SECTION 05 31 13

STEEL FLOOR DECKING AND SHEAR STUDS

PART 1 – GENERAL

1.1 PURPOSE

A. This guideline is intended to provide useful information to the Professional Service Provider (PSP) to establish a basis of design. PSP is to apply the principles of this section such that the University of Texas at Arlington (UTA) may achieve a level of quality and consistency in the design and construction of their facilities. Deviations from these guidelines must be approved by UTA and may require justification through Life Cycle Cost (LCC) analysis and submitted to UTA for approval.

1.2 LESSONS LEARNED AND DESIGN CONSIDERATIONS

A. X

1.3 REFERENCED DOCUMENTS

A. The Drawings and General Provisions of the Contract, including the General and Supplementary Conditions and Division 1 Specification Sections, apply to work specified in this Section.

1.4 DESCRIPTION OF WORK

A. Work Included: Furnish all labor, materials, services, equipment and appliances required in conjunction with or properly incidental to furnishing, fabrication, delivery, and installation of metal floor decking and field welded shear studs complete, including but not limited to the following:
   1. Metal floor deck installed.
   2. Field welded shear studs installed.
   3. Sheet metal flashing around columns.
   4. Sheet metal end closures.
   5. Inserts to attach ceiling hangers.
   6. Cleaning top flange of all supporting steel beams.
   7. Sheet metal edge forms.

B. Related Work Specified Elsewhere:
   1. Structural steel: 05 12 00
   2. Miscellaneous metal: Section 05 50 00.
   3. Metal roof deck: Section 05 31 23
   4. Testing laboratory inspection for verification of quality: Division 01.
   5. Sustainable construction for LEED requirements: Division 01.

1.5 SUBMITTALS

A. Shop Drawings: Submit detailed shop drawings to Architect for review prior to fabrication. Show deck layout, spacing and location of all shear studs, and locate all necessary accessories required to prevent leakage and to contain the concrete. Indicate where shoring of metal floor decking is required. Omission from shop drawings of any material shown on Contract Drawings or called for by these Specifications shall not relieve Contractor of the responsibility for furnishing and installing such materials, even though such shop drawings may have been reviewed and returned by Architect.

B. Shear Studs: Submit, for Architect's record, test results of studs welded directly through specified metal deck, establishing studs' ability to provide allowable shear load specified in Section 1.11.5, of the AISC Specifications, for the stud diameters specified.

PART 2 – PRODUCTS

2.1 GENERAL

A. High Deck units shall be classified by Underwriter's Laboratory, Inc. Each unit or bundle shall be labeled and marked as required by (UL), indicating manufacturer testing and inspection.

B. Deck units shall be approved by the International Code Council (ICC) and shall have a corresponding ICC-ES report.

C. Deck units shall be formed, with integral locking lugs or embossments, to provide a mechanical lock between

steel floor and concrete slab.

D. Minimum gauge of metal deck shall be as indicated on Drawings. Contractor may, at his option, use a heavier gauge to accommodate construction loads or to reduce shoring requirements, if any.
E. Sections have been selected to support the weight of wet concrete, plus a live load of 20 psf on normal 3-span conditions without any intermediate shoring, unless otherwise indicated.
F. Install shoring as required wherever metal deck will be subjected to heavier than normal loads during construction, such as at thicker slab areas and curbs, and wherever spans exceed the normal design span for deck.
G. Sections and calculation of deck properties shall conform to American Iron and Steel Institute's, "Specification for the Design of Light Gauge, Cold-Formed, Steel Structural Members."
H. Load carrying capacity of metal deck shall be at least equal to deck sections indicated on Drawings. Deck load carrying capacity shall be provided in ICC-ES reports.

2.2 NON-CELLULAR STEEL DECK UNITS

A. Sheet steel for galvanized floor deck and accessories shall conform to ASTM A653, structural quality. Galvanizing shall conform to ASTM A924 with a minimum coating class of G 90.
B. Provide galvanized deck where indicated on Drawings.
C. Deck type, depth, gauge, and yield strength shall be as indicated on Drawings.

