# WOOD STRUCTURAL DESIGN DATA

## 1986 Edition with 1992 Revisions




American Wood Council

American Forest & Paper Association

# WOOD STRUCTURAL DESIGN DATA

## 1986 Edition with 1992 Revisions

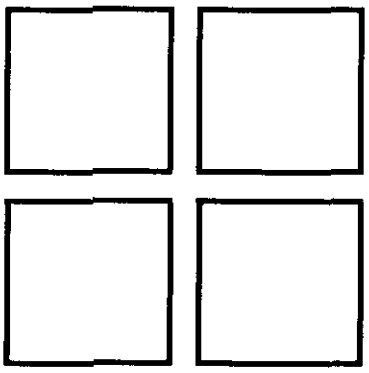
***The American Wood Council*** *(AWC) is the wood products division of the American Forest & Paper Association (AF&PA). AF&PA is the national trade association of the forest, paper, and wood products industry, representing member companies engaged in growing, harvesting, and processing wood and wood fiber, manufacturing pulp, paper, and paperboard products from both virgin and recycled fiber, and producing engineered and traditional wood products. For more information see www.afandpa.org.*





American Wood Council
1111 19th St., NW, Suite 800
Washington, DC 20036
202-463-4713
awcinfo@afandpa.org
www.awc.org

# WOOD STRUCTURAL DESIGN DATA



**1986 Edition**
**with 1992 Revisions**

**Recommended by**
**AMERICAN FOREST & PAPER ASSOCIATION**
**(formerly National Forest Products Association)**

## FOREWORD

Wood in the form of lumber and timbers has been used as a major structural material for centuries. Originally the material of craftsmen, wood is now the material of the engineer who uses technical data to design todays' sophisticated structures.

Wood Structural Design Data, 1986 Edition, provides information relating to design of typical wood structural members. These data are augmented by reference to the National Design Specification for Wood Construction, particularly on the subject of design stresses. Wood Structural Design Data was first published in 1934, with revised editions issued periodically to take into account new data and developments in wood design.

Tabular data in this volume are presented primarily as a convenient aid in design of the most frequently encountered elements of wood structural framing. Hence, certain subjects are only summarized in the text to indicate their relationships to the tabular data. More detailed information is available in other publications, many of which are listed as References.

In preparation of this and previous editions, information from the regional lumber manufacturers associations provided valuable data. Reports and other publications from the Forest Products Laboratory, U. S. Department of Agriculture, were important sources of fundamental information.

Tabular data relate to dressed sizes conforming to the American Softwood Lumber Standard, Voluntary Product Standard 20-70, U.S. Department of Commerce, National Bureau of Standards.

# TABLE OF CONTENTS

# PROPERTIES OF STRUCTURAL LUMBER

## Physical Properties

### Wood Structure

Wood is an aggregate of cells, essentially cellulose in composition, which are cemented together by a substance called lignin. Although wood cells vary in shape and size according to their function, the greater number are elongated and are positioned vertically in the standing tree. Known as fibers in hardwoods and tracheids in softwoods, wood cells vary from about 1/25 to 1/3-inch in length and 1/100 of these dimensions in width.

Hardwoods and softwoods have some horizontally positioned bands of cells called rays. These are usually evident on quarter-sawed surfaces and are more conspicuous in some species than others. They provide a pleasing pattern where visible.

### Hardwoods and Softwoods

Native trees are divided into two classes–hardwoods which have broad leaves and softwoods or conifers, which have needlelike or scalelike leaves. Most hardwoods shed their leaves at the end of each growing season. Softwoods, except cypress, larch, and some exotic species are evergreen.

The terms "hardwood" and "softwood" do not apply to the hardness or softness of the wood. In fact, some species of hardwoods have softer wood than some of the species of softwoods while certain softwoods are as hard as the medium density hardwoods.

### Heartwood and Sapwood

The end of a log shows three distinct zones, the bark, a light-colored zone just beneath it called the sapwood, and an inner zone, often darker in color, called heartwood. At the structural center of the heartwood is the pith or "heart center" as it is called in the lumber trade.

A tree increases in diameter by forming new layers of cells at the outer surface of the sapwood. Here a thin band of tissue called the cambium lays down new bark cells toward the outside and new wood cells toward the inner or sapwood side.

The young tree is composed primarily of sapwood which functions in sap conduction and food storage. As the tree increases in diameter, inner sapwood cells cease their conductive function and form the inactive heartwood. Deposits in these inactive cells give the heartwood of many species a darker color than the sapwood.

As all heartwood was once sapwood, there is no consistent difference between heartwood and sapwood in weight when dry or in strength. Deposits in the cells, however, make heartwood more durable when in contact with soil and under other conditions conducive to decay. Where wood is to be treated with perservative, however, deeper and more effective penetration can be attained in sapwood.

## PROPERTIES OF STRUCTURAL LUMBER

### Annular Growth Rings

The activity of the cambium tissue in forming new wood is influenced in temperate zones by the growing season. Through winter months the tree is dormant. In the spring the cambium begins to form thin walled cells with large cavities. Through the summer, cell walls increase in thickness and cell cavities decrease in size until growth virtually ceases in the fall. Differences in cell wall thickness between those last formed in the fall and the thin walled new cells formed the following spring results in rings of annual growth which are apparent on cross sections of all native woods.

Annual rings vary in width according to growth conditions. Narrow rings are formed during short dry seasons and wider rings occur when growing conditions are more favorable. Annual growth rings appear on the ends of timbers as concentric circles around the pith or heart center.

### Springwood and Summerwood

In many woods two distinct areas are visible in each ring of annual growth: (a) an inner light colored portion, known as springwood; and (b) an outer darker portion, known as summerwood.

The springwood is composed of the large cavitied thin walled cells formed during the early part of each growing season. The thicker walled cells formed later in the year make up the summerwood portion. As the summerwood contains more solid wood substance than springwood, it usually appears darker in color. Springwood and summerwood bands are usually most noticeable in the dense softwood species. In these species the proportion of springwood and summerwood present has an important effect upon strength properties.

### Density and Rate of Growth

In the softwoods commonly used for structural purposes, the rate at which trees grow has an important effect on their strength properties. An accurate measure of this is provided by the relative width and character of wood in each annual growth ring.

In such woods, pieces having medium to narrow growth rings generally have higher strength properties than those having wide rings. In addition, pieces in which a considerable portion of each annual ring is made up of dense darker summerwood are recognized as having higher strength properties than pieces with a lower percentage of summerwood. Therefore, in grading structural material of some species the rate of growth (number of rings per inch) and the density (proportion of summerwood) are considered and made a part of the specification.

## PROPERTIES OF STRUCTURAL LUMBER

### Grain and Texture

The terms "grain" and "texture" are used in various ways to describe the characteristics of wood. Wood from slow growing trees in which annual growth rings are narrow is sometimes described as "close-grained"; that from rapidly growing trees with wide rings as "coarse-grained." This is another way of describing the number of rings per inch in strength grading.

Straight grained and cross grained describe wood in which the direction of the fibers (not annual rings) are parallel to, or at an angle with the sides of the piece. Cross grain includes spiral grain where fibers wind around the trunk of the tree. The expression "slope of grain" is employed in the grading of structural lumber to describe the extent of cross grain permitted, as slope of grain has an important influence on strength.

Lumber sawed in such a manner that the annual rings when viewed from the end of the piece form an angle of 45° or more with the wide faces is described as edge-grain, vertical grain or rift-sawn in softwoods, and as quarter-sawn or comb-grained in hardwoods. The term "flat grain" or "plain-sawed" describes lumber in which the annual rings are at an angle of 45° or less with the wide faces of the piece.

### Specific Gravity

Solid wood substance is heavier than water, its specific gravity being about 1.5 regardless of the species of wood. Despite this fact, dry wood of most species floats in water because a portion of its volume is occupied by air filled cell cavities. Variation among species in the size of cells and in the thickness of cell walls affects the amount of solid wood substance present and hence, the specific gravity. Thus, specific gravity of wood is a measure of its solid wood substance and an index of its strength properties. Specific gravity values, however, may be somewhat affected by gums, resins, and extractives which contribute little to strength. The relationship of specific gravity to wood strength is evident in the practice of assigning higher basic stress values to lumber designated as "dense."

### Weights of Wood

Weights of sawed or round timbers are approximate because of moisture content, density and sapwood thickness variations within the piece. Average weights per cubic foot of various commerical wood, at 15 percent moisture content, are given in the following table. Weights of individual pieces will vary from these averages and are also different at other moisture contents.

## PROPERTIES OF STRUCTURAL LUMBER

Average specific gravity and average weight in pounds per cubic foot for commercially important species or species combinations.

| SPECIES | SPECIFIC[1] GRAVITY | WEIGHT PER CUBIC FOOT[2] |
|---|---|---|
| *Aspen* | 0.39 | 26.6 |
| Balsam Fir | 0.36 | 24.6 |
| Beech-Birch-Hickory | 0.71 | 46.5 |
| Coast Sitka Spruce | 0.39 | 26.6 |
| Cottonwood | 0.41 | 27.9 |
| Douglas Fir-Larch | 0.50 | 33.6 |
| Douglas Fir-Larch (North) | 0.49 | 33.0 |
| Douglas Fir-South | 0.46 | 31.1 |
| Eastern Hemlock | 0.41 | 27.9 |
| Eastern Hemlock-Tamarack | 0.41 | 27.9 |
| Eastern Hemlock-Tamarack (North) | 0.47 | 31.7 |
| Eastern Softwoods | 0.36 | 24.6 |
| Eastern Spruce | 0.41 | 27.9 |
| Eastern White Pine | 0.36 | 24.6 |
| Engelmann Spruce-Lodgepole Pine[3] (MSR 1650f and higher grades) | 0.46 | 31.1 |
| Engelmann Spruce-Lodgepole Pine[3] (MSR 1500f and lower grades) | 0.38 | 25.9 |
| Hem-Fir | 0.43 | 29.2 |
| Hem-Fir (North) | 0.46 | 31.1 |
| Mixed Maple | 0.55 | 36.7 |
| Mixed Oak | 0.68 | 44.7 |
| Mixed Southern Pine | 0.51 | 34.2 |
| Mountain Hemlock | 0.47 | 31.7 |
| Northern Pine | 0.42 | 28.5 |
| Northern Red Oak | 0.68 | 44.7 |
| Northern Species | 0.35 | 24.0 |
| Northern White Cedar | 0.31 | 21.4 |
| Ponderosa Pine | 0.43 | 29.2 |
| Red Maple | 0.58 | 38.6 |
| Red Oak | 0.67 | 44.1 |
| Red Pine | 0.44 | 29.8 |
| Redwood, close grain | 0.44 | 29.8 |
| Redwood, open grain | 0.37 | 25.3 |
| Sitka Spruce | 0.43 | 29.2 |
| Southern Pine | 0.55 | 36.7 |
| Spruce-Pine-Fir | 0.42 | 28.5 |
| Spruce-Pine-Fir (South) | 0.36 | 24.6 |
| Western Cedars | 0.36 | 24.6 |
| Western Cedars (North) | 0.35 | 24.0 |
| Western Hemlock | 0.47 | 31.7 |
| Western Hemlock (North) | 0.46 | 31.1 |
| Western White Pine | 0.40 | 27.2 |
| Western Woods | 0.36 | 24.6 |
| White Oak | 0.73 | 47.7 |
| Yellow Poplar | 0.43 | 29.2 |

1. Specific gravity based on weight and volume when oven dry.
2. Weight per cubic foot is based on weight and volume at a moisture content of 15 percent.
3. Applies only to Engelmann Spruce-Lodgepole Pine machine stress rated (MSR) structural lumber.

## PROPERTIES OF STRUCTURAL LUMBER

### Moisture Content of Wood

Wood may contain moisture in two forms: As "free water" in the cell cavities and as "absorbed water" in the capillaries of the cell walls.

When green wood begins to lose moisture in the seasoning process, the cell walls remain saturated until the free water has been evaporated. The point at which evaporation of free water is complete and cell walls begin to lose their moisture is called the fiber saturation point (fsp). This point occurs between 25 and 30 percent moisture for most species.

Moisture in wood is expressed as a percentage of the oven dry weight and is determined most accurately by weighing a representative sample, drying it at slightly over 212°F. until no further loss of weight takes place, reweighing, and then dividing the difference between the original and final weights by the final (oven dry) weight. Electric moisture meters offer a simpler though less exact method of determining moisture content.

With slight seasonal variations, wood in use over a period of time attains an equilibrium moisture content (emc) corresponding to the humidity and temperature of the surrounding atmosphere. When exposed to similar atmospheric conditions, different woods will have the same moisture content regardless of their density.

Moisture content has an important effect upon susceptibility to decay. Most decay fungi require a moisture content above fiber saturation point to develop. In addition, a favorable temperature, an adequate supply of air, and a source of food are essential. Wood that is continuously water-soaked (as when submerged) or continuously dry (with a moisture content of 20 per cent or less) will not decay.

Moisture content variations above the fiber saturation point have no effect upon the volume or strength of wood. As wood dries below the fiber saturation point and begins to lose moisture from the cell walls, shrinkage begins and strength increases.

### Shrinkage Due to Drying

Shrinkage of wood takes place between fiber saturation point and the oven dry condition. It is stated as a percentage of the original or green dimension. Where wood is installed at approximately the moisture content it will attain in service, only minor dimensional changes occur. These are caused by absorption or release of moisture due to atmospheric changes.

Wood shrinkage is greatest in the direction of the annual growth rings (tangentially), somewhat less across the rings (radially), and very little along the grain (longitudinally). Longitudinal shrinkage is usually too small to be of practical significance.

Shrinkage of commercial softwood boards across the grain averages about 1 per cent for each 4 per cent change in moisture content. Shrinkage of hardwoods is slightly greater.

## PROPERTIES OF STRUCTURAL LUMBER

Large structural members shrink proportionately less than smaller lumber because drying does not take place simultaneously in the inner and outer portions of such pieces. In softwood structural lumber, 6" x 6" or larger in cross section, a shrinkage of approximately 1/64" per inch width of face may be expected in drying from green to average equilibrium moisture content in service.

Effect of Drying on Strength

Increase in strength begins when the cell walls begin to lose moisture; that is, as the wood is dried below the fiber saturation point. From this point most strength properties increase rapidly as drying progresses.

Drying wood from green to 5 per cent moisture content often doubles and in some cases triples end crushing strength and bending strength. However, increases in strength with seasoning may be greater in small clear specimens of wood than in larger timbers. In the latter, increase in strength may be offset to some extent if checking develops in seasoning.

Other strength properties are not equally affected by changes in moisture content. Although some properties, such as crushing strength and bending strength, increase greatly with seasoning, other, such as stiffness, change moderately. Shock resistance, an exception, shows only slight change as wood dries.

The following table presents the average variation in strength properties of small wood samples for each 1 percent change in moisture content. These changes in strength properties may not be directly applicable to structural sizes of lumber and timber. Appropriate moisture content adjustment factors for structural members are given in the National Design Specification for Wood Construction, available from the National Forest Products Association.

Average Increase (or Decrease) in Clear Wood Strength Properties for a 1-percent Decrease (or Increase) in Moisture Content Below Fiber Saturation Point.

| Property | Change per 1-percent change in moisture content (percent) |
|---|---|
| Static bending | |
| Fiber stress at proportional limit | 5 |
| Modulus of rupture | 4 |
| Modulus of elasticity | 2 |
| Work to proportional limit | 8 |
| Work to maximum load | 0.5 |
| Impact bending, height of drop causing complete failure | 0.5 |
| Compression parallel to grain | |
| Fiber stress at proportional limit | 5 |
| Maximum crushing strength | 6 |
| Compression perpendicular to grain, fiber stress at proportional limit | 5.5 |
| Hardness, end grain | 4 |
| Hardness, side grain | 2.5 |
| Shear parallel to grain | 3 |
| Tension perpendicular to grain | 1.5 |

## PROPERTIES OF STRUCTURAL LUMBER

### Effect of Temperature on Strength

The usual design values for wood products are applicable to members used under ordinary ranges of temperature and occasionally heated in use to temperatures up to 150°F. Wood increases in strength when cooled below normal temperatures and decreases in strength when heated. Members heated in use to temperatures up to 150°F will return essentially to original strength when cooled. Prolonged temperatures above 150°F may result in permanent loss of strength. Some reduction in design values may be necessary in specific applications to account for the temporary decrease in strength occurring when members are heated to elevated temperatures up to 150°F for extended periods of time. Information on the approximate effect of temperature on mechanical properties is given in the National Design Specification for Wood Construction, available from the National Forest Products Association.

# PROPERTIES OF STRUCTURAL LUMBER

## Mechanical Properties

### Wood as Structural Material

Wood is not an isotropic material in that its strength properties differ along its different axes. It is strongest when loaded to induce stress parallel to grain, either in tension or compression. However, this condition is not always possible and loading perpendicular to grain may be accomplished in a satisfactory manner.

The anisotropic nature of wood may be confusing to the designer during his first experience with its use, but as he gets to know the material he finds that engineering design with wood can be interesting as well as productive in the way of lower construction costs. The discussion which follows provides a brief description of the various mechanical properties of structural wood as they affect engineering design.

### Tension Parallel to Grain

A force generating tension parallel to grain, as shown in Figure 1, creates a tendency to elongate the wood fibers and to cause them to slip by each other. Resistance to tension applied strictly parallel to grain is the highest strength property of wood. This resistance, however, is substantially reduced when the force is applied at an angle to the grain or when the cross-section of the piece is reduced by knots or holes.

**Figure 1. Tension Parallel to Grain**

### Compression Parallel to Grain

A force generating compression parallel to grain, as shown in Figure 2, creates a tendency to compress the wood fibers in the lengthwise position. As with tension, resistance to compression parallel to grain is affected by the angle of load to grain and by the presence of knots or holes.

**Figure 2. Compression Parallel to Grain**

Fiber Stress in Bending

A force applied perpendicular to a beam, as shown in Figure 3, creates compression in the extreme fibers on the side to which the force is applied and it also creates tension in the extreme fibers on the opposite side. Thus, there is a tendency to compress the fibers on the compression side and to elongate the fibers on the tension side. As the stress is distributed from the extreme fibers or outside faces towards the center of neutral axis of the piece it is reduced in intensity. Thus, deviations in slope of grain and the presence of knots or holes in these outside faces tend to reduce the resistance in the extreme fibers and the bending strength of the beam.

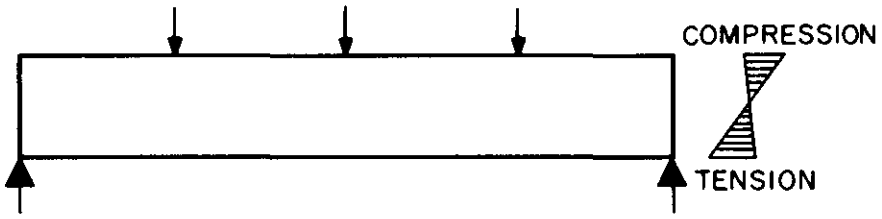



**Figure 3. Fiber Stress in Bending**

Shear Parallel to Grain

A force applied in the manner illustrated in Figure 4 causes one section of the piece to shear or slide along the other section in a direction parallel to grain. In a loaded beam where the induced stress on the one side is compression and on the other side is tension, as illustrated in Figure 3, there is a tendency to create shearing stress parallel to grain. The largest shear parallel to grain stress usually occurs along the neutral axis on the plane at which the induced stress changes from compression to tension. Checks and splits which may occur during the drying of lumber have the effect of reducing the area in the plane of shear resistance. Consequently, laboratory test values for shear strength parallel to grain are substantially reduced for design purposes in order to accommodate the probability of the occurrence of checks and splits after drying.

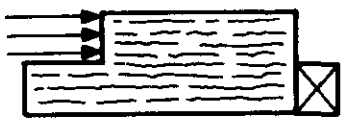


**Figure 4. Shear Parallel to Grain**

Compression Perpendicular to Grain

A force applied perpendicular to grain, such as the bearing under the ends of a beam as shown in Figure 5, tends to compress the wood at its surface. While the wood becomes more dense as it is compressed, this action causes slight displacement of the supported member. Thus, limits are placed on loading in bearing perpendicular to grain.

For sawn lumber, the compression perpendicular to grain values are based on a deformation limit that has been shown by experience to provide for adequate service in typical wood frame construction. Therefore, stress modifications for duration of load (see pg. 13) are not applicable to compression perpendicular to grain allowable stresses for sawn lumber.

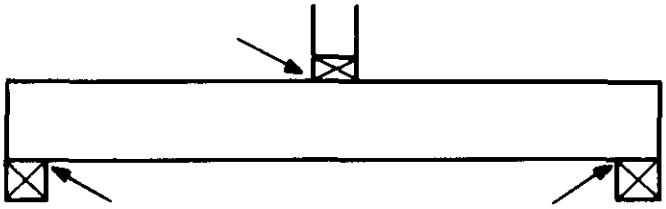


**Figure 5. Compression Perpendicular to Grain**

Shear Perpendicular Grain

Shear perpendicular to grain is not a design factor in solid wood because effective control is applied through limits on design stresses in shear parallel to grain and compression or bearing perpendicular to grain.

Tension Perpendicular to Grain

A force generating tension perpendicular to grain tends to separate the wood fibers along the grain. This is the direction in which wood has the least strength, and because it is not good practice to apply loading to induce tension across grain, design values are not provided for this strength property, except for special applications.

Proportional Limit, Static Bending

The proportional limit occurs at the point where the induced strain or deformation ceases to be proportional to the stress or applied load, as determined by the standard test method. Stress at proportional limit is computed by the standard method. All conventional methods of structural design for wood are within the proportional or elastic limit.

Modulus of Rupture, Static Bending

The modulus of rupture is computed from the ultimate load or the point at which the piece breaks under the standard bending test method. Loading by test beyond the proportional limit shows an increasing rate of deformation, without a specific yield point, until ultimate load is reached.

Modulus of Elasticity, Static Bending

The modulus of elasticity is a measure of stiffness and is computed on the basis of the load and deformation within the proportional limit.

# PROPERTIES OF STRUCTURAL LUMBER

## Design Values for Structural Lumber

### General

Design values are assigned to lumber in a scientific manner to provide material of predictable strength properties to meet the requirements of engineering design. Because of the varying nature of the different species of trees there is a wide range of stress values from which the designer can make his selection. However, to avoid delay during construction, it is advisable to determine which species and grades are available locally before design values are selected.

### Classification of Structural Lumber

Since the effects of knots, slope of grain, checks and shakes on the strength of lumber vary with the loading to which the piece is subjected, structural lumber is often classified according to its size and use. The three major classifications are as follows:

Dimension – Pieces of rectangular or square cross section, 2 to 4 inches thick and 2 or more inches wide (nominal dimensions) graded primarily for strength in bending edgewise or flatwise but also used where tensile or compressive strength is important. Dimension lumber may be further classified as Joists and Planks, for material 5 or more inches in nominal width, and as Light Framing or Structural Light Framing for material 2 inches to 4 inches wide.

Beams and Stringers – Pieces of rectangular cross section, 5 by 8 inches (nominal dimensions) and larger, graded for strength in bending when loaded on the narrow face.

Posts and Timbers – Pieces of square or nearly square cross section, 5 by 5 inches (nominal dimensions) and larger, graded primarily for use as posts or columns but adapted to miscellaneous uses in which bending strength is not especially important.

### Characteristics Affecting Strength

Aside from the natural properties of the species, the major characteristics affecting the strength of a piece of lumber are the sizes of knots or holes and their locations, the sizes of checks or shakes and splits and their locations, the amount of wane or absence of wood, slope of grain, degree of density or rings per inch and the condition of seasoning. All of these characteristics are taken into consideration in the stress grading of a piece of lumber.

### American Society for Testing and Materials

There are two ASTM standards which serve as principal references in the assignment of working stresses of lumber. One standard is ASTM Designation D-2555, "Methods for Establishing Clear Wood Strength Values" which sets forth procedures for establishing strength values for clear wood of different species in the unseasoned condition and unadjusted for end use. Such procedures may be applied to a single species or to a group of species where growth and marketing conditions justify such

grouping. The other standard is ASTM Designation D-245, "Methods for Establishing Structural Grades for Visually Graded Lumber" which sets forth reduction factors to be applied to the clear wood values and provides procedures for determining strength ratios, based on knots and other characteristics, which, when applied to the adjusted clear wood values, results in working stresses for the various commercial grades of any species. This standard also provides adjustments for degree of density and for condition of seasoning.

A third standard is ASTM D-1990, "Standard Practice for Establishing Allowable Properties for Visually Graded Dimension Lumber from In-Grade Tests of Full-Size Specimens," which outlines criteria to properly analyze data from In-Grade tests. ASTM D-1990 applies directly to dimension lumber in sizes from 2x2 to 4x16.

### Lumber Grading Rules

Lumber grading rules are, in effect, specifications of quality in that the maximum knots, slope of grain and other strength reducing characteristics are described in sufficient detail so that the procedures of ASTM Designation D-245 can be applied and working stresses assigned to the specified quality. It is common practice to give each grade a commercial designation such as No. 1, etc. This means that the purchaser orders the commercial grade which qualifies for the design values used in design.

### Machine Graded Lumber

While most structural lumber has design values assigned on the basis of visual grading to meet a minimum quality specification, there is a growing trend toward the non-destructive testing of lumber by machine. In this method a piece of lumber is passed flat-wise through a series of loading rollers and the stiffness, or modulus of elasticity, is automatically recorded. Through correlation with previously established test data, bending strength and other strength properties are assigned to each piece tested. At present, machine grading is supplemented by visual grading particularly in the assignment of horizontal or longitudinal shear values.

### National Design Specification

The principal reference for the working stresses for commercial grades of structural lumber is the National Design Specification® for Wood Construction (NDS®) available from the National Forest Products Association, Washington, D.C. The design value information in this specification is taken from the published rules written by the various grading rules writing agencies. When these values are used, each piece of lumber is required to be identified by the grade mark of a lumber grading or inspection agency recognized as being competent.

The NDS provides for design of single member uses of lumber and other structural timbers, and also for repetitive member uses of lumber where load sharing is known to exist between repetitive framing members, which are spaced not more than 24 inches, are not less than 3 in number and are jointed by floor, roof or other load-distributing elements adequate to support the design load. For repetitive member uses, the design values in bending are higher than those for single member uses, as provided in the NDS.

### Adjustments of Design Values for Duration of Loading

Normal Duration of Loading:

The design values listed in the National Design Specification and most other wood engineering references are for normal duration of loading. Normal load duration contemplates fully stressing a member to the tabulated normal duration design value by the application of the full maximum normal design load for a duration of approximately ten years (either continuously or cumulatively) and/or the application of 90 percent of this full maximum normal load continuously throughout the remainder of the life of the structure, without encroaching on the factor of safety. See Figure 6.

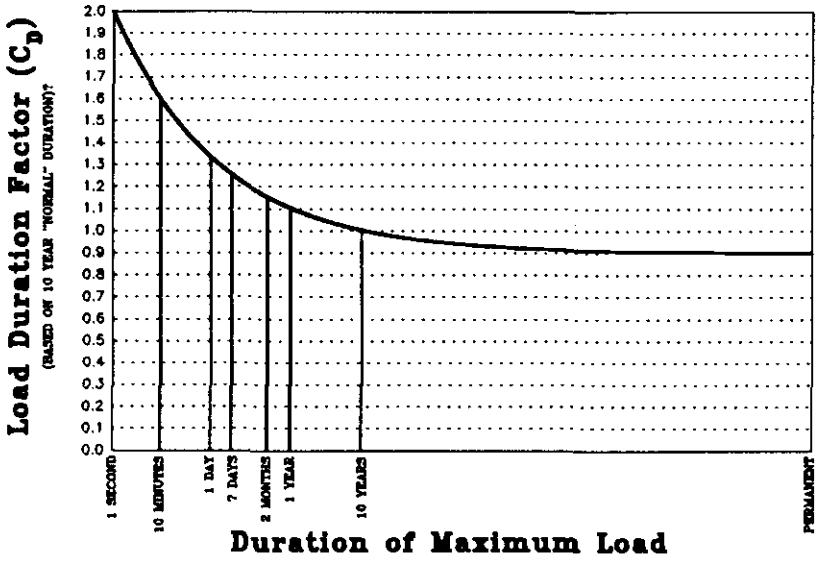



**Figure 6. Adjustment of Working Stresses For Various Durations of Load.***

*Derived from the Forest Products Laboratory Report No. R1916

Adjustments for Other Durations of Loading:

Since tests have shown that wood has the property of carrying substantially greater maximum loads for short durations than for long durations of loading, the design values for normal loading, except modulus of elasticity and compression perpendicular-to-grain, are adjusted as follows for other durations of loads:

When a member is fully stressed to the design value by application of the full maximum load permanently, or for a total of more than 10 hears either continuously or for cumulative periods of full maximum load, use 90 percent of the design value given for normal loading conditions.

Likewise, when the duration of the full maximum load does not exceed the following durations, adjust the design values for normal loading durations, except modulus of elasticity and compression perpendicular-to-grain, to a new stress level by increasing them:

15 percent for two months duration, as for snow,

25 percent for seven days duration,

60 percent for 10 minutes duration, as for wind or earthquake,

100 percent for impact.

Design values for normal loading conditions may thus be used without regard for impact if the stress induced by impact does not exceed the design value for normal loading.

The impact load duration increase factor does not apply when the member has been pressure-treated with water-borne preservatives to the heavy retentions required for "marine" exposure, nor when the member has been pressure-treated with fire retardant chemicals.

*Combinations of Loads of Different Durations*

The preceding adjustments are not cumulative in the sense that the required size of a member cannot be determined for a load of particular duration without consideration of the total load resulting from that load together with the other loads of longer durations when applied simultaneously. In cases where combinations of loads of different durations are applied simultaneously, the size of member is usually determined for the total of all loads applied simultaneously and the adjusted design values for that load which has the shortest duration in the combination of loads. However, in some instances, this procedure may cause the member to be overstressed by loads of longer duration. To insure that the overstress will not occur the following procedure may be used:

1. Determine the magnitude of each load that will occur on a structural member and accumulate subtotals of combinations of these loads of progressively shorter durations.

2. Divide each of these subtotals by the load duration factor of the load having the shortest duration in the combination of loads under consideration.

| Shortest Duration in the Combination of Loads Being Considered | Load Duration Factor |
|---|---|
| Permanent | 0.90 |
| Ten Years | 1.00 |
| Two Months | 1.15 |
| Seven Days | 1.25 |
| Ten Minutes | 1.60 |
| Impact | 2.00 |

3. The largest value thus obtained indicates which is the critical combination and the loading to be used in determining the structural element.

Connections

The impact load duration factor shall not apply to connections. Connection design values shall be adjusted by applicable load duration factors which are less than or equal to 1.6, except when the load capacity of the connection is controlled by strength of the metal fastener.

## PROPERTIES OF STRUCTURAL LUMBER

### Glossary of Lumber Terms

The following list represents a limited selection of industry terms used in purchasing and describing standard grades and patterns of lumber and timber. For specific definitions and abbreviations applicable to particular wood products or species, the appropriate lumber grading rule or product standard should be consulted.

*Air Dried* – Seasoned by exposure to the atmosphere, in the open or under cover, without artificial heat.

*All Heart* – Of heartwood throughout, i.e., free of sapwood.

*American Lumber Standards for Softwood Lumber (ALS)* – The American Softwood Lumber Standard, Voluntary Product Standard 20-70 is developed by the American Lumber Standards Committee appointed by the Department of Commerce. It provides a basis for coordination of the grades of various species in the preparation of grading rules applicable to each species by the agencies which formulate, publish and maintain grading rules and inspection facilities.

*Annual Ring* – Growth put on in a single year.

*Boxed Heart* – The pith or soft center core of the log enclosed within the piece.

*Board Feet* – The number of board feet in a piece is obtained by multiplying the nominal thickness in inches by the nominal width in feet by the length in feet.

*Boxed Pith* – Where the pith is enclosed within the four sides of the piece.

*Check* – A lengthwise separation of the wood, which usually occurs through the rings of annual growth.

*Compression Wood* – Abnormal wood that forms on the underside of leaning and crooked trees, characterized by being hard and brittle.

*Decay* – Disintegration of wood substance due to action of wood-destroying fungi. Also known as dote and rot.

*Density Rule* – Rules for estimating the density of wood based upon the percentage of summerwood and the number of annual rings of growth.

*Dry* – Seasoned; not green.

*Durability* – A general term used to describe the resistance of a species to attack by decay when conditions for decay development are favorable. In this connection "resistance to decay" is a more specific term.

*Edge* – The narrow faces of rectangular-shaped lumber.

*Equilibrium Moisture Content* – The moisture content at which wood neither gains nor loses moisture when surrounded by air at a constant relative humidity and temperature.

*Face Width* – The width of the face of a piece of dressed and matched or shiplapped lumber, not including the width of the tongue or lap.

*Fiber-Saturation Point* – The stage in the drying or in the wetting of wood at which the cell walls are saturated and the cell cavities are free of water.

*Grade* – The designation of the quality of a manufactured piece of wood.

## PROPERTIES OF STRUCTURAL LUMBER

*Grain* –

*Edge Grain (vertical grain)* – Annual rings which form an angle of 45 degrees or more with the surface of the piece.

*Flat Grain (slash grain)* – Annual rings which form an angle of less than 45 degrees with the surface of the piece.

*Mixed Grain* – Any combination of edge grain and flat grain.

*Slope of Grain* – Cross grain or deviation of the fiber from a line parallel to the sides of the piece and may consist of diagnonal grain, spiral grain or both.

*Quarter Sawed* – Another term for edge or vertical grain used generally in hardwoods.

*Heart Face* – Face side free of sapwood.

*Heartwood* – Inner core of the tree trunk comprising the annual rings containing nonliving elements: often darker in color than sapwood.

*Kiln Dried* – Seasoned in a chamber by means of artificial heat.

*Knot* – Branch or limb, embedded in the tree and cut through in the process of lumber manufacture; classified according to size, quality and occurrence.

*Laminated Wood* – A wood assembly consisting of plies or laminations joined together with an adhesive and/or mechanical fastenings.

*Structural Glued Laminated Timber* – Any member comprising an assembly of laminations of lumber in which the grain of all laminations is approximately parallel longitudinally; in which the laminations are bonded with adhesives; and which is designed in accordance with accepted engineering practice.

*Lumber* –

*Yard Lumber* – Lumber of those grades, sizes and patterns which is generally intended for ordinary construction and general building purposes.

*Structural Lumber* – Lumber that is two or more inches in thickness and width for use where working stresses are required.

*Factory and Shop Lumber* – Lumber that is produced or selected primarily for remanufacturing purposes.

*Boards* – Lumber less than two inches thick and two or more inches wide. Boards less than six inches wide may be classified as strips.

*Dimension* – Lumber from two inches to, but not including five inches thick, and two or more inches wide. Dimension may be classified as framing, joists, planks, rafters, studs, small timbers, etc.

*Timbers* – Lumber 5 or more inches in least dimension. Timber may be classified as beams, stringers, posts, caps, sills, girders, purlins, etc.

*Rough Lumber* – Lumber that has not been dressed (surfaced) but which has been sawed, edged, and trimmed at least to the extent of showing saw marks in the wood on the four longitudinal surfaces of each piece for its overall length.

## PROPERTIES OF STRUCTURAL LUMBER

*Dressed (Surfaced) Lumber* – Lumber that has been surfaced by a planing machine (for purposes of attaining smoothness of surface and uniformity of size) on the one side (S1S), two sides (S2S), or a combination of sides and edges (S1S1E, S1S2E, S2S1E, or S4S).

*Worked Lumber* – Lumber which in addition to being dressed has been matched, shiplapped, or patterned.

*Matched Lumber* – Lumber that has been worked with a tongue on one edge of each piece and a groove on the opposite edge, to provide a close tongue-and-groove joint by fitting two pieces together; when end-matched the tongue and groove are worked in the ends also.

*Shiplapped Lumber* – Lumber that has been worked or rabbeted on both edges of each piece to provide a close lapped joint by fitting two pieces together.

*Patterned Lumber* – Lumber that is shaped to a pattern or to a molded form, in addition to being dressed, matched, or shiplapped, or any combination of these workings.

*Moisture Content* – Weight of the water in wood expressed in percentage of the weight of oven-dry wood.

*Pith* – Small soft core in the structural center of a log.

*Rate of Growth* – The rate at which a tree has increased its radius. The unit of measure in use is the number of annual growth rings per inch.

*Sapwood* – Outer layers of growth in a tree, exclusive of bark, which contains living elements; usually lighter in color than heartwood.

*Shake* – A lengthwise grain separation between or through the growth rings. Shake may be further classified as ring shake or pith shake.

*Stress-Grade Lumber* – Lumber to each grade of which is assigned proper design values (unit stresses).

*Split* – Lengthwise separation of the wood extending from one surface through the piece to the opposite surface or to an adjoining surface.

*Springwood* – More or less open and porous tissue marking the inner part of each annual ring formed early in the period of growth.

*Summerwood* – Denser, fibrous outer portion of each annual ring, usually without conspicuous pores, formed late in the growing period.

*Wane* – Bark, or lack of wood or bark, from any cause, on the edge or corner or a wood member.

*Warp* – Any variation from a true or plane surface; includes bow, crook, cup or any combination thereof.

### Abbreviations of Lumber Terms

Abbreviations of lumber terms are frequently used in designing, on plans, and in specifications. The following have been selected as those most likely to be encountered in connection with structural lumber.

The form indicated is the abbreviation in common use, but variations such as the use or omission of periods, punctuation and capital letters are optional. The appropriate grading rule should be consulted for abbreviations applicable to a particular species of lumber.

| | |
|---|---|
| AD | air dried. |
| ALS | American Lumber Standards. |
| AV. or avg. | Average. |
| B&B or B&Btr | B and Better. |
| Btr. or BTR | Better. |
| BD. or bd. | Board. |
| BD. FT. or bd. ft | Board foot. |
| BH | Boxed Heart. |
| BP | Boxed Pith. |
| B&S | Beams and Stringers. |
| BEV. or Bev. | Bevel or Beveled. |
| BM. or bm. | Board measure. |
| CLR. or clr. | clear. |
| CM | center matched; that is, the tongue and grooved joints are worked along the center of the edges of the piece. |
| com. | common. |
| cu. ft. | cubic foot. |
| DET | Double end trimmed. |
| D&SM | Dressed and standard matched. |
| DIM. or Dim. | Dimension. |
| DKG. or Dkg. | Decking. |
| D/S or D/Sdg. | Drop siding. |
| D2S & CM | Dressed 2 sides and center matched. |
| D2S&SM | Dressed 2 sides and standard matched. |
| EG | Edge (vertical) grain. |
| EM | End matched. |
| EV1S | Edge V one side. |
| EV2S | Edge V two sides. |
| Fac. | Factory (lumber). |
| FG | Flat or slash grain. |
| FLG or Flg | Flooring. |
| FOB | Free on board (named point). |
| FOHC | Free of heart center. |
| FOK | Free of knots. |
| FRT or Frt. | Freight. |
| FRM | Framing. |
| FT. or ft | Foot or feet (' ). |
| FT. BM or FBM | Feet board measure. |
| FT. SM. | Feet surface measure. |
| GM | Grade-marked. |
| G/R or G/Rfg | Grooved roofing. |
| HB | Hollow back. |
| H&M | Hit and miss. |
| H or M | Hit or miss. |
| HRT. or Hrt. | Heart. |
| IN. or in. | Inch or inches (" ). |
| J&P | Joists and Planks. |
| KD | Kiln-dried. |

**Abbreviations of Lumber Terms**

| | |
|---|---|
| LBR. or lbr. | Lumber. |
| LGTH. or Lgth. | Length. |
| LGR. or Lgr. | Longer. |
| LFT or Lin. Ft. | Linear foot. |
| LIN. | Linear. |
| LNG. or Lng. | Lining. |
| M | thousand. |
| MBM | thousand (feet) board measure. |
| MC or m.c. | Moisture content. |
| MERCH. or Merch. | Merchantable. |
| ML | Mixed lengths. |
| MLDG. or Mldg. | moulding. |
| Mft. | thousand feet. |
| NO. or No. | Number. |
| N1E | Nosed one edge. |
| N2E | Nosed two edges. |
| PAR. or Par. | Paragraph. |
| PART. or Part. | Partition. |
| PAT. or Pat. | Pattern. |
| Pc. | Piece. |
| Pcs. | Pieces. |
| PE | Plain end. |
| P&T | Post and Timbers. |
| RDM. or Rdm. | Random. |
| REG. or Reg. | Regular. |
| RFG. or Rfg. | Roofing. |
| RGH. or Rgh. | Rough. |
| R/L or RL. | Random lengths. |
| RND. | Round. |
| R/W | Random widths. |
| R/W&L | Random widths and lengths. |
| S1E | Surfaced one edge. |
| S2E | Surfaced two edges. |
| S1S | Surfaced one side. |
| S2S | Surfaced two sides. |
| S1S1E | Surfaced 1 side and 1 edge. |
| S2S1E | Surfaced 2 sides and 1 edge. |
| S1S2E | Surfaced 1 side and 2 edges. |
| S4S | Surfaced four sides. |
| S2S&CM | Surfaced two sides and center matched. |
| S2S&SM | Surfaced two sides and standard matched. |
| S2S&SL | Surfaced two sides and shiplapped. |
| SAP. | Sapwood. |
| SDG. or Sdg. | Siding. |
| SEL. or Sel. | Select. |
| SE&S | Square edge and sound. |
| SH.D. | Shipping dry. |
| S/L or S/Lap | Shiplap. |
| SM | Surface measure. |
| SSND | Sap stain no defect. |
| SQ. or Sq. | Square. |
| SQ.E&H.B. | Square edged and hollow back. |
| STRUCT. or STR. | Structural. |
| T&G | Tongued and Grooved. |
| TBR. | Timber. |
| VG | Vertical grain. |
| WTH. or Wth. | Width. |
| WT. or Wt. | Weight. |

# PROPERTIES OF STRUCTURAL LUMBER

## Tables of Board Measure

| NOMINAL SIZE OF PIECE | BOARD FEET CONTENT WHEN LENGTH IN FEET EQUALS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| 1 x 2 | 1/3 | 2/3 | 1 | 1 1/3 | 1 2/3 | 2 | 2 1/3 | 2 2/3 | 3 | 3 1/3 | 3 2/3 | 4 |
| 1 x 3 | 1/2 | 1 | 1 1/2 | 2 | 2 1/2 | 3 | 3 1/2 | 4 | 4 1/2 | 5 | 5 1/2 | 6 |
| 1 x 4 | 2/3 | 1 1/3 | 2 | 2 2/3 | 3 1/3 | 4 | 4 2/3 | 5 1/3 | 6 | 6 2/3 | 7 1/3 | 8 |
| 1 x 6 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 x 8 | 1 1/3 | 2 2/3 | 4 | 5 1/3 | 6 2/3 | 8 | 9 1/3 | 10 2/3 | 12 | 13 1/3 | 14 2/3 | 16 |
| 1 x 10 | 1 2/3 | 3 1/3 | 5 | 6 2/3 | 8 1/3 | 10 | 11 2/3 | 13 1/3 | 15 | 16 2/3 | 18 1/3 | 20 |
| 1 x 12 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| 2 x 2 | 2/3 | 1 1/3 | 2 | 2 2/3 | 3 1/3 | 4 | 4 2/3 | 5 1/3 | 6 | 6 2/3 | 7 1/3 | 8 |
| 2 x 3 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 2 x 4 | 1 1/3 | 2 2/3 | 4 | 5 1/3 | 6 2/3 | 8 | 9 1/3 | 10 2/3 | 12 | 13 1/3 | 14 2/3 | 16 |
| 2 x 6 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| 2 x 8 | 2 2/3 | 5 1/3 | 8 | 10 2/3 | 13 1/3 | 16 | 18 2/3 | 21 1/3 | 24 | 26 2/3 | 29 1/3 | 32 |
| 2 x 10 | 3 1/3 | 6 2/3 | 10 | 13 1/3 | 16 2/3 | 20 | 23 1/3 | 26 2/3 | 30 | 33 1/3 | 36 2/3 | 40 |
| 2 x 12 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |
| 2 x 14 | 4 2/3 | 9 1/3 | 14 | 18 2/3 | 23 1/3 | 28 | 32 2/3 | 37 1/3 | 42 | 46 2/3 | 51 1/3 | 56 |
| 3 x 4 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| 3 x 6 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 |
| 3 x 8 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |
| 3 x 10 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| 3 x 12 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| 3 x 14 | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 77 | 84 |
| 3 x 16 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 88 | 96 |
| 4 x 4 | 2 2/3 | 5 1/3 | 8 | 10 2/3 | 13 1/3 | 16 | 18 2/3 | 21 1/3 | 24 | 26 2/3 | 29 1/3 | 32 |
| 4 x 6 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |
| 4 x 8 | 5 1/3 | 10 2/3 | 16 | 21 1/3 | 26 2/3 | 32 | 37 1/3 | 42 2/3 | 48 | 53 1/3 | 58 2/3 | 64 |
| 4 x 10 | 6 2/3 | 13 1/3 | 20 | 26 2/3 | 33 1/3 | 40 | 46 2/3 | 53 1/3 | 60 | 66 2/3 | 73 1/3 | 80 |
| 4 x 12 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 88 | 96 |
| 4 x 14 | 9 1/3 | 18 2/3 | 28 | 37 1/3 | 46 2/3 | 56 | 65 1/3 | 74 2/3 | 84 | 93 1/3 | 102 2/3 | 112 |
| 4 x 16 | 10 2/3 | 21 1/3 | 32 | 42 2/3 | 53 1/3 | 64 | 74 2/3 | 85 1/3 | 96 | 106 2/3 | 117 1/3 | 128 |
| 6 x 6 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| 6 x 8 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 88 | 96 |
| 6 x 10 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| 6 x 12 | 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |
| 6 x 14 | 14 | 28 | 42 | 56 | 70 | 84 | 98 | 112 | 126 | 140 | 154 | 168 |
| 6 x 16 | 16 | 32 | 48 | 64 | 80 | 96 | 112 | 128 | 144 | 160 | 176 | 192 |
| 6 x 18 | 18 | 36 | 54 | 72 | 90 | 108 | 126 | 144 | 162 | 180 | 198 | 216 |
| 6 x 20 | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 |
| 6 x 22 | 22 | 44 | 66 | 88 | 110 | 132 | 154 | 176 | 198 | 220 | 242 | 264 |
| 6 x 24 | 24 | 48 | 72 | 96 | 120 | 144 | 168 | 192 | 216 | 240 | 264 | 288 |
| 8 x 8 | 10 2/3 | 21 1/3 | 32 | 42 2/3 | 53 1/3 | 64 | 74 2/3 | 85 1/3 | 96 | 106 2/3 | 117 1/3 | 128 |
| 8 x 10 | 13 1/3 | 26 2/3 | 40 | 53 1/3 | 66 2/3 | 80 | 93 1/3 | 106 2/3 | 120 | 133 1/3 | 146 2/3 | 160 |
| 8 x 12 | 16 | 32 | 48 | 64 | 80 | 96 | 112 | 128 | 144 | 160 | 176 | 192 |
| 8 x 14 | 18 2/3 | 37 1/3 | 56 | 74 2/3 | 93 1/3 | 112 | 130 2/3 | 149 1/3 | 168 | 186 2/3 | 205 1/3 | 224 |
| 8 x 16 | 21 1/3 | 42 2/3 | 64 | 85 1/3 | 106 2/3 | 128 | 149 1/3 | 170 2/3 | 192 | 213 1/3 | 234 2/3 | 256 |
| 8 x 18 | 24 | 48 | 72 | 96 | 120 | 144 | 168 | 192 | 216 | 240 | 264 | 288 |
| 8 x 20 | 26 2/3 | 53 1/3 | 80 | 106 2/3 | 133 1/3 | 160 | 186 2/3 | 213 1/3 | 240 | 266 2/3 | 293 1/3 | 320 |
| 8 x 22 | 29 1/3 | 58 2/3 | 88 | 117 1/3 | 146 2/3 | 176 | 205 1/3 | 234 2/3 | 264 | 293 1/3 | 322 2/3 | 352 |
| 8 x 24 | 32 | 64 | 96 | 128 | 160 | 192 | 224 | 256 | 288 | 320 | 352 | 384 |
| 10 x 10 | 16 2/3 | 33 1/3 | 50 | 66 2/3 | 83 1/3 | 100 | 116 2/3 | 133 1/3 | 150 | 166 2/3 | 183 1/3 | 200 |
| 10 x 12 | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 |
| 10 x 14 | 23 1/3 | 46 2/3 | 70 | 93 1/3 | 116 2/3 | 140 | 163 1/3 | 186 2/3 | 210 | 233 1/3 | 256 2/3 | 280 |
| 10 x 16 | 26 2/3 | 53 1/3 | 80 | 106 2/3 | 133 1/3 | 160 | 186 2/3 | 213 1/3 | 240 | 266 2/3 | 293 1/3 | 320 |
| 10 x 18 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 | 330 | 360 |
| 10 x 20 | 33 1/3 | 66 2/3 | 100 | 133 1/3 | 166 2/3 | 200 | 233 1/3 | 266 2/3 | 300 | 333 1/3 | 366 2/3 | 400 |
| 10 x 22 | 36 2/3 | 73 1/3 | 110 | 146 2/3 | 183 1/3 | 220 | 256 2/3 | 293 1/3 | 330 | 366 2/3 | 403 1/3 | 440 |
| 10 x 24 | 40 | 80 | 120 | 160 | 200 | 240 | 280 | 320 | 360 | 400 | 440 | 480 |

# PROPERTIES OF STRUCTURAL LUMBER

## Tables of Board Measure

| NOMINAL SIZE OF PIECE | BOARD FEET CONTENT WHEN LENGTH IN FEET EQUALS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| 12 x 12 | 24 | 48 | 72 | 96 | 120 | 144 | 168 | 192 | 216 | 240 | 264 | 288 |
| 12 x 14 | 28 | 56 | 84 | 112 | 140 | 168 | 196 | 224 | 252 | 280 | 308 | 336 |
| 12 x 16 | 32 | 64 | 96 | 128 | 160 | 192 | 224 | 256 | 288 | 320 | 352 | 384 |
| 12 x 18 | 36 | 72 | 108 | 144 | 180 | 216 | 252 | 288 | 324 | 360 | 396 | 432 |
| 12 x 20 | 40 | 80 | 120 | 160 | 200 | 240 | 280 | 320 | 360 | 400 | 440 | 480 |
| 12 x 22 | 44 | 88 | 132 | 176 | 220 | 264 | 308 | 352 | 396 | 440 | 484 | 528 |
| 12 x 24 | 48 | 96 | 144 | 192 | 240 | 288 | 336 | 384 | 432 | 480 | 528 | 576 |
| 14 x 14 | 32 2/3 | 65 1/3 | 98 | 130 2/3 | 163 1/3 | 196 | 228 2/3 | 261 1/3 | 294 | 326 2/3 | 359 1/3 | 392 |
| 14 x 16 | 37 1/3 | 74 2/3 | 112 | 149 1/3 | 186 2/3 | 224 | 261 1/3 | 298 2/3 | 336 | 373 1/3 | 410 2/3 | 448 |
| 14 x 18 | 42 | 84 | 126 | 168 | 210 | 252 | 294 | 336 | 378 | 420 | 462 | 504 |
| 14 x 20 | 46 2/3 | 93 1/3 | 140 | 186 2/3 | 233 1/3 | 280 | 326 2/3 | 373 1/3 | 420 | 466 2/3 | 513 1/3 | 560 |
| 14 x 22 | 51 1/3 | 102 2/3 | 154 | 205 1/3 | 256 2/3 | 308 | 359 1/3 | 410 2/3 | 462 | 513 1/3 | 564 2/3 | 616 |
| 14 x 24 | 56 | 112 | 168 | 224 | 280 | 336 | 392 | 448 | 504 | 560 | 616 | 672 |
| 16 x 16 | 42 2/3 | 85 1/3 | 128 | 170 2/3 | 213 1/3 | 256 | 298 2/3 | 341 1/3 | 384 | 426 2/3 | 469 1/3 | 512 |
| 16 x 18 | 48 | 96 | 144 | 192 | 240 | 288 | 336 | 384 | 432 | 480 | 528 | 576 |
| 16 x 20 | 53 1/3 | 106 2/3 | 160 | 213 1/3 | 266 2/3 | 320 | 373 1/3 | 426 2/3 | 480 | 533 1/3 | 586 2/3 | 640 |
| 16 x 22 | 58 2/3 | 117 1/3 | 176 | 234 2/3 | 293 1/3 | 352 | 410 2/3 | 469 1/3 | 528 | 586 2/3 | 645 1/3 | 704 |
| 16 x 24 | 64 | 128 | 192 | 256 | 320 | 384 | 448 | 512 | 576 | 640 | 704 | 768 |
| 18 x 18 | 54 | 108 | 162 | 216 | 270 | 324 | 378 | 432 | 486 | 540 | 594 | 648 |
| 18 x 20 | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | 600 | 660 | 720 |
| 18 x 22 | 66 | 132 | 198 | 264 | 330 | 396 | 462 | 528 | 594 | 660 | 726 | 792 |
| 18 x 24 | 72 | 144 | 216 | 288 | 360 | 432 | 504 | 576 | 648 | 720 | 792 | 864 |
| 20 x 20 | 66 2/3 | 133 1/3 | 200 | 266 2/3 | 333 1/3 | 400 | 466 2/3 | 533 1/3 | 600 | 666 2/3 | 733 1/3 | 800 |
| 20 x 22 | 73 1/3 | 146 2/3 | 220 | 293 1/3 | 366 2/3 | 440 | 513 1/3 | 586 2/3 | 660 | 733 1/3 | 806 2/3 | 880 |
| 20 x 24 | 80 | 160 | 240 | 320 | 400 | 480 | 560 | 640 | 720 | 800 | 880 | 960 |
| 22 x 22 | 80 2/3 | 161 1/3 | 242 | 322 2/3 | 403 1/3 | 484 | 564 2/3 | 645 1/3 | 726 | 806 2/3 | 887 1/3 | 968 |
| 22 x 24 | 88 | 176 | 264 | 352 | 440 | 528 | 616 | 704 | 792 | 880 | 968 | 1056 |
| 24 x 24 | 96 | 192 | 288 | 384 | 480 | 576 | 672 | 768 | 864 | 960 | 1056 | 1152 |

# PROPERTIES OF STRUCTURAL LUMBER

## Standard Sizes of Yard Lumber and Timbers

Details regarding the dressed sizes of various species of lumber are provided in the grading rules of the agencies which formulate and maintain such rules. The dressed sizes in the following table conform to the sizes set forth in the American Softwood Lumber Standard, Voluntary Product Standard 20-70, and have been adopted for virtually all structural lumber. While these sizes are generally available on a commercial basis, some require special ordering and consequent extended lead time for supply. **It is good practice to consult the local lumber dealer to determine what sizes are on hand or can be readily secured.**

NOMINAL AND MINIMUM-DRESSED SIZES OF BOARDS, DIMENSION, AND TIMBERS

(The thicknesses apply to all widths and all widths to all thicknesses.)

| Item | Thicknesses | | | Face widths | | |
|---|---|---|---|---|---|---|
| | Nominal | Minimum dressed | | Nominal | Minimum dressed | |
| | | Dry[1] | Green[1] | | Dry[1] | Green[1] |
| | | Inches | Inches | | Inches | Inches |
| Boards | 1 | 3/4 | 25/32 | 2 | 1-1/2 | 1-9/16 |
| | 1-1/4 | 1 | 1-1/32 | 3 | 2-1/2 | 2-9/16 |
| | 1-1/2 | 1-1/4 | 1-9/32 | 4 | 3-1/2 | 3-9/16 |
| | | | | 5 | 4-1/2 | 4-5/8 |
| | | | | 6 | 5-1/2 | 5-5/8 |
| | | | | 7 | 6-1/2 | 6-5/8 |
| | | | | 8 | 7-1/4 | 7-1/2 |
| | | | | 9 | 8-1/4 | 8-1/2 |
| | | | | 10 | 9-1/4 | 9-1/2 |
| | | | | 11 | 10-1/4 | 10-1/2 |
| | | | | 12 | 11-1/4 | 11-1/2 |
| | | | | 14 | 13-1/4 | 13-1/2 |
| | | | | 16 | 15-1/4 | 15-1/2 |
| Dimension | 2 | 1-1/2 | 1-9/16 | 2 | 1-1/2 | 1-9/16 |
| | 2-1/2 | 2 | 2-1/16 | 3 | 2-1/2 | 2-9/16 |
| | 3 | 2-1/2 | 2-9/16 | 4 | 3-1/2 | 3-9/16 |
| | 3-1/2 | 3 | 3-1/16 | 5 | 4-1/2 | 4-5/8 |
| | | | | 6 | 5-1/2 | 5-5/8 |
| | | | | 8 | 7-1/4 | 7-1/2 |
| | | | | 10 | 9-1/4 | 9-1/2 |
| | | | | 12 | 11-1/4 | 11-1/2 |
| | | | | 14 | 13-1/4 | 13-1/2 |
| | | | | 16 | 15-1/4 | 15-1/2 |
| Dimension | 4 | 3-1/2 | 3-9/16 | 2 | 1-1/2 | 1-9/16 |
| | 4-1/2 | 4 | 4-1/16 | 3 | 2-1/2 | 2-9/16 |
| | | | | 4 | 3-1/2 | 3-9/16 |
| | | | | 5 | 4-1/2 | 4-5/8 |
| | | | | 6 | 5-1/2 | 5-5/8 |
| | | | | 8 | 7-1/4 | 7-1/2 |
| | | | | 10 | 9-1/4 | 9-1/2 |
| | | | | 12 | 11-1/4 | 11-1/2 |
| | | | | 14 | ------ | 13-1/2 |
| | | | | 16 | ------ | 15-1/2 |
| Timbers | 5 and thicker | ------ | 1/2 off | 8 and wider | ------ | 1/2 off |

1. Dry lumber is defined as lumber which has been seasoned to a moisture content of 19 per cent or less. Green lumber is defined as lumber having a moisture content in excess of 19 per cent.

# PROPERTIES OF STRUCTURAL LUMBER

## Properties of Standard Dressed Sizes

Certain mathematical expressions of the properties or elements of sections are used in computing the values of structural members of various shapes for the various conditions under which they are subjected to stress. The properties or elements of sections of certain standard sizes of boards, dimension, and timbers are given in the following tables.

NEUTRAL AXIS, in the cross section of a beam or column in a state of flexure, is the line on which there is neither tension or compression.

The neutral axis, X-X in the following tables of properties of rectangular and square sections of lumber has been assumed as perpendicular to the depth of the section at its center, the depth "d" being parallel to and in the direction of the application of the force or load.

MOMENT OF INERTIA, I, of the cross section of a beam is the sum of the products of each of its elementary areas by the square of their distance from the neutral axis of the section.

SECTION MODULUS, S, is the moment of inertia divided by the distance from the neutral axis to extreme fiber of the section.

CROSS SECTION is a section taken through the member perpendicular to its longitudinal axis.

The following symbols and formulas apply to rectangular and square beam sections with neutral axis perpendicular to depth at center, d/2.

A = area of section in square inches = bd

b = breadth in inches of beam face opposed to or to which the force or load is applied

d = height or depth in inches of beam face parallel with the direction of the action of the force or load.

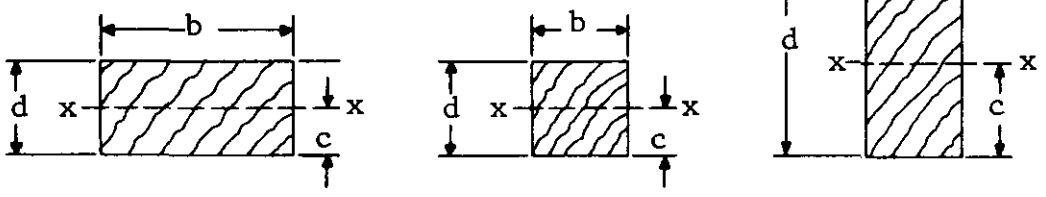
I = moment of inertia in inches$^4$ = $\frac{bd^3}{12}$

c = distance in inches from axis to extremities of section = $\frac{d}{2}$

r = radius of gyration in inches = $\sqrt{I/A}$

S = section modulus in inches$^3$ = $\frac{I}{c} = \frac{bd^2}{6}$

X-X = neutral axis



## PROPERTIES OF STRUCTURAL LUMBER — Sectional Properties of Standard Dressed (S4S) Lumber Sizes

| NOMINAL SIZE b(inches)d | STANDARD DRESSED SIZE (S4S) b(inches)d | AREA OF SECTION A | MOMENT OF INERTIA I | SECTION MODULUS S | Weight in pounds per linear foot of piece when weight of wood per cubic foot equals: | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 25 lb. | 30 lb. | 35 lb. | 40 lb. | 45 lb. | 50 lb. |
| 1 x 3 | 3/4 x 2 1/2 | 1.875 | 0.977 | 0.781 | 0.326 | 0.391 | 0.456 | 0.521 | 0.586 | 0.651 |
| 1 x 4 | 3/4 x 3 1/2 | 2.625 | 2.680 | 1.531 | 0.456 | 0.547 | 0.638 | 0.729 | 0.820 | 0.911 |
| 1 x 6 | 3/4 x 5 1/2 | 4.125 | 10.398 | 3.781 | 0.716 | 0.859 | 1.003 | 1.146 | 1.289 | 1.432 |
| 1 x 8 | 3/4 x 7 1/4 | 5.438 | 23.817 | 6.570 | 0.944 | 1.133 | 1.322 | 1.510 | 1.699 | 1.888 |
| 1 x 10 | 3/4 x 9 1/4 | 6.938 | 49.466 | 10.695 | 1.204 | 1.445 | 1.686 | 1.927 | 2.168 | 2.409 |
| 1 x 12 | 3/4 x 11 1/4 | 8.438 | 88.989 | 15.820 | 1.465 | 1.758 | 2.051 | 2.344 | 2.637 | 2.930 |
| 2 x 3 | 1 1/2 x 2 1/2 | 3.750 | 1.953 | 1.563 | 0.651 | 0.781 | 0.911 | 1.042 | 1.172 | 1.302 |
| 2 x 4 | 1 1/2 x 3 1/2 | 5.250 | 5.359 | 3.063 | 0.911 | 1.094 | 1.276 | 1.458 | 1.641 | 1.823 |
| 2 x 6 | 1 1/2 x 5 1/2 | 8.250 | 20.797 | 7.563 | 1.432 | 1.719 | 2.005 | 2.292 | 2.578 | 2.865 |
| 2 x 8 | 1 1/2 x 7 1/4 | 10.875 | 47.635 | 13.141 | 1.888 | 2.266 | 2.643 | 3.021 | 3.398 | 3.776 |
| 2 x 10 | 1 1/2 x 9 1/4 | 13.875 | 98.932 | 21.391 | 2.409 | 2.891 | 3.372 | 3.854 | 4.336 | 4.818 |
| 2 x 12 | 1 1/2 x 11 1/4 | 16.875 | 177.979 | 31.641 | 2.930 | 3.516 | 4.102 | 4.688 | 5.273 | 5.859 |
| 2 x 14 | 1 1/2 x 13 1/4 | 19.875 | 290.775 | 43.891 | 3.451 | 4.141 | 4.831 | 5.521 | 6.211 | 6.901 |
| 3 x 1 | 2 1/2 x 3/4 | 1.875 | 0.088 | 0.234 | 0.326 | 0.391 | 0.456 | 0.521 | 0.586 | 0.651 |
| 3 x 2 | 2 1/2 x 1 1/2 | 3.750 | 0.703 | 0.938 | 0.651 | 0.781 | 0.911 | 1.042 | 1.172 | 1.302 |
| 3 x 4 | 2 1/2 x 3 1/2 | 8.750 | 8.932 | 5.104 | 1.519 | 1.823 | 2.127 | 2.431 | 2.734 | 3.038 |
| 3 x 6 | 2 1/2 x 5 1/2 | 13.750 | 34.661 | 12.604 | 2.387 | 2.865 | 3.342 | 3.819 | 4.297 | 4.774 |
| 3 x 8 | 2 1/2 x 7 1/4 | 18.125 | 79.391 | 21.901 | 3.147 | 3.776 | 4.405 | 5.035 | 5.664 | 6.293 |
| 3 x 10 | 2 1/2 x 9 1/4 | 23.125 | 164.886 | 35.651 | 4.015 | 4.818 | 5.621 | 6.424 | 7.227 | 8.030 |
| 3 x 12 | 2 1/2 x 11 1/4 | 28.125 | 296.631 | 52.734 | 4.883 | 5.859 | 6.836 | 7.813 | 8.789 | 9.766 |
| 3 x 14 | 2 1/2 x 13 1/4 | 33.125 | 484.625 | 73.151 | 5.751 | 6.901 | 8.051 | 9.201 | 10.352 | 11.502 |
| 3 x 16 | 2 1/2 x 15 1/4 | 38.125 | 738.870 | 96.901 | 6.619 | 7.943 | 9.266 | 10.590 | 11.914 | 13.238 |
| 4 x 1 | 3 1/2 x 3/4 | 2.625 | 0.123 | 0.328 | 0.456 | 0.547 | 0.638 | 0.729 | 0.820 | 0.911 |
| 4 x 2 | 3 1/2 x 1 1/2 | 5.250 | 0.984 | 1.313 | 0.911 | 1.094 | 1.276 | 1.458 | 1.641 | 1.823 |
| 4 x 3 | 3 1/2 x 2 1/2 | 8.750 | 4.557 | 3.646 | 1.519 | 1.823 | 2.127 | 2.431 | 2.734 | 3.038 |
| 4 x 4 | 3 1/2 x 3 1/2 | 12.250 | 12.505 | 7.146 | 2.127 | 2.552 | 2.977 | 3.403 | 3.828 | 4.253 |
| 4 x 6 | 3 1/2 x 5 1/2 | 19.250 | 48.526 | 17.646 | 3.342 | 4.010 | 4.679 | 5.347 | 6.016 | 6.684 |
| 4 x 8 | 3 1/2 x 7 1/4 | 25.375 | 111.148 | 30.661 | 4.405 | 5.286 | 6.168 | 7.049 | 7.930 | 8.811 |
| 4 x 10 | 3 1/2 x 9 1/4 | 32.375 | 230.840 | 49.911 | 5.621 | 6.745 | 7.869 | 8.933 | 10.117 | 11.241 |
| 4 x 12 | 3 1/2 x 11 1/4 | 39.375 | 415.283 | 73.828 | 6.836 | 8.203 | 9.570 | 10.938 | 12.305 | 13.672 |
| 4 x 14 | 3 1/2 x 13 1/4 | 46.38 | 678.5 | 102.4 | 8.051 | 9.661 | 11.27 | 12.88 | 14.49 | 16.10 |
| 4 x 16 | 3 1/2 x 15 1/4 | 53.38 | 1034 | 135.7 | 9.266 | 11.12 | 12.97 | 14.83 | 16.68 | 18.53 |
| 6 x 1 | 5 1/2 x 3/4 | 4.125 | 0.193 | 0.516 | 0.716 | 0.859 | 1.003 | 1.146 | 1.289 | 1.432 |
| 6 x 2 | 5 1/2 x 1 1/2 | 8.250 | 1.547 | 2.063 | 1.432 | 1.719 | 2.005 | 2.292 | 2.578 | 2.865 |
| 6 x 3 | 5 1/2 x 2 1/2 | 13.750 | 7.161 | 5.729 | 2.387 | 2.865 | 3.342 | 3.819 | 4.297 | 4.774 |
| 6 x 4 | 5 1/2 x 3 1/2 | 19.250 | 19.651 | 11.229 | 3.342 | 4.010 | 4.679 | 5.347 | 6.016 | 6.684 |
| 6 x 6 | 5 1/2 x 5 1/2 | 30.250 | 76.255 | 27.729 | 5.252 | 6.302 | 7.352 | 8.403 | 9.453 | 10.503 |
| 6 x 8 | 5 1/2 x 7 1/2 | 41.250 | 193.359 | 51.563 | 7.161 | 8.594 | 10.026 | 11.458 | 12.891 | 14.323 |
| 6 x 10 | 5 1/2 x 9 1/2 | 52.250 | 392.963 | 82.729 | 9.071 | 10.885 | 12.700 | 14.514 | 16.328 | 18.142 |
| 6 x 12 | 5 1/2 x 11 1/2 | 63.250 | 697.068 | 121.229 | 10.981 | 13.177 | 15.373 | 17.569 | 19.766 | 21.962 |
| 6 x 14 | 5 1/2 x 13 1/2 | 74.250 | 1127.672 | 167.063 | 12.891 | 15.469 | 18.047 | 20.625 | 23.203 | 25.781 |
| 6 x 16 | 5 1/2 x 15 1/2 | 85.250 | 1706.776 | 220.229 | 14.800 | 17.760 | 20.720 | 23.681 | 26.641 | 29.601 |
| 6 x 18 | 5 1/2 x 17 1/2 | 96.250 | 2456.380 | 280.729 | 16.710 | 20.052 | 23.394 | 26.736 | 30.078 | 33.420 |
| 6 x 20 | 5 1/2 x 19 1/2 | 107.250 | 3398.484 | 348.563 | 18.620 | 22.344 | 26.068 | 29.792 | 33.516 | 37.240 |
| 6 x 22 | 5 1/2 x 21 1/2 | 118.250 | 4555.086 | 423.729 | 20.530 | 24.635 | 28.741 | 32.847 | 36.953 | 41.059 |
| 6 x 24 | 5 1/2 x 23 1/2 | 129.250 | 5948.191 | 506.229 | 22.439 | 26.927 | 31.415 | 35.903 | 40.391 | 44.878 |
| 8 x 1 | 7 1/4 x 3/4 | 5.438 | 0.255 | 0.680 | 0.944 | 1.133 | 1.322 | 1.510 | 1.699 | 1.888 |
| 8 x 2 | 7 1/4 x 1 1/2 | 10.875 | 2.039 | 2.719 | 1.888 | 2.266 | 2.643 | 3.021 | 3.398 | 3.776 |
| 8 x 3 | 7 1/4 x 2 1/2 | 18.125 | 9.440 | 7.552 | 3.147 | 3.776 | 4.405 | 5.035 | 5.664 | 6.293 |
| 8 x 4 | 7 1/4 x 3 1/2 | 25.375 | 25.904 | 14.802 | 4.405 | 5.286 | 6.168 | 7.049 | 7.930 | 8.811 |
| 8 x 6 | 7 1/2 x 5 1/2 | 41.250 | 103.984 | 37.813 | 7.161 | 8.594 | 10.026 | 11.458 | 12.891 | 14.323 |
| 8 x 8 | 7 1/2 x 7 1/2 | 56.250 | 263.672 | 70.313 | 9.766 | 11.719 | 13.672 | 15.625 | 17.578 | 19.531 |
| 8 x 10 | 7 1/2 x 9 1/2 | 71.250 | 535.859 | 112.813 | 12.370 | 14.844 | 17.318 | 19.792 | 22.266 | 24.740 |
| 8 x 12 | 7 1/2 x 11 1/2 | 86.250 | 950.547 | 165.313 | 14.974 | 17.969 | 20.964 | 23.958 | 26.953 | 29.948 |
| 8 x 14 | 7 1/2 x 13 1/2 | 101.250 | 1537.734 | 227.813 | 17.578 | 21.094 | 24.609 | 28.125 | 31.641 | 35.156 |
| 8 x 16 | 7 1/2 x 15 1/2 | 116.250 | 2327.422 | 300.313 | 20.182 | 24.219 | 28.255 | 32.292 | 36.328 | 40.365 |
| 8 x 18 | 7 1/2 x 17 1/2 | 131.250 | 3349.609 | 382.813 | 22.786 | 27.344 | 31.901 | 36.458 | 41.016 | 45.573 |
| 8 x 20 | 7 1/2 x 19 1/2 | 146.250 | 4634.297 | 475.313 | 25.391 | 30.469 | 35.547 | 40.625 | 45.703 | 50.781 |
| 8 x 22 | 7 1/2 x 21 1/2 | 161.250 | 6211.484 | 577.813 | 27.995 | 33.594 | 39.193 | 44.792 | 50.391 | 55.990 |
| 8 x 24 | 7 1/2 x 23 1/2 | 176.250 | 8111.172 | 690.313 | 30.599 | 36.719 | 42.839 | 48.958 | 55.078 | 61.198 |

## PROPERTIES OF STRUCTURAL LUMBER — Sectional Properties of Standard Dressed (S4S) Lumber Sizes

| NOMINAL SIZE b(inches)d | STANDARD DRESSED SIZE (S4S) b(inches)d | AREA OF SECTION A | MOMENT OF INERTIA I | SECTION MODULUS S | Weight in pounds per linear foot of piece when weight of wood per cubic foot equals: | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 25 lb. | 30 lb. | 35 lb. | 40 lb. | 45 lb. | 50 lb. |
| 10 x 1 | 9 1/4 x 3/4 | 6.938 | 0.325 | 0.867 | 1.204 | 1.445 | 1.686 | 1.927 | 2.168 | 2.409 |
| 10 x 2 | 9 1/4 x 1 1/2 | 13.875 | 2.602 | 3.469 | 2.409 | 2.891 | 3.372 | 3.854 | 4.336 | 4.818 |
| 10 x 3 | 9 1/4 x 2 1/2 | 23.125 | 12.044 | 9.635 | 4.015 | 4.818 | 5.621 | 6.424 | 7.227 | 8.030 |
| 10 x 4 | 9 1/4 x 3 1/2 | 32.375 | 33.049 | 18.885 | 5.621 | 6.745 | 7.869 | 8.993 | 10.117 | 11.241 |
| 10 x 6 | 9 1/2 x 5 1/2 | 52.250 | 131.714 | 47.896 | 9.071 | 10.885 | 12.700 | 14.514 | 16.328 | 18.142 |
| 10 x 8 | 9 1/2 x 7 1/2 | 71.250 | 333.984 | 89.063 | 12.370 | 14.844 | 17.318 | 19.792 | 22.266 | 24.740 |
| 10 x 10 | 9 1/2 x 9 1/2 | 90.250 | 678.755 | 142.896 | 15.668 | 18.802 | 21.936 | 25.069 | 28.203 | 31.337 |
| 10 x 12 | 9 1/2 x 11 1/2 | 109.250 | 1204.026 | 209.396 | 18.967 | 22.760 | 26.554 | 30.347 | 34.141 | 37.934 |
| 10 x 14 | 9 1/2 x 13 1/2 | 128.250 | 1947.797 | 288.563 | 22.266 | 26.719 | 31.172 | 35.625 | 40.078 | 44.531 |
| 10 x 16 | 9 1/2 x 15 1/2 | 147.250 | 2948.068 | 380.396 | 25.564 | 30.677 | 35.790 | 40.903 | 46.016 | 51.128 |
| 10 x 18 | 9 1/2 x 17 1/2 | 166.250 | 4242.836 | 484.896 | 28.863 | 34.635 | 40.408 | 46.181 | 51.953 | 57.726 |
| 10 x 20 | 9 1/2 x 19 1/2 | 185.250 | 5870.109 | 602.063 | 32.161 | 38.594 | 45.026 | 51.458 | 57.891 | 64.323 |
| 10 x 22 | 9 1/2 x 21 1/2 | 204.250 | 7867.879 | 731.896 | 35.460 | 42.552 | 49.644 | 56.736 | 63.828 | 70.920 |
| 10 x 24 | 9 1/2 x 23 1/2 | 223.250 | 10274.148 | 874.396 | 38.759 | 46.510 | 54.262 | 62.014 | 69.766 | 77.517 |
| 12 x 1 | 11 1/4 x 3/4 | 8.438 | 0.396 | 1.055 | 1.465 | 1.758 | 2.051 | 2.344 | 2.637 | 2.930 |
| 12 x 2 | 11 1/4 x 1 1/2 | 16 875 | 3.164 | 4.219 | 2.930 | 3.516 | 4.102 | 4.688 | 5.273 | 5.859 |
| 12 x 3 | 11 1/4 x 2 1/2 | 28.125 | 14.648 | 11.719 | 4.883 | 5.859 | 6.836 | 7.813 | 8.789 | 9.766 |
| 12 x 4 | 11 1/4 x 3 1/2 | 39.375 | 40.195 | 22.969 | 6.836 | 8.203 | 9.570 | 10 938 | 12.305 | 13.672 |
| 12 x 6 | 11 1/2 x 5 1/2 | 63.250 | 159.443 | 57.979 | 10.981 | 13.177 | 15.373 | 17.569 | 19.766 | 21.962 |
| 12 x 8 | 11 1/2 x 7 1/2 | 86.250 | 404.297 | 107.813 | 14.974 | 17.969 | 20.964 | 23.958 | 26.953 | 29.948 |
| 12 x 10 | 11 1/2 x 9 1/2 | 109.250 | 821.651 | 172.979 | 18.967 | 22.760 | 26.554 | 30.347 | 34.141 | 37.934 |
| 12 x 12 | 11 1/2 x 11 1/2 | 132.250 | 1457.505 | 253.479 | 22.960 | 27.552 | 32.144 | 36.736 | 41.328 | 45.920 |
| 12 x 14 | 11 1/2 x 13 1/2 | 155.250 | 2357.859 | 349.313 | 26.953 | 32.344 | 37.734 | 43.125 | 48.516 | 53.906 |
| 12 x 16 | 11 1/2 x 15 1/2 | 178.250 | 3568.713 | 460.479 | 30.946 | 37.135 | 43.325 | 49.514 | 55.703 | 61.892 |
| 12 x 18 | 11 1/2 x 17 1/2 | 201.250 | 5136.066 | 586.979 | 34.939 | 41.927 | 48.915 | 55.903 | 62.891 | 69.878 |
| 12 x 20 | 11 1/2 x 19 1/2 | 224.250 | 7105.922 | 728.813 | 38.932 | 46.719 | 54.505 | 62.292 | 70.078 | 77.865 |
| 12 x 22 | 11 1/2 x 21 1/2 | 247.250 | 9524.273 | 885.979 | 42.925 | 51.510 | 60.095 | 68.681 | 77.266 | 85.851 |
| 12 x 24 | 11 1/2 x 23 1/2 | 270.250 | 12437.129 | 1058.479 | 46.918 | 56.302 | 65.686 | 75.069 | 84.453 | 93.837 |
| 14 x 2 | 13 1/4 x 1 1/2 | 19.875 | 3.727 | 4.969 | 3.451 | 4.141 | 4.831 | 5.521 | 6.211 | 6.901 |
| 14 x 3 | 13 1/4 x 2 1/2 | 33.125 | 17.253 | 13.802 | 5.751 | 6.901 | 8.051 | 9.201 | 10.352 | 11.502 |
| 14 x 4 | 13 1/2 x 3 1/2 | 47.250 | 48.234 | 27.563 | 8.203 | 9.844 | 11.484 | 13.125 | 14.766 | 16.406 |
| 14 x 6 | 13 1/2 x 5 1/2 | 74.250 | 187.172 | 68.063 | 12.891 | 15.469 | 18.047 | 20.625 | 23.203 | 25.781 |
| 14 x 8 | 13 1/2 x 7 1/2 | 101.250 | 474.609 | 126.563 | 17.578 | 21.094 | 24.609 | 28.125 | 31.641 | 35.156 |
| 14 x 10 | 13 1/2 x 9 1/2 | 128.250 | 964.547 | 203.063 | 22.266 | 26.719 | 31.172 | 35.625 | 40.078 | 44.531 |
| 14 x 12 | 13 1/2 x 11 1/2 | 155.250 | 1710.984 | 297.563 | 26.953 | 32.344 | 37.734 | 43.125 | 48.516 | 53.906 |
| 14 x 16 | 13 1/2 x 15 1/2 | 209.250 | 4189.359 | 540.563 | 36.328 | 43.594 | 50.859 | 58.125 | 65.391 | 72.656 |
| 14 x 18 | 13 1/2 x 17 1/2 | 236.250 | 6029.297 | 689.063 | 41.016 | 49.219 | 57.422 | 65.625 | 73.828 | 82.031 |
| 14 x 20 | 13 1/2 x 19 1/2 | 263.250 | 8341.734 | 855.563 | 45.703 | 54.844 | 63.984 | 73.125 | 82.266 | 91.406 |
| 14 x 22 | 13 1/2 x 21 1/2 | 290.250 | 11180.672 | 1040.063 | 50.391 | 60.469 | 70.547 | 80.625 | 90.703 | 100.781 |
| 14 x 24 | 13 1/2 x 23 1/2 | 317.250 | 14600.109 | 1242.563 | 55.078 | 66.094 | 77.109 | 88.125 | 99.141 | 110.156 |
| 16 x 3 | 15 1/2 x 2 1/2 | 38.750 | 20.182 | 16.146 | 6.727 | 8.073 | 9.418 | 10.764 | 12.109 | 13.455 |
| 16 x 4 | 15 1/2 x 3 1/2 | 54.250 | 55.380 | 31.646 | 9.418 | 11.302 | 13.186 | 15.069 | 16.953 | 18.837 |
| 16 x 6 | 15 1/2 x 5 1/2 | 85.250 | 214.901 | 78.146 | 14.800 | 17.760 | 20.720 | 23.681 | 26.641 | 29.601 |
| 16 x 8 | 15 1/2 x 7 1/2 | 116.250 | 544.922 | 145.313 | 20.182 | 24.219 | 28.255 | 32.292 | 36.328 | 40.365 |
| 16 x 10 | 15 1/2 x 9 1/2 | 147.250 | 1107.443 | 233.146 | 25.564 | 30.677 | 35.790 | 40.903 | 46.016 | 51.128 |
| 16 x 12 | 15 1/2 x 11 1/2 | 178.250 | 1964.463 | 341.646 | 30.946 | 37.135 | 43.325 | 49.514 | 55.703 | 61.892 |
| 16 x 14 | 15 1/2 x 13 1/2 | 209.250 | 3177.984 | 470.813 | 36.328 | 43.594 | 50.859 | 58.125 | 65.391 | 72.656 |
| 16 x 16 | 15 1/2 x 15 1/2 | 240.250 | 4810.004 | 620.646 | 41.710 | 50.052 | 58.394 | 66.736 | 75.078 | 83.420 |
| 16 x 18 | 15 1/2 x 17 1/2 | 271.250 | 6922.523 | 791.146 | 47.092 | 56.510 | 65.929 | 75.347 | 84.766 | 94.184 |
| 16 x 20 | 15 1/2 x 19 1/2 | 302.250 | 9577.547 | 982.313 | 52.474 | 62.969 | 73.464 | 83.958 | 94.453 | 104.948 |
| 16 x 22 | 15 1/2 x 21 1/2 | 333.250 | 12837.066 | 1194.146 | 57.856 | 69.427 | 80.998 | 92.569 | 104.141 | 115.712 |
| 16 x 24 | 15 1/2 x 23 1/2 | 364.250 | 16763.086 | 1426.646 | 63.238 | 75.885 | 88.533 | 101.181 | 113.828 | 126.476 |
| 18 x 6 | 17 1/2 x 5 1/2 | 96.250 | 242.630 | 88.229 | 16.710 | 20.052 | 23.394 | 26.736 | 30.078 | 33.420 |
| 18 x 8 | 17 1/2 x 7 1/2 | 131.250 | 615.234 | 164.063 | 22.786 | 27.344 | 31.901 | 36.458 | 41.016 | 45.573 |
| 18 x 10 | 17 1/2 x 9 1/2 | 166.250 | 1250.338 | 263.229 | 28.863 | 34.635 | 40.408 | 46.181 | 51.953 | 57.726 |
| 18 x 12 | 17 1/2 x 11 1/2 | 201.250 | 2217.943 | 385.729 | 34.939 | 41.927 | 48.915 | 55.903 | 62.891 | 69.878 |
| 18 x 14 | 17 1/2 x 13 1/2 | 236.250 | 3588.047 | 531.563 | 41.016 | 49.219 | 57.422 | 65.625 | 73.828 | 82.031 |
| 18 x 16 | 17 1/2 x 15 1/2 | 271.250 | 5430.648 | 700.729 | 47.092 | 56.510 | 65.929 | 75.347 | 84.766 | 94.184 |
| 18 x 18 | 17 1/2 x 17 1/2 | 306.250 | 7815.754 | 893.229 | 53.168 | 63.802 | 74.436 | 85.069 | 95.703 | 106.337 |
| 18 x 20 | 17 1/2 x 19 1/2 | 341.250 | 10813.359 | 1109.063 | 59.245 | 71.094 | 82.943 | 94.792 | 106.641 | 118.490 |
| 18 x 22 | 17 1/2 x 21 1/2 | 376.250 | 14493.461 | 1348.229 | 65.321 | 78.385 | 91.450 | 104.514 | 117.578 | 130.642 |
| 18 x 24 | 17 1/2 x 23 1/2 | 411.250 | 18926.066 | 1610.729 | 71.398 | 85.677 | 99.957 | 114.236 | 128.516 | 142.795 |

## PROPERTIES OF STRUCTURAL LUMBER — Sectional Properties of Standard Dressed (S4S) Lumber Sizes

| NOMINAL SIZE b(inches)d | STANDARD DRESSED SIZE (S4S) b(inches)d | AREA OF SECTION A | MOMENT OF INERTIA I | SECTION MODULUS S | Weight in pounds per linear foot of piece when weight of wood per cubic foot equals: | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 25 lb. | 30 lb. | 35 lb. | 40 lb. | 45 lb. | 50 lb. |
| 20 x 6 | 19 1/2 x 5 1/2 | 107.250 | 270.359 | 98.313 | 18.620 | 22.344 | 26.068 | 29.792 | 33.516 | 37.240 |
| 20 x 8 | 19 1/2 x 7 1/2 | 146.250 | 685.547 | 182.813 | 25.391 | 30.469 | 35.547 | 40.625 | 45.703 | 50.781 |
| 20 x 10 | 19 1/2 x 9 1/2 | 185.250 | 1393.234 | 293.313 | 32.161 | 38.594 | 45.026 | 51.458 | 57.891 | 64.323 |
| 20 x 12 | 19 1/2 x 11 1/2 | 224.250 | 2471.422 | 429.813 | 38.932 | 46.719 | 54.505 | 62.292 | 70.078 | 77.865 |
| 20 x 14 | 19 1/2 x 13 1/2 | 263.250 | 3998.109 | 592.313 | 45.703 | 54.844 | 63.984 | 73.125 | 82.266 | 91.406 |
| 20 x 16 | 19 1/2 x 15 1/2 | 302.250 | 6051.297 | 780.813 | 52.474 | 62.969 | 73.464 | 83.958 | 94.453 | 104.948 |
| 20 x 18 | 19 1/2 x 17 1/2 | 341.250 | 8708.984 | 995.313 | 59.245 | 71.094 | 82.943 | 94.792 | 106.641 | 118.490 |
| 20 x 20 | 19 1/2 x 19 1/2 | 380.250 | 12049.172 | 1235.813 | 66.016 | 79.219 | 92.422 | 105.625 | 118.828 | 132.031 |
| 20 x 22 | 19 1/2 x 21 1/2 | 419.250 | 16149.859 | 1502.313 | 72.786 | 87.344 | 101.901 | 116.458 | 131.016 | 145.573 |
| 20 x 24 | 19 1/2 x 23 1/2 | 458.250 | 21089.047 | 1794.813 | 79.557 | 95.469 | 111.380 | 127.292 | 243.203 | 159.115 |
| 22 x 6 | 21 1/2 x 5 1/2 | 118.250 | 298.088 | 108.396 | 20.530 | 24.635 | 28.741 | 32.847 | 36.953 | 41.059 |
| 22 x 8 | 21 1/2 x 7 1/2 | 161.250 | 755.859 | 201.563 | 27.995 | 33.594 | 39.193 | 44.792 | 50.391 | 55.990 |
| 22 x 10 | 21 1/2 x 9 1/2 | 204.250 | 1536.130 | 323.396 | 35.460 | 42.552 | 49.644 | 56.736 | 63.828 | 70.920 |
| 22 x 12 | 21 1/2 x 11 1/2 | 247.250 | 2724.901 | 473.896 | 42.925 | 51.510 | 60.095 | 68.681 | 77.266 | 85.851 |
| 22 x 14 | 21 1/2 x 13 1/2 | 290.250 | 4408.172 | 653.063 | 50.391 | 60.469 | 70.547 | 80.625 | 90.703 | 100.781 |
| 22 x 16 | 21 1/2 x 15 1/2 | 333.250 | 6671.941 | 860.896 | 57.856 | 69.427 | 80.998 | 92.569 | 104.141 | 115.712 |
| 22 x 18 | 21 1/2 x 17 1/2 | 376.250 | 9602.211 | 1097.396 | 65.321 | 78.385 | 91.450 | 104.514 | 117.578 | 130.642 |
| 22 x 20 | 21 1/2 x 19 1/2 | 419.250 | 13284.984 | 1362.563 | 72.786 | 87.344 | 101.901 | 116.458 | 131.016 | 145.573 |
| 22 x 22 | 21 1/2 x 21 1/2 | 462.250 | 17806.254 | 1656.396 | 80.252 | 96.302 | 112.352 | 128.403 | 144.453 | 160.503 |
| 22 x 24 | 21 1/2 x 23 1/2 | 505.250 | 23252.023 | 1978.896 | 87.717 | 105.260 | 122.804 | 140.347 | 157.891 | 175.434 |
| 24 x 6 | 23 1/2 x 5 1/2 | 129.250 | 325.818 | 118.479 | 22.439 | 26.927 | 31.415 | 35.903 | 40.391 | 44.878 |
| 24 x 8 | 23 1/2 x 7 1/2 | 176.250 | 826.172 | 220.313 | 30.599 | 36.719 | 42.839 | 48.958 | 55.078 | 61.198 |
| 24 x 10 | 23 1/2 x 9 1/2 | 223.250 | 1679.026 | 353.479 | 38.759 | 46.510 | 54.262 | 62.014 | 69.766 | 77.517 |
| 24 x 12 | 23 1/2 x 11 1/2 | 270.250 | 2978.380 | 517.979 | 46.918 | 56.302 | 65.686 | 75.069 | 84.453 | 93.837 |
| 24 x 14 | 23 1/2 x 13 1/2 | 317.250 | 4818.234 | 713.813 | 55.078 | 66.094 | 77.109 | 88.125 | 99.141 | 110.156 |
| 24 x 16 | 23 1/2 x 15 1/2 | 364.250 | 7292.586 | 940.979 | 63.238 | 75.885 | 88.533 | 101.181 | 113.828 | 126.476 |
| 24 x 18 | 23 1/2 x 17 1/2 | 411.250 | 10495.441 | 1199.479 | 71.398 | 85.677 | 99.957 | 114.236 | 128.516 | 142.795 |
| 24 x 20 | 23 1/2 x 19 1/2 | 458.250 | 14520.797 | 1489.313 | 79.557 | 95.469 | 111.380 | 127.292 | 143.203 | 159.115 |
| 24 x 22 | 23 1/2 x 21 1/2 | 505.250 | 19462.648 | 1810.479 | 87.717 | 105.260 | 122.804 | 140.347 | 157.891 | 175.434 |
| 24 x 24 | 23 1/2 x 23 1/2 | 552.250 | 25415.004 | 2162.979 | 95.877 | 115.052 | 134.227 | 153.403 | 172.578 | 191.753 |

# WOOD BEAMS

## General Design Information

Investigation of the strength and stiffness requirements of a wood beam under transverse loading should take into consideration the following factors:

Bending moment induced by the load

Deflection or deformation caused by the load

Horizontal shear at supports

Bearing on supporting members

Any one of these four factors may control the design although deflection is not a matter of safety and would be a control only where appearance or comfort to occupants is important.

### Design Loads

Design load consists of the dead load, which is the weight of the structure plus any permanently fixed loads, and the live loads. The live load may be taken from a building code or a design standard, or it may be determined by experience with the intended use of the building or structure.

### Span

The effective span length of a beam may be taken as the distance from face-to-face of supports plus one-half the required length of bearing at each end, except for continuous beams the span length is measured from the center of bearing at those supports over which the beam is continuous.

### Design Values

Unit design values for design of wood beams are given in the National Design Specification for Wood Construction, published by the National Forest Products Association. As indicated therein, these stresses are subject to adjustment for duration of load and other conditions of use.

### Net Sizes of Lumber

Lumber is customarily specified in terms of nominal sizes. Computations used in design should be based on the net dimensions, or actual sizes.

## WOOD BEAMS

### Notations

**Except where otherwise noted, the following symbols are used in the formulas for beams:**

| | |
|---|---|
| $A$ | = area of cross section, $in^2$ |
| $b$ | = breadth of rectangular bending member, inches |
| $C_D$ | = load duration factor |
| $C_F$ | = size factor for sawn lumber |
| $C_{fu}$ | = flat use factor for dimension lumber |
| $C_L$ | = beam stability factor |
| $C_V$ | = volume factor for structural glued laminated timber |
| $COV_E$ | = coefficient of variation in modulus of elasticity |
| $c$ | = distance from neutral axis to extreme fiber, inches |
| $d$ | = depth of bending member, inches |
| $d_n$ | = depth of member remaining at a notch, inches |
| $E,E'$ | = tabulated and allowable modulus of elasticity, psi |
| $F_b,F_b'$ | = tabulated and allowable bending design value, psi |
| $F_{bE}$ | = critical buckling design value for bending members, psi |
| $f_b$ | = actual bending stress, psi |
| $F_c,F_c'$ | = tabulated and allowable compression design value parallel to grain, psi |
| $F_{cE}$ | = critical buckling design value for compression members, psi |
| $f_c$ | = actual compression stress parallel to grain, psi |
| $F_{c\perp},F_{c\perp}'$ | = tabulated and allowable compression design value perpendicular to grain, psi |
| $F_t,F_t'$ | = tabulated and allowable tension design value parallel to grain, psi |
| $f_t$ | = actual tension stress parallel to grain, psi |
| $F_v,F_v'$ | = tabulated and allowable shear design value parallel to grain (horizontal shear), psi |
| $f_v$ | = actual shear stress parallel to grain, psi |
| $I$ | = moment of inertia, $in^4$ |
| $K_{bE}$ | = Euler buckling coefficient for beams |
| $L$ | = span length of bending member, feet |
| $\ell$ | = span length of bending member, inches |
| $\ell_e$ | = effective span length of bending member, inches |
| $\ell_u$ | = laterally unsupported span length of bending member, inches |
| $M$ | = maximum bending moment, inch-pounds |
| $P$ | = total concentrated load or total axial load, lbs |
| $P/A$ | = axial load per unit of cross-sectional area, psi |
| psi | = pounds per square inch |
| $Q$ | = statical moment of an area about the neutral axis, $in^3$ |
| $R_B$ | = slenderness ratio of bending member |
| $S$ | = section modulus, $in^3$ |
| $V$ | = shear force, lbs |
| $W$ | = total uniform load, pounds |
| $w$ | = uniform load in pounds per unit of length |
| $x$ | = distance from beam support face to load, inches |
| $\Delta$ | = deflection due to load, inches |

### Beam Diagrams and Formulas

Pages 41 through 57 provide a series of shear and moment diagrams with accompanying formulas for beams under various conditions of static loading.

### Design for Bending Moment

To maintain static equilibrium in a beam, the resisting moment of the member must be not less than the bending moment induced by the live and dead loads on the beam. For the purpose of illustration, assume a beam with span L uniformly loaded with w pounds per foot as illustrated in Figure 7.

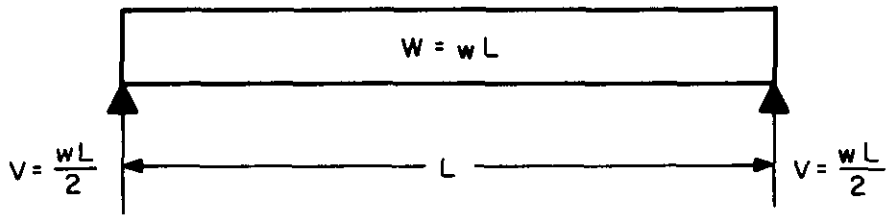



**Figure 7. Simple Beam, Uniform Load**

Induced Bending Moment

From the moment diagram for the condition illustrated in Figure 7, it can be seen that the maximum induced moment occurs at the center of the beam, or at point L/2, and that the formula for the maximum moment is as follows:

$$M = \frac{WL}{8} \text{ in pound-feet}$$

When converted to pound-inches, the formula becomes

$$M = \frac{wL^2(12)}{8} = \frac{3wL^2}{2}$$

Resisting Moment

The resisting moment of a beam is the product of the allowable fiber stress in bending for the species and grade of lumber, $F_b$, and the section modulus of the beam. The formula is as follows:

$$M = F_bS$$

in which S for a rectangular Section $= \frac{bd^2}{6}$

Equilibrium in Bending

Since the resisting moment must be equal to or greater than the induced bending moment in order to maintain static equilibrium, the formulas for each may be equated as follows:

$$F_bS = \frac{3wL^2}{2}$$

## WOOD BEAMS

To determine the beam size required for a given span and load this equation may be written as follows:

$$S=\frac{3wL^2}{2F_b}$$

To determine the allowable span for a given size of beam and load per linear foot, the equation takes the following form:

$$L=\sqrt{\frac{2F_bS}{3w}}$$

To determine the allowable load per linear foot for a given span and size of beam, the equation may be written as follows:

$$w=\frac{2F_bS}{3L^2}$$

The preceding equations apply only to the condition illustrated in Figure 7. For other conditions of loading, the formula for the induced bending moment will be changed as indicated in the series of diagrams and formulas on pages 41 through 57. However, for rectangular sections, the formula for resisting moment remains the same.

Lateral Stability of Beams

Beams which are relatively deep in comparison to width may be unstable under the application of loads. Such instability is due to the tendency of the compression edge of the beam to buckle causing the beam to deflect laterally. The following general rules may be applied in providing lateral restraint for sawn lumber bending members. If the ratio of depth to breadth, d/b, based on nominal dimensions is:

(a) 2 to 1; no lateral support shall be required.

(b) 3 to 1 or 4 to 1; the ends shall be held in position, as by full depth solid blocking, bridging, hangers, nailing or bolting to other framing members, or other acceptable means.

(c) 5 to 1; one edge shall be held in line for its entire length.

(d) 6 to 1; bridging, full depth solid blocking or cross bracing shall be installed at intervals not exceeding 8 feet unless both edges are held in line or unless the compression edge of the member is supported throughout its length to prevent lateral displacement, as by adequate sheathing or subflooring, and the ends at points of bearing have lateral support to prevent rotation.

(e) 7 to 1; both edges shall be held in line for their entire length.

## WOOD BEAMS

A more precise method of beam design which accounts for lateral stability is given below. The slenderness ratio for a bending member shall be calculated by the following formula:

$$R_B = \sqrt{\frac{\ell_e d}{b^2}}$$

The slenderness ratio, $R_B$, for bending members shall not exceed 50.

The effective span length, $\ell_e$, for single span or cantilever bending members shall be determined as follows:

| | CONDITION | $\ell_u/d < 7$ | $\ell_u/d \geq 7$ |
|---|---|---|---|
| **Cantilever** | uniformly distributed load | $\ell_e = 1.33\ell_u$ | $\ell_e = 0.90\ell_u + 3d$ |
| | concentrated load at unsupported end | $\ell_e = 1.87\ell_u$ | $\ell_e = 1.44\ell_u + 3d$ |
| **Single Span Beam** | uniformly distributed load | $\ell_e = 2.06\ell_u$ | $\ell_e = 1.63\ell_u + 3d$ |
| | concentrated load at center with no intermediate lateral support | $\ell_e = 1.80\ell_u$ | $\ell_e = 1.37\ell_u + 3d$ |
| | equal end moments | $\ell_e = 1.84\ell_u$ | $\ell_e = 1.84\ell_u$ |

The NDS outlines additional load and support conditions for determining the effective length, $\ell_e$, for bending members. For single span or cantilever bending members with loading conditions not specified above, a conservative value is:

$\ell_e = 2.06\ell_u$ when $\ell_u/d < 7$
$\ell_e = 1.63\ell_u + 3d$ when $7 \leq \ell_u/d \leq 14.3$
$\ell_e = 1.84\ell_u$ when $\ell_u/d > 14.3$

The tabulated bending design value, $F_b$, shall be multiplied by all applicable adjustment factors to determine the allowable bending design value, $F_b'$. The beam stability factor, $C_L$, shall be calculated as follows:

$$C_L = \frac{1+(F_{bE}/F_b^*)}{1.9} - \sqrt{\left[\frac{1+(F_{bE}/F_b^*)}{1.9}\right]^2 - \frac{F_{bE}/F_b^*}{0.95}}$$

in which

$F_b^*$ = tabulated bending design value multiplied by all applicable adjustment factors except $C_{fu}$, $C_V$ (see NDS section 2.3), and $C_L$
$F_{bE} = K_{bE}E'/R_B^2$
$K_{bE}$ = 0.438 for visually graded lumber and MEL
$K_{bE}$ = 0.609 for products with $COV_E \leq 0.11$ (See NDS Appendix F.2)

When the compression edge of a bending member is supported throughout its length to prevent lateral displacement, and the ends at points of bearing have lateral support to prevent rotation, $C_L = 1.0$.

The resisting moment of a slender beam is calculated as $M = F_b'S$ (see page 30) but shall not exceed the full design value, $F_bS$, including the duration of load modification (p. 13) and size factor modification (p. 33).

## WOOD BEAMS

Size Factor for Rectangular Beams

As the depth of a beam increases there is a slight decrease in the unit bending strength. Since laboratory test values for clear wood are determined on the basis of a beam 2 inches in depth, it is customary practice to adjust the clear wood values to a depth of 12 inches in assigning allowable bending stresses to visually graded lumber. For large rectangular sawn beams deeper than 12 inches, the size factor may be determined from the following formula:

$$C_F = \left(\frac{12}{d}\right)^{1/9}$$

in which,

$C_F$ = size factor

d = actual depth of beam, inches

The size factor is not applicable to visually graded or machine stress rated lumber 2 to 4 inches thick.

Values for $C_F$ for solid-sawn beams having various depths are as follows:

| when d equals | $C_F$ equals |
|---|---|
| 13.5 in. | 0.987 |
| 15.5 in. | 0.972 |
| 17.5 in. | 0.959 |
| 19.5 in. | 0.947 |
| 21.5 in. | 0.937 |
| 23.5 in. | 0.928 |
| 25.5 in. | 0.920 |
| 27.5 in. | 0.912 |

To calculate the resisting moment of a beam deeper than 12 inches, the size factor is inserted in the standard formula as follows:

$$M = C_F F_b S$$

## Design for Bending and Axial Loading Combined

Loading conditions on a beam, or other member, are sometimes of a nature which induces bending and axial tension or compression in the member at the same time. When this condition is expected to exist, the member must be designed to resist the combined forces without exceeding the allowable unit stresses.

Bending and Axial Tension

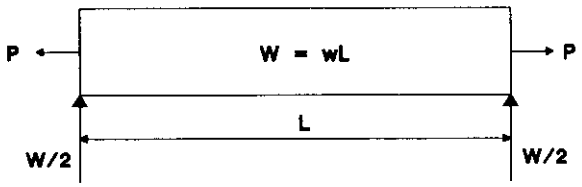



**Figure 8. Bending and Axial Tension Combined**

From Figure 8, the induced tension stress $f_t = P/A$ and the induced unit bending stress $f_b = M/S$. The member is in equilibrium when:

$$\frac{f_t}{F_t'} + \frac{f_b}{F_b^*} \leq 1.0 \quad \textit{and} \quad \frac{f_b - f_t}{F_b^{**}} \leq 1.0$$

in which

$F_b^*$ = tabulated bending design value multiplied by all applicable adjustment factors except $C_L$
$F_b^{**}$ = tabulated bending design value multiplied by all applicable adjustment factors except $C_V$

Bending and Axial Compression

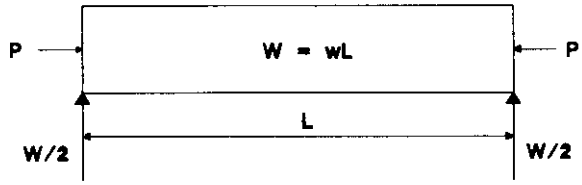



**Figure 9. Bending and Axial Compression Combined**

From Figure 9, the induced unit compression stress $f_c = P/A$ and the induced unit bending stress $f_b = M/S$. This member is in equilibrium when:

$$\left[\frac{f_c}{F_c'}\right]^2 + \frac{f_{b1}}{F_{b1}'[1-(f_c/F_{cE1})]} \leq 1.0$$

$f_{b1}$, $F_{b1}'$ and $F_{cE1}$ and the appropriate application of the above equation are as defined on page 200.

## Design for Deflection

The deflection of a beam is a measure of the deformation which occurs as the beam resists bending under applied load. When the induced bending stress does not exceed the applicable design value, this deformation does not seriously affect the endurance of the beam. Thus, where appearance or rigidity of the assembly is not important, deflection may be ignored and the design based on strength alone. However, where appearance or rigidity is important, deflection may be the controlling factor in determing the size of member required. Another reason for limiting deflection is to control vibration due to impact on residential floors.

### Conditions for Design

The reason for controlling deflection has bearing on the design load selected. Deflection due to the dead load of the materials of construction has occured by the time they are installed. Where the purpose is to provide adequate rigidity to avoid damaging brittle materials or to eliminate excessive vibration in floors due to impact, design for live load only is adequate.

The deflection of a wood beam, under long-continued full design load, will increase beyond what it was immediately after the load was first applied, but without endangering the safety of the beam. Where it is necessary to limit the deflection under such long-continued loading, extra stiffness can be provided in the design stage by increasing member size. This can be done by applying an increase factor to the deflection due to long-term load. Total deflection is thus calculated as the immediate deflection due to long-time or permanent loading, times the appropriate increase factor, plus deflection due to the short-term or normal component of the design load. It has been customary practice to use a deflection factor of 1½ for glued laminated timber or seasoned sawn lumber, or 2 for unseasoned sawn lumber, when calculating deflection due to long-term loading. In any case, it should be understood that the recommended values for modulus of elasticity will give the initial deflection of a beam and that this will increase under long-continued, full design load.

### Deflection Limits

Deflection limits are expressed as a fraction of the span and the selection of an appropriate limit has generally been a matter of judgment on the part of the designer. Originally, it was believed that a limitation of $\ell/360$ of the span, in inches, was required to avoid the cracking of plaster. However, more recent research has demonstrated that other factors have equal or greater bearing on the tendency of plaster to crack in service. The limit of $\ell/360$ has continued in use, mainly for the purpose of providing comfortable floors free from excessive vibration under impact.

The most generally used deflection limits are as follows:

| | |
|---|---|
| For floor joists | $l/360$ of span, inches |
| For ceiling joists | $l/360$ of span, inches |
| For roof framing with slope of 3 in 12 or less | $l/240$ of span, inches |
| For roof framing with slope more than 3 in 12 | $l/180$ of span, inches |

*Calculations for Deflection*

Pages 41 through 57 provide formulas for calculating deflection for various loading conditions for beams. From these formulas, it can be seen that resistance to deflection of a beam under load is provided by the product of the modulus of elasticity, E, and the moment of inertia, I. For a simply supported beam under uniform loading, as illustrated in Figure 7, maximum deflection occurs at mid-span, or at L/2, and the formula is as follows:

$$\Delta = \frac{5Wl^3}{384EI}$$

When converted, this formula becomes

$$\Delta = \frac{5wL^4(12)^3}{384EI} = \frac{22.5wL^4}{EI}$$

This initial formula is altered further on the basis of the acceptable deflection limit as shown in the explanation which follows.

1. When the deflection limit is $l/360$, or L/30, the formula is as follows:

$$\frac{L}{30} = \frac{22.5wL^4}{EI}$$

or,

$$EI = 675wL^3$$

2. When the deflection limit is $l/300$, or L/25, the formula is as follows:

$$\frac{L}{25} = \frac{22.5wL^4}{EI}$$

or,

$$EI = 562.5wL^3$$

3. When the deflection limit is $l/240$, or L/20, the formula is as follows:

$$\frac{L}{20} = \frac{22.5wL^4}{EI}$$

or,

$$EI = 450\,wL^3$$

4. When the deflection limit is $l/180$, or L/15, the formula is as follows:

$$\frac{L}{15} = \frac{22.5wL^4}{EI}$$

or,

$$EI = 337.5\,wL^3$$

For a specified deflection limit, the appropriate formula in items 1 through 4 may be used to determine any one of the four factors of E, I, W, or L provided the other three factors are known. It should be noted that the preceding formulas apply only for the condition of loading illustrated in Figure 7. Formulas for other conditions of loading may be developed by following a similar procedure and using the appropriate information from the moment diagrams on pages 41 through 57.

### Design for Horizontal Shear

A beam subjected to a vertical shearing force is also subjected to a horizontal or longitudinal shearing force. Such a vertical load results in a tendency of the upper part of the beam to slide by the lower part, as illustrated in Figure 10. To maintain equilibrium within the beam, the shear resistance of the wood must equal or exceed the horizontal shear induced by the vertical load. In a rectangular beam, the maximum intensity of horizontal shear occurs at the neutral axis of the section and is dependent upon the magnitude of the vertical shear force.

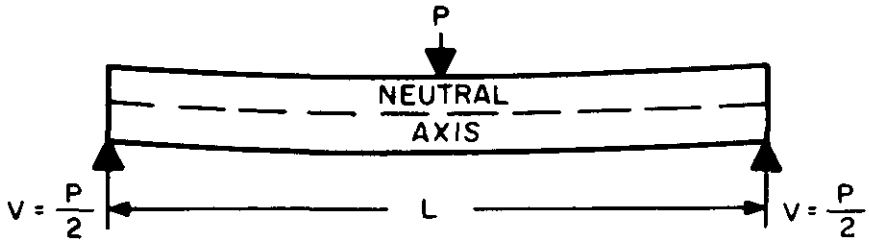



**Figure 10. Horizontal or Longitudinal Shear in Simple Beam**

Calculations for Horizontal Shear

The maximum horizontal shear stress in a wood beam is calculated from the following formula:

$$f_v = \frac{VQ}{Ib}$$

For a rectangular beam b inches wide and d inches deep, this formula becomes

$$f_v = \frac{3V}{2bd}$$

in which $f_v$ may not exceed the design value in horizontal shear, $F_v$ for the species and grade of lumber used.

Horizontal Shear in Checked Beams

In the stress grades of solid-sawn beams, allowances have been made for checks, end splits and shakes in assigning the design values for horizontal shear and design computations are based on the full depth of the beam. Because the upper and lower portions of a beam seriously checked near the neutral axis act partly as two beams and partly as a unit, a part of the vertical design shear, V, is resisted internally by each half of the beam acting separately to supplement the resistance at the neutral axis of the beam. Recognition of the redistribution of stress just described is accomplished by modifying the vertical design shear, V, as indicated in the following:

(a) Take into account any relief to the beam resulting from distribution of load to adjacent parallel members by flooring or other members.

(b) Neglect all loads within a distance from either support equal to the depth of the beam.

(c) With moving loads, place the largest one at a distance from the support equal to the depth of the beam, keeping others in their normal relation.

(d) Treat all other loads in the usual manner.

If a member does not qualify for shear resistance under the foregoing procedure, which for certain conditions may be over conservative, the reaction for concentrated loads should be determined more accurately by the following formula:

$$V = \frac{P\,(\ell_c - x)\,(x/d)^2}{\ell_c\left[2 + (x/d)^2\right]}$$

where $\ell_c$ = clear span.

For additional information on shear controlled design, see the detailed shear design procedure in the National Design Specification for Wood Construction.

Notched Beams

Notching of beams should be avoided, especially on the tension side of the member. Stress concentrations due to notches can be reduced by using a gradual tapered notch configuration in lieu of a square-cornered notch. Notches at the ends do not affect bending strength directly, but do affect shear strength.

Notches in sawn lumber bending members shall not exceed one-sixth the depth of the member and shall not be located in the middle third of the span. Where members are notched at the ends, the notch depth shall not exceed one-fourth the beam depth. The tension side of sawn lumber bending members of 4 inch or greater nominal thickness shall not be notched, except at ends of members.

The shearing strength of a short, relatively deep beam notched on the lower face at the end is decreased by an amount depending on the relation of the depth above the notch to the depth of the beam. This condition is illustrated in Figure 11.

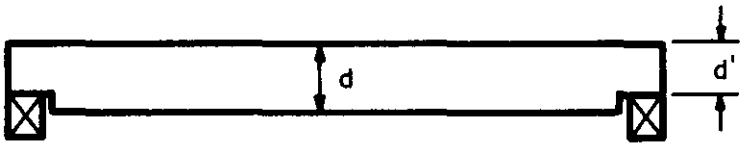



**Figure 11. Horizontal Shear in Notched Beams**

When designing a beam having square-cornered notches at the ends, as in Figure 11, the desired bending load should be checked against the load obtained by the following formula:

$$V = \left(\frac{2}{3} Fv\, bd'\right)\left(\frac{d'}{d}\right)$$

When the depth of a beam at an end has been reduced by a very gradual change in cross section, rather than by an abrupt change in section, the designer may choose to analyse the beam by the shear formulas applicable to straight or tapered beams, rather than the formula for notched beams, but using the reduced depth, $d'$, rather than the full depth, $d$.

### Design for Bearing on Supports

The load on a wood beam tends to compress the wood fibers at points where the beam rests on supporting members. Thus, the area of bearing on such supports must be large enough to transfer the load without damage to the wood fibers. Such required bearing area is determined by dividing the reaction by the design value in compression perpendicular to grain, $F_{c\perp}$, for the species and grade of lumber to be used.

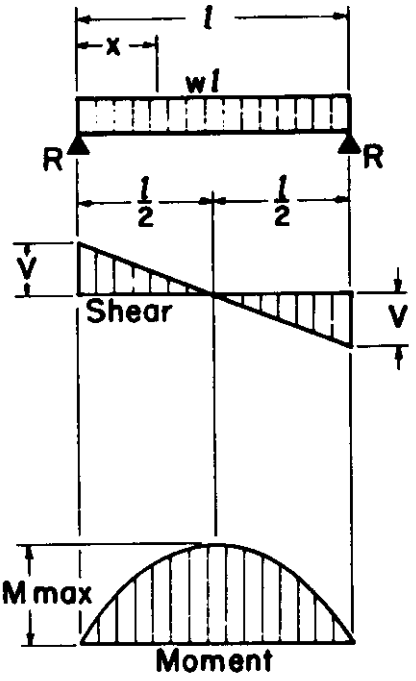
For bearings less than 6 inches in length, located away from the ends of a wood beam, higher stresses in compression perpendicular to grain may be used safely. For bearings shorter than 6 inches, located 3 inches or more from the end of a beam, the design value in compression perpendicular to grain may be increased in accordance with the following factors:

| Length of bearing, inches | 1/2 | 1 | 1 1/2 | 2 | 3 | 4 | 6 or more |
|---|---|---|---|---|---|---|---|
| Factor | 1.75 | 1.38 | 1.25 | 1.19 | 1.13 | 1.10 | 1.00 |

For stress under a washer, the same factor may be taken as for a bearing whose length equals the diameter of the washer.

## FORMULAS AND DIAGRAMS FOR STATIC LOADS

### Simple Beam—Uniformly Distributed Load




$R = V \quad = \frac{wl}{2}$

$V_x \quad = w\left(\frac{l}{2} - x\right)$

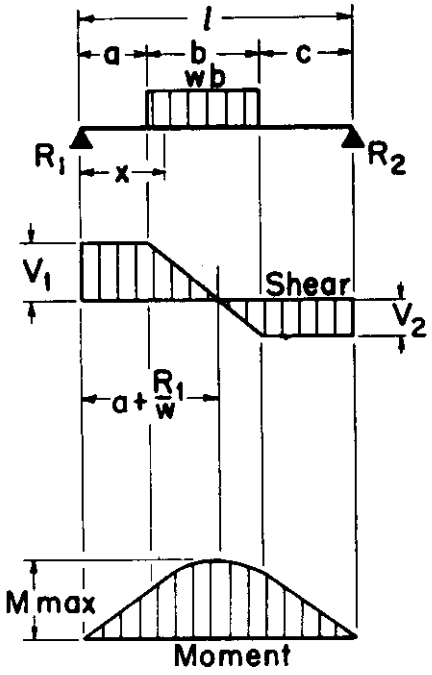
$M \text{ max.} \left(\text{at center}\right) \quad = \frac{wl^2}{8}$

$M_x \quad = \frac{wx}{2}(l - x)$

$\Delta \text{max.} \left(\text{at center}\right) \quad = \frac{5\,wl^4}{384\,EI}$

$\Delta_x \quad = \frac{wx}{24EI}(l^3 - 2lx^2 + x^3)$

### Simple Beam—Uniform Load Partially Distributed




$R_1 = V_1 \left(\text{max. when } a < c\right) \quad = \frac{wb}{2l}(2c + b)$

$R_2 = V_2 \left(\text{max. when } a > c\right) \quad = \frac{wb}{2l}(2a + b)$

$V_x \quad \left(\text{when } x < a \text{ and } > (a + b)\right) = R_1 - w\,(x - a)$

$M \text{ max.} \left(\text{at } x = a + \frac{R_1}{w}\right) \quad = R_1\left(a + \frac{R_1}{2w}\right)$

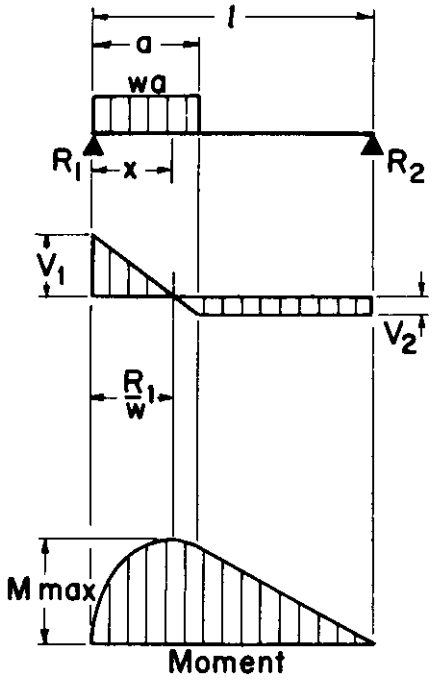
$M_x \quad \left(\text{when } x < a\right) \quad = R_1 x$

$M_x \quad \left(\text{when } x > a \text{ and } < (a + b)\right) = R_1 x - \frac{w}{2}(x - a)^2$

$M_x \quad \left(\text{when } x < (a + b)\right) \quad = R_2\,(l - x)$

## FORMULAS AND DIAGRAMS FOR STATIC LOADS

### Simple Beam—Uniform Load Partially Distributed at One End




$R_1 = V_1$ max. . . . . $= \frac{wa}{2l}(2l-a)$

$R_2 = V_2$ . . . . . $= \frac{wa^2}{2l}$

$V_x$ $\left(\text{when } x < a\right)$ . . . . . $= R_1 - wx$

M max. $\left(\text{at } x = \frac{R_1}{w}\right)$ . . . . . $= \frac{R_1^2}{2w}$

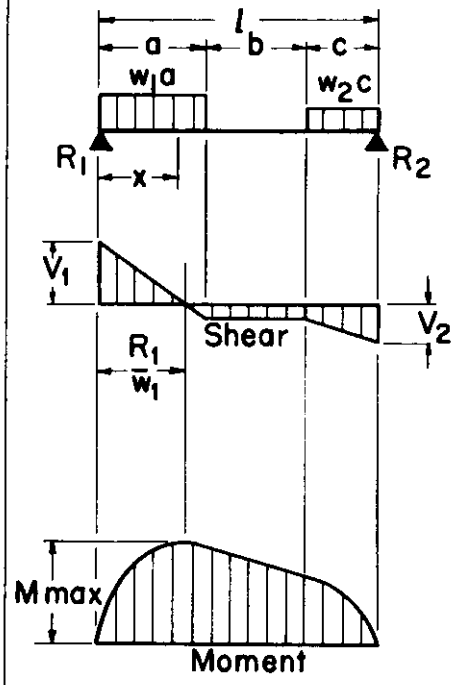
$M_x$ $\left(\text{when } x < a\right)$ . . . . . $= R_1 x - \frac{wx^2}{2}$

$M_x$ $\left(\text{when } x > a\right)$ . . . . . $= R_2(l-x)$

$\Delta_x$ $\left(\text{when } x < a\right)$ . . . . . $= \frac{wx}{24EIl}\left(a^2(2l-a)^2 - 2ax^2(2l-a) + lx^3\right)$

$\Delta_x$ $\left(\text{when } x > a\right)$ . . . . . $= \frac{wa^2(l-x)}{24EIl}(4xl - 2x^2 - a^2)$

### Simple Beam—Uniform Load Partially Distributed at Each End




$R_1 = V_1$ . . . . . $= \frac{w_1 a(2l-a) + w_2 c^2}{2l}$

$R_2 = V_2$ . . . . . $= \frac{w_2 c(2l-c) + w_1 a^2}{2l}$

$V_x$ $\left(\text{when } x < a\right)$ . . . . . $= R_1 - w_1 x$

$V_x$ $\left(\text{when } x > a \text{ and } < (a+b)\right)$ $= R_1 - R_2$

$V_x$ $\left(\text{when } x > (a+b)\right)$ . . . . $= R_2 - w_2(l-x)$

M max. $\left(\text{at } x = \frac{R_1}{w_1} \text{ when } R_1 < w_1 a\right)$ . . $= \frac{R_1^2}{2w_1}$

M max. $\left(\text{at } x = l - \frac{R_2}{w_2} \text{ when } R_2 < w_2 c\right)$ $= \frac{R_2^2}{2w_2}$

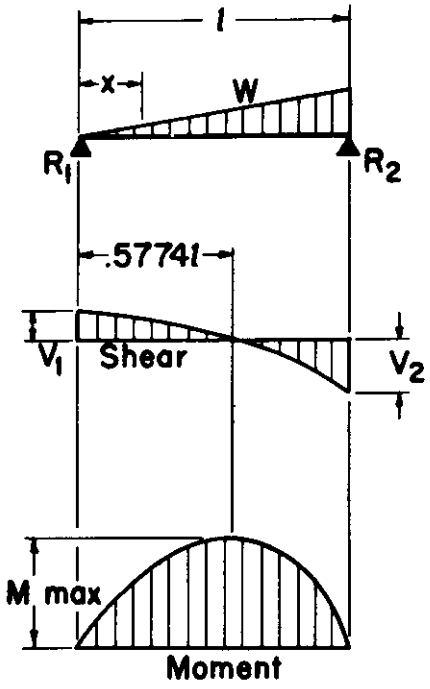
$M_x$ $\left(\text{when } x < a\right)$ . . . . . $= R_1 x - \frac{w_1 x^2}{2}$

$M_x$ $\left(\text{when } x > a \text{ and } < (a+b)\right)$ $= R_1 x - \frac{w_1 a}{2}(2x-a)$

$M_x$ $\left(\text{when } x > (a+b)\right)$ . . . . $= R_2(l-x) - \frac{w_2(l-x)^2}{2}$

# FORMULAS AND DIAGRAMS FOR STATIC LOADS

## Simple Beam—Load Increasing Uniformly to One End




$R_1 = V_1 \ldots = \frac{W}{3}$

$R_2 = V_2 \text{ max.} \ldots = \frac{2W}{3}$

$V_x \ldots = \frac{W}{3} - \frac{Wx^2}{l^2}$

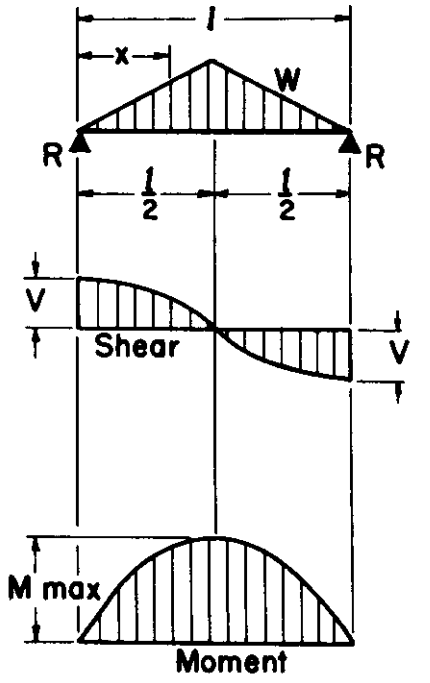
$M \text{ max.} \left(\text{at } x = \frac{l}{\sqrt{3}} = .5774l\right) \ldots = \frac{2Wl}{9\sqrt{3}} = .1283\,Wl$

$M_x \ldots = \frac{Wx}{3l^2}(l^2 - x^2)$

$\Delta \text{max.} \left(\text{at } x = l\sqrt{1 - \sqrt{\frac{8}{15}}} = .5193l\right) = .01304\,\frac{Wl^3}{EI}$

$\Delta_x \ldots = \frac{Wx}{180EI\,l^2}(3x^4 - 10l^2x^2 + 7l^4)$

## Simple Beam—Load Increasing Uniformly to Center




$R = V \ldots = \frac{W}{2}$

$V_x \left(\text{when } x < \frac{l}{2}\right) \ldots = \frac{W}{2l^2}(l^2 - 4x^2)$

$M \text{ max.} \left(\text{at center}\right) \ldots = \frac{Wl}{6}$

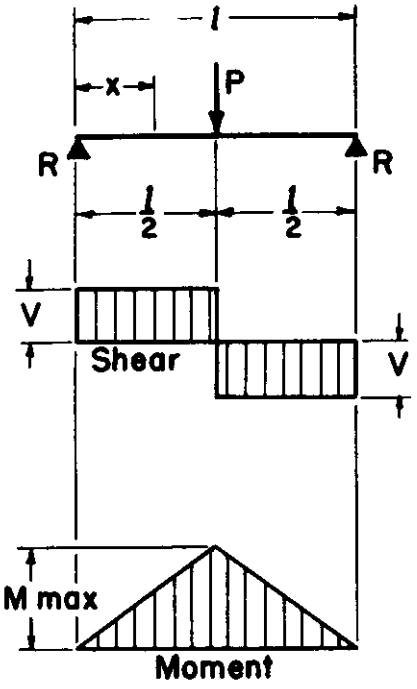
$M_x \left(\text{when } x < \frac{l}{2}\right) \ldots = Wx\left(\frac{1}{2} - \frac{2x^2}{3l^2}\right)$

$\Delta \text{max.} \left(\text{at center}\right) \ldots = \frac{Wl^3}{60EI}$

$\Delta_x \ldots = \frac{Wx}{480EI\,l^2}(5l^2 - 4x^2)^2$

# FORMULAS AND DIAGRAMS FOR STATIC LOADS

## Simple Beam—Concentrated Load at Center




$R = V \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad = \frac{P}{2}$

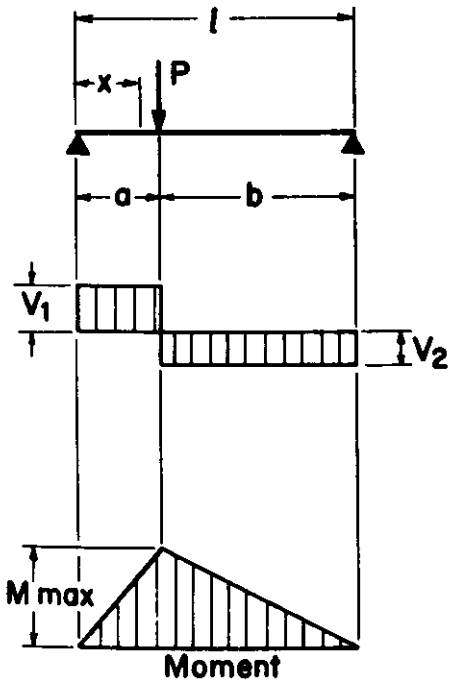
$M \text{ max.} \left(\text{at point of load}\right) \quad . \quad . \quad . \quad . \quad . \quad = \frac{Pl}{4}$

$Mx \quad \left(\text{when } x < \frac{l}{2}\right) \quad . \quad . \quad . \quad . \quad . \quad . \quad = \frac{Px}{2}$

$\Delta \text{max.} \left(\text{at point of load}\right) \quad . \quad . \quad . \quad . \quad . \quad = \frac{Pl^3}{48EI}$

$\Delta x \quad \left(\text{when } x < \frac{l}{2}\right) \quad . \quad . \quad . \quad . \quad . \quad . \quad = \frac{Px}{48EI}(3l^2 - 4x^2)$

## Simple Beam—Concentrated Load at Any Point




$R_1 = V_1 \quad \left(\text{max. when } a < b\right) \quad . \quad . \quad . \quad . \quad . \quad . \quad = \frac{Pb}{l}$

$R_2 = V_2 \quad \left(\text{max. when } a > b\right) \quad . \quad . \quad . \quad . \quad . \quad . \quad = \frac{Pa}{l}$

$M \text{ max.} \quad \left(\text{at point of load}\right) \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad = \frac{Pab}{l}$

$Mx \quad \left(\text{when } x < a\right) \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad = \frac{Pbx}{l}$

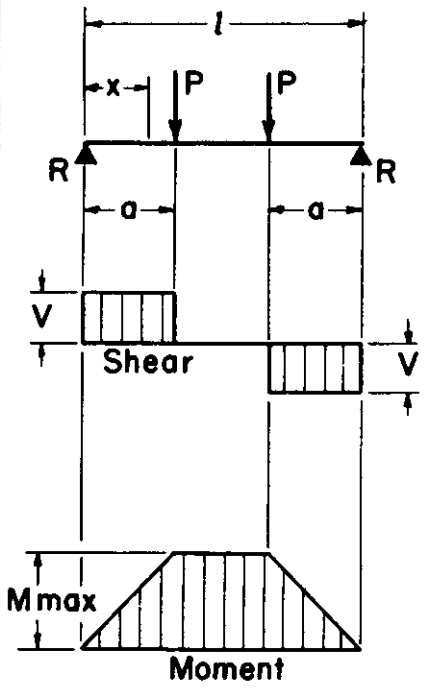
$\Delta \text{max.} \quad \left(\text{at } x = \sqrt{\frac{a(a+2b)}{3}} \text{ when } a > b\right) \quad = \frac{Pab(a+2b)\sqrt{3a(a+2b)}}{27EIl}$

$\Delta a \quad \left(\text{at point of load}\right) \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad = \frac{Pa^3b^3}{3EIl}$

$\Delta x \quad \left(\text{when } x < a\right) \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad = \frac{Pbx}{6EIl}(l^2 - b^2 - x^2)$

## FORMULAS AND DIAGRAMS FOR STATIC LOADS

### Simple Beam—Two Equal Concentrated Loads Symmetrically Placed




$R = V \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad = P$

$M \text{ max.} \left(\text{between loads}\right) \quad . \quad . \quad . \quad . \quad . \quad = Pa$

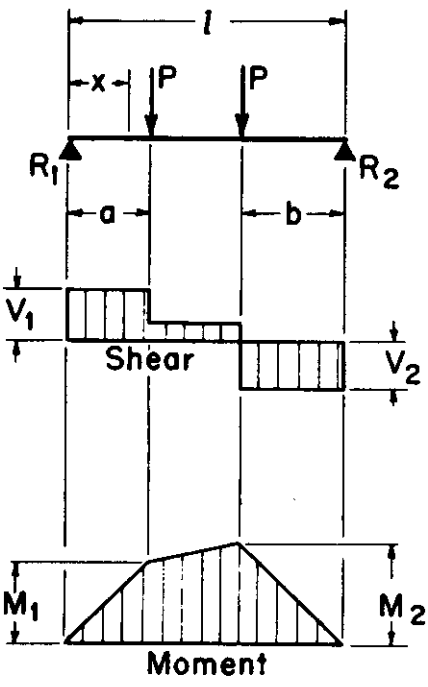
$M_x \quad \left(\text{when } x < a\right) \quad . \quad . \quad . \quad . \quad . \quad . \quad = Px$

$\Delta \text{max.} \left(\text{at center}\right) \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad = \frac{Pa}{24EI}(3l^2 - 4a^2)$

$\Delta_x \quad \left(\text{when } x < a\right) \quad . \quad . \quad . \quad . \quad . \quad . \quad = \frac{Px}{6EI}(3la - 3a^2 - x^2)$

$\Delta_x \quad \left(\text{when } x > a \text{ and } < (l - a)\right) \quad . \quad = \frac{Pa}{6EI}(3lx - 3x^2 - a^2)$

### Simple Beam—Two Equal Concentrated Loads Unsymmetrically Placed




$R_1 = V_1 \left(\text{max. when } a < b\right) \quad . \quad . \quad . \quad . \quad = \frac{P}{l}(l - a + b)$

$R_2 = V_2 \left(\text{max. when } a > b\right) \quad . \quad . \quad . \quad . \quad = \frac{P}{l}(l - b + a)$

$V_x \quad \left(\text{when } x > a \text{ and } < (l - b)\right) \quad . \quad = \frac{P}{l}(b - a)$

$M_1 \quad \left(\text{max. when } a > b\right) \quad . \quad . \quad . \quad . \quad = R_1 a$

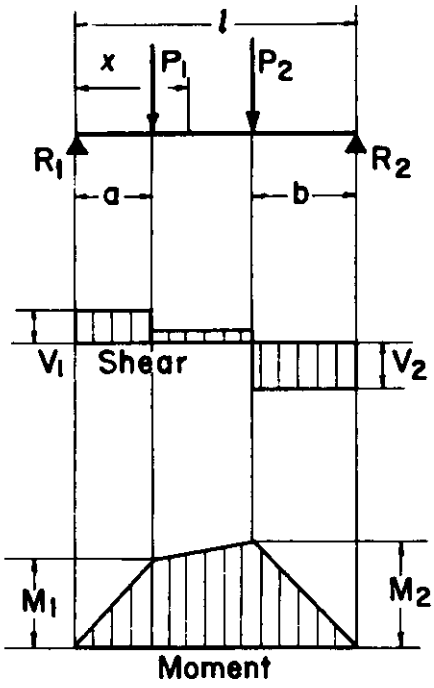
$M_2 \quad \left(\text{max. when } a < b\right) \quad . \quad . \quad . \quad . \quad = R_2 b$

$M_x \quad \left(\text{when } x < a\right) \quad . \quad . \quad . \quad . \quad . \quad . \quad = R_1 x$

$M_x \quad \left(\text{when } x > a \text{ and } < (l - b)\right) \quad . \quad = R_1 x - P(x - a)$

## FORMULAS AND DIAGRAMS FOR STATIC LOADS

### Simple Beam—Two Unequal Concentrated Loads Unsymmetrically Placed




$R_1 = V_1 \ldots = \dfrac{P_1(l-a) + P_2 b}{l}$

$R_2 = V_2 \ldots = \dfrac{P_1 a + P_2(l-b)}{l}$

$V_x$ (when $x > a$ and $< (l-b)$) . $= R_1 - P_1$

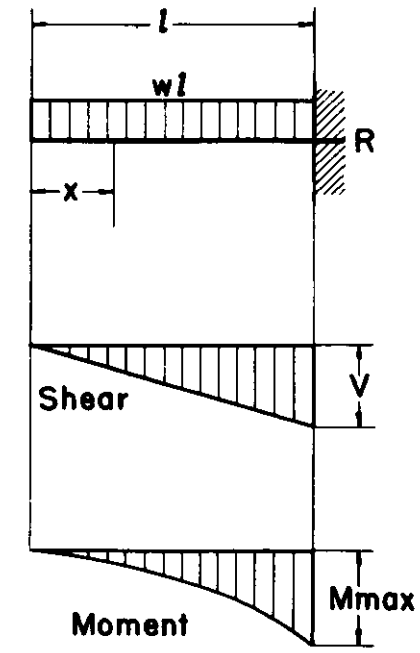
$M_1$ (max. when $R_1 < P_1$) . . . . $= R_1 a$

$M_2$ (max. when $R_2 < P_2$) . . . . $= R_2 b$

$M_x$ (when $x < a$) . . . . . $= R_1 x$

$M_x$ (when $x > a$ and $< (l-b)$) . $= R_1 x - P_1(x-a)$

### Cantilever Beam—Uniformly Distributed Load




$R = V \ldots = wl$

$V_x \ldots = wx$

M max. (at fixed end) . . . . . $= \dfrac{wl^2}{2}$

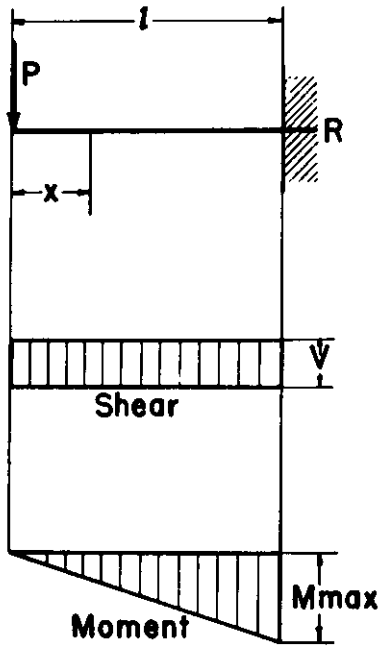
$M_x \ldots = \dfrac{wx^2}{2}$

$\Delta$max. (at free end) . . . . . $= \dfrac{wl^4}{8EI}$

$\Delta_x \ldots = \dfrac{w}{24EI}(x^4 - 4l^3x + 3l^4)$

## FORMULAS AND DIAGRAMS FOR STATIC LOADS

### Cantilever Beam—Concentrated Load at Free End




$R = V \quad = P$

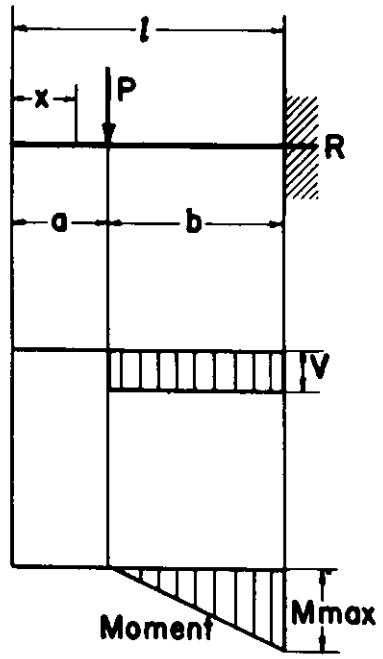
$M\ max.\ (at\ fixed\ end) \quad = Pl$

$M_x \quad = Px$

$\Delta max.\ (at\ free\ end) \quad = \frac{Pl^3}{3EI}$

$\Delta_x \quad = \frac{P}{6EI}(2l^3 - 3l^2x + x^3)$

### Cantilever Beam—Concentrated Load at Any Point




$R = V \quad (when\ x < a) \quad = P$

$M\ max.\ (at\ fixed\ end) \quad = Pb$

$M_x \quad (when\ x > a) \quad = P(x - a)$

$\Delta max.\ (at\ free\ end) \quad = \frac{Pb^2}{6EI}(3l - b)$

$\Delta_a \quad (at\ point\ of\ load) \quad = \frac{Pb^3}{3EI}$

$\Delta_x \quad (when\ x < a) \quad = \frac{Pb^2}{6EI}(3l - 3x - b)$

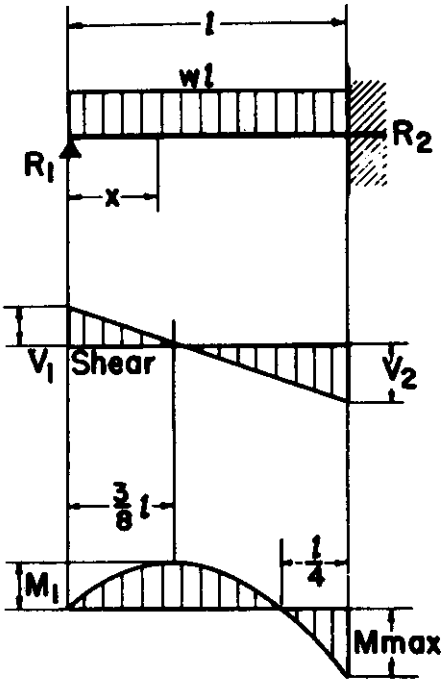
$\Delta_x \quad (when\ x > a) \quad = \frac{P(l - x)^2}{6EI}(3b - l + x)$



Data reproduced by courtesy of Western Wood Products Association

# FORMULAS AND DIAGRAMS FOR STATIC LOADS

## Beam Fixed at One End, Supported at Other—Uniformly Distributed Load




$R_1 = V_1 \quad = \frac{3wl}{8}$

$R_2 = V_2 \text{ max.} \quad = \frac{5wl}{8}$

$V_x \quad = R_1 - wx$

$M \text{ max.} \quad = \frac{wl^2}{8}$

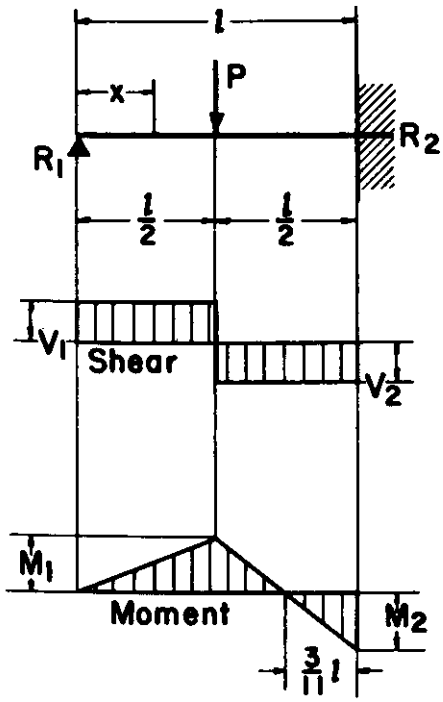
$M_1 \quad \left(\text{at } x = \frac{3}{8}l\right) \quad = \frac{9}{128}wl^2$

$M_x \quad = R_1 x - \frac{wx^2}{2}$

$\Delta \text{max.} \quad \left(\text{at } x = \frac{l}{16}(1 + \sqrt{33}) = .4215l\right) = \frac{wl^4}{185EI}$

$\Delta_x \quad = \frac{wx}{48EI}(l^3 - 3lx^2 + 2x^3)$

## Beam Fixed at One End, Supported at Other—Concentrated Load at Center




$R_1 = V_1 \quad = \frac{5P}{16}$

$R_2 = V_2 \text{ max.} \quad = \frac{11P}{16}$

$M \text{ max.} \left(\text{at fixed end}\right) \quad = \frac{3Pl}{16}$

$M_1 \quad \left(\text{at point of load}\right) \quad = \frac{5Pl}{32}$

$M_x \quad \left(\text{when } x < \frac{l}{2}\right) \quad = \frac{5Px}{16}$

$M_x \quad \left(\text{when } x > \frac{l}{2}\right) \quad = P\left(\frac{l}{2} - \frac{11x}{16}\right)$

$\Delta \text{max.} \quad \left(\text{at } x = l\sqrt{\frac{1}{5}} = .4472l\right) \quad = \frac{Pl^3}{48EI\sqrt{5}} = .009317\frac{Pl^3}{EI}$

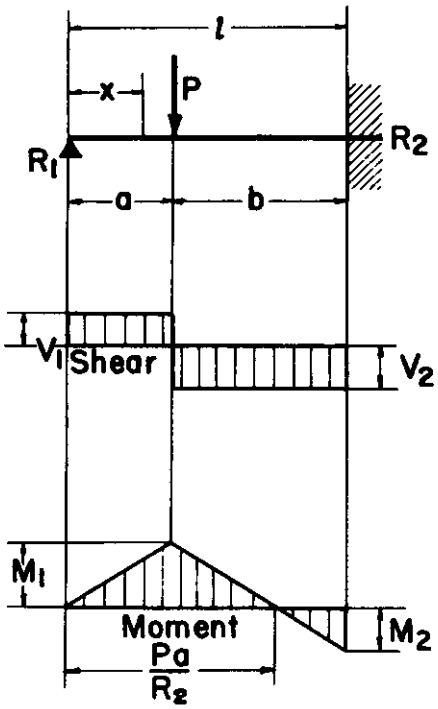
$\Delta_x \quad \left(\text{at point of load}\right) \quad = \frac{7Pl^3}{768EI}$

$\Delta_x \quad \left(\text{when } x < \frac{l}{2}\right) \quad = \frac{Px}{96EI}(3l^2 - 5x^2)$

$\Delta_x \quad \left(\text{when } x > \frac{l}{2}\right) \quad = \frac{P}{96EI}(x - l)^2(11x - 2l)$

# FORMULAS AND DIAGRAMS FOR STATIC LOADS

## Beam Fixed at One End, Supported at Other—Concentrated Load at Any Point




$R_1 = V_1 \quad \ldots\ldots\ldots\ldots = \frac{Pb^2}{2l^3}(a + 2l)$

$R_2 = V_2 \quad \ldots\ldots\ldots\ldots = \frac{Pa}{2l^3}(3l^2 - a^2)$

$M_1 \quad (\text{at point of load}) \ldots\ldots\ldots = R_1 a$

$M_2 \quad (\text{at fixed end}) \ldots\ldots\ldots = \frac{Pab}{2l^2}(a + l)$

$Mx \quad (\text{when } x < a) \ldots\ldots\ldots = R_1 x$

$Mx \quad (\text{when } x > a) \ldots\ldots\ldots = R_1 x - P(x - a)$

$\Delta\text{max.} \left(\text{when } a < .414l \text{ at } x = l\frac{l^2 + a^2}{3l^2 - a^2}\right) = \frac{Pa}{3EI}\frac{(l^2 - a^2)^2}{(3l^2 - a^2)^2}$

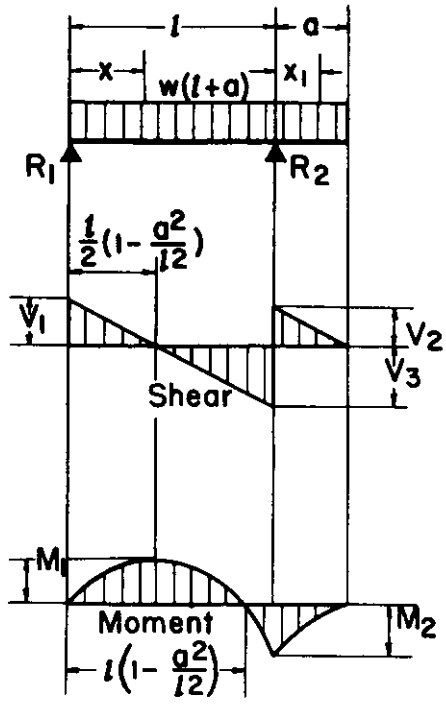
$\Delta\text{max.} \left(\text{when } a > .414l \text{ at } x = l\sqrt{\frac{a}{2l + a}}\right) = \frac{Pab^2}{6EI}\sqrt{\frac{a}{2l + a}}$

$\Delta a \quad (\text{at point of load}) \ldots\ldots\ldots = \frac{Pa^2b^2}{12EIl^3}(3l + a)$

$\Delta x \quad (\text{when } x < a) \ldots\ldots\ldots = \frac{Pb^2x}{12EIl^3}(3al^2 - 2lx^2 - ax^2)$

$\Delta x \quad (\text{when } x > a) \ldots\ldots\ldots = \frac{Pa}{12EIl^3}(l - x)^2(3l^2x - a^2x - 2a^2l)$

## Beam Overhanging One Support—Uniformly Distributed Load




$R_1 = V_1 \quad \ldots\ldots\ldots\ldots = \frac{w}{2l}(l^2 - a^2)$

$R_2 = V_2 + V_3 \ldots\ldots\ldots\ldots = \frac{w}{2l}(l + a)^2$

$V_2 \quad \ldots\ldots\ldots\ldots = wa$

$V_3 \quad \ldots\ldots\ldots\ldots = \frac{w}{2l}(l^2 + a^2)$

$Vx \quad (\text{between supports}) \ldots = R_1 - wx$

$Vx_1 \quad (\text{for overhang}) \ldots\ldots = w(a - x_1)$

$M_1 \quad \left(\text{at } x = \frac{l}{2}\left[1 - \frac{a^2}{l^2}\right]\right) \ldots = \frac{w}{8l^2}(l + a)^2(l - a)^2$

$M_2 \quad (\text{at } R_2) \ldots\ldots\ldots = \frac{wa^2}{2}$

$Mx \quad (\text{between supports}) \ldots = \frac{wx}{2l}(l^2 - a^2 - xl)$

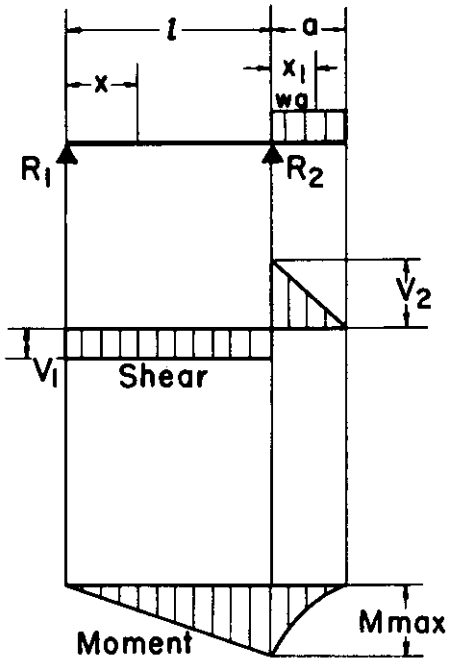
$Mx_1 \quad (\text{for overhang}) \ldots\ldots = \frac{w}{2}(a - x_1)^2$

$\Delta x \quad (\text{between supports}) \ldots = \frac{wx}{24EIl}(l^4 - 2l^2x^2 + lx^3 - 2a^2l^2 + 2a^2x^2)$

$\Delta x_1 \quad (\text{for overhang}) \ldots\ldots = \frac{wx_1}{24EI}(4a^2l - l^2 + 6a^2x_1 - 4ax_1^2 + x_1^3)$

# FORMULAS AND DIAGRAMS FOR STATIC LOADS

## Beam Overhanging One Support—Uniformly Distributed Load on Overhang




$R_1 = V_1 \ldots = \frac{wa^2}{2l}$

$R_2 = V_1 + V_2 \ldots = \frac{wa}{2l}(2l + a)$

$V_2 \ldots = wa$

$V_{x_1}$ (for overhang) $\ldots = w(a - x_1)$

M max. (at $R_2$) $\ldots = \frac{wa^2}{2}$

$M_x$ (between supports) $\ldots = \frac{wa^2x}{2l}$

$M_{x_1}$ (for overhang) $\ldots = \frac{w}{2}(a - x_1)^2$

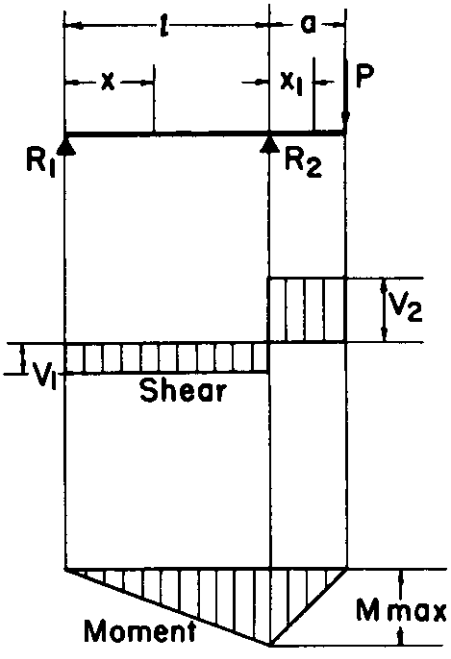
$\Delta$max. (between supports at $x = \frac{l}{\sqrt{3}}$) $= \frac{wa^2l^2}{18\sqrt{3}EI} = .03208\frac{wa^2l^2}{EI}$

$\Delta$max. (for overhang at $x_1 = a$) $\ldots = \frac{wa^2}{24EI}(4l + 3a)$

$\Delta_x$ (between supports) $\ldots = \frac{wa^2x}{12EIl}(l^2 - x^2)$

$\Delta_{x_1}$ (for overhang) $\ldots = \frac{wx_1}{24EI}(4a^2l + 6a^2x_1 - 4ax_1^2 + x_1^3)$

## Beam Overhanging One Support—Concentrated Load at End of Overhang




$R_1 = V_1 \ldots = \frac{Pa}{l}$

$R_2 = V_1 + V_2 \ldots = \frac{P}{l}(l + a)$

$V_2 \ldots = P$

M max. (at $R_2$) $\ldots = Pa$

$M_x$ (between supports) $\ldots = \frac{Pax}{l}$

$M_{x_1}$ (for overhang) $\ldots = P(a - x_1)$

$\Delta$max (between supports at $x = \frac{l}{\sqrt{3}}$) $= \frac{Pal^2}{9\sqrt{3}EI} = .06415\frac{Pal^2}{EI}$

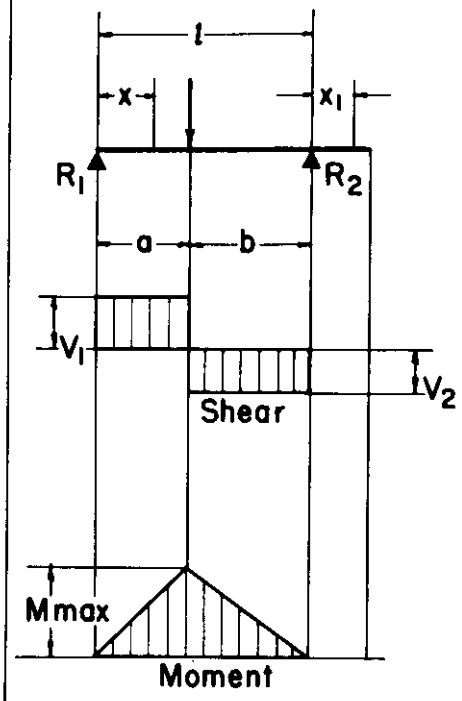
$\Delta$max (for overhang at $x_1 = a$) $\ldots = \frac{Pa^2}{3EI}(l + a)$

$\Delta_x$ (between supports) $\ldots = \frac{Pax}{6EIl}(l^2 - x^2)$

$\Delta_{x_1}$ (for overhang) $\ldots = \frac{Px_1}{6EI}(2al + 3ax_1 - x_1^2)$

# FORMULAS AND DIAGRAMS FOR STATIC LOADS

## Beam Overhanging One Support—Concentrated Load at Any Point Between Supports




$R_1 = V_1$ (max. when $a < b$) . . . . . $= \frac{Pb}{l}$

$R_2 = V_2$ (max. when $a > b$) . . . . . $= \frac{Pa}{l}$

M max. (at point of load) . . . . . $= \frac{Pab}{l}$

Mx (when $x < a$) . . . . . $= \frac{Pbx}{l}$

$\Delta$max. $\left(\text{at } x = \sqrt{\frac{a(a+2b)}{3}} \text{ when } a > b\right) = \frac{Pab\,(a+2b)\,\sqrt{3a\,(a+2b)}}{27EI\,l}$

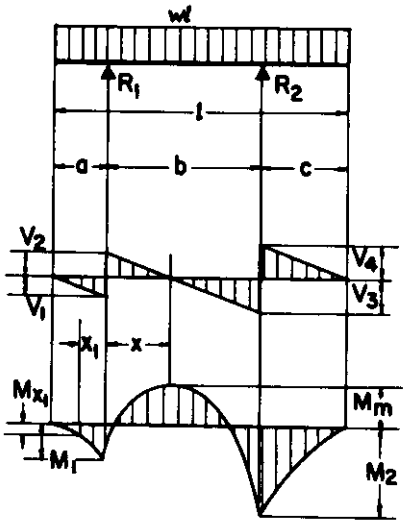
$\Delta a$ (at point of load) . . . . . $= \frac{Pa^2b^2}{3EI\,l}$

$\Delta x$ (when $x < a$) . . . . . $= \frac{Pbx}{6EI\,l}(l^2 - b^2 - x^2)$

$\Delta x$ (when $x > a$) . . . . . $= \frac{Pa\,(l-x)}{6EI\,l}(2lx - x^2 - a^2)$

$\Delta x_1$ . . . . . $= \frac{Pabx_1}{6EI\,l}(l + a)$

## Beam Overhanging Both Supports—Unequal Overhangs—Uniformly Distributed Load




$R_1$ . . . . . $= \frac{wl\,(l - 2c)}{2b}$

$R_2$ . . . . . $= \frac{wl\,(l - 2a)}{2b}$

$V_1$ . . . . . $= wa$

$V_2$ . . . . . $= R_1 - V_1$

$V_3$ . . . . . $= R_2 - V_4$

$V_4$ . . . . . $= wc$

$V_{x_1}$ . . . . . $= V_1 - wx_1$

Vx (when $x < l$) . . . . . $= R_1 - w\,(a + x_1)$

Vm (when $a < c$) . . . . . $= R_2 - wc$

$M_1$ . . . . . $= -\frac{wa^2}{2}$

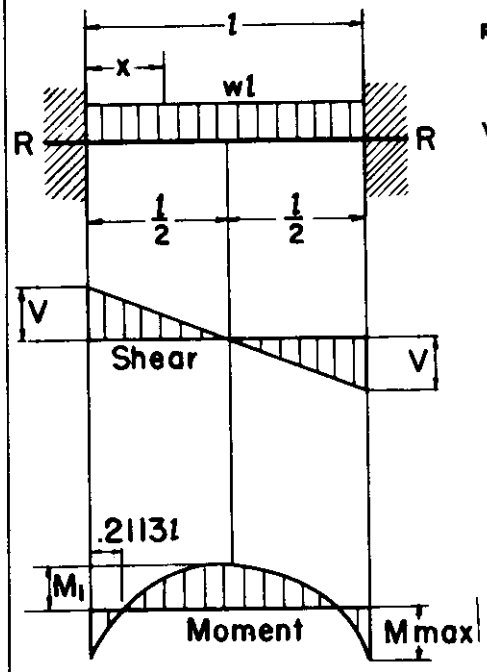
$M_2$ . . . . . $= -\frac{wc^2}{2}$

Mm . . . . . $= R_1\left(\frac{R_1}{2w} - a\right)$

Mx $\left(\text{max. when } x = \frac{R_1}{w} - a\right)$ . . . $= R_1x - \frac{w\,(a + x)^2}{2}$

## FORMULAS AND DIAGRAMS FOR STATIC LOADS

### Beam Fixed at Both Ends—Uniformly Distributed Load




$R = V \quad = \frac{wl}{2}$

$V_x \quad = w\left(\frac{l}{2} - x\right)$

$M \text{ max.} \left(\text{at ends}\right) \quad = \frac{wl^2}{12}$

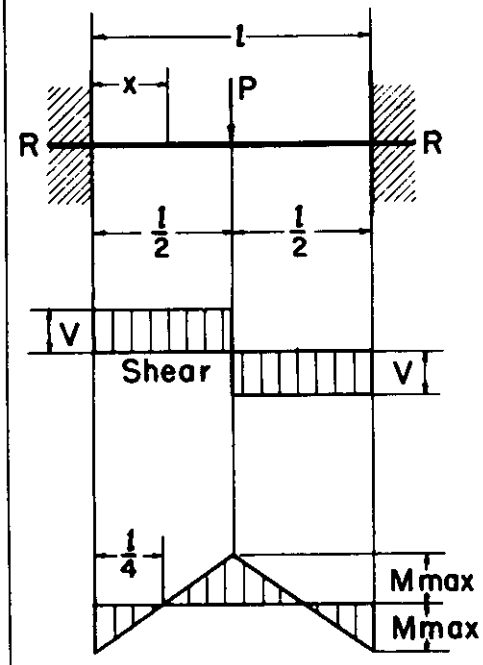
$M_1 \quad \left(\text{at center}\right) \quad = \frac{wl^2}{24}$

$M_x \quad = \frac{w}{12}(6lx - l^2 - 6x^2)$

$\Delta \text{max.} \left(\text{at center}\right) \quad = \frac{wl^4}{384EI}$

$\Delta_x \quad = \frac{wx^2}{24EI}(l - x)^2$

### Beam Fixed at Both Ends—Concentrated Load at Center




$R = V \quad = \frac{P}{2}$

$M \text{ max.} \left(\text{at center and ends}\right) \quad = \frac{Pl}{8}$

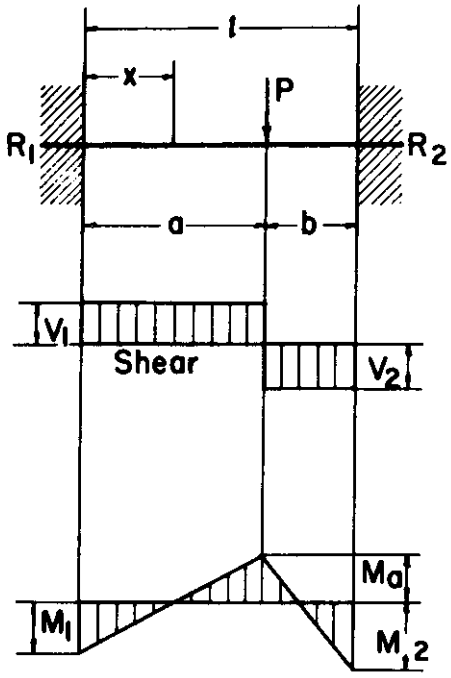
$M_x \quad \left(\text{when } x < \frac{l}{2}\right) \quad = \frac{P}{8}(4x - l)$

$\Delta \text{max.} \left(\text{at center}\right) \quad = \frac{Pl^3}{192EI}$

$\Delta_x \quad = \frac{Px^2}{48EI}(3l - 4x)$

# FORMULAS AND DIAGRAMS FOR STATIC LOADS

## Beam Fixed at Both Ends—Concentrated Load at Any Point




$R_1 = V_1$ (max. when $a < b$) . . . . $= \frac{Pb^2}{l^3}(3a + b)$

$R_2 = V_2$ (max. when $a > b$) . . . . $= \frac{Pa^2}{l^3}(a + 3b)$

$M_1$ (max. when $a < b$) . . . . $= \frac{Pab^2}{l^2}$

$M_2$ (max. when $a > b$) . . . . $= \frac{Pa^2b}{l^2}$

$M_a$ (at point of load) . . . . . $= \frac{2Pa^2b^2}{l^3}$

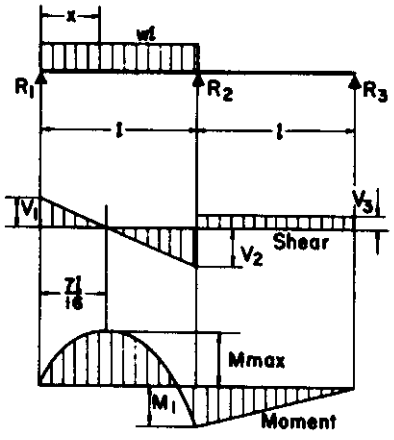
$M_x$ (when $x < a$) . . . . . $= R_1 x - \frac{Pab^2}{l^2}$

$\Delta_{max.}$ $\left(\text{when } a > b \text{ at } x = \frac{2al}{3a + b}\right)$ . $= \frac{2Pa^3b^3}{3EI(3a + b)^2}$

$\Delta_a$ (at point of load) . . . . . $= \frac{Pa^3b^3}{3EIl^3}$

$\Delta_x$ (when $x < a$) . . . . . $= \frac{Pb^2x^2}{6EIl^3}(3al - 3ax - bx)$

## Continuous Beam—Two Equal Spans—Uniform Load on One Span




$R_1 = V_1$ . . . . . $= \frac{7}{16}wl$

$R_2 = V_2 + V_3$ . . . . . $= \frac{5}{8}wl$

$R_3 = V_3$ . . . . . $= \frac{1}{16}wl$

$V_2$ . . . . . $= \frac{9}{16}wl$

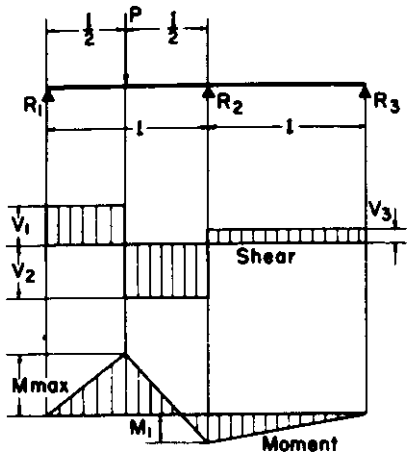
$M_{max.}$ $\left(\text{at } x = \frac{7}{16}l\right)$ . . . . . $= \frac{49}{512}wl^2$

$M_1$ (at support $R_2$) . . . . . $= \frac{1}{16}wl^2$

$M_x$ (when $x < l$) . . . . . $= \frac{wx}{16}(7l - 8x)$

# FORMULAS AND DIAGRAMS FOR STATIC LOADS

## Continuous Beam—Two Equal Spans—Concentrated Load at Center of One Span




$R_1 = V_1 \ldots = \frac{13}{32}P$

$R_2 = V_2 + V_3 \ldots = \frac{11}{16}P$

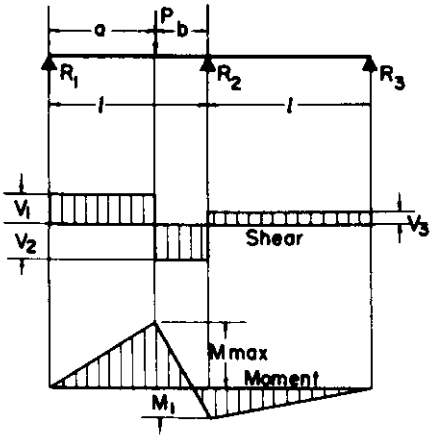
$R_3 = V_3 \ldots = -\frac{3}{32}P$

$V_2 \ldots = \frac{19}{32}P$

$M$ max. (at point of load) $\ldots = \frac{13}{64}Pl$

$M_1$ (at support $R_2$) $\ldots = \frac{3}{32}Pl$

## Continuous Beam—Two Equal Spans—Concentrated Load at Any Point




$R_1 = V_1 \ldots = \frac{Pb}{4l^3}\left(4l^3 - a\,(l+a)\right)$

$R_2 = V_2 + V_3 \ldots = \frac{Pa}{2l^3}\left(2l^3 + b\,(l+a)\right)$

$R_3 = V_3 \ldots = \frac{Pab}{4l^3}\,(l+a)$

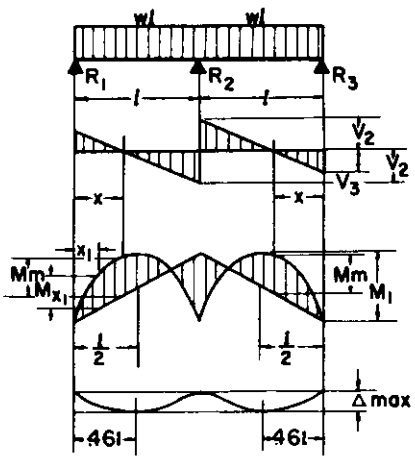
$V_2 \ldots = \frac{Pa}{4l^3}\left(4l^3 + b\,(l+a)\right)$

$M$ max. (at point of load) $\ldots = \frac{Pab}{4l^3}\left(4l^3 - a\,(l+a)\right)$

$M_1$ (at support $R_2$) $\ldots = \frac{Pab}{4l^3}\,(l+a)$

## FORMULAS AND DIAGRAMS FOR STATIC LOADS

### Continuous Beam—Two Equal Spans—Uniformly Distributed Load




$R_1 = V_1 = R_3 = V_3 \ldots\ldots\ldots = \frac{3wl}{8}$

$R_2 \ldots\ldots\ldots\ldots\ldots = \frac{10wl}{8}$

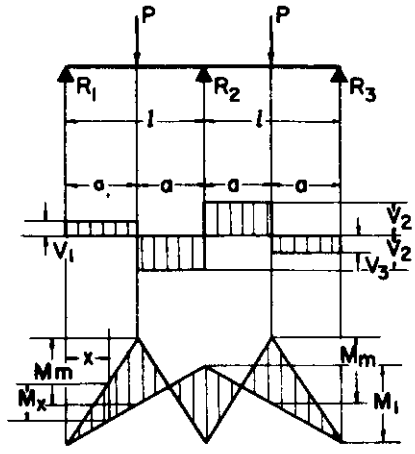
$V_2 = V_{max} \ldots\ldots\ldots\ldots = \frac{5wl}{8}$

$M_1 \ldots\ldots\ldots\ldots\ldots = -\frac{wl^2}{8}$

$M_m \left(\text{at } \frac{3l}{8}\right) \ldots\ldots\ldots = \frac{9wl^2}{128}$

$\Delta_{max.} \left(\text{at } 0.46l, \text{ approx, from } R_1 \text{ and } R_2\right) = \frac{wl^4}{185EI}$

### Continuous Beam—Two Equal Spans—Two Equal Concentrated Loads Symmetrically Placed




$R_1 = V_2 = R_3 = V_3 \ldots\ldots\ldots = \frac{5P}{16}$

$R_2 = 2V_3 \ldots\ldots\ldots\ldots = \frac{11P}{8}$

$V_2 = P - R_1 \ldots\ldots\ldots\ldots = \frac{11P}{16}$

$V_{max.} \ldots\ldots\ldots\ldots\ldots = V_2$

$M_1 \ldots\ldots\ldots\ldots\ldots = -\frac{3Pl}{16}$

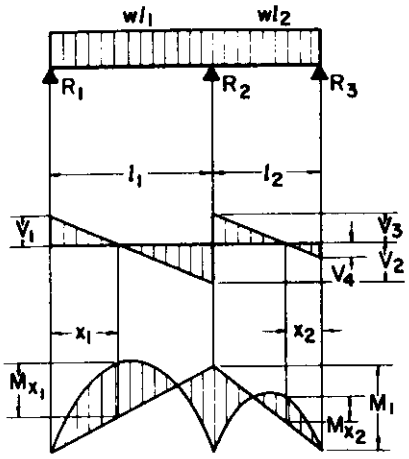
$M_m \ldots\ldots\ldots\ldots\ldots = \frac{5Pl}{32}$

$M_x \left(\text{when } x < a\right) \ldots\ldots = R_1 x$


Data reproduced by courtesy of Western Wood Products Association

# FORMULAS AND DIAGRAMS FOR STATIC LOADS

## Continuous Beam—Two Unequal Spans—Uniformly Distributed Load




$R_1 \ldots = \frac{M_1}{l_1} + \frac{wl_1}{2}$

$R_2 \ldots = wl_1 + wl_2 - R_1 - R_3$

$R_3 = V_4 \ldots = \frac{M_1}{l_2} + \frac{wl_2}{2}$

$V_1 \ldots = R_1$

$V_2 \ldots = wl_1 - R_1$

$V_3 \ldots = wl_2 - R_3$

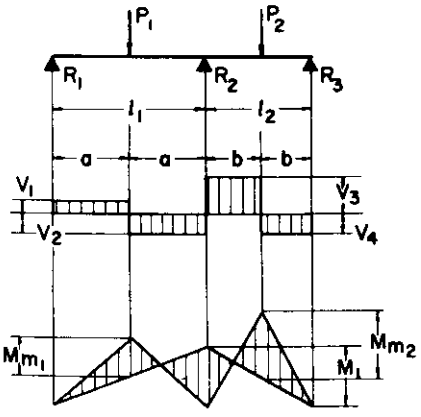
$V_4 \ldots = R_3$

$M_1 \ldots = -\frac{wl_2^3 + wl_1^3}{8(l_1 + l_2)}$

$Mx_1 \quad \left(\text{when } x_1 = \frac{R_1}{w}\right) \ldots = R_1x_1 - \frac{wx_1^2}{2}$

$Mx_2 \quad \left(\text{when } x_2 = \frac{R_3}{w}\right) \ldots = R_3x_2 - \frac{wx_2^2}{2}$

## Continuous Beam—Two Unequal Spans—Concentrated Load on Each Span Symmetrically Placed




$R_1 \ldots = \frac{M_1}{l_1} + \frac{P_1}{2}$

$R_2 \ldots = P_1 + P_2 - R_1 - R_3$

$R_3 \ldots = \frac{M_1}{l_2} + \frac{P_2}{2}$

$V_1 \ldots = R_1$

$V_2 \ldots = P_1 - R_1$

$V_3 \ldots = P_2 - R_3$

$V_4 \ldots = R_3$

$M_1 \ldots = -\frac{3}{16}\left(\frac{P_1l_1^2 + P_2l_2^2}{l_1 + l_2}\right)$

$Mm_1 \ldots = R_1a$

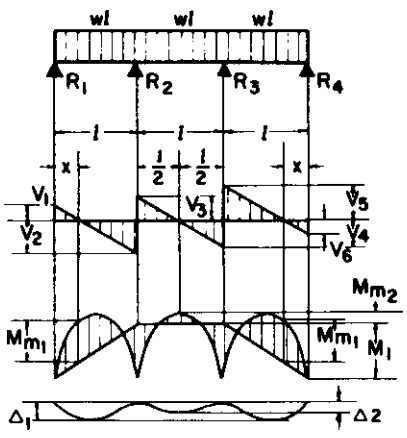
$Mm_2 \ldots = R_3b$



Data reproduced by courtesy of Western Wood Products Association

# FORMULAS AND DIAGRAMS FOR STATIC LOADS

## Continuous Beam—Three Equal Spans—Uniformly Distributed Load




$R_1 = R_4 = V_1 = V_6 \ldots\ldots\ldots = \dfrac{4wl}{10}$

$R_2 = R_3 \ldots\ldots\ldots\ldots = \dfrac{11wl}{10}$

$V_2 = V_5 \ldots\ldots\ldots\ldots = \dfrac{6wl}{10}$

$V_3 = V_4 \ldots\ldots\ldots\ldots = \dfrac{wl}{2}$

$M_1 \ldots\ldots\ldots\ldots = -\dfrac{wl^2}{10}$

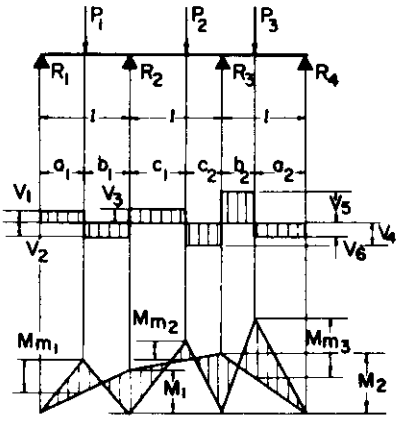
$Mm_1 \quad \left(\text{at } x = \dfrac{4l}{10}\right) \ldots\ldots = \dfrac{2wl^2}{25}$

$Mm_2 \ldots\ldots\ldots\ldots = \dfrac{wl^2}{40}$

$\Delta_1 \ldots\ldots\ldots\ldots = \dfrac{4wl^4}{581EI}$

$\Delta_2 \ldots\ldots\ldots\ldots = \dfrac{wl^4}{1920EI}$

## Continuous Beam—Three Equal Spans—Concentrated Load on Each Span Unsymmetrically Placed




$R_1 \ldots\ldots\ldots = \dfrac{M_1 + P_1b_1}{l}$

$R_2 \ldots\ldots\ldots = \dfrac{M_2 - 2R_1l + P_2c_2 + P_1(l + b_1)}{l}$

$R_3 \ldots\ldots\ldots = \dfrac{M_1 - 2R_4l + P_2c_1 + P_2(l + b_2)}{l}$

$R_4 \ldots\ldots\ldots = \dfrac{M_2 + P_2b_2}{l}$

$V_1 \ldots\ldots\ldots = R_1$

$V_2 \ldots\ldots\ldots = R_1 - P_1$

$V_3 \ldots\ldots\ldots = R_2 - V_2$

$V_4 \ldots\ldots\ldots = R_3 - V_5$

$V_5 \ldots\ldots\ldots = R_4 - P_3$

$V_6 \ldots\ldots\ldots = R_4$

$M_1 \ldots\ldots\ldots = \dfrac{-4P_1a_1b_1(l + a_1) - P_2c_1c_2(7l - 5c_1) + P_3b_2a_2(l + a_2)}{15l^2}$

$M_2 \ldots\ldots\ldots = \dfrac{P_1a_1b_1(l + a_1) - P_2c_1c_2(2l + 5c_1) - 4P_3a_2b_2(l + a_2)}{15l^2}$

$Mm_1 \ldots\ldots\ldots = R_1a_1$

$Mm_2 \ldots\ldots\ldots = M_1 + V_2c_1$

$Mm_3 \ldots\ldots\ldots = R_4a_2$

## WOOD BEAMS

### Wood Beams - Load Tables

The tables for beam loads are based on solid wood beams of rectangular cross section, surfaced 4 sides to standard dressed dimensions, as given on pages 25 and 26. The compression edge is supported throughout the beam length to prevent lateral displacement and lateral support is provided at each end at points of bearing to prevent rotation. Beams are single span and are loaded uniformly for their entire lengths. The data are presented with span lengths in feet for the various sizes of beams with load capacities based on a range of bending stress, $F_b$ values. Data provided for each span and nominal size of beam are as follows:

W = total load in pounds, uniformly distributed, based on $F_b$
w = load per linear foot of span, W/L
$F_v$ = minimum horizontal shear design value, psi, required to resist the horizontal shear stress induced by load W
E = required modulus of elasticity design value, psi, if deflection under load W is limited to $\ell/360$

Use of Tables

To use the tables, secure from appropriate reference (see page 28), the bending design value, $F_b$, appropriately adjusted for duration of load, service condition, size factor or other applicable modification factors, and refer tot he span length involved. If the total load W is known read down the column under the appropriate $F_b$ heading to find a matching design load W and then red across the page to see the required beam size. If the beam size is known read across the page to the column under the appropriate $F_b$ heading to find the design load W.

