

SECTION 05120

STRUCTURAL STEEL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Structural steel framing members.
- B. Base plates, angles and sections.
- C. Scope of Work: Examine the Drawings, and the Structural General Notes in particular, for details which describe the extent of structural steel work.
 - 1. Understand that the "General Notes" listed on the Structural Drawings, which specify the performance requirements generally found in this Section, are left on Drawings for the convenience of the Contractor to facilitate fabrication and assembly.
 - 2. Interpret the contents of this section and the Structural General Notes as complementary in nature and, in the spirit of the General Conditions, shall be read collectively to the work.

1.02 RELATED SECTIONS

- 1. Section 05210 - Steel Joists
- 2. Section 05400 - Cold Formed Metal Framing.
- 3. Section 09900 - Paints and Coatings

1.03 REFERENCES

- A. Standards: Comply with the reference standards shown on Drawings and listed as follows:
 - 1. AISC "Code of Standard Practice for Steel Buildings and Bridges."
Delete the following sentence in Paragraph 4.2.1: "This approval constitutes the owner's acceptance of all responsibility for the design adequacy of any connections designed by the fabricator as a part of his preparation of these shop drawings."
 - 2. AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings," including "Commentary" and Supplements.
 - 3. AISC "Specifications for Architecturally Exposed Structural Steel".
 - 4. AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts," approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.
 - 5. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel".
 - 6. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".
- B. AISC - Code of Standard Practice - Manual of Steel Construction - Allowable Stress Design (ASD).

- C. ASTM A36/A36M - Structural Steel.
- D. ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
- E. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.
- F. ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.
- G. ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.
- H. ASTM A325 - High Strength Bolts for Structural Steel Joints.
- I. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- J. ASTM A563 - Carbon and Alloy Steel Nuts.
- K. ASTM A568/A568M - General Requirements for Steel, Carbon and High-Strength Low-Alloy Hot-Rolled Sheet and Cold-Rolled Sheet.
- L. ASTM A992/A992M - Structural Steel, 50 ksi minimum yield strength.
- M. AWS A2.4 - Symbols for Welding, Brazing, and Nondestructive Examination.
- N. AWS D1.1 - Structural Welding Code.
- O. SSPC (Steel Structures Painting Council) - Painting Manual.

1.04 SUBMITTALS FOR REVIEW

- A. Section 01300 - Submittals: Procedures for submittals.
- B. Shop Drawings: Submit shop drawings prepared under supervision of a registered professional engineer, and including complete details and schedules for fabrication and assembly, procedures and diagrams.
 - 1. Indicate welds by standard AWS A2.1 and A2.4 symbols, and show size, length and type of each weld.
 - 2. Provide setting drawings, templates and directions for installation of anchor bolts or other anchorages.
 - 3. Prohibit direct reproduction of the Contract Drawings for use as Shop Drawings.
- C. Test Reports: Assist independent testing agency in submitting reports of inspections and testing of structural steel.
 - 1. Furnish testing agency with fabrication plant's schedule, in order for appropriate mill inspections to be accomplished.
 - 2. Request testing agency to conduct both visual inspections and torque samplings of mill-fabricated connections, at the rate of one test and sampling for each 25 tons of steel fabricated.
 - 3. See Field Quality Control measures at the end of this Section.

1.05 SUBMITTALS FOR INFORMATION

- A Section 01300 - Submittals: Procedures for submittals.
- B Manufacturer's Mill Certificate: Certify that Products meet or exceed specified requirements.
- C Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 3 months.

1.06 QUALITY ASSURANCE

- A Fabricate structural steel members in accordance with AISC Code of Standard Practice.
- B Maintain one copy of each document on site.
- C Fabricator: Company specializing in performing the work of this section with minimum five years documented experience.
- D Erector: Company specializing in performing the work of this section with a minimum of 5 years documented experience.
- E Design connections not detailed on the Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Louisiana.

1.07 SYSTEM DESCRIPTION

- A. Design: Provide Structural steel to drawn details, which are typical unless specifically noted otherwise. Verify dimensions at site.
- B. Performance: Perform source quality control of materials and fabrication procedures without reducing responsibility for design requirements.

Promptly remove and replace materials or fabricated components which do not comply, and at no additional cost to the Owner.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Furnish fabricated materials on site to meet the progress schedule or conditions required by other work.
- B. Deliver rebar, anchor bolts and other concrete embedments in ample time to meet formwork requirements.
- C. Inspect delivered goods for damage and misorders and reject materials which are unrepairable or are considered unacceptable by the Owner's Representative.
- D. Storage: Store materials to permit easy access for inspection and identification.

Support steel members off the ground to prevent rusting or corrosion caused by ground moisture condensation.

Prohibit storage of steel members on structures in a manner that will endanger the safety or integrity of structure.

- E. Handling: Offload steel materials using equipment sized to the load requirements, using personnel trained in lifting and handling large steel sections.

Avoid damage to individual members caused by improper lifting or abusive handling methods.

Repair or recoat primed steel surfaces that have been scratched or gouged, using primer coating compatible with shop-applied material.

PART 2 PRODUCTS

2.01 MATERIALS

1. Structural Steel Members (Beams, Columns and Channels): ASTM A572, Fy=50ksi.
2. Structural Tubing: ASTM A500, Grade B, Fy=46 KSI.
3. Plates and Angles: ASTM A36.
4. Shear Stud Connectors: ASTM A108. Forged steel, headed, unfinished.
5. Bolts, Nuts, and Washers: ASTM A325 bolts, galvanized to ASTM A153. Use tension indicating washers.
6. Welding Materials: AWS D1.1; type required for materials being welded.
7. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 28 days.
8. Touch-Up Primer for Galvanized Surfaces: SSPC 20 Type II Organic.

2.02 FABRICATION

- A. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- B. Fabricate connections for bolt, nut, and washer connectors.
- C. Develop required camber for members.

2.03 FINISH

- A. Prepare structural component surfaces in accordance with SSPC SP 10.
- B. Shop prime structural steel members with an inorganic zinc primer to 3 mil D.M.F.T. Do not prime surfaces that will be field welded, in contact with concrete, high strength bolted or that will receive sprayed on fire proofing. Field touch up all damaged or uncoated areas. Review painting requirements of Section 09900 - Paints and Coatings.

- C. Galvanize all structural steel members exposed to the weather to ASTM A123. Provide minimum 1.50 oz/sq ft galvanized coating. Items to be galvanized include all embedded angles, plates, etc. used for mechanical support frames and masonry lintels.

PART 3 EXECUTION

3.01 ERECTION

1. Check elevations of bearing services, end locations of anchor bolts and similar devices before erection work begins. Report discrepancies to Architect, and delay erection operations until corrections have been made, or until compensating adjustments have been made.
2. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
3. Provide temporary planking and working platforms as necessary and in accordance with OSHA standards.
4. Field weld components and shear studs indicated on shop drawings.
5. Clean bearing surfaces, clean bottom surface of base and bearing plates.
6. Field connect members with threaded fasteners; torque to required resistance.
7. Do not field cut or alter structural members without approval of Architect/Engineer.
8. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.
9. Anchor Bolts:
 1. Set loose and attached base plates and bearing plates for on wedges or other adjusting devices.
 2. Tighten anchor bolts after supported members have been positioned and plumbed, without removing wedges or shims.
 3. Cut off protruding portions of shims flush with edge of base or bearing plate prior to packing with grout.
 4. Pack grout solidly between bearing surfaces and base plates to eliminate voids, using manufacturer=s mixing and application instructions.
10. Field Assembly:
 1. Set structural frames accurately to lines and elevations indicated, and level or plumb individual members within specified AISC tolerances.

2. Align and adjust various members before permanently fastening, and perform necessary adjustments to compensate for discrepancies in elevations and alignment.
3. Establish required leveling and plumbing measurements on mean operating temperature of structures.
4. Splice members only where indicated and accepted on shop drawings, and supported by Structural General Notes.
5. Remove erection bolts on exposed welded construction, fill holes with plug welds, and grind smooth exposed surfaces.
6. Prohibit the practice of enlarging unfair holes in members by burning or by use of drift pins, except in secondary bracing members.
7. Ream holes that must be enlarged to admit bolts.

11. Field Painting

1. Clean field welds and bolted connections immediately after erection, and apply paint to exposed areas using same material as used for shop painting.

3.02 ERECTION TOLERANCES

- A Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B Maximum Offset From True Alignment: 1/4 inch.

3.03 FIELD QUALITY CONTROL

- A. General: Coordinate with the independent testing agency to conduct field testing and sampling of both field-bolted and welded structural connections.
 1. Confirm with testing agency that appropriate mill inspections have been performed on shop-fabricated assemblies.
 2. Allow testing agency to inspect structural steel at plant before shipment.
- B. Inspections: Arrange for testing agency to conduct the required inspections by providing the appropriate advanced notices.
 1. Provide suitable access to the work by the testing agency.
- C. Testing: Make accommodations with testing agency to conduct the following field inspections:
 1. Bolt-up Connections: Perform torque samplings, in accordance with Section 1.23.6 of AISC's Manual of Steel Construction, at the rate of one sampling within each 30-foot grid.
 2. Welded Connections: Perform visual inspections, in accordance with AWS D.1.069, at the rate of one visual examination at each beam and column connection.
 - a. Perform ultrasonic inspections of moment-welded connections, at the ratio of 25% of all moment connections.

- D. Corrections: Correct deficiencies which inspections and test reports have indicated to be not in compliance with requirements.
1. Perform additional test, at Contractor's expense and at no additional cost to the Owner's Representative.

END OF SECTION



SECTION 05210

STEEL JOISTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Open web steel joists, with bridging, attached seats and anchors.
 2. Loose bearing plates and anchor bolts for site placement.
 3. Framed floor openings greater than 12 inches .
- B. Related Sections:
1. Section 05120 - Structural Steel: Superstructure framing.
 2. Section 05311 - Steel Floor Deck: Support framing for openings less than 12 inches in decking.
 3. Section 05500 - Metal Fabrications: Non-framing steel fabrications attached to joists.
- C. Coordination with Drawings:
1. Examine the Drawings, and the Structural General Notes in particular, for details which describe the extent of steel deck work.
 2. Understand that the "General Notes" listed on the Structural Drawings, which specify the performance requirements generally found in this Section, are left on Drawings for the convenience of the Contractor to facilitate fabrication and assembly.
 3. Interpret the contents of this Section and the Structural General Notes as complementary in nature and, in the spirit of the General Conditions, shall be read collectively to perform the work.

1.2 REFERENCES

- A. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 2. ASTM A108 - Standard Specification for Steel Bars, Carbon, Cold Finished, Standard Quality.
 3. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 4. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 5. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 6. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
 7. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
 8. ASTM F436 - Standard Specification for Hardened Steel Washers.

9. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
- B. American Welding Society:
 1. AWS D1.1 - Structural Welding Code - Steel.
- C. Steel Joist Institute:
 1. SJI - Standard Specifications and Load Tables.
- D. SSPC: The Society for Protective Coatings:
 1. SSPC - Steel Structures Painting Manual.
 2. SSPC SP 1 - Solvent Cleaning.
 3. SSPC SP 10 - Near-White Blast Cleaning.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings:
 1. Indicate standard designations, configuration, sizes, spacing, locations of joists, joist leg extensions.
 2. Joist coding, bridging, connections, and attachments.
 3. Connection details.
- C. Welders' Certificates: Submit manufacturer's certificates, certifying welders employed on the Work, verifying AWS qualification within previous 12 months.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with SJI, Load Tables, and Weight Tables, including headers and other supplementary framing.

1.5 QUALIFICATIONS

- A. Fabricator: Company specializing in performing Work of this section with minimum five years documented experience.
- B. Erector: Company specializing in performing Work of this section with minimum five years documented experience.
- C. Design connections not detailed on drawings under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Louisiana.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Manufacturers:
 - 1. New Columbia Joist Co.
 - 2. Vulcraft Steel Joist
 - 3. SMI Joist Co.
- B. Open Web Joists Members: SJI Type CSX.
- C. Nuts: ASTM A563 heavy hex type.
 - 1. Finish: Mechanically galvanized.
- D. Washers: ASTM F436; Type 1, circular.
 - 1. Finish: Mechanically galvanized.
- E. Anchor Rods: ASTM F1554; Grade 55, weldable.
 - 1. Shape: Hooked.
- F. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A36/A36M.
- G. Welding Materials: AWS D1.1; type required for materials being welded.
- H. Shop and Touch-Up Primer: [SSPC 15, Type 1, red oxide.

2.2 FABRICATION

- A. Furnish top chord extensions as indicated on drawings. Furnish bottom bearing joists where indicated on drawings.
- B. Fabricate to achieve end bearing of:
 - 1. 2-1/2 inches on steel.
 - 2. 4 inches on masonry.
- C. Frame special sized openings in joist web framing as detailed.

2.3 FINISH

- A. Prepare joist component surfaces in accordance with SSPC SP 2.
- B. Shop prime joists and supplementary framing members. Do not prime surfaces that will be fireproofed, or field welded.
 - 1. Hot-Dipped Galvanizing: ASTM A153/A153M.
 - 2. Mechanical Galvanizing: ASTM B695; Class 50 minimum.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.

3.2 ERECTION

- A. Erect and bear joists on supports.
- B. Allow for erection loads. Install sufficient temporary bracing to maintain framing safe, plumb, and in alignment.
- C. Coordinate placement of anchors in masonry construction for securing bearing plates.
- D. After joist alignment and installation of framing, field weld joist seat to bearing plates.
- E. Position and field weld joist chord extensions and wall attachments as detailed.
- F. Frame floor openings greater than 12 inches with supplementary framing.
- G. Do not permit erection of decking until joists are bridged, and secured or until completion of erection and installation of permanent bridging and bracing.
- H. Do not field cut or alter structural members without approval of Architect/Engineer.
- I. After erection, prime welds, abrasions, and surfaces not shop primed except surfaces to be in contact with concrete.

3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation From Plumb: 1/4 inch.
- C. Maximum Offset From Alignment: 1/4 inch

3.4 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements: Testing and Inspection Services: Field inspection of members, connections, welds, and tightening of high strength bolts in slip-critical connections.

END OF SECTION

SECTION 05311

STEEL FLOOR DECK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Steel floor deck and accessories
 - 2. Formed steel deck end forms to contain wet concrete.
 - 3. Framing for openings up to and including 12 inches.

- B. Related Sections:
 - 1. Section 03300 - Cast-in-Place Concrete: Concrete topping over metal floor deck.
 - 2. Section 05120 - Structural Steel: Support framing for openings larger than 12 inches.
 - 3. Section 05210 - Steel Joists: Support framing for openings larger than 12 inches.

- C. Coordination with Drawings:
 - 1. Examine the Drawings, and the Structural General Notes in particular, for details which describe the extent of steel deck work.
 - 2. Understand that the "General Notes" listed on the Structural Drawings, which specify the performance requirements generally found in this Section, are left on Drawings for the convenience of the Contractor to facilitate fabrication and assembly.
 - 3. Interpret the contents of this Section and the Structural General Notes as complementary in nature and, in the spirit of the General Conditions, shall be read collectively to perform the work.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 - 2. ASTM A108 - Standard Specification for Steel Bars, Carbon, Cold Finished, Standard Quality.
 - 3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 4. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
 - 5. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

- B. American Welding Society:
 - 1. AWS D1.1 - Structural Welding Code - Steel.

- C. Steel Deck Institute:
 - 1. SDI 29 - Design Manual for Composite Decks, Form Decks and Roof Decks.
- D. SSPC: The Society for Protective Coatings:
 - 1. SSPC Paint 15 - Steel Joist Shop Paint.
 - 2. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
- E. Underwriters Laboratories Inc.:
 - 1. UL - Fire Resistance Directory.
- F. Intertek Testing Services (Warnock Hersey Listed):
 - 1. WH - Certification Listings.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings: Indicate deck plan, support locations, Projections, openings and reinforcement, pertinent details, and accessories.
- C. Product Data: Submit deck profile characteristics and dimensions, structural properties, finishes.
- D. Manufacturer's Installation Instructions: Submit manufacturer's installation instructions.

1.4 QUALIFICATIONS

- A. Installer: Company specializing in performing Work of this section with minimum five years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Cut plastic wrap to encourage ventilation.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Manufacturer:
 - 1. Vulcraft Steel Deck: Model 0.6C, 26 gage, galvanized to ASTM A525, G60.
- B. Sheet Steel: ASTM A611, Grade E, 80 ksi Minimum Yield strength with G60 galvanized coating conforming to ASTM A525.

2.2 ACCESSORIES

- A. Flute Closures: Closed cell; profiled to fit tight to deck.

2.3 FABRICATION

- A. Metal Deck: Sheet steel, configured as follows:
 - 1. Span Design: multiple
 - 2. Minimum Metal Thickness Excluding Finish: 26 gage.
 - 3. Nominal Height: 9/16 inch, fluted profile.
 - 4. Minimum Section Properties (per foot width): S= 0.043, I= 0.015.
 - 5. Formed Sheet Width: 30 inches.
 - 6. Side Joints: lapped
 - 7. Flute Sides: plain vertical face
- B. Fasteners: Hilti ENP2K deck pins in a 30/4 pattern.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.

3.2 INSTALLATION

- A. Erect metal deck in accordance with SDI 29 Manual.
- B. Bear deck on steel supports with 1-1/2 inch minimum bearing. Align and level.
- C. Fasten deck to steel support members at ends and intermediate supports with mechanical fasteners in 30/4 pattern
- D. Weld in accordance with AWS D1.1.

END OF SECTION



