

**CALL 800-480-6613**

SALES  
REPAIR

SERVICE  
INSTALLATION

INTEGRATION  
WARRANTY

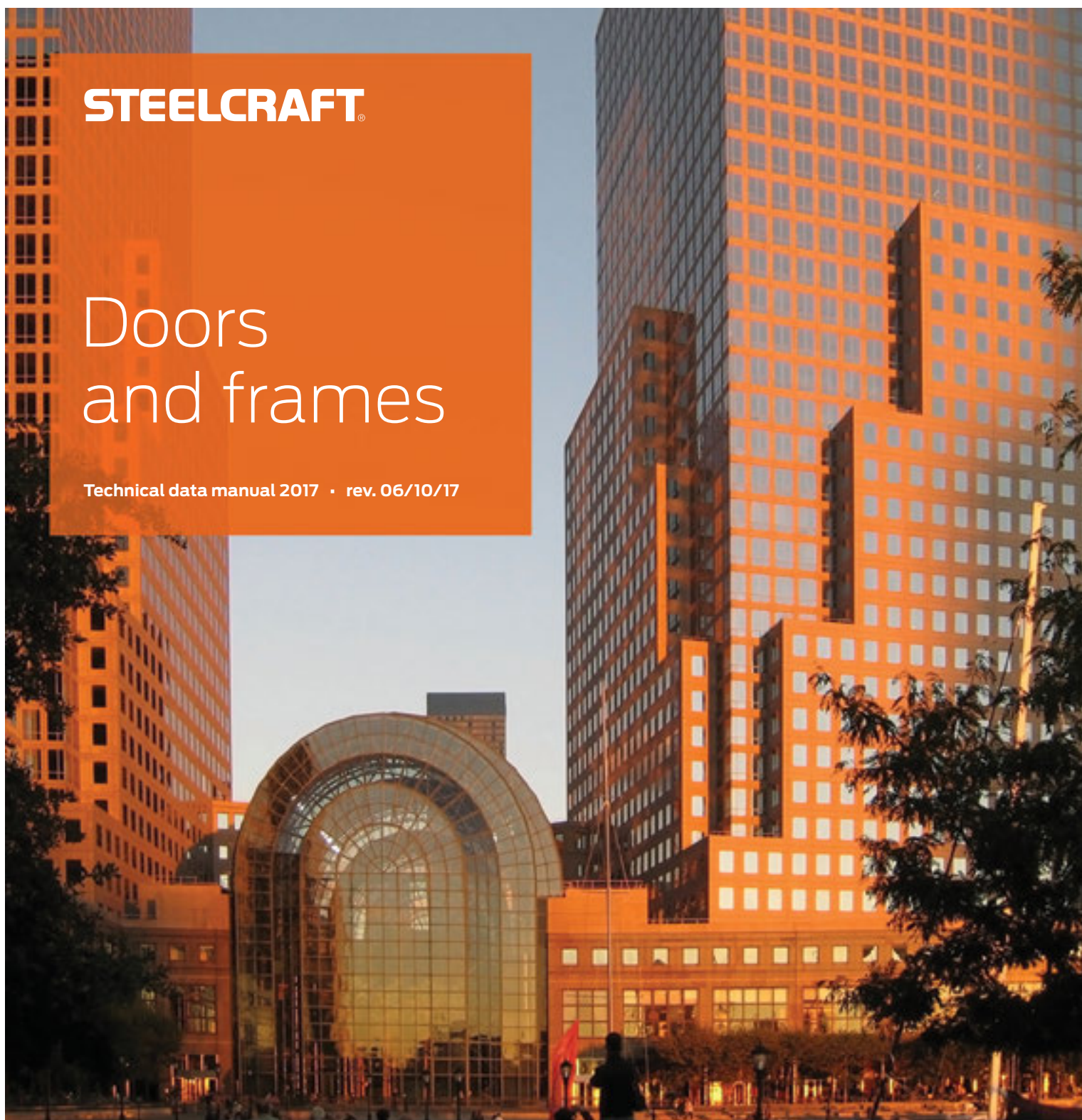


**FBH ARCHITECTURAL SECURITY**  
*Commercial Doors and Hardware*

**STEELCRAFT®**

# Doors and frames

Technical data manual 2017 • rev. 06/10/17





# Contents

Technical product support .....	iv	Lights and louvers.....	147
General Information.....	5	General information .....	148
Introduction.....	6	Glazing kit options.....	149
Technical publications.....	7	Flush door glass lights.....	150
Handling procedures diagrams .....	11	Special glass lights.....	157
Nomenclature .....	12	Embossed door glass lights.....	159
Typical hardware locations .....	14	Louver prep.....	163
Comparative hinge and strike locations.....	18	Elevations.....	165
Frames .....	21	General information .....	166
General information .....	22	Architectural sticks.....	169
F Series flush.....	25	Typical elevations.....	176
FN Series 1" flush face .....	29	Installation details.....	183
MU Series multi-use.....	33	Hurricane resistant openings.....	185
FE Series double egress.....	37	General test Information.....	186
DE Series double egress.....	41	H16 and H14 Series flush doors.....	187
DW Series drywall.....	45	HE16 Series embossed doors .....	191
K Series drywall.....	49	Approvals.....	194
Frame variations and options .....	53	Tornado resistant openings.....	203
Profile Variations.....	54	General information .....	204
Dutch doors.....	65	PW Series flush doors .....	205
Communicating frames.....	67	FP14 Series flush frames .....	211
Hospital stops.....	68	Approvals.....	214
Head reinforcement, 12 gauge full width channel .....	69	Specialty products.....	217
Lead lined.....	70	Stainless steel doors and frames.....	218
Rough buck frames.....	71	Sound openings .....	222
Applied stops.....	72	Thermal break frames.....	224
Hardware.....	73	Hardware preparations .....	229
Thick doors.....	74	General information .....	230
Weather seals.....	75	Locations: Hinging, locking, closing .....	231
Throat fillers.....	76	Hardware preparations: Nomenclature .....	235
Kerf frames.....	77	Door preps: Locks.....	241
Anchoring systems.....	78	Door preps: Exit devices.....	246
Doors.....	89	Door preps: Inactive leaves .....	252
General door information .....	90	Frame preps: Hinges.....	260
L Series.....	93	Frame preps: Strikes.....	261
SL Series.....	97	Frame preps: Closers .....	267
Falcon SZ Series.....	101	Frame preps: Hinges.....	268
B Series.....	103	Frame preps: Miscellaneous.....	270
T Series.....	107	Fire rated products .....	271
CE Series.....	111	General information .....	272
A14 Series full glass entrance doors .....	115	Three sided frames.....	278
Doors variations and options .....	119	Doors.....	287
Embossed CE Series .....	120	Fire window frames .....	307
Dutch doors.....	125	Smoke Barrier Doors and Frames .....	315
Monorail.....	130	Performance and finishes .....	317
GRAINTECH™.....	131	General information .....	318
Hardware.....	132	Physical endurance.....	318
Z Astragal.....	137	Insulation factors .....	320
Flat plate astragal.....	142	Air infiltration.....	321
2 piece astragal.....	143	Finishes.....	322
Weather seals.....	145	Architectural .....	327
		Specifications.....	328
		Section 08110 steel doors and frames .....	329
		SDI selection and usage guide .....	336
		Green buildings construction: LEED certification.....	342

# Technical product support

Phone: (877) 671-7011

E-Mail: [doors\\_frames\\_techprodsupport@allegion.com](mailto:doors_frames_techprodsupport@allegion.com)



# General Information

Introduction .....	6
Standards and SDI Certified.....	6
Dimensioning.....	6
Terminology.....	6
Literature .....	6
Errors and omissions.....	6
Technical publications.....	7
SDI Technical publications.....	7
HMMA Technical publications.....	9
ANSI Technical publications.....	10
Handing procedures diagrams .....	11
Nomenclature.....	12
Frame nomenclature .....	12
Door nomenclature.....	13
Typical hardware locations .....	14
3 Hinges (1 ½ Pair) .....	14
4 Hinges (2 Pair) .....	15
5 Hinges (2 ½ Pair) .....	16
Dutch doors.....	17
Comparative hinge and strike locations.....	18
1 ¾" Doors and frames with 4 ½" x 4 ½" hinges .....	19
45 mm doors and frames with 114 mm x 114 mm hinges (metric dimensions).....	20

## Introduction

After more than seven decades of quality, craftsmanship and service leadership, Steelcraft continues to be recognized as the world's leading manufacturer of steel doors and frames.

Steelcraft manufactures the most complete line of steel doors and frames. These products are produced from the highest quality of commercial carbon steel or galvanized steel as specified.

Steelcraft frames are designed for virtually all types of wall construction. The flush frame is primarily intended for installation as part of the wall framing system(s), while the Drywall Frames are specifically designed for drywall construction.

Steelcraft also offers the broadest line of labeled (Fire Rated) doors and frames for either Positive or Neutral fire test environments. Steelcraft continues to be very active in assisting building code officials in the adoption of more stringent and realistic codes for Fire Doors and Frames.

The Steelcraft Architectural Stick System consists of standard frame components that are pre-engineered for assembly and fabrication by the local Steelcraft distributor. This allows for unlimited opportunities to meet the architectural and aesthetic needs of extensive window wall, store front and entrance units.

Steelcraft is devoted to the manufacture, service and continuous improvement of steel doors, frames and their components. A measure of this commitment can be found in the great number of door and frame innovations that are now common in the industry-pioneered, designed, developed, and in certain products, patented by Steelcraft.

This Technical Manual is designed to provide Architects, Engineers, Specification Writers, End Users and Distributors with the necessary information to specify the correct Steelcraft product to meet the application and functional needs of the project. In addition to providing the industry with the highest quality of steel doors, frames and components, Steelcraft offers the widest selection of sizes, styles and designs to compliment virtually any architectural, aesthetic, security or safety requirement.

### Standards and SDI Certified

Steelcraft products are SDI Certified (<https://www.steeldoor.org/sdicertified.php>). Steelcraft is a long-standing and very involved member of several training and industry organizations, which are also dedicated to the continual improvement of the Commercial Door and Frame Markets. Some of the major trade associations of which Steelcraft is an active member include:



<b>SDI</b>	Steel Door Institute
<b>HMMA</b>	Hollow Metal Manufacturers' Association
<b>DHI</b>	The Door and Hardware Institute

### Dimensioning

All dimensions shown in this manual are based on the imperial (feet and inches) dimensions system, with the equivalent metric (millimeters) shown in parentheses. Steelcraft has and does supply projects globally in both Imperial and Metric dimensioning. It is the responsibility of the architect, specifier and purchaser of the doors and frames to clearly indicate the dimensional system required to be met. With the multitude of building components interfacing with the door and frame installations, this is extremely critical and requires a clearly stated and understood dimensioning policy.

### Steelcraft Metric Policy

Jobs ordered in metric dimensions will be supplied to the actual dimensions indicated on orders placed to Steelcraft. No dimensions will be considered nominal, unless they are clearly indicated and supported by a clearly stated metric dimensional standard. All critical, installation and functional tolerances will be in accordance with the industry tolerance published in and by the Steel Door Institute (SDI) and the Hollow Metal Manufacturers Association (HMMA).

### Terminology

The terms covered in this manual are in accordance with those published by:

<b>SDI</b>	ANSI A250.7 Nomenclature for: <i>Standard Steel Doors and Steel Frames</i>
<b>HMMA</b>	HMMA 801-05 Glossary of <i>Terms for Hollow Metal Doors and Frames</i>

### Literature

Literature or standards referenced in this manual can be obtained directly from the publisher of that literature. To obtain any standard referenced in this manual, refer to the organizations listed. Downloadable documents may be obtained by connecting to the organization's website.

Organization		Website
<b>ANSI</b>	American National Standards Institute	<a href="http://www.ansi.org">www.ansi.org</a>
<b>ASTM</b>	American Society for Testing and Materials	<a href="http://www.astm.org">www.astm.org</a>
<b>CSI</b>	Construction Specifications Institute	<a href="http://csinet.org">csinet.org</a>
<b>DHI</b>	Door and Hardware Institute	<a href="http://www.dhi.org">www.dhi.org</a>
<b>HMMA</b>	Hollow Metal Manufacturers' Association, Division of NAAMM	<a href="http://www.naamm.org">www.naamm.org</a>
<b>NAAMM</b>	National Association of Architectural Metal Manufacturers	<a href="http://www.naamm.org">www.naamm.org</a>
<b>NFPA</b>	National Fire Protection Association	<a href="http://www.nfpa.org">www.nfpa.org</a>
<b>SDI</b>	Steel Door Institute	<a href="http://www.steeldoor.org">www.steeldoor.org</a>
<b>UL</b>	Underwriters Laboratories, Inc.	<a href="http://www.ul.com">www.ul.com</a>
<b>WH</b>	Warnock Hersey (Intertek ETL SEMKO)	<a href="http://www.intertek.com">www.intertek.com</a>

### Errors and omissions

Every effort has been made to ensure the accuracy and completeness of this Steelcraft Technical Manual. This manual is for use by qualified persons only. The information herein is subject to some interpretation, and from time to time, the data sheets will be updated whenever it is deemed necessary as new tests are conducted, new products and technologies are introduced and as specifications are revised.

Similarly, there may be recommendations provided in this manual concerning hardware or construction procedures. Specific hardware, code, and specific industry standards and instructions should always be followed. Any differences should be fully understood by the architect and contractors. For these reasons, and because of the nature and scope of the subject, Steelcraft and its employees can assume no responsibility or liability for the absolute accuracy of the material contained herein or its use. The information in this Technical Manual is subject to change without notice and does not represent a commitment on the part of Steelcraft.

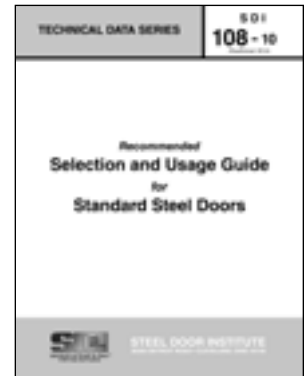
Please contact the Steelcraft Technical Service Department if you identify an error or omissions.

## Technical publications

### SDI Technical publications

Listed here, and on the following page, are the current Technical publications available from the Steel Door Institute.

All documents in this list are part of the **SDI Fact File**. Free downloads of these documents are available from SDI's Website: [www.steeldoor.org](http://www.steeldoor.org)



SDI Technical publications		
Pub No.	Title	Description
SDI 106-99	Recommended Standard Door Type Nomenclature	This document contains Standard door type nomenclature ranging from flush (Type F) to Dutch doors (Type D). The use of the Standard nomenclature contained in the document will greatly simplify architectural drawing takeoff process and will do much to avoid confusion and errors which result from misinterpretation of these details.
SDI 108-04	Recommended Selection and Usage Guide for Standard Steel Doors	This document was developed to establish guide criteria for the selection and usage of standard steel doors in such building types as apartment, dormitory, hotel/motel, hospital/nursing home, industrial, office and school.
SDI 109-04	Hardware for Standard Steel Doors and Frames	This document contains a listing of hardware from various hardware manufacturers that is compatible for use on standard steel doors and frames. It covers various types of locks, exit devices, closers, holders, hinges, roller latches, flush bolts, and electric strikes.
SDI 110-84 (R2000)	Standard Steel Doors and Frames for Modular Masonry Construction	This document contains information in respect to, as the title indicates, the installation of standard steel doors and frames in modular masonry construction. The basic module covered in the document as developed by the industry is 4".
SDI 111-00	<b>Recommended Selection and Usage Guide for Standard Steel Doors, Frames and Accessories (A through H):</b>	
SDI 111-A	Recommended Standard Steel Door Frame Details	Covers Recommended steel door frame details as they are affected by common wall conditions.
SDI 111-B	Recommended Standard Details for Dutch Doors	Standard dimensions for dutch doors.
SDI 111-C	Recommended Louver Details for Standard Steel Doors	This document discusses, explains and details a variety of louver designs and size available for standard steel doors.
SDI 111-D	Recommended Door, Frame and Hardware Schedule for Standard Steel Doors and Frames	Contains a suggested door, frame and hardware schedule form and defines "handing".
SDI 111-E	Recommended Guidelines for The Use of Gasketing and Thresholds for Standard Steel Doors and Frames	Contains details which represent the recommendations of the SDI in respect to weather-stripping of standard steel doors and frames.
SDI 111-F	Recommended Existing Wall Anchors for Standard Steel Doors and Frames	A guide for architects to aid them in recognizing available options to the traditional sub buck detail which has been widely used in the past. It illustrates anchoring systems which are available in regular and labeled frames.
SDI 111-G	Recommended Standard Preparation for Double Type (Interconnected) Locks On Standard Steel Doors and Frames	Dimensions for standard door and frame preparation for double type (interconnected) locks.
SDI 111-H	High Frequency Hinge Preparations for Frames	Specifications for steel frames used in extremely high frequency or high use areas which need to be supplied with additional reinforcing to eliminate potential door sag.
SDI 112-97	Zinc-Coated (Galvanized/ Galvannealed) Standard Steel Doors and Frames	This document provides information regarding the galvanized sheet used in standard steel door and frame construction when a requirement for galvanized doors and frames is specified.
SDI 113-01	Standard Practice for Determining the Steady State Thermal Transmittance of Steel Door and Frame Assemblies	This document establishes a minimum standard and a method of test for thermal effectiveness of steel door and frame assemblies under circumstances that might reasonably be considered normal field applications and conditions.
SDI 117-00	Manufacturing Tolerances Standard Steel Doors and Frames	This document is intended to furnish users and prospective users of standard steel doors and frames with practical information regarding mortise and manufacturing tolerances for both doors and frames.
SDI 118-02	Basic Fire Door Requirements	This document contains rules and other information in a condense simplified manner in respect to code requirements for the design and use of fire doors.
SDI 122-99	Installation and Troubleshooting Guide for Standard Steel Doors and Frames	This document covers field installation problems most commonly experienced with standard steel door and frame installations. Most problems encountered are because of inappropriate application of the products and/or improper installation.
SDI 124-98	Maintenance of Standard Steel Doors and Frames	This document is intended to serve as a general outline of maintenance activities needed for hollow metal doors and frames.

SDI Technical publications		
Pub No.	Title	Description
<b>SDI 127 Series: Industry Alerts (A through J):</b>		
<b>SDI 127A-99</b>	End Closure Location	Industry Alerts - End Closure
<b>SDI 127B-99</b>	Door Edge Cutouts	Industry Alerts - Door Edge Cutouts
<b>SDI 127C-99</b>	Frame Cutout Limits	Industry Alerts - Frame Cutout Limits
<b>SDI 127D-99</b>	Electric Strikes In Stud Walls	Industry Alerts - Electric Strikes in Stud Walls
<b>SDI 127E-01</b>	Prime Painted Materials Alert	Industry Alerts - Prime Painted Materials Alert
<b>SDI 127F-02</b>	Butted Frames Rough Opening Sizes	Industry Alerts - Butted Frames Rough Opening Sizes
<b>SDI 127G-02</b>	Environmental Considerations Relating to Factory Painted Steel Doors and Frames	Industry Alerts - Environmental Considerations Relating to Factory Painted Steel Doors and Frames
<b>SDI 127H-02</b>	Water Penetration	Industry Alerts - Water Penetration
<b>SDI 127I-04</b>	Grouting Frames in Drywall	Industry Alerts - Grouting Frames in Drywall
<b>SDI 127J-04</b>	Bituminous Back-Coating of Frames	Industry Alerts - Bituminous Back-Coating of Frames
<b>SDI 128-97</b>	Guidelines for Acoustical Performance of Standard Steel Doors and Frames	This document shall provide guidelines for the specifying, designing, installing, and adjusting of standard steel doors and frames in Sound Control applications.
<b>SDI 129-04</b>	Hinge and Strike Spacing	A reference of standard locations used in the manufacture of steel door and frames by SDI member companies for a variety of door sizes.
<b>SDI 130-05</b>	Electronic Hinge Preparations	Practical information regarding an acceptable method for preparing frames for 4 1/2" electric hinges. This document will allow frame manufacturers to provide frames prior to having knowledge of the specific electric hinge being used.
<b>SDI 131-04</b>	Accelerated Physical Endurance Test Procedure for Steel Doors, Frames and Frame Anchors	This test procedure provides manufacturers with a method of quickly testing the performance of doors.
	Drywall Slip-On Frames	This document illustrates step by step how to install Drywall Frames in less than 10 minutes. It also lists the many advantages of drywall slip-on frames.

**HMMA Technical publications**

Listed here, and on the following page are the current Technical publications available from the Hollow Metal Manufacturers Association, a Division of the National Association of Architectural Metal Manufacturers.

Free downloads of these documents are available from the HMMA/NAAMM Website: [naamm.org/hmma/](http://naamm.org/hmma/)



<b>HMMA Technical publications</b>		
<b>Pub No.</b>	<b>Title</b>	<b>Description</b>
<b>HMMA 800-96</b>	Introduction to Custom Hollow Metal	It is the purpose of this manual to provide authoritative and unbiased technical information regarding the manufacture, design and use of custom hollow metal doors and frames.
<b>ANSI/NAAMM HMMA 801-05</b>	Glossary of Terms for Hollow Metal Doors and Frames	Defines commonly used terms in connection with Hollow Metal Work as they specifically apply to hollow metal doors and frames. These terms may be defined differently by other industries.
<b>HMMA 802-07</b>	Manufacturing of Hollow Metal Doors and Frames	This publication details the types of steel materials used and fabrication processes, including shearing, blanking, brake forming, limitations of break forming, welding and painting.
<b>HMMA 803-97</b>	Steel Tables	Values of minimum steel thicknesses taken from the Underwriters Laboratories, Inc. publication for gauge number and equivalent thickness are shown. ASTM and ANSI do not list gauge numbers in their standards which was the standard of referral prior to 1970.
<b>HMMA 810-87</b>	Hollow Metal Doors	This document reviews basic sizes, types, designs and construction of hollow metal doors.
<b>HMMA 820-87</b>	Hollow Metal Frames	This document details various elevation types, profiles, assembly and anchoring of Knock-Down (KD) and welded 3-sided and multiple opening hollow metal frames.
<b>HMMA 830-02</b>	Hardware Selection for Hollow Metal Doors and Frames	This publication is intended to acquaint the reader with commonly used door hardware that provides both aesthetic appeal and durable function.
<b>HMMA 831-97</b>	Hardware Locations for Hollow Metal Doors and Frames	Recommended locations for hardware on Custom Hollow Metal doors differ from those established for Standard Hollow Metal doors principally with respect to hinges, knobs and strikes.
<b>HMMA 840-99</b>	Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames	A comprehensive review of the delivery, receiving, on-site storage and installation of Knock-Down (KD) and welded hollow metal frames and hanging of hollow metal doors.
<b>HMMA 850-00</b>	Fire Rated Hollow Metal Doors and Frames	Data on current practices within the industry are presented with emphasis on the requirements of the National Fire Protection Association (NFPA) and Model Codes. Fire testing, listing, labeling and certification services are thoroughly covered.
<b>HMMA 860-92</b>	Guide Specifications for Hollow Metal Doors and Frames	A CSI format specification intended as a guideline for the development of, and editing of job specifications for the application of specific job requirements related to Apartment Buildings, Dormitories, Military Barracks, and Motels.
<b>HMMA 861-06</b>	Guide Specifications for Commercial Hollow Metal Doors and Frames	A CSI format specification intended as a guideline for the development of, and editing of job specifications for the application of specific job requirements related to Schools, Hospitals, Industrial Buildings, Office Buildings, Hotels, Nursing Homes, Airports, and Convention Centers.
<b>ANSI/NAAMM HMMA 862-03</b>	Guide Specifications for Commercial Security Hollow Metal Doors and Frames	A CSI format specification intended as a guideline for the development of, and editing of job specifications for the application of specific job requirements related to Exterior Doors to Schools, Warehouses, Industrial Buildings, or Strip Stores.
<b>ANSI/NAAMM HMMA 863-04</b>	Guide Specifications for Detention Security Hollow Metal Doors and Frames	A CSI format specification intended as a guideline for the development of, and editing of job specifications for the application of specific job requirements related to Jails, Prisons, Detention Centers, and Secured Areas in Hospitals or Courthouses.
<b>ANSI/NAAMM HMMA 865-03</b>	Guide Specifications for Swinging Sound Control Hollow Metal Doors and Frames	A CSI format specification intended as a guideline for the development of, and editing of job specifications for the application of specific job requirements related to Television, Radio, Recording and Sound Studios, Theaters, and Music Rooms.
<b>ANSI/NAAMM HMMA 866-01</b>	Guide Specifications for Stainless Steel Hollow Metal Doors and Frames	A CSI format specification intended as a guideline for the development of, and editing of job specifications for the application of specific job requirements related to the use of Type 304 or 316 Stainless Steel for highly corrosive, moderately corrosive or aesthetic applications.
<b>ANSI/NAAMM HMMA 867-06</b>	Guide Specifications for Commercial Laminated Core Hollow Metal Doors and Frames	This specification presents the 2004 CSI Format (for the new CSI location for hollow metal doors and frame products) Master Format 2004 Section 08 11 13 and is intended as a guideline for the development of, and editing of job specifications for the application of specific job requirements related to Commercial, laminated core, steel doors, and appropriate frame products



**ANSI Technical publications**

Listed on this page are the current Technical publications available from the American National Standards Institute. Note that although some references to ANSI codes in the following tech data pages of this book do not reference revision dates, they are up to date per the revision dates listed below on this page.

Free downloads of these documents are available from SDI's Website: [www.steeldoor.org](http://www.steeldoor.org)



<b>ANSI Technical publications</b>		
<b>Pub No.</b>	<b>Title</b>	<b>Description</b>
<b>A250.3-2007 (R2011)</b>	Test Procedure and Acceptance Criteria for – Factory Applied Finish Coatings for Steel Doors and Frames	Prescribes the procedure to be followed in the selection of material, chemical preparation, painting, testing, and evaluation of factory applied finish painted steel surfaces for steel doors and frames.
<b>A250.4-2011</b>	Test Procedures and Accepted Criteria for – Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcing	A standard method of testing the performance of a steel door mounted in a pressed steel or channel iron frame under condition that might be considered an accelerated field operating conditions.
<b>A250.6-2003 (R2009)</b>	Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames	Provides users of standard steel doors and frames with practical information regarding accepted design methods for reinforcing, and Recommended practices for proper field preparation and installation of builders hardware.
<b>A250.7-1997 (R2002)</b>	Nomenclature for – Standard Steel Doors and Steel Frames	Detailed definitions of terms common to the Standard Steel Door and Steel Door Frame Industry.
<b>250.8-2014 (SDI 100)</b>	Recommended Specifications for Standard Steel Doors and Frames	This specification for swinging steel doors and frames offers a number of choices in both regular and fire rated door and frame constructions. The user must select from the specification the specific grades of doors and frames that best apply to the project. This specification covers sizes, types, materials, general construction requirements and finishing of 1 3/4" extra heavy duty steel doors, 1 3/4" heavy duty steel doors, 1 3/4" and 1 3/8" standard duty steel doors, together with frames and accessories. They are intended to be standard items not subject to variations.
<b>A250.10-2011</b>	Test Procedure and Acceptance Criteria for – Prime Painted Steel Surfaces for Steel Doors and Frames	Procedures for the selection of material, chemical preparation, painting, testing and evaluation of prime painted steel surfaces for steel doors and frames.
<b>A250.11-2012</b>	Recommended Erection Instructions for Steel Frames	This document includes information in respect to storage of frames on the jobsite, grouting and back painting of frames and assembly of frames. It contains instructions in respect to bracing frames before wall construction and the installation of frames in masonry, steel stud wall construction, wood stud wall construction and drywall construction.
<b>A250.13-2014</b>	Testing and Rating of Severe Windstorm Resistant Components for Swinging Door Assemblies	This standard provides procedures for testing and establishing load ratings (design load in pounds per square foot or pounds force) for components of exterior swinging door assemblies. It is the intent of this document to test the protection of openings during severe windstorm conditions, such as a hurricane, that produces sustained wind speeds or gusts in a range of 110 to 150 miles per hour as defined by ASCE 7-02. It is not intended to simulate wind forces generated by tornadoes.

## Handing procedures diagrams

To determine the hand of a door, view the door from the outside (the side that hinges are on is the hand of the door).

- If the door swings away from the viewer, the hand is regular hand, i.e., right or left hand.
- If the door swings to the viewer, the door is reverse swing, i.e., right hand reverse swing or left hand reverse swing.

All Steelcraft Doors and Frames are handed according to the following chart:

<p><b>Right hand door (swing in)</b> <b>Right hand frame</b></p>	<p><b>Left hand door (swing in)</b> <b>Left hand frame</b></p>
<p><b>Right hand reverse bevel door (swing out)</b> <b>Left hand frame</b></p>	<p><b>Left hand reverse bevel door (swing out)</b> <b>Right hand frame</b></p>
<p><b>Pair of doors - LH active (swing in)</b> <b>Double door frame - LH active</b></p>	<p><b>Pair of doors - RH active (swing in)</b> <b>Double door frame - RH active</b></p>
<p><b>Pair of doors LHRB active (swing out)</b> <b>Double door frame - RH active</b></p>	<p><b>Pair of doors - RHRB active (swing out)</b> <b>Double door frame - LH active</b></p>

K Indicates key side of the active door

## Nomenclature

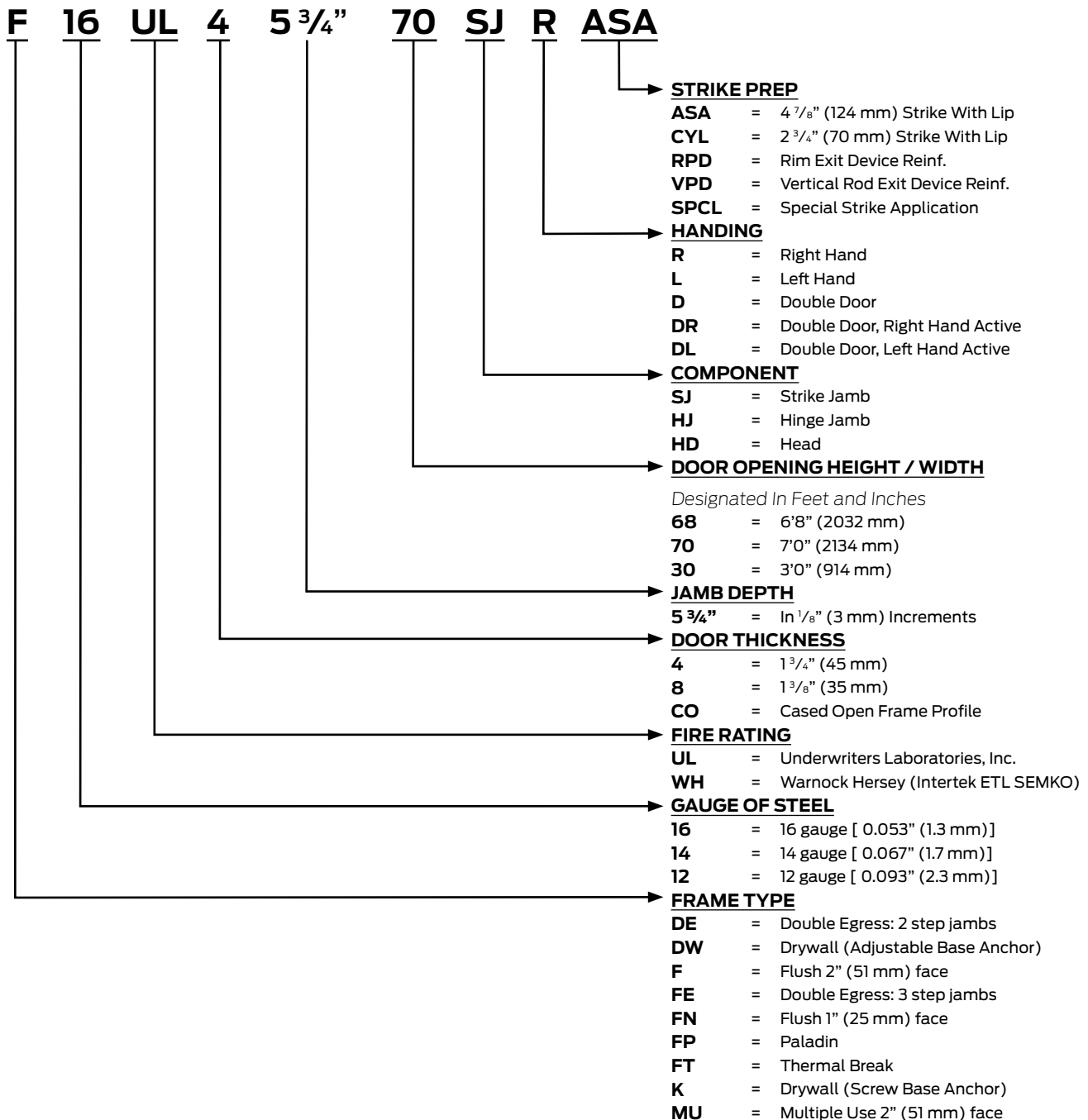
### Frame nomenclature

Steelcraft frames are described and marked with easy to follow product identification nomenclature. The markings identify the frames by frame series, gauge (decimal and metric), fire rating, door thickness, overall depth, door opening height/width, hardware preps, component and handing.

The following is a brief guide to the nomenclature used by Steelcraft: **F 16 UL 4 5 3/4" 70 SJ R ASA**

### Notes:

1. The nomenclature designation shown on this page is for education, example and reference only.
2. Refer to the individual Technical Data Manual sheets to develop options related to the specific frame series.
3. Refer to the hardware section of this manual for preps and nomenclature not covered on this sheet.



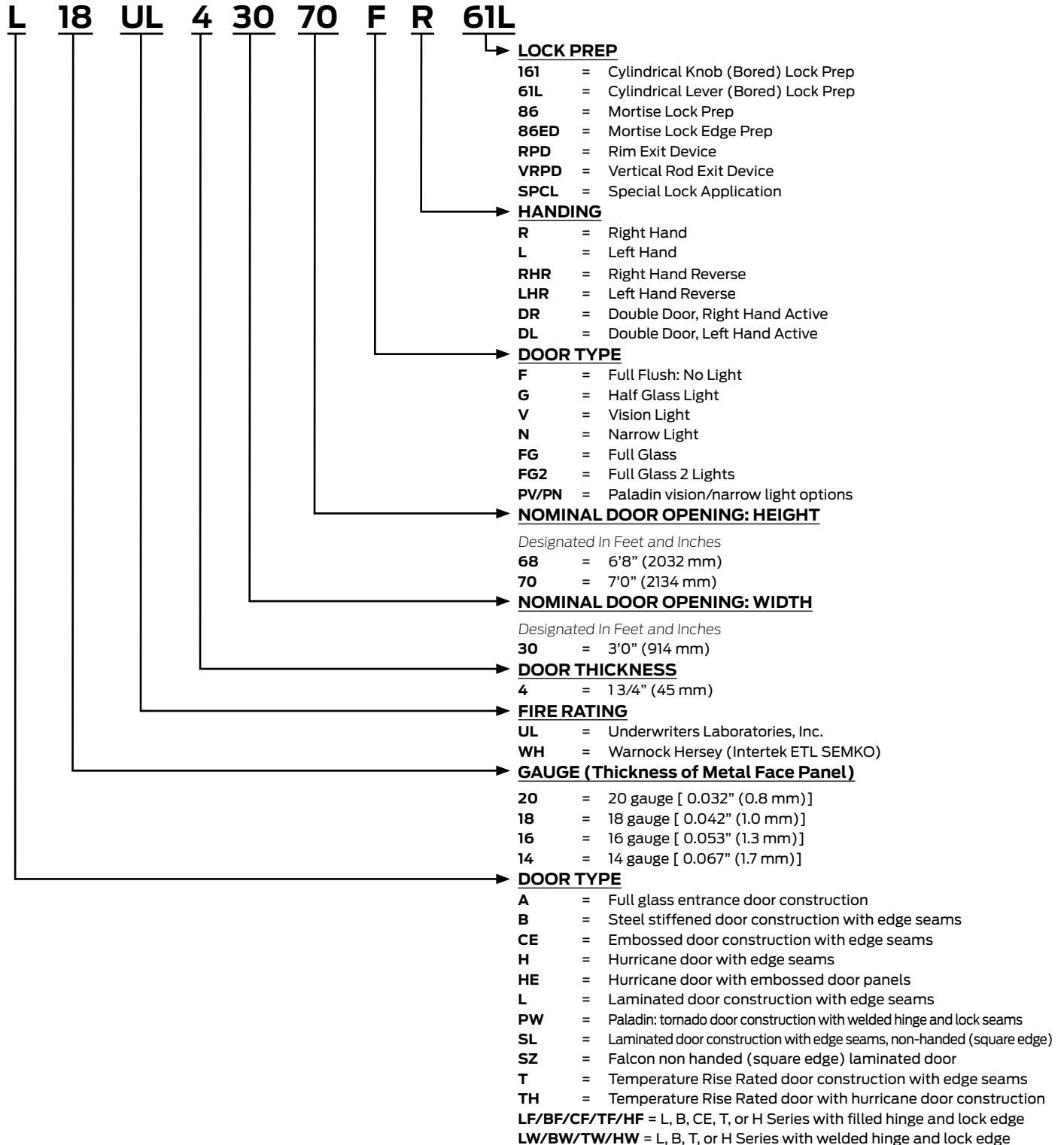
**Door nomenclature**

Steelcraft doors are described and marked with easy to follow product identification nomenclature. The markings identify the doors by door series, gauge (decimal and metric), fire rating, door thickness, width, height, glass design, hand and lock preps.

The following is a brief guide to the nomenclature used by Steelcraft: **L 18 UL 4 30 70 F R 61L**

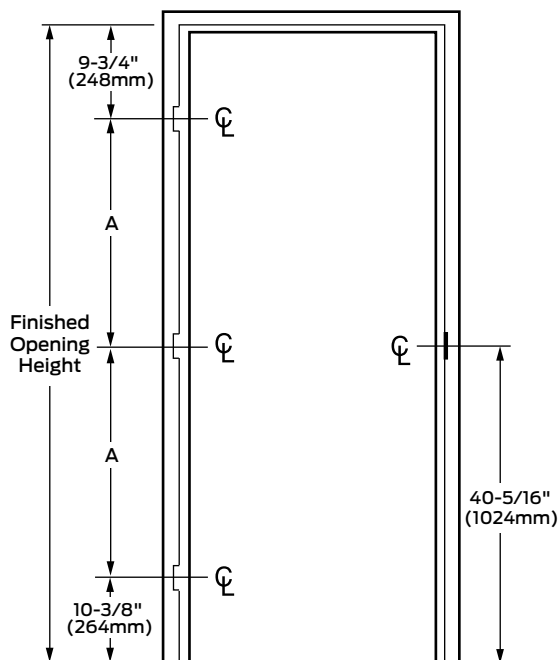
**Notes:**

1. The nomenclature designation shown on this page is for education, example and reference only.
2. Refer to the individual Technical Data Manual sheets to develop options related to the specific door series.
3. Refer to the hardware section of this manual for preps and nomenclature not covered on this sheet.
4. Refer to the lights and louvers section for additional information.

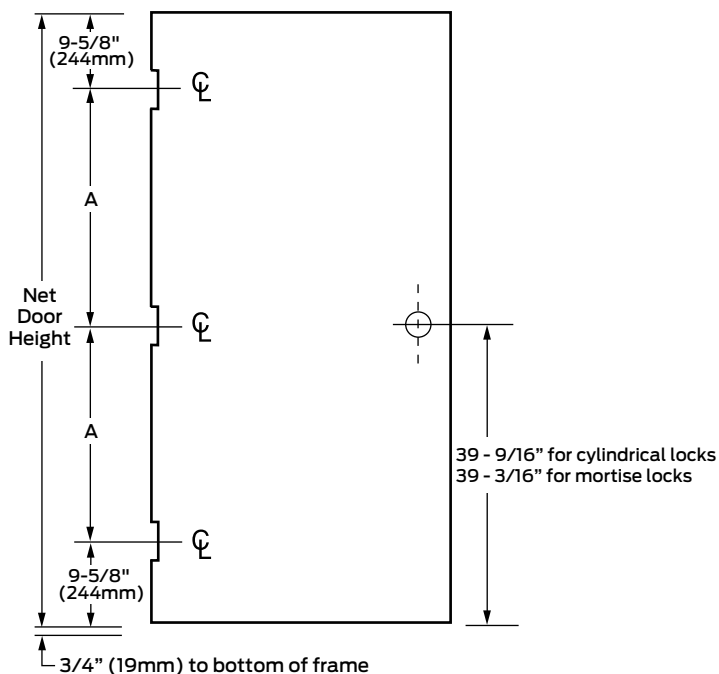


## Typical hardware locations

### 3 Hinges (1 ½ Pair)



TYPICAL FRAME ELEVATION



TYPICAL DOOR ELEVATION

Typical Hardware Preps: Table 1

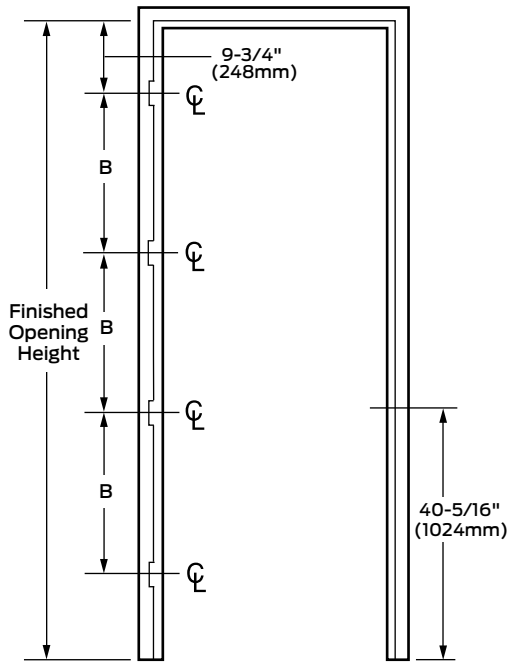
Door opening height	Dimension "A"
6'8" (2032 mm)	29 15/16" (760 mm)
7'0" (2134 mm)	31 15/16" (811 mm)
7'2" (2184 mm)	32 15/16" (837 mm)
7'6" (2286 mm)	34 15/16" (887 mm)

#### Notes

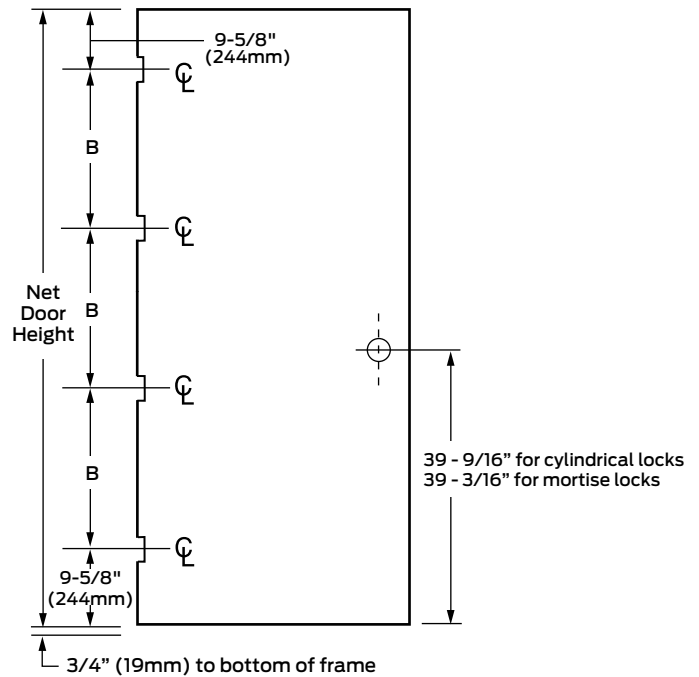
- 3 hinges (1 ½ pair) are standard on 6'8", 7'0", 7'2", and 7'6" openings
- Steelcraft standard locations:** hardware preps (hinge and lock) with standard ¾" undercut are located as illustrated above and as noted in Table 1.
- Special door undercuts:** hardware locations shown from the bottom of the door will be adjusted accordingly. Locations will be held from the top of the door.
- Special door heights:** special door heights are available. Dimension "A" will vary accordingly.
- Refer to the Hardware section of this manual for all hardware locations and most prep details.



## 4 Hinges (2 Pair)



TYPICAL FRAME ELEVATION



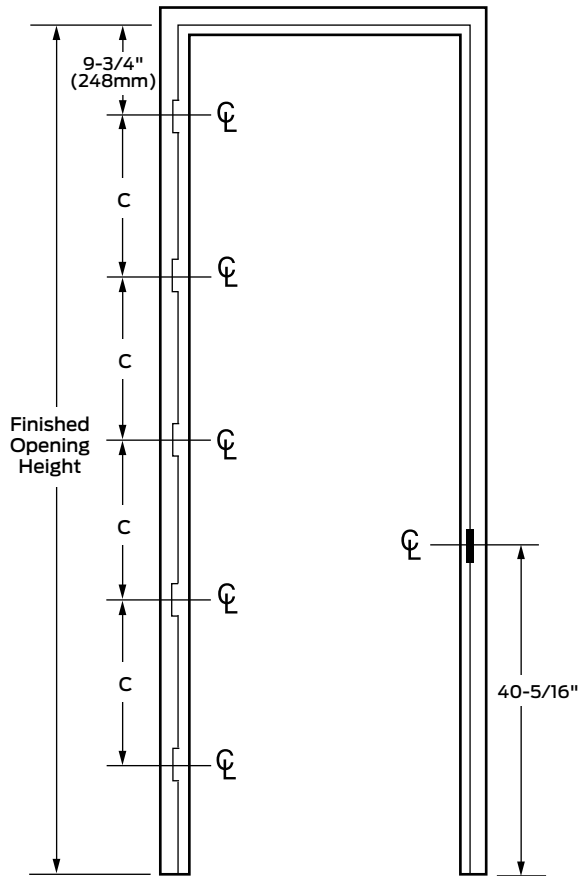
TYPICAL DOOR ELEVATION

Typical Hardware Preps: Table 2	
Door opening height	Dimension "B"
6'8" (2032 mm)	19 5/16" (507 mm)
7'0" (2134 mm)	21 1/16" (541 mm)
7'2" (2184 mm)	21 5/16" (558 mm)
7'6" (2286 mm)	23 1/16" (592 mm)
7'8" (2337 mm)	23 5/16" (608 mm)
7'10" (2388 mm)	24 5/8" (625 mm)
8'0" (2438 mm)	25 1/16" (643 mm)
8'2" (2489 mm)	25 5/16" (659 mm)
8'4" (2540 mm)	26 5/8" (676 mm)
8'6" (2591 mm)	27 1/16" (693 mm)
8'8" (2642 mm)	27 5/16" (710 mm)
8'10" (2692 mm)	28 5/8" (727 mm)
9'0" (2743 mm)	29 1/16" (744 mm)
9'2" (2794 mm)	29 5/16" (761 mm)
9'4" (2845 mm)	30 5/8" (778 mm)
9'6" (2896 mm)	31 1/16" (795 mm)
9'8" (2946 mm)	31 5/16" (812 mm)
9'10" (2997 mm)	32 5/8" (829 mm)
10'0" (3048 mm)	33 1/16" (846 mm)

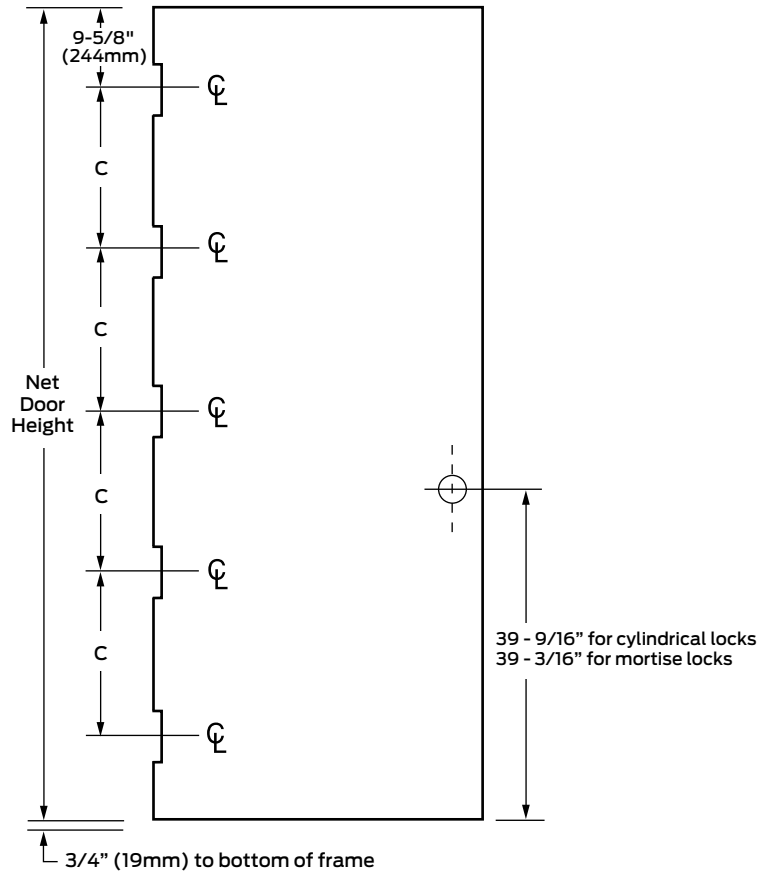
### Notes

- 4 hinges (2 pair) are standard on openings over 7'6" in height and up to and including 10'0" in height.
- Steelcraft standard locations:** hardware preps (hinge and lock) with standard 3/4" undercut are located as illustrated above and as noted in Table 2.
- Special door undercuts:** hardware locations shown from the bottom of the door will be adjusted accordingly. Locations will be held from the top of the door.
- Special door heights:** special door heights are available. Dimension "B" will vary accordingly.
- Refer to the Hardware section of this manual for all hardware locations and most prep details.

## 5 Hinges (2 ½ Pair)



TYPICAL FRAME ELEVATION



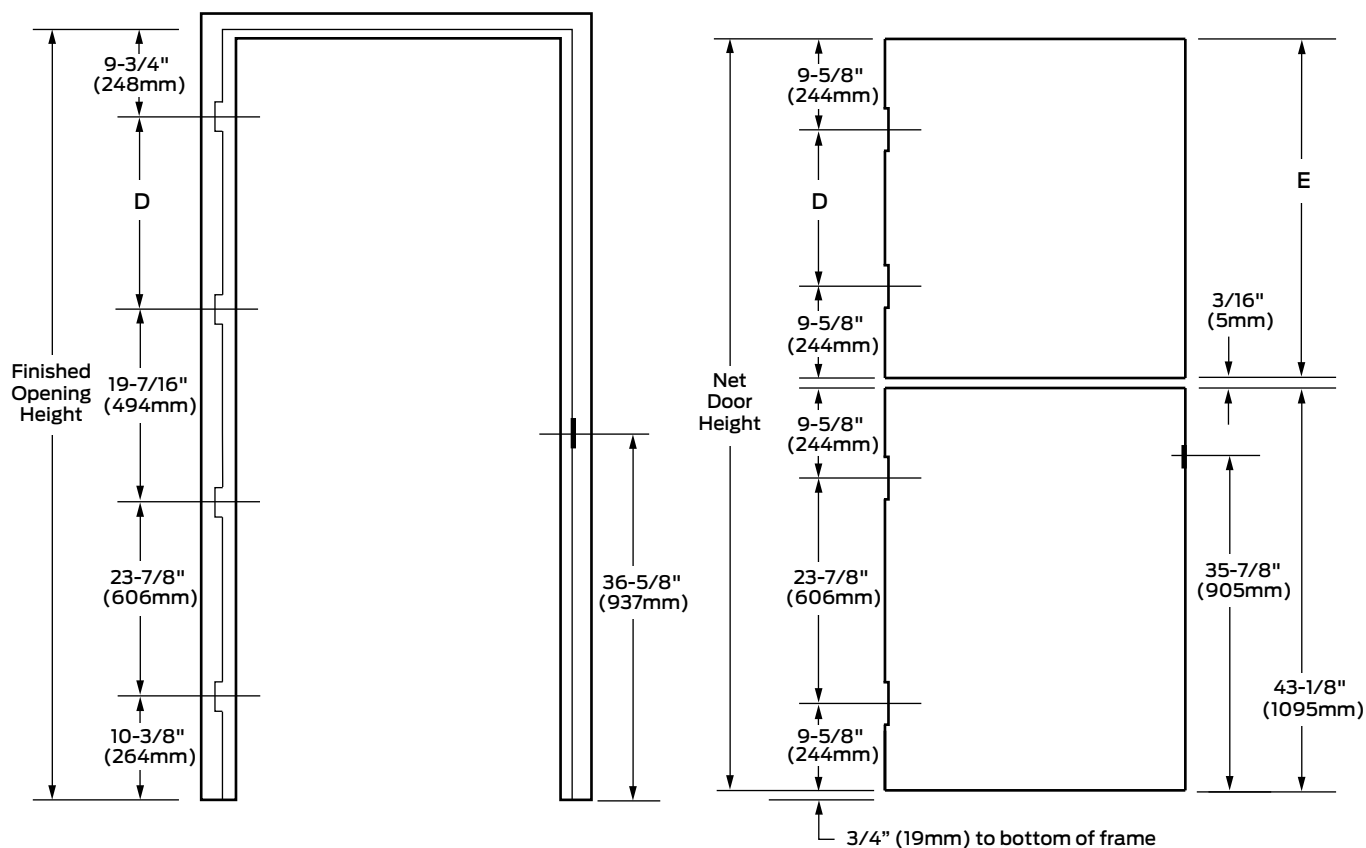
TYPICAL DOOR ELEVATION

Typical Hardware Preps: Table 3	
Door opening height	Dimension "C"
10'2" (3049 mm)	25 15/32" (647 mm)
10'4" (3154 mm)	25 31/32" (660 mm)
10'6" (3200 mm)	26 15/32" (672 mm)
10'8" (3251 mm)	26 31/32" (685 mm)
10'10" (3302 mm)	27 15/32" (698 mm)
11'0" (3353 mm)	27 31/32" (710 mm)

### Notes

1. 5 hinges (2 ½ pair) are standard on openings over 10'0" in height.
2. **Steelcraft standard locations:** hardware preps (hinge and lock) with standard ¾" undercut are located as illustrated above and as noted in Table 3.
3. **Special door undercuts:** hardware locations shown from the bottom of the door will be adjusted accordingly. Locations will be held from the top of the door.
4. **Special door heights:** special door heights are available. Dimension "C" will vary accordingly.
5. Refer to the Hardware section of this manual for all hardware locations and most prep details.

## Dutch doors



## DUTCH DOOR ELEVATION

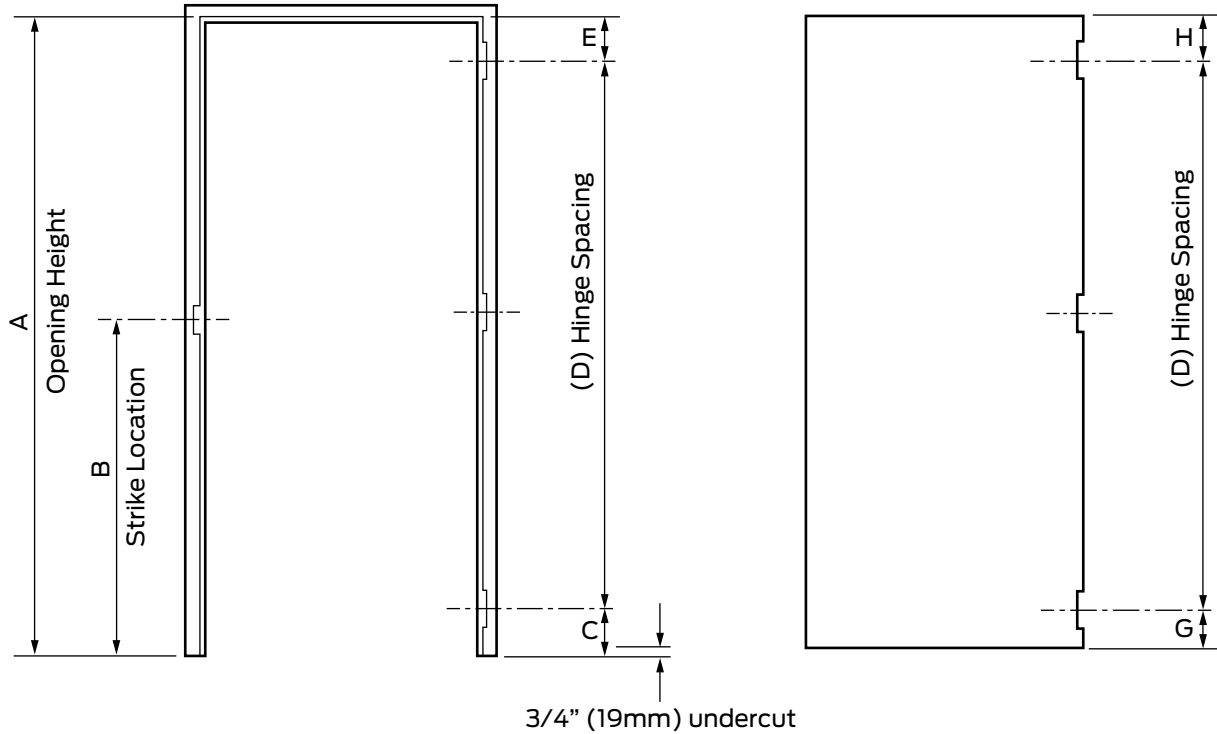
Typical Hardware Preps: Table 4

Door opening height	Dimension "D"	Dimension "E"
6'8" (2032 mm)	16 9/16" (421 mm)	35 13/16" (910 mm)
7'0" (2134 mm)	20 9/16" (522 mm)	39 13/16" (1011 mm)
7'2" (2184 mm)	22 9/16" (573 mm)	41 13/16" (1062 mm)

## Notes

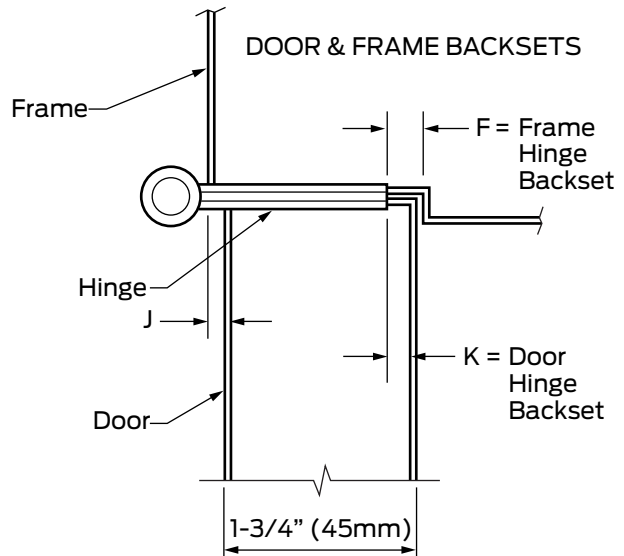
- 4 hinges (2 pair) are standard on dutch door openings.
- Steelcraft standard locations:** hardware preps (hinge and lock) with standard 3/4" undercut are located as illustrated above and as noted in Table 4.
- Special door undercuts:** hardware locations shown from the bottom of the door will be adjusted accordingly. Locations will be held from the top of the door.
- Special door heights:** special door heights are available. Dimensions "D and E" will vary accordingly.
- Fire Rated dutch doors:** additional locking hardware is required. Refer to the Fire Rated section of this manual.
- Refer to the Hardware section of this manual for all hardware locations and most prep details.

## Comparative hinge and strike locations



### Notes

- See page 19 for foot/inch Comparative Hinge and Strike Locations for 1 3/4" Doors and Frames with 4 1/2" x 4 1/2" Hinges.
- See page 20 for metric Comparative hinge and strike locations for 45 mm Doors and Frames with 114 mm x 114 mm Hinges.
- Dimensions for hinge and strike locations of the SDI Manufacturers shown on pages 19 and 20 are to the centerline of the preparation.



**1 3/4" Doors and frames with 4 1/2" x 4 1/2" hinges**

Manufacturer	A	B	C	D	E	F	G	H	J	K
	Frame						Door			
	Height	Strike	Bottom hinge	Hinge spacing	Top hinge	Hinge backset	Bottom hinge	Top hinge	Inset (reveal)	Hinge backset
		ℓ from floor		ℓ to ℓ	ℓ from underside of head		ℓ to door bottom	ℓ to top of door		
Steelcraft	6'8"	40 5/16"	10 3/8"	2 @ 29 15/16"	9 3/4"	5/16"	9 5/8"	9 5/8"	1/8"	1/4"
	7'0"			2 @ 31 15/16"						
	7'2"			2 @ 32 15/16"						
	7'10"			3 @ 24 5/8"						
	8'0"			3 @ 25 19/64"						
Amweld	6'8"	40 5/16"	10 3/8"	2 @ 29 15/16"	9 3/4"	5/16"	9 5/8"	9 5/8"	1/16"	3/16"
	7'0"			2 @ 31 15/16"			11 5/8"			
	7'2"			12 3/8"			7 9/16"			
	7'10"			8 5/16"			9 9/16"			
	8'0"			10 5/16"						
Ceco	6'8"	41 13/16"	9"	2 @ 31"	9"	5/16"	8 1/4"	8 7/8"	1/8"	1/4"
	7'0"			2 @ 33"						
	7'2"			2 @ 34"						
	7'10"			3 @ 25 21/64"						
	8'0"			3 @ 26"						
Curries	6'8"	40"	12 1/4"	2 @ 30 1/4"	7 1/4"	5/16"	11 5/8"	7 1/8"	1/8"	1/4"
	7'0"			2 @ 32 1/4"			11 1/2"			
	7'2"			2 @ 33 1/4"			11 5/8"			
	7'10"			12 1/8"			11 1/2"			
	8'0"			12 1/4"			11 5/8"			
Deansteel	6'8"	40 5/16"	12 1/4"	2 @ 30 1/4"	7 1/4"	5/16"	11 1/2"	7 1/8"	1/8"	1/4"
	7'0"			2 @ 32 1/4"						
	7'2"			2 @ 33 1/4"						
	7'10"			24 7/8" 24 3/4" 24 7/8"						
	8'0"			3 @ 25 1/2"						
Mesker	6'8"	40 5/16"	12 1/4"	2 @ 30 1/4"	7 1/4"	5/16"	11 1/2"	7 1/8"	1/8"	1/4"
	7'0"			2 @ 32 1/4"			9 1/2"			
	7'2"			2 @ 33 1/4"			11 1/2"			
	7'10"			10 1/4"						
	8'0"			12 1/4"						
Pioneer	6'8"	38"	12 1/4"	2 @ 30 1/4"	7 1/4"	5/16"	11 5/8"	7 1/8"	3/32"	7/32"
	7'0"			2 @ 32 1/4"			11 11/16"			
	7'2"			2 @ 33 1/4"			11 5/8"			
	7'10"			12 5/16"						
	8'0"			12 1/4"						
Republic	6'8"	40 5/16"	12 1/4"	2 @ 30 1/4"	7 1/4"	5/16"	11 1/2"	7 1/8"	1/8"	1/4"
	7'0"			2 @ 32 1/4"						
	7'2"			2 @ 33 1/4"						
	7'10"			3 @ 24 53/64"						
	8'0"			3 @ 25 1/2"						
Security metal products	6'8"	40 5/16"	12 1/4"	2 @ 30 1/4"	7 1/4"	3/8"	11 1/2"	7 1/8"	1/16"	1/4"
	7'0"			2 @ 32 1/4"						
	7'2"			2 @ 33 1/4"						
	7'10"			3 @ 24 53/64"						
	8'0"			3 @ 25 1/2"						

All dimensions are current at the time of publication. Refer to SDI-129 for updated dimensions.



## 45 mm doors and frames with 114 mm x 114 mm hinges (metric dimensions)

Manufacturer	A	B	C	D	E	F	G	H	J	K
	Frame						Door			
	Height	Strike	Bottom hinge	Hinge spacing	Top hinge	Hinge backset	Bottom hinge	Top hinge	Inset (reveal)	Hinge backset
		℄ from floor		℄ to ℄	℄ from underside of head		℄ to door bottom	℄ to top of door		
Steelcraft	2032 mm	1024 mm	264 mm	2 @ 760 mm	248 mm	8 mm	244 mm	244 mm	3.2 mm	6.4 mm
	2134 mm			2 @ 811 mm						
	2184 mm			2 @ 837 mm						
	2388 mm			3 @ 625 mm						
	2438 mm			3 @ 643 mm						
Amweld	2032 mm	1024 mm	264 mm	2 @ 760 mm	248 mm	8 mm	244 mm	244 mm	1.6 mm	4.7 mm
	2134 mm		264 mm	2 @ 811 mm			244 mm			
	2184 mm		314 mm	2 @ 811 mm			295 mm			
	2388 mm		211 mm	3 @ 643 mm			192 mm			
	2438 mm		253 mm	3 @ 643 mm			243 mm			
Ceco	2032 mm	1062 mm	229 mm	2 @ 787 mm	229 mm	8 mm	210 mm	225 mm	3.2 mm	6.4 mm
	2134 mm			2 @ 838 mm						
	2184 mm			2 @ 864 mm						
	2388 mm			3 @ 643 mm						
	2438 mm			3 @ 660 mm						
Curries	2032 mm	1016 mm	311 mm	2 @ 768 mm	184 mm	8 mm	295 mm	181 mm	3.2 mm	6.4 mm
	2134 mm		311 mm	2 @ 819 mm			295 mm			
	2184 mm		311 mm	2 @ 845 mm			295 mm			
	2388 mm		308 mm	3 @ 632 mm			292 mm			
	2438 mm		311 mm	3 @ 648 mm			295 mm			
Deansteel	2032 mm	1024 mm	311 mm	2 @ 768 mm	184 mm	8 mm	292 mm	181 mm	3.2 mm	6.4 mm
	2134 mm			2 @ 819 mm						
	2184 mm			2 @ 845 mm						
	2388 mm			632 mm - 629 mm - 632 mm						
	2438 mm			3 @ 648 mm						
Mesker	2032 mm	1024 mm	311 mm	2 @ 768 mm	184 mm	8 mm	292 mm	181 mm	3.2 mm	6.4 mm
	2134 mm		311 mm	2 @ 819 mm			292 mm			
	2184 mm		311 mm	2 @ 845 mm			292 mm			
	2388 mm		260 mm	3 @ 648 mm			241 mm			
	2438 mm		311 mm	3 @ 648 mm			292 mm			
Pioneer	2032 mm	965 mm	311 mm	2 @ 768 mm	184 mm	8 mm	295 mm	181 mm	2.4 mm	5.6 mm
	2134 mm		311 mm	2 @ 819 mm			295 mm			
	2184 mm		311 mm	2 @ 845 mm			295 mm			
	2388 mm		313 mm	3 @ 630 mm			297 mm			
	2438 mm		311 mm	3 @ 648 mm			295 mm			
Republic	2032 mm	1024 mm	311 mm	2 @ 768 mm	184 mm	8 mm	292 mm	181 mm	3.2 mm	6.4 mm
	2134 mm			2 @ 819 mm						
	2184 mm			2 @ 845 mm						
	2388 mm			3 @ 631 mm						
	2438 mm			3 @ 648 mm						
Security metal products	2032 mm	1024 mm	311 mm	2 @ 768 mm	184 mm	10 mm	292 mm	181 mm	1.6 mm	6.4 mm
	2134 mm			2 @ 819 mm						
	2184 mm			2 @ 845 mm						
	2388 mm			3 @ 630 mm						
	2438 mm			3 @ 648 mm						

All dimensions are current at the time of publication. Refer to SDI-129 for updated dimensions.

# Frames

General information.....	22	DE Series double egress .....	41
Sizes and performance.....	22	About the product.....	41
Usage and application .....	22	Installation .....	41
Steel frames.....	22	Features and benefits.....	41
How they are supplied .....	23	Specification compliance .....	41
Job site storage.....	23	Fire ratings.....	41
Installation .....	23	Applications .....	41
Profile terminology.....	23	General notes.....	43
Profile variations.....	23	Anchoring and installation notes .....	44
Anchors .....	24		
F Series flush .....	25	DW Series drywall .....	45
About the product.....	25	About the product.....	45
Installation .....	25	Installation .....	45
Features and benefits.....	25	Features and benefits.....	45
Specification compliance .....	25	Specification compliance .....	45
Fire ratings.....	25	Fire ratings.....	45
Applications .....	25	Applications .....	45
Standard construction .....	26	General notes.....	47
General notes.....	27	Anchoring and installation notes .....	48
Anchoring and installation notes .....	28		
FN Series 1" flush face.....	29	K Series drywall.....	49
About the product.....	29	About the product.....	49
Installation .....	29	Installation .....	49
Features and benefits.....	29	Features and benefits.....	49
Specification compliance .....	29	Specification compliance .....	49
Fire ratings.....	29	Fire ratings.....	49
Applications .....	29	Applications .....	49
General notes.....	31	General notes.....	51
Anchoring and installation notes .....	32	Anchoring and installation notes .....	52
MU Series multi-use .....	33		
About the product.....	33		
Installation .....	33		
Features and benefits.....	33		
Specification compliance .....	33		
Fire ratings.....	33		
Applications .....	33		
General notes.....	35		
Anchoring and installation notes .....	36		
FE Series double egress .....	37		
About the product.....	37		
Installation .....	37		
Features and benefits.....	37		
Specification compliance .....	37		
Fire ratings.....	37		
Applications .....	37		
General notes.....	39		
Anchoring and installation notes .....	40		

## General information

Steelcraft framing systems are designed to fit virtually all construction requirements for commercial and institutional building applications. Their construction, durability and flexibility have been proven throughout the world in both operation and physical testing of all types.

The **F, FN, FE, DE, and MU Series** frames are designed for installation as part of the wall framing sequence, and installed in interior and exterior applications. When installed, this frame series will either wrap or butt up against the wall construction. Anchoring will be either into the masonry wall, or to the stud wall framing systems.

The **DW and K Series** frames are designed for interior application and for installation in rough openings after the wall is erected and finished. They can be installed in minutes and can be relocated without damage to the frame. When installed, this frame series will wrap the wall construction. Anchorage will be compression fit to the stud systems.

### Sizes and performance

All framing systems are manufactured and supplied to meet the dimensional standards and performance levels as published in ANSI A250.8-2014 (SDI 100).

Special size products are available to meet the unique construction, performance and aesthetic requirements of the Architectural community. Contact Steelcraft for those requirements.

### Usage and application

To help simplify the use, selection and specification of Steelcraft framing systems, the following guidelines for base material selection can be used:

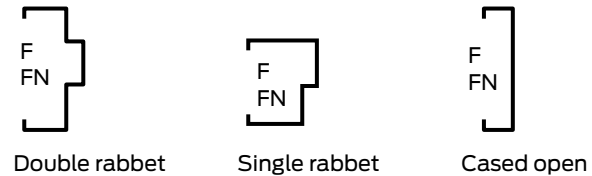
**Material gauge:** the following material thicknesses are available:

- **16 gauge** [0.053" (1.3 mm)]: for Heavy Duty Commercial and Institutional applications with high use.
- **14 gauge** [0.067" (1.7 mm)]: for Extra Heavy Duty Commercial and Institutional applications with the potential of very high use.
- **12 gauge** [0.093" (2.3 mm)]: for Maximum Duty Commercial and Institutional applications with extremely high use.

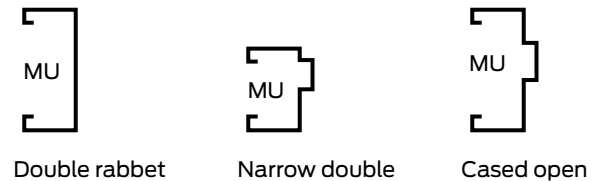
**Material selection:** in addition to the thickness of base material, the following base material types of metal are available:

- Commercial quality cold rolled steel conforming to ASTM specifications A1008, A568, and A569 is commonly used on interior openings.
- Galvannealed Steel conforming to ASTM specification A653 is recommended for use on exterior openings or for interior locations where high humidity is present.

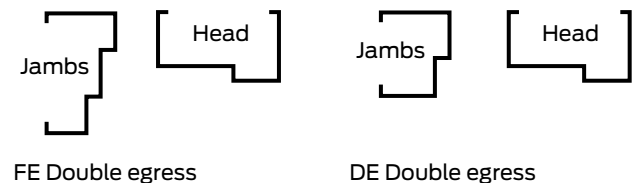
### F and FN Series frame construction



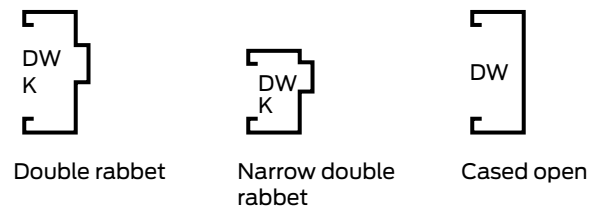
### MU Series frame construction



### FE and DE Series double egress frame construction



### DW and K Series frame construction



### Steel frames

Three sided steel frames are furnished in three pieces (two jambs and a head) which are anchored to the wall systems. The most common 3 sided frame components are:

1. **Hinge jamb:** vertical frame member on which the door is hinged. [For double doors (pairs), there are two hinge jambs and no strike jamb].
2. **Strike jamb:** vertical frame member into which the door latches. [For double doors (pairs), there is no strike jamb, but there are two hinge jambs].
3. **Head:** horizontal frame member which connects the jambs.

## How they are supplied

The connecting corners of the 3 piece frame include precision factory die miters with interlocking tabs and corner clips. The corner miters are specially designed to insure a tight closed corner connection when assembled and installed properly. There are two methods of furnishing 3 sided frames to the job site:

- **Knock Down (KD):** Frames are supplied in 3 pieces for assembly prior to installation at the job site by the installing contractor. This is an economical method of supplying the frames, and at the job site, there is less space consumed in staging the products, easier job site movement of material, and, usually less damage to the frame prior to installation.
- **Set-Up and welded:** Prior to arriving at the job site, the 3 sided frame (with factory miters) is assembled (at the distributor's fabrication location, or by Steelcraft). The miters are welded (in accordance with ANSI A250.8-2014 [SDI 100]), finished and supplied to the job site ready for installation. **Welded frames are shipped to the job site with temporary shipping bars attached. The temporary shipping bars must be removed prior to installation. When installing frames, the temporary shipping bars must not be used as spreader bars or installation bracing.**

## Job site storage

Frames shall be stored under cover on 4" (101.6 mm) wood sills, on the floor, in a manner to avoid contact with moisture, and to prevent rust and damage. Only use vented plastic or canvas. The use of no-vented materials, create a humidity chamber, which promotes blistering and corrosion. Assembled frames shall be stored in a vertical position, five (5) units maximum in a stack. Provide a ¼" (6.3 mm) space between the frames to provide air circulation.

## Installation

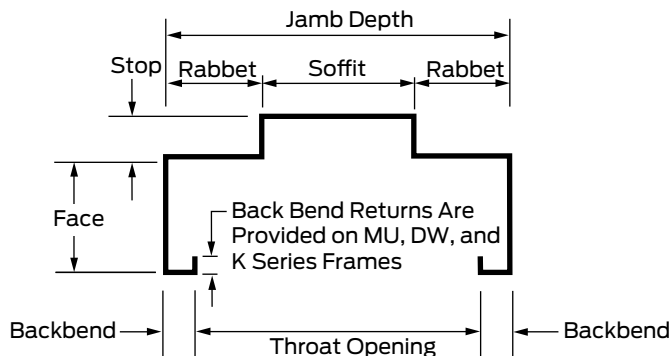
Proper frame installation is critical for reliable door and hardware functionality. To insure proper fit, function and reliability, install all frames in accordance with ANSI A250.11 and HMMA 840.

## Profile terminology

The frame profile has specific terminology related to each surface. Their jamb depth describes the frame size required.

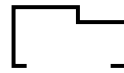
It is critical that the throat opening of the frame be compatible with the wall to which it will be attached.

### Double rabbet: standard profile



## Profile variations

Steel frames are supplied standard as double rabbet. To accommodate various application needs, the frame profile (in any frame series) can change. Some of the typical variations are as follows:

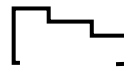


**Single rabbet:** Jamb depths below 4 ½" (114 mm) are single rabbet due to the dimensional limitations of the profile. Some specifications will require single rabbet profiles on frames over 4 ½" (114 mm) in jamb depth.

Profile as shown will vary on MU, DW, and K Series frames, refer to the appropriate data sheets.

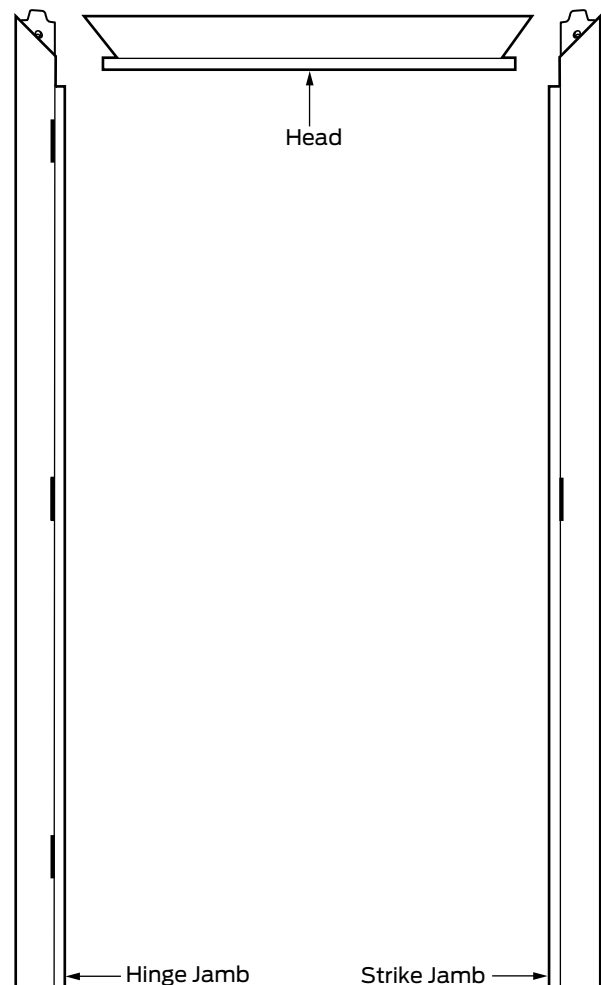


**Cased open:** Used for double acting doors (swinging in both directions), sliding doors, bi-fold doors or frames used to close-off an opening in a wall when a door is not required.



**Double egress:** This is a frame specifically designed for cross corridor applications where traffic control is required. **This frame is not available in the Drywall Series (DW and T) or Multi-Use Series (MU).**

Typical Frame



## Anchors

Frames must be anchored to the applicable wall construction. Wall construction at door openings must be of sufficient construction to support commercial or institutional grade steel doors and frames. Refer to the appropriate frame data sheets since anchor types will vary with frame constructions and noted in this manual. Basic guidelines is as follows:

### Flush frames:

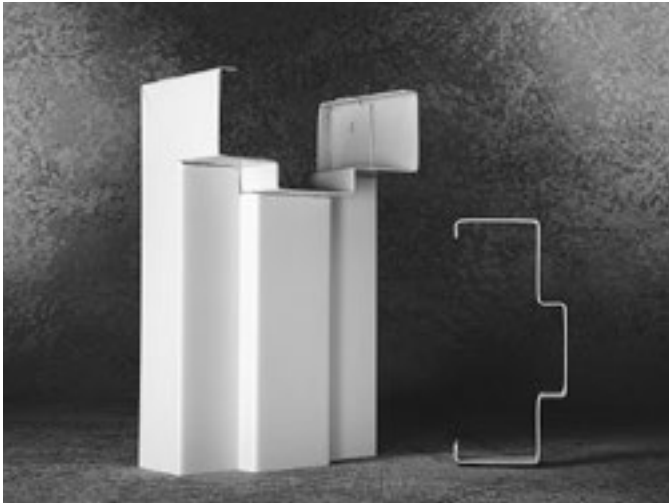
- **Base anchors:** one located at the bottom of each jamb
- **Jamb anchors:** Locate anchors near each hinge location in both hinge and strike jambs. Transom frames require additional anchors above the top hinge.
- **Head anchors:** For wide frame openings usually over 60" in width, an anchor located in the center of the frame head is recommended

### Drywall frames:

- **Base anchors:** two (2) located at the bottom of each jamb
- **Jamb anchors:** Drywall frame includes an adjustable compression anchor near the top of each jamb



## F Series flush



### About the product

F Series 3 sided flush frames are designed to meet requirements for light to maximum duty applications in both commercial and institutional buildings. They are installed in both interior and exterior locations, and in virtually all types of buildings and wall constructions. These frames are to be installed as part of the wall framing sequence. They can be specified and supplied as KD (knock-down) for field assembly prior to installation or welded for installation as a complete unit.

### Installation

1. Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) Recommended Erection Instructions for Steel Frames and HMMA 840.
2. Fire Rated Assemblies must be in accordance with NFPA Pamphlet 80. The Authority Having Jurisdiction is the final authority in issues related to the installation and use of installed Fire Rated Doors.

### Features and benefits

Steelcraft F Series flush frames offer the following unique features, which enhance long term functionality and durability:

1. **Die-mitered corner connections:** Die-mitered corner connection at the head and jamb insure an attractive, tight and closed mitered connection. The miter includes 4 corner tabs designed with concealed connection eliminating the need for continuous profile welding.
2. **Patented universal hinge preparations** allow for easy field conversion from standard weight .134" (3.3 mm) thick hinges to heavy weight .180" (4.7 mm) hinges.
3. **Adjustable base anchors** allow for installation adjustment when the floor is not level.
4. **Factory prepared** for field installed silencers.
5. **Factory applied baked on rust inhibiting primer** in accordance with ANSI A250.10-2011.

### Specification compliance

1. Overall frame construction for the Steelcraft F Series flush frames meets the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.8-2014 (SDI 100). Locations are in accordance with ANSI/DHI A115.

### Fire ratings

The F Series flush frames meet the broadest fire rating requirements. They are listed for installations requiring compliance to both neutral pressure testing (ASTM E152 and UL 10B) and positive pressure standards (UL 10C). Refer to the **Fire Rated Section** of this manual for particular listings.

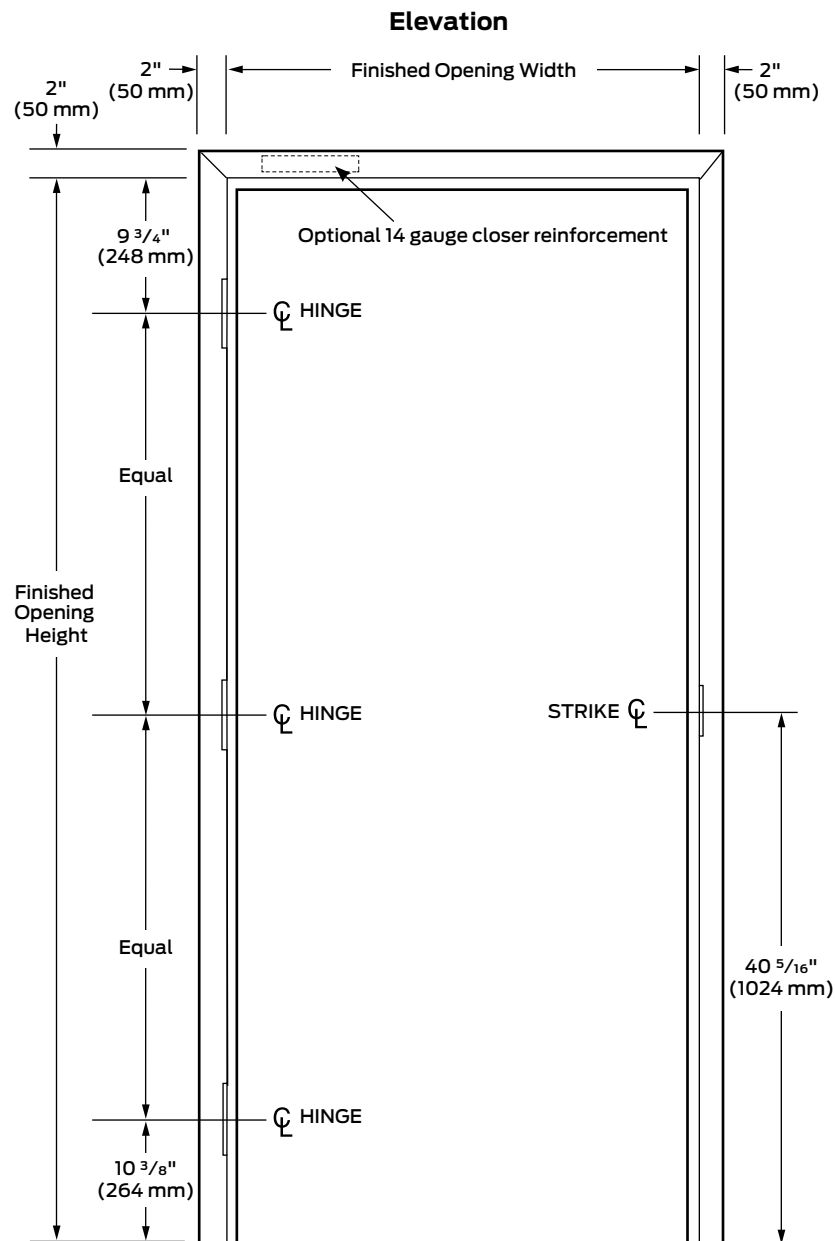
### Applications

F Series frames are typically installed in wall construction types as defined in the chart below:

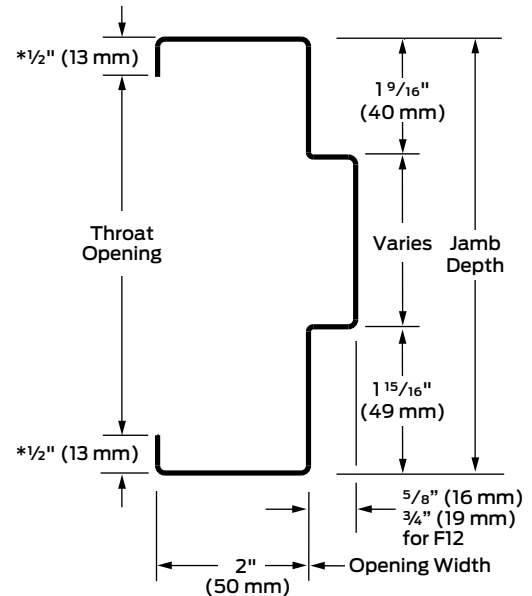
#### Frame applications

Profile	Steel thickness	Wall construction	Typical wall anchors
<b>F16</b>	16 Gauge [0.053" (1.3 mm)]	Wood or steel stud	Lock-in stud anchor
<b>F16</b>	16 Gauge [0.053" (1.3 mm)]	Masonry	Wire masonry
<b>F16</b>	16 Gauge [0.053" (1.3 mm)]	Existing masonry	Bolted through soffit
<b>F14</b>	14 Gauge [0.067" (1.7 mm)]	Wood or steel stud	Lock-in stud anchor
<b>F14</b>	14 Gauge [0.067" (1.7 mm)]	Masonry	Wire masonry
<b>F14</b>	14 Gauge [0.067" (1.7 mm)]	Existing masonry	Bolted through soffit
<b>F12</b>	12 Gauge [0.093" (2.3 mm)]	Wood or steel stud	Lock-in stud anchor
<b>F12</b>	12 Gauge [0.093" (2.3 mm)]	Masonry	Wire masonry
<b>F12</b>	12 Gauge [0.093" (2.3 mm)]	Existing masonry	Bolted through soffit

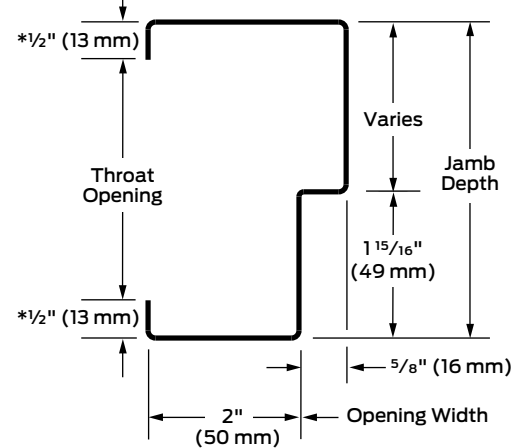
## Standard construction



## Standard Double Rabbet Frame



## Single Rabbet Frame



\* 7/16" (11 mm) on 5 3/4" frame depth

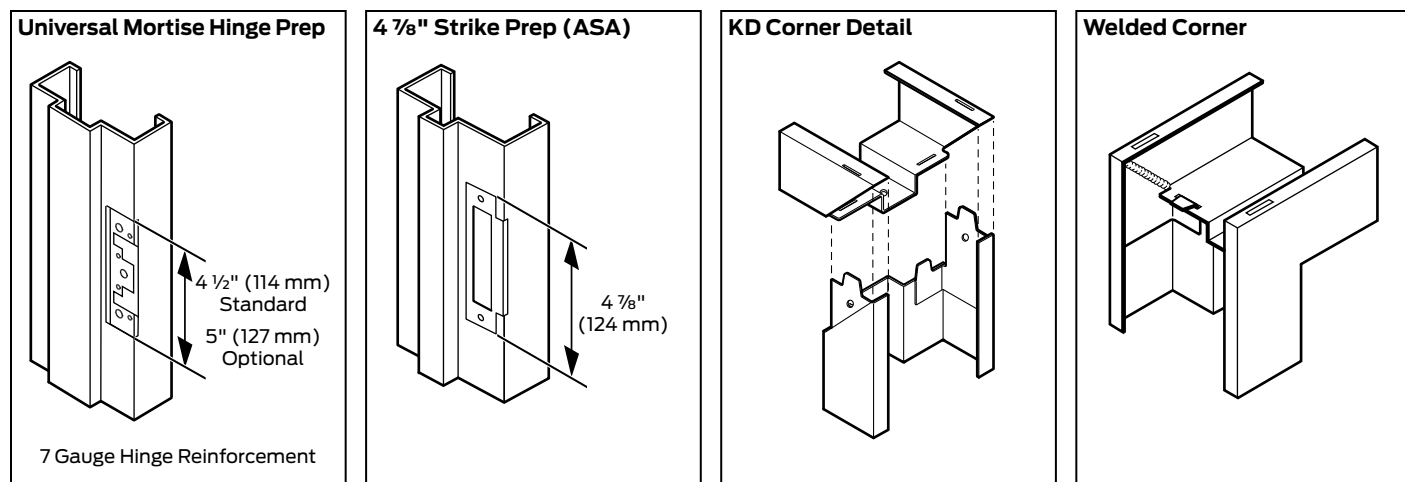
## Frame sizing options

Series	Maximum opening size		Jamb depth availability(profile)				Standard profile dimensions (variations available)			Corners
	Single	Pair	Single rabbet		Double rabbet		Face	Stop	Return	Standard
			Min.	Max.	Min.	Max.				
<b>F16</b>	5'0" x 11'0" (1524 mm x 3353 mm)	10'0" x 11'0" (2439 mm x 3353 mm)	3" (76 mm)	20" (508 mm)	4 1/2" (114 mm)	20" (508 mm)	2" (50 mm)	5/8" (16 mm)	1/2"* (13 mm)	DIE MITERED with four (4) concealed tabs interlocking head and jambs
<b>F14</b>	4'0" x 8'0" (1219 mm x 2438 mm)	8'0" x 8'0" (2438 mm x 2438 mm)	N/A	N/A	4 3/4" (121 mm)	14 3/4" (375 mm)	2" (50 mm)	3/4" (19 mm)	1/2" (13 mm)	Square cut for welded corners

\* Except 5 3/4" (146 mm) depth, which is 7/16" (11 mm)

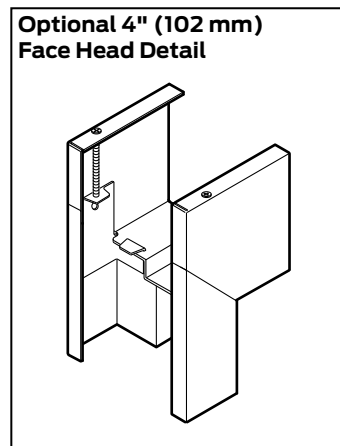
N/A - Not Available

12 gauge standard profile is equal rabbet



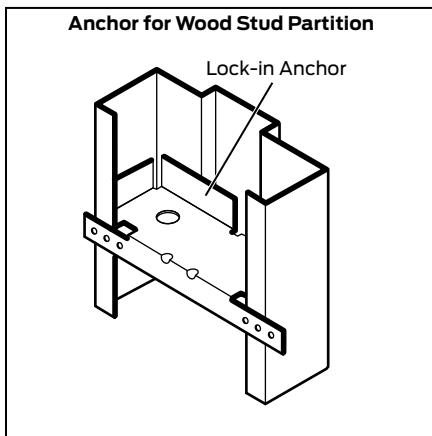
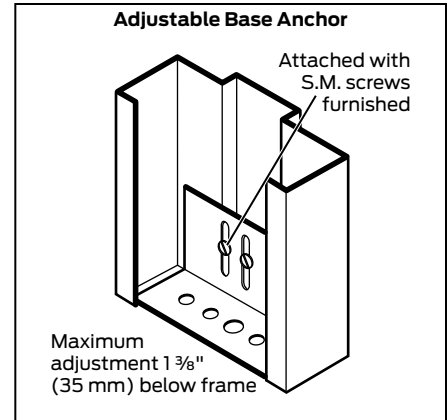
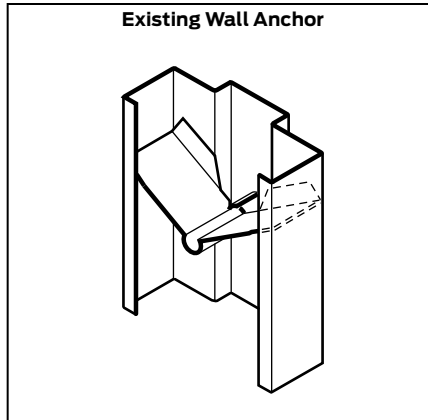
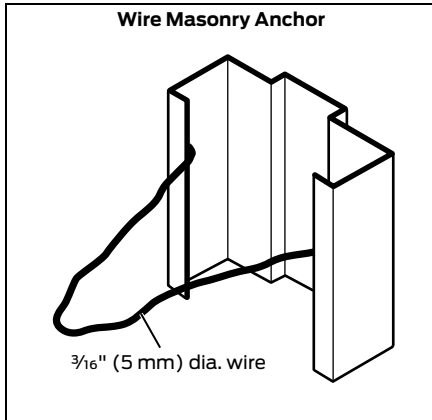
### General notes

1. Variations in jamb depths available in  $\frac{1}{8}$ " (3 mm) increments.
2. All F Series frames are supplied standard with masonry wire or lock-in jamb anchors and adjustable base anchors. Anchors are designed for maximum wall/frame engagement and installation flexibility.
3. F Series frames are to be installed as part of the wall framing sequence.
4. Depending on environmental and usage conditions the steel can be either cold rolled or galvanized. Galvanized steel is recommended for all exterior applications.
5. 12 gauge flush frames, F12, are standard equal rabbet profiles with  $\frac{3}{4}$ " stops.
6. For KD Corner and optional 4" Head, tabs in rabbeted area should be bent outward, not inward, during assembly (as shown).
7. F Series frames with 4" heads are mainly used in masonry applications when 2" face heads do not match course blocking.
8. For reinforcement requirements for automatic operators, see ["High frequency hinge reinforcement F and FE Series" on page 73.](#)



Frame options							
Series	Frame profile		Corner connections				4" (102 mm) heads
			KD (Knock-down)		SUA (Set-up & weld)		
	Single rabbet	Double rabbet	Single rabbet	Double rabbet	Single rabbet	Double rabbet	
F16	Typically for walls less than 3 ¾" (95 mm) thick. Minimum walls thickness 2" (51 mm)	Typically for walls less than 3 ¾" (95 mm) thickness or greater	3 interlocking corner tabs per factory die-miter. See the KD Corner Detail	4 interlocking corner tabs per factory die-miter. See the KD Corner Detail	Available when specified, and in accordance with ANSI A250.8-2014 (SDI 100).		Die-mitered for use with 2" (51 mm) face double rabbet jambs. Available when specified for KD or SUA applications.
F14							
F12	N/A		N/A	N/A	Standard Saw Cut and welded, and in accordance with ANSI A250.8-2014 (SDI 100)		For use with 2" (51 mm) face double rabbet jambs.

N/A - Not Available



### Anchoring and installation notes

- F16 and F14 Series commercial and Institutional frames** are supplied standard with masonry wire or lock-in jamb anchors and adjustable base anchors. Anchors are designed for maximum wall/frame engagement and installation flexibility.
- For anchoring applications, refer to the Frames: Anchoring systems section of this manual.**
- Installation Caution Notice: Grouted frames:**
  - When temperature conditions necessitate an additive to be used in the mortar to prevent freezing, the contractor installing the frames must coat the inside of frames in the field with a corrosion resistant coating per SDI 105.
  - When frames are to be grouted full, silencers must be field installed prior to grouting.
  - Steel frames, including fire rated frames, do not require grouting. Grouting is not recommended for frames in drywall.
- All fire rated frames must be installed in accordance with NFPA Pamphlet 80 and the Authority Having Jurisdiction.

### Framing applications

Series	Steel type	Building type	Opening	Usage frequency <sup>1</sup>	KD Corner <sup>4</sup>	SUA Corner <sup>5</sup>	Applications
<b>F16</b>	Non-Galvannealed <sup>2</sup>	Institutional and Commercial	Interior	Heavy to extra heavy duty	✓	✓	Typical building conditions
	Galvannealed <sup>3</sup>		Mainly Exterior				High humidity and/or weather exposure
<b>F14</b>	Non-Galvannealed <sup>2</sup>	Institutional and Commercial	Interior	Extra heavy to maximum duty	✓	✓	Typical building conditions
	Galvannealed <sup>3</sup>		Mainly Exterior				High humidity and/or weather exposure
<b>F12</b>	Galvannealed <sup>3</sup>	Institutional and Commercial	Interior and exterior	Maximum duty	N/A	✓	Maximum traffic building conditions
							High humidity and/or weather exposure

<sup>1</sup> Usage frequency is based on ANSI A250.8-2014 (SDI 100)

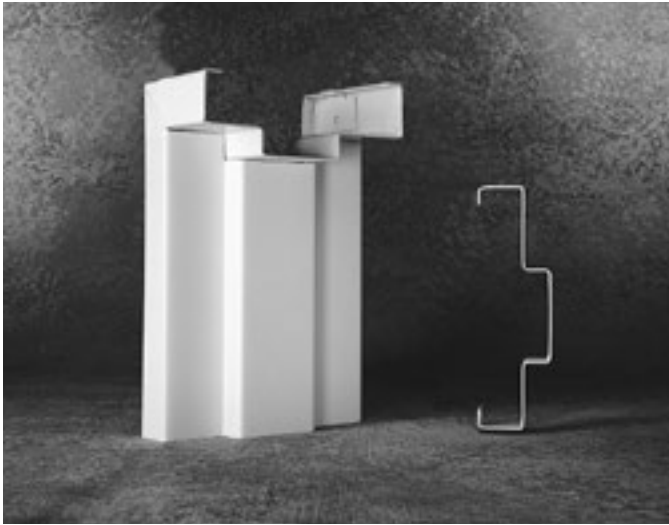
<sup>2</sup> Commercial quality cold rolled steel

<sup>3</sup> Reinforcements for galvannealed frames are also galvannealed

<sup>4</sup> Knock-Down for field assembly prior to installation

<sup>5</sup> Set-up and Welded for installation as a pre-welded unit

## FN Series 1" flush face



### About the product

FN Series 3 sided flush narrow 1" (25 mm) face frames are designed to meet requirements for light to extra heavy duty applications in both commercial and institutional buildings where a slim face profile is required. They are installed in both interior and exterior locations, and in virtually all types of buildings and wall constructions. These frames are to be installed as part of the wall framing sequence. They can be specified and supplied as KD (knock-down) for field assembly prior to installation or welded for installation as a complete unit.

### Installation

1. Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) Recommended Erection Instructions for Steel Frames and HMMA 840.
2. Fire Rated Assemblies must be in accordance with NFPA Pamphlet 80. The Authority Having Jurisdiction is the final authority in issues related to the installation and use of installed Fire Rated Doors.

### Features and benefits

Steelcraft FN Series 1" (25 mm) flush face frames offer the following unique features, which enhance long term functionality and durability. Features can vary depending on the steel thickness of the frame:

1. **Narrow 1" (25 mm) face** provides a very slim appearance to the door opening.
2. **Die-mitered corner connections** Die-mitered corner connection at the head and jamb insure an attractive, tight and closed mitered connection. The miter includes 4 corner tabs designed with concealed connection eliminating the need for continuous profile welding.
3. **Patented universal hinge preparations** allow for easy field conversion from standard weight .134" (3.3 mm) thick hinges to heavy weight .180" (4.7 mm) hinges.
4. **Factory prepared** for field installed silencers.
5. **Factory applied baked on rust inhibiting primer** in accordance with ANSI A250.10-2011.

### Specification compliance

1. Overall frame construction for the Steelcraft FN18, FN16 and FN14 Series flush narrow 1" (25 mm) face frames meets the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6. Locations are in accordance with ANSI/DHI A115 unless otherwise stated.

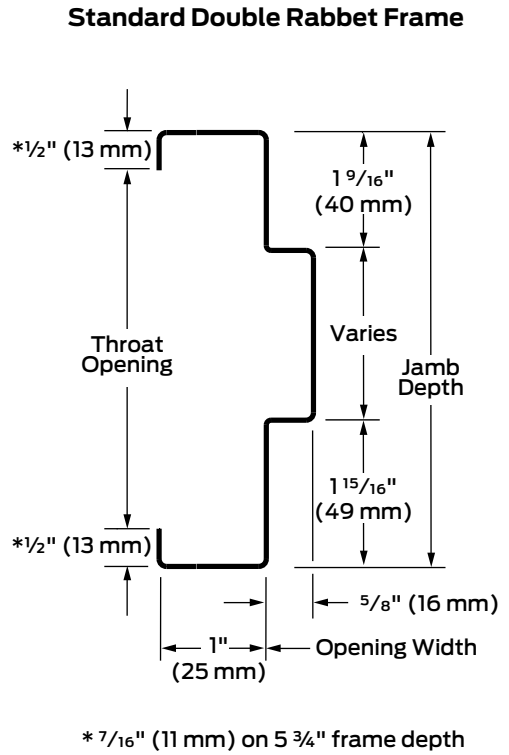
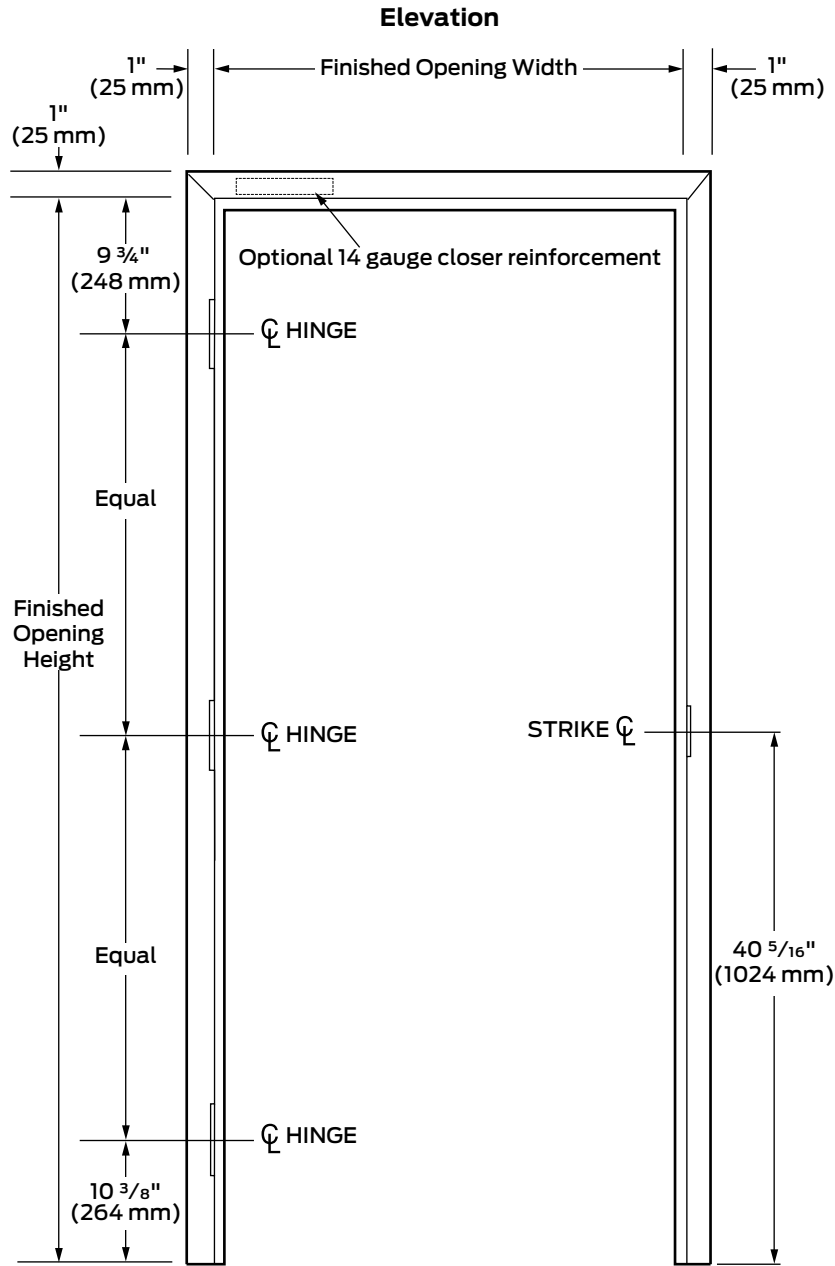
### Fire ratings

The FN Series flush narrow 1" (25 mm) face frames meet the broadest fire rating requirements. They are listed for installations requiring compliance to both neutral pressure testing (ASTM E152 and UL 10B) and positive pressure standards (UL 10C). Refer to the **Fire Rated section** of this manual for particular listings.

### Applications

FN Series 1" (25 mm) flush face frames are designed to meet the aesthetic needs of a very slender face dimension, and still maintain the functionality of the conventional flush framing systems. The FN Series 1" (25 mm) flush face frames are typically installed in wall construction types as defined in the chart below:

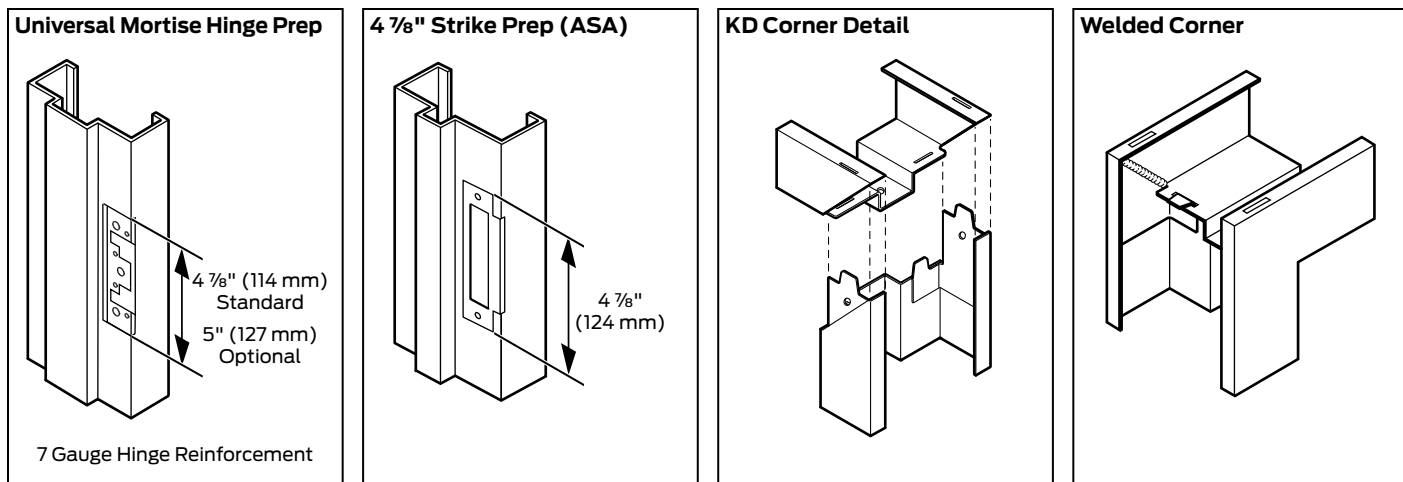
Frame applications			
Profile	Steel thickness	Wall construction	Typical wall anchors
<b>FN16</b>	16 Gauge [0.053" (1.3 mm)]	Wood or steel stud	Lock-in stud anchor
<b>FN16</b>	16 Gauge [0.053" (1.3 mm)]	Masonry	Wire masonry
<b>FN16</b>	16 Gauge [0.053" (1.3 mm)]	Existing masonry	Bolted through soffit
<b>FN14</b>	14 Gauge [0.067" (1.7 mm)]	Wood or steel stud	Lock-in stud anchor
<b>FN14</b>	14 Gauge [0.067" (1.7 mm)]	Masonry	Wire masonry
<b>FN14</b>	14 Gauge [0.067" (1.7 mm)]	Existing masonry	Bolted through soffit



Note:  
FN Series 3 sided flush narrow 1" (25 mm) face frames are available as double rabbet only.

Frame sizing options										
Series	Maximum opening size		Jamb depth availability (profile)				Standard profile dimensions (variations available)			Corners
	Single	Pair	Single rabbet		Double rabbet		Face	Stop	Returns	Standard
			Min.	Max.	Min.	Max.				
FN16	4'0" x 8'0" (1219 mm x 2439 mm)	8'0" x 8'0" (2439 mm x 2439 mm)	N/A	N/A	4 1/2" (114 mm)	20" (508 mm)	1" (25 mm)	5/8" (16 mm)	1/2"* (13 mm)	DIE MITERED with four (4) concealed tabs interlocking head and jambs
FN14	4'0" x 8'0" (1219 mm x 2439 mm)	8'0" x 8'0" (2439 mm x 2439 mm)	N/A	N/A	4 1/2" (114 mm)	20" (508 mm)	1" (25 mm)	5/8" (16 mm)	1/2"* (13 mm)	DIE MITERED with four (4) concealed tabs interlocking head and jambs

N/A = Not Available

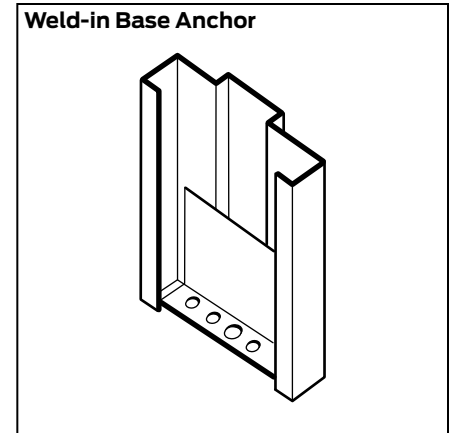
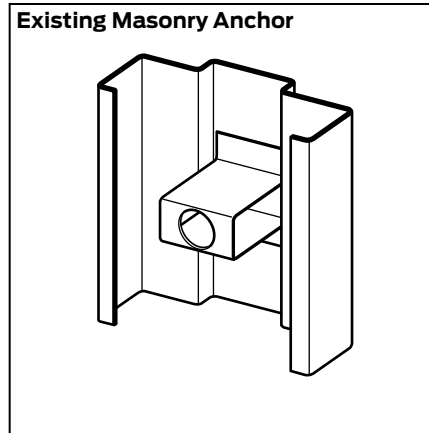
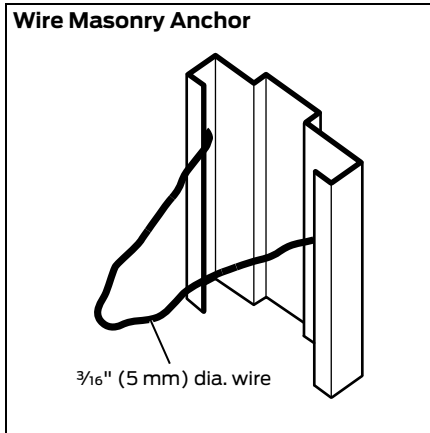


### General notes

1. Variations in jamb depths available in  $\frac{1}{8}$ " (3 mm) increments.
2. All FN Series frames are supplied standard with masonry wire and weld-in base anchors. Anchors are designed for maximum wall/frame engagement and installation flexibility.
3. FN Series frames are to be installed as part of the framing sequence.
4. Depending on environmental and usage conditions, the steel can be either cold rolled or galvanized. Galvanized steel is recommended for all exterior applications.
5. For KD Corner, tabs in rabbeted area should be bent outward, not inward, during assembly.

Frame options						
Series	Frame profile		Corner connections			
			KD (Knock-down)		SUA (Set-up & weld)	
	Single rabbet	Double rabbet	Single rabbet	Double rabbet	Single rabbet	Double rabbet
FN16	N/A	Typically for walls 3 $\frac{3}{4}$ " (95 mm) thickness or greater	N/A	4 interlocking corner tabs per factory die-miter. See the "KD Corner Detail"	N/A	Available when specified, and in accordance with ANSI A250.8-2014 (SDI 100)
FN14	N/A	Typically for walls 3 $\frac{3}{4}$ " (95 mm) thickness or greater	N/A	4 interlocking corner tabs per factory die-miter. See the "KD Corner Detail"	N/A	Available when specified, and in accordance with ANSI A250.8-2014 (SDI 100)

N/A = Not Available



### Anchoring and installation notes

- FN16 Series narrow 1" (25 mm) Face frames** are supplied standard with masonry wire and weld-in base anchors. Anchors are designed for maximum wall/frame engagement and installation flexibility.
- For anchoring applications, refer to the Frames: Anchoring systems section of this manual.**
- Installation caution notice: Grouted frames:**
  - When temperature conditions necessitate an additive to be used in the mortar to prevent freezing, the contractor installing the frames must coat the inside of the frames in the field with a corrosion resistant coating per SDI 105.
  - When frames are to be grouted full, silencers must be field installed prior to grouting
  - Steel frames, including fire rated frames, do not require grouting. Grouting is not recommended for frames in drywall.
- Installation shall conform to the published Steelcraft installation instructions, SDI 105 Recommended Installation Instructions for Steel Frames.
- All fire rated frames must be installed in accordance with NFPA Pamphlet 80 and the Authority Having Jurisdiction.

### Framing applications

Series	Steel type	Building type	Opening	Usage frequency <sup>1</sup>	KD Corner <sup>4</sup>	SUA Corner <sup>5</sup>	Applications
FN16	Non-Galvannealed <sup>2</sup>	Institutional and commercial	Interior	Heavy to extra heavy duty	✓	✓	Typical building conditions
	Galvannealed <sup>3</sup>		Mainly exterior				High humidity and/or weather exposure
FN14	Non-Galvannealed <sup>2</sup>	Institutional and commercial	Interior	Extra heavy to maximum duty	✓	✓	Typical building conditions
	Galvannealed <sup>3</sup>		Mainly exterior				High humidity and/or weather exposure

<sup>1</sup> Usage frequency is based on ANSI A250.8-2014 (SDI 100)

<sup>2</sup> Commercial quality cold rolled steel

<sup>3</sup> Reinforcements for galvannealed frames are also galvannealed

<sup>4</sup> Knock-Down for field assembly prior to installation

<sup>5</sup> Set-up and Welded for installation as a pre-welded unit



## MU Series multi-use



### About the product

Steelcraft's MU Series multi-use flush frames are designed for light to extra heavy duty applications in both commercial and institutional buildings. They can be installed in both interior and exterior locations, and in virtually all types of buildings and wall constructions. They have a jamb profile similar to the DW frames, but are designed to be installed as part of the wall framing sequence. They can be specified and/or supplied as either KD (knock-down) for field assembly prior to installation, or welded for installation as a complete unit.

### Installation

1. Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) Recommended Erection Instructions for Steel Frames and HMMMA 840.
2. Fire Rated Assemblies must be in accordance with NFPA Pamphlet 80. The Authority Having Jurisdiction is the final authority in issues related to the installation and use of installed Fire Rated Doors.

### Features and benefits

Steelcraft MU Series multi-use flush frames offer the following unique features which enhance long-term functionality and durability. Features can vary depending on the steel thickness of the frame:

1. **Die-mitered corner connections** of the MU Series multi-use flush frame corners lock together once the frame is installed. The tab/lock design:
  - a. prevents the head from rising
  - b. keeps the head and jamb members in alignment
  - c. keeps the miter tight
  - d. includes wedge-lock corner clips. Screws are supplied to secure miter.
2. **Patented universal hinge preparations** allow for easy field conversion from standard weight .134" (3.3 mm) thick hinges to heavy weight 0.180" (4.7 mm) hinges.
3. **Adjustable base anchors** allow for installation adjustment when the floor is not level.
4. **Factory prepared** for field installed silencers.
5. **Factory applied baked-on rust inhibiting primer** in accordance with ANSI A250.10-2011.

### Specification compliance

1. Overall frame construction for Steelcraft MU Series multi-use flush frames meet the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6. Locations are in accordance with ANSI/DHI A115 unless otherwise stated.

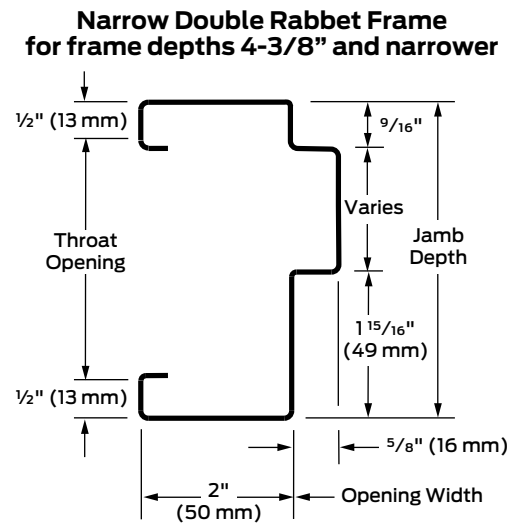
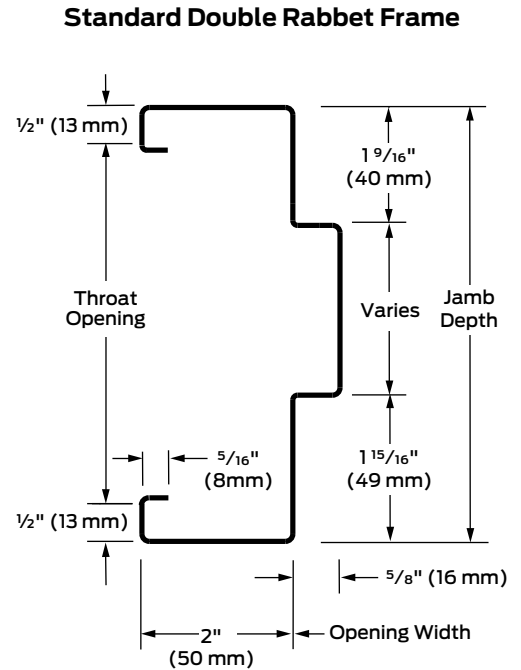
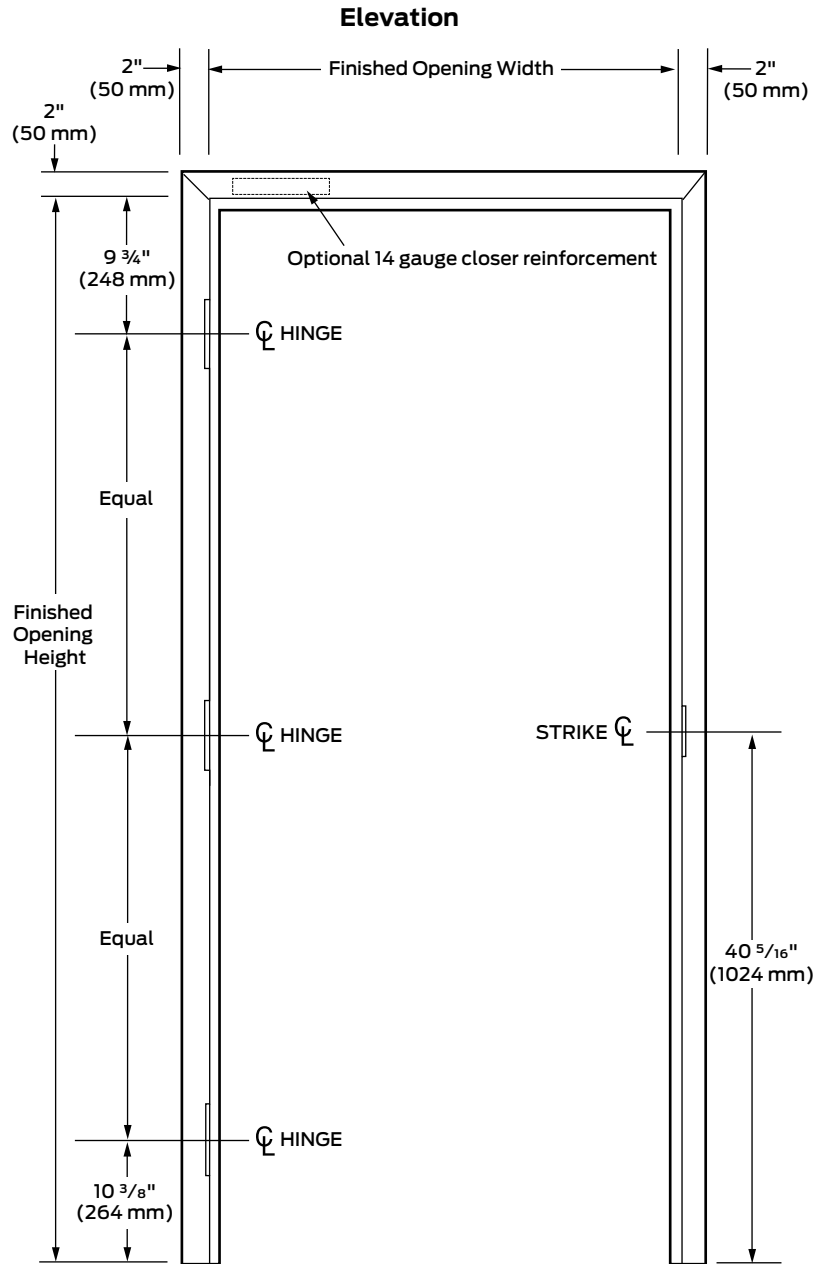
### Fire ratings

MU Series multi-use flush frames meet the broadest fire rating requirements. They are listed for installations requiring compliance to both neutral pressure testing (ASTM E152 and UL 10B) and positive pressure standards (UL 10C). Refer to the **Fire Rated Section** of this manual for particular listings.

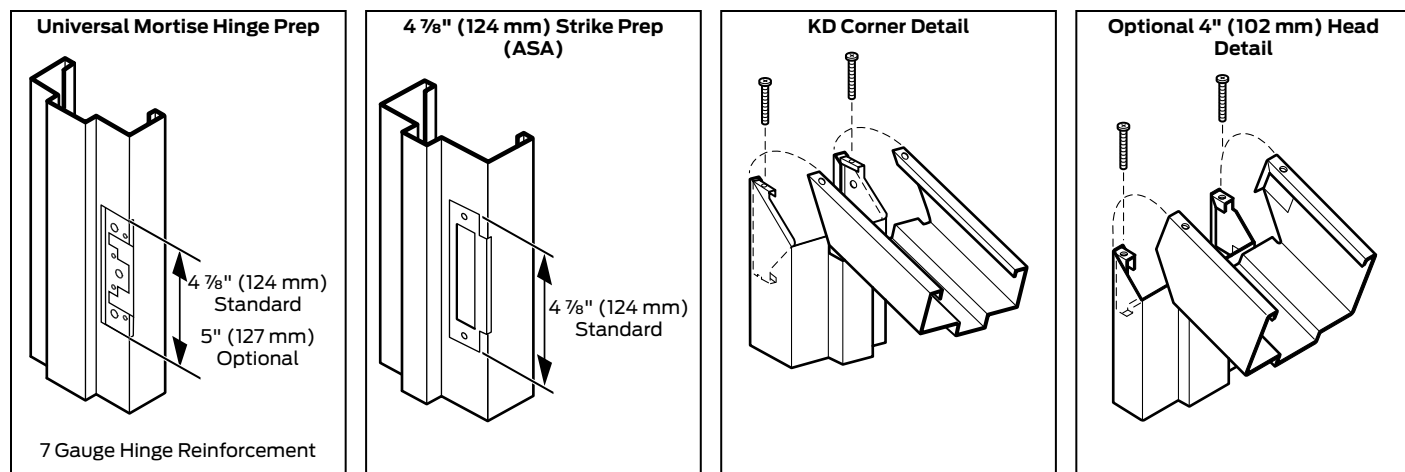
### Applications

Steelcraft MU Series multi-use flush frames are typically installed in wall construction types as defined in the chart below:

Frame applications			
Profile	Steel thickness	Wall construction	Typical wall anchors
MU16	16 Gauge [0.053" (1.3 mm)]	Wood or steel stud	Lock-in stud anchor
MU16	16 Gauge [0.053" (1.3 mm)]	Masonry	Wire masonry
MU16	16 Gauge [0.053" (1.3 mm)]	Existing Masonry	Bolted through soffit
MU14	14 Gauge [0.067" (1.7 mm)]	Wood or steel stud	Lock-in stud anchor
MU14	14 Gauge [0.067" (1.7 mm)]	Masonry	Wire masonry
MU14	14 Gauge [0.067" (1.7 mm)]	Existing masonry	Bolted through soffit



Frame sizing options										
Series	Maximum opening size		Jamb depth availability(profile)				Standard profile dimensions (variations available)			Corners
	Single	Pair	Narrow double rabbet		Double rabbet		Face	Stop	Returns	Standard
			Min.	Max.	Min.	Max.				
MU16	4'0" x 9'0" (1219 mm x 2743 mm)	8'0" x 9'0" (2439 mm x 2743 mm)	3 1/4" (83 mm)	4 3/8" (111 mm)	4 1/2" (114 mm)	20" (508 mm)	2" (51 mm)	5/8" (16 mm)	1/2" (13 mm)	DIE MITERED with interlocking Soffit tab
MU14	4'0" x 9'0" (1219 mm x 2743 mm)	8'0" x 9'0" (2439 mm x 2743 mm)	3 1/4" (83 mm)	4 3/8" (111 mm)	4 1/2" (114 mm)	20" (508 mm)	2" (51 mm)	5/8" (16 mm)	1/2" (13 mm)	DIE MITERED with interlocking Soffit tab



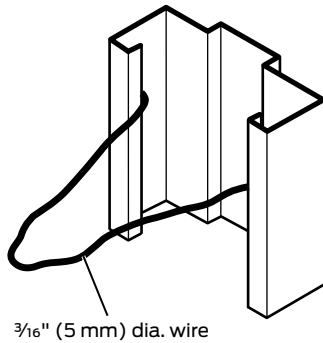
### General notes

1. Variations in jamb depths available in 1/8" (3 mm) increments.
2. All MU Series frames are supplied standard with masonry wire or lock-in jamb anchors and adjustable base anchors. Anchors are designed for maximum wall/frame engagement and installation flexibility.
3. MU Series frames are to be installed as part of the wall framing sequence.
4. Depending on environmental and usage conditions the steel can be either cold rolled or galvanized. Galvanized steel is recommended for all exterior applications.
5. MU Series with 4" heads are used mainly in masonry applications when 2" face heads do not match block coursing, or in drywall applications when installed in close proximity to a F Series or MU Series frame installed with a 4" head.

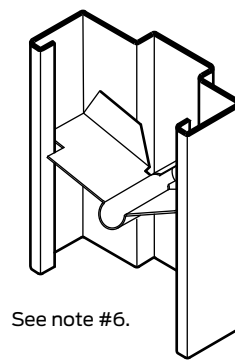
Frame options							
Series	Frame profile		Corner connections				4" (102 mm) Heads
			KD (Knock-down)		SUA (Set-up & weld)		
	Narrow double rabbet	Double rabbet	Single rabbet	Double rabbet	Single rabbet	Double rabbet	
MU16	Typically for walls less than 3 ¾" (95 mm) thick.	Typically for walls less than 3 ¾" (95 mm) thickness or greater	Factory Die-Mitered, Soffit Tab included. Corner clip assembly screws required.		Available when specified, and in accordance with ANSI A250.8-2014 (SDI 100).		Die-mitered for use with 2" (51 mm) face jambs. Corner Clip assembly screws required.
MU14	Minimum walls thickness = 2" (51 mm)						

N/A - Not Available

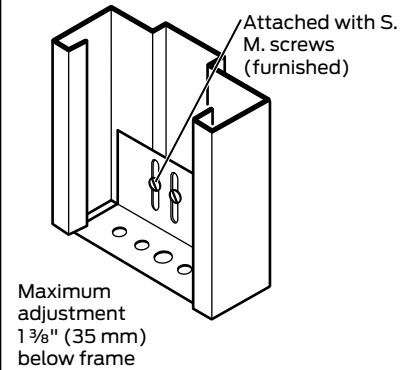
**Wire Masonry Anchor**



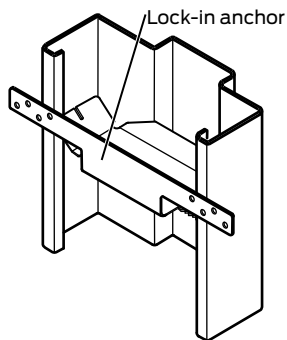
**Existing Masonry Anchor**



**Adjustable Base Anchor**



**Anchor for Stud Partition**



### Anchoring and installation notes

- MU16 Series Multi-use flush frames** are supplied standard with masonry wire, or lock-in jamb anchors and adjustable base anchors. Anchors are designed for maximum wall/frame engagement, and installation flexibility.
- For anchoring applications, refer to the Frames: Anchoring systems section of this manual.**
- Installation caution notice: Grouted frames:**
  - When temperature conditions necessitate an additive to be used in the mortar to prevent freezing, the contractor installing the frames must coat the inside of frames in the field with a corrosion resistant coating per SDI 105.
  - When frames are to be grouted full, silencers must be field installed prior to grouting.
  - Steel frames, including fire rated frames, do not require grouting. Grouting is not recommended for frames in drywall.
- Installation shall conform to the published Steelcraft installation instructions, SDI 105 Recommended Installation Instructions for Steel Frames.
- All fire rated frames must be installed in accordance with NFPA Pamphlet 80 and the Authority Having Jurisdiction.
- When using Standard Exiting Wall Anchors the anchor must be field modified (notched) to provide clearance for the backbend return.

### Framing applications

Series	Steel type	Building type	Opening	Usage frequency <sup>1</sup>	KD Corner <sup>4</sup>	SUA Corner <sup>5</sup>	Applications
MU16	Non-Galvannealed <sup>2</sup>	Institutional and Commercial	Interior	Heavy to extra heavy duty	✓	✓	Typical building conditions
	Galvannealed <sup>3</sup>		Mainly Exterior				High humidity and/or weather exposure
MU14	Non-Galvannealed <sup>2</sup>	Institutional and Commercial	Interior	Extra heavy to maximum duty	✓	✓	Typical building conditions
	Galvannealed <sup>3</sup>		Mainly Exterior				High humidity and/or weather exposure

<sup>1</sup> Usage frequency is based on ANSI A250.8-2014 (SDI 100)

<sup>2</sup> Commercial quality carbon steel

<sup>3</sup> Reinforcements for galvannealed frames are also galvannealed

<sup>4</sup> Knock-Down for field assembly prior to installation

<sup>5</sup> Set-up and Welded for installation as a pre-welded unit

## FE Series double egress



### About the product

The FE Series double egress frames are designed to meet requirements for heavy to extra heavy duty applications in both commercial and institutional buildings. They are installed at interior locations, and in virtually all types of buildings and wall constructions. These frames can be specified and supplied as KD (knock-down) for field assembly prior to installation or welded for installation as a complete unit. If clear opening width for cross corridor applications is critical, refer to the DE Series Frame.

### Installation

1. Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) Recommended Erection Instructions for Steel Frames and HMMMA 840.
2. Fire Rated Assemblies must be in accordance with NFPA Pamphlet 80. The Authority Having Jurisdiction is the final authority in issues related to the installation and use of installed Fire Rated Doors. The Authority Having Jurisdiction is the final authority in issues related to the installation and use of installed Fire Rated Doors.

### Features and benefits

Steelcraft FE Series double egress frames offer the following unique features, which enhance long term functionality and durability:

1. **Die-mitered corner connections** Die-mitered corner connection at the head and jamb insure an attractive, tight and closed mitered connection. The miter includes 4 corner tabs designed with concealed connection eliminating the need for continuous profile welding.
2. **Patented universal hinge preparations** allow for easy field conversion from standard weight .134" (3.3 mm) thick hinges to heavy weight .180" (4.7 mm) hinges.
3. **Factory prepared** for field installed silencers.
4. **Factory applied baked-on rust inhibiting primer** in accordance with ANSI A250.10-2011.

### Specification compliance

1. Overall frame construction for the Steelcraft FE16 and FE14 Series double egress frames meet and exceed the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6. Locations are in accordance with ANSI/DHI A115 unless otherwise stated.

### Fire ratings

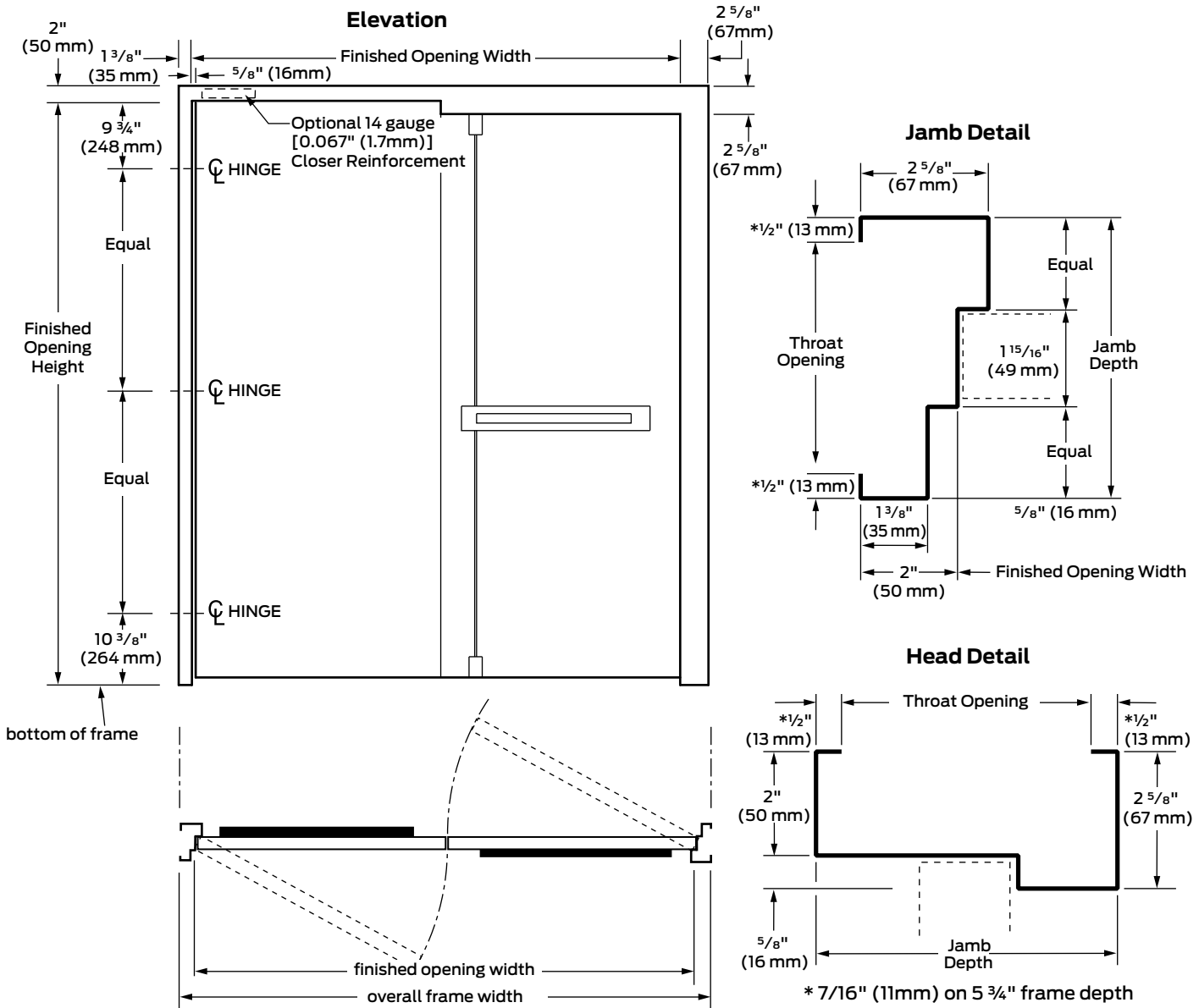
The FE Series double egress frames meet the broadest fire rating requirements. They are listed for installations requiring compliance to both neutral pressure testing (ASTM E152 and UL 10B) and positive pressure standards (UL 10C). Refer to the Fire Rated Section of this manual for particular listings.

### Applications

FE Series double egress frames are typically installed in wall construction types as defined in the chart below:

#### Frame applications

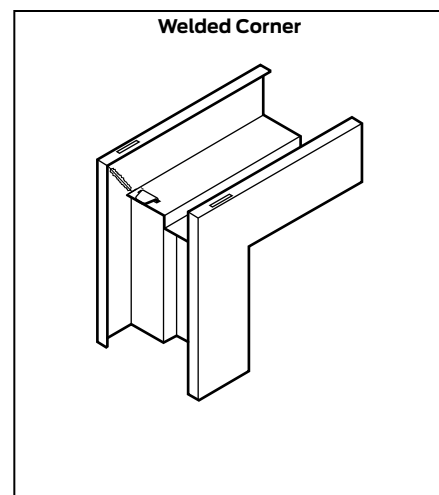
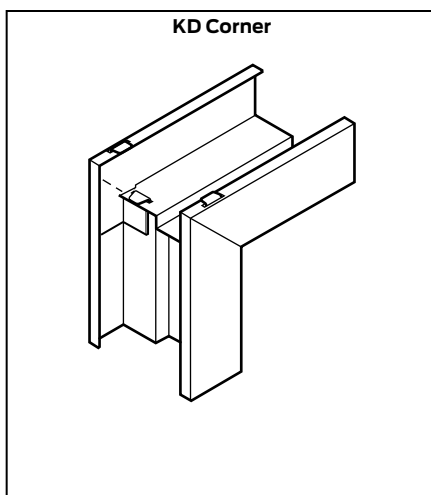
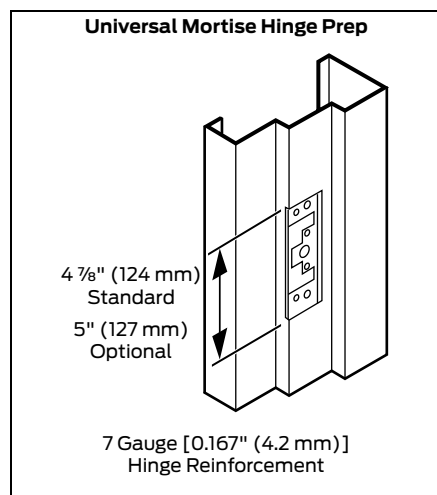
Profile	Steel thickness	Wall construction	Typical wall anchors
FE16	16 Gauge [0.053" (1.3 mm)]	Wood or steel stud	Weld-in stud anchor
FE16	16 Gauge [0.053" (1.3 mm)]	Masonry	Wire masonry
FE16	16 Gauge [0.053" (1.3 mm)]	Existing masonry	Bolted through door rabbet
FE14	14 Gauge [0.067" (1.7 mm)]	Wood or steel stud	Weld-in stud anchor
FE14	14 Gauge [0.067" (1.7 mm)]	Masonry	Wire masonry
FE14	14 Gauge [0.067" (1.7 mm)]	Existing masonry	Bolted through door rabbet



**Finished opening width (Door Opening Dimension)** is the dimension from frame door rabbet to the opposite rabbet. **Note:** For FE and DE Series double egress frames is 1/8" (3.2 mm) undersized from the standard nominal opening width. Example: 6'0" (1829 mm) head = 71 7/8" net width in lieu of the standard 72".

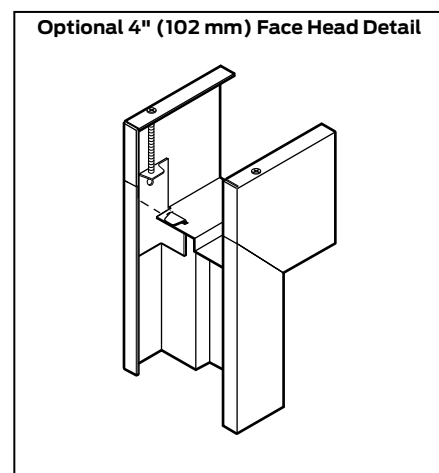
Frame sizing options							
Series	Maximum opening size	Jamb depth availability (profile)		Standard profile dimensions (variations available)			Corners
		3 step jambs x 2 step heads		Face	Stop	Returns	Standard
	Minimum	Maximum					
FE16	8'0" x 10'0" (2439 mm x 3048 mm)	4 ¾" (121 mm) Non-label	14" (356 mm)	1 ⅜" (35 mm) on narrow side.	⅝" (16 mm)	½"* (13 mm)	DIE MITERED with four (4) concealed tabs interlocking head and jambs
		5 ¾" (146 mm) Labeled		2 ⅝" (67 mm) on wide side.			
FE14	8'0" x 10'0" (2439 mm x 3048 mm)	4 ¾" (121 mm) Non-label	14" (356 mm)	1 ⅜" (35 mm) on narrow side.	⅝" (16 mm)	½"* (13 mm)	DIE MITERED with four (4) concealed tabs interlocking head and jambs
		5 ¾" (146 mm) Labeled		2 ⅝" (67 mm) on wide side.			

\*Except 5 3/4" (146 mm) depth, which is 7/16" (11 mm)



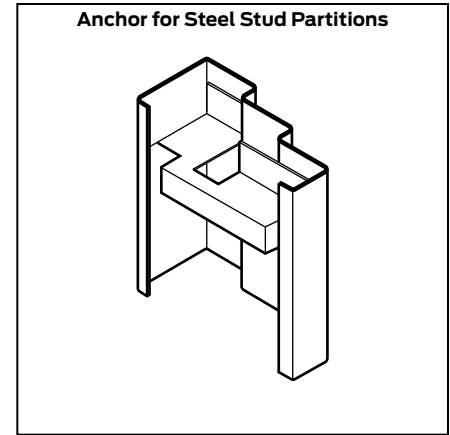
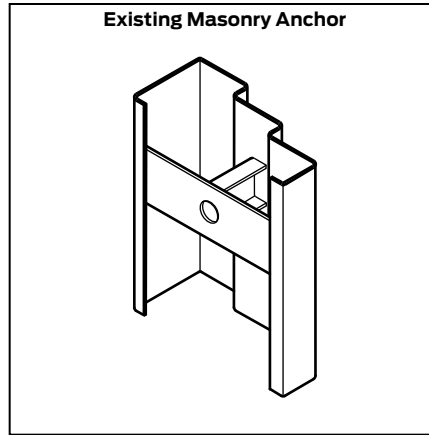
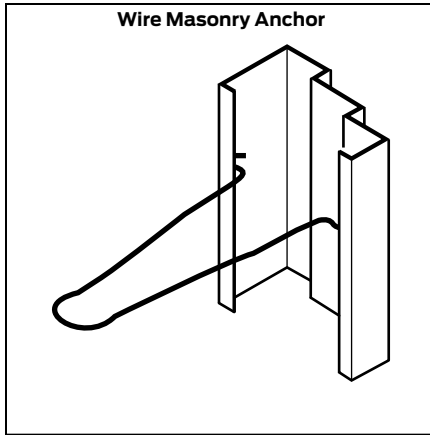
### General notes

1. Variations in jamb depths available in 1/8" (3 mm) increments.
2. All FE Series frames are supplied standard with masonry and wire and weld-in base anchors. Anchors are designed for maximum wall/frame engagement and installation flexibility. Weld-in stud anchors are an optional add.
3. FE Series frames are to be installed as part of the wall framing sequence.
4. Depending on environmental and usage conditions, the steel can be either cold rolled or galvanized. Galvanized steel is recommended for all exterior applications.
5. Tabs in Rabbeted area should be bent outward, not inward, during assembly (as shown).
6. FE Series with 4" heads are used mainly in masonry applications when 2" face heads do not match block coursing.
7. For reinforcement requirements for automatic operators, see ["High frequency hinge reinforcement F and FE Series" on page 73](#).



Frame options				
Series	Frame profile	Corner connections		4" (102 mm) Heads
		KD (Knock-down)	SUA (Set-up & weld)	
<b>FE16</b>	Typically for walls less than 3 3/4" (95 mm) thickness or greater	KD assembly, slots, and tabs, must be assembled by distributor prior to installation.	Available from Steelcraft when specified in accordance with ANSI A250.8-2014 (SDI 100)	Die-mitered for use with 2" (51 mm) face double rabbet jambs. Available when specified for KD or SUA applications. For KD assembly, must be assembled by distributor prior to installation.
<b>FE14</b>	Typically for walls less than 3 3/4" (95 mm) thickness or greater	KD assembly, slots, and tabs, must be assembled by distributor prior to installation.	Available from Steelcraft when specified in accordance with ANSI A250.8-2014 (SDI 100)	Die-mitered for use with 2" (51 mm) face double rabbet jambs. Available when specified for KD or SUA applications. For KD assembly, must be assembled by distributor prior to installation.

N/A - Not Available



### Anchoring and installation notes

1. **FE Series double egress frames** are supplied standard with masonry wire and fixed base anchors. Anchors are designed for maximum wall/frame engagement, and installation flexibility. Optional weld-in jamb anchors are available as an add.
2. **For anchoring applications, refer to the Frames: Anchoring systems section of this manual.**
3. **Installation caution notice: Grouted frames:**
  - When temperature conditions necessitate an additive to be used in the mortar to prevent freezing, the contractor installing the frames must coat the inside of frames in the field with a corrosion resistant coating per SDI 105.
  - When frames are to be grouted full, silencers must be field installed prior to grouting.
  - Steel frames, including fire rated frames, do not require grouting. Grouting is not recommended for frames in drywall.
4. **Special frame anchorage:** Frame anchor details shown on this sheet are applicable to Formatube Egress frames with 2" (50 mm) faces. Anchor details will vary with frame profile changes.
5. Installation shall conform to the published Steelcraft installation instructions, SDI 105 Recommended Installation Instructions for Steel Frames.
6. All fire rated frames must be installed in accordance with NFPA Pamphlet 80 and the Authority Having Jurisdiction.

Framing applications						
Series	Steel type	Building type	Usage frequency <sup>1</sup>	KD Corner <sup>4</sup>	SUA Corner <sup>5</sup>	Applications
FE16	Non-Galvannealed <sup>2</sup>	Institutional and Commercial	Heavy to extra heavy duty	✓	✓	Typical building conditions
	Galvannealed <sup>3</sup>					High humidity and/or weather exposure
FE14	Non-Galvannealed <sup>2</sup>	Institutional and Commercial	Extra heavy to maximum duty	✓	✓	Typical building conditions
	Galvannealed <sup>3</sup>					High humidity and/or weather exposure

<sup>1</sup> Usage frequency is based on ANSI A250.8-2014 (SDI 100)

<sup>2</sup> Commercial quality carbon steel

<sup>3</sup> Reinforcements for galvannealed frames are also galvannealed

<sup>4</sup> Knock-Down for field assembly prior to installation

<sup>5</sup> Set-up and Welded for installation as a pre-welded unit



## DE Series double egress



### About the product

The DE Series double egress frames meet all the design parameters of conventional double egress frames and is specified when cross corridor openings have the additional requirements of maximized clear opening width. The unique design of the DE Series Frame **allows for the use of swing clear hinges**. This must be considered if your local building code has a minimum clear opening width requirement, typically 44".

### Installation

1. Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) Recommended Erection Instructions for Steel Frames and HMM 840.
2. Fire Rated Assemblies must be in accordance with NFPA Pamphlet 80. The Authority Having Jurisdiction is the final authority in issues related to the installation and use of installed Fire Rated Doors. The Authority Having Jurisdiction is the final authority in issues related to the installation and use of installed Fire Rated Doors.

### Features and benefits

Steelcraft DE Series double egress frames offer the following unique features, which enhance long term functionality and durability:

1. **Die-mitered corner connection** insures tight fit and assembly. Frame must be welded by prior to installation.
2. **Patented universal hinge preparations** allow for easy field conversion from standard weight .134" (3.3 mm) thick hinges to heavy weight .180" (4.7 mm) hinges.
3. **Factory prepared** for field installed silencers.
4. **Factory applied baked-on rust inhibiting primer** in accordance with ANSI A250.10-2011.
5. **Unique design to meet clear width corridor applications.**

### Specification compliance

1. Overall frame construction for the Steelcraft DE16 and DE14 Series double egress frames meet and exceed the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6. Locations are in accordance with ANSI/DHI A115 unless otherwise stated.

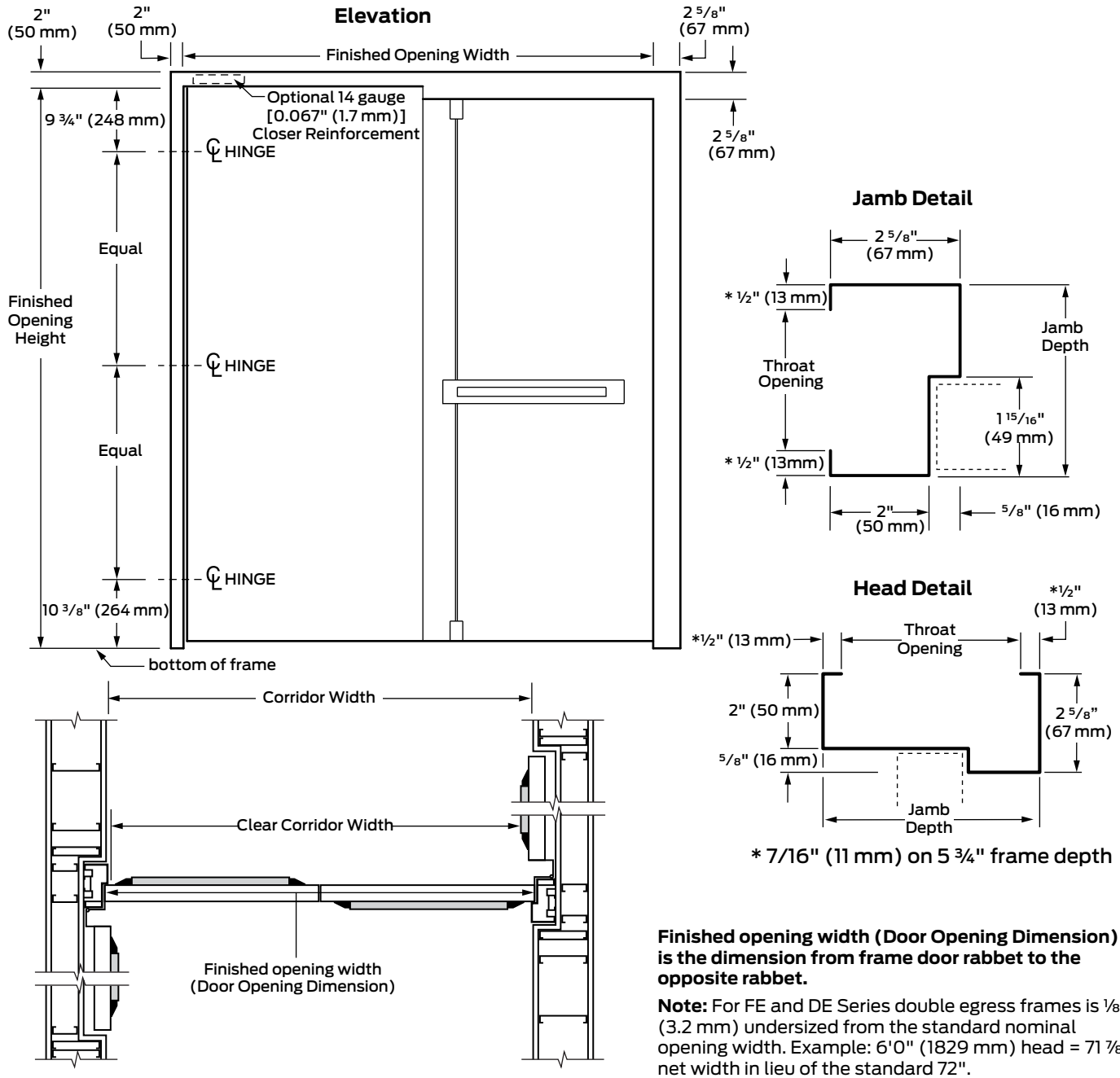
### Fire ratings

The DE Series double egress frames meet the broadest fire rating requirements. They are listed for installations requiring compliance to both neutral pressure testing (ASTM E152 and UL 10B) and positive pressure standards (UL 10C). Refer to the **Fire Rated Section** of this manual for particular listings.

### Applications

DE Series double egress frames are typically installed in wall construction types as defined in the chart below:

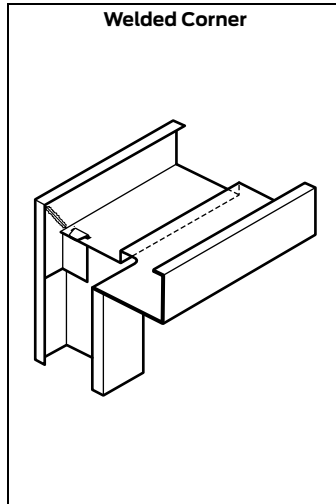
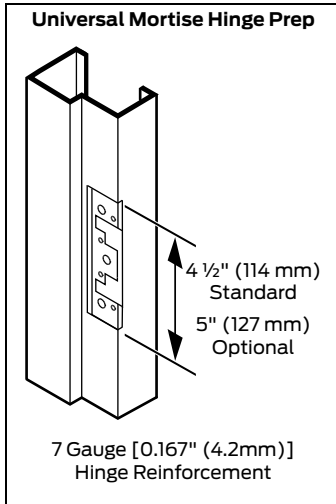
Frame applications			
Profile	Steel thickness	Wall construction	Typical wall anchors
DE16	16 Gauge [0.053" (1.3 mm)]	Wood or steel stud	Weld-in stud anchor
DE16	16 Gauge [0.053" (1.3 mm)]	Masonry	Wire masonry
DE16	16 Gauge [0.053" (1.3 mm)]	Existing masonry	Bolted through door rabbet
DE14	14 Gauge [0.067" (1.7 mm)]	Wood or steel stud	Weld-in stud anchor
DE14	14 Gauge [0.067" (1.7 mm)]	Masonry	Wire masonry
DE14	14 Gauge [0.067" (1.7 mm)]	Existing masonry	Bolted through door rabbet



#### Frame sizing options

Series	Maximum opening size	Jamb depth availability(profile)		Standard profile dimensions (variations available)			Corners
	Pair	2 step jambs x 2 step heads		Face	Stop	Returns	Standard
		Min.	Max.				
DE16	8'0" x 10'0" (2439 mm x 3048 mm)	5 ¾" (146 mm) Labeled or Non-label	14" (356 mm)	2" (50 mm) on narrow side. 2 ⅝" (67 mm) on wide side.	⅝" (16 mm)	½"* (13 mm)	Must be welded prior to installation
DE14	8'0" x 10'0" (2439 mm x 3048 mm)	5 ¾" (146 mm) Labeled or Non-label	14" (356 mm)	2" (50 mm) on narrow side. 2 ⅝" (67 mm) on wide side.	⅝" (16 mm)	½"* (13 mm)	Must be welded prior to installation

\*Except 5 3/4" (146 mm) depth, which is 7/16" (11 mm)



### General notes

1. Variations in jamb depths available in 1/8" (3 mm) increments.
2. Due to the configuration of narrow hinge jambs mating to wider heads, DE Series frames are supplied set-up and welded only.
3. All DE Series frames are supplied standard with masonry wire and weld-in base anchors. Anchors are designed for maximum wall/frame engagement and installation flexibility. Optional weld-in jamb anchors are available as an add.
4. DE Series frames are to be installed as part of the wall framing sequence.
5. Depending on environmental and usage conditions, the steel can be either cold rolled or galvanized.
6. Tabs in rabbeted area should be bent outward, not inward, during assembly (as shown).

### Note:

Together with the use of Swing-Clear type hinges, the DE Series double egress 2 Step hinge jambs will provide additional cross-corridor width between jambs:

- removes the thickness of the door from the opening, even when at 90°
- changes the Pivot Point of the door
- can increase the clear opening width by 5 1/4" (133 mm)



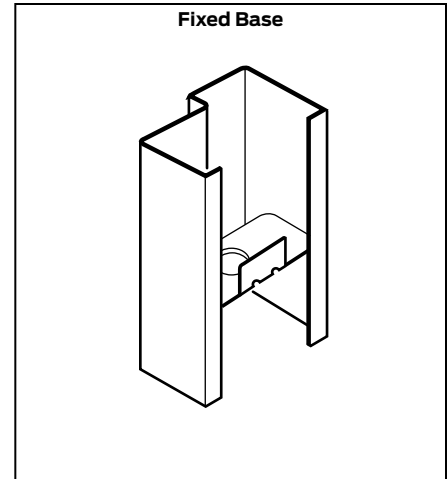
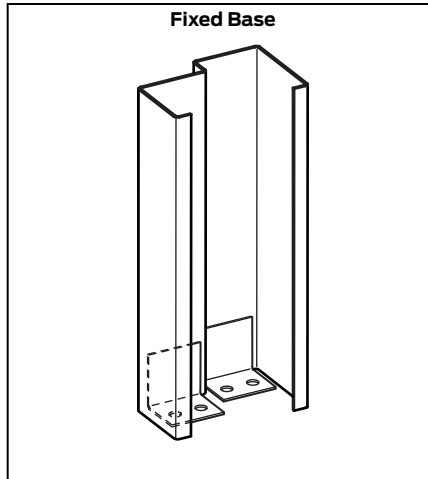
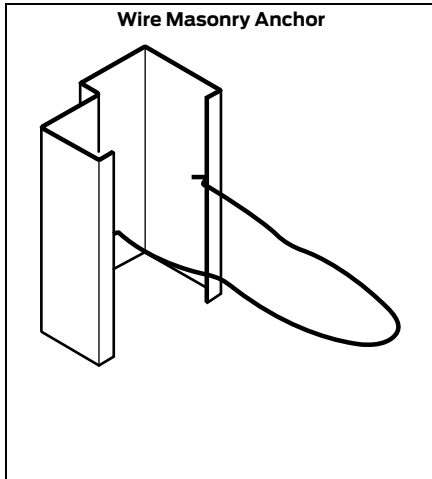
Frame options				
Series	Frame profile	Corner connections		4" (102 mm) Heads
		KD (Knock-down)	SUA (Set-up & weld)	
DE16	Typically for walls 3 3/4" (95 mm) thickness or greater	NOT AVAILABLE FOR KD INSTALLATION Die-mitered corners, must be welded by distributor prior to installation	Available from Steelcraft when specified in accordance with ANSI A250.8-2014 (SDI 100)	Available when specified. Must be welded prior to installation
DE14	Typically for walls 3 3/4" (95 mm) thickness or greater	NOT AVAILABLE FOR KD INSTALLATION Die-mitered corners, must be welded by distributor prior to installation	Available from Steelcraft when specified in accordance with ANSI A250.8-2014 (SDI 100)	Available when specified. Must be welded prior to installation

### Note:

1. Hinge Jambs for DE Series double egress frames are single rabbet sections and are a smaller jamb depth than the head.
2. The jamb depth of the hinge jambs is shown in the chart below.
3. **ALWAYS ORDER DE Series frames BY THE FRAME DEPTH OF THE HEAD.** Steelcraft will manufacture the jambs as required.

Head		Jamb	
Frame depth	Throat opening	Jamb depth	Throat opening
5 3/4" (146 mm)	4 7/8" (124 mm)	3 27/32" (98 mm)	2 31/32" (75 mm)
6 3/4" (171 mm)	5 3/4" (146 mm)	4 11/32" (110 mm)	3 11/32" (85 mm)
7 3/4" (197 mm)	6 3/4" (171 mm)	4 27/32" (123 mm)	3 27/32" (98 mm)
8 3/4" (222 mm)	7 3/4" (197 mm)	5 11/32" (136 mm)	4 11/32" (110 mm)

15 3/4" (146 mm) jamb depth frame has 7/16" (11 mm) backbends. All others have 1/2" (13 mm) backbends.



### Anchoring and installation notes

- DE Series double egress frames** are supplied standard with masonry wire and fixed base anchors. Anchors are designed for maximum wall/frame engagement and installation flexibility. Optional weld-in jamb anchors are available as an add.
- For anchoring applications, refer to the Frames: Anchoring systems section of this manual.**
- Installation caution notice: Grouted frames:**
  - When temperature conditions necessitate an additive to be used in the mortar to prevent freezing, the contractor installing the frames must coat the inside of frames in the field with a corrosion resistant coating per SDI 105.
  - When frames are to be grouted full, silencers must be field installed prior to grouting.
  - Steel frames, including fire rated frames, do not require grouting. Grouting is not recommended for frames in drywall.
- Special frame anchorage:** Frame anchor details shown on this sheet are applicable To Formatable Egress frames with 2" (50 mm) faces. Anchor details will vary with frame profile changes.
- Installation shall conform to the published Steelcraft installation instructions, SDI 105 Recommended Installation Instructions for Steel Frames.
- All fire rated frames must be installed in accordance with NFPA Pamphlet 80 and the Authority Having Jurisdiction.

Framing applications						
Series	Steel type	Building type	Usage frequency <sup>1</sup>	KD Corner <sup>4</sup>	SUA Corner <sup>4</sup>	Applications
DE16	Non-Galvannealed <sup>2</sup>	Institutional and Commercial	Heavy to extra heavy duty	N/A	✓	Typical building conditions
	Galvannealed <sup>3</sup>					High humidity and/or weather exposure
DE14	Non-Galvannealed <sup>2</sup>	Institutional and Commercial	Extra heavy to maximum duty	N/A	✓	Typical building conditions
	Galvannealed <sup>3</sup>					High humidity and/or weather exposure

<sup>1</sup> Usage frequency is based on ANSI A250.8-2014 (SDI 100)

<sup>2</sup> Commercial quality carbon steel

<sup>3</sup> Reinforcements for galvannealed frames are also galvannealed

<sup>4</sup> Knock-Down for field assembly prior to installation

N/A = Not available

## DW Series drywall



### About the product

Steelcraft's DW Series Drywall frames are designed for light to heavy duty applications in both commercial and institutional buildings. They can be installed in rough openings after the wall has been constructed and finished. They are installed in virtually all types of buildings in all interior drywall partition locations using baseboards. To accommodate the installation of the DW Series frames on finished drywall construction, they are supplied with a KD (knock-down) corner for quick installation.

### Installation

1. Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) Recommended Erection Instructions for Steel Frames and HMMA 840.
2. Fire Rated Assemblies must be in accordance with NFPA Pamphlet 80. The Authority Having Jurisdiction is the final authority in issues related to the installation and use of installed Fire Rated Doors.

### Features and benefits

Steelcraft DW Series Drywall frames include unique features which enhance long-term functionality and durability:

1. **Quick and flexible installation** of Steelcraft's DW Series Drywall frames facilitates their installation in minutes and they can be relocated without damage to the frame.
2. **Die-mitered corner connections** of the DW Series Drywall Frame corners lock together once the frame is installed. The tab/lock design:
  - a. prevents the head from rising
  - b. keeps the head and jamb members in alignment
  - c. keeps the miter tight
  - d. includes wedge-lock corner clips. Screws are included to secure miter.
3. **Adjustable base anchors** allow for attachment directly to the wall sill runner, and facilitates installation adjustment when the floor is not level.
4. **Factory prepared** for field installed silencers.
5. **Factory applied baked-on rust inhibiting primer** in accordance with ANSI A250.10-2011.

### Specification compliance

1. Overall frame construction for the Steelcraft DW Series Drywall frames meet and exceed the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6. Locations are in accordance with ANSI/DHI A115 unless otherwise stated.

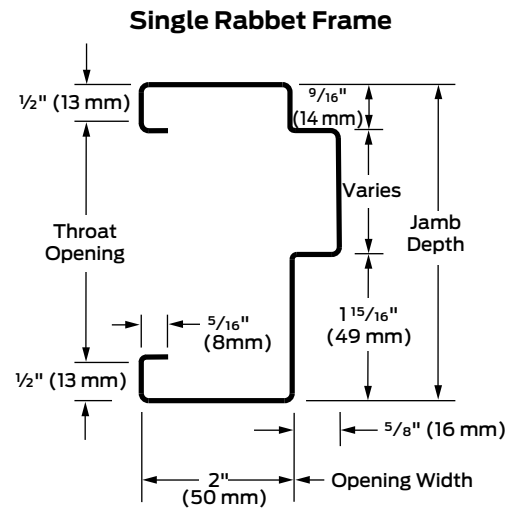
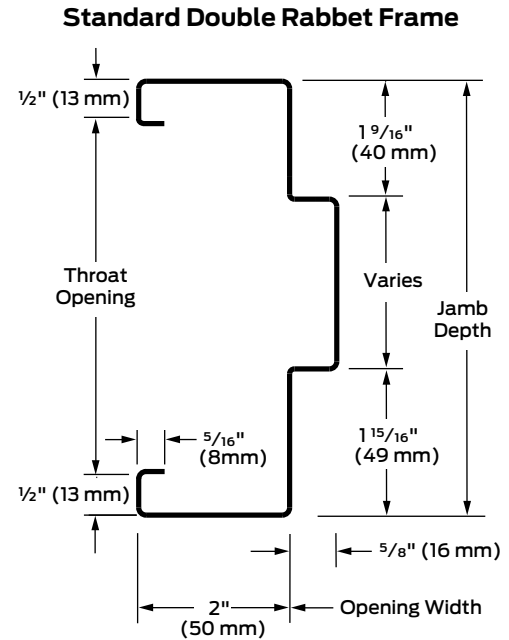
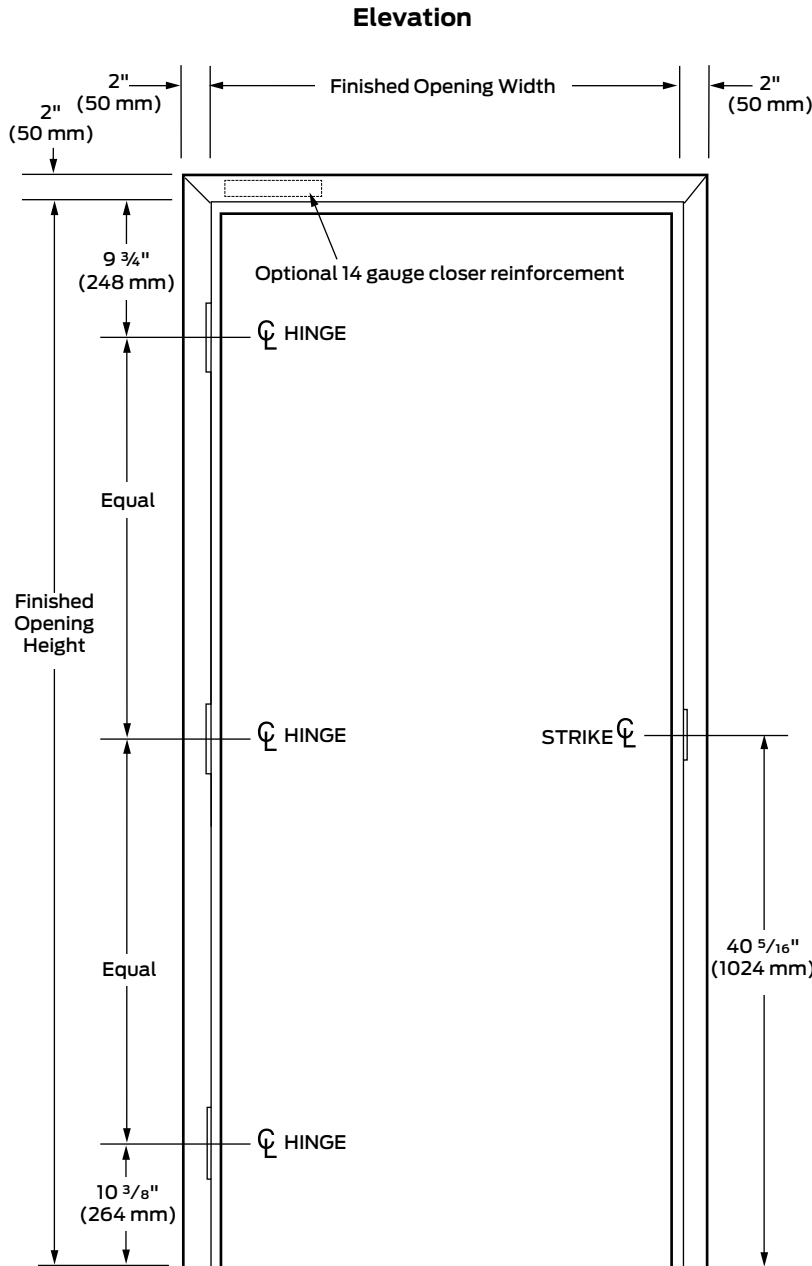
### Fire ratings

The DW Series Drywall frames meet the broadest fire rating requirements. They are listed for installations requiring compliance to both neutral pressure testing (ASTM E152 and UL 10B) and positive pressure standards (UL 10C). Refer to the **Fire Rated Section** of this manual for particular listings.

### Applications

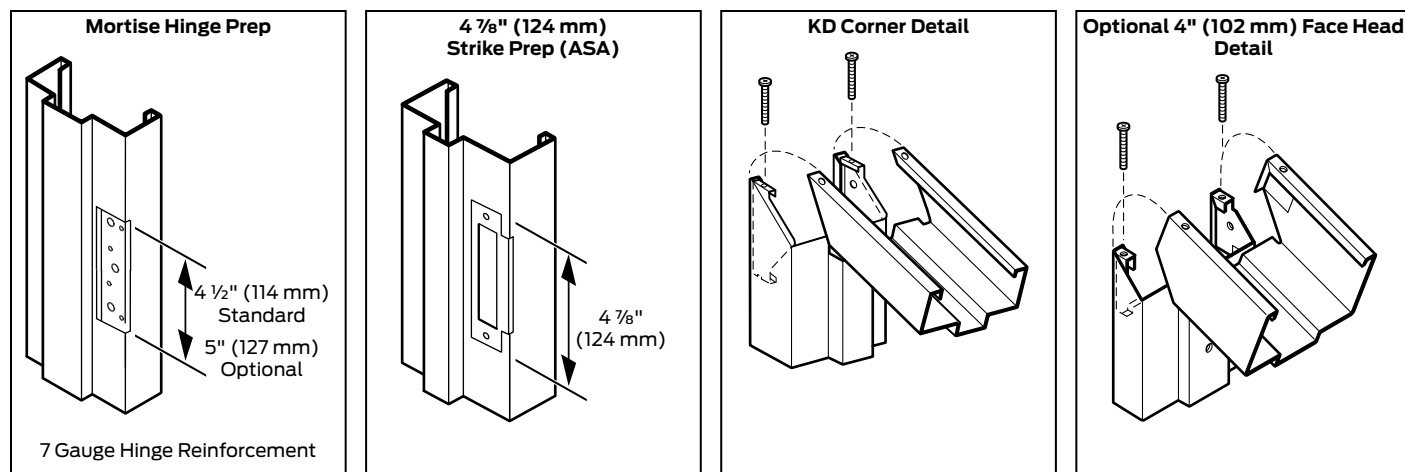
Steelcraft DW Series Drywall frames are typically installed in wall construction types as defined in the chart below:

Frame applications			
Profile	Steel thickness	Wall construction	Typical wall anchors
DW16	16 Gauge [0.053" (1.3 mm)]	Drywall partitions with wood or steel stud	Compression jamb anchor(s) with adjustable Base Anchor Systems
DW14	14 Gauge [0.067" (1.7 mm)]	Drywall partitions with wood or steel stud	Compression jamb anchor(s) with adjustable Base Anchor Systems



**Frame sizing options**

Series	Maximum opening size		Jamb depth availability (profile)				Standard profile dimensions (variations available)			Corners
	Single	Pair	Single rabbet		Double rabbet		Face	Stop	Returns	Standard
			Min.	Max.	Min.	Max.				
DW16	4'0" x 9'0" (1219 mm x 2743 mm)	8'0" x 9'0" (2439 mm x 2743 mm)	3 1/4" (83 mm)	4 3/8" (111 mm)	4 1/2" (114 mm)	14 3/4" (375 mm)	2" (51 mm)	5/8" (16 mm)	1/2" (13 mm)	DIE MITERED Wedge Lock Corner with interlocking soffit tab
DW14	4'0" x 9'0" (1219 mm x 2743 mm)	8'0" x 9'0" (2439 mm x 2743 mm)	3 1/4" (83 mm)	4 3/8" (111 mm)	4 1/2" (114 mm)	14 3/4" (375 mm)	2" (51 mm)	5/8" (16 mm)	1/2" (13 mm)	DIE MITERED Wedge Lock Corner with interlocking soffit tab

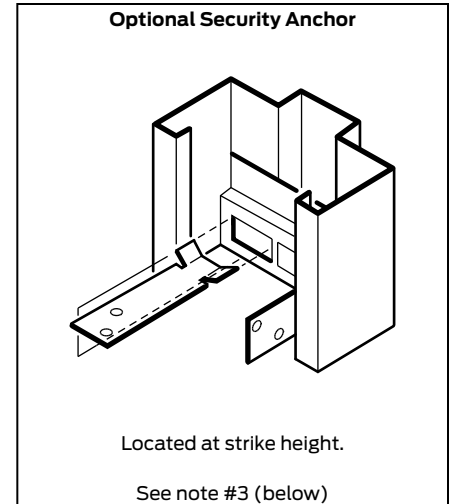
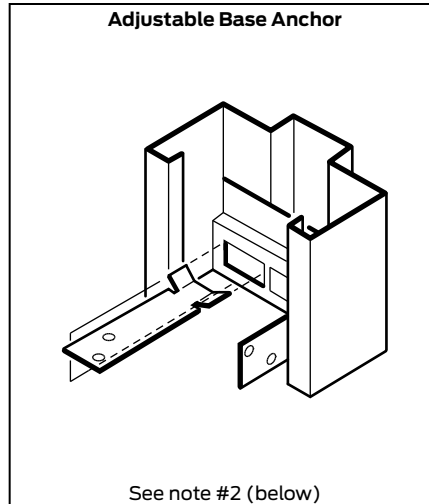
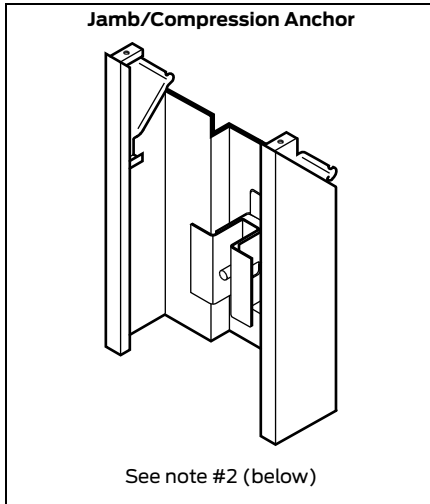


### General notes

- Variations in jamb depths available in  $\frac{1}{8}$ " (3 mm) increments.
- All DW Series frames are supplied standard with field adjustable compression anchors located near the top of each jamb and adjustable base anchors with twist-in strap base anchors in each jamb.
  - The compression anchor can be easily adjusted with a screw driver or power driver.
  - The lock-in base anchor system is provided for attachment directly to the floor runner (sill) when using wall baseboards.
- Depending on environmental and usage conditions, the steel used can be either cold rolled or galvanized. Galvanized steel is recommended in areas of high moisture.
- DW Series frames are supplied standard with 4  $\frac{1}{2}$ " standard duty hinge preps. Optional universal 4  $\frac{1}{2}$ " or 5" hinge preps are available.
- DW Series with 4" heads are used mainly when installed in close proximity to a F Series or MU Series frame installed with a 4" head.

Frame options							
Series	Frame profile		Corner connections				4" (102 mm) Heads
			KD (Knock-down)		SUA (Set-up & weld)		
	Single rabbet	Double rabbet	Single rabbet	Double rabbet	Single rabbet	Double rabbet	
DW16	Typically for walls less than 3 ¾" (95 mm) thick. Minimum wall thickness = 2" (51 mm)	Typically for walls less than 3 ¾" (95 mm) thickness or greater	Factory Die-Mitered, Soffit Tab included. Corner clip assembly screws required on labeled frames.	Factory Die-Mitered, Soffit Tab included. Corner clip assembly screws required on labeled frames.	N/A	N/A	Die-mitered for use with 2" (51 mm) face jambs. Corner Clip assembly screws required.
DW14							

N/A - Not Available



### Anchoring and installation notes

1. **DW16 Series Drywall frames** are supplied standard with field adjustable compression anchors in each jamb and adjustable base anchors. DW Series frames are designed especially for use in installations using wall baseboards.
2. **For anchoring applications, refer to the Frames: Anchoring systems section of this manual**
  - Masonry wall: Not recommended
3. **Optional security anchor:** Security anchors are recommended in frames over 8'0" (2438 mm) high or in frames installed in areas where security is a priority. Locate the security anchor immediately above or below the strike reinforcements, and on both faces of the jamb. Anchors may be used in both the strike and hinge jamb. Also recommend to be used in the head of frames for pairs.
4. **Grouting of the DW Series frames is not recommended.**
5. **Installation Caution Notice:** After the frame pieces are slid over the wall, the frame is squared by adjusting the compression anchor screws located in the soffit of the jambs. Turning the screw clockwise will tighten the frame. Check to insure the opening is plumb.
6. Installation shall conform to the published Steelcraft installation instructions, SDI 105 Recommended Installation Instructions for Steel Frames.
7. All fire rated frames must be installed in accordance with NFPA Pamphlet 80 and the Authority Having Jurisdiction.

### Framing applications

Series	Steel type	Building type	Opening	Usage frequency <sup>1</sup>	KD Corner <sup>4</sup>	SUA Corner	Applications
<b>DW16</b>	Non-Galvannealed <sup>2</sup>	Institutional and Commercial	Interior	Heavy to extra heavy duty	✓	N/A	Typical building conditions with base boards
	Galvannealed <sup>3</sup>						
<b>DW14</b>	Non-Galvannealed <sup>2</sup>	Institutional and Commercial	Interior	Extra heavy to maximum duty	✓	N/A	Typical building conditions with base boards
	Galvannealed <sup>3</sup>						

<sup>1</sup> Usage frequency is based on ANSI A250.8-2014 (SDI 100)

<sup>2</sup> Commercial quality carbon steel

<sup>3</sup> Reinforcements for galvannealed frames are also galvannealed

<sup>4</sup> Knock-Down for field assembly prior to installation

N/A = Not available



## K Series drywall



### About the product

Steelcraft's K Series Drywall frames are designed for light to heavy duty applications in both commercial and institutional buildings. They can be installed in rough openings after the wall has been constructed and finished. They are installed in virtually all types of buildings in all interior drywall partition locations not using baseboards. To accommodate the installation of the K Series Drywall frames on finished drywall construction, they are supplied with a KD (knock-down) corner for quick installation.

### Installation

1. Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) Recommended Erection Instructions for Steel Frames.
2. Fire Rated Assemblies must be in accordance with NFPA Pamphlet 80. The Authority Having Jurisdiction is the final authority in issues related to the installation and use of installed Fire Rated Doors.

### Features and benefits

Steelcraft K Series Drywall frames include unique features which enhance long-term functionality and durability:

1. **Quick and flexible installation** of Steelcraft's K Series Drywall frames facilitates their installation in minutes and they can be relocated without damage to the frame.
2. **Die-mitered corner connections** of the K Series Drywall Frame corners lock together once the frame is installed. The tab/lock design:
  - a. prevents the head from rising
  - b. keeps the head and jamb members in alignment
  - c. keeps the miter tight
  - d. includes wedge-lock corner clips. Screws are supplied to secure miter.
3. **Sill attachment** is made through the face of the frame directly into the wall sill runner. The frame is supplied with factory countersunk holes for the screw attachment.
4. **Factory prepared** for field installed silencers.
5. **Factory applied baked-on rust inhibiting primer** in accordance with ANSI A250.10-2011.

### Specification compliance

1. Overall frame construction for Steelcraft K Series Drywall frames meet the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6. Locations are in accordance with ANSI/DHI A115 unless otherwise stated.

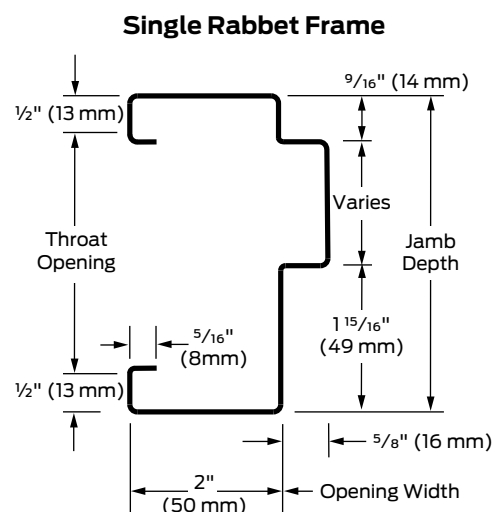
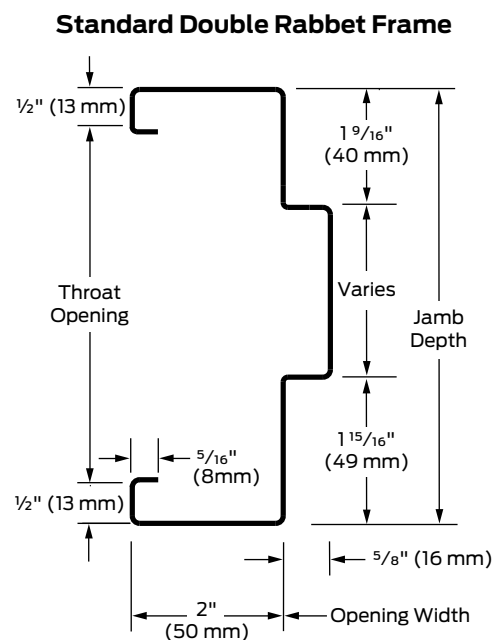
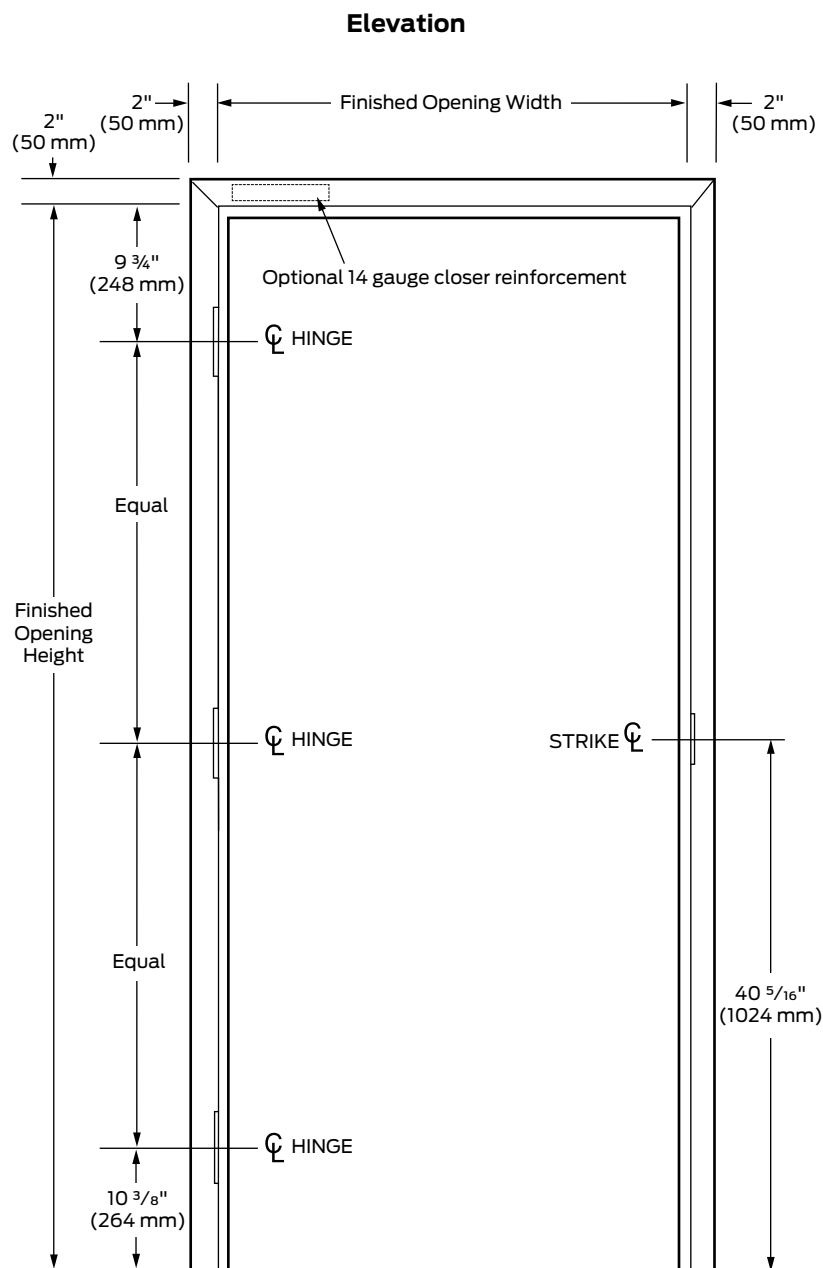
### Fire ratings

The K Series Drywall frames meet the broadest fire rating requirements. They are listed for installations requiring compliance to both neutral pressure testing (ASTM E152 and UL 10B) and positive pressure standards (UL 10C). Refer to the **Fire Rated Section** of this manual for particular listings.

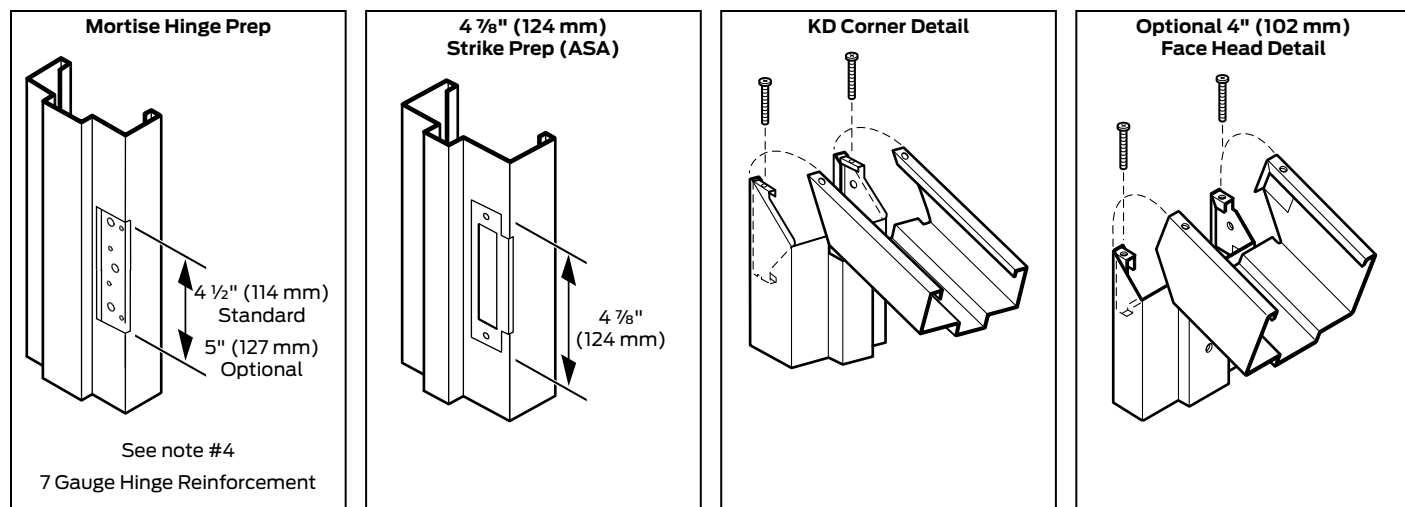
### Applications

Steelcraft K Series Drywall frames are typically installed in wall construction types as defined in the chart below:

Frame applications			
Profile	Steel thickness	Wall construction	Typical wall anchors
K16	16 Gauge [0.053" (1.3 mm)]	Drywall partitions with wood or steel stud	Compression jamb anchor(s) with factory countersunk holes for screw attachment directly to the wall sill runner
K14	14 Gauge [0.067" (1.7 mm)]	Drywall partitions with wood or steel stud	Compression jamb anchor(s) with factory countersunk holes for screw attachment directly to the wall sill runner



Frame sizing options										
Series	Maximum opening size		Jamb depth availability (profile)				Standard profile dimensions (variations available)			Corners
	Single	Pair	Single rabbet		Double rabbet		Face	Stop	Returns	Standard
			Min.	Max.	Min.	Max.				
K16	4'0" x 9'0" (1219 mm x 2743 mm)	8'0" x 9'0" (2439 mm x 2743 mm)	3 1/4" (83 mm)	4 3/8" (111 mm)	4 1/2" (114 mm)	14 3/4" (375 mm)	2" (51 mm)	5/8" (16 mm)	1/2" (13 mm)	DIE MITERED Wedge Lock Corner with interlocking soffit tab
K14	4'0" x 9'0" (1219 mm x 2743 mm)	8'0" x 9'0" (2439 mm x 2743 mm)	3 1/4" (83 mm)	4 3/8" (111 mm)	4 1/2" (114 mm)	14 3/4" (375 mm)	2" (51 mm)	5/8" (16 mm)	1/2" (13 mm)	DIE MITERED Wedge Lock Corner with interlocking soffit tab

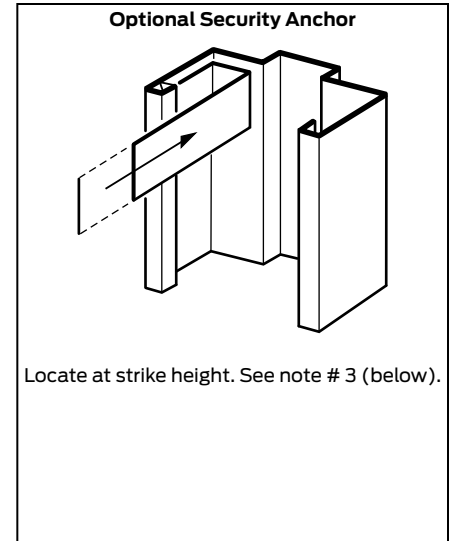
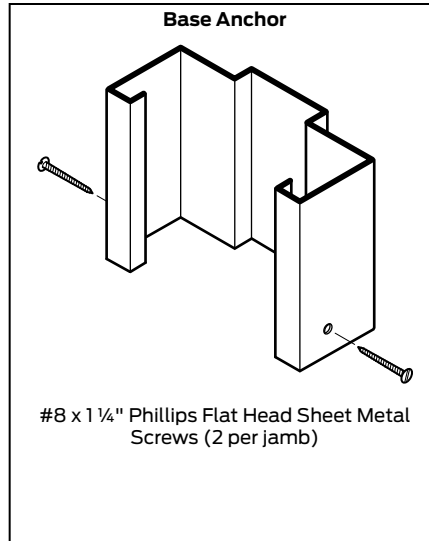
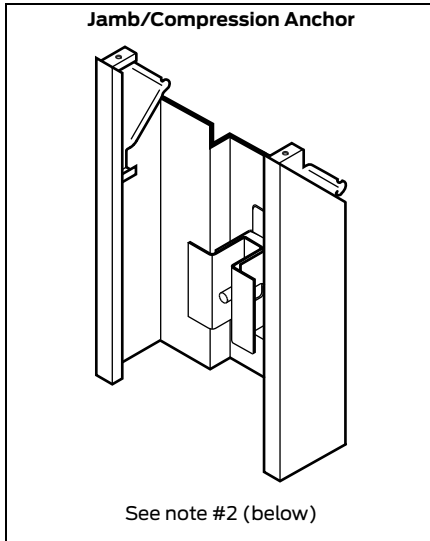


### General notes

- Variations in jamb depths available in 1/8" (3 mm) increments.
- All K Series frames are supplied standard with field adjustable compression anchors located near the top of each jamb and factory countersunk holes for direct screw attachment to the wall runner.
  - The compression anchor can be easily adjusted with a screw driver or power driver.
  - A fastener [typically a drywall screw (by others)] is installed through the factory countersunk hole for attachment directly to the floor runner (sill) when not using wall baseboards.
- Depending on environmental and usage conditions, the steel used can be either cold rolled or galvanized. Galvanized steel is recommended in areas of high moisture.
- K Series frames are supplied standard with 4 1/2" standard duty hinge preps. Optional universal 4 1/2" or 5" hinge preps are available.
- K Series with 4" heads are used mainly when installed in close proximity to a F Series or MU Series frame installed with a 4" head.

Frame options							
Series	Frame profile		Corner connections				4" (102 mm) Heads
			KD (Knock-down)		SUA (Set-up & weld)		
	Single rabbet	Double rabbet	Single rabbet	Double rabbet	Single rabbet	Double rabbet	
K16	Typically for walls less than 3 ¾" (95 mm) thick. Minimum walls thickness = 2" (51 mm)	Typically for walls less than 3 ¾" (95 mm) thickness or greater	Factory Die-Mitered, Soffit Tab included. Corner clip assembly screws required on labeled frames.		N/A		Die-mitered for use with 2" (51 mm) face jambs. Corner Clip assembly screws required.
K14							

N/A - Not Available



### Anchoring and installation notes

- K Series Drywall frames** are supplied with field adjustable compression anchors in each jamb. The base of each jamb is anchored to the wall by installing screws through the factory prepared anchor holes. K Series frames are designed especially for use in applications not using base boards.
- For anchoring applications, refer to the Frames: Anchoring systems section of this manual.**
- Optional security anchor:** Security anchors are recommended in frames over 8'0" (2438 mm) high or in frames installed in areas where security is a priority. Locate the security anchor immediately above or below the strike reinforcements, and on both faces of the jamb. Anchors may be used in both the strike and hinge jamb. Also recommend to be used in the head of the frame for pairs.
- Grouting of the K Series frames** is not recommended.
- Installation shall conform to the published Steelcraft installation instructions, SDI 105 Recommended Installation Instructions for Steel Frames.
- All fire rated frames must be installed in accordance with NFPA Pamphlet 80 and the Authority Having Jurisdiction.

Framing applications							
Series	Steel type	Building type	Opening	Usage frequency <sup>1</sup>	KD Corner <sup>4</sup>	SUA Corner	Applications
K16	Non-Galvannealed <sup>2</sup>	Institutional and Commercial	Interior	Heavy to extra heavy duty	✓	N/A	Typical building conditions where base boards are not being used
	Galvannealed <sup>3</sup>						
K14	Non-Galvannealed <sup>2</sup>	Institutional and Commercial	Interior	Extra heavy to maximum duty	✓	N/A	Typical building conditions where base boards are not being used
	Galvannealed <sup>3</sup>						

<sup>1</sup> Usage frequency is based on ANSI A250.8-2014 (SDI 100)

<sup>2</sup> Commercial quality carbon steel

<sup>3</sup> Reinforcements for galvannealed frames are also galvannealed

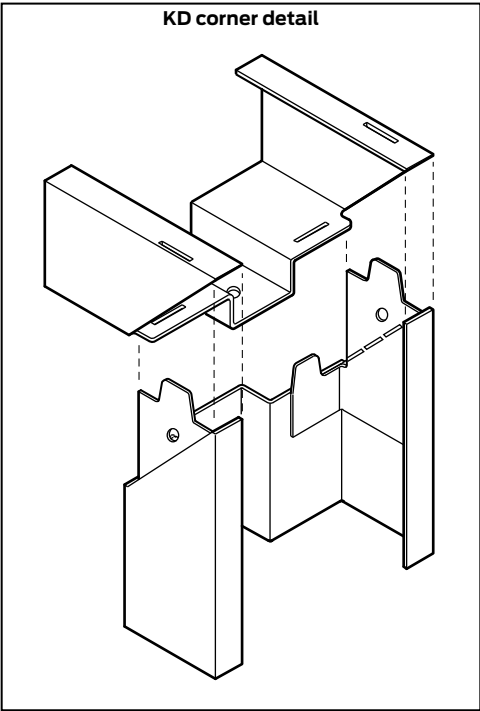
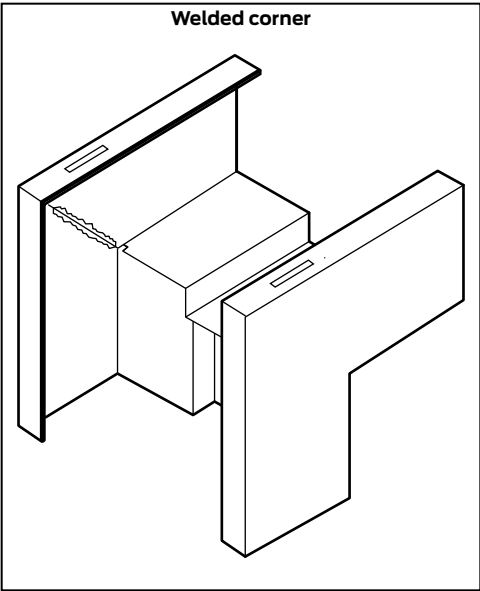
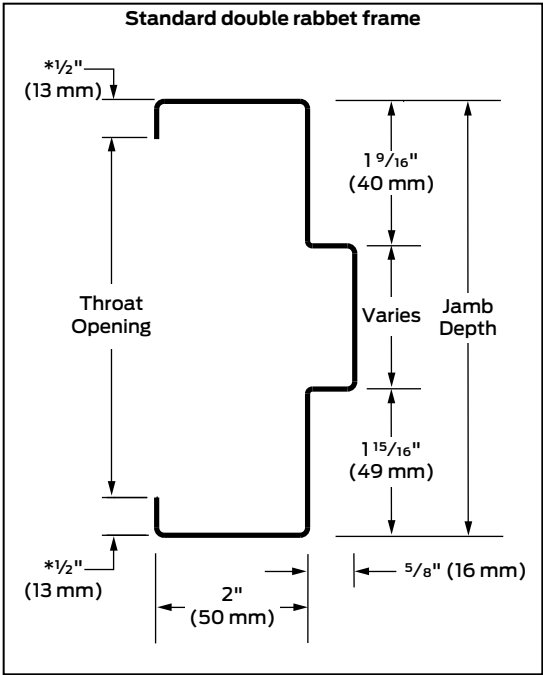
<sup>4</sup> Knock-Down for field assembly prior to installation

# Frame variations and options

Profile Variations.....	54	Anchoring systems .....	78
Standard F Series double rabbeted .....	54	F, FN, MU, FE, and DE Series Flush Frames .....	78
F Series frames.....	55	Anchor Locations:.....	79
F Series 4" heads: F16, F14.....	56	Stud wall applications .....	79
FE Series frames options .....	57	DW and K Series drywall frames.....	80
FE Series double egress frames.....	58	Wire masonry .....	82
Application.....	58	Masonry T.....	82
Purpose .....	58	Yoke & strap masonry.....	82
Product availability .....	58	Butterfly existing wall .....	83
DE Series frames.....	59	Hat spacer existing wall.....	83
DE Series double egress frames .....	60	Tube & strap existing wall .....	83
Standard DW, K, and MU Series double rabbeted frames.....	61	Universal stud.....	84
DW, K, and MU Series frames .....	62	Wood stud .....	84
4" Head: DW, K, and MU Series frames.....	63	Wood stud .....	84
Silencer preparations.....	64	Closed steel stud .....	85
Dutch doors .....	65	Flush steel stud .....	85
Non-labeled .....	65	Recessed steel stud.....	85
Labeled.....	66	Field adjustable base.....	86
Communicating frames .....	67	Fixed base .....	86
Hospital stops.....	68	Compression jamb.....	86
Terminated or sanitary steps.....	68	Security anchor (optional) for DW and K Series.....	87
Head reinforcement, 12 gauge full width channel.....	69	Adjustable base for DW Series .....	87
Lead lined.....	70	Base for K Series .....	87
Clips .....	70	Mullion base .....	88
Rough buck frames .....	71	Sill section base .....	88
Applied stops .....	72	Corner post base .....	88
Hardware .....	73		
High frequency hinge reinforcement F and FE Series .....	73		
Automatic operators .....	73		
Thick doors.....	74		
Over 1 3/4" thru 3" thick .....	74		
Weather seals.....	75		
PS-074™ Surface applied weatherstrip.....	75		
Throat fillers.....	76		
Rigid vinyl.....	76		
Kerf frames.....	77		
Integral.....	77		

Profile Variations

Standard F Series double rabbet



F Series unequal rabbet frames

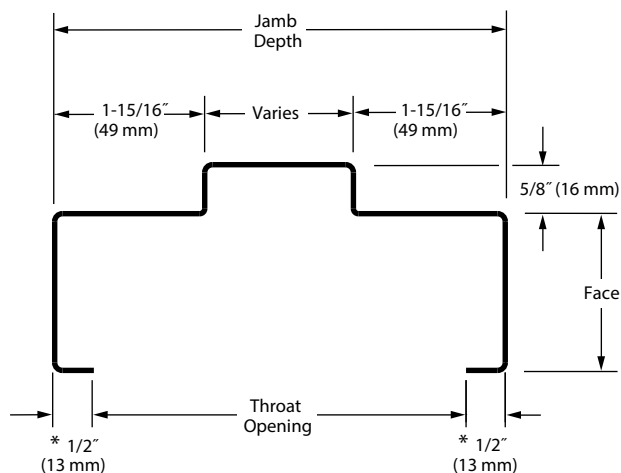
Gauge:	16 Ga. (1.3 mm), 14 Ga. (1.7 mm)
Jamb depth:	4 ½" (121 mm) min. thru 20" (508 mm) in ½" (3.2 mm) increments
Face:	Standard 2" (50 mm). Non-standard 1" (25.4 mm) thru 4" (102 mm) in ½" (3.2 mm) increments
*Backbend:	⅞" (11 mm) for 5 ¾" Frame depth
Miter:	45° die miter with 4 interlocking tabs for welded

Notes:

1. F Series (2" face) and FN Series (1" face) are available KD or welded. All other frames with custom face dimensions must be welded prior to installation.
2. Tabs in Rabbeted area should be bent outward, not inward, during assembly.

