

Part 1 General

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| 1.1 RELATED
REQUIREMENTS | .1 | Section 09 91 23 - Interior Painting. |
| 1.2 REFERENCES | .1 | Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA). |
| | .1 | CISC/CPMA 2-75, Quick-Drying Primer for use on Structural Steel. |
| | .2 | Canadian Institute of Steel Construction (CISC) |
| | .1 | Handbook of Steel Construction, Tenth Edition. |
| | .3 | Canadian Standards Association (CSA). |
| | .1 | CSA-G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel. |
| | .2 | CSA-S16-14, Design of Steel Structures. |
| | .3 | CSA-W47.1-09 (R2014), Certification of Companies for Fusion Welding of Steel. |
| | .4 | CSA-W48-14, Filler Metals and Allied Materials for Metal Arc Welding. |
| | .5 | CSA-W55.3-08, Certification of Companies for Resistance Welding of Steel and Aluminium. |
| | .6 | CSA-W59-13, Welded Steel Construction (Metal Arc Welding). |
| 1.3 SOURCE QUALITY
CONTROL | .1 | The Contractor is to provide written documentation from the Canadian Welding Bureau certifying that the steel subcontractor is qualified to requirements of CSA-W47.1, Division 1 or 2.1. This document is to be submitted in accordance with Section 01 33 00 - Submittal Procedures. |
| 1.4 SUBMITTALS | .1 | Submit fabrication and erection documents and material lists in accordance with Section 01 33 00 - Submittal Procedures. |
| | .2 | It is the responsibility of the Contractor to field confirm the exact locations and construction of related work to which work under this section, modifies, connects to, or is supported on. |
| | .3 | On shop fabrication erection drawings, indicate materials and connections. |

- .4 Submission shall bear signature and stamp of qualified Professional Engineer registered or licensed to practice in the Province of New Brunswick, for all details and connections not shown on the contract drawings.
- .5 Review of shop details and erection diagrams will extend to general design concept only. This review does not relieve the Contractor of the responsibility for accuracy of the detail dimensions, general fit-up of parts to be assembled, adequacy of connection details, or for errors or defects contained in the details.

Part 2 Products

2.1 MATERIALS

- .1 Structural Steel (C-sections and plates): new, to CSA-G40.21, Grade 300W.
- .2 Welding materials: to CSA-W59 and certified by Canadian Welding Bureau.
- .3 Bolts, nuts and washers: to ASTM A325, galvanized for structural steel connections.
- .4 Adhesive Anchors: Acrylic adhesive for dowel and anchor rod anchorage: to ASTM C881, Type IV, Grade 3, Class A, B, and C.
 - .1 Acceptable Products:
 - .1 Epcon S7 by ITW Red Head.
 - .2 HIT HY200 by HILTI.
 - .3 SET-XP by Simpson Strong-Tie.
 - .4 FLO-ROK FR6-SD by UCAN Fastening Products.
 - .5 Anchorfix-3001 by Sika Canada Inc.
 - .6 Alternate Materials: Approved by addendum in accordance with Instructions to Tenderers.
- .5 Shrinkage Compensating Grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents to CSA-A23.1/A23.2.
 - .1 Compressive strength: 50 MPa at 28 days.
 - .2 Net shrinkage at 28 days: maximum 0.08%.
 - .3 Consistency:
 - .1 Fluid: to ASTM C827. Time of efflux through flow cone (ASTM C939), under 30s.
 - .2 Flowable: to ASTM C827. Flow table, 5 drops in 3s, (ASTM C109, applicable portion) 125 to 145%.
 - .3 Plastic: to ASTM C827. Flow table, 5 drops in 3s, (ASTM C109, applicable portions) 100 to 125%.
 - .4 Dry pack to manufacturer's requirements.
 - .4 Acceptable Products:

- .1 Sika Grout 212 standard by Sika Canada Inc.
- .2 Construction Grout to BASF Building Systems.
- .3 NS Grout by Euclid Canada Inc.
- .4 Alternate Materials: Approved by addendum in accordance with Instructions to Tenderers.

.6 Shop paint primer: to CISC/CPMA 2-75.

