

**Part 1 General**

**1.1 SUMMARY**

- .1 Description of work of this Section:
  - .1 Fabrication, supply and installation of fall arrest anchor system as indicated on drawings and specified herein, which is used for life safety requirements and may be used for cleaning exterior surfaces of the building.
  - .2 Obtain and pay for all required permits and approvals from the jurisdictional authorities.

**1.2 RELATED REQUIREMENTS**

- .1 Section 07 46 19: Preformed Aluminum Panels
- .2 Section 07 52 16: Modified Bituminous Sheet Roofing and Sheet Metal
- .3 Section 07 92 00: Sealants

**1.3 REFERENCE STANDARDS**

- .1 Conform to the Ontario Building Code - latest edition, in particular Article 4.1.10.7.
- .2 Conform to Ontario Regulation 527/88, Regulation for Window Cleaning.
- .3 Conform to CAN/CSA-Z91-M, Safety Code for Window Cleaning Operations.
- .4 All welding shall conform to CSA W59, Welded Steel Construction.
- .5 Certification of welding companies shall conform to CAN/CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.

**1.4 QUALITY ASSURANCE**

- .1 Work of this Section shall conform to the requirements of Ontario Regulation 659/79, Occupational Health and Safety Act and Regulations for Construction Projects, as amended by Ontario Regulation 845/79, the Occupational Health and Safety Statute Law Amendment Act and all other applicable regulations of the Ontario Ministry of Labour.
- .2 Design and layout of fall arrest anchor system shall be acceptable to the Ontario Ministry of Labour, as verified by a "letter of acceptance" from the Ontario Ministry of Labour. Provide a copy of the "letter of acceptance" with the fall arrest anchor reports as specified herein.
- .3 Subcontractor executing work of this Section shall have a minimum five (5) years continuous Canadian experience in successful manufacture and installation of work of type and quality shown and specified herein. Submit proof of experience upon Departmental Representative's request.

**1.5 DESIGN REQUIREMENTS**

- .1 Design fall arrest anchors in strict accordance with the requirements of the Ontario Ministry of Labour and CSA-Z91-M.

## **1.6 SPECIAL LIABILITY INSURANCE**

- .1 Subcontractor executing the work of this Section shall provide as part of the required fall arrest anchor report, a copy of the currently dated and duly authorized certificate indicating that the subcontractor executing work of this Section has valid, special liability insurance policy in place to warranty the fabrication and installation of fall arrest anchor system.

## **1.7 SUBMITTALS**

- .1 Submit submittals in accordance with the General Conditions and Section 01 33 00.
  - .2 Shop Drawings:
    - .1 Submit shop drawings showing and describing in detail, anchor layout plans, materials, finishes, dimensions, details of connections and fastenings, elevations, plans, sections, metal thicknesses, hardware and any other pertinent information.
    - .2 All shop drawings shall bear the seal and signature of a Professional Engineer registered to design structures in the place of the Work, and employed by the fabricator/installer executing the work of this Section.
  - .3 Test Data:
    - .1 Submit test data showing that the materials shall meet the specified performance with fall arrest anchor reports as specified herein.
  - .4 Samples:
    - .1 Submit two (2) samples of each of the following for review of the Departmental Representative;
      - .1 Safety log book.
      - .2 Work plan acrylic protection cover.
  - .5 Fall Arrest Anchor Reports:
    - .1 Submit fall arrest anchor reports including copies of, but not limited to the following; approved work plans, anchor details, test data, special liability insurance certificate, warranty certificate and "letter of acceptance" from the Ontario Ministry of Labour.
    - .2 Include fall arrest anchor reports in the Operation and Maintenance Manuals.
  - .6 Maintenance Instructions:
    - .1 Submit copies of maintenance instructions including but not limited to the following; complete description and list of components, written and illustrated instructions relative to the care, adjustments and operation of all parts of anchors with recommended frequency of service and maintenance to ensure maximum efficiency, reliability and long life of the anchors.
    - .2 Include maintenance instructions in the Operation and Maintenance Manuals.
- ## **1.8 DELIVERY, STORAGE, HANDLING AND PROTECTION**
- .1 Coordinate deliveries to comply with construction schedule and arrange ahead for off the ground, under cover storage location. Do not load any area beyond the design limits.
  - .2 Materials shall be carefully checked, unloaded, stored and handled to prevent damage. Protect materials with suitable non-staining waterproof coverings.

- .3 Store materials in original, undamaged containers or wrappings with manufacturer's seals and labels intact.
- .4 Unsatisfactory or damaged materials shall be identified and removed from the Site.
- .5 Adequately protect the structure and work of other Sections during delivery, storage, handling and execution of the work of this Section. Repair and /or replace damaged work of other Sections caused by the work of this Section at no additional cost to the Departmental Representative.
- .6 Provide tools, plant and other equipment required for the proper execution of the work of this Section.

## **1.9 MAINTENANCE INSPECTIONS**

- .1 Subcontractor executing the work of this Section shall provide three (3) years of fall arrest anchors maintenance inspections in accordance with the General Conditions and no additional costs to the Owner. Maintenance inspections shall include but shall not be limited to; anchor fastener "pull tests", flashing inspections and weld inspections.

## **1.10 WARRANTY**

- .1 Warrant work of this Section against defects in materials and workmanship in accordance with the General Conditions for a period of three (3) years and agree to promptly make good defects which become evident during warranty period without cost to the Owner. Defects shall include but not be limited to; flashing failure, weld failure, deformation of anchors and/or part of anchors while under imposed loading and metal fatigue.

## **Part 2 Products**

### **2.1 APPROVED SYSTEMS**

- .1 Fall Arrest Anchors:
  - .1 Fall arrest anchors shall be bolt through extension wall type to suit conditions as indicated on drawings and specified herein.

