STANDARD SPECIFICATION
FOR OPEN WEB STEEL JOISTS, K-SERIES

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

SECTION 1.
SCOPE AND DEFINITION

1.1 SCOPE

The *Standard Specification for Open Web Steel Joists,* **K**-*Series*, hereafter referred to as the Specification, covers the design, manufacture, application, and erection stability and handling of Open Web Steel Joists **K**-Series in buildings or other structures, where other structures are defined as those structures designed, manufactured, and erected in a manner similar to buildings. **K-**Series joists shall be designed using Allowable Stress Design (ASD) or Load and Resistance Factor Design (LRFD) in accordance with this Specification. Steel joists 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. The KCS joists; Joist Substitutes, **K**-Series; and Top Chord Extensions and Extended Ends, **K**-Series are included as part of this Specification.

This Specification includes Sections 1 through 6.

1.2 DEFINITION

The term "Open Web Steel Joists **K**-Series", 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, suitable for the direct support or floors and roof slabs or deck.

The **K**-Series Joists have been standardized in depths from 10 inches (254 mm) through 30 inches (762 mm), for spans up through 60 feet (18288 mm). The maximum total safe uniformly distributed load-carrying capacity of a **K**-Series Joist is 550 plf (8.02 kN/m) in ASD or 825 plf (12.03 kN/m) in LRFD.

The **K**-Series standard joist designations are determined by their nominal depth, followed by the letter **"K"**, and then by the chord size designation assigned. The chord size designations range from 01 to 12. Therefore, as a performance based specification, the **K**-Series standard joist designations listed in the following Standard Load Tables shall support the uniformly distributed loads as provided in the appropriate tables:

Standard LRFD Load Table Open Web Steel Joists, **K**-Series – U.S. Customary Units
Standard ASD Load Table Open Web Steel Joists, **K**-Series – U.S. Customary Units

And the following Standard Load Tables published electronically at www.steeljoist.org/loadtables

Standard LRFD Load Table Open Web Steel Joists, **K**-Series – S.I. Units
Standard ASD Load Table Open Web Steel Joists, **K**-Series – S.I. Units

Two standard types of **K**-Series Joists are designed and manufactured. These types are underslung (top chord bearing) or square-ended (bottom chord bearing), with parallel chords.

A **KCS** Joist shall be designed in accordance with this Specification based on an envelope of moment and shear capacity, rather than uniform load capacity, to support uniform plus concentrated loads or other non-uniform loads. The **KCS** Joists have been standardized in depths from 10 inches (254 mm) through 30 inches (762 mm), for spans up through 60 feet (18288 mm). The maximum total safe uniformly distributed load-carrying capacity of a **KCS** Joist is 550 plf (8.02 kN/m) in ASD or 825 plf (12.03 kN/m) in LRFD.

The **KCS** Joists standard designations are determined by their nominal depth, followed by the letters **"KCS"**, and then by the chord size designation assigned. The chord size designations range from 1 to 5. Therefore, as a performance based specification, the **KCS** Joists standard designations listed in the following Standard Load Tables shall provide the moment capacity and shear capacity as listed in the appropriate tables:

Standard LRFD Load Table for **KCS** Open Web Steel Joists – U.S. Customary Units
Standard ASD Load Table for **KCS** Open Web Steel Joists – U.S. Customary Units

And the following Standard Load Tables published electronically at www.steeljoist.org/loadtables

Standard LRFD Load Table for **KCS** Open Web Steel Joists – S.I. Units
Standard ASD Load Table for **KCS** Open Web Steel Joists – S.I. Units

A Joist Substitute, **K**-Series, ~~is~~ shall be designed in accordance with this Specification to support uniform loads when the span is less than 10 feet (3048 mm) where an open web configuration becomes impractical. The Joist Substitutes, **K**-Series have been standardized as 2.5 inch (64 mm) deep sections for spans up through 10'-0" (3048 mm). The maximum total safe uniformly distributed load-carrying capacity of a Joist Substitute is 550 plf (8.02 kN/m) in ASD or 825 plf (12.03 kN/m) in LRFD.

The Joist Substitutes, **K**-Series standard designations are determined by their nominal depth, i.e. **2.5**, followed by the letter **"K"** and then by the chord size designation assigned. The chord size designations range from 1 to 3. Therefore, as a performance based specification, the Joist Substitutes, **K**-Series standard designations listed in the following Load Tables shall support the uniformly distributed loads as provided in the appropriate tables:

LRFD Simple Span Load Table for 2.5 Inch **K**–Series Joist Substitutes – U.S. Customary Units
ASD Simple Span Load Table for 2.5 Inch **K**–Series Joist Substitutes – U.S. Customary Units

LRFD Outriggers Load Table for 2.5 Inch **K**–Series Joist Substitutes – U.S. Customary Units
ASD Outriggers Load Table for 2.5 Inch **K**–Series Joist Substitutes – U.S. Customary Units

And the following Load Tables published electronically at www.steeljoist.org/loadtables

LRFD Simple Span Load Table for 64 mm **K**–Series Joist Substitutes – S.I. Units
ASD Simple Span Load Table for 64 mm **K**–Series Joist Substitutes – S.I. Units

LRFD Outriggers Load Table for 64 mm **K**–Series Joist Substitutes – S.I. Units
ASD Outriggers Load Table for 64 mm **K**–Series Joist Substitutes – S.I. Units

A Top Chord Extension or Extended End, K-Series, shall be a joist accessory that shall be designed in accordance with this Specification to support uniform loads when one or both ends of an underslung joist needs to be cantilevered beyond its bearing seat. The Top Chord Extensions and Extended Ends, **K**-Series have been standardized as an "S" Type (top chord angles extended only) and an "R" Type (top chord and bearing seat angles extended), respectively. The maximum total safe uniformly distributed load-carrying capacity of either an "R" or "S" Type extension is 550 plf (8.02 kN/m) in ASD or 825 plf (12.03 kN/m) in LRFD.

Standard designations for the "S" Type range from S1 to S12 for spans from 0'-6" to 4'-6" (152 to 1372 mm). Standard designations for the "R" Type range from R1 to R12 for spans from 0'-6" to 6'-0" (152 to 1829 mm). Therefore, as a performance based specification, the "S" Type Top Chord Extensions and "R" Type Extended Ends listed in the following Standard Load Tables shall support the uniformly distributed loads as provided in the appropriate tables:

LRFD Top Chord Extension Load Table (S Type) – U.S. Customary Units
ASD Top Chord Extension Load Table (S Type) – U.S. Customary Units

LRFD Top Chord Extension Load Table (R Type) – U.S. Customary Units
ASD Top Chord Extension Load Table (R Type) – U.S. Customary Units

And the following Standard Load Tables published electronically at www.steeljoist.org/loadtables

LRFD Top Chord Extension Load Table (S Type) – S.I. Units
ASD Top Chord Extension Load Table (S Type) – S.I. Units
LRFD Top Chord Extension Load Table (R Type) – S.I. Units
ASD Top Chord Extension Load Table (R Type) – S.I. Units

1.3 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 2. REFERENCED SPECIFICATIONS, CODES AND STANDARDS

2.1 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 Atmoshperic 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

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

2.1 OTHER REFERENCES

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

American Society of Civil Engineers (ASCE)

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

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.

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 (2010), *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*

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 3.
MATERIALS

3.1 STEEL

The steel used in the manufacture of **K**-Series Joists 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 3.2.

3.2 MECHANICAL PROPERTIES

Steel used for **K-**Series Joists 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 3.2 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.

3.3 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 4.
DESIGN AND MANUFACTURE

4.1 METHOD

Joists shall be designed in accordance with this specification as simply-supported, trusses supporting a floor or roof deck so constructed as to brace the top chord of the joists against lateral buckling. 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:

Steel joist 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 steel joist 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.

4.2 DESIGN AND ALLOWABLE STRESSES

Design Using Load and Resistance Factor Design (LRFD)

Joists 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)

Joists 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 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 members.

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

Design Stress = $0.9F_y$ (LRFD) (4.2-1)

Allowable Stress = $0.6F_y$ (ASD) (4.2-2)

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

Design Stress = $0.9F_{cr}$ (LRFD) (4.2-3)

Allowable Stress = $0.6F_{cr}$ (ASD) (4.2-4)

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

$$F_{cr} = Q\left[0.658^{\left(QF_y/F_e\right)}\right]F_y \qquad (4.2\text{-}5)$$

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

$$F_{cr} = 0.877F_e \qquad (4.2\text{-}6)$$

Where: F_e = Elastic buckling stress determined in accordance with Equation 4.2-7

$$F_e = \frac{\pi^2 E}{\left(k\ell/r\right)^2} \qquad (4.2\text{-}7)$$

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 a compression or tension web member, 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:.

$$Q = [5.25/(w/t)] + t \le 1.0 \qquad (4.2\text{-}8)$$

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

or,

$$Q = [5.25/(w/t)] + (t/25.4) \le 1.0 \qquad (4.2\text{-}9)$$

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: $F_n = F_y$

$$\text{Design Stress} = \phi_b F_n = 0.9F_y \text{ (LRFD)} \qquad (4.2\text{-}10)$$

$$\text{Allowable Stress} = F_n/\Omega_b = 0.6F_y \text{ (ASD)} \qquad (4.2\text{-}11)$$

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

Design Stress = $\phi_b F_n = 1.45F_y$ (LRFD) (4.2-12)

Allowable Stress = $F_n/\Omega_b = 0.95F_y$ (ASD) (4.2-13)

For bearing plates used in joist seats: $F_n = 1.5\ F_y$

Design Stress = $\phi_b F_n = 1.35F_y$ (LRFD) (4.2-14)

Allowable Stress = $F_n/\Omega_b = 0.90F_y$ (ASD) (4.2-15)

(d) Weld Strength:

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

Nominal Shear Stress = $F_{nw} = 0.6F_{exx}$ (4.2-16)

LRFD: $\phi_w = 0.75$

Design Shear Strength = $\phi R_n = \phi_w F_{nw} A = 0.45F_{exx} A_w$ (4.2-17)

ASD: $\Omega_w = 2.0$

Allowable Shear Strength = $R_n/\Omega_w = F_{nw}A/\Omega_w = 0.3F_{exx} A_w$ (4.2-18)

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 shall be permitted to be used);

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

T (inches) = 0.12D + 0.11 (4.2-19)

Where: D = web diameter, inches

or,

T (mm) = 0.12D + 2.8 (4.2-20)

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:

$\phi_t = \phi_c = 0.90$ (LRFD) $\Omega_t = \Omega_c = 1.67$ (ASD)

Design Stress = $0.9F_y$ (LRFD) (4.2-21)

Allowable Stress = $0.6F_y$ (ASD) (4.2-22)

4.3 MAXIMUM SLENDERNESS RATIOS

The slenderness ratios, 1.0 ℓ/r and 1.0 ℓ_s /r of members as a whole or any component part shall not exceed the values given in Table 4.3-1, Parts A.

The effective slenderness ratio, kℓ/r to be used in calculating the nominal stresses, F_{cr} and $F'_{e,}$ is the largest value as determined from Table 4.3-1, Parts B and C.

In compression members when fillers or ties are used, they shall be spaced so that the ℓ_s/r_z ratio of each component does not exceed the governing ℓ/r ratio of the member as a whole. The terms used in Table 4.3-1 are defined as follows:

ℓ = length center-to-center of panel points, except ℓ = 36 inches (914 millimeters) for calculating ℓ/r_y of top chord member, in. (mm) or the appropriate length for a compression or tension web member, in. (mm).

ℓ_s = maximum length center-to-center between panel point and filler (tie), or between adjacent fillers (ties), in. (mm).

r_x = member radius of gyration in the plane of the joist, in. (mm).

r_y = member radius of gyration out of the plane of the joist, in. (mm).

r_z = least radius of gyration of a member component, in. (mm).

Compression web members are those web members subject to compressive axial loads under gravity loading.

Tension web members are those web members subject to tension axial loads under gravity loading, and which may be subject to compressive axial loads under alternate loading conditions, such as net uplift.

For top chords, the end panel(s) are the panels between the bearing seat and the first primary interior panel point comprised of at least two intersecting web members.

TABLE 4.3-1
MAXIMUM AND EFFECTIVE SLENDERNESS RATIOS

Description			$k\ell/r_x$	$K\ell/r_y$	$k\ell/r_z$	$k\ell_s/r_z$
I	TOP CHORD INTERIOR PANELS					
	A.	The slenderness ratios, $1.0\ell/r$ and $1.0\ell_s/r$, of members as a whole or any component part shall not exceed 90.				
	B.	The effective slenderness ratio, $k\ell/r$, to determine F_{cr} where k is:				
		1. With fillers or ties	1.0	0.94	---	1.0
		2. Without fillers or ties	---	---	1.0	---
		3. Single component members	1.0	0.94	---	---
	C.	For bending, the effective slenderness ratio, $k\ell/r$, to determine F'_e where k is:				
			1.0	---	---	---
II	TOP CHORD END PANELS, ALL BOTTOM CHORD PANELS					
	A.	The slenderness ratios, $1.0\ell/r$ and $1.0\ell_s/r$, of members as a whole or any component part shall not exceed 120 for Top Chords, or 240 for Bottom Chords.				
	B.	The effective slenderness ratio, $k\ell/r$, to determine F_{cr} where k is:				
		1. With fillers or ties	1.0	0.94	---	1.0
		2. Without fillers or ties	---	---	1.0	---
		3. Single component members	1.0	0.94	---	---
	C.	For bending, the effective slenderness ratio, $k\ell/r$, to determine F'_e where k is:				
			1.0	---	---	---
III	TENSION WEB MEMBERS					
	A.	The slenderness ratios, $1.0\ell/r$ and $1.0\ell_s/r$, of members as a whole or any component part shall not exceed 240.				
	B.	For end web members subject to compression, the effective slenderness ratio, $k\ell/r$, to determine F_{cr} where k is:				
		1. With fillers or ties	1.0	1.0	---	1.0
		2. Without fillers or ties	---	---	1.0	---
		3. Single component members	0.8	0.8	---	---
IV	COMPRESSION WEB MEMBERS					
	A.	The slenderness ratios, $1.0\ \ell/r$ and $1.0\ell_s/r$, of members as a whole or any component part shall not exceed 200.				
	B.	The effective slenderness ratio, $k\ell/r$, to determine F_{cr} where k is:				
		1. With fillers or ties	1.0	1.0	---	1.0
		2. Without fillers or ties	---	---	1.0	---
		3. Single component members	1.0	1.0	---	---

4.4 MEMBERS

(a) **Chords**

The bottom chord shall be designed as an axially loaded tension member.