Before selecting a size of beam it is advisable to check the board measure, bm, in several sizes which qualify in order to find the one which had the least amount of lumber and thus is the most efficient.

After determining he required beam size, or design load, W, in the manner just described, it is necessary to check the horizontal shear, $F_v$, and the modulus of elasticity, E, to make sure that the induced or required values do not exceed the respective values allowed for the species and grade of lumber to be used.

It is good practice to consult the local lumber supplier(s) before finalizing a beam design, to determine what sizes, species and grades are on hand or can be readily secured.

Use of the tables is illustrated in the two examples which follow.

Example 1. Assume a span of 14'- 0" for a species and grade of lumber having a fiber bending stress, $F_b$, value of 1400 psi to carry a total load of 8000 pounds. The problem is to determine the size of beam required.

Turn to the page on which the 14'- 0" span is listed and, under the column headed 1400, read down until the total load of 8000 pounds is reached. Then read to the left to note the size of beam required. In this case, the required size is a nominal 6 by 12 member having a total load capacity, W, of 8082 pounds or a load per foot, w, of 577 pounds.

The apparent horizontal shear design value, $F_v$, required for the load of 8082 pounds is 96 psi and the modulus of elasticity, E, required to limit deflection to ℓ/360 under the same load is 1,530,000 psi. Thus, the nominal 6 x 12 beam selected to carry the 8,000 pounds must have values of not less than $F_b$ = 1400 psi, $F_v$ = 96 psi and E = 1,530,000 psi. If deflection control is not important for the case under consideration the required E value may be ignored. If $F_v$ is critical, the adjustment procedure below may be applied.

Example 2. Assume a span of 15'-0" and a beam size of nominal 8 by 12 with a fiber bending design value, $F_b$, of 1600 psi. The problem is to determine the total load capacity, W, of the beam.

Turn to the page on which the 15'-0" span is listed and read down the left column until the 8 by 12 size is reached. Then read across to the right to the column headed 1600 where it is shown that the total load capacity, W, is 11755 pounds, the load per foot, w, is 784 pounds, the apparent shear, $F_v$, required for the load of 11755 pounds is 102 psi and the modulus of elasticity, E, for a deflection limit of ℓ/360 under the same load is 1,878,000 psi.

*In both Examples 1 and 2, the total load, W, includes live and dead load.* To determine the allowable live load which may be super imposed on the beam, the weight of the construction materials should be deducted from the total load, W.

## Adjustment of Modulus of Elasticity

As previously stated, the modulus of elasticity values listed in the tables are based on limiting the initial deflection due to total live and dead load, W, to ℓ/360. Where other deflection limits are acceptable the tabular values of E may be adjusted by multiplying them by the following factors:

| | | |
|---|---|---|
| For limit of ℓ/300 | — | 0.833 |
| For limit of ℓ/240 | — | 0.667 |
| For limit of ℓ/180 | — | 0.500 |

When it is appropriate to design for deflection due to live load only (see page 34), the required value of E may be calculated as follows:

(a) determine the live load supported by the beam, either from known design loads or by subtracting the weight of supported construction materials from the tabulated total load, W,

(b) multiply the tabular value of E by the ratio of the live load divided by the tabulated total load,

(c) multiply the resulting value of E by the applicable deflection limit factor, if the limit is other than ℓ/360.

## Adjustment of Shear Stress

When the tabulated horizontal shear value, $F_v$, exceeds the shear design value for the member, the tabular value may be multiplied by:

$$1 - \frac{2d}{\ell} \quad \text{or} \quad 1 - \frac{d}{6L}$$

to adjust $F_v$ by neglecting that portion of the load within a distance from either support equal to the depth of the beam. If the adjusted $F_v$ still controls member design, use of the detailed shear

## WOOD BEAMS

design procedure in the National Design Specification for Wood Construction, available from the National Forest Products Association, may be considered.

Interpolation of Tabular Values

Design loads and induced values of $F_v$ and E for bending stresses intermediate of those listed in the column headings may be determined through straight-line interpolation.

Example. For a nominal 6 by 12 beam with $F_b$ of 1200 on 20'-0" span: W = 4849, w = 242, $F_v$ = 57 and E = 1,878,000. For a beam of the same size on the same span with $F_b$ of 1300, the preceding values for W, w, $F_v$ and E are multiplied by 13/12.

## WOOD BEAMS–SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l$/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **4'-0" SPAN** | | | | | | | | | | | |
| 2 x 4 | W | 459 | 510 | 561 | 613 | 664 | 715 | 766 | 817 | 919 | 1021 |
| | w | 115 | 128 | 140 | 153 | 166 | 179 | 191 | 204 | 230 | 255 |
| | $F_v$ | 66 | 73 | 80 | 88 | 95 | 102 | 109 | 117 | 131 | 146 |
| | E | 926 | 1029 | 1131 | 1234 | 1337 | 1440 | 1543 | 1646 | 1851 | 2057 |
| 3 x 4 | W | 766 | 851 | 936 | 1021 | 1106 | 1191 | 1276 | 1361 | 1531 | 1701 |
| | w | 191 | 213 | 234 | 255 | 276 | 298 | 319 | 340 | 383 | 425 |
| | $F_v$ | 66 | 73 | 80 | 88 | 95 | 102 | 109 | 117 | 131 | 146 |
| | E | 926 | 1029 | 1131 | 1234 | 1337 | 1440 | 1543 | 1646 | 1851 | 2057 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **4' - 0" SPAN CONT'D** | | | | | | | | | | | |
| 4 x 4 | W | 1072 | 1191 | 1310 | 1429 | 1548 | 1667 | 1786 | 1906 | 2144 | 2382 |
| | w | 268 | 298 | 328 | 357 | 387 | 417 | 447 | 476 | 536 | 595 |
| | $F_v$ | 66 | 73 | 80 | 88 | 95 | 102 | 109 | 117 | 131 | 146 |
| | E | 926 | 1029 | 1131 | 1234 | 1337 | 1440 | 1543 | 1646 | 1851 | 2057 |
| 2 x 6 | W | 1134 | 1260 | 1386 | 1513 | 1639 | 1765 | 1891 | 2017 | 2269 | 2521 |
| | w | 284 | 315 | 347 | 378 | 410 | 441 | 473 | 504 | 567 | 630 |
| | $F_v$ | 103 | 115 | 126 | 138 | 149 | 160 | 172 | 183 | 206 | 229 |
| | E | 589 | 655 | 720 | 785 | 851 | 916 | 982 | 1047 | 1178 | 1309 |
| 3 x 6 | W | 1891 | 2101 | 2311 | 2521 | 2731 | 2941 | 3151 | 3361 | 3781 | 4201 |
| | w | 473 | 525 | 578 | 630 | 683 | 735 | 788 | 840 | 945 | 1050 |
| | $F_v$ | 103 | 115 | 126 | 138 | 149 | 160 | 172 | 183 | 206 | 229 |
| | E | 589 | 655 | 720 | 785 | 851 | 916 | 982 | 1047 | 1178 | 1309 |
| 2 x 8 | W | 1971 | 2190 | 2409 | 2628 | 2847 | 3066 | 3285 | 3504 | 3942 | 4380 |
| | w | 493 | 548 | 602 | 657 | 712 | 767 | 821 | 876 | 986 | 1095 |
| | $F_v$ | 136 | 151 | 166 | 181 | 196 | 211 | 227 | 242 | 272 | 302 |
| | E | 447 | 497 | 546 | 596 | 646 | 695 | 745 | 794 | 894 | 993 |
| 4 x 6 | W | 2647 | 2941 | 3235 | 3529 | 3823 | 4117 | 4411 | 4706 | 5294 | 5882 |
| | w | 662 | 735 | 809 | 882 | 956 | 1029 | 1103 | 1176 | 1323 | 1470 |
| | $F_v$ | 103 | 115 | 126 | 138 | 149 | 160 | 172 | 183 | 206 | 229 |
| | E | 589 | 655 | 720 | 785 | 251 | 916 | 982 | 1047 | 1178 | 1309 |
| 3 x 8 | W | 3285 | 3650 | 4015 | 4380 | 4745 | 5110 | 5475 | 5840 | 6570 | 7300 |
| | w | 821 | 913 | 1004 | 1095 | 1186 | 1278 | 1369 | 1460 | 1643 | 1825 |
| | $F_v$ | 136 | 151 | 166 | 181 | 196 | 211 | 227 | 242 | 272 | 302 |
| | E | 447 | 497 | 546 | 596 | 646 | 695 | 745 | 794 | 894 | 993 |
| 6 x 6 | W | 4159 | 4622 | 5084 | 5546 | 6008 | 6470 | 6932 | 7394 | 8319 | 9243 |
| | w | 1040 | 1155 | 1271 | 1386 | 1502 | 1618 | 1733 | 1849 | 2080 | 2311 |
| | $F_v$ | 103 | 115 | 126 | 138 | 149 | 160 | 172 | 183 | 206 | 229 |
| | E | 589 | 655 | 720 | 785 | 851 | 916 | 982 | 1047 | 1178 | 1309 |
| 4 x 8 | W | 4599 | 5110 | 5621 | 6132 | 6643 | 7154 | 7665 | 8176 | 9198 | 10220 |
| | w | 1150 | 1278 | 1405 | 1533 | 1661 | 1789 | 1916 | 2044 | 2300 | 2555 |
| | $F_v$ | 136 | 151 | 166 | 181 | 196 | 211 | 227 | 242 | 272 | 302 |
| | E | 447 | 497 | 546 | 596 | 646 | 695 | 745 | 794 | 894 | 993 |
| 6 x 8 | W | 7734 | 8594 | 9453 | 10313 | 11172 | 12031 | 12891 | 13750 | 15469 | 17188 |
| | w | 1934 | 2148 | 2363 | 2578 | 2793 | 3008 | 3223 | 3438 | 3867 | 4297 |
| | $F_v$ | 141 | 156 | 172 | 188 | 203 | 219 | 234 | 250 | 281 | 313 |
| | E | 432 | 480 | 528 | 576 | 624 | 672 | 720 | 768 | 864 | 960 |
| **5' - 0" SPAN** | | | | | | | | | | | |
| 2 x 4 | W | 368 | 408 | 449 | 490 | 531 | 572 | 613 | 653 | 735 | 817 |
| | w | 74 | 82 | 90 | 98 | 106 | 114 | 123 | 131 | 147 | 163 |
| | $F_v$ | 53 | 58 | 64 | 70 | 76 | 82 | 88 | 93 | 105 | 117 |
| | E | 1157 | 1286 | 1414 | 1543 | 1671 | 1800 | 1929 | 2057 | 2314 | 2571 |
| 3 x 4 | W | 612 | 681 | 749 | 817 | 885 | 953 | 1021 | 1089 | 1225 | 1361 |
| | w | 123 | 136 | 149 | 163 | 177 | 191 | 204 | 218 | 245 | 272 |
| | $F_v$ | 53 | 58 | 64 | 70 | 76 | 82 | 88 | 93 | 105 | 117 |
| | E | 1157 | 1286 | 1414 | 1543 | 1671 | 1800 | 1929 | 2057 | 2314 | 2571 |
| 4 x 4 | W | 857 | 953 | 1048 | 1143 | 1239 | 1334 | 1429 | 1524 | 1715 | 1906 |
| | w | 172 | 191 | 210 | 229 | 248 | 267 | 286 | 305 | 343 | 381 |
| | $F_v$ | 53 | 58 | 64 | 70 | 76 | 82 | 88 | 93 | 105 | 117 |
| | E | 1157 | 1286 | 1414 | 1543 | 1671 | 1800 | 1929 | 2057 | 2314 | 2571 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l$/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **5' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **2 x 6** | W | 908 | 1008 | 1109 | 1210 | 1311 | 1412 | 1513 | 1613 | 1815 | 2017 |
| | w | 182 | 202 | 222 | 242 | 262 | 282 | 303 | 323 | 363 | 403 |
| | $F_v$ | 83 | 92 | 101 | 110 | 119 | 128 | 138 | 147 | 165 | 183 |
| | E | 736 | 818 | 900 | 982 | 1064 | 1145 | 1227 | 1309 | 1473 | 1636 |
| **3 x 6** | W | 1512 | 1681 | 1849 | 2017 | 2185 | 2353 | 2521 | 2689 | 3025 | 3361 |
| | w | 303 | 336 | 370 | 403 | 437 | 471 | 504 | 538 | 605 | 672 |
| | $F_v$ | 83 | 92 | 101 | 110 | 119 | 128 | 138 | 147 | 165 | 183 |
| | E | 736 | 818 | 900 | 982 | 1064 | 1145 | 1227 | 1309 | 1473 | 1636 |
| **2 x 8** | W | 1577 | 1752 | 1927 | 2103 | 2278 | 2453 | 2628 | 2803 | 3154 | 3504 |
| | w | 315 | 350 | 385 | 421 | 456 | 491 | 526 | 561 | 631 | 701 |
| | $F_v$ | 109 | 121 | 133 | 145 | 157 | 169 | 181 | 193 | 218 | 242 |
| | E | 559 | 621 | 683 | 745 | 807 | 869 | 931 | 993 | 1117 | 1241 |
| **4 x 6** | W | 2117 | 2353 | 2588 | 2823 | 3059 | 3294 | 3529 | 3764 | 4235 | 4706 |
| | w | 424 | 471 | 518 | 565 | 612 | 659 | 706 | 753 | 847 | 941 |
| | $F_v$ | 83 | 92 | 101 | 110 | 119 | 128 | 138 | 147 | 165 | 183 |
| | E | 736 | 818 | 900 | 982 | 1064 | 1145 | 1227 | 1309 | 1473 | 1636 |
| **2 x 10** | W | 2567 | 2852 | 3137 | 3423 | 3708 | 3993 | 4278 | 4563 | 5134 | 5704 |
| | w | 513 | 570 | 627 | 685 | 742 | 799 | 856 | 913 | 1027 | 1141 |
| | $F_v$ | 139 | 154 | 170 | 185 | 200 | 215 | 231 | 247 | 278 | 308 |
| | E | 438 | 486 | 535 | 584 | 632 | 681 | 730 | 778 | 876 | 973 |
| **3 x 8** | W | 2628 | 2920 | 3212 | 3504 | 3796 | 4088 | 4380 | 4672 | 5256 | 5840 |
| | w | 526 | 584 | 642 | 701 | 759 | 818 | 876 | 934 | 1051 | 1168 |
| | $F_v$ | 109 | 121 | 133 | 145 | 157 | 169 | 181 | 193 | 218 | 242 |
| | E | 559 | 621 | 683 | 745 | 807 | 869 | 931 | 993 | 1117 | 1241 |
| **6 x 6** | W | 3327 | 3697 | 4067 | 4437 | 4806 | 5176 | 5546 | 5916 | 6655 | 7394 |
| | w | 666 | 739 | 813 | 887 | 961 | 1035 | 1109 | 1183 | 1331 | 1479 |
| | $F_v$ | 83 | 92 | 101 | 110 | 119 | 128 | 138 | 147 | 165 | 183 |
| | E | 736 | 818 | 900 | 982 | 1064 | 1145 | 1227 | 1309 | 1473 | 1636 |
| **4 x 8** | W | 3679 | 4088 | 4497 | 4906 | 5315 | 5723 | 6132 | 6541 | 7359 | 8176 |
| | w | 736 | 818 | 899 | 981 | 1063 | 1145 | 1226 | 1308 | 1472 | 1635 |
| | $F_v$ | 109 | 121 | 133 | 145 | 157 | 169 | 181 | 193 | 218 | 242 |
| | E | 559 | 621 | 683 | 745 | 807 | 869 | 931 | 993 | 1117 | 1241 |
| **3 x 10** | W | 4278 | 4752 | 5229 | 5704 | 6180 | 6655 | 7130 | 7606 | 8556 | 9507 |
| | w | 856 | 951 | 1046 | 1141 | 1236 | 1331 | 1426 | 1521 | 1711 | 1901 |
| | $F_v$ | 139 | 154 | 170 | 185 | 200 | 216 | 231 | 247 | 278 | 308 |
| | E | 438 | 486 | 535 | 584 | 632 | 681 | 730 | 778 | 876 | 973 |
| **6 x 8** | W | 6188 | 6875 | 7563 | 8250 | 8938 | 9625 | 10313 | 11000 | 12375 | 13750 |
| | w | 1238 | 1375 | 1513 | 1650 | 1788 | 1925 | 2063 | 2200 | 2475 | 2750 |
| | $F_v$ | 113 | 125 | 138 | 150 | 163 | 175 | 188 | 200 | 225 | 250 |
| | E | 540 | 600 | 660 | 720 | 780 | 840 | 900 | 960 | 1080 | 1200 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **6'- 0" SPAN** | | | | | | | | | | | |
| **2 x 4** | W | 306 | 340 | 374 | 408 | 442 | 476 | 510 | 544 | 612 | 680 |
| | w | 51 | 56 | 62 | 68 | 73 | 79 | 85 | 90 | 102 | 113 |
| | $F_v$ | 43 | 48 | 53 | 58 | 63 | 68 | 72 | 77 | 87 | 97 |
| | E | 1388 | 1542 | 1697 | 1851 | 2005 | 2159 | 2314 | 2468 | 2777 | 3085 |
| **3 x 4** | W | 510 | 567 | 623 | 680 | 737 | 793 | 850 | 907 | 1020 | 1134 |
| | w | 85 | 94 | 103 | 113 | 122 | 132 | 141 | 151 | 170 | 189 |
| | $F_v$ | 43 | 48 | 53 | 58 | 63 | 68 | 72 | 77 | 87 | 97 |
| | E | 1388 | 1542 | 1697 | 1851 | 2005 | 2159 | 2314 | 2468 | 2777 | 3085 |
| **4 x 4** | W | 714 | 793 | 873 | 952 | 1032 | 1111 | 1190 | 1270 | 1429 | 1587 |
| | w | 119 | 132 | 145 | 158 | 172 | 185 | 198 | 211 | 238 | 264 |
| | $F_v$ | 43 | 48 | 53 | 58 | 63 | 68 | 72 | 77 | 87 | 97 |
| | E | 1388 | 1542 | 1697 | 1851 | 2005 | 2159 | 2314 | 2468 | 2777 | 3085 |
| **2 x 6** | W | 756 | 840 | 924 | 1008 | 1092 | 1176 | 1260 | 1344 | 1512 | 1680 |
| | w | 126 | 140 | 154 | 168 | 182 | 196 | 210 | 224 | 252 | 280 |
| | $F_v$ | 68 | 76 | 84 | 91 | 99 | 106 | 114 | 122 | 137 | 152 |
| | E | 883 | 981 | 1079 | 1178 | 1276 | 1374 | 1472 | 1570 | 1767 | 1963 |
| **3 x 6** | W | 1260 | 1400 | 1540 | 1680 | 1820 | 1960 | 2100 | 2240 | 2520 | 2800 |
| | w | 210 | 233 | 256 | 280 | 303 | 326 | 350 | 373 | 420 | 466 |
| | $F_v$ | 68 | 76 | 84 | 91 | 99 | 106 | 114 | 122 | 137 | 152 |
| | E | 883 | 981 | 1079 | 1178 | 1276 | 1374 | 1472 | 1570 | 1767 | 1963 |
| **2 x 8** | W | 1314 | 1460 | 1606 | 1752 | 1898 | 2044 | 2190 | 2336 | 2628 | 2920 |
| | w | 219 | 243 | 267 | 292 | 316 | 340 | 365 | 389 | 438 | 486 |
| | $F_v$ | 90 | 100 | 110 | 120 | 130 | 140 | 151 | 161 | 181 | 201 |
| | E | 670 | 744 | 819 | 893 | 968 | 1042 | 1117 | 1191 | 1340 | 1489 |
| **4 x 6** | W | 1764 | 1960 | 2156 | 2352 | 2548 | 2744 | 2940 | 3137 | 3529 | 3921 |
| | w | 294 | 326 | 359 | 392 | 424 | 457 | 490 | 522 | 588 | 653 |
| | $F_v$ | 68 | 76 | 84 | 91 | 99 | 106 | 114 | 122 | 137 | 152 |
| | E | 883 | 981 | 1079 | 1178 | 1276 | 1374 | 1472 | 1570 | 1767 | 1963 |
| **2 x 10** | W | 2139 | 2376 | 2614 | 2852 | 3089 | 3327 | 3565 | 3802 | 4278 | 4753 |
| | w | 356 | 396 | 435 | 475 | 514 | 554 | 594 | 633 | 713 | 792 |
| | $F_v$ | 115 | 128 | 141 | 154 | 167 | 179 | 192 | 205 | 231 | 256 |
| | E | 525 | 583 | 642 | 700 | 758 | 817 | 875 | 934 | 1050 | 1167 |
| **3 x 8** | W | 2190 | 2433 | 2676 | 2920 | 3163 | 3406 | 3650 | 3893 | 4380 | 4866 |
| | w | 365 | 405 | 446 | 486 | 527 | 567 | 608 | 648 | 730 | 811 |
| | $F_v$ | 90 | 100 | 110 | 120 | 130 | 140 | 151 | 161 | 181 | 201 |
| | E | 670 | 744 | 819 | 893 | 968 | 1042 | 1117 | 1191 | 1340 | 1489 |
| **6 x 6** | W | 2772 | 3081 | 3389 | 3697 | 4005 | 4313 | 4621 | 4929 | 5545 | 6162 |
| | w | 462 | 513 | 564 | 616 | 667 | 718 | 770 | 821 | 924 | 1027 |
| | $F_v$ | 68 | 76 | 84 | 91 | 99 | 106 | 114 | 122 | 137 | 152 |
| | E | 883 | 981 | 1079 | 1178 | 1276 | 1374 | 1472 | 1570 | 1767 | 1963 |
| **4 x 8** | W | 3066 | 3406 | 3747 | 4088 | 4428 | 4769 | 5110 | 5450 | 6132 | 6813 |
| | w | 511 | 567 | 624 | 681 | 738 | 794 | 851 | 908 | 1022 | 1135 |
| | $F_v$ | 90 | 100 | 110 | 120 | 130 | 140 | 151 | 161 | 181 | 201 |
| | E | 670 | 744 | 819 | 893 | 968 | 1042 | 1117 | 1191 | 1340 | 1489 |
| **2 x 12** | W | 3164 | 3515 | 3867 | 4218 | 4570 | 4921 | 5273 | 5625 | 6328 | 7031 |
| | w | 527 | 585 | 644 | 703 | 761 | 820 | 878 | 937 | 1054 | 1171 |
| | $F_v$ | 140 | 156 | 171 | 187 | 203 | 218 | 234 | 250 | 281 | 312 |
| | E | 432 | 480 | 528 | 576 | 624 | 672 | 720 | 768 | 864 | 960 |
| **3 x 10** | W | 3565 | 3961 | 4357 | 4753 | 5149 | 5545 | 5941 | 6337 | 7130 | 7922 |
| | w | 594 | 660 | 726 | 792 | 858 | 924 | 990 | 1056 | 1188 | 1320 |
| | $F_v$ | 115 | 128 | 141 | 154 | 167 | 179 | 192 | 205 | 231 | 256 |
| | E | 525 | 583 | 642 | 700 | 758 | 817 | 875 | 934 | 1050 | 1167 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **6' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **6 x 8** | W | 5156 | 5729 | 6302 | 6875 | 7447 | 8020 | 8593 | 9166 | 10312 | 11458 |
| | w | 859 | 954 | 1050 | 1145 | 1241 | 1336 | 1432 | 1527 | 1718 | 1909 |
| | $F_v$ | 93 | 104 | 114 | 125 | 135 | 145 | 156 | 166 | 187 | 208 |
| | E | 648 | 719 | 792 | 864 | 935 | 1008 | 1079 | 1151 | 1295 | 1439 |
| **4 x 10** | W | 4991 | 5545 | 6100 | 6654 | 7209 | 7764 | 8318 | 8873 | 9982 | 11091 |
| | w | 831 | 924 | 1016 | 1109 | 1201 | 1294 | 1386 | 1478 | 1663 | 1848 |
| | $F_v$ | 115 | 128 | 141 | 154 | 167 | 179 | 192 | 205 | 231 | 256 |
| | E | 525 | 583 | 642 | 700 | 758 | 817 | 875 | 934 | 1050 | 1167 |
| **3 x 12** | W | 5273 | 5859 | 6445 | 7031 | 7617 | 8203 | 8789 | 9375 | 10546 | 11718 |
| | w | 878 | 976 | 1074 | 1171 | 1269 | 1367 | 1464 | 1562 | 1757 | 1953 |
| | $F_v$ | 140 | 156 | 171 | 187 | 203 | 218 | 234 | 250 | 281 | 312 |
| | E | 432 | 480 | 528 | 576 | 624 | 672 | 720 | 768 | 864 | 959 |
| **7' - 0" SPAN** | | | | | | | | | | | |
| **2 x 4** | W | 262 | 291 | 320 | 350 | 379 | 408 | 437 | 466 | 525 | 583 |
| | w | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2160 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **3 x 4** | W | 437 | 486 | 534 | 583 | 631 | 680 | 729 | 777 | 875 | 972 |
| | w | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 138 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **4 x 4** | W | 612 | 680 | 748 | 816 | 884 | 952 | 1020 | 1088 | 1225 | 1361 |
| | w | 87 | 97 | 106 | 116 | 126 | 136 | 145 | 155 | 175 | 194 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **2 x 6** | W | 648 | 720 | 792 | 864 | 936 | 1008 | 1080 | 1152 | 1296 | 1440 |
| | w | 92 | 102 | 113 | 123 | 133 | 144 | 154 | 164 | 185 | 205 |
| | $F_v$ | 58 | 65 | 72 | 78 | 85 | 91 | 98 | 104 | 117 | 130 |
| | E | 1030 | 1145 | 1259 | 1374 | 1489 | 1603 | 1718 | 1832 | 2061 | 2290 |
| **3 x 6** | W | 1080 | 1200 | 1320 | 1440 | 1560 | 1680 | 1800 | 1920 | 2160 | 2400 |
| | w | 154 | 171 | 188 | 205 | 222 | 240 | 257 | 274 | 308 | 342 |
| | $F_v$ | 58 | 65 | 72 | 78 | 85 | 91 | 98 | 104 | 117 | 130 |
| | E | 1030 | 1145 | 1259 | 1374 | 1489 | 1603 | 1718 | 1832 | 2061 | 2290 |
| **2 x 8** | W | 1126 | 1251 | 1376 | 1501 | 1626 | 1752 | 1877 | 2002 | 2252 | 2502 |
| | w | 160 | 178 | 196 | 214 | 232 | 250 | 268 | 286 | 321 | 357 |
| | $F_v$ | 77 | 86 | 94 | 103 | 112 | 120 | 129 | 138 | 155 | 172 |
| | E | 782 | 868 | 955 | 1042 | 1129 | 1216 | 1303 | 1390 | 1564 | 1737 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **7' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **4 x 6** | W | 1512 | 1680 | 1848 | 2016 | 2184 | 2352 | 2520 | 2688 | 3024 | 3361 |
| | w | 216 | 240 | 264 | 288 | 312 | 336 | 360 | 384 | 432 | 480 |
| | $F_v$ | 58 | 65 | 72 | 78 | 85 | 91 | 98 | 104 | 117 | 130 |
| | E | 1030 | 1145 | 1259 | 1374 | 1489 | 1603 | 1718 | 1832 | 2061 | 2290 |
| **2 x 10** | W | 1833 | 2037 | 2240 | 2444 | 2648 | 2852 | 3055 | 3259 | 3666 | 4074 |
| | w | 261 | 291 | 320 | 349 | 378 | 407 | 436 | 465 | 523 | 582 |
| | $F_v$ | 99 | 110 | 121 | 132 | 143 | 154 | 165 | 176 | 198 | 220 |
| | E | 612 | 681 | 749 | 817 | 885 | 953 | 1021 | 1089 | 1225 | 1362 |
| **3 x 8** | W | 1877 | 2085 | 2294 | 2502 | 2711 | 2920 | 3128 | 3337 | 3754 | 4171 |
| | w | 268 | 297 | 327 | 357 | 387 | 417 | 446 | 476 | 536 | 595 |
| | $F_v$ | 77 | 86 | 94 | 103 | 112 | 120 | 129 | 138 | 155 | 172 |
| | E | 782 | 868 | 955 | 1042 | 1129 | 1216 | 1303 | 1390 | 1564 | 1737 |
| **6 x 6** | W | 2376 | 2640 | 2904 | 3169 | 3433 | 3697 | 3961 | 4225 | 4753 | 5281 |
| | w | 339 | 377 | 414 | 452 | 490 | 528 | 565 | 603 | 679 | 754 |
| | $F_v$ | 58 | 65 | 72 | 78 | 85 | 91 | 98 | 104 | 117 | 130 |
| | E | 1030 | 1145 | 1259 | 1374 | 1489 | 1603 | 1718 | 1832 | 2061 | 2290 |
| **4 x 8** | W | 2628 | 2920 | 3212 | 3504 | 3796 | 4088 | 4380 | 4672 | 5256 | 5840 |
| | w | 375 | 417 | 458 | 500 | 542 | 584 | 625 | 667 | 750 | 834 |
| | $F_v$ | 77 | 86 | 94 | 103 | 112 | 120 | 129 | 138 | 155 | 172 |
| | E | 782 | 868 | 955 | 1042 | 1129 | 1216 | 1303 | 1390 | 1564 | 1737 |
| **2 x 12** | W | 2712 | 3013 | 3314 | 3616 | 3917 | 4218 | 4520 | 4821 | 5424 | 6026 |
| | w | 387 | 430 | 473 | 516 | 559 | 602 | 645 | 688 | 774 | 860 |
| | $F_v$ | 120 | 133 | 147 | 160 | 174 | 187 | 200 | 214 | 241 | 267 |
| | E | 504 | 560 | 616 | 672 | 728 | 784 | 839 | 895 | 1007 | 1119 |
| **3 x 10** | W | 3055 | 3395 | 3734 | 4074 | 4413 | 4753 | 5093 | 5432 | 6111 | 6790 |
| | w | 436 | 485 | 533 | 582 | 630 | 679 | 727 | 776 | 873 | 970 |
| | $F_v$ | 99 | 110 | 121 | 132 | 143 | 154 | 165 | 176 | 198 | 220 |
| | E | 612 | 681 | 749 | 817 | 885 | 953 | 1021 | 1089 | 1225 | 1362 |
| **2 x 14** | W | 3762 | 4180 | 4598 | 5016 | 5434 | 5852 | 6270 | 6688 | 7524 | 8360 |
| | w | 537 | 597 | 656 | 716 | 776 | 836 | 895 | 955 | 1074 | 1194 |
| | $F_v$ | 141 | 157 | 173 | 189 | 205 | 220 | 236 | 252 | 283 | 315 |
| | E | 427 | 475 | 523 | 570 | 618 | 665 | 713 | 760 | 855 | 950 |
| **6 x 8** | W | 4419 | 4910 | 5401 | 5892 | 6383 | 6875 | 7366 | 7857 | 8839 | 9821 |
| | w | 631 | 701 | 771 | 841 | 911 | 982 | 1052 | 1122 | 1262 | 1403 |
| | $F_v$ | 80 | 89 | 98 | 107 | 116 | 125 | 133 | 142 | 160 | 178 |
| | E | 755 | 839 | 924 | 1007 | 1091 | 1175 | 1259 | 1343 | 1511 | 1679 |
| **4 x 10** | W | 4278 | 4753 | 5228 | 5704 | 6179 | 6654 | 7130 | 7605 | 8556 | 9506 |
| | w | 611 | 679 | 746 | 814 | 882 | 950 | 1018 | 1086 | 1222 | 1358 |
| | $F_v$ | 99 | 110 | 121 | 132 | 143 | 154 | 165 | 176 | 198 | 220 |
| | E | 612 | 681 | 749 | 817 | 885 | 953 | 1021 | 1089 | 1225 | 1362 |
| **3 x 12** | W | 4520 | 5022 | 5524 | 6026 | 6529 | 7031 | 7533 | 8035 | 9040 | 10044 |
| | w | 645 | 717 | 789 | 860 | 932 | 1004 | 1076 | 1147 | 1291 | 1434 |
| | $F_v$ | 120 | 133 | 147 | 160 | 174 | 187 | 200 | 214 | 241 | 267 |
| | E | 504 | 560 | 616 | 672 | 728 | 784 | 840 | 895 | 1007 | 1119 |
| **8 x 8** | W | 6026 | 6696 | 7366 | 8035 | 8705 | 9375 | 10044 | 10714 | 12053 | 13392 |
| | w | 860 | 956 | 1052 | 1147 | 1243 | 1339 | 1434 | 1530 | 1721 | 1913 |
| | $F_v$ | 80 | 89 | 98 | 107 | 116 | 125 | 133 | 142 | 160 | 178 |
| | E | 756 | 839 | 924 | 1007 | 1091 | 1175 | 1259 | 1343 | 1511 | 1679 |
| **3 x 14** | W | 6270 | 6966 | 7663 | 8360 | 9056 | 9753 | 10450 | 11146 | 12540 | 13933 |
| | w | 895 | 995 | 1094 | 1194 | 1293 | 1393 | 1492 | 1592 | 1791 | 1990 |
| | $F_v$ | 141 | 157 | 173 | 189 | 205 | 220 | 236 | 252 | 283 | 315 |
| | E | 427 | 475 | 523 | 570 | 618 | 665 | 713 | 760 | 855 | 950 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **7'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **4 x 12** | W | 6328 | 7031 | 7734 | 8437 | 9140 | 9843 | 10546 | 11250 | 12656 | 14062 |
| | w | 904 | 1004 | 1104 | 1205 | 1305 | 1406 | 1506 | 1607 | 1808 | 2008 |
| | $F_v$ | 120 | 133 | 147 | 160 | 174 | 187 | 200 | 214 | 241 | 267 |
| | E | 504 | 560 | 616 | 672 | 728 | 783 | 840 | 896 | 1008 | 1119 |
| **6 x 10** | W | 7091 | 7878 | 8666 | 9454 | 10242 | 11030 | 11818 | 12606 | 14182 | 15757 |
| | w | 1013 | 1125 | 1238 | 1350 | 1463 | 1575 | 1688 | 1800 | 2026 | 2251 |
| | $F_v$ | 101 | 113 | 124 | 135 | 147 | 158 | 169 | 180 | 203 | 226 |
| | E | 596 | 663 | 729 | 795 | 862 | 928 | 994 | 1061 | 1193 | 1326 |
| **4 x 14** | W | 9112 | 10125 | 11137 | 12150 | 13162 | 14175 | 15187 | 16200 | 18225 | 20250 |
| | w | 1301 | 1446 | 1591 | 1735 | 1880 | 2025 | 2169 | 2314 | 2603 | 2892 |
| | $F_v$ | 144 | 160 | 176 | 192 | 208 | 225 | 241 | 257 | 289 | 321 |
| | E | 420 | 466 | 513 | 560 | 606 | 653 | 700 | 746 | 840 | 933 |
| **8 x 10** | W | 9669 | 10744 | 11818 | 12892 | 13967 | 15041 | 16116 | 17190 | 19339 | 21488 |
| | w | 1381 | 1534 | 1688 | 1841 | 1995 | 2148 | 2302 | 2455 | 2762 | 3069 |
| | $F_v$ | 101 | 113 | 124 | 135 | 147 | 158 | 169 | 180 | 203 | 226 |
| | E | 596 | 663 | 729 | 795 | 862 | 928 | 994 | 1061 | 1193 | 1326 |
| **6 x 12** | W | 10391 | 11545 | 12700 | 13854 | 15009 | 16163 | 17318 | 18473 | 20782 | 23091 |
| | w | 1484 | 1649 | 1814 | 1979 | 2144 | 2309 | 2474 | 2639 | 2968 | 3298 |
| | $F_v$ | 123 | 136 | 150 | 164 | 177 | 191 | 205 | 219 | 246 | 273 |
| | E | 493 | 547 | 602 | 657 | 712 | 766 | 821 | 876 | 986 | 1095 |
| **10 x 10** | W | 12248 | 13609 | 14970 | 16330 | 17691 | 19052 | 20413 | 21774 | 24496 | 27218 |
| | w | 1749 | 1944 | 2138 | 2332 | 2527 | 2721 | 2916 | 3110 | 3499 | 3888 |
| | $F_v$ | 101 | 113 | 124 | 135 | 147 | 158 | 169 | 180 | 203 | 226 |
| | E | 596 | 663 | 729 | 795 | 862 | 928 | 994 | 1061 | 1193 | 1326 |
| **8 x 12** | W | 14169 | 15744 | 17318 | 18892 | 20467 | 22041 | 23616 | 25190 | 28339 | 31488 |
| | w | 2024 | 2249 | 2474 | 2698 | 2923 | 3148 | 3373 | 3598 | 4048 | 4498 |
| | $F_v$ | 123 | 136 | 150 | 164 | 177 | 191 | 205 | 219 | 246 | 273 |
| | E | 493 | 547 | 602 | 657 | 712 | 766 | 821 | 876 | 986 | 1095 |
| **6 x 14** | W | 14319 | 15910 | 17501 | 19092 | 20683 | 22275 | 23866 | 25457 | 28639 | 31821 |
| | w | 2045 | 2272 | 2500 | 2727 | 2954 | 3182 | 3409 | 3636 | 4091 | 4545 |
| | $F_v$ | 144 | 160 | 176 | 192 | 208 | 225 | 241 | 257 | 289 | 321 |
| | E | 420 | 466 | 513 | 560 | 606 | 653 | 700 | 746 | 839 | 933 |
| **10 x 12** | W | 17948 | 19942 | 21936 | 23930 | 25925 | 27919 | 29913 | 31907 | 35896 | 39884 |
| | w | 2564 | 2848 | 3133 | 3418 | 3703 | 3988 | 4273 | 4558 | 5128 | 5697 |
| | $F_v$ | 123 | 136 | 150 | 164 | 177 | 191 | 205 | 219 | 246 | 273 |
| | E | 493 | 547 | 602 | 657 | 712 | 766 | 821 | 876 | 986 | 1095 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **8'- 0" SPAN** | | | | | | | | | | | |
| **2 x 4** | W | 229 | 255 | 280 | 306 | 331 | 357 | 382 | 408 | 459 | 510 |
| | w | 28 | 31 | 35 | 38 | 41 | 44 | 47 | 51 | 57 | 63 |
| | $F_v$ | 32 | 36 | 40 | 43 | 47 | 51 | 54 | 58 | 65 | 72 |
| | E | 1851 | 2057 | 2262 | 2468 | 2674 | 2879 | 3085 | 3291 | 3702 | 4114 |
| **3 x 4** | W | 382 | 425 | 467 | 510 | 552 | 595 | 638 | 680 | 765 | 850 |
| | w | 47 | 53 | 58 | 63 | 69 | 74 | 79 | 85 | 95 | 106 |
| | $F_v$ | 32 | 36 | 40 | 43 | 47 | 51 | 54 | 58 | 65 | 72 |
| | E | 1851 | 2057 | 2262 | 2468 | 2674 | 2879 | 3085 | 3291 | 3702 | 4114 |
| **4 x 4** | W | 535 | 595 | 655 | 714 | 774 | 833 | 893 | 952 | 1071 | 1190 |
| | w | 66 | 74 | 81 | 89 | 96 | 104 | 111 | 119 | 133 | 148 |
| | $F_v$ | 32 | 36 | 40 | 43 | 47 | 51 | 54 | 58 | 65 | 72 |
| | E | 1851 | 2057 | 2262 | 2468 | 2674 | 2879 | 3085 | 3291 | 3702 | 4114 |
| **2 x 6** | W | 567 | 630 | 693 | 756 | 819 | 882 | 945 | 1008 | 1134 | 1260 |
| | w | 70 | 78 | 86 | 94 | 102 | 110 | 118 | 126 | 141 | 157 |
| | $F_v$ | 51 | 57 | 63 | 68 | 74 | 80 | 85 | 91 | 103 | 114 |
| | E | 1178 | 1309 | 1439 | 1570 | 1701 | 1832 | 1963 | 2094 | 2356 | 2618 |
| **3 x 6** | W | 945 | 1050 | 1155 | 1260 | 1365 | 1470 | 1575 | 1680 | 1890 | 2100 |
| | w | 118 | 131 | 144 | 157 | 170 | 183 | 196 | 210 | 236 | 262 |
| | $F_v$ | 51 | 57 | 63 | 68 | 74 | 80 | 85 | 91 | 103 | 114 |
| | E | 1178 | 1309 | 1439 | 1570 | 1701 | 1832 | 1963 | 2094 | 2356 | 2618 |
| **2 x 8** | W | 985 | 1095 | 1204 | 1314 | 1423 | 1533 | 1642 | 1752 | 1971 | 2190 |
| | w | 123 | 136 | 150 | 164 | 177 | 191 | 205 | 219 | 246 | 273 |
| | $F_v$ | 67 | 75 | 83 | 90 | 98 | 105 | 113 | 120 | 135 | 151 |
| | E | 893 | 993 | 1092 | 1191 | 1291 | 1390 | 1489 | 1588 | 1787 | 1986 |
| **4 x 6** | W | 1323 | 1470 | 1617 | 1764 | 1911 | 2058 | 2205 | 2352 | 2646 | 2940 |
| | w | 165 | 183 | 202 | 220 | 238 | 257 | 275 | 294 | 330 | 367 |
| | $F_v$ | 51 | 57 | 63 | 68 | 74 | 80 | 85 | 91 | 103 | 114 |
| | E | 1178 | 1309 | 1439 | 1570 | 1701 | 1832 | 1963 | 2094 | 2356 | 2618 |
| **2 x 10** | W | 1604 | 1782 | 1960 | 2139 | 2317 | 2495 | 2673 | 2852 | 3208 | 3565 |
| | w | 200 | 222 | 245 | 267 | 289 | 311 | 334 | 356 | 401 | 445 |
| | $F_v$ | 86 | 96 | 105 | 115 | 125 | 134 | 144 | 154 | 173 | 192 |
| | E | 700 | 778 | 856 | 934 | 1011 | 1089 | 1167 | 1245 | 1401 | 1556 |
| **3 x 8** | W | 1642 | 1825 | 2007 | 2190 | 2372 | 2555 | 2737 | 2920 | 3285 | 3650 |
| | w | 205 | 228 | 250 | 273 | 296 | 319 | 342 | 365 | 410 | 456 |
| | $F_v$ | 67 | 75 | 83 | 90 | 98 | 105 | 113 | 120 | 135 | 151 |
| | E | 893 | 993 | 1092 | 1191 | 1291 | 1390 | 1489 | 1588 | 1787 | 1986 |
| **6 x 6** | W | 2079 | 2310 | 2541 | 2772 | 3003 | 3235 | 3466 | 3697 | 4159 | 4621 |
| | w | 259 | 288 | 317 | 346 | 375 | 404 | 433 | 462 | 519 | 577 |
| | $F_v$ | 51 | 57 | 63 | 68 | 74 | 80 | 85 | 91 | 103 | 114 |
| | E | 1178 | 1309 | 1439 | 1570 | 1701 | 1832 | 1963 | 2094 | 2356 | 2618 |
| **4 x 8** | W | 2299 | 2555 | 2810 | 3066 | 3321 | 3577 | 3832 | 4088 | 4599 | 5110 |
| | w | 287 | 319 | 351 | 383 | 415 | 447 | 479 | 511 | 574 | 638 |
| | $F_v$ | 67 | 75 | 83 | 90 | 98 | 105 | 113 | 120 | 135 | 151 |
| | E | 893 | 993 | 1092 | 1191 | 1291 | 1390 | 1489 | 1588 | 1787 | 1986 |
| **2 x 12** | W | 2373 | 2636 | 2900 | 3164 | 3427 | 3691 | 3955 | 4218 | 4746 | 5273 |
| | w | 296 | 329 | 362 | 395 | 428 | 461 | 494 | 527 | 593 | 659 |
| | $F_v$ | 105 | 117 | 128 | 140 | 152 | 164 | 175 | 187 | 210 | 234 |
| | E | 576 | 640 | 704 | 768 | 832 | 896 | 960 | 1024 | 1151 | 1279 |
| **3 x 10** | W | 2673 | 2970 | 3268 | 3565 | 3862 | 4159 | 4456 | 4753 | 5347 | 5941 |
| | w | 334 | 371 | 408 | 445 | 482 | 519 | 557 | 594 | 668 | 742 |
| | $F_v$ | 86 | 96 | 105 | 115 | 125 | 134 | 144 | 154 | 173 | 192 |
| | E | 700 | 778 | 856 | 934 | 1011 | 1089 | 1167 | 1245 | 1401 | 1556 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **8'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **2 x 14** | W | 3291 | 3657 | 4023 | 4389 | 4754 | 5120 | 5486 | 5852 | 6583 | 7315 |
| | w | 411 | 457 | 502 | 548 | 594 | 640 | 685 | 731 | 822 | 914 |
| | $F_v$ | 124 | 138 | 151 | 165 | 179 | 193 | 207 | 220 | 248 | 276 |
| | E | 489 | 543 | 597 | 652 | 706 | 760 | 815 | 869 | 978 | 1086 |
| **6 x 8** | W | 3867 | 4296 | 4726 | 5156 | 5585 | 6015 | 6445 | 6875 | 7734 | 8593 |
| | w | 483 | 537 | 590 | 644 | 698 | 751 | 805 | 859 | 966 | 1074 |
| | $F_v$ | 70 | 78 | 85 | 93 | 101 | 109 | 117 | 125 | 140 | 156 |
| | E | 864 | 960 | 1055 | 1152 | 1247 | 1343 | 1439 | 1535 | 1727 | 1919 |
| **4 x 10** | W | 3743 | 4159 | 4575 | 4991 | 5407 | 5823 | 6238 | 6654 | 7486 | 8318 |
| | w | 467 | 519 | 571 | 623 | 675 | 727 | 779 | 831 | 935 | 1039 |
| | $F_v$ | 86 | 96 | 105 | 115 | 125 | 134 | 144 | 154 | 173 | 192 |
| | E | 700 | 778 | 856 | 934 | 1011 | 1089 | 1167 | 1245 | 1401 | 1556 |
| **3 x 12** | W | 3955 | 4394 | 4833 | 5273 | 5712 | 6152 | 6591 | 7031 | 7910 | 8789 |
| | w | 494 | 549 | 604 | 659 | 714 | 769 | 823 | 878 | 988 | 1098 |
| | $F_v$ | 105 | 117 | 128 | 140 | 152 | 164 | 175 | 187 | 210 | 234 |
| | E | 576 | 640 | 704 | 768 | 832 | 896 | 959 | 1024 | 1151 | 1279 |
| **8 x 8** | W | 5273 | 5859 | 6445 | 7031 | 7617 | 8203 | 8789 | 9375 | 10546 | 11718 |
| | w | 659 | 732 | 805 | 878 | 952 | 1025 | 1098 | 1171 | 1318 | 1464 |
| | $F_v$ | 70 | 78 | 85 | 93 | 101 | 109 | 117 | 125 | 140 | 156 |
| | E | 864 | 960 | 1055 | 1151 | 1247 | 1343 | 1439 | 1535 | 1727 | 1919 |
| **3 x 14** | W | 5486 | 6095 | 6705 | 7315 | 7924 | 8534 | 9143 | 9753 | 10972 | 12191 |
| | w | 685 | 761 | 838 | 914 | 990 | 1066 | 1142 | 1219 | 1371 | 1523 |
| | $F_v$ | 124 | 138 | 151 | 165 | 179 | 193 | 207 | 220 | 248 | 276 |
| | E | 489 | 543 | 597 | 652 | 706 | 760 | 815 | 869 | 978 | 1086 |
| **4 x 12** | W | 5537 | 6152 | 6767 | 7382 | 7998 | 8613 | 9228 | 9843 | 11074 | 12304 |
| | w | 692 | 769 | 845 | 922 | 999 | 1076 | 1153 | 1230 | 1384 | 1538 |
| | $F_v$ | 105 | 117 | 128 | 140 | 152 | 164 | 175 | 187 | 210 | 234 |
| | E | 576 | 640 | 703 | 768 | 832 | 896 | 960 | 1023 | 1151 | 1279 |
| **6 x 10** | W | 6204 | 6894 | 7583 | 8272 | 8962 | 9651 | 10341 | 11030 | 12409 | 13788 |
| | w | 775 | 861 | 947 | 1034 | 1120 | 1206 | 1292 | 1378 | 1551 | 1723 |
| | $F_v$ | 89 | 98 | 108 | 118 | 128 | 138 | 148 | 158 | 178 | 197 |
| | E | 682 | 757 | 833 | 909 | 985 | 1061 | 1136 | 1212 | 1364 | 1515 |
| **3 x 16** | W | 7267 | 8075 | 8882 | 9690 | 10497 | 11305 | 12112 | 12920 | 14535 | 16150 |
| | w | 908 | 1009 | 1110 | 1211 | 1312 | 1413 | 1514 | 1615 | 1816 | 2018 |
| | $F_v$ | 142 | 158 | 174 | 190 | 206 | 222 | 238 | 254 | 285 | 317 |
| | E | 424 | 472 | 519 | 566 | 613 | 660 | 708 | 755 | 849 | 944 |
| **4 x 14** | W | 7973 | 8859 | 9745 | 10631 | 11517 | 12403 | 13289 | 14175 | 15946 | 17718 |
| | w | 996 | 1107 | 1218 | 1328 | 1439 | 1550 | 1661 | 1771 | 1993 | 2214 |
| | $F_v$ | 126 | 140 | 154 | 168 | 182 | 196 | 210 | 225 | 253 | 281 |
| | E | 480 | 533 | 586 | 640 | 693 | 746 | 800 | 853 | 960 | 1066 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **8' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **8 x 10** | W | 8460 | 9401 | 10341 | 11281 | 12221 | 13161 | 14101 | 15041 | 16921 | 18802 |
| | w | 1057 | 1175 | 1292 | 1410 | 1527 | 1645 | 1762 | 1880 | 2115 | 2350 |
| | $F_v$ | 89 | 98 | 108 | 118 | 128 | 138 | 148 | 158 | 178 | 197 |
| | E | 682 | 757 | 833 | 909 | 985 | 1061 | 1136 | 1212 | 1364 | 1515 |
| **6 x 12** | W | 9092 | 10102 | 11112 | 12122 | 13133 | 14143 | 15153 | 16163 | 18184 | 20204 |
| | w | 1136 | 1262 | 1389 | 1515 | 1641 | 1767 | 1894 | 2020 | 2273 | 2525 |
| | $F_v$ | 107 | 119 | 131 | 143 | 155 | 167 | 179 | 191 | 215 | 239 |
| | E | 563 | 626 | 688 | 751 | 813 | 876 | 939 | 1001 | 1126 | 1252 |
| **10 x 10** | W | 10717 | 11907 | 13098 | 14289 | 15480 | 16671 | 17861 | 19052 | 21434 | 23815 |
| | w | 1339 | 1488 | 1637 | 1786 | 1935 | 2083 | 2232 | 2381 | 2679 | 2976 |
| | $F_v$ | 89 | 98 | 108 | 118 | 128 | 138 | 148 | 158 | 178 | 197 |
| | E | 682 | 757 | 833 | 909 | 985 | 1061 | 1136 | 1212 | 1364 | 1515 |
| **4 x 16** | W | 10510 | 11678 | 12846 | 14014 | 15182 | 16350 | 17518 | 18686 | 21021 | 23357 |
| | w | 1313 | 1459 | 1605 | 1751 | 1897 | 2043 | 2189 | 2335 | 2627 | 2919 |
| | $F_v$ | 145 | 161 | 177 | 193 | 209 | 226 | 242 | 258 | 290 | 322 |
| | E | 418 | 464 | 510 | 557 | 603 | 650 | 696 | 743 | 836 | 929 |
| **8 x 12** | W | 12398 | 13776 | 15153 | 16531 | 17908 | 19286 | 20664 | 22041 | 24796 | 27552 |
| | w | 1549 | 1722 | 1894 | 2066 | 2238 | 2410 | 2583 | 2755 | 3099 | 3444 |
| | $F_v$ | 107 | 119 | 131 | 143 | 155 | 167 | 179 | 191 | 215 | 239 |
| | E | 563 | 626 | 688 | 751 | 813 | 876 | 939 | 1001 | 1126 | 1252 |
| **6 x 14** | W | 12529 | 13921 | 15314 | 16706 | 18098 | 19490 | 20882 | 22275 | 25059 | 27843 |
| | w | 1566 | 1740 | 1914 | 2088 | 2262 | 2436 | 2610 | 2784 | 3132 | 3480 |
| | $F_v$ | 126 | 140 | 154 | 168 | 182 | 196 | 210 | 225 | 253 | 281 |
| | E | 480 | 533 | 586 | 640 | 693 | 746 | 800 | 853 | 960 | 1066 |
| **10 x 12** | W | 15704 | 17449 | 19194 | 20939 | 22684 | 24429 | 26174 | 27919 | 31409 | 34899 |
| | w | 1963 | 2181 | 2399 | 2617 | 2835 | 3053 | 3271 | 3489 | 3926 | 4362 |
| | $F_v$ | 107 | 119 | 131 | 143 | 155 | 167 | 179 | 191 | 215 | 239 |
| | E | 563 | 626 | 688 | 751 | 813 | 876 | 939 | 1001 | 1126 | 1252 |
| **6 x 16** | W | 16517 | 18352 | 20187 | 22022 | 23858 | 25693 | 27528 | 29363 | 33034 | 36704 |
| | w | 2064 | 2294 | 2523 | 2752 | 2982 | 3211 | 3441 | 3670 | 4129 | 4588 |
| | $F_v$ | 145 | 161 | 177 | 193 | 209 | 226 | 242 | 258 | 290 | 322 |
| | E | 418 | 464 | 510 | 557 | 603 | 650 | 696 | 743 | 836 | 929 |
| **8 x 14** | W | 17085 | 18984 | 20882 | 22781 | 24679 | 26578 | 28476 | 30375 | 34171 | 37968 |
| | w | 2135 | 2373 | 2610 | 2847 | 3084 | 3322 | 3559 | 3796 | 4271 | 4746 |
| | $F_v$ | 126 | 140 | 154 | 168 | 182 | 196 | 210 | 225 | 253 | 281 |
| | E | 480 | 533 | 586 | 640 | 693 | 746 | 800 | 853 | 960 | 1066 |
| **12 x 12** | W | 19010 | 21123 | 23235 | 25347 | 27460 | 29572 | 31684 | 33797 | 38021 | 42246 |
| | w | 2376 | 2640 | 2904 | 3168 | 3432 | 3696 | 3960 | 4224 | 4752 | 5280 |
| | $F_v$ | 107 | 119 | 131 | 143 | 155 | 167 | 179 | 191 | 215 | 239 |
| | E | 563 | 626 | 688 | 751 | 813 | 876 | 939 | 1001 | 1126 | 1252 |
| **10 x 14** | W | 21642 | 24046 | 26451 | 28856 | 31260 | 33665 | 36070 | 38475 | 43284 | 48093 |
| | w | 2705 | 3005 | 3306 | 3607 | 3907 | 4208 | 4508 | 4809 | 5410 | 6011 |
| | $F_v$ | 126 | 140 | 154 | 168 | 182 | 196 | 210 | 225 | 253 | 281 |
| | E | 480 | 533 | 586 | 640 | 693 | 746 | 800 | 853 | 960 | 1066 |
| **8 x 16** | W | 22523 | 25026 | 27528 | 30031 | 32533 | 35036 | 37539 | 40041 | 45046 | 50052 |
| | w | 2815 | 3128 | 3441 | 3753 | 4066 | 4379 | 4692 | 5005 | 5630 | 6256 |
| | $F_v$ | 145 | 161 | 177 | 193 | 209 | 226 | 242 | 258 | 290 | 322 |
| | E | 418 | 464 | 510 | 557 | 603 | 650 | 696 | 743 | 836 | 929 |
| **12 x 14** | W | 26198 | 29109 | 32020 | 34931 | 37842 | 40753 | 43664 | 46575 | 52396 | 58218 |
| | w | 3274 | 3638 | 4002 | 4366 | 4730 | 5094 | 5458 | 5821 | 6549 | 7277 |
| | $F_v$ | 126 | 140 | 154 | 168 | 182 | 196 | 210 | 225 | 253 | 281 |
| | E | 480 | 533 | 586 | 640 | 693 | 746 | 800 | 853 | 960 | 1066 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l$/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **8' - 0" SPAN CONT'D** | | | | | | | | | | | |
| 10 x 16 | W | 28529 | 31699 | 34869 | 38039 | 41209 | 44379 | 47549 | 50719 | 57059 | 63399 |
| | w | 3566 | 3962 | 4358 | 4754 | 5151 | 5547 | 5943 | 6339 | 7132 | 7924 |
| | $F_v$ | 145 | 161 | 177 | 193 | 209 | 226 | 242 | 258 | 290 | 322 |
| | E | 418 | 464 | 510 | 557 | 603 | 650 | 696 | 743 | 836 | 929 |
| 14 x 14 | W | 30754 | 34171 | 37589 | 41006 | 44423 | 47840 | 51257 | 54675 | 61509 | 68343 |
| | w | 3844 | 4271 | 4698 | 5125 | 5552 | 5980 | 6407 | 6834 | 7688 | 8542 |
| | $F_v$ | 126 | 140 | 154 | 168 | 182 | 196 | 210 | 225 | 253 | 281 |
| | E | 480 | 533 | 586 | 640 | 693 | 746 | 799 | 853 | 960 | 1066 |
| **9' - 0" SPAN** | | | | | | | | | | | |
| 3 x 4 | W | 340 | 378 | 415 | 453 | 491 | 529 | 567 | 604 | 680 | 756 |
| | w | 37 | 42 | 46 | 50 | 54 | 58 | 63 | 67 | 75 | 84 |
| | $F_v$ | 29 | 32 | 35 | 38 | 42 | 45 | 48 | 51 | 58 | 64 |
| | E | 2082 | 2314 | 2545 | 2777 | 3008 | 3239 | 3471 | 3702 | 4165 | 4628 |
| 4 x 4 | W | 476 | 529 | 582 | 635 | 688 | 741 | 793 | 846 | 952 | 1058 |
| | w | 52 | 58 | 64 | 70 | 76 | 82 | 88 | 94 | 105 | 117 |
| | $F_v$ | 29 | 32 | 35 | 38 | 42 | 45 | 48 | 51 | 58 | 64 |
| | E | 2082 | 2314 | 2545 | 2777 | 3008 | 3239 | 3471 | 3702 | 4165 | 4628 |
| 2 x 6 | W | 504 | 560 | 616 | 672 | 728 | 784 | 840 | 896 | 1008 | 1120 |
| | w | 56 | 62 | 68 | 74 | 80 | 87 | 93 | 99 | 112 | 124 |
| | $F_v$ | 45 | 50 | 56 | 61 | 66 | 71 | 76 | 81 | 91 | 101 |
| | E | 1325 | 1472 | 1619 | 1767 | 1914 | 2061 | 2209 | 2356 | 2650 | 2945 |
| 3 x 6 | W | 840 | 933 | 1027 | 1120 | 1213 | 1307 | 1400 | 1493 | 1680 | 1867 |
| | w | 93 | 103 | 114 | 124 | 134 | 145 | 155 | 165 | 186 | 207 |
| | $F_v$ | 45 | 50 | 56 | 61 | 66 | 71 | 76 | 81 | 91 | 101 |
| | E | 1325 | 1472 | 1619 | 1767 | 1914 | 2061 | 2209 | 2356 | 2650 | 2945 |
| 2 x 8 | W | 876 | 973 | 1070 | 1168 | 1265 | 1362 | 1460 | 1557 | 1752 | 1946 |
| | w | 97 | 108 | 118 | 129 | 140 | 151 | 162 | 173 | 194 | 216 |
| | $F_v$ | 60 | 67 | 73 | 80 | 87 | 93 | 100 | 107 | 120 | 134 |
| | E | 1005 | 1117 | 1228 | 1340 | 1452 | 1564 | 1675 | 1787 | 2011 | 2234 |
| 4 x 6 | W | 1176 | 1307 | 1437 | 1568 | 1699 | 1829 | 1960 | 2091 | 2352 | 2614 |
| | w | 130 | 145 | 159 | 174 | 188 | 203 | 217 | 232 | 261 | 290 |
| | $F_v$ | 45 | 50 | 56 | 61 | 66 | 71 | 76 | 81 | 91 | 101 |
| | E | 1325 | 1472 | 1619 | 1767 | 1914 | 2061 | 2209 | 2356 | 2650 | 2945 |
| 2 x 10 | W | 1426 | 1584 | 1742 | 1901 | 2059 | 2218 | 2376 | 2535 | 2852 | 3168 |
| | w | 158 | 176 | 193 | 211 | 228 | 246 | 264 | 281 | 316 | 352 |
| | $F_v$ | 77 | 85 | 94 | 102 | 111 | 119 | 128 | 137 | 154 | 171 |
| | E | 788 | 875 | 963 | 1050 | 1138 | 1225 | 1313 | 1401 | 1576 | 1751 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **9' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **3 x 8** | W | 1460 | 1622 | 1784 | 1946 | 2108 | 2271 | 2433 | 2595 | 2920 | 3244 |
| | w | 162 | 180 | 198 | 216 | 234 | 252 | 270 | 288 | 324 | 360 |
| | $F_v$ | 60 | 67 | 73 | 80 | 87 | 93 | 100 | 107 | 120 | 134 |
| | E | 1005 | 1117 | 1228 | 1340 | 1452 | 1564 | 1675 | 1787 | 2011 | 2234 |
| **6 x 6** | W | 1848 | 2054 | 2259 | 2464 | 2670 | 2875 | 3081 | 3286 | 3697 | 4108 |
| | w | 205 | 228 | 251 | 273 | 296 | 319 | 342 | 365 | 410 | 456 |
| | $F_v$ | 45 | 50 | 56 | 61 | 66 | 71 | 76 | 81 | 91 | 101 |
| | E | 1325 | 1472 | 1619 | 1767 | 1914 | 2061 | 2209 | 2356 | 2650 | 2945 |
| **4 x 8** | W | 2044 | 2271 | 2498 | 2725 | 2952 | 3179 | 3406 | 3633 | 4088 | 4542 |
| | w | 227 | 252 | 277 | 302 | 328 | 353 | 378 | 403 | 454 | 504 |
| | $F_v$ | 60 | 67 | 73 | 80 | 87 | 93 | 100 | 107 | 120 | 134 |
| | E | 1005 | 1117 | 1228 | 1340 | 1452 | 1564 | 1675 | 1787 | 2011 | 2234 |
| **2 x 12** | W | 2109 | 2343 | 2578 | 2812 | 3046 | 3281 | 3515 | 3750 | 4218 | 4687 |
| | w | 234 | 260 | 286 | 312 | 338 | 364 | 390 | 416 | 468 | 520 |
| | $F_v$ | 93 | 104 | 114 | 125 | 135 | 145 | 156 | 166 | 187 | 208 |
| | E | 648 | 720 | 792 | 864 | 936 | 1008 | 1079 | 1151 | 1295 | 1439 |
| **3 x 10** | W | 2376 | 2640 | 2904 | 3168 | 3433 | 3697 | 3961 | 4225 | 4753 | 5281 |
| | w | 264 | 293 | 322 | 352 | 381 | 410 | 440 | 469 | 528 | 586 |
| | $F_v$ | 77 | 85 | 94 | 102 | 111 | 119 | 128 | 137 | 154 | 171 |
| | E | 788 | 875 | 963 | 1050 | 1138 | 1225 | 1313 | 1401 | 1576 | 1751 |
| **2 x 14** | W | 2926 | 3251 | 3576 | 3901 | 4226 | 4551 | 4876 | 5201 | 5852 | 6502 |
| | w | 325 | 361 | 397 | 433 | 469 | 505 | 541 | 577 | 650 | 722 |
| | $F_v$ | 110 | 122 | 134 | 147 | 159 | 171 | 184 | 196 | 220 | 245 |
| | E | 550 | 611 | 672 | 733 | 794 | 855 | 916 | 978 | 1100 | 1222 |
| **6 x 8** | W | 3437 | 3819 | 4201 | 4583 | 4965 | 5347 | 5729 | 6111 | 6875 | 7638 |
| | w | 381 | 424 | 466 | 509 | 551 | 594 | 636 | 679 | 763 | 848 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 138 |
| | E | 972 | 1079 | 1187 | 1295 | 1403 | 1511 | 1619 | 1727 | 1943 | 2159 |
| **4 x 10** | W | 3327 | 3697 | 4066 | 4436 | 4806 | 5176 | 5545 | 5915 | 6654 | 7394 |
| | w | 369 | 410 | 451 | 492 | 534 | 575 | 616 | 657 | 739 | 821 |
| | $F_v$ | 77 | 85 | 94 | 102 | 111 | 119 | 128 | 137 | 154 | 171 |
| | E | 788 | 875 | 963 | 1050 | 1138 | 1225 | 1313 | 1401 | 1576 | 1751 |
| **3 x 12** | W | 3515 | 3906 | 4296 | 4687 | 5078 | 5468 | 5859 | 6250 | 7031 | 7812 |
| | w | 390 | 434 | 477 | 520 | 564 | 607 | 651 | 694 | 781 | 868 |
| | $F_v$ | 93 | 104 | 114 | 125 | 135 | 145 | 156 | 166 | 187 | 208 |
| | E | 648 | 720 | 792 | 864 | 935 | 1008 | 1079 | 1151 | 1295 | 1439 |
| **8 x 8** | W | 4687 | 5208 | 5729 | 6250 | 6770 | 7291 | 7812 | 8333 | 9375 | 10416 |
| | w | 520 | 578 | 636 | 694 | 752 | 810 | 868 | 925 | 1041 | 1157 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 138 |
| | E | 972 | 1079 | 1187 | 1295 | 1403 | 1511 | 1619 | 1727 | 1943 | 2159 |
| **3 x 14** | W | 4876 | 5418 | 5960 | 6502 | 7044 | 7586 | 8127 | 8669 | 9753 | 10837 |
| | w | 541 | 602 | 662 | 722 | 782 | 842 | 903 | 963 | 1083 | 1204 |
| | $F_v$ | 110 | 122 | 134 | 147 | 159 | 171 | 184 | 196 | 220 | 245 |
| | E | 550 | 611 | 672 | 733 | 794 | 855 | 916 | 978 | 1100 | 1222 |
| **4 x 12** | W | 4921 | 5468 | 6015 | 6562 | 7109 | 7656 | 8203 | 8750 | 9843 | 10937 |
| | w | 546 | 607 | 668 | 729 | 789 | 850 | 911 | 972 | 1093 | 1215 |
| | $F_v$ | 93 | 104 | 114 | 125 | 135 | 145 | 156 | 166 | 187 | 208 |
| | E | 648 | 720 | 792 | 863 | 936 | 1008 | 1079 | 1151 | 1295 | 1439 |
| **6 x 10** | W | 5515 | 6128 | 6740 | 7353 | 7966 | 8579 | 9192 | 9804 | 11030 | 12256 |
| | w | 612 | 680 | 748 | 817 | 885 | 953 | 1021 | 1089 | 1225 | 1361 |
| | $F_v$ | 79 | 87 | 96 | 105 | 114 | 123 | 131 | 140 | 158 | 175 |
| | E | 767 | 852 | 937 | 1023 | 1108 | 1193 | 1278 | 1364 | 1534 | 1705 |

## WOOD BEAMS–SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **9'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **3 x 16** | W | 6460 | 7177 | 7895 | 8613 | 9331 | 10048 | 10766 | 11484 | 12920 | 14355 |
| | w | 717 | 797 | 877 | 957 | 1036 | 1116 | 1196 | 1276 | 1435 | 1595 |
| | $F_v$ | 127 | 141 | 155 | 169 | 183 | 197 | 211 | 225 | 254 | 282 |
| | E | 478 | 531 | 584 | 637 | 690 | 743 | 796 | 849 | 956 | 1062 |
| **4 x 14** | W | 7087 | 7875 | 8662 | 9450 | 10237 | 11025 | 11812 | 12600 | 14175 | 15750 |
| | w | 787 | 875 | 962 | 1050 | 1137 | 1225 | 1312 | 1400 | 1575 | 1750 |
| | $F_v$ | 112 | 125 | 137 | 150 | 162 | 175 | 187 | 200 | 225 | 250 |
| | E | 540 | 600 | 660 | 720 | 780 | 840 | 900 | 960 | 1079 | 1199 |
| **8 x 10** | W | 7520 | 8356 | 9192 | 10027 | 10863 | 11699 | 12534 | 13370 | 15041 | 16712 |
| | w | 835 | 928 | 1021 | 1114 | 1207 | 1299 | 1392 | 1485 | 1671 | 1856 |
| | $F_v$ | 79 | 87 | 96 | 105 | 114 | 123 | 131 | 140 | 158 | 175 |
| | E | 767 | 852 | 937 | 1023 | 1108 | 1193 | 1278 | 1364 | 1534 | 1705 |
| **6 x 12** | W | 8081 | 8979 | 9877 | 10775 | 11673 | 12571 | 13469 | 14367 | 16163 | 17959 |
| | w | 897 | 997 | 1097 | 1197 | 1297 | 1396 | 1496 | 1596 | 1795 | 1995 |
| | $F_v$ | 95 | 106 | 117 | 127 | 138 | 149 | 159 | 170 | 191 | 212 |
| | E | 633 | 704 | 774 | 845 | 915 | 986 | 1056 | 1126 | 1267 | 1408 |
| **10 x 10** | W | 9526 | 10584 | 11643 | 12701 | 13760 | 14818 | 15877 | 16935 | 19052 | 21169 |
| | w | 1058 | 1176 | 1293 | 1411 | 1528 | 1646 | 1764 | 1881 | 2116 | 2352 |
| | $F_v$ | 79 | 87 | 96 | 105 | 114 | 123 | 131 | 140 | 158 | 175 |
| | E | 767 | 852 | 937 | 1023 | 1108 | 1193 | 1278 | 1364 | 1534 | 1705 |
| **4 x 16** | W | 9343 | 10381 | 11419 | 12457 | 13495 | 14533 | 15571 | 16609 | 18686 | 20762 |
| | w | 1038 | 1153 | 1268 | 1384 | 1499 | 1614 | 1730 | 1845 | 2076 | 2306 |
| | $F_v$ | 129 | 143 | 157 | 172 | 186 | 200 | 215 | 229 | 258 | 287 |
| | E | 470 | 522 | 574 | 627 | 679 | 731 | 783 | 836 | 940 | 1045 |
| **8 x 12** | W | 11020 | 12245 | 13469 | 14694 | 15918 | 17143 | 18368 | 19592 | 22041 | 24490 |
| | w | 1224 | 1360 | 1496 | 1632 | 1768 | 1904 | 2040 | 2176 | 2449 | 2721 |
| | $F_v$ | 95 | 106 | 117 | 127 | 138 | 149 | 159 | 170 | 191 | 212 |
| | E | 633 | 704 | 774 | 845 | 915 | 986 | 1056 | 1126 | 1267 | 1408 |
| **6 x 14** | W | 11137 | 12375 | 13612 | 14850 | 16087 | 17325 | 18562 | 19800 | 22275 | 24750 |
| | w | 1237 | 1375 | 1512 | 1650 | 1787 | 1925 | 2062 | 2200 | 2475 | 2750 |
| | $F_v$ | 112 | 125 | 137 | 150 | 162 | 175 | 187 | 200 | 225 | 250 |
| | E | 540 | 600 | 659 | 720 | 779 | 840 | 900 | 960 | 1079 | 1199 |
| **10 x 12** | W | 13959 | 15510 | 17061 | 18612 | 20164 | 21715 | 23266 | 24817 | 27919 | 31021 |
| | w | 1551 | 1723 | 1895 | 2068 | 2240 | 2412 | 2585 | 2757 | 3102 | 3446 |
| | $F_v$ | 95 | 106 | 117 | 127 | 138 | 149 | 159 | 170 | 191 | 212 |
| | E | 633 | 704 | 774 | 845 | 915 | 986 | 1056 | 1126 | 1267 | 1408 |
| **6 x 16** | W | 14681 | 16313 | 17944 | 19575 | 21207 | 22838 | 24469 | 26101 | 29363 | 32626 |
| | w | 1631 | 1812 | 1993 | 2175 | 2356 | 2537 | 2718 | 2900 | 3262 | 3625 |
| | $F_v$ | 129 | 143 | 157 | 172 | 186 | 200 | 215 | 229 | 258 | 287 |
| | E | 470 | 522 | 574 | 627 | 679 | 731 | 783 | 836 | 940 | 1045 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **9' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **8 x 14** | W | 15187 | 16875 | 18562 | 20250 | 21937 | 23625 | 25312 | 27000 | 30375 | 33750 |
| | w | 1687 | 1875 | 2062 | 2250 | 2437 | 2625 | 2812 | 3000 | 3375 | 3750 |
| | $F_v$ | 112 | 125 | 137 | 150 | 162 | 175 | 187 | 200 | 225 | 250 |
| | E | 540 | 600 | 660 | 720 | 780 | 840 | 900 | 960 | 1079 | 1199 |
| **12 x 12** | W | 16898 | 18776 | 20653 | 22531 | 24409 | 26286 | 28164 | 30041 | 33797 | 37552 |
| | w | 1877 | 2086 | 2294 | 2503 | 2712 | 2920 | 3129 | 3337 | 3755 | 4172 |
| | $F_v$ | 95 | 106 | 117 | 127 | 138 | 149 | 159 | 170 | 191 | 212 |
| | E | 633 | 704 | 774 | 845 | 915 | 986 | 1056 | 1126 | 1267 | 1408 |
| **6 x 18** | W | 18715 | 20794 | 22874 | 24953 | 27033 | 29112 | 31192 | 33271 | 37430 | 41589 |
| | w | 2079 | 2310 | 2541 | 2772 | 3003 | 3234 | 3465 | 3696 | 4158 | 4621 |
| | $F_v$ | 145 | 162 | 178 | 194 | 210 | 226 | 243 | 259 | 291 | 324 |
| | E | 416 | 462 | 509 | 555 | 601 | 647 | 694 | 740 | 833 | 925 |
| **10 x 14** | W | 19237 | 21375 | 23512 | 25650 | 27787 | 29925 | 32062 | 34200 | 38475 | 42750 |
| | w | 2137 | 2375 | 2612 | 2850 | 3087 | 3325 | 3562 | 3800 | 4275 | 4750 |
| | $F_v$ | 112 | 125 | 137 | 150 | 162 | 175 | 187 | 200 | 225 | 250 |
| | E | 540 | 600 | 660 | 720 | 780 | 840 | 900 | 960 | 1079 | 1199 |
| **8 x 16** | W | 20020 | 22245 | 24469 | 26694 | 28918 | 31143 | 33368 | 35592 | 40041 | 44490 |
| | w | 2224 | 2471 | 2718 | 2966 | 3213 | 3460 | 3707 | 3954 | 4449 | 4943 |
| | $F_v$ | 129 | 143 | 157 | 172 | 186 | 200 | 215 | 229 | 258 | 287 |
| | E | 470 | 522 | 574 | 627 | 679 | 731 | 783 | 836 | 940 | 1045 |
| **12 x 14** | W | 23287 | 25875 | 28462 | 31050 | 33637 | 36225 | 38812 | 41400 | 46575 | 51750 |
| | w | 2587 | 2875 | 3162 | 3450 | 3737 | 4025 | 4312 | 4600 | 5175 | 5750 |
| | $F_v$ | 112 | 125 | 137 | 150 | 162 | 175 | 187 | 200 | 225 | 250 |
| | E | 540 | 600 | 660 | 720 | 780 | 840 | 900 | 960 | 1079 | 1199 |
| **10 x 16** | W | 25359 | 28177 | 30995 | 33812 | 36630 | 39448 | 42266 | 45083 | 50719 | 56354 |
| | w | 2817 | 3130 | 3443 | 3756 | 4070 | 4383 | 4696 | 5009 | 5635 | 6261 |
| | $F_v$ | 129 | 143 | 157 | 172 | 186 | 200 | 215 | 229 | 258 | 287 |
| | E | 470 | 522 | 574 | 627 | 679 | 731 | 783 | 836 | 940 | 1045 |
| **8 x 18** | W | 25520 | 28356 | 31192 | 34027 | 36863 | 39699 | 42534 | 45370 | 51041 | 56712 |
| | w | 2835 | 3150 | 3465 | 3780 | 4095 | 4411 | 4726 | 5041 | 5671 | 6301 |
| | $F_v$ | 145 | 162 | 178 | 194 | 210 | 226 | 243 | 259 | 291 | 324 |
| | E | 416 | 462 | 509 | 555 | 601 | 648 | 694 | 740 | 833 | 925 |
| **14 x 14** | W | 27337 | 30375 | 33412 | 36450 | 39487 | 42525 | 45562 | 48600 | 54675 | 60750 |
| | w | 3037 | 3375 | 3712 | 4050 | 4387 | 4725 | 5062 | 5400 | 6075 | 6750 |
| | $F_v$ | 112 | 125 | 137 | 150 | 162 | 175 | 187 | 200 | 225 | 250 |
| | E | 540 | 600 | 660 | 720 | 779 | 840 | 899 | 960 | 1079 | 1199 |
| **12 x 16** | W | 30698 | 34109 | 37520 | 40931 | 44342 | 47753 | 51164 | 54575 | 61397 | 68219 |
| | w | 3410 | 3789 | 4168 | 4547 | 4926 | 5305 | 5684 | 6063 | 6821 | 7579 |
| | $F_v$ | 129 | 143 | 157 | 172 | 186 | 200 | 215 | 229 | 258 | 287 |
| | E | 470 | 522 | 574 | 627 | 679 | 731 | 783 | 836 | 940 | 1045 |
| **10 x 18** | W | 32326 | 35918 | 39510 | 43101 | 46693 | 50285 | 53877 | 57469 | 64652 | 71836 |
| | w | 3591 | 3990 | 4390 | 4789 | 5188 | 5587 | 5986 | 6385 | 7183 | 7981 |
| | $F_v$ | 145 | 162 | 178 | 194 | 210 | 226 | 243 | 259 | 291 | 324 |
| | E | 416 | 462 | 509 | 555 | 601 | 648 | 694 | 740 | 833 | 925 |
| **14 x 16** | W | 36037 | 40041 | 44045 | 48050 | 52054 | 56058 | 60062 | 64066 | 72075 | 80083 |
| | w | 4004 | 4449 | 4893 | 5338 | 5783 | 6228 | 6673 | 7118 | 8008 | 8898 |
| | $F_v$ | 129 | 143 | 157 | 172 | 186 | 200 | 215 | 229 | 258 | 287 |
| | E | 470 | 522 | 574 | 627 | 679 | 731 | 783 | 836 | 940 | 1045 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **10' - 0" SPAN** | | | | | | | | | | | |
| **3 x 4** | W | 306 | 340 | 374 | 408 | 442 | 476 | 510 | 544 | 612 | 680 |
| | w | 30 | 34 | 37 | 40 | 44 | 47 | 51 | 54 | 61 | 68 |
| | $F_v$ | 26 | 29 | 32 | 35 | 37 | 40 | 43 | 46 | 52 | 58 |
| | E | 2314 | 2571 | 2828 | 3085 | 3342 | 3599 | 3857 | 4114 | 4628 | 5142 |
| **4 x 4** | W | 428 | 476 | 524 | 571 | 619 | 666 | 714 | 762 | 857 | 952 |
| | w | 42 | 47 | 52 | 57 | 61 | 66 | 71 | 76 | 85 | 95 |
| | $F_v$ | 26 | 29 | 32 | 35 | 37 | 40 | 43 | 46 | 52 | 58 |
| | E | 2314 | 2571 | 2828 | 3085 | 3342 | 3599 | 3857 | 4114 | 4628 | 5142 |
| **2 x 6** | W | 453 | 504 | 554 | 605 | 655 | 705 | 756 | 806 | 907 | 1008 |
| | w | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | $F_v$ | 41 | 45 | 50 | 55 | 59 | 64 | 68 | 73 | 82 | 91 |
| | E | 1472 | 1636 | 1799 | 1963 | 2127 | 2290 | 2454 | 2618 | 2945 | 3272 |
| **3 x 6** | W | 756 | 840 | 924 | 1008 | 1092 | 1176 | 1260 | 1344 | 1512 | 1680 |
| | w | 75 | 84 | 92 | 100 | 109 | 117 | 126 | 134 | 151 | 168 |
| | $F_v$ | 41 | 45 | 50 | 55 | 59 | 64 | 68 | 73 | 82 | 91 |
| | E | 1472 | 1636 | 1799 | 1963 | 2127 | 2290 | 2454 | 2618 | 2945 | 3272 |
| **2 x 8** | W | 788 | 876 | 963 | 1051 | 1138 | 1226 | 1314 | 1401 | 1576 | 1752 |
| | w | 78 | 87 | 96 | 105 | 113 | 122 | 131 | 140 | 157 | 175 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 84 | 90 | 96 | 108 | 120 |
| | E | 1117 | 1241 | 1365 | 1489 | 1613 | 1737 | 1862 | 1986 | 2234 | 2482 |
| **4 x 6** | W | 1058 | 1176 | 1294 | 1411 | 1529 | 1646 | 1764 | 1882 | 2117 | 2352 |
| | w | 105 | 117 | 129 | 141 | 152 | 164 | 176 | 188 | 211 | 235 |
| | $F_v$ | 41 | 45 | 50 | 55 | 59 | 64 | 68 | 73 | 82 | 91 |
| | E | 1472 | 1636 | 1799 | 1963 | 2127 | 2290 | 2454 | 2618 | 2945 | 3272 |
| **2 x 10** | W | 1283 | 1426 | 1568 | 1711 | 1853 | 1996 | 2139 | 2281 | 2566 | 2852 |
| | w | 128 | 142 | 156 | 171 | 185 | 199 | 213 | 228 | 256 | 285 |
| | $F_v$ | 69 | 77 | 84 | 92 | 100 | 107 | 115 | 123 | 138 | 154 |
| | E | 875 | 972 | 1070 | 1167 | 1264 | 1362 | 1459 | 1556 | 1751 | 1945 |
| **3 x 8** | W | 1314 | 1460 | 1606 | 1752 | 1898 | 2044 | 2190 | 2336 | 2628 | 2920 |
| | w | 131 | 146 | 160 | 175 | 189 | 204 | 219 | 233 | 262 | 292 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 84 | 90 | 96 | 108 | 120 |
| | E | 1117 | 1241 | 1365 | 1489 | 1613 | 1737 | 1862 | 1986 | 2234 | 2482 |
| **6 x 6** | W | 1663 | 1848 | 2033 | 2218 | 2403 | 2588 | 2772 | 2957 | 3327 | 3697 |
| | w | 166 | 184 | 203 | 221 | 240 | 258 | 277 | 295 | 332 | 369 |
| | $F_v$ | 41 | 45 | 50 | 55 | 59 | 64 | 68 | 73 | 82 | 91 |
| | E | 1472 | 1636 | 1799 | 1963 | 2127 | 2290 | 2454 | 2618 | 2945 | 3272 |
| **4 x 8** | W | 1839 | 2044 | 2248 | 2452 | 2657 | 2861 | 3066 | 3270 | 3679 | 4088 |
| | w | 183 | 204 | 224 | 245 | 265 | 286 | 306 | 327 | 367 | 408 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 84 | 90 | 96 | 108 | 120 |
| | E | 1117 | 1241 | 1365 | 1489 | 1613 | 1737 | 1862 | 1986 | 2234 | 2482 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **10'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **2 x 12** | W | 1898 | 2109 | 2320 | 2531 | 2742 | 2953 | 3164 | 3375 | 3796 | 4218 |
| | w | 189 | 210 | 232 | 253 | 274 | 295 | 316 | 337 | 379 | 421 |
| | $F_v$ | 84 | 93 | 103 | 112 | 121 | 131 | 140 | 150 | 168 | 187 |
| | E | 720 | 800 | 880 | 960 | 1040 | 1119 | 1199 | 1279 | 1439 | 1599 |
| **3 x 10** | W | 2139 | 2376 | 2614 | 2852 | 3089 | 3327 | 3565 | 3802 | 4278 | 4753 |
| | w | 213 | 237 | 261 | 285 | 308 | 332 | 356 | 380 | 427 | 475 |
| | $F_v$ | 69 | 77 | 84 | 92 | 100 | 107 | 115 | 123 | 138 | 154 |
| | E | 875 | 972 | 1070 | 1167 | 1264 | 1362 | 1459 | 1556 | 1751 | 1945 |
| **2 x 14** | W | 2633 | 2926 | 3218 | 3511 | 3803 | 4096 | 4389 | 4681 | 5266 | 5852 |
| | w | 263 | 292 | 321 | 351 | 380 | 409 | 438 | 468 | 526 | 585 |
| | $F_v$ | 99 | 110 | 121 | 132 | 143 | 154 | 165 | 176 | 198 | 220 |
| | E | 611 | 679 | 747 | 815 | 883 | 950 | 1018 | 1086 | 1222 | 1358 |
| **6 x 8** | W | 3093 | 3437 | 3781 | 4125 | 4468 | 4812 | 5156 | 5500 | 6187 | 6875 |
| | w | 309 | 343 | 378 | 412 | 446 | 481 | 515 | 550 | 618 | 687 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **4 x 10** | W | 2994 | 3327 | 3660 | 3992 | 4325 | 4658 | 4991 | 5323 | 5989 | 6654 |
| | w | 299 | 332 | 366 | 399 | 432 | 465 | 499 | 532 | 598 | 665 |
| | $F_v$ | 69 | 77 | 84 | 92 | 100 | 107 | 115 | 123 | 138 | 154 |
| | E | 875 | 972 | 1070 | 1167 | 1264 | 1362 | 1459 | 1556 | 1751 | 1945 |
| **3 x 12** | W | 3164 | 3515 | 3867 | 4218 | 4570 | 4921 | 5273 | 5625 | 6328 | 7031 |
| | w | 316 | 351 | 386 | 421 | 457 | 492 | 527 | 562 | 632 | 703 |
| | $F_v$ | 84 | 93 | 103 | 112 | 121 | 131 | 140 | 150 | 168 | 187 |
| | E | 720 | 800 | 880 | 959 | 1039 | 1119 | 1199 | 1279 | 1439 | 1599 |
| **8 x 8** | W | 4218 | 4687 | 5156 | 5625 | 6093 | 6562 | 7031 | 7500 | 8437 | 9375 |
| | w | 421 | 468 | 515 | 562 | 609 | 656 | 703 | 750 | 843 | 937 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **3 x 14** | W | 4389 | 4876 | 5364 | 5852 | 6339 | 6827 | 7315 | 7802 | 8778 | 9753 |
| | w | 438 | 487 | 536 | 585 | 633 | 682 | 731 | 780 | 877 | 975 |
| | $F_v$ | 99 | 110 | 121 | 132 | 143 | 154 | 165 | 176 | 198 | 220 |
| | E | 611 | 679 | 747 | 815 | 883 | 950 | 1018 | 1086 | 1222 | 1358 |
| **4 x 12** | W | 4429 | 4921 | 5414 | 5906 | 6398 | 6890 | 7382 | 7875 | 8859 | 9843 |
| | w | 442 | 492 | 541 | 590 | 639 | 689 | 738 | 787 | 885 | 984 |
| | $F_v$ | 84 | 93 | 103 | 112 | 121 | 131 | 140 | 150 | 168 | 187 |
| | E | 720 | 800 | 880 | 960 | 1040 | 1119 | 1199 | 1279 | 1439 | 1599 |
| **6 x 10** | W | 4963 | 5515 | 6066 | 6618 | 7169 | 7721 | 8272 | 8824 | 9927 | 11030 |
| | w | 496 | 551 | 606 | 661 | 716 | 772 | 827 | 882 | 992 | 1103 |
| | $F_v$ | 71 | 79 | 87 | 95 | 102 | 110 | 118 | 126 | 142 | 158 |
| | E | 852 | 947 | 1042 | 1136 | 1231 | 1326 | 1421 | 1515 | 1705 | 1894 |
| **3 x 16** | W | 5814 | 6460 | 7106 | 7752 | 8398 | 9044 | 9690 | 10336 | 11628 | 12920 |
| | w | 581 | 646 | 710 | 775 | 839 | 904 | 969 | 1033 | 1162 | 1292 |
| | $F_v$ | 114 | 127 | 139 | 152 | 165 | 177 | 190 | 203 | 228 | 254 |
| | E | 531 | 590 | 649 | 708 | 767 | 826 | 885 | 944 | 1062 | 1180 |
| **4 x 14** | W | 6378 | 7087 | 7796 | 8505 | 9213 | 9922 | 10631 | 11340 | 12757 | 14175 |
| | w | 637 | 708 | 779 | 850 | 921 | 992 | 1063 | 1134 | 1275 | 1417 |
| | $F_v$ | 101 | 112 | 123 | 135 | 146 | 157 | 168 | 180 | 202 | 225 |
| | E | 600 | 666 | 733 | 800 | 866 | 933 | 1000 | 1066 | 1199 | 1333 |
| **8 x 10** | W | 6768 | 7520 | 8272 | 9025 | 9777 | 10529 | 11281 | 12033 | 13537 | 15041 |
| | w | 676 | 752 | 827 | 902 | 977 | 1052 | 1128 | 1203 | 1353 | 1504 |
| | $F_v$ | 71 | 79 | 87 | 95 | 102 | 110 | 118 | 126 | 142 | 158 |
| | E | 852 | 947 | 1042 | 1136 | 1231 | 1326 | 1421 | 1515 | 1705 | 1894 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $\ell$/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **10' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **6 x 12** | W | 7273 | 8081 | 8890 | 9698 | 10506 | 11314 | 12122 | 12931 | 14547 | 16163 |
| | w | 727 | 808 | 889 | 969 | 1050 | 1131 | 1212 | 1293 | 1454 | 1616 |
| | $F_v$ | 86 | 95 | 105 | 115 | 124 | 134 | 143 | 153 | 172 | 191 |
| | E | 704 | 782 | 860 | 939 | 1017 | 1095 | 1173 | 1252 | 1408 | 1565 |
| **10 x 10** | W | 8573 | 9526 | 10479 | 11431 | 12384 | 13336 | 14289 | 15242 | 17147 | 19052 |
| | w | 857 | 952 | 1047 | 1143 | 1238 | 1333 | 1428 | 1524 | 1714 | 1905 |
| | $F_v$ | 71 | 79 | 87 | 95 | 102 | 110 | 118 | 126 | 142 | 158 |
| | E | 852 | 947 | 1042 | 1136 | 1231 | 1326 | 1421 | 1515 | 1705 | 1894 |
| **4 x 16** | W | 8408 | 9343 | 10277 | 11211 | 12145 | 13080 | 14014 | 14948 | 16817 | 18686 |
| | w | 840 | 934 | 1027 | 1121 | 1214 | 1308 | 1401 | 1494 | 1681 | 1868 |
| | $F_v$ | 116 | 129 | 142 | 155 | 167 | 180 | 193 | 206 | 232 | 258 |
| | E | 522 | 580 | 638 | 696 | 754 | 812 | 870 | 929 | 1045 | 1161 |
| **8 x 12** | W | 9918 | 11020 | 12122 | 13225 | 14327 | 15429 | 16531 | 17633 | 19837 | 22041 |
| | w | 991 | 1102 | 1212 | 1322 | 1432 | 1542 | 1653 | 1763 | 1983 | 2204 |
| | $F_v$ | 86 | 95 | 105 | 115 | 124 | 134 | 143 | 153 | 172 | 191 |
| | E | 704 | 782 | 860 | 939 | 1017 | 1095 | 1173 | 1252 | 1408 | 1565 |
| **6 x 14** | W | 10023 | 11137 | 12251 | 13365 | 14478 | 15592 | 16706 | 17820 | 20047 | 22275 |
| | w | 1002 | 1113 | 1225 | 1336 | 1447 | 1559 | 1670 | 1782 | 2004 | 2227 |
| | $F_v$ | 101 | 112 | 123 | 135 | 146 | 157 | 168 | 180 | 202 | 225 |
| | E | 600 | 666 | 733 | 800 | 866 | 933 | 1000 | 1066 | 1199 | 1333 |
| **10 x 12** | W | 12563 | 13959 | 15355 | 16751 | 18147 | 19543 | 20939 | 22335 | 25127 | 27919 |
| | w | 1256 | 1395 | 1535 | 1675 | 1814 | 1954 | 2093 | 2233 | 2512 | 2791 |
| | $F_v$ | 86 | 95 | 105 | 115 | 124 | 134 | 143 | 153 | 172 | 191 |
| | E | 704 | 782 | 860 | 939 | 1017 | 1095 | 1173 | 1252 | 1408 | 1565 |
| **6 x 16** | W | 13213 | 14681 | 16150 | 17618 | 19086 | 20554 | 22022 | 23491 | 26427 | 29363 |
| | w | 1321 | 1468 | 1615 | 1761 | 1908 | 2055 | 2202 | 2349 | 2642 | 2936 |
| | $F_v$ | 116 | 129 | 142 | 155 | 167 | 180 | 193 | 206 | 232 | 258 |
| | E | 522 | 580 | 638 | 696 | 754 | 812 | 870 | 929 | 1045 | 1161 |
| **8 x 14** | W | 13668 | 15187 | 16706 | 18225 | 19743 | 21262 | 22781 | 24300 | 27337 | 30375 |
| | w | 1366 | 1518 | 1670 | 1822 | 1974 | 2126 | 2278 | 2430 | 2733 | 3037 |
| | $F_v$ | 101 | 112 | 123 | 135 | 146 | 157 | 168 | 180 | 202 | 225 |
| | E | 600 | 666 | 733 | 800 | 866 | 933 | 1000 | 1066 | 1199 | 1333 |
| **12 x 12** | W | 15208 | 16898 | 18588 | 20278 | 21968 | 23658 | 25347 | 27037 | 30417 | 33797 |
| | w | 1520 | 1689 | 1858 | 2027 | 2196 | 2365 | 2534 | 2703 | 3041 | 3379 |
| | $F_v$ | 86 | 95 | 105 | 115 | 124 | 134 | 143 | 153 | 172 | 191 |
| | E | 704 | 782 | 860 | 939 | 1017 | 1095 | 1173 | 1252 | 1408 | 1565 |
| **6 x 18** | W | 16843 | 18715 | 20586 | 22458 | 24329 | 26201 | 28072 | 29944 | 33687 | 37430 |
| | w | 1684 | 1871 | 2058 | 2245 | 2432 | 2620 | 2807 | 2994 | 3368 | 3743 |
| | $F_v$ | 131 | 145 | 160 | 175 | 189 | 204 | 218 | 233 | 262 | 291 |
| | E | 462 | 514 | 565 | 617 | 668 | 719 | 771 | 822 | 925 | 1028 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **10' - 0" SPAN CONT'D** | | | | | | | | | | | |
| 10 x 14 | W | 17313 | 19237 | 21161 | 23085 | 25008 | 26932 | 28856 | 30780 | 34627 | 38475 |
| | w | 1731 | 1923 | 2116 | 2308 | 2500 | 2693 | 2885 | 3078 | 3462 | 3847 |
| | $F_v$ | 101 | 112 | 123 | 135 | 146 | 157 | 168 | 180 | 202 | 225 |
| | E | 600 | 666 | 733 | 800 | 866 | 933 | 1000 | 1066 | 1199 | 1333 |
| 8 x 16 | W | 18018 | 20020 | 22022 | 24025 | 26027 | 28029 | 30031 | 32033 | 36037 | 40041 |
| | w | 1801 | 2002 | 2202 | 2402 | 2602 | 2802 | 3003 | 3203 | 3603 | 4004 |
| | $F_v$ | 116 | 129 | 142 | 155 | 167 | 180 | 193 | 206 | 232 | 258 |
| | E | 522 | 580 | 638 | 696 | 754 | 812 | 870 | 929 | 1045 | 1161 |
| 12 x 14 | W | 20958 | 23287 | 25616 | 27945 | 30273 | 32602 | 34931 | 37260 | 41917 | 46575 |
| | w | 2095 | 2328 | 2561 | 2794 | 3027 | 3260 | 3493 | 3726 | 4191 | 4657 |
| | $F_v$ | 101 | 112 | 123 | 135 | 146 | 157 | 168 | 180 | 202 | 225 |
| | E | 600 | 666 | 733 | 800 | 866 | 933 | 1000 | 1066 | 1199 | 1333 |
| 10 x 16 | W | 22823 | 25359 | 27895 | 30431 | 32967 | 35503 | 38039 | 40575 | 45647 | 50719 |
| | w | 2282 | 2535 | 2789 | 3043 | 3296 | 3550 | 3803 | 4057 | 4564 | 5071 |
| | $F_v$ | 116 | 129 | 142 | 155 | 167 | 180 | 193 | 206 | 232 | 258 |
| | E | 522 | 580 | 638 | 696 | 754 | 812 | 870 | 929 | 1045 | 1161 |
| 8 x 18 | W | 22968 | 25520 | 28072 | 30625 | 33177 | 35729 | 38281 | 40833 | 45937 | 51041 |
| | w | 2296 | 2552 | 2807 | 3062 | 3317 | 3572 | 3828 | 4083 | 4593 | 5104 |
| | $F_v$ | 131 | 145 | 160 | 175 | 189 | 204 | 218 | 233 | 262 | 291 |
| | E | 462 | 514 | 565 | 617 | 668 | 720 | 771 | 822 | 925 | 1028 |
| 14 x 14 | W | 24603 | 27337 | 30071 | 32805 | 35538 | 38272 | 41006 | 43740 | 49207 | 54675 |
| | w | 2460 | 2733 | 3007 | 3280 | 3553 | 3827 | 4100 | 4374 | 4920 | 5467 |
| | $F_v$ | 101 | 112 | 123 | 135 | 146 | 157 | 168 | 180 | 202 | 225 |
| | E | 600 | 666 | 733 | 800 | 866 | 933 | 999 | 1066 | 1199 | 1333 |
| 12 x 16 | W | 27628 | 30698 | 33768 | 36838 | 39908 | 42978 | 46047 | 49117 | 55257 | 61397 |
| | w | 2762 | 3069 | 3376 | 3683 | 3990 | 4297 | 4604 | 4911 | 5525 | 6139 |
| | $F_v$ | 116 | 129 | 142 | 155 | 167 | 180 | 193 | 206 | 232 | 258 |
| | E | 522 | 580 | 638 | 696 | 754 | 812 | 870 | 929 | 1045 | 1161 |
| 10 x 18 | W | 29093 | 32326 | 35559 | 38791 | 42024 | 45256 | 48489 | 51722 | 58187 | 64652 |
| | w | 2909 | 3232 | 3555 | 3879 | 4202 | 4525 | 4848 | 5172 | 5818 | 6465 |
| | $F_v$ | 131 | 145 | 160 | 175 | 189 | 204 | 218 | 233 | 262 | 291 |
| | E | 462 | 514 | 565 | 617 | 668 | 720 | 771 | 822 | 925 | 1028 |
| 14 x 16 | W | 32433 | 36037 | 39641 | 43245 | 46848 | 50452 | 54056 | 57660 | 64867 | 72075 |
| | w | 3243 | 3603 | 3964 | 4324 | 4684 | 5045 | 5405 | 5766 | 6486 | 7207 |
| | $F_v$ | 116 | 129 | 142 | 155 | 167 | 180 | 193 | 206 | 232 | 258 |
| | E | 522 | 580 | 638 | 696 | 754 | 812 | 870 | 929 | 1045 | 1161 |
| **11' - 0" SPAN** | | | | | | | | | | | |
| 2 x 6 | W | 412 | 458 | 504 | 550 | 595 | 641 | 687 | 733 | 825 | 916 |
| | w | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| 3 x 6 | W | 687 | 763 | 840 | 916 | 993 | 1069 | 1145 | 1222 | 1375 | 1527 |
| | w | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 138 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| 2 x 8 | W | 716 | 796 | 876 | 955 | 1035 | 1114 | 1194 | 1274 | 1433 | 1592 |
| | w | 65 | 72 | 79 | 86 | 94 | 101 | 108 | 115 | 130 | 144 |
| | $F_v$ | 49 | 54 | 60 | 65 | 71 | 76 | 82 | 87 | 98 | 109 |
| | E | 1228 | 1365 | 1502 | 1638 | 1775 | 1911 | 2048 | 2184 | 2457 | 2731 |

## WOOD BEAMS–SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **11'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **4 x 6** | W | 962 | 1069 | 1176 | 1283 | 1390 | 1497 | 1604 | 1711 | 1924 | 2138 |
| | w | 87 | 97 | 106 | 116 | 126 | 136 | 145 | 155 | 175 | 194 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **2 x 10** | W | 1166 | 1296 | 1426 | 1555 | 1685 | 1814 | 1944 | 2074 | 2333 | 2592 |
| | w | 106 | 117 | 129 | 141 | 153 | 164 | 176 | 188 | 212 | 235 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 112 | 126 | 140 |
| | E | 963 | 1070 | 1177 | 1284 | 1391 | 1498 | 1605 | 1712 | 1926 | 2140 |
| **3 x 8** | W | 1194 | 1327 | 1460 | 1592 | 1725 | 1858 | 1991 | 2123 | 2389 | 2654 |
| | w | 108 | 120 | 132 | 144 | 156 | 168 | 181 | 193 | 217 | 241 |
| | $F_v$ | 49 | 54 | 60 | 65 | 71 | 76 | 82 | 87 | 98 | 109 |
| | E | 1228 | 1365 | 1502 | 1638 | 1775 | 1911 | 2048 | 2184 | 2457 | 2731 |
| **6 x 6** | W | 1512 | 1680 | 1848 | 2016 | 2184 | 2352 | 2520 | 2688 | 3024 | 3361 |
| | w | 137 | 152 | 168 | 183 | 198 | 213 | 229 | 244 | 275 | 305 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **4 x 8** | W | 1672 | 1858 | 2044 | 2229 | 2415 | 2601 | 2787 | 2973 | 3344 | 3716 |
| | w | 152 | 168 | 185 | 202 | 219 | 236 | 253 | 270 | 304 | 337 |
| | $F_v$ | 49 | 54 | 60 | 65 | 71 | 76 | 82 | 87 | 98 | 109 |
| | E | 1228 | 1365 | 1502 | 1638 | 1775 | 1911 | 2048 | 2184 | 2457 | 2731 |
| **2 x 12** | W | 1725 | 1917 | 2109 | 2301 | 2492 | 2684 | 2876 | 3068 | 3451 | 3835 |
| | w | 156 | 174 | 191 | 209 | 226 | 244 | 261 | 278 | 313 | 348 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 792 | 880 | 968 | 1055 | 1143 | 1231 | 1319 | 1407 | 1583 | 1759 |
| **3 x 10** | W | 1944 | 2160 | 2376 | 2592 | 2808 | 3024 | 3241 | 3457 | 3889 | 4321 |
| | w | 176 | 196 | 216 | 235 | 255 | 274 | 294 | 314 | 353 | 392 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 112 | 126 | 140 |
| | E | 963 | 1070 | 1177 | 1284 | 1391 | 1498 | 1605 | 1712 | 1926 | 2140 |
| **2 x 14** | W | 2394 | 2660 | 2926 | 3192 | 3458 | 3724 | 3990 | 4256 | 4788 | 5320 |
| | w | 217 | 241 | 266 | 290 | 314 | 338 | 362 | 386 | 435 | 483 |
| | $F_v$ | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 180 | 200 |
| | E | 672 | 747 | 821 | 896 | 971 | 1046 | 1120 | 1195 | 1344 | 1494 |
| **6 x 8** | W | 2812 | 3125 | 3437 | 3750 | 4062 | 4375 | 4687 | 5000 | 5625 | 6250 |
| | w | 255 | 284 | 312 | 340 | 369 | 397 | 426 | 454 | 511 | 568 |
| | $F_v$ | 51 | 56 | 62 | 68 | 73 | 79 | 85 | 90 | 102 | 113 |
| | E | 1187 | 1319 | 1451 | 1583 | 1715 | 1847 | 1979 | 2111 | 2375 | 2639 |
| **4 x 10** | W | 2722 | 3024 | 3327 | 3629 | 3932 | 4234 | 4537 | 4839 | 5444 | 6049 |
| | w | 247 | 274 | 302 | 329 | 357 | 384 | 412 | 439 | 494 | 549 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 112 | 126 | 140 |
| | E | 963 | 1070 | 1177 | 1284 | 1391 | 1498 | 1605 | 1712 | 1926 | 2140 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **11'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **3 x 12** | W | 2876 | 3196 | 3515 | 3835 | 4154 | 4474 | 4794 | 5113 | 5752 | 6392 |
| | w | 261 | 290 | 319 | 348 | 377 | 406 | 435 | 464 | 522 | 581 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 792 | 880 | 968 | 1055 | 1143 | 1231 | 1319 | 1407 | 1583 | 1759 |
| **8 x 8** | W | 3835 | 4261 | 4687 | 5113 | 5539 | 5965 | 6392 | 6818 | 7670 | 8522 |
| | w | 348 | 387 | 426 | 464 | 503 | 542 | 581 | 619 | 697 | 774 |
| | $F_v$ | 51 | 56 | 62 | 68 | 73 | 79 | 85 | 90 | 102 | 113 |
| | E | 1187 | 1319 | 1451 | 1583 | 1715 | 1847 | 1979 | 2111 | 2375 | 2639 |
| **3 x 14** | W | 3990 | 4433 | 4876 | 5320 | 5763 | 6206 | 6650 | 7093 | 7980 | 8866 |
| | w | 362 | 403 | 443 | 483 | 523 | 564 | 604 | 644 | 725 | 806 |
| | $F_v$ | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 180 | 200 |
| | E | 672 | 747 | 821 | 896 | 971 | 1046 | 1120 | 1195 | 1344 | 1494 |
| **4 x 12** | W | 4026 | 4474 | 4921 | 5369 | 5816 | 6264 | 6711 | 7159 | 8053 | 8948 |
| | w | 366 | 406 | 447 | 488 | 528 | 569 | 610 | 650 | 732 | 813 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 792 | 879 | 968 | 1055 | 1143 | 1231 | 1319 | 1407 | 1583 | 1759 |
| **6 x 10** | W | 4512 | 5013 | 5515 | 6016 | 6518 | 7019 | 7520 | 8022 | 9024 | 10027 |
| | w | 410 | 455 | 501 | 546 | 592 | 638 | 683 | 729 | 820 | 911 |
| | $F_v$ | 64 | 71 | 79 | 86 | 93 | 100 | 107 | 115 | 129 | 143 |
| | E | 937 | 1042 | 1146 | 1250 | 1354 | 1458 | 1563 | 1667 | 1875 | 2084 |
| **3 x 16** | W | 5285 | 5872 | 6460 | 7047 | 7634 | 8221 | 8809 | 9396 | 10571 | 11745 |
| | w | 480 | 533 | 587 | 640 | 694 | 747 | 800 | 854 | 961 | 1067 |
| | $F_v$ | 103 | 115 | 127 | 138 | 150 | 161 | 173 | 184 | 207 | 231 |
| | E | 584 | 649 | 714 | 779 | 843 | 908 | 973 | 1038 | 1168 | 1298 |
| **4 x 14** | W | 5798 | 6443 | 7087 | 7731 | 8376 | 9020 | 9664 | 10309 | 11597 | 12886 |
| | w | 527 | 585 | 644 | 702 | 761 | 820 | 878 | 937 | 1054 | 1171 |
| | $F_v$ | 92 | 102 | 112 | 122 | 132 | 143 | 153 | 163 | 184 | 204 |
| | E | 660 | 733 | 806 | 880 | 953 | 1026 | 1099 | 1173 | 1319 | 1466 |
| **8 x 10** | W | 6153 | 6837 | 7520 | 8204 | 8888 | 9571 | 10255 | 10939 | 12306 | 13674 |
| | w | 559 | 621 | 683 | 745 | 808 | 870 | 932 | 994 | 1118 | 1243 |
| | $F_v$ | 64 | 71 | 79 | 86 | 93 | 100 | 107 | 115 | 129 | 143 |
| | E | 937 | 1042 | 1146 | 1250 | 1354 | 1458 | 1563 | 1667 | 1875 | 2084 |
| **6 x 12** | W | 6612 | 7347 | 8081 | 8816 | 9551 | 10286 | 11020 | 11755 | 13224 | 14694 |
| | w | 601 | 667 | 734 | 801 | 868 | 935 | 1001 | 1068 | 1202 | 1335 |
| | $F_v$ | 78 | 87 | 95 | 104 | 113 | 121 | 130 | 139 | 156 | 174 |
| | E | 774 | 860 | 946 | 1033 | 1119 | 1205 | 1291 | 1377 | 1549 | 1721 |
| **10 x 10** | W | 7794 | 8660 | 9526 | 10392 | 11258 | 12124 | 12990 | 13856 | 15588 | 17320 |
| | w | 708 | 787 | 866 | 944 | 1023 | 1102 | 1180 | 1259 | 1417 | 1574 |
| | $F_v$ | 64 | 71 | 79 | 86 | 93 | 100 | 107 | 115 | 129 | 143 |
| | E | 937 | 1042 | 1146 | 1250 | 1354 | 1458 | 1563 | 1667 | 1875 | 2084 |
| **4 x 16** | W | 7644 | 8493 | 9343 | 10192 | 11041 | 11891 | 12740 | 13589 | 15288 | 16987 |
| | w | 694 | 772 | 849 | 926 | 1003 | 1081 | 1158 | 1235 | 1389 | 1544 |
| | $F_v$ | 105 | 117 | 129 | 140 | 152 | 164 | 176 | 187 | 211 | 234 |
| | E | 574 | 638 | 702 | 766 | 830 | 894 | 958 | 1021 | 1149 | 1277 |
| **8 x 12** | W | 9017 | 10018 | 11020 | 12022 | 13024 | 14026 | 15028 | 16030 | 18034 | 20037 |
| | w | 819 | 910 | 1001 | 1092 | 1184 | 1275 | 1366 | 1457 | 1639 | 1821 |
| | $F_v$ | 78 | 87 | 95 | 104 | 113 | 121 | 130 | 139 | 156 | 174 |
| | E | 774 | 860 | 946 | 1033 | 1119 | 1205 | 1291 | 1377 | 1549 | 1721 |
| **6 x 14** | W | 9112 | 10125 | 11137 | 12150 | 13162 | 14175 | 15187 | 16200 | 18225 | 20250 |
| | w | 828 | 920 | 1012 | 1104 | 1196 | 1288 | 1380 | 1472 | 1656 | 1840 |
| | $F_v$ | 92 | 102 | 112 | 122 | 132 | 143 | 153 | 163 | 184 | 204 |
| | E | 659 | 733 | 806 | 880 | 953 | 1026 | 1099 | 1173 | 1319 | 1466 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **11'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **10 x 12** | W | 11421 | 12690 | 13959 | 15228 | 16497 | 17766 | 19035 | 20305 | 22843 | 25381 |
| | w | 1038 | 1153 | 1269 | 1384 | 1499 | 1615 | 1730 | 1845 | 2076 | 2307 |
| | $F_v$ | 78 | 87 | 95 | 104 | 113 | 121 | 130 | 139 | 156 | 174 |
| | E | 774 | 860 | 946 | 1033 | 1119 | 1205 | 1291 | 1377 | 1549 | 1721 |
| **6 x 16** | W | 12012 | 13347 | 14681 | 16016 | 17351 | 18686 | 20020 | 21355 | 24024 | 26694 |
| | w | 1092 | 1213 | 1334 | 1456 | 1577 | 1698 | 1820 | 1941 | 2184 | 2426 |
| | $F_v$ | 105 | 117 | 129 | 140 | 152 | 164 | 176 | 187 | 211 | 234 |
| | E | 574 | 638 | 702 | 766 | 830 | 894 | 958 | 1021 | 1149 | 1277 |
| **8 x 14** | W | 12426 | 13806 | 15187 | 16568 | 17948 | 19329 | 20710 | 22090 | 24852 | 27613 |
| | w | 1129 | 1255 | 1380 | 1506 | 1631 | 1757 | 1882 | 2008 | 2259 | 2510 |
| | $F_v$ | 92 | 102 | 112 | 122 | 132 | 143 | 153 | 163 | 184 | 204 |
| | E | 660 | 733 | 806 | 879 | 953 | 1026 | 1099 | 1173 | 1319 | 1466 |
| **12 x 12** | W | 13826 | 15362 | 16898 | 18434 | 19971 | 21507 | 23043 | 24579 | 27652 | 30724 |
| | w | 1256 | 1396 | 1536 | 1675 | 1815 | 1955 | 2094 | 2234 | 2513 | 2793 |
| | $F_v$ | 78 | 87 | 95 | 104 | 113 | 121 | 130 | 139 | 156 | 174 |
| | E | 774 | 860 | 946 | 1033 | 1119 | 1205 | 1291 | 1377 | 1549 | 1721 |
| **6 x 18** | W | 15312 | 17013 | 18715 | 20416 | 22118 | 23819 | 25520 | 27222 | 30624 | 34027 |
| | w | 1392 | 1546 | 1701 | 1856 | 2010 | 2165 | 2320 | 2474 | 2784 | 3093 |
| | $F_v$ | 119 | 132 | 145 | 159 | 172 | 185 | 198 | 212 | 238 | 265 |
| | E | 509 | 565 | 622 | 678 | 735 | 791 | 848 | 905 | 1018 | 1131 |
| **10 x 14** | W | 15739 | 17488 | 19237 | 20986 | 22735 | 24484 | 26232 | 27981 | 31479 | 34977 |
| | w | 1430 | 1589 | 1748 | 1907 | 2066 | 2225 | 2384 | 2543 | 2861 | 3179 |
| | $F_v$ | 92 | 102 | 112 | 122 | 132 | 143 | 153 | 163 | 184 | 204 |
| | E | 660 | 733 | 806 | 880 | 953 | 1026 | 1099 | 1173 | 1319 | 1466 |
| **8 x 16** | W | 16380 | 18200 | 20020 | 21840 | 23660 | 25481 | 27301 | 29121 | 32761 | 36401 |
| | w | 1489 | 1654 | 1820 | 1985 | 2150 | 2316 | 2481 | 2647 | 2978 | 3309 |
| | $F_v$ | 105 | 117 | 129 | 140 | 152 | 164 | 176 | 187 | 211 | 234 |
| | E | 574 | 638 | 702 | 766 | 830 | 894 | 958 | 1021 | 1149 | 1277 |
| **6 x 20** | W | 19012 | 21125 | 23237 | 25350 | 27462 | 29575 | 31687 | 33800 | 38025 | 42250 |
| | w | 1728 | 1920 | 2112 | 2304 | 2496 | 2688 | 2880 | 3072 | 3456 | 3840 |
| | $F_v$ | 132 | 147 | 162 | 177 | 192 | 206 | 221 | 236 | 265 | 295 |
| | E | 456 | 507 | 558 | 609 | 660 | 710 | 761 | 812 | 913 | 1015 |
| **12 x 14** | W | 19053 | 21170 | 23287 | 25404 | 27521 | 29638 | 31755 | 33872 | 38106 | 42340 |
| | w | 1732 | 1924 | 2117 | 2309 | 2501 | 2694 | 2886 | 3079 | 3464 | 3849 |
| | $F_v$ | 92 | 102 | 112 | 122 | 132 | 143 | 153 | 163 | 184 | 204 |
| | E | 660 | 733 | 806 | 880 | 953 | 1026 | 1099 | 1173 | 1319 | 1466 |
| **10 x 16** | W | 20748 | 23054 | 25359 | 27665 | 29970 | 32276 | 34581 | 36886 | 41497 | 46108 |
| | w | 1886 | 2095 | 2305 | 2515 | 2724 | 2934 | 3143 | 3353 | 3772 | 4191 |
| | $F_v$ | 105 | 117 | 129 | 140 | 152 | 164 | 176 | 187 | 211 | 234 |
| | E | 574 | 638 | 702 | 766 | 830 | 894 | 958 | 1021 | 1149 | 1277 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **11'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **8 x 18** | W | 20880 | 23200 | 25520 | 27840 | 30160 | 32481 | 34801 | 37121 | 41761 | 46401 |
| | w | 1898 | 2109 | 2320 | 2530 | 2741 | 2952 | 3163 | 3374 | 3796 | 4218 |
| | $F_v$ | 119 | 132 | 145 | 159 | 172 | 185 | 198 | 212 | 238 | 265 |
| | E | 509 | 565 | 622 | 678 | 735 | 792 | 848 | 905 | 1018 | 1131 |
| **14 x 14** | W | 22367 | 24852 | 27337 | 29822 | 32307 | 34793 | 37278 | 39763 | 44734 | 49704 |
| | w | 2033 | 2259 | 2485 | 2711 | 2937 | 3163 | 3388 | 3614 | 4066 | 4518 |
| | $F_v$ | 92 | 102 | 112 | 122 | 132 | 143 | 153 | 163 | 184 | 204 |
| | E | 660 | 733 | 806 | 880 | 953 | 1026 | 1099 | 1173 | 1319 | 1466 |
| **12 x 16** | W | 25117 | 27907 | 30698 | 33489 | 36280 | 39070 | 41861 | 44652 | 50234 | 55815 |
| | w | 2283 | 2537 | 2790 | 3044 | 3298 | 3551 | 3805 | 4059 | 4566 | 5074 |
| | $F_v$ | 105 | 117 | 129 | 140 | 152 | 164 | 176 | 187 | 211 | 234 |
| | E | 574 | 638 | 702 | 766 | 830 | 894 | 958 | 1021 | 1149 | 1277 |
| **8 x 20** | W | 25926 | 28806 | 31687 | 34568 | 37448 | 40329 | 43210 | 46090 | 51852 | 57613 |
| | w | 2356 | 2618 | 2880 | 3142 | 3404 | 3666 | 3928 | 4190 | 4713 | 5237 |
| | $F_v$ | 132 | 147 | 162 | 177 | 192 | 206 | 221 | 236 | 265 | 295 |
| | E | 456 | 507 | 558 | 609 | 660 | 710 | 761 | 812 | 913 | 1015 |
| **10 x 18** | W | 26448 | 29387 | 32326 | 35265 | 38203 | 41142 | 44081 | 47020 | 52897 | 58775 |
| | w | 2404 | 2671 | 2938 | 3205 | 3473 | 3740 | 4007 | 4274 | 4808 | 5343 |
| | $F_v$ | 119 | 132 | 145 | 159 | 172 | 185 | 198 | 212 | 238 | 265 |
| | E | 509 | 565 | 622 | 678 | 735 | 792 | 848 | 905 | 1018 | 1131 |
| **14 x 16** | W | 29485 | 32761 | 36037 | 39313 | 42589 | 45865 | 49142 | 52418 | 58970 | 65522 |
| | w | 2680 | 2978 | 3276 | 3573 | 3871 | 4169 | 4467 | 4765 | 5360 | 5956 |
| | $F_v$ | 105 | 117 | 129 | 140 | 152 | 164 | 176 | 187 | 211 | 234 |
| | E | 574 | 638 | 702 | 766 | 830 | 894 | 958 | 1021 | 1149 | 1277 |
| **12 x 18** | W | 32017 | 35574 | 39131 | 42689 | 46246 | 49804 | 53361 | 56919 | 64034 | 71148 |
| | w | 2910 | 3234 | 3557 | 3880 | 4204 | 4527 | 4851 | 5174 | 5821 | 6468 |
| | $F_v$ | 119 | 132 | 145 | 159 | 172 | 185 | 198 | 212 | 238 | 265 |
| | E | 509 | 565 | 622 | 678 | 735 | 792 | 848 | 905 | 1018 | 1131 |
| **10 x 20** | W | 32839 | 36488 | 40137 | 43786 | 47435 | 51084 | 54732 | 58381 | 65679 | 72977 |
| | w | 2985 | 3317 | 3648 | 3980 | 4312 | 4644 | 4975 | 5307 | 5970 | 6634 |
| | $F_v$ | 132 | 147 | 162 | 177 | 192 | 206 | 221 | 236 | 265 | 295 |
| | E | 456 | 507 | 558 | 609 | 660 | 710 | 761 | 812 | 913 | 1015 |
| **16 x 16** | W | 33853 | 37614 | 41376 | 45137 | 48899 | 52660 | 56422 | 60183 | 67706 | 75229 |
| | w | 3077 | 3419 | 3761 | 4103 | 4445 | 4787 | 5129 | 5471 | 6155 | 6839 |
| | $F_v$ | 105 | 117 | 129 | 140 | 152 | 164 | 176 | 187 | 211 | 234 |
| | E | 574 | 638 | 702 | 766 | 830 | 894 | 958 | 1021 | 1149 | 1277 |
| **14 x 18** | W | 37585 | 41761 | 45937 | 50113 | 54289 | 58465 | 62642 | 66818 | 75170 | 83522 |
| | w | 3416 | 3796 | 4176 | 4555 | 4935 | 5315 | 5694 | 6074 | 6833 | 7592 |
| | $F_v$ | 119 | 132 | 145 | 159 | 172 | 185 | 198 | 212 | 238 | 265 |
| | E | 509 | 565 | 622 | 678 | 735 | 791 | 848 | 905 | 1018 | 1131 |
| **12 x 20** | W | 39753 | 44170 | 48587 | 53004 | 57421 | 61838 | 66255 | 70672 | 79506 | 88340 |
| | w | 3613 | 4015 | 4417 | 4818 | 5220 | 5621 | 6023 | 6424 | 7227 | 8030 |
| | $F_v$ | 132 | 147 | 162 | 177 | 192 | 206 | 221 | 236 | 265 | 295 |
| | E | 456 | 507 | 558 | 609 | 659 | 710 | 761 | 812 | 913 | 1015 |
| **16 x 18** | W | 43153 | 47948 | 52743 | 57537 | 62332 | 67127 | 71922 | 76717 | 86306 | 95896 |
| | w | 3923 | 4358 | 4794 | 5230 | 5666 | 6102 | 6538 | 6974 | 7846 | 8717 |
| | $F_v$ | 119 | 132 | 145 | 159 | 172 | 185 | 198 | 212 | 238 | 265 |
| | E | 509 | 565 | 622 | 678 | 735 | 791 | 848 | 905 | 1018 | 1131 |
| **14 x 20** | W | 46667 | 51852 | 57037 | 62222 | 67407 | 72593 | 77778 | 82963 | 93334 | 103704 |
| | w | 4242 | 4713 | 5185 | 5656 | 6127 | 6599 | 7070 | 7542 | 8484 | 9427 |
| | $F_v$ | 132 | 147 | 162 | 177 | 192 | 206 | 221 | 236 | 265 | 295 |
| | E | 456 | 507 | 558 | 609 | 659 | 710 | 761 | 812 | 913 | 1015 |

## WOOD BEAMS–SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **11'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **18 x 18** | W | 48721 | 54135 | 59548 | 64962 | 70375 | 75789 | 81202 | 86616 | 97443 | 108270 |
| | w | 4429 | 4921 | 5413 | 5905 | 6397 | 6889 | 7382 | 7874 | 8858 | 9842 |
| | $F_v$ | 119 | 132 | 145 | 159 | 172 | 185 | 198 | 212 | 238 | 265 |
| | E | 509 | 565 | 622 | 678 | 735 | 791 | 848 | 905 | 1018 | 1131 |
| **16 x 20** | W | 53580 | 59534 | 65487 | 71440 | 77394 | 83347 | 89301 | 95254 | 107161 | 119068 |
| | w | 4870 | 5412 | 5953 | 6494 | 7035 | 7577 | 8118 | 8659 | 9741 | 10824 |
| | $F_v$ | 132 | 147 | 162 | 177 | 192 | 206 | 221 | 236 | 265 | 295 |
| | E | 456 | 507 | 558 | 609 | 659 | 710 | 761 | 812 | 913 | 1015 |
| **18 x 20** | W | 60494 | 67215 | 73937 | 80659 | 87380 | 94102 | 100823 | 107545 | 120988 | 134431 |
| | w | 5499 | 6110 | 6721 | 7332 | 7943 | 8554 | 9165 | 9776 | 10998 | 12221 |
| | $F_v$ | 132 | 147 | 162 | 177 | 192 | 206 | 221 | 236 | 265 | 295 |
| | E | 456 | 507 | 558 | 609 | 659 | 710 | 761 | 812 | 913 | 1015 |
| **20 x 20** | W | 67407 | 74897 | 82387 | 89877 | 97367 | 104856 | 112346 | 119836 | 134815 | 149795 |
| | w | 6127 | 6808 | 7489 | 8170 | 8851 | 9532 | 10213 | 10894 | 12255 | 13617 |
| | $F_v$ | 132 | 147 | 162 | 177 | 192 | 206 | 221 | 236 | 265 | 295 |
| | E | 456 | 507 | 558 | 609 | 660 | 710 | 761 | 812 | 913 | 1015 |
| **12'- 0" SPAN** | | | | | | | | | | | |
| **2 x 6** | W | 378 | 420 | 462 | 504 | 546 | 588 | 630 | 672 | 756 | 840 |
| | w | 31 | 35 | 38 | 42 | 45 | 49 | 52 | 56 | 63 | 70 |
| | $F_v$ | 34 | 38 | 42 | 45 | 49 | 53 | 57 | 61 | 68 | 76 |
| | E | 1767 | 1963 | 2159 | 2356 | 2552 | 2749 | 2945 | 3141 | 3534 | 3927 |
| **3 x 6** | W | 630 | 700 | 770 | 840 | 910 | 980 | 1050 | 1120 | 1260 | 1400 |
| | w | 52 | 58 | 64 | 70 | 75 | 81 | 87 | 93 | 105 | 116 |
| | $F_v$ | 34 | 38 | 42 | 45 | 49 | 53 | 57 | 61 | 68 | 76 |
| | E | 1767 | 1963 | 2159 | 2356 | 2552 | 2749 | 2945 | 3141 | 3534 | 3927 |
| **2 x 8** | W | 657 | 730 | 803 | 876 | 949 | 1022 | 1095 | 1168 | 1314 | 1460 |
| | w | 54 | 60 | 66 | 73 | 79 | 85 | 91 | 97 | 109 | 121 |
| | $F_v$ | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | E | 1340 | 1489 | 1638 | 1787 | 1936 | 2085 | 2234 | 2383 | 2681 | 2979 |
| **4 x 6** | W | 882 | 980 | 1078 | 1176 | 1274 | 1372 | 1470 | 1568 | 1764 | 1960 |
| | w | 73 | 81 | 89 | 98 | 106 | 114 | 122 | 130 | 147 | 163 |
| | $F_v$ | 34 | 38 | 42 | 45 | 49 | 53 | 57 | 61 | 68 | 76 |
| | E | 1767 | 1963 | 2159 | 2356 | 2552 | 2749 | 2945 | 3141 | 3534 | 3927 |
| **2 x 10** | W | 1069 | 1188 | 1307 | 1426 | 1544 | 1663 | 1782 | 1901 | 2139 | 2376 |
| | w | 89 | 99 | 108 | 118 | 128 | 138 | 148 | 158 | 178 | 198 |
| | $F_v$ | 57 | 64 | 70 | 77 | 83 | 89 | 96 | 102 | 115 | 128 |
| | E | 1050 | 1167 | 1284 | 1401 | 1517 | 1634 | 1751 | 1868 | 2101 | 2335 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **12' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **3 x 8** | W | 1095 | 1216 | 1338 | 1460 | 1581 | 1703 | 1825 | 1946 | 2190 | 2433 |
| | w | 91 | 101 | 111 | 121 | 131 | 141 | 152 | 162 | 182 | 202 |
| | $F_v$ | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | E | 1340 | 1489 | 1638 | 1787 | 1936 | 2085 | 2234 | 2383 | 2681 | 2979 |
| **6 x 6** | W | 1386 | 1540 | 1694 | 1848 | 2002 | 2156 | 2310 | 2464 | 2772 | 3081 |
| | w | 115 | 128 | 141 | 154 | 166 | 179 | 192 | 205 | 231 | 256 |
| | $F_v$ | 34 | 38 | 42 | 45 | 49 | 53 | 57 | 61 | 68 | 76 |
| | E | 1767 | 1963 | 2159 | 2356 | 2552 | 2749 | 2945 | 3141 | 3534 | 3927 |
| **4 x 8** | W | 1533 | 1703 | 1873 | 2044 | 2214 | 2384 | 2555 | 2725 | 3066 | 3406 |
| | w | 127 | 141 | 156 | 170 | 184 | 198 | 212 | 227 | 255 | 283 |
| | $F_v$ | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | E | 1340 | 1489 | 1638 | 1787 | 1936 | 2085 | 2234 | 2383 | 2681 | 2979 |
| **2 x 12** | W | 1582 | 1757 | 1933 | 2109 | 2285 | 2460 | 2636 | 2812 | 3164 | 3515 |
| | w | 131 | 146 | 161 | 175 | 190 | 205 | 219 | 234 | 263 | 292 |
| | $F_v$ | 70 | 78 | 85 | 93 | 101 | 109 | 117 | 125 | 140 | 156 |
| | E | 864 | 960 | 1055 | 1151 | 1247 | 1343 | 1439 | 1535 | 1727 | 1919 |
| **3 x 10** | W | 1782 | 1980 | 2178 | 2376 | 2574 | 2772 | 2970 | 3168 | 3565 | 3961 |
| | w | 148 | 165 | 181 | 198 | 214 | 231 | 247 | 264 | 297 | 330 |
| | $F_v$ | 57 | 64 | 70 | 77 | 83 | 89 | 96 | 102 | 115 | 128 |
| | E | 1050 | 1167 | 1284 | 1401 | 1517 | 1634 | 1751 | 1868 | 2101 | 2335 |
| **2 x 14** | W | 2194 | 2438 | 2682 | 2926 | 3169 | 3413 | 3657 | 3901 | 4389 | 4876 |
| | w | 182 | 203 | 223 | 243 | 264 | 284 | 304 | 325 | 365 | 406 |
| | $F_v$ | 82 | 92 | 101 | 110 | 119 | 128 | 138 | 147 | 165 | 184 |
| | E | 733 | 815 | 896 | 978 | 1059 | 1141 | 1222 | 1304 | 1467 | 1630 |
| **6 x 8** | W | 2578 | 2864 | 3151 | 3437 | 3723 | 4010 | 4296 | 4583 | 5156 | 5729 |
| | w | 214 | 238 | 262 | 286 | 310 | 334 | 358 | 381 | 429 | 477 |
| | $F_v$ | 46 | 52 | 57 | 62 | 67 | 72 | 78 | 83 | 93 | 104 |
| | E | 1295 | 1439 | 1583 | 1727 | 1871 | 2015 | 2159 | 2303 | 2591 | 2879 |
| **4 x 10** | W | 2495 | 2772 | 3050 | 3327 | 3604 | 3882 | 4159 | 4436 | 4991 | 5545 |
| | w | 207 | 231 | 254 | 277 | 300 | 323 | 346 | 369 | 415 | 462 |
| | $F_v$ | 57 | 64 | 70 | 77 | 83 | 89 | 96 | 102 | 115 | 128 |
| | E | 1050 | 1167 | 1284 | 1401 | 1517 | 1634 | 1751 | 1868 | 2101 | 2335 |
| **3 x 12** | W | 2636 | 2929 | 3222 | 3515 | 3808 | 4101 | 4394 | 4687 | 5273 | 5859 |
| | w | 219 | 244 | 268 | 292 | 317 | 341 | 366 | 390 | 439 | 488 |
| | $F_v$ | 70 | 78 | 85 | 93 | 101 | 109 | 117 | 125 | 140 | 156 |
| | E | 864 | 959 | 1055 | 1151 | 1247 | 1343 | 1439 | 1535 | 1727 | 1919 |
| **8 x 8** | W | 3515 | 3906 | 4296 | 4687 | 5078 | 5468 | 5859 | 6250 | 7031 | 7812 |
| | w | 292 | 325 | 358 | 390 | 423 | 455 | 488 | 520 | 585 | 651 |
| | $F_v$ | 46 | 52 | 57 | 62 | 67 | 72 | 78 | 83 | 93 | 104 |
| | E | 1295 | 1439 | 1583 | 1727 | 1871 | 2015 | 2159 | 2303 | 2591 | 2879 |
| **3 x 14** | W | 3657 | 4063 | 4470 | 4876 | 5283 | 5689 | 6095 | 6502 | 7315 | 8127 |
| | w | 304 | 338 | 372 | 406 | 440 | 474 | 507 | 541 | 609 | 677 |
| | $F_v$ | 82 | 92 | 101 | 110 | 119 | 128 | 138 | 147 | 165 | 184 |
| | E | 733 | 815 | 896 | 978 | 1059 | 1141 | 1222 | 1304 | 1467 | 1630 |
| **4 x 12** | W | 3691 | 4101 | 4511 | 4921 | 5332 | 5742 | 6152 | 6562 | 7382 | 8203 |
| | w | 307 | 341 | 375 | 410 | 444 | 478 | 512 | 546 | 615 | 683 |
| | $F_v$ | 70 | 78 | 85 | 93 | 101 | 109 | 117 | 125 | 140 | 156 |
| | E | 863 | 960 | 1055 | 1151 | 1247 | 1343 | 1439 | 1535 | 1727 | 1919 |
| **6 x 10** | W | 4136 | 4596 | 5055 | 5515 | 5974 | 6434 | 6894 | 7353 | 8272 | 9192 |
| | w | 344 | 383 | 421 | 459 | 497 | 536 | 574 | 612 | 689 | 766 |
| | $F_v$ | 59 | 65 | 72 | 79 | 85 | 92 | 98 | 105 | 118 | 131 |
| | E | 1023 | 1136 | 1250 | 1364 | 1477 | 1591 | 1705 | 1818 | 2046 | 2273 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **12' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **3 x 16** | W | 4845 | 5383 | 5921 | 6460 | 6998 | 7536 | 8075 | 8613 | 9690 | 10766 |
| | w | 403 | 448 | 493 | 538 | 583 | 628 | 672 | 717 | 807 | 897 |
| | $F_v$ | 95 | 105 | 116 | 127 | 137 | 148 | 158 | 169 | 190 | 211 |
| | E | 637 | 708 | 779 | 849 | 920 | 991 | 1062 | 1133 | 1274 | 1416 |
| **4 x 14** | W | 5315 | 5906 | 6496 | 7087 | 7678 | 8268 | 8859 | 9450 | 10631 | 11812 |
| | w | 442 | 492 | 541 | 590 | 639 | 689 | 738 | 787 | 885 | 984 |
| | $F_v$ | 84 | 93 | 103 | 112 | 121 | 131 | 140 | 150 | 168 | 187 |
| | E | 720 | 800 | 880 | 960 | 1040 | 1119 | 1199 | 1279 | 1439 | 1599 |
| **8 x 10** | W | 5640 | 6267 | 6894 | 7520 | 8147 | 8774 | 9401 | 10027 | 11281 | 12534 |
| | w | 470 | 522 | 574 | 626 | 678 | 731 | 783 | 835 | 940 | 1044 |
| | $F_v$ | 59 | 65 | 72 | 79 | 85 | 92 | 98 | 105 | 118 | 131 |
| | E | 1023 | 1136 | 1250 | 1364 | 1477 | 1591 | 1705 | 1818 | 2046 | 2273 |
| **6 x 12** | W | 6061 | 6734 | 7408 | 8081 | 8755 | 9428 | 10102 | 10775 | 12122 | 13469 |
| | w | 505 | 561 | 617 | 673 | 729 | 785 | 841 | 897 | 1010 | 1122 |
| | $F_v$ | 71 | 79 | 87 | 95 | 103 | 111 | 119 | 127 | 143 | 159 |
| | E | 845 | 939 | 1033 | 1126 | 1220 | 1314 | 1408 | 1502 | 1690 | 1878 |
| **10 x 10** | W | 7144 | 7938 | 8732 | 9526 | 10320 | 11114 | 11907 | 12701 | 14289 | 15877 |
| | w | 595 | 661 | 727 | 793 | 860 | 926 | 992 | 1058 | 1190 | 1323 |
| | $F_v$ | 59 | 65 | 72 | 79 | 85 | 92 | 98 | 105 | 118 | 131 |
| | E | 1023 | 1136 | 1250 | 1364 | 1477 | 1591 | 1705 | 1818 | 2046 | 2273 |
| **4 x 16** | W | 7007 | 7785 | 8564 | 9343 | 10121 | 10900 | 11678 | 12457 | 14014 | 15571 |
| | w | 583 | 648 | 713 | 778 | 843 | 908 | 973 | 1038 | 1167 | 1297 |
| | $F_v$ | 96 | 107 | 118 | 129 | 139 | 150 | 161 | 172 | 193 | 215 |
| | E | 627 | 696 | 766 | 836 | 905 | 975 | 1045 | 1114 | 1254 | 1393 |
| **8 x 12** | W | 8265 | 9184 | 10102 | 11020 | 11939 | 12857 | 13776 | 14694 | 16531 | 18368 |
| | w | 688 | 765 | 841 | 918 | 994 | 1071 | 1148 | 1224 | 1377 | 1530 |
| | $F_v$ | 71 | 79 | 87 | 95 | 103 | 111 | 119 | 127 | 143 | 159 |
| | E | 845 | 939 | 1033 | 1126 | 1220 | 1314 | 1408 | 1502 | 1690 | 1878 |
| **6 x 14** | W | 8353 | 9281 | 10209 | 11137 | 12065 | 12993 | 13921 | 14850 | 16706 | 18562 |
| | w | 696 | 773 | 850 | 928 | 1005 | 1082 | 1160 | 1237 | 1392 | 1546 |
| | $F_v$ | 84 | 93 | 103 | 112 | 121 | 131 | 140 | 150 | 168 | 187 |
| | E | 720 | 800 | 880 | 960 | 1040 | 1119 | 1199 | 1279 | 1439 | 1599 |
| **10 x 12** | W | 10469 | 11633 | 12796 | 13959 | 15123 | 16286 | 17449 | 18612 | 20939 | 23266 |
| | w | 872 | 969 | 1066 | 1163 | 1260 | 1357 | 1454 | 1551 | 1744 | 1938 |
| | $F_v$ | 71 | 79 | 87 | 95 | 103 | 111 | 119 | 127 | 143 | 159 |
| | E | 845 | 939 | 1033 | 1126 | 1220 | 1314 | 1408 | 1502 | 1690 | 1878 |
| **6 x 16** | W | 11011 | 12234 | 13458 | 14681 | 15905 | 17128 | 18352 | 19575 | 22022 | 24469 |
| | w | 917 | 1019 | 1121 | 1223 | 1325 | 1427 | 1529 | 1631 | 1835 | 2039 |
| | $F_v$ | 96 | 107 | 118 | 129 | 139 | 150 | 161 | 172 | 193 | 215 |
| | E | 627 | 696 | 766 | 836 | 905 | 975 | 1045 | 1114 | 1254 | 1393 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **12'-0" SPAN CONT'D** | | | | | | | | | | | |
| **8 x 14** | W | 11390 | 12656 | 13921 | 15187 | 16453 | 17718 | 18984 | 20250 | 22781 | 25312 |
| | w | 949 | 1054 | 1160 | 1265 | 1371 | 1476 | 1582 | 1687 | 1898 | 2109 |
| | $F_v$ | 84 | 93 | 103 | 112 | 121 | 131 | 140 | 150 | 168 | 187 |
| | E | 720 | 800 | 880 | 960 | 1040 | 1119 | 1199 | 1279 | 1439 | 1599 |
| **12 x 12** | W | 12673 | 14082 | 15490 | 16898 | 18306 | 19715 | 21123 | 22531 | 25347 | 28164 |
| | w | 1056 | 1173 | 1290 | 1408 | 1525 | 1642 | 1760 | 1877 | 2112 | 2347 |
| | $F_v$ | 71 | 79 | 87 | 95 | 103 | 111 | 119 | 127 | 143 | 159 |
| | E | 845 | 939 | 1033 | 1126 | 1220 | 1314 | 1408 | 1502 | 1690 | 1878 |
| **6 x 18** | W | 14036 | 15596 | 17155 | 18715 | 20274 | 21834 | 23394 | 24953 | 28072 | 31192 |
| | w | 1169 | 1299 | 1429 | 1559 | 1689 | 1819 | 1949 | 2079 | 2339 | 2599 |
| | $F_v$ | 109 | 121 | 133 | 145 | 157 | 170 | 182 | 194 | 218 | 243 |
| | E | 555 | 617 | 678 | 740 | 802 | 863 | 925 | 987 | 1110 | 1234 |
| **10 x 14** | W | 14428 | 16031 | 17634 | 19237 | 20840 | 22443 | 24046 | 25650 | 28856 | 32062 |
| | w | 1202 | 1335 | 1469 | 1603 | 1736 | 1870 | 2003 | 2137 | 2404 | 2671 |
| | $F_v$ | 84 | 93 | 103 | 112 | 121 | 131 | 140 | 150 | 168 | 187 |
| | E | 720 | 800 | 880 | 960 | 1040 | 1119 | 1199 | 1279 | 1439 | 1599 |
| **8 x 16** | W | 15015 | 16684 | 18352 | 20020 | 21689 | 23357 | 25026 | 26694 | 30031 | 33368 |
| | w | 1251 | 1390 | 1529 | 1668 | 1807 | 1946 | 2085 | 2224 | 2502 | 2780 |
| | $F_v$ | 96 | 107 | 118 | 129 | 139 | 150 | 161 | 172 | 193 | 215 |
| | E | 627 | 696 | 766 | 836 | 905 | 975 | 1045 | 1114 | 1254 | 1393 |
| **6 x 20** | W | 17428 | 19364 | 21301 | 23237 | 25173 | 27110 | 29046 | 30983 | 34856 | 38729 |
| | w | 1452 | 1613 | 1775 | 1936 | 2097 | 2259 | 2420 | 2581 | 2904 | 3227 |
| | $F_v$ | 121 | 135 | 148 | 162 | 176 | 189 | 203 | 216 | 243 | 270 |
| | E | 498 | 553 | 609 | 664 | 720 | 775 | 830 | 886 | 996 | 1107 |
| **12 x 14** | W | 17465 | 19406 | 21346 | 23287 | 25228 | 27168 | 29109 | 31050 | 34931 | 38812 |
| | w | 1455 | 1617 | 1778 | 1940 | 2102 | 2264 | 2425 | 2587 | 2910 | 3234 |
| | $F_v$ | 84 | 93 | 103 | 112 | 121 | 131 | 140 | 150 | 168 | 187 |
| | E | 720 | 800 | 880 | 960 | 1040 | 1119 | 1199 | 1279 | 1439 | 1599 |
| **10 x 16** | W | 19019 | 21133 | 23246 | 25359 | 27473 | 29586 | 31699 | 33812 | 38039 | 42266 |
| | w | 1584 | 1761 | 1937 | 2113 | 2289 | 2465 | 2641 | 2817 | 3169 | 3522 |
| | $F_v$ | 96 | 107 | 118 | 129 | 139 | 150 | 161 | 172 | 193 | 215 |
| | E | 627 | 696 | 766 | 836 | 905 | 975 | 1045 | 1114 | 1254 | 1393 |
| **8 x 18** | W | 19140 | 21267 | 23394 | 25520 | 27647 | 29774 | 31901 | 34027 | 38281 | 42534 |
| | w | 1595 | 1772 | 1949 | 2126 | 2303 | 2481 | 2658 | 2835 | 3190 | 3544 |
| | $F_v$ | 109 | 121 | 133 | 145 | 157 | 170 | 182 | 194 | 218 | 243 |
| | E | 555 | 617 | 678 | 740 | 802 | 864 | 925 | 987 | 1110 | 1234 |
| **14 x 14** | W | 20503 | 22781 | 25059 | 27337 | 29615 | 31893 | 34171 | 36450 | 41006 | 45562 |
| | w | 1708 | 1898 | 2088 | 2278 | 2467 | 2657 | 2847 | 3037 | 3417 | 3796 |
| | $F_v$ | 84 | 93 | 103 | 112 | 121 | 131 | 140 | 150 | 168 | 187 |
| | E | 720 | 800 | 880 | 960 | 1039 | 1119 | 1199 | 1279 | 1439 | 1599 |
| **6 x 22** | W | 21186 | 23540 | 25894 | 28248 | 30602 | 32956 | 35310 | 37664 | 42372 | 47081 |
| | w | 1765 | 1961 | 2157 | 2354 | 2550 | 2746 | 2942 | 3138 | 3531 | 3923 |
| | $F_v$ | 134 | 149 | 164 | 179 | 194 | 209 | 223 | 238 | 268 | 298 |
| | E | 452 | 502 | 552 | 602 | 653 | 703 | 753 | 803 | 904 | 1004 |
| **12 x 16** | W | 23023 | 25582 | 28140 | 30698 | 33256 | 35815 | 38373 | 40931 | 46047 | 51164 |
| | w | 1918 | 2131 | 2345 | 2558 | 2771 | 2984 | 3197 | 3410 | 3837 | 4263 |
| | $F_v$ | 96 | 107 | 118 | 129 | 139 | 150 | 161 | 172 | 193 | 215 |
| | E | 627 | 696 | 766 | 836 | 905 | 975 | 1045 | 1114 | 1254 | 1393 |
| **8 x 20** | W | 23765 | 26406 | 29046 | 31687 | 34328 | 36968 | 39609 | 42250 | 47531 | 52812 |
| | w | 1980 | 2200 | 2420 | 2640 | 2860 | 3080 | 3300 | 3520 | 3960 | 4401 |
| | $F_v$ | 121 | 135 | 148 | 162 | 176 | 189 | 203 | 216 | 243 | 270 |
| | E | 498 | 553 | 609 | 664 | 719 | 775 | 830 | 886 | 996 | 1107 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l$/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **12'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **10 x 18** | W | 24244 | 26938 | 29632 | 32326 | 35020 | 37714 | 40407 | 43101 | 48489 | 53887 |
| | w | 2020 | 2244 | 2469 | 2693 | 2918 | 3142 | 3367 | 3591 | 4040 | 4489 |
| | $F_v$ | 109 | 121 | 133 | 145 | 157 | 170 | 182 | 194 | 218 | 243 |
| | E | 555 | 617 | 678 | 740 | 802 | 864 | 925 | 987 | 1110 | 1234 |
| **14 x 16** | W | 27028 | 30031 | 33034 | 36037 | 39040 | 42043 | 45046 | 48050 | 54056 | 60062 |
| | w | 2252 | 2502 | 2752 | 3003 | 3253 | 3503 | 3753 | 4004 | 4504 | 5005 |
| | $F_v$ | 96 | 107 | 118 | 129 | 139 | 150 | 161 | 172 | 193 | 215 |
| | E | 627 | 696 | 766 | 836 | 905 | 975 | 1045 | 1114 | 1254 | 1393 |
| **8 x 22** | W | 28890 | 32100 | 35310 | 38520 | 41730 | 44940 | 48151 | 51361 | 57781 | 64201 |
| | w | 2407 | 2675 | 2942 | 3210 | 3477 | 3745 | 4012 | 4280 | 4815 | 5350 |
| | $F_v$ | 134 | 149 | 164 | 179 | 194 | 209 | 223 | 238 | 268 | 298 |
| | E | 452 | 502 | 552 | 602 | 653 | 703 | 753 | 803 | 904 | 1004 |
| **12 x 18** | W | 29348 | 32609 | 35870 | 39131 | 42392 | 45653 | 48914 | 52175 | 58697 | 65219 |
| | w | 2445 | 2717 | 2989 | 3260 | 3532 | 3804 | 4076 | 4347 | 4891 | 5434 |
| | $F_v$ | 109 | 121 | 133 | 145 | 157 | 170 | 182 | 194 | 218 | 243 |
| | E | 555 | 617 | 678 | 740 | 802 | 863 | 925 | 987 | 1110 | 1234 |
| **10 x 20** | W | 30103 | 33447 | 36792 | 40137 | 43482 | 46827 | 50171 | 53516 | 60206 | 66895 |
| | w | 2508 | 2787 | 3066 | 3344 | 3623 | 3902 | 4180 | 4459 | 5017 | 5574 |
| | $F_v$ | 121 | 135 | 148 | 162 | 176 | 189 | 203 | 216 | 243 | 270 |
| | E | 498 | 553 | 609 | 664 | 720 | 775 | 830 | 886 | 996 | 1107 |
| **16 x 16** | W | 31032 | 34480 | 37928 | 41376 | 44824 | 48272 | 51720 | 55168 | 62064 | 68960 |
| | w | 2586 | 2873 | 3160 | 3448 | 3735 | 4022 | 4310 | 4597 | 5172 | 5746 |
| | $F_v$ | 96 | 107 | 118 | 129 | 139 | 150 | 161 | 172 | 193 | 215 |
| | E | 627 | 696 | 766 | 836 | 905 | 975 | 1045 | 1114 | 1254 | 1393 |
| **14 x 18** | W | 34453 | 38281 | 42109 | 45937 | 49765 | 53593 | 57421 | 61250 | 68906 | 76562 |
| | w | 2871 | 3190 | 3509 | 3828 | 4147 | 4466 | 4785 | 5104 | 5742 | 6380 |
| | $F_v$ | 109 | 121 | 133 | 145 | 157 | 170 | 182 | 194 | 218 | 243 |
| | E | 555 | 617 | 678 | 740 | 802 | 863 | 925 | 987 | 1110 | 1234 |
| **12 x 20** | W | 36440 | 40489 | 44538 | 48587 | 52636 | 56685 | 60734 | 64783 | 72881 | 80979 |
| | w | 3036 | 3374 | 3711 | 4048 | 4386 | 4723 | 5061 | 5398 | 6073 | 6748 |
| | $F_v$ | 121 | 135 | 148 | 162 | 176 | 189 | 203 | 216 | 243 | 270 |
| | E | 498 | 553 | 609 | 664 | 719 | 775 | 830 | 886 | 996 | 1107 |
| **10 x 22** | W | 36594 | 40660 | 44726 | 48793 | 52859 | 56925 | 60991 | 65057 | 73189 | 81321 |
| | w | 3049 | 3388 | 3727 | 4066 | 4404 | 4743 | 5082 | 5421 | 6099 | 6776 |
| | $F_v$ | 134 | 149 | 164 | 179 | 194 | 209 | 223 | 238 | 268 | 298 |
| | E | 452 | 502 | 552 | 602 | 653 | 703 | 753 | 803 | 904 | 1004 |
| **16 x 18** | W | 39557 | 43952 | 48347 | 52743 | 57138 | 61533 | 65928 | 70324 | 79114 | 87905 |
| | w | 3296 | 3662 | 4028 | 4395 | 4761 | 5127 | 5494 | 5860 | 6592 | 7325 |
| | $F_v$ | 109 | 121 | 133 | 145 | 157 | 170 | 182 | 194 | 218 | 243 |
| | E | 555 | 617 | 678 | 740 | 802 | 863 | 925 | 987 | 1110 | 1234 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **12' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **14 x 20** | W | 42778 | 47531 | 52284 | 57037 | 61790 | 66543 | 71296 | 76050 | 85556 | 95062 |
| | w | 3564 | 3960 | 4357 | 4753 | 5149 | 5545 | 5941 | 6337 | 7129 | 7921 |
| | $F_v$ | 121 | 135 | 148 | 162 | 176 | 189 | 203 | 216 | 243 | 270 |
| | E | 498 | 553 | 609 | 664 | 720 | 775 | 830 | 886 | 996 | 1107 |
| **12 x 22** | W | 44298 | 49221 | 54143 | 59065 | 63987 | 68909 | 73831 | 78753 | 88597 | 98442 |
| | w | 3691 | 4101 | 4511 | 4922 | 5332 | 5742 | 6152 | 6562 | 7383 | 8203 |
| | $F_v$ | 134 | 149 | 164 | 179 | 194 | 209 | 223 | 238 | 268 | 298 |
| | E | 452 | 502 | 552 | 602 | 653 | 703 | 753 | 803 | 904 | 1004 |
| **18 x 18** | W | 44661 | 49623 | 54586 | 59548 | 64510 | 69473 | 74435 | 79398 | 89322 | 99247 |
| | w | 3721 | 4135 | 4548 | 4962 | 5375 | 5789 | 6202 | 6616 | 7443 | 8270 |
| | $F_v$ | 109 | 121 | 133 | 145 | 157 | 170 | 182 | 194 | 218 | 243 |
| | E | 555 | 617 | 678 | 740 | 802 | 863 | 925 | 987 | 1110 | 1234 |
| **16 x 20** | W | 49115 | 54572 | 60030 | 65487 | 70944 | 76402 | 81859 | 87316 | 98231 | 109145 |
| | w | 4092 | 4547 | 5002 | 5457 | 5912 | 6366 | 6821 | 7276 | 8185 | 9095 |
| | $F_v$ | 121 | 135 | 148 | 162 | 176 | 189 | 203 | 216 | 243 | 270 |
| | E | 498 | 553 | 609 | 664 | 719 | 775 | 830 | 886 | 996 | 1107 |
| **14 x 22** | W | 52003 | 57781 | 63559 | 69337 | 75115 | 80893 | 86671 | 92450 | 104006 | 115562 |
| | w | 4333 | 4815 | 5296 | 5778 | 6259 | 6741 | 7222 | 7704 | 8667 | 9630 |
| | $F_v$ | 134 | 149 | 164 | 179 | 194 | 209 | 223 | 238 | 268 | 298 |
| | E | 452 | 502 | 552 | 602 | 653 | 703 | 753 | 803 | 904 | 1004 |
| **18 x 20** | W | 55453 | 61614 | 67776 | 73937 | 80098 | 86260 | 92421 | 98583 | 110906 | 123229 |
| | w | 4621 | 5134 | 5648 | 6161 | 6674 | 7188 | 7701 | 8215 | 9242 | 10269 |
| | $F_v$ | 121 | 135 | 148 | 162 | 176 | 189 | 203 | 216 | 243 | 270 |
| | E | 498 | 553 | 609 | 664 | 720 | 775 | 830 | 886 | 996 | 1107 |
| **16 x 22** | W | 59707 | 66341 | 72975 | 79609 | 86243 | 92878 | 99512 | 106146 | 119414 | 132682 |
| | w | 4975 | 5528 | 6081 | 6634 | 7186 | 7739 | 8292 | 8845 | 9951 | 11056 |
| | $F_v$ | 134 | 149 | 164 | 179 | 194 | 209 | 223 | 238 | 268 | 298 |
| | E | 452 | 502 | 552 | 602 | 653 | 703 | 753 | 803 | 904 | 1004 |
| **20 x 20** | W | 61790 | 68656 | 75521 | 82387 | 89253 | 96118 | 102984 | 109850 | 123581 | 137312 |
| | w | 5149 | 5721 | 6293 | 6865 | 7437 | 8009 | 8582 | 9154 | 10298 | 11442 |
| | $F_v$ | 121 | 135 | 148 | 162 | 176 | 189 | 203 | 216 | 243 | 270 |
| | E | 498 | 553 | 609 | 664 | 719 | 775 | 830 | 886 | 996 | 1107 |
| **13' - 0" SPAN** | | | | | | | | | | | |
| **2 x 6** | W | 349 | 387 | 426 | 465 | 504 | 542 | 581 | 620 | 698 | 775 |
| | w | 26 | 29 | 32 | 35 | 38 | 41 | 44 | 47 | 53 | 59 |
| | $F_v$ | 31 | 35 | 38 | 42 | 45 | 49 | 52 | 56 | 63 | 70 |
| | E | 1914 | 2127 | 2339 | 2552 | 2765 | 2978 | 3190 | 3403 | 3829 | 4254 |
| **3 x 6** | W | 581 | 646 | 711 | 775 | 840 | 904 | 969 | 1034 | 1163 | 1292 |
| | w | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 89 | 99 |
| | $F_v$ | 31 | 35 | 38 | 42 | 45 | 49 | 52 | 56 | 63 | 70 |
| | E | 1914 | 2127 | 2339 | 2552 | 2765 | 2978 | 3190 | 3403 | 3829 | 4254 |
| **2 x 8** | W | 606 | 673 | 741 | 808 | 876 | 943 | 1010 | 1078 | 1212 | 1347 |
| | w | 46 | 51 | 57 | 62 | 67 | 72 | 77 | 82 | 93 | 103 |
| | $F_v$ | 41 | 46 | 51 | 55 | 60 | 65 | 69 | 74 | 83 | 92 |
| | E | 1452 | 1613 | 1775 | 1936 | 2097 | 2259 | 2420 | 2582 | 2904 | 3227 |
| **4 x 6** | W | 814 | 904 | 995 | 1085 | 1176 | 1266 | 1357 | 1447 | 1628 | 1809 |
| | w | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 139 |
| | $F_v$ | 31 | 35 | 38 | 42 | 45 | 49 | 52 | 56 | 63 | 70 |
| | E | 1914 | 2127 | 2339 | 2552 | 2765 | 2978 | 3190 | 3403 | 3829 | 4254 |

