COMMERCIAL STAINLESS STEEL DOOR AND FRAME SPECIFICATIONS
CSI BROADSCOPE SECTION 08130

INTRODUCTION

This document has been developed as a guide to assist professionals in the preparation of specifications covering the performance, design, manufacture and installation requirements for commercial, industrial and institutional stainless steel door and frame products.

This specification has been prepared in accordance with the Construction Specification Institute’s (CSI) and Construction Specifications Canada National Master Specification (CSSC/NMS) recommended format; Part 1 - General, Part 2 - Products and Part 3 - Execution.

Products included in this specification meet or exceed the standards set by both the National Association of Architectural Metal Manufacturers’ - Hollow Metal Manufacturers Association division (NAAMM/HMMA) and the Canadian Steel Door Manufacturers Association (CSDMA).

Throughout the document notations under the heading “Spec Note” have been included in italics for the guidance of the specifier and should not appear in project specifications.

This is an “all products” specification and contains options not applicable to every project. It is therefore not intended to be duplicated verbatim, but to be selectively edited and compiled after due consideration of all factors relating to performance, application, function, regulatory and architectural requirements.

All dimensions referenced in this publication are nominal. Imperial (foot-pound) values are dominant, followed by the SI metric counter-part in parenthesis. Imperial and metric values may not be equal.

Two constructions of doors are detailed in this specification; those “fabricated from” and those “clad in” stainless steel.

For applications where corrosion resistance or sanitary requirements are major factors in the design criteria, the “fabricated from” construction should be utilized. Typical applications would include hospital or other clinical “clean areas”, chemical, pulp and paper manufacturing facilities, sewage treatment plants or swimming pool or saunas.

Where aesthetics are the primary consideration, steel doors, "clad in" stainless steel can be utilized.

Separate Guide Specifications are included in the Architectural Manual for Commercial Steel Doors and Frames - Section 08110 (TDS S01) and Detention Security Steel Doors and Frames - Section 11190 (TDS S03).

"Short Form" specifications, covering individual Fleming door and frame series are included in the Technical Data Sheets (TDS) detailing each specific product. Refer to TDS F11 for FSS-Series Frame Product and D04 for DSS-Series Doors.

Diskette and customized versions of this specification are available on request. Contact your local Authorized Fleming Distributor or Technical Services, Ajax for further information and/or assistance.
PART 1 - GENERAL

Spec Note Co-ordinate design, drawing requirements and Related Work of other Sections with the following publications:

- Fleming's “Fire Labeling Specifications” (See Section “C” of Fleming Architectural Manual
- Fleming’s “Users Guide for Commercial Steel Doors and Frames” (TDS S04)
- Canadian Steel Door Manufacturers Association "Recommended Dimensional Standards for Steel Doors and Frames"
- Door and Hardware Institute’s “Installation Guide”

1.1 WORK INCLUDED

Spec Note Edit 1.2.2 to include NAAMM for US projects or CSDMA for Canadian projects

1. Products included within the scope of this Section shall be fabricated by a single manufacturer.
2. Manufacturer shall be a member in good standing of the National Association of Architectural Metal Manufacturers’ - Hollow Metal Manufacturers’ Association division - [Canadian Steel Door Manufacturers Association (CSDMA)].
3. Supply only of stainless steel frame products including frames, transom frames, sidelight and window assemblies with provision for glazed, paneled or louvered openings, fire labeled and non-labeled, as scheduled or detailed by the Architect.
4. Supply only of flush stainless steel doors with provision for glazed, paneled or louvered openings, fire labeled and non-labeled, insulated or uninsulated, as scheduled or detailed by the Architect.
5. Supply only of flush stainless steel clad hollow metal doors with provision for glazed, paneled or louvered openings, with or without photo-engraved acid etched patterns/logos/designs, fire labeled and non-labeled, as scheduled or detailed by the architect.
6. Supply only of stainless steel panels, similar in construction to stainless steel doors, with flush or rabbeted bottoms for stainless steel frames, transom frames, sidelight and window assemblies as scheduled or detailed by the Architect.
7. Supply only of stainless steel lead-lined doors and frame assemblies, with provision for glazed openings, as scheduled or detailed by the Architect.
8. Supply only of stainless steel louvers for stainless steel doors, as scheduled or detailed by the Architect.

1.2 RELATED WORK

“Related Work” details those products or services not supplied and/or installed under this Section. The Specifier should designate specific responsibility for each by including Section references for each item.

Spec Note Include 1.2.5 only if doors and frames are “fabricated from” stainless steel.
Exclude 1.2.11 and 1.2.13 if door louvers or vents are supplied under this section.
Exclude 1.2.12 if frame louvers or vents are supplied under this section.
Exclude 1.2.20 if lead-lined stainless steel frame assemblies are supplied under this section.

