
VALLEY
JOIST+DECK

VALLEY JOIST+DECK

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Valley Joist is a member in good standing of the Steel Joist Institute and the Steel Deck Institute

JOIST DESIGN COMMENTARY

SPECIFYING JOISTS

Joists can be specified in one of two ways. The first option is to specify the joists using the "SJI designation". Examples of this are 16K3, 22K5, 28K10, 32LH11, 44LH16, 68DLH19, etc. and they are commonly referred to as "catalog joists". These designations are listed in the SJI Standard Load Capacity Tables for the different Joist Series.

When the SJI designation is used, the joist is designed for the (total) load capacity given in the Standard Load Capacity Tables. The loads will be interpolated when the joist span is between the spans listed in the tables. For K-Series Joists, when the span is less than the minimum table span, the design total load will be 550 plf. For LH-Series Joists, when the span is less than the minimum table span, the loads will be determined based on the "SAFE LOAD" using the method described in the preamble to the LH-Series Load Capacity Tables.

The span-to-depth ratio (24:1) given in the SJI specifications **cannot** be exceeded. This is shown in the Standard Load Capacity Tables by the cutoff point for the joist lengths and designation.

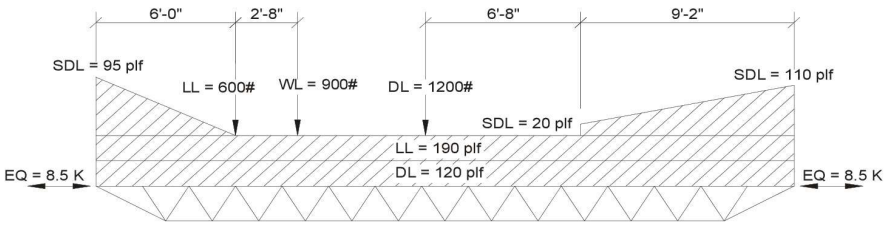
The second option for specifying a joist is to use the design loads. Examples of this are 18K300/160, 30K450/250, 36LH650/250, 72DLH1250/950, etc. These are commonly referred to as "load/load" joists. In this joist designation the last numbers are the Total Load and Live Load in plf, respectively.

It is the specifying professional's responsibility to provide a complete joist designation and to calculate and specify all joist loads.

SPECIFYING CONCENTRATED AND NON-UNIFORM LOADS

Whether using K-Series, LH-Series, or Joist Girders, it is important that the specifying professional show all the design loads on the contract drawings. The most effective way of showing these loads is with a load diagram. The specifying professional shall designate a "special" joist in this situation. **These joists are to be labeled "SP" and a load diagram for each SP joist shall be provided on the contract drawings.** Each SP joist's load diagram shall include the location, magnitude, and type of all concentrated, uniform and non-uniform loads.

The most common non-uniform load is a (snow) drift load. The specifying professional must clearly indicate on the contract drawings the length of the drift load and the magnitude of the load at each end of the drift. The most effective method for specifying this load is with a load diagram that includes all loads as shown in the figure below.



For further information on specifying joists and joist loads refer to Sections 2.2 and 2.3 of the SJI Code of Standard Practice.

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JOIST DESIGN COMMENTARY

JOIST "ADD-LOAD" AND "BEND-CHECK"

Frequently, the specifying professional includes a generic additional load, often referred to as an "Add-Load", to account for miscellaneous mechanical, electrical, or plumbing equipment that are part of the building but cannot be readily located. This load is typically given in the design specifications for the Open Web Steel Joists and Joist Girders. There are many ways this type of load can be specified. To ensure correct interpretation, Valley Joist offers the following suggestions.

Suggested Specification: Design all joists for an additional 500 pound load at any panel point.

Valley Joist Interpretation: All joists are designed for an additional single 500 pound concentrated load that can be placed at any top or bottom chord panel point. This is also referred to as an "Add-Load". Note: The load must be within 6 inches of a panel point or additional field-installed reinforcing webs are required.

Suggested Specification: Design all joists for an additional 500 pound concentrated load anywhere along the top chord.

Valley Joist Interpretation: All joists are designed for an additional single 500 pound concentrated load that can be placed at any location along the top chord. Field installed webs are not required should the load be offset more than 6 inches from a top chord panel point. This is commonly referred to as an "Add-Load w/ a Bend Check".

Suggested Specification: Design all joists for an additional 500 pound concentrated load anywhere along the top chord and 350 pounds anywhere along the bottom chord.

Valley Joist Interpretation: All joists will be designed for an additional single 500 pound concentrated load that can be placed at any location along the top chord and an additional single 350 pound concentrated load that can be placed at any location along the bottom chord. Field installed reinforcing webs are not required should the load be offset more than 6 inches from a top chord panel point.

Suggested Specification: Design all joist top chords for an additional 500 pound concentrated load of which 250 pounds may occur at any location.

Valley Joist Interpretation: All joists will be designed for an additional single 500 pound concentrated load that can be placed at any top chord panel point. The top chord will than be checked for the affects of local bending between panel points for a 250 pound load; this is commonly referred to as a "Bend-Check" load. The "Bend-Check load is not considered to be additive Field installed reinforcing webs are not required for additional loads of 250 pounds and less that do not occur at panel points.

For additional information and detailed examples of specifying loads refer to Section 2.2 and 2.3 of the SJI Code of Standard Practice.

JOIST SUBSTITUTES

Joist substitutes should be specified when the span is 10 feet or less. The Steel Joist Institute K-Series Standard Specifications include three standard joist substitute designations: 2.5K1, 2.5K2, and 2.5K3. Standard Load Capacity Tables are provided for each of these designations. **Note that the length of the joist substitutes in these tables does not exceed 10 feet.**

In addition to the SJI designated joist substitutes, Valley Joist manufactures joist substitutes in depths up to 5 inches. When specifying a 5" deep joist substitute, the specifying professional should designate the joist substitute by depth and design loads in the same manner as a "load/load" joist, i.e., 5K260/150. **Contact Valley Joist if the length, depth, or design loads for the joist substitute exceeds the SJI Table values to ensure that a joist substitute can be manufactured for the loads and lengths specific to your project.**

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JOIST DESIGN COMMENTARY

AXIAL LOADS

Joists may be subject to axial loads from wind and/or seismic loading conditions. For joists spanning over interior beams or Joist Girders, or for opposing Joist Girders at columns, an axial load transfer mechanism provides the best overall structural system and should always be specified. Several recommended details for axial load transfer mechanisms are shown in details on the accompanying pages.

The most efficient method of transferring an axial load into or out of the joist is to provide a direct attachment to the joist's top chord using a tie plate, tie rods, or strap angles. A **knife plate** should only be used for transferring axial loads in Joist Girders.

Note: When axial loads are transferred through the joist or Joist Girder seat there will be additional material and manufacturing.

It is the specifying professional's responsibility to design the connection of the joist's bearing seats to the structure. If the axial load must be transferred through the joist or Joist Girder Bearing seat, the following are recommended limits.

For K-Series Joists	.....	20 kips
For LH-Series Joists	.....	30 kips
For Joist Girders	.....	40 kips

Contact Valley Joist for specific applications.

CAMBER

The camber given in the SJI Standard Specifications for K-Series and LH-Series joists, and for Joist Girders is considered to be "standard camber" and is **approximate.** The camber tables given in the SJI specifications can be used as a guide to determine the expected camber for a joist or Joist Girder of a given length. Because camber is approximate, the amount of camber may vary slightly between joists of the same length.

Valley Joist manufactures all joists and Joist Girders for the approximate SJI standard camber. Joists and Joist Girders can also be manufactured without camber (zero camber) if clearly specified on the contract drawings. With the exception of composite joists, Valley Joist excludes any special camber in all quotes. It is recommended that camber for joists and Joist Girders be specified as "SJI Standard Camber". Avoid specifying "camber for dead load".

When non-composite joists are used in concrete floor slabs special camber may be required to ensure there is not excessive deflection of the joists during placement of the concrete slab. The specifying professional must clearly denote the floor dead load for which the required camber must be calculated.

Camber other than the SJI standard is considered "special camber" and may result in additional costs. Contact Valley Joist for information regarding "special camber".

JOISTS IN SLOPED ROOFS

When joists are installed in a sloping roof, sloped bearing seats will be provided depending on the roof slope. When joist top chord extensions are required, special attention must be given to the bearing seat depth to accommodate both manufacturing and erecting the joists. Tables are included in the Accessories and Details Section of the SJI Specifications for the required bearing seat depth for K-Series and LH-Series joist, respectively, for the various roof slopes.

JOIST DESIGN COMMENTARY

JOISTS AND FIRE PROTECTION PIPING

Open web steel joists can be designed and manufactured to allow for the passage of fire protection branch line piping through the web openings. Valley Joist manufactures K- and LH-Series joists so that the joist webs are aligned to allow for a continuous passage of sprinkler branch lines; however, the joists are not designed around the sprinkler branch line locations.

WOOD-NAILER JOISTS (Available from Western Division only)

"Wood-nailer" joists are a hybrid-type joist system that have wood attached to the joist's top chord. The wood is used for attaching sub-purlins between the joists in a "panelized, wood roof system". This process allows an entire panel consisting of joists, nailers, sub-purlins, and deck to be assembled on the ground. The panel is then lifted into position and nailed to the previously erected panel.

The wood-nailer will be #2 Douglas Fir-Larch, solid sawn, dimension lumber or, if required, an engineered wood lumber product, i.e. LVL, PSL. The wood-nailer must be specified on the contract drawings. APA rated sheathing must be used for the decking. It is the responsibility of the specifying professional to determine and specify the wood-nailer and the deck sheathing.

There are different methods used to attach the wood nailer to the top chord; however, in each case the attachment must be capable of providing lateral stability for the top chord. This requirement is given in SJI Standard Specifications for K- and LH-Series joists. The attachment must also be capable of resisting and transferring any withdrawal forces from net uplift loads. The attachment may also be required to transfer the diaphragm shears or axial forces from the wood-nailer to the joist top chord.

Valley Joist's standard attachment is #14 screws spaced at 12 inches on-center staggered, as shown in the "Standard Screw Spacing for Wood Nailer Joists". The screw length will be based on the depth of the wood-nailer. For a 1¾" thick wood-nailer, a 1½" long screw is used; for 2½" thick wood-nailer a 2" long screw is used.

The required screw spacing and screw type must be specified on the contract drawings.

Valley Joist can supply the joists either with or without the wood-nailer attached to the top chord based on the project's requirements. If the wood-nailer is not supplied by Valley Joist (field installed), we can provide holes in the joist top chords based on the spacing and screw size requirements given on the contract drawings. Contact Valley Joist for your specific needs.

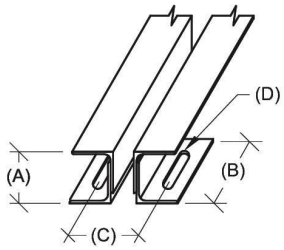
Valley Joist recommends a minimum depth of 18 inches for all wood-nailer joists. The joist bearing seat depth can be adjusted to accommodate the project requirements. When using LH-Series joist it is recommended that the SJI standard seat depth of 5 inches be adhered to.

Specifying a wood nailer joist is the same as a joist in a metal deck roof. The specifying professional must show all loads on the contract drawings. Provisions must be made and details provided for the transfer of axial loads. Several suggested details for transferring the axial loads between joists, between Joist Girders, or at column and wall connections are provided in this catalog for consideration by the design professional.

Note that when axial loads are transferred through the joist or Joist Girder seats there will be additional material and manufacturing.

Because lateral support for the joist top chord is provided when using this panelized erection process, top chord bridging in not needed. Bottom chord bridging (bracing) is bolted to the bottom chord and nailed to the wood sub-purlins. The number and placement of these braces should be in accordance with the SJI specifications and bridging tables for K-Series and LH-Series joists. If net uplift forces are a design consideration, uplift bridging (braces) must be installed near the first bottom chord panel point at each end of the joist as required in the SJI specifications.

Joist Substitutes can be used as wood-nailer joists. Special manufacturing is required so that the wood-nailer can be attached to the joist substitute.



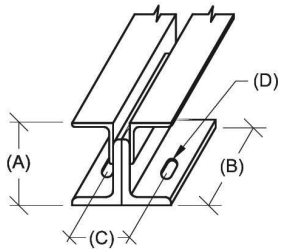
(A) STANDARD BEARING SEAT DEPTH:
$2\frac{1}{2}$" (64 MM) (1)

(B) STANDARD BEARING SEAT LENGTH:
5" (127 MM)
MIN REQ'D BEARING = $2\frac{1}{2}$" (63 MM) (2)

(C) STANDARD SLOT GAUGE:
$3\frac{1}{2}$" (89 MM) (3)

(D) STANDARD SLOT SIZE
$\frac{9}{16}$" x $2\frac{3}{4}$" (3, 4)
$\frac{9}{16}$" x 2" LONG SLOT- AVAILABLE UPON REQUEST

A K - SERIES



(A) STANDARD BEARING SEAT DEPTH:
5" (127 MM) FOR LH-SERIES (1)
$7\frac{1}{2}$" (190 MM) FOR DLH-SERIES SECTION NO. 18 - 25 (1)

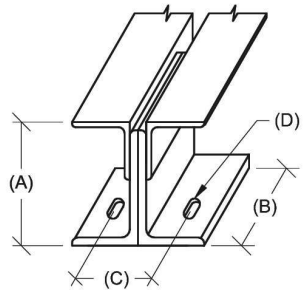
(B) STANDARD BEARING SEAT LENGTH:
6" (152 MM) (2)

MIN BEARING REQ'D. - BY SECTION NUMBER =
02 - 06 INCL. $2\frac{1}{2}$" (64 MM)
07 - 17 INCL. 4" (102 MM)
18 - 25 INCL. 6" (152 MM)

(C) STANDARD SLOT GAUGE:
4" (102 MM) 5" (127MM) FOR DLH 18-35 (3)

(D) STANDARD SLOT SIZE
$\frac{13}{16}$" x $1\frac{1}{4}$" (3, 4)

B LH - SERIES AND DLH - SERIES



(A) STANDARD BEARING SEAT DEPTH:
$7\frac{1}{2}$" (191 MM) (1)

(B) STANDARD BEARING SEAT LENGTH:
6" (152 MM)
MIN REQ'D BEARING = 4" MIN (102 MM) (2)

(C) STANDARD SLOT GAUGE:
5" (127 MM) (3)

(D) STANDARD SLOT SIZE
$\frac{13}{16}$" x $1\frac{1}{4}$" (3, 4)

C JOIST GIRDERS

BEARING SEAT STANDARDS

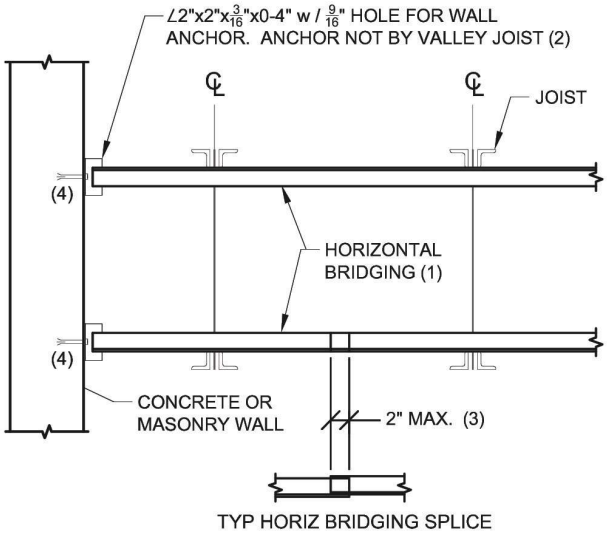
(1) MINIMUM BEARING SEAT DEPTH IS BASED ON SJI STANDARD SPECIFICATIONS.

(2) REFERENCE SJI SPECIFICATIONS FOR MINIMUM REQUIRED BEARING LENGTH.

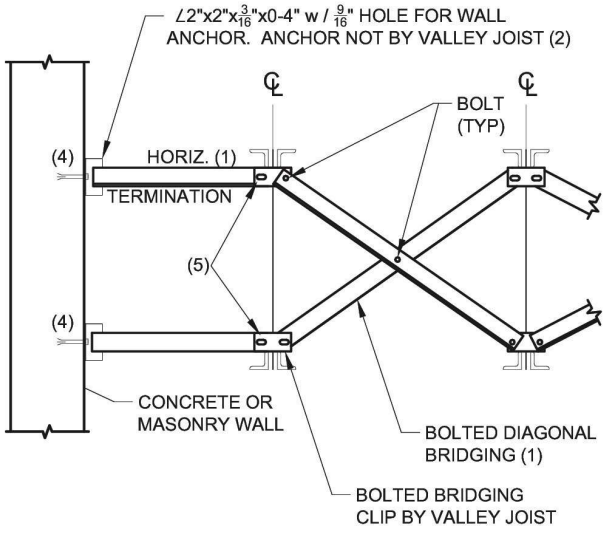
(3) SLOT SIZE AND GAUGE IS VALLEY JOIST MANUFACTURING STANDARD.

(4) WHERE JOISTS ARE BOLTED TO SUPPORTING STRUCTURE A307 BOLTS WILL BE USED.
JOISTS OVER 40'-0" AND AS REQUIRED BY OSHA ERECTION REGULATIONS WILL BE BOLTED USING A307 BOLTS.
VALLEY JOIST WILL PROVIDE A307 BOLTS FOR JOIST TO GIRDERS ONLY, ALL OTHER REQUIRED BOLTS WILL BE PROVIDED BY OTHERS. VALLEY JOIST WILL PROVIDE OUR STANDARD BOLT SIZE AND GRADE ONLY.
$\frac{1}{2}$" x$1\frac{1}{2}$" FOR K- SERIES AND $\frac{3}{4}$" x$1\frac{3}{4}$" FOR LH-SERIES.

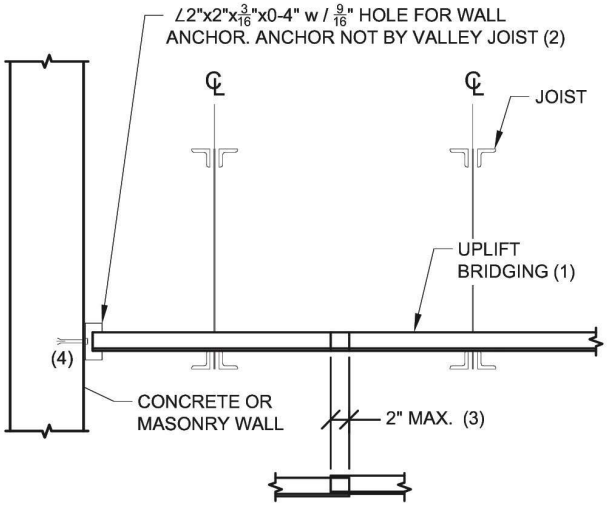
VALLEY JOIST+DECK



A TYP. HORIZONTAL BRIDGING TO WALL



B BOLTED DIAGONAL BRIDGING TO WALL



C TYP. UPLIFT BRIDGING TO WALL

SEE GUIDELINES FOR COMPLYING WITH OSHA STEEL ERECTION STANDARD, PARAGRAPH § 1926.757(a)(10) AND § 1926.757 (c)(5).

(1) BRIDGING - SIZE, TYPE AND NUMBER OF ROWS TO BE PROVIDED PER SJI SPECIFICATIONS,

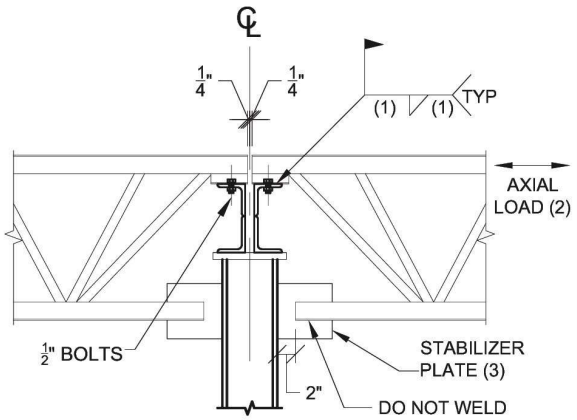
(2) VALLEY JOIST STANDARD BRIDGING ANCHOR CLIP (BAC)

(3) 2" MAX SPLICE LAP AT ALL HORIZONTAL BRIDGING. (USE ALL DROPS)

(4) 'ANCHOR' TYPE AND EMBEDMENT TO BE DETERMINED BY ENGINEER OF RECORD. (NOT BY VALLEY JOIST)

(5) HORIZONTAL TERMINATION BRIDGING IS WELDED TO BOLTED BRIDGING CLIP.

VALLEY JOIST+DECK



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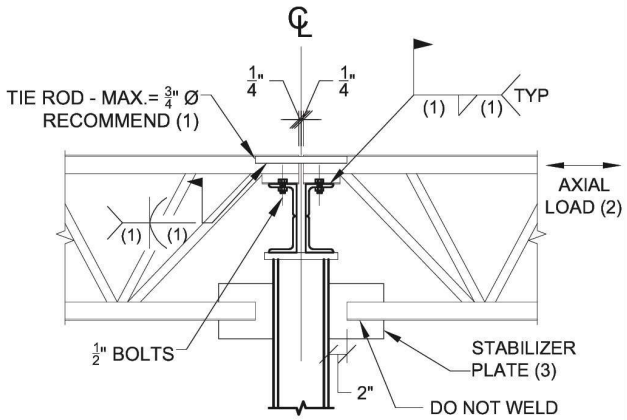

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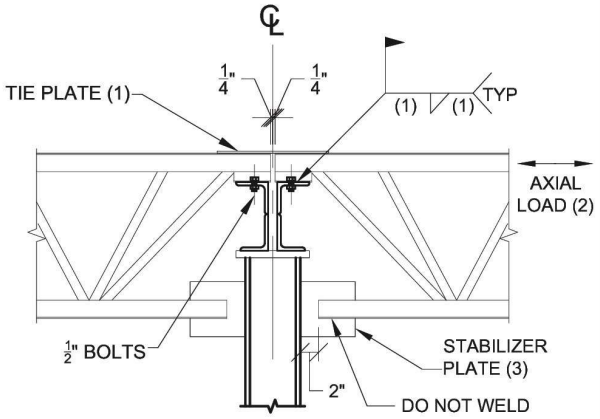


C

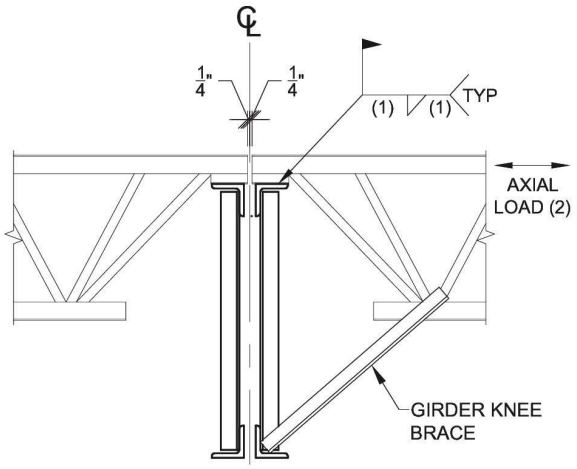
JOIST @ COLUMN DETAILS

(1) SIZE AND LENGTH BY ENGINEER OF RECORD.

(2) MAGNITUDE BY ENGINEER OF RECORD.
***AXIAL LOAD TRANSFERRED THROUGH JOIST SEATS MAY RESULT IN ADDITIONAL COSTS.

- WELDS SHOWN ABOVE ARE TYPICAL FOR BOTH JOISTS.
- STABILIZER PLATES, AXIAL TRANSFER MECHANISMS ARE NOT PROVIDED BY VALLEY JOIST.

VALLEY JOIST+DECK



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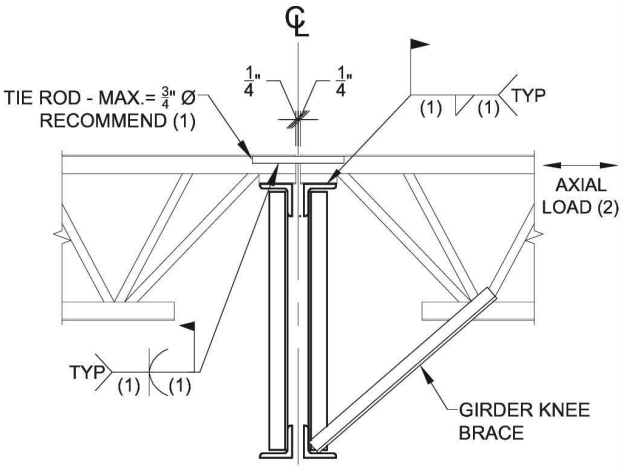

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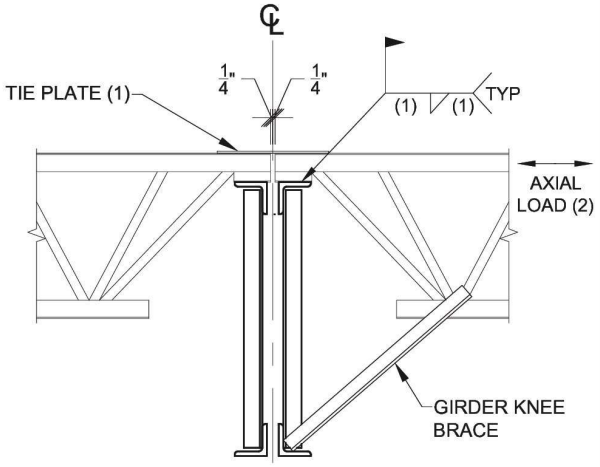


C

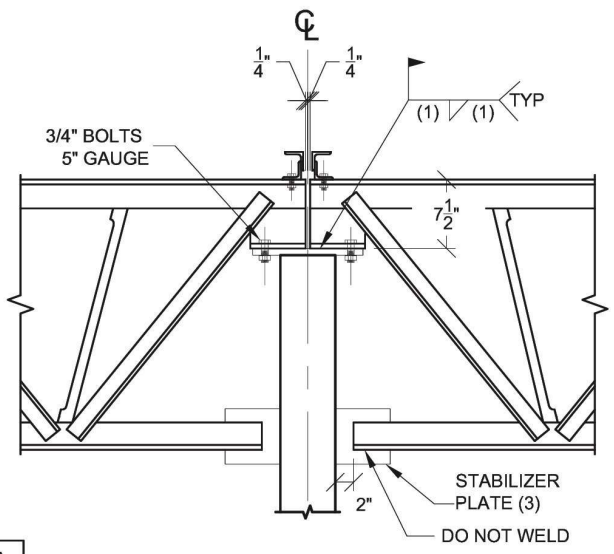
JOIST @ GIRDER DETAILS

(1) SIZE AND LENGTH BY ENGINEER OF RECORD.

(2) MAGNITUDE BY ENGINEER OF RECORD.
***AXIAL LOAD TRANSFERRED THROUGH JOIST SEATS MAY RESULT IN ADDITIONAL COSTS.

- WELDS SHOWN ABOVE ARE TYPICAL FOR BOTH JOISTS.
- AXIAL TRANSFER MECHANISMS ARE NOT PROVIDED BY VALLEY JOIST.

VALLEY JOIST+DECK



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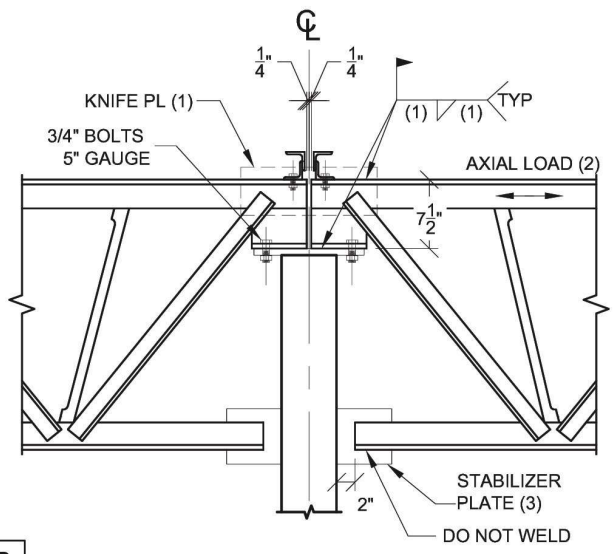

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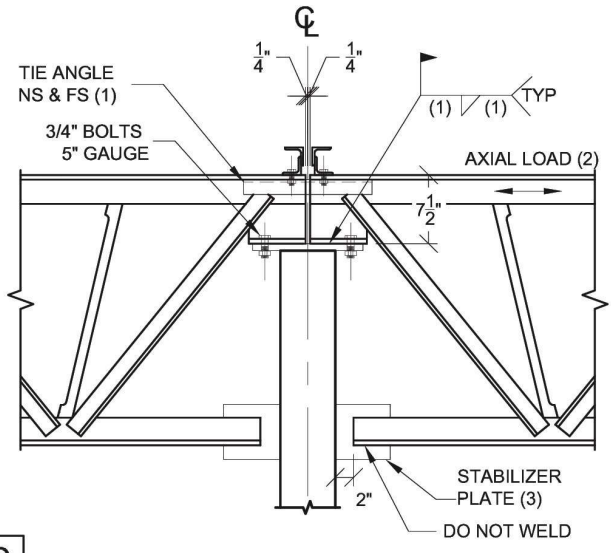


C

D

GIRDER TO HSS COLUMN DETAILS

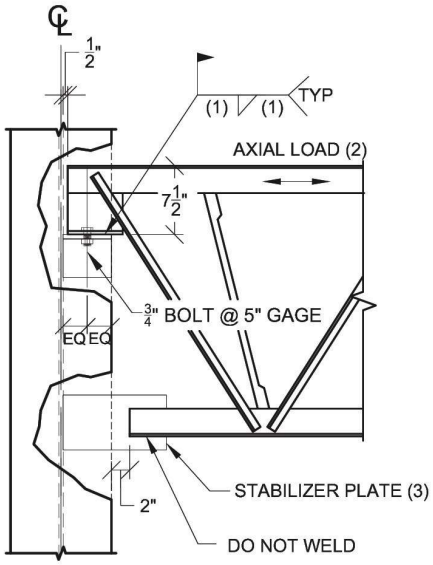
(1) SIZE AND LENGTH TO BE PROVIDED BY ENGINEER OF RECORD.

(2) MAGNITUDE PROVIDED BY ENGINEER OF RECORD.

(3) VALLEY JOIST RECOMMENDS USING A STABILIZER PLATE SIZE OF ¾"x6"x6".

- COLUMN BOLTS, STABILIZER PLATES & AXIAL TRANSFER MECHANISMS ARE NOT PROVIDED BY VALLEY JOIST.
- WELDS SHOWN ABOVE ARE TYPICAL FOR BOTH JOIST GIRDERS.