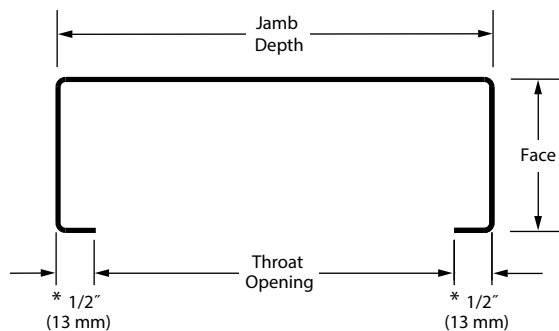
## F Series frames

### F Series equal rabbet frames



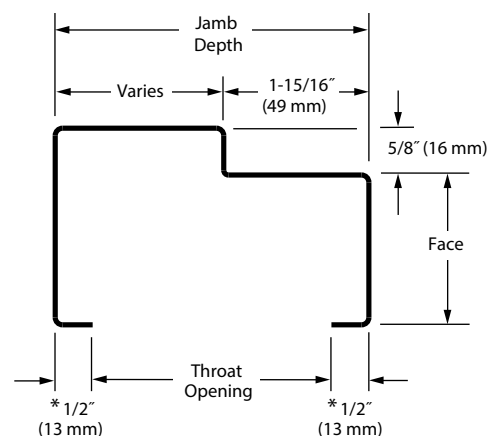
Gauge:	16 Ga. (1.3 mm), 14 Ga. (1.7 mm)
Jamb depth:	4 7/8" (124 mm) min. thru 20" (508 mm) in 1/8" (3.2 mm) increments
Face:	Standard 2" (50 mm). Non-standard 1" (25.4 mm) thru 4" (102 mm) in 1/8" (3.2 mm) increments
*Backbend:	7/16" (11 mm) for 5 3/4" Frame depth
Miter:	45° die miter with 4 interlocking tabs for welded

### F Series cased open frames



Gauge:	16 Ga. (1.3 mm), 14 Ga. (1.7 mm)
Jamb depth:	3" (76 mm) min. thru 20" (508 mm) in 1/8" (3.2 mm) increments
Face:	Standard 2" (50 mm). Non-standard 1" (25.4 mm) thru 4" (102 mm) in 1/8" (3.2 mm) increments
*Backbend:	7/16" (11 mm) for 5 3/4" Frame depth
Miter:	45° die miter with 4 interlocking tabs for welded

### F Series single rabbet frames

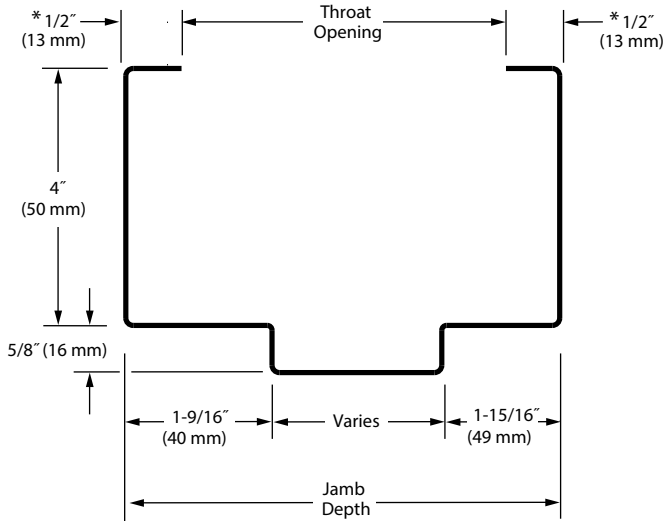


Gauge:	16 Ga. (1.3 mm), 14 Ga. (1.7 mm)
Jamb depth:	3" (76 mm) min. thru 20" (508 mm) in 1/8" (3.2 mm) increments
Face:	Standard 2" (50 mm). Non-standard 1" (25.4 mm) thru 4" (102 mm) in 1/8" (3.2 mm) increments
*Backbend:	7/16" (11 mm) for 5 3/4" Frame depth
Miter:	45° die miter with 4 interlocking tabs for welded

#### Notes:

1. F Series (2" and 1 1/2" face) and FN Series (1" face) are available KD or welded. All other frames with custom face dimensions must be welded prior to installation.

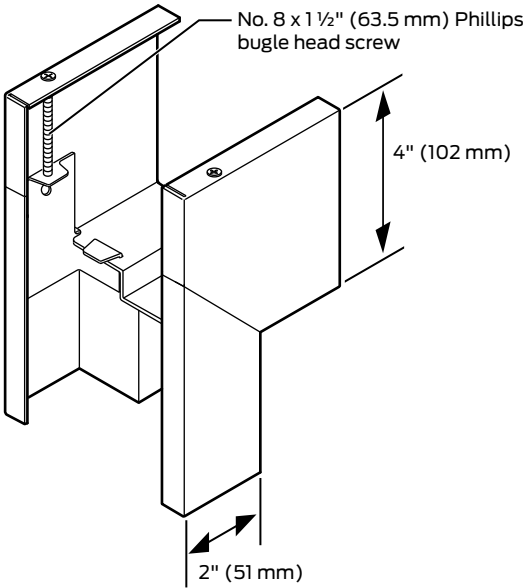
F Series 4" heads: F16, F14



Profile variation:	Unequal, equal cased open
Jamb depth:	4 1/2" through 20" in 1/8" increments
*Backbend:	7/16" (11 mm) for 5 3/4" Frame depth
Miter:	Die mitered, tabs vary with profile variations

Notes:

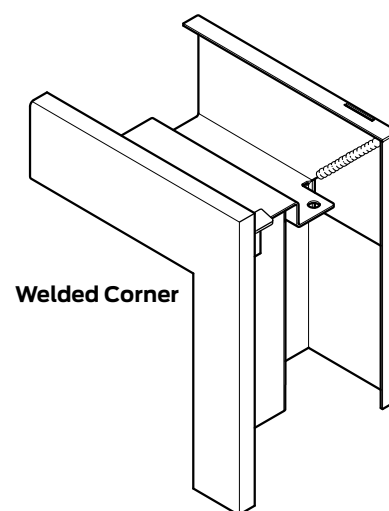
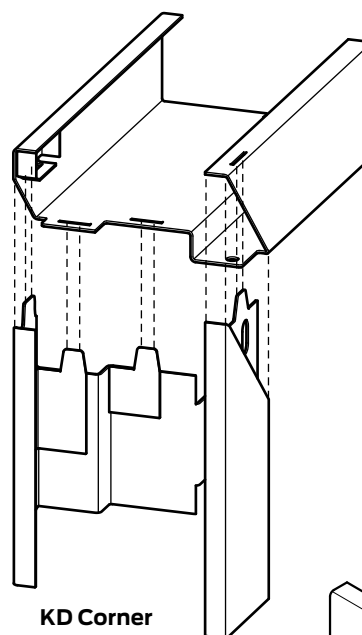
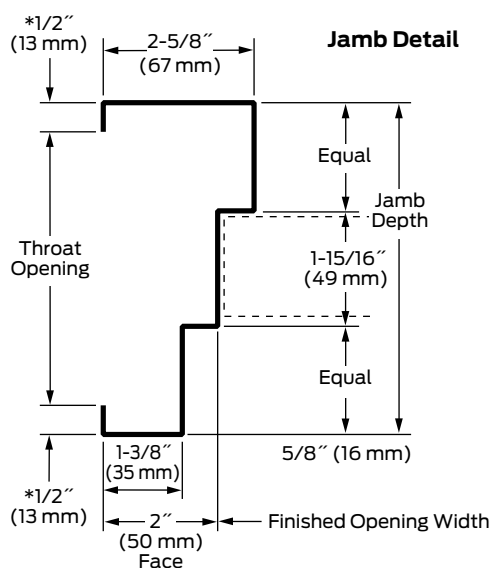
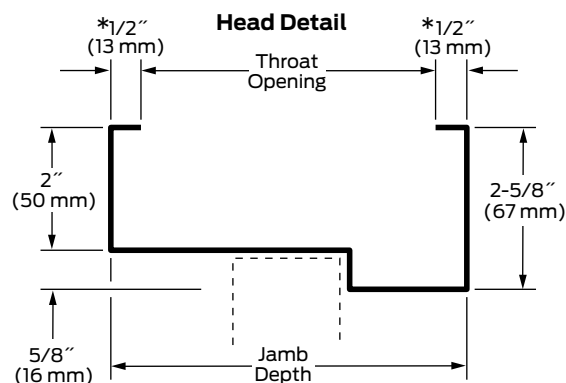
- Frames with 4" heads are used mainly in masonry applications when 2" face heads do not match block coursing.
- Tabs in rabbeted area should be bent outward, not inward, during assembly (as shown).





## FE Series frames options

### FE Series Conventional double egress frames

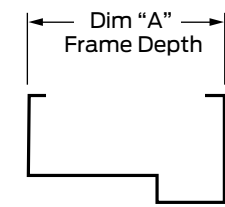


Gauge:	16 Ga. (1.3 mm), 14 Ga. (1.7 mm)
Jamb depth:	4 3/4" (121 mm) min. thru 14" (356 mm) in 1/8" (3.2 mm) increments
Face:	Standard 2" (50 mm). Non-standard 1" (25.4 mm) thru 4" (102 mm) in 1/8" (3.2 mm) increments
*Backbend:	7/16" (11 mm) for 5 3/4" Frame depth
Miter:	45° die miter with 4 interlocking tabs or welded

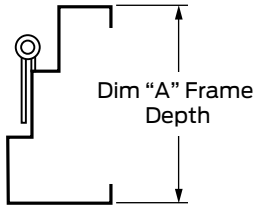
#### Notes:

1. Conventional FE Series double egress heads have a different profile from the jambs. Both heads and jambs are considered to have a 2" face.
2. Since the door is mounted on the centerline of the jamb depth, the 2" face of the jamb includes an 1 3/8" visible face and a 5/8" additional stop.
3. The door opening dimension of Steelcraft FE Series double egress frames is 1/8" undersized to insure proper door center clearances are maintained. Door widths must be adjusted accordingly when using wood or non-Steelcraft doors.
4. Tabs in Rabbeted area should be bent outward, not inward, during assembly (as shown).

## FE Series double egress frames

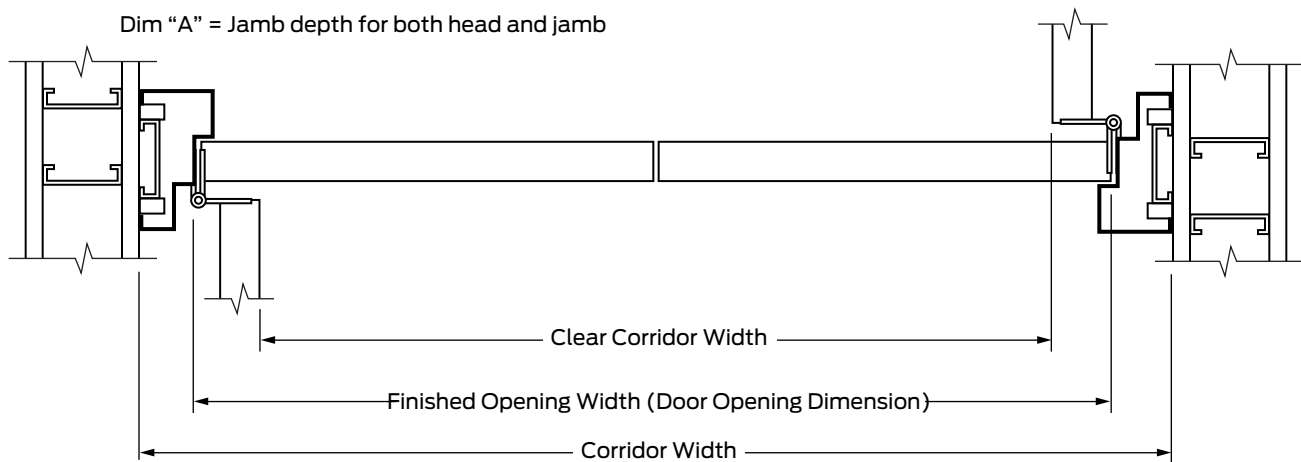


Head Detail  
FE Series



Jamb Detail  
FE Series

Dim "A" = Jamb depth for both head and jamb



**Finished opening width (Door Opening Dimension) is the dimension from the frame door rabbet to the opposite rabbet.**

- **Note:** FE and DE Series double egress frames are  $\frac{1}{8}$ " (3.2 mm) undersized from the standard nominal opening width. Example: 6'0" (1829 mm) head = 71  $\frac{7}{8}$ " net width in lieu of the standard 72".

**Clear Opening Width is the dimension between doors, measured from door face to door face, when both doors are open 90 degrees.**

- **Note:** This dimension is critical for compliance with handicapped accessibility.

**Corridor Width is the actual dimension between walls in a corridor.**

- **Note:** This dimension is critical in sizing the finished opening width (Door Opening Dimension) of the double egress frame.

### Application

FE Series double egress frames are designed for use in cross corridor application where clear opening width is not of major concern. Conventional butt or continuous hinges are used. For applications where clear opening width is critical the DE Series double egress frame is recommended.

### Purpose

FE Series double egress frames are used in cross corridor application for traffic and smoke control.

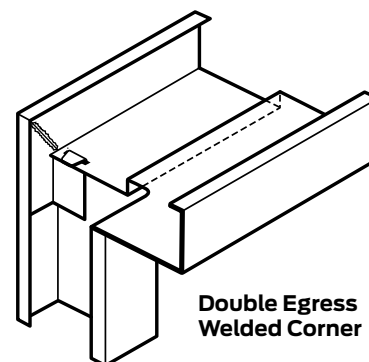
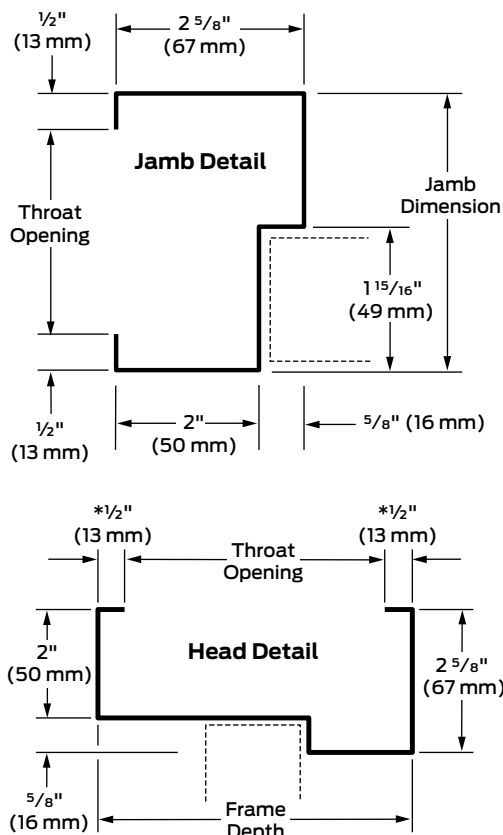
### Product availability

This product option is available for the following Steelcraft frame Series:

- FE16 and FE14 in depths from 4  $\frac{3}{4}$ " (121 mm) to 14" (356 mm).

## DE Series frames

DE Series double egress frames for clear width corridor applications



Dimension "A" head	Dimension "B" jamb
Frame depth	Jamb dimension
4 3/4"	3 11/32"
5 1/4"	3 19/32"
5 3/4"	3 27/32"
6 1/4"	4 3/32"
6 3/4"	4 11/32"
7 1/4"	4 19/32"
7 3/4"	4 27/32"
8 1/4"	5 3/32"
8 3/4"	5 11/32"
9 1/4"	5 19/32"
9 3/4"	5 27/32"
10 1/4"	6 3/32"
10 3/4"	6 11/32"

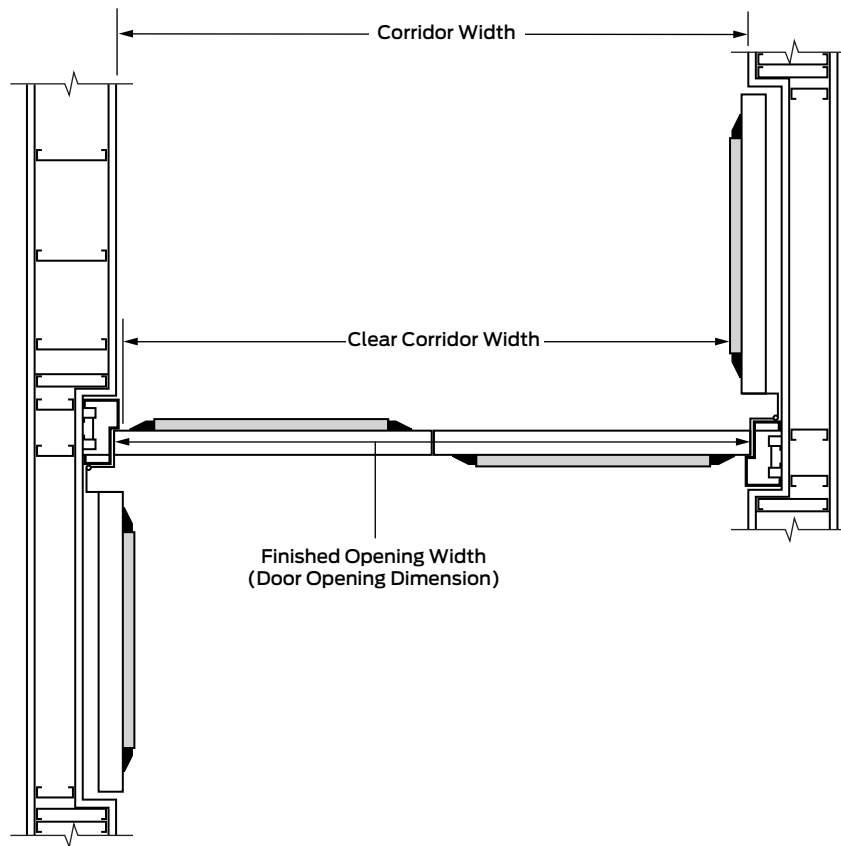
**Note:** When ordering DE Series frames, Dimension "A" specifies the frame jamb depth.

Gauge:	6 Ga. (1.3 mm), 14 Ga. (1.7 mm)
Jamb depth:	4 3/4" (121 mm) min. thru 14" (356 mm) in 1/8" (3.2 mm) increments
Face:	Standard 2" (50 mm). Non-standard 1" (25.4 mm) thru 4" (102 mm) in 1/8" (3.2 mm) increments
*Backbend:	7/16" (11 mm) for 5 3/4" Frame depth
Miter:	45° die miter be welded prior to most installation

### Notes:

- Face dimensions on the DE Series frames are 2" faces for on both heads and jambs.
- Frame depth varies for head to jambs. This variation allows for larger clear opening widths for handicapped accessibility.
  - Frame depth (head):** This is the jamb depth of the head and is the size specified when ordering.
  - Jamb dimension (jamb):** This is the actual jamb depth of the vertical frame member. This dimension is not specified when ordering. Refer to table for additional clarification.
- The door opening dimension of Steelcraft DE Series double egress frames is 1/8" undersized to insure proper door center clearances are maintained. Door widths must be adjusted accordingly when using wood or non-Steelcraft doors.
- Tabs in rabbeted area should be bent outward, not inward, during assembly (as shown).

## DE Series double egress frames



**Finished opening width (Door Opening Dimension) is the dimension from the frame door rabbet to the opposite rabbet.**

- Note: FE and DE Series double egress frames are  $\frac{1}{8}$ " (3.2 mm) undersized from the standard nominal opening width. Example: 6'0" (1829 mm) head = 71  $\frac{7}{8}$ " net width in lieu of the standard 72".

**Clear Opening Width is the dimension between doors, measured from door face to door face, when both doors are open 90 degrees.**

- Note: this dimension is critical for compliance with handicapped accessibility.

**Corridor Width is the actual dimension between walls in a corridor.**

- Note: this dimension is critical in sizing the finished opening width (Door Opening Dimension) of the double egress frame.

### Application

DE Series double egress frames are designed for use in cross corridor application where clear opening width is of major concern. Swing clear hinges or pocket pivot hinges are used. For applications where clear opening width is not critical the FE Series double egress frame is recommended.

### Purpose

DE Series double egress frames are used in cross corridor application for traffic and smoke control.

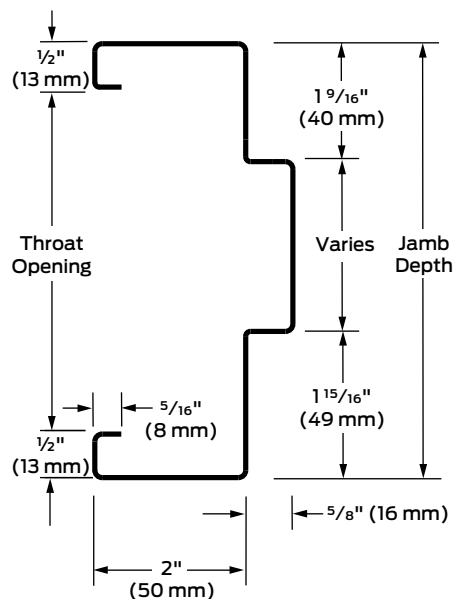
### Product availability

This product option is available for the following Steelcraft frame Series:

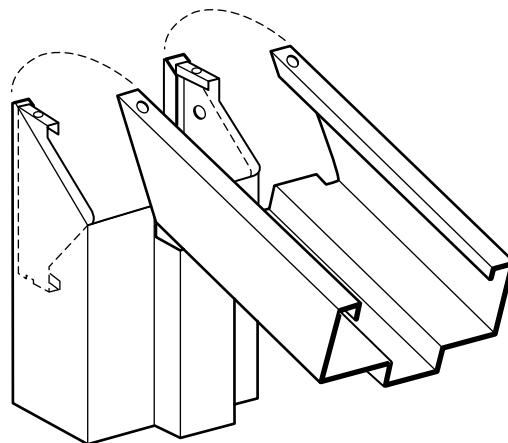
- DE16 and DE14 in depths from 4  $\frac{3}{4}$ " (121 mm) to 14" (356 mm)

## Standard DW, K, and MU Series double rabbeted frames

### Standard Double Rabbet Frame



### KD Corner Detail



### DW, K, and MU Series

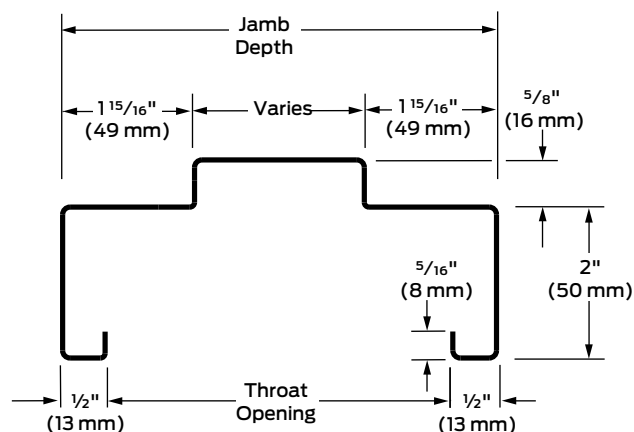
Gauge:	6 Ga. (1.3 mm), 14 Ga. (1.7 mm)
Jamb depth:	DW and K = 4 1/2" (114 mm) thru 14 3/4" (375 mm) in 1/8" increments MU = 4 3/4" (114 mm) thru 20" (508 mm) in 1/8" increments
Face:	Standard 2" (50 mm)
Miter:	45° die miter with soffit tab and interlocking corner clip.

### Notes:

1. DW and K Series are installed KD.
2. MU Series can be installed KD or welded.
3. Equal rabbet frames are supplied when specified or in communicating frame applications (refer to page 68).
4. Cased open frames are used for double acting door or applied stop applications (refer to page 73).
5. Narrow double rabbet frames are used for jamb depths below 4 1/2".
6. KD Corner includes wedge-lock corner clips. Screws are supplied to secure miter. Screws are supplied for all MU Series label and non-label, and for DW and K Series label only.

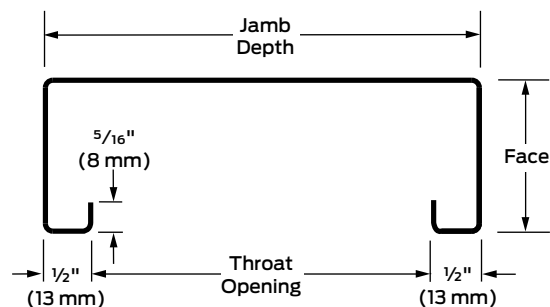
## DW, K, and MU Series frames

### DW, K, and MU Series equal rabbet frames



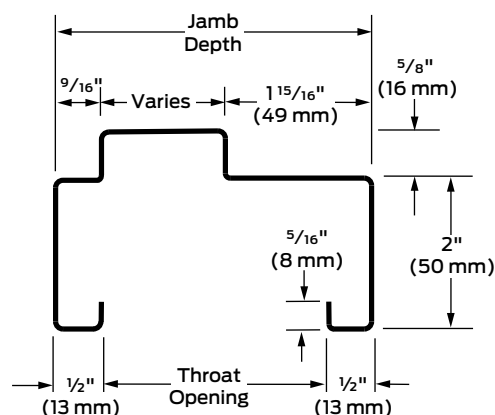
Gauge:	16 Ga. (1.3 mm), 14 Ga. (1.7 mm)
Jamb depth:	4 7/8\" (124 mm) min. thru 14 3/4\" (375 mm) in 1/8\" (3.2 mm) increments
Face:	Standard 2\" (50 mm)
Miter:	45° die miter with soffit tab and interlocking corner clip.

### DW, K, and MU Series cased open frames



Gauge:	6 Ga. (1.3 mm), 14 Ga. (1.7 mm)
Jamb depth:	3 1/4\" (133 mm) min. thru 14 3/4\" (375 mm) in 1/8\" (3.2 mm) increments
Face:	Standard 2\" (50 mm)
Miter:	45° die miter with soffit tab and interlocking corner clip.

### DW, K, and MU Series single rabbet frames

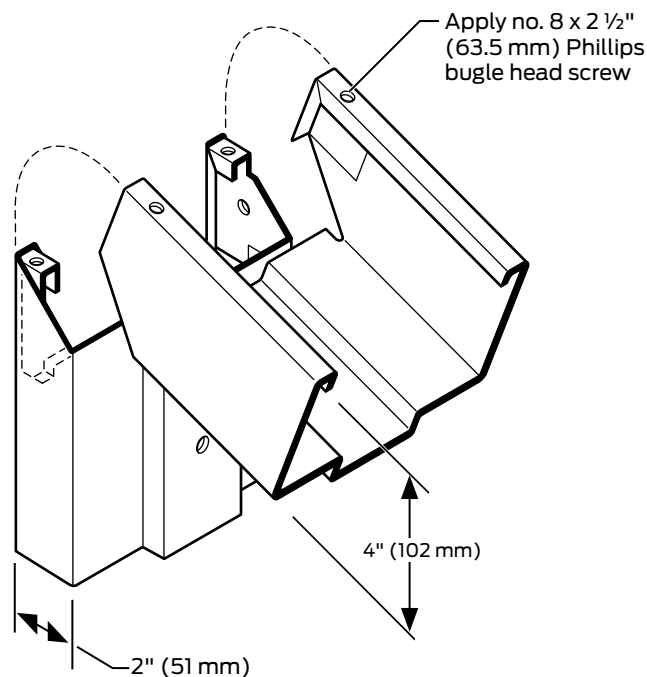
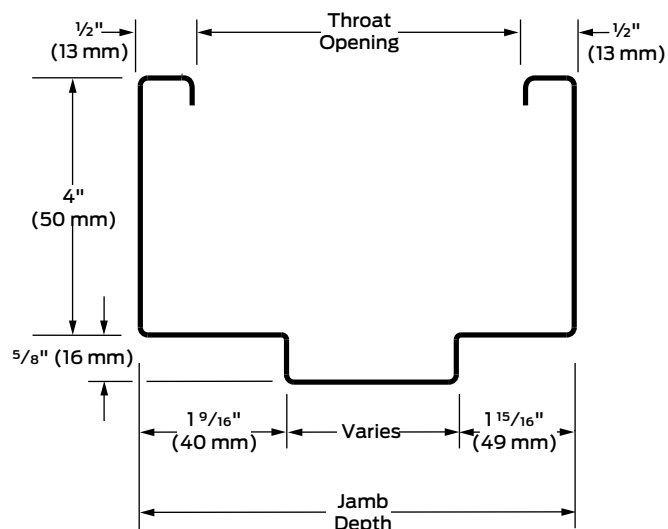


Gauge:	6 Ga. (1.3 mm), 14 Ga. (1.7 mm)
Jamb depth:	3 1/4\" (133 mm) min. thru 4 3/8\" (111 mm) in 1/8\" (3.2 mm) increments
Face:	Standard 2\" (50 mm)
Miter:	45° die miter with soffit tab and interlocking corner clip.

#### Notes:

1. DW and K Series are installed KD
2. MU Series can be installed KD or welded.
3. Equal rabbet frames are supplied when specified or in communicating frame applications (refer to page 68).
4. Cased open frames are used double acting door or applied stop applications (refer to page 73).
5. Single rabbet frames are used for jamb depths below 4 1/2\".

#### 4" Head: DW, K, and MU Series frames



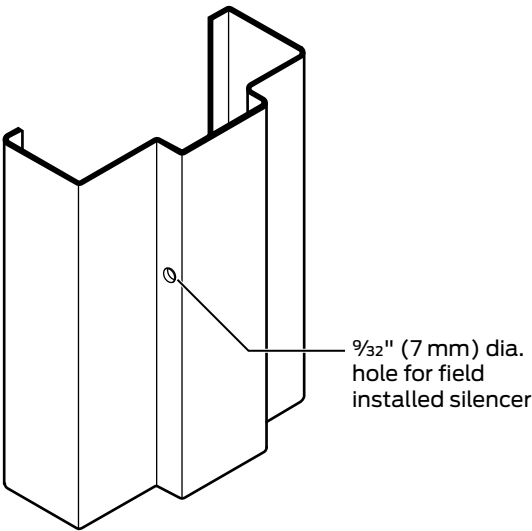
#### DW16, DW14, K16, K14, MU16, and MU14

Profile variation:	Unequal, equal or single rabbet, cased open
Jamb depth:	3 $\frac{1}{4}$ " through 14 $\frac{3}{4}$ " in $\frac{1}{8}$ " increments

#### Notes:

1. MU Series frames with 4" heads are used mainly in masonry applications when 2" face heads do not match block coursing.
2. DW and K Series with 4" heads are used mainly, when installed in close proximity to a F Series or MU Series frame installed with a 4" head.
3. DW, KD, and MU corners includes wedge-lock corner clips. Screws are supplied to secure miter.

Silencer preparations



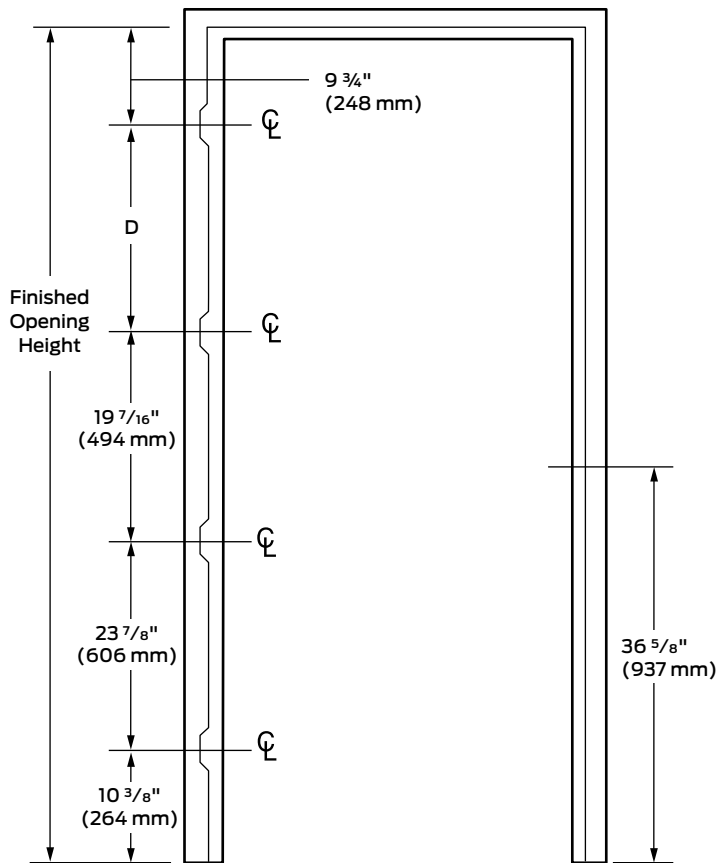
F, FN, FE, DE, MU, DW, and K Series frames both open and closed sections

Description:	Frames are supplied factory prepared for field installed silencers (3 per strike jamb and/or 2 per double door head).	Caution:	When frames are to be grout filled, it is the responsibility of the installing contractor to guard off the silencer holes.
		Exceptions:	Field applied self adhesive silencers are used on all mullions.



## Dutch doors

### Non-labeled



Door opening height	Dimension "D"
6'8" (2032 mm)	16 9/16" (421 mm)
7'0" (2134 mm)	20 9/16" (522 mm)
7'2" (2184 mm)	22 9/16" (573 mm)

#### Application

- Single Swing applications only: no double door configurations.
- Standard Dutch Door Frame Openings are prepared for:
  - 4 1/2" (114 mm) x 4 1/2" (114 mm) universal hinge reinforcements, 1 pair per leaf.

High Frequency Hinge Reinforcements are installed at the top hinge for each door leaf.

- One (1) ASA 4 7/8" (124 mm) high ANSI A115.1 or 2 strike aligned for top and bottom leaf.
- Optional Strike Preparations for the Top Leaf include:
  - One (1) ASA 2 3/4" (70 mm) high ANSI A115.3 strike aligned for top and bottom leaf, or
  - One (1) CYL 4 7/8" (124 mm) high ANSI A115.1 or 2 strike or one (1) ASA 2 3/4" (70 mm).
- Sizes available from 2'0" (610 mm) x 6'8" (2032 mm) thru 4'0" (1219 mm) x 8'0" (2438 mm).

#### Purpose

Together with the use of a dutch door shelf, dutch doors can be viewed as an extension of nearby counter tops as well as allowing the passage of materials without opening the entire door leaf.

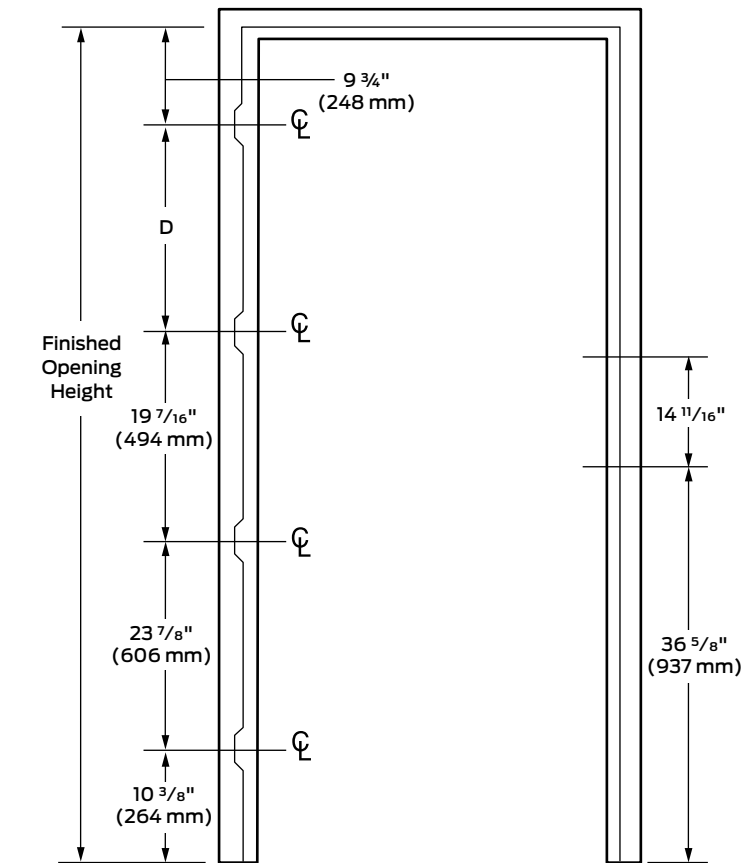
#### Product availability

This product option is available for the following Steelcraft frame Series:

- F16, F14, FN16, FN14, MU16, and MU14 in depths from 3 1/4" (83 mm) to 20" (508 mm).
- DW16, DW14, K16, and K14 in depths from 3 1/4" (83 mm) to 14 3/4" (372 mm).

Refer to pages 136-140 in the Door Section of this manual for information of applicable dutch doors.

Labeled



Door opening height	Dimension "D"
6'8" (2032 mm)	16 9/16" (421 mm)
7'0" (2134 mm)	20 9/16" (522 mm)
7'2" (2184 mm)	22 9/16" (573 mm)

Labeled application

- Refer to pages 136-140 in the Door Section of this manual for information of applicable dutch doors.
- Maximum 3 hour approval in sizes up to 4'0" x 7'2". Refer to the Fire Rated section of this manual for fire rated approvals.

Purpose

Together with the use of a dutch door shelf, dutch doors can be viewed as an extension of nearby counter tops as well as allowing the passage of materials without opening the entire door leaf.

Product availability

This product option is available for the following Steelcraft labeled frame Series:

- F16 and F14 in depths from 3" (76 mm) to 14" (356 mm).
- MU16 and MU14 in depths from 3 1/4" (83 mm) to 14" (356 mm)

Application

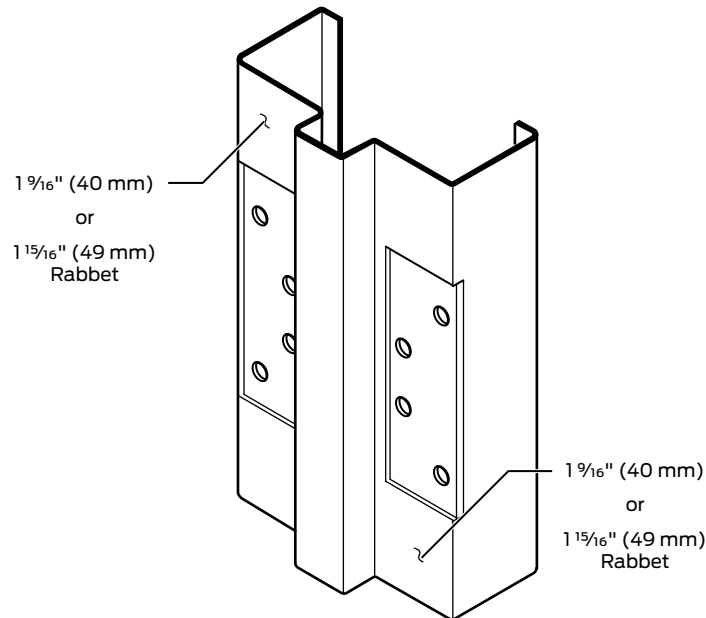
- Single Swing applications only: no double door configurations.

- Hinge preparations for standard dutch door frame openings include:
  - 4 1/2" (114 mm) x 4 1/2" (114 mm) universal hinge reinforcements, 1 pair per leaf.
  - High Frequency Hinge Reinforcements are installed at the top hinge for each door leaf.
- Optional Strike Preparations for the Top Leaf include:
  - One (1) ASA 4 7/8" (124 mm) high ANSI A115.1 or 2 strike aligned for top and bottom leaf, or

One (1) CYL 2 3/4" (70 mm) high ANSI A115.3 strike aligned for top and bottom leaf, or

- One (1) ASA 4 7/8" (124 mm) high ANSI A115.1 or 2 strike or one (1) CYL 2 3/4" (70 mm) high ANSI A115.3 strike aligned for the bottom leaf due to the latch bolt from the top leaf projecting into the strike preparation in the bottom leaf (see pages 138-140).
- Frame head is equipped with a closer reinforcement.
- Sizes available from 2'0" (610 mm) x 6'8" (2032 mm) thru 4'0" (1219 mm) x 7'2" (2184 mm)..

## Communicating frames



### Labeled application

Maximum 3 hour approval in sizes up to 4'0" x 8'0" single doors or 8'0" x 8'0" pairs. Refer to the Fire Rated section of this manual for fire rated approvals.

### Application

These Frames are prepared for hanging a door in each rabbet.

1. 1 15/16" (49 mm) rabbets are prepared for 1 3/4" (45 mm) doors.
2. The 1 9/16" (40 mm) rabbets are prepared for 1 3/8" (35 mm) doors.
3. 1 3/8" (35 mm) x 1 3/4" (45 mm) doors can be accommodated.

These communicating frames are primarily used in the Hospitality Segment of building types to separate two (2) adjoining rooms.

### Purpose

Communicating frames provide security for both adjoining rooms: each door is locked from the occupied side of each room.

### Product availability

This frame option is available for the following Steelcraft Series of Frames:

- FN16, FN14, F16, F14, MU16, and MU 14 for Singles and Pairs.
- DW16, DW14, K16, and K14 for Single Swing only.

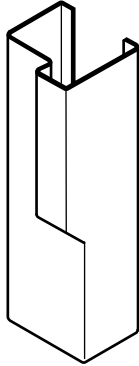
### Note:

1. When using DW and K Series Frames, doors are to be hinged on opposite jambs.

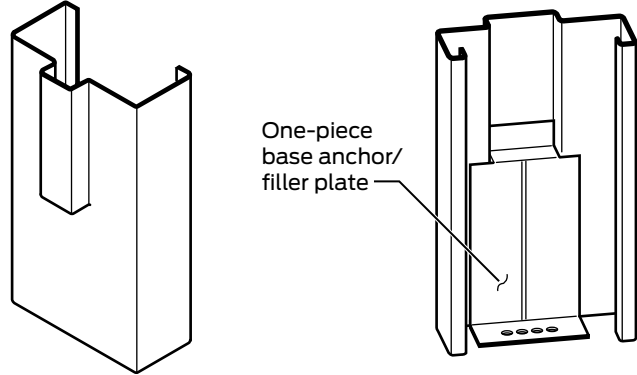
## Hospital stops

### Terminated or sanitary steps

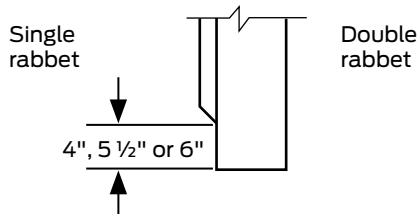
Single rabbet



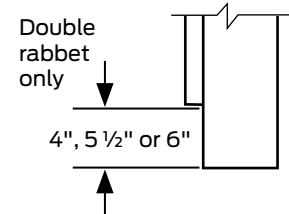
Double rabbet



45° hospital stops



90° hospital stops



#### Note:

1. 45° Hospital stops are measured from the bottom of the frame to the bottom of the 45° stop miter.

#### Application

- Frames with Hospital stops are primarily used in the health care segment where cleanliness is required.
- Frames with optional hospital stop preparations include stops which do not run the full height of the frame.
- The stop terminates above the floor line and is closed with a 45° or 90° angle.

#### Purpose

The stop terminating above the floor line allows for easier cleaning and minimizes the build-up of germs, bacteria and residue at the floor level of the door opening.

#### Product availability

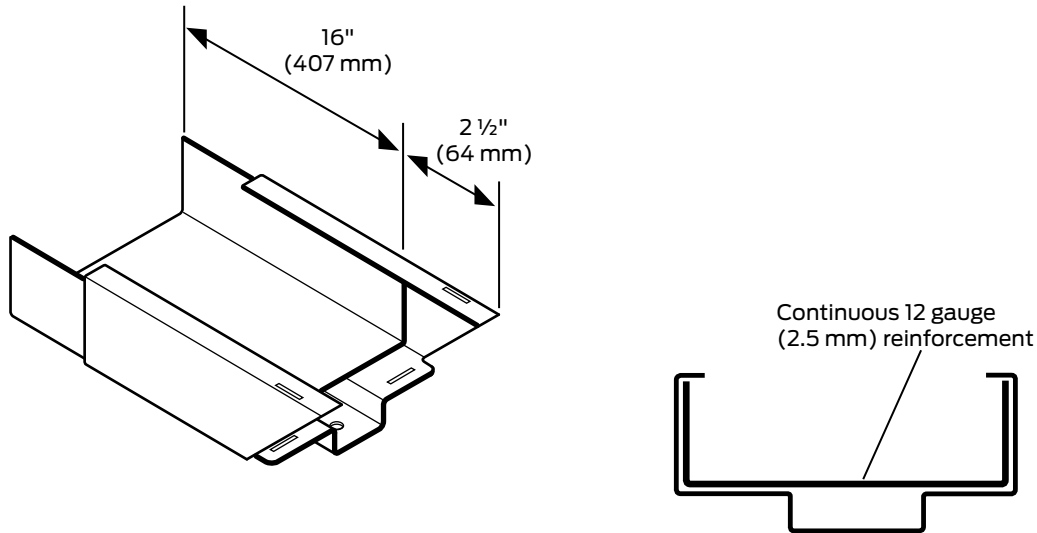
This frame option is available for the following Steelcraft Series Frames:

- Single Rabbet 45° only: F16 and F14
- Double Rabbet 45°: FN16, FN14, F16, F14, DW16, DW14, K16, K14, MU16, and MU14
- Double Rabbet 90°: FN16, FN14, F16, F14, DW16, DW14, K16, K14, MU16, and MU14
- Weld-in base anchors are included as standard and not available without.
  - F and MU Series frames come standard with weld-in one-piece base anchor/filler plates, which are not available as omit.
- Standard base anchors for DW and K Series will remain available

#### Labeled application

- Maximum 3 hour approval in sizes up to 4'0" x 8'0" single doors or 8'0" x 8'0" pairs. Refer to the Fire Rated section of this manual for fire rated approvals
- Frames with hospital stop are available for smoke and draft applications.
- Only 4" Hospital stops with EMA anchored frames may be labeled. When using EMA anchors, the max height of hospital stop is 4"

## Head reinforcement, 12 gauge full width channel



### Application

Continuous head reinforcement channels are used at the specifiers' discretion to safe guard against head sag in door opening usually over 6'0" in width. The 12 gauge continuous head reinforcement is 1" (25 mm) less in length than the nominal head size, i.e., a head for a 6'0" (1829 mm) pair of doors would require a 71" (1803 mm) long continuous head reinforcement:

- Welded into frame head
- Minimum 2" (50 mm) face dimension
- Length, other than standard, must be specified

### Purpose

When there is concern for the weight of overhead wall construction, or, when multiple surface applied hardware components are being used, this continuous steel channel has the ability to spread and transfer the load to the floor through the jambs while also providing the necessary strength and thickness for thread engagement.

**Note:** Hollow metal frames, with or without the optional continuous head reinforcement, are not designed as or intended to be a load bearing member of wall construction.

### Product availability

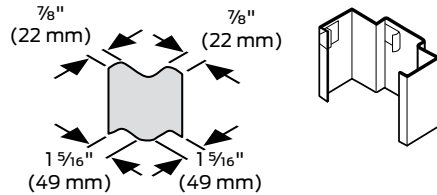
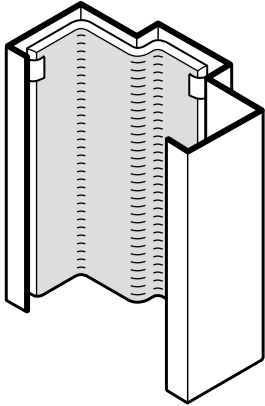
This optional frame component is available for the following Steelcraft standard double rabbet profile Series frames: F16, F14, MU16, MU14, DW16, DW14, K16, and K14.

- Also available on standard FE or DE Series double egress frames

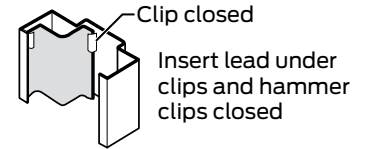
## Lead lined

### Clips

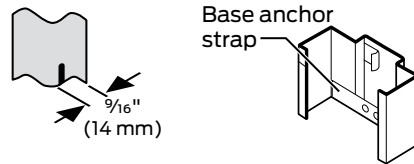
(all lead lining supplied by owners)



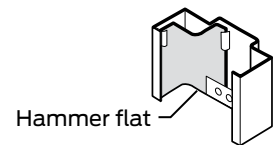
Form lead, as shown, to fit over guards. Open clips are provided for the installation of the lead.



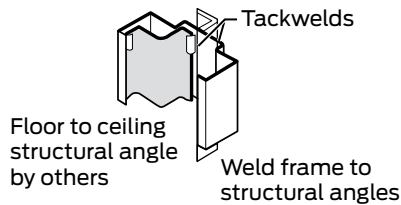
Clip closed  
Insert lead under clips and hammer clips closed



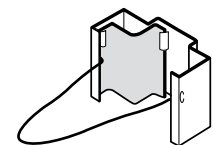
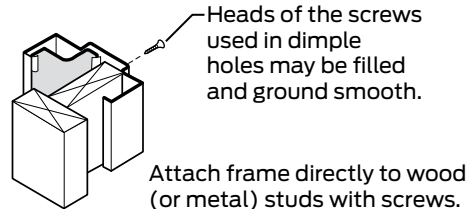
Cut lead to fit around base anchor strap



Hammer flat  
Fit lead around these anchor strap and flatten for the installation of the base anchor.



Floor to ceiling structural angle by others



Standard wire masonry anchor

### Application

Lead lined frames are intended for use in the X-ray Room locations in Health Care facilities.

- Frames are supplied knock-down (KD). Frame preparation and installation of lead lining by others.
- Thickness of lead varies as required or specified for the type of equipment being used.
- Lead is located on the door side of the frame, covering the inside surfaces of the face, rabbet, stop and part, or all, of the soffit. Lead linings are to be overlapped at the miters of the frame.
- It is recommended that the installation of the lead be done by a local lead contractor who may also be installing lead in the walls, floor and ceiling of the room where the lead lined frame is being used.
- For masonry wire anchoring applications only with all others being subject to the authority having jurisdiction.

### Purpose

Attachment clips are furnished for the installation of lead lining in frames used in X-Ray rooms.

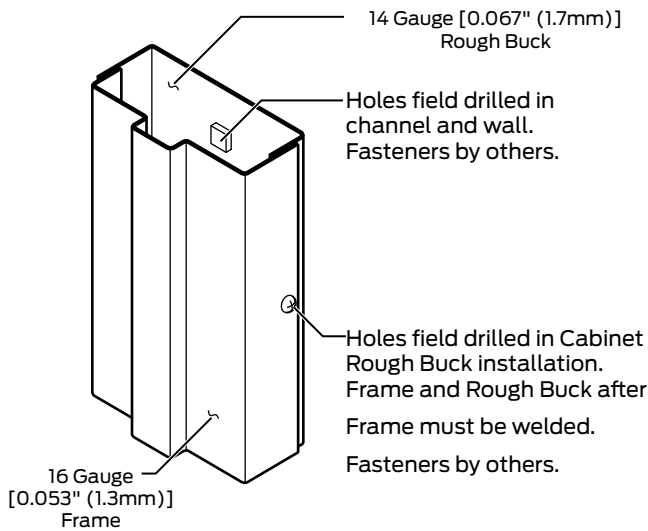
### Product availability

This product option is available for Steelcraft labeled or non-labeled F and MU Series Frames.

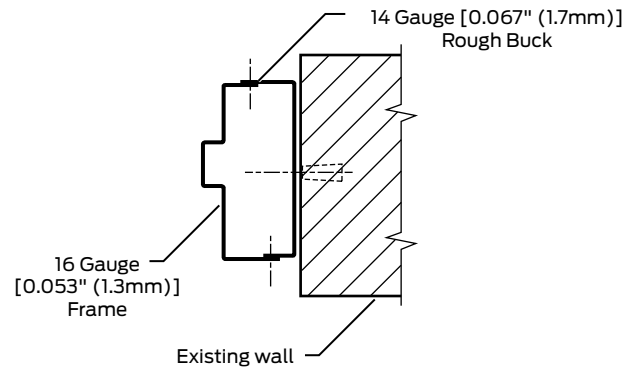
### Notes:

- Lead supplied by others.
- CAUTION: Any cutting of lead to fit around hardware reinforcements can cause leakage of X-Rays through the frame.
- The doors, walls and other perimeter construction must also include integral lead lining.
- Wire masonry anchors only (labeled and non-labeled)

## Rough buck frames



Typical wall detail



### Application

Rough Buck (Cabinet) frames are specialty frames that include a sub-channel (Rough Buck). The sub-channel is attached to an existing wall condition. The exposed steel (Cabinet Frame) is then attached to the sub-channel with fasteners provided by others.

Rough Buck (Cabinet) frames are rarely used. They are usually installed in pre-cast existing masonry wall applications.

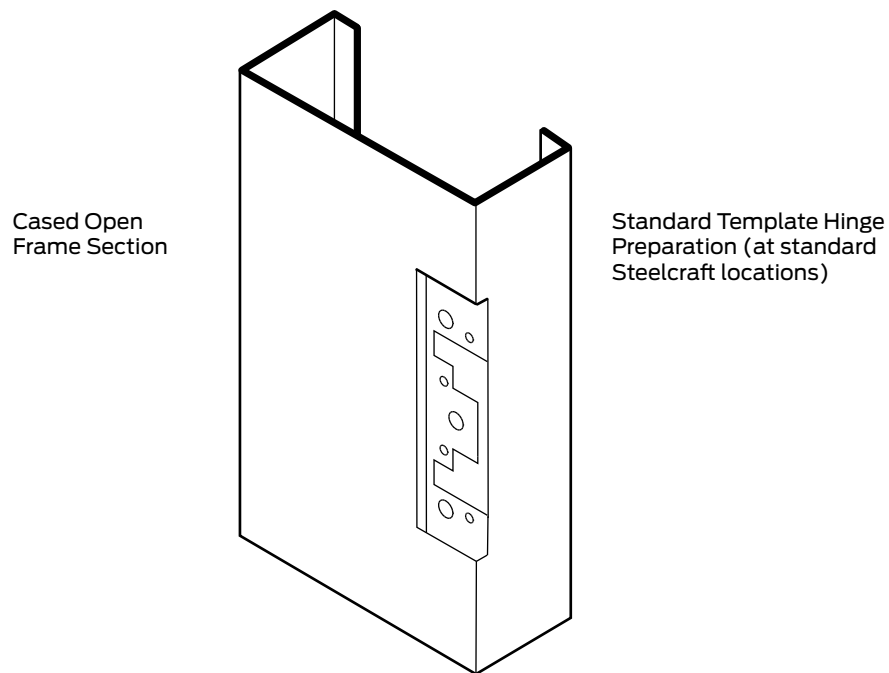
### Purpose

Using this frame application allows contractors to install the Rough Buck relatively early in the construction cycle. The finished frame (Cabinet Frame) is then installed at a later date.

### Product availability

This frame option is available on special order only. It is a Non-Stock item. It is available as a non-labeled frame only.

## Applied stops



### Application

Frames with applied stops are used in commercial and/or institutional applications where sound control is a consideration. Frames configured as Cased Open sections can be prepared for standard template hinges at standard Steelcraft vertical locations. Applied stops, manufactured by others, can be attached to the center portion of the frame either as a hardware item, for safeguarding acoustical control, weather stripping or for spring adjustable sealing. The field applied stop must provide a  $1\frac{9}{16}$ " (40 mm) rabbet to accommodate a  $1\frac{3}{8}$ " (35 mm) thick door, or a  $1\frac{5}{16}$ " (49 mm) rabbet accommodating a  $1\frac{3}{4}$ " (45 mm) thick door.

### Purpose

Frames for applied stops provide versatility for the building owner to accommodate security, sound attenuation or weather protection using integrated sealing hardware.

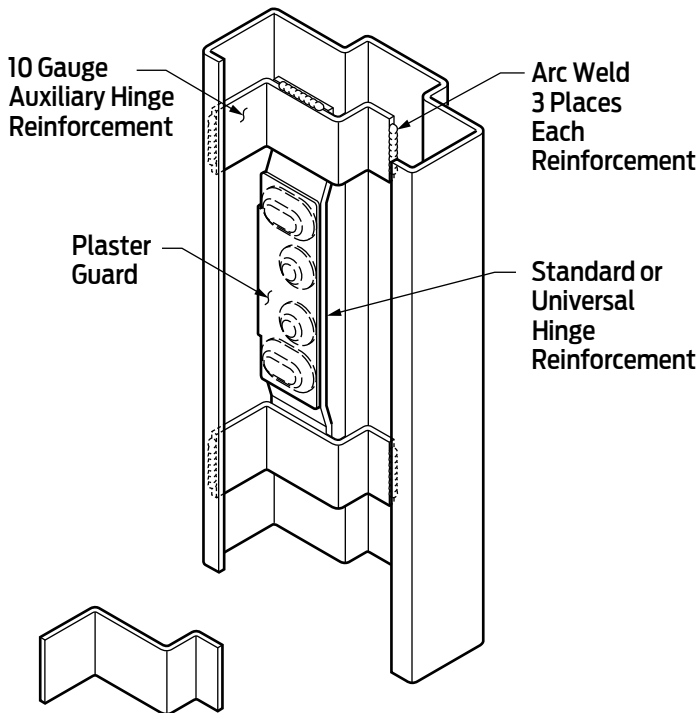
### Product availability

This frame option is available as non-labeled only for the following Steelcraft Series of frames: FN16, FN14, F16, F14, MU16 and MU 14, DW16, DW14, K16, and K14.



## Hardware

### High frequency hinge reinforcement F and FE Series



Auxiliary Hinge Reinforcement  
3HR0103P002-GL

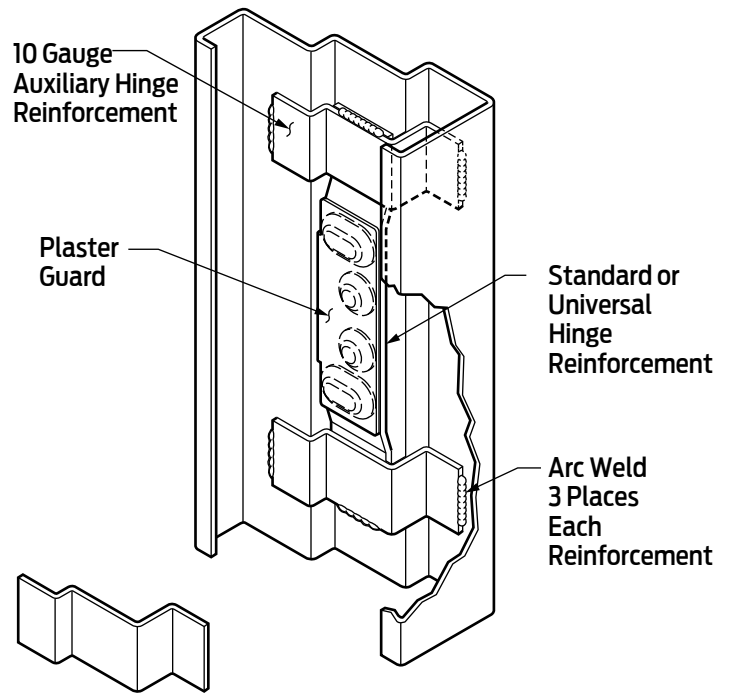
#### Application

High frequency hinge reinforcements are installed in frames located in high abuse areas of commercial and/or institutional facilities formed to match the contour of the frame, the 10 gauge (3 mm) auxiliary hinge reinforcement is arc welded in 3 locations of the frame:

- The frame face
- The 7 gauge (4.7 mm) hinge reinforcement (projection welded to the frame at the factory)
- The soffit section The auxiliary reinforcement is primarily applicable to the top hinge reinforcement of 4 ½" (114 mm) or 5" (127 mm) hinge reinforcements, but may be used on other hinge locations when specified.

#### Automatic operators

- Automatic Operators, such as those from LCN <http://us.allegion.com/en/home/support/library.html> (search "automatic operators" filtered by LCN; Catalogs) or any manufacturer, place a great deal of stress on the hinges of a frame and can cause failure. When using automatic operators with butt hinging systems any frame used must include all of the following:
  - High frequency hinge reinforcing installed
  - 14 gauge steel
  - 5" heavy weight hinges



Auxiliary Hinge Reinforcement  
3HR0102P001-GL

#### Purpose

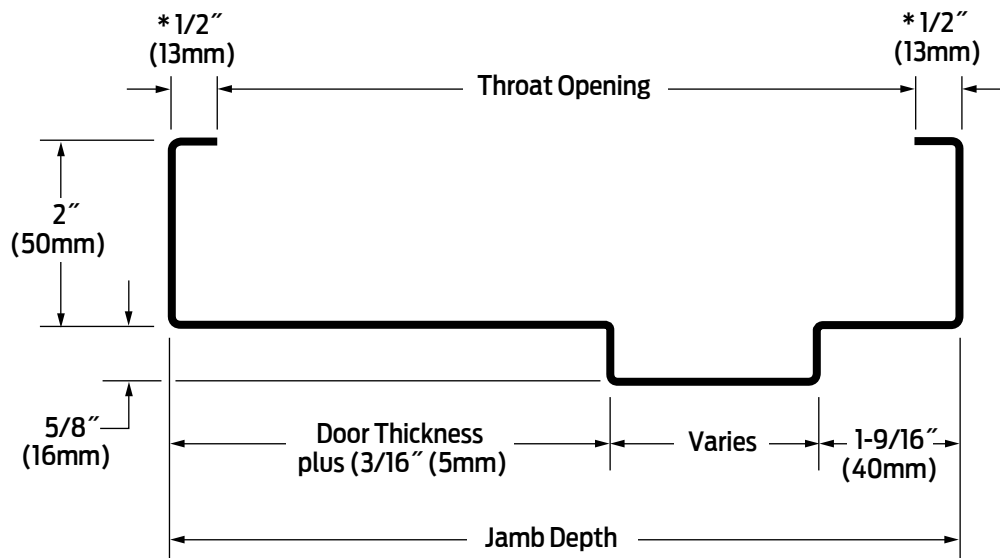
The optional high frequency hinge reinforcement provides additional strength to the 4 ½" (114 mm) or 5" (127 mm) hinge reinforcement specified for use in high abuse openings, including dutch doors, and doors with automatic operators.

#### Product availability

High frequency hinge reinforcements are available factory installed, or, may be installed in the local Steelcraft distributor's fabrication shop and is applicable to all series of Steelcraft labeled and non-labeled steel frames.

## Thick doors

Over 1 3/4" thru 3" thick



**\*Backbend:** 7/16" (11 mm) for 5 3/4" Frame depth

### Application

- Door rabbet to be equal to the door thickness plus 3/16" (5 mm) for clearances
- Backset on Hinge preparation must be specified:
  - Regular Weight
  - Heavy Weight
- Backset on Strike preparation must be specified
- Frame must be welded

### Purpose

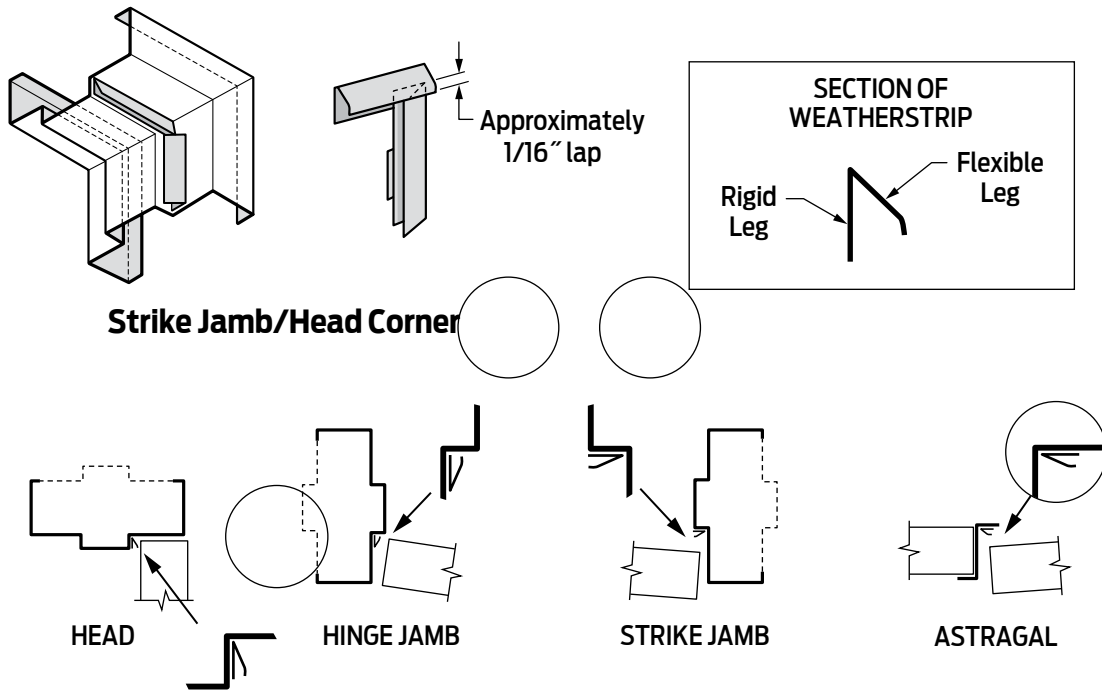
To accommodate the varying thickness of Specialty doors requiring a standard frame profile.