2.2 FABRICATION

- .1 Fabricate metal fabrications as indicated, in accordance with CAN/CSA-S16 and in accordance with reviewed shop drawings.
- .2 Minimum fillet weld size shall be 4 mm.

2.3 SHOP PAINTING

- .1 Clean, prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16.
- .2 Clean steel plate, remove loose mill scale, rust, oil, dirt and other foreign matter.
- .3 Prepare surface according to SSPC SP7 (brush-off blast).
- .4 Apply one shop coat of CISC/CPMA 2-75 primer in shop to achieve minimum dry film thickness of 37-50 micrometers (1½ to 2 mils).
- .5 Apply paint under cover, on dry surfaces only and when surface and air temperatures are above 5 degrees Celsius.
- .6 Maintain dry condition and 5 degrees Celsius minimum temperature until paint is thoroughly dry.

Part 3 Execution

3.1 GENERAL

- .1 Do steel work in accordance with CAN/CSA-S16.
- .2 Do 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.

3.2 INSPECTION

- .1 Examine the work of the other sections upon which the work of this section depends and report any discrepancies to the Departmental Representative.
- .2 Verify that surfaces and conditions are ready to accept the work of this section.
- .3 Beginning of installation means acceptance of existing conditions.

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| <u>3.3 PRODUCT DELIVERY, STORAGE AND HANDLING</u> | .1 | Exercise care in storing, handling, and erecting material and support materials properly at all times so that no piece will be bent, twisted, or otherwise damaged structurally or visually. |
| <u>3.4 WALL OPENING SUPPORT FRAMING</u> | .1 | Field verify all dimensions and existing conditions prior to fabrication. |
| | .2 | Fabricate and install to details shown on plans and as per reviewed shop and erection drawings. |
| <u>3.5 BENT PLATE ENCLOSURES</u> | .1 | Fabricate bent plate enclosures to details shown on plans. |
| | .2 | Enclosure plates to be of single length for both new wall opening jamb and header. |
| <u>3.6 ERECTION</u> | .1 | Erect all new miscellaneous structural steel shown on drawings, and as indicated herein, in accordance with CAN/CSA-S16 and reviewed erection drawings. |
| | .2 | Provide temporary bracing and shoring as required until permanent connections are completed. |
| <u>3.7 FIELD PAINTING</u> | .1 | Touch up all damaged surfaces and surfaces without shop coat with primer to CAN/CGSB-1.40 except as specified otherwise. Apply in accordance with CAN/CGSB 85.10. |

PART 1 GENERAL

1.1 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A27 / A27M - 13, Standard Specification for Steel Castings, Carbon, for General Application
 - .2 ASTM A36 / A36M - 14, Standard Specification for Carbon Structural Steel
 - .3 ASTM A47 / A47M - 99(2014), Standard Specification for Ferritic Malleable Iron Castings
 - .4 ASTM A53/A53M-12, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .5 ASTM A108 - 13, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
 - .6 ASTM A167 - 99(2009) Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .7 ASTM A194 / A194M - 15a Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
 - .8 ASTM A283 / A283M - 13, Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
 - .9 ASTM A307 - 14 Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .10 ASTM A325M - 14 Standard Specifications for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric).
 - .11 ASTM A336 / A336M - 15, Standard Specification for Alloy Steel Forgings for Pressure and High-Temperature Parts
 - .12 ASTM A501 / A501M - 14, Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
 - .13 ASTM A666 - 15 Standard Specifications for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 - .14 ASTM F436M - 11 Standard Specification for Hardened Steel Washers (Metric).
- .2 Canadian Standards Association (CSA)

International)

- .1 CSA-G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA-S16.1-01, Limit States Design of Steel Structures.
 - .4 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .5 CSA W59-13, Welded Steel Construction (Metal Arc Welding) (Imperial Version).
- .3 Federal Specifications:
- .1 FF-B-561D, Federal Specification: Bolts, (Screw), Lag (03 Aug 1993) [S/S By ASME/ANSI Standard B18.2.1 And ASME/ANSI Standard B18.18.1m]
 - .2 FF-S-111D, Federal Specification, Screw, Wood (27 Aug 1974)
 - .3 FF-W-92B, Federal Specification Washer, Flat (Plain) (9 May 1974)

1.2 SUBMITTALS

- .1 Product Data:
- .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's:
 - .1 For finishes, coatings, primers and paints.
- .2 Shop Drawings
- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Have shop drawings prepared by a structural engineer registered in New Brunswick for items required to be designed in accordance with Part 4.0 of the National Building Code.
 - .3 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

- .4 Shop drawings shall show construction details of specialties, general arrangements, typical and special installation conditions, materials, connections, attachments, anchorage, location of exposed fastenings and interface with adjacent materials.