VALLEY JOIST+DECK



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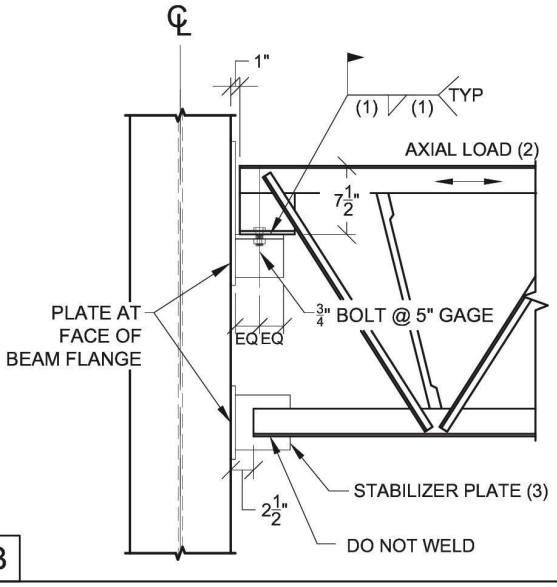

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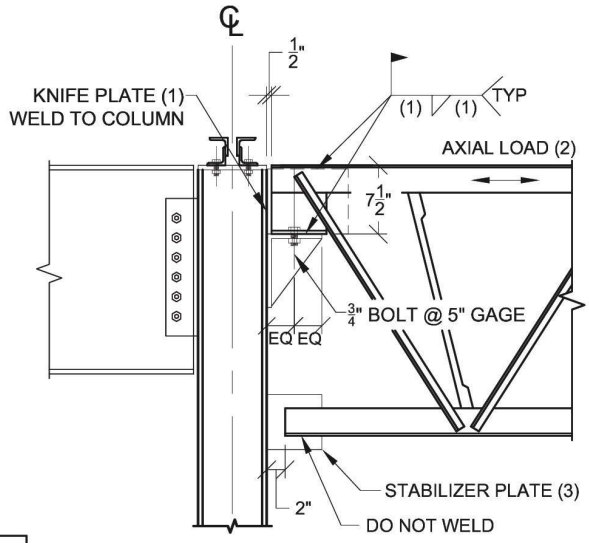


C

GIRDER TO WIDE FLANGE COLUMN DETAILS

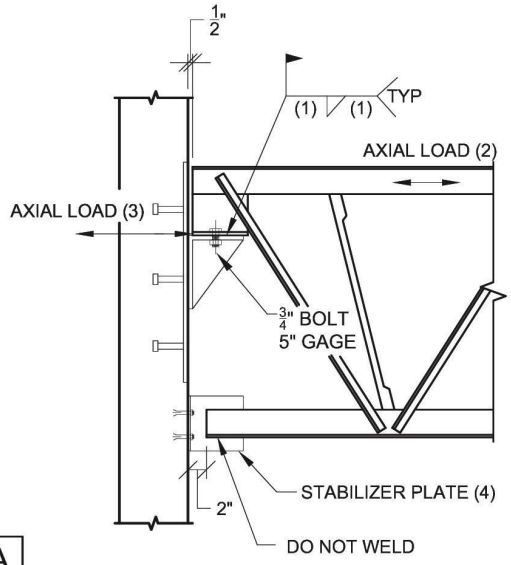
(1) SIZE AND LENGTH TO BE PROVIDED BY ENGINEER OF RECORD.

(2) MAGNITUDE PROVIDED BY ENGINEER OF RECORD.

(3) VALLEY JOIST RECOMMENDS USING A STABILIZER PLATE SIZE OF ¾"x6"x6".

- COLUMN BOLTS, STABILIZER PLATES & AXIAL TRANSFER MECHANISMS ARE NOT PROVIDED BY VALLEY JOIST.

VALLEY JOIST+DECK



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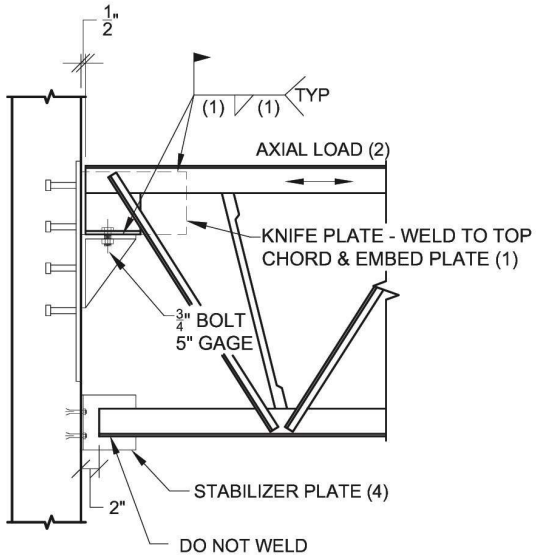

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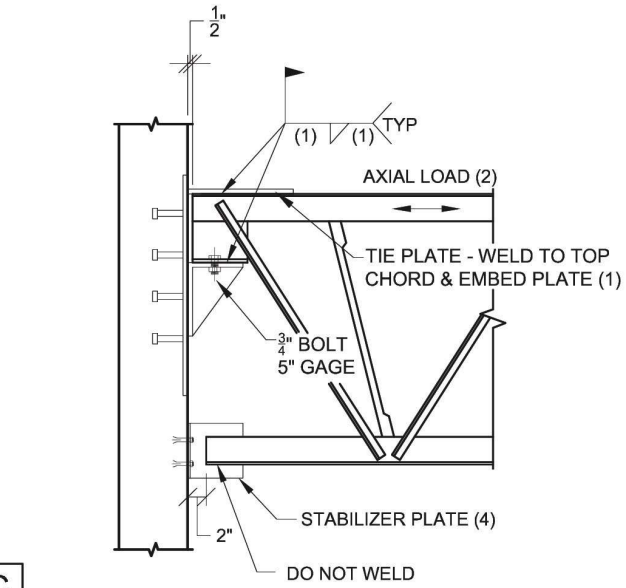

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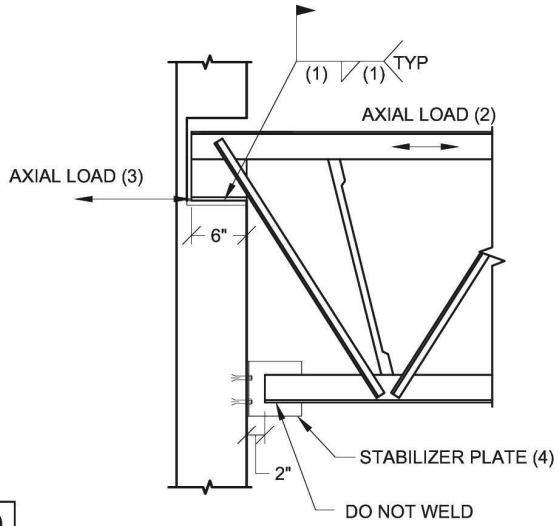


D

GIRDER @ MASONRY/CONCRETE WALL DETAILS

(1) SIZE AND LENGTH TO BE PROVIDED BY ENGINEER OF RECORD.

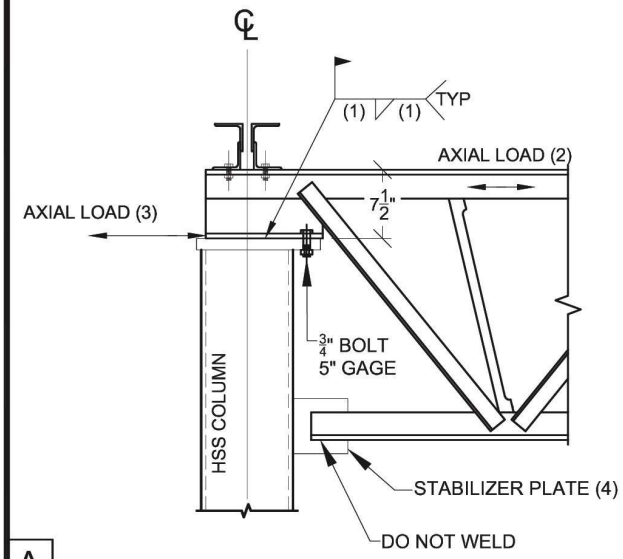
(2) MAGNITUDE PROVIDED BY ENGINEER OF RECORD.

(3) MAGNITUDE OF FORCE TO BE TRANSFERRED THROUGH SEAT PROVIDED BY THE ENGINEER OF RECORD.
***AXIAL LOAD TRANSFERRED THROUGH JOIST GIRDER SEAT MAY RESULT IN ADDITIONAL COSTS.

(4) VALLEY JOIST RECOMMENDS USING A 3/4" x 6" x 6" STABILIZER PLATE.

- COLUMN BOLTS, STABILIZER PLATES & AXIAL TRANSFER MECHANISMS ARE NOT PROVIDED BY VALLEY JOIST.

VALLEY JOIST+DECK



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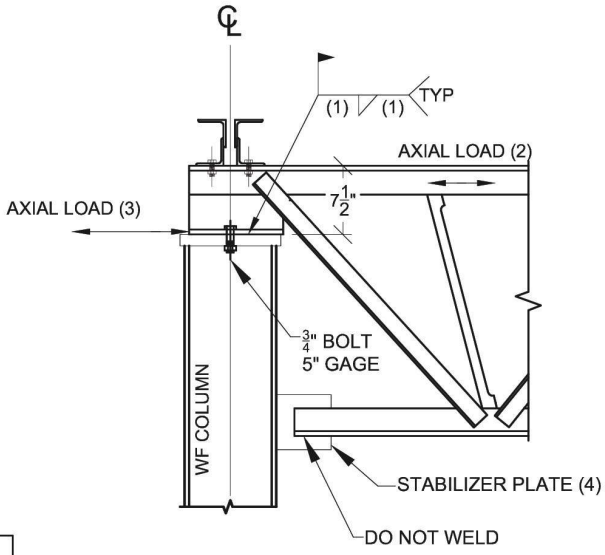

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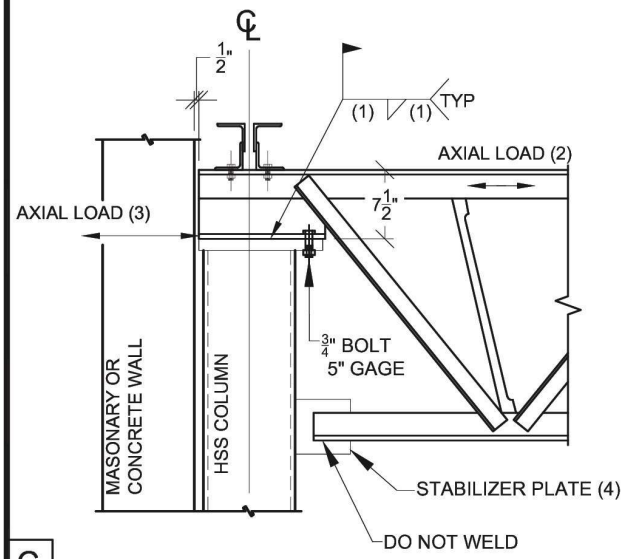

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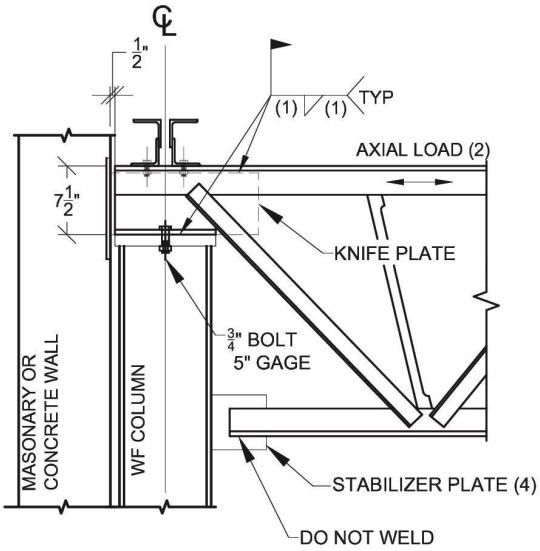


D

GIRDER TO PERIMETER COLUMN DETAILS

(1) SIZE AND LENGTH TO BE PROVIDED BY ENGINEER OF RECORD.

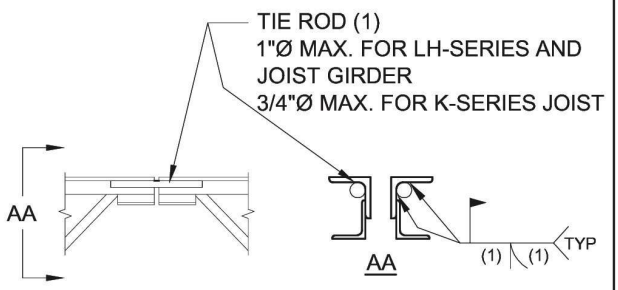
(2) MAGNITUDE PROVIDED BY ENGINEER OF RECORD.

(3) MAGNITUDE OF FORCE TO BE TRANSFERRED THROUGH SEAT PROVIDED BY THE ENGINEER OF RECORD.
***AXIAL LOAD TRANSFERRED THROUGH JOIST GIRDER SEAT MAY RESULT IN ADDITIONAL COSTS.

(4) VALLEY JOIST RECOMMENDS USING A STABILIZER PLATE SIZE OF 3/4"x6"x6".

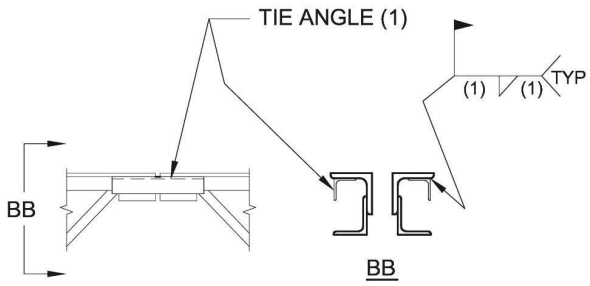
- COLUMN BOLTS, STABILIZER PLATES & AXIAL TRANSFER MECHANISMS ARE NOT PROVIDED BY VALLEY JOIST.

VALLEY JOIST+DECK



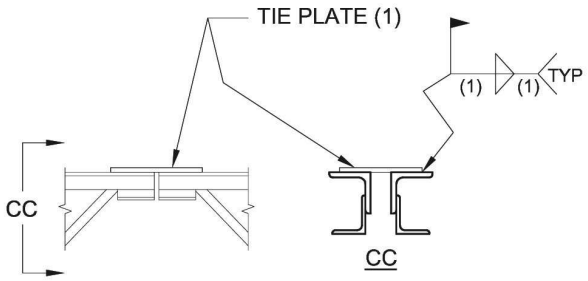
ATTACH RODS TO NEAR SIDE AND FAR SIDE OF JOIST

A



ATTACH ANGLES TO NEAR SIDE AND FAR SIDE OF JOIST

B



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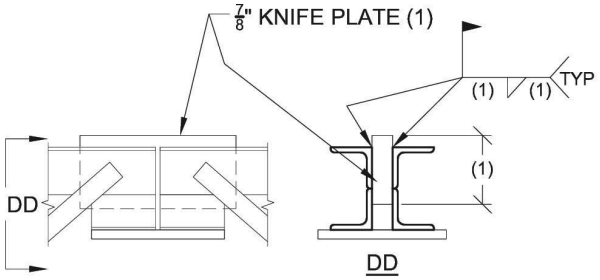
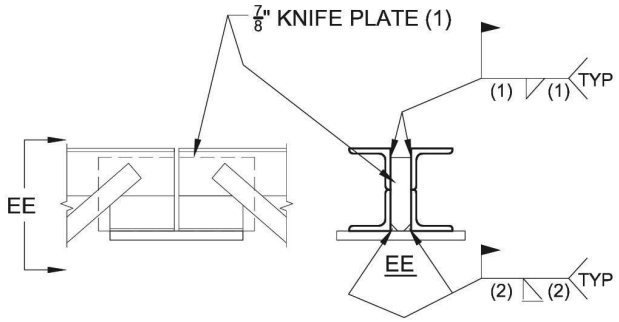


D KNIFE PLATE BETWEEN JOIST GIRDER SEAT/CHORDS



E KNIFE PLATE BETWEEN JOIST GIRDER SEAT/CHORDS

AXIAL TRANSFER MECHANISMS

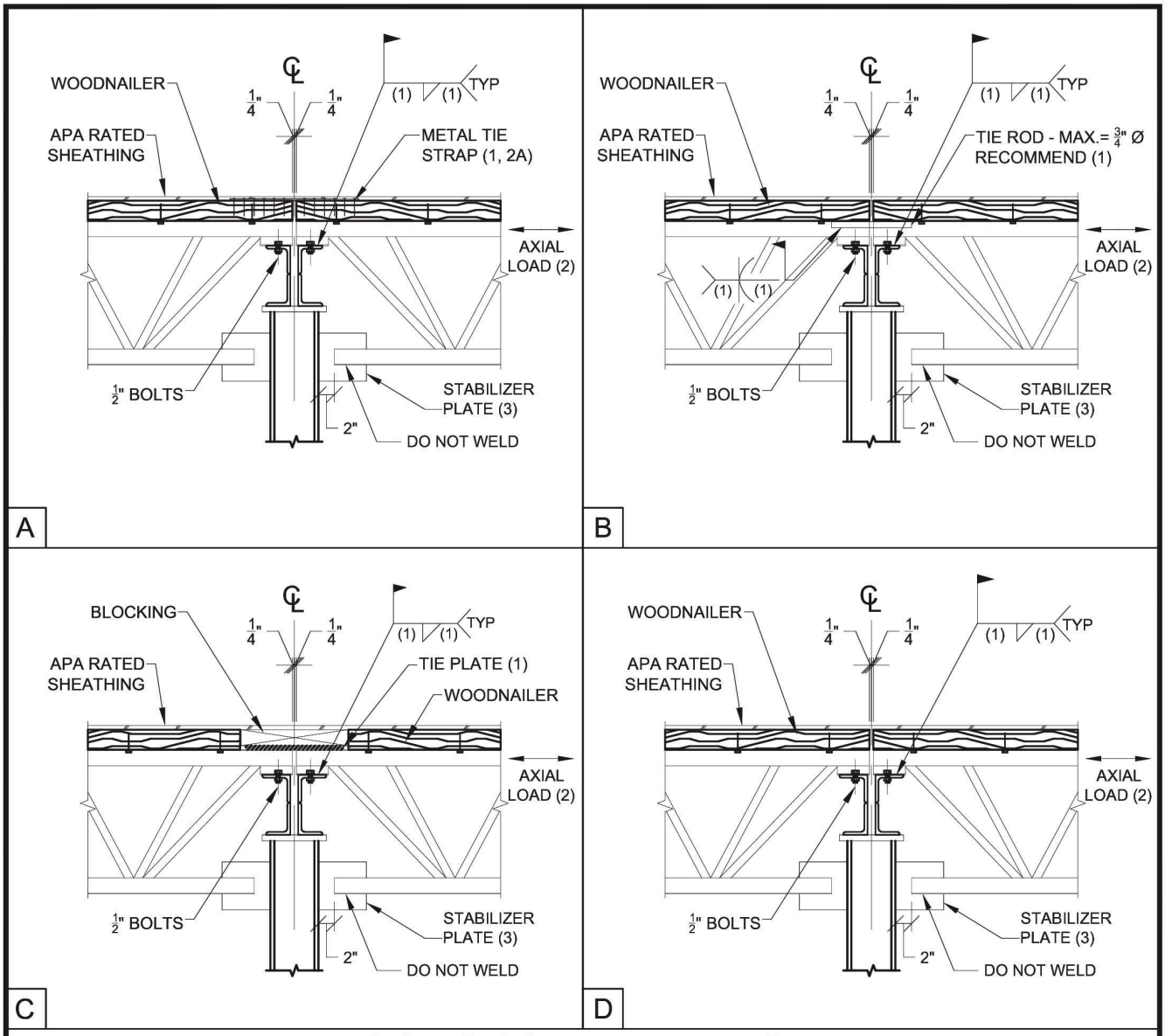
(1) SIZE AND LENGTH TO BE PROVIDED BY ENGINEER OF RECORD.

- RECOMMEND TIE PLATE WIDTH = 4"
- RECOMMEND MAX TIE ANGLE = L2x2x$\frac{1}{4}$"

(2) SIZE AND LENGTH TO BE PROVIDED BY ENGINEER OF RECORD, IF REQUIRED.

- AXIAL TRANSFER MECHANISMS ARE NOT PROVIDED BY VALLEY JOIST.

VALLEY JOIST+DECK



JOIST @ COLUMN DETAILS

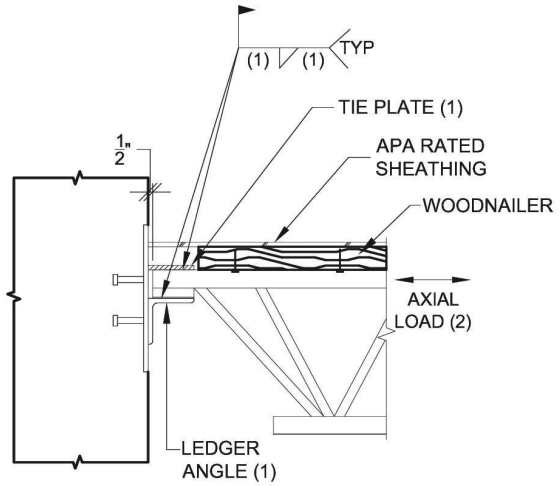
(1) SIZE AND LENGTH BY ENGINEER OF RECORD.

(2) MAGNITUDE BY ENGINEER OF RECORD.
***AXIAL LOAD TRANSFERRED THROUGH JOIST SEATS MAY RESULT IN ADDITIONAL COSTS.
(2A) TIE STRAPS ARE NOT CONSIDERED SUFFICIENT TO TRANSFER AXIAL LOAD ACROSS JOIST TOP CHORDS.

- WELDS SHOWN ABOVE ARE TYPICAL FOR BOTH JOISTS.
- STABILIZER PLATES, AXIAL TRANSFER MECHANISMS ARE NOT PROVIDED BY VALLEY JOIST.

WOOD NAILER JOISTS ARE AVAILABLE FROM WESTERN DIVISION ONLY

VALLEY JOIST+DECK



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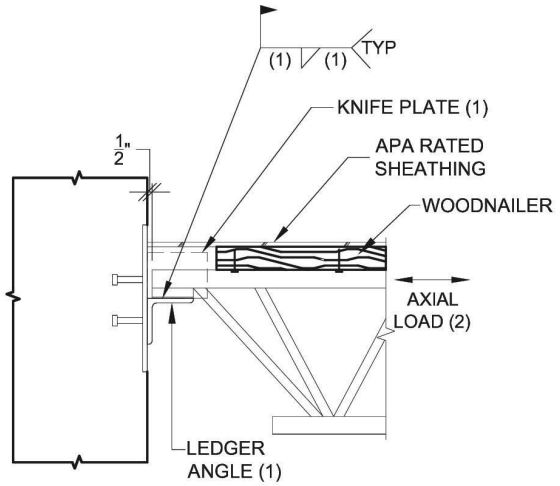


B

JOIST @ STEEL LEDGER DETAILS
"K" OR "LH" SERIES JOIST DRAG STRUT CONNECTION

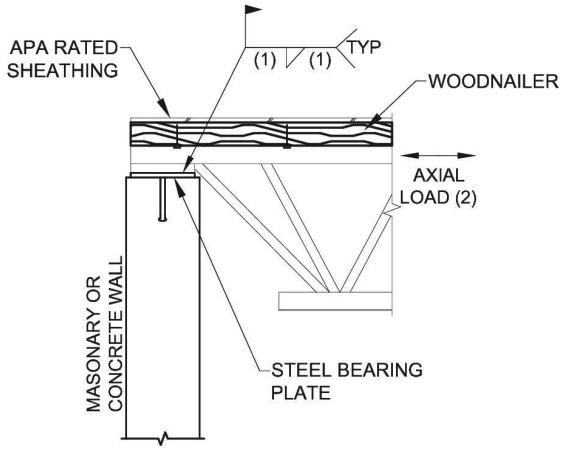
(1) SIZE AND LENGTH TO BE PROVIDED BY ENGINEER OF RECORD.

(2) MAGNITUDE PROVIDED BY ENGINEER OF RECORD.

- COLUMN BOLTS, STABILIZER PLATES & AXIAL TRANSFER MECHANISMS ARE NOT PROVIDED BY VALLEY JOIST.

WOOD NAILER JOISTS ARE AVAILABLE FROM WESTERN DIVISION ONLY

VALLEY JOIST+DECK



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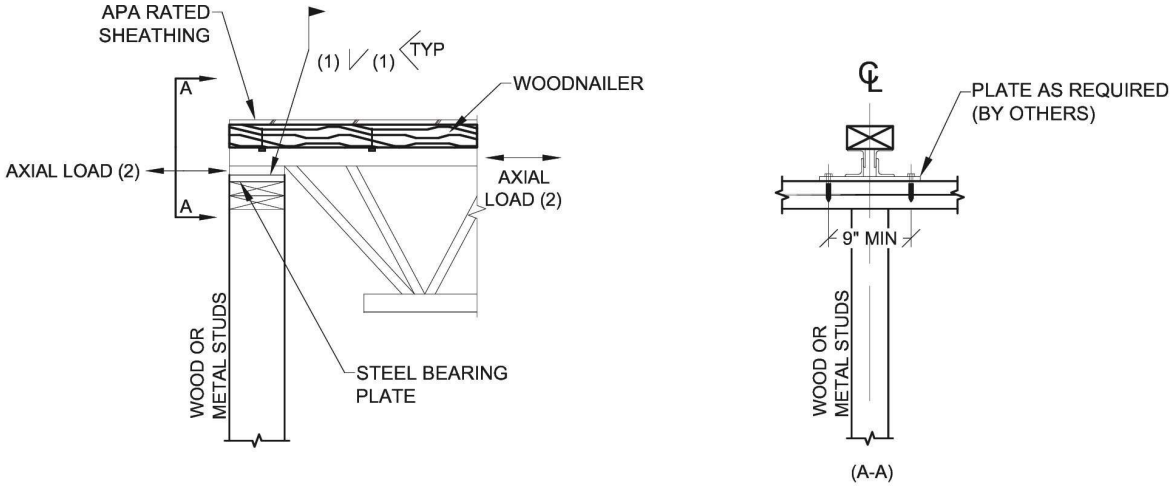


B

JOIST AT TOP OF WALL

(1) SIZE AND LENGTH TO BE PROVIDED BY ENGINEER OF RECORD.

(2) MAGNITUDE BY ENGINEER OF RECORD.
***AXIAL LOAD TRANSFERRED THROUGH JOIST SEATS MAY RESULT IN ADDITIONAL COSTS.

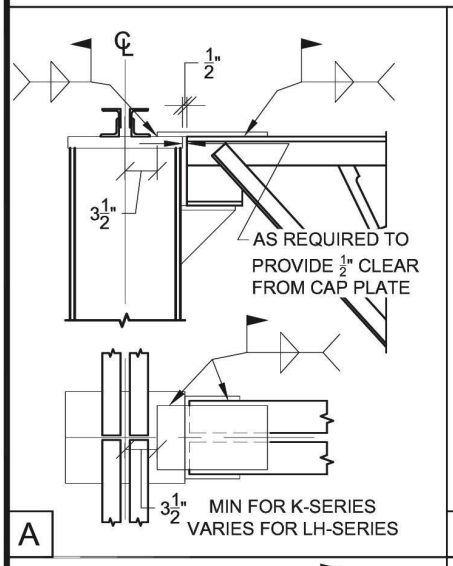
- STABILIZER PLATES, AXIAL TRANSFER MECHANISMS ARE NOT PROVIDED BY VALLEY JOIST.

WOOD NAILER JOISTS ARE AVAILABLE FROM WESTERN DIVISION ONLY

VALLEY JOIST+DECK

MOMENT CONNECTION DETAILS

BELOW ARE SIX SUGGESTED DETAILS FOR A MOMENT RESISTIVE CONNECTION INVOLVING ROOF JOIST GIRDERS. SIMILAR DETAILS SHOULD BE UTILIZED FOR LH-SERIES JOISTS WITH END MOMENTS. IN ALL CASES, THE BOTTOM CHORD IS TO BE CONNECTED TO THE COLUMN STABILIZER PLATE WHICH IS TO BE SIZED TO CARRY THE REQUIRED LOAD AND TO OBTAIN THE REQUIRED WELD. (USE MINIMUM 6 x 6 x $\frac{3}{4}$ PLATE FOR JOISTS AND JOIST GIRDERS.



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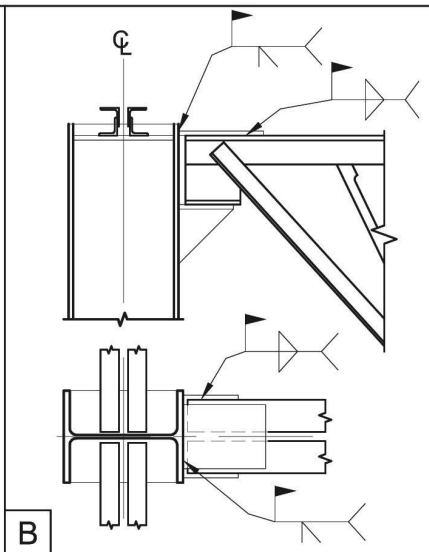

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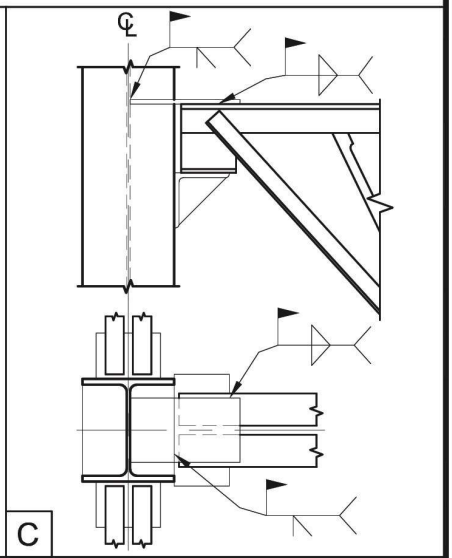

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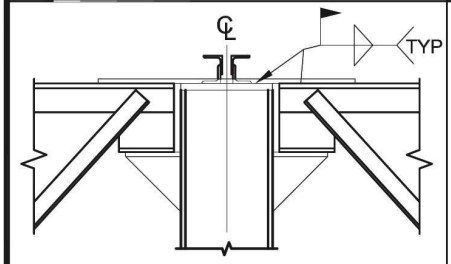

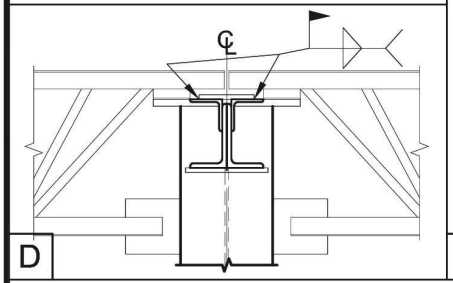

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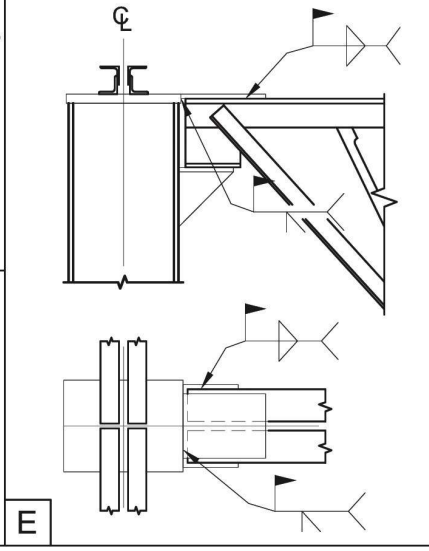

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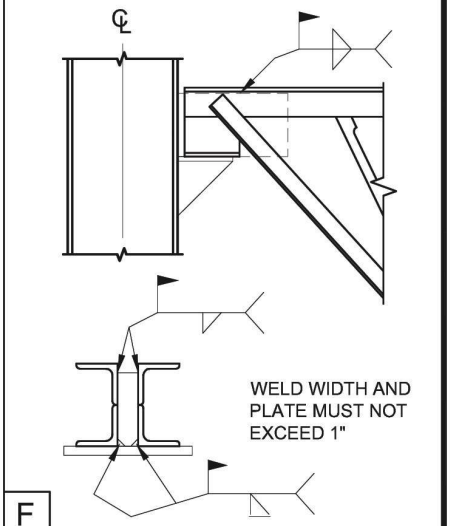


F

NOTES:

(1) CONNECTION TYPE B, C & F CAN ALSO BE USED FOR FLOOR GIRDER DETAILS.

