SECTION 05 1700

COMPOSITE FLOOR SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Steel floor joists.
2. Steel decking.
3. Concrete fill.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section [03 3200 - Concrete Reinforcement.] [__ ____ - _____.]
3. Section [03 3000 - Cast-In-Place Concrete.] [__ ____ - _____.]

1.2 REFERENCES

A. American Concrete Institute (ACI) 318-08 - Building Code Requirements for Structural Concrete.

B. American Welding Society (AWS):
1. D1.1: 2008 - Structural Welding Code - Steel.
2. D1.3: 2008 - Structural Welding Code - Sheet Steel.

C. ASTM International (ASTM):
1. A307-04 - Standard Specification for Carbon Steel Externally Threaded Standard Fasteners.
2. A325-06 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
3. A529-05 - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
4. A563-04a - Standard Specifications for Carbon and Alloy Steel Nuts.
5. A572/A572M-06 - Standard Specification for High Strength Low Alloy Columbium-Vanadium Steels of Structural Quality.
6. A653/A653M -06a- Standard Specification for Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
7. A1008/A1008M-07 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
8. C1513-04 - Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
9. F436-07a - Standard Specification for Hardened Steel Washers.

D. Society for Protective Coatings (SSPC) - Painting Manual, 2005.

E. Steel Deck Institute (SDI) - Manual of Construction with Steel Deck.

F. Steel Joist Institute (SJI) - Standard Specifications and Load Tables for Steel Joists and Joist Girders, March 01, 2005.

1.3 SYSTEM DESCRIPTION

A. Design Requirements:
1. Design composite floor system including layouts, spans, fasteners, and joints under supervision of a Professional Engineer registered in the State in which the project is located.
2. Design joists to manufacturer's requirements. Camber joists based on [100 percent of non-composite dead load.] [____.]
3. Design welded connections in accordance with AWS D1.1 and D1.3.

4. Where steel deck is not designed to support load, design slab in accordance with recognized construction principles or manufacturer's recommendations.

B. Design system to withstand following un-factored loads:
   1. Non-composite dead load:
      a. Concrete: [__] PSF.
      b. Joists: [__] PSF.
      c. Decking: [__] PSF.
      d. Bridging: [__] PSF.
      e. Total: [__] PSF.
   2. Construction live load: [__] PSF.
   3. Composite dead load:
      a. Fixed partitions: [__] PSF.
      b. Mechanical/Electrical/Plumbing: [__] PSF.
      c. Fire suppression: [__] PSF.
      d. Fireproofing: [__] PSF.
      e. Floor coverings and ceilings: [__] PSF.
      f. Total: [__] PSF.
   4. Composite live load:
      a. Design live load: [__] PSF.
      b. Reduction factor: [__] PSF.
      c. Reduced design live load: [__] PSF.
      d. Movable partitions: [__] PSF.
      e. Total: [__] PSF.
   5. Total non-composite and composite loads: [__] PSF.
   6. Maximum allowable live load deflection: Span/[__].

1.4 SUBMITTALS

A. Submittals for Review:
   1. Shop Drawings:
      a. Include joist identification numbers, types, locations spacings, bridging, and attachments.
      b. Indicate decking plan, support locations, projections through decking, openings, relevant details, and accessories.
   2. Product Data: Provide joist and decking profiles, characteristics, dimensions, structural properties, materials, and finishes.

B. Sustainable Design Submittals:
   1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content, show cost of products containing recycled content, and certify recycled content information source.
   2. Regional Materials: Certify that materials have been harvested, extracted, recovered, or manufactured within 500 mile radius of Project site.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Minimum [__] years [documented] experience in work of this Section.

B. Welder Qualifications: AWS D1.1 and D1.3.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store joists off ground. Prevent corrosion and damage.

B. Store decking in accordance with SDI recommendations, off ground at site, with one end elevated to provide drainage; protect with waterproof covering, properly vented.

C. Place decking bundles on structural steel members per SDI MOC2.

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Contract Documents are based on Ecospan™ by Vulcraft/Verco Group.

B. Substitutions: [Under provisions of Division 01.] [Not permitted.]

2.2 MATERIALS

A. Steel Shapes:
   1. ASTM A572/A572M, Grade 50, or ASTM A 529, Grade 50.
   2. Recycled content: Minimum [__] percent recycled steel, with minimum [__] percent classified as post consumer.

B. Galvanized Steel Sheet:
   1. ASTM A653/A653M.
   2. Recycled content: Minimum [__] percent, with minimum [__] percent classified as post consumer.

**** OR ****

C. Steel Sheet:
   1. ASTM A1008/A1008M.
   2. Recycled content: Minimum [__] percent recycled steel, with minimum [__] percent classified as post consumer.

