

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            Section 05 21 00; 05 31 00.

**1.2                REFERENCES**

- .1            ASTM International Inc.
- .2            Canadian General Standards Board (CGSB)
  - .1            CAN/CGSB-85.10- 99, Protective Coatings for Metals.
- .3            Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturers Association (CPMA).
  - .1            Handbook of the Canadian Institute of Steel Construction.
  - .2            CISC/CPMA Standard 2-75, Quick-Drying Primer for use on Structural Steel.
- .4            Canadian Standards Association (CSA International)
  - .1            CSA G40.20-13/G40.21- 13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2            CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3            CAN/CSA-S16-09 Design of Steel Structures.
  - .4            CAN/CSA-S136- 07, North American Specifications for the Design of Cold Formed Steel Structural Members.
  - .5            CSA W47.1- 09, Certification of Companies for Fusion Welding of Steel.
  - .6            CSA W48-06 (R2011), Filler Metals and Allied Materials for Metal Arc Welding.
  - .7            CSA W59- 03 (R2008), Welded Steel Construction (Metal Arc Welding).
- .5            Master Painters Institute
  - .1            MPI-INT 5.1- 08, Structural Steel and Metal Fabrications.
  - .2            MPI-EXT 5.1- 08, Structural Steel and Metal Fabrications.
- .6            The Society for Protective Coatings (SSPC) and National Association of Corrosion Engineers (NACE) International
  - .1            NACE No. 3/SSPC SP-6- 06, Commercial Blast Cleaning.

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1            Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2            Shop Drawings:
  - .1            Provide drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.

- .3 Erection drawings:
  - Submit erection drawings indicating details and information necessary for assembly and erection purposes including:
    - .1 Description of methods.
    - .2 Sequence of erection.
    - .3 Type of equipment used in erection.
    - .4 Temporary bracings.
- .4 Fabrication drawings:
  - .1 Submit fabrication drawings showing designed assemblies, components and connections are stamped and signed by qualified professional engineer licensed in the Province of Alberta, Canada.
- .5 Source Quality Control Submittals:
  - .1 Submit 2 copies of mill test reports 4 weeks prior to fabrication of structural steel.
    - .1 Mill test reports to show chemical and physical properties and other details of steel to be incorporated in project.
    - .2 Provide mill test reports certified by metallurgists qualified to practice in Province of Alberta, Canada.
- .6 Fabricator Reports:
  - .1 Provide structural steel fabricator's affidavit stating that materials and products used in fabrication conform to applicable material and products standards specified and indicated.

#### **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials in manufacturer's original, undamaged containers with identification labels intact.

### **Part 2 Products**

#### **2.1 DESIGN REQUIREMENTS**

- .1 Design details and connections in accordance with requirements of CAN/CSA-S16-09 and CAN/CSA-S136-07 to resist forces, moments, shears and allow for movements indicated.
- .2 Shear connections:
  - .1 Select framed beam shear connections from an industry accepted publication such as "Handbook of the Canadian Institute of Steel Construction" when connection for shear only (standard connection) is required.

- .2 Select or design connections to support reaction from maximum uniformly distributed load that can be safely supported by beam in bending, provided no point loads act on beam, when shears are not indicated.
- .3 For composite construction select or design minimum end connection to resist reaction resulting from factored movement resistance as tabulated in the "Handbook of the Canadian Institute of Steel Construction" assuming 100% shear connection with depth of steel deck and/or slab shown on drawings.
- .4 Submit sketches and design calculations stamped and signed by qualified professional engineer licensed in Province of Alberta, Canada for non-standard connections.

## **2.2 MATERIALS**

- .1 Structural steel: to CSA-G40.20/G40.21 Grade 350W and CAN/CSA-S136.
- .2 Anchor bolts: to CSA-G40.20/G40.21, Grade 300W.
- .3 High strength anchor bolts: to ASTM A193/A193M, Grade 8.
- .4 Bolts, nuts and washers: to ASTM A325.
- .5 Welding materials: CSA W59 and certified by Canadian Welding Bureau.
- .6 Shop paint primer: to CISC/CPMA2-75 solvent reducible alkyd, grey.
- .7 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 600 g/m<sup>2</sup>.
- .8 Shear studs: to CSA W59, Appendix H.