1.3 QUALITY ASSURANCE

- .1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Deliver, store, handle and protect materials.
- .2 Storage and Protection:
 - .1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
 - .2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

1.5 WARRANTIES

- .1 Upon completion of the work, submit the manufacturer's product warranties for incorporation into operation and maintenance manuals.
- .2 Specific warranties will be noted under the schedule of specialties if required by the Departmental Representative, otherwise the standard manufacturer's warranties shall be submitted.

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| <u>1.6 WASTE
MANAGEMENT AND
DISPOSAL</u> | .1 | Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal. |
| | .2 | Remove from site and dispose of packaging materials at appropriate recycling facilities. |
| | .3 | Collect and separate for disposal paper plastic polystyrene corrugated cardboard and packaging material for recycling in accordance with Waste Management Plan. |
| | .4 | Divert unused metal materials from landfill to metal recycling facility approved by Departmental Representative. |

PART 2 PRODUCTS

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| <u>2.1 MATERIALS</u> | .1 | Bolts and Anchor Bolts: to ASTM A325, type 1 medium carbon steel bolts, galvanized finish; ASTM A194, Grade 2H nuts, galvanized finish; ASTM F436, type 1 washers; ASTM A307, detention fabrications. |
| | .2 | Fasteners (to stainless steel fabrications): to ASTM A666, type 304 stainless steel, of size and capacity as indicated on the reviewed shop drawings and as required to withstand all super imposed loading and to conform with all code requirements. Use Torx and pin fasteners where exposed. |
| | .3 | Hollow Structural Sections: To CSA-G40.20/G40.21, 350W yield strength, Class C. |
| | .4 | Isolation Coating: Alkali resistant bituminous paint or epoxy resin solution. |
| | .5 | Supply new materials, free from defects impairing strength, durability or appearance, of best commercial quality for purposes specified. Where metal fabrications are exposed and painted, ensure that manufacturer's stamps are not visible. |
| | .6 | Welding electrodes: to CSA W48 Series. |

- .7 Welding materials: to CSA W59.
- .8 Welding Rods: of same analysis or high chromium nickel content than metal being welded.

2.2 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured. Provide strict quality control over fabrication to assure fabrication and assembly for +/- 1.5 mm from location indicated in the contract documents.
- .2 Where possible, fit and shop assemble work, ready for erection.
- .3 Ensure exposed welds are continuous for length of each joint.
 - .1 Welds shall be designed for flush smooth finish.
 - .2 Minor imperfections will be allowed only where practical during primer application.
 - .3 Defects which would be visible in the finished work shall be ground out, filled with welding material and ground flush prior to finishing.
 - .4 Grind all welds smooth. Welds shall be neat, complete and free of voids, flush finish, not ground.
- .4 Ease exposed edges to approximate 0.5 mm uniform radius.
- .5 Provide holes required for other work secured to or passing through architecturally exposed steel.
- .6 Fabricate all miscellaneous metalwork shown and detailed in the drawings and listed in this section in the quantities required.
- .7 Assemble built-up work in the shop and match-mark for correct field erection. Execute work in accordance with reviewed shop drawings.
- .8 All copes, miters and butt cuts in surfaces exposed to view shall be made with uniform gaps of 3.0 mm if detailed to be open joints or in uniform contact if detailed without gaps.
- .9 Weld in such a manner as to avoid distortion,

discolouration or damage to the members.

