

## **COMMERCIAL STEEL DOOR AND FRAME SPECIFICATIONS CSI BROADSCOPE SECTION 08110**

### **INTRODUCTION**

This document has been developed as a guide to assist professionals in the preparation of specifications covering the performance, design, manufacture and installation of commercial, industrial and institutional 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 (CSC/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.

Steel door and frame products covered in this specification are intended for use in commercial, industrial and institutional facilities such as offices, factories, hotels, hospitals, libraries or schools.

Separate Guide Specifications are also included in the Architectural Manual for Commercial Stainless Steel Doors and Frames - Section 08130 (TDS S02) 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 Sheet (TDS) detailing each specific product. Refer to Sections "F" (Frame Product) and "D" (Doors).

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

# COMMERCIAL STEEL DOOR AND FRAME SPECIFICATIONS CSI BROADSCOPE SECTION 08110

## 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)
- : National Association of Architectural Metal Manufacturers' - Hollow Metal Manufacturers' Association division - HMMA 840 "Installation Guide for Commercial Steel Doors and Frames"
- : Canadian Steel Door Manufacturers Association "Recommended Dimensional Standards for Commercial Steel Doors and Frames"
- : Door and Hardware Institute - "Installation Guide"

### 1.1 WORK INCLUDED

*Spec Note* Edit 1.1.2 to include NAAMM for US projects or CSDMA for Canadian projects  
Include 1.1.6 only if acoustic assemblies are required  
Include 1.1.7 only if lead-lined assemblies are required  
Include 1.1.8 only if door louvers are supplied under this section

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 (NAAMM-HMMA) division] [Canadian Steel Door Manufacturers Association (CSDMA)].
3. Supply only of 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 steel doors, flush or embossed, with provision for glazed, paneled or louvered openings, insulated and un-insulated, fire labeled, with or without temperature rise ratings and non-labeled, as scheduled or detailed by the Architect.
5. Supply only of steel panels, similar in construction to steel doors, with flush or rabbetted bottoms for steel frames, transom frames, sidelight and window assemblies, fire labeled and non-labeled, as scheduled or detailed by the Architect.
6. Supply only of steel acoustic door and frame assemblies including frame and door gasket system, fire labeled and non-labeled, as scheduled or detailed by the Architect.
7. Supply only of steel lead-lined door and frame assemblies, with provision for glazed openings, fire labeled and non-labeled, as scheduled or detailed by the Architect.
8. Supply only of louvers for steel doors, fire labeled and non-labeled, as scheduled or detailed by the Architect.

### 1.2 RELATED WORK

*Spec Note* "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.

*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 1.2.19 if lead-lined frames are supplied under this section*

- |     |   |             |
|-----|---|-------------|
| 1.  | Building-in and grouting frame product into unit masonry                                  | Section [ ] |
| 2.  | Building-in frame product in previously placed concrete, masonry or structural steel      | Section [ ] |
| 3.  | Building-in frame product in steel or wood stud walls                                     | Section [ ] |
| 4.  | Assembly of knocked-down or knocked-down drywall construction frames                      | Section [ ] |
| 5.  | Supply and installation of stainless steel, wood, plastic or composite core doors         | Section [ ] |
| 6.  | Supply and installation of stainless steel frame product                                  | Section [ ] |
| 7.  | Supply and installation of builders' hardware except as specified for acoustic assemblies | Section [ ] |
| 8.  | Drilling and tapping for surface mounted or non-templated builders' hardware              | Section [ ] |
| 9.  | Caulking of joints between frame product and other building components                    | Section [ ] |
| 10. | Supply and installation of gaskets or weather-strip                                       | Section [ ] |
| 11. | Supply of louvers or vents  | Section [ ] |
| 12. | Installation of louvers or vents in frame product   | Section [ ] |

13.	Installation of louvers or vents in doors	Section [ ]
14.	Supply and installation of glazing materials	Section [ ]
15.	Site touch-up and painting	Section [ ]
16.	Wiring for electronic or electric hardware in steel frame product	Section [ ]
17.	Wiring for electronic or electric hardware in steel doors	Section [ ]
18.	Field measurements	Section [ ]
19.	Supply and installation of lead-lining of frame product	Section [ ]
20.	Fasteners for frame product in previously placed concrete, masonry or structural steel	Section [ ]
21.	Steel lintels, posts, columns or other load-bearing elements	Section [ ]
22.	Field welding	Section [ ]

### 1.3 REQUIREMENTS OF REGULATORY AGENCIES

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

### 1.4 REFERENCES

*Spec Note Include 1.4.6 and 1.4.8 only if lead-lined assemblies are required  
 Include 1.4.9 through 13 only if insulated exterior doors are required  
 Include 1.4.15 and 1.4.18 only if acoustic assemblies are required  
 Exclude 1.4.19 through 25 for all US projects*

*Exclude 1.4.30, 31, 32 and 35 for US "traditional pressure" fire rated jurisdictions (See "Spec Note" under 1.5 for additional information)*

*Exclude 1.4.16, 17, 29, 33 and 34 for US "positive pressure" fire rated jurisdictions (See*