1. Building-in and grouting stainless steel frame product into unit masonry
2. Building-in stainless steel frame product in previously placed concrete, masonry or structural steel
3. Building-in stainless steel frame product in steel or wood stud walls
4. Assembly of knocked-down construction frames
5. Supply and installation of hollow metal doors and frames
6. Supply and installation of wood, plastic or composite core doors
7. Supply and installation of builders' hardware
8. Drilling and tapping for surface mounted or non-templated builders' hardware
9. Caulking of joints between stainless steel frame product and other building components
10. Supply and installation of gaskets or weatherstrip
11. Supply of louvers or vents
12. Installation of louvers or vents in stainless steel frame product
13. Installation of louvers or vents in stainless steel doors
14. Supply and installation of glazing materials
15. Site touch-up or refinishing
16. Wiring for electric/electronic hardware in stainless steel frame product
17. Wiring for electric/electronic hardware in stainless steel doors
18. Field Measurements
19. Insulation of perimeter members in exterior stainless steel frame product
20. Supply and installation of lead-lining of frame product
21. Fasteners for frame product in previously placed concrete, masonry or structural steel
22. Steel lintels, posts, columns or other load-bearing elements.
23. Field welding

1.3 REQUIREMENTS OF REGULATORY AGENCIES

1. Install fire labeled stainless steel door and frame product in accordance with NFPA-80, current edition, unless specified otherwise.

1.4 REFERENCES

Spec Note Exclude 1.4.4 and 1.4.5 if doors “fabricated from” Type 316 stainless steel are specified. Include 1.4.6 and 1.4.8 only if lead-lined stainless steel assemblies are required. Include 1.4.9 thru 13 only if insulated exterior doors are required. Exclude 1.4.16 through 19 for all US projects
Exclude 1.4.24, 25 and 27 for US "traditional pressure" fire rated jurisdictions (See "Spec Note" under 1.5 for additional information)
Exclude 1.4.15, 23 and 26 for US "positive pressure" fire rated jurisdictions (See "Spec Note" under 1.5 for additional information)
Exclude 1.4.24, 25, 27 and 28 for all Canadian projects

1. ANSI A115.IG-1994 Installation Guide for Doors and Hardware
2. ANSI A250.4-1994 Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcements
4. ASTM A653-97(M-97) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dipped Process
5. ASTM A924-97(M-97) Standard Specification for General Requirements for Sheet Steel, Metallic Coated by the Hot-Dip Process
6. ASTM B29-92 Specifications for Refined Lead
7. ASTM B117-95 Method of Salt Spray (Fog) Testing
8. ASTM B749-85(91) Specification for Lead and Lead Alloy Strip, Sheet and Plate Products
11. ASTM C578-95 Specification for Rigid, Cellular Polystyrene Thermal Insulation
12. ASTM C665-95 Specification for Mineral-Fiber Blanket Insulation for Light Frame Construction and Manufactured Housing
13. ASTM C1289-95 Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
15. ASTM E152-81a Method for Fire Tests of Door Assemblies
16. CAN4-S104-M80 Fire Tests of Door Assemblies
17. CAN4-S105-M85 Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104
18. CSA A101-M83 Mineral Fiber Thermal Insulation for Buildings
19. CSA W59-M89 Welded Steel Construction (Metal Arc Welding)
21. NAAMM-HMMA 840 Installation Guide for Commercial Steel Doors and Frames
1.5 TESTING AND PERFORMANCE

1. Door constructions covered by this specification shall be certified as meeting Level "A" (1,000,000 cycles) and Twist Test Acceptance Criteria (deflection not to exceed .25"/30 lb. force (6.4mm/13.6kg), total deflection at 300 lb. (136.1kg) force not to exceed 2.5" (63.5mm) and permanent deflection not to exceed .125" (3.2mm)) when tested in strict conformance with ANSI-A250.4-1994. Tests shall be conducted by an independent nationally recognized accredited laboratory.

Spec Note Builders hardware and glazing materials are available which have not been evaluated from a fire protection standpoint. Co-ordination of hardware, glazing materials and other design elements, is therefore essential. A thorough review of UL's "Building Materials Directory", ULC's "List of Equipment and Materials - Volume 2" and WH's "Certification Listings" should be made during the specification, scheduling and detailing process. In addition, the Architect should review Fleming's "Fire Labeling Specifications" publication to ensure profile, size and other design criteria desired are within the requirements of testing authorities. Inquiries relating to eligibility may be directed to Fleming's Technical Services Department.

Edit 1.5.2 to delete reference to ULC and the CAN4 Standard for US projects. Certain jurisdictions in the United States have adopted fire test standards that require the neutral pressure plane within the furnace to be located 40" (1016mm) from the sill. This is referred to as "positive pressure" fire testing. For projects in "positive pressure" jurisdictions, edit 1.5.2 to delete references to UL10b/ASTM E152/NFPA 252 and CAN4-S104. Edit 1.5.2 for projects requiring "traditional" fire testing in the US and Canadian jurisdictions to delete reference to UL10c and UBC 7-2.

As well many jurisdictions throughout the US require door assemblies to be rated for "smoke and draft control", in addition to their "traditional" or "positive" pressure fire protection. Edit 1.5.3 to delete reference to UBC 7-2, Part 2 when smoke and draft control door assemblies under "traditional" fire tests are required.

Delete 1.5.3 for Canadian projects.