The radius of gyration of the top chord about its vertical axis shall not be less than:

$$r_y \geq \ell_{br} \Big/ \left(124 + 0.67 d_j + 28 \frac{d_j}{L} \right), \text{ in.} \tag{4.4-1a}$$

$$r_y \geq \ell_{br} \Big/ \left(124 + 0.026 d_j + 0.34 \frac{d_j}{L} \right), \text{ mm} \tag{4.4-1b}$$

or,

$$r_y \geq \ell_{br} / 170 \tag{4.4-2}$$

Where:

d_j is the steel joist depth, in. (mm)

L is the design length for the joist, ft. (m)

r_y is the out-of-plane radius of gyration of the top chord, in. (mm)

ℓ_{br} is the spacing in inches (millimeters) between lines of bridging as specified in Section 5.4(c).

The top chord shall be considered as stayed laterally by the floor slab or roof deck when attachments are in accordance with the requirements of Section 5.8(e) of these specifications.

The top chord shall be designed for only axial compressive stress when the panel length, ℓ, does not exceed 24 inches (609 mm). When the panel length exceeds 24 inches (609 mm), the top chord shall be designed as a continuous member subject to combined axial and bending stresses and shall be so proportioned that:

For **LRFD**:

at the panel point:

$$f_{au} + f_{bu} \leq 0.9 F_y \tag{4.4-3}$$

at the mid panel:

for, $\dfrac{f_{au}}{\phi_c F_{cr}} \geq 0.2$,

$$\frac{f_{au}}{\phi_c F_{cr}} + \frac{8}{9} \left[\frac{C_m f_{bu}}{\left[1 - \left(\dfrac{f_{au}}{\phi_c F'_e} \right) \right] Q \phi_b F_y} \right] \leq 1.0 \tag{4.4-4}$$

for, $\frac{f_{au}}{\phi_c F_{cr}} < 0.2$,

$$\left(\frac{f_{au}}{2\phi_c F_{cr}}\right) + \left[\frac{C_m f_{bu}}{\left[1-\left(\frac{f_{au}}{\phi_c F'_e}\right)\right] Q\phi_b F_y}\right] \le 1.0 \qquad (4.4\text{-}5)$$

f_{au} = P_u/A = Required compressive stress, ksi (MPa)
P_u = Required axial strength using LRFD load combinations, kips (N)
f_{bu} = M_u/S = Required bending stress at the location under consideration, ksi (MPa)
M_u = Required flexural strength using LRFD load combinations, kip-in. (N-mm)
S = Elastic Section Modulus, $in.^3$ (mm^3)
F_{cr} = Nominal axial compressive stress in ksi (MPa) based on ℓ/r as defined in Section 4.2(b),
C_m = 1 - 0.3 $f_{au}/\phi F_e$ for end panels
C_m = 1 - 0.4 $f_{au}/\phi F_e$ for interior panels
F_y = Specified minimum yield strength, ksi (MPa)
F'_e = $\frac{\pi^2 E}{(K\ell/r_x)^2}$, ksi (MPa)

Where ℓ is the panel length, in inches (millimeters), as defined in Section 4.2(b) and r_x is the radius of gyration about the axis of bending.

Q = Form factor defined in Section 4.2(b)
A = Area of the top chord, $in.^2$ (mm^2)

For **ASD**:

at the panel point:

$$f_a + f_b \le 0.6F_y \qquad (4.4\text{-}6)$$

at the mid panel:

for, $\frac{f_a}{F_a} \ge 0.2$,

$$\frac{f_a}{F_a} + \frac{8}{9}\left[\frac{C_m f_b}{\left[1-\left(\frac{1.67 f_a}{F'_e}\right)\right] QF_b}\right] \le 1.0 \qquad (4.4\text{-}7)$$

for $\frac{f_a}{F_a} < 0.2$,

$$\left(\frac{f_a}{2F_a}\right) + \left[\frac{C_m f_b}{\left[1-\left(\frac{1.67 f_a}{F'_e}\right)\right] Q F_b}\right] \le 1.0 \qquad (4.4\text{-}8)$$

f_a = P/A required compressive stress, ksi (MPa)
P = Required axial strength using ASD load combinations, kips (N)
f_b = M/S = required bending stress at the location under consideration, ksi (MPa)
M = Required flexural strength using ASD load combinations, k-in (N-mm)
F_a = Allowable axial compressive stress based on ℓ/r as defined in Section 4.2(b), ksi (MPa)
F_b = Allowable bending stress; $0.6F_y$, ksi (MPa)
C_m = 1 - 0.50 f_a/F_e for end panels
C_m = 1 - 0.67 f_a/F_e for interior panels

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

$$f_{vmod} \le \phi_v f_n \qquad \text{(LRFD, } \phi = 1.00\text{)} \qquad (4.4\text{-}9)$$

$$f_{vmod} \le f_n/\Omega_v \qquad \text{(ASD, } \Omega = 1.50\text{)} \qquad (4.4\text{-}10)$$

Where:

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

It shall not be 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 section 4.4(b) (25 percent of the end reaction) shall not be required when evaluating Equation 4.4-9 or 4.4-10.

KCS Joist chords shall be designed for a flat positive bending moment envelope where the moment capacity is constant at all interior panels. The top chord end panel(s) is designed for an axial load based on the force in the first tension web resulting from the specified shear. A uniform load of 550 plf (8020 N/m) in ASD or 825 plf (12030 N/m) in LRFD shall be used to check bending in the end panel(s).

(b) Web

The vertical shears to be used in the design of the web members shall be determined from full uniform loading, but such vertical shears shall be not less than 25 percent of the end reaction. Due consideration shall be given to the effect of eccentricity. The effect of combined axial compression and bending shall be investigated using the provisions of Section 4.4(a), letting $C_m = 0.4$ when bending due to eccentricity produces reversed curvature.

Interior vertical web members used in modified Warren type web systems shall be designed to resist the gravity loads supported by the member plus an additional axial load of ½ of 1.0 percent of the top chord axial force.

KCS Joist web forces shall be determined based on a flat shear envelope. All webs shall be designed for a vertical shear equal to the specified shear capacity. In addition, all webs shall be designed for 100 percent stress reversal except for the first tension web which will remain in tension under all simple span gravity loads.

(c) Joist Extensions

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

Design criteria for joist extensions shall be specified using one of the following methods:

(1) A Top chord extension (TCX), extended end, or full depth cantilevered end shall be designed for the load from the Standard Load Tables based on the design length and designation of the specified joist. In the absence of other design information, the joist manufacturer shall design the joist extension for this loading as a default.

(2) A loading diagram shall be provided for the top chord extension, extended end, or full depth cantilevered end. The diagram shall include the magnitude and location of the loads to be supported, as well as the appropriate load combinations.

(3) Joist extensions shall be specified using extension designations found in the Top Chord Extension Load Table (S Type) for TCXs or the Top Chord Extension Load Table (R Type) for extended ends.

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

The joist manufacturer shall consider the effects of joist extension loading on the base span of the joist. 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 chord and web axial forces. In the case of a K-Series Standard Type 'R' Extended End or 'S' TCX, the design bending moment is defined as the tabulated extension section modulus (S) multiplied by the appropriate allowable (ASD) or design (LRFD) flexural stress.

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

4.5 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 for 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 5.12 of this specification)

The agency shall arrange for visual inspection to determine that welds meet the acceptance standards of Section 4.5(a)(1) above. 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 will be less than the design (LRFD) or allowable (ASD) stress.

(c) Eccentricity

Members connected at a joint shall have their centroidal axes meet at a point whenever possible. Between joist ends where the eccentricity of a web member is less than 3/4 of the over-all dimension, measured in the plane of the web, of the largest member connected, the additional bending stress from this eccentricity shall be permitted to be neglected in the joist design. Otherwise, due consideration shall be given to the effect of eccentricity. The eccentricity of any web member shall be the perpendicular distance from the centroidal axis of that web member to the point on the centroidal axis of the chord which is vertically above or below the intersection of the centroidal axis of the web member(s) forming the joint. Joist ends shall be proportioned to resist bending produced by eccentricity at the support.

4.6 CAMBER

Joists shall have approximate camber in accordance with the following:

TABLE 4.6-1

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)

The specifying professional shall give consideration to coordinating joist camber with adjacent framing.

4.7 VERIFICATION OF DESIGN AND MANUFACTURE

(a) Design Calculations

Companies manufacturing **K-**Series Joists 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) Tests of Chord and Web Members

Each manufacturer shall, at the time of design review by the Steel Joist Institute, verify by tests that the design, in accordance with Sections 4.1 through 4.5 of this specification, will provide the theoretical strength of critical members. Such tests shall be evaluated considering the actual yield strength of the members of the test joists.

Material tests for determining mechanical properties of component members shall be conducted.

(c) Tests of Joints and Connections

Each manufacturer shall, at the time of design review by the Steel Joist Institute, verify by shear tests on representative joints of typical joists that connections will meet the provision of Section 4.5(b). Chord and web members shall be permitted to be reinforced for such tests.

(d) In-Plant Inspections

Each manufacturer shall verify their ability to manufacture **K**-Series Joists 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 5.
APPLICATION

5.1 USAGE

This specification shall apply to any type of structure where floors and roofs are to be supported directly by steel joists installed as hereinafter specified. Where joists are used other than on simple spans under uniformly distributed loading as prescribed in Section 4.1, they shall be investigated and modified when necessary to limit the required stresses to those listed in Section 4.2.

When a rigid connection of the bottom chord is to be made to a column or other structural support, the joist is then no longer simply supported, and the system shall be investigated for continuous frame action by the specifying professional. The magnitude and location of all loads and forces 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.”

5.2 SPAN

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

5.3 END SUPPORTS

(a) Masonry and Concrete

A **K**-Series Joist 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 **K**-Series Joists shall extend a distance of not less than 4 inches (102 mm) over the masonry or concrete support unless it is deemed necessary to bear less than 4 inches (102 mm) over the support. Special consideration shall then be given to the design of the steel bearing plate and the masonry or concrete by the specifying professional. **K**-Series Joists shall be anchored to the steel bearing plate and shall bear a minimum of 2 1/2 inches (64 mm) on the plate.

The steel bearing plate shall be located not more than 1/2 inch (13 mm) from the face of the wall, otherwise special consideration shall then be given to the design of the steel bearing plate and the masonry or concrete by the specifying professional. When the specifying professional requires the joist reaction to occur at or near the centerline of the wall or other support, then a note shall be placed on the contract drawings specifying this requirement and the specified bearing seat depth shall be increased accordingly. If the joist reaction is to occur more than 2 1/2 inches (64 mm) from the face of the wall or other support, the minimum seat depth shall be 2 1/2 inches (64 mm) plus a dimension equal to the distance the joist reaction is to occur beyond 2 1/2 inches (64 mm).

The steel bearing plate shall not be less than 6 inches (152 mm) wide perpendicular to the length of the joist. The plate is to be designed by the specifying professional and shall be furnished by other than the joist manufacturer.

(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 **K**-Series Joists shall extend a distance of not less than 2 ½ inches (64 millimeters) over the steel supports.

5.4 BRIDGING

Top and bottom chord bridging is required and shall consist of one or both of the following types.

(a) Horizontal

Horizontal bridging shall consist of continuous horizontal steel members. The ratio of unbraced length to least radius of gyration, ℓ/r, of the bridging member shall not exceed 300, where ℓ is the distance in inches (mm) between attachments, and r is the least radius of gyration of the bridging member.

(b) Diagonal

Diagonal bridging shall consist of cross-bracing with a ℓ/r ratio of not more than 200, where ℓ is the distance in inches (millimeters) between connections and r is the least radius of gyration of the bracing member. Where cross-bracing members are connected at their point of intersection, the ℓ distance shall be taken as the distance in inches (millimeters) between connections at the point of intersection of the bracing members and the connections to the chord of the joists.

(c) Quantity and Spacing

Bridging shall be properly spaced and anchored to support the decking and the employees prior to the attachment of the deck to the top chord. The maximum spacing of lines of bridging, ℓ_{brmax} shall be the lesser of,

$$\ell_{brmax} = \left(124 + 0.67\,d_j + 28\frac{d_j}{L}\right) r_y \text{, in.} \qquad (5.4\text{-}1a)$$

$$\ell_{brmax} = \left(124 + 0.026\,d_j + 0.34\frac{d_j}{L}\right) r_y \text{, mm} \qquad (5.4\text{-}1b)$$

or,
$$\ell_{brmax} = 170\,r_y \qquad (5.4\text{-}2)$$

Where:

d_j is the steel joist depth, in. (mm)

L is the Joist Span length, ft. (m)

r_y is the out-of-plane radius of gyration of the top chord, in. (mm)

The number of rows of top chord bridging shall not be less than as shown in Bridging Tables 5.4-1 and 5.4-2 and the spacing shall meet the requirements of Equations 5.4-1 and 5.4-2. The number of rows of bottom chord bridging, including bridging required per Section 5.11, shall not be less than the number of top chord rows. Rows of bottom chord bridging are permitted to be spaced independently of rows of top chord bridging. The spacing of rows of bottom chord bridging shall meet the slenderness requirement of Section 4.3 and any specified strength requirements.

TABLE 5.4-1

U.S. CUSTOMARY UNITS

NUMBER OF ROWS OF TOP CHORD BRIDGING**

Refer to the K-Series Load Table and Specification Section 6 for required bolted diagonal bridging.

Distances are Joist Span lengths in feet – See "Definition of Span" preceding Load Tables.

