

MIT

Design Standards

DIVISION 05 — Metals

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Department
of Facilities

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1. 051200 - STRUCTURAL STEEL FRAMING

1.1 Project Includes

Structural steel assemblies and accessories.

1.2 Sustainable Design

Provide structural steel framing with the following sustainable design features:

1. Recycled content.
2. Regional materials.

1.3 Quality Assurance

Standards:

1. 780 CMR, Massachusetts State Building Code, Eighth Edition.
2. AISC Code of Standard Practice for Steel Buildings and Bridges, and applicable regulations.
3. AISC Specification for Load and Resistance Factor Design for Structural Steel Buildings
4. AWS D1.1, Structural Welding Code.

Architecturally Exposed Structural Steel: Comply with fabrication requirements, including tolerance limits, and installation tolerances of the AISC Code of Standard Practice for Steel Buildings and Bridges for structural steel identified as architecturally exposed structural steel.

Employ a registered engineer to check elevations and plumb and level tolerances; certify that installed work is within AISC Standards. MIT may engage testing/inspection agency to inspect welded and bolted connections.

1.4 Products

Structural Steel Shapes: ASTM A992, unless indicated otherwise below.

Structural Steel Plates, and Bars: ASTM A36.

Structural Steel Hollow Structural Sections (HSS): ASTM A500, Grade B, 46 ksi.

Cold-Formed Steel Tubing: ASTM A500, Grade B.

Hot-Formed Steel Tubing: ASTM A501.

Steel Pipe: ASTM A53, Type E or S, Grade B; or ASTM A501.

Steel Castings: ASTM A27, Grade 65-35.

Headed Stud-Type Shear Connectors: ASTM A108, Grade 1015 or 1020.

Anchor Bolts: ASTM F1554, unless indicated otherwise on plans.

Unfinished Threaded Fasteners: ASTM A307, Grade A.

High-Strength Threaded Fasteners: ASTM A325N or ASTM A490N, as applicable.

Direct Tension Indicators: ASTM A959.

Electrodes for Welding: E70XX.

Structural Steel Primer Paint: SSPC - Paint 13, compatible with topcoats.

Structural Steel Finish Coating: As selected by the Architect from manufacturer's full range.

Cement Grout: Portland cement, sand.

Metallic Shrinkage-Resistant Grout: Premixed ferrous aggregate grouting compound ASTM C1107.

Nonmetallic Shrinkage-Resistant Grout: Premixed nonmetallic grouting compound, ASTM C1107.

2. 053100 - METAL DECKING

2.1 Project Includes

Metal decking may include the following:

1. Steel roof deck.
2. Acoustical steel roof deck.
3. Steel floor deck.
4. Composite steel floor deck.
5. Composite cellular metal floor deck with electrical distribution

2.2 Sustainable Design

Provide metal decking with the following sustainable design features:

1. Recycled content.

2. Regional materials.

2.3 Quality Assurance

Metal decking for steel deck roofs shall be FM Approved and installed according to the RoofNav assembly appropriate for the needed, wind, hail and interior and exterior fire ratings.

Standards:

1. 780 CMR, Massachusetts State Building Code, Eighth Edition.
2. AISI Specification for the Design of Cold-Formed Steel Structural Members.
3. SDI Design Manual for Composite Decks, Form Decks, and Roof Decks.
4. AWS D1.3, Structural Welding Code – Sheet Steel.

2.4 Products

Steel Type: Steel for painted metal deck, ASTM A1008; steel for galvanized metal deck, ASTM A653 Grade 40 minimum, 18GA min, G90 coating.

Steel Shapes: ASTM A36.

Headed Stud Type Shear Connectors: ASTM A108, Grade 1015 or 1020.

Sheet Metal Accessories: Galvanized per ASTM A653, G60 coating, commercial quality.

Galvanizing: ASTM A653, G90.

Galvanizing Repair: ASTM A780.

3. 054000 - COLD-FORMED METAL FRAMING

3.1 Project Includes

Cold-formed metal framing may include the following:

1. Cold-formed metal framing for support of exterior walls.
2. Cold-formed metal framing for support of interior demising partitions.

3.2 Sustainable Design

Provide cold-formed metal framing with the following sustainable design features:

1. Recycled content.
2. Regional materials.

3.3 Quality Assurance

Standards: AISI, Specification for Design of Cold Formed Steel Structural Members.

Deflection Criteria: $L/600$ for masonry; $L/360$ for metal panels and siding.

