Guide Specification

Specifier Notes: This guide specification is written in Construction Specifications Institute (CSI) 3-Part Format in accordance with The *CSI Construction Specifications Practice Guide*, including *MasterFormat, SectionFormat,* and *PageFormat*.

This section must be carefully reviewed and edited by the Architect or Engineer to meet the requirements of the Project and local building code. Coordinate this section with Division 01, other specification sections, and the Drawings. Delete all Specifier Notes after editing this section.

Section numbers and titles are based on *MasterFormat 2014 Update*.

SECTION 05 22 00
COMPOSITE FLOOR SYSTEM

Specifier Notes: This section is based on the products of Nucor Vulcraft/Verco group. Consult local Vulcraft/Verco Sales office at Vulcraft.com and Vercodeck.com.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Composite Floor System:

1. Steel joists.
2. Steel decking.
3. Shear connectors.
4. Slab reinforcement.
5. Concrete slab.
6. Accessories.

1.2 RELATED REQUIREMENTS

Specifier Notes: Edit the following list of related sections as required for Project. Limit the list to sections with specific information that the reader might expect to find in this section but is specified elsewhere.

A. Section 03 20 00 – Concrete Reinforcing: Slab reinforcement.

B. Section 03 30 00 – Cast-in-Place Concrete: Concrete slab.

C. Section 05 12 00 – Structural Steel

D. Section 05 21 00 – Steel Joists

E. Section 05 31 13 – Steel Floor Decking.

F. Section 05 31 00 – Steel Decking.

1.3 REFERENCE STANDARDS

Specifier Notes: List reference standards used elsewhere in this section, complete with designations and titles.

A. American Concrete Institute (ACI) (www.concrete.org):

1. ACI 318 – Building Code Requirements for Structural Concrete and Commentary.

B. American Welding Society (AWS) (www.aws.org):

1. AWS D1.1/D1.1M – Structural Welding Code - Steel.
2. AWS D1.3/D1.3M – Structural Welding Code - Sheet Steel.

C. ASTM International (ASTM) (www.astm.org):

1. ASTM A307 – Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength.
2. ASTM A325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
3. ASTM A529/A529M – Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
4. ASTM A563 – Standard Specification for Carbon and Alloy Steel Nuts.
5. ASTM A572/A572M – Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
6. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
7. ASTM A992/A992M – Standard Specification for Structural Steel Shapes.
8. ASTM A1008/A1008M – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
9. ASTM F436 – Standard Specification for Hardened Steel Washers.

D. Society for Protective Coatings (SSPC) (www.sspc.org):

1. SSPC Painting Manual.
2. SSPC- 15.

E. Steel Joist Institute (SJI) (steeljoist.org)

1. Standard Specifications for Composite Steel Joists, CJ-Series (SJI-200-2015)
2. Code of Standard Practice for Composite Joists (SJI-CJ COSP-2015)
3. SJI Technical Digests (TD9 and TD13)

F. Steel Deck Institute (SDI) (www.sdi.org):

1. SDI FDDM – Floor Deck Design Manual.
2. SDI MOC3 – Manual of Construction with Steel Deck

1.4 PRE-INSTALLATION MEETINGS

Specifier Notes: Edit pre-installation meetings as required for Project. Delete if not required.

A. Convene pre-installation meeting [1 week] [2 weeks] before start of Work of this Section.

B. Require attendance of parties directly affecting Work of this Section, including Contractor, Architect, Engineer, and installer.

C. Review the Following:

1. Materials.

2. Installation/erection.

Specifier Notes: Include field quality control and adjusting if those requirements are specified in Part 3 of this section.

3. Field quality control.

4. Adjusting.

5. Protection.

6. Coordination with other Work.

1.5 SUBMITTALS

Specifier Notes: Edit submittal requirements as required for Project. Delete submittals not required.

A. Comply with Division 01.

B. Submittals for Review:

1. Product Data: Submit manufacturer's product data, indicating joist and decking profiles, characteristics, dimensions, structural properties, materials, and finishes.

2. Joist Layout Drawings: Submit manufacturer's layout Drawings, including plans, slab openings per structural Drawings, elevations, sections, and details, indicating the following:

a. Joists: Joist identification numbers, types, locations, spacings, bridging, and attachments.

b. Decking: Decking plan, support locations, relevant details, and accessories.

Specifier Notes: Joist calculations can be supplied by manufacturer on any project and are typically generated during the final design process. They are not typically supplied as a part of the approval process due to potential future revisions.