Section Number*	Joist Depth	One Row	Two Rows	Three Rows	Four Rows
#1	All	Up thru 17	Over 17 thru 26	Over 26 thru 28	
#2	All	Up thru 21	Over 21 thru 30	Over 30 thru 32	
#3	All	Up thru 18	Over 18 thru 26	Over 26 thru 40	
#4	All	Up thru 20	Over 20 thru 30	Over 30 thru 41	Over 41 thru 48
#5	12K to 24K	Up thru 20	Over 20 thru 30	Over 30 thru 42	Over 42 thru 48
	26K	Up thru 28	Over 28 thru 41	Over 41 thru 52	
#6	14K to 24K	Up thru 20	Over 20 thru 31	Over 31 thru 42	Over 42 thru 48
	26K & 28K	UP thru 28	Over 28 thru 41	Over 41 thru 54	Over 54 thru 56
#7	16K to 24K	Up thru 23	Over 23 thru 34	Over 34 thru 48	
	26K to 30K	Up thru 29	Over 29 thru 44	Over 44 thru 60	
#8	24K	Up thru 25	Over 25 thru 39	Over 39 thru 48	
	26K to 30K	Up thru 29	Over 29 thru 44	Over 44 thru 60	
#9	16K to 24K	Up thru 22	Over 22 thru 34	Over 34 thru 48	
	26K to 30K	Up thru 29	Over 29 thru 44	Over 44 thru 60	
#10	18K to 24K	Up thru 22	Over 22 thru 38	Over 38 thru 48	
	26K to 30K	Up thru 29	Over 29 thru 48	Over 48 thru 60	
#11	22K	Up thru 24	Over 24 thru 39	Over 39 thru 44	
	30K	Up thru 34	Over 34 thru 49	Over 49 thru 60	
#12	24K	Up thru 25	Over 25 thru 43	Over 43 thru 48	
	26K to 30K	Up thru 29	Over 29 thru 47	Over 47 thru 60	

*Last digit(s) of joist designation shown in Load Table

**See Section 5.11 for additional bridging required for uplift design.

TABLE 5.4-2

METRIC UNITS

NUMBER OF ROWS OF TOP CHORD BRIDGING**

Refer to the K-Series Load Table and Specification Section 6 for required bolted diagonal bridging.

Distances are Joist Span lengths in mm – See "Definition of Span" preceding Load Tables.

Section Number*	Joist Depth	One Row	Two Rows	Three Rows	Four Rows
#1	All	Up thru 5182	Over 5182 thru 7925	Over 7925 thru 8534	
#2	All	Up thru 6401	Over 6401 thru 9144	Over 9144 thru 9754	
#3	All	Up thru 5486	Over 5486 thru 7925	Over 7925 thru 12192	
#4	All	Up thru 6096	Over 6096 thru 9144	Over 9144 thru 12497	Over 12497 thru 14630
#5	12K to 24K	Up thru 6096	Over 6096 thru 9144	Over 9144 thru 12802	Over 12802 thru 14630
	26K	Up thru 8534	Over 8534 thru 12497	Over 12497 thru 15850	
#6	14K to 24K	Up thru 6096	Over 6096 thru 9449	Over 9449 thru 12802	Over 12802 thru 14630
	26K & 28K	Up thru 8534	Over 8534 thru 12497	Over 12497 thru 16459	Over 16459 thru 17069
#7	16K to 24K	Up thru 7010	Over 7010 thru 10363	Over 10363 thru 14630	
	26K to 30K	Up thru 8839	Over 8839 thru 13411	Over 13411 thru 18288	
#8	24K	Up thru 7620	Over 7620 thru 11887	Over 11887 thru 14630	
	26K to 30K	Up thru 8839	Over 8839 thru 13411	Over 13411 thru 18288	
#9	16K to 24K	Up thru 6706	Over 6706 thru 10363	Over 10363 thru 14630	
	26K to 30K	Up thru 8839	Over 8839 thru 13411	Over 13411 thru 18288	
#10	18K to 24K	Up thru 6706	Over 6706 thru 11582	Over 11582 thru 14630	
	26K to 30K	Up thru 8839	Over 8839 thru 14630	Over 14630 thru 18288	
#11	22K	Up thru 7315	Over 7315 thru 11887	Over 11887 thru 13411	
	30K	Up thru 10363	Over 10363 thru 14935	Over 14935 thru 18288	
#12	24K	Up thru 7620	Over 7620 thru 13106	Over 13106 thru 14630	
	26K to 30K	UP thru 8839	Over 8839 thru 14326	Over 14326 thru 18288	

*Last digit(s) of joist designation shown in Load Table

**See Section 5.11 for additional bridging required for uplift design.

(d) Sizing of Bridging

Horizontal and diagonal bridging shall be capable of resisting the nominal unfactored horizontal compressive force, P_{br} given in Equation 5.4-3.

$$P_{br} = 0.0025\ n\ A_t\ F_{construction}\ ,\ lbs\ (N) \qquad (5.4\text{-}3)$$

Where:

n = 8 for horizontal bridging

n = 2 for diagonal bridging

A_t = cross sectional area of joist top chord, $in.^2$ (mm^2)

$F_{construction}$ = assumed ultimate stress in top chord to resist construction loads

$$F_{construction} = \left(\frac{\pi^2 E}{\left(\frac{0.9\ell_{br\max}}{r_y} \right)^2} \right) \geq 12.2\,ksi \qquad (5.4\text{-}4a)$$

$$F_{construction} = \left(\frac{\pi^2 E}{\left(\frac{0.9\ell_{br\max}}{r_y} \right)^2} \right) \geq 84.1\,MPa \qquad (5.4\text{-}4b)$$

Where: E = Modulus of Elasticity of steel = 29,000 ksi (200,000 MPa) and $\frac{\ell_{br\max}}{r_y}$ is determined from Equations 5.4-1a, 5.4-1b or 5.4-2

The bridging nominal unfactored horizontal compressive forces, P_{br} , are summarized in Table 5.4-3.

TABLE 5.4-3

*Section Number	Horizontal P_{br} (n=8)		Diagonal P_{br} (n=2)	
	lbs	(N)	lbs	(N)
#1 thru #8	340	(1512)	85	(378)
#9, #10	450	(2002)	113	(503)
#11, #12	560	(2491)	140	(623)
*Last digit(s) of joist designation shown in Load Table				

(e) Connections

Attachments to the joist chords shall be made by welding or mechanical means and shall be capable of resisting the nominal (unfactored) horizontal force, P_{br}, of Equation 5.4-3, but not less 700 pounds (3114 N).

(f) Bottom Chord Bearing Joists

Where bottom chord bearing joists are utilized, a row of diagonal bridging shall be provided near the support(s). This bridging shall be installed and anchored before the hoisting cable(s) is released.

5.5 INSTALLATION OF BRIDGING

Bridging shall support the top and bottom chords against lateral movement during the construction period and shall hold the steel joists in the approximate position as shown on the joist placement plans.

The ends of all bridging lines terminating at walls or beams shall be anchored thereto.

5.6 BEARING SEAT ATTACHMENTS

(a) Masonry and Concrete

Ends of K-Series Joists resting on steel bearing plates on masonry or structural concrete shall be attached thereto with a minimum of two 1/8 inch (3 mm) fillet welds 2 inches (51 mm) long, or with two 1/2 inch (13 mm) ASTM - A307 bolts, or the equivalent.

(b) Steel

Ends of K-Series Joists resting on steel supports shall be attached thereto with a minimum of two 1/8 inch (3 mm) fillet welds 2 inches (51 mm) long, or with two 1/2 inch (13 mm) ASTM – A307 bolts, or the equivalent. When K-Series Joists are used to provide lateral stability to the supporting member, the final connection shall be made by welding or as designated by the specifying professional.

(c) Uplift

Where uplift forces are a design consideration, roof joists shall be anchored to resist such forces (Refer to Section 5.11 Uplift).

5.7 JOIST SPACING

Joists shall be spaced so that the loading on each joist does not exceed the design load (LRFD or ASD) for the particular joist designation and span as shown in the applicable load tables.

5.8 FLOOR AND ROOF DECKS

(a) Material

Floor and roof decks shall be permitted to consist of cast-in-place or pre-cast concrete or gypsum, formed steel, wood, or other suitable material capable of supporting the required load at the specified joist spacing.

(b) Thickness

Cast-in-place slabs shall be not less than 2 inches (51 mm) thick.

(c) Centering

Centering for cast-in-place slabs shall be permitted to be ribbed metal lath, corrugated steel sheets, paper-backed welded wire fabric, removable centering or any other suitable material capable of supporting the slab at the designated joist spacing.

Centering shall not cause lateral displacement or damage to the top chord of joists during installation or removal of the centering or placing of the concrete.

(d) Bearing

Slabs or decks shall bear uniformly along the top chords of the joists.

(e) Attachments

The spacing for slab or deck attachments along the joist top chord shall not exceed 36 inches (914 mm), and shall be capable of resisting a nominal (unfactored) lateral force of not less than 300 pounds (1335 N), i.e., 100 plf (1.46 kN/m).

(f) Wood Nailers

Where wood nailers are used, such nailers in conjunction with deck or slab shall be attached to the top chords of the joists in conformance with Section 5.8(e).

(g) Joist With Standing Seam Roofing or Laterally Unbraced Top Chords

When the roof system does not provide lateral stability for the joists in accordance with Section 5.8 (e), (i.e. as may be the case with standing seam roofs or extended skylights and openings) sufficient stability shall be provided to brace the joists laterally under the full design load,.. The compression chord shall resist the chord axial design force in the plane of the joist (i.e., x-x axis buckling) and out of the plane of the joist (i.e., y-y axis buckling). In any case where the attachment requirement of Section 5.8(e) is not achieved, out-of-plane strength shall be achieved by adjusting the bridging spacing and/or increasing the compression chord area and the y-axis radius of gyration. The effective slenderness ratio in the y-direction equals $0.94\ L/r_y$; where L is the bridging spacing in inches (millimeters). The maximum bridging spacing shall not exceed that specified in Section 5.4(c).

Horizontal bridging members attached to the compression chords and their anchorages shall be designed for a compressive axial force of $0.001nP + 0.004P\sqrt{n} \geq 0.0025nP$, where n is the number of joists between end anchors and P is the chord design force in kips (Newtons). The attachment force between the horizontal bridging member and the compression chord shall be 0.01P. Horizontal bridging attached to the tension chords shall be proportioned so that the slenderness ratio between attachments does not exceed 300. Diagonal bridging shall be proportioned so that the slenderness ratio between attachments does not exceed 200.

5.9 DEFLECTION

The deflection due to the design nominal 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 joists.

*****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.

5.10 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 the AISC Specification for Structural Steel Buildings.

5.11 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 documents shall indicate if the net uplift is based upon LRFD or ASD. When these forces are specified, they shall be considered in the design of joists and/or bridging. A single line of **bottom chord** bridging 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”.

5.12 INSPECTION

Joists shall be inspected by the manufacturer before shipment to verify compliance of materials and workmanship with the requirements of these specifications. If the purchaser wishes an inspection of the steel joists by someone other than the manufacturer's own inspectors, he shall be permitted to reserve the right to do so in his "Invitation to Bid" or the accompanying "Job Specifications".

Arrangements shall be made with the manufacturer for such inspection of the joists at the manufacturing shop by the purchaser's inspectors at purchaser's expense.

5.13 PARALLEL CHORD SLOPED JOISTS

The Span of a parallel chord sloped joist shall be defined by the length along the slope. Minimum depth, load-carrying capacity, and bridging requirements shall be determined by the sloped definition of span. The Standard Load Table capacity shall be the component normal to the joist.

SECTION 6.
ERECTION STABILITY AND HANDLING

When it is necessary for the erector to climb on the joists, extreme caution shall be exercised since unbridged joists may exhibit some degree of instability under the erector's weight.

(a) Stability Requirements

1) Before an employee is allowed on the steel joist: BOTH ends of joists at columns (or joists designated as column joists) shall be attached to its supports. For all other joists a minimum of one end shall be attached before the employee is allowed on the joist. The attachment shall be in accordance with Section 5.6 – End Anchorage.

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.

2) On steel joists that do not require erection bridging as shown by the unshaded area of the Load Tables, only one employee shall be allowed on the steel joist unless all bridging is installed and anchored.

3) Where the span of the steel joist is within the red shaded area of the Load Table, the following shall apply:

   a) The row of bridging nearest the mid span of the steel joists shall be bolted diagonal erection bridging; and
   b) Hoisting cables shall not be released until this bolted diagonal erection bridging is installed and anchored, unless an alternate method of stabilizing the joist has been provided; and
   c) No more than one employee shall be allowed on these spans until all other bridging is installed and anchored.

4) When permanent bridging terminus points cannot be used during erection, additional temporary bridging terminus points are required to provide stability.

5) In the case of bottom chord bearing joists, the ends of the joist shall be restrained laterally per Section 5.4(f).

6) After the joist is straightened and plumbed, and all bridging is completely installed and anchored, the ends of the joists shall be fully connected to the supports in accordance with Section 5.6 End Anchorage.

(b) Landing and Placing Loads

1) Except as stated in paragraphs 6(B)(3) and 6(B)(4) of this section, no "construction loads"[(1)] shall be allowed on the steel joists until all bridging is installed and anchored, and all joist bearing ends are attached.

2) During the construction period, loads placed on the steel joists shall be distributed so as not to exceed the capacity of the steel joists.

3) The weight of a bundle of joist bridging shall not exceed a total of 1000 pounds (454 kilograms). The bundle of joist bridging shall be placed on a minimum of 3 steel joists that are secured at one end. The edge of the bridging bundle shall be positioned within 1 foot (0.30 m) of the secured end.

4) No bundle of deck shall be placed on steel joists until all bridging has been installed and anchored and all joist bearing ends attached, unless the following conditions are met:

   a) The contractor has first determined from a qualified person and documented in a site-specific erection plan that the structure or portion of the structure is capable of supporting the load;
   b) The bundle of decking is placed on a minimum of 3 steel joists;
   c) The joists supporting the bundle of decking are attached at both ends;
   d) At least one row of bridging is installed and anchored;
   e) The total weight of the decking does not exceed 4000 pounds (1816 kilograms); and
   f) The edge of the decking shall be placed within 1 foot (0.30 meters) of the bearing surface of the joist end.

5) The edge of the construction load shall be placed within 1 foot (.30 meters) of the bearing surface of the joist end.

(c) Field Welding

1) All field welding shall be performed in accordance with the contract documents. Field welding shall not damage the joists.

2) On cold-formed members whose yield strength has been attained by cold working, and whose as-formed strength is used in the design, the total length of weld at any one point shall not exceed 50 percent of the overall developed width of the cold-formed section.

(d) Handling

Care shall be exercised at all times to avoid damage to the joists and accessories.

