JOINT BASE LEWIS McCHORD DESIGN STANDARDS

DIVISION 05 - METALS SECTION 05 21 00

STEEL JOIST FRAMING

# 07/18

PART 1 GENERAL

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2015; Errata 1 2015; Errata 2 2016)

Structural Welding Code - Steel ASTM INTERNATIONAL (ASTM)

ASTM A36/A36M (2014) Standard Specification for Carbon Structural Steel

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC (2018) International Building Code SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC PA 1 (2016) Shop, Field, and Maintenance Coating of Metals

SSPC Paint 15 (1999; E 2004) Steel Joist Shop Primer

SSPC SP 2 (1982; E 2000; E 2004) Hand Tool Cleaning STEEL JOIST INSTITUTE (SJI)

SJI COMPOSITE JOISTS (2007; Supplement 1 2010) Standard

Specifications for Composite Steel Joist Catalog

SJI LOAD TABLES (2010; Errata 1 2011; Errata 2 2012) 42nd

Edition Catalog of Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders

SJI MANUAL (2009) 80 Years of Open Web Steel Joist Construction

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926 Safety and Health Regulations for Construction

29 CFR 1926.756 Steel Erection; Beams and Columns

29 CFR 1926.757 Steel Erection; Open Web Steel Joists

* 1. SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals Welder Qualification; G

SD-02 Shop Drawings

Steel Joist Framing; G SD-05 Design Data

Design Calculations; G SD-06 Test Reports

Erection Inspection Welding Inspections

SD-07 Certificates Certification of Compliance

SD-11 Closeout Submittals

Recycled Content of Steel Products; S

* 1. QUALITY ASSURANCE

Perform all work in compliance with the requirements set forth in 29 CFR 1926.

* + 1. Drawing Requirements

Submit drawings of steel joist framing including fabrication, specifications for shop painting, and identification markings of joists and joist girders. Show joist type and size, layout in plan, all applicable loads, deflection criteria, and erection details including methods of anchoring, framing at openings, type, size, and location and connections for and spacing of bridging, requirements for field welding, and details of accessories as applicable. Show profiles for nonstandard joist configurations. Show steel joist field splice locations and details.

* + 1. Certification of Compliance

Prior to construction commencement, submit certification for welder qualification, in compliance with AWS D1.1/D1.1M, welding operation, and tacker, stating the type of welding and positions qualified for, the code and procedure qualified under, date qualified, and the firm and individual certifying the qualification tests. Submit certification of compliance for the following:

1. SJI MANUAL

 b. Steel Joist Institute Member Fabricator

 c. 29 CFR 1926

 d. 29 CFR 1926.757

 e. Statement from steel joist manufacturer, that work was performed in accordance with approved construction documents and with SJI standard specifications, in accordance with ICC IBC Section 1704.2.5.2.

1.4 DELIVERY, STORAGE, AND HANDLING

Handle, transport, and store joists and joist girders in a manner to prevent damage affecting their structural integrity. Verify piece count of all joist products upon delivery and inspect all joists products for damage. Report any damage to the joist supplier. Store all items off the ground in a well drained location protected from the weather and easily accessible for inspection and handling. Store joists with top chord down and with joists in a vertical position. Store deep joists horizontally if they were shipped on their sides.

PART 2 PRODUCTS

* 1. SYSTEM DESCRIPTION

Designate steel joists and joist girders on the drawings in accordance with the standard designations of the Steel Joist Institute. Joists of other standard designations or joists with properties other than those shown may be substituted for the joists designated provided the structural properties are equal to or greater than those of the joists shown and provided all other specified requirements are met.

* 1. STEEL JOISTS AND JOIST GIRDERS

Provide steel joists and joist girders conforming to SJI LOAD TABLES. Design joists designated K, KCS, LH and DLH to support the loads given in the applicable standard load tables of SJI LOAD TABLES. Submit design calculations for joist girders, special steel joists, composite steel joists, net uplift loads, non-SJI standard details, and field splices.

Include cover letter signed and sealed by the joist manufacturer's registered design professional.

* + 1. Steel Joist Camber

Camber joists as indicated.

* + 1. Special Steel Joists

Provide special joists and connections capable of withstanding the design loads indicated with a live-load deflection less than L/360 for roof joists and L/240 for floor joists.