Label materials approved by UL, WHI and ULC include; metal drive riveted, adhesive-backed mylar or die-stamped (embossed) into the product. Labels for doors under "positive pressure" list the various test standards they comply with. Smoke and draft control doors have an "S" in a box ( ) on the fire door label.

Include 1.5.5 only if insulated exterior doors are required. Edit to include either Polystyrene (R6) for standard insulated exterior doors or Polyisocyanurate (R12.3) for high performance insulated exterior doors.
Edit 1.5.8 to include NAAMM for US projects and CSDMA for Canadian projects.

2. Fire labeled product shall be provided for those openings requiring fire protection ratings, as determined and scheduled by the Architect. Products shall be tested in strict conformance with [UL10(b)/ASTM E152/NFPA-252/CAN4-S104 for traditional fire test requirements] [UL10c/UBC 7-2, Part 1 for positive pressure requirements]. Products shall be listed by Underwriters’ Laboratories, Underwriters Laboratories of Canada or Warnock Hersey under an active Factory Inspection Program and shall be constructed as detailed in Follow-Up Service Procedures issued to the manufacturer.

3. Smoke and draft control door assemblies shall be provided for those openings as determined and scheduled by the Architect. Doors shall be tested in strict accordance with UL 1784 [and UBC 7-2, Part 2] and shall be listed by Underwriters Laboratories, Underwriters Laboratories of Canada or Warnock Hersey under an active Factory Inspection Program and shall be constructed as detailed in Follow-Up Service Procedures issued to the manufacturer.

4. Should any door or frame specified by the Architect to be fire rated, not qualify for labeling due to design, hardware, glazing or any other reason, the Architect shall be so advised before manufacturing commences.

5. Core materials for exterior doors shall attain a thermal resistance rating of [R6.0 (RSI 1.06)] [R12.3 (RSI 2.17)] when tested in accordance with ASTM C177 or ASTM C518.

6. Product shall be manufactured by a firm experienced in the design and production of standard and custom commercial stainless steel door and frame assemblies, the integration of builders’ or electronic hardware and glazing materials and their impact on the scope of work.

7. Manufacturer shall be assessed and registered as meeting the requirements of Quality Systems under ISO 9001.

8. Product quality shall meet standards set by the [National Association of Architectural Metal Manufacturers’ - Hollow Metal Manufacturers’ Association division] [Canadian Steel Door Manufacturers Association].

1.6 TEST REPORTS

Spec Note Include 1.6.1.2 only if insulated exterior doors are required.

1. All alternates to this specification shall be submitted to the Architect for acceptance ten (10) days prior to bid date, complete with reports from independent, nationally recognized testing authorities, certifying that:
   1. Stainless steel door and frame assemblies furnished under this Section meet the acceptance criteria of ANSI-A250.4-1994, Level “A”.
   2. Insulated door cores furnished in exterior doors under this Section meet the specified thermal resistance rating.

2. All reports shall include name of testing authority, date of test, location of test facility, descriptions of test specimens, procedures used in testing and indicate compliance with acceptance criteria of the test.

1.7 SUBMITTALS

1. Submit shop drawings in accordance with the General Conditions of the Contract.

2. Indicate each type of door, frame, steel, finish, core, material thickness, mortises, reinforcements, anchorages, locations of exposed fasteners, openings (glazed, paneled or louvered) and arrangement of standard builders’ hardware.

3. Include a schedule identifying each unit, with door marks and numbers relating to the numbering in Architect’s schedules or drawings.

1.8 WARRANTY

1. All stainless steel door and frame product shall be warranted from defects in workmanship for a period of one (1) year from date of shipment.

PART 2 - PRODUCTS

2.1 DOORS

2.1.1 Materials

Spec Note Assemblies are fabricated from two types of stainless steel. Type 304 door face sheets, with galvanneal internal components are suggested for most typical commercial applications. Type 316 face sheets and components should be specified where elevated levels of corrosion resistance are dictated.
Edit 2.1.1.1 to include required Finish for stainless steel.

Nominal Gages referenced throughout this specification are summarized below, in accordance with National Gage Standard Tolerances.

<table>
<thead>
<tr>
<th>Gage</th>
<th>Galvanneal</th>
<th>Stainless</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>.138” (3.5mm)</td>
<td>.142” (3.6mm)</td>
</tr>
<tr>
<td>12</td>
<td>.105” (2.7mm)</td>
<td>.109” (2.8mm)</td>
</tr>
<tr>
<td>14</td>
<td>.075” (1.9mm)</td>
<td>.078” (2.0mm)</td>
</tr>
<tr>
<td>16</td>
<td>.060” (1.6mm)</td>
<td>.063” (1.6mm)</td>
</tr>
<tr>
<td>18</td>
<td>.048” (1.2mm)</td>
<td>.050” (1.3mm)</td>
</tr>
<tr>
<td>20</td>
<td>.036” (0.9mm)</td>
<td>.038” (1.0mm)</td>
</tr>
<tr>
<td>22</td>
<td>.030” (0.8mm)</td>
<td>.031” (0.8mm)</td>
</tr>
</tbody>
</table>

1. Steel:

   Spec Note Include 1.1 only when doors "fabricated from" Type 304 stainless steel are required. Edit 1.1 to include the required Finish for stainless steel doors.