(e) Fall Arrest Systems

Steel joists shall not be used as anchorage points for a fall arrest system unless written direction to do so is obtained from a "qualified person" [2].

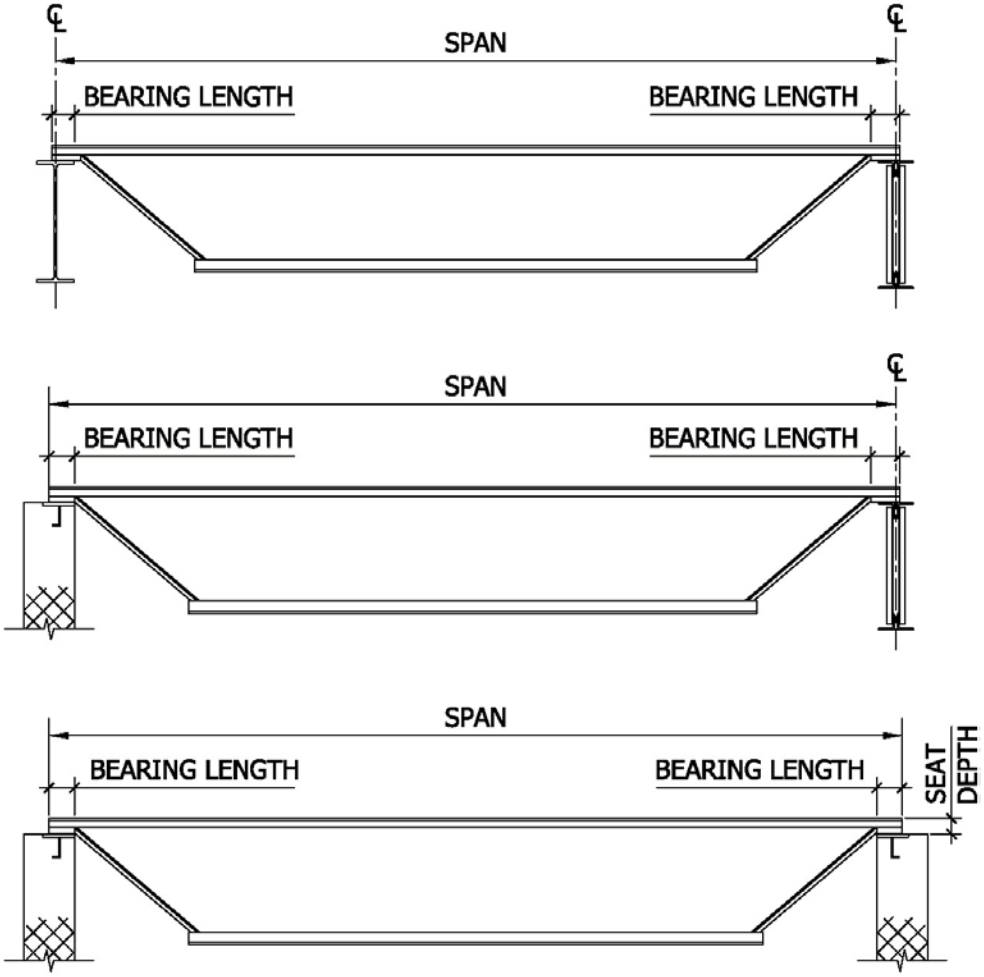
*For a thorough coverage of this topic, refer to SJI Technical Digest 9, "Handling and Erection of Steel Joists and Joist Girders."

[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 "construction load".

[2] 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".

DEFINITION OF SPAN

(U. S. Customary Units)



NOTES:
1) **DESIGN LENGTH = SPAN - 0.33 FT.**
2) **BEARING LENGTH FOR STEEL SUPPORTS SHALL NOT BE LESS THAN 2½ INCHES ; FOR MASONRY AND CONCRETE NOT LESS THAN 4 INCHES.**
3) **PARALLEL CHORD JOISTS INSTALLED TO A SLOPE GREATER THAN ½ INCH PER FOOT SHALL USE SPAN DEFINED BY THE LENGTH ALONG THE SLOPE.**

STANDARD ASD LOAD TABLE

OPEN WEB STEEL JOISTS, K-SERIES

Based on a 50 ksi Maximum Yield Strength
Adopted by the Steel Joist Institute November 4, 1985
Revised to May 18, 2010 – Effective December 31, 2010

The **BLACK** figures in the Load Table give the TOTAL safe uniformly distributed load-carrying capacities, in pounds per linear foot, of **ASD K-Series** Steel Joists.

The approximate joist weights, in pounds per linear foot, given in the Load Table may be added to the other building weights to determine the DEAD load. In all cases the DEAD load, including the joist self-weight, must be deducted from the TOTAL load to determine the LIVE load. The approximate joist weights do not include accessories.

The **RED** figures in the Load Table represent the uniform load, in pounds per linear foot, which will produce an approximate joist deflection of 1/360 of the span. This load can be linearly prorated to obtain the uniform load for supplementary deflection criteria (i.e. a uniform load which will produce a joist deflection of 1/240 of the span may be obtained by multiplying the **RED** figure by 360/240). In no case shall the prorated load exceed the TOTAL load-carrying capacity of the joist.

Where the joist span is in the **RED SHADED** area of the Load Table, the row of bridging nearest the mid span shall be diagonal bridging with bolted connections at chords and intersections. Hoisting cables shall not be released until this row of bolted diagonal bridging is completely installed. The **RED SHADED** area extends up through 60'–0".

The approximate gross moment of inertia (not adjusted for shear deformation), in inches^4, of a standard joist listed in the Load Table may be determined as follows:

$I_j = 26.767(W)(L^3)(10^{-6})$, where W= **RED** figure in the Load Table, and
L = (span – 0.33) in feet.

The TOTAL safe uniformly distributed load-carrying capacities, in pounds per linear foot, of **ASD K-Series** Steel Joists shall not exceed 550 plf for spans shorter than what is explicitly shown in the Load Table. The maximum prorated RED load shall not exceed 550 plf (the TOTAL load-carrying capacity of the joist as given in the Standard **ASD** Load Table for Open Web Steel Joists, **K**-Series).

Loads for span increments not explicitly given in the Load Table may be determined using linear interpolation between the load values given in adjacent span columns.

For the proper handling of concentrated and/or varying loads, see Section 2.3 in the **Code of Standard Practice for Steel Joist and Joist Girders**.

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STANDARD LOAD TABLE FOR OPEN WEB STEEL JOISTS, K-SERIES
Based on a 50 ksi Maximum Yield Strength - Loads Shown In Pounds Per Linear Foot (plf)

Joist Designation	10K1	12K1	12K3	12K5	14K1	14K3	14K4	14K6	16K2	16K3	16K4	16K5	16K6	16K7	16K9
Depth (in.)	10	12	12	12	14	14	14	14	16	16	16	16	16	16	16
Approx. Wt (lbs./ft.)	5.0	5.0	5.7	7.1	5.2	6.0	6.7	7.7	5.5	6.3	7.0	7.5	8.1	8.6	10.0
Span (ft.) ↓															
10	550 550														
11	550 542														
12	550 455	550 550	550 550	550 550											
13	479 363	550 510	550 510	550 510											
14	412 289	500 425	550 463	550 463	550 550	550 550	550 550	550 550							
15	358 234	434 344	543 428	550 434	511 475	550 507	550 507	550 507							
16	313 192	380 282	476 351	550 396	448 390	550 467	550 467	550 467	550 550	550 550	550 550	550 550	550 550	550 550	550 550
17	277 159	336 234	420 291	550 366	395 324	495 404	550 443	550 443	512 488	550 526	550 526	550 526	550 526	550 526	550 526
18	246 134	299 197	374 245	507 317	352 272	441 339	530 397	550 408	456 409	508 456	550 490	550 490	550 490	550 490	550 490
19	221 113	268 167	335 207	454 269	315 230	395 287	475 336	550 383	408 347	455 386	547 452	550 455	550 455	550 455	550 455
20	199 97	241 142	302 177	409 230	284 197	356 246	428 287	525 347	368 297	410 330	493 386	550 426	550 426	550 426	550 426
21		218 123	273 153	370 198	257 170	322 212	388 248	475 299	333 255	371 285	447 333	503 373	548 405	550 406	550 406
22		199 106	249 132	337 172	234 147	293 184	353 215	432 259	303 222	337 247	406 289	458 323	498 351	550 385	550 385
23		181 93	227 116	308 150	214 128	268 160	322 188	395 226	277 194	308 216	371 252	418 282	455 307	507 339	550 363
24		166 81	208 101	282 132	196 113	245 141	295 165	362 199	254 170	283 189	340 221	384 248	418 269	465 298	550 346
25					180 100	226 124	272 145	334 175	234 150	260 167	313 195	353 219	384 238	428 263	514 311
26					166 88	209 110	251 129	308 156	216 133	240 148	289 173	326 194	355 211	395 233	474 276
27					154 79	193 98	233 115	285 139	200 119	223 132	268 155	302 173	329 188	366 208	439 246
28					143 70	180 88	216 103	265 124	186 106	207 118	249 138	281 155	306 168	340 186	408 220
29									173 95	193 106	232 124	261 139	285 151	317 167	380 198
30									161 86	180 96	216 112	244 126	266 137	296 151	355 178
31									151 78	168 87	203 101	228 114	249 124	277 137	332 161
32									142 71	158 79	190 92	214 103	233 112	259 124	311 147

ASD

STANDARD LOAD TABLE FOR OPEN WEB STEEL JOISTS, K-SERIES
Based on a 50 ksi Maximum Yield Strength - Loads Shown In Pounds Per Linear Foot (plf)

Joist Designation	18K3	18K4	18K5	18K6	18K7	18K9	18K10	20K3	20K4	20K5	20K6	20K7	20K9	20K10	22K4	22K5	22K6	22K7	22K9	22K10	22K11
Depth (In.)	18	18	18	18	18	18	18	20	20	20	20	20	20	20	22	22	22	22	22	22	22
Approx. Wt. (lbs./ft.)	6.4	7.2	7.7	8.4	8.9	10.1	11.6	6.5	7.2	7.7	8.4	8.9	10.1	11.6	7.3	7.7	8.5	9.0	10.2	11.7	11.9
Span (ft.) ↓																					
18	550	550	550	550	550	550	550														
	550	550	550	550	550	550	550														
19	514	550	550	550	550	550	550	550	550	550	550	550	550	550							
	494	523	523	523	523	523	523	550	550	550	550	550	550	550							
20	463	550	550	550	550	550	550	517	550	550	550	550	550	550							
	423	490	490	490	490	490	490	517	550	550	550	550	550	550							
21	420	506	550	550	550	550	550	468	550	550	550	550	550	550	550	550	550	550	550	550	550
	364	426	460	460	460	460	460	453	520	520	520	520	520	520	550	550	550	550	550	550	550
22	382	460	518	550	550	550	550	426	514	550	550	550	550	550	550	550	550	550	550	550	550
	316	370	414	438	438	438	438	393	461	490	490	490	490	490	548	548	548	548	548	548	548
23	349	420	473	516	550	550	550	389	469	529	550	550	550	550	518	550	550	550	550	550	550
	276	323	362	393	418	418	418	344	402	451	468	468	468	468	491	518	518	518	518	518	518
24	320	385	434	473	526	550	550	357	430	485	528	550	550	550	475	536	550	550	550	550	550
	242	284	318	345	382	396	396	302	353	396	430	448	448	448	431	483	495	495	495	495	495
25	294	355	400	435	485	550	550	329	396	446	486	541	550	550	438	493	537	550	550	550	550
	214	250	281	305	337	377	377	266	312	350	380	421	426	426	381	427	464	474	474	474	474
26	272	328	369	402	448	538	550	304	366	412	449	500	550	550	404	455	496	550	550	550	550
	190	222	249	271	299	354	361	236	277	310	337	373	405	405	338	379	411	454	454	454	454
27	252	303	342	372	415	498	550	281	339	382	416	463	550	550	374	422	459	512	550	550	550
	169	198	222	241	267	315	347	211	247	277	301	333	389	389	301	337	367	406	432	432	432
28	234	282	318	346	385	463	548	261	315	355	386	430	517	550	348	392	427	475	550	550	550
	151	177	199	216	239	282	331	189	221	248	269	298	353	375	270	302	328	364	413	413	413
29	218	263	296	322	359	431	511	243	293	330	360	401	482	550	324	365	398	443	532	550	550
	136	159	179	194	215	254	298	170	199	223	242	268	317	359	242	272	295	327	387	399	399
30	203	245	276	301	335	402	477	227	274	308	336	374	450	533	302	341	371	413	497	550	550
	123	144	161	175	194	229	269	153	179	201	218	242	286	336	219	245	266	295	349	385	385
31	190	229	258	281	313	376	446	212	256	289	314	350	421	499	283	319	347	387	465	550	550
	111	130	146	158	175	207	243	138	162	182	198	219	259	304	198	222	241	267	316	369	369
32	178	215	242	264	294	353	418	199	240	271	295	328	395	468	265	299	326	363	436	517	549
	101	118	132	144	159	188	221	126	147	165	179	199	235	276	180	201	219	242	287	337	355
33	168	202	228	248	276	332	393	187	226	254	277	309	371	440	249	281	306	341	410	486	532
	92	108	121	131	145	171	201	114	134	150	163	181	214	251	164	183	199	221	261	307	334
34	158	190	214	233	260	312	370	176	212	239	261	290	349	414	235	265	288	321	386	458	516
	84	98	110	120	132	156	184	105	122	137	149	165	195	229	149	167	182	202	239	280	314
35	149	179	202	220	245	294	349	166	200	226	246	274	329	390	221	249	272	303	364	432	494
	77	90	101	110	121	143	168	96	112	126	137	151	179	210	137	153	167	185	219	257	292
36	141	169	191	208	232	278	330	157	189	213	232	259	311	369	209	236	257	286	344	408	467
	70	82	92	101	111	132	154	88	103	115	125	139	164	193	126	141	153	169	201	236	269
37								148	179	202	220	245	294	349	198	223	243	271	325	386	442
								81	95	106	115	128	151	178	116	130	141	156	185	217	247
38								141	170	191	208	232	279	331	187	211	230	256	308	366	419
								74	87	98	106	118	139	164	107	119	130	144	170	200	228
39								133	161	181	198	220	265	314	178	200	218	243	292	347	397
								69	81	90	98	109	129	151	98	110	120	133	157	185	211
40								127	153	172	188	209	251	298	169	190	207	231	278	330	377
								64	75	84	91	101	119	140	91	102	111	123	146	171	195
41															161	181	197	220	264	314	359
															85	95	103	114	135	159	181
42															153	173	188	209	252	299	342
															79	88	96	106	126	148	168
43															146	165	179	200	240	285	326
															73	82	89	99	117	138	157
44															139	157	171	191	229	272	311
															68	76	83	92	109	128	146

