

PART 1 - GENERAL

1.1 REFERENCES

.1 ASTM International

- .1 ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM A167-99(2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .3 ASTM A500/A500M-18, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

.2 CSA International

- .1 CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CSA W47.1-19, Certification of Companies for Fusion Welding of Steel.
- .3 CSA W55.3-08(R2018), Certification of Companies for Resistance Welding of Steel and Aluminum.

1.2 ACTION AND INFORMATIONAL SUBMITALS

- .1 Submit in accordance with Section 01 33 00.
- .2 Submit manufacturer's instructions, printed product literature and data sheets for [roof anchors and safety restraints] and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Ontario, Canada.
 - .2 Indicate component profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - .3 Indicate welded connections using standard welding symbols include net weld lengths.
 - .4 Roof plan including windows location, anchor system layout, anchor type, rigging diagram, design and test load.
- .4 Third party load test report, logbook, system information and user's information

1.3 QUALITY ASSURANCE

- .1 Qualifications:
- .2 Welder's qualifications: welders' certification to CSA W55.3
 - .1 Employ qualified and licensed welders possessing certificates for each procedure to be performed.
 - .2 Each welder to possess identification symbol issued by authority having jurisdiction.

- .3 Welding company certification: certified for fusion welding of steel structures to CSA W47.1
- .4 Manufacturer Qualifications: company specializing in manufacturing products specified in this section with minimum 3 years documented experience.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect roof anchors and safety restraints from nicks, scratches, and blemishes.
- .4 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- .1 Fall arrest system, roof-mounted anchors with adhesive anchorage connectors for fall arrest as per structural drawings and details. System should meet regulation and standards, including, the Ontario building code, 2012, Ontario ministry of labour guidelines, CSA Z91.15, CSA 271 and CSA S16.

2.2 MATERIALS

- .1 Structural steel - CSA standard G40.20/G40.21, general requirements for rolled or welded structural quality steel/structural quality steels. Grade 350W for general purpose structural steel shapes, 300W for angles, channels, rods, and plates. Hollow structural sections shall conform to CSA standard G40.20 grade 350W, hot form welded or hollow structural section, class H.
- .2 High strength bolts, nuts, and washers ASTM standard A325, standard specification for structural bolts, steel, heat treated 120/105 ksi minimum tensile strength or A325M, standard specification for high strength bolts for structural steel joints (metric).
- .3 Steel Rings: forged steel, ring thickness determined by imposed loads.
- .4 Bolts, Nuts, and Washers for Stainless Steel: stainless steel, matte finish.
- .5 Gaskets Under Anchors: neoprene pads, or elastomeric pad compatible with roof membrane, cut to size.
- .6 Welding Materials: CSA W47.1 for materials being welded.
- .7 Eyebolts and all bolts that are used to secure the roof anchor assembly to the structure shall be stainless steel to:
 - .1 ASTM A193-B8 for bolts,
 - .2 ASTM A194-Grade 8 for nuts,
 - .3 ASTM A479-5304 for stock.

- .8 All steel components not stainless steel shall be hot dipped galvanized to the current edition of CSA G164.

2.3 FABRICATION

- .1 Fit and shop assemble items in largest practical sections, for delivery to site.
- .2 Fabricate items with joints tightly fitted and secured.
- .3 Continuously seal joined members by intermittent welds and plastic filler.
- .4 Grind exposed joints flush and smooth with adjacent finish surface.
- .5 Make exposed joints butt tight, flush, and hairline.
- .6 Ease exposed edges to small uniform radius.
- .7 Exposed Mechanical Fastenings: screws or bolts; consistent with design of component.
- .8 Furnish and install components required for anchorage of fabrications.
- .9 Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- .10 Provide vent holes in hollow structural section prior to galvanizing.

2.4 FABRICATION TOLERANCES

- .1 Squareness: 3 mm maximum difference in diagonal measurements.
- .2 Maximum Deviation from Plane: 100 mm from 1 m.

2.5 FINISHES

- .1 Prepare uncoated steel surfaces: SSPC-SP 2, no more than 4 hours before applying epoxy primer.
- .2 Concealed steel anchors, clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- .3 Do not prime surfaces in direct contact with concrete or where field welding is required.
- .4 Concealed Structural Components and Anchors: galvanize after fabrication to ASTM A123/A123M Coating Grade 85 to minimum [600 g/sq m] galvanized coating.
- .5 hot dipped galvanized as per can/csa-g164 hot dip galvanizing of irregularly shaped articles. apply two coats of zinc-rich touch-up paint to any galvanized surface that has been damaged or field welded.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for roof anchors and safety restraint installation in accordance with manufacturer's written instructions.
- .2 Visually inspect substrate in presence of Departmental Representative.
- .3 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

- .5 Verify dimensions, tolerances, and method of attachment with other work.

3.2 PREPARATION

- .1 Locate anchors to suit suspended access for window cleaning operations. notify the consultant immediately if any of the proposed new roof anchors locations differ from those noted on the structural drawings. the contractor is responsible for all costs, including design fees, associated with additional structural reinforcement required to accommodate new roof anchors differing from any of the parameters listed.
- .2 Supply and install steel items required to be [cast into concrete] [attached to steel framing] as clean uncoated metal, with setting templates to appropriate sections.
- .3 Verify existing dimensions and conditions on site prior to construction.
- .4 Existing structural information is based upon drawings provided by the owner report any variations to the structural Departmental Representative before proceeding with the work.
- .5 Take all precautions necessary to protect existing structures during construction.

3.3 ERECTION TOLERANCES

- .1 Maximum Variation from Plumb: 3 mm.

3.4 INSTALLATION

- .1 Install items plumb and level, accurately fitted, free from distortion or defects.
- .2 Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- .3 Field weld components as indicated on shop drawings.
- .4 Obtain approval from Departmental Representative prior to site cutting or making adjustments not scheduled.
- .5 After erection, apply primer in accordance with MPI Painting Manual to: welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.
- .6 Deform threads of bolts or use other approved method to limit removal of nuts or bolts securing roof anchors.

3.5 INSPECTION AND TESTING

- .1 Provide safe access to work areas as required and assist in their work. Provide at least 48 hours notice prior to concealing any work that requires inspection, review, or testing. Schedule this work to occur during normal business hours. Ensure that the work to be reviewed is substantially complete in time for the review.
- .2 Retain an independent inspection and testing agency to perform roof anchor inspection and in-situ load testing under the supervision of a professional engineer engaged by the contractor.
- .3 Test methods and results shall conform to CSA Z91, Z259.15 and CSA Z271.
- .4 Roof anchors to be approved, certified, and tested to safely support an ultimate load of 5000 lb (22.2 KN) and test load of 2500 lb (11.1 KN) at the top of the anchor in any direction. Proof of acceptability must be furnished prior to installation.
- .5 If failures are encountered, conduct additional testing and replace anchors as specified by the departmental representative.

3.6 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse and recycling.
- .4 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by roof anchors and safety restraint installation.

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