   1. Door face sheets and glazing trims shall be fabricated from commercial grade, tension leveled stainless steel to ASTM A167-92b, Type 304, [XL Blend S (brushed)] [XL Buff (mirror)] Finish. Balance of components shall be fabricated from tension leveled steel to ASTM A924-97(M-97), galvanized to ASTM A653-97(M-97), Commercial Steel, Type B, coating designation A40 (ZF120), known commercially as paintable Galvanneal.

   Spec Note Include 1.2 only when doors "fabricated from" Type 316 stainless steel are required. Edit 1.2 to include the required Finish for stainless steel doors.

   2. Doors shall be fabricated from commercial grade, tension leveled stainless steel to ASTM A167-92b, Type 316. Face sheets and glazing trims shall be [XL Blend S (brushed)] [XL Buff (mirror)] Finish. Balance of components shall be Mill Finish.

   Spec Note Include 1.3 only when "clad" door construction is specified. Edit 1.3 to include the required Finish for stainless steel doors.

   3. Door cladding and glazing trims shall be fabricated from commercial grade, tension leveled stainless steel to ASTM A167-92b, Type 304, [XL Blend S (brushed)] [XL Buff (mirror)] Finish. Base hollow metal door shall be fabricated from tension leveled steel to ASTM A924-97(M-97), galvanized to ASTM A653-97(M-97), Commercial Steel (CS), Type B, coating designation A40 (ZF120), known commercially as paintable "Galvanneal".

2. Door Cores - Standard:

   Honeycomb:
   Structural small cell (1” (25.4mm) maximum) kraft paper “honeycomb”. Weight: 80 lb. (36.3kg) per ream (minimum), density: 1.03 pcf (16.5kg/m³) (minimum), sanded to the required thickness.

3. Door Cores - Optional:

   Spec Note Include either 3.1 for standard (R6/RSI 1.06) insulated exterior doors or 3.2 for high performance (R12.3/RSI 2.17) doors as required, only if insulated stainless steel exterior doors are specified. Include 3.3 only if lead-lined stainless steel doors are required.

   1. Polystyrene:
   Rigid extruded, fire retardant, closed cell board. Type 1, density: 1 to 2 pcf (16 to 32 kg/m³), thermal values: R 6.0 (RSI 1.06) (minimum), conforming to ASTM C578

   2. Polyisocyanurate:
   Rigid foam, closed cell, faced board, thermal value: R12.3 (RSI 2.17) (minimum), conforming to ASTM C1289

   3. Lead:
   Cast or rolled pure sheet lead meeting ASTM B29-92 or ASTM B749-85(91).

4. Adhesives:
1. Heat resistant, single component, polyurethane reactive (water) hot melt, thermoset adhesive, UL/ULC/WH approved or equivalent

2. Inter-locking Edge Seams:
   Resin reinforced polychloroprene (RRPC), fire resistant, high viscosity, sealant/adhesive or UL approved equivalent.

5. Exterior Top Caps:
   Rigid polyvinylchloride (PVC) extrusion

2.1.2 Construction

Spec Note Edit 1.3, 1.5 and 1.10 to reflect either “fabricated from” or “clad” construction. Exclude 1.4 if “clad” construction is specified. Base door specifications in Section 08110 will govern construction.

1. General:
   1. All stainless steel doors shall be as manufactured by Fleming.
   2. Doors shall be flush swinging, of the types and sizes indicated on the Architects’ schedules or drawings.
   3. [Doors fabricated from stainless steel] [Base door for clad construction] shall be 1.75" (44.4mm) thick.

Spec Note Edit 1.4 to include either honeycomb, polystyrene or polyisocyanurate core. Clad construction doors are not recommended for exterior applications.

4. Exterior doors shall be Fleming DSS-Series with face sheets fabricated from 18 gage stainless steel, stiffened, insulated and sound deadened with [honeycomb] [polystyrene] [polyisocyanurate] core laminated under pressure to each face sheet.

5. Interior doors shall be Fleming [DSS-Series with face sheets fabricated from 18 gage stainless steel, stiffened, insulated and sound deadened with honeycomb core laminated under pressure to each face sheet.] [D18] [D16] Series, clad with 18 gage stainless steel.

Spec Note Include 1.6 only if lead-lined stainless steel doors are required. Sheet leads are specified by weight per square foot and/or nominal thickness. Commercially available sheet lead, specified for radiation shielding conforms to the following standards:

<table>
<thead>
<tr>
<th>Weight</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 psf (9.8kg/m²)</td>
<td>1/32” (.031”) (0.8mm)</td>
</tr>
<tr>
<td>3 psf (14.6kg/m²)</td>
<td>3/64” (.047”) (1.2mm)</td>
</tr>
<tr>
<td>4 psf (19.5kg/m²)</td>
<td>1/16” (.063”) (1.6mm)</td>
</tr>
</tbody>
</table>

6. Lead-lined doors shall be Fleming LDSS-Series with face sheets fabricated from 18 gage stainless steel, stiffened, insulated and sound deadened with composite core comprising [.031”/0.8mm] [.047”/1.2mm] [.063”/1.6mm] pure sheet lead on the inside front face skin, both bevels, inside top and bottom channels and honeycomb core, laminated under pressure to each face sheet.