## WOOD BEAMS–SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for $l$/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **13'-0" SPAN CONT'D** | | | | | | | | | | | |
| **2 x 10** | W | 987 | 1096 | 1206 | 1316 | 1426 | 1535 | 1645 | 1755 | 1974 | 2193 |
| | w | 75 | 84 | 92 | 101 | 109 | 118 | 126 | 135 | 151 | 168 |
| | $F_v$ | 53 | 59 | 65 | 71 | 77 | 83 | 88 | 94 | 106 | 118 |
| | E | 1138 | 1264 | 1391 | 1517 | 1644 | 1770 | 1897 | 2023 | 2276 | 2529 |
| **3 x 8** | W | 1010 | 1123 | 1235 | 1347 | 1460 | 1572 | 1684 | 1797 | 2021 | 2246 |
| | w | 77 | 86 | 95 | 103 | 112 | 120 | 129 | 138 | 155 | 172 |
| | $F_v$ | 41 | 46 | 51 | 55 | 60 | 65 | 69 | 74 | 83 | 92 |
| | E | 1452 | 1613 | 1775 | 1936 | 2097 | 2259 | 2420 | 2582 | 2904 | 3227 |
| **6 x 6** | W | 1279 | 1422 | 1564 | 1706 | 1848 | 1990 | 2133 | 2275 | 2559 | 2844 |
| | w | 98 | 109 | 120 | 131 | 142 | 153 | 164 | 175 | 196 | 218 |
| | $F_v$ | 31 | 35 | 38 | 42 | 45 | 49 | 52 | 56 | 63 | 70 |
| | E | 1914 | 2127 | 2339 | 2552 | 2765 | 2978 | 3190 | 3403 | 3829 | 4254 |
| **4 x 8** | W | 1415 | 1572 | 1729 | 1886 | 2044 | 2201 | 2358 | 2515 | 2830 | 3144 |
| | w | 108 | 120 | 133 | 145 | 157 | 169 | 181 | 193 | 217 | 241 |
| | $F_v$ | 41 | 46 | 51 | 55 | 60 | 65 | 69 | 74 | 83 | 92 |
| | E | 1452 | 1613 | 1775 | 1936 | 2097 | 2259 | 2420 | 2582 | 2904 | 3227 |
| **2 x 12** | W | 1460 | 1622 | 1784 | 1947 | 2109 | 2271 | 2433 | 2596 | 2920 | 3245 |
| | w | 112 | 124 | 137 | 149 | 162 | 174 | 187 | 199 | 224 | 249 |
| | $F_v$ | 64 | 72 | 79 | 86 | 93 | 100 | 108 | 115 | 129 | 144 |
| | E | 936 | 1040 | 1143 | 1247 | 1351 | 1455 | 1599 | 1663 | 1871 | 2079 |
| **3 x 10** | W | 1645 | 1828 | 2011 | 2193 | 2376 | 2559 | 2742 | 2925 | 3290 | 3656 |
| | w | 126 | 140 | 154 | 168 | 182 | 196 | 210 | 225 | 253 | 281 |
| | $F_v$ | 53 | 59 | 65 | 71 | 77 | 83 | 88 | 94 | 106 | 118 |
| | E | 1138 | 1264 | 1391 | 1517 | 1644 | 1770 | 1897 | 2023 | 2276 | 2529 |
| **2 x 14** | W | 2025 | 2250 | 2475 | 2700 | 2926 | 3151 | 3376 | 3601 | 4051 | 4501 |
| | w | 155 | 173 | 190 | 207 | 225 | 242 | 259 | 277 | 311 | 346 |
| | $F_v$ | 76 | 84 | 93 | 101 | 110 | 118 | 127 | 135 | 152 | 169 |
| | E | 794 | 883 | 971 | 1059 | 1147 | 1236 | 1324 | 1412 | 1589 | 1766 |
| **6 x 8** | W | 2379 | 2644 | 2908 | 3173 | 3437 | 3701 | 3966 | 4230 | 4759 | 5288 |
| | w | 183 | 203 | 223 | 244 | 264 | 284 | 305 | 325 | 366 | 406 |
| | $F_v$ | 43 | 48 | 52 | 57 | 62 | 67 | 72 | 76 | 86 | 96 |
| | E | 1403 | 1559 | 1715 | 1871 | 2027 | 2183 | 2339 | 2495 | 2807 | 3119 |
| **4 x 10** | W | 2303 | 2559 | 2815 | 3071 | 3327 | 3583 | 3839 | 4095 | 4607 | 5119 |
| | w | 177 | 196 | 216 | 236 | 255 | 275 | 295 | 315 | 354 | 393 |
| | $F_v$ | 53 | 59 | 65 | 71 | 77 | 83 | 88 | 94 | 106 | 118 |
| | E | 1138 | 1264 | 1391 | 1517 | 1644 | 1770 | 1897 | 2023 | 2276 | 2529 |
| **3 x 12** | W | 2433 | 2704 | 2974 | 3245 | 3515 | 3786 | 4056 | 4326 | 4867 | 5408 |
| | w | 187 | 208 | 228 | 249 | 270 | 291 | 312 | 332 | 374 | 416 |
| | $F_v$ | 64 | 72 | 79 | 86 | 93 | 100 | 108 | 115 | 129 | 144 |
| | E | 935 | 1039 | 1143 | 1247 | 1351 | 1455 | 1559 | 1663 | 1871 | 2079 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **13'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **8 x 8** | W | 3245 | 3605 | 3966 | 4326 | 4687 | 5048 | 5408 | 5769 | 6490 | 7211 |
| | w | 249 | 277 | 305 | 332 | 360 | 388 | 416 | 443 | 499 | 554 |
| | $F_v$ | 43 | 48 | 52 | 57 | 62 | 67 | 72 | 76 | 86 | 96 |
| | E | 1403 | 1559 | 1715 | 1871 | 2027 | 2183 | 2339 | 2495 | 2807 | 3119 |
| **3 x 14** | W | 3376 | 3751 | 4126 | 4501 | 4876 | 5251 | 5627 | 6002 | 6752 | 7502 |
| | w | 259 | 288 | 317 | 346 | 375 | 403 | 432 | 461 | 519 | 577 |
| | $F_v$ | 76 | 84 | 93 | 101 | 110 | 118 | 127 | 135 | 152 | 169 |
| | E | 794 | 883 | 971 | 1059 | 1147 | 1236 | 1324 | 1412 | 1589 | 1766 |
| **4 x 12** | W | 3407 | 3786 | 4164 | 4543 | 4921 | 5300 | 5679 | 6057 | 6814 | 7572 |
| | w | 262 | 291 | 320 | 349 | 378 | 407 | 436 | 465 | 524 | 582 |
| | $F_v$ | 64 | 72 | 79 | 86 | 93 | 100 | 108 | 115 | 129 | 144 |
| | E | 936 | 1039 | 1143 | 1247 | 1351 | 1455 | 1559 | 1663 | 1871 | 2079 |
| **6 x 10** | W | 3818 | 4242 | 4666 | 5091 | 5515 | 5939 | 6363 | 6788 | 7636 | 8485 |
| | w | 293 | 326 | 358 | 391 | 424 | 456 | 489 | 522 | 587 | 652 |
| | $F_v$ | 54 | 60 | 66 | 73 | 79 | 85 | 91 | 97 | 109 | 121 |
| | E | 1108 | 1231 | 1354 | 1477 | 1601 | 1724 | 1847 | 1970 | 2216 | 2463 |
| **3 x 16** | W | 4472 | 4969 | 5466 | 5963 | 6460 | 6956 | 7453 | 7950 | 8944 | 9938 |
| | w | 344 | 382 | 420 | 458 | 496 | 535 | 573 | 611 | 688 | 764 |
| | $F_v$ | 87 | 97 | 107 | 117 | 127 | 136 | 146 | 156 | 175 | 195 |
| | E | 690 | 767 | 843 | 920 | 997 | 1074 | 1150 | 1227 | 1380 | 1534 |
| **4 x 14** | W | 4906 | 5451 | 5997 | 6542 | 7087 | 7632 | 8177 | 8723 | 9813 | 10903 |
| | w | 377 | 419 | 461 | 503 | 545 | 587 | 629 | 671 | 754 | 838 |
| | $F_v$ | 77 | 86 | 95 | 103 | 112 | 121 | 129 | 138 | 155 | 173 |
| | E | 780 | 866 | 953 | 1039 | 1126 | 1213 | 1299 | 1386 | 1559 | 1733 |
| **8 x 10** | W | 5206 | 5785 | 6363 | 6942 | 7520 | 8099 | 8677 | 9256 | 10413 | 11570 |
| | w | 400 | 445 | 489 | 534 | 578 | 623 | 667 | 712 | 801 | 890 |
| | $F_v$ | 54 | 60 | 66 | 73 | 79 | 85 | 91 | 97 | 109 | 121 |
| | E | 1108 | 1231 | 1354 | 1477 | 1601 | 1724 | 1847 | 1970 | 2216 | 2463 |
| **6 x 12** | W | 5595 | 6216 | 6838 | 7460 | 8081 | 8703 | 9325 | 9947 | 11190 | 12433 |
| | w | 430 | 478 | 526 | 573 | 621 | 669 | 717 | 765 | 860 | 956 |
| | $F_v$ | 66 | 73 | 81 | 88 | 95 | 103 | 110 | 117 | 132 | 147 |
| | E | 915 | 1017 | 1119 | 1220 | 1322 | 1424 | 1526 | 1627 | 1831 | 2034 |
| **10 x 10** | W | 6595 | 7327 | 8060 | 8793 | 9526 | 10259 | 10991 | 11724 | 13190 | 14655 |
| | w | 507 | 563 | 620 | 676 | 732 | 789 | 845 | 901 | 1014 | 1127 |
| | $F_v$ | 54 | 60 | 66 | 73 | 79 | 85 | 91 | 97 | 109 | 121 |
| | E | 1108 | 1231 | 1354 | 1477 | 1601 | 1724 | 1847 | 1970 | 2216 | 2463 |
| **4 x 16** | W | 6468 | 7186 | 7905 | 8624 | 9343 | 10061 | 10780 | 11499 | 12936 | 14373 |
| | w | 497 | 552 | 608 | 663 | 718 | 773 | 829 | 884 | 995 | 1105 |
| | $F_v$ | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 158 | 178 | 198 |
| | E | 679 | 754 | 830 | 905 | 981 | 1056 | 1132 | 1207 | 1358 | 1509 |
| **8 x 12** | W | 7629 | 8477 | 9325 | 10173 | 11020 | 11868 | 12716 | 13564 | 15259 | 16955 |
| | w | 586 | 652 | 717 | 782 | 847 | 912 | 978 | 1043 | 1173 | 1304 |
| | $F_v$ | 66 | 73 | 81 | 88 | 95 | 103 | 110 | 117 | 132 | 147 |
| | E | 915 | 1017 | 1119 | 1220 | 1322 | 1424 | 1526 | 1627 | 1831 | 2034 |
| **6 x 14** | W | 7710 | 8567 | 9424 | 10280 | 11137 | 11994 | 12850 | 13707 | 15421 | 17134 |
| | w | 593 | 659 | 724 | 790 | 856 | 922 | 988 | 1054 | 1186 | 1318 |
| | $F_v$ | 77 | 86 | 95 | 103 | 112 | 121 | 129 | 138 | 155 | 173 |
| | E | 779 | 866 | 953 | 1039 | 1126 | 1213 | 1299 | 1386 | 1559 | 1733 |
| **10 x 12** | W | 9664 | 10738 | 11812 | 12885 | 13959 | 15033 | 16107 | 17181 | 19328 | 21476 |
| | w | 743 | 826 | 908 | 991 | 1073 | 1156 | 2139 | 1321 | 1486 | 1652 |
| | $F_v$ | 66 | 73 | 81 | 88 | 95 | 103 | 110 | 117 | 132 | 147 |
| | E | 915 | 1017 | 1119 | 1220 | 1322 | 1424 | 1526 | 1627 | 1831 | 2034 |

## WOOD BEAMS–SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l$/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **13'-0" SPAN** CONT'D | | | | | | | | | | | |
| **6 x 16** | W | 10164 | 11293 | 12423 | 13552 | 14681 | 15811 | 16940 | 18070 | 20328 | 22587 |
| | w | 781 | 868 | 955 | 1042 | 1129 | 1216 | 1303 | 1390 | 1563 | 1737 |
| | $F_v$ | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 158 | 178 | 198 |
| | E | 679 | 754 | 830 | 905 | 981 | 1056 | 1132 | 1207 | 1358 | 1509 |
| **8 x 14** | W | 10514 | 11682 | 12850 | 14019 | 15187 | 16355 | 17524 | 18692 | 21028 | 23365 |
| | w | 808 | 898 | 988 | 1078 | 1168 | 1258 | 1348 | 1437 | 1617 | 1797 |
| | $F_v$ | 77 | 86 | 95 | 103 | 112 | 121 | 129 | 138 | 155 | 173 |
| | E | 780 | 866 | 953 | 1039 | 1126 | 1213 | 1299 | 1386 | 1559 | 1733 |
| **12 x 12** | W | 11699 | 12998 | 14298 | 15598 | 16898 | 18198 | 19498 | 20798 | 23398 | 25997 |
| | w | 899 | 999 | 1099 | 1199 | 1299 | 1399 | 1499 | 1599 | 1799 | 1999 |
| | $F_v$ | 66 | 73 | 81 | 88 | 95 | 103 | 110 | 117 | 132 | 147 |
| | E | 915 | 1017 | 1119 | 1220 | 1322 | 1424 | 1526 | 1627 | 1831 | 2034 |
| **6 x 18** | W | 12956 | 14396 | 15835 | 17275 | 18715 | 20154 | 21594 | 23034 | 25913 | 28792 |
| | w | 996 | 1107 | 1218 | 1328 | 1439 | 1550 | 1661 | 1771 | 1993 | 2214 |
| | $F_v$ | 100 | 112 | 123 | 134 | 145 | 157 | 168 | 179 | 201 | 224 |
| | E | 601 | 668 | 735 | 802 | 869 | 935 | 1002 | 1069 | 1203 | 1337 |
| **10 x 14** | W | 13318 | 14798 | 16277 | 17757 | 19237 | 20717 | 22197 | 23676 | 26636 | 29596 |
| | w | 1024 | 1138 | 1252 | 1365 | 1479 | 1593 | 1707 | 1821 | 2048 | 2276 |
| | $F_v$ | 77 | 86 | 95 | 103 | 112 | 121 | 129 | 138 | 155 | 173 |
| | E | 779 | 866 | 953 | 1040 | 1126 | 1213 | 1299 | 1386 | 1559 | 1733 |
| **8 x 16** | W | 13860 | 15400 | 16940 | 18480 | 20020 | 21560 | 23100 | 24641 | 27721 | 30801 |
| | w | 1066 | 1184 | 1303 | 1421 | 1540 | 1658 | 1776 | 1895 | 2132 | 2369 |
| | $F_v$ | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 158 | 178 | 198 |
| | E | 679 | 754 | 830 | 905 | 981 | 1056 | 1132 | 1207 | 1358 | 1509 |
| **6 x 20** | W | 16087 | 17875 | 19662 | 21450 | 23237 | 25025 | 26812 | 28600 | 32175 | 35750 |
| | w | 1237 | 1375 | 1512 | 1650 | 1787 | 1925 | 2062 | 2200 | 2475 | 2750 |
| | $F_v$ | 112 | 125 | 137 | 150 | 162 | 175 | 187 | 200 | 225 | 250 |
| | E | 540 | 600 | 660 | 720 | 780 | 840 | 900 | 960 | 1079 | 1199 |
| **12 x 14** | W | 16122 | 17913 | 19704 | 21496 | 23287 | 25078 | 26870 | 28661 | 32244 | 35826 |
| | w | 1240 | 1377 | 1515 | 1653 | 1791 | 1929 | 2066 | 2204 | 2480 | 2755 |
| | $F_v$ | 77 | 86 | 95 | 103 | 112 | 121 | 129 | 138 | 155 | 173 |
| | E | 780 | 866 | 953 | 1040 | 1126 | 1213 | 1299 | 1386 | 1559 | 1733 |
| **10 x 16** | W | 17556 | 19507 | 21458 | 23408 | 25359 | 27310 | 29261 | 31211 | 35113 | 39014 |
| | w | 1350 | 1500 | 1650 | 1800 | 1950 | 2100 | 2250 | 2400 | 2701 | 3001 |
| | $F_v$ | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 158 | 178 | 198 |
| | E | 679 | 754 | 830 | 905 | 981 | 1056 | 1132 | 1207 | 1358 | 1509 |
| **8 x 18** | W | 17668 | 19631 | 21594 | 23557 | 25520 | 27483 | 29447 | 31410 | 35336 | 39262 |
| | w | 1359 | 1510 | 1661 | 1812 | 1963 | 2114 | 2265 | 2416 | 2718 | 3020 |
| | $F_v$ | 100 | 112 | 123 | 134 | 145 | 157 | 168 | 179 | 201 | 224 |
| | E | 601 | 668 | 735 | 802 | 869 | 936 | 1002 | 1069 | 1203 | 1337 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **13'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **14 x 14** | W | 18925 | 21028 | 23131 | 25234 | 27337 | 29440 | 31543 | 33646 | 37851 | 42057 |
| | w | 1455 | 1617 | 1779 | 1941 | 2102 | 2264 | 2426 | 2588 | 2911 | 3235 |
| | $F_v$ | 77 | 86 | 95 | 103 | 112 | 121 | 129 | 138 | 155 | 173 |
| | E | 780 | 866 | 953 | 1040 | 1126 | 1213 | 1299 | 1386 | 1559 | 1733 |
| **6 x 22** | W | 19556 | 21729 | 23902 | 26075 | 28248 | 30421 | 32594 | 34767 | 39113 | 43459 |
| | w | 1504 | 1671 | 1838 | 2005 | 2172 | 2340 | 2507 | 2674 | 3008 | 3343 |
| | $F_v$ | 124 | 137 | 151 | 165 | 179 | 192 | 206 | 220 | 248 | 275 |
| | E | 489 | 544 | 598 | 653 | 707 | 761 | 816 | 870 | 979 | 1088 |
| **12 x 16** | W | 21252 | 23614 | 25975 | 28337 | 30698 | 33060 | 35421 | 37782 | 42505 | 47228 |
| | w | 1634 | 1816 | 1998 | 2179 | 2361 | 2543 | 2724 | 2906 | 3269 | 3632 |
| | $F_v$ | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 158 | 178 | 198 |
| | E | 679 | 754 | 830 | 905 | 981 | 1056 | 1132 | 1207 | 1358 | 1509 |
| **8 x 20** | W | 21937 | 24375 | 26812 | 29250 | 31687 | 34125 | 36562 | 39000 | 43875 | 48750 |
| | w | 1687 | 1875 | 2062 | 2250 | 2437 | 2625 | 2812 | 3000 | 3375 | 3750 |
| | $F_v$ | 112 | 125 | 137 | 150 | 162 | 175 | 187 | 200 | 225 | 250 |
| | E | 540 | 600 | 660 | 720 | 779 | 840 | 899 | 960 | 1079 | 1199 |
| **10 x 18** | W | 22379 | 24866 | 27353 | 29839 | 32326 | 34813 | 37299 | 39786 | 44759 | 49732 |
| | w | 1721 | 1912 | 2104 | 2295 | 2486 | 2677 | 2869 | 3060 | 3443 | 3825 |
| | $F_v$ | 100 | 112 | 123 | 134 | 145 | 157 | 168 | 179 | 201 | 224 |
| | E | 601 | 668 | 735 | 802 | 869 | 936 | 1002 | 1069 | 1203 | 1337 |
| **6 x 24** | W | 23364 | 25960 | 28556 | 31152 | 33748 | 36344 | 38940 | 41536 | 46728 | 51920 |
| | w | 1797 | 1996 | 2196 | 2396 | 2596 | 2795 | 2995 | 3195 | 3594 | 3993 |
| | $F_v$ | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 241 | 271 | 301 |
| | E | 448 | 497 | 547 | 597 | 647 | 697 | 746 | 796 | 896 | 995 |
| **14 x 16** | W | 24949 | 27721 | 30493 | 33265 | 36037 | 38809 | 41581 | 44353 | 49898 | 55442 |
| | w | 1919 | 2132 | 2345 | 2558 | 2772 | 2985 | 3198 | 3411 | 3838 | 4264 |
| | $F_v$ | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 158 | 178 | 198 |
| | E | 679 | 754 | 830 | 905 | 981 | 1056 | 1132 | 1207 | 1358 | 1509 |
| **8 x 22** | W | 26668 | 29631 | 32594 | 35557 | 38520 | 41483 | 44447 | 47410 | 53336 | 59262 |
| | w | 2051 | 2279 | 2507 | 2735 | 2963 | 3191 | 3419 | 3646 | 4102 | 4558 |
| | $F_v$ | 124 | 137 | 151 | 165 | 179 | 192 | 206 | 220 | 248 | 275 |
| | E | 489 | 544 | 598 | 653 | 707 | 761 | 816 | 870 | 979 | 1088 |
| **12 x 18** | W | 27091 | 30101 | 33111 | 36121 | 39131 | 42142 | 45152 | 48162 | 54182 | 60202 |
| | w | 2083 | 2315 | 2547 | 2778 | 3010 | 3241 | 3473 | 3704 | 4167 | 4630 |
| | $F_v$ | 100 | 112 | 123 | 134 | 145 | 157 | 168 | 179 | 201 | 224 |
| | E | 601 | 668 | 735 | 802 | 869 | 936 | 1002 | 1069 | 1203 | 1337 |
| **10 x 20** | W | 27787 | 30875 | 33962 | 37050 | 40137 | 43225 | 46312 | 49400 | 55574 | 61750 |
| | w | 2137 | 2375 | 2612 | 2850 | 3087 | 3325 | 3562 | 3800 | 4274 | 4750 |
| | $F_v$ | 112 | 125 | 137 | 150 | 162 | 175 | 187 | 200 | 225 | 250 |
| | E | 540 | 600 | 660 | 720 | 779 | 840 | 899 | 959 | 1079 | 1199 |
| **16 x 16** | W | 28645 | 31827 | 35010 | 38193 | 41376 | 44559 | 47741 | 50924 | 57290 | 63655 |
| | w | 2203 | 2448 | 2693 | 2937 | 3182 | 3427 | 3672 | 3917 | 4406 | 4896 |
| | $F_v$ | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 158 | 178 | 198 |
| | E | 679 | 754 | 830 | 905 | 981 | 1056 | 1132 | 1207 | 1358 | 1509 |
| **14 x 18** | W | 31802 | 35336 | 38870 | 42403 | 45937 | 49471 | 53004 | 56538 | 63605 | 70673 |
| | w | 2446 | 2718 | 2990 | 3261 | 3533 | 3805 | 4077 | 4349 | 4892 | 5436 |
| | $F_v$ | 100 | 112 | 123 | 134 | 145 | 157 | 168 | 179 | 201 | 224 |
| | E | 601 | 668 | 735 | 802 | 869 | 936 | 1002 | 1069 | 1203 | 1337 |
| **8 x 24** | W | 31860 | 35400 | 38940 | 42480 | 46020 | 49560 | 53100 | 56641 | 63721 | 70801 |
| | w | 2450 | 2723 | 2995 | 3267 | 3540 | 3812 | 4084 | 4357 | 4901 | 5446 |
| | $F_v$ | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 241 | 271 | 301 |
| | E | 448 | 497 | 547 | 597 | 647 | 697 | 746 | 796 | 896 | 995 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $\ell$/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **13'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **12 x 20** | W | 33637 | 37375 | 41112 | 44850 | 48587 | 52325 | 56062 | 59800 | 67274 | 74750 |
| | w | 2587 | 2875 | 3162 | 3450 | 3737 | 4025 | 4312 | 4600 | 5174 | 5750 |
| | $F_v$ | 112 | 125 | 137 | 150 | 162 | 175 | 187 | 200 | 225 | 250 |
| | E | 540 | 600 | 659 | 719 | 779 | 840 | 899 | 960 | 1079 | 1199 |
| **10 x 22** | W | 33779 | 37533 | 41286 | 45039 | 48793 | 52546 | 56299 | 60052 | 67559 | 75066 |
| | w | 2598 | 2887 | 3175 | 3464 | 3753 | 4042 | 4330 | 4619 | 5196 | 5774 |
| | $F_v$ | 124 | 137 | 151 | 165 | 179 | 192 | 206 | 220 | 248 | 275 |
| | E | 489 | 544 | 598 | 653 | 707 | 761 | 816 | 870 | 979 | 1088 |
| **16 x 18** | W | 36514 | 40571 | 44628 | 48685 | 52743 | 56800 | 60857 | 64914 | 73028 | 81143 |
| | w | 2808 | 3120 | 3432 | 3745 | 4057 | 4369 | 4681 | 4993 | 5617 | 6241 |
| | $F_v$ | 100 | 112 | 123 | 134 | 145 | 157 | 168 | 179 | 201 | 224 |
| | E | 601 | 668 | 735 | 802 | 869 | 936 | 1002 | 1069 | 1203 | 1337 |
| **14 x 20** | W | 39487 | 43875 | 48262 | 52650 | 57037 | 61424 | 65812 | 70200 | 78974 | 87750 |
| | w | 3037 | 3375 | 3712 | 4050 | 4387 | 4724 | 5062 | 5400 | 6074 | 6750 |
| | $F_v$ | 112 | 125 | 137 | 150 | 162 | 175 | 187 | 200 | 225 | 250 |
| | E | 539 | 600 | 659 | 720 | 780 | 839 | 899 | 959 | 1079 | 1199 |
| **10 x 24** | W | 40356 | 44840 | 49324 | 53808 | 58293 | 62777 | 67261 | 71745 | 80713 | 89681 |
| | w | 3104 | 3449 | 3794 | 4139 | 4484 | 4829 | 5173 | 5518 | 6208 | 6898 |
| | $F_v$ | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 241 | 271 | 301 |
| | E | 448 | 497 | 547 | 597 | 647 | 697 | 746 | 796 | 896 | 995 |
| **12 x 22** | W | 40891 | 45434 | 49978 | 54521 | 59065 | 63608 | 68152 | 72695 | 81782 | 90869 |
| | w | 3145 | 3494 | 3844 | 4193 | 4543 | 4892 | 5242 | 5591 | 6290 | 6989 |
| | $F_v$ | 124 | 137 | 151 | 165 | 179 | 192 | 206 | 220 | 248 | 275 |
| | E | 489 | 544 | 598 | 653 | 707 | 761 | 816 | 870 | 979 | 1088 |
| **18 x 18** | W | 41225 | 45806 | 50387 | 54967 | 59548 | 64129 | 68709 | 73290 | 82451 | 91613 |
| | w | 3171 | 3523 | 3875 | 4228 | 4580 | 4933 | 5285 | 5637 | 6342 | 7047 |
| | $F_v$ | 100 | 112 | 123 | 134 | 145 | 157 | 168 | 179 | 201 | 224 |
| | E | 601 | 668 | 735 | 802 | 869 | 935 | 1002 | 1069 | 1203 | 1337 |
| **16 x 20** | W | 45337 | 50375 | 55412 | 60450 | 65487 | 70524 | 75562 | 80600 | 90674 | 100750 |
| | w | 3487 | 3875 | 4262 | 4650 | 5037 | 5424 | 5812 | 6200 | 6974 | 7750 |
| | $F_v$ | 112 | 125 | 137 | 150 | 162 | 175 | 187 | 200 | 225 | 250 |
| | E | 540 | 600 | 659 | 720 | 779 | 839 | 899 | 960 | 1079 | 1199 |
| **14 x 22** | W | 48002 | 53336 | 58670 | 64003 | 69337 | 74671 | 80004 | 85338 | 96005 | 106673 |
| | w | 3692 | 4102 | 4513 | 4923 | 5333 | 5743 | 6154 | 6564 | 7385 | 8205 |
| | $F_v$ | 124 | 137 | 151 | 165 | 179 | 192 | 206 | 220 | 248 | 275 |
| | E | 489 | 544 | 598 | 653 | 707 | 761 | 816 | 870 | 979 | 1088 |
| **12 x 24** | W | 48852 | 54280 | 59709 | 65137 | 70565 | 75993 | 81421 | 86849 | 97705 | 108561 |
| | w | 3757 | 4175 | 4593 | 5010 | 5428 | 5845 | 6263 | 6680 | 7515 | 8350 |
| | $F_v$ | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 241 | 271 | 301 |
| | E | 448 | 497 | 547 | 597 | 647 | 697 | 746 | 796 | 896 | 995 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **13'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **18 x 20** | W | 51187 | 56874 | 62562 | 68250 | 73937 | 79624 | 85312 | 91000 | 102374 | 113750 |
| | w | 3937 | 4374 | 4812 | 5250 | 5687 | 6124 | 6562 | 7000 | 7874 | 8750 |
| | $F_v$ | 112 | 125 | 137 | 150 | 162 | 175 | 187 | 200 | 225 | 250 |
| | E | 539 | 599 | 659 | 720 | 779 | 839 | 899 | 960 | 1079 | 1199 |
| **16 x 22** | W | 55114 | 61238 | 67362 | 73485 | 79609 | 85733 | 91857 | 97981 | 110228 | 122476 |
| | w | 4239 | 4710 | 5181 | 5652 | 6123 | 6594 | 7065 | 7537 | 8479 | 9421 |
| | $F_v$ | 124 | 137 | 151 | 165 | 179 | 192 | 206 | 220 | 248 | 275 |
| | E | 489 | 544 | 598 | 653 | 707 | 761 | 816 | 870 | 979 | 1088 |
| **20 x 20** | W | 57037 | 63374 | 69712 | 76050 | 82387 | 88724 | 95062 | 101400 | 114074 | 126750 |
| | w | 4387 | 4874 | 5362 | 5850 | 6337 | 6824 | 7312 | 7800 | 8774 | 9750 |
| | $F_v$ | 112 | 125 | 137 | 150 | 162 | 175 | 187 | 200 | 225 | 250 |
| | E | 540 | 599 | 659 | 720 | 779 | 839 | 899 | 959 | 1079 | 1199 |
| **14 x 24** | W | 57349 | 63721 | 70093 | 76465 | 82837 | 89209 | 95581 | 101953 | 114698 | 127442 |
| | w | 4411 | 4901 | 5391 | 5881 | 6372 | 6862 | 7352 | 7842 | 8822 | 9803 |
| | $F_v$ | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 241 | 271 | 301 |
| | E | 448 | 497 | 547 | 597 | 647 | 697 | 746 | 796 | 896 | 995 |
| **18 x 22** | W | 62225 | 69139 | 76053 | 82967 | 89881 | 96795 | 103709 | 110623 | 124451 | 138279 |
| | w | 4786 | 5318 | 5850 | 6382 | 6913 | 7445 | 7977 | 8509 | 9573 | 10636 |
| | $F_v$ | 124 | 137 | 151 | 165 | 179 | 192 | 206 | 220 | 248 | 275 |
| | E | 489 | 544 | 598 | 653 | 707 | 761 | 816 | 870 | 979 | 1088 |
| **16 x 24** | W | 65845 | 73161 | 80477 | 87793 | 95109 | 102425 | 109741 | 117058 | 131690 | 146322 |
| | w | 5065 | 5627 | 6190 | 6753 | 7316 | 7878 | 8441 | 9004 | 10130 | 11255 |
| | $F_v$ | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 241 | 271 | 301 |
| | E | 448 | 497 | 547 | 597 | 647 | 697 | 746 | 796 | 896 | 995 |
| **20 x 22** | W | 69337 | 77041 | 84745 | 92450 | 100154 | 107858 | 115562 | 123266 | 138674 | 154083 |
| | w | 5333 | 5926 | 6518 | 7111 | 7704 | 8296 | 8889 | 9482 | 10667 | 11852 |
| | $F_v$ | 124 | 137 | 151 | 165 | 179 | 192 | 206 | 220 | 248 | 275 |
| | E | 489 | 544 | 598 | 653 | 707 | 761 | 816 | 870 | 979 | 1088 |
| **18 x 24** | W | 74341 | 82601 | 90861 | 99121 | 107381 | 115642 | 123902 | 132162 | 148682 | 165202 |
| | w | 5718 | 6353 | 6989 | 7624 | 8260 | 8895 | 9530 | 10166 | 11437 | 12707 |
| | $F_v$ | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 241 | 271 | 301 |
| | E | 448 | 497 | 547 | 597 | 647 | 697 | 746 | 796 | 896 | 995 |
| **22 x 22** | W | 76449 | 84943 | 93437 | 101932 | 110426 | 118920 | 127415 | 135909 | 152898 | 169886 |
| | w | 5880 | 6534 | 7187 | 7840 | 8494 | 9147 | 9801 | 10454 | 11761 | 13068 |
| | $F_v$ | 124 | 137 | 151 | 165 | 179 | 192 | 206 | 220 | 248 | 275 |
| | E | 489 | 544 | 598 | 653 | 707 | 761 | 816 | 870 | 979 | 1088 |
| **20 x 24** | W | 82837 | 92041 | 101245 | 110450 | 119654 | 128858 | 138062 | 147266 | 165674 | 184083 |
| | w | 6372 | 7080 | 7788 | 8496 | 9204 | 9912 | 10620 | 11328 | 12744 | 14160 |
| | $F_v$ | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 241 | 271 | 301 |
| | E | 448 | 497 | 547 | 597 | 647 | 697 | 746 | 796 | 896 | 995 |
| **22 x 24** | W | 91333 | 101481 | 111630 | 121778 | 131926 | 142074 | 152222 | 162370 | 182667 | 202963 |
| | w | 7025 | 7806 | 8586 | 9367 | 10148 | 10928 | 11709 | 12490 | 14051 | 15612 |
| | $F_v$ | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 241 | 271 | 301 |
| | E | 448 | 497 | 547 | 597 | 647 | 697 | 746 | 796 | 896 | 995 |
| **24 x 24** | W | 99829 | 110922 | 122014 | 133106 | 144198 | 155290 | 166382 | 177475 | 199659 | 221844 |
| | w | 7679 | 8532 | 9385 | 10238 | 11092 | 11945 | 12798 | 13651 | 15358 | 17064 |
| | $F_v$ | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 241 | 271 | 301 |
| | E | 448 | 497 | 547 | 597 | 647 | 697 | 746 | 796 | 896 | 995 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

*Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.*

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **14' - 0" SPAN** | | | | | | | | | | | |
| **3 x 6** | W | 540 | 600 | 660 | 720 | 780 | 840 | 900 | 960 | 1080 | 1200 |
| | w | 38 | 42 | 47 | 51 | 55 | 60 | 64 | 68 | 77 | 85 |
| | $F_v$ | 29 | 32 | 36 | 39 | 42 | 45 | 49 | 52 | 58 | 65 |
| | E | 2061 | 2290 | 2519 | 2749 | 2978 | 3207 | 3436 | 3665 | 4123 | 4581 |
| **2 x 8** | W | 563 | 625 | 688 | 750 | 813 | 876 | 938 | 1001 | 1126 | 1251 |
| | w | 40 | 44 | 49 | 53 | 58 | 62 | 67 | 71 | 80 | 89 |
| | $F_v$ | 38 | 43 | 47 | 51 | 56 | 60 | 64 | 69 | 77 | 86 |
| | E | 1564 | 1737 | 1911 | 2085 | 2259 | 2433 | 2606 | 2780 | 3128 | 3475 |
| **4 x 6** | W | 756 | 840 | 924 | 1008 | 1092 | 1176 | 1260 | 1344 | 1512 | 1680 |
| | w | 54 | 60 | 66 | 72 | 78 | 84 | 90 | 96 | 108 | 120 |
| | $F_v$ | 29 | 32 | 36 | 39 | 42 | 45 | 49 | 52 | 58 | 65 |
| | E | 2061 | 2290 | 2519 | 2749 | 2978 | 3207 | 3436 | 3665 | 4123 | 4581 |
| **2 x 10** | W | 916 | 1018 | 1120 | 1222 | 1324 | 1426 | 1527 | 1629 | 1833 | 2037 |
| | w | 65 | 72 | 80 | 87 | 94 | 101 | 109 | 116 | 130 | 145 |
| | $F_v$ | 49 | 55 | 60 | 66 | 71 | 77 | 82 | 88 | 99 | 110 |
| | E | 1225 | 1362 | 1498 | 1634 | 1770 | 1907 | 2043 | 2179 | 2451 | 2724 |
| **3 x 8** | W | 938 | 1042 | 1147 | 1251 | 1355 | 1460 | 1564 | 1668 | 1877 | 2085 |
| | w | 67 | 74 | 81 | 89 | 96 | 104 | 111 | 119 | 134 | 148 |
| | $F_v$ | 38 | 43 | 47 | 51 | 56 | 60 | 64 | 69 | 77 | 86 |
| | E | 1564 | 1737 | 1911 | 2085 | 2259 | 2433 | 2606 | 2780 | 3128 | 3475 |
| **6 x 6** | W | 1188 | 1320 | 1452 | 1584 | 1716 | 1848 | 1980 | 2112 | 2376 | 2640 |
| | w | 84 | 94 | 103 | 113 | 122 | 132 | 141 | 150 | 169 | 188 |
| | $F_v$ | 29 | 32 | 36 | 39 | 42 | 45 | 49 | 52 | 58 | 65 |
| | E | 2061 | 2290 | 2519 | 2749 | 2978 | 3207 | 3436 | 3665 | 4123 | 4581 |
| **4 x 8** | W | 1314 | 1460 | 1606 | 1752 | 1898 | 2044 | 2190 | 2336 | 2628 | 2920 |
| | w | 93 | 104 | 114 | 125 | 135 | 146 | 156 | 166 | 187 | 208 |
| | $F_v$ | 38 | 43 | 47 | 51 | 56 | 60 | 64 | 69 | 77 | 86 |
| | E | 1564 | 1737 | 1911 | 2085 | 2259 | 2433 | 2606 | 2780 | 3128 | 3475 |
| **2 x 12** | W | 1356 | 1506 | 1657 | 1808 | 1958 | 2109 | 2260 | 2410 | 2712 | 3013 |
| | w | 96 | 107 | 118 | 129 | 139 | 150 | 161 | 172 | 193 | 215 |
| | $F_v$ | 60 | 66 | 73 | 80 | 87 | 93 | 100 | 107 | 120 | 133 |
| | E | 1008 | 1119 | 1231 | 1343 | 1455 | 1567 | 1679 | 1791 | 2015 | 2239 |
| **3 x 10** | W | 1527 | 1697 | 1867 | 2037 | 2206 | 2376 | 2546 | 2716 | 3055 | 3395 |
| | w | 109 | 121 | 133 | 145 | 157 | 169 | 181 | 194 | 218 | 242 |
| | $F_v$ | 49 | 55 | 60 | 66 | 71 | 77 | 82 | 88 | 99 | 110 |
| | E | 1225 | 1362 | 1498 | 1634 | 1770 | 1907 | 2043 | 2179 | 2451 | 2724 |
| **2 x 14** | W | 1881 | 2090 | 2299 | 2508 | 2717 | 2926 | 3135 | 3344 | 3762 | 4180 |
| | w | 134 | 149 | 164 | 179 | 194 | 209 | 223 | 238 | 268 | 298 |
| | $F_v$ | 70 | 78 | 86 | 94 | 102 | 110 | 118 | 126 | 141 | 157 |
| | E | 855 | 950 | 1046 | 1141 | 1236 | 1331 | 1426 | 1521 | 1711 | 1901 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **14' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **6 x 8** | W | 2209 | 2455 | 2700 | 2946 | 3191 | 3437 | 3683 | 3928 | 4419 | 4910 |
| | w | 157 | 175 | 192 | 210 | 227 | 245 | 263 | 280 | 315 | 350 |
| | $F_v$ | 40 | 44 | 49 | 53 | 58 | 62 | 66 | 71 | 80 | 89 |
| | E | 1511 | 1679 | 1847 | 2015 | 2183 | 2351 | 2519 | 2687 | 3023 | 3359 |
| **4 x 10** | W | 2139 | 2376 | 2614 | 2852 | 3089 | 3327 | 3565 | 3802 | 4278 | 4753 |
| | w | 152 | 169 | 186 | 203 | 220 | 237 | 254 | 271 | 305 | 339 |
| | $F_v$ | 49 | 55 | 60 | 66 | 71 | 77 | 82 | 88 | 99 | 110 |
| | E | 1225 | 1362 | 1498 | 1634 | 1770 | 1907 | 2043 | 2179 | 2451 | 2724 |
| **3 x 12** | W | 2260 | 2511 | 2762 | 3013 | 3264 | 3515 | 3766 | 4017 | 4520 | 5022 |
| | w | 161 | 179 | 197 | 215 | 233 | 251 | 269 | 286 | 322 | 358 |
| | $F_v$ | 60 | 66 | 73 | 80 | 87 | 93 | 100 | 107 | 120 | 133 |
| | E | 1007 | 1119 | 1231 | 1343 | 1455 | 1567 | 1679 | 1791 | 2015 | 2239 |
| **8 x 8** | W | 3013 | 3348 | 3683 | 4017 | 4352 | 4687 | 5022 | 5357 | 6026 | 6696 |
| | w | 215 | 239 | 263 | 286 | 310 | 334 | 358 | 382 | 430 | 478 |
| | $F_v$ | 40 | 44 | 49 | 53 | 58 | 62 | 66 | 71 | 80 | 89 |
| | E | 1511 | 1679 | 1847 | 2015 | 2183 | 2351 | 2519 | 2687 | 3023 | 3359 |
| **3 x 14** | W | 3135 | 3483 | 3831 | 4180 | 4528 | 4876 | 5225 | 5573 | 6270 | 6966 |
| | w | 223 | 248 | 273 | 298 | 323 | 348 | 373 | 398 | 447 | 497 |
| | $F_v$ | 70 | 78 | 86 | 94 | 102 | 110 | 118 | 126 | 141 | 157 |
| | E | 855 | 950 | 1046 | 1141 | 1236 | 1331 | 1426 | 1521 | 1711 | 1901 |
| **4 x 12** | W | 3164 | 3515 | 3867 | 4218 | 4570 | 4921 | 5273 | 5625 | 6328 | 7031 |
| | w | 226 | 251 | 276 | 301 | 326 | 351 | 376 | 401 | 452 | 502 |
| | $F_v$ | 60 | 66 | 73 | 80 | 87 | 93 | 100 | 107 | 120 | 133 |
| | E | 1008 | 1119 | 1231 | 1343 | 1455 | 1567 | 1679 | 1791 | 2015 | 2239 |
| **6 x 10** | W | 3545 | 3939 | 4333 | 4727 | 5121 | 5515 | 5909 | 6303 | 7091 | 7878 |
| | w | 253 | 281 | 309 | 337 | 365 | 393 | 422 | 450 | 506 | 562 |
| | $F_v$ | 50 | 56 | 62 | 67 | 73 | 79 | 84 | 90 | 101 | 113 |
| | E | 1193 | 1326 | 1458 | 1591 | 1724 | 1856 | 1989 | 2122 | 2387 | 2652 |
| **3 x 16** | W | 4152 | 4614 | 5075 | 5537 | 5998 | 6460 | 6921 | 7382 | 8305 | 9228 |
| | w | 296 | 329 | 362 | 395 | 428 | 461 | 494 | 527 | 593 | 659 |
| | $F_v$ | 81 | 90 | 99 | 108 | 118 | 127 | 136 | 145 | 163 | 181 |
| | E | 743 | 826 | 908 | 991 | 1074 | 1156 | 1239 | 1321 | 1487 | 1652 |
| **4 x 14** | W | 4556 | 5062 | 5568 | 6075 | 6581 | 7087 | 7593 | 8100 | 9112 | 10125 |
| | w | 325 | 361 | 397 | 433 | 470 | 506 | 542 | 578 | 650 | 723 |
| | $F_v$ | 72 | 80 | 88 | 96 | 104 | 112 | 120 | 128 | 144 | 160 |
| | E | 840 | 933 | 1026 | 1119 | 1213 | 1306 | 1399 | 1493 | 1679 | 1866 |
| **8 x 10** | W | 4834 | 5372 | 5909 | 6446 | 6983 | 7520 | 8058 | 8595 | 9669 | 10744 |
| | w | 345 | 383 | 422 | 460 | 498 | 537 | 575 | 613 | 690 | 767 |
| | $F_v$ | 50 | 56 | 62 | 67 | 73 | 79 | 84 | 90 | 101 | 113 |
| | E | 1193 | 1326 | 1458 | 1591 | 1724 | 1856 | 1989 | 2122 | 2387 | 2652 |
| **6 x 12** | W | 5195 | 5772 | 6350 | 6927 | 7504 | 8082 | 8659 | 9236 | 10391 | 11545 |
| | w | 371 | 412 | 453 | 494 | 536 | 577 | 618 | 659 | 742 | 824 |
| | $F_v$ | 61 | 68 | 75 | 82 | 88 | 96 | 102 | 109 | 123 | 136 |
| | E | 986 | 1095 | 1205 | 1314 | 1424 | 1530 | 1643 | 1753 | 1972 | 2191 |
| **10 x 10** | W | 6124 | 6804 | 7485 | 8165 | 8845 | 9526 | 10206 | 10887 | 12248 | 13609 |
| | w | 437 | 486 | 534 | 583 | 631 | 680 | 729 | 777 | 874 | 972 |
| | $F_v$ | 50 | 56 | 62 | 67 | 73 | 79 | 84 | 90 | 101 | 113 |
| | E | 1193 | 1326 | 1458 | 1591 | 1724 | 1856 | 1989 | 2122 | 2387 | 2652 |
| **4 x 16** | W | 6006 | 6673 | 7340 | 8008 | 8675 | 9343 | 10010 | 10677 | 12012 | 13347 |
| | w | 429 | 476 | 524 | 572 | 619 | 667 | 715 | 762 | 858 | 953 |
| | $F_v$ | 83 | 92 | 101 | 110 | 119 | 129 | 138 | 147 | 166 | 184 |
| | E | 731 | 812 | 894 | 975 | 1056 | 1138 | 1219 | 1300 | 1463 | 1625 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **14'-0" SPAN** CONT'D | | | | | | | | | | | |
| **8 x 12** | W | 7084 | 7872 | 8659 | 9446 | 10233 | 11020 | 11808 | 12595 | 14169 | 15744 |
| | w | 506 | 562 | 618 | 674 | 730 | 787 | 843 | 899 | 1012 | 1124 |
| | $F_v$ | 61 | 68 | 75 | 82 | 88 | 95 | 102 | 109 | 123 | 136 |
| | E | 986 | 1095 | 1205 | 1314 | 1424 | 1533 | 1643 | 1753 | 1972 | 2191 |
| **6 x 14** | W | 7159 | 7955 | 8750 | 9546 | 10341 | 11137 | 11933 | 12728 | 14319 | 15910 |
| | w | 511 | 568 | 625 | 681 | 738 | 795 | 852 | 909 | 1022 | 1136 |
| | $F_v$ | 72 | 80 | 88 | 96 | 104 | 112 | 120 | 128 | 144 | 160 |
| | E | 839 | 933 | 1026 | 1119 | 1213 | 1306 | 1399 | 1493 | 1679 | 1866 |
| **10 x 12** | W | 8974 | 9971 | 10968 | 11965 | 12962 | 13959 | 14956 | 15953 | 17948 | 19942 |
| | w | 641 | 712 | 783 | 854 | 925 | 997 | 1068 | 1139 | 1282 | 1424 |
| | $F_v$ | 61 | 68 | 75 | 82 | 88 | 95 | 102 | 109 | 123 | 136 |
| | E | 986 | 1095 | 1205 | 1314 | 1424 | 1533 | 1643 | 1753 | 1972 | 2191 |
| **6 x 16** | W | 9438 | 10487 | 11535 | 12584 | 13633 | 14681 | 15730 | 16779 | 18876 | 20974 |
| | w | 674 | 749 | 823 | 898 | 973 | 1048 | 1123 | 1198 | 1348 | 1498 |
| | $F_v$ | 83 | 92 | 101 | 110 | 119 | 129 | 138 | 147 | 166 | 184 |
| | E | 731 | 812 | 894 | 975 | 1056 | 1138 | 1219 | 1300 | 1463 | 1625 |
| **8 x 14** | W | 9763 | 10848 | 11933 | 13017 | 14102 | 15187 | 16272 | 17357 | 19526 | 21696 |
| | w | 697 | 774 | 852 | 929 | 1007 | 1084 | 1162 | 1239 | 1394 | 1549 |
| | $F_v$ | 72 | 80 | 88 | 96 | 104 | 112 | 120 | 128 | 144 | 160 |
| | E | 839 | 933 | 1026 | 1119 | 1213 | 1306 | 1399 | 1493 | 1679 | 1866 |
| **12 x 12** | W | 10863 | 12070 | 13277 | 14484 | 15691 | 16898 | 18105 | 19312 | 21726 | 24140 |
| | w | 775 | 862 | 948 | 1034 | 1120 | 1207 | 1293 | 1379 | 1551 | 1724 |
| | $F_v$ | 61 | 68 | 75 | 82 | 88 | 95 | 102 | 109 | 123 | 136 |
| | E | 986 | 1095 | 1205 | 1314 | 1424 | 1533 | 1643 | 1753 | 1972 | 2191 |
| **6 x 18** | W | 12031 | 13368 | 14704 | 16041 | 17378 | 18715 | 20052 | 21388 | 24062 | 26736 |
| | w | 859 | 954 | 1050 | 1145 | 1241 | 1336 | 1432 | 1527 | 1718 | 1909 |
| | $F_v$ | 93 | 104 | 114 | 125 | 135 | 145 | 156 | 166 | 187 | 208 |
| | E | 647 | 719 | 791 | 863 | 935 | 1007 | 1079 | 1151 | 1295 | 1439 |
| **10 x 14** | W | 12366 | 13741 | 15115 | 16489 | 17863 | 19237 | 20611 | 21985 | 24733 | 27482 |
| | w | 883 | 981 | 1079 | 1177 | 1275 | 1374 | 1472 | 1570 | 1766 | 1963 |
| | $F_v$ | 72 | 80 | 88 | 96 | 104 | 112 | 120 | 128 | 144 | 160 |
| | E | 839 | 933 | 1026 | 1119 | 1213 | 1306 | 1399 | 1493 | 1679 | 1866 |
| **8 x 16** | W | 12870 | 14300 | 15730 | 17160 | 18590 | 20020 | 21450 | 22880 | 25741 | 28601 |
| | w | 919 | 1021 | 1123 | 1225 | 1327 | 1430 | 1532 | 1634 | 1838 | 2042 |
| | $F_v$ | 83 | 92 | 101 | 110 | 119 | 129 | 138 | 147 | 166 | 184 |
| | E | 731 | 812 | 894 | 975 | 1056 | 1138 | 1219 | 1300 | 1463 | 1625 |
| **6 x 20** | W | 14938 | 16598 | 18258 | 19917 | 21577 | 23237 | 24897 | 26557 | 29876 | 33196 |
| | w | 1067 | 1185 | 1304 | 1422 | 1541 | 1659 | 1778 | 1896 | 2134 | 2371 |
| | $F_v$ | 104 | 116 | 127 | 139 | 150 | 162 | 174 | 185 | 208 | 232 |
| | E | 581 | 646 | 710 | 775 | 840 | 904 | 969 | 1033 | 1163 | 1292 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **14' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **12 x 14** | W | 14970 | 16633 | 18297 | 19960 | 21624 | 23287 | 24950 | 26614 | 29941 | 33267 |
| | w | 1069 | 1188 | 1306 | 1425 | 1544 | 1663 | 1782 | 1901 | 2138 | 2376 |
| | $F_v$ | 72 | 80 | 88 | 96 | 104 | 112 | 120 | 128 | 144 | 160 |
| | E | 840 | 933 | 1026 | 1119 | 1213 | 1306 | 1399 | 1493 | 1679 | 1866 |
| **10 x 16** | W | 16302 | 18114 | 19925 | 21736 | 23548 | 25359 | 27171 | 28982 | 32605 | 36228 |
| | w | 1164 | 1293 | 1423 | 1552 | 1682 | 1811 | 1940 | 2070 | 2328 | 2587 |
| | $F_v$ | 83 | 92 | 101 | 110 | 119 | 129 | 138 | 147 | 166 | 184 |
| | E | 731 | 812 | 894 | 975 | 1056 | 1138 | 1219 | 1300 | 1463 | 1625 |
| **8 x 18** | W | 16406 | 18229 | 20052 | 21875 | 23697 | 25520 | 27343 | 29166 | 32812 | 36458 |
| | w | 1171 | 1302 | 1432 | 1562 | 1692 | 1822 | 1953 | 2083 | 2343 | 2604 |
| | $F_v$ | 93 | 104 | 114 | 125 | 135 | 145 | 156 | 166 | 187 | 208 |
| | E | 648 | 720 | 792 | 864 | 936 | 1008 | 1079 | 1151 | 1295 | 1439 |
| **14 x 14** | W | 17574 | 19526 | 21479 | 23432 | 25384 | 27337 | 29290 | 31242 | 35148 | 39053 |
| | w | 1255 | 1394 | 1534 | 1673 | 1813 | 1952 | 2092 | 2231 | 2510 | 2789 |
| | $F_v$ | 72 | 80 | 88 | 96 | 104 | 112 | 120 | 128 | 144 | 160 |
| | E | 840 | 933 | 1026 | 1119 | 1213 | 1306 | 1399 | 1493 | 1679 | 1866 |
| **6 x 22** | W | 18159 | 20177 | 22195 | 24213 | 26230 | 28248 | 30266 | 32284 | 36319 | 40355 |
| | w | 1297 | 1441 | 1585 | 1729 | 1873 | 2017 | 2161 | 2306 | 2594 | 2882 |
| | $F_v$ | 115 | 127 | 140 | 153 | 166 | 179 | 191 | 204 | 230 | 255 |
| | E | 527 | 586 | 644 | 703 | 761 | 820 | 879 | 937 | 1054 | 1172 |
| **12 x 16** | W | 19734 | 21927 | 24120 | 26313 | 28505 | 30698 | 32891 | 35084 | 39469 | 43855 |
| | w | 1409 | 1566 | 1722 | 1879 | 2036 | 2192 | 2349 | 2506 | 2819 | 3132 |
| | $F_v$ | 83 | 92 | 101 | 110 | 119 | 129 | 138 | 147 | 166 | 184 |
| | E | 731 | 812 | 894 | 975 | 1056 | 1138 | 1219 | 1300 | 1463 | 1625 |
| **8 x 20** | W | 20370 | 22633 | 24897 | 27160 | 29424 | 31687 | 33950 | 36214 | 40741 | 45267 |
| | w | 1455 | 1616 | 1778 | 1940 | 2101 | 2263 | 2425 | 2586 | 2910 | 3233 |
| | $F_v$ | 104 | 116 | 127 | 139 | 150 | 162 | 174 | 185 | 208 | 232 |
| | E | 581 | 646 | 710 | 775 | 839 | 904 | 969 | 1033 | 1163 | 1292 |
| **10 x 18** | W | 20781 | 23090 | 25399 | 27708 | 30017 | 32326 | 34635 | 36944 | 41562 | 46180 |
| | w | 1484 | 1649 | 1814 | 1979 | 2144 | 2309 | 2473 | 2638 | 2968 | 3298 |
| | $F_v$ | 93 | 104 | 114 | 125 | 135 | 145 | 156 | 166 | 187 | 208 |
| | E | 648 | 720 | 792 | 864 | 936 | 1008 | 1079 | 1151 | 1295 | 1439 |
| **6 x 24** | W | 21695 | 24106 | 26516 | 28927 | 31337 | 33748 | 36159 | 38569 | 43391 | 48212 |
| | w | 1549 | 1721 | 1894 | 2066 | 2238 | 2410 | 2582 | 2754 | 3099 | 3443 |
| | $F_v$ | 125 | 139 | 153 | 167 | 181 | 195 | 209 | 223 | 251 | 279 |
| | E | 482 | 536 | 589 | 643 | 697 | 750 | 804 | 857 | 965 | 1072 |
| **14 x 16** | W | 23166 | 25741 | 28315 | 30889 | 33463 | 36037 | 38611 | 41185 | 46333 | 51482 |
| | w | 1654 | 1838 | 2022 | 2206 | 2390 | 2574 | 2757 | 2941 | 3309 | 3677 |
| | $F_v$ | 83 | 92 | 101 | 110 | 119 | 129 | 138 | 147 | 166 | 184 |
| | E | 731 | 812 | 894 | 975 | 1056 | 1138 | 1219 | 1300 | 1463 | 1625 |
| **8 x 22** | W | 24763 | 27514 | 30266 | 33017 | 35769 | 38520 | 41272 | 44023 | 49526 | 55029 |
| | w | 1768 | 1965 | 2161 | 2358 | 2554 | 2751 | 2948 | 3144 | 3537 | 3930 |
| | $F_v$ | 115 | 127 | 140 | 153 | 166 | 179 | 191 | 204 | 230 | 255 |
| | E | 527 | 586 | 644 | 703 | 761 | 820 | 879 | 937 | 1054 | 1172 |
| **12 x 18** | W | 25156 | 27951 | 30746 | 33541 | 36336 | 39131 | 41927 | 44722 | 50312 | 55902 |
| | w | 1796 | 1996 | 2196 | 2395 | 2595 | 2795 | 2994 | 3194 | 3593 | 3993 |
| | $F_v$ | 93 | 104 | 114 | 125 | 135 | 145 | 156 | 166 | 187 | 208 |
| | E | 648 | 720 | 791 | 863 | 935 | 1007 | 1079 | 1151 | 1295 | 1439 |
| **10 x 20** | W | 25802 | 28669 | 31536 | 34403 | 37270 | 40137 | 43004 | 45871 | 51605 | 57339 |
| | w | 1843 | 2047 | 2252 | 2457 | 2662 | 2866 | 3071 | 3276 | 3686 | 4095 |
| | $F_v$ | 104 | 116 | 127 | 139 | 150 | 162 | 174 | 185 | 208 | 232 |
| | E | 581 | 646 | 710 | 775 | 839 | 904 | 969 | 1033 | 1163 | 1292 |

## WOOD BEAMS–SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for $l$/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **14'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **16 x 16** | W | 26599 | 29554 | 32510 | 35465 | 38420 | 41376 | 44331 | 47287 | 53198 | 59109 |
| | w | 1899 | 2111 | 2322 | 2533 | 2744 | 2955 | 3166 | 3377 | 3799 | 4222 |
| | $F_v$ | 83 | 92 | 101 | 110 | 119 | 129 | 138 | 147 | 166 | 184 |
| | E | 731 | 812 | 894 | 975 | 1056 | 1138 | 1219 | 1300 | 1463 | 1625 |
| **14 x 18** | W | 29531 | 32812 | 36093 | 39375 | 42656 | 45937 | 49218 | 52500 | 59062 | 65625 |
| | w | 2109 | 2343 | 2578 | 2812 | 3046 | 3281 | 3515 | 3750 | 4218 | 4687 |
| | $F_v$ | 93 | 104 | 114 | 125 | 135 | 145 | 156 | 166 | 187 | 208 |
| | E | 647 | 720 | 791 | 863 | 935 | 1008 | 1079 | 1151 | 1295 | 1439 |
| **8 x 24** | W | 29584 | 32872 | 36159 | 39446 | 42733 | 46020 | 49308 | 52595 | 59169 | 65744 |
| | w | 2113 | 2348 | 2582 | 2817 | 3052 | 3287 | 3522 | 3756 | 4226 | 4696 |
| | $F_v$ | 125 | 139 | 153 | 167 | 181 | 195 | 209 | 223 | 251 | 279 |
| | E | 482 | 536 | 589 | 643 | 697 | 750 | 804 | 857 | 965 | 1072 |
| **12 x 20** | W | 31234 | 34705 | 38175 | 41646 | 45116 | 48587 | 52058 | 55528 | 62469 | 69410 |
| | w | 2231 | 2478 | 2726 | 2974 | 3222 | 3470 | 3718 | 3966 | 4462 | 4957 |
| | $F_v$ | 104 | 116 | 127 | 139 | 150 | 162 | 174 | 185 | 208 | 232 |
| | E | 581 | 646 | 710 | 775 | 839 | 904 | 969 | 1033 | 1163 | 1292 |
| **10 x 22** | W | 31366 | 34852 | 38337 | 41822 | 45307 | 48793 | 52278 | 55763 | 62733 | 69704 |
| | w | 2240 | 2489 | 2738 | 2987 | 3236 | 3485 | 3734 | 3983 | 4480 | 4978 |
| | $F_v$ | 115 | 127 | 140 | 153 | 166 | 179 | 191 | 204 | 230 | 255 |
| | E | 527 | 586 | 644 | 703 | 761 | 820 | 879 | 937 | 1054 | 1172 |
| **16 x 18** | W | 33906 | 37673 | 41440 | 45208 | 48975 | 52743 | 56510 | 60277 | 67812 | 75347 |
| | w | 2421 | 2690 | 2960 | 3229 | 3498 | 3767 | 4036 | 4305 | 4843 | 5381 |
| | $F_v$ | 93 | 104 | 114 | 125 | 135 | 145 | 156 | 166 | 187 | 208 |
| | E | 647 | 719 | 791 | 863 | 935 | 1008 | 1079 | 1151 | 1295 | 1439 |
| **14 x 20** | W | 36666 | 40741 | 44815 | 48889 | 52963 | 57037 | 61111 | 65185 | 73333 | 81482 |
| | w | 2619 | 2910 | 3201 | 3492 | 3783 | 4074 | 4365 | 4656 | 5238 | 5820 |
| | $F_v$ | 104 | 116 | 127 | 139 | 150 | 162 | 174 | 185 | 208 | 232 |
| | E | 581 | 646 | 710 | 775 | 839 | 904 | 969 | 1033 | 1163 | 1292 |
| **10 x 24** | W | 37474 | 41637 | 45801 | 49965 | 54129 | 58293 | 62456 | 66620 | 74948 | 83275 |
| | w | 2676 | 2974 | 3271 | 3568 | 3866 | 4163 | 4461 | 4758 | 5353 | 5948 |
| | $F_v$ | 125 | 139 | 153 | 167 | 181 | 195 | 209 | 223 | 251 | 279 |
| | E | 482 | 536 | 589 | 643 | 697 | 750 | 804 | 857 | 965 | 1072 |
| **12 x 22** | W | 37970 | 42189 | 46408 | 50627 | 54846 | 59065 | 63284 | 67503 | 75941 | 84378 |
| | w | 2712 | 3013 | 3314 | 3616 | 3917 | 4218 | 4520 | 4821 | 5424 | 6027 |
| | $F_v$ | 115 | 127 | 140 | 153 | 166 | 179 | 191 | 204 | 230 | 255 |
| | E | 527 | 586 | 644 | 703 | 761 | 820 | 879 | 937 | 1054 | 1172 |
| **18 x 18** | W | 38281 | 42534 | 46788 | 51041 | 55295 | 59548 | 63802 | 68055 | 76562 | 85069 |
| | w | 2734 | 3038 | 3342 | 3645 | 3949 | 4253 | 4557 | 4861 | 5468 | 6076 |
| | $F_v$ | 93 | 104 | 114 | 125 | 135 | 145 | 156 | 166 | 187 | 208 |
| | E | 648 | 719 | 791 | 863 | 935 | 1007 | 1079 | 1151 | 1295 | 1439 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **14'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **16 x 20** | W | 42099 | 46776 | 51454 | 56132 | 60809 | 65487 | 70165 | 74842 | 84198 | 93553 |
| | w | 3007 | 3341 | 3675 | 4009 | 4343 | 4677 | 5011 | 5345 | 6014 | 6682 |
| | $F_v$ | 104 | 116 | 127 | 139 | 150 | 162 | 174 | 185 | 208 | 232 |
| | E | 581 | 646 | 710 | 775 | 839 | 904 | 969 | 1033 | 1163 | 1292 |
| **14 x 22** | W | 44574 | 49526 | 54479 | 59432 | 64384 | 69337 | 74290 | 79242 | 89148 | 99053 |
| | w | 3183 | 3537 | 3891 | 4245 | 4598 | 4952 | 5306 | 5660 | 6367 | 7075 |
| | $F_v$ | 115 | 127 | 140 | 153 | 166 | 179 | 191 | 204 | 230 | 255 |
| | E | 527 | 586 | 644 | 703 | 761 | 820 | 879 | 937 | 1054 | 1172 |
| **12 x 24** | W | 45363 | 50403 | 55444 | 60484 | 65524 | 70565 | 75605 | 80646 | 90726 | 100807 |
| | w | 3240 | 3600 | 3960 | 4320 | 4680 | 5040 | 5400 | 5760 | 6480 | 7200 |
| | $F_v$ | 125 | 139 | 153 | 167 | 181 | 195 | 209 | 223 | 251 | 279 |
| | E | 482 | 536 | 589 | 643 | 697 | 750 | 804 | 857 | 965 | 1072 |
| **18 x 20** | W | 47531 | 52812 | 58093 | 63375 | 68656 | 73937 | 79218 | 84500 | 95062 | 105625 |
| | w | 3395 | 3772 | 4149 | 4526 | 4904 | 5281 | 5658 | 6035 | 6790 | 7544 |
| | $F_v$ | 104 | 116 | 127 | 139 | 150 | 162 | 174 | 185 | 208 | 232 |
| | E | 581 | 646 | 710 | 775 | 839 | 904 | 969 | 1033 | 1163 | 1292 |
| **16 x 22** | W | 51177 | 56864 | 62550 | 68236 | 73923 | 79609 | 85296 | 90982 | 102355 | 113728 |
| | w | 3655 | 4061 | 4467 | 4874 | 5280 | 5686 | 6092 | 6498 | 7311 | 8123 |
| | $F_v$ | 115 | 127 | 140 | 153 | 166 | 179 | 191 | 204 | 230 | 255 |
| | E | 527 | 586 | 644 | 703 | 761 | 820 | 879 | 937 | 1054 | 1172 |
| **20 x 20** | W | 52963 | 58848 | 64733 | 70617 | 76502 | 82387 | 88272 | 94157 | 105926 | 117696 |
| | w | 3783 | 4203 | 4623 | 5044 | 5464 | 5884 | 6305 | 6725 | 7566 | 8406 |
| | $F_v$ | 104 | 116 | 127 | 139 | 150 | 162 | 174 | 185 | 208 | 232 |
| | E | 581 | 646 | 710 | 775 | 839 | 904 | 969 | 1033 | 1163 | 1292 |
| **14 x 24** | W | 53252 | 59169 | 65086 | 71003 | 76920 | 82837 | 88754 | 94671 | 106505 | 118339 |
| | w | 3803 | 4226 | 4649 | 5071 | 5494 | 5916 | 6339 | 6762 | 7607 | 8452 |
| | $F_v$ | 125 | 139 | 153 | 167 | 181 | 195 | 209 | 223 | 251 | 279 |
| | E | 482 | 536 | 589 | 643 | 697 | 750 | 804 | 857 | 965 | 1072 |
| **18 x 22** | W | 57781 | 64201 | 70621 | 77041 | 83461 | 89881 | 96302 | 102722 | 115562 | 128402 |
| | w | 4127 | 4585 | 5044 | 5502 | 5961 | 6420 | 6878 | 7337 | 8254 | 9171 |
| | $F_v$ | 115 | 127 | 140 | 153 | 166 | 179 | 191 | 204 | 230 | 255 |
| | E | 527 | 586 | 644 | 703 | 761 | 820 | 879 | 937 | 1054 | 1172 |
| **16 x 24** | W | 61141 | 67935 | 74729 | 81522 | 88316 | 95109 | 101903 | 108696 | 122283 | 135871 |
| | w | 4367 | 4852 | 5337 | 5823 | 6308 | 6793 | 7278 | 7764 | 8734 | 9705 |
| | $F_v$ | 125 | 139 | 153 | 167 | 181 | 195 | 209 | 223 | 251 | 279 |
| | E | 482 | 536 | 589 | 643 | 697 | 750 | 804 | 857 | 965 | 1072 |
| **20 x 22** | W | 64384 | 71538 | 78692 | 85846 | 93000 | 100154 | 107308 | 114461 | 128769 | 143077 |
| | w | 4598 | 5109 | 5620 | 6131 | 6642 | 7153 | 7664 | 8175 | 9197 | 10219 |
| | $F_v$ | 115 | 127 | 140 | 153 | 166 | 179 | 191 | 204 | 230 | 255 |
| | E | 527 | 586 | 644 | 703 | 761 | 820 | 879 | 937 | 1054 | 1172 |
| **18 x 24** | W | 69031 | 76701 | 84371 | 92041 | 99711 | 107381 | 115052 | 122722 | 138062 | 153402 |
| | w | 4930 | 5478 | 6026 | 6574 | 7122 | 7670 | 8218 | 8765 | 9861 | 10957 |
| | $F_v$ | 125 | 139 | 153 | 167 | 181 | 195 | 209 | 223 | 251 | 279 |
| | E | 482 | 536 | 589 | 643 | 697 | 750 | 804 | 857 | 965 | 1072 |
| **22 x 22** | W | 70988 | 78875 | 86763 | 94651 | 102538 | 110426 | 118313 | 126201 | 141976 | 157751 |
| | w | 5070 | 5633 | 6197 | 6760 | 7324 | 7887 | 8450 | 9014 | 10141 | 11267 |
| | $F_v$ | 115 | 127 | 140 | 153 | 166 | 179 | 191 | 204 | 230 | 255 |
| | E | 527 | 586 | 644 | 703 | 761 | 820 | 879 | 937 | 1054 | 1172 |
| **20 x 24** | W | 76920 | 85467 | 94013 | 102560 | 111107 | 119654 | 128200 | 136747 | 153841 | 170934 |
| | w | 5494 | 6104 | 6715 | 7325 | 7936 | 8546 | 9157 | 9767 | 10988 | 12209 |
| | $F_v$ | 125 | 139 | 153 | 167 | 181 | 195 | 209 | 223 | 251 | 279 |
| | E | 482 | 536 | 589 | 643 | 697 | 750 | 804 | 857 | 965 | 1072 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F'_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l$/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **14' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **22 x 24** | W | 84809 | 94233 | 103656 | 113079 | 122503 | 131926 | 141349 | 150773 | 169619 | 188466 |
| | w | 6057 | 6730 | 7404 | 8077 | 8750 | 9423 | 10096 | 10769 | 12115 | 13461 |
| | $F_v$ | 125 | 139 | 153 | 167 | 181 | 195 | 209 | 223 | 215 | 279 |
| | E | 482 | 536 | 589 | 643 | 697 | 750 | 804 | 857 | 965 | 1072 |
| **24 x 24** | W | 92699 | 102999 | 113298 | 123598 | 133898 | 144198 | 154498 | 164798 | 185398 | 205998 |
| | w | 6621 | 7357 | 8092 | 8828 | 9564 | 10299 | 11035 | 11771 | 13242 | 14714 |
| | $F_v$ | 125 | 139 | 153 | 167 | 181 | 195 | 209 | 223 | 251 | 279 |
| | E | 482 | 536 | 589 | 643 | 697 | 750 | 804 | 857 | 965 | 1072 |
| **15' - 0" SPAN** | | | | | | | | | | | |
| **3 x 6** | W | 504 | 560 | 616 | 672 | 728 | 784 | 840 | 896 | 1008 | 1120 |
| | w | 33 | 37 | 41 | 44 | 48 | 52 | 56 | 59 | 67 | 74 |
| | $F_v$ | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 55 | 61 |
| | E | 2209 | 2454 | 2699 | 2945 | 3190 | 3436 | 3681 | 3927 | 4418 | 4909 |
| **2 x 8** | W | 525 | 584 | 642 | 700 | 759 | 817 | 876 | 934 | 1051 | 1168 |
| | w | 35 | 38 | 42 | 46 | 50 | 54 | 58 | 62 | 70 | 77 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | E | 1675 | 1862 | 2048 | 2234 | 2420 | 2606 | 2793 | 2979 | 3351 | 3724 |
| **4 x 6** | W | 705 | 784 | 862 | 941 | 1019 | 1097 | 1176 | 1254 | 1411 | 1568 |
| | w | 47 | 52 | 57 | 62 | 67 | 73 | 78 | 83 | 94 | 104 |
| | $F_v$ | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 55 | 61 |
| | E | 2209 | 2454 | 2699 | 2945 | 3190 | 3436 | 3681 | 3927 | 4418 | 4909 |
| **2 x 10** | W | 855 | 950 | 1045 | 1140 | 1235 | 1330 | 1426 | 1521 | 1711 | 1901 |
| | w | 57 | 63 | 69 | 76 | 82 | 88 | 95 | 101 | 114 | 126 |
| | $F_v$ | 46 | 51 | 56 | 61 | 66 | 71 | 77 | 82 | 92 | 102 |
| | E | 1313 | 1459 | 1605 | 1751 | 1897 | 2043 | 2189 | 2335 | 2627 | 2918 |
| **3 x 8** | W | 876 | 973 | 1070 | 1168 | 1265 | 1362 | 1460 | 1557 | 1752 | 1946 |
| | w | 58 | 64 | 71 | 77 | 84 | 90 | 97 | 103 | 116 | 129 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | E | 1675 | 1862 | 2048 | 2234 | 2420 | 2606 | 2793 | 2979 | 3351 | 3724 |
| **6 x 6** | W | 1109 | 1232 | 1355 | 1478 | 1602 | 1725 | 1848 | 1971 | 2218 | 2464 |
| | w | 73 | 82 | 90 | 98 | 106 | 115 | 123 | 131 | 147 | 164 |
| | $F_v$ | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 55 | 61 |
| | E | 2209 | 2454 | 2699 | 2945 | 3190 | 3436 | 3681 | 3927 | 4418 | 4909 |
| **4 x 8** | W | 1226 | 1362 | 1499 | 1635 | 1771 | 1907 | 2044 | 2180 | 2452 | 2725 |
| | w | 81 | 90 | 99 | 109 | 118 | 127 | 136 | 145 | 163 | 181 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | E | 1675 | 1862 | 2048 | 2234 | 2420 | 2606 | 2793 | 2979 | 3351 | 3724 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **15' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **2 x 12** | W | 1265 | 1406 | 1546 | 1687 | 1828 | 1968 | 2109 | 2250 | 2531 | 2812 |
| | w | 84 | 93 | 103 | 112 | 121 | 131 | 140 | 150 | 168 | 187 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **3 x 10** | W | 1426 | 1584 | 1742 | 1901 | 2059 | 2218 | 2376 | 2535 | 2852 | 3168 |
| | w | 95 | 105 | 116 | 126 | 137 | 147 | 158 | 169 | 190 | 211 |
| | $F_v$ | 46 | 51 | 56 | 61 | 66 | 71 | 77 | 82 | 92 | 102 |
| | E | 1313 | 1459 | 1605 | 1751 | 1897 | 2043 | 2189 | 2335 | 2627 | 2918 |
| **2 x 14** | W | 1755 | 1950 | 2145 | 2340 | 2535 | 2730 | 2926 | 3121 | 3511 | 3901 |
| | w | 117 | 130 | 143 | 156 | 169 | 182 | 195 | 208 | 234 | 260 |
| | $F_v$ | 66 | 73 | 80 | 88 | 95 | 103 | 110 | 117 | 132 | 147 |
| | E | 916 | 1018 | 1120 | 1222 | 1324 | 1426 | 1528 | 1630 | 1833 | 2037 |
| **6 x 8** | W | 2062 | 2291 | 2520 | 2750 | 2979 | 3208 | 3437 | 3666 | 4125 | 4583 |
| | w | 137 | 152 | 168 | 183 | 198 | 213 | 229 | 244 | 275 | 305 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **4 x 10** | W | 1996 | 2218 | 2440 | 2661 | 2883 | 3105 | 3327 | 3549 | 3992 | 4436 |
| | w | 133 | 147 | 162 | 177 | 192 | 207 | 221 | 236 | 266 | 295 |
| | $F_v$ | 46 | 51 | 56 | 61 | 66 | 71 | 77 | 82 | 92 | 102 |
| | E | 1313 | 1459 | 1605 | 1751 | 1897 | 2043 | 2189 | 2335 | 2627 | 2918 |
| **3 x 12** | W | 2109 | 2343 | 2578 | 2812 | 3046 | 3281 | 3515 | 3750 | 4218 | 4687 |
| | w | 140 | 156 | 171 | 187 | 203 | 218 | 234 | 250 | 281 | 312 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **8 x 8** | W | 2812 | 3125 | 3437 | 3750 | 4062 | 4375 | 4687 | 5000 | 5625 | 6250 |
| | w | 187 | 208 | 229 | 250 | 270 | 291 | 312 | 333 | 375 | 416 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **3 x 14** | W | 2926 | 3251 | 3576 | 3901 | 4226 | 4551 | 4876 | 5201 | 5852 | 6502 |
| | w | 195 | 216 | 238 | 260 | 281 | 303 | 325 | 346 | 390 | 433 |
| | $F_v$ | 66 | 73 | 80 | 88 | 95 | 103 | 110 | 117 | 132 | 147 |
| | E | 916 | 1018 | 1120 | 1222 | 1324 | 1426 | 1528 | 1630 | 1833 | 2037 |
| **4 x 12** | W | 2953 | 3281 | 3609 | 3937 | 4265 | 4593 | 4921 | 5250 | 5906 | 6562 |
| | w | 196 | 218 | 240 | 262 | 284 | 306 | 328 | 350 | 393 | 437 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **6 x 10** | W | 3309 | 3676 | 4044 | 4412 | 4779 | 5147 | 5515 | 5882 | 6618 | 7353 |
| | w | 220 | 245 | 269 | 294 | 318 | 343 | 367 | 392 | 441 | 490 |
| | $F_v$ | 47 | 52 | 58 | 63 | 68 | 73 | 79 | 84 | 95 | 105 |
| | E | 1278 | 1421 | 1563 | 1705 | 1847 | 1989 | 2131 | 2273 | 2557 | 2842 |
| **3 x 16** | W | 3876 | 4306 | 4737 | 5168 | 5598 | 6029 | 6460 | 6890 | 7752 | 8613 |
| | w | 258 | 287 | 315 | 344 | 373 | 401 | 430 | 459 | 516 | 574 |
| | $F_v$ | 76 | 84 | 93 | 101 | 110 | 118 | 127 | 135 | 152 | 169 |
| | E | 796 | 885 | 973 | 1062 | 1150 | 1239 | 1327 | 1416 | 1593 | 1770 |
| **4 x 14** | W | 4252 | 4725 | 5197 | 5670 | 6142 | 6615 | 7087 | 7560 | 8505 | 9450 |
| | w | 283 | 315 | 346 | 378 | 409 | 441 | 472 | 504 | 567 | 630 |
| | $F_v$ | 67 | 75 | 82 | 90 | 97 | 105 | 112 | 120 | 135 | 150 |
| | E | 900 | 1000 | 1099 | 1199 | 1299 | 1399 | 1499 | 1599 | 1799 | 1999 |
| **8 x 10** | W | 4512 | 5013 | 5515 | 6016 | 6518 | 7019 | 7520 | 8022 | 9025 | 10027 |
| | w | 300 | 334 | 367 | 401 | 434 | 467 | 501 | 534 | 601 | 668 |
| | $F_v$ | 47 | 52 | 58 | 63 | 68 | 73 | 79 | 84 | 95 | 105 |
| | E | 1278 | 1421 | 1563 | 1705 | 1847 | 1989 | 2131 | 2273 | 2557 | 2842 |

## WOOD BEAMS—SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l$/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **15'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **6 x 12** | W | 4849 | 5387 | 5926 | 6465 | 7004 | 7543 | 8081 | 8620 | 9698 | 10775 |
| | w | 323 | 359 | 395 | 431 | 466 | 502 | 538 | 574 | 646 | 718 |
| | $F_v$ | 57 | 63 | 70 | 76 | 83 | 89 | 95 | 102 | 115 | 127 |
| | E | 1056 | 1173 | 1291 | 1408 | 1526 | 1643 | 1760 | 1878 | 2113 | 2347 |
| **10 x 10** | W | 5715 | 6350 | 6986 | 7621 | 8256 | 8891 | 9526 | 10161 | 11431 | 12701 |
| | w | 381 | 423 | 465 | 508 | 550 | 592 | 635 | 677 | 762 | 846 |
| | $F_v$ | 47 | 52 | 58 | 63 | 68 | 73 | 79 | 84 | 95 | 105 |
| | E | 1278 | 1421 | 1563 | 1705 | 1847 | 1989 | 2131 | 2273 | 2557 | 2842 |
| **4 x 16** | W | 5605 | 6228 | 6851 | 7474 | 8097 | 8720 | 9343 | 9965 | 11211 | 12457 |
| | w | 373 | 415 | 456 | 498 | 539 | 581 | 622 | 664 | 747 | 830 |
| | $F_v$ | 77 | 86 | 94 | 103 | 111 | 120 | 129 | 137 | 155 | 172 |
| | E | 783 | 870 | 958 | 1045 | 1132 | 1219 | 1306 | 1393 | 1567 | 1741 |
| **8 x 12** | W | 6612 | 7347 | 8081 | 8816 | 9551 | 10286 | 11020 | 11755 | 13225 | 14694 |
| | w | 440 | 489 | 538 | 587 | 636 | 685 | 734 | 784 | 881 | 979 |
| | $F_v$ | 57 | 63 | 70 | 76 | 83 | 89 | 95 | 102 | 115 | 127 |
| | E | 1056 | 1173 | 1291 | 1408 | 1526 | 1643 | 1760 | 1878 | 2113 | 2347 |
| **6 x 14** | W | 6682 | 7425 | 8167 | 8910 | 9652 | 10395 | 11137 | 11880 | 13365 | 14850 |
| | w | 445 | 495 | 544 | 594 | 643 | 693 | 742 | 792 | 891 | 990 |
| | $F_v$ | 67 | 75 | 82 | 90 | 97 | 105 | 112 | 120 | 135 | 150 |
| | E | 900 | 1000 | 1099 | 1199 | 1299 | 1399 | 1499 | 1599 | 1799 | 1999 |
| **10 x 12** | W | 8375 | 9306 | 10237 | 11167 | 12098 | 13029 | 13959 | 14890 | 16751 | 18612 |
| | w | 558 | 620 | 682 | 744 | 806 | 868 | 930 | 992 | 1116 | 1240 |
| | $F_v$ | 57 | 63 | 70 | 76 | 83 | 89 | 95 | 102 | 115 | 127 |
| | E | 1056 | 1173 | 1291 | 1408 | 1526 | 1643 | 1760 | 1878 | 2113 | 2347 |
| **6 x 16** | W | 8809 | 9787 | 10766 | 11745 | 12724 | 13703 | 14681 | 15660 | 17618 | 19575 |
| | w | 587 | 652 | 717 | 783 | 848 | 913 | 978 | 1044 | 1174 | 1305 |
| | $F_v$ | 77 | 86 | 94 | 103 | 111 | 120 | 129 | 137 | 155 | 172 |
| | E | 783 | 870 | 958 | 1045 | 1132 | 1219 | 1306 | 1393 | 1567 | 1741 |
| **8 x 14** | W | 9112 | 10125 | 11137 | 12150 | 13162 | 14175 | 15187 | 16200 | 18225 | 20250 |
| | w | 607 | 675 | 742 | 810 | 877 | 945 | 1012 | 1080 | 1215 | 1350 |
| | $F_v$ | 67 | 75 | 82 | 90 | 97 | 105 | 112 | 120 | 135 | 150 |
| | E | 900 | 1000 | 1099 | 1199 | 1299 | 1399 | 1499 | 1599 | 1799 | 1999 |
| **12 x 12** | W | 10139 | 11265 | 12392 | 13518 | 14645 | 15772 | 16898 | 18025 | 20278 | 22531 |
| | w | 675 | 751 | 826 | 901 | 976 | 1051 | 1126 | 1201 | 1351 | 1502 |
| | $F_v$ | 57 | 63 | 70 | 76 | 83 | 89 | 95 | 102 | 115 | 127 |
| | E | 1056 | 1173 | 1291 | 1408 | 1526 | 1643 | 1760 | 1878 | 2113 | 2347 |
| **6 x 18** | W | 11229 | 12476 | 13724 | 14972 | 16219 | 17467 | 18715 | 19962 | 22458 | 24953 |
| | w | 748 | 831 | 914 | 998 | 1081 | 1164 | 1247 | 1330 | 1497 | 1663 |
| | $F_v$ | 87 | 97 | 106 | 116 | 126 | 136 | 145 | 155 | 175 | 194 |
| | E | 694 | 771 | 848 | 925 | 1002 | 1079 | 1157 | 1234 | 1388 | 1542 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **15' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **10 x 14** | W | 11542 | 12825 | 14107 | 15390 | 16672 | 17955 | 19237 | 20520 | 23085 | 25650 |
| | w | 769 | 855 | 940 | 1026 | 1111 | 1197 | 1282 | 1368 | 1539 | 1710 |
| | $F_v$ | 67 | 75 | 82 | 90 | 97 | 105 | 112 | 120 | 135 | 150 |
| | E | 900 | 1000 | 1099 | 1199 | 1299 | 1399 | 1499 | 1599 | 1799 | 1999 |
| **8 x 16** | W | 12012 | 13347 | 14681 | 16016 | 17351 | 18686 | 20020 | 21355 | 24025 | 26694 |
| | w | 800 | 889 | 978 | 1067 | 1156 | 1245 | 1334 | 1423 | 1601 | 1779 |
| | $F_v$ | 77 | 86 | 94 | 103 | 111 | 120 | 129 | 137 | 155 | 172 |
| | E | 783 | 870 | 958 | 1045 | 1132 | 1219 | 1306 | 1393 | 1567 | 1741 |
| **6 x 20** | W | 13942 | 15491 | 17040 | 18590 | 20139 | 21688 | 23237 | 24786 | 27885 | 30983 |
| | w | 929 | 1032 | 1136 | 1239 | 1342 | 1445 | 1549 | 1652 | 1859 | 2065 |
| | $F_v$ | 97 | 108 | 119 | 130 | 140 | 151 | 162 | 173 | 195 | 216 |
| | E | 623 | 692 | 761 | 830 | 900 | 969 | 1038 | 1107 | 1246 | 1384 |
| **12 x 14** | W | 13972 | 15525 | 17077 | 18630 | 20182 | 21735 | 23287 | 24840 | 27945 | 31050 |
| | w | 931 | 1035 | 1138 | 1242 | 1345 | 1449 | 1552 | 1656 | 1863 | 2070 |
| | $F_v$ | 67 | 75 | 82 | 90 | 97 | 105 | 112 | 120 | 135 | 150 |
| | E | 900 | 1000 | 1099 | 1199 | 1299 | 1399 | 1499 | 1599 | 1799 | 1999 |
| **10 x 16** | W | 15215 | 16906 | 18597 | 20287 | 21978 | 23669 | 25359 | 27050 | 30431 | 33812 |
| | w | 1014 | 1127 | 1239 | 1352 | 1465 | 1577 | 1690 | 1803 | 2028 | 2254 |
| | $F_v$ | 77 | 86 | 94 | 103 | 111 | 120 | 129 | 137 | 155 | 172 |
| | E | 783 | 870 | 958 | 1045 | 1132 | 1219 | 1306 | 1393 | 1567 | 1741 |
| **8 x 18** | W | 15312 | 17013 | 18715 | 20416 | 22118 | 23819 | 25520 | 27222 | 30625 | 34027 |
| | w | 1020 | 1134 | 1247 | 1361 | 1474 | 1587 | 1701 | 1814 | 2041 | 2268 |
| | $F_v$ | 87 | 97 | 106 | 116 | 126 | 136 | 145 | 155 | 175 | 194 |
| | E | 694 | 771 | 848 | 925 | 1002 | 1079 | 1157 | 1234 | 1388 | 1542 |
| **14 x 14** | W | 16402 | 18225 | 20047 | 21870 | 23692 | 25515 | 27337 | 29160 | 32805 | 36450 |
| | w | 1093 | 1215 | 1336 | 1458 | 1579 | 1701 | 1822 | 1944 | 2187 | 2430 |
| | $F_v$ | 67 | 75 | 82 | 90 | 97 | 105 | 112 | 120 | 135 | 150 |
| | E | 900 | 1000 | 1099 | 1199 | 1299 | 1399 | 1499 | 1599 | 1799 | 1999 |
| **6 x 22** | W | 16949 | 18832 | 20715 | 22598 | 24482 | 26365 | 28248 | 30131 | 33898 | 37664 |
| | w | 1129 | 1255 | 1381 | 1506 | 1632 | 1757 | 1883 | 2008 | 2259 | 2510 |
| | $F_v$ | 107 | 119 | 131 | 143 | 155 | 167 | 179 | 191 | 215 | 238 |
| | E | 565 | 627 | 690 | 753 | 816 | 879 | 941 | 1004 | 1130 | 1255 |
| **12 x 16** | W | 18419 | 20465 | 22512 | 24558 | 26605 | 28652 | 30698 | 32745 | 36838 | 40931 |
| | w | 1227 | 1364 | 1500 | 1637 | 1773 | 1910 | 2046 | 2183 | 2455 | 2728 |
| | $F_v$ | 77 | 86 | 94 | 103 | 111 | 120 | 129 | 137 | 155 | 172 |
| | E | 783 | 870 | 958 | 1045 | 1132 | 1219 | 1306 | 1393 | 1567 | 1741 |
| **8 x 20** | W | 19012 | 21125 | 23237 | 25350 | 27462 | 29575 | 31687 | 33800 | 38025 | 42250 |
| | w | 1267 | 1408 | 1549 | 1690 | 1830 | 1971 | 2112 | 2253 | 2535 | 2816 |
| | $F_v$ | 97 | 108 | 119 | 130 | 140 | 151 | 162 | 173 | 195 | 216 |
| | E | 623 | 692 | 761 | 830 | 899 | 969 | 1038 | 1107 | 1246 | 1384 |
| **10 x 18** | W | 19395 | 21550 | 23706 | 25861 | 28016 | 30171 | 32326 | 34481 | 38791 | 43101 |
| | w | 1293 | 1436 | 1580 | 1724 | 1867 | 2011 | 2155 | 2298 | 2586 | 2873 |
| | $F_v$ | 87 | 97 | 106 | 116 | 126 | 136 | 145 | 155 | 175 | 194 |
| | E | 694 | 771 | 848 | 925 | 1002 | 1079 | 1157 | 1234 | 1388 | 1542 |
| **6 x 24** | W | 20249 | 22499 | 24748 | 26998 | 29248 | 31498 | 33748 | 35998 | 40498 | 44998 |
| | w | 1349 | 1499 | 1649 | 1799 | 1949 | 2099 | 2249 | 2399 | 2699 | 2999 |
| | $F_v$ | 117 | 130 | 143 | 156 | 169 | 182 | 195 | 208 | 235 | 261 |
| | E | 517 | 574 | 631 | 689 | 746 | 804 | 861 | 919 | 1034 | 1148 |
| **14 x 16** | W | 21622 | 24025 | 26427 | 28830 | 31232 | 33635 | 36037 | 38440 | 43245 | 48050 |
| | w | 1441 | 1601 | 1761 | 1922 | 2082 | 2242 | 2402 | 2562 | 2883 | 3203 |
| | $F_v$ | 77 | 86 | 94 | 103 | 111 | 120 | 129 | 137 | 155 | 172 |
| | E | 783 | 870 | 958 | 1045 | 1132 | 1219 | 1306 | 1393 | 1567 | 1741 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **15'-0" SPAN CONT'D** | | | | | | | | | | | |
| **8 x 22** | W | 23112 | 25680 | 28248 | 30816 | 33384 | 35952 | 38520 | 41088 | 46225 | 51361 |
| | w | 1540 | 1712 | 1883 | 2054 | 2225 | 2396 | 2568 | 2739 | 3081 | 3424 |
| | $F_v$ | 107 | 119 | 131 | 143 | 155 | 167 | 179 | 191 | 215 | 238 |
| | E | 565 | 627 | 690 | 753 | 816 | 879 | 941 | 1004 | 1130 | 1255 |
| **12 x 18** | W | 23479 | 26087 | 28696 | 31305 | 33914 | 36523 | 39131 | 41740 | 46958 | 52175 |
| | w | 1565 | 1739 | 1913 | 2087 | 2260 | 2434 | 2608 | 2782 | 3130 | 3478 |
| | $F_v$ | 87 | 97 | 106 | 116 | 126 | 136 | 145 | 155 | 175 | 194 |
| | E | 694 | 771 | 848 | 925 | 1002 | 1079 | 1157 | 1234 | 1388 | 1542 |
| **10 x 20** | W | 24082 | 26758 | 29434 | 32110 | 34785 | 37461 | 40137 | 42813 | 48164 | 53516 |
| | w | 1605 | 1783 | 1962 | 2140 | 2319 | 2497 | 2675 | 2854 | 3210 | 3567 |
| | $F_v$ | 97 | 108 | 119 | 130 | 140 | 151 | 162 | 173 | 195 | 216 |
| | E | 623 | 692 | 761 | 830 | 899 | 969 | 1038 | 1107 | 1246 | 1384 |
| **16 x 16** | W | 24825 | 27584 | 30342 | 33101 | 35859 | 38617 | 41376 | 44134 | 49651 | 55168 |
| | w | 1655 | 1838 | 2022 | 2206 | 2390 | 2574 | 2758 | 2942 | 3310 | 3677 |
| | $F_v$ | 77 | 86 | 94 | 103 | 111 | 120 | 129 | 137 | 155 | 172 |
| | E | 783 | 870 | 958 | 1045 | 1132 | 1219 | 1306 | 1393 | 1567 | 1741 |
| **14 x 18** | W | 27562 | 30625 | 33687 | 36750 | 39812 | 42875 | 45937 | 49000 | 55124 | 61250 |
| | w | 1837 | 2041 | 2245 | 2450 | 2654 | 2858 | 3062 | 3266 | 3674 | 4083 |
| | $F_v$ | 87 | 97 | 106 | 116 | 126 | 136 | 145 | 155 | 175 | 194 |
| | E | 694 | 771 | 848 | 925 | 1002 | 1079 | 1157 | 1234 | 1388 | 1542 |
| **8 x 24** | W | 27612 | 30680 | 33748 | 36816 | 39884 | 42952 | 46020 | 49088 | 55224 | 61361 |
| | w | 1840 | 2045 | 2249 | 2454 | 2658 | 2863 | 3068 | 3272 | 3681 | 4090 |
| | $F_v$ | 117 | 130 | 143 | 156 | 169 | 182 | 195 | 208 | 235 | 261 |
| | E | 517 | 574 | 631 | 689 | 746 | 804 | 861 | 919 | 1034 | 1148 |
| **12 x 20** | W | 29152 | 32391 | 35630 | 38870 | 42109 | 45348 | 48587 | 51826 | 58304 | 64783 |
| | w | 1943 | 2159 | 2375 | 2591 | 2807 | 3023 | 3239 | 3455 | 3886 | 4318 |
| | $F_v$ | 97 | 108 | 119 | 130 | 140 | 151 | 162 | 173 | 195 | 216 |
| | E | 623 | 692 | 761 | 830 | 899 | 969 | 1038 | 1107 | 1246 | 1384 |
| **10 x 22** | W | 29275 | 32528 | 35781 | 39034 | 42287 | 45540 | 48793 | 52045 | 58551 | 65057 |
| | w | 1951 | 2168 | 2385 | 2602 | 2819 | 3036 | 3252 | 3469 | 3903 | 4337 |
| | $F_v$ | 107 | 119 | 131 | 143 | 155 | 167 | 179 | 191 | 215 | 238 |
| | E | 565 | 627 | 690 | 753 | 816 | 879 | 941 | 1004 | 1130 | 1255 |
| **16 x 18** | W | 31645 | 35162 | 38678 | 42194 | 45710 | 49226 | 52743 | 56259 | 63291 | 70324 |
| | w | 2109 | 2344 | 2578 | 2812 | 3047 | 3281 | 3516 | 3750 | 4219 | 4688 |
| | $F_v$ | 87 | 97 | 106 | 116 | 126 | 136 | 145 | 155 | 175 | 194 |
| | E | 694 | 771 | 848 | 925 | 1002 | 1079 | 1157 | 1234 | 1388 | 1542 |
| **14 x 20** | W | 34222 | 38025 | 41827 | 45630 | 49432 | 53234 | 57037 | 60840 | 68444 | 76050 |
| | w | 2281 | 2535 | 2788 | 3042 | 3295 | 3548 | 3802 | 4056 | 4562 | 5070 |
| | $F_v$ | 97 | 108 | 119 | 130 | 140 | 151 | 162 | 173 | 195 | 216 |
| | E | 623 | 692 | 761 | 830 | 900 | 969 | 1038 | 1107 | 1246 | 1384 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **15' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **10 x 24** | W | 34975 | 38862 | 42748 | 46634 | 50520 | 54406 | 58293 | 62179 | 69951 | 77724 |
| | w | 2331 | 2590 | 2849 | 3108 | 3368 | 3627 | 3886 | 4145 | 4663 | 5181 |
| | $F_v$ | 117 | 130 | 143 | 156 | 169 | 182 | 195 | 208 | 235 | 261 |
| | E | 517 | 574 | 631 | 689 | 746 | 804 | 861 | 919 | 1034 | 1148 |
| **12 x 22** | W | 35439 | 39376 | 43314 | 47252 | 51189 | 55127 | 59065 | 63002 | 70878 | 78753 |
| | w | 2362 | 2625 | 2887 | 3150 | 3412 | 3675 | 3937 | 4200 | 4725 | 5250 |
| | $F_v$ | 107 | 119 | 131 | 143 | 155 | 167 | 179 | 191 | 215 | 238 |
| | E | 565 | 627 | 690 | 753 | 816 | 879 | 941 | 1004 | 1130 | 1255 |
| **18 x 18** | W | 35729 | 39699 | 43668 | 47638 | 51608 | 55578 | 59548 | 63518 | 74158 | 79398 |
| | w | 2381 | 2646 | 2911 | 3175 | 3440 | 3705 | 3969 | 4234 | 4763 | 5293 |
| | $F_v$ | 87 | 97 | 106 | 116 | 126 | 136 | 145 | 155 | 175 | 194 |
| | E | 694 | 771 | 848 | 925 | 1002 | 1079 | 1157 | 1234 | 1388 | 1542 |
| **16 x 20** | W | 39292 | 43658 | 48024 | 52390 | 56755 | 61121 | 65487 | 69853 | 78584 | 87316 |
| | w | 2619 | 2910 | 3201 | 3492 | 3783 | 4074 | 4365 | 4656 | 5238 | 5821 |
| | $F_v$ | 97 | 108 | 119 | 130 | 140 | 151 | 162 | 173 | 195 | 216 |
| | E | 623 | 692 | 761 | 830 | 899 | 969 | 1038 | 1107 | 1246 | 1384 |
| **14 x 22** | W | 41602 | 46225 | 50847 | 55470 | 60092 | 64714 | 69337 | 73960 | 83204 | 92450 |
| | w | 2773 | 3081 | 3389 | 3698 | 4006 | 4314 | 4622 | 4930 | 5546 | 6163 |
| | $F_v$ | 107 | 119 | 131 | 143 | 155 | 167 | 179 | 191 | 215 | 238 |
| | E | 565 | 627 | 690 | 753 | 816 | 879 | 941 | 1004 | 1130 | 1255 |
| **12 x 24** | W | 42339 | 47043 | 51747 | 56452 | 61156 | 65860 | 70565 | 75269 | 84678 | 94087 |
| | w | 2822 | 3136 | 3449 | 3763 | 4077 | 4390 | 4704 | 5017 | 5645 | 6272 |
| | $F_v$ | 117 | 130 | 143 | 156 | 169 | 182 | 195 | 208 | 235 | 261 |
| | E | 517 | 574 | 631 | 689 | 746 | 804 | 861 | 919 | 1034 | 1148 |
| **18 x 20** | W | 44362 | 49291 | 54220 | 59150 | 64079 | 69008 | 73937 | 78866 | 88724 | 98583 |
| | w | 2957 | 3286 | 3614 | 3943 | 4271 | 4600 | 4929 | 5257 | 5914 | 6572 |
| | $F_v$ | 97 | 108 | 119 | 130 | 140 | 151 | 162 | 173 | 195 | 216 |
| | E | 623 | 692 | 761 | 830 | 899 | 969 | 1038 | 1107 | 1246 | 1384 |
| **16 x 22** | W | 47765 | 53073 | 58380 | 63687 | 68995 | 74302 | 79609 | 84917 | 95531 | 106146 |
| | w | 3184 | 3538 | 3892 | 4245 | 4599 | 4953 | 5307 | 5661 | 6368 | 7076 |
| | $F_v$ | 107 | 119 | 131 | 143 | 155 | 167 | 179 | 191 | 215 | 238 |
| | E | 565 | 627 | 690 | 753 | 816 | 879 | 941 | 1004 | 1130 | 1255 |
| **20 x 20** | W | 49432 | 54924 | 60417 | 65910 | 71402 | 76894 | 82387 | 87880 | 98864 | 109850 |
| | w | 3295 | 3661 | 4027 | 4394 | 4760 | 5126 | 5492 | 5858 | 6590 | 7323 |
| | $F_v$ | 97 | 108 | 119 | 130 | 140 | 151 | 162 | 173 | 195 | 216 |
| | E | 623 | 692 | 761 | 830 | 899 | 969 | 1038 | 1107 | 1246 | 1384 |
| **14 x 24** | W | 49702 | 55224 | 60747 | 66270 | 71792 | 77314 | 82837 | 88360 | 99404 | 110450 |
| | w | 3313 | 3681 | 4049 | 4418 | 4786 | 5154 | 5522 | 5890 | 6626 | 7363 |
| | $F_v$ | 117 | 130 | 143 | 156 | 169 | 182 | 195 | 208 | 235 | 261 |
| | E | 517 | 574 | 631 | 689 | 746 | 804 | 861 | 919 | 1034 | 1148 |
| **18 x 22** | W | 53929 | 59921 | 65913 | 71905 | 77897 | 83889 | 89881 | 95874 | 107858 | 119842 |
| | w | 3595 | 3994 | 4394 | 4793 | 5193 | 5592 | 5992 | 6391 | 7190 | 7989 |
| | $F_v$ | 107 | 119 | 131 | 143 | 155 | 167 | 179 | 191 | 215 | 238 |
| | E | 565 | 627 | 690 | 753 | 816 | 879 | 941 | 1004 | 1130 | 1255 |
| **16 x 24** | W | 57065 | 63406 | 69747 | 76087 | 82428 | 88769 | 95109 | 101450 | 114131 | 126812 |
| | w | 3804 | 4227 | 4649 | 5072 | 5495 | 5917 | 6340 | 6763 | 7608 | 8454 |
| | $F_v$ | 117 | 130 | 143 | 156 | 169 | 182 | 195 | 208 | 235 | 261 |
| | E | 517 | 574 | 631 | 689 | 746 | 804 | 861 | 919 | 1034 | 1148 |
| **20 x 22** | W | 60092 | 66769 | 73446 | 80123 | 86800 | 93477 | 100154 | 106831 | 120184 | 133538 |
| | w | 4006 | 4451 | 4896 | 5341 | 5786 | 6231 | 6676 | 7122 | 8012 | 8902 |
| | $F_v$ | 107 | 119 | 131 | 143 | 155 | 167 | 179 | 191 | 215 | 238 |
| | E | 565 | 627 | 690 | 753 | 816 | 879 | 941 | 1004 | 1130 | 1255 |

# WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **15' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **18 x 24** | W | 64429 | 71587 | 78746 | 85905 | 93064 | 100223 | 107381 | 114540 | 128858 | 143175 |
| | w | 4295 | 4772 | 5249 | 5727 | 6204 | 6681 | 7158 | 7636 | 8590 | 9545 |
| | $F_v$ | 117 | 130 | 143 | 156 | 169 | 182 | 195 | 208 | 235 | 261 |
| | E | 517 | 574 | 631 | 689 | 746 | 804 | 861 | 919 | 1034 | 1148 |
| **22 x 22** | W | 66255 | 73617 | 80979 | 88341 | 95702 | 103064 | 110426 | 117788 | 132511 | 147235 |
| | w | 4417 | 4907 | 5398 | 5889 | 6380 | 6870 | 7361 | 7852 | 8834 | 9815 |
| | $F_v$ | 107 | 119 | 131 | 143 | 155 | 167 | 179 | 191 | 215 | 238 |
| | E | 565 | 627 | 690 | 753 | 816 | 879 | 941 | 1004 | 1130 | 1255 |
| **20 x 24** | W | 71792 | 79769 | 87746 | 95723 | 103700 | 111677 | 119654 | 127631 | 143584 | 159538 |
| | w | 4786 | 5317 | 5849 | 6381 | 6913 | 7445 | 7676 | 8508 | 9572 | 10635 |
| | $F_v$ | 117 | 130 | 143 | 156 | 169 | 182 | 195 | 208 | 235 | 261 |
| | E | 517 | 574 | 631 | 689 | 746 | 804 | 861 | 919 | 1034 | 1148 |
| **22 x 24** | W | 79155 | 87950 | 96746 | 105541 | 114336 | 123131 | 131926 | 140721 | 158311 | 175901 |
| | w | 5277 | 5863 | 6449 | 7036 | 7622 | 8208 | 8795 | 9381 | 10554 | 11726 |
| | $F_v$ | 117 | 130 | 143 | 156 | 169 | 182 | 195 | 208 | 235 | 261 |
| | E | 517 | 574 | 631 | 689 | 746 | 804 | 861 | 919 | 1034 | 1148 |
| **24 x 24** | W | 86519 | 96132 | 105745 | 115358 | 124972 | 134585 | 144198 | 153811 | 173038 | 192264 |
| | w | 5767 | 6408 | 7049 | 7690 | 8331 | 8972 | 9613 | 10254 | 11535 | 12817 |
| | $F_v$ | 117 | 130 | 143 | 156 | 169 | 182 | 195 | 208 | 235 | 261 |
| | E | 517 | 574 | 631 | 689 | 746 | 804 | 861 | 919 | 1034 | 1148 |
| **16' - 0" SPAN** | | | | | | | | | | | |
| **3 x 6** | W | 472 | 525 | 577 | 630 | 682 | 735 | 787 | 840 | 945 | 1050 |
| | w | 29 | 32 | 36 | 39 | 42 | 45 | 49 | 52 | 59 | 65 |
| | $F_v$ | 25 | 28 | 31 | 34 | 37 | 40 | 42 | 45 | 51 | 57 |
| | E | 2356 | 2618 | 2879 | 3141 | 3403 | 3665 | 3927 | 4189 | 4712 | 5236 |
| **2 x 8** | W | 492 | 547 | 602 | 657 | 711 | 766 | 821 | 876 | 985 | 1095 |
| | w | 30 | 34 | 37 | 41 | 44 | 47 | 51 | 54 | 61 | 68 |
| | $F_v$ | 33 | 37 | 41 | 45 | 49 | 52 | 56 | 60 | 67 | 75 |
| | E | 1787 | 1986 | 2184 | 2383 | 2582 | 2780 | 2979 | 3177 | 3575 | 3972 |
| **4 x 6** | W | 661 | 735 | 808 | 882 | 955 | 1029 | 1102 | 1176 | 1323 | 1470 |
| | w | 41 | 45 | 50 | 55 | 59 | 64 | 68 | 73 | 82 | 91 |
| | $F_v$ | 25 | 28 | 31 | 34 | 37 | 40 | 42 | 45 | 51 | 57 |
| | E | 2356 | 2618 | 2879 | 3141 | 3403 | 3665 | 3927 | 4189 | 4712 | 5236 |
| **2 x 10** | W | 802 | 891 | 980 | 1069 | 1158 | 1247 | 1336 | 1426 | 1604 | 1782 |
| | w | 50 | 55 | 61 | 66 | 72 | 77 | 83 | 89 | 100 | 111 |
| | $F_v$ | 43 | 48 | 52 | 57 | 62 | 67 | 72 | 77 | 86 | 96 |
| | E | 1401 | 1556 | 1712 | 1868 | 2023 | 2179 | 2335 | 2490 | 2802 | 3113 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **16'-0" SPAN CONT'D** | | | | | | | | | | | |
| **3 x 8** | W | 821 | 912 | 1003 | 1095 | 1186 | 1277 | 1368 | 1460 | 1642 | 1825 |
| | w | 51 | 57 | 62 | 68 | 74 | 79 | 85 | 91 | 102 | 114 |
| | $F_v$ | 33 | 37 | 41 | 45 | 49 | 52 | 56 | 60 | 67 | 75 |
| | E | 1787 | 1986 | 2184 | 2383 | 2582 | 2780 | 2979 | 3177 | 3575 | 3972 |
| **6 x 6** | W | 1039 | 1155 | 1270 | 1386 | 1501 | 1617 | 1733 | 1848 | 2079 | 2310 |
| | w | 64 | 72 | 79 | 86 | 93 | 101 | 108 | 115 | 129 | 144 |
| | $F_v$ | 25 | 28 | 31 | 34 | 37 | 40 | 42 | 45 | 51 | 57 |
| | E | 2356 | 2618 | 2879 | 3141 | 3403 | 3665 | 3927 | 4189 | 4712 | 5236 |
| **4 x 8** | W | 1149 | 1277 | 1405 | 1533 | 1660 | 1788 | 1916 | 2044 | 2299 | 2555 |
| | w | 71 | 79 | 87 | 95 | 103 | 111 | 119 | 127 | 143 | 159 |
| | $F_v$ | 33 | 37 | 41 | 45 | 49 | 52 | 56 | 60 | 67 | 75 |
| | E | 1787 | 1986 | 2184 | 2383 | 2582 | 2780 | 2979 | 3177 | 3575 | 3972 |
| **2 x 12** | W | 1186 | 1318 | 1450 | 1582 | 1713 | 1845 | 1977 | 2109 | 2373 | 2636 |
| | w | 74 | 82 | 90 | 98 | 107 | 115 | 123 | 131 | 148 | 164 |
| | $F_v$ | 52 | 58 | 64 | 70 | 76 | 82 | 87 | 93 | 105 | 117 |
| | E | 1151 | 1279 | 1407 | 1535 | 1663 | 1791 | 1919 | 2047 | 2303 | 2559 |
| **3 x 10** | W | 1336 | 1485 | 1634 | 1782 | 1931 | 2079 | 2228 | 2376 | 2673 | 2970 |
| | w | 83 | 92 | 102 | 111 | 120 | 129 | 139 | 148 | 167 | 185 |
| | $F_v$ | 43 | 48 | 52 | 57 | 62 | 67 | 72 | 77 | 86 | 96 |
| | E | 1401 | 1556 | 1712 | 1868 | 2023 | 2179 | 2335 | 2490 | 2802 | 3113 |
| **2 x 14** | W | 1645 | 1828 | 2011 | 2194 | 2377 | 2560 | 2743 | 2926 | 3291 | 3657 |
| | w | 102 | 114 | 125 | 137 | 148 | 160 | 171 | 182 | 205 | 228 |
| | $F_v$ | 62 | 69 | 75 | 82 | 89 | 96 | 103 | 110 | 124 | 138 |
| | E | 978 | 1086 | 1195 | 1304 | 1412 | 1521 | 1630 | 1738 | 1956 | 2173 |
| **6 x 8** | W | 1933 | 2148 | 2363 | 2578 | 2792 | 3007 | 3222 | 3437 | 3867 | 4296 |
| | w | 120 | 134 | 147 | 161 | 174 | 187 | 201 | 214 | 241 | 268 |
| | $F_v$ | 35 | 39 | 42 | 46 | 50 | 54 | 58 | 62 | 70 | 78 |
| | E | 1727 | 1919 | 2111 | 2303 | 2495 | 2687 | 2879 | 3071 | 3455 | 3839 |
| **4 x 10** | W | 1871 | 2079 | 2287 | 2495 | 2703 | 2911 | 3119 | 3327 | 3743 | 4159 |
| | w | 116 | 129 | 142 | 155 | 168 | 181 | 194 | 207 | 233 | 259 |
| | $F_v$ | 43 | 48 | 52 | 57 | 62 | 67 | 72 | 77 | 86 | 96 |
| | E | 1401 | 1556 | 1712 | 1868 | 2023 | 2179 | 2335 | 2490 | 2802 | 3113 |
| **3 x 12** | W | 1977 | 2197 | 2416 | 2636 | 2856 | 3076 | 3295 | 3515 | 3955 | 4394 |
| | w | 123 | 137 | 151 | 164 | 178 | 192 | 205 | 219 | 247 | 274 |
| | $F_v$ | 52 | 58 | 64 | 70 | 76 | 82 | 87 | 93 | 105 | 117 |
| | E | 1151 | 1279 | 1407 | 1535 | 1663 | 1791 | 1919 | 2047 | 2303 | 2559 |
| **8 x 8** | W | 2636 | 2929 | 3222 | 3515 | 3808 | 4101 | 4394 | 4687 | 5273 | 5859 |
| | w | 164 | 183 | 201 | 219 | 238 | 256 | 274 | 292 | 329 | 366 |
| | $F_v$ | 35 | 39 | 42 | 46 | 50 | 54 | 58 | 62 | 70 | 78 |
| | E | 1727 | 1919 | 2111 | 2303 | 2495 | 2687 | 2879 | 3071 | 3455 | 3839 |
| **3 x 14** | W | 2743 | 3047 | 3352 | 3657 | 3962 | 4267 | 4571 | 4876 | 5486 | 6095 |
| | w | 171 | 190 | 209 | 228 | 247 | 266 | 285 | 304 | 342 | 380 |
| | $F_v$ | 62 | 69 | 75 | 82 | 89 | 96 | 103 | 110 | 124 | 138 |
| | E | 978 | 1086 | 1195 | 1304 | 1412 | 1521 | 1630 | 1738 | 1956 | 2173 |
| **4 x 12** | W | 2768 | 3076 | 3383 | 3691 | 3999 | 4306 | 4614 | 4921 | 5537 | 6152 |
| | w | 173 | 192 | 211 | 230 | 249 | 269 | 288 | 307 | 346 | 384 |
| | $F_v$ | 52 | 58 | 64 | 70 | 76 | 82 | 87 | 93 | 105 | 117 |
| | E | 1151 | 1279 | 1407 | 1535 | 1663 | 1791 | 1919 | 2047 | 2303 | 2559 |
| **6 x 10** | W | 3102 | 3447 | 3791 | 4136 | 4481 | 4825 | 5170 | 5515 | 6204 | 6894 |
| | w | 193 | 215 | 236 | 258 | 280 | 301 | 323 | 344 | 387 | 430 |
| | $F_v$ | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 89 | 98 |
| | E | 1364 | 1515 | 1667 | 1818 | 1970 | 2122 | 2273 | 2425 | 2728 | 3031 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E' = Modulus of elasticity, 1000 psi, induced by load W for $\ell$ /360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **16'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **3 x 16** | W | 3633 | 4037 | 4441 | 4845 | 5248 | 5652 | 6056 | 6460 | 7267 | 8075 |
| | w | 227 | 252 | 277 | 302 | 382 | 353 | 378 | 403 | 454 | 504 |
| | $F_v$ | 71 | 79 | 87 | 95 | 103 | 111 | 119 | 127 | 142 | 158 |
| | E | 849 | 944 | 1038 | 1133 | 1227 | 1321 | 1416 | 1510 | 1699 | 1888 |
| **4 x 14** | W | 3986 | 4429 | 4872 | 5315 | 5758 | 6201 | 6644 | 7087 | 7973 | 8859 |
| | w | 249 | 276 | 304 | 332 | 359 | 387 | 415 | 442 | 498 | 553 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 112 | 126 | 140 |
| | E | 960 | 1066 | 1173 | 1279 | 1386 | 1493 | 1599 | 1706 | 1919 | 2133 |
| **8 x 10** | W | 4230 | 4700 | 5170 | 5640 | 6110 | 6580 | 7050 | 7520 | 8460 | 9401 |
| | w | 264 | 293 | 323 | 352 | 381 | 411 | 440 | 470 | 528 | 587 |
| | $F_v$ | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 89 | 98 |
| | E | 1364 | 1515 | 1667 | 1818 | 1970 | 2122 | 2273 | 2425 | 2728 | 3031 |
| **6 x 12** | W | 4546 | 5051 | 5556 | 6061 | 6566 | 7071 | 7576 | 8081 | 9092 | 10102 |
| | w | 284 | 315 | 347 | 378 | 410 | 441 | 473 | 505 | 568 | 631 |
| | $F_v$ | 53 | 59 | 65 | 71 | 77 | 83 | 89 | 95 | 107 | 119 |
| | E | 1126 | 1252 | 1377 | 1502 | 1627 | 1753 | 1878 | 2003 | 2253 | 2504 |
| **10 x 10** | W | 5358 | 5953 | 6549 | 7144 | 7740 | 8335 | 8930 | 9526 | 10717 | 11907 |
| | w | 334 | 372 | 409 | 446 | 483 | 520 | 558 | 595 | 699 | 744 |
| | $F_v$ | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 89 | 98 |
| | E | 1364 | 1515 | 1667 | 1818 | 1970 | 2122 | 2273 | 2425 | 2728 | 3031 |
| **4 x 16** | W | 5255 | 5839 | 6423 | 7007 | 7591 | 8175 | 8759 | 9343 | 10510 | 11678 |
| | w | 328 | 364 | 401 | 437 | 474 | 510 | 547 | 583 | 656 | 729 |
| | $F_v$ | 72 | 80 | 88 | 96 | 104 | 113 | 121 | 129 | 145 | 161 |
| | E | 836 | 929 | 1021 | 1114 | 1207 | 1300 | 1393 | 1486 | 1672 | 1858 |
| **8 x 12** | W | 6199 | 6888 | 7576 | 8265 | 8954 | 9643 | 10332 | 11020 | 12398 | 13776 |
| | w | 387 | 430 | 473 | 516 | 559 | 602 | 645 | 688 | 774 | 861 |
| | $F_v$ | 53 | 59 | 65 | 71 | 77 | 83 | 89 | 95 | 107 | 119 |
| | E | 1126 | 1252 | 1377 | 1502 | 1627 | 1753 | 1878 | 2003 | 2253 | 2504 |
| **6 x 14** | W | 6264 | 6960 | 7657 | 8353 | 9049 | 9745 | 10441 | 11137 | 12529 | 13921 |
| | w | 391 | 435 | 478 | 522 | 565 | 609 | 652 | 696 | 783 | 870 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 112 | 126 | 140 |
| | E | 960 | 1066 | 1173 | 1279 | 1386 | 1493 | 1599 | 1706 | 1919 | 2133 |
| **10 x 12** | W | 7852 | 8724 | 9597 | 10469 | 11342 | 12214 | 13087 | 13959 | 15704 | 17449 |
| | w | 490 | 545 | 599 | 654 | 708 | 763 | 817 | 872 | 981 | 1090 |
| | $F_v$ | 53 | 59 | 65 | 71 | 77 | 83 | 89 | 95 | 107 | 119 |
| | E | 1126 | 1252 | 1377 | 1502 | 1627 | 1753 | 1878 | 2003 | 2253 | 2504 |
| **6 x 16** | W | 8258 | 9176 | 10093 | 11011 | 11929 | 12846 | 13764 | 14681 | 16517 | 18352 |
| | w | 516 | 573 | 630 | 688 | 745 | 802 | 860 | 917 | 1032 | 1147 |
| | $F_v$ | 72 | 80 | 88 | 96 | 104 | 113 | 121 | 129 | 145 | 161 |
| | E | 836 | 929 | 1021 | 1114 | 1207 | 1300 | 1393 | 1486 | 1672 | 1858 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **16'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **8 x 14** | W | 8542 | 9492 | 10441 | 11390 | 12339 | 13289 | 14238 | 15187 | 17085 | 18984 |
| | w | 533 | 593 | 652 | 711 | 771 | 830 | 889 | 949 | 1067 | 1186 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 112 | 126 | 140 |
| | E | 960 | 1066 | 1173 | 1279 | 1386 | 1493 | 1599 | 1706 | 1919 | 2133 |
| **12 x 12** | W | 9505 | 10561 | 11617 | 12673 | 13730 | 14786 | 15842 | 16898 | 19010 | 21123 |
| | w | 594 | 660 | 726 | 792 | 858 | 924 | 990 | 1056 | 1188 | 1320 |
| | $F_v$ | 53 | 59 | 65 | 71 | 77 | 83 | 89 | 95 | 107 | 119 |
| | E | 1126 | 1252 | 1377 | 1502 | 1627 | 1753 | 1878 | 2003 | 2253 | 2504 |
| **6 x 18** | W | 10527 | 11697 | 12866 | 14036 | 15206 | 16375 | 17545 | 18715 | 21054 | 23394 |
| | w | 657 | 731 | 804 | 877 | 950 | 1023 | 1096 | 1169 | 1315 | 1462 |
| | $F_v$ | 82 | 91 | 100 | 109 | 118 | 127 | 136 | 145 | 164 | 182 |
| | E | 740 | 822 | 905 | 987 | 1069 | 1151 | 1234 | 1316 | 1481 | 1645 |
| **10 x 14** | W | 10821 | 12023 | 13225 | 14428 | 15630 | 16832 | 18035 | 19237 | 21642 | 24046 |
| | w | 676 | 751 | 826 | 901 | 976 | 1052 | 1127 | 1202 | 1352 | 1502 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 112 | 126 | 140 |
| | E | 960 | 1066 | 1173 | 1279 | 1386 | 1493 | 1599 | 1706 | 1919 | 2133 |
| **8 x 16** | W | 11261 | 12513 | 13764 | 15015 | 16266 | 17518 | 18769 | 20020 | 22523 | 25026 |
| | w | 703 | 782 | 860 | 938 | 1016 | 1094 | 1173 | 1251 | 1407 | 1564 |
| | $F_v$ | 72 | 80 | 88 | 96 | 104 | 113 | 121 | 129 | 145 | 161 |
| | E | 836 | 929 | 1021 | 1114 | 1207 | 1300 | 1393 | 1486 | 1672 | 1858 |
| **6 x 20** | W | 13071 | 14523 | 15975 | 17428 | 18880 | 20332 | 21785 | 23237 | 26142 | 29046 |
| | w | 816 | 907 | 998 | 1089 | 1180 | 1270 | 1361 | 1452 | 1633 | 1815 |
| | $F_v$ | 91 | 101 | 111 | 121 | 132 | 142 | 152 | 162 | 182 | 203 |
| | E | 664 | 738 | 812 | 886 | 960 | 1033 | 1107 | 1181 | 1329 | 1476 |
| **12 x 14** | W | 13099 | 14554 | 16010 | 17465 | 18921 | 20376 | 21832 | 23287 | 26198 | 29109 |
| | w | 818 | 909 | 1000 | 1091 | 1182 | 1273 | 1364 | 1455 | 1637 | 1819 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 112 | 126 | 140 |
| | E | 960 | 1066 | 1173 | 1279 | 1386 | 1493 | 1599 | 1706 | 1919 | 2133 |
| **10 x 16** | W | 14264 | 15849 | 17434 | 19019 | 20604 | 22189 | 23774 | 25359 | 28529 | 31699 |
| | w | 891 | 990 | 1089 | 1188 | 1287 | 1386 | 1485 | 1584 | 1783 | 1981 |
| | $F_v$ | 72 | 80 | 88 | 96 | 104 | 113 | 121 | 129 | 145 | 161 |
| | E | 836 | 929 | 1021 | 1114 | 1207 | 1300 | 1393 | 1486 | 1672 | 1858 |
| **8 x 18** | W | 14355 | 15950 | 17545 | 19140 | 20735 | 22330 | 23925 | 25520 | 28710 | 31901 |
| | w | 897 | 996 | 1096 | 1196 | 1295 | 1395 | 1495 | 1595 | 1794 | 1993 |
| | $F_v$ | 82 | 91 | 100 | 109 | 118 | 127 | 136 | 145 | 164 | 182 |
| | E | 740 | 822 | 905 | 987 | 1069 | 1151 | 1234 | 1316 | 1481 | 1645 |
| **14 x 14** | W | 15377 | 17085 | 18794 | 20503 | 22211 | 23920 | 25628 | 27337 | 30754 | 34171 |
| | w | 961 | 1067 | 1174 | 1281 | 1388 | 1495 | 1601 | 1708 | 1922 | 2135 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 112 | 126 | 140 |
| | E | 960 | 1066 | 1173 | 1279 | 1386 | 1493 | 1599 | 1706 | 1919 | 2133 |
| **6 x 22** | W | 15889 | 17655 | 19420 | 21186 | 22951 | 24717 | 26483 | 28248 | 31779 | 35310 |
| | w | 993 | 1103 | 1213 | 1324 | 1434 | 1544 | 1655 | 1765 | 1986 | 2206 |
| | $F_v$ | 100 | 111 | 123 | 134 | 145 | 156 | 167 | 179 | 201 | 223 |
| | E | 602 | 669 | 736 | 803 | 870 | 937 | 1004 | 1071 | 1205 | 1339 |
| **12 x 16** | W | 17267 | 19186 | 21105 | 23023 | 24942 | 26861 | 28779 | 30698 | 34535 | 38373 |
| | w | 1079 | 1199 | 1319 | 1438 | 1558 | 1678 | 1798 | 1918 | 2158 | 2398 |
| | $F_v$ | 72 | 80 | 88 | 96 | 104 | 113 | 121 | 129 | 145 | 161 |
| | E | 836 | 929 | 1021 | 1114 | 1207 | 1300 | 1393 | 1486 | 1672 | 1858 |
| **8 x 20** | W | 17824 | 19804 | 21785 | 23765 | 25746 | 27726 | 29707 | 31687 | 35648 | 39609 |
| | w | 1114 | 1237 | 1361 | 1485 | 1609 | 1732 | 1856 | 1980 | 2228 | 2475 |
| | $F_v$ | 91 | 101 | 111 | 121 | 132 | 142 | 152 | 162 | 182 | 203 |
| | E | 664 | 738 | 812 | 886 | 959 | 1033 | 1107 | 1181 | 1329 | 1476 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **16'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **10 x 18** | W | 18183 | 20203 | 22224 | 24244 | 26265 | 28285 | 30305 | 32326 | 36367 | 40407 |
| | w | 1136 | 1262 | 1389 | 1515 | 1641 | 1767 | 1894 | 2020 | 2272 | 2525 |
| | $F_v$ | 82 | 91 | 100 | 109 | 118 | 127 | 136 | 145 | 164 | 182 |
| | E | 740 | 822 | 905 | 987 | 1069 | 1151 | 1234 | 1316 | 1481 | 1645 |
| **6 x 24** | W | 18983 | 21092 | 23202 | 25311 | 27420 | 29530 | 31639 | 33748 | 37967 | 42185 |
| | w | 1186 | 1318 | 1450 | 1581 | 1713 | 1845 | 1977 | 2109 | 2372 | 2636 |
| | $F_v$ | 110 | 122 | 134 | 146 | 159 | 171 | 183 | 195 | 220 | 244 |
| | E | 551 | 612 | 674 | 735 | 796 | 857 | 919 | 980 | 1102 | 1225 |
| **14 x 16** | W | 20271 | 22523 | 24775 | 27028 | 29280 | 31532 | 33785 | 36037 | 40542 | 45046 |
| | w | 1266 | 1407 | 1548 | 1689 | 1830 | 1970 | 2111 | 2252 | 2533 | 2815 |
| | $F_v$ | 72 | 80 | 88 | 96 | 104 | 113 | 121 | 129 | 145 | 161 |
| | E | 836 | 929 | 1021 | 1114 | 1207 | 1300 | 1393 | 1486 | 1672 | 1858 |
| **8 x 22** | W | 21667 | 24075 | 26483 | 28890 | 31298 | 33705 | 36113 | 38520 | 43335 | 48151 |
| | w | 1354 | 1504 | 1655 | 1805 | 1956 | 2106 | 2257 | 2407 | 2708 | 3009 |
| | $F_v$ | 100 | 111 | 123 | 134 | 145 | 156 | 167 | 179 | 201 | 223 |
| | E | 602 | 669 | 736 | 803 | 870 | 937 | 1004 | 1071 | 1205 | 1339 |
| **12 x 18** | W | 22011 | 24457 | 26903 | 29348 | 31794 | 34240 | 36686 | 39131 | 44023 | 48914 |
| | w | 1375 | 1528 | 1681 | 1834 | 1987 | 2140 | 2292 | 2445 | 2751 | 3057 |
| | $F_v$ | 82 | 91 | 100 | 109 | 118 | 127 | 136 | 145 | 164 | 182 |
| | E | 740 | 822 | 905 | 987 | 1069 | 1151 | 1234 | 1316 | 1481 | 1645 |
| **10 x 20** | W | 22577 | 25085 | 27594 | 30103 | 32611 | 35120 | 37628 | 40137 | 45154 | 50171 |
| | w | 1411 | 1567 | 1724 | 1881 | 2038 | 2195 | 2351 | 2508 | 2822 | 3135 |
| | $F_v$ | 91 | 101 | 111 | 121 | 132 | 142 | 152 | 162 | 182 | 203 |
| | E | 664 | 738 | 812 | 886 | 959 | 1033 | 1107 | 1181 | 1329 | 1476 |
| **16 x 16** | W | 23274 | 25860 | 28446 | 31032 | 33618 | 36204 | 38790 | 41376 | 46548 | 51720 |
| | w | 1454 | 1616 | 1777 | 1939 | 2101 | 2262 | 2424 | 2586 | 2909 | 3232 |
| | $F_v$ | 72 | 80 | 88 | 96 | 104 | 113 | 121 | 129 | 145 | 161 |
| | E | 836 | 929 | 1021 | 1114 | 1207 | 1300 | 1393 | 1486 | 1672 | 1858 |
| **14 x 18** | W | 25839 | 28710 | 31582 | 34453 | 37324 | 40195 | 43066 | 45937 | 51679 | 57421 |
| | w | 1614 | 1794 | 1973 | 2153 | 2332 | 2512 | 2691 | 2871 | 3229 | 3588 |
| | $F_v$ | 82 | 91 | 100 | 109 | 118 | 127 | 136 | 145 | 164 | 182 |
| | E | 740 | 822 | 905 | 987 | 1069 | 1151 | 1234 | 1316 | 1481 | 1645 |
| **8 x 24** | W | 25886 | 28763 | 31639 | 34515 | 37391 | 40268 | 43144 | 46020 | 51773 | 57526 |
| | w | 1617 | 1797 | 1977 | 2157 | 2336 | 2516 | 2696 | 2876 | 3235 | 3595 |
| | $F_v$ | 110 | 122 | 134 | 146 | 159 | 171 | 183 | 195 | 220 | 244 |
| | E | 551 | 612 | 674 | 735 | 796 | 857 | 919 | 980 | 1102 | 1225 |
| **12 x 20** | W | 27330 | 30367 | 33403 | 36440 | 39477 | 42514 | 45550 | 48587 | 54660 | 60734 |
| | w | 1708 | 1897 | 2087 | 2277 | 2467 | 2657 | 2846 | 3036 | 3416 | 3795 |
| | $F_v$ | 91 | 101 | 111 | 121 | 132 | 142 | 152 | 162 | 182 | 203 |
| | E | 664 | 738 | 812 | 886 | 959 | 1033 | 1107 | 1181 | 1329 | 1476 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **16'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **10 x 22** | W | 27446 | 30495 | 33545 | 36594 | 39644 | 42693 | 45743 | 48793 | 54892 | 60991 |
| | w | 1715 | 1905 | 2096 | 2287 | 2477 | 2668 | 2858 | 3049 | 3430 | 3811 |
| | $F_v$ | 100 | 111 | 123 | 134 | 145 | 156 | 167 | 179 | 201 | 223 |
| | E | 602 | 669 | 736 | 803 | 870 | 937 | 1004 | 1071 | 1205 | 1339 |
| **16 x 18** | W | 29667 | 32964 | 36260 | 39557 | 42853 | 46150 | 49446 | 52743 | 59335 | 65928 |
| | w | 1854 | 2060 | 2266 | 2472 | 2678 | 2884 | 3090 | 3296 | 3708 | 4120 |
| | $F_v$ | 82 | 91 | 100 | 109 | 118 | 127 | 136 | 145 | 164 | 182 |
| | E | 740 | 822 | 905 | 987 | 1069 | 1152 | 1234 | 1316 | 1481 | 1645 |
| **14 x 20** | W | 32083 | 35648 | 39213 | 42778 | 46342 | 49907 | 53472 | 57037 | 64167 | 71296 |
| | w | 2005 | 2228 | 2450 | 2673 | 2896 | 3119 | 3342 | 3564 | 4010 | 4456 |
| | $F_v$ | 91 | 101 | 111 | 121 | 132 | 142 | 152 | 162 | 182 | 203 |
| | E | 664 | 738 | 812 | 886 | 959 | 1033 | 1107 | 1181 | 1329 | 1476 |
| **10 x 24** | W | 32789 | 36433 | 40076 | 43719 | 47363 | 51006 | 54649 | 58293 | 65579 | 72866 |
| | w | 2049 | 2277 | 2504 | 2732 | 2960 | 3187 | 3415 | 3643 | 4098 | 4554 |
| | $F_v$ | 110 | 122 | 134 | 146 | 159 | 171 | 183 | 195 | 220 | 244 |
| | E | 551 | 612 | 674 | 735 | 796 | 857 | 919 | 980 | 1102 | 1225 |
| **12 x 22** | W | 33224 | 36915 | 40607 | 44298 | 47990 | 51682 | 55373 | 59065 | 66448 | 73831 |
| | w | 2076 | 2307 | 2537 | 2768 | 2999 | 3230 | 3460 | 3691 | 4153 | 4614 |
| | $F_v$ | 100 | 111 | 123 | 134 | 145 | 156 | 167 | 179 | 201 | 223 |
| | E | 602 | 669 | 736 | 803 | 870 | 937 | 1004 | 1071 | 1205 | 1339 |
| **18 x 18** | W | 33496 | 37217 | 40939 | 44661 | 48383 | 52105 | 55826 | 59548 | 66992 | 74435 |
| | w | 2093 | 2326 | 2558 | 2791 | 3023 | 3256 | 3489 | 3721 | 4187 | 4652 |
| | $F_v$ | 82 | 91 | 100 | 109 | 118 | 127 | 136 | 145 | 164 | 182 |
| | E | 740 | 822 | 905 | 987 | 1069 | 1151 | 1234 | 1316 | 1481 | 1645 |
| **16 x 20** | W | 36836 | 40929 | 45022 | 49115 | 53208 | 57301 | 61394 | 65487 | 73673 | 81859 |
| | w | 2302 | 2558 | 2813 | 3069 | 3325 | 3581 | 3837 | 4092 | 4604 | 5116 |
| | $F_v$ | 91 | 101 | 111 | 121 | 132 | 142 | 152 | 162 | 182 | 203 |
| | E | 664 | 738 | 812 | 886 | 960 | 1033 | 1107 | 1181 | 1329 | 1476 |
| **14 x 22** | W | 39002 | 43335 | 47669 | 52003 | 56336 | 60670 | 65003 | 69337 | 78004 | 86671 |
| | w | 2437 | 2708 | 2979 | 3250 | 3521 | 3791 | 4062 | 4333 | 4875 | 5416 |
| | $F_v$ | 100 | 111 | 123 | 134 | 145 | 156 | 167 | 179 | 201 | 223 |
| | E | 602 | 669 | 736 | 803 | 870 | 937 | 1004 | 1071 | 1205 | 1339 |
| **12 x 24** | W | 39692 | 44103 | 48513 | 52923 | 57334 | 61744 | 66154 | 70565 | 79385 | 88206 |
| | w | 2480 | 2756 | 3032 | 3307 | 3583 | 3859 | 4134 | 4410 | 4961 | 5512 |
| | $F_v$ | 110 | 122 | 134 | 146 | 159 | 171 | 183 | 195 | 220 | 244 |
| | E | 551 | 612 | 674 | 735 | 796 | 857 | 919 | 980 | 1102 | 1225 |
| **18 x 20** | W | 41589 | 46210 | 50832 | 55453 | 60074 | 64695 | 69316 | 73937 | 83179 | 92421 |
| | w | 2599 | 2888 | 3177 | 3465 | 3754 | 4043 | 4332 | 4621 | 5198 | 5776 |
| | $F_v$ | 91 | 101 | 111 | 121 | 132 | 142 | 152 | 162 | 182 | 203 |
| | E | 664 | 738 | 812 | 886 | 960 | 1033 | 1107 | 1181 | 1329 | 1476 |
| **20 x 20** | W | 46342 | 51492 | 56641 | 61790 | 66939 | 72089 | 77238 | 82387 | 92685 | 102984 |
| | w | 2896 | 3218 | 3540 | 3861 | 4183 | 4505 | 4827 | 5149 | 5792 | 6436 |
| | $F_v$ | 91 | 101 | 111 | 121 | 132 | 142 | 152 | 162 | 182 | 203 |
| | E | 664 | 738 | 812 | 886 | 959 | 1033 | 1107 | 1181 | 1329 | 1476 |
| **14 x 24** | W | 46596 | 51773 | 56950 | 62128 | 67305 | 72482 | 77660 | 82837 | 93192 | 103546 |
| | w | 2912 | 3235 | 3559 | 3883 | 4206 | 4530 | 4853 | 5177 | 5824 | 6471 |
| | $F_v$ | 110 | 122 | 134 | 146 | 159 | 171 | 183 | 195 | 220 | 244 |
| | E | 551 | 612 | 674 | 735 | 796 | 857 | 919 | 980 | 1102 | 1225 |
| **18 x 22** | W | 50558 | 56176 | 61793 | 67411 | 73029 | 78646 | 84264 | 89881 | 101117 | 112352 |
| | w | 3159 | 3511 | 3862 | 4213 | 4564 | 4915 | 5266 | 5617 | 6319 | 7022 |
| | $F_v$ | 100 | 111 | 123 | 134 | 145 | 156 | 167 | 179 | 201 | 223 |
| | E | 602 | 669 | 736 | 803 | 870 | 937 | 1004 | 1071 | 1205 | 1339 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for $\ell$/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **16' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **16 x 24** | W | 53499 | 59443 | 65387 | 71332 | 77276 | 83221 | 89165 | 95109 | 106998 | 118887 |
| | w | 3343 | 3715 | 4086 | 4458 | 4829 | 5201 | 5572 | 5944 | 6687 | 7430 |
| | $F_v$ | 110 | 122 | 134 | 146 | 159 | 171 | 183 | 195 | 220 | 244 |
| | E | 551 | 612 | 674 | 735 | 796 | 857 | 919 | 980 | 1102 | 1225 |
| **20 x 22** | W | 56336 | 62596 | 68855 | 75115 | 81375 | 87634 | 93894 | 100154 | 112673 | 125192 |
| | w | 3521 | 3912 | 4303 | 4694 | 5085 | 5477 | 5868 | 6259 | 7042 | 7824 |
| | $F_v$ | 100 | 111 | 123 | 134 | 145 | 156 | 167 | 179 | 201 | 223 |
| | E | 602 | 669 | 736 | 803 | 870 | 937 | 1004 | 1071 | 1205 | 1339 |
| **18 x 24** | W | 60402 | 67113 | 73825 | 80536 | 87247 | 93959 | 100670 | 107381 | 120804 | 134227 |
| | w | 3775 | 4194 | 4614 | 5033 | 5452 | 5872 | 6291 | 6711 | 7550 | 8389 |
| | $F_v$ | 110 | 122 | 134 | 146 | 159 | 171 | 183 | 195 | 220 | 244 |
| | E | 551 | 612 | 674 | 735 | 796 | 857 | 919 | 980 | 1102 | 1225 |
| **22 x 22** | W | 62114 | 69016 | 75918 | 82819 | 89721 | 96623 | 103524 | 110426 | 124229 | 138032 |
| | w | 3882 | 4313 | 4744 | 5176 | 5607 | 6038 | 6470 | 6901 | 7764 | 8627 |
| | $F_v$ | 100 | 111 | 123 | 134 | 145 | 156 | 167 | 179 | 201 | 223 |
| | E | 602 | 669 | 736 | 803 | 870 | 937 | 1004 | 1071 | 1205 | 1339 |
| **20 x 24** | W | 67305 | 74783 | 82262 | 89740 | 97219 | 104697 | 112175 | 119654 | 134610 | 149567 |
| | w | 4206 | 4673 | 5141 | 5608 | 6076 | 6543 | 7010 | 7478 | 8413 | 9347 |
| | $F_v$ | 110 | 122 | 134 | 146 | 159 | 171 | 183 | 195 | 220 | 244 |
| | E | 551 | 612 | 674 | 735 | 796 | 857 | 919 | 980 | 1102 | 1225 |
| **22 x 24** | W | 74208 | 82453 | 90699 | 98944 | 107190 | 115435 | 123680 | 131926 | 148417 | 164907 |
| | w | 4638 | 5153 | 5668 | 6184 | 6699 | 7214 | 7730 | 8245 | 9276 | 10306 |
| | $F_v$ | 110 | 122 | 134 | 146 | 159 | 171 | 183 | 195 | 220 | 244 |
| | E | 551 | 612 | 674 | 735 | 796 | 857 | 919 | 980 | 1102 | 1225 |
| **24 x 24** | W | 81111 | 90124 | 99136 | 108148 | 117161 | 126173 | 135186 | 144198 | 162223 | 180248 |
| | w | 5069 | 5632 | 6196 | 6759 | 7322 | 7885 | 8449 | 9012 | 10138 | 11265 |
| | $F_v$ | 110 | 122 | 134 | 146 | 159 | 171 | 183 | 195 | 220 | 244 |
| | E | 551 | 612 | 674 | 735 | 796 | 857 | 919 | 980 | 1102 | 1225 |
| **17' - 0" SPAN** | | | | | | | | | | | |
| **3 x 6** | W | 444 | 494 | 543 | 593 | 642 | 691 | 741 | 790 | 889 | 988 |
| | w | 26 | 29 | 31 | 34 | 37 | 40 | 43 | 46 | 52 | 58 |
| | $F_v$ | 24 | 26 | 29 | 32 | 35 | 37 | 40 | 43 | 48 | 53 |
| | E | 2503 | 2781 | 3059 | 3338 | 3616 | 3894 | 4172 | 4450 | 5007 | 5563 |
| **2 x 8** | W | 463 | 515 | 566 | 618 | 669 | 721 | 772 | 824 | 927 | 1030 |
| | w | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 54 | 60 |
| | $F_v$ | 31 | 35 | 39 | 42 | 46 | 49 | 53 | 56 | 63 | 71 |
| | E | 1899 | 2110 | 2321 | 2532 | 2743 | 2954 | 3165 | 3376 | 3798 | 4220 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **17' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **4 x 6** | W | 622 | 691 | 761 | 830 | 899 | 968 | 1037 | 1107 | 1245 | 1383 |
| | w | 36 | 40 | 44 | 48 | 52 | 56 | 61 | 65 | 73 | 81 |
| | $F_v$ | 24 | 26 | 29 | 32 | 35 | 37 | 40 | 43 | 48 | 53 |
| | E | 2503 | 2781 | 3059 | 3338 | 3616 | 3894 | 4172 | 4450 | 5007 | 5563 |
| **2 x 10** | W | 754 | 838 | 922 | 1006 | 1090 | 1174 | 1258 | 1342 | 1509 | 1677 |
| | w | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 78 | 88 | 98 |
| | $F_v$ | 40 | 45 | 49 | 54 | 58 | 63 | 68 | 72 | 81 | 90 |
| | E | 1488 | 1654 | 1819 | 1984 | 2150 | 2315 | 2481 | 2646 | 2977 | 3308 |
| **3 x 8** | W | 772 | 858 | 944 | 1030 | 1116 | 1202 | 1288 | 1374 | 1545 | 1717 |
| | w | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 101 |
| | $F_v$ | 31 | 35 | 39 | 42 | 46 | 49 | 53 | 56 | 63 | 71 |
| | E | 1899 | 2110 | 2321 | 2532 | 2743 | 2954 | 3165 | 3376 | 3798 | 4220 |
| **6 x 6** | W | 978 | 1087 | 1196 | 1304 | 1413 | 1522 | 1631 | 1739 | 1957 | 2174 |
| | w | 57 | 63 | 70 | 76 | 83 | 89 | 95 | 102 | 115 | 127 |
| | $F_v$ | 24 | 26 | 29 | 32 | 35 | 37 | 40 | 43 | 48 | 53 |
| | E | 2503 | 2781 | 3059 | 3338 | 3616 | 3894 | 4172 | 4450 | 5007 | 5563 |
| **4 x 8** | W | 1082 | 1202 | 1322 | 1442 | 1563 | 1683 | 1803 | 1923 | 2164 | 2404 |
| | w | 63 | 70 | 77 | 84 | 91 | 99 | 106 | 113 | 127 | 141 |
| | $F_v$ | 31 | 35 | 39 | 42 | 46 | 49 | 53 | 56 | 63 | 71 |
| | E | 1899 | 2110 | 2321 | 2532 | 2743 | 2954 | 3165 | 3376 | 3798 | 4220 |
| **2 x 12** | W | 1116 | 1240 | 1364 | 1488 | 1613 | 1737 | 1861 | 1985 | 2233 | 2481 |
| | w | 65 | 72 | 80 | 87 | 94 | 102 | 109 | 116 | 131 | 145 |
| | $F_v$ | 49 | 55 | 60 | 66 | 71 | 77 | 82 | 88 | 99 | 110 |
| | E | 1223 | 1359 | 1495 | 1631 | 1767 | 1903 | 2039 | 2175 | 2447 | 2719 |
| **3 x 10** | W | 1258 | 1398 | 1537 | 1677 | 1817 | 1957 | 2097 | 2236 | 2516 | 2796 |
| | w | 74 | 82 | 90 | 98 | 106 | 115 | 123 | 131 | 148 | 164 |
| | $F_v$ | 40 | 45 | 49 | 54 | 58 | 63 | 68 | 72 | 81 | 90 |
| | E | 1488 | 1654 | 1819 | 1984 | 2150 | 2315 | 2481 | 2646 | 2977 | 3308 |
| **2 x 14** | W | 1549 | 1721 | 1893 | 2065 | 2237 | 2409 | 2581 | 2753 | 3098 | 3442 |
| | w | 91 | 101 | 111 | 121 | 131 | 141 | 151 | 161 | 182 | 202 |
| | $F_v$ | 58 | 64 | 71 | 77 | 84 | 90 | 97 | 103 | 116 | 129 |
| | E | 1039 | 1154 | 1270 | 1385 | 1501 | 1616 | 1732 | 1847 | 2078 | 2309 |
| **6 x 8** | W | 1819 | 2022 | 2224 | 2426 | 2628 | 2830 | 3033 | 3235 | 3639 | 4044 |
| | w | 107 | 118 | 130 | 142 | 154 | 166 | 178 | 190 | 214 | 237 |
| | $F_v$ | 33 | 36 | 40 | 44 | 47 | 51 | 55 | 58 | 66 | 73 |
| | E | 1835 | 2039 | 2243 | 2447 | 2651 | 2855 | 3059 | 3263 | 3671 | 4079 |
| **4 x 10** | W | 1761 | 1957 | 2153 | 2348 | 2544 | 2740 | 2935 | 3131 | 3523 | 3914 |
| | w | 103 | 115 | 126 | 138 | 149 | 161 | 172 | 184 | 207 | 230 |
| | $F_v$ | 40 | 45 | 49 | 54 | 58 | 63 | 68 | 72 | 81 | 90 |
| | E | 1488 | 1654 | 1819 | 1984 | 2150 | 2315 | 2481 | 2646 | 2977 | 3308 |
| **3 x 12** | W | 1861 | 2068 | 2274 | 2481 | 2688 | 2895 | 3102 | 3308 | 3722 | 4136 |
| | w | 109 | 121 | 133 | 145 | 158 | 170 | 182 | 194 | 218 | 243 |
| | $F_v$ | 49 | 55 | 60 | 66 | 71 | 77 | 82 | 88 | 99 | 110 |
| | E | 1223 | 1359 | 1495 | 1631 | 1767 | 1903 | 2039 | 2175 | 2447 | 2719 |
| **8 x 8** | W | 2481 | 2757 | 3033 | 3308 | 3584 | 3860 | 4136 | 4411 | 4963 | 5514 |
| | w | 145 | 162 | 178 | 194 | 210 | 227 | 243 | 259 | 291 | 324 |
| | $F_v$ | 33 | 36 | 40 | 44 | 47 | 51 | 55 | 58 | 66 | 73 |
| | E | 1835 | 2039 | 2243 | 2447 | 2651 | 2855 | 3059 | 3263 | 3671 | 4079 |
| **3 x 14** | W | 2581 | 2868 | 3155 | 3442 | 3729 | 4016 | 4303 | 4589 | 5163 | 5737 |
| | w | 151 | 168 | 185 | 202 | 219 | 236 | 253 | 269 | 303 | 337 |
| | $F_v$ | 58 | 64 | 71 | 77 | 84 | 90 | 97 | 103 | 116 | 129 |
| | E | 1039 | 1154 | 1270 | 1385 | 1501 | 1616 | 1732 | 1847 | 2078 | 2309 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **17'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **4 x 12** | W | 2605 | 2895 | 3184 | 3474 | 3763 | 4053 | 4342 | 4632 | 5211 | 5790 |
| | w | 153 | 170 | 187 | 204 | 221 | 238 | 255 | 272 | 306 | 340 |
| | $F_v$ | 49 | 55 | 60 | 66 | 71 | 77 | 82 | 88 | 99 | 110 |
| | E | 1223 | 1359 | 1495 | 1631 | 1767 | 1903 | 2039 | 2175 | 2447 | 2719 |
| **6 x 10** | W | 2919 | 3244 | 3568 | 3893 | 4217 | 4541 | 4866 | 5190 | 5839 | 6488 |
| | w | 171 | 190 | 209 | 229 | 248 | 267 | 286 | 305 | 343 | 381 |
| | $F_v$ | 41 | 46 | 51 | 55 | 60 | 65 | 69 | 74 | 83 | 93 |
| | E | 1449 | 1610 | 1771 | 1932 | 2093 | 2254 | 2415 | 2576 | 2898 | 3221 |
| **3 x 16** | W | 3420 | 3800 | 4180 | 4560 | 4940 | 5320 | 5700 | 6080 | 6840 | 7600 |
| | w | 201 | 223 | 245 | 268 | 290 | 312 | 335 | 357 | 402 | 447 |
| | $F_v$ | 67 | 74 | 82 | 89 | 97 | 104 | 112 | 119 | 134 | 149 |
| | E | 902 | 1003 | 1103 | 1203 | 1304 | 1404 | 1504 | 1605 | 1805 | 2006 |
| **4 x 14** | W | 3752 | 4169 | 4586 | 5002 | 5419 | 5836 | 6253 | 6670 | 7504 | 8338 |
| | w | 220 | 245 | 269 | 294 | 318 | 343 | 367 | 392 | 441 | 490 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 105 | 119 | 132 |
| | E | 1019 | 1133 | 1246 | 1359 | 1473 | 1586 | 1699 | 1813 | 2039 | 2266 |
| **8 x 10** | W | 3981 | 4424 | 4866 | 5308 | 5751 | 6193 | 6636 | 7078 | 7963 | 8848 |
| | w | 234 | 260 | 286 | 312 | 338 | 364 | 390 | 416 | 468 | 520 |
| | $F_v$ | 41 | 46 | 51 | 55 | 60 | 65 | 69 | 74 | 83 | 93 |
| | E | 1449 | 1610 | 1771 | 1932 | 2093 | 2254 | 2415 | 2576 | 2898 | 3221 |
| **6 x 12** | W | 4278 | 4754 | 5229 | 5704 | 6180 | 6655 | 7131 | 7606 | 8557 | 9508 |
| | w | 251 | 279 | 307 | 335 | 363 | 391 | 419 | 447 | 503 | 559 |
| | $F_v$ | 50 | 56 | 62 | 67 | 73 | 78 | 84 | 90 | 101 | 112 |
| | E | 1197 | 1330 | 1463 | 1596 | 1729 | 1862 | 1995 | 2128 | 2394 | 2660 |
| **10 x 10** | W | 5043 | 5603 | 6164 | 6724 | 7284 | 7845 | 8405 | 8966 | 10086 | 11207 |
| | w | 296 | 329 | 362 | 395 | 428 | 461 | 494 | 527 | 593 | 659 |
| | $F_v$ | 41 | 46 | 51 | 55 | 60 | 65 | 69 | 74 | 83 | 93 |
| | E | 1449 | 1610 | 1771 | 1932 | 2093 | 2254 | 2415 | 2576 | 2898 | 3221 |
| **4 x 16** | W | 4946 | 5495 | 6045 | 6595 | 7144 | 7694 | 8243 | 8793 | 9892 | 10991 |
| | w | 290 | 323 | 355 | 387 | 420 | 452 | 484 | 517 | 581 | 646 |
| | $F_v$ | 68 | 75 | 83 | 91 | 98 | 106 | 113 | 121 | 136 | 151 |
| | E | 888 | 987 | 1085 | 1184 | 1283 | 1381 | 1480 | 1579 | 1776 | 1974 |
| **8 x 12** | W | 5834 | 6482 | 7131 | 7779 | 8427 | 9075 | 9724 | 10372 | 11669 | 12965 |
| | w | 343 | 381 | 419 | 457 | 495 | 533 | 572 | 610 | 686 | 762 |
| | $F_v$ | 50 | 56 | 62 | 67 | 73 | 78 | 84 | 90 | 101 | 112 |
| | E | 1197 | 1330 | 1463 | 1596 | 1729 | 1862 | 1995 | 2128 | 2394 | 2660 |
| **6 x 14** | W | 5896 | 6551 | 7206 | 7861 | 8516 | 9172 | 9827 | 10482 | 11792 | 13102 |
| | w | 346 | 385 | 423 | 462 | 500 | 539 | 578 | 616 | 693 | 770 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 105 | 119 | 132 |
| | E | 1019 | 1133 | 1246 | 1359 | 1473 | 1586 | 1699 | 1813 | 2039 | 2266 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **17' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **10 x 12** | W | 7390 | 8211 | 9032 | 9853 | 10675 | 11496 | 12317 | 13138 | 14780 | 16423 |
| | w | 434 | 483 | 531 | 579 | 627 | 676 | 724 | 772 | 869 | 966 |
| | $F_v$ | 50 | 56 | 62 | 67 | 73 | 78 | 84 | 90 | 101 | 112 |
| | E | 1197 | 1330 | 1463 | 1596 | 1729 | 1862 | 1995 | 2128 | 2394 | 2660 |
| **6 x 16** | W | 7772 | 8636 | 9500 | 10363 | 11227 | 12091 | 12954 | 13818 | 15545 | 17272 |
| | w | 457 | 508 | 558 | 609 | 660 | 711 | 762 | 812 | 914 | 1016 |
| | $F_v$ | 68 | 75 | 83 | 91 | 98 | 106 | 113 | 121 | 136 | 151 |
| | E | 888 | 987 | 1085 | 1184 | 1283 | 1381 | 1480 | 1579 | 1776 | 1974 |
| **8 x 14** | W | 8040 | 8933 | 9827 | 10720 | 11613 | 12507 | 13400 | 14294 | 16080 | 17867 |
| | w | 472 | 525 | 578 | 630 | 683 | 735 | 788 | 840 | 945 | 1051 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 105 | 119 | 132 |
| | E | 1019 | 1133 | 1246 | 1359 | 1473 | 1586 | 1699 | 1813 | 2039 | 2266 |
| **12 x 12** | W | 8946 | 9940 | 10934 | 11928 | 12922 | 13916 | 14910 | 15904 | 17892 | 19880 |
| | w | 526 | 584 | 643 | 701 | 760 | 818 | 877 | 935 | 1052 | 1169 |
| | $F_v$ | 50 | 56 | 62 | 67 | 73 | 78 | 84 | 90 | 101 | 112 |
| | E | 1197 | 1330 | 1463 | 1596 | 1729 | 1862 | 1995 | 2128 | 2394 | 2660 |
| **6 x 18** | W | 9908 | 11008 | 12109 | 13210 | 14311 | 15412 | 16513 | 17614 | 19816 | 22017 |
| | w | 582 | 647 | 712 | 777 | 841 | 906 | 971 | 1036 | 1165 | 1295 |
| | $F_v$ | 77 | 85 | 94 | 102 | 111 | 120 | 128 | 137 | 154 | 171 |
| | E | 786 | 874 | 961 | 1049 | 1136 | 1223 | 1311 | 1398 | 1573 | 1748 |
| **10 x 14** | W | 10184 | 11316 | 12447 | 13579 | 14711 | 15842 | 16974 | 18105 | 20369 | 22632 |
| | w | 599 | 665 | 732 | 798 | 865 | 931 | 998 | 1065 | 1198 | 1331 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 105 | 119 | 132 |
| | E | 1020 | 1133 | 1246 | 1359 | 1473 | 1586 | 1699 | 1813 | 2039 | 2266 |
| **8 x 16** | W | 10599 | 11776 | 12954 | 14132 | 15310 | 16487 | 17665 | 18843 | 21198 | 23553 |
| | w | 623 | 692 | 762 | 831 | 900 | 969 | 1039 | 1108 | 1246 | 1385 |
| | $F_v$ | 68 | 75 | 83 | 91 | 98 | 106 | 113 | 121 | 136 | 151 |
| | E | 888 | 987 | 1085 | 1184 | 1283 | 1381 | 1480 | 1579 | 1776 | 1974 |
| **6 x 20** | W | 12302 | 13669 | 15036 | 16402 | 17769 | 19136 | 20503 | 21870 | 24604 | 27338 |
| | w | 723 | 804 | 884 | 964 | 1045 | 1125 | 1206 | 1286 | 1447 | 1608 |
| | $F_v$ | 86 | 95 | 105 | 114 | 124 | 133 | 143 | 152 | 172 | 191 |
| | E | 706 | 784 | 863 | 941 | 1020 | 1098 | 1176 | 1255 | 1412 | 1569 |
| **12 x 14** | W | 12328 | 13698 | 15068 | 16438 | 17808 | 19177 | 20547 | 21917 | 24657 | 27397 |
| | w | 725 | 805 | 886 | 966 | 1047 | 1128 | 1208 | 1289 | 1450 | 1611 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 105 | 119 | 132 |
| | E | 1020 | 1133 | 1246 | 1359 | 1473 | 1586 | 1699 | 1813 | 2039 | 2266 |
| **10 x 16** | W | 13425 | 14917 | 16409 | 17900 | 19392 | 20884 | 22376 | 23867 | 26851 | 29834 |
| | w | 789 | 877 | 965 | 1052 | 1140 | 1228 | 1316 | 1403 | 1579 | 1754 |
| | $F_v$ | 68 | 75 | 83 | 91 | 98 | 106 | 113 | 121 | 136 | 151 |
| | E | 888 | 987 | 1085 | 1184 | 1283 | 1381 | 1480 | 1579 | 1776 | 1974 |
| **8 x 18** | W | 13511 | 15012 | 16513 | 18014 | 19515 | 21017 | 22518 | 24019 | 27022 | 30024 |
| | w | 794 | 883 | 971 | 1059 | 1147 | 1236 | 1324 | 1412 | 1589 | 1766 |
| | $F_v$ | 77 | 85 | 94 | 102 | 111 | 120 | 128 | 137 | 154 | 171 |
| | E | 786 | 874 | 961 | 1049 | 1136 | 1223 | 1311 | 1398 | 1573 | 1748 |
| **14 x 14** | W | 14472 | 16080 | 17688 | 19297 | 20905 | 22513 | 24121 | 25729 | 28945 | 32161 |
| | w | 851 | 945 | 1040 | 1135 | 1229 | 1324 | 1418 | 1513 | 1702 | 1891 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 105 | 119 | 132 |
| | E | 1020 | 1133 | 1246 | 1359 | 1473 | 1586 | 1699 | 1813 | 2039 | 2266 |
| **6 x 22** | W | 14955 | 16616 | 18278 | 19940 | 21601 | 23263 | 24925 | 26586 | 29910 | 33233 |
| | w | 879 | 977 | 1075 | 1172 | 1270 | 1368 | 1466 | 1563 | 1759 | 1954 |
| | $F_v$ | 94 | 105 | 115 | 126 | 137 | 147 | 158 | 168 | 189 | 210 |
| | E | 640 | 711 | 782 | 853 | 925 | 996 | 1067 | 1138 | 1280 | 1423 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **17' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **12 x 16** | W | 16252 | 18058 | 19863 | 21669 | 23475 | 25281 | 27087 | 28892 | 32504 | 36116 |
| | w | 956 | 1062 | 1168 | 1274 | 1380 | 1487 | 1593 | 1699 | 1912 | 2124 |
| | $F_v$ | 68 | 75 | 83 | 91 | 98 | 106 | 113 | 121 | 136 | 151 |
| | E | 888 | 987 | 1085 | 1184 | 1283 | 1381 | 1480 | 1579 | 1776 | 1974 |
| **8 x 20** | W | 16775 | 18639 | 20503 | 22367 | 24231 | 26095 | 27959 | 29823 | 33551 | 37279 |
| | w | 986 | 1096 | 1206 | 1315 | 1425 | 1535 | 1644 | 1754 | 1973 | 2192 |
| | $F_v$ | 86 | 95 | 105 | 114 | 124 | 133 | 143 | 152 | 172 | 191 |
| | E | 706 | 784 | 863 | 941 | 1019 | 1098 | 1176 | 1255 | 1412 | 1569 |
| **10 x 18** | W | 17113 | 19015 | 20917 | 22818 | 24720 | 26621 | 28523 | 30424 | 34227 | 38031 |
| | w | 1006 | 1118 | 1230 | 1342 | 1454 | 1565 | 1677 | 1789 | 2013 | 2237 |
| | $F_v$ | 77 | 85 | 94 | 102 | 111 | 120 | 128 | 137 | 154 | 171 |
| | E | 786 | 874 | 961 | 1049 | 1136 | 1223 | 1311 | 1398 | 1573 | 1748 |
| **6 x 24** | W | 17866 | 19852 | 21837 | 23822 | 25807 | 27792 | 29778 | 31763 | 35733 | 39704 |
| | w | 1050 | 1167 | 1284 | 1401 | 1518 | 1634 | 1751 | 1868 | 2101 | 2335 |
| | $F_v$ | 103 | 115 | 126 | 138 | 149 | 161 | 172 | 184 | 207 | 230 |
| | E | 585 | 651 | 716 | 781 | 846 | 911 | 976 | 1041 | 1171 | 1302 |
| **14 x 16** | W | 19078 | 21198 | 23318 | 25438 | 27558 | 29677 | 31797 | 33917 | 38157 | 42397 |
| | w | 1122 | 1246 | 1371 | 1496 | 1621 | 1745 | 1870 | 1995 | 2244 | 2493 |
| | $F_v$ | 68 | 75 | 83 | 91 | 98 | 106 | 113 | 121 | 136 | 151 |
| | E | 888 | 987 | 1085 | 1184 | 1283 | 1381 | 1480 | 1579 | 1776 | 1974 |
| **8 x 22** | W | 20393 | 22659 | 24925 | 27191 | 29457 | 31723 | 33988 | 36254 | 40786 | 45318 |
| | w | 1199 | 1332 | 1466 | 1599 | 1732 | 1866 | 1999 | 2132 | 2399 | 2665 |
| | $F_v$ | 94 | 105 | 115 | 126 | 137 | 147 | 158 | 168 | 189 | 210 |
| | E | 640 | 711 | 782 | 853 | 925 | 996 | 1067 | 1138 | 1280 | 1423 |
| **12 x 18** | W | 20716 | 23018 | 25320 | 27622 | 29924 | 32226 | 34528 | 36830 | 41433 | 46037 |
| | w | 1218 | 1354 | 1489 | 1624 | 1760 | 1895 | 2031 | 2166 | 2437 | 2708 |
| | $F_v$ | 77 | 85 | 94 | 102 | 111 | 120 | 128 | 137 | 154 | 171 |
| | E | 786 | 874 | 961 | 1049 | 1136 | 1223 | 1311 | 1398 | 1573 | 1748 |
| **10 x 20** | W | 21249 | 23610 | 25971 | 28332 | 30693 | 33054 | 35415 | 37776 | 42498 | 47220 |
| | w | 1249 | 1388 | 1527 | 1666 | 1805 | 1944 | 2083 | 2222 | 2499 | 2777 |
| | $F_v$ | 86 | 95 | 105 | 114 | 124 | 133 | 143 | 152 | 172 | 191 |
| | E | 706 | 784 | 863 | 941 | 1019 | 1098 | 1176 | 1255 | 1412 | 1569 |
| **16 x 16** | W | 21905 | 24339 | 26772 | 29206 | 31640 | 34074 | 36508 | 38942 | 43810 | 48678 |
| | w | 1288 | 1431 | 1574 | 1718 | 1861 | 2004 | 2147 | 2290 | 2577 | 2863 |
| | $F_v$ | 68 | 75 | 83 | 91 | 98 | 106 | 113 | 121 | 136 | 151 |
| | E | 888 | 987 | 1085 | 1184 | 1283 | 1381 | 1480 | 1579 | 1776 | 1974 |
| **14 x 18** | W | 24319 | 27022 | 29724 | 32426 | 35128 | 37830 | 40533 | 43235 | 48639 | 54044 |
| | w | 1430 | 1589 | 1748 | 1907 | 2066 | 2225 | 2384 | 2543 | 2861 | 3179 |
| | $F_v$ | 77 | 85 | 94 | 102 | 111 | 120 | 128 | 137 | 154 | 171 |
| | E | 786 | 874 | 961 | 1049 | 1136 | 1223 | 1311 | 1398 | 1573 | 1748 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **17' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **8 x 24** | W | 24363 | 27071 | 29778 | 32485 | 35192 | 37899 | 40606 | 43313 | 48727 | 54142 |
| | w | 1433 | 1592 | 1751 | 1910 | 2070 | 2229 | 2388 | 2547 | 2866 | 3184 |
| | $F_v$ | 103 | 115 | 126 | 138 | 149 | 161 | 172 | 184 | 207 | 230 |
| | E | 585 | 651 | 716 | 781 | 846 | 911 | 976 | 1041 | 1171 | 1302 |
| **12 x 20** | W | 25722 | 28580 | 31438 | 34297 | 37155 | 40013 | 42871 | 45729 | 51445 | 57161 |
| | w | 1513 | 1681 | 1849 | 2017 | 2185 | 2353 | 2521 | 2689 | 3026 | 3362 |
| | $F_v$ | 86 | 95 | 105 | 114 | 124 | 133 | 143 | 152 | 172 | 191 |
| | E | 706 | 784 | 863 | 941 | 1019 | 1098 | 1176 | 1255 | 1412 | 1569 |
| **10 x 22** | W | 25831 | 28701 | 31571 | 34442 | 37312 | 40182 | 43052 | 45922 | 51663 | 57403 |
| | w | 1519 | 1688 | 1857 | 2026 | 2194 | 2363 | 2532 | 2701 | 3039 | 3376 |
| | $F_v$ | 94 | 105 | 115 | 126 | 137 | 147 | 158 | 168 | 189 | 210 |
| | E | 640 | 711 | 782 | 853 | 925 | 996 | 1067 | 1138 | 1280 | 1423 |
| **16 x 18** | W | 27922 | 31025 | 34127 | 37230 | 40332 | 43435 | 46537 | 49640 | 55845 | 62050 |
| | w | 1642 | 1825 | 2007 | 2190 | 2372 | 2555 | 2737 | 2920 | 3285 | 3650 |
| | $F_v$ | 77 | 85 | 94 | 102 | 111 | 120 | 128 | 137 | 154 | 171 |
| | E | 786 | 874 | 961 | 1049 | 1136 | 1223 | 1311 | 1398 | 1573 | 1748 |
| **14 x 20** | W | 30196 | 33551 | 36906 | 40261 | 43616 | 46972 | 50327 | 53682 | 60392 | 67102 |
| | w | 1776 | 1973 | 2170 | 2368 | 2565 | 2763 | 2960 | 3157 | 3552 | 3947 |
| | $F_v$ | 86 | 95 | 105 | 114 | 124 | 133 | 143 | 152 | 172 | 191 |
| | E | 706 | 784 | 863 | 941 | 1019 | 1098 | 1176 | 1255 | 1412 | 1569 |
| **10 x 24** | W | 30861 | 34290 | 37719 | 41148 | 44577 | 48006 | 51435 | 54864 | 61722 | 68580 |
| | w | 1815 | 2017 | 2218 | 2420 | 2622 | 2823 | 3025 | 3227 | 3630 | 4034 |
| | $F_v$ | 103 | 115 | 126 | 138 | 149 | 161 | 172 | 184 | 207 | 230 |
| | E | 585 | 651 | 716 | 781 | 846 | 911 | 976 | 1041 | 1171 | 1302 |
| **12 x 22** | W | 31269 | 34744 | 38218 | 41693 | 45167 | 48641 | 52116 | 55590 | 62539 | 69488 |
| | w | 1839 | 2043 | 2248 | 2452 | 2656 | 2861 | 3065 | 3270 | 3678 | 4087 |
| | $F_v$ | 94 | 105 | 115 | 126 | 137 | 147 | 158 | 168 | 189 | 210 |
| | E | 640 | 711 | 782 | 853 | 925 | 996 | 1067 | 1138 | 1280 | 1423 |
| **18 x 18** | W | 31525 | 35028 | 38531 | 42034 | 45537 | 49040 | 52542 | 56045 | 63051 | 70057 |
| | w | 1854 | 2060 | 2266 | 2472 | 2678 | 2884 | 3090 | 3296 | 3708 | 4121 |
| | $F_v$ | 77 | 85 | 94 | 102 | 111 | 120 | 128 | 137 | 154 | 171 |
| | E | 786 | 874 | 961 | 1049 | 1136 | 1223 | 1311 | 1398 | 1573 | 1748 |
| **16 x 20** | W | 34669 | 38522 | 42374 | 46226 | 50078 | 53930 | 57783 | 61635 | 69339 | 77044 |
| | w | 2039 | 2266 | 2492 | 2719 | 2945 | 3172 | 3399 | 3625 | 4078 | 4532 |
| | $F_v$ | 86 | 95 | 105 | 114 | 124 | 133 | 143 | 152 | 172 | 191 |
| | E | 706 | 784 | 863 | 941 | 1019 | 1098 | 1176 | 1255 | 1412 | 1569 |
| **14 x 22** | W | 36708 | 40786 | 44865 | 48944 | 53022 | 57101 | 61180 | 65258 | 73416 | 81573 |
| | w | 2159 | 2399 | 2639 | 2879 | 3118 | 3358 | 3598 | 3838 | 4318 | 4798 |
| | $F_v$ | 94 | 105 | 115 | 126 | 137 | 147 | 158 | 168 | 189 | 210 |
| | E | 640 | 711 | 782 | 853 | 925 | 996 | 1067 | 1138 | 1280 | 1423 |
| **12 x 24** | W | 37358 | 41508 | 45659 | 49810 | 53961 | 58112 | 62263 | 66414 | 74716 | 83017 |
| | w | 2197 | 2441 | 2685 | 2930 | 3174 | 3418 | 3662 | 3906 | 4395 | 4883 |
| | $F_v$ | 103 | 115 | 126 | 138 | 149 | 161 | 172 | 184 | 207 | 230 |
| | E | 585 | 651 | 716 | 781 | 846 | 911 | 976 | 1041 | 1171 | 1302 |
| **18 x 20** | W | 39143 | 43492 | 47841 | 52191 | 56540 | 60889 | 65238 | 69588 | 78286 | 86985 |
| | w | 2302 | 2558 | 2814 | 3070 | 3325 | 3581 | 3837 | 4093 | 4605 | 5116 |
| | $F_v$ | 86 | 95 | 105 | 114 | 124 | 133 | 143 | 152 | 172 | 191 |
| | E | 706 | 784 | 863 | 941 | 1020 | 1098 | 1176 | 1255 | 1412 | 1569 |
| **20 x 20** | W | 43616 | 48463 | 53309 | 58155 | 63002 | 67848 | 72694 | 77541 | 87233 | 96926 |
| | w | 2565 | 2850 | 3135 | 3420 | 3706 | 3991 | 4276 | 4561 | 5131 | 5701 |
| | $F_v$ | 86 | 95 | 105 | 114 | 124 | 133 | 143 | 152 | 172 | 191 |
| | E | 706 | 784 | 863 | 941 | 1020 | 1098 | 1176 | 1255 | 1412 | 1569 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **17'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **14 x 24** | W | 43855 | 48727 | 53600 | 58473 | 63346 | 68219 | 73091 | 77964 | 87710 | 97455 |
| | w | 2579 | 2866 | 3152 | 3439 | 3726 | 4012 | 4299 | 4586 | 5159 | 5732 |
| | $F_v$ | 103 | 115 | 126 | 138 | 149 | 161 | 172 | 184 | 207 | 230 |
| | E | 585 | 651 | 716 | 781 | 846 | 911 | 976 | 1041 | 1171 | 1302 |
| **18 x 22** | W | 47584 | 52871 | 58158 | 63446 | 68733 | 74020 | 79307 | 84594 | 95169 | 105743 |
| | w | 2799 | 3110 | 3421 | 3732 | 4043 | 4354 | 4665 | 4976 | 5598 | 6220 |
| | $F_v$ | 94 | 105 | 115 | 126 | 137 | 147 | 158 | 168 | 189 | 210 |
| | E | 640 | 711 | 782 | 853 | 925 | 996 | 1067 | 1138 | 1280 | 1423 |
| **16 x 24** | W | 50352 | 55946 | 61541 | 67136 | 72730 | 78325 | 83920 | 89515 | 100704 | 111893 |
| | w | 2961 | 3290 | 3620 | 3949 | 4278 | 4607 | 4936 | 5265 | 5923 | 6581 |
| | $F_v$ | 103 | 115 | 126 | 138 | 149 | 161 | 172 | 184 | 207 | 230 |
| | E | 585 | 651 | 716 | 781 | 846 | 911 | 976 | 1041 | 1171 | 1302 |
| **20 x 22** | W | 53022 | 58914 | 64805 | 70697 | 76588 | 82479 | 88371 | 94262 | 106045 | 117828 |
| | w | 3118 | 3465 | 3812 | 4158 | 4505 | 4851 | 5198 | 5544 | 6237 | 6931 |
| | $F_v$ | 94 | 105 | 115 | 126 | 137 | 147 | 158 | 168 | 189 | 210 |
| | E | 640 | 711 | 782 | 853 | 925 | 996 | 1067 | 1138 | 1280 | 1423 |
| **18 x 24** | W | 56849 | 63165 | 69482 | 75798 | 82115 | 88432 | 94748 | 101065 | 113698 | 126331 |
| | w | 3344 | 3715 | 4087 | 4458 | 4830 | 5201 | 5573 | 5945 | 6688 | 7431 |
| | $F_v$ | 103 | 115 | 126 | 138 | 149 | 161 | 172 | 184 | 207 | 230 |
| | E | 585 | 651 | 716 | 781 | 846 | 911 | 976 | 1041 | 1171 | 1302 |
| **22 x 22** | W | 58461 | 64956 | 71452 | 77948 | 84443 | 90939 | 97435 | 103930 | 116922 | 129913 |
| | w | 3438 | 3820 | 4203 | 4585 | 4967 | 5349 | 5731 | 6113 | 6877 | 7641 |
| | $F_v$ | 94 | 105 | 115 | 126 | 137 | 147 | 158 | 168 | 189 | 210 |
| | E | 640 | 711 | 782 | 853 | 925 | 996 | 1067 | 1138 | 1280 | 1423 |
| **20 x 24** | W | 63346 | 70384 | 77423 | 84461 | 91500 | 98538 | 105577 | 112615 | 126692 | 140769 |
| | w | 3726 | 4140 | 4554 | 4968 | 5382 | 5796 | 6210 | 6624 | 7452 | 8280 |
| | $F_v$ | 103 | 115 | 126 | 138 | 149 | 161 | 172 | 184 | 207 | 230 |
| | E | 585 | 651 | 716 | 781 | 846 | 911 | 976 | 1041 | 1171 | 1302 |
| **22 x 24** | W | 69843 | 77603 | 85364 | 93124 | 100884 | 108645 | 116405 | 124166 | 139686 | 155207 |
| | w | 4108 | 4564 | 5021 | 5477 | 5934 | 6390 | 6847 | 7303 | 8216 | 9129 |
| | $F_v$ | 103 | 115 | 126 | 138 | 149 | 161 | 172 | 184 | 207 | 230 |
| | E | 585 | 651 | 716 | 781 | 846 | 911 | 976 | 1041 | 1171 | 1302 |
| **24 x 24** | W | 76340 | 84822 | 93304 | 101787 | 110269 | 118751 | 127234 | 135716 | 152680 | 169645 |
| | w | 4490 | 4989 | 5488 | 5987 | 6486 | 6985 | 7484 | 7983 | 8981 | 9979 |
| | $F_v$ | 103 | 115 | 126 | 138 | 149 | 161 | 172 | 184 | 207 | 230 |
| | E | 585 | 651 | 716 | 781 | 846 | 911 | 976 | 1041 | 1171 | 1302 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **18'- 0" SPAN** | | | | | | | | | | | |
| **2 x 8** | W | 438 | 486 | 535 | 584 | 632 | 681 | 730 | 778 | 876 | 973 |
| | w | 24 | 27 | 29 | 32 | 35 | 37 | 40 | 43 | 48 | 54 |
| | $F_v$ | 30 | 33 | 36 | 40 | 43 | 46 | 50 | 53 | 60 | 67 |
| | E | 2011 | 2234 | 2457 | 2681 | 2904 | 3128 | 3351 | 3575 | 4022 | 4468 |
| **4 x 6** | W | 588 | 653 | 718 | 784 | 849 | 914 | 980 | 1045 | 1176 | 1307 |
| | w | 32 | 36 | 39 | 43 | 47 | 50 | 54 | 58 | 65 | 72 |
| | $F_v$ | 22 | 25 | 28 | 30 | 33 | 35 | 38 | 40 | 45 | 50 |
| | E | 2650 | 2945 | 3239 | 3534 | 3829 | 4123 | 4418 | 4712 | 5301 | 5890 |
| **2 x 10** | W | 713 | 792 | 871 | 950 | 1029 | 1109 | 1188 | 1267 | 1426 | 1584 |
| | w | 39 | 44 | 48 | 52 | 57 | 61 | 66 | 70 | 79 | 88 |
| | $F_v$ | 38 | 42 | 47 | 51 | 55 | 59 | 64 | 68 | 77 | 85 |
| | E | 1576 | 1751 | 1926 | 2101 | 2276 | 2451 | 2627 | 2802 | 3152 | 3502 |
| **3 x 8** | W | 730 | 811 | 892 | 973 | 1054 | 1135 | 1216 | 1297 | 1460 | 1622 |
| | w | 40 | 45 | 49 | 54 | 58 | 63 | 67 | 72 | 81 | 90 |
| | $F_v$ | 30 | 33 | 36 | 40 | 43 | 46 | 50 | 53 | 60 | 67 |
| | E | 2011 | 2234 | 2457 | 2681 | 2904 | 3128 | 3351 | 3575 | 4022 | 4468 |
| **6 x 6** | W | 924 | 1027 | 1129 | 1232 | 1335 | 1437 | 1540 | 1643 | 1848 | 2054 |
| | w | 51 | 57 | 62 | 68 | 74 | 79 | 85 | 91 | 102 | 114 |
| | $F_v$ | 22 | 25 | 28 | 30 | 33 | 35 | 38 | 40 | 45 | 50 |
| | E | 2650 | 2945 | 3239 | 3534 | 3829 | 4123 | 4418 | 4712 | 5301 | 5890 |
| **4 x 8** | W | 1022 | 1135 | 1249 | 1362 | 1476 | 1589 | 1703 | 1816 | 2044 | 2271 |
| | w | 56 | 63 | 69 | 75 | 82 | 88 | 94 | 100 | 113 | 126 |
| | $F_v$ | 30 | 33 | 36 | 40 | 43 | 46 | 50 | 53 | 60 | 67 |
| | E | 2011 | 2234 | 2457 | 2681 | 2904 | 3128 | 3351 | 3575 | 4022 | 4468 |
| **2 x 12** | W | 1054 | 1171 | 1289 | 1406 | 1523 | 1640 | 1757 | 1875 | 2109 | 2343 |
| | w | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | $F_v$ | 46 | 52 | 57 | 62 | 67 | 72 | 78 | 83 | 93 | 104 |
| | E | 1295 | 1439 | 1583 | 1727 | 1871 | 2015 | 2159 | 2303 | 2591 | 2879 |
| **3 x 10** | W | 1188 | 1320 | 1452 | 1584 | 1716 | 1848 | 1980 | 2112 | 2376 | 2640 |
| | w | 66 | 73 | 80 | 88 | 95 | 102 | 110 | 117 | 132 | 146 |
| | $F_v$ | 38 | 42 | 47 | 51 | 55 | 59 | 64 | 68 | 77 | 85 |
| | E | 1576 | 1751 | 1926 | 2101 | 2276 | 2451 | 2627 | 2802 | 3152 | 3502 |
| **2 x 14** | W | 1463 | 1625 | 1788 | 1950 | 2113 | 2275 | 2438 | 2600 | 2926 | 3251 |
| | w | 81 | 90 | 99 | 108 | 117 | 126 | 135 | 144 | 162 | 180 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 85 | 92 | 98 | 110 | 122 |
| | E | 1100 | 1222 | 1344 | 1467 | 1589 | 1711 | 1833 | 1956 | 2200 | 2445 |
| **6 x 8** | W | 1718 | 1909 | 2100 | 2291 | 2482 | 2673 | 2864 | 3055 | 3437 | 3819 |
| | w | 95 | 106 | 116 | 127 | 137 | 148 | 159 | 169 | 190 | 212 |
| | $F_v$ | 31 | 34 | 38 | 41 | 45 | 48 | 52 | 55 | 62 | 69 |
| | E | 1943 | 2159 | 2375 | 2591 | 2807 | 3023 | 3239 | 3455 | 3887 | 4319 |
| **4 x 10** | W | 1663 | 1848 | 2033 | 2218 | 2403 | 2588 | 2772 | 2957 | 3327 | 3697 |
| | w | 92 | 102 | 112 | 123 | 133 | 143 | 154 | 164 | 184 | 205 |
| | $F_v$ | 38 | 42 | 47 | 51 | 55 | 59 | 64 | 68 | 77 | 85 |
| | E | 1576 | 1751 | 1926 | 2101 | 2276 | 2451 | 2627 | 2802 | 3152 | 3502 |
| **3 x 12** | W | 1757 | 1953 | 2148 | 2343 | 2539 | 2734 | 2929 | 3125 | 3515 | 3906 |
| | w | 97 | 108 | 119 | 130 | 141 | 151 | 162 | 173 | 195 | 217 |
| | $F_v$ | 46 | 52 | 57 | 62 | 67 | 72 | 78 | 83 | 93 | 104 |
| | E | 1295 | 1439 | 1583 | 1727 | 1871 | 2015 | 2159 | 2303 | 2591 | 2879 |
| **8 x 8** | W | 2343 | 2604 | 2864 | 3125 | 3385 | 3645 | 3906 | 4166 | 4687 | 5208 |
| | w | 130 | 144 | 159 | 173 | 188 | 202 | 217 | 231 | 260 | 289 |
| | $F_v$ | 31 | 34 | 38 | 41 | 45 | 48 | 52 | 55 | 62 | 69 |
| | E | 1943 | 2159 | 2375 | 2591 | 2807 | 3023 | 3239 | 3455 | 3887 | 4319 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **18'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **3 x 14** | W | 2438 | 2709 | 2980 | 3251 | 3522 | 3793 | 4063 | 4334 | 4876 | 5418 |
| | w | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 240 | 270 | 301 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 85 | 92 | 98 | 110 | 122 |
| | E | 1100 | 1222 | 1344 | 1467 | 1589 | 1711 | 1833 | 1956 | 2200 | 2445 |
| **4 x 12** | W | 2460 | 2734 | 3007 | 3281 | 3554 | 3828 | 4101 | 4375 | 4921 | 5468 |
| | w | 136 | 151 | 167 | 182 | 197 | 212 | 227 | 243 | 273 | 303 |
| | $F_v$ | 46 | 52 | 57 | 62 | 67 | 72 | 78 | 83 | 93 | 104 |
| | E | 1295 | 1439 | 1583 | 1727 | 1871 | 2015 | 2159 | 2303 | 2591 | 2879 |
| **6 x 10** | W | 2757 | 3064 | 3370 | 3676 | 3983 | 4289 | 4596 | 4902 | 5515 | 6128 |
| | w | 153 | 170 | 187 | 204 | 221 | 238 | 255 | 272 | 306 | 340 |
| | $F_v$ | 39 | 43 | 48 | 52 | 57 | 61 | 65 | 70 | 79 | 87 |
| | E | 1534 | 1705 | 1875 | 2046 | 2216 | 2387 | 2557 | 2728 | 3069 | 3410 |
| **3 x 16** | W | 3230 | 3588 | 3947 | 4306 | 4665 | 5024 | 5383 | 5742 | 6460 | 7177 |
| | w | 179 | 199 | 219 | 239 | 259 | 279 | 299 | 319 | 358 | 398 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 112 | 127 | 141 |
| | E | 956 | 1062 | 1168 | 1274 | 1380 | 1487 | 1593 | 1699 | 1912 | 2124 |
| **4 x 14** | W | 3543 | 3937 | 4331 | 4725 | 5118 | 5512 | 5906 | 6300 | 7087 | 7875 |
| | w | 196 | 218 | 240 | 262 | 284 | 306 | 328 | 350 | 393 | 437 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **8 x 10** | W | 3760 | 4178 | 4596 | 5013 | 5431 | 5849 | 6267 | 6685 | 7520 | 8356 |
| | w | 208 | 232 | 255 | 278 | 301 | 324 | 348 | 371 | 417 | 464 |
| | $F_v$ | 39 | 43 | 48 | 52 | 57 | 61 | 65 | 70 | 79 | 87 |
| | E | 1534 | 1705 | 1875 | 2046 | 2216 | 2387 | 2557 | 2728 | 3069 | 3410 |
| **6 x 12** | W | 4040 | 4489 | 4938 | 5387 | 5836 | 6285 | 6734 | 7183 | 8081 | 8979 |
| | w | 224 | 249 | 274 | 299 | 324 | 349 | 374 | 399 | 448 | 498 |
| | $F_v$ | 47 | 53 | 58 | 63 | 69 | 74 | 79 | 85 | 95 | 106 |
| | E | 1267 | 1408 | 1549 | 1690 | 1831 | 1972 | 2113 | 2253 | 2535 | 2817 |
| **10 x 10** | W | 4763 | 5292 | 5821 | 6350 | 6880 | 7409 | 7938 | 8467 | 9526 | 10584 |
| | w | 264 | 294 | 323 | 352 | 382 | 411 | 441 | 470 | 529 | 588 |
| | $F_v$ | 39 | 43 | 48 | 52 | 57 | 61 | 65 | 70 | 79 | 87 |
| | E | 1534 | 1705 | 1875 | 2046 | 2216 | 2387 | 2557 | 2728 | 3069 | 3410 |
| **4 x 16** | W | 4671 | 5190 | 5709 | 6228 | 6747 | 7266 | 7785 | 8304 | 9343 | 10381 |
| | w | 259 | 288 | 317 | 346 | 374 | 403 | 432 | 461 | 519 | 576 |
| | $F_v$ | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | E | 940 | 1045 | 1149 | 1254 | 1358 | 1463 | 1567 | 1672 | 1881 | 2090 |
| **8 x 12** | W | 5510 | 6122 | 6734 | 7347 | 7959 | 8571 | 9184 | 9796 | 11020 | 12245 |
| | w | 306 | 340 | 374 | 408 | 442 | 476 | 510 | 544 | 612 | 680 |
| | $F_v$ | 47 | 53 | 58 | 63 | 69 | 74 | 79 | 85 | 95 | 106 |
| | E | 1267 | 1408 | 1549 | 1690 | 1831 | 1972 | 2113 | 2253 | 2535 | 2817 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **18'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **6 x 14** | W | 5568 | 6187 | 6806 | 7425 | 8043 | 8662 | 9281 | 9900 | 11137 | 12375 |
| | w | 309 | 343 | 378 | 412 | 446 | 481 | 515 | 550 | 618 | 687 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **10 x 12** | W | 6979 | 7755 | 8530 | 9306 | 10082 | 10857 | 11633 | 12408 | 13959 | 15510 |
| | w | 387 | 430 | 473 | 517 | 560 | 603 | 646 | 689 | 775 | 861 |
| | $F_v$ | 47 | 53 | 58 | 63 | 69 | 74 | 79 | 85 | 95 | 106 |
| | E | 1267 | 1408 | 1549 | 1690 | 1831 | 1972 | 2113 | 2253 | 2535 | 2817 |
| **6 x 16** | W | 7340 | 8156 | 8972 | 9787 | 10603 | 11419 | 12234 | 13050 | 14681 | 16313 |
| | w | 407 | 453 | 498 | 543 | 589 | 634 | 679 | 725 | 815 | 906 |
| | $F_v$ | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | E | 940 | 1045 | 1149 | 1254 | 1358 | 1463 | 1567 | 1672 | 1881 | 2090 |
| **8 x 14** | W | 7593 | 8437 | 9281 | 10125 | 10968 | 11812 | 12656 | 13500 | 15187 | 16875 |
| | w | 421 | 468 | 515 | 562 | 609 | 656 | 703 | 750 | 843 | 937 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **12 x 12** | W | 8449 | 9388 | 10326 | 11265 | 12204 | 13143 | 14082 | 15020 | 16898 | 18776 |
| | w | 469 | 521 | 573 | 625 | 678 | 730 | 782 | 834 | 938 | 1043 |
| | $F_v$ | 47 | 53 | 58 | 63 | 69 | 74 | 79 | 85 | 95 | 106 |
| | E | 1267 | 1408 | 1549 | 1690 | 1831 | 1972 | 2113 | 2253 | 2535 | 2817 |
| **6 x 18** | W | 9357 | 10397 | 11437 | 12476 | 13516 | 14556 | 15596 | 16635 | 18715 | 20794 |
| | w | 519 | 577 | 635 | 693 | 750 | 808 | 866 | 924 | 1039 | 1155 |
| | $F_v$ | 72 | 81 | 89 | 97 | 105 | 113 | 121 | 129 | 145 | 162 |
| | E | 833 | 925 | 1018 | 1110 | 1203 | 1295 | 1388 | 1481 | 1666 | 1851 |
| **10 x 14** | W | 9618 | 10687 | 11756 | 12825 | 13893 | 14962 | 16031 | 17100 | 19237 | 21375 |
| | w | 534 | 593 | 653 | 712 | 771 | 831 | 890 | 950 | 1068 | 1187 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **8 x 16** | W | 10010 | 11122 | 12234 | 13347 | 14459 | 15571 | 16684 | 17796 | 20020 | 22245 |
| | w | 556 | 617 | 679 | 741 | 803 | 865 | 926 | 988 | 1112 | 1235 |
| | $F_v$ | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | E | 940 | 1045 | 1149 | 1254 | 1358 | 1463 | 1567 | 1672 | 1881 | 2090 |
| **6 x 20** | W | 11618 | 12909 | 14200 | 15491 | 16782 | 18073 | 19364 | 20655 | 23237 | 25819 |
| | w | 645 | 717 | 788 | 860 | 932 | 1004 | 1075 | 1147 | 1290 | 1434 |
| | $F_v$ | 81 | 90 | 99 | 108 | 117 | 126 | 135 | 144 | 162 | 180 |
| | E | 747 | 830 | 913 | 996 | 1079 | 1163 | 1246 | 1329 | 1495 | 1661 |
| **12 x 14** | W | 11643 | 12937 | 14231 | 15525 | 16818 | 18112 | 19406 | 20700 | 23287 | 25875 |
| | w | 646 | 718 | 790 | 862 | 934 | 1006 | 1078 | 1150 | 1293 | 1437 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **10 x 16** | W | 12679 | 14088 | 15497 | 16906 | 18315 | 19724 | 21133 | 22541 | 25359 | 28177 |
| | w | 704 | 782 | 860 | 939 | 1017 | 1095 | 1174 | 1252 | 1408 | 1565 |
| | $F_v$ | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | E | 940 | 1045 | 1149 | 1254 | 1358 | 1463 | 1567 | 1672 | 1881 | 2090 |
| **8 x 18** | W | 12760 | 14178 | 15596 | 17013 | 18431 | 19849 | 21267 | 22685 | 25520 | 28356 |
| | w | 708 | 787 | 866 | 945 | 1023 | 1102 | 1181 | 1260 | 1417 | 1575 |
| | $F_v$ | 72 | 81 | 89 | 97 | 105 | 113 | 121 | 129 | 145 | 162 |
| | E | 833 | 925 | 1018 | 1110 | 1203 | 1295 | 1388 | 1481 | 1666 | 1851 |
| **14 x 14** | W | 13668 | 15187 | 16706 | 18225 | 19743 | 21262 | 22781 | 24300 | 27337 | 30375 |
| | w | 759 | 843 | 928 | 1012 | 1096 | 1181 | 1265 | 1350 | 1518 | 1687 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **18'-0" SPAN** CONT'D | | | | | | | | | | | |
| **6 x 22** | W | 14124 | 15693 | 17263 | 18832 | 20401 | 21971 | 23540 | 25109 | 28248 | 31387 |
| | w | 784 | 871 | 959 | 1046 | 1133 | 1220 | 1307 | 1394 | 1569 | 1743 |
| | $F_v$ | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 159 | 179 | 199 |
| | E | 678 | 753 | 828 | 904 | 979 | 1054 | 1130 | 1205 | 1356 | 1506 |
| **12 x 16** | W | 15349 | 17054 | 18760 | 20465 | 22171 | 23876 | 25582 | 27287 | 30698 | 34109 |
| | w | 852 | 947 | 1042 | 1136 | 1231 | 1326 | 1421 | 1515 | 1705 | 1894 |
| | $F_v$ | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | E | 940 | 1045 | 1149 | 1254 | 1358 | 1463 | 1567 | 1672 | 1881 | 2090 |
| **8 x 20** | W | 15843 | 17604 | 19364 | 21125 | 22885 | 24645 | 26406 | 28166 | 31687 | 35208 |
| | w | 880 | 978 | 1075 | 1173 | 1271 | 1369 | 1467 | 1564 | 1760 | 1956 |
| | $F_v$ | 81 | 90 | 99 | 108 | 117 | 126 | 135 | 144 | 162 | 180 |
| | E | 747 | 830 | 913 | 996 | 1079 | 1163 | 1246 | 1329 | 1495 | 1661 |
| **10 x 18** | W | 16163 | 17959 | 19755 | 21550 | 23346 | 25142 | 26938 | 28734 | 32326 | 35918 |
| | w | 897 | 997 | 1097 | 1197 | 1297 | 1396 | 1496 | 1596 | 1795 | 1995 |
| | $F_v$ | 72 | 81 | 89 | 97 | 105 | 113 | 121 | 129 | 145 | 162 |
| | E | 833 | 925 | 1018 | 1110 | 1203 | 1296 | 1388 | 1481 | 1666 | 1851 |
| **6 x 24** | W | 16874 | 18749 | 20624 | 22499 | 24373 | 26248 | 28123 | 29998 | 33748 | 37498 |
| | w | 937 | 1041 | 1145 | 1249 | 1354 | 1458 | 1562 | 1666 | 1874 | 2083 |
| | $F_v$ | 97 | 108 | 119 | 130 | 141 | 152 | 163 | 174 | 195 | 217 |
| | E | 620 | 689 | 758 | 827 | 896 | 965 | 1034 | 1102 | 1240 | 1378 |
| **14 x 16** | W | 18018 | 20020 | 22022 | 24025 | 26027 | 28029 | 30031 | 32033 | 36037 | 40041 |
| | w | 1001 | 1112 | 1223 | 1334 | 1445 | 1557 | 1668 | 1779 | 2002 | 2224 |
| | $F_v$ | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | E | 940 | 1045 | 1149 | 1254 | 1358 | 1463 | 1567 | 1672 | 1881 | 2090 |
| **8 x 22** | W | 19260 | 21400 | 23540 | 25680 | 27820 | 29960 | 32100 | 34240 | 38520 | 42800 |
| | w | 1070 | 1188 | 1307 | 1426 | 1545 | 1664 | 1783 | 1902 | 2140 | 2377 |
| | $F_v$ | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 159 | 179 | 199 |
| | E | 678 | 753 | 828 | 904 | 979 | 1054 | 1130 | 1205 | 1356 | 1506 |
| **12 x 18** | W | 19565 | 21739 | 23913 | 26087 | 28261 | 30435 | 32609 | 34783 | 39131 | 43479 |
| | w | 1086 | 1207 | 1328 | 1449 | 1570 | 1690 | 1811 | 1932 | 2173 | 2415 |
| | $F_v$ | 72 | 81 | 89 | 97 | 105 | 113 | 121 | 129 | 145 | 162 |
| | E | 833 | 925 | 1018 | 1110 | 1203 | 1295 | 1388 | 1481 | 1666 | 1851 |
| **10 x 20** | W | 20068 | 22298 | 24528 | 26758 | 28988 | 31218 | 33447 | 35677 | 40137 | 44597 |
| | w | 1114 | 1238 | 1362 | 1486 | 1610 | 1734 | 1858 | 1982 | 2229 | 2477 |
| | $F_v$ | 81 | 90 | 99 | 108 | 117 | 126 | 135 | 144 | 162 | 180 |
| | E | 747 | 830 | 913 | 996 | 1079 | 1163 | 1246 | 1329 | 1495 | 1661 |
| **16 x 16** | W | 20688 | 22986 | 25285 | 27584 | 29882 | 32181 | 34480 | 36779 | 41376 | 45973 |
| | w | 1149 | 1277 | 1404 | 1532 | 1660 | 1787 | 1915 | 2043 | 2298 | 2554 |
| | $F_v$ | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | E | 940 | 1045 | 1149 | 1254 | 1358 | 1463 | 1567 | 1672 | 1881 | 2090 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **18'-0" SPAN** CONT'D | | | | | | | | | | | |
| **14 x 18** | W | 22968 | 25520 | 28072 | 30625 | 33177 | 35729 | 38281 | 40833 | 45937 | 51041 |
| | w | 1276 | 1417 | 1559 | 1701 | 1843 | 1984 | 2126 | 2268 | 2552 | 2835 |
| | $nF_v$ | 72 | 81 | 89 | 97 | 105 | 113 | 121 | 129 | 145 | 162 |
| | E | 833 | 925 | 1018 | 1110 | 1203 | 1295 | 1388 | 1481 | 1666 | 1851 |
| **8 x 24** | W | 23010 | 25567 | 28123 | 30680 | 33237 | 35793 | 38350 | 40907 | 46020 | 51134 |
| | w | 1278 | 1420 | 1562 | 1704 | 1846 | 1988 | 2130 | 2272 | 2556 | 2840 |
| | $F_v$ | 97 | 108 | 119 | 130 | 141 | 152 | 163 | 174 | 195 | 217 |
| | E | 620 | 689 | 758 | 827 | 896 | 965 | 1034 | 1102 | 1240 | 1378 |
| **12 x 20** | W | 24293 | 26993 | 29692 | 32391 | 35090 | 37790 | 40489 | 43188 | 48587 | 53986 |
| | w | 1349 | 1499 | 1649 | 1799 | 1949 | 2099 | 2249 | 2399 | 2699 | 2999 |
| | $F_v$ | 81 | 90 | 99 | 108 | 117 | 126 | 135 | 144 | 162 | 180 |
| | E | 747 | 830 | 913 | 996 | 1079 | 1163 | 1246 | 1329 | 1495 | 1661 |
| **10 x 22** | W | 24396 | 27107 | 29817 | 32528 | 35239 | 37950 | 40660 | 43371 | 48793 | 54214 |
| | w | 1355 | 1505 | 1656 | 1807 | 1957 | 2108 | 2258 | 2409 | 2710 | 3011 |
| | $F_v$ | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 159 | 179 | 199 |
| | E | 678 | 753 | 828 | 904 | 979 | 1054 | 1130 | 1205 | 1356 | 1506 |
| **16 x 18** | W | 26371 | 29301 | 32231 | 35162 | 38092 | 41022 | 43952 | 46882 | 52743 | 58603 |
| | w | 1465 | 1627 | 1790 | 1953 | 2116 | 2279 | 2441 | 2604 | 2930 | 3255 |
| | $F_v$ | 72 | 81 | 89 | 97 | 105 | 113 | 121 | 129 | 145 | 162 |
| | E | 833 | 925 | 1018 | 1110 | 1203 | 1295 | 1388 | 1481 | 1666 | 1851 |
| **14 x 20** | W | 28518 | 31687 | 34856 | 38025 | 41193 | 44362 | 47531 | 50700 | 57037 | 63375 |
| | w | 1584 | 1760 | 1936 | 2112 | 2288 | 2464 | 2640 | 2816 | 3168 | 3520 |
| | $F_v$ | 81 | 90 | 99 | 108 | 117 | 126 | 135 | 144 | 162 | 180 |
| | E | 747 | 830 | 913 | 996 | 1079 | 1163 | 1246 | 1329 | 1495 | 1661 |
| **10 x 24** | W | 29146 | 32385 | 35623 | 38862 | 42100 | 45339 | 48577 | 51816 | 58293 | 64770 |
| | w | 1619 | 1799 | 1979 | 2159 | 2338 | 2518 | 2698 | 2878 | 3238 | 3598 |
| | $F_v$ | 97 | 108 | 119 | 130 | 141 | 152 | 163 | 174 | 195 | 217 |
| | E | 620 | 689 | 758 | 827 | 896 | 965 | 1034 | 1102 | 1240 | 1378 |
| **12 x 22** | W | 29532 | 32814 | 36095 | 39376 | 42658 | 45939 | 49221 | 52502 | 59065 | 65628 |
| | w | 1640 | 1823 | 2005 | 2187 | 2369 | 2552 | 2734 | 2916 | 3281 | 3646 |
| | $F_v$ | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 159 | 179 | 199 |
| | E | 678 | 753 | 828 | 904 | 979 | 1054 | 1130 | 1205 | 1356 | 1506 |
| **18 x 18** | W | 29774 | 33082 | 36390 | 39699 | 43007 | 46315 | 49623 | 52932 | 59548 | 66165 |
| | w | 1654 | 1837 | 2021 | 2205 | 2389 | 2573 | 2756 | 2940 | 3308 | 3675 |
| | $F_v$ | 72 | 81 | 89 | 97 | 105 | 113 | 121 | 129 | 145 | 162 |
| | E | 833 | 925 | 1018 | 1110 | 1203 | 1295 | 1388 | 1481 | 1666 | 1851 |
| **16 x 20** | W | 32743 | 36381 | 40020 | 43658 | 47296 | 50934 | 54572 | 58211 | 65487 | 72763 |
| | w | 1819 | 2021 | 2223 | 2425 | 2627 | 2829 | 3031 | 3233 | 3638 | 4042 |
| | $F_v$ | 81 | 90 | 99 | 108 | 117 | 126 | 135 | 144 | 162 | 180 |
| | E | 747 | 830 | 913 | 996 | 1079 | 1163 | 1246 | 1329 | 1495 | 1661 |
| **14 x 22** | W | 34668 | 38520 | 42372 | 46225 | 50077 | 53929 | 57781 | 61633 | 69337 | 77041 |
| | w | 1926 | 2140 | 2354 | 2568 | 2782 | 2996 | 3210 | 3424 | 3852 | 4280 |
| | $F_v$ | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 159 | 179 | 199 |
| | E | 678 | 753 | 828 | 904 | 979 | 1054 | 1130 | 1205 | 1356 | 1506 |
| **12 x 24** | W | 35282 | 39202 | 43123 | 47043 | 50963 | 54884 | 58804 | 62724 | 70565 | 78405 |
| | w | 1960 | 2177 | 2395 | 2613 | 2831 | 3049 | 3266 | 3484 | 3920 | 4355 |
| | $F_v$ | 97 | 108 | 119 | 130 | 141 | 152 | 163 | 174 | 195 | 217 |
| | E | 620 | 689 | 758 | 827 | 896 | 965 | 1034 | 1102 | 1240 | 1378 |
| **18 x 20** | W | 36968 | 41076 | 45184 | 49291 | 53399 | 57506 | 61614 | 65722 | 73937 | 82152 |
| | w | 2053 | 2282 | 2510 | 2738 | 2966 | 3194 | 3423 | 3651 | 4107 | 4564 |
| | $F_v$ | 81 | 90 | 99 | 108 | 117 | 126 | 135 | 144 | 162 | 180 |
| | E | 747 | 830 | 913 | 996 | 1079 | 1163 | 1246 | 1329 | 1495 | 1661 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l$/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **18'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **16 x 22** | W | 39804 | 44227 | 48650 | 53073 | 57495 | 61918 | 66341 | 70764 | 79609 | 88455 |
| | w | 2211 | 2457 | 2702 | 2948 | 3194 | 3439 | 3685 | 3931 | 4422 | 4914 |
| | $F_v$ | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 159 | 179 | 199 |
| | E | 678 | 753 | 828 | 904 | 979 | 1054 | 1130 | 1205 | 1356 | 1506 |
| **20 x 20** | W | 41193 | 45770 | 50347 | 54925 | 59502 | 64079 | 68656 | 73233 | 82387 | 91541 |
| | w | 2288 | 2542 | 2797 | 3051 | 3305 | 3559 | 3814 | 4068 | 4577 | 5085 |
| | $F_v$ | 81 | 90 | 99 | 108 | 117 | 126 | 135 | 144 | 162 | 180 |
| | E | 747 | 830 | 913 | 996 | 1079 | 1163 | 1246 | 1329 | 1495 | 1661 |
| **14 x 24** | W | 41418 | 46020 | 50622 | 55225 | 59827 | 64429 | 69031 | 73633 | 82837 | 92041 |
| | w | 2301 | 2556 | 2812 | 3068 | 3323 | 3579 | 3835 | 4090 | 4602 | 5113 |
| | $F_v$ | 97 | 108 | 119 | 130 | 141 | 152 | 163 | 174 | 195 | 217 |
| | E | 620 | 689 | 758 | 827 | 896 | 965 | 1034 | 1102 | 1240 | 1378 |
| **18 x 22** | W | 44940 | 49934 | 54927 | 59921 | 64914 | 69908 | 74901 | 79895 | 89881 | 99868 |
| | w | 2496 | 2774 | 3051 | 3328 | 3606 | 3883 | 4161 | 4438 | 4993 | 5548 |
| | $F_v$ | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 159 | 179 | 199 |
| | E | 678 | 753 | 828 | 904 | 979 | 1054 | 1130 | 1205 | 1356 | 1506 |
| **16 x 24** | W | 47554 | 52838 | 58122 | 63406 | 68690 | 73974 | 79258 | 84541 | 95109 | 105677 |
| | w | 2641 | 2935 | 3229 | 3522 | 3816 | 4109 | 4403 | 4696 | 5283 | 5870 |
| | $F_v$ | 97 | 108 | 119 | 130 | 141 | 152 | 163 | 174 | 195 | 217 |
| | E | 620 | 689 | 758 | 827 | 896 | 965 | 1034 | 1102 | 1240 | 1378 |
| **20 x 22** | W | 50077 | 55641 | 61205 | 66769 | 72333 | 77897 | 83461 | 89025 | 100154 | 111282 |
| | w | 2782 | 3091 | 3400 | 3709 | 4018 | 4327 | 4636 | 4945 | 5564 | 6182 |
| | $F_v$ | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 159 | 179 | 199 |
| | E | 678 | 753 | 828 | 904 | 979 | 1054 | 1130 | 1205 | 1356 | 1506 |
| **18 x 24** | W | 53690 | 59656 | 65622 | 71587 | 77553 | 83519 | 89484 | 95450 | 107381 | 119313 |
| | w | 2982 | 3314 | 3645 | 3977 | 4308 | 4639 | 4971 | 5302 | 5965 | 6628 |
| | $F_v$ | 97 | 108 | 119 | 130 | 141 | 152 | 163 | 174 | 195 | 217 |
| | E | 620 | 689 | 758 | 827 | 896 | 965 | 1034 | 1102 | 1240 | 1378 |
| **22 x 22** | W | 55213 | 61347 | 67482 | 73617 | 79752 | 85887 | 92021 | 98156 | 110426 | 122695 |
| | w | 3067 | 3408 | 3749 | 4089 | 4430 | 4771 | 5112 | 5453 | 6134 | 6816 |
| | $F_v$ | 89 | 99 | 109 | 119 | 129 | 139 | 149 | 159 | 179 | 199 |
| | E | 678 | 753 | 828 | 904 | 979 | 1054 | 1130 | 1205 | 1356 | 1506 |
| **20 x 24** | W | 59827 | 66474 | 73121 | 79769 | 86416 | 93064 | 99711 | 106359 | 119654 | 132949 |
| | w | 3323 | 3693 | 4062 | 4431 | 4800 | 5170 | 5539 | 5908 | 6647 | 7386 |
| | $F_v$ | 97 | 108 | 119 | 130 | 141 | 152 | 163 | 174 | 195 | 217 |
| | E | 620 | 689 | 758 | 827 | 896 | 965 | 1034 | 1102 | 1240 | 1378 |
| **22 x 24** | W | 65963 | 73292 | 80621 | 87950 | 95280 | 102609 | 109938 | 117267 | 131926 | 146584 |
| | w | 3664 | 4071 | 4478 | 4886 | 5293 | 5700 | 6107 | 6514 | 7329 | 8143 |
| | $F_v$ | 97 | 108 | 119 | 130 | 141 | 152 | 163 | 174 | 195 | 217 |
| | E | 620 | 689 | 758 | 827 | 896 | 965 | 1034 | 1102 | 1240 | 1378 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **18'-0" SPAN CONT'D** | | | | | | | | | | | |
| **24 x 24** | W | 72099 | 80110 | 88121 | 96132 | 104143 | 112154 | 120165 | 128176 | 144198 | 160220 |
| | w | 4005 | 4450 | 4895 | 5340 | 5785 | 6230 | 6675 | 7120 | 8011 | 8901 |
| | $F_v$ | 97 | 108 | 119 | 130 | 141 | 152 | 163 | 174 | 195 | 217 |
| | E | 620 | 689 | 758 | 827 | 896 | 965 | 1034 | 1102 | 1240 | 1378 |
| **19'-0" SPAN** | | | | | | | | | | | |
| **2 x 8** | W | 414 | 461 | 507 | 553 | 599 | 645 | 691 | 737 | 829 | 922 |
| | w | 21 | 24 | 26 | 29 | 31 | 33 | 36 | 38 | 43 | 48 |
| | $F_v$ | 28 | 31 | 34 | 38 | 41 | 44 | 47 | 50 | 57 | 63 |
| | E | 2122 | 2358 | 2594 | 2830 | 3066 | 3302 | 3537 | 3773 | 4245 | 4717 |
| **4 x 6** | W | 557 | 619 | 681 | 742 | 804 | 866 | 928 | 990 | 1114 | 1238 |
| | w | 29 | 32 | 35 | 39 | 42 | 45 | 48 | 52 | 58 | 65 |
| | $F_v$ | 21 | 24 | 26 | 28 | 31 | 33 | 36 | 38 | 43 | 48 |
| | E | 2798 | 3109 | 3419 | 3730 | 4041 | 4352 | 4663 | 4974 | 5596 | 6218 |
| **2 x 10** | W | 675 | 750 | 825 | 900 | 975 | 1050 | 1125 | 1200 | 1350 | 1501 |
| | w | 35 | 39 | 43 | 47 | 51 | 55 | 59 | 63 | 71 | 79 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 73 | 81 |
| | E | 1663 | 1848 | 2033 | 2218 | 2403 | 2588 | 2772 | 2957 | 3327 | 3697 |
| **3 x 8** | W | 691 | 768 | 845 | 922 | 998 | 1075 | 1152 | 1229 | 1383 | 1536 |
| | w | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | $F_v$ | 28 | 31 | 34 | 38 | 41 | 44 | 47 | 50 | 57 | 63 |
| | E | 2122 | 2358 | 2594 | 2830 | 3066 | 3302 | 3537 | 3773 | 4245 | 4717 |
| **6 x 6** | W | 875 | 972 | 1070 | 1167 | 1264 | 1362 | 1459 | 1556 | 1751 | 1945 |
| | w | 46 | 51 | 56 | 61 | 66 | 71 | 76 | 81 | 92 | 102 |
| | $F_v$ | 21 | 24 | 26 | 28 | 31 | 33 | 36 | 38 | 43 | 48 |
| | E | 2798 | 3109 | 3419 | 3730 | 4041 | 4352 | 4663 | 4974 | 5596 | 6218 |
| **4 x 8** | W | 968 | 1075 | 1183 | 1291 | 1398 | 1506 | 1613 | 1721 | 1936 | 2151 |
| | w | 50 | 56 | 62 | 67 | 73 | 79 | 84 | 90 | 101 | 113 |
| | $F_v$ | 28 | 31 | 34 | 38 | 41 | 44 | 47 | 50 | 57 | 63 |
| | E | 2122 | 2358 | 2594 | 2830 | 3066 | 3302 | 3537 | 3773 | 4245 | 4717 |
| **2 x 12** | W | 999 | 1110 | 1221 | 1332 | 1443 | 1554 | 1665 | 1776 | 1998 | 2220 |
| | w | 52 | 58 | 64 | 70 | 75 | 81 | 87 | 93 | 105 | 116 |
| | $F_v$ | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 78 | 88 | 98 |
| | E | 1367 | 1519 | 1671 | 1823 | 1975 | 2127 | 2279 | 2431 | 2735 | 3039 |
| **3 x 10** | W | 1125 | 1250 | 1376 | 1501 | 1626 | 1751 | 1876 | 2001 | 2251 | 2501 |
| | w | 59 | 65 | 72 | 79 | 85 | 92 | 98 | 105 | 118 | 131 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 73 | 81 |
| | E | 1663 | 1848 | 2033 | 2218 | 2403 | 2588 | 2772 | 2957 | 3327 | 3697 |
| **2 x 14** | W | 1386 | 1540 | 1694 | 1848 | 2002 | 2156 | 2310 | 2464 | 2772 | 3080 |
| | w | 72 | 81 | 89 | 97 | 105 | 113 | 121 | 129 | 145 | 162 |
| | $F_v$ | 52 | 58 | 63 | 69 | 75 | 81 | 87 | 92 | 104 | 116 |
| | E | 1161 | 1290 | 1419 | 1548 | 1677 | 1806 | 1935 | 2064 | 2323 | 2581 |
| **6 x 8** | W | 1628 | 1809 | 1990 | 2171 | 2351 | 2532 | 2713 | 2894 | 3256 | 3618 |
| | w | 85 | 95 | 104 | 114 | 123 | 133 | 142 | 152 | 171 | 190 |
| | $F_v$ | 29 | 32 | 36 | 39 | 42 | 46 | 49 | 52 | 59 | 65 |
| | E | 2051 | 2279 | 2507 | 2735 | 2963 | 3191 | 3419 | 3647 | 4103 | 4559 |
| **4 x 10** | W | 1576 | 1751 | 1926 | 2101 | 2276 | 2451 | 2626 | 2802 | 3152 | 3502 |
| | w | 82 | 92 | 101 | 110 | 119 | 129 | 138 | 147 | 165 | 184 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 73 | 81 |
| | E | 1663 | 1848 | 2033 | 2218 | 2403 | 2588 | 2772 | 2957 | 3327 | 3697 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

