

STANDARD SPECIFICATION FOR JOIST GIRDERS

Adopted by the Steel Joist Institute November 4, 1985
Revised to May 18, 2010, Effective December 31, 2010

SECTION 1000. SCOPE AND DEFINITION

1000.1 SCOPE

The *Standard Specification for Joist Girders*, hereafter referred to as the Specification, covers the design, manufacture, application, and handling and erection of Joist Girders in buildings or other structures, where other structures are defined as those structures designed, manufactured, and erected in a manner similar to buildings. Joist Girders shall be designed using Allowable Stress Design (ASD) or Load and Resistance Factor Design (LRFD) in accordance with this Specification. Joist Girders shall be erected in accordance with the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, Code of Federal Regulations 29CFR Part 1926 Safety Standards for Steel Erection, Section 1926.757 Open Web Steel Joists.

This Specification includes Sections 1000 through 1005.

1000.2 DEFINITION

The term "Joist Girders", as used herein, refers to open web, load-carrying members utilizing hot-rolled or cold-formed steel, including cold-formed steel whose yield strength has been attained by cold working. Joist Girders are open web steel trusses used as primary framing members. They are designed as simple spans supporting concentrated loads for a floor or roof system. These concentrated loads are normally considered to act at the top chord panel points of the Joist Girders. Joist Girders have been standardized in depths from 20 inches (508 mm) through 120 inches (3048 mm), for spans from 20 feet (6096 mm) through 120 feet (36576 mm).

The Joist Girder standard designation in ASD is determined by its nominal depth in inches (mm), the letter "G", followed by the number of joist spaces, the letter "N", and finally the load in kips (kN) at each panel point, and the letter "K". The Joist Girder standard designation in LRFD is determined by its nominal depth in inches (mm), the letter "G", followed by the number of joist spaces, the letter "N", and finally the factored load in kips (kN) at each panel point, and the letter "F". Joist Girders shall be designed in accordance with these specifications to support the loads defined by the **specifying professional**.

Joist Girders are designed and manufactured as either simple framing members with underslung ends and bottom chord extensions or as part of an ordinary steel moment frame (OMF). When used as part of an OMF the **specifying professional** shall be responsible for carrying out all the required frame analyses (i.e. first-order and second-order), provide all the required load information and stiffness data to the joist manufacturer, and indicate the type of Joist Girder to column connections that are being designed on the contract documents.

A pitch of the Joist Girder top chord up to 1/2 inch per foot (1:24) is allowed. The standard Joist Girder designation depth shall be the depth at mid-span.



1000.3 STRUCTURAL DESIGN DRAWINGS AND SPECIFICATIONS

The design drawings and specifications shall meet the requirements in the *Code of Standard Practice for Steel Joists and Joist Girders*, except for deviations specifically identified in the design drawings and/or specifications.

SECTION 1001. REFERENCED SPECIFICATIONS, CODES AND STANDARDS

1001.1 REFERENCES

American Institute of Steel Construction, Inc. (AISC)

ANSI/AISC 360-10 *Specification for Structural Steel Buildings*

American Iron and Steel Institute (AISI)

ANSI/AISI S100-2007 *North American Specification for Design of Cold-Formed Steel Structural Members*

ANSI/AISI S100-07/S1-09, *Supplement No. 1 to the North American Specification for the Design of Cold-Formed Steel Structural Members*, 2007 Edition

ANSI/AISI S100-07/S2-10, *Supplement No. 2 to the North American Specification for the Design of Cold-Formed Steel Structural Members*, 2007 Edition

American Society of Testing and Materials, ASTM International (ASTM)

ASTM A6/A6M-09, Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling

ASTM A36/A36M-08, Standard Specification for Carbon Structural Steel

ASTM A242/242M-04 (2009), Standard Specification for High-Strength Low-Alloy Structural Steel

ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength

ASTM A325/325M-09, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi [830 MPa] Minimum Tensile Strength

ASTM A370-09ae1, Standard Test Methods and Definitions for Mechanical Testing of Steel Products

ASTM A500/A500M-07, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

ASTM A529/A529M-05, Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality

ASTM A572/A572M-07, Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel

ASTM A588/A588M-05, Standard Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi [345 MPa] Minimum Yield Point, with Atmospheric Corrosion Resistance

ASTM A606/A606M-09, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance

ASTM A992/A992M-06a, Standard Specification for Structural Steel Shapes



American National Standard SJI-JG-2010

ASTM A1008/A1008M-09, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable

ASTM A1011/A1011M-09a, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength

American Welding Society (AWS)

AWS A5.1/A5.1M-2004, Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding

AWS A5.5/A5.5M:2006, Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding

AWS A5.17/A5.17M-97:R2007, Specification for Carbon Steel Electrodes and Fluxes for Submerged Arc Welding

AWS A5.18/A5.18M:2005, Specification for Carbon Steel Electrodes and Rods for Gas Shielded Arc Welding

AWS A5.20/A5.20M:2005, Specification for Carbon Steel Electrodes for Flux Cored Arc Welding

AWS A5.23/A5.23M:2007, Specification for Low-Alloy Steel Electrodes and Fluxes for Submerged Arc Welding

AWS A5.28/A5.28M:2005, Specification for Low-Alloy Steel Electrodes and Rods for Gas Shielded Arc Welding

AWS A5.29/A5.29M:2005, Specification for Low Alloy Steel Electrodes for Flux Cored Arc Welding

1001.2 OTHER REFERENCES

The following references are non-ANSI approved documents and as such, are provided solely as sources of commentary or additional information related to topics in this Specification:

Federal Register, Department of Labor, Occupational Safety and Health Administration (2001), 29 CFR Part 1926 Safety Standards for Steel Erection; Final Rule, §1926.757 Open Web Steel Joists - January 18, 2001, Washington, D.C.

American Society of Civil Engineers (ASCE)

SEI/ASCE 7-10 *Minimum Design Loads for Buildings and Other Structures*

Steel Joist Institute (SJI)

SJI-COSP-2010, *Code of Standard Practice for Steel Joists and Joist Girders*

Technical Digest No. 3 (2007), *Structural Design of Steel Joist Roofs to Resist Ponding Loads*

Technical Digest No. 5 (1988), *Vibration of Steel Joist-Concrete Slab Floors*

Technical Digest No. 6 (2011), *Structural Design of Steel Joist Roofs to Resist Uplift Loads*

Technical Digest No. 8 (2008), *Welding of Open Web Steel Joists and Joist Girders*

Technical Digest No. 9 (2008), *Handling and Erection of Steel Joists and Joist Girders*

Technical Digest No. 10 (2003), *Design of Fire Resistive Assemblies with Steel Joists*

Technical Digest No. 11 (2007), *Design of Lateral Load Resisting Frames Using Steel Joists and Joist Girders*

Technical Digest No. 12 (2007), *Evaluation and Modification of Open Web Steel Joists and Joist Girders*

Steel Structures Painting Council (SSPC) (2000), *Steel Structures Painting Manual, Volume 2, Systems and Specifications*, Paint Specification No. 15, Steel Joist Shop Primer, May 1, 1999, Pittsburgh, PA.



SECTION 1002. MATERIALS

1002.1 STEEL

The steel used in the manufacture of Joist Girders shall conform to one of the following ASTM Specifications:

- Carbon Structural Steel, ASTM A36/A36M.
- High-Strength Low-Alloy Structural Steel, ASTM A242/A242M.
- Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes, ASTM A500/A500M.
- High-Strength Carbon-Manganese Steel of Structural Quality, ASTM A529/A529M.
- High-Strength Low-Alloy Columbium-Vanadium Structural Steel, ASTM A572/A572M.
- High-Strength Low-Alloy Structural Steel up to 50 ksi [345 MPa] Minimum Yield Point with Atmospheric Corrosion Resistance, ASTM A588/A588M.
- Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance, ASTM A606/A606M.
- Structural Steel Shapes, ASTM A992/A992M.
- Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable, ASTM A1008/A1008M.
- Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra High Strength, ASTM A1011/A1011M.

or shall be of suitable quality ordered or produced to other than the listed specifications, provided that such material in the state used for final assembly and manufacture is weldable and is proved by tests performed by the producer or manufacturer to have the properties specified in Section 1002.2.

1002.2 MECHANICAL PROPERTIES

Steel used for Joist Girders shall have a minimum yield strength determined in accordance with one of the procedures specified in this section, which is equal to the yield strength* assumed in the design.

*The term "Yield Strength" as used herein shall designate the yield level of a material as determined by the applicable method outlined in paragraph 13.1 "Yield Point", and in paragraph 13.2 "Yield Strength", of ASTM A370, *Standard Test Methods and Definitions for Mechanical Testing of Steel Products*, or as specified in paragraph 1002.2 of this specification.

Evidence that the steel furnished meets or exceeds the design yield strength shall, if requested, be provided in the form of an affidavit or by witnessed or certified test reports.

For material used without consideration of increase in yield strength resulting from cold forming, the specimens shall be taken from as-rolled material. In the case of material, the mechanical properties of which conform to the requirements of one of the listed specifications, the test specimens and procedures shall conform to those of such specifications and to ASTM A370.



In the case of material, the mechanical properties of which do not conform to the requirements of one of the listed specifications, the test specimens and procedures shall conform to the applicable requirements of ASTM A370, and the specimens shall exhibit a yield strength equal to or exceeding the design yield strength and an elongation of not less than (a) 20 percent in 2 inches (51 millimeters) for sheet and strip, or (b) 18 percent in 8 inches (203 millimeters) for plates, shapes and bars with adjustments for thickness for plates, shapes and bars as prescribed in ASTM A36/A36M, A242/A242M, A500/A500M, A529/A529M, A572/A572M, A588/A588M, A992/A992M whichever specification is applicable, on the basis of design yield strength.

The number of tests shall be as prescribed in ASTM A6/A6M for plates, shapes, and bars; and ASTM A606/A606M, A1008/A1008M and A1011/A1011M for sheet and strip.

If as-formed strength is utilized, the test reports shall show the results of tests performed on full section specimens in accordance with the provisions of the AISI North American Specifications for the Design of Cold-Formed Steel Structural Members. They shall also indicate compliance with these provisions and with the following additional requirements:

- a) The yield strength calculated from the test data shall equal or exceed the design yield strength.
- b) Where tension tests are made for acceptance and control purposes, the tensile strength shall be at least 8 percent greater than the yield strength of the section.
- c) Where compression tests are used for acceptance and control purposes, the specimen shall withstand a gross shortening of 2 percent of its original length without cracking. The length of the specimen shall be not greater than 20 times the least radius of gyration.
- d) If any test specimen fails to pass the requirements of the subparagraphs (a), (b), or (c) above, as applicable, two retests shall be made of specimens from the same lot. Failure of one of the retest specimens to meet such requirements shall be the cause for rejection of the lot represented by the specimens.

1002.3 WELDING ELECTRODES

The following electrodes shall be used for arc welding:

- a) For connected members both having a specified minimum yield strength greater than 36 ksi (250 MPa).
 - AWS A5.1: E70XX
 - AWS A5.5: E70XX-X
 - AWS A5.17: F7XX-EXXX, F7XX-ECXXX flux electrode combination
 - AWS A5.18: ER70S-X, E70C-XC, E70C-XM
 - AWS A5.20: E7XT-X, E7XT-XM
 - AWS A5.23: F7XX-EXXX-XX, F7XX-ECXXX-XX
 - AWS A5.28: ER70S-XXX, E70C-XXX
 - AWS A5.29: E7XTX-X, E7XTX-XM
- b) For connected members both having a specified minimum yield strength of 36 ksi (250 MPa) or one having a specified minimum yield strength of 36 ksi (250 MPa), and the other having a specified minimum yield strength greater than 36 ksi (250 MPa).
 - AWS A5.1: E60XX
 - AWS A5.17: F6XX-EXXX, F6XX-ECXXX flux electrode combination
 - AWS A5.20: E6XT-X, E6XT-XM
 - AWS A5.29: E6XTX-X, E6XTX-XM
 - or any of those listed in Section 102.3(a).

Other welding methods, providing equivalent strength as demonstrated by tests, shall be permitted to be used.



1002.4 PAINT

The standard shop paint is intended to protect the steel for only a short period of exposure in ordinary atmospheric conditions and shall be considered an impermanent and provisional coating.

When specified, the standard shop paint shall conform to one of the following:

- a) Steel Structures Painting Council Specification, SSPC No. 15.
- b) Or, shall be a shop paint which meets the minimum performance requirements of the above listed specification.

**SECTION 1003.
DESIGN AND MANUFACTURE**

1003.1 METHOD

Joist Girders shall be designed in accordance with these specifications as simply-supported primary load-carrying members. All loads shall be applied through steel joists, and placed along the Joist Girder top chord. Where any applicable design feature is not specifically covered herein, the design shall be in accordance with the following specifications:

- a) Where the steel used consists of hot-rolled shapes, bars or plates use the American Institute of Steel Construction, *Specification for Structural Steel Buildings*.
- b) For members which are cold-formed from sheet or strip steel, use the American Iron and Steel Institute, *North American Specification for the Design of Cold-Formed Steel Structural Members*.

Design Basis:

Joist Girder designs shall be in accordance with the provisions in this Standard Specification using Load and Resistance Factor Design (LRFD) or Allowable Strength Design (ASD) as specified by the **specifying professional** for the project.

Loads, Forces and Load Combinations:

The loads and forces used for the Joist Girder design shall be calculated by the **specifying professional** in accordance with the applicable building code and specified and provided on the contract drawings.

The load combinations shall be specified by the **specifying professional** on the contract drawings in accordance with the applicable building code or, in the absence of a building code, the load combinations shall be those stipulated in SEI/ASCE 7. For LRFD designs, the load combinations in SEI/ASCE 7, Section 2.3 apply. For ASD designs, the load combinations in SEI/ASCE 7, Section 2.4 apply.

1003.2 DESIGN AND ALLOWABLE STRESSES

Design Using Load and Resistance Factor Design (LRFD)

Joist Girders shall have their components so proportioned that the required stresses, f_u , shall not exceed ϕF_n where

- f_u = required stress ksi (MPa)
- F_n = nominal stress ksi (MPa)
- ϕ = resistance factor
- ϕF_n = design stress



Design Using Allowable Strength Design (ASD)

Joist Girders shall have their components so proportioned that the required stresses, f , shall not exceed F_n / Ω where

- f = required stress ksi (MPa)
- F_n = nominal stress ksi (MPa)
- Ω = safety factor
- F_n / Ω = allowable stress

Stresses:

For Chords: The calculation of design or allowable stress shall be based on a yield strength, F_y , of the material used in manufacturing equal to 50 ksi (345 MPa).

For all other Joist Girder elements: The calculation of design or allowable stress shall be based on a yield strength, F_y , of the material used in manufacturing, but shall not be less than 36 ksi (250 MPa) or greater than 50 ksi (345 MPa).

Note: Yield strengths greater than 50 ksi shall not be used for the design of any Joist Girder members.

(a) Tension: $\phi_t = 0.90$ (LRFD), $\Omega_t = 1.67$ (ASD)

$$\text{Design Stress} = 0.9F_y \text{ (LRFD)} \tag{1003.2-1}$$

$$\text{Allowable Stress} = 0.6F_y \text{ (ASD)} \tag{1003.2-2}$$

(b) Compression: $\phi_c = 0.90$ (LRFD), $\Omega_c = 1.67$ (ASD)

$$\text{Design Stress} = 0.9F_{cr} \text{ (LRFD)} \tag{1003.2-3}$$

$$\text{Allowable Stress} = 0.6F_{cr} \text{ (ASD)} \tag{1003.2-4}$$

For members with $\ell/r \leq 4.71 \sqrt{E/QF_y}$

$$F_{cr} = Q \left[0.658 \left(\frac{QF_y}{F_e} \right) \right] F_y \tag{1003.2-5}$$

For members with $\ell/r > 4.71 \sqrt{E/QF_y}$

$$F_{cr} = 0.877F_e \tag{1003.2-6}$$

Where F_e = Elastic buckling stress determined in accordance with Equation 1003.2-7

$$F_e = \frac{\pi^2 E}{\left(\frac{\ell}{r} \right)^2} \tag{1003.2-7}$$

In the above equations, ℓ is taken as the distance in inches (millimeters) between panel points for the chord members and the appropriate length for web members, and r is the corresponding least radius of gyration of the member or any component thereof. E is equal to 29,000 ksi (200,000 MPa).



For hot-rolled sections and cold formed angles, Q is the full reduction factor for slender compression members as defined in the AISC *Specification for Structural Steel Buildings*, except that when the first primary compression web member is a crimped-end angle member, whether hot-rolled or cold formed.

$$Q = [5.25/(w/t)] + t \leq 1.0 \quad (1003.2-8)$$

Where: w = angle leg length, inches
 t = angle leg thickness, inches

or,

$$Q = [5.25/(w/t)] + (t/25.4) \leq 1.0 \quad (1003.2-9)$$

Where: w = angle leg length, millimeters
 t = angle leg thickness, millimeters

For all other cold-formed sections the method of calculating the nominal compression strength is given in the AISI, *North American Specification for the Design of Cold-Formed Steel Structural Members*.

(c) Bending: $\phi_b = 0.90$ (LRFD), $\Omega_b = 1.67$ (ASD)

Bending calculations are to be based on using the elastic section modulus.

