

SECTION 05120
STRUCTURAL STEEL

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED:

- A. Supply and install all Structural Steel work as indicated on the drawings and specified herein.

1.2 RELATED REQUIREMENTS:

- A. Section 05210 - Steel Joists.
- B. Section 05310 - Metal Deck.
- C. Section 05500 - Metal Fabrications.

1.3 REQUIREMENTS OF REGULATORY AGENCIES:

- A. Comply with federal and state codes and regulations for performance of the work of this Section including erection safety regulations.

1.4 REFERENCE STANDARDS:

- A. Except where provision of these Specifications are more stringent, work of this Section shall comply with all applicable provisions of the latest editions of the following standards. When in conflict, the more stringent requirements shall apply.
- B. AISC Specification is defined as AISC "Specification for Structural Steel Buildings", Ninth Edition, and the AISC "Code of Standard Practice for Steel Buildings and Bridges", Ninth Edition.
- C. AWS Building Code shall mean AWS D1.1 "Structural Welding Code – Steel".
- D. Specification for Structural Joints shall mean "Specification for Structural Joints Using ASTM A325 or A490 Bolts" approved by the Research Council on Riveted and Bolted Joints of the Engineering Foundation.

1.5 QUALIFICATIONS:

- A. Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".
- B. Provide certification that welders employed in the work shall have satisfactorily passed AWS qualification tests within 12 months prior to the time of welding in the erection period.
- C. If re-certification of welders is required, re-testing shall be the Contractor's responsibility.

1.6 SUBMITTALS:

- A. Shop Drawings:
 - 1. Submit connection details for review and approval prior to preparation of other shop and erection drawings. Provide manufacturer's specifications and test reports for high-strength bolts.
 - 2. Submit six sets of shop drawings indicating all shop and erection details, including cuts, copes, connections, holes and welds.
 - 3. All welds, both shop and field, shall be indicated by AWS welding symbols, showing size, length and type.
- B. Mill Reports: The Contractor shall furnish three certified copies of all mill reports covering the chemical and physical properties of the steel used.
- C. Erection Procedure: Submit descriptive data to illustrate the structural steel erection procedure, including the sequence of erection, equipment to be employed, and methods to accomplish temporary staying and bracing.

1.7 PRODUCT HANDLING:

- A. Delivery of Materials to be Installed under other Sections:
 - 1. Anchor bolts and other anchorage devices which are embedded in cast-in-place concrete and masonry construction shall be delivered to the project site in time to be installed before the start of cast-in-place concrete operations or masonry work.
 - 2. Provide setting drawings, templates, and directions for the installation of the anchor bolts and other devices.
- B. Storage of Materials:
 - 1. Structural steel members that are stored at the project site shall be above ground on platforms, skids, or other supports.
 - 2. Steel shall be protected from corrosion.
 - 3. Other materials shall be stored in a weather-tight and dry place, until needed for use in the work.
 - 4. Packaged materials shall be stored in their original unbroken package or container.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. All structural steel shapes, bars, plates and other structural steel shall be new and of basic open hearth process steel of domestic manufacture conforming to all applicable requirements of ASTM A36.
- B. Structural steel tubing shall be of domestic manufacture conforming to all applicable requirements of ASTM A500, Grade B.

- C. Threaded Fasteners: Standard bolts: ASTM A325-X, in accordance with Part 4, Table I or Table III of AISC Manual, complete with nuts and standard or beveled washers as required. Standard nuts: ASTM A563. Standard and beveled washers: ASTM F436.
- D. Anchor Bolts: Conform to Section 1.3 of ASTM A307.
- E. Shop Paint Primer: Zinc chromate primer.
- F. Non-Shrink Grout: Pre-mixed, factory packaged grouting compound. Submit product data and manufacturer's literature for review and approval.