Fabrication Tolerances: 1/8 inch in 10 feet.

Erection Tolerances: 1/16 inch.

Engineering: Systems engineered and stamped by contractor's professional engineer.

3.4 Products

Cold-Formed Metal Framing Materials:

1. Wall Framing: C shaped load bearing steel studs.
2. Units 16 gage (0.0598 inch): ASTM A446, yield point 50,000 psi.
3. Finish: Galvanized, ASTM A525, G90.

Cold-Formed Metal Framing Accessories:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Deflection track and vertical side clips.
5. Reinforcement plates.
6. Anchors, clips, and fasteners.
7. Screw strips.

4. 055000 - METAL FABRICATIONS

4.1 Project Includes

Miscellaneous Metal Fabrications may include the following:

1. Ladders.
2. Galvanized steel lintels at exterior; primed steel at interior.
3. Galvanized steel loading dock edge angles.
4. Bollards, concrete filled galvanized steel at exterior, shop primed steel at interior.
5. Galvanized steel areaway bar gratings and support frames.
6. Miscellaneous metal framing and supports for overhead doors and grilles.

7. Miscellaneous metal framing and supports for ceiling hung toilet partitions.
8. Miscellaneous metal framing and supports for operable partitions.
9. Miscellaneous metal framing and supports for elevators.
10. Miscellaneous metal framing and supports for mechanical, electrical and audiovisual equipment.
11. Roof davits for window washing equipment.

Metal Stairs may include the following:

1. Galvanized steel exterior steel stairs, with concrete filled pans.
2. Shop-primed interior steel stairs, with concrete filled pans.

Metal Railings may include the following:

1. Galvanized exterior steel railings, handrails, and guardrails.
2. Decorative interior stainless steel and glass railings, handrails, and guardrails.
3. Shop-primed interior steel railings, handrails, and guardrails.

Metal Gratings may include the following:

1. Galvanized exterior steel bar gratings and supports at areaways.

Decorative Metal Fabrications may include the following:

1. Stainless steel fabrications, satin finish typical.

MIT Main Group Buildings: Exterior Handrails shall be as follows. Refer also to the railing details in Division 32.

1. Bronze handrails with oil-rubbed bronze finish, top rail Julius Blum Profile 4539. Sleeve mounted with high-density grout.

4.2 Sustainable Design

Provide metal fabrications with the following sustainable design features:

1. Recycled content.
2. Regional materials.
3. Low VOC adhesives and sealants.
4. Low VOC paints and coatings.

4.3 Quality Assurance

Handrail and Railing Structural Performance: ASTM E985.

Accessibility Requirements:

1. Americans with Disabilities Act Accessibility Guidelines (ADAAG).
2. Massachusetts Architectural Access Board (MAAB).
3. Local regulations.

4.4 Products

Ferrous Materials:

1. Steel Plates, Shapes, and Bars: ASTM A36 (ASTM A36M).
2. Cold-Formed Steel Tubing: ASTM A500.
3. Hot-Formed Steel Tubing: ASTM A501.
4. Steel Pipe: ASTM A53, standard weight.
 - a. Railings: Schedule 40.
 - b. Bollards: Schedule 80.
5. Stainless-Steel:
 - a. Sheet, Strip, Plate, and Flat Bars: ASTM A666.
 - b. Bars and Shapes: ASTM A276.
 - c. Types: Type 304 at interior, Type 316L at exterior.
6. Fasteners: Plated fasteners, ASTM B633, zinc-coated.
7. Welding Rods and Bare Electrodes: AWS specifications.
8. Zinc-Coating: Hot-dip galvanized coating for materials in exterior assemblies or exterior walls.

Non-Ferrous Materials:

1. Aluminum Extrusions and Bars: ASTM B221.
2. Aluminum Plate and Sheet: ASTM B209.

Auxiliary Materials:

1. Nonshrink Nonmetallic Grout: CE CRD-C621.
2. Grout: Factory-packaged, nonshrink, nonmetallic, ASTM C1107.
3. Exterior/Interior Anchoring Cement: Erosion-resistant hydraulic expansion cement.
4. Galvanizing Repair Paint: SSPC - Paint 20.
5. Bituminous Paint: SSPC - Paint 12.
6. Fasteners: Corrosion-resistant, suitable for use.

Finishes: Unless otherwise indicated, provide the following:

1. Steel: Shop primed, color and sheen as selected by the Architect.
2. Stainless Steel: AISI No. 4.
3. Aluminum: Mill finish.

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