- .10 Weld interior work continuously along the entire line of contact.
- .11 Drill for countersunk screws if exposed to view unless otherwise shown or accepted by the Departmental Representative.
- .12 Locate holes in structural members for connections or for other purposes so as not to cause appreciable reduction in the strength of members.
- .13 Reinforce all work to suit the purpose for which it is intended and to withstand design loads.
- .14 Fabricate work square, true, straight and accurate to detail with sharply, defined profiles.
- .15 Fabricate curved work to smooth, uniform constant radii as detailed.
- .16 Joints in materials shall be cut to form fine hairline joints flush with adjacent surfaces.
- .17 Provide suitable temporary bracing as required to maintain alignment during shipment and erection.
- .18 Use self-tapping shake-proof and tamper proof flat headed screws on items requiring assembly by screws or as indicated. Use tamper proof fasteners where indicated of type as indicated on the Drawings.
- .19 Use one length piece per location, with neatly and accurately formed corners.
- .20 Use concealed fastening wherever possible.
- .21 Where exposed fastening is required, all exposed mechanical fastenings shall be flush countersunk Torx with pin type screws or bolts unobtrusively located consistent with the design, except where specifically noted otherwise.
- .22 Remove all sharp edges, burrs and the like.

2.3 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m2 to CAN/CSA-G164.
- .2 Shop coat primer: to CAN/CGSB-1.40.
- .3 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .4 For items to be finish painted, conform to Section 09 91 23 for primer types.

2.4 SHOP PREPARATION FOR PAINTING

- .1 Clean metal of all loose mill scale, rust, oil, dirt and all other foreign matter.
- .2 Clean interior metal to be painted in accordance with SSPC SPI Solvent Cleaning followed with SSPC SP.6 Commercial Blast Cleaning.
- .3 Remove or repair sharp edges, burrs, weld spatter and other defects to steel members prior to application of primers.

2.5 SHOP PAINTING

- .1 Apply one shop coat of primer to metal items. For items to be finish painted, apply primers in accordance with Section 09 91 23. Apply primer as specified under Section 09 91 23 in accordance with manufacturer's directions. Ensure that primer is applied within 8 hours of completion of surface preparations.
- .2 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.
- .3 Clean surfaces to be field welded; do not paint.
- .4 If the correct primer is not applied by this section of the Work, this section is responsible for removal of the incorrect primer, re-conditioning the surface and applying the correct primer as specified, including removal and re-installation of the affected work as required.
- .5 Primer applied to surfaces not properly prepared in accordance with specified SSPC preparations will be rejected by the consultant and shall be

removed, brought up to the specified requirements and re-installed by the Contractor at no additional cost to the Departmental Representative.

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| <u>2.6 BULKHEAD FRAMING</u> | .1 | Fabricate bulkhead frames from steel, 51x51x6.4 angles as indicated. |
| | .2 | Weld angles together to form frame for steel bulkhead, sizes as indicated. |
| <u>2.7 STEEL BULKHEAD</u> | .1 | Fabricate steel sheet bulkhead as detailed on the drawings using 3 mm thick bent Weld sections together with fillet welds as detailed. |
| | .2 | Use Torx with pin tamperproof fasteners at all exposed fasteners. |
| <u>2.8 MISCELLANEOUS ITEMS</u> | .1 | Fabricate and install wall mounted supports to millwork as detailed on the drawings and elsewhere as indicated; coordinate with millwork and counters specified in Section 06 40 00. |
| | .2 | Fabricate and install security framing of L51x51x6.4 angles, for the installation of the washer and dryer as detailed on the Drawings and reviewed shop drawings. |
| | .3 | Existing door, at enlarged cells, to be welded into place to form a fixed panel as detailed on drawings. |
| | .4 | Fabricate all other metal fabrication items or miscellaneous metal items required to complete the project. |

PART 3 EXECUTION

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| <u>3.1 ERECTION</u> | .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 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 Provide components for building by other sections in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CAN/CSA-S16.1, or weld.
- .7 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .8 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.2 BULKHEAD FRAMES

- .1 Install steel channel frames as indicated.

3.3 MISCELLANEOUS ITEMS

- .1 Install all miscellaneous metal fabrications as indicated on the Drawings and as required to complete the work and to withstand all superimposed loading.

3.4 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Remove all protective labels just prior to final acceptance and clean products using cleaners as recommended by the manufacturer.
- .3 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION