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| Version | Date | Description of Revisions |
| 1 | August 30, 2006 | Approved final document. |
| 2 | November 13, 2009 | Modified ‘Related Section’ |
| 3 | March 15, 2011 | Minor changes from Legal |
| 4 | June 5, 2012 | Added References and Replacement Parts Sections |
| 5 | July 3, 2012 | Reformatted to Remove White Space |
| 6 | April 22, 2015 | General formatting |
| 7 | April 11, 2016 | Phase 1 Update (AV) |
| 8 | February 15, 2017 | Updated the listed manufacturers, added in some performance specifications and standards for those that were removed, and removed the subsection on hinged manhole covers. (CPD) (AV) |

NOTE:

This is a CONTROLLED Document. Any documents appearing in paper form are not controlled and should be checked against the on-line file version prior to use.

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**The on-line copy is the current version of the document.**

# GEneral

## Related Sections

### [Under "Related Sections", identify other Sections that are related to, and/or dependent on, the work results or information specified elsewhere. The list should be limited to Sections with specific information that the reader might expect to find in this Section, but is specified elsewhere. For example, if hardware for aluminum entrances is specified in the aluminum entrance Section, a cross-reference would be appropriate in the finish hardware Section. The purpose of this cross-referencing is for information only, to aid in finding those other requirements—not to define the scope of the Section.

### Cross-referencing here may also be used to coordinate assemblies or systems whose components may span multiple Sections and which must meet certain performance requirements as an assembly or system.

### Contractor is responsible for coordination of the Work.

### This Section is to be completed/updated during the design development by the Consultant. If it is not applicable to the section for the specific project it may be deleted.]

### [List Sections specifying installation of products supplied but not installed under this Section and indicate specific items.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Execution requirements for ...[item]... specified under this Section.

### [List Sections specifying products installed but not supplied under this Section and indicate specific items.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Product requirements for ...[item]... for installation under this Section.

### [List Sections specifying related requirements.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: [Optional short phrase indicating relationship].

#### Section 01300 – Submittals

#### Section 05120 – Structural Steel

#### Section 05500 – Metal Fabrications- General

#### Section 05512 – Aluminum Handrails

## References

### Comply with the latest edition of the following statutes codes and standards and all amendments thereto.

#### American Society for Testing and Materials (ASTM)

##### ASTM A36/ A36M-14; Standard Specification for Carbon Structural Steel.

##### ASTM A276/A276M-16a; Standard Specification for Stainless Steel Bars and Shapes.

##### ASTM B429/B429M-10e1; Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.

##### ASTM B632/B632M-15, Standard Specification for Aluminum-Alloy Rolled Tread Plate.

#### American National Standards Institute (ANSI)

##### ANSI ASC A14.3-2008; American National Standards for Ladders – Fixed – Safety Requirements.

#### Ontario Building Code (OBC) O. Reg. 312/12

#### Occupational Health and Safety Act R.S. O. 1990, c.O.1.

#### American Iron and Steel Institute (AISI)

#### Underwriters Laboratories (UL), Underwriters laboratories Canada (ULC)

# PRODUCTS

## Steel Lintels and Shelf Angles

### ASTM A36/A36M-14, hot dip galvanize after fabrication in accordance with [Consultant to provide alternate standard as appropriate to replace withdrawn G164].

### [Where lintel or shelf angle size is not shown, design lintels to OBC 9.20.5.2 Lintel Support. Consultant to confirm with current edition of OBC and amend as required.]

### Provide adjustable anchors for lintels and shelf angles.

## Embedded Steel Support Frames for Floor Plate and Grating

### Steel angle support frames to be embedded in concrete shall be stainless steel, ASTM A276/A276M-16a, AISI Type 316, unless indicated otherwise.

### Welded anchors for stainless steel support frames shall also be stainless steel.

## Floor Plate

### Design Requirements:

#### Visit the site and measure existing floor plate openings to be replaced or

#### modified.

#### Design floor plates and frames.

#### Subdivide floor plates with side larger than 1,000 mm by reinforcing each subdivision with stiffeners.

#### Size floor plate to fit existing embedded frames with clearances between frames and floor plates not exceeding 3 mm on any side.