*"Spec Note" under 1.5 for additional information)*

*Exclude 1.4.6 and 1.4.8 for all Canadian projects*

1.	ANSI A115.IG-1994	Installation Guide for Doors and Hardware
2.	ANSI A224.1-1990	Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames
3.	ANSI A250.4-1994	Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings
4.	ASTM A653(M-97)	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
5.	ASTM A924(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
9.	ASTM C177-97	Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
10.	ASTM C518-91	Test Method for Steady State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
11.	ASTM C578-95	Specification for Rigid, Cellular Polystyrene Thermal Insulation
12.	ASTM C665-95	Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
13.	ASTM C1289-95	Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
14.	ASTM D1735-92	Practice for Testing Water Resistance of Coating Using Water Fog Apparatus
15.	ASTM E 90-81	Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions
16.	ASTM E152-81a	Methods for Fire Tests of Door Assemblies
17.	ASTM E 163-94a	Methods for Fire Tests of Window Assemblies
18.	ASTM E 413-73	Classification for Determination of Sound Transmission Class
19.	CAN4-S104-M80	Fire Tests of Door Assemblies
20.	CAN4-S105-M85	Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104
21.	CAN4-S106-M80	Standard Method for Fire Tests of Window and Glass Block Assemblies
22.	CGSB 41-Gp-19Ma	Rigid Vinyl Extrusions for Windows and Doors
23.	CGSB 82.5-M88	Insulated Steel Doors
24.	CSA A101-M83	Mineral Fiber Thermal Insulation for Buildings
25.	CSA W59-M89	Welded Steel Construction (Metal Arc Welding)

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|-----|---|--|
| 26. | ISO 9001 : 1994   | Quality Systems - Model for Quality Assurance            |
| 27. | NAAMM-HMMA 840  | Installation Guide for Commercial Steel Doors and Frames |
| 28. | NFPA-80, 1995   | Fire Doors and Windows                                   |
| 29. | NFPA-252, 1990  | Fire Tests of Door Assemblies                            |
| 30. | UBC 7-2 Part 1 (1997)   | Fire Tests of Door Assemblies Under Positive Pressure    |
| 31. | UBC 7-2 Part 2 (1997)   | Test for Smoke and Draft Control Door Assemblies         |
| 32. | UBC 7-4 (1997)  | Fire Tests of Window Assemblies Under Positive Pressure  |
| 33. | UL9, 6 <sup>th</sup> Edition                                      | Fire Tests of Window Assemblies                          |
| 34. | UL10b, 8 <sup>th</sup> Edition                                    | Fire Tests of Door Assemblies                            |
| 35. | UL10c, 1 <sup>st</sup> Edition                                    | Fire Tests of Door Assemblies Under Positive Pressure    |
| 36. | UL 1784   | Air Leakage Tests of Door Assemblies                     |
| 37. | CSDMA Dimensional Standards for Commercial Steel Doors and Frames |  |
| 38. | Fleming Fire Labeling Specifications                              |  |
| 39. | Manufacturers Standard and Galvanized Sheet Gages                 |  |
| 40. | UL Building Materials Directory                                   |  |
| 41. | ULC List of Equipment and Materials, Volume 2                     |  |
| 42. | WH Certification Listings   |  |

<i>ANSI</i>	<i>American National Standards Institute</i>
<i>ASTM</i>	<i>American Society for Testing Materials</i>
<i>CGSB</i>	<i>Canadian Government Standards Board</i>
<i>CSA</i>	<i>Canadian Standards Association</i>
<i>CSDMA</i>	<i>Canadian Steel Door Manufacturers Association</i>
<i>DHI</i>	<i>Door and Hardware Institute</i>
<i>HMMA</i>	<i>Hollow Metal Manufacturers' Association</i>
<i>ISO</i>	<i>International Standards Organization</i>
<i>NAAMM</i>	<i>National Association of Architectural Metal Manufacturers</i>
<i>NFPA</i>	<i>National Fire Protection Association</i>
<i>UBC</i>	<i>Uniform Building Code</i>
<i>UL</i>	<i>Underwriters' Laboratories, Incorporated</i>
<i>ULC</i>	<i>Underwriters Laboratories of Canada</i>
<i>WH</i>	<i>Warnock Hersey Professional Services</i>

## 1.5 TESTING AND PERFORMANCE

1. Door constructions covered by this specification shall meet the acceptance criteria of ANSI-A224.1-1990 and 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. Test shall be conducted by an independent nationally recognized accredited laboratory.