(2) WHERE A BACKER BAR IS REQUIRED FOR GROOVE WELDS, ADDITIONAL CLEARANCE MUST BE PROVIDED WHEN DETERMINING GIRDER HOLD BACK DIMENSION.

(3) SIMILAR DETAILS WOULD APPLY AT OTHER TYPES OF COLUMS OR AT CONCRETE WALLS.

(4) ADDITIONAL STIFFENER PLATES MAY BE REQUIRED (NOT SHOWN FOR CLARITY.)

(5) IN ALL DETAILS MOMENT PLATE DESIGN AND MATERIAL IS NOT BY BALLEY JOIST.

VALLEY JOIST+DECK

CONTENTS

K-SERIES

LH- AND DLH-SERIES

STANDARD SPECIFICATIONS

JOIST GIRDERS

STANDARD SPECIFICATIONS

CODE OF STANDARD PRACTICE FOR STEEL JOISTS AND JOIST GIRDERS

GLOSSARY

APPENDICES

The following documents contained in this catalog have been approved by the American National Standards Institute (ANSI):

Standard Specification for Open Web Steel Joists, **K**-Series and Load Tables (SJI-K-2010)

Standard Specifications for Longspan Steel Joists, **LH**-Series and Deep Longspan Steel Joists, **DLH**-Series and Load Tables (SJI-LH/DLH-2010)

Standard Specifications for Joist Girders, **JG**-Series (SJI-JG-2010)

STEEL JOIST INSTITUTE

HISTORY

Formed five years after the first open web steel joist was manufactured, the Institute has worked since 1928 to maintain sound engineering practice throughout our industry. As a non-profit organization of active manufacturers, the Institute cooperates with governmental and business agencies to establish steel joist standards. Continuing research and updating are included in its work.

The first joist in 1923 was a Warren truss type, with top and bottom chords of round bars and a web formed from a single continuous bent bar. Various other types were developed, but problems also followed because each manufacturer had their own design and fabrication standards. Architects, engineers and builders found it difficult to compare rated capacities and to use fully the economies of steel joist construction.

Members of the industry began to organize the Institute, and in 1928 the first standard specifications were adopted, followed in 1929 by the first load table. The joists covered by these early standards were later identified as open web steel joists, **SJ**-Series.

Other landmark adoptions by the Institute include the following:

1953
Introduction of Longspan Steel Joists, **L**-Series. Specifications and a standard load table, covering spans through 96 feet and depths through 48 inches, were jointly approved with the American Institute of Steel Construction.

1959
Introduction of the **S**-Series Joists, which replaced the **SJ**-Series Joists. The allowable tensile stress was increased from 18,000 to 20,000 psi, joist depths were expanded through 24 inches, and spans increased through 48 feet.

1961
(a) Introduction of the **J**-Series Joists, which replaced the **S**-Series Joists. The allowable tensile stress was increased from 20,000 psi to 22,000 psi, based on the use of steel with a minimum yield strength of 36,000 psi.

(b) Introduction of the **LA**-Series Joists, which replaced the **L**-Series Joists. The **LA**-Series Joists were designed to a maximum tensile stress of either 20,000 psi or 22,000 psi, depending on the yield strength of the steel.

(c) Introduction of the **H**-Series Joists, whose design was based on steel with a minimum yield strength of 50,000 psi, and an allowable tensile stress of 30,000 psi.

1962
Introduction of the **LH**-Series Joists, utilizing steel whose minimum yield strength was between 36,000 psi and 50,000 psi and an allowable tensile strength of 22,000 psi to 30,000 psi.

1965
Development of a single specification for both the **J**- and **H**-Series Joists by the Steel Joist Institute and the American Institute of Steel Construction.

1966
Development and introduction by the SJI and AISC of the **LJ**-Series Joists, which replaced the **LA**-Series Joists. Also, the development of a single specification for both the **LJ**- and the **LH**-Series Joists, with the use of 36,000 psi minimum yield strength steel for the **LJ**-Series, and 36,000 psi to 50,000 psi minimum yield strength steel for the **LH**-Series.

1970
Introduction of the **DLJ**- and **DLH**-Series Joists to include depths through 72 inches and spans through 144 feet.

1971
Elimination of chord section number 2 and the addition of joist designations 8J3 and 8H3 to the load tables.

1972
(a) Adoption by the SJI and AISC of a single specification for the **LJ-, LH-, DLJ-,** and **DLH-**Series Joists.

(b) Adoption by the SJI and AISC of the expanded specifications and load tables for Open Web Steel Joists with increased depths through 30 inches, and spans through 60 feet, plus adding chord section numbers 9, 10, and 11.

1978
(a) Elimination of the **J-, LJ-**, and **DLJ**-Series Joists because of the widespread acceptance of high strength steel joists.

(b) Introduction of Joist Girders, complete with specifications and weight tables, in response to the growing need for longer span primary structural members with highly efficient use of steel.

1986
Introduction of the **K**-Series Joists, which replaced the **H**-Series Joists. The reasons for developing the **K**-Series Joists were: (1) to achieve greater economies by utilizing the Load Span design concept; (2) to meet the demand for roofs with lighter loads at depths from 18 inches to 30 inches; (3) to offer joists whose load carrying capacities at frequently used spans are those most commonly required; (4) to eliminate the very heavy joists in medium depths for which there was little, if any, demand.

1994

(a) Introduction of the **KCS** Joists as a part of the **K**-Series Specification in response to the need for a joist with a constant moment and constant shear. The **KCS** Joist is an economical alternative joist that may be specified for special loading situations.

(b) Addition of metric nomenclature for all Joist and Joist Girder Series in compliance with government and industry standards.

(c) Addition of revised stability criteria.

2002

(a) Introduction of Joist Substitutes, **K**-Series.

(b) **K**-Series, **LH**- and **DLH**- Series and Joist Girder Specifications approved as American National Standards (ANSI).

(c) Revisions to **K**-Series Section 6, **LH**- and **DLH**-Series Section 105, and Recommended Code of Standard Practice for conformance to OSHA Steel Erection Standard § 1926.757.

(d) Addition of Standing Seam Roof requirements to the **K**-Series Specification Section 5.8(g) and the **LH**- and **DLH**-Series Specification Section 104.9(g).

(e) Addition of Definition for Parallel Chord Sloped Joists – **K**-Series Section 5.13 and **LH**-Series Section 104.14.

2005

(a) Major revision of **K**-Series, **LH**- and **DLH**-Series and Joist Girder Specifications to allow the design of joists and Joist Girders to be either in accordance with Load and Resistance Factor Design (LRFD) or Allowable Strength Design (ASD).

(b) Major revision of **K**-Series and **LH**- and **DLH**-Series Load Tables to be in both LRFD and ASD.

(c) Expansion of Joist Girder Weight Tables to spans through 120 feet.

(d) Code of Standard Practice was renamed.

2007

Introduction of the **CJ**-Series Composite Joists, complete with specifications, weight tables and bridging tables, in response to the growing need to have a standard design specification for all member companies producing composite steel joists.

2010

(a) Expanded Range of Products

Most significant is the extension of the **DLH**-Series joist range from a maximum of 72 inches deep and 144 feet long to a maximum now of 120 inches deep and 240 feet long. In conjunction with the increased range, the standard camber for spans over 100 feet has been reduced and the **LH-/DLH**-Series Load Tables have been converted from a "Clearspan" to "Span" basis. An alternate "load/load" method of specifying Longspan joists has been introduced. Changes were also made with regard to Joist Substitutes and Top Chord Extensions.

(b) Substantial changes were made to the criteria for the spacing of bridging rows and the design of bridging. The changes make the criteria more cohesive between **K**-Series and **LH**-Series joists.

(c) A number of changes were made relative to bearing seat and end anchorage conditions, primarily incremental criteria rather than one standard for **LH-/DLH**-Series joists due to the broad range. In addition, design responsibilities are better defined and additional options for masonry bearing conditions are permitted.

(d) Several design criteria or checks that were already being performed but had not been shown in the specifications, are now included. These include node shear, girder top chord transverse bending, and weld design criteria. Based on SJI research, new criteria for crimped end angle webs have been applied.

(e) The Code of Standard Practice is updated with more discussion of the options available when specifying joist for non-uniform loads.

POLICY

The manufacturers of any standard SJI products shall be required to submit design data for verification of compliance with Steel Joist Institute Specifications, undergo physical design verification tests (on **K**-Series only), and undergo an initial plant inspection and subsequent biennial in-plant inspections for all products for which they wish to be certified.

SJI Member companies complying with the above conditions shall be licensed to publish the appropriate copyrighted SJI Specifications, Load Tables and Weight Tables.

MEMBERSHIP

Membership is open to manufacturers who produce, on a continuing basis, joists of the **K-, LH-, and DLH**-Series, and/or Joist Girders, conforming to the Institute's Specifications and Load Tables. Membership requirements differ as described below.

APPLICANTS BASED ON K-SERIES JOISTS

The Institute's Consulting Engineer checks to see that designs conform to the Institute's Specifications and Load Tables. This comprises an examination of: (1) Complete engineering design details and calculations of all **K**-Series Joists, bridging and accessories for which standards have been adopted; (2) Data obtained from physical tests of a limited number of joists, conducted by an independent laboratory, to verify conclusions from analysis of the applicant's engineering design details and calculations.

An initial plant inspection and subsequent biennial inspections are required to ensure that the applicant/member possesses the facilities, equipment and personnel required to properly manufacture the **K**-Series Joists.

APPLICANTS BASED ON LH- OR DLH-SERIES JOISTS OR JOIST GIRDERS

Designs are checked by the Consulting Engineer. Biennial in-plant inspections (but no physical tests) are required.

RESPONSIBILITY FOR PRODUCT QUALITY

The plant inspections are not a guarantee of the quality of any specific joists or Joist Girders; this responsibility lies fully and solely with the individual manufacturer.

SERVICES TO NONMEMBERS

The Institute's facilities for checking the design of **K-**, **LH-**, and **DLH**-Series Joists or Joist Girders are available on a cost basis.

The Steel Joist Institute does not check joist designs for specific construction projects. Manufacturing to Institute Specifications is the responsibility of the individual manufacturer.

STEEL JOIST INSTITUTE PUBLICATION

Visit the SJI Web Site at <www.steeljoist.org> for a complete listing of SJI publications and a copy of the standard order form. Also, be sure to check the website for upcoming Education opportunities in your area.

A. Catalog of Standard Specifications, Load Tables and Weight Tables and Code of Standard Practice for Steel Joists and Joist Girders

B. Catalog of Standard Specifications for Composite Steel Joists, Weight Tables, Bridging Tables and Code of Standard Practice (**CJ**-Series)

C. The following **TECHNICAL DIGESTS** are also available from the Institute:

No. 3 Structural Design of Steel Joist Roofs to Resist Ponding Loads (2007)
No. 5 Vibration of Steel Joist - Concrete Slab Floors (1988)
No. 6 Structural Design of Steel Joist Roofs to Resist Uplift Loads (2011)
No. 8 Welding of Open Web Steel Joists (2008)
No. 9 Handling and Erection of Steel Joists and Joist Girders (2008)
No. 10 Design of Fire Resistive Assemblies (2003)
No. 11 Design of Joist Girder Frames (2007)
No. 12 Evaluation and Modification of Open Web Steel Joists and Joist Girders (2007)

D. 80-Year CD Open Web Steel Joist Construction (1928-2008)

E. Vibration Computer Program (upcoming in 2011)

F. SJI DVD – Design of Open Web Steel Joists (2010)

G. SJI Video No. 2 – The Safe Erection of Steel Joists and Joist Girders (2001)

INTRODUCTION TO K-SERIES

Open Web Steel Joists, **K**-Series, were primarily developed to provide structural support for floors and roofs of buildings. They possess the following advantages and features which have resulted in their wide use and acceptance throughout the United States and other countries.

First and foremost, they are economical. For many types of buildings, no other products or methods for supporting floors and roofs can compete with steel joists. The advantages listed in the following paragraphs all contribute to the overall economy of using Open Web Steel Joists.

K-Series are light in weight – they possess an exceptionally high strength-to-weight ratio in comparison with other building materials. Coupled with their low price per pound, they contribute significantly to lower building costs. An additional economy stemming from their light weight is the fact that the structural materials supporting the joists, such as beams and Joist Girders, columns, and the foundations themselves, can therefore be lighter, thus leading to even greater economies.

Open Web Steel Joists represent unitized construction. Upon arrival at the job site, the joists are ready immediately for proper installation. No forming, pouring, curing, or stripping is required. Furthermore, their light weight makes the erection procedure simple and fast.

K-Series Joists are standardized regarding depths, spans, and load-carrying capacities. There are 63 separate designations in the Load Tables, representing joist depths from 10 inches (254 mm) through 30 inches (762 mm) in 2 inch (51 mm) increments and spans through 60 feet (18,288 mm). Standard **K**-Series Joists have a 2 1/2 inch (64 mm) end bearing depth so that, regardless of the overall joist depths, the tops of the joists lie in the same plane. Seat depths deeper than 2 ½" (64 mm) can also be specified.

The open webs in the joists permit the ready passage and concealment of pipes, ducts and electric conduits within the depth of the floor. In high rise buildings this can result in a reduced overall building height, which translates into considerable cost savings. As soon as the joists are erected and bridged, with ends properly attached, a working platform is available for the immediate follow-up of allied trades; this allows field work to progress rapidly and efficiently.

In combination with other materials, joists can provide fire resistive assemblies for both floors and roofs of buildings for nearly any hourly rating required. Appendix A, Fire Resistance Ratings, provides detailed information on this subject.

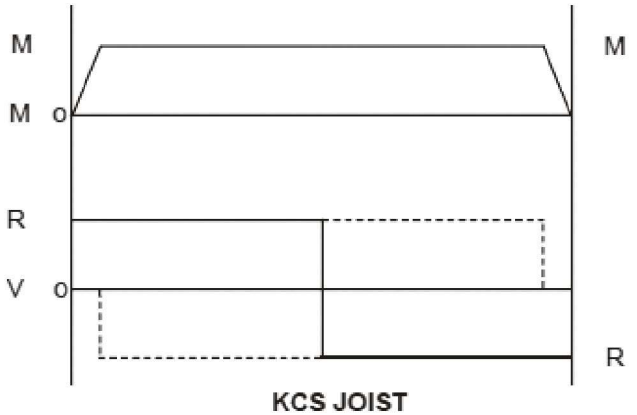
There are no restrictions on the types, sizes or heights of buildings in which joists can be used. They can be found in the roof of the neighborhood convenience store as well as in your local Lowe's, Home Depot, discount club, K-Mart, Target or Walmart.

Standard **K**-Series Joists are designed for simple span uniform loading which results in a parabolic moment diagram for chord forces and a linearly sloped shear diagram for web forces. When non-uniform and/or concentrated loads are encountered the shear and moment diagrams required may be shaped quite differently and may not be covered by the shear and moment design envelopes of a standard **K**-Series Joist. When conditions such as this arise, a **KCS**-Series (**K**-Series **C**onstant **S**hear) joist may be a good option. **KCS**-Series Joists are designed in accordance with the Standard Specification for **K**-Series Joists with a few unique advantages.

KCS- Series joist advantages:

1. Provides a versatile **K**-Series Joist that can be easily specified to support uniform and non-uniform loads plus concentrated loads applied at panel points.
2. Eliminate many repetitive load diagrams required on contract documents and allow some flexibility of load locations.

KCS-Series joist chords are designed for a flat positive moment envelope. The moment capacity is constant at all interior panels. All webs are designed for a vertical shear equal to the specified shear capacity and interior webs will be designed for 100% stress reversal.



KCS JOIST
SHEAR AND MOMENT ENVELOPES

Both LRFD and ASD **KCS**-Series joist load tables list the shear and moment capacity of each joist. The selection of a **KCS**-Series Joist requires the specifying professional to calculate the maximum moment and shear imposed and select the appropriate **KCS**- Series Joist.

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.

INTRODUCTION TO LH - and DLH - SERIES

Longspan and Deep Longspan Steel Joists are relatively light weight shop-manufactured steel trusses. Longspan Steel Joists are used in the direct support of floor or roof slabs or decks between walls, beams, and main structural members. Deep Longspan Steel Joists are used for the direct support of roof slabs or decks between walls, beams, and main structural members.

The **LH**- and **DLH**-Series have been designed for the purpose of extending the use of joists to spans and loads in excess of those covered by Open Web Steel Joists, **K**-Series.

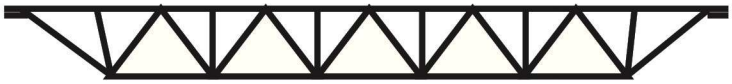
Longspan Series Joists have been standardized in depths from 18 inches (457 mm) through 48 inches (1219 mm), for spans through 96 feet (29,260 mm).

Deep Longspan Series Joists have been standardized in depths from 52 inches (1321 mm) through 120 inches (3048 mm), for spans up through 240 feet (73,152 mm).

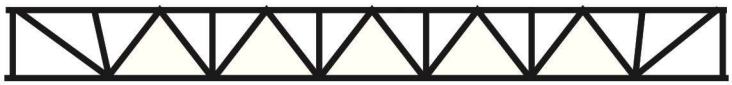
Longspan and Deep Longspan Steel Joists can be furnished with either under-slung or square ends, with parallel chords or with single or double pitched top chords to provide sufficient slope for roof drainage. Square end joists are primarily intended for bottom chord bearing.
Sloped parallel-chord joists shall use span as defined by the length along the slope. The joist designation is determined by its nominal depth at the center of the span and by the chord size designation.

The depth of the bearing seat at the ends of underslung **LH**- and **DLH**-Series Longspan Joists has been established at 5 inches (127 mm) for chord section number 2 through 17. A bearing seat depth of 7 1/2 inches (191 mm) has been established for the DLH Series chord section number 18 through 25.

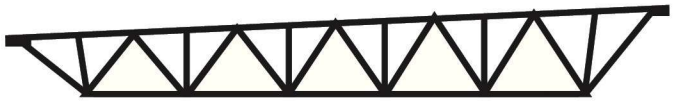
All Longspan and Deep Longspan Steel Joists are manufactured with standardized camber as given in Table 103.6-1. For the proper handling of concentrated and/or varying loads, see Section 2.3 in the Code of Standard Practice for Steel Joists and Joist Girders.



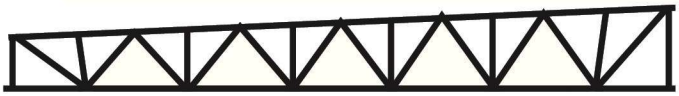
Parallel Chords, Underslung



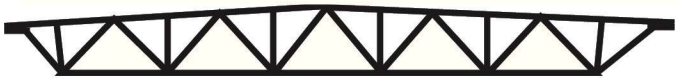
Parallel Chords, Square Ends



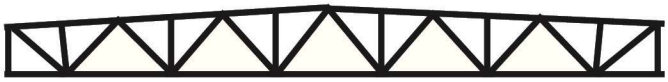
Top Chord Pitched One Way, Underslung



Top Chord Pitched One Way, Square Ends



Top Chord Pitched Two Ways, Underslung



Top Chord Pitched Two Ways, Square Ends

The illustrations above show Longspan and Deep Longspan Steel Joists with modified WARREN type web systems. However, the web systems may be any type, whichever is standard with the manufacturer furnishing the product.

INTRODUCTION TO CJ-SERIES

Open Web Composite Steel Joists, **CJ**-Series, were developed to provide structural support for floors and roofs which incorporate an overlying concrete slab while also allowing the steel joist and slab to act together as an integral unit after the concrete has adequately cured.

The **CJ**-Series Joists are capable of supporting larger floor or roof loadings due to the attachment of the concrete slab to the top chord of the composite joist. Shear connection between the concrete slab and steel joist is typically made by the welding of shear studs thru the steel deck to the underlying **CJ**-Series Composite Steel Joist.

CJ-Series joists can provide an economical alternative to **K-**, **KCS-**, or **LH**-Series joists when taking into account overall costs. Some potential advantages may include those listed below:

1. Reductions in overall floor to floor height of the structure.
2. Maximum span-to-depth ratios of 30 permit the use of shallower joists for any given span.
3. Efficient composite design makes it possible to span greater distances. This results in larger column spacing, thus increasing the rental value of floor space.
4. Composite Steel Joists can be more efficient than other series dependent on loading and span due to a potential reduction in the joist weight for any given joist depth. Lighter weight joists translate into potentially lighter weight columns and reduced foundation costs.
5. Live load deflections are significantly reduced. With the overlying concrete slab locked to the steel joist, the resulting composite action provides a stiffer floor system.
6. Efficient erection of the **CJ**-Series joist system reduces construction time and permits early occupancy of the building. Wider joist spacing reduces the number of joists to be erected and fireproofed.

The composite joist designation is determined by its nominal depth, the letters "**CJ**", followed by the total uniform composite load, uniform composite live load, and finally the uniform composite dead load. Composite Steel Joists are furnished with parallel chords with either under-slung or square ends and act as pinned-pinned members. For specifications, load tables, and additional information to determine if **CJ**-Series may be suitable for your project, please refer to the latest edition of the *Steel Joist Institute Standard Specifications for Composite Steel Joists*.

INTRODUCTION TO JOIST GIRDERS

Joist Girders are open web steel trusses used as primary framing members. They are designed as simple spans supporting equally spaced concentrated loads for a floor or roof system. These concentrated loads are considered to act at the panel points of the Joist Girders. Joist Girders have been designed to allow for a growing need for longer span primary members, coupled with a need for more efficient steel usage.

These members have been standardized in the LRFD and ASD Weight Tables for depths from 20 inches (508 mm) to 120 inches (3048 mm), and spans to 120 feet (36,576 mm). Standardized camber is as shown in Table 1003.6-1 of the Specifications. Joist Girders are furnished with underslung ends and bottom chord extensions. The standard depth at the bearing ends has been established at 7 1/2 inches (191 mm) for all Joist Girders. Joist Girders are usually attached to the columns by bolting with two 3/4 inch diameter (19 mm) A325 bolts. A loose connection of the bottom chord to the column or other support is recommended during erection in order to stabilize the bottom chord laterally and to help brace the Joist Girder against possible overturning. A vertical stabilizer plate shall be provided on each column for the bottom chord of the Joist Girder. The stabilizer plate shall be furnished by other than the joist manufacturer.

"CAUTION": If a rigid connection of the bottom chord is to be made to the column or other support, it shall be made only after the application of the dead loads. The Joist Girder is then no longer simply supported and the system must be investigated for

continuous frame action by the specifying professional*. Bearing details of joists on perimeter Joist Girders, or interior Joist Girders with unbalanced loads, should be designed such that the joist reactions pass through the centroid of the Joist Girder.

The Weight Tables list the approximate weight in pounds per linear foot (kilograms per meter) for a Joist Girder supporting the concentrated panel point loads shown. Please note that the weight of the Joist Girder must be included in the panel point load (See Code of Standard Practice for Steel Joists and Joist Girders, Section 2.3 for examples).

For calculating the approximate deflection or checking for ponding, the following formulas in U. S. Customary Units and Metric Units may be used in determining the approximate moment of inertia of a Joist Girder.

I_{JG} = 0.027 NPLd: where N = number of joist spaces;

P = Total panel point load in kips (unfactored); L = Joist Girder length in feet; and d = effective depth of the Joist Girder in inches, or,

I_{JG} = 0.3296 NPLd: where N = number of joist spaces;

P = Total panel point load in kiloNewtons (unfactored); L = Joist Girder length in millimeters and d = effective depth of the Joist Girder in millimeters.

The Joist Girder manufacturer should be contacted when a more exact Joist Girder moment of inertia must be known.

* For further reference, refer to Steel Joist Institute Technical Digest Number 11, “Design of Joist Girder Frames”.

END ANCHORAGE FOR UPLIFT

For wind uplift conditions it is the responsibility of the **specifying professional** to specify the wind uplift forces and the attachment of the joist or Joist Girder seat to the supporting element. It is the responsibility of the joist manufacturer to design the joist seat for the specified uplift. See Section 6.1(b) of the SJI Code of Standard Practice.

Welded Anchorage

The strength of the joist bearing seat for an uplift loading combination is a function of both the joist seat thickness and length of the end anchorage welds. The minimum end anchorage welds from the SJI Specifications may not develop the full capacity of the joist seat assembly for the specified uplift resistance. Where appropriate, a longer end anchorage weld length aids the joist manufacturer in providing an economical design of the joist bearing seat. The joist manufacturer will provide a seat of sufficient thickness and strength to resist the specified uplift end reaction.

To aid in the design and efficiency of the joist bearing seat, it is suggested that the minimum weld lengths of the Specification be increased by one inch whenever there is a net uplift load case, and there is sufficient bearing length to place the longer weld.
For a **K**-Series joist, the minimum weld size and length is (2) 1/8" x 2" long, and the minimum required bearing length (on steel) is 2-1/2". Where uplift is present and the bearing length is at least 3", specifying a one inch longer anchorage weld, (2) 1/8" x 3", will allow the joist manufacturer to engage more of the seat length for uplift resistance and provide a more economical seat design. For an **LH/DLH**-Series joist, SJI recommends the same as **K**-Series, to increase the weld length by 1". The minimum bearing lengths for **LH/DLH-** joists are such that there should be sufficient bearing length for the longer weld. Table 1 below demonstrates these suggestions.

TABLE 1

JOIST SERIES and SECTION NUMBER	MINIMUM FILLET WELD	SUGGESTED INCREASED WELD LENGTH
K-Series	(2) 1/8" x 2"	(2) 1/8" x 3" *
LH-Series, 02-06	(2) 3/16" x 2"	(2) 3/16" x 3"
LH/DLH-Series, 07-17	(2) 1/4" x 2"	(2) 1/4" x 3"
DLH-Series, 18-25	(2) 1/4" x 4"	

* The minimum bearing length on steel for K-Series joists is 2 1/2", so weld length should be increased only where bearing length is available.

Bolted Anchorage

Typically, joists and Joist Girders with bolted end anchorage also require a final connection by welding in order to provide lateral stability to the supporting member. However, only the bolts are relied on to provide uplift anchorage. The bolt type and diameter designated by the **specifying professional** shall provide sufficient tensile strength to resist the specified uplift end reaction. Higher strength bolts than the minimums required by the SJI Specification may be required.

If the bearing seats are detailed for a bolted connection, bolts shall be installed. If the bolts are not installed, an equivalent welded connection may be permitted by the **specifying professional**, provided the weld is deposited in the slot on the side farthest from the edge of the seat. Additional weld required to meet that specified for the welded connection shall be placed at a location on the seat away from the outer edge of the slot as shown in Figure 1.

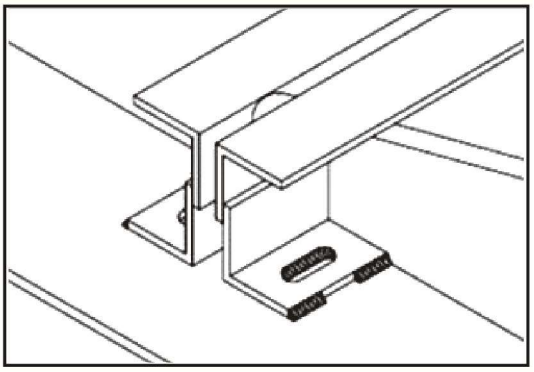


Figure 1

For additional information on uplift, see SJI Technical Digest 6.

JOIST MOMENT OF INERTIA AND DEFLECTION

The moment of inertia of **K-**Series and **LH/DLH-** series joists in the load table can be estimated using the following equations:

$I_J = 26.767\ (W)\ (L^3)\ (10^{-6})$ ASD, US Customary Units with W in plf and L = Span – 0.33 in feet

$I_J = 2.6953\ (W)\ (L^3)\ (10^{-5})$ ASD, Metric Units with W in kN/m and L = Span -102 in mm

The equations shown above provide an approximate "gross" moment of inertia, not including the effects of shear deformation. An open web steel joist can be expected to have approximately 15 percent more deformation than a solid web member. When a conventional beam formula is used to calculate joist deflection, a factor of 1.15 should be applied to account for the web shear deformation.

Example:

Find the Inertia for a 24K7 @ 40'-0":

SJI tables 253 / 148

$I_J = 26.767\ (W)\ (L^3)\ (10^{-6})$ where W = RED figure in the Load Table and L = (Span - 0.33) in feet.

$I_J = 26.767(148)\ (40 - 0.33)^3(10^{-6}) = 247\ in^4$

Compute Joist Deflection:

Increase deflection 15% to account for shear deformation in webs.

$(1.15)(5WL^4/384EI)$

$(1.15)(5)(148/12)\ [(40 - 0.33) \times 12)]^4\ /\ [(384)(29 \times 10^{-6})\ (247)] = 1.32"$

Verify the RED number represents the joist loading that produces L/360 deflection

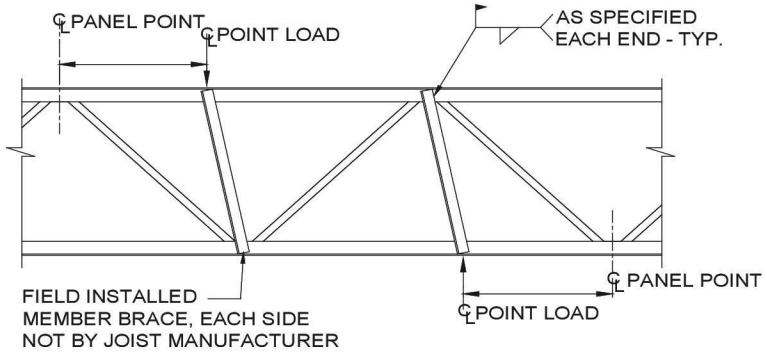
$L/360 = (40 - 0.33) \times 12/360 = 1.32"$

The 15 percent approximation also applies to the deflection equations when using the Joist Girder moment of Inertia equations.

For a Load/Load **LH-**Series joist type, the Weight Table includes an estimated moment of inertia value, so an equation is not needed for approximation.