3. Calculations: Comprehensive engineering analysis of composite joists [signed and sealed by the qualified professional engineer]. Submitted after approval process prior to fabrication.

1.6 QUALITY ASSURANCE

Specifier Notes: Edit the following paragraphs to specify a minimum level of experience of the parties performing the Work of this section.

A. Manufacturer's Qualifications: Member of the Steel Joist Institute who regularly produces composite steel joists and joist girders conforming to SJI's requirements.

1. Manufacturer's responsibilities include provide engineering services for designing joists that comply with performance requirements shown on the approved joist layout Drawings.

B. Field Welder's Qualifications: AWS D1.1/D1.1M and AWS D1.3/D1.3M.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joists, decking, and accessories as recommended in SJI Specifications, SJI TD9, and SDI MOC3.

B. Store joists and decking off ground.

C. Protect materials from damage in accordance with SDI MOC3.

D. Store decking in accordance with SDI MOC3, with one end elevated to provide drainage.

E. Protect decking with vented, waterproof covering.

F. Place decking bundles on structural steel members in accordance with SDI MOC3.

G. Tie down loose decking bundles to prevent wind damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: NUCOR Vulcraft/Verco Group

Specifier Notes: Specify if substitutions will be permitted.

B. Substitutions: [Not permitted] [Comply with Division 01].

2.2 DESIGN CRITERIA

A. Design Requirements:

1. Design composite floor joists under supervision of a professional engineer registered in state in which Project is located.

Specifier Notes: Cambering the CJ-Series joists for 100 percent of non-composite dead load is standard. Insert other camber requirements as required for Project.

2. Camber joists based on [100 percent of non-composite dead load] [_____].

Specifier Notes: Provide deflection requirements as required for Project. Live load deflection limit of span/360 is typical for most floors but may differ depending on planned usage.

3. Maximum Allowable Live Load Deflection: [Span/360] [Span/_____]

2.3 MATERIALS

A. Composite Joists

B. Steel Shapes:

Specifier Notes: Edit as required for Project. Delete reference standards for steel shapes not required.

1. ASTM A572/A572M, [50 ksi] [_____ ksi].

2. ASTM A529/A529M, [50 ksi] [_____ ksi].

3. ASTM A992/A992M.

Specifier Notes: Include the first paragraph for galvanized steel decking OR the second paragraph for uncoated or prime-painted steel decking. Delete paragraph not required for Project.

C. Galvanized Steel Sheet:

1. ASTM A653/A653M Grade 40, 50, or 80 as indicated on structural drawings.

D. Uncoated or Shop Primed Steel Sheet:

1. ASTM A1008/A1008M. Grade 40, 50, or 80 as indicated on structural drawings

Specifier Notes: Include the section number for the section specifying slab reinforcement.

E. Slab Reinforcement: Specified in Section [03 20 00] [03 __ __].

Specifier Notes: Include the section number for the section specifying concrete slab.

F. Concrete Slab: Specified in Section [03 30 00] [03 __ __].

2.4 ACCESSORIES

A. Shear Studs: ASTM A29 / A29M-12e1, Grade 1010 – 1020.

B. Bolts, Nuts, and Washers: ASTM A307, ASTM A325, ASTM A563, and ASTM F436.

C. Screws: ASTM C1513.

D. Touch-Up Paint for Galvanized Surfaces: SSPC-Paint 20, Type I or II.

E. Welding Materials: AWS D1.1/D1.1M and AWS D1.3/D1.3M; type required for materials being welded.

2.5 FABRICATION OF STEEL JOISTS

A. Fabricate steel joists in accordance with manufacturer's standard practice.

B. Top and Bottom Chord Members:

1. Two equal leg angles.

2. Minimum Yield Strength: 50,000 psi.

C. Web Members:

1. Round rods; crimped or un-crimped angles; rectangular bars; cold-formed angles.

2. Minimum Yield Strength: 50,000 psi.

D. Joist Bearing Seats: Indicated on the Drawings.

E. Welding Materials and Methods: In accordance with SJI COSP.

Specifier Notes: Best practice is for composite joists to be manufactured without primer. Primer may will hinder the installation of welded shear studs to the joist top chord. If primer is required, the top chord angles and some upper portion of the web angles will not be primed.

F. Primer: [None] [Apply manufacturer's standard gray primer in accordance with SSPC 15 and manufacturer's recommendations and standards.]