*Spec Note Builders hardware and glazing materials are available that 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 references to ULC and the CAN4 Standards for US.*

*Certain jurisdictions in the United States have adopted fire test standards that require the neutral pressure plane within the furnace to be located at 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 reference to UL10b/ASTM E 152/NFPA 252/CAN4-S104 and UL 9/ASTM E163/NFPA 257/CAN4-S016.*

*Edit 1.5.2 for projects requiring "traditional" fire testing in the US and Canadian jurisdictions to delete references 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 references to UBC 7-2, Part 2 when smoke and draft control door assemblies under "traditional" fire protection are required.*

*Delete 1.5.3 for Canadian projects.*

*Labels materials approved by UL, WHI and ULC include; metal drive riveted, adhesive-*

*backed mylar or die-stamped (embossed) into the product. Label for doors under "positive pressure" list the various test standards they comply with. Smoke and draft control doors have an "S" in a box ( ) included on the fire door label.*

For non-labeled insulated high performance exterior D-Series doors specify R12.3 in 1.5.5 For fire labeled insulated exterior D or E-Series doors, specify R6.0.  
Include 1.5.6 only if acoustic assemblies are required.  
Edit 1.5.9 to include NAAMM for US projects or CSDMA for Canadian projects

2. Fire labeled product shall be provided for those openings requiring fire protection and temperature rise ratings, as determined and scheduled by the Architect. Doors, frames, transom frames and sidelight assemblies shall be tested in strict accordance with *[UL10b/ASTM E152/NFPA-252/CAN4-S104 for traditional fire test requirements] [UL10c/UBC 7-2 for positive pressure requirements]*. Window Assemblies shall be tested in strict accordance with *[UL9/ASTM E163/NFPA-257/CAN4-S106 for traditional fire test requirements] [UBC 7-4 for positive pressure requirements]*. Product shall be listed by Underwriters' Laboratories, Underwriters Laboratories of Canada or Warnock Hersey under active Factory Inspection Programs 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]*. Door assemblies shall be listed by Underwriters' Laboratories, Underwriters Laboratories of Canada or Warnock Hersey under active Factory Inspection Programs 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. Acoustic assemblies shall be provided for those openings scheduled by the *[Architect] [Acoustic Consultant]*. Assemblies shall be tested as a fully operable unit in strict conformance with ASTM E90-81 and ASTM E413-73 by an independent laboratory accredited for these specific test procedures by the National Bureau of Standards under the National Voluntary Laboratory Accreditation Program.

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

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

9. 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 specified.  
Include 1.6.1.3 only if acoustic assemblies 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 test reports from independent, nationally recognized testing authorities, certifying that:

1. Steel door and frame assemblies furnished under this section meet the acceptance criteria of ANSI-A224.1-1990 and ANSI-A250.4-1994, Level "A".

2. Insulated door cores furnished in exterior doors under this Section meet the specified thermal resistance rating.

3. Acoustic door and frame assemblies provide the Sound Transmission Class (STC) and sound Transmission Loss (TL) values specified within the critical frequency range, as determined and scheduled by the *[Architect] [Acoustic Consultant]*.

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, 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 or numbers referencing the numbering in Architect's schedules or drawings.

## 1.8 WARRANTY

1. All 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 For specialized applications where extreme environments are anticipated, such as chemical manufacturing or processing plants, pulp, paper or steel mills and sewage treatment facilities, heavier galvanized coatings (reference G90 (Z275) - ASTM A653M) are available. In certain applications the use of stainless steel doors and frames may be required. Refer to Fleming's companion publication "Commercial Stainless Steel Door and Frame Guide Specifications" (TDS S02) for additional information and guidance.*

1. Steel:

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

Gage	10	12	14	16	18	20	22
Imperial	.138"	.105"	.075"	.060"	.048"	.036"	.030"
Metric (SI)	3.5mm	2.7mm	1.9mm	1.6mm	1.2mm	0.9mm	0.8mm

2. Door Cores - Standard:

*Spec Note Honeycomb (2.1) is standard for D and LD-Series doors.  
Fiberglass (2.2) is standard for H-Series doors.  
Include CSA reference in Canadian projects only.  
Polystyrene (3.1) is standard for E-Series doors*

1. 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/m<sup>3</sup>) (minimum), sanded to the required thickness.

2. Fiberglass:

Loose batt type, density: 1.5 pcf (24kg/m<sup>3</sup>) (minimum), conforming to ASTM C665 [and CSA A101-M83]

3. Door Cores - Optional

*Spec Note Include 3.1 only if E-Series doors or fire labeled, insulated D-Series doors are specified  
Include 3.2 when high performance insulated exterior D-Series doors are required  
Include 3.3 only if D-Series TRR doors are required  
Edit 3.3 to delete reference to 250°C (450°F) at 30 or 60 minutes for US projects and delete reference to 250°F (120°C), 450°F (250°C) or 650°F (345°C) at 30 minutes from Canadian projects.  
Include 3.4 only if acoustic assemblies are required  
Include 3.5 only if lead-lined assemblies are required*

1. Polystyrene:

Rigid extruded, fire retardant, closed cell board, Type 1, density: 1 to 2 pcf (16 to 32 kg/m<sup>3</sup>), 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. Temperature Rise Rated (TRR):

Solid slab core of non-combustible, inorganic composite to limit temperature rise on the "

unexposed" side of door to [250°F (120°C), 450°F (250°C) or 650°F (345°C) at 30 minutes] [250°C (450°F) at 30 or 60 minutes], as required by governing building code requirements and determined and scheduled by the Architect.

4. Acoustic - Composite:

Core materials shall be Fleming proprietary design, tested as part of a fully operable assembly in accordance with ASTM E90-81 and ASTM E413-73

5. Lead:

Cast or rolled pure sheet lead meeting ASTM B29 or ASTM B749.