*Symbols used in the tables are as follows:*

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **19'-0" SPAN CONT'D** | | | | | | | | | | | |
| **3 x 12** | W | 1665 | 1850 | 2035 | 2220 | 2405 | 2590 | 2775 | 2960 | 3330 | 3700 |
| | w | 87 | 97 | 107 | 116 | 126 | 136 | 146 | 155 | 175 | 194 |
| | $F_v$ | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 78 | 88 | 98 |
| | E | 1367 | 1519 | 1671 | 1823 | 1975 | 2127 | 2279 | 2431 | 2735 | 3039 |
| **8 x 8** | W | 2220 | 2467 | 2713 | 2960 | 3207 | 3453 | 3700 | 3947 | 4440 | 4934 |
| | w | 116 | 129 | 142 | 155 | 168 | 181 | 194 | 207 | 233 | 259 |
| | $F_v$ | 29 | 32 | 36 | 39 | 42 | 46 | 49 | 52 | 59 | 65 |
| | E | 2051 | 2279 | 2507 | 2735 | 2963 | 3191 | 3419 | 3647 | 4103 | 4559 |
| **3 x 14** | W | 2310 | 2566 | 2823 | 3080 | 3336 | 3593 | 3850 | 4106 | 4620 | 5133 |
| | w | 121 | 135 | 148 | 162 | 175 | 189 | 202 | 216 | 243 | 270 |
| | $F_v$ | 52 | 58 | 63 | 69 | 75 | 81 | 87 | 92 | 104 | 116 |
| | E | 1161 | 1290 | 1419 | 1548 | 1677 | 1806 | 1935 | 2064 | 2323 | 2581 |
| **4 x 12** | W | 2331 | 2590 | 2849 | 3108 | 3367 | 3626 | 3885 | 4144 | 4662 | 5180 |
| | w | 122 | 136 | 149 | 163 | 177 | 190 | 204 | 218 | 245 | 272 |
| | $F_v$ | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 78 | 88 | 98 |
| | E | 1367 | 1519 | 1671 | 1823 | 1975 | 2127 | 2279 | 2431 | 2735 | 3039 |
| **6 x 10** | W | 2612 | 2902 | 3193 | 3483 | 3773 | 4063 | 4354 | 4644 | 5224 | 5805 |
| | w | 137 | 152 | 168 | 183 | 198 | 213 | 229 | 244 | 275 | 305 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3600 |
| **3 x 16** | W | 3060 | 3400 | 3740 | 4080 | 4420 | 4760 | 5100 | 5440 | 6120 | 6800 |
| | w | 161 | 178 | 196 | 214 | 232 | 250 | 268 | 286 | 322 | 357 |
| | $F_v$ | 60 | 66 | 73 | 80 | 86 | 93 | 100 | 107 | 120 | 133 |
| | E | 1009 | 1121 | 1233 | 1345 | 1457 | 1569 | 1681 | 1794 | 2018 | 2242 |
| **4 x 14** | W | 3357 | 3730 | 4103 | 4476 | 4849 | 5222 | 5595 | 5968 | 6714 | 7460 |
| | w | 176 | 196 | 215 | 235 | 255 | 274 | 294 | 314 | 353 | 392 |
| | $F_v$ | 53 | 59 | 65 | 71 | 76 | 82 | 88 | 94 | 106 | 118 |
| | E | 1139 | 1266 | 1393 | 1519 | 1646 | 1773 | 1899 | 2026 | 2279 | 2533 |
| **8 x 10** | W | 3562 | 3958 | 4354 | 4750 | 5145 | 5541 | 5937 | 6333 | 7125 | 7916 |
| | w | 187 | 208 | 229 | 250 | 270 | 291 | 312 | 333 | 375 | 416 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **6 x 12** | W | 3828 | 4253 | 4679 | 5104 | 5529 | 5955 | 6380 | 6805 | 7656 | 8507 |
| | w | 201 | 223 | 246 | 268 | 291 | 313 | 335 | 358 | 402 | 447 |
| | $F_v$ | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | E | 1338 | 1486 | 1635 | 1784 | 1933 | 2081 | 2230 | 2379 | 2676 | 2973 |
| **10 x 10** | W | 4512 | 5013 | 5515 | 6016 | 6518 | 7019 | 7520 | 8022 | 9024 | 10027 |
| | w | 237 | 263 | 290 | 316 | 343 | 369 | 395 | 422 | 475 | 527 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **19' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **4 x 16** | W | 4425 | 4917 | 5409 | 5900 | 6392 | 6884 | 7376 | 7867 | 8851 | 9834 |
| | w | 232 | 258 | 284 | 310 | 336 | 362 | 388 | 414 | 465 | 517 |
| | $F_v$ | 61 | 67 | 74 | 81 | 88 | 95 | 101 | 108 | 122 | 135 |
| | E | 992 | 1103 | 1213 | 1323 | 1434 | 1544 | 1654 | 1765 | 1985 | 2206 |
| **8 x 12** | W | 5220 | 5800 | 6380 | 6960 | 7540 | 8120 | 8700 | 9280 | 10440 | 11600 |
| | w | 274 | 305 | 335 | 366 | 396 | 427 | 457 | 488 | 549 | 610 |
| | $F_v$ | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | E | 1338 | 1486 | 1635 | 1784 | 1933 | 2081 | 2230 | 2379 | 2676 | 2973 |
| **6 x 14** | W | 5275 | 5861 | 6448 | 7034 | 7620 | 8206 | 8792 | 9378 | 10551 | 11723 |
| | w | 277 | 308 | 339 | 370 | 401 | 431 | 462 | 493 | 555 | 617 |
| | $F_v$ | 53 | 59 | 65 | 71 | 76 | 82 | 88 | 94 | 106 | 118 |
| | E | 1139 | 1266 | 1393 | 1519 | 1646 | 1773 | 1899 | 2026 | 2279 | 2533 |
| **10 x 12** | W | 6612 | 7347 | 8081 | 8816 | 9551 | 10286 | 11020 | 11755 | 13224 | 14694 |
| | w | 348 | 386 | 425 | 464 | 502 | 541 | 580 | 618 | 696 | 773 |
| | $F_v$ | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | E | 1338 | 1486 | 1635 | 1784 | 1933 | 2081 | 2230 | 2379 | 2676 | 2973 |
| **6 x 16** | W | 6954 | 7727 | 8500 | 9272 | 10045 | 10818 | 11591 | 12363 | 13909 | 15454 |
| | w | 366 | 406 | 447 | 488 | 528 | 569 | 610 | 650 | 732 | 813 |
| | $F_v$ | 61 | 67 | 74 | 81 | 88 | 95 | 101 | 108 | 122 | 135 |
| | E | 992 | 1103 | 1213 | 1323 | 1434 | 1544 | 1654 | 1765 | 1985 | 2206 |
| **8 x 14** | W | 7194 | 7993 | 8792 | 9592 | 10391 | 11190 | 11990 | 12789 | 14388 | 15986 |
| | w | 378 | 420 | 462 | 504 | 546 | 588 | 631 | 673 | 757 | 841 |
| | $F_v$ | 53 | 59 | 65 | 71 | 76 | 82 | 88 | 94 | 106 | 118 |
| | E | 1139 | 1266 | 1393 | 1519 | 1646 | 1773 | 1899 | 2026 | 2279 | 2533 |
| **12 x 12** | W | 8004 | 8894 | 9783 | 10672 | 11562 | 12451 | 13341 | 14230 | 16009 | 17788 |
| | w | 421 | 468 | 514 | 561 | 608 | 655 | 702 | 748 | 842 | 936 |
| | $F_v$ | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | E | 1338 | 1486 | 1635 | 1784 | 1933 | 2081 | 2230 | 2379 | 2676 | 2973 |
| **6 x 18** | W | 8865 | 9850 | 10835 | 11820 | 12805 | 13790 | 14775 | 15760 | 17730 | 19700 |
| | w | 466 | 518 | 570 | 622 | 673 | 725 | 777 | 829 | 933 | 1036 |
| | $F_v$ | 69 | 76 | 84 | 92 | 99 | 107 | 115 | 122 | 138 | 153 |
| | E | 879 | 977 | 1074 | 1172 | 1270 | 1367 | 1465 | 1563 | 1758 | 1954 |
| **10 x 14** | W | 9112 | 10125 | 11137 | 12150 | 13162 | 14175 | 15187 | 16200 | 18225 | 20250 |
| | w | 479 | 532 | 586 | 639 | 692 | 746 | 799 | 852 | 959 | 1065 |
| | $F_v$ | 53 | 59 | 65 | 71 | 76 | 82 | 88 | 94 | 106 | 118 |
| | E | 1139 | 1266 | 1393 | 1519 | 1646 | 1773 | 1899 | 2026 | 2279 | 2533 |
| **8 x 16** | W | 9483 | 10537 | 11591 | 12644 | 13698 | 14752 | 15805 | 16859 | 18967 | 21074 |
| | w | 499 | 554 | 610 | 665 | 720 | 776 | 831 | 887 | 998 | 1109 |
| | $F_v$ | 61 | 67 | 74 | 81 | 88 | 95 | 101 | 108 | 122 | 135 |
| | E | 992 | 1103 | 1213 | 1323 | 1434 | 1544 | 1654 | 1765 | 1985 | 2206 |
| **6 x 20** | W | 11007 | 12230 | 13453 | 14676 | 15899 | 17122 | 18345 | 19568 | 22014 | 24460 |
| | w | 579 | 643 | 708 | 772 | 836 | 901 | 965 | 1029 | 1158 | 1287 |
| | $F_v$ | 76 | 85 | 94 | 102 | 111 | 119 | 128 | 136 | 153 | 171 |
| | E | 789 | 876 | 964 | 1052 | 1139 | 1227 | 1315 | 1403 | 1578 | 1753 |
| **12 x 14** | W | 11030 | 12256 | 13482 | 14707 | 15933 | 17159 | 18384 | 19610 | 22061 | 24513 |
| | w | 580 | 645 | 709 | 774 | 838 | 903 | 967 | 1032 | 1161 | 1290 |
| | $F_v$ | 53 | 59 | 65 | 71 | 76 | 82 | 88 | 94 | 106 | 118 |
| | E | 1139 | 1266 | 1393 | 1519 | 1646 | 1773 | 1899 | 2026 | 2279 | 2533 |
| **10 x 16** | W | 12012 | 13347 | 14681 | 16016 | 17351 | 18686 | 20020 | 21355 | 24024 | 26694 |
| | w | 632 | 702 | 772 | 842 | 913 | 983 | 1053 | 1123 | 1264 | 1404 |
| | $F_v$ | 61 | 67 | 74 | 81 | 88 | 95 | 101 | 108 | 122 | 135 |
| | E | 992 | 1103 | 1213 | 1323 | 1434 | 1544 | 1654 | 1765 | 1985 | 2206 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **19'-0" SPAN** CONT'D | | | | | | | | | | | |
| **8 x 18** | W | 12088 | 13432 | 14775 | 16118 | 17461 | 18804 | 20148 | 21491 | 24177 | 26864 |
| | w | 636 | 706 | 777 | 848 | 919 | 989 | 1060 | 1131 | 1272 | 1413 |
| | $F_v$ | 69 | 76 | 84 | 92 | 99 | 107 | 115 | 122 | 138 | 153 |
| | E | 879 | 977 | 1074 | 1172 | 1270 | 1367 | 1465 | 1563 | 1758 | 1954 |
| **14 x 14** | W | 12949 | 14388 | 15826 | 17265 | 18704 | 20143 | 21582 | 23021 | 25898 | 28776 |
| | w | 681 | 757 | 832 | 908 | 984 | 1060 | 1135 | 1211 | 1363 | 1514 |
| | $F_v$ | 53 | 59 | 65 | 71 | 76 | 82 | 88 | 94 | 106 | 118 |
| | E | 1139 | 1266 | 1393 | 1519 | 1646 | 1773 | 1899 | 2026 | 2279 | 2533 |
| **6 x 22** | W | 13380 | 14867 | 16354 | 17841 | 19327 | 20814 | 22301 | 23788 | 26761 | 29735 |
| | w | 704 | 782 | 860 | 939 | 1017 | 1095 | 1173 | 1252 | 1408 | 1565 |
| | $F_v$ | 84 | 94 | 103 | 113 | 122 | 132 | 141 | 150 | 169 | 188 |
| | E | 715 | 795 | 874 | 954 | 1033 | 1113 | 1193 | 1272 | 1431 | 1590 |
| **12 x 16** | W | 14541 | 16157 | 17772 | 19388 | 21004 | 22620 | 24235 | 25851 | 29082 | 32314 |
| | w | 765 | 850 | 935 | 1020 | 1105 | 1190 | 1275 | 1360 | 1530 | 1700 |
| | $F_v$ | 61 | 67 | 74 | 81 | 88 | 95 | 101 | 108 | 122 | 135 |
| | E | 992 | 1103 | 1213 | 1323 | 1434 | 1544 | 1654 | 1765 | 1985 | 2206 |
| **8 x 20** | W | 15009 | 16677 | 18345 | 20013 | 21680 | 23348 | 25016 | 26684 | 30019 | 33355 |
| | w | 789 | 877 | 965 | 1053 | 1141 | 1228 | 1316 | 1404 | 1579 | 1755 |
| | $F_v$ | 76 | 85 | 94 | 102 | 111 | 119 | 128 | 136 | 153 | 171 |
| | E | 789 | 876 | 964 | 1052 | 1139 | 1227 | 1315 | 1403 | 1578 | 1753 |
| **10 x 18** | W | 15312 | 17013 | 18715 | 20416 | 22118 | 23819 | 25520 | 27222 | 30624 | 34027 |
| | w | 805 | 895 | 985 | 1074 | 1164 | 1253 | 1343 | 1432 | 1611 | 1790 |
| | $F_v$ | 69 | 76 | 84 | 92 | 99 | 107 | 115 | 122 | 138 | 153 |
| | E | 879 | 977 | 1074 | 1172 | 1270 | 1368 | 1465 | 1563 | 1758 | 1954 |
| **6 x 24** | W | 15986 | 17762 | 19538 | 21314 | 23091 | 24867 | 26643 | 28419 | 31972 | 35524 |
| | w | 841 | 934 | 1028 | 1121 | 1215 | 1308 | 1402 | 1495 | 1682 | 1869 |
| | $F_v$ | 92 | 103 | 113 | 123 | 133 | 144 | 154 | 164 | 185 | 206 |
| | E | 654 | 727 | 800 | 873 | 945 | 1018 | 1091 | 1164 | 1309 | 1455 |
| **14 x 16** | W | 17070 | 18967 | 20863 | 22760 | 24657 | 26553 | 28450 | 30347 | 34140 | 37934 |
| | w | 898 | 998 | 1098 | 1197 | 1297 | 1397 | 1497 | 1597 | 1796 | 1996 |
| | $F_v$ | 61 | 67 | 74 | 81 | 88 | 95 | 101 | 108 | 122 | 135 |
| | E | 992 | 1103 | 1213 | 1323 | 1434 | 1544 | 1654 | 1765 | 1985 | 2206 |
| **8 x 22** | W | 18246 | 20274 | 22301 | 24328 | 26356 | 28383 | 30411 | 32438 | 36493 | 40548 |
| | w | 960 | 1067 | 1173 | 1280 | 1387 | 1493 | 1600 | 1707 | 1920 | 2134 |
| | $F_v$ | 84 | 94 | 103 | 113 | 122 | 132 | 141 | 150 | 169 | 188 |
| | E | 715 | 795 | 874 | 954 | 1033 | 1113 | 1193 | 1272 | 1431 | 1590 |
| **12 x 18** | W | 18536 | 20595 | 22655 | 24714 | 26774 | 28834 | 30893 | 32953 | 37072 | 41191 |
| | w | 975 | 1083 | 1192 | 1300 | 1409 | 1517 | 1625 | 1734 | 1951 | 2167 |
| | $F_v$ | 69 | 76 | 84 | 92 | 99 | 107 | 115 | 122 | 138 | 153 |
| | E | 879 | 977 | 1074 | 1172 | 1270 | 1367 | 1465 | 1563 | 1758 | 1954 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **19' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **10 x 20** | W | 19012 | 21125 | 23237 | 25350 | 27462 | 29575 | 31687 | 33800 | 38024 | 42250 |
| | w | 1000 | 1111 | 1223 | 1334 | 1445 | 1556 | 1667 | 1778 | 2001 | 2223 |
| | $F_v$ | 76 | 85 | 94 | 102 | 111 | 119 | 128 | 136 | 153 | 171 |
| | E | 789 | 876 | 964 | 1052 | 1139 | 1227 | 1315 | 1403 | 1578 | 1753 |
| **16 x 16** | W | 19599 | 21777 | 23954 | 26132 | 28310 | 30487 | 32665 | 34843 | 39198 | 43554 |
| | w | 1031 | 1146 | 1260 | 1375 | 1490 | 1604 | 1719 | 1833 | 2063 | 2292 |
| | $F_v$ | 61 | 67 | 74 | 81 | 88 | 95 | 101 | 108 | 122 | 135 |
| | E | 992 | 1103 | 1213 | 1323 | 1434 | 1544 | 1654 | 1765 | 1985 | 2206 |
| **14 x 18** | W | 21759 | 24177 | 26595 | 29013 | 31430 | 33848 | 36266 | 38684 | 43519 | 48355 |
| | w | 1145 | 1272 | 1399 | 1527 | 1654 | 1781 | 1908 | 2036 | 2290 | 2545 |
| | $F_v$ | 69 | 76 | 84 | 92 | 99 | 107 | 115 | 122 | 138 | 153 |
| | E | 879 | 977 | 1074 | 1172 | 1270 | 1367 | 1465 | 1563 | 1758 | 1954 |
| **8 x 24** | W | 21799 | 24221 | 26643 | 29065 | 31487 | 33910 | 36332 | 38754 | 43598 | 48442 |
| | w | 1147 | 1274 | 1402 | 1529 | 1657 | 1784 | 1912 | 2039 | 2294 | 2549 |
| | $F_v$ | 92 | 103 | 113 | 123 | 133 | 144 | 154 | 164 | 185 | 206 |
| | E | 654 | 727 | 800 | 873 | 945 | 1018 | 1091 | 1164 | 1309 | 1455 |
| **12 x 20** | W | 23015 | 25572 | 28129 | 30686 | 33244 | 35801 | 38358 | 40915 | 46030 | 51144 |
| | w | 1211 | 1345 | 1480 | 1615 | 1749 | 1884 | 2018 | 2153 | 2422 | 2691 |
| | $F_v$ | 76 | 85 | 94 | 102 | 111 | 119 | 128 | 136 | 153 | 171 |
| | E | 789 | 876 | 964 | 1052 | 1139 | 1227 | 1315 | 1403 | 1578 | 1753 |
| **10 x 22** | W | 23112 | 25680 | 28248 | 30816 | 33384 | 35952 | 38520 | 41088 | 46224 | 51361 |
| | w | 1216 | 1351 | 1486 | 1621 | 1757 | 1892 | 2027 | 2162 | 2432 | 2703 |
| | $F_v$ | 84 | 94 | 103 | 113 | 122 | 132 | 141 | 150 | 169 | 188 |
| | E | 715 | 795 | 874 | 954 | 1033 | 1113 | 1193 | 1272 | 1431 | 1590 |
| **16 x 18** | W | 24983 | 27759 | 30535 | 33311 | 36087 | 38863 | 41639 | 44415 | 49967 | 55518 |
| | w | 1314 | 1461 | 1607 | 1753 | 1899 | 2045 | 2191 | 2337 | 2629 | 2922 |
| | $F_v$ | 69 | 76 | 84 | 92 | 99 | 107 | 115 | 122 | 138 | 153 |
| | E | 879 | 977 | 1074 | 1172 | 1270 | 1368 | 1465 | 1563 | 1758 | 1954 |
| **14 x 20** | W | 27017 | 30019 | 33021 | 36023 | 39025 | 42027 | 45029 | 48031 | 54035 | 60039 |
| | w | 1421 | 1579 | 1737 | 1895 | 2053 | 2211 | 2369 | 2527 | 2843 | 3159 |
| | $F_v$ | 76 | 85 | 94 | 102 | 111 | 119 | 128 | 136 | 153 | 171 |
| | E | 789 | 876 | 964 | 1052 | 1139 | 1227 | 1315 | 1403 | 1578 | 1753 |
| **10 x 24** | W | 27612 | 30680 | 33748 | 36816 | 39884 | 42952 | 46020 | 49088 | 55224 | 61361 |
| | w | 1453 | 1614 | 1776 | 1937 | 2099 | 2260 | 2422 | 2583 | 2906 | 3229 |
| | $F_v$ | 92 | 103 | 113 | 123 | 133 | 144 | 154 | 164 | 185 | 206 |
| | E | 654 | 727 | 800 | 873 | 945 | 1018 | 1091 | 1164 | 1309 | 1455 |
| **12 x 22** | W | 27978 | 31086 | 34195 | 37304 | 40413 | 43521 | 46630 | 49739 | 55956 | 62173 |
| | w | 1472 | 1636 | 1799 | 1963 | 2127 | 2290 | 2454 | 2617 | 2945 | 3272 |
| | $F_v$ | 84 | 94 | 103 | 113 | 122 | 132 | 141 | 150 | 169 | 188 |
| | E | 715 | 795 | 874 | 954 | 1033 | 1113 | 1193 | 1272 | 1431 | 1590 |
| **18 x 18** | W | 28207 | 31341 | 34475 | 37609 | 40743 | 43877 | 47012 | 50146 | 56414 | 62682 |
| | w | 1484 | 1649 | 1814 | 1979 | 2144 | 2309 | 2474 | 2639 | 2969 | 3299 |
| | $F_v$ | 69 | 76 | 84 | 92 | 99 | 107 | 115 | 122 | 138 | 153 |
| | E | 879 | 977 | 1074 | 1172 | 1270 | 1367 | 1465 | 1563 | 1758 | 1954 |
| **16 x 20** | W | 31020 | 34467 | 37913 | 41360 | 44807 | 48253 | 51700 | 55147 | 62040 | 68934 |
| | w | 1632 | 1814 | 1995 | 2176 | 2358 | 2539 | 2721 | 2902 | 3265 | 3628 |
| | $F_v$ | 76 | 85 | 94 | 102 | 111 | 119 | 128 | 136 | 153 | 171 |
| | E | 789 | 876 | 964 | 1052 | 1139 | 1227 | 1315 | 1403 | 1578 | 1753 |
| **14 x 22** | W | 32844 | 36493 | 40142 | 43792 | 47441 | 51090 | 54740 | 58389 | 65688 | 72986 |
| | w | 1728 | 1920 | 2112 | 2304 | 2496 | 2688 | 2881 | 3073 | 3457 | 3841 |
| | $F_v$ | 84 | 94 | 103 | 113 | 122 | 132 | 141 | 150 | 169 | 188 |
| | E | 715 | 795 | 874 | 954 | 1033 | 1113 | 1193 | 1272 | 1431 | 1590 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **19'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **12 x 24** | W | 33425 | 37139 | 40853 | 44567 | 48281 | 51995 | 55709 | 59423 | 66851 | 74279 |
| | w | 1759 | 1954 | 2150 | 2345 | 2541 | 2736 | 2932 | 3127 | 3518 | 3909 |
| | $F_v$ | 92 | 103 | 113 | 123 | 133 | 144 | 154 | 164 | 185 | 206 |
| | E | 654 | 727 | 800 | 873 | 945 | 1018 | 1091 | 1164 | 1309 | 1455 |
| **18 x 20** | W | 35023 | 38914 | 42805 | 46697 | 50588 | 54480 | 58371 | 62263 | 70046 | 77828 |
| | w | 1843 | 2048 | 2252 | 2457 | 2662 | 2867 | 3072 | 3277 | 3686 | 4096 |
| | $F_v$ | 76 | 85 | 94 | 102 | 111 | 119 | 128 | 136 | 153 | 171 |
| | E | 789 | 876 | 964 | 1052 | 1139 | 1227 | 1315 | 1403 | 1578 | 1753 |
| **16 x 22** | W | 37709 | 41899 | 46089 | 50279 | 54469 | 58659 | 62849 | 67039 | 75419 | 83799 |
| | w | 1984 | 2205 | 2425 | 2646 | 2866 | 3087 | 3307 | 3528 | 3969 | 4410 |
| | $F_v$ | 84 | 94 | 103 | 113 | 122 | 132 | 141 | 150 | 169 | 188 |
| | E | 715 | 795 | 874 | 954 | 1033 | 1113 | 1193 | 1272 | 1431 | 1590 |
| **20 x 20** | W | 39025 | 43361 | 47698 | 52034 | 56370 | 60706 | 65042 | 69378 | 78051 | 86723 |
| | w | 2053 | 2282 | 2510 | 2738 | 2966 | 3195 | 3423 | 3651 | 4107 | 4564 |
| | $F_v$ | 76 | 85 | 94 | 102 | 111 | 119 | 128 | 136 | 153 | 171 |
| | E | 789 | 876 | 964 | 1052 | 1139 | 1227 | 1315 | 1403 | 1578 | 1753 |
| **14 x 24** | W | 39238 | 43598 | 47958 | 52318 | 56678 | 61038 | 65398 | 69757 | 78477 | 87197 |
| | w | 2065 | 2294 | 2524 | 2753 | 2983 | 3212 | 3442 | 3671 | 4130 | 4589 |
| | $F_v$ | 92 | 103 | 113 | 123 | 133 | 144 | 154 | 164 | 185 | 206 |
| | E | 654 | 727 | 800 | 873 | 945 | 1018 | 1091 | 1164 | 1309 | 1455 |
| **18 x 22** | W | 42575 | 47306 | 52036 | 56767 | 61498 | 66228 | 70959 | 75690 | 85151 | 94612 |
| | w | 2240 | 2489 | 2738 | 2987 | 3236 | 3485 | 3734 | 3983 | 4481 | 4979 |
| | $F_v$ | 84 | 94 | 103 | 113 | 122 | 132 | 141 | 150 | 169 | 188 |
| | E | 715 | 795 | 874 | 954 | 1033 | 1113 | 1193 | 1272 | 1431 | 1590 |
| **16 x 24** | W | 45051 | 50057 | 55063 | 60069 | 65075 | 70080 | 75086 | 80092 | 90103 | 100115 |
| | w | 2371 | 2634 | 2898 | 3161 | 3425 | 3688 | 3951 | 4215 | 4742 | 5269 |
| | $F_v$ | 92 | 103 | 113 | 123 | 133 | 144 | 154 | 164 | 185 | 206 |
| | E | 654 | 727 | 800 | 873 | 945 | 1018 | 1091 | 1164 | 1309 | 1455 |
| **20 x 22** | W | 47441 | 52712 | 57983 | 63255 | 68526 | 73797 | 79069 | 84340 | 94882 | 105425 |
| | w | 2496 | 2774 | 3051 | 3329 | 3606 | 3884 | 4161 | 4438 | 4993 | 5548 |
| | $F_v$ | 84 | 94 | 103 | 113 | 122 | 132 | 141 | 150 | 169 | 188 |
| | E | 715 | 795 | 874 | 954 | 1033 | 1113 | 1193 | 1272 | 1431 | 1590 |
| **18 x 24** | W | 50865 | 56516 | 62168 | 67820 | 73471 | 79123 | 84775 | 90426 | 101730 | 113033 |
| | w | 2677 | 2974 | 3272 | 3569 | 3866 | 4164 | 4461 | 4759 | 5354 | 5949 |
| | $F_v$ | 92 | 103 | 113 | 123 | 133 | 144 | 154 | 164 | 185 | 206 |
| | E | 654 | 727 | 800 | 873 | 945 | 1018 | 1091 | 1164 | 1309 | 1455 |
| **22 x 22** | W | 52307 | 58119 | 63931 | 69742 | 75554 | 81366 | 87178 | 92990 | 104614 | 116238 |
| | w | 2753 | 3058 | 3364 | 3670 | 3976 | 4282 | 4588 | 4894 | 5506 | 6117 |
| | $F_v$ | 84 | 94 | 103 | 113 | 122 | 132 | 141 | 150 | 169 | 188 |
| | E | 715 | 795 | 874 | 954 | 1033 | 1113 | 1193 | 1272 | 1431 | 1590 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **19' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **20 x 24** | W | 56678 | 62975 | 69273 | 75571 | 81868 | 88166 | 94463 | 100761 | 113356 | 125951 |
| | w | 2983 | 3314 | 3645 | 3977 | 4308 | 4640 | 4971 | 5303 | 5966 | 6629 |
| | $F_v$ | 92 | 103 | 113 | 123 | 133 | 144 | 154 | 164 | 185 | 206 |
| | E | 654 | 727 | 800 | 873 | 945 | 1018 | 1091 | 1164 | 1309 | 1455 |
| **22 x 24** | W | 62491 | 69434 | 76378 | 83321 | 90265 | 97208 | 104152 | 111095 | 124982 | 138869 |
| | w | 3289 | 3654 | 4019 | 4385 | 4750 | 5116 | 5481 | 5847 | 6578 | 7308 |
| | $F_v$ | 92 | 103 | 113 | 123 | 133 | 144 | 154 | 164 | 185 | 206 |
| | E | 654 | 727 | 800 | 873 | 945 | 1018 | 1091 | 1164 | 1309 | 1455 |
| **24 x 24** | W | 68304 | 75894 | 83483 | 91072 | 98662 | 106251 | 113840 | 121430 | 136609 | 151788 |
| | w | 3594 | 3994 | 4393 | 4793 | 5192 | 5592 | 5991 | 6391 | 7189 | 7988 |
| | $F_v$ | 92 | 103 | 113 | 123 | 133 | 144 | 154 | 164 | 185 | 206 |
| | E | 654 | 727 | 800 | 873 | 945 | 1018 | 1091 | 1164 | 1309 | 1455 |
| **20' - 0" SPAN** | | | | | | | | | | | |
| **4 x 6** | W | 529 | 588 | 647 | 705 | 764 | 823 | 882 | 941 | 1058 | 1176 |
| | w | 26 | 29 | 32 | 35 | 38 | 41 | 44 | 47 | 52 | 58 |
| | $F_v$ | 20 | 22 | 25 | 27 | 29 | 32 | 34 | 36 | 41 | 45 |
| | E | 2945 | 3272 | 3599 | 3927 | 4254 | 4581 | 4909 | 5236 | 5890 | 6545 |
| **2 x 10** | W | 641 | 713 | 784 | 855 | 926 | 998 | 1069 | 1140 | 1283 | 1426 |
| | w | 32 | 35 | 39 | 42 | 46 | 49 | 53 | 57 | 64 | 71 |
| | $F_v$ | 34 | 38 | 42 | 46 | 50 | 53 | 57 | 61 | 69 | 77 |
| | E | 1751 | 1945 | 2140 | 2335 | 2529 | 2724 | 2918 | 3113 | 3502 | 3891 |
| **3 x 8** | W | 657 | 730 | 803 | 876 | 949 | 1022 | 1095 | 1168 | 1314 | 1460 |
| | w | 32 | 36 | 40 | 43 | 47 | 51 | 54 | 58 | 65 | 73 |
| | $F_v$ | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 54 | 60 |
| | E | 2234 | 2482 | 2731 | 2979 | 3227 | 3475 | 3724 | 3972 | 4468 | 4965 |
| **6 x 6** | W | 831 | 924 | 1016 | 1109 | 1201 | 1294 | 1386 | 1478 | 1663 | 1848 |
| | w | 41 | 46 | 50 | 55 | 60 | 64 | 69 | 73 | 83 | 92 |
| | $F_v$ | 20 | 22 | 25 | 27 | 29 | 32 | 34 | 36 | 41 | 45 |
| | E | 2945 | 3272 | 3599 | 3927 | 4254 | 4581 | 4909 | 5236 | 5890 | 6545 |
| **4 x 8** | W | 919 | 1022 | 1124 | 1226 | 1328 | 1430 | 1533 | 1635 | 1839 | 2044 |
| | w | 45 | 51 | 56 | 61 | 66 | 71 | 76 | 81 | 91 | 102 |
| | $F_v$ | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 54 | 60 |
| | E | 2234 | 2482 | 2731 | 2979 | 3227 | 3475 | 3724 | 3972 | 4468 | 4965 |
| **2 x 12** | W | 949 | 1054 | 1160 | 1265 | 1371 | 1476 | 1582 | 1687 | 1898 | 2109 |
| | w | 47 | 52 | 58 | 63 | 68 | 73 | 79 | 84 | 94 | 105 |
| | $F_v$ | 42 | 46 | 51 | 56 | 60 | 65 | 70 | 75 | 84 | 93 |
| | E | 1439 | 1599 | 1759 | 1919 | 2079 | 2239 | 2399 | 2559 | 2879 | 3199 |
| **3 x 10** | W | 1069 | 1188 | 1307 | 1426 | 1544 | 1663 | 1782 | 1901 | 2139 | 2376 |
| | w | 53 | 59 | 65 | 71 | 77 | 83 | 89 | 95 | 106 | 118 |
| | $F_v$ | 34 | 38 | 42 | 46 | 50 | 53 | 57 | 61 | 69 | 77 |
| | E | 1751 | 1945 | 2140 | 2335 | 2529 | 2724 | 2918 | 3113 | 3502 | 3891 |
| **2 x 14** | W | 1316 | 1463 | 1609 | 1755 | 1901 | 2048 | 2194 | 2340 | 2633 | 2926 |
| | w | 65 | 73 | 80 | 87 | 95 | 102 | 109 | 117 | 131 | 146 |
| | $F_v$ | 49 | 55 | 60 | 66 | 71 | 77 | 82 | 88 | 99 | 110 |
| | E | 1222 | 1358 | 1494 | 1630 | 1766 | 1901 | 2037 | 2173 | 2445 | 2716 |
| **6 x 8** | W | 1546 | 1718 | 1890 | 2062 | 2234 | 2406 | 2578 | 2750 | 3093 | 3437 |
| | w | 77 | 85 | 94 | 103 | 111 | 120 | 128 | 137 | 154 | 171 |
| | $F_v$ | 28 | 31 | 34 | 37 | 40 | 43 | 46 | 50 | 56 | 62 |
| | E | 2159 | 2399 | 2639 | 2879 | 3119 | 3359 | 3599 | 3839 | 4319 | 4799 |

## WOOD BEAMS–SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **20' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **4 x 10** | W | 1497 | 1663 | 1830 | 1996 | 2162 | 2329 | 2495 | 2661 | 2994 | 3327 |
| | w | 74 | 83 | 91 | 99 | 108 | 116 | 124 | 133 | 149 | 166 |
| | $F_v$ | 34 | 38 | 42 | 46 | 50 | 53 | 57 | 61 | 69 | 77 |
| | E | 1751 | 1945 | 2140 | 2335 | 2529 | 2724 | 2918 | 3113 | 3502 | 3891 |
| **3 x 12** | W | 1582 | 1757 | 1933 | 2109 | 2285 | 2460 | 2636 | 2812 | 3164 | 3515 |
| | w | 79 | 87 | 96 | 105 | 114 | 123 | 131 | 140 | 158 | 175 |
| | $F_v$ | 42 | 46 | 51 | 56 | 60 | 65 | 70 | 75 | 84 | 93 |
| | E | 1439 | 1599 | 1759 | 1919 | 2079 | 2239 | 2399 | 2559 | 2879 | 3199 |
| **8 x 8** | W | 2109 | 2343 | 2578 | 2812 | 3046 | 3281 | 3515 | 3750 | 4218 | 4687 |
| | w | 105 | 117 | 128 | 140 | 152 | 164 | 175 | 187 | 210 | 234 |
| | $F_v$ | 28 | 31 | 34 | 37 | 40 | 43 | 46 | 50 | 56 | 62 |
| | E | 2159 | 2399 | 2639 | 2879 | 3119 | 3359 | 3599 | 3839 | 4319 | 4799 |
| **3 x 14** | W | 2194 | 2438 | 2682 | 2926 | 3169 | 3413 | 3657 | 3901 | 4389 | 4876 |
| | w | 109 | 121 | 134 | 146 | 158 | 170 | 182 | 195 | 219 | 243 |
| | $F_v$ | 49 | 55 | 60 | 66 | 71 | 77 | 82 | 88 | 99 | 110 |
| | E | 1222 | 1358 | 1494 | 1630 | 1766 | 1901 | 2037 | 2173 | 2445 | 2716 |
| **4 x 12** | W | 2214 | 2460 | 2707 | 2953 | 3199 | 3445 | 3691 | 3937 | 4429 | 4921 |
| | w | 110 | 123 | 135 | 147 | 159 | 172 | 184 | 196 | 221 | 246 |
| | $F_v$ | 42 | 46 | 51 | 56 | 60 | 65 | 70 | 75 | 84 | 93 |
| | E | 1439 | 1599 | 1759 | 1919 | 2079 | 2239 | 2399 | 2559 | 2879 | 3199 |
| **6 x 10** | W | 2481 | 2757 | 3033 | 3309 | 3584 | 3860 | 4136 | 4412 | 4963 | 5515 |
| | w | 124 | 137 | 151 | 165 | 179 | 193 | 206 | 220 | 248 | 275 |
| | $F_v$ | 35 | 39 | 43 | 47 | 51 | 55 | 59 | 63 | 71 | 79 |
| | E | 1705 | 1894 | 2084 | 2273 | 2463 | 2652 | 2842 | 3031 | 3410 | 3789 |
| **3 x 16** | W | 2907 | 3230 | 3553 | 3876 | 4199 | 4522 | 4845 | 5168 | 5814 | 6460 |
| | w | 145 | 161 | 177 | 193 | 209 | 226 | 242 | 258 | 290 | 323 |
| | $F_v$ | 57 | 63 | 69 | 76 | 82 | 88 | 95 | 101 | 114 | 127 |
| | E | 1062 | 1180 | 1298 | 1416 | 1534 | 1652 | 1770 | 1888 | 2124 | 2360 |
| **4 x 14** | W | 3189 | 3543 | 3898 | 4252 | 4606 | 4961 | 5315 | 5670 | 6378 | 7087 |
| | w | 159 | 177 | 194 | 212 | 230 | 248 | 265 | 283 | 318 | 354 |
| | $F_v$ | 50 | 56 | 61 | 67 | 73 | 78 | 84 | 90 | 101 | 112 |
| | E | 1199 | 1333 | 1466 | 1599 | 1733 | 1866 | 1999 | 2133 | 2399 | 2666 |
| **8 x 10** | W | 3384 | 3760 | 4136 | 4512 | 4888 | 5264 | 5640 | 6016 | 6768 | 7520 |
| | w | 169 | 188 | 206 | 225 | 244 | 263 | 282 | 300 | 338 | 376 |
| | $F_v$ | 35 | 39 | 43 | 47 | 51 | 55 | 59 | 63 | 71 | 79 |
| | E | 1705 | 1894 | 2084 | 2273 | 2463 | 2652 | 2842 | 3031 | 3410 | 3789 |
| **6 x 12** | W | 3636 | 4040 | 4445 | 4849 | 5253 | 5657 | 6061 | 6465 | 7273 | 8081 |
| | w | 181 | 202 | 222 | 242 | 262 | 282 | 303 | 323 | 363 | 404 |
| | $F_v$ | 43 | 47 | 52 | 57 | 62 | 67 | 71 | 76 | 86 | 95 |
| | E | 1408 | 1565 | 1721 | 1878 | 2034 | 2191 | 2347 | 2504 | 2817 | 3130 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **20' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **10 x 10** | W | 4286 | 4763 | 5239 | 5715 | 6192 | 6668 | 7144 | 7621 | 8573 | 9526 |
| | w | 214 | 238 | 261 | 285 | 309 | 333 | 357 | 381 | 428 | 476 |
| | $F_v$ | 35 | 39 | 43 | 47 | 51 | 55 | 59 | 63 | 71 | 79 |
| | E | 1705 | 1894 | 2084 | 2273 | 2463 | 2652 | 2842 | 3031 | 3410 | 3789 |
| **4 x 16** | W | 4204 | 4671 | 5138 | 5605 | 6072 | 6540 | 7007 | 7474 | 8408 | 9343 |
| | w | 210 | 233 | 256 | 280 | 303 | 327 | 350 | 373 | 420 | 467 |
| | $F_v$ | 58 | 64 | 71 | 77 | 83 | 90 | 96 | 103 | 116 | 129 |
| | E | 1045 | 1161 | 1277 | 1393 | 1509 | 1625 | 1741 | 1858 | 2090 | 2322 |
| **8 x 12** | W | 4959 | 5510 | 6061 | 6612 | 7163 | 7714 | 8265 | 8816 | 9918 | 11020 |
| | w | 247 | 275 | 303 | 330 | 358 | 385 | 413 | 440 | 495 | 551 |
| | $F_v$ | 43 | 47 | 52 | 57 | 62 | 67 | 71 | 76 | 86 | 95 |
| | E | 1408 | 1565 | 1721 | 1878 | 2034 | 2191 | 2347 | 2504 | 2817 | 3130 |
| **6 x 14** | W | 5011 | 5568 | 6125 | 6682 | 7239 | 7796 | 8353 | 8910 | 10023 | 11137 |
| | w | 250 | 278 | 306 | 334 | 361 | 389 | 417 | 445 | 501 | 556 |
| | $F_v$ | 50 | 56 | 61 | 67 | 73 | 78 | 84 | 90 | 101 | 112 |
| | E | 1199 | 1333 | 1466 | 1599 | 1733 | 1866 | 1999 | 2133 | 2399 | 2666 |
| **10 x 12** | W | 6281 | 6979 | 7677 | 8375 | 9073 | 9771 | 10469 | 11167 | 12563 | 13959 |
| | w | 314 | 348 | 383 | 418 | 453 | 488 | 523 | 558 | 628 | 697 |
| | $F_v$ | 43 | 47 | 52 | 57 | 62 | 67 | 71 | 76 | 86 | 95 |
| | E | 1408 | 1565 | 1721 | 1878 | 2034 | 2191 | 2347 | 2504 | 2817 | 3130 |
| **6 x 16** | W | 6606 | 7340 | 8075 | 8809 | 9543 | 10277 | 11011 | 11745 | 13213 | 14681 |
| | w | 330 | 367 | 403 | 440 | 477 | 513 | 550 | 587 | 660 | 734 |
| | $F_v$ | 58 | 64 | 71 | 77 | 83 | 90 | 96 | 103 | 116 | 129 |
| | E | 1045 | 1161 | 1277 | 1393 | 1509 | 1625 | 1741 | 1858 | 2090 | 2322 |
| **8 x 14** | W | 6834 | 7593 | 8353 | 9112 | 9871 | 10631 | 11390 | 12150 | 13668 | 15187 |
| | w | 341 | 379 | 417 | 455 | 493 | 531 | 569 | 607 | 683 | 759 |
| | $F_v$ | 50 | 56 | 61 | 67 | 73 | 78 | 84 | 90 | 101 | 112 |
| | E | 1199 | 1333 | 1466 | 1599 | 1733 | 1866 | 1999 | 2133 | 2399 | 2666 |
| **12 x 12** | W | 7604 | 8449 | 9294 | 10139 | 10984 | 11829 | 12673 | 13518 | 15208 | 16898 |
| | w | 380 | 422 | 464 | 506 | 549 | 591 | 633 | 675 | 760 | 844 |
| | $F_v$ | 43 | 47 | 52 | 57 | 62 | 67 | 71 | 76 | 86 | 95 |
| | E | 1408 | 1565 | 1721 | 1878 | 2034 | 2191 | 2347 | 2504 | 2817 | 3130 |
| **6 x 18** | W | 8421 | 9357 | 10293 | 11229 | 12164 | 13100 | 14036 | 14972 | 16843 | 18715 |
| | w | 421 | 467 | 514 | 561 | 608 | 655 | 701 | 748 | 842 | 935 |
| | $F_v$ | 65 | 72 | 80 | 87 | 94 | 102 | 109 | 116 | 131 | 145 |
| | E | 925 | 1028 | 1131 | 1234 | 1337 | 1439 | 1542 | 1645 | 1851 | 2057 |
| **10 x 14** | W | 8656 | 9618 | 10580 | 11542 | 12504 | 13466 | 14428 | 15390 | 17313 | 19237 |
| | w | 432 | 480 | 529 | 577 | 625 | 673 | 721 | 769 | 865 | 961 |
| | $F_v$ | 50 | 56 | 61 | 67 | 73 | 78 | 84 | 90 | 101 | 112 |
| | E | 1199 | 1333 | 1466 | 1599 | 1733 | 1866 | 1999 | 2133 | 2399 | 2666 |
| **8 x 16** | W | 9009 | 10010 | 11011 | 12012 | 13013 | 14014 | 15015 | 16016 | 18018 | 20020 |
| | w | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 900 | 1001 |
| | $F_v$ | 58 | 64 | 71 | 77 | 83 | 90 | 96 | 103 | 116 | 129 |
| | E | 1045 | 1161 | 1277 | 1393 | 1509 | 1625 | 1741 | 1858 | 2090 | 2322 |
| **6 x 20** | W | 10456 | 11618 | 12780 | 13942 | 15104 | 16266 | 17428 | 18590 | 20913 | 23237 |
| | w | 522 | 580 | 639 | 697 | 755 | 813 | 871 | 929 | 1045 | 1161 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 113 | 121 | 130 | 146 | 162 |
| | E | 830 | 923 | 1015 | 1107 | 1199 | 1292 | 1384 | 1476 | 1661 | 1846 |
| **12 x 14** | W | 10479 | 11643 | 12808 | 13972 | 15136 | 16301 | 17465 | 18630 | 20958 | 23287 |
| | w | 523 | 582 | 640 | 698 | 756 | 815 | 873 | 931 | 1047 | 1164 |
| | $F_v$ | 50 | 56 | 61 | 67 | 73 | 78 | 84 | 90 | 101 | 112 |
| | E | 1199 | 1333 | 1466 | 1599 | 1733 | 1866 | 1999 | 2133 | 2399 | 2666 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for *l*/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **20' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **10 x 16** | W | 11411 | 12679 | 13947 | 15215 | 16483 | 17751 | 19019 | 20287 | 22823 | 25359 |
| | w | 570 | 633 | 697 | 760 | 824 | 887 | 950 | 1014 | 1141 | 1267 |
| | $F_v$ | 58 | 64 | 71 | 77 | 83 | 90 | 96 | 103 | 116 | 129 |
| | E | 1045 | 1161 | 1277 | 1393 | 1509 | 1625 | 1741 | 1858 | 2090 | 2322 |
| **8 x 18** | W | 11484 | 12760 | 14036 | 15312 | 16588 | 17864 | 19140 | 20416 | 22968 | 25520 |
| | w | 574 | 638 | 701 | 765 | 829 | 893 | 957 | 1020 | 1148 | 1276 |
| | $F_v$ | 65 | 72 | 80 | 87 | 94 | 102 | 109 | 116 | 131 | 145 |
| | E | 925 | 1028 | 1131 | 1234 | 1337 | 1439 | 1542 | 1645 | 1851 | 2057 |
| **14 x 14** | W | 12301 | 13668 | 15035 | 16402 | 17769 | 19136 | 20503 | 21870 | 24603 | 27337 |
| | w | 615 | 683 | 751 | 820 | 888 | 956 | 1025 | 1093 | 1230 | 1366 |
| | $F_v$ | 50 | 56 | 61 | 67 | 73 | 78 | 84 | 90 | 101 | 112 |
| | E | 1199 | 1333 | 1466 | 1599 | 1733 | 1866 | 1999 | 2133 | 2399 | 2666 |
| **6 x 22** | W | 12711 | 14124 | 15536 | 16949 | 18361 | 19774 | 21186 | 22598 | 25423 | 28248 |
| | w | 635 | 706 | 776 | 847 | 918 | 988 | 1059 | 1129 | 1271 | 1412 |
| | $F_v$ | 80 | 89 | 98 | 107 | 116 | 125 | 134 | 143 | 161 | 179 |
| | E | 753 | 837 | 920 | 1004 | 1088 | 1172 | 1255 | 1339 | 1506 | 1674 |
| **12 x 16** | W | 13814 | 15349 | 16884 | 18419 | 19954 | 21489 | 23023 | 24558 | 27628 | 30698 |
| | w | 690 | 767 | 844 | 920 | 997 | 1074 | 1151 | 1227 | 1381 | 1534 |
| | $F_v$ | 58 | 64 | 71 | 77 | 83 | 90 | 96 | 103 | 116 | 129 |
| | E | 1045 | 1161 | 1277 | 1393 | 1509 | 1625 | 1741 | 1858 | 2090 | 2322 |
| **8 x 20** | W | 14259 | 15843 | 17428 | 19012 | 20596 | 22181 | 23765 | 25350 | 28518 | 31687 |
| | w | 712 | 792 | 871 | 950 | 1029 | 1109 | 1188 | 1267 | 1425 | 1584 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 113 | 121 | 130 | 146 | 162 |
| | E | 830 | 923 | 1015 | 1107 | 1199 | 1292 | 1384 | 1476 | 1661 | 1846 |
| **10 x 18** | W | 14546 | 16163 | 17779 | 19395 | 21012 | 22628 | 24244 | 25861 | 29093 | 32326 |
| | w | 727 | 808 | 888 | 969 | 1050 | 1131 | 1212 | 1293 | 1454 | 1616 |
| | $F_v$ | 65 | 72 | 80 | 87 | 94 | 102 | 109 | 116 | 131 | 145 |
| | E | 925 | 1028 | 1131 | 1234 | 1337 | 1439 | 1542 | 1645 | 1851 | 2057 |
| **6 x 24** | W | 15186 | 16874 | 18561 | 20249 | 21936 | 23624 | 25311 | 26998 | 30373 | 33748 |
| | w | 759 | 843 | 928 | 1012 | 1096 | 1181 | 1265 | 1349 | 1518 | 1687 |
| | $F_v$ | 88 | 97 | 107 | 117 | 127 | 137 | 146 | 156 | 176 | 195 |
| | E | 689 | 765 | 842 | 919 | 995 | 1072 | 1148 | 1225 | 1378 | 1531 |
| **14 x 16** | W | 16216 | 18018 | 19820 | 21622 | 23424 | 25226 | 27028 | 28830 | 32433 | 36037 |
| | w | 810 | 900 | 991 | 1081 | 1171 | 1261 | 1351 | 1441 | 1621 | 1801 |
| | $F_v$ | 58 | 64 | 71 | 77 | 83 | 90 | 96 | 103 | 116 | 129 |
| | E | 1045 | 1161 | 1277 | 1393 | 1509 | 1625 | 1741 | 1858 | 2090 | 2322 |
| **8 x 22** | W | 17334 | 19260 | 21186 | 23112 | 25038 | 26964 | 28890 | 30816 | 34668 | 38520 |
| | w | 866 | 963 | 1059 | 1155 | 1251 | 1348 | 1444 | 1540 | 1733 | 1926 |
| | $F_v$ | 80 | 89 | 98 | 107 | 116 | 125 | 134 | 143 | 161 | 179 |
| | E | 753 | 837 | 920 | 1004 | 1088 | 1172 | 1255 | 1339 | 1506 | 1674 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **20'-0" SPAN CONT'D** | | | | | | | | | | | |
| **12 x 18** | W | 17609 | 19565 | 21522 | 23479 | 25435 | 27392 | 29348 | 31305 | 35218 | 39131 |
| | w | 880 | 978 | 1076 | 1173 | 1271 | 1369 | 1467 | 1565 | 1760 | 1956 |
| | $F_v$ | 65 | 72 | 80 | 87 | 94 | 102 | 109 | 116 | 131 | 145 |
| | E | 925 | 1028 | 1131 | 1234 | 1337 | 1439 | 1542 | 1645 | 1851 | 2057 |
| **10 x 20** | W | 18061 | 20068 | 22075 | 24082 | 26089 | 28096 | 30103 | 32110 | 36123 | 40137 |
| | w | 903 | 1003 | 1103 | 1204 | 1304 | 1404 | 1505 | 1605 | 1806 | 2006 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 113 | 121 | 130 | 146 | 162 |
| | E | 830 | 923 | 1015 | 1107 | 1199 | 1292 | 1384 | 1476 | 1661 | 1846 |
| **16 x 16** | W | 18619 | 20688 | 22757 | 24825 | 26894 | 28963 | 31032 | 33101 | 37238 | 41376 |
| | w | 930 | 1034 | 1137 | 1241 | 1344 | 1448 | 1551 | 1655 | 1861 | 2068 |
| | $F_v$ | 58 | 64 | 71 | 77 | 83 | 90 | 96 | 103 | 116 | 129 |
| | E | 1045 | 1161 | 1277 | 1393 | 1509 | 1625 | 1741 | 1858 | 2090 | 2322 |
| **14 x 18** | W | 20671 | 22968 | 25265 | 27562 | 29859 | 32156 | 34453 | 36750 | 41343 | 45937 |
| | w | 1033 | 1148 | 1263 | 1378 | 1492 | 1607 | 1722 | 1837 | 2067 | 2296 |
| | $F_v$ | 65 | 72 | 80 | 87 | 94 | 102 | 109 | 116 | 131 | 145 |
| | E | 925 | 1028 | 1131 | 1234 | 1337 | 1439 | 1542 | 1645 | 1851 | 2057 |
| **8 x 24** | W | 20709 | 23010 | 25311 | 27612 | 29913 | 32214 | 34515 | 36816 | 41418 | 46020 |
| | w | 1035 | 1150 | 1265 | 1380 | 1495 | 1610 | 1725 | 1840 | 2070 | 2301 |
| | $F_v$ | 88 | 97 | 107 | 117 | 127 | 137 | 146 | 156 | 176 | 195 |
| | E | 689 | 765 | 842 | 919 | 995 | 1072 | 1148 | 1225 | 1378 | 1531 |
| **12 x 20** | W | 21864 | 24293 | 26723 | 29152 | 31581 | 34011 | 36440 | 38870 | 43728 | 48587 |
| | w | 1093 | 1214 | 1336 | 1457 | 1579 | 1700 | 1822 | 1943 | 2186 | 2429 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 113 | 121 | 130 | 146 | 162 |
| | E | 830 | 923 | 1015 | 1107 | 1199 | 1292 | 1384 | 1476 | 1661 | 1846 |
| **10 x 22** | W | 21956 | 24396 | 26836 | 29275 | 31715 | 34155 | 36594 | 39034 | 43913 | 48793 |
| | w | 1097 | 1219 | 1341 | 1463 | 1585 | 1707 | 1829 | 1951 | 2195 | 2439 |
| | $F_v$ | 80 | 89 | 98 | 107 | 116 | 125 | 134 | 143 | 161 | 179 |
| | E | 753 | 837 | 920 | 1004 | 1088 | 1172 | 1255 | 1339 | 1506 | 1674 |
| **16 x 18** | W | 23734 | 26371 | 29008 | 31645 | 34282 | 36920 | 39557 | 42194 | 47468 | 52743 |
| | w | 1186 | 1318 | 1450 | 1582 | 1714 | 1846 | 1977 | 2109 | 2373 | 2637 |
| | $F_v$ | 65 | 72 | 80 | 87 | 94 | 102 | 109 | 116 | 131 | 145 |
| | E | 925 | 1028 | 1131 | 1234 | 1337 | 1440 | 1542 | 1645 | 1851 | 2057 |
| **14 x 20** | W | 25666 | 28518 | 31370 | 34222 | 37074 | 39926 | 42778 | 45630 | 51333 | 57037 |
| | w | 1283 | 1425 | 1568 | 1711 | 1853 | 1996 | 2138 | 2281 | 2566 | 2851 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 113 | 121 | 130 | 146 | 162 |
| | E | 830 | 923 | 1015 | 1107 | 1199 | 1292 | 1384 | 1476 | 1661 | 1846 |
| **10 x 24** | W | 26231 | 29146 | 32061 | 34975 | 37890 | 40805 | 43719 | 46634 | 52463 | 58293 |
| | w | 1311 | 1457 | 1603 | 1748 | 1894 | 2040 | 2185 | 2331 | 2623 | 2914 |
| | $F_v$ | 88 | 97 | 107 | 117 | 127 | 137 | 146 | 156 | 176 | 195 |
| | E | 689 | 765 | 842 | 919 | 995 | 1072 | 1148 | 1225 | 1378 | 1531 |
| **12 x 22** | W | 26579 | 29532 | 32485 | 35439 | 38392 | 41345 | 44298 | 47252 | 53158 | 59065 |
| | w | 1328 | 1476 | 1624 | 1771 | 1919 | 2067 | 2214 | 2362 | 2657 | 2953 |
| | $F_v$ | 80 | 89 | 98 | 107 | 116 | 125 | 134 | 143 | 161 | 179 |
| | E | 753 | 837 | 920 | 1004 | 1088 | 1172 | 1255 | 1339 | 1506 | 1674 |
| **18 x 18** | W | 26796 | 29774 | 32751 | 35729 | 38706 | 41684 | 44661 | 47638 | 53593 | 59548 |
| | w | 1339 | 1488 | 1637 | 1786 | 1935 | 2084 | 2233 | 2381 | 2679 | 2977 |
| | $F_v$ | 65 | 72 | 80 | 87 | 94 | 102 | 109 | 116 | 131 | 145 |
| | E | 925 | 1028 | 1131 | 1234 | 1337 | 1439 | 1542 | 1645 | 1851 | 2057 |
| **16 x 20** | W | 29469 | 32743 | 36018 | 39292 | 42566 | 45841 | 49115 | 52390 | 58938 | 65487 |
| | w | 1473 | 1637 | 1800 | 1964 | 2128 | 2292 | 2455 | 2619 | 2946 | 3274 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 113 | 121 | 130 | 146 | 162 |
| | E | 830 | 923 | 1015 | 1107 | 1199 | 1292 | 1384 | 1476 | 1661 | 1846 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for $\ell/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **20' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **14 x 22** | W | 31201 | 34668 | 38135 | 41602 | 45069 | 48536 | 52003 | 55470 | 62403 | 69337 |
| | w | 1560 | 1733 | 1906 | 2080 | 2253 | 2426 | 2600 | 2773 | 3120 | 3466 |
| | $F_v$ | 80 | 89 | 98 | 107 | 116 | 125 | 134 | 143 | 161 | 179 |
| | E | 753 | 837 | 920 | 1004 | 1088 | 1172 | 1255 | 1339 | 1506 | 1674 |
| **12 x 24** | W | 31754 | 35282 | 38810 | 42339 | 45867 | 49395 | 52923 | 56452 | 63508 | 70565 |
| | w | 1587 | 1764 | 1940 | 2116 | 2293 | 2469 | 2646 | 2822 | 3175 | 3528 |
| | $F_v$ | 88 | 97 | 107 | 117 | 127 | 137 | 146 | 156 | 176 | 195 |
| | E | 689 | 765 | 842 | 919 | 995 | 1072 | 1148 | 1225 | 1378 | 1531 |
| **18 x 20** | W | 33271 | 36968 | 40665 | 44362 | 48059 | 51756 | 55453 | 59150 | 66543 | 73937 |
| | w | 1663 | 1848 | 2033 | 2218 | 2402 | 2587 | 2772 | 2957 | 3327 | 3696 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 113 | 121 | 130 | 146 | 162 |
| | E | 830 | 923 | 1015 | 1107 | 1199 | 1292 | 1384 | 1476 | 1661 | 1846 |
| **16 x 22** | W | 35824 | 39804 | 43785 | 47765 | 51746 | 55726 | 59707 | 63687 | 71648 | 79609 |
| | w | 1791 | 1990 | 2189 | 2388 | 2587 | 2786 | 2985 | 3184 | 3582 | 3980 |
| | $F_v$ | 80 | 89 | 98 | 107 | 116 | 125 | 134 | 143 | 161 | 179 |
| | E | 753 | 837 | 920 | 1004 | 1088 | 1172 | 1255 | 1339 | 1506 | 1674 |
| **20 x 20** | W | 37074 | 41193 | 45313 | 49432 | 53551 | 57671 | 61790 | 65910 | 74148 | 82387 |
| | w | 1853 | 2059 | 2265 | 2471 | 2677 | 2883 | 3089 | 3295 | 3707 | 4119 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 113 | 121 | 130 | 146 | 162 |
| | E | 830 | 923 | 1015 | 1107 | 1199 | 1292 | 1384 | 1476 | 1661 | 1846 |
| **14 x 24** | W | 37276 | 41418 | 45560 | 49702 | 53844 | 57986 | 62128 | 66270 | 74553 | 82837 |
| | w | 1863 | 2070 | 2278 | 2485 | 2692 | 2899 | 3106 | 3313 | 3727 | 4141 |
| | $F_v$ | 88 | 97 | 107 | 117 | 127 | 137 | 146 | 156 | 176 | 195 |
| | E | 689 | 765 | 842 | 919 | 995 | 1072 | 1148 | 1225 | 1378 | 1531 |
| **18 x 22** | W | 40446 | 44940 | 49435 | 53929 | 58423 | 62917 | 67411 | 71905 | 80893 | 89881 |
| | w | 2022 | 2247 | 2471 | 2696 | 2921 | 3145 | 3370 | 3595 | 4044 | 4494 |
| | $F_v$ | 80 | 89 | 98 | 107 | 116 | 125 | 134 | 143 | 161 | 179 |
| | E | 753 | 837 | 920 | 1004 | 1088 | 1172 | 1255 | 1339 | 1506 | 1674 |
| **16 x 24** | W | 42799 | 47554 | 52310 | 57065 | 61821 | 66576 | 71332 | 76087 | 85598 | 95109 |
| | w | 2139 | 2377 | 2615 | 2853 | 3091 | 3328 | 3566 | 3804 | 4279 | 4755 |
| | $F_v$ | 88 | 97 | 107 | 117 | 127 | 137 | 146 | 156 | 176 | 195 |
| | E | 689 | 765 | 842 | 919 | 995 | 1072 | 1148 | 1225 | 1378 | 1531 |
| **20 x 22** | W | 45069 | 50077 | 55084 | 60092 | 65100 | 70107 | 75115 | 80123 | 90138 | 100154 |
| | w | 2253 | 2503 | 2754 | 3004 | 3255 | 3505 | 3755 | 4006 | 4506 | 5007 |
| | $F_v$ | 80 | 89 | 98 | 107 | 116 | 125 | 134 | 143 | 161 | 179 |
| | E | 753 | 837 | 920 | 1004 | 1088 | 1172 | 1255 | 1339 | 1506 | 1674 |
| **18 x 24** | W | 48321 | 53690 | 59060 | 64429 | 69798 | 75167 | 80536 | 85905 | 96643 | 107381 |
| | w | 2416 | 2684 | 2953 | 3221 | 3489 | 3758 | 4026 | 4295 | 4832 | 5369 |
| | $F_v$ | 88 | 97 | 107 | 117 | 127 | 137 | 146 | 156 | 176 | 195 |
| | E | 689 | 765 | 842 | 919 | 995 | 1072 | 1148 | 1225 | 1378 | 1531 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **20' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **22 x 22** | W | 49691 | 55213 | 60734 | 66255 | 71777 | 77298 | 82819 | 88341 | 99383 | 110426 |
| | w | 2484 | 2760 | 3036 | 3312 | 3588 | 3864 | 4140 | 4417 | 4969 | 5521 |
| | $F_v$ | 80 | 89 | 98 | 107 | 116 | 125 | 134 | 143 | 161 | 179 |
| | E | 753 | 837 | 920 | 1004 | 1088 | 1172 | 1255 | 1339 | 1506 | 1674 |
| **20 x 24** | W | 53844 | 59827 | 65809 | 71792 | 77775 | 83757 | 89740 | 95723 | 107688 | 119654 |
| | w | 2692 | 2991 | 3290 | 3589 | 3888 | 4187 | 4487 | 4786 | 5384 | 5982 |
| | $F_v$ | 88 | 97 | 107 | 117 | 127 | 137 | 146 | 156 | 176 | 195 |
| | E | 689 | 765 | 842 | 919 | 995 | 1072 | 1148 | 1225 | 1378 | 1531 |
| **22 x 24** | W | 59366 | 65963 | 72559 | 79155 | 85752 | 92348 | 98944 | 105541 | 118733 | 131926 |
| | w | 2968 | 3298 | 3627 | 3957 | 4287 | 4617 | 4947 | 5277 | 5936 | 6596 |
| | $F_v$ | 88 | 97 | 107 | 117 | 127 | 137 | 146 | 156 | 176 | 195 |
| | E | 689 | 765 | 842 | 919 | 995 | 1072 | 1148 | 1225 | 1378 | 1531 |
| **24 x 24** | W | 64889 | 72099 | 79309 | 86519 | 93729 | 100939 | 108148 | 115358 | 129778 | 144198 |
| | w | 3244 | 3604 | 3965 | 4325 | 4686 | 5046 | 5407 | 5767 | 6488 | 7209 |
| | $F_v$ | 88 | 97 | 107 | 117 | 127 | 137 | 146 | 156 | 176 | 195 |
| | E | 689 | 765 | 842 | 919 | 995 | 1072 | 1148 | 1225 | 1378 | 1531 |
| **21' - 0" SPAN** | | | | | | | | | | | |
| **4 x 6** | W | 504 | 560 | 616 | 672 | 728 | 784 | 840 | 896 | 1008 | 1120 |
| | w | 24 | 26 | 29 | 32 | 34 | 37 | 40 | 42 | 48 | 53 |
| | $F_v$ | 19 | 21 | 24 | 26 | 28 | 30 | 32 | 34 | 39 | 43 |
| | E | 3092 | 3436 | 3779 | 4123 | 4467 | 4810 | 5154 | 5498 | 6185 | 6872 |
| **2 x 10** | W | 611 | 679 | 746 | 814 | 882 | 950 | 1018 | 1086 | 1222 | 1358 |
| | w | 29 | 32 | 35 | 38 | 42 | 45 | 48 | 51 | 58 | 64 |
| | $F_v$ | 33 | 36 | 40 | 44 | 47 | 51 | 55 | 58 | 66 | 73 |
| | E | 1838 | 2043 | 2247 | 2451 | 2656 | 2860 | 3064 | 3269 | 3677 | 4086 |
| **3 x 8** | W | 625 | 695 | 764 | 834 | 903 | 973 | 1042 | 1112 | 1251 | 1390 |
| | w | 29 | 33 | 36 | 39 | 43 | 46 | 49 | 52 | 59 | 66 |
| | $F_v$ | 25 | 28 | 31 | 34 | 37 | 40 | 43 | 46 | 51 | 57 |
| | E | 2346 | 2606 | 2867 | 3128 | 3388 | 3649 | 3910 | 4171 | 4692 | 5213 |
| **6 x 6** | W | 792 | 880 | 968 | 1056 | 1144 | 1232 | 1320 | 1408 | 1584 | 1760 |
| | w | 37 | 41 | 46 | 50 | 54 | 58 | 62 | 67 | 75 | 83 |
| | $F_v$ | 19 | 21 | 24 | 26 | 28 | 30 | 32 | 34 | 39 | 43 |
| | E | 3092 | 3436 | 3779 | 4123 | 4467 | 4810 | 5154 | 5498 | 6185 | 6872 |
| **4 x 8** | W | 876 | 973 | 1070 | 1168 | 1265 | 1362 | 1460 | 1557 | 1752 | 1946 |
| | w | 41 | 46 | 50 | 55 | 60 | 64 | 69 | 74 | 83 | 92 |
| | $F_v$ | 25 | 28 | 31 | 34 | 37 | 40 | 43 | 46 | 51 | 57 |
| | E | 2346 | 2606 | 2867 | 3128 | 3388 | 3649 | 3910 | 4171 | 4692 | 5213 |
| **2 x 12** | W | 904 | 1004 | 1104 | 1205 | 1305 | 1406 | 1506 | 1607 | 1808 | 2008 |
| | w | 43 | 47 | 52 | 57 | 62 | 66 | 71 | 76 | 86 | 95 |
| | $F_v$ | 40 | 44 | 49 | 53 | 58 | 62 | 66 | 71 | 80 | 89 |
| | E | 1511 | 1679 | 1847 | 2015 | 2183 | 2351 | 2519 | 2687 | 3023 | 3359 |
| **3 x 10** | W | 1018 | 1131 | 1244 | 1358 | 1471 | 1584 | 1697 | 1810 | 2037 | 2263 |
| | w | 48 | 53 | 59 | 64 | 70 | 75 | 80 | 86 | 97 | 107 |
| | $F_v$ | 33 | 36 | 40 | 44 | 47 | 51 | 55 | 58 | 66 | 73 |
| | E | 1838 | 2043 | 2247 | 2451 | 2656 | 2860 | 3064 | 3269 | 3677 | 4086 |
| **2 x 14** | W | 1254 | 1393 | 1532 | 1672 | 1811 | 1950 | 2090 | 2229 | 2508 | 2786 |
| | w | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | $F_v$ | 47 | 52 | 57 | 63 | 68 | 73 | 78 | 84 | 94 | 105 |
| | E | 1283 | 1426 | 1569 | 1711 | 1854 | 1996 | 2139 | 2282 | 2567 | 2852 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **21'-0" SPAN CONT'D** | | | | | | | | | | | |
| **6 x 8** | W | 1473 | 1636 | 1800 | 1964 | 2127 | 2291 | 2455 | 2619 | 2946 | 3273 |
| | w | 70 | 77 | 85 | 93 | 101 | 109 | 116 | 124 | 140 | 155 |
| | $F_v$ | 26 | 29 | 32 | 35 | 38 | 41 | 44 | 47 | 53 | 59 |
| | E | 2267 | 2519 | 2771 | 3023 | 3275 | 3527 | 3779 | 4031 | 4535 | 5039 |
| **4 x 10** | W | 1426 | 1584 | 1742 | 1901 | 2059 | 2218 | 2376 | 2535 | 2852 | 3168 |
| | w | 67 | 75 | 82 | 90 | 98 | 105 | 113 | 120 | 135 | 150 |
| | $F_v$ | 33 | 36 | 40 | 44 | 47 | 51 | 55 | 58 | 66 | 73 |
| | E | 1838 | 2043 | 2247 | 2451 | 2656 | 2860 | 3064 | 3269 | 3677 | 4086 |
| **3 x 12** | W | 1506 | 1674 | 1841 | 2008 | 2176 | 2343 | 2511 | 2678 | 3013 | 3348 |
| | w | 71 | 79 | 87 | 95 | 103 | 111 | 119 | 127 | 143 | 159 |
| | $F_v$ | 40 | 44 | 49 | 53 | 58 | 62 | 66 | 71 | 80 | 89 |
| | E | 1511 | 1679 | 1847 | 2015 | 2183 | 2351 | 2519 | 2687 | 3023 | 3359 |
| **8 x 8** | W | 2008 | 2232 | 2455 | 2678 | 2901 | 3125 | 3348 | 3571 | 4017 | 4464 |
| | w | 95 | 106 | 116 | 127 | 138 | 148 | 159 | 170 | 191 | 212 |
| | $F_v$ | 26 | 29 | 32 | 35 | 38 | 41 | 44 | 47 | 53 | 59 |
| | E | 2267 | 2519 | 2771 | 3023 | 3275 | 3527 | 3779 | 4031 | 4535 | 5039 |
| **3 x 14** | W | 2090 | 2322 | 2554 | 2786 | 3018 | 3251 | 3483 | 3715 | 4180 | 4644 |
| | w | 99 | 110 | 121 | 132 | 143 | 154 | 165 | 176 | 199 | 221 |
| | $F_v$ | 47 | 52 | 57 | 63 | 68 | 73 | 78 | 84 | 94 | 105 |
| | E | 1283 | 1426 | 1569 | 1711 | 1854 | 1996 | 2139 | 2282 | 2567 | 2852 |
| **4 x 12** | W | 2109 | 2343 | 2578 | 2812 | 3046 | 3281 | 3515 | 3750 | 4218 | 4687 |
| | w | 100 | 111 | 122 | 133 | 145 | 156 | 167 | 178 | 200 | 223 |
| | $F_v$ | 40 | 44 | 49 | 53 | 58 | 62 | 66 | 71 | 80 | 89 |
| | E | 1511 | 1679 | 1847 | 2015 | 2183 | 2351 | 2519 | 2687 | 3023 | 3359 |
| **6 x 10** | W | 2363 | 2626 | 2888 | 3151 | 3414 | 3676 | 3939 | 4202 | 4727 | 5252 |
| | w | 112 | 125 | 137 | 150 | 162 | 175 | 187 | 200 | 225 | 250 |
| | $F_v$ | 33 | 37 | 41 | 45 | 49 | 52 | 56 | 60 | 67 | 75 |
| | E | 1790 | 1989 | 2188 | 2387 | 2586 | 2785 | 2984 | 3183 | 3581 | 3978 |
| **3 x 16** | W | 2768 | 3076 | 3383 | 3691 | 3999 | 4306 | 4614 | 4921 | 5537 | 6152 |
| | w | 131 | 146 | 161 | 175 | 190 | 205 | 219 | 234 | 263 | 292 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 84 | 90 | 96 | 108 | 121 |
| | E | 1115 | 1239 | 1363 | 1487 | 1611 | 1735 | 1859 | 1982 | 2230 | 2478 |
| **4 x 14** | W | 3037 | 3375 | 3712 | 4050 | 4387 | 4725 | 5062 | 5400 | 6075 | 6750 |
| | w | 144 | 160 | 176 | 192 | 208 | 225 | 241 | 257 | 289 | 321 |
| | $F_v$ | 48 | 53 | 58 | 64 | 69 | 75 | 80 | 85 | 96 | 107 |
| | E | 1259 | 1399 | 1539 | 1679 | 1819 | 1959 | 2099 | 2239 | 2519 | 2799 |
| **8 x 10** | W | 3223 | 3581 | 3939 | 4297 | 4655 | 5013 | 5372 | 5730 | 6446 | 7162 |
| | w | 153 | 170 | 187 | 204 | 221 | 238 | 255 | 272 | 306 | 341 |
| | $F_v$ | 33 | 37 | 41 | 45 | 49 | 52 | 56 | 60 | 67 | 75 |
| | E | 1790 | 1989 | 2188 | 2387 | 2586 | 2785 | 2984 | 3183 | 3581 | 3978 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **21'-0" SPAN CONT'D** | | | | | | | | | | | |
| **6 x 12** | W | 3463 | 3848 | 4233 | 4618 | 5003 | 5387 | 5772 | 6157 | 6927 | 7697 |
| | w | 164 | 183 | 201 | 219 | 238 | 256 | 274 | 293 | 329 | 366 |
| | $F_v$ | 41 | 45 | 50 | 54 | 59 | 63 | 68 | 73 | 82 | 91 |
| | E | 1479 | 1643 | 1807 | 1972 | 2136 | 2300 | 2465 | 2629 | 2958 | 3286 |
| **10 x 10** | W | 4082 | 4536 | 4990 | 5443 | 5897 | 6350 | 6804 | 7258 | 8165 | 9072 |
| | w | 194 | 216 | 237 | 259 | 280 | 302 | 324 | 345 | 388 | 432 |
| | $F_v$ | 33 | 37 | 41 | 45 | 49 | 52 | 56 | 60 | 67 | 75 |
| | E | 1790 | 1989 | 2188 | 2387 | 2586 | 2785 | 2984 | 3183 | 3581 | 3978 |
| **4 x 16** | W | 4004 | 4449 | 4893 | 5338 | 5783 | 6228 | 6673 | 7118 | 8008 | 8898 |
| | w | 190 | 211 | 233 | 254 | 275 | 296 | 317 | 338 | 381 | 423 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 86 | 92 | 98 | 110 | 123 |
| | E | 1097 | 1219 | 1341 | 1463 | 1585 | 1707 | 1829 | 1950 | 2194 | 2438 |
| **8 x 12** | W | 4723 | 5248 | 5772 | 6297 | 6822 | 7347 | 7872 | 8396 | 9446 | 10496 |
| | w | 224 | 249 | 274 | 299 | 324 | 349 | 374 | 399 | 449 | 499 |
| | $F_v$ | 41 | 45 | 50 | 54 | 59 | 63 | 68 | 73 | 82 | 91 |
| | E | 1479 | 1643 | 1807 | 1972 | 2136 | 2300 | 2465 | 2629 | 2958 | 3286 |
| **6 x 14** | W | 4773 | 5303 | 5833 | 6364 | 6894 | 7425 | 7955 | 8485 | 9546 | 10607 |
| | w | 227 | 252 | 277 | 303 | 328 | 353 | 378 | 404 | 454 | 505 |
| | $F_v$ | 48 | 53 | 58 | 64 | 69 | 75 | 80 | 85 | 96 | 107 |
| | E | 1259 | 1399 | 1539 | 1679 | 1819 | 1959 | 2099 | 2239 | 2519 | 2799 |
| **10 x 12** | W | 5982 | 6647 | 7312 | 7976 | 8641 | 9306 | 9971 | 10635 | 11965 | 13294 |
| | w | 284 | 316 | 348 | 379 | 411 | 443 | 474 | 506 | 569 | 633 |
| | $F_v$ | 41 | 45 | 50 | 54 | 59 | 63 | 68 | 73 | 82 | 91 |
| | E | 1479 | 1643 | 1807 | 1972 | 2136 | 2300 | 2465 | 2629 | 2958 | 3286 |
| **6 x 16** | W | 6292 | 6991 | 7690 | 8389 | 9088 | 9787 | 10487 | 11186 | 12584 | 13982 |
| | w | 299 | 332 | 366 | 399 | 432 | 466 | 499 | 532 | 599 | 665 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 86 | 92 | 98 | 110 | 123 |
| | E | 1097 | 1219 | 1341 | 1463 | 1585 | 1707 | 1829 | 1950 | 2194 | 2438 |
| **8 x 14** | W | 6508 | 7232 | 7955 | 8678 | 9401 | 10125 | 10848 | 11571 | 13017 | 14464 |
| | w | 309 | 344 | 378 | 413 | 447 | 482 | 516 | 551 | 619 | 688 |
| | $F_v$ | 48 | 53 | 58 | 64 | 69 | 75 | 80 | 85 | 96 | 107 |
| | E | 1259 | 1399 | 1539 | 1679 | 1819 | 1959 | 2099 | 2239 | 2519 | 2799 |
| **12 x 12** | W | 7242 | 8046 | 8851 | 9656 | 10461 | 11265 | 12070 | 12875 | 14484 | 16093 |
| | w | 344 | 383 | 421 | 459 | 498 | 536 | 574 | 613 | 689 | 766 |
| | $F_v$ | 41 | 45 | 50 | 54 | 59 | 63 | 68 | 73 | 82 | 91 |
| | E | 1479 | 1643 | 1807 | 1972 | 2136 | 2300 | 2465 | 2629 | 2958 | 3286 |
| **6 x 18** | W | 8020 | 8912 | 9803 | 10694 | 11585 | 12476 | 13368 | 14259 | 16041 | 17824 |
| | w | 381 | 424 | 466 | 509 | 551 | 594 | 636 | 679 | 763 | 848 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 138 |
| | E | 971 | 1079 | 1187 | 1295 | 1403 | 1511 | 1619 | 1727 | 1943 | 2159 |
| **10 x 14** | W | 8244 | 9160 | 10076 | 10992 | 11908 | 12825 | 13741 | 14657 | 16489 | 18321 |
| | w | 392 | 436 | 479 | 523 | 567 | 610 | 654 | 697 | 785 | 872 |
| | $F_v$ | 48 | 53 | 58 | 64 | 69 | 75 | 80 | 85 | 96 | 107 |
| | E | 1259 | 1399 | 1539 | 1679 | 1819 | 1959 | 2099 | 2239 | 2519 | 2799 |
| **8 x 16** | W | 8580 | 9533 | 10487 | 11440 | 12393 | 13347 | 14300 | 15253 | 17160 | 19067 |
| | w | 408 | 453 | 499 | 544 | 590 | 635 | 680 | 726 | 817 | 907 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 86 | 92 | 98 | 110 | 123 |
| | E | 1097 | 1219 | 1341 | 1463 | 1585 | 1707 | 1829 | 1950 | 2194 | 2438 |
| **6 x 20** | W | 9958 | 11065 | 12172 | 13278 | 14385 | 15491 | 16598 | 17704 | 19917 | 22130 |
| | w | 474 | 526 | 579 | 632 | 685 | 737 | 790 | 843 | 948 | 1053 |
| | $F_v$ | 69 | 77 | 85 | 92 | 100 | 108 | 116 | 123 | 139 | 154 |
| | E | 872 | 969 | 1066 | 1163 | 1259 | 1356 | 1453 | 1550 | 1744 | 1938 |

