Montgomery County Public Schools Facilities Guide

DIVISION 5 – METALS

SECTION 05000

METAL FRAMING AND FABRICATIONS

PART 1 GENERAL

1.01 GUIDE INCLUDES

A. Structural Steel
B. Steel Joists
C. Metal Decking
D. Metal Fabrications to include:
   1. Rough hardware
   2. Ladders
   3. Loose bearing and leveling plates, lintels & shields angles.
   4. Miscellaneous framing and supports
   5. Expansion joint covers
   6. Steel pipe railings, handrails, guardrails, bollards
   7. Steel stairs
   8. Roof opening framing
   9. Miscellaneous metal
E. Cold Formed Metal Framing

1.02 CODES AND STANDARDS

A. Comply with applicable OSHA, AISC & ASTM, Steel Joist Institute, American Welding Society and Steel Deck Institute publications.

1.03 DOMESTIC ORIGIN

A. Consistent with Maryland Annotated Code, Article 78A known as "Buy American Steel" Act of the General Assembly of Maryland, Acts of 1978, steel used in this project shall be manufactured in United States of America.

1.04 QUALIFICATIONS OF STRUCTURAL STEEL FABRICATION

A. Fabrication shall be in accordance with applicable provisions of the AISC S 335. Fabrication and assembly shall be done in the shop to greatest extent possible. fabrication plant shall be qualified under American Institute of Steel Construction (AISC) certification program for Category I, structural steelwork. Category II certifications required for buildings with auditorium and stadia.
B. Copy of AISC certification showing fabrication plant is certified for Category I or II projects.
C. Provide before shipment, a certified copy of mill tests, performed at plant, on structural steel fabricated for this project and certified copies of welders qualification test records showing qualification in accordance with AWSD1.1.

1.05 TESTING & INSPECTION

A. Contractor shall employ an independent testing and inspection agency having a registered Professional Engineer licensed in State of Maryland on its staff to inspect, perform tests and prepare reports necessary to cover structural steel joists and metal decking. Scope of testing and inspection shall be responsibility of project architect and structural Engineers and shall include but not limited to:
   1. Testing of shop and field bolted connections.

2. Testing of shop and field welds:
    a. Certify welders and conduct visual inspections of welds.
    b. Perform tests of suspected defective welds using one of four testing procedures.
        1) Liquid Penetrant Inspection ASTM E165
        2) Magnetic Particle Inspection ASTM 109
        3) Radiographic Inspection ASTM E94 & ASTM E142
        4) Ultrasonic Inspection ASTM E164
3. Provide part time field inspection while steel erection is in progress.
4. Field inspection of metal decking.

1.06 SUBMITTALS

A. Shop drawings for structural steel shall be prepared under supervision of registered professional engineer. Shop drawings shall include complete details and schedule for fabrication and assembly of structural steel members, procedures and diagrams. If fabricator develops the detail configuration of connection during preparation of shop drawings, thereby becomes responsible for design of that part of overall structure.
B. Submit location of manufacture and of extraction/ recovery of steel materials.
C. Submit recycled-content information, designating percentages of post-consumer and pre-consumer waste material.
D. Submit MSDS for any applicable products used.

PART 2 PRODUCTS

2.01 STEEL MATERIALS, GENERAL

A. Regional Materials: Provide products manufactured and of primary materials extracted/ recovered within a 500-mile radius of the project site.
B. Recycled Content: Provide products with minimum recycled-content values as follows:
    1. Reinforcing bars: 95 percent total recycled-content including at least 60 percent post-consumer material.
    2. Structural steel members: 99 percent total recycled-content including at least 60 percent post-consumer material.
    3. Steel joists: 50 percent total recycled-content including at least 25 percent post-consumer material.
    4. Steel deck: 50 percent total recycled-content including at least 25 percent post-consumer material.
    5. Cold-formed metal framing: 30 percent total recycled-content.
    6. Miscellaneous metal fabrications: Provide maximum feasible recycled-content material for that product.

2.02 STRUCTURAL STEEL

A. Steel manufactured in United States and conforming to applicable ASTM and AISC standards.
B. Coordinate with interior utilities to accommodate extra loads for pipes, ducts, and etc.

2.03 STEEL JOISTS

A. Steel manufactured in United States and fabricated by a domestic firm conforming with Standard Specifications and load tables of Steel Joist Institute.

2.04 METAL DECKING

A. Domestic manufacturer, conforming to Steel Roof Deck Design manual of Steel Deck Institute.
B. Roof decking shall be 22 gauge minimum and 1-1/2 inches high minimum.
C. Decking shall be a product of one manufacturer, except specialized decking such as acoustical deck.

D. Galvanized metal decking shall comply with ASTM A446 and repair paint shall be high zinc dust content complying with Military Specifications MIL-P-21034 (ships).
E. Acoustical metal deck shall have Noise Reduction Coefficient of 0.85 or better.
F. Acceptance: Examine areas and conditions under which metal decking items are to be installed. Do not proceed with work until satisfactory conditions have been corrected in an acceptable manner.

