

SECTION 05 1200
STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.03 SUMMARY

- A. This Section includes structural steel.
- B. This Section includes structural steel and architecturally exposed structural steel.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Quality Control" for independent testing agency procedures and administrative requirements.
 - 2. Division 5 Section "Steel Deck" for field installation of shear connectors.
 - 3. Division 5 Section "Metal Fabrications" for loose steel bearing plates and miscellaneous steel framing.
 - 4. Division 9 Section "Special Coatings" for surface preparation and priming requirements.
 - 5. Division 9 Section "Painting" for surface preparation and priming requirements.

1.04 PERFORMANCE REQUIREMENTS

- A. Retain this Article when fabricator is made responsible for designing any structural steel connections. Coordinate requirements of this Article with the structural engineer. See AIA Document A201, 3.12.11 for Contractor's responsibility for calculations if paragraph below is retained with "Professional Engineer Qualifications" Paragraph under "Quality Assurance" Article. Delete or modify paragraphs below where Architect assumes or is required by law to assume design responsibility.
- B. Structural Performance: Engineer structural steel connections required by the Contract Documents to be selected or completed by the fabricator to withstand design loadings indicated.
- C. Engineering Responsibility: Engage a fabricator who utilizes a qualified professional engineer to prepare Shop Drawings and other structural data for structural steel connections.

1.05 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of product specified.
- C. Shop Drawings detailing fabrication of structural steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
 - 3. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify high-strength bolted slip-critical, direct-tension, or tensioned shear/bearing connections.
 - 4. Include Shop Drawings signed and sealed by a qualified professional engineer responsible for their preparation.
- D. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

- E. Mill test reports signed by manufacturers certifying that their products, including the following, comply with requirements.
 - 1. Structural steel, including chemical and physical properties.
 - 2. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
 - 3. Direct-tension indicators.
 - 4. Shear stud connectors.
 - 5. Shop primers.
 - 6. Non-shrink grout.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed structural steel work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Fabricator Qualifications: Engage a firm experienced in fabricating structural steel similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the Work.
 - 1. Fabricator must participate in the AISC Quality Certification Program and be designated an AISC-Certified Plant as follows:
 - a. Category: Category I, conventional steel structures.
 - b. Category: Category II, complex steel building structures.
 - c. Fabricator shall be registered with and approved by authorities having jurisdiction.
- C. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
 - 2. AISC's "Specification for Allowable Stress Design of Single-Angle Members."
- D. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for projects with structural steel framing that are similar to that indicated for this Project in material, design, and extent.
- E. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code-Steel."
 - 1. Present evidence that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver structural steel to Project site in such quantities and at such times to ensure continuity of installation.
- B. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.
 - 1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 2. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.08 SEQUENCING

- A. Supply anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Structural Steel Shapes, Plates, and Bars: As follows:
 - 1. Structural Steel wide flange members shall meet the requirements of ASTM A992 (Grade 50). Miscellaneous plates, angles and channels shall meet the requirements of ASTM A36.
 - 2. High-Strength, Low-Alloy Columbium-Vanadium Steel: ASTM A 572 Grade 50.
 - 3. High-Strength, Low-Alloy Structural Steel: ASTM A 588, Grade 50, corrosion resistant.
- B. Structural Steel Tubing: ASTM A 500, Grade B.
- C. Shear Connectors: ASTM A 108, Grade 1015 through 1020, headed-stud type, cold-finished carbon steel, AWS D1.1, Type B.
- D. Anchor Rods, Bolts, Nuts, and Washers: As follows:
 - 1. Anchor Rods: ASTM F1554, Grade 36, Grade 55, Grade 105
 - 2. Unheaded Bolts: ASTM A 687, high strength.
 - 3. Headed Bolts: ASTM A 307, Grade A; carbon-steel, hex-head bolts; and carbon-steel nuts.
 - 4. Headed Bolts: ASTM A 325 , Type 1, heavy hex steel structural bolts and heavy hex carbon-steel nuts.
 - 5. Headed Bolts: ASTM A 490, Type 1, heavy hex steel structural bolts and heavy hex carbon-steel nuts.
 - 6. Washers: ASTM A 36.
- E. Nonhigh-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A ; carbon-steel, hex-head bolts; carbon-steel nuts; and flat, unhardened steel washers.
 - 1. Finish: Plain, uncoated.
- F. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers.
 - 1. Finish: Plain, uncoated.
- G. High-Strength Bolts, Nuts, and Washers: ASTM A 490, Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers, uncoated.
 - 1. Direct-Tension Indicators: ASTM F 959, Type 490, uncoated.
- H. Welding Electrodes: Comply with AWS requirements.

2.02 GROUT

- A. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404, Size No. 2. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- B. Metallic, Shrinkage-Resistant Grout: Premixed, factory-packaged, ferrous aggregate grout, complying with ASTM C 1107, of consistency suitable for application, and a 30-minute working time.
- C. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, of consistency suitable for application, and a 30-minute working time.