## **2.3 FABRICATION**

- .1 Fabricate structural steel in accordance with CAN/CSA-S16-09 , CAN/CSA-S136 and in accordance with reviewed shop drawings.
- .2 Install shear studs in accordance with CSA W59.

## **2.4 SHOP PAINTING**

- .1 Clean, prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16-09; CAN/CSA-S136-07.
- .2 Clean members, remove loose mill scale, rust, oil, dirt and foreign matter. Prepare surface according to NACE No.3/SSPC-SP-6.
- .3 Apply one coat of primer in shop to steel surfaces to achieve minimum dry film thickness of 0.25 to 0.50 mils, except:
- .4 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5 degrees C.
- .5 Maintain dry condition and 5 degrees C minimum temperature until paint is thoroughly dry.
- .6 Strip paint from bolts, nuts, sharp edges and corners before prime coat is dry.

**Part 3 Execution**

**3.1 APPLICATION**

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

**3.2 GENERAL**

- .1 Structural steel work: in accordance with CAN/CSA-S16-09, CAN/CSA-S136-07
- .2 Welding: in accordance with CSA W59.
- .3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.

**3.3 CONNECTION TO EXISTING WORK**

- .1 Verify dimensions and condition of existing work, report discrepancies and potential problem areas to Departmental Representative for direction before commencing fabrication.

**3.4 MARKING**

- .1 Mark materials in accordance with CSA G40.20/G40.21. Do not use die stamping. When steel is to be left in unpainted condition, place marking at locations not visible from exterior after erection.

**3.5 ERECTION**

- .1 Erect structural steel, as indicated and in accordance with CAN/CSA-S16-09, CAN/CSA-S136-07 and in accordance with reviewed erection drawings.
- .2 Field cutting or altering structural members: to approval of Departmental Representative.
- .3 Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.
- .4 Continuously seal members by continuous welds where indicated. Grind smooth.

**3.6 FIELD QUALITY CONTROL**

- .1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Departmental Representative.
- .2 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by Departmental Representative.
- .3 Submit test reports to Departmental Representative within 2 weeks of completion of inspection.
- .4 Departmental Representative DCC Representative will pay costs of tests as specified in Section 01 29 83 - Payment Procedures for Testing Laboratory Services.

**3.7 FIELD PAINTING**

- .1 Paint in accordance with Section 09 91 23 - Interior Painting.
  - .1 Touch up damaged surfaces and surfaces without shop coat with primer to NACE No.3/SSPC-SP-6 except as specified otherwise. Apply in accordance: MPI Architectural Painting Specification Manual.

**3.8 CLEANING**

- .1 Clean in accordance with Section 01 74 11 - Cleaning.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            Section 05 31 00.

**1.2                REFERENCES**

- .1            Canadian General Standards Board (CGSB)
  - .1            CAN/CGSB-85.10-99, Protective Coatings for Metals.
- .2            Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA)
  - .1            CISC/CPMA 2-75-1975, Quick-Drying, Primer for Use on Structural Steel.
  - .2            CISC/CPMA 1-73a-1975, Quick-Drying, One-Coat Paint for Use on Structural Steel.
- .3            CSA International
  - .1            CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2            CSA S16-09, Design of Steel Structures.
  - .3            CSA S136-07, North American Specification for the Design of Cold Formed Steel Structural Members.
  - .4            CSA W47.1-09, Certification of Companies for Fusion Welding of Steel.
  - .5            CSA W55.3-08, Certificate of Companies for Resistance Welding of Steel and Aluminum.
  - .6            CSA W59-M03(R2008), Welded Steel Construction (Metal Arc Welding) Metric.
- .4            The Master Painters Institute (MPI)
  - .1            Architectural Painting Specification Manual - current edition.

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1            Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2            Product Data:
  - .1            Submit manufacturer's instructions, printed product literature and data sheets for steel joist framing 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 Province of Alberta, Canada.
  - .2            Indicate on erection drawings, relevant details such as joist mark, depth, spacing, bridging lines, bearing, anchorage and details.