For chords and web members other than solid rounds: $F_n = F_y$

$$\text{Design Stress} = \phi_b F_n = 0.9F_y \quad (\text{LRFD}) \quad (1003.2-10)$$

$$\text{Allowable Stress} = F_n/\Omega_b = 0.6F_y \quad (\text{ASD}) \quad (1003.2-11)$$

For web members of solid round cross section: $F_n = 1.6 F_y$

$$\text{Design Stress} = \phi_b F_n = 1.45F_y \quad (\text{LRFD}) \quad (1003.2-12)$$

$$\text{Allowable Stress} = F_n/\Omega_b = 0.95F_y \quad (\text{ASD}) \quad (1003.2-13)$$

For bearing plates used in Joist Girder seats: $F_n = 1.5 F_y$

$$\text{Design Stress} = \phi_b F_n = 1.35F_y \quad (\text{LRFD}) \quad (1003.2-14)$$

$$\text{Allowable Stress} = F_n/\Omega_b = 0.90F_y \quad (\text{ASD}) \quad (1003.2-15)$$



(d) Weld Strength:

Shear at throat of fillet welds, flare bevel groove welds, partial joint penetration groove welds, and plug/slot welds:

$$\text{Nominal Shear Stress} = F_{nw} = 0.6F_{exx} \quad (1003.2-16)$$

LRFD: $\phi_w = 0.75$

$$\text{Design Shear Strength} = \phi R_n = \phi_w F_{nw} A = 0.45F_{exx} A_w \quad (1003.2-17)$$

ASD: $\Omega_w = 2.0$

$$\text{Allowable Shear Strength} = R_n/\Omega_w = F_{nw} A/\Omega_w = 0.3F_{exx} A_w \quad (1003.2-18)$$

Made with E70 series electrodes or F7XX-EXXX flux-electrode combinations $F_{exx} = 70$ ksi (483 MPa)

Made with E60 series electrodes or F6XX-EXXX flux-electrode combinations $F_{exx} = 60$ ksi (414 MPa)

A_w = effective throat area, where:

For fillet welds, A_w = effective throat area, (other design methods demonstrated to provide sufficient strength by testing may be used);

For flare bevel groove welds, the effective weld area is based on a weld throat width, T, where

$$T \text{ (inches)} = 0.12D + 0.11 \quad (1003.2-19)$$

Where D = web diameter, inches

or,

$$T \text{ (mm)} = 0.12D + 2.8 \quad (1003.2-20)$$

Where D = web diameter, mm

For plug/slot welds, A_w = cross-sectional area of the hole or slot in the plane of the faying surface provided that the hole or slot meets the requirements of the American Institute of Steel Construction *Specification for Structural Steel Buildings* (and as described in SJI Technical Digest No. 8, "Welding of Open-Web Steel Joists and Joist Girders").

Strength of resistance welds and complete-joint-penetration groove or butt welds in tension or compression (only when the stress is normal to the weld axis) is equal to the base metal strength:

$$\phi_t = \phi_c = 0.90 \text{ (LRFD)} \quad \Omega_t = \Omega_c = 1.67 \text{ (ASD)}$$

$$\text{Design Stress} = 0.9F_y \text{ (LRFD)} \quad (1003.2-21)$$

$$\text{Allowable Stress} = 0.6F_y \text{ (ASD)} \quad (1003.2-22)$$

1003.3 MAXIMUM SLENDERNESS RATIOS

The slenderness ratio ℓ/r , where ℓ is the length center-to-center of support points and r is the corresponding least radius of gyration, shall not exceed the following:

Top chord interior panels.....	90
Top chord end panels.....	120
Compression members other than top chord.....	200
Tension members.....	240



1003.4 MEMBERS

(a) Chords

The bottom chord shall be designed as an axially loaded tension member. The radius of gyration of the bottom chord about its vertical axis shall not be less than $\ell/240$ where ℓ is the distance between lines of bracing.

The top chord shall be designed as an axial loaded compression member. The radius of gyration of the top chord about the vertical axis shall not be less than $\text{Span}/575$.

The top chord shall be considered as stayed laterally by the steel joists provided positive attachment is made. The outstanding part of the top chord member shall be designed such that the allowable reaction from a single joist is the lesser of:

$$\phi P_p \text{ and } \phi P_p (1.6 - f_{au}/\phi Q F_y) \quad (\text{LRFD, } \phi = 0.9) \quad (1003.4-1)$$

$$0.6 P_p \text{ and } 0.6 P_p (1.6 - f_a/\Omega Q F_y) \quad (\text{ASD, } \Omega = 0.6) \quad (1003.4-2)$$

Where:

- F_y = Specified minimum yield strength, ksi (MPa)
- P_p = Plastic failure mode = $[(t^2 F_y)/[2(b-k)]] [g+5.66(b-k)]$
- Q = Form factor defined in Section 1003.2(b)
- b = width of the outstanding part of the top chord member, in. (mm)
- f_{au} = P_u/A = Required compressive stress, ksi (MPa)
- f_a = P/A = Required compressive stress, ksi (MPa)
- g = width of bearing seat, in. (mm)
- k = value from angle properties or similar dimension for other members
- t = thickness of the outstanding part of the top chord member, in. (mm)

The top chord and bottom chord shall be designed such that at each joint:

$$f_{vmod} \leq \phi_v f_n \quad (\text{LRFD, } \phi = 1.00) \quad (1003.4-3)$$

$$f_{vmod} \leq f_n/\Omega_v \quad (\text{ASD, } \Omega = 1.50) \quad (1003.4-4)$$

Where:

- f_n = nominal shear stress = $0.6 F_y$, ksi (MPa)
- f_t = axial stress = P/A , ksi (MPa)
- f_v = shear stress = V/bt , ksi (MPa)
- f_{vmod} = modified shear stress = $(\frac{1}{2})(f_t^2 + 4f_v^2)^{1/2}$
- b = length of vertical part(s) of cross section, in. (mm)
- t = thickness of vertical part(s) of cross section, in. (mm)

It is not necessary to design the top chord and bottom chord for the modified shear stress when a round bar web member is continuous through a joint. The minimum required shear of 25 percent of the end reaction is not required when evaluating Equation 1003.4-3 or 1003.4-4.



(b) Web

The vertical shears to be used in the design of the web members shall be determined from full loading, but such vertical shear shall be not less than 25 percent of the end reaction.

Interior vertical web members used in modified Warren type web systems that do not support the direct loads through steel joists shall be designed to resist an axial load of 2 percent of the top chord axial force.

Tension members shall be designed to resist at least 25 percent of their axial force in compression.

(c) Joist Girder Extensions

Joist Girder extensions are defined as one of three types, top chord extensions (TCX), extended ends, or full depth cantilevers.

Joist Girder extensions shall be designed based on the following:

- (1) A loading diagram shall be provided for the Joist Girder extension. The diagram shall include the magnitude and location of the loads to be supported, as well as the appropriate load combinations.

Any deflection requirements or limits due to the accompanying loads and load combinations on the Joist Girder extension shall be provided by the **specifying professional**. Unless otherwise specified, the joist manufacturer shall check the extension for the specified deflection limit under live load acting simultaneously on both the Joist Girder base span and the extension.

The joist manufacturer shall consider the effects of Joist Girder extension loading on the base span of the Joist Girder. This includes carrying the design bending moment due to the loading on the extension into the top chord end panel(s), and the effect on the overall Joist Girder chord and web axial forces.

Bracing of Joist Girder extensions shall be clearly indicated on the structural drawings.

(d) Fillers and Ties

In compression members composed of two components, (when fillers, ties or welds are used) they shall be spaced so the ℓ/r ratio for each component does not exceed the ℓ/r ratio of the member as a whole. In tension members composed of two components (when fillers, ties or welds are used), they shall be spaced so that the ℓ/r ratio of each component does not exceed 240. The least radius of gyration shall be used in computing the ℓ/r ratio of a component.

1003.5 CONNECTIONS

(a) Methods

Joist connections and splices shall be made by attaching the members to one another by arc or resistance welding or other accredited methods.

(1) Welded Connections

- a) Selected welds shall be inspected visually by the manufacturer. Prior to this inspection, weld slag shall be removed.
- b) Cracks are not acceptable and shall be repaired.
- c) Thorough fusion shall exist between weld and base metal for the required design length of the weld; such fusion shall be verified by visual inspection.
- d) Unfilled weld craters shall not be included in the design length of the weld.
- e) Undercut shall not exceed 1/16 inch (2 mm) for welds oriented parallel to the principal stress.



- f) The sum of surface (piping) porosity diameters shall not exceed 1/16 inch (2 mm) in any 1 inch (25 mm) of design weld length.
- g) Weld spatter that does not interfere with paint coverage is acceptable.

(2) Welded Connections for Crimped-End Angle Web Members

The connection of each end of a crimped angle web member to each side of the chord shall consist of a weld group made of more than a single line of weld. The design weld length shall include, at minimum, an end return of two times the nominal weld size.

(3) Welding Program

Manufacturers shall have a program for establishing weld procedures and operator qualification, and weld sampling and testing. (See Technical Digest 8, "Welding of Open Web Steel Joists and Joist Girders").

(4) Weld Inspection by Outside Agencies (See Section 1004.10 of this specification).

The agency shall arrange for visual inspection to determine that welds meet the acceptance standards of Section 1003.5(a)(1). Ultrasonic, X-Ray, and magnetic particle testing are inappropriate for joists due to the configurations of the components and welds.

(b) Strength

- (1) Joint Connections - Joint connections shall develop the maximum force due to any of the design loads, but not less than 50 percent of the strength of the member in tension or compression, whichever force is the controlling factor in the selection of the member.
- (2) Shop Splices – Shop splices shall be permitted to occur at any point in chord or web members. Splices shall be designed for the member force, but not less than 50 percent of the member strength. All component parts comprising the cross section of the chord or web member (including reinforcing plates, rods, etc.) at the point of the splice, shall develop an ultimate tensile force of at least 1.2 times the product of the yield strength and the full design area of the chord or web. The "full design area" is the minimum required area such that the required stress shall be less than the design (LRFD) or allowable (ASD) stress.

(c) Field Splices

Field Splices shall be designed by the manufacturer and may be either bolted or welded. Splices shall be designed for the member force, but not less than 50 percent of the member strength.

(d) Eccentricity

Members connected at a joint shall have their center of gravity lines meet at a point, if practical. Eccentricity on either side of the neutral axis of chord members shall be permitted to be neglected when it does not exceed the distance between the centroid and the back of the chord. Otherwise, provision shall be made for the stresses due to eccentricity. Ends of Joist Girders shall be proportioned to resist bending produced by eccentricity at the support.

In those cases where a single angle compression member is attached to the outside of the stem of a tee or double angle chord, due consideration shall be given to eccentricity.



1003.6 CAMBER

Joist Girders shall have approximate cambers in accordance with the following:

TABLE 1003.6-1

Top Chord Length		Approximate Camber	
20'-0"	(6096 mm)	1/4"	(6 mm)
30'-0"	(9144 mm)	3/8"	(10 mm)
40'-0"	(12192 mm)	5/8"	(16 mm)
50'-0"	(15240 mm)	1"	(25 mm)
60'-0"	(18288 mm)	1 1/2"	(38 mm)
70'-0"	(21336 mm)	2"	(51 mm)
80'-0"	(24384 mm)	2 3/4"	(70 mm)
90'-0"	(27432 mm)	3 1/2"	(89 mm)
100'-0"	(30480 mm)	4 1/4"	(108 mm)

For Joist Girder lengths exceeding 100'-0" a camber equal to Span/300 shall be used.

The **specifying professional** shall give consideration to coordinating Joist Girder camber with adjacent framing.

1003.7 VERIFICATION OF DESIGN AND MANUFACTURE

(a) Design Calculations

Companies manufacturing Joist Girders shall submit design data to the Steel Joist Institute (or an independent agency approved by the Steel Joist Institute) for verification of compliance with the SJI Specifications. Design data shall be submitted in detail and in the format specified by the Institute.

(b) In-Plant Inspections

Each manufacturer shall verify his ability to manufacture Joist Girders through periodic In-Plant Inspections. Inspections shall be performed by an independent agency approved by the Steel Joist Institute. The frequency, manner of inspection, and manner of reporting shall be determined by the Steel Joist Institute. The plant inspections are not a guarantee of the quality of any specific joists; this responsibility lies fully and solely with the individual manufacturer.



SECTION 1004. APPLICATION

1004.1 USAGE

This specification shall apply to any type of structure where steel joists are to be supported directly by Joist Girders installed as hereinafter specified. Where Joist Girders are used other than on simple spans under equal concentrated gravity loading, as prescribed in Section 1003.1, they shall be investigated and modified when necessary to limit the unit stresses to those listed in Section 1003.2. The magnitude and location of all loads and forces, other than equal concentrated gravity loading, shall be provided on the structural drawings. The **specifying professional** shall design the supporting structure, including the design of columns, connections, and moment plates*. This design shall account for the stresses caused by lateral forces and the stresses due to connecting the bottom chord to the column or other structural support.

The designed detail of a rigid type connection and moment plates shall be shown on the structural drawings by the **specifying professional**. The moment plates shall be furnished by other than the joist manufacturer.

*For further reference, refer to Steel Joist Institute Technical Digest 11, "Design of Lateral Load Resisting Frames Using Steel Joists and Joist Girders."

1004.2 SPAN

The span of a Joist Girder shall not exceed 24 times its depth.

1004.3 DEPTH

Joist Girders may have either parallel chords or a top chord pitch of up to 1/2 inch per foot (1:24). The nominal depth of a Joist Girder shall be the depth at mid-span.

1004.4 END SUPPORTS

(a) Masonry and Concrete

A Joist Girder end supported by masonry or concrete shall bear on steel bearing plates and shall be designed as steel bearing. Due consideration of the end reactions and all other vertical or lateral forces shall be taken by the **specifying professional** in the design of the steel bearing plate and the masonry or concrete. The ends of Joist Girders shall extend a distance of not less than 6 inches (152 millimeters) over the masonry or concrete support and be anchored to the steel bearing plate. The plate shall be located not more than 1/2 inch (13 millimeters) from the face of the wall and shall be not less than 9 inches (229 millimeters) wide perpendicular to the length of the girder. The plate is to be designed by the **specifying professional** and shall be furnished by other than the joist manufacturer.

Where it is deemed necessary to bear less than 6 inches (152 millimeters) over the masonry or concrete support, special consideration is to be given to the design of the steel bearing plate and the masonry or concrete by the **specifying professional**. The girders shall bear a minimum of 4 inches (102 millimeters) on the steel bearing plate.

(b) Steel

Due consideration of the end reactions and all other vertical and lateral forces shall be taken by the **specifying professional** in the design of the steel support. The ends of Joist Girders shall extend a distance of not less than 4 inches (102 millimeters) over the steel supports and shall have positive attachment to the support, either by bolting or welding.



1004.5 BRACING

Joist Girders shall be proportioned such that they can be erected without bridging (See Section 1004.9 for bracing required for uplift forces). Therefore, the following requirements shall be met:

- a) The ends of the bottom chord are restrained from lateral movement to brace the girder from overturning. For Joist Girders at columns in steel frames, restraint shall be provided by a stabilizer plate on the column.
- b) No other loads shall be placed on the Joist Girder until the steel joists bearing on the girder are in place and welded to the girder.

1004.6 BEARING SEAT ATTACHMENTS

(a) Masonry and Concrete

Ends of Joist Girders resting on steel bearing plates on masonry or structural concrete shall be attached thereto with a minimum of two 1/4 inch (6 millimeters) fillet welds 2 inches (51 millimeters) long, or with two 3/4 inch (19 millimeters) ASTM - A307 bolts (minimum), or the equivalent.

(b) Steel

Ends of Joist Girders resting on steel supports shall be attached thereto with a minimum of two 1/4 inch (6 millimeters) fillet welds 2 inches (51 millimeters) long, or with two 3/4 inch (19 millimeters) ASTM - A307 bolts, or the equivalent. In steel frames, bearing seats for Joist Girders shall be fabricated to allow for field bolting.

(c) Uplift

Where uplift forces are a design consideration, roof Joist Girders shall be anchored to resist such forces (Refer to Section 1004.9).

1004.7 DEFLECTION

The deflections due to the design live load shall not exceed the following:

Floors: 1/360 of span.

Roofs: 1/360 of span where a plaster ceiling is attached or suspended.
1/240 of span for all other cases.

The **specifying professional** shall give consideration to the effects of deflection and vibration* in the selection of Joist Girders.

*For further reference, refer to Steel Joist Institute Technical Digest 5, "Vibration of Steel Joist-Concrete Slab Floors" and the Institute's Computer Vibration Program.

1004.8 PONDING

The ponding investigation shall be performed by the **specifying professional**.

*For further reference, refer to Steel Joist Institute Technical Digest 3, "Structural Design of Steel Joist Roofs to Resist Ponding Loads" and AISC Specification for Structural Steel Buildings.



1004.9 UPLIFT

Where uplift forces due to wind are a design requirement, these forces shall be indicated on the contract drawings in terms of NET uplift in pounds per square foot (Pascals). The contract drawings shall indicate if the net uplift is based on ASD or LRFD. When these forces are specified, they shall be considered in the design of Joist Girders and/or bracing. If the ends of the bottom chord are not strutted, bracing shall be provided near the first bottom chord panel points whenever uplift due to wind forces is a design consideration.