* + 1. Steel Joist Substitutes and Outriggers

Provide joist substitutes and outriggers conforming to SJI LOAD TABLES with steel angle or channel members.

* + 1. Composite Steel Joists

Provide composite steel joists conforming to SJI COMPOSITE JOISTS.

* + 1. Joist Girders

Provide joist girders capable of withstanding the design loads indicated with a live-load deflection less than L/360 for roof girders and L/240 for floor girders. Where joist girders are part of the lateral load resisting system, design girder for the end moments indicated for wind and seismic.

Provide holes in top chord members for connecting and securing other

construction to the joist girders.

Camber joist girders as indicated.

* 1. RECYCLED CONTENT

Provide products with an average recycled content of steel products of postconsumer recycled content plus one half of preconsumer recycled content not less than 25 percent.

* 1. ACCESSORIES AND FITTINGS
		1. Bridging

Provide bridging of material, size, and type required by SJI LOAD TABLES for type of joist, chord size, spacing and span. Furnish additional erection bridging if required for stability.

* + 1. Bearing Plates

Fabricate steel bearing plats from ASTM A36/A36M steel of size and thickness indicated.

* + 1. Ceiling Extensions

Furnish ceiling extensions, either bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 13 mm 1/2 inch of finished wall surface unless otherwise indicated.

2.5 SHOP PAINTING

SSPC Paint 15. Shop prime joists, except as modified herein, in accordance with SSPC PA 1. Clean joists in accordance with SSPC SP 2 before priming. If flash rusting occurs, re-clean the surface prior to application of primer. For joists and joist girders which require finish painting under Section 09 90 00 PAINTS AND COATINGS, the primer paint must be compatible with the finish paint.

PART 3 EXECUTION

3.1 ERECTION

Install joists and joist girders in conformance with SJI LOAD TABLES for the joist series indicated, and the requirements of 29 CFR 1926 and 29 CFR 1926.757. Handle and set joists and joist girders avoiding damage to the members. Place the "tag end" of joists as shown on the joists placement plans. Ensure that square-end joists are erected right side up. Place joists on joist girders in accordance with the joist placement plan, noting that in many instances joist may not need to be placed at a joist girder panel point. Distribute temporary loads so that joist capacity is not exceeded. Remove damaged joists and joist girders from the site, except when field repair is approved and such repairs are satisfactorily made in accordance with the manufacturer's recommendations. Do not repair, field modify, or alter any joists or joist girder without specific written instructions from the Designer of Record and/or joist manufacturer.

Install and connect bridging concurrently with joist erection, before construction loads are applied. Do not apply loads to bridging. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams. Do not cut away vertical leg of bridging where bridging makes an elevation transition; weld a separate piece of bridging at the transition. Perform all welding in accordance with AWS D1.1/D1.1M.

3.2 BEARING PLATES

Provide bearing plates to accept full bearing after the supporting members

have been plumbed and properly positioned, but prior to placing superimposed loads. The area under the plate must be damp-packed solidly with bedding mortar, except where non-shrink grout is indicated on the drawings. Provide bedding mortar and grout as specified in Section

03 30 00.00 10 CAST-IN-PLACE CONCRETE.

3.3 PAINTING

* + 1. Touch-Up Painting

After erection of joists and joist girders, touch-up connections and areas of abraded shop coat with paint of the same type used for the shop coat.

3.3.2 Field Painting

Paint joists and joist girders requiring a finish coat in conformance with the requirements of Section 09 90 00 PAINTS AND COATINGS.

3.4 VISUAL INSPECTIONS

Perform the following visual inspections:

* + - 1. Verify that all joists are spaced properly.
			2. Verify that there is sufficient joist bearing on steel beams, concrete, and masonry.
			3. Verify all bridging lines are properly spaced and anchored.
			4. Verify that damage has not occurred to the joists [and joist girder] during erection.
			5. Verify the joists are aligned vertically and there is no lateral sweep in the joists.
			6. Where concentrated loads are present on the joists verify that they are located in accordance with the joists placement plan.
			7. Verify welding of bridging and joist seats in accordance with AWS D1.1/D1.1M, Section 6. Perform erection inspection and field welding inspections with AWS certified welding inspectors.
			8. Verify proper bolting of diagonal bridging and joist seats where the bolts are snug-tight.

--End of Section --