CONCENTRATED LOADS AT JOIST CHORDS

TYPICAL JOIST REINFORCEMENT AT CONCENTRATED LOADS



For nominal concentrated loads between panel points, which have been accounted for in the specified uniform design loads, a "strut" to transfer the load to a panel point on the opposite chord shall not be required, provided the sum of the concentrated loads within a chord panel does not exceed 100 pounds and the attachments are concentric to the chord.

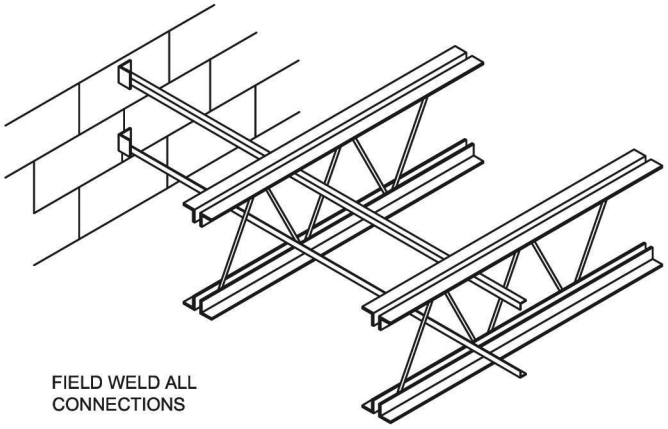
Although standard **K**-Series, including **KCS**-Series, and standard **LH**-Series joists are designed specifically to support uniformly distributed loads applied to the top chord, research conducted by the Steel Joist Institute, using second-order inelastic analysis, has demonstrated that the localized accumulation of uniform design loads of up to 100 pounds within any top or bottom chord panel has a negligible effect on the overall performance of the joist, provided that the load is applied to both chord angles in a manner which does not induce torsion on the chords.

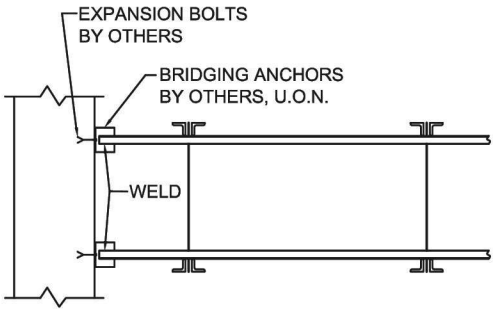
Concentrated loads in excess of 100 pounds or which do not meet the criteria outlined above must be applied at joist panel points or field strut members must be utilized as shown in the detail above.

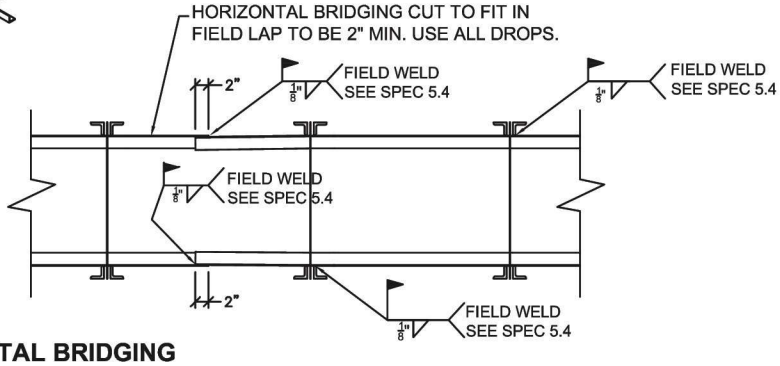
Joist manufacturers can provide a specially designed joist with the capability to take point loads without the added members if this requirement and the exact location and magnitude of the loads are shown on the contract drawings. Also, the manufacturer can consider the worst case for both the shear and bending moment for a traveling load with no specific location. When a traveling load is specified, the contract drawings should indicate whether the load is to be applied at the top or bottom chord, and at any panel point, or at any point with the local bending effects considered. For additional information see SJI Code of Standard Practice, Section 2.3 – Specifying Design Loads.

ACCESSORIES AND DETAILS

K-SERIES BRIDGING DETAILS

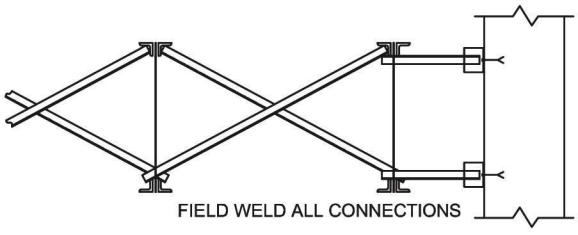






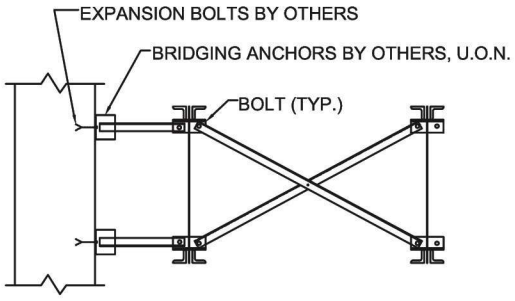
HORIZONTAL BRIDGING
SEE SJI SPECIFICATIONS

NOTE: DO NOT WELD BRIDGING TO JOIST WEB MEMBERS. DO NOT HANG ANY MECHANICAL, ELECTRICAL, ETC. FROM BRIDGING.



WELDED CROSS BRIDGING SEE SJI SPECIFICATIONS

HORIZONTAL BRIDGING SHALL BE USED IN SPACE ADJACENT TO THE WALL TO ALLOW FOR PROPER DEFLECTION OF THE JOIST NEAREST WALL.



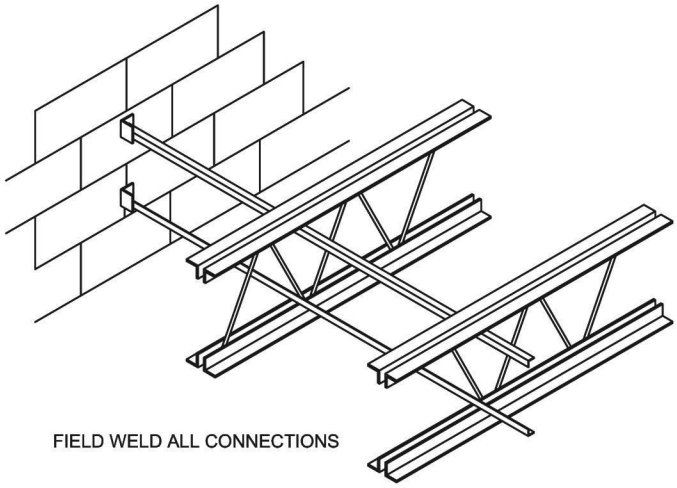
BOLTED CROSS BRIDGING SEE SJI SPECIFICATIONS

(a) HORIZONTAL BRIDGING UNITS SHALL BE USED IN THE SPACE ADJACENT TO THE WALL TO ALLOW FOR PROPER DEFLECTION OF THE JOIST NEAREST THE WALL.

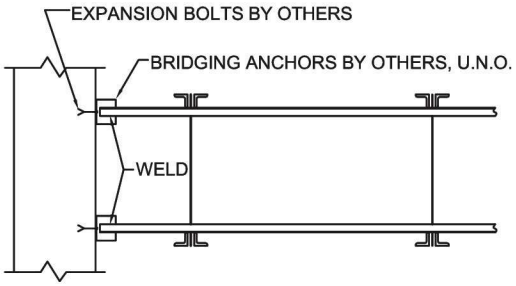
(b) FOR REQUIRED BOLT SIZE REFER TO BRIDGING TABLE.
NOTE: CLIP CONFIGURATION MAY VARY FROM THAT SHOWN.

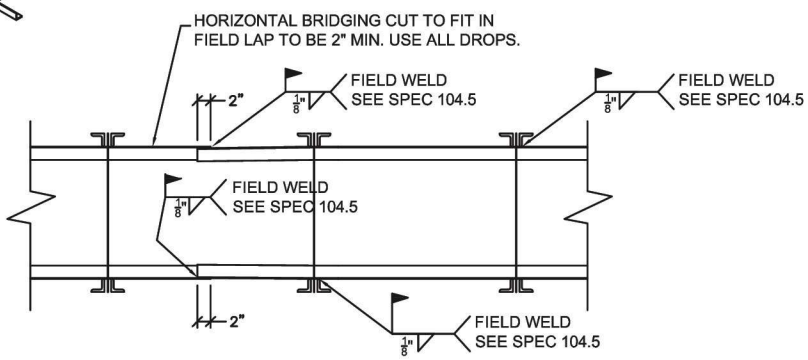
ACCESSORIES AND DETAILS

LH- AND DLH-SERIES BRIDGING DETAILS



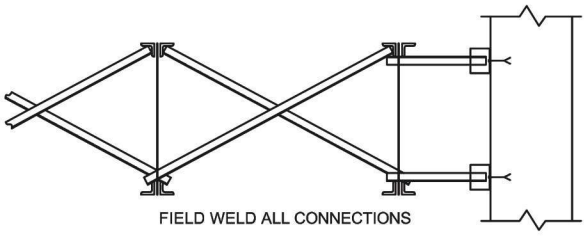
FIELD WELD ALL CONNECTIONS





HORIZONTAL BRIDGING
SEE SJI SPECIFICATIONS

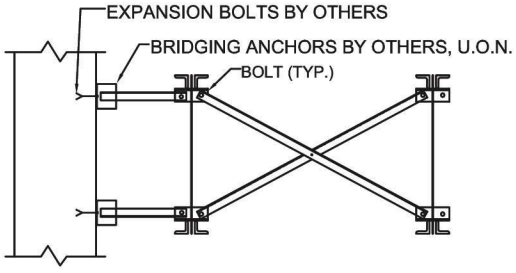
NOTE: DO NOT WELD BRIDGING TO WEB MEMBERS. DO NOT HANG ANY MECHANICAL, ELECTRICAL, ETC. FROM BRIDGING.



FIELD WELD ALL CONNECTIONS

WELDED CROSS BRIDGING
SEE SJI SPECIFICATIONS

HORIZONTAL BRIDGING SHALL BE USED IN SPACE ADJACENT TO THE WALL TO ALLOW FOR PROPER DEFLECTION OF THE JOIST NEAREST WALL.



BOLTED CROSS BRIDGING SEE SJI SPECIFICATIONS

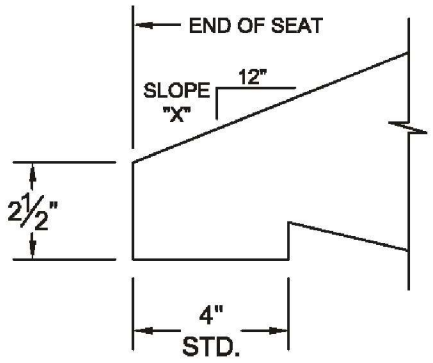
(a) HORIZONTAL BRIDGING UNITS SHALL BE USED IN THE SPACE ADJACENT TO THE WALL TO ALLOW FOR PROPER DEFLECTION OF THE JOIST NEAREST THE WALL.

(b) FOR REQUIRED BOLT SIZE REFER TO BRIDGING TABLE. NOTE: CLIP CONFIGURATION MAY VARY FROM THAT SHOWN.

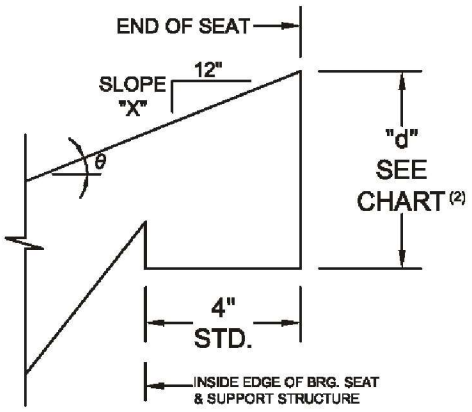
ACCESSORIES AND DETAILS

SLOPED SEAT REQUIRMENTS FOR SLOPES 3/8":12 AND GREATER
K-SERIES OPEN WEB STEEL JOISTS

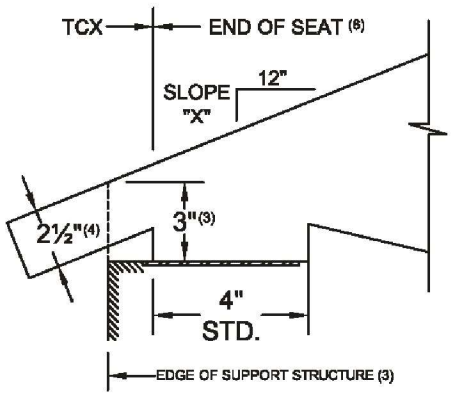
LOW END W/OUT TOP CHORD EXTENSIONS



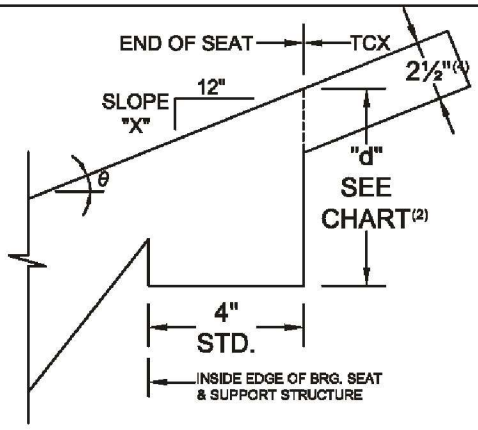
HIGH END W/OUT TOP CHORD EXTENSIONS



LOW END W/ TOP CHORD EXTENSIONS



HIGH END W/ TOP CHORD EXTENSIONS



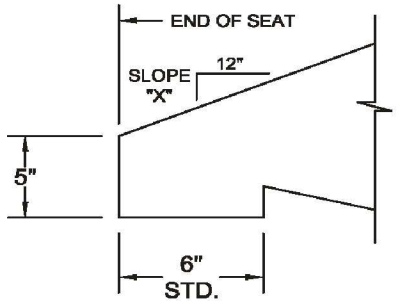
SLOPE "X":12	MINIMUM HIGH END SEAT DEPTH "d"
3/8	3 1/2
1/2	3 1/2
1	3 1/2
1 1/2	4
2	4
2 1/2	4
3	4 1/2
3 1/2	4 1/2
4	4 1/2
4 1/2	5
5	5
5 1/2	5 1/2
6	5 1/2
SEE NOTE (2) FOR SLOPE RATES GREATER THAN 6:12	

Notes:
(1) Depths shown are the minimum required for manufacturing of sloped seats. Depths may vary depending on actual bearing conditions.
(2) $d = 1/2 + 2.5/\cos\theta + 4\tan\theta$ (Rounded up to the nearest 1/2".)
(3) Clearance must be checked at outer edge of support. Increase bearing depths as required to allow passage of 2 1/2" deep extension.
(4) If extension depth greater than 2 1/2" is required, increase bearing depths accordingly.
(5) If slope is 1/4 : 12 or less, sloped seats are not required.
(6) Required bearing seat depth is determined at END OF SEAT.
(7) Also refer to SJI Specification 5.3(a) for special considerations of joist end reaction location.

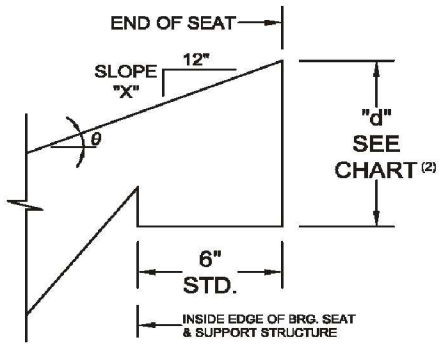
ACCESSORIES AND DETAILS

SLOPED SEAT REQUIRMENTS FOR SLOPES 3/8":12 AND GREATER
LH- AND DLH-SERIES OPEN WEB STEEL JOISTS

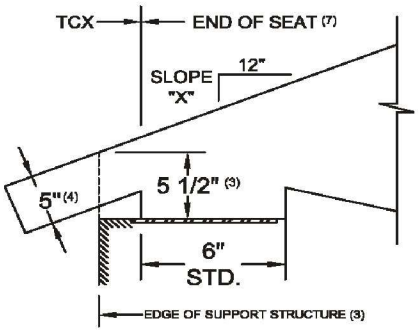
LOW END W/OUT TOP CHORD EXTENSIONS



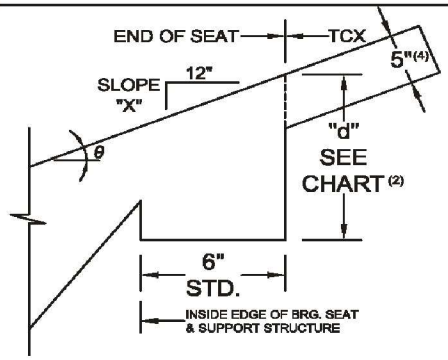
HIGH END W/OUT TOP CHORD EXTENSIONS



LOW END W/ TOP CHORD EXTENSIONS



HIGH END W/ TOP CHORD EXTENSIONS

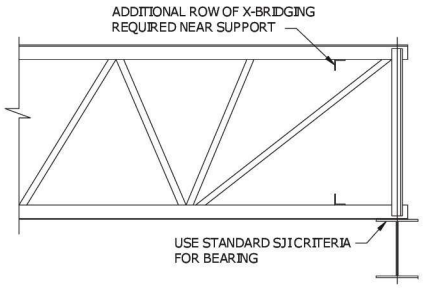


SLOPE "X" : 12	MINIMUM HIGH END SEAT DEPTH "d"
3/8	6
1/2	6
1	6 1/2
1 1/2	6 1/2
2	7
2 1/2	7
3	7 1/2
3 1/2	7 1/2
4	8
4 1/2	8 1/2
5	8 1/2
5 1/2	9
6	9 1/2
SEE NOTE (2) FOR SLOPE RATES GREATER THAN 6:12	

Notes:
(1) Depths shown are the minimum required for manufacturing of sloped seats. Depth may vary depending on actual bearing condition.
(2) $d = 1/2 + 5 / \cos\theta + 6 \tan\theta$
(3) Clearance must be checked at outer edge of support. Increase bearing seat depth as required to allow passage of 5" deep extension.
(4) If extension depth greater than 5" is required, increase bearing depths accordingly.
(5) Add 2 1/2" to seat depth at 18 thru 25 chord section numbers. Consult with joist manufacturer for information when TCXs are present.
(6) If slope is 1/4 : 12 or less, sloped seats may not required.
(7) Required bearing seat depth shall be determined at END OF SEAT.
(8) Also refer to SJI Specification 104.4(a) for special considerations of joist end reaction location.

ACCESSORIES AND DETAILS

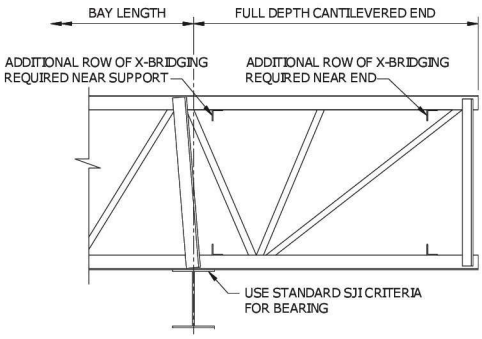
SQUARE ENDED, BOTTOM BEARING



Whenever joists are bottom chord bearing, diagonal cross bridging must be installed from joist to joist at or near the bearing location to provide additional lateral erection stability.

Note: Joist configuration and member size may vary

CANTILEVERED, BOTTOM BEARING SQUARE END



The weight of walls, signage, fascia, etc. supported at the end of a cantilever square end must be shown on the contract drawings to be properly considered in the joist design.

Note: Joist configuration and member size may vary.

ACCESSORIES AND DETAILS

APPROXIMATE DUCT OPENING SIZES

JOIST DEPTH	ROUND	SQUARE	RECTANGLE
10 INCHES	5 INCHES	4 x 4 INCHES	3 x 7 INCHES
12 INCHES	7 INCHES	5 x 5 INCHES	3 X 8 INCHES
14 INCHES	8 INCHES	6 X 6 INCHES	5 X 9 INCHES
16 INCHES	8 INCHES	6 X 6 INCHES	5 X 9 INCHES
18 INCHES	9 INCHES	7 X 7 INCHES	5 X 9 INCHES
20 INCHES	10 INCHES	8 X 8 INCHES	6 X 11 INCHES
22 INCHES	10 INCHES	9 X 9 INCHES	7 X 11 INCHES
24 INCHES	12 INCHES	10 X 10 INCHES	7 X 13 INCHES
28 INCHES	15 INCHES*	12 X 12 INCHES*	9 X 18 INCHES*
28 INCHES	16 INCHES*	13 X 13 INCHES*	9 X 18 INCHES*
30 INCHES	17 INCHES*	14 X 14 INCHES*	10 X 18 INCHES*

SPECIFYING PROFESSIONAL MUST INDICATE ON STRUCTURAL DRAWINGS SIZE AND LOCATION OF ANY DUCT THAT IS TO PASS THRU JOIST. THIS DOES NOT INCLUDE ANY FIREPROOFING ATTACHED TO JOIST. FOR DEEPER LH- AND DLH- SERIES JOISTS, CONSULT MANUFACTURER.

***FOR ROD WEB CONFIGURATION, THESE WILL BE REDUCED. CONSULT MANUFACTURER.**

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 DEFINITIONS

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 of 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, 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 (2011), *Structural Design of Steel Joist Roofs to Resist Uplift Loads*

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

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

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

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

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

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

SECTION 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)

$$\text{Design Stress} = 0.9F_y \text{ (LRFD)} \quad (4.2\text{-}1)$$

$$\text{Allowable Stress} = 0.6F_y \text{ (ASD)} \quad (4.2\text{-}2)$$

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

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

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

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

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

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

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

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: $F_n = F_y$

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

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

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

$$\text{Design Stress} = \phi_b F_n = 1.45F_y \text{ (LRFD)} \quad (4.2\text{-}12)$$

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

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

$$\text{Design Stress} = \phi_b F_n = 1.35F_y \text{ (LRFD)} \quad (4.2\text{-}14)$$

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

(d) Weld Strength:

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

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

LRFD: $\phi_w = 0.75$

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

ASD: $\Omega_w = 2.0$

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

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:

$$T \text{ (inches)} = 0.12D + 0.11 \quad (4.2\text{-}19)$$

Where: D = web diameter, inches

or,

$$T \text{ (mm)} = 0.12D + 2.8 \quad (4.2\text{-}20)$$

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) $\quad \Omega_t = \Omega_c = 1.67$ (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:

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

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

or,

$$r_y \geq \ell_{br} / 170 \qquad (4.4\text{-}2)$$

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:

$$f_{au} + f_{bu} \leq 0.9 F_y \qquad (4.4\text{-}3)$$

at the mid panel:

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

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

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

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

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:

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

at the mid panel:

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

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

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 = $(1/2)\left(f_t^2 + 4f_v^2\right)^{1/2}$
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.

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

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

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

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

Where: E = Modulus of Elasticity of steel = 29,000 ksi (200,000 MPa) and $\frac{\ell_{brmax}}{r_y}$ 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 $0.001nP + 0.004\ P\sqrt{n} \geq 0.0025nP$, 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].

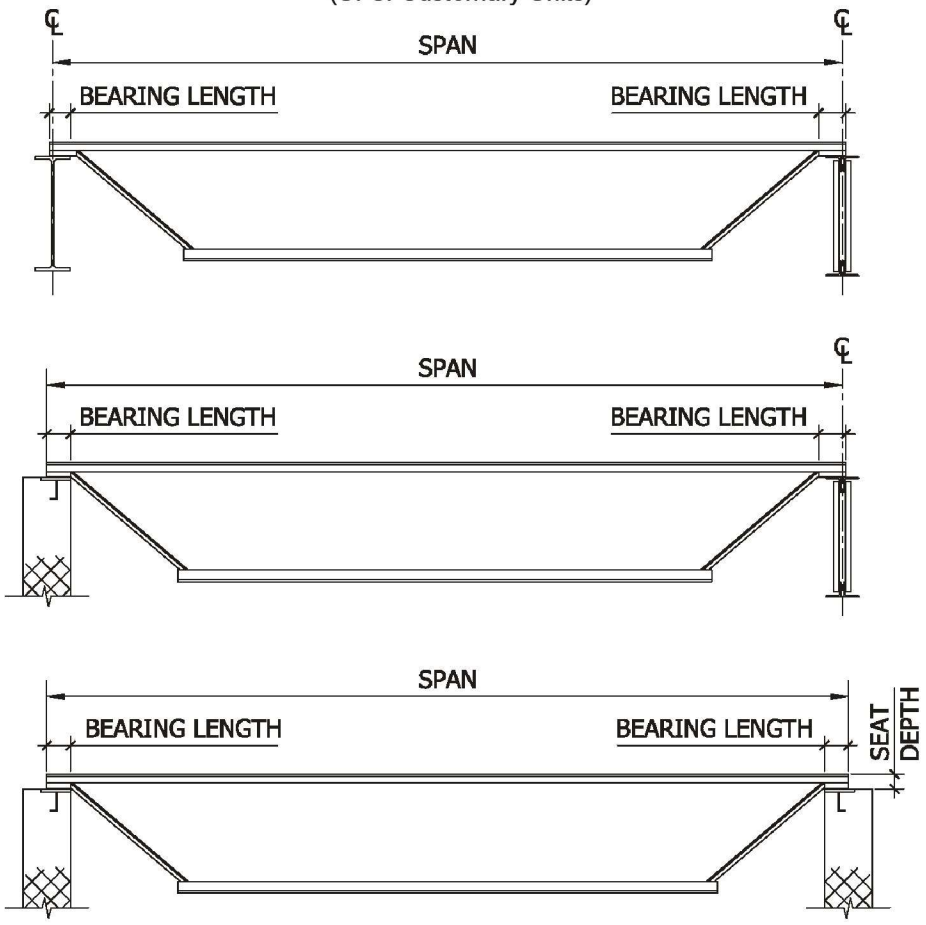
*For a thorough coverage of this topic, refer to SJI Technical Digest 9, "Handling and Erection of Steel Joists and Joist Girders."

[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.**

American National Standard SJI-K-2010

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

American National Standard SJI K-2010

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.

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

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

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

ECONOMY LOAD TABLES

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 tables on the following pages are provided as an aid to the designer in selecting the most economical **K-**Series Joists for the loads and spans required. Although considerable care has been taken in developing this chart, it must be realized that each joist manufacturer has his own unique cost; consequently, the Steel Joist Institute cannot guaranty the accuracy of this Table.

The **K-**Series Joists are arranged in accordance with their weight per foot; where two or more joists weigh the same, they are arranged according to their depth.

To utilize these tables, determine the span (ft) and load (plf) required; go to the required span in the left hand column, then read across until a load equal to or greater than the required load is reached. The first joist that satisfies this loading is the most economical joist for those conditions. If this joist is too deep or too shallow, or does not satisfy the deflection limitations, continue on horizontally to the right until a joist is found that satisfies the depth requirements as well as the load and deflection requirements.

ASD EXAMPLE:

Floor joists @ 2'-6" on center, supporting a structural concrete slab. (Section 5.9 of the **K-**Series Specifications limits the deflection due to the design live load to 1/360 of the span).

Span = 30'- 0"

Maximum joist depth allowed = 20”

DL = 48 psf (includes joist weight)
LL = 100 psf
TL = 148 psf

W_{TL} = 148 x 2.5 = 370 plf
W_{LL} = 100 x 2.5 = 250 plf

A 22K6 at a span of 30 feet can carry 371 plf of Total Load and possesses a RED figure of 266 plf (RED figure load produces a deflection of approximately 1/360 of span). However, it exceeds the maximum depth limitation of 20 inches. A 20K7 fulfills the Total Load requirement but possesses a RED figure of only 242 plf**.** It is then found that a 20K9 is the most economical joist that satisfies all the requirements of Total Load, Live Load deflection, and maximum depth limitation.

Where the joist span exceeds the unshaded area of the table, the row of bridging nearest the midspan shall be diagonal bridging with bolted connections at chords and midspan.

LRFD EXAMPLE:

Floor joists @ 2'-6" on center, supporting a structural concrete slab. (Section 5.9 of the **K**-Series Specifications limits the deflection due to the design live load to 1/360 of the span).

Span = 30'- 0"

Load factors per ASCE 7-Minimum Design Loads for Buildings and Other Structures

Maximum joist depth allowed = 20"

Factored DL = 48 x 1.2 = 58 psf (includes joist weight)
Factored LL = 100 x 1.6 = 160 psf
Factored TL = 218 psf

Factored W_{TL} = 218 x 2.5 = 545 plf
Unfactored W_{LL} = 100 x 2.5 = 250 plf

A 22K6 at a span of 30 feet can carry 566 plf of Factored Total Load and possesses a RED figure of 266 plf (RED figure load produces a deflection of approximately of 1/360 of span). However, it exceeds the maximum depth limitation of 20 inches. A 20K7 fulfills the Factored Total Load requirement but possesses a RED figure of only 242 plf. It is then found that a 20K9 is the most economical joist that satisfies all the requirements of Factored Total Load, Live Load deflection, and maximum depth limitation.

Where the joist span exceeds the unshaded area of the table, the row of bridging nearest the midspan shall be diagonal bridging with bolted connections at chords and midspan.