*For further reference, refer to Steel Joist Institute Technical Digest 6, "Structural Design of Steel Joist Roofs to Resist Uplift Loads."

1004.10 INSPECTION

Joist Girders shall be inspected by the manufacturer before shipment to verify compliance of materials and workmanship with the requirements of this specification. If the purchaser wishes an inspection of the Joist Girders by someone other than the manufacturer's own inspectors, they may reserve the right to do so in their "Invitation to Bid" or the accompanying "Job Specifications". Arrangements shall be made with the manufacturer for such inspection of the Joist Girders at the manufacturing shop by the purchaser's inspectors at purchaser's expense.

SECTION 1005. HANDLING AND ERECTION*

Particular attention shall be paid to the erection of Joist Girders.

Care shall be exercised at all times to avoid damage through careless handling during unloading, storing and erecting. Dropping of Joist Girders shall not be permitted.

In steel framing, where Joist Girders are utilized at column lines, the Joist Girder shall be field-bolted at the column. Before hoisting cables are released and before an employee is allowed on the Joist Girder the following conditions shall be met:

- a) The seat at each end of the Joist Girder is attached in accordance with Section 1004.6.

When a bolted seat connection is used for erection purposes, as a minimum, the bolts shall be snug tightened. The snug tight condition is defined as the tightness that exists when all plies of a joint are in firm contact. This shall be attained by a few impacts of an impact wrench or the full effort of an employee using an ordinary spud wrench.

- b) Where stabilizer plates are required the Joist Girder bottom chord shall engage the stabilizer plate.

During the construction period, the contractor shall provide means for the adequate distribution of loads so that the carrying capacity of any Joist Girder is not exceeded.

Joist Girders shall not be used as anchorage points for a fall arrest system unless written direction to do so is obtained from a "qualified person". ⁽¹⁾

Field welding shall not damage the Joist Girder. The total length of weld at any one cross-section on cold formed members whose yield strength has been attained by cold working and whose as-formed strength is used in the design, shall not exceed 50 percent of the overall developed width of the cold-formed section.

*For a thorough coverage of this topic, refer to SJI Technical Digest 9, "Handling and Erection of Steel Joists and Joist Girders."

⁽¹⁾ See Federal Register, Department of Labor, Occupational Safety and Health Administration (2001), 29 CFR Part 1926 Safety Standards for Steel Erection; Final Rule, §1926.757 Open Web Steel Joists - January 18, 2001, Washington, D.C. for definition of "qualified person".



DESIGN GUIDE LRFD WEIGHT TABLE

FOR JOIST GIRDERS

Based on a 50 ksi Maximum Yield Strength

GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT – POUNDS PER LINEAR FOOT																	
			FACTORED LOAD ON EACH PANEL POINT – KIPS																	
			6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	36.0	42.0	48.0	54.0	60.0	66.0	72.0	78.0	84.0
20	2N@ 10.00	20	16	19	19	19	19	20	24	24	25	30	37	41	46	50	56	62	70	75
		24	16	19	19	19	19	20	21	21	25	28	32	36	41	42	49	52	53	66
		28	16	19	19	19	19	20	20	21	23	26	28	32	39	40	42	46	48	49
	3N@ 6.67	20	15	15	19	19	20	23	24	27	31	36	44	48	54	74	75	81	84	89
		24	15	16	16	16	19	20	23	26	27	33	36	45	47	53	56	68	79	82
		28	15	16	16	16	17	20	24	24	26	31	36	44	46	49	53	57	68	80
	4N@ 5.00	20	15	15	19	21	25	29	33	38	41	50	57	65	71	88	97	100	107	120
24		15	16	17	20	23	26	29	32	35	44	50	55	62	71	85	90	100	102	
28		16	16	17	19	22	25	28	30	34	39	49	50	59	63	72	86	91	91	
5N@ 4.00	20	15	17	21	26	31	36	39	48	51	62	71	82	99	99	109	120	141	142	
	24	16	16	20	23	26	30	35	39	43	53	60	68	80	91	101	103	110	120	
	28	16	16	18	22	27	28	33	37	39	48	55	64	68	77	93	95	107	111	
6N@ 3.33	20	16	19	25	29	36	41	50	57	58	72	82	99	107	118	138	141	147	147	
	24	16	18	22	28	31	37	43	46	53	61	70	85	102	102	111	123	144	147	
	28	17	18	22	26	30	33	40	42	47	58	68	76	83	96	109	112	119	130	
8N@ 2.50	20	19	25	32	41	51	58	65	72	82	99	118	139	142						
	24	17	22	29	36	42	50	54	61	69	86	103	107	128	149	153				
	28	18	22	29	34	40	47	54	61	67	76	88	107	112	124	135	155	166		
22	2N@ 11.00	20	21	21	21	22	22	23	24	24	25	34	39	43	49	55	62	69	76	78
		24	18	21	21	22	22	22	23	24	24	30	33	41	41	45	51	55	61	73
		28	18	21	21	21	22	22	22	23	24	37	30	33	41	42	46	48	51	58
	3N@ 7.33	20	15	18	18	19	22	24	26	29	33	42	45	53	68	70	76	84	88	94
		24	15	15	19	19	20	23	24	26	30	35	40	45	48	55	61	74	81	84
		28	15	16	16	16	19	20	23	24	27	32	36	45	47	52	54	59	74	82
	4N@ 5.50	20	15	16	19	23	26	30	36	39	44	55	62	71	82	95	96	106	119	134
24		15	15	17	20	25	27	29	34	38	48	52	58	71	79	89	98	101	107	
28		16	16	16	19	22	25	28	32	35	40	49	54	60	72	79	87	90	97	
5N@ 4.40	20	15	17	24	27	34	38	42	49	55	65	75	96	98	111	126	137	147	148	
	24	16	16	20	24	28	33	38	40	48	56	62	73	85	100	101	110	116	133	
	28	16	16	18	22	26	30	32	38	41	51	57	65	73	86	92	102	105	111	
6N@ 3.67	20	16	21	27	33	39	49	56	57	65	79	97	106	118	137					
	24	16	19	23	28	32	39	45	51	58	66	82	98	101	109	120	142	144		
	28	16	18	22	26	30	34	39	44	50	61	70	76	89	102	104	113	127	148	
8N@ 2.75	20	19	27	36	43	56	64	71	80	96	106	135	138							
	24	18	24	31	38	46	53	60	68	75	101	105	125	145	149					
	28	18	22	28	34	40	47	54	62	69	79	87	106	118	131	152	164			
25	3N@ 8.33	20	18	18	19	22	26	27	30	37	41	49	59	66	70	76	86	89	97	102
		24	15	18	19	20	22	25	26	28	32	39	43	51	59	67	71	81	84	89
	4N@ 6.25	28	15	15	19	19	20	23	24	27	29	34	39	45	47	55	59	67	81	82
		32	15	16	16	16	20	21	23	24	27	32	36	44	46	52	54	58	74	81
	5N@ 5.00	36	16	16	16	17	17	20	24	24	26	32	36	40	45	48	53	54	68	79
		20	15	18	20	25	29	35	39	42	49	55	70	78	93	99	109	119	134	135
	6N@ 4.17	24	15	16	19	21	26	29	33	37	40	50	57	64	72	88	97	100	106	120
		28	15	15	17	20	24	25	29	34	37	43	51	58	66	72	89	90	101	102
	8N@ 3.12	32	16	16	17	19	21	25	28	32	35	40	49	54	60	69	79	86	91	96
		36	16	16	17	19	21	26	26	29	34	38	49	50	56	63	73	85	88	92
	10N@ 2.50	20	15	18	25	31	38	43	51	55	58	73	93	100	109	125	134			
		24	15	17	23	26	32	36	42	47	53	61	75	81	98	102	112	129	140	125
	10N@ 2.50	28	16	16	20	24	28	31	37	41	47	56	62	72	79	93	101	106	117	117
		32	16	16	19	23	26	30	33	38	41	51	57	65	73	83	93	102	105	111
10N@ 2.50	36	16	17	18	22	26	28	31	36	39	48	54	64	69	75	88	96	101	108	
	20	21	29	39	48	58	70	78	94	99	115	134								
10N@ 2.50	24	19	26	33	41	50	57	65	75	81	99	118	138							
	28	18	23	30	38	44	53	60	67	75	86	103	116	127	147					
10N@ 2.50	32	18	24	28	34	39	47	54	65	71	78	87	105	117	129	152	154			
	36	18	22	29	34	40	46	52	61	63	76	87	101	114	121	136	148	166	167	
10N@ 2.50	20	26	38	49	63	78	94	100	115	134										
	24	23	33	42	54	65	75	89	99	104	130									
10N@ 2.50	28	21	30	38	48	56	64	74	84	101	109	134	147							
	32	21	28	36	43	52	62	69	76	87	107	118	130	153						
10N@ 2.50	36	22	28	37	44	52	64	71	77	85	100	116	130	151	157					



L R F D

GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT -- POUNDS PER LINEAR FOOT																	
			FACTORED LOAD ON EACH PANEL POINT -- KIPS																	
			6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	36.0	42.0	48.0	54.0	60.0	66.0	72.0	78.0	84.0
28	3N@ 9.33	24	18	18	19	22	24	27	29	36	39	43	53	62	70	71	78	85	89	98
		28	18	18	19	20	22	25	26	28	31	39	43	46	55	61	66	76	83	86
	32	15	18	19	19	21	23	24	27	28	34	39	45	48	53	58	66	80	81	
	4N@ 7.00	24	15	16	20	24	27	32	38	40	48	55	62	71	82	95	104	106	120	135
		28	15	15	18	21	25	28	32	36	39	49	56	64	71	79	96	97	106	107
	32	15	15	17	20	23	25	29	33	37	43	50	58	62	70	85	90	99	107	102
	5N@ 5.60	24	15	18	24	29	34	39	46	52	58	66	78	96	102	111	126	136	130	142
28		15	17	21	26	30	35	39	46	50	61	68	77	90	99	107	114	112	119	
32	16	17	20	24	27	32	37	41	44	56	62	70	80	93	102	107	112	112	119	
6N@ 4.67	24	16	21	28	35	41	49	55	63	70	79	96	106	134	137	138	142	144	146	
	28	15	20	24	30	36	42	50	54	58	71	82	99	107	118	118	142	144	146	
32	16	19	23	28	32	37	43	49	53	64	74	84	101	102	111	123	144	146	146	
7N@ 4.00	24	18	24	32	41	49	56	64	74	79	96	110	135	129	140					
	28	17	22	27	35	43	51	57	62	69	82	99	108	108	123	143	146			
32	16	21	27	31	38	44	52	55	63	74	85	102	108	123						
8N@ 3.50	24	20	28	37	48	55	64	74	79	95	105	134	129	141						
	28	18	25	32	39	50	58	65	72	81	99	108	129	141						
32	17	24	29	38	43	53	60	64	70	86	103	113	127	147	149					
10N@ 2.80	24	24	36	46	57	70	79	96	102	117	137	141								
	28	23	30	41	50	60	69	82	99	100	120	126	147							
32	21	30	38	46	55	66	71	80	93	109	126	147								
30	3N@ 10.00	24	18	18	21	24	27	31	35	38	40	48	58	66	71	80	92	98	117	119
		28	18	18	19	22	25	27	30	35	37	42	49	56	63	70	79	82	93	99
		32	18	18	19	20	22	26	28	31	32	39	46	51	57	64	71	73	83	84
	4N@ 7.50	24	16	18	23	29	33	37	42	49	53	64	76	85	101	104	126	127	149	150
		28	15	16	21	25	30	33	37	42	45	53	61	73	81	86	103	104	126	128
	32	15	16	18	22	26	30	34	37	43	51	55	62	70	77	87	103	105	116	116
	36	16	16	17	22	24	27	31	34	36	46	52	59	64	74	78	88	91	105	105
5N@ 6.00	24	15	19	25	30	37	43	51	55	58	73	86	96	109	125	134	128	138	133	
	28	15	17	23	27	32	37	44	47	53	61	75	88	97	102	112	128	117	118	
32	16	17	21	24	29	35	39	43	48	56	63	77	90	100	101	107	117	118	133	
36	16	17	20	24	27	31	36	40	43	51	60	70	80	86	94	103	110	110	118	
6N@ 5.00	24	16	24	29	37	45	52	58	66	73	94	104	116	134	140	142	144	148	148	
	28	16	20	27	32	38	44	50	57	65	75	97	99	107	137	140	142	144	148	
32	16	19	24	29	34	40	45	51	58	65	82	98	100	109	121	142	144	148	148	
36	16	18	23	26	31	37	41	46	52	61	70	84	101	102	111	123	126	126	148	
8N@ 3.75	24	21	32	40	51	63	73	83	99	111	124	146	149	154	161					
	28	20	30	37	44	53	61	73	80	86	114	126	149	154	161					
32	18	26	34	42	49	55	63	71	79	104	117	130	154	161						
36	17	23	32	39	46	54	61	69	76	89	108	121	134	154	169					
10N@ 3.00	24	25	38	51	66	78	99	111	123	134	138	142								
	28	24	36	47	57	69	80	94	113	116	138	129								
32	22	31	39	52	58	74	82	95	105	105	129	142								
36	22	30	39	48	54	68	79	84	91	119	132	151								
32	3N@ 10.67	24	18	19	21	26	27	34	38	40	42	54	61	70	75	84	88	102	102	113
		28	16	17	18	24	26	28	31	34	37	43	55	60	69	70	76	85	89	93
		32	17	17	18	21	25	26	28	32	34	39	44	54	61	62	67	77	80	86
	4N@ 8.00	24	18	19	23	26	32	37	40	47	55	61	72	86	94	103	114	133	134	135
		28	15	18	20	24	28	32	37	40	45	55	62	70	78	94	96	105	121	135
	32	15	15	20	22	25	29	32	36	39	49	56	64	71	83	82	97	102	107	107
	36	15	16	17	21	24	26	30	34	36	43	50	58	65	70	85	90	99	107	102
5N@ 6.40	24	15	20	27	33	39	44	51	57	65	77	93	100	123	133	126	137	130	142	
	28	15	18	24	28	34	39	46	52	58	66	74	96	101	110	105	114	130	142	
32	15	17	22	26	32	35	41	46	53	61	68	77	90	99	105	114	114	130	142	
36	16	17	21	24	27	33	37	42	47	56	62	70	79	93	102	106	117	117	120	
6N@ 5.33	24	17	24	31	39	47	55	61	69	76	94	103	133	134	137					
	28	16	21	27	35	40	48	55	60	67	79	96	105	117	137					
32	16	20	25	30	36	42	50	54	58	71	82	99	103	118	139	142	144	146	146	
36	16	19	24	28	34	38	44	49	55	66	73	84	101	102	111	123	144	146	146	
8N@ 4.00	24	22	32	40	54	61	72	86	93	103	133	137								
	28	19	27	35	45	55	63	70	80	95	105	134	137							
32	18	25	32	39	50	58	65	71	81	99	109	120	141							
36	18	24	31	38	43	53	59	67	71	86	103	113	127	147						