- .3 Indicate particulars, on shop drawings, relative to joist geometry, framed openings, splicing details, bearing and anchorage. Include member size, properties, specified and factored member loads, and stresses under various loadings, deflection and camber.

- .4 Delegated Design Submittals:

#### **1.4 QUALITY ASSURANCE**

- .1 Submit two copies of mill test reports at least 4 weeks prior to fabrication of steel joists and accessories. Reports to show:
  - .1 Chemical and physical properties.
  - .2 Other details of steel to be incorporated into work.
  - .3 Certification by qualified metallurgists confirming that tests conform to requirements of CSA G40.20/G40.21

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 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 Replace defective or damaged materials with new.

### **Part 2 Products**

#### **2.1 DESIGN CRITERIA**

- .1 Design steel joists and bridging to carry loads indicated on drawings to CSA S16-09 CSA S136-07.
- .2 Design joists and anchorages for uplift forces as indicated.
- .3 Ensure joists are manufactured to consider load effects due to fabrication, erection and handling.
- .4 Limit roof joist deflection due to specified live load to 1/360 maximum of span and deflection due to specified total load to 1/240 maximum of span.

#### **2.2 MATERIALS**

- .1 Open web steel joists: to CSA S16-09 CSA S136-07.
- .2 Structural steel: to CSA G40.20/G40.21.
- .3 Welding materials: to CSA W59.
- .4 Shop paint primer: CISC/CPMA-2.
- .5 Shear studs: to CSA W59, Appendix H.

### **2.3 FABRICATION**

- .1 Fabricate steel joists and accessories as indicated in accordance with CSA S16-09 CSA S136-07 and in accordance with reviewed shop drawings.
- .2 Weld in accordance with CSA W59.
- .3 Provide diagonal and horizontal bridging and anchorages as indicated.

### **2.4 SHOP PAINTING**

- .1 Clean, prepare and shop prime surfaces of steel joists to CSA S16 SSPC SP6.
- .2 Clean members of loose mill scale, rust, oil, dirt and other foreign matter. Prepare surfaces to SSPC SP1 brush blast.
- .3 Apply one coat of CISC/CPMA 2 primer to steel surfaces to achieve dry film thickness of .065 mm to .080 mm maximum except:
  - .1 Surfaces to be encased in concrete.
  - .2 Surfaces to receive field installed stud shear connectors and steel decks.
  - .3 Surfaces and edges to be field welded.
  - .4 Faying surfaces of friction-type connections.
  - .5 Below grade surfaces in contact with soil.
- .4 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5 degrees C.
- .5 Maintain dry condition and 5 degrees C minimum temperature until paint is thoroughly dry.
- .6 Strip paint bolts, nuts, sharp edges and corners before prime coat is dry.

## **Part 3 Execution**

### **3.1 EXAMINATION**

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

### **3.2 INSTALLATION**

- .1 Do structural steel work: to CSA S16-09 CSA S136-07
- .2 Do welding: in accordance with CSA W59.
- .3 Ensure installers are certified to CSA W47.1 for fusion welding. Submit certification that welded joints are qualified by Canadian Welding Bureau.

### **3.3 CONNECTION TO EXISTING WORK**

- .1 Verify dimensions and condition of existing work; report discrepancies and potential problem areas to Departmental Representative for direction before commencing fabrication.

### **3.4 FIELD QUALITY CONTROL**

- .1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Departmental Representative. Testing laboratory will inspect representative joists for integrity, accuracy of fabrication and soundness of welds. Testing laboratory will also monitor test loading of joists used by manufacturer to verify design and check representative field connections. Departmental Representative will determine extent of and identify all inspections.
- .2 Submit test report to Departmental Representative within seven days after completion of inspection.

### **3.5 ERECTION**

- .1 Erect steel joists and bridging as indicated to CSA S16 and in accordance with reviewed erection drawing.
- .2 Complete installation of bridging and anchorages before placing construction loads on joists.
- .3 Field cutting or altering joists or bridging that are not shown on shop drawings: to approval of Departmental Representative. Clean and touch up shop primer to bolts, welds, burned or scratched surfaces at completion of erection.