ASD

STANDARD LOAD TABLE FOR OPEN WEB STEEL JOISTS, K-SERIES

Based on a 50 ksi Maximum Yield Strength - Loads Shown In Pounds Per Linear Foot (plf)

Joist Designation	24K4	24K5	24K6	24K7	24K8	24K9	24K10	24K12	26K5	26K6	26K7	26K8	26K9	26K10	26K12
Depth (In.)	24	24	24	24	24	24	24	24	26	26	26	26	26	26	26
Approx. Wt. (lbs./ft.)	7.8	7.9	8.5	9.0	9.4	10.3	11.7	13.5	8.1	8.6	9.0	9.7	10.4	11.8	13.7
Span (ft.) ↓															
23	550	550	550	550	550	550	550	550							
	550	550	550	550	550	550	550	550							
24	520	550	550	550	550	550	550	550							
	516	544	544	544	544	544	544	544							
25	479	540	550	550	550	550	550	550	550	550	550	550	550	550	550
	456	511	520	520	520	520	520	520	550	550	550	550	550	550	550
26	442	499	543	550	550	550	550	550	542	550	550	550	550	550	550
	405	453	493	499	499	499	499	499	535	541	541	541	541	541	541
27	410	462	503	550	550	550	550	550	502	547	550	550	550	550	550
	361	404	439	479	479	479	479	479	477	519	522	522	522	522	522
28	381	429	467	521	550	550	550	550	466	508	550	550	550	550	550
	323	362	393	436	456	456	456	456	427	464	501	501	501	501	501
29	354	400	435	485	536	550	550	550	434	473	527	550	550	550	550
	290	325	354	392	429	436	436	436	384	417	463	479	479	479	479
30	331	373	406	453	500	544	550	550	405	441	492	544	550	550	550
	262	293	319	353	387	419	422	422	346	377	417	457	459	459	459
31	310	349	380	424	468	510	550	550	379	413	460	509	550	550	550
	237	266	289	320	350	379	410	410	314	341	378	413	444	444	444
32	290	327	357	397	439	478	549	549	356	387	432	477	519	549	549
	215	241	262	290	318	344	393	393	285	309	343	375	407	431	431
33	273	308	335	373	413	449	532	532	334	364	406	448	488	532	532
	196	220	239	265	289	313	368	368	259	282	312	342	370	404	404
34	257	290	315	351	388	423	502	516	315	343	382	422	459	516	516
	179	201	218	242	264	286	337	344	237	257	285	312	338	378	378
35	242	273	297	331	366	399	473	501	297	323	360	398	433	501	501
	164	184	200	221	242	262	308	324	217	236	261	286	310	356	356
36	229	258	281	313	346	377	447	487	280	305	340	376	409	486	487
	150	169	183	203	222	241	283	306	199	216	240	263	284	334	334
37	216	244	266	296	327	356	423	474	265	289	322	356	387	460	474
	138	155	169	187	205	222	260	290	183	199	221	242	262	308	315
38	205	231	252	281	310	338	401	461	251	274	305	337	367	436	461
	128	143	156	172	189	204	240	275	169	184	204	223	241	284	299
39	195	219	239	266	294	320	380	449	238	260	289	320	348	413	449
	118	132	144	159	174	189	222	261	156	170	188	206	223	262	283
40	185	208	227	253	280	304	361	438	227	247	275	304	331	393	438
	109	122	133	148	161	175	206	247	145	157	174	191	207	243	269
41	176	198	216	241	266	290	344	427	215	235	262	289	315	374	427
	101	114	124	137	150	162	191	235	134	146	162	177	192	225	256
42	168	189	206	229	253	276	327	417	205	224	249	275	300	356	417
	94	106	115	127	139	151	177	224	125	136	150	164	178	210	244
43	160	180	196	219	242	263	312	406	196	213	238	263	286	339	407
	88	98	107	118	130	140	165	213	116	126	140	153	166	195	232
44	153	172	187	209	231	251	298	387	187	204	227	251	273	324	398
	82	92	100	110	121	131	154	199	108	118	131	143	155	182	222
45	146	164	179	199	220	240	285	370	179	194	217	240	261	310	389
	76	86	93	103	113	122	144	185	101	110	122	133	145	170	212
46	139	157	171	191	211	230	272	354	171	186	207	229	250	296	380
	71	80	87	97	106	114	135	174	95	103	114	125	135	159	203
47	133	150	164	183	202	220	261	339	164	178	199	219	239	284	369
	67	75	82	90	99	107	126	163	89	96	107	117	127	149	192
48	128	144	157	175	194	211	250	325	157	171	190	210	229	272	353
	63	70	77	85	93	101	118	153	83	90	100	110	119	140	180
49									150	164	183	202	220	261	339
									78	85	94	103	112	131	169
50									144	157	175	194	211	250	325
									73	80	89	97	105	124	159
51									139	151	168	186	203	241	313
									69	75	83	91	99	116	150
52									133	145	162	179	195	231	301
									65	71	79	86	93	110	142

ASD

STANDARD LOAD TABLE FOR OPEN WEB STEEL JOISTS, K-SERIES

Based on a 50 ksi Maximum Yield Strength - Loads Shown In Pounds Per Linear Foot (plf)

Joist Designation	28K6	28K7	28K8	28K9	28K10	28K12	30K7	30K8	30K9	30K10	30K11	30K12
Depth (In.)	28	28	28	28	28	28	30	30	30	30	30	30
Approx. Wt. (lbs./ft.)	8.9	9.2	9.8	10.5	11.8	14.5	9.6	10.0	10.6	11.9	13.3	15.0
Span (ft.) ↓												
27	550	550	550	550	550	550						
	550	550	550	550	550	550						
28	548	550	550	550	550	550						
	541	543	543	543	543	543						
29	511	550	550	550	550	550	550	550	550	550	550	550
	486	522	522	522	522	522	550	550	550	550	550	550
30	477	531	550	550	550	550	550	550	550	550	550	550
	439	486	500	500	500	500	543	543	543	543	543	543
31	446	497	550	550	550	550	534	550	550	550	550	550
	397	440	480	480	480	480	508	520	520	520	520	520
32	418	466	515	549	549	549	501	549	549	549	549	549
	361	400	438	463	463	463	461	500	500	500	500	500
33	393	438	484	527	532	532	471	520	532	532	532	532
	329	364	399	432	435	435	420	460	468	468	468	468
34	370	412	456	496	516	516	443	490	516	516	516	516
	300	333	364	395	410	410	384	420	441	441	441	441
35	349	389	430	468	501	501	418	462	501	501	501	501
	275	305	333	361	389	389	351	384	415	415	415	415
36	330	367	406	442	487	487	395	436	475	487	487	487
	252	280	306	332	366	366	323	353	383	392	392	392
37	312	348	384	418	474	474	373	413	449	474	474	474
	232	257	282	305	344	344	297	325	352	374	374	374
38	296	329	364	396	461	461	354	391	426	461	461	461
	214	237	260	282	325	325	274	300	325	353	353	353
39	280	313	346	376	447	449	336	371	404	449	449	449
	198	219	240	260	306	308	253	277	300	333	333	333
40	266	297	328	357	424	438	319	353	384	438	438	438
	183	203	222	241	284	291	234	256	278	315	315	315
41	253	283	312	340	404	427	303	335	365	427	427	427
	170	189	206	224	263	277	217	238	258	300	300	300
42	241	269	297	324	384	417	289	320	348	413	417	417
	158	175	192	208	245	264	202	221	240	282	284	284
43	230	257	284	309	367	407	276	305	332	394	407	407
	147	163	179	194	228	252	188	206	223	263	270	270
44	220	245	271	295	350	398	263	291	317	376	398	398
	137	152	167	181	212	240	176	192	208	245	258	258
45	210	234	259	282	334	389	251	278	303	359	389	389
	128	142	156	169	198	229	164	179	195	229	246	246
46	201	224	248	270	320	380	241	266	290	344	380	380
	120	133	146	158	186	219	153	168	182	214	236	236
47	192	214	237	258	306	372	230	255	277	329	372	372
	112	125	136	148	174	210	144	157	171	201	226	226
48	184	206	227	247	294	365	221	244	266	315	362	365
	105	117	128	139	163	201	135	148	160	188	215	216
49	177	197	218	237	282	357	212	234	255	303	347	357
	99	110	120	130	153	193	127	139	150	177	202	207
50	170	189	209	228	270	350	203	225	245	291	333	350
	93	103	113	123	144	185	119	130	141	166	190	199
51	163	182	201	219	260	338	195	216	235	279	320	343
	88	97	106	115	136	175	112	123	133	157	179	192
52	157	175	193	210	250	325	188	208	226	268	308	336
	83	92	100	109	128	165	106	116	126	148	169	184
53	151	168	186	203	240	313	181	200	218	258	296	330
	78	87	95	103	121	156	100	109	119	140	159	177
54	145	162	179	195	232	301	174	192	209	249	285	324
	74	82	89	97	114	147	94	103	112	132	150	170
55	140	156	173	188	223	290	168	185	202	240	275	312
	70	77	85	92	108	139	89	98	106	125	142	161
56	135	151	166	181	215	280	162	179	195	231	265	301
	66	73	80	87	102	132	84	92	100	118	135	153
57							156	173	188	223	256	290
							80	88	95	112	128	145
58							151	167	181	215	247	280
							76	83	90	106	121	137
59							146	161	175	208	239	271
							72	79	86	101	115	130
60							141	156	169	201	231	262
							69	75	81	96	109	124

STANDARD LRFD LOAD TABLE

OPEN WEB STEEL JOISTS, K-SERIES

Based on a 50 ksi Maximum Yield Strength
Adopted by the Steel Joist Institute May 1, 2000
Revised to May 18, 2010 – Effective December 31, 2010

The **BLACK** figures in the Load Table give the TOTAL safe factored uniformly distributed load-carrying capacities, in pounds per linear foot, of **LRFD K-Series** Steel Joists.

The approximate joist weights, in pounds per linear foot, given in the Load Table may be added to the other building weights to determine the unfactored DEAD load. In all cases the factored DEAD load, including the joist self-weight, must be deducted from the TOTAL load to determine the factored LIVE load. The approximate joist weights do not include accessories.

The **RED** figures in the Load Table represent the unfactored uniform load, in pounds per linear foot, which will produce an approximate joist deflection of 1/360 of the span. This load can be linearly prorated to obtain the unfactored uniform load for supplementary deflection criteria (i.e. an unfactored uniform load which will produce a joist deflection of 1/240 of the span may be obtained by multiplying the **RED** figures by 360/240). In no case shall the prorated, unfactored load exceed the unfactored TOTAL load-carrying capacity of the joist as given in the Standard **ASD** Load Table for Open Web Steel Joists, **K**-Series.

Where the joist span is in the **RED SHADED** area of the Load Table, the row of bridging nearest the mid span shall be diagonal bridging with bolted connections at chords and intersections. Hoisting cables shall not be released until this row of bolted diagonal bridging is completely installed. The **RED SHADED** area extends up through 60'–0".

The approximate gross moment of inertia (not adjusted for shear deformation), in inches^4, of a standard joist listed in the Load Table may be determined as follows:

$I_j = 26.767(W)(L^3)(10^{-6})$, where W= **RED** figure in the Load Table, and
L = (span – 0.33) in feet.

The TOTAL safe factored uniformly distributed load-carrying capacities, in pounds per linear foot, of **LRFD K-Series** Steel Joists shall not exceed 825 plf for spans shorter than what is explicitly shown in the Load Table. The maximum prorated unfactored RED load shall not exceed 550 plf (the TOTAL load-carrying capacity of the joist as given in the Standard **ASD** Load Table for Open Web Steel Joists, **K**-Series).

Loads for span increments not explicitly given in the Load Table may be determined using linear interpolation between the load values given in adjacent span columns.

For the proper handling of concentrated and/or varying loads, see Section 2.3 in the **Code of Standard Practice for Steel Joist and Joist Girders**.