### **2.2 MATERIALS**

- .1 Stainless Steel:
  - .1 Stainless Steel Plate and Round Bar Stock: AISI Type 304 stainless steel, structural quality with  $F_y = 50,000$  psi and conforming to ASTM A167-92b.
  - .2 Stainless Steel Welding Materials: Conforms to CSA W59. Electrodes shall be compatible with and of the same properties of stainless steel.
- .2 Steel:
  - .1 Structural Steel Plate: Conforms to CAN/CSA-G40.20/G40.21, Grade 300W.
  - .2 Hollow Structural Sections: Conforms to CAN/CSA G40.20/G40.21, Grade 350W, Class H.
  - .3 Steel Welding Materials: Conforms to CSA W59.

- .3 Bolts, Nuts, Washers:
  - .1 Conforms to ASTM A325-92a. Provide high strength stainless steel bolts, nuts and washers where in contact with stainless steel and/or dissimilar materials.
- .4 Galvanizing:
  - .1 All uncoated steel specified to be galvanized shall be galvanized after fabrication by the hot dip process and conforming to CAN/CSA-G164-M, with minimum coating of 2 oz./sq.ft. Galvanize after all welding is complete. Welding of galvanized material will not be permitted.
- .5 Foamed-In-Place Insulation:
  - .1 Two component polyurethane froth/spray kit, UL Class I (flame spread of 25 or less).
- .6 Bituminous Paint:
  - .1 Conforms to CAN/CGSB-1.108-M, Type 2.
- .7 Building Paper:
  - .1 Conforms to CAN/CGSB-51.32-M .
- .8 Butyl Tape:
  - .1 Extruded, high grade, macro-polyisobutylene tape of thickness, width and shore hardness to suit conditions.
- .9 Acrylic Protective Covers:
  - .1 Clear, acrylic sheet type protective covers for protecting fall arrest anchor work plans and for wall mounting, as approved by the Departmental Representative.

## **2.3 FABRICATION**

- .1 Fit and assemble work in shop where possible. Execute work in strict accordance with Ontario Ministry of Labour requirements for fall arrest anchors, details and reviewed shop drawings.
- .2 Take measurements at the building for work which is to fit or be connected to steel, concrete framing or masonry, before commencing fabrication.
- .3 Do all welding in accordance with requirements of CSA W59 and CSA W55.3, including all supplements. Companies and personnel performing welding work of this Section shall be certified according to CAN/CSA W47.1. Weld stainless steel electric arc process. Grind welds smooth and flush with surface of parent metal, where exposed to view and where specifically indicated on drawings. Welds shall be "captive welds" and/or "TIG" welds unless specified otherwise. Maintain sharp arises.
- .4 Galvanize all steel after fabrication by the hot dip process, as specified herein.
- .5 Apply foamed-in-place insulation in all steel fall arrest anchor extensions as indicated to form a continuous thermal barrier. Apply foamed-in-place insulation with suitable equipment in accordance with the manufacturer's written instructions. Fill all spaces completely, leaving no voids or gaps and trim excess material.

## **2.4 FINISHES**

- .1 Stainless Steel: "Mill" finish.
- .2 Steel: Hot dip galvanized as specified herein.

## **Part 3 Execution**

### **3.1 EXAMINATION AND PREPARATION**

- .1 Make thorough examination of drawings and details, determine the intent, extent, materials, conditions of interfacing with other work and be fully cognizant of all requirements.
- .2 Inspect surfaces over which the work of this Section is dependent for any irregularities detrimental to the application and performance of the work of this Section.
- .3 Notify Departmental Representative in writing of all conditions which are at variance with those in the contract documents and/or detrimental to the proper and timely installation of the work of this Section. The decision regarding corrective measures shall be obtained from the Departmental Representative prior to proceeding with the affected work of this Section.
- .4 Provide anchors, inserts, templates, rough-in dimensions, installation instructions and engineering requirements in sufficient time to other Sections for building-in work of this Section.
- .5 Subcontractor executing work of this Section shall have a senior, qualified representative on the Site to direct and supervise the work of other Sections as it relates to the work of this Section.
- .6 Commencement of work of this Section implies acceptance of surfaces and conditions.

### **3.2 INSTALLATION**

- .1 Fall arrest anchors shall be installed by manufacturer or by the authorized representative under direct supervision of a Professional Engineer registered to design structures in the place of the Work.
- .2 Where through bolt type fastening methods are used, deform end of threaded stud/rod after torquing of fall arrest anchors is complete.
- .3 Isolate contact surfaces to prevent electrolysis due to metal to metal contact, or contact between metal and concrete or masonry. Use bituminous paint, butyl tape, building paper or other means approved by Departmental Representative.
- .4 Do all drilling of steel, masonry and concrete necessary for the anchorage of the work of this Section.
- .5 Install copies of roof work plans in acrylic protective covers at all roof access locations in strict accordance with the authorities having jurisdiction. Exact locations shall be as designated later by the Departmental Representative.

### **3.3 ADJUSTING AND INSPECTION**

- .1 Upon completion of the work of this Section, verify by inspection that work of this Section functions properly and adjust as required to ensure safe and satisfactory operation of the fall arrest anchors. Perform required "pull test" on minimum one (1) out of every four (4) fasteners of each fall arrest anchor, in strict accordance with the requirements of

the authorities having jurisdiction. Where fall arrest anchors fail "pull test" as stated previously, replace all defective fall arrest anchors at no additional costs to the Owner.

- .2 After inspections are complete and corrections are made, accurately fill out inspection log book, certify fall arrest anchor system for use and hand over completed inspection log book to the Owner.

**END OF SECTION**