2.6 FABRICATION OF STEEL DECKING

A. Manufacture steel decking and accessories in accordance with SDI FDDM2.

B. Manufacture decking as indicated on structural drawings.

C. Detail deck units to span 3 or more supports when possible.

D. Deck sidelaps shall allow clearance for shear stud installation.

1. Butt ends in accordance with manufacturer's instructions.

Specifier Notes: Best practice for metal deck carrying concrete is a galvanized finish.

E. Finish: As indicated on Drawings.

F. Accessories: Fabricate in accordance with SDI FDM02 and manufacturer's standards.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas to receive composite floor system.

B. Verify surfaces to support composite floor system are clean, dry, flat, plumb, level, square, stable, rigid, and capable of supporting the weight.

C. Notify Architect of conditions that would adversely affect installation.

D. Do not begin installation until unacceptable conditions are corrected.

3.2 INSTALLATION – GENERAL

A. Install composite floor system in accordance with manufacturer's instructions at locations indicated on the Drawings.

B. Install composite joists plumb, level, square, and true to line.

C. Anchor composite floor system securely in place to supports as indicated on the Drawings.

3.3 INSTALLATION OF STEEL JOISTS

A. Erect steel joists and accessories in accordance with manufacturer's instructions, SJI Specifications, and as indicated on the Drawings.

B. Lift and support joists in upright position during unloading and erection.

C. Place joists plumb, at elevations, lines, and spacings as indicated on the Drawings.

D. Complete joist attachment to supporting members before placing decking.

E. Complete joist and decking attachments in each bay before applying construction loads.

F. Provide minimum bearing length as indicated on the Drawings.

G. Bridging:

1. Install bridging before installing decking.

2. Terminate horizontal bridging rows per SJI and OSHA requirements before placing decking.

H. Provide for distribution of concentrated loads incurred during erection.

I. Welding: Conform to AWS D1.1 requirements.

J. Do not make corrections or alterations to joists without approval of manufacturer and structural engineer of record.

3.4 INSTALLATION OF STEEL DECKING

A. Install steel decking and accessories in accordance with manufacturer's instructions, SDI Specifications, and as indicated on the Drawings.

Specifier Notes: Determination of shoring requirements and design of shoring is not done by manufacturer.

B. Install temporary shoring before placing deck panels if required to meet deflection limitations.

C. Place decking flat and square, without warp or deflection.

D. Provide minimum bearing on steel in accordance with manufacturer's instructions.

E. Attachment to Supporting Members:

1. Mechanically fasten or weld decking to supporting members as indicated on the Drawings.

2. Deck may be tack welded to secure in position before shear connectors are installed.

3. Welding: Conform to AWS D1.3/D1.3M.

F. Shear Studs:

1. Install shear studs as indicated on the Drawings.

G. Cutting and Fitting Decking:

1. Cut and fit deck units and accessories at perimeter and around projections and openings.
2. Make cuts neat and trim.

H. Pour Stops:

1. Install pour stops where indicated on drawings, upturned to top of slab.
2. Screw or weld pour stops in place.

3.5 PLACEMENT OF CONCRETE SLAB

A. Slab Reinforcement:

1. Place slab reinforcement for concrete slab [as indicated on the Drawings] [as specified in Section [03 20 00] [03 __ __].

B. Place concrete for slab as specified in Section [03 30 00] [03 __ __] and SDI MOC3.

C. Maintain minimum concrete slab thicknesses as indicated on the Drawings.

D. Locate slab openings not shown on the Drawings a minimum of 6 inches from edge of top chord of joists.

E. Terminate Concrete Placement:

1. Above beams or girders, wherever possible.
2. Parallel to joists midway between joists.

F. Locate Joints:

1. Perpendicular to joists over supporting member.
2. Parallel to joists midway between joists.

Specifier Notes: Include the following article for testing and inspection services to be provided by an outside entity. Coordinate with Division 01 requirements for testing and inspection services. Delete if not required.

3.6 INSPECTION

A. Follow inspection requirements required by owner and Section 05 12 00.

B. Inspect steel joists for conformance to specified requirements:

1. Verify placement including location, alignment, and bearing.
2. Inspect seat-to-support welds.
3. Verify shear connector quantity and spacing.

C. Inspect steel decking for conformance to specified requirements:

1. Verify decking type and gage.
2. Verify decking placement and alignment.
3. Inspect welds and weld pattern.
4. Inspect fastener types, locations, quantities, and placement.

3.7 PROTECTION

A. Protect installed composite floor system from damage during construction.

END OF SECTION