LRFD

STANDARD LOAD TABLE FOR OPEN WEB STEEL JOISTS, K-SERIES
Based On A 50 ksi Maximum Yield Strength - Loads Shown In Pounds Per Linear Foot (plf)

Joist Designation	10K1	12K1	12K3	12K5	14K1	14K3	14K4	14K6	16K2	16K3	16K4	16K5	16K6	16K7	16K9
Depth (in.)	10	12	12	12	14	14	14	14	16	16	16	16	16	16	16
Approx. Wt (lbs./ft.)	5.0	5.0	5.7	7.1	5.2	6.0	6.7	7.7	5.5	6.3	7.0	7.5	8.1	8.6	10.0
Span (ft.) ↓															
10	825 550														
11	825 542														
12	825 455	825 550	825 550	825 550											
13	718 363	825 510	825 510	825 510											
14	618 289	750 425	825 463	825 463	825 550	825 550	825 550	825 550							
15	537 234	651 344	814 428	825 434	766 475	825 507	825 507	825 507							
16	469 192	570 282	714 351	825 396	672 390	825 467	825 467	825 467	825 550	825 550	825 550	825 550	825 550	825 550	825 550
17	415 159	504 234	630 291	825 366	592 324	742 404	825 443	825 443	768 488	825 526	825 526	825 526	825 526	825 526	825 526
18	369 134	448 197	561 245	760 317	528 272	661 339	795 397	825 408	684 409	762 456	825 490	825 490	825 490	825 490	825 490
19	331 113	402 167	502 207	681 269	472 230	592 287	712 336	825 383	612 347	682 386	820 452	825 455	825 455	825 455	825 455
20	298 97	361 142	453 177	613 230	426 197	534 246	642 287	787 347	552 297	615 330	739 386	825 426	825 426	825 426	825 426
21		327 123	409 153	555 198	385 170	483 212	582 248	712 299	499 255	556 285	670 333	754 373	822 405	825 406	825 406
22		298 106	373 132	505 172	351 147	439 184	529 215	648 259	454 222	505 247	609 289	687 323	747 351	825 385	825 385
23		271 93	340 116	462 150	321 128	402 160	483 188	592 226	415 194	462 216	556 252	627 282	682 307	760 339	825 363
24		249 81	312 101	423 132	294 113	367 141	442 165	543 199	381 170	424 189	510 221	576 248	627 269	697 298	825 346
25					270 100	339 124	408 145	501 175	351 150	390 167	469 195	529 219	576 238	642 263	771 311
26					249 88	313 110	376 129	462 156	324 133	360 148	433 173	489 194	532 211	592 233	711 276
27					231 79	289 98	349 115	427 139	300 119	334 132	402 155	453 173	493 188	549 208	658 246
28					214 70	270 88	324 103	397 124	279 106	310 118	373 138	421 155	459 168	510 186	612 220
29									259 95	289 106	348 124	391 139	427 151	475 167	570 198
30									241 86	270 96	324 112	366 126	399 137	444 151	532 178
31									226 78	252 87	304 101	342 114	373 124	415 137	498 161
32									213 71	237 79	285 92	321 103	349 112	388 124	466 147

LRFD

STANDARD LOAD TABLE FOR OPEN WEB STEEL JOISTS, K-SERIES
Based On A 50 ksi Maximum Yield Strength - Loads Shown In Pounds Per Linear Foot (plf)

Joist Designation	18K3	18K4	18K5	18K6	18K7	18K9	18K10	20K3	20K4	20K5	20K6	20K7	20K9	20K10	22K4	22K5	22K6	22K7	22K9	22K10	22K11
Depth (In.)	18	18	18	18	18	18	18	20	20	20	20	20	20	20	22	22	22	22	22	22	22
Approx. Wt. (lbs./ft.)	6.4	7.2	7.7	8.4	8.9	10.1	11.6	6.5	7.2	7.7	8.4	8.9	10.1	11.6	7.3	7.7	8.5	9.0	10.2	11.7	11.9
Span (ft.) ↓																					
18	825	825	825	825	825	825	825														
	550	550	550	550	550	550	550														
19	771	825	825	825	825	825	825	825	825	825	825	825	825	825							
	494	523	523	523	523	523	523	550	550	550	550	550	550	550							
20	694	825	825	825	825	825	825	775	825	825	825	825	825	825							
	423	490	490	490	490	490	490	517	550	550	550	550	550	550							
21	630	759	825	825	825	825	825	702	825	825	825	825	825	825	825	825	825	825	825	825	825
	364	426	460	460	460	460	460	453	520	520	520	520	520	520	550	550	550	550	550	550	550
22	573	690	777	825	825	825	825	639	771	825	825	825	825	825	825	825	825	825	825	825	825
	316	370	414	438	438	438	438	393	461	490	490	490	490	490	548	548	548	548	548	548	548
23	523	630	709	774	825	825	825	583	703	793	825	825	825	825	777	825	825	825	825	825	825
	276	323	362	393	418	418	418	344	402	451	468	468	468	468	491	518	518	518	518	518	518
24	480	577	651	709	789	825	825	535	645	727	792	825	825	825	712	804	825	825	825	825	825
	242	284	318	345	382	396	396	302	353	396	430	448	448	448	431	483	495	495	495	495	495
25	441	532	600	652	727	825	825	493	594	669	729	811	825	825	657	739	805	825	825	825	825
	214	250	281	305	337	377	377	266	312	350	380	421	426	426	381	427	464	474	474	474	474
26	408	492	553	603	672	807	825	456	549	618	673	750	825	825	606	682	744	825	825	825	825
	190	222	249	271	299	354	361	236	277	310	337	373	405	405	338	379	411	454	454	454	454
27	378	454	513	558	622	747	825	421	508	573	624	694	825	825	561	633	688	768	825	825	825
	169	198	222	241	267	315	347	211	247	277	301	333	389	389	301	337	367	406	432	432	432
28	351	423	477	519	577	694	822	391	472	532	579	645	775	825	522	588	640	712	825	825	825
	151	177	199	216	239	282	331	189	221	248	269	298	353	375	270	302	328	364	413	413	413
29	327	394	444	483	538	646	766	364	439	495	540	601	723	825	486	547	597	664	798	825	825
	136	159	179	194	215	254	298	170	199	223	242	268	317	359	242	272	295	327	387	399	399
30	304	367	414	451	502	603	715	340	411	462	504	561	675	799	453	511	556	619	745	825	825
	123	144	161	175	194	229	269	153	179	201	218	242	286	336	219	245	266	295	349	385	385
31	285	343	387	421	469	564	669	318	384	433	471	525	631	748	424	478	520	580	697	825	825
	111	130	146	158	175	207	243	138	162	182	198	219	259	304	198	222	241	267	316	369	369
32	267	322	363	396	441	529	627	298	360	406	442	492	592	702	397	448	489	544	654	775	823
	101	118	132	144	159	188	221	126	147	165	179	199	235	276	180	201	219	242	287	337	355
33	252	303	342	372	414	498	589	280	339	381	415	463	556	660	373	421	459	511	615	729	798
	92	108	121	131	145	171	201	114	134	150	163	181	214	251	164	183	199	221	261	307	334
34	237	285	321	349	390	468	555	264	318	358	391	435	523	621	352	397	432	481	579	687	774
	84	98	110	120	132	156	184	105	122	137	149	165	195	229	149	167	182	202	239	280	314
35	223	268	303	330	367	441	523	249	300	339	369	411	493	585	331	373	408	454	546	648	741
	77	90	101	110	121	143	168	96	112	126	137	151	179	210	137	153	167	185	219	257	292
36	211	253	286	312	348	417	495	235	283	319	348	388	466	553	313	354	385	429	516	612	700
	70	82	92	101	111	132	154	88	103	115	125	139	164	193	126	141	153	169	201	236	269
37								222	268	303	330	367	441	523	297	334	364	406	487	579	663
								81	95	106	115	128	151	178	116	130	141	156	185	217	247
38								211	255	286	312	348	418	496	280	316	345	384	462	549	628
								74	87	98	106	118	139	164	107	119	130	144	170	200	228
39								199	241	271	297	330	397	471	267	300	327	364	438	520	595
								69	81	90	98	109	129	151	98	110	120	133	157	185	211
40								190	229	258	282	313	376	447	253	285	310	346	417	495	565
								64	75	84	91	101	119	140	91	102	111	123	146	171	195
41															241	271	295	330	396	471	538
															85	95	103	114	135	159	181
42															229	259	282	313	378	448	513
															79	88	96	106	126	148	168
43															219	247	268	300	360	427	489
															73	82	89	99	117	138	157
44															208	235	256	286	343	408	466
															68	76	83	92	109	128	146

LRFD

STANDARD LOAD TABLE FOR OPEN WEB STEEL JOISTS, K-SERIES
Based On A 50 ksi Maximum Yield Strength - Loads Shown In Pounds Per Linear Foot (plf)

Joist Designation	24K4	24K5	24K6	24K7	24K8	24K9	24K10	24K12	26K5	26K6	26K7	26K8	26K9	26K10	26K12
Depth (In.)	24	24	24	24	24	24	24	24	26	26	26	26	26	26	26
Approx. Wt. (lbs./ft.)	7.8	7.9	8.5	9.0	9.4	10.3	11.7	13.5	8.1	8.6	9.0	9.7	10.4	11.8	13.7
Span (ft.) ↓															
23	825	825	825	825	825	825	825	825							
	550	550	550	550	550	550	550	550							
24	780	825	825	825	825	825	825	825							
	516	544	544	544	544	544	544	544							
25	718	810	825	825	825	825	825	825	825	825	825	825	825	825	825
	456	511	520	520	520	520	520	520	550	550	550	550	550	550	550
26	663	748	814	825	825	825	825	825	813	825	825	825	825	825	825
	405	453	493	499	499	499	499	499	535	541	541	541	541	541	541
27	615	693	754	825	825	825	825	825	753	820	825	825	825	825	825
	361	404	439	479	479	479	479	479	477	519	522	522	522	522	522
28	571	643	700	781	825	825	825	825	699	762	825	825	825	825	825
	323	362	393	436	456	456	456	456	427	464	501	501	501	501	501
29	531	600	652	727	804	825	825	825	651	709	790	825	825	825	825
	290	325	354	392	429	436	436	436	384	417	463	479	479	479	479
30	496	559	609	679	750	816	825	825	607	661	738	816	825	825	825
	262	293	319	353	387	419	422	422	346	377	417	457	459	459	459
31	465	523	570	636	702	765	825	825	568	619	690	763	825	825	825
	237	266	289	320	350	379	410	410	314	341	378	413	444	444	444
32	435	490	535	595	658	717	823	823	534	580	648	715	778	823	823
	215	241	262	290	318	344	393	393	285	309	343	375	407	431	431
33	409	462	502	559	619	673	798	798	501	546	609	672	732	798	798
	196	220	239	265	289	313	368	368	259	282	312	342	370	404	404
34	385	435	472	526	582	634	753	774	472	514	573	633	688	774	774
	179	201	218	242	264	286	337	344	237	257	285	312	338	378	378
35	363	409	445	496	549	598	709	751	445	484	540	597	649	751	751
	164	184	200	221	242	262	308	324	217	236	261	286	310	356	356
36	343	387	421	469	519	565	670	730	420	457	510	564	613	729	730
	150	169	183	203	222	241	283	306	199	216	240	263	284	334	334
37	324	366	399	444	490	534	634	711	397	433	483	534	580	690	711
	138	155	169	187	205	222	260	290	183	199	221	242	262	308	315
38	307	346	378	421	465	507	601	691	376	411	457	505	550	654	691
	128	143	156	172	189	204	240	275	169	184	204	223	241	284	299
39	292	328	358	399	441	480	570	673	357	390	433	480	522	619	673
	118	132	144	159	174	189	222	261	156	170	188	206	223	262	283
40	277	312	340	379	420	456	541	657	340	370	412	456	496	589	657
	109	122	133	148	161	175	206	247	145	157	174	191	207	243	269
41	264	297	324	361	399	435	516	640	322	352	393	433	472	561	640
	101	114	124	137	150	162	191	235	134	146	162	177	192	225	256
42	252	283	309	343	379	414	490	625	307	336	373	412	450	534	625
	94	106	115	127	139	151	177	224	125	136	150	164	178	210	244
43	240	270	294	328	363	394	468	609	294	319	357	394	429	508	610
	88	98	107	118	130	140	165	213	116	126	140	153	166	195	232
44	229	258	280	313	346	376	447	580	280	306	340	376	409	486	597
	82	92	100	110	121	131	154	199	108	118	131	143	155	182	222
45	219	246	268	298	330	360	427	555	268	291	325	360	391	465	583
	76	86	93	103	113	122	144	185	101	110	122	133	145	170	212
46	208	235	256	286	316	345	408	531	256	279	310	343	375	444	570
	71	80	87	97	106	114	135	174	95	103	114	125	135	159	203
47	199	225	246	274	303	330	391	508	246	267	298	328	358	426	553
	67	75	82	90	99	107	126	163	89	96	107	117	127	149	192
48	192	216	235	262	291	316	375	487	235	256	285	315	343	408	529
	63	70	77	85	93	101	118	153	83	90	100	110	119	140	180
49									225	246	274	303	330	391	508
									78	85	94	103	112	131	169
50									216	235	262	291	316	375	487
									73	80	89	97	105	124	159
51									208	226	252	279	304	361	469
									69	75	83	91	99	116	150
52									199	217	243	268	292	346	451
									65	71	79	86	93	110	142

LRFD

STANDARD LOAD TABLE/OPEN WEB STEEL JOISTS, K-SERIES
Based On A 50 ksi Maximum Yield Strength - Loads Shown In Pounds Per Linear Foot (plf)

Joist Designation	28K6	28K7	28K8	28K9	28K10	28K12	30K7	30K8	30K9	30K10	30K11	30K12
Depth (In.)	28	28	28	28	28	28	30	30	30	30	30	30
Approx. Wt. (lbs./ft.)	8.9	9.2	9.8	10.5	11.8	14.5	9.6	10.0	10.6	11.9	13.3	15.0
Span (ft.) ↓												
27	825 550	825 550	825 550	825 550	825 550	825 550						
28	822 541	825 543	825 543	825 543	825 543	825 543						
29	766 486	825 522	825 522	825 522	825 522	825 522	825 550	825 550	825 550	825 550	825 550	825 550
30	715 439	796 486	825 500	825 500	825 500	825 500	825 543	825 543	825 543	825 543	825 543	825 543
31	669 397	745 440	825 480	825 480	825 480	825 480	801 508	825 520	825 520	825 520	825 520	825 520
32	627 361	699 400	772 438	823 463	823 463	823 463	751 461	823 500	823 500	823 500	823 500	823 500
33	589 329	657 364	726 399	790 432	798 435	798 435	706 420	780 460	798 468	798 468	798 468	798 468
34	555 300	618 333	684 364	744 395	774 410	774 410	664 384	735 420	774 441	774 441	774 441	774 441
35	523 275	583 305	645 333	702 361	751 389	751 389	627 351	693 384	751 415	751 415	751 415	751 415
36	495 252	550 280	609 306	663 332	730 366	730 366	592 323	654 353	712 383	730 392	730 392	730 392
37	468 232	522 257	576 282	627 305	711 344	711 344	559 297	619 325	673 352	711 374	711 374	711 374
38	444 214	493 237	546 260	594 282	691 325	691 325	531 274	586 300	639 325	691 353	691 353	691 353
39	420 198	469 219	519 240	564 260	670 306	673 308	504 253	556 277	606 300	673 333	673 333	673 333
40	399 183	445 203	492 222	535 241	636 284	657 291	478 234	529 256	576 278	657 315	657 315	657 315
41	379 170	424 189	468 206	510 224	606 263	640 277	454 217	502 238	547 258	640 300	640 300	640 300
42	361 158	403 175	445 192	486 208	576 245	625 264	433 202	480 221	522 240	619 282	625 284	625 284
43	345 147	385 163	426 179	463 194	550 228	610 252	414 188	457 206	498 223	591 263	610 270	610 270
44	330 137	367 152	406 167	442 181	525 212	597 240	394 176	436 192	475 208	564 245	597 258	597 258
45	315 128	351 142	388 156	423 169	501 198	583 229	376 164	417 179	454 195	538 229	583 246	583 246
46	301 120	336 133	372 146	405 158	480 186	570 219	361 153	399 168	435 182	516 214	570 236	570 236
47	288 112	321 125	355 136	387 148	459 174	558 210	345 144	382 157	415 171	493 201	558 226	558 226
48	276 105	309 117	340 128	370 139	441 163	547 201	331 135	366 148	399 160	472 188	543 215	547 216
49	265 99	295 110	327 120	355 130	423 153	535 193	318 127	351 139	382 150	454 177	520 202	535 207
50	255 93	283 103	313 113	342 123	405 144	525 185	304 119	337 130	367 141	436 166	499 190	525 199
51	244 88	273 97	301 106	328 115	390 136	507 175	292 112	324 123	352 133	418 157	480 179	514 192
52	235 83	262 92	289 100	315 109	375 128	487 165	282 106	312 116	339 126	402 148	462 169	504 184
53	226 78	252 87	279 95	304 103	360 121	469 156	271 100	300 109	327 119	387 140	444 159	495 177
54	217 74	243 82	268 89	292 97	348 114	451 147	261 94	288 103	313 112	373 132	427 150	486 170
55	210 70	234 77	259 85	282 92	334 108	435 139	252 89	277 98	303 106	360 125	412 142	468 161
56	202 66	226 73	249 80	271 87	322 102	420 132	243 84	268 92	292 100	346 118	397 135	451 153
57							234 80	259 88	282 95	334 112	384 128	435 145
58							226 76	250 83	271 90	322 106	370 121	420 137
59							219 72	241 79	262 86	312 101	358 115	406 130
60							211 69	234 75	253 81	301 96	346 109	393 124