2.3 ACCESSORIES

A. End closures, edge forms and flashing shall be furnished in the same material and with the same coating as specified for floor deck. Minimum gauge shall be 20, but not less than required to hold shape as a form for concrete. Edge form shall be furnished with 1" return lip at top.

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2.4 SHEAR STUDS

A. Shear Studs: Shall be a shear connector with proper ferrules and accessories especially designed to create composite deck action between concrete deck and supporting beam. Steel for studs shall conform to requirements of "Specifications for Steel Bars, Carbon, Cold Finished, Standard Quality," ASTM A108, Grades 1015-1020, with a minimum tensile strength of 60,000 psi. Studs shall be of uniform diameter with heads concentric and normal to shaft; and the weld end shall be chamfered and solid flux. Shear studs shall be approved by Engineer.

2.5 SPRAYED FIREPROOFING

A. Underside of units used as electrical raceways shall receive sprayed fireproofing as specified.

PART 3 – EXECUTION

3.1 ERECTION OF METAL DECK

A. The Top of all supporting steel beams shall be cleaned of all debris and foreign matter.
B. Steel deck shall be fabricated to span over 4 or more supports (over 3 spans) where possible. Each unit shall be properly positioned and brought to rest tightly on supporting beam before being permanently fastened. Ends of units shall abut and shall not be overlapped. Flutes shall align at butt joints.
C. Where shoring is required by Drawings or manufacturer's recommendations, it shall be supported from the bottom flanges of beams, not from floor below. Shoring shall be wood or steel, designed by the Contractor to safely support all dead loads and construction loads and limit midspan deflection of the deck to l/240 between beams.
D. Metal deck shall, in general, be fastened to steel framework by welding shear studs through the deck. If field welded shear studs through metal deck are not called for in schedule or on Drawings, deck shall be welded to steel framework by puddle welds not less than 3/4" diameter, spaced not more than 1'-0". Where shear stud spacing exceeds specified maximum deck weld spacing, use additional puddle welds at 1'-0" spacing between studs. Where two units abut, either end-to-end or side-to-side each shall be so fastened to steel framing.
E. Sides of adjacent units shall be joined by welding 1" long fusion welds or button punching at a maximum spacing of 3'-0" between supports.
F. At all open ends install all necessary end closures required to prevent leakage of concrete. Tack weld at not more than 2'-0" on center. Sheet metal edge form shall bear at least 1 1/2" on beam flange and shall be welded with 2" long welds at 1'-0" maximum spacing. Cut edge form around columns, pockets, embeds, and offsets

as required and weld in place.

G. Install sheet metal flashing around columns, gussets, posts, and other projections as required to prevent leakage of concrete.
H. Apply 2" wide tape to butt joints between cellular deck units, immediately after deck installation.
I. Do not hang sprinkler pipes or other equipment directly from metal deck. Fastening method for all hangers shall be designed by trade requiring them, unless specifically shown, and shall be submitted to Architect for review.

3.2 FABRICATION CUTTING AND DRILLING STEEL FLOOR DECK

A. Holes smaller than 5" in diameter required for passage of other work or for attachment to subfloors, shall be made by respective trade involved.
B. Where holes or openings 5" in diameter and larger are required in subfloors, such holes shall be made by respective trades requiring them. Reinforcing for these openings shall be supplied by these trades and reinforcing details shall be submitted to Architect for approval.

3.3 ERECTION OF SHEAR STUDS

A. Shear studs shall be automatically end welded in the field, through the deck, in accordance with Specifications of shear stud manufacturer.
B. Adequate welding power must be available for stud being welded. Special Power Pact Rectifier furnished by the stud manufacturer that will provide adequate power shall be used.
C. Studs shall not be applied to galvanized members. Either shop weld studs before galvanizing or grind off galvanizing.

END OF SECTION