L R F D

GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT – POUNDS PER LINEAR FOOT																	
			FACTORED LOAD ON EACH PANEL POINT – KIPS																	
			6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	36.0	42.0	48.0	54.0	60.0	66.0	72.0	78.0	84.0
35	4N@ 8.75	28	16	19	23	27	31	36	41	46	52	60	74	79	94	100	111	117	137	138
		32	15	18	21	24	28	33	37	39	45	53	60	73	80	92	100	106	112	127
		36	15	16	20	23	27	30	33	37	41	561	55	62	74	83	94	97	107	113
	5N@ 7.00	40	15	16	17	21	26	27	30	37	38	46	52	61	64	75	90	95	96	108
		28	15	20	26	32	37	43	52	57	59	73	86	100	109	126	136			
		32	15	18	24	29	34	37	45	50	53	66	75	88	100	102	112	128	138	
	6N@ 5.83	36	16	17	23	27	29	35	40	46	48	62	68	77	90	100	104	115	131	133
		40	16	17	22	25	27	33	37	43	47	56	63	70	80	95	102	107	115	125
		28	17	24	30	37	44	52	58	65	73	93	103	115	134					
	7N@ 5.00	32	16	21	27	33	38	46	53	57	65	79	96	100	117	139	140			
		36	16	20	25	31	36	41	48	54	58	70	81	99	102	113	121	142	144	
		40	16	20	24	28	34	38	44	49	55	64	77	84	101	104	115	123	145	146
8N@ 4.38	28	19	27	34	43	52	59	66	74	86	101	115	135							
	32	17	24	30	39	47	53	61	67	75	97	103	118	137						
	36	17	23	28	35	42	48	55	62	69	82	99	105	120	141	144				
38	4N@ 9.50	40	17	22	27	32	39	44	50	55	63	73	86	102	107	118	133	147		
		28	21	30	39	48	59	69	78	94	98	115	136							
		32	20	27	36	42	53	61	69	79	88	101	118	138						
	5N@ 7.60	36	19	26	32	39	48	55	62	71	77	99	109	121	141					
		40	18	24	30	37	44	54	60	65	73	86	102	113	127	147	149			
		28	16	21	26	31	36	41	48	55	62	70	86	96	101	111	126	137		
	6N@ 6.33	36	16	20	24	28	33	38	45	47	53	64	74	89	98	103	112	129	138	
		40	16	20	23	26	31	35	40	46	48	59	70	78	91	101	105	113	117	134
		44	17	20	22	25	30	33	39	41	48	56	63	75	80	93	102	107	111	118
	8N@ 4.75	32	17	24	30	35	41	49	55	62	70	86	98	105	125	136				
		36	16	21	27	33	39	47	50	57	61	75	89	100	107	118	141	142		
		40	16	21	25	31	36	40	48	55	59	71	82	99	102	109	121	143	142	
40	4N@ 10.00	44	17	20	24	29	33	38	44	49	55	64	77	84	102	104	115	123	145	147
		32	20	29	38	47	56	64	74	86	95	105	135							
		36	19	28	35	42	50	57	65	76	81	101	113	138	140					
	5N@ 8.00	40	19	26	32	40	48	55	62	67	78	100	103	121	142	144				
		44	20	24	30	39	47	51	57	64	71	86	102	113	127	147	149			
		28	15	20	25	31	36	42	46	52	59	70	86	96	101	111	126	137		
	6N@ 6.67	36	16	20	24	28	33	38	45	47	53	64	74	89	98	103	112	129	138	
		40	16	20	23	26	31	35	40	46	48	59	70	78	91	101	105	113	117	134
		44	17	20	23	29	32	37	41	49	50	58	70	82	84	99	116	118	130	141
	7N@ 5.71	48	17	20	23	26	31	34	40	41	50	57	68	75	85	95	100	119	120	132
		32	16	24	30	38	44	52	58	65	72	93	100	115	133					
		36	17	22	27	34	39	47	53	60	67	79	97	102	117	137	141			
8N@ 5.00	40	16	21	26	30	36	43	48	54	62	71	82	99	103	114	130	142			
	44	17	21	24	28	36	40	47	51	55	66	78	91	102	107	116	134	142	146	
	48	17	21	24	31	36	42	46	53	57	69	79	86	100	109	132	133	135	164	
10N@ 4.00	32	18	26	33	43	52	58	66	74	86	101	115	135							
	36	17	24	31	39	47	53	61	67	75	97	103	117	136						
	40	17	24	29	35	43	49	55	62	69	82	99	105	119	140					
8N@ 5.00	44	20	22	28	33	39	48	55	59	64	78	92	102	111	122	143				
	48	20	23	28	36	41	48	54	61	66	80	86	108	122	134	136	164	167		
	32	21	29	38	48	58	67	78	94	96	115	135								
10N@ 4.00	36	19	27	36	46	53	60	68	80	88	102	118	137							
	40	19	25	34	39	49	58	65	72	82	99	109	120	141						
	44	21	27	33	39	47	56	63	70	75	93	103	120	136	147	170				
10N@ 4.00	48	20	25	32	42	47	55	62	69	80	90	104	122	136	155	170				
	32	29	39	51	64	79	92	112	123	125	149									
	36	25	36	45	56	66	75	82	96	115	129	152								
10N@ 4.00	40	24	36	45	56	66	75	82	96	115	129	152								
	44	23	32	41	51	60	71	82	84	99	119	143	161							
	48	23	32	41	52	58	68	76	85	94	121	134	152							



L R F D

GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT – POUNDS PER LINEAR FOOT																	
			FACTORED LOAD ON EACH PANEL POINT – KIPS																	
			6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	36.0	42.0	48.0	54.0	60.0	66.0	72.0	78.0	84.0
42	4N@ 10.50	32	16	21	25	29	34	38	43	49	53	67	74	86	99	101	112	125	134	138
		36	16	19	22	26	32	35	39	44	47	58	67	73	87	95	101	112	118	129
		40	16	19	21	24	28	34	36	41	45	53	61	73	76	93	97	97	113	122
		44	16	19	20	23	27	31	34	38	42	51	55	62	74	84	94	97	108	109
	48	16	19	21	24	26	29	32	36	39	47	54	62	65	75	90	95	97	108	109
	5N@ 8.40	32	16	22	28	35	41	45	52	57	66	74	88	100	110	125				
		36	15	21	25	31	36	42	46	52	59	70	85	96	102	111	126	137		
		40	16	21	24	28	33	39	44	51	54	64	74	89	98	103	113	129	130	
		44	16	20	24	27	31	37	40	46	52	59	69	78	91	101	105	113	126	134
	48	17	20	23	27	30	35	39	42	48	57	63	75	81	95	102	107	115	118	
	6N@ 7.00	32	18	25	32	39	45	55	61	69	77	93	103	124	135					
		36	17	23	30	35	41	49	56	60	67	79	96	105	117	137				
		40	17	21	26	33	39	46	54	57	61	75	89	100	108	119	141	142		
		44	16	21	24	31	35	41	48	54	59	71	81	100	102	109	121	143	142	
	48	20	20	25	29	33	39	44	49	56	64	77	85	102	104	115	124	145	147	
	7N@ 6.00	32	20	28	36	45	52	65	72	85	93	102	125							
		36	19	26	34	40	49	56	67	74	79	98	110	127	138					
		40	18	24	31	38	46	54	61	68	75	90	101	113	129	142				
		44	20	23	29	35	41	49	55	63	70	78	100	106	116	132	145			
	48	18	23	28	34	39	44	50	56	64	73	92	102	108	118	136	149			
	8N@ 5.25	32	22	32	40	51	62	72	78	94	100	124	135							
		36	20	27	38	46	56	64	74	79	96	105	126	138						
		40	20	26	35	42	51	57	65	76	81	101	113	138	141					
		44	20	25	32	39	49	55	63	70	78	99	107	121	142	147				
48	21	26	32	41	48	56	63	67	74	93	103	112	128	148						
10N@ 4.20	32	27	38	52	62	77	94	101	114	134										
	36	25	36	46	60	70	86	97	102	112	140									
	40	24	34	45	54	64	75	89	99	104	129									
	44	23	31	41	52	61	70	79	91	100	114	143								
48	23	30	39	49	56	66	72	80	93	107	125	146								
45	4N@ 11.25	36	18	21	25	28	33	38	42	46	52	62	72	79	95	100	112	117	128	138
		40	19	21	22	27	31	35	39	44	47	55	64	75	87	95	101	112	113	128
		44	19	21	22	24	29	33	37	39	45	53	61	74	76	89	95	102	108	114
		48	18	21	22	24	28	31	34	38	40	51	55	63	75	83	94	95	107	109
	52	18	22	23	24	27	29	33	37	39	47	52	60	66	76	91	95	96	109	109
	5N@ 9.00	36	16	22	27	33	38	44	52	55	63	74	86	101	109	125	136			
		40	16	21	25	30	36	42	45	53	56	68	75	88	102	111	122	128		
		44	16	21	24	29	34	38	44	46	54	65	74	85	90	103	110	123	130	142
		48	20	21	24	27	32	36	41	45	52	59	67	75	91	95	106	112	118	134
	52	20	21	24	27	30	35	39	42	48	57	64	75	81	94	98	107	117	119	
	6N@ 7.50	36	19	24	31	38	45	52	58	66	74	93	100	115	134					
		40	19	23	28	34	40	47	53	60	67	79	97	103	117	137	140			
		44	19	21	27	32	38	46	50	54	62	76	90	100	107	118	139	142		
		48	20	21	26	30	36	42	48	55	59	69	78	92	102	110	122	143	143	
	52	20	21	25	29	34	39	44	50	56	64	77	85	102	102	116	124	136	148	
	7N@ 6.43	36	20	27	35	44	52	58	66	74	86	101	115	135						
		40	20	26	33	40	47	54	61	67	75	97	105	127	138					
		44	20	24	30	39	46	54	61	62	69	90	100	113	129	143				
		48	20	23	29	36	41	49	55	63	70	79	92	107	117	133	145			
	52	18	23	28	34	39	45	50	56	65	73	93	102	109	118	136	149			
	8N@ 5.62	36	21	30	38	48	58	67	78	94	98	114	135							
		40	20	28	36	46	53	61	68	80	89	105	118	137						
		44	20	27	34	41	51	58	66	73	81	99	109	130	141					
		48	21	26	32	39	47	55	63	68	74	92	104	116	142	146				
52	22	28	33	42	48	54	59	67	71	94	102	112	127	148						
9N@ 5.00	36	24	34	45	55	66	74	88	98	104	135									
	40	22	31	39	49	61	69	80	89	100	113	138								
	44	23	31	39	48	58	66	76	89	99	108	132								
	48	23	29	37	47	55	63	70	79	91	106	117	133							
52	23	28	36	46	55	60	70	73	84	102	112	135	148							
10N@ 4.50	36	26	38	49	60	73	86	98	105	116	137									
	40	25	35	47	60	66	76	90	102	112	140									
	44	24	33	46	54	64	72	89	99	104	130	142								
	48	24	31	40	49	62	71	78	91	100	114	134								
52	23	31	39	50	56	67	72	80	93	107	123	147								



L R F D

GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT – POUNDS PER LINEAR FOOT																	
			FACTORED LOAD ON EACH PANEL POINT – KIPS																	
			6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	36.0	42.0	48.0	54.0	60.0	66.0	72.0	78.0	84.0
48	5N@ 9.60	36	19	26	31	37	45	52	59	66	71	87	111	113	135	136				
		40	19	23	29	35	41	46	52	59	68	77	92	112	114	136	138			
		44	19	22	27	32	37	44	48	54	61	69	80	93	113	116	126	139	150	
		48	19	21	25	30	36	40	48	48	55	69	78	90	96	115	116	128	140	142
		52	20	21	25	29	33	39	42	50	54	62	71	82	92	99	117	118	130	141
	6N@ 8.00	56	20	21	24	29	33	38	40	46	50	59	71	79	85	100	100	119	120	133
		36	20	28	35	42	51	62	70	78	83	100	122	134	147					
		40	19	25	33	39	47	56	64	71	79	93	112	124	137	148				
		44	19	24	31	36	45	50	57	65	73	81	102	115	127	138	151			
		48	19	23	30	35	40	48	52	59	67	78	95	105	116	129	141	160		
	8N@ 6.00	52	20	23	27	32	38	46	51	59	60	75	83	97	107	130	131	144	162	
		56	20	22	27	31	37	42	48	54	61	69	80	91	107	120	132	134	153	165
		36	30	36	45	56	64	78	91	100	122	134								
		40	28	33	42	51	59	70	80	92	101	124	148							
		44	27	32	39	49	55	65	74	82	95	114	127	150						
9N@ 5.33	48	26	30	37	47	53	60	68	76	84	105	129	131		154					
	52	26	30	36	44	51	59	65	71	80	99	119	132	146	164					
	56	25	28	36	43	49	57	63	69	78	90	109	123	136	155					
	36	35	44	55	70	79	91	99	121	122	146									
	40	34	42	52	63	74	88	93	101	113	136									
12N@ 4.00	44	33	39	50	59	69	83	91	94	103	126	150								
	48	33	37	46	56	66	76	85	94	97	118	130								
	52	31	36	46	54	63	72	80	95	101	108	132	152							
	56	31	35	44	53	62	69	80	89	98	103	123	137	165						
	36	35	52	71	84	100	123	135	148											
50	5N@ 10.00	40	34	48	65	76	93	113	125	137	149									
		44	31	44	57	73	82	102	115	126	139									
		48	30	41	53	67	76	88	104	117	130	153								
		52	30	39	52	61	76	84	97	107	131	144								
		56	27	38	49	61	70	81	91	108	122	135	165							
	6N@ 8.33	40	18	23	30	38	44	47	56	60	68	79	93	113	124	136	138			
		44	17	22	29	34	40	46	51	56	61	76	89	94	113	126	137	139		
		48	19	22	28	31	38	42	48	55	61	69	78	94	96	115	127	139	141	
		52	20	22	25	31	35	40	45	49	55	62	74	82	96	116	117	129	141	142
		56	20	22	25	30	32	40	43	50	51	63	71	83	92	99	117	119	131	142
	8N@ 6.25	60	20	20	24	30	33	36	42	46	51	58	65	76	86	96	101	120	121	133
		40	20	28	34	42	48	56	64	71	80	100	112	124	147					
		44	19	24	31	38	47	50	57	65	73	85	102	124	127	149				
		48	19	23	30	37	40	49	57	65	67	82	95	115	127	129	151			
		52	20	23	30	36	40	46	52	59	67	75	84	105	117	129	131	153	162	
9N@ 5.56	56	20	23	26	33	39	42	51	54	60	72	84	98	107	120	132	144	163	164	
	60	21	23	27	33	38	43	49	53	61	70	80	87	102	110	123	134	154	165	
	40	22	31	39	51	59	67	78	86	96	110	135								
	44	21	29	37	47	53	61	70	80	96	103	118	139							
	48	21	27	35	42	51	58	69	76	81	99	114	130	142						
10N@ 5.00	52	21	25	33	40	49	55	63	70	78	99	107	121	141						
	56	24	29	36	42	47	56	64	68	78	94	108	118	137	148					
	60	24	27	35	40	47	55	61	69	74	83	103	110	123	139	149				
	40	24	34	44	55	66	74	86	96	104	134									
	44	23	32	40	53	61	69	80	88	98	113	138								
12N@ 4.17	48	24	32	42	52	58	69	77	90	99	111	133								
	52	24	31	40	47	58	66	74	79	92	106	126	143							
	56	24	30	38	46	55	60	68	77	89	102	116	135							
	60	24	32	38	49	53	61	70	75	83	97	111	125	141						
	40	26	38	49	60	74	87	96	104	116	136									
	44	25	36	47	60	68	84	96	102	112	140									
	48	24	34	46	54	65	76	89	99	103	130									
	52	24	34	45	52	62	70	79	91	100	114	134								
	56	23	32	41	48	60	70	76	87	93	107	134	146							
	60	24	31	40	49	57	66	73	81	94	109	119	138							
	40	34	49	65	80	100	112	125	147											
	44	31	44	57	73	86	102	126	127	149										
	48	30	41	58	67	82	96	115	127	130	154									
	52	30	39	53	68	76	84	105	118	130	154									
	56	27	40	52	61	70	85	99	108	122	135	164								
60	27	39	49	61	70	82	88	104	112	135	166									