2.2 FABRICATION:

- A. Fabricate structural steel in accordance with the applicable city Building Code and AISC Specification for Structural Steel Buildings with the modifications and additional requirements specified in this Section.
 - 1. Where a conflict occurs between the standards specified above, the more stringent shall govern.
 - 2. Structural material shall be fabricated and assembled in the shop to the greatest extent possible.
 - 3. Mark and match-mark all materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling.
- B. Shop connections shall be welded except where shown to be bolted.
- C. Welded Construction:
 - 1. Welded construction shall conform to the AISC Specification for Structural Steel Buildings.
 - 2. Welding process shall be limited to one or a combination of the following: Gas metal-arc, flux cored arc, electroslag or electrogas.
- D. Connections shall be made to conform to the AISC Specification for Structural Steel Buildings.
- E. Holes shall be cut, drilled, or punched at right angles to the surface of the metal and shall not be made or enlarged by burning. Holes in base or bearing plates shall be drilled. Holes shall be provided in members to permit connecting the work of other trades. Holes shall be clean-cut without torn or ragged edges. Outside burrs resulting from drilling or reaming operations shall be removed with a tool making a 1/16 inch bevel.
- F. Column bottoms shall be milled and welded to bases.
- G. Shop Painting:
 - 1. Shop paint all steelwork except contact surfaces which are to be welded, high-strength bolted or riveted. Coat all joints and crevices thoroughly. Paint any surfaces concealed or inaccessible after assembly, prior to assembly.
 - 2. Steelwork to be painted shall receive the following shop paint system:
 - a. Surface Preparation: Remove all mill scale, rust, dirt, grease and other harmful materials prior to coating, and prepare surface per SSPC SP3, Power Tool Cleaning.

- b. Visual Standard of Cleanness: SSPC Visual Pictorial Standards B St3, C St3 and D St3.
- c. Pre-treatment: None required.
- d. Paint Application: SSPC PA 1, as soon as possible after cleaning.
- e. Paint: Zinc chromate primer.
- f. Number of Coats: One.
- g. Dry Film Thickness: Not less than 2.0 mils.
- h. Promptly repair any damaged coating with primer.

PART 3 - EXECUTION

3.1 PRE-ERECTION INSPECTION:

- A. Immediately report to Architect any errors in shop fabrication or deformation resulting from handling and transportation that prevents proper assembly and fitting of parts. Obtain approval of method or correction. Approved corrections shall be made at no additional cost to the Owner.
- B. Examine the areas and conditions under which structural steel work is to be installed. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 ERECTION:

- A. Erect structural steel in accordance with the Building Code of local jurisdiction and AISC Specifications with modifications and additional requirements of this Section: Where a conflict occurs between the standards specified, the more stringent shall govern.
- B. Connections shall be inspected by the testing laboratory.
- C. Anchor bolts and anchors shall be properly located and built into connection work. Bolts and anchors shall be preset by the use of templates or such other methods as may be required to locate the anchors and anchor bolts accurately.
- D. Provide any temporary shoring and additional bracing of steel framing necessary to adequately and safely support any or all loads imposed on structure during construction. As erection progresses, the work shall be securely fastened to sufficiently resist all dead load, wind, and erection stresses. Remove temporary members and connections when permanent members are in place and final connections are made.
- E. Erection Tolerances: Individual pieces shall be erected so that the deviation from plumb, level and alignment shall not exceed 1 in 500.

3.3 FIELD ASSEMBLY:

- A. Structural steel frames shall be accurately assembled to the lines and elevations indicated, within the specified erection tolerances.
- B. The various members forming parts of a complete frame or structure after being assembled shall be aligned and adjusted accurately before being fastened.

- C. Bearing surfaces and surfaces that will be in permanent contact shall be cleaned before the members are assembled.
- D. Splices shall be permitted only where indicated.
- E. Erection bolts used in welded construction may be either tightened securely and left in place or removed and the holes filled with plug welds.
- F. Driftpins may be used only to bring together the several parts and shall not be used in such manner as to distort or damage the metal.
- G. Gas Cutting: The use of a gas-cutting torch in the field for correcting fabrication errors will not be permitted on any major member in the structural framing. The use of a gas-cutting torch will be permitted only on minor members, when the member is not under stress, and only after the approval of the Engineer has been obtained.