4. Adhesives:

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

2. Interlocking Edge Seams:

Resin reinforced polychloroprene (RRPC), fire resistant, high viscosity, sealant/adhesive or UL approved or equivalent.

5. Primer:

Rust inhibitive touch-up only

6. Exterior Top Caps:

Rigid polyvinylchloride (PVC) extrusion

## 2.1.2 Construction

*Spec Note* The following Table summarizes the various Fleming door "Series-Gage-Construction" combinations available. Edit Section 2.1.2 to include only those combinations indicated.

Series	Available Gages	Construction
H	12 or 14 or 16	Fully Welded, Vertically Stiffened, Flush
D	16 or 18 or 20	Lock Seam, Flush
E	18 or 20	Lock Seam, Embossed
SD	16	Acoustic, Flush
LD	16 or 18	Lead-Lined, Flush

1. General:

1. All steel doors shall be as manufactured by Fleming

2. Doors shall be swinging, 1.75" (44.4mm) thick (1.875"/47.6 for H12-Series), of the types and sizes indicated on the Architect's schedules or drawings.

3. Exterior doors shall be Fleming [H] [D] [E] Series.

4. Face sheets for exterior doors shall be fabricated from [12] [14] [16] [18] [20] gage steel.

*Spec Note* Select one of the following:

*Include 5.1 when H-Series doors are specified*

*Include 5.2 when D or E-Series doors are specified.*

*For E-Series or fire labeled insulated D-Series doors specify polystyrene core in Section 5.2*

*For non-labeled, high performance D-Series exterior doors specify polyisocyanurate core in*

### Section 5.2

5. Exterior doors shall be:

1. Internally reinforced with 20 gage continuous interlocking steel stiffeners at 6" (150mm) on center, securely welded to each face sheet at 6" (150mm) on center maximum, with voids between stiffeners filled and sound deadened with 1.5 pcf (24kg/m<sup>3</sup>) loose batt type fiberglass material.

2. Stiffened, insulated and sound deadened with [honeycomb] [polystyrene] [polyisocyanurate] core laminated under pressure to each face sheet.

*Spec Note* Select one of the following:

*Include 6.1 when H-Series doors are specified*

*Include 6.2 when D-Series or E-Series doors are required*

*Where "tack welded, filled and sanded flush with no visible seam" is an option, it is intended to address aesthetics not the functionality of the door edge or finished product.*

6. Longitudinal edges of exterior doors shall be:

1. Continuously welded the full height of the door, filled and ground smooth with no visible

seams.

2. Mechanically interlocked, adhesive assisted with edge seams *[visible] [tack welded, filled and sanded flush with no visible seam]*.
7. Interior doors shall be Fleming *[H] [D] [E]* Series.
8. Face sheets of interior doors shall be fabricated from *[12] [14] [16] [18] [20]* gage steel.

*Spec Note Select one of the following;  
 Include 9.1 when H-Series doors are specified.  
 Include 9.2 when D or E-Series doors are specified.  
 Include 9.3 when Temperature Rise Rated (TRR) fire labeled D-Series doors are required.*

9. Interior doors shall be:
  1. Internally reinforced with 20 gage continuous interlocking steel stiffeners at 6" (150mm) on center, securely welded to each face sheet at 6" (150mm) on center maximum, with voids between stiffeners filled and sound deadened with 1.5 pcf (24kg/m<sup>3</sup>) loose batt type fiberglass material.
  2. Stiffened, insulated and sound deadened with *[honeycomb] [polystyrene]* core laminated under pressure to each face sheet.
  3. Stiffened, insulated and sound deadened with Fleming's proprietary core where Temperature Rise Rated (TRR) fire labeled doors are specified on the Architect's schedules.

*Spec Note Select one of the following;  
 Include 10.1 when H-Series doors are specified  
 Include 10.2n D or E-Series doors are specified*

10. Longitudinal edges of interior doors shall be:
  1. Continuously welded the full height of the door filled and ground smooth with no visible seams.
  2. Mechanically interlocked, adhesive assisted with edge seams *[visible] [tack welded, filled and sanded flush with no visible seam]*.

*Spec Note Include 11.1 through 11.3 only if acoustic assemblies are required.  
 Acoustic assemblies should be specified with regard to the frequencies of the offending sound, expressed in hertz (Hz), known as the "critical frequency range" and the required reduction of sound levels from source to receiving areas, expressed in decibels (dB). Once this criteria has been established, select the corresponding STC rating required from the Table below.*

Sound Transmission Loss (TL) Values in Decibels (dB)

STC Rating	Frequency (Hz)																	
	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
41	23	24	29	33	36	41	44	45	45	44	40	37	37	41	45	47	49	46
42	18	22	31	32	40	42	42	45	42	43	41	39	39	43	46	47	46	45
43	30	26	36	40	43	44	46	47	46	46	44	40	42	47	51	52	53	52
44	25	26	29	34	41	45	46	47	46	45	45	43	43	47	51	53	55	53
46	31	29	36	40	42	45	47	49	47	47	45	42	43	47	51	57	57	54

*Spec Note Edit 11 to include the assembly STC Rating desired.*

11. Acoustic doors shall be Fleming SD-16 Series, attaining an assembly STC rating of [ ].
  1. Face sheets for acoustic steel doors shall be fabricated from 16 gage steel
  2. Interior voids of acoustic doors shall be completely filled, stiffened, insulated and sound deadened with Fleming proprietary sound attenuating core.
  3. Longitudinal edges mechanically interlocked, adhesive assisted, with edge seams *[visible] [tack welded, filled and sanded flush with no visible seam]*.

*Spec Note Include 12.1 through 12.3 only if lead-lined 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:*

<i>Weight</i>	<i>Thickness</i>
2 pcf ( 9.8kg/m <sup>3</sup> )	1/32" (.031") (0.8mm)

3 psf (14.6kg/m<sup>3</sup>)  
4 psf (19.5kg/m<sup>3</sup>)

3/64" (.047") (1.2mm)  
1/16" (.063") (1.6mm)

12. Lead-Lined doors shall be Fleming LD Series.

1. Face sheets for lead-lined steel doors shall be fabricated from [16] [18] gage steel.

2. Interior voids of lead-lined steel doors shall be completely filled, stiffened, insulated and sound deadened with composite core comprising [.031" (1/32")/0.8mm] [.047" (3/64")/1.2mm] [.063" (1/16")/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.

3. Longitudinal edges of lead-lined steel doors shall be mechanically interlocked, adhesive assisted with edge seams [visible] [tack welded, filled and sanded flush with no visible seam].

*Spec Note Items 2.1.2.1.13 through 19 apply to all Fleming Door Series, unless specifically indicated otherwise.*

13. Door faces of all steel doors shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles and waves.

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

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

*Spec Note Edit 2.1.2.1.16 to include 12 gage end channels only if acoustic doors are required.*

16. 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. [For acoustic doors, end channels shall be fabricated from 12 gage steel.]

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

*Spec Note Include 2.1.2.1.18 only if acoustic or lead-lined doors are required.*

18. Top and bottom of [acoustic] [lead-lined] doors shall be provided with 16 gage continuous flush steel non-removable end caps welded securely in place.

*Spec Note The following are not available as fire labeled product; 3 hour or glazed LD-Series, dutch or louvered doors; lead-lined or TRR core dutch doors; pairs with panel above doors (no transom mullion); combustible claddings or facings; polyisocyanurate cores; double acting doors.*

19. 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 and temperature rise 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) rabet height shall be prepared for 4.5" (114.3mm) heavy weight (.180"/4.6mm) hinges minimum.

*Spec Note Include 2.8 only if acoustic or lead-lined doors are required*

8. Hinge reinforcements for [acoustic] [lead-lined] doors shall be 10 gage minimum with each cutout provided with 4.5" (114.3mm) heavy weight (.180"/4.6mm) high frequency type reinforcing.

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 steel surface mounted flat bar astragal, shipped loose for application on site, by the contractor responsible for installation.

*Spec Note Pairs of fire labeled doors are available without astragal when specified. This option is available on H, D16 and D18 Series doors, up to 96" x 96" (2450mm x 2450mm) to 1½ hour rating maximum only. Include 2.13 if this option is desired.*

13. Pairs of [H] [D16] [D18] Series up to 96" x 96" (2450mm x 2450mm), to 1½ hour fire rating maximum shall be provided without astragals. Lock edge seam of such doors shall be [tack-welded and ground smooth] [tack-welded, filled and ground smooth].

*Spec Note Include 2.14 through 2.17 only when acoustic assemblies are required.*

14. Acoustic doors shall be reinforced for and provided with Fleming surface mounted adjustable automatic door bottoms, shipped loose for application on site, by the contractor responsible for installation.

15. Pairs of acoustic doors shall be provided with Fleming surface mounted over-lapping acoustic astragal and where fire labeled assemblies are specified, an additional 12 gage steel over-lapping flat bar astragal, each shipped loose, for application on site, by the contractor responsible for installation.

16. Clearance (undercut) beneath acoustic doors shall be .25" (6.4mm) maximum, measured from the underside of the door to the top of the finished floor (exclusive of floor coverings) or top of threshold, where specified in the final approved hardware list.

17. Floor below acoustic assemblies shall provide a level, smooth and solid surface.

*Spec Note Edit 2.18 to include UL for US projects or CSA for Canadian projects.*

18. 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 inter-connected with [UL] [CSA] Approved .5" (12.7mm) diameter conduit and connectors.

### 3. Glazing:

*Spec Note Include 3.2 only if glazing materials greater than 5/16" (8mm) thickness are required*

1. Where glazing materials up to and including 5/16" (8mm) thick are specified on the Architects schedules or details, doors shall be provided with 20 gage steel glazing trim and snap-in glazing stops.
2. Where glazing materials greater than 5/16" (8mm) thick are specified on the Architect's schedules or details, doors shall receive 20 gage 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.
3. Glazing trim and stops shall be accurately fitted, butted at corners, with removable glazing stops located on the 'push' side of the door.