## WOOD BEAMS–SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $\ell/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **21'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **12 x 14** | W | 9980 | 11089 | 12198 | 13307 | 14416 | 15525 | 16633 | 17742 | 19960 | 22178 |
| | w | 475 | 528 | 580 | 633 | 686 | 739 | 792 | 844 | 950 | 1056 |
| | $F_v$ | 48 | 53 | 58 | 64 | 69 | 75 | 80 | 85 | 96 | 107 |
| | E | 1259 | 1399 | 1539 | 1679 | 1819 | 1959 | 2099 | 2239 | 2519 | 2799 |
| **10 x 16** | W | 10868 | 12076 | 13283 | 14491 | 15698 | 16906 | 18114 | 19321 | 21736 | 24152 |
| | w | 517 | 575 | 632 | 690 | 747 | 805 | 862 | 920 | 1035 | 1150 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 86 | 92 | 98 | 110 | 123 |
| | E | 1097 | 1219 | 1341 | 1463 | 1585 | 1707 | 1829 | 1950 | 2194 | 2438 |
| **8 x 18** | W | 10937 | 12152 | 13368 | 14583 | 15798 | 17013 | 18229 | 19444 | 21875 | 24305 |
| | w | 520 | 578 | 636 | 694 | 752 | 810 | 868 | 925 | 1041 | 1157 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 138 |
| | E | 972 | 1079 | 1187 | 1295 | 1403 | 1511 | 1619 | 1727 | 1943 | 2159 |
| **14 x 14** | W | 11716 | 13017 | 14319 | 15621 | 16923 | 18225 | 19526 | 20828 | 23432 | 26035 |
| | w | 557 | 619 | 681 | 743 | 805 | 867 | 929 | 991 | 1115 | 1239 |
| | $F_v$ | 48 | 53 | 58 | 64 | 69 | 75 | 80 | 85 | 96 | 107 |
| | E | 1259 | 1399 | 1539 | 1679 | 1819 | 1959 | 2099 | 2239 | 2519 | 2799 |
| **6 x 22** | W | 12106 | 13451 | 14796 | 16142 | 17487 | 18832 | 20177 | 21522 | 24213 | 26903 |
| | w | 576 | 640 | 704 | 768 | 832 | 896 | 960 | 1024 | 1153 | 1281 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 791 | 879 | 966 | 1054 | 1142 | 1230 | 1318 | 1406 | 1582 | 1758 |
| **12 x 16** | W | 13156 | 14618 | 16080 | 17542 | 19003 | 20465 | 21927 | 23389 | 26313 | 29236 |
| | w | 626 | 696 | 765 | 835 | 904 | 974 | 1044 | 1113 | 1253 | 1392 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 86 | 92 | 98 | 110 | 123 |
| | E | 1097 | 1219 | 1341 | 1463 | 1585 | 1707 | 1829 | 1950 | 2194 | 2438 |
| **8 x 20** | W | 13580 | 15089 | 16598 | 18107 | 19616 | 21125 | 22633 | 24142 | 27160 | 30178 |
| | w | 646 | 718 | 790 | 862 | 934 | 1005 | 1077 | 1149 | 1293 | 1437 |
| | $F_v$ | 69 | 77 | 85 | 92 | 100 | 108 | 116 | 123 | 139 | 154 |
| | E | 872 | 969 | 1066 | 1163 | 1259 | 1356 | 1453 | 1550 | 1744 | 1938 |
| **10 x 18** | W | 13854 | 15393 | 16932 | 18472 | 20011 | 21550 | 23090 | 24629 | 27708 | 30787 |
| | w | 659 | 733 | 806 | 879 | 952 | 1026 | 1099 | 1172 | 1319 | 1466 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 138 |
| | E | 972 | 1079 | 1187 | 1295 | 1403 | 1511 | 1620 | 1727 | 1943 | 2159 |
| **6 x 24** | W | 14463 | 16070 | 17677 | 19284 | 20891 | 22499 | 24106 | 25713 | 28927 | 32141 |
| | w | 688 | 765 | 841 | 918 | 994 | 1071 | 1147 | 1224 | 1377 | 1530 |
| | $F_v$ | 83 | 93 | 102 | 111 | 121 | 130 | 139 | 149 | 167 | 186 |
| | E | 723 | 804 | 884 | 965 | 1045 | 1125 | 1206 | 1286 | 1447 | 1608 |
| **14 x 16** | W | 15444 | 17160 | 18876 | 20592 | 22308 | 24025 | 25741 | 27457 | 30889 | 34321 |
| | w | 735 | 817 | 898 | 980 | 1062 | 1144 | 1225 | 1307 | 1470 | 1634 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 86 | 92 | 98 | 110 | 123 |
| | E | 1097 | 1219 | 1341 | 1463 | 1585 | 1707 | 1829 | 1950 | 2194 | 2438 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **21'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **8 x 22** | W | 16508 | 18343 | 20177 | 22011 | 23846 | 25680 | 27514 | 29349 | 33017 | 36686 |
| | w | 786 | 873 | 960 | 1048 | 1135 | 1222 | 1310 | 1397 | 1572 | 1746 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 791 | 879 | 966 | 1054 | 1142 | 1230 | 1318 | 1406 | 1582 | 1758 |
| **12 x 18** | W | 16770 | 18634 | 20497 | 22361 | 24224 | 26087 | 27951 | 29814 | 33541 | 37268 |
| | w | 798 | 887 | 976 | 1064 | 1153 | 1242 | 1331 | 1419 | 1597 | 1774 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 138 |
| | E | 971 | 1079 | 1187 | 1295 | 1403 | 1511 | 1619 | 1727 | 1943 | 2159 |
| **10 x 20** | W | 17201 | 19113 | 21024 | 22935 | 24847 | 26758 | 28669 | 30580 | 34403 | 38226 |
| | w | 819 | 910 | 1001 | 1092 | 1183 | 1274 | 1365 | 1456 | 1638 | 1820 |
| | $F_v$ | 69 | 77 | 85 | 92 | 100 | 108 | 116 | 123 | 139 | 154 |
| | E | 872 | 969 | 1066 | 1163 | 1259 | 1356 | 1453 | 1550 | 1744 | 1938 |
| **16 x 16** | W | 17732 | 19703 | 21673 | 23643 | 25613 | 27584 | 29554 | 31524 | 35465 | 39406 |
| | w | 844 | 938 | 1032 | 1125 | 1219 | 1313 | 1407 | 1501 | 1688 | 1876 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 86 | 92 | 98 | 110 | 123 |
| | E | 1097 | 1219 | 1341 | 1463 | 1585 | 1707 | 1829 | 1950 | 2194 | 2438 |
| **14 x 18** | W | 19687 | 21875 | 24062 | 26250 | 28437 | 30625 | 32812 | 35000 | 39374 | 43750 |
| | w | 937 | 1041 | 1145 | 1250 | 1354 | 1458 | 1562 | 1666 | 1874 | 2083 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 138 |
| | E | 971 | 1079 | 1187 | 1295 | 1403 | 1511 | 1619 | 1727 | 1943 | 2159 |
| **8 x 24** | W | 19723 | 21914 | 24106 | 26297 | 28489 | 30680 | 32872 | 35063 | 39446 | 43829 |
| | w | 939 | 1043 | 1147 | 1252 | 1356 | 1460 | 1565 | 1669 | 1878 | 2087 |
| | $F_v$ | 83 | 93 | 102 | 111 | 121 | 130 | 139 | 149 | 167 | 186 |
| | E | 723 | 804 | 884 | 965 | 1045 | 1125 | 1206 | 1286 | 1447 | 1608 |
| **12 x 20** | W | 20823 | 23136 | 25450 | 27764 | 30077 | 32391 | 34705 | 37019 | 41646 | 46273 |
| | w | 991 | 1101 | 1211 | 1322 | 1432 | 1542 | 1652 | 1762 | 1983 | 2203 |
| | $F_v$ | 69 | 77 | 85 | 92 | 100 | 108 | 116 | 123 | 139 | 154 |
| | E | 872 | 969 | 1066 | 1163 | 1259 | 1356 | 1453 | 1550 | 1744 | 1938 |
| **10 x 22** | W | 20911 | 23234 | 25558 | 27881 | 30205 | 32528 | 34852 | 37175 | 41822 | 46469 |
| | w | 995 | 1106 | 1217 | 1327 | 1438 | 1548 | 1659 | 1770 | 1991 | 2212 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 791 | 879 | 966 | 1054 | 1142 | 1230 | 1318 | 1406 | 1582 | 1758 |
| **16 x 18** | W | 22604 | 25115 | 27627 | 30138 | 32650 | 35162 | 37673 | 40185 | 45208 | 50231 |
| | w | 1076 | 1195 | 1315 | 1435 | 1554 | 1674 | 1793 | 1913 | 2152 | 2391 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 138 |
| | E | 971 | 1079 | 1187 | 1295 | 1403 | 1512 | 1619 | 1727 | 1943 | 2159 |
| **14 x 20** | W | 24444 | 27160 | 29876 | 32592 | 35308 | 38024 | 40741 | 43457 | 48889 | 54321 |
| | w | 1164 | 1293 | 1422 | 1552 | 1681 | 1810 | 1940 | 2069 | 2328 | 2586 |
| | $F_v$ | 69 | 77 | 85 | 92 | 100 | 108 | 116 | 123 | 139 | 154 |
| | E | 872 | 969 | 1066 | 1163 | 1259 | 1356 | 1453 | 1550 | 1744 | 1938 |
| **10 x 24** | W | 24982 | 27758 | 30534 | 33310 | 36086 | 38862 | 41637 | 44413 | 49965 | 55517 |
| | w | 1189 | 1321 | 1454 | 1586 | 1718 | 1850 | 1982 | 2114 | 2379 | 2643 |
| | $F_v$ | 83 | 93 | 102 | 111 | 121 | 130 | 139 | 149 | 167 | 186 |
| | E | 723 | 804 | 884 | 965 | 1045 | 1125 | 1206 | 1286 | 1447 | 1608 |
| **12 x 22** | W | 25313 | 28126 | 30938 | 33751 | 36564 | 39376 | 42189 | 45002 | 50627 | 56252 |
| | w | 1205 | 1339 | 1473 | 1607 | 1741 | 1875 | 2009 | 2142 | 2410 | 2678 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 791 | 879 | 966 | 1054 | 1142 | 1230 | 1318 | 1406 | 1582 | 1758 |
| **18 x 18** | W | 25520 | 28356 | 31192 | 34027 | 36863 | 39699 | 42534 | 45370 | 51041 | 56712 |
| | w | 1215 | 1350 | 1485 | 1620 | 1755 | 1890 | 2025 | 2160 | 2430 | 2700 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 138 |
| | E | 971 | 1079 | 1187 | 1295 | 1403 | 1511 | 1619 | 1727 | 1943 | 2159 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **21'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **16 x 20** | W | 28066 | 31184 | 34302 | 37421 | 40539 | 43658 | 46776 | 49895 | 56132 | 62369 |
| | w | 1336 | 1484 | 1633 | 1781 | 1930 | 2078 | 2227 | 2375 | 2672 | 2969 |
| | $F_v$ | 69 | 77 | 85 | 92 | 100 | 108 | 116 | 123 | 139 | 154 |
| | E | 872 | 969 | 1066 | 1163 | 1259 | 1356 | 1453 | 1550 | 1744 | 1938 |
| **14 x 22** | W | 29716 | 33017 | 36319 | 39621 | 42923 | 46224 | 49526 | 52828 | 59432 | 66035 |
| | w | 1415 | 1572 | 1729 | 1886 | 2043 | 2201 | 2358 | 2515 | 2830 | 3144 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 791 | 879 | 966 | 1054 | 1142 | 1230 | 1318 | 1406 | 1582 | 1758 |
| **12 x 24** | W | 30242 | 33602 | 36962 | 40322 | 43683 | 47043 | 50403 | 53764 | 60484 | 67205 |
| | w | 1440 | 1600 | 1760 | 1920 | 2080 | 2240 | 2400 | 2560 | 2880 | 3200 |
| | $F_v$ | 83 | 93 | 102 | 111 | 121 | 130 | 139 | 149 | 167 | 186 |
| | E | 723 | 804 | 884 | 965 | 1045 | 1125 | 1206 | 1286 | 1447 | 1608 |
| **18 x 20** | W | 31687 | 35208 | 38729 | 42250 | 45770 | 49291 | 52812 | 56333 | 63374 | 70416 |
| | w | 1508 | 1676 | 1844 | 2011 | 2179 | 2347 | 2514 | 2682 | 3017 | 3353 |
| | $F_v$ | 69 | 77 | 85 | 92 | 100 | 108 | 116 | 123 | 139 | 154 |
| | E | 872 | 969 | 1066 | 1163 | 1259 | 1356 | 1453 | 1550 | 1744 | 1938 |
| **16 x 22** | W | 34118 | 37909 | 41700 | 45491 | 49282 | 53073 | 56864 | 60655 | 68236 | 75818 |
| | w | 1624 | 1805 | 1985 | 2166 | 2346 | 2527 | 2707 | 2888 | 3249 | 3610 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 791 | 879 | 966 | 1054 | 1142 | 1230 | 1318 | 1406 | 1582 | 1758 |
| **20 x 20** | W | 35308 | 39232 | 43155 | 47078 | 51001 | 54924 | 58848 | 62771 | 70617 | 78464 |
| | w | 1681 | 1868 | 2055 | 2241 | 2428 | 2615 | 2802 | 2989 | 3362 | 3736 |
| | $F_v$ | 69 | 77 | 85 | 92 | 100 | 108 | 116 | 123 | 139 | 154 |
| | E | 872 | 969 | 1066 | 1163 | 1259 | 1356 | 1453 | 1550 | 1744 | 1938 |
| **14 x 24** | W | 35501 | 39446 | 43391 | 47335 | 51280 | 55224 | 59169 | 63114 | 71003 | 78892 |
| | w | 1690 | 1878 | 2066 | 2254 | 2441 | 2629 | 2817 | 3005 | 3381 | 3756 |
| | $F_v$ | 83 | 93 | 102 | 111 | 121 | 130 | 139 | 149 | 167 | 186 |
| | E | 723 | 804 | 884 | 965 | 1045 | 1125 | 1206 | 1286 | 1447 | 1608 |
| **18 x 22** | W | 38520 | 42800 | 47080 | 51361 | 55641 | 59921 | 64201 | 68481 | 77041 | 85601 |
| | w | 1834 | 2038 | 2241 | 2445 | 2649 | 2853 | 3057 | 3261 | 3668 | 4076 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 791 | 879 | 966 | 1054 | 1142 | 1230 | 1318 | 1406 | 1582 | 1758 |
| **16 x 24** | W | 40761 | 45290 | 49819 | 54348 | 58877 | 63406 | 67935 | 72464 | 81522 | 90580 |
| | w | 1941 | 2156 | 2372 | 2588 | 2803 | 3019 | 3235 | 3450 | 3882 | 4313 |
| | $F_v$ | 83 | 93 | 102 | 111 | 121 | 130 | 139 | 149 | 167 | 186 |
| | E | 723 | 804 | 884 | 965 | 1045 | 1125 | 1206 | 1286 | 1447 | 1608 |
| **20 x 22** | W | 42923 | 47692 | 52461 | 57230 | 62000 | 66769 | 71538 | 76307 | 85846 | 95384 |
| | w | 2043 | 2271 | 2498 | 2725 | 2952 | 3179 | 3406 | 3633 | 4087 | 4542 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 791 | 879 | 966 | 1054 | 1142 | 1230 | 1318 | 1406 | 1582 | 1758 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **21'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **18 x 24** | W | 46020 | 51134 | 56247 | 61361 | 66474 | 71587 | 76701 | 81814 | 92041 | 102268 |
| | w | 2191 | 2434 | 2678 | 2921 | 3165 | 3408 | 3652 | 3895 | 4382 | 4869 |
| | $F_v$ | 83 | 93 | 102 | 111 | 121 | 130 | 139 | 149 | 167 | 186 |
| | E | 723 | 804 | 884 | 965 | 1045 | 1125 | 1206 | 1286 | 1447 | 1608 |
| **22 x 22** | W | 47325 | 52583 | 57842 | 63100 | 68359 | 73617 | 78875 | 84134 | 94651 | 105167 |
| | w | 2253 | 2503 | 2754 | 3004 | 3255 | 3505 | 3755 | 4006 | 4507 | 5007 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 791 | 879 | 966 | 1054 | 1142 | 1230 | 1318 | 1406 | 1582 | 1758 |
| **20 x 24** | W | 51280 | 56978 | 62675 | 68373 | 74071 | 79769 | 85467 | 91165 | 102560 | 113956 |
| | w | 2441 | 2713 | 2984 | 3255 | 3527 | 3798 | 4069 | 4341 | 4883 | 5426 |
| | $F_v$ | 83 | 93 | 102 | 111 | 121 | 130 | 139 | 149 | 167 | 186 |
| | E | 723 | 804 | 884 | 965 | 1045 | 1125 | 1206 | 1286 | 1447 | 1608 |
| **22 x 24** | W | 56539 | 62822 | 69104 | 75386 | 81668 | 87950 | 94233 | 100515 | 113079 | 125644 |
| | w | 2692 | 2991 | 3290 | 3589 | 3888 | 4188 | 4487 | 4786 | 5384 | 5983 |
| | $F_v$ | 83 | 93 | 102 | 111 | 121 | 130 | 139 | 149 | 167 | 186 |
| | E | 723 | 804 | 884 | 965 | 1045 | 1125 | 1206 | 1286 | 1447 | 1608 |
| **24 x 24** | W | 61799 | 68666 | 75532 | 82399 | 89265 | 96132 | 102998 | 109865 | 123598 | 137332 |
| | w | 2942 | 3269 | 3596 | 3923 | 4250 | 4577 | 4904 | 5231 | 5885 | 6539 |
| | $F_v$ | 83 | 93 | 102 | 111 | 121 | 130 | 139 | 149 | 167 | 186 |
| | E | 723 | 804 | 884 | 965 | 1045 | 1125 | 1206 | 1286 | 1447 | 1608 |
| **22'- 0" SPAN** | | | | | | | | | | | |
| **2 x 10** | W | 583 | 648 | 713 | 777 | 842 | 907 | 972 | 1037 | 1166 | 1296 |
| | w | 26 | 29 | 32 | 35 | 38 | 41 | 44 | 47 | 53 | 58 |
| | $F_v$ | 31 | 35 | 38 | 42 | 45 | 49 | 52 | 56 | 63 | 70 |
| | E | 1926 | 2140 | 2354 | 2568 | 2782 | 2996 | 3210 | 3424 | 3852 | 4281 |
| **2 x 12** | W | 862 | 958 | 1054 | 1150 | 1246 | 1342 | 1438 | 1534 | 1725 | 1917 |
| | w | 39 | 43 | 47 | 52 | 56 | 61 | 65 | 69 | 78 | 87 |
| | $F_v$ | 38 | 42 | 46 | 51 | 55 | 59 | 63 | 68 | 76 | 85 |
| | E | 1583 | 1759 | 1935 | 2111 | 2287 | 2463 | 2639 | 2815 | 3167 | 3519 |
| **3 x 10** | W | 972 | 1080 | 1188 | 1296 | 1404 | 1512 | 1620 | 1728 | 1944 | 2160 |
| | w | 44 | 49 | 54 | 58 | 63 | 68 | 73 | 78 | 88 | 98 |
| | $F_v$ | 31 | 35 | 38 | 42 | 45 | 49 | 52 | 56 | 63 | 70 |
| | E | 1926 | 2140 | 2354 | 2568 | 2782 | 2996 | 3210 | 3424 | 3852 | 4281 |
| **2 x 14** | W | 1197 | 1330 | 1463 | 1596 | 1729 | 1862 | 1995 | 2128 | 2394 | 2660 |
| | w | 54 | 60 | 66 | 72 | 78 | 84 | 90 | 96 | 108 | 120 |
| | $F_v$ | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | E | 1344 | 1494 | 1643 | 1793 | 1942 | 2092 | 2241 | 2390 | 2689 | 2988 |
| **4 x 10** | W | 1361 | 1512 | 1663 | 1814 | 1966 | 2117 | 2268 | 2419 | 2722 | 3024 |
| | w | 61 | 68 | 75 | 82 | 89 | 96 | 103 | 109 | 123 | 137 |
| | $F_v$ | 31 | 35 | 38 | 42 | 45 | 49 | 52 | 56 | 63 | 70 |
| | E | 1926 | 2140 | 2354 | 2568 | 2782 | 2996 | 3210 | 3424 | 3852 | 4281 |
| **3 x 12** | W | 1438 | 1598 | 1757 | 1917 | 2077 | 2237 | 2397 | 2556 | 2876 | 3196 |
| | w | 65 | 72 | 79 | 87 | 94 | 101 | 108 | 116 | 130 | 145 |
| | $F_v$ | 38 | 42 | 46 | 51 | 55 | 59 | 63 | 68 | 76 | 85 |
| | E | 1583 | 1759 | 1935 | 2111 | 2287 | 2463 | 2639 | 2815 | 3167 | 3519 |
| **8 x 8** | W | 1917 | 2130 | 2343 | 2556 | 2769 | 2982 | 3196 | 3409 | 3835 | 4261 |
| | w | 87 | 96 | 106 | 116 | 125 | 135 | 145 | 154 | 174 | 193 |
| | $F_v$ | 25 | 28 | 31 | 34 | 36 | 39 | 42 | 45 | 51 | 56 |
| | E | 2375 | 2639 | 2903 | 3167 | 3431 | 3695 | 3959 | 4223 | 4751 | 5279 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **22' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **3 x 14** | W | 1995 | 2216 | 2438 | 2660 | 2881 | 3103 | 3325 | 3546 | 3990 | 4433 |
| | w | 90 | 100 | 110 | 120 | 130 | 141 | 151 | 161 | 181 | 201 |
| | $F_v$ | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | E | 1344 | 1494 | 1643 | 1793 | 1942 | 2092 | 2241 | 2390 | 2689 | 2988 |
| **4 x 12** | W | 2013 | 2237 | 2460 | 2684 | 2908 | 3132 | 3355 | 3579 | 4026 | 4474 |
| | w | 91 | 101 | 111 | 122 | 132 | 142 | 152 | 162 | 183 | 203 |
| | $F_v$ | 38 | 42 | 46 | 51 | 55 | 59 | 63 | 68 | 76 | 85 |
| | E | 1583 | 1759 | 1935 | 2111 | 2287 | 2463 | 2639 | 2815 | 3167 | 3519 |
| **6 x 10** | W | 2256 | 2506 | 2757 | 3008 | 3259 | 3509 | 3760 | 4011 | 4512 | 5013 |
| | w | 102 | 113 | 125 | 136 | 148 | 159 | 170 | 182 | 205 | 227 |
| | $F_v$ | 32 | 35 | 39 | 43 | 46 | 50 | 53 | 57 | 64 | 71 |
| | E | 1875 | 2084 | 2292 | 2501 | 2709 | 2917 | 3126 | 3334 | 3751 | 4168 |
| **3 x 16** | W | 2642 | 2936 | 3230 | 3523 | 3817 | 4110 | 4404 | 4698 | 5285 | 5872 |
| | w | 120 | 133 | 146 | 160 | 173 | 186 | 200 | 213 | 240 | 266 |
| | $F_v$ | 51 | 57 | 63 | 69 | 75 | 80 | 86 | 92 | 103 | 115 |
| | E | 1168 | 1298 | 1428 | 1558 | 1687 | 1817 | 1947 | 2077 | 2337 | 2596 |
| **4 x 14** | W | 2899 | 3221 | 3543 | 3865 | 4188 | 4510 | 4832 | 5154 | 5798 | 6443 |
| | w | 131 | 146 | 161 | 175 | 190 | 205 | 219 | 234 | 263 | 292 |
| | $F_v$ | 46 | 51 | 56 | 61 | 66 | 71 | 76 | 81 | 92 | 102 |
| | E | 1319 | 1466 | 1613 | 1759 | 1906 | 2053 | 2199 | 2346 | 2639 | 2933 |
| **8 x 10** | W | 3076 | 3418 | 3760 | 4102 | 4444 | 4785 | 5127 | 5469 | 6153 | 6837 |
| | w | 139 | 155 | 170 | 186 | 202 | 217 | 233 | 248 | 279 | 310 |
| | $F_v$ | 32 | 35 | 39 | 43 | 46 | 50 | 53 | 57 | 64 | 71 |
| | E | 1875 | 2084 | 2292 | 2501 | 2709 | 2917 | 3126 | 3334 | 3751 | 4168 |
| **6 x 12** | W | 3306 | 3673 | 4040 | 4408 | 4775 | 5143 | 5510 | 5877 | 6612 | 7347 |
| | w | 150 | 166 | 183 | 200 | 217 | 233 | 250 | 267 | 300 | 333 |
| | $F_v$ | 39 | 43 | 47 | 52 | 56 | 60 | 65 | 69 | 78 | 87 |
| | E | 1549 | 1721 | 1893 | 2066 | 2238 | 2410 | 2582 | 2754 | 3099 | 3443 |
| **10 x 10** | W | 3897 | 4330 | 4763 | 5196 | 5629 | 6062 | 6495 | 6928 | 7794 | 8660 |
| | w | 177 | 196 | 216 | 236 | 255 | 275 | 295 | 314 | 354 | 393 |
| | $F_v$ | 32 | 35 | 39 | 43 | 46 | 50 | 53 | 57 | 64 | 71 |
| | E | 1875 | 2084 | 2292 | 2501 | 2709 | 2917 | 3126 | 3334 | 3751 | 4168 |
| **4 x 16** | W | 3822 | 4246 | 4671 | 5096 | 5520 | 5945 | 6370 | 6794 | 7644 | 8493 |
| | w | 173 | 193 | 212 | 231 | 250 | 270 | 289 | 308 | 347 | 386 |
| | $F_v$ | 52 | 58 | 64 | 70 | 76 | 82 | 88 | 93 | 105 | 117 |
| | E | 1149 | 1277 | 1405 | 1532 | 1660 | 1788 | 1916 | 2043 | 2299 | 2554 |
| **8 x 12** | W | 4508 | 5009 | 5510 | 6011 | 6512 | 7013 | 7514 | 8015 | 9017 | 10018 |
| | w | 204 | 227 | 250 | 273 | 296 | 318 | 341 | 364 | 409 | 455 |
| | $F_v$ | 39 | 43 | 47 | 52 | 56 | 60 | 65 | 69 | 78 | 87 |
| | E | 1549 | 1721 | 1893 | 2066 | 2238 | 2410 | 2582 | 2754 | 3099 | 3443 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **22'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **6 x 14** | W | 4556 | 5062 | 5568 | 6075 | 6581 | 7087 | 7593 | 8100 | 9112 | 10125 |
| | w | 207 | 230 | 253 | 276 | 299 | 322 | 345 | 368 | 414 | 460 |
| | $F_v$ | 46 | 51 | 56 | 61 | 66 | 71 | 76 | 81 | 92 | 102 |
| | E | 1319 | 1466 | 1613 | 1759 | 1906 | 2053 | 2199 | 2346 | 2639 | 2933 |
| **10 x 12** | W | 5710 | 6345 | 6979 | 7614 | 8248 | 8883 | 9517 | 10152 | 11421 | 12690 |
| | w | 259 | 288 | 317 | 346 | 374 | 403 | 432 | 461 | 519 | 576 |
| | $F_v$ | 39 | 43 | 47 | 52 | 56 | 60 | 65 | 69 | 78 | 87 |
| | E | 1549 | 1721 | 1893 | 2066 | 2238 | 2410 | 2582 | 2754 | 3099 | 3443 |
| **6 x 16** | W | 6006 | 6673 | 7340 | 8008 | 8675 | 9343 | 10010 | 10677 | 12012 | 13347 |
| | w | 273 | 303 | 333 | 364 | 394 | 424 | 455 | 485 | 546 | 606 |
| | $F_v$ | 52 | 58 | 64 | 70 | 76 | 82 | 88 | 93 | 105 | 117 |
| | E | 1149 | 1277 | 1405 | 1532 | 1660 | 1788 | 1916 | 2043 | 2299 | 2554 |
| **8 x 14** | W | 6213 | 6903 | 7593 | 8284 | 8974 | 9664 | 10355 | 11045 | 12426 | 13806 |
| | w | 282 | 313 | 345 | 376 | 407 | 439 | 470 | 502 | 564 | 627 |
| | $F_v$ | 46 | 51 | 56 | 61 | 66 | 71 | 76 | 81 | 92 | 102 |
| | E | 1319 | 1466 | 1613 | 1759 | 1906 | 2053 | 2199 | 2346 | 2639 | 2933 |
| **12 x 12** | W | 6913 | 7681 | 8449 | 9217 | 9985 | 10753 | 11521 | 12289 | 13826 | 15362 |
| | w | 314 | 349 | 384 | 418 | 453 | 488 | 523 | 558 | 628 | 698 |
| | $F_v$ | 39 | 43 | 47 | 52 | 56 | 60 | 65 | 69 | 78 | 87 |
| | E | 1549 | 1721 | 1893 | 2066 | 2238 | 2410 | 2582 | 2754 | 3099 | 3443 |
| **6 x 18** | W | 7656 | 8506 | 9357 | 10208 | 11059 | 11909 | 12760 | 13611 | 15312 | 17013 |
| | w | 348 | 386 | 425 | 464 | 502 | 541 | 580 | 618 | 696 | 773 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | E | 1018 | 1131 | 1244 | 1357 | 1470 | 1583 | 1697 | 1810 | 2036 | 2262 |
| **10 x 14** | W | 7869 | 8744 | 9618 | 10493 | 11367 | 12242 | 13116 | 13990 | 15739 | 17488 |
| | w | 357 | 397 | 437 | 476 | 516 | 556 | 596 | 635 | 715 | 794 |
| | $F_v$ | 46 | 51 | 56 | 61 | 66 | 71 | 76 | 81 | 92 | 102 |
| | E | 1319 | 1466 | 1613 | 1759 | 1906 | 2053 | 2199 | 2346 | 2639 | 2933 |
| **8 x 16** | W | 8190 | 9100 | 10010 | 10920 | 11830 | 12740 | 13650 | 14560 | 16380 | 18200 |
| | w | 372 | 413 | 455 | 496 | 537 | 579 | 620 | 661 | 744 | 827 |
| | $F_v$ | 52 | 58 | 64 | 70 | 76 | 82 | 88 | 93 | 105 | 117 |
| | E | 1149 | 1277 | 1405 | 1532 | 1660 | 1788 | 1916 | 2043 | 2299 | 2554 |
| **6 x 20** | W | 9506 | 10562 | 11618 | 12675 | 13731 | 14787 | 15843 | 16900 | 19012 | 21125 |
| | w | 432 | 480 | 528 | 576 | 624 | 672 | 720 | 768 | 864 | 960 |
| | $F_v$ | 66 | 73 | 81 | 88 | 96 | 103 | 110 | 118 | 132 | 147 |
| | E | 913 | 1015 | 1116 | 1218 | 1319 | 1421 | 1523 | 1624 | 1827 | 2030 |
| **12 x 14** | W | 9526 | 10585 | 11643 | 12702 | 13760 | 14819 | 15877 | 16936 | 19053 | 21170 |
| | w | 433 | 481 | 529 | 577 | 625 | 673 | 721 | 769 | 866 | 962 |
| | $F_v$ | 46 | 51 | 56 | 61 | 66 | 71 | 76 | 81 | 92 | 102 |
| | E | 1319 | 1466 | 1613 | 1759 | 1906 | 2053 | 2199 | 2346 | 2639 | 2933 |
| **10 x 16** | W | 10374 | 11527 | 12679 | 13832 | 14985 | 16138 | 17290 | 18443 | 20748 | 23054 |
| | w | 471 | 523 | 576 | 628 | 681 | 733 | 785 | 838 | 943 | 1047 |
| | $F_v$ | 52 | 58 | 64 | 70 | 76 | 82 | 88 | 93 | 105 | 117 |
| | E | 1149 | 1277 | 1405 | 1532 | 1660 | 1788 | 1916 | 2043 | 2299 | 2554 |
| **8 x 18** | W | 10440 | 11600 | 12760 | 13920 | 15080 | 16240 | 17400 | 18560 | 20880 | 23200 |
| | w | 474 | 527 | 580 | 632 | 685 | 738 | 790 | 843 | 949 | 1054 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | E | 1018 | 1131 | 1244 | 1357 | 1470 | 1583 | 1697 | 1810 | 2036 | 2262 |
| **14 x 14** | W | 11183 | 12426 | 13668 | 14911 | 16153 | 17396 | 18639 | 19881 | 22367 | 24852 |
| | w | 508 | 564 | 621 | 677 | 734 | 790 | 847 | 903 | 1016 | 1129 |
| | $F_v$ | 46 | 51 | 56 | 61 | 66 | 71 | 76 | 81 | 92 | 102 |
| | E | 1319 | 1466 | 1613 | 1759 | 1906 | 2053 | 2199 | 2346 | 2639 | 2933 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **22' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **6 x 22** | W | 11556 | 12840 | 14124 | 15408 | 16692 | 17976 | 19260 | 20544 | 23112 | 25680 |
| | w | 525 | 583 | 642 | 700 | 758 | 817 | 875 | 933 | 1050 | 1167 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 114 | 122 | 130 | 146 | 162 |
| | E | 828 | 920 | 1013 | 1105 | 1197 | 1289 | 1381 | 1473 | 1657 | 1841 |
| **12 x 16** | W | 12558 | 13953 | 15349 | 16744 | 18140 | 19535 | 20930 | 22326 | 25117 | 27907 |
| | w | 570 | 634 | 697 | 761 | 824 | 887 | 951 | 1014 | 1141 | 1268 |
| | $F_v$ | 52 | 58 | 64 | 70 | 76 | 82 | 88 | 93 | 105 | 117 |
| | E | 1149 | 1277 | 1405 | 1532 | 1660 | 1788 | 1916 | 2043 | 2299 | 2554 |
| **8 x 20** | W | 12963 | 14403 | 15843 | 17284 | 18724 | 20164 | 21605 | 23045 | 25926 | 28806 |
| | w | 589 | 654 | 720 | 785 | 851 | 916 | 982 | 1047 | 1178 | 1309 |
| | $F_v$ | 66 | 73 | 81 | 88 | 96 | 103 | 110 | 118 | 132 | 147 |
| | E | 913 | 1015 | 1116 | 1218 | 1319 | 1421 | 1523 | 1624 | 1827 | 2030 |
| **10 x 18** | W | 13224 | 14693 | 16163 | 17632 | 19101 | 20571 | 22040 | 23510 | 26448 | 29387 |
| | w | 601 | 667 | 734 | 801 | 868 | 935 | 1001 | 1068 | 1202 | 1335 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | E | 1018 | 1131 | 1244 | 1357 | 1470 | 1583 | 1697 | 1810 | 2036 | 2262 |
| **6 x 24** | W | 13806 | 15340 | 16874 | 18408 | 19942 | 21476 | 23010 | 24544 | 27612 | 30680 |
| | w | 627 | 697 | 767 | 836 | 906 | 976 | 1045 | 1115 | 1255 | 1394 |
| | $F_v$ | 80 | 89 | 97 | 106 | 115 | 124 | 133 | 142 | 160 | 178 |
| | E | 758 | 842 | 926 | 1011 | 1095 | 1179 | 1263 | 1348 | 1516 | 1685 |
| **14 x 16** | W | 14742 | 16380 | 18018 | 19656 | 21294 | 22932 | 24571 | 26209 | 29485 | 32761 |
| | w | 670 | 744 | 819 | 893 | 967 | 1042 | 1116 | 1191 | 1340 | 1489 |
| | $F_v$ | 52 | 58 | 64 | 70 | 76 | 82 | 88 | 93 | 105 | 117 |
| | E | 1149 | 1277 | 1405 | 1532 | 1660 | 1788 | 1916 | 2043 | 2299 | 2554 |
| **8 x 22** | W | 15758 | 17509 | 19260 | 21011 | 22762 | 24513 | 26264 | 28015 | 31517 | 35018 |
| | w | 716 | 795 | 875 | 955 | 1034 | 1114 | 1193 | 1273 | 1432 | 1591 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 114 | 122 | 130 | 146 | 162 |
| | E | 828 | 920 | 1013 | 1105 | 1197 | 1289 | 1381 | 1473 | 1657 | 1841 |
| **12 x 18** | W | 16008 | 17787 | 19565 | 21344 | 23123 | 24902 | 26680 | 28459 | 32017 | 35574 |
| | w | 727 | 808 | 889 | 970 | 1051 | 1131 | 1212 | 1293 | 1455 | 1617 |
| | $F_v$ | 50 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | E | 1018 | 1131 | 1244 | 1357 | 1470 | 1583 | 1697 | 1810 | 2036 | 2262 |
| **10 x 20** | W | 16419 | 18244 | 20068 | 21893 | 23717 | 25542 | 27366 | 29190 | 32839 | 36488 |
| | w | 746 | 829 | 912 | 995 | 1078 | 1161 | 1243 | 1326 | 1492 | 1658 |
| | $F_v$ | 66 | 73 | 81 | 88 | 96 | 103 | 110 | 118 | 132 | 147 |
| | E | 913 | 1015 | 1116 | 1218 | 1319 | 1421 | 1523 | 1624 | 1827 | 2030 |
| **16 x 16** | W | 16926 | 18807 | 20688 | 22568 | 24449 | 26330 | 28211 | 30091 | 33853 | 37614 |
| | w | 769 | 854 | 940 | 1025 | 1111 | 1196 | 1282 | 1367 | 1538 | 1709 |
| | $F_v$ | 52 | 58 | 64 | 70 | 76 | 82 | 88 | 93 | 105 | 117 |
| | E | 1149 | 1277 | 1405 | 1532 | 1660 | 1788 | 1916 | 2043 | 2299 | 2554 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **22' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **14 x 18** | W | 18792 | 20880 | 22968 | 25056 | 27144 | 29232 | 31321 | 33409 | 37585 | 41761 |
| | w | 854 | 949 | 1044 | 1138 | 1233 | 1328 | 1423 | 1518 | 1708 | 1898 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | E | 1018 | 1131 | 1244 | 1357 | 1470 | 1583 | 1697 | 1810 | 2036 | 2262 |
| **8 x 24** | W | 18826 | 20918 | 23010 | 25102 | 27194 | 29285 | 31377 | 33469 | 37653 | 41837 |
| | w | 855 | 950 | 1045 | 1141 | 1236 | 1331 | 1426 | 1521 | 1711 | 1901 |
| | $F_v$ | 80 | 89 | 97 | 106 | 115 | 124 | 133 | 142 | 160 | 178 |
| | E | 758 | 842 | 926 | 1011 | 1095 | 1179 | 1263 | 1348 | 1516 | 1685 |
| **12 x 20** | W | 19876 | 22085 | 24293 | 26502 | 28710 | 30919 | 33127 | 35336 | 39753 | 44170 |
| | w | 903 | 1003 | 1104 | 1204 | 1305 | 1405 | 1505 | 1606 | 1806 | 2007 |
| | $F_v$ | 66 | 73 | 81 | 88 | 96 | 103 | 110 | 118 | 132 | 147 |
| | E | 913 | 1015 | 1116 | 1218 | 1319 | 1421 | 1523 | 1624 | 1827 | 2030 |
| **10 x 22** | W | 19960 | 22178 | 24396 | 26614 | 28832 | 31050 | 33267 | 35485 | 39921 | 44357 |
| | w | 907 | 1008 | 1108 | 1209 | 1310 | 1411 | 1512 | 1612 | 1814 | 2016 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 114 | 122 | 130 | 146 | 162 |
| | E | 828 | 920 | 1013 | 1105 | 1197 | 1289 | 1381 | 1473 | 1657 | 1841 |
| **16 x 18** | W | 21576 | 23974 | 26371 | 28768 | 31166 | 33563 | 35961 | 38358 | 43153 | 47948 |
| | w | 980 | 1089 | 1198 | 1307 | 1416 | 1525 | 1634 | 1743 | 1961 | 2179 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | E | 1018 | 1131 | 1244 | 1357 | 1470 | 1583 | 1697 | 1810 | 2036 | 2262 |
| **14 x 20** | W | 23333 | 25926 | 28518 | 31111 | 33703 | 36296 | 38889 | 41481 | 46667 | 51852 |
| | w | 1060 | 1178 | 1296 | 1414 | 1531 | 1649 | 1767 | 1885 | 2121 | 2356 |
| | $F_v$ | 66 | 73 | 81 | 88 | 96 | 103 | 110 | 118 | 132 | 147 |
| | E | 913 | 1015 | 1116 | 1218 | 1319 | 1421 | 1523 | 1624 | 1827 | 2030 |
| **10 x 24** | W | 23847 | 26496 | 29146 | 31796 | 34445 | 37095 | 39745 | 42394 | 47694 | 52993 |
| | w | 1083 | 1204 | 1324 | 1445 | 1565 | 1686 | 1806 | 1927 | 2167 | 2408 |
| | $F_v$ | 80 | 89 | 97 | 106 | 115 | 124 | 133 | 142 | 160 | 178 |
| | E | 758 | 842 | 926 | 1011 | 1095 | 1179 | 1263 | 1348 | 1516 | 1685 |
| **12 x 22** | W | 24163 | 26847 | 29532 | 32217 | 34902 | 37586 | 40271 | 42956 | 48326 | 53695 |
| | w | 1098 | 1220 | 1342 | 1464 | 1586 | 1708 | 1830 | 1952 | 2196 | 2440 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 114 | 122 | 130 | 146 | 162 |
| | E | 828 | 920 | 1013 | 1105 | 1197 | 1289 | 1381 | 1473 | 1657 | 1841 |
| **18 x 18** | W | 24360 | 27067 | 29774 | 32481 | 35187 | 37894 | 40601 | 43308 | 48721 | 54135 |
| | w | 1107 | 1230 | 1353 | 1476 | 1599 | 1722 | 1845 | 1968 | 2214 | 2460 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | E | 1018 | 1131 | 1244 | 1357 | 1470 | 1583 | 1697 | 1810 | 2036 | 2262 |
| **16 x 20** | W | 26790 | 29767 | 32743 | 35720 | 38697 | 41673 | 44650 | 47627 | 53580 | 59534 |
| | w | 1217 | 1353 | 1488 | 1623 | 1758 | 1894 | 2029 | 2164 | 2435 | 2706 |
| | $F_v$ | 66 | 73 | 81 | 88 | 96 | 103 | 110 | 118 | 132 | 147 |
| | E | 913 | 1015 | 1116 | 1218 | 1319 | 1421 | 1523 | 1624 | 1827 | 2030 |
| **14 x 22** | W | 28365 | 31517 | 34668 | 37820 | 40972 | 44123 | 47275 | 50427 | 56730 | 63034 |
| | w | 1289 | 1432 | 1575 | 1719 | 1862 | 2005 | 2148 | 2292 | 2578 | 2865 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 114 | 122 | 130 | 146 | 162 |
| | E | 828 | 920 | 1013 | 1105 | 1197 | 1289 | 1381 | 1473 | 1657 | 1841 |
| **12 x 24** | W | 28867 | 32075 | 35282 | 38490 | 41697 | 44905 | 48112 | 51320 | 57735 | 64150 |
| | w | 1312 | 1457 | 1603 | 1749 | 1895 | 2041 | 2186 | 2332 | 2624 | 2915 |
| | $F_v$ | 80 | 89 | 97 | 106 | 115 | 124 | 133 | 142 | 160 | 178 |
| | E | 758 | 842 | 926 | 1011 | 1095 | 1179 | 1263 | 1348 | 1516 | 1685 |
| **18 x 20** | W | 30247 | 33607 | 36968 | 40329 | 43690 | 47051 | 50411 | 53772 | 60494 | 67215 |
| | w | 1374 | 1527 | 1680 | 1833 | 1985 | 2138 | 2291 | 2444 | 2749 | 3055 |
| | $F_v$ | 66 | 73 | 81 | 88 | 96 | 103 | 110 | 118 | 132 | 147 |
| | E | 913 | 1015 | 1116 | 1218 | 1319 | 1421 | 1523 | 1624 | 1827 | 2030 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **22' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **16 x 22** | W | 32567 | 36186 | 39804 | 43423 | 47042 | 50660 | 54279 | 57897 | 65135 | 72372 |
| | w | 1480 | 1644 | 1809 | 1973 | 2138 | 2302 | 2467 | 2631 | 2960 | 3289 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 114 | 122 | 130 | 146 | 162 |
| | E | 828 | 920 | 1013 | 1105 | 1197 | 1289 | 1381 | 1473 | 1657 | 1841 |
| **20 x 20** | W | 33703 | 37448 | 41193 | 44938 | 48683 | 52428 | 56173 | 59918 | 67407 | 74897 |
| | w | 1531 | 1702 | 1872 | 2042 | 2212 | 2383 | 2553 | 2723 | 3063 | 3404 |
| | $F_v$ | 66 | 73 | 81 | 88 | 96 | 103 | 110 | 118 | 132 | 147 |
| | E | 913 | 1015 | 1116 | 1218 | 1319 | 1421 | 1523 | 1624 | 1827 | 2030 |
| **14 x 24** | W | 33888 | 37653 | 41418 | 45184 | 48949 | 52714 | 56480 | 60245 | 67776 | 75306 |
| | w | 1540 | 1711 | 1882 | 2053 | 2224 | 2396 | 2567 | 2738 | 3080 | 3423 |
| | $F_v$ | 80 | 89 | 97 | 106 | 115 | 124 | 133 | 142 | 160 | 178 |
| | E | 758 | 842 | 926 | 1011 | 1095 | 1179 | 1263 | 1348 | 1516 | 1685 |
| **18 x 22** | W | 36769 | 40855 | 44940 | 49026 | 53112 | 57197 | 61283 | 65368 | 73539 | 81710 |
| | w | 1671 | 1857 | 2042 | 2228 | 2414 | 2599 | 2785 | 2971 | 3342 | 3714 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 114 | 122 | 130 | 146 | 162 |
| | E | 828 | 920 | 1013 | 1105 | 1197 | 1289 | 1381 | 1473 | 1657 | 1841 |
| **16 x 24** | W | 38908 | 43231 | 47554 | 51878 | 56201 | 60524 | 64847 | 69170 | 77817 | 86463 |
| | w | 1768 | 1965 | 2161 | 2358 | 2554 | 2751 | 2947 | 3144 | 3537 | 3930 |
| | $F_v$ | 80 | 89 | 97 | 106 | 115 | 124 | 133 | 142 | 160 | 178 |
| | E | 758 | 842 | 926 | 1011 | 1095 | 1179 | 1263 | 1348 | 1516 | 1685 |
| **20 x 22** | W | 40972 | 45524 | 50077 | 54629 | 59182 | 63734 | 68286 | 72839 | 81944 | 91049 |
| | w | 1862 | 2069 | 2276 | 2483 | 2690 | 2897 | 3103 | 3310 | 3724 | 4138 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 114 | 122 | 130 | 146 | 162 |
| | E | 828 | 920 | 1013 | 1105 | 1197 | 1289 | 1381 | 1473 | 1657 | 1841 |
| **18 x 24** | W | 43928 | 48809 | 53690 | 58571 | 63452 | 68333 | 73214 | 78095 | 87857 | 97619 |
| | w | 1996 | 2218 | 2440 | 2662 | 2884 | 3106 | 3327 | 3549 | 3993 | 4437 |
| | $F_v$ | 80 | 89 | 97 | 106 | 115 | 124 | 133 | 142 | 160 | 178 |
| | E | 758 | 842 | 926 | 1011 | 1095 | 1179 | 1263 | 1348 | 1516 | 1685 |
| **22 x 22** | W | 45174 | 50193 | 55213 | 60232 | 65251 | 70271 | 75290 | 80310 | 90348 | 100387 |
| | w | 2053 | 2281 | 2509 | 2737 | 2965 | 3194 | 3422 | 3650 | 4106 | 4563 |
| | $F_v$ | 73 | 81 | 89 | 97 | 105 | 114 | 122 | 130 | 146 | 162 |
| | E | 828 | 920 | 1013 | 1105 | 1197 | 1289 | 1381 | 1473 | 1657 | 1841 |
| **20 x 24** | W | 48949 | 54388 | 59827 | 65265 | 70704 | 76143 | 81582 | 87021 | 97898 | 108776 |
| | w | 2224 | 2472 | 2719 | 2966 | 3213 | 3461 | 3708 | 3955 | 4449 | 4944 |
| | $F_v$ | 80 | 89 | 97 | 106 | 115 | 124 | 133 | 142 | 160 | 178 |
| | E | 758 | 842 | 926 | 1011 | 1095 | 1179 | 1263 | 1348 | 1516 | 1685 |
| **22 x 24** | W | 53969 | 59966 | 65963 | 71959 | 77956 | 83953 | 89949 | 95946 | 107939 | 119933 |
| | w | 2453 | 2725 | 2998 | 3270 | 3543 | 3816 | 4088 | 4361 | 4906 | 5451 |
| | $F_v$ | 80 | 89 | 97 | 106 | 115 | 124 | 133 | 142 | 160 | 178 |
| | E | 758 | 842 | 926 | 1011 | 1095 | 1179 | 1263 | 1348 | 1516 | 1685 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **22' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **24 x 24** | W | 58990 | 65544 | 72099 | 78653 | 85208 | 91762 | 98317 | 104871 | 117980 | 131089 |
| | w | 2681 | 2979 | 3277 | 3575 | 3873 | 4171 | 4468 | 4766 | 5362 | 5958 |
| | $F_v$ | 80 | 89 | 97 | 106 | 115 | 124 | 133 | 142 | 160 | 178 |
| | E | 758 | 842 | 926 | 1011 | 1095 | 1179 | 1263 | 1348 | 1516 | 1685 |
| **23' - 0" SPAN** | | | | | | | | | | | |
| **2 x 10** | W | 538 | 620 | 682 | 744 | 806 | 868 | 930 | 992 | 1116 | 1240 |
| | w | 24 | 26 | 29 | 32 | 35 | 37 | 40 | 43 | 48 | 53 |
| | $F_v$ | 30 | 33 | 36 | 40 | 43 | 46 | 50 | 53 | 60 | 67 |
| | E | 2014 | 2237 | 2461 | 2685 | 2909 | 3132 | 3356 | 3580 | 4028 | 4475 |
| **2 x 12** | W | 825 | 917 | 1008 | 1100 | 1192 | 1283 | 1375 | 1467 | 1650 | 1834 |
| | w | 35 | 39 | 43 | 47 | 51 | 55 | 59 | 63 | 71 | 79 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 57 | 61 | 65 | 73 | 81 |
| | E | 1655 | 1839 | 2023 | 2207 | 2391 | 2575 | 2759 | 2943 | 3311 | 3679 |
| **3 x 10** | W | 930 | 1033 | 1136 | 1240 | 1343 | 1446 | 1550 | 1653 | 1860 | 2066 |
| | w | 40 | 44 | 49 | 53 | 58 | 62 | 67 | 71 | 80 | 89 |
| | $F_v$ | 30 | 33 | 36 | 40 | 43 | 46 | 50 | 53 | 60 | 67 |
| | E | 2014 | 2237 | 2461 | 2685 | 2909 | 3132 | 3356 | 3580 | 4028 | 4475 |
| **2 x 14** | W | 1144 | 1272 | 1399 | 1526 | 1653 | 1781 | 1908 | 2035 | 2289 | 2544 |
| | w | 49 | 55 | 60 | 66 | 71 | 77 | 82 | 88 | 99 | 110 |
| | $F_v$ | 43 | 48 | 52 | 57 | 62 | 67 | 72 | 76 | 86 | 96 |
| | E | 1406 | 1562 | 1718 | 1874 | 2030 | 2187 | 2343 | 2499 | 2812 | 3124 |
| **4 x 10** | W | 1302 | 1446 | 1591 | 1736 | 1880 | 2025 | 2170 | 2314 | 2604 | 2893 |
| | w | 56 | 62 | 69 | 75 | 81 | 88 | 94 | 100 | 113 | 125 |
| | $F_v$ | 30 | 33 | 36 | 40 | 43 | 46 | 50 | 53 | 60 | 67 |
| | E | 2014 | 2237 | 2461 | 2685 | 2909 | 3132 | 3356 | 3580 | 4028 | 4475 |
| **3 x 12** | W | 1375 | 1528 | 1681 | 1834 | 1987 | 2139 | 2292 | 2445 | 2751 | 3057 |
| | w | 59 | 66 | 73 | 79 | 86 | 93 | 99 | 106 | 119 | 132 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 57 | 61 | 65 | 73 | 81 |
| | E | 1655 | 1839 | 2023 | 2207 | 2391 | 2575 | 2759 | 2943 | 3311 | 3679 |
| **8 x 8** | W | 1834 | 2038 | 2241 | 2445 | 2649 | 2853 | 3057 | 3260 | 3668 | 4076 |
| | w | 79 | 88 | 97 | 106 | 115 | 124 | 132 | 141 | 159 | 177 |
| | $F_v$ | 24 | 27 | 29 | 32 | 35 | 38 | 40 | 43 | 48 | 54 |
| | E | 2483 | 2759 | 3035 | 3311 | 3587 | 3863 | 4139 | 4415 | 4967 | 5519 |
| **3 x 14** | W | 1908 | 2120 | 2332 | 2544 | 2756 | 2968 | 3180 | 3392 | 3816 | 4240 |
| | w | 82 | 92 | 101 | 110 | 119 | 129 | 138 | 147 | 165 | 184 |
| | $F_v$ | 43 | 48 | 52 | 57 | 62 | 67 | 72 | 76 | 86 | 96 |
| | E | 1406 | 1562 | 1718 | 1874 | 2030 | 2187 | 2343 | 2499 | 2812 | 3124 |
| **4 x 12** | W | 1925 | 2139 | 2353 | 2567 | 2781 | 2995 | 3209 | 3423 | 3851 | 4279 |
| | w | 83 | 93 | 102 | 111 | 120 | 130 | 139 | 148 | 167 | 186 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 57 | 61 | 65 | 73 | 81 |
| | E | 1655 | 1839 | 2023 | 2207 | 2391 | 2575 | 2759 | 2943 | 3311 | 3679 |
| **6 x 10** | W | 2158 | 2397 | 2637 | 2877 | 3117 | 3357 | 3596 | 3836 | 4316 | 4795 |
| | w | 93 | 104 | 114 | 125 | 135 | 145 | 156 | 166 | 187 | 208 |
| | $F_v$ | 30 | 34 | 37 | 41 | 44 | 48 | 51 | 55 | 61 | 68 |
| | E | 1961 | 2178 | 2396 | 2614 | 2832 | 3050 | 3268 | 3486 | 3922 | 4357 |
| **3 x 16** | W | 2527 | 2808 | 3089 | 3370 | 3651 | 3932 | 4213 | 4493 | 5055 | 5617 |
| | w | 109 | 122 | 134 | 146 | 158 | 170 | 183 | 195 | 219 | 244 |
| | $F_v$ | 49 | 55 | 60 | 66 | 71 | 77 | 82 | 88 | 99 | 110 |
| | E | 1221 | 1357 | 1493 | 1628 | 1764 | 1900 | 2036 | 2171 | 2443 | 2714 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for *l*/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **23' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **4 x 14** | W | 2773 | 3081 | 3389 | 3697 | 4005 | 4314 | 4622 | 4930 | 5546 | 6163 |
| | w | 120 | 133 | 147 | 160 | 174 | 187 | 200 | 214 | 241 | 267 |
| | $F_v$ | 44 | 48 | 53 | 58 | 63 | 68 | 73 | 78 | 88 | 97 |
| | E | 1379 | 1533 | 1686 | 1839 | 1993 | 2146 | 2299 | 2453 | 2759 | 3066 |
| **8 x 10** | W | 2942 | 3269 | 3596 | 3923 | 4250 | 4577 | 4904 | 5231 | 5885 | 6539 |
| | w | 127 | 142 | 156 | 170 | 184 | 199 | 213 | 227 | 255 | 284 |
| | $F_v$ | 30 | 34 | 37 | 41 | 44 | 48 | 51 | 55 | 61 | 68 |
| | E | 1961 | 2178 | 2396 | 2614 | 2832 | 3050 | 3268 | 3486 | 3922 | 4357 |
| **6 x 12** | W | 3162 | 3513 | 3865 | 4216 | 4568 | 4919 | 5270 | 5622 | 6324 | 7027 |
| | w | 137 | 152 | 168 | 183 | 198 | 213 | 229 | 244 | 275 | 305 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **10 x 10** | W | 3727 | 4141 | 4556 | 4970 | 5384 | 5798 | 6212 | 6627 | 7455 | 8283 |
| | w | 162 | 180 | 198 | 216 | 234 | 252 | 270 | 288 | 324 | 360 |
| | $F_v$ | 30 | 34 | 37 | 41 | 44 | 48 | 51 | 55 | 61 | 68 |
| | E | 1961 | 2178 | 2396 | 2614 | 2832 | 3050 | 3268 | 3486 | 3922 | 4357 |
| **4 x 16** | W | 3655 | 4062 | 4468 | 4874 | 5280 | 5687 | 6093 | 6499 | 7311 | 8124 |
| | w | 158 | 176 | 194 | 211 | 229 | 247 | 264 | 282 | 317 | 353 |
| | $F_v$ | 50 | 56 | 61 | 67 | 73 | 78 | 84 | 89 | 101 | 112 |
| | E | 1201 | 1335 | 1469 | 1602 | 1736 | 1869 | 2003 | 2136 | 2403 | 2670 |
| **8 x 12** | W | 4312 | 4791 | 5270 | 5750 | 6229 | 6708 | 7187 | 7666 | 8625 | 9583 |
| | w | 187 | 208 | 229 | 250 | 270 | 291 | 312 | 333 | 375 | 416 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **6 x 14** | W | 4358 | 4842 | 5326 | 5810 | 6295 | 6779 | 7263 | 7747 | 8716 | 9684 |
| | w | 189 | 210 | 231 | 252 | 273 | 294 | 315 | 336 | 378 | 421 |
| | $F_v$ | 44 | 48 | 53 | 58 | 63 | 68 | 73 | 78 | 88 | 97 |
| | E | 1379 | 1533 | 1686 | 1839 | 1993 | 2146 | 2299 | 2453 | 2759 | 3066 |
| **10 x 12** | W | 5462 | 6069 | 6676 | 7283 | 7890 | 8497 | 9104 | 9711 | 10924 | 12138 |
| | w | 237 | 263 | 290 | 316 | 343 | 369 | 395 | 422 | 475 | 527 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **6 x 16** | W | 5745 | 6383 | 7021 | 7660 | 8298 | 8936 | 9575 | 10213 | 11490 | 12766 |
| | w | 249 | 277 | 305 | 333 | 360 | 388 | 416 | 444 | 499 | 555 |
| | $F_v$ | 50 | 56 | 61 | 67 | 73 | 78 | 84 | 89 | 101 | 112 |
| | E | 1201 | 1335 | 1469 | 1602 | 1736 | 1869 | 2003 | 2136 | 2403 | 2670 |
| **8 x 14** | W | 5942 | 6603 | 7263 | 7923 | 8584 | 9244 | 9904 | 10565 | 11885 | 13206 |
| | w | 258 | 287 | 315 | 344 | 373 | 401 | 430 | 459 | 516 | 574 |
| | $F_v$ | 44 | 48 | 53 | 58 | 63 | 68 | 73 | 78 | 88 | 97 |
| | E | 1379 | 1533 | 1686 | 1839 | 1993 | 2146 | 2299 | 2453 | 2759 | 3066 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **23' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **12 x 12** | W | 6612 | 7347 | 8081 | 8816 | 9551 | 10286 | 11020 | 11755 | 13224 | 14694 |
| | w | 287 | 319 | 351 | 383 | 415 | 447 | 479 | 511 | 575 | 638 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **6 x 18** | W | 7323 | 8137 | 8950 | 9764 | 10578 | 11391 | 12205 | 13019 | 14646 | 16274 |
| | w | 318 | 353 | 389 | 424 | 459 | 495 | 530 | 566 | 636 | 707 |
| | $F_v$ | 57 | 63 | 69 | 76 | 82 | 88 | 95 | 101 | 114 | 126 |
| | E | 1064 | 1182 | 1301 | 1419 | 1537 | 1655 | 1774 | 1892 | 2129 | 2365 |
| **10 x 14** | W | 7527 | 8364 | 9200 | 10036 | 10873 | 11709 | 12546 | 13382 | 15055 | 16728 |
| | w | 327 | 363 | 400 | 436 | 472 | 509 | 545 | 581 | 654 | 727 |
| | $F_v$ | 44 | 48 | 53 | 58 | 63 | 68 | 73 | 78 | 88 | 97 |
| | E | 1379 | 1533 | 1686 | 1839 | 1993 | 2146 | 2299 | 2453 | 2759 | 3066 |
| **8 x 16** | W | 7834 | 8704 | 9575 | 10445 | 11316 | 12186 | 13057 | 13927 | 15668 | 17409 |
| | w | 340 | 378 | 416 | 454 | 492 | 529 | 567 | 605 | 681 | 756 |
| | $F_v$ | 50 | 56 | 61 | 67 | 73 | 78 | 84 | 89 | 101 | 112 |
| | E | 1201 | 1335 | 1469 | 1602 | 1736 | 1869 | 2003 | 2136 | 2403 | 2670 |
| **6 x 20** | W | 9092 | 10103 | 11113 | 12123 | 13134 | 14144 | 15154 | 16165 | 18185 | 20206 |
| | w | 395 | 439 | 483 | 527 | 571 | 614 | 658 | 702 | 790 | 878 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 113 | 127 | 141 |
| | E | 955 | 1061 | 1167 | 1273 | 1379 | 1486 | 1592 | 1698 | 1910 | 2123 |
| **12 x 14** | W | 9112 | 10125 | 11137 | 12150 | 13162 | 14175 | 15187 | 16200 | 18225 | 20250 |
| | w | 396 | 440 | 484 | 528 | 572 | 616 | 660 | 704 | 792 | 880 |
| | $F_v$ | 44 | 48 | 53 | 58 | 63 | 68 | 73 | 78 | 88 | 97 |
| | E | 1379 | 1533 | 1686 | 1839 | 1993 | 2146 | 2299 | 2453 | 2759 | 3066 |
| **10 x 16** | W | 9923 | 11025 | 12128 | 13231 | 14333 | 15436 | 16538 | 17641 | 19846 | 22051 |
| | w | 431 | 479 | 527 | 575 | 623 | 671 | 719 | 767 | 862 | 958 |
| | $F_v$ | 50 | 56 | 61 | 67 | 73 | 78 | 84 | 89 | 101 | 112 |
| | E | 1201 | 1335 | 1469 | 1602 | 1736 | 1869 | 2003 | 2136 | 2403 | 2670 |
| **8 x 18** | W | 9986 | 11096 | 12205 | 13315 | 14424 | 15534 | 16644 | 17753 | 19972 | 22192 |
| | w | 434 | 482 | 530 | 578 | 627 | 675 | 723 | 771 | 868 | 964 |
| | $F_v$ | 57 | 63 | 69 | 76 | 82 | 88 | 95 | 101 | 114 | 126 |
| | E | 1064 | 1182 | 1301 | 1419 | 1537 | 1655 | 1774 | 1892 | 2129 | 2365 |
| **14 x 14** | W | 10697 | 11885 | 13074 | 14263 | 15451 | 16640 | 17828 | 19017 | 21394 | 23771 |
| | w | 465 | 516 | 568 | 620 | 671 | 723 | 775 | 826 | 930 | 1033 |
| | $F_v$ | 44 | 48 | 53 | 58 | 63 | 68 | 73 | 78 | 88 | 97 |
| | E | 1379 | 1533 | 1686 | 1839 | 1993 | 2146 | 2299 | 2453 | 2759 | 3066 |
| **6 x 22** | W | 11053 | 12282 | 13510 | 14738 | 15966 | 17194 | 18423 | 19651 | 22107 | 24564 |
| | w | 480 | 534 | 587 | 640 | 694 | 747 | 801 | 854 | 961 | 1068 |
| | $F_v$ | 70 | 77 | 85 | 93 | 101 | 109 | 116 | 124 | 140 | 155 |
| | E | 866 | 962 | 1059 | 1155 | 1251 | 1347 | 1444 | 1540 | 1733 | 1925 |
| **12 x 16** | W | 12012 | 13347 | 14681 | 16016 | 17351 | 18686 | 20020 | 21355 | 24024 | 26694 |
| | w | 522 | 580 | 638 | 696 | 754 | 812 | 870 | 928 | 1044 | 1160 |
| | $F_v$ | 50 | 56 | 61 | 67 | 73 | 78 | 84 | 89 | 101 | 112 |
| | E | 1201 | 1335 | 1469 | 1602 | 1736 | 1869 | 2003 | 2136 | 2403 | 2670 |
| **8 x 20** | W | 12399 | 13777 | 15154 | 16532 | 17910 | 19288 | 20665 | 22043 | 24798 | 27554 |
| | w | 539 | 599 | 658 | 718 | 778 | 838 | 898 | 958 | 1078 | 1198 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 113 | 127 | 141 |
| | E | 955 | 1061 | 1167 | 1273 | 1379 | 1486 | 1592 | 1698 | 1910 | 2123 |
| **10 x 18** | W | 12649 | 14054 | 15460 | 16865 | 18271 | 19676 | 21082 | 22487 | 25298 | 28109 |
| | w | 549 | 611 | 672 | 733 | 794 | 855 | 916 | 977 | 1099 | 1222 |
| | $F_v$ | 57 | 63 | 69 | 76 | 82 | 88 | 95 | 101 | 114 | 126 |
| | E | 1064 | 1182 | 1301 | 1419 | 1537 | 1655 | 1774 | 1892 | 2129 | 2365 |

## WOOD BEAMS–SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **23'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **6 x 24** | W | 13205 | 14673 | 16140 | 17607 | 19075 | 20542 | 22009 | 23477 | 26411 | 29346 |
| | w | 574 | 637 | 701 | 765 | 829 | 893 | 956 | 1020 | 1148 | 1275 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 792 | 880 | 968 | 1057 | 1145 | 1233 | 1321 | 1409 | 1585 | 1761 |
| **14 x 16** | W | 14101 | 15668 | 17235 | 18802 | 20369 | 21935 | 23502 | 25069 | 28203 | 31336 |
| | w | 613 | 681 | 749 | 817 | 885 | 953 | 1021 | 1089 | 1226 | 1362 |
| | $F_v$ | 50 | 56 | 61 | 67 | 73 | 78 | 84 | 89 | 101 | 112 |
| | E | 1201 | 1335 | 1469 | 1602 | 1736 | 1869 | 2003 | 2136 | 2403 | 2670 |
| **8 x 22** | W | 15073 | 16748 | 18423 | 20097 | 21772 | 23447 | 25122 | 26797 | 30146 | 33496 |
| | w | 655 | 728 | 801 | 873 | 946 | 1019 | 1092 | 1165 | 1310 | 1456 |
| | $F_v$ | 70 | 77 | 85 | 93 | 101 | 109 | 116 | 124 | 140 | 155 |
| | E | 866 | 962 | 1059 | 1155 | 1251 | 1347 | 1444 | 1540 | 1733 | 1925 |
| **12 x 18** | W | 15312 | 17013 | 18715 | 20416 | 22118 | 23819 | 25520 | 27222 | 30624 | 34027 |
| | w | 665 | 739 | 813 | 887 | 961 | 1035 | 1109 | 1183 | 1331 | 1479 |
| | $F_v$ | 57 | 63 | 69 | 76 | 82 | 88 | 95 | 101 | 114 | 126 |
| | E | 1064 | 1182 | 1301 | 1419 | 1537 | 1655 | 1774 | 1892 | 2129 | 2365 |
| **10 x 20** | W | 15705 | 17451 | 19196 | 20941 | 22686 | 24431 | 26176 | 27921 | 31411 | 34902 |
| | w | 682 | 758 | 834 | 910 | 986 | 1062 | 1138 | 1213 | 1365 | 1517 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 113 | 127 | 141 |
| | E | 955 | 1061 | 1167 | 1273 | 1379 | 1486 | 1592 | 1698 | 1910 | 2123 |
| **16 x 16** | W | 16190 | 17989 | 19788 | 21587 | 23386 | 25185 | 26984 | 28783 | 32381 | 35979 |
| | w | 703 | 782 | 860 | 938 | 1016 | 1095 | 1173 | 1251 | 1407 | 1564 |
| | $F_v$ | 50 | 56 | 61 | 67 | 73 | 78 | 84 | 89 | 101 | 112 |
| | E | 1201 | 1335 | 1469 | 1602 | 1736 | 1869 | 2003 | 2136 | 2403 | 2670 |
| **14 x 18** | W | 17975 | 19972 | 21970 | 23967 | 25964 | 27961 | 29959 | 31956 | 35951 | 39945 |
| | w | 781 | 868 | 955 | 1042 | 1128 | 1215 | 1302 | 1389 | 1563 | 1736 |
| | $F_v$ | 57 | 63 | 69 | 76 | 82 | 88 | 95 | 101 | 114 | 126 |
| | E | 1064 | 1182 | 1301 | 1419 | 1537 | 1655 | 1774 | 1892 | 2129 | 2365 |
| **8 x 24** | W | 18008 | 20009 | 22009 | 24010 | 26011 | 28012 | 30013 | 32014 | 36016 | 40018 |
| | w | 782 | 869 | 956 | 1043 | 1130 | 1217 | 1304 | 1391 | 1565 | 1739 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 792 | 880 | 968 | 1057 | 1145 | 1233 | 1321 | 1409 | 1585 | 1761 |
| **12 x 20** | W | 19012 | 21125 | 23237 | 25350 | 27462 | 29575 | 31687 | 33800 | 38024 | 42250 |
| | w | 826 | 918 | 1010 | 1102 | 1194 | 1285 | 1377 | 1469 | 1653 | 1836 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 113 | 127 | 141 |
| | E | 955 | 1061 | 1167 | 1273 | 1379 | 1486 | 1592 | 1698 | 1910 | 2123 |
| **10 x 22** | W | 19092 | 21214 | 23335 | 25457 | 27578 | 29700 | 31821 | 33942 | 38185 | 42428 |
| | w | 830 | 922 | 1014 | 1106 | 1199 | 1291 | 1383 | 1475 | 1660 | 1844 |
| | $F_v$ | 70 | 77 | 85 | 93 | 101 | 109 | 116 | 124 | 140 | 155 |
| | E | 866 | 962 | 1059 | 1155 | 1251 | 1347 | 1444 | 1540 | 1733 | 1925 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **23' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **16 x 18** | W | 20638 | 22931 | 25224 | 27518 | 29811 | 32104 | 34397 | 36690 | 41277 | 45863 |
| | w | 897 | 997 | 1096 | 1196 | 1296 | 1395 | 1495 | 1595 | 1794 | 1994 |
| | $F_v$ | 57 | 63 | 69 | 76 | 82 | 88 | 95 | 101 | 114 | 126 |
| | E | 1064 | 1182 | 1301 | 1419 | 1537 | 1655 | 1774 | 1892 | 2129 | 2365 |
| **14 x 20** | W | 22319 | 24798 | 27278 | 29758 | 32238 | 34718 | 37198 | 39678 | 44638 | 49597 |
| | w | 970 | 1078 | 1186 | 1293 | 1401 | 1509 | 1617 | 1725 | 1940 | 2156 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 113 | 127 | 141 |
| | E | 955 | 1061 | 1167 | 1273 | 1379 | 1486 | 1592 | 1698 | 1910 | 2123 |
| **10 x 24** | W | 22810 | 25344 | 27879 | 30413 | 32948 | 35482 | 38017 | 40551 | 45620 | 50689 |
| | w | 991 | 1101 | 1212 | 1322 | 1432 | 1542 | 1652 | 1763 | 1983 | 2203 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 792 | 880 | 968 | 1057 | 1145 | 1233 | 1321 | 1409 | 1585 | 1761 |
| **12 x 22** | W | 23112 | 25680 | 28248 | 30816 | 33384 | 35952 | 38520 | 41088 | 46224 | 51361 |
| | w | 1004 | 1116 | 1228 | 1339 | 1451 | 1563 | 1674 | 1786 | 2009 | 2233 |
| | $F_v$ | 70 | 77 | 85 | 93 | 101 | 109 | 116 | 124 | 140 | 155 |
| | E | 866 | 962 | 1059 | 1155 | 1251 | 1347 | 1444 | 1540 | 1733 | 1925 |
| **18 x 18** | W | 23301 | 25890 | 28479 | 31068 | 33657 | 36246 | 38836 | 41425 | 46603 | 51781 |
| | w | 1013 | 1125 | 1238 | 1350 | 1463 | 1575 | 1688 | 1801 | 2026 | 2251 |
| | $F_v$ | 57 | 63 | 69 | 76 | 82 | 88 | 95 | 101 | 114 | 126 |
| | E | 1064 | 1182 | 1301 | 1419 | 1537 | 1655 | 1774 | 1892 | 2129 | 2365 |
| **16 x 20** | W | 25625 | 28472 | 31320 | 34167 | 37014 | 39861 | 42709 | 45556 | 51251 | 56945 |
| | w | 1114 | 1237 | 1361 | 1485 | 1609 | 1733 | 1856 | 1980 | 2228 | 2475 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 113 | 127 | 141 |
| | E | 955 | 1061 | 1167 | 1273 | 1379 | 1486 | 1592 | 1698 | 1910 | 2123 |
| **14 x 22** | W | 27132 | 30146 | 33161 | 36176 | 39190 | 42205 | 45220 | 48234 | 54264 | 60293 |
| | w | 1179 | 1310 | 1441 | 1572 | 1703 | 1835 | 1966 | 2097 | 2359 | 2621 |
| | $F_v$ | 70 | 77 | 85 | 93 | 101 | 109 | 116 | 124 | 140 | 155 |
| | E | 866 | 962 | 1059 | 1155 | 1251 | 1347 | 1444 | 1540 | 1733 | 1925 |
| **12 x 24** | W | 27612 | 30680 | 33748 | 36816 | 39884 | 42952 | 46020 | 49088 | 55224 | 61361 |
| | w | 1200 | 1333 | 1467 | 1600 | 1734 | 1867 | 2000 | 2134 | 2401 | 2667 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 792 | 880 | 968 | 1057 | 1145 | 1233 | 1321 | 1409 | 1585 | 1761 |
| **18 x 20** | W | 28932 | 32146 | 35361 | 38576 | 41790 | 45005 | 48220 | 51434 | 57864 | 64293 |
| | w | 1257 | 1397 | 1537 | 1677 | 1816 | 1956 | 2096 | 2236 | 2515 | 2795 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 113 | 127 | 141 |
| | E | 955 | 1061 | 1167 | 1273 | 1379 | 1486 | 1592 | 1698 | 1910 | 2123 |
| **16 x 22** | W | 31151 | 34612 | 38074 | 41535 | 44996 | 48458 | 51919 | 55380 | 62303 | 69225 |
| | w | 1354 | 1504 | 1655 | 1805 | 1956 | 2106 | 2257 | 2407 | 2708 | 3009 |
| | $F_v$ | 70 | 77 | 85 | 93 | 101 | 109 | 116 | 124 | 140 | 155 |
| | E | 866 | 962 | 1059 | 1155 | 1251 | 1347 | 1444 | 1540 | 1733 | 1925 |
| **20 x 20** | W | 32238 | 35820 | 39402 | 42984 | 46566 | 50148 | 53730 | 57313 | 64477 | 71641 |
| | w | 1401 | 1557 | 1713 | 1868 | 2024 | 2180 | 2336 | 2491 | 2803 | 3114 |
| | $F_v$ | 63 | 70 | 77 | 84 | 91 | 98 | 105 | 113 | 127 | 141 |
| | E | 955 | 1061 | 1167 | 1273 | 1379 | 1486 | 1592 | 1698 | 1910 | 2123 |
| **14 x 24** | W | 32414 | 36016 | 39617 | 43219 | 46821 | 50422 | 54024 | 57626 | 64829 | 72032 |
| | w | 1409 | 1565 | 1722 | 1879 | 2035 | 2192 | 2348 | 2505 | 2818 | 3131 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 792 | 880 | 968 | 1057 | 1145 | 1233 | 1321 | 1409 | 1585 | 1761 |
| **18 x 22** | W | 35171 | 39079 | 42986 | 46894 | 50802 | 54710 | 58618 | 62526 | 70342 | 78158 |
| | w | 1529 | 1699 | 1868 | 2038 | 2208 | 2378 | 2548 | 2718 | 3058 | 3398 |
| | $F_v$ | 70 | 77 | 85 | 93 | 101 | 109 | 116 | 124 | 140 | 155 |
| | E | 866 | 962 | 1059 | 1155 | 1251 | 1347 | 1444 | 1540 | 1733 | 1925 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **23' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **16 x 24** | W | 37216 | 41352 | 45487 | 49622 | 53757 | 57892 | 62028 | 66163 | 74433 | 82704 |
| | w | 1618 | 1797 | 1977 | 2157 | 2337 | 2517 | 2696 | 2876 | 3236 | 3595 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 792 | 880 | 968 | 1057 | 1145 | 1233 | 1321 | 1409 | 1585 | 1761 |
| **20 x 22** | W | 39190 | 43545 | 47899 | 52254 | 56608 | 60963 | 65317 | 69672 | 78381 | 87090 |
| | w | 1703 | 1893 | 2082 | 2271 | 2461 | 2650 | 2839 | 3029 | 3407 | 3786 |
| | $F_v$ | 70 | 77 | 85 | 93 | 101 | 109 | 116 | 124 | 140 | 155 |
| | E | 866 | 962 | 1059 | 1155 | 1251 | 1347 | 1444 | 1540 | 1733 | 1925 |
| **18 x 24** | W | 42019 | 46687 | 51356 | 56025 | 60694 | 65362 | 70031 | 74700 | 84038 | 93375 |
| | w | 1826 | 2029 | 2232 | 2435 | 2638 | 2841 | 3044 | 3247 | 3653 | 4059 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 792 | 880 | 968 | 1057 | 1145 | 1233 | 1321 | 1409 | 1585 | 1761 |
| **22 x 22** | W | 43210 | 48011 | 52812 | 57613 | 62414 | 67216 | 72017 | 76818 | 86420 | 96022 |
| | w | 1878 | 2087 | 2296 | 2504 | 2713 | 2922 | 3131 | 3339 | 3757 | 4174 |
| | $F_v$ | 70 | 77 | 85 | 93 | 101 | 109 | 116 | 124 | 140 | 155 |
| | E | 866 | 962 | 1059 | 1155 | 1251 | 1347 | 1444 | 1540 | 1733 | 1925 |
| **20 x 24** | W | 46821 | 52023 | 57225 | 62428 | 67630 | 72832 | 78035 | 83237 | 93642 | 104047 |
| | w | 2035 | 2261 | 2488 | 2714 | 2940 | 3166 | 3392 | 3619 | 4071 | 4523 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 792 | 880 | 968 | 1057 | 1145 | 1233 | 1321 | 1409 | 1585 | 1761 |
| **22 x 24** | W | 51623 | 57359 | 63095 | 68831 | 74567 | 80303 | 86038 | 91774 | 103246 | 114718 |
| | w | 2244 | 2493 | 2743 | 2992 | 3242 | 3491 | 3740 | 3990 | 4488 | 4987 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 792 | 880 | 968 | 1057 | 1145 | 1233 | 1321 | 1409 | 1585 | 1761 |
| **24 x 24** | W | 56425 | 62695 | 68964 | 75234 | 81503 | 87773 | 94042 | 100312 | 112851 | 125390 |
| | w | 2453 | 2725 | 2998 | 3271 | 3543 | 3816 | 4088 | 4361 | 4906 | 5451 |
| | $F_v$ | 76 | 85 | 93 | 102 | 110 | 119 | 127 | 136 | 153 | 170 |
| | E | 792 | 880 | 968 | 1057 | 1145 | 1233 | 1321 | 1409 | 1585 | 1761 |
| **24' - 0" SPAN** | | | | | | | | | | | |
| **2 x 12** | W | 791 | 878 | 966 | 1054 | 1142 | 1230 | 1318 | 1406 | 1582 | 1757 |
| | w | 32 | 36 | 40 | 43 | 47 | 51 | 54 | 58 | 65 | 73 |
| | $F_v$ | 35 | 39 | 42 | 46 | 50 | 54 | 58 | 62 | 70 | 78 |
| | E | 1727 | 1919 | 2111 | 2303 | 2495 | 2687 | 2879 | 3071 | 3455 | 3839 |
| **3 x 10** | W | 891 | 990 | 1089 | 1188 | 1287 | 1386 | 1485 | 1584 | 1782 | 1980 |
| | w | 37 | 41 | 45 | 49 | 53 | 57 | 61 | 66 | 74 | 82 |
| | $F_v$ | 28 | 32 | 35 | 38 | 41 | 44 | 48 | 51 | 57 | 64 |
| | E | 2101 | 2335 | 2568 | 2802 | 3035 | 3269 | 3502 | 3736 | 4203 | 4670 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **24' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **2 x 14** | W | 1097 | 1219 | 1341 | 1463 | 1584 | 1706 | 1828 | 1950 | 2194 | 2438 |
| | w | 45 | 50 | 55 | 60 | 66 | 71 | 76 | 81 | 91 | 101 |
| | $F_v$ | 41 | 46 | 50 | 55 | 59 | 64 | 69 | 73 | 82 | 92 |
| | E | 1467 | 1630 | 1793 | 1956 | 2119 | 2282 | 2445 | 2608 | 2934 | 3260 |
| **4 x 10** | W | 1247 | 1386 | 1525 | 1663 | 1802 | 1941 | 2079 | 2218 | 2495 | 2772 |
| | w | 51 | 57 | 63 | 69 | 75 | 80 | 86 | 92 | 103 | 115 |
| | $F_v$ | 28 | 32 | 35 | 38 | 41 | 44 | 48 | 51 | 57 | 64 |
| | E | 2101 | 2335 | 2568 | 2802 | 3035 | 3269 | 3502 | 3736 | 4203 | 4670 |
| **3 x 12** | W | 1318 | 1464 | 1611 | 1757 | 1904 | 2050 | 2197 | 2343 | 2636 | 2929 |
| | w | 54 | 61 | 67 | 73 | 79 | 85 | 91 | 97 | 109 | 122 |
| | $F_v$ | 35 | 39 | 42 | 46 | 50 | 54 | 58 | 62 | 70 | 78 |
| | E | 1727 | 1919 | 2111 | 2303 | 2495 | 2687 | 2879 | 3071 | 3455 | 3839 |
| **3 x 14** | W | 1828 | 2031 | 2235 | 2438 | 2641 | 2844 | 3047 | 3251 | 3657 | 4063 |
| | w | 76 | 84 | 93 | 101 | 110 | 118 | 126 | 135 | 152 | 169 |
| | $F_v$ | 41 | 46 | 50 | 55 | 59 | 64 | 69 | 73 | 82 | 92 |
| | E | 1467 | 1630 | 1793 | 1956 | 2119 | 2282 | 2445 | 2608 | 2934 | 3260 |
| **4 x 12** | W | 1845 | 2050 | 2255 | 2460 | 2666 | 2871 | 3076 | 3281 | 3691 | 4101 |
| | w | 76 | 85 | 93 | 102 | 111 | 119 | 128 | 136 | 153 | 170 |
| | $F_v$ | 35 | 39 | 42 | 46 | 50 | 54 | 58 | 62 | 70 | 78 |
| | E | 1727 | 1919 | 2111 | 2303 | 2495 | 2687 | 2879 | 3071 | 3455 | 3839 |
| **6 x 10** | W | 2068 | 2298 | 2527 | 2757 | 2987 | 3217 | 3447 | 3676 | 4136 | 4596 |
| | w | 86 | 95 | 105 | 114 | 124 | 134 | 143 | 153 | 172 | 191 |
| | $F_v$ | 29 | 32 | 36 | 39 | 42 | 46 | 49 | 52 | 59 | 65 |
| | E | 2046 | 2273 | 2501 | 2728 | 2955 | 3183 | 3410 | 3637 | 4092 | 4547 |
| **3 x 16** | W | 2422 | 2691 | 2960 | 3230 | 3499 | 3768 | 4037 | 4306 | 4845 | 5383 |
| | w | 100 | 112 | 123 | 134 | 145 | 157 | 168 | 179 | 201 | 224 |
| | $F_v$ | 47 | 52 | 58 | 63 | 68 | 74 | 79 | 84 | 95 | 105 |
| | E | 1274 | 1416 | 1558 | 1699 | 1841 | 1982 | 2124 | 2266 | 2549 | 2832 |
| **4 x 14** | W | 2657 | 2953 | 3248 | 3543 | 3839 | 4134 | 4429 | 4725 | 5315 | 5906 |
| | w | 110 | 123 | 135 | 147 | 159 | 172 | 184 | 196 | 221 | 246 |
| | $F_v$ | 42 | 46 | 51 | 56 | 60 | 65 | 70 | 75 | 84 | 93 |
| | E | 1439 | 1599 | 1759 | 1919 | 2079 | 2239 | 2399 | 2559 | 2879 | 3199 |
| **8 x 10** | W | 2820 | 3133 | 3447 | 3760 | 4073 | 4387 | 4700 | 5013 | 5640 | 6267 |
| | w | 117 | 130 | 143 | 156 | 169 | 182 | 195 | 208 | 235 | 261 |
| | $F_v$ | 29 | 32 | 36 | 39 | 42 | 46 | 49 | 52 | 59 | 65 |
| | E | 2046 | 2273 | 2501 | 2728 | 2955 | 3183 | 3410 | 3637 | 4092 | 4547 |
| **6 x 12** | W | 3030 | 3367 | 3704 | 4040 | 4377 | 4714 | 5051 | 5387 | 6061 | 6734 |
| | w | 126 | 140 | 154 | 168 | 182 | 196 | 210 | 224 | 252 | 280 |
| | $F_v$ | 35 | 39 | 43 | 47 | 51 | 55 | 59 | 63 | 71 | 79 |
| | E | 1690 | 1878 | 2066 | 2253 | 2441 | 2629 | 2817 | 3005 | 3380 | 3756 |
| **10 x 10** | W | 3572 | 3969 | 4366 | 4763 | 5160 | 5557 | 5953 | 6350 | 7144 | 7938 |
| | w | 148 | 165 | 181 | 198 | 215 | 231 | 248 | 264 | 297 | 330 |
| | $F_v$ | 29 | 32 | 36 | 39 | 42 | 46 | 49 | 52 | 59 | 65 |
| | E | 2046 | 2273 | 2501 | 2728 | 2955 | 3183 | 3410 | 3637 | 4092 | 4547 |
| **4 x 16** | W | 3503 | 3892 | 4282 | 4671 | 5060 | 5450 | 5839 | 6228 | 7007 | 7785 |
| | w | 145 | 162 | 178 | 194 | 210 | 227 | 243 | 259 | 291 | 324 |
| | $F_v$ | 48 | 53 | 59 | 64 | 69 | 75 | 80 | 86 | 96 | 107 |
| | E | 1254 | 1393 | 1532 | 1672 | 1811 | 1950 | 2090 | 2229 | 2508 | 2787 |
| **8 x 12** | W | 4132 | 4592 | 5051 | 5510 | 5969 | 6428 | 6888 | 7347 | 8265 | 9184 |
| | w | 172 | 191 | 210 | 229 | 248 | 267 | 287 | 306 | 344 | 382 |
| | $F_v$ | 35 | 39 | 43 | 47 | 51 | 55 | 59 | 63 | 71 | 79 |
| | E | 1690 | 1878 | 2066 | 2253 | 2441 | 2629 | 2817 | 3005 | 3380 | 3756 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **24' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **6 x 14** | W | 4176 | 4640 | 5104 | 5568 | 6032 | 6496 | 6960 | 7425 | 8353 | 9281 |
| | w | 174 | 193 | 212 | 232 | 251 | 270 | 290 | 309 | 348 | 386 |
| | $F_v$ | 42 | 46 | 51 | 56 | 60 | 65 | 70 | 75 | 84 | 93 |
| | E | 1439 | 1599 | 1759 | 1919 | 2079 | 2239 | 2399 | 2559 | 2879 | 3199 |
| **10 x 12** | W | 5234 | 5816 | 6398 | 6979 | 7561 | 8143 | 8724 | 9306 | 10469 | 11633 |
| | w | 218 | 242 | 266 | 290 | 315 | 339 | 363 | 387 | 436 | 484 |
| | $F_v$ | 35 | 39 | 43 | 47 | 51 | 55 | 59 | 63 | 71 | 79 |
| | E | 1690 | 1878 | 2066 | 2253 | 2441 | 2629 | 2817 | 3005 | 3380 | 3756 |
| **6 x 16** | W | 5505 | 6117 | 6729 | 7340 | 7952 | 8564 | 9176 | 9787 | 11011 | 12234 |
| | w | 229 | 254 | 280 | 305 | 331 | 356 | 382 | 407 | 458 | 509 |
| | $F_v$ | 48 | 53 | 59 | 64 | 69 | 75 | 80 | 86 | 96 | 107 |
| | E | 1254 | 1393 | 1532 | 1672 | 1811 | 1950 | 2090 | 2229 | 2508 | 2787 |
| **8 x 14** | W | 5695 | 6328 | 6960 | 7593 | 8226 | 8859 | 9492 | 10125 | 11390 | 12656 |
| | w | 237 | 263 | 290 | 316 | 342 | 369 | 395 | 421 | 474 | 527 |
| | $F_v$ | 42 | 46 | 51 | 56 | 60 | 65 | 70 | 75 | 84 | 93 |
| | E | 1439 | 1599 | 1759 | 1919 | 2079 | 2239 | 2399 | 2559 | 2879 | 3199 |
| **12 x 12** | W | 6336 | 7041 | 7745 | 8449 | 9153 | 9857 | 10561 | 11265 | 12673 | 14082 |
| | w | 264 | 293 | 322 | 352 | 381 | 410 | 440 | 469 | 528 | 586 |
| | $F_v$ | 35 | 39 | 43 | 47 | 51 | 55 | 59 | 63 | 71 | 79 |
| | E | 1690 | 1878 | 2066 | 2253 | 2441 | 2629 | 2817 | 3005 | 3380 | 3756 |
| **6 x 18** | W | 7018 | 7798 | 8577 | 9357 | 10137 | 10917 | 11697 | 12476 | 14036 | 15596 |
| | w | 292 | 324 | 357 | 389 | 422 | 454 | 487 | 519 | 584 | 649 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 85 | 91 | 97 | 109 | 121 |
| | E | 1110 | 1234 | 1357 | 1481 | 1604 | 1727 | 1851 | 1974 | 2221 | 2468 |
| **10 x 14** | W | 7214 | 8015 | 8817 | 9618 | 10420 | 11221 | 12023 | 12825 | 14428 | 16031 |
| | w | 300 | 333 | 367 | 400 | 434 | 467 | 500 | 534 | 601 | 667 |
| | $F_v$ | 42 | 46 | 51 | 56 | 60 | 65 | 70 | 75 | 84 | 93 |
| | E | 1439 | 1599 | 1759 | 1919 | 2079 | 2239 | 2399 | 2559 | 2879 | 3199 |
| **8 x 16** | W | 7507 | 8342 | 9176 | 10010 | 10844 | 11678 | 12513 | 13347 | 15015 | 16684 |
| | w | 312 | 347 | 382 | 417 | 451 | 486 | 521 | 556 | 625 | 695 |
| | $F_v$ | 48 | 53 | 59 | 64 | 69 | 75 | 80 | 86 | 96 | 107 |
| | E | 1254 | 1393 | 1532 | 1672 | 1811 | 1950 | 2090 | 2229 | 2508 | 2787 |
| **6 x 20** | W | 8714 | 9682 | 10650 | 11618 | 12586 | 13555 | 14523 | 15491 | 17428 | 19364 |
| | w | 363 | 403 | 443 | 484 | 524 | 564 | 605 | 645 | 726 | 806 |
| | $F_v$ | 60 | 67 | 74 | 81 | 88 | 94 | 101 | 108 | 121 | 135 |
| | E | 996 | 1107 | 1218 | 1329 | 1439 | 1550 | 1661 | 1772 | 1993 | 2215 |
| **12 x 14** | W | 8732 | 9703 | 10673 | 11643 | 12614 | 13584 | 14554 | 15525 | 17465 | 19406 |
| | w | 363 | 404 | 444 | 485 | 525 | 566 | 606 | 646 | 727 | 808 |
| | $F_v$ | 42 | 46 | 51 | 56 | 60 | 65 | 70 | 75 | 84 | 93 |
| | E | 1439 | 1599 | 1759 | 1919 | 2079 | 2239 | 2399 | 2559 | 2879 | 3199 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **24' - 0" SPAN CONT'D** | | | | | | | | | | | |
| 10 x 16 | W | 9509 | 10566 | 11623 | 12679 | 13736 | 14793 | 15849 | 16906 | 19019 | 21133 |
| | w | 396 | 440 | 484 | 528 | 572 | 616 | 660 | 704 | 792 | 880 |
| | $F_v$ | 48 | 53 | 59 | 64 | 69 | 75 | 80 | 86 | 96 | 107 |
| | E | 1254 | 1393 | 1532 | 1672 | 1811 | 1950 | 2090 | 2229 | 2508 | 2787 |
| 8 x 18 | W | 9570 | 10633 | 11697 | 12760 | 13823 | 14887 | 15950 | 17013 | 19140 | 21267 |
| | w | 398 | 443 | 487 | 531 | 575 | 620 | 664 | 708 | 797 | 886 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 85 | 91 | 97 | 109 | 121 |
| | E | 1110 | 1234 | 1357 | 1481 | 1604 | 1727 | 1851 | 1974 | 2221 | 2468 |
| 14 x 14 | W | 10251 | 11390 | 12529 | 13668 | 14807 | 15946 | 17085 | 18225 | 20503 | 22781 |
| | w | 427 | 474 | 522 | 569 | 616 | 664 | 711 | 759 | 854 | 949 |
| | $F_v$ | 42 | 46 | 51 | 56 | 60 | 65 | 70 | 75 | 84 | 93 |
| | E | 1439 | 1599 | 1759 | 1919 | 2079 | 2239 | 2399 | 2559 | 2879 | 3199 |
| 6 x 22 | W | 10593 | 11770 | 12947 | 14124 | 15301 | 16478 | 17655 | 18832 | 21186 | 23540 |
| | w | 441 | 490 | 539 | 588 | 637 | 686 | 735 | 784 | 882 | 980 |
| | $F_v$ | 67 | 74 | 82 | 89 | 97 | 104 | 111 | 119 | 134 | 149 |
| | E | 904 | 1004 | 1105 | 1205 | 1306 | 1406 | 1506 | 1607 | 1808 | 2009 |
| 12 x 16 | W | 11511 | 12791 | 14070 | 15349 | 16628 | 17907 | 19186 | 20465 | 23023 | 25582 |
| | w | 479 | 532 | 586 | 639 | 692 | 746 | 799 | 852 | 959 | 1065 |
| | $F_v$ | 48 | 53 | 59 | 64 | 69 | 75 | 80 | 86 | 96 | 107 |
| | E | 1254 | 1393 | 1532 | 1672 | 1811 | 1950 | 2090 | 2229 | 2508 | 2787 |
| 8 x 20 | W | 11882 | 13203 | 14523 | 15843 | 17164 | 18484 | 19804 | 21125 | 23765 | 26406 |
| | w | 495 | 550 | 605 | 660 | 715 | 770 | 825 | 880 | 990 | 1100 |
| | $F_v$ | 60 | 67 | 74 | 81 | 88 | 94 | 101 | 108 | 121 | 135 |
| | E | 996 | 1107 | 1218 | 1329 | 1439 | 1550 | 1661 | 1772 | 1993 | 2215 |
| 10 x 18 | W | 12122 | 13469 | 14816 | 16163 | 17510 | 18857 | 20203 | 21550 | 24244 | 26938 |
| | w | 505 | 561 | 617 | 673 | 729 | 785 | 841 | 897 | 1010 | 1122 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 85 | 91 | 97 | 109 | 121 |
| | E | 1110 | 1234 | 1357 | 1481 | 1604 | 1727 | 1851 | 1974 | 2221 | 2468 |
| 6 x 24 | W | 12655 | 14061 | 15468 | 16874 | 18280 | 19686 | 21092 | 22499 | 25311 | 28123 |
| | w | 527 | 585 | 644 | 703 | 761 | 820 | 878 | 937 | 1054 | 1171 |
| | $F_v$ | 73 | 81 | 89 | 97 | 106 | 114 | 122 | 130 | 146 | 163 |
| | E | 827 | 919 | 1011 | 1102 | 1194 | 1286 | 1378 | 1470 | 1654 | 1838 |
| 14 x 16 | W | 13514 | 15015 | 16517 | 18018 | 19520 | 21021 | 22523 | 24025 | 27028 | 30031 |
| | w | 563 | 625 | 688 | 750 | 813 | 875 | 938 | 1001 | 1126 | 1251 |
| | $F_v$ | 48 | 53 | 59 | 64 | 69 | 75 | 80 | 86 | 96 | 107 |
| | E | 1254 | 1393 | 1532 | 1672 | 1811 | 1950 | 2090 | 2229 | 2508 | 2787 |
| 8 x 22 | W | 14445 | 16050 | 17655 | 19260 | 20865 | 22470 | 24075 | 25680 | 28890 | 32100 |
| | w | 601 | 668 | 735 | 802 | 869 | 936 | 1003 | 1070 | 1203 | 1337 |
| | $F_v$ | 67 | 74 | 82 | 89 | 97 | 104 | 111 | 119 | 134 | 149 |
| | E | 904 | 1004 | 1105 | 1205 | 1306 | 1406 | 1506 | 1607 | 1808 | 2009 |
| 12 x 18 | W | 14674 | 16304 | 17935 | 19565 | 21196 | 22826 | 24457 | 26087 | 29348 | 32609 |
| | w | 611 | 679 | 747 | 815 | 883 | 951 | 1019 | 1086 | 1222 | 1358 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 85 | 91 | 97 | 109 | 121 |
| | E | 1110 | 1234 | 1357 | 1481 | 1604 | 1727 | 1851 | 1974 | 2221 | 2468 |
| 10 x 20 | W | 15051 | 16723 | 18396 | 20068 | 21741 | 23413 | 25085 | 26758 | 30103 | 33447 |
| | w | 627 | 696 | 766 | 836 | 905 | 975 | 1045 | 1114 | 1254 | 1393 |
| | $F_v$ | 60 | 67 | 74 | 81 | 88 | 94 | 101 | 108 | 121 | 135 |
| | E | 996 | 1107 | 1218 | 1329 | 1439 | 1550 | 1661 | 1772 | 1993 | 2215 |
| 16 x 16 | W | 15516 | 17240 | 18964 | 20688 | 22412 | 24136 | 25860 | 27584 | 31032 | 34480 |
| | w | 646 | 718 | 790 | 862 | 933 | 1005 | 1077 | 1149 | 1293 | 1436 |
| | $F_v$ | 48 | 53 | 59 | 64 | 69 | 75 | 80 | 86 | 96 | 107 |
| | E | 1254 | 1393 | 1532 | 1672 | 1811 | 1950 | 2090 | 2229 | 2508 | 2787 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
$w$ = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, *induced by load W for l /360 limit*

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **24' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **14 x 18** | W | 17226 | 19140 | 21054 | 22968 | 24882 | 26796 | 28710 | 30625 | 34453 | 38281 |
| | w | 717 | 797 | 877 | 957 | 1036 | 1116 | 1196 | 1276 | 1435 | 1595 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 85 | 91 | 97 | 109 | 121 |
| | E | 1110 | 1234 | 1357 | 1481 | 1604 | 1727 | 1851 | 1974 | 2221 | 2468 |
| **8 x 24** | W | 17257 | 19175 | 21092 | 23010 | 24927 | 26845 | 28763 | 30680 | 34515 | 38350 |
| | w | 719 | 798 | 878 | 958 | 1038 | 1118 | 1198 | 1278 | 1438 | 1597 |
| | $F_v$ | 73 | 81 | 89 | 97 | 106 | 114 | 122 | 130 | 146 | 163 |
| | E | 827 | 919 | 1011 | 1102 | 1194 | 1286 | 1378 | 1470 | 1654 | 1838 |
| **12 x 20** | W | 18220 | 20244 | 22269 | 24293 | 26318 | 28342 | 30367 | 32391 | 36440 | 40489 |
| | w | 759 | 843 | 927 | 1012 | 1096 | 1180 | 1265 | 1349 | 1518 | 1687 |
| | $F_v$ | 60 | 67 | 74 | 81 | 88 | 94 | 101 | 108 | 121 | 135 |
| | E | 996 | 1107 | 1218 | 1329 | 1439 | 1550 | 1661 | 1772 | 1993 | 2215 |
| **10 x 22** | W | 18297 | 20330 | 22363 | 24396 | 26429 | 28462 | 30495 | 32528 | 36594 | 40660 |
| | w | 762 | 847 | 931 | 1016 | 1101 | 1185 | 1270 | 1355 | 1524 | 1694 |
| | $F_v$ | 67 | 74 | 82 | 89 | 97 | 104 | 111 | 119 | 134 | 149 |
| | E | 904 | 1004 | 1105 | 1205 | 1306 | 1406 | 1506 | 1607 | 1808 | 2009 |
| **16 x 18** | W | 19778 | 21976 | 24173 | 26371 | 28569 | 30766 | 32964 | 35162 | 39557 | 43952 |
| | w | 824 | 915 | 1007 | 1098 | 1190 | 1281 | 1373 | 1465 | 1648 | 1831 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 85 | 91 | 97 | 109 | 121 |
| | E | 1110 | 1234 | 1357 | 1481 | 1604 | 1727 | 1851 | 1974 | 2221 | 2468 |
| **14 x 20** | W | 21389 | 23765 | 26142 | 28518 | 30895 | 33271 | 35648 | 38025 | 42778 | 47531 |
| | w | 891 | 990 | 1089 | 1188 | 1287 | 1386 | 1485 | 1584 | 1782 | 1980 |
| | $F_v$ | 60 | 67 | 74 | 81 | 88 | 94 | 101 | 108 | 121 | 135 |
| | E | 996 | 1107 | 1218 | 1329 | 1439 | 1550 | 1661 | 1772 | 1993 | 2215 |
| **10 x 24** | W | 21859 | 24288 | 26717 | 29146 | 31575 | 34004 | 36433 | 38862 | 43719 | 48577 |
| | w | 910 | 1012 | 1113 | 1214 | 1315 | 1416 | 1518 | 1619 | 1821 | 2024 |
| | $F_v$ | 73 | 81 | 89 | 97 | 106 | 114 | 122 | 130 | 146 | 163 |
| | E | 827 | 919 | 1011 | 1102 | 1194 | 1286 | 1378 | 1470 | 1654 | 1838 |
| **12 x 22** | W | 22149 | 24610 | 27071 | 29532 | 31993 | 34454 | 36915 | 39376 | 44298 | 49221 |
| | w | 922 | 1025 | 1127 | 1230 | 1333 | 1435 | 1538 | 1640 | 1845 | 2050 |
| | $F_v$ | 67 | 74 | 82 | 89 | 97 | 104 | 111 | 119 | 134 | 149 |
| | E | 904 | 1004 | 1105 | 1205 | 1306 | 1406 | 1506 | 1607 | 1808 | 2009 |
| **18 x 18** | W | 22330 | 24811 | 27293 | 29774 | 32255 | 34736 | 37217 | 39699 | 44661 | 49623 |
| | w | 930 | 1033 | 1137 | 1240 | 1343 | 1447 | 1550 | 1654 | 1860 | 2067 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 85 | 91 | 97 | 109 | 121 |
| | E | 1110 | 1234 | 1357 | 1481 | 1604 | 1727 | 1851 | 1974 | 2221 | 2468 |
| **16 x 20** | W | 24557 | 27286 | 30015 | 32743 | 35472 | 38201 | 40929 | 43658 | 49115 | 54572 |
| | w | 1023 | 1136 | 1250 | 1364 | 1478 | 1591 | 1705 | 1819 | 2046 | 2273 |
| | $F_v$ | 60 | 67 | 74 | 81 | 88 | 94 | 101 | 108 | 121 | 135 |
| | E | 996 | 1107 | 1218 | 1329 | 1439 | 1550 | 1661 | 1772 | 1993 | 2215 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **24' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **14 x 22** | W | 26001 | 28890 | 31779 | 34668 | 37557 | 40446 | 43335 | 46225 | 52003 | 57781 |
| | w | 1083 | 1203 | 1324 | 1444 | 1564 | 1685 | 1805 | 1926 | 2166 | 2407 |
| | $F_v$ | 67 | 74 | 82 | 89 | 97 | 104 | 111 | 119 | 134 | 149 |
| | E | 904 | 1004 | 1105 | 1205 | 1306 | 1406 | 1506 | 1607 | 1808 | 2009 |
| **12 x 24** | W | 26461 | 29402 | 32342 | 35282 | 38222 | 41163 | 44103 | 47043 | 52923 | 58804 |
| | w | 1102 | 1225 | 1347 | 1470 | 1592 | 1715 | 1837 | 1960 | 2205 | 2450 |
| | $F_v$ | 73 | 81 | 89 | 97 | 106 | 114 | 122 | 130 | 146 | 163 |
| | E | 827 | 919 | 1011 | 1102 | 1194 | 1286 | 1378 | 1470 | 1654 | 1838 |
| **18 x 20** | W | 27726 | 30807 | 33888 | 36968 | 40049 | 43130 | 46210 | 49291 | 55453 | 61614 |
| | w | 1155 | 1283 | 1412 | 1540 | 1668 | 1797 | 1925 | 2053 | 2310 | 2567 |
| | $F_v$ | 60 | 67 | 74 | 81 | 88 | 94 | 101 | 108 | 121 | 135 |
| | E | 996 | 1107 | 1218 | 1329 | 1439 | 1550 | 1661 | 1772 | 1993 | 2215 |
| **16 x 22** | W | 29853 | 33170 | 36487 | 39804 | 43121 | 46439 | 49756 | 53073 | 59707 | 66341 |
| | w | 1243 | 1382 | 1520 | 1658 | 1796 | 1934 | 2073 | 2211 | 2487 | 2764 |
| | $F_v$ | 67 | 74 | 82 | 89 | 97 | 104 | 111 | 119 | 134 | 149 |
| | E | 904 | 1004 | 1105 | 1205 | 1306 | 1406 | 1506 | 1607 | 1808 | 2009 |
| **20 x 20** | W | 30895 | 34328 | 37760 | 41193 | 44626 | 48059 | 51492 | 54925 | 61790 | 68656 |
| | w | 1287 | 1430 | 1573 | 1716 | 1859 | 2002 | 2145 | 2288 | 2574 | 2860 |
| | $F_v$ | 60 | 67 | 74 | 81 | 88 | 94 | 101 | 108 | 121 | 135 |
| | E | 996 | 1107 | 1218 | 1329 | 1439 | 1550 | 1661 | 1772 | 1993 | 2215 |
| **14 x 24** | W | 31064 | 34515 | 37967 | 41418 | 44870 | 48321 | 51773 | 55225 | 62128 | 69031 |
| | w | 1294 | 1438 | 1581 | 1725 | 1869 | 2013 | 2157 | 2301 | 2588 | 2876 |
| | $F_v$ | 73 | 81 | 89 | 97 | 106 | 114 | 122 | 130 | 146 | 163 |
| | E | 827 | 919 | 1011 | 1102 | 1194 | 1286 | 1378 | 1470 | 1654 | 1838 |
| **18 x 22** | W | 33705 | 37450 | 41195 | 44940 | 48686 | 52431 | 56176 | 59921 | 67411 | 74901 |
| | w | 1404 | 1560 | 1716 | 1872 | 2028 | 2184 | 2340 | 2496 | 2808 | 3120 |
| | $F_v$ | 67 | 74 | 82 | 89 | 97 | 104 | 111 | 119 | 134 | 149 |
| | E | 904 | 1004 | 1105 | 1205 | 1306 | 1406 | 1506 | 1607 | 1808 | 2009 |
| **16 x 24** | W | 35666 | 39629 | 43591 | 47554 | 51517 | 55480 | 59443 | 63406 | 71332 | 79258 |
| | w | 1486 | 1651 | 1816 | 1981 | 2146 | 2311 | 2476 | 2641 | 2972 | 3302 |
| | $F_v$ | 73 | 81 | 89 | 97 | 106 | 114 | 122 | 130 | 146 | 163 |
| | E | 827 | 919 | 1011 | 1102 | 1194 | 1286 | 1378 | 1470 | 1654 | 1838 |
| **20 x 22** | W | 37557 | 41730 | 45903 | 50077 | 54250 | 58423 | 62596 | 66769 | 75115 | 83461 |
| | w | 1564 | 1738 | 1912 | 2086 | 2260 | 2434 | 2608 | 2782 | 3129 | 3477 |
| | $F_v$ | 67 | 74 | 82 | 89 | 97 | 104 | 111 | 119 | 134 | 149 |
| | E | 904 | 1004 | 1105 | 1205 | 1306 | 1406 | 1506 | 1607 | 1808 | 2009 |
| **18 x 24** | W | 40268 | 44742 | 49216 | 53690 | 58165 | 62639 | 67113 | 71587 | 80536 | 89484 |
| | w | 1677 | 1864 | 2050 | 2237 | 2423 | 2609 | 2796 | 2982 | 3355 | 3728 |
| | $F_v$ | 73 | 81 | 89 | 97 | 106 | 114 | 122 | 130 | 146 | 163 |
| | E | 827 | 919 | 1011 | 1102 | 1194 | 1286 | 1378 | 1470 | 1654 | 1838 |
| **22 x 22** | W | 41409 | 46010 | 50612 | 55213 | 59814 | 64415 | 69016 | 73617 | 82819 | 92021 |
| | w | 1725 | 1917 | 2108 | 2300 | 2492 | 2683 | 2875 | 3067 | 3450 | 3834 |
| | $F_v$ | 67 | 74 | 82 | 89 | 97 | 104 | 111 | 119 | 134 | 149 |
| | E | 904 | 1004 | 1105 | 1205 | 1306 | 1406 | 1506 | 1607 | 1808 | 2009 |
| **20 x 24** | W | 44870 | 49855 | 54841 | 59827 | 64812 | 69798 | 74783 | 79769 | 89740 | 99711 |
| | w | 1869 | 2077 | 2285 | 2492 | 2700 | 2908 | 3115 | 3323 | 3739 | 4154 |
| | $F_v$ | 73 | 81 | 89 | 97 | 106 | 114 | 122 | 130 | 146 | 163 |
| | E | 827 | 919 | 1011 | 1102 | 1194 | 1286 | 1378 | 1470 | 1654 | 1838 |
| **22 x 24** | W | 49472 | 54969 | 60466 | 65963 | 71460 | 76957 | 82453 | 87950 | 98944 | 109938 |
| | w | 2061 | 2290 | 2519 | 2748 | 2977 | 3206 | 3435 | 3664 | 4122 | 4580 |
| | $F_v$ | 73 | 81 | 89 | 97 | 106 | 114 | 122 | 130 | 146 | 163 |
| | E | 827 | 919 | 1011 | 1102 | 1194 | 1286 | 1378 | 1470 | 1654 | 1838 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l$/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **24' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **24 x 24** | W | 54074 | 60082 | 66091 | 72099 | 78107 | 84115 | 90124 | 96132 | 108148 | 120165 |
| | w | 2253 | 2503 | 2753 | 3004 | 3254 | 3504 | 3755 | 4005 | 4506 | 5006 |
| | $F_v$ | 73 | 81 | 89 | 97 | 106 | 114 | 122 | 130 | 146 | 163 |
| | E | 827 | 919 | 1011 | 1102 | 1194 | 1286 | 1378 | 1470 | 1654 | 1838 |
| **25' - 0" SPAN** | | | | | | | | | | | |
| **2 x 12** | W | 759 | 843 | 928 | 1012 | 1096 | 1181 | 1265 | 1350 | 1518 | 1687 |
| | w | 30 | 33 | 37 | 40 | 43 | 47 | 50 | 54 | 60 | 67 |
| | $F_v$ | 33 | 37 | 41 | 45 | 48 | 52 | 56 | 60 | 67 | 75 |
| | E | 1799 | 1999 | 2199 | 2399 | 2599 | 2799 | 2999 | 3199 | 3599 | 3999 |
| **3 x 10** | W | 855 | 950 | 1045 | 1140 | 1235 | 1330 | 1426 | 1521 | 1711 | 1901 |
| | w | 34 | 38 | 41 | 45 | 49 | 53 | 57 | 60 | 68 | 76 |
| | $F_v$ | 27 | 30 | 33 | 37 | 40 | 43 | 46 | 49 | 55 | 61 |
| | E | 2189 | 2432 | 2675 | 2918 | 3162 | 3405 | 3648 | 3891 | 4378 | 4864 |
| **2 x 14** | W | 1053 | 1170 | 1287 | 1404 | 1521 | 1638 | 1755 | 1872 | 2106 | 2340 |
| | w | 42 | 46 | 51 | 56 | 60 | 65 | 70 | 74 | 84 | 93 |
| | $F_v$ | 39 | 44 | 48 | 53 | 57 | 61 | 66 | 70 | 79 | 88 |
| | E | 1528 | 1698 | 1867 | 2037 | 2207 | 2377 | 2547 | 2716 | 3056 | 3396 |
| **4 x 10** | W | 1197 | 1330 | 1464 | 1597 | 1730 | 1863 | 1996 | 2129 | 2395 | 2661 |
| | w | 47 | 53 | 58 | 63 | 69 | 74 | 79 | 85 | 95 | 106 |
| | $F_v$ | 27 | 30 | 33 | 37 | 40 | 43 | 46 | 49 | 55 | 61 |
| | E | 2189 | 2432 | 2675 | 2918 | 3162 | 3405 | 3648 | 3891 | 4378 | 4864 |
| **3 x 12** | W | 1265 | 1406 | 1546 | 1687 | 1828 | 1968 | 2109 | 2250 | 2531 | 2812 |
| | w | 50 | 56 | 61 | 67 | 73 | 78 | 84 | 90 | 101 | 112 |
| | $F_v$ | 33 | 37 | 41 | 45 | 48 | 52 | 56 | 60 | 67 | 75 |
| | E | 1799 | 1999 | 2199 | 2399 | 2599 | 2799 | 2999 | 3199 | 3599 | 3999 |
| **3 x 14** | W | 1755 | 1950 | 2145 | 2340 | 2535 | 2730 | 2926 | 3121 | 3511 | 3901 |
| | w | 70 | 78 | 85 | 93 | 101 | 109 | 117 | 124 | 140 | 156 |
| | $F_v$ | 39 | 44 | 48 | 53 | 57 | 61 | 66 | 70 | 79 | 88 |
| | E | 1528 | 1698 | 1867 | 2037 | 2207 | 2377 | 2547 | 2716 | 3056 | 3396 |
| **4 x 12** | W | 1771 | 1968 | 2165 | 2362 | 2559 | 2756 | 2953 | 3150 | 3543 | 3937 |
| | w | 70 | 78 | 86 | 94 | 102 | 110 | 118 | 126 | 141 | 157 |
| | $F_v$ | 33 | 37 | 41 | 45 | 48 | 52 | 56 | 60 | 67 | 75 |
| | E | 1799 | 1999 | 2199 | 2399 | 2599 | 2799 | 2999 | 3199 | 3599 | 3999 |
| **6 x 10** | W | 1985 | 2206 | 2426 | 2647 | 2867 | 3088 | 3309 | 3529 | 3970 | 4412 |
| | w | 79 | 88 | 97 | 105 | 114 | 123 | 132 | 141 | 158 | 176 |
| | $F_v$ | 28 | 31 | 34 | 38 | 41 | 44 | 47 | 50 | 57 | 63 |
| | E | 2131 | 2368 | 2605 | 2842 | 3078 | 3315 | 3552 | 3789 | 4263 | 4736 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **25' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **3 x 16** | W | 2325 | 2584 | 2842 | 3100 | 3359 | 3617 | 3876 | 4134 | 4651 | 5168 |
| | w | 93 | 103 | 113 | 124 | 134 | 144 | 155 | 165 | 186 | 206 |
| | $F_v$ | 45 | 50 | 55 | 61 | 66 | 71 | 76 | 81 | 91 | 101 |
| | E | 1327 | 1475 | 1622 | 1770 | 1918 | 2065 | 2213 | 2360 | 2655 | 2950 |
| **4 x 14** | W | 2551 | 2835 | 3118 | 3402 | 3685 | 3969 | 4252 | 4536 | 5103 | 5670 |
| | w | 102 | 113 | 124 | 136 | 147 | 158 | 170 | 181 | 204 | 226 |
| | $F_v$ | 40 | 45 | 49 | 54 | 58 | 63 | 67 | 72 | 81 | 90 |
| | E | 1499 | 1666 | 1833 | 1999 | 2166 | 2333 | 2499 | 2666 | 2999 | 3333 |
| **8 x 10** | W | 2707 | 3008 | 3309 | 3610 | 3910 | 4211 | 4512 | 4813 | 5415 | 6016 |
| | w | 108 | 120 | 132 | 144 | 156 | 168 | 180 | 192 | 216 | 240 |
| | $F_v$ | 28 | 31 | 34 | 38 | 41 | 44 | 47 | 50 | 57 | 63 |
| | E | 2131 | 2368 | 2605 | 2842 | 3078 | 3315 | 3552 | 3789 | 4263 | 4736 |
| **6 x 12** | W | 2909 | 3232 | 3556 | 3879 | 4202 | 4525 | 4849 | 5172 | 5818 | 6465 |
| | w | 116 | 129 | 142 | 155 | 168 | 181 | 193 | 206 | 232 | 258 |
| | $F_v$ | 34 | 38 | 42 | 46 | 49 | 53 | 57 | 61 | 69 | 76 |
| | E | 1760 | 1956 | 2152 | 2347 | 2543 | 2739 | 2934 | 3130 | 3521 | 3913 |
| **10 x 10** | W | 3429 | 3810 | 4191 | 4572 | 4953 | 5334 | 5715 | 6096 | 6858 | 7621 |
| | w | 137 | 152 | 167 | 182 | 198 | 213 | 228 | 243 | 274 | 304 |
| | $F_v$ | 28 | 31 | 34 | 38 | 41 | 44 | 47 | 50 | 57 | 63 |
| | E | 2131 | 2368 | 2605 | 2842 | 3078 | 3315 | 3552 | 3789 | 4263 | 4736 |
| **4 x 16** | W | 3363 | 3737 | 4110 | 4484 | 4858 | 5232 | 5605 | 5979 | 6726 | 7474 |
| | w | 134 | 149 | 164 | 179 | 194 | 209 | 224 | 239 | 269 | 298 |
| | $F_v$ | 46 | 51 | 56 | 62 | 67 | 72 | 77 | 82 | 93 | 103 |
| | E | 1306 | 1451 | 1596 | 1741 | 1887 | 2032 | 2177 | 2322 | 2612 | 2903 |
| **8 x 12** | W | 3967 | 4408 | 4849 | 5290 | 5730 | 6171 | 6612 | 7053 | 7935 | 8816 |
| | w | 158 | 176 | 193 | 211 | 229 | 246 | 264 | 282 | 317 | 352 |
| | $F_v$ | 34 | 38 | 42 | 46 | 49 | 53 | 57 | 61 | 69 | 76 |
| | E | 1760 | 1956 | 2152 | 2347 | 2543 | 2739 | 2934 | 3130 | 3521 | 3913 |
| **6 x 14** | W | 4009 | 4455 | 4900 | 5346 | 5791 | 6237 | 6682 | 7128 | 8019 | 8910 |
| | w | 160 | 178 | 196 | 213 | 231 | 249 | 267 | 285 | 320 | 356 |
| | $F_v$ | 40 | 45 | 49 | 54 | 58 | 63 | 67 | 72 | 81 | 90 |
| | E | 1499 | 1666 | 1833 | 1999 | 2166 | 2333 | 2499 | 2666 | 2999 | 3333 |
| **10 x 12** | W | 5025 | 5583 | 6142 | 6700 | 7259 | 7817 | 8375 | 8934 | 10050 | 11167 |
| | w | 201 | 223 | 245 | 268 | 290 | 312 | 335 | 357 | 402 | 446 |
| | $F_v$ | 34 | 38 | 42 | 46 | 49 | 53 | 57 | 61 | 69 | 76 |
| | E | 1760 | 1956 | 2152 | 2347 | 2543 | 2739 | 2934 | 3130 | 3521 | 3913 |
| **6 x 16** | W | 5285 | 5872 | 6460 | 7047 | 7634 | 8221 | 8809 | 9396 | 10570 | 11745 |
| | w | 211 | 234 | 258 | 281 | 305 | 328 | 352 | 375 | 422 | 469 |
| | $F_v$ | 46 | 51 | 56 | 62 | 67 | 72 | 77 | 82 | 93 | 103 |
| | E | 1306 | 1451 | 1596 | 1741 | 1887 | 2032 | 2177 | 2322 | 2612 | 2903 |
| **8 x 14** | W | 5467 | 6075 | 6682 | 7290 | 7897 | 8505 | 9112 | 9720 | 10935 | 12150 |
| | w | 218 | 243 | 267 | 291 | 315 | 340 | 364 | 388 | 437 | 486 |
| | $F_v$ | 40 | 45 | 49 | 54 | 58 | 63 | 67 | 72 | 81 | 90 |
| | E | 1499 | 1666 | 1833 | 1999 | 2166 | 2333 | 2499 | 2666 | 2999 | 3333 |
| **12 x 12** | W | 6083 | 6759 | 7435 | 8111 | 8787 | 9463 | 10139 | 10815 | 12166 | 13518 |
| | w | 243 | 270 | 297 | 324 | 351 | 378 | 405 | 432 | 486 | 540 |
| | $F_v$ | 34 | 38 | 42 | 46 | 49 | 53 | 57 | 61 | 69 | 76 |
| | E | 1760 | 1956 | 2152 | 2347 | 2543 | 2739 | 2934 | 3130 | 3521 | 3913 |
| **6 x 18** | W | 6737 | 7486 | 8234 | 8983 | 9731 | 10480 | 11229 | 11977 | 13474 | 14972 |
| | w | 269 | 299 | 329 | 359 | 389 | 419 | 449 | 479 | 539 | 598 |
| | $F_v$ | 52 | 58 | 64 | 70 | 75 | 81 | 87 | 93 | 105 | 116 |
| | E | 1157 | 1285 | 1414 | 1542 | 1671 | 1799 | 1928 | 2057 | 2314 | 2571 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l$/360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **25' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **10 x 14** | W | 6925 | 7695 | 8464 | 9234 | 10003 | 10773 | 11542 | 12312 | 13851 | 15390 |
| | w | 277 | 307 | 338 | 369 | 400 | 430 | 461 | 492 | 554 | 615 |
| | $F_v$ | 40 | 45 | 49 | 54 | 58 | 63 | 67 | 72 | 81 | 90 |
| | E | 1499 | 1666 | 1833 | 1999 | 2166 | 2333 | 2499 | 2666 | 2999 | 3333 |
| **8 x 16** | W | 7207 | 8008 | 8809 | 9610 | 10410 | 11211 | 12012 | 12813 | 14415 | 16016 |
| | w | 288 | 320 | 352 | 384 | 416 | 448 | 480 | 512 | 576 | 640 |
| | $F_v$ | 46 | 51 | 56 | 62 | 67 | 72 | 77 | 82 | 93 | 103 |
| | E | 1306 | 1451 | 1596 | 1741 | 1887 | 2032 | 2177 | 2322 | 2612 | 2903 |
| **6 x 20** | W | 8365 | 9295 | 10224 | 11154 | 12083 | 13013 | 13942 | 14872 | 16731 | 18590 |
| | w | 334 | 371 | 408 | 446 | 483 | 520 | 557 | 594 | 669 | 743 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1038 | 1153 | 1269 | 1384 | 1499 | 1615 | 1730 | 1846 | 2076 | 2307 |
| **12 x 14** | W | 8383 | 9315 | 10246 | 11178 | 12109 | 13041 | 13972 | 14904 | 16767 | 18630 |
| | w | 335 | 372 | 409 | 447 | 484 | 521 | 558 | 596 | 670 | 745 |
| | $F_v$ | 40 | 45 | 49 | 54 | 58 | 63 | 67 | 72 | 81 | 90 |
| | E | 1499 | 1666 | 1833 | 1999 | 2166 | 2333 | 2499 | 2666 | 2999 | 3333 |
| **10 x 16** | W | 9129 | 10143 | 11158 | 12172 | 13187 | 14201 | 15215 | 16230 | 18258 | 20287 |
| | w | 365 | 405 | 446 | 486 | 527 | 568 | 608 | 649 | 730 | 811 |
| | $F_v$ | 46 | 51 | 56 | 62 | 67 | 72 | 77 | 82 | 93 | 103 |
| | E | 1306 | 1451 | 1596 | 1741 | 1887 | 2032 | 2177 | 2322 | 2612 | 2903 |
| **8 x 18** | W | 9187 | 10208 | 11229 | 12250 | 13270 | 14291 | 15312 | 16333 | 18375 | 20416 |
| | w | 367 | 408 | 449 | 490 | 530 | 571 | 612 | 653 | 735 | 816 |
| | $F_v$ | 52 | 58 | 64 | 70 | 75 | 81 | 87 | 93 | 105 | 116 |
| | E | 1157 | 1285 | 1414 | 1542 | 1671 | 1799 | 1928 | 2057 | 2314 | 2571 |
| **14 x 14** | W | 9841 | 10935 | 12028 | 13122 | 14215 | 15309 | 16402 | 17496 | 19683 | 21870 |
| | w | 393 | 437 | 481 | 524 | 568 | 612 | 656 | 699 | 787 | 874 |
| | $F_v$ | 40 | 45 | 49 | 54 | 58 | 63 | 67 | 72 | 81 | 90 |
| | E | 1499 | 1666 | 1833 | 1999 | 2166 | 2333 | 2499 | 2666 | 2999 | 3333 |
| **6 x 22** | W | 10169 | 11299 | 12429 | 13559 | 14689 | 15819 | 16949 | 18079 | 20338 | 22598 |
| | w | 406 | 451 | 497 | 542 | 587 | 632 | 677 | 723 | 813 | 903 |
| | $F_v$ | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | E | 941 | 1046 | 1151 | 1255 | 1360 | 1465 | 1569 | 1674 | 1883 | 2093 |
| **12 x 16** | W | 11051 | 12279 | 13507 | 14735 | 15963 | 17191 | 18419 | 19647 | 22102 | 24558 |
| | w | 442 | 491 | 540 | 589 | 638 | 687 | 736 | 785 | 884 | 982 |
| | $F_v$ | 46 | 51 | 56 | 62 | 67 | 72 | 77 | 82 | 93 | 103 |
| | E | 1306 | 1451 | 1596 | 1741 | 1887 | 2032 | 2177 | 2322 | 2612 | 2903 |
| **8 x 20** | W | 11407 | 12675 | 13942 | 15210 | 16477 | 17745 | 19012 | 20280 | 22815 | 25350 |
| | w | 456 | 507 | 557 | 608 | 659 | 709 | 760 | 811 | 912 | 1014 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1038 | 1153 | 1269 | 1384 | 1499 | 1615 | 1730 | 1846 | 2076 | 2307 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **25'-0" SPAN CONT'D** | | | | | | | | | | | |
| **10 x 18** | W | 11637 | 12930 | 14223 | 15516 | 16809 | 18102 | 19395 | 20688 | 23274 | 25861 |
| | w | 465 | 517 | 568 | 620 | 672 | 724 | 775 | 827 | 930 | 1034 |
| | $F_v$ | 52 | 58 | 64 | 70 | 75 | 81 | 87 | 93 | 105 | 116 |
| | E | 1157 | 1285 | 1414 | 1542 | 1671 | 1799 | 1928 | 2057 | 2314 | 2571 |
| **6 x 24** | W | 12149 | 13499 | 14849 | 16199 | 17549 | 18899 | 20249 | 21599 | 24298 | 26998 |
| | w | 485 | 539 | 593 | 647 | 701 | 755 | 809 | 863 | 971 | 1079 |
| | $F_v$ | 70 | 78 | 86 | 94 | 101 | 109 | 117 | 125 | 141 | 156 |
| | E | 861 | 957 | 1053 | 1148 | 1244 | 1340 | 1436 | 1531 | 1723 | 1914 |
| **14 x 16** | W | 12973 | 14415 | 15856 | 17298 | 18739 | 20181 | 21622 | 23064 | 25947 | 28830 |
| | w | 518 | 576 | 634 | 691 | 749 | 807 | 864 | 922 | 1037 | 1153 |
| | $F_v$ | 46 | 51 | 56 | 62 | 67 | 72 | 77 | 82 | 93 | 103 |
| | E | 1306 | 1451 | 1596 | 1741 | 1887 | 2032 | 2177 | 2322 | 2612 | 2903 |
| **8 x 22** | W | 13867 | 15408 | 16949 | 18490 | 20030 | 21571 | 23112 | 24653 | 27735 | 30816 |
| | w | 554 | 616 | 677 | 739 | 801 | 862 | 924 | 986 | 1109 | 1232 |
| | $F_v$ | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | E | 941 | 1046 | 1151 | 1255 | 1360 | 1465 | 1569 | 1674 | 1883 | 2093 |
| **12 x 18** | W | 14087 | 15652 | 17218 | 18783 | 20348 | 21913 | 23479 | 25044 | 28174 | 31305 |
| | w | 563 | 626 | 688 | 751 | 813 | 876 | 939 | 1001 | 1126 | 1252 |
| | $F_v$ | 52 | 58 | 64 | 70 | 75 | 81 | 87 | 93 | 105 | 116 |
| | E | 1157 | 1285 | 1414 | 1542 | 1671 | 1799 | 1928 | 2057 | 2314 | 2571 |
| **10 x 20** | W | 14449 | 16055 | 17660 | 19266 | 20871 | 22477 | 24082 | 25688 | 28898 | 32110 |
| | w | 577 | 642 | 706 | 770 | 834 | 899 | 963 | 1027 | 1155 | 1284 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1038 | 1153 | 1269 | 1384 | 1499 | 1615 | 1730 | 1846 | 2076 | 2307 |
| **16 x 16** | W | 14895 | 16550 | 18205 | 19860 | 21515 | 23170 | 24825 | 26480 | 29790 | 33101 |
| | w | 595 | 662 | 728 | 794 | 860 | 926 | 993 | 1059 | 1191 | 1324 |
| | $F_v$ | 46 | 51 | 56 | 62 | 67 | 72 | 77 | 82 | 93 | 103 |
| | E | 1306 | 1451 | 1596 | 1741 | 1887 | 2032 | 2177 | 2322 | 2612 | 2903 |
| **14 x 18** | W | 16537 | 18375 | 20212 | 22050 | 23887 | 25725 | 27562 | 29400 | 33074 | 36750 |
| | w | 661 | 735 | 808 | 882 | 955 | 1029 | 1102 | 1176 | 1322 | 1470 |
| | $F_v$ | 52 | 58 | 64 | 70 | 75 | 81 | 87 | 93 | 105 | 116 |
| | E | 1157 | 1285 | 1414 | 1542 | 1671 | 1799 | 1928 | 2057 | 2314 | 2571 |
| **8 x 24** | W | 16567 | 18408 | 20249 | 22090 | 23930 | 25771 | 27612 | 29453 | 33134 | 36816 |
| | w | 662 | 736 | 809 | 883 | 957 | 1030 | 1104 | 1178 | 1325 | 1472 |
| | $F_v$ | 70 | 78 | 86 | 94 | 101 | 109 | 117 | 125 | 141 | 156 |
| | E | 861 | 957 | 1053 | 1148 | 1244 | 1340 | 1436 | 1531 | 1723 | 1914 |
| **12 x 20** | W | 17491 | 19435 | 21378 | 23322 | 25265 | 27209 | 29152 | 31096 | 34982 | 38870 |
| | w | 699 | 777 | 855 | 932 | 1010 | 1088 | 1166 | 1243 | 1399 | 1554 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1038 | 1153 | 1269 | 1384 | 1499 | 1615 | 1730 | 1846 | 2076 | 2307 |
| **10 x 22** | W | 17565 | 19517 | 21468 | 23420 | 25372 | 27324 | 29275 | 31227 | 35130 | 39034 |
| | w | 702 | 780 | 858 | 936 | 1014 | 1092 | 1171 | 1249 | 1405 | 1561 |
| | $F_v$ | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | E | 941 | 1046 | 1151 | 1255 | 1360 | 1465 | 1569 | 1674 | 1883 | 2093 |
| **16 x 18** | W | 18987 | 21097 | 23206 | 25316 | 27426 | 29536 | 31645 | 33755 | 37974 | 42194 |
| | w | 759 | 843 | 928 | 1012 | 1097 | 1181 | 1265 | 1350 | 1518 | 1687 |
| | $F_v$ | 52 | 58 | 64 | 70 | 75 | 81 | 87 | 93 | 105 | 116 |
| | E | 1157 | 1285 | 1414 | 1542 | 1671 | 1799 | 1928 | 2057 | 2314 | 2571 |
| **14 x 20** | W | 20533 | 22815 | 25096 | 27378 | 29659 | 31940 | 34222 | 36504 | 41066 | 45630 |
| | w | 821 | 912 | 1003 | 1095 | 1186 | 1277 | 1368 | 1460 | 1642 | 1825 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1038 | 1153 | 1269 | 1384 | 1499 | 1615 | 1730 | 1846 | 2076 | 2307 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for / 360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **25' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **10 x 24** | W | 20985 | 23317 | 25648 | 27980 | 30312 | 32644 | 34975 | 37307 | 41970 | 46634 |
| | w | 839 | 932 | 1025 | 1119 | 1212 | 1305 | 1399 | 1492 | 1678 | 1865 |
| | $F_v$ | 70 | 78 | 86 | 94 | 101 | 109 | 117 | 125 | 141 | 156 |
| | E | 861 | 957 | 1053 | 1148 | 1244 | 1340 | 1436 | 1531 | 1723 | 1914 |
| **12 x 22** | W | 21263 | 23626 | 25988 | 28351 | 30713 | 33076 | 35439 | 37801 | 42526 | 47252 |
| | w | 850 | 945 | 1039 | 1134 | 1228 | 1323 | 1417 | 1512 | 1701 | 1890 |
| | $F_v$ | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | E | 941 | 1046 | 1151 | 1255 | 1360 | 1465 | 1569 | 1674 | 1883 | 2093 |
| **18 x 18** | W | 21437 | 23819 | 26201 | 28583 | 30965 | 33347 | 35729 | 38111 | 42874 | 47638 |
| | w | 857 | 952 | 1048 | 1143 | 1238 | 1333 | 1429 | 1524 | 1714 | 1905 |
| | $F_v$ | 52 | 58 | 64 | 70 | 75 | 81 | 87 | 93 | 105 | 116 |
| | E | 1157 | 1285 | 1414 | 1542 | 1671 | 1799 | 1928 | 2057 | 2314 | 2571 |
| **16 x 20** | W | 23575 | 26195 | 28814 | 31434 | 34053 | 36672 | 39292 | 41912 | 47150 | 52390 |
| | w | 943 | 1047 | 1152 | 1257 | 1362 | 1466 | 1571 | 1676 | 1886 | 2095 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1038 | 1153 | 1269 | 1384 | 1499 | 1615 | 1730 | 1846 | 2076 | 2307 |
| **14 x 22** | W | 24961 | 27735 | 30508 | 33282 | 36055 | 38828 | 41602 | 44376 | 49922 | 55470 |
| | w | 998 | 1109 | 1220 | 1331 | 1442 | 1553 | 1664 | 1775 | 1996 | 2218 |
| | $F_v$ | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | E | 941 | 1046 | 1151 | 1255 | 1360 | 1465 | 1569 | 1674 | 1883 | 2093 |
| **12 x 24** | W | 25403 | 28226 | 31048 | 33871 | 36693 | 39516 | 42339 | 45161 | 50806 | 56452 |
| | w | 1016 | 1129 | 1241 | 1354 | 1467 | 1580 | 1693 | 1806 | 2032 | 2258 |
| | $F_v$ | 70 | 78 | 86 | 94 | 101 | 109 | 117 | 125 | 141 | 156 |
| | E | 861 | 957 | 1053 | 1148 | 1244 | 1340 | 1436 | 1531 | 1723 | 1914 |
| **18 x 20** | W | 26617 | 29574 | 32532 | 35490 | 38447 | 41404 | 44362 | 47320 | 53234 | 59150 |
| | w | 1064 | 1182 | 1301 | 1419 | 1537 | 1656 | 1774 | 1892 | 2129 | 2366 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1038 | 1153 | 1269 | 1384 | 1499 | 1615 | 1730 | 1846 | 2076 | 2307 |
| **16 x 22** | W | 28659 | 31843 | 35028 | 38212 | 41397 | 44581 | 47765 | 50950 | 57318 | 63687 |
| | w | 1146 | 1273 | 1401 | 1528 | 1655 | 1783 | 1910 | 2038 | 2292 | 2547 |
| | $F_v$ | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | E | 941 | 1046 | 1151 | 1255 | 1360 | 1465 | 1569 | 1674 | 1883 | 2093 |
| **20 x 20** | W | 29659 | 32954 | 36250 | 39546 | 42841 | 46136 | 49432 | 52728 | 59318 | 65910 |
| | w | 1186 | 1318 | 1450 | 1581 | 1713 | 1845 | 1977 | 2109 | 2372 | 2636 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1038 | 1153 | 1269 | 1384 | 1499 | 1615 | 1730 | 1846 | 2076 | 2307 |
| **14 x 24** | W | 29821 | 33134 | 36448 | 39762 | 43075 | 46388 | 49702 | 53016 | 59642 | 66270 |
| | w | 1192 | 1325 | 1457 | 1590 | 1723 | 1855 | 1988 | 2120 | 2385 | 2650 |
| | $F_v$ | 70 | 78 | 86 | 94 | 101 | 109 | 117 | 125 | 141 | 156 |
| | E | 861 | 957 | 1053 | 1148 | 1244 | 1340 | 1436 | 1531 | 1723 | 1914 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **25' - 0" SPAN CONT'D** | | | | | | | | | | | |
| 18 x 22 | W | 32357 | 35952 | 39548 | 43143 | 46738 | 50333 | 53929 | 57524 | 64714 | 71905 |
| | w | 1294 | 1438 | 1581 | 1725 | 1869 | 2013 | 2157 | 2300 | 2588 | 2876 |
| | $F_v$ | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | E | 941 | 1046 | 1151 | 1255 | 1360 | 1465 | 1569 | 1674 | 1883 | 2093 |
| 16 x 24 | W | 34239 | 38043 | 41848 | 45652 | 49457 | 53261 | 57065 | 60870 | 68478 | 76087 |
| | w | 1369 | 1521 | 1673 | 1826 | 1978 | 2130 | 2282 | 2434 | 2739 | 3043 |
| | $F_v$ | 70 | 78 | 86 | 94 | 101 | 109 | 117 | 125 | 141 | 156 |
| | E | 861 | 957 | 1053 | 1148 | 1244 | 1340 | 1436 | 1531 | 1723 | 1914 |
| 20 x 22 | W | 36055 | 40061 | 44067 | 48074 | 52080 | 56086 | 60092 | 64098 | 72110 | 80123 |
| | w | 1442 | 1602 | 1762 | 1922 | 2083 | 2243 | 2403 | 2563 | 2884 | 3204 |
| | $F_v$ | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | E | 941 | 1046 | 1151 | 1255 | 1360 | 1465 | 1569 | 1674 | 1883 | 2093 |
| 18 x 24 | W | 38657 | 42952 | 47248 | 51543 | 55838 | 60133 | 64429 | 68724 | 77314 | 85905 |
| | w | 1546 | 1718 | 1889 | 2061 | 2233 | 2405 | 2577 | 2748 | 3092 | 3436 |
| | $F_v$ | 70 | 78 | 86 | 94 | 101 | 109 | 117 | 125 | 141 | 156 |
| | E | 861 | 957 | 1053 | 1148 | 1244 | 1340 | 1436 | 1531 | 1723 | 1914 |
| 22 x 22 | W | 39753 | 44170 | 48587 | 53004 | 57421 | 61838 | 66255 | 70672 | 79506 | 88341 |
| | w | 1590 | 1766 | 1943 | 2120 | 2296 | 2473 | 2650 | 2826 | 3180 | 3533 |
| | $F_v$ | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | E | 941 | 1046 | 1151 | 1255 | 1360 | 1465 | 1569 | 1674 | 1883 | 2093 |
| 20 x 24 | W | 43075 | 47861 | 52647 | 57434 | 62220 | 67006 | 71792 | 76578 | 86150 | 95723 |
| | w | 1723 | 1914 | 2105 | 2297 | 2488 | 2680 | 2871 | 3063 | 3446 | 3828 |
| | $F_v$ | 70 | 78 | 86 | 94 | 101 | 109 | 117 | 125 | 141 | 156 |
| | E | 861 | 957 | 1053 | 1148 | 1244 | 1340 | 1436 | 1531 | 1723 | 1914 |
| 22 x 24 | W | 47493 | 52770 | 58047 | 63324 | 68601 | 73878 | 79155 | 84432 | 94986 | 105541 |
| | w | 1899 | 2110 | 2321 | 2532 | 2744 | 2955 | 3166 | 3377 | 3799 | 4221 |
| | $F_v$ | 70 | 78 | 86 | 94 | 101 | 109 | 117 | 125 | 141 | 156 |
| | E | 861 | 957 | 1053 | 1148 | 1244 | 1340 | 1436 | 1531 | 1723 | 1914 |
| 24 x 24 | W | 51911 | 57679 | 63447 | 69215 | 74983 | 80751 | 86519 | 92287 | 103822 | 115358 |
| | w | 2076 | 2307 | 2537 | 2768 | 2999 | 3230 | 3460 | 3691 | 4152 | 4614 |
| | $F_v$ | 70 | 78 | 86 | 94 | 101 | 109 | 117 | 125 | 141 | 156 |
| | E | 861 | 957 | 1053 | 1148 | 1244 | 1340 | 1436 | 1531 | 1723 | 1914 |
| **26' - 0" SPAN** | | | | | | | | | | | |
| 2 x 14 | W | 1012 | 1125 | 1237 | 1350 | 1463 | 1575 | 1688 | 1800 | 2025 | 2250 |
| | w | 38 | 43 | 47 | 51 | 56 | 60 | 64 | 69 | 77 | 86 |
| | $F_v$ | 38 | 42 | 46 | 50 | 55 | 59 | 63 | 67 | 76 | 84 |
| | E | 1589 | 1766 | 1942 | 2119 | 2295 | 2472 | 2649 | 2825 | 3178 | 3532 |
| 4 x 10 | W | 1151 | 1279 | 1407 | 1535 | 1663 | 1791 | 1919 | 2047 | 2303 | 2559 |
| | w | 44 | 49 | 54 | 59 | 63 | 68 | 73 | 78 | 88 | 98 |
| | $F_v$ | 26 | 29 | 32 | 35 | 38 | 41 | 44 | 47 | 53 | 59 |
| | E | 2276 | 2529 | 2782 | 3035 | 3288 | 3541 | 3794 | 4047 | 4553 | 5059 |
| 3 x 12 | W | 1216 | 1352 | 1487 | 1622 | 1757 | 1893 | 2028 | 2163 | 2433 | 2704 |
| | w | 46 | 52 | 57 | 62 | 67 | 72 | 78 | 83 | 93 | 104 |
| | $F_v$ | 32 | 36 | 39 | 43 | 46 | 50 | 54 | 57 | 64 | 72 |
| | E | 1871 | 2079 | 2287 | 2495 | 2703 | 2911 | 3119 | 3327 | 3743 | 4159 |
| 3 x 14 | W | 1688 | 1875 | 2063 | 2250 | 2438 | 2625 | 2813 | 3001 | 3376 | 3751 |
| | w | 64 | 72 | 79 | 86 | 93 | 100 | 108 | 115 | 129 | 144 |
| | $F_v$ | 38 | 42 | 46 | 50 | 55 | 59 | 63 | 67 | 76 | 84 |
| | E | 1589 | 1766 | 1942 | 2119 | 2295 | 2472 | 2649 | 2825 | 3178 | 3532 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **26' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **4 x 12** | W | 1703 | 1893 | 2082 | 2271 | 2460 | 2650 | 2839 | 3028 | 3407 | 3786 |
| | w | 65 | 72 | 80 | 87 | 94 | 101 | 109 | 116 | 131 | 145 |
| | $F_v$ | 32 | 36 | 39 | 43 | 46 | 50 | 54 | 57 | 64 | 72 |
| | E | 1871 | 2079 | 2287 | 2495 | 2703 | 2911 | 3119 | 3327 | 3743 | 4159 |
| **6 x 10** | W | 1909 | 2121 | 2333 | 2545 | 2757 | 2969 | 3181 | 3394 | 3818 | 4242 |
| | w | 73 | 81 | 89 | 97 | 106 | 114 | 122 | 130 | 146 | 163 |
| | $F_v$ | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 54 | 60 |
| | E | 2216 | 2463 | 2709 | 2955 | 3202 | 3448 | 3694 | 3941 | 4433 | 4926 |
| **3 x 16** | W | 2236 | 2484 | 2733 | 2981 | 3230 | 3478 | 3726 | 3975 | 4472 | 4969 |
| | w | 86 | 95 | 105 | 114 | 124 | 133 | 143 | 152 | 172 | 191 |
| | $F_v$ | 43 | 48 | 53 | 58 | 63 | 68 | 73 | 78 | 87 | 97 |
| | E | 1380 | 1534 | 1687 | 1841 | 1994 | 2148 | 2301 | 2455 | 2761 | 3068 |
| **4 x 14** | W | 2453 | 2725 | 2998 | 3271 | 3543 | 3816 | 4088 | 4361 | 4906 | 5451 |
| | w | 94 | 104 | 115 | 125 | 136 | 146 | 157 | 167 | 188 | 209 |
| | $F_v$ | 38 | 43 | 47 | 51 | 56 | 60 | 64 | 69 | 77 | 86 |
| | E | 1559 | 1733 | 1906 | 2079 | 2253 | 2426 | 2599 | 2773 | 3119 | 3466 |
| **8 x 10** | W | 2603 | 2892 | 3181 | 3471 | 3760 | 4049 | 4338 | 4628 | 5206 | 5785 |
| | w | 100 | 111 | 122 | 133 | 144 | 155 | 166 | 178 | 200 | 222 |
| | $F_v$ | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 54 | 60 |
| | E | 2216 | 2463 | 2709 | 2955 | 3202 | 3448 | 3694 | 3941 | 4433 | 4926 |
| **6 x 12** | W | 2797 | 3108 | 3419 | 3730 | 4040 | 4351 | 4662 | 4973 | 5595 | 6216 |
| | w | 107 | 119 | 131 | 143 | 155 | 167 | 179 | 191 | 215 | 239 |
| | $F_v$ | 33 | 36 | 40 | 44 | 47 | 51 | 55 | 58 | 66 | 73 |
| | E | 1831 | 2034 | 2238 | 2441 | 2645 | 2848 | 3052 | 3255 | 3662 | 4069 |
| **10 x 10** | W | 3297 | 3663 | 4030 | 4396 | 4763 | 5129 | 5495 | 5862 | 6595 | 7327 |
| | w | 126 | 140 | 155 | 169 | 183 | 197 | 211 | 225 | 253 | 281 |
| | $F_v$ | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 54 | 60 |
| | E | 2216 | 2463 | 2709 | 2955 | 3202 | 3448 | 3694 | 3941 | 4433 | 4926 |
| **4 x 16** | W | 3234 | 3593 | 3952 | 4312 | 4671 | 5030 | 5390 | 5749 | 6468 | 7186 |
| | w | 124 | 138 | 152 | 165 | 179 | 193 | 207 | 221 | 248 | 276 |
| | $F_v$ | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 89 | 99 |
| | E | 1358 | 1509 | 1660 | 1811 | 1962 | 2113 | 2264 | 2415 | 2717 | 3019 |
| **8 x 12** | W | 3814 | 4238 | 4662 | 5086 | 5510 | 5934 | 6358 | 6782 | 7629 | 8477 |
| | w | 146 | 163 | 179 | 195 | 211 | 228 | 244 | 260 | 293 | 326 |
| | $F_v$ | 33 | 36 | 40 | 44 | 47 | 51 | 55 | 58 | 66 | 73 |
| | E | 1831 | 2034 | 2238 | 2441 | 2645 | 2848 | 3052 | 3255 | 3662 | 4069 |
| **6 x 14** | W | 3855 | 4283 | 4712 | 5140 | 5568 | 5997 | 6425 | 6853 | 7710 | 8567 |
| | w | 148 | 164 | 181 | 197 | 214 | 230 | 247 | 263 | 296 | 329 |
| | $F_v$ | 38 | 43 | 47 | 51 | 56 | 60 | 64 | 69 | 77 | 86 |
| | E | 1559 | 1733 | 1906 | 2079 | 2253 | 2426 | 2599 | 2773 | 3119 | 3466 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **26' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **10 x 12** | W | 4832 | 5369 | 5906 | 6442 | 6979 | 7516 | 8053 | 8590 | 9664 | 10738 |
| | w | 185 | 206 | 227 | 247 | 268 | 289 | 309 | 330 | 371 | 413 |
| | $F_v$ | 33 | 36 | 40 | 44 | 47 | 51 | 55 | 58 | 66 | 73 |
| | E | 1831 | 2034 | 2238 | 2441 | 2645 | 2848 | 3052 | 3255 | 3662 | 4069 |
| **6 x 16** | W | 5082 | 5646 | 6211 | 6776 | 7340 | 7905 | 8470 | 9035 | 10164 | 11293 |
| | w | 195 | 217 | 238 | 260 | 282 | 304 | 325 | 347 | 390 | 434 |
| | $F_v$ | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 89 | 99 |
| | E | 1358 | 1509 | 1660 | 1811 | 1962 | 2113 | 2264 | 2415 | 2717 | 3019 |
| **8 x 14** | W | 5257 | 5841 | 6425 | 7009 | 7593 | 8177 | 8762 | 9346 | 10514 | 11682 |
| | w | 202 | 224 | 247 | 269 | 292 | 314 | 337 | 359 | 404 | 449 |
| | $F_v$ | 38 | 43 | 47 | 51 | 56 | 60 | 64 | 69 | 77 | 86 |
| | E | 1559 | 1733 | 1906 | 2079 | 2253 | 2426 | 2599 | 2773 | 3119 | 3466 |
| **12 x 12** | W | 5849 | 6499 | 7149 | 7799 | 8449 | 9099 | 9749 | 10399 | 11699 | 12998 |
| | w | 224 | 249 | 274 | 299 | 324 | 349 | 374 | 399 | 449 | 499 |
| | $F_v$ | 33 | 36 | 40 | 44 | 47 | 51 | 55 | 58 | 66 | 73 |
| | E | 1831 | 2034 | 2238 | 2441 | 2645 | 2848 | 3052 | 3255 | 3662 | 4069 |
| **6 x 18** | W | 6478 | 7198 | 7917 | 8637 | 9357 | 10077 | 10797 | 11517 | 12956 | 14396 |
| | w | 249 | 276 | 304 | 332 | 359 | 387 | 415 | 442 | 498 | 553 |
| | $F_v$ | 50 | 56 | 61 | 67 | 72 | 78 | 84 | 89 | 100 | 112 |
| | E | 1203 | 1337 | 1470 | 1604 | 1738 | 1871 | 2005 | 2139 | 2406 | 2674 |
| **10 x 14** | W | 6659 | 7399 | 8138 | 8878 | 9618 | 10358 | 11098 | 11838 | 13318 | 14798 |
| | w | 256 | 284 | 313 | 341 | 369 | 398 | 426 | 455 | 512 | 569 |
| | $F_v$ | 38 | 43 | 47 | 51 | 56 | 60 | 64 | 69 | 77 | 86 |
| | E | 1559 | 1733 | 1906 | 2079 | 2253 | 2426 | 2599 | 2773 | 3119 | 3466 |
| **8 x 16** | W | 6930 | 7700 | 8470 | 9240 | 10010 | 10780 | 11550 | 12320 | 13860 | 15400 |
| | w | 266 | 296 | 325 | 355 | 385 | 414 | 444 | 473 | 533 | 592 |
| | $F_v$ | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 89 | 99 |
| | E | 1358 | 1509 | 1660 | 1811 | 1962 | 2113 | 2264 | 2415 | 2717 | 3019 |
| **6 x 20** | W | 8043 | 8937 | 9831 | 10725 | 11618 | 12512 | 13406 | 14300 | 16087 | 17875 |
| | w | 309 | 343 | 378 | 412 | 446 | 481 | 515 | 550 | 618 | 687 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **12 x 14** | W | 8061 | 8956 | 9852 | 10748 | 11643 | 12539 | 13435 | 14330 | 16122 | 17913 |
| | w | 310 | 344 | 378 | 413 | 447 | 482 | 516 | 551 | 620 | 688 |
| | $F_v$ | 38 | 43 | 47 | 51 | 56 | 60 | 64 | 69 | 77 | 86 |
| | E | 1559 | 1733 | 1906 | 2079 | 2253 | 2426 | 2599 | 2773 | 3119 | 3466 |
| **10 x 16** | W | 8778 | 9753 | 10729 | 11704 | 12679 | 13655 | 14630 | 15605 | 17556 | 19507 |
| | w | 337 | 375 | 412 | 450 | 487 | 525 | 562 | 600 | 675 | 750 |
| | $F_v$ | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 89 | 99 |
| | E | 1358 | 1509 | 1660 | 1811 | 1962 | 2113 | 2264 | 2415 | 2717 | 3019 |
| **8 x 18** | W | 8834 | 9815 | 10797 | 11778 | 12760 | 13741 | 14723 | 15705 | 17668 | 19631 |
| | w | 339 | 377 | 415 | 453 | 490 | 528 | 566 | 604 | 679 | 755 |
| | $F_v$ | 50 | 56 | 61 | 67 | 72 | 78 | 84 | 89 | 100 | 112 |
| | E | 1203 | 1337 | 1470 | 1604 | 1738 | 1871 | 2005 | 2139 | 2406 | 2674 |
| **14 x 14** | W | 9462 | 10514 | 11565 | 12617 | 13668 | 14720 | 15771 | 16823 | 18925 | 21028 |
| | w | 363 | 404 | 444 | 485 | 525 | 566 | 606 | 647 | 727 | 808 |
| | $F_v$ | 38 | 43 | 47 | 51 | 56 | 60 | 64 | 69 | 77 | 86 |
| | E | 1559 | 1733 | 1906 | 2079 | 2253 | 2426 | 2599 | 2773 | 3119 | 3466 |
| **6 x 22** | W | 9778 | 10864 | 11951 | 13037 | 14124 | 15210 | 16297 | 17383 | 19556 | 21729 |
| | w | 376 | 417 | 459 | 501 | 543 | 585 | 626 | 668 | 752 | 835 |
| | $F_v$ | 62 | 68 | 75 | 82 | 89 | 96 | 103 | 110 | 124 | 137 |
| | E | 979 | 1088 | 1197 | 1306 | 1414 | 1523 | 1632 | 1741 | 1959 | 2176 |

## WOOD BEAMS–SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **26'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **12 x 16** | W | 10626 | 11807 | 12987 | 14168 | 15349 | 16530 | 17710 | 18891 | 21252 | 23614 |
| | w | 408 | 454 | 499 | 544 | 590 | 635 | 681 | 726 | 817 | 908 |
| | $F_v$ | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 89 | 99 |
| | E | 1358 | 1509 | 1660 | 1811 | 1962 | 2113 | 2264 | 2415 | 2717 | 3019 |
| **8 x 20** | W | 10968 | 12187 | 13406 | 14625 | 15843 | 17062 | 18281 | 19500 | 21937 | 24375 |
| | w | 421 | 468 | 515 | 562 | 609 | 656 | 703 | 750 | 843 | 937 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **10 x 18** | W | 11189 | 12433 | 13676 | 14919 | 16163 | 17406 | 18649 | 19893 | 22379 | 24866 |
| | w | 430 | 478 | 526 | 573 | 621 | 669 | 717 | 765 | 860 | 956 |
| | $F_v$ | 50 | 56 | 61 | 67 | 72 | 78 | 84 | 89 | 100 | 112 |
| | E | 1203 | 1337 | 1470 | 1604 | 1738 | 1872 | 2005 | 2139 | 2406 | 2674 |
| **6 x 24** | W | 11682 | 12980 | 14278 | 15576 | 16874 | 18172 | 19470 | 20768 | 23364 | 25960 |
| | w | 449 | 499 | 549 | 599 | 649 | 698 | 748 | 798 | 898 | 998 |
| | $F_v$ | 67 | 75 | 82 | 90 | 97 | 105 | 112 | 120 | 135 | 150 |
| | E | 896 | 995 | 1095 | 1194 | 1294 | 1394 | 1493 | 1593 | 1792 | 1991 |
| **14 x 16** | W | 12474 | 13860 | 15246 | 16632 | 18018 | 19404 | 20790 | 22176 | 24949 | 27721 |
| | w | 479 | 533 | 586 | 639 | 693 | 746 | 799 | 852 | 959 | 1066 |
| | $F_v$ | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 89 | 99 |
| | E | 1358 | 1509 | 1660 | 1811 | 1962 | 2113 | 2264 | 2415 | 2717 | 3019 |
| **8 x 22** | W | 13334 | 14815 | 16297 | 17778 | 19260 | 20741 | 22223 | 23705 | 26668 | 29631 |
| | w | 512 | 569 | 626 | 683 | 740 | 797 | 854 | 911 | 1025 | 1139 |
| | $F_v$ | 62 | 68 | 75 | 82 | 89 | 96 | 103 | 110 | 124 | 137 |
| | E | 979 | 1088 | 1197 | 1306 | 1414 | 1523 | 1632 | 1741 | 1959 | 2176 |
| **12 x 18** | W | 13545 | 15050 | 16555 | 18060 | 19565 | 21071 | 22576 | 24081 | 27091 | 30101 |
| | w | 520 | 578 | 636 | 694 | 752 | 810 | 868 | 926 | 1041 | 1157 |
| | $F_v$ | 50 | 56 | 61 | 67 | 72 | 78 | 84 | 89 | 100 | 112 |
| | E | 1203 | 1337 | 1470 | 1604 | 1738 | 1871 | 2005 | 2139 | 2406 | 2674 |
| **10 x 20** | W | 13893 | 15437 | 16981 | 18525 | 20068 | 21612 | 23156 | 24700 | 27787 | 30875 |
| | w | 534 | 593 | 653 | 712 | 771 | 831 | 890 | 950 | 1068 | 1187 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **16 x 16** | W | 14322 | 15913 | 17505 | 19096 | 20688 | 22279 | 23870 | 25462 | 28645 | 31827 |
| | w | 550 | 612 | 673 | 734 | 795 | 856 | 918 | 979 | 1101 | 1224 |
| | $F_v$ | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 89 | 99 |
| | E | 1358 | 1509 | 1660 | 1811 | 1962 | 2113 | 2264 | 2415 | 2717 | 3019 |
| **14 x 18** | W | 15901 | 17668 | 19435 | 21201 | 22968 | 24735 | 26502 | 28269 | 31802 | 35336 |
| | w | 611 | 679 | 747 | 815 | 883 | 951 | 1019 | 1087 | 1223 | 1359 |
| | $F_v$ | 50 | 56 | 61 | 67 | 72 | 78 | 84 | 89 | 100 | 112 |
| | E | 1203 | 1337 | 1470 | 1604 | 1738 | 1871 | 2005 | 2139 | 2406 | 2674 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **26' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **8 x 24** | W | 15930 | 17700 | 19470 | 21240 | 23010 | 24780 | 26550 | 28320 | 31860 | 35400 |
| | w | 612 | 680 | 748 | 816 | 885 | 953 | 1021 | 1089 | 1225 | 1361 |
| | $F_v$ | 67 | 75 | 82 | 90 | 97 | 105 | 112 | 120 | 135 | 150 |
| | E | 896 | 995 | 1095 | 1194 | 1294 | 1394 | 1493 | 1593 | 1792 | 1991 |
| **12 x 20** | W | 16818 | 18687 | 20556 | 22425 | 24293 | 26162 | 28031 | 29900 | 33637 | 37375 |
| | w | 646 | 718 | 790 | 862 | 934 | 1006 | 1078 | 1150 | 1293 | 1437 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **10 x 22** | W | 16889 | 18766 | 20643 | 22519 | 24396 | 26273 | 28149 | 30026 | 33779 | 37533 |
| | w | 649 | 721 | 793 | 866 | 938 | 1010 | 1082 | 1154 | 1299 | 1443 |
| | $F_v$ | 62 | 68 | 75 | 82 | 89 | 96 | 103 | 110 | 124 | 137 |
| | E | 979 | 1088 | 1197 | 1306 | 1414 | 1523 | 1632 | 1741 | 1959 | 2176 |
| **16 x 18** | W | 18257 | 20285 | 22314 | 24342 | 26371 | 28400 | 30428 | 32457 | 36514 | 40571 |
| | w | 702 | 780 | 858 | 936 | 1014 | 1092 | 1170 | 1248 | 1404 | 1560 |
| | $F_v$ | 50 | 56 | 61 | 67 | 72 | 78 | 84 | 89 | 100 | 112 |
| | E | 1203 | 1337 | 1470 | 1604 | 1738 | 1871 | 2005 | 2139 | 2406 | 2674 |
| **14 x 20** | W | 19743 | 21937 | 24131 | 26325 | 28518 | 30712 | 32906 | 35100 | 39487 | 43875 |
| | w | 759 | 843 | 928 | 1012 | 1096 | 1181 | 1265 | 1350 | 1518 | 1687 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **10 x 24** | W | 20178 | 22420 | 24662 | 26904 | 29146 | 31388 | 33630 | 35872 | 40356 | 44840 |
| | w | 776 | 862 | 948 | 1034 | 1121 | 1207 | 1293 | 1379 | 1552 | 1724 |
| | $F_v$ | 67 | 75 | 82 | 90 | 97 | 105 | 112 | 120 | 135 | 150 |
| | E | 896 | 995 | 1095 | 1194 | 1294 | 1394 | 1493 | 1593 | 1792 | 1991 |
| **12 x 22** | W | 20445 | 22717 | 24989 | 27260 | 29532 | 31804 | 34076 | 36347 | 40891 | 45434 |
| | w | 786 | 873 | 961 | 1048 | 1135 | 1223 | 1310 | 1397 | 1572 | 1747 |
| | $F_v$ | 62 | 68 | 75 | 82 | 89 | 96 | 103 | 110 | 124 | 137 |
| | E | 979 | 1088 | 1197 | 1306 | 1414 | 1523 | 1632 | 1741 | 1959 | 2176 |
| **18 x 18** | W | 20612 | 22903 | 25193 | 27483 | 29774 | 32064 | 34354 | 36645 | 41225 | 45806 |
| | w | 792 | 880 | 968 | 1057 | 1145 | 1233 | 1321 | 1409 | 1585 | 1761 |
| | $F_v$ | 50 | 56 | 61 | 67 | 72 | 78 | 84 | 89 | 100 | 112 |
| | E | 1203 | 1337 | 1470 | 1604 | 1738 | 1871 | 2005 | 2139 | 2406 | 2674 |
| **16 x 20** | W | 22668 | 25187 | 27706 | 30225 | 32743 | 35262 | 37781 | 40300 | 45337 | 50375 |
| | w | 871 | 968 | 1065 | 1162 | 1259 | 1356 | 1453 | 1550 | 1743 | 1937 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **14 x 22** | W | 24001 | 26668 | 29335 | 32001 | 34668 | 37335 | 40002 | 42669 | 48002 | 53336 |
| | w | 923 | 1025 | 1128 | 1230 | 1333 | 1435 | 1538 | 1641 | 1846 | 2051 |
| | $F_v$ | 62 | 68 | 75 | 82 | 89 | 96 | 103 | 110 | 124 | 137 |
| | E | 979 | 1088 | 1197 | 1306 | 1414 | 1523 | 1632 | 1741 | 1959 | 2176 |
| **12 x 24** | W | 24426 | 27140 | 29854 | 32568 | 35282 | 37996 | 40710 | 43424 | 48852 | 54280 |
| | w | 939 | 1043 | 1148 | 1252 | 1357 | 1461 | 1565 | 1670 | 1878 | 2087 |
| | $F_v$ | 67 | 75 | 82 | 90 | 97 | 105 | 112 | 120 | 135 | 150 |
| | E | 896 | 995 | 1095 | 1194 | 1294 | 1394 | 1493 | 1593 | 1792 | 1991 |
| **18 x 20** | W | 25593 | 28437 | 31281 | 34125 | 36968 | 39812 | 42656 | 45500 | 51187 | 56875 |
| | w | 984 | 1093 | 1203 | 1312 | 1421 | 1531 | 1640 | 1750 | 1968 | 2187 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **16 x 22** | W | 27557 | 30619 | 33681 | 36742 | 39804 | 42866 | 45928 | 48990 | 55114 | 61238 |
| | w | 1059 | 1177 | 1295 | 1413 | 1530 | 1648 | 1766 | 1884 | 2119 | 2355 |
| | $F_v$ | 62 | 68 | 75 | 82 | 89 | 96 | 103 | 110 | 124 | 137 |
| | E | 979 | 1088 | 1197 | 1306 | 1414 | 1523 | 1632 | 1741 | 1959 | 2176 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **26' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **20 x 20** | W | 28518 | 31687 | 34856 | 38025 | 41193 | 44362 | 47531 | 50700 | 57037 | 63375 |
| | w | 1096 | 1218 | 1340 | 1462 | 1584 | 1706 | 1828 | 1950 | 2193 | 2437 |
| | $F_v$ | 56 | 62 | 68 | 75 | 81 | 87 | 93 | 100 | 112 | 125 |
| | E | 1079 | 1199 | 1319 | 1439 | 1559 | 1679 | 1799 | 1919 | 2159 | 2399 |
| **14 x 24** | W | 28674 | 31860 | 35046 | 38232 | 41418 | 44604 | 47790 | 50976 | 57349 | 63721 |
| | w | 1102 | 1225 | 1347 | 1470 | 1593 | 1715 | 1838 | 1960 | 2205 | 2450 |
| | $F_v$ | 67 | 75 | 82 | 90 | 97 | 105 | 112 | 120 | 135 | 150 |
| | E | 896 | 995 | 1095 | 1194 | 1294 | 1394 | 1493 | 1593 | 1792 | 1991 |
| **18 x 22** | W | 31112 | 34569 | 38026 | 41483 | 44940 | 48397 | 51854 | 55311 | 62225 | 69139 |
| | w | 1196 | 1329 | 1462 | 1595 | 1728 | 1861 | 1994 | 2127 | 2393 | 2659 |
| | $F_v$ | 62 | 68 | 75 | 82 | 89 | 96 | 103 | 110 | 124 | 137 |
| | E | 979 | 1088 | 1197 | 1306 | 1414 | 1523 | 1632 | 1741 | 1959 | 2176 |
| **16 x 24** | W | 32922 | 36580 | 40238 | 43896 | 47554 | 51212 | 54870 | 58529 | 65845 | 73161 |
| | w | 1266 | 1406 | 1547 | 1688 | 1829 | 1969 | 2110 | 2251 | 2532 | 2813 |
| | $F_v$ | 67 | 75 | 82 | 90 | 97 | 105 | 112 | 120 | 135 | 150 |
| | E | 896 | 995 | 1095 | 1194 | 1294 | 1394 | 1493 | 1593 | 1792 | 1991 |
| **20 x 22** | W | 34668 | 38520 | 42372 | 46225 | 50077 | 53929 | 57781 | 61633 | 69337 | 77041 |
| | w | 1333 | 1481 | 1629 | 1777 | 1926 | 2074 | 2222 | 2370 | 2666 | 2963 |
| | $F_v$ | 62 | 68 | 75 | 82 | 89 | 96 | 103 | 110 | 124 | 137 |
| | E | 979 | 1088 | 1197 | 1306 | 1414 | 1523 | 1632 | 1741 | 1959 | 2176 |
| **18 x 24** | W | 37170 | 41300 | 45430 | 49560 | 53690 | 57821 | 61951 | 66081 | 74341 | 82601 |
| | w | 1429 | 1588 | 1747 | 1906 | 2065 | 2223 | 2382 | 2541 | 2859 | 3176 |
| | $F_v$ | 67 | 75 | 82 | 90 | 97 | 105 | 112 | 120 | 135 | 150 |
| | E | 896 | 995 | 1095 | 1194 | 1294 | 1394 | 1493 | 1593 | 1792 | 1991 |
| **22 x 22** | W | 38224 | 42471 | 46718 | 50966 | 55213 | 59460 | 63707 | 67954 | 76449 | 84943 |
| | w | 1470 | 1633 | 1796 | 1960 | 2123 | 2286 | 2450 | 2613 | 2940 | 3267 |
| | $F_v$ | 62 | 68 | 75 | 82 | 89 | 96 | 103 | 110 | 124 | 137 |
| | E | 979 | 1088 | 1197 | 1306 | 1414 | 1523 | 1632 | 1741 | 1959 | 2176 |
| **20 x 24** | W | 41418 | 46020 | 50622 | 55225 | 59827 | 64429 | 69031 | 73633 | 82837 | 92041 |
| | w | 1593 | 1770 | 1947 | 2124 | 2301 | 2478 | 2655 | 2832 | 3186 | 3540 |
| | $F_v$ | 67 | 75 | 82 | 90 | 97 | 105 | 112 | 120 | 135 | 150 |
| | E | 896 | 995 | 1095 | 1194 | 1294 | 1394 | 1493 | 1593 | 1792 | 1991 |
| **22 x 24** | W | 45666 | 50740 | 55815 | 60889 | 65963 | 71037 | 76111 | 81185 | 91333 | 101481 |
| | w | 1756 | 1951 | 2146 | 2341 | 2537 | 2732 | 2927 | 3122 | 3512 | 3903 |
| | $F_v$ | 67 | 75 | 82 | 90 | 97 | 105 | 112 | 120 | 135 | 150 |
| | E | 896 | 995 | 1095 | 1194 | 1294 | 1394 | 1493 | 1593 | 1792 | 1991 |
| **24 x 24** | W | 49914 | 55461 | 61007 | 66553 | 72099 | 77645 | 83191 | 88737 | 99829 | 110922 |
| | w | 1919 | 2133 | 2346 | 2559 | 2773 | 2986 | 3199 | 3412 | 3839 | 4266 |
| | $F_v$ | 67 | 75 | 82 | 90 | 97 | 105 | 112 | 120 | 135 | 150 |
| | E | 896 | 995 | 1095 | 1194 | 1294 | 1394 | 1493 | 1593 | 1792 | 1991 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **27' - 0" SPAN** | | | | | | | | | | | |
| **2 x 14** | W | 975 | 1083 | 1192 | 1300 | 1408 | 1517 | 1625 | 1733 | 1950 | 2167 |
| | w | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | $F_v$ | 36 | 40 | 44 | 49 | 53 | 57 | 61 | 65 | 73 | 81 |
| | E | 1650 | 1833 | 2017 | 2200 | 2384 | 2567 | 2750 | 2934 | 3301 | 3667 |
| **4 x 10** | W | 1109 | 1232 | 1355 | 1478 | 1602 | 1725 | 1848 | 1971 | 2218 | 2464 |
| | w | 41 | 45 | 50 | 54 | 59 | 63 | 68 | 73 | 82 | 91 |
| | $F_v$ | 25 | 28 | 31 | 34 | 37 | 39 | 42 | 45 | 51 | 57 |
| | E | 2364 | 2627 | 2889 | 3152 | 3415 | 3677 | 3940 | 4203 | 4728 | 5254 |
| **3 x 12** | W | 1171 | 1302 | 1432 | 1562 | 1692 | 1822 | 1953 | 2083 | 2343 | 2604 |
| | w | 43 | 48 | 53 | 57 | 62 | 67 | 72 | 77 | 86 | 96 |
| | $F_v$ | 31 | 34 | 38 | 41 | 45 | 48 | 52 | 55 | 62 | 69 |
| | E | 1943 | 2159 | 2375 | 2591 | 2807 | 3023 | 3239 | 3455 | 3887 | 4319 |
| **3 x 14** | W | 1625 | 1806 | 1986 | 2167 | 2348 | 2528 | 2709 | 2889 | 3251 | 3612 |
| | w | 60 | 66 | 73 | 80 | 86 | 93 | 100 | 107 | 120 | 133 |
| | $F_v$ | 36 | 40 | 44 | 49 | 53 | 57 | 61 | 65 | 73 | 81 |
| | E | 1650 | 1833 | 2017 | 2200 | 2384 | 2567 | 2750 | 2934 | 3301 | 3667 |
| **4 x 12** | W | 1640 | 1822 | 2005 | 2187 | 2369 | 2552 | 2734 | 2916 | 3281 | 3645 |
| | w | 60 | 67 | 74 | 81 | 87 | 94 | 101 | 108 | 121 | 135 |
| | $F_v$ | 31 | 34 | 38 | 41 | 45 | 48 | 52 | 55 | 62 | 69 |
| | E | 1943 | 2159 | 2375 | 2591 | 2807 | 3023 | 3239 | 3455 | 3887 | 4319 |
| **6 x 10** | W | 1838 | 2042 | 2246 | 2451 | 2655 | 2859 | 3064 | 3268 | 3676 | 4085 |
| | w | 68 | 75 | 83 | 90 | 98 | 105 | 113 | 121 | 136 | 151 |
| | $F_v$ | 26 | 29 | 32 | 35 | 38 | 41 | 43 | 46 | 52 | 58 |
| | E | 2302 | 2557 | 2813 | 3069 | 3325 | 3581 | 3836 | 4092 | 4604 | 5115 |
| **3 x 16** | W | 2153 | 2392 | 2631 | 2871 | 3110 | 3349 | 3588 | 3828 | 4306 | 4785 |
| | w | 79 | 88 | 97 | 106 | 115 | 124 | 132 | 141 | 159 | 177 |
| | $F_v$ | 42 | 47 | 51 | 56 | 61 | 65 | 70 | 75 | 84 | 94 |
| | E | 1434 | 1593 | 1752 | 1912 | 2071 | 2230 | 2390 | 2549 | 2868 | 3186 |
| **4 x 14** | W | 2362 | 2625 | 2887 | 3150 | 3412 | 3675 | 3937 | 4200 | 4725 | 5250 |
| | w | 87 | 97 | 106 | 116 | 126 | 136 | 145 | 155 | 175 | 194 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **8 x 10** | W | 2506 | 2785 | 3064 | 3342 | 3621 | 3899 | 4178 | 4456 | 5013 | 5570 |
| | w | 92 | 103 | 113 | 123 | 134 | 144 | 154 | 165 | 185 | 206 |
| | $F_v$ | 26 | 29 | 32 | 35 | 38 | 41 | 43 | 46 | 52 | 58 |
| | E | 2302 | 2557 | 2813 | 3069 | 3325 | 3581 | 3836 | 4092 | 4604 | 5115 |
| **6 x 12** | W | 2693 | 2993 | 3292 | 3591 | 3891 | 4190 | 4489 | 4789 | 5387 | 5986 |
| | w | 99 | 110 | 121 | 133 | 144 | 155 | 166 | 177 | 199 | 221 |
| | $F_v$ | 31 | 35 | 39 | 42 | 46 | 49 | 53 | 56 | 63 | 70 |
| | E | 1901 | 2113 | 2324 | 2535 | 2746 | 2958 | 3169 | 3380 | 3803 | 4226 |
| **10 x 10** | W | 3175 | 3528 | 3881 | 4233 | 4586 | 4939 | 5292 | 5645 | 6350 | 7056 |
| | w | 117 | 130 | 143 | 156 | 169 | 182 | 196 | 209 | 235 | 261 |
| | $F_v$ | 26 | 29 | 32 | 35 | 38 | 41 | 43 | 46 | 52 | 58 |
| | E | 2302 | 2557 | 2813 | 3069 | 3325 | 3581 | 3836 | 4092 | 4604 | 5115 |
| **4 x 16** | W | 3114 | 3460 | 3806 | 4152 | 4498 | 4844 | 5190 | 5536 | 6228 | 6920 |
| | w | 115 | 128 | 140 | 153 | 166 | 179 | 192 | 205 | 230 | 256 |
| | $F_v$ | 43 | 47 | 52 | 57 | 62 | 66 | 71 | 76 | 86 | 95 |
| | E | 1410 | 1567 | 1724 | 1881 | 2038 | 2194 | 2351 | 2508 | 2821 | 3135 |
| **8 x 12** | W | 3673 | 4081 | 4489 | 4898 | 5306 | 5714 | 6122 | 6530 | 7347 | 8163 |
| | w | 136 | 151 | 166 | 181 | 196 | 211 | 226 | 241 | 272 | 302 |
| | $F_v$ | 31 | 35 | 39 | 42 | 46 | 49 | 53 | 56 | 63 | 70 |
| | E | 1901 | 2113 | 2324 | 2535 | 2746 | 2958 | 3169 | 3380 | 3803 | 4226 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l$ 360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **27' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **6 x 14** | W | 3712 | 4125 | 4537 | 4950 | 5362 | 5775 | 6187 | 6600 | 7425 | 8250 |
| | w | 137 | 152 | 168 | 183 | 198 | 213 | 229 | 244 | 275 | 305 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **10 x 12** | W | 4653 | 5170 | 5687 | 6204 | 6721 | 7238 | 7755 | 8272 | 9306 | 10340 |
| | w | 172 | 191 | 210 | 229 | 248 | 268 | 287 | 306 | 344 | 382 |
| | $F_v$ | 31 | 35 | 39 | 42 | 46 | 49 | 53 | 56 | 63 | 70 |
| | E | 1901 | 2113 | 2324 | 2535 | 2746 | 2958 | 3169 | 3380 | 3803 | 4226 |
| **6 x 16** | W | 4893 | 5437 | 5981 | 6525 | 7069 | 7612 | 8156 | 8700 | 9787 | 10875 |
| | w | 181 | 201 | 221 | 241 | 261 | 281 | 302 | 322 | 362 | 402 |
| | $F_v$ | 43 | 47 | 52 | 57 | 62 | 66 | 71 | 76 | 86 | 95 |
| | E | 1410 | 1567 | 1724 | 1881 | 2038 | 2194 | 2351 | 2508 | 2821 | 3135 |
| **8 x 14** | W | 5062 | 5625 | 6187 | 6750 | 7312 | 7875 | 8437 | 9000 | 10125 | 11250 |
| | w | 187 | 208 | 229 | 250 | 270 | 291 | 312 | 333 | 375 | 416 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **12 x 12** | W | 5632 | 6258 | 6884 | 7510 | 8136 | 8762 | 9388 | 10013 | 11265 | 12517 |
| | w | 208 | 231 | 254 | 278 | 301 | 324 | 347 | 370 | 417 | 463 |
| | $F_v$ | 31 | 35 | 39 | 42 | 46 | 49 | 53 | 56 | 63 | 70 |
| | E | 1901 | 2113 | 2324 | 2535 | 2746 | 2958 | 3169 | 3380 | 3803 | 4226 |
| **6 x 18** | W | 6238 | 6931 | 7624 | 8317 | 9011 | 9704 | 10397 | 11090 | 12476 | 13863 |
| | w | 231 | 256 | 282 | 308 | 333 | 359 | 385 | 410 | 462 | 513 |
| | $F_v$ | 48 | 54 | 59 | 64 | 70 | 75 | 81 | 86 | 97 | 108 |
| | E | 1249 | 1388 | 1527 | 1666 | 1805 | 1943 | 2082 | 2221 | 2499 | 2777 |
| **10 x 14** | W | 6412 | 7125 | 7837 | 8550 | 9262 | 9975 | 10687 | 11400 | 12825 | 14250 |
| | w | 237 | 263 | 290 | 316 | 343 | 369 | 395 | 422 | 475 | 527 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **8 x 16** | W | 6673 | 7415 | 8156 | 8898 | 9639 | 10381 | 11122 | 11864 | 13347 | 14830 |
| | w | 247 | 274 | 302 | 329 | 357 | 384 | 411 | 439 | 494 | 549 |
| | $F_v$ | 43 | 47 | 52 | 57 | 62 | 66 | 71 | 76 | 86 | 95 |
| | E | 1410 | 1567 | 1724 | 1881 | 2038 | 2194 | 2351 | 2508 | 2821 | 3135 |
| **6 x 20** | W | 7745 | 8606 | 9467 | 10327 | 11188 | 12049 | 12909 | 13770 | 15491 | 17212 |
| | w | 286 | 318 | 350 | 382 | 414 | 446 | 478 | 510 | 573 | 637 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 84 | 90 | 96 | 108 | 120 |
| | E | 1121 | 1246 | 1370 | 1495 | 1619 | 1744 | 1869 | 1993 | 2245 | 2492 |
| **12 x 14** | W | 7762 | 8625 | 9487 | 10350 | 11212 | 12075 | 12937 | 13800 | 15525 | 17250 |
| | w | 287 | 319 | 351 | 383 | 415 | 447 | 479 | 511 | 575 | 638 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **27' - 0" SPAN CONT'D** | | | | | | | | | | | |
| 10 x 16 | W | 8453 | 9392 | 10331 | 11270 | 12210 | 13149 | 14088 | 15027 | 16906 | 18784 |
| | w | 313 | 347 | 382 | 417 | 452 | 487 | 521 | 556 | 626 | 695 |
| | $F_v$ | 43 | 47 | 52 | 57 | 62 | 66 | 71 | 76 | 86 | 95 |
| | E | 1410 | 1567 | 1724 | 1881 | 2038 | 2194 | 2351 | 2508 | 2821 | 3135 |
| 8 x 18 | W | 8506 | 9452 | 10397 | 11342 | 12287 | 13233 | 14178 | 15123 | 17013 | 18904 |
| | w | 315 | 350 | 385 | 420 | 455 | 490 | 525 | 560 | 630 | 700 |
| | $F_v$ | 48 | 54 | 59 | 64 | 70 | 75 | 81 | 86 | 97 | 108 |
| | E | 1249 | 1388 | 1527 | 1666 | 1805 | 1943 | 2082 | 2221 | 2499 | 2777 |
| 14 x 14 | W | 9112 | 10125 | 11137 | 12150 | 13162 | 14175 | 15187 | 16200 | 18225 | 20250 |
| | w | 337 | 375 | 412 | 450 | 487 | 525 | 562 | 600 | 675 | 750 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| 6 x 22 | W | 9416 | 10462 | 11508 | 12554 | 13601 | 14647 | 15693 | 16739 | 18832 | 20924 |
| | w | 348 | 387 | 426 | 464 | 503 | 542 | 581 | 619 | 697 | 774 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | E | 1017 | 1130 | 1243 | 1356 | 1469 | 1582 | 1695 | 1808 | 2034 | 2260 |
| 12 x 16 | W | 10232 | 11369 | 12506 | 13643 | 14780 | 15917 | 17054 | 18191 | 20465 | 22739 |
| | w | 378 | 421 | 463 | 505 | 547 | 589 | 631 | 673 | 757 | 842 |
| | $F_v$ | 43 | 47 | 52 | 57 | 62 | 66 | 71 | 76 | 86 | 95 |
| | E | 1410 | 1567 | 1724 | 1881 | 2038 | 2194 | 2351 | 2508 | 2821 | 3135 |
| 8 x 20 | W | 10562 | 11736 | 12909 | 14083 | 15256 | 16430 | 17604 | 18777 | 21125 | 23472 |
| | w | 391 | 434 | 478 | 521 | 565 | 608 | 652 | 695 | 782 | 869 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 84 | 90 | 96 | 108 | 120 |
| | E | 1121 | 1246 | 1370 | 1495 | 1619 | 1744 | 1869 | 1993 | 2243 | 2492 |
| 10 x 18 | W | 10775 | 11972 | 13170 | 14367 | 15564 | 16761 | 17959 | 19156 | 21550 | 23945 |
| | w | 399 | 443 | 487 | 532 | 576 | 620 | 665 | 709 | 798 | 886 |
| | $F_v$ | 48 | 54 | 59 | 64 | 70 | 75 | 81 | 86 | 97 | 108 |
| | E | 1249 | 1388 | 1527 | 1666 | 1805 | 1943 | 2082 | 2221 | 2499 | 2777 |
| 6 x 24 | W | 11249 | 12499 | 13749 | 14999 | 16249 | 17499 | 18749 | 19999 | 22499 | 24998 |
| | w | 416 | 462 | 509 | 555 | 601 | 648 | 694 | 740 | 833 | 925 |
| | $F_v$ | 65 | 72 | 79 | 87 | 94 | 101 | 108 | 116 | 130 | 145 |
| | E | 930 | 1034 | 1137 | 1240 | 1344 | 1447 | 1551 | 1654 | 1861 | 2068 |
| 14 x 16 | W | 12012 | 13347 | 14681 | 16016 | 17351 | 18686 | 20020 | 21355 | 24025 | 26694 |
| | w | 444 | 494 | 543 | 593 | 642 | 692 | 741 | 790 | 889 | 988 |
| | $F_v$ | 43 | 47 | 52 | 57 | 62 | 66 | 71 | 76 | 86 | 95 |
| | E | 1410 | 1567 | 1724 | 1881 | 2038 | 2194 | 2351 | 2508 | 2821 | 3135 |
| 8 x 22 | W | 12840 | 14266 | 15693 | 17120 | 18547 | 19973 | 21400 | 22827 | 25680 | 28533 |
| | w | 475 | 528 | 581 | 634 | 686 | 739 | 792 | 845 | 951 | 1056 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | E | 1017 | 1130 | 1243 | 1356 | 1469 | 1582 | 1695 | 1808 | 2034 | 2260 |
| 12 x 18 | W | 13043 | 14493 | 15942 | 17391 | 18841 | 20290 | 21739 | 23189 | 26087 | 28986 |
| | w | 483 | 536 | 590 | 644 | 697 | 751 | 805 | 858 | 966 | 1073 |
| | $F_v$ | 48 | 54 | 59 | 64 | 70 | 75 | 81 | 86 | 97 | 108 |
| | E | 1249 | 1388 | 1527 | 1666 | 1805 | 1943 | 2082 | 2221 | 2499 | 2777 |
| 10 x 20 | W | 13379 | 14865 | 16352 | 17838 | 19325 | 20812 | 22298 | 23785 | 26758 | 29731 |
| | w | 495 | 550 | 605 | 660 | 715 | 770 | 825 | 880 | 991 | 1101 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 84 | 90 | 96 | 108 | 120 |
| | E | 1121 | 1246 | 1370 | 1495 | 1619 | 1744 | 1869 | 1993 | 2243 | 2492 |
| 16 x 16 | W | 13792 | 15324 | 16857 | 18389 | 19921 | 21454 | 22986 | 24519 | 27584 | 30649 |
| | w | 510 | 567 | 624 | 681 | 737 | 794 | 851 | 908 | 1021 | 1135 |
| | $F_v$ | 43 | 47 | 52 | 57 | 62 | 66 | 71 | 76 | 86 | 95 |
| | E | 1410 | 1567 | 1724 | 1881 | 2038 | 2194 | 2351 | 2508 | 2821 | 3135 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