2.03 FABRICATION

- A. Fabricate and assemble structural steel in shop to greatest extent possible. Fabricate structural steel according to AISC specifications referenced in this Section and in Shop Drawings.
 - 1. Camber structural steel members where indicated.
 - 2. Mark and match-mark materials for field assembly.
 - 3. Fabricate for delivery a sequence that will expedite erection and minimize field handling of structural steel.
 - 4. Complete structural steel assemblies, including welding of units, before starting shop-priming operations.
 - 5. Comply with fabrication tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible..
- C. Finishing: accurately mill ends of columns and other members transmitting loads in bearing.
- D. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to ASW D1.1 and manufacturer's printed instructions.
- E. Holes: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on Shop Drawings.
 - 1. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.
 - 2. Weld threaded nuts to framing and other specially items as indicated to receive other work.

2.04 SHOP CONNECTIONS

- A. Shop install and tighten nonhigh-strength bolts, except where high-strength bolts are indicated.
- B. When high-strength bolts are required, retain paragraph and applicable subparagraphs below, with or without paragraph above. Distinguish locations of both types of high-strength bolts where used on same Project.
- D. Shop install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- E. Shop install and tighten high-strength bolts according to RCSC's "Load and Resistance Factor Design Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - 1. Bolts: ASTM A 325 high-strength bolts, unless otherwise indicated.
 - 2. Connection Type: Snug tightened, unless indicated as slip-critical, direct-tension, or tensioned shear/bearing connections.
- F. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.
 - 1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp.
 - 2. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent surface bleeding of back-side welding on exposed steel surfaces. Grind smooth exposed fillet welds 1/2 inch and larger. Grind flush butt welds. Dress exposed welds.

2.05 SHOP PRIMING

- A. Shop prime steel surfaces, except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 - 2. Surfaces to be field welded.

3. Surfaces to be high-strength bolted with slip-critical connections.
 4. Surfaces to receive sprayed-on fireproofing.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust, loose mill scale, and spatter, slag, or flux deposits.
 - C. Priming: Immediately after surface preparation, apply primer according to manufacturer's instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 2. Apply 2 coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.
 - D. Painting: Apply a 1-coat, nonasphaltic primer complying with SSPC's "Painting System Guide No. 7.00" to provide a dry film thickness of not less than 1.5 mils.

2.06 SOURCE QUALITY CONTROL

- A. Owner will engage an independent testing and inspecting agency to perform shop inspections and tests and to prepare test reports.
 1. Testing agency will conduct and interpret tests and state in each report whether test specimens comply with or deviate from requirements.
 2. Provide testing agency with access to places where structural steel Work is being fabricated or produced so required inspection and testing can be accomplished.
- B. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.
- C. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.
- D. Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Before erection proceeds, and with the steel erector present, verify elevations of concrete and masonry bearing surfaces and locations of anchorages for compliance with requirements.
- B. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.
 1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.03 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section.
- B. Base and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
 1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.

2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
3. Pack grout solidly between bearing surfaces and plates so no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
 - a. Comply with manufacturer's instructions for proprietary grout materials.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 1. Maintain erection tolerances of architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 1. Level and plumb individual members of structure.
 2. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.
- E. Splice members only where indicated.
- F. Retain paragraph below when welded, architecturally exposed structural steel is required.
- G. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.
- H. Do not use thermal cutting during erection.
- I. Do not enlarge unfair holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts.

3.04 FIELD CONNECTIONS

- A. Install and tighten nonhigh-strength bolts, except where high-strength bolts are indicated.
- B. Install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Install and tighten high-strength bolts according to RCSC's "Load and Resistance Factor Design Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 1. Bolts: ASTM A 325 high-strength bolts, unless otherwise indicated.
 2. Bolts: ASTM A 490 high-strength bolts, unless otherwise indicated.
 3. Connection Type: Snug tightened, unless indicated as slip-critical, direct-tension, or tensioned shear/bearing connections.
- D. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.
 1. Comply with AISC specifications referenced in this Section for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
 2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp.
 3. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent surface bleeding of back-side welding on exposed steel surfaces. Grind smooth exposed fillet welds 1/2 inch and larger. Grind flush butt welds. Dress exposed welds.

3.05 FIELD QUALITY CONTROL

- A. Owner will engage an independent testing and inspecting agency to perform field inspections and tests and to prepare test reports.
 - 1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements.
- B. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.
- C. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.
- D. Field-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- E. Field-bolted connections will be tested and inspected according to RCSC's "Load and Resistance Factor Design Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - 1. Direct-tension indicator gaps will be verified to comply with ASTM F 959, Table 2.
- F. In addition to visual inspection, field-welded full penetration weld connections will be inspected and tested according to AWS D1.1 and the inspection procedures listed below, at testing agency's option.
 - 1. Liquid Penetrant Inspection: ASTM E 165.
 - 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - 3. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T."
 - 4. Ultrasonic Inspection: ASTM E 164.
- G. In addition to visual inspection, field-welded shear connectors will be inspected and tested according to requirements of AWS D1.1 for stud welding and as follows:
 - 1. Bend tests will be performed when visual inspections reveal either less than a continuous 360-degree flash or welding repairs to any shear connector.
 - 2. Tests will be conducted on additional shear connectors when weld fracture occurs on shear connectors already tested, according to requirements of AWS D1.1.

3.06 CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.
 - 1. Apply by brush or spray to provide a minimum dry film thickness of 1.5 mils.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on structural steel are included in Division 9 Section "Painting."

END OF SECTION

SECTION 05 2100
STEEL JOIST FRAMING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including general and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 WORK INCLUDED

- A. Fabrication, delivery and erection of steel joists and joist bridging.
- B. Bearing plates, angles and anchors.

1.03 RELATED WORK

- A. Section 05 12 00 – Structural Steel.
- B. Section 05 31 00 – Steel Decking.
- C. Section 05 50 00 – Miscellaneous Metals.

1.04 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Manufacturer's Data, Steel Joists: Submit manufacturer's specification and installation instructions for each type of joist and its accessories. Include manufacturer's certification that joists comply with SJI "Standard Specifications." Indicate by transmittal form that a copy of each instruction has been distributed to the Erector.
- C. Shop Drawings, Steel Joists: Submit detailed drawings showing layout of joist units, special connections, jointing and accessories. Include the mark, number, type, location and spacing of joists and bridging.

1.05 QUALITY ASSURANCE

- A. Provide joists fabricated in compliance with the following and as herein specified:
 - 1. Steel Joist Institute (SJI) Standard Specifications, Load Tables and Weight Tables for:
 - a. K-Series Open Web Steel Joist.
- B. Qualification of Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure."
- C. Joists welded in place are subject to inspection and testing. Refer to Section 01 45 29 for inspections and tests by Owners Testing Agency.

1.06 DELIVERY, STORAGE AND HANDLING

Deliver, store and handle steel joists as recommended by SJI "Standard Specifications." Handle and store joists in a manner to avoid deforming members and to avoid excessive stresses.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Steel: Comply with SJI "Standard Specifications" for K-Series joists.
- B. Steel Prime Paint: Comply with SJI "Standard Specifications," except asphalt type paint not permitted.

2.02 FABRICATION

- A. General: Fabricate steel joists in accordance with SJI "Standard Specifications".
- B. Holes in Chord Members: Provide holes in chord members where shown for securing other work to the steel joists; however, deduct the area of holes from the area of the chord when calculating the strength of the member.

- C. Extended Ends: Provide extended ends on joists where shown, complying with the manufacturer's standards and requirements of applicable SJI "Standard Specification" and load tables.
- D. Ceiling Extension: Provide ceiling extensions in areas having ceilings attached directly to joist bottom chord. Provide either an extended bottom chord element or a separate unit to suit manufacturer's standards of sufficient strength to support the ceiling construction. Extend ends to within 1/2 inch of the finished wall surface unless otherwise indicated.
- E. Bridging: Provide horizontal or diagonal type bridging for "open web" joints complying with SJI "Standard Specifications".
- F. End Anchorage: Provide end anchorages to secure joists to adjacent construction, complying with SJI "Standard Specifications", unless otherwise indicated.
- G. Camber: Provide camber in accordance with SJI "Standard Specifications"
- H. Shop Painting: Remove loose scale, heavy rust and other foreign materials from fabricated joists and accessories before application of shop paint.
 - 1. Apply one shop coat of steel joist primer paint to steel joist and accessories, by spray, dipping, or other method to provide a continuous dry paint film thickness of not less than 0.50 mil.

PART 3 EXECUTION

3.01 INSPECTION

Erector must examine the areas and conditions under which steel joists are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Erector.

3.02 ERECTION

- A. Place and secure steel joists in accordance with SJI "Standard Specifications", final shop drawings and as herein specified.
- B. Placing Joists: Adjust and align in accurate locations and spacing before permanently fastening.
 - 1. Provide temporary bridging, connections and anchors to ensure lateral stability during construction.
- C. Bridging: Install bridging simultaneously with joist erection before any construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at walls or beams.
- D. Fastening Joists: Field weld joists to supporting steel framework in accordance with SJI "Standard Specifications" for the type of joists used. Coordinate welding sequence and procedure with the placing of joists.
- E. Touch-Up Painting: After joist installation, paint all field bolt heads and nuts and abraded or rusty surfaces on joists and steel supporting members. Wire brush surfaces and clean with solvent before painting.