LRFD

LRFD K-SERIES ECONOMY TABLE - STANDARD UNITS

Joist Designation	10K1	12K1	14K1	16K2	12K3	14K3	16K3	18K3	20K3	14K4	16K4	12K5	18K4	20K4	22K4	16K5
Depth (In.)	10	12	14	16	12	14	16	18	20	14	16	12	18	20	22	16
Approx. Wt. (lbs./ft)	5.0	5.0	5.2	5.5	5.7	6.0	6.3	6.4	6.5	6.7	7.0	7.1	7.2	7.2	7.3	7.5
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	825 550		825 463	825 550				825 550		825 463				
15	537 234	651 344	766 475		814 428	825 507				825 507		825 434				
16	469 192	570 282	672 390	825 550	714 351	825 467	825 550			825 467	825 550	825 396				825 550
17	415 159	504 234	592 324	768 488	630 291	742 404	825 526			825 443	825 526	825 366				825 526
18	369 134	448 197	528 272	684 409	561 245	661 339	762 456	825 550		795 397	825 490	760 317	825 550			825 490
19	331 113	402 167	472 230	612 347	502 207	592 287	682 386	771 494	825 550	712 336	820 452	681 269	825 523	825 550		825 455
20	298 97	361 142	426 197	552 297	453 177	534 246	615 330	694 423	775 517	642 287	739 386	613 230	825 490	825 550		825 426
21		327 123	385 170	499 255	409 153	483 212	556 285	630 364	702 453	582 248	670 333	555 198	759 426	825 520	825 550	754 373
22		298 106	351 147	454 222	373 132	439 184	505 247	573 316	639 393	529 215	609 289	505 172	690 370	771 461	825 548	687 323
23		271 93	321 128	415 194	340 116	402 160	462 216	523 276	583 344	483 188	556 252	462 150	630 323	703 402	777 491	627 282
24		249 81	294 113	381 170	312 101	367 141	424 189	480 242	535 302	442 165	510 221	423 132	577 284	645 353	712 431	576 248
25			270 100	351 150		339 124	390 167	441 214	493 266	408 145	469 195		532 250	594 312	657 381	529 219
26			249 88	324 133		313 110	360 148	408 190	456 236	376 129	433 173		492 222	549 277	606 338	489 194
27			231 79	300 119		289 98	334 132	378 169	421 211	349 115	402 155		454 198	508 247	561 301	453 173
28			214 70	279 106		270 88	310 118	351 151	391 189	324 103	373 138		423 177	472 221	522 270	421 155
29				259 95			289 106	327 136	364 170		232 124		394 159	439 199	486 242	391 139
30				241 86			270 96	304 123	340 153		216 112		367 144	411 179	453 219	366 126
31				226 78			252 87	285 111	318 138		203 101		343 130	384 162	424 198	342 114
32				213 71			237 79	267 101	298 126		190 92		322 118	360 147	397 180	321 103
33								252 92	280 114				303 108	339 134	373 164	
34								237 84	264 105				285 98	318 122	352 149	
35								223 77	249 96				268 90	300 112	331 137	
36								211 70	235 88				253 82	283 103	313 126	
37									222 81					268 95	297 116	
38									211 74					255 87	280 107	
39									199 69					241 81	267 98	
40									190 64					229 75	253 91	
41															241 85	
42															229 79	
43															219 73	
44															208 68	

LRFD

LRFD K-SERIES ECONOMY TABLE - STANDARD UNITS

Joist Designation	14K6	18K5	20K5	22K5	24K4	24K5	16K6	26K5	18K6	20K6	22K6	24K6	16K7	26K6	18K7	20K7
Depth (In).	14	18	20	22	24	24	16	26	18	20	22	24	16	26	18	20
Approx. Wt. (lbs./ft)	7.7	7.7	7.7	7.7	7.8	7.9	8.1	8.1	8.4	8.4	8.5	8.5	8.6	8.6	8.9	8.9
Span (ft)																
14	825 550															
15	825 507															
16	825 467						825 550						825 550			
17	825 443						825 526						825 526			
18	825 408	825 550					825 490		825 550				825 490		825 550	
19	825 383	825 523	825 550				825 455		825 523	825 550			825 455		825 523	825 550
20	787 347	825 490	825 550				825 426		825 490	825 550			825 426		825 490	825 550
21	712 299	825 460	825 520	825 550			822 405		825 460	825 520	825 550		825 406		825 460	825 520
22	648 259	777 414	825 490	825 548			747 351		825 438	825 490	825 548		825 385		825 438	825 490
23	592 226	709 362	793 451	825 518	825 550	825 550	682 307		774 393	825 468	825 518	825 550	760 339		825 418	825 468
24	543 199	651 318	727 396	804 483	780 516	825 544	627 269		709 345	792 430	825 495	825 544	697 298		789 382	825 448
25	501 175	600 281	669 350	739 427	718 456	810 511	576 238	825 550	652 305	729 380	805 464	825 520	642 263	825 550	727 337	811 421
26	462 156	553 249	618 310	682 379	663 405	748 453	532 211	813 535	603 271	673 337	744 411	814 493	592 233	825 541	672 299	750 373
27	427 139	513 222	573 277	633 337	615 361	693 404	493 188	753 477	558 241	624 301	688 367	754 439	549 208	820 519	622 267	694 333
28	397 124	477 199	532 248	588 302	571 323	643 362	459 168	699 427	519 216	579 269	640 328	700 393	510 186	762 464	577 239	645 298
29		444 179	495 223	547 272	531 290	600 325	427 151	651 384	483 194	540 242	597 295	652 354	475 167	709 417	538 215	601 268
30		414 161	462 201	511 245	496 262	559 293	399 137	607 346	451 175	504 218	556 266	609 319	444 151	661 377	502 194	561 242
31		387 146	433 182	478 222	465 237	523 266	373 124	568 314	421 158	471 198	520 241	570 289	415 137	619 341	469 175	525 219
32		363 132	406 165	448 201	435 215	490 241	349 112	534 285	396 144	442 179	489 219	535 262	388 124	580 309	441 159	492 199
33		342 121	381 150	421 183	409 196	462 220		501 259	248 131	415 163	459 199	502 239		546 282	414 145	463 181
34		321 110	358 137	397 167	385 179	435 201		472 237	233 120	391 149	432 182	472 218		514 257	390 132	435 165
35		303 101	339 126	373 153	363 164	409 184		445 217	330 110	369 137	408 167	445 200		484 236	367 121	411 151
36		286 92	319 115	354 141	343 150	387 169		420 199	312 101	348 125	385 153	421 183		457 216	348 111	388 139
37			303 106	334 130	324 138	366 155		397 183		330 115	364 141	399 169		433 199		367 128
38			286 98	316 119	307 128	346 143		376 169		312 106	345 130	378 156		411 184		348 118
39			271 90	300 110	292 118	328 132		357 156		297 98	327 120	358 144		390 170		330 109
40			258 84	285 102	277 109	312 122		340 145		282 91	310 111	340 133		370 157		313 101
41				271 95	264 101	297 114		322 134			295 103	324 124		352 146		
42				259 88	252 94	283 106		307 125			282 96	309 115		336 136		
43				247 82	240 88	270 98		294 116			268 89	294 107		319 126		
44				235 76	229 82	258 92		280 108			256 83	280 100		306 118		
45					219 76	246 86		268 101				268 93		291 110		
46					208 71	235 80		256 95				256 87		279 103		
47					199 67	225 75		246 89				246 82		267 96		
48					192 63	216 70		235 83				235 77		256 90		
49								225 78						246 85		
50								216 73						235 80		
51								208 69						226 75		
52								199 65						217 71		

LRFD K-SERIES ECONOMY TABLE - STANDARD UNITS

Joist Designation	28K6	22K7	24K7	26K7	28K7	24K8	30K7	26K8	28K8	16K9	30K8	18K9	20K9	22K9	24K9	26K9
Depth (In).	28	22	24	26	28	24	30	26	28	16	30	18	20	22	24	26
Approx. Wt (lbs./ft.)	8.9	9.0	9.0	9.0	9.2	9.4	9.6	9.7	9.8	10.0	10.0	10.1	10.1	10.2	10.3	10.4
Span (ft.)																
16										825 550						
17										825 526						
18										825 490		825 550				
19										825 455		825 523	825 550			
20										825 426		825 490	825 550			
21		825 550								825 406		825 460	825 520	825 550		
22		825 548								825 385		825 438	825 490	825 548		
23		825 518	825 550			825 550				825 363		825 418	825 468	825 518	825 550	
24		825 495	825 544			825 544				825 346		825 396	825 448	825 495	825 544	
25		825 474	825 520	825 550		825 520		825 550		771 311		825 377	825 426	825 474	825 520	825 550
26		825 454	825 499	825 541		825 499		825 541		711 276		807 354	825 405	825 454	825 499	825 541
27	825 550	768 406	825 479	825 522	825 550	825 479		825 522	825 550	658 246		747 315	825 389	825 432	825 479	825 522
28	822 541	712 364	781 436	825 501	825 543	825 456		825 501	825 543	612 220		694 282	775 353	825 413	825 456	825 501
29	766 486	664 327	727 392	790 463	825 522	804 429	825 550	825 479	825 522	570 198	825 550	646 254	723 317	798 387	825 436	825 479
30	715 439	619 295	679 353	738 417	796 486	750 387	825 543	816 457	825 500	532 178	825 543	603 229	675 286	745 349	816 419	825 459
31	669 397	580 267	636 320	690 378	745 440	702 350	801 508	763 413	825 480	498 161	825 520	564 207	631 259	697 316	765 379	825 444
32	627 361	544 242	595 290	648 343	699 400	658 318	751 461	715 375	772 438	466 147	823 500	529 188	592 235	654 287	717 344	778 407
33	589 329	511 221	559 265	609 312	657 364	619 289	706 420	672 342	726 399		780 460	498 171	556 214	615 261	673 313	732 370
34	555 300	481 202	526 242	573 285	618 333	582 264	664 384	633 312	684 364		735 420	468 156	523 195	579 239	634 286	688 338
35	523 275	454 185	496 221	540 261	583 305	549 242	627 351	597 286	645 333		693 384	441 143	493 179	546 219	598 262	649 310
36	495 252	429 169	469 203	510 240	550 280	519 222	592 323	564 263	609 306		654 353	417 132	466 164	516 201	565 241	613 284
37	468 232	406 156	444 187	483 221	522 257	490 205	559 297	534 242	576 282		619 325		441 151	487 185	534 222	580 262
38	444 214	384 144	421 172	457 204	493 237	465 189	531 274	505 223	546 260		586 300		418 139	462 170	507 204	550 241
39	420 198	364 133	399 159	433 188	469 219	441 174	504 253	480 206	519 240		556 277		397 129	438 157	480 189	522 223
40	399 183	346 123	379 148	412 174	445 203	420 161	478 234	456 191	492 222		529 256		376 119	417 146	456 175	496 207
41	379 170	330 114	361 137	393 162	424 189	399 150	454 217	433 177	468 206		502 238			396 135	435 162	472 192
42	361 158	313 106	343 127	373 150	403 175	379 139	433 202	412 164	445 192		480 221			378 126	414 151	450 178
43	345 147	300 99	328 118	357 140	385 163	363 130	414 188	394 153	426 179		457 206			360 117	394 140	429 166
44	330 137	286 92	313 110	340 131	367 152	346 121	394 176	376 143	406 167		436 192			343 109	376 131	409 155
45	315 128		298 103	325 122	351 142	330 113	376 164	360 133	388 156		417 179				360 122	391 145
46	301 120		286 97	310 114	336 133	316 106	361 153	343 125	372 146		399 168				345 114	375 135
47	288 112		274 90	298 107	321 125	303 99	345 144	328 117	355 136		382 157				330 107	358 127
48	276 105		262 85	285 100	309 117	291 93	331 135	315 110	340 128		366 148				316 101	343 119
49	265 99			274 94	295 110		318 127	303 103	327 120		351 139					330 112
50	255 93			262 89	283 103		304 119	291 97	313 113		337 130					316 105
51	244 88			252 83	273 97		292 112	279 91	301 106		324 123					304 99
52	235 83			243 79	262 92		282 106	268 86	289 100		312 116					292 93
53	226 78				252 87		271 100		279 95		300 109					
54	217 74				243 82		261 94		268 89		288 103					
55	210 70				234 77		252 89		259 85		277 98					
56	202 66				226 73		243 84		249 80		268 92					
57							234 80				259 88					
58							226 76				250 83					
59							219 72				241 79					
60							211 69				234 75					

LRFD K-SERIES ECONOMY TABLE - STANDARD UNITS

Joist Designation	28K9	30K9	18K10	20K10	22K10	24K10	26K10	28K10	22K11	30K10	30K11	24K12	26K12	28K12	30K12
Depth (In.)	28	30	18	20	22	24	26	28	22	30	30	24	26	28	30
Approx. Wt. (lbs/ft)	10.5	10.6	11.6	11.6	11.7	11.7	11.8	11.8	11.9	11.9	13.3	13.5	13.7	14.5	15.0
Span (ft.)															
18			825 550												
19			825 523	825 550											
20			825 490	825 550											
21			825 460	825 520	825 550				825 550						
22			825 438	825 490	825 548				825 548						
23			825 418	825 468	825 518	825 550			825 518			825 550			
24			825 396	825 448	825 495	825 544			825 495			825 544			
25			825 377	825 426	825 474	825 520	825 550		825 474			825 520	825 550		
26			825 361	825 405	825 454	825 499	825 541		825 454			825 499	825 541		
27	825 550		825 347	825 389	825 432	825 479	825 522	825 550	825 432			825 479	825 522	825 550	
28	825 543		822 331	825 375	825 413	825 456	825 501	825 543	825 413			825 456	825 501	825 543	
29	825 522	825 550	766 298	825 359	825 399	825 436	825 479	825 522	825 399	825 550	825 550	825 436	825 479	825 522	825 550
30	825 500	825 543	715 269	799 336	825 386	825 422	825 459	825 500	825 386	825 543	825 543	825 422	825 459	825 500	825 543
31	825 480	825 520	669 243	748 304	825 369	825 410	825 444	825 480	825 369	825 520	825 520	825 410	825 444	825 480	825 520
32	823 463	823 500	627 221	702 276	775 337	823 393	823 431	823 463	823 355	823 500	823 500	823 393	823 431	823 463	823 500
33	790 432	798 468	589 201	660 251	729 307	798 368	798 404	798 435	798 334	798 468	798 468	798 368	798 404	798 435	798 468
34	744 395	774 441	555 184	621 229	687 280	753 337	774 378	774 410	774 314	774 441	774 441	774 344	774 378	774 410	774 441
35	702 361	751 415	523 168	585 210	648 257	709 308	751 356	751 389	741 292	751 415	751 415	751 324	751 356	751 389	751 415
36	663 332	712 383	495 154	553 193	612 236	670 283	729 334	730 366	700 269	730 392	730 392	730 306	730 334	730 366	730 392
37	627 305	673 352		523 178	579 217	634 260	690 308	711 344	663 247	711 374	711 374	711 290	711 315	711 344	711 374
38	594 282	639 325		496 164	549 200	601 240	654 284	691 325	628 228	691 353	691 353	691 275	691 299	691 325	691 353
39	564 260	606 300		471 151	520 185	570 222	619 262	670 306	595 211	673 333	673 333	673 261	673 283	673 308	673 333
40	535 241	576 278		447 140	495 171	541 206	589 243	636 284	565 195	657 315	657 315	657 247	657 269	657 291	657 315
41	510 224	547 258			471 159	516 191	561 225	606 263	538 181	640 300	640 300	640 235	640 256	640 277	640 300
42	486 208	522 240			448 148	490 177	534 210	576 245	513 168	619 282	625 284	625 224	625 244	625 264	625 284
43	463 194	498 223			427 138	468 165	508 195	550 228	489 157	591 263	610 270	609 213	610 232	610 252	610 270
44	442 181	475 208			408 128	447 154	486 182	525 212	466 146	564 245	597 258	580 199	597 222	597 240	597 258
45	423 169	454 195				427 144	465 170	501 198		538 229	583 246	555 185	583 212	583 229	583 246
46	405 158	435 182				408 135	444 159	480 186		516 214	570 236	531 174	570 203	570 219	570 236
47	387 148	416 171				391 126	426 149	459 174		493 201	558 226	508 163	553 192	558 210	558 226
48	370 139	399 160				375 118	408 140	441 163		472 188	543 215	487 153	529 180	547 201	547 216
49	355 130	382 150					391 131	423 153		454 177	520 202		508 169	535 193	535 207
50	342 123	367 141					375 124	405 144		436 166	499 190		487 159	525 185	525 199
51	328 115	352 133					361 116	390 136		418 157	480 179		469 150	507 175	514 192
52	315 109	339 126					346 110	375 128		402 148	462 169		451 142	487 165	504 184
53	304 103	327 119						360 121		387 140	444 159			469 156	495 177
54	292 97	313 112						348 114		373 132	427 150			451 147	486 170
55	282 92	303 106						334 108		360 125	412 142			435 139	468 161
56	271 87	292 100						322 102		346 118	397 135			420 132	451 153
57		282 95								334 112	384 128				435 145
58		271 90								322 106	370 121				420 137
59		262 86								312 101	358 115				406 130
60		253 81								301 96	346 109				393 124

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ASD K-SERIES ECONOMY TABLE - STANDARD UNITS

Joist Designation	10K1	12K1	14K1	16K2	12K3	14K3	16K3	18K3	20K3	14K4	16K4	12K5	18K4	20K4	22K4	16K5
Depth (In.)	10	12	14	16	12	14	16	18	20	14	16	12	18	20	22	16
Approx. Wt. (lbs./ft)	5.0	5.0	5.2	5.5	5.7	6.0	6.3	6.4	6.5	6.7	7.0	7.1	7.2	7.2	7.3	7.5
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	550 550		550 463	550 550				550 550		550 463				
15	358 234	434 344	511 475		543 428	550 507				550 507		550 434				
16	313 192	380 282	448 390	550 550	476 351	550 467	550 550			550 467	550 550	550 396				550 550
17	277 159	336 234	395 324	512 488	420 291	495 404	550 526			550 443	550 526	550 366				550 526
18	246 134	299 197	352 272	456 409	374 245	441 339	508 456	550 550		530 397	550 490	507 317	550 550			550 490
19	221 113	268 167	315 230	408 347	335 207	395 287	455 386	514 494	550 550	475 336	547 452	454 269	550 523	550 550		550 455
20	199 97	241 142	284 197	368 297	302 177	356 246	410 330	463 423	517 517	428 287	493 386	409 230	550 490	550 550		550 426
21		218 123	257 170	333 255	273 153	322 212	371 285	420 364	468 453	388 248	447 333	370 198	506 426	550 520	550 550	503 373
22		199 106	234 147	303 222	249 132	293 184	337 247	382 316	426 393	353 215	406 289	337 172	460 370	514 461	550 548	458 323
23		181 93	214 128	277 194	227 116	268 160	308 216	349 276	389 344	322 188	371 252	308 150	420 323	469 402	518 491	418 282
24		166 81	196 113	254 170	208 101	245 141	283 189	320 242	357 302	295 165	340 221	282 132	385 284	430 353	475 431	384 248
25			180 100	234 150		226 124	260 167	294 214	329 266	272 145	313 195		355 250	396 312	438 381	353 219
26			166 88	216 133		209 110	240 148	272 190	304 236	251 129	289 173		328 222	366 277	404 338	326 194
27			154 79	200 119		193 98	223 132	252 169	281 211	233 115	268 155		303 198	339 247	374 301	302 173
28			143 70	186 106		180 88	207 118	234 151	261 189	216 103	249 138		282 177	315 221	348 270	281 155
29				173 95			193 106	218 136	243 170		232 124		263 159	293 199	324 242	261 139
30				161 86			180 96	203 123	227 153		216 112		245 144	274 179	302 219	244 126
31				151 78			168 87	190 111	212 138		203 101		229 130	256 162	283 198	228 114
32				142 71			158 79	178 101	199 126		190 92		215 118	240 147	265 180	214 103
33								168 92	187 114				202 108	226 134	249 164	
34								158 84	176 105				190 98	212 122	235 149	
35								149 77	166 96				179 90	200 112	221 137	
36								141 70	157 88				169 82	189 103	209 126	
37									148 81					179 95	198 116	
38									141 74					170 87	187 107	
39									133 69					161 81	178 98	
40									127 64					153 75	169 91	
41															161 85	
42															153 79	
43															146 73	
44															139 68	

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ASD K-SERIES ECONOMY TABLE - STANDARD UNITS

Joist Designation	14K6	18K5	20K5	22K5	24K4	24K5	16K6	26K5	18K6	20K6	22K6	24K6	16K7	26K6	18K7	20K7
Depth (In).	14	18	20	22	24	24	16	26	18	20	22	24	16	26	18	20
Approx. Wt. (lbs./ft)	7.7	7.7	7.7	7.7	7.8	7.9	8.1	8.1	8.4	8.4	8.5	8.5	8.6	8.6	8.9	8.9
Span (ft)																
14	550 550															
15	550 507															
16	550 467						550 550						550 550			
17	550 443						550 526						550 526			
18	550 408	550 550					550 490		550 550				550 490		550 550	
19	550 383	550 523	550 550				550 455		550 523	550 550			550 455		550 523	550 550
20	525 347	550 490	550 550				550 426		550 490	550 550			550 426		550 490	550 550
21	475 299	550 460	550 520	550 550			548 405		550 460	550 520	550 550		550 406		550 460	550 520
22	432 259	518 414	550 490	550 548			498 351		550 438	550 490	550 548		550 385		550 438	550 490
23	395 226	473 362	529 451	550 518	550 550	550 550	455 307		516 393	550 468	550 518	550 550	507 339		550 418	550 468
24	362 199	434 318	485 396	536 483	520 516	550 544	418 269		473 345	528 430	550 495	550 544	465 298		526 382	550 448
25	334 175	400 281	446 350	493 427	479 456	540 511	384 238	550 550	435 305	486 380	537 464	550 520	428 263	550 550	485 337	541 421
26	308 156	369 249	412 310	455 379	442 405	499 453	355 211	542 535	402 271	449 337	496 411	543 493	395 233	550 541	448 299	500 373
27	285 139	342 222	382 277	422 337	410 361	462 404	329 188	502 477	372 241	416 301	459 367	503 439	366 208	547 519	415 267	463 333
28	265 124	318 199	355 248	392 302	381 323	429 362	306 168	466 427	346 216	386 269	427 328	467 393	340 186	508 464	385 239	430 298
29		296 179	330 223	365 272	354 290	400 325	285 151	434 384	322 194	360 242	398 295	435 354	317 167	473 417	359 215	401 268
30		276 161	308 201	341 245	331 262	373 293	266 137	405 346	301 175	336 218	371 266	406 319	296 151	441 377	335 194	374 242
31		258 146	289 182	319 222	310 237	349 266	249 124	379 314	281 158	314 198	347 241	380 289	277 137	413 341	313 175	350 219
32		242 132	271 165	299 201	290 215	327 241	233 112	356 285	264 144	295 179	326 219	357 262	259 124	387 309	294 159	328 199
33		228 121	254 150	281 183	273 196	308 220		334 259	248 131	277 163	306 199	335 239		364 282	276 145	309 181
34		214 110	239 137	265 167	257 179	290 201		315 237	233 120	261 149	288 182	315 218		343 257	260 132	290 165
35		202 101	226 126	249 153	242 164	273 184		297 217	220 110	246 137	272 167	297 200		323 236	245 121	274 151
36		191 92	213 115	236 141	229 150	258 169		280 199	208 101	232 125	257 153	281 183		305 216	232 111	259 139
37			202 106	223 130	216 138	244 155		265 183		220 115	243 141	266 169		289 199		245 128
38			191 98	211 119	205 128	231 143		251 169		208 106	230 130	252 156		274 184		232 118
39			181 90	200 110	195 118	219 132		238 156		198 98	218 120	239 144		260 170		220 109
40			172 84	190 102	185 109	208 122		227 145		188 91	207 111	227 133		247 157		209 101
41				181 95	176 101	198 114		215 134			197 103	216 124		235 146		
42				173 88	168 94	189 106		205 125			188 96	206 115		224 136		
43				165 82	160 88	180 98		196 116			179 89	196 107		213 126		
44				157 76	153 82	172 92		187 108			171 83	187 100		204 118		
45					146 76	164 86		179 101				179 93		194 110		
46					139 71	157 80		171 95				171 87		186 103		
47					133 67	150 75		164 89				164 82		178 96		
48					128 63	144 70		157 83				157 77		171 90		
49								150 78						164 85		
50								144 73						157 80		
51								139 69						151 75		
52								133 65						145 71		

ASD

ASD K-SERIES ECONOMY TABLE - STANDARD UNITS

Joist Designation	28K6	22K7	24K7	26K7	28K7	24K8	30K7	26K8	28K8	16K9	30K8	18K9	20K9	22K9	24K9	26K9
Depth (In).	28	22	24	26	28	24	30	26	28	16	30	18	20	22	24	26
Approx. Wt (lbs./ft.)	8.9	9.0	9.0	9.0	9.2	9.4	9.6	9.7	9.8	10.0	10.0	10.1	10.1	10.2	10.3	10.4
Span (ft.)																
16										550 550						
17										550 526						
18										550 490		550 550				
19										550 455		550 523	550 550			
20										550 426		550 490	550 550			
21		550 550								550 406		550 460	550 520	550 550		
22		550 548								550 385		550 438	550 490	550 548		
23		550 518	550 550			550 550				550 363		550 418	550 468	550 518	550 550	
24		550 495	550 544			550 544				550 346		550 396	550 448	550 495	550 544	
25		550 474	550 520	550 550		550 520		550 550		514 311		550 377	550 426	550 474	550 520	550 550
26		550 454	550 499	550 541		550 499		550 541		474 276		538 354	550 405	550 454	550 499	550 541
27	550 550	512 406	550 479	550 522	550 550	550 479		550 522	550 550	439 246		498 315	550 389	550 432	550 479	550 522
28	548 541	475 364	521 436	550 501	550 543	550 456		550 501	550 543	408 220		463 282	517 353	550 413	550 456	550 501
29	511 486	443 327	485 392	527 463	550 522	536 429	550 550	550 479	550 522	380 198	550 550	431 254	482 317	532 387	550 436	550 479
30	477 439	413 295	453 353	492 417	531 486	500 387	550 543	544 457	550 500	355 178	550 543	402 229	450 286	497 349	544 419	550 459
31	446 397	387 267	424 320	460 378	497 440	468 350	534 508	509 413	550 480	332 161	550 520	376 207	421 259	465 316	510 379	550 444
32	418 361	363 242	397 290	432 343	466 400	439 318	501 461	477 375	515 438	311 147	549 500	353 188	395 235	436 287	478 344	519 407
33	393 329	341 221	373 265	406 312	438 364	413 289	471 420	448 342	484 399		520 460	332 171	371 214	410 261	449 313	488 370
34	370 300	321 202	351 242	382 285	412 333	388 264	443 384	422 312	456 364		490 420	312 156	349 195	386 239	423 286	459 338
35	349 275	303 185	331 221	360 261	389 305	366 242	418 351	398 286	430 333		462 384	294 143	329 179	364 219	399 262	433 310
36	330 252	286 169	313 203	340 240	367 280	346 222	395 323	376 263	406 306		436 353	278 132	311 164	344 201	377 241	409 284
37	312 232	271 156	296 187	322 221	348 257	327 205	373 297	356 242	384 282		413 325		294 151	325 185	356 222	387 262
38	296 214	256 144	281 172	305 204	329 237	310 189	354 274	337 223	364 260		391 300		279 139	308 170	338 204	367 241
39	280 198	243 133	266 159	289 188	313 219	294 174	336 253	320 206	346 240		371 277		265 129	292 157	320 189	348 223
40	266 183	231 123	253 148	275 174	297 203	280 161	319 234	304 191	328 222		353 256		251 119	278 146	304 175	331 207
41	253 170	220 114	241 137	262 162	283 189	266 150	303 217	289 177	312 206		335 238			264 135	290 162	315 192
42	241 158	209 106	229 127	249 150	269 175	253 139	289 202	275 164	297 192		320 221			252 126	276 151	300 178
43	230 147	200 99	219 118	238 140	257 163	242 130	276 188	263 153	284 179		305 206			240 117	263 140	286 166
44	220 137	191 92	209 110	227 131	245 152	231 121	263 176	251 143	271 167		291 192			229 109	251 131	273 155
45	210 128		199 103	217 122	234 142	220 113	251 164	240 133	259 156		278 179				240 122	261 145
46	201 120		191 97	207 114	224 133	211 106	241 153	229 125	248 146		266 168				230 114	250 135
47	192 112		183 90	199 107	214 125	202 99	230 144	219 117	237 136		255 157				220 107	239 127
48	184 105		175 85	190 100	206 117	194 93	221 135	210 110	227 128		244 148				211 101	229 119
49	177 99			183 94	197 110		212 127	202 103	218 120		234 139					220 112
50	170 93			175 89	189 103		203 119	194 97	209 113		225 130					211 105
51	163 88			168 83	182 97		195 112	186 91	201 106		216 123					203 99
52	157 83			162 79	175 92		188 106	179 86	193 100		208 116					195 93
53	151 78				168 87		181 100		186 95		200 109					
54	145 74				162 82		174 94		179 89		192 103					
55	140 70				156 77		168 89		173 85		185 98					
56	135 66				151 73		162 84		166 80		179 92					
57							156 80				173 88					
58							151 76				167 83					
59							146 72				161 79					
60							141 69				156 75					

ASD

ASD K-SERIES ECONOMY TABLE - STANDARD UNITS

Joist Designation	28K9	30K9	18K10	20K10	22K10	24K10	26K10	28K10	22K11	30K10	30K11	24K12	26K12	28K12	30K12
Depth (In.)	28	30	18	20	22	24	26	28	22	30	30	24	26	28	30
Approx. Wt. (lbs/ft)	10.5	10.6	11.6	11.6	11.7	11.7	11.8	11.8	11.9	11.9	13.3	13.5	13.7	14.5	15.0
Span (ft.)															
18			550 550												
19			550 523	550 550											
20			550 490	550 550											
21			550 460	550 520	550 550				550 550						
22			550 438	550 490	550 548				550 548						
23			550 418	550 468	550 518	550 550			550 518			550 550			
24			550 396	550 448	550 495	550 544			550 495			550 544			
25			550 377	550 426	550 474	550 520	550 550		550 474			550 520	550 550		
26			550 361	550 405	550 454	550 499	550 541		550 454			550 499	550 541		
27	550 550		550 347	550 389	550 432	550 479	550 522	550 550	550 432			550 479	550 522	550 550	
28	550 543		548 331	550 375	550 413	550 456	550 501	550 543	550 413			550 456	550 501	550 543	
29	550 522	550 550	511 298	550 359	550 399	550 436	550 479	550 522	550 399	550 550	550 550	550 436	550 479	550 522	550 550
30	550 500	550 543	477 269	533 336	550 385	550 422	550 459	550 500	550 385	550 543	550 543	550 422	550 459	550 500	550 543
31	550 480	550 520	446 243	499 304	550 369	550 410	550 444	550 480	550 369	550 520	550 520	550 410	550 444	550 480	550 520
32	549 463	549 500	418 221	468 276	517 337	549 393	549 431	549 463	549 355	549 500	549 500	549 393	549 431	549 463	549 500
33	527 432	532 468	393 201	440 251	486 307	532 368	532 404	532 435	532 334	532 468	532 468	532 368	532 404	532 435	532 468
34	496 395	516 441	370 184	414 229	458 280	502 337	516 378	516 410	516 314	516 441	516 441	516 344	516 378	516 410	516 441
35	468 361	501 415	349 168	390 210	432 257	473 308	501 356	501 389	494 292	501 415	501 415	501 324	501 356	501 389	501 415
36	442 332	475 383	330 154	369 193	408 236	447 283	486 334	487 366	467 269	487 392	487 392	487 306	487 334	487 366	487 392
37	418 305	449 352		349 178	386 217	423 260	460 308	474 344	442 247	474 374	474 374	474 290	474 315	474 344	474 374
38	396 282	426 325		331 164	366 200	401 240	436 284	461 325	419 228	461 353	461 353	461 275	461 299	461 325	461 353
39	376 260	404 300		314 151	347 185	380 222	413 262	447 306	397 211	449 333	449 333	449 261	449 283	449 308	449 333
40	357 241	384 278		298 140	330 171	361 206	393 243	424 284	377 195	438 315	438 315	438 247	438 269	438 291	438 315
41	340 224	365 258			314 159	344 191	374 225	404 263	359 181	427 300	427 300	427 235	427 256	427 277	427 300
42	324 208	348 240			299 148	327 177	356 210	384 245	342 168	413 282	417 284	417 224	417 244	417 264	417 284
43	309 194	332 223			285 138	312 165	339 195	367 228	326 157	394 263	407 270	406 213	407 232	407 252	407 270
44	295 181	317 208			272 128	298 154	324 182	350 212	311 146	376 245	398 258	387 199	398 222	398 240	398 258
45	282 169	303 195				285 144	310 170	334 198		359 229	389 246	370 185	389 212	389 229	389 246
46	270 158	290 182				272 135	296 159	320 186		344 214	380 236	354 174	380 203	380 219	380 236
47	258 148	277 171				261 126	284 149	306 174		329 201	372 226	339 163	369 192	372 210	372 226
48	247 139	266 160				250 118	272 140	294 163		315 188	362 215	325 153	353 180	365 201	365 216
49	237 130	255 150					261 131	282 153		303 177	347 202		339 169	357 193	357 207
50	228 123	245 141					250 124	270 144		291 166	333 190		325 159	350 185	350 199
51	219 115	235 133					241 116	260 136		279 157	320 179		313 150	338 175	343 192
52	210 109	226 126					231 110	250 128		268 148	308 169		301 142	325 165	336 184
53	203 103	218 119						240 121		258 140	296 159			313 156	330 177
54	195 97	209 112						232 114		249 132	285 150			301 147	324 170
55	188 92	202 106						223 108		240 125	275 142			290 139	312 161
56	181 87	195 100						215 102		231 118	265 135			280 132	301 153
57		188 95								223 112	256 128				290 145
58		181 90								215 106	247 121				280 137
59		175 86								208 101	239 115				271 130
60		169 81								201 96	231 109				262 124

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 Simple nature whereas the "R" TYPE involves Reinforcing 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.