### **3.6 FIELD PAINTING**

- .1 Paint: in accordance with Section 09 91 23 - Interior Painting.
- .2 Touch up all damaged surfaces and surfaces without shop coat with CISC/CPMA-1 CISC/CPMA-2 in accordance with manufacturers' recommendations.

### **3.7 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 7411 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

### **3.8 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by steel joist framing installation.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

05 21 00.

**1.2 REFERENCES**

- .1 ASTM International
  - .1 ASTM A653/A653M-09a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .3 CSA International
  - .1 CSA C22.2 No.79-1978(R2008), Cellular Metal and Cellular Concrete Floor Raceways and Fittings.
  - .2 CSA S16-09, Design of Steel Structures.
  - .3 CSA S136-07, North American Specification for the Design of Cold Formed Steel Structural Members.
  - .4 CSA W47.1-09, Certification of Companies for Fusion Welding of Steel Structures.
  - .5 CSA W59-03(R2008), Welded Steel Construction, (Metal Arc Welding).
- .4 Canadian Sheet Steel Building Institute (CSSBI)
  - .1 CSSBI 10M-08, Standard for Steel Roof Deck.
  - .2 CSSBI 12M-08, Standard for Composite Steel Deck.
- .5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1113-A2007, Architectural Coatings.
  - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for steel decking 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 Province of Alberta, Canada.
  - .2 Submit design calculations if requested by Departmental Representative. Indicate deck plan, profile, dimensions, base steel thickness, metallic coating designation,

connections to supports and spacings, projections, openings, reinforcement details and accessories.

- .3 Indicate details of temporary shoring of steel deck, such as location, time and duration of placement and removal of shoring for concrete fill decks.

- .4 Sustainable Design Submittals:

#### **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements 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 decking from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

### **Part 2 Products**

#### **2.1 DESIGN CRITERIA**

- .1 Design steel deck to CSA S136. Steel deck and connections to steel framing to carry dead, live and other loads including lateral loads, diaphragm action, composite deck action, and uplift as indicated.
- .2 Deflection under specified live load not to exceed 1/240 of span, except that when plaster gypsum board ceilings are hung directly from deck, live load deflection not to exceed 1/360 of span.
- .3 Where vibration effects are to be controlled as indicated, dynamic characteristics of decking system to be designed to be in accordance with CSA S16.

#### **2.2 MATERIALS**

- .1 Zinc-iron Alloy (ZF) coated steel sheet: to ASTM A653/A653M structural quality Grade 230, with Z275 coating, for interior surfaces not exposed to weather, painted finish, 1.22 mm minimum base steel thickness.
- .2 Decks to be painted: zinc-iron alloy coated decks suitable for finish painting.
- .3 Zinc (Z) coated steel sheet: to ASTM A653/A653M structural quality Grade 230 255, with ZF75, coating, regular spangle extra smooth] surface, chemically treated for unpainted finish, not chemically treated for paint finish, for exterior surfaces exposed to weather, 0.91 mm minimum base steel thickness.
- .4 Closures: as indicated in accordance with manufacturer's recommendations.
- .5 Cover plates, cell closures and flashings: steel sheet with minimum base steel thickness of 0.76 mm minimum. Metallic coating same as deck material.

- .6 Primer: zinc rich, ready mix to CAN/CGSB-1.181.
  - .1 VOC limit 350 g/L maximum to GS-11 SCAQMD Rule 1113
- .7 Shear studs: to CSA W59.

### **2.3 TYPES OF DECKING**

- .1 Steel roof deck: 1.22 mm minimum base steel thickness, 38 mm maximum deep profile, non-cellular, interlocking side laps. SPEC NOTE: Repeat the following paragraph if roof

## **Part 3 Execution**

### **3.1 EXAMINATION**

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

### **3.2 INSTALLATION**

- .1 Structural steel work: in accordance with CSA S136. Welding: in accordance with CSA W59, except where specified otherwise.
- .2 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel and/or CSA W55.3 for resistance welding.