2.05 METAL FABRICATIONS

A. Rough Hardware - Fabricate to size, bolts, plates, anchors, hangers, and other miscellaneous steel and iron shapes for securing woodwork to concrete or other structure. Provide steel washers, except malleable iron washers for heads and nuts which bear on wood structural connections.
B. Ladders - Provide:
   1. 1/2 inch X 2-1/2 inches steel flat bar side rails 18 inches apart.
   2. 3/4 inch diameter non slip steel bar rungs at 12 inches o.c.
   3. Support side rails at spacing not greater than 5'-0" o.c.
   4. Extend side rails 42 inches above top rung and return rails to wall or structure. At roof level, goose neck back to wall parapet. Do not anchor to roof membrane.
   5. Ladders shall be hot dip galvanized in exterior and crawl space locations, then painted.
   6. Ladders shall be provided at every roof or equipment level, not assessable by roof scuttle or other means.
C. Loose bearing and leveling plates, lintels and shelf angles.
   1. Bearing and leveling plates to be free of bow and twist and of required size and thickness.
   2. Lintels to bear 8 inches on each side of opening.
   3. Multiple angle lintels to be welded into a single lintel if in excess of 5'-0" length.
   4. Hot dip galvanize plates and lintels where exposed to the weather and in wet areas.
D. Miscellaneous Framing and Supports
   1. Items not part of structural steel framework but required for completed project shall be fabricated to required sizes and shapes and conform to standards required for structural steel.
E. Expansion Joint Covers
   1. Interior to be as designed by architect and be manufactured by one of following:
      a. Architectural Art Manufacturing
      b. Balco, Inc.
      c. CS Group
      d. MM Systems Corporation
      e. Metalines, Inc.
   2. Exterior - Painted 1/4 inch X 4 inches steel plate secured to one side only.
F. Handrails, Guardrails, and Bollards (Meet IBC code and ADAAG)
   1. Fabricate railings and handrails as indicated out of steel pipe or aluminum tubing.
   2. Spacing of vertical balusters shall be 4-1/2 inches + 1/4 inch or less.
   3. Height of guardrail at landings or straight-aways shall be 43 inches for elementary and 48 inches for secondary schools.
   4. Provide two level handrails at elementary schools with one 27 inches and one 36 inches high.
   5. Bollards shall be hot dipped galvanized of pipe size as indicated and complying with ASTM A53 standards.
   6. Secure railing to masonry walls with 3/8 inch double expansion bolts into solid CMU or completely thru-bolt.
G. Steel Stairs
   1. Fabricate metal pan type steel stairs in accordance with commercial class NAAMM's Metal Stairs Manual to sustain live load of not less than 100 psf addition to dead load.
   2. For buildings of three stories or more, consider use of pre-fabricated stairs as manufactured by "The Sharon Companies LTD.," Median, Ohio, or American Stair, Willow Springs, Illinois. Manufacturer shall design and certify stair drawings. Require stair drawings for submittal review and record drawings.
H. Roof Opening Framing
   1. Unless otherwise shown, roof deck openings greater than 12 inches X 12 inches

shall be framed with 5 inches X 5 inches X 5/16 inch steel angle.

2.06 COLD FORMED METAL FRAMING

A. Description: Metal studs and track for exterior walls.
B. Steel studs and tracks to be hot dipped galvanized steel with a minimum yield point of 33,000 psi conforming to ASTM C 955 - studs; ASTM C 1007 - installation.
C. Manufacturers:
   1. Deitrich - Worthington
   2. Marino/Ware
   3. Clarke Western
   4. Dale/Incor

PART 3 EXECUTION

3.01 METAL DECK INSTALLATION

A. Placing Decking: Place deck units on supporting steel framework and adjust to final position with end bearing on supporting members, accurately aligned end-to-end, before being permanently fastened. Butt ends and center directly over supports. Do not stretch or contract side-lap interlocks. Place deck units flat and square, secured to adjacent framing. Do not use deck units for storage or working platforms until permanently secured. See structural drawings for opening reinforcing.
   1. Decking placement for slopes of 1/4 inch or more shall be lapped in shingle fashion.
B. Fastening Deck Units: Permanently weld deck units to steel supporting members by not less than 1/2 inch diameter at intermediate supports, unless otherwise shown or noted. Fasten by connectors, punching, or self-tapping screws, subject to approval of Architect, between adjacent deck units at intervals not exceeding 18 inch o.c.
C. Metal Closure Strips: Provide closure strips, including ridge and valley plates (as applicable), at open uncovered ends and edges of decking, and in voids between decking and other construction. Weld into position to provide complete decking installation.
D. Roof Insulation Supports: Shall be welded in place, metal closure strips where rib openings in top surface of roof decking occur adjacent to edges and openings.
E. Touch-Up Painting: After deck installation, wire brush, clean and paint scarred areas, welds and rust spots on top and bottom surfaces of decking units and supporting members with galvanizing repair paint applied in accordance with manufacturer's instruction. Patch and close holes in deck (except acoustical deck) created by welding, prior to touch-up.

3.02 WASTE MANAGEMENT

A. Recycle or salvage waste metal materials in accordance with Division 1 "Construction Waste Management" requirements.

END OF SECTION