L R F D

GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT – POUNDS PER LINEAR FOOT																	
			FACTORED LOAD ON EACH PANEL POINT – KIPS																	
			6.0	7.5	9.0	10.5	12.0	13.5	15.0	16.5	18.0	19.5	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0
55	5N@ 11.00	44	21	21	24	25	29	32	35	38	41	43	47	53	59	63	71	82	83	86
		48	21	21	23	24	28	30	32	35	38	41	43	49	56	60	64	71	73	83
		52	20	22	23	25	27	29	32	33	36	39	42	44	52	57	65	66	74	74
		56	20	21	24	24	26	28	31	33	36	37	39	44	51	53	58	66	66	74
		60	23	24	24	24	27	27	31	33	35	38	38	45	47	52	60	61	67	68
	66	24	24	24	25	26	28	28	33	34	37	37	42	47	48	55	56	62	69	
	6N@ 9.17	44	19	22	26	29	33	36	38	43	45	51	52	59	66	75	86	86	98	101
		48	20	22	24	28	31	33	36	40	44	46	50	56	64	68	75	87	89	98
		52	20	22	24	26	29	33	35	37	41	59	59	66	74	86	93	99	109	110
		56	18	21	24	25	28	31	35	36	39	42	47	52	55	63	70	71	78	91
		60	20	21	24	25	29	30	33	35	38	39	43	48	55	60	64	71	75	80
	66	19	20	22	24	28	30	31	33	36	39	40	47	50	56	62	65	73	73	
	7N@ 7.86	44	21	24	28	33	36	39	44	50	53	59	59	70	75	87	97	102	111	120
		48	21	24	27	31	34	38	43	45	51	54	56	65	72	76	89	98	103	110
		52	21	23	26	29	33	36	39	44	46	52	55	62	69	74	86	91	100	105
		56	20	22	25	28	31	35	38	40	46	48	53	55	64	70	79	87	92	101
		60	21	22	24	27	30	33	36	39	41	47	49	56	64	68	72	81	93	94
	66	22	22	24	26	30	32	36	37	40	43	48	52	58	65	70	74	83	84	
	9N@ 6.11	44	24	29	34	39	46	52	55	60	67	74	74	87	98	105	116	135	137	139
		48	24	28	32	38	40	47	53	57	61	68	69	81	97	103	107	118	129	139
52		25	30	33	39	43	47	52	57	65	65	73	77	90	104	105	114	125	133	
56		24	29	32	38	43	46	51	53	59	66	67	75	87	92	105	107	117	128	
60		24	27	32	36	40	45	47	52	56	60	67	71	80	93	95	108	109	118	
66	24	27	31	35	39	42	46	49	54	58	61	71	78	83	91	97	111	113		
11N@ 5.00	44	30	36	43	49	55	63	67	74	87	88	97	106	126	137					
	48	28	33	39	45	54	61	65	69	76	87	89	103	112	128	139				
	52	27	34	37	44	52	55	62	66	73	77	88	99	105	115	131	142			
	56	27	33	39	42	48	54	60	64	68	77	80	93	102	107	118	134	146		
	60	26	31	37	40	47	49	58	64	67	72	77	82	95	108	110	121	137	148	
66	26	31	36	39	45	50	54	60	65	68	74	82	97	98	113	117	126	141		
60	5N@ 12.00	48	21	23	27	29	33	35	39	43	44	49	51	57	63	69	76	87	89	94
		52	21	22	27	28	31	33	36	40	44	45	47	52	60	65	69	77	85	90
		56	22	23	24	28	30	31	34	36	41	44	45	52	59	63	69	74	78	87
		60	22	23	24	28	29	32	34	35	40	42	45	49	53	60	66	70	75	80
		66	24	24	24	26	30	30	33	35	36	38	42	47	51	56	61	67	72	73
	72	25	25	25	25	27	30	31	35	36	37	39	45	48	56	56	63	69	70	
	6N@ 10.00	48	20	24	29	32	36	38	41	47	49	56	60	67	72	80	93	93	112	113
		52	20	23	28	30	33	37	39	46	48	50	57	62	69	78	80	94	94	113
		56	19	24	25	30	33	38	39	42	48	49	51	58	66	69	79	83	95	96
		60	19	23	24	29	32	34	39	40	43	49	50	57	63	70	75	83	83	96
		66	19	23	24	27	32	32	34	40	42	44	50	52	61	65	69	77	84	85
	72	22	22	24	27	28	33	34	36	41	43	44	52	54	63	68	71	75	87	
	8N@ 7.50	48	24	29	34	39	43	49	56	57	64	72	72	80	93	112	123	125	135	148
		52	23	29	31	37	40	48	50	57	58	66	72	81	94	103	114	125	127	139
		56	23	26	31	36	38	44	49	51	58	60	66	75	83	96	104	116	127	129
		60	23	26	32	33	39	42	47	50	53	59	61	69	77	85	98	106	118	129
		66	28	30	33	34	41	43	46	48	53	57	62	70	78	82	90	100	108	120
	72	29	30	31	34	36	41	46	47	52	58	59	66	73	80	90	92	104	110	
	10N@ 6.00	48	26	32	37	44	49	55	60	67	74	79	87	97	105	118	137	138		
		52	28	34	38	44	50	56	64	65	71	75	88	97	103	113	130	138		
56		27	33	37	43	46	51	58	66	65	72	76	90	104	105	123	131	143		
60		25	31	37	39	45	51	57	60	66	70	73	86	93	104	111	126	134		
66		27	32	37	42	49	51	56	62	65	72	74	85	95	102	120	122	134	145	
72	26	32	33	38	42	47	50	55	59	66	69	74	83	96	98	111	111	121		
12N@ 5.00	48	33	39	46	53	59	68	75	86	87	97	102	111	135						
	52	31	37	45	51	57	65	69	76	88	89	98	104	118	139					
	56	29	36	41	48	55	62	66	72	77	89	91	104	113	129	140				
	60	30	35	39	47	54	56	64	73	74	79	91	102	106	116	133	145			
	66	32	35	41	48	53	61	62	70	77	80	87	100	110	122	134	147	164		
72	29	33	38	42	50	52	60	61	69	72	77	86	100	110	114	127	142	151		
15N@ 4.00	48	40	49	64	72	80	93	102	113	124	126	136								
	52	39	48	57	66	74	81	94	103	114	126	127	150							
	56	38	46	53	67	71	80	83	96	104	116	127	140	153						
	60	38	42	51	60	68	76	83	89	98	106	118	132	144						
	66	35	41	49	55	62	70	81	87	87	103	110	123	136	153	167				
72	35	44	46	55	64	66	77	85	90	93	106	125	139	142	160	171				



L R F D

GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT – POUNDS PER LINEAR FOOT																	
			FACTORED LOAD ON EACH PANEL POINT – KIPS																	
			6.0	7.5	9.0	10.5	12.0	13.5	15.0	16.5	18.0	19.5	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0
65	6N@ 10.83	52	22	28	30	33	39	41	45	49	54	58	61	69	78	83	95	97	115	116
		56	21	25	29	33	35	40	42	48	49	55	58	63	70	80	84	97	97	117
		60	23	24	29	32	34	39	41	44	50	50	56	64	71	76	82	92	98	99
		66	22	24	26	31	33	35	40	42	45	51	51	58	65	73	78	83	87	100
	8N@ 8.12	72	24	25	27	31	32	35	37	42	43	47	49	54	60	68	76	80	87	89
		52	25	31	38	40	44	51	58	62	66	74	74	83	97	115	127	129	141	153
		56	24	30	34	39	43	50	52	59	63	68	74	83	97	105	118	129	131	143
		60	23	28	33	39	41	47	51	53	60	68	69	77	85	99	108	119	130	133
	9N@ 7.22	66	24	28	33	35	42	44	49	52	56	63	63	75	80	89	101	110	122	124
		72	38	39	39	39	42	45	47	52	56	58	65	73	78	89	92	104	113	125
		52	30	32	38	44	49	58	62	67	74	79	83	97	116	128	129	142	153	
		56	26	32	39	42	48	53	59	68	68	76	81	98	106	118	130	142	144	155
	10N@ 6.50	60	25	32	38	40	47	51	58	60	69	70	78	86	100	109	120	132	145	146
		66	28	32	37	41	44	50	53	60	64	71	72	81	89	103	112	124	136	138
		72	29	30	35	38	44	46	52	57	62	66	71	79	91	91	108	115	127	140
		52	31	36	41	49	58	62	67	75	82	89	97	116	128	131	154	155		
	11N@ 5.91	56	31	36	40	46	52	60	68	69	77	85	91	107	119	132	144			
		60	32	38	44	49	55	63	70	74	79	86	92	109	122	134	147			
66		30	37	42	46	54	57	64	72	73	81	90	104	113	125	139	147	164		
72		30	36	41	47	51	57	62	67	77	77	88	93	110	118	131	144	156	173	
13N@ 5.00	52	37	45	55	64	72	79	89	98	106	117	130	142							
	56	37	43	53	61	69	77	86	91	99	108	120	133	146						
	60	35	41	50	58	64	71	77	85	93	100	108	131	134	158					
	66	34	41	49	53	62	70	75	80	87	93	102	122	134	137	161				
70	7N@ 10.00	72	34	41	46	53	58	64	72	78	85	90	113	127	138	141	170			
		56	24	25	30	35	39	43	46	51	56	57	64	71	83	88	102	102	110	121
		60	23	26	30	33	37	43	44	50	52	57	61	66	73	85	90	102	105	111
		66	24	27	30	32	35	39	44	46	51	53	58	67	73	75	87	93	104	106
	9N@ 7.78	72	24	25	29	32	34	38	42	46	47	53	54	60	69	76	78	89	94	102
		78	25	26	28	31	34	37	40	43	47	49	50	58	63	71	78	83	90	96
		84	24	27	29	31	35	37	39	42	44	49	51	57	65	69	72	80	85	94
		56	27	34	38	45	53	57	60	68	75	80	88	100	106	118	137			
	10N@ 7.00	60	30	36	41	48	55	60	65	69	71	84	88	102	109	122	130			
		66	29	35	42	44	51	55	62	66	70	73	85	91	105	109	123	132		
		72	30	34	38	43	47	52	59	63	66	69	78	88	94	106	112	127	133	
		78	30	33	37	40	46	51	55	61	65	71	71	79	94	96	108	115	130	137
	11N@ 6.36	84	31	33	36	40	47	49	55	57	63	70	72	80	92	98	109	112	121	133
		56	32	41	45	51	60	64	71	83	87	89	102	108	127	138				
		60	30	39	44	50	57	65	66	73	85	89	90	104	114	129				
		66	31	38	43	46	53	59	67	67	76	86	88	105	106	117	132			
	12N@ 5.83	72	32	37	42	48	55	57	62	70	70	78	82	94	108	109	119	136	148	
		78	29	35	40	47	50	55	61	65	73	72	80	92	98	110	118	124	140	141
84		30	36	39	45	49	52	59	66	68	73	78	84	97	102	116	124	129	144	
56		34	41	50	56	63	68	76	87	88	102	103	113	129						
14N@ 5.00	60	33	39	46	55	58	65	74	76	89	90	103	112	128	139					
	66	32	37	45	48	55	63	67	76	78	90	92	105	115	130	143				
	72	32	37	42	48	55	61	65	69	77	80	89	102	107	119	135	148			
	78	30	36	42	48	51	56	64	70	72	80	84	97	106	113	123	141	151	151	
	84	30	36	40	45	51	53	61	68	73	77	83	89	102	115	118	128	144		
	56	36	44	53	63	71	75	87	96	102	111	120	137							
	60	37	43	54	61	69	75	88	89	99	103	112	128							
	66	35	42	48	55	64	70	77	90	92	102	106	115	132						
	72	34	40	49	55	61	69	73	81	91	95	103	110	120	138					
	78	33	39	44	52	58	67	72	76	84	92	97	111	120	138	141				
	84	33	40	44	51	58	62	69	78	79	86	97	106	116	127	143	155			



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GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT – POUNDS PER LINEAR FOOT																	
			FACTORED LOAD ON EACH PANEL POINT – KIPS																	
			6.0	7.5	9.0	10.5	12.0	13.5	15.0	16.5	18.0	19.5	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0
75	8N@ 9.38	56	29	33	40	43	49	55	61	65	73	79	82	95	115	116	128	140	152	153
		60	26	32	38	42	48	51	58	63	70	75	80	92	97	116	118	130	142	144
		66	27	32	35	41	44	51	53	60	64	69	72	82	98	99	118	120	132	144
		72	26	32	34	41	43	46	52	58	61	66	71	79	87	100	101	121	122	134
		78	27	29	34	37	43	45	54	61	64	69	77	81	89	103	105	123	125	
	10N@ 7.50	60	32	39	42	50	59	67	69	76	83	89	98	117	129	131	154			
		66	32	37	42	49	55	62	69	70	78	86	87	100	119	132	134			
		72	30	36	42	45	54	57	63	72	73	81	86	101	111	123	136	138		
		78	31	35	39	46	48	56	63	66	74	75	82	91	105	114	127	139	152	156
		84	31	36	39	45	49	55	59	65	69	77	78	94	95	110	128	131	143	
	12N@ 6.25	60	38	43	51	59	68	76	84	90	98	106	118	131	144					
		66	35	42	50	55	62	70	79	87	90	100	110	122	135	148				
		72	36	41	46	54	63	65	73	81	90	91	104	124	126	141	154			
		78	35	42	47	54	61	68	76	78	86	90	98	105	126	139	152	163		
		84	34	39	46	52	56	64	70	78	79	90	92	106	126	139	141	164	171	
	14N@ 5.36	66	41	48	56	63	72	80	89	102	111	122	125	137						
		72	41	46	52	61	70	75	84	95	101	110	121	134	148					
		78	37	44	53	61	68	76	80	89	98	103	107	125	139	151				
		84	38	44	52	57	64	71	79	86	92	100	108	127	130	153	171			
		90	37	42	50	58	66	73	77	87	94	94	110	119	142	144	173	176		
15N@ 5.00	66	41	52	60	69	77	85	98	106	118	120	132	146							
	72	42	52	59	67	74	84	87	99	110	121	123	146	160						
	78	41	47	54	65	73	77	88	91	104	112	124	139	152	169					
	84	39	46	55	63	67	76	86	92	93	109	116	131	143	171	174				
	90	38	46	52	60	69	74	81	90	95	103	118	133	145	146	177				
80	8N@ 10.00	60	28	31	37	42	45	51	56	63	64	72	75	88	97	103	112	127	137	131
		66	30	31	35	38	45	47	52	57	62	65	70	77	90	103	105	113	129	126
		72	29	32	33	38	41	46	48	53	59	63	68	76	87	92	106	108	116	118
		78	30	31	33	37	41	42	47	53	56	60	64	73	81	88	94	109	111	118
		84	30	32	35	37	39	43	48	52	56	59	63	71	79	83	96	98	112	114
	10N@ 8.00	60	31	35	41	47	53	60	68	75	76	88	97	103	112	129	139	142		
		66	31	35	39	46	52	55	62	70	75	78	90	100	107	115	132			
		72	33	37	43	50	55	62	63	70	74	83	87	97	106	120	127			
		78	32	36	42	46	51	56	63	68	71	76	86	90	100	112	122	130		
		84	33	37	42	45	51	57	61	65	70	77	78	91	100	109	115	125	131	136
	12N@ 6.67	66	36	44	50	57	65	70	73	86	90	103	103	115	130					
		72	34	42	47	54	59	67	72	77	86	92	101	107	125	133				
		78	33	39	46	53	60	65	69	79	80	88	94	108	114	129	136			
		84	34	38	47	49	56	63	70	72	79	83	92	99	111	121	138	140		
		90	36	39	44	50	56	59	66	72	74	82	86	101	113	116	125	143	149	156
	14N@ 5.71	66	39	47	57	64	73	77	89	98	103	109	113	129						
		72	38	46	54	59	67	76	79	91	101	106	106	125	143					
		78	36	43	50	58	66	70	78	90	95	96	109	118	136	149				
		84	36	42	50	56	64	71	74	80	92	98	99	112	124	143				
		90	36	41	48	53	61	68	74	82	86	95	100	115	121	136	146			
16N@ 5.00	66	42	53	62	70	78	90	101	105	113	129	130								
	72	41	50	57	69	76	81	93	102	109	116	118	145							
	78	41	49	58	66	73	83	91	96	104	112	120	137	149						
	84	39	45	54	61	69	76	84	97	100	109	115	126	143						
	90	39	46	54	62	70	74	80	86	101	102	114	119	144	155					
96	40	46	55	58	68	73	81	88	94	106	110	121	133	155	164					



L R F D

GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT -- POUNDS PER LINEAR FOOT																		
			FACTORED LOAD ON EACH PANEL POINT -- KIPS																		
			6.0	7.5	9.0	10.5	12.0	13.5	15.0	16.5	18.0	19.5	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0	
110	10N@ 11.00	84	54	58	61	65	69	73	82	83	94	99	100	120	143	144					
		96	62	62	63	65	69	72	81	82	91	97	98	107	125						
		108	63	63	64	67	69	72	75	82	86	91	95	105	113	131	133				
		114	63	64	67	68	72	73	76	79	86	88	96	108	115	133	136				
	120	64	64	66	69	72	74	76	81	83	88	90	100	111	128	137	140				
	12N@ 9.17	84	58	62	66	70	74	84	88	101	109	120	122	144							
		96	57	62	66	70	74	79	88	92	101	107	125	127	151						
		108	58	64	68	72	75	79	84	90	95	106	111	132	136	158					
		114	59	65	66	71	75	79	84	89	102	106	107	126	134	156	158				
	120	59	62	67	72	74	79	82	91	96	107	109	126	135	158	161					
	14N@ 7.86	84	60	66	71	76	84	97	102	122	123	134	147								
		96	60	65	69	74	83	95	100	105	124	125	136	150							
		108	60	64	69	72	78	87	99	103	108	120	128	142	155						
		114	61	65	69	74	79	84	93	103	105	111	124	133	157						
	120	60	66	69	74	80	82	90	96	106	109	126	135	158	160						
	16N@ 6.88	96	62	68	72	79	89	104	106	125	126	147	149								
		102	63	67	74	80	89	103	108	125	127	128	152	156							
		108	64	68	73	81	83	95	104	110	127	130	142	158							
		114	65	70	74	80	86	95	105	111	114	132	135	161	162						
	120	66	69	75	81	88	97	99	109	117	135	138	152	165							
	18N@ 6.11	96	64	71	77	87	99	106	125	127	148	151									
		102	66	70	80	89	101	109	127	128	139	152	153								
		108	66	71	77	83	94	106	111	129	131	144	157								
		114	67	73	79	85	97	107	113	132	134	137	159	163							
120	68	74	79	88	91	101	110	118	136	139	152	166									
20N@ 5.50	96	68	77	82	99	106	125	139	152	154											
	102	69	75	81	94	109	129	130	142	154	155										
	108	69	77	83	94	106	114	132	133	145	157	169									
	114	69	77	86	91	101	115	134	135	147	160	161									
120	66	72	77	83	93	106	113	126	128	137	154	167									
120	10N@ 12.00	96	63	66	69	72	76	78	82	86	89	89	94	108	115	129					
		102	64	67	69	71	75	79	83	83	86	91	92	110	117	131	137				
		108	78	79	82	83	83	83	86	91	95	94	100	108	126						
		114	78	79	82	83	83	84	86	91	90	95	95	109	127	128					
	120	79	81	83	84	84	85	86	88	92	92	97	102	113	133						
	12N@ 10.00	96	68	69	71	77	82	86	90	99	100	113	125	130							
		102	68	69	72	78	80	85	88	96	101	102	116	130							
		108	69	70	72	75	81	86	90	91	99	103	105	128	134						
		114	70	70	71	75	82	86	87	92	95	100	130	121	135						
	120	70	71	72	76	80	84	88	92	93	102	107	123	133	138						
	15N@ 8.00	96	69	74	77	82	90	96	109	115	125	129	134								
		102	70	73	78	84	88	93	103	113	118	129	132								
		108	70	73	80	85	90	95	101	106	115	119	133								
		114	70	73	78	83	88	93	98	107	117	121	122	137							
	120	72	74	78	84	89	94	99	100	110	118	124	140								
	16N@ 7.50	96	70	76	80	85	90	100	109	114	128	134									
		102	70	74	78	86	92	97	110	112	120	131	137								
		108	70	74	80	85	90	95	100	114	120	124	133								
		114	70	73	81	86	91	96	101	107	117	122	135	145							
	120	70	75	79	85	90	94	99	103	118	119	126	147								
	18N@ 6.67	96	71	77	85	89	95	109	116	129	136										
		102	72	78	83	87	97	111	113	121	138	138									
		108	72	79	84	88	94	101	115	121	156	157									
		114	72	76	85	90	96	102	116	117	123	136	143								
120	73	77	84	89	95	99	105	118	125	129	140										
20N@ 6.00	96	76	82	89	94	110	116	130	136												
	102	75	83	87	92	105	114	123	140	150											
	108	75	81	88	94	101	115	121	135	142	152										
	114	77	82	87	93	103	113	119	128	138	146										
120	77	84	90	96	102	107	121	124	133	148	150										
24N@ 5.00	96	83	90	96	111	121	136														
	102	81	88	99	108	118	140	151													
	108	83	91	96	103	119	129	147	157												
	114	86	96	109	121	141	143	152	160												
120	86	97	107	117	143	146	152	163	165												