D. Slab Reinforcement: Specified in Section [03 2000;] [__ ____;] minimum 6 x 6 inch, W1.4 x W1.4 welded wire mesh, minimum yield strength of 60,000 PSI unless otherwise required by system design.

E. Concrete: Specified in Section [03 3000;] [__ ____;] minimum 3000 PSI compressive strength at 28 days unless noted otherwise.

2.3 ACCESSORIES

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

B. Screws: ASTM C1513.

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

D. Shear Connectors: Shearflex® screws manufactured by Elco Fastening Systems LLC; size required by system design.

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

2.4 FABRICATION OF JOISTS

A. Fabricate joists in accordance with manufacturer's Information and Design Manual and approved Shop Drawings.

B. Final approval from the specifying design professional required prior to fabrication.

C. Top and Bottom Chord Members: Two equal sized angles with minimum yield strength of 50,000 PSI.

D. Web Members: Round rod, crimped or un-crimped angles, minimum yield strength of 50,000 PSI.

E. Provide joists with either flush or standard joist bearing seats.

F. Welding materials and methods to conform to SJI requirements.

G. Apply manufacturer's standard gray primer except where noted on contract documents.

2.5 FABRICATION OF DECKING

A. Manufacture decking and accessories to SDI Design Manual and approved Shop Drawings.

B. Manufacture decking from 16 to 26 gage galvanized steel sheets to [1] [1-5/16] [1-1/2] [2] [3] inch depth.

C. Detail deck units to span three or more supports when possible, with lapped ends and nesting side laps.

D. Accessories: Fabricate in accordance with manufacturer's instructions.

E. Finish: [Uncoated.] [Manufacturer's standard gray primer.] [Galvanized, G60 coating class.]

PART 3 - EXECUTION

3.1 ERECTION OF JOISTS

A. Erect joists and accessories in accordance with manufacturer's instructions, SJI Specifications, and approved Shop Drawings.

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

C. Place joists plumb, at elevations, lines, and spacings indicated on approved Shop Drawings.

D. Complete joist attachment to supporting members before placing decking. Complete joist and decking attachments in each bay prior to applying construction loads.

E. Provide minimum bearing length of 2-1/2 inches on steel, 4 inches on masonry or concrete, or per approved Shop Drawings.

F. Install horizontal bridging as indicated on approved Shop Drawings prior to installing decking. Terminate horizontal bridging rows with X-bridging or positive anchorage to wall prior to placing decking.

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

H. Welding to conform to manufacturer's requirements.

I. Provide supplemental framing at openings where indicated on approved Shop Drawings.

J. Do not make corrections or alterations to joists without manufacturer's approval.

3.2 INSTALLATION OF DECKING

A. Install decking and accessories in accordance with manufacturer's instructions and approved Shop Drawings.

B. Lap ends minimum of 3 inches for form deck. Center laps over supports. Nest side laps.

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

D. Provide minimum 1-1/2 inches of bearing on steel.

E. Mechanically fasten or weld decking to supporting members as indicated on approved Shop Drawings. Deck may be tack welded to secure in position before shear connectors are installed. Welding to conform to AWS D1.3.

F. Install shear connectors at spacings indicated on approved Shop Drawings. Drive shear connectors using equipment provided by manufacturer, through decking and into joist top cord, until bottom collar is tight against decking.

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

H. Install pour stops at edges and around projections and openings, upturned to top of slab.
   1. Provide pour stops of sufficient strength to remain stationary under weight of wet concrete without distortion.
   2. Screw or weld pour stops in place.

3.3 PLACEMENT OF CONCRETE

A. Place concrete reinforcement as specified in Section [03 3200.] [__ ____.] Make laps in accordance with ACI 318 and SDI MOP2.

B. Place concrete as specified in Section [03 3000] [__ ____] and SDI MOC2.

C. Maintain minimum concrete thicknesses indicated.

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

E. Terminate concrete placement perpendicular to top chord wherever possible. Placement may be terminated parallel to joists only at mid-span between joists.

F. Locate construction joints parallel to joist midway between joists. Locate construction joints perpendicular to joist over supporting member.

3.4 FIELD QUALITY CONTROL

A. Testing Laboratory Services:
   1. Inspect joists for conformance to specified requirements:
      a. Verify placement including location, alignment, and bearing.
      b. Inspect joist-to-seat and seat-to-support welds.
   2. Inspect decking for conformance to specified requirements:
      a. Verify decking type and gage.
      b. Verify decking placement and alignment.
      c. Inspect welds and weld pattern.
      d. Inspect fastener types, locations, quantities, and placement.

3.5 ADJUSTING

A. Clean welds and abrasions after erection.

B. Touch up painted surfaces with same primer as originally applied.

C. Touch up galvanized coatings with galvanizing repair paint; apply as recommended by manufacturer.

END OF SECTION