3.03 DEFICIENCIES

- A. Correct deficiencies in steel joist work which inspections and laboratory test reports have indicated to be not in compliance with requirements.
- B. Independent Testing Laboratory shall inspect and report on corrected work until it is in compliance with specification requirements.

END OF SECTION

SECTION 05 3100
STEEL DECKING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 SECTION INCLUDES

- A. Steel roof deck and accessories.
- B. Formed steel cant strips.
- C. Framing for openings up to and including 18 inches.
- D. Bearing plates and angles.

1.03 RELATED SECTIONS

- A. Section 05 12 00 – Structural Steel: Structural framed openings larger than 18 inches.
- B. Section 05 21 00 – Steel Joists: Structural framed openings larger than 18 inches.
- C. Section 05 50 00 – Miscellaneous Metals.

1.04 REFERENCES

- A. AISI – Specification for the Design of Cold-Formed Steel Structural Members.
- B. ASTM A36 – Structural Steel.
- C. ASTM A525 – Steel Sheet, Zinc-Coated, Galvanized by the Hot-Dip Process.
- D. ASTM A611 – Steel, Cold-Rolled Sheet, Carbon, Structural.
- E. AWS D1.1 – Structural Welding Code.
- F. SDI – Design Manual for Composite Decks, Form Decks, Roof Decks.

1.05 PERFORMANCE REQUIREMENTS

- A. Design metal decking in accordance with SDI Design Manual for Composite Decks, Form Decks, Roof Decks.

1.06 SUBMITTALS

- A. Shop Drawings: Indicate decking plan, support locations, projections, openings, pertinent details and accessories.
- B. Product Data: Provide deck profile characteristics and dimensions, structural properties and finishes.

1.07 QUALIFICATIONS

- A. Installer: Company specializing in performing the work of this Section with minimum 5 years experience.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Separate sheets and store decking on dry wood sleepers; slope for positive drainage.

1.09 FIELD MEASUREMENTS

- A. Verify that field measurements are as shown on Drawings.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Sheet Steel: ASTM A446, Grade A Structural Quality; with G90 galvanized coating conforming to ASTM A525.

- B. Bearing Angles: ASTM A36 steel, unfinished.
- C. Tough-up Primer: Zinc chromate type.

2.02 FABRICATION

- A. 1 ½" Metal Decking: Sheet steel, configured as follows:

Span Design:	Multiple
Minimum Metal Thickness (Excluding Finish)	22- Gauge
Nominal Height:	1-1/2" Type B fluted profile to SDI, WR (or as indicated on the drawings)
Formed Sheet Width:	36 inch
Side Joints:	Lapped
Flute Sides:	Plain vertical face
- B. Fasteners:
 - Hilti X-HSN-24
 - Hilti X-ENP 19
 - Hilti SLC 01

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means installer accepts existing conditions.

3.02 INSTALLATION

- A. Erect metal decking in accordance with SDI Design Manual for Composite Decks, Form Decks, Roof Decks and manufacturer's instructions.
- B. Bear decking on steel supports with 1-1/2" minimum bearing. Align and level.
- C. Fasten ribbed deck as per GENERAL NOTES on Structural Drawings.
- D. Reinforce steel deck openings from 6 to 18 inches in size with 2 x 2 x 1/4" steel angles. Place angles perpendicular to flutes; extend minimum three flutes beyond each side of opening and mechanically attach to deck at each flute.
- E. Install sheet steel closures and angle flashings to close openings between deck and walls, columns and openings.

END OF SECTION

SECTION 05 3113
STEEL FLOOR DECKING

PART 1 - GENERAL

1.01 SUMMARY

- A. Related Documents:
 - 1. Drawings and general provisions of the Subcontract apply to this Section.
 - 2. Review these documents for coordination with additional requirements and information that apply to work under this Section.
- B. Section Includes:
 - 1. Steel floor deck and accessories.
 - 2. Cold formed steel edge strips and closure strips.
 - 3. Steel angle reinforcement for small openings.
- C. Related Sections:
 - 1. Division 01 Section "General Requirements."
 - 2. Division 01 Section "Special Procedures."
 - 3. Division 05 Section "Structural Steel Framing".

1.02 REFERENCES

- A. General:
 - 1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
 - 2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
 - 3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.
- B. AISI - Specification for the Design of Cold-Formed Steel Structural Members.
- C. ASTM International:
 - 1. ASTM A36 / A36M Standard Specification for Carbon Structural Steel
 - 2. ASTM A653 / A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- D. AWS D1.1 - Structural Welding Code.
- E. Steel Deck Institute (SDI) - Design Manual for Composite Decks, Form Decks, Roof Decks.
- F. Underwriters' Laboratories (UL) - Fire Resistance Directory.
- G. Steel Structures Painting Council (SSPC) – Systems and Specifications.