7. Door faces shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles and waves.

8. Direction of grain on faces and bevels shall be vertical.

9. Formed edges shall be true and straight with a minimum radius for the thickness of steel used.

10. Longitudinal edges of [doors fabricated from] [base doors clad in] stainless steel shall be mechanically inter-locked, adhesive assisted. Edge seams shall be visible.

Spec Note Include 1.11 only if “clad” construction is specified.

11. Cladding shall be securely attached to [front (pull side) and edges only] [back (push side) only] [front, back and edges with visible hair-line butted joints at door edges].

12. Lock and hinge edges shall be beveled 1/8” in 2” (3mm in 50mm) unless builders' hardware or door swing dictates otherwise.

13. Top and bottom of doors shall be provided with inverted, recessed, 16 gage steel end channels, welded to each face sheet at 6” (150mm) on center maximum.

14. Exterior doors shall be provided with factory installed flush PVC top caps. Fire labeled exterior doors shall be provided with factory installed flush stainless steel top caps.

Spec Note The following are not available as labeled product; glazed DSS-Series doors; 3 hour dutch or
DSS-Series or Clad Construction doors; H-Series hollow metal clad doors; louvers in lited or LDSS Series doors.

15. Unless ineligible due to design, size, hardware or glazing specified on the Architects’ or Hardware Suppliers’ schedules or details, fire labeled doors shall be provided for those openings requiring fire protection ratings as determined and scheduled by the Architect.

2. Hardware Preparations:
   1. Doors shall be factory blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templates provided by the hardware supplier.
   2. Doors shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
   3. Doors shall be factory reinforced only for surface mounted hardware.
   4. Templated holes .5" (12.7mm) diameter and larger shall be factory prepared, except mounting and through bolt holes, which shall be by the contractor responsible for installation, on site at the time of application. Templated holes less than .5" (12.7mm) diameter shall be factory prepared only when required for the function of the device (for knobs, levers, cylinders, thumb or turn pieces) or when these holes over-lap function holes.
   5. Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation, on site at the time of application.
   6. Hinge and pivot reinforcements shall be 10 gage steel minimum high frequency type reinforcing.
   7. Doors in excess of 96" (2450mm) rabbet height shall be prepared for 4.5" (114.3mm) heavy weight (.180"/4.6mm) hinges minimum.

Spec Note Include 2.8 only if lead-lined stainless steel doors are required.

8. Hinge reinforcements for LDSS-Series doors shall be 10 gage minimum with each cutout provided with 4.5" (114.3mm) heavy weight (.180"/4.6mm) high frequency type reinforcements.
9. Lock, strike and flush bolt reinforcements shall be 16 gage steel minimum.
10. Reinforcements for concealed closers and holders shall be 12 gage steel minimum.
11. For surface mounted hardware reinforcements shall be 16 gage steel minimum.
12. All pairs of fire labeled doors shall be provided with 12 gage stainless steel surface mounted flat bar astragal, shipped loose for application on site by the contractor responsible for installation.

Spec Note Edit 2.13 to include UL for US projects or CSA for Canadian projects.

13. Where electrically or electronically operated hardware is specified on the Architects’ schedules or details or the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on the templates, shall be provided and interconnected with [UL] [CSA] Approved .5" (12.7mm) diameter conduit and connectors.

3. Glazing:
   1. Where glazing is specified, doors shall receive 20 gage stainless steel trim and screw fixed glazing stops. Screws shall be # 6 x 1¼" oval head scrulox (self-drilling) type at 12" (300mm) on center maximum.
   2. Glazing trim and stops shall be accurately fitted, butted at corners, with removable stops located on the “push” side of the door.

Spec Note Include 2.4 only if louvers are supplied under this section.

4. Louvers:
   1. Where specified on the Architect’s schedules or details, non-labeled doors shall be prepared for and provided with sight proof, chevron type blade, door louver inserts. Louvers shall be fabricated from stainless steel and finished to match door face sheets

5. Finishing:
   1. All tool marks, abrasions and surface blemishes shall be finished to present smooth uniform surfaces.
   2. All exposed surfaces shall be factory masked to protect their finish.

2.2 PANELS

1. Panels shall be fabricated from the same materials, construction and finished in the same manner as doors as specified in Section 2.1.
2.3 FRAME PRODUCT

Spec Note "Frame Product" includes stainless steel frames, transom frames, sidelight and window assemblies.

2.3.1 Materials

Spec Note Assemblies are fabricated from two types of stainless steel. Type 304 frame sections and glazing stops with galvanneal internal components are suggested for most typical commercial applications. Type 316 frame sections, glazing stops and reinforcements should be specified where elevated levels of corrosion resistance are dictated.

1. Steel:

Spec Note Include 2.3.1.1.1 only when Type 304 stainless steel frame product is specified
Edit 2.3.1.1.1 to include required Finish for stainless steel.