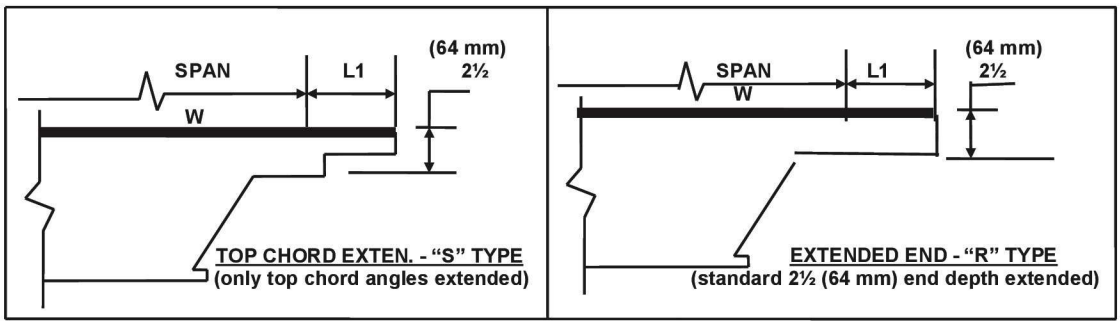
In cases where it is not possible to meet specific job requirements with a 2½" (64 mm) deep "R" type extension (refer to "S" and "I" values in the Extended End Load Table), the depth of the extension must be increased to provide greater load-carrying capacity.

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**



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

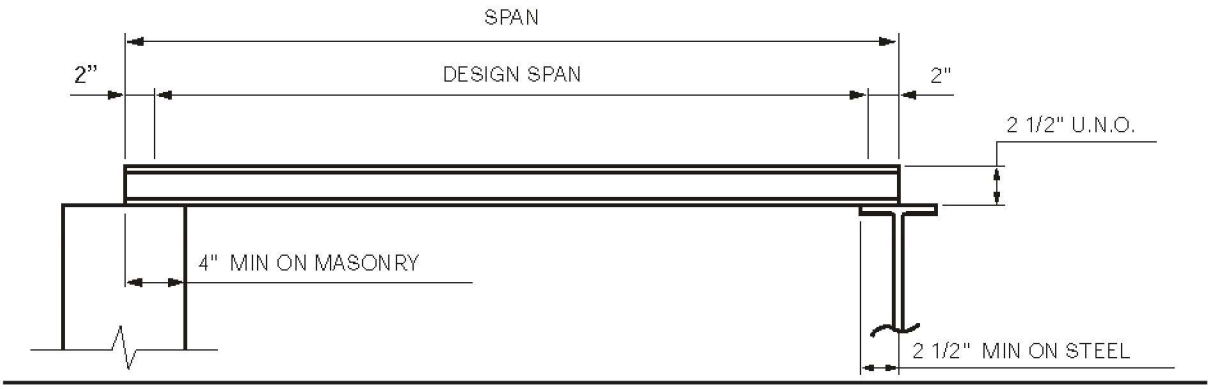
TYPE	"S" ($in.^3$)	"I" ($in.^4$)	LENGTH (L1)								
			0'-6"	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"
S1	0.099	0.088	825	544	267	157					
S2	0.127	0.138	825	700	343	202					
S3	0.144	0.156	825	793	388	229					
S4	0.160	0.172	825	825	432	255	168				
S5	0.176	0.188	825	825	474	280	184				
S6	0.192	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

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

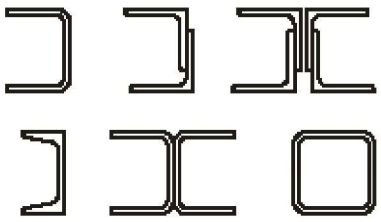
Based on a 50 ksi Maximum Yield Strength
LRFD Load Table adopted by the Steel Joist Institute May 1, 2001
Revised to May 18, 2010 – Effective December 31, 2010

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

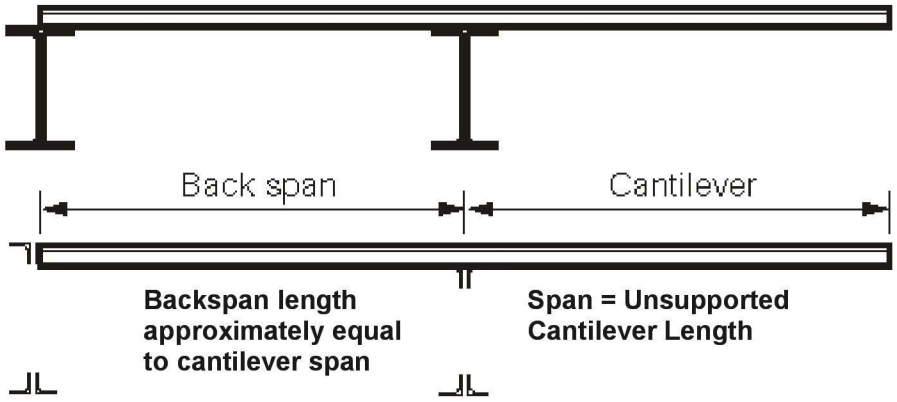
LOAD TABLES FOR 2.5 INCH SIMPLE SPAN JOIST SUBSTITUTES, K-SERIES Based on a Maximum Yield Strength of 50 ksi			
Designation	**2.5K1**	**2.5K2**	**2.5K3**
Span (ft-in)	**Pounds per Linear foot**		
4'-0"	825	825	825
	550	550	550
5'-0"	825	825	825
	326	452	550
6'-0"	579	804	825
	182	253	354
7'-0"	418	580	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

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

Notes:

STANDARD SPECIFICATION

FOR LONGSPAN STEEL JOISTS, LH-SERIES AND DEEP LONGSPAN STEEL JOISTS, DLH-SERIES

Adopted by the Steel Joist Institute May 10, 2006
Revised to May 18, 2010, Effective December 31, 2010

SECTION 100.
SCOPE AND DEFINITIONS

100.1 SCOPE

The *Standard Specification for Longspan Steel Joists,* **LH**-*Series and Deep Longspan Steel Joists,* **DLH**-*Series*, hereafter referred to as the Specification, covers the design, manufacture, application, and erection stability and handling of Longspan Steel Joists **LH**-Series, and Deep Longspan Steel Joists, **DLH**-Series in buildings or other structures, where other structures are defined as those structures designed, manufactured, and erected in a manner similar to buildings.. **LH**- and **DLH**-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. The erection of **LH**- and **DLH**-Series joists 144 ft. (43.9 m) or less is governed by Section 1926.757 Open Web Steel Joists and joists over this length by Section 1926.756 Beams and Columns.

This Specification includes Sections 100 through 105.

100.2 DEFINITION

The term "Longspan Steel Joists **LH**-Series and Deep Longspan Steel Joists **DLH**-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 of floors and roof slabs or decks. The **LH**-Series joists have been standardized in depths from 18 inches (457 mm) through 48 inches (1219 mm), for spans up through 96 feet (29260 mm). The **DLH**-Series joists have been standardized in depths from 52 inches (1321 mm) through 120 inches (3048 mm), for spans up through 240 feet (73150 mm).

The **LH**- and **DLH**-Series standard joist designations are determined by their nominal depth at the center of the span, followed by the letters **LH** or **DLH** as appropriate, and then by the chord size designation assigned. The chord size designations range from 02 to 25. Therefore, as a performance based specification, the **LH**- and **DLH**-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 Longspan Steel Joists, **LH**-Series – U.S. Customary Units
Standard ASD Load Table Longspan Steel Joists, **LH**-Series – U.S. Customary Units
Standard LRFD Load Table Deep Longspan Steel Joists, **DLH**-Series – U.S. Customary Units
Standard ASD Load Table Deep Longspan Steel Joists, **DLH**-Series – U.S. Customary Units

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

Standard LRFD Load Table Longspan Steel Joists, **LH**-Series – S.I. Units
Standard ASD Load Table Longspan Steel Joists, **LH**-Series – S.I. Units
Standard LRFD Load Table Deep Longspan Steel Joists, **DLH**-Series – S.I. Units
Standard ASD Load Table Deep Longspan Steel Joists, **DLH**-Series – S.I. Units

An alternate method of specifying a standard **LH**-Series joist is to provide the designation in a "load/load" sequence. The format used is dd**LH**tl/ll where:

dd is the nominal depth of the joist in inches (mm)
tl is the total uniformly distributed load applied to the joist top chord, plf (kN/m)
ll is the uniform live load for which the deflection shall be checked and limited as required by the Specification, plf (kN/m)

The load/load **LH**-Series joists can be specified in depths from 14 inches (356 mm) through 120 inches (3048 mm) and spans from 14 feet (4267 mm) up through 240 feet (73152 mm). The maximum uniformly distributed load-carrying capacity of 2400 plf (35.03 kN/m) in ASD and 3600 plf (52.54 kN/m) in LRFD has been established for this alternate **LH**-Series format. The maximum capacity for any given load/load **LH**-Series joist is a function of span, depth and chord size.

Six standard types of **LH**- and **DLH**-Series joists are designed and manufactured. These types are underslung (top chord bearing) or square-ended (bottom chord bearing), with parallel chords or with single or double pitched top chords. A pitch of the joist top chord up to 1/2 inch per foot (1:24) is allowed. The standard joist designation depth shall be the depth at mid-span.

100.3 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 101.
REFERENCED SPECIFICATIONS, CODES AND STANDARDS

101.1 REFERENCES

American Institute of Steel Construction, Inc. (AISC)

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

American Iron and Steel Institute (AISI)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

101.2 OTHER REFERENCES

The following references are non-ANSI Standard 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 (2011), *Structural Design of Steel Joist Roofs to Resist Uplift Loads*

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

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

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

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

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

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

SECTION 102.
MATERIALS

102.1 STEEL

The steel used in the manufacture of **LH**- and **DLH**-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 102.2.

102.2 MECHANICAL PROPERTIES

Steel used for **LH**- and **DLH**-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 102.2 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.

102.3 WELDING ELECTRODES

The following electrodes shall be used for arc welding:

a) For connected members both having a specified minimum yield strength greater than 36 ksi (250 MPa).

AWS A5.1: E70XX
AWS A5.5: E70XX-X
AWS A5.17: F7XX–EXXX, F7XX–ECXXX flux electrode combination
AWS A5.18: ER70S-X, E70C-XC, E70C-XM

AWS A5.20: E7XT-X, E7XT-XM
AWS A5.23: F7XX–EXXX-XX, F7XX–ECXXX-XX
AWS A5.28: ER70S-XXX, E70C-XXX
AWS A5.29: E7XTX-X, E7XTX-XM

b) For connected members both having a specified minimum yield strength of 36 ksi (250 MPa) or one having a specified minimum yield strength of 36 ksi (250 MPa), and the other having a specified minimum yield strength greater than 36 ksi (250 MPa).

AWS A5.1: E60XX
AWS A5.17: F6XX-EXXX, F6XX-ECXXX flux electrode combination
AWS A5.20: E6XT-X, E6XT-XM
AWS A5.29: E6XTX-X, E6XTX-XM
or any of those listed in Section 102.3(a).

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

102.4 PAINT

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

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

a) Steel Structures Painting Council Specification, SSPC No. 15.

b) Or, shall be a shop paint which meets the minimum performance requirements of the above listed specification.

SECTION 103.
DESIGN AND MANUFACTURE

103.1 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.

103.2 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: ϕ_t = 0.90 (LRFD), Ω_t = 1.67 (ASD)

Design Stress = $0.9F_y$ (LRFD) (103.2-1)

Allowable Stress = $0.6F_y$ (ASD) (103.2-2)

(b) Compression: ϕ_c = 0.90 (LRFD), Ω_c = 1.67 (ASD)

Design Stress = $0.9F_{cr}$ (LRFD) (103.2-3)

Allowable Stress = $0.6F_{cr}$ (ASD) (103.2-4)

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

$$F_{cr} = Q\left[0.658^{\left(QF_y/F_e\right)}\right]F_y \qquad (103.2\text{-}5)$$

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

$$F_{cr} = 0.877F_e \quad (103.2\text{-}6)$$

Where F_e = Elastic buckling stress determined in accordance with Equation 103.2-7

$$F_e = \frac{\pi^2 E}{\left(k\ell/r\right)^2} \quad (103.2\text{-}7)$$

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:.

$$Q = [5.25/(w/t)] + t \leq 1.0 \quad (103.2\text{-}8)$$

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

or,

$$Q = [5.25/(w/t)] + (t/25.4) \leq 1.0 \quad (103.2\text{-}9)$$

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: $F_n = F_y$

Design Stress = $\phi_b F_n = 0.9F_y$ (LRFD) (103.2-10)

Allowable Stress = $F_n/\Omega_b = 0.6F_y$ (ASD) (103.2-11)

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

Design Stress = $\phi_b F_n = 1.45F_y$ (LRFD) (103.2-12)

Allowable Stress = $F_n/\Omega_b = 0.95F_y$ (ASD) (103.2-13)

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

Design Stress = $\phi_b F_n = 1.35F_y$ (LRFD) (103.2-14)

Allowable Stress = $F_n/\Omega_b = 0.90F_y$ (ASD) (103.2-15)

(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 = $F_{nw} = 0.6F_{exx}$ (103.2-16)

LRFD: $\phi_w = 0.75$

Design Shear Strength = $\phi R_n = \phi_w F_{nw} A = 0.45F_{exx} A_w$ (103.2-17)

ASD: $\Omega_w = 2.0$

Allowable Shear Strength = $R_n/\Omega_w = F_{nw}A/\Omega_w = 0.3F_{exx} A_w$ (103.2-18)

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 (103.2-19)

Where: D = web diameter, inches

or,

T (mm) = 0.12D + 2.8 (103.2-20)

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) $\quad \Omega_t = \Omega_c = 1.67$ (ASD)

Design Stress = $0.9\ F_y$ (LRFD) (103.2-21)

Allowable Stress = $0.6\ F_y$ (ASD) (103.2-22)

103.3 MAXIMUM SLENDERNESS RATIOS

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 the values given in Table 103.3-1, Parts A.

The effective slenderness ratio, $k\ell/r$ to be used in calculating the nominal stresses, F_{cr} and F'_e, is the largest value as determined from Table 103.3-1, 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 103.3-1 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).

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 103.3-1
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	0.75	0.94	---	1.0
	2. Without fillers or ties	---	---	0.75	---
	3. Single component members	0.75	0.94	---	---
	C. For bending, the effective slenderness ratio, $k\ell/r$, to determine F'_e where k is:	0.75	---	---	---
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	0.75	1.0	---	1.0
	2. Without fillers or ties	---	---	1.0	---
	3. Single component members	0.75	0.8	---	---
IV	COMPRESSION WEB MEMBERS				
	A. The slenderness ratios, 1.0 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	0.75	1.0	---	1.0
	2. Without fillers or ties	---	---	1.0	---
	3. Single component members	0.75	1.0	---	---

103.4 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:

$$r_y \geq \ell_{br} \Big/ \left(124 + 0.67\, d_j + 28 \frac{d_j}{L} \right), \text{ in.} \qquad (103.4\text{-}1a)$$

$$r_y \geq \ell_{br} \Big/ \left(124 + 0.026\, d_j + 0.34 \frac{d_j}{L} \right), \text{ mm} \qquad (103.4\text{-}1b)$$

or,

$$r_y \geq \ell_{br} / 170 \qquad (103.4\text{-}2)$$

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)

ℓ_{br} is the spacing in inches (millimeters) between lines of bridging as specified in Section 104.5(d).

The top chord shall be considered as stayed laterally by the floor slab or roof deck provided the requirements of Section 104.9(e) of this specification are met.

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:

$$f_{au} + f_{bu} \leq 0.9F_y \qquad (103.4\text{-}3)$$

at the mid panel:

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

$$\frac{f_{au}}{\phi_c F_{cr}} + \frac{8}{9}\left[\frac{C_m f_{bu}}{\left[1 - \left(\dfrac{f_{au}}{\phi_c F'_e} \right) \right] Q \phi_b F_y} \right] \leq 1.0 \qquad (103.4\text{-}4)$$

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

$$\left(\frac{f_{au}}{2\phi_c F_{cr}}\right) + \left[\frac{C_m f_{bu}}{\left[1-\left(\frac{f_{au}}{\phi_c F'_e}\right)\right] Q\phi_b F_y}\right] \le 1.0 \qquad (103.4\text{-}5)$$

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 103.2(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 103.2(b) and r_x is the radius of gyration about the axis of bending.

Q = Form factor defined in Section 103.2(b)
A = Area of the top chord, in.^{2} (mm^2)

For **ASD**:

at the panel point:

$$f_a + f_b \le 0.6F_y \qquad (103.4\text{-}6)$$

at the mid panel:

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

$$\frac{f_a}{F_a} + \frac{8}{9}\left[\frac{C_m f_b}{\left[1-\left(\frac{1.67f_a}{F'_e}\right)\right] QF_b}\right] \le 1.0 \qquad (103.4\text{-}7)$$

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

$$\left(\frac{f_a}{2F_a}\right) + \left[\frac{C_m f_b}{\left[1-\left(\frac{1.67 f_a}{F'_e}\right)\right] QF_b}\right] \leq 1.0 \qquad (103.4\text{-}8)$$

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 103.2(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:

$$f_{vmod} \leq \phi_v f_n \qquad \text{(LRFD, } \phi = 1.00\text{)} \qquad (103.4\text{-}9)$$

$$f_{vmod} \leq f_n/\Omega_v \qquad \text{(ASD, } \Omega = 1.50\text{)} \qquad (103.4\text{-}10)$$

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 = $(1/2)\left(f_t^2 + 4f_v^2\right)^{1/2}$
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 of Section 103.4(b) 25 percent of the end reaction) shall not be required when evaluating Equation 103.4-9 or 103.4-10.

(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.

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.

(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 joist extension 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 joist extension. The diagram shall include the magnitude and location of the loads to be supported, as well as the appropriate load combinations.

Any deflection requirements or limits due to the accompanying loads and load combinations on the joist 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.

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

103.5 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 104.13 of this specification)

The agency shall arrange for visual inspection to determine that welds meet the acceptance standards of Section 103.5(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) Field Splices

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

(d) Eccentricity

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

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

103.6 CAMBER

Joists shall have approximate camber in accordance with the following:

TABLE 103.6-1

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

For joist lengths exceeding 100'-0" a camber equal to Span/300 shall be used. The **specifying professional** shall give consideration to coordinating joist camber with adjacent framing.

103.7 VERIFICATION OF DESIGN AND MANUFACTURE

(a) Design Calculations

Companies manufacturing any **LH-** or **DLH**-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) In-Plant Inspections

Each manufacturer shall verify his ability to manufacture **LH-** and **DLH**-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 104.
APPLICATION

104.1 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 103.1, they shall be investigated and modified when necessary to limit the required stresses to those listed in Section 103.2.

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 No. 11, “Design of Lateral Load Resisting Frames Using Steel Joists and Joist Girders”

104.2 SPAN

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

104.3 DEPTH

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

104.4 END SUPPORTS

(a) Masonry and Concrete

A **LH**- or **DLH**-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 **LH**- and **DLH**-Series Joists shall extend a distance of not less than 6 inches (152 mm) over the masonry or concrete support unless it is deemed necessary to bear less than 6 inches (152 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**. **LH**- and **DLH**-Series Joists shall be anchored to the steel bearing plate and shall bear a minimum of 4 inches (102 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 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 4 inches (102 mm) from the face of the wall or other support, the required bearing seat depth shall be the minimum seat depth plus a dimension at least equal to the distance the joist reaction is to occur beyond 4 inches (102 mm).

The steel bearing plate shall not be less than 9 inches (229 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 **LH**- and **DLH**-Series Joists shall extend a distance over the steel supports not less than that shown in Table 104.4-1.

TABLE 104.4-1

JOIST SECTION NUMBER*	MINIMUM BEARING LENGTH
02 to 06 incl	2 ½" (64 mm)
07 to 17 incl	4" (102 mm)
18 to 25 incl	6" (152 mm)
*Last two digits of joist designation shown in Load Table.	

Where deemed necessary to butt opposite joists over a narrow steel support with bearing less than that noted above, special ends shall be specified, and such ends shall have positive attachment to the support, either by bolting or welding.

104.5 BRIDGING

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

(a) Horizontal

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

(b) Diagonal

Diagonal bridging lines 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 bridging members and the connections to the chords of the joists.

(c) Bridging Lines

For spans up through 60 feet (18288 mm), welded horizontal bridging shall be permitted except where the row of bridging nearest the center is required to be bolted diagonal bridging as indicated by the **Red** shaded area in the Load Table.

For spans over 60 feet (18288 mm) bolted diagonal bridging shall be used as indicated by the **Blue** and **Gray** shaded areas of the Load Table. When the joist spacing is less than 0.70 x joist depth, bolted horizontal bridging shall be used in addition to bolted diagonal bridging.

(d) 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,

$$\ell_{brmax} = \left(124 + 0.67\,d_j + 28\frac{d_j}{L}\right) r_y \text{, in.} \qquad (104.5\text{-}1a)$$

$$\ell_{brmax} = \left(124 + 0.026\,d_j + 0.34\frac{d_j}{L}\right) r_y \text{, mm} \qquad (104.5\text{-}1b)$$

or,

$$\ell_{brmax} = 170\,r_y \qquad (104.5\text{-}2)$$

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 Table 104.5-1 and the spacing shall meet the requirements of Equations 104.5-1 and 104.5-2. The number of rows of bottom chord bridging, including bridging required per Section 104.12, 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 103.4(a) and any specified strength requirements. For joist Section Number 21 and greater, bridging shall be installed near a bottom chord panel point or an extra web member shall be furnished to brace the bottom chord for the vertical component of the bridging force equal to the horizontal bracing force.

(e) Sizing of Bridging

Horizontal and diagonal bridging shall be capable of resisting the nominal unfactored horizontal compressive force, P_{br} given in Equation 104.5-3.

$$P_{br} = 0.0025\ n\ A_t\ F_{construction}\ ,\ lbs\ (N) \qquad (104.5\text{-}3)$$

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

$$F_{construction} = \left(\frac{\pi^2 E}{\left(\frac{0.9 \ell_{brmax}}{r_y} \right)^2} \right) \geq 12.2 ksi \qquad (104.5\text{-}4a)$$

$$F_{construction} = \left(\frac{\pi^2 E}{\left(\frac{0.9 \ell_{brmax}}{r_y} \right)^2} \right) \geq 84.1 MPa \qquad (104.5\text{-}4b)$$

Where:

E = Modulus of Elasticity of steel = 29,000 ksi (200,000 MPa)

and $\frac{\ell_{brmax}}{r_y}$ is determined from Equations 104.5-1a, 104.5-1b or 104.5-2

The bridging nominal horizontal unfactored compressive forces, P_{br}, are summarized in Table 104.5-1.

TABLE 104.5-1

JOIST SECTION NUMBER*	MAXIMUM SPACING OF LINES OF TOP CHORD BRIDGING	NOMINAL HORIZONTAL BRACING FORCE**	
		lbs	(N)
02 to 03 incl	10'-0″ (3048 mm)	400	(1779)
04 to 05 incl	11'-0″ (3353 mm)	550	(2447)
06 to 08 incl	13'-0″ (3962 mm) up to 39'-0" (11.89 m), then 15'-0" (4572 mm)	750	(3336)
09	13'-0″ (3962 mm) up to 39'-0" (11.89 m), then 16'-0" (4877 mm)	850	(3781)
10	14'-0" (4267 mm) up to 42'-0" (12.80 m), then 18'-0" (5486 mm)	900	(4003)
11	15'-0" (4572 mm) up to 45'-0" (13.72 m), then 18'-0" (5486 mm)	950	(4226)
12	17'-0″ (5182 mm) up to 51'-0" (15.54 m), then 18'-6" (5639 mm)	1100	(4893)
13	18'-0" (5486 mm) up to 54'-0" (16.46 m), then 21'-0" (6400 mm)	1200	(5338)
14	19'-0″ (5791 mm) up to 57'-0" (17.37 m), then 21'-6" (6553 mm)	1300	(5783)
15	21'-0″ (6400 mm) up to 63'-0" (19.20 m), then 24'-6" (7468 mm)	1450	(6450)
16 to 17 incl	22'-0″ (6706 mm) up to 66'-0" (20.12 m), then 25'-0" (7620 mm)	1850	(8229)
18 to 20 incl	26'-0" (7924 mm)	2000	(8896)
21 to 22 incl	30'-0" (9144 mm)	2500	(11120)
23 to 24 incl	30'-0" (9144 mm)	3100	(13789)
25	30'-0" (9144 mm)	3500	(15569)

Number of lines of bridging is based on joist span dimensions.
*Last two digits of joist designation shown in load table.
**Nominal bracing force is unfactored and shown value is for horizontal bridging only. For horizontal bracing force for X bridging divide value shown by 4.

(f) Connections

Connections 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 104.5-3.

(g) 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.

104.6 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.

104.7 BEARING SEAT ATTACHMENTS

(a) Masonry and Concrete

Ends of **LH**- and **DLH**-Series Joists resting on steel bearing plates on masonry or structural concrete shall be attached thereto, as shown in Table 104.7-1, with a minimum of two fillet welds, or with two bolts, or the equivalent.

(b) Steel

Ends of **LH**- and **DLH**-Series Joists resting on steel supports shall be attached thereto, as shown in Table 104.7-1, with two fillet welds, or with two 3/4 inch (19 mm) bolts, or the equivalent. When **LH**- and **DLH**-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**.

TABLE 104.7-1

JOIST SECTION NUMBER*	FILLET WELD	BEARING SEAT BOLTS FOR ERECTION
02 to 06 incl.	2– 3/16" x 2" (5 x 51 mm)	2– 3/4" (19 mm) A307
07 to 17 incl	2– 1/4" x 2" (6 x 51 mm)	2– 3/4" (19 mm) A307
18 to 25 incl	2– 1/4" x 4" (6 x 102 mm)	2– 3/4" (19 mm) A325
*Last two digits of joist designation shown in load table.		

(c) Uplift

Where uplift forces are a design consideration, roof joists shall be anchored to resist such forces (Refer to Section 104.12 Uplift).

104.8 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.

104.9 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 millimeters) 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 of attachments along the joist top chord shall not exceed 36 inches (914 millimeters). Such attachments of the slab or deck to the top chords of joists shall be capable of resisting the forces given in Table 104.9-1.

TABLE 104.9-1

JOIST SECTION NUMBER*	NOMINAL FORCE REQUIRED**
02 to 04 incl.	120 lbs/ft. (1.75 kN/m)
05 to 09 incl.	150 lbs/ft. (2.19 kN/m)
10 to 17 incl.	200 lbs/ft. (2.92 kN/m)
18 and 19	250 lbs/ft. (3.65 kN/m)
20 and 21	300 lbs/ft. (4.38 kN/m)
22 to 24 incl.	420 lbs/ft. (6.13 kN/m)
25	520 lbs/ft. (7.59 kN/m)
*Last two digits of joist designation shown in Load Table. **Nominal bracing force is unfactored.	

(f) Wood Nailers

Where wood nailers are used, such nailers in conjunction with deck or slab shall be firmly attached to the top chords of the joists in conformance with Section 104.9(e).

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

When the roof systems do not provide lateral stability for the joists in accordance with Section 104.9(e), i.e. as may be the case with standing seam roofs or 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 104.9(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 104.5(d).

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.

104.10 DEFLECTION

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

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

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

104.11 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.

104.12 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.”

104.13 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, they shall be permitted to reserve the right to do so in their "Invitation to Bid" or the accompanying "Job Specifications".

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

104.14 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 Load Table capacity shall be the component normal to the joist.

SECTION 105.
ERECTION STABILITY AND HANDLING*

When it is necessary for the erector to climb on the joists, extreme caution shall be exercised since unbridged joists 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 104.7 – 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 joist 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) Where the span of the steel joist is within the Blue shaded area of the Load Table, the following shall apply:
   a) All rows of bridging shall be bolted diagonal bridging; and
   b) Hoisting cables shall not be released until the two rows of bolted diagonal erection bridging nearest the third points of the steel joist are installed and anchored; and
   c) No more than two employees shall be allowed on these spans until all other bridging is installed and anchored.

5) Where the span of the steel joist is in the Gray shaded area of the Load Table, the following shall apply:
   a) All rows of bridging shall be bolted diagonal bridging; and
   b) Hoisting cables shall not be released until all bridging is installed and anchored; and
   c) No more than two employees shall be allowed on these spans until all other bridging is installed and anchored.

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

7) In the case of bottom chord bearing joists, the ends of the joist shall be restrained laterally per Section 104.5(g) before releasing the hoisting cables.

8) 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 104.7 - End Anchorage.

(b) Landing and Placing Loads

1) Except as stated in paragraph 105(b)(3) 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"[2] 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 bundle of 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 (0.30 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

Particular attention shall be considered for the handling and erection of **LH**- and **DLH-**Series steel joists. Care shall be exercised at all times to avoid damage to the joists and accessories. Hoisting cables shall be attached at panel point locations and those locations shall be selected to minimize erection stresses.

Each joist shall be adequately braced laterally before any loads are applied. If lateral support is provided by bridging, the bridging lines as defined in Section 105(a), paragraphs 2, 3, 4 and 5 shall be anchored to prevent lateral movement.

(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].

