

Design and Construction Standards

Division 05 – Metals

General

In general, follow the guidelines below when designing, specifying and installing structural steel, metal deck, and metal fabrications. Unless specifically indicated otherwise, these guidelines are not intended to restrict or replace professional judgment.

1. All ferrous metals (steel) at exterior locations, exposed to weather, or supporting veneers subject to weather must be hot-dipped galvanized (e.g. railings, opening lintels, etc.)
2. Whenever possible, galvanizing shall be factory performed hot dipped *after* fabrications are complete.
3. Coordination of lintels required for MEP penetrations shall be the responsibility of the Professional / General Contractor.
4. Structural steel connections shall be bolted or welded. Power or powder driven anchors are prohibited structural steel, joist, or deck connections, and may only be considered for appropriate light gauge framing or similar work attaching to the building structure.
 - a. Power driven anchors are anchors driven by compressed air or have explosive caps used when striking the anchor into place.
5. Fabrication and erection shop drawings shall be provided to EMU, including as-built corrections, as part of the record set of documents. For trusses, joists, or items designed by manufacturers, drawings shall be signed and sealed by a licensed engineer registered in the State of Michigan.
6. Structural design documents, construction documents, fabrication, and installation documents shall include all live and dead load design.
7. On all structural framing documents (including construction documents), include unit weights of mechanical units or allowable load design, and coordinate with Mechanical Engineer / Contractor prior to fabrication of structural steel.
8. Coordinate steel connections and attachments to steel with fire protection and fire proofing systems. All connections and supports shall be made prior to installation of fire proofing systems.
9. For exposed structural steel, all connections shall be made prior to finish painting.

Section 05 12 00 Structural Steel Framing

1. Steel lintels and shelf angles supporting limestone or “cast stone” are preferred to be stainless steel, however may be galvanized per approval of the Physical Plant. This is also true for support pins / studs attached to these lintels.
2. Provisions for Vertical Expansion: In buildings designed for future vertical expansion, structural steel shall be erected within tolerances stipulated in the AISC Code of Standard practice. All future design loads must be identified on the drawings/specifications with parameters describing expansion.

3. Affidavit from Erector: The General Contractor shall be required to provide an affidavit, at the completion of the job, to the effect that the structural steel frame is plumb and level within the normal tolerances specified in the code.
4. Record of Erection: The General Contractor shall provide a certified survey by a registered Civil Engineer showing the exact location of the centers and elevations of the columns at their topmost level, exactly as installed. This information shall be incorporated into the "record" drawings.
5. Where steel columns bear at foundations or below grade, black asphaltic paint coat underside of base plate and up to grade / floor level.

Section 05 21 00 Steel Joist Framing

1. All designed and manufactured steel joists must be in compliance with the Steel Joist Institute.
2. Prime coat and touch up painting will be considered adequate for joists, except where subjected to moisture or where exposed to view. Asphalt coatings are not permitted on metal joists that are to remain exposed and receive painted finish.
3. Support of building infrastructure, ducts, cabling, piping, ceilings, etc. shall be from "panel points" only and not from members intermediate between these support points.
4. Where concentrated loads bear on joists more than 6" from "panel points", joists shall be reinforced.

Section 05 31 00 Steel Decking

1. Support of building infrastructure, ducts, cabling, piping, ceilings, etc. shall be prohibited from metal deck and shall only be from building structural components.
2. Roof curbs, stub columns, or equipment supports shall not bear directly on the deck and shall extend directly to the building structure or have appropriately designed bearing.
3. All metal decking shall be hot-dipped galvanized. Galvanized metal deck shall be considered adequate appearance for metal deck, except where exposed to view.
4. All equipment, penetrations, or similar openings in metal deck shall be supported by a structural steel frame (shape and size dependent on unit weights). Frame shall be sized for deck and unit weights.
5. All metal deck spans shall have a minimum of three supporting points (continuous spans).
6. Provide metal closure angles (or similar) at all deck perimeters and penetrations through metal decking.

Section 05 40 00 Cold-Formed Metal Framing

1. Metal stud framing shall be designed and installed in compliance with American Iron & Steel Institute (AISI) specifications SG02-1 North American Specifications for the Design of Cold-Formed Steel Structural /Members and SG-973 Cold-Formed Steel Design Manual.

2. Stud gauge, thickness, shape, and spacing shall be determined by stud height and loading per the manufacturers catalogue, and this information shall be supplied by the Professional on request. In no case shall Cold Formed Stud and Furring Channel spacing exceed 16" o.c. maximum.
3. Wall dimensions shall be minimum 3 5/8" studs, adjusted to 6" or 8" (or more) where necessary for plumbing, duct, or conduit runs. Preferred Furring Channel thickness shall be minimum 1 1/2" wide to accommodate electrical boxes, however 3/4" wide may be allowed where infrastructure is not present in the wall.

Section 05 50 00 Metal Fabrications

1. Support systems, including Unistrut, hangers, etc. or similar for support of infrastructure items (electrical, mechanical, plumbing) shall be designed and supplied by the appropriate trade. Refer to those Divisions for additional requirements.

Section 05 51 00 Metal Stairs

1. Stair designs shall be in compliance with the building codes, and in compliance with Architectural Products Division of the National Association of Architectural Metal Manufacturer's AMP 510 Metal Stairs Manual.
2. Stairs for Fire Exits are preferred to be straight run, or switchback style stairs. Curved stairs for emergency egress purposes are to be avoided when possible.
3. Fire Exit stair treads shall be concrete filled pan. Stair treads shall have non-slip surface finish.
4. Exterior stair systems may utilized pre-cast or cast in place concrete stair system – refer to concrete requirements in Division 03.
5. Stairways in mechanical or maintenance spaces may be entirely metal fabricated with appropriate non-slip metal treads.
6. Alternating tread stairs are prohibited.
7. Where ladders are required for equipment or mechanical space access, provide fabricated ladders of galvanized steel. Provide integral fall cages or safety devices where necessitated by code.

Section 05 52 13 Pipe and Tube Railings

1. At decorative railing systems, use of stainless steel, bronze, anodized aluminum, or decorative metal may be allowed. At standard railing systems use of aluminum guard and handrails is encouraged to avoid maintenance and regular painting. Galvanized steel is the minimum material requirement.
2. Horizontal balusters, decorative patterns, or similar railing designs that create a "ladder" effect in the railing are prohibited. At mechanical and utilitarian spaces, use of metal mesh with steel frames may also be allowed as guardrail infill. Decorative panels, mesh, or similar may be used at common use spaces.
3. All railing corners shall be radiused. No sharp edges, mitered corners, or similar edges are allowed.
4. At all railings, provide seamless expansion sleeves at appropriate for spacing.

5. At exterior railings, regardless of metal material, provide weep holes in railings at appropriate spacing.
6. Handrails at concrete paving and walks may be set in sleeves or core-drilled. Provide minimum core / bearing depth of 4" within a solid bearing. Ensure core is appropriate distance from edges to avoid cracking or spalling the walk/support. Drill depth or sleeve diameter to be 1" larger (1/2" gap) around railing size. All permanently set rails shall use non-shrink, erosion resistant grout.
7. Utilize removable railings only where authorized by the Physical Plant.

End of Division 05 – Metals