STANDARD ASD LOAD TABLE

FOR KCS JOISTS

Based on a 50 ksi Maximum Yield Strength
Adopted by the Steel Joist Institute May 2, 1994
Revised to May 18, 2010 – Effective December 31, 2010

The figures in the following table give the Moment Capacity (kip-in.) and Shear Capacity (lbs). The maximum uniformly distributed load capacity in **ASD** shall not exceed 550 plf and a single concentrated load cannot exceed the shear capacity. Sloped parallel-chord KCS Joists shall use the appropriate moment and shear capacity for the span as defined by the length along the slope.

The approximate KCS Joist weights per linear foot shown in the table do not include accessories.

The KCS Joist designation is not used to establish bridging requirements. The Bridging Table Section Numbers given in the KCS Standard Load Table indicate the equivalent **K**-Series joist of the same depth to be used for determination of the number of bridging rows, the size of horizontal bridging, and the need for erection stability bridging. While the need for erection stability bridging (diagonal bridging with bolted connections at the chords and intersections), can be determined from the **RED** shaded portion of the Standard Load Table, Open Web Steel Joists, **K**-Series, for convenience the KCS Load Table also includes a column for erection stability bridging. Where the span of the KCS Joist designation exceeds the length in ft. listed, the row of bridging nearest the joist midspan shall be erection stability bridging. Where “NA” is listed in the column, the KCS Joist designation does not require bolted diagonal erection bridging regardless of span.

For the proper handling of concentrated and/or varying loads, see Section 2.3 in the Code of Standard Practice for Steel Joists and Joist Girders.

ASD

STANDARD LOAD TABLE FOR KCS OPEN WEB STEEL JOISTS

Based on a 50 ksi Maximum Yield Strength

JOIST DESIGNATION	DEPTH (in.)	MOMENT CAPACITY (k-in.)	SHEAR CAPACITY* (lbs)	APPROX. WEIGHT** (lbs/ft.)	GROSS MOMENT OF INERTIA ($in.^4$)	ERECTION STABILITY BRIDGING REQ'D (ft.)	BRIDGING TABLE SECTION NUMBER
10KCS1	10	172	2000	6.0	29	NA	1
10KCS2	10	225	2500	7.5	37	NA	1
10KCS3	10	296	3000	10.0	47	NA	1
12KCS1	12	209	2400	6.0	43	NA	3
12KCS2	12	274	3000	8.0	55	NA	5
12KCS3	12	362	3500	10.0	71	NA	5
14KCS1	14	247	2900	6.5	59	NA	4
14KCS2	14	324	3400	8.0	77	NA	6
14KCS3	14	428	3900	10.0	99	NA	6
16KCS2	16	349	4000	8.5	99	NA	6
16KCS3	16	470	4800	10.5	128	NA	9
16KCS4	16	720	5300	14.5	192	NA	9
16KCS5	16	934	5800	18.0	245	NA	9
18KCS2	18	395	4700	9.0	127	35-0	6
18KCS3	18	532	5200	11.0	164	NA	9
18KCS4	18	817	5700	15.0	247	NA	10
18KCS5	18	1062	6200	18.5	316	NA	10
20KCS2	20	442	5200	9.5	159	36-0	6
20KCS3	20	595	6000	11.5	205	39-0	9
20KCS4	20	914	7900	16.5	308	NA	10
20KCS5	20	1191	8400	20.0	396	NA	10
22KCS2	22	488	5900	10.0	194	36-0	6
22KCS3	22	658	6600	12.5	251	40-0	9
22KCS4	22	1012	7900	16.5	377	NA	11
22KCS5	22	1319	8600	20.5	485	NA	11
24KCS2	24	534	6300	10.0	232	39-0	6
24KCS3	24	720	7200	12.5	301	44-0	9
24KCS4	24	1108	8400	16.5	453	NA	12
24KCS5	24	1448	8900	20.5	584	NA	12
26KCS2	26	580	6600	10.0	274	39-0	6
26KCS3	26	783	7800	12.5	355	44-0	9
26KCS4	26	1206	8500	16.5	536	NA	12
26KCS5	26	1576	9200	20.5	691	NA	12
28KCS2	28	626	6900	10.5	320	40-0	6
28KCS3	28	846	8000	12.5	414	45-0	9
28KCS4	28	1303	8500	16.5	626	53-0	12
28KCS5	28	1704	9200	20.5	808	53-0	12
30KCS3	30	908	8000	13.0	478	45-0	9
30KCS4	30	1400	8500	16.5	722	54-0	12
30KCS5	30	1833	9200	21.0	934	54-0	12

*Maximum uniformly distributed load capacity is 550 plf and single concentrated load cannot exceed shear capacity

**Does not include accessories

STANDARD LRFD LOAD TABLE

FOR KCS JOISTS

Based on a 50 ksi Maximum Yield Strength
Adopted by the Steel Joist Institute May 1, 2000
Revised to May 18, 2010 – Effective December 31, 2010

The figures in the following table give the Moment Capacity (kip-in.) and Shear Capacity (lbs). The maximum uniformly distributed load capacity in **LRFD** shall not exceed 825 plf and a single concentrated load cannot exceed the shear capacity. Sloped parallel-chord KCS Joists shall use the appropriate moment and shear capacity for the span as defined by the length along the slope.

The approximate KCS Joist weights per linear foot shown in this table do not include accessories.

The KCS Joist designation is not used to establish bridging requirements. The Bridging Table Section Numbers given in the KCS Standard Load Table indicate the equivalent **K**-Series joist of the same depth to be used for determination of the number of bridging rows, the size of horizontal bridging, and the need for erection stability bridging. While the need for erection stability bridging (diagonal bridging with bolted connections at the chords and intersections), can be determined from the **RED** shaded portion of the Standard Load Table, Open Web Steel Joists, **K**-Series, for convenience the KCS Load Table also includes a column for erection stability bridging. Where the span of the KCS Joist designation exceeds the length in ft. listed, the row of bridging nearest the joist midspan shall be erection stability bridging. Where "NA" is listed in the column, the KCS Joist designation does not require bolted diagonal erection bridging regardless of span.

For the proper handling of concentrated and/or varying loads, see Section 2.3 in the Code of Standard Practice for Steel Joists and Joist Girders.

LRFD

STANDARD LOAD TABLE FOR KCS OPEN WEB STEEL JOISTS

Based on a 50 ksi Maximum Yield Strength

JOIST DESIGNATION	DEPTH (in.)	MOMENT CAPACITY (k-in.)	SHEAR CAPACITY* (lbs)	APPROX. WEIGHT** (lbs/ft.)	GROSS MOMENT OF INERTIA ($in.^4$)	ERECTION STABILITY BRIDGING REQ'D (ft.)	BRIDGING TABLE SECTION NUMBER
10KCS1	10	258	3000	6.0	29	NA	1
10KCS2	10	337	3750	7.5	37	NA	1
10KCS3	10	444	4500	10.0	47	NA	1
12KCS1	12	313	3600	6.0	43	NA	3
12KCS2	12	411	4500	8.0	55	NA	5
12KCS3	12	543	5250	10.0	71	NA	5
14KCS1	14	370	4350	6.5	59	NA	4
14KCS2	14	486	5100	8.0	77	NA	6
14KCS3	14	642	5850	10.0	99	NA	6
16KCS2	16	523	6000	8.5	99	NA	6
16KCS3	16	705	7200	10.5	128	NA	9
16KCS4	16	1080	7950	14.5	192	NA	9
16KCS5	16	1401	8700	18.0	245	NA	9
18KCS2	18	592	7050	9.0	127	35-0	6
18KCS3	18	798	7800	11.0	164	NA	9
18KCS4	18	1225	8550	15.0	247	NA	10
18KCS5	18	1593	9300	18.5	316	NA	10
20KCS2	20	663	7800	9.5	159	36-0	6
20KCS3	20	892	9000	11.5	205	39-0	9
20KCS4	20	1371	11850	16.5	308	NA	10
20KCS5	20	1786	12600	20.0	396	NA	10
22KCS2	22	732	8850	10.0	194	36-0	6
22KCS3	22	987	9900	12.5	251	40-0	9
22KCS4	22	1518	11850	16.5	377	NA	11
22KCS5	22	1978	12900	20.5	485	NA	11
24KCS2	24	801	9450	10.0	232	39-0	6
24KCS3	24	1080	10800	12.5	301	44-0	9
24KCS4	24	1662	12600	16.5	453	NA	12
24KCS5	24	2172	13350	20.5	584	NA	12
26KCS2	26	870	9900	10.0	274	39-0	6
26KCS3	26	1174	11700	12.5	355	44-0	9
26KCS4	26	1809	12750	16.5	536	NA	12
26KCS5	26	2364	13800	20.5	691	NA	12
28KCS2	28	939	10350	10.5	320	40-0	6
28KCS3	28	1269	12000	12.5	414	45-0	9
28KCS4	28	1954	12750	16.5	626	53-0	12
28KCS5	28	2556	13800	20.5	808	53-0	12
30KCS3	30	1362	12000	13.0	478	45-0	9
30KCS4	30	2100	12750	16.5	722	54-0	12
30KCS5	30	2749	13800	21.0	934	54-0	12

*Maximum uniformly distributed load capacity is 825 plf and single concentrated load cannot exceed shear capacity

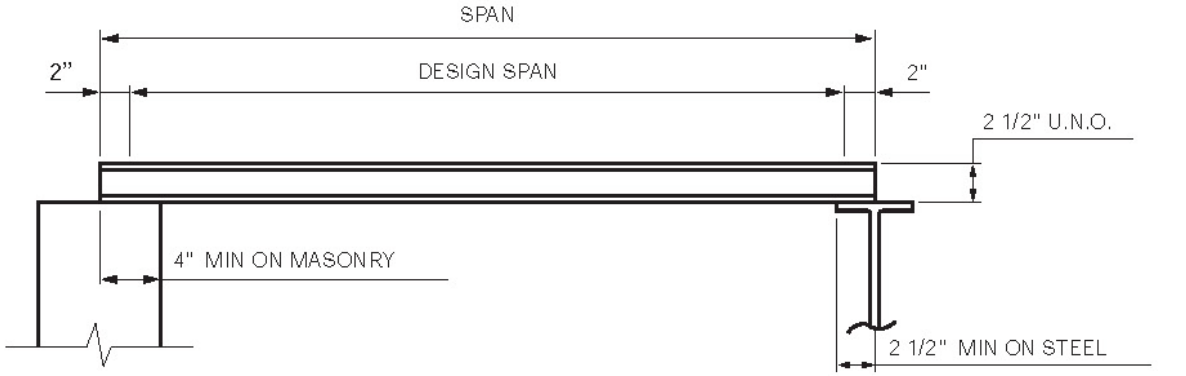
**Does not include accessories

STANDARD ASD LOAD TABLE
STANDARD LRFD LOAD TABLE
FOR JOIST SUBSTITUTES AND OUTRIGGERS

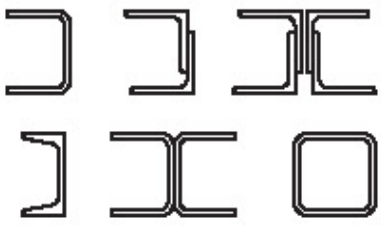
Based on a 50 ksi Maximum Yield Strength
LRFD Load Table adopted by the Steel Joist Institute May 1, 2001
Revised to May 18, 2010 – Effective December 31, 2010

JOIST SUBSTITUTES, SIMPLE SPAN LOAD TABLES

Joist substitutes are 2.5 inch (64 mm) deep sections intended for use in very short spans (less than 10 feet (3.05 m)) where Open Web Steel Joists are impractical. They are commonly specified to span over hallways and short spans in skewed bays.



Joist substitutes are solid members that can be manufactured from material conforming to the Steel Joist Institute Standard Specifications and can be made of hot rolled or cold-formed channels or HSS as shown below.



Full lateral support to the compressive flange is provided by attachments to the deck. Caution must be exercised during erection since joist substitutes exhibit some degree of instability. After erection and before loads of any description are placed on the joist substitutes, the ends must be attached to the supports per the SJI Standard Specification for Open Web Steel Joists, **K**-Series and the deck installed and attached to the top flange.

The Simple Span Joist Substitutes Load Tables list uniform loads based on **LRFD** and **ASD** methods of design and are shown in U.S. Customary Units.