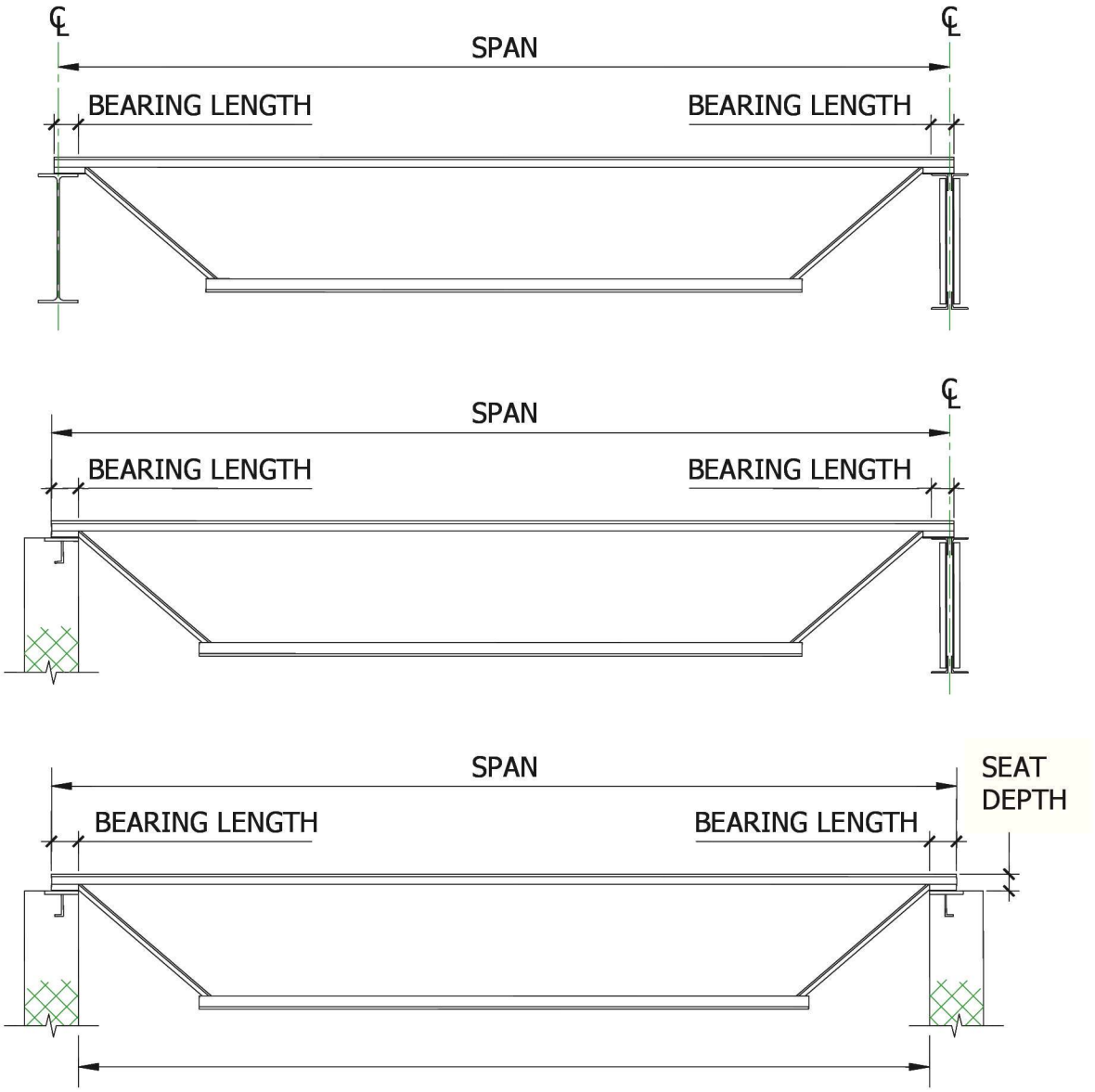
*For further reference, refer to Steel Joist Institute Technical Digest 9, "Handling and Erection of Steel Joists and Joist Girders."

[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 SHOWN IN TABLE 104.4-1; FOR MASONRY AND CONCRETE NOT LESS THAN 6 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.**

American National Standard SJI-LH/DLH-2010

STANDARD LRFD LOAD TABLE

LONGSPAN STEEL JOISTS, LH-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 LH-**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 Longspan Steel Joists, **LH-**Series.

The Load Table applies to joists with either parallel chords or pitched top chords. Joists can have a top chord pitch up to 1/2 inch per foot. If the pitch exceeds this limit, the Load Table does not apply. When top chords are pitched, the load-carrying capacities are determined by the nominal depth of the joists at the center of the span. Sloped parallel-chord joists shall use span as defined by the length along the slope.

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".

Where the joist span is in the **BLUE SHADED** area of the Load Table, all rows of bridging shall be diagonal bridging with bolted connections at chords and intersections. Hoisting cables shall not be released until the two rows of bridging nearest the third points are completely installed. The **BLUE SHADED** area starts after 60'–0" and extends up through 100'–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.

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.

*The safe factored uniform load for the spans shown in the SAFE LOAD Column is equal to (SAFE LOAD) / (span). The TOTAL safe factored uniformly distributed load-carrying capacity, for spans less than those shown in the SAFE LOAD Column are given in the MAX LOAD Column.

To solve for an unfactored RED figure for spans shown in the SAFE LOAD Column (or lesser spans), multiply the unfactored RED figure of the shortest span shown in the Load Table by (the shortest span shown in the Load Table – 0.33 feet)^2 and divide by (the actual span – 0.33 feet)^2. In no case shall the calculated unfactored load exceed the unfactored TOTAL load-carrying capacity of the joist as determined from the Standard **ASD** Load Table for Longspan Steel Joists, **LH-**Series.

LRFD

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

Joist Designation	Approx. Wt in Lbs. Per Linear Ft. (Joists only)	Depth in inches	Max Load (plf)	SAFE LOAD* in Lbs. Between	SPAN IN FEET														
			< 22	22-25	26	27	28	29	30	31	32	33	34	35	36				
18LH02	10	18	829	18240	702	663	627	586	550	517	486	459	433	409	388				
					313	284	259	234	212	193	175	160	147	135	124				
18LH03	11	18	919	20220	781	739	700	657	613	573	538	505	475	448	424				
					348	317	289	262	236	213	194	177	161	148	136				
18LH04	12	18	1070	23550	906	856	802	750	703	660	619	582	547	516	487				
					403	367	329	296	266	242	219	200	182	167	153				
18LH05	15	18	1210	26610	1026	972	921	871	814	762	714	672	631	595	562				
					454	414	378	345	311	282	256	233	212	195	179				
18LH06	15	18	1430	31470	1213	1123	1044	972	907	849	796	748	705	664	627				
					526	469	419	377	340	307	280	254	232	212	195				
18LH07	17	18	1485	32670	1260	1213	1170	1089	1017	952	892	838	789	744	703				
					553	513	476	428	386	349	317	288	264	241	222				
18LH08	19	18	1548	34050	1314	1264	1218	1176	1137	1075	1020	961	906	856	810				
					577	534	496	462	427	387	351	320	292	267	246				
18LH09	21	18	1658	36480	1404	1351	1302	1257	1215	1174	1138	1069	1006	949	897				
					616	571	527	491	458	418	380	346	316	289	266				
			< 23	23-25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
20LH02	10	20	747	17190	663	655	646	615	582	547	516	487	460	436	412	393	373	355	337
					306	303	298	274	250	228	208	190	174	160	147	136	126	117	108
20LH03	11	20	793	18240	703	694	687	678	651	621	592	558	528	499	474	448	424	403	382
					337	333	317	302	280	258	238	218	200	184	169	156	143	133	123
20LH04	12	20	972	22350	861	849	837	792	744	700	660	624	589	558	529	502	477	454	433
					428	406	386	352	320	291	265	243	223	205	189	174	161	149	139
20LH05	14	20	1045	24030	924	913	903	892	856	816	769	726	687	651	616	585	556	529	504
					459	437	416	395	366	337	308	281	258	238	219	202	187	173	161
20LH06	15	20	1394	32070	1233	1186	1144	1084	1018	952	894	840	790	745	703	666	631	598	568
					606	561	521	477	427	386	351	320	292	267	246	226	209	192	178
20LH07	17	20	1487	34200	1317	1267	1221	1179	1140	1066	1000	940	885	834	789	745	706	670	637
					647	599	556	518	484	438	398	362	331	303	278	256	236	218	202
20LH08	19	20	1534	35280	1362	1309	1263	1219	1177	1140	1083	1030	981	931	882	837	795	754	718
					669	619	575	536	500	468	428	395	365	336	309	285	262	242	225
20LH09	21	20	1679	38610	1485	1429	1377	1329	1284	1242	1203	1167	1132	1068	1009	954	904	858	816
					729	675	626	581	542	507	475	437	399	366	336	309	285	264	244
20LH10	23	20	1810	41640	1602	1542	1486	1434	1386	1341	1297	1258	1221	1186	1122	1060	1005	954	906
					786	724	673	626	585	545	510	479	448	411	377	346	320	296	274

LRFD

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

Joist Designation	Approx. Wt in Lbs. Per Linear Ft. (Joists only)	Depth in inches	Max Load (plf)	SAFELOAD* in Lbs. Between		SPAN IN FEET														
			< 29	29-33		34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
24LH03	11	24	601	17430		513	508	504	484	460	439	418	400	382	366	351	336	322	310	298
						235	226	218	204	188	175	162	152	141	132	124	116	109	102	96
24LH04	12	24	737	21360		628	597	568	540	514	490	468	447	427	409	393	376	361	346	333
						288	265	246	227	210	195	182	169	158	148	138	130	122	114	107
24LH05	13	24	789	22890		673	669	660	628	598	570	544	520	496	475	456	436	420	403	387
						308	297	285	264	244	226	210	196	182	171	160	150	141	132	124
24LH06	16	24	1061	30780		906	868	832	795	756	720	685	655	625	598	571	546	522	501	480
						411	382	356	331	306	284	263	245	228	211	197	184	172	161	152
24LH07	17	24	1166	33810		997	957	919	882	847	811	774	736	702	669	639	610	583	559	535
						452	421	393	367	343	320	297	276	257	239	223	208	195	182	171
24LH08	18	24	1243	36060		1060	1015	973	933	895	858	817	780	745	712	682	652	625	600	576
						480	447	416	388	362	338	314	292	272	254	238	222	208	196	184
24LH09	21	24	1464	42450		1248	1212	1177	1146	1096	1044	994	948	903	861	822	786	751	720	690
						562	530	501	460	424	393	363	337	313	292	272	254	238	223	209
24LH10	23	24	1547	44850		1323	1284	1248	1213	1182	1152	1105	1053	1002	955	912	873	834	799	766
						596	559	528	500	474	439	406	378	351	326	304	285	266	249	234
24LH11	25	24	1630	47280		1390	1350	1312	1276	1243	1210	1180	1152	1101	1051	1006	963	924	885	850
						624	588	555	525	498	472	449	418	388	361	337	315	294	276	259
			< 34	34-41		42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
28LH05	13	28	623	21180		505	484	465	445	429	412	397	382	367	355	342	330	319	309	298
						219	205	192	180	169	159	150	142	133	126	119	113	107	102	97
28LH06	16	28	828	28140		672	643	618	592	568	546	525	505	486	469	451	436	421	406	393
						289	270	253	238	223	209	197	186	175	165	156	148	140	133	126
28LH07	17	28	934	31770		757	726	696	667	640	615	591	568	547	528	508	490	474	457	442
						326	305	285	267	251	236	222	209	197	186	176	166	158	150	142
28LH08	18	28	1001	34020		810	775	744	712	684	657	630	604	580	556	535	516	496	478	462
						348	325	305	285	268	252	236	222	209	196	185	175	165	156	148
28LH09	21	28	1232	41880		1000	958	918	879	844	810	778	748	721	694	669	645	622	601	580
						428	400	375	351	329	309	291	274	258	243	228	216	204	193	183
28LH10	23	28	1347	45810		1093	1056	1018	976	937	900	864	831	799	769	742	715	690	666	643
						466	439	414	388	364	342	322	303	285	269	255	241	228	215	204
28LH11	25	28	1445	49140		1170	1143	1104	1066	1023	982	943	907	873	841	810	781	753	727	702
						498	475	448	423	397	373	351	331	312	294	278	263	249	236	223
28LH12	27	28	1587	53970		1285	1255	1227	1200	1173	1149	1105	1063	1023	984	948	913	880	849	819
						545	520	496	476	454	435	408	383	361	340	321	303	285	270	256
28LH13	30	28	1654	56250		1342	1311	1281	1252	1224	1198	1173	1149	1126	1083	1041	1002	964	930	897
						569	543	518	495	472	452	433	415	396	373	352	332	314	297	281
			< 39	39-46	47-49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
32LH06	14	32	647	25230	25230	507	489	472	456	441	426	412	399	385	373	363	351	340	330	321
						211	199	189	179	169	161	153	145	138	131	125	119	114	108	104
32LH07	16	32	728	28380	28380	568	549	529	511	493	477	462	447	432	418	406	393	381	370	360
						235	223	211	200	189	179	170	162	154	146	140	133	127	121	116
32LH08	17	32	790	30810	30810	616	595	574	553	535	517	499	483	468	453	439	426	412	400	388
						255	242	229	216	205	194	184	175	167	159	151	144	137	131	125
32LH09	21	32	992	38670	38670	774	747	720	694	670	648	627	606	586	568	550	534	517	502	487
						319	302	285	270	256	243	230	219	208	198	189	180	172	164	157
32LH10	21	32	1096	42750	42750	856	825	796	768	742	717	693	667	645	624	603	583	564	546	529
						352	332	315	297	282	267	254	240	228	217	206	196	186	178	169
32LH11	24	32	1201	46830	46830	937	903	870	840	811	783	757	732	709	687	664	643	624	604	585
						385	363	343	325	308	292	277	263	251	239	227	216	206	196	187
32LH12	27	32	1409	54960	54960	1101	1068	1032	996	961	928	897	867	838	811	786	762	738	715	694
						450	428	406	384	364	345	327	311	295	281	267	255	243	232	221
32LH13	30	32	1572	61320	61320	1225	1201	1177	1156	1113	1072	1035	999	964	931	900	871	843	816	790
						500	480	461	444	420	397	376	354	336	319	304	288	275	262	249
32LH14	33	32	1618	63120	63120	1264	1239	1215	1192	1170	1149	1107	1069	1032	997	964	933	903	874	846
						515	495	476	458	440	417	395	374	355	337	321	304	290	276	264
32LH15	35	32	1673	65250	65250	1305	1279	1255	1231	1207	1186	1164	1144	1125	1087	1051	1017	984	952	924
						532	511	492	473	454	438	422	407	393	374	355	338	322	306	292
			< 43	43-46	47-56 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
36LH07	16	36	590	25350	25350	438	424	411	399	387	376	366	355	345	336	327	318	310	301	294
						177	168	160	153	146	140	134	128	122	117	112	107	103	99	95
36LH08	18	36	649	27900	27900	481	466	453	439	426	414	402	390	379	369	358	349	340	331	322
						194	185	176	168	160	153	146	140	134	128	123	118	113	109	104
36LH09	21	36	832	35760	35760	616	597	579	561	544	528	513	499	484	471	459	445	433	423	412
						247	236	224	214	204	195	186	179	171	163	157	150	144	138	133
36LH10	21	36	916	39390	39390	681	660	639	619	601	583	567	550	535	520	507	492	480	466	454
						273	260	248	236	225	215	206	197	188	180	173	165	159	152	146
36LH11	23	36	1000	42990	42990	742	720	697	676	657	637	618	601	583	567	552	537	522	508	495
						297	283	269	257	246	234	224	214	205	196	188	180	173	166	159
36LH12	25	36	1197	51450	51450	889	862	835	810	784	762	739	717	696	675	655	636	618	600	583
						354	338	322	307	292	279	267	255	243	232	222	213	204	195	187
36LH13	30	36	1407	60510	60510	1045	1012	981	951	922	894	868	843	819	796	774	753	732	712	694
						415	395	376	359	342	327	312	298	285	273	262	251	240	231	222
36LH14	36	36	1551	66690	66690	1152	1132	1093	1059	1024	991	961	931	903	876	850	826	802	780	757
						456	434	412	392	373	356	339	323	309	295	283	270	259	247	237
36LH15	36	36	1635	70320	70320	1213	1192	1171	1153	1116	1081	1047	1015	984	955	927	900	874	850	826
						480	464	448	434	413	394	375	358	342	327	312	299	286	274	263

LRFD

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

Joist Designation	Approx. Wt in Lbs. Per Linear Ft. (Joists Only)	Depth in inches	Max Load (plf)	SAFELOAD* in Lbs. Between		SPAN IN FEET														
			< 48	**48-59**	**60-65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**
40LH08	16	40	521	25020	25020	381 150	370 144	361 138	351 132	342 127	333 122	325 117	316 112	309 108	301 104	294 100	288 97	280 93	274 90	267 86
40LH09	21	40	685	32880	32880	498 196	484 188	472 180	459 173	447 166	436 160	424 153	414 147	403 141	394 136	384 131	375 126	366 122	358 118	349 113
40LH10	21	40	754	36180	36180	550 216	535 207	520 198	507 190	493 183	481 176	469 169	457 162	445 156	435 150	424 144	414 139	403 134	393 129	382 124
40LH11	22	40	823	39510	39510	598 234	582 224	567 215	552 207	537 198	523 190	510 183	498 176	484 169	472 163	462 157	450 151	439 145	429 140	418 135
40LH12	25	40	1002	48090	48090	729 285	708 273	688 261	670 251	652 241	636 231	619 222	603 213	588 205	573 197	559 189	546 182	532 176	519 169	507 163
40LH13	30	40	1181	56700	56700	859 334	835 320	813 307	792 295	771 283	750 271	730 260	712 250	694 241	676 231	660 223	643 214	628 207	613 199	598 192
40LH14	35	40	1351	64830	64830	984 383	957 367	930 351	904 336	880 323	856 309	834 297	813 285	792 273	772 263	753 252	735 243	717 233	699 225	682 216
40LH15	36	40	1511	72510	72510	1101 427	1068 408	1036 390	1006 373	978 357	949 342	924 328	898 315	874 302	850 290	828 279	807 268	786 258	766 248	747 239
40LH16	42	40	1665	79920	79920	1212 469	1194 455	1176 441	1158 428	1141 416	1126 404	1095 387	1065 371	1036 356	1009 342	982 329	957 316	933 304	909 292	886 282
			< 53	**53-59**	**60-73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**
44LH09	19	44	569	30150	30150	408 158	397 152	388 146	379 141	370 136	363 131	354 127	346 122	339 118	331 114	324 110	316 106	310 103	303 99	297 96
44LH10	21	44	628	33300	33300	450 174	439 168	429 162	418 155	408 150	399 144	390 139	381 134	373 130	364 125	357 121	349 117	342 113	334 110	327 106
44LH11	22	44	679	36000	36000	487 188	475 181	465 175	453 168	442 162	433 157	423 151	414 146	403 140	396 136	387 131	378 127	370 123	363 119	354 115
44LH12	25	44	842	44610	44610	603 232	589 224	574 215	561 207	547 200	534 192	520 185	508 179	496 172	484 166	472 160	462 155	450 149	439 144	430 139
44LH13	30	44	998	52890	52890	715 275	699 265	681 254	666 246	649 236	634 228	619 220	606 212	592 205	579 198	565 191	553 185	541 179	529 173	519 167
44LH14	31	44	1148	60870	60870	823 315	801 302	780 291	759 279	739 268	721 259	703 249	685 240	669 231	654 223	637 215	622 207	609 200	594 193	580 187
44LH15	36	44	1336	70830	70830	958 366	934 352	912 339	889 326	868 314	847 303	826 292	805 281	786 271	768 261	750 252	732 243	714 234	699 227	682 219
44LH16	42	44	1541	81660	81660	1105 421	1078 405	1051 390	1026 375	1002 362	978 348	955 336	933 324	912 313	891 302	870 291	852 282	832 272	814 263	796 255
44LH17	47	44	1655	87690	87690	1185 450	1170 438	1153 426	1138 415	1125 405	1098 390	1072 376	1048 363	1024 351	1000 338	978 327	957 316	936 305	915 295	895 285
			< 57	**57-59**	**60-81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**
48LH10	21	48	528	30120	30120	369 141	361 136	354 132	346 127	339 123	331 119	325 116	318 112	312 108	306 105	300 102	294 99	288 96	282 93	277 90
48LH11	22	48	573	32670	32670	399 152	390 147	382 142	373 137	366 133	358 129	351 125	343 120	337 117	330 113	324 110	318 106	312 103	306 100	300 97
48LH12	25	48	724	41250	41250	504 191	493 185	483 179	472 173	462 167	451 161	442 156	433 151	424 147	415 142	408 138	399 133	391 129	384 126	376 122
48LH13	29	48	867	49410	49410	603 228	589 221	576 213	564 206	552 199	540 193	529 187	517 180	507 175	498 170	487 164	477 159	468 154	459 150	450 145
48LH14	32	48	1023	58290	58290	712 269	696 260	681 251	666 243	651 234	637 227	624 220	610 212	598 206	585 199	574 193	562 187	550 181	540 176	529 171
48LH15	36	48	1176	67020	67020	817 308	799 298	781 287	765 278	748 269	732 260	717 252	702 244	687 236	672 228	658 221	645 214	633 208	619 201	607 195
48LH16	42	48	1355	77250	77250	943 355	922 343	901 331	882 320	864 310	844 299	826 289	810 280	792 271	777 263	760 255	745 247	730 239	715 232	702 225
48LH17	47	48	1522	86760	86760	1059 397	1035 383	1012 371	990 358	969 346	948 335	928 324	909 314	889 304	871 294	853 285	837 276	820 268	804 260	787 252

American National Standard SJI-LH/DLH-2010

STANDARD ASD LOAD TABLE

LONGSPAN STEEL JOISTS, LH-SERIES

Based on a 50 ksi Maximum Yield Strength
Adopted by the Steel Joist Institute May 25, 1983
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 LH-**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 that 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 load exceed the TOTAL load-carrying capacity of the joist.

The Load Table applies to joists with either parallel chords or pitched top chords. Joists can have a top chord pitch up to 1/2 inch per foot. If the pitch exceeds this limit, the Load Table does not apply. When top chords are pitched, the load-carrying capacities are determined by the nominal depth of the joists at the center of the span. Sloped parallel-chord joists shall use span as defined by the length along the slope.

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".

Where the joist span is in the **BLUE SHADED** area of the Load Table, all rows of bridging shall be diagonal bridging with bolted connections at chords and intersections. Hoisting cables shall not be released until the two rows of bridging nearest the third points are completely installed. The **BLUE SHADED** area starts after 60'–0" and extends up through 100'–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.

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.

*The safe uniform load for the spans shown in the SAFE LOAD Column is equal to (SAFE LOAD) / (span). The TOTAL safe uniformly distributed load-carrying capacity, for spans less than those shown in the SAFE LOAD Column are given in the MAX LOAD Column.

To solve for a RED figure for spans shown in the SAFE LOAD Column (or lesser spans), multiply the RED figure of the shortest span shown in the Load Table by (the shortest span shown in the Load Table – 0.33 feet)^2 and divide by (the actual span – 0.33 feet)^2. In no case shall the calculated load exceed the TOTAL load-carrying capacity of the joist.

ASD

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

Joist Designation	Approx. Wt in Lbs. Per Linear Ft. (Joists only)	Depth in inches	Max Load (plf)	SAFE LOAD* in Lbs. Between	SPAN IN FEET															
			< 22	**22-25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**					
18LH02	10	18	553	12160	468	442	418	391	367	345	324	306	289	273	259					
					313	284	259	234	212	193	175	160	147	135	124					
18LH03	11	18	613	13480	521	493	467	438	409	382	359	337	317	299	283					
					348	317	289	262	236	213	194	177	161	148	136					
18LH04	12	18	714	15700	604	571	535	500	469	440	413	388	365	344	325					
					403	367	329	296	266	242	219	200	182	167	153					
18LH05	15	18	806	17740	684	648	614	581	543	508	476	448	421	397	375					
					454	414	378	345	311	282	256	233	212	195	179					
18LH06	15	18	954	20980	809	749	696	648	605	566	531	499	470	443	418					
					526	469	419	377	340	307	280	254	232	212	195					
18LH07	17	18	990	21780	840	809	780	726	678	635	595	559	526	496	469					
					553	513	476	428	386	349	317	288	264	241	222					
18LH08	19	18	1032	22700	876	843	812	784	758	717	680	641	604	571	540					
					577	534	496	462	427	387	351	320	292	267	246					
18LH09	21	18	1105	24320	936	901	868	838	810	783	759	713	671	633	598					
					616	571	527	491	458	418	380	346	316	289	266					
			< 23	**23-25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	
20LH02	10	20	498	11460	442	437	431	410	388	365	344	325	307	291	275	262	249	237	225	
					306	303	298	274	250	228	208	190	174	160	147	136	126	117	108	
20LH03	11	20	529	12160	469	463	458	452	434	414	395	372	352	333	316	299	283	269	255	
					337	333	317	302	280	258	238	218	200	184	169	156	143	133	123	
20LH04	12	20	648	14900	574	566	558	528	496	467	440	416	393	372	353	335	318	303	289	
					428	406	386	352	320	291	265	243	223	205	189	174	161	149	139	
20LH05	14	20	697	16020	616	609	602	595	571	544	513	484	458	434	411	390	371	353	336	
					459	437	416	395	366	337	308	281	258	238	219	202	187	173	161	
20LH06	15	20	930	21380	822	791	763	723	679	635	596	560	527	497	469	444	421	399	379	
					606	561	521	477	427	386	351	320	292	267	246	226	209	192	178	
20LH07	17	20	991	22800	878	845	814	786	760	711	667	627	590	556	526	497	471	447	425	
					647	599	556	518	484	438	398	362	331	303	278	256	236	218	202	
20LH08	19	20	1023	23520	908	873	842	813	785	760	722	687	654	621	588	558	530	503	479	
					669	619	575	536	500	468	428	395	365	336	309	285	262	242	225	
20LH09	21	20	1119	25740	990	953	918	886	856	828	802	778	755	712	673	636	603	572	544	
					729	675	626	581	542	507	475	437	399	366	336	309	285	264	244	
20LH10	23	20	1207	27760	1068	1028	991	956	924	894	865	839	814	791	748	707	670	636	604	
					786	724	673	626	585	545	510	479	448	411	377	346	320	296	274	

ASD

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

Joist Designation	Approx. Wt in Lbs. Per Linear Ft. (Joists only)	Depth in inches	Max Load (plf)	SAFELOAD* in Lbs. Between	SPAN IN FEET														
			< 29	29-33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
24LH03	11	24	401	11620	342	339	336	323	307	293	279	267	255	244	234	224	215	207	199
					235	226	218	204	188	175	162	152	141	132	124	116	109	102	96
24LH04	12	24	491	14240	419	398	379	360	343	327	312	298	285	273	262	251	241	231	222
					288	265	246	227	210	195	182	169	158	148	138	130	122	114	107
24LH05	13	24	526	15260	449	446	440	419	399	380	363	347	331	317	304	291	280	269	258
					308	297	285	264	244	226	210	196	182	171	160	150	141	132	124
24LH06	16	24	708	20520	604	579	555	530	504	480	457	437	417	399	381	364	348	334	320
					411	382	356	331	306	284	263	245	228	211	197	184	172	161	152
24LH07	17	24	777	22540	665	638	613	588	565	541	516	491	468	446	426	407	389	373	357
					452	421	393	367	343	320	297	276	257	239	223	208	195	182	171
24LH08	18	24	829	24040	707	677	649	622	597	572	545	520	497	475	455	435	417	400	384
					480	447	416	388	362	338	314	292	272	254	238	222	208	196	184
24LH09	21	24	976	28300	832	808	785	764	731	696	663	632	602	574	548	524	501	480	460
					562	530	501	460	424	393	363	337	313	292	272	254	238	223	209
24LH10	23	24	1031	29900	882	856	832	809	788	768	737	702	668	637	608	582	556	533	511
					596	559	528	500	474	439	406	378	351	326	304	285	266	249	234
24LH11	25	24	1087	31520	927	900	875	851	829	807	787	768	734	701	671	642	616	590	567
					624	588	555	525	498	472	449	418	388	361	337	315	294	276	259
			< 34	34-41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
28LH05	13	28	415	14120	337	323	310	297	286	275	265	255	245	237	228	220	213	206	199
					219	205	192	180	169	159	150	142	133	126	119	113	107	102	97
28LH06	16	28	552	18760	448	429	412	395	379	364	350	337	324	313	301	291	281	271	262
					289	270	253	238	223	209	197	186	175	166	156	148	140	133	126
28LH07	17	28	623	21180	505	484	464	445	427	410	394	379	365	352	339	327	316	305	295
					326	305	285	267	251	236	222	209	197	186	176	166	158	150	142
28LH08	18	28	667	22680	540	517	496	475	456	438	420	403	387	371	357	344	331	319	308
					348	325	305	285	268	252	236	222	209	196	185	175	165	156	148
28LH09	21	28	821	27920	667	639	612	586	563	540	519	499	481	463	446	430	415	401	387
					428	400	375	351	329	309	291	274	258	243	228	216	204	193	183
28LH10	23	28	898	30540	729	704	679	651	625	600	576	554	533	513	495	477	460	444	429
					466	439	414	388	364	342	322	303	285	269	255	241	228	215	204
28LH11	25	28	964	32760	780	762	736	711	682	655	629	605	582	561	540	521	502	485	468
					498	475	448	423	397	373	351	331	312	294	278	263	249	236	223
28LH12	27	28	1058	35980	857	837	818	800	782	766	737	709	682	656	632	609	587	566	546
					545	520	496	476	454	435	408	383	361	340	321	303	285	270	256
28LH13	30	28	1103	37500	895	874	854	835	816	799	782	766	751	722	694	668	643	620	598
					569	543	518	495	472	452	433	415	396	373	352	332	314	297	281
			< 39	39-46 47-49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
32LH06	14	32	431	16820 16820	338	326	315	304	294	284	275	266	257	249	242	234	227	220	214
					211	199	189	179	169	161	153	145	138	131	125	119	114	108	104
32LH07	16	32	485	18920 18920	379	366	353	341	329	318	308	298	288	279	271	262	254	247	240
					235	223	211	200	189	179	170	162	154	146	140	133	127	121	116
32LH08	17	32	527	20540 20540	411	397	383	369	357	345	333	322	312	302	293	284	275	267	259
					255	242	229	216	205	194	184	175	167	159	151	144	137	131	125
32LH09	21	32	661	25780 25780	516	498	480	463	447	432	418	404	391	379	367	356	345	335	325
					319	302	285	270	256	243	230	219	208	198	189	180	172	164	157
32LH10	21	32	731	28500 28500	571	550	531	512	495	478	462	445	430	416	402	389	376	364	353
					352	332	315	297	282	267	254	240	228	217	206	196	186	178	169
32LH11	24	32	801	31220 31220	625	602	580	560	541	522	505	488	473	458	443	429	416	403	390
					385	363	343	325	308	292	277	263	251	239	227	216	206	196	187
32LH12	27	32	939	36640 36640	734	712	688	664	641	619	598	578	559	541	524	508	492	477	463
					450	428	406	384	364	345	327	311	295	281	267	255	243	232	221
32LH13	30	32	1048	40880 40880	817	801	785	771	742	715	690	666	643	621	600	581	562	544	527
					500	480	461	444	420	397	376	354	336	319	304	288	275	262	249
32LH14	33	32	1079	42080 42080	843	826	810	795	780	766	738	713	688	665	643	622	602	583	564
					515	495	476	458	440	417	395	374	355	337	321	304	290	276	264
32LH15	35	32	1115	43500 43500	870	853	837	821	805	791	776	763	750	725	701	678	656	635	616
					532	511	492	473	454	438	422	407	393	374	355	338	322	306	292
			< 43	43-46 47-56 57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
36LH07	16	36	393	16900 16900	292	283	274	266	258	251	244	237	230	224	218	212	207	201	196
					177	168	160	153	146	140	134	128	122	117	112	107	103	99	95
36LH08	18	36	433	18600 18600	321	311	302	293	284	276	268	260	253	246	239	233	227	221	215
					194	185	176	168	160	153	146	140	134	128	123	118	113	109	104
36LH09	21	36	554	23840 23840	411	398	386	374	363	352	342	333	323	314	306	297	289	282	275
					247	235	224	214	204	195	186	179	171	163	157	150	144	138	133
36LH10	21	36	611	26260 26260	454	440	426	413	401	389	378	367	357	347	338	328	320	311	303
					273	260	248	236	225	215	206	197	188	180	173	165	159	152	146
36LH11	23	36	667	28660 28660	495	480	465	451	438	425	412	401	389	378	368	358	348	339	330
					297	283	269	257	246	234	224	214	205	196	188	180	173	166	159
36LH12	25	36	798	34300 34300	593	575	557	540	523	508	493	478	464	450	437	424	412	400	389
					354	338	322	307	292	279	267	255	243	232	222	213	204	195	187
36LH13	30	36	938	40340 40340	697	675	654	634	615	596	579	562	546	531	516	502	488	475	463
					415	395	376	359	342	327	312	298	285	273	262	251	240	231	222
36LH14	36	36	1034	44460 44460	768	755	729	706	683	661	641	621	602	584	567	551	535	520	505
					456	434	412	392	373	356	339	323	309	295	283	270	259	247	237
36LH15	36	36	1090	46880 46880	809	795	781	769	744	721	698	677	656	637	618	600	583	567	551
					480	464	448	434	413	394	375	358	342	327	312	299	286	274	263