3.4 TEMPORARY PROTECTION:

- A. Provide two layers of corrugated cardboard wrapped around steel tube columns and other structural shapes that are adjacent to masonry surfaces in order to prevent any bonding of steel to masonry. Secure cardboard by use of light gage wire or similar method of fastening.

3.5 FIELD TOUCH-UP PAINTING:

- A. After the erection of structural steel, and before the erection of masonry, touch-up paint field welds, bolt heads, nuts and abrasions in the shop paint coating with the same paint used for the shop painting.

END OF SECTION

SECTION 05500
METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes shop fabricated metal items.
 - 1. Lintels.
 - 2. Channel door frames.
 - 3. Structural supports for miscellaneous attachments.
 - 4. Anchor bolts for sill plates.

- B. Related Sections:
 - 1. Section 05120 - Structural Steel: Structural steel anchor bolts.
 - 2. Section 05200 - Steel Joists: Structural joist bearing plates, including anchorage.
 - 3. Section 09900 - Paints and Coatings: Field applied paint finish.
 - 4. Section 03300 - Cast-In-Place Concrete: Execution requirements for embedded anchors and attachments for metal fabrications specified by this section in concrete.
 - 5. Section 04810 - Unit Masonry Assemblies: Execution requirements for embedded anchors and attachments for metal fabrications specified by this section in masonry.

1.2 REFERENCES

- A. Aluminum Association:
 - 1. AA DAF-45 - Designation System for Aluminum Finishes.

- B. American Architectural Manufacturers Association:
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.

- C. ASTM International:
 - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 - 2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 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 A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - 6. ASTM A297/A297M - Standard Specification for Steel Castings, Iron-Chromium and Iron-Chromium-Nickel, Heat Resistant, for General Application.

7. ASTM A283/283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
8. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
9. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
10. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.
11. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
12. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

D. American Welding Society:

1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
2. AWS D1.1 - Structural Welding Code - Steel.
3. AWS D1.6 - Structural Welding Code - Stainless Steel.

E. National Ornamental & Miscellaneous Metals Association:

1. NOMMA Guideline 1 - Joint Finishes.

F. 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.
4. SSPC Paint 15 - Steel Joist Shop Paint.
5. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.
- C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Accept metal fabrications on site in labeled shipments. Inspect for damage.

- C. Protect metal fabrications from damage by exposure to weather.

1.5 FIELD MEASUREMENTS

- A. Verify field measurements are as indicated on shop drawings.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A500, Grade B.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40.
- E. Bolts, Nuts, and Washers: ASTM A325 galvanized to ASTM A153/A153M for galvanized components.
- F. Welding Materials: AWS D1.1; type required for materials being welded.
- G. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type I Inorganic zinc rich.

2.2 LINTELS

- A. Lintels: Steel sections, size and configuration as indicated on Drawings, length to allow 8 inches minimum bearing on both sides of opening.
 - 1. Exterior Locations: Galvanized. Prime paint, two coats.
 - 2. Interior Locations: Prime paint, two coats.

2.3 STRUCTURAL SUPPORTS

- A. Other Structural Supports: Steel sections, shape and size as indicated on Drawings required to support applied loads with maximum deflection of 1/240 of the span; prime paint, two coats (interior); galvanize (exterior).

2.4 ANCHOR BOLTS

- A. Anchor Bolts: ASTM A307; 3/4 inch steel bolt, standard J-hook, with nut and washer; unfinished.

2.5 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.

- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.6 FACTORY APPLIED FINISHES - STEEL

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime paint items with one coat two coats except where galvanizing is specified.
- D. Galvanized Structural Steel Members: Galvanize after fabrication to ASTM A123. Furnish minimum 1.25 oz/sq ft galvanized coating.
- E. Galvanized Non-structural Items: Galvanized after fabrication to ASTM A123. Furnish minimum 1.25 oz/sq ft galvanized coating.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify field conditions are acceptable and are ready to receive Work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Make provisions for erection stresses. Install temporary bracing to maintain alignment, until permanent bracing and attachments are installed.
- C. Field weld components indicated on Drawings.
- D. Perform field welding in accordance with AWS D1.1.
- E. Obtain approval of Architect prior to site cutting or making adjustments not scheduled.
- F. After erection, touch up welds, abrasions, and damaged finishes with prime paint or galvanizing repair paint to match shop finishes.