1. Frame sections and glazing stops shall be fabricated from commercial grade, tension leveled stainless steel to ASTM A167-92b, Type 304, [XL Blend S] [XL Buff] Finish. Balance of components shall be fabricated from tension leveled steel to ASTM A924-97(M-97), galvanized to ASTM A653-97(M-97), Commercial Steel (CS), Type B, coating designation A40 (ZF120), known commercially as paintable Galvanneal.

Spec Note Include 2.3.1.1.2 only when Type 316 stainless steel frame product is specified
Edit 2.3.1.1.2 to include required Finish for stainless steel.

2. Frame product shall be fabricated from commercial grade, tension leveled stainless steel to ASTM A167-92b, Type 316. Frame sections and glazing stops shall be [XL Blend S] [XL Buff] Finish. Balance of components shall be Mill Finish.

Spec Note Include 2.3.1.2 only if lead-lined stainless steel frames are required.

2. Lead:

Cast or rolled pure sheet lead meeting ASTM B29-92 or ASTM B749-85(91)

3. Miscellaneous:

1. Door Silencers: GJ-64 or equivalent, Single Stud rubber/neoprene type
2. Fiberglass: Loose batt type, density: 1.5 pcf (24kg/m³) (minimum), complying with ASTM C665

2.3.2 Construction

1. General:

1. All stainless steel frame product shall be as manufactured by Fleming of the types, sizes and profiles indicated on the Architects' schedules or details.
2. Direction of stainless steel grain shall be vertical on frame faces.
3. Exterior frames shall be Fleming FSS-Series fabricated from 16 gage stainless steel.

Spec Note The terminology used to define the method of assembly refers predominantly to the treatment of the intersecting components and their resulting appearance. Refer to Section 2.3.2.1.13 for explanations of the various Assembly Methods available.

“Set-up and welded (SUW)” frames are factory assembled as a complete unit. “Knocked-down (KD)” frame products are intended to be assembled as a complete unit, by the contractor responsible for installation prior to the construction of the adjacent partition.

Transom frames, sidelight and window assemblies are available only in set-up and welded (SUW) construction.
The chart below summarizes the Assembly Methods available for each Type and Finish of stainless steel:

<table>
<thead>
<tr>
<th>Type</th>
<th>Finish</th>
<th>304</th>
<th>316</th>
</tr>
</thead>
<tbody>
<tr>
<td>XL Blend S (Brushed)</td>
<td>SUW, KD</td>
<td>KD</td>
<td></td>
</tr>
</tbody>
</table>
4. Exterior frame product shall be supplied [set-up and welded (SUW)] [knocked-down (KD)].
5. Insulation of open sections (jambs, heads and sills) shall be provided and installed by the contractor responsible for installation.
6. Interior frames shall be Fleming FSS-Series, fabricated from 16 gage stainless steel.
7. Interior frame product shall be supplied [set-up and welded (SUW)] [knocked-down (KD)].

**Spec Note** Include 1.8. only if lead-lined stainless steel frames are required.

*LFSS-Series (lead-lined) stainless steel frames are utilized in conjunction with LDSS-Series doors to provide radiation shielding from x-ray and similar medical and clinical applications. Edit 1.8.2 to include the thickness of lead required and to specify which sub-contractor is responsible for the application of the lead-lining.*

8. Lead-lined frames shall be Fleming LFSS-Series, fabricated from 16 gage stainless steel.
   1. Lead-lined frame product shall be supplied set-up and welded (SUW).
   2. Lead shall be [.031”/0.8mm] [.047”/1.2mm] [.063”/1.6mm] thick laminated securely to the inside of profile from return to frame door stop (inclusive) on the door side of profile only by the [frame manufacturer] [contractor responsible for lead-lining of adjacent walls].

**Spec Note** The following applies to all Fleming stainless steel frames unless indicated otherwise.

9. Jambs, heads, mullions, sills and center rails shall be straight and uniform throughout their lengths.
10. Factory assembled frame product shall be square, free of defects, warps or buckles.

**Spec Note** Include 1.11 only if “knocked-down (KD)” has been specified.

11. Knocked-down (KD) frames shall be shipped unassembled.
12. Corner joints shall be accurately mitered and tightly fitted with integral door stops mitered or butted when assembled.

**Spec Note** Edit 1.13 to include only those Assembly Methods specified in Sections 2.3.2.1.4 or 2.3.2.1.7

13. Corner joints shall be:
   1. Continuously welded on the inside of the profiles’ faces with exposed faces ground to a smooth, uniform, seamless surface for set-up and welded (SUW) frames.
   2. Provided with 20 gage steel reinforcing plates with integral tabs. Jamb corner reinforcements shall securely interlock mechanically with factory prepared head for knocked-down (KD) frames.
14. Joints at mullions, sills or center rails shall be coped accurately, butted at corners and tightly fitted, with faces matching corner joint faces when assembled.
15. Frame product shall be fabricated with integral door stops having a minimum height of .625” (16mm).
16. Glazing stops shall be formed 20 gage stainless steel .625” (16mm) height channel, accurately fitted, butted at corners and fastened to frame sections with #6 x 1¼” oval head scrulox (self-drilling) type screws at 12” (300mm) on center maximum.
17. Where required due to site access, as indicated on the Architects’ schedules or details, when advised by the contractor responsible for co-ordination or installation, or when shipping limitations so dictate, frame product shall be fabricated in sections for splicing in the field.
   1. Field spliced jambs, heads and sills shall be provided with 16 gage steel splice plates securely welded into one section, extending 4” (100mm) minimum each side of splice joint.
   2. Field splices at closed sections (mullions or center rails) shall be 16 gage steel splice angles securely welded to the abutting member. Face of splice angle shall extend 4” (100mm) minimum into closed sections when assembled.
   3. Field splice joints shall be finished to match corner joints, by the contractor responsible for installation, after assembly.
18. On factory assembled frame product, each door opening shall be provided with two (2) temporary steel jamb spreaders welded to the base of the jambs or mullions to maintain proper alignment during shipping and handling. Spreaders shall be removed by the contractor responsible for installation prior to anchoring of frame product to floor.