ASD

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

Joist Designation	Approx. Wt in Lbs. Per Linear Ft. (Joists Only)	Depth in inches	Max Load (plf)	SAFELOAD* in Lbs. Between		SPAN IN FEET														
			< 48	48-59	60-65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
40LH08	16	40	348	16680	16680	254 150	247 144	241 138	234 132	228 127	222 122	217 117	211 112	206 108	201 104	196 100	192 97	187 93	183 90	178 86
40LH09	21	40	457	21920	21920	332 196	323 188	315 180	306 173	298 166	291 160	283 153	276 147	269 141	263 136	256 131	250 126	244 122	239 118	233 113
40LH10	21	40	503	24120	24120	367 216	357 207	347 198	338 190	329 183	321 176	313 169	305 162	297 156	290 150	283 144	276 139	269 134	262 129	255 124
40LH11	22	40	549	26340	26340	399 234	388 224	378 215	368 207	358 198	349 190	340 183	332 176	323 169	315 163	308 157	300 151	293 145	286 140	279 135
40LH12	25	40	668	32060	32060	486 285	472 273	459 261	447 251	435 241	424 231	413 222	402 213	392 205	382 197	373 189	364 182	355 176	346 169	338 163
40LH13	30	40	788	37800	37800	573 334	557 320	542 307	528 295	514 283	500 271	487 260	475 250	463 241	451 231	440 223	429 214	419 207	409 199	399 192
40LH14	35	40	900	43220	43220	656 383	638 367	620 351	603 336	587 323	571 309	556 297	542 285	528 273	515 263	502 252	490 243	478 233	466 225	455 216
40LH15	36	40	1007	48340	48340	734 427	712 408	691 390	671 373	652 357	633 342	616 328	599 315	583 302	567 290	552 279	538 268	524 258	511 248	498 239
40LH16	42	40	1110	53280	53280	808 469	796 455	784 441	772 428	761 416	751 404	730 387	710 371	691 356	673 342	655 329	638 316	622 304	606 292	591 282
			< 53	53-59	60-73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
44LH09	19	44	379	20100	20100	272 158	265 152	259 146	253 141	247 136	242 131	236 127	231 122	226 118	221 114	216 110	211 106	207 103	202 99	198 96
44LH10	21	44	419	22200	22200	300 174	293 168	286 162	279 155	272 150	266 144	260 139	254 134	249 130	243 125	238 121	233 117	228 113	223 110	218 106
44LH11	22	44	453	24000	24000	325 188	317 181	310 175	302 168	295 162	289 157	282 151	276 146	269 140	264 136	258 131	252 127	247 123	242 119	236 115
44LH12	25	44	561	29740	29740	402 232	393 224	383 215	374 207	365 200	356 192	347 185	339 179	331 172	323 166	315 160	308 155	300 149	293 144	287 139
44LH13	30	44	665	35260	35260	477 275	466 265	454 254	444 246	433 236	423 228	413 220	404 212	395 205	386 198	377 191	369 185	361 179	353 173	346 167
44LH14	31	44	766	40580	40580	549 315	534 302	520 291	506 279	493 268	481 259	469 249	457 240	446 231	436 223	425 215	415 207	406 200	396 193	387 187
44LH15	36	44	891	47220	47220	639 366	623 352	608 339	593 326	579 314	565 303	551 292	537 281	524 271	512 261	500 252	488 243	476 234	466 227	455 219
44LH16	42	44	1027	54440	54440	737 421	719 405	701 390	684 375	668 362	652 348	637 336	622 324	608 313	594 302	580 291	568 282	555 272	543 263	531 255
44LH17	47	44	1103	58460	58460	790 450	780 438	769 426	759 415	750 405	732 390	715 376	699 363	683 351	667 338	652 327	638 316	624 305	610 295	597 285
			< 57	57-59	60-81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
48LH10	21	48	352	20080	20080	246 141	241 136	236 132	231 127	226 123	221 119	217 116	212 112	208 108	204 105	200 102	196 99	192 96	188 93	185 90
48LH11	22	48	382	21780	21780	266 152	260 147	255 142	249 137	244 133	239 129	234 125	229 120	225 117	220 113	216 110	212 106	208 103	204 100	200 97
48LH12	25	48	482	27500	27500	336 191	329 185	322 179	315 173	308 167	301 161	295 156	289 151	283 147	277 142	272 138	266 133	261 129	256 126	251 122
48LH13	29	48	578	32940	32940	402 228	393 221	384 213	376 206	368 199	360 193	353 187	345 180	338 175	332 170	325 164	318 159	312 154	306 150	300 145
48LH14	32	48	682	38860	38860	475 269	464 260	454 251	444 243	434 234	425 227	416 220	407 212	399 206	390 199	383 193	375 187	367 181	360 176	353 171
48LH15	36	48	784	44680	44680	545 308	533 298	521 287	510 278	499 269	488 260	478 252	468 244	458 236	448 228	439 221	430 214	422 208	413 201	405 195
48LH16	42	48	904	51500	51500	629 355	615 343	601 331	588 320	576 310	563 299	551 289	540 280	528 271	518 263	507 255	497 247	487 239	477 232	468 225
48LH17	47	48	1015	57840	57840	706 397	690 383	675 371	660 358	646 346	632 335	619 324	606 314	593 304	581 294	569 285	558 276	547 268	536 260	525 252

American National Standard SJI-LH/DLH-2010

STANDARD LRFD LOAD TABLE

DEEP LONGSPAN STEEL JOISTS, DLH-SERIES

Based on a 50 ksi Maximum Yield Strength
Spans up to and including 144 ft. adopted by the Steel Joist Institute May 1, 2000
Spans greater than 144 ft. up to and including 240 ft. adopted by the Steel Joist Institute May 18, 2010
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 DLH-**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. the 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 Deep Longspan Steel Joists, **DLH**-Series.

The Load Table applies to joists with either parallel chords or pitched top chords. Joists can have a top chord pitch up to 1/2 inch per foot. If the pitch exceeds this limit, the Load Table does not apply. When top chords are pitched, the load-carrying capacities are determined by the nominal depth of the joists at the center of the span. Sloped parallel-chord joists shall use span as defined by the length along the slope.

Where the joist span is in the **BLUE SHADED** area of the Load Table, all rows of bridging shall be diagonal bridging with bolted connections at chords and intersections. Hoisting cables shall not be released until the two rows of bridging nearest the third points are completely installed. The **BLUE SHADED** area starts after 60'–0" and extends up through 100'–0".
Where the joist span is in the **GRAY SHADED** area of the Load Table, all rows of bridging shall be diagonal bridging with bolted connections at chords and intersections. Hoisting cables shall not be released until all rows of bridging are completely installed. The **GRAY SHADED** area starts after 100'–0" and extends up through 240'–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.

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.

*The safe factored uniform load for the spans shown in the SAFE LOAD Column is equal to (SAFE LOAD) / (span). The TOTAL safe factored uniformly distributed load-carrying capacity, for spans less than those shown in the SAFE LOAD Column are given in the MAX LOAD Column.

To solve for an unfactored **RED** figure for spans shown in the SAFE LOAD Column (or lesser spans), multiply the unfactored **RED** figure of the shortest span shown in the Load Table by (the shortest span shown in the Load Table - 0.33 feet)^2 and divide by (the actual span - 0.33 feet)^2. In no case shall the calculated unfactored load exceed the unfactored TOTAL load-carrying capacity of the joist as determined from the Standard **ASD** Load Table for Deep Longspan Steel Joists, **DLH**-Series.

STANDARD LOAD TABLE LONGSPAN STEEL JOISTS, DLH-SERIES

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

Joist Designation	Approx. Wt in Lbs. Per Linear Ft (Joists only)	Depth in inches	Max Load plf	SAFE LOAD* in Lbs. Between		SPAN IN FEET														
			< 62	62-89		90	91	92	93	94	95	96	97	98	99	100	101	102	103	104
52DLH10	25	52	648	40200		447	436	427	418	409	400	391	384	376	369	361	354	346	340	334
						171	165	159	154	150	145	140	136	132	128	124	120	116	114	110
52DLH11	26	52	712	44130		490	480	469	459	448	439	430	421	412	405	396	388	381	373	366
						187	181	174	169	164	158	153	149	144	140	135	132	128	124	120
52DLH12	29	52	794	49230		547	535	523	513	501	490	480	471	460	451	442	433	426	417	409
						204	197	191	185	179	173	168	163	158	153	149	144	140	135	132
52DLH13	34	52	964	59760		664	649	636	621	609	595	583	571	559	549	537	526	516	507	496
						247	239	231	224	216	209	203	197	191	185	180	174	170	164	159
52DLH14	39	52	1103	68370		760	745	729	714	699	685	670	657	645	631	619	607	595	585	573
						276	266	258	249	242	234	227	220	213	207	201	194	189	184	178
52DLH15	42	52	1239	76800		853	835	817	799	783	766	750	735	720	705	691	676	664	651	639
						311	301	291	282	272	264	256	247	240	233	226	219	213	207	201
52DLH16	45	52	1335	82800		921	901	882	862	844	826	810	792	777	760	745	730	717	702	688
						346	335	324	314	304	294	285	276	267	260	252	245	237	230	224
52DLH17	52	52	1537	95310		1059	1036	1014	991	970	951	930	912	892	874	858	840	823	808	792
						395	381	369	357	346	335	324	315	304	296	286	279	270	263	255
			<67	67-97		98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
56DLH11	26	56	631	42300		432	424	415	408	400	393	385	379	372	366	358	352	346	340	334
						169	163	158	153	149	145	140	136	133	129	125	122	118	115	113
56DLH12	30	56	725	48600		496	486	477	468	459	450	442	433	426	417	409	402	394	388	381
						184	178	173	168	163	158	153	150	145	141	137	133	130	126	123
56DLH13	34	56	879	58860		601	591	579	568	558	547	537	526	516	507	496	487	478	471	462
						223	216	209	204	197	191	186	181	175	171	166	161	157	152	149
56DLH14	39	56	993	66540		679	666	652	640	628	616	604	594	582	571	562	552	541	532	523
						249	242	234	228	221	214	209	202	196	190	186	181	175	171	167
56DLH15	42	56	1135	76020		777	762	747	732	717	703	690	676	664	651	639	628	616	604	594
						281	272	264	256	248	242	234	228	221	215	209	204	198	192	188
56DLH16	46	56	1224	82020		838	822	805	789	774	759	744	730	717	703	690	678	666	654	642
						313	304	294	285	277	269	262	254	247	240	233	227	221	214	209
56DLH17	51	56	1411	94530		964	945	927	907	891	873	856	840	823	808	793	780	765	751	738
						356	345	335	325	316	306	298	289	281	273	266	258	251	245	238
			< 71	71-99	100-105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
60DLH12	29	60	659	46800	46800	442	433	426	418	411	405	397	391	384	378	372	366	360	354	348
						166	163	158	154	150	146	142	138	134	131	128	124	121	118	115
60DLH13	35	60	801	56880	56880	537	526	517	508	499	490	483	474	466	459	451	444	436	429	423
						203	197	191	187	181	176	171	167	163	158	154	151	147	143	139
60DLH14	40	60	890	63210	63210	597	586	574	564	555	544	534	525	516	507	498	490	481	474	465
						216	210	205	199	193	189	183	178	173	170	165	161	156	152	149
60DLH15	43	60	1045	74190	74190	700	687	675	663	651	640	628	618	607	597	588	577	568	559	550
						255	248	242	235	228	223	216	210	205	200	194	190	185	180	175
60DLH16	46	60	1149	81570	81570	769	756	741	727	714	702	690	676	666	654	642	631	621	610	600
						285	277	269	262	255	247	241	235	228	223	217	211	206	201	196
60DLH17	52	60	1320	93750	93750	885	868	853	837	822	807	793	778	765	751	739	726	714	702	690
						324	315	306	298	290	283	275	267	261	254	247	241	235	228	223
60DLH18	59	60	1524	108180	108180	1021	1002	984	966	948	931	915	898	883	867	852	838	823	810	796
						366	357	346	337	327	319	310	303	294	286	279	272	266	259	252
			<76	76-99	100-113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128
64DLH12	31	64	594	45120	45120	396	388	382	376	370	364	358	352	346	342	336	331	327	321	316
						153	150	146	142	138	135	132	129	125	122	119	116	114	111	109
64DLH13	34	64	720	54750	54750	481	472	465	457	450	442	436	429	421	415	409	403	396	390	385
						186	181	176	171	168	163	159	155	152	148	144	141	137	134	131
64DLH14	40	64	825	62730	62730	550	540	531	523	514	505	498	489	481	474	466	459	451	444	438
						199	193	189	184	179	174	171	166	162	158	154	151	147	143	140
64DLH15	43	64	946	71910	71910	631	621	610	600	591	580	571	562	553	544	537	528	520	511	504
						234	228	223	217	211	206	201	196	191	187	182	177	173	170	165
64DLH16	46	64	1065	80940	80940	711	699	687	675	664	652	642	631	621	610	601	591	582	573	564
						262	254	248	242	235	229	224	218	213	208	203	198	193	189	184
64DLH17	52	64	1227	93270	93270	819	804	790	777	763	751	738	726	714	702	691	681	669	658	648
						298	290	283	275	268	262	255	248	243	237	231	226	220	215	210
64DLH18	59	64	1417	107700	107700	945	928	912	897	880	867	852	838	823	810	798	784	772	760	748
						337	328	320	311	304	296	288	282	274	267	261	255	249	243	237
			< 81	81-99	100-121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136
68DLH13	37	68	650	52650	52650	432	426	418	412	406	400	394	388	382	378	372	366	361	355	351
						171	168	164	159	155	152	149	145	142	138	135	133	130	127	124
68DLH14	40	68	749	60630	60630	498	490	483	475	468	462	454	448	441	435	429	421	415	409	403
						184	179	175	171	167	163	159	155	152	148	145	141	138	135	133
68DLH15	44	68	839	67980	67980	558	547	540	531	522	514	505	498	490	483	475	468	462	454	448
						206	201	196	191	187	182	178	174	170	166	162	158	155	152	148
68DLH16	49	68	995	80610	80610	661	649	640	630	619	610	600	591	582	573	564	556	547	540	531
						242	236	230	225	219	214	209	204	199	195	190	186	182	178	174
68DLH17	55	68	1121	90840	90840	745	733	721	711	700	690	679	669	658	649	640	630	621	612	604
						275	268	262	256	249	244	238	232	228	222	217	212	208	203	198
68DLH18	61	68	1298	105150	105150	862	849	835	823	810	798	786	774	762	751	739	729	718	708	697
						311	304	297	289	283	276	269	263	257	251	246	240	234	230	225
68DLH19	67	68	1495	121080	121080	993	976	961	946	931	916	901	888	874	861	847	835	822	810	798
						353	344	336	328	320	313	305	298	291	285	278	272	266	260	254
			< 85	85-99	100-129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144
72DLH14	41	72	694	58950	58950	454	447	441	435	427	421	415	411	405	399	393	388	382	378	372
						171	167	163	159	155	152	149	146	143	139	136	133	131	128	125
72DLH15	44	72	794	67530	67530	520	513	504	496	489	483	475	468	462	454	448	442	436	429	423
						191	187	183	178	174	171	167	163	160	156	152	150	147	143	140
72DLH16	50	72	918	78060	78060	601	592	585	576	567	559	552	544	537	529	522	514	507	501	493
						225	219	214	209	205	200	196	191	188	183	179	175	171	169	165
72DLH17	56	72	1033	87810	87810	676	667	657	648	639	630	621	612	603	595	586	579	571	564	556
						256	250	245	239	233	228	224	218	213	209	205	200	196	191	188
72DLH18	59	72	1210	102870	102870	792	780	768	757	745	735	724	718	705	694	685	675	666	657	648
						289	283	276	270	265	258	252	247	242	236	231	227	222	217	212
72DLH19	70	72	1419	120600	120600	928	913	900	886	873	859	847	835	823	811	799	789	777	766	756
						328	321	313	306	300	293	286	280	274	268	263	257	251	247	241

LRFD

STANDARD LOAD TABLE LONGSPAN STEEL JOISTS, LRFD DLH-SERIES

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

Joist Designation	Approx. Wt in Lbs. Per Linear Ft (Joists only)	Depth in inches	Max Load (plf)	SAFE LOAD* in Lbs. Between		SPAN IN FEET															
			< 81	**81-99**	**100-111**	**112**	**115**	**118**	**121**	**124**	**127**	**130**	**133**	**136**	**139**	**142**	**145**	**148**	**151**	**155**	**160**
80DLH15	40	80	966	78240	78240	699	663	632	602	575	549	525	503	482	461	443	425	408	392	371	347
						321	296	275	255	236	220	205	192	179	167	157	147	139	130	120	109
80DLH16	46	80	1161	94020	94020	840	802	763	727	691	658	628	600	574	549	525	504	483	463	439	411
						375	347	321	297	276	257	240	224	209	196	184	172	162	152	141	128
80DLH17	53	80	1341	108630	108630	971	926	881	839	800	765	731	699	669	641	615	590	567	545	517	485
						451	416	386	358	332	309	288	269	252	235	221	207	195	183	169	154
80DLH18	60	80	1518	122760	122760	1097	1044	993	947	903	863	825	789	756	723	695	666	641	615	584	548
						516	477	441	409	380	354	330	308	288	270	253	237	223	210	194	176
80DLH19	67	80	1768	143220	143220	1280	1218	1160	1104	1052	1005	960	918	878	840	806	774	743	714	677	635
						578	533	493	458	425	396	369	344	322	301	283	266	250	235	217	197
80DLH20	75	80	1987	160980	160980	1446	1382	1323	1268	1211	1157	1104	1056	1011	968	927	891	855	821	780	731
						646	596	552	512	475	443	412	385	360	337	316	297	279	263	243	220
			< 89	**89-99**	**100-120**	**121**	**124**	**127**	**130**	**133**	**136**	**139**	**142**	**145**	**148**	**151**	**155**	**160**	**165**	**170**	**175**
88DLH16	46	88	1048	93270	93270	771	735	701	671	642	615	591	567	545	524	503	477	448	422	398	376
						361	336	313	291	272	254	238	223	210	197	186	172	156	143	130	119
88DLH17	51	88	1185	105450	105450	871	830	789	753	719	687	659	630	605	579	557	528	495	465	437	412
						404	375	349	325	304	284	266	249	234	220	207	191	173	159	146	133
88DLH18	58	88	1359	120930	120930	1001	953	908	866	827	791	756	725	695	666	639	607	569	535	503	474
						460	427	397	370	346	323	303	284	267	250	236	218	199	181	165	152
88DLH19	65	88	1572	139890	139890	1157	1101	1049	999	954	912	873	836	801	770	738	701	657	617	580	547
						521	484	450	420	392	367	343	322	302	284	267	248	225	205	187	172
88DLH20	76	88	1808	160950	160950	1334	1281	1232	1184	1133	1085	1041	998	959	921	885	841	790	743	700	660
						623	579	539	502	469	438	410	385	361	340	320	296	269	246	224	206
88DLH21	89	88	2231	198540	198540	1649	1568	1494	1425	1361	1301	1244	1191	1143	1097	1053	999	936	880	827	779
						724	673	626	584	545	509	477	447	420	395	372	344	313	285	261	239
			< 97	**97-99**	**100-129**	**130**	**133**	**136**	**139**	**142**	**145**	**148**	**151**	**155**	**160**	**165**	**170**	**175**	**180**	**185**	**190**
96DLH17	52	96	1085	105270	105270	810	776	744	711	684	657	632	608	578	542	509	480	452	427	404	382
						389	363	339	318	298	280	263	247	229	208	190	173	159	146	134	124
96DLH18	58	96	1222	118500	118500	912	875	839	803	770	740	713	686	653	615	579	546	516	488	463	438
						443	413	386	362	340	319	300	282	261	237	216	198	181	166	153	141
96DLH19	66	96	1460	141660	141660	1091	1046	1001	957	917	878	842	809	768	720	676	636	601	566	536	507
						502	469	438	410	385	361	340	320	296	269	246	224	206	189	174	161
96DLH20	74	96	1644	159420	159420	1236	1184	1131	1083	1037	993	952	915	868	815	766	721	680	642	607	574
						569	531	496	465	436	409	385	362	336	305	277	254	233	214	196	181
96DLH21	90	96	2062	200010	200010	1541	1473	1410	1350	1296	1243	1196	1149	1093	1026	965	908	856	809	765	724
						698	652	610	571	535	503	473	445	412	374	341	312	286	263	242	224
96DLH22	102	96	2310	224070	224070	1725	1662	1601	1542	1487	1436	1382	1329	1264	1188	1118	1054	995	941	890	843
						811	757	708	663	622	584	549	517	479	435	396	362	332	305	281	259
			< 105	**105-138**		**139**	**142**	**145**	**148**	**151**	**155**	**160**	**165**	**170**	**175**	**180**	**185**	**190**	**195**	**200**	**205**
104DLH18	59	104	1100	115470		831	798	768	734	708	674	635	601	568	537	508	482	458	435	414	394
						426	400	375	353	332	307	279	255	233	213	195	180	167	154	142	132
104DLH19	67	104	1337	140430		1011	971	933	897	861	819	770	727	686	648	613	581	552	524	497	473
						484	453	426	401	377	349	317	289	265	242	222	204	189	175	162	150
104DLH20	75	104	1504	157890		1146	1107	1071	1032	992	944	886	833	784	739	698	660	626	593	563	535
						548	513	483	453	427	395	359	327	299	274	251	232	214	198	184	170
104DLH21	90	104	1890	198480		1434	1376	1322	1271	1220	1160	1091	1028	970	917	866	821	779	740	703	668
						673	632	593	558	525	486	442	403	368	337	307	284	263	244	226	209
104DLH22	104	104	2119	222540		1607	1551	1499	1449	1401	1340	1261	1189	1121	1059	1001	949	901	855	812	774
						783	734	689	648	610	564	513	468	428	392	359	331	306	283	262	244
104DLH23	109	104	2334	245100		1772	1712	1644	1578	1514	1437	1348	1267	1192	1125	1062	1004	952	902	857	814
						819	768	721	678	638	590	536	489	447	410	377	347	320	296	274	254
			< 113	**113-147**		**148**	**151**	**155**	**160**	**165**	**170**	**175**	**180**	**185**	**190**	**195**	**200**	**205**	**210**	**215**	**220**
112DLH19	67	112	1223	138150		935	900	857	805	759	716	677	643	610	579	549	523	498	476	454	433
						466	439	406	369	336	308	281	259	238	220	203	189	175	162	151	142
112DLH20	76	112	1384	156360		1065	1032	985	927	873	824	780	740	702	667	632	603	574	547	522	500
						528	497	459	418	381	348	319	293	270	249	231	213	198	184	171	160
112DLH21	91	112	1743	196950		1337	1287	1223	1150	1083	1022	966	915	867	823	782	744	709	676	645	616
						650	612	566	514	469	429	393	361	333	306	283	263	244	227	211	198
112DLH22	104	112	1956	221010		1499	1451	1392	1321	1250	1181	1117	1057	1002	952	904	860	820	782	745	712
						755	711	657	598	545	498	457	419	386	356	329	306	283	264	246	229
112DLH23	110	112	2155	243540		1653	1601	1535	1454	1369	1288	1214	1147	1086	1030	977	928	882	839	800	763
						790	744	688	625	571	522	478	439	404	373	345	320	297	276	257	239
112DLH24	131	112	2555	286660		1956	1895	1818	1727	1631	1539	1455	1379	1307	1241	1179	1123	1070	1019	972	928
						957	901	834	758	691	632	579	532	489	451	418	387	359	334	311	291
			< 121	**121-165**		**166**	**170**	**175**	**180**	**185**	**190**	**195**	**200**	**205**	**210**	**215**	**220**	**225**	**230**	**235**	**240**
120DLH20	77	120	1229	148650		896	856	808	766	726	691	658	627	598	570	544	521	498	477	457	439
						430	400	367	338	311	287	265	246	228	212	198	185	172	161	151	142
120DLH21	92	120	1528	184860		1122	1072	1012	959	908	864	821	782	745	710	678	648	620	593	569	545
						530	494	452	416	383	353	326	303	281	262	244	227	212	199	186	173
120DLH22	104	120	1751	211920		1283	1235	1169	1106	1049	997	949	903	860	821	783	749	716	686	657	629
						616	574	526	483	445	411	380	352	327	304	283	265	247	231	217	204
120DLH23	111	120	1938	234480		1415	1361	1287	1219	1157	1099	1046	995	948	903	862	822	786	751	719	689
						644	601	551	506	466	430	397	369	341	318	296	276	258	241	227	213
120DLH24	132	120	2298	278070		1676	1610	1522	1441	1367	1300	1237	1177	1122	1070	1022	977	934	894	857	821
						781	728	667	613	565	521	482	447	414	386	359	335	313	293	275	258
120DLH25	152	120	2633	318630		1926	1847	1748	1656	1571	1492	1418	1350	1287	1228	1173	1122	1073	1026	983	943
						915	853	782	718	661	610	564	523	485	452	421	393	367	344	322	302

Notes:

American National Standard SJI-LH/DLH-2010

STANDARD ASD LOAD TABLE

DEEP LONGSPAN STEEL JOISTS, DLH-SERIES

Based on a 50 ksi Maximum Yield Strength
Spans up to and including 144 ft. adopted by the Steel Joist Institute May 25, 1983
Spans greater than 144 ft. up to and including 240 ft. adopted by the Steel Joist Institute May 18, 2010
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 DLH-**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** figures by 360/240). In no case shall the prorated load exceed the TOTAL load-carrying capacity of the joist.

The Load Table applies to joists with either parallel chords or pitched top chords. Joists can have a top chord pitch up to 1/2 inch per foot. If the pitch exceeds this limit, the Load Table does not apply. When top chords are pitched, the load-carrying capacities are determined by the nominal depth of the joists at the center of the span. Sloped parallel-chord joists shall use span as defined by the length along the slope.

Where the joist span is in the **BLUE SHADED** area of the Load Table, all rows of bridging shall be diagonal bridging with bolted connections at chords and intersections. Hoisting cables shall not be released until the two rows of bridging nearest the third points are completely installed. The **BLUE SHADED** area starts after 60'–0" and extends up through 100'–0".

Where the joist span is in the **GRAY SHADED** area of the Load Table, all rows of bridging shall be diagonal bridging with bolted connections at chords and intersections. Hoisting cables shall not be released until all rows of bridging are completely installed. The **GRAY SHADED** area starts after 100'–0" and extends up through 240'–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.

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.

*The safe uniform load for the spans shown in the SAFE LOAD Column is equal to (SAFE LOAD) / (span). The TOTAL safe uniformly distributed load-carrying capacity, for spans less than those shown in the SAFE LOAD Column are given in the MAX LOAD Column.

To solve for a **RED** figure for spans shown in the SAFE LOAD Column (or lesser spans), multiply the **RED** figure of the shortest span shown in the Load Table by (the shortest span shown in the Load Table - 0.33 feet)^2 and divide by (the actual span - 0.33 feet)^2. In no case shall the calculated load exceed the TOTAL load-carrying capacity of the joist.

ASD

STANDARD LOAD TABLE LONGSPAN STEEL JOISTS, DLH-SERIES

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

Joist Designation	Approx. Wt in Lbs. Per Linear Ft (Joists only)	Depth in inches	Max Load plf	SAFE LOAD* in Lbs. Between	SPAN IN FEET														
			< 62	62-89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104
52DLH10	25	52	432	26800	298	291	285	279	273	267	261	256	251	246	241	236	231	227	223
					171	165	159	154	150	145	140	136	132	128	124	120	116	114	110
52DLH11	26	52	475	29420	327	320	313	306	299	293	287	281	275	270	264	259	254	249	244
					187	181	174	169	164	158	153	149	144	140	135	132	128	124	120
52DLH12	29	52	529	32820	365	357	349	342	334	327	320	314	307	301	295	289	284	278	273
					204	197	191	185	179	173	168	163	158	153	149	144	140	135	132
52DLH13	34	52	643	39840	443	433	424	414	406	397	389	381	373	366	358	351	344	338	331
					247	239	231	224	216	209	203	197	191	185	180	174	170	164	159
52DLH14	39	52	735	45580	507	497	486	476	466	457	447	438	430	421	413	405	397	390	382
					276	266	258	249	242	234	227	220	213	207	201	194	189	184	178
52DLH15	42	52	826	51200	569	557	545	533	522	511	500	490	480	470	461	451	443	434	426
					311	301	291	282	272	264	256	247	240	233	226	219	213	207	201
52DLH16	45	52	890	55200	614	601	588	575	563	551	540	528	518	507	497	487	478	468	459
					346	335	324	314	304	294	285	276	267	260	252	245	237	230	224
52DLH17	52	52	1025	63540	706	691	676	661	647	634	620	608	595	583	572	560	549	539	528
					395	381	369	357	346	335	324	315	304	296	286	279	270	263	255
			<67	67-97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
56DLH11	26	56	421	28200	288	283	277	272	267	262	257	253	248	244	239	235	231	227	223
					169	163	158	153	149	145	140	136	133	129	125	122	118	115	113
56DLH12	30	56	484	32400	331	324	318	312	306	300	295	289	284	278	273	268	263	259	254
					184	178	173	168	163	158	153	150	145	141	137	133	130	126	123
56DLH13	34	56	586	39240	401	394	386	379	372	365	358	351	344	338	331	325	319	314	308
					223	216	209	204	197	191	186	181	175	171	166	161	157	152	149
56DLH14	39	56	662	44360	453	444	435	427	419	411	403	396	388	381	375	368	361	355	349
					249	242	234	228	221	214	209	202	196	190	186	181	175	171	167
56DLH15	42	56	756	50680	518	508	498	488	478	469	460	451	443	434	426	419	411	403	396