### **3.3 ERECTION**

- .1 Erect steel deck as indicated and in accordance with CSA S136 1 and in accordance with reviewed erection drawings.
- .2 Butt ends: to 1.5 mm gap. Install steel cover plates over gaps wider than 3 mm.
- .3 Lap ends: to 50 mm minimum.
- .4 Weld and test stud shear connectors through steel deck to steel joists/beams below in accordance with CSA W59.
- .5 Immediately after deck is permanently secured in place, touch up metallic coated top surface with compatible primer where burned by welding.
- .6 Prior to concrete placement, steel deck to be free of soil, debris, standing water, loose mill scale and other foreign matter.
- .7 Temporary shoring, if required, to be designed to support construction loads, wet concrete and other construction equipment. Do not remove temporary shoring until concrete attains 75% of its specified 28 day compression strength.
- .8 Place and support reinforcing steel as indicated.

**3.4 CLOSURES**

- .1 Install closures in accordance with approved details.

**3.5 OPENINGS AND AREAS OF CONCENTRATED LOADS**

- .1 No reinforcement required for openings cut in deck which are smaller than 150 mm square.
- .2 Frame deck openings with any one dimension between 150 to 300 mm as recommended by manufacturer, except as otherwise indicated.
- .3 For deck openings with any one dimension greater than 300 mm and for areas of concentrated load, reinforce in accordance with structural framing details, except as otherwise indicated.

**3.6 CONNECTIONS**

- .1 Install connections in accordance with CSSBI recommendations as indicated.

**3.7 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

**3.8 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by steel decking installation.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1    ASTM International
  - .1    ASTM A53/A53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  - .2    ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2    CSA International
  - .1    CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2    CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3    CSA S16-09, Design of Steel Structures.
  - .4    CSA W59-M03(R2008), Welded Steel Construction (Metal Arc Welding) Metric.
- .3    Green Seal Environmental Standards (GS)
  - .1    GS-11-2008, 2nd Edition, Paints and Coatings.
- .4    Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1    Material Safety Data Sheets (MSDS).
- .5    The Master Painters Institute (MPI)
  - .1    Architectural Painting Specification Manual - current edition.

**1.2                ACTION AND INFORMATIONAL SUBMITTALS**

- .1    Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2    Product Data:
  - .1    Submit manufacturer's instructions, printed product literature and data sheets for sections, plates, bolts and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2    Submit two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements 01 35 43 - Environmental Procedures.
    - .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 Alberta, Canada.
  - .2    Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

### **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 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common 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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Steel sections and plates: to CSA G40.20/G40.21, Grade 350W.
- .2 Welding materials: to CSA W59.
- .3 Welding electrodes: to CSA W48 Series.
- .4 Bolts and anchor bolts: to ASTM A307.
- .5 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

### **2.2 FABRICATION**

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use Where possible, fit and shop assemble work, ready for erection.
- .3 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

### **2.3 FINISHES**

- .1 Galvanizing: hot dipped galvanizing with zinc coating 900 g/m<sup>2</sup> to CAN/CSA-G164.
- .2 Zinc primer: zinc rich, ready mix to MPI- EXT 5.2C in accordance with chemical component limits and restrictions requirements and VOC limits of CCD-047a

### **2.4 SHOP PAINTING**

- .1 Primer: VOC limit 250 g/L maximum to CCD-047a CCD-048.

- .2 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .3 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.
- .4 Clean surfaces to be field welded; do not paint.
- .5 Galvanize finish for exterior, prime paint for interior.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative, Consultant.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied to Consultant.

#### **3.2 ERECTION**

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Departmental Representative Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Supply components for work by other trades in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CSA S16 ; Weld field connection.
- .7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces with primer after completion of:
  - .1 Primer: maximum VOC limit 250 g/L
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
  - .1 Primer: maximum VOC limit 250 g/L.

**3.3 CHANNEL FRAMES**

- .1 Install steel channel frames to openings as indicated.

**3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

**3.5 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by metal fabrications installation.

**END OF SECTION**