**Spec Note** Sanitary base option is available on XL Blend S (brushed) finish product only and should not be utilized on exterior, lead-lined or gasketed frame product.
19. Cut-off door stops (sanitary bases) where indicated on the Architects’ schedules or details shall be capped at 30°, terminating at the specified height. Joints below cut-off door stop shall be fully welded and ground smooth with no visible seams.

20. Each door opening shall be prepared for GJ-64 or equivalent, single stud door silencers, three (3) for single door openings, two (2) for double door openings. Silencers shall be shipped loose for installation by the contractor.

Spec Note The following are not available as fire labeled product; thermally broken frame product, sidelight or window assemblies; frame product incorporating louvers or vents, angled or radiused corners, heads or transoms.

21. Unless ineligible due to design, size, hardware or glazing specified on the Architects’ or Hardware Suppliers' schedules or details, fire labeled frame product shall be provided for those openings requiring fire protection ratings as determined and scheduled by the Architect.

2. Hardware Preparations:
   1. Frame product shall be blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templates provided by the hardware supplier.
   2. Frame product shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
   3. Frame product shall be reinforced only for surface mounted hardware.
   4. Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation, on site at the time of application.
   5. Frames shall be prepared for 4.5" (114.3mm) standard weight hinges (minimum).
   6. Hinge reinforcements shall be 10 gage steel minimum high frequency type reinforcing.

Spec Note Include 2.7 only if lead-lined stainless steel frames are required.

7. Hinge reinforcements for LFSS-Series frames shall be 10 gage minimum with each cutout provided with 4.5" (114.3mm) heavy weight (.180'/4.6mm) high frequency type reinforcements.
   8. Strike reinforcements shall be 16 gage steel minimum.
   9. Reinforcements for surface mounted hardware, concealed closers and holders and flush bolts shall be 12 gage steel minimum.
   10. Mortised cutouts shall be protected with 22 gage steel minimum guard boxes (may be omitted on drywall applications).

Spec Note Edit 2.11 to include UL for US projects or CSA for Canadian projects.

11. Where electrically or electronically operated hardware is specified on the Architects’ schedules or details or the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on the templates, shall be provided and interconnected with [UL] CSA Approved .5" (12.7mm) diameter conduit and connectors.

3. Anchorage:
   1. Frame product shall be provided with anchorage appropriate to floor, wall and frame construction.
   2. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb, except as indicated below.
   3. Frame product installed in unit masonry partitions shall be provided with .156" (4.0mm) diameter steel wire anchors, 18 gage steel adjustable stirrup and strap or "T" type anchors as conditions dictate.
   4. Where frame product is installed prior to construction of the adjacent wall, each jamb shall be provided with 16 gage steel floor anchors. Each anchor shall be provided with two (2) holes for mounting to the floor and shall be securely welded to the inside of the jamb profile.
   5. Frame product installed in steel stud and drywall partitions shall be provided with 20 gage steel snap-in or "Z" type stud type anchors.
   6. Frame product installed in wood stud and drywall partitions shall be provided with 20 gage steel snap-in or wood stud type anchors.
   7. Jambs of frames in previously placed concrete, masonry or structural steel shall be punched and dimpled to accept machine bolt anchors, .25" (6.4mm) diameter, located not more than 6" (150mm) from the top and bottom of each jamb. Anchor preparations and guides shall also be located immediately above or below intermediate hinge reinforcements and directly opposite on the strike jamb. Each preparation shall be provided with 16 gage anchor bolt guides.
   8. Anchor bolts and expansion shell anchors for the above preparations shall be provided by the
contractor responsible for installation.

9. Where indicated on the Architects' schedules or details, channel extensions shall be provided from the top of the frame assembly to the underside of the structure above. Extensions shall be fabricated from 12 gage steel formed channels, mounting angles and adjusting brackets, with angles welded to inside of frame. Formed channels, adjusting brackets, and fasteners shall be shipped loose. Channels shall be mechanically connected to mounting angles and adjusting brackets with supplied fasteners on site, by contractor responsible for installation.

4. Finishing:
   1. All tool marks, abrasions and surface blemishes shall be finished to present smooth uniform surfaces.
   2. All exposed surfaces shall be factory masked to protect their finish.

2.4 SIZES AND TOLERANCES

1. Widths of door openings shall be measured from inside of frame jamb rabbets with a tolerance of + .063", - .031" (+1.6mm, -0.8mm).