1.03 SUBMITTALS

- A. Submit under provisions of Division 01 Section "General Requirements."
- B. Shop Drawings shall indicate decking plan, deck profile dimensions, supports, projections, openings, and reinforcement, finishes, pertinent details, and accessories.
- C. Certificates are required which indicate the decking meets or exceeds specified requirements.
- D. Submit documentation that welders employed on the Work meet AWS qualifications.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Division 01 Section "Special Procedures."

- B. Store decking under provisions of Division 01 Section "Special Procedures" on wood sleepers with slope for positive drainage cut plastic wrappings to encourage ventilation.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Sheet steel shall conform to ASTM A653, SS Grade 33, minimum 38,000 psi yield, and galvanized with a G60.
- B. Angles: ASTM A36 steel.
- C. Welding materials shall conform to AWS D1.1.
- D. Accessories: Same material and finish as deck and not lighter than 20 gauge.
- E. Galvanizing Repair Paint: SSPC Paint 20 with dry film containing a minimum of 94 percent zinc dust by weight.

2.02 STEEL DECK TYPES

- A. General Requirements: Steel decking shall be designed in accordance with SDI Publication No. 29.
 - 1. Section design properties shall be computed in accordance with applicable requirements of AISI Specification.
 - 2. Superimposed Load shall be ICC ES report approved allowable superimposed load for deck plus fill, installed as shown on Contract Documents.
 - 3. Diaphragm Shear shall be ICC ES report approved allowable shear for deck, or deck plus fill, installed as shown on Contract Documents.
 - 4. Refer to Drawings for deck profile, steel sheet thickness, minimum allowable superimposed load for deck plus fill assembly, and required UL fire-resistive rating for deck plus fill assembly.
- B. Fabricate metal decking in accordance with SDI Design Manual for Form Decks.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions prior to starting work.

3.02 INSTALLATION

- A. Erect metal decking in accordance with SDI Design Manual for Form Decks.
- B. Layout:
 - 1. Place and adjust units in final position prior to permanent fastening.
 - 2. Install in straight, continuous rows with ribs at right angles to supporting members.
 - 3. Align ribs to be straight within 1/4 inch (6 mm) in overall length of decking.
 - 4. Locate end joints over supporting members and ensure not less than 2 inches (50 mm) bearing of each panel on support. Butt end joints of floor deck tight at center line of structural support. Lap end joints of roof deck not less than 2 inches (50 mm) , unless otherwise noted.
 - 5. Provide decking continuous over openings that are not surrounded by perimeter safety cables. Do not cut openings in steel deck until the opening is required.
- C. Fastening Deck Units:
 - 1. Secure to supporting members as shown or noted on Drawings.
 - 2. Connect side laps as shown or noted on Drawings.
- D. Reinforcement of Openings:

1. Reinforce openings, except single openings spaced more than 24 inches (610 mm) on center and cutting no webs.
 2. Use reinforcement details shown on Drawings.
 3. At deck to receive concrete fill, do not cut deck until concrete has achieved 3000 psi (20.7 MPa) compressive strength, unless opening is surrounded with steel spanning to structural frame.
- E. Install sheet steel strip closures at floor edge upturned to thickness of slab to contain wet concrete. Provide closures of sufficient strength to remain in place without distortion.
 - F. Install sheet steel closures and angle flashings to close openings between deck and walls, columns, and openings.
 - G. Immediately after welding deck in place and removing slag, touch-up welds, burned areas and damaged surface coating with prime paint.

3.03 FIELD QUALITY CONTROL

- A. Inspection and testing will be performed under provisions of Division 1.
- B. Testing Laboratory will:
 1. Inspect and test deck welding as required by CBC Section 1701.5, Item 5, in accordance with AWS D1.3. Review materials and qualification of welders and procedures prior to start of work, periodically inspect welding in progress, and perform final visual inspection of welds.

END OF SECTION

SECTION 05 4000
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 DESCRIPTION

This section specifies materials and services required for the design and installation of cold-formed metal frame system including purlins and steel studs, with tracks and required accessories as required for a complete system.

1.02 RELATED WORK

- A. Structural steel framing: Section 05 50 00, METAL FABRICATIONS.

1.03 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
1. The Contract Documents as defined in Section 01 10 00 – Summary of Work, apply to the Work of this Section.
 2. Memorandum of Understanding (MOU) between the United States Environmental Protection Agency's ENERGY STAR® Roof Products Program and Roofing Material Manufacturers. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
 3. Section 01 23 00 – Alternates.
 4. Section 01 60 00 – Substitution Request Form.

1.04 DESIGN REQUIREMENTS

Design steel studs in accordance with AISI Publication "Specification for the Design of Cold-Formed Steel Structural Members", unless otherwise permitted by the architect and engineer.