### Product availability

This special frame option is available for Labeled and Non-labeled 16 gauge (1.3 mm) and 14 gauge (1.7 mm) Steelcraft F and FN Series frames.

## Weather seals

### PS-074™ Surface applied weatherstrip



#### Application

The Weatherstrip is manufactured from a flexible, black plastic material (TPE) that is resistant to paint migration, impervious to fatigue and capable of withstanding extreme temperatures:

- Ideal temperature range to apply PS-074 Weatherstrip is 70°F to 90°F (21°C to 32°C).
- PS-074™ should not be applied when the temperature is below 50°F (10°C) or above 100°F (38°C).
- Warranted shelf life of adhesive is 12 months when stored at 70°F (21°C) and 50% relative humidity.
- When tested in accordance with ASTM E-283 (air infiltration) and ASTM E-331 (water resistance) PS-074 Weatherstrip had an air infiltration rate of .074 cubic feet per minute, per lineal foot of crack, and, no water leakage.

#### Purpose

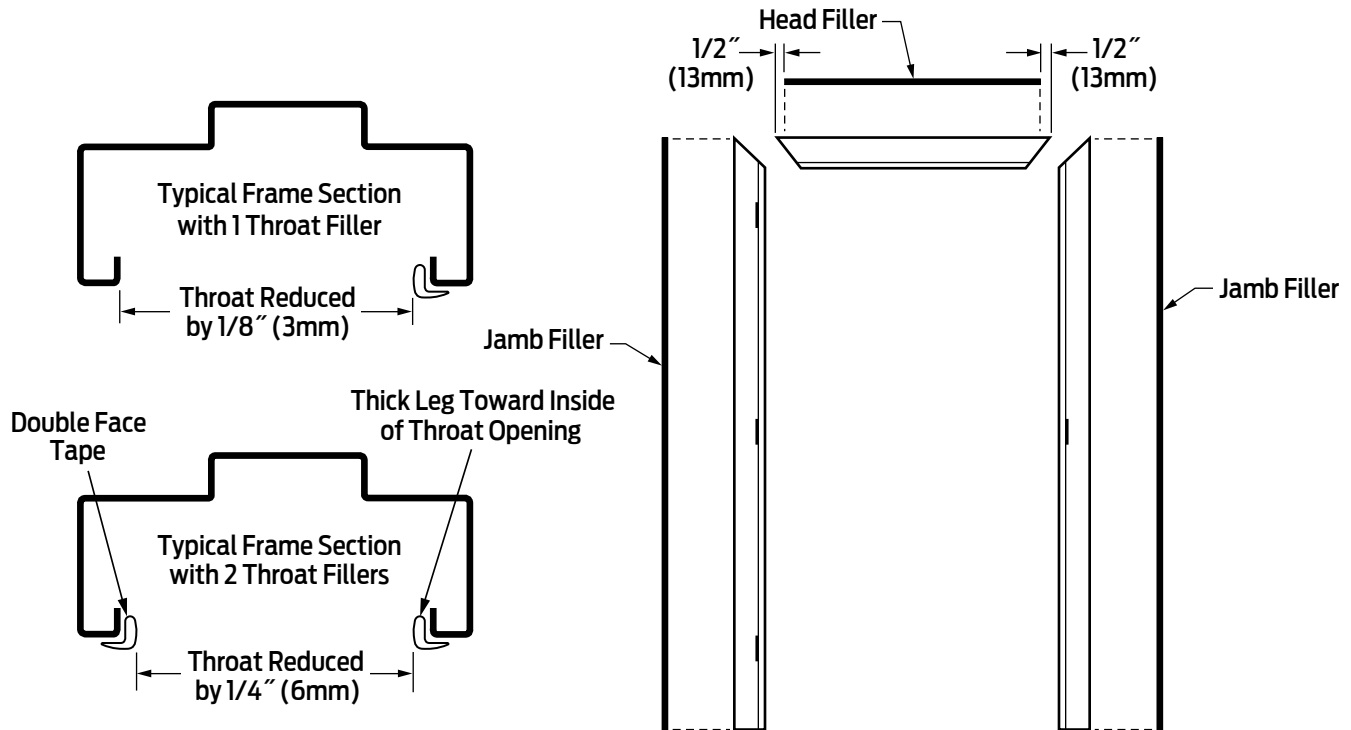
Steelcraft PS074 Weatherstrip, when applied to frames and overlapping astragals, will perform as an effective seal against adverse weather conditions.

#### Product availability

This product is available from factory inventory and can be applied to the full line of Steelcraft frames. Application to label frames is subject to the Authority Having Jurisdiction.

## Throat fillers

### Rigid vinyl



#### Application

The Steelcraft Throat filler is made of extruded rigid vinyl:

- Sections supplied with double faced tape applied to the inside lip for installation on frame backbends.
- Standard length of Throat filler sections is 87" (2210 mm) to ensure continuous sections that accommodate heights up to 7'2" (2184 mm).
- To be applied to the backbend(s) of frames after they have been installed on the wall:
  - Jamb filler(s) are to be equal to the overall length of the jamb backbend.
  - Head filler(s) are to be 1" (25 mm) less than the overall length of the head backbend.

#### Purpose

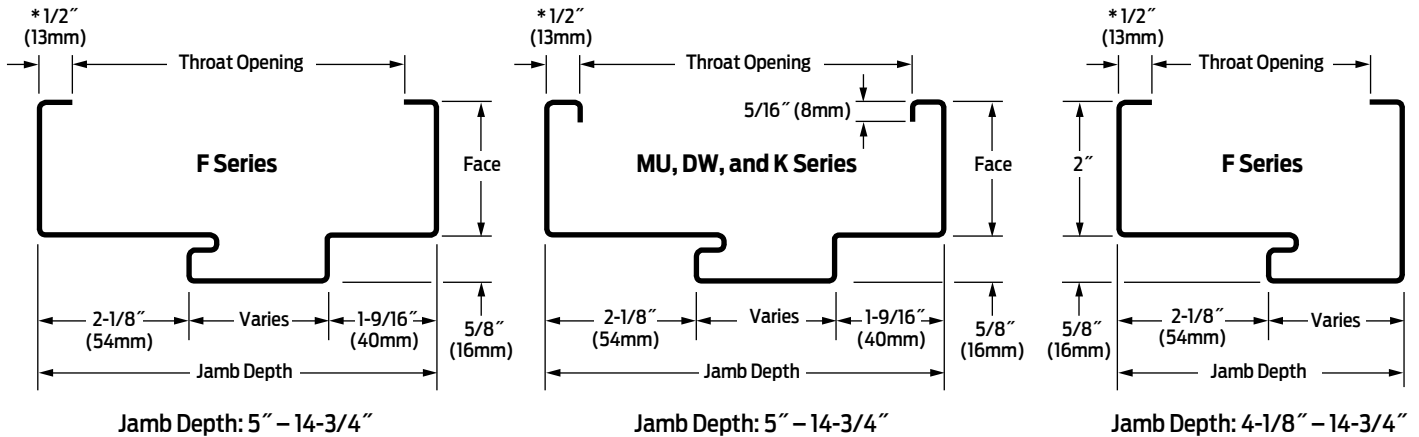
When wall thickness is between 1/8" (3 mm) to 1/4" (6 mm) less than the frame throat dimension, Throat filler section(s) can be used to fill the gap, assuring the proper amount of grip required to complete the installation.

#### Product availability

This optional frame component is available from factory inventory and is applicable to Steelcraft non-labeled DW and K Series frames.

## Kerf frames

### Integral



**Gauge:** 16 Ga. (1.3 mm)

#### Jamb Depth:

- F, MU, DW, and K Series: 5" (127 mm) min. through 14 3/4" (375 mm) for standard profile.
- F Series: 4 1/8" (105 mm) min. through 14 3/4" (375 mm) for single rabbet
- Note: EMA anchors require minimum jamb depth of 5 5/8" for standard profile frames.

**Face:** Standard 2" (51 mm) face head and jamb dimensions with 4" (102 mm) face head optional on equal and unequal rabbet only.

**Miter:** 45° die miter with soffit tab and interlocking corner clip.

**Opening Size:** 8'0" x 8'0" (2439 mm x 2439 mm) maximum.

**Profile Options:** 1 15/16" (49 mm) or 1 9/16" (40 mm) equal rabbet profiles or single rabbet profiles.

**\*Backbend:** 7/16" (11 mm) for 5 3/4" frame jamb depth on F Series only.

#### Application

The Integral Kerf frame is intended for use in areas, interior or exterior, which require a further reduction in air flow from the door and frame. The kerf material is manufactured from a durable, UV-resistant, polyethylene cladding covering the urethane foam. The gasket material complies with UL 10C. They have also passed the water penetration test up to 34 mph per ASTM E-331.

- Frames are supplied knock-down as standard with gasket material shipped loose for insertion into frame by others.

- Replacement gasket material can be found in the Parts section of the price manual.

#### Product availability

This optional frame feature is available for the following Steelcraft frame series:

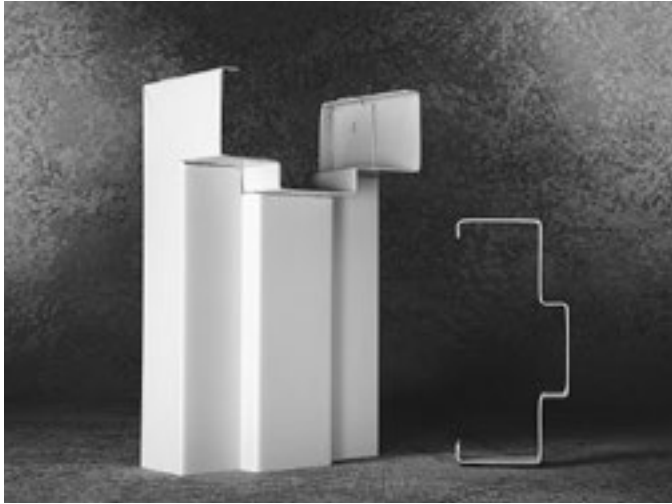
- Equal and unequal rabbet F16, MU16, DW16 and K16
- Single rabbet F16

#### Labeled application

Maximum 3 hour fire rating approval up to an 8'0" x 8'0" opening size.

## Anchoring systems

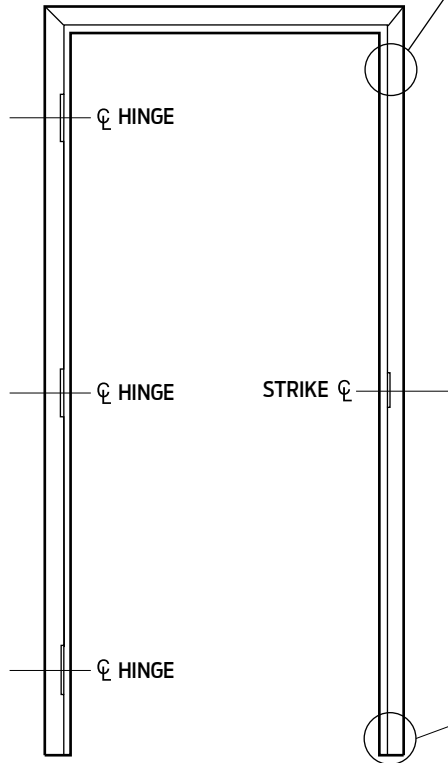
### F, FN, MU, FE, and DE Series Flush Frames



#### Anchoring and installation notes

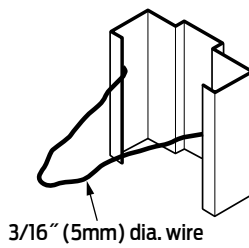
1. **All Frames** in this category are supplied standard with masonry wire or lock-in jamb anchors and adjustable base anchors. Anchors are designed for maximum wall/frame engagement and installation flexibility.
2. **Anchoring Applications:**
  - **Masonry Wall:** Masonry wire anchors ( $\frac{3}{16}$ " [5 mm] diameter) provide maximum engagements in mortar joints, and allow for full internal grouting during installation. The anchor is to be spread wider than the jamb depth and twisted into position. Adjustable base anchors are attached directly to the floor and adjusted. The wall is built around the anchored frame.
  - **Existing Masonry Walls:** Specifically designed (18 Ga.) jamb anchors are used to add support for bolting the frame into the rough opening of an existing wall.
  - **Wood Stud Walls:** Lock-in (18 Ga.) jamb anchors are designed to be attached to the wood studs of a rough opening.
  - **Steel Stud Walls:** Lock-in (18 Ga.) jamb anchors are designed to be attached to the webbing of the closed steel studs which are built around the frame.
  - **Universal Stud Wall Anchors:** Universal lock-in (18 Ga.) jamb anchors are designed for use in either wood or steel stud wall applications. Maximum jamb depth is 9 ½".
3. **Adjustable Base Anchors:**
  - Field attached (16 Ga.) base anchors provides direct attachment and adjustability for out of level base surface conditions.
  - If frame is NOT to be set directly on the floor (slab) adjust base anchor UPWARD as required.
4. **Special Frame Anchors:** Anchor details and availability of lock-in anchors will vary with the following frame profile changes:
  - Single Rabbet: all details will vary.
  - Double Rabbet: weld-in anchors required over 9 ½" jamb depth.
  - FE and DE Series Double Egress Frames: Anchor details will vary due to frame and application conditions.
5. **Installation** shall conform to the published Steelcraft installation instructions, ANSI A250.11 *Recommended Erection Instructions for Steel Frames*, and HMMA 84.
6. **Installation Caution Notice:** Grouted Frames:
  - When temperature conditions necessitate an additive to be used in the plaster or mortar to prevent freezing, the contractor installing the frames must coat the inside of the frames in the field with a corrosion resistant coating per ANSI A250.11 *Recommended Erection Instructions for Steel Frames*.
  - When frames are to be grouted full, silencers must be field installed prior to grouting.
  - Steel frames, including fire rated frames, do not require grouting. Grouting is not recommended for frames in drywall.
7. **All Fire Rated frames** must be installed in accordance with NFPA Pamphlet 80 and the *Authority Having Jurisdiction*.

Standard Lock-In Jamb Anchors are supplied on standard F Series frames having 2" faces

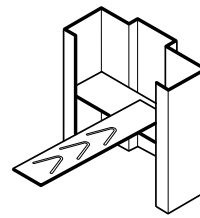


#### Masonry wall applications

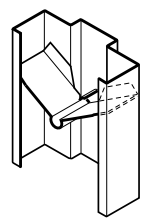
##### Wire Masonry Anchor



##### Masonry "T" Anchor

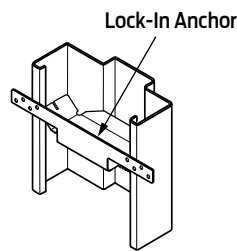


##### Existing Wall Anchor

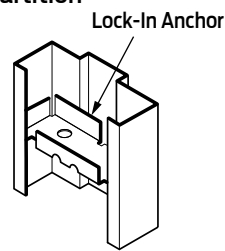


#### Stud wall applications

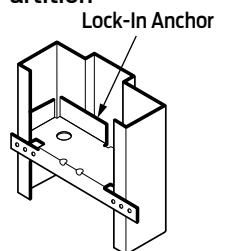
##### Universal Stud Anchor



##### Anchor for Steel Stud Partition



##### Anchor for Wood Stud Partition



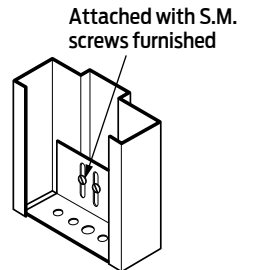
Adjustable Sill Anchors are provided as standard

#### Anchor Quantities:

- 3 per jamb through 7'6" height
- 4 per jamb over 7'6" to 12'0" height
- 1 adjustable base anchor per jamb

#### Anchor Locations:

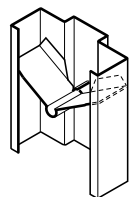
- Locate all anchors on hinge jamb as close to top of hinge reinforcement as possible.
- Locate anchors on strike jamb in the corresponding position as the hinge jamb.



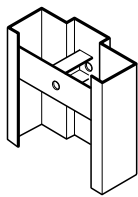
Maximum adjustment  
1-3/8" (35mm)  
below bottom of frame

Specialty Weld-In Jamb Anchors are supplied for custom frames and special wall applications when specified.

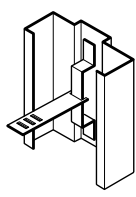
#### Masonry wall application



Existing Wall Anchor

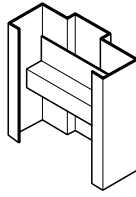


Weld-In Tube & Strap Anchor for Special

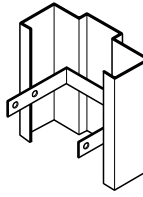


Weld-In Yoke Strap &

#### Stud wall anchors

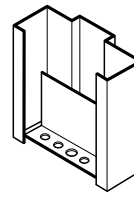


"Z" Steel Stud Weld-In Anchor for Special

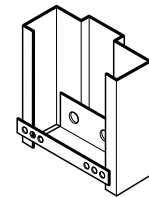


Weld-In Wood Stud Anchor

#### Sill anchors



Weld-In Floor Anchor



Weld-In Wood Stud Base Anchor

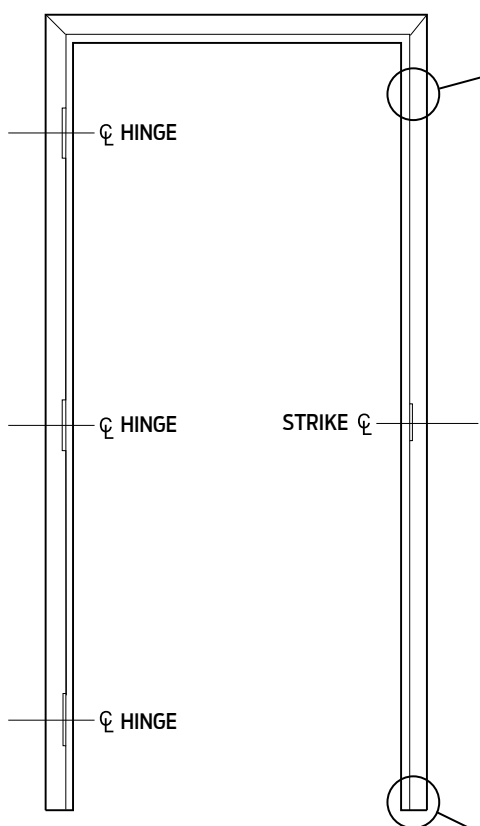
## DW and K Series drywall frames



### Anchoring and installation notes

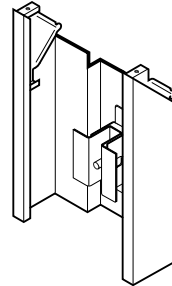
1. **Drywall Frames** are supplied standard with field adjustable compression anchors in each jamb and adjustable base anchors. DW Series Frames are designed especially for use in installations using wall baseboards.
2. **Anchoring Applications:**
  - **Masonry Wall:** Not recommended.
  - **Wood and Steel Stud Walls:** Adjustable compression anchors are factory located near the top of each jamb. These anchors can be easily adjusted with either a screw driver or power driver. Adjustable lock-in base anchors are provided for attachment directly to the wall floor (sill) runner.
  - **Optional Security Anchor:** Security Stud Anchors are recommended in frames over 8' 0" (2438 mm) high or in frames installed in areas where security is a priority. Locate the Security Stud Anchor immediately above or below the strike reinforcements, and on both faces (secure and entrance sides) of the jamb. Security Stud Anchors may be used in both the strike and hinge jambs. They are also recommended to be used in the head of frames for pairs of doors.
3. **Grouting of the DW and K Series Frames** is not recommended.
4. **Installation** shall conform to the published Steelcraft installation instructions, ANSI A250.11 *Recommended Erection Instructions for Steel Frames*, and HMMA 840.
5. **Installation Caution Notice:**
  - After the frame pieces have been installed over the wallboard, the frame is squared by adjusting the compression anchor screws located in the soffit of the jambs. Turning the screw in a clockwise direction will tighten the frame.
  - DO NOT over tighten the compression anchors.
  - Check to insure the opening is plumb.
6. All Fire Rated frames must be installed in accordance with NFPA Pamphlet 80 and the *Authority Having Jurisdiction*.





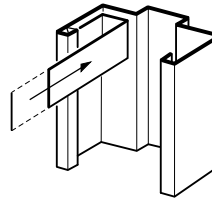
Standard Field Adjustable Compression Jamb Anchors are supplied as standard for DW & K Series frames having 2" faces

Stud Wall Applications (refer to page 93)



Jamb/Compression Anchor (refer to page 93)

Optional Security Applications (refer to page 93)



#### Anchor Quantities:

- 1 compression anchor per jamb through 9" depth
- 2 compression anchors per jamb for 9" depth and greater
- 2 twist-in strap base anchors per jamb

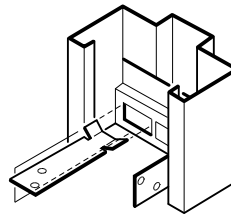
#### Anchor Locations:

- Compression anchors are factory installed near the top of each jamb.
- The twist-in anchors are installed into the Base Anchor Attaching Strap that is factory installed at the bottom of each jamb.

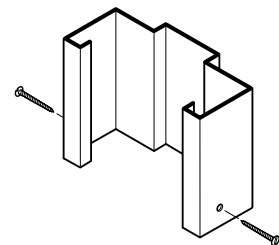
#### Anchor Options:

- Security Jamb Anchor
  - See description on the previous page
  - See details on Page 93

Either Adjustable Sill Anchors or Counter Sunk Sill Anchor Holes are provided as standard

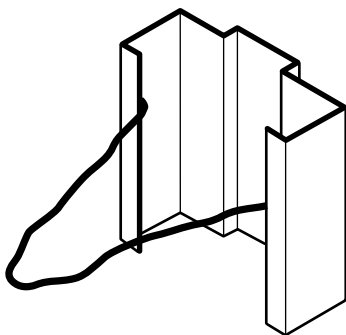


DW Series Adjustable Lock-in Base Anchor (refer to page 94)



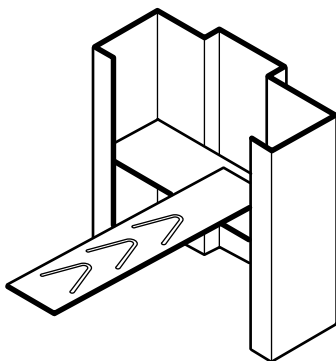
K Series Base Anchor (refer to page 94)

## Wire masonry



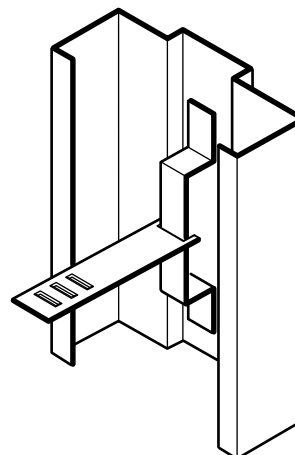
<b>Material</b>	3/16" (5 mm) dia. wire
<b>Supplied</b>	Shipped loose for field installation
<b>Applicable Frame Series</b>	F, FN, MU, FE, and DE
<b>Profile variations</b>	SR Single Rabbet DR Double Rabbet (equal & unequal) CO Cased Open NOTE profile must have back bends
<b>Frame depths</b>	3" through 14 3/4"
<b>Face variations</b>	Fits all face variations
<b>Frame attachment</b>	Lock-in
<b>Application</b>	Ship loose to jobsite, field installed
<b>Wall construction</b>	Masonry block or brick
<b>Fire label applications</b>	UL/WH 3 hour max.
<b>Base anchor</b>	See page 86 for base anchor details.

## Masonry T



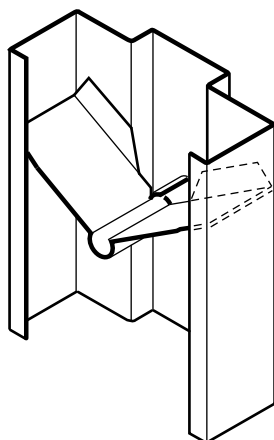
<b>Material</b>	18 Ga. Galvannealed Steel
<b>Supplied</b>	Shipped loose for field installation
<b>Applicable Frame Series</b>	F, FN, MU, FE, DE, PW for new masonry
<b>Profile variations</b>	SR: Single Rabbet DR: Double Rabbet (equal & unequal) CO: Cased Open NOTE: profile must have backbends
<b>Frame depths</b>	All frame depths Ordered specifically to fit frame depths
<b>Face variations</b>	Fits all face variations
<b>Frame attachment</b>	Lock-in
<b>Application</b>	Ship loose to jobsite, field installed
<b>Wall construction</b>	Masonry block or brick
<b>Fire label applications</b>	UL/WH 3 hour max.
<b>Base anchor</b>	See page 86 for base anchor details.

## Yoke & strap masonry



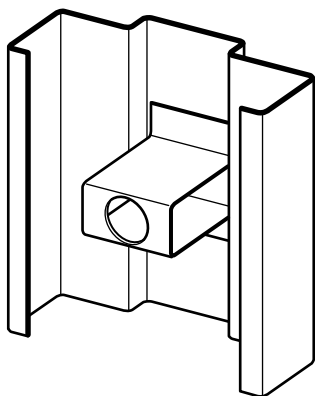
<b>Material</b>	18 Ga. Galvannealed Steel
<b>Supplied</b>	Factory welded in prior to shipment
<b>Applicable Frame Series</b>	F, FN, MU, FE, DE
<b>Profile variations</b>	SR: Single Rabbet DR: Double Rabbet (equal & unequal) CO: Cased Open
<b>Frame depths</b>	All frame depths For frame depths over 12 3/4" 2 anchors welded at each anchor location
<b>Face variations</b>	Fits all face variations Ordered specifically to fit face
<b>Frame attachment</b>	Arrives to jobsite welded into frame
<b>Application</b>	Factory welded
<b>Wall construction</b>	Masonry block or brick
<b>Fire label applications</b>	UL/WH 3 hour max.
<b>Base anchor</b>	See page 86 for base anchor details.

## Butterfly existing wall



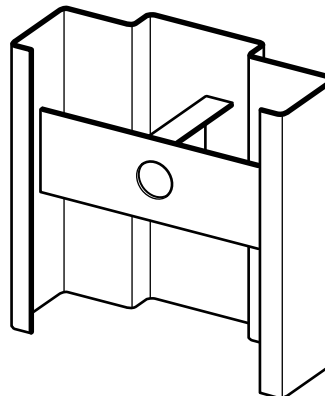
<b>Material</b>	18 Ga. Galvannealed Steel
<b>Supplied</b>	Shipped loose for field installation
<b>Applicable Frame Series</b>	F
<b>Profile variations</b>	SR: Single Rabbet DR: Double Rabbet (equal & unequal) CO: Cased Open NOTE: profile must have a backbend
<b>Frame depths</b>	4 3/4" through 9 1/8" Adjustable Fits all depths up to 9 1/8" Single Rabbet up to 3 3/4"
<b>Face variations</b>	2" face only.
<b>Frame attachment</b>	Lock-in or factory welded
<b>Application</b>	Ship loose to jobsite, field installed. When specified welded, arrives to jobsite welded into frame.
<b>Wall construction</b>	Masonry block, brick, existing or pre-cast
<b>Fire label applications</b>	UL/WH 3 hour max.
<b>Base anchor</b>	Additional butterfly anchor used as the base anchor

## Hat spacer existing wall



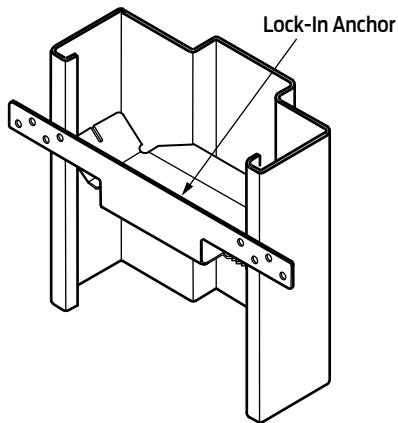
<b>Material</b>	16 Ga. Galvannealed Steel
<b>Supplied</b>	Welded in prior to shipment
<b>Applicable Frame Series</b>	F, FN, MU, FE, DE
<b>Profile variations</b>	SR: Single Rabbet DR: Double Rabbet (equal & unequal) CO: Cased Open NOTE: profile must have a backbend
<b>Frame depths</b>	All frame depths For frame depths over 9 1/4" 2 anchors welded at each anchor location
<b>Face variations</b>	Fits all face variations
<b>Frame attachment</b>	Factory welded
<b>Application</b>	Arrives at jobsite welded into frame
<b>Wall construction</b>	Masonry block, brick, existing or pre-cast
<b>Fire label applications</b>	UL/WH 3 hour max.
<b>Base anchor</b>	Additional Hat Spacer anchor used as the base anchor

## Tube & strap existing wall



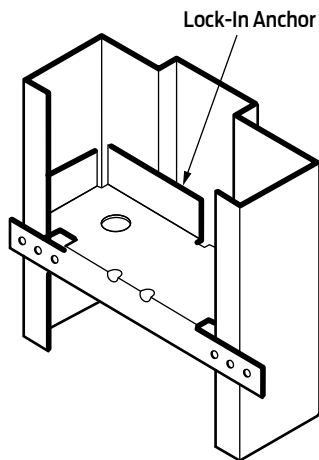
<b>Material</b>	16 Ga. Galvannealed Steel
<b>Supplied</b>	Welded in prior to shipment
<b>Applicable Frame Series</b>	F, FN, MU, FE, DE, PW for existing masonry
<b>Profile variations</b>	SR: Single Rabbet DR: Double Rabbet (equal & unequal) CO: Cased Open NOTE: profile must have a backbend
<b>Frame depths</b>	All frame depths For frame depths over 9 1/4" 2 anchors welded at each anchor location
<b>Face variations</b>	Fits all face variations
<b>Frame attachment</b>	Factory welded
<b>Application</b>	Arrives at jobsite welded into frame
<b>Wall construction</b>	Masonry block, brick, existing or pre-cast
<b>Fire label applications</b>	UL/WH 3 hour max.
<b>Base anchor</b>	Additional Tube & Strap anchor used as the base anchor

## Universal stud



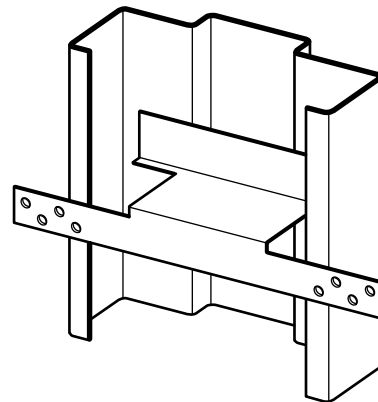
<b>Material</b>	18 Ga. Galvannealed Steel
<b>Supplied</b>	Shipped loose for field installation
<b>Applicable Frame Series</b>	F, MU
<b>Profile variations</b>	DR: Double Rabbet (equal & unequal) CO: Cased Open NOTE: profile must have a backbend
<b>Frame depths</b>	4 3/4", through 9 1/2" Ordered specifically to fit frame depths
<b>Face variations</b>	2" only
<b>Frame attachment</b>	Lock-in
<b>Application</b>	Ship loose to jobsite, field installed
<b>Wall construction</b>	Wood stud or steel stud walls
<b>Fire label applications</b>	UL/WH 3 hour max.
<b>Base anchor</b>	Additional wood stud anchor used as the base anchor

## Wood stud



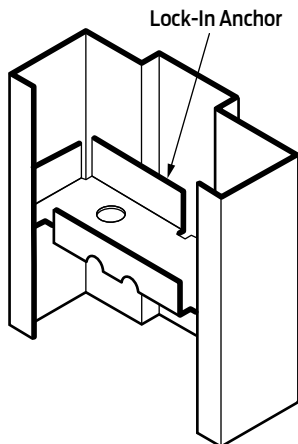
<b>Material</b>	18 Ga. Galvannealed Steel
<b>Supplied</b>	Shipped loose for field installation
<b>Applicable Frame Series</b>	F
<b>Profile variations</b>	DR: Double Rabbet (equal & unequal) CO: Cased Open NOTE: profile must have a backbend
<b>Frame depths</b>	4 3/4", 5 3/4", 6 3/4", 7 3/4", 8 3/4" - non-adjustable
<b>Face variations</b>	2" only
<b>Frame attachment</b>	Lock-in
<b>Application</b>	Ship loose to jobsite, field installed
<b>Wall construction</b>	Wood stud walls
<b>Fire label applications</b>	UL/WH 3 hour max.
<b>Base anchor</b>	Additional wood stud anchor used as the base anchor

## Wood stud



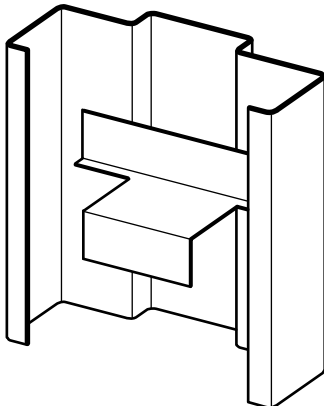
<b>Material</b>	16 Ga. Galvannealed Steel
<b>Supplied</b>	Welded in prior to shipment
<b>Applicable Frame Series</b>	F, FN, MU, FE, DE
<b>Profile variations</b>	DR: Double Rabbet (equal & unequal) CO: Cased Open NOTE: profile must have a return
<b>Frame depths</b>	All frame depths
<b>Face variations</b>	Fits all face variations Ordered specifically to fit face
<b>Frame attachment</b>	Must be welded to frame
<b>Application</b>	Arrives at jobsite welded into frame
<b>Wall construction</b>	Wood stud walls
<b>Fire label applications</b>	UL/WH 3 hour max.
<b>Base anchor</b>	Additional wood stud anchor used as the base anchor

## Closed steel stud



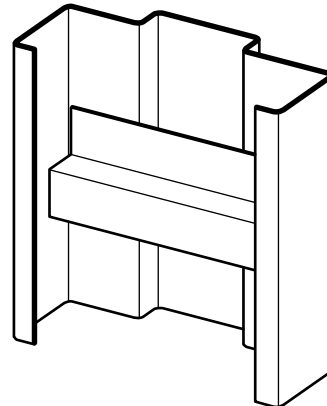
<b>Material</b>	18 Ga. Galvannealed Steel
<b>Supplied</b>	Shipped loose for field installation
<b>Applicable Frame Series</b>	F
<b>Profile variations</b>	DR: Double Rabbet (equal & unequal) CO: Cased Open NOTE: profile must have a return
<b>Frame depths</b>	4 3/4", 5 3/4", 6 3/4", 7 3/4", 8 3/4" - non-adjustable
<b>Face variations</b>	2" only
<b>Frame attachment</b>	Lock-in
<b>Application</b>	Ship loose to jobsite, field installed
<b>Wall construction</b>	Closed steel stud walls
<b>Fire label applications</b>	UL/WH 3 hour max.
<b>Base anchor</b>	See page 86 for base anchor details.

## Flush steel stud



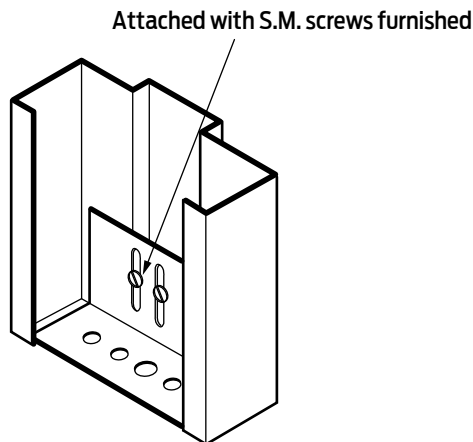
<b>Material</b>	16 Ga. Galvannealed Steel
<b>Supplied</b>	Welded in prior to shipment
<b>Applicable Frame Series</b>	F, FN, MU, FE, DE
<b>Profile variations</b>	SR: Single Rabbet DR: Double Rabbet (equal & unequal) CO: Cased Open NOTE: profile must have a return
<b>Frame depths</b>	All frame depths
<b>Face variations</b>	Fits all face variations Ordered specifically to fit face
<b>Frame attachment</b>	Must be welded to frame
<b>Application</b>	Arrives at jobsite welded into frame
<b>Wall construction</b>	Closed steel stud walls
<b>Fire label applications</b>	UL/WH 3 hour max.
<b>Base anchor</b>	See page 86 for base anchor details.

## Recessed steel stud



<b>Material</b>	16 Ga. Galvannealed Steel
<b>Supplied</b>	Welded in prior to shipment
<b>Applicable Frame Series</b>	F, FN, MU, FE, DE
<b>Profile variations</b>	SR: Single Rabbet DR: Double Rabbet (equal & unequal) CO: Cased Open NOTE: profile must have a return
<b>Frame depths</b>	All frame depths
<b>Face variations</b>	Fits all face variations Ordered specifically to fit face
<b>Frame attachment</b>	Must be welded to frame
<b>Application</b>	Arrives at jobsite welded into frame
<b>Wall construction</b>	Closed steel stud walls
<b>Fire label applications</b>	UL/WH 3 hour max.
<b>Base anchor</b>	See page 86 for base anchor details.

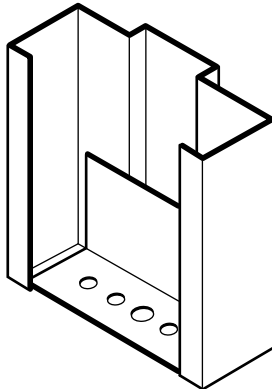
### Field adjustable base



Maximum adjustment 1-3/8" (35mm)  
below bottom of frame

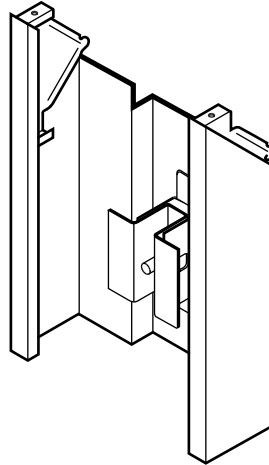
<b>Material</b>	16 Ga. Galvannealed Steel
<b>Supplied</b>	Shipped loose for field installation
<b>Applicable Frame Series</b>	F, MU
<b>Profile variations</b>	DR: Double Rabbet (equal & unequal)
<b>Frame depths</b>	All frame depths Ordered to specifically fit frame depths
<b>Face variations</b>	Fits all face variations
<b>Frame attachment</b>	Retaining clip is factory welded into each jamb. Adjustable anchor is field attached and adjusted during installation.
<b>Application</b>	Anchor angle ship loose to jobsite, field attached and adjusted. Adjustable base anchors are manufactured to fit the frame profile, depth and profile variations which must be specified when ordering this anchor.
<b>Wall construction</b>	Masonry block or brick, steel stud
<b>Fire label applications</b>	UL/WH 3 hour max.

### Fixed base



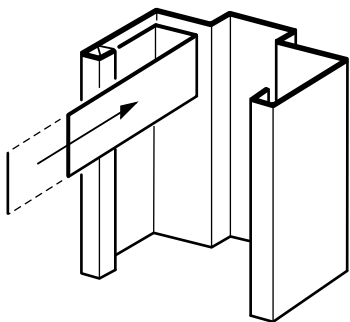
<b>Material</b>	16 Ga. Galvannealed Steel
<b>Supplied</b>	Welded in prior to shipment
<b>Applicable Frame Series</b>	F, FN, MU, FE, DE
<b>Profile variations</b>	SR: Single Rabbet DR: Double Rabbet (equal & unequal) CO: Cased Open
<b>Frame depths</b>	All frame depths Ordered to specifically fit frame depths
<b>Face variations</b>	Fits all face variations
<b>Frame attachment</b>	Must be welded to frame
<b>Application</b>	Arrives at jobsite welded into frame
<b>Wall construction</b>	Masonry block or brick, steel stud
<b>Fire label applications</b>	UL/WH 3 hour max.

### Compression jamb



<b>Material</b>	16 Ga. Galvannealed Steel
<b>Supplied</b>	Factory welded in prior to shipment
<b>Applicable Frame Series</b>	DW, K
<b>Profile variations</b>	SR: Single Rabbet DR: Double Rabbet (equal & unequal) CO: Cased Open NOTE: profile must have a backbend
<b>Frame depths</b>	All DW & K frame depths For frame depths over 9", 2 anchors welded at each anchor location
<b>Face variations</b>	2" face only
<b>Frame attachment</b>	Must be welded to frame
<b>Application</b>	Arrives at jobsite welded into frame
<b>Wall construction</b>	Wood or steel stud walls
<b>Fire label applications</b>	UL/WH 1 1/2 hour max.
<b>Base anchor</b>	See page 88 for sill anchor details

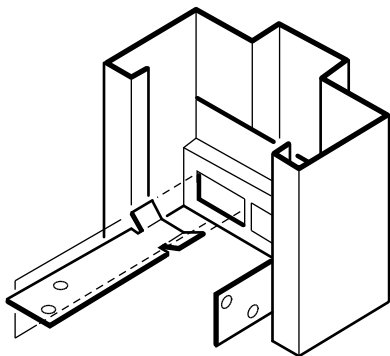
### Security anchor (optional) for DW and K Series



Security anchor is field installed in the strike jamb directly above or below the strike preparation.

<b>Material</b>	24 Ga. Galvannealed Steel
<b>Supplied</b>	Shipped loose for field installation
<b>Applicable Frame Series</b>	DW, K
<b>Profile variations</b>	SR: Single Rabbet DR: Double Rabbet (equal & unequal) CO: Cased Open NOTE: profile must have a backbend
<b>Frame depths</b>	All frame depths
<b>Face variations</b>	2" face only
<b>Frame attachment</b>	Lock-in
<b>Application</b>	Ship loose to jobsite, field installed
<b>Wall construction</b>	Wood or steel stud walls
<b>Fire label applications</b>	UL/WH 1 ½ hour max.

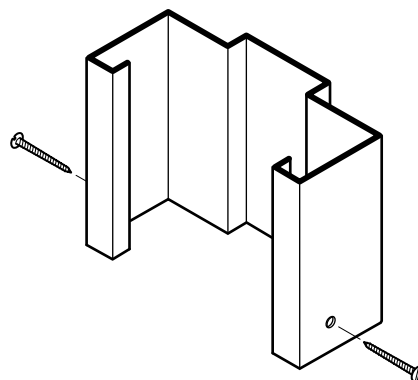
### Adjustable base for DW Series



<b>Material</b>	16 Ga. Galvannealed Steel
<b>Supplied</b>	Shipped loose for field installation
<b>Applicable Frame Series</b>	DW
<b>Profile variations</b>	SR: Single Rabbet DR: Double Rabbet (equal & unequal) CO: Cased Open NOTE: profile must have a backbend
<b>Frame depths</b>	All frame depths
<b>Face variations</b>	2" face only
<b>Frame attachment</b>	Retaining clip is factory welded into each jamb. Adjustable anchor is field attached and adjusted during installation.
<b>Application</b>	Anchor angle ship loose to jobsite, field attached and adjusted.
<b>Wall construction</b>	Wood or steel stud walls
<b>Fire label applications</b>	UL/WH 1 ½ hour max.

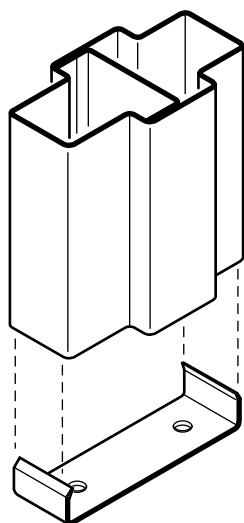
### Base for K Series

Factory prepared holes: screws by others



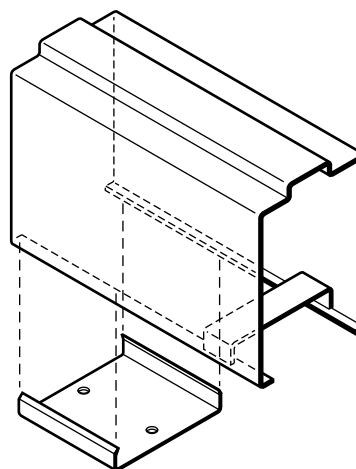
<b>Material</b>	#8 Phillips Flat Head Sheet Metal Screws (2 per jamb). Supplied by others.
<b>Supplied</b>	Base of each jamb is factory prepared with a countersunk hole to accept a #8 Phillips Flat Head Screw. Supplied by others.
<b>Applicable Frame Series</b>	K
<b>Profile variations</b>	SR: Single Rabbet DR: Double Rabbet (equal & unequal) CO: Cased Open NOTE: profile must have a backbend
<b>Frame depths</b>	All frame depths
<b>Face variations</b>	Fits all face variations Ordered specifically to fit face
<b>Frame attachment</b>	Counter sunk holes pierced onto the face at the factory
<b>Application</b>	Field attached
<b>Wall construction</b>	Wood or steel stud walls
<b>Fire label applications</b>	UL/WH 1 ½ hour max.

## Mullion base



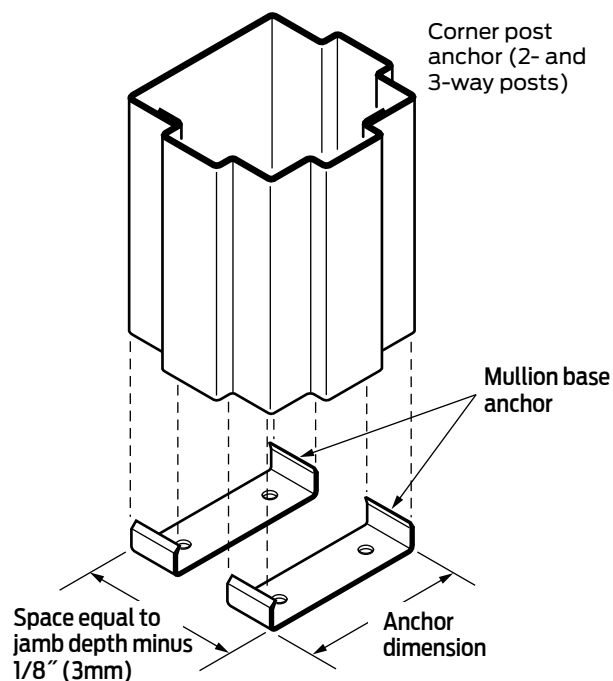
<b>Material:</b>	16 Ga. Galvannealed Steel
<b>Supplied:</b>	Shipped loose for field installation
<b>Applicable Frame Series:</b>	F Series Hollow Metal Mullions
<b>Profile variations:</b>	SR: Single Rabbet DR: Double Rabbet (equal & unequal)
<b>Frame depths:</b>	All frame depths
<b>Face variations:</b>	Ordered specifically to fit face
<b>Frame attachment:</b>	Anchor to floor, mullion slides over
<b>Application:</b>	Ship loose to jobsite, field installed
<b>Floor construction:</b>	All
<b>Fire label applications:</b>	UL/WH 3 hour max.

## Sill section base



<b>Material</b>	16 Ga. Galvannealed Steel
<b>Supplied</b>	Shipped loose for field installation
<b>Applicable Frame Series</b>	F, FN,
<b>Profile variations</b>	SR: Single Rabbet DR: Double Rabbet (equal & unequal)
<b>Frame depths</b>	All frame depths
<b>Face variations</b>	Fits all pace variations
<b>Frame attachment</b>	Anchor to floor, sill snaps on top
<b>Application</b>	Ship loose to jobsite, field installed
<b>Floor construction</b>	All
<b>Fire label applications</b>	UL/WH 3 hour max.

## Corner post base



<b>Material</b>	12 Ga. Galvanized Steel
<b>Supplied</b>	Shipped loose for field installation
<b>Applicable Frame Series</b>	Corner posts
<b>Profile variations</b>	DR: Double Rabbet (equal & unequal)
<b>Frame depths</b>	All frame depths
<b>Face variations</b>	Ordered specifically to fit face
<b>Frame attachment</b>	Attached to floor, corner post slides over
<b>Application</b>	Ship loose to jobsite, field installed
<b>Floor construction</b>	All
<b>Fire label applications</b>	UL/WH Approved



# Doors

General door information .....	90	T Series .....	107
Full flush door construction .....	90	About the product .....	107
Full glass entrance door construction .....	90	Installation .....	107
Sizes and performance .....	90	Features and benefits .....	107
Usage and application .....	90	Specification compliance .....	107
Installation .....	90	Fire ratings .....	107
Job site storage .....	90	Core construction .....	108
Construction notes .....	91	Standard hardware preparations .....	109
Single door application .....	91	Door Sizes and ANSI A250.8 Conversions .....	109
Double door application .....	92	Door edge construction .....	110
		Glass light options .....	110
L Series .....	93	CE Series .....	111
About the product .....	93	About the product .....	111
Installation .....	93	Installation .....	111
Features and benefits .....	93	Features and benefits .....	111
Specification compliance .....	93	Specification compliance .....	111
Fire ratings .....	93	Fire ratings .....	111
Standard hardware preparations .....	95	Laminated core .....	112
Door edge construction .....	96	Standard hardware preparations .....	113
Glass light options .....	96	Door Sizes and ANSI A250.8 Conversions .....	113
SL Series .....	97	Door edge construction .....	114
About the product .....	97	Embossed Pattern Designs .....	114
Installation .....	97	Glass light options .....	114
Features and benefits .....	97	A14 Series full glass entrance doors .....	115
Specification compliance .....	97	About the product .....	115
Fire ratings .....	97	Installation .....	115
Standard hardware preparations .....	99	Features and benefits .....	115
Door edge construction .....	100	Specification compliance .....	115
Glass light options .....	100	Fire ratings .....	115
Falcon SZ Series .....	101	Standard hardware preparations .....	117
About the product .....	101	Door Sizes and ANSI A250.8 Conversions .....	117
Installation .....	101	Standard glass design options .....	118
Features and benefits .....	101	Glass light options .....	118
Specification compliance .....	101		
Fire ratings .....	101		
Options .....	101		
Door construction .....	102		
Door Sizes and ANSI A250.8 Conversions .....	102		
B Series .....	103		
About the product .....	103		
Installation .....	103		
Features and benefits .....	103		
Specification compliance .....	103		
Fire ratings .....	103		
Core construction .....	104		
Standard hardware preparations .....	105		
Door Sizes and ANSI A250.8 Conversions .....	105		
Door edge construction .....	106		
Glass light options .....	106		

## General door information

Steelcraft full flush doors are designed for virtually all construction requirements in commercial building applications. Their construction, durability and flexibility have been proven throughout the world in both operation and physical testing of all types.

### Full flush door construction

- **Laminated (L and SL Series):** Honeycomb core doors are designed for installation in all types of building construction, for both interior and exterior applications. The continuously bonded cores and full height mechanically interlocked edge seams provide attractive, flat and very durable doors to the commercial construction industry. Many options are available in this product Series including edge construction, GRAINTECH™ woodgrain embossment, core variations.
- **Steel Stiffened (B Series):** These internally steel stiffened core doors are designed for installation in all types of building construction, for both interior and exterior applications. The internal steel stiffeners are welded to the face sheets. The full height mechanically interlocked edge seams provide attractive and very durable doors to the commercial construction industry. Edge construction options are available.
- **Embossed (CE Series):** The 6 and 8 panel embossed doors, with a polystyrene core, are designed for installation in all types of building construction for both interior and exterior applications. The crisp and deeply embossed panels create the appearance of hand carved doors. The continuously bonded cores and full height mechanically interlocked edge seams provide attractive, flat and very durable doors to the commercial construction industry.
- **Temperature Rise (T Series):** T Series doors are equipped with a mineral core and are designed for use in locations requiring a temperature rise rating. The use of this door series is usually dictated by the local building code. Steelcraft T Series doors carry a 250° F (121° C) temperature rise Listing. Edge construction options are available.

### Full glass entrance door construction

The A14 Series doors are specifically designed for entrances and applications requiring full glass designs. They are an attractive and very durable alternative to aluminum entrance doors.

### Sizes and performance

All doors are manufactured and supplied to meet the dimensional standards and performance levels as published in ANSI A250.8-2014 (SDI 100).

Special size products are available to meet the unique construction, performance and aesthetic requirements of the architectural community. Contact Steelcraft for those requirements.

### Usage and application

To help simplify the use, selection and specification of Steelcraft door products, the following guidelines for base material selection can be used:

Material Gauge: the following base material thickness values were taken from the Underwriters Laboratories, Inc. publication for gauge number and equivalent thickness and describe the sheet steel products available from Steelcraft:

- **20 Gauge [0.032" (0.8 mm)]:** for Light Commercial applications with minimal use and abuse.
- **18 Gauge [0.042" (1.0 mm)]:** for Heavy Commercial and Institutional applications with high use.
- **16 Gauge [0.053" (1.3 mm)]:** for Extra Heavy Commercial and Institutional applications having the potential of very high use.
- **14 Gauge [0.067" (1.7 mm)]:** for Extra Heavy Commercial and Institutional applications with extremely high use.

**Material Selection:** in addition to the thickness of base material, the following base material types of metal are available from Steelcraft:

- **Cold Rolled Steel (CRS):** conforming to ASTM A1008 and ASTM A568 recommended for interior opening with normal humidity exposure.
- **Hot-Dip Galvannealed Steel:** conforming to ASTM A924 and ASTM A653 recommended for exterior opening or interior openings with high humidity.
  - **Note:** For recommendations on material and door types, refer to the product specification tables on pages 366-372 of this manual.

### Installation

Installation of all Steelcraft frames and doors shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) *Recommended Erection Instructions for Steel Frames and HMMA 840*.

All Fire Rated doors must be installed and maintained in accordance with the National Fire Protection Association Pamphlet 80, and/or the local Authority Having Jurisdiction.

### Job site storage

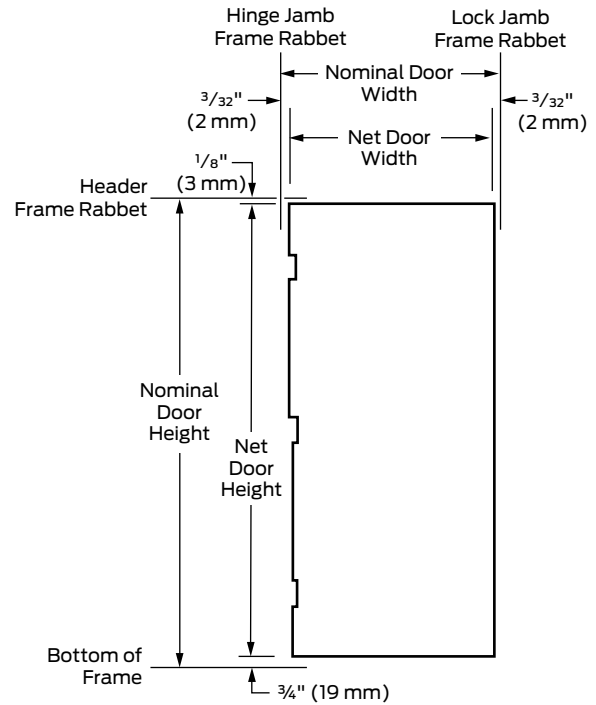
Store doors under cover, in a dry area and in an upright position. All ferrous metal products should be stored where they will not be exposed to, or come in contact with water. This is particularly true of products such as doors, which have large flat surfaces on which water may collect if they are stacked horizontally. Only use vented plastic or canvas. The use of no-vented materials, create a humidity chamber, which promotes blistering and corrosion.

Place no more than 5 doors in a group, with all material on planking or blocking at least 4 in. (100 mm) off the ground, 2 in. (50 mm) off a paved area or the floor slab. Provide a least ¼ in. (6.4 mm) space (wood strip) between all units to permit air circulation.

### Construction notes

1. **Doors** are 1  $\frac{3}{4}$ " (45 mm) thick.
2. **Hardware Preparations:** to meet specifications, doors can be prepared for all commercial mortised hardware, and can be factory reinforced for surface applied hardware applications.
3. **Top and bottom edges** of all doors are closed with 14 gauge [0.067" (1.7 mm)] welded channels. Exterior applications require the addition of top caps to protect against weather infiltration.
4. **Optional edge seams** are prepared prior to the application of factory, baked-on primer paint.
5. **Standard hardware preparations**, mortised and reinforced for the following:
  - **Universal Hinge Preps:** 4  $\frac{1}{2}$ " (114 mm) patented preparation which allows for easy and quick field conversion from standard weight .134" (3.3 mm) to heavy weight .180" (4.5 mm) hinges.
  - **Locks:** a multitude of standard lock preps are available. The most commonly used with a 4  $\frac{7}{8}$ " (124 mm) strike are 161, 61L and 86.
6. **Glass Lights with Dezigner® Trim:** for doors with glazed cutouts, see the **Lights and Louvers** section of this Manual.
7. **Louvers:** for doors with attached louvers, see the **Lights and Louvers** section of this Manual.

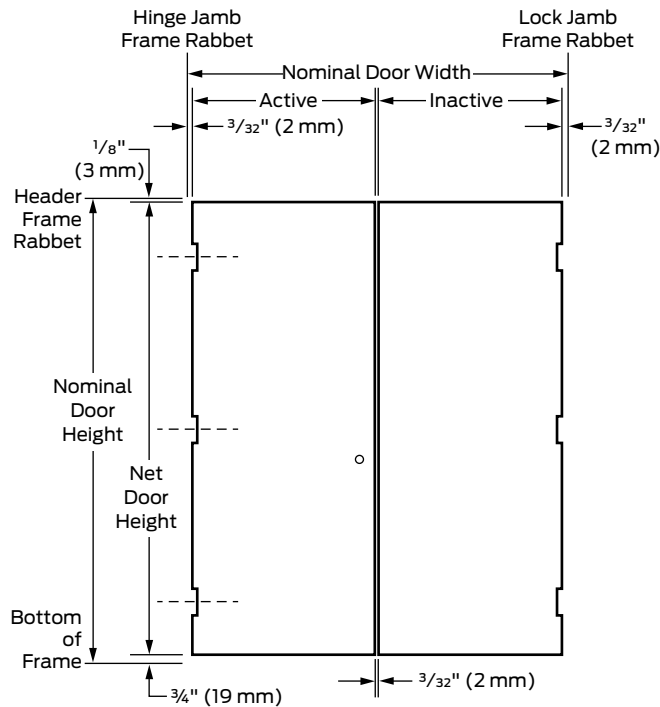
### Single door application



### Standard Operating Clearances (Installed in frame)

- Top (at the Head) = 1/8" (3 mm) to bottom of head or transom panel;
- Hinge Side = 3/32" (2 mm) to rabbet or jamb;
- Lock Side = 3/32" (2 mm) to rabbet or jamb;
- Bottom (at the Floor) = 3/4" (19 mm) to bottom of frame.

## Double door application



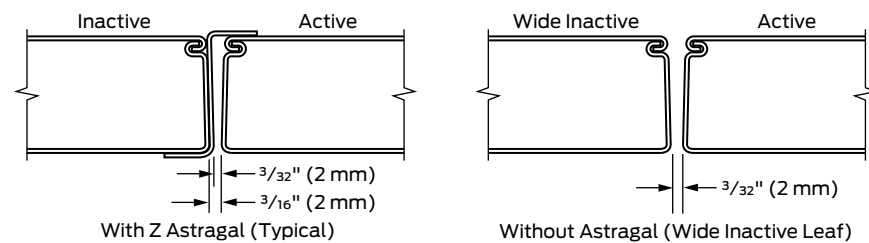
Both leaves of double door elevations employ the same construction features as single swing and could include an optional overlapping astragal.

### Meeting Edges

- A 14 gauge [0.067" (1.7 mm)] "Z" astragal is furnished loose for installation in the field by others.
- Overlapping astragal kits are available to convert an active leaf to an inactive leaf.
- When an astragal is not used, the width of the inactive leaf is increased  $\frac{3}{32}"$  (2 mm) when specified.

### Meeting edge details

Refer to pages 137 - 144 for all standard astragal applications.



**Hardware Preparations:** the inactive leaf can be prepared for hardware as specified.

### Standard Operating Clearances (installed in frame)

- Head =  $\frac{1}{8}"$  (3 mm) to bottom of head or transom panel.
- Hinge Side =  $\frac{3}{32}"$  (2 mm) to rabbet on jamb.
- Meeting Edges =  $\frac{3}{32}"$  (2 mm) with or without astragal.
- For openings without an astragal, a wide inactive leaf is used.
- Bottom =  $\frac{3}{4}"$  (19 mm) to bottom of frame.

## L Series



### About the product

The L20, L18, and L16 Series flush doors are designed to meet the architectural requirements for full flush doors. The L14 Series flush doors are designed to meet the architectural requirements for maximum duty full flush doors. Refer to the Architectural section for specifications and the selection and usage guide of the appropriate door constructions.

This premium door construction combines the strength and dimensional stability of steel with the structural integrity of the laminate core. The continuous bonding of core to steel face sheets provides an attractive, flat door, free of face welding marks. Tests have proven that the L Series door has high resistance to impact damage, low thermal conductivity and high STC ratings.

To meet application, specification and performance requirements, the L Series door offers a wide range of specifiable options including sizes, glass light designs and hardware (mechanical, pneumatic, electrical) preparations.

L Series doors are 1 3/4" (45 mm) thick.

### Installation

1. Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) *Recommended Erection Instructions for Steel Frames and HMMA 840s*.
2. Fire Rated Assemblies must be in accordance with NFPA Pamphlet 80. The Authority Having Jurisdiction is the final authority on issues related to the installation and use of installed Fire Rated Doors.

### Features and benefits

Steelcraft's L Series doors offer the following standard unique features, which enhance long term performance and durability:

1. **Core Systems** that enhance the structural integrity of the door:
  - **Honeycomb (standard):** 1" (25 mm) cell kraft honeycomb configuration that increases structural integrity while reducing overall weight
  - **Polystyrene (optional):** enhanced thermal performance
  - **Polyurethane (optional):** extreme thermal performance
2. **Full Height, Epoxy Filled Mechanical Interlock Edges** provide structural support and stability the full height of the door edges. Available edge options:
  - **Visible Edge Seam (standard):** full height, epoxy filled mechanical Interlocked edges
  - **Filled Edge Seam (optional add to standard):** seam filled with structural adhesive and dressed smooth. Includes tack welds above and below edge cutouts for hinges, locks, etc.
  - **Welded Edge Seam (optional add to standard):** intermittently welded using 1" long welds, then seam filled with structural adhesive and dressed smooth. Option available on L18, L16 and L14 doors.
3. **Universal Hinge Preparations** (patented) allow for easy field conversion from standard weight .134" (3.3 mm) hinges to heavy weight .180" (4.7 mm) hinges.
4. **14 Gauge [0.067" (1.7 mm)] Inverted Top and Bottom Channels** provide stability and protection for the top and bottom edges from abuse.
5. **Beveled Hinge and Lock Edges** allow for tighter installation tolerances, ensure easier operation and eliminate binding and sticking.
6. **Recessed Dezigner™ Glass Trim** provides a clean, neat and flush finish with the door surface.
7. **Factory Applied Baked-On Rust Inhibiting Primer** paint in accordance with ANSI A250.10-2011.

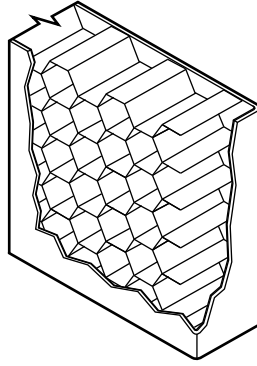
### Specification compliance

1. Door construction for Steelcraft L Series full flush doors meets the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6-2003 (R2009). Locations are in accordance with ANSI/DHI A115 unless otherwise stated.

### Fire ratings

L Series doors meet the broadest fire rating requirements. They are listed for installations requiring compliance to both neutral pressure testing (ASTM E152 and UL-10B) and positive pressure standards (UL-10C).

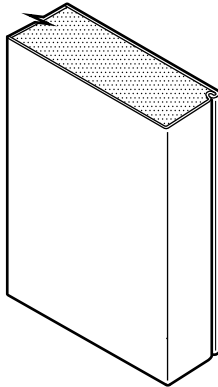
### Rigid Honeycomb



#### Standard Laminated Honeycomb Core

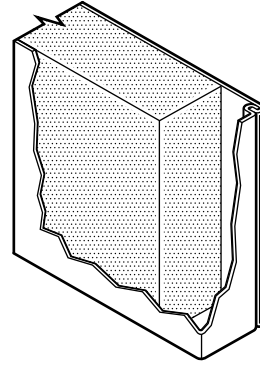
- 1" (25 mm) cell, 99 pound Kraft honeycomb
- Honeycomb surfaces sanded for maximum adhesion
- Impregnated with phenolic resin (resists mildew and vermin)
- Laminated to both face sheets with contact adhesive
- Assembled door is run through high pressure pinch rollers, achieving ultimate bond

#### Optional cores are polystyrene or polyurethane



#### Standard Premium Edge Construction

- Beveled hinge & lock edges
- Full height mechanical interlock with epoxy adhesive
- Visible edge seam standard
- Seamless edge optional

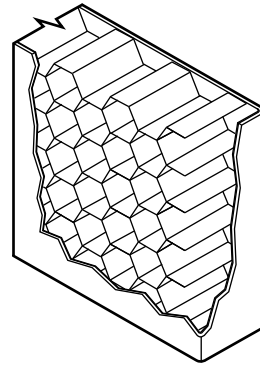


#### Optional Polystyrene Core

- 1 pound (453.6g) per ft<sup>3</sup> density slab
- Laminated to both face sheets with contact adhesive
- Labeled applications

#### Optional Polyurethane Core

- 1.8 pound (816.5g) per ft<sup>3</sup> density slab
- Laminated to both face sheets with contact adhesive
- Non-Labeled applications



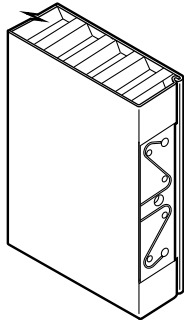
#### Standard Rigid 14 Gauge End Channel Construction

- 14 gauge inverted galvanized top & bottom channels
- Projection welded to both face sheets
- For optional caps, see "[Weather seals](#)" on page 145.