The **BLACK** figures in the **LRFD** Load Table gives the TOTAL safe factored uniformly distributed load-carrying capacity in pounds per linear foot, of 2.5 Inch Joist Substitutes. The **BLACK** figures in the **ASD** Load Table gives the TOTAL safe uniformly distributed load-carrying capacity in pounds per linear foot, of 2.5 Inch Joist Substitutes.

The **RED** figures in the Load Table represent the unfactored, uniform load, in pounds per linear foot, which will produce an approximate joist substitute deflection of 1/360 of the span. This load can be linearly prorated to obtain the unfactored, uniform load for supplementary deflection criteria (i.e. an unfactored uniform load which will produce a joist substitute deflection of 1/240 of the span may be obtained by multiplying the **RED** figure by 360/240). In no case shall the prorated, unfactored load exceed the unfactored TOTAL load-carrying capacity of the joist substitute as given in the ASD Load Table for 2.5 Inch Simple Span Joist Substitutes, K-Series.

Minimum section properties shall be provided for the particular 2.5K type specified even at shorter spans where the developed load capacity may exceed 550 plf (**ASD**) or 825 plf (**LRFD**).

2.5K JOIST SUBSTITUTES PROPERTIES			
2.5K TYPE	**2.5K1**	**2.5K2**	**2.5K3**
S in^3	0.62	0.86	1.20
I in^4	0.77	1.07	1.50
Approximate weight (lbs/ft)	3.0	4.2	6.4

LRFD

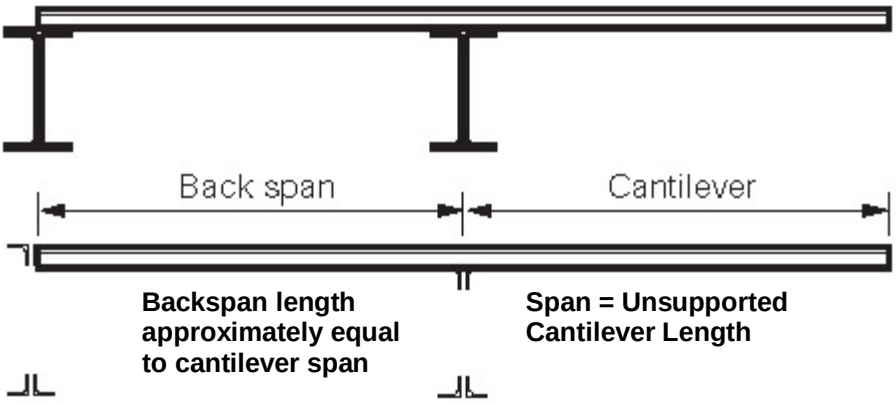
LOAD TABLES FOR 2.5 INCH SIMPLE SPAN JOIST SUBSTITUTES, K-SERIES			
Based on a Maximum Yield Strength of 50 ksi			
Designation	**2.5K1**	**2.5K2**	**2.5K3**
Span (ft-in)	**Pounds per Linear foot**		
4'-0"	825	825	825
	550	550	550
5'-0"	825	825	825
	326	452	550
6'-0"	579	804	825
	182	253	354
7'-0"	418	580	810
	112	155	218
8'-0"	316	439	612
	73	102	143
9'-0"	0	343	480
	0	71	99
10'-0"	0	0	385
	0	0	71

ASD

LOAD TABLES FOR 2.5 INCH SIMPLE SPAN JOIST SUBSTITUTES, K-SERIES			
Based on a Maximum Yield Strength of 50 ksi			
Designation	**2.5K1**	**2.5K2**	**2.5K3**
Span (ft-in)	**Pounds per Linear Foot**		
4'-0"	550	550	550
	550	550	550
5'-0"	550	550	550
	326	452	550
6'-0"	386	536	550
	182	253	354
7'-0"	279	387	540
	112	155	218
8'-0"	211	293	408
	73	102	143
9'-0"	0	229	320
	0	71	99
10'-0"	0	0	257
	0	0	71

JOIST SUBSTITUTES, OUTRIGGERS LOAD TABLES

Joist substitutes may be used in an outrigger condition where the member is overhanging one support as illustrated below where a portion is the back span and the remainder is the cantilever span or outrigger. Joist substitutes used in this configuration are 2.5 inch (64 mm) deep sections.



The Joist Outriggers Load Tables list uniform loads based on **LRFD** and **ASD** methods of design and are shown in U.S. Customary Units.

The **BLACK** figures in the **LRFD** Load Table gives the TOTAL safe factored uniformly distributed load-carrying capacity in pounds per linear foot, of 2.5 Inch Joist Outriggers. The **BLACK** figures in the **ASD** Load Table gives the TOTAL safe uniformly distributed load-carrying capacity in pounds per linear foot, of 2.5 Inch Joist Outriggers.

Serviceability requirements must be checked by the specifying professional. When calculating the actual live load deflection at the end of the cantilever it is necessary to consider the length of the back span.

Minimum section properties shall be provided for the particular 2.5K type specified even at shorter spans where the developed load capacity may exceed 550 plf (**ASD**) or 825 plf (**LRFD**).

LRFD

LOAD TABLES FOR 2.5 INCH JOIST OUTRIGGERS, K-SERIES									
OUTRIGGER TYPE	TOTAL ALLOWABLE LOAD FOR UNSUPPORTED CANTILEVER PLF SPAN ft-in								
	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"
2.5K1	825	744	516	379	291	229	186	153	129
2.5K2	825	825	717	526	403	318	258	213	179
2.5K3	825	825	825	735	562	444	360	297	250

ASD

LOAD TABLES FOR 2.5 INCH JOIST OUTRIGGERS, K-SERIES									
OUTRIGGER TYPE	TOTAL ALLOWABLE LOAD FOR UNSUPPORTED CANTILEVER PLF SPAN ft-in								
	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"
2.5K1	550	496	344	253	194	153	124	102	86
2.5K2	550	550	478	351	269	212	172	142	119
2.5K3	550	550	550	490	375	296	240	198	167

STANDARD ASD LOAD TABLE
STANDARD LRFD LOAD TABLE
FOR TOP CHORD EXTENSIONS (S TYPE) and (R TYPE)

Based on a 50 ksi Maximum Yield Strength
ASD Load Table adopted by the Steel Joist Institute November 15, 1989
LRFD Load Table adopted by the Steel Joist Institute May 1, 2000
Revised to May 18, 2010 – Effective December 31, 2010

Joist extensions are commonly furnished to support a variety of overhang conditions. Two types are pictured below. The first is the **TOP CHORD EXTENSION or "S" TYPE**, which has only the top chord angles extended. The second is the **EXTENDED END or "R" TYPE** in which the standard 2½, (64 mm) end bearing depth is maintained over the entire length of the extension. The "S" TYPE extension is so designated because of its **S**imple nature whereas the "R" TYPE involves **R**einforcing the top chord angles. The **specifying professional** should be aware that an "S" TYPE is more economical and should be specified whenever possible.

The following load tables are for K-Series TOP CHORD EXTENSIONS and EXTENDED ENDS for **ASD** and **LRFD** methods of design. The tabulated values are the maximum allowable uniform load in pounds per linear foot (kiloNewton/meter). The “S” and “I” numbers shown in the load tables are the Elastic Section Modulus and Moment of Inertia of the extension (Section) number with which they are associated.

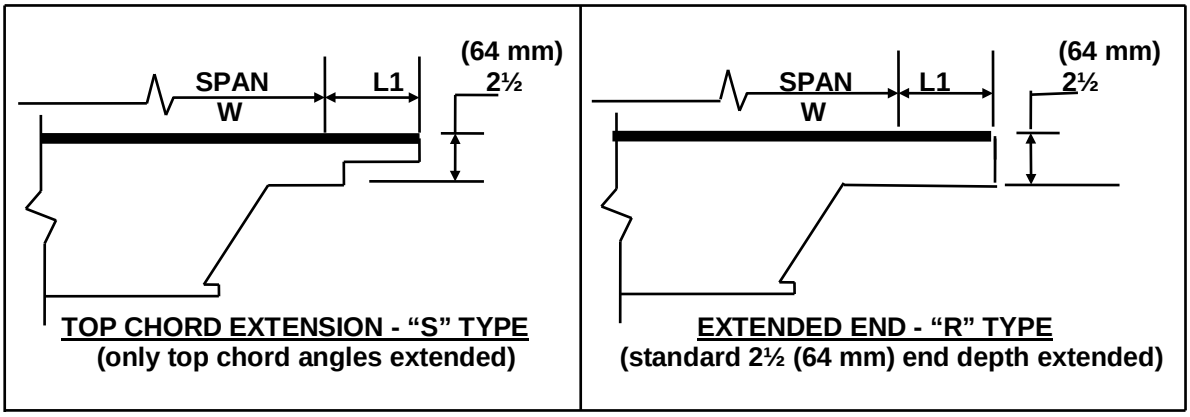
In cases where it is not possible to meet specific job requirements with a 2½" (64 mm) deep "R" type extension (refer to "S" and "I" values in the Extended End Load Table), the depth of the extension must be increased to provide greater load-carrying capacity.

The “S” and “R” extension numbers are intended to be associated with Standard K-Series Joist Sizes of matching Section Number. When possible, the extension number should be limited to no more than the Standard K-Series Joist Section Number, for optimum economy.

When TOP CHORD EXTENSIONS or EXTENDED ENDS are specified the bracing requirements must be considered by the specifying professional.

It should be noted that an "R" TYPE extension must be specified when building details dictate a 2½, (64 mm) depth at the end of the extension. In the absence of specific instructions. the joist manufacturer may provide either type.

TOP CHORD EXTENSION **EXTENDED END**



TOP CHORD EXTENSION - "S" TYPE
(only top chord angles extended)

EXTENDED END - "R" TYPE
(standard 2½ (64 mm) end depth extended)

W = Uniform Load
L1 = Length of Extension
SPAN = See **K**-Series Standard Specification for Definition of Span

ASD

TOP CHORD EXTENSION LOAD TABLE (R TYPE)
Based on a Yield Strength of 50 ksi
Pounds Per Linear Foot

TYPE	"S" ($in.^3$)	"I" ($in.^4$)	LENGTH (L1)											
			0'-6"	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"
R1	0.895	1.119	550	550	550	550	550	446	332	257	205	167	139	117
R2	0.923	1.157	550	466	228	550	550	460	343	265	211	172	143	121
R3	1.039	1.299	550	550	550	550	550	518	386	299	238	194	161	136
R4	1.147	1.433	550	550	550	550	550	550	426	330	263	214	178	150
R5	1.249	1.561	550	550	550	550	550	550	464	359	286	233	194	164
R6	1.352	1.690	550	550	550	550	550	550	502	389	310	253	210	177
R7	1.422	1.802	550	550	550	550	550	550	528	409	326	266	221	186
R8	1.558	1.948	550	550	550	550	550	550	550	448	357	291	242	204
R9	1.673	2.091	550	550	550	550	550	550	550	481	384	313	260	219
R10	1.931	2.414	550	550	550	550	550	550	550	550	443	361	300	253
R11	2.183	2.729	550	550	550	550	550	550	550	550	501	408	339	287
R12	2.413	3.016	550	550	550	550	550	550	550	550	550	451	375	317

ASD

TOP CHORD EXTENSION LOAD TABLE (S TYPE)
Based on a Maximum Yield Strength of 50 ksi
Pounds Per Linear Foot

TYPE	"S" ($in.^3$)	"I" ($in.^4$)	LENGTH (L1)								
			0'-6"	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"
S1	0.099	0.088	550	363	178	105					
S2	0.127	0.138	550	466	228	135					
S3	0.144	0.156	550	529	259	153					
S4	0.160	0.172	550	550	288	170	112				
S5	0.176	0.188	550	550	316	187	123				
S6	0.192	0.204	550	550	345	204	135				
S7	0.241	0.306	550	550	433	256	169	120			
S8	0.266	0.332	550	550	478	283	187	132			
S9	0.288	0.358	550	550	518	306	202	143	107		
S10	0.380	0.544	550	550	550	404	267	189	141	109	
S11	0.438	0.622	550	550	550	466	307	218	162	126	100
S12	0.494	0.696	550	550	550	526	347	246	183	142	113

LRFD

TOP CHORD EXTENSION LOAD TABLE (R TYPE)
Based on a Yield Strength of 50 ksi
Pounds Per Linear Foot

TYPE	"S" ($in.^3$)	"I" ($in.^4$)	LENGTH (L1)											
			0'-6"	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"
R1	0.895	1.119	825	544	825	157	825	669	498	385	307	250	208	175
R2	0.923	1.157	825	700	343	202	825	690	514	399	318	259	216	181
R3	1.039	1.299	825	793	388	229	825	777	579	448	358	292	243	205
R4	1.147	1.433	825	825	825	825	825	825	639	495	394	321	267	225
R5	1.249	1.561	825	825	825	280	184	825	696	538	429	349	291	246
R6	1.352	1.690	825	825	517	825	202	825	753	583	465	379	315	265
R7	1.422	1.802	825	825	649	825	253	825	792	613	489	399	331	279
R8	1.558	1.948	825	825	825	424	280	825	825	672	535	436	363	306
R9	1.673	2.091	825	825	825	825	825	214	160	721	576	469	390	328
R10	1.931	2.414	825	825	825	825	400	283	211	163	664	541	450	379
R11	2.183	2.729	825	825	825	825	460	825	825	825	751	612	508	430
R12	2.413	3.016	825	825	825	825	520	825	274	825	169	676	562	475

LRFD

TOP CHORD EXTENSION LOAD TABLE (S TYPE)
Based on a Yield Strength of 50 ksi
Pounds Per Linear Foot

TYPE	"S" ($in.^3$)	"I" ($in.^4$)	LENGTH (L1)								
			0'-6"	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"
S1	0.099	0.088	825	544	267	157					
S2	0.127	0.138	825	700	343	202					
S3	0.144	0.156	825	793	388	229					
S4	0.160	0.172	825	825	432	255	168				
S5	0.176	0.188	825	825	474	280	184				
S6	0.192	0.204	825	825	517	306	202				
S7	0.241	0.306	825	825	649	384	253	180			
S8	0.266	0.332	825	825	717	424	280	198			
S9	0.288	0.358	825	825	777	459	303	214	160		
S10	0.380	0.544	825	825	825	606	400	283	211	163	
S11	0.438	0.622	825	825	825	699	460	327	243	189	150
S12	0.494	0.696	825	825	825	789	520	369	274	213	169