*Symbols used in the tables are as follows:*

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **27' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **14 x 18** | W | 15312 | 17013 | 18715 | 20416 | 22118 | 23819 | 25520 | 27222 | 30624 | 34027 |
| | w | 567 | 630 | 693 | 756 | 819 | 882 | 945 | 1008 | 1134 | 1260 |
| | $F_v$ | 48 | 54 | 59 | 64 | 70 | 75 | 81 | 86 | 97 | 108 |
| | E | 1249 | 1388 | 1527 | 1666 | 1805 | 1943 | 2082 | 2221 | 2499 | 2777 |
| **8 x 24** | W | 15340 | 17044 | 18749 | 20453 | 22158 | 23862 | 25567 | 27271 | 30680 | 34089 |
| | w | 568 | 631 | 694 | 757 | 820 | 883 | 946 | 1010 | 1136 | 1262 |
| | $F_v$ | 65 | 72 | 79 | 87 | 94 | 101 | 108 | 116 | 130 | 145 |
| | E | 930 | 1034 | 1137 | 1240 | 1344 | 1447 | 1551 | 1654 | 1861 | 2068 |
| **12 x 20** | W | 16195 | 17995 | 19794 | 21594 | 23393 | 25193 | 26993 | 28792 | 32391 | 35990 |
| | w | 599 | 666 | 733 | 799 | 866 | 933 | 999 | 1066 | 1199 | 1332 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 84 | 90 | 96 | 108 | 120 |
| | E | 1121 | 1246 | 1370 | 1495 | 1619 | 1744 | 1869 | 1993 | 2243 | 2492 |
| **10 x 22** | W | 16264 | 18071 | 19878 | 21685 | 23492 | 25300 | 27107 | 28914 | 32528 | 36142 |
| | w | 602 | 669 | 736 | 803 | 870 | 937 | 1003 | 1070 | 1204 | 1338 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | E | 1017 | 1130 | 1243 | 1356 | 1469 | 1582 | 1695 | 1808 | 2034 | 2260 |
| **16 x 18** | W | 17581 | 19534 | 21487 | 23441 | 25394 | 27348 | 29301 | 31255 | 35162 | 39068 |
| | w | 651 | 723 | 795 | 868 | 940 | 1012 | 1085 | 1157 | 1302 | 1446 |
| | $F_v$ | 48 | 54 | 59 | 64 | 70 | 75 | 81 | 86 | 97 | 108 |
| | E | 1249 | 1388 | 1527 | 1666 | 1805 | 1943 | 2082 | 2221 | 2499 | 2777 |
| **14 x 20** | W | 19012 | 21125 | 23237 | 25350 | 27462 | 29574 | 31687 | 33800 | 38024 | 42250 |
| | w | 704 | 782 | 860 | 938 | 1017 | 1095 | 1173 | 1251 | 1408 | 1564 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 84 | 90 | 96 | 108 | 120 |
| | E | 1121 | 1246 | 1370 | 1495 | 1619 | 1744 | 1869 | 1993 | 2243 | 2492 |
| **10 x 24** | W | 19431 | 21590 | 23749 | 25908 | 28067 | 30226 | 32385 | 34544 | 38862 | 43180 |
| | w | 719 | 799 | 879 | 959 | 1039 | 1119 | 1199 | 1279 | 1439 | 1599 |
| | $F_v$ | 65 | 72 | 79 | 87 | 94 | 101 | 108 | 116 | 130 | 145 |
| | E | 930 | 1034 | 1137 | 1240 | 1344 | 1447 | 1551 | 1654 | 1861 | 2068 |
| **12 x 22** | W | 19688 | 21876 | 24063 | 26251 | 28438 | 30626 | 32814 | 35001 | 39376 | 43752 |
| | w | 729 | 810 | 891 | 972 | 1053 | 1134 | 1215 | 1296 | 1458 | 1620 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | E | 1017 | 1130 | 1243 | 1356 | 1469 | 1582 | 1695 | 1808 | 2034 | 2260 |
| **18 x 18** | W | 19849 | 22055 | 24260 | 26466 | 28671 | 30877 | 33082 | 35288 | 39699 | 44110 |
| | w | 735 | 816 | 898 | 980 | 1061 | 1143 | 1225 | 1306 | 1470 | 1633 |
| | $F_v$ | 48 | 54 | 59 | 64 | 70 | 75 | 81 | 86 | 97 | 108 |
| | E | 1249 | 1388 | 1527 | 1666 | 1805 | 1943 | 2082 | 2221 | 2499 | 2777 |
| **16 x 20** | W | 21829 | 24254 | 26680 | 29105 | 31531 | 33956 | 36381 | 38807 | 43658 | 48509 |
| | w | 808 | 898 | 988 | 1077 | 1167 | 1257 | 1347 | 1437 | 1616 | 1796 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 84 | 90 | 96 | 108 | 120 |
| | E | 1121 | 1246 | 1370 | 1495 | 1619 | 1744 | 1869 | 1993 | 2243 | 2492 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **27' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **14 x 22** | W | 23112 | 25680 | 28248 | 30816 | 33384 | 35952 | 38520 | 41088 | 46224 | 51361 |
| | w | 856 | 951 | 1046 | 1141 | 1236 | 1331 | 1426 | 1521 | 1712 | 1902 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | E | 1017 | 1130 | 1243 | 1356 | 1469 | 1582 | 1695 | 1808 | 2034 | 2260 |
| **12 x 24** | W | 23521 | 26135 | 28748 | 31362 | 33975 | 36589 | 39202 | 41816 | 47043 | 52270 |
| | w | 871 | 967 | 1064 | 1161 | 1258 | 1355 | 1451 | 1548 | 1742 | 1935 |
| | $F_v$ | 65 | 72 | 79 | 87 | 94 | 101 | 108 | 116 | 130 | 145 |
| | E | 930 | 1034 | 1137 | 1240 | 1344 | 1447 | 1551 | 1654 | 1861 | 2068 |
| **18 x 20** | W | 24645 | 27384 | 30122 | 32861 | 35599 | 38337 | 41076 | 43814 | 49291 | 54768 |
| | w | 912 | 1014 | 1115 | 1217 | 1318 | 1419 | 1521 | 1622 | 1825 | 2028 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 84 | 90 | 96 | 108 | 120 |
| | E | 1121 | 1246 | 1370 | 1495 | 1619 | 1744 | 1869 | 1993 | 2243 | 2492 |
| **16 x 22** | W | 26536 | 29485 | 32433 | 35382 | 38330 | 41279 | 44227 | 47176 | 53073 | 58970 |
| | w | 982 | 1092 | 1201 | 1310 | 1419 | 1528 | 1638 | 1747 | 1965 | 2184 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | E | 1017 | 1130 | 1243 | 1356 | 1469 | 1582 | 1695 | 1808 | 2034 | 2260 |
| **20 x 20** | W | 27462 | 30513 | 33565 | 36616 | 39668 | 42719 | 45770 | 48822 | 54924 | 61027 |
| | w | 1017 | 1130 | 1243 | 1356 | 1469 | 1582 | 1695 | 1808 | 2034 | 2260 |
| | $F_v$ | 54 | 60 | 66 | 72 | 78 | 84 | 90 | 96 | 108 | 120 |
| | E | 1121 | 1246 | 1370 | 1495 | 1619 | 1744 | 1869 | 1993 | 2243 | 2492 |
| **14 x 24** | W | 27612 | 30680 | 33748 | 36816 | 39884 | 42952 | 46020 | 49088 | 55224 | 61361 |
| | w | 1022 | 1136 | 1249 | 1363 | 1477 | 1590 | 1704 | 1818 | 2045 | 2272 |
| | $F_v$ | 65 | 72 | 79 | 87 | 94 | 101 | 108 | 116 | 130 | 145 |
| | E | 930 | 1034 | 1137 | 1240 | 1344 | 1447 | 1551 | 1654 | 1861 | 2068 |
| **18 x 22** | W | 29960 | 33289 | 36618 | 39947 | 43276 | 46605 | 49934 | 53263 | 59921 | 66579 |
| | w | 1109 | 1232 | 1356 | 1479 | 1602 | 1726 | 1849 | 1972 | 2219 | 2465 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | E | 1017 | 1130 | 1243 | 1356 | 1469 | 1582 | 1695 | 1808 | 2034 | 2260 |
| **16 x 24** | W | 31703 | 35225 | 38748 | 42270 | 45793 | 49316 | 52838 | 56361 | 63406 | 70451 |
| | w | 1174 | 1304 | 1435 | 1565 | 1696 | 1826 | 1956 | 2087 | 2348 | 2609 |
| | $F_v$ | 65 | 72 | 79 | 87 | 94 | 101 | 108 | 116 | 130 | 145 |
| | E | 930 | 1034 | 1137 | 1240 | 1344 | 1447 | 1551 | 1654 | 1861 | 2068 |
| **20 x 22** | W | 33384 | 37094 | 40803 | 44512 | 48222 | 51931 | 55641 | 59350 | 66769 | 74188 |
| | w | 1236 | 1373 | 1511 | 1648 | 1786 | 1923 | 2060 | 2198 | 2472 | 2747 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | E | 1017 | 1130 | 1243 | 1356 | 1469 | 1582 | 1695 | 1808 | 2034 | 2260 |
| **18 x 24** | W | 35793 | 39771 | 43748 | 47725 | 51702 | 55679 | 59656 | 63633 | 71587 | 79542 |
| | w | 1325 | 1473 | 1620 | 1767 | 1914 | 2062 | 2209 | 2356 | 2651 | 2946 |
| | $F_v$ | 65 | 72 | 79 | 87 | 94 | 101 | 108 | 116 | 130 | 145 |
| | E | 930 | 1034 | 1137 | 1240 | 1344 | 1447 | 1551 | 1654 | 1861 | 2068 |
| **22 x 22** | W | 36808 | 40898 | 44988 | 49078 | 53168 | 57258 | 61347 | 65437 | 73617 | 81797 |
| | w | 1363 | 1514 | 1666 | 1817 | 1969 | 2120 | 2272 | 2423 | 2726 | 3029 |
| | $F_v$ | 59 | 66 | 72 | 79 | 86 | 92 | 99 | 106 | 119 | 132 |
| | E | 1017 | 1130 | 1243 | 1356 | 1469 | 1582 | 1695 | 1808 | 2034 | 2260 |
| **20 x 24** | W | 39884 | 44316 | 48747 | 53179 | 57611 | 62042 | 66474 | 70906 | 79769 | 88632 |
| | w | 1477 | 1641 | 1805 | 1969 | 2133 | 2297 | 2462 | 2626 | 2954 | 3282 |
| | $F_v$ | 65 | 72 | 79 | 87 | 94 | 101 | 108 | 116 | 130 | 145 |
| | E | 930 | 1034 | 1137 | 1240 | 1344 | 1447 | 1551 | 1654 | 1861 | 2068 |
| **22 x 24** | W | 43975 | 48861 | 53747 | 58633 | 63520 | 68406 | 73292 | 78178 | 87950 | 97723 |
| | w | 1628 | 1809 | 1990 | 2171 | 2352 | 2533 | 2714 | 2895 | 3257 | 3619 |
| | $F_v$ | 65 | 72 | 79 | 87 | 94 | 101 | 108 | 116 | 130 | 145 |
| | E | 930 | 1034 | 1137 | 1240 | 1344 | 1447 | 1551 | 1654 | 1861 | 2068 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **27' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **24 x 24** | W | 48066 | 53406 | 58747 | 64088 | 69428 | 74769 | 80110 | 85451 | 96132 | 106813 |
| | w | 1780 | 1978 | 2175 | 2373 | 2571 | 2769 | 2967 | 3164 | 3560 | 3956 |
| | $F_v$ | 65 | 72 | 79 | 87 | 94 | 101 | 108 | 116 | 130 | 145 |
| | E | 930 | 1034 | 1137 | 1240 | 1344 | 1447 | 1551 | 1654 | 1861 | 2068 |
| **28' - 0" SPAN** | | | | | | | | | | | |
| **3 x 12** | W | 1130 | 1255 | 1381 | 1506 | 1632 | 1757 | 1883 | 2008 | 2260 | 2511 |
| | w | 40 | 44 | 49 | 53 | 58 | 62 | 67 | 71 | 80 | 89 |
| | $F_v$ | 30 | 33 | 36 | 40 | 43 | 46 | 50 | 53 | 60 | 66 |
| | E | 2015 | 2239 | 2463 | 2687 | 2911 | 3135 | 3359 | 3583 | 4031 | 4479 |
| **3 x 14** | W | 1567 | 1741 | 1915 | 2090 | 2264 | 2438 | 2612 | 2786 | 3135 | 3483 |
| | w | 55 | 62 | 68 | 74 | 80 | 87 | 93 | 99 | 111 | 124 |
| | $F_v$ | 35 | 39 | 43 | 47 | 51 | 55 | 59 | 63 | 70 | 78 |
| | E | 1711 | 1901 | 2092 | 2282 | 2472 | 2662 | 2852 | 3043 | 3423 | 3803 |
| **4 x 12** | W | 1582 | 1757 | 1933 | 2109 | 2285 | 2460 | 2636 | 2812 | 3164 | 3515 |
| | w | 56 | 62 | 69 | 75 | 81 | 87 | 94 | 100 | 113 | 125 |
| | $F_v$ | 30 | 33 | 36 | 40 | 43 | 46 | 50 | 53 | 60 | 66 |
| | E | 2015 | 2239 | 2463 | 2687 | 2911 | 3135 | 3359 | 3583 | 4031 | 4479 |
| **3 x 16** | W | 2076 | 2307 | 2537 | 2768 | 2999 | 3230 | 3460 | 3691 | 4152 | 4614 |
| | w | 74 | 82 | 90 | 98 | 107 | 115 | 123 | 131 | 148 | 164 |
| | $F_v$ | 40 | 45 | 49 | 54 | 59 | 63 | 68 | 72 | 81 | 90 |
| | E | 1487 | 1652 | 1817 | 1982 | 2148 | 2313 | 2478 | 2643 | 2974 | 3304 |
| **4 x 14** | W | 2278 | 2531 | 2784 | 3037 | 3290 | 3543 | 3796 | 4050 | 4556 | 5062 |
| | w | 81 | 90 | 99 | 108 | 117 | 126 | 135 | 144 | 162 | 180 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | E | 1679 | 1866 | 2053 | 2239 | 2426 | 2613 | 2799 | 2986 | 3359 | 3733 |
| **6 x 12** | W | 2597 | 2886 | 3175 | 3463 | 3752 | 4040 | 4329 | 4618 | 5195 | 5772 |
| | w | 92 | 103 | 113 | 123 | 134 | 144 | 154 | 164 | 185 | 206 |
| | $F_v$ | 30 | 34 | 37 | 41 | 44 | 47 | 51 | 54 | 61 | 68 |
| | E | 1972 | 2191 | 2410 | 2629 | 2848 | 3067 | 3286 | 3506 | 3944 | 4382 |
| **4 x 16** | W | 3003 | 3336 | 3670 | 4004 | 4337 | 4671 | 5005 | 5338 | 6006 | 6673 |
| | w | 107 | 119 | 131 | 143 | 154 | 166 | 178 | 190 | 214 | 238 |
| | $F_v$ | 41 | 46 | 50 | 55 | 59 | 64 | 69 | 73 | 83 | 92 |
| | E | 1463 | 1625 | 1788 | 1950 | 2113 | 2276 | 2438 | 2601 | 2926 | 3251 |
| **8 x 12** | W | 3542 | 3936 | 4329 | 4723 | 5116 | 5510 | 5904 | 6297 | 7084 | 7872 |
| | w | 126 | 140 | 154 | 168 | 182 | 196 | 210 | 224 | 253 | 281 |
| | $F_v$ | 30 | 34 | 37 | 41 | 44 | 47 | 51 | 54 | 61 | 68 |
| | E | 1972 | 2191 | 2410 | 2629 | 2848 | 3067 | 3286 | 3506 | 3944 | 4382 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **28' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **6 x 14** | W | 3579 | 3977 | 4375 | 4773 | 5170 | 5568 | 5966 | 6364 | 7159 | 7955 |
| | w | 127 | 142 | 156 | 170 | 184 | 198 | 213 | 227 | 255 | 284 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | E | 1679 | 1866 | 2053 | 2239 | 2426 | 2613 | 2799 | 2986 | 3359 | 3733 |
| **10 x 12** | W | 4487 | 4985 | 5484 | 5982 | 6481 | 6979 | 7478 | 7976 | 8974 | 9971 |
| | w | 160 | 178 | 195 | 213 | 231 | 249 | 267 | 284 | 320 | 356 |
| | $F_v$ | 30 | 34 | 37 | 41 | 44 | 47 | 51 | 54 | 61 | 68 |
| | E | 1972 | 2191 | 2410 | 2629 | 2848 | 3067 | 3286 | 3506 | 3944 | 4382 |
| **6 x 16** | W | 4719 | 5243 | 5767 | 6292 | 6816 | 7340 | 7865 | 8389 | 9438 | 10487 |
| | w | 168 | 187 | 205 | 224 | 243 | 262 | 280 | 299 | 337 | 374 |
| | $F_v$ | 41 | 46 | 50 | 55 | 59 | 64 | 69 | 73 | 83 | 92 |
| | E | 1463 | 1625 | 1788 | 1950 | 2113 | 2276 | 2438 | 2601 | 2926 | 3251 |
| **8 x 14** | W | 4881 | 5424 | 5966 | 6508 | 7051 | 7593 | 8136 | 8678 | 9763 | 10848 |
| | w | 174 | 193 | 213 | 232 | 251 | 271 | 290 | 309 | 348 | 387 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | E | 1679 | 1866 | 2053 | 2239 | 2426 | 2613 | 2799 | 2986 | 3359 | 3733 |
| **12 x 12** | W | 5431 | 6035 | 6638 | 7242 | 7845 | 8449 | 9052 | 9656 | 10863 | 12070 |
| | w | 193 | 215 | 237 | 258 | 280 | 301 | 323 | 344 | 387 | 431 |
| | $F_v$ | 30 | 34 | 37 | 41 | 44 | 47 | 51 | 54 | 61 | 68 |
| | E | 1972 | 2191 | 2410 | 2629 | 2848 | 3067 | 3286 | 3506 | 3944 | 4382 |
| **6 x 18** | W | 6015 | 6684 | 7352 | 8020 | 8689 | 9357 | 10026 | 10694 | 12031 | 13368 |
| | w | 214 | 238 | 262 | 286 | 310 | 334 | 358 | 381 | 429 | 477 |
| | $F_v$ | 46 | 52 | 57 | 62 | 67 | 72 | 78 | 83 | 93 | 104 |
| | E | 1295 | 1439 | 1583 | 1727 | 1871 | 2015 | 2159 | 2303 | 2591 | 2879 |
| **10 x 14** | W | 6183 | 6870 | 7557 | 8244 | 8931 | 9618 | 10305 | 10992 | 12366 | 13741 |
| | w | 220 | 245 | 269 | 294 | 318 | 343 | 368 | 392 | 441 | 490 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | E | 1679 | 1866 | 2053 | 2239 | 2426 | 2613 | 2799 | 2986 | 3359 | 3733 |
| **8 x 16** | W | 6435 | 7150 | 7865 | 8580 | 9295 | 10010 | 10725 | 11440 | 12870 | 14300 |
| | w | 229 | 255 | 280 | 306 | 331 | 357 | 383 | 408 | 459 | 510 |
| | $F_v$ | 41 | 46 | 50 | 55 | 59 | 64 | 69 | 73 | 83 | 92 |
| | E | 1463 | 1625 | 1788 | 1950 | 2113 | 2276 | 2438 | 2601 | 2926 | 3251 |
| **6 x 20** | W | 7469 | 8299 | 9129 | 9958 | 10788 | 11618 | 12448 | 13278 | 14938 | 16598 |
| | w | 266 | 296 | 326 | 355 | 385 | 414 | 444 | 474 | 533 | 592 |
| | $F_v$ | 52 | 58 | 63 | 69 | 75 | 81 | 87 | 92 | 104 | 116 |
| | E | 1163 | 1292 | 1421 | 1550 | 1679 | 1809 | 1938 | 2067 | 2326 | 2584 |
| **12 x 14** | W | 7485 | 8316 | 9148 | 9980 | 10812 | 11643 | 12475 | 13307 | 14970 | 16633 |
| | w | 267 | 297 | 326 | 356 | 386 | 415 | 445 | 475 | 534 | 594 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | E | 1679 | 1866 | 2053 | 2239 | 2426 | 2613 | 2799 | 2986 | 3359 | 3733 |
| **10 x 16** | W | 8151 | 9057 | 9962 | 10868 | 11774 | 12679 | 13585 | 14491 | 16302 | 18114 |
| | w | 291 | 323 | 355 | 388 | 420 | 452 | 485 | 517 | 582 | 646 |
| | $F_v$ | 41 | 46 | 50 | 55 | 59 | 64 | 69 | 73 | 83 | 92 |
| | E | 1463 | 1625 | 1788 | 1950 | 2113 | 2276 | 2438 | 2601 | 2926 | 3251 |
| **8 x 18** | W | 8203 | 9114 | 10026 | 10937 | 11848 | 12760 | 13671 | 14583 | 16406 | 18229 |
| | w | 292 | 325 | 358 | 390 | 423 | 455 | 488 | 520 | 585 | 651 |
| | $F_v$ | 46 | 52 | 57 | 62 | 67 | 72 | 78 | 83 | 93 | 104 |
| | E | 1295 | 1439 | 1583 | 1727 | 1871 | 2015 | 2159 | 2303 | 2591 | 2879 |
| **14 x 14** | W | 8787 | 9763 | 10739 | 11716 | 12692 | 13668 | 14645 | 15621 | 17574 | 19526 |
| | w | 313 | 348 | 383 | 418 | 453 | 488 | 523 | 557 | 627 | 697 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | E | 1679 | 1866 | 2053 | 2239 | 2426 | 2613 | 2799 | 2986 | 3359 | 3733 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **28' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **6 x 22** | W | 9079 | 10088 | 11097 | 12106 | 13115 | 14124 | 15133 | 16142 | 18159 | 20177 |
| | w | 324 | 360 | 396 | 432 | 468 | 504 | 540 | 576 | 648 | 720 |
| | $F_v$ | 57 | 63 | 70 | 76 | 83 | 89 | 95 | 102 | 115 | 127 |
| | E | 1054 | 1172 | 1289 | 1406 | 1523 | 1640 | 1758 | 1875 | 2109 | 2344 |
| **12 x 16** | W | 9867 | 10963 | 12060 | 13156 | 14252 | 15349 | 16445 | 17542 | 19734 | 21927 |
| | w | 352 | 391 | 430 | 469 | 509 | 548 | 587 | 626 | 704 | 783 |
| | $F_v$ | 41 | 46 | 50 | 55 | 59 | 64 | 69 | 73 | 83 | 92 |
| | E | 1463 | 1625 | 1788 | 1950 | 2113 | 2276 | 2438 | 2601 | 2926 | 3251 |
| **8 x 20** | W | 10185 | 11316 | 12448 | 13580 | 14712 | 15843 | 16975 | 18107 | 20370 | 22633 |
| | w | 363 | 404 | 444 | 485 | 525 | 565 | 606 | 646 | 727 | 808 |
| | $F_v$ | 52 | 58 | 63 | 69 | 75 | 81 | 87 | 92 | 104 | 116 |
| | E | 1163 | 1292 | 1421 | 1550 | 1679 | 1809 | 1938 | 2067 | 2326 | 2584 |
| **10 x 18** | W | 10390 | 11545 | 12699 | 13854 | 15008 | 16163 | 17317 | 18472 | 20781 | 23090 |
| | w | 371 | 412 | 453 | 494 | 536 | 577 | 618 | 659 | 742 | 824 |
| | $F_v$ | 46 | 52 | 57 | 62 | 67 | 72 | 78 | 83 | 93 | 104 |
| | E | 1295 | 1439 | 1583 | 1727 | 1871 | 2016 | 2159 | 2303 | 2591 | 2879 |
| **6 x 24** | W | 10847 | 12053 | 13258 | 14463 | 15668 | 16874 | 18079 | 19284 | 21695 | 24106 |
| | w | 387 | 430 | 473 | 516 | 559 | 602 | 645 | 688 | 774 | 860 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 139 |
| | E | 965 | 1072 | 1179 | 1286 | 1394 | 1501 | 1608 | 1715 | 1930 | 2144 |
| **14 x 16** | W | 11583 | 12870 | 14157 | 15444 | 16731 | 18018 | 19305 | 20592 | 23166 | 25741 |
| | w | 413 | 459 | 505 | 551 | 597 | 643 | 689 | 735 | 827 | 919 |
| | $F_v$ | 41 | 46 | 50 | 55 | 59 | 64 | 69 | 73 | 83 | 92 |
| | E | 1463 | 1625 | 1788 | 1950 | 2113 | 2276 | 2438 | 2601 | 2926 | 3251 |
| **8 x 22** | W | 12381 | 13757 | 15133 | 16508 | 17884 | 19260 | 20636 | 22011 | 24763 | 27514 |
| | w | 442 | 491 | 540 | 589 | 638 | 687 | 737 | 786 | 884 | 982 |
| | $F_v$ | 57 | 63 | 70 | 76 | 83 | 89 | 95 | 102 | 115 | 127 |
| | E | 1054 | 1172 | 1289 | 1406 | 1523 | 1640 | 1758 | 1875 | 2109 | 2344 |
| **12 x 18** | W | 12578 | 13975 | 15373 | 16770 | 18168 | 19565 | 20963 | 22361 | 25156 | 27951 |
| | w | 449 | 499 | 549 | 598 | 648 | 698 | 748 | 798 | 898 | 998 |
| | $F_v$ | 46 | 52 | 57 | 62 | 67 | 72 | 78 | 83 | 93 | 104 |
| | E | 1295 | 1439 | 1583 | 1727 | 1871 | 2015 | 2159 | 2303 | 2591 | 2879 |
| **10 x 20** | W | 12901 | 14334 | 15768 | 17201 | 18635 | 20068 | 21502 | 22935 | 25802 | 28669 |
| | w | 460 | 511 | 563 | 614 | 665 | 716 | 767 | 819 | 921 | 1023 |
| | $F_v$ | 52 | 58 | 63 | 69 | 75 | 81 | 87 | 92 | 104 | 116 |
| | E | 1163 | 1292 | 1421 | 1550 | 1679 | 1809 | 1938 | 2067 | 2326 | 2584 |
| **16 x 16** | W | 13299 | 14777 | 16255 | 17732 | 19210 | 20688 | 22165 | 23643 | 26599 | 29554 |
| | w | 474 | 527 | 580 | 633 | 686 | 738 | 791 | 844 | 949 | 1055 |
| | $F_v$ | 41 | 46 | 50 | 55 | 59 | 64 | 69 | 73 | 83 | 92 |
| | E | 1463 | 1625 | 1788 | 1950 | 2113 | 2276 | 2438 | 2601 | 2926 | 3251 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **28' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **14 x 18** | W | 14765 | 16406 | 18046 | 19687 | 21328 | 22968 | 24609 | 26250 | 29531 | 32812 |
| | w | 527 | 585 | 644 | 703 | 761 | 820 | 878 | 937 | 1054 | 1171 |
| | $F_v$ | 46 | 52 | 57 | 62 | 67 | 72 | 78 | 83 | 93 | 104 |
| | E | 1295 | 1439 | 1583 | 1727 | 1871 | 2015 | 2159 | 2303 | 2591 | 2879 |
| **8 x 24** | W | 14792 | 16436 | 18079 | 19723 | 21366 | 23010 | 24654 | 26297 | 29584 | 32872 |
| | w | 528 | 587 | 645 | 704 | 763 | 821 | 880 | 939 | 1056 | 1174 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 139 |
| | E | 965 | 1072 | 1179 | 1286 | 1394 | 1501 | 1608 | 1715 | 1930 | 2144 |
| **12 x 20** | W | 15617 | 17352 | 19087 | 20823 | 22558 | 24293 | 26029 | 27764 | 31234 | 34705 |
| | w | 557 | 619 | 681 | 743 | 805 | 867 | 929 | 991 | 1115 | 1239 |
| | $F_v$ | 52 | 58 | 63 | 69 | 75 | 81 | 87 | 92 | 104 | 116 |
| | E | 1163 | 1292 | 1421 | 1550 | 1679 | 1809 | 1938 | 2067 | 2326 | 2584 |
| **10 x 22** | W | 15683 | 17426 | 19168 | 20911 | 22653 | 24396 | 26139 | 27881 | 31366 | 34852 |
| | w | 560 | 622 | 684 | 746 | 809 | 871 | 933 | 995 | 1120 | 1244 |
| | $F_v$ | 57 | 63 | 70 | 76 | 83 | 89 | 95 | 102 | 115 | 127 |
| | E | 1054 | 1172 | 1289 | 1406 | 1523 | 1640 | 1758 | 1875 | 2109 | 2344 |
| **16 x 18** | W | 16953 | 18836 | 20720 | 22604 | 24487 | 26371 | 28255 | 30138 | 33906 | 37673 |
| | w | 605 | 672 | 740 | 807 | 874 | 941 | 1009 | 1076 | 1210 | 1345 |
| | $F_v$ | 46 | 52 | 57 | 62 | 67 | 72 | 78 | 83 | 93 | 104 |
| | E | 1295 | 1439 | 1583 | 1727 | 1871 | 2015 | 2159 | 2303 | 2591 | 2879 |
| **14 x 20** | W | 18333 | 20370 | 22407 | 24444 | 26481 | 28518 | 30555 | 32592 | 36666 | 40741 |
| | w | 654 | 727 | 800 | 873 | 945 | 1018 | 1091 | 1164 | 1309 | 1455 |
| | $F_v$ | 52 | 58 | 63 | 69 | 75 | 81 | 87 | 92 | 104 | 116 |
| | E | 1163 | 1292 | 1421 | 1550 | 1679 | 1809 | 1938 | 2067 | 2326 | 2584 |
| **10 x 24** | W | 18737 | 20818 | 22900 | 24982 | 27064 | 29146 | 31228 | 33310 | 37474 | 41637 |
| | w | 669 | 743 | 817 | 892 | 966 | 1040 | 1115 | 1189 | 1338 | 1487 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 139 |
| | E | 965 | 1072 | 1179 | 1286 | 1394 | 1501 | 1608 | 1715 | 1930 | 2144 |
| **12 x 22** | W | 18985 | 21094 | 23204 | 25313 | 27423 | 29532 | 31642 | 33751 | 37970 | 42189 |
| | w | 678 | 753 | 828 | 904 | 979 | 1054 | 1130 | 1205 | 1356 | 1506 |
| | $F_v$ | 57 | 63 | 70 | 76 | 83 | 89 | 95 | 102 | 115 | 127 |
| | E | 1054 | 1172 | 1289 | 1406 | 1523 | 1640 | 1758 | 1875 | 2109 | 2344 |
| **18 x 18** | W | 19140 | 21267 | 23394 | 25520 | 27647 | 29774 | 31901 | 34027 | 38281 | 42534 |
| | w | 683 | 759 | 835 | 911 | 987 | 1063 | 1139 | 1215 | 1367 | 1519 |
| | $F_v$ | 46 | 52 | 57 | 62 | 67 | 72 | 78 | 83 | 93 | 104 |
| | E | 1295 | 1439 | 1583 | 1727 | 1871 | 2015 | 2159 | 2303 | 2591 | 2879 |
| **16 x 20** | W | 21049 | 23388 | 25727 | 28066 | 30404 | 32743 | 35082 | 37421 | 42099 | 46776 |
| | w | 751 | 835 | 918 | 1002 | 1085 | 1169 | 1252 | 1336 | 1503 | 1670 |
| | $F_v$ | 52 | 58 | 63 | 69 | 75 | 81 | 87 | 92 | 104 | 116 |
| | E | 1163 | 1292 | 1421 | 1550 | 1679 | 1809 | 1938 | 2067 | 2326 | 2584 |
| **14 x 22** | W | 22287 | 24763 | 27239 | 29716 | 32192 | 34668 | 37145 | 39621 | 44574 | 49526 |
| | w | 795 | 884 | 972 | 1061 | 1149 | 1238 | 1326 | 1415 | 1591 | 1768 |
| | $F_v$ | 57 | 63 | 70 | 76 | 83 | 89 | 95 | 102 | 115 | 127 |
| | E | 1054 | 1172 | 1289 | 1406 | 1523 | 1640 | 1758 | 1875 | 2109 | 2344 |
| **12 x 24** | W | 22681 | 25201 | 27722 | 30242 | 32762 | 35282 | 37802 | 40323 | 45363 | 50403 |
| | w | 810 | 900 | 990 | 1080 | 1170 | 1260 | 1350 | 1440 | 1620 | 1800 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 139 |
| | E | 965 | 1072 | 1179 | 1286 | 1394 | 1501 | 1608 | 1715 | 1930 | 2144 |
| **18 x 20** | W | 23765 | 26406 | 29046 | 31687 | 34328 | 36968 | 39609 | 42250 | 47531 | 52812 |
| | w | 848 | 943 | 1037 | 1131 | 1226 | 1320 | 1414 | 1508 | 1697 | 1886 |
| | $F_v$ | 52 | 58 | 63 | 69 | 75 | 81 | 87 | 92 | 104 | 116 |
| | E | 1163 | 1292 | 1421 | 1550 | 1679 | 1809 | 1938 | 2067 | 2326 | 2584 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for / 360 limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **28' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **16 x 22** | W | 25588 | 28432 | 31275 | 34118 | 36961 | 39804 | 42648 | 45491 | 51177 | 56864 |
| | w | 913 | 1015 | 1116 | 1218 | 1320 | 1421 | 1523 | 1624 | 1827 | 2030 |
| | $F_v$ | 57 | 63 | 70 | 76 | 83 | 89 | 95 | 102 | 115 | 127 |
| | E | 1054 | 1172 | 1289 | 1406 | 1523 | 1640 | 1758 | 1875 | 2109 | 2344 |
| **20 x 20** | W | 26481 | 29424 | 32366 | 35308 | 38251 | 41193 | 44136 | 47078 | 52963 | 58848 |
| | w | 945 | 1050 | 1155 | 1261 | 1366 | 1471 | 1576 | 1681 | 1891 | 2101 |
| | $F_v$ | 52 | 58 | 63 | 69 | 75 | 81 | 87 | 92 | 104 | 116 |
| | E | 1163 | 1292 | 1421 | 1550 | 1679 | 1809 | 1938 | 2067 | 2326 | 2584 |
| **14 x 24** | W | 26626 | 29584 | 32543 | 35501 | 38460 | 41418 | 44377 | 47335 | 53252 | 59169 |
| | w | 950 | 1056 | 1162 | 1267 | 1373 | 1479 | 1584 | 1690 | 1901 | 2113 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 139 |
| | E | 965 | 1072 | 1179 | 1286 | 1394 | 1501 | 1608 | 1715 | 1930 | 2144 |
| **18 x 22** | W | 28890 | 32100 | 35310 | 38520 | 41730 | 44940 | 48151 | 51361 | 57781 | 64201 |
| | w | 1031 | 1146 | 1261 | 1375 | 1490 | 1605 | 1719 | 1834 | 2063 | 2292 |
| | $F_v$ | 57 | 63 | 70 | 76 | 83 | 89 | 95 | 102 | 115 | 127 |
| | E | 1054 | 1172 | 1289 | 1406 | 1523 | 1640 | 1758 | 1875 | 2109 | 2344 |
| **16 x 24** | W | 30570 | 33967 | 37364 | 40761 | 44158 | 47554 | 50951 | 54348 | 61141 | 67935 |
| | w | 1091 | 1213 | 1334 | 1455 | 1577 | 1698 | 1819 | 1941 | 2183 | 2426 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 139 |
| | E | 965 | 1072 | 1179 | 1286 | 1394 | 1501 | 1608 | 1715 | 1930 | 2144 |
| **20 x 22** | W | 32192 | 35769 | 39346 | 42923 | 46500 | 50077 | 53654 | 57230 | 64384 | 71538 |
| | w | 1149 | 1277 | 1405 | 1532 | 1660 | 1788 | 1916 | 2043 | 2299 | 2554 |
| | $F_v$ | 57 | 63 | 70 | 76 | 83 | 89 | 95 | 102 | 115 | 127 |
| | E | 1054 | 1172 | 1289 | 1406 | 1523 | 1640 | 1758 | 1875 | 2109 | 2344 |
| **18 x 24** | W | 34515 | 38350 | 42185 | 46020 | 49855 | 53690 | 57526 | 61361 | 69031 | 76701 |
| | w | 1232 | 1369 | 1506 | 1643 | 1780 | 1917 | 2054 | 2191 | 2465 | 2739 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 139 |
| | E | 965 | 1072 | 1179 | 1286 | 1394 | 1501 | 1608 | 1715 | 1930 | 2144 |
| **22 x 22** | W | 35494 | 39437 | 43381 | 47325 | 51269 | 55213 | 59156 | 63100 | 70988 | 78875 |
| | w | 1267 | 1408 | 1549 | 1690 | 1831 | 1971 | 2112 | 2253 | 2535 | 2816 |
| | $F_v$ | 57 | 63 | 70 | 76 | 83 | 89 | 95 | 102 | 115 | 127 |
| | E | 1054 | 1172 | 1289 | 1406 | 1523 | 1640 | 1758 | 1875 | 2109 | 2344 |
| **20 x 24** | W | 38460 | 42733 | 47006 | 51280 | 55553 | 59827 | 64100 | 68373 | 76920 | 85467 |
| | w | 1373 | 1526 | 1678 | 1831 | 1984 | 2136 | 2289 | 2441 | 2747 | 3052 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 139 |
| | E | 965 | 1072 | 1179 | 1286 | 1394 | 1501 | 1608 | 1715 | 1930 | 2144 |
| **22 x 24** | W | 42404 | 47116 | 51828 | 56539 | 61251 | 65963 | 70674 | 75386 | 84809 | 94233 |
| | w | 1514 | 1682 | 1851 | 2019 | 2187 | 2355 | 2524 | 2692 | 3028 | 3365 |
| | $F_v$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 139 |
| | E | 965 | 1072 | 1179 | 1286 | 1394 | 1501 | 1608 | 1715 | 1930 | 2144 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **28' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **24 x 24** | W | 46349 | 51499 | 56649 | 61799 | 66949 | 72099 | 77249 | 82399 | 92699 | 102999 |
| | w | 1655 | 1839 | 2023 | 2207 | 2391 | 2574 | 2758 | 2942 | 3310 | 3678 |
| | $F_V$ | 62 | 69 | 76 | 83 | 90 | 97 | 104 | 111 | 125 | 139 |
| | E | 965 | 1072 | 1179 | 1286 | 1394 | 1501 | 1608 | 1715 | 1930 | 2144 |
| **29' - 0" SPAN** | | | | | | | | | | | |
| **3 x 12** | W | 1091 | 1212 | 1333 | 1454 | 1575 | 1697 | 1818 | 1939 | 2182 | 2424 |
| | w | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | $F_V$ | 29 | 32 | 35 | 38 | 42 | 45 | 48 | 51 | 58 | 64 |
| | E | 2087 | 2319 | 2551 | 2783 | 3015 | 3247 | 3479 | 3711 | 4175 | 4639 |
| **3 x 14** | W | 1513 | 1681 | 1849 | 2017 | 2186 | 2354 | 2522 | 2690 | 3026 | 3363 |
| | w | 52 | 57 | 63 | 69 | 75 | 81 | 86 | 92 | 104 | 115 |
| | $F_V$ | 34 | 38 | 41 | 45 | 49 | 53 | 57 | 60 | 68 | 76 |
| | E | 1772 | 1969 | 2166 | 2363 | 2560 | 2757 | 2954 | 3151 | 3545 | 3939 |
| **4 x 12** | W | 1527 | 1697 | 1866 | 2036 | 2206 | 2376 | 2545 | 2715 | 3054 | 3394 |
| | w | 52 | 58 | 64 | 70 | 76 | 81 | 87 | 93 | 105 | 117 |
| | $F_V$ | 29 | 32 | 35 | 38 | 42 | 45 | 48 | 51 | 58 | 64 |
| | E | 2087 | 2319 | 2551 | 2783 | 3015 | 3247 | 3479 | 3711 | 4175 | 4639 |
| **3 x 16** | W | 2004 | 2227 | 2450 | 2673 | 2895 | 3118 | 3341 | 3564 | 4009 | 4455 |
| | w | 69 | 76 | 84 | 92 | 99 | 107 | 115 | 122 | 138 | 153 |
| | $F_V$ | 39 | 43 | 48 | 52 | 56 | 61 | 65 | 70 | 78 | 87 |
| | E | 1540 | 1711 | 1882 | 2053 | 2224 | 2396 | 2567 | 2738 | 3080 | 3422 |
| **4 x 14** | W | 2199 | 2443 | 2688 | 2932 | 3177 | 3421 | 3665 | 3910 | 4399 | 4887 |
| | w | 75 | 84 | 92 | 101 | 109 | 117 | 126 | 134 | 151 | 168 |
| | $F_V$ | 34 | 38 | 42 | 46 | 50 | 54 | 58 | 62 | 69 | 77 |
| | E | 1739 | 1933 | 2126 | 2319 | 2513 | 2706 | 2899 | 3093 | 3479 | 3866 |
| **6 x 12** | W | 2508 | 2786 | 3065 | 3344 | 3622 | 3901 | 4180 | 4459 | 5016 | 5573 |
| | w | 86 | 96 | 105 | 115 | 124 | 134 | 144 | 153 | 172 | 192 |
| | $F_V$ | 29 | 33 | 36 | 39 | 42 | 46 | 49 | 52 | 59 | 66 |
| | E | 2042 | 2269 | 2496 | 2723 | 2950 | 3177 | 3404 | 3631 | 4085 | 4539 |
| **4 x 16** | W | 2899 | 3221 | 3543 | 3866 | 4188 | 4510 | 4832 | 5154 | 5799 | 6443 |
| | w | 99 | 111 | 122 | 133 | 144 | 155 | 166 | 177 | 199 | 222 |
| | $F_V$ | 40 | 44 | 48 | 53 | 57 | 62 | 66 | 71 | 80 | 89 |
| | E | 1515 | 1683 | 1852 | 2020 | 2189 | 2357 | 2525 | 2694 | 3030 | 3367 |
| **8 x 12** | W | 3420 | 3800 | 4180 | 4560 | 4940 | 5320 | 5700 | 6080 | 6840 | 7600 |
| | w | 117 | 131 | 144 | 157 | 170 | 183 | 196 | 209 | 235 | 262 |
| | $F_V$ | 29 | 33 | 36 | 39 | 42 | 46 | 49 | 52 | 59 | 66 |
| | E | 2042 | 2269 | 2496 | 2723 | 2950 | 3177 | 3404 | 3631 | 4085 | 4539 |
| **6 x 14** | W | 3456 | 3840 | 4224 | 4608 | 4992 | 5376 | 5760 | 6144 | 6912 | 7681 |
| | w | 119 | 132 | 145 | 158 | 172 | 185 | 198 | 211 | 238 | 264 |
| | $F_V$ | 34 | 38 | 42 | 46 | 50 | 54 | 58 | 62 | 69 | 77 |
| | E | 1739 | 1933 | 2126 | 2319 | 2513 | 2706 | 2899 | 3093 | 3479 | 3866 |
| **10 x 12** | W | 4332 | 4813 | 5295 | 5776 | 6257 | 6739 | 7220 | 7701 | 8664 | 9627 |
| | w | 149 | 165 | 182 | 199 | 215 | 232 | 248 | 265 | 298 | 331 |
| | $F_V$ | 29 | 33 | 36 | 39 | 42 | 46 | 49 | 52 | 59 | 66 |
| | E | 2042 | 2269 | 2496 | 2723 | 2950 | 3177 | 3404 | 3631 | 4085 | 4539 |
| **6 x 16** | W | 4556 | 5062 | 5569 | 6075 | 6581 | 7087 | 7594 | 8100 | 9112 | 10125 |
| | w | 157 | 174 | 192 | 209 | 226 | 244 | 261 | 279 | 314 | 349 |
| | $F_V$ | 40 | 44 | 48 | 53 | 57 | 62 | 66 | 71 | 80 | 89 |
| | E | 1515 | 1683 | 1852 | 2020 | 2189 | 2357 | 2525 | 2694 | 3030 | 3367 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **29' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **8 x 14** | W | 4713 | 5237 | 5760 | 6284 | 6808 | 7331 | 7855 | 8379 | 9426 | 10474 |
| | w | 162 | 180 | 198 | 216 | 234 | 252 | 270 | 288 | 325 | 361 |
| | $F_v$ | 34 | 38 | 42 | 46 | 50 | 54 | 58 | 62 | 69 | 77 |
| | E | 1739 | 1933 | 2126 | 2319 | 2513 | 2706 | 2899 | 3093 | 3479 | 3866 |
| **12 x 12** | W | 5244 | 5827 | 6409 | 6992 | 7575 | 8157 | 8740 | 9323 | 10488 | 11654 |
| | w | 180 | 200 | 221 | 241 | 261 | 281 | 301 | 321 | 361 | 401 |
| | $F_v$ | 29 | 33 | 36 | 39 | 42 | 46 | 49 | 52 | 59 | 66 |
| | E | 2042 | 2269 | 2496 | 2723 | 2950 | 3177 | 3404 | 3631 | 4085 | 4539 |
| **6 x 18** | W | 5808 | 6453 | 7098 | 7744 | 8389 | 9034 | 9680 | 10325 | 11616 | 12907 |
| | w | 200 | 222 | 244 | 267 | 289 | 311 | 333 | 356 | 400 | 445 |
| | $F_v$ | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | E | 1342 | 1491 | 1640 | 1789 | 1938 | 2087 | 2237 | 2386 | 2684 | 2982 |
| **10 x 14** | W | 5970 | 6633 | 7296 | 7960 | 8623 | 9287 | 9950 | 10613 | 11940 | 13267 |
| | w | 205 | 228 | 251 | 274 | 297 | 320 | 343 | 365 | 411 | 457 |
| | $F_v$ | 34 | 38 | 42 | 46 | 50 | 54 | 58 | 62 | 69 | 77 |
| | E | 1739 | 1933 | 2126 | 2319 | 2513 | 2706 | 2899 | 3093 | 3479 | 3866 |
| **8 x 16** | W | 6213 | 6903 | 7594 | 8284 | 8974 | 9665 | 10355 | 11045 | 12426 | 13807 |
| | w | 214 | 238 | 261 | 285 | 309 | 333 | 357 | 380 | 428 | 476 |
| | $F_v$ | 40 | 44 | 48 | 53 | 57 | 62 | 66 | 71 | 80 | 89 |
| | E | 1515 | 1683 | 1852 | 2020 | 2189 | 2357 | 2525 | 2694 | 3030 | 3367 |
| **6 x 20** | W | 7211 | 8012 | 8814 | 9615 | 10416 | 11218 | 12019 | 12820 | 14423 | 16025 |
| | w | 248 | 276 | 303 | 331 | 359 | 386 | 414 | 442 | 497 | 552 |
| | $F_v$ | 50 | 56 | 61 | 67 | 72 | 78 | 84 | 89 | 100 | 112 |
| | E | 1204 | 1338 | 1472 | 1606 | 1739 | 1873 | 2007 | 2141 | 2409 | 2676 |
| **12 x 14** | W | 7227 | 8030 | 8833 | 9636 | 10439 | 11242 | 12045 | 12848 | 14454 | 16060 |
| | w | 249 | 276 | 304 | 332 | 359 | 387 | 415 | 443 | 498 | 553 |
| | $F_v$ | 34 | 38 | 42 | 46 | 50 | 54 | 58 | 62 | 69 | 77 |
| | E | 1739 | 1933 | 2126 | 2319 | 2513 | 2706 | 2899 | 3093 | 3479 | 3866 |
| **10 x 16** | W | 7870 | 8744 | 9619 | 10493 | 11368 | 12242 | 13117 | 13991 | 15740 | 17489 |
| | w | 271 | 301 | 331 | 361 | 392 | 422 | 452 | 482 | 542 | 603 |
| | $F_v$ | 40 | 44 | 48 | 53 | 57 | 62 | 66 | 71 | 80 | 89 |
| | E | 1515 | 1683 | 1852 | 2020 | 2189 | 2357 | 2525 | 2694 | 3030 | 3367 |
| **8 x 18** | W | 7920 | 8800 | 9680 | 10560 | 11440 | 12320 | 13200 | 14080 | 15840 | 17600 |
| | w | 273 | 303 | 333 | 364 | 394 | 424 | 455 | 485 | 546 | 606 |
| | $F_v$ | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | E | 1342 | 1491 | 1640 | 1789 | 1938 | 2087 | 2237 | 2386 | 2684 | 2982 |
| **14 x 14** | W | 8484 | 9426 | 10369 | 11312 | 12254 | 13197 | 14140 | 15082 | 16968 | 18853 |
| | w | 292 | 325 | 357 | 390 | 422 | 455 | 487 | 520 | 585 | 650 |
| | $F_v$ | 34 | 38 | 42 | 46 | 50 | 54 | 58 | 62 | 69 | 77 |
| | E | 1739 | 1933 | 2126 | 2319 | 2513 | 2706 | 2899 | 3093 | 3479 | 3866 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **29' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **6 x 22** | W | 8766 | 9740 | 10714 | 11689 | 12663 | 13637 | 14611 | 15585 | 17533 | 19481 |
| | w | 302 | 335 | 369 | 403 | 436 | 470 | 503 | 537 | 604 | 671 |
| | $F_v$ | 55 | 61 | 67 | 74 | 80 | 86 | 92 | 98 | 111 | 123 |
| | E | 1092 | 1213 | 1335 | 1456 | 1578 | 1699 | 1820 | 1942 | 2185 | 2427 |
| **12 x 16** | W | 9527 | 10585 | 11644 | 12702 | 13761 | 14820 | 15878 | 16937 | 19054 | 21171 |
| | w | 328 | 365 | 401 | 438 | 474 | 511 | 547 | 584 | 657 | 730 |
| | $F_v$ | 40 | 44 | 48 | 53 | 57 | 62 | 66 | 71 | 80 | 89 |
| | E | 1515 | 1683 | 1852 | 2020 | 2189 | 2357 | 2525 | 2694 | 3030 | 3367 |
| **8 x 20** | W | 9834 | 10926 | 12019 | 13112 | 14204 | 15297 | 16390 | 17482 | 19668 | 21853 |
| | w | 339 | 376 | 414 | 452 | 489 | 527 | 565 | 602 | 678 | 753 |
| | $F_v$ | 50 | 56 | 61 | 67 | 72 | 78 | 84 | 89 | 100 | 112 |
| | E | 1204 | 1338 | 1472 | 1606 | 1739 | 1873 | 2007 | 2141 | 2409 | 2676 |
| **10 x 18** | W | 10032 | 11147 | 12261 | 13376 | 14491 | 15605 | 16720 | 17835 | 20064 | 22294 |
| | w | 345 | 384 | 422 | 461 | 499 | 538 | 576 | 615 | 691 | 768 |
| | $F_v$ | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | E | 1342 | 1491 | 1640 | 1789 | 1938 | 2088 | 2237 | 2386 | 2684 | 2982 |
| **6 x 24** | W | 10473 | 11637 | 12801 | 13964 | 15128 | 16292 | 17456 | 18619 | 20947 | 23274 |
| | w | 361 | 401 | 441 | 481 | 521 | 561 | 601 | 642 | 722 | 802 |
| | $F_v$ | 60 | 67 | 74 | 81 | 87 | 94 | 101 | 108 | 121 | 135 |
| | E | 999 | 1110 | 1221 | 1332 | 1443 | 1554 | 1665 | 1777 | 1999 | 2221 |
| **14 x 16** | W | 11184 | 12426 | 13669 | 14912 | 16154 | 17397 | 18640 | 19882 | 22368 | 24853 |
| | w | 385 | 428 | 471 | 514 | 557 | 599 | 642 | 685 | 771 | 857 |
| | $F_v$ | 40 | 44 | 48 | 53 | 57 | 62 | 66 | 71 | 80 | 89 |
| | E | 1515 | 1683 | 1852 | 2020 | 2189 | 2357 | 2525 | 2694 | 3030 | 3367 |
| **8 x 22** | W | 11954 | 13283 | 14611 | 15939 | 17267 | 18596 | 19924 | 21252 | 23909 | 26566 |
| | w | 412 | 458 | 503 | 549 | 595 | 641 | 687 | 732 | 824 | 916 |
| | $F_v$ | 55 | 61 | 67 | 74 | 80 | 86 | 92 | 98 | 111 | 123 |
| | E | 1092 | 1213 | 1335 | 1456 | 1578 | 1699 | 1820 | 1942 | 2185 | 2427 |
| **12 x 18** | W | 12144 | 13493 | 14843 | 16192 | 17541 | 18891 | 20240 | 21590 | 24288 | 26987 |
| | w | 418 | 465 | 511 | 558 | 604 | 651 | 697 | 744 | 837 | 930 |
| | $F_v$ | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | E | 1342 | 1491 | 1640 | 1789 | 1938 | 2087 | 2237 | 2386 | 2684 | 2982 |
| **10 x 20** | W | 12456 | 13840 | 15224 | 16608 | 17992 | 19376 | 20760 | 22144 | 24912 | 27681 |
| | w | 429 | 477 | 524 | 572 | 620 | 668 | 715 | 763 | 859 | 954 |
| | $F_v$ | 50 | 56 | 61 | 67 | 72 | 78 | 84 | 89 | 100 | 112 |
| | E | 1204 | 1338 | 1472 | 1606 | 1739 | 1873 | 2007 | 2141 | 2409 | 2676 |
| **16 x 16** | W | 12840 | 14267 | 15694 | 17121 | 18548 | 19974 | 21401 | 22828 | 25681 | 28535 |
| | w | 442 | 491 | 541 | 590 | 639 | 688 | 737 | 787 | 885 | 983 |
| | $F_v$ | 40 | 44 | 48 | 53 | 57 | 62 | 66 | 71 | 80 | 89 |
| | E | 1515 | 1683 | 1852 | 2020 | 2189 | 2357 | 2525 | 2694 | 3030 | 3367 |
| **14 x 18** | W | 14256 | 15840 | 17424 | 19008 | 20592 | 22176 | 23760 | 25344 | 28512 | 31681 |
| | w | 491 | 546 | 600 | 655 | 710 | 764 | 819 | 873 | 983 | 1092 |
| | $F_v$ | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | E | 1342 | 1491 | 1640 | 1789 | 1938 | 2087 | 2237 | 2386 | 2684 | 2982 |
| **8 x 24** | W | 14282 | 15869 | 17456 | 19043 | 20630 | 22216 | 23803 | 25390 | 28564 | 31738 |
| | w | 492 | 547 | 601 | 656 | 711 | 766 | 820 | 875 | 984 | 1094 |
| | $F_v$ | 60 | 67 | 74 | 81 | 87 | 94 | 101 | 108 | 121 | 135 |
| | E | 999 | 1110 | 1221 | 1332 | 1443 | 1554 | 1665 | 1777 | 1999 | 2221 |
| **12 x 20** | W | 15078 | 16754 | 18429 | 20105 | 21780 | 23456 | 25131 | 26806 | 30157 | 33508 |
| | w | 519 | 577 | 635 | 693 | 751 | 808 | 866 | 924 | 1039 | 1155 |
| | $F_v$ | 50 | 56 | 61 | 67 | 72 | 78 | 84 | 89 | 100 | 112 |
| | E | 1204 | 1338 | 1472 | 1606 | 1739 | 1873 | 2007 | 2141 | 2409 | 2676 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **29' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **10 x 22** | W | 15142 | 16825 | 18507 | 20190 | 21872 | 23555 | 25237 | 26920 | 30285 | 33650 |
| | w | 522 | 580 | 638 | 696 | 754 | 812 | 870 | 928 | 1044 | 1160 |
| | $F_v$ | 55 | 61 | 67 | 74 | 80 | 86 | 92 | 98 | 111 | 123 |
| | E | 1092 | 1213 | 1335 | 1456 | 1578 | 1699 | 1820 | 1942 | 2185 | 2427 |
| **16 x 18** | W | 16368 | 18187 | 20005 | 21824 | 23643 | 25462 | 27280 | 29099 | 32737 | 36374 |
| | w | 564 | 627 | 689 | 752 | 815 | 878 | 940 | 1003 | 1128 | 1254 |
| | $F_v$ | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | E | 1342 | 1491 | 1640 | 1789 | 1938 | 2087 | 2237 | 2386 | 2684 | 2982 |
| **14 x 20** | W | 17701 | 19668 | 21634 | 23601 | 25568 | 27535 | 29502 | 31468 | 35402 | 39336 |
| | w | 610 | 678 | 746 | 813 | 881 | 949 | 1017 | 1085 | 1220 | 1356 |
| | $F_v$ | 50 | 56 | 61 | 67 | 72 | 78 | 84 | 89 | 100 | 112 |
| | E | 1204 | 1338 | 1472 | 1606 | 1739 | 1873 | 2007 | 2141 | 2409 | 2676 |
| **10 x 24** | W | 18090 | 20101 | 22111 | 24121 | 26131 | 28141 | 30151 | 32161 | 36181 | 40202 |
| | w | 623 | 693 | 762 | 831 | 901 | 970 | 1039 | 1109 | 1247 | 1386 |
| | $F_v$ | 60 | 67 | 74 | 81 | 87 | 94 | 101 | 108 | 121 | 135 |
| | E | 999 | 1110 | 1221 | 1332 | 1443 | 1554 | 1665 | 1777 | 1999 | 2221 |
| **12 x 22** | W | 18330 | 20367 | 22404 | 24440 | 26477 | 28514 | 30550 | 32587 | 36661 | 40734 |
| | w | 632 | 702 | 772 | 842 | 913 | 983 | 1053 | 1123 | 1264 | 1404 |
| | $F_v$ | 55 | 61 | 67 | 74 | 80 | 86 | 92 | 98 | 111 | 123 |
| | E | 1092 | 1213 | 1335 | 1456 | 1578 | 1699 | 1820 | 1942 | 2185 | 2427 |
| **18 x 18** | W | 18480 | 20534 | 22587 | 24640 | 26694 | 28747 | 30800 | 32854 | 36961 | 41068 |
| | w | 637 | 708 | 778 | 849 | 920 | 991 | 1062 | 1132 | 1274 | 1416 |
| | $F_v$ | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 90 | 100 |
| | E | 1342 | 1491 | 1640 | 1789 | 1938 | 2087 | 2237 | 2386 | 2684 | 2982 |
| **16 x 20** | W | 20323 | 22581 | 24840 | 27098 | 29356 | 31614 | 33872 | 36131 | 40647 | 45163 |
| | w | 700 | 778 | 856 | 934 | 1012 | 1090 | 1168 | 1245 | 1401 | 1557 |
| | $F_v$ | 50 | 56 | 61 | 67 | 72 | 78 | 84 | 89 | 100 | 112 |
| | E | 1204 | 1338 | 1472 | 1606 | 1739 | 1873 | 2007 | 2141 | 2409 | 2676 |
| **14 x 22** | W | 21518 | 23909 | 26300 | 28691 | 31082 | 33473 | 35864 | 38255 | 43037 | 47818 |
| | w | 742 | 824 | 906 | 989 | 1071 | 1154 | 1236 | 1319 | 1484 | 1648 |
| | $F_v$ | 55 | 61 | 67 | 74 | 80 | 86 | 92 | 98 | 111 | 123 |
| | E | 1092 | 1213 | 1335 | 1456 | 1578 | 1699 | 1820 | 1942 | 2185 | 2427 |
| **12 x 24** | W | 21899 | 24332 | 26766 | 29199 | 31632 | 34065 | 36499 | 38932 | 43799 | 48665 |
| | w | 755 | 839 | 922 | 1006 | 1090 | 1174 | 1258 | 1342 | 1510 | 1678 |
| | $F_v$ | 60 | 67 | 74 | 81 | 87 | 94 | 101 | 108 | 121 | 135 |
| | E | 999 | 1110 | 1221 | 1332 | 1443 | 1554 | 1665 | 1777 | 1999 | 2221 |
| **18 x 20** | W | 22946 | 25495 | 28045 | 30594 | 33144 | 35693 | 38243 | 40793 | 45892 | 50991 |
| | w | 791 | 879 | 967 | 1054 | 1142 | 1230 | 1318 | 1406 | 1582 | 1758 |
| | $F_v$ | 50 | 56 | 61 | 67 | 72 | 78 | 84 | 89 | 100 | 112 |
| | E | 1204 | 1338 | 1472 | 1606 | 1739 | 1873 | 2007 | 2141 | 2409 | 2676 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **29' - 0" SPAN** CONT'D | | | | | | | | | | | |
| 16 x 22 | W | 24706 | 27451 | 30196 | 32941 | 35687 | 38432 | 41177 | 43922 | 49412 | 54903 |
| | w | 851 | 946 | 1041 | 1135 | 1230 | 1325 | 1419 | 1514 | 1703 | 1893 |
| | $F_v$ | 55 | 61 | 67 | 74 | 80 | 86 | 92 | 98 | 111 | 123 |
| | E | 1092 | 1213 | 1335 | 1456 | 1578 | 1699 | 1820 | 1942 | 2185 | 2427 |
| 20 x 20 | W | 25568 | 28409 | 31250 | 34091 | 36932 | 39773 | 42614 | 45455 | 51137 | 56818 |
| | w | 881 | 979 | 1077 | 1175 | 1273 | 1371 | 1469 | 1567 | 1763 | 1959 |
| | $F_v$ | 50 | 56 | 61 | 67 | 72 | 78 | 84 | 89 | 100 | 112 |
| | E | 1204 | 1338 | 1472 | 1606 | 1739 | 1873 | 2007 | 2141 | 2409 | 2676 |
| 14 x 24 | W | 25708 | 28564 | 31421 | 34277 | 37134 | 39990 | 42846 | 45703 | 51416 | 57129 |
| | w | 886 | 984 | 1083 | 1181 | 1280 | 1378 | 1477 | 1575 | 1772 | 1969 |
| | $F_v$ | 60 | 67 | 74 | 81 | 87 | 94 | 101 | 108 | 121 | 135 |
| | E | 999 | 1110 | 1221 | 1332 | 1443 | 1554 | 1665 | 1777 | 1999 | 2221 |
| 18 x 22 | W | 27894 | 30993 | 34093 | 37192 | 40291 | 43391 | 46490 | 49590 | 55788 | 61987 |
| | w | 961 | 1068 | 1175 | 1282 | 1389 | 1496 | 1603 | 1710 | 1923 | 2137 |
| | $F_v$ | 55 | 61 | 67 | 74 | 80 | 86 | 92 | 98 | 111 | 123 |
| | E | 1092 | 1213 | 1335 | 1456 | 1578 | 1699 | 1820 | 1942 | 2185 | 2427 |
| 16 x 24 | W | 29516 | 32796 | 36076 | 39355 | 42635 | 45915 | 49194 | 52474 | 59033 | 65592 |
| | w | 1017 | 1130 | 1244 | 1357 | 1470 | 1583 | 1696 | 1809 | 2035 | 2261 |
| | $F_v$ | 60 | 67 | 74 | 81 | 87 | 94 | 101 | 108 | 121 | 135 |
| | E | 999 | 1110 | 1221 | 1332 | 1443 | 1554 | 1665 | 1777 | 1999 | 2221 |
| 20 x 22 | W | 31082 | 34535 | 37989 | 41443 | 44896 | 48350 | 51803 | 55257 | 62164 | 69071 |
| | w | 1071 | 1190 | 1309 | 1429 | 1548 | 1667 | 1786 | 1905 | 2143 | 2381 |
| | $F_v$ | 55 | 61 | 67 | 74 | 80 | 86 | 92 | 98 | 111 | 123 |
| | E | 1092 | 1213 | 1335 | 1456 | 1578 | 1699 | 1820 | 1942 | 2185 | 2427 |
| 18 x 24 | W | 33325 | 37028 | 40731 | 44433 | 48136 | 51839 | 55542 | 59245 | 66650 | 74056 |
| | w | 1149 | 1276 | 1404 | 1532 | 1659 | 1787 | 1915 | 2042 | 2298 | 2553 |
| | $F_v$ | 60 | 67 | 74 | 81 | 87 | 94 | 101 | 108 | 121 | 135 |
| | E | 999 | 1110 | 1221 | 1332 | 1443 | 1554 | 1665 | 1777 | 1999 | 2221 |
| 22 x 22 | W | 34270 | 38078 | 41885 | 45693 | 49501 | 53309 | 57117 | 60924 | 68540 | 76156 |
| | w | 1181 | 1313 | 1444 | 1575 | 1706 | 1838 | 1969 | 2100 | 2363 | 2626 |
| | $F_v$ | 55 | 61 | 67 | 74 | 80 | 86 | 92 | 98 | 111 | 123 |
| | E | 1092 | 1213 | 1335 | 1456 | 1578 | 1699 | 1820 | 1942 | 2185 | 2427 |
| 20 x 24 | W | 37134 | 41260 | 45386 | 49512 | 53638 | 57764 | 61890 | 66016 | 74268 | 82520 |
| | w | 1280 | 1422 | 1565 | 1707 | 1849 | 1991 | 2134 | 2276 | 2560 | 2845 |
| | $F_v$ | 60 | 67 | 74 | 81 | 87 | 94 | 101 | 108 | 121 | 135 |
| | E | 999 | 1110 | 1221 | 1332 | 1443 | 1554 | 1665 | 1777 | 1999 | 2221 |
| 22 x 24 | W | 40942 | 45491 | 50041 | 54590 | 59139 | 63688 | 68237 | 72786 | 81885 | 90983 |
| | w | 1411 | 1568 | 1725 | 1882 | 2039 | 2196 | 2353 | 2509 | 2823 | 3137 |
| | $F_v$ | 60 | 67 | 74 | 81 | 87 | 94 | 101 | 108 | 121 | 135 |
| | E | 999 | 1110 | 1221 | 1332 | 1443 | 1554 | 1665 | 1777 | 1999 | 2221 |
| 24 x 24 | W | 44751 | 49723 | 54696 | 59668 | 64640 | 69613 | 74585 | 79557 | 89502 | 99447 |
| | w | 1543 | 1714 | 1886 | 2057 | 2228 | 2400 | 2571 | 2743 | 3086 | 3429 |
| | $F_v$ | 60 | 67 | 74 | 81 | 87 | 94 | 101 | 108 | 121 | 135 |
| | E | 999 | 1110 | 1221 | 1332 | 1443 | 1554 | 1665 | 1777 | 1999 | 2221 |
| **30' - 0" SPAN** | | | | | | | | | | | |
| 3 x 14 | W | 1463 | 1625 | 1788 | 1950 | 2113 | 2275 | 2438 | 2600 | 2926 | 3251 |
| | w | 48 | 54 | 59 | 65 | 70 | 75 | 81 | 86 | 97 | 108 |
| | $F_v$ | 33 | 36 | 40 | 44 | 47 | 51 | 55 | 58 | 66 | 73 |
| | E | 1833 | 2037 | 2241 | 2445 | 2649 | 2852 | 3056 | 3260 | 3667 | 4075 |

## WOOD BEAMS–SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **30'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **4 x 12** | W | 1476 | 1640 | 1804 | 1968 | 2132 | 2296 | 2460 | 2625 | 2953 | 3281 |
| | w | 49 | 54 | 60 | 65 | 71 | 76 | 82 | 87 | 98 | 109 |
| | $F_v$ | 28 | 31 | 34 | 37 | 40 | 43 | 46 | 50 | 56 | 62 |
| | E | 2159 | 2399 | 2639 | 2879 | 3119 | 3359 | 3599 | 3839 | 4319 | 4799 |
| **3 x 16** | W | 1938 | 2153 | 2368 | 2584 | 2799 | 3014 | 3230 | 3445 | 3876 | 4306 |
| | w | 64 | 71 | 78 | 86 | 93 | 100 | 107 | 114 | 129 | 143 |
| | $F_v$ | 38 | 42 | 46 | 50 | 55 | 59 | 63 | 67 | 76 | 84 |
| | E | 1593 | 1770 | 1947 | 2124 | 2301 | 2478 | 2655 | 2832 | 3186 | 3540 |
| **4 x 14** | W | 2126 | 2362 | 2598 | 2835 | 3071 | 3307 | 3543 | 3780 | 4252 | 4725 |
| | w | 70 | 78 | 86 | 94 | 102 | 110 | 118 | 126 | 141 | 157 |
| | $F_v$ | 33 | 37 | 41 | 45 | 48 | 52 | 56 | 60 | 67 | 75 |
| | E | 1799 | 1999 | 2199 | 2399 | 2599 | 2799 | 2999 | 3199 | 3599 | 3999 |
| **6 x 12** | W | 2424 | 2693 | 2963 | 3232 | 3502 | 3771 | 4040 | 4310 | 4849 | 5387 |
| | w | 80 | 89 | 98 | 107 | 116 | 125 | 134 | 143 | 161 | 179 |
| | $F_v$ | 28 | 31 | 35 | 38 | 41 | 44 | 47 | 51 | 57 | 63 |
| | E | 2113 | 2347 | 2582 | 2817 | 3052 | 3286 | 3521 | 3756 | 4226 | 4695 |
| **4 x 16** | W | 2802 | 3114 | 3425 | 3737 | 4048 | 4360 | 4671 | 4982 | 5605 | 6228 |
| | w | 93 | 103 | 114 | 124 | 134 | 145 | 155 | 166 | 186 | 207 |
| | $F_v$ | 38 | 43 | 47 | 51 | 55 | 60 | 64 | 68 | 77 | 86 |
| | E | 1567 | 1741 | 1916 | 2090 | 2264 | 2438 | 2612 | 2787 | 3135 | 3483 |
| **8 x 12** | W | 3306 | 3673 | 4040 | 4408 | 4775 | 5143 | 5510 | 5877 | 6612 | 7347 |
| | w | 110 | 122 | 134 | 146 | 159 | 171 | 183 | 195 | 220 | 244 |
| | $F_v$ | 28 | 31 | 35 | 38 | 41 | 44 | 47 | 51 | 57 | 63 |
| | E | 2113 | 2347 | 2582 | 2817 | 3052 | 3286 | 3521 | 3756 | 4226 | 4695 |
| **6 x 14** | W | 3341 | 3712 | 4083 | 4455 | 4826 | 5197 | 5568 | 5940 | 6682 | 7425 |
| | w | 111 | 123 | 136 | 148 | 160 | 173 | 185 | 198 | 222 | 247 |
| | $F_v$ | 33 | 37 | 41 | 45 | 48 | 52 | 56 | 60 | 67 | 75 |
| | E | 1799 | 1999 | 2199 | 2399 | 2599 | 2799 | 2999 | 3199 | 3599 | 3999 |
| **10 x 12** | W | 4187 | 4653 | 5118 | 5583 | 6049 | 6514 | 6979 | 7445 | 8375 | 9306 |
| | w | 139 | 155 | 170 | 186 | 201 | 217 | 232 | 248 | 279 | 310 |
| | $F_v$ | 28 | 31 | 35 | 38 | 41 | 44 | 47 | 51 | 57 | 63 |
| | E | 2113 | 2347 | 2582 | 2817 | 3052 | 3286 | 3521 | 3756 | 4226 | 4695 |
| **6 x 16** | W | 4404 | 4893 | 5383 | 5872 | 6362 | 6851 | 7340 | 7830 | 8809 | 9787 |
| | w | 146 | 163 | 179 | 195 | 212 | 228 | 244 | 261 | 293 | 326 |
| | $F_v$ | 38 | 43 | 47 | 51 | 55 | 60 | 64 | 68 | 77 | 86 |
| | E | 1567 | 1741 | 1916 | 2090 | 2264 | 2438 | 2612 | 2787 | 3135 | 3483 |
| **8 x 14** | W | 4556 | 5062 | 5568 | 6075 | 6581 | 7087 | 7593 | 8100 | 9112 | 10125 |
| | w | 151 | 168 | 185 | 202 | 219 | 236 | 253 | 270 | 303 | 337 |
| | $F_v$ | 33 | 37 | 41 | 45 | 48 | 52 | 56 | 60 | 67 | 75 |
| | E | 1799 | 1999 | 2199 | 2399 | 2599 | 2799 | 2999 | 3199 | 3599 | 3999 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **30' - 0" SPAN** CONT'D | | | | | | | | | | | |
| **12 x 12** | W | 5069 | 5632 | 6196 | 6759 | 7322 | 7886 | 8449 | 9012 | 10139 | 11265 |
| | w | 168 | 187 | 206 | 225 | 244 | 262 | 281 | 300 | 337 | 375 |
| | $F_v$ | 28 | 31 | 35 | 38 | 41 | 44 | 47 | 51 | 57 | 63 |
| | E | 2113 | 2347 | 2582 | 2817 | 3052 | 3286 | 3521 | 3756 | 4226 | 4695 |
| **6 x 18** | W | 5614 | 6238 | 6862 | 7486 | 8109 | 8733 | 9357 | 9981 | 11229 | 12476 |
| | w | 187 | 207 | 228 | 249 | 270 | 291 | 311 | 332 | 374 | 415 |
| | $F_v$ | 43 | 48 | 53 | 58 | 63 | 68 | 72 | 77 | 87 | 97 |
| | E | 1388 | 1542 | 1697 | 1851 | 2005 | 2159 | 2314 | 2468 | 2777 | 3085 |
| **10 x 14** | W | 5771 | 6412 | 7053 | 7695 | 8336 | 8977 | 9618 | 10260 | 11542 | 12825 |
| | w | 192 | 213 | 235 | 256 | 277 | 299 | 320 | 342 | 384 | 427 |
| | $F_v$ | 33 | 37 | 41 | 45 | 48 | 52 | 56 | 60 | 67 | 75 |
| | E | 1799 | 1999 | 2199 | 2399 | 2599 | 2799 | 2999 | 3199 | 3599 | 3999 |
| **8 x 16** | W | 6006 | 6673 | 7340 | 8008 | 8675 | 9343 | 10010 | 10677 | 12012 | 13347 |
| | w | 200 | 222 | 244 | 266 | 289 | 311 | 333 | 355 | 400 | 444 |
| | $F_v$ | 38 | 43 | 47 | 51 | 55 | 60 | 64 | 68 | 77 | 86 |
| | E | 1567 | 1741 | 1916 | 2090 | 2264 | 2438 | 2612 | 2787 | 3135 | 3483 |
| **6 x 20** | W | 6971 | 7745 | 8520 | 9295 | 10069 | 10844 | 11618 | 12393 | 13942 | 15491 |
| | w | 232 | 258 | 284 | 309 | 335 | 361 | 387 | 413 | 464 | 516 |
| | $F_v$ | 48 | 54 | 59 | 65 | 70 | 75 | 81 | 86 | 97 | 108 |
| | E | 1246 | 1384 | 1523 | 1661 | 1799 | 1938 | 2076 | 2215 | 2492 | 2769 |
| **12 x 14** | W | 6986 | 7762 | 8538 | 9315 | 10091 | 10867 | 11643 | 12420 | 13972 | 15525 |
| | w | 232 | 258 | 284 | 310 | 336 | 362 | 388 | 414 | 465 | 517 |
| | $F_v$ | 33 | 37 | 41 | 45 | 48 | 52 | 56 | 60 | 67 | 75 |
| | E | 1799 | 1999 | 2199 | 2399 | 2599 | 2799 | 2999 | 3199 | 3599 | 3999 |
| **10 x 16** | W | 7607 | 8453 | 9298 | 10143 | 10989 | 11834 | 12679 | 13525 | 15215 | 16906 |
| | w | 253 | 281 | 309 | 338 | 366 | 394 | 422 | 450 | 507 | 563 |
| | $F_v$ | 38 | 43 | 47 | 51 | 55 | 60 | 64 | 68 | 77 | 86 |
| | E | 1567 | 1741 | 1916 | 2090 | 2264 | 2438 | 2612 | 2787 | 3135 | 3483 |
| **8 x 18** | W | 7656 | 8506 | 9357 | 10208 | 11059 | 11909 | 12760 | 13611 | 15312 | 17013 |
| | w | 255 | 283 | 311 | 340 | 368 | 396 | 425 | 453 | 510 | 567 |
| | $F_v$ | 43 | 48 | 53 | 58 | 63 | 68 | 72 | 77 | 87 | 97 |
| | E | 1388 | 1542 | 1697 | 1851 | 2005 | 2159 | 2314 | 2468 | 2777 | 3085 |
| **14 x 14** | W | 8201 | 9112 | 10023 | 10935 | 11846 | 12757 | 13668 | 14580 | 16402 | 18225 |
| | w | 273 | 303 | 334 | 364 | 394 | 425 | 455 | 486 | 546 | 607 |
| | $F_v$ | 33 | 37 | 41 | 45 | 48 | 52 | 56 | 60 | 67 | 75 |
| | E | 1799 | 1999 | 2199 | 2399 | 2599 | 2799 | 2999 | 3199 | 3599 | 3999 |
| **6 x 22** | W | 8474 | 9416 | 10357 | 11299 | 12241 | 13182 | 14124 | 15065 | 16949 | 18832 |
| | w | 282 | 313 | 345 | 376 | 408 | 439 | 470 | 502 | 564 | 627 |
| | $F_v$ | 53 | 59 | 65 | 71 | 77 | 83 | 89 | 95 | 107 | 119 |
| | E | 1130 | 1255 | 1381 | 1506 | 1632 | 1758 | 1883 | 2009 | 2260 | 2511 |
| **12 x 16** | W | 9209 | 10232 | 11256 | 12279 | 13302 | 14326 | 15349 | 16372 | 18419 | 20465 |
| | w | 306 | 341 | 375 | 409 | 443 | 477 | 511 | 545 | 613 | 682 |
| | $F_v$ | 38 | 43 | 47 | 51 | 55 | 60 | 64 | 68 | 77 | 86 |
| | E | 1567 | 1741 | 1916 | 2090 | 2264 | 2438 | 2612 | 2787 | 3135 | 3483 |
| **8 x 20** | W | 9506 | 10562 | 11618 | 12675 | 13731 | 14787 | 15843 | 16900 | 19012 | 21125 |
| | w | 316 | 352 | 387 | 422 | 457 | 492 | 528 | 563 | 633 | 704 |
| | $F_v$ | 48 | 54 | 59 | 65 | 70 | 75 | 81 | 86 | 97 | 108 |
| | E | 1246 | 1384 | 1523 | 1661 | 1799 | 1938 | 2076 | 2215 | 2492 | 2769 |
| **10 x 18** | W | 9697 | 10775 | 11853 | 12930 | 14008 | 15085 | 16163 | 17240 | 19395 | 21550 |
| | w | 323 | 359 | 395 | 431 | 466 | 502 | 538 | 574 | 646 | 718 |
| | $F_v$ | 43 | 48 | 53 | 58 | 63 | 68 | 72 | 77 | 87 | 97 |
| | E | 1388 | 1542 | 1697 | 1851 | 2005 | 2159 | 2314 | 2468 | 2777 | 3085 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.

W = Total uniformly distributed load, pounds

w = Load per linear foot of beam, pounds

$F_v$ = Horizontal shear stress, psi, induced by load W

E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **30' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **6 x 24** | W | 10124 | 11249 | 12374 | 13499 | 14624 | 15749 | 16874 | 17999 | 20249 | 22499 |
| | w | 337 | 374 | 412 | 449 | 487 | 524 | 562 | 599 | 674 | 749 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1034 | 1148 | 1263 | 1378 | 1493 | 1608 | 1723 | 1838 | 2068 | 2297 |
| **14 x 16** | W | 10811 | 12012 | 13213 | 14415 | 15616 | 16817 | 18018 | 19220 | 21622 | 24025 |
| | w | 360 | 400 | 440 | 480 | 520 | 560 | 600 | 640 | 720 | 800 |
| | $F_v$ | 38 | 43 | 47 | 51 | 55 | 60 | 64 | 68 | 77 | 86 |
| | E | 1567 | 1741 | 1916 | 2090 | 2264 | 2438 | 2612 | 2787 | 3135 | 3483 |
| **8 x 22** | W | 11556 | 12840 | 14124 | 15408 | 16692 | 17976 | 19260 | 20544 | 23112 | 25680 |
| | w | 385 | 428 | 470 | 513 | 556 | 599 | 642 | 684 | 770 | 856 |
| | $F_v$ | 53 | 59 | 65 | 71 | 77 | 83 | 89 | 95 | 107 | 119 |
| | E | 1130 | 1255 | 1381 | 1506 | 1632 | 1758 | 1883 | 2009 | 2260 | 2511 |
| **12 x 18** | W | 11739 | 13043 | 14348 | 15652 | 16957 | 18261 | 19565 | 20870 | 23479 | 26087 |
| | w | 391 | 434 | 478 | 521 | 565 | 608 | 652 | 695 | 782 | 869 |
| | $F_v$ | 43 | 48 | 53 | 58 | 63 | 68 | 72 | 77 | 87 | 97 |
| | E | 1388 | 1542 | 1697 | 1851 | 2005 | 2159 | 2314 | 2468 | 2777 | 3085 |
| **10 x 20** | W | 12041 | 13379 | 14717 | 16055 | 17392 | 18730 | 20068 | 21406 | 24082 | 26758 |
| | w | 401 | 445 | 490 | 535 | 579 | 624 | 668 | 713 | 802 | 891 |
| | $F_v$ | 48 | 54 | 59 | 65 | 70 | 75 | 81 | 86 | 97 | 108 |
| | E | 1246 | 1384 | 1523 | 1661 | 1799 | 1938 | 2076 | 2215 | 2492 | 2769 |
| **16 x 16** | W | 12412 | 13792 | 15171 | 16550 | 17929 | 19308 | 20688 | 22067 | 24825 | 27584 |
| | w | 413 | 459 | 505 | 551 | 597 | 643 | 689 | 735 | 827 | 919 |
| | $F_v$ | 38 | 43 | 47 | 51 | 55 | 60 | 64 | 68 | 77 | 86 |
| | E | 1567 | 1741 | 1916 | 2090 | 2264 | 2438 | 2612 | 2787 | 3135 | 3483 |
| **14 x 18** | W | 13781 | 15312 | 16843 | 18375 | 19906 | 21437 | 22968 | 24500 | 27562 | 30625 |
| | w | 459 | 510 | 561 | 612 | 663 | 714 | 765 | 816 | 918 | 1020 |
| | $F_v$ | 43 | 48 | 53 | 58 | 63 | 68 | 72 | 77 | 87 | 97 |
| | E | 1388 | 1542 | 1697 | 1851 | 2005 | 2159 | 2314 | 2468 | 2777 | 3085 |
| **8 x 24** | W | 13806 | 15340 | 16874 | 18408 | 19942 | 21476 | 23010 | 24544 | 27612 | 30680 |
| | w | 460 | 511 | 562 | 613 | 664 | 715 | 767 | 818 | 920 | 1022 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1034 | 1148 | 1263 | 1378 | 1493 | 1608 | 1723 | 1838 | 2068 | 2297 |
| **12 x 20** | W | 14576 | 16195 | 17815 | 19435 | 21054 | 22674 | 24293 | 25913 | 29152 | 32391 |
| | w | 485 | 539 | 593 | 647 | 701 | 755 | 809 | 863 | 971 | 1079 |
| | $F_v$ | 48 | 54 | 59 | 65 | 70 | 75 | 81 | 86 | 97 | 108 |
| | E | 1246 | 1384 | 1523 | 1661 | 1799 | 1938 | 2076 | 2215 | 2492 | 2769 |
| **10 x 22** | W | 14637 | 16264 | 17890 | 19517 | 21143 | 22770 | 24396 | 26022 | 29275 | 32528 |
| | w | 487 | 542 | 596 | 650 | 704 | 759 | 813 | 867 | 975 | 1084 |
| | $F_v$ | 53 | 59 | 65 | 71 | 77 | 83 | 89 | 95 | 107 | 119 |
| | E | 1130 | 1255 | 1381 | 1506 | 1632 | 1758 | 1883 | 2009 | 2260 | 2511 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **30' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **16 x 18** | W | 15822 | 17581 | 19339 | 21097 | 22855 | 24613 | 26371 | 28129 | 31645 | 35162 |
| | w | 527 | 586 | 644 | 703 | 761 | 820 | 879 | 937 | 1054 | 1172 |
| | $F_v$ | 43 | 48 | 53 | 58 | 63 | 68 | 72 | 77 | 87 | 97 |
| | E | 1388 | 1542 | 1697 | 1851 | 2005 | 2159 | 2314 | 2468 | 2777 | 3085 |
| **14 x 20** | W | 17111 | 19012 | 20913 | 22815 | 24716 | 26617 | 28518 | 30420 | 34222 | 38025 |
| | w | 570 | 633 | 697 | 760 | 823 | 887 | 950 | 1014 | 1140 | 1267 |
| | $F_v$ | 48 | 54 | 59 | 65 | 70 | 75 | 81 | 86 | 97 | 108 |
| | E | 1246 | 1384 | 1523 | 1661 | 1799 | 1938 | 2076 | 2215 | 2492 | 2769 |
| **10 x 24** | W | 17487 | 19431 | 21374 | 23317 | 25260 | 27203 | 29146 | 31089 | 34975 | 38862 |
| | w | 582 | 647 | 712 | 777 | 842 | 906 | 971 | 1036 | 1165 | 1295 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1034 | 1148 | 1263 | 1378 | 1493 | 1608 | 1723 | 1838 | 2068 | 2297 |
| **12 x 22** | W | 17719 | 19688 | 21657 | 23626 | 25594 | 27563 | 29532 | 31501 | 35439 | 39376 |
| | w | 590 | 656 | 721 | 787 | 853 | 918 | 984 | 1050 | 1181 | 1312 |
| | $F_v$ | 53 | 59 | 65 | 71 | 77 | 83 | 89 | 95 | 107 | 119 |
| | E | 1130 | 1255 | 1381 | 1506 | 1632 | 1758 | 1883 | 2009 | 2260 | 2511 |
| **18 x 18** | W | 17864 | 19849 | 21834 | 23819 | 25804 | 27789 | 29774 | 31759 | 35729 | 39699 |
| | w | 595 | 661 | 727 | 793 | 860 | 926 | 992 | 1058 | 1190 | 1323 |
| | $F_v$ | 43 | 48 | 53 | 58 | 63 | 68 | 72 | 77 | 87 | 97 |
| | E | 1388 | 1542 | 1697 | 1851 | 2005 | 2159 | 2314 | 2468 | 2777 | 3085 |
| **16 x 20** | W | 19646 | 21829 | 24012 | 26195 | 28377 | 30560 | 32743 | 34926 | 39292 | 43658 |
| | w | 654 | 727 | 800 | 873 | 945 | 1018 | 1091 | 1164 | 1309 | 1455 |
| | $F_v$ | 48 | 54 | 59 | 65 | 70 | 75 | 81 | 86 | 97 | 108 |
| | E | 1246 | 1384 | 1523 | 1661 | 1799 | 1938 | 2076 | 2215 | 2492 | 2769 |
| **14 x 22** | W | 20801 | 23112 | 25423 | 27735 | 30046 | 32357 | 34668 | 36980 | 41602 | 46225 |
| | w | 693 | 770 | 847 | 924 | 1001 | 1078 | 1155 | 1232 | 1386 | 1540 |
| | $F_v$ | 53 | 59 | 65 | 71 | 77 | 83 | 89 | 95 | 107 | 119 |
| | E | 1130 | 1255 | 1381 | 1506 | 1632 | 1758 | 1883 | 2009 | 2260 | 2511 |
| **12 x 24** | W | 21169 | 23521 | 25873 | 28226 | 30578 | 32930 | 35282 | 37634 | 42339 | 47043 |
| | w | 705 | 784 | 862 | 940 | 1019 | 1097 | 1176 | 1254 | 1411 | 1568 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1034 | 1148 | 1263 | 1378 | 1493 | 1608 | 1723 | 1838 | 2068 | 2297 |
| **18 x 20** | W | 22181 | 24645 | 27110 | 29575 | 32039 | 34504 | 36968 | 39433 | 44362 | 49291 |
| | w | 739 | 821 | 903 | 985 | 1067 | 1150 | 1232 | 1314 | 1478 | 1643 |
| | $F_v$ | 48 | 54 | 59 | 65 | 70 | 75 | 81 | 86 | 97 | 108 |
| | E | 1246 | 1384 | 1523 | 1661 | 1799 | 1938 | 2076 | 2215 | 2492 | 2769 |
| **16 x 22** | W | 23882 | 26536 | 29190 | 31843 | 34497 | 37151 | 39804 | 42458 | 47765 | 53073 |
| | w | 796 | 884 | 973 | 1061 | 1149 | 1238 | 1326 | 1415 | 1592 | 1769 |
| | $F_v$ | 53 | 59 | 65 | 71 | 77 | 83 | 89 | 95 | 107 | 119 |
| | E | 1130 | 1255 | 1381 | 1506 | 1632 | 1758 | 1883 | 2009 | 2260 | 2511 |
| **20 x 20** | W | 24716 | 27462 | 30208 | 32955 | 35701 | 38447 | 41193 | 43940 | 49432 | 54925 |
| | w | 823 | 915 | 1006 | 1098 | 1190 | 1281 | 1373 | 1464 | 1647 | 1830 |
| | $F_v$ | 48 | 54 | 59 | 65 | 70 | 75 | 81 | 86 | 97 | 108 |
| | E | 1246 | 1384 | 1523 | 1661 | 1799 | 1938 | 2076 | 2215 | 2492 | 2769 |
| **14 x 24** | W | 24851 | 27612 | 30373 | 33135 | 35896 | 38657 | 41418 | 44180 | 49702 | 55225 |
| | w | 828 | 920 | 1012 | 1104 | 1196 | 1288 | 1380 | 1472 | 1656 | 1840 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1034 | 1148 | 1263 | 1378 | 1493 | 1608 | 1723 | 1838 | 2068 | 2297 |
| **18 x 22** | W | 26964 | 29960 | 32956 | 35952 | 38948 | 41944 | 44940 | 47937 | 53929 | 59921 |
| | w | 898 | 998 | 1098 | 1198 | 1298 | 1398 | 1498 | 1597 | 1797 | 1997 |
| | $F_v$ | 53 | 59 | 65 | 71 | 77 | 83 | 89 | 95 | 107 | 119 |
| | E | 1130 | 1255 | 1381 | 1506 | 1632 | 1758 | 1883 | 2009 | 2260 | 2511 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **30' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **16 x 24** | W | 28532 | 31703 | 34873 | 38043 | 41214 | 44384 | 47554 | 50725 | 57065 | 63406 |
| | w | 951 | 1056 | 1162 | 1268 | 1373 | 1479 | 1585 | 1690 | 1902 | 2113 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1034 | 1148 | 1263 | 1378 | 1493 | 1608 | 1723 | 1838 | 2068 | 2297 |
| **20 x 22** | W | 30046 | 33384 | 36723 | 40061 | 43400 | 46738 | 50077 | 53415 | 60092 | 66769 |
| | w | 1001 | 1112 | 1224 | 1335 | 1446 | 1557 | 1669 | 1780 | 2003 | 2225 |
| | $F_v$ | 53 | 59 | 65 | 71 | 77 | 83 | 89 | 95 | 107 | 119 |
| | E | 1130 | 1255 | 1381 | 1506 | 1632 | 1758 | 1883 | 2009 | 2260 | 2511 |
| **18 x 24** | W | 32214 | 35793 | 39373 | 42952 | 46532 | 50111 | 53690 | 57270 | 64429 | 71587 |
| | w | 1073 | 1193 | 1312 | 1431 | 1551 | 1670 | 1789 | 1909 | 2147 | 2386 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1034 | 1148 | 1263 | 1378 | 1493 | 1608 | 1723 | 1838 | 2068 | 2297 |
| **22 x 22** | W | 33127 | 36808 | 40489 | 44170 | 47851 | 51532 | 55213 | 58894 | 66255 | 73617 |
| | w | 1104 | 1226 | 1349 | 1472 | 1595 | 1717 | 1840 | 1963 | 2208 | 2453 |
| | $F_v$ | 53 | 59 | 65 | 71 | 77 | 83 | 89 | 95 | 107 | 119 |
| | E | 1130 | 1255 | 1381 | 1506 | 1632 | 1758 | 1883 | 2009 | 2260 | 2511 |
| **20 x 24** | W | 35896 | 39884 | 43873 | 47861 | 51850 | 55838 | 59827 | 63815 | 71792 | 79769 |
| | w | 1196 | 1329 | 1462 | 1595 | 1728 | 1861 | 1994 | 2127 | 2393 | 2658 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1034 | 1148 | 1263 | 1378 | 1493 | 1608 | 1723 | 1838 | 2068 | 2297 |
| **22 x 24** | W | 39577 | 43975 | 48373 | 52770 | 57168 | 61565 | 65963 | 70360 | 79155 | 87950 |
| | w | 1319 | 1465 | 1612 | 1759 | 1905 | 2052 | 2198 | 2345 | 2638 | 2931 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1034 | 1148 | 1263 | 1378 | 1493 | 1608 | 1723 | 1838 | 2068 | 2297 |
| **24 x 24** | W | 43259 | 48066 | 52872 | 57679 | 62486 | 67292 | 72099 | 76905 | 86519 | 96132 |
| | w | 1441 | 1602 | 1762 | 1922 | 2082 | 2243 | 2403 | 2563 | 2883 | 3204 |
| | $F_v$ | 58 | 65 | 71 | 78 | 84 | 91 | 97 | 104 | 117 | 130 |
| | E | 1034 | 1148 | 1263 | 1378 | 1493 | 1608 | 1723 | 1838 | 2068 | 2297 |
| **31' - 0" SPAN** | | | | | | | | | | | |
| **3 x 14** | W | 1415 | 1573 | 1730 | 1887 | 2045 | 2202 | 2359 | 2517 | 2831 | 3146 |
| | w | 45 | 50 | 55 | 60 | 65 | 71 | 76 | 81 | 91 | 101 |
| | $F_v$ | 32 | 35 | 39 | 42 | 46 | 49 | 53 | 56 | 64 | 71 |
| | E | 1895 | 2105 | 2316 | 2526 | 2737 | 2947 | 3158 | 3369 | 3790 | 4211 |
| **4 x 12** | W | 1428 | 1587 | 1746 | 1905 | 2064 | 2222 | 2381 | 2540 | 2857 | 3175 |
| | w | 46 | 51 | 56 | 61 | 66 | 71 | 76 | 81 | 92 | 102 |
| | $F_v$ | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 54 | 60 |
| | E | 2231 | 2479 | 2727 | 2975 | 3223 | 3471 | 3719 | 3967 | 4463 | 4959 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **31'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **3 x 16** | W | 1875 | 2083 | 2292 | 2500 | 2709 | 2917 | 3125 | 3334 | 3751 | 4167 |
| | w | 60 | 67 | 73 | 80 | 87 | 94 | 100 | 107 | 121 | 134 |
| | $F_v$ | 36 | 40 | 45 | 49 | 53 | 57 | 61 | 65 | 73 | 81 |
| | E | 1646 | 1829 | 2012 | 2195 | 2378 | 2561 | 2744 | 2927 | 3293 | 3659 |
| **4 x 14** | W | 2057 | 2286 | 2514 | 2743 | 2972 | 3200 | 3429 | 3658 | 4115 | 4572 |
| | w | 66 | 73 | 81 | 88 | 95 | 103 | 110 | 118 | 132 | 147 |
| | $F_v$ | 32 | 36 | 39 | 43 | 47 | 50 | 54 | 58 | 65 | 72 |
| | E | 1859 | 2066 | 2273 | 2479 | 2686 | 2893 | 3099 | 3306 | 3719 | 4133 |
| **6 x 12** | W | 2346 | 2607 | 2867 | 3128 | 3389 | 3649 | 3910 | 4171 | 4692 | 5214 |
| | w | 75 | 84 | 92 | 100 | 109 | 117 | 126 | 134 | 151 | 168 |
| | $F_v$ | 27 | 30 | 34 | 37 | 40 | 43 | 46 | 49 | 55 | 61 |
| | E | 2183 | 2426 | 2668 | 2911 | 3153 | 3396 | 3639 | 3881 | 4366 | 4852 |
| **4 x 16** | W | 2712 | 3013 | 3315 | 3616 | 3918 | 4219 | 4520 | 4822 | 5424 | 6027 |
| | w | 87 | 97 | 106 | 116 | 126 | 136 | 145 | 155 | 175 | 194 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **8 x 12** | W | 3199 | 3555 | 3910 | 4266 | 4621 | 4977 | 5332 | 5688 | 6399 | 7110 |
| | w | 103 | 114 | 126 | 137 | 149 | 160 | 172 | 183 | 206 | 229 |
| | $F_v$ | 27 | 30 | 34 | 37 | 40 | 43 | 46 | 49 | 55 | 61 |
| | E | 2183 | 2426 | 2668 | 2911 | 3153 | 3396 | 3639 | 3881 | 4366 | 4852 |
| **6 x 14** | W | 3233 | 3592 | 3952 | 4311 | 4670 | 5029 | 5389 | 5748 | 6466 | 7185 |
| | w | 104 | 115 | 127 | 139 | 150 | 162 | 173 | 185 | 208 | 231 |
| | $F_v$ | 32 | 36 | 39 | 43 | 47 | 50 | 54 | 58 | 65 | 72 |
| | E | 1859 | 2066 | 2273 | 2479 | 2686 | 2893 | 3099 | 3306 | 3719 | 4133 |
| **10 x 12** | W | 4052 | 4503 | 4953 | 5403 | 5854 | 6304 | 6754 | 7205 | 8105 | 9006 |
| | w | 130 | 145 | 159 | 174 | 188 | 203 | 217 | 232 | 261 | 290 |
| | $F_v$ | 27 | 30 | 34 | 37 | 40 | 43 | 46 | 49 | 55 | 61 |
| | E | 2183 | 2426 | 2668 | 2911 | 3153 | 3396 | 3639 | 3881 | 4366 | 4852 |
| **6 x 16** | W | 4262 | 4736 | 5209 | 5683 | 6156 | 6630 | 7104 | 7577 | 8524 | 9472 |
| | w | 137 | 152 | 168 | 183 | 198 | 213 | 229 | 244 | 275 | 305 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **8 x 14** | W | 4409 | 4899 | 5389 | 5879 | 6368 | 6858 | 7348 | 7838 | 8818 | 9798 |
| | w | 142 | 158 | 173 | 189 | 205 | 221 | 237 | 252 | 284 | 316 |
| | $F_v$ | 32 | 36 | 39 | 43 | 47 | 50 | 54 | 58 | 65 | 72 |
| | E | 1859 | 2066 | 2273 | 2479 | 2686 | 2893 | 3099 | 3306 | 3719 | 4133 |
| **12 x 12** | W | 4906 | 5451 | 5996 | 6541 | 7086 | 7631 | 8176 | 8721 | 9812 | 10902 |
| | w | 158 | 175 | 193 | 211 | 228 | 246 | 263 | 281 | 316 | 351 |
| | $F_v$ | 27 | 30 | 34 | 37 | 40 | 43 | 46 | 49 | 55 | 61 |
| | E | 2183 | 2426 | 2668 | 2911 | 3153 | 3396 | 3639 | 3881 | 4366 | 4852 |
| **6 x 18** | W | 5433 | 6037 | 6640 | 7244 | 7848 | 8452 | 9055 | 9659 | 10866 | 12074 |
| | w | 175 | 194 | 214 | 233 | 253 | 272 | 292 | 311 | 350 | 389 |
| | $F_v$ | 42 | 47 | 51 | 56 | 61 | 65 | 70 | 75 | 84 | 94 |
| | E | 1434 | 1594 | 1753 | 1913 | 2072 | 2231 | 2391 | 2550 | 2869 | 3188 |
| **10 x 14** | W | 5585 | 6205 | 6826 | 7446 | 8067 | 8687 | 9308 | 9929 | 11170 | 12411 |
| | w | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 360 | 400 |
| | $F_v$ | 32 | 36 | 39 | 43 | 47 | 50 | 54 | 58 | 65 | 72 |
| | E | 1859 | 2066 | 2273 | 2479 | 2686 | 2893 | 3099 | 3306 | 3719 | 4133 |
| **8 x 16** | W | 5812 | 6458 | 7104 | 7750 | 8395 | 9041 | 9687 | 10333 | 11625 | 12916 |
| | w | 187 | 208 | 229 | 250 | 270 | 291 | 312 | 333 | 375 | 416 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **31'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **6 x 20** | W | 6746 | 7495 | 8245 | 8995 | 9744 | 10494 | 11243 | 11993 | 13492 | 14991 |
| | w | 217 | 241 | 265 | 290 | 314 | 338 | 362 | 386 | 435 | 483 |
| | $F_v$ | 47 | 52 | 57 | 62 | 68 | 73 | 78 | 83 | 94 | 104 |
| | E | 1287 | 1430 | 1573 | 1716 | 1859 | 2003 | 2146 | 2289 | 2575 | 2861 |
| **12 x 14** | W | 6760 | 7512 | 8263 | 9014 | 9765 | 10516 | 11268 | 12019 | 13521 | 15024 |
| | w | 218 | 242 | 266 | 290 | 315 | 339 | 363 | 387 | 436 | 484 |
| | $F_v$ | 32 | 36 | 39 | 43 | 47 | 50 | 54 | 58 | 65 | 72 |
| | E | 1859 | 2066 | 2273 | 2479 | 2686 | 2893 | 3099 | 3306 | 3719 | 4133 |
| **10 x 16** | W | 7362 | 8180 | 8998 | 9816 | 10634 | 11452 | 12270 | 13088 | 14724 | 16361 |
| | w | 237 | 263 | 290 | 316 | 343 | 369 | 395 | 422 | 475 | 527 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **8 x 18** | W | 7409 | 8232 | 9055 | 9879 | 10702 | 11525 | 12348 | 13172 | 14818 | 16465 |
| | w | 239 | 265 | 292 | 318 | 345 | 371 | 398 | 424 | 478 | 531 |
| | $F_v$ | 42 | 47 | 51 | 56 | 61 | 65 | 70 | 75 | 84 | 94 |
| | E | 1434 | 1594 | 1753 | 1913 | 2072 | 2231 | 2391 | 2550 | 2869 | 3188 |
| **14 x 14** | W | 7936 | 8818 | 9700 | 10582 | 11464 | 12345 | 13227 | 14109 | 15873 | 17637 |
| | w | 256 | 284 | 312 | 341 | 369 | 398 | 426 | 455 | 512 | 568 |
| | $F_v$ | 32 | 36 | 39 | 43 | 47 | 50 | 54 | 58 | 65 | 72 |
| | E | 1859 | 2066 | 2273 | 2479 | 2686 | 2893 | 3099 | 3306 | 3719 | 4133 |
| **6 x 22** | W | 8201 | 9112 | 10023 | 10934 | 11846 | 12757 | 13668 | 14579 | 16402 | 18224 |
| | w | 264 | 293 | 323 | 352 | 382 | 411 | 440 | 470 | 529 | 587 |
| | $F_v$ | 52 | 57 | 63 | 69 | 75 | 80 | 86 | 92 | 104 | 115 |
| | E | 1167 | 1297 | 1427 | 1557 | 1686 | 1816 | 1946 | 2076 | 2335 | 2595 |
| **12 x 16** | W | 8912 | 9902 | 10893 | 11883 | 12873 | 13863 | 14854 | 15844 | 17824 | 19805 |
| | w | 287 | 319 | 351 | 383 | 415 | 447 | 479 | 511 | 575 | 638 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| **8 x 20** | W | 9199 | 10221 | 11243 | 12266 | 13288 | 14310 | 15332 | 16354 | 18399 | 20443 |
| | w | 296 | 329 | 362 | 395 | 428 | 461 | 494 | 527 | 593 | 659 |
| | $F_v$ | 47 | 52 | 57 | 62 | 68 | 73 | 78 | 83 | 94 | 104 |
| | E | 1287 | 1430 | 1573 | 1716 | 1859 | 2003 | 2146 | 2289 | 2575 | 2861 |
| **10 x 18** | W | 9385 | 10427 | 11470 | 12513 | 13556 | 14599 | 15641 | 16684 | 18770 | 20855 |
| | w | 302 | 336 | 370 | 403 | 437 | 470 | 504 | 538 | 605 | 672 |
| | $F_v$ | 42 | 47 | 51 | 56 | 61 | 65 | 70 | 75 | 84 | 94 |
| | E | 1434 | 1594 | 1753 | 1913 | 2072 | 2231 | 2391 | 2550 | 2869 | 3188 |
| **6 x 24** | W | 9797 | 10886 | 11975 | 13063 | 14152 | 15241 | 16329 | 17418 | 19595 | 21773 |
| | w | 316 | 351 | 386 | 421 | 456 | 491 | 526 | 561 | 632 | 702 |
| | $F_v$ | 56 | 63 | 69 | 75 | 82 | 88 | 94 | 101 | 113 | 126 |
| | E | 1068 | 1187 | 1305 | 1424 | 1543 | 1662 | 1780 | 1899 | 2137 | 2374 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **31' - 0" SPAN** CONT'D | | | | | | | | | | | |
| 14 x 16 | W | 10462 | 11625 | 12787 | 13950 | 15112 | 16275 | 17437 | 18600 | 20925 | 23250 |
| | w | 337 | 375 | 412 | 450 | 487 | 525 | 562 | 600 | 675 | 750 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| 8 x 22 | W | 11183 | 12426 | 13668 | 14911 | 16153 | 17396 | 18639 | 19881 | 22366 | 24852 |
| | w | 360 | 400 | 440 | 481 | 521 | 561 | 601 | 641 | 721 | 801 |
| | $F_v$ | 52 | 57 | 63 | 69 | 75 | 80 | 86 | 92 | 104 | 115 |
| | E | 1167 | 1297 | 1427 | 1557 | 1686 | 1816 | 1946 | 2076 | 2335 | 2595 |
| 12 x 18 | W | 11360 | 12623 | 13885 | 15147 | 16410 | 17672 | 18934 | 20197 | 22721 | 25246 |
| | w | 366 | 407 | 447 | 488 | 529 | 570 | 610 | 651 | 732 | 814 |
| | $F_v$ | 42 | 47 | 51 | 56 | 61 | 65 | 70 | 75 | 84 | 94 |
| | E | 1434 | 1594 | 1753 | 1913 | 2072 | 2231 | 2391 | 2550 | 2869 | 3188 |
| 10 x 20 | W | 11652 | 12947 | 14242 | 15537 | 16831 | 18126 | 19421 | 20716 | 23305 | 25895 |
| | w | 375 | 417 | 459 | 501 | 542 | 584 | 626 | 668 | 751 | 835 |
| | $F_v$ | 47 | 52 | 57 | 62 | 68 | 73 | 78 | 83 | 94 | 104 |
| | E | 1287 | 1430 | 1573 | 1716 | 1859 | 2003 | 2146 | 2289 | 2575 | 2861 |
| 16 x 16 | W | 12012 | 13347 | 14681 | 16016 | 17351 | 18686 | 20020 | 21355 | 24024 | 26694 |
| | w | 387 | 430 | 473 | 516 | 559 | 602 | 645 | 688 | 775 | 861 |
| | $F_v$ | 37 | 41 | 45 | 50 | 54 | 58 | 62 | 66 | 75 | 83 |
| | E | 1619 | 1799 | 1979 | 2159 | 2339 | 2519 | 2699 | 2879 | 3239 | 3599 |
| 14 x 18 | W | 13336 | 14818 | 16300 | 17782 | 19264 | 20745 | 22227 | 23709 | 26673 | 29637 |
| | w | 430 | 478 | 525 | 573 | 621 | 669 | 717 | 764 | 860 | 956 |
| | $F_v$ | 42 | 47 | 51 | 56 | 61 | 65 | 70 | 75 | 84 | 94 |
| | E | 1434 | 1594 | 1753 | 1913 | 2072 | 2231 | 2391 | 2550 | 2869 | 3188 |
| 8 x 24 | W | 13360 | 14845 | 16329 | 17814 | 19299 | 20783 | 22268 | 23752 | 26721 | 29690 |
| | w | 430 | 478 | 526 | 574 | 622 | 670 | 718 | 766 | 861 | 957 |
| | $F_v$ | 56 | 63 | 69 | 75 | 82 | 88 | 94 | 101 | 113 | 126 |
| | E | 1068 | 1187 | 1305 | 1424 | 1543 | 1662 | 1780 | 1899 | 2137 | 2374 |
| 12 x 20 | W | 14106 | 15673 | 17240 | 18808 | 20375 | 21942 | 23510 | 25077 | 28212 | 31346 |
| | w | 455 | 505 | 556 | 606 | 657 | 707 | 758 | 808 | 910 | 1011 |
| | $F_v$ | 47 | 52 | 57 | 62 | 68 | 73 | 78 | 83 | 94 | 104 |
| | E | 1287 | 1430 | 1573 | 1716 | 1859 | 2003 | 2146 | 2289 | 2575 | 2861 |
| 10 x 22 | W | 14165 | 15739 | 17313 | 18887 | 20461 | 22035 | 23609 | 25183 | 28331 | 31479 |
| | w | 456 | 507 | 558 | 609 | 660 | 710 | 761 | 812 | 913 | 1015 |
| | $F_v$ | 52 | 57 | 63 | 69 | 75 | 80 | 86 | 92 | 104 | 115 |
| | E | 1167 | 1297 | 1427 | 1557 | 1686 | 1816 | 1946 | 2076 | 2335 | 2595 |
| 16 x 18 | W | 15312 | 17013 | 18715 | 20416 | 22118 | 23819 | 25520 | 27222 | 30624 | 34027 |
| | w | 493 | 548 | 603 | 658 | 713 | 768 | 823 | 878 | 987 | 1097 |
| | $F_v$ | 42 | 47 | 51 | 56 | 61 | 65 | 70 | 75 | 84 | 94 |
| | E | 1434 | 1594 | 1753 | 1913 | 2072 | 2231 | 2391 | 2550 | 2869 | 3188 |
| 14 x 20 | W | 16559 | 18399 | 20239 | 22079 | 23918 | 25758 | 27598 | 29438 | 33118 | 36798 |
| | w | 534 | 593 | 652 | 712 | 771 | 830 | 890 | 949 | 1068 | 1187 |
| | $F_v$ | 47 | 52 | 57 | 62 | 68 | 73 | 78 | 83 | 94 | 104 |
| | E | 1287 | 1430 | 1573 | 1716 | 1859 | 2003 | 2146 | 2289 | 2575 | 2861 |
| 10 x 24 | W | 16923 | 18804 | 20684 | 22565 | 24445 | 26325 | 28206 | 30086 | 33847 | 37608 |
| | w | 545 | 606 | 667 | 727 | 788 | 849 | 909 | 970 | 1091 | 1213 |
| | $F_v$ | 56 | 63 | 69 | 75 | 82 | 88 | 94 | 101 | 113 | 126 |
| | E | 1068 | 1187 | 1305 | 1424 | 1543 | 1662 | 1780 | 1899 | 2137 | 2374 |
| 12 x 22 | W | 17147 | 19053 | 20958 | 22863 | 24769 | 26674 | 28579 | 30485 | 34295 | 38106 |
| | w | 553 | 614 | 676 | 737 | 799 | 860 | 921 | 983 | 1106 | 1229 |
| | $F_v$ | 52 | 57 | 63 | 69 | 75 | 80 | 86 | 92 | 104 | 115 |
| | E | 1167 | 1297 | 1427 | 1557 | 1686 | 1816 | 1946 | 2076 | 2335 | 2595 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **31'- 0" SPAN** CONT'D | | | | | | | | | | | |
| **18 x 18** | W | 17288 | 19209 | 21130 | 23051 | 24971 | 26892 | 28813 | 30734 | 34576 | 38418 |
| | w | 557 | 619 | 681 | 743 | 805 | 867 | 929 | 991 | 1115 | 1239 |
| | $F_v$ | 42 | 47 | 51 | 56 | 61 | 65 | 70 | 75 | 84 | 94 |
| | E | 1434 | 1594 | 1753 | 1913 | 2072 | 2231 | 2391 | 2550 | 2869 | 3188 |
| **16 x 20** | W | 19012 | 21125 | 23237 | 25350 | 27462 | 29574 | 31687 | 33880 | 38024 | 42250 |
| | w | 613 | 681 | 749 | 817 | 885 | 954 | 1022 | 1090 | 1226 | 1362 |
| | $F_v$ | 47 | 52 | 57 | 62 | 68 | 73 | 78 | 83 | 94 | 104 |
| | E | 1287 | 1430 | 1573 | 1716 | 1859 | 2003 | 2146 | 2289 | 2575 | 2861 |
| **14 x 22** | W | 20130 | 22366 | 24603 | 26840 | 29077 | 31313 | 33550 | 35787 | 40260 | 44733 |
| | w | 649 | 721 | 793 | 865 | 937 | 1010 | 1082 | 1154 | 1298 | 1443 |
| | $F_v$ | 52 | 57 | 63 | 69 | 75 | 80 | 86 | 92 | 104 | 115 |
| | E | 1167 | 1297 | 1427 | 1557 | 1686 | 1816 | 1946 | 2076 | 2335 | 2595 |
| **12 x 24** | W | 20486 | 22762 | 25039 | 27315 | 29591 | 31868 | 34144 | 36420 | 40973 | 45525 |
| | w | 660 | 734 | 809 | 881 | 954 | 1028 | 1101 | 1174 | 1321 | 1468 |
| | $F_v$ | 56 | 63 | 69 | 75 | 82 | 88 | 94 | 101 | 113 | 126 |
| | E | 1068 | 1187 | 1305 | 1424 | 1543 | 1662 | 1780 | 1899 | 2137 | 2374 |
| **18 x 20** | W | 21465 | 23850 | 26235 | 28620 | 31006 | 33391 | 35776 | 38161 | 42931 | 47701 |
| | w | 692 | 769 | 846 | 923 | 1000 | 1077 | 1154 | 1231 | 1384 | 1538 |
| | $F_v$ | 47 | 52 | 57 | 62 | 68 | 73 | 78 | 83 | 94 | 104 |
| | E | 1287 | 1430 | 1573 | 1716 | 1859 | 2003 | 2146 | 2289 | 2575 | 2861 |
| **16 x 22** | W | 23112 | 25680 | 28248 | 30816 | 33384 | 25952 | 38520 | 41088 | 46224 | 51361 |
| | w | 745 | 828 | 911 | 994 | 1076 | 1159 | 1242 | 1325 | 1491 | 1656 |
| | $F_v$ | 52 | 57 | 63 | 69 | 75 | 80 | 86 | 92 | 104 | 115 |
| | E | 1167 | 1297 | 1427 | 1557 | 1686 | 1816 | 1946 | 2076 | 2335 | 2595 |
| **20 x 20** | W | 23918 | 26576 | 29234 | 31891 | 34549 | 37207 | 39864 | 42522 | 47837 | 53153 |
| | w | 771 | 857 | 943 | 1028 | 1114 | 1200 | 1285 | 1371 | 1543 | 1714 |
| | $F_v$ | 47 | 52 | 57 | 62 | 68 | 73 | 78 | 83 | 94 | 104 |
| | E | 1287 | 1430 | 1573 | 1716 | 1859 | 2003 | 2146 | 2289 | 2575 | 2861 |
| **14 x 24** | W | 24049 | 26721 | 29393 | 32066 | 34738 | 37410 | 40082 | 42754 | 48099 | 53443 |
| | w | 775 | 861 | 948 | 1034 | 1120 | 1206 | 1292 | 1379 | 1551 | 1723 |
| | $F_v$ | 56 | 63 | 69 | 75 | 82 | 88 | 94 | 101 | 113 | 126 |
| | E | 1068 | 1187 | 1305 | 1424 | 1543 | 1662 | 1780 | 1899 | 2137 | 2374 |
| **18 x 22** | W | 26094 | 28994 | 31893 | 34792 | 37692 | 40591 | 43491 | 46390 | 52189 | 57988 |
| | w | 841 | 935 | 1028 | 1122 | 1215 | 1309 | 1402 | 1496 | 1683 | 1870 |
| | $F_v$ | 52 | 57 | 63 | 69 | 75 | 80 | 86 | 92 | 104 | 115 |
| | E | 1167 | 1297 | 1427 | 1557 | 1686 | 1816 | 1946 | 2076 | 2335 | 2595 |
| **16 x 24** | W | 27612 | 30680 | 33748 | 36816 | 39884 | 42952 | 46020 | 49088 | 55224 | 61361 |
| | w | 890 | 989 | 1088 | 1187 | 1286 | 1385 | 1484 | 1583 | 1781 | 1979 |
| | $F_v$ | 56 | 63 | 69 | 75 | 82 | 88 | 94 | 101 | 113 | 126 |
| | E | 1068 | 1187 | 1305 | 1424 | 1543 | 1662 | 1780 | 1899 | 2137 | 2374 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **31'- 0" SPAN CONT'D** | | | | | | | | | | | |
| **20 x 22** | W | 29077 | 32307 | 35538 | 38769 | 42000 | 45230 | 48461 | 51692 | 58154 | 64615 |
| | w | 937 | 1042 | 1146 | 1250 | 1354 | 1459 | 1563 | 1667 | 1875 | 2084 |
| | $F_v$ | 52 | 57 | 63 | 69 | 75 | 80 | 86 | 92 | 104 | 115 |
| | E | 1167 | 1297 | 1427 | 1557 | 1686 | 1816 | 1946 | 2076 | 2335 | 2595 |
| **18 x 24** | W | 31175 | 34639 | 38103 | 41567 | 45031 | 48495 | 51958 | 55422 | 62350 | 69278 |
| | w | 1005 | 1117 | 1229 | 1340 | 1452 | 1564 | 1676 | 1787 | 2011 | 2234 |
| | $F_v$ | 56 | 63 | 69 | 75 | 82 | 88 | 94 | 101 | 113 | 126 |
| | E | 1068 | 1187 | 1305 | 1424 | 1543 | 1662 | 1780 | 1899 | 2137 | 2374 |
| **22 x 22** | W | 32059 | 35621 | 39183 | 42745 | 46307 | 49869 | 53432 | 56994 | 64118 | 71242 |
| | w | 1034 | 1149 | 1263 | 1378 | 1493 | 1608 | 1723 | 1838 | 2068 | 2298 |
| | $F_v$ | 52 | 57 | 63 | 69 | 75 | 80 | 86 | 92 | 104 | 115 |
| | E | 1167 | 1297 | 1427 | 1557 | 1686 | 1816 | 1946 | 2076 | 2335 | 2595 |
| **20 x 24** | W | 34738 | 38598 | 42457 | 46317 | 50177 | 54037 | 57897 | 61756 | 69476 | 77196 |
| | w | 1120 | 1245 | 1369 | 1494 | 1618 | 1743 | 1867 | 1992 | 2241 | 2490 |
| | $F_v$ | 56 | 63 | 69 | 75 | 82 | 88 | 94 | 101 | 113 | 126 |
| | E | 1068 | 1187 | 1305 | 1424 | 1543 | 1662 | 1780 | 1899 | 2137 | 2374 |
| **22 x 24** | W | 38301 | 42556 | 46812 | 51068 | 55323 | 59579 | 63835 | 68091 | 76602 | 85113 |
| | w | 1235 | 1372 | 1510 | 1647 | 1784 | 1921 | 2059 | 2196 | 2471 | 2745 |
| | $F_v$ | 56 | 63 | 69 | 75 | 82 | 88 | 94 | 101 | 113 | 126 |
| | E | 1068 | 1187 | 1305 | 1424 | 1543 | 1662 | 1780 | 1899 | 2137 | 2374 |
| **24 x 24** | W | 41864 | 46515 | 51167 | 55818 | 60470 | 65121 | 69773 | 74425 | 83728 | 93031 |
| | w | 1350 | 1500 | 1650 | 1800 | 1950 | 2100 | 2250 | 2400 | 2700 | 3001 |
| | $F_v$ | 56 | 63 | 69 | 75 | 82 | 88 | 94 | 101 | 113 | 126 |
| | E | 1068 | 1187 | 1305 | 1424 | 1543 | 1662 | 1780 | 1899 | 2137 | 2374 |
| **32'- 0" SPAN** | | | | | | | | | | | |
| **4 x 16** | W | 2627 | 2919 | 3211 | 3503 | 3795 | 4087 | 4379 | 4671 | 5255 | 5839 |
| | w | 82 | 91 | 100 | 109 | 118 | 127 | 136 | 145 | 164 | 182 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | E | 1672 | 1858 | 2043 | 2229 | 2415 | 2601 | 2787 | 2972 | 3344 | 3716 |
| **6 x 14** | W | 3132 | 3480 | 3828 | 4176 | 4524 | 4872 | 5220 | 5568 | 6264 | 6960 |
| | w | 97 | 108 | 119 | 130 | 141 | 152 | 163 | 174 | 195 | 217 |
| | $F_v$ | 31 | 35 | 38 | 42 | 45 | 49 | 52 | 56 | 63 | 70 |
| | E | 1919 | 2133 | 2346 | 2559 | 2773 | 2986 | 3199 | 3413 | 3839 | 4266 |
| **6 x 16** | W | 4129 | 4588 | 5046 | 5505 | 5964 | 6423 | 6882 | 7340 | 8258 | 9176 |
| | w | 129 | 143 | 157 | 172 | 186 | 200 | 215 | 229 | 258 | 286 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | E | 1672 | 1858 | 2043 | 2229 | 2415 | 2601 | 2787 | 2972 | 3344 | 3716 |
| **8 x 14** | W | 4271 | 4746 | 5220 | 5695 | 6169 | 6644 | 7119 | 7593 | 8542 | 9492 |
| | w | 133 | 148 | 163 | 177 | 192 | 207 | 222 | 237 | 266 | 296 |
| | $F_v$ | 31 | 35 | 38 | 42 | 45 | 49 | 52 | 56 | 63 | 70 |
| | E | 1919 | 2133 | 2346 | 2559 | 2773 | 2986 | 3199 | 3413 | 3839 | 4266 |
| **6 x 18** | W | 5263 | 5848 | 6433 | 7018 | 7603 | 8187 | 8772 | 9357 | 10527 | 11697 |
| | w | 164 | 182 | 201 | 219 | 237 | 255 | 274 | 292 | 328 | 365 |
| | $F_v$ | 41 | 45 | 50 | 54 | 59 | 63 | 68 | 72 | 82 | 91 |
| | E | 1481 | 1645 | 1810 | 1974 | 2139 | 2303 | 2468 | 2633 | 2962 | 3291 |
| **10 x 14** | W | 5410 | 6011 | 6612 | 7214 | 7815 | 8416 | 9017 | 9618 | 10821 | 12023 |
| | w | 169 | 187 | 206 | 225 | 244 | 263 | 281 | 300 | 338 | 375 |
| | $F_v$ | 31 | 35 | 38 | 42 | 45 | 49 | 52 | 56 | 63 | 70 |
| | E | 1919 | 2133 | 2346 | 2559 | 2773 | 2986 | 3199 | 3413 | 3839 | 4266 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **32' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **8 x 16** | W | 5630 | 6256 | 6882 | 7507 | 8133 | 8759 | 9384 | 10010 | 11261 | 12513 |
| | w | 175 | 195 | 215 | 234 | 254 | 273 | 293 | 312 | 351 | 391 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | E | 1672 | 1858 | 2043 | 2229 | 2415 | 2601 | 2787 | 2972 | 3344 | 3716 |
| **6 x 20** | W | 6535 | 7261 | 7987 | 8714 | 9440 | 10166 | 10892 | 11618 | 13071 | 14523 |
| | w | 204 | 226 | 249 | 272 | 295 | 317 | 340 | 363 | 408 | 453 |
| | $F_v$ | 45 | 50 | 55 | 60 | 66 | 71 | 76 | 81 | 91 | 101 |
| | E | 1329 | 1476 | 1624 | 1772 | 1919 | 2067 | 2215 | 2363 | 2658 | 2953 |
| **12 x 14** | W | 6549 | 7277 | 8005 | 8732 | 9460 | 10188 | 10916 | 11643 | 13099 | 14554 |
| | w | 204 | 227 | 250 | 272 | 295 | 318 | 341 | 363 | 409 | 454 |
| | $F_v$ | 31 | 35 | 38 | 42 | 45 | 49 | 52 | 56 | 63 | 70 |
| | E | 1919 | 2133 | 2346 | 2559 | 2773 | 2986 | 3199 | 3413 | 3839 | 4266 |
| **10 x 16** | W | 7132 | 7924 | 8717 | 9509 | 10302 | 11094 | 11887 | 12679 | 14264 | 15849 |
| | w | 222 | 247 | 272 | 297 | 321 | 346 | 371 | 396 | 445 | 495 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | E | 1672 | 1858 | 2043 | 2229 | 2415 | 2601 | 2787 | 2972 | 3344 | 3716 |
| **8 x 18** | W | 7177 | 7975 | 8772 | 9570 | 10367 | 11165 | 11962 | 12760 | 14355 | 15950 |
| | w | 224 | 249 | 274 | 299 | 323 | 348 | 373 | 398 | 448 | 498 |
| | $F_v$ | 41 | 45 | 50 | 54 | 59 | 63 | 68 | 72 | 82 | 91 |
| | E | 1481 | 1645 | 1810 | 1974 | 2139 | 2303 | 2468 | 2633 | 2962 | 3291 |
| **14 x 14** | W | 7688 | 8542 | 9397 | 10251 | 11105 | 11960 | 12814 | 13668 | 15377 | 17085 |
| | w | 240 | 266 | 293 | 320 | 347 | 373 | 400 | 427 | 480 | 533 |
| | $F_v$ | 31 | 35 | 38 | 42 | 45 | 49 | 52 | 56 | 63 | 70 |
| | E | 1919 | 2133 | 2346 | 2559 | 2773 | 2986 | 3199 | 3413 | 3839 | 4266 |
| **6 x 22** | W | 7944 | 8827 | 9710 | 10593 | 11475 | 12358 | 13241 | 14124 | 15889 | 17655 |
| | w | 248 | 275 | 303 | 331 | 358 | 386 | 413 | 441 | 496 | 551 |
| | $F_v$ | 50 | 55 | 61 | 67 | 72 | 78 | 83 | 89 | 100 | 111 |
| | E | 1205 | 1339 | 1473 | 1607 | 1741 | 1875 | 2009 | 2143 | 2411 | 2679 |
| **12 x 16** | W | 8633 | 9593 | 10552 | 11511 | 12471 | 13430 | 14389 | 15349 | 17267 | 19186 |
| | w | 269 | 299 | 329 | 359 | 389 | 419 | 449 | 479 | 539 | 599 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | E | 1672 | 1858 | 2043 | 2229 | 2415 | 2601 | 2787 | 2972 | 3344 | 3716 |
| **8 x 20** | W | 8912 | 9902 | 10892 | 11882 | 12873 | 13863 | 14853 | 15843 | 17824 | 19804 |
| | w | 278 | 309 | 340 | 371 | 402 | 433 | 464 | 495 | 557 | 618 |
| | $F_v$ | 45 | 50 | 55 | 60 | 66 | 71 | 76 | 81 | 91 | 101 |
| | E | 1329 | 1476 | 1624 | 1772 | 1919 | 2067 | 2215 | 2363 | 2658 | 2953 |
| **10 x 18** | W | 9091 | 10101 | 11112 | 12122 | 13132 | 14142 | 15152 | 16163 | 18183 | 20203 |
| | w | 284 | 315 | 347 | 378 | 410 | 441 | 473 | 505 | 568 | 631 |
| | $F_v$ | 41 | 45 | 50 | 54 | 59 | 63 | 68 | 72 | 82 | 91 |
| | E | 1481 | 1645 | 1810 | 1974 | 2139 | 2303 | 2468 | 2633 | 2962 | 3291 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **32' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **6 x 24** | W | 9491 | 10546 | 11601 | 12655 | 13710 | 14765 | 15819 | 16874 | 18983 | 21092 |
| | w | 296 | 329 | 362 | 395 | 428 | 461 | 494 | 527 | 593 | 659 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 85 | 91 | 97 | 110 | 122 |
| | E | 1102 | 1225 | 1348 | 1470 | 1593 | 1715 | 1838 | 1960 | 2205 | 2451 |
| **14 x 16** | W | 10135 | 11261 | 12387 | 13514 | 14640 | 15766 | 16892 | 18018 | 20271 | 22523 |
| | w | 316 | 351 | 387 | 422 | 457 | 492 | 527 | 563 | 633 | 703 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | E | 1672 | 1858 | 2043 | 2229 | 2415 | 2601 | 2787 | 2972 | 3344 | 3716 |
| **8 x 22** | W | 10833 | 12037 | 13241 | 14445 | 15649 | 16852 | 18056 | 19260 | 21667 | 24075 |
| | w | 338 | 376 | 413 | 451 | 489 | 526 | 564 | 601 | 677 | 752 |
| | $F_v$ | 50 | 55 | 61 | 67 | 72 | 78 | 83 | 89 | 100 | 111 |
| | E | 1205 | 1339 | 1473 | 1607 | 1741 | 1875 | 2009 | 2143 | 2411 | 2679 |
| **12 x 18** | W | 11005 | 12228 | 13451 | 14674 | 15897 | 17120 | 18343 | 19565 | 22011 | 24457 |
| | w | 343 | 382 | 420 | 458 | 496 | 535 | 573 | 611 | 687 | 764 |
| | $F_v$ | 41 | 45 | 50 | 54 | 59 | 63 | 68 | 72 | 82 | 91 |
| | E | 1481 | 1645 | 1810 | 1974 | 2139 | 2303 | 2468 | 2633 | 2962 | 3291 |
| **10 x 20** | W | 11288 | 12542 | 13797 | 15051 | 16305 | 17560 | 18814 | 20068 | 22577 | 25085 |
| | w | 352 | 391 | 431 | 470 | 509 | 548 | 587 | 627 | 705 | 783 |
| | $F_v$ | 45 | 50 | 55 | 60 | 66 | 71 | 76 | 81 | 91 | 101 |
| | E | 1329 | 1476 | 1624 | 1772 | 1919 | 2067 | 2215 | 2363 | 2658 | 2953 |
| **16 x 16** | W | 11637 | 12930 | 14223 | 15516 | 16809 | 18102 | 19395 | 20688 | 23274 | 25860 |
| | w | 363 | 404 | 444 | 484 | 525 | 565 | 606 | 646 | 727 | 808 |
| | $F_v$ | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 72 | 80 |
| | E | 1672 | 1858 | 2043 | 2229 | 2415 | 2601 | 2787 | 2972 | 3344 | 3716 |
| **14 x 18** | W | 12919 | 14355 | 15791 | 17226 | 18662 | 20097 | 21533 | 22968 | 25839 | 28710 |
| | w | 403 | 448 | 493 | 538 | 583 | 628 | 672 | 717 | 807 | 897 |
| | $F_v$ | 41 | 45 | 50 | 54 | 59 | 63 | 68 | 72 | 82 | 91 |
| | E | 1481 | 1645 | 1810 | 1974 | 2139 | 2303 | 2468 | 2633 | 2962 | 3291 |
| **8 x 24** | W | 12943 | 14381 | 15819 | 17257 | 18695 | 20134 | 21572 | 23010 | 25886 | 28763 |
| | w | 404 | 449 | 494 | 539 | 584 | 629 | 674 | 719 | 808 | 898 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 85 | 91 | 97 | 110 | 122 |
| | E | 1102 | 1225 | 1348 | 1470 | 1593 | 1715 | 1838 | 1960 | 2205 | 2451 |
| **12 x 20** | W | 13665 | 15183 | 16701 | 18220 | 19738 | 21257 | 22775 | 24293 | 27330 | 30367 |
| | w | 427 | 474 | 521 | 569 | 616 | 664 | 711 | 759 | 854 | 948 |
| | $F_v$ | 45 | 50 | 55 | 60 | 66 | 71 | 76 | 81 | 91 | 101 |
| | E | 1329 | 1476 | 1624 | 1772 | 1919 | 2067 | 2215 | 2363 | 2658 | 2953 |
| **10 x 22** | W | 13723 | 15247 | 16772 | 18297 | 19822 | 21346 | 22871 | 24396 | 27446 | 30495 |
| | w | 428 | 476 | 524 | 571 | 619 | 667 | 714 | 762 | 857 | 952 |
| | $F_v$ | 50 | 55 | 61 | 67 | 72 | 78 | 83 | 89 | 100 | 111 |
| | E | 1205 | 1339 | 1473 | 1607 | 1741 | 1875 | 2009 | 2143 | 2411 | 2679 |
| **16 x 18** | W | 14833 | 16482 | 18130 | 19778 | 21426 | 23075 | 24723 | 26371 | 29667 | 32964 |
| | w | 463 | 515 | 566 | 618 | 669 | 721 | 772 | 824 | 927 | 1030 |
| | $F_v$ | 41 | 45 | 50 | 54 | 59 | 63 | 68 | 72 | 82 | 91 |
| | E | 1481 | 1645 | 1810 | 1974 | 2139 | 2303 | 2468 | 2633 | 2962 | 3291 |
| **14 x 20** | W | 16041 | 17824 | 19606 | 21389 | 23171 | 24953 | 26736 | 28518 | 32083 | 35648 |
| | w | 501 | 557 | 612 | 668 | 724 | 779 | 835 | 891 | 1002 | 1114 |
| | $F_v$ | 45 | 50 | 55 | 60 | 66 | 71 | 76 | 81 | 91 | 101 |
| | E | 1329 | 1476 | 1624 | 1772 | 1919 | 2067 | 2215 | 2363 | 2658 | 2953 |
| **10 x 24** | W | 16394 | 18216 | 20038 | 21859 | 23681 | 25503 | 27324 | 29146 | 32789 | 36433 |
| | w | 512 | 569 | 626 | 683 | 740 | 796 | 853 | 910 | 1024 | 1138 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 85 | 91 | 97 | 110 | 122 |
| | E | 1102 | 1225 | 1348 | 1470 | 1593 | 1715 | 1838 | 1960 | 2205 | 2451 |

## WOOD BEAMS – SAFE LOAD TABLES

See instructions for use of tables on page 58.

Symbols used in the tables are as follows:

$F_b$ = Allowable unit stress in extreme fiber in bending, psi.
W = Total uniformly distributed load, pounds
w = Load per linear foot of beam, pounds
$F_v$ = Horizontal shear stress, psi, induced by load W
E = Modulus of elasticity, 1000 psi, induced by load W for $l/360$ limit

Beam sizes are expressed as nominal sizes, inches, but calculations are based on net dimensions of S4S sizes.

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **32'-0" SPAN CONT'D** | | | | | | | | | | | |
| **12 x 22** | W | 16612 | 18457 | 20303 | 22149 | 23995 | 25841 | 27686 | 29532 | 33224 | 36915 |
| | w | 519 | 576 | 634 | 692 | 749 | 807 | 865 | 922 | 1038 | 1153 |
| | $F_v$ | 50 | 55 | 61 | 67 | 72 | 78 | 83 | 89 | 100 | 111 |
| | E | 1205 | 1339 | 1473 | 1607 | 1741 | 1875 | 2009 | 2143 | 2411 | 2679 |
| **18 x 18** | W | 16748 | 18608 | 20469 | 22330 | 24191 | 26052 | 27913 | 29774 | 33496 | 37217 |
| | w | 523 | 581 | 639 | 697 | 755 | 814 | 872 | 930 | 1046 | 1163 |
| | $F_v$ | 41 | 45 | 50 | 54 | 59 | 63 | 68 | 72 | 82 | 91 |
| | E | 1481 | 1645 | 1810 | 1974 | 2139 | 2303 | 2468 | 2633 | 2962 | 3291 |
| **16 x 20** | W | 18418 | 20464 | 22511 | 24557 | 26604 | 28650 | 30697 | 32743 | 36836 | 40929 |
| | w | 575 | 639 | 703 | 767 | 831 | 895 | 959 | 1023 | 1151 | 1279 |
| | $F_v$ | 45 | 50 | 55 | 60 | 66 | 71 | 76 | 81 | 91 | 101 |
| | E | 1329 | 1476 | 1624 | 1772 | 1919 | 2067 | 2215 | 2363 | 2658 | 2953 |
| **14 x 22** | W | 19501 | 21667 | 23834 | 26001 | 28168 | 30335 | 32501 | 34668 | 39002 | 43335 |
| | w | 609 | 677 | 744 | 812 | 880 | 947 | 1015 | 1083 | 1218 | 1354 |
| | $F_v$ | 50 | 55 | 61 | 67 | 72 | 78 | 83 | 89 | 100 | 111 |
| | E | 1205 | 1339 | 1473 | 1607 | 1741 | 1875 | 2009 | 2143 | 2411 | 2679 |
| **12 x 24** | W | 19846 | 22051 | 24256 | 26461 | 28667 | 30872 | 33077 | 35282 | 39692 | 44103 |
| | w | 620 | 689 | 758 | 826 | 895 | 964 | 1033 | 1102 | 1240 | 1378 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 85 | 91 | 97 | 110 | 122 |
| | E | 1102 | 1225 | 1348 | 1470 | 1593 | 1715 | 1838 | 1960 | 2205 | 2451 |
| **18 x 20** | W | 20794 | 23105 | 25416 | 27726 | 30037 | 32347 | 34658 | 36968 | 41589 | 46210 |
| | w | 649 | 722 | 794 | 866 | 938 | 1010 | 1083 | 1155 | 1299 | 1444 |
| | $F_v$ | 45 | 50 | 55 | 60 | 66 | 71 | 76 | 81 | 91 | 101 |
| | E | 1329 | 1476 | 1624 | 1772 | 1919 | 2067 | 2215 | 2363 | 2658 | 2953 |
| **16 x 22** | W | 22390 | 24878 | 27365 | 29853 | 32341 | 34829 | 37317 | 39804 | 44780 | 49756 |
| | w | 699 | 777 | 855 | 932 | 1010 | 1088 | 1166 | 1243 | 1399 | 1554 |
| | $F_v$ | 50 | 55 | 61 | 67 | 72 | 78 | 83 | 89 | 100 | 111 |
| | E | 1205 | 1339 | 1473 | 1607 | 1741 | 1875 | 2009 | 2143 | 2411 | 2679 |
| **20 x 20** | W | 23171 | 25746 | 28320 | 30895 | 33469 | 36044 | 38619 | 41193 | 46342 | 51492 |
| | w | 724 | 804 | 885 | 965 | 1045 | 1126 | 1206 | 1287 | 1448 | 1609 |
| | $F_v$ | 45 | 50 | 55 | 60 | 66 | 71 | 76 | 81 | 91 | 101 |
| | E | 1329 | 1476 | 1624 | 1772 | 1919 | 2067 | 2215 | 2363 | 2658 | 2953 |
| **14 x 24** | W | 23298 | 25886 | 28475 | 31064 | 33652 | 36241 | 38830 | 41418 | 46596 | 51773 |
| | w | 728 | 808 | 889 | 970 | 1051 | 1132 | 1213 | 1294 | 1456 | 1617 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 85 | 91 | 97 | 110 | 122 |
| | E | 1102 | 1225 | 1348 | 1470 | 1593 | 1715 | 1838 | 1960 | 2205 | 2451 |
| **18 x 22** | W | 25279 | 28088 | 30896 | 33705 | 36514 | 39323 | 42132 | 44940 | 50558 | 56176 |
| | w | 789 | 877 | 965 | 1053 | 1141 | 1228 | 1316 | 1404 | 1579 | 1755 |
| | $F_v$ | 50 | 55 | 61 | 67 | 72 | 78 | 83 | 89 | 100 | 111 |
| | E | 1205 | 1339 | 1473 | 1607 | 1741 | 1875 | 2009 | 2143 | 2411 | 2679 |

## WOOD BEAMS – SAFE LOAD TABLES

| SIZE OF BEAM | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| **32' - 0" SPAN CONT'D** | | | | | | | | | | | |
| **16 x 24** | W | 26749 | 29721 | 32693 | 35666 | 38638 | 41610 | 44582 | 47554 | 53499 | 59443 |
| | w | 835 | 928 | 1021 | 1114 | 1207 | 1300 | 1393 | 1486 | 1671 | 1857 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 85 | 91 | 97 | 110 | 122 |
| | E | 1102 | 1225 | 1348 | 1470 | 1593 | 1715 | 1838 | 1960 | 2205 | 2451 |
| **20 x 22** | W | 28168 | 31298 | 34427 | 37557 | 40687 | 43817 | 46947 | 50077 | 56336 | 62596 |
| | w | 880 | 978 | 1075 | 1173 | 1271 | 1369 | 1467 | 1564 | 1760 | 1956 |
| | $F_v$ | 50 | 55 | 61 | 67 | 72 | 78 | 83 | 89 | 100 | 111 |
| | E | 1205 | 1339 | 1473 | 1607 | 1741 | 1875 | 2009 | 2143 | 2411 | 2679 |
| **18 x 24** | W | 30201 | 33556 | 36912 | 40268 | 43623 | 46979 | 50335 | 53690 | 60402 | 67113 |
| | w | 943 | 1048 | 1153 | 1258 | 1363 | 1468 | 1572 | 1677 | 1887 | 2097 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 85 | 91 | 97 | 110 | 122 |
| | E | 1102 | 1225 | 1348 | 1470 | 1593 | 1715 | 1838 | 1960 | 2205 | 2451 |
| **22 x 22** | W | 31057 | 34508 | 37959 | 41409 | 44860 | 48311 | 51762 | 55213 | 62114 | 69016 |
| | w | 970 | 1078 | 1186 | 1294 | 1401 | 1509 | 1617 | 1725 | 1941 | 2156 |
| | $F_v$ | 50 | 55 | 61 | 67 | 72 | 78 | 83 | 89 | 100 | 111 |
| | E | 1205 | 1339 | 1473 | 1607 | 1741 | 1875 | 2009 | 2143 | 2411 | 2679 |
| **20 x 24** | W | 33652 | 37391 | 41131 | 44870 | 48609 | 52348 | 56087 | 59827 | 67305 | 74783 |
| | w | 1051 | 1168 | 1285 | 1402 | 1519 | 1635 | 1752 | 1869 | 2103 | 2336 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 85 | 91 | 97 | 110 | 122 |
| | E | 1102 | 1225 | 1348 | 1470 | 1593 | 1715 | 1838 | 1960 | 2205 | 2451 |
| **22 x 24** | W | 37104 | 41226 | 45349 | 49472 | 53595 | 57717 | 61840 | 65963 | 74208 | 82453 |
| | w | 1159 | 1288 | 1417 | 1546 | 1674 | 1803 | 1932 | 2061 | 2319 | 2576 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 85 | 91 | 97 | 110 | 122 |
| | E | 1102 | 1225 | 1348 | 1470 | 1593 | 1715 | 1838 | 1960 | 2205 | 2451 |
| **24 x 24** | W | 40555 | 45062 | 49568 | 54074 | 58580 | 63086 | 67593 | 72099 | 81111 | 90124 |
| | w | 1267 | 1408 | 1549 | 1689 | 1830 | 1971 | 2112 | 2253 | 2534 | 2816 |
| | $F_v$ | 55 | 61 | 67 | 73 | 79 | 85 | 91 | 97 | 110 | 122 |
| | E | 1102 | 1225 | 1348 | 1470 | 1593 | 1715 | 1838 | 1960 | 2205 | 2451 |

## WOOD COLUMNS

Notations

Except where otherwise noted, the following symbols are used in the formulas for columns and other compression members:

| | | |
|---|---|---|
| $A$ | = | area of cross section, $in^2$ |
| $C_D$ | = | load duration factor |
| $C_M$ | = | wet service factor |
| $C_t$ | = | temperature factor |
| $d$ | = | least dimension of rectangular compression member, inches |
| $d_1, d_2$ | = | cross-sectional dimensions of rectangular compression member in planes of lateral support, inches |
| $E, E'$ | = | tabulated and allowable modulus of elasticity, psi |
| $F_b, F_b'$ | = | tabulated and allowable bending design value, psi |
| $F_{b1}'$ | = | allowable edgewise bending design value, psi |
| $F_{bE}$ | = | *critical buckling design value for bending members, psi* |
| $f_b$ | = | actual bending stress, psi |
| $f_{b1}$ | = | actual edgewise bending stress, psi |
| $F_c, F_c'$ | = | tabulated and allowable compression design value parallel to grain, psi |
| $F_{cE}$ | = | critical buckling design value for compression members, psi |
| $F_{cE1}$ | = | critical buckling design value for compression members in planes of lateral support, psi |
| $f_c$ | = | actual compression stress parallel to grain, psi |
| $K_{cE}$ | = | Euler buckling coefficient for columns |
| $K_x$ | = | spaced column fixity coefficient |
| $\ell$ | = | distance between points of lateral support of compression member, inches |
| $\ell_e/d$ | = | slenderness ratio of compression member |
| $\ell_1, \ell_2$ | = | distances between points of lateral support of compression member in planes 1 and 2, inches |
| $\ell_3$ | = | distance from center of spacer block to centroid of group of split ring or shear plate connectors in end block for a spaced column, inches |
| psi | = | pounds per square inch |

# WOOD COLUMNS

## General Design Information

Investigation of the strength of a wood column or other member loaded to induce compression parallel to grain should take into consideration the following factors:

Type of column, whether solid, spaced or built-up member.

Shape of cross section, whether rectangular, round or other form.

Cross-sectional area of column.

Slenderness ratio or relation of laterally unsupported length to least dimension of cross section or radius of gyration.

Degree of end fixity.

Amount and type of loading, whether axial only or axial combined with bending.

Design values for species and grade of lumber used.

### Type and Shape of Column

The most common wood column is a solid member of rectangular or round cross section. Under certain conditions, members may be nailed or bolted together to form larger columns but because of the possibility of movement along the joint, such members have lower load capacity than sawn or round columns.

Spaced columns which consist of two or more pieces with spacer blocks between are frequently used as top chords of wood trusses. Because ends of the members of a spaced column are restrained, the degree of end fixity for a spaced column is greater than for the type of simple column described in the preceding paragraph. The side members and spacer blocks of spaced columns are connected by means of bolts or bolts and split-ring connectors.

### Net Sizes of Lumber

Lumber is customarily specified in terms of nominal sizes but calculations must be made on the basis of net dimensions which are tabulated herein for lumber surfaced four sides (S4S).

### Slenderness Ratio for a Column

The slenderness ratio of a column is a measure of its stiffness. Since the maximum unit axial stress for a column is calculated through use of the slenderness ratio, it has an important bearing on the load a column will support.

The slenderness ratio is the laterally unsupported length in inches divided by the appropriate cross-sectional dimension in inches. The laterally unsupported length, $\ell$, is measured parallel to the longitudinal axis and is the distance between supports which restrain the column against lateral movement in the direction in which the cross-sectional dimension, d, is measured. This is illustrated in Figure 12.

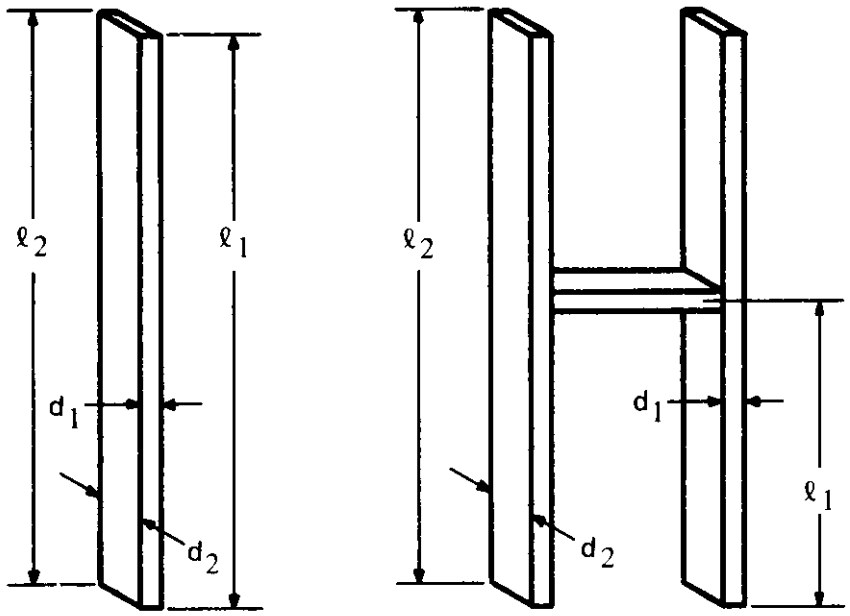



**Figure 12. Slenderness, Ratio $\ell/d$, for Simple Solid Columns**

The cross-sectional dimension, d, of the column is measured perpendicular to the longitudinal axis of the column, on the face which is parallel to the plane of lateral support. Since each rectangular column has two faces, and two major axes or planes for lateral support, both slenderness ratios, $\ell_1/d_1$ and $\ell_2/d_2$, should be checked and the larger one used in design.

Design Stresses

Design values applicable to design of wood columns or other compression members for the most frequently encountered conditions of use are given in the National Design Specification for Wood Construction. As indicated therein, these design values may be subject to adjustment for different moisture service conditions or durations of loading.

Moisture service condition modification factors are given in the National Design Specification for Wood Construction. Modification factors for duration of load are described on pages 13 to 15 herein. Modulus of elasticity design values, E, are not subject to adjustment for duration of load.

All modifications of design values should be made before calculating the column working stress, $F_c'$. Calculated values of $F_c'$ are not subject to further adjustment for moisture service condition or duration of loading.

## WOOD COLUMNS

### Solid Columns

The tabulated compression design value, $F_c$, shall be multiplied by all applicable adjustment factors to determine the allowable compression design value, $F_c'$, for square or rectangular simple, solid columns. The column stability factor, $C_P$, shall be calculated as follows:

$$C_P = \frac{1+(F_{cE}/F_c^*)}{2c} - \sqrt{\left[\frac{1+(F_{cE}/F_c^*)}{2c}\right]^2 - \frac{F_{cE}/F_c^*}{c}}$$

in which

$F_c^*$ = tabulated compression design value multiplied by all applicable adjustment factors except $C_P$
$F_{cE}$ = $K_{cE}\, E'/(\ell_e/d)^2$
$K_{cE}$ = 0.3 for visually graded lumber and MEL
$K_{cE}$ = 0.418 for products with $COV_E \leq 0.11$ (see NDS Appendix F.2)
c = 0.8 for sawn lumber
c = 0.85 for round timber piles
c = 0.9 for glued laminated timber

When a compression member is supported throughout its length to prevent lateral displacement in all directions, $C_P = 1.0$.

### Limitation on $\ell_e/d$ Ratio

The slenderness ratio for solid columns, $\ell_e/d$, shall not exceed 50, except that during construction $\ell_e/d$ shall not exceed 75.

### Column Fixity

The effective column length, $\ell_e$, for a solid column shall be determined in accordance with good engineering practice. The formulas for solid columns are based on pin-end conditions but may also be applied to square-end conditions. Where column end conditions provide less stability than pin-end conditions, the effective length of the column for design purposes shall be increased accordingly. Where column end conditions provide greater stability than pin-end conditions, such as may occur for a truss compression chord or when a column is continuous through more than one story, the increased degree of fixity should be evaluated and the effective length of the column for design purposes may be reduced accordingly. Actual column length shall be permitted to be multiplied by the appropriate buckling length coefficient specified in NDS Appendix G to determine effective column length, $\ell_e = (K_e)(\ell)$.

For solid columns with rectangular cross section, the slenderness ratio, $\ell_e/d$, shall be taken as the larger of the ratios $\ell_{e1}/d_1$ or $\ell_{e2}/d_2$ (see Figure 12) where each ratio has been adjusted by the appropriate buckling length coefficient, $K_e$, from NDS Appendix G.

### Round Columns

The design load for a column of round cross section may be taken as the same as that for a square column of the same cross-sectional area. Thus, the d used in determining the $\ell_e/d$ ratio should be 0.886 times the diameter of the round column.

### Tapered Round Columns

For design of a column with rectangular cross section, tapered at one or both ends, the representative dimension, d, for each face of the column shall be derived as follows:

$$d = d_{min} + (d_{max} - d_{min})\left[a - 0.15\left(1 - \frac{d_{min}}{d_{max}}\right)\right]$$

in which

$d_{min}$ = the minimum dimension for that face of the column
$d_{max}$ = the maximum dimension for that face of the column

Support Conditions

Large end fixed, small end unsupported or simply supported — a = 0.70

Small end fixed, large end unsupported or simply supported — a = 0.30

Both ends simply supported:

Tapered toward one end — a = 0.50
Tapered toward both ends — a = 0.70

For all other support conditions:

$$d = d_{min} + (d_{max} - d_{min})(1/3)$$

Calculations of $f_c$ and $C_P$ shall be based on the representative dimension, d. In addition, $f_c$ at any cross section in the tapered column shall not exceed the tabulated compression design value parallel to grain multiplied by all applicable adjustment factors except the column stability factor, $f_c \leq (F_c)(C_D)(C_M)(C_t)$.

### Built-Up Columns with Mechanical Fastenings

Arrangement of laminations joined by nails, bolts or other mechanical fastenings into a built-up column assembly will not make a column fully equal in strength to a one-piece member of comparable material and dimensions. The following provisions apply to nailed or bolted built-up columns with 2 to 5 laminations in which each lamination has a rectangular cross section and is at least 1-1/2" thick. The provisions also require that all laminations have the same depth (face width), d, that faces of adjacent laminations are in contact and all laminations are full column length. Adequate nailing or bolting shall be required in accordance with NDS criteria (sections 15.3.3 or 15.3.4). When individual laminations are of different species, grades, or thicknesses, the lesser allowable compression parallel to grain design value, $F_c'$, and modulus of elasticity, E′, for the weakest lamination shall apply.

The column stability factor, $C_P$, shall be calculated in accordance with provisions found on page 203. The column stability factor, $C_P$, shall be modified (multiplied) by 0.60 for built-up columns nailed in accordance with NDS section 15.3.3 or by 0.75 for built-up columns bolted in accordance with NDS section 15.3.4. The effective column length, $\ell_e$, and slenderness ratio, $\ell_e/d$, shall be determined in accordance with provisions found on page 203.

### Spaced Columns

Spaced columns are formed of two or more individual solid members with their longitudinal axes parallel, separated at the ends and at one or more intermediate points of their length by blocking and joined at the ends by split ring or shear plate connectors capable of developing the required shear resistance. As a result of the end fixity developed by the split ring or shear plate connectors and spacer blocks, the maximum unit stress, $F_c'$, for members of spaced columns may be greater than that allowed for simple solid columns having the same $\ell_e/d$ ratio. A greater $\ell_e/d$ ratio may also be accepted for the members of spaced columns. The design load for a spaced column shall be the sum of the design loads for each of its individual members.

Spaced columns are classified as to degree of end fixity; i.e., end condition "a" or end condition "b". The magnitude of the spaced column fixity factor, $K_x$, is determined by the end condition. This is illustrated in Figure 14.

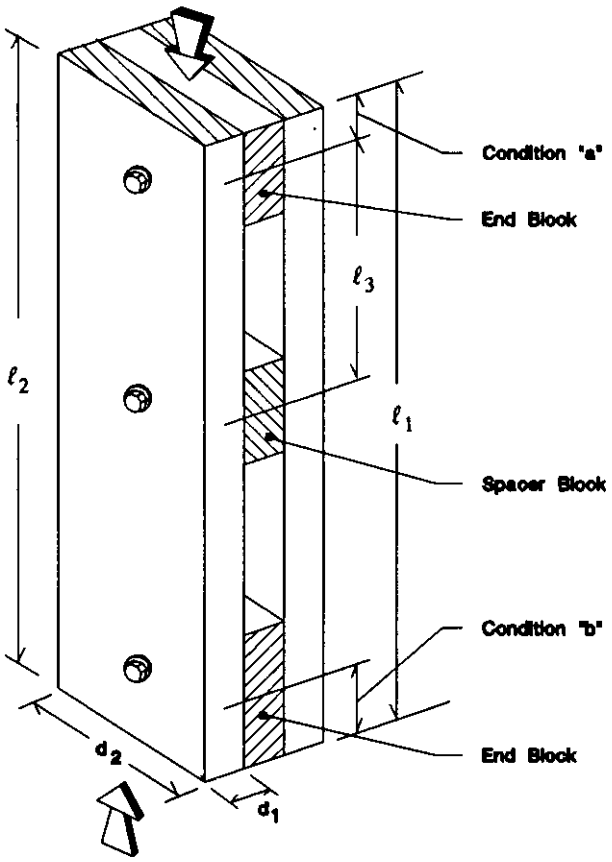



**Figure 14. Spaced Column Joined by Split Ring or Shear Plate Connectors**

Condition "a": end distance $\leq \ell_1/20$; $K_x=2.5$

$\ell_1$ and $\ell_2$ = distance between points of lateral support in planes 1 and 2, measured from center to center of lateral supports for continuous spaced columns, and measured from end to end for simple spaced columns, inches.

$\ell_3$ = distance from center of spacer block to centroid of the group of split ring or shear plate connectors in end blocks, inches.

$d_1$ and $d_2$ = cross-sectional dimensions of individual rectangular compression members in planes of lateral support, inches.

Condition "b": $\ell_1/20 <$ end distance $\leq \ell_1/10$; $K_x=3.0$.

Spacer and End Block Provisions

When a single spacer block is located within the middle tenth of the column length, $\ell_1$, split ring or shear plate connectors shall not be required for this block. If there are two or more spacer blocks, split ring or shear plate connectors shall be required and the distance between two adjacent blocks shall not exceed 1/2 the distance between centers of split ring or shear plate connectors in the end blocks.

For spaced columns used as compression members of a truss, a panel point which is stayed laterally shall be considered as the end of the spaced column, and the portion of the web members, between the individual pieces making up a spaced column, shall be permitted to be considered as the end blocks.

Dimensions for Spacer and End Blocks

Thickness of spacer and end blocks shall not be less than that of individual members of the spaced column nor shall thickness, width, and length of spacer and end blocks be less than required for split ring or shear plate connectors of a size and number capable of carrying the load computed in 15.2.2.5. Blocks thicker than a side member do not appreciably increase load capacity.

Connectors in End Blocks

To obtain spaced column action the split ring or shear plate connectors in each mutually contacting surface of end block and individual member at each end of a spaced column shall provide the appropriate load capacity specified in the NDS.

Design of Spaced Columns

The effective column length, $\ell_e$, for a spaced column shall be determined in accordance with good engineering practice. Actual column length shall be permitted to be multiplied by the appropriate buckling length coefficient specified in NDS Appendix G to determine effective column length, $\ell_e = (K_e)(\ell)$, except that the effective column length, $\ell_e$, shall not be less than the actual column length, $\ell$.

For individual members of a spaced column (see Figure 14):

(a) $\ell_1/d_1$ shall not exceed 80, where $\ell_1$ is the distance between lateral supports that provide restraint perpendicular to the wide faces of the individual members.
(b) $\ell_2/d_2$ shall not exceed 50, where $\ell_2$ is the distance between lateral supports that provide restraint in a direction parallel to the wide faces of the individual members.
(c) $\ell_3/d_1$ shall not exceed 40, where $\ell_3$ is the distance between the center of the spacer block and the centroid of the group of split ring or shear plate connectors in an end block.

The column stability factor shall be calculated as follows:

$$C_P = \frac{1+(F_{cE}/F_c^*)}{2c} - \sqrt{\left[\frac{1+(F_{cE}/F_c^*)}{2c}\right]^2 - \frac{F_{cE}/F_c^*}{c}}$$

in which
$F_c^*$ = tabulated compression design value multiplied by all applicable adjustment factors except $C_P$ (see 2.3)
$F_{cE} = K_{cE} K_x E' / (\ell_e/d)^2$
$K_{cE}$ = 0.3 for visually graded lumber and machine evaluated lumber (MEL)
$K_{cE}$ = 0.418 for products with $COV_E \leq 0.11$ (see NDS Appendix F.2)

$K_x$ = 2.5 for fixity condition "a"
$K_x$ = 3.0 for fixity condition "b"
c = 0.8 for sawn lumber
c = 0.9 for glued laminated timber

When individual members of a spaced column are of different species, grades, or thicknesses, the lesser allowable compression parallel to grain design value, $F_c'$, for the weaker member shall apply to both members.

The allowable compression parallel to grain design value, $F_c'$, for a spaced column shall not exceed the allowable compression parallel to grain design value, $F_c'$, for the individual members evaluated as solid columns without regard to fixity in accordance with page 203 using the column slenderness ratio $\ell_2/d_2$ (see Figure 14).

**Combined Axial and Bending Loading**

The equations on page 34 for combined flexure and axial loading apply to spaced columns only for uniaxial bending in a direction parallel to the wide face of the individual member (dimension $d_2$ in Figure 14). Such members are in equilibrium when:

$$\left[\frac{f_c}{F_c'}\right]^2 + \frac{f_{b1}}{F_{b1}'[1-(f_c/F_{cE1})]} \le 1.0$$

in which

$f_c < F_{cE1}$ = $K_{cE} E' / (\ell_{e1}/d_1)^2$

$f_{b1}$ = actual edgewise bending stress (bending load applied to narrow face of member)
$d_1$ = wide face dimension
$d_2$ = narrow face dimension

Effective column length, $\ell_{e1}$ shall be determined in accordance with page 203. $F_c'$ and $F_{cE1}$ shall be determined in accordance with page 203 using the slenderness ratio, $\ell_e/d$, applicable to the plane being checked. $F_{b1}'$ shall be determined in accordance with page 32. The load duration factor, $C_D$, associated with the shortest duration load in a combination of loads shall be permitted to be used to calculate $F_c'$ and $F_{b1}'$. All applicable load combinations shall be evaluated to determine the critical load combination (see pages 14 and 15).

### Solution of Hankinson Formula

The compressive strength of wood depends on the direction of the applied load. It is highest parallel to the grain and lowest perpendicular to grain. The variation in strength at angles between parallel and perpendicular is determined by the Hankinson formula which is as follows:

$$F_n = \frac{F_g F_{c\perp}}{F_g \sin^2\theta + F_{c\perp} \cos^2\theta}$$

$F_g$ = design value for end grain in bearing parallel to the grain, psi.

$F_{c\perp}$ = design value in compression perpendicular to the grain, psi.

$\theta$ = Angle between the direction of grain and direction of load normal to the face considered.

$F_n$ = design value in compression at inclination $\theta$ with the direction of grain.

The Hankinson formula is for the condition where the loaded surface is perpendicular to the direction of the load. Where the resultant force is at an angle other than 90° with the surface under construction, the angle $\theta$ is the angle between the direction of grain and the direction of the force component which is perpendicular to the surface.

The following table lists $\sin^2\theta$ and $\cos^2\theta$ for various angles of $\theta$ :

| $\sin^2\theta$ | $\theta$ | $\cos^2\theta$ | $\sin^2\theta$ | $\theta$ | $\cos^2\theta$ |
|---|---|---|---|---|---|
| 0.00000 | 0 | 1.00000 | .58682 | 50 | .41318 |
| .00760 | 5 | .99240 | .67101 | 55 | .32899 |
| .03015 | 10 | .96985 | .75000 | 60 | .25000 |
| .06698 | 15 | .93302 | .82140 | 65 | .17860 |
| .11698 | 20 | .88302 | .88302 | 70 | .11698 |
| .17860 | 25 | .82140 | .93302 | 75 | .06698 |
| .25000 | 30 | .75000 | .96985 | 80 | .03015 |
| .32899 | 35 | .67101 | .99240 | 85 | .00760 |
| .41318 | 40 | .58682 | 1.00000 | 90 | .00000 |
| .50000 | 45 | .50000 | | | |

Graphic solution to the Hankinson formula is shown in Figure 15. EXAMPLE: Assume an $F_g$ value of 960 psi, and $F_{c\perp}$ value of 360 psi and an angle $\theta$ of 35°. On line AB locate 360 psi and project to line AC. On same line AB locate 960 psi and project to point m on line. Where line m-n intersects the radial for 35° project to line AB and read 620 psi.

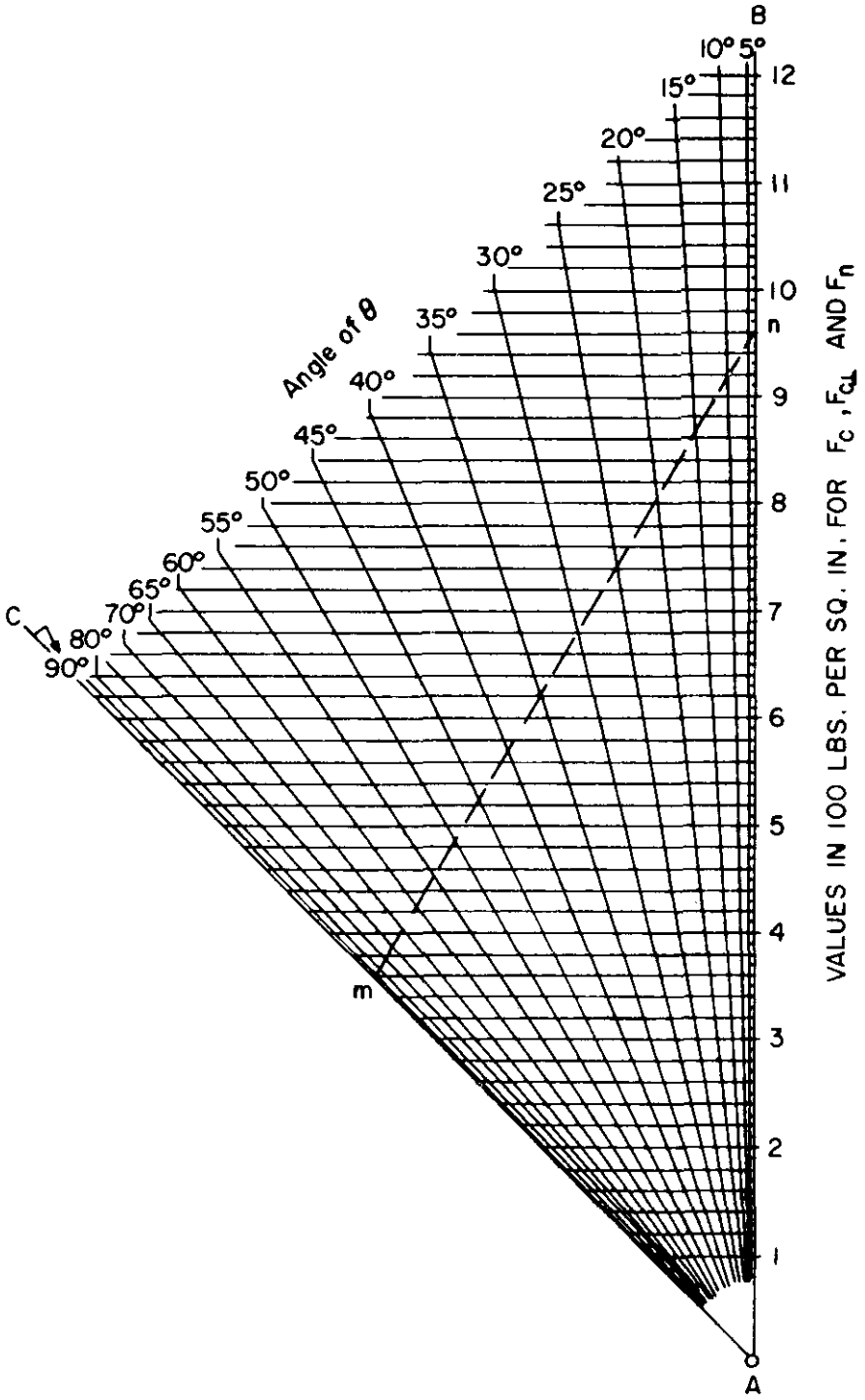



Figure 15. Graphic Solution of Hankinson Formula

# WOOD COLUMNS

## Use of Tabular Column Data

The tabular data included herein for unit axial stresses provides a simplified and accurate method for calculating design loads on columns of any size and length. The load is determined by multiplying the appropriate tabular unit stress by the cross-sectional area of the member, based on net dimensions. Where the degree of refinement so indicates, the weight of the column should be deducted to determine the design load which may be applied.

Unit axial stresses are provided for simple solid columns, spaced columns with end condition "a" and spaced columns with end condition "b".

### Ratio of $\ell/d$

The $\ell/d$ ratio is calculated in the manner previously described in the text on wood columns. Values of $F_c'$ for $\ell/d$ ratios intermediate to those given may be determined by straight line interpolation. For example, a simple, solid column having an $F_c$ of 1,200 psi and E of 1,600,000 psi, the $F_c'$ for an $\ell/d$ of 28 is 529 psi and the $F_c'$ for an $\ell/d$ of 29 is 500 psi. For an $\ell/d$ of 28.4, the $F_c'$ is 500 + 0.6(529-500) = 517.4 psi.

### Design Values of E and $F_c$

*Modulus of elasticity, E, and compression parallel to grain, $F_c$, design values for the species and grade of wood to* be used may be obtained from the National Design Specification for Wood Construction. If appropriate, E and $F_c$ should be adjusted as previously described for the conditions under which the column will be used.

Tabular values of $F_c'$ are provided for a range of E values from 2,100,000 to 900,000 psi, for $F_c$ values between 200 and 3,600 psi as appropriate for each E. Values of $F_c'$ for $F_c$ values intermediate to those tabulated may be determined by straight line interpolation. For example, for an $\ell/d$ of 25 and E of 1,400,000 psi, the $F_c'$ for an $F_c$ of 1000 psi is 543 psi and the $F_c'$ for an $F_c$ of 800 psi is 502 psi. For an $F_c$ of 875 psi, the interpolated $F_c'$ is 502 + 75/200 (543-502)=517.4 psi.

### Use of Tabular Data for Round Columns

Unit axial loads for simple solid columns of square cross section may be converted to unit loads for round columns. First, multiply the column diameter by 0.886 to determine the dimension, d, and then calculate the $\ell/d$ ratio. From the tabular data obtain the applicable $F_c'$ for that $\ell/d$ ratio and multiply this by the cross sectional area of the round column to determine the design load for the column.

Conversely, to determine the diameter of a round column required to carry the same total load as a square column, multiply the dimension d of the square column by 1.128.