   Spec Note  Finished floor is defined as the top surface of the floor, except when resilient tile or carpet is used, when it is to the top of the concrete slab.

2. Heights of door openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame with a tolerance of ± .047" (1.2mm).

3. Unless builders' hardware dictates otherwise, doors shall be sized so as to fit the above openings and allow a .125" (3mm) clearance at jambs and head. A clearance of .75" (19mm) between the bottom of the door and the finished floor (exclusive of floor coverings) shall be provided. Tolerances on door sizes shall be ± .047" (1.2mm).

4. Manufacturing tolerances on formed frame profiles shall be ± .031" (0.8mm) for faces, door stop heights and jamb depths. Tolerances for throat openings and door rebates shall be ± .063" (1.6mm) and ±.016" (0.4mm) respectively. Hardware cutout dimensions shall be as per template dimensions, ±.015" (+0.4mm), ± 0.

2.5 HARDWARE LOCATIONS

1. Hardware preparations in frame product shall be as noted below and locations on doors shall be adjusted for clearances specified in Section 2.4.

2. Top of upper hinge preparation for 4.5" (114.3mm) hinges shall be located 7.5" (180mm) down from head, transom mullion or panel as appropriate. The top of the bottom hinge preparation for 4.5" (114.3mm) hinges shall be located 12.625" (310mm) from finished floor as defined in 2.4. Intermediate hinge preparations shall be spaced equally between top and bottom cutouts. For dutch door frames, top and bottom hinge locations shall be as above, with the tops of intermediate hinges located at 36.5" (930mm) and 55.938" (1403mm) from finished floor.

3. Strike preparations for unit, integral, cylindrical or mortise locks and roller latches shall be centered 40-5/16" (1033mm) from finished floor. Strikes for deadlocks shall be centered at 48" (1220mm) from finished floor. Strikes for panic or fire exit hardware shall be located as per the device manufacturer’s templates.

4. Push and/or pulls on doors shall be centered at 42" (1070mm) from finished floor.

5. Preparations not noted above shall be as per the hardware manufacturer’s templates.

6. Hardware preparation tolerances shall comply with the ANSI A115 Series standards.

PART 3 - EXECUTION

3.1 SITE STORAGE AND PROTECTION OF MATERIALS

1. The contractor responsible for installation shall remove wraps or covers from door and frame product upon delivery at building site.

2. All materials shall be thoroughly inspected upon receipt and all discrepancies, deficiencies and/or damages shall be immediately reported in writing to the supplier. All damage shall be noted on the carriers' Bill of Lading.

3. Contractor responsible for installation shall ensure all materials are properly stored on planks or dunnage in a dry location. Product shall be stored in a vertical position, spaced with blocking to permit air circulation between them. Materials shall be covered to protect them from damage from any cause.

4. Contractor shall notify the supplier in writing of any errors or deficiencies in the product before initiating any corrective work.
3.2 INSTALLATION

_Spec Note_ Installation of product covered by this Specification is not the responsibility of the manufacturer. This Section is included to provide guidance to the Contractor responsible for installation. Refer to NAAMM-HMMA’s 840 publication, “Installation Guide for Commercial Steel Doors and Frames” and DHI publication “Installation Guide” for detailed recommendations.

1. Set frame product plumb, square, aligned, without twist at correct elevation in accordance with NAAMM-HMMA 840.
2. Frame Product Installation Tolerances:
   1. Plumbness tolerance, measured through a line from the intersecting corner of vertical members and the head to the floor, shall be ± .063” (1.6mm).
   2. Squareness tolerance, measured through a line 90° from one jamb at the upper corner of the product, to the opposite jamb, shall be ± .063” (1.6mm).
   3. Alignment tolerance, measured on jambs, through a horizontal line parallel to the plane of the wall, shall be ± .063” (1.6mm).
   4. Twist tolerance, measured at face corners of jambs, on parallel lines perpendicular to the plane of the wall, shall be ± .063” (1.6mm).
3. Fire labeled product shall be installed in accordance with NFPA-80.
4. Brace frame product rigidly in position while building-in. Remove temporary steel shipping jamb spreaders. Install wood spreaders at mid-point of frame rebate height to maintain frame widths. Provide vertical support at center of head for openings exceeding 48” (1200mm) in width. Remove wood spreaders after product has been built-in.
5. Secure anchorages and connections to adjacent construction.
6. Frame product in unit masonry shall be fully grouted in place.
7. Install doors in accordance with NAAMM-HMMA 840, maintaining clearances outlined in Section 2.4.
8. Install builders’ hardware in accordance with ANSI A115.IG-1994, manufacturers’ templates and instructions.
9. Install louvers and vents.
10. Adjust operable parts for correct clearances and function.
11. Steel surfaces shall be kept free of grout, tar or other bonding materials or sealers.
12. Any grout or other bonding material shall be cleaned from products immediately following installation.
13. Remove protective coverings.
14. Exposed surfaces which have been scratched or otherwise marred during installation or handling shall be repaired.
15. Install glazing materials and door silencers.

- END OF SECTION -