1.05 SUBMITTALS

- A. Submit in accordance with Section 01 30 00, SAMPLES AND SHOP DRAWINGS.
- B. Shop Drawings: Shop and erection drawings showing stud layout, connections to supporting members, and information necessary to complete the installation as shown and specified. Include structural design calculations for framing members and accessories.
- C. Manufacturer's Literature and Data: Showing stud sections and specifying structural characteristics.

1.06 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Iron and Steel Institute (AISI):
 Specification for the Design of Cold-Formed Steel Structural Members (1986)
- C. American Society of Testing and Materials (ASTM):
 A446..... Steel Sheet, Zinc-coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality
 A525..... General Requirements for Steel Sheet, Zinc-coated (Galvanized) by the Hot-Dip Process
- D. American Welding Society (AWS):
 D1.3..... Structural Welding Code-Sheet Steel

E. Military Specifications (Mil. Spec.):

MIL-P-21035B.....Paint, High Zinc Dust Content, Galvanizing Repair

1.07 SYSTEM DESCRIPTION

- A. Structural Design: Prepare complete structural design calculations for framing members and accessories.
- B. Welding: Comply with AWS D1.1.
- C. Maximum Allowable Deflection: L/600 when backing masonry. L/360 otherwise
- D. Engineer wall system to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day and night temperature ranges.
- E. Design system to accommodate construction tolerances, deflections of building structural members, and clearances of intended openings.
- F. The loading requirements for the Video Wall in the Council Chamber shall be coordinated with the screen supplier through the contractor.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Studs:
 - 1. Manufacturer's standard C-shaped load-bearing steel stud with 1.625" flange and flange return lip complying with ASTM A653 and C955.
 - 2. Studs may be punched.
 - 3. 16 Gauge and Heavier Units: Structural quality steel sheet with minimum yield point of 50,000 psi, conforming to ASTM A653 and C955.
 - 4. 18 Gauge and Lighter Units: Commercial quality steel sheet with minimum yield point of 33,000 psi, conforming to ASTM A653 and C955.
- B. Track: Formed steel, channel shaped, same width as studs, tight fit with thick solid web.
- C. Fasteners:
 - 1. Screws:
 - a. Self-tapping, self-drilling, with corrosion-resistant finish.
 - b. 1/2 inch Type S-12 pan head for attaching two members of 16 or 18 gauge metal thickness.
 - 2. Anchorage Devices: Power driven or power actuated, drilled expansion bolts; or screws with sleeves.
 - 3. Welding: AWS D1.1.
- D. Finishes:
 - 1. Galvanizing: ASTM A525, coating class G-60.
 - 2. Primer: FS TT-P-645, touch-up for galvanized surfaces.
 - 3. Purlins shall be primer finished per 05120.2.02.
- E. Galvanizing Repair Paint: MIL-P-21035B.

2.02 REQUIREMENTS

- A. Stud framing members shall be of the type, size, gage, and have the section properties shown.
- B. Steel members and components shall be hot-dip galvanized in accordance with ASTM A525, G60.
- C. Welding shall be in accordance with AWS D1.3.

- D. Members and accessories shall be furnished by one manufacturer only.

PART 3 EXECUTION

3.01 FABRICATION

- A. Framing components may be pre-assembled into panels. Panels shall be square with components attached.
- B. Cut framing components squarely or as required for attachment.
- C. Hold members in place until fastened.
- D. Where required, provide specified insulation in double header members and double jamb studs which will not be accessible after erection.

3.02 ERECTION

- A. Handle and lift prefabricated panels in a manner as to not distort any member.
- B. Securely anchor tracks to supports as shown.
- C. At butt joints, securely anchor the two pieces of track to the same supporting member or butt-weld or splice together.
- D. Plumb, align, and securely attach studs to the flanges or webs of both upper and lower tracks.
- E. Install jack studs above and below openings and as required to furnish support. Securely attach jack studs to supporting members.
- F. Attach bridging for studs in a manner to prevent stud rotation. Space bridging rows as shown.
- G. Studs shall be in one piece for their entire length, splices will not be permitted, unless approved by design engineer representing shop drawing submittal. Manufacture and their design engineer shall provide design and material necessary to span notches required at x bracing or similar conflicts.
- H. Provide a load distribution member at the top track where joist is not located directly over bearing stud.
- I. Provide joist bridging and web stiffeners at reaction points where shown.
- J. Provide end blocking where joist ends are not restrained from rotation.
- K. Provide an additional joist under parallel partitions, unless otherwise shown, when the partition length exceeds one-half the joist span and when floor and roof openings interrupt one or more spanning members.
- L. Exterior wall stud spacing shall be as required by the engineer designing this cold form metal stud system.

3.03 FIELD REPAIR

Touch-up damaged galvanizing with galvanizing repair paint.

END OF SECTION

SECTION 05 5000
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated steel and aluminum items.
- B. Prefabricated ladders and ship ladders.

