

METAL FABRICATIONS

1. GENERAL

1.1 References

- .1 ASTM International (ASTM)
 - .1 ASTM A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A108, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
 - .3 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .4 ASTM A269, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .5 ASTM A276, Standard Specification for Stainless Steel Bar and Shapes.
 - .6 ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .7 ASTM A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- .2 Canadian Standards Association (CSA)
 - .1 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA S16, Design of Steel Structures.
 - .3 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding (Developed in cooperation with the Canadian Welding Bureau).
 - .4 CSA W59, Welded Steel Construction (Metal Arc Welding).
- .3 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specification Manual.

1.2 Action and Informational Submittals

- .1 Submit in accordance with Section E3 – Submittals and Shop Drawings.
- .2 Product Data:
 - .1 Submit Manufacturer's instructions, printed product literature and data sheets for sections, plates, pipe, tubing, bolts and include product characteristics, performance criteria, physical size, finish and limitations.

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- .2 Submit two (2) copies of WHMIS MSDS.
 - .1 For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.
- .3 Shop Drawings:
 - .1 Submit Drawings stamped and signed by Professional Engineer registered or licensed in Province of Manitoba.
 - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
 - .3 Include erection Drawings, elevations, and details where applicable.
 - .4 Indicate welded connections using CISC standard welding symbols. Clearly indicate net weld lengths.

1.3 Quality Assurance

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 Source Quality Control

- .1 Shop inspection and testing, when required by the Contract Administrator, will be performed by an Inspection and Testing Firm appointed and paid by the Contract Administrator.
 - .1 Radiographic and magnetic particle inspection of welds will be performed as required by the Inspection and Testing Firm, in accordance with CSA W59 and ASTM E109.
 - .2 Welds will be considered defective if they fail to meet quality requirements of CSA W59.
- .2 Provide free access to all portions of Work in the shop and cooperate with appointed firm.
- .3 Pay all additional costs for inspection and re-inspection due to defective workmanship or materials.

2. PRODUCTS

2.1 Materials

- .1 Steel sections, W and HSS: to CSA G40.20/G40.21, Grade 350W.
- .2 Steel plates: to CSA G40.20, Grade 300W.
- .3 Steel L sections: to CSA G40.20, Grade 300W
- .4 Steel pipe: to ASTM A 53/A 53M double (XXS) extra strong, galvanized finish.

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- .5 Aluminum: As specified on drawings.
- .6 Welding materials: to CSA W59.
- .7 Welding electrodes: to CSA W48 Series.
- .8 Bolts, nuts, and washers: to ASTM A325 unless specified otherwise.
 - .1 Galvanized bolts, nuts and washers for connection of galvanized structural steel.
- .9 All fasteners submerged in water: Stainless Steel
- .10 Shear Stud Connectors: to ASTM A108
- .11 Grating: Type 30-102M aluminum grating
- .12 Stainless Steel: to ASTM A276, Grade A316.
- .13 Floor Hatches: cover and frame shall be a luminum. Hinges: Cast steel. Slam lock with fixed interior handle and removable exterior turn and lift handle with removable gasketed screw plug, lift assistance and automatic hold open device: Type A316 stainless steel. All hardware to be Type 316 stainless steel. All hatches exposed to ambient temperatures shall be insulated with 50 mm of concealed polystyrene foam.
 - .1 Single leaf hatches shall be Bilco Type K, or approved equal in accordance with B8.
 - .2 Double leaf hatches shall be Bilco Type KD, or approved equal in accordance with B8.

2.2 General Fabrication

- .1 Verify all dimensions on-site prior to shop fabrication.
- .2 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .3 Fit and shop assemble in largest practical sections for delivery to Site.
- .4 Supply all components required for proper anchorage of miscellaneous metals. Fabricate anchorage and related components of same material and finish as metal fabrications, unless otherwise specified or shown.
- .5 Weld connections where possible, otherwise bolt connections. Cut off bolts flush with nuts, leave smooth or flush; grind or file if required.
- .6 Accurately form all connections and joints with exposed faces flush, mitres and joints tight.
- .7 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- .8 Provide for flush welded or hairline butt field joints.