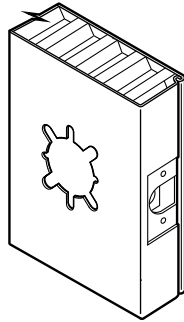
Door application and usage			
Series	Steel Thickness	Opening	Usage Frequency
L20	20 Ga (0.8 mm)	Interior - Cold Rolled Steel	Standard Duty
L20	20 Ga (0.8 mm)	Exterior - Galvanized Steel	Light Commercial applications with minimal use and abuse
L18	18 Ga (1.0 mm)	Interior - Cold Rolled Steel	Heavy Duty
L18	18 Ga (1.0 mm)	Exterior - Galvanized Steel	Heavy Commercial & Institutional applications with high use
L16	16 Ga (1.3 mm)	Interior - Cold Rolled Steel	Extra Heavy Duty
L16	16 Ga (1.3 mm)	Exterior - Galvanized Steel	Extra Heavy Commercial applications with potential of very high use
L14	14 Ga (1.7 mm)	Interior - Cold Rolled Steel	Maximum Duty
L14	14 Ga (1.7 mm)	Exterior - Galvanized Steel	Extra Heavy Commercial applications with extremely high use

## Standard hardware preparations

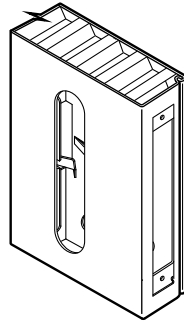
Typical hardware applications shown. Refer to "Hardware" section for more details.



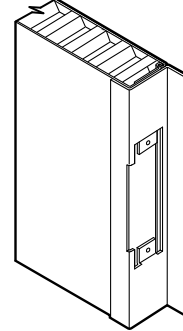
**Universal Mortise Hinge Prep**  
7 Gauge Universal hinge reinforcement



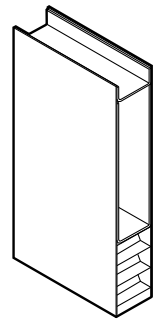
**61L Lock**



**86 Lock**



**Inactive Leaf ASA Strike Prep with Astragal attached**



**Optional 14 Gauge Closer Reinforcement**

### Standard: mortised and reinforced for:

- Patented Universal hinge preparations allow for easy field conversion from standard 4 1/2" (114 mm) x .134" (3.3 mm) standard weight hinges to 4 1/2" (114 mm) x .180" (4.7 mm) heavy weight hinges. Optional hinge preparation for 5" (127 mm) x .146" (3.7 mm) standard weight hinges or for 5" (127 mm) x .190" (4.8 mm) heavy weight hinges is also available.
- A multitude of standard lock preparations are available. The cylindrical 161, 61L and mortise 86 lock preps are the most commonly used active leaf preparations. The 4 7/8" (124 mm) strike prep is the most commonly used inactive leaf preparation.
- Optional reinforcements for surface and concealed Closers are available.
- Special hardware applications are available.

### Door Sizes and ANSI A250.8 Conversions

Steelcraft product selection for L Series doors has been matched to ANSI/SDI Level and Model designations.

- In accordance with ANSI A250.8-2014 (SDI 100), core material is not specific to the level or model designations. Core material selection is specified based on preference and application.
- Recommended minimum frame gauge also applies to the frequency of operation of the opening.

Series	ANSI A250.8 - SDI 100			Edge Construction	Edge Maximum Sizes		Recommended Gauge of Frame
	Level	Model	Description		Single	Pair	
Level 1: Light Commercial							
L20	1	1	Full Flush	Visible	3'-0" x 8'-0" 914 mm x 2438 mm	6'-0" x 8'-0" 1829 mm x 2438 mm	18 Gauge [0.042" (1.0 mm)]
LF20		2	Seamless	Filled			16 Gauge [0.053" (1.3 mm)]
Level 2: Heavy Duty Commercial & Institutional							
L18	2	1	Full Flush	Visible	4'-0" x 10'-0" 1219 mm x 3048 mm	8'-0" x 10'-0" 2438 mm x 3048 mm	16 Gauge [0.053" (1.3 mm)]
LF18		2	Seamless	Filled			
LW18		2	Seamless	Welded			
Level 3: Extra Heavy Duty Commercial & Institutional							
L16	3	1	Full Flush	Visible	4'-0" x 10'-0" 1219 mm x 3048 mm	8'-0" x 10'-0" 2438 mm x 3048 mm	16 Gauge [0.053" (1.3 mm)]
LF16		2	Seamless	Filled			14 Gauge [0.067" (1.7 mm)]
LW16		2	Seamless	Welded			
Level 4: Maximum Duty Commercial & Institutional							
L14	4	1	Full Flush	Visible	4'-0" x 10'-0" 1219 mm x 3048 mm	8'-0" x 10'-0" 2438 mm x 3048 mm	14 Gauge [0.067" (1.7 mm)]
LF14		2	Seamless	Filled			
LW14		2	Seamless	Welded			

## Door edge construction

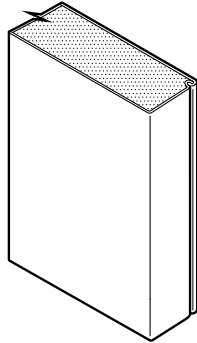
### Optional Edge Seams available in the L Series doors:

- **L:** Standard feature includes visible edge seams with full height interlocked edges.
- **LF:** the mechanical edge seam is filled and dressed smooth prior to applying the factory primer.
- **LW:** the mechanical edge seam is welded and dressed smooth prior to applying the factory primer.

### Standard visible edge seam

#### L Series visible seam features

- Full height mechanical interlock
- Interlock filled with epoxy adhesive
- Visible edge seam



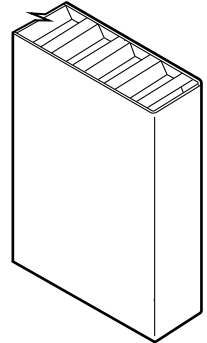
### Optional seamless edge

#### LF Series Seam Filled Features

- Standard Visible Edge Seam is tack welded above and below edge cutouts for hinges, locks, etc.
- Edge Seam is then filled with structural adhesive and dressed smooth

#### LW Series Seam Welded Features

- Standard Visible Edge Seam is intermittently welded using 1" long welds
- Edge Seam is then filled with structural adhesive and dressed smooth
- No visible edge seam

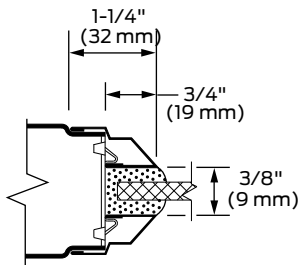


## Glass light options

(Refer to the Lights and Louvers section for further details and options)

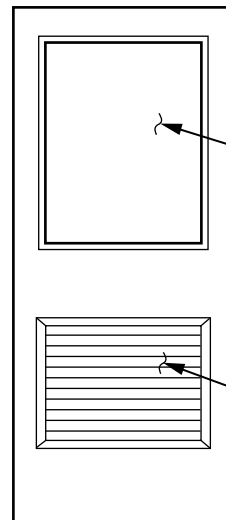
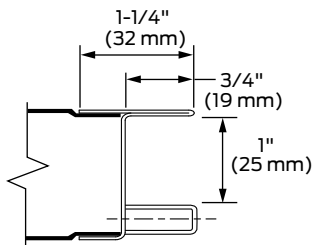
### Designer® Trim

- Standard for 1/4" Thick Glass
- Optional for 1/2" Thick Glass



### Flush Mounted Steel Trim

- For 1" Thick Glass



**Note:** Glazing type and thickness vary per job requirements.

**Note:** Louver size and type vary per requirements.

**Divider Muntins Are Not Available**



## SL Series



### About the product

The SL20 and SL18 Series **Square Edge** flush doors are designed to meet the architectural requirements for full flush doors. Refer to Section 11 (Architectural) for specifications and the selection and usage guide of the appropriate door constructions.

This door construction combines the strength and dimensional stability of steel with the structural integrity of the laminate core. The continuous bonding of core to steel face sheets provides an attractive, flat door, free of face welding marks. Tests have proven that the construction employed has integral high resistance to impact damage, low thermal conductivity and high STC ratings.

To meet application, specification and performance requirements, the SL Series door offers options including sizes, glass light designs and hardware preparations.

SL Series doors are 1 3/4" (45 mm) thick, with **Square Edges**.

### Installation

1. Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) *Recommended Erection Instructions for Steel Frames and HMMMA 840*.
2. Fire Rated Assemblies must be in accordance with NFPA Pamphlet 80. The Authority Having Jurisdiction is the final authority on issues related to the installation and use of installed Fire Rated Doors.

### Features and benefits

Steelcraft's SL Series doors offer the following standard features, which enhance performance and durability:

1. **Core Systems** that enhance the structural integrity of the door:
  - **Honeycomb (standard):** 1" (25 mm) cell kraft honeycomb configuration that increases structural integrity while reducing overall weight
  - **Polystyrene (optional):** enhanced thermal performance
2. **Full Height, Epoxy Filled Mechanical Interlock Edges** provide structural support and stability the full height of the door edges.
3. **Standard Hinge Preparations** for 4 1/2" (114 mm) x .134" (3.3 mm) standard weight or .180" (4.7 mm) heavy weight hinges.
4. **14 Gauge [0.067" (1.7 mm)] Inverted Top and Bottom Channels** provide stability and protection for the top and bottom edges from abuse.
5. **Square Hinge and Lock Edges** allow for non-handed inventory control for local distribution.
6. **Recessed Designer™ Glass Trim** provides a clean, neat and flush finish with the door surface.
7. **Factory Applied Baked-On Rust Inhibiting Primer** paint in accordance with ANSI A250.10-2011.

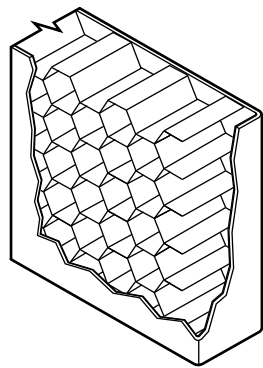
### Specification compliance

1. Door construction for Steelcraft SL Series doors meets the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6-2003 (R2009). Locations are in accordance with ANSI/DHI A115 unless otherwise stated.

### Fire ratings

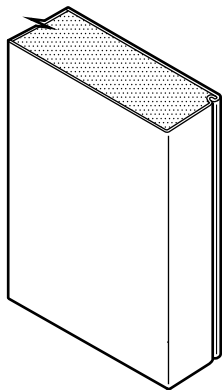
SL Series doors meet the broadest fire rating requirements. They are listed for installations requiring compliance to both neutral pressure testing (ASTM E152 and UL-10B) and positive pressure standards (UL-10C).

Rigid Honeycomb



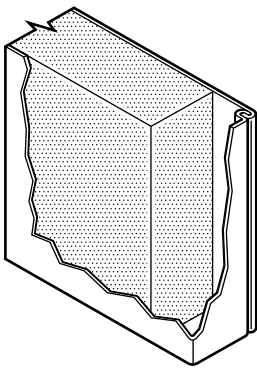
Standard Laminated Honeycomb Core

- 1" (25 mm) cell, 99 pound Kraft honeycomb
- Honeycomb surfaces sanded for maximum adhesion
- Impregnated with phenolic resin (resists mildew and vermin)
- Laminated to both face sheets with contact adhesive
- Assembled door is run through high pressure pinch rollers, achieving ultimate bond



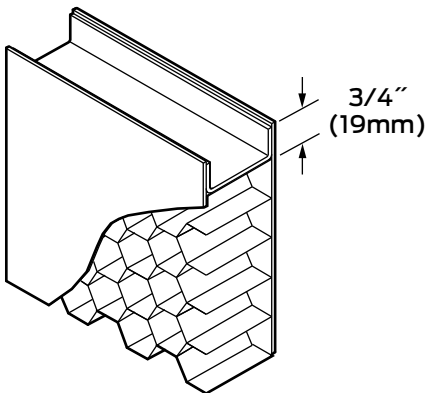
Standard Premium Edge Construction

- Beveled hinge & lock edges
- Full height mechanical interlock with epoxy adhesive
- Visible edge seam standard



Optional Polystyrene Core

- 1 pound (453.6g) per ft<sup>3</sup> density slab
- Laminated to both face sheets with contact adhesive
- Labeled applications



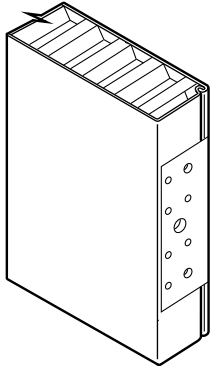
Standard Rigid 14 Gauge End Channel Construction

- 14 gauge inverted galvanized top & bottom channels
- Projection welded to both face sheets
- For optional caps, see "[Weather seals](#)" on page 145.

Door application and usage			
Series	Steel Thickness	Opening	Usage Frequency
SL20	20 Ga (0.8 mm)	Interior - Cold Rolled Steel	Standard Duty
SL20	20 Ga (0.8 mm)	Exterior - Galvanized Steel	Light Commercial applications with minimal use and abuse
SL18	18 Ga (1.0 mm)	Interior - Cold Rolled Steel	Heavy Duty
SL18	18 Ga (1.0 mm)	Exterior - Galvanized Steel	Heavy Commercial & Institutional applications with high use

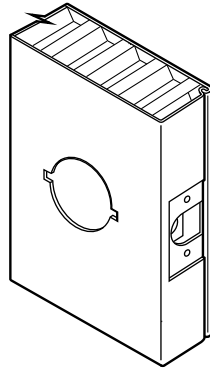
### Standard hardware preparations

Typical hardware applications shown. Refer to "Hardware" section for more details.

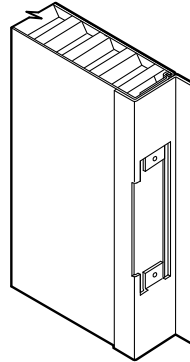


#### Mortise Hinge

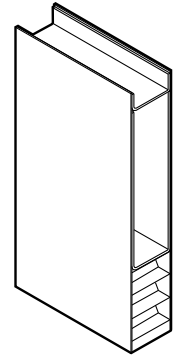
7 Gauge hinge reinforcement,  
reversible hinge fillers supplied



#### 161 Lock 61L Available



#### Inactive Leaf ASA Strike Prep with Astragal attached



#### Optional 14 Gauge Closer Reinforcement

### Standard: mortised and reinforced for

- Template hinge preparations for 4 ½" x .134" standard weight hinges or for 4 ½" x .180" heavy weight hinges. Butt hinge preparations are cut through for non-handed function; spacer plates are furnished for field installation and handing.
- The cylindrical 161, 61L and mortise 86 lock preps are the most commonly used active leaf preparations. The 4 ⅞ (124 mm) strike prep is the most commonly used inactive leaf preparation.
- Optional reinforcements for surface Closers are available.
- Limited hardware applications are available.

### Door Sizes and ANSI A250.8 Conversions

Steelcraft product selection for SL Series doors has been matched to ANSI/SDI Level and Model designations.

- In accordance with ANSI A250.8-2014 (SDI 100), core material is not specific to the level or model designations. Core material selection is specified based on preference and application.
- Recommended minimum frame gauge also applies to the frequency of operation of the opening.

Series	ANSI A250.8 - SDI 100			Edge Construction	Edge Maximum Sizes		Recommended Gauge of Frame
	Level	Model	Description		Single	Pair	
Level 1: Light Commercial							
SL20	1	1	Full Flush	Visible	3'0" x 8'0"	6'0" x 8'0"	18 Gauge [0.042" (1.0 mm)]
					914 mm x 2438 mm	1829 mm x 2438 mm	16 Gauge [0.053" (1.3 mm)]
Level 2: Heavy Duty Commercial & Institutional							
SL18	2	1	Full Flush	Visible	4'0" x 8'0"	8'0" x 8'0"	16 Gauge [0.053" (1.3 mm)]
					1219 mm x 2438 mm	2438 mm x 2438 mm	

## Door edge construction

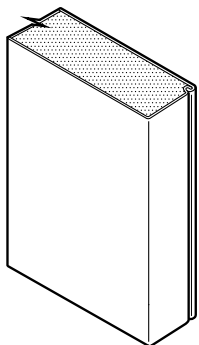
### Optional Edge Seams available in the SL Series doors:

- **SL:** Standard feature includes visible edge seams with full height interlocked edges.

### Standard visible edge seam

#### Features

- Full height mechanical interlock
- Interlock filled with epoxy adhesive
- Visible edge seam



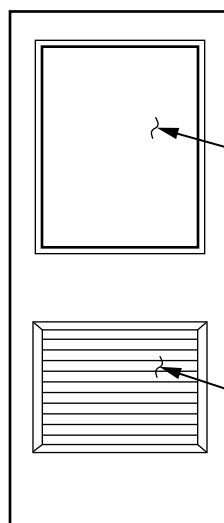
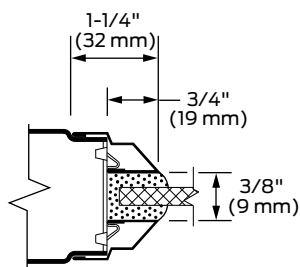
---

## Glass light options

Refer to the Lights and Louvers section for further details.

### Designer® Trim

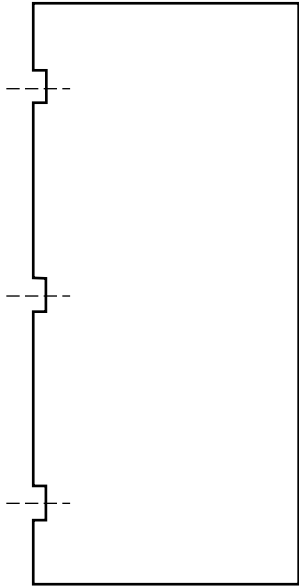
- Standard for 1/4" Thick Glass
- Optional for 1/2" Thick Glass



**Note:** Glazing type and thickness vary per job requirements.

**Note:** Louver size and type vary per requirements.

## Falcon SZ Series



### About the product

The SZ Series **Square Edge** flush doors are designed to meet requirements for commercial quality full flush steel doors.

This commercial door construction combines both the rigid construction and dimensional stability of steel with the integrity of the laminate core. The continuous bonding of the core to steel face sheets provides an attractive, flat door, free of face welding marks.

### Recommended area for use:

The SZ Series flush doors are recommended for commercial applications which are not required to comply with architectural specifications. This product is targeted at Distributor over the counter sales with walk-in Contractor trades requiring stock opening sizes and basic hardware configurations.

Typically, the SZ Series door is applicable to the following commercial applications:

- Storage Room & closets.
- Retail entrance and back doors.
- Economy Hotel and Motel unit entrances.

Falcon SZ Series doors are 1 3/4" (45 mm) thick, with **Square Edges**.

### Installation

1. Installation instructions, ANSI A250.11-2012 (formerly SDI 105) *Recommended Erection Instructions for Steel Frames and HMMA 840*.
2. Fire Rated Assemblies must be in accordance with NFPA Pamphlet 80. The *Authority Having Jurisdiction* is the final authority on issues related to the installation and use of installed Fire Rated Doors.

### Features and benefits

Steelcraft's SZ Series doors offer the following standard features:

1. **Core Systems** that enhance the performance of the door:
  - **Honeycomb (standard):** 1" (25 mm) cell Kraft honeycomb.
  - **Polystyrene (optional):** enhanced thermal performance.
2. **18 gauge Face Sheets**
3. **Full Height, Epoxy Filled Mechanical Interlock Edges** provide structural support and stability the full height of the door edges.
4. **Non-Handed for 4 1/2" (114 mm) Hinge Preparations** (.134") weight hinges (includes spacer plates which can be modified at install to accommodate heavyweight hinges).
5. **14 Gauge Inverted Top and Bottom Channels** provide stability and protection for the top and bottom edges from abuse.
6. **Closer Reinforcement** 14 Gauge minimum on all doors.
7. **Square Hinge and Lock Edges** for non-handed inventory control for local distribution.
8. **Factory Applied Rust Inhibiting Primer**

### Specification compliance

9. Door construction for Steelcraft's Falcon SZ Series doors meets the requirements of ANSI A250.8-2014 (SDI 100).
10. Hardware preparations and reinforcements are in accordance with ANSI A250.6-2003 (R2009). Locations are in accordance with ANSI/DHI A115 unless otherwise stated.

### Fire ratings

Falcon SZ Series doors are listed for installations requiring compliance to negative pressure testing (ASTM E152 and UL-10B) and positive pressure standards (UL-10C).

- Doors are factory labeled with a Warnock Hersey 1 1/2 Hour (90 min) Mylar label.

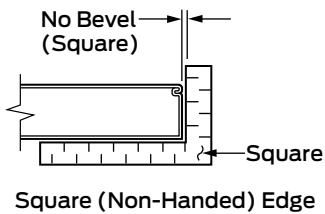
### Options

The Falcon SZ Series door sizing and option configurations are available only as noted in this TD Sheet or on the related Price Book pages. Commonly available configuration options **are not available** on the Falcon SZ Series doors including the options listed below.

- Factory installed glass lights.
- Factory cutouts for louver or glass lights.
- Hardware preparations or reinforcements other than those outlined in this TD Sheet or the related Price Pages.
- If configuration options are required, refer to the SL or L Series products.

**Door construction**

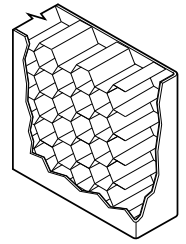
1. Vertical edges (both hinge and lock) are square with a visible, epoxy filled mechanical interlock edge seam.
2. Top and bottom edges are closed with inverted 14 gauge top and bottom channels (top cap not included, see 'Parts').
3. Doors are 1 3/4" (45 mm) thick.

**Available: Mortised and reinforced:**

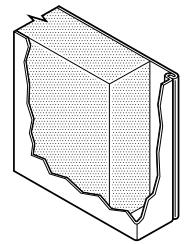
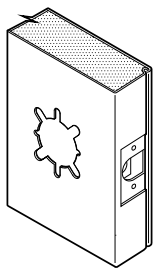
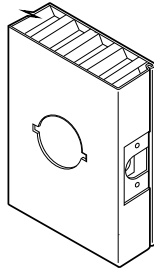
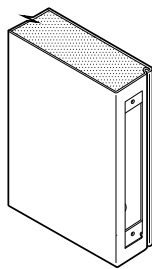
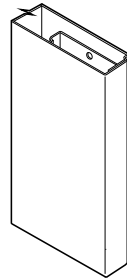
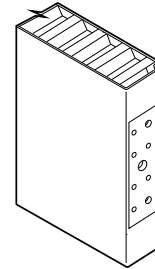
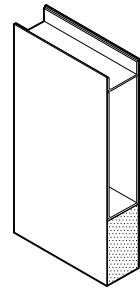
- Template hinge preparations for 4 1/2" (114 mm) x .134" (3.3 mm) standard weight hinges. Butt hinge preparations are cut through for non-handed function; spacer plates are furnished for field installation and handing.
- Lock preparations for mortise and cylindrical locks follow ANSI A115.1 for mortise preparations and A115.2 for cylindrical.
- Rim Exit Device preparation is reinforced on both hinge and lock side and located at 39 1/16" from bottom of door to center line of reinforcing.

**Standard Core: Rigid Honeycomb**

- 1" (25 mm) cell, 99 pound Kraft honeycomb
- Honeycomb surfaces sanded for maximum adhesion
- Impregnated with phenolic resin (resists mildew and vermin)
- Laminated to both face sheets with contact adhesive
- Assembled door is run through high pressure pinch rollers, achieving ultimate bond

**Rigid Honeycomb****Optional Core: Polystyrene Core**

- 1lb (433.6g) per ft<sup>3</sup> density slab.
- Laminated to both face sheets with contact adhesive.
- Assembled door is run through high pressure pinch rollers, achieving ultimate bond.

**Polystyrene Core****61L Lock****161 Lock****86ED Lock****RPD****Non-Handed  
Mortise Hinge Prep****Closer Reinf. 14 Ga.****Door application and usage**

Series	Steel Thickness	Opening	Usage Frequency
<b>SZ18</b>	18 Ga (1.0 mm)	Interior: Cold Rolled Steel	Heavy Duty
<b>SZ18</b>	18 Ga (1.0 mm)	Exterior: Galvannealed Steel	Heavy Commercial & Institutional applications with high use

**Door Sizes and ANSI A250.8 Conversions**

Steelcraft product selection for Falcon SZ Series doors has been matched to ANSI/SDI Level and Model designations.

- In accordance with ANSI A250.8-2014 (SDI 100), core material is not specific to the level or model designations. Core material selection is specified based on preference and application.
- Recommended minimum frame gauge also applies to the frequency of operation of the opening.

Series	ANSI A250.8 - SDI 100			Edge Construction	Maximum Sizes		Recommended Gauge of Frame
	Level	Model	Description		Single	Pair	
Level 2: Heavy Duty Commercial							
SZ18	2	1	Full Flush	Visible	4'0" x 7'0" (1219 mm x 2134 mm)	8'0" x 7'0" (2438 mm x 2134 mm)	16 gauge [0.053" (1.3 mm)]

**Note:** The Falcon SZ Series must be ordered in single leaf configurations. An 86ED lock prep allows a distributor to supply a pair of doors with the appropriate Z Astragal.

## B Series



### About the product

Steelcraft B18, B16, and B14 Series flush doors are designed to meet the architectural requirements for full flush, steel stiffened doors. The door face sheets are supported by the internal steel stiffeners, which extend the full door width. The stiffeners are welded to (1) face sheet and bonded to the opposite panel.

The B Series Door offers a wide range of specifiable options including sizes, glass light designs, optional edge constructions and hardware (mechanical, pneumatic, electrical) preparations.

B Series doors are 1 3/4" (45 mm) thick.

### THE USE OF HIGH GLOSS PAINT IS NOT RECOMMENDED.

High gloss paint accentuates the visibility of all welds.

### Installation

1. Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) *Recommended Erection Instructions for Steel Frames and HMMMA 840*.
2. Fire Rated Assemblies must be in accordance with NFPA Pamphlet 80. The *Authority Having Jurisdiction* is the final authority on issues related to the installation and use of installed Fire Rated Doors.
3. See Sound Openings section on page 243 for optional B-Door construction.

**Note 1:** For optional B-Door construction with STC-Stiffened Core, see SPECIALTY PRODUCTS: SOUND OPENINGS section page 243.

### Features and benefits

Steelcraft's B Series doors offer the following standard unique features, which enhance long term performance and durability:

1. **Steel Stiffened core construction** with welded 20 gauge hat section stiffeners.
2. **Full Height, Epoxy Filled Mechanical Interlock Edges** provide structural support and stability the full height of the door edges. Available edge options:
  - **Visible Edge Seam (standard):** full height, epoxy filled mechanical Interlocked edges
  - **Filled Edge Seam (optional add to standard):** seam filled with structural adhesive and dressed smooth. Includes tack welds above and below edge cutouts for hinges, locks, etc.
  - **Welded Edge Seam (optional add to standard):** intermittently welded using 1" long welds, then seam filled with structural adhesive and dressed smooth. Option available on B18, B16 and B14 doors.
3. **Universal Hinge Preparations** (patented) allow for easy field conversion from standard weight .134" (3.3 mm) hinges to heavy weight .180" (4.7 mm) hinges.  
**14 Gauge [0.067" (1.7 mm)] Inverted Top and Bottom Channels** provide stability and protection for the top and bottom edges from abuse.
4. **Beveled Hinge and Lock Edges** allow for tighter installation tolerances, ensure easier operation and eliminate binding and sticking.
5. **Recessed Dezigner™ Glass Trim** provides a clean, neat and flush finish with the door surface.
6. **Factory Applied Baked-On Rust Inhibiting Primer** paint in accordance with ANSI A250.10-2011.

### Specification compliance

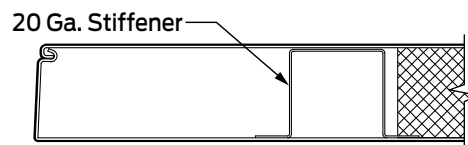
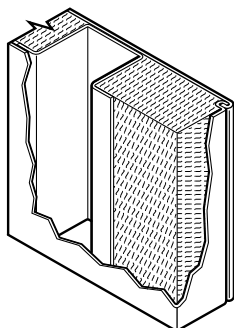
1. Door construction for Steelcraft B Series full flush doors meets the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6-2003 (R2009). Locations are in accordance with ANSI/DHI A115 unless otherwise stated.

### Fire ratings

B Series doors meet the broadest fire rating requirements. They are listed for installations requiring compliance to both neutral pressure testing (ASTM E152 and UL-10B) and positive pressure standards (UL-10C).

## Core construction

### Steel Stiffeners with Fiberglass Insulation

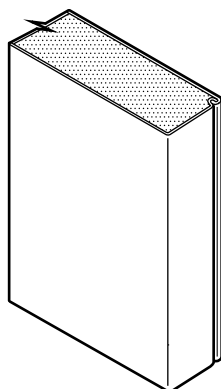


### Standard B Series Core

- 20 gauge stiffeners
- Stiffeners welded to inside of (1) face sheet and bonded to the opposite face
  - Vertical interior webs located 6" (152 mm) apart
  - Weld spacing 5" (127 mm) on center along the full height of each stiffener
- Stiffener height extends full height of door thickness
- Areas between stiffeners filled with nominal 1 pound (453.6g) per ft<sup>3</sup> density fiberglass batt insulation
- For optional B-Door construction with STC-Stiffened Core, see SPECIALTY PRODUCTS: SOUND OPENINGS on page 245.

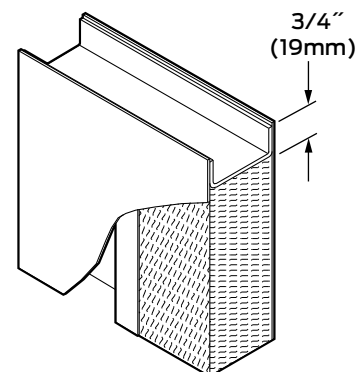
### Standard Premium Edge Construction

- Beveled hinge & lock edges
- Full height mechanical interlock with epoxy adhesive
- Visible edge seam standard
- Seamless edge optional



### Standard Rigid 14 Gauge End Channel Construction

- 14 gauge inverted galvanized top & bottom channels
- Projection welded to both face sheets
- For optional caps, see [""Weather seals" on page 145.](#)

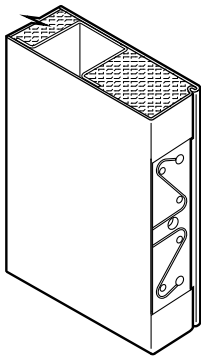


Door application and usage			
Series	Steel Thickness	Opening	Usage Frequency
B18	18 Ga (1.0 mm)	Interior: Cold Rolled Steel	Heavy Duty
B18	18 Ga (1.0 mm)	Exterior: Galvanized Steel	Heavy Commercial & Institutional applications with high use
B16	16 Ga (1.3 mm)	Interior: Cold Rolled Steel	Extra Heavy Duty
B16	16 Ga (1.3 mm)	Exterior: Galvanized Steel	Extra Heavy Commercial applications with potential of very high use
B14	14 Ga (1.7 mm)	Interior: Cold Rolled Steel	Maximum Duty
B14	14 Ga (1.7 mm)	Exterior: Galvanized Steel	Extra Heavy Commercial applications with extremely high use

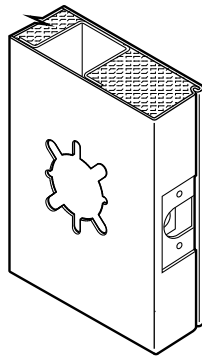


## Standard hardware preparations

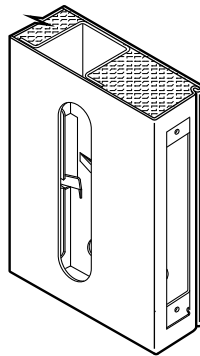
Typical hardware applications shown. Refer to "Hardware" section for more details.



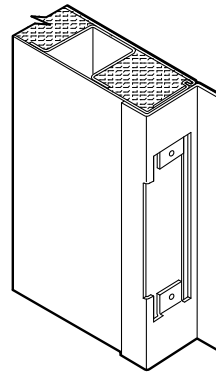
**Universal Mortise Hinge Prep**  
7 Gauge Universal hinge  
reinforcement



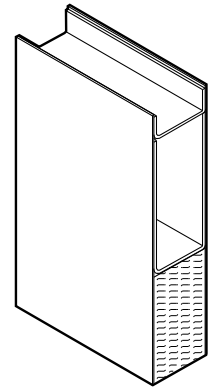
**61L Lock**



**86 Lock**



**Inactive Leaf ASA Strike  
Prep with Astragal attached**



**Optional 14 Gauge Closer  
Reinforcement**

### Standard: mortised and reinforced for:

- Patented Universal hinge preparations allow for easy field conversion from standard 4 1/2" x .134" standard weight hinges to 4 1/2" x .180" heavy weight hinges. Optional hinge preparation for 5" x .146" standard weight hinges or for 5" (127 mm) x .190" (4.8 mm) heavy weight hinges is also available.
- The cylindrical 161, 61L and mortise 86 lock preps are the most commonly used active leaf preparations. The 4 7/8" (124 mm) strike prep is the most commonly used inactive leaf preparation.
- Optional reinforcements for surface and concealed Closers are available.
- Special hardware applications are available.

## Door Sizes and ANSI A250.8 Conversions

Steelcraft product selection for B Series doors has been matched to ANSI/SDI Level and Model designations.

- In accordance with ANSI A250.8-2014 (SDI 100), core material is not specific to the level or model designations. Core material selection is specified based on preference and application.
- Recommended minimum frame gauge also applies to the frequency of operation of the opening.

Series	ANSI A250.8 - SDI 100			Edge Construction	Edge Maximum Sizes		Recommended Gauge of Frame
	Level	Model	Description		Single	Pair	
Level 2: Heavy Duty Commercial & Institutional							
B18	2	1	Full Flush	Visible	4'0" x 10'0" 1219 mm x 3048 mm	8'0" x 10'0" 2438 mm x 3048 mm	16 Gauge [0.053" (1.3 mm)]
BF18		2	Seamless	Filled			
BW18		2	Seamless	Welded			
Level 3: Extra Heavy Duty Commercial & Institutional							
B16	3	1	Full Flush	Visible	4'0" x 10'0" 1219 mm x 3048 mm	8'0" x 10'0" 2438 mm x 3048 mm	16 Gauge [0.053" (1.3 mm)]
BF16		2	Seamless	Filled			14 Gauge [0.067" (1.7 mm)]
BW16		2	Seamless	Welded			
Level 4: Maximum Duty Commercial & Institutional							
B14	4	1	Full Flush	Visible	4'0" x 10'0" 1219 mm x 3048 mm	8'0" x 10'0" 2438 mm x 3048 mm	14 Gauge [0.067" (1.7 mm)]
BF14		2	Seamless	Filled			
BW14		2	Seamless	Welded			

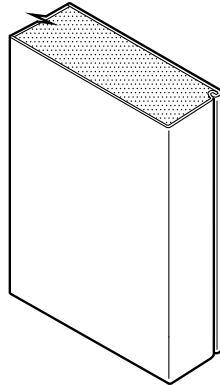
## Door edge construction

- Vertical edges (both hinge and lock) are beveled  $\frac{1}{8}$ " (3.2 mm) in 2" (51 mm) with a visible seam.
- Top and bottom edges are closed with inverted 14 gauge [0.067" (1.7 mm)] welded channels. Exterior applications require the addition of top caps to protect against the weather
- Optional Edge Seams available in the B Series doors:
  - BF:** the mechanical edge seam is filled and dressed smooth prior to applying the factory primer.
  - BW:** the mechanical edge seam is welded and dressed smooth prior to applying the factory primer.

### Standard visible edge seam

#### B Series Visible Seam Features

- Full height mechanical interlock
- Interlock filled with epoxy adhesive
- Visible edge seam



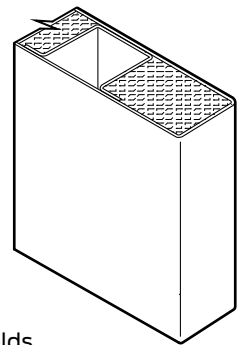
### Optional seamless edge

#### BF Series Seam Filled Features

- Standard Visible Edge Seam is tack welded above and below edge cutouts for hinges, locks, etc.
- Edge Seam is then filled with structural adhesive and dressed smooth
- No visible edge seam

#### BW Series Seam Welded Features

- Standard Visible Edge Seam is intermittently welded using 1" long welds
- Edge Seam is then filled with structural adhesive and dressed smooth
- No visible edge seam

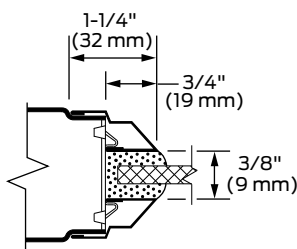


## Glass light options

(Refer to the Lights and Louvers section for further details)

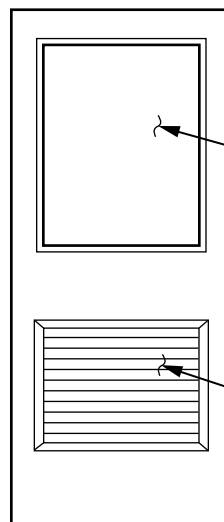
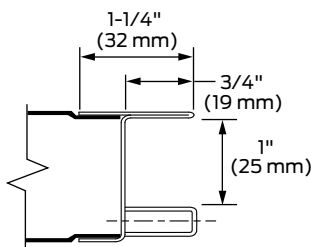
### Designer® Trim

- Standard for  $\frac{1}{4}$ " Thick Glass
- Optional for  $\frac{1}{2}$ " Thick Glass



### Flush Mounted Steel Trim

- For 1" Thick Glass



**Note:** Glazing type and thickness vary per job requirements.

**Note:** Louver size and type vary per requirements.

Divider Muntins Are Not Available

## T Series



### About the product

Steelcraft T20, T18, T16, and T14 Series flush doors are designed to meet the architectural requirements for Temperature Rise rated full flush doors. Refer to the Architectural section for specifications and the selection and usage guide of the appropriate door constructions. To meet application, specification and performance requirements, the T Series door offers a wide range of specifiable options including sizes, glass light designs, optional edge constructions and hardware (mechanical, pneumatic, electrical) preparations.

T Series doors are 1 3/4" (45 mm) thick.

### Installation

1. Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) *Recommended Erection Instructions for Steel Frames and HMMA 840*.
2. Fire Rated Assemblies must be in accordance with NFPA Pamphlet 80. The Authority Having Jurisdiction is the final authority on issues related to the installation and use of installed Fire Rated Doors.

### Features and benefits

Steelcraft's T Series doors offer the following standard unique features, which enhance long term performance and durability:

1. **Mineral board core** provides a 250°F (121°C) Temperature Rise rating or 450°C (232°C) at 30 minutes of test exposure, depending on hardware application.
2. **Full Height, Epoxy Filled Mechanical Interlock Edges** provide structural support and stability the full height of the door edges. Available edge options:
  - **Visible Edge Seam** (standard): full height, epoxy filled mechanical Interlocked edges with tack welds
  - **Filled Edge Seam (optional add to standard)**: seam filled with structural adhesive and dressed smooth.
  - **Welded Edge Seam (optional add to standard)**: intermittently welded using 1" long welds, then seam filled with structural adhesive and dressed smooth. Option available on T18, T16 and T14.
3. **Universal Hinge Preparations** (patented) allow for easy field conversion from standard weight .134" (3.3 mm) hinges to heavy weight .180" (4.7 mm) hinges.
4. **14 Gauge [0.067" (1.7 mm)] Inverted Top and Bottom Channels** provide stability and protection for the top and bottom edges from abuse.
5. **Beveled Hinge and Lock Edges** allow for tighter installation tolerances, ensure easier operation and eliminate binding and sticking.
6. **Recessed Designer™ Glass Trim** provides a clean, neat and flush finish with the door surface.
7. **Factory Applied Baked-On Rust Inhibiting Primer** paint in accordance with ANSI A250.10-2011.

### Specification compliance

1. Door construction for Steelcraft T Series full flush doors meets the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6-2003 (R2009). Locations are in accordance with ANSI/DHI A115 unless otherwise stated.

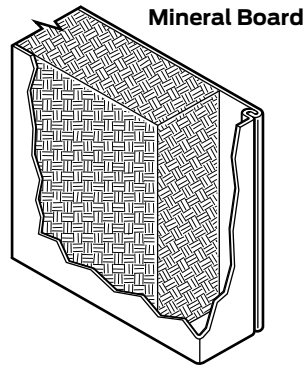
### Fire ratings

T Series doors meet the broadest fire rating requirements. They are listed for installations requiring compliance to both neutral pressure testing (ASTM E152 and UL-10B) and positive pressure standards (UL-10C).

## Core construction

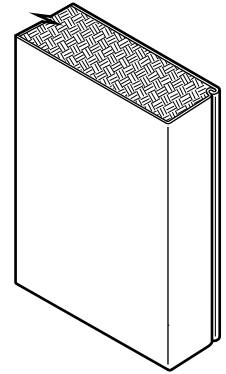
### Standard T Series Core

- Mineral Fiber board core
  - 250°F (121°C) Temperature Rise rating
    - single point locks
    - exit hardware
  - 450°F (218°C) Temperature Rise rating
    - single point locks
    - exit hardware
    - doors prepared for INPACT™ exit devices
    - pairs of doors with two (2) vertical rod exit devices (without astragal)
- Fire label ratings up to 3 hours
- Laminated to inside faces of both door panels with contact adhesive



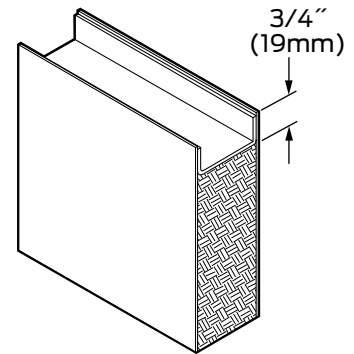
### Standard Premium Edge Construction

- Beveled hinge & lock edges
- Full height mechanical interlock with epoxy adhesive
- Visible edge seam standard, with tack welds above and below edge cutouts for hinges, locks, etc.
- Seamless edge optional



### Standard Rigid 14 Gauge End Channel Construction

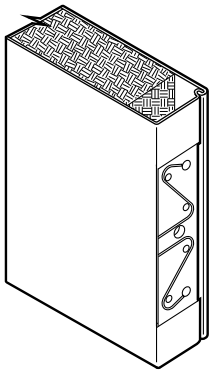
- 14 gauge inverted galvanized top & bottom channels
- Projection welded to both face sheets
- For optional caps, see [""Weather seals"" on page 145.](#)



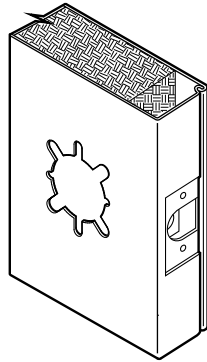
Door application and usage			
Series	Steel Thickness	Opening	Usage Frequency
T20	20 Ga (0.8 mm)	Interior: Cold Rolled Steel	Standard Duty
T20	20 Ga (0.8 mm)	Exterior: Galvanized Steel	Light Commercial applications with minimal use and abuse
T18	18 Ga (1.0 mm)	Interior: Cold Rolled Steel	Heavy Duty
T18	18 Ga (1.0 mm)	Exterior: Galvanized Steel	Heavy Commercial & Institutional applications with high use
T18	16 Ga (1.3 mm)	Interior: Cold Rolled Steel	Extra Heavy Duty
T18	16 Ga (1.3 mm)	Exterior: Galvanized Steel	Extra Heavy Commercial applications with potential of very high use
T14	14 Ga (1.7 mm)	Interior: Cold Rolled Steel	Maximum Duty
T14	14 Ga (1.7 mm)	Exterior: Galvanized Steel	Extra Heavy Commercial applications with extremely high use

## Standard hardware preparations

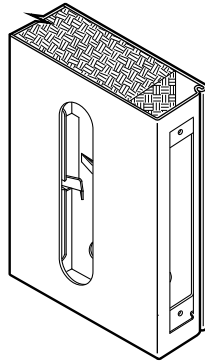
Typical hardware applications shown. Refer to "Hardware" section for more details.



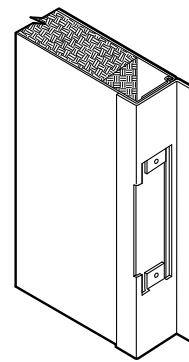
**Universal Mortise Hinge Prep**  
7 Gauge Universal hinge  
reinforcement



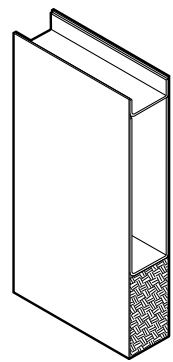
**61L Lock**



**86 Lock**



**Inactive Leaf ASA Strike  
Prep with Astragal  
attached**



**Optional 14 Gauge Closer  
Reinforcement**

### Standard: mortised and reinforced for

- Patented Universal hinge preparations allow for easy field conversion from standard 4 1/2" x .134" standard weight hinges to 4 1/2" x .180" heavy weight hinges. Optional hinge preparation for 5" x .146" standard weight hinges or for 5" x .190" heavy weight hinge are also available.
- The cylindrical 161, 61L and mortise 86 lock preps are the most commonly used active leaf preparations. The 4 7/8 (124 mm) strike prep is the most commonly used inactive leaf preparation.
- Optional reinforcements for surface and concealed Closers are available.
- Special hardware applications are available.

## Door Sizes and ANSI A250.8 Conversions

Steelcraft product selection for T Series doors has been matched to ANS/SDI Level and Model designations.

- In accordance with ANSI A250.8-2014 (SDI 100), core material is not specific to the level or model designations. Core material selection is specified based on preference and application.
- Recommended minimum frame gauge also applies to the frequency of operation of the opening.

Series	ANSI A250.8 - SDI 100			Edge Construction	Edge Maximum Sizes		Recommended Gauge of Frame
	Level	Model	Description		Single	Pair	
Level 2: Heavy Duty Commercial & Institutional							
B18	2	1	Full Flush	Visible	4'0" x 10'0" 1219 mm x 3048 mm	8'0" x 10'0" 2438 mm x 3048 mm	16 Gauge [0.053" (1.3 mm)]
BF18		2	Seamless	Filled			
BW18		2	Seamless	Welded			
Level 3: Extra Heavy Duty Commercial & Institutional							
B16	3	1	Full Flush	Visible	4'0" x 10'0" 1219 mm x 3048 mm	8'0" x 10'0" 2438 mm x 3048 mm	16 Gauge [0.053" (1.3 mm)]
BF16		2	Seamless	Filled			14 Gauge [0.067" (1.7 mm)]
BW16		2	Seamless	Welded			
Level 4: Maximum Duty Commercial & Institutional							
B14	4	1	Full Flush	Visible	4'0" x 10'0" 1219 mm x 3048 mm	8'0" x 10'0" 2438 mm x 3048 mm	14 Gauge [0.067" (1.7 mm)]
BF14		2	Seamless	Filled			
BW14		2	Seamless	Welded			

## Door edge construction

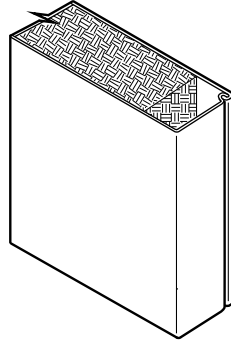
### Optional Edge Seams available in the T Series doors:

- **TF:** the mechanical edge seam is tack welded, filled, and dressed smooth prior to applying the factory primer.
- **TW:** the mechanical edge seam is welded and dressed smooth prior to applying the factory primer.

### Standard Visible Edge Seam

#### T Series Visible Seam Features

- Full height mechanical interlock
- Interlock is tack welded and filled with epoxy adhesive
- Visible edge seam with tack welds



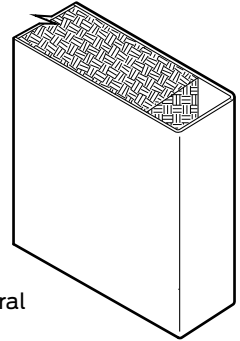
### Optional Seamless Edge

#### TF Series Seam Filled Features

- Standard Visible Edge Seam is filled with structural adhesive and dressed smooth
- No visible edge seam

#### TW Series Seam Welded Features

- Standard Visible Edge Seam is intermittently welded using 1" long welds
- Edge Seam is then filled with structural adhesive and dressed smooth
- No visible edge seam

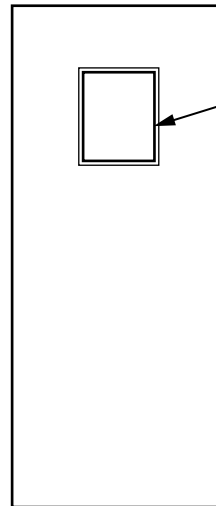
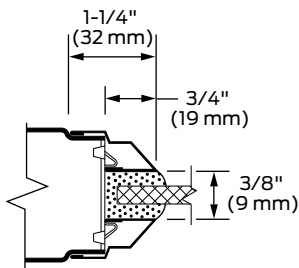


## Glass light options

(Refer to the Lights and Louvers section for further details and options – maximum 100 square inch of exposed glass)

### Designer® Trim

- Standard for 1/4" Thick Glass
- Optional for 1/2" Thick Glass



**Note:** Glazing type and thickness vary per job requirements. Max. 100 square inch exposed.

## CE Series



### About the product

The CE, HD2, and HD2A Series embossed panel doors are designed to meet the architectural requirements for embossed panel doors. The door construction combines the features and benefits of polystyrene core laminated construction. Refer Architectural section for specifications and the selection and usage guide of the appropriate door constructions.

This premium door construction combines the strength and dimensional stability of steel with the structural integrity of the laminate core. The continuous bonding of core to steel face sheets provides an attractive, flat door, free of face welding marks.

To meet application, specification and performance requirements, the CE Series embossed panel doors offers a wide range of specifiable options including sizes, glass light designs and hardware (mechanical, pneumatic, electrical) preparations.

CE Series doors are 1 3/4" (45 mm) thick.

### Installation

1. Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) *Recommended Erection Instructions for Steel Frames and HMMMA 840*.
2. Fire Rated Assemblies must be in accordance with NFPA Pamphlet 80. The Authority Having Jurisdiction is the final authority on issues related to the installation and use of installed Fire Rated Doors.

### Features and benefits

Steelcraft's CE Series embossed panel doors offer the following standard unique features, which enhance long term performance and durability:

1. **A-40 Galvannealed steel** face sheets
2. **Polystyrene Core** provides enhanced thermal performance
3. **Full Height, Epoxy Filled Mechanical Interlock Edges** provide structural support and stability the full height of the door edges. Available edge options:
  - **Visible Edge Seam (standard):** full height, epoxy filled mechanical interlocked edges
  - **Filled Edge Seam (optional add to standard):** seam filled with structural adhesive and dressed smooth. Includes tack welds above and below edge cutouts for hinges, locks, etc.
4. **Universal Hinge Preparations** (patented) allow for easy field conversion from standard weight .134" (3.3 mm) hinges to heavy weight .180" (4.7 mm) hinges.
5. **14 Gauge [0.067" (1.7 mm)] Inverted Top and Bottom Channels** provide stability and protection for the top and bottom edges from abuse.
6. **Beveled Hinge and Lock Edges** allow for tighter installation tolerances, ensure easier operation and eliminate binding and sticking.
7. **Recessed Dezigner™ Glass Trim** provides a clean, neat and flush finish with the door surface.
8. **Factory Applied Baked-On Rust Inhibiting Primer** paint in accordance with ANSI A250.10-2011.

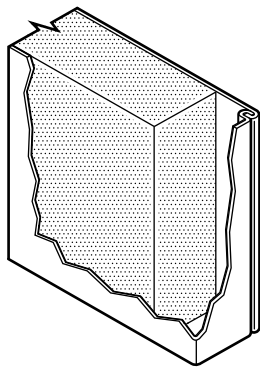
### Specification compliance

1. Door construction for Steelcraft CE Series embossed panel doors meets the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6-2003 (R2009). Locations are in accordance with ANSI/DHI A115 unless otherwise stated.
3. Door construction for the CE Series embossed panel doors meets ANSI A117.1-1998 (ADA) requirements for minimum 10" (254 mm) bottom rail height measured from the floor.

### Fire ratings

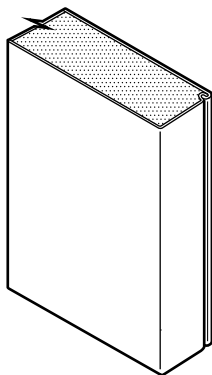
CE Series embossed panel doors meet the broadest fire rating requirements. They are listed for installations requiring compliance to both neutral pressure testing (ASTM E152 and UL-10B) and positive pressure standards (UL-10C).

Laminated core  
Standard CE Series Core



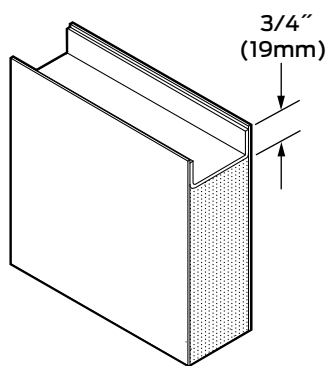
- 1 pound (453.6g) per ft<sup>3</sup> density polystyrene slab
- Laminated to both face sheets with contact adhesive
- Assembled door is run through high pressure pinch rollers, achieving ultimate bond

Standard Premium Edge Construction



- Beveled hinge & lock edges
- Full height mechanical interlock with epoxy adhesive
- Visible edge seam standard
- Seamless edge optional

Standard Rigid 14 Gauge End Channel Construction



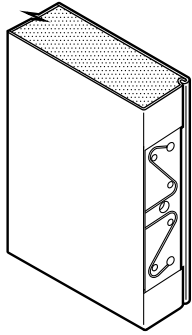
- 14 gauge inverted galvanized top & bottom channels
- Projection welded to both face sheets
- For optional caps, see [""Weather seals" on page 145.](#)

Door application and usage			
Series	Steel Thickness	Opening	Usage Frequency
CE20	20 Ga (0.8 mm)	Interior or Exterior - Galvanized Steel	Standard Duty Light Commercial applications with minimal use and abuse
CE18, HD18, HD2A18	18 Ga (1.0 mm)		Heavy Duty Heavy Commercial & Institutional applications with high use
CE16, HD16, HD2A16	16 Ga (1.3 mm)		Extra Heavy Duty Extra Heavy Commercial applications with potential of very high use

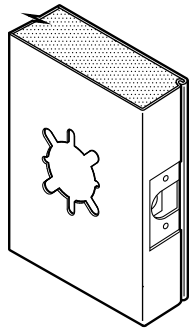


## Standard hardware preparations

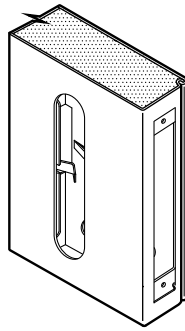
Typical hardware applications shown. Refer to "Hardware" section for more details.



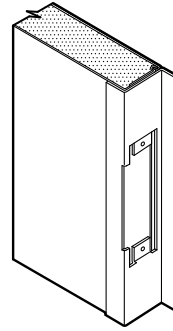
**Universal Mortise Hinge Prep**  
7 Gauge Universal hinge  
reinforcement



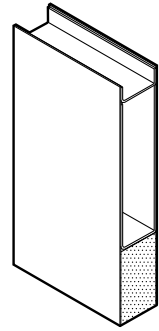
**61L Lock**



**86 Lock**



**Inactive Leaf ASA Strike  
Prep with Astragal  
attached**



**Optional 14 Gauge Closer  
Reinforcement**

### Standard: mortised and reinforced for

- Patented Universal hinge preparations allow for easy field conversion from standard 4 1/2" x .134" standard weight hinges to 4 1/2" (114 mm) x .180" heavy weight hinges. Optional hinge preparation for 5" x .146" standard weight hinges or for 5" (127 mm) x .190" heavy weight hinges is also available.
- The cylindrical 161, 61L and mortise 86 lock preps are the most commonly used active leaf preparations. The 4 7/8 (124 mm) strike prep is the most commonly used inactive leaf preparation.
- Optional reinforcements for surface Closers are available.
- Special hardware applications are available.

## Door Sizes and ANSI A250.8 Conversions

Steelcraft product selection for CE Series doors has been matched to ANSI/ISD Level and Model designations.

- In accordance with ANSI A250.8-2014 (SDI 100), core material is not specific to the level or model designations. Core material selection is specified based on preference and application.
- Recommended minimum frame gauge also applies to the frequency of operation of the opening.

Series	ANSI A250.8 - SDI 100			Edge Construction	Edge Maximum Sizes			
	Level	Model	Description		6 Panel Door Design		8 Panel Door Design	
					Single	Pair	Single	Pair
Level 1: Light Commercial								
CE20	1	1	Full Flush	Visible	3'0" x 8'0"	6'0" x 8'0"	3'0" x 7'0"	6'0" x 7'0"
CE20		2	Seamless	Filled	914 mm x 2438 mm	1829 mm x 2438 mm	914 mm x 2134 mm	1829 mm x 2134 mm
Level 2: Heavy Duty Commercial & Institutional								
CE18	2	1	Full Flush	Visible	3'8" x 7'0"	7'4" x 7'0"	Not Available	Not Available
HD218		2	Seamless	Filled	1118 mm x 2134 mm	2235 mm x 2134 mm		
HD2A18								
Level 3: Extra Heavy Duty Commercial & Institutional								
CE16	3	1	Full Flush	Visible	3'0" x 8'0"	6'0" x 8'0"	Not Available	Not Available
HD216		2	Seamless	Filled	3'8" x 7'0"	7'4" x 7'0"		
HD2A16					1118 mm x 2134 mm	2235 mm x 2134 mm		

## Door edge construction

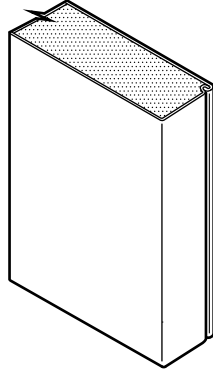
- Optional Edge Seams available in the CE Series doors:
  - CF:** the mechanical edge seam is dressed smooth and finished prior to applying the factory primer.

### Beveled Edge with Full Height Mechanical Interlock

#### Standard Visible Edge Seam

##### CE Series Visible Seam Features

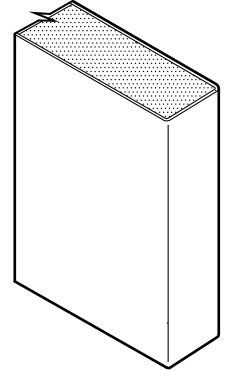
- Full height mechanical interlock
- Interlock filled with epoxy adhesive
- Visible edge seam



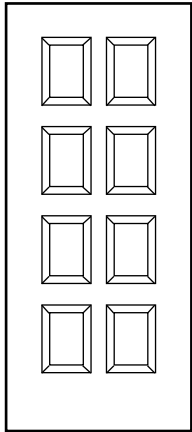
#### Optional Seamless Edge

##### CF Series Seam Filled Features

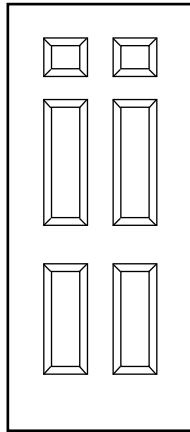
- Standard Visible Edge Seam is tack welded above and below edge cutouts for hinges, locks, etc.
- Edge Seam is then filled with structural adhesive and dressed smooth
- No visible edge seam



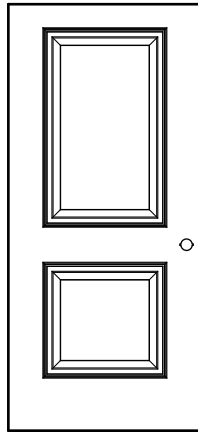
## Embossed Pattern Designs



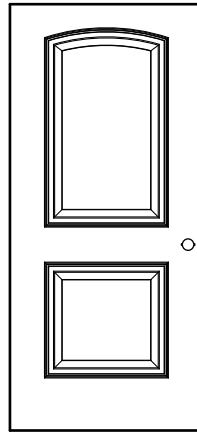
8 Panel



6 Panel



HD2



HD2A

#### Notes:

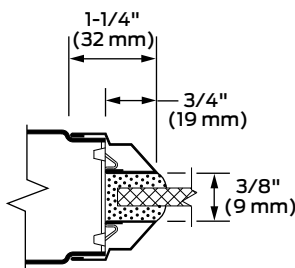
- Standard door sizes are available.
- Refer to pages [120-124](#) of this manual for all panel dimensions.
- Availability of non standard door sizes is limited.

## Glass light options

(Refer to the Lights and Louvers section for further details and options)

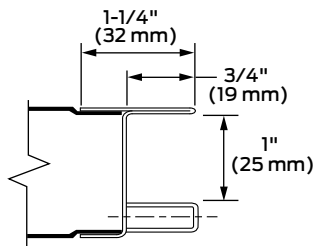
#### Designer® Trim

- Standard for 1/4" Thick Glass
- Optional for 1/2" Thick Glass

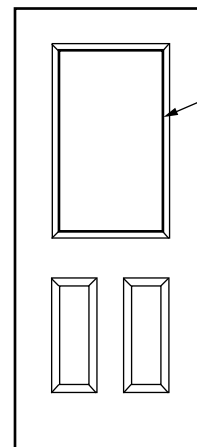


#### Flush Mounted Steel Trim

- For 1" Thick Glass

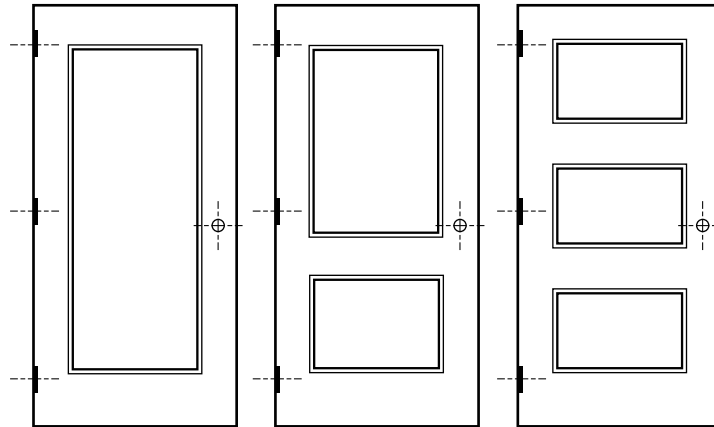


Divider Muntins are Not Available



**Note:** Glazing type and thickness vary per job requirements.

## A14 Series full glass entrance doors



### About the product

The A14 Series full glass entrance doors are designed to meet the architectural requirements for exterior entrance applications. Refer to Section 11 (Architectural) for specifications and the selection and usage guide of the appropriate door constructions.

A14 Series doors are available for high frequency openings and entrances where large full glass (FG, FG2, and FG3) lights are required. This premium door construction combines the strength and dimensional stability of steel with the structural integrity of the laminate core with internal corner gussets to provide added strength and rigidity.

To meet application, specification and performance requirements for entrance door applications, the A14 Series Door offers a wide range of specifiable options including sizes, glass light designs and hardware (mechanical, pneumatic, electrical) preparations.

A14 Series doors are 1 3/4" (45 mm) thick.

### Installation

1. Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) *Recommended Erection Instructions for Steel Frames and HMMA 840*.
2. Fire Rated Assemblies must be in accordance with NFPA Pamphlet 80. The Authority Having Jurisdiction is the final authority in issues related to the installation and use of installed Fire Rated Doors.

### Features and benefits

Steelcraft's A14 Series doors offer the following standard unique features, which enhance long term performance and durability:

1. **Honeycomb Core Systems** that enhance the structural integrity of the door:
  - 1" (25 mm) cell kraft honeycomb configuration with internal corner gussets to provide added strength and rigidity.
2. **Seamless edges** with full height, epoxy filled mechanical Interlock edges, provide structural support and stability the full height of the door. Edges are seam filled with structural adhesive and dressed smooth. Includes tack welds above and below edge cutouts for hinges, locks, etc.
3. **Universal Hinge Preparations** (patented) allow for easy field conversion from standard weight .134" (3.3 mm) hinges to heavy weight .180" (4.7 mm) hinges.
4. **14 Gauge [0.067" (1.7 mm)] Inverted Top and Bottom Channels** provide stability and protection for the top and bottom edges from abuse.
5. **Beveled Hinge and Lock Edges** allow for tighter installation tolerances, ensure easier operation and eliminate binding and sticking.
6. **Recessed Designer™ Glass Trim** provides a clean, neat and flush finish with the door surface.
7. **Factory Applied Baked-On Rust Inhibiting Primer** paint in accordance with ANSI A250.10-2011.

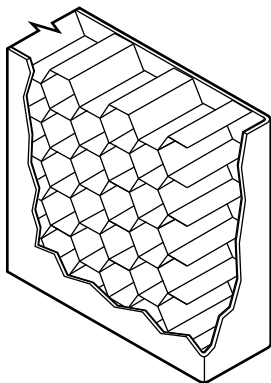
### Specification compliance

1. Door construction for Steelcraft A14 Series doors meets the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6-2003 (R2009). Locations are in accordance with ANSI/DHI A115 unless otherwise stated.

### Fire ratings

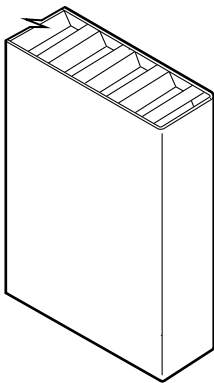
A14 Series doors meet fire rating requirements. They are listed for installations requiring compliance to NFPA252-1999 and UL-10C.

Standard Laminated Honeycomb Core with internal corner gussets



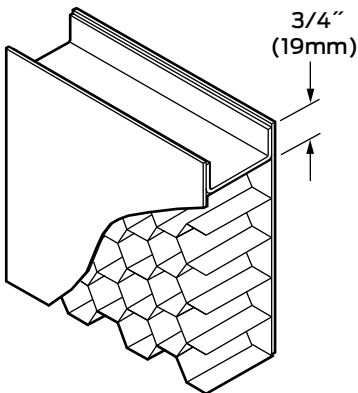
- 1" (25 mm) cell, 99 pound Kraft honeycomb
- Honeycomb surfaces sanded for maximum adhesion
- Impregnated with phenolic resin (resists mildew and vermin)
- Laminated to both face sheets with contact adhesive
- Assembled door is run through high pressure pinch rollers, achieving ultimate bond

Standard Premium Edge Construction



- Beveled hinge & lock edges
- Full height mechanical Interlock with structural adhesive
- Tack welds above and below edge cutouts for hinges, locks, etc.
- Edge Seam filled with structural adhesive and dressed smooth
- No visible edge seam

Standard Rigid 14 Gauge End Channel Construction

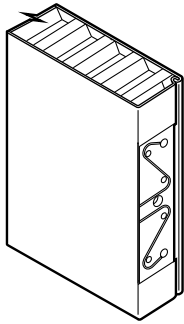


- 14 gauge inverted galvanized top & bottom channels
- Projection welded to both face sheets
- For optional caps, see [""Weather seals" on page 145.](#)

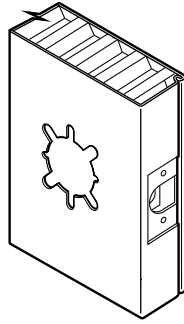
Door application and usage			
Series	Steel Thickness	Opening	Usage Frequency
A14	14 Ga (1.7 mm)	Interior: Cold Rolled Steel	Maximum Duty
A14	14 Ga (1.7 mm)	Exterior: Galvanized Steel	Extra Heavy Commercial applications with potential of very high use

### Standard hardware preparations

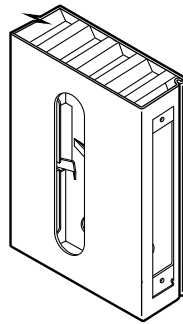
Typical hardware applications shown. Refer to "Hardware" section for more details.