L R F D

GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT -- POUNDS PER LINEAR FOOT																	
			FACTORED LOAD ON EACH PANEL POINT -- KIPS																	
			6.0	7.5	9.0	10.5	12.0	13.5	15.0	16.5	18.0	19.5	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0
110	10N@ 11.00	84	54	58	61	65	69	73	82	83	94	99	100	120	143	144				
		96	62	62	63	65	69	72	81	82	91	97	98	107	125					
		108	63	63	64	67	69	72	75	82	86	91	95	105	113	131	133			
		114	63	64	67	68	72	73	76	79	86	88	96	108	115	133	136			
	120	64	64	66	69	72	74	76	81	83	88	90	100	111	128	137	140			
	12N@ 9.17	84	58	62	66	70	74	84	88	101	109	120	122	144						
		96	57	62	66	70	74	79	88	92	101	107	125	127	151					
		108	58	64	68	72	75	79	84	90	95	106	111	132	136	158				
		114	59	65	66	71	75	79	84	89	102	106	107	126	134	156	158			
	120	59	62	67	72	74	79	82	91	96	107	109	126	135	158	161				
	14N@ 7.86	84	60	66	71	76	84	97	102	122	123	134	147							
		96	60	65	69	74	83	95	100	105	124	125	136	150						
		108	60	64	69	72	78	87	99	103	108	120	128	142	155					
		114	61	65	69	74	79	84	93	103	105	111	124	133	157					
	120	60	66	69	74	80	82	90	96	106	109	126	135	158	160					
	16N@ 6.88	96	62	68	72	79	89	104	106	125	126	147	149							
		102	63	67	74	80	89	103	108	125	127	128	152	156						
		108	64	68	73	81	83	95	104	110	127	130	142	158						
		114	65	70	74	80	86	95	105	111	114	132	135	161	162					
	120	66	69	75	81	88	97	99	109	117	135	138	152	165						
	18N@ 6.11	96	64	71	77	87	99	106	125	127	148	151								
		102	66	70	80	89	101	109	127	128	139	152	153							
		108	66	71	77	83	94	106	111	129	131	144	157							
		114	67	73	79	85	97	107	113	132	134	137	159	163						
120	68	74	79	88	91	101	110	118	136	139	152	166								
20N@ 5.50	96	68	77	82	99	106	125	139	152	154										
	102	69	75	81	94	109	129	130	142	154	155									
	108	69	77	83	94	106	114	132	133	145	157	169								
	114	69	77	86	91	101	115	134	135	147	160	161								
120	66	72	77	83	93	106	113	126	128	137	154	167								
120	10N@ 12.00	96	63	66	69	72	76	78	82	86	89	89	94	108	115	129				
		102	64	67	69	71	75	79	83	83	86	91	92	110	117	131	137			
		108	78	79	82	83	83	83	86	91	95	94	100	108	126					
		114	78	79	82	83	83	84	86	91	90	95	95	109	127	128				
	120	79	81	83	84	84	85	86	88	92	92	97	102	113	133					
	12N@ 10.00	96	68	69	71	77	82	86	90	99	100	113	125	130						
		102	68	69	72	78	80	85	88	96	101	102	116	130						
		108	69	70	72	75	81	86	90	91	99	103	105	128	134					
		114	70	70	71	75	82	86	87	92	95	100	130	121	135					
	120	70	71	72	76	80	84	88	92	93	102	107	123	133	138					
	15N@ 8.00	96	69	74	77	82	90	96	109	115	125	129	134							
		102	70	73	78	84	88	93	103	113	118	129	132							
		108	70	73	80	85	90	95	101	106	115	119	133							
		114	70	73	78	83	88	93	98	107	117	121	122	137						
	120	72	74	78	84	89	94	99	100	110	118	124	140							
	16N@ 7.50	96	70	76	80	85	90	100	109	114	128	134								
		102	70	74	78	86	92	97	110	112	120	131	137							
		108	70	74	80	85	90	95	100	114	120	124	133							
		114	70	73	81	86	91	96	101	107	117	122	135	145						
	120	70	75	79	85	90	94	99	103	118	119	126	147							
	18N@ 6.67	96	71	77	85	89	95	109	116	129	136									
		102	72	78	83	87	97	111	113	121	138	138								
		108	72	79	84	88	94	101	115	121	156	157								
		114	72	76	85	90	96	102	116	117	123	136	143							
120	73	77	84	89	95	99	105	118	125	129	140									
20N@ 6.00	96	76	82	89	94	110	116	130	136											
	102	75	83	87	92	105	114	123	140	150										
	108	75	81	88	94	101	115	121	135	142	152									
	114	77	82	87	93	103	113	119	128	138	146									
120	77	84	90	96	102	107	121	124	133	148	150									
24N@ 5.00	96	83	90	96	111	121	136													
	102	81	88	99	108	118	140	151												
	108	83	91	96	103	119	129	147	157											
	114	86	96	109	121	141	143	152	160											
120	86	97	107	117	143	146	152	163	165											



DESIGN GUIDE ASD WEIGHT TABLE

FOR JOIST GIRDERS

Based on a 50 ksi Maximum Yield Strength

GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT – POUNDS PER LINEAR FOOT																		
			LOAD ON EACH PANEL POINT – KIPS																		
			4	6	8	10	12	14	16	18	20	24	28	32	36	40	44	48	52	56	
20	2N@ 10.00	20	16	19	19	19	19	19	20	24	24	25	30	37	41	46	50	56	62	70	75
		24	16	19	19	19	19	20	21	21	25	28	32	36	41	42	49	52	53	66	66
		28	16	19	19	19	19	20	20	21	23	26	28	32	39	40	42	46	48	49	49
	3N@ 6.67	20	15	15	19	19	20	23	24	27	31	36	44	48	54	74	75	81	84	89	89
		24	15	16	16	16	19	20	23	26	27	33	36	45	47	53	56	68	79	82	82
		28	15	16	16	16	17	20	24	24	26	31	36	44	46	49	53	57	68	80	80
	4N@ 5.00	20	15	15	19	21	25	29	33	38	41	50	57	65	71	88	97	100	107	120	120
24		15	16	17	20	23	26	29	32	35	44	50	55	62	71	85	90	100	102	102	
28		16	16	17	19	22	25	28	30	34	39	49	50	59	63	72	86	91	91	91	
5N@ 4.00	20	15	17	21	26	31	36	39	48	51	62	71	82	99	99	109	120	141	142	142	
	24	16	16	20	23	26	30	35	39	43	53	60	68	80	91	101	103	110	120	120	
	28	16	16	18	22	27	28	33	37	39	48	55	64	68	77	93	95	107	111	111	
6N@ 3.33	20	16	19	25	29	36	41	50	57	58	72	82	99	107	118	138	141				
	24	16	18	22	28	31	37	43	46	53	61	70	85	102	102	111	123	144	147	147	
	28	17	18	22	26	30	33	40	42	47	58	68	76	83	96	109	112	119	130	130	
8N@ 2.50	20	19	25	32	41	51	58	65	72	82	99	118	139	142							
	24	17	22	29	36	42	50	54	61	69	86	103	107	128	149	153					
	28	18	22	29	34	40	47	54	61	67	76	88	107	112	124	135	155	166			
22	2N@ 11.00	20	21	21	21	22	22	23	24	24	25	34	39	43	49	55	62	69	76	78	
		24	18	21	21	22	22	22	23	24	24	30	33	41	41	45	51	55	61	73	73
		28	18	21	21	21	22	22	22	23	24	37	30	33	41	42	46	48	51	58	58
	3N@ 7.33	20	15	18	18	19	22	24	26	29	33	42	45	53	68	70	76	84	88	94	94
		24	15	15	19	19	20	23	24	26	30	35	40	45	48	55	61	74	81	84	84
		28	15	16	16	16	19	20	23	24	27	32	36	45	47	52	54	59	74	82	82
	4N@ 5.50	20	15	16	19	23	26	30	36	39	44	55	62	71	82	95	96	106	119	134	134
24		15	15	17	20	25	27	29	34	38	48	52	58	71	79	89	98	101	107	107	
28		16	16	16	19	22	25	28	32	35	40	49	54	60	72	79	87	90	97	97	
5N@ 4.40	20	15	17	24	27	34	38	42	49	55	65	75	96	98	111	126	137				
	24	16	16	20	24	28	33	38	40	48	56	62	73	85	100	101	110	116	133	133	
	28	16	16	18	22	26	30	32	38	41	51	57	65	73	86	92	102	105	111	111	
6N@ 3.67	20	16	21	27	33	39	49	56	57	65	79	97	106	118	137						
	24	16	19	23	28	32	39	45	51	58	66	82	98	101	109	120	142	144			
	28	16	18	22	26	30	34	39	44	50	61	70	76	89	102	104	113	127	148	148	
8N@ 2.75	20	19	27	36	43	56	64	71	80	96	106	135	138								
	24	18	24	31	38	46	53	60	68	75	101	105	125	145	149						
	28	18	22	28	34	40	47	54	62	69	79	87	106	118	131	152	164				
25	3N@ 8.33	20	18	18	19	22	26	27	30	37	41	49	59	66	70	76	86	89	97	102	
		24	15	18	19	20	22	25	26	28	32	39	43	51	59	67	71	81	84	89	89
		28	15	15	19	19	20	23	24	27	29	34	39	45	47	55	59	67	81	82	82
	4N@ 6.25	32	15	16	16	16	20	21	23	24	27	32	36	44	46	52	54	58	74	81	81
		36	16	16	16	17	17	20	24	24	26	32	36	40	45	48	53	54	68	79	79
		20	15	18	20	25	29	35	39	42	49	55	70	78	93	99	109	119	134	135	135
	5N@ 5.00	24	15	16	19	21	26	29	33	37	40	50	57	64	72	88	97	100	106	120	120
		28	15	15	17	20	24	25	29	34	37	43	51	58	66	72	89	90	101	102	102
		32	16	16	17	19	21	25	28	32	35	40	49	54	60	69	79	86	91	96	96
	6N@ 4.17	36	16	16	17	19	21	26	26	29	34	38	49	50	56	63	73	85	88	92	92
		20	15	18	25	31	38	43	51	55	58	73	93	100	109	125	134				
		24	15	17	23	26	32	36	42	47	53	61	75	81	98	102	112	129	140		
	8N@ 3.12	28	16	16	20	24	28	31	37	41	47	56	62	72	79	93	101	106	117	125	125
32		16	16	19	23	26	30	33	38	41	51	57	65	73	83	93	102	105	111	111	
36		16	17	18	22	26	28	31	36	39	48	54	64	69	75	88	96	101	108	108	
10N@ 2.50	20	16	24	29	38	45	55	58	69	78	94	104	116	134							
	24	16	20	25	31	37	44	50	56	64	75	97	99	107	118	138					
	28	16	18	23	28	32	38	44	51	55	67	73	87	101	104	120	134	143	145	145	
20	2.50	32	16	18	22	26	30	34	39	44	50	61	69	77	89	102	105	113	127	148	148
		36	16	18	24	25	30	36	39	43	49	58	67	74	84	98	108	116	117	129	129
		20	21	29	39	48	58	70	78	94	99	115	134								
24	2.50	24	19	26	33	41	50	57	65	75	81	99	118	138							
		28	18	23	30	38	44	53	60	67	75	86	103	116	127	147					
		32	18	24	28	34	39	47	54	65	71	78	87	105	117	129	152	154			
28	2.50	36	18	22	29	34	40	46	52	61	63	76	87	101	114	121	136	148	166	167	167
		20	26	38	49	63	78	94	100	115	134										
		24	23	33	42	54	65	75	89	99	104	130									
32	2.50	28	21	30	38	48	56	64	74	84	101										
		32	21	28	36	43	52	62	69	76	87	107									
		36	22	28	37	44	52	64	71	77	85	100									



A S D

GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT – POUNDS PER LINEAR FOOT																		
			LOAD ON EACH PANEL POINT – KIPS																		
			4	6	8	10	12	14	16	18	20	24	28	32	36	40	44	48	52	56	
28	3N@ 9.33	24 28 32	18 18 15	18 18 18	19 19 19	22 20 19	24 22 21	27 25 23	29 26 24	36 28 27	39 31 28	43 39 34	53 46 39	62 55 48	70 61 53	78 66 58	85 76 66	89 83 80	98 86 81		
	4N@ 7.00	24 28 32	15 15 15	16 15 15	20 18 17	24 21 20	27 25 23	32 28 25	38 32 29	40 36 33	48 39 41	55 49 43	62 56 50	71 64 58	82 71 70	95 85 85	104 96 90	106 97 90	120 106 99	135 107 102	
	5N@ 5.60	24 28 32	15 15 16	18 17 17	24 21 20	29 26 24	34 30 27	39 35 32	46 41 37	52 46 44	58 50 44	66 61 56	78 68 62	96 77 70	102 90 80	111 99 93	126 107 102	136 114 107	130 112	142 119	
	6N@ 4.67	24 28 32	16 15 16	21 20 19	28 24 23	35 30 30	41 36 32	49 42 37	56 50 43	64 54 49	74 64 53	79 71 64	96 82 74	110 99 84	135 107 101	149 118 101	164 138 111	180 142 123	196 144	212 146	
	7N@ 4.00	24 28 32	18 17 16	24 22 21	32 27 31	41 35 38	49 43 38	56 51 44	64 57 52	74 62 55	79 69 63	96 82 74	110 99 85	135 108 102	149 129 108	164 140 123	180 143	196 146			
	8N@ 3.50	24 28 32	20 18 17	28 25 24	37 32 29	48 39 38	55 50 43	64 58 53	74 65 60	79 72 64	95 81 70	105 99 86	134 108 103	149 129 113	164 141 127	180 147	196 149				
	10N@ 2.80	24 28 32	23 23 21	36 30 30	46 41 38	57 50 46	70 60 55	79 69 66	96 82 71	102 99 90	117 100 93	137 120 109	149 126								
30	3N@ 10.00	24 28 32 36	18 18 18 16	18 18 18 19	21 19 20 19	24 22 22 21	27 25 22 23	31 27 26 23	35 30 28 26	38 35 32 31	40 37 32 35	48 42 39 35	58 49 46 39	66 56 51 46	71 63 57 52	80 70 64 57	92 79 71 64	98 83 83 73	117 99 84	119	
	4N@ 7.50	24 28 32 36	16 15 15 16	18 16 16 16	23 21 22 17	29 25 22 22	33 30 26 24	37 33 30 27	42 37 34 31	49 42 43 37	53 45 43 36	64 53 51 46	76 61 55 52	85 73 62 59	101 81 77 64	104 86 77 74	126 103 101 88	127 104 103 88	149 126 105 91	150 128 116	
	5N@ 6.00	24 28 32 36	15 15 16 16	19 17 17 17	25 23 21 20	30 27 24 24	37 32 29 27	43 37 35 31	51 44 43 36	55 47 48 40	58 53 48 43	73 61 56 51	86 75 63 60	96 88 77 70	109 97 90 80	125 102 100 86	134 112 101 94	128 108 101 103	138 117 110	133 118	
	6N@ 5.00	24 28 32 36	16 16 16 16	24 20 19 18	29 27 24 23	37 32 29 26	45 38 34 31	52 44 40 37	58 50 45 41	66 57 51 46	73 65 58 52	94 75 65 61	104 88 82 70	116 99 98 84	134 107 100 101	149 137 121 111	164 140 121 111	180 142 126	196 144 126	212 148	
	8N@ 3.75	24 28 32 36	21 20 18 17	32 30 26 23	40 37 34 32	51 44 42 42	63 53 49 46	73 61 55 54	83 73 63 61	99 86 79 69	111 86 79 76	124 114 104 89	146 126 117 108	161 149 130 121	176 154 134	191 169					
	10N@ 3.00	24 28 32 36	25 24 22 22	38 36 31 30	51 47 39 39	66 57 52 48	78 69 58 54	99 80 74 68	111 94 82 79	123 113 105 84	134 116 105 91	149 138 129 119	164 142 132	180 151							
	32	3N@ 10.67	24 28 32 36	18 16 17 15	19 17 17 17	21 18 18 19	26 24 25 20	27 26 25 23	34 28 26 26	38 31 32 28	40 34 34 30	42 37 39 38	54 43 44 38	61 55 54 40	70 60 61 45	75 69 62 51	84 70 67 53	88 76 77 58	102 85 80 67	102 89 86 81	113 93
4N@ 8.00	24 28 32 36	18 15 15 15	19 18 15 16	23 20 22 17	26 24 25 21	32 28 29 24	37 32 32 26	40 40 36 30	47 45 49 36	55 45 51 43	61 55 61 43	72 62 69 58	86 70 78 65	94 78 83 70	103 86 91 65	114 96 100 85	114 103 105 85	133 114 117 99	134 121 102 99	135 107 102	
5N@ 6.40	24 28 32 36	15 15 15 16	20 18 17 17	27 24 22 21	33 28 26 24	39 34 32 27	44 39 35 33	51 46 41 42	57 52 53 47	65 56 61 47	77 66 68 56	93 74 77 62	100 86 88 70	123 101 99 93	133 110 105 102	137 110 105 106	154 126 114 106	169 137 117 117	184 142 130 117	199 142 120	
6N@ 5.33	24 28 32 36	17 16 16 16	24 21 20 19	31 27 25 24	39 35 30 28	47 40 36 34	55 48 42 38	61 55 50 44	69 60 54 49	76 67 58 55	94 79 71 66	103 96 82 73	133 105 99 84	137 117 103 101	154 137 118 102	170 151 139 111	186 164 142 123	202 177 144 117	218 192 146		
8N@ 4.00	24 28 32 36	22 19 18 18	32 27 25 24	40 35 32 31	54 48 45 43	61 55 50 43	72 63 58 53	86 70 65 59	93 80 71 67	103 95 81 71	133 105 99 86	137 113 109 103	151 137 127	166 141 127	181 154 147						