#### Limit deflection under a concentrated mid span load of 1.0 kN to 1/360th of the span, and under superimposed 2.5 kN/m2 uniformly distributed load, 6 mm maximum. Provide angle stiffeners as required.

#### Provide recessed handles or lifting holes. Provide gastight lifting holes or handles for plates on process and sanitary sumps.

#### Provide hinges for floor plates that are opened often like covers for sumps and accesses.

#### Where floor plates indicated to be removable, fabricate plates with 2 handles and weight not more than 20 kg.

### Fabricate aluminum angle frames and border bars with the following features:

#### Corners neatly fitted, welded and mitred.

#### Shop weld border bars.

#### Provide strap anchors welded to angle frames for casting into concrete.

#### Size angle frames to fit the floor plate with clearances between frames and the floor plate not exceeding 3 mm on any side.

#### Material: Aluminum: ASTM B632/B632M-15, Alloy 6061-T6.

#### Minimum floor plate thickness 10 mm.

#### Surface shall be raised-lug pattern or diamond tread, unless shown on Drawings.

### Fabricate floor plates on process and sanitary sumps with the following features:

#### Gastight.

#### Hinged.

#### Hold open assembly.

#### 3 mm full face neoprene border gasket secured in place with a suitable adhesive.

#### Gastight lifting handles.

#### Countersunk stainless steel screws to fasten plate down.

#### Minimum plate thickness 10 mm.

### Fabricate galvanized checkered plate a minimum 6 mm thick with 50 mm thick Styrofoam SM insulation and a1.3 mm thick galvanized back-pan secured to the underside of the checkered plate.

### Grating Slip Resistant Surface:

#### Provide where indicated on the Drawings.

#### The non-slip surface shall be listed as slip resistant by Underwriters Laboratories.

#### The surface shall have a minimum coefficient of kinetic friction of [0.8].

#### The surface shall have minimum bond strength of [13.7 MPa].

## Ladders

### Fabricate ladders with rails, rungs, landings, and cages to meet the applicable requirements of OSHA, CFR Part 1910.27, and ANSI ASC A14.3-2008.

#### Concentrated load of 1.1 kN plus 30 percent impact on rungs.

#### Maximum rung deflection of l/360.

#### Concentrated load of 1.1 kN plus 30 percent impact between consecutive attachments.

#### Self closing gates at landings.

#### Ladder extender when access is to be achieved by bending down on knee.

### Flat Bar Ladders:

#### Punch rails, pass rungs through rails, and weld on outside.

#### Weld brackets to the ladder for fastening ladder to wall.

#### All material shall be stainless steel or galvanized steel as noted on the Contract Drawings.

### Aluminum Pre Engineered Pipe Ladders:

#### Rungs:

##### Aluminum extrusions of Alloy 6063 T6.

##### Nonslip grip surface, 25 mm wide flat top, and semicircular bottom with mill finish.

##### Diamondback, finish to match rails, as manufactured by Alcoa Building Products, Inc.

#### Side Rails: ASTM B429/B429M-10e1, Alloy 6063 T6, 38 mm, Schedule 40 pipe with anodized finish, AA M32 C22 A41.

#### Fasteners for Ladder Attachments and Cage Assembly: Stainless steel.

#### Welded, pop riveted, or glued construction is not acceptable.

#### Fabricate to longest length as practical but not to exceed 7.3 m.

#### Furnish support attachments to side rails at a maximum spacing of 1.8 m.

### Ladder Safety Post or Ladder Extender:

#### Telescoping tubular, spring balanced and automatically locking in the raised position, with a release lever for unlocking.

#### Fabricated retractable ladder extender.

#### Material: [Hot dip galvanized steel in accordance with CSA G164M Consultant to amend with replacement standard for withdrawn G164] [Stainless steel, AISI Type 316] [Aluminum]

## Safety Climb Device

### General:

#### Conforms to ANSI ASC A14.3-2008 and [OSHA CFR Part 1910.27 Consultant to replace with appropriate Canadian and/or provincial regulation and reference].