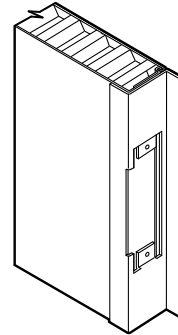
**Universal Mortise Hinge Prep**  
7 Gauge Universal hinge reinforcement



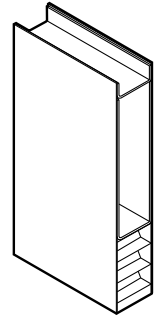
**61L Lock**



**86 Lock**



**Inactive Leaf ASA  
Strike Prep with  
Astragal attached**



**14 Gauge Closer  
Reinforcement**

### Standard: mortised and reinforced for

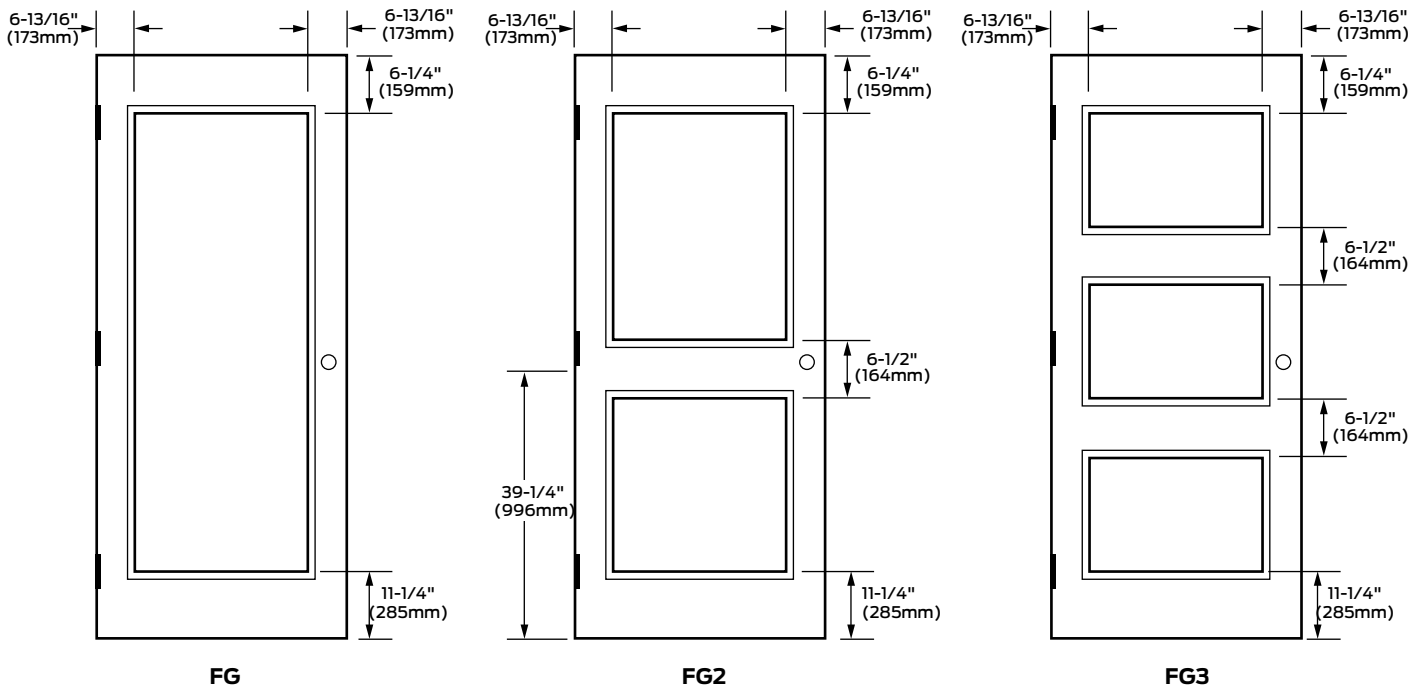
- Patented Universal hinge preparations allow for easy field conversion from standard 4 1/2" (114 mm) x .134" (3.3 mm) standard weight hinges to 4 1/2" (114 mm) x .180" (4.7 mm) heavy weight hinges. Optional hinge preparation for 5" (127 mm) x .146" (3.7 mm) standard weight hinges or for 5" (127 mm) x .190" (4.8 mm) heavy weight hinges is also available.
- A multitude of standard lock preparations are available. The cylindrical 161, 61L and mortise 86 lock preps are the most commonly used active leaf preparations. The 4 7/8" (124 mm) strike prep is the most commonly used inactive leaf preparation.
- Optional reinforcements for surface and concealed Closers are available.
- Special hardware applications are available.

### Door Sizes and ANSI A250.8 Conversions

Steelcraft product selection for A Series Stile and Rail Doors has been matched to ANSI/SDI designations for Level and Model. Recommended minimum frame gauge also applies to the frequency of operation of the opening.

Series	ANSI A250.8 - SDI100			Edge Construction	Edge Maximum Sizes		Recommended Gauge of Frame
	Level	Model	Description		Single	Pair	
Level 3: Extra Heavy Duty Commercial & Institutional							
A14	4	2	Seamless	Filled	4'0" x 8'0" 1219 mm x 2438 mm	8'0" x 8'0" 2438 mm x 2438 mm	14 Gauge [0.067" (1.7 mm)]

## Standard glass design options



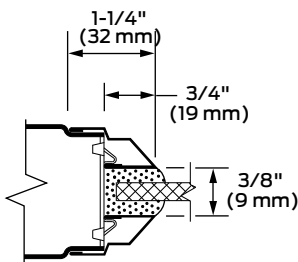
3. Dimensions shown are to the exposed glass sizes. Refer to the Lights section for cutout and glass sizes.
4. Standard Vertical Stiles (both hinge and lock) are 6 13/16" (173 mm) wide to the finished edge opening of the glass light trim (6 5/64" from the door edge to the cutout of the glass light) and are beveled 1/8" (3.2 mm) in 2" (51 mm) with no visible seams.
5. Standard Top Rails are 6 1/4" (159 mm) high and are closed with inverted 14 gauge [0.067" (1.7 mm)] welded channels. Exterior applications require the addition of top caps to protect against the weather.
6. Standard Bottom Rails are 11 1/4" (285 mm) high and are closed with inverted 14 gauge [0.067" (1.7 mm)] welded channels.
7. Standard Intermediate Rails are 6 1/2" (164 mm) high and are used to create the FG2 and FG3 designs.
8. Special glass sizes are available; however, the vertical stiles are always fixed at 6 13/16" wide regardless of the glass size.

## Glass light options

(Refer to the Lights and Louvers section for further details and options – Flush Mounted Steel Trim not available on 14GA doors)

### Designer® Trim

- Standard for 1/4" Thick Glass
- Optional for 1/2" Thick Glass

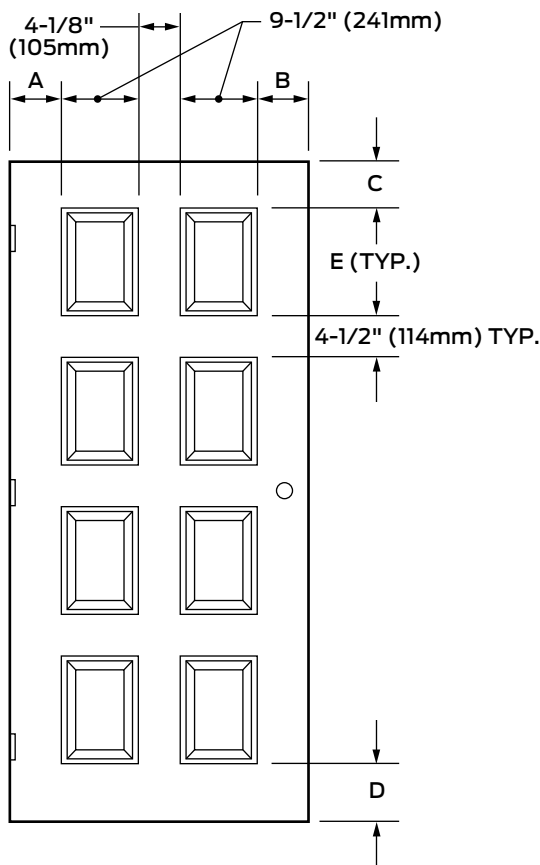


# Doors variations and options

Embossed CE Series.....	120
8 panels .....	120
6 panels .....	121
6 panels (2' 10" thru 3' 8" door widths).....	122
HD2 panels (2' 8" thru 3' 8" door widths) .....	123
HD2A panels (2' 8" thru 3' 4" door widths) .....	124
Dutch doors .....	125
Non-labeled .....	125
Full shelf (non-labeled) .....	126
Labeled.....	127
Half shelf (labeled) .....	128
Optional lock preparation.....	129
Monorail.....	130
Preparation.....	130
GRAINTECH™ .....	131
Steel doors.....	131
Hardware .....	132
High frequency hinge preparation.....	132
Aluminum door edge nosing .....	133
Interviewer prep.....	134
Peep slot with trim.....	135
Mail slot preparation .....	136
Z Astragal.....	137
Applications .....	137
Inactive leaf mounting.....	138
Double egress mounting .....	139
Active leaf mounting .....	140
Hardware preparations.....	141
Flat plate astragal .....	142
Exposed fastening.....	142
2 piece astragal.....	143
Applications .....	143
Hardware preparations.....	144
Weather seals.....	145
Top & bottom caps.....	145
FAS-SEAL™ door bottom sweep.....	146

Embossed CE Series

8 panels



Door widths	A	B
2' 8"	3 27/32"	4 27/32"
3' 0"	6 11/32"	6 11/32"

Door heights	C	D	E
6' 8"	* 3 7/8"	9 3/4"	13"
7' 0"	5 7/8"	11 3/4"	13"

**\* Note:** Due to the 3 7/8" top rail dimension, the use of closers should be either avoided or be mounted with drop brackets on all 6' 8" high embossed 8 Panel doors.

Purpose

Embossed doors are specified when decorative door face sheets are architecturally required. The 8 panel embossed door design is a less popular design.

Application

Hotel, apartment or office entrance doors.

Product availability

This door option is available in the CE Series in either fire labeled or and non-labeled applications:

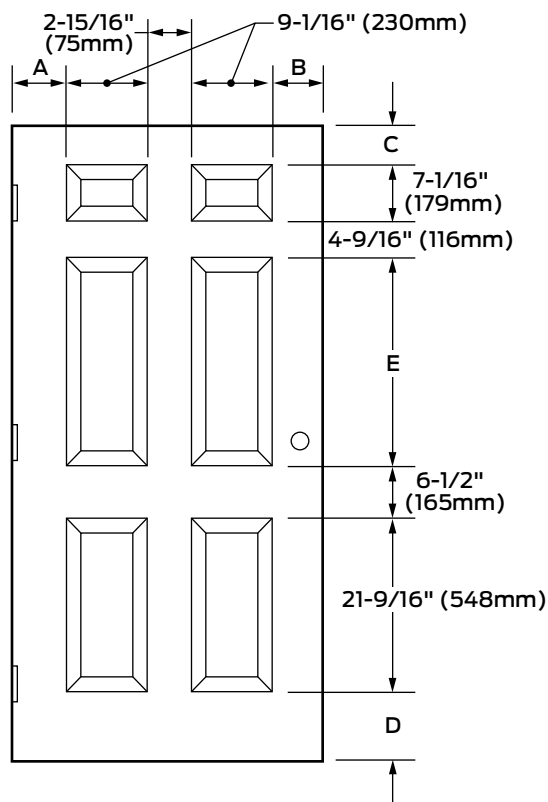
- 20 Gauge [0.032" (0.8 mm) A-40 galvanized steel] only
- Available in 1/16" (1.5 mm) increments in width and height subject to the following:
  - 2' 8" (813 mm) thru 3' 0" (914 mm) widths
  - 6' 8" (2032 mm) thru 7' 0" (2134 mm) heights

8 Panel design (lights or louvers are not available).



**6 panels**

(2' 6" thru 2' 8" door widths)



Door widths	A	B
2' 6"	3 ¾"	5"
2' 8"	5 ¾"	5 ¾"

**Note:** The rail dimension "A" is narrower on the hinge side of doors narrower than 2' 8" in nominal door width.

Door heights	C	D	E
6' 8"	* 4 ¼"	9 ¾"	25 ⅞"
7' 0"	6 ¼"	11 ¾"	25 ⅞"

**\* Note:** Due to the 4 ¼" top rail dimension, the use of closers should be either avoided or be mounted with drop brackets on all 6' 8" high embossed 6 Panel doors.

**Purpose**

Embossed doors are specified when decorative door face sheets are architecturally required. The 6 panel embossed door design is the most popular design.

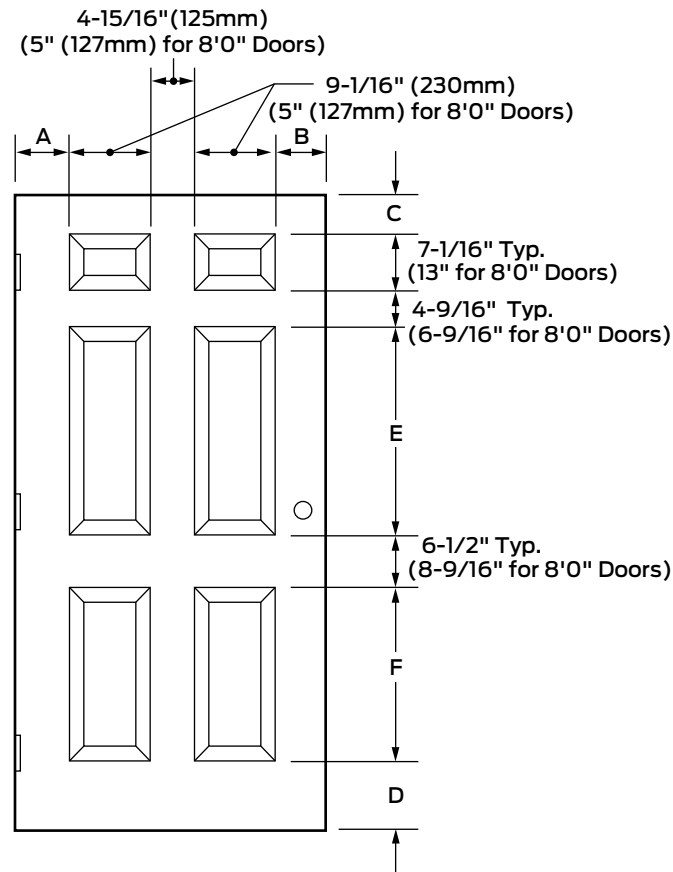
**Application**

Hotel, apartment, office entrance doors or other applications as specified.

**Product availability**

This door option is available in the CE Series in either fire labeled or and non-labeled applications.

- 20, 18, or 16 Gauge. A-40 galvanized steel.
- Available in ⅛" (1.5 mm) increments in width and height subject to the following:
  - 2' 6" thru 2' 8" widths
  - 6' 8" (2032 mm) thru 7' 0" (2134 mm) heights
- 6 Panel design has limited lights available. Louvers are not available.

**6 panels (2' 10" thru 3' 8" door widths)**

Door widths	A	B
2' 10"	5 3/8"	5 3/8"
3' 0"	6 3/8"	6 3/8"
3' 2"	7 3/8"	7 3/8"
3' 4"	8 3/8"	8 3/8"
3' 6"	9 3/8"	9 3/8"
3' 8"	10 3/8"	10 3/8"

**Note:** On all door widths 2' 10" and wider, both rail dimensions "A" and "B" are equal unless specified differently.

Door heights	C	D	E	F
6' 8"	* 4 1/4"	9 3/4"	25 7/16"	21 9/16"
6' 10"	5 1/4"	10 3/4"	25 7/16"	21 9/16"
7' 0"	6 1/4"	11 3/4"	25 7/16"	21 9/16"
8' 0"	4 1/4"	9 3/4"	27 1/2"	25 1/2"

**\* Notes:**

- Due to the 4 1/4" top rail dimension, the use of closers should be either avoided or be mounted with drop brackets on all 6' 8" high embossed 8 Panel doors.
- 8' 0" high 6 panel doors are available in only 2' 10" and 3' 0" door widths.

**Purpose**

Embossed doors are specified when decorative door face sheets are architecturally required.

The 6 panel embossed door design is the most popular design.

**Application**

Hotel, apartment, office entrance doors or other applications as specified.

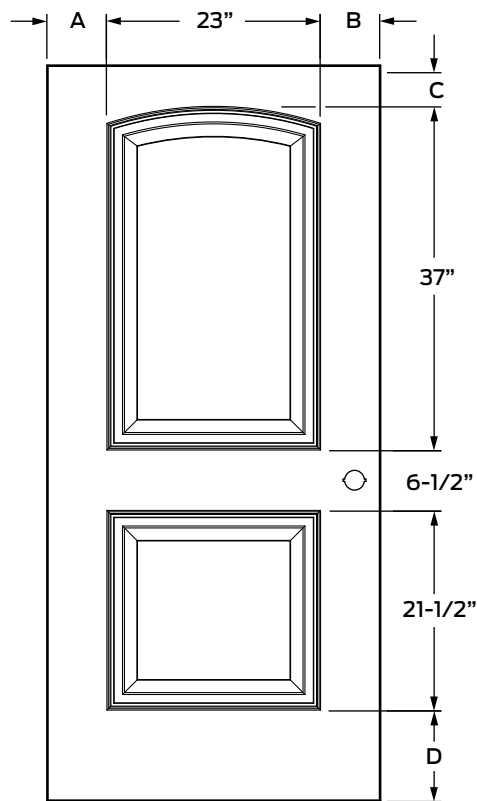
**Product availability**

This door option is available in the CE Series in either fire labeled or non-labeled applications:

- 20, 18 or 16 Gauge: up to and including 3' 0" door widths
- 18 Gauge: 3' 4" thru 3' 8" door widths
- Available in 1/16" increments in width and height subject to the following:
  - 2' 10" thru 3' 8" widths
  - 6' 8" thru 7' 0" heights: all door widths noted above
- 8' 0" available in 2' 10" or 3' 0" door widths
- 6 Panel design has limited lights available. Louvers are not available.



HD2A panels (2' 8" thru 3' 4" door widths)



Door widths	A	B
2' 8"	3 13/16"	5"
3' 0"	6 13/32"	6 13/32"
3' 4"	8 13/32"	8 13/32"

**Note:** On all doors widths 3' 0" and wider, both rail dimensions "D" and "E" are equal unless specified differently.

Door heights	C	D
6' 8"	* 4 3/8"	9 3/4"
6'10"	5 3/8"	10 3/4"
7' 0"	6 3/8"	11 3/4"

**\* Note:** Due to the 4 3/8" top rail dimension, the use of closers should be either avoided or be mounted with drop brackets on all 6' 8" high embossed Panel doors.

Purpose

Embossed doors are specified when decorative door face sheets are architecturally required.

Application

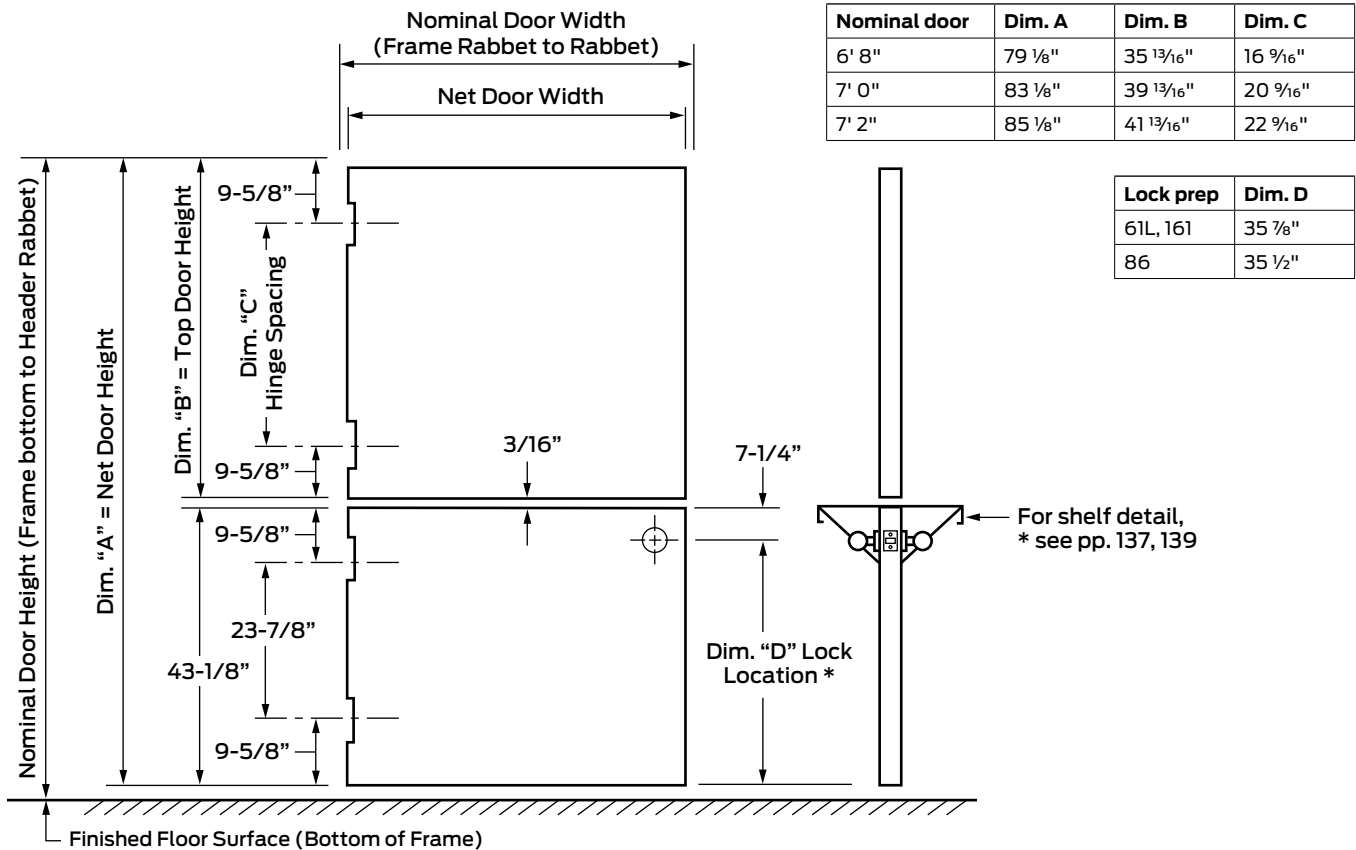
Hotel, apartment, office entrance doors or other applications as specified

Product availability

- This door option is available in the CE Series in either fire labeled or non-labeled applications.
- 18 or 16 Gauge: Up to and including 3' 4" door widths
  - Available in 1/16" increments in width and height subject to the following:
    - 2' 8" thru 3' 4" widths
    - 6' 8" thru 7' 0" heights: all door widths noted above
  - HD2A panel designs do not have louver or light options available.

## Dutch doors

## Non-labeled

**Purpose**

The dutch door design incorporates two separate door leaves, hung one over the other, and mounted into a single swing opening. Both leaves can operate separately. The bottom leaf latches into the strike jamb of the frame.

When specified, the lower leaf can include a dutch door shelf (see "Dutch doors full shelf (non-labeled door)" detail on page 137).

**Application**

- Usually installed in storage room applications
- Hardware applications:
  - Bottom leaf—prepared for one (1) Government 161, 61L or Government 86 lock.
- Top leaf locking option:
  - Standard: Surface applied bolt engaging bottom leaf
  - Option: Government 161 lock preparation latching into strike jamb
  - Option: Government 161 lock preparation latching into top of bottom leaf (see "Dutch doors (labeled)" on page 138).
- Top door leaf may be equipped with a 14 gauge closer reinforcement as an option

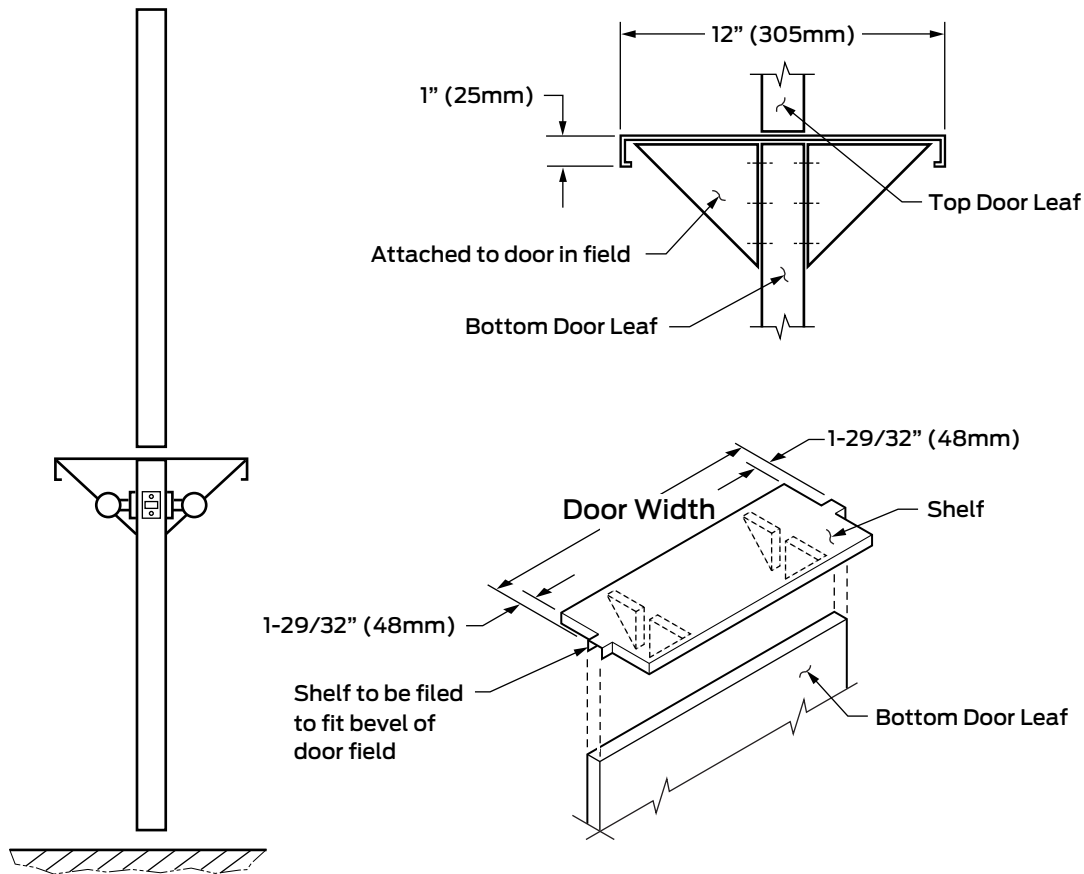
**Notes**

- Sizes available from 2' 0" (610 mm) x 6' 8" (2032 mm) thru 4' 0" (1219 mm) x 7' 2" (2184 mm)
  - Single Swing applications only: no double door configurations
- Glass lights are limited to one 100 square inch light in top leaf
- High Frequency Hinge Reinforcements are installed at the top hinge of each door leaf

**Product availability**

This product option is available on L and B Series doors.

### Full shelf (non-labeled)



#### Application

Non-labeled dutch doors applications.

The 12" (305 mm) wide 16 gauge full shelf and brackets for non-labeled doors, or the 7" (178 mm) wide half shelf and brackets (see "Dutch doors (labeled)" on page 138) is shipped loose from the factory and is to be field attached to the bottom door leaf with the supplied No. 10 x 3/4" (19 mm) Bugle Head Sheet Metal Screws.

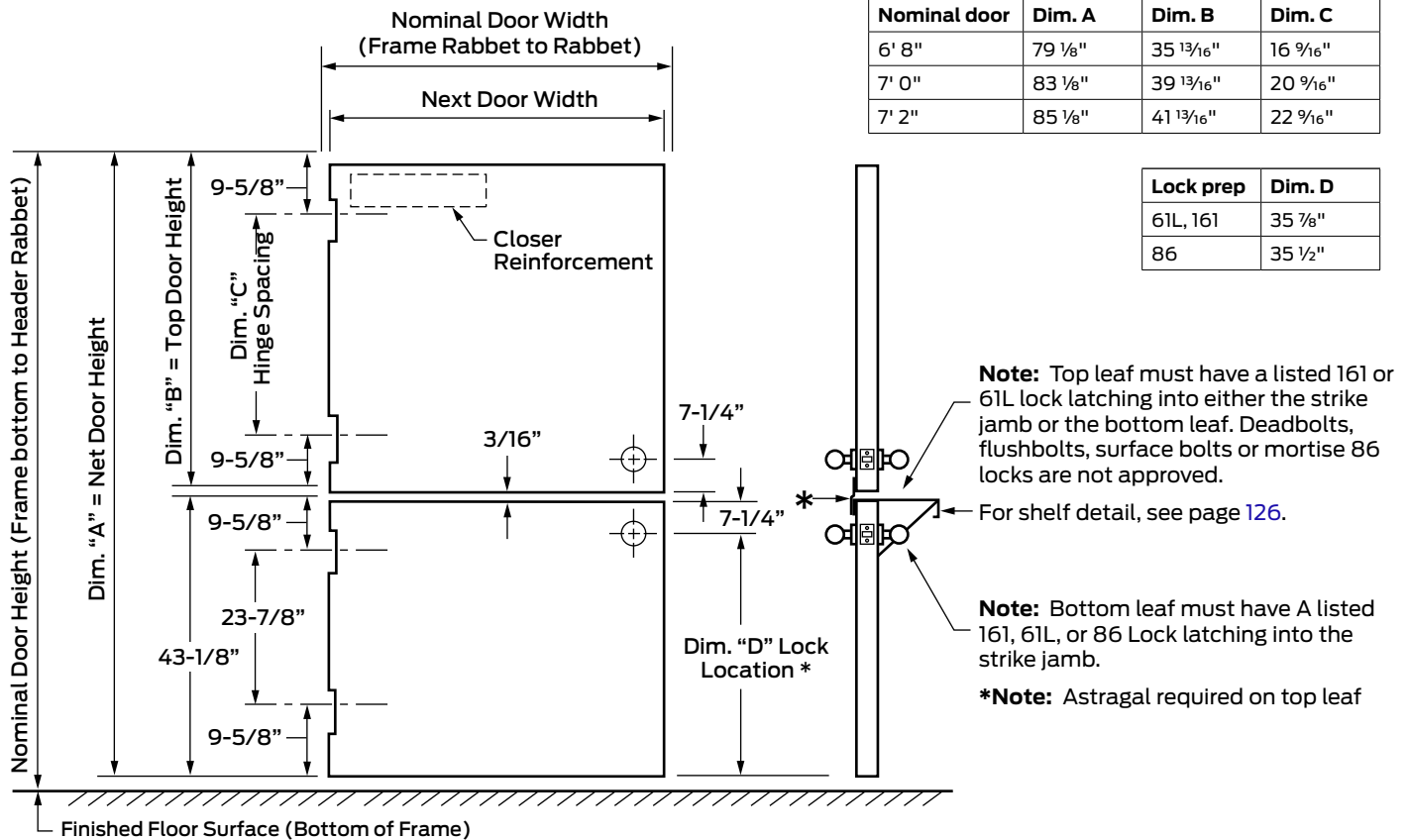
#### Purpose

Dutch door shelves are not supplied with dutch doors unless specified. When the top leaf is opened, the bottom leaf and shelf act as a counter that can be used for multiple uses. If the dutch door shelf (full or half shelf) is not used, the top of the bottom leaf specify a steel top cap installed.

#### Product availability

The full and half shelf can be used on Steelcraft L and B Series non-labeled doors. Shelves are furnished factory prime painted.

## Labeled



## Purpose

Fire labeled dutch door design incorporates two separate door leaves, hung one over the other, and mounted into a single swing opening. Both leaves can operate separately. The bottom leaf must latch into the strike jamb of the frame. The top leaf must latch into either the strike jamb or into the top leaf.

When specified, the lower leaf can include a dutch door half shelf (see "Dutch Door Full Shelf", detail on page 137).

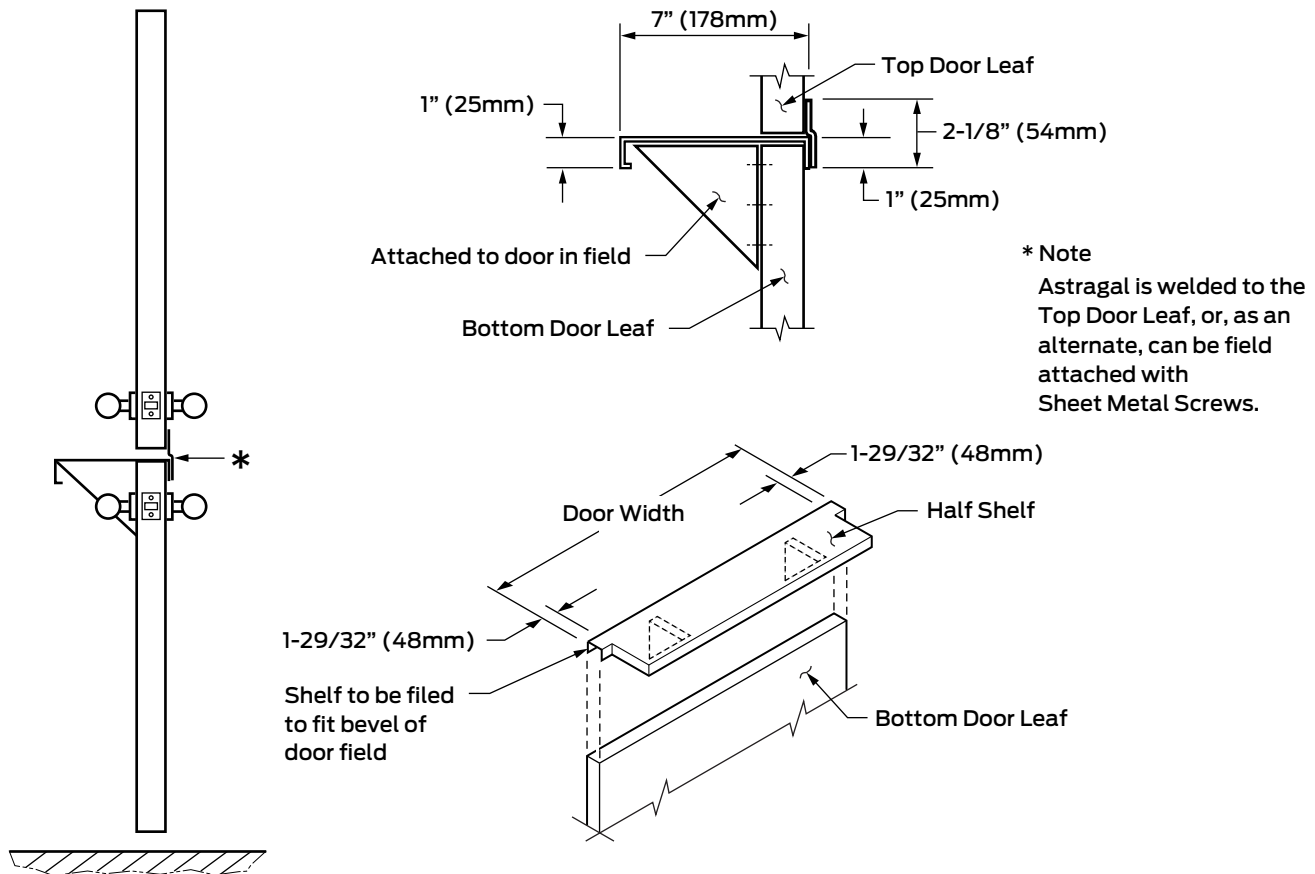
## Application

- Single Swing applications only: no double door configurations
- High Frequency Hinge Reinforcements are installed at the top hinge of each door leaf
- Labeled dutch door openings must have two (2) locks:
  - Standard: Both locks latching into jambs
  - Optional:
    - Top lock latching into top of bottom leaf
    - Bottom lock latching into jamb
    - See "Dutch Door: Optional Lock Preparation" on page 140
- Top door leaf must be equipped with a closer reinforcement
- Maximum size for 3 Hour Fire Rating: 4' 0" (1219 mm) x 7' 2" (2184 mm)
- Limited to one 100 square inch light in top leaf only for 1 1/2 hour fire rating

## Product availability

- This product option is available for Steelcraft L and B Series steel stiffened doors. See the Fire rated products section for additional information.

### Half shelf (labeled)



### Purpose

Dutch door shelves are not supplied with dutch doors unless specified. When the top leaf is opened, the bottom leaf and shelf act as a counter. If the dutch door shelf (half shelf) is not used, it is recommended that the bottom leaf includes a steel top cap installed.

### Application

Labeled and non-labeled fire rated dutch door assemblies

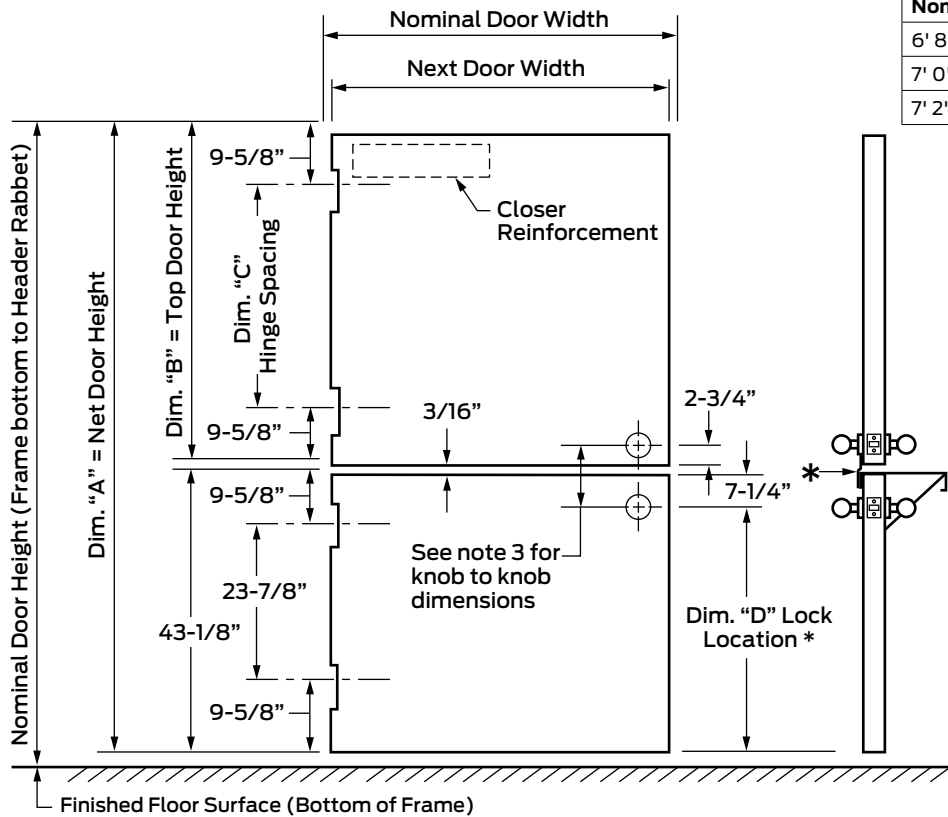
The 7" wide (178 mm) 16 gauge (1.3 mm) half shelf and brackets for Labeled doors is shipped loose from the factory and is to be field attached to the bottom door leaf with the supplied No. 10 x 3/4" (19 mm) Bugle Head Sheet Metal Screws. The astragal is factory welded to the top door leaf.

### Product availability

The half shelf can be used on Steelcraft L and B Series labeled or non-labeled doors. The shelf is furnished factory prime painted.



## Optional lock preparation



Nominal door	Dim. A	Dim. B	Dim. C
6' 8"	79 1/8"	35 13/16"	16 9/16"
7' 0"	83 1/8"	39 13/16"	20 9/16"
7' 2"	85 1/8"	41 13/16"	22 9/16"

Lock prep	Dim. D
61L, 161	35 7/8"
86	35 1/2"

## \* Notes:

- Top leaf must have a listed 161 for latching into bottom leaf
- Bottom leaf must have 161, 61L or 86 lock latching into the strike jamb
- Knob to knob location will vary depending on latching devices used.
  - 10 3/16" if 161 top leaf X 161 or 61L in bottom leaf
  - 12 1/16" approx. if 161 in top leaf X 86 in bottom leaf
- Astragal required on top leaf.
- See "Dutch doors full shelf (non-labeled door)" detail on 126.

## Purpose

In the interest of expedient transition through the path of the means of egress, a single lock operation of latch bolt retraction becomes paramount. By choosing this preparation, the only lock operation required to retract the latch bolt is found at the standard lock location on the bottom leaf.

## Application

Labeled and non-labeled fire rated dutch door assemblies.

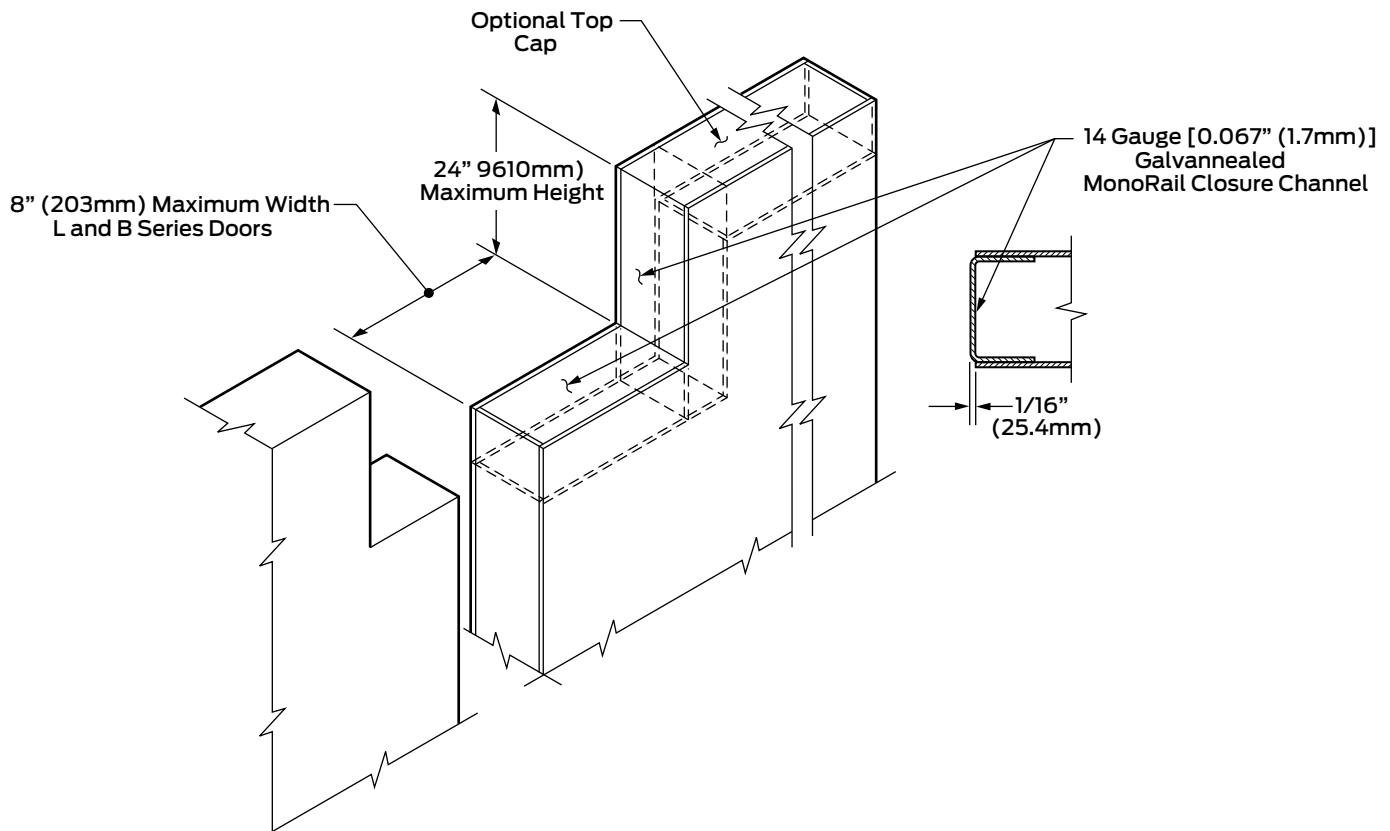
This alternative lock preparation combination is Fire Rated up to 3 hours. The top leaf is limited to a Government 161 lock preparation. The bottom leaf may be prepared for a Government 86, 61L or 161 lock. The latch bolt of the lock in the top leaf projects into a cylindrical strike attached to the strike preparation in the top of the bottom leaf, eliminating one strike preparation in the jamb. This optional lock preparation must be specified when ordering.

## Product availability

This lock preparation is available on Steelcraft L and B Series Steel Stiffened doors for non-label, or for labeled openings up to 3 hour Fire Ratings. See the Fire Rated products section for additional information.

## Monorail

### Preparation



### Purpose

When the movement of heavy equipment or material is required between separated work areas of an industrial buildings, overhead monorails are employed to support and transport mechanically operated cranes. When specified, doors with monorail preparations are designed to accommodate the transfer equipment and perform as closures between these spaces.

### Application

Industrial non-fire rated applications

When specified preparation includes:

- 14 gauge (1.7 mm) galvannealed Mono Rail Closure Channel is installed along cutout perimeter
  - tack welded to the door faces
  - projects 1/16" (1.6 mm) beyond edge of vertical cutout of the L and B Series doors
- Optional top caps are positioned in the top of the door as required

### Product availability

This door option is available for the following Steelcraft door Series:

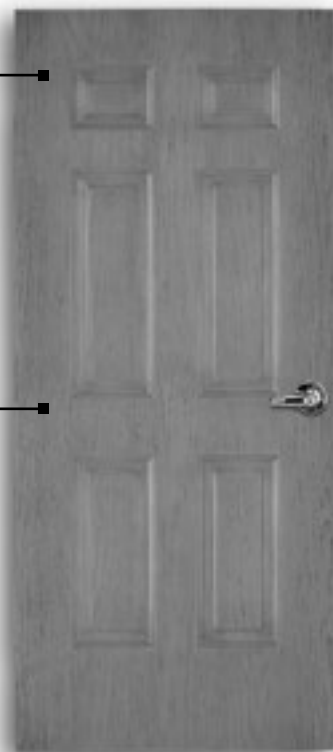
- L and B Series full flush doors

## GRAINTECH™

### Steel doors

Clear Coat baked on for the ultimate in UV and graffiti resistance

Multiple Finishes provide options for a variety of applications



Designer™ Trim flush light kits, stained to match the door



#### Purpose

When a premium wood finish is desired, and the features and benefits of steel are required, Steelcraft's GRAINTECH™ products provide the flexibility your specification demands.

#### Application

The exclusive engraining and staining process employed simulates a wide variety of wood finishes, from the standards of Birch, Ash, Oak, Maple, Mahogany and Walnut to custom finish matching or primed only. GRAINTECH™ is ideal to use in Schools, Hospitals, Offices, Nursing Homes, Apartment Buildings, Dormitories, etc. Unlike veneered or solid wood doors, GRAINTECH™ is fully warranted for use on exterior openings, is less susceptible to damage, and will never warp, crack, peel or bow. Designer® Trim Glass Lights used for glass light openings is likewise supplied in the finish matching the door.

#### Product availability

This product option is available in the following door constructions:

- CE Series
  - E6 design only (18 and 16 gauge)
  - HD2 and HD2A (18 and 16 gauge)
- H16 and HE16 Series
- L Series (18 and 16 gauge)
- T Series (18 and 16 gauge)

Glass light options:

- GRAINTECH™ glass light options for L Series doors are V, N3, N4, N5, NL, G, FG, FG2 and FG3
- GRAINTECH™ glass light options for CE Series doors E2G and E4TL

See the Fire Rated Products section for application to Fire Rated doors.



Birch



Ash



Oak



Maple



Mahogany



Walnut

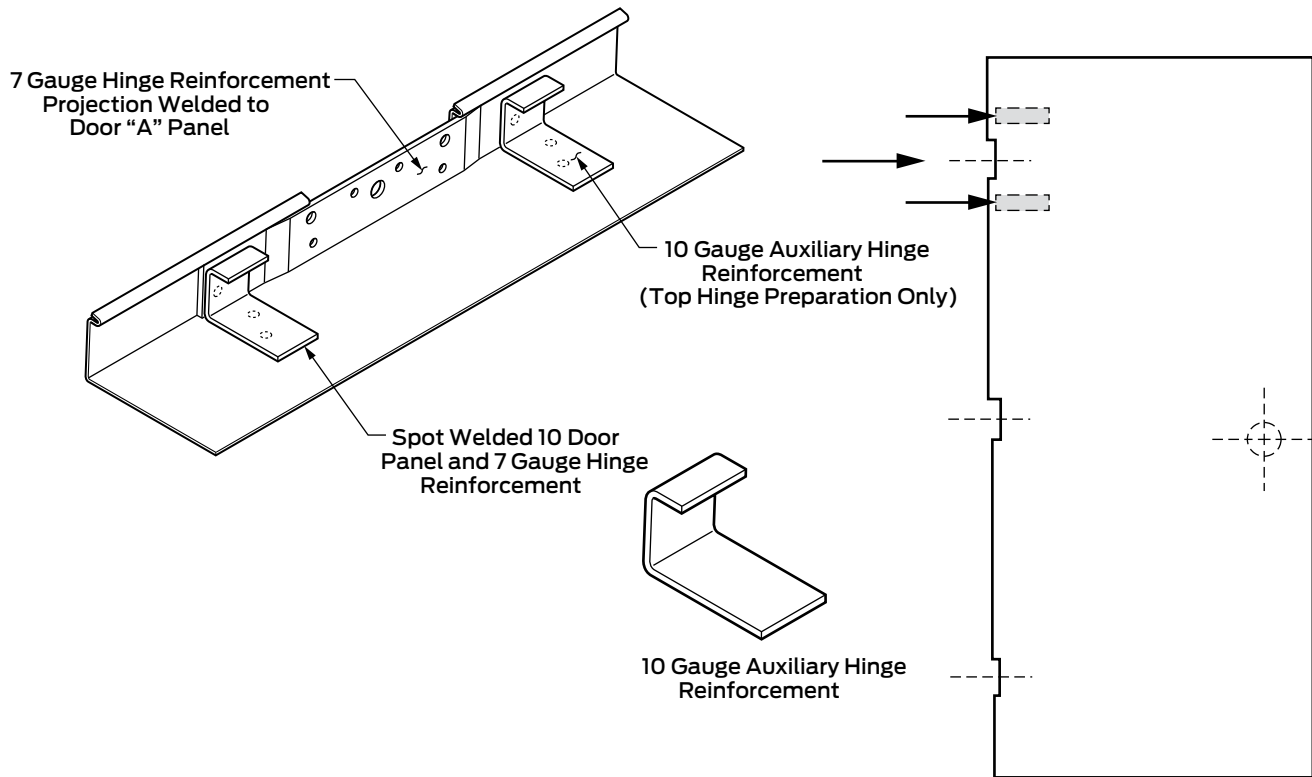
GRAINTECH™ colors chart.

Colors may vary based on your monitor, printer, and settings. Request a physical GRAINTECH™ swatch for color matching.

Custom colors are available.

## Hardware

### High frequency hinge preparation



#### Purpose

The optional high frequency hinge reinforcement provides additional strength to the 4 ½" (114 mm) or 5" (127 mm) hinge reinforcement specified for use in high abuse openings.

#### Application

The 10 gauge (3 mm) auxiliary hinge reinforcement is spot welded to the top and bottom of the top hinge reinforcement in 2 locations of the door:

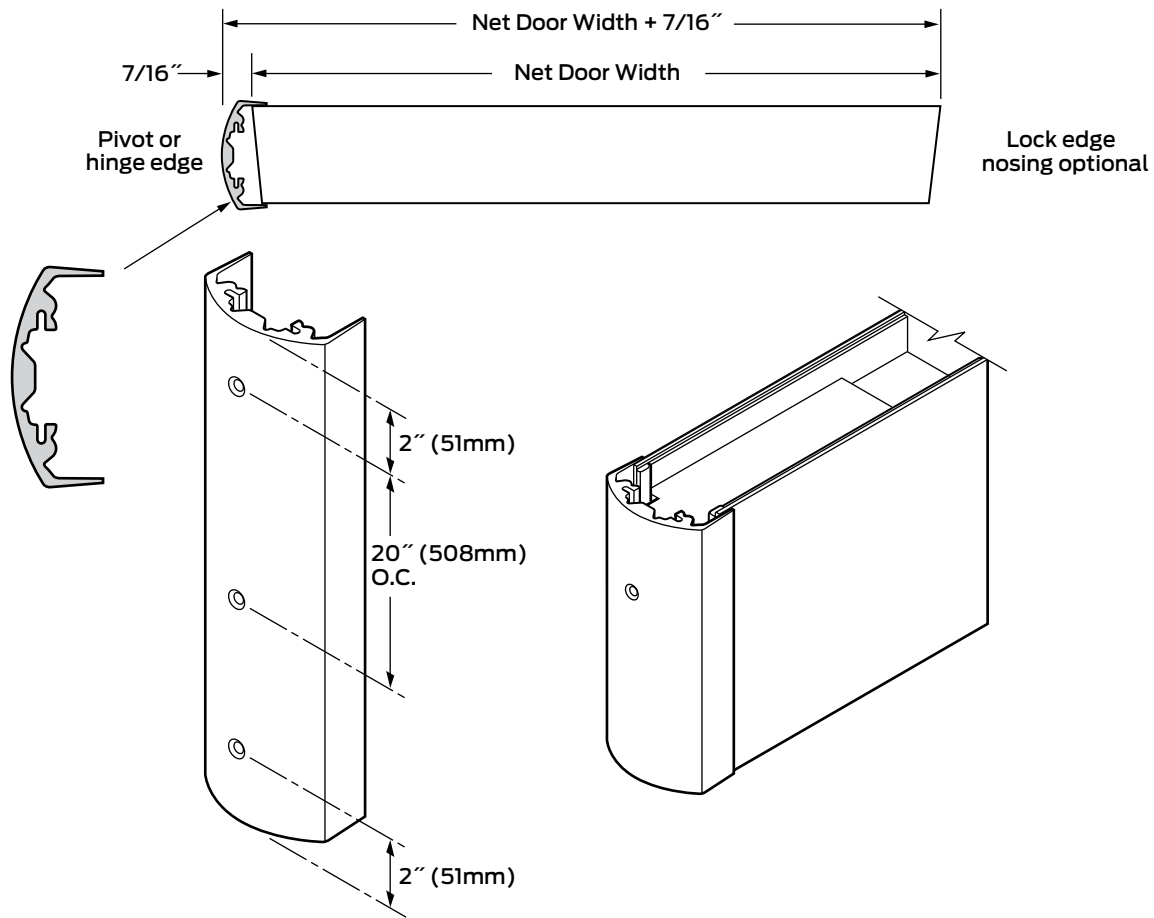
- The face of the door panel
- The 7 gauge (4.7 mm) hinge reinforcement (projection welded to the door at the factory)

Primarily applicable to the top hinge reinforcement of 4 ½" (114 mm) or 5" (127 mm) hinge reinforcements the auxiliary reinforcement may be used on other hinge locations when specified.

#### Product availability

High frequency hinge reinforcements are available factory installed only, and are applicable to all Series of Steelcraft labeled and non-labeled steel doors.

## Aluminum door edge nosing



### Purpose

Optional aluminum door edge nosing is recommended for use on double acting doors to minimize the operating clearance, between the door edge(s) and the jamb(s) of the frame.

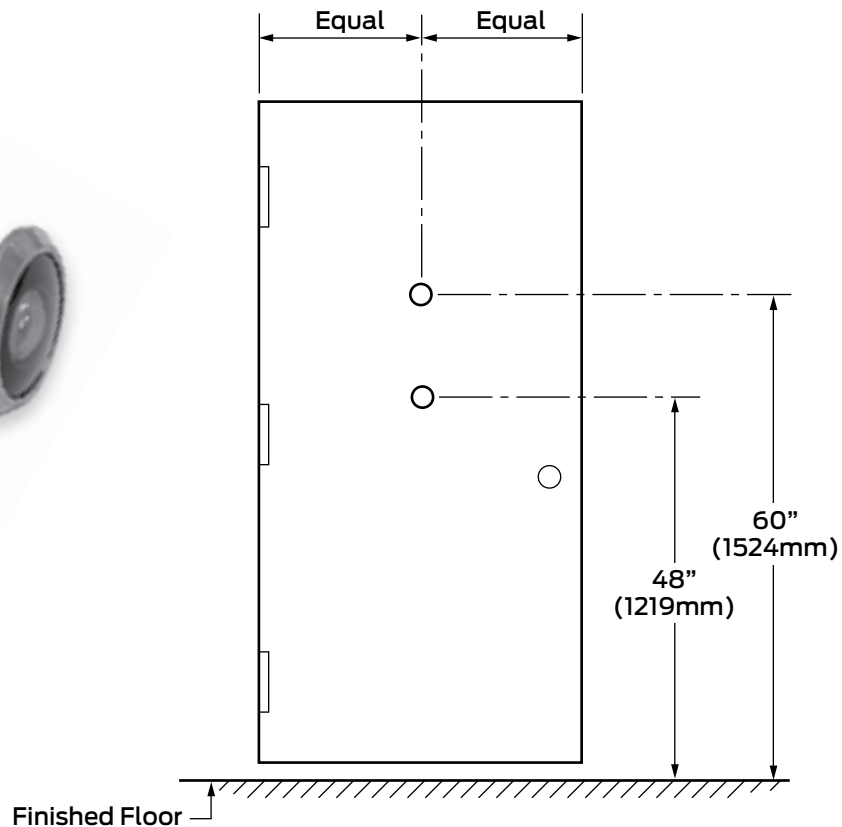
### Application

- Door edge nosing, manufactured from extruded aluminum, is prime painted.
- Recommended application to hinge edge of doors equipped with Double Acting Center Hung Pivots, Double Acting Spring Hinges, Double Acting Floor Closers and Rescue Hardware to reduce the additional vertical edge clearances required.
- Some applications may require nosing to be applied to both the pivot/hinge and lock edges of the door. Door size and/or pivot/hinge location must be adjusted accordingly.
- The door edge nosing is placed over the door edge. A No. 4 x 1" oval head sheet metal screw is installed through a  $\frac{3}{16}$ " (5 mm) diameter hole to attach the unit to the door.
- Double acting doors are normally installed in cased open frames (frames that have no stops). However, smoke and fire can penetrate the clearance gap, creating a failure.
- No labeled applications.

### Product availability

This door option is available for the L, B, CE, and A14 Series doors.

## Interviewer prep



### Purpose

Interviewer preps are specified when vision through a door without the use of a window is required.

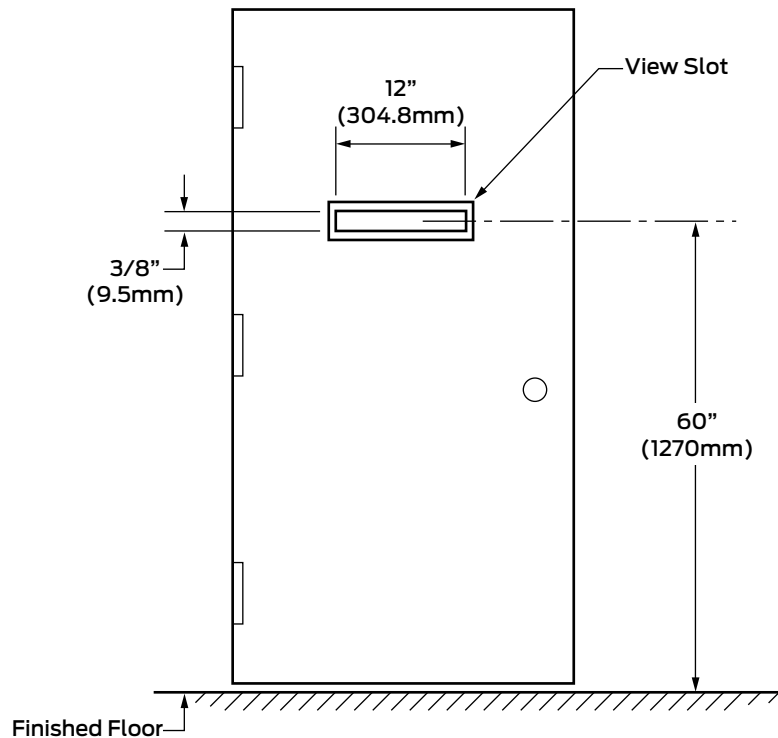
### Application

Hotel room or apartment entrance doors.

The Interviewer preparation (Peep Hole) has a normal location centered on the door with various heights that depend on application. Two of the standard vertical locations are shown above. The maximum size preparation is a 3" diameter (76.2 mm) hole. For fire rated applications, the viewer must also be fire rated. Maximum 3/4" diameter hole unless otherwise listed and by UL or ITS/WHI.

### Product availability

This door option is available for the L, SL, B, T, CE, and non-labeled H Series doors.

**Peep slot with trim****Purpose**

Certain building segments require functional, inconspicuous observation positions to enforce the safety and security regulations prescribed by the facility operating procedures. This optional viewing unit is factory installed.

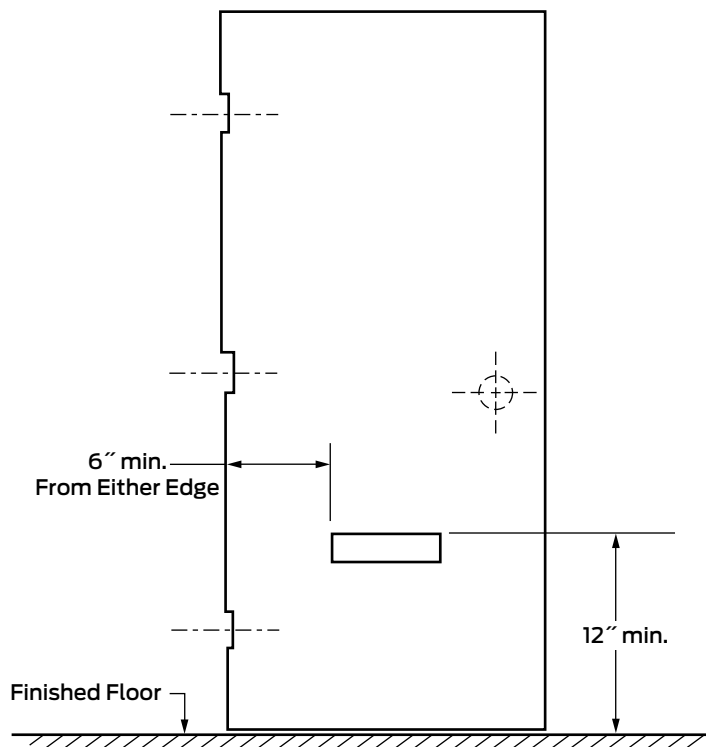
**Application**

The Peep Slot with trim preparation has a recommended vertical location of 60" (1270 mm) and is centered on the door. Customer specified heights that depend on application, are available. The cutout dimension is 13 1/2" (343 mm) wide x 1 7/8" (48 mm) high. The perimeter of the cutout is reinforced with a 18 gauge channel. The U-Channel trim finishes the viewing area dimension to 3/8" (9.5 mm) high x 12" (304.8 mm) wide.

**Product availability**

This preparation is available on Steelcraft L and B Series doors.

## Mail slot preparation



Typical Door Elevation

### Purpose

Optional mail slots allow for the pass through of mail. They are usually located in the bottom of the door and are prepared in the bottom of the door when specified.

### Application

The preparation must be placed within the minimum edge dimensions shown above. Customer must indicate the manufacturer, template number and model number of the unit to be installed in order to prepare the proper size opening.

### Product availability

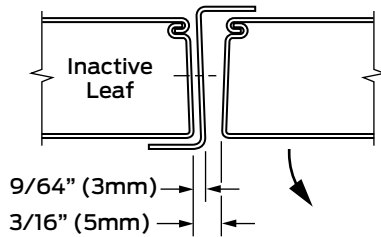
This preparation is available on Steelcraft L and CE Series doors.



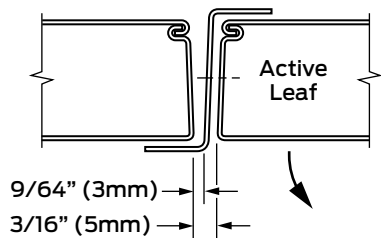
## Z Astragal

### Applications

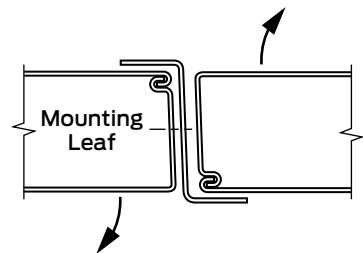
#### Inactive Leaf Mounting



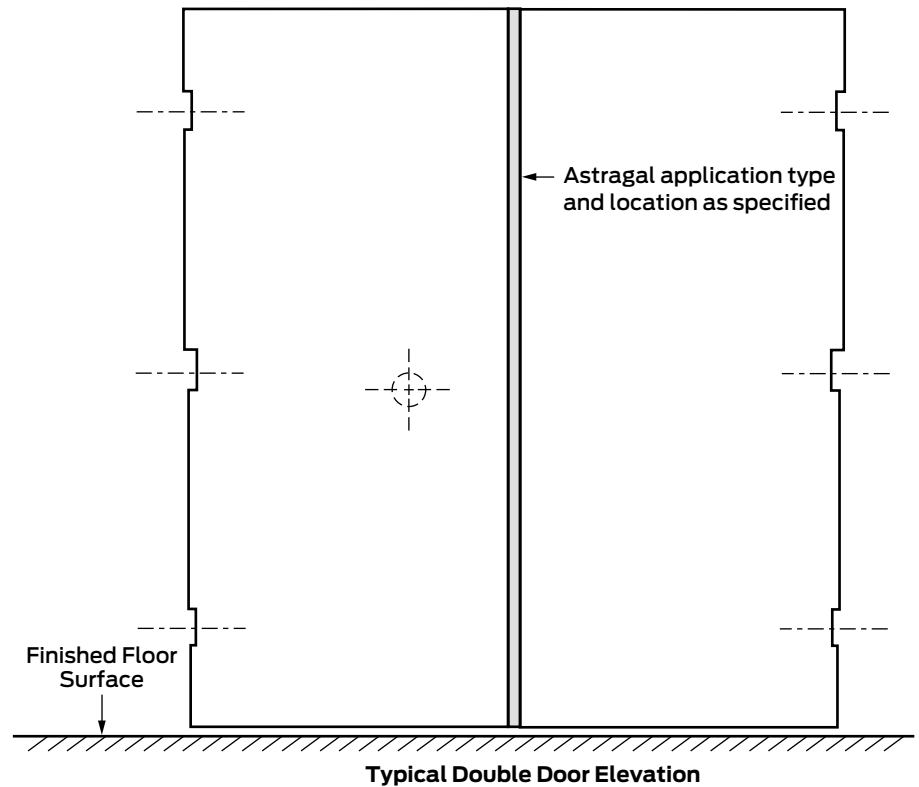
#### Active Leaf Mounting



#### Double Egress Mounting



#### Z Astragal Applications



### Purpose

Astragals are used to close the gap between pairs of doors. The astragal seals the opening from weather, light, and in some cases, sound. Security requirements dictate the appropriate application.