A S D

GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT – POUNDS PER LINEAR FOOT																		
			LOAD ON EACH PANEL POINT – KIPS																		
			4	6	8	10	12	14	16	18	20	24	28	32	36	40	44	48	52	56	
35	4N@ 8.75	28	16	19	23	27	31	36	41	46	52	60	74	79	94	100	111	117	137	138	
		32	15	18	21	24	28	33	37	39	45	53	60	73	80	92	100	106	112	127	
		36	15	16	20	23	27	30	33	37	41	561	55	62	74	83	94	97	107	113	
	5N@ 7.00	40	15	16	17	21	26	27	30	37	38	46	52	61	64	75	90	95	96	108	
		28	15	20	26	32	37	43	52	57	59	73	86	100	109	126	136				
		32	15	18	24	29	34	37	45	50	53	66	75	88	100	102	112	128	138		
	6N@ 5.83	36	16	17	23	27	29	35	40	46	48	62	68	77	90	100	104	115	131	133	
		40	16	17	22	25	27	33	37	43	47	56	63	70	80	95	102	107	115	125	
		28	17	24	30	37	44	52	58	65	73	93	103	115	134						
	7N@ 5.00	32	16	21	27	33	38	46	53	57	65	79	96	100	117	139	140				
		36	16	20	25	31	36	41	48	54	58	70	81	99	102	113	121	142	144		
		40	16	20	24	28	34	38	44	49	55	64	77	84	101	104	115	123	145	146	
	8N@ 4.38	28	19	27	34	43	52	59	66	74	86	101	115	135							
		32	17	24	30	39	47	53	61	67	75	97	103	118	137						
		36	17	23	28	35	42	48	55	62	69	82	99	105	120	141	144				
38	4N@ 9.50	40	17	22	27	32	39	44	50	55	63	73	86	102	107	118	133	147			
		28	21	30	39	48	59	69	78	94	98	115	136								
		32	20	27	36	42	53	61	69	79	88	101	118	138							
	5N@ 7.60	36	19	26	32	39	48	55	62	71	77	99	109	121	141						
		40	18	24	30	37	44	54	60	65	73	86	102	113	127	147	149				
		32	15	20	25	31	36	42	46	52	59	70	86	96	101	111	126	137			
	6N@ 6.33	36	16	20	24	28	33	38	45	47	53	64	74	89	98	103	112	129	138		
		40	16	20	23	26	31	35	40	46	48	59	70	78	91	101	105	113	117	134	
		44	17	20	22	25	30	33	39	41	48	56	63	75	80	93	102	107	111	118	
	8N@ 4.75	32	17	24	30	35	41	49	55	62	70	86	98	105	125	136					
		36	16	21	27	33	39	47	50	57	61	75	89	100	107	118	141	142			
		40	16	21	25	31	36	40	48	55	59	71	82	99	102	109	121	143	142		
	40	4N@ 10.00	44	17	20	24	29	33	38	44	49	55	64	77	84	102	104	115	123	145	147
			32	20	29	38	47	56	64	74	86	95	105	135							
			36	19	28	35	42	50	57	65	76	81	101	113	138	140					
5N@ 8.00		40	19	26	32	40	48	55	62	67	78	100	103	121	142						
		44	20	24	30	39	47	51	57	64	71	86	102	113	127	147	149				
		32	15	21	26	32	38	43	52	55	62	73	86	101	109	124	134				
6N@ 6.67		36	16	20	24	30	34	39	45	53	55	66	74	88	102	102	112	128	138		
		40	16	20	24	27	32	37	41	46	51	62	68	77	90	100	105	115	130	142	
		44	17	20	23	29	32	37	41	49	50	58	70	82	84	99	116	118	130	141	
7N@ 5.71		48	17	20	24	25	30	32	37	39	48	53	59	66	74	78	85	99	106	106	
		32	16	24	30	38	44	52	58	65	72	93	100	115	133						
		36	17	22	27	34	39	47	53	60	67	79	97	102	117	137	141				
8N@ 5.00		40	16	21	26	30	36	43	48	54	62	71	82	99	103	114	130	142			
		44	17	21	24	28	36	40	47	51	55	66	78	91	102	107	116	134	142	146	
		48	17	21	24	31	36	42	46	53	57	69	79	86	100	109	132	133	135	164	
10N@ 4.00	32	18	26	33	43	52	58	66	74	86	101	115	135								
	36	17	24	31	39	47	53	61	67	75	97	103	117	136							
	40	17	24	29	35	43	49	55	62	69	82	99	105	119	140						
10N@ 4.00	44	20	22	28	33	39	48	55	59	64	78	92	102	111	122	143					
	48	20	23	28	36	41	48	54	61	66	80	86	108	122	134	136	164	167			
	32	21	29	38	48	58	67	78	94	96	115	135									
10N@ 4.00	36	19	27	36	46	53	60	68	80	88	102	118	137								
	40	19	25	34	39	49	58	65	72	82	99	109	120	141							
	44	21	27	33	39	47	56	63	70	75	93	103	120	136	147						
10N@ 4.00	48	20	25	32	42	47	55	62	69	80	90	104	122	136	155	170					
	32	29	39	51	64	79	92	112	123	125	149										
	36	25	36	47	60	69	81	94	103	125	150										
10N@ 4.00	40	24	36	45	56	66	75	82	96	115	129	152									
	44	23	32	41	51	60	71	82	84	99	119	143	161								
	48	23	32	41	52	58	68	76	85	94	121	134	152								



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GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT – POUNDS PER LINEAR FOOT																	
			LOAD ON EACH PANEL POINT – KIPS																	
			4	6	8	10	12	14	16	18	20	24	28	32	36	40	44	48	52	56
42	4N@ 10.50	32	16	21	25	29	34	38	43	49	53	67	74	86	99	101	112	125	134	138
		36	16	19	22	26	32	35	39	44	47	58	67	73	87	95	101	112	118	129
		40	16	19	21	24	28	34	36	41	45	53	61	73	76	93	97	97	113	122
		44	16	19	20	23	27	31	34	38	42	51	55	62	74	84	94	97	108	109
	5N@ 8.40	48	16	19	21	24	26	29	32	36	39	47	54	62	65	75	90	95	97	108
		32	16	22	28	35	41	45	52	57	66	74	88	100	110	125				
		36	15	21	25	31	36	42	46	52	59	70	85	96	102	111	126	137		
		40	16	21	24	28	33	39	44	51	54	64	74	89	98	103	113	129	130	
	6N@ 7.00	44	16	20	24	27	31	37	40	46	52	59	69	78	91	101	105	113	126	134
		48	17	20	23	27	30	35	39	42	48	57	63	75	81	95	102	107	115	118
32		18	25	32	39	45	55	61	69	77	93	103	124	135						
36		17	23	30	35	41	49	56	60	67	79	96	105	117	137					
7N@ 6.00	40	17	21	26	33	39	46	54	57	61	75	89	100	108	119	141	142			
	44	16	21	24	31	35	41	48	54	59	71	81	100	102	109	121	143	142		
	48	20	20	25	29	33	39	44	49	56	64	77	85	102	104	115	124	145	147	
	32	20	28	36	45	52	65	72	85	93	102	125								
8N@ 5.25	36	19	26	34	40	49	56	67	74	79	98	110	127	138						
	40	18	24	31	38	46	54	61	68	75	90	101	113	129	142					
	44	20	23	29	35	41	49	55	63	70	78	100	106	116	132	145				
	48	18	23	28	34	39	44	50	56	64	73	92	102	108	118	136	149			
10N@ 4.20	32	22	32	40	51	62	72	78	94	100	124	135								
	36	20	27	38	46	56	64	74	79	96	105	126	138							
	40	20	26	35	42	51	57	65	76	81	101	113	138	141						
	44	20	25	32	39	49	55	63	70	78	99	107	121	142	147					
45	4N@ 11.25	48	21	26	32	41	48	56	63	67	74	93	103	112	128	148				
		32	27	38	52	62	77	94	101	114	134									
		36	25	36	46	60	70	86	97	102	112	140								
		40	24	34	45	54	64	75	89	99	104	129								
	5N@ 9.00	44	23	31	41	52	61	70	79	91	100	114	143							
		48	23	30	39	49	56	66	72	80	93	107	125	146						
		36	18	21	25	28	33	38	42	46	52	62	72	79	95	100	112	117	128	138
		40	19	21	22	27	31	35	39	44	47	55	64	75	87	95	101	112	113	128
	6N@ 7.50	44	19	21	22	24	29	33	37	39	45	53	61	74	76	89	95	102	108	114
		48	18	21	22	24	28	31	34	38	40	51	55	63	75	83	94	95	107	109
52		18	22	23	24	27	29	33	37	39	47	52	60	66	76	91	95	96	109	
36		16	22	27	33	38	44	52	55	63	74	86	101	109	125	136				
7N@ 6.43	40	16	21	25	30	36	42	45	53	56	68	75	88	102	111	122	128			
	44	16	21	24	29	34	38	44	46	54	65	74	85	90	103	110	123	130	142	
	48	20	21	24	27	32	36	41	45	52	59	67	75	91	95	106	112	118	134	
	52	20	21	24	27	30	35	39	42	48	57	64	75	81	94	98	107	117	119	
8N@ 5.62	36	19	24	31	38	45	52	58	66	74	93	100	115	134						
	40	19	23	28	34	40	47	53	60	67	79	97	103	117	137	140				
	44	19	21	27	32	38	46	50	54	62	76	90	100	107	118	139	142			
	48	20	21	26	30	36	42	48	55	59	69	78	92	102	110	122	143	143		
9N@ 5.00	52	20	21	25	29	34	39	44	50	56	64	77	85	102	102	116	124	136	148	
	36	20	27	35	44	52	58	66	74	86	101	115	135							
	40	20	26	33	40	47	54	61	67	75	97	105	127	138						
	44	20	24	30	39	46	54	61	62	69	90	100	113	129	143					
10N@ 4.50	48	20	23	29	36	41	49	55	63	70	79	92	107	117	133	145				
	52	18	23	28	34	39	45	50	56	65	73	93	102	109	118	136	149			
	36	21	30	38	48	58	67	78	94	98	114	135								
	40	20	28	36	46	53	61	68	80	89	105	118	137							



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GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT – POUNDS PER LINEAR FOOT																	
			LOAD ON EACH PANEL POINT – KIPS																	
			4	6	8	10	12	14	16	18	20	24	28	32	36	40	44	48	52	56
48	5N@ 9.60	36	19	26	31	37	45	52	59	66	71	87	111	113	135	136				
		40	19	23	29	35	41	46	52	59	68	77	92	112	114	136	138			
		44	19	22	27	32	37	44	48	54	61	69	80	93	113	116	126	139	150	
		48	19	21	25	30	36	40	48	48	55	69	78	90	96	115	116	128	140	
		52	20	21	25	29	33	39	42	50	54	62	71	82	92	99	117	118	130	
	56	20	21	24	29	33	38	40	46	50	59	71	79	85	100	100	119	120	133	
	6N@ 8.00	36	20	28	35	42	51	62	70	78	83	100	122	134	147					
		40	19	25	33	39	47	56	64	71	79	93	112	124	137	148				
		44	19	24	31	36	45	50	57	65	73	81	102	115	127	138	151			
		48	19	23	30	35	40	48	52	59	67	78	95	105	116	129	141	160		
		52	20	23	27	32	38	46	51	59	60	75	83	97	107	130	131	144	162	
	56	20	22	27	31	37	42	48	54	61	69	80	91	107	120	132	134	153	165	
	8N@ 6.00	36	30	36	45	56	64	78	91	100	122	134								
		40	28	33	42	51	59	70	80	92	101	124	148							
		44	27	32	39	49	55	65	74	82	95	114	127	150						
48		26	30	37	47	53	60	68	76	84	105	129	131	154						
52		26	30	36	44	51	59	65	71	80	99	119	132	146	164					
56	25	28	36	43	49	57	63	69	78	90	109	123	136	155						
9N@ 5.33	36	35	44	55	70	79	91	99	121	122	146									
	40	34	42	52	63	74	88	93	101	113	136									
	44	33	39	50	59	69	83	91	94	103	126	150								
	48	33	37	46	56	66	76	85	94	97	118	130								
	52	31	36	46	54	63	72	80	95	101	108	132	152							
56	31	35	44	53	62	69	80	89	98	103	123	137	165							
12N@ 4.00	36	35	52	71	84	100	123	135	148											
	40	34	48	65	76	93	113	125	137	149										
	44	31	44	57	73	82	102	115	126	139	153									
	48	30	41	53	67	76	88	104	117	130	153									
	52	30	39	52	61	76	84	97	107	131	144									
56	27	38	49	61	70	81	91	108	122	135	165									
50	5N@ 10.00	40	18	23	30	38	44	47	56	60	68	79	93	113	124	136	138			
		44	17	22	29	34	40	46	51	56	61	76	89	94	113	126	137	139		
		48	19	22	28	31	38	42	48	55	61	69	78	94	96	115	127	139	141	
		52	20	22	25	31	35	40	45	49	55	62	74	82	96	116	117	129	141	
		56	20	22	25	30	32	40	43	50	51	63	71	83	92	99	117	119	131	
	60	20	20	24	30	33	36	42	46	51	58	65	76	86	96	101	120	121	133	
	6N@ 8.33	40	20	28	34	42	48	56	64	71	80	100	112	124	147					
		44	19	24	31	38	47	50	57	65	73	85	102	124	127	149				
		48	19	23	30	37	40	49	57	65	67	82	95	115	127	129	151			
		52	20	23	30	36	40	46	52	59	67	75	84	105	117	129	131	153	162	
		56	20	23	26	33	39	42	51	54	60	72	84	98	107	120	132	144	163	
	60	21	23	27	33	38	43	49	53	61	70	80	87	102	110	123	134	154	165	
	8N@ 6.25	40	22	31	39	51	59	67	78	86	96	110	135							
		44	21	29	37	47	53	61	70	80	96	103	118	139						
		48	21	27	35	42	51	58	69	76	81	99	114	130	142					
52		21	25	33	40	49	55	63	70	78	99	107	121	141						
56		24	29	36	42	47	56	64	68	78	94	108	118	137	148					
60	24	27	35	40	47	55	61	69	74	83	103	110	123	139	149					
9N@ 5.56	40	24	34	44	55	66	74	86	96	104	134									
	44	23	32	40	53	61	69	80	88	98	113	138								
	48	24	32	42	52	58	69	77	90	99	111	133								
	52	24	31	40	47	58	66	74	79	92	106	126	143							
	56	24	30	38	46	55	60	68	77	89	102	116	135							
60	24	32	38	49	53	61	70	75	83	97	111	125	141							
10N@ 5.00	40	26	38	49	60	74	87	96	104	116	136									
	44	25	36	47	60	68	84	96	102	112	140									
	48	24	34	46	54	65	76	89	99	103	130									
	52	24	34	45	52	62	70	79	91	100	114	134								
	56	23	32	41	48	60	70	76	87	93	107	134	146							
60	24	31	40	49	57	66	73	81	94	109	119	138								
12N@ 4.17	40	34	49	65	80	100	112	125	147											
	44	31	44	57	73	86	102	126	127	149										
	48	30	41	58	67	82	96	115	127	130	154									
	52	30	39	53	68	76	84	105	118	130	154									
	56	27	40	52	61	70	85	99	108	122	135	164								
60	27	39	49	61	70	82	88	104	112	135	166									