## UNIT AXIAL STRESSES - SIMPLE SOLID COLUMNS - l/d from 2 to 30

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| | 4000 | 3979 | 3914 | 3790 | 3588 | 3285 | 3094 | 2884 | 2665 | 2445 | 2234 | 2038 | 1858 | 1695 | 1549 | 1419 | 1303 | 1199 | 1106 | 1023 | 949 | 882 | 822 | 767 | 718 | 673 |
| | 3800 | 3781 | 3722 | 3612 | 3432 | 3162 | 2992 | 2802 | 2600 | 2396 | 2197 | 2010 | 1836 | 1679 | 1537 | 1409 | 1295 | 1193 | 1101 | 1019 | 945 | 879 | 819 | 765 | 716 | 671 |
| | 3600 | 3583 | 3530 | 3432 | 3274 | 3035 | 2884 | 2714 | 2530 | 2342 | 2156 | 1978 | 1812 | 1660 | 1522 | 1398 | 1286 | 1185 | 1095 | 1014 | 941 | 876 | 816 | 763 | 714 | 669 |
| | 3400 | 3385 | 3338 | 3252 | 3112 | 2904 | 2770 | 2619 | 2454 | 2282 | 2110 | 1943 | 1785 | 1639 | 1506 | 1385 | 1275 | 1177 | 1088 | 1009 | 937 | 872 | 813 | 760 | 711 | 667 |
| | 3200 | 3187 | 3145 | 3069 | 2948 | 2767 | 2650 | 2518 | 2371 | 2216 | 2058 | 1903 | 1754 | 1615 | 1487 | 1370 | 1264 | 1168 | 1081 | 1002 | 932 | 867 | 809 | 757 | 709 | 665 |
| | 3000 | 2988 | 2952 | 2886 | 2781 | 2625 | 2525 | 2409 | 2281 | 2143 | 2000 | 1857 | 1719 | 1588 | 1465 | 1353 | 1250 | 1157 | 1072 | 995 | 925 | 862 | 805 | 753 | 706 | 662 |
| | 2800 | 2790 | 2758 | 2701 | 2611 | 2479 | 2393 | 2294 | 2183 | 2062 | 1935 | 1805 | 1678 | 1556 | 1440 | 1333 | 1234 | 1144 | 1061 | 986 | 918 | 856 | 800 | 749 | 702 | 659 |
| 2100000 | 2600 | 2591 | 2564 | 2516 | 2439 | 2327 | 2255 | 2172 | 2077 | 1973 | 1862 | 1746 | 1631 | 1518 | 1411 | 1309 | 1215 | 1129 | 1049 | 976 | 910 | 850 | 794 | 744 | 698 | 656 |
| | 2400 | 2393 | 2370 | 2329 | 2265 | 2172 | 2112 | 2042 | 1963 | 1875 | 1779 | 1679 | 1576 | 1475 | 1376 | 1281 | 1193 | 1110 | 1034 | 964 | 900 | 841 | 787 | 738 | 693 | 651 |
| | 2200 | 2194 | 2175 | 2140 | 2088 | 2011 | 1963 | 1906 | 1841 | 1768 | 1688 | 1602 | 1513 | 1423 | 1334 | 1248 | 1166 | 1088 | 1016 | 950 | 888 | 831 | 779 | 731 | 687 | 646 |
| | 2000 | 1995 | 1979 | 1951 | 1908 | 1847 | 1808 | 1762 | 1710 | 1651 | 1586 | 1515 | 1440 | 1362 | 1284 | 1207 | 1133 | 1062 | 994 | 931 | 873 | 819 | 768 | 722 | 679 | 640 |
| | 1800 | 1796 | 1783 | 1761 | 1727 | 1678 | 1647 | 1612 | 1571 | 1525 | 1473 | 1416 | 1355 | 1291 | 1224 | 1158 | 1092 | 1028 | 967 | 909 | 854 | 803 | 755 | 711 | 670 | 632 |
| | 1600 | 1597 | 1587 | 1569 | 1543 | 1505 | 1482 | 1455 | 1424 | 1389 | 1349 | 1305 | 1257 | 1206 | 1152 | 1097 | 1041 | 986 | 931 | 879 | 829 | 782 | 738 | 696 | 657 | 621 |
| | 1400 | 1397 | 1390 | 1376 | 1357 | 1329 | 1312 | 1292 | 1269 | 1243 | 1214 | 1182 | 1146 | 1107 | 1066 | 1022 | 977 | 931 | 886 | 841 | 797 | 755 | 715 | 677 | 641 | 607 |
| | 1200 | 1198 | 1193 | 1183 | 1169 | 1149 | 1137 | 1123 | 1107 | 1089 | 1068 | 1046 | 1020 | 993 | 963 | 931 | 897 | 862 | 826 | 790 | 754 | 718 | 683 | 650 | 618 | 587 |
| | 3600 | 3582 | 3527 | 3423 | 3254 | 3000 | 2839 | 2660 | 2470 | 2277 | 2089 | 1911 | 1747 | 1597 | 1462 | 1341 | 1232 | 1135 | 1048 | 970 | 900 | 837 | 780 | 728 | 682 | 639 |
| | 3400 | 3384 | 3335 | 3243 | 3095 | 2872 | 2731 | 2571 | 2399 | 2222 | 2047 | 1879 | 1722 | 1578 | 1447 | 1329 | 1223 | 1128 | 1042 | 965 | 896 | 833 | 777 | 726 | 679 | 637 |
| | 3200 | 3186 | 3143 | 3062 | 2933 | 2740 | 2616 | 2475 | 2322 | 2161 | 2000 | 1843 | 1695 | 1557 | 1431 | 1316 | 1213 | 1119 | 1035 | 959 | 891 | 830 | 774 | 723 | 677 | 635 |
| | 3000 | 2988 | 2950 | 2880 | 2768 | 2602 | 2495 | 2373 | 2237 | 2094 | 1947 | 1802 | 1663 | 1532 | 1411 | 1301 | 1200 | 1109 | 1027 | 953 | 886 | 825 | 770 | 720 | 674 | 633 |
| | 2800 | 2789 | 2756 | 2696 | 2600 | 2459 | 2367 | 2262 | 2145 | 2019 | 1887 | 1755 | 1626 | 1503 | 1389 | 1283 | 1186 | 1098 | 1018 | 945 | 879 | 820 | 765 | 716 | 671 | 630 |
| 2000000 | 2600 | 2591 | 2562 | 2511 | 2430 | 2311 | 2234 | 2145 | 2045 | 1935 | 1819 | 1701 | 1583 | 1470 | 1362 | 1262 | 1169 | 1084 | 1007 | 936 | 872 | 813 | 760 | 712 | 667 | 627 |
| | 2400 | 2392 | 2368 | 2325 | 2257 | 2158 | 2094 | 2020 | 1936 | 1843 | 1743 | 1639 | 1533 | 1430 | 1331 | 1237 | 1149 | 1068 | 994 | 925 | 863 | 806 | 754 | 706 | 663 | 623 |
| | 2200 | 2193 | 2173 | 2137 | 2081 | 2000 | 1948 | 1887 | 1818 | 1741 | 1657 | 1567 | 1475 | 1383 | 1293 | 1207 | 1125 | 1049 | 978 | 912 | 852 | 797 | 746 | 700 | 657 | 618 |
| | 2000 | 1995 | 1978 | 1948 | 1903 | 1838 | 1796 | 1748 | 1692 | 1629 | 1560 | 1486 | 1407 | 1328 | 1248 | 1170 | 1095 | 1024 | 958 | 896 | 839 | 786 | 737 | 692 | 651 | 613 |
| | 1800 | 1796 | 1782 | 1759 | 1722 | 1671 | 1638 | 1600 | 1557 | 1507 | 1452 | 1392 | 1328 | 1261 | 1193 | 1125 | 1058 | 994 | 933 | 876 | 822 | 772 | 725 | 682 | 642 | 605 |
| | 1600 | 1597 | 1586 | 1567 | 1540 | 1500 | 1475 | 1446 | 1413 | 1376 | 1333 | 1287 | 1236 | 1182 | 1126 | 1069 | 1012 | 956 | 902 | 849 | 800 | 753 | 710 | 669 | 631 | 596 |
| | 1400 | 1397 | 1389 | 1375 | 1354 | 1325 | 1307 | 1285 | 1261 | 1234 | 1202 | 1168 | 1130 | 1089 | 1045 | 1000 | 953 | 907 | 860 | 815 | 771 | 729 | 689 | 652 | 616 | 583 |

## UNIT AXIAL STRESSES - SIMPLE SOLID COLUMNS - l/d from 2 to 30

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| | 3600 | 3582 | 3523 | 3412 | 3232 | 2960 | 2790 | 2602 | 2405 | 2208 | 2018 | 1841 | 1679 | 1532 | 1401 | 1283 | 1178 | 1084 | 1000 | 926 | 858 | 798 | 743 | 694 | 649 | 609 |
| | 3400 | 3384 | 3331 | 3234 | 3076 | 2837 | 2687 | 2519 | 2340 | 2158 | 1981 | 1813 | 1657 | 1516 | 1388 | 1273 | 1170 | 1078 | 995 | 921 | 855 | 795 | 741 | 692 | 647 | 607 |
| | 3200 | 3185 | 3139 | 3054 | 2916 | 2709 | 2577 | 2429 | 2268 | 2103 | 1938 | 1780 | 1632 | 1496 | 1373 | 1261 | 1160 | 1070 | 989 | 916 | 850 | 791 | 738 | 689 | 645 | 605 |
| | 3000 | 2987 | 2947 | 2873 | 2754 | 2575 | 2461 | 2332 | 2190 | 2040 | 1890 | 1743 | 1604 | 1474 | 1355 | 1247 | 1150 | 1061 | 982 | 910 | 846 | 787 | 734 | 686 | 643 | 603 |
| | 2800 | 2789 | 2754 | 2690 | 2588 | 2436 | 2339 | 2227 | 2103 | 1971 | 1835 | 1701 | 1571 | 1449 | 1335 | 1232 | 1137 | 1051 | 974 | 903 | 840 | 782 | 730 | 683 | 640 | 601 |
| | 2600 | 2590 | 2560 | 2506 | 2420 | 2292 | 2210 | 2115 | 2009 | 1893 | 1773 | 1651 | 1532 | 1419 | 1312 | 1213 | 1122 | 1039 | 964 | 895 | 833 | 777 | 726 | 679 | 636 | 598 |
| | 2400 | 2392 | 2366 | 2320 | 2248 | 2142 | 2074 | 1995 | 1905 | 1807 | 1702 | 1595 | 1487 | 1383 | 1284 | 1191 | 1104 | 1025 | 952 | 886 | 825 | 770 | 720 | 674 | 632 | 594 |
| 1900000 | 2200 | 2193 | 2172 | 2134 | 2074 | 1987 | 1932 | 1867 | 1793 | 1711 | 1622 | 1529 | 1435 | 1341 | 1250 | 1164 | 1083 | 1007 | 938 | 874 | 816 | 762 | 713 | 669 | 628 | 590 |
| | 2000 | 1994 | 1977 | 1945 | 1897 | 1828 | 1783 | 1731 | 1672 | 1605 | 1532 | 1453 | 1372 | 1290 | 1209 | 1131 | 1056 | 986 | 921 | 860 | 804 | 752 | 705 | 662 | 622 | 585 |
| | 1800 | 1795 | 1781 | 1756 | 1718 | 1663 | 1628 | 1587 | 1541 | 1488 | 1430 | 1366 | 1299 | 1229 | 1159 | 1090 | 1023 | 959 | 898 | 842 | 789 | 740 | 695 | 653 | 614 | 579 |
| | 1600 | 1596 | 1585 | 1566 | 1536 | 1494 | 1467 | 1436 | 1401 | 1361 | 1316 | 1266 | 1213 | 1156 | 1098 | 1039 | 981 | 925 | 870 | 818 | 769 | 724 | 681 | 641 | 604 | 570 |
| | 1400 | 1397 | 1389 | 1374 | 1352 | 1320 | 1301 | 1278 | 1252 | 1223 | 1189 | 1153 | 1112 | 1069 | 1023 | 976 | 928 | 880 | 833 | 787 | 744 | 702 | 663 | 626 | 591 | 559 |
| | 1200 | 1198 | 1192 | 1181 | 1165 | 1143 | 1129 | 1113 | 1095 | 1074 | 1051 | 1025 | 996 | 965 | 932 | 896 | 859 | 821 | 783 | 745 | 708 | 672 | 637 | 604 | 573 | 543 |
| | 1000 | 999 | 994 | 987 | 976 | 961 | 952 | 941 | 929 | 916 | 901 | 884 | 865 | 844 | 822 | 797 | 772 | 744 | 716 | 687 | 658 | 629 | 601 | 573 | 546 | 520 |
| | 3400 | 3383 | 3327 | 3224 | 3054 | 2798 | 2638 | 2461 | 2275 | 2089 | 1910 | 1743 | 1589 | 1451 | 1326 | 1215 | 1116 | 1027 | 948 | 877 | 813 | 756 | 704 | 657 | 615 | 576 |
| | 3200 | 3185 | 3136 | 3045 | 2897 | 2675 | 2534 | 2377 | 2210 | 2039 | 1872 | 1714 | 1567 | 1434 | 1313 | 1205 | 1107 | 1020 | 942 | 872 | 809 | 753 | 701 | 655 | 613 | 575 |
| | 3000 | 2986 | 2944 | 2865 | 2737 | 2546 | 2424 | 2286 | 2137 | 1983 | 1829 | 1681 | 1542 | 1414 | 1298 | 1193 | 1098 | 1013 | 936 | 867 | 805 | 749 | 698 | 653 | 611 | 573 |
| | 2800 | 2788 | 2751 | 2683 | 2574 | 2411 | 2307 | 2188 | 2057 | 1919 | 1779 | 1643 | 1513 | 1392 | 1280 | 1179 | 1087 | 1004 | 929 | 861 | 800 | 745 | 695 | 650 | 608 | 571 |
| | 2600 | 2590 | 2558 | 2500 | 2408 | 2271 | 2182 | 2081 | 1968 | 1848 | 1723 | 1599 | 1479 | 1365 | 1259 | 1162 | 1074 | 993 | 920 | 854 | 794 | 740 | 691 | 646 | 605 | 568 |
| | 2400 | 2391 | 2364 | 2315 | 2238 | 2124 | 2051 | 1966 | 1871 | 1767 | 1658 | 1548 | 1438 | 1333 | 1234 | 1142 | 1058 | 980 | 910 | 846 | 787 | 734 | 686 | 642 | 602 | 565 |
| | 2200 | 2193 | 2170 | 2130 | 2066 | 1973 | 1913 | 1843 | 1765 | 1678 | 1584 | 1488 | 1391 | 1296 | 1204 | 1119 | 1039 | 965 | 897 | 835 | 779 | 727 | 680 | 637 | 598 | 562 |
| 1800000 | 2000 | 1994 | 1975 | 1942 | 1891 | 1816 | 1768 | 1712 | 1649 | 1577 | 1500 | 1418 | 1334 | 1250 | 1168 | 1089 | 1015 | 946 | 882 | 823 | 768 | 718 | 673 | 631 | 592 | 557 |
| | 1800 | 1795 | 1780 | 1754 | 1713 | 1654 | 1616 | 1573 | 1523 | 1466 | 1404 | 1337 | 1267 | 1195 | 1123 | 1053 | 986 | 922 | 862 | 807 | 755 | 707 | 663 | 623 | 586 | 551 |
| | 1600 | 1596 | 1584 | 1564 | 1532 | 1487 | 1458 | 1425 | 1387 | 1344 | 1296 | 1243 | 1187 | 1128 | 1068 | 1007 | 948 | 891 | 837 | 786 | 738 | 693 | 651 | 613 | 577 | 544 |
| | 1400 | 1397 | 1388 | 1372 | 1349 | 1315 | 1294 | 1270 | 1242 | 1210 | 1175 | 1135 | 1092 | 1047 | 999 | 950 | 900 | 851 | 804 | 758 | 715 | 674 | 635 | 599 | 565 | 534 |
| | 1200 | 1198 | 1191 | 1180 | 1163 | 1139 | 1124 | 1107 | 1088 | 1066 | 1041 | 1013 | 982 | 949 | 913 | 876 | 838 | 798 | 759 | 721 | 683 | 647 | 613 | 580 | 549 | 520 |
| | 1000 | 999 | 994 | 986 | 975 | 959 | 949 | 937 | 925 | 910 | 894 | 876 | 856 | 833 | 809 | 783 | 756 | 727 | 698 | 668 | 638 | 609 | 580 | 552 | 526 | 500 |
| | 800 | 799 | 796 | 791 | 784 | 774 | 768 | 761 | 753 | 745 | 735 | 724 | 712 | 699 | 685 | 669 | 652 | 634 | 614 | 594 | 574 | 552 | 531 | 510 | 489 | 468 |

## UNIT AXIAL STRESSES - SIMPLE SOLID COLUMNS - l/d from 2 to 30

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| | 3200 | 3184 | 3132 | 3035 | 2875 | 2636 | 2486 | 2320 | 2145 | 1970 | 1802 | 1644 | 1500 | 1369 | 1252 | 1147 | 1053 | 969 | 895 | 828 | 768 | 713 | 665 | 621 | 581 | 544 |
| | 3000 | 2986 | 2940 | 2856 | 2718 | 2512 | 2381 | 2235 | 2079 | 1920 | 1764 | 1615 | 1478 | 1352 | 1239 | 1136 | 1045 | 963 | 889 | 823 | 764 | 710 | 662 | 618 | 579 | 543 |
| | 2800 | 2788 | 2748 | 2675 | 2558 | 2382 | 2270 | 2143 | 2005 | 1862 | 1719 | 1582 | 1452 | 1332 | 1223 | 1124 | 1035 | 955 | 883 | 818 | 759 | 707 | 659 | 616 | 577 | 541 |
| | 2600 | 2589 | 2555 | 2493 | 2394 | 2246 | 2151 | 2043 | 1924 | 1797 | 1669 | 1542 | 1422 | 1309 | 1205 | 1110 | 1024 | 946 | 875 | 812 | 754 | 702 | 655 | 613 | 574 | 539 |
| | 2400 | 2391 | 2362 | 2310 | 2227 | 2104 | 2025 | 1934 | 1833 | 1724 | 1610 | 1496 | 1386 | 1281 | 1183 | 1092 | 1010 | 935 | 866 | 804 | 748 | 697 | 651 | 609 | 571 | 536 |
| | 2200 | 2192 | 2168 | 2125 | 2057 | 1956 | 1892 | 1817 | 1733 | 1640 | 1543 | 1443 | 1343 | 1247 | 1156 | 1072 | 993 | 921 | 855 | 795 | 741 | 691 | 646 | 605 | 567 | 533 |
| | 2000 | 1994 | 1974 | 1939 | 1883 | 1803 | 1751 | 1691 | 1623 | 1547 | 1465 | 1379 | 1292 | 1207 | 1124 | 1046 | 972 | 904 | 842 | 784 | 732 | 683 | 639 | 599 | 562 | 529 |
| 1700000 | 1800 | 1795 | 1779 | 1751 | 1707 | 1644 | 1603 | 1556 | 1502 | 1442 | 1375 | 1305 | 1231 | 1157 | 1084 | 1014 | 947 | 883 | 825 | 770 | 720 | 674 | 631 | 592 | 557 | 524 |
| | 1600 | 1596 | 1583 | 1561 | 1528 | 1479 | 1448 | 1413 | 1371 | 1325 | 1273 | 1217 | 1158 | 1096 | 1034 | 973 | 913 | 856 | 803 | 752 | 705 | 661 | 621 | 584 | 549 | 517 |
| | 1400 | 1397 | 1387 | 1371 | 1345 | 1310 | 1287 | 1261 | 1231 | 1196 | 1158 | 1116 | 1070 | 1022 | 972 | 921 | 870 | 821 | 773 | 728 | 685 | 644 | 607 | 572 | 539 | 509 |
| | 1200 | 1198 | 1191 | 1179 | 1160 | 1135 | 1119 | 1101 | 1080 | 1056 | 1029 | 999 | 966 | 931 | 893 | 854 | 814 | 773 | 733 | 695 | 657 | 621 | 587 | 555 | 525 | 497 |
| | 1000 | 998 | 994 | 985 | 973 | 956 | 945 | 933 | 919 | 904 | 886 | 867 | 845 | 821 | 795 | 768 | 739 | 709 | 678 | 648 | 617 | 587 | 558 | 531 | 504 | 479 |
| | 800 | 799 | 796 | 791 | 783 | 772 | 766 | 759 | 750 | 741 | 731 | 719 | 706 | 692 | 676 | 659 | 641 | 621 | 601 | 580 | 558 | 536 | 514 | 493 | 471 | 451 |
| | 600 | 599 | 598 | 595 | 591 | 585 | 581 | 577 | 573 | 568 | 563 | 557 | 550 | 543 | 535 | 526 | 517 | 506 | 495 | 484 | 471 | 458 | 445 | 431 | 417 | 403 |
| | 3200 | 3183 | 3127 | 3023 | 2850 | 2592 | 2431 | 2256 | 2075 | 1897 | 1728 | 1572 | 1430 | 1303 | 1189 | 1088 | 998 | 918 | 846 | 783 | 725 | 674 | 628 | 586 | 548 | 514 |
| | 3000 | 2985 | 2936 | 2846 | 2697 | 2474 | 2333 | 2178 | 2015 | 1852 | 1694 | 1546 | 1411 | 1288 | 1177 | 1079 | 991 | 912 | 842 | 779 | 722 | 671 | 625 | 584 | 546 | 512 |
| | 2800 | 2787 | 2745 | 2667 | 2540 | 2349 | 2229 | 2093 | 1948 | 1800 | 1655 | 1517 | 1388 | 1270 | 1164 | 1068 | 982 | 905 | 836 | 774 | 718 | 668 | 623 | 582 | 544 | 511 |
| | 2600 | 2589 | 2553 | 2486 | 2379 | 2219 | 2116 | 2000 | 1874 | 1742 | 1610 | 1482 | 1362 | 1250 | 1148 | 1056 | 972 | 897 | 830 | 769 | 714 | 664 | 620 | 579 | 542 | 509 |
| | 2400 | 2390 | 2360 | 2304 | 2214 | 2081 | 1996 | 1898 | 1790 | 1675 | 1557 | 1441 | 1330 | 1226 | 1129 | 1041 | 960 | 888 | 822 | 762 | 709 | 660 | 616 | 576 | 539 | 506 |
| | 2200 | 2192 | 2166 | 2120 | 2046 | 1938 | 1868 | 1787 | 1697 | 1599 | 1497 | 1393 | 1293 | 1196 | 1106 | 1022 | 946 | 876 | 812 | 755 | 702 | 655 | 611 | 572 | 536 | 503 |
| | 2000 | 1993 | 1972 | 1934 | 1875 | 1788 | 1732 | 1667 | 1593 | 1512 | 1426 | 1337 | 1247 | 1161 | 1078 | 1000 | 928 | 861 | 801 | 745 | 694 | 648 | 606 | 567 | 532 | 500 |
| 1600000 | 1800 | 1795 | 1778 | 1747 | 1700 | 1632 | 1588 | 1537 | 1479 | 1414 | 1343 | 1269 | 1193 | 1117 | 1043 | 972 | 905 | 843 | 786 | 733 | 684 | 640 | 599 | 561 | 527 | 496 |
| | 1600 | 1596 | 1582 | 1559 | 1522 | 1470 | 1437 | 1398 | 1354 | 1303 | 1248 | 1188 | 1126 | 1062 | 998 | 936 | 876 | 820 | 766 | 717 | 671 | 629 | 590 | 554 | 521 | 490 |
| | 1400 | 1397 | 1387 | 1369 | 1342 | 1303 | 1278 | 1250 | 1217 | 1180 | 1139 | 1094 | 1045 | 994 | 942 | 890 | 838 | 788 | 741 | 696 | 654 | 614 | 577 | 543 | 512 | 483 |
| | 1200 | 1198 | 1190 | 1177 | 1158 | 1130 | 1113 | 1093 | 1070 | 1045 | 1015 | 983 | 948 | 910 | 870 | 829 | 788 | 746 | 706 | 667 | 629 | 594 | 560 | 529 | 500 | 472 |
| | 1000 | 998 | 993 | 984 | 971 | 953 | 941 | 928 | 913 | 896 | 877 | 856 | 833 | 807 | 779 | 750 | 719 | 688 | 656 | 625 | 594 | 564 | 535 | 508 | 481 | 457 |
| | 800 | 799 | 796 | 790 | 782 | 771 | 764 | 756 | 747 | 737 | 725 | 713 | 699 | 683 | 666 | 648 | 628 | 608 | 586 | 564 | 541 | 519 | 496 | 474 | 453 | 432 |
| | 600 | 599 | 598 | 594 | 590 | 584 | 580 | 576 | 571 | 566 | 560 | 554 | 546 | 538 | 530 | 520 | 510 | 499 | 487 | 475 | 461 | 447 | 433 | 419 | 404 | 389 |

## UNIT AXIAL STRESSES - SIMPLE SOLID COLUMNS - l/d from 2 to 30

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| | 3000 | 2984 | 2932 | 2834 | 2672 | 2430 | 2279 | 2115 | 1945 | 1778 | 1620 | 1473 | 1341 | 1221 | 1115 | 1020 | 936 | 861 | 794 | 734 | 680 | 632 | 589 | 549 | 514 | 482 |
| | 2800 | 2786 | 2741 | 2657 | 2519 | 2312 | 2181 | 2037 | 1885 | 1733 | 1586 | 1448 | 1321 | 1206 | 1103 | 1011 | 928 | 855 | 789 | 730 | 677 | 629 | 586 | 547 | 512 | 480 |
| | 2600 | 2588 | 2549 | 2478 | 2361 | 2187 | 2076 | 1951 | 1818 | 1681 | 1546 | 1418 | 1298 | 1189 | 1089 | 1000 | 920 | 848 | 783 | 725 | 673 | 626 | 584 | 545 | 510 | 478 |
| | 2400 | 2390 | 2357 | 2297 | 2200 | 2055 | 1962 | 1857 | 1742 | 1621 | 1500 | 1382 | 1271 | 1168 | 1073 | 987 | 909 | 839 | 776 | 720 | 668 | 622 | 580 | 542 | 508 | 476 |
| | 2200 | 2191 | 2164 | 2114 | 2034 | 1916 | 1840 | 1752 | 1656 | 1552 | 1446 | 1340 | 1238 | 1142 | 1053 | 971 | 897 | 829 | 768 | 713 | 663 | 617 | 576 | 539 | 505 | 474 |
| | 2000 | 1993 | 1970 | 1930 | 1865 | 1770 | 1709 | 1639 | 1559 | 1473 | 1382 | 1290 | 1199 | 1111 | 1029 | 952 | 881 | 817 | 758 | 705 | 656 | 612 | 572 | 535 | 502 | 471 |
| | 1800 | 1794 | 1776 | 1743 | 1693 | 1618 | 1570 | 1515 | 1452 | 1382 | 1307 | 1229 | 1150 | 1073 | 998 | 928 | 862 | 801 | 745 | 694 | 647 | 605 | 565 | 530 | 497 | 467 |
| 1500000 | 1600 | 1595 | 1581 | 1556 | 1517 | 1460 | 1423 | 1381 | 1333 | 1279 | 1219 | 1156 | 1090 | 1024 | 959 | 897 | 837 | 781 | 729 | 681 | 636 | 595 | 558 | 523 | 491 | 462 |
| | 1400 | 1396 | 1386 | 1366 | 1337 | 1295 | 1269 | 1238 | 1202 | 1162 | 1117 | 1069 | 1017 | 964 | 909 | 856 | 804 | 754 | 707 | 662 | 621 | 583 | 547 | 514 | 484 | 456 |
| | 1200 | 1197 | 1189 | 1176 | 1155 | 1125 | 1106 | 1085 | 1060 | 1032 | 1000 | 965 | 927 | 887 | 845 | 802 | 759 | 717 | 676 | 637 | 600 | 565 | 532 | 502 | 473 | 447 |
| | 1000 | 998 | 993 | 983 | 969 | 949 | 937 | 923 | 906 | 888 | 867 | 844 | 819 | 791 | 761 | 730 | 698 | 665 | 633 | 601 | 569 | 539 | 511 | 483 | 458 | 434 |
| | 800 | 799 | 795 | 789 | 781 | 768 | 761 | 752 | 743 | 732 | 719 | 705 | 690 | 673 | 655 | 635 | 614 | 592 | 569 | 546 | 523 | 500 | 477 | 454 | 433 | 412 |
| | 600 | 599 | 597 | 594 | 589 | 583 | 579 | 574 | 569 | 563 | 557 | 550 | 542 | 533 | 524 | 514 | 502 | 490 | 478 | 464 | 450 | 435 | 420 | 405 | 390 | 375 |
| | 400 | 400 | 399 | 397 | 395 | 392 | 391 | 389 | 387 | 385 | 382 | 379 | 376 | 373 | 369 | 365 | 361 | 356 | 351 | 345 | 339 | 333 | 327 | 320 | 312 | 305 |
| | 2800 | 2785 | 2736 | 2645 | 2494 | 2268 | 2127 | 1974 | 1816 | 1660 | 1512 | 1375 | 1251 | 1140 | 1040 | 952 | 873 | 803 | 741 | 685 | 635 | 590 | 549 | 513 | 480 | 449 |
| | 2600 | 2587 | 2545 | 2468 | 2341 | 2149 | 2029 | 1896 | 1755 | 1614 | 1478 | 1349 | 1232 | 1125 | 1029 | 943 | 866 | 797 | 736 | 681 | 631 | 587 | 547 | 511 | 478 | 448 |
| | 2400 | 2389 | 2354 | 2288 | 2182 | 2024 | 1923 | 1809 | 1687 | 1561 | 1437 | 1319 | 1208 | 1107 | 1015 | 932 | 857 | 790 | 730 | 676 | 628 | 584 | 544 | 508 | 476 | 446 |
| | 2200 | 2191 | 2161 | 2107 | 2020 | 1890 | 1807 | 1713 | 1609 | 1500 | 1390 | 1282 | 1180 | 1085 | 998 | 918 | 846 | 782 | 723 | 670 | 623 | 580 | 541 | 506 | 473 | 444 |
| | 2000 | 1992 | 1968 | 1924 | 1854 | 1750 | 1683 | 1606 | 1521 | 1429 | 1333 | 1238 | 1146 | 1058 | 977 | 902 | 833 | 771 | 715 | 663 | 617 | 575 | 537 | 502 | 470 | 442 |
| | 1800 | 1794 | 1774 | 1739 | 1684 | 1602 | 1550 | 1489 | 1421 | 1346 | 1266 | 1185 | 1104 | 1025 | 951 | 881 | 817 | 758 | 704 | 654 | 610 | 569 | 532 | 498 | 467 | 438 |
| 1400000 | 1600 | 1595 | 1580 | 1552 | 1510 | 1448 | 1408 | 1362 | 1309 | 1250 | 1186 | 1119 | 1051 | 983 | 917 | 854 | 795 | 740 | 690 | 643 | 600 | 561 | 525 | 492 | 462 | 434 |
| | 1400 | 1396 | 1385 | 1364 | 1332 | 1286 | 1257 | 1223 | 1184 | 1140 | 1092 | 1040 | 985 | 929 | 874 | 819 | 767 | 717 | 671 | 627 | 587 | 550 | 516 | 484 | 455 | 429 |
| | 1200 | 1197 | 1189 | 1174 | 1151 | 1119 | 1098 | 1075 | 1047 | 1017 | 982 | 944 | 903 | 860 | 816 | 772 | 728 | 685 | 644 | 606 | 569 | 535 | 503 | 474 | 446 | 421 |
| | 1000 | 998 | 992 | 982 | 967 | 945 | 932 | 916 | 898 | 878 | 855 | 830 | 802 | 772 | 741 | 708 | 674 | 640 | 607 | 574 | 543 | 513 | 485 | 458 | 433 | 410 |
| | 800 | 799 | 795 | 789 | 779 | 766 | 758 | 748 | 738 | 726 | 712 | 697 | 680 | 662 | 642 | 621 | 598 | 575 | 551 | 526 | 502 | 479 | 456 | 433 | 412 | 392 |
| | 600 | 599 | 597 | 594 | 588 | 581 | 577 | 572 | 567 | 560 | 553 | 546 | 537 | 528 | 517 | 506 | 494 | 481 | 467 | 452 | 437 | 422 | 406 | 390 | 375 | 359 |
| | 400 | 400 | 399 | 397 | 395 | 392 | 390 | 388 | 386 | 383 | 381 | 377 | 374 | 370 | 366 | 362 | 357 | 352 | 346 | 340 | 334 | 327 | 320 | 312 | 305 | 297 |

## UNIT AXIAL STRESSES - SIMPLE SOLID COLUMNS - l/d from 2 to 30

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| | 2800 | 2784 | 2731 | 2631 | 2465 | 2216 | 2064 | 1902 | 1738 | 1580 | 1433 | 1299 | 1178 | 1071 | 976 | 892 | 817 | 751 | 692 | 639 | 592 | 550 | 512 | 478 | 447 | 419 |
| | 2600 | 2586 | 2541 | 2456 | 2316 | 2106 | 1975 | 1833 | 1686 | 1541 | 1404 | 1277 | 1162 | 1058 | 966 | 884 | 811 | 746 | 688 | 636 | 589 | 548 | 510 | 476 | 445 | 417 |
| | 2400 | 2388 | 2350 | 2279 | 2162 | 1987 | 1877 | 1755 | 1625 | 1495 | 1369 | 1251 | 1142 | 1043 | 954 | 875 | 803 | 740 | 683 | 632 | 586 | 545 | 508 | 474 | 444 | 416 |
| | 2200 | 2190 | 2158 | 2099 | 2004 | 1861 | 1769 | 1667 | 1556 | 1442 | 1328 | 1220 | 1118 | 1025 | 940 | 863 | 795 | 733 | 677 | 627 | 582 | 542 | 505 | 472 | 442 | 414 |
| | 2000 | 1992 | 1966 | 1918 | 1841 | 1726 | 1652 | 1568 | 1476 | 1378 | 1279 | 1182 | 1089 | 1002 | 922 | 850 | 783 | 724 | 670 | 621 | 577 | 537 | 501 | 469 | 439 | 412 |
| | 1800 | 1793 | 1772 | 1734 | 1673 | 1584 | 1526 | 1459 | 1385 | 1304 | 1220 | 1135 | 1053 | 974 | 900 | 832 | 769 | 712 | 661 | 614 | 571 | 532 | 497 | 465 | 436 | 409 |
| | 1600 | 1595 | 1578 | 1548 | 1502 | 1433 | 1389 | 1338 | 1281 | 1217 | 1149 | 1078 | 1007 | 938 | 872 | 809 | 751 | 698 | 649 | 604 | 563 | 526 | 491 | 460 | 432 | 406 |
| 1300000 | 1400 | 1396 | 1383 | 1361 | 1326 | 1276 | 1244 | 1206 | 1163 | 1115 | 1063 | 1007 | 949 | 891 | 834 | 779 | 727 | 678 | 633 | 591 | 552 | 517 | 484 | 454 | 426 | 401 |
| | 1200 | 1197 | 1188 | 1172 | 1147 | 1111 | 1089 | 1063 | 1033 | 999 | 961 | 920 | 876 | 830 | 784 | 739 | 694 | 651 | 611 | 573 | 537 | 504 | 473 | 445 | 419 | 395 |
| | 1000 | 998 | 992 | 980 | 964 | 940 | 925 | 908 | 889 | 866 | 841 | 814 | 783 | 751 | 717 | 682 | 647 | 612 | 578 | 546 | 515 | 485 | 458 | 432 | 408 | 385 |
| | 800 | 799 | 795 | 788 | 777 | 763 | 754 | 744 | 732 | 719 | 704 | 687 | 669 | 649 | 627 | 604 | 580 | 555 | 530 | 505 | 480 | 456 | 433 | 411 | 390 | 370 |
| | 600 | 599 | 597 | 593 | 587 | 580 | 575 | 570 | 564 | 557 | 549 | 541 | 531 | 521 | 509 | 497 | 483 | 469 | 454 | 439 | 423 | 406 | 390 | 374 | 358 | 342 |
| | 400 | 400 | 399 | 397 | 395 | 391 | 389 | 387 | 385 | 382 | 379 | 375 | 372 | 368 | 363 | 358 | 353 | 347 | 341 | 335 | 328 | 320 | 312 | 304 | 296 | 287 |
| | 200 | 200 | 200 | 199 | 199 | 198 | 197 | 197 | 196 | 196 | 195 | 194 | 194 | 193 | 192 | 191 | 190 | 188 | 187 | 186 | 185 | 183 | 181 | 180 | 178 | 176 |
| | 2600 | 2585 | 2536 | 2442 | 2287 | 2054 | 1912 | 1761 | 1608 | 1462 | 1325 | 1200 | 1089 | 990 | 902 | 824 | 755 | 693 | 639 | 590 | 547 | 508 | 473 | 441 | 413 | 387 |
| | 2400 | 2387 | 2345 | 2267 | 2138 | 1944 | 1823 | 1692 | 1556 | 1423 | 1296 | 1179 | 1072 | 977 | 892 | 816 | 748 | 688 | 635 | 587 | 544 | 506 | 471 | 439 | 411 | 385 |
| | 2200 | 2189 | 2154 | 2090 | 1984 | 1825 | 1724 | 1613 | 1495 | 1377 | 1261 | 1153 | 1053 | 962 | 880 | 807 | 741 | 682 | 630 | 583 | 541 | 503 | 468 | 437 | 409 | 384 |
| | 2000 | 1991 | 1962 | 1910 | 1825 | 1697 | 1616 | 1524 | 1425 | 1322 | 1219 | 1121 | 1028 | 943 | 865 | 795 | 732 | 675 | 624 | 578 | 537 | 499 | 466 | 435 | 407 | 382 |
| | 1800 | 1793 | 1770 | 1728 | 1661 | 1561 | 1497 | 1424 | 1342 | 1256 | 1168 | 1081 | 998 | 919 | 847 | 780 | 720 | 666 | 616 | 572 | 531 | 495 | 462 | 432 | 405 | 380 |
| | 1600 | 1594 | 1576 | 1544 | 1492 | 1416 | 1367 | 1311 | 1247 | 1178 | 1106 | 1032 | 959 | 889 | 823 | 762 | 705 | 654 | 606 | 564 | 525 | 489 | 457 | 428 | 401 | 377 |
| 1200000 | 1400 | 1396 | 1382 | 1357 | 1319 | 1263 | 1228 | 1186 | 1139 | 1086 | 1029 | 970 | 909 | 849 | 791 | 736 | 685 | 637 | 593 | 553 | 516 | 482 | 451 | 423 | 397 | 373 |
| | 1200 | 1197 | 1187 | 1169 | 1142 | 1103 | 1078 | 1049 | 1015 | 978 | 936 | 891 | 844 | 797 | 749 | 702 | 657 | 615 | 575 | 538 | 503 | 472 | 442 | 415 | 390 | 368 |
| | 1000 | 998 | 991 | 979 | 960 | 934 | 918 | 899 | 877 | 852 | 825 | 794 | 761 | 726 | 690 | 653 | 617 | 582 | 548 | 515 | 485 | 456 | 429 | 404 | 381 | 360 |
| | 800 | 799 | 794 | 787 | 775 | 759 | 750 | 738 | 725 | 710 | 694 | 675 | 655 | 633 | 609 | 584 | 558 | 532 | 506 | 480 | 456 | 431 | 409 | 387 | 366 | 347 |
| | 600 | 599 | 597 | 593 | 586 | 578 | 573 | 567 | 560 | 552 | 544 | 534 | 524 | 512 | 500 | 486 | 471 | 456 | 440 | 423 | 406 | 389 | 372 | 356 | 340 | 324 |
| | 400 | 400 | 399 | 397 | 394 | 390 | 388 | 386 | 383 | 380 | 377 | 373 | 369 | 364 | 359 | 354 | 348 | 342 | 335 | 328 | 320 | 312 | 303 | 295 | 286 | 276 |
| | 200 | 200 | 200 | 199 | 199 | 198 | 197 | 197 | 196 | 195 | 195 | 194 | 193 | 192 | 191 | 190 | 189 | 187 | 186 | 185 | 183 | 181 | 179 | 178 | 176 | 173 |

## UNIT AXIAL STRESSES - SIMPLE SOLID COLUMNS - l/d from 2 to 30

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| | 1800 | 1792 | 1767 | 1720 | 1646 | 1534 | 1462 | 1381 | 1293 | 1201 | 1110 | 1021 | 938 | 861 | 790 | 727 | 669 | 617 | 571 | 529 | 491 | 457 | 426 | 398 | 373 | 350 |
| | 1600 | 1594 | 1574 | 1538 | 1481 | 1395 | 1341 | 1278 | 1208 | 1133 | 1056 | 980 | 906 | 836 | 771 | 711 | 657 | 607 | 563 | 522 | 486 | 452 | 422 | 395 | 370 | 347 |
| | 1400 | 1395 | 1380 | 1353 | 1311 | 1248 | 1208 | 1161 | 1109 | 1051 | 990 | 926 | 864 | 803 | 745 | 691 | 640 | 594 | 552 | 513 | 478 | 446 | 417 | 391 | 366 | 344 |
| | 1200 | 1196 | 1186 | 1166 | 1136 | 1092 | 1064 | 1031 | 994 | 952 | 907 | 858 | 808 | 758 | 709 | 662 | 617 | 576 | 537 | 501 | 468 | 438 | 410 | 385 | 361 | 340 |
| | 1000 | 998 | 990 | 977 | 956 | 927 | 909 | 888 | 863 | 835 | 805 | 771 | 735 | 697 | 659 | 621 | 584 | 549 | 515 | 483 | 453 | 425 | 400 | 376 | 354 | 333 |
| 1100000 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 800 | 798 | 794 | 785 | 773 | 755 | 744 | 731 | 717 | 700 | 682 | 661 | 638 | 614 | 588 | 561 | 534 | 507 | 480 | 454 | 429 | 405 | 383 | 361 | 342 | 323 |
| | 600 | 599 | 596 | 592 | 585 | 576 | 570 | 563 | 556 | 547 | 538 | 527 | 515 | 502 | 488 | 473 | 457 | 440 | 423 | 405 | 387 | 370 | 352 | 336 | 320 | 304 |
| | 400 | 400 | 398 | 396 | 393 | 390 | 387 | 384 | 381 | 378 | 374 | 370 | 366 | 360 | 355 | 349 | 342 | 335 | 328 | 319 | 311 | 302 | 293 | 283 | 274 | 264 |
| | 200 | 200 | 200 | 199 | 198 | 197 | 197 | 196 | 196 | 195 | 194 | 193 | 192 | 191 | 190 | 189 | 187 | 186 | 185 | 183 | 181 | 179 | 177 | 175 | 173 | 170 |
| | 2000 | 1989 | 1955 | 1889 | 1782 | 1620 | 1519 | 1410 | 1297 | 1186 | 1080 | 982 | 894 | 814 | 743 | 680 | 624 | 574 | 529 | 489 | 453 | 421 | 392 | 366 | 343 | 321 |
| | 1800 | 1791 | 1763 | 1712 | 1627 | 1500 | 1420 | 1330 | 1235 | 1139 | 1045 | 956 | 873 | 799 | 731 | 670 | 616 | 568 | 524 | 485 | 450 | 418 | 390 | 364 | 341 | 320 |
| | 1600 | 1593 | 1571 | 1531 | 1466 | 1370 | 1308 | 1238 | 1161 | 1081 | 1000 | 922 | 847 | 778 | 715 | 658 | 606 | 560 | 518 | 480 | 446 | 415 | 387 | 362 | 339 | 318 |
| | 1400 | 1395 | 1378 | 1348 | 1300 | 1229 | 1184 | 1131 | 1073 | 1009 | 943 | 877 | 813 | 752 | 694 | 641 | 593 | 549 | 509 | 473 | 440 | 410 | 383 | 358 | 336 | 315 |
| | 1200 | 1196 | 1184 | 1162 | 1128 | 1079 | 1047 | 1010 | 968 | 921 | 871 | 819 | 767 | 715 | 665 | 618 | 575 | 534 | 497 | 463 | 432 | 403 | 377 | 353 | 331 | 311 |
| 1000000 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1000 | 997 | 989 | 974 | 952 | 919 | 898 | 874 | 846 | 815 | 780 | 743 | 704 | 664 | 624 | 585 | 548 | 512 | 479 | 448 | 419 | 393 | 369 | 346 | 325 | 306 |
| | 800 | 798 | 793 | 784 | 770 | 750 | 738 | 723 | 707 | 688 | 667 | 643 | 618 | 591 | 563 | 535 | 506 | 478 | 451 | 425 | 400 | 377 | 355 | 335 | 316 | 298 |
| | 600 | 599 | 596 | 591 | 583 | 573 | 566 | 559 | 551 | 541 | 530 | 518 | 505 | 490 | 474 | 457 | 440 | 421 | 403 | 384 | 366 | 348 | 330 | 314 | 298 | 283 |
| | 400 | 400 | 398 | 396 | 393 | 388 | 386 | 383 | 379 | 376 | 371 | 367 | 361 | 356 | 349 | 342 | 335 | 327 | 318 | 309 | 300 | 290 | 280 | 270 | 260 | 250 |
| | 200 | 200 | 200 | 199 | 198 | 197 | 197 | 196 | 195 | 194 | 193 | 192 | 191 | 190 | 189 | 188 | 186 | 184 | 183 | 181 | 179 | 177 | 174 | 172 | 169 | 167 |
| | 1600 | 1592 | 1568 | 1522 | 1449 | 1337 | 1267 | 1188 | 1105 | 1019 | 936 | 857 | 784 | 717 | 657 | 602 | 554 | 510 | 471 | 436 | 405 | 376 | 351 | 328 | 307 | 287 |
| | 1400 | 1394 | 1376 | 1342 | 1287 | 1206 | 1153 | 1094 | 1028 | 960 | 890 | 821 | 756 | 696 | 640 | 589 | 543 | 502 | 464 | 431 | 400 | 372 | 347 | 325 | 304 | 285 |
| | 1200 | 1196 | 1182 | 1158 | 1119 | 1062 | 1026 | 983 | 936 | 884 | 829 | 774 | 719 | 667 | 617 | 571 | 529 | 490 | 455 | 423 | 394 | 367 | 343 | 321 | 301 | 283 |
| | 1000 | 997 | 988 | 971 | 945 | 908 | 884 | 856 | 824 | 789 | 750 | 709 | 667 | 625 | 584 | 545 | 508 | 473 | 441 | 411 | 384 | 359 | 336 | 315 | 296 | 278 |
| 900000 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 800 | 798 | 792 | 782 | 766 | 743 | 729 | 713 | 694 | 672 | 648 | 622 | 593 | 564 | 534 | 504 | 474 | 446 | 419 | 393 | 369 | 346 | 326 | 306 | 289 | 272 |
| | 600 | 599 | 596 | 590 | 581 | 570 | 562 | 554 | 544 | 533 | 520 | 506 | 491 | 475 | 457 | 438 | 419 | 399 | 380 | 360 | 342 | 324 | 306 | 290 | 275 | 260 |
| | 400 | 400 | 398 | 396 | 392 | 387 | 384 | 381 | 377 | 372 | 368 | 362 | 356 | 350 | 342 | 334 | 326 | 317 | 307 | 297 | 287 | 276 | 266 | 255 | 244 | 234 |
| | 200 | 200 | 200 | 199 | 198 | 197 | 196 | 195 | 195 | 194 | 193 | 192 | 190 | 189 | 187 | 186 | 184 | 182 | 180 | 178 | 176 | 173 | 171 | 168 | 165 | 162 |

## UNIT AXIAL STRESSES - SIMPLE SOLID COLUMNS - l/d from 30 to 50

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| | 4000 | 673 | 632 | 594 | 560 | 529 | 500 | 473 | 449 | 426 | 405 | 386 | 367 | 350 | 335 | 320 | 306 | 293 | 281 | 270 | 259 | 249 |
| | 3800 | 671 | 630 | 593 | 559 | 528 | 499 | 473 | 448 | 426 | 405 | 385 | 367 | 350 | 334 | 320 | 306 | 293 | 281 | 269 | 259 | 249 |
| | 3600 | 669 | 629 | 592 | 558 | 527 | 498 | 472 | 447 | 425 | 404 | 385 | 366 | 350 | 334 | 319 | 305 | 293 | 280 | 269 | 258 | 248 |
| | 3400 | 667 | 627 | 590 | 557 | 526 | 497 | 471 | 447 | 424 | 403 | 384 | 366 | 349 | 333 | 319 | 305 | 292 | 280 | 269 | 258 | 248 |
| | 3200 | 665 | 625 | 589 | 555 | 524 | 496 | 470 | 446 | 423 | 403 | 383 | 365 | 349 | 333 | 318 | 305 | 292 | 280 | 269 | 258 | 248 |
| | 3000 | 662 | 623 | 587 | 553 | 523 | 495 | 469 | 445 | 422 | 402 | 383 | 365 | 348 | 332 | 318 | 304 | 291 | 279 | 268 | 258 | 248 |
| | 2800 | 659 | 620 | 584 | 551 | 521 | 493 | 467 | 443 | 421 | 401 | 382 | 364 | 347 | 332 | 317 | 304 | 291 | 279 | 268 | 257 | 247 |
| 2100000 | 2600 | 656 | 617 | 582 | 549 | 519 | 491 | 466 | 442 | 420 | 400 | 381 | 363 | 346 | 331 | 317 | 303 | 290 | 279 | 267 | 257 | 247 |
| | 2400 | 651 | 613 | 578 | 546 | 517 | 489 | 464 | 440 | 419 | 398 | 379 | 362 | 346 | 330 | 316 | 302 | 290 | 278 | 267 | 256 | 246 |
| | 2200 | 646 | 609 | 575 | 543 | 514 | 487 | 462 | 438 | 417 | 397 | 378 | 361 | 344 | 329 | 315 | 302 | 289 | 277 | 266 | 256 | 246 |
| | 2000 | 640 | 603 | 570 | 539 | 510 | 483 | 459 | 436 | 415 | 395 | 376 | 359 | 343 | 328 | 314 | 300 | 288 | 276 | 265 | 255 | 245 |
| | 1800 | 632 | 596 | 564 | 534 | 506 | 479 | 455 | 433 | 412 | 392 | 374 | 357 | 341 | 326 | 312 | 299 | 287 | 275 | 264 | 254 | 244 |
| | 1600 | 621 | 587 | 556 | 527 | 500 | 474 | 451 | 429 | 408 | 389 | 371 | 355 | 339 | 324 | 310 | 298 | 285 | 274 | 263 | 253 | 243 |
| | 1400 | 607 | 575 | 546 | 518 | 492 | 467 | 445 | 423 | 404 | 385 | 368 | 351 | 336 | 322 | 308 | 295 | 283 | 272 | 261 | 251 | 242 |
| | 1200 | 587 | 558 | 531 | 505 | 481 | 458 | 436 | 416 | 397 | 379 | 362 | 347 | 332 | 318 | 305 | 292 | 281 | 270 | 259 | 249 | 240 |
| | 3600 | 639 | 600 | 565 | 532 | 503 | 475 | 450 | 427 | 405 | 385 | 367 | 349 | 333 | 318 | 304 | 291 | 279 | 267 | 256 | 246 | 237 |
| | 3400 | 637 | 599 | 564 | 531 | 502 | 474 | 449 | 426 | 405 | 385 | 366 | 349 | 333 | 318 | 304 | 291 | 279 | 267 | 256 | 246 | 236 |
| | 3200 | 635 | 597 | 562 | 530 | 500 | 473 | 448 | 425 | 404 | 384 | 366 | 348 | 332 | 318 | 304 | 290 | 278 | 267 | 256 | 246 | 236 |
| | 3000 | 633 | 595 | 560 | 528 | 499 | 472 | 447 | 424 | 403 | 383 | 365 | 348 | 332 | 317 | 303 | 290 | 278 | 266 | 256 | 246 | 236 |
| | 2800 | 630 | 593 | 558 | 527 | 498 | 471 | 446 | 423 | 402 | 382 | 364 | 347 | 331 | 316 | 303 | 290 | 277 | 266 | 255 | 245 | 236 |
| 2000000 | 2600 | 627 | 590 | 556 | 524 | 496 | 469 | 445 | 422 | 401 | 381 | 363 | 346 | 331 | 316 | 302 | 289 | 277 | 266 | 255 | 245 | 235 |
| | 2400 | 623 | 586 | 553 | 522 | 493 | 467 | 443 | 420 | 400 | 380 | 362 | 345 | 330 | 315 | 301 | 288 | 276 | 265 | 254 | 244 | 235 |
| | 2200 | 618 | 582 | 549 | 519 | 491 | 465 | 441 | 419 | 398 | 379 | 361 | 344 | 329 | 314 | 300 | 288 | 276 | 264 | 254 | 244 | 234 |
| | 2000 | 613 | 577 | 545 | 515 | 488 | 462 | 438 | 416 | 396 | 377 | 359 | 343 | 327 | 313 | 299 | 287 | 275 | 264 | 253 | 243 | 234 |
| | 1800 | 605 | 571 | 540 | 511 | 484 | 458 | 435 | 414 | 393 | 375 | 357 | 341 | 326 | 311 | 298 | 286 | 274 | 263 | 252 | 242 | 233 |
| | 1600 | 596 | 563 | 533 | 504 | 478 | 454 | 431 | 410 | 390 | 372 | 355 | 339 | 324 | 310 | 296 | 284 | 272 | 261 | 251 | 241 | 232 |
| | 1400 | 583 | 552 | 523 | 496 | 471 | 448 | 426 | 405 | 386 | 368 | 351 | 336 | 321 | 307 | 294 | 282 | 271 | 260 | 250 | 240 | 231 |

## UNIT AXIAL STRESSES - SIMPLE SOLID COLUMNS - l/d from 30 to 50

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| | 3600 | 609 | 572 | 538 | 507 | 478 | 452 | 428 | 406 | 385 | 366 | 349 | 332 | 317 | 303 | 289 | 277 | 265 | 254 | 244 | 234 | 225 |
| | 3400 | 607 | 570 | 537 | 506 | 477 | 451 | 428 | 405 | 385 | 366 | 348 | 332 | 317 | 302 | 289 | 277 | 265 | 254 | 244 | 234 | 225 |
| | 3200 | 605 | 569 | 535 | 505 | 476 | 451 | 427 | 405 | 384 | 365 | 348 | 331 | 316 | 302 | 289 | 276 | 265 | 254 | 243 | 234 | 225 |
| | 3000 | 603 | 567 | 534 | 503 | 475 | 449 | 426 | 404 | 383 | 365 | 347 | 331 | 316 | 302 | 288 | 276 | 264 | 253 | 243 | 233 | 224 |
| | 2800 | 601 | 565 | 532 | 502 | 474 | 448 | 425 | 403 | 383 | 364 | 346 | 330 | 315 | 301 | 288 | 275 | 264 | 253 | 243 | 233 | 224 |
| | 2600 | 598 | 562 | 530 | 500 | 472 | 447 | 423 | 402 | 382 | 363 | 346 | 330 | 314 | 300 | 287 | 275 | 263 | 253 | 242 | 233 | 224 |
| 1900000 | 2400 | 594 | 559 | 527 | 497 | 470 | 445 | 422 | 400 | 380 | 362 | 345 | 329 | 314 | 300 | 287 | 274 | 263 | 252 | 242 | 232 | 223 |
| | 2200 | 590 | 556 | 524 | 495 | 468 | 443 | 420 | 399 | 379 | 361 | 344 | 328 | 313 | 299 | 286 | 274 | 262 | 252 | 241 | 232 | 223 |
| | 2000 | 585 | 551 | 520 | 491 | 465 | 440 | 418 | 397 | 377 | 359 | 342 | 326 | 312 | 298 | 285 | 273 | 262 | 251 | 241 | 231 | 222 |
| | 1800 | 579 | 546 | 515 | 487 | 461 | 437 | 415 | 394 | 375 | 357 | 340 | 325 | 310 | 297 | 284 | 272 | 261 | 250 | 240 | 231 | 222 |
| | 1600 | 570 | 538 | 509 | 482 | 457 | 433 | 411 | 391 | 372 | 355 | 338 | 323 | 308 | 295 | 282 | 270 | 259 | 249 | 239 | 230 | 221 |
| | 1400 | 559 | 529 | 501 | 475 | 450 | 428 | 407 | 387 | 368 | 351 | 335 | 320 | 306 | 293 | 280 | 269 | 258 | 247 | 238 | 228 | 220 |
| | 1200 | 543 | 515 | 489 | 465 | 442 | 420 | 400 | 381 | 363 | 347 | 331 | 316 | 303 | 290 | 278 | 266 | 256 | 245 | 236 | 227 | 218 |
| | 3400 | 576 | 541 | 509 | 480 | 453 | 428 | 406 | 385 | 365 | 347 | 330 | 315 | 300 | 287 | 274 | 262 | 251 | 241 | 231 | 222 | 213 |
| | 3200 | 575 | 540 | 508 | 479 | 452 | 428 | 405 | 384 | 365 | 347 | 330 | 314 | 300 | 286 | 274 | 262 | 251 | 241 | 231 | 222 | 213 |
| | 3000 | 573 | 538 | 507 | 478 | 451 | 427 | 404 | 383 | 364 | 346 | 329 | 314 | 299 | 286 | 273 | 262 | 251 | 240 | 231 | 221 | 213 |
| | 2800 | 571 | 536 | 505 | 476 | 450 | 426 | 403 | 382 | 363 | 345 | 329 | 313 | 299 | 286 | 273 | 261 | 250 | 240 | 230 | 221 | 213 |
| | 2600 | 568 | 534 | 503 | 475 | 448 | 424 | 402 | 381 | 362 | 345 | 328 | 313 | 298 | 285 | 273 | 261 | 250 | 240 | 230 | 221 | 212 |
| | 2400 | 565 | 532 | 501 | 473 | 447 | 423 | 401 | 380 | 361 | 344 | 327 | 312 | 298 | 284 | 272 | 260 | 249 | 239 | 230 | 220 | 212 |
| | 2200 | 562 | 528 | 498 | 470 | 445 | 421 | 399 | 379 | 360 | 342 | 326 | 311 | 297 | 284 | 271 | 260 | 249 | 239 | 229 | 220 | 212 |
| 1800000 | 2000 | 557 | 525 | 495 | 467 | 442 | 419 | 397 | 377 | 358 | 341 | 325 | 310 | 296 | 283 | 270 | 259 | 248 | 238 | 228 | 219 | 211 |
| | 1800 | 551 | 520 | 491 | 464 | 439 | 416 | 395 | 375 | 356 | 339 | 323 | 308 | 295 | 282 | 269 | 258 | 247 | 237 | 228 | 219 | 210 |
| | 1600 | 544 | 513 | 485 | 459 | 435 | 412 | 391 | 372 | 354 | 337 | 321 | 307 | 293 | 280 | 268 | 257 | 246 | 236 | 227 | 218 | 210 |
| | 1400 | 534 | 505 | 478 | 453 | 429 | 407 | 387 | 368 | 351 | 334 | 319 | 304 | 291 | 278 | 266 | 255 | 245 | 235 | 226 | 217 | 209 |
| | 1200 | 520 | 493 | 468 | 444 | 421 | 401 | 381 | 363 | 346 | 330 | 315 | 301 | 288 | 276 | 264 | 253 | 243 | 233 | 224 | 215 | 207 |
| | 1000 | 500 | 476 | 453 | 431 | 410 | 391 | 372 | 355 | 339 | 324 | 310 | 296 | 284 | 272 | 261 | 250 | 240 | 231 | 222 | 213 | 205 |
| | 800 | 468 | 448 | 428 | 410 | 392 | 375 | 358 | 343 | 328 | 314 | 301 | 289 | 277 | 266 | 255 | 245 | 236 | 227 | 218 | 210 | 202 |

## UNIT AXIAL STRESSES - SIMPLE SOLID COLUMNS - l/d from 30 to 50

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| | 3200 | 544 | 511 | 481 | 453 | 428 | 405 | 383 | 363 | 345 | 328 | 312 | 297 | 284 | 271 | 259 | 248 | 237 | 227 | 218 | 209 | 201 |
| | 3000 | 543 | 510 | 480 | 452 | 427 | 404 | 382 | 363 | 344 | 327 | 312 | 297 | 283 | 270 | 259 | 247 | 237 | 227 | 218 | 209 | 201 |
| | 2800 | 541 | 508 | 478 | 451 | 426 | 403 | 381 | 362 | 344 | 327 | 311 | 296 | 283 | 270 | 258 | 247 | 237 | 227 | 218 | 209 | 201 |
| | 2600 | 539 | 506 | 477 | 450 | 425 | 402 | 380 | 361 | 343 | 326 | 310 | 296 | 282 | 270 | 258 | 247 | 236 | 227 | 217 | 209 | 201 |
| | 2400 | 536 | 504 | 475 | 448 | 423 | 400 | 379 | 360 | 342 | 325 | 310 | 295 | 282 | 269 | 257 | 246 | 236 | 226 | 217 | 208 | 200 |
| | 2200 | 533 | 501 | 472 | 446 | 421 | 399 | 378 | 359 | 341 | 324 | 309 | 294 | 281 | 268 | 257 | 246 | 235 | 226 | 217 | 208 | 200 |
| | 2000 | 529 | 498 | 469 | 443 | 419 | 397 | 376 | 357 | 339 | 323 | 308 | 293 | 280 | 268 | 256 | 245 | 235 | 225 | 216 | 208 | 200 |
| 1700000 | 1800 | 524 | 493 | 466 | 440 | 416 | 394 | 374 | 355 | 338 | 321 | 306 | 292 | 279 | 267 | 255 | 244 | 234 | 224 | 215 | 207 | 199 |
| | 1600 | 517 | 488 | 461 | 436 | 413 | 391 | 371 | 353 | 335 | 319 | 304 | 291 | 277 | 265 | 254 | 243 | 233 | 224 | 215 | 206 | 198 |
| | 1400 | 509 | 480 | 454 | 430 | 408 | 387 | 367 | 349 | 332 | 317 | 302 | 288 | 276 | 264 | 252 | 242 | 232 | 222 | 214 | 205 | 198 |
| | 1200 | 497 | 470 | 445 | 422 | 401 | 381 | 362 | 345 | 328 | 313 | 299 | 286 | 273 | 261 | 250 | 240 | 230 | 221 | 212 | 204 | 196 |
| | 1000 | 479 | 455 | 432 | 411 | 391 | 372 | 355 | 338 | 322 | 308 | 294 | 281 | 269 | 258 | 247 | 237 | 228 | 219 | 210 | 202 | 195 |
| | 800 | 451 | 430 | 411 | 393 | 375 | 358 | 342 | 327 | 313 | 299 | 287 | 275 | 263 | 253 | 242 | 233 | 224 | 215 | 207 | 199 | 192 |
| | 600 | 403 | 388 | 374 | 360 | 346 | 333 | 320 | 308 | 296 | 284 | 273 | 263 | 252 | 243 | 234 | 225 | 217 | 209 | 201 | 194 | 187 |
| | 3200 | 514 | 482 | 454 | 428 | 404 | 382 | 361 | 342 | 325 | 309 | 294 | 280 | 267 | 255 | 244 | 233 | 223 | 214 | 206 | 197 | 190 |
| | 3000 | 512 | 481 | 453 | 427 | 403 | 381 | 361 | 342 | 325 | 309 | 294 | 280 | 267 | 255 | 244 | 233 | 223 | 214 | 205 | 197 | 189 |
| | 2800 | 511 | 480 | 451 | 426 | 402 | 380 | 360 | 341 | 324 | 308 | 293 | 279 | 267 | 255 | 243 | 233 | 223 | 214 | 205 | 197 | 189 |
| | 2600 | 509 | 478 | 450 | 424 | 401 | 379 | 359 | 340 | 323 | 307 | 293 | 279 | 266 | 254 | 243 | 232 | 223 | 213 | 205 | 197 | 189 |
| | 2400 | 506 | 476 | 448 | 423 | 399 | 378 | 358 | 339 | 322 | 307 | 292 | 278 | 266 | 254 | 242 | 232 | 222 | 213 | 205 | 196 | 189 |
| | 2200 | 503 | 474 | 446 | 421 | 398 | 376 | 357 | 338 | 321 | 306 | 291 | 278 | 265 | 253 | 242 | 232 | 222 | 213 | 204 | 196 | 188 |
| | 2000 | 500 | 471 | 443 | 419 | 396 | 375 | 355 | 337 | 320 | 305 | 290 | 277 | 264 | 252 | 241 | 231 | 221 | 212 | 204 | 196 | 188 |
| 1600000 | 1800 | 496 | 467 | 440 | 416 | 393 | 372 | 353 | 335 | 319 | 303 | 289 | 276 | 263 | 251 | 241 | 230 | 221 | 212 | 203 | 195 | 188 |
| | 1600 | 490 | 462 | 436 | 412 | 390 | 370 | 351 | 333 | 317 | 302 | 287 | 274 | 262 | 250 | 240 | 229 | 220 | 211 | 202 | 195 | 187 |
| | 1400 | 483 | 456 | 431 | 407 | 386 | 366 | 347 | 330 | 314 | 299 | 285 | 272 | 260 | 249 | 238 | 228 | 219 | 210 | 202 | 194 | 186 |
| | 1200 | 472 | 447 | 423 | 401 | 380 | 361 | 343 | 326 | 311 | 296 | 283 | 270 | 258 | 247 | 236 | 226 | 217 | 209 | 200 | 193 | 185 |
| | 1000 | 457 | 433 | 411 | 391 | 371 | 353 | 336 | 320 | 306 | 292 | 278 | 266 | 255 | 244 | 234 | 224 | 215 | 207 | 199 | 191 | 184 |
| | 800 | 432 | 412 | 393 | 375 | 357 | 341 | 326 | 311 | 297 | 284 | 272 | 260 | 249 | 239 | 229 | 220 | 212 | 203 | 196 | 188 | 181 |
| | 600 | 389 | 375 | 360 | 346 | 333 | 319 | 306 | 294 | 282 | 271 | 260 | 250 | 240 | 231 | 222 | 213 | 205 | 198 | 191 | 184 | 177 |

## UNIT AXIAL STRESSES - SIMPLE SOLID COLUMNS - l/d from 30 to 50

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| | 3000 | 482 | 452 | 425 | 401 | 378 | 358 | 339 | 321 | 305 | 290 | 276 | 263 | 251 | 239 | 229 | 219 | 210 | 201 | 193 | 185 | 178 |
| | 2800 | 480 | 451 | 424 | 400 | 378 | 357 | 338 | 320 | 304 | 289 | 275 | 262 | 250 | 239 | 228 | 219 | 209 | 201 | 192 | 185 | 178 |
| | 2600 | 478 | 449 | 423 | 399 | 377 | 356 | 337 | 320 | 304 | 289 | 275 | 262 | 250 | 239 | 228 | 218 | 209 | 200 | 192 | 185 | 177 |
| | 2400 | 476 | 448 | 421 | 397 | 375 | 355 | 336 | 319 | 303 | 288 | 274 | 261 | 249 | 238 | 228 | 218 | 209 | 200 | 192 | 184 | 177 |
| | 2200 | 474 | 446 | 420 | 396 | 374 | 354 | 335 | 318 | 302 | 287 | 273 | 261 | 249 | 238 | 227 | 217 | 208 | 200 | 192 | 184 | 177 |
| | 2000 | 471 | 443 | 417 | 394 | 372 | 352 | 334 | 317 | 301 | 286 | 273 | 260 | 248 | 237 | 227 | 217 | 208 | 199 | 191 | 184 | 177 |
| | 1800 | 467 | 440 | 415 | 391 | 370 | 350 | 332 | 315 | 300 | 285 | 272 | 259 | 247 | 236 | 226 | 216 | 207 | 199 | 191 | 183 | 176 |
| 1500000 | 1600 | 462 | 436 | 411 | 388 | 367 | 348 | 330 | 313 | 298 | 284 | 270 | 258 | 246 | 235 | 225 | 216 | 207 | 198 | 190 | 183 | 176 |
| | 1400 | 456 | 430 | 406 | 384 | 364 | 345 | 327 | 311 | 296 | 282 | 269 | 256 | 245 | 234 | 224 | 214 | 206 | 197 | 189 | 182 | 175 |
| | 1200 | 447 | 422 | 400 | 378 | 359 | 340 | 323 | 308 | 293 | 279 | 266 | 254 | 243 | 232 | 222 | 213 | 204 | 196 | 188 | 181 | 174 |
| | 1000 | 434 | 411 | 390 | 370 | 351 | 334 | 318 | 302 | 288 | 275 | 263 | 251 | 240 | 230 | 220 | 211 | 202 | 194 | 187 | 180 | 173 |
| | 800 | 412 | 393 | 374 | 356 | 339 | 323 | 308 | 294 | 281 | 269 | 257 | 246 | 235 | 226 | 216 | 208 | 199 | 192 | 184 | 177 | 171 |
| | 600 | 375 | 360 | 346 | 331 | 318 | 305 | 292 | 280 | 268 | 257 | 247 | 237 | 227 | 218 | 210 | 202 | 194 | 187 | 180 | 173 | 167 |
| | 400 | 305 | 297 | 289 | 281 | 273 | 264 | 256 | 248 | 240 | 232 | 224 | 217 | 209 | 202 | 195 | 189 | 182 | 176 | 170 | 164 | 159 |
| | 2800 | 449 | 422 | 397 | 374 | 353 | 334 | 316 | 300 | 284 | 270 | 257 | 245 | 234 | 223 | 213 | 204 | 196 | 187 | 180 | 173 | 166 |
| | 2600 | 448 | 421 | 396 | 373 | 352 | 333 | 315 | 299 | 284 | 270 | 257 | 245 | 233 | 223 | 213 | 204 | 195 | 187 | 180 | 172 | 166 |
| | 2400 | 446 | 419 | 395 | 372 | 351 | 332 | 315 | 298 | 283 | 269 | 256 | 244 | 233 | 223 | 213 | 204 | 195 | 187 | 179 | 172 | 166 |
| | 2200 | 444 | 417 | 393 | 371 | 350 | 331 | 314 | 297 | 283 | 269 | 256 | 244 | 233 | 222 | 212 | 203 | 195 | 187 | 179 | 172 | 165 |
| | 2000 | 442 | 415 | 391 | 369 | 349 | 330 | 313 | 296 | 282 | 268 | 255 | 243 | 232 | 222 | 212 | 203 | 194 | 186 | 179 | 172 | 165 |
| | 1800 | 438 | 413 | 389 | 367 | 347 | 328 | 311 | 295 | 281 | 267 | 254 | 242 | 231 | 221 | 211 | 202 | 194 | 186 | 178 | 171 | 165 |
| 1400000 | 1600 | 434 | 409 | 386 | 364 | 344 | 326 | 309 | 294 | 279 | 266 | 253 | 241 | 230 | 220 | 211 | 202 | 193 | 185 | 178 | 171 | 164 |
| | 1400 | 429 | 404 | 382 | 361 | 341 | 323 | 307 | 291 | 277 | 264 | 251 | 240 | 229 | 219 | 210 | 201 | 192 | 185 | 177 | 170 | 164 |
| | 1200 | 421 | 398 | 376 | 356 | 337 | 320 | 304 | 289 | 275 | 262 | 249 | 238 | 227 | 218 | 208 | 199 | 191 | 184 | 176 | 169 | 163 |
| | 1000 | 410 | 388 | 367 | 348 | 331 | 314 | 299 | 284 | 271 | 258 | 246 | 235 | 225 | 215 | 206 | 198 | 190 | 182 | 175 | 168 | 162 |
| | 800 | 392 | 372 | 354 | 337 | 320 | 305 | 291 | 277 | 265 | 253 | 242 | 231 | 221 | 212 | 203 | 195 | 187 | 180 | 173 | 166 | 160 |
| | 600 | 359 | 344 | 330 | 316 | 302 | 289 | 277 | 265 | 254 | 243 | 233 | 223 | 214 | 206 | 198 | 190 | 183 | 176 | 169 | 163 | 157 |
| | 400 | 297 | 288 | 280 | 271 | 263 | 254 | 246 | 237 | 229 | 221 | 214 | 206 | 199 | 192 | 185 | 179 | 172 | 166 | 161 | 155 | 150 |

## UNIT AXIAL STRESSES - SIMPLE SOLID COLUMNS - l/d from 30 to 50

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| | 2800 | 419 | 393 | 370 | 348 | 329 | 311 | 294 | 279 | 265 | 251 | 239 | 228 | 217 | 208 | 198 | 190 | 182 | 174 | 167 | 160 | 154 |
| | 2600 | 417 | 392 | 369 | 347 | 328 | 310 | 293 | 278 | 264 | 251 | 239 | 228 | 217 | 207 | 198 | 190 | 182 | 174 | 167 | 160 | 154 |
| | 2400 | 416 | 391 | 368 | 346 | 327 | 309 | 293 | 278 | 264 | 251 | 238 | 227 | 217 | 207 | 198 | 189 | 181 | 174 | 167 | 160 | 154 |
| | 2200 | 414 | 389 | 366 | 345 | 326 | 308 | 292 | 277 | 263 | 250 | 238 | 227 | 216 | 207 | 198 | 189 | 181 | 174 | 167 | 160 | 154 |
| | 2000 | 412 | 387 | 365 | 344 | 325 | 307 | 291 | 276 | 262 | 249 | 237 | 226 | 216 | 206 | 197 | 189 | 181 | 173 | 166 | 160 | 153 |
| | 1800 | 409 | 385 | 363 | 342 | 323 | 306 | 290 | 275 | 261 | 248 | 237 | 226 | 215 | 206 | 197 | 188 | 180 | 173 | 166 | 159 | 153 |
| | 1600 | 406 | 382 | 360 | 340 | 321 | 304 | 288 | 274 | 260 | 247 | 236 | 225 | 214 | 205 | 196 | 188 | 180 | 172 | 165 | 159 | 153 |
| 1300000 | 1400 | 401 | 378 | 357 | 337 | 319 | 302 | 286 | 272 | 258 | 246 | 234 | 224 | 213 | 204 | 195 | 187 | 179 | 172 | 165 | 158 | 152 |
| | 1200 | 395 | 372 | 352 | 333 | 315 | 299 | 283 | 269 | 256 | 244 | 233 | 222 | 212 | 203 | 194 | 186 | 178 | 171 | 164 | 158 | 152 |
| | 1000 | 385 | 364 | 345 | 326 | 310 | 294 | 279 | 266 | 253 | 241 | 230 | 220 | 210 | 201 | 192 | 184 | 177 | 170 | 163 | 157 | 151 |
| | 800 | 370 | 351 | 333 | 317 | 301 | 286 | 273 | 260 | 248 | 237 | 226 | 216 | 207 | 198 | 190 | 182 | 175 | 168 | 161 | 155 | 149 |
| | 600 | 342 | 327 | 313 | 299 | 286 | 273 | 261 | 249 | 239 | 228 | 219 | 210 | 201 | 193 | 185 | 178 | 171 | 164 | 158 | 152 | 147 |
| | 400 | 287 | 278 | 270 | 261 | 252 | 243 | 234 | 226 | 218 | 210 | 202 | 195 | 188 | 181 | 174 | 168 | 162 | 156 | 151 | 146 | 141 |
| | 200 | 176 | 174 | 172 | 170 | 167 | 165 | 162 | 159 | 157 | 154 | 151 | 148 | 145 | 142 | 139 | 136 | 132 | 129 | 126 | 123 | 120 |
| | 2600 | 387 | 363 | 341 | 322 | 303 | 287 | 271 | 257 | 244 | 232 | 221 | 210 | 201 | 192 | 183 | 175 | 168 | 161 | 154 | 148 | 142 |
| | 2400 | 385 | 362 | 340 | 321 | 303 | 286 | 271 | 257 | 244 | 232 | 221 | 210 | 200 | 191 | 183 | 175 | 168 | 161 | 154 | 148 | 142 |
| | 2200 | 384 | 360 | 339 | 320 | 302 | 285 | 270 | 256 | 243 | 231 | 220 | 210 | 200 | 191 | 183 | 175 | 167 | 160 | 154 | 148 | 142 |
| | 2000 | 382 | 359 | 338 | 319 | 301 | 284 | 269 | 255 | 243 | 231 | 220 | 209 | 200 | 191 | 182 | 174 | 167 | 160 | 154 | 148 | 142 |
| | 1800 | 380 | 357 | 336 | 317 | 299 | 283 | 268 | 255 | 242 | 230 | 219 | 209 | 199 | 190 | 182 | 174 | 167 | 160 | 153 | 147 | 142 |
| | 1600 | 377 | 354 | 334 | 315 | 298 | 282 | 267 | 253 | 241 | 229 | 218 | 208 | 198 | 190 | 181 | 174 | 166 | 159 | 153 | 147 | 141 |
| 1200000 | 1400 | 373 | 351 | 331 | 313 | 296 | 280 | 265 | 252 | 239 | 228 | 217 | 207 | 198 | 189 | 181 | 173 | 166 | 159 | 153 | 147 | 141 |
| | 1200 | 368 | 346 | 327 | 309 | 293 | 277 | 263 | 250 | 238 | 226 | 216 | 206 | 196 | 188 | 180 | 172 | 165 | 158 | 152 | 146 | 140 |
| | 1000 | 360 | 340 | 321 | 304 | 288 | 273 | 260 | 247 | 235 | 224 | 213 | 204 | 195 | 186 | 178 | 171 | 164 | 157 | 151 | 145 | 139 |
| | 800 | 347 | 329 | 312 | 296 | 281 | 267 | 254 | 242 | 231 | 220 | 210 | 201 | 192 | 184 | 176 | 169 | 162 | 155 | 149 | 144 | 138 |
| | 600 | 324 | 309 | 295 | 281 | 268 | 256 | 244 | 233 | 223 | 213 | 204 | 195 | 187 | 179 | 172 | 165 | 159 | 153 | 147 | 141 | 136 |
| | 400 | 276 | 267 | 258 | 249 | 240 | 231 | 222 | 214 | 206 | 198 | 190 | 183 | 176 | 170 | 163 | 157 | 152 | 146 | 141 | 136 | 131 |
| | 200 | 173 | 171 | 169 | 166 | 164 | 161 | 158 | 155 | 152 | 149 | 146 | 143 | 140 | 136 | 133 | 130 | 127 | 123 | 120 | 117 | 114 |

## UNIT AXIAL STRESSES - SIMPLE SOLID COLUMNS - l/d from 30 to 50

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| | 1800 | 350 | 329 | 309 | 292 | 276 | 261 | 247 | 234 | 222 | 211 | 201 | 192 | 183 | 175 | 167 | 160 | 153 | 147 | 141 | 135 | 130 |
| | 1600 | 347 | 327 | 308 | 290 | 274 | 259 | 246 | 233 | 221 | 211 | 201 | 191 | 182 | 174 | 167 | 159 | 153 | 146 | 141 | 135 | 130 |
| | 1400 | 344 | 324 | 305 | 288 | 272 | 258 | 244 | 232 | 220 | 210 | 200 | 190 | 182 | 174 | 166 | 159 | 152 | 146 | 140 | 135 | 129 |
| | 1200 | 340 | 320 | 302 | 285 | 270 | 256 | 242 | 230 | 219 | 208 | 198 | 189 | 181 | 173 | 165 | 158 | 152 | 145 | 140 | 134 | 129 |
| | 1000 | 333 | 315 | 297 | 281 | 266 | 252 | 240 | 228 | 217 | 206 | 197 | 188 | 179 | 171 | 164 | 157 | 151 | 145 | 139 | 133 | 128 |
| 1100000 | | | | | | | | | | | | | | | | | | | | | | |
| | 800 | 323 | 306 | 289 | 274 | 260 | 247 | 235 | 224 | 213 | 203 | 194 | 185 | 177 | 169 | 162 | 155 | 149 | 143 | 138 | 132 | 127 |
| | 600 | 304 | 289 | 275 | 262 | 250 | 238 | 227 | 217 | 207 | 198 | 189 | 181 | 173 | 166 | 159 | 153 | 146 | 141 | 135 | 130 | 125 |
| | 400 | 264 | 254 | 245 | 236 | 226 | 218 | 209 | 201 | 193 | 185 | 178 | 171 | 164 | 158 | 152 | 146 | 141 | 136 | 131 | 126 | 121 |
| | 200 | 170 | 168 | 165 | 162 | 160 | 157 | 153 | 150 | 147 | 144 | 140 | 137 | 133 | 130 | 127 | 123 | 120 | 117 | 113 | 110 | 107 |
| | 2000 | 321 | 301 | 284 | 267 | 252 | 238 | 226 | 214 | 203 | 193 | 184 | 175 | 167 | 159 | 152 | 146 | 140 | 134 | 128 | 123 | 119 |
| | 1800 | 320 | 300 | 282 | 266 | 251 | 238 | 225 | 213 | 203 | 193 | 183 | 175 | 167 | 159 | 152 | 146 | 139 | 134 | 128 | 123 | 118 |
| | 1600 | 318 | 298 | 281 | 265 | 250 | 237 | 224 | 213 | 202 | 192 | 183 | 174 | 166 | 159 | 152 | 145 | 139 | 133 | 128 | 123 | 118 |
| | 1400 | 315 | 296 | 279 | 263 | 249 | 235 | 223 | 212 | 201 | 191 | 182 | 174 | 166 | 158 | 151 | 145 | 139 | 133 | 128 | 123 | 118 |
| | 1200 | 311 | 293 | 276 | 261 | 247 | 234 | 221 | 210 | 200 | 190 | 181 | 173 | 165 | 157 | 151 | 144 | 138 | 133 | 127 | 122 | 117 |
| 1000000 | | | | | | | | | | | | | | | | | | | | | | |
| | 1000 | 306 | 289 | 273 | 258 | 244 | 231 | 219 | 208 | 198 | 188 | 180 | 171 | 164 | 156 | 150 | 143 | 137 | 132 | 127 | 122 | 117 |
| | 800 | 298 | 282 | 266 | 252 | 239 | 227 | 216 | 205 | 195 | 186 | 177 | 169 | 162 | 155 | 148 | 142 | 136 | 131 | 126 | 121 | 116 |
| | 600 | 283 | 269 | 255 | 243 | 231 | 220 | 209 | 199 | 190 | 181 | 173 | 166 | 159 | 152 | 146 | 140 | 134 | 129 | 124 | 119 | 115 |
| | 400 | 250 | 240 | 230 | 221 | 212 | 203 | 195 | 187 | 179 | 171 | 165 | 158 | 152 | 146 | 140 | 135 | 129 | 125 | 120 | 116 | 111 |
| | 200 | 167 | 164 | 161 | 158 | 155 | 151 | 148 | 144 | 141 | 137 | 134 | 130 | 127 | 123 | 119 | 116 | 113 | 109 | 106 | 103 | 100 |
| | 1600 | 287 | 270 | 254 | 240 | 226 | 214 | 202 | 192 | 182 | 173 | 165 | 157 | 150 | 143 | 137 | 131 | 125 | 120 | 115 | 111 | 106 |
| | 1400 | 285 | 268 | 253 | 238 | 225 | 213 | 202 | 191 | 182 | 173 | 164 | 157 | 149 | 143 | 137 | 131 | 125 | 120 | 115 | 111 | 106 |
| | 1200 | 283 | 266 | 250 | 236 | 223 | 211 | 200 | 190 | 181 | 172 | 164 | 156 | 149 | 142 | 136 | 130 | 125 | 120 | 115 | 110 | 106 |
| | 1000 | 278 | 262 | 247 | 234 | 221 | 209 | 199 | 188 | 179 | 171 | 162 | 155 | 148 | 141 | 135 | 129 | 124 | 119 | 114 | 110 | 106 |
| 900000 | | | | | | | | | | | | | | | | | | | | | | |
| | 800 | 272 | 257 | 243 | 229 | 217 | 206 | 196 | 186 | 177 | 169 | 161 | 153 | 146 | 140 | 134 | 128 | 123 | 118 | 113 | 109 | 105 |
| | 600 | 260 | 247 | 234 | 222 | 211 | 200 | 191 | 181 | 173 | 165 | 158 | 151 | 144 | 138 | 132 | 127 | 121 | 117 | 112 | 108 | 104 |
| | 400 | 234 | 224 | 214 | 205 | 196 | 187 | 179 | 171 | 164 | 157 | 151 | 144 | 138 | 133 | 128 | 123 | 118 | 113 | 109 | 105 | 101 |
| | 200 | 162 | 159 | 155 | 152 | 148 | 145 | 141 | 137 | 133 | 130 | 126 | 122 | 119 | 115 | 111 | 108 | 105 | 101 | 98 | 95 | 92 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "a" - l/d from 2 to 46

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 |
| | 4000 | 3992 | 3967 | 3923 | 3857 | 3764 | 3637 | 3472 | 3263 | 3015 | 2742 | 2464 | 2198 | 1956 | 1741 | 1553 | 1390 | 1249 | 1127 | 1021 | 928 | 847 | 776 | 713 |
| | 3800 | 3793 | 3770 | 3730 | 3671 | 3588 | 3476 | 3329 | 3143 | 2921 | 2672 | 2414 | 2163 | 1931 | 1723 | 1540 | 1381 | 1242 | 1121 | 1016 | 925 | 845 | 774 | 712 |
| | 3600 | 3593 | 3573 | 3538 | 3485 | 3411 | 3312 | 3183 | 3019 | 2820 | 2596 | 2358 | 2124 | 1903 | 1703 | 1526 | 1370 | 1234 | 1115 | 1012 | 921 | 842 | 771 | 709 |
| | 3400 | 3394 | 3376 | 3345 | 3298 | 3233 | 3146 | 3032 | 2889 | 2714 | 2513 | 2297 | 2079 | 1872 | 1680 | 1509 | 1358 | 1225 | 1108 | 1006 | 917 | 838 | 769 | 707 |
| | 3200 | 3195 | 3179 | 3151 | 3110 | 3053 | 2977 | 2879 | 2754 | 2601 | 2424 | 2230 | 2030 | 1836 | 1655 | 1490 | 1344 | 1214 | 1100 | 1000 | 912 | 834 | 765 | 705 |
| | 3000 | 2995 | 2981 | 2957 | 2921 | 2872 | 2806 | 2721 | 2614 | 2482 | 2327 | 2155 | 1974 | 1795 | 1625 | 1468 | 1327 | 1202 | 1091 | 993 | 906 | 829 | 762 | 702 |
| | 2800 | 2796 | 2784 | 2763 | 2732 | 2689 | 2633 | 2561 | 2469 | 2357 | 2223 | 2073 | 1912 | 1748 | 1591 | 1443 | 1308 | 1188 | 1080 | 984 | 899 | 824 | 757 | 698 |
| 2100000 | 2600 | 2597 | 2586 | 2568 | 2541 | 2505 | 2458 | 2396 | 2319 | 2225 | 2112 | 1982 | 1841 | 1695 | 1551 | 1413 | 1286 | 1171 | 1067 | 974 | 891 | 818 | 752 | 694 |
| | 2400 | 2397 | 2388 | 2373 | 2350 | 2320 | 2280 | 2229 | 2165 | 2086 | 1992 | 1883 | 1762 | 1634 | 1504 | 1378 | 1260 | 1151 | 1051 | 962 | 882 | 810 | 746 | 689 |
| | 2200 | 2198 | 2190 | 2177 | 2158 | 2133 | 2100 | 2058 | 2006 | 1942 | 1865 | 1774 | 1673 | 1563 | 1449 | 1336 | 1228 | 1126 | 1033 | 947 | 870 | 801 | 739 | 683 |
| | 2000 | 1998 | 1992 | 1981 | 1966 | 1945 | 1918 | 1885 | 1842 | 1791 | 1729 | 1656 | 1573 | 1482 | 1385 | 1286 | 1189 | 1096 | 1010 | 929 | 856 | 790 | 730 | 675 |
| | 1800 | 1798 | 1793 | 1785 | 1772 | 1756 | 1735 | 1708 | 1675 | 1634 | 1586 | 1529 | 1463 | 1389 | 1310 | 1226 | 1142 | 1059 | 981 | 907 | 838 | 775 | 718 | 666 |
| | 1600 | 1599 | 1595 | 1588 | 1578 | 1565 | 1549 | 1528 | 1503 | 1472 | 1435 | 1392 | 1342 | 1284 | 1221 | 1154 | 1083 | 1013 | 944 | 878 | 815 | 757 | 703 | 654 |
| | 1400 | 1399 | 1396 | 1391 | 1384 | 1374 | 1361 | 1346 | 1327 | 1304 | 1277 | 1246 | 1209 | 1166 | 1119 | 1067 | 1011 | 954 | 896 | 839 | 784 | 732 | 683 | 638 |
| | 1200 | 1199 | 1197 | 1193 | 1188 | 1181 | 1172 | 1161 | 1147 | 1131 | 1112 | 1090 | 1064 | 1035 | 1001 | 964 | 923 | 880 | 834 | 789 | 743 | 698 | 656 | 615 |
| | 3600 | 3593 | 3572 | 3534 | 3479 | 3401 | 3295 | 3157 | 2982 | 2772 | 2538 | 2294 | 2056 | 1836 | 1639 | 1465 | 1314 | 1182 | 1067 | 968 | 880 | 804 | 737 | 677 |
| | 3400 | 3394 | 3375 | 3342 | 3292 | 3224 | 3131 | 3010 | 2857 | 2671 | 2461 | 2238 | 2016 | 1808 | 1619 | 1451 | 1303 | 1174 | 1061 | 963 | 877 | 801 | 734 | 675 |
| | 3200 | 3195 | 3178 | 3149 | 3105 | 3045 | 2964 | 2859 | 2726 | 2564 | 2377 | 2175 | 1971 | 1776 | 1596 | 1434 | 1290 | 1164 | 1054 | 957 | 872 | 797 | 731 | 673 |
| | 3000 | 2995 | 2980 | 2955 | 2917 | 2865 | 2795 | 2704 | 2590 | 2450 | 2286 | 2106 | 1921 | 1739 | 1569 | 1414 | 1276 | 1153 | 1046 | 951 | 867 | 793 | 728 | 670 |
| | 2800 | 2796 | 2783 | 2761 | 2728 | 2683 | 2623 | 2546 | 2448 | 2329 | 2188 | 2030 | 1863 | 1697 | 1538 | 1392 | 1259 | 1141 | 1036 | 943 | 861 | 789 | 724 | 667 |
| 2000000 | 2600 | 2596 | 2585 | 2566 | 2538 | 2500 | 2449 | 2384 | 2302 | 2201 | 2081 | 1945 | 1798 | 1648 | 1502 | 1365 | 1239 | 1126 | 1024 | 934 | 854 | 783 | 720 | 663 |
| | 2400 | 2397 | 2388 | 2371 | 2348 | 2315 | 2273 | 2219 | 2151 | 2067 | 1966 | 1851 | 1724 | 1592 | 1460 | 1333 | 1215 | 1108 | 1010 | 923 | 846 | 776 | 714 | 659 |
| | 2200 | 2197 | 2190 | 2176 | 2156 | 2130 | 2095 | 2050 | 1994 | 1926 | 1843 | 1748 | 1641 | 1527 | 1410 | 1296 | 1187 | 1086 | 994 | 910 | 835 | 768 | 708 | 654 |
| | 2000 | 1998 | 1991 | 1980 | 1964 | 1942 | 1914 | 1878 | 1833 | 1778 | 1712 | 1635 | 1547 | 1451 | 1351 | 1250 | 1152 | 1059 | 973 | 894 | 823 | 758 | 700 | 647 |
| | 1800 | 1798 | 1793 | 1784 | 1771 | 1754 | 1731 | 1703 | 1667 | 1624 | 1573 | 1512 | 1442 | 1364 | 1281 | 1195 | 1109 | 1026 | 947 | 874 | 807 | 745 | 689 | 639 |
| | 1600 | 1599 | 1594 | 1587 | 1577 | 1564 | 1546 | 1524 | 1497 | 1464 | 1425 | 1379 | 1325 | 1265 | 1198 | 1128 | 1056 | 984 | 914 | 848 | 786 | 729 | 676 | 628 |
| | 1400 | 1399 | 1396 | 1390 | 1383 | 1372 | 1359 | 1343 | 1323 | 1299 | 1270 | 1236 | 1197 | 1152 | 1101 | 1047 | 989 | 930 | 871 | 813 | 758 | 706 | 658 | 613 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "a" - l/d from 2 to 46

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 |
| | 3600 | 3593 | 3570 | 3531 | 3472 | 3389 | 3276 | 3128 | 2941 | 2719 | 2474 | 2225 | 1986 | 1767 | 1573 | 1404 | 1257 | 1129 | 1019 | 923 | 840 | 766 | 702 | 645 |
| | 3400 | 3393 | 3373 | 3338 | 3286 | 3213 | 3114 | 2984 | 2821 | 2624 | 2403 | 2174 | 1950 | 1742 | 1555 | 1391 | 1247 | 1122 | 1013 | 919 | 836 | 764 | 700 | 643 |
| | 3200 | 3194 | 3177 | 3146 | 3100 | 3036 | 2950 | 2837 | 2694 | 2522 | 2326 | 2117 | 1909 | 1713 | 1535 | 1376 | 1236 | 1114 | 1007 | 914 | 832 | 760 | 697 | 641 |
| | 3000 | 2995 | 2979 | 2952 | 2912 | 2857 | 2782 | 2685 | 2563 | 2413 | 2241 | 2053 | 1863 | 1680 | 1511 | 1358 | 1223 | 1104 | 1000 | 908 | 828 | 757 | 694 | 639 |
| | 2800 | 2796 | 2782 | 2759 | 2724 | 2676 | 2613 | 2530 | 2425 | 2297 | 2148 | 1983 | 1811 | 1642 | 1483 | 1338 | 1208 | 1093 | 991 | 901 | 822 | 753 | 691 | 636 |
| | 2600 | 2596 | 2585 | 2564 | 2535 | 2494 | 2440 | 2371 | 2283 | 2175 | 2047 | 1904 | 1751 | 1598 | 1451 | 1315 | 1190 | 1079 | 981 | 893 | 816 | 747 | 687 | 633 |
| | 2400 | 2397 | 2387 | 2370 | 2345 | 2311 | 2265 | 2207 | 2134 | 2045 | 1938 | 1816 | 1683 | 1547 | 1413 | 1286 | 1169 | 1063 | 968 | 884 | 808 | 742 | 682 | 629 |
| 1900000 | 2200 | 2197 | 2189 | 2175 | 2154 | 2125 | 2088 | 2041 | 1981 | 1908 | 1820 | 1718 | 1606 | 1487 | 1368 | 1252 | 1144 | 1044 | 954 | 872 | 799 | 734 | 676 | 624 |
| | 2000 | 1998 | 1991 | 1979 | 1962 | 1939 | 1909 | 1870 | 1823 | 1764 | 1693 | 1611 | 1518 | 1418 | 1314 | 1211 | 1113 | 1020 | 935 | 858 | 788 | 725 | 669 | 618 |
| | 1800 | 1798 | 1793 | 1783 | 1769 | 1751 | 1727 | 1697 | 1659 | 1613 | 1558 | 1493 | 1419 | 1337 | 1250 | 1161 | 1074 | 990 | 912 | 840 | 774 | 714 | 660 | 611 |
| | 1600 | 1599 | 1594 | 1587 | 1576 | 1562 | 1543 | 1520 | 1491 | 1456 | 1414 | 1364 | 1307 | 1243 | 1173 | 1100 | 1025 | 952 | 882 | 817 | 755 | 699 | 648 | 601 |
| | 1400 | 1399 | 1396 | 1390 | 1382 | 1371 | 1357 | 1339 | 1318 | 1292 | 1262 | 1225 | 1183 | 1135 | 1082 | 1024 | 964 | 904 | 844 | 786 | 731 | 680 | 632 | 588 |
| | 1200 | 1199 | 1197 | 1193 | 1187 | 1179 | 1169 | 1156 | 1141 | 1123 | 1101 | 1076 | 1047 | 1013 | 975 | 933 | 888 | 840 | 792 | 744 | 697 | 652 | 610 | 570 |
| | 1000 | 999 | 998 | 995 | 991 | 985 | 979 | 970 | 960 | 948 | 934 | 917 | 898 | 876 | 850 | 822 | 791 | 758 | 723 | 686 | 650 | 613 | 578 | 544 |
| | 3400 | 3393 | 3372 | 3335 | 3279 | 3201 | 3095 | 2956 | 2780 | 2571 | 2341 | 2105 | 1879 | 1673 | 1490 | 1329 | 1190 | 1070 | 965 | 874 | 795 | 726 | 665 | 611 |
| | 3200 | 3194 | 3175 | 3143 | 3094 | 3025 | 2933 | 2812 | 2659 | 2475 | 2269 | 2054 | 1843 | 1647 | 1471 | 1316 | 1180 | 1062 | 959 | 870 | 792 | 723 | 663 | 609 |
| | 3000 | 2995 | 2978 | 2950 | 2907 | 2848 | 2768 | 2664 | 2532 | 2373 | 2190 | 1996 | 1802 | 1618 | 1450 | 1301 | 1169 | 1054 | 953 | 865 | 788 | 720 | 660 | 607 |
| | 2800 | 2795 | 2781 | 2756 | 2719 | 2669 | 2600 | 2512 | 2399 | 2262 | 2104 | 1931 | 1755 | 1584 | 1426 | 1283 | 1156 | 1044 | 945 | 859 | 783 | 716 | 657 | 605 |
| | 2600 | 2596 | 2584 | 2562 | 2531 | 2488 | 2430 | 2355 | 2261 | 2145 | 2009 | 1858 | 1701 | 1545 | 1397 | 1262 | 1140 | 1032 | 936 | 852 | 777 | 712 | 653 | 602 |
| | 2400 | 2397 | 2386 | 2368 | 2342 | 2305 | 2257 | 2195 | 2116 | 2020 | 1906 | 1777 | 1639 | 1499 | 1363 | 1237 | 1122 | 1018 | 925 | 843 | 771 | 706 | 649 | 598 |
| | 2200 | 2197 | 2188 | 2173 | 2151 | 2121 | 2081 | 2030 | 1966 | 1887 | 1793 | 1685 | 1567 | 1445 | 1323 | 1207 | 1099 | 1001 | 912 | 833 | 763 | 700 | 644 | 594 |
| 1800000 | 2000 | 1998 | 1990 | 1978 | 1960 | 1935 | 1903 | 1862 | 1811 | 1748 | 1672 | 1584 | 1486 | 1381 | 1274 | 1170 | 1071 | 980 | 896 | 821 | 753 | 692 | 638 | 589 |
| | 1800 | 1798 | 1792 | 1782 | 1768 | 1748 | 1722 | 1690 | 1650 | 1600 | 1541 | 1471 | 1392 | 1306 | 1216 | 1125 | 1037 | 953 | 876 | 805 | 740 | 682 | 630 | 582 |
| | 1600 | 1598 | 1594 | 1586 | 1575 | 1559 | 1540 | 1515 | 1484 | 1446 | 1401 | 1348 | 1287 | 1219 | 1145 | 1069 | 993 | 919 | 849 | 784 | 724 | 669 | 619 | 574 |
| | 1400 | 1399 | 1395 | 1389 | 1381 | 1369 | 1354 | 1336 | 1313 | 1285 | 1252 | 1213 | 1168 | 1117 | 1060 | 1000 | 938 | 876 | 815 | 757 | 702 | 652 | 605 | 562 |
| | 1200 | 1199 | 1197 | 1192 | 1186 | 1177 | 1167 | 1154 | 1137 | 1118 | 1095 | 1068 | 1036 | 1000 | 959 | 914 | 867 | 818 | 768 | 719 | 672 | 628 | 586 | 547 |
| | 1000 | 999 | 998 | 995 | 990 | 985 | 977 | 968 | 958 | 945 | 929 | 912 | 891 | 867 | 840 | 810 | 777 | 742 | 705 | 667 | 630 | 593 | 557 | 523 |
| | 800 | 800 | 798 | 797 | 794 | 790 | 786 | 780 | 773 | 766 | 756 | 746 | 733 | 719 | 703 | 685 | 665 | 643 | 619 | 594 | 567 | 540 | 513 | 487 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "a" - l/d from 2 to 46

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 |
| | 3200 | 3194 | 3174 | 3139 | 3087 | 3013 | 2914 | 2784 | 2619 | 2423 | 2207 | 1985 | 1773 | 1579 | 1406 | 1255 | 1124 | 1010 | 911 | 826 | 751 | 685 | 628 | 577 |
| | 3000 | 2994 | 2977 | 2947 | 2901 | 2838 | 2752 | 2640 | 2498 | 2327 | 2135 | 1933 | 1736 | 1553 | 1387 | 1241 | 1114 | 1002 | 906 | 821 | 747 | 683 | 626 | 575 |
| | 2800 | 2795 | 2780 | 2754 | 2714 | 2660 | 2587 | 2491 | 2370 | 2223 | 2055 | 1875 | 1694 | 1523 | 1366 | 1226 | 1102 | 994 | 899 | 816 | 743 | 679 | 623 | 573 |
| | 2600 | 2596 | 2583 | 2560 | 2527 | 2480 | 2418 | 2338 | 2236 | 2111 | 1967 | 1808 | 1646 | 1488 | 1341 | 1207 | 1088 | 983 | 891 | 810 | 738 | 675 | 620 | 570 |
| | 2400 | 2396 | 2385 | 2366 | 2338 | 2299 | 2247 | 2180 | 2096 | 1992 | 1870 | 1733 | 1590 | 1447 | 1311 | 1185 | 1072 | 971 | 881 | 802 | 733 | 671 | 616 | 567 |
| | 2200 | 2197 | 2188 | 2172 | 2148 | 2116 | 2073 | 2018 | 1949 | 1864 | 1763 | 1649 | 1525 | 1398 | 1275 | 1159 | 1052 | 956 | 870 | 793 | 725 | 665 | 611 | 564 |
| | 2000 | 1997 | 1990 | 1977 | 1957 | 1931 | 1897 | 1852 | 1797 | 1729 | 1647 | 1553 | 1450 | 1341 | 1232 | 1126 | 1028 | 938 | 856 | 782 | 717 | 658 | 606 | 559 |
| 1700000 | 1800 | 1798 | 1792 | 1781 | 1766 | 1745 | 1717 | 1683 | 1639 | 1586 | 1522 | 1447 | 1363 | 1272 | 1179 | 1086 | 997 | 914 | 838 | 768 | 706 | 649 | 599 | 553 |
| | 1600 | 1598 | 1593 | 1585 | 1573 | 1557 | 1536 | 1509 | 1476 | 1435 | 1387 | 1329 | 1264 | 1191 | 1115 | 1036 | 959 | 884 | 815 | 750 | 692 | 638 | 590 | 546 |
| | 1400 | 1399 | 1395 | 1389 | 1379 | 1367 | 1351 | 1331 | 1307 | 1277 | 1242 | 1199 | 1151 | 1096 | 1036 | 973 | 909 | 845 | 784 | 726 | 673 | 623 | 577 | 536 |
| | 1200 | 1199 | 1196 | 1192 | 1185 | 1176 | 1165 | 1151 | 1133 | 1112 | 1087 | 1058 | 1024 | 985 | 941 | 894 | 844 | 793 | 743 | 693 | 646 | 602 | 560 | 522 |
| | 1000 | 999 | 997 | 994 | 990 | 984 | 976 | 966 | 955 | 941 | 924 | 905 | 883 | 857 | 828 | 796 | 761 | 724 | 685 | 646 | 608 | 571 | 535 | 502 |
| | 800 | 800 | 798 | 796 | 793 | 790 | 785 | 779 | 772 | 763 | 753 | 742 | 729 | 713 | 696 | 676 | 655 | 631 | 606 | 579 | 552 | 524 | 496 | 469 |
| | 600 | 600 | 599 | 598 | 596 | 594 | 592 | 588 | 584 | 580 | 575 | 569 | 562 | 554 | 545 | 535 | 524 | 512 | 498 | 483 | 467 | 451 | 433 | 415 |
| | 3200 | 3193 | 3172 | 3135 | 3079 | 3000 | 2892 | 2751 | 2573 | 2365 | 2138 | 1912 | 1699 | 1507 | 1338 | 1192 | 1065 | 957 | 862 | 781 | 710 | 647 | 593 | 545 |
| | 3000 | 2994 | 2975 | 2943 | 2894 | 2826 | 2733 | 2612 | 2458 | 2275 | 2073 | 1866 | 1667 | 1484 | 1322 | 1180 | 1057 | 950 | 857 | 777 | 706 | 645 | 591 | 543 |
| | 2800 | 2795 | 2779 | 2751 | 2709 | 2650 | 2571 | 2467 | 2336 | 2178 | 2000 | 1813 | 1630 | 1458 | 1304 | 1167 | 1047 | 942 | 852 | 772 | 703 | 642 | 589 | 541 |
| | 2600 | 2595 | 2582 | 2557 | 2522 | 2472 | 2405 | 2318 | 2207 | 2073 | 1919 | 1753 | 1587 | 1428 | 1282 | 1151 | 1035 | 933 | 845 | 767 | 699 | 639 | 586 | 539 |
| | 2400 | 2396 | 2384 | 2364 | 2334 | 2292 | 2236 | 2164 | 2072 | 1960 | 1829 | 1685 | 1537 | 1391 | 1255 | 1131 | 1021 | 923 | 836 | 760 | 694 | 635 | 582 | 536 |
| | 2200 | 2197 | 2187 | 2170 | 2145 | 2110 | 2064 | 2005 | 1930 | 1838 | 1729 | 1607 | 1478 | 1348 | 1224 | 1108 | 1004 | 910 | 826 | 753 | 688 | 630 | 579 | 533 |
| | 2000 | 1997 | 1989 | 1975 | 1955 | 1926 | 1889 | 1842 | 1782 | 1708 | 1620 | 1519 | 1410 | 1297 | 1186 | 1080 | 982 | 894 | 814 | 743 | 680 | 624 | 574 | 529 |
| 1600000 | 1800 | 1798 | 1791 | 1780 | 1763 | 1741 | 1712 | 1674 | 1627 | 1569 | 1500 | 1420 | 1330 | 1235 | 1139 | 1045 | 956 | 873 | 799 | 731 | 670 | 616 | 568 | 524 |
| | 1600 | 1598 | 1593 | 1584 | 1571 | 1554 | 1531 | 1502 | 1466 | 1423 | 1370 | 1308 | 1238 | 1161 | 1081 | 1000 | 922 | 847 | 778 | 715 | 658 | 606 | 560 | 518 |
| | 1400 | 1399 | 1395 | 1388 | 1378 | 1365 | 1348 | 1327 | 1300 | 1268 | 1229 | 1184 | 1131 | 1073 | 1009 | 943 | 877 | 813 | 752 | 694 | 641 | 593 | 549 | 509 |
| | 1200 | 1199 | 1196 | 1191 | 1184 | 1175 | 1162 | 1147 | 1128 | 1106 | 1079 | 1047 | 1010 | 968 | 921 | 871 | 819 | 767 | 715 | 665 | 618 | 575 | 534 | 497 |
| | 1000 | 999 | 997 | 994 | 989 | 982 | 974 | 964 | 952 | 937 | 919 | 898 | 874 | 846 | 815 | 780 | 743 | 704 | 664 | 624 | 585 | 548 | 512 | 479 |
| | 800 | 800 | 798 | 796 | 793 | 789 | 784 | 777 | 770 | 761 | 750 | 738 | 723 | 707 | 688 | 667 | 643 | 618 | 591 | 563 | 535 | 506 | 478 | 451 |
| | 600 | 600 | 599 | 598 | 596 | 594 | 591 | 588 | 583 | 579 | 573 | 566 | 559 | 551 | 541 | 530 | 518 | 505 | 490 | 474 | 457 | 440 | 421 | 403 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "a" - l/d from 2 to 46

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 |
| | 3000 | 2994 | 2974 | 2939 | 2887 | 2813 | 2712 | 2579 | 2413 | 2217 | 2005 | 1792 | 1593 | 1413 | 1255 | 1117 | 999 | 897 | 808 | 732 | 665 | 607 | 556 | 511 |
| | 2800 | 2794 | 2777 | 2747 | 2702 | 2638 | 2552 | 2439 | 2297 | 2127 | 1939 | 1746 | 1560 | 1390 | 1238 | 1106 | 990 | 890 | 803 | 728 | 662 | 604 | 554 | 509 |
| | 2600 | 2595 | 2580 | 2555 | 2516 | 2462 | 2389 | 2294 | 2174 | 2029 | 1865 | 1693 | 1523 | 1363 | 1219 | 1092 | 980 | 882 | 797 | 723 | 658 | 602 | 551 | 507 |
| | 2400 | 2396 | 2383 | 2361 | 2329 | 2284 | 2223 | 2144 | 2044 | 1923 | 1783 | 1632 | 1479 | 1332 | 1197 | 1075 | 968 | 873 | 790 | 718 | 654 | 598 | 549 | 505 |
| | 2200 | 2197 | 2186 | 2168 | 2141 | 2103 | 2054 | 1989 | 1907 | 1807 | 1691 | 1561 | 1427 | 1294 | 1169 | 1055 | 953 | 862 | 782 | 711 | 649 | 594 | 545 | 502 |
| | 2000 | 1997 | 1988 | 1973 | 1951 | 1921 | 1881 | 1829 | 1764 | 1683 | 1588 | 1481 | 1365 | 1249 | 1136 | 1031 | 935 | 848 | 771 | 703 | 642 | 589 | 541 | 499 |
| | 1800 | 1798 | 1791 | 1779 | 1761 | 1737 | 1705 | 1664 | 1613 | 1550 | 1475 | 1388 | 1293 | 1194 | 1095 | 1000 | 912 | 831 | 758 | 692 | 634 | 582 | 536 | 494 |
| 1500000 | 1600 | 1598 | 1593 | 1583 | 1569 | 1550 | 1526 | 1495 | 1456 | 1408 | 1350 | 1283 | 1208 | 1127 | 1044 | 961 | 882 | 808 | 740 | 679 | 624 | 574 | 529 | 489 |
| | 1400 | 1399 | 1394 | 1387 | 1377 | 1362 | 1344 | 1321 | 1292 | 1257 | 1215 | 1166 | 1109 | 1046 | 979 | 911 | 843 | 778 | 717 | 661 | 609 | 562 | 520 | 481 |
| | 1200 | 1199 | 1196 | 1191 | 1183 | 1173 | 1160 | 1143 | 1123 | 1098 | 1069 | 1034 | 994 | 949 | 899 | 846 | 792 | 738 | 685 | 636 | 589 | 546 | 507 | 471 |
| | 1000 | 999 | 997 | 993 | 988 | 981 | 972 | 961 | 948 | 932 | 912 | 890 | 863 | 833 | 799 | 762 | 722 | 682 | 640 | 600 | 560 | 523 | 488 | 455 |
| | 800 | 800 | 798 | 796 | 793 | 788 | 783 | 776 | 768 | 758 | 746 | 733 | 717 | 699 | 678 | 655 | 630 | 603 | 575 | 545 | 516 | 487 | 458 | 431 |
| | 600 | 600 | 599 | 598 | 596 | 593 | 590 | 587 | 582 | 577 | 571 | 564 | 556 | 547 | 536 | 524 | 511 | 497 | 481 | 464 | 446 | 427 | 408 | 389 |
| | 400 | 400 | 400 | 399 | 398 | 397 | 396 | 394 | 392 | 390 | 388 | 385 | 381 | 378 | 374 | 369 | 364 | 358 | 352 | 345 | 338 | 330 | 321 | 312 |
| | 2800 | 2794 | 2775 | 2743 | 2694 | 2625 | 2531 | 2407 | 2252 | 2069 | 1871 | 1673 | 1486 | 1319 | 1171 | 1043 | 932 | 837 | 755 | 683 | 621 | 567 | 519 | 477 |
| | 2600 | 2595 | 2579 | 2551 | 2509 | 2451 | 2371 | 2267 | 2136 | 1979 | 1805 | 1626 | 1454 | 1296 | 1155 | 1031 | 924 | 830 | 749 | 679 | 618 | 564 | 517 | 475 |
| | 2400 | 2396 | 2382 | 2359 | 2323 | 2274 | 2208 | 2122 | 2012 | 1880 | 1730 | 1572 | 1416 | 1269 | 1135 | 1017 | 913 | 823 | 743 | 674 | 614 | 561 | 514 | 473 |
| | 2200 | 2196 | 2185 | 2165 | 2136 | 2096 | 2041 | 1971 | 1881 | 1772 | 1646 | 1509 | 1370 | 1236 | 1112 | 1000 | 901 | 813 | 736 | 669 | 610 | 557 | 511 | 471 |
| | 2000 | 1997 | 1988 | 1971 | 1948 | 1915 | 1871 | 1814 | 1743 | 1655 | 1552 | 1437 | 1316 | 1197 | 1083 | 979 | 885 | 801 | 727 | 662 | 604 | 553 | 508 | 468 |
| | 1800 | 1798 | 1790 | 1777 | 1758 | 1732 | 1697 | 1653 | 1597 | 1528 | 1446 | 1352 | 1252 | 1148 | 1048 | 953 | 865 | 786 | 716 | 653 | 597 | 547 | 503 | 464 |
| 1400000 | 1600 | 1598 | 1592 | 1582 | 1567 | 1547 | 1520 | 1486 | 1443 | 1391 | 1328 | 1255 | 1175 | 1089 | 1003 | 919 | 840 | 767 | 701 | 641 | 588 | 540 | 497 | 459 |
| | 1400 | 1399 | 1394 | 1386 | 1375 | 1360 | 1340 | 1315 | 1283 | 1245 | 1199 | 1144 | 1083 | 1016 | 946 | 875 | 806 | 741 | 681 | 626 | 576 | 531 | 490 | 453 |
| | 1200 | 1199 | 1196 | 1190 | 1182 | 1171 | 1156 | 1139 | 1116 | 1090 | 1057 | 1019 | 975 | 926 | 873 | 817 | 761 | 706 | 654 | 604 | 559 | 517 | 479 | 444 |
| | 1000 | 999 | 997 | 993 | 987 | 980 | 970 | 958 | 944 | 926 | 905 | 880 | 851 | 818 | 781 | 741 | 700 | 657 | 614 | 573 | 534 | 497 | 463 | 431 |
| | 800 | 800 | 798 | 796 | 792 | 787 | 781 | 774 | 765 | 754 | 742 | 727 | 710 | 690 | 667 | 642 | 615 | 586 | 556 | 526 | 495 | 466 | 437 | 410 |
| | 600 | 600 | 599 | 598 | 596 | 593 | 590 | 586 | 581 | 575 | 569 | 561 | 552 | 542 | 530 | 517 | 503 | 487 | 470 | 452 | 433 | 413 | 393 | 373 |
| | 400 | 400 | 400 | 399 | 398 | 397 | 395 | 394 | 392 | 389 | 387 | 384 | 380 | 376 | 371 | 366 | 361 | 355 | 348 | 340 | 332 | 323 | 314 | 304 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "a" - l/d from 2 to 46

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 |
| | 2800 | 2794 | 2774 | 2738 | 2685 | 2609 | 2506 | 2369 | 2199 | 2003 | 1796 | 1594 | 1408 | 1244 | 1101 | 978 | 873 | 783 | 705 | 638 | 579 | 528 | 483 | 444 |
| | 2600 | 2594 | 2577 | 2547 | 2502 | 2438 | 2350 | 2235 | 2091 | 1921 | 1737 | 1553 | 1380 | 1224 | 1087 | 968 | 866 | 777 | 701 | 634 | 577 | 526 | 482 | 443 |
| | 2400 | 2395 | 2381 | 2355 | 2317 | 2263 | 2190 | 2095 | 1975 | 1831 | 1671 | 1506 | 1348 | 1201 | 1071 | 957 | 857 | 771 | 696 | 630 | 573 | 524 | 480 | 441 |
| | 2200 | 2196 | 2184 | 2162 | 2131 | 2086 | 2027 | 1949 | 1850 | 1731 | 1595 | 1452 | 1309 | 1174 | 1051 | 942 | 846 | 763 | 689 | 626 | 570 | 520 | 477 | 439 |
| | 2000 | 1997 | 1987 | 1969 | 1943 | 1907 | 1859 | 1797 | 1718 | 1621 | 1509 | 1387 | 1262 | 1140 | 1027 | 924 | 833 | 753 | 682 | 620 | 565 | 517 | 474 | 436 |
| | 1800 | 1797 | 1789 | 1775 | 1754 | 1726 | 1688 | 1639 | 1577 | 1501 | 1412 | 1311 | 1205 | 1098 | 996 | 902 | 817 | 740 | 672 | 612 | 559 | 512 | 470 | 433 |
| | 1600 | 1598 | 1591 | 1580 | 1564 | 1542 | 1513 | 1476 | 1429 | 1371 | 1302 | 1223 | 1136 | 1047 | 958 | 873 | 795 | 724 | 660 | 602 | 551 | 506 | 465 | 429 |
| 1300000 | 1400 | 1398 | 1393 | 1385 | 1373 | 1356 | 1334 | 1307 | 1272 | 1230 | 1179 | 1120 | 1053 | 982 | 908 | 836 | 767 | 702 | 643 | 589 | 541 | 498 | 459 | 424 |
| | 1200 | 1199 | 1195 | 1189 | 1180 | 1168 | 1153 | 1133 | 1109 | 1079 | 1044 | 1002 | 954 | 901 | 844 | 786 | 728 | 672 | 620 | 571 | 527 | 486 | 450 | 416 |
| | 1000 | 999 | 997 | 992 | 986 | 978 | 968 | 955 | 939 | 919 | 896 | 868 | 837 | 800 | 761 | 718 | 674 | 630 | 586 | 545 | 506 | 470 | 436 | 405 |
| | 800 | 799 | 798 | 795 | 791 | 786 | 780 | 772 | 762 | 750 | 736 | 720 | 701 | 679 | 655 | 627 | 598 | 567 | 535 | 504 | 473 | 443 | 414 | 388 |
| | 600 | 600 | 599 | 597 | 595 | 592 | 589 | 584 | 579 | 573 | 566 | 557 | 548 | 536 | 524 | 510 | 494 | 476 | 458 | 438 | 418 | 397 | 377 | 356 |
| | 400 | 400 | 399 | 399 | 398 | 397 | 395 | 393 | 391 | 388 | 386 | 382 | 378 | 374 | 369 | 363 | 357 | 350 | 343 | 334 | 325 | 316 | 306 | 295 |
| | 200 | 200 | 200 | 200 | 199 | 199 | 199 | 198 | 198 | 197 | 197 | 196 | 195 | 194 | 193 | 192 | 190 | 189 | 188 | 186 | 184 | 182 | 180 | 178 |
| | 2600 | 2594 | 2575 | 2542 | 2493 | 2422 | 2325 | 2197 | 2038 | 1855 | 1662 | 1474 | 1302 | 1149 | 1017 | 904 | 806 | 723 | 651 | 589 | 535 | 488 | 446 | 410 |
| | 2400 | 2395 | 2379 | 2351 | 2309 | 2250 | 2169 | 2063 | 1930 | 1774 | 1604 | 1434 | 1274 | 1130 | 1004 | 894 | 799 | 717 | 647 | 585 | 532 | 486 | 445 | 409 |
| | 2200 | 2196 | 2182 | 2159 | 2124 | 2076 | 2010 | 1923 | 1814 | 1683 | 1537 | 1387 | 1241 | 1107 | 987 | 882 | 790 | 711 | 642 | 581 | 529 | 483 | 443 | 407 |
| | 2000 | 1996 | 1985 | 1966 | 1938 | 1898 | 1845 | 1776 | 1688 | 1582 | 1460 | 1331 | 1201 | 1079 | 967 | 867 | 779 | 702 | 635 | 577 | 525 | 480 | 440 | 405 |
| | 1800 | 1797 | 1788 | 1773 | 1750 | 1719 | 1677 | 1623 | 1554 | 1470 | 1372 | 1264 | 1152 | 1043 | 941 | 849 | 766 | 692 | 627 | 570 | 520 | 476 | 437 | 402 |
| | 1600 | 1598 | 1591 | 1579 | 1561 | 1537 | 1505 | 1463 | 1411 | 1347 | 1270 | 1184 | 1092 | 999 | 909 | 825 | 748 | 679 | 617 | 562 | 514 | 471 | 433 | 399 |
| 1200000 | 1400 | 1398 | 1393 | 1384 | 1370 | 1352 | 1328 | 1298 | 1259 | 1212 | 1156 | 1091 | 1019 | 943 | 866 | 793 | 724 | 661 | 603 | 552 | 505 | 464 | 427 | 394 |
| | 1200 | 1199 | 1195 | 1188 | 1178 | 1165 | 1148 | 1127 | 1100 | 1067 | 1027 | 981 | 928 | 871 | 811 | 750 | 691 | 635 | 584 | 537 | 494 | 455 | 420 | 388 |
| | 1000 | 999 | 996 | 992 | 985 | 976 | 965 | 950 | 933 | 911 | 885 | 855 | 819 | 780 | 736 | 691 | 645 | 599 | 556 | 514 | 476 | 441 | 408 | 379 |
| | 800 | 799 | 798 | 795 | 791 | 785 | 778 | 769 | 758 | 745 | 730 | 712 | 691 | 666 | 639 | 610 | 578 | 545 | 512 | 480 | 448 | 418 | 390 | 364 |
| | 600 | 600 | 599 | 597 | 595 | 592 | 588 | 583 | 577 | 571 | 563 | 553 | 542 | 530 | 516 | 500 | 483 | 464 | 443 | 422 | 401 | 380 | 358 | 338 |
| | 400 | 400 | 399 | 399 | 398 | 396 | 395 | 393 | 390 | 387 | 384 | 380 | 376 | 371 | 366 | 360 | 353 | 345 | 337 | 327 | 318 | 307 | 296 | 285 |
| | 200 | 200 | 200 | 200 | 199 | 199 | 199 | 198 | 198 | 197 | 196 | 195 | 194 | 193 | 192 | 191 | 190 | 188 | 186 | 184 | 182 | 180 | 178 | 175 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "a" - l/d from 2 to 46

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 |
| 1100000 | 1800 | 1797 | 1787 | 1770 | 1745 | 1711 | 1664 | 1603 | 1526 | 1432 | 1325 | 1209 | 1094 | 983 | 883 | 792 | 712 | 642 | 581 | 528 | 481 | 439 | 403 | 371 |
| | 1600 | 1598 | 1590 | 1577 | 1557 | 1530 | 1495 | 1448 | 1389 | 1317 | 1233 | 1140 | 1042 | 946 | 856 | 772 | 698 | 631 | 573 | 521 | 475 | 435 | 400 | 368 |
| | 1400 | 1398 | 1392 | 1382 | 1368 | 1347 | 1321 | 1287 | 1244 | 1191 | 1128 | 1056 | 978 | 898 | 820 | 746 | 678 | 617 | 561 | 512 | 468 | 430 | 395 | 364 |
| | 1200 | 1199 | 1194 | 1187 | 1176 | 1162 | 1143 | 1119 | 1089 | 1052 | 1008 | 956 | 898 | 836 | 773 | 710 | 651 | 596 | 546 | 500 | 459 | 422 | 389 | 359 |
| | 1000 | 999 | 996 | 991 | 984 | 974 | 961 | 945 | 925 | 901 | 872 | 838 | 799 | 755 | 708 | 660 | 612 | 566 | 522 | 482 | 444 | 411 | 380 | 352 |
| | 800 | 799 | 797 | 794 | 790 | 784 | 776 | 766 | 754 | 739 | 722 | 702 | 678 | 651 | 621 | 589 | 555 | 520 | 486 | 453 | 422 | 392 | 365 | 340 |
| | 600 | 600 | 599 | 597 | 594 | 591 | 587 | 581 | 575 | 567 | 559 | 548 | 536 | 522 | 506 | 489 | 469 | 448 | 427 | 404 | 382 | 360 | 339 | 318 |
| | 400 | 400 | 399 | 399 | 397 | 396 | 394 | 392 | 389 | 386 | 383 | 378 | 374 | 368 | 362 | 355 | 347 | 339 | 329 | 319 | 308 | 297 | 285 | 273 |
| | 200 | 200 | 200 | 200 | 199 | 199 | 199 | 198 | 197 | 197 | 196 | 195 | 194 | 193 | 191 | 190 | 188 | 187 | 185 | 183 | 181 | 178 | 175 | 173 |
| 1000000 | 2000 | 1996 | 1982 | 1959 | 1924 | 1875 | 1808 | 1719 | 1608 | 1478 | 1337 | 1195 | 1062 | 942 | 836 | 745 | 666 | 598 | 539 | 488 | 443 | 405 | 371 | 340 |
| | 1800 | 1797 | 1786 | 1767 | 1739 | 1700 | 1648 | 1578 | 1491 | 1386 | 1269 | 1147 | 1028 | 918 | 820 | 733 | 657 | 591 | 534 | 484 | 440 | 402 | 368 | 339 |
| | 1600 | 1597 | 1589 | 1574 | 1553 | 1522 | 1482 | 1429 | 1363 | 1282 | 1188 | 1088 | 986 | 888 | 798 | 717 | 645 | 582 | 527 | 479 | 436 | 399 | 366 | 337 |
| | 1400 | 1398 | 1391 | 1380 | 1364 | 1342 | 1312 | 1273 | 1224 | 1164 | 1094 | 1015 | 932 | 848 | 769 | 696 | 630 | 570 | 518 | 472 | 431 | 394 | 362 | 334 |
| | 1200 | 1198 | 1194 | 1186 | 1174 | 1158 | 1137 | 1109 | 1075 | 1033 | 983 | 926 | 862 | 796 | 730 | 667 | 608 | 554 | 505 | 462 | 423 | 388 | 357 | 329 |
| | 1000 | 999 | 996 | 990 | 982 | 971 | 957 | 939 | 917 | 889 | 856 | 817 | 774 | 726 | 675 | 625 | 576 | 530 | 487 | 447 | 411 | 379 | 350 | 324 |
| | 800 | 799 | 797 | 794 | 789 | 782 | 773 | 762 | 749 | 732 | 713 | 689 | 663 | 632 | 599 | 564 | 528 | 492 | 457 | 424 | 393 | 364 | 338 | 314 |
| | 600 | 600 | 598 | 596 | 594 | 590 | 585 | 579 | 572 | 564 | 554 | 542 | 528 | 512 | 494 | 475 | 453 | 430 | 407 | 384 | 360 | 338 | 317 | 297 |
| | 400 | 400 | 399 | 398 | 397 | 396 | 394 | 391 | 388 | 385 | 381 | 376 | 371 | 364 | 357 | 350 | 341 | 331 | 320 | 309 | 297 | 285 | 272 | 259 |
| | 200 | 200 | 200 | 200 | 199 | 199 | 198 | 198 | 197 | 196 | 195 | 194 | 193 | 192 | 191 | 189 | 187 | 185 | 183 | 181 | 178 | 175 | 172 | 169 |
| 900000 | 1600 | 1597 | 1588 | 1571 | 1547 | 1513 | 1466 | 1406 | 1330 | 1238 | 1135 | 1027 | 922 | 824 | 736 | 658 | 590 | 531 | 480 | 435 | 396 | 362 | 331 | 305 |
| | 1400 | 1398 | 1391 | 1378 | 1360 | 1334 | 1300 | 1256 | 1200 | 1131 | 1052 | 966 | 877 | 792 | 713 | 641 | 578 | 522 | 473 | 429 | 391 | 358 | 329 | 302 |
| | 1200 | 1198 | 1193 | 1184 | 1171 | 1153 | 1128 | 1097 | 1058 | 1010 | 953 | 888 | 819 | 749 | 682 | 618 | 561 | 509 | 463 | 422 | 385 | 353 | 325 | 299 |
| | 1000 | 999 | 995 | 989 | 980 | 968 | 952 | 931 | 905 | 874 | 836 | 792 | 743 | 690 | 637 | 585 | 536 | 490 | 448 | 410 | 376 | 346 | 319 | 294 |
| | 800 | 799 | 797 | 793 | 787 | 780 | 770 | 757 | 742 | 723 | 701 | 674 | 643 | 609 | 573 | 535 | 497 | 460 | 425 | 392 | 362 | 335 | 310 | 287 |
| | 600 | 600 | 598 | 596 | 593 | 589 | 583 | 577 | 569 | 559 | 547 | 534 | 518 | 500 | 479 | 457 | 433 | 409 | 384 | 360 | 336 | 314 | 293 | 273 |
| | 400 | 400 | 399 | 398 | 397 | 395 | 393 | 390 | 387 | 383 | 378 | 373 | 367 | 360 | 351 | 342 | 332 | 321 | 309 | 297 | 284 | 270 | 257 | 243 |
| | 200 | 200 | 200 | 200 | 199 | 199 | 198 | 198 | 197 | 196 | 195 | 194 | 192 | 191 | 189 | 188 | 185 | 183 | 181 | 178 | 175 | 172 | 168 | 165 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "a" - l/d from 46 to 80

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 |
| 2100000 | 4000 | 713 | 658 | 608 | 564 | 524 | 489 | 456 | 427 | 401 | 377 | 355 | 335 | 316 | 299 | 283 | 269 | 255 | 243 |
| | 3800 | 712 | 656 | 607 | 563 | 523 | 488 | 456 | 427 | 400 | 376 | 354 | 334 | 316 | 299 | 283 | 269 | 255 | 243 |
| | 3600 | 709 | 655 | 606 | 562 | 522 | 487 | 455 | 426 | 400 | 376 | 354 | 334 | 315 | 298 | 283 | 268 | 255 | 243 |
| | 3400 | 707 | 653 | 604 | 560 | 521 | 486 | 454 | 425 | 399 | 375 | 353 | 333 | 315 | 298 | 282 | 268 | 255 | 242 |
| | 3200 | 705 | 650 | 602 | 559 | 520 | 485 | 453 | 425 | 398 | 375 | 353 | 333 | 315 | 298 | 282 | 268 | 254 | 242 |
| | 3000 | 702 | 648 | 600 | 557 | 518 | 484 | 452 | 424 | 398 | 374 | 352 | 332 | 314 | 297 | 282 | 267 | 254 | 242 |
| | 2800 | 698 | 645 | 598 | 555 | 517 | 482 | 451 | 422 | 397 | 373 | 351 | 332 | 314 | 297 | 281 | 267 | 254 | 242 |
| | 2600 | 694 | 642 | 595 | 553 | 515 | 480 | 449 | 421 | 396 | 372 | 351 | 331 | 313 | 296 | 281 | 267 | 253 | 241 |
| | 2400 | 689 | 637 | 591 | 550 | 512 | 478 | 448 | 420 | 394 | 371 | 350 | 330 | 312 | 296 | 280 | 266 | 253 | 241 |
| | 2200 | 683 | 633 | 587 | 546 | 509 | 476 | 446 | 418 | 393 | 370 | 348 | 329 | 311 | 295 | 279 | 265 | 252 | 240 |
| | 2000 | 675 | 626 | 582 | 542 | 506 | 473 | 443 | 416 | 391 | 368 | 347 | 328 | 310 | 294 | 279 | 265 | 252 | 240 |
| | 1800 | 666 | 619 | 576 | 537 | 501 | 469 | 440 | 413 | 388 | 366 | 345 | 326 | 309 | 292 | 278 | 264 | 251 | 239 |
| | 1600 | 654 | 609 | 568 | 530 | 496 | 464 | 436 | 409 | 385 | 363 | 343 | 324 | 307 | 291 | 276 | 262 | 250 | 238 |
| | 1400 | 638 | 595 | 557 | 521 | 488 | 458 | 430 | 405 | 381 | 360 | 340 | 321 | 305 | 289 | 274 | 261 | 248 | 236 |
| | 1200 | 615 | 577 | 541 | 508 | 477 | 449 | 422 | 398 | 376 | 355 | 336 | 318 | 301 | 286 | 272 | 258 | 246 | 235 |
| 2000000 | 3600 | 677 | 625 | 578 | 536 | 498 | 465 | 434 | 406 | 381 | 358 | 337 | 318 | 301 | 284 | 270 | 256 | 243 | 231 |
| | 3400 | 675 | 623 | 576 | 535 | 497 | 464 | 433 | 406 | 381 | 358 | 337 | 318 | 300 | 284 | 269 | 256 | 243 | 231 |
| | 3200 | 673 | 621 | 575 | 533 | 496 | 463 | 432 | 405 | 380 | 357 | 336 | 317 | 300 | 284 | 269 | 255 | 243 | 231 |
| | 3000 | 670 | 619 | 573 | 532 | 495 | 462 | 431 | 404 | 379 | 357 | 336 | 317 | 299 | 283 | 269 | 255 | 242 | 231 |
| | 2800 | 667 | 616 | 571 | 530 | 493 | 460 | 430 | 403 | 378 | 356 | 335 | 316 | 299 | 283 | 268 | 255 | 242 | 230 |
| | 2600 | 663 | 613 | 568 | 528 | 491 | 459 | 429 | 402 | 377 | 355 | 334 | 316 | 298 | 282 | 268 | 254 | 242 | 230 |
| | 2400 | 659 | 610 | 565 | 525 | 489 | 457 | 427 | 401 | 376 | 354 | 334 | 315 | 298 | 282 | 267 | 254 | 241 | 230 |
| | 2200 | 654 | 605 | 562 | 522 | 487 | 455 | 425 | 399 | 375 | 353 | 333 | 314 | 297 | 281 | 267 | 253 | 241 | 229 |
| | 2000 | 647 | 600 | 557 | 518 | 484 | 452 | 423 | 397 | 373 | 351 | 331 | 313 | 296 | 280 | 266 | 252 | 240 | 228 |
| | 1800 | 639 | 593 | 551 | 514 | 480 | 449 | 420 | 395 | 371 | 349 | 330 | 311 | 295 | 279 | 265 | 252 | 239 | 228 |
| | 1600 | 628 | 584 | 544 | 508 | 474 | 444 | 417 | 391 | 368 | 347 | 327 | 310 | 293 | 278 | 264 | 250 | 238 | 227 |
| | 1400 | 613 | 572 | 534 | 499 | 468 | 438 | 412 | 387 | 365 | 344 | 325 | 307 | 291 | 276 | 262 | 249 | 237 | 226 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "a" - l/d from 46 to 80

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 |
| | 3600 | 645 | 595 | 550 | 510 | 474 | 442 | 413 | 387 | 363 | 341 | 321 | 303 | 286 | 270 | 256 | 243 | 231 | 220 |
| | 3400 | 643 | 593 | 549 | 509 | 473 | 441 | 412 | 386 | 362 | 340 | 320 | 302 | 286 | 270 | 256 | 243 | 231 | 220 |
| | 3200 | 641 | 592 | 547 | 508 | 472 | 440 | 411 | 385 | 361 | 340 | 320 | 302 | 285 | 270 | 256 | 243 | 231 | 219 |
| | 3000 | 639 | 590 | 546 | 506 | 471 | 439 | 411 | 385 | 361 | 339 | 320 | 301 | 285 | 270 | 255 | 242 | 230 | 219 |
| | 2800 | 636 | 587 | 544 | 505 | 470 | 438 | 410 | 384 | 360 | 339 | 319 | 301 | 284 | 269 | 255 | 242 | 230 | 219 |
| | 2600 | 633 | 585 | 542 | 503 | 468 | 437 | 408 | 383 | 359 | 338 | 318 | 300 | 284 | 269 | 255 | 242 | 230 | 219 |
| | 2400 | 629 | 581 | 539 | 501 | 466 | 435 | 407 | 381 | 358 | 337 | 317 | 300 | 283 | 268 | 254 | 241 | 229 | 218 |
| 1900000 | 2200 | 624 | 577 | 536 | 498 | 464 | 433 | 405 | 380 | 357 | 336 | 316 | 299 | 282 | 267 | 254 | 241 | 229 | 218 |
| | 2000 | 618 | 573 | 532 | 495 | 461 | 431 | 403 | 378 | 355 | 334 | 315 | 298 | 282 | 267 | 253 | 240 | 228 | 217 |
| | 1800 | 611 | 566 | 526 | 490 | 458 | 428 | 401 | 376 | 353 | 333 | 314 | 296 | 280 | 266 | 252 | 239 | 228 | 217 |
| | 1600 | 601 | 559 | 520 | 485 | 453 | 424 | 397 | 373 | 351 | 331 | 312 | 295 | 279 | 264 | 251 | 238 | 227 | 216 |
| | 1400 | 588 | 548 | 511 | 478 | 447 | 419 | 393 | 369 | 348 | 328 | 310 | 293 | 277 | 263 | 249 | 237 | 226 | 215 |
| | 1200 | 570 | 533 | 499 | 467 | 438 | 411 | 387 | 364 | 343 | 324 | 306 | 290 | 275 | 260 | 247 | 235 | 224 | 213 |
| | 1000 | 544 | 511 | 481 | 452 | 426 | 401 | 378 | 356 | 337 | 318 | 301 | 285 | 271 | 257 | 244 | 233 | 222 | 211 |
| | 3400 | 611 | 564 | 521 | 483 | 449 | 419 | 391 | 366 | 343 | 323 | 304 | 287 | 271 | 256 | 243 | 230 | 219 | 208 |
| | 3200 | 609 | 562 | 520 | 482 | 448 | 418 | 390 | 366 | 343 | 322 | 304 | 286 | 271 | 256 | 243 | 230 | 219 | 208 |
| | 3000 | 607 | 560 | 518 | 481 | 447 | 417 | 390 | 365 | 342 | 322 | 303 | 286 | 270 | 256 | 242 | 230 | 218 | 208 |
| | 2800 | 605 | 558 | 517 | 479 | 446 | 416 | 389 | 364 | 342 | 321 | 303 | 285 | 270 | 255 | 242 | 230 | 218 | 208 |
| | 2600 | 602 | 556 | 515 | 478 | 445 | 415 | 388 | 363 | 341 | 321 | 302 | 285 | 269 | 255 | 242 | 229 | 218 | 207 |
| | 2400 | 598 | 553 | 512 | 476 | 443 | 413 | 386 | 362 | 340 | 320 | 301 | 284 | 269 | 254 | 241 | 229 | 218 | 207 |
| | 2200 | 594 | 549 | 509 | 473 | 441 | 412 | 385 | 361 | 339 | 319 | 300 | 284 | 268 | 254 | 241 | 228 | 217 | 207 |
| 1800000 | 2000 | 589 | 545 | 506 | 470 | 438 | 409 | 383 | 359 | 337 | 318 | 299 | 283 | 267 | 253 | 240 | 228 | 217 | 206 |
| | 1800 | 582 | 540 | 501 | 467 | 435 | 407 | 381 | 357 | 336 | 316 | 298 | 282 | 266 | 252 | 239 | 227 | 216 | 206 |
| | 1600 | 574 | 533 | 496 | 462 | 431 | 403 | 378 | 355 | 334 | 314 | 296 | 280 | 265 | 251 | 238 | 226 | 215 | 205 |
| | 1400 | 562 | 523 | 488 | 455 | 426 | 399 | 374 | 351 | 331 | 312 | 294 | 278 | 263 | 250 | 237 | 225 | 214 | 204 |
| | 1200 | 547 | 510 | 477 | 446 | 418 | 392 | 369 | 347 | 327 | 308 | 291 | 276 | 261 | 248 | 235 | 223 | 213 | 203 |
| | 1000 | 523 | 491 | 461 | 433 | 407 | 383 | 361 | 340 | 321 | 303 | 287 | 272 | 258 | 245 | 232 | 221 | 211 | 201 |
| | 800 | 487 | 461 | 436 | 412 | 389 | 368 | 348 | 329 | 311 | 295 | 280 | 266 | 252 | 240 | 228 | 217 | 207 | 198 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "a" - l/d from 46 to 80

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 |
| | 3200 | 577 | 532 | 492 | 456 | 424 | 395 | 369 | 346 | 324 | 305 | 287 | 271 | 256 | 242 | 229 | 218 | 207 | 197 |
| | 3000 | 575 | 531 | 491 | 455 | 423 | 395 | 369 | 345 | 324 | 304 | 287 | 270 | 255 | 242 | 229 | 217 | 207 | 196 |
| | 2800 | 573 | 529 | 489 | 454 | 422 | 394 | 368 | 345 | 323 | 304 | 286 | 270 | 255 | 241 | 229 | 217 | 206 | 196 |
| | 2600 | 570 | 527 | 487 | 452 | 421 | 393 | 367 | 344 | 323 | 303 | 286 | 270 | 255 | 241 | 228 | 217 | 206 | 196 |
| | 2400 | 567 | 524 | 485 | 451 | 419 | 391 | 366 | 343 | 322 | 303 | 285 | 269 | 254 | 241 | 228 | 216 | 206 | 196 |
| | 2200 | 564 | 521 | 483 | 449 | 418 | 390 | 365 | 342 | 321 | 302 | 284 | 268 | 254 | 240 | 228 | 216 | 205 | 195 |
| | 2000 | 559 | 517 | 480 | 446 | 415 | 388 | 363 | 340 | 320 | 301 | 283 | 267 | 253 | 239 | 227 | 216 | 205 | 195 |
| 1700000 | 1800 | 553 | 513 | 476 | 443 | 413 | 386 | 361 | 338 | 318 | 299 | 282 | 266 | 252 | 239 | 226 | 215 | 204 | 195 |
| | 1600 | 546 | 506 | 471 | 438 | 409 | 383 | 358 | 336 | 316 | 298 | 281 | 265 | 251 | 238 | 225 | 214 | 204 | 194 |
| | 1400 | 536 | 498 | 464 | 433 | 404 | 379 | 355 | 333 | 314 | 295 | 279 | 264 | 249 | 236 | 224 | 213 | 203 | 193 |
| | 1200 | 522 | 487 | 455 | 425 | 398 | 373 | 350 | 329 | 310 | 292 | 276 | 261 | 247 | 235 | 223 | 212 | 201 | 192 |
| | 1000 | 502 | 470 | 441 | 413 | 388 | 365 | 343 | 323 | 305 | 288 | 272 | 258 | 244 | 232 | 220 | 210 | 200 | 190 |
| | 800 | 469 | 443 | 418 | 395 | 372 | 351 | 332 | 314 | 297 | 281 | 266 | 252 | 240 | 228 | 217 | 206 | 197 | 188 |
| | 600 | 415 | 397 | 379 | 362 | 344 | 328 | 312 | 296 | 282 | 268 | 255 | 243 | 231 | 220 | 210 | 201 | 192 | 183 |
| | 3200 | 545 | 502 | 464 | 430 | 400 | 373 | 348 | 326 | 306 | 287 | 270 | 255 | 241 | 228 | 216 | 205 | 195 | 185 |
| | 3000 | 543 | 501 | 463 | 429 | 399 | 372 | 348 | 325 | 305 | 287 | 270 | 255 | 241 | 228 | 216 | 205 | 195 | 185 |
| | 2800 | 541 | 499 | 462 | 428 | 398 | 371 | 347 | 325 | 305 | 286 | 270 | 254 | 240 | 227 | 216 | 205 | 194 | 185 |
| | 2600 | 539 | 497 | 460 | 427 | 397 | 370 | 346 | 324 | 304 | 286 | 269 | 254 | 240 | 227 | 215 | 204 | 194 | 185 |
| | 2400 | 536 | 495 | 458 | 425 | 396 | 369 | 345 | 323 | 303 | 285 | 269 | 254 | 240 | 227 | 215 | 204 | 194 | 184 |
| | 2200 | 533 | 492 | 456 | 424 | 394 | 368 | 344 | 322 | 303 | 285 | 268 | 253 | 239 | 226 | 215 | 204 | 194 | 184 |
| | 2000 | 529 | 489 | 453 | 421 | 392 | 366 | 343 | 321 | 301 | 284 | 267 | 252 | 238 | 226 | 214 | 203 | 193 | 184 |
| 1600000 | 1800 | 524 | 485 | 450 | 418 | 390 | 364 | 341 | 320 | 300 | 282 | 266 | 251 | 238 | 225 | 213 | 203 | 193 | 183 |
| | 1600 | 518 | 480 | 446 | 415 | 387 | 362 | 339 | 318 | 298 | 281 | 265 | 250 | 237 | 224 | 213 | 202 | 192 | 183 |
| | 1400 | 509 | 473 | 440 | 410 | 383 | 358 | 336 | 315 | 296 | 279 | 263 | 249 | 235 | 223 | 212 | 201 | 191 | 182 |
| | 1200 | 497 | 463 | 432 | 403 | 377 | 353 | 331 | 311 | 293 | 276 | 261 | 247 | 234 | 221 | 210 | 200 | 190 | 181 |
| | 1000 | 479 | 448 | 419 | 393 | 369 | 346 | 325 | 306 | 289 | 273 | 258 | 244 | 231 | 219 | 208 | 198 | 188 | 180 |
| | 800 | 451 | 425 | 400 | 377 | 355 | 335 | 316 | 298 | 282 | 266 | 252 | 239 | 227 | 216 | 205 | 195 | 186 | 177 |
| | 600 | 403 | 384 | 366 | 348 | 330 | 314 | 298 | 283 | 269 | 255 | 243 | 231 | 220 | 209 | 199 | 190 | 181 | 173 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "a" - l/d from 46 to 80

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 |
| | 3000 | 511 | 471 | 435 | 404 | 375 | 350 | 326 | 306 | 287 | 269 | 254 | 239 | 226 | 214 | 203 | 192 | 183 | 174 |
| | 2800 | 509 | 469 | 434 | 403 | 374 | 349 | 326 | 305 | 286 | 269 | 253 | 239 | 226 | 213 | 202 | 192 | 182 | 173 |
| | 2600 | 507 | 468 | 433 | 401 | 373 | 348 | 325 | 304 | 286 | 268 | 253 | 238 | 225 | 213 | 202 | 192 | 182 | 173 |
| | 2400 | 505 | 466 | 431 | 400 | 372 | 347 | 324 | 304 | 285 | 268 | 252 | 238 | 225 | 213 | 202 | 191 | 182 | 173 |
| | 2200 | 502 | 464 | 429 | 398 | 371 | 346 | 323 | 303 | 284 | 267 | 252 | 238 | 224 | 212 | 201 | 191 | 182 | 173 |
| | 2000 | 499 | 461 | 427 | 396 | 369 | 344 | 322 | 302 | 283 | 266 | 251 | 237 | 224 | 212 | 201 | 191 | 181 | 173 |
| | 1800 | 494 | 457 | 424 | 394 | 367 | 343 | 321 | 300 | 282 | 265 | 250 | 236 | 223 | 211 | 200 | 190 | 181 | 172 |
| 1500000 | 1600 | 489 | 453 | 420 | 391 | 364 | 340 | 319 | 299 | 281 | 264 | 249 | 235 | 222 | 211 | 200 | 190 | 180 | 172 |
| | 1400 | 481 | 446 | 415 | 387 | 361 | 337 | 316 | 297 | 279 | 263 | 248 | 234 | 221 | 210 | 199 | 189 | 180 | 171 |
| | 1200 | 471 | 438 | 408 | 381 | 356 | 333 | 312 | 293 | 276 | 260 | 246 | 232 | 220 | 208 | 198 | 188 | 179 | 170 |
| | 1000 | 455 | 425 | 398 | 372 | 349 | 327 | 307 | 289 | 272 | 257 | 243 | 230 | 218 | 206 | 196 | 186 | 177 | 169 |
| | 800 | 431 | 405 | 381 | 358 | 337 | 317 | 299 | 282 | 266 | 252 | 238 | 226 | 214 | 203 | 193 | 184 | 175 | 167 |
| | 600 | 389 | 370 | 351 | 333 | 316 | 299 | 284 | 269 | 255 | 242 | 230 | 218 | 208 | 198 | 188 | 179 | 171 | 164 |
| | 400 | 312 | 302 | 292 | 282 | 271 | 261 | 250 | 240 | 230 | 220 | 211 | 202 | 193 | 185 | 177 | 170 | 163 | 156 |
| | 2800 | 477 | 439 | 406 | 377 | 350 | 326 | 305 | 285 | 268 | 251 | 237 | 223 | 211 | 199 | 189 | 179 | 170 | 162 |
| | 2600 | 475 | 438 | 405 | 376 | 349 | 326 | 304 | 285 | 267 | 251 | 236 | 223 | 211 | 199 | 189 | 179 | 170 | 162 |
| | 2400 | 473 | 436 | 404 | 374 | 348 | 325 | 303 | 284 | 266 | 251 | 236 | 223 | 210 | 199 | 189 | 179 | 170 | 162 |
| | 2200 | 471 | 434 | 402 | 373 | 347 | 324 | 302 | 283 | 266 | 250 | 235 | 222 | 210 | 199 | 188 | 179 | 170 | 162 |
| | 2000 | 468 | 432 | 400 | 371 | 346 | 322 | 301 | 282 | 265 | 249 | 235 | 222 | 209 | 198 | 188 | 178 | 169 | 161 |
| | 1800 | 464 | 429 | 397 | 369 | 344 | 321 | 300 | 281 | 264 | 248 | 234 | 221 | 209 | 198 | 187 | 178 | 169 | 161 |
| 1400000 | 1600 | 459 | 425 | 394 | 367 | 342 | 319 | 298 | 280 | 263 | 247 | 233 | 220 | 208 | 197 | 187 | 177 | 169 | 160 |
| | 1400 | 453 | 420 | 390 | 363 | 338 | 316 | 296 | 278 | 261 | 246 | 232 | 219 | 207 | 196 | 186 | 177 | 168 | 160 |
| | 1200 | 444 | 413 | 384 | 358 | 334 | 313 | 293 | 275 | 259 | 244 | 230 | 217 | 206 | 195 | 185 | 176 | 167 | 159 |
| | 1000 | 431 | 402 | 375 | 350 | 328 | 308 | 289 | 271 | 256 | 241 | 228 | 215 | 204 | 193 | 183 | 174 | 166 | 158 |
| | 800 | 410 | 385 | 361 | 339 | 318 | 299 | 282 | 265 | 250 | 236 | 224 | 212 | 201 | 191 | 181 | 172 | 164 | 156 |
| | 600 | 373 | 354 | 335 | 317 | 300 | 284 | 269 | 254 | 241 | 228 | 217 | 206 | 195 | 186 | 177 | 169 | 161 | 154 |
| | 400 | 304 | 294 | 283 | 272 | 261 | 251 | 240 | 230 | 220 | 210 | 201 | 192 | 183 | 175 | 168 | 160 | 153 | 147 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "a" - l/d from 46 to 80

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 |
| | 2800 | 444 | 409 | 378 | 351 | 326 | 304 | 283 | 265 | 249 | 234 | 220 | 208 | 196 | 185 | 176 | 167 | 158 | 151 |
| | 2600 | 443 | 408 | 377 | 350 | 325 | 303 | 283 | 265 | 248 | 233 | 220 | 207 | 196 | 185 | 176 | 167 | 158 | 150 |
| | 2400 | 441 | 407 | 376 | 349 | 324 | 302 | 282 | 264 | 248 | 233 | 219 | 207 | 196 | 185 | 175 | 166 | 158 | 150 |
| | 2200 | 439 | 405 | 375 | 348 | 323 | 301 | 282 | 264 | 247 | 233 | 219 | 207 | 195 | 185 | 175 | 166 | 158 | 150 |
| | 2000 | 436 | 403 | 373 | 346 | 322 | 300 | 281 | 263 | 247 | 232 | 218 | 206 | 195 | 184 | 175 | 166 | 158 | 150 |
| | 1800 | 433 | 400 | 371 | 344 | 320 | 299 | 280 | 262 | 246 | 231 | 218 | 206 | 194 | 184 | 174 | 165 | 157 | 150 |
| | 1600 | 429 | 397 | 368 | 342 | 319 | 297 | 278 | 261 | 245 | 230 | 217 | 205 | 194 | 183 | 174 | 165 | 157 | 149 |
| 1300000 | 1400 | 424 | 393 | 364 | 339 | 316 | 295 | 276 | 259 | 243 | 229 | 216 | 204 | 193 | 183 | 173 | 164 | 156 | 149 |
| | 1200 | 416 | 386 | 359 | 335 | 312 | 292 | 274 | 257 | 241 | 227 | 214 | 203 | 192 | 182 | 172 | 164 | 156 | 148 |
| | 1000 | 405 | 377 | 352 | 328 | 307 | 288 | 270 | 254 | 239 | 225 | 212 | 201 | 190 | 180 | 171 | 162 | 155 | 147 |
| | 800 | 388 | 363 | 340 | 318 | 299 | 281 | 264 | 248 | 234 | 221 | 209 | 198 | 188 | 178 | 169 | 161 | 153 | 146 |
| | 600 | 356 | 337 | 318 | 300 | 284 | 268 | 253 | 239 | 226 | 214 | 203 | 193 | 183 | 174 | 165 | 158 | 150 | 143 |
| | 400 | 295 | 284 | 273 | 262 | 250 | 239 | 229 | 218 | 208 | 199 | 190 | 181 | 173 | 165 | 158 | 151 | 144 | 138 |
| | 200 | 178 | 175 | 173 | 170 | 167 | 164 | 160 | 157 | 153 | 150 | 146 | 142 | 138 | 134 | 130 | 126 | 122 | 118 |
| | 2600 | 410 | 378 | 349 | 324 | 301 | 280 | 262 | 245 | 230 | 216 | 203 | 192 | 181 | 171 | 162 | 154 | 146 | 139 |
| | 2400 | 409 | 377 | 348 | 323 | 300 | 280 | 261 | 244 | 229 | 215 | 203 | 191 | 181 | 171 | 162 | 154 | 146 | 139 |
| | 2200 | 407 | 375 | 347 | 322 | 299 | 279 | 261 | 244 | 229 | 215 | 203 | 191 | 180 | 171 | 162 | 154 | 146 | 139 |
| | 2000 | 405 | 373 | 346 | 321 | 298 | 278 | 260 | 243 | 228 | 215 | 202 | 191 | 180 | 170 | 162 | 153 | 146 | 139 |
| | 1800 | 402 | 371 | 344 | 319 | 297 | 277 | 259 | 242 | 228 | 214 | 202 | 190 | 180 | 170 | 161 | 153 | 145 | 138 |
| | 1600 | 399 | 369 | 341 | 317 | 295 | 276 | 258 | 241 | 227 | 213 | 201 | 190 | 179 | 170 | 161 | 153 | 145 | 138 |
| 1200000 | 1400 | 394 | 365 | 338 | 315 | 293 | 274 | 256 | 240 | 225 | 212 | 200 | 189 | 178 | 169 | 160 | 152 | 145 | 138 |
| | 1200 | 388 | 360 | 334 | 311 | 290 | 271 | 254 | 238 | 224 | 211 | 199 | 188 | 178 | 168 | 159 | 151 | 144 | 137 |
| | 1000 | 379 | 352 | 328 | 306 | 286 | 267 | 251 | 235 | 222 | 209 | 197 | 186 | 176 | 167 | 158 | 150 | 143 | 136 |
| | 800 | 364 | 340 | 318 | 298 | 279 | 262 | 246 | 231 | 218 | 206 | 194 | 184 | 174 | 165 | 157 | 149 | 142 | 135 |
| | 600 | 338 | 319 | 300 | 283 | 266 | 251 | 237 | 223 | 211 | 200 | 189 | 179 | 170 | 162 | 154 | 146 | 139 | 133 |
| | 400 | 285 | 273 | 261 | 250 | 238 | 227 | 216 | 206 | 196 | 187 | 178 | 170 | 162 | 154 | 147 | 141 | 134 | 128 |
| | 200 | 175 | 173 | 170 | 167 | 163 | 160 | 156 | 152 | 148 | 144 | 140 | 136 | 132 | 128 | 124 | 120 | 116 | 112 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "a" - l/d from 46 to 80

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 |
| | 1800 | 371 | 342 | 316 | 294 | 273 | 255 | 238 | 223 | 209 | 197 | 185 | 175 | 165 | 156 | 148 | 140 | 133 | 127 |
| | 1600 | 368 | 340 | 315 | 292 | 272 | 254 | 237 | 222 | 208 | 196 | 185 | 174 | 165 | 156 | 148 | 140 | 133 | 127 |
| | 1400 | 364 | 337 | 312 | 290 | 270 | 252 | 236 | 221 | 207 | 195 | 184 | 174 | 164 | 155 | 147 | 140 | 133 | 126 |
| | 1200 | 359 | 333 | 309 | 287 | 268 | 250 | 234 | 219 | 206 | 194 | 183 | 173 | 163 | 155 | 147 | 139 | 132 | 126 |
| | 1000 | 352 | 326 | 304 | 283 | 264 | 247 | 231 | 217 | 204 | 192 | 181 | 171 | 162 | 154 | 146 | 138 | 132 | 125 |
| 1100000 | | | | | | | | | | | | | | | | | | | |
| | 800 | 340 | 317 | 295 | 276 | 258 | 242 | 227 | 214 | 201 | 190 | 179 | 169 | 160 | 152 | 144 | 137 | 131 | 124 |
| | 600 | 318 | 299 | 281 | 264 | 248 | 233 | 220 | 207 | 196 | 185 | 175 | 166 | 157 | 149 | 142 | 135 | 129 | 123 |
| | 400 | 273 | 261 | 248 | 237 | 225 | 214 | 203 | 193 | 184 | 174 | 166 | 158 | 150 | 143 | 137 | 130 | 124 | 119 |
| | 200 | 173 | 170 | 166 | 163 | 159 | 155 | 151 | 147 | 143 | 139 | 134 | 130 | 126 | 122 | 117 | 113 | 109 | 105 |
| | 2000 | 340 | 314 | 290 | 269 | 250 | 233 | 218 | 204 | 191 | 180 | 169 | 159 | 151 | 142 | 135 | 128 | 122 | 116 |
| | 1800 | 339 | 312 | 289 | 268 | 249 | 232 | 217 | 203 | 191 | 179 | 169 | 159 | 150 | 142 | 135 | 128 | 122 | 116 |
| | 1600 | 337 | 311 | 287 | 267 | 248 | 231 | 216 | 202 | 190 | 179 | 168 | 159 | 150 | 142 | 134 | 128 | 121 | 115 |
| | 1400 | 334 | 308 | 285 | 265 | 247 | 230 | 215 | 202 | 189 | 178 | 168 | 158 | 149 | 141 | 134 | 127 | 121 | 115 |
| | 1200 | 329 | 305 | 283 | 263 | 245 | 228 | 214 | 200 | 188 | 177 | 167 | 157 | 149 | 141 | 134 | 127 | 121 | 115 |
| 1000000 | | | | | | | | | | | | | | | | | | | |
| | 1000 | 324 | 300 | 278 | 259 | 242 | 226 | 212 | 199 | 187 | 176 | 166 | 156 | 148 | 140 | 133 | 126 | 120 | 114 |
| | 800 | 314 | 292 | 272 | 254 | 237 | 222 | 208 | 196 | 184 | 173 | 164 | 155 | 146 | 139 | 132 | 125 | 119 | 113 |
| | 600 | 297 | 278 | 260 | 244 | 229 | 215 | 202 | 191 | 180 | 170 | 160 | 152 | 144 | 137 | 130 | 123 | 118 | 112 |
| | 400 | 259 | 246 | 234 | 222 | 210 | 199 | 189 | 179 | 170 | 161 | 153 | 146 | 138 | 132 | 125 | 120 | 114 | 109 |
| | 200 | 169 | 166 | 162 | 158 | 154 | 150 | 145 | 141 | 136 | 132 | 127 | 123 | 119 | 114 | 110 | 106 | 102 | 98 |
| | 1600 | 305 | 281 | 260 | 241 | 224 | 209 | 195 | 183 | 171 | 161 | 152 | 143 | 135 | 128 | 121 | 115 | 109 | 104 |
| | 1400 | 302 | 279 | 258 | 240 | 223 | 208 | 194 | 182 | 171 | 161 | 151 | 143 | 135 | 128 | 121 | 115 | 109 | 104 |
| | 1200 | 299 | 276 | 256 | 238 | 221 | 207 | 193 | 181 | 170 | 160 | 151 | 142 | 134 | 127 | 121 | 114 | 109 | 104 |
| | 1000 | 294 | 273 | 253 | 235 | 219 | 205 | 192 | 180 | 169 | 159 | 150 | 141 | 134 | 127 | 120 | 114 | 108 | 103 |
| 900000 | | | | | | | | | | | | | | | | | | | |
| | 800 | 287 | 266 | 248 | 231 | 216 | 202 | 189 | 177 | 167 | 157 | 148 | 140 | 132 | 126 | 119 | 113 | 108 | 102 |
| | 600 | 273 | 255 | 239 | 223 | 209 | 196 | 184 | 173 | 163 | 154 | 146 | 138 | 131 | 124 | 118 | 112 | 106 | 101 |
| | 400 | 243 | 230 | 218 | 206 | 195 | 184 | 174 | 165 | 156 | 148 | 140 | 133 | 126 | 120 | 114 | 109 | 104 | 99 |
| | 200 | 165 | 161 | 157 | 152 | 148 | 143 | 138 | 134 | 129 | 124 | 119 | 115 | 110 | 106 | 102 | 98 | 94 | 91 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "b" - l/d from 2 to 46

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 |
| | 4000 | 3993 | 3972 | 3936 | 3882 | 3808 | 3708 | 3578 | 3413 | 3212 | 2981 | 2730 | 2476 | 2232 | 2007 | 1804 | 1624 | 1465 | 1327 | 1205 | 1098 | 1004 | 921 | 848 |
| | 3800 | 3794 | 3775 | 3743 | 3694 | 3628 | 3539 | 3423 | 3277 | 3098 | 2890 | 2661 | 2425 | 2195 | 1980 | 1784 | 1609 | 1455 | 1318 | 1198 | 1093 | 1000 | 918 | 845 |
| | 3600 | 3594 | 3578 | 3549 | 3506 | 3446 | 3368 | 3266 | 3137 | 2978 | 2793 | 2586 | 2369 | 2154 | 1950 | 1762 | 1593 | 1442 | 1309 | 1191 | 1087 | 995 | 914 | 842 |
| | 3400 | 3395 | 3380 | 3354 | 3316 | 3264 | 3194 | 3105 | 2992 | 2853 | 2689 | 2504 | 2307 | 2108 | 1916 | 1737 | 1574 | 1428 | 1298 | 1183 | 1081 | 990 | 910 | 838 |
| | 3200 | 3196 | 3182 | 3160 | 3126 | 3080 | 3020 | 2942 | 2844 | 2723 | 2580 | 2416 | 2239 | 2056 | 1878 | 1709 | 1553 | 1412 | 1286 | 1173 | 1073 | 984 | 905 | 834 |
| | 3000 | 2996 | 2985 | 2965 | 2935 | 2895 | 2843 | 2776 | 2691 | 2587 | 2463 | 2320 | 2163 | 1998 | 1834 | 1676 | 1528 | 1393 | 1271 | 1162 | 1064 | 977 | 899 | 830 |
| | 2800 | 2797 | 2787 | 2769 | 2744 | 2709 | 2664 | 2607 | 2535 | 2447 | 2341 | 2217 | 2080 | 1933 | 1784 | 1638 | 1500 | 1372 | 1255 | 1149 | 1054 | 969 | 893 | 824 |
| 2100000 | 2600 | 2597 | 2588 | 2573 | 2552 | 2522 | 2484 | 2435 | 2375 | 2300 | 2211 | 2107 | 1988 | 1860 | 1727 | 1594 | 1466 | 1346 | 1235 | 1134 | 1042 | 959 | 885 | 818 |
| | 2400 | 2398 | 2390 | 2377 | 2359 | 2334 | 2302 | 2261 | 2211 | 2149 | 2075 | 1988 | 1888 | 1778 | 1662 | 1544 | 1427 | 1316 | 1211 | 1115 | 1027 | 948 | 876 | 811 |
| | 2200 | 2198 | 2192 | 2181 | 2166 | 2145 | 2118 | 2085 | 2044 | 1993 | 1933 | 1861 | 1779 | 1687 | 1588 | 1484 | 1381 | 1279 | 1183 | 1093 | 1010 | 934 | 864 | 801 |
| | 2000 | 1998 | 1993 | 1984 | 1972 | 1955 | 1933 | 1906 | 1873 | 1832 | 1784 | 1726 | 1660 | 1585 | 1503 | 1415 | 1325 | 1236 | 1149 | 1066 | 988 | 916 | 850 | 790 |
| | 1800 | 1799 | 1794 | 1787 | 1777 | 1764 | 1746 | 1725 | 1698 | 1667 | 1629 | 1584 | 1532 | 1472 | 1406 | 1335 | 1259 | 1182 | 1106 | 1032 | 961 | 895 | 833 | 776 |
| | 1600 | 1599 | 1596 | 1590 | 1582 | 1571 | 1558 | 1541 | 1521 | 1497 | 1468 | 1434 | 1394 | 1349 | 1298 | 1241 | 1181 | 1117 | 1053 | 989 | 926 | 867 | 810 | 757 |
| | 1400 | 1399 | 1397 | 1392 | 1386 | 1378 | 1368 | 1356 | 1341 | 1322 | 1301 | 1276 | 1247 | 1214 | 1176 | 1134 | 1088 | 1038 | 987 | 934 | 882 | 830 | 780 | 732 |
| | 1200 | 1199 | 1198 | 1194 | 1190 | 1184 | 1177 | 1168 | 1157 | 1144 | 1129 | 1112 | 1091 | 1068 | 1042 | 1012 | 979 | 943 | 905 | 864 | 823 | 781 | 739 | 699 |
| | 3600 | 3594 | 3577 | 3546 | 3500 | 3438 | 3354 | 3245 | 3108 | 2939 | 2743 | 2528 | 2305 | 2087 | 1883 | 1697 | 1531 | 1384 | 1255 | 1141 | 1040 | 952 | 874 | 804 |
| | 3400 | 3395 | 3379 | 3352 | 3312 | 3256 | 3183 | 3087 | 2967 | 2819 | 2645 | 2452 | 2248 | 2045 | 1852 | 1675 | 1515 | 1372 | 1245 | 1133 | 1035 | 947 | 870 | 801 |
| | 3200 | 3195 | 3181 | 3157 | 3122 | 3073 | 3009 | 2926 | 2822 | 2693 | 2541 | 2369 | 2185 | 1998 | 1818 | 1649 | 1495 | 1357 | 1234 | 1125 | 1028 | 942 | 866 | 798 |
| | 3000 | 2996 | 2984 | 2963 | 2932 | 2889 | 2834 | 2762 | 2672 | 2562 | 2430 | 2279 | 2115 | 1945 | 1778 | 1620 | 1473 | 1341 | 1221 | 1115 | 1020 | 936 | 861 | 794 |
| | 2800 | 2797 | 2786 | 2768 | 2741 | 2704 | 2657 | 2595 | 2519 | 2425 | 2312 | 2181 | 2037 | 1885 | 1733 | 1586 | 1448 | 1321 | 1206 | 1103 | 1011 | 928 | 855 | 789 |
| 2000000 | 2600 | 2597 | 2588 | 2572 | 2549 | 2518 | 2478 | 2426 | 2361 | 2282 | 2187 | 2076 | 1951 | 1818 | 1681 | 1546 | 1418 | 1298 | 1189 | 1089 | 1000 | 920 | 848 | 783 |
| | 2400 | 2397 | 2390 | 2376 | 2357 | 2331 | 2297 | 2253 | 2200 | 2134 | 2055 | 1962 | 1857 | 1742 | 1621 | 1500 | 1382 | 1271 | 1168 | 1073 | 987 | 909 | 839 | 776 |
| | 2200 | 2198 | 2191 | 2180 | 2164 | 2142 | 2114 | 2078 | 2034 | 1981 | 1916 | 1840 | 1752 | 1656 | 1552 | 1446 | 1340 | 1238 | 1142 | 1053 | 971 | 897 | 829 | 768 |
| | 2000 | 1998 | 1993 | 1984 | 1970 | 1952 | 1930 | 1901 | 1865 | 1822 | 1770 | 1709 | 1639 | 1559 | 1473 | 1382 | 1290 | 1199 | 1111 | 1029 | 952 | 881 | 817 | 758 |
| | 1800 | 1799 | 1794 | 1787 | 1776 | 1762 | 1743 | 1721 | 1693 | 1659 | 1618 | 1570 | 1515 | 1452 | 1382 | 1307 | 1229 | 1150 | 1073 | 998 | 928 | 862 | 801 | 745 |
| | 1600 | 1599 | 1595 | 1590 | 1581 | 1570 | 1556 | 1538 | 1517 | 1491 | 1460 | 1423 | 1381 | 1333 | 1279 | 1219 | 1156 | 1090 | 1024 | 959 | 897 | 837 | 781 | 729 |
| | 1400 | 1399 | 1396 | 1392 | 1386 | 1377 | 1366 | 1353 | 1337 | 1318 | 1295 | 1269 | 1238 | 1202 | 1162 | 1117 | 1069 | 1017 | 964 | 909 | 856 | 804 | 754 | 707 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "b" - l/d from 2 to 46