### 4. Louvers

*Spec Note Include 4.1 and 4.2 only if louvers are supplied under this section.*

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 6063-T5 aluminum alloy with a minimum thickness of .062" (1.6mm).
2. Where specified on the Architect's schedules or details, fire labeled doors shall be prepared for and provided with UL listed sight-proof fusible link louver inserts. Louvers shall be fabricated from 16 gage steel with UL Listed 135°F (57°C) fusible links, stainless steel operating springs and shall provide 40% free air flow.

### 5. Finishing:

1. Remove weld slag and splatter from exposed surfaces.
2. All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth uniform surfaces.
3. On exposed surfaces where zinc coating has been removed during fabrication, doors shall receive a factory applied touch-up primer.
4. Primer shall be fully cured prior to shipment.

## 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 steel frames, transom frames, sidelight and window assemblies.*

### 2.3.1 Materials

*Spec Note For specialized applications where extreme environments are anticipated, such as chemical manufacturing or processing plants, pulp, paper or steel mills and sewage treatment facilities, heavier galvanized coatings (reference G90 (Z275) - ASTM A653M) are available. In certain applications the use of stainless steel doors and frames may be required. Refer to Fleming's companion publication "Commercial Stainless Steel Door and Frame Guide Specifications" (TDS S02) for additional information and guidance.*

1. Steel:

Frame product 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. Primer:

Rust inhibitive touch-up only

*Spec Note Include 2.3.1.3 only if lead-lined assemblies are required.*

3. Lead:

Cast or rolled pure sheet lead meeting ASTM B29 or ASTM B749

4. Miscellaneous:

*Spec Note Include 4.2 and 4.3 only if thermally broken frames are required.*

1. Door Silencers:

GJ-64 or equal, Single Stud rubber/neoprene type

2. Thermal Breaks:

Rigid polyvinylchloride (PVC) extrusion

3. Fiberglass:

Loose batt type, density: 1.5 pcf (24kg/m<sup>3</sup>)(minimum), conforming to ASTM C665

### 2.3.2 Construction

*Spec Note Fleming manufacturers nine (9) "Series" of frame product that are classified by their function. The terminology used to define the method of assembly refers predominantly to the treatment of intersecting components and their resulting appearance. Refer to Section 2.3.2.1.14 for explanations of the various Assembly Methods available. To assist in the selection for each Frame Series-Gage-Assembly Method combination, the Table below is provided. Edit Section 2.3.2 - Construction accordingly.*

Frame Gage	Available Frame Assembly Methods Fleming Frame Series								
	F	DW	MD or R	Therma	A	SF	LF	TW	
12	SUW	-	-	-	-	-	SUW	-	
14	SUW	-	-	SUW, KD	-	SUW	SUW	-	
16	SUW, KD	KD-DW	SUW, KD	SUW, KD	SUW, KD	-	SUW	-	
18	SUW, KD	KD-DW	-	-	-	-	-	SUW	

1. General:

1. All steel frame product shall be as manufactured by Fleming of the types, sizes and profiles indicated on the Architects' schedules or details.

*Spec Note F-Series frames are utilized in most general applications and are designed to be set in place with the partition built around them.*

*MD-Series frames are drywall profile units installed in steel or wood stud partitions before wall is constructed.*

*Therma-Frames Series is a specialized product that should be specified for applications where energy conservation or extreme temperature differences between the interior and exterior are design factors.*

*Edit 1.2 to include "Therma-Frame" Series only if thermally broken frames are required  
A-Series are adjustable jamb depth frames which can be used in existing openings which are protected from the weather*

*R-Series is specialized frame installed in the door rabbet of existing wood or steel frame.*

2. Exterior frames shall be Fleming [F] [Therma-Frame] [A] [MD] [R] Series, fabricated from [12] [14] [16] [18] gage steel.

*Spec Note "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 construction of the adjacent partition.*

*Where exterior MD, R or A-Series are specified, frames should be set-up and welded.*

3. Exterior frame product shall be supplied [set-up and welded (SUW)] [knocked-down (KD)].

*Spec Note Include 4.1 through 4.3 only if thermally broken frames are specified.*

4. Interior and exterior sections of thermally broken frames shall be separated by a continuous PVC thermal break.

1. Thermally broken sections shall not be assembled by means of screws, grommets or other fasteners.

2. Where thermally broken welded frame product is specified, welds shall not cause thermal transfers between interior and exterior surfaces of the frame sections.

3. [Closed sections (mullions and center rails) of thermally broken frames shall be factory insulated with 1.5 pcf (24kg/m<sup>3</sup>) loose batt type fiberglass material.]

5. Insulation of open sections (jambs, heads and sills) shall be provided and installed by the contractor responsible for installation.

*Spec Note DW-Series frames are specified as an economical alternative to F-Series products in drywall and steel or wood stud partitions. This Series is designed for installation in a rough stud opening after the drywall has been applied. DW-Series frames are generically known as "Slip-On" frames.*

*TW-Series, also commercially known as "Trimwall", is an interior office partitioning, sidelight and window system. Utilizing a .625" face width, it presents the narrowest profile available in the industry.*

6. Interior frames shall be Fleming [F] [DW] [A] [MD] [R] [Trimwall] Series, fabricated from [12] [14] [16] [18] gage steel.