A S D

GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT – POUNDS PER LINEAR FOOT																	
			LOAD ON EACH PANEL POINT – KIPS																	
			4	5	6	7	8	9	10	11	12	13	14	16	18	20	22	24	26	28
55	5N@ 11.00	44	21	21	24	25	29	32	35	38	41	43	47	53	59	63	71	82	83	86
		48	21	21	23	24	28	30	32	35	38	41	43	49	56	60	64	71	73	83
		52	20	22	23	25	27	29	32	33	36	39	42	44	52	57	65	66	74	74
		56	20	21	24	24	26	28	31	33	36	37	39	44	51	53	58	66	66	74
		60	23	24	24	24	27	27	31	33	35	38	38	45	47	52	60	61	67	68
	66	24	24	24	25	26	28	28	33	34	37	37	42	47	48	55	56	62	69	
	6N@ 9.17	44	19	22	26	29	33	36	38	43	45	51	52	59	66	75	86	86	98	101
		48	20	22	24	28	31	33	36	40	44	46	50	56	64	68	75	87	89	98
		52	20	22	24	26	29	33	35	37	41	59	59	66	74	86	93	99	109	110
		56	18	21	24	25	28	31	35	36	39	42	47	52	55	63	70	71	78	91
		60	20	21	24	25	29	30	33	35	38	39	43	48	55	60	64	71	75	80
	66	19	20	22	24	28	30	31	33	36	39	40	47	50	56	62	65	73	73	
	7N@ 7.86	44	21	24	28	33	36	39	44	50	53	59	59	70	75	87	97	102	111	120
		48	21	24	27	31	34	38	43	45	51	54	56	65	72	76	89	98	103	110
		52	21	23	26	29	33	36	39	44	46	52	55	62	69	74	86	91	100	105
		56	20	22	25	28	31	35	38	40	46	48	53	55	64	70	79	87	92	101
		60	21	22	24	27	30	33	36	39	41	47	49	56	64	68	72	81	93	94
	66	22	22	24	26	30	32	36	37	40	43	48	52	58	65	70	74	83	84	
9N@ 6.11	44	24	29	34	39	46	52	55	60	67	74	74	87	98	105	116	135	137	139	
	48	24	28	32	38	40	47	53	57	61	68	69	81	97	103	107	118	129	133	
	52	25	30	33	39	43	47	52	57	65	65	73	77	90	104	105	114	125	133	
	56	24	29	32	38	43	46	51	53	59	66	67	75	87	92	105	107	117	128	
	60	24	27	32	36	40	45	47	52	56	60	67	71	80	93	95	108	109	118	
66	24	27	31	35	39	42	46	49	54	58	61	71	78	83	91	97	111	113		
11N@ 5.00	44	30	36	43	49	55	63	67	74	87	88	97	106	126	137					
	48	28	33	39	45	54	61	65	69	76	87	89	103	112	128	139				
	52	27	34	37	44	52	55	62	66	73	77	88	99	105	115	131	142			
	56	27	33	39	42	48	54	60	64	68	77	80	93	102	107	118	134	146		
	60	26	31	37	40	47	49	58	64	67	72	77	82	95	108	110	121	137	148	
66	26	31	36	39	45	50	54	60	65	68	74	82	97	98	113	117	126	141		
60	5N@ 12.00	48	21	23	27	29	33	35	39	43	44	49	51	57	63	69	76	87	89	94
		52	21	22	27	28	31	33	36	40	44	45	47	52	60	65	69	77	85	90
		56	22	23	24	28	30	31	34	36	41	44	45	52	59	63	69	74	78	87
		60	22	23	24	28	29	32	34	35	40	42	45	49	53	60	66	70	75	80
		66	24	24	24	26	30	30	33	35	36	38	42	47	51	56	61	67	72	73
	72	25	25	25	25	27	30	31	35	36	37	39	45	48	56	56	63	69	70	
	6N@ 10.00	48	20	24	29	32	36	38	41	47	49	56	60	67	72	80	93	93	112	113
		52	20	23	28	30	33	37	39	46	48	50	57	62	69	78	80	94	94	113
		56	19	24	25	30	33	38	39	42	48	49	51	58	66	69	79	83	95	96
		60	19	23	24	29	32	34	39	40	43	49	50	57	63	70	75	83	83	96
		66	19	23	24	27	32	32	34	40	42	44	50	52	61	65	69	77	84	85
	72	22	22	24	27	28	33	34	36	41	43	44	52	54	63	68	71	75	87	
	8N@ 7.50	48	24	29	34	39	43	49	56	57	64	72	72	80	93	112	123	125	136	148
		52	23	29	31	37	40	48	50	57	58	66	72	81	94	103	114	125	127	139
		56	23	26	31	36	38	44	49	51	58	60	66	75	83	96	104	116	127	129
		60	23	26	32	33	39	42	47	50	53	59	61	69	77	85	98	106	118	129
		66	28	30	33	34	41	43	46	48	53	57	62	70	78	82	90	100	108	120
	72	29	30	31	34	36	41	46	47	52	58	59	66	73	80	90	92	104	110	
10N@ 6.00	48	26	32	37	44	49	55	60	67	74	79	87	97	105	118	137	138			
	52	28	34	38	44	50	56	64	65	71	75	88	97	103	113	130	138			
	56	27	33	37	43	46	51	58	66	65	72	76	90	104	105	123	131	143		
	60	25	31	37	39	45	51	57	60	66	70	73	86	93	104	111	126	134		
	66	27	32	37	42	49	51	56	62	65	72	74	85	95	102	120	122	134	145	
72	26	32	33	38	42	47	50	55	59	66	69	74	83	96	98	111	111	121		
12N@ 5.00	48	33	39	46	53	59	68	75	86	87	97	102	111	135						
	52	31	37	45	51	57	65	69	76	88	89	98	104	118	139					
	56	29	36	41	48	55	62	66	72	77	89	91	104	113	129	140				
	60	30	35	39	47	54	56	64	73	74	79	91	102	106	116	133	145			
	66	32	35	41	48	53	61	62	70	77	80	87	100	110	122	134	147	164		
72	29	33	38	42	50	52	60	61	69	72	77	86	100	110	114	127	142	151		
15N@ 4.00	48	40	49	64	72	80	93	102	113	124	126	136								
	52	39	48	57	66	74	81	94	103	114	126	127	150							
	56	38	46	53	67	71	80	83	96	104	116	127	140	153						
	60	38	42	51	60	68	76	83	89	98	106	118	132	144						
	66	35	41	49	55	62	70	81	87	87	103	110	123	136	153	167				
72	35	44	46	55	64	66	77	85	90	93	106	125	139	142	160	171				



A S D

GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT – POUNDS PER LINEAR FOOT																	
			LOAD ON EACH PANEL POINT – KIPS																	
			4	5	6	7	8	9	10	11	12	13	14	16	18	20	22	24	26	28
65	6N@ 10.83	52	22	28	30	33	39	41	45	49	54	58	61	69	78	83	95	97	115	116
		56	21	25	29	33	35	40	42	48	49	55	58	63	70	80	84	97	97	117
		60	23	24	29	32	34	39	41	44	50	50	56	64	71	76	82	92	98	99
		66	22	24	26	31	33	35	40	42	45	51	51	58	65	73	78	83	87	100
	72	24	25	27	31	32	35	37	42	43	47	49	54	60	68	76	80	87	89	
	8N@ 8.12	52	25	31	38	40	44	51	58	62	66	74	74	83	97	115	127	129	141	153
		56	24	30	34	39	43	50	52	59	63	68	74	83	97	105	118	129	131	143
		60	23	28	33	39	41	47	51	53	60	68	69	77	85	99	108	119	130	133
		66	24	28	33	35	42	44	49	52	56	63	63	75	80	89	101	110	122	124
	72	38	39	39	39	42	45	47	52	56	58	65	73	78	89	92	104	113	125	
	9N@ 7.22	52	30	32	38	44	49	58	62	67	74	79	83	97	116	128	129	142	153	155
		56	26	32	39	42	48	53	59	68	68	76	81	98	106	118	130	142	144	155
		60	25	32	38	40	47	51	58	60	69	70	78	86	100	109	120	132	145	146
		66	28	32	37	41	44	50	53	60	64	71	72	81	89	103	112	124	136	138
	72	29	30	35	38	44	46	52	57	62	66	71	79	91	91	108	115	127	140	
	10N@ 6.50	52	31	36	41	49	58	62	67	75	82	89	97	116	128	131	154	155		
		56	31	36	40	46	52	60	68	69	77	85	91	107	119	132	144			
		60	29	34	40	44	51	57	61	70	74	78	87	100	109	122	134	146		
66		27	34	39	43	50	54	60	65	72	74	82	90	103	113	125	138	140	163	
72	27	33	37	44	47	52	56	62	67	75	76	87	93	110	127	129	141	143		
11N@ 5.91	52	33	39	45	52	59	67	75	83	89	98	106	118	131	153					
	56	32	39	44	51	60	64	69	77	85	91	99	119	132	144	156				
	60	33	38	44	49	55	63	70	74	79	86	92	109	122	134	147				
	66	30	37	42	46	54	57	64	72	73	81	90	104	113	125	139	147	164		
72	30	36	41	47	51	57	62	67	77	77	88	93	110	118	131	144	156	173		
13N@ 5.00	52	37	45	55	64	72	79	89	98	106	117	130	142							
	56	37	43	53	61	69	77	86	91	99	108	120	133	146						
	60	35	41	50	58	64	71	77	85	93	100	108	131	134	158					
	66	34	41	49	53	62	70	75	80	87	93	102	122	134	137	161				
72	34	41	46	53	58	64	72	78	85	90	90	113	127	138	141	170				
70	7N@ 10.00	56	24	25	30	35	39	43	46	51	56	57	64	71	83	88	102	102	110	121
		60	23	26	30	33	37	43	44	50	52	57	61	66	73	85	90	102	105	111
		66	24	27	30	32	35	39	44	46	51	53	58	67	73	75	87	93	104	106
		72	24	25	29	32	34	38	42	46	47	53	54	60	69	76	78	89	94	102
	78	25	26	28	31	34	37	40	43	47	49	50	58	63	71	78	83	90	96	
	84	24	27	29	31	35	37	39	42	44	49	51	57	65	69	72	80	85	94	
	9N@ 7.78	56	26	31	37	40	45	53	56	61	67	72	75	88	102	110	122	128		
		60	25	30	35	39	45	47	54	61	65	70	73	89	99	105	114	129	131	
		66	31	34	38	43	48	51	56	63	67	70	74	86	92	106	112	122	127	
		72	32	33	37	43	45	51	56	58	64	67	69	77	89	100	108	114	124	131
	78	32	34	36	39	45	48	53	59	60	66	66	76	87	93	102	110	116	118	
	84	33	34	35	38	45	47	50	55	59	63	67	72	81	94	95	103	113	118	
	10N@ 7.00	56	27	34	38	45	53	57	60	68	75	80	88	100	106	118	137			
		60	30	36	41	48	55	60	65	69	71	84	88	102	109	122	130			
		66	29	35	42	44	51	55	62	66	70	73	85	91	105	109	123	132		
		72	30	34	38	43	47	52	59	63	66	69	78	88	94	106	112	127	133	
	78	30	33	37	40	46	51	55	61	65	71	71	79	94	96	108	115	130	137	
	84	31	33	36	40	47	49	55	57	63	70	72	80	92	98	109	112	121	133	
11N@ 6.36	56	32	41	45	51	60	64	71	83	87	89	102	108	127	138					
	60	30	39	44	50	57	65	66	73	85	89	90	104	114	129					
	66	31	38	43	46	53	59	67	67	76	86	88	105	106	117	132				
	72	32	37	42	48	55	57	62	70	70	78	82	94	108	109	119	136	148		
78	29	35	40	47	50	55	61	65	73	72	80	92	98	110	118	124	140	141		
84	30	36	39	45	49	52	59	66	68	73	78	84	97	102	116	124	129	144		
12N@ 5.83	56	34	41	50	56	63	68	76	87	88	102	103	113	129						
	60	33	39	46	55	58	65	74	76	89	90	103	112	128	139					
	66	32	37	45	48	55	63	67	76	78	90	92	105	115	130	143				
	72	32	37	42	48	55	61	65	69	77	80	89	102	107	119	135	148			
78	30	36	42	48	51	56	64	70	72	80	84	97	106	113	123	141	151			
84	30	36	40	45	51	53	61	68	73	77	83	89	102	115	118	128	144	151		
14N@ 5.00	56	36	44	53	63	71	75	87	96	102	111	120	137							
	60	37	43	54	61	69	75	88	89	99	103	112	128							
	66	35	42	48	55	64	70	77	90	92	102	106	115	132						
	72	34	40	49	55	61	69	73	81	91	95	103	110	120	138					
78	33	39	44	52	58	67	72	76	84	92	97	111	120	138	141					
84	33	40	44	51	58	62	69	78	79	86	97	106	116	127	143	155				



A S D

GIRDER SPAN (ft.)	JOIST SPACES (ft.)	GIRDER DEPTH (in.)	JOIST GIRDER WEIGHT – POUNDS PER LINEAR FOOT																	
			LOAD ON EACH PANEL POINT – KIPS																	
			4	5	6	7	8	9	10	11	12	13	14	16	18	20	22	24	26	28
110	10N@ 11.00	84	54	58	61	65	69	73	82	83	94	99	100	120	143	144				
		96	62	62	63	65	69	72	81	82	91	97	98	107	125					
		108	63	63	64	67	69	72	75	82	86	91	95	105	113	131	133			
		114	63	64	67	68	72	73	76	79	86	88	96	108	115	133	136			
	120	64	64	66	69	72	74	76	81	83	88	90	100	111	128	137	140			
	12N@ 9.17	84	58	62	66	70	74	84	88	101	109	120	122	144						
		96	57	62	66	70	74	79	88	92	101	107	125	127	151					
108		58	64	68	72	75	79	84	90	95	106	111	132	136	158					
114		59	65	66	71	75	79	84	89	102	106	107	126	134	156	158				
120	59	62	67	72	74	79	82	91	96	107	109	126	135	158	161					
14N@ 7.86	84	60	66	71	76	84	97	102	122	123	134	147								
	96	60	65	69	74	83	95	100	105	124	125	136	150							
	108	60	64	69	72	78	87	99	103	108	120	128	142	155						
	114	61	65	69	74	79	84	93	103	105	111	124	133	157						
120	60	66	69	74	80	82	90	96	106	109	126	135	158	160						
16N@ 6.88	96	62	68	72	79	89	104	106	125	126	147	149								
	102	63	67	74	80	89	103	108	125	127	128	152	156							
	108	64	68	73	81	83	95	104	110	127	130	142	158							
	114	65	70	74	80	86	95	105	111	114	132	135	161	162						
120	66	69	75	81	88	97	99	109	117	135	138	152	165							
18N@ 6.11	96	64	71	77	87	99	106	125	127	148	151									
	102	66	70	80	89	101	109	127	128	139	152	153								
	108	66	71	77	83	94	106	111	129	131	144	157								
	114	67	73	79	85	97	107	113	132	134	137	159	163							
120	68	74	79	88	91	101	110	118	136	139	152	166								
20N@ 5.50	96	68	77	82	99	106	125	139	152	154										
	102	69	75	81	94	109	129	130	142	154	155									
	108	69	77	83	94	106	114	132	133	145	157	169								
	114	69	77	86	91	101	115	134	135	147	160	161								
120	66	72	77	83	93	106	113	126	128	137	154	167								
120	10N@ 12.00	96	63	66	69	72	76	78	82	86	89	89	94	108	115	129				
		102	64	67	69	71	75	79	83	83	86	91	92	110	117	131	137			
		108	78	79	82	83	83	83	86	91	95	94	100	108	126					
		114	78	79	82	83	83	84	86	91	90	95	95	109	127	128				
	120	79	81	83	84	85	86	88	92	92	97	102	113	133	133					
	12N@ 10.00	96	68	69	71	77	82	86	90	99	100	113	125	130						
		102	68	69	72	78	80	85	88	96	101	102	116	130						
108		69	70	72	75	81	86	90	91	99	103	105	128	134						
114		70	70	71	75	82	86	87	92	95	100	130	121	135						
120	70	71	72	76	80	84	88	92	93	102	107	123	133	138						
15N@ 8.00	96	69	74	77	82	90	96	109	115	125	129	134								
	102	70	73	78	84	88	93	103	113	118	129	132								
	108	70	73	80	85	90	95	101	106	115	119	133								
	114	70	73	78	83	88	93	98	107	117	121	122	137							
120	72	74	78	84	89	94	99	100	110	118	124	140								
16N@ 7.50	96	70	76	80	85	90	100	109	114	128	134									
	102	70	74	78	86	92	97	110	112	120	131	137								
	108	70	74	80	85	90	95	100	114	120	124	133								
	114	70	73	81	86	91	96	101	107	117	122	135	145							
120	70	75	79	85	90	94	99	103	118	119	126	147								
18N@ 6.67	96	71	77	85	89	95	109	116	129	136										
	102	72	78	83	87	97	111	113	121	138	138									
	108	72	79	84	88	94	101	115	121	156	157									
	114	72	76	85	90	96	102	116	117	123	136	143								
120	73	77	84	89	95	99	105	118	125	129	140									
20N@ 6.00	96	76	82	89	94	110	116	130	136											
	102	75	83	87	92	105	114	123	140	150										
	108	75	81	88	94	101	115	121	135	142	152									
	114	77	82	87	93	103	113	119	128	138	146									
120	77	84	90	96	102	107	121	124	133	148	150									
24N@ 5.00	96	83	90	96	111	121	136													
	102	81	88	99	108	118	140	151												
	108	83	91	96	103	119	129	147	157											
	114	86	96	109	121	141	143	152	160											
120	86	97	107	117	143	146	152	163	165											