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- .9 Shop fabricate openings in members for other building components. Reinforce openings to restore member to original design strengths.
- .10 Provide lugs, clips, brackets, hangers, and struts as required for attaching miscellaneous metal items securely to building structure.
- .11 Thoroughly clean all surfaces of rust, scale, grease, and foreign matter prior to prime painting or galvanizing.
- .12 Galvanize and prime paint items as shown. Do not shop prime surfaces in contact with or embedded in concrete or requiring field welding.
- .13 Provide banding at discontinuous edges of grating and around all penetrations.

2.3 Finishes

- .1 Primer: to CISC/CPMA 2-75.
- .2 Galvanizing for steel shapes: to ASTM A123/A123M.
- .3 Galvanizing for steel fasteners: to ASTM A153/A153M.
- .4 Touch-up galvanizing with minimum two (2) coats of zinc rich primer and two (2) top coats of colour matched shiny galv. paint.
- .5 Reference Section 09 91 00 for painting of monorail structural steel.

2.4 Shop Painting

- .1 Clean all members, remove loose mill scale, rust, oil, dirt, and other foreign matter. Prepare surfaces according to Society for Protective Coatings (SSPC) SP7 unless indicated otherwise.
- .2 Clean all members receiving galvanizing material to SSPC SP- 10 "Near-White Blast Cleaning".
- .3 Apply one (1) coat of prime paint in the shop to all steel surfaces, except:
 - .1 Surfaces to be encased in concrete.
 - .2 Surfaces and edges to be field welded.
 - .3 Faying surfaces of friction-type connections.
- .4 Use primer unadulterated, as prepared by manufacturer. Paint under cover, on dry surfaces only and when surface and air temperatures are above 5°C.
- .5 Patch paint bolts, nuts, sharp edges, and corners one (1) coat before full prime coat is applied.
- .6 Maintain dry condition and 5°C minimum temperature until paint is thoroughly dry.

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3. EXECUTION

3.1 Erection

- .1 Obtain Contract Administrator's permission prior to Site cutting or making adjustments that are not part of scheduled Work.
- .2 Install items plumb, square and level, fit accurately, and maintain free from distortion or defects detrimental to appearance and performance.
- .3 Make provision for erection stresses and temporary bracing. Keep work in alignment at all times.
- .4 Replace items damaged in course of installation.
- .5 Perform required field welding. Exposed welds shall be smooth and flush; grind or file if required.
- .6 Perform necessary cutting and altering for the installation of Work of other Sections, and as indicated on Drawings. No additional cutting is to be done without the permission of the Contract Administrator.
- .7 Perform all field assembly bolting and welding to match standard of shop bolting and welding. Bolts and screws are to be concealed whenever possible.
- .8 After installation, touch-up field bolts, nuts, welds, and scratched and damaged prime painted surfaces. Field touch-up primer to be same as shop primer. Touch-up galvanized surfaces with minimum two (2) coats of zinc rich primer.
- .9 Supply, to appropriate sections, items required to be cast into concrete and built into masonry, complete with necessary setting templates.

3.2 Field Quality Control

- .1 Inspection and testing, when required by the Contract Administrator, will be performed by an Inspection and Testing Firm appointed and paid by the Contract Administrator.
 - .1 Radiographic and magnetic particle inspection of welds will be performed as required by the Inspection and Testing Firm, in accordance with CSA W59 and ASTM E109.
 - .2 Welds will be considered defective if they fail to meet quality requirements of CSA W59.
- .2 Provide free access to all portions of Work in the field and cooperate with appointed firm.
- .3 Pay all additional costs for inspection and re-inspection due to defective workmanship or materials.
- .4 Repair damage to adjacent materials caused by metal fabrications installation.

END OF SECTION