

SECTION 05 31 00
STEEL DECK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Steel floor deck and accessories
- B. Formed steel deck end forms to contain wet concrete
- C. Framed floor and roof openings 18" or less
- D. Bearing plates and angles
- E. Shear stud connectors

1.2 REFERENCES

- A. AISI – Specification for Steel the Design of Cold-Formed Steel Structural Members
- B. ASCE 7 - American Society of Civil Engineers – Minimum Design Loads of Buildings and Other Structures
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel
- D. ASTM A108 - Standard Specification for Steel Bars, Carbon, and Alloy, Cold-Finished
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- F. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
- G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, and Ultra High Strength
- H. ANSI/AWS A2.4 - Symbols for Welding, Brazing and Nondestructive Examination
- I. AWS D1.3- Structural Welding Code – Sheet Steel
- J. FM - Roof Assembly Classifications
- K. SSPC (Steel Structures Painting Council) - Paint Manual
- L. SDI – Steel Deck Institute - -Design Manual for Composite Decks, Form Decks, and Roof Decks
- M. UL - Fire Resistance Directory
- N. FBC - Florida Building Code

1.3 SUBMITTALS FOR REVIEW

- A. Section 01 33 00 - Submittals Procedures
- B. Shop Drawings:
 - 1. Indicate decking plan, support locations, projections, openings and reinforcement, cellular raceways and outlet box locations, pertinent details, cant strips, special joining, anchor details, and accessories.
 - 2. Provide manufacturer's specifications and installation instructions for each type of decking and accessories.
 - 3. Florida PE specializing in steel joist and girders shall prepare, sign, and seal the erection plans and joists fabrication plans.
- C. Manufacturer's Mill Certificate: Certify that Products meet or exceed specified requirements.
- D. Mill Test Reports: Submit indicating structural strength, destructive and non-destructive test analysis.
- E. Welders' Certificates: Certify welders employed on the Work, verifying AWS qualifications within the previous 12 months.

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1.4 QUALITY ASSURANCE

- A. Fabricator: Company specializing in performing the work of this section with minimum 5-years documented experience.
- B. Installer: Company specializing in performing the work of this section with minimum 5-years documented experience.
- C. State of Florida Professional Structural Engineer experienced in design of connection details shall design all connections not detailed on the plans from the Architect/Engineer of record.

1.5 REGULATORY REQUIREMENTS

- A. Structural steel design and construction shall comply with FBC, ASCE 7 – Wind loads, and AISI Specification for Steel the Design of Cold-Formed Steel Structural Members.
- B. Properly certified Welders shall perform all work in accordance with AWS standards.
- C. Conform to UL, FM, and Warnock Hersey Assembly.

1.6 DELIVERY, STORAGE AND PROTECTION

- A. Section 01 60 00 - Materials Equipment and approved equals: Transport, handle, store and protect product.
- B. Follow the requirements and recommendations of AISI and Manufacturer for delivery, storage, and protection of materials.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Sheet Steel: ASTM A446, Grade B Structural Quality; with G90 galvanized coating conforming to ASTM A525
- B. Plates, Angles, Miscellaneous Steel Shapes: ASTM A36/A36M steel, G90 galvanizing coating
- C. Shear Connectors: Headed stud type, ASTM A108, Grade 1015 or 1020, cold-finished carbon steel, with dimensions complying with AISC specifications.
- D. Shear Connectors: Strap type, ASTM A1011/A1011M, Grade D, hot-rolled carbon steel.
- E. Sheet Metal Accessories: ASTM A653/A653M, commercial quality, galvanized.
- F. Galvanizing: ASTM A653/A653M, G90
- G. Galvanizing Repair: Damaged galvanized surfaces, prepare surfaces and repair per ASTM A780/A780.
- H. Flexible Closure Strips: Use Manufacturer's standard vulcanized, closed cell, synthetic rubber.
- I. Acoustic Sound Barrier Closures: Use Manufacturer's standard mineral fiber closures
- J. Paint: Use Manufacturer's baked on, rust-inhibitive paint, for application to metal surfaces, chemically cleaned, and treated with a phosphate chemical.

2.2 FABRICATION

- A. Minimum roof deck material shall be 22-gage sheet steel.
- B. Form deck units in lengths to span at least three supports, with flush, telescoped, or nested 2" laps at ends and interlocking or nested side laps, of metal thickness, depth, and width indicated.
- C. Roof Deck Units: Provide deck configurations complying with SDI Specifications and Commentary for Steel Roof Deck.
- D. Acoustical Roof Deck Units:
 - 1. Single-pan Units: Provide fluted units with vertical webs perforated with approximate 5/32" diameter holes staggered at 3/8" oc., with mineral fiber acoustical insulation strips of a profile to fit void space between the vertical ribs.