7. Interior frame product shall be supplied [set-up and welded (SUW)] [knocked-down (KD)] [knocked-down drywall (KD-DW)].

*Spec Note Include 8.1 through 8.4 only if acoustic assemblies are required.*

*SF-Series (acoustic) products should be specified where problems relating to unwanted sound transmission are anticipated. SF-Series frames must be utilized in conjunction with SD-Series doors and Fleming's acoustic gasketing system to ensure the validity of the STC rating. A range of assemblies from STC 41 to 46 are available.*

8. Acoustic frames shall be Fleming SF-Series, fabricated from 14 gage steel.

1. Acoustic frames shall be supplied set-up and welded (SUW).

2. Acoustic frames shall be supplied complete with Fleming surface mounted acoustic gasket/stop system.

3. Acoustic gasketing system shall be fully adjustable without the removal or disfigurement of any portion of the door or frame assembly.

4. Insulation of open sections (jambs and heads) of acoustic frames shall be provided and installed by the contractor responsible for installation.

*Spec Note LF-Series (lead-lined) frames are utilized in conjunction with LD-Series doors to provide radiation shielding from x-rays and similar medical and clinical applications.*

*Include 9.1 and 9.2 only if lead-lined assemblies are required.*

*Edit 9.2 to include the thickness lead required and to specify which sub-contractor is responsible for the application of the lead-lining.*

9. Lead-lined frames shall be Fleming LF-Series, fabricated from [12] [14] [16] gage steel.
  1. Lead-lined frames 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 the profile from return to door stop (inclusive) on the door side of the profile only by the [frame manufacturer] [contractor responsible for lead-lining adjacent walls].

*Spec Note Include 10 only if A-Series adjustable frames are specified.*

10. Adjustable jamb depth frames shall be provided with 2-piece, 14 gage galvaneal steel sliding angle bracket assemblies, welded to each frame section. Each sliding bracket assembly shall be supplied with two (2) machine screws installed for permanent setting of required jamb depth. Jambs up to 7'2" (2200 rabbet height and heads for pairs shall receive three (3) assemblies each. Jambs over 7'2" (2200), four (4) assemblies and single heads two (2) assemblies.

*Spec Note The following applies to all Fleming Frame Series, unless specifically indicated otherwise.*

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

*Spec Note Include 13 only if "knocked-down (KD)" or "knocked-down drywall (KD-DW)" have been specified accordingly.*

13. [Knocked-down (KD)] [Knocked-down drywall (KD-DW)] frames shall be shipped unassembled.
14. Corner joints shall be accurately mitered and tightly fitted with integral door stops mitered or butted when assembled.

*Spec Note Edit 15.1 and 15.2 to include only those Assembly Methods specified in Sections 2.3.2.1.3 or 2.3.2.1.7.*

15. Corner joints shall be:
  1. Welded on the inside of the profiles' returns and faces for set-up and welded (SUW) frames.
  2. Provided with 20 gage steel reinforcing plates and/or jambs with integral tabs. Jambs or corner reinforcing plates shall securely interlock mechanically with factory prepared head for [knocked-down (KD)] [knocked-down drywall (KD-DW)] frames.
16. Joints at mullions, transom bars, sills or center rails shall be coped accurately, butted and tightly fitted, with faces securely welded, matching corner joint faces.
17. Frame product shall be fabricated with integral door stops having a minimum height of .625" (16mm).
18. Glazing stops shall be formed 20 gage 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.
19. 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 welded, filled and ground to present a smooth uniform surface by the contractor responsible for installation after assembly.
20. 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 to floor.

*Spec Note Cut-off door stops (sanitary bases) are available on F, MD and DW-Series frame product only and should not be utilized on exterior, double egress, lead-lined or gasketed frame product.*

21. 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.

22. 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, after finish painting.

*Spec Note The following are not available as fire labeled product: thermally broken, R or TW-Series frame product, frame product incorporating louvers or vents or angled or radiused corners.*

23. 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 and pivot reinforcements shall be 10 gage steel minimum reinforcing, high frequency type shall be provided (except on R-Series frames).

*Spec Note Include 2.7 only if acoustic or lead-lined frames are required.*

7. Hinge reinforcements for [acoustic] [lead-lined] frames shall be 10 gage minimum with each cutout provided with 4.5" (114.3mm) heavy weight (.180"/4.6mm) high frequency type reinforcing.
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 except on A and R-Series frames (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 templates, shall be provided and inter-connected 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.

*Spec Note Items 3.2 through 3.10 do not apply to Fleming A, R or DW-Series frames.*

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.

*Spec Note Edit 3.4 to delete reference to "thermal transfers" if "Therma-Frame" Series frames are not required.*

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 [designed so as not to permit thermal transfers from exterior to interior surfaces of the frame sections].

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. Jamb 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 the 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. *[After sufficient tightening of the anchor bolt, the head shall be welded so as to provide a non-removable application. Welded bolt and dimple shall be filled and ground to present a smooth uniform surface by the contractor responsible for installation, prior to finish painting.]*

10. 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 mounting angles welded to the inside of frame head. 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.