1.02 REFERENCE STANDARDS

- A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- C. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
- D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
- E. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- F. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire.
- G. ASTM B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold-Finished Bar, Rod, and Wire (Metric).
- H. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.
- I. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- J. AWS D1.2/D1.2M - Structural Welding Code - Aluminum.
- K. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- 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.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- F. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

- A. Aluminum-Alloy Bars: ASTM B211 (ASTM B211M), 6061 alloy, T6 temper.
- B. Aluminum-Alloy Die Castings: ASTM B85/B85M.

- C. Bolts, Nuts, and Washers: Stainless steel.
- D. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 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. 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.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED ITEMS

- A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
 - 1. Side Rails: 3/8 x 2 inches members spaced at 20 inches.
 - 2. Rungs: one inch diameter solid round bar spaced 12 inches on center.
 - 3. Space rungs 7 inches from wall surface.
- B. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; raw finish.
- C. Lintels: As detailed; prime paint finish.
- D. Toilet Partition Suspension Members: Steel channel sections; prime paint finish.

2.05 DOWNSPOUT BOOTS

- A. Downspout Boots: Smooth interior without boxed corners or choke points; include integral lug slots, integral cleanout, cleanout cover, and tamper proof fasteners.
 - 1. Configuration: Straight.
 - 2. Material: Cast iron; ASTM A48/A48M; casting thickness 3/8 inch (9.5 mm), minimum.
 - 3. Finish: Manufacturer's standard factory applied powder coat finish.
 - 4. Color: To be selected by Architect from manufacturer's standard range.
 - 5. Accessories: Manufacturer's standard stainless steel fasteners, stainless steel building wall anchors, integral neoprene gaskets, and rubber coupling.
 - 6. Manufacturers:
 - a. Downspoutboots.com, a division of J. R. Hoe & Sons; ____:
www.downspoutboots.com.
 - 1) O-Series: Offset Downspout Boot
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.06 ALUMINUM BAR GRATING

- A. Aluminum Bar Grating:
 - 1. Basis of Design: McNichols Swag-Locked, Rectangular Bar Series, GAL 100, 24" x 288".
 - a. Item Number: 6701315324

2.07 FINISHES - ALUMINUM

2.08 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

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

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on shop drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

3.04 TOLERANCES

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

END OF SECTION

SECTION 05 5100
METAL STAIRS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Stairs with concrete treads.
- B. Structural steel stair framing and supports.
- C. Handrails and guards.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Placement of metal anchors in concrete.
- B. Section 05 5000 - Metal Fabrications.
- C. Section 09 9123 - Interior Painting: Paint finish.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.
- B. ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- D. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
- E. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.
- F. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
- G. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- H. SSPC-SP 2 - Hand Tool Cleaning.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 - 2. Include the design engineer's stamp or seal on each sheet of shop drawings.

1.05 QUALITY ASSURANCE

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.

PART 2 PRODUCTS

2.01 METAL STAIRS - GENERAL

- A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
 - 1. Regulatory Requirements: Provide stairs and railings complying with the most stringent requirements of local, state, and federal regulations; where requirements of the contract documents exceed those of regulations, comply with the contract documents.
 - 2. Dimensions: As indicated on drawings.
 - 3. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.

4. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
 5. Separate dissimilar metals using paint or permanent tape.
- B. Metal Jointing and Finish Quality Levels:
1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
 - a. Welded Joints: Continuously welded and ground smooth and flush.
 - b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
 - c. Exposed Edges and Corners: Eased to small uniform radius.
 - d. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality finish.
- C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
- D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.02 METAL STAIRS WITH CONCRETE TREADS

- A. Jointing and Finish Quality Level: Architectural, as defined above.
- B. Risers: Closed.
- C. Treads: Metal pan with field-installed concrete fill.
 1. Concrete Depth: 1-1/2 inches, minimum.
 2. Tread Pan Material: Steel sheet.
 3. Tread Pan Thickness: As required by design; 14 gage, 0.075 inch minimum.
 4. Concrete Reinforcement: Welded wire mesh.
 5. Concrete Finish: Stained & Polished.
- D. Risers: Same material and thickness as tread pans.
 1. Nosing Depth: Not more than 1-1/2 inch overhang.
 2. Nosing Return: Flush with top of concrete fill, not more than 1/2 inch wide.
- E. Stringers: Rolled steel channels.
 1. Stringer Depth: As indicated on drawings.
 2. End Closure: Sheet steel of same thickness as risers welded across ends.
- F. Railings: Pipe & Mesh - Reference drawings and specifications..
- G. Under Side of Stair: Exposed to view, to be finished same as specified for other exposed to view surfaces.

2.03 MATERIALS

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Plates: ASTM A6/A6M or ASTM A283/A283M.
- C. Concrete Reinforcement: Mesh type as detailed, galvanized.