#### Belt and harness shall withstand minimum drop test of 113 kg in 1.8 m free fall.

#### Fall Prevention System Material: [Aluminum 6061 T6.] [Hot dip galvanized steel in accordance with [Consultant to replace withdrawn standard G164 with an alternate appropriate standard reference] [Stainless steel, AISI Type 316.]

### Components and Accessories:

#### Main Components: Sleeve or Trolley, Safety Harness, and Carrier or Climbing Rail.

#### Ladder rung clamps with [aluminum] [hot dip galvanized steel] [stainless steel, AISI Type 316,] mounting brackets and hardware.

#### Removable extension kit with tie-down rod or trolley gate, mandrel, and carrier rail for ladders under manholes and hatches.

### Manufacturers and Products:

#### Canadian Safety Equipment Inc., North Safety Products Canada

#### TS Group (Ontario), TS Safety Rail System.

#### Approved Equivalent

## Aluminum Platforms

### Aluminum, Structural Shapes, and Plates: B209 and B308, Alloy 6061 T6.

### Design framing members and connections in accordance with AA30 and other applicable standards.

### Design’s Qualification: Calculations and shop drawings required for the Contractor’s design must be stamped by a registered engineer, licensed in the Province of Ontario.

### Design Criteria:

#### Comply with the requirements of the OBC.

#### Uniform Service Load: 5.0 kPa minimum.

#### Maximum Deflection: 6 mm or L/240.

#### [For support points, use locations indicated on drawings. Point loads at all support points are [F: 12 kN] maximum. If additional support points are required, design and provide additional members that will safely resist new loads at no additional cost].

#### Do not use existing building framing as part of lateral load resisting system.

#### Design platforms to accommodate openings for piping, ducting, and electrical services as shown on the drawings.

### Design and provide other items such as aluminum grating, aluminum stairs, aluminum railing, bolts, welds, anchors, etc. in compliance with the requirements of this Section.

### Field measure areas around equipment prior to fabrication. Design platforms and grating so that gaps around the perimeter of equipment do not exceed 75 mm clearance.]

## Stairs

### Design stairs in accordance with Ontario Building Code and for the additional requirements specified.

### Fabricate stairs as detailed on the Contract Documents and install using stainless steel anchor bolts.

### Design the tread sections to limit deflection to 1/180th of the span under a concentrated load of 1.0 kN at the centre.

### For handrail requirements, refer to Section 05512 - Aluminum Handrails.

### Fabricate stairs with open grating treads of welded grating with slip-resistant, solid nosing.

## Lifting Hooks

### Design hooks to withstand loads imposed with a minimum safety factory of 3.

### Hot-dip galvanize steel lifting hooks after fabrication.

### Cast hooks into concrete slab or beams at the location(s) shown. Do not weld hooks to structural steel beams without prior written authorization from the Consultant.

## Protective Steel Angle

### Fabricate hot-dip galvanized steel angles for casting into concrete as indicated on the Drawings.

### Use headed anchor studs of a minimum 12 mm diameter in diameter by 150 mm long. Space studs at 400 mm.

# EXECUTION

## Floor Plate

### Install floor plate covers in accordance with detailed shop drawings.

### Accurately position floor plates prior to welding or bolting, such that covers are level with floor surface.

### Grind all field welds smooth.

### Grind all projected corners and edges above finish floor to bevel edges to level with finish floor.

### Use stainless steel anchors.

## Access Covers

### Accurately position prior to placing concrete, such that covers are flush with the floor surface.

### Protect from damage resulting from concrete placement. Thoroughly clean exposed surfaces of any concrete spillage in order to obtain a clean, uniform appearance.

## Safety Climb Device System

### Provide for each ladder where the unbroken height between levels exceeds 6 m, or at lesser heights where indicated on Drawings.

### Install in accordance with the manufacturer’s instructions.

### Furnish additional accessories required to complete the system for each ladder.

### Furnish one harness for each ladder equipped with a safety climb device.

### Furnish pivot sections at platforms, landings, and roofs.

### When installed to required height, the fall prevention system shall be rigid and an integral part of the structure.

## Field Quality Control

### Clean off dirt on installed floor plate surfaces.

**END OF SECTION**