3.4 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation From Plumb: 1/4 inch per story or for every 12 ft in height whichever is greater, non-cumulative.
- C. Maximum Offset From Alignment: 1/4 inch.
- D. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 05810
EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes expansion joint assemblies for interior floor, wall and ceiling surfaces.
- B. Related Sections:
 - 1. Section 03100 - Concrete Forms and Accessories: Execution requirements for placement of joint assembly frames in formwork.
 - 2. Section 03300 - Cast-in-Place Concrete: Expansion and contraction joints in junction of concrete slab-on-grade and perimeter walls.
 - 3. Section 04810 - Unit Masonry Assemblies: Execution requirements for placement of joint assembly frames specified in this section in concrete masonry.
 - 4. Section 07900 - Joint Sealers: Expansion and control joint finishing utilizing sealant and bond breaker.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 2. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.
 - 3. ASTM B455 - Standard Specification for Copper-Zinc-Lead Alloy (Leaded-Brass) Extruded Shapes.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings: Indicate joint and splice locations, miters, layout of work, affected adjacent construction, and anchorage locations.
- C. Product Data: Submit joint assembly profiles, profile dimensions, anchorage devices, available colors and finish.
- D. Samples: Submit two samples 6 inch long, illustrating profile, dimension, color, and finish selected.
- E. Manufacturer's Installation Instructions: Submit rough-in sizes; provide templates for cast-in or placed frames or anchors; required tolerances for item placement.

1.4 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.5 FIELD MEASUREMENTS

- A. Verify field measurements are as instructed by manufacturer.

PART 2 PRODUCTS

2.1 EXPANSION JOINT ASSEMBLIES

- A. Manufacturers:
 - 1. Architectural Art Manufacturing, Inc.
 - 2. Balco/Metalines.
 - 3. Pawling Corp.
 - 4. Substitutions: Section 01600 - Product Requirements.

2.2 COMPONENTS

- A. Extruded Aluminum: ASTM B221, 6063-T5 alloy, 6061-T6 extrusions.
- B. Resilient Filler: Neoprene, exhibiting Shore A hardness of 40 - 50 Durometer.
- C. Threaded Fasteners: Aluminum or Stainless steel.

2.3 FABRICATION

- A. Joint Covers: Aluminum cover plate, aluminum frame construction, retainers with resilient neoprene filler strip, designed to permit plus or minus 50 percent joint movement with full recovery, flush and recess mounted.
- B. Back paint components in contact with cementitious materials.
- C. Galvanize embedded ferrous metal anchors and fastening devices.
- D. Shop assemble components and package with anchors and fittings.
- E. Furnish joint components in single length wherever practical. Minimize site splicing.

2.4 FACTORY FINISHING

- A. Floors: Mill finish.
- B. Walls and Ceilings: Clear anodized.

- C. Resilient Filler Exposed to View: Gray.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify joint preparation and affected dimensions are acceptable.

3.2 PREPARATION

- A. Provide anchoring devices for installation and embedding.
- B. Provide templates and rough-in measurements.

3.3 INSTALLATION

- A. Align work plumb and level, flush with adjacent surfaces.
- B. Rigidly anchor to substrate to prevent misalignment.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Do not permit traffic over unprotected floor joint surfaces.
- C. Install removable strippable coating to protect finish surface.

3.5 SCHEDULES

- A. Floor to Floor: C10-11-41
- B. Floor to Wall: C10-32-41
- C. Ceiling to Ceiling: J10-71-44
- D. Ceiling to Wall: J10-72-44
- E. Wall to Wall: H10-51-14
- F. Wall to Wall (Inside Corner) H10-61-14

END OF SECTION