*Spec Note Items 3.11 through 3.13 should be included only if DW-Series frames are specified.*

11. Each jamb on DW-Series frames shall be provided with one (1) adjustable compression anchor located 5" (125mm) from the intersection of the jamb and head door stops.

12. Each jamb face shall be punched and dimpled .75" (19mm) from the bottom to receive countersunk drywall screws or shall be provided with two (2) 20 gage steel snap-in base anchors for secure anchorage to the drywall and floor runner.

13. For fire labeled frames, each strike jamb shall be provided with an additional snap-in anchor in each face, to be installed above or below the strike reinforcement. Each head for fire labeled pairs shall be provided with two (2) snap-in anchors, to be installed in the head faces at the center of the rabbet opening width.

*Spec Note Item 3.14 should be included only if A-Series frames are specified.*

14. Each jamb and head face on A-Series frames shall be punched and dimpled for #8 drywall screws (or .188" (4.8mm) diameter Tapcon screws for existing concrete or masonry partitions.) Jamb up to 7'2" (2200mm) rabbet height and heads of pairs shall receive 3 dimples per face. Jamb over 7'2" (2200mm) rabbet height shall receive 4 dimples per face. Single heads shall receive 2 dimples per face.

*Spec Note Item 3.15 should be included only if R-Series frames are specified.*

15. Each jamb and head on R-Series frames shall be punched and countersunk for #8 screws. Hinge jamb faces up to 7'2" (2200mm) rabbet height shall receive 5 preparations each. Hinge jambs over 7'2" (2200mm) rabbet height shall receive 6 per face. Jamb door rabbets shall receive preparations immediately above and below each mortised hardware preparation and at 1" (25mm) from both the top and bottom of the jamb. All strike jambs shall receive 3 preparations per face. Heads shall receive 3 in each face and door rabbet. Screws shall be supplied by the contractor responsible for installation.

*Spec Note Item 3.16 can be included when A or R-Series frames are specified to address security and aesthetic considerations.*

16. On *[A] [R]* Series frames, after sufficient tightening of the face screws, their heads shall be tack welded and ground smooth. Welded screw heads shall be filled and ground to present a smooth uniform surface by the contractor responsible for installation.

4. Finishing:

1. Remove weld slag and spatter from exposed surfaces.
2. All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth and uniform surfaces.
3. On exposed surfaces where zinc has been removed during fabrication, frame product shall receive a factory applied touch-up primer.
4. Primer shall be fully cured prior to shipment.

## 2.4 SIZES AND TOLERANCES

1. Widths of door openings shall be measured from inside of frame jamb rabbet 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 are 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  $\pm .047"$  ( $\pm 1.2\text{mm}$ ).

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  $\pm .047"$  ( $\pm 1.2\text{mm}$ ).

4. Manufacturing tolerances on formed frame profiles shall be  $\pm .031"$  ( $\pm 0.8\text{mm}$ ) for faces, door stop heights and jamb depths. Tolerances for throat openings and door rabbets shall be  $\pm .063"$  ( $\pm 1.6\text{mm}$ ) and  $\pm .016"$  ( $\pm 0.4\text{mm}$ ) 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 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 and 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 device manufacturer's templates.

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

5. Preparations not noted above shall be as per 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 itself 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's 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  $\pm .063"$  (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  $\pm .063"$  (1.6mm).

3. Alignment tolerance, measured on jambs, through a horizontal line parallel to the plane of the wall, shall be  $\pm .063"$  (1.6mm).

4. Twist tolerance, measured at face corners of jambs, on parallel lines perpendicular to the plane of the wall, shall be  $\pm .063$ " (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 rabbet height to maintain frame widths.
5. Provide vertical support at center of head for openings exceeding 48" (1250mm) in width.
6. Remove wood spreaders after product has been built-in.
7. Secure anchorages and connections to adjacent construction.
8. Frame product in unit masonry shall be fully grouted in place.
9. Install doors in accordance with NAAMM-HMMA 840, maintaining clearances outlined in Section 2.4.
10. Install builders' hardware in accordance with ANSI A115.IG-1994, manufacturers' templates and instructions.
11. Install louvers and vents.
12. Adjust operable parts for correct clearances and function.
13. Steel surfaces shall be kept free of grout, tar or other bonding materials or sealers.
14. Any grout or other bonding material shall be cleaned from products immediately following installation.
15. Prior to site touch-up, exposed surfaces of galvanized steel to be finished with latex paints shall be cleaned with soap and water to remove foreign matter. When alkyd paints are specified, turpentine or paint thinners shall be used. Refer to paint manufacturers recommendations for additional information.
16. Exposed field welds shall be finished to present a smooth uniform surface and shall be touched-up with a rust inhibitive primer.
17. Exposed surfaces that have been scratched or otherwise marred during shipment, installation or handling shall be touched-up with a rust inhibitive primer.
18. Finish paint in accordance with Section 09900.
19. Install glazing materials and door silencers.

**- END OF SECTION 08110 -**