2.04 SHOP FINISHING

- 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 Painting: Use specified shop- and touch-up primer.
 1. Preparation of Steel: In accordance with SSPC-SP 2, Hand Tool Cleaning.
 2. Number of Coats: One.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. When field welding is required, clean and strip primed steel items to bare metal.

- B. Supply items required to be cast into concrete with setting templates.

3.03 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects.
- B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1/D1.1M.
- D. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.
- E. Obtain approval prior to site cutting or creating adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 TOLERANCES

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

END OF SECTION

SECTION 05 7000
DECORATIVE METAL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Railing and guardrail assemblies.

1.02 REFERENCE STANDARDS

- A. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's product data including description of materials, components, finishes, fabrication details, glass, anchors, and accessories.
- C. Shop Drawings: Indicate railing system elevations and sections, details of profile, dimensions, sizes, connection attachments, anchorage, size and type of fasteners, and accessories. Indicate anchor and joint locations, brazed connections, transitions, and terminations.
- D. Samples: Submit one (1) of each item below for each type and condition shown.
 - 1. Railing: 12 inch long section of handrail illustrating color, finish and connection detail.
- E. Test Reports: Submit test reports from an independent testing agency showing compliance with specified design and performance requirements.
- F. Manufacturer's Installation Instructions.
- G. Maintenance Data: Manufacturer's instructions for care and cleaning.
- H. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in installing decorative stairs and railing systems and acceptable to manufacturer.
- B. Templates: Supply installation templates, reinforcing and required anchorage devices.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in factory provided protective coverings and packaging.
- B. Protect materials against damage during transit, delivery, storage, and installation at site.
- C. Inspect materials upon delivery for damage. Repair damage to be indistinguishable from undamaged areas; if damage cannot be repaired to be indistinguishable from undamaged parts and finishes, replace damaged items.
- D. Prior to installation, store materials and components under cover, in a dry location.

1.06 FIELD CONDITIONS

- A. Do not install railings until project is enclosed and ambient temperature of space is minimum 65 degrees F and maximum 95 degrees F.
- B. Maintain ambient temperature of space at minimum 65 degrees F and maximum 95 degrees F for 24 hours before, during, and after railing installation.

1.07 WARRANTY

- A. Warranty: Manufacturer's standard one year warranty against defects in materials, fabrication, finishes, and installation commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Railing Components:
 - 1. Manufacturer/Fabricator specified for railings.
 - 2. Basis of Design: Hollaender Architetural Railing Systems.
 - a. Speed-Rail Handrailing System.
 - 3. Color: As selected by Architect from manufacturer's full range of options.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Metal Rail Infill:
 - 1. Hollaender Manufacturing Co; Steel: www.hollaender.com/sle.
 - 2. Wire Mesh Infill Panels.
 - a. 2" x 4" Rectangular (Horizontal Orientation).
 - 3. Color: As selected by Architect from manufacturer's full range of options.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ACCESSORIES

- A. Anchors and Fasteners: Provide anchors and other materials as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
 - 1. For anchorage to concrete, provide inserts to be cast into concrete for bolting anchors.
 - 2. For anchorage to masonry, provide brackets to be embedded in masonry for bolting anchors.
 - 3. For anchorage to stud walls, provide backing plates for bolting anchors.
 - 4. Exposed Fasteners: _____.
- B. Carbon Steel Bolts and Nuts: ASTM A307.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate and site conditions are acceptable and ready to receive work.
- B. Verify field dimensions of locations and areas to receive work.
- C. Notify Architect immediately of conditions that would prevent satisfactory installation.
- D. Do not proceed with work until detrimental conditions have been corrected.
- E. Furnish components to be installed in other work to installer of that other work, including but not limited to blocking, sleeves, inserts, anchor bolts, embedded plates and supports for attachment of anchors.

3.02 PREPARATION

- A. Protect existing work.
- B. Review installation drawings before beginning installation. Coordinate diagrams, templates, instructions and directions for installation of anchorages and fasteners.
- C. Clean surfaces to receive units. Remove materials and substances detrimental to the installation.

3.03 INSTALLATION

- A. Comply with manufacturer's drawings and written instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects and with tight joints, except where necessary for expansion.
- C. Anchor securely to structure.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.

- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

3.05 FIELD QUALITY CONTROL

- A. Field Services: Provide the services of the manufacturer for field observation of installation of railings.

3.06 CLEANING

- A. Remove protective film from exposed metal surfaces.
- B. Metal: Clean exposed metal finishes with potable water and mild detergent, in accordance with manufacturer recommendations; do not use abrasive materials or chemicals, detergents or other substances that may damage the material or finish.

3.07 PROTECTION

- A. Protect installed components and finishes from damage after installation.
- B. Repair damage to exposed finishes to be indistinguishable from undamaged areas.
 - 1. If damage to finishes and components cannot be repaired to be indistinguishable from undamaged finishes and components, replace damaged items.

END OF SECTION