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 |
| | 3600 | 3594 | 3575 | 3543 | 3495 | 3428 | 3339 | 3223 | 3075 | 2896 | 2689 | 2464 | 2236 | 2016 | 1813 | 1630 | 1468 | 1325 | 1200 | 1090 | 993 | 908 | 833 | 767 |
| | 3400 | 3395 | 3378 | 3349 | 3307 | 3248 | 3169 | 3067 | 2938 | 2781 | 2597 | 2394 | 2184 | 1979 | 1786 | 1610 | 1453 | 1314 | 1191 | 1083 | 988 | 904 | 830 | 764 |
| | 3200 | 3195 | 3180 | 3155 | 3118 | 3066 | 2998 | 2909 | 2797 | 2660 | 2498 | 2317 | 2126 | 1936 | 1755 | 1587 | 1436 | 1301 | 1181 | 1075 | 982 | 899 | 826 | 761 |
| | 3000 | 2996 | 2983 | 2961 | 2928 | 2883 | 2824 | 2747 | 2651 | 2533 | 2392 | 2233 | 2062 | 1888 | 1719 | 1561 | 1416 | 1286 | 1170 | 1067 | 975 | 894 | 821 | 757 |
| | 2800 | 2796 | 2785 | 2766 | 2738 | 2699 | 2648 | 2583 | 2501 | 2400 | 2279 | 2141 | 1990 | 1834 | 1679 | 1531 | 1394 | 1269 | 1157 | 1056 | 967 | 887 | 816 | 753 |
| | 2600 | 2597 | 2587 | 2571 | 2546 | 2513 | 2470 | 2415 | 2346 | 2261 | 2159 | 2041 | 1910 | 1772 | 1631 | 1495 | 1367 | 1249 | 1141 | 1044 | 957 | 879 | 810 | 748 |
| | 2400 | 2397 | 2389 | 2375 | 2354 | 2327 | 2291 | 2245 | 2187 | 2117 | 2032 | 1933 | 1822 | 1701 | 1577 | 1454 | 1335 | 1224 | 1122 | 1030 | 946 | 870 | 803 | 742 |
| 1900000 | 2200 | 2198 | 2191 | 2179 | 2162 | 2139 | 2109 | 2071 | 2024 | 1966 | 1897 | 1816 | 1723 | 1621 | 1514 | 1404 | 1297 | 1195 | 1100 | 1012 | 932 | 859 | 794 | 735 |
| | 2000 | 1998 | 1992 | 1983 | 1969 | 1950 | 1925 | 1895 | 1857 | 1811 | 1755 | 1690 | 1615 | 1531 | 1440 | 1346 | 1251 | 1159 | 1072 | 990 | 915 | 846 | 783 | 726 |
| | 1800 | 1798 | 1794 | 1786 | 1775 | 1760 | 1740 | 1716 | 1686 | 1650 | 1607 | 1555 | 1496 | 1429 | 1355 | 1277 | 1196 | 1116 | 1037 | 963 | 893 | 828 | 769 | 714 |
| | 1600 | 1599 | 1595 | 1589 | 1580 | 1568 | 1553 | 1535 | 1512 | 1484 | 1451 | 1412 | 1367 | 1315 | 1258 | 1195 | 1129 | 1061 | 994 | 928 | 865 | 806 | 751 | 699 |
| | 1400 | 1399 | 1396 | 1392 | 1385 | 1376 | 1365 | 1351 | 1333 | 1313 | 1289 | 1260 | 1227 | 1189 | 1146 | 1099 | 1047 | 994 | 938 | 883 | 829 | 776 | 727 | 680 |
| | 1200 | 1199 | 1197 | 1194 | 1189 | 1182 | 1174 | 1164 | 1152 | 1137 | 1120 | 1100 | 1077 | 1051 | 1021 | 987 | 950 | 910 | 867 | 824 | 780 | 736 | 693 | 653 |
| | 1000 | 1000 | 998 | 996 | 992 | 988 | 982 | 975 | 967 | 958 | 946 | 933 | 918 | 900 | 881 | 858 | 834 | 807 | 777 | 746 | 713 | 680 | 647 | 613 |
| | 3400 | 3394 | 3377 | 3346 | 3301 | 3238 | 3154 | 3045 | 2906 | 2738 | 2542 | 2331 | 2116 | 1908 | 1716 | 1543 | 1390 | 1255 | 1136 | 1032 | 941 | 860 | 789 | 726 |
| | 3200 | 3195 | 3179 | 3153 | 3113 | 3058 | 2984 | 2889 | 2769 | 2622 | 2450 | 2260 | 2063 | 1870 | 1689 | 1523 | 1375 | 1243 | 1127 | 1025 | 935 | 856 | 786 | 723 |
| | 3000 | 2996 | 2982 | 2958 | 2924 | 2876 | 2813 | 2731 | 2627 | 2500 | 2350 | 2182 | 2005 | 1827 | 1657 | 1500 | 1358 | 1230 | 1117 | 1017 | 929 | 851 | 782 | 720 |
| | 2800 | 2796 | 2784 | 2764 | 2734 | 2693 | 2638 | 2568 | 2480 | 2372 | 2243 | 2097 | 1939 | 1778 | 1621 | 1473 | 1337 | 1215 | 1106 | 1008 | 922 | 845 | 777 | 716 |
| | 2600 | 2597 | 2586 | 2569 | 2543 | 2508 | 2462 | 2403 | 2329 | 2238 | 2128 | 2003 | 1865 | 1722 | 1578 | 1441 | 1314 | 1197 | 1092 | 998 | 914 | 839 | 772 | 712 |
| | 2400 | 2397 | 2388 | 2374 | 2352 | 2322 | 2284 | 2234 | 2173 | 2097 | 2006 | 1901 | 1783 | 1657 | 1529 | 1404 | 1285 | 1176 | 1075 | 985 | 903 | 830 | 765 | 707 |
| | 2200 | 2198 | 2190 | 2178 | 2160 | 2135 | 2103 | 2063 | 2012 | 1950 | 1876 | 1789 | 1691 | 1583 | 1472 | 1360 | 1252 | 1150 | 1055 | 969 | 891 | 821 | 757 | 700 |
| 1800000 | 2000 | 1998 | 1992 | 1982 | 1967 | 1947 | 1921 | 1888 | 1848 | 1798 | 1738 | 1668 | 1588 | 1499 | 1404 | 1307 | 1211 | 1118 | 1031 | 950 | 876 | 809 | 748 | 692 |
| | 1800 | 1798 | 1794 | 1785 | 1773 | 1757 | 1737 | 1711 | 1679 | 1640 | 1593 | 1538 | 1475 | 1403 | 1326 | 1244 | 1161 | 1079 | 1000 | 926 | 857 | 793 | 735 | 682 |
| | 1600 | 1599 | 1595 | 1588 | 1579 | 1566 | 1550 | 1530 | 1506 | 1476 | 1441 | 1399 | 1350 | 1295 | 1234 | 1168 | 1099 | 1030 | 961 | 895 | 832 | 774 | 719 | 669 |
| | 1400 | 1399 | 1396 | 1391 | 1384 | 1375 | 1362 | 1348 | 1329 | 1307 | 1281 | 1251 | 1215 | 1174 | 1128 | 1078 | 1024 | 968 | 911 | 854 | 800 | 747 | 698 | 652 |
| | 1200 | 1199 | 1197 | 1193 | 1188 | 1181 | 1173 | 1162 | 1149 | 1134 | 1115 | 1094 | 1069 | 1040 | 1008 | 972 | 932 | 890 | 846 | 801 | 756 | 711 | 669 | 628 |
| | 1000 | 1000 | 998 | 995 | 992 | 987 | 981 | 974 | 965 | 955 | 943 | 929 | 912 | 894 | 872 | 849 | 822 | 793 | 762 | 729 | 695 | 661 | 627 | 593 |
| | 800 | 800 | 799 | 797 | 795 | 792 | 788 | 784 | 778 | 772 | 764 | 756 | 746 | 735 | 722 | 708 | 692 | 675 | 655 | 635 | 612 | 589 | 565 | 540 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "b" - l/d from 2 to 46

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 |
| | 3200 | 3195 | 3178 | 3150 | 3107 | 3048 | 2970 | 2867 | 2737 | 2579 | 2396 | 2198 | 1995 | 1800 | 1620 | 1457 | 1312 | 1184 | 1072 | 974 | 888 | 812 | 745 | 686 |
| | 3000 | 2995 | 2981 | 2956 | 2919 | 2868 | 2800 | 2711 | 2600 | 2463 | 2303 | 2126 | 1943 | 1762 | 1592 | 1436 | 1297 | 1173 | 1064 | 967 | 883 | 808 | 742 | 683 |
| | 2800 | 2796 | 2783 | 2762 | 2730 | 2686 | 2627 | 2552 | 2457 | 2340 | 2202 | 2047 | 1883 | 1718 | 1559 | 1412 | 1279 | 1160 | 1053 | 960 | 876 | 803 | 738 | 680 |
| | 2600 | 2596 | 2586 | 2567 | 2540 | 2502 | 2453 | 2389 | 2309 | 2211 | 2094 | 1960 | 1816 | 1667 | 1522 | 1385 | 1258 | 1144 | 1041 | 950 | 869 | 797 | 733 | 676 |
| | 2400 | 2397 | 2388 | 2372 | 2349 | 2317 | 2276 | 2223 | 2157 | 2075 | 1977 | 1864 | 1740 | 1609 | 1478 | 1352 | 1233 | 1125 | 1027 | 939 | 860 | 790 | 727 | 671 |
| | 2200 | 2197 | 2190 | 2177 | 2157 | 2131 | 2097 | 2053 | 1999 | 1932 | 1852 | 1759 | 1654 | 1542 | 1426 | 1312 | 1203 | 1102 | 1009 | 925 | 849 | 781 | 720 | 665 |
| | 2000 | 1998 | 1992 | 1981 | 1965 | 1943 | 1916 | 1881 | 1837 | 1784 | 1719 | 1644 | 1558 | 1464 | 1365 | 1265 | 1167 | 1074 | 988 | 908 | 836 | 771 | 712 | 658 |
| 1700000 | 1800 | 1798 | 1793 | 1784 | 1772 | 1755 | 1732 | 1705 | 1670 | 1629 | 1578 | 1519 | 1451 | 1375 | 1293 | 1208 | 1122 | 1039 | 961 | 887 | 819 | 757 | 701 | 650 |
| | 1600 | 1599 | 1595 | 1588 | 1578 | 1564 | 1547 | 1526 | 1500 | 1468 | 1429 | 1384 | 1332 | 1273 | 1208 | 1138 | 1067 | 996 | 926 | 860 | 798 | 740 | 687 | 638 |
| | 1400 | 1399 | 1396 | 1391 | 1383 | 1373 | 1360 | 1344 | 1325 | 1301 | 1273 | 1240 | 1202 | 1158 | 1108 | 1055 | 998 | 940 | 881 | 824 | 769 | 717 | 668 | 623 |
| | 1200 | 1199 | 1197 | 1193 | 1188 | 1180 | 1171 | 1160 | 1146 | 1129 | 1109 | 1086 | 1059 | 1029 | 994 | 955 | 913 | 868 | 822 | 776 | 730 | 685 | 642 | 602 |
| | 1000 | 999 | 998 | 995 | 991 | 986 | 980 | 972 | 963 | 952 | 939 | 924 | 906 | 886 | 863 | 837 | 809 | 778 | 745 | 711 | 675 | 640 | 605 | 571 |
| | 800 | 800 | 799 | 797 | 795 | 791 | 787 | 783 | 777 | 770 | 762 | 753 | 742 | 730 | 717 | 701 | 684 | 665 | 645 | 623 | 599 | 575 | 549 | 524 |
| | 600 | 600 | 599 | 598 | 597 | 595 | 593 | 590 | 587 | 584 | 579 | 574 | 569 | 563 | 556 | 548 | 539 | 529 | 519 | 507 | 494 | 481 | 466 | 451 |
| | 3200 | 3194 | 3177 | 3146 | 3101 | 3038 | 2953 | 2842 | 2701 | 2531 | 2336 | 2129 | 1922 | 1726 | 1547 | 1388 | 1247 | 1124 | 1016 | 922 | 840 | 768 | 704 | 648 |
| | 3000 | 2995 | 2980 | 2953 | 2913 | 2858 | 2785 | 2689 | 2568 | 2421 | 2250 | 2064 | 1875 | 1692 | 1523 | 1370 | 1234 | 1114 | 1009 | 917 | 835 | 764 | 701 | 645 |
| | 2800 | 2796 | 2782 | 2759 | 2725 | 2678 | 2615 | 2533 | 2430 | 2304 | 2156 | 1992 | 1822 | 1653 | 1495 | 1349 | 1218 | 1102 | 1000 | 910 | 830 | 760 | 698 | 642 |
| | 2600 | 2596 | 2585 | 2565 | 2536 | 2495 | 2442 | 2373 | 2287 | 2180 | 2054 | 1912 | 1761 | 1608 | 1462 | 1325 | 1200 | 1089 | 990 | 902 | 824 | 755 | 693 | 639 |
| | 2400 | 2397 | 2387 | 2370 | 2345 | 2312 | 2267 | 2210 | 2138 | 2049 | 1944 | 1823 | 1692 | 1556 | 1423 | 1296 | 1179 | 1072 | 977 | 892 | 816 | 748 | 688 | 635 |
| | 2200 | 2197 | 2189 | 2175 | 2154 | 2126 | 2090 | 2043 | 1984 | 1911 | 1825 | 1724 | 1613 | 1495 | 1377 | 1261 | 1153 | 1053 | 962 | 880 | 807 | 741 | 682 | 630 |
| | 2000 | 1998 | 1991 | 1979 | 1962 | 1940 | 1910 | 1872 | 1825 | 1767 | 1697 | 1616 | 1524 | 1425 | 1322 | 1219 | 1121 | 1028 | 943 | 865 | 795 | 732 | 675 | 624 |
| 1600000 | 1800 | 1798 | 1793 | 1783 | 1770 | 1751 | 1728 | 1698 | 1661 | 1615 | 1561 | 1497 | 1424 | 1342 | 1256 | 1168 | 1081 | 998 | 919 | 847 | 780 | 720 | 666 | 616 |
| | 1600 | 1599 | 1594 | 1587 | 1576 | 1562 | 1544 | 1521 | 1492 | 1458 | 1416 | 1367 | 1311 | 1247 | 1178 | 1106 | 1032 | 959 | 889 | 823 | 762 | 705 | 654 | 606 |
| | 1400 | 1399 | 1396 | 1390 | 1382 | 1371 | 1357 | 1340 | 1319 | 1294 | 1263 | 1228 | 1186 | 1139 | 1086 | 1029 | 970 | 909 | 849 | 791 | 736 | 685 | 637 | 593 |
| | 1200 | 1199 | 1197 | 1193 | 1187 | 1179 | 1169 | 1157 | 1142 | 1124 | 1103 | 1078 | 1049 | 1015 | 978 | 936 | 891 | 844 | 797 | 749 | 702 | 657 | 615 | 575 |
| | 1000 | 999 | 998 | 995 | 991 | 986 | 979 | 970 | 960 | 949 | 934 | 918 | 899 | 877 | 852 | 825 | 794 | 761 | 726 | 690 | 653 | 617 | 582 | 548 |
| | 800 | 800 | 799 | 797 | 794 | 791 | 787 | 781 | 775 | 768 | 759 | 750 | 738 | 725 | 710 | 694 | 675 | 655 | 633 | 609 | 584 | 558 | 532 | 506 |
| | 600 | 600 | 599 | 598 | 597 | 595 | 593 | 590 | 586 | 582 | 578 | 573 | 567 | 560 | 552 | 544 | 534 | 524 | 512 | 500 | 486 | 471 | 456 | 440 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "b" - l/d from 2 to 46

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 |
| | 3000 | 2995 | 2978 | 2950 | 2907 | 2848 | 2768 | 2664 | 2532 | 2373 | 2190 | 1996 | 1802 | 1618 | 1450 | 1301 | 1169 | 1054 | 953 | 865 | 788 | 720 | 660 | 607 |
| | 2800 | 2795 | 2781 | 2756 | 2719 | 2669 | 2600 | 2512 | 2399 | 2262 | 2104 | 1931 | 1755 | 1584 | 1426 | 1283 | 1156 | 1044 | 945 | 859 | 783 | 716 | 657 | 605 |
| | 2600 | 2596 | 2584 | 2562 | 2531 | 2488 | 2430 | 2355 | 2261 | 2145 | 2009 | 1858 | 1701 | 1545 | 1397 | 1262 | 1140 | 1032 | 936 | 852 | 777 | 712 | 653 | 602 |
| | 2400 | 2397 | 2386 | 2368 | 2342 | 2305 | 2257 | 2195 | 2116 | 2020 | 1906 | 1777 | 1639 | 1499 | 1363 | 1237 | 1122 | 1018 | 925 | 843 | 771 | 706 | 649 | 598 |
| | 2200 | 2197 | 2188 | 2173 | 2151 | 2121 | 2081 | 2030 | 1966 | 1887 | 1793 | 1685 | 1567 | 1445 | 1323 | 1207 | 1099 | 1001 | 912 | 833 | 763 | 700 | 644 | 594 |
| | 2000 | 1998 | 1990 | 1978 | 1960 | 1935 | 1903 | 1862 | 1811 | 1748 | 1672 | 1584 | 1486 | 1381 | 1274 | 1170 | 1071 | 980 | 896 | 821 | 753 | 692 | 638 | 589 |
| | 1800 | 1798 | 1792 | 1782 | 1768 | 1748 | 1722 | 1690 | 1650 | 1600 | 1541 | 1471 | 1392 | 1306 | 1216 | 1125 | 1037 | 953 | 876 | 805 | 740 | 682 | 630 | 582 |
| 1500000 | 1600 | 1598 | 1594 | 1586 | 1575 | 1559 | 1540 | 1515 | 1484 | 1446 | 1401 | 1348 | 1287 | 1219 | 1145 | 1069 | 993 | 919 | 849 | 784 | 724 | 669 | 619 | 574 |
| | 1400 | 1399 | 1395 | 1389 | 1381 | 1369 | 1354 | 1336 | 1313 | 1285 | 1252 | 1213 | 1168 | 1117 | 1060 | 1000 | 938 | 876 | 815 | 757 | 702 | 652 | 605 | 562 |
| | 1200 | 1199 | 1197 | 1192 | 1186 | 1177 | 1167 | 1154 | 1137 | 1118 | 1095 | 1068 | 1036 | 1000 | 959 | 914 | 867 | 818 | 768 | 719 | 672 | 628 | 586 | 547 |
| | 1000 | 999 | 998 | 995 | 990 | 985 | 977 | 968 | 958 | 945 | 929 | 912 | 891 | 867 | 840 | 810 | 777 | 742 | 705 | 667 | 630 | 593 | 557 | 523 |
| | 800 | 800 | 798 | 797 | 794 | 790 | 786 | 780 | 773 | 766 | 756 | 746 | 733 | 719 | 703 | 685 | 665 | 643 | 619 | 594 | 567 | 540 | 513 | 487 |
| | 600 | 600 | 599 | 598 | 597 | 595 | 592 | 589 | 585 | 581 | 576 | 571 | 564 | 557 | 549 | 539 | 529 | 518 | 505 | 491 | 476 | 461 | 444 | 427 |
| | 400 | 400 | 400 | 399 | 398 | 398 | 396 | 395 | 394 | 392 | 390 | 387 | 385 | 382 | 379 | 375 | 371 | 366 | 362 | 356 | 350 | 344 | 337 | 330 |
| | 2800 | 2795 | 2780 | 2753 | 2713 | 2658 | 2584 | 2486 | 2363 | 2214 | 2044 | 1863 | 1682 | 1510 | 1354 | 1214 | 1091 | 983 | 889 | 807 | 735 | 672 | 616 | 567 |
| | 2600 | 2596 | 2582 | 2560 | 2526 | 2479 | 2416 | 2334 | 2230 | 2104 | 1957 | 1798 | 1634 | 1476 | 1329 | 1196 | 1078 | 973 | 882 | 801 | 730 | 668 | 613 | 564 |
| | 2400 | 2396 | 2385 | 2366 | 2337 | 2298 | 2245 | 2177 | 2091 | 1986 | 1862 | 1724 | 1579 | 1436 | 1300 | 1175 | 1062 | 961 | 873 | 794 | 725 | 664 | 609 | 561 |
| | 2200 | 2197 | 2188 | 2171 | 2147 | 2115 | 2071 | 2016 | 1946 | 1859 | 1757 | 1641 | 1516 | 1389 | 1265 | 1149 | 1043 | 947 | 861 | 785 | 718 | 658 | 605 | 558 |
| | 2000 | 1997 | 1990 | 1976 | 1957 | 1930 | 1895 | 1850 | 1794 | 1725 | 1642 | 1547 | 1442 | 1332 | 1223 | 1117 | 1019 | 929 | 848 | 775 | 709 | 651 | 600 | 553 |
| | 1800 | 1798 | 1792 | 1781 | 1765 | 1744 | 1716 | 1681 | 1637 | 1583 | 1518 | 1442 | 1357 | 1265 | 1171 | 1078 | 989 | 906 | 830 | 761 | 699 | 643 | 593 | 548 |
| 1400000 | 1600 | 1598 | 1593 | 1585 | 1573 | 1556 | 1535 | 1508 | 1474 | 1433 | 1383 | 1325 | 1259 | 1186 | 1108 | 1029 | 951 | 877 | 808 | 743 | 685 | 632 | 584 | 540 |
| | 1400 | 1399 | 1395 | 1389 | 1379 | 1367 | 1351 | 1331 | 1306 | 1275 | 1239 | 1196 | 1147 | 1092 | 1031 | 967 | 903 | 839 | 778 | 720 | 666 | 617 | 572 | 531 |
| | 1200 | 1199 | 1196 | 1192 | 1185 | 1176 | 1164 | 1150 | 1132 | 1111 | 1086 | 1056 | 1021 | 982 | 938 | 890 | 839 | 788 | 737 | 688 | 641 | 596 | 555 | 517 |
| | 1000 | 999 | 997 | 994 | 990 | 983 | 976 | 966 | 954 | 940 | 923 | 904 | 881 | 855 | 826 | 793 | 757 | 720 | 681 | 642 | 604 | 566 | 531 | 497 |
| | 800 | 800 | 798 | 796 | 793 | 789 | 785 | 779 | 771 | 763 | 753 | 741 | 727 | 712 | 694 | 675 | 653 | 629 | 603 | 576 | 548 | 520 | 493 | 466 |
| | 600 | 600 | 599 | 598 | 596 | 594 | 591 | 588 | 584 | 580 | 574 | 568 | 561 | 553 | 544 | 534 | 523 | 510 | 496 | 481 | 465 | 449 | 431 | 413 |
| | 400 | 400 | 400 | 399 | 398 | 397 | 396 | 395 | 393 | 391 | 389 | 387 | 384 | 380 | 377 | 373 | 368 | 364 | 358 | 352 | 346 | 339 | 331 | 323 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "b" - l/d from 2 to 46

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 |
| | 2800 | 2795 | 2778 | 2749 | 2706 | 2645 | 2564 | 2456 | 2321 | 2159 | 1976 | 1787 | 1602 | 1431 | 1278 | 1142 | 1024 | 922 | 832 | 755 | 687 | 627 | 575 | 528 |
| | 2600 | 2595 | 2581 | 2556 | 2519 | 2468 | 2399 | 2309 | 2195 | 2056 | 1898 | 1730 | 1562 | 1402 | 1257 | 1127 | 1013 | 913 | 826 | 750 | 683 | 624 | 572 | 526 |
| | 2400 | 2396 | 2384 | 2363 | 2332 | 2289 | 2231 | 2156 | 2061 | 1946 | 1811 | 1664 | 1514 | 1368 | 1232 | 1109 | 1000 | 903 | 818 | 744 | 678 | 620 | 569 | 524 |
| | 2200 | 2197 | 2187 | 2169 | 2143 | 2107 | 2060 | 1999 | 1921 | 1826 | 1714 | 1590 | 1458 | 1327 | 1202 | 1087 | 984 | 891 | 809 | 736 | 672 | 615 | 565 | 521 |
| | 2000 | 1997 | 1989 | 1974 | 1953 | 1924 | 1886 | 1837 | 1775 | 1698 | 1608 | 1504 | 1393 | 1278 | 1166 | 1061 | 963 | 876 | 797 | 727 | 665 | 610 | 561 | 517 |
| | 1800 | 1798 | 1791 | 1779 | 1762 | 1739 | 1709 | 1670 | 1622 | 1562 | 1490 | 1408 | 1316 | 1219 | 1122 | 1027 | 938 | 857 | 782 | 716 | 656 | 603 | 555 | 512 |
| | 1600 | 1598 | 1593 | 1584 | 1570 | 1552 | 1529 | 1499 | 1462 | 1417 | 1362 | 1299 | 1226 | 1148 | 1066 | 985 | 906 | 832 | 763 | 701 | 644 | 593 | 547 | 506 |
| 1300000 | 1400 | 1399 | 1395 | 1388 | 1378 | 1364 | 1347 | 1324 | 1297 | 1264 | 1224 | 1177 | 1123 | 1062 | 998 | 931 | 864 | 799 | 738 | 681 | 629 | 581 | 537 | 498 |
| | 1200 | 1199 | 1196 | 1191 | 1184 | 1174 | 1161 | 1146 | 1126 | 1103 | 1075 | 1042 | 1004 | 960 | 913 | 861 | 809 | 755 | 703 | 654 | 607 | 563 | 523 | 487 |
| | 1000 | 999 | 997 | 994 | 989 | 982 | 973 | 963 | 950 | 935 | 916 | 895 | 870 | 841 | 809 | 773 | 735 | 695 | 655 | 614 | 575 | 538 | 503 | 470 |
| | 800 | 800 | 798 | 796 | 793 | 789 | 783 | 777 | 769 | 760 | 749 | 736 | 721 | 704 | 684 | 662 | 638 | 612 | 585 | 556 | 527 | 498 | 470 | 443 |
| | 600 | 600 | 599 | 598 | 596 | 594 | 591 | 587 | 583 | 578 | 572 | 565 | 558 | 549 | 539 | 528 | 515 | 501 | 486 | 470 | 453 | 435 | 416 | 397 |
| | 400 | 400 | 400 | 399 | 398 | 397 | 396 | 394 | 393 | 391 | 388 | 385 | 382 | 379 | 375 | 370 | 366 | 360 | 354 | 348 | 341 | 333 | 325 | 316 |
| | 200 | 200 | 200 | 200 | 200 | 199 | 199 | 199 | 198 | 198 | 197 | 197 | 196 | 195 | 194 | 193 | 192 | 191 | 190 | 189 | 187 | 186 | 184 | 182 |
| | 2600 | 2595 | 2580 | 2553 | 2512 | 2455 | 2379 | 2279 | 2152 | 2000 | 1830 | 1654 | 1482 | 1323 | 1181 | 1056 | 946 | 851 | 769 | 697 | 634 | 579 | 531 | 488 |
| | 2400 | 2396 | 2383 | 2360 | 2326 | 2278 | 2214 | 2131 | 2026 | 1898 | 1752 | 1597 | 1441 | 1294 | 1160 | 1041 | 935 | 843 | 762 | 692 | 630 | 576 | 528 | 486 |
| | 2200 | 2196 | 2185 | 2166 | 2138 | 2099 | 2046 | 1978 | 1892 | 1787 | 1665 | 1531 | 1393 | 1260 | 1135 | 1022 | 922 | 833 | 755 | 686 | 625 | 572 | 525 | 483 |
| | 2000 | 1997 | 1988 | 1972 | 1949 | 1917 | 1875 | 1820 | 1751 | 1667 | 1567 | 1455 | 1337 | 1218 | 1105 | 1000 | 905 | 820 | 745 | 678 | 619 | 567 | 521 | 480 |
| | 1800 | 1798 | 1790 | 1778 | 1759 | 1734 | 1700 | 1657 | 1603 | 1537 | 1458 | 1367 | 1269 | 1167 | 1067 | 972 | 884 | 804 | 733 | 669 | 612 | 561 | 516 | 476 |
| | 1600 | 1598 | 1592 | 1582 | 1568 | 1548 | 1522 | 1490 | 1449 | 1398 | 1337 | 1267 | 1188 | 1105 | 1019 | 936 | 857 | 784 | 717 | 657 | 602 | 554 | 510 | 471 |
| 1200000 | 1400 | 1399 | 1394 | 1387 | 1376 | 1361 | 1342 | 1317 | 1287 | 1250 | 1206 | 1153 | 1094 | 1028 | 960 | 890 | 821 | 756 | 696 | 640 | 589 | 543 | 502 | 464 |
| | 1200 | 1199 | 1196 | 1190 | 1182 | 1171 | 1158 | 1140 | 1119 | 1093 | 1062 | 1026 | 983 | 936 | 884 | 829 | 774 | 719 | 667 | 617 | 571 | 529 | 490 | 455 |
| | 1000 | 999 | 997 | 993 | 988 | 980 | 971 | 960 | 945 | 928 | 908 | 884 | 856 | 824 | 789 | 750 | 709 | 667 | 625 | 584 | 545 | 508 | 473 | 441 |
| | 800 | 800 | 798 | 796 | 792 | 788 | 782 | 775 | 766 | 756 | 743 | 729 | 713 | 694 | 672 | 648 | 622 | 593 | 564 | 534 | 504 | 474 | 446 | 419 |
| | 600 | 600 | 599 | 598 | 596 | 593 | 590 | 586 | 581 | 576 | 570 | 562 | 554 | 544 | 533 | 520 | 506 | 491 | 475 | 457 | 438 | 419 | 399 | 380 |
| | 400 | 400 | 400 | 399 | 398 | 397 | 396 | 394 | 392 | 390 | 387 | 384 | 381 | 377 | 372 | 368 | 362 | 356 | 350 | 342 | 334 | 326 | 317 | 307 |
| | 200 | 200 | 200 | 200 | 200 | 199 | 199 | 199 | 198 | 198 | 197 | 196 | 195 | 195 | 194 | 193 | 192 | 190 | 189 | 187 | 186 | 184 | 182 | 180 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "b" - l/d from 2 to 46

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 |
| 1100000 | 1800 | 1797 | 1789 | 1775 | 1755 | 1727 | 1690 | 1642 | 1581 | 1507 | 1419 | 1320 | 1215 | 1109 | 1007 | 912 | 826 | 749 | 681 | 620 | 567 | 519 | 477 | 439 |
| | 1600 | 1598 | 1592 | 1581 | 1565 | 1543 | 1514 | 1478 | 1432 | 1375 | 1307 | 1229 | 1144 | 1055 | 967 | 883 | 804 | 733 | 668 | 610 | 559 | 513 | 472 | 435 |
| | 1400 | 1398 | 1394 | 1385 | 1373 | 1357 | 1336 | 1309 | 1275 | 1233 | 1183 | 1125 | 1059 | 989 | 916 | 844 | 775 | 710 | 651 | 597 | 548 | 504 | 465 | 430 |
| | 1200 | 1199 | 1195 | 1189 | 1180 | 1169 | 1153 | 1134 | 1111 | 1081 | 1047 | 1006 | 958 | 906 | 850 | 792 | 735 | 679 | 627 | 578 | 533 | 493 | 456 | 422 |
| | 1000 | 999 | 997 | 993 | 987 | 979 | 968 | 955 | 940 | 921 | 898 | 871 | 840 | 804 | 765 | 723 | 679 | 635 | 592 | 551 | 512 | 475 | 442 | 411 |
| | 800 | 799 | 798 | 795 | 791 | 786 | 780 | 772 | 763 | 751 | 737 | 721 | 703 | 681 | 657 | 631 | 602 | 571 | 540 | 508 | 477 | 448 | 419 | 392 |
| | 600 | 600 | 599 | 597 | 595 | 592 | 589 | 585 | 580 | 573 | 566 | 558 | 549 | 538 | 525 | 511 | 496 | 479 | 460 | 441 | 421 | 400 | 380 | 360 |
| | 400 | 400 | 399 | 399 | 398 | 397 | 395 | 393 | 391 | 389 | 386 | 382 | 379 | 374 | 369 | 364 | 358 | 351 | 344 | 336 | 327 | 317 | 307 | 297 |
| | 200 | 200 | 200 | 200 | 199 | 199 | 199 | 198 | 198 | 197 | 197 | 196 | 195 | 194 | 193 | 192 | 191 | 189 | 188 | 186 | 184 | 182 | 180 | 178 |
| 1000000 | 2000 | 1996 | 1985 | 1966 | 1938 | 1898 | 1845 | 1776 | 1688 | 1582 | 1460 | 1331 | 1201 | 1079 | 967 | 867 | 779 | 702 | 635 | 577 | 525 | 480 | 440 | 405 |
| | 1800 | 1797 | 1788 | 1773 | 1750 | 1719 | 1677 | 1623 | 1554 | 1470 | 1372 | 1264 | 1152 | 1043 | 941 | 849 | 766 | 692 | 627 | 570 | 520 | 476 | 437 | 402 |
| | 1600 | 1598 | 1591 | 1579 | 1561 | 1537 | 1505 | 1463 | 1411 | 1347 | 1270 | 1184 | 1092 | 999 | 909 | 825 | 748 | 679 | 617 | 562 | 514 | 471 | 433 | 399 |
| | 1400 | 1398 | 1393 | 1384 | 1370 | 1352 | 1328 | 1298 | 1259 | 1212 | 1156 | 1091 | 1019 | 943 | 866 | 793 | 724 | 661 | 603 | 552 | 505 | 464 | 427 | 394 |
| | 1200 | 1199 | 1195 | 1188 | 1178 | 1165 | 1148 | 1127 | 1100 | 1067 | 1027 | 981 | 928 | 871 | 811 | 750 | 691 | 635 | 584 | 537 | 494 | 455 | 420 | 388 |
| | 1000 | 999 | 996 | 992 | 985 | 976 | 965 | 950 | 933 | 911 | 885 | 855 | 819 | 780 | 736 | 691 | 645 | 599 | 556 | 514 | 476 | 441 | 408 | 379 |
| | 800 | 799 | 798 | 795 | 791 | 785 | 778 | 769 | 758 | 745 | 730 | 712 | 691 | 666 | 639 | 610 | 578 | 545 | 512 | 480 | 448 | 418 | 390 | 364 |
| | 600 | 600 | 599 | 597 | 595 | 592 | 588 | 583 | 577 | 571 | 563 | 553 | 542 | 530 | 516 | 500 | 483 | 464 | 443 | 422 | 401 | 380 | 358 | 338 |
| | 400 | 400 | 399 | 399 | 398 | 396 | 395 | 393 | 390 | 387 | 384 | 380 | 376 | 371 | 366 | 360 | 353 | 345 | 337 | 327 | 318 | 307 | 296 | 285 |
| | 200 | 200 | 200 | 200 | 199 | 199 | 199 | 198 | 198 | 197 | 196 | 195 | 194 | 193 | 192 | 191 | 190 | 188 | 186 | 184 | 182 | 180 | 178 | 175 |
| 900000 | 1600 | 1597 | 1590 | 1576 | 1556 | 1529 | 1492 | 1445 | 1385 | 1311 | 1225 | 1130 | 1032 | 935 | 844 | 762 | 687 | 622 | 564 | 513 | 468 | 428 | 393 | 362 |
| | 1400 | 1398 | 1392 | 1382 | 1367 | 1346 | 1319 | 1284 | 1240 | 1186 | 1122 | 1048 | 970 | 889 | 810 | 736 | 669 | 608 | 553 | 504 | 461 | 423 | 389 | 358 |
| | 1200 | 1199 | 1194 | 1187 | 1176 | 1161 | 1142 | 1117 | 1086 | 1049 | 1003 | 950 | 891 | 829 | 765 | 702 | 643 | 588 | 538 | 492 | 452 | 415 | 383 | 353 |
| | 1000 | 999 | 996 | 991 | 983 | 973 | 960 | 944 | 924 | 899 | 869 | 834 | 794 | 750 | 702 | 653 | 605 | 559 | 515 | 475 | 438 | 404 | 374 | 346 |
| | 800 | 799 | 797 | 794 | 789 | 783 | 775 | 765 | 753 | 738 | 720 | 700 | 675 | 648 | 617 | 584 | 550 | 515 | 480 | 447 | 416 | 387 | 360 | 335 |
| | 600 | 600 | 599 | 597 | 594 | 591 | 586 | 581 | 575 | 567 | 558 | 547 | 534 | 520 | 504 | 486 | 466 | 445 | 423 | 400 | 378 | 356 | 334 | 314 |
| | 400 | 400 | 399 | 399 | 397 | 396 | 394 | 392 | 389 | 386 | 382 | 378 | 373 | 367 | 361 | 354 | 346 | 337 | 328 | 317 | 306 | 295 | 283 | 270 |
| | 200 | 200 | 200 | 200 | 199 | 199 | 199 | 198 | 197 | 197 | 196 | 195 | 194 | 193 | 191 | 190 | 188 | 186 | 185 | 182 | 180 | 178 | 175 | 172 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "b" - l/d from 46 to 80

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 |
| | 4000 | 848 | 782 | 724 | 672 | 625 | 583 | 545 | 510 | 479 | 450 | 424 | 400 | 378 | 358 | 339 | 322 | 306 | 291 |
| | 3800 | 845 | 780 | 722 | 670 | 624 | 582 | 544 | 509 | 478 | 449 | 423 | 399 | 377 | 357 | 339 | 321 | 305 | 291 |
| | 3600 | 842 | 777 | 720 | 668 | 622 | 580 | 543 | 508 | 477 | 449 | 423 | 399 | 377 | 357 | 338 | 321 | 305 | 290 |
| | 3400 | 838 | 775 | 718 | 666 | 620 | 579 | 541 | 507 | 476 | 448 | 422 | 398 | 376 | 356 | 338 | 321 | 305 | 290 |
| | 3200 | 834 | 771 | 715 | 664 | 619 | 577 | 540 | 506 | 475 | 447 | 421 | 397 | 376 | 356 | 337 | 320 | 304 | 290 |
| | 3000 | 830 | 768 | 712 | 662 | 616 | 575 | 538 | 505 | 474 | 446 | 420 | 397 | 375 | 355 | 337 | 320 | 304 | 289 |
| | 2800 | 824 | 763 | 708 | 658 | 614 | 573 | 536 | 503 | 472 | 445 | 419 | 396 | 374 | 354 | 336 | 319 | 303 | 289 |
| 2100000 | 2600 | 818 | 758 | 704 | 655 | 611 | 571 | 534 | 501 | 471 | 443 | 418 | 395 | 373 | 353 | 335 | 318 | 303 | 288 |
| | 2400 | 811 | 752 | 699 | 651 | 607 | 568 | 532 | 499 | 469 | 442 | 416 | 393 | 372 | 352 | 334 | 318 | 302 | 287 |
| | 2200 | 801 | 744 | 692 | 645 | 603 | 564 | 528 | 496 | 467 | 439 | 415 | 392 | 371 | 351 | 333 | 317 | 301 | 287 |
| | 2000 | 790 | 735 | 685 | 639 | 597 | 559 | 525 | 493 | 464 | 437 | 412 | 390 | 369 | 350 | 332 | 315 | 300 | 286 |
| | 1800 | 776 | 723 | 675 | 631 | 590 | 554 | 520 | 489 | 460 | 434 | 410 | 387 | 367 | 348 | 330 | 314 | 299 | 285 |
| | 1600 | 757 | 708 | 662 | 620 | 582 | 546 | 513 | 483 | 455 | 430 | 406 | 384 | 364 | 346 | 328 | 312 | 297 | 283 |
| | 1400 | 732 | 688 | 646 | 606 | 570 | 536 | 505 | 476 | 449 | 424 | 402 | 380 | 361 | 342 | 325 | 310 | 295 | 281 |
| | 1200 | 699 | 659 | 622 | 587 | 553 | 522 | 493 | 466 | 441 | 417 | 395 | 375 | 356 | 338 | 322 | 306 | 292 | 278 |
| | 3600 | 804 | 743 | 688 | 638 | 594 | 554 | 518 | 485 | 455 | 428 | 403 | 380 | 359 | 340 | 322 | 306 | 291 | 277 |
| | 3400 | 801 | 740 | 685 | 636 | 592 | 553 | 517 | 484 | 454 | 427 | 402 | 380 | 359 | 340 | 322 | 306 | 290 | 276 |
| | 3200 | 798 | 737 | 683 | 634 | 591 | 551 | 515 | 483 | 453 | 426 | 402 | 379 | 358 | 339 | 322 | 305 | 290 | 276 |
| | 3000 | 794 | 734 | 680 | 632 | 589 | 549 | 514 | 482 | 452 | 425 | 401 | 378 | 358 | 339 | 321 | 305 | 290 | 276 |
| | 2800 | 789 | 730 | 677 | 629 | 586 | 547 | 512 | 480 | 451 | 424 | 400 | 378 | 357 | 338 | 320 | 304 | 289 | 275 |
| 2000000 | 2600 | 783 | 725 | 673 | 626 | 584 | 545 | 510 | 478 | 449 | 423 | 399 | 377 | 356 | 337 | 320 | 304 | 289 | 275 |
| | 2400 | 776 | 720 | 668 | 622 | 580 | 542 | 508 | 476 | 448 | 421 | 397 | 375 | 355 | 336 | 319 | 303 | 288 | 274 |
| | 2200 | 768 | 713 | 663 | 617 | 576 | 539 | 505 | 474 | 446 | 420 | 396 | 374 | 354 | 335 | 318 | 302 | 287 | 273 |
| | 2000 | 758 | 705 | 656 | 612 | 572 | 535 | 502 | 471 | 443 | 417 | 394 | 372 | 352 | 334 | 317 | 301 | 286 | 273 |
| | 1800 | 745 | 694 | 647 | 605 | 565 | 530 | 497 | 467 | 440 | 415 | 391 | 370 | 350 | 332 | 315 | 300 | 285 | 272 |
| | 1600 | 729 | 681 | 636 | 595 | 558 | 523 | 491 | 462 | 436 | 411 | 388 | 367 | 348 | 330 | 313 | 298 | 284 | 270 |
| | 1400 | 707 | 662 | 621 | 583 | 547 | 514 | 484 | 456 | 430 | 406 | 384 | 364 | 345 | 327 | 311 | 296 | 282 | 269 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "b" - l/d from 46 to 80

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 |
| | 3600 | 767 | 708 | 655 | 608 | 565 | 527 | 493 | 461 | 433 | 407 | 383 | 362 | 342 | 323 | 307 | 291 | 276 | 263 |
| | 3400 | 764 | 705 | 653 | 606 | 564 | 526 | 492 | 461 | 432 | 406 | 383 | 361 | 341 | 323 | 306 | 291 | 276 | 263 |
| | 3200 | 761 | 703 | 651 | 604 | 562 | 525 | 491 | 460 | 431 | 406 | 382 | 361 | 341 | 323 | 306 | 290 | 276 | 262 |
| | 3000 | 757 | 700 | 648 | 602 | 561 | 523 | 489 | 458 | 430 | 405 | 381 | 360 | 340 | 322 | 305 | 290 | 275 | 262 |
| | 2800 | 753 | 696 | 645 | 600 | 559 | 521 | 488 | 457 | 429 | 404 | 381 | 359 | 340 | 322 | 305 | 289 | 275 | 262 |
| | 2600 | 748 | 692 | 642 | 597 | 556 | 519 | 486 | 456 | 428 | 403 | 380 | 358 | 339 | 321 | 304 | 289 | 275 | 261 |
| | 2400 | 742 | 687 | 638 | 593 | 553 | 517 | 484 | 454 | 426 | 401 | 378 | 357 | 338 | 320 | 303 | 288 | 274 | 261 |
| 1900000 | 2200 | 735 | 681 | 633 | 589 | 550 | 514 | 481 | 452 | 425 | 400 | 377 | 356 | 337 | 319 | 303 | 287 | 273 | 260 |
| | 2000 | 726 | 674 | 627 | 584 | 546 | 510 | 478 | 449 | 422 | 398 | 375 | 355 | 335 | 318 | 302 | 286 | 272 | 259 |
| | 1800 | 714 | 664 | 619 | 578 | 540 | 506 | 474 | 446 | 419 | 395 | 373 | 353 | 334 | 316 | 300 | 285 | 271 | 259 |
| | 1600 | 699 | 652 | 609 | 569 | 533 | 500 | 469 | 441 | 416 | 392 | 370 | 350 | 332 | 314 | 299 | 284 | 270 | 257 |
| | 1400 | 680 | 636 | 596 | 558 | 524 | 492 | 463 | 436 | 411 | 388 | 367 | 347 | 329 | 312 | 296 | 282 | 268 | 256 |
| | 1200 | 653 | 614 | 577 | 543 | 511 | 481 | 453 | 428 | 404 | 382 | 361 | 342 | 325 | 309 | 293 | 279 | 266 | 254 |
| | 1000 | 613 | 581 | 550 | 520 | 491 | 465 | 439 | 416 | 394 | 373 | 354 | 336 | 319 | 303 | 289 | 275 | 262 | 250 |
| | 3400 | 726 | 670 | 620 | 576 | 536 | 499 | 467 | 437 | 410 | 386 | 363 | 343 | 324 | 306 | 290 | 276 | 262 | 249 |
| | 3200 | 723 | 668 | 618 | 574 | 534 | 498 | 466 | 436 | 409 | 385 | 363 | 342 | 323 | 306 | 290 | 275 | 262 | 249 |
| | 3000 | 720 | 665 | 616 | 572 | 533 | 497 | 465 | 435 | 409 | 384 | 362 | 342 | 323 | 306 | 290 | 275 | 261 | 249 |
| | 2800 | 716 | 662 | 614 | 570 | 531 | 495 | 463 | 434 | 408 | 383 | 361 | 341 | 322 | 305 | 289 | 275 | 261 | 248 |
| | 2600 | 712 | 658 | 611 | 567 | 529 | 493 | 462 | 433 | 406 | 382 | 360 | 340 | 322 | 304 | 289 | 274 | 260 | 248 |
| | 2400 | 707 | 654 | 607 | 564 | 526 | 491 | 460 | 431 | 405 | 381 | 359 | 339 | 321 | 304 | 288 | 273 | 260 | 247 |
| | 2200 | 700 | 649 | 603 | 561 | 523 | 489 | 458 | 429 | 403 | 380 | 358 | 338 | 320 | 303 | 287 | 273 | 259 | 247 |
| 1800000 | 2000 | 692 | 642 | 597 | 556 | 519 | 485 | 455 | 427 | 401 | 378 | 356 | 337 | 319 | 302 | 286 | 272 | 259 | 246 |
| | 1800 | 682 | 634 | 590 | 551 | 514 | 481 | 451 | 424 | 399 | 376 | 355 | 335 | 317 | 300 | 285 | 271 | 258 | 245 |
| | 1600 | 669 | 624 | 582 | 543 | 508 | 476 | 447 | 420 | 395 | 373 | 352 | 333 | 315 | 299 | 284 | 270 | 256 | 244 |
| | 1400 | 652 | 609 | 570 | 533 | 500 | 469 | 441 | 415 | 391 | 369 | 349 | 330 | 313 | 297 | 282 | 268 | 255 | 243 |
| | 1200 | 628 | 589 | 553 | 520 | 488 | 460 | 433 | 408 | 385 | 364 | 344 | 326 | 309 | 293 | 279 | 265 | 253 | 241 |
| | 1000 | 593 | 560 | 529 | 499 | 471 | 445 | 421 | 398 | 376 | 356 | 338 | 320 | 304 | 289 | 275 | 262 | 250 | 238 |
| | 800 | 540 | 516 | 491 | 468 | 444 | 422 | 401 | 381 | 362 | 344 | 327 | 311 | 296 | 282 | 269 | 256 | 245 | 234 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "b" - l/d from 46 to 80

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 |
| | 3200 | 686 | 633 | 586 | 544 | 506 | 472 | 441 | 413 | 387 | 364 | 343 | 324 | 306 | 289 | 274 | 260 | 247 | 235 |
| | 3000 | 683 | 631 | 584 | 542 | 504 | 470 | 440 | 412 | 387 | 364 | 342 | 323 | 305 | 289 | 274 | 260 | 247 | 235 |
| | 2800 | 680 | 628 | 582 | 540 | 503 | 469 | 439 | 411 | 386 | 363 | 342 | 322 | 305 | 289 | 273 | 260 | 247 | 235 |
| | 2600 | 676 | 625 | 579 | 538 | 501 | 467 | 437 | 410 | 385 | 362 | 341 | 322 | 304 | 288 | 273 | 259 | 246 | 234 |
| | 2400 | 671 | 621 | 576 | 535 | 499 | 465 | 436 | 408 | 383 | 361 | 340 | 321 | 303 | 287 | 272 | 259 | 246 | 234 |
| | 2200 | 665 | 616 | 572 | 532 | 496 | 463 | 434 | 407 | 382 | 359 | 339 | 320 | 303 | 287 | 272 | 258 | 245 | 234 |
| | 2000 | 658 | 610 | 567 | 528 | 493 | 460 | 431 | 404 | 380 | 358 | 338 | 319 | 302 | 286 | 271 | 257 | 245 | 233 |
| 1700000 | 1800 | 650 | 603 | 561 | 523 | 488 | 457 | 428 | 402 | 378 | 356 | 336 | 317 | 300 | 284 | 270 | 256 | 244 | 232 |
| | 1600 | 638 | 594 | 553 | 517 | 483 | 452 | 424 | 399 | 375 | 353 | 334 | 315 | 299 | 283 | 269 | 255 | 243 | 231 |
| | 1400 | 623 | 581 | 543 | 508 | 476 | 446 | 419 | 394 | 371 | 350 | 331 | 313 | 296 | 281 | 267 | 254 | 241 | 230 |
| | 1200 | 602 | 564 | 529 | 496 | 466 | 438 | 412 | 388 | 366 | 346 | 327 | 309 | 293 | 278 | 264 | 252 | 240 | 228 |
| | 1000 | 571 | 538 | 507 | 478 | 451 | 425 | 401 | 379 | 358 | 339 | 321 | 304 | 289 | 274 | 261 | 248 | 237 | 226 |
| | 800 | 524 | 499 | 474 | 450 | 427 | 405 | 384 | 364 | 345 | 328 | 312 | 296 | 282 | 268 | 255 | 244 | 232 | 222 |
| | 600 | 451 | 435 | 419 | 402 | 386 | 369 | 353 | 338 | 323 | 308 | 294 | 281 | 269 | 257 | 245 | 235 | 225 | 215 |
| | 3200 | 648 | 598 | 553 | 513 | 477 | 445 | 416 | 389 | 365 | 343 | 323 | 305 | 288 | 273 | 258 | 245 | 233 | 222 |
| | 3000 | 645 | 596 | 551 | 512 | 476 | 444 | 415 | 388 | 365 | 343 | 323 | 305 | 288 | 272 | 258 | 245 | 233 | 221 |
| | 2800 | 642 | 593 | 549 | 510 | 474 | 443 | 414 | 388 | 364 | 342 | 322 | 304 | 287 | 272 | 258 | 245 | 232 | 221 |
| | 2600 | 639 | 590 | 547 | 508 | 473 | 441 | 413 | 387 | 363 | 341 | 322 | 303 | 287 | 271 | 257 | 244 | 232 | 221 |
| | 2400 | 635 | 587 | 544 | 506 | 471 | 439 | 411 | 385 | 362 | 340 | 321 | 303 | 286 | 271 | 257 | 244 | 232 | 221 |
| | 2200 | 630 | 583 | 541 | 503 | 468 | 437 | 409 | 384 | 360 | 339 | 320 | 302 | 285 | 270 | 256 | 243 | 231 | 220 |
| | 2000 | 624 | 578 | 537 | 499 | 466 | 435 | 407 | 382 | 359 | 338 | 319 | 301 | 284 | 269 | 255 | 243 | 231 | 220 |
| 1600000 | 1800 | 616 | 572 | 531 | 495 | 462 | 432 | 405 | 380 | 357 | 336 | 317 | 299 | 283 | 268 | 255 | 242 | 230 | 219 |
| | 1600 | 606 | 564 | 525 | 489 | 457 | 428 | 401 | 377 | 354 | 334 | 315 | 298 | 282 | 267 | 253 | 241 | 229 | 218 |
| | 1400 | 593 | 553 | 516 | 482 | 451 | 423 | 397 | 373 | 351 | 331 | 313 | 296 | 280 | 265 | 252 | 239 | 228 | 217 |
| | 1200 | 575 | 538 | 503 | 472 | 442 | 415 | 390 | 368 | 346 | 327 | 309 | 293 | 277 | 263 | 250 | 238 | 226 | 216 |
| | 1000 | 548 | 515 | 485 | 456 | 429 | 404 | 381 | 360 | 340 | 321 | 304 | 288 | 273 | 260 | 247 | 235 | 224 | 213 |
| | 800 | 506 | 480 | 456 | 431 | 409 | 387 | 366 | 347 | 329 | 312 | 296 | 281 | 267 | 254 | 242 | 231 | 220 | 210 |
| | 600 | 440 | 423 | 406 | 389 | 372 | 356 | 340 | 324 | 309 | 295 | 281 | 268 | 256 | 244 | 233 | 223 | 213 | 204 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "b" - l/d from 46 to 80

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 |
| | 3000 | 607 | 560 | 518 | 481 | 447 | 417 | 390 | 365 | 342 | 322 | 303 | 286 | 270 | 256 | 242 | 230 | 218 | 208 |
| | 2800 | 605 | 558 | 517 | 479 | 446 | 416 | 389 | 364 | 342 | 321 | 303 | 285 | 270 | 255 | 242 | 230 | 218 | 208 |
| | 2600 | 602 | 556 | 515 | 478 | 445 | 415 | 388 | 363 | 341 | 321 | 302 | 285 | 269 | 255 | 242 | 229 | 218 | 207 |
| | 2400 | 598 | 553 | 512 | 476 | 443 | 413 | 386 | 362 | 340 | 320 | 301 | 284 | 269 | 254 | 241 | 229 | 218 | 207 |
| | 2200 | 594 | 549 | 509 | 473 | 441 | 412 | 385 | 361 | 339 | 319 | 300 | 284 | 268 | 254 | 241 | 228 | 217 | 207 |
| | 2000 | 589 | 545 | 506 | 470 | 438 | 409 | 383 | 359 | 337 | 318 | 299 | 283 | 267 | 253 | 240 | 228 | 217 | 206 |
| | 1800 | 582 | 540 | 501 | 467 | 435 | 407 | 381 | 357 | 336 | 316 | 298 | 282 | 266 | 252 | 239 | 227 | 216 | 206 |
| 1500000 | 1600 | 574 | 533 | 496 | 462 | 431 | 403 | 378 | 355 | 334 | 314 | 296 | 280 | 265 | 251 | 238 | 226 | 215 | 205 |
| | 1400 | 562 | 523 | 488 | 455 | 426 | 399 | 374 | 351 | 331 | 312 | 294 | 278 | 263 | 250 | 237 | 225 | 214 | 204 |
| | 1200 | 547 | 510 | 477 | 446 | 418 | 392 | 369 | 347 | 327 | 308 | 291 | 276 | 261 | 248 | 235 | 223 | 213 | 203 |
| | 1000 | 523 | 491 | 461 | 433 | 407 | 383 | 361 | 340 | 321 | 303 | 287 | 272 | 258 | 245 | 232 | 221 | 211 | 201 |
| | 800 | 487 | 461 | 436 | 412 | 389 | 368 | 348 | 329 | 311 | 295 | 280 | 266 | 252 | 240 | 228 | 217 | 207 | 198 |
| | 600 | 427 | 410 | 392 | 375 | 358 | 341 | 325 | 309 | 294 | 280 | 267 | 254 | 243 | 231 | 221 | 211 | 202 | 193 |
| | 400 | 330 | 322 | 313 | 305 | 296 | 286 | 277 | 267 | 258 | 248 | 239 | 230 | 221 | 212 | 204 | 196 | 188 | 181 |
| | 2800 | 567 | 523 | 484 | 449 | 417 | 389 | 364 | 341 | 320 | 300 | 283 | 267 | 252 | 239 | 226 | 215 | 204 | 194 |
| | 2600 | 564 | 521 | 482 | 447 | 416 | 388 | 363 | 340 | 319 | 300 | 282 | 266 | 252 | 238 | 226 | 214 | 204 | 194 |
| | 2400 | 561 | 518 | 480 | 446 | 415 | 387 | 362 | 339 | 318 | 299 | 282 | 266 | 251 | 238 | 225 | 214 | 203 | 193 |
| | 2200 | 558 | 515 | 478 | 444 | 413 | 385 | 360 | 338 | 317 | 298 | 281 | 265 | 251 | 237 | 225 | 214 | 203 | 193 |
| | 2000 | 553 | 512 | 474 | 441 | 411 | 384 | 359 | 336 | 316 | 297 | 280 | 264 | 250 | 237 | 224 | 213 | 203 | 193 |
| | 1800 | 548 | 507 | 471 | 438 | 408 | 381 | 357 | 335 | 314 | 296 | 279 | 263 | 249 | 236 | 224 | 212 | 202 | 192 |
| 1400000 | 1600 | 540 | 501 | 466 | 434 | 405 | 378 | 354 | 333 | 313 | 294 | 278 | 262 | 248 | 235 | 223 | 212 | 201 | 192 |
| | 1400 | 531 | 493 | 459 | 428 | 400 | 374 | 351 | 330 | 310 | 292 | 276 | 261 | 247 | 234 | 222 | 211 | 200 | 191 |
| | 1200 | 517 | 482 | 450 | 421 | 394 | 369 | 346 | 326 | 307 | 289 | 273 | 258 | 245 | 232 | 220 | 209 | 199 | 190 |
| | 1000 | 497 | 466 | 436 | 409 | 384 | 361 | 340 | 320 | 302 | 285 | 269 | 255 | 242 | 229 | 218 | 207 | 197 | 188 |
| | 800 | 466 | 440 | 415 | 391 | 369 | 348 | 329 | 311 | 294 | 278 | 263 | 250 | 237 | 225 | 214 | 204 | 195 | 186 |
| | 600 | 413 | 395 | 377 | 359 | 342 | 325 | 309 | 294 | 279 | 265 | 253 | 240 | 229 | 218 | 208 | 199 | 190 | 181 |
| | 400 | 323 | 315 | 306 | 296 | 287 | 277 | 267 | 257 | 247 | 238 | 228 | 219 | 210 | 202 | 194 | 186 | 178 | 171 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "b" - l/d from 46 to 80

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 |
| | 2800 | 528 | 487 | 451 | 418 | 389 | 362 | 338 | 317 | 297 | 279 | 263 | 248 | 234 | 222 | 210 | 200 | 190 | 180 |
| | 2600 | 526 | 486 | 449 | 417 | 388 | 361 | 338 | 316 | 297 | 279 | 263 | 248 | 234 | 222 | 210 | 199 | 189 | 180 |
| | 2400 | 524 | 483 | 447 | 415 | 386 | 360 | 337 | 315 | 296 | 278 | 262 | 247 | 234 | 221 | 210 | 199 | 189 | 180 |
| | 2200 | 521 | 481 | 445 | 414 | 385 | 359 | 336 | 315 | 295 | 278 | 262 | 247 | 233 | 221 | 209 | 199 | 189 | 180 |
| | 2000 | 517 | 478 | 443 | 411 | 383 | 358 | 334 | 313 | 294 | 277 | 261 | 246 | 233 | 220 | 209 | 198 | 188 | 179 |
| | 1800 | 512 | 474 | 440 | 409 | 381 | 356 | 333 | 312 | 293 | 276 | 260 | 245 | 232 | 220 | 208 | 198 | 188 | 179 |
| | 1600 | 506 | 469 | 435 | 405 | 378 | 353 | 331 | 310 | 291 | 274 | 259 | 244 | 231 | 219 | 207 | 197 | 187 | 178 |
| 1300000 | 1400 | 498 | 462 | 430 | 401 | 374 | 350 | 328 | 308 | 289 | 272 | 257 | 243 | 230 | 218 | 207 | 196 | 187 | 178 |
| | 1200 | 487 | 453 | 422 | 394 | 369 | 345 | 324 | 304 | 286 | 270 | 255 | 241 | 228 | 216 | 205 | 195 | 186 | 177 |
| | 1000 | 470 | 439 | 411 | 385 | 361 | 338 | 318 | 299 | 282 | 266 | 252 | 238 | 226 | 214 | 203 | 193 | 184 | 175 |
| | 800 | 443 | 417 | 392 | 369 | 348 | 328 | 309 | 292 | 275 | 260 | 247 | 234 | 222 | 211 | 200 | 191 | 182 | 173 |
| | 600 | 397 | 378 | 360 | 342 | 325 | 308 | 292 | 277 | 263 | 250 | 237 | 226 | 215 | 205 | 195 | 186 | 177 | 169 |
| | 400 | 316 | 307 | 297 | 287 | 277 | 267 | 256 | 246 | 236 | 227 | 217 | 208 | 199 | 191 | 183 | 175 | 168 | 161 |
| | 200 | 182 | 180 | 178 | 176 | 174 | 171 | 168 | 166 | 163 | 160 | 156 | 153 | 150 | 146 | 143 | 139 | 135 | 132 |
| | 2600 | 488 | 450 | 416 | 386 | 359 | 335 | 313 | 293 | 274 | 258 | 243 | 229 | 216 | 205 | 194 | 184 | 175 | 166 |
| | 2400 | 486 | 448 | 415 | 385 | 358 | 334 | 312 | 292 | 274 | 257 | 242 | 229 | 216 | 205 | 194 | 184 | 175 | 166 |
| | 2200 | 483 | 446 | 413 | 383 | 357 | 333 | 311 | 291 | 273 | 257 | 242 | 228 | 216 | 204 | 193 | 184 | 175 | 166 |
| | 2000 | 480 | 443 | 411 | 381 | 355 | 331 | 310 | 290 | 272 | 256 | 241 | 228 | 215 | 204 | 193 | 183 | 174 | 166 |
| | 1800 | 476 | 440 | 408 | 379 | 353 | 330 | 308 | 289 | 271 | 255 | 241 | 227 | 215 | 203 | 193 | 183 | 174 | 165 |
| | 1600 | 471 | 436 | 405 | 376 | 351 | 328 | 307 | 287 | 270 | 254 | 240 | 226 | 214 | 202 | 192 | 182 | 173 | 165 |
| 1200000 | 1400 | 464 | 431 | 400 | 372 | 347 | 325 | 304 | 285 | 268 | 253 | 238 | 225 | 213 | 202 | 191 | 182 | 173 | 164 |
| | 1200 | 455 | 423 | 394 | 367 | 343 | 321 | 301 | 283 | 266 | 250 | 236 | 223 | 211 | 200 | 190 | 181 | 172 | 164 |
| | 1000 | 441 | 411 | 384 | 359 | 336 | 315 | 296 | 278 | 262 | 247 | 234 | 221 | 209 | 199 | 188 | 179 | 171 | 162 |
| | 800 | 419 | 393 | 369 | 346 | 326 | 306 | 289 | 272 | 257 | 243 | 229 | 217 | 206 | 196 | 186 | 177 | 169 | 161 |
| | 600 | 380 | 360 | 342 | 324 | 306 | 290 | 275 | 260 | 247 | 234 | 222 | 211 | 200 | 191 | 181 | 173 | 165 | 158 |
| | 400 | 307 | 297 | 287 | 276 | 266 | 255 | 244 | 234 | 224 | 214 | 205 | 196 | 187 | 179 | 171 | 164 | 157 | 151 |
| | 200 | 180 | 178 | 176 | 173 | 171 | 168 | 165 | 162 | 159 | 155 | 152 | 148 | 145 | 141 | 137 | 133 | 130 | 126 |

## UNIT AXIAL STRESSES - SPACED COLUMNS, CONDITION "b" - l/d from 46 to 80

See instructions for use of tables on page 210. Obtain design values for E and $F_c$ from the *National Design Specification® for Wood Construction*. Modify $F_c$ for different load duration, if applicable (see page 13). Calculate l/d where l=unsupported length of column in inches and d=applicable least actual dimension of column cross section. Determine value of $F_c'$ from table.

**Total design load on column = cross-sectional area in square inches times $F_c'$ value.**

| | | l/d | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | $F_c$* | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 |
| | 1800 | 439 | 406 | 376 | 349 | 325 | 303 | 284 | 266 | 250 | 235 | 221 | 209 | 197 | 187 | 177 | 168 | 160 | 152 |
| | 1600 | 435 | 403 | 373 | 347 | 323 | 302 | 282 | 265 | 248 | 234 | 220 | 208 | 197 | 186 | 176 | 167 | 159 | 152 |
| | 1400 | 430 | 398 | 370 | 344 | 320 | 299 | 280 | 263 | 247 | 232 | 219 | 207 | 196 | 185 | 176 | 167 | 159 | 151 |
| | 1200 | 422 | 392 | 364 | 339 | 317 | 296 | 278 | 261 | 245 | 231 | 218 | 206 | 195 | 184 | 175 | 166 | 158 | 150 |
| | 1000 | 411 | 382 | 356 | 333 | 311 | 292 | 274 | 257 | 242 | 228 | 215 | 204 | 193 | 183 | 174 | 165 | 157 | 149 |
| 1100000 | | | | | | | | | | | | | | | | | | | |
| | 800 | 392 | 367 | 344 | 323 | 303 | 284 | 267 | 252 | 237 | 224 | 212 | 201 | 190 | 180 | 171 | 163 | 155 | 148 |
| | 600 | 360 | 340 | 322 | 304 | 287 | 271 | 256 | 242 | 229 | 217 | 206 | 195 | 185 | 176 | 168 | 160 | 152 | 145 |
| | 400 | 297 | 286 | 275 | 264 | 253 | 242 | 231 | 221 | 211 | 201 | 192 | 183 | 175 | 167 | 160 | 153 | 146 | 140 |
| | 200 | 178 | 176 | 173 | 170 | 167 | 164 | 161 | 158 | 154 | 150 | 147 | 143 | 139 | 135 | 131 | 127 | 123 | 119 |
| | 2000 | 405 | 373 | 346 | 321 | 298 | 278 | 260 | 243 | 228 | 215 | 202 | 191 | 180 | 170 | 162 | 153 | 146 | 139 |
| | 1800 | 402 | 371 | 344 | 319 | 297 | 277 | 259 | 242 | 228 | 214 | 202 | 190 | 180 | 170 | 161 | 153 | 145 | 138 |
| | 1600 | 399 | 369 | 341 | 317 | 295 | 276 | 258 | 241 | 227 | 213 | 201 | 190 | 179 | 170 | 161 | 153 | 145 | 138 |
| | 1400 | 394 | 365 | 338 | 315 | 293 | 274 | 256 | 240 | 225 | 212 | 200 | 189 | 178 | 169 | 160 | 152 | 145 | 138 |
| | 1200 | 388 | 360 | 334 | 311 | 290 | 271 | 254 | 238 | 224 | 211 | 199 | 188 | 178 | 168 | 159 | 151 | 144 | 137 |
| 1000000 | | | | | | | | | | | | | | | | | | | |
| | 1000 | 379 | 352 | 328 | 306 | 286 | 267 | 251 | 235 | 222 | 209 | 197 | 186 | 176 | 167 | 158 | 150 | 143 | 136 |
| | 800 | 364 | 340 | 318 | 298 | 279 | 262 | 246 | 231 | 218 | 206 | 194 | 184 | 174 | 165 | 157 | 149 | 142 | 135 |
| | 600 | 338 | 319 | 300 | 283 | 266 | 251 | 237 | 223 | 211 | 200 | 189 | 179 | 170 | 162 | 154 | 146 | 139 | 133 |
| | 400 | 285 | 273 | 261 | 250 | 238 | 227 | 216 | 206 | 196 | 187 | 178 | 170 | 162 | 154 | 147 | 141 | 134 | 128 |
| | 200 | 175 | 173 | 170 | 167 | 163 | 160 | 156 | 152 | 148 | 144 | 140 | 136 | 132 | 128 | 124 | 120 | 116 | 112 |
| | 1600 | 362 | 334 | 309 | 287 | 267 | 249 | 233 | 218 | 205 | 192 | 181 | 171 | 162 | 153 | 145 | 138 | 131 | 124 |
| | 1400 | 358 | 331 | 307 | 285 | 265 | 248 | 232 | 217 | 204 | 192 | 181 | 170 | 161 | 153 | 145 | 137 | 130 | 124 |
| | 1200 | 353 | 327 | 303 | 282 | 263 | 246 | 230 | 216 | 202 | 191 | 180 | 170 | 160 | 152 | 144 | 137 | 130 | 124 |
| | 1000 | 346 | 321 | 299 | 278 | 260 | 243 | 227 | 213 | 201 | 189 | 178 | 168 | 159 | 151 | 143 | 136 | 129 | 123 |
| 900000 | | | | | | | | | | | | | | | | | | | |
| | 800 | 335 | 312 | 291 | 272 | 254 | 238 | 223 | 210 | 198 | 186 | 176 | 166 | 158 | 149 | 142 | 135 | 128 | 122 |
| | 600 | 314 | 295 | 277 | 260 | 244 | 230 | 216 | 204 | 193 | 182 | 172 | 163 | 155 | 147 | 139 | 133 | 126 | 121 |
| | 400 | 270 | 258 | 246 | 234 | 222 | 211 | 200 | 190 | 181 | 172 | 163 | 155 | 148 | 141 | 134 | 128 | 122 | 117 |
| | 200 | 172 | 169 | 165 | 162 | 158 | 154 | 150 | 146 | 142 | 137 | 133 | 129 | 124 | 120 | 116 | 112 | 108 | 104 |

# PLANK AND LAMINATED FLOORS AND ROOFS

## General Design Information

Planks laid flat or pieces of dimension lumber set on edge and nailed to each other provide economical floor and roof decks capable of supporting substantial loads. When used as roof decks such construction has the added advantage of providing good insulation against heat and cold.

Where planks are laid flat they should be tongued and grooved or grooved for spline. Planks thicker than 4 inches nominal should have double tongues and grooves. Where end joints occur between supports, end matching is recommended.

## Nailing of Laminated Decks

Where laminated decks are used, nailing of the individual pieces to each other is an important factor. Nails should be long enough to penetrate two laminations and approximately one-half the thickness of the third. Nails should be driven near the upper and lower edges and spaced approximately 18 inches on centers. To avoid splitting, nails in one lamination should be staggered with those in the adjacent lamination.

Plank and laminated floor and roof decks should be supported on members of sufficient size to carry the design loads and should be securely nailed or otherwise fastened to such members. When used as a floor in a building with masonry walls it is good practice to provide a space of about one inch between the decking and masonry to allow for possible expansion of the wood through accidental wetting. This space should be covered by moulding, or equivalent, attached to the masonry.

## Net Sizes of Lumber

Lumber is customarily specified in terms of nominal sizes. Computations used in design should be based on the net dimensions, or actual sizes.

## Design Procedures

Plank and laminated floor and roof decks are usually designed to withstand uniform loading. From the standpoint of bending strength, it is customary to design the decks using the following flexure formula (see page 29 for notations):

$$M = \frac{wL^2}{8}$$

From the standpoint of deflection, the arrangement of pieces has bearing on the stiffness of the deck and deflection formulas are adjusted to reflect this arrangement. Various arrangements with appropriate deflection formulas are as follows (see page 29 for notations):

Type I: Simple Span

Planks or laminations are arranged on a simple span with bearing on two supports as shown in Figure 16. For this arrangement the following deflection formula is used:

$$\Delta = \frac{5Wl^3}{384EI}$$

When converted,

$$\Delta = \frac{22.5wL^4}{EI}$$

When the deflection limit is $l/240$ or L/20,

$$\frac{L}{20} = \frac{22.5wL^4}{EI}$$

or,

$$EI = 450wL^3$$

When the deflection limit is $l/180$ or L/15,

$$\frac{L}{15} = \frac{22.5wL^4}{EI}$$

or,

$$EI = 337.5wL^3$$

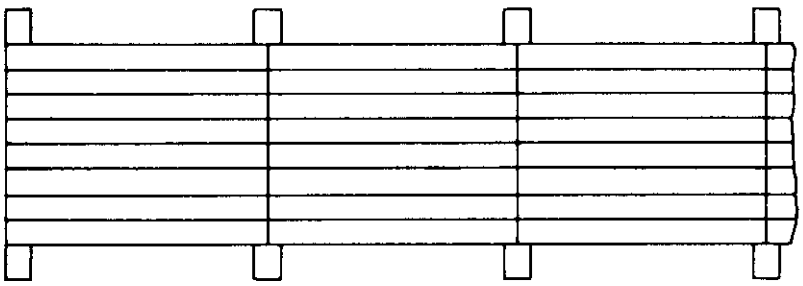


Figure 16. Type I, Simple Span Decking

Type II: Two-span Continuous

Planks or laminations are arranged to be continuous over two spans as illustrated in Figure 17. For this arrangement, the following deflection formula is appropriate.

$$\Delta = \frac{W\ell^3}{185EI}$$

When converted,

$$\Delta = \frac{9.34wL^4}{EI}$$

When the deflection limit is $\ell/240$ or L/20,

$$\frac{L}{20} = \frac{9.34wL^4}{EI}$$

or,

$$EI = 186.8wL^3$$

When the deflection limit is $\ell/180$ or L/15,

$$\frac{L}{15} = \frac{9.34wL^4}{EI}$$

or,

$$EI = 140.1wL^3$$

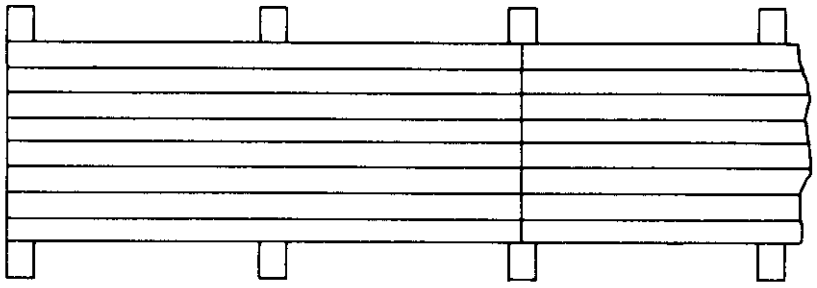


Figure 17. Type II, Two-Span Continuous Decking

Type III: Combination of Simple and Two-Span Continuous

Except for alternate pieces in the end spans, all planks or laminations are continuous over two spans. End joints are over intermediate supports and are staggered in adjacent lines on deck pieces as shown in Figure 18. For this arrangement, the following formula may be used to calculate deflection:

$$\Delta = \frac{W\ell^3}{110EI}$$

When converted,

$$\Delta = \frac{15.71wL^4}{EI}$$

When the deflection limit is $\ell/240$ or L/20,

$$\frac{L}{20} = \frac{15.71wL^4}{EI}$$

or,

$$EI = 314.2wL^3$$

When the deflection limit is $\ell/180$ or L/15,

$$\frac{L}{15} = \frac{15.71wL^4}{EI}$$

or,

$$EI = 235.6wL^3$$

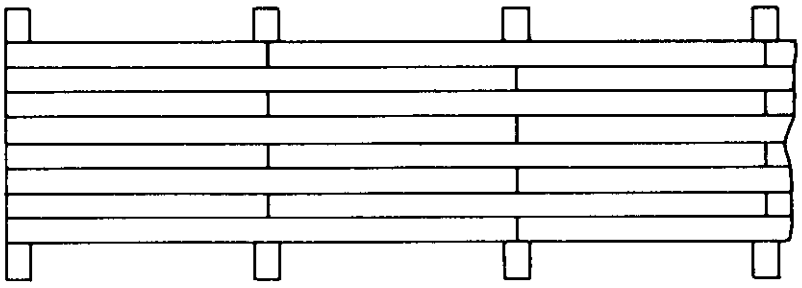


Figure 18. Type III, Combination Simple and Two-Span Continuous

Type IV: Random Length

In this arrangement, random-length pieces may be used provided (a), end joints in adjacent planks or laminations are at least 12 inches apart and (b), each plank or lamination rests on at least one support. For this arrangement which is illustrated in Figure 19, the following formula may be used:

$$\Delta = \frac{W l^3}{100EI}$$

When converted,

$$\Delta = \frac{17.28wL^4}{EI}$$

When the deflection limit is $l/240$ or $L/20$,

$$\frac{L}{20} = \frac{17.28wL^4}{EI}$$

or,

$$EI = 345.6wL^3$$

When the deflection limit is $l/180$ or $L/15$,

$$\frac{L}{15} = \frac{17.28wL^4}{EI}$$

or,

$$EI = 259.2wL^3$$

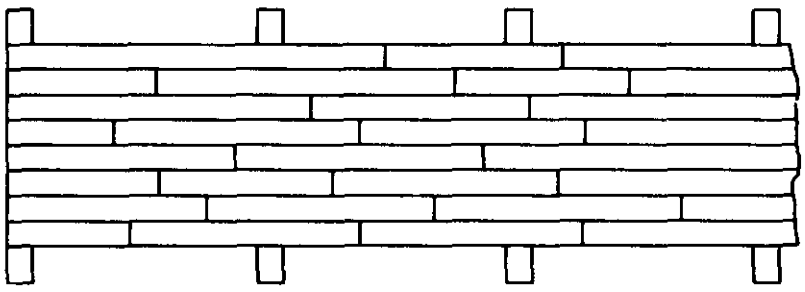


Figure 19. Type IV, Random Length Decking

Use of Tabular Data

The tabular data are presented in simplified form for those spans and loads most frequently encountered. The design load per square foot, w, is calculated on the basis of $M = wL^2/8$ which, as previously indicated, is appropriate for any of the four types of plank or lamination arrangement. For values of $F_b$ intermediate to those listed, the design load per square foot, w, may be determined by direct interpolation.

The minimum required modulus of elasticity design value, E, if deflection under load w is limited to $\ell/240$, is calculated for Types III and IV arrangements of planks. For other arrangements of planks or laminations, the required E value for $\ell/240$ may be determined by direct interpolation using the appropriate constants listed for Types I or II arrangements. For a deflection limit of $\ell/180$, the tabulated E value may be multiplied by 0.75.

The design load per square foot, w, includes the weight of the deck. This weight should be subtracted from the tabulated load w to determine the load which may be applied to the floor or roof.

## PLANK AND LAMINATED FLOORS AND ROOFS – SAFE UNIFORM LOADS – TYPE III

See instructions for use of table on page 228.
Symbols used in the table are as follows:

$F_b$ = Unit design stress at extreme fiber in bending, psi
w = Load per square foot of deck, pounds
E = Minimum required modulus of elasticity, 1000 psi, if deflection under load w is limited to $\ell/240$, where $E = 314.2\ wL^3/I$ when $\Delta = \ell/240$

Deck thicknesses are expressed as nominal but calculations are based on dressed sizes (see pages 25-27).

| Span | Thickness | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| 6' - 0" | 2" | w | 75 | 83 | 92 | 100 | 108 | 117 | 125 | 133 | 150 | 167 |
| | | E | 1506 | 1674 | 1848 | 2009 | 2170 | 2350 | 2511 | 2672 | 3013 | 3355 |
| | 3" | w | 208 | 231 | 256 | 278 | 300 | 325 | 347 | 369 | 417 | 464 |
| | | E | 904 | 1003 | 1112 | 1208 | 1303 | 1412 | 1507 | 1603 | 1811 | 2016 |
| 7' - 0" | 2" | w | 55 | 61 | 68 | 73 | 79 | 86 | 92 | 98 | 110 | 123 |
| | | E | 1755 | 1946 | 2169 | 2329 | 2520 | 2743 | 2935 | 3126 | 3509 | 3924 |
| | 3" | w | 153 | 170 | 188 | 204 | 220 | 239 | 255 | 271 | 306 | 341 |
| | | E | 1055 | 1173 | 1297 | 1407 | 1518 | 1649 | 1759 | 1869 | 2111 | 2352 |
| 8' - 0" | 2" | w | 42 | 47 | 52 | 56 | 61 | 66 | 70 | 75 | 84 | 94 |
| | | E | 2000 | 2238 | 2476 | 2667 | 2905 | 3143 | 3333 | 3572 | 4000 | 4476 |
| | 3" | w | 117 | 130 | 144 | 156 | 169 | 183 | 195 | 207 | 234 | 261 |
| | | E | 1205 | 1339 | 1483 | 1606 | 1740 | 1884 | 2008 | 2131 | 2409 | 2687 |
| | 4" | w | 230 | 254 | 282 | 306 | 330 | 358 | 383 | 407 | 459 | 511 |
| | | E | 863 | 953 | 1058 | 1148 | 1238 | 1343 | 1437 | 1527 | 1722 | 1917 |
| 9' - 0" | 3" | w | 92 | 103 | 114 | 123 | 133 | 144 | 154 | 164 | 185 | 206 |
| | | E | 1349 | 1510 | 1671 | 1803 | 1950 | 2111 | 2258 | 2404 | 2712 | 3020 |
| | 4" | w | 182 | 201 | 223 | 242 | 261 | 283 | 303 | 322 | 363 | 404 |
| | | E | 972 | 1074 | 1191 | 1293 | 1394 | 1512 | 1619 | 1720 | 1939 | 2158 |
| 10' - 0" | 3" | w | 75 | 83 | 92 | 100 | 108 | 117 | 125 | 133 | 150 | 167 |
| | | E | 1508 | 1669 | 1850 | 2011 | 2172 | 2353 | 2514 | 2675 | 3017 | 3358 |
| | 4" | w | 147 | 163 | 181 | 196 | 211 | 229 | 245 | 261 | 294 | 327 |
| | | E | 1077 | 1195 | 1326 | 1436 | 1546 | 1678 | 1795 | 1913 | 2154 | 2396 |
| 11' - 0" | 3" | w | 62 | 69 | 76 | 83 | 90 | 97 | 103 | 110 | 124 | 138 |
| | | E | 1660 | 1847 | 2034 | 2222 | 2382 | 2596 | 2757 | 2944 | 3319 | 3694 |
| | 4" | w | 122 | 135 | 149 | 163 | 175 | 189 | 203 | 215 | 243 | 270 |
| | | E | 1190 | 1307 | 1453 | 1580 | 1707 | 1844 | 1980 | 2097 | 2370 | 2634 |
| 12' - 0" | 3" | w | 52 | 58 | 64 | 70 | 75 | 81 | 87 | 92 | 104 | 116 |
| | | E | 1807 | 2016 | 2224 | 2433 | 2606 | 2815 | 3023 | 3197 | 3614 | 4031 |
| | 4" | w | 102 | 113 | 125 | 136 | 147 | 159 | 170 | 181 | 204 | 227 |
| | | E | 1292 | 1431 | 1583 | 1722 | 1862 | 2013 | 2153 | 2292 | 2583 | 2875 |
| | 6" | w | 252 | 279 | 309 | 336 | 363 | 393 | 420 | 447 | 504 | 561 |
| | | E | 822 | 910 | 1008 | 1096 | 1185 | 1282 | 1371 | 1459 | 1645 | 1831 |
| 13' - 0" | 3" | w | 44 | 50 | 55 | 59 | 64 | 69 | 74 | 79 | 89 | 99 |
| | | E | 1944 | 2165 | 2430 | 2607 | 2828 | 3048 | 3269 | 3490 | 3932 | 4374 |
| | 4" | w | 87 | 96 | 107 | 116 | 125 | 136 | 145 | 154 | 174 | 194 |
| | | E | 1401 | 1546 | 1723 | 1868 | 2013 | 2190 | 2335 | 2479 | 2801 | 3123 |
| | 6" | w | 215 | 238 | 263 | 286 | 309 | 335 | 358 | 381 | 429 | 478 |
| | | E | 892 | 987 | 1091 | 1186 | 1282 | 1390 | 1485 | 1580 | 1780 | 1983 |
| 14' - 0" | 4" | w | 75 | 83 | 92 | 100 | 108 | 117 | 126 | 133 | 150 | 167 |
| | | E | 1508 | 1669 | 1850 | 2011 | 2172 | 2353 | 2534 | 2674 | 3016 | 3358 |
| | 6" | w | 185 | 205 | 227 | 247 | 266 | 289 | 308 | 328 | 370 | 412 |
| | | E | 959 | 1062 | 1176 | 1280 | 1378 | 1497 | 1596 | 1699 | 1917 | 2135 |
| 15' - 0" | 4" | w | 65 | 72 | 80 | 87 | 94 | 102 | 109 | 116 | 130 | 145 |
| | | E | 1608 | 1781 | 1979 | 2152 | 2325 | 2523 | 2696 | 2869 | 3215 | 3586 |
| | 6" | w | 161 | 179 | 198 | 215 | 232 | 252 | 269 | 286 | 323 | 359 |
| | | E | 1026 | 1141 | 1262 | 1370 | 1478 | 1605 | 1714 | 1822 | 2058 | 2288 |
| 16' - 0" | 4" | w | 58 | 64 | 71 | 77 | 83 | 90 | 96 | 102 | 115 | 128 |
| | | E | 1741 | 1921 | 2131 | 2311 | 2491 | 2701 | 2887 | 3062 | 3452 | 3842 |
| | 6" | w | 142 | 157 | 174 | 189 | 204 | 221 | 236 | 251 | 283 | 315 |
| | | E | 1098 | 1214 | 1346 | 1462 | 1578 | 1709 | 1825 | 1941 | 2188 | 2436 |
| | 8" | w | 246 | 273 | 302 | 329 | 355 | 384 | 411 | 437 | 493 | 549 |
| | | E | 830 | 921 | 1019 | 1110 | 1198 | 1296 | 1387 | 1474 | 1663 | 1852 |
| 17' - 0" | 6" | w | 126 | 139 | 154 | 167 | 181 | 196 | 209 | 223 | 251 | 279 |
| | | E | 1169 | 1289 | 1429 | 1549 | 1679 | 1818 | 1939 | 2069 | 2328 | 2588 |
| | 8" | w | 218 | 242 | 267 | 291 | 314 | 340 | 364 | 387 | 436 | 486 |
| | | E | 882 | 980 | 1081 | 1178 | 1271 | 1376 | 1474 | 1567 | 1765 | 1967 |
| 18' - 0" | 6" | w | 112 | 124 | 137 | 149 | 161 | 175 | 187 | 199 | 224 | 249 |
| | | E | 1233 | 1366 | 1508 | 1641 | 1773 | 1927 | 2059 | 2191 | 2467 | 2741 |
| | 8" | w | 194 | 216 | 239 | 260 | 281 | 303 | 325 | 345 | 390 | 434 |
| | | E | 932 | 1038 | 1149 | 1250 | 1351 | 1456 | 1562 | 1658 | 1874 | 2086 |

## PLANK AND LAMINATED FLOORS AND ROOFS – SAFE UNIFORM LOADS – TYPE IV

See instructions for use of table on page 228.
Symbols used in the table are as follows:

$F_b$ = Unit design stress at extreme fiber in bending, psi
w = Load per square foot of deck, pounds
E = Minimum required modulus of elasticity, 1000 psi, if deflection under load w is limited to $\ell/240$, where $E = 345.6\ wL^3/I$ when $\Delta = \ell/240$

Deck thicknesses are expressed as nominal but calculations are based on dressed sizes (see pages 25-27).

| Span | Thickness | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| 6'-0" | 2" | w | 75 | 83 | 92 | 100 | 108 | 117 | 125 | 133 | 150 | 167 |
| | | E | 1657 | 1841 | 2033 | 2210 | 2387 | 2585 | 2762 | 2939 | 3314 | 3691 |
| | 3" | w | 208 | 231 | 256 | 278 | 300 | 325 | 347 | 369 | 417 | 464 |
| | | E | 994 | 1103 | 1223 | 1329 | 1433 | 1553 | 1658 | 1763 | 1992 | 2218 |
| 7'-0" | 2" | w | 55 | 61 | 68 | 73 | 79 | 86 | 92 | 98 | 110 | 123 |
| | | E | 1931 | 2141 | 2386 | 2562 | 2772 | 3017 | 3229 | 3339 | 3860 | 4316 |
| | 3" | w | 153 | 170 | 188 | 204 | 220 | 239 | 255 | 271 | 306 | 341 |
| | | E | 1161 | 1290 | 1427 | 1548 | 1670 | 1814 | 2056 | 2056 | 2322 | 2587 |
| 8'-0" | 2" | w | 42 | 47 | 52 | 56 | 61 | 66 | 70 | 75 | 84 | 94 |
| | | E | 2200 | 2462 | 2724 | 2934 | 3196 | 3457 | 3666 | 3929 | 4400 | 4924 |
| | 3" | w | 117 | 130 | 144 | 156 | 169 | 183 | 195 | 207 | 234 | 261 |
| | | E | 1326 | 1473 | 1631 | 1767 | 1914 | 2072 | 2209 | 2344 | 2650 | 2956 |
| | 4" | w | 230 | 254 | 282 | 306 | 330 | 358 | 383 | 407 | 459 | 511 |
| | | E | 949 | 1048 | 1164 | 1263 | 1362 | 1477 | 1581 | 1680 | 1894 | 2109 |
| 9'-0" | 3" | w | 92 | 103 | 114 | 123 | 133 | 144 | 154 | 164 | 185 | 206 |
| | | E | 1484 | 1661 | 1838 | 1983 | 2145 | 2323 | 2484 | 2644 | 2983 | 3322 |
| | 4" | w | 182 | 201 | 223 | 242 | 261 | 283 | 303 | 322 | 363 | 404 |
| | | E | 1069 | 1181 | 1310 | 1422 | 1533 | 1663 | 1781 | 1892 | 2133 | 2374 |
| 10'-0" | 3" | w | 75 | 83 | 92 | 100 | 108 | 117 | 125 | 133 | 150 | 167 |
| | | E | 1659 | 1836 | 2035 | 2212 | 2389 | 2588 | 2765 | 2943 | 3319 | 3694 |
| | 4" | w | 147 | 163 | 181 | 196 | 211 | 229 | 245 | 261 | 294 | 327 |
| | | E | 1185 | 1315 | 1459 | 1580 | 1701 | 1846 | 1975 | 2104 | 2369 | 2636 |
| 11'-0" | 3" | w | 62 | 69 | 76 | 83 | 90 | 97 | 103 | 110 | 124 | 138 |
| | | E | 1826 | 2032 | 2237 | 2444 | 2620 | 2856 | 3033 | 3238 | 3651 | 4063 |
| | 4" | w | 122 | 134 | 149 | 162 | 175 | 189 | 203 | 215 | 243 | 270 |
| | | E | 1309 | 1438 | 1598 | 1738 | 1878 | 2028 | 2178 | 2307 | 2607 | 2897 |
| 12'-0" | 3" | w | 52 | 58 | 64 | 70 | 75 | 81 | 87 | 92 | 104 | 116 |
| | | E | 1988 | 2218 | 2446 | 2676 | 2867 | 3095 | 3225 | 3517 | 3975 | 4434 |
| | 4" | w | 102 | 113 | 125 | 136 | 147 | 159 | 170 | 181 | 204 | 227 |
| | | E | 1421 | 1574 | 1741 | 1894 | 2048 | 2214 | 2368 | 2521 | 2841 | 3163 |
| | 6" | w | 252 | 279 | 309 | 336 | 363 | 393 | 420 | 447 | 504 | 561 |
| | | E | 904 | 1001 | 1109 | 1206 | 1304 | 1410 | 1508 | 1605 | 1810 | 2014 |
| 13'-0" | 3" | w | 44 | 49 | 55 | 59 | 64 | 69 | 74 | 79 | 89 | 99 |
| | | E | 2138 | 2382 | 2673 | 2868 | 3111 | 3353 | 3596 | 3839 | 4325 | 4811 |
| | 4" | w | 87 | 96 | 107 | 116 | 125 | 136 | 145 | 154 | 174 | 194 |
| | | E | 1541 | 1701 | 1895 | 2055 | 2214 | 2409 | 2569 | 2727 | 3081 | 3435 |
| | 6" | w | 215 | 238 | 263 | 286 | 309 | 335 | 358 | 381 | 429 | 478 |
| | | E | 981 | 1086 | 1200 | 1305 | 1410 | 1529 | 1634 | 1738 | 1958 | 2181 |
| 14'-0" | 4" | w | 75 | 83 | 92 | 100 | 108 | 117 | 126 | 133 | 150 | 167 |
| | | E | 1659 | 1836 | 2035 | 2212 | 2389 | 2588 | 2787 | 2941 | 3318 | 3694 |
| | 6" | w | 185 | 205 | 227 | 247 | 266 | 289 | 308 | 328 | 370 | 412 |
| | | E | 1055 | 1168 | 1294 | 1408 | 1516 | 1647 | 1756 | 1869 | 2109 | 2349 |
| 15'-0" | 4" | w | 65 | 73 | 80 | 87 | 95 | 102 | 109 | 116 | 131 | 145 |
| | | E | 1780 | 1977 | 2175 | 2373 | 2571 | 2768 | 2966 | 3164 | 3559 | 3955 |
| | 6" | w | 162 | 180 | 197 | 215 | 233 | 251 | 269 | 287 | 323 | 359 |
| | | E | 1133 | 1258 | 1384 | 1510 | 1636 | 1762 | 1887 | 2013 | 2265 | 2517 |
| 16'-0" | 4" | w | 58 | 64 | 71 | 77 | 83 | 90 | 96 | 102 | 115 | 128 |
| | | E | 1915 | 2113 | 2344 | 2542 | 2740 | 2971 | 3176 | 3369 | 3797 | 4226 |
| | 6" | w | 142 | 157 | 174 | 189 | 204 | 221 | 236 | 251 | 283 | 315 |
| | | E | 1208 | 1335 | 1481 | 1608 | 1736 | 1880 | 2008 | 2135 | 2407 | 2680 |
| | 8" | w | 246 | 273 | 302 | 329 | 355 | 384 | 411 | 437 | 493 | 549 |
| | | E | 913 | 1013 | 1121 | 1221 | 1318 | 1426 | 1526 | 1621 | 1829 | 2037 |
| 17'-0" | 6" | w | 126 | 139 | 154 | 167 | 181 | 196 | 209 | 223 | 251 | 279 |
| | | E | 1286 | 1418 | 1572 | 1704 | 1847 | 2000 | 2133 | 2276 | 2561 | 2847 |
| | 8" | w | 218 | 242 | 267 | 291 | 314 | 340 | 364 | 387 | 436 | 486 |
| | | E | 970 | 1078 | 1189 | 1296 | 1398 | 1514 | 1621 | 1724 | 1942 | 2164 |
| 18'-0" | 6" | w | 112 | 124 | 137 | 149 | 161 | 175 | 187 | 199 | 224 | 249 |
| | | E | 1356 | 1503 | 1659 | 1805 | 1950 | 2120 | 2265 | 2410 | 2714 | 3015 |
| | 8" | w | 194 | 216 | 239 | 260 | 281 | 303 | 325 | 345 | 390 | 434 |
| | | E | 1025 | 1142 | 1264 | 1375 | 1486 | 1602 | 1718 | 1824 | 2061 | 2295 |

# MAXIMUM SPANS FOR FLOOR JOISTS

## General Design Information

The publication entitled Span Tables for Joists and Rafters, available from the National Forest Products Association, provides information suitable for design of residential construction. The information on roof design in that book is also suitable for roofs of other types of building occupancy. For floor construction where live loading is heavier than customarily found in residential occupancies, tabular data are provided herein.

The tabulated spans are based on bending strength using the live load indicated in each table heading plus a dead load of 10 pounds per square foot. In calculating the required modulus of elasticity for the tabulated span, the live load only was used since this is in accordance with established practice for design of floor joists.

### Span

While the effective span length for an isolated beam is customarily taken as the distance from face to face of supports plus one-half the required length of bearing at each end, it is the practice in designing joists spaced not over 24 inches apart to consider the span as the clear distance between supports.

### Net Sizes of Lumber

Joists are customarily specified in terms of nominal sizes but calculations to determine the allowable span and required modulus of elasticity are based on dressed sizes (see pages 25-27).

### Design Stresses

Unit design values for design of wood joists are given in the National Design Specification for Wood Construction, available from the National Forest Products Association.

### Adjustment of Modulus of Elasticity

The modulus of elasticity values listed in the span tables for joists are those required for the tabulated spans if deflection under the live load is limited to $\ell/360$. Where other deflection limits are acceptable, the tabular E values may be adjusted by multiplying them by the following factors:

For limit of $\ell/300$ ------- 0.833

For limit of $\ell/240$ ------- 0.667

For limit of $\ell/180$ ------- 0.500

## MAXIMUM SPANS – FLOOR JOISTS – 50 psf LIVE LOAD

See instructions for use of tables on page 231.

Symbols used in the tables are as follows:

$F_b$ = Unit design stress at extreme fiber in bending, psi.
L = Clear distance between supports, feet.
E = Minimum required modulus of elasticity, 1000 psi, if deflection under the live load is limited to $\ell/360$.

Joist sizes are expressed as nominal but calculations are based on dressed sizes (see pages 25-27).

| Size of Joist | Spacing C. to C. | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| 2 x 6 | 12 | L | 8'8" | 9'2" | 9'7" | 10'0" | 10'5" | 10'10" | 11'3" | 11'7" | 12'3" | 12'11" |
| | | E | 1063 | 1246 | 1437 | 1637 | 1846 | 2063 | 2289 | 2521 | 3007 | 3522 |
| | 16 | L | 7'6" | 7'11" | 8'4" | 8'8" | 9'1" | 9'5" | 9'9" | 10'0" | 10'7" | 11'2" |
| | | E | 924 | 1083 | 1249 | 1423 | 1605 | 1794 | 1989 | 2191 | 2614 | 3062 |
| | 24 | L | 6'1" | 6'5" | 6'9" | 7'1" | 7'4" | 7'7" | 7'11" | 8'2" | 8'7" | 9'1" |
| | | E | 744 | 871 | 1005 | 1144 | 1291 | 1443 | 1600 | 1762 | 2103 | 2463 |
| 2 x 8 | 12 | L | 11'5" | 12'1" | 12'7" | 13'3" | 13'9" | 14'3" | 14'9" | 15'3" | 16'2" | 17'1" |
| | | E | 1063 | 1246 | 1437 | 1631 | 1846 | 2063 | 2289 | 2521 | 3007 | 3522 |
| | 16 | L | 9'11" | 10'5" | 11'0" | 11'6" | 11'11" | 12'5" | 12'10" | 13'3" | 14'0" | 14'10" |
| | | E | 924 | 1083 | 1249 | 1423 | 1605 | 1794 | 1989 | 2191 | 2614 | 3062 |
| | 24 | L | 8'1" | 8'6" | 8'11" | 9'4" | 9'8" | 10'1" | 10'5" | 10'9" | 11'5" | 12'0" |
| | | E | 744 | 871 | 1005 | 1144 | 1291 | 1443 | 1600 | 1762 | 2103 | 2463 |
| 2 x 10 | 12 | L | 14'7" | 15'5" | 16'2" | 16'10" | 17'6" | 18'2" | 18'10" | 19'5" | 20'7" | 21'9" |
| | | E | 1063 | 1246 | 1437 | 1637 | 1846 | 2063 | 2289 | 2521 | 3007 | 3522 |
| | 16 | L | 12'7" | 13'4" | 14'0" | 14'7" | 15'3" | 15'10" | 16'4" | 16'10" | 17'11" | 18'11" |
| | | E | 924 | 1083 | 1249 | 1423 | 1605 | 1794 | 1989 | 2191 | 2614 | 3062 |
| | 24 | L | 10'3" | 10'10" | 11'4" | 11'10" | 12'4" | 12'10" | 13'3" | 13'9" | 14'7" | 15'4" |
| | | E | 744 | 871 | 1005 | 1144 | 1291 | 1443 | 1600 | 1762 | 2103 | 2463 |
| 2 x 12 | 12 | L | 17'9" | 18'9" | 19'7" | 20'6" | 21'4" | 22'2" | 22'11" | 23'8" | 25'1" | 26'6" |
| | | E | 1063 | 1246 | 1437 | 1637 | 1846 | 2063 | 2289 | 2521 | 3007 | 3522 |
| | 16 | L | 15'5" | 16'3" | 17'1" | 17'10" | 18'6" | 19'2" | 19'10" | 20'6" | 21'9" | 23'0" |
| | | E | 924 | 1083 | 1249 | 1423 | 1605 | 1794 | 1989 | 2191 | 2614 | 3062 |
| | 24 | L | 12'6" | 13'2" | 13'10" | 14'5" | 15'0" | 15'7" | 16'2" | 16'7" | 17'8" | 18'10" |
| | | E | 744 | 871 | 1005 | 1144 | 1291 | 1443 | 1600 | 1762 | 2103 | 2463 |
| 2 x 14 | 12 | L | 20'11" | 22'1" | 23'2" | 24'2" | 25'2" | 26'1" | 27'0" | 27'11" | 29'7" | 31'2" |
| | | E | 1063 | 1246 | 1437 | 1637 | 1846 | 2063 | 2289 | 2521 | 3007 | 3522 |
| | 16 | L | 18'2" | 19'2" | 20'1" | 20'11" | 21'9" | 22'7" | 23'5" | 24'2" | 25'7" | 27'0" |
| | | E | 924 | 1083 | 1249 | 1423 | 1605 | 1794 | 1989 | 2191 | 2614 | 3062 |
| | 24 | L | 14'9" | 15'6" | 16'3" | 17'0" | 17'8" | 18'4" | 19'0" | 19'7" | 20'10" | 22'0" |
| | | E | 744 | 871 | 1005 | 1144 | 1291 | 1443 | 1600 | 1762 | 2103 | 2463 |
| 3 x 6 | 12 | L | 11'2" | 11'10" | 12'5" | 12'11" | 13'6" | 14'0" | 14'6" | 14'11" | 15'10" | 16'9" |
| | | E | 1373 | 1608 | 1855 | 2113 | 2383 | 2663 | 2953 | 3254 | 3882 | 4547 |
| | 16 | L | 9'9" | 10'3" | 10'9" | 11'3" | 11'8" | 12'2" | 12'7" | 12'11" | 13'9" | 14'6" |
| | | E | 1193 | 1397 | 1612 | 1836 | 2071 | 2314 | 2567 | 2827 | 3374 | 3952 |
| | 24 | L | 7'11" | 8'4" | 8'9" | 9'2" | 9'6" | 9'10" | 10'2" | 10'6" | 11'2" | 11'9" |
| | | E | 960 | 1124 | 1297 | 1478 | 1666 | 1862 | 2065 | 2275 | 2714 | 3179 |
| 3 x 8 | 12 | L | 14'9" | 15'7" | 16'4" | 17'1" | 17'9" | 18'5" | 19'1" | 19'9" | 20'11" | 22'1" |
| | | E | 1373 | 1608 | 1855 | 2113 | 2383 | 2663 | 2953 | 3254 | 3882 | 4547 |
| | 16 | L | 12'10" | 13'6" | 14'2" | 14'10" | 15'5" | 16'0" | 16'7" | 17'1" | 18'1" | 19'1" |
| | | E | 1193 | 1397 | 1612 | 1836 | 2071 | 2314 | 2567 | 2827 | 3374 | 3952 |
| | 24 | L | 10'5" | 11'0" | 11'6" | 12'0" | 12'6" | 13'0" | 13'5" | 13'10" | 14'8" | 15'6" |
| | | E | 960 | 1124 | 1297 | 1478 | 1666 | 1862 | 2065 | 2275 | 2714 | 3179 |
| 3 x 10 | 12 | L | 18'10" | 19'10" | 20'10" | 21'9" | 22'7" | 23'6" | 24'4" | 25'1" | 26'7" | 28'1" |
| | | E | 1373 | 1608 | 1855 | 2113 | 2383 | 2663 | 2953 | 3254 | 3882 | 4547 |
| | 16 | L | 16'4" | 17'3" | 18'1" | 18'10" | 19'7" | 20'5" | 21'1" | 21'10" | 23'2" | 24'5" |
| | | E | 1193 | 1397 | 1612 | 1836 | 2071 | 2314 | 2567 | 2827 | 3374 | 3952 |
| | 24 | L | 13'3" | 14'0" | 14'8" | 15'4" | 16'0" | 16'7" | 17'2" | 17'8" | 18'9" | 19'10" |
| | | E | 960 | 1124 | 1297 | 1478 | 1666 | 1862 | 2065 | 2275 | 2714 | 3179 |
| 3 x 12 | 12 | L | 22'11" | 24'2" | 25'4" | 26'5' | 27'6" | 28'7" | 29'7" | 30'7" | 32'5" | 34'2" |
| | | E | 1373 | 1608 | 1855 | 2113 | 2383 | 2663 | 2953 | 3254 | 3882 | 4547 |
| | 16 | L | 19'11" | 20'11" | 21'11" | 22'11" | 23'11" | 24'10" | 25'8" | 26'6" | 28'1" | 29'7" |
| | | E | 1193 | 1397 | 1612 | 1836 | 2071 | 2314 | 2567 | 2827 | 3374 | 3952 |
| | 24 | L | 16'2" | 17'0" | 17'10" | 18'8" | 19'5" | 20'2" | 20'10" | 21'6" | 22'10" | 24'1" |
| | | E | 960 | 1124 | 1297 | 1478 | 1666 | 1862 | 2065 | 2275 | 2714 | 3179 |
| 3 x 14 | 12 | L | 27'0" | 28'5" | 29'10" | 31'2" | 32'5" | 33'8" | 34'10" | 36'0" | 38'2" | 40'3" |
| | | E | 1373 | 1608 | 1855 | 2113 | 2383 | 2663 | 2953 | 3254 | 3882 | 4547 |
| | 16 | L | 23'5" | 24'8" | 25'11" | 27'1" | 28'2" | 29'3" | 30'3" | 31'3" | 33'1" | 34'11" |
| | | E | 1193 | 1397 | 1612 | 1836 | 2071 | 2314 | 2567 | 2827 | 3374 | 3952 |
| | 24 | L | 19'0" | 20'0" | 21'0" | 22'0" | 22'11" | 23'9" | 24'7" | 25'5" | 26'11" | 28'4" |
| | | E | 960 | 1124 | 1297 | 1478 | 1666 | 1862 | 2065 | 2275 | 2714 | 3179 |

## MAXIMUM SPANS – FLOOR JOISTS – 60 psf LIVE LOAD

See instructions for use of tables on page 231.

Symbols used in the tables are as follows:

$F_b$ = Unit design stress at extreme fiber in bending, psi.
L = Clear distance between supports, feet.
E = Minimum required modulus of elasticity, 1000 psi, if deflection under the live load is limited to $\ell/360$.

Joist sizes are expressed as nominal but calculations are based on dressed sizes (see pages 25-27).

| Size of Joist | Spacing C. to C. | | $F_b$ 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 x 6 | 12 | L | 8'1" | 8'6" | 8'11" | 9'3" | 9'8" | 10'0" | 10'5" | 10'9" | 11'5" | 12'0" |
| | | E | 1012 | 1186 | 1368 | 1558 | 1757 | 1964 | 2179 | 2400 | 2863 | 3353 |
| | 16 | L | 7'0" | 7'4" | 7'9" | 8'1" | 8'5" | 8'8" | 9'0" | 9'4" | 9'10" | 10'5" |
| | | E | 880 | 1031 | 1189 | 1355 | 1528 | 1708 | 1894 | 2191 | 2489 | 2915 |
| | 24 | L | 5'8" | 6'0" | 6'4" | 6'7" | 6'10" | 7'1" | 7'4" | 7'7" | 8'0" | 8'5" |
| | | E | 708 | 829 | 957 | 1089 | 1229 | 1374 | 1523 | 1677 | 2002 | 2345 |
| 2 x 8 | 12 | L | 10'7" | 11'2" | 11'9" | 12'3" | 12'9" | 13'3" | 13'8" | 14'1" | 15'0" | 15'10" |
| | | E | 1012 | 1186 | 1368 | 1558 | 1757 | 1964 | 2179 | 2400 | 2863 | 3353 |
| | 16 | L | 9'2" | 9'8" | 10'2" | 10'7" | 11'0" | 11'5" | 11'10" | 12'3" | 13'0" | 13'8" |
| | | E | 880 | 1031 | 1189 | 1355 | 1528 | 1708 | 1894 | 2191 | 2489 | 2915 |
| | 24 | L | 7'6" | 7'11" | 8'3" | 8'7" | 9'0" | 9'4" | 9'7" | 9'11" | 10'7" | 11'2" |
| | | E | 708 | 829 | 957 | 1089 | 1229 | 1374 | 1523 | 1677 | 2002 | 2345 |
| 2 x 10 | 12 | L | 13'6" | 14'3" | 14'11" | 15'7" | 16'3" | 16'10" | 17'5" | 18'0" | 19'1" | 20'2" |
| | | E | 1012 | 1186 | 1368 | 1558 | 1757 | 1964 | 2179 | 2400 | 2863 | 3353 |
| | 16 | L | 11'9" | 12'3" | 13'0" | 13'6" | 14'0" | 14'6" | 15'1" | 15'7" | 16'7" | 17'6" |
| | | E | 880 | 1031 | 1189 | 1355 | 1528 | 1708 | 1894 | 2191 | 2489 | 2915 |
| | 24 | L | 9'6" | 10'0" | 10'6" | 11'0" | 11'6" | 11'11" | 12'4" | 12'9" | 13'6" | 14'3" |
| | | E | 708 | 829 | 957 | 1089 | 1229 | 1374 | 1523 | 1677 | 2002 | 2345 |
| 2 x 12 | 12 | L | 16'6" | 17'4" | 18'2" | 19'0" | 19'9" | 20'6" | 21'3" | 21'11" | 23'3" | 24'6" |
| | | E | 1012 | 1186 | 1368 | 1558 | 1757 | 1964 | 2179 | 2400 | 2863 | 3353 |
| | 16 | L | 14'3" | 15'0" | 15'9" | 16'6" | 17'2" | 17'10" | 18'5" | 19'0" | 20'2" | 21'3" |
| | | E | 880 | 1031 | 1189 | 1355 | 1528 | 1708 | 1894 | 2191 | 2489 | 2915 |
| | 24 | L | 11'7" | 12'3" | 12'10 | 13'5" | 13'11" | 14'5" | 14'11" | 15'5" | 16'5" | 17'5" |
| | | E | 708 | 829 | 957 | 1089 | 1229 | 1374 | 1523 | 1677 | 2002 | 2345 |
| 2 x 14 | 12 | L | 19'5" | 20'5" | 21'5" | 22'4" | 23'3" | 24'2" | 25'0" | 25'10" | 27'5" | 28'11" |
| | | E | 1012 | 1186 | 1368 | 1558 | 1757 | 1964 | 2179 | 2400 | 2863 | 3353 |
| | 16 | L | 16'10" | 17'8" | 18'6" | 19'4" | 20'2" | 20'11" | 21'8" | 22'5" | 23'9" | 25'1" |
| | | E | 880 | 1031 | 1189 | 1355 | 1528 | 1708 | 1894 | 2191 | 2489 | 2915 |
| | 24 | L | 13'8" | 14'5" | 15'1" | 15'9" | 16'5" | 17'0" | 17'7" | 18'2" | 19'3" | 20'4" |
| | | E | 708 | 829 | 957 | 1089 | 1229 | 1374 | 1523 | 1677 | 2002 | 2345 |
| 3 x 6 | 12 | L | 10'4" | 10'11" | 11'6" | 12'0" | 12'6" | 13'0" | 13'5" | 13'10" | 14'8" | 15'6" |
| | | E | 1307 | 1531 | 1766 | 2012 | 2269 | 2535 | 2811 | 3098 | 3696 | 4329 |
| | 16 | L | 9'0" | 9'6" | 10'0" | 10'5" | 10'10" | 11'3" | 11'8" | 12'0" | 12'9" | 13'5" |
| | | E | 1136 | 1330 | 1535 | 1748 | 1972 | 2203 | 2444 | 2691 | 3212 | 3762 |
| | 24 | L | 7'4" | 7'9" | 8'1" | 8'5" | 8'9" | 9'1" | 9'5" | 9'9" | 10'4" | 10'11" |
| | | E | 914 | 1070 | 1235 | 1406 | 1586 | 1773 | 1966 | 2166 | 2584 | 3026 |
| 3 x 8 | 12 | L | 13'8" | 14'5" | 15'2" | 15'10" | 16'6" | 17'1" | 17'8" | 18'3" | 19'4" | 20'5" |
| | | E | 1307 | 1531 | 1766 | 2012 | 2269 | 2535 | 2811 | 3098 | 3696 | 4329 |
| | 16 | L | 11'10" | 12'6" | 13'1" | 13'8" | 14'3" | 14'10" | 15'4" | 15'10" | 16'9" | 17'8" |
| | | E | 1136 | 1330 | 1535 | 1748 | 1972 | 2203 | 2444 | 2691 | 3212 | 3762 |
| | 24 | L | 9'7" | 10'1" | 10'7" | 11'1" | 11'7" | 12'0" | 12'5" | 12'10" | 13'7" | 14'4" |
| | | E | 914 | 1070 | 1235 | 1406 | 1586 | 1773 | 1966 | 2166 | 2584 | 3026 |
| 3 x 10 | 12 | L | 17'5" | 18'5" | 19'4" | 20'2" | 21'0" | 21'9" | 22'7" | 23'4" | 24'9" | 26'1" |
| | | E | 1307 | 1531 | 1766 | 2012 | 2269 | 2535 | 2811 | 3098 | 3696 | 4329 |
| | 16 | L | 15'2" | 16'0" | 16'9" | 17'6" | 18'2" | 18'10" | 19'6" | 20'2" | 21'5" | 22'7" |
| | | E | 1136 | 1330 | 1535 | 1748 | 1972 | 2203 | 2444 | 2691 | 3212 | 3762 |
| | 24 | L | 12'4" | 13'0" | 13'7" | 14'2" | 14'9" | 15'4" | 15'10" | 16'4" | 17'5" | 18'4" |
| | | E | 914 | 1070 | 1235 | 1406 | 1586 | 1773 | 1966 | 2166 | 2584 | 3026 |
| 3 x 12 | 12 | L | 21'3" | 22'4" | 23'5" | 24'6" | 25'6" | 26'6" | 27'5" | 28'4" | 30'0" | 31'7" |
| | | E | 1307 | 1531 | 1766 | 2012 | 1269 | 2535 | 2811 | 3098 | 3696 | 4329 |
| | 16 | L | 18'5" | 19'5" | 20'4" | 21'3" | 22'2" | 23'0" | 23'9" | 24'6" | 26'0" | 27'5" |
| | | E | 1136 | 1330 | 1535 | 1748 | 1972 | 2203 | 2444 | 2691 | 3212 | 3762 |
| | 24 | L | 15'0" | 15'9" | 16'6" | 17'3" | 18'0" | 18'8" | 19'4" | 20'0" | 21'2" | 22'4" |
| | | E | 914 | 1070 | 1235 | 1406 | 1586 | 1773 | 1966 | 2166 | 2584 | 3036 |
| 3 x 14 | 12 | L | 25'0" | 26'4" | 27'7" | 28'10" | 30'1" | 31'3" | 32'4" | 33'4" | 35'4" | 37'4" |
| | | E | 1307 | 1531 | 1766 | 2012 | 1269 | 2535 | 2811 | 3098 | 3696 | 4329 |
| | 16 | L | 21'8" | 22'10" | 24'0" | 25'1" | 26'1" | 27'1" | 28'0" | 28'11" | 30'8" | 32'4" |
| | | E | 1136 | 1330 | 1535 | 1748 | 1972 | 2203 | 2444 | 2691 | 3212 | 3762 |
| | 24 | L | 17'7" | 18'7" | 19'6" | 20'4" | 21'2" | 22'0" | 22'9" | 23'6" | 24'11" | 26'3" |
| | | E | 914 | 1070 | 1235 | 1406 | 1586 | 1773 | 1966 | 2166 | 2584 | 3026 |

## MAXIMUM SPANS – FLOOR JOISTS – 70 psf LIVE LOAD

See instructions for use of tables on page 231.
Symbols used in the tables are as follows:

$F_b$ = Unit design stress at extreme fiber in bending, psi.
L = Clear distance between supports, feet.
E = Minimum required modulus of elasticity, 1000 psi, if deflection under the live load is limited to $\ell/360$.

Joist sizes are expressed as nominal but calculations are based on dressed sizes (see pages 25-27).

| Size of Joist | Spacing C. to C. | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| 2 x 10 | 12 | L | 12'8" | 13'4" | 14'0" | 14'7" | 15'2" | 15'9" | 16'4" | 16'10" | 17'11" | 18'10" |
| | | E | 963 | 1133 | 1306 | 1488 | 1678 | 1875 | 2081 | 2292 | 2733 | 3201 |
| | 16 | L | 11'1" | 11'7" | 12'1" | 12'7" | 13'2" | 13'8" | 14'2" | 14'7" | 15'6" | 16'4" |
| | | E | 840 | 984 | 1135 | 1294 | 1459 | 1631 | 1808 | 1992 | 2376 | 2783 |
| | 24 | L | 8'11" | 9'5" | 9'10" | 10'3" | 10'8" | 11'1" | 11'6" | 11'11" | 12'7" | 13'3" |
| | | E | 676 | 792 | 914 | 1040 | 1174 | 1312 | 1454 | 1602 | 1912 | 2239 |
| 2 x 12 | 12 | L | 15'5" | 16'3" | 17'0" | 17'9" | 18'6" | 19 2" | 19'10" | 20'6" | 21'9" | 22'11" |
| | | E | 963 | 1133 | 1306 | 1488 | 1678 | 1875 | 2081 | 2292 | 2733 | 3201 |
| | 16 | L | 13'4" | 14'1" | 14'9" | 15'5" | 16'0" | 16'7" | 17'3" | 17'10" | 18'10" | 19'11" |
| | | E | 840 | 984 | 1135 | 1294 | 1459 | 1631 | 1808 | 1992 | 2376 | 2783 |
| | 24 | L | 10'10" | 11'5" | 12'0" | 12'6" | 13'0" | 13'6" | 14'0" | 14'5" | 15'4" | 16'4" |
| | | E | 676 | 792 | 914 | 1040 | 1174 | 1312 | 1454 | 1602 | 1912 | 2239 |
| 2 x 14 | 12 | L | 18'2" | 19'1" | 20'0" | 20'11" | 21'9" | 22'7" | 23'5" | 24'2" | 25'7" | 27'0" |
| | | E | 963 | 1133 | 1306 | 1488 | 1678 | 1875 | 2081 | 2292 | 2733 | 3201 |
| | 16 | L | 15'9" | 16'7" | 17'5" | 18'2" | 18'11" | 19'7" | 20'3" | 20'11" | 22'3" | 23'5" |
| | | E | 840 | 984 | 1135 | 1294 | 1459 | 1631 | 1808 | 1992 | 2376 | 2783 |
| | 24 | L | 12'9" | 13'6" | 14'2" | 14'9" | 15'4" | 15'11" | 16'6" | 17'0" | 18'01" | 19'01" |
| | | E | 676 | 792 | 914 | 1040 | 1174 | 1312 | 1454 | 1602 | 1912 | 2239 |
| 3 x 8 | 12 | L | 12'10" | 13'6" | 14'2" | 14'9" | 15'4" | 15'11" | 16'6" | 17'1" | 18'1" | 19'1" |
| | | E | 1248 | 1462 | 1686 | 1921 | 2166 | 2421 | 2684 | 2958 | 3529 | 4133 |
| | 16 | L | 11'1" | 11'8" | 12'3" | 12'10" | 13'4" | 13'10" | 14'4" | 14'10" | 15'8" | 16'7" |
| | | E | 1084 | 1270 | 1465 | 1669 | 1883 | 2103 | 2333 | 2570 | 3067 | 3592 |
| | 24 | L | 9'0" | 9'6" | 10'0" | 10'5" | 10'10" | 11'3" | 11'8" | 12'0" | 12'9" | 13'5" |
| | | E | 873 | 1022 | 1179 | 1344 | 1514 | 1693 | 1877 | 2068 | 2467 | 2900 |
| 3 x 10 | 12 | L | 16'4" | 17'3" | 18'1" | 18'10" | 19'7" | 20'4" | 21'1" | 21'9" | 23'1" | 24'4" |
| | | E | 1248 | 1462 | 1686 | 1921 | 2166 | 2421 | 2684 | 2958 | 3529 | 4133 |
| | 16 | L | 14'2" | 14'11" | 15'8" | 16'4" | 17'0" | 17'8" | 18'3" | 18'11" | 20'1" | 21'1" |
| | | E | 1084 | 1270 | 1465 | 1669 | 1883 | 2103 | 2333 | 2570 | 3067 | 3592 |
| | 24 | L | 11'6" | 12'2" | 12'9" | 13'3" | 13'10" | 14'4" | 14'10" | 15'4" | 16'3" | 17'2" |
| | | E | 873 | 1022 | 1179 | 1344 | 1514 | 1693 | 1877 | 2068 | 2467 | 2900 |
| 3 x 12 | 12 | L | 19'11" | 20'11" | 21'11" | 22'11" | 23'10" | 24'9" | 25'8" | 26'6" | 28'1" | 29'7" |
| | | E | 1248 | 1462 | 1686 | 1921 | 2166 | 2421 | 2684 | 2958 | 3529 | 4133 |
| | 16 | L | 17'3" | 18'2" | 19'1" | 19'11" | 20'9" | 21'6" | 22'3" | 23'0" | 24'4" | 25'8" |
| | | E | 1084 | 1270 | 1465 | 1669 | 1883 | 2103 | 2333 | 2570 | 3067 | 3592 |
| | 24 | L | 14'0" | 14'9" | 15'6" | 16'2" | 16'10" | 17'6" | 18'1" | 18'7" | 19'9" | 20'10" |
| | | E | 873 | 1022 | 1179 | 1344 | 1514 | 1693 | 1877 | 2068 | 2467 | 2900 |
| 3 x 14 | 12 | L | 23'4" | 24'7" | 25'10" | 27'0" | 28'1" | 29'2" | 30'2" | 31'2" | 33'1" | 34'11" |
| | | E | 1248 | 1462 | 1686 | 1921 | 2166 | 2421 | 2684 | 2958 | 3529 | 4133 |
| | 16 | L | 20'3" | 21'4" | 22'5" | 23'5" | 24'5" | 25'4" | 26'2" | 27'0" | 28'8" | 30'3" |
| | | E | 1084 | 1270 | 1465 | 1669 | 1883 | 2103 | 2333 | 2570 | 3067 | 3592 |
| | 24 | L | 16'6" | 17'4" | 18'7" | 19'0" | 19'9" | 20'6" | 21'3" | 22'0" | 23'4" | 24'7" |
| | | E | 873 | 1022 | 1179 | 1344 | 1514 | 1693 | 1877 | 2068 | 2467 | 2900 |
| 4 x 8 | 12 | L | 15'2" | 16'0" | 16'10" | 17'7" | 18'3" | 18'11" | 19'7" | 20'3" | 21'6" | 22'7" |
| | | E | 1490 | 1745 | 2015 | 2295 | 2588 | 2891 | 3207 | 3533 | 4217 | 4939 |
| | 16 | L | 13'2" | 13'11" | 14'7" | 15'3" | 15'11" | 16'6" | 17'1" | 17'7" | 18'7" | 19'7" |
| | | E | 1300 | 1533 | 1757 | 2002 | 2257 | 2522 | 2799 | 3082 | 3676 | 4306 |
| | 24 | L | 10'9" | 11'4" | 11'11" | 12'5" | 12'11" | 13'5" | 13'11" | 14'4" | 15'2" | 16'0" |
| | | E | 1054 | 1234 | 1425 | 1625 | 1831 | 2046 | 2268 | 2500 | 2922 | 3492 |
| 4 x 10 | 12 | L | 19'5" | 20'5" | 21'5" | 22'5" | 22'4" | 24'2" | 25'0" | 25'10" | 27'5" | 28'9" |
| | | E | 1490 | 1745 | 2015 | 2295 | 2588 | 2891 | 3207 | 3533 | 4217 | 4939 |
| | 16 | L | 16'10" | 17'9" | 18'7" | 19'5" | 20'3" | 21'0" | 21'9" | 22'5" | 23'10" | 25'1" |
| | | E | 1300 | 1533 | 1757 | 2002 | 2257 | 2522 | 2799 | 3082 | 3676 | 4306 |
| | 24 | L | 13'8" | 14'5" | 15'2" | 15'10" | 16'6" | 17'1" | 17'8" | 18'3" | 19'3" | 20'5" |
| | | E | 1054 | 1234 | 1425 | 1625 | 1831 | 2046 | 2268 | 2500 | 2922 | 3492 |
| 4 x 12 | 12 | L | 23'7" | 24'10" | 26'1" | 27'3" | 28'4" | 29'5" | 30'5" | 31'5" | 33'4" | 35'2" |
| | | E | 1490 | 1745 | 2015 | 2295 | 2588 | 2891 | 3207 | 2533 | 4217 | 4939 |
| | 16 | L | 20'6" | 21'7" | 22'7" | 23'7" | 24'7" | 25'6" | 26'5" | 27'4" | 28'5" | 30'6" |
| | | E | 1300 | 1533 | 1757 | 2002 | 2257 | 2522 | 2799 | 3082 | 3676 | 4306 |
| | 24 | L | 16'8" | 17'7" | 18'5" | 19'3" | 20'1" | 20'10" | 21'6" | 22'2" | 23'6" | 24'10" |
| | | E | 1054 | 1234 | 1425 | 1625 | 1831 | 2046 | 2268 | 2500 | 2922 | 3492 |

## MAXIMUM SPANS– FLOOR JOISTS–80 psf LIVE LOAD

See instructions for use of tables on page 231.

Symbols used in the tables are as follows:

$F_b$ = Unit design stress at extreme fiber in bending, psi.

L = Clear distance between supports, feet.

E = Minimum required modulus of elasticity, 1000 psi, if deflection under the live load is limited to $\ell/360$.

Joist sizes are expressed as nominal but calculations are based on dressed sizes (see pages 25-27).

| Size of Joist | Spacing C. to C. | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| 2 x 10 | 12 | L | 11'11" | 12'7" | 13'2" | 13'9" | 14'4" | 14'11" | 15'5" | 15'11" | 16'10" | 17'9" |
| | | E | 926 | 1084 | 1250 | 1423 | 1604 | 1795 | 1988 | 2191 | 2617 | 3062 |
| | 16 | L | 10'4" | 10'11" | 11'5" | 11'11" | 12'5" | 12'11" | 13'4" | 13'9" | 14'7" | 15'5" |
| | | E | 803 | 941 | 1086 | 1236 | 1395 | 1561 | 1730 | 1903 | 2273 | 2662 |
| | 24 | L | 8'5" | 8'10" | 9'3" | 9'8" | 10'1" | 10'6" | 10'10" | 11'2" | 11'10" | 12'6" |
| | | E | 646 | 758 | 873 | 995 | 1124 | 1254 | 1390 | 1533 | 1829 | 2143 |
| 2 x 12 | 12 | L | 14'6" | 15'4" | 16'1" | 16'9" | 17'5" | 18'1" | 18'9" | 19'4" | 20'6" | 21'7" |
| | | E | 926 | 1084 | 1250 | 1423 | 1604 | 1795 | 1988 | 2191 | 2617 | 3062 |
| | 16 | L | 12'7" | 11'3" | 13'11" | 14'6" | 15'1" | 15'8" | 16'3" | 16'9" | 17'9" | 18'9" |
| | | E | 803 | 941 | 1086 | 1236 | 1395 | 1561 | 1730 | 1903 | 2273 | 2662 |
| | 24 | L | 10'3" | 10'9" | 11'3" | 11'9" | 12'3" | 12'9" | 13'2" | 13'7" | 14'5" | 15'5" |
| | | E | 646 | 758 | 873 | 995 | 1124 | 1254 | 1390 | 1533 | 1829 | 2143 |
| 2 x 14 | 12 | L | 17'1" | 18'0" | 18'10" | 19'8" | 20'6" | 21'4" | 22'1" | 22'9" | 24'2" | 25'5" |
| | | E | 926 | 1084 | 1250 | 1423 | 1604 | 1795 | 1988 | 2191 | 2617 | 3062 |
| | 16 | L | 14'10" | 15'7" | 16'4" | 17'1" | 17'10" | 18'6" | 19'2" | 19'9" | 20'11" | 22'1" |
| | | E | 803 | 941 | 1086 | 1236 | 1395 | 1561 | 1730 | 1903 | 2273 | 2662 |
| | 24 | L | 12'0" | 12'8" | 13'4" | 13'11" | 14'5" | 15'0" | 15'6" | 16'0" | 17'0" | 18'0" |
| | | E | 646 | 758 | 873 | 995 | 1124 | 1254 | 1390 | 1533 | 1829 | 2143 |
| 3 x 8 | 12 | L | 12'0" | 12'8" | 13'4" | 13'11" | 14'6" | 15'1" | 15'7" | 16'1" | 17'1" | 18'0" |
| | | E | 1195 | 1399 | 1614 | 1838 | 2073 | 2317 | 2569 | 2831 | 3377 | 3956 |
| | 16 | L | 10'6" | 11'0" | 11'7" | 12'1" | 12'7" | 13'1" | 13'6" | 13'11" | 14'9" | 15'7" |
| | | E | 1038 | 1215 | 1402 | 1597 | 1802 | 2013 | 2233 | 2459 | 2935 | 3438 |
| | 24 | L | 8'6" | 9'0" | 9'5" | 9'10" | 10'3" | 10'7" | 11'0" | 11'4" | 12'0" | 12'8" |
| | | E | 835 | 978 | 1128 | 1286 | 1449 | 1620 | 1797 | 1979 | 2361 | 2766 |
| 3 x 10 | 12 | L | 15'5" | 16'3" | 17'0" | 17'9" | 18'6" | 19'2" | 19'10" | 20'6" | 21'8" | 22'11" |
| | | E | 1195 | 1399 | 1614 | 1838 | 2073 | 2317 | 2569 | 2831 | 3377 | 3956 |
| | 16 | L | 13'4" | 14'1" | 14'9" | 15'5" | 16'0" | 16'7" | 17'3" | 17'9" | 18'10" | 19'11" |
| | | E | 1038 | 1215 | 1402 | 1597 | 1802 | 2013 | 2233 | 2459 | 2935 | 3438 |
| | 24 | L | 10'10"' | 11'5" | 12'0" | 12'6" | 13'0" | 13'6" | 14'0" | 14'5" | 15'4" | 16'2" |
| | | E | 835 | 978 | 1128 | 1286 | 1449 | 1620 | 1797 | 1979 | 2361 | 2766 |
| 3 x 12 | 12 | L | 18'9" | 19'9" | 20'8" | 21'7" | 22'6" | 23'4" | 24'2" | 25'0" | 26'5" | 27'11" |
| | | E | 1195 | 1399 | 1614 | 1838 | 2073 | 2317 | 2569 | 2831 | 3377 | 3956 |
| | 16 | L | 16'3" | 17'1" | 17'11" | 18'9" | 19'6" | 20'3" | 20'11" | 21'7" | 22'11" | 24'2" |
| | | E | 1038 | 1215 | 1402 | 1597 | 1802 | 2013 | 2233 | 2459 | 2935 | 3438 |
| | 24 | L | 13'2" | 13'11" | 14'7" | 15'3" | 15'10" | 16'5" | 17'0" | 17'7" | 18'7" | 19'7" |
| | | E | 835 | 978 | 1128 | 1286 | 1449 | 1620 | 1797 | 1979 | 2361 | 2766 |
| 3 x 14 | 12 | L | 22'1" | 23'3" | 24'4" | 25'5" | 26'6" | 27'6" | 28'6" | 29'5" | 31'2" | 32'10" |
| | | E | 1195 | 1399 | 1614 | 1838 | 2073 | 2317 | 2569 | 2831 | 3377 | 3956 |
| | 16 | L | 19'2" | 20'2" | 21'2" | 22'1" | 23'0" | 23'10" | 24'8" | 25'6" | 27'1" | 28'6" |
| | | E | 1038 | 1215 | 1402 | 1597 | 1802 | 2013 | 2233 | 2459 | 2935 | 3438 |
| | 24 | L | 15'6" | 16'4" | 17'2" | 17'11" | 18'8" | 19'5" | 20'1" | 20'9" | 22'0" | 23'2" |
| | | E | 835 | 978 | 1128 | 1286 | 1449 | 1620 | 1797 | 1979 | 2361 | 2766 |
| 4 x 8 | 12 | L | 14'4" | 15'1" | 15'10" | 16'6" | 17'2" | 17'10" | 18'5" | 19'0" | 20'3" | 21'4" |
| | | E | 1426 | 1670 | 1928 | 2196 | 2475 | 2766 | 3068 | 3379 | 4034 | 4725 |
| | 16 | L | 12'5" | 13'1" | 13'9" | 14'4" | 14'11" | 15'6" | 16'1" | 16'7" | 17'7" | 18'6" |
| | | E | 1243 | 1457 | 1681 | 1915 | 2159 | 2413 | 2677 | 2948 | 3516 | 4119 |
| | 24 | L | 10'2" | 10'8" | 11'2" | 11'8" | 12'2" | 12'6" | 13'1" | 13'6" | 14'4" | 15'1" |
| | | E | 1009 | 1180 | 1363 | 1554 | 1752 | 1957 | 2170 | 2391 | 2795 | 3340 |
| 4 x 10 | 12 | L | 18'3" | 19'3" | 20'2" | 21'1" | 21'11" | 22'9" | 23'7" | 24'4" | 25'10" | 27'3" |
| | | E | 1426 | 1670 | 1928 | 2196 | 2475 | 2766 | 3068 | 3379 | 4034 | 4725 |
| | 16 | L | 15'10" | 16'8" | 17'6" | 18'4" | 19'1" | 19'10" | 20'6" | 21'2" | 22'5" | 23'7" |
| | | E | 1243 | 1457 | 1681 | 1915 | 2159 | 2413 | 2677 | 2948 | 3516 | 4119 |
| | 24 | L | 12'11" | 13'7" | 14'3" | 14'11" | 15'6" | 16'1" | 16'8" | 17'2" | 18'2" | 19'3" |
| | | E | 1009 | 1180 | 1363 | 1554 | 1752 | 1957 | 2170 | 2391 | 2795 | 3340 |
| 4 x 12 | 12 | L | 22'3" | 23'5" | 24'6" | 25'7" | 26'8" | 27'8" | 28'8" | 29'7" | 31'5" | 33'2" |
| | | E | 1426 | 1670 | 1928 | 2196 | 2475 | 2766 | 3068 | 3379 | 4034 | 4725 |
| | 16 | L | 19'3" | 20'4" | 21'4" | 22'3" | 23'2" | 24'1" | 24'11" | 25'9" | 27'3" | 28'9" |
| | | E | 1243 | 1457 | 1681 | 1915 | 2159 | 2413 | 2677 | 2948 | 3516 | 4119 |
| | 24 | L | 15'9" | 16'7" | 17'4" | 18'1" | 18'10" | 19'7" | 20'3" | 20'11" | 22'2" | 23'5" |
| | | E | 1009 | 1180 | 1363 | 1554 | 1752 | 1957 | 2170 | 2391 | 2795 | 3340 |

## MAXIMUM SPANS– FLOOR JOISTS– 90 psf LIVE LOAD

See instructions for use of tables on page 231.
Symbols used in the tables are as follows:

$F_b$ = Unit design stress at extreme fiber in bending, psi.
L = Clear distance between supports, feet.
E = Minimum required modulus of elasticity, 1000 psi, if deflection under the live load is limited to ℓ /360.

Joist sizes are expressed as nominal but calculations are based on dressed sizes (see pages 25-27).

| Size of Joist | Spacing C. to C. | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| 2 x 12 | 12 | L | 13'9" | 14'6" | 15'3" | 15'11" | 16'7" | 17'2" | 17'9" | 18'4" | 19'5" | 20'6" |
| | | E | 890 | 1042 | 1203 | 1370 | 1545 | 1727 | 1916 | 2110 | 2517 | 2948 |
| | 16 | L | 11'11" | 12'7" | 13'3" | 13'10" | 14'5" | 14'11" | 15'5" | 15'11" | 16'11" | 17'10" |
| | | E | 774 | 907 | 1045 | 1423 | 1343 | 1502 | 1665 | 1834 | 2188 | 2563 |
| | 24 | L | 9'8" | 10'3" | 10'9" | 11'2" | 11'7" | 12'1" | 12'6" | 12'11" | 13'9" | 14'6" |
| | | E | 623 | 729 | 841 | 958 | 1081 | 1208 | 1339 | 1475 | 1760 | 2062 |
| 2 x 14 | 12 | L | 16'2" | 17'1" | 17'11" | 18'9" | 19'6" | 20'3" | 20'11" | 21'7" | 22'11" | 24'2" |
| | | E | 890 | 1042 | 1203 | 1370 | 1545 | 1727 | 1916 | 2110 | 2517 | 2942 |
| | 16 | L | 14'1" | 14'10" | 15'7" | 16'3" | 16'11" | 17'7" | 18'2" | 18'9" | 19'11" | 21'0" |
| | | E | 774 | 907 | 1045 | 1423 | 1343 | 1502 | 1665 | 1834 | 2188 | 2563 |
| | 24 | L | 11'5" | 12'0" | 12'7" | 13'2" | 13'9" | 14'3" | 14'9" | 15'3" | 16'2" | 17'1" |
| | | E | 623 | 729 | 841 | 958 | 1081 | 1208 | 1339 | 1475 | 1760 | 2062 |
| 3 x 8 | 12 | L | 11'5" | 12'0" | 12'7" | 13'3" | 13'9" | 14'3" | 14'9" | 15'3" | 16'2" | 17'1" |
| | | E | 1149 | 1346 | 1553 | 1769 | 1995 | 2229 | 2472 | 2724 | 3249 | 3806 |
| | 16 | L | 9'11" | 10'6" | 11'0" | 11'6" | 12'0" | 12'5" | 12'10" | 13'3" | 14'1" | 14'10" |
| | | E | 999 | 1169 | 1349 | 1537 | 1733 | 1937 | 2149 | 2366 | 2824 | 3309 |
| | 24 | L | 8'1" | 8'6" | 8'11" | 9'4" | 9'9" | 10'1" | 10'5" | 10'9" | 11'5" | 12'1" |
| | | E | 804 | 941 | 1086 | 1237 | 1394 | 1558 | 1728 | 1904 | 2272 | 2661 |
| 3 x 10 | 12 | L | 14'7" | 15'5" | 16'2" | 16'11" | 17'7" | 18'3" | 18'11" | 19'6" | 20'8" | 21'10" |
| | | E | 1149 | 1346 | 1553 | 1769 | 1995 | 2229 | 2472 | 2724 | 3249 | 3806 |
| | 16 | L | 12'8" | 13'4" | 14'0" | 14'8" | 15'3" | 15'10" | 16'5" | 16'11" | 17'11" | 18'11" |
| | | E | 999 | 1169 | 1349 | 1537 | 1733 | 1937 | 2149 | 2366 | 2824 | 3309 |
| | 24 | L | 10'4" | 10'10" | 11'4" | 11'10" | 12'4" | 12'10" | 13'3" | 13'8" | 14'7" | 15'4" |
| | | E | 804 | 941 | 1086 | 1237 | 1394 | 1558 | 1728 | 1904 | 2272 | 2661 |
| 3 x 12 | 12 | L | 17'9" | 18'8" | 19'7" | 20'6" | 21'4" | 22'2" | 22'11" | 23'8" | 25'2" | 26'6" |
| | | E | 1149 | 1346 | 1553 | 1769 | 1995 | 2229 | 2472 | 2724 | 3249 | 3806 |
| | 16 | L | 15'5" | 16'3" | 17'0" | 17'9" | 18'6" | 19'3" | 19'11" | 20'7" | 21'9" | 23'0" |
| | | E | 999 | 1169 | 1349 | 1537 | 1733 | 1937 | 2149 | 2366 | 2824 | 3309 |
| | 24 | L | 12'6" | 13'2" | 13'10" | 14'5" | 15'0" | 15'7" | 16'2" | 16'8" | 17'8" | 18'7" |
| | | E | 804 | 941 | 1086 | 1237 | 1394 | 1558 | 1728 | 1904 | 2272 | 2661 |
| 3 x 14 | 12 | L | 20'11" | 22'1" | 23'2" | 24'2" | 25'2" | 26'1" | 27'0" | 27'11" | 29'7" | 31'3" |
| | | E | 1149 | 1346 | 1553 | 1769 | 1995 | 2229 | 2472 | 2724 | 3249 | 3806 |
| | 16 | L | 18'2" | 19'2" | 20'1" | 21'0" | 21'10" | 22'8" | 23'5" | 24'2" | 25'7" | 27'1" |
| | | E | 999 | 1169 | 1349 | 1537 | 1733 | 1937 | 2149 | 2366 | 2824 | 3309 |
| | 24 | L | 14'9" | 15'7" | 16'4" | 17'0" | 17'8" | 18'4" | 19'0" | 19'7" | 20'10" | 22'0" |
| | | E | 804 | 941 | 1086 | 1237 | 1394 | 1558 | 1728 | 1904 | 2272 | 2661 |
| 4 x 8 | 12 | L | 13'7" | 14'4" | 15'0" | 15'8" | 16'4" | 16'11" | 17'6" | 18'1" | 19'2" | 20'3" |
| | | E | 1370 | 1604 | 1852 | 2109 | 2378 | 2657 | 2948 | 3246 | 3875 | 4539 |
| | 16 | L | 11'10" | 12'5" | 13'0" | 13'7" | 14'2" | 14'9" | 15'3" | 15'9" | 16'8" | 17'7" |
| | | E | 1194 | 1400 | 1614 | 1840 | 2074 | 2318 | 2572 | 2832 | 3378 | 3957 |
| | 24 | L | 9'7" | 10'1" | 10'7" | 11'1" | 11'7" | 12'0" | 12'5" | 12'10" | 13'7" | 14'4" |
| | | E | 969 | 1134 | 1309 | 1493 | 1683 | 1880 | 2084 | 2297 | 2685 | 3209 |
| 4 x 10 | 12 | L | 17'4" | 18'3" | 19'2" | 20'0" | 20'10" | 21'7" | 22'4" | 23'1" | 24'6" | 25'10" |
| | | E | 1370 | 1604 | 1852 | 2109 | 2378 | 2657 | 2948 | 3246 | 3875 | 4539 |
| | 16 | L | 15'1" | 15'10" | 16'7" | 17'4" | 18'1" | 18'9" | 19'5" | 20'1" | 21'3" | 22'5" |
| | | E | 1194 | 1400 | 1614 | 1840 | 2074 | 2318 | 2572 | 2832 | 3378 | 3957 |
| | 24 | L | 12'3" | 12'11" | 13'7" | 14'2" | 14'9" | 15'4" | 15'10" | 16'4" | 17'3" | 18'3" |
| | | E | 969 | 1134 | 1309 | 1493 | 1683 | 1880 | 2084 | 2297 | 2685 | 3209 |
| 4 x 12 | 12 | L | 21'1" | 22'3" | 23'4" | 24'4" | 25'4" | 26'4" | 27'3" | 28'1" | 29'10" | 31'5" |
| | | E | 1370 | 1604 | 1852 | 2109 | 2378 | 2657 | 2948 | 3246 | 3875 | 4539 |
| | 16 | L | 18'4" | 19'4" | 20'3" | 21'2" | 22'0" | 22'10" | 23'8" | 24'5" | 25'11" | 27'4" |
| | | E | 1194 | 1400 | 1614 | 1840 | 2074 | 2318 | 2572 | 2832 | 3378 | 3957 |
| | 24 | L | 14'11" | 15'9" | 16'6" | 17'3" | 17'11" | 18'7" | 19'3" | 19'11" | 20'11" | 22'3" |
| | | E | 969 | 1134 | 1309 | 1493 | 1683 | 1880 | 2084 | 2297 | 2685 | 3209 |
| 4 x 14 | 12 | L | 25'4" | 26'8" | 28'0" | 29'3" | 30'5" | 31'7" | 32'8" | 33'9" | 35'9" | 37'9" |
| | | E | 1370 | 1604 | 1852 | 2109 | 2378 | 2657 | 2948 | 3246 | 3875 | 4539 |
| | 16 | L | 22'0" | 23'2" | 24'3" | 25'4" | 26'5" | 27'5" | 28'4" | 29'3" | 31'0" | 32'9" |
| | | E | 1194 | 1400 | 1614 | 1840 | 2074 | 2318 | 2572 | 2832 | 3378 | 3957 |
| | 24 | L | 17'11" | 18'10" | 19'9" | 20'8" | 21'6" | 22'4" | 23'1" | 23'10" | 25'4" | 26'8" |
| | | E | 969 | 1134 | 1309 | 1493 | 1683 | 1880 | 2084 | 2297 | 2685 | 3209 |

## MAXIMUM SPANS–FLOOR JOISTS–100 psf LIVE LOAD

See instructions for use of tables on page 231.

Symbols used in the tables are as follows:

$F_b$ = Unit design stress at extreme fiber in bending, psi.
L = Clear distance between supports, feet.
E = Minimum required modulus of elasticity, 1000 psi, if deflection under the live load is limited to $\ell/360$.

Joist sizes are expressed as nominal but calculations are based on dressed sizes (see pages 25-27).

| Size of Joist | Spacing C. to C. | | $F_b$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1800 | 2000 |
| 2 x 12 | 12 | L | 13'1" | 13'10" | 14'6" | 15'2" | 15'9" | 16'4" | 16'11" | 17'6" | 18'6" | 19'6" |
| | | E | 855 | 1002 | 1156 | 1317 | 1384 | 1660 | 1841 | 2028 | 2419 | 2833 |
| | 16 | L | 11'4" | 12'0" | 12'7" | 13'2" | 13'8" | 14'2" | 14'8" | 15'2" | 16'1" | 17'0" |
| | | E | 743 | 871 | 1005 | 1145 | 1291 | 1443 | 1600 | 1762 | 2103 | 2463 |
| | 24 | L | 9'3" | 9'9" | 10'3" | 10'8" | 11'1" | 11'6" | 11'11" | 12'4" | 13'1" | 13'11" |
| | | E | 599 | 701 | 808 | 920 | 1039 | 1161 | 1287 | 1417 | 1692 | 1981 |
| 2 x 14 | 12 | L | 15'5" | 16'3" | 17'1" | 17'10" | 18'7" | 19'3" | 19'11" | 20'7" | 21'10" | 23'0" |
| | | E | 855 | 1002 | 1156 | 1317 | 1384 | 1660 | 1841 | 2028 | 2419 | 2833 |
| | 16 | L | 13'4" | 14'1" | 14'10" | 15'6" | 16'1" | 16'8" | 17'3" | 17'10" | 18'11" | 20'0" |
| | | E | 743 | 871 | 1005 | 1145 | 1291 | 1443 | 1600 | 1762 | 2103 | 2463 |
| | 24 | L | 10'11" | 11'6" | 12'1" | 12'7" | 13'1" | 13'7" | 14'1" | 14'6" | 15'4" | 16'2" |
| | | E | 599 | 701 | 808 | 920 | 1039 | 1161 | 1287 | 1417 | 1692 | 1981 |
| 3 x 8 | 12 | L | 10'11" | 11'6" | 12'1" | 12'7" | 13'1" | 13'7" | 14'1" | 14'7" | 15'5" | 16'3" |
| | | E | 1104 | 1294 | 1492 | 1700 | 1917 | 2142 | 2375 | 2618 | 3123 | 3658 |
| | 16 | L | 9'6" | 10'0" | 10'6" | 10'11" | 11'4" | 11'9" | 12'2" | 12'7" | 13'4" | 14'1" |
| | | E | 960 | 1124 | 1297 | 1477 | 1666 | 1861 | 2065 | 2274 | 2714 | 3179 |
| | 24 | L | 7'7" | 8'1" | 8'6" | 8'11" | 9'3" | 9'7" | 9'11" | 10'3" | 10'10" | 11'5" |
| | | E | 772 | 904 | 1043 | 1189 | 1340 | 1498 | 1661 | 1830 | 2183 | 2557 |
| 3 x 10 | 12 | L | 13'10" | 14'7" | 15'4" | 16'1" | 16'9" | 17'5" | 18'0" | 18'7" | 19'8" | 20'9" |
| | | E | 1104 | 1294 | 1492 | 1700 | 1917 | 2142 | 2375 | 2618 | 3123 | 3658 |
| | 16 | L | 12'1" | 12'9" | 13'4" | 13'11" | 14'6" | 15'1" | 15'7" | 16'1" | 17'1" | 18'0" |
| | | E | 960 | 1124 | 1297 | 1477 | 1666 | 1861 | 2065 | 2274 | 2714 | 3179 |
| | 24 | L | 9'10" | 10'4" | 10'10" | 11'4" | 11'10" | 12'3" | 12'8" | 13'1" | 13'10" | 14'7" |
| | | E | 772 | 904 | 1043 | 1189 | 1340 | 1498 | 1661 | 1830 | 2183 | 2557 |
| 3 x 12 | 12 | L | 16'11" | 17'10" | 18'9" | 19'7" | 20'4" | 21'1" | 21'10" | 22'6" | 23'11" | 25'3" |
| | | E | 1104 | 1294 | 1492 | 1700 | 1917 | 2142 | 2375 | 2618 | 3123 | 3658 |
| | 16 | L | 14'8" | 15'6" | 16'3" | 16'11" | 17'7" | 18'3" | 18'11" | 19'6" | 20'9" | 21'11" |
| | | E | 960 | 1124 | 1297 | 1477 | 1666 | 1861 | 2065 | 2274 | 2714 | 3179 |
| | 24 | L | 11'11" | 12'7" | 13'2" | 13'9" | 14'4" | 14'10" | 15'4" | 15'10" | 16'10" | 17'9" |
| | | E | 772 | 904 | 1043 | 1189 | 1340 | 1498 | 1661 | 1830 | 2183 | 2557 |
| 3 x 14 | 12 | L | 19'11" | 21'0" | 22'0" | 23'0" | 23'11" | 24'10" | 25'9" | 26'7" | 28'2" | 29'9" |
| | | E | 1104 | 1294 | 1492 | 1700 | 1917 | 2142 | 2375 | 2618 | 3123 | 3658 |
| | 16 | L | 17'3" | 18'2" | 19'1" | 19'11" | 20'9" | 21'7" | 22'4" | 23'1" | 24'5" | 25'9" |
| | | E | 960 | 1124 | 1297 | 1477 | 1666 | 1861 | 2065 | 2274 | 2714 | 3179 |
| | 24 | L | 14'1" | 14'10" | 15'7" | 16'3" | 16'11" | 17'7" | 18'2" | 18'9" | 19'10" | 20'11" |
| | | E | 772 | 904 | 1043 | 1189 | 1340 | 1498 | 1661 | 1830 | 2183 | 2557 |
| 4 x 8 | 12 | L | 13'0" | 13'8" | 14'4" | 15'0" | 15'7" | 16'2" | 16'9" | 17'3" | 18'4" | 19'4" |
| | | E | 1320 | 1546 | 1785 | 2033 | 2292 | 2561 | 2841 | 3129 | 3735 | 4375 |
| | 16 | L | 11'3" | 11'10" | 12'5" | 13'0" | 13'6" | 14'0" | 14'6" | 15'0" | 15'11" | 16'9" |
| | | E | 1151 | 1349 | 1556 | 1773 | 1999 | 2234 | 2479 | 2730 | 3256 | 3816 |
| | 24 | L | 9'1" | 9'7" | 10'1" | 10'7" | 11'0" | 11'5" | 11'10" | 12'3" | 12'11" | 13'7" |
| | | E | 934 | 1093 | 1262 | 1439 | 1622 | 1812 | 2009 | 2214 | 2588 | 3093 |
| 4 x 10 | 12 | L | 16'6" | 17'5" | 18'3" | 19'1" | 19'10" | 20'7" | 21'4" | 22'1" | 23'4" | 24'7" |
| | | E | 1320 | 1546 | 1785 | 2033 | 2296 | 2561 | 2841 | 3129 | 3735 | 4375 |
| | 16 | L | 14'4" | 15'1" | 15'10" | 16'7" | 17'3" | 17'11" | 18'7" | 19'2" | 20'5" | 21'5" |
| | | E | 1151 | 1349 | 1556 | 1773 | 1999 | 2234 | 2479 | 2730 | 3256 | 3814 |
| | 24 | L | 11'8" | 12'4" | 12'11" | 13'6" | 14'1" | 14'7" | 15'1" | 15'7" | 16'5" | 17'5" |
| | | E | 934 | 1093 | 1262 | 1439 | 1622 | 1812 | 2009 | 2214 | 2588 | 3093 |
| 4 x 12 | 12 | L | 20'1" | 21'2" | 22'3" | 23'3" | 24'2" | 25'0" | 25'10" | 26'8" | 28'5" | 30'0" |
| | | E | 1320 | 1546 | 1785 | 2033 | 2292 | 2561 | 2841 | 3121 | 3735 | 4375 |
| | 16 | L | 17'5" | 18'5" | 19'4" | 20'2" | 21'0" | 21'9" | 22'6" | 23'3" | 24'8" | 26'0" |
| | | E | 1151 | 1349 | 1556 | 1773 | 1999 | 2234 | 2479 | 2730 | 3256 | 3814 |
| | 24 | L | 14'3" | 15'0" | 15'9" | 16'5" | 17'1" | 17'9" | 18'4" | 18'11" | 20'0" | 21'2" |
| | | E | 934 | 1093 | 1262 | 1439 | 1622 | 1812 | 2009 | 2214 | 2588 | 3093 |
| 4 x 14 | 12 | L | 24'2" | 25'5" | 26'8" | 27'10" | 29'0" | 30'1" | 31'2" | 32'2" | 34'2" | 36'0" |
| | | E | 1320 | 1546 | 1785 | 2033 | 2292 | 2561 | 2841 | 3129 | 3735 | 4375 |
| | 16 | L | 21'0" | 22'1" | 23'2" | 24'2" | 25'2" | 26'1" | 27'0" | 24'11" | 29'7" | 31'3" |
| | | E | 1151 | 1349 | 1556 | 1773 | 1999 | 2234 | 2479 | 2730 | 3256 | 3814 |
| | 24 | L | 17'1" | 18'0" | 18'10" | 19'8" | 20'6" | 21'3" | 22'0" | 22'9" | 24'2" | 25'5" |
| | | E | 934 | 1093 | 1262 | 1439 | 1622 | 1812 | 2009 | 2214 | 2588 | 3093 |

## REFERENCES


1. *National Design Specification for Wood Construction;* National Forest Products Association, Washington, D.C.
2. *Span Tables for Joists and Rafters;* National Forest Products Association, Washington, D.C.
3. *The All-Weather Wood Foundation System: Basic Requirements, Technical Report No. 7;* National Forest Products Association, Washington, D.C.
4. *All-Weather Wood Foundation System: Design, Fabrication, Installation Manual;* National Forest Products Association, Washington, D.C.
5. *Wood Construction Data Series;* National Forest Products Association, Washington, D.C.
6. *Construction Cost Saver Series;* National Forest Products Association, Washington, D.C.
7. *Distribution and Fabrication Facilities for Wood Products and Systems;* National Forest Products Association, Washington, D.C.
8. *Lumber and Wood Products Literature;* National Forest Products Association, Washington, D.C.
9. *Wood Handbook: Wood as an Engineering Material;* Agriculture Handbook No. 72; Forest Products Laboratory, U.S. Department of Agriculture, Madison, Wisconsin*
10. *Timber Construction Manual;* American Institute of Timber Construction, Englewood, Colorado
11. *Western Woods Use Book;* Western Wood Products Association, Portland, Oregon
12. *Timber Design Manual;* Laminated Timber Institute of Canada, Ottawa, Canada
13. *Timber Design and Construction Handbook;* Timber Engineering Company, Washington, D.C.
14. *Wood Engineering;* by G. Gurfinkel; Southern Forest Products Association, New Orleans, Louisiana
15. *Wood Technology in the Design of Structures;* by R. J. Hoyle, Jr.; Mountain Press Publishing Company, Missoula, Montana
16. *Wood Structures: A Design Guide and Commentary;* American Society of Civil Engineers, New York, New York
17. *Simplified Design of Structural Timber;* by H. Parker; John Wiley and Sons, New York, New York
18. *The Wood Book;* Wood Products Publications, Tacoma, Washington
19. *Wood Frame House Construction;* Agriculture Handbook No. 73; Forest Products Laboratory, U.S. Department of Agriculture, Madison, Wisconsin*
20. *Design Specifications for Light Metal-Plate Connected Wood Trusses;* Truss Plate Institute, Hyattsville, Maryland
21. *TECO Design Manual for Timber Connector Construction;* Timber Engineering Company, Washington, D.C.
22. *Plywood Design Specification and Supplement;* American Plywood Association, Tacoma, Washington

23. *Standard Specifications for Highway Bridges;* American Association of State Highway and Transportation Officials, Washington, D.C.

24. *Construction and Maintenance Manual, Part 7;* American Railway Engineering Association, Chicago, Illinois

25. *Glulam Bridge Systems: Plans and Details;* American Institute of Timber Construction, Englewood, Colorado

26. *Pole Building Design;* American Wood Preservers Institute, McLean, Virginia

27. *Pile Foundations Know-How;* American Wood Preservers Institute, McLean, Virginia

28. *Product Use Manual, Catalogue A;* Western Wood Products Association, Portland, Oregon

29. *Southern Pine Use Guide;* Southern Forest Products Association, New Orleans, Louisiana

30. *Plywood Construction Guide;* American Plywood Association, Tacoma, Washington

31. Grading Rules for Lumber; issued by industry agencies established to promulgate rules and maintain lumber grading and inspection services

32. *Timber Construction Standards;* American Institute of Timber Construction, Englewood, Colorado

33. *Standard for Heavy Timber Decking;* American Institute of Timber Construction, Englewood, Colorado

34. *Standard for Two-Inch Nominal Thickness Lumber Roof Decking for Structural Applications;* American Institute of Timber Construction, Englewood, Colorado

35. *Manual of Recommended Practices for Wood Preservation;* American Wood Preservers Association, Washington, D.C.

36. *American Softwood Lumber Standard, Voluntary Product Standard PS 20-70;* National Bureau of Standards, U.S. Department of Commerce*

37. *Structural Glued Laminated Timber, Voluntary Product Standard PS 56;* National Bureau of Standards, U.S. Department of Commerce*

38. *Construction and Industrial Plywood, Voluntary Product Standard PS 1;* National Bureau of Standards, U.S. Department of Commerce*

39. *Methods for Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber,* ASTM D-245; American Society for Testing and Materials, Philadelphia, Pennsylvania

40. *Methods for Establishing Clear-Wood Strength Values,* ASTM D-2555; American Society for Testing and Materials, Philadelphia, Pennsylvania

41. *Basic Building Code;* Building Officials and Code Administrators International, Chicago, Illinois

42. *National Building Code;* American Insurance Association, New York, New York

43. *Standard Building Code;* Southern Building Code Congress International, Birmingham, Alabama

44. *Uniform Building Code;* International Conference of Building Officials, Los Angeles, California

45. *One and Two Family Dwelling Code;* by the model code agencies, see items 41-44, above.

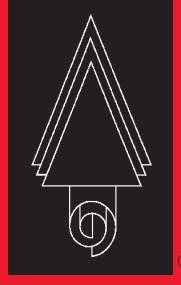
*Available from U.S. Government Printing Office, Washington, D.C.

# DECIMAL EQUIVALENTS

| INCHES TO DECIMAL OF A FOOT | | | | | | DECIMAL OF AN INCH | |
|---|---|---|---|---|---|---|---|
| INCH | FOOT | INCH | FOOT | INCH | FOOT | FRACTION | DECIMAL |
| 1/16 | 0.0052 | 4-1/16 | 0.3385 | 8-1/16 | 0.6719 | 1/64 | 0.015625 |
| 1/8 | 0.0104 | 4-1/8 | 0.3438 | 8-1/8 | 0.6771 | 1/32 | 0.03125 |
| 3/16 | 0.0156 | 4-3/16 | 0.3490 | 8-3/16 | 0.6823 | 3/64 | 0.046875 |
| 1/4 | 0.0208 | 4-1/4 | 0.3542 | 8-1/4 | 0.6875 | 1/16 | 0.0625 |
| 5/16 | 0.0260 | 4-5/16 | 0.3594 | 8-5/16 | 0.6927 | 5/64 | 0.078125 |
| 3/8 | 0.0313 | 4-3/8 | 0.3646 | 8-3/8 | 0.6979 | 3/32 | 0.09375 |
| 7/16 | 0.0365 | 4-7/16 | 0.3698 | 8-7/16 | 0.7031 | 7/64 | 0.109375 |
| 1/2 | 0.0417 | 4-1/2 | 0.3750 | 8-1/2 | 0.7083 | 1/8 | 0.125 |
| 9/16 | 0.0459 | 4-9/16 | 0.3802 | 8-9/16 | 0.7135 | 9/64 | 0.140625 |
| 5/8 | 0.0521 | 4-5/8 | 0.3854 | 8-5/8 | 0.7188 | 5/32 | 0.15625 |
| 11/16 | 0.0573 | 4-11/16 | 0.3906 | 8-11/16 | 0.7240 | 11/64 | 0.171875 |
| 3/4 | 0.0625 | 4-3/4 | 0.3958 | 8-3/4 | 0.7292 | 3/16 | 0.1875 |
| 13/16 | 0.0677 | 4-13/16 | 0.4010 | 8-13/16 | 0.7344 | 13/64 | 0.203125 |
| 7/8 | 0.0729 | 4-7/8 | 0.4063 | 8-7/8 | 0.7396 | 7/32 | 0.21875 |
| 15/16 | 0.0781 | 4-15/16 | 0.4115 | 8-15/16 | 0.7448 | 15/64 | 0.234375 |
| 1- | 0.0833 | 5- | 0.4167 | 9- | 0.7500 | 1/4 | 0.250 |
| 1-1/16 | 0.0885 | 5-1/16 | 0.4219 | 9-1/16 | 0.7552 | 17/64 | 0.265625 |
| 1-1/8 | 0.0938 | 5-1/8 | 0.4271 | 9-1/8 | 0.7604 | 9/32 | 0.28125 |
| 1-3/16 | 0.0990 | 5-3/16 | 0.4323 | 9-3/16 | 0.7656 | 19/64 | 0.296875 |
| 1-1/4 | 0.1042 | 5-1/4 | 0.4375 | 9-1/4 | 0.7708 | 5/16 | 0.3125 |
| 1-5/16 | 0.1094 | 5-5/16 | 0.4427 | 9-5/16 | 0.7760 | 21/64 | 0.328125 |
| 1-3/8 | 0.1146 | 5-3/8 | 0.4479 | 9-3/8 | 0.7813 | 11/32 | 0.34375 |
| 1-7/16 | 0.1198 | 5-7/16 | 0.4531 | 9-7/16 | 0.7865 | 23/64 | 0.359375 |
| 1-1/2 | 0.1250 | 5-1/2 | 0.4583 | 9-1/2 | 0.7917 | 3/8 | 0.375 |
| 1-9/16 | 0.1302 | 5-9/16 | 0.4635 | 9-9/16 | 0.7969 | 25/64 | 0.390625 |
| 1-5/8 | 0.1354 | 5-5/8 | 0.4688 | 9-5/8 | 0.8021 | 13/32 | 0.40625 |
| 1-11/16 | 0.1406 | 5-11/16 | 0.4740 | 9-11/16 | 0.8073 | 27/64 | 0.421875 |
| 1-3/4 | 0.1458 | 5-3/4 | 0.4792 | 9-3/4 | 0.8125 | 7/16 | 0.4375 |
| 1-13/16 | 0.1510 | 5-13/16 | 0.4844 | 9-13/16 | 0.8177 | 29/64 | 0.453125 |
| 1-7/8 | 0.1563 | 5-7/8 | 0.4896 | 9-7/8 | 0.8229 | 15/32 | 0.46875 |
| 1-15/16 | 0.1615 | 5-15/16 | 0.4948 | 9-15/16 | 0.8281 | 31/64 | 0.484375 |
| 2- | 0.1667 | 6- | 0.5000 | 10- | 0.8333 | 1/2 | 0.500 |
| 2-1/16 | 0.1719 | 6-1/16 | 0.5052 | 10-1/16 | 0.8385 | 33/64 | 0.515625 |
| 2-1/8 | 0.1771 | 6-1/8 | 0.5104 | 10-1/8 | 0.8438 | 17/32 | 0.53125 |
| 2-3/16 | 0.1823 | 6-3/16 | 0.5156 | 10-3/16 | 0.8490 | 35/64 | 0.546875 |
| 2-1/4 | 0.1875 | 6-1/4 | 0.5208 | 10-1/4 | 0.8542 | 9/16 | 0.5625 |
| 2-5/16 | 0.1927 | 6-5/16 | 0.5260 | 10-5/16 | 0.8594 | 37/64 | 0.578125 |
| 2-3/8 | 0.1979 | 6-3/8 | 0.5313 | 10-3/8 | 0.8646 | 19/32 | 0.59375 |
| 2-7/16 | 0.2031 | 6-7/16 | 0.5365 | 10-7/16 | 0.8698 | 39/64 | 0.609375 |
| 2-1/2 | 0.2083 | 6-1/2 | 0.5417 | 10-1/2 | 0.8750 | 5/8 | 0.625 |
| 2-9/16 | 0.2135 | 6-9/16 | 0.5469 | 10-9/16 | 0.8802 | 41/64 | 0.640625 |
| 2-5/8 | 0.2188 | 6-5/8 | 0.5521 | 10-5/8 | 0.8854 | 21/32 | 0.65625 |
| 2-11/16 | 0.2240 | 6-11/16 | 0.5573 | 10-11/16 | 0.8906 | 43/64 | 0.671875 |
| 2-3/4 | 0.2292 | 6-3/4 | 0.5625 | 10-3/4 | 0.8958 | 11/16 | 0.6875 |
| 2-13/16 | 0.2344 | 6-13/16 | 0.5677 | 10-13/16 | 0.9010 | 45/64 | 0.703125 |
| 2-7/8 | 0.2396 | 6-7/8 | 0.5729 | 10-7/8 | 0.9063 | 23/32 | 0.71875 |
| 2-15/16 | 0.2448 | 6-15/16 | 0.5781 | 10-15/16 | 0.9115 | 47/64 | 0.734375 |
| 3- | 0.2500 | 7- | 0.5833 | 11- | 0.9167 | 3/4 | 0.750 |
| 3-1/16 | 0.2552 | 7-1/16 | 0.5885 | 11-1/16 | 0.9219 | 49/64 | 0.765625 |
| 3-1/8 | 0.2604 | 7-1/8 | 0.5938 | 11-1/8 | 0.9271 | 25/32 | 0.78125 |
| 3-3/16 | 0.2656 | 7-3/16 | 0.5990 | 11-3/16 | 0.9323 | 51/64 | 0.796875 |
| 3-1/4 | 0.2708 | 7-1/4 | 0.6042 | 11-1/4 | 0.9375 | 13/16 | 0.8125 |
| 3-5/16 | 0.2760 | 7-5/16 | 0.6094 | 11-5/16 | 0.9427 | 53/64 | 0.828125 |
| 3-3/8 | 0.2813 | 7-3/8 | 0.6146 | 11-3/8 | 0.9479 | 27/32 | 0.84375 |
| 3-7/16 | 0.2865 | 7-7/16 | 0.6198 | 11-7/16 | 0.9531 | 55/64 | 0.859375 |
| 3-1/2 | 0.2917 | 7-1/2 | 0.6250 | 11-1/2 | 0.9583 | 7/8 | 0.875 |
| 3-9/16 | 0.2969 | 7-9/16 | 0.6302 | 11-9/16 | 0.9635 | 57/64 | 0.890625 |
| 3-5/8 | 0.3021 | 7-5/8 | 0.6354 | 11-5/8 | 0.9688 | 29/32 | 0.90625 |
| 3-11/16 | 0.3073 | 7-11/16 | 0.6406 | 11-11/16 | 0.9740 | 59/64 | 0.921875 |
| 3-3/4 | 0.3125 | 7-3/4 | 0.6458 | 11-3/4 | 0.9792 | 15/16 | 0.9375 |
| 3-13/16 | 0.3177 | 7-13/16 | 0.6510 | 11-13/16 | 0.9844 | 61/64 | 0.953125 |
| 3-7/8 | 0.3229 | 7-7/8 | 0.6563 | 11-7/8 | 0.9896 | 31/32 | 0.96875 |
| 3-15/16 | 0.3281 | 7-15/16 | 0.6615 | 11-15/16 | 0.9948 | 63/64 | 0.984375 |
| 4- | 0.3333 | 8- | 0.6667 | 12- | 1.0000 | 1- | 1.000 |

**American Forest & Paper Association**
**American Wood Council**
**1111 19th Street, NW**
**Suite 800**
**Washington, DC 20036**
**Phone: 202-463-4713**
**Fax: 202-463-2791**
**awcinfo@afandpa.org**
**www.awc.org**

A F & P A®



07-07 0.5M