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2. Multiple-pan Units: Provide composite units consisting of upper fluted section with lower flat plate section having interlocking side laps and approximate 5/32" diameter holes staggered at 3/8" oc., with mineral fiber acoustical insulation strips of a profile to fit void space of each cell.
 - E. Composite Steel Deck:
 1. Fabricate deck units with integral embossing or raised pattern to furnish mechanical bond with concrete slab.
 2. Fabricate open-beam deck units with fluted sections interlocking side laps.
 - F. Non-Composite Form Deck: Provide fluted sections of metal deck as permanent forms for reinforced concrete slabs.
 - G. Cellular Metal Floor Deck Units:
 1. Fabricate flat-bottom units with top fluted section cells combined on a lower flat plate, of metal thickness, depth, and width of unit, number of cells per unit, and width of cells as indicated on plans.
 2. Fabricate double-cell units with top fluted section cells combined with matching fluted bottom section, of metal thickness, depth, and width of units, number of cells per unit, and width of cells as indicated on plans.
 3. Provide sufficient welds, forming sheets into cellular floor deck units to develop full horizontal shear strength at plane joining the steel sheets.
 - H. Metal Cover Plates:
 1. Fabricate metal cover plates for end-abutting floor deck units of not less than same thickness as decking.
 2. Form to match contour of deck units and approximately 6" wide.
 - I. Metal Closure Strips:
 1. Fabricate metal closure strips, for sell raceways and openings between decking and other construction, of not less than 0.045", minimum 18-gage sheet steel.
 2. Form to provide tight-fitting closures at open ends of cells or flutes and sides of decking.
 - J. Roof Sump Pans:
 1. Fabricate from single piece of 0.071", minimum 14-gage galvanized sheet steel with level bottoms and sloping sides to direct water flow to drain.
 2. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3" wide.
 3. Recess pans at least 1½" below roof deck surface unless shown otherwise or required by deck configuration.
 4. Cut holes for drains in the field by others.
- 2.3 FINISH
- A. Prepare structural component surfaces in accordance with SSPC SP-2.
 - B. Shop prime structural steel members
 1. Do not prime surfaces scheduled for fireproofing or field welding.
 2. Do not prime surfaces in contact with concrete.
 3. Do not prime surface of high strength bolts.
 - C. Galvanize steel ledge angle members to ASTM A123/A123M; provide minimum 1.25 oz/sq ft galvanized coating.
 - D. Shop Painting
 1. Remove all loose scale, rust, and other foreign materials from fabricated joist, girder, and accessories before applying paint.

2. Spray, dip, or other approved method apply one shop coat of steel primer to steel joist, girder, and accessories, that applies a continuous paint film of at least 1.0 mil.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 31 00 –Project Management and Coordination: Verification of existing conditions prior to beginning work

3.2 INSTALLATION

- A. Install deck units and accessories in accordance with manufacturer's requirements, shop drawings, and as specified in this section.
- B. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting metal members before being permanently fastening.
 1. Do not stretch or contract side lap interlocks.
- C. Align deck units for entire length of run of cells and with closure alignment between cells at ends of abutting units.
- D. Place deck units flat and square, secure to adjacent framing without warp or deflection.
- E. Do not place deck units on concrete supporting structure until concrete is cure and dry.
- F. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.
- G. Do not use floor deck units for storage or working platforms until permanently secured.
- H. Fastening Deck units:
 1. Fasten floor deck units to steel supporting members by nominal 5/8" puddle welds or elongated welds of equal strength, spaced not more than 12" o.c. with a minimum of two welds per unit at each support.
 2. Tack weld or use self-tapping No. 8 or larger machine screws at 4' o.c. for fastening end closures.
 3. Fasten floor deck units to steel supporting members by nominal 5/8" dia. puddle welds or elongated welds of equal strength, spaced not more than 12" at each support, and at closer spacing where indicated on plans.
 - a. Also, secure deck to each supporting member in ribs where side laps occur.
 4. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.
 5. Mechanically fasten side laps of adjacent deck units between supports, at intervals not exceeding 36" o.c., using self-tapping No. 8 or larger machine screws.
 6. Uplift Loading: Install and anchor roof deck units to resist gross uplift loading, as indicated on plans.
- I. Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking, as shown on plans.
- J. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking, and support of other work as shown.
- K. Hanger Slots or Clips: Provide UL-approved punched hanger slots between cells or flutes of lower elements where floor deck units are to receive hangers for support of ceiling construction, air ducts, diffusers, or lighting fixtures.
 1. May use hanger clips designed to clip over male side lap joints of floor deck units instead of hanger slots.

2. Locate slots or clips not more than 14" o.c. in both directions, not over 9" from walls at ends, and not more than 12" from walls at sides, unless indicated otherwise.
3. Provide manufacturer's standard hanger attachment devices.
- L. Joint Covers: Provide metal joint covers at abutting ends and changes in direction of floor deck units, except at taped joints.
- M. Roof Sump Pans: Place them over openings in roof decking and weld to top decking surface, spacing the welds not more than 12" o.c. with at least one weld at each corner.
- N. Shear Connectors:
 1. Weld shear-connectors to supports through decking units in accordance with manufacturer's instructions.
 2. Do not weld connectors through two layers (lapped ends) of decking.
 3. Weld only on clean dry deck surfaces.
- O. Closure Strips: Provide and weld metal closure strips at open uncovered ends and edges of roof decking and in voids between decking and other construction to provide complete decking installation.
 1. Provide and install flexible closure strips instead of metal closures, at Contractor's option, wherever their use ensures complete closure, use adhesive per manufacturer's instructions.
- P. Touch-Up Painting: After decking installation, wire brush, clean, and paint scarred areas, welds, and rust spots and bottom surfaces of decking units and supporting steel members.
 1. Touch-up galvanized surfaces with galvanizing repair paint applied in accordance with manufacturer's instructions.
 2. Touch-up painted surfaces with same type of shop paint used on adjacent surfaces.
 3. In areas of exposed shop painted surfaces, apply touch-up paint to blend into adjacent surfaces.
- Q. Ridge and Valley Plates:
 1. Weld ridge and valley plates to the top surface of the roof decking.
 2. Lap end joints not less than 3", with laps made in the direction of water flow.
- R. Repair and Valley Plates:
 1. Holes up to ½" in diameter fill with urethane or silicone sealant and cover with duct tape.
 2. Holes over ½" diameter require sheet metal plate patches fastened to deck.

END OF SECTION