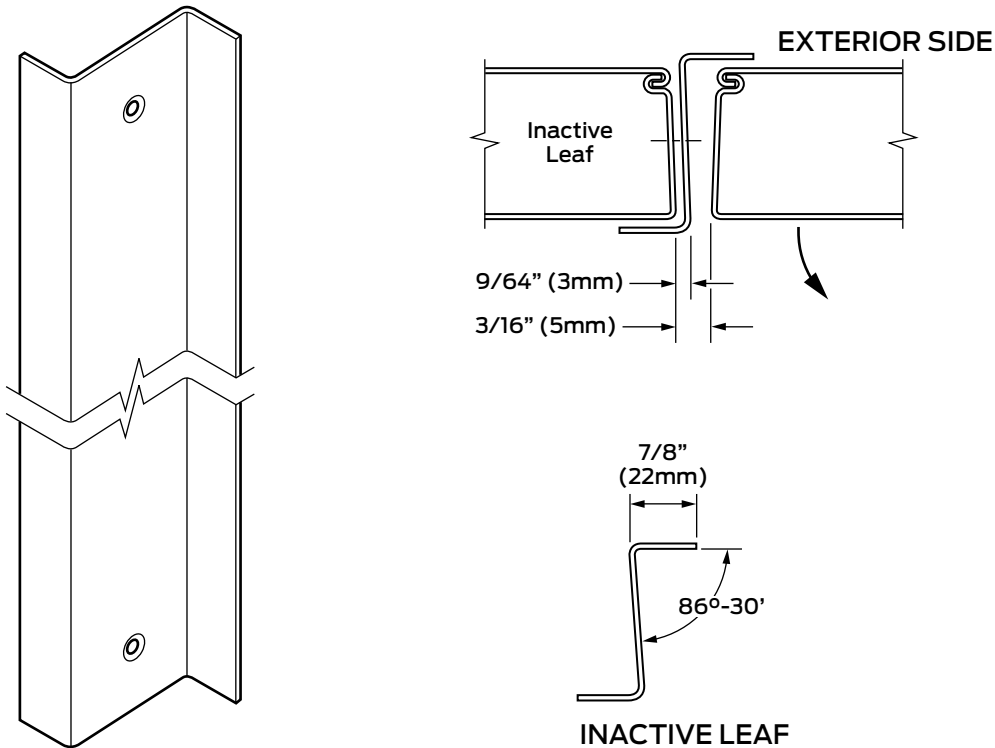
### Application

- This astragal is normally supplied with pairs of Steelcraft doors.
  - This is a handed product.
  - Attachment is made to the inactive door leaf, with the sheet metal screws supplied.
  - Shipped loose for field attachment.
- This astragal can be used on both rated fire doors and non-rated doors.

### Product availability

This product option is available for Steelcraft L, SL, B, T, CE, H, HE, PW, and A14 Series doors. See the Fire Rated products section for application to Fire Rated doors.

## Inactive leaf mounting



### Purpose

Astragals are used to close the gap between pairs of doors. The astragal seals the opening from weather, light, and in some cases, sound. Security requirements dictate the appropriate application.

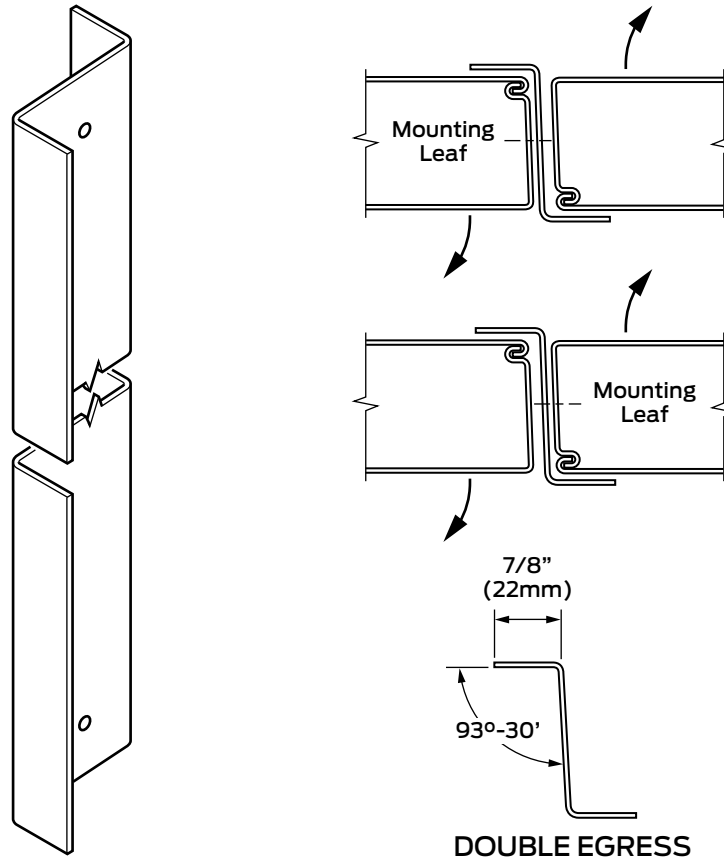
### Application

- This astragal is normally supplied with pairs of Steelcraft doors.
- This is a handed product; it has the same hand as the inactive door leaf.
- Attachment is made to the inactive door leaf, with the sheet metal screws supplied.
- Shipped loose for field attachment.
- Active Leaf Mounting or Double Egress Mounting, must be called-out separately on the order.
  - The astragal is formed to match the bevel of the door.
  - When mounted to an active leaf or double egress leaf, the astragal forming is reversed.
- This astragal can be used on both fire rated and non-rated doors.

### Product availability

This product option is available for Steelcraft L, SL, B, T, H, HE, PW, and A14 Series doors. See the Fire Rated Products section for application to Fire Rated doors.

## Double egress mounting



### Purpose

Astragals are used to close the gap between pairs of doors. The astragal seals the opening from weather, light, and in some cases, sound. Security requirements dictate the appropriate application.

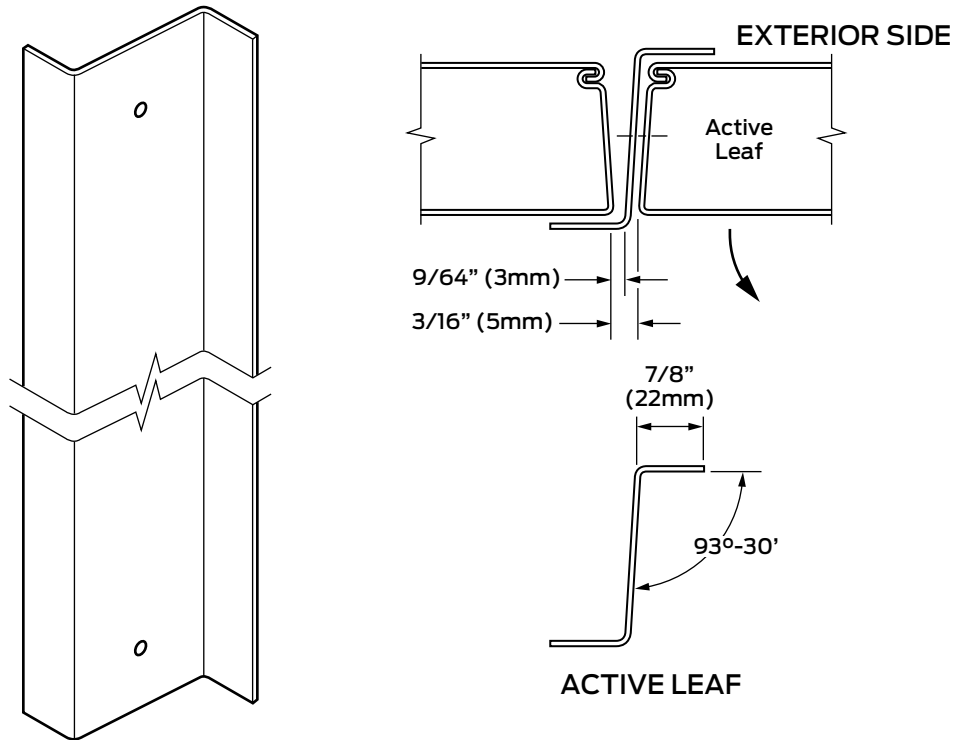
### Application

- Required on all three (3) Hour Rated Double Egress openings. Astragal must be ordered separately.
- This is a handed product; it has the same hand as the active leaf.
- The astragal is blank, with no hardware cutouts.
- Shipped loose for field attachment, with the sheet metal screws supplied.
- The astragal can be attached to either leaf as shown, as it does not impede operation.
  - Can be used on pairs of doors with Vertical Rod Exit devices on both leaves.
  - This astragal can also be used on 1 ½ and ¾ hour rated Double Egress openings although it is not required to meet the label requirements.
- This astragal can not be used on the active door leaf or inactive door leaf of a conventional pair of doors due to reverse forming and no hardware cutouts.

### Product availability

This product option is available for Steelcraft L, SL, B, T, and CE Series doors. See the Fire Rated Products section for application to Fire Rated doors.

## Active leaf mounting



### Purpose

Astragals are used to close the gap between pairs of doors. The astragal seals the opening from weather, light, and in some cases, sound. Security requirements dictate the appropriate application.

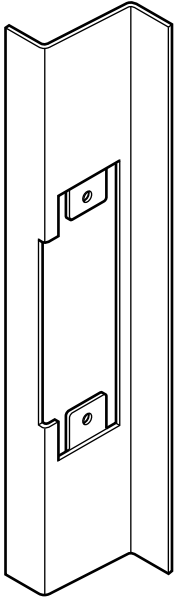
### Application

- This astragal requires a special call-out when ordered.
- This is a handed product; it has the same hand as the active door leaf
- Shipped loose for field attachment, with the sheet metal screws supplied
- This astragal can not be attached to an inactive door leaf or a double egress door because of the hardware cutouts
  - The lock and strike type being used affects the astragal since cutouts are required for the lock front and strike lip. The notching for an ASA strike lip notch is provided.
  - The lock front must be shimmed to insure that the lock front seats flush with the astragal.
- This astragal can be used on both fire rated and non-rated doors.

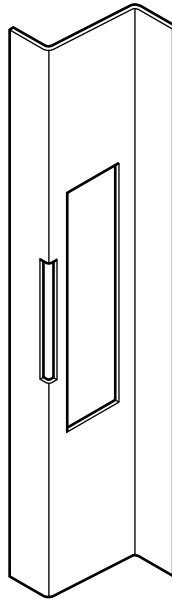
### Product availability

This product option is available for Steelcraft L, SL, B, T, CE, and A14 Series doors. See the Fire Rated Products Section for application to Fire Rated doors.

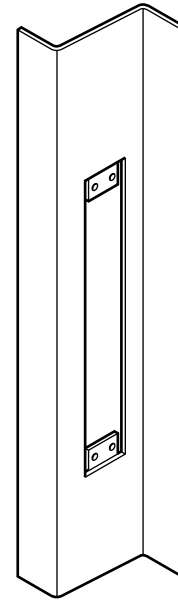
## Hardware preparations



**Strike Preparation**  
**INACTIVE LEAF**



**Lock Front & Strike Preparation**  
**ACTIVE LEAF**



**Flush Bolt Preparation**  
**INACTIVE LEAF**

### Purpose

Astragals are used to close the gap between pairs of doors. The astragal seals the opening from weather, light, and in some cases, sound. Security requirements dictate the appropriate application. Hardware applications determine the appropriate preparation(s).

### Product availability

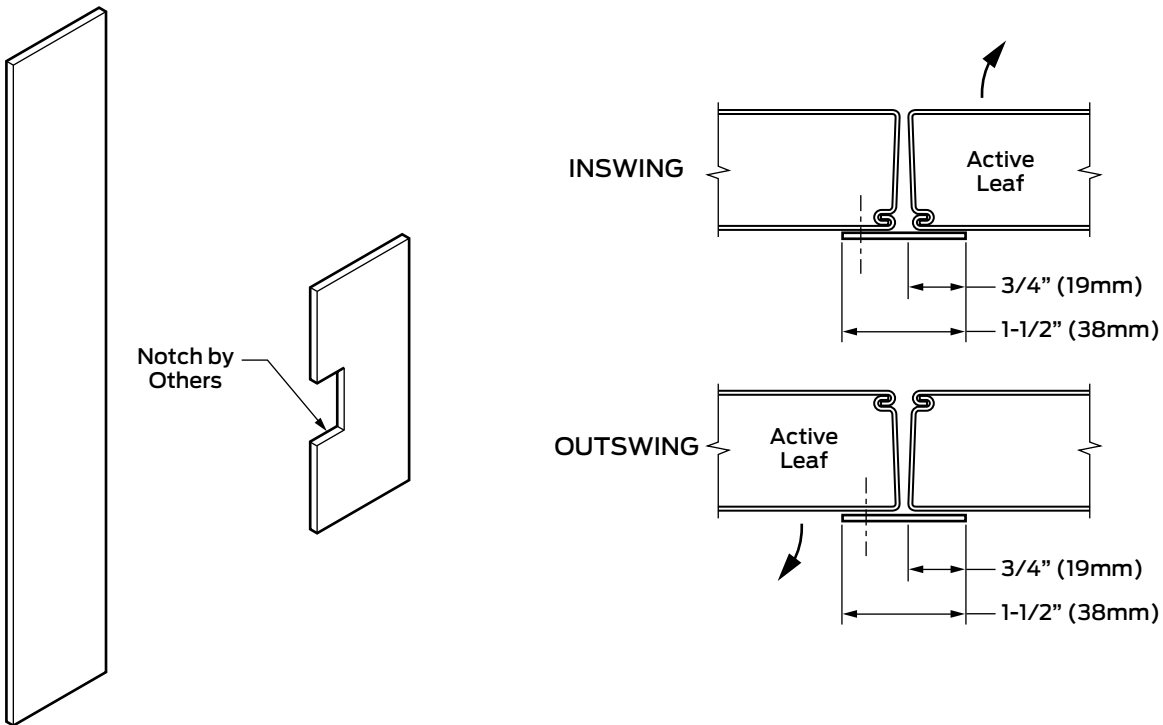
These hardware preparations are available in all Steelcraft Z-type astragals.

### Application

- **Strike Preparations:** This is the conventional strike preparation in an astragal mounted to the inactive leaf. The astragal has mounting tabs pierced from the base metal. The tabs are drilled and tapped for the screws supplied by the hardware manufacturer (with the strike). The type of strike being used must be specified.
- **Lock Front & Strike Preparations:** This is the type of cutout required for an astragal that is mounted to the active leaf. The cutouts are clearance holes for the lock front. The notching for an ASA strike lip is provided as shown in the detail above.
- **Flush Bolt Preparations:** When mounted to the inactive leaf, the astragal is prepared at the top and the bottom for flush bolts (manual or automatic) when they are specified as the locking device for the inactive leaf. The preparation consists of tabs stamped out of the base metal. The tabs are drilled and tapped for the screws supplied by the flush bolt manufacturer. If surface bolts are used, this preparation is not required.

## Flat plate astragal

### Exposed fastening



### Purpose

Astragals are used to close the gap between pairs of doors. The astragal seals the opening from weather, light, and in some cases, sound. Security requirements dictate the appropriate application.

### Application

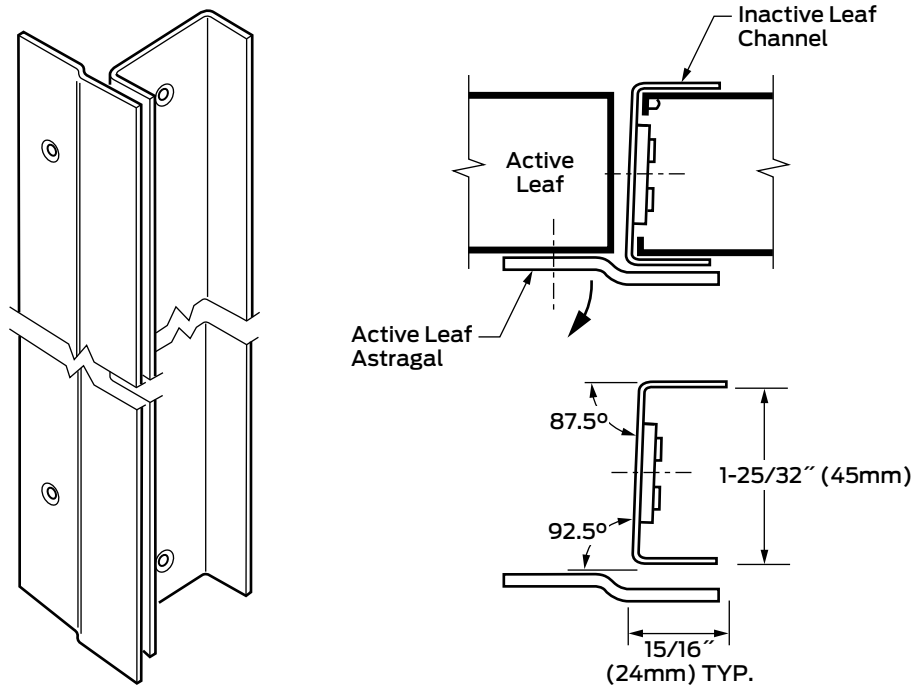
- Attached to the outside of the active leaf on swing-out doors
- Attached to the outside of the inactive leaf on swing-in doors
- The astragal is a 14 gauge (1.7 mm) steel part; attached by using screws or by welding to the proper door leaf
- For this type of astragal, a wide inactive leaf is recommended
- When a conventional lock and strike are used, notching for the strike lip is performed in the field by others
- See Hardware Preparations section for strike, lock front and flush bolt preparation

### Product availability

This product option is available for Steelcraft L, SL, B, T, CE, and A14 Series doors. See the Fire Rated Products Section for application to Fire Rated doors.

## 2 piece astragal

### Applications



#### Application

The 2 piece astragal is an alternate active leaf astragal. It allows for using the flushbolt and strike clearance holes on standard inactive leaves and providing an exterior bar type astragal.

#### Purpose

Astragals are used to close the gap between pairs of doors. The astragal seals the opening from weather, light, and in some cases, sound. Security requirements dictate the appropriate application.

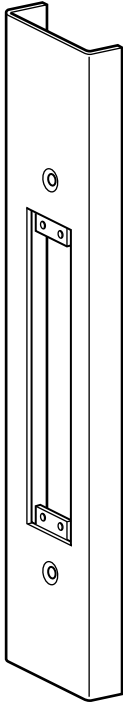
#### Application

- This is a handed product; it has the same hand as the inactive door leaf
- For this type of astragal, standard width inactive leaf is recommended
- Shipped loose for field attachment
- The 14 gauge galvanized channel section is mounted to the inactive leaf with the sheet metal screws supplied
- The 12 gauge (2.5 mm) galvanized flat bar section is mounted to the pull side face of the door with the sheet metal screws provided
- This astragal can be used on both rated and non-rated doors.

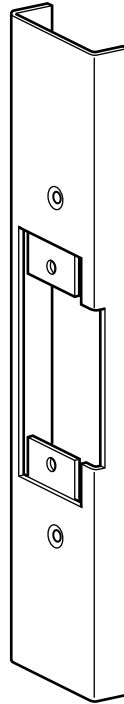
#### Product availability

This product option is available for Steelcraft L, B, T, CE, and A14 Series doors. See the Fire Rated Products Section for application to Fire Rated doors.

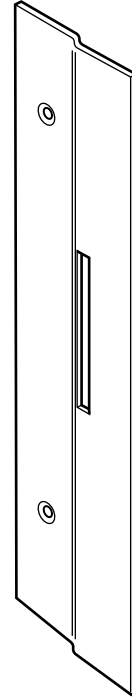
## Hardware preparations



**Flushbolt Preparation  
Inactive Leaf Channel**



**Strike Preparation  
Inactive Leaf Channel**



**Strike Lip Preparation  
Active Leaf Astragal**

### Purpose

Astragals are used to close the gap between pairs of doors. The astragal seals the opening from weather, light, and in some cases, sound. Security requirements dictate the appropriate application. Hardware applications determine the appropriate preparation(s).

### Application

- **Flush Bolt Preparations:** When mounted to the inactive leaf, the astragal is prepared at the top and the bottom for flush bolts (manual or automatic) when they are specified as the locking device for the inactive leaf. The preparation consists of tabs stamped out of the base metal. The tabs are drilled and tapped for the screws supplied by the flush bolt manufacturer. If surface bolts are used, this preparation is not required.

**Strike Preparations:** This is the conventional strike preparation in an astragal mounted to the inactive leaf. The astragal has mounting tabs pierced from the base metal.

- The tabs are drilled and tapped for the screws supplied by the hardware manufacturer (with the strike). The type of strike being used must be specified.
- **Strike Lip Preparations:** This is the type of cutout required for an astragal that is mounted to the active leaf. The notching for an ASA strike lip is provided as shown in the detail above.

### Product availability

These hardware preparations are available in all Steelcraft 2 piece astragals.

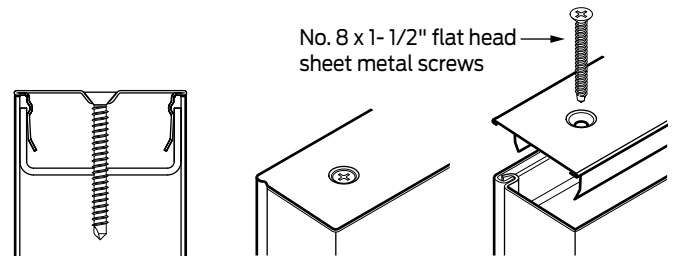


## Weather seals

### Top & bottom caps

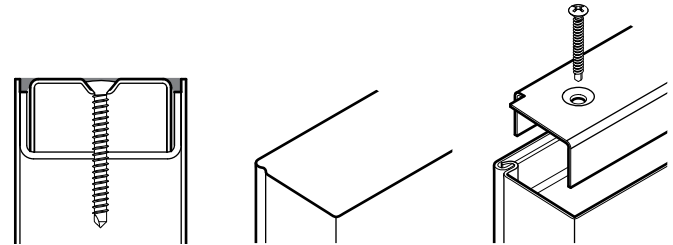
#### Steel Top Cap (Screwed-in) (bottom cap also available)

- 24 ga. top cap sits on top edge of door, flush with exterior surface of door and adds 0.020" (0.5 mm) to the height of the door
- Attached to 14 ga. top channel



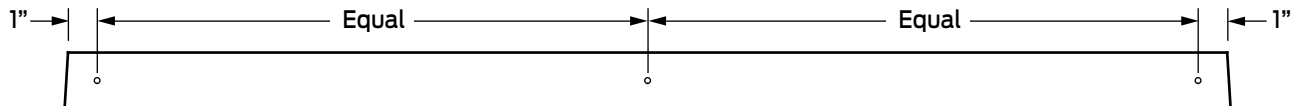
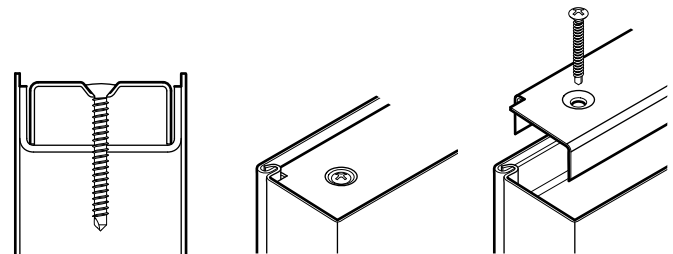
#### Flush/Filled Top Cap (bottom cap also available)

- 18 ga. top channel sits flush with top of door and is seam filled
- Attached to 14 ga. top channel



#### Recessed Top Cap (Screwed-in) (bottom cap also available)

- 18 ga. top channel is recessed ~1/8" from top of door
- Attached to 14 ga. top channel



### Purpose

Top and/or Bottom Caps provide security shields from unwanted objects placed in the 14 gauge (1.7 mm) top and bottom closure channels. Steel and Flush/Filled caps shield from unwanted moisture penetration when installed on exterior outswing doors. If required, top caps may be sealed with caulk in the field by others. To prevent the build-up of moisture on the interior of the door, **bottom caps should never be caulked**. All caps and the 14 gauge closure channels they attach to are galvanized.

### Application

All top and bottom caps can be ordered and installed at the factory. Only the Steel Top Cap with Screws can be installed by others and is also available in "Parts" from our Price book.

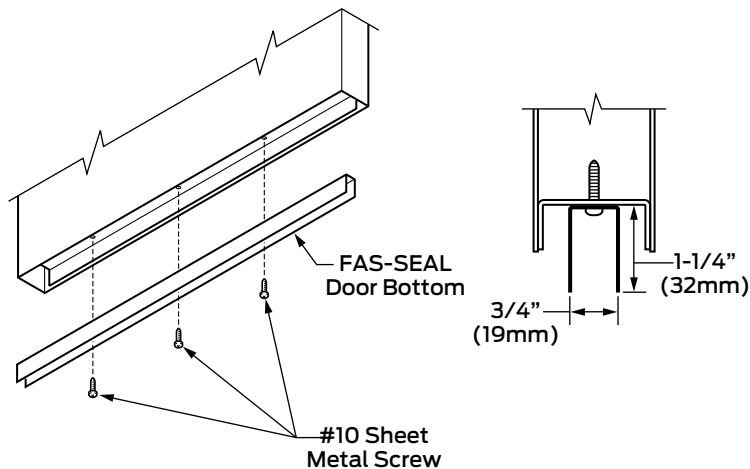
### Certification Label Locations with continuous hinge preps or pocket pivots:

- Steel Top Cap (screwed-in): Label located on top channel underneath cap
  - Supplemental label attached to top cap indicating certification label is attached underneath
- Flush/filled: Label attached to top of cap
- Recessed Top Cap (screwed-in): Label attached to top of cap

### Product availability

Top and/or bottom caps are available in the 3 versions -- Steel screwed-in, Flush/filled, and Recessed. All are available on any available Steelcraft door series for non-label, or for labeled openings up to 3 hour Fire Ratings, except for the following:

- SZ Series doors cannot be ordered with top caps, but the Steel top cap version can be ordered through "Parts" and installed by others for non-labeled openings or for 1 1/2 hour Fire Ratings.
- Recessed caps are not available on Hurricane H Series doors
- Paladin PW series doors have a 12 gauge top channel installed as standard, not filled.
- The Stainless Steel LS series doors are available with 18 gauge stainless caps either screwed in or tack welded 3" from each end and 12" OC. Seams can be filled (sealed top) with silicone as an option.

**FAS-SEAL™ door bottom sweep**

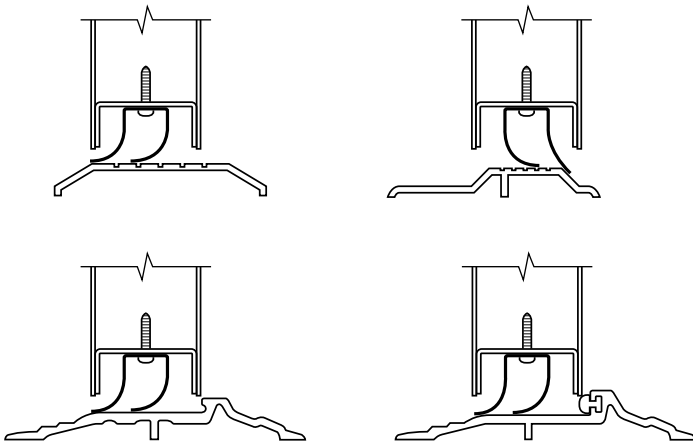
The combination of Steelcraft door, frame, PS074 Weatherstripping, and the FAS-SEAL™ door bottom meets the requirements of NFPA 105, Smoke Control Standard, for both warm, and ambient room temperatures.

The ASTM E283 Air Infiltration Test was conducted on doors with and without a FAS-SEAL™ door bottom. A Non-weatherstripped frame with a 5/8" (16 mm) high threshold was used. The results of these tests were:

Without FAS-SEAL™ 8.77 CFM/FT

With FAS-SEAL™ 4.71 CFM/FT

- CFM/FT = Cubic Feet Per Minute Per Lineal Foot of Crack
- Tests were conducted by a nationally recognized test and research laboratory.

**Purpose**

The concealed double sealing sweep conforms to sill variances, providing an effective seal. The FAS-SEAL™ door bottom is made from a synthetic material that is impervious to the elements, is capable of withstanding extreme temperatures and is Fire Rated.

**Application**

FAS-SEAL™ door bottoms are installed to the bottom channel with No. 10 x 3/4" Pan Head SMS

- Doors sized from 2' 0" (610 mm) wide to 3' 0" (914 mm) wide: apply 3 screws furnished through the 3 holes provided in the FAS-SEAL™ door bottom into the holes provided in the door bottom channel
- Doors sized from 3' 4" (106 mm) wide to 4' 0" (1219 mm) wide:
  - Apply 4 screws furnished through the 4 holes provided in the FAS-SEAL™ door bottom into holes field drilled by others, or
  - Apply 4 No. 10 x 3/4" self-drill and tap screws (by others) through the four holes provided in the FAS-SEAL™ door bottom into holes field drilled by others or by self-drill and tap screws

**Product availability**

Sweeps for doors 2' 0" through 4' 0" in width are available from factory inventory and are used on Steelcraft L, SL, B, T, TH, CE, H, HE, PW, and A14 Series doors.

# Lights and louvers

General information.....	148
Door designs for full flush doors.....	148
Door (light) designs for CE embossed doors.....	148
Door designs for full glass entrance doors.....	148
Glazing kit options.....	149
Dezigner® Trim.....	149
Dezigner® Trim for Distributor Prep & Install.....	149
Flush door glass lights.....	150
Vision light: V.....	150
Narrow light: Variable sizes.....	151
Narrow light: Fixed sizes.....	152
Half glass light: G.....	153
Full glass light: FG.....	154
Full glass with multiple lights: FG2.....	155
Full glass with multiple lights: FG3.....	156
Special glass lights.....	157
Von Duprin® INPACT™ glass lights (mortise and concealed vertical rod).....	157
Paladin glass lights.....	158
Embossed door glass lights.....	159
Half glass light: Fixed sizes.....	159
Full glass light: FG.....	160
Full glass with multiple lights: FG2.....	161
Full glass with multiple lights: FG3.....	162
Louver prep.....	163
Louver prep: -L.....	163

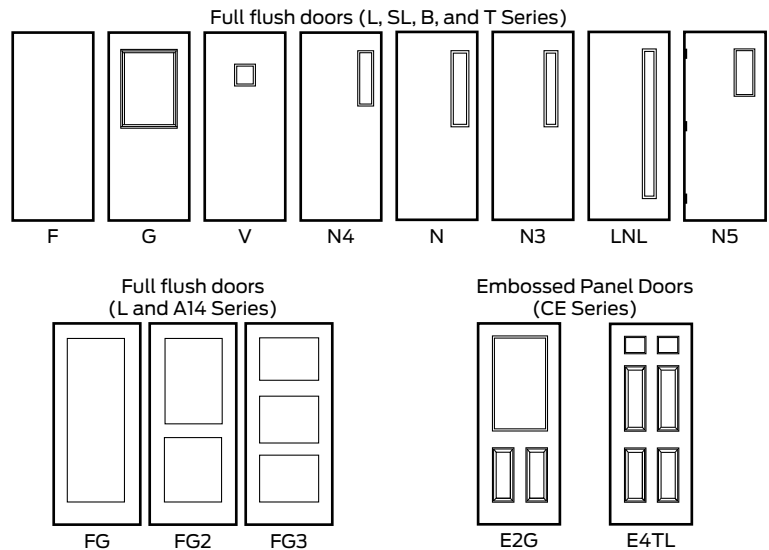
## General information



Steelcraft doors can be specified and supplied with various glass options and louver cutouts depending on the architectural and applications needs.

### Door designs for full flush doors

The glass configuration is referred to as the door design. Letter designations describe the glass light designs. A brief description of the standard glass light available:



- **F: Flush door:** designation for a door without any glass light installed.
- **G: Half Glass door:** designation for a door with a glass light located in the top half of the door face. The glass size will vary with the size of the door. However, for special sized doors, the next smaller glass size will be supplied.
- **V: Vision Light door:** designation for a door with a small square window located in the top of the door. The glass size will remain constant regardless of the door size.
- **N: Narrow Light door:** designation for a door with a long narrow light located along the lock edge of the door. The following variations in the Narrow light designs are available as standard:
  - **N Light:** door prepared for a 7 3/8" (187 mm) wide glass light (exposed glass size) which varies in height depending on the door height.
  - **N3 Light:** door prepared for a 3" (76 mm) wide and 33" (838 mm) high glass light (exposed glass size).
  - **N4 Light:** door prepared for a 4" (102 mm) wide and 25" (635 mm) high glass light (exposed glass size).
  - **N5 Light:** door prepared for a 5" (127 mm) wide and 20" (508 mm) high glass light (exposed glass size).
  - **LNL Light:** door prepared for an 7 3/8" (187 mm) wide glass light (exposed glass size) which extends the majority of the door height, and varies in height depending on the door height.
- **FG: Full Glass L Series doors:** designation for L Series doors with a full view window, glass extending nearly the full door width and height. The following variations in Full Glass Light designs are available:
  - **FG Light:** door prepared for a full view window extending nearly the full width and height of the door.
  - **FG2 Light:** variation of the FG Light which includes a stationary horizontal mid-rail dividing the window into two (2) individual lights.
  - **FG3 Light:** variation of the FG Light which includes two (2) stationary horizontal mid-rails, dividing the window into three (3) equal individual lights.

### Door (light) designs for CE embossed doors

Doors with glass cutouts specifically sized to fit into the CE Series embossed door.

- **E2G:** designation for a door with a half glass light located in the top half of the door and two embossed patterns in the bottom half.
- **E4TL:** designation for a door with dual vision lights located in the top section of the door and four embossed patterns in the lower section

### Door designs for full glass entrance doors

The glass configuration is referred to as the door design. Letter designations describe the glass light designs. Refer to page 125 for unique A14 Series door construction. A brief description of the standard glass light available:

- **FG: Full Glass A14 Series doors:** designation for A14 Series doors with a full view window, glass extending nearly the full door width and height. The following variations in Full Glass Light designs are available:
  - **FG Light:** door prepared for a full view window extending nearly the full width and height of the door.
  - **FG2 Light:** variation of the FG Light which includes a stationary horizontal mid-rail dividing the window into two (2) individual lights.
  - **FG3 Light:** variation of the FG Light which includes two (2) stationary horizontal mid-rails, dividing the window into three (3) equal individual lights.

### Note on Window Sizes and Designs:

All door lights covered in this section are Steelcraft standards. Special light sizes and configurations are available when specified. For special size lights using Steelcraft trims, the glass cutting size is the Exposed Glass Size (EGS) plus 1 1/8". Refer to the following pages for specific details and dimensions of the various glass designs.

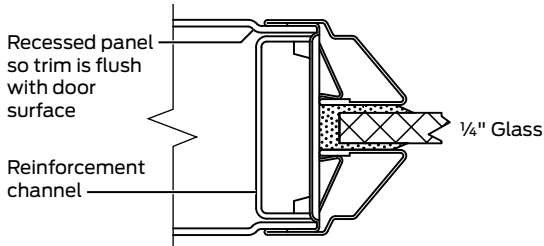
## Glazing kit options

Flush door glass kits include the following glass trim systems:

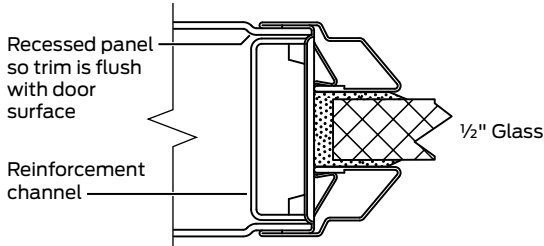
### Designer® Trim

**Designer® Trim** is a unique and patented steel trim, recessed into the door face at the factory, providing a neat flush door surface designed to accommodate Standard ¼" (6 mm) thick glass and Optional ½" (13 mm) thick insulated glass.

#### Designer Trim (recessed) for ¼" Glass (standard)



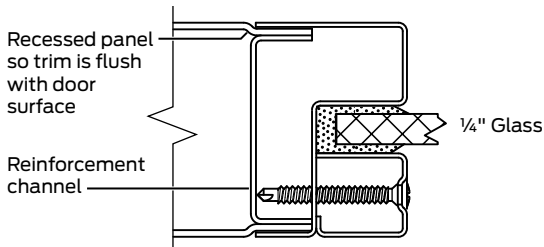
#### Designer Trim (recessed) for ½" Insulated Glass



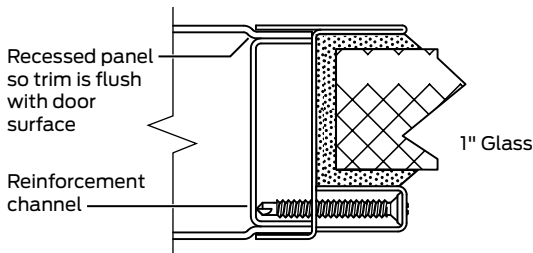
**Flush Mounted Steel Trim** sits in the recessed door face and is flush with the door surface. It is available for Standard ¼" (6 mm) thick glass as well as Optional 1" (25 mm) thick insulated glass. Glazing beads are screw attached.

**Not available on 14GA doors.**

#### Flush Mounted Steel Trim for ¼" Glass



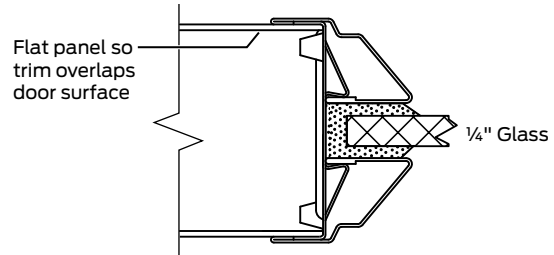
#### Flush Mounted Steel Trim for 1" Insulated Glass



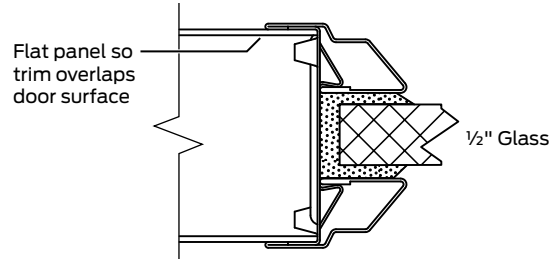
### Designer® Trim for Distributor Prep & Install

**Designer Trim for Distributor Prep & Install** is shipped assembled with flush clips (no recess in the door face). This trim is the same as the factory installed Designer® trim, but it rests on the surface of the door face, like conventional hollow metal doors.

#### Designer Trim (for Distributor Prep) for ¼" Glass (standard)

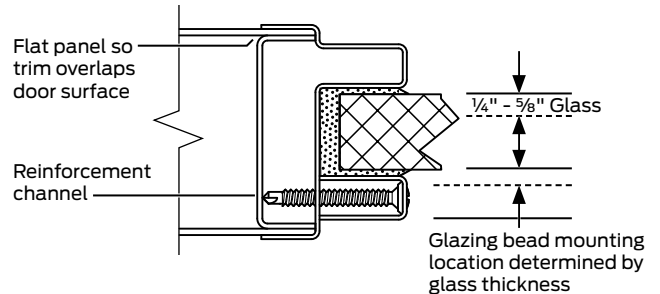


#### Designer Trim (for Distributor Prep) for ½" Insulated Glass

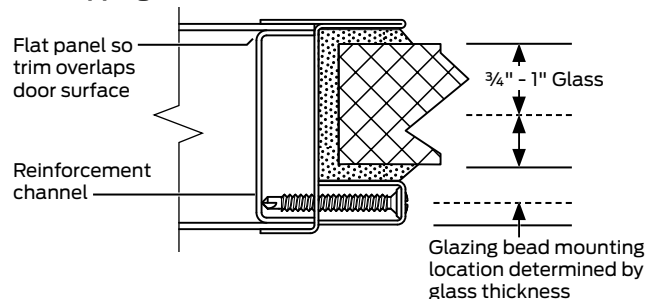


**Overlapping Steel Trim** sits tight on the door face and overlaps the door surface. This trim accommodates a wide range of sizes from ¼" thru 1" thick insulated glass. Glass thickness must be specified. Glazing beads are screw attached.

#### Overlapping Steel Trim for ¼" THRU ⅝" Glass



#### Overlapping Steel Trim for ¾" THRU 1" Insulated Glass

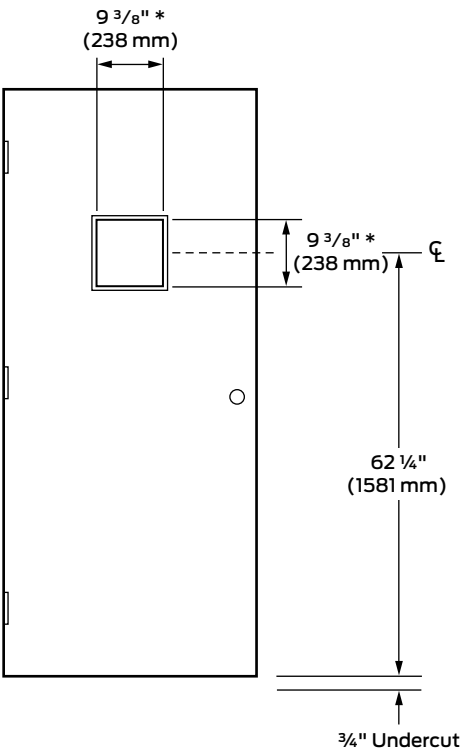


**Note:** Reinforcement Channels shown are used with labeled doors and all Full glass & H Series doors.

# Flush door glass lights

## Vision light: V

L, SL, B, H, and T Series doors



\* Dimensions shown are to Exposed Glass Size

### Vision light door design

The V Light designation is for a door with a small square window located in the top of the door. The glass size will remain constant regardless of the door size, and the light location is held constant from the bottom of the door.

### Glazing bead system

1/4" (6 mm) thick glass lights are available as standard with the Steelcraft Dezigner® trim system for L, SL, B and T Series doors.

1/2" (13 mm) thick insulated glass lights, are available as an option with the Steelcraft Dezigner® trim system for insulated glass. 1/2" is standard on H Series doors.

Insulated glass light thicker than 1/2" (13 mm) are available as an option with specially designed overlapping steel trim.

### Ordering nomenclature

The door ordering nomenclature is suffixed with the letter: V.

### Door series available

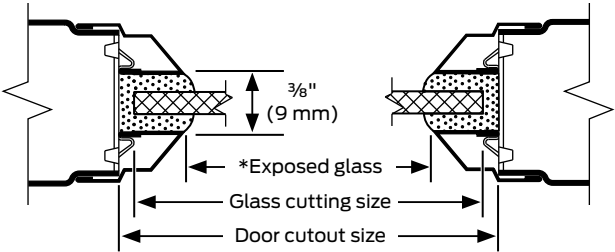
Vision Light kits are available for the following door series in all of their standard options and gauges: L, SL, B, H, and T Series.

### Glass light sizes

The following critical dimensions apply to the standard Steelcraft V Light (vision light) window designs:

Exposed Glass Size	9 3/8" (238 mm) square
Glass Cutting Size	10 5/8" (270 mm) square
Door Cutout Size	11" (279 mm) square

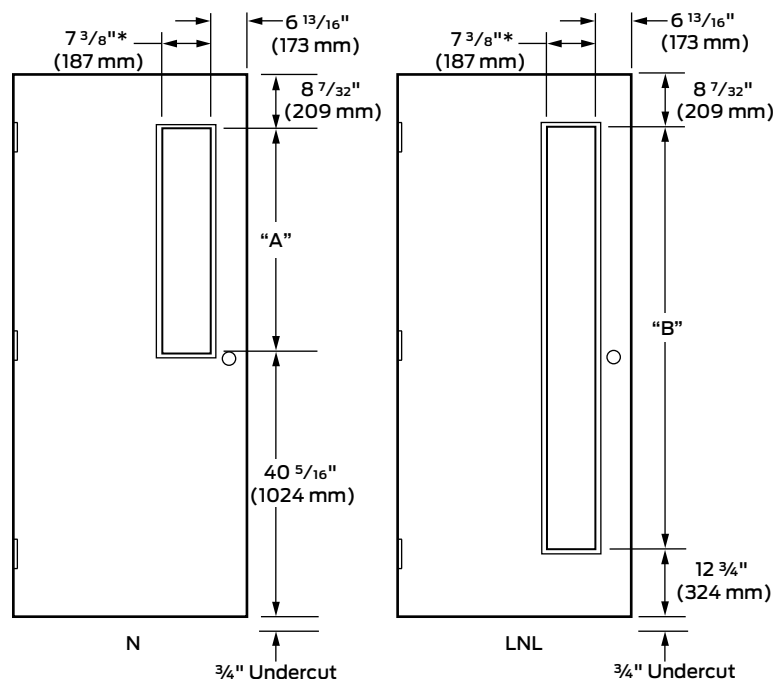
### Glazing details



**Note:** For fire rated applications using ceramic type glazing, consult the glass manufacturer's glazing instructions for glass, caulking and/or glazing tape requirements. Details will vary as required by glazing selections.

## Narrow light: Variable sizes

### L, SL, B, and H Series doors



\* Dimensions shown are to Exposed Glass Size

### Variable narrow light door design

Designation for a door with a long narrow light located along the lock edge of the door. The following variations in the Narrow Light designs are available as standard:

- **N Light:** door prepared for a 7 3/8" (191 mm) wide glass light (exposed glass size) which varies in height with the door height. However, for special sized doors, the next smaller glass size will be supplied.
- **LNL Light:** door prepared for a 7 3/8" (191 mm) wide glass light (exposed glass size) which extends the majority of the door height, and varies in height with the door height.

### Glazing bead system

1/4" (6 mm) thick glass lights are available as standard with the Steelcraft Designer® trim system for L, SL, and B Series doors.

1/2" (13 mm) thick insulated glass lights, are available as an option with the Steelcraft Designer® trim system for insulated glass. 1/2" is standard on H Series doors.

Insulated glass lights thicker than 1/2" (13 mm) are available as an option with specially designed overlapping steel trim.

### Ordering nomenclature

The door ordering nomenclature is suffixed with the letter:

- **N:** 7 3/8" (191 mm) wide glass light (which varies in height with the door height).
- **LNL:** 7 3/8" (191 mm) wide glass light (which extends the majority of the door height).

### Glass light sizes

The following critical dimensions apply to the standard Steelcraft N and LNL Light window designs:

### Window widths N and LNL

Exposed Glass Size (EGS)	7 3/8" (191 mm)
Glass Cutting Size (GCS)	8 5/8" (219 mm)
Door Cutout Size (DCS)	9" (229 mm)

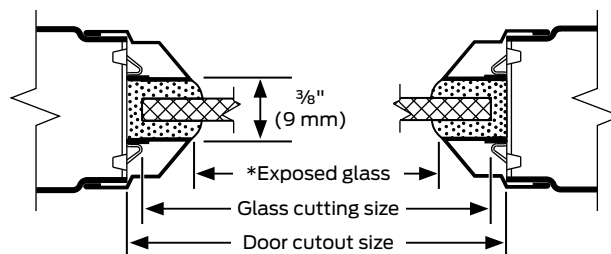
### Window heights

N	Door heights (Dim "A")					
	6' 8"	6' 10"	7' 0"	7' 2"	7' 10"	8' 0"
EGS	30 1/2"	32 1/2"	34 1/2"	36 1/2"	44 1/2"	46 1/2"
GCS	31 3/4"	33 3/4"	35 3/4"	37 3/4"	45 3/4"	47 3/4"
DCS	32 3/32"	34 3/32"	36 3/32"	38 3/32"	46 3/32"	48 3/32"
LNL	Door heights (Dim "B")					
	6' 8"	6' 0"	7' 0"	7' 2"	7' 10"	8' 0"
EGS	58"	60"	62"	64"	72"	74"
GCS	59 1/4"	61 1/4"	63 1/4"	65 1/4"	73 1/4"	75 1/4"
DCS	59 21/32"	61 21/32"	63 21/32"	65 21/32"	73 21/32"	75 21/32"

### Door series available

Narrow Light kits are available for the following door series in all of their standard options and gauges: L, SL, B, and H Series.

### Glazing details



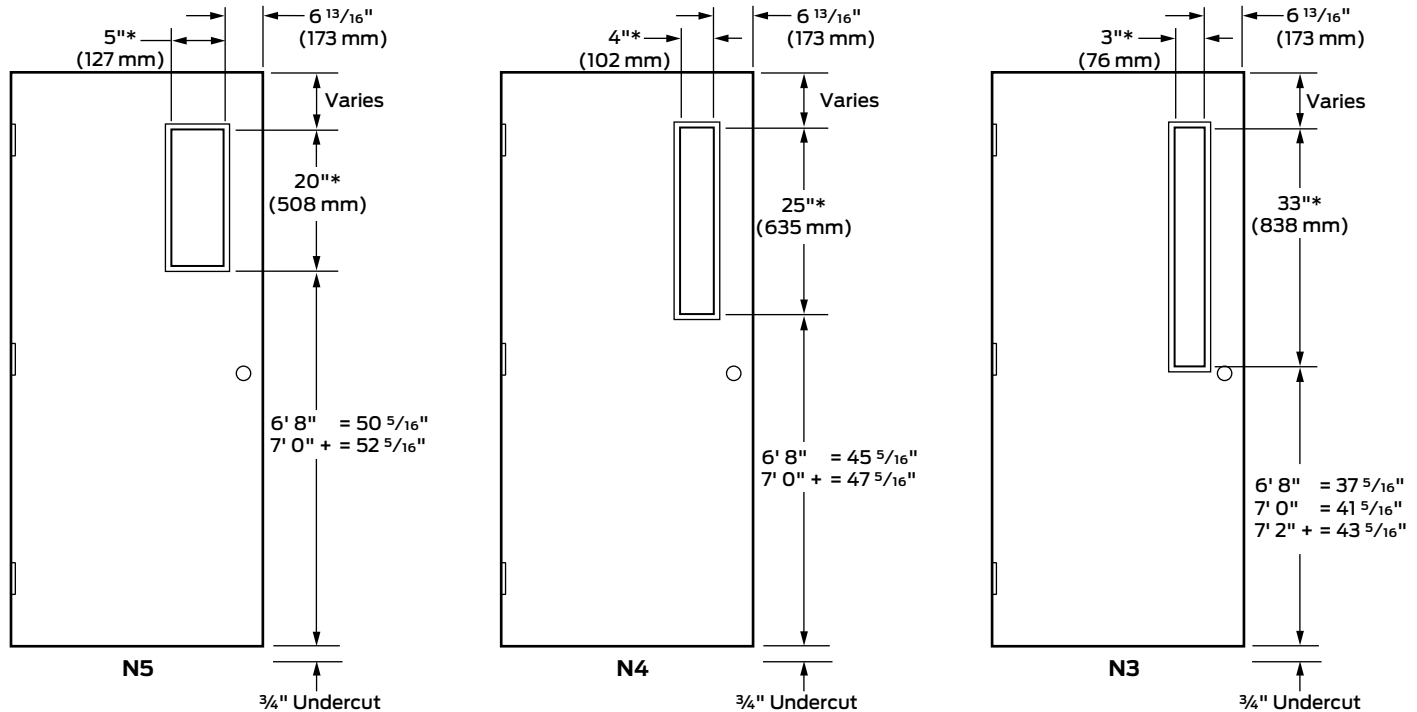
**Note:** For fire rated applications using ceramic type glazing, consult the glass manufacturer's glazing instructions for glass, caulking and/or glazing tape requirements. Details will vary as required by glazing selections.

**Note:** For special size doors, the next smaller glass size will be used. The glass light location will be held from the bottom of the door.



## Narrow light: Fixed sizes

### L, SL, B, H, and T Series doors



### Fixed narrow light door design

Designation for a door with a long narrow light located along the lock edge of the door. The following variations in the Narrow Light designs are covered on this sheet, and are available as standard:

- **N3 Light:** door prepared for a 3" (76 mm) wide and 33" (838 mm) high\* glass light.
- **N4 Light:** door prepared for a 4" (102 mm) wide and 25" (635 mm) high\* glass light.
- **N5 Light:** door prepared for a 5" (127 mm) wide and 20" (508 mm) high\* glass light.

### Glazing bead system

1/4" (6 mm) thick glass lights are available as standard with the Steelcraft Designer® trim system for L, SL, B and T Series doors.

1/2" (13 mm) thick insulated glass lights, are available as an option with the Steelcraft Designer® Trim System for insulated glass. 1/2" is standard on H Series doors.

Insulated glass lights thicker than 1/2" (13 mm) are available as an option with specially designed overlapping steel trim.

### Ordering nomenclature

The door ordering nomenclature is suffixed with the letter:

- **N3:** 3" (76 mm) wide and 33" (838 mm) high\* glass light.
- **N4:** 4" (102 mm) wide and 25" (635 mm) high\* glass light.
- **N5:** 5" (127 mm) wide and 20" (508 mm) high\* glass light.

### Door series available

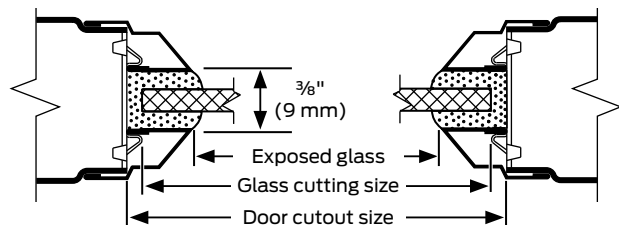
Narrow Light kits are available for the following door series in all of their standard options and gauges: L, SL, B, H, and T Series.

### Glass light sizes

The following critical dimensions apply to the standard Steelcraft N3, N4, and N5 Light window designs:

	Glass designs		
	N5	N4	N3
<b>Window widths</b>			
Exposed glass size	5"	4"	3"
Glass cutting size	6 1/4"	5 1/4"	4 1/4"
Door cutout size	6 19/32"	5 19/32"	4 19/32"
<b>Window heights</b>			
Exposed glass size	20"	25"	33"
Glass cutting size	21 1/4"	26 1/4"	34 1/4"
Door cutout size	21 19/32"	26 19/32"	34 19/32"

### Glazing details



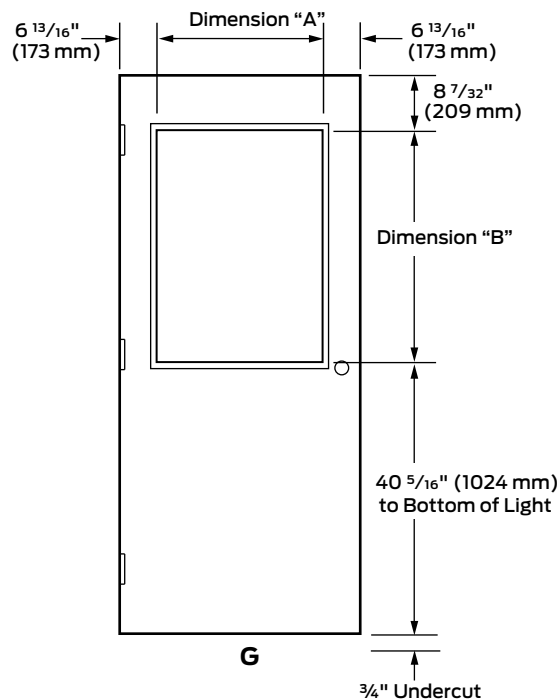
**Note:** For fire rated applications using ceramic type glazing, consult the glass manufacturer's glazing instructions for glass, caulking and/or glazing tape requirements. Details will vary as required by glazing selections.

\* Dimensions shown are to Exposed Glass Size



## Half glass light: G

L, SL, B, and H Series doors



### Half glass door lights

Designation for a door with a glass light located in the top half of the door face. The glass size will vary with the size of the door. **However, for special sized doors, the next smaller glass size will be supplied.**

### Glazing bead system

¼" (6 mm) thick glass lights are available as standard with the Steelcraft Designer® trim system for L, SL, and B Series doors.

½" (13 mm) thick insulated glass lights, are available as an option with the Steelcraft Designer® trim system for insulated glass. ½" is standard on H Series doors.

Insulated glass lights thicker than ½" (13 mm) are available as an option with specially designed overlapping steel trim.

### Ordering nomenclature

The door ordering nomenclature is suffixed with the letter: **G**.

### Door series available

Half Glass kits are available for the following door series in all of their standard options and gauges:  
L, SL, B, and H Series.

### Glass light sizes

The following critical dimensions apply to the standard Steelcraft G Light window designs:

#### Window widths

	Door widths (Dim "A")										
	2' 0"	2' 4"	2' 6"	2' 8"	2' 10"	3' 0"	3' 4"	3' 6"	3' 8"	3' 10"	4' 0"
EGS	10 ¾"	14 ¾"	16 ¾"	18 ¾"	20 ¾"	22 ¾"	26 ¾"	28 ¾"	30 ¾"	32 ¾"	34 ¾"
GCS	11 ⅞"	15 ⅞"	17 ⅞"	19 ⅞"	21 ⅞"	23 ⅞"	27 ⅞"	29 ⅞"	31 ⅞"	33 ⅞"	35 ⅞"
DCS	11 25/32"	15 25/32"	17 25/32"	19 25/32"	21 25/32"	23 25/32"	27 25/32"	29 25/32"	31 25/32"	33 25/32"	35 25/32"

#### Window heights

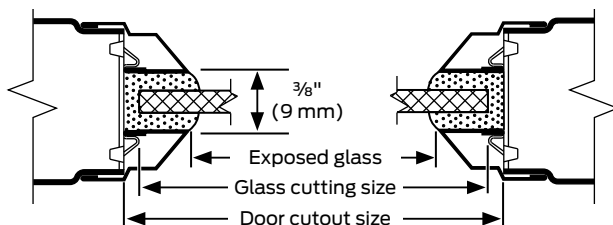
	Door heights (Dim "B")					
	6' 8"	6' 10"	7' 0"	7' 2"	7' 10"	8' 0"
EGS	30 ½"	32 ½"	34 ½"	36 ½"	44 ½"	46 ½"
GCS	31 ¾"	33 ¾"	35 ¾"	37 ¾"	45 ¾"	47 ¾"
DCS	32 ¾"	34 ¾"	36 ¾"	38 ¾"	46 ¾"	48 ¾"

**Note:** EGS = Exposed Glass Size

GCS = Glass Cutting Size

DCS = Door Cutout Size

### Glazing details



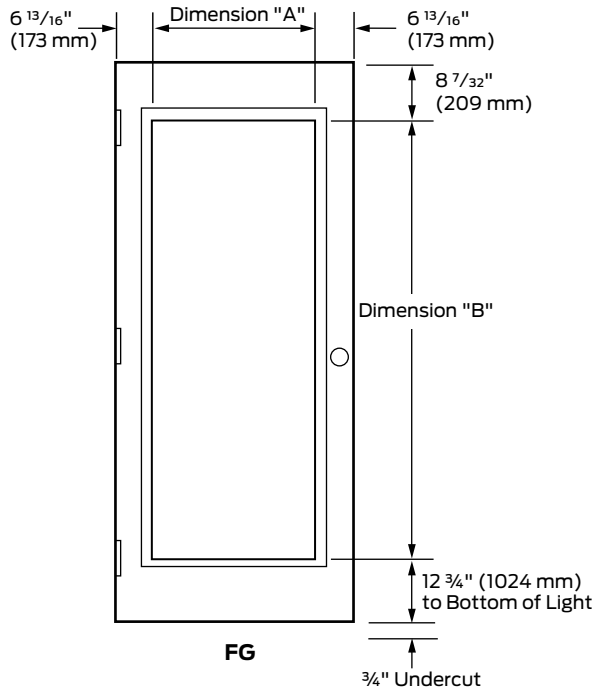
caulking and/or glazing tape requirements. Details will vary as required by glazing selections.

**Note:** For fire rated applications using ceramic type glazing, consult the glass manufacturer's glazing instructions for glass,

\* Dimensions shown are to Exposed Glass Size

## Full glass light: FG

### L and H Series doors



\* Dimensions shown are to Exposed Glass Size

### Full glass (FG) door lights

Designation for a door with a full vision glass light. The glass size will vary with the size of the door.

### Glazing bead system

¼" (6 mm) thick glass lights are available as standard with the Steelcraft Designer® trim system for L Series doors.

½" (13 mm) thick insulated glass lights, are available as an option with the Steelcraft Designer® trim system for insulated glass. ½" is standard on H Series doors.

Insulated glass lights thicker than ½" (13 mm) are available as an option with specially designed overlapping steel trim.

Flush mounted steel trim not available on 14GA doors.

Reinforcement Channels are used in all Full glass applications.

### Ordering nomenclature

The door ordering nomenclature is suffixed with the letter: **FG**.

### Door series available

Full Glass kits are available for the following door series in all of their standard options and gauges: L and H Series.

### Special size doors

Standard policy for special size doors is the next smaller glass size will be supplied unless noted differently on the order.

The following critical dimensions apply to the standard Steelcraft G Light window designs:

### Window widths

	Door widths (Dim "A")										
	2' 0"	2' 4"	2' 6"	2' 8"	2' 10"	3' 0"	3' 4"	3' 6"	3' 8"	3' 10"	4' 0"
EGS	10 ¾"	14 ¾"	16 ¾"	18 ¾"	20 ¾"	22 ¾"	26 ¾"	28 ¾"	30 ¾"	32 ¾"	34 ¾"
GCS	11 ⅞"	15 ⅞"	17 ⅞"	19 ⅞"	21 ⅞"	23 ⅞"	27 ⅞"	29 ⅞"	31 ⅞"	33 ⅞"	35 ⅞"
DCS	11 25/32"	15 25/32"	17 25/32"	19 25/32"	21 25/32"	23 25/32"	27 25/32"	29 25/32"	31 25/32"	33 25/32"	35 25/32"

### Window heights

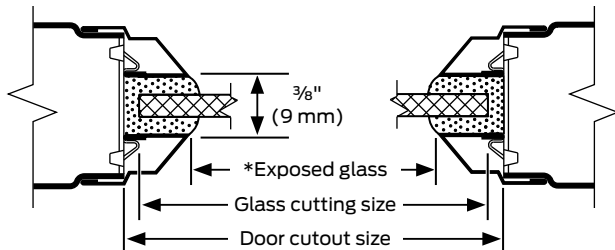
	Door heights (Dim "B")					
	6' 8"	6' 10"	7' 0"	7' 2"	7' 10"	8' 0"
EGS	58"	60"	62"	64"	72"	74"
GCS	59 ¼"	61 ¼"	63 ¼"	65 ¼"	73 ¼"	75 ¼"
DCS	59 21/32"	61 21/32"	63 21/32"	65 21/32"	73 21/32"	75 21/32"

**Note:** EGS = Exposed Glass Size

GCS = Glass Cutting Size

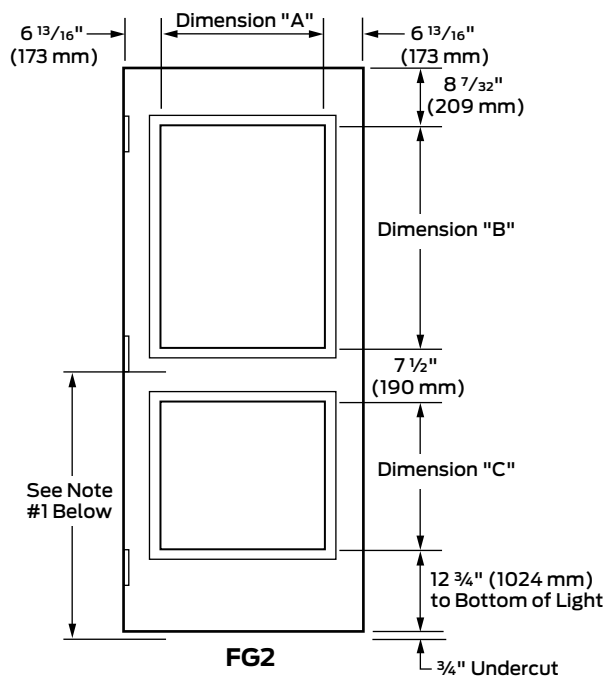
DCS = Door Cutout Size

### Glazing details



**Note:** For fire rated applications using ceramic type glazing, consult the glass manufacturer's glazing instructions for glass, caulking and/or glazing tape requirements. Details will vary as required by glazing selections.

## Full glass with multiple lights: FG2



\* Dimensions shown are to Exposed Glass Size

### Full glass (FG2) door lights

Designation for a door with two (2) glass lights each separated by an integral rail. Glass sizes will vary with the size of the door.

### Glazing bead system

1/4" (6 mm) thick glass lights are available as standard with the Steelcraft Designer® trim system for L Series doors.

1/2" (13 mm) thick insulated glass lights, are available as an option with the Steelcraft Designer® trim system for insulated glass.

1/2" is standard on H Series doors.

Insulated glass lights thicker than 1/2" (13 mm) are available as an option with specially designed overlapping steel trim.

Flush mounted steel trim not available on 14GA doors.

Reinforcement Channels are used in all Full glass applications.

### Ordering nomenclature

The door ordering nomenclature is suffixed with the letter: **FG2**.

### Door series available

Full Glass FG2 kits are available for the following door series in all of their standard options and gauges: L and H Series.

### Special size doors

Standard policy for special size doors is the next smaller glass size will be supplied unless noted differently on the order.

The following critical dimensions apply to the standard Steelcraft FG2 designs with multiple glass lights

### Window widths

	Door widths (Dim "A")										
	2' 0"	2' 4"	2' 6"	2' 8"	2' 10"	3' 0"	3' 4"	3' 6"	3' 8"	3' 10"	4' 0"
EGS	10 3/16"	14 3/16"	16 3/16"	18 3/16"	20 3/16"	22 3/16"	26 3/16"	28 3/16"	30 3/16"	32 3/16"	34 3/16"
GCS	11 7/16"	15 7/16"	17 7/16"	19 7/16"	21 7/16"	23 7/16"	27 7/16"	29 7/16"	31 7/16"	33 7/16"	35 7/16"
DCS	11 25/32"	15 25/32"	17 25/32"	19 25/32"	21 25/32"	23 25/32"	27 25/32"	29 25/32"	31 25/32"	33 25/32"	35 25/32"

### Window heights

	Door heights (Dim "B")						(Dim "C")
	6' 8"	6' 10"	7' 0"	7' 2"	7' 10"	8' 0"	All Doors
EGS	27 13/16"	29 13/16"	31 13/16"	33 13/16"	41 13/16"	43 13/16"	22 21/32"
GCS	29 1/16"	31 1/16"	33 1/16"	35 1/16"	43 1/16"	45 1/16"	23 7/8"
DCS	29 13/32"	31 13/32"	33 13/32"	35 13/32"	43 13/32"	45 13/32"	24 1/4"

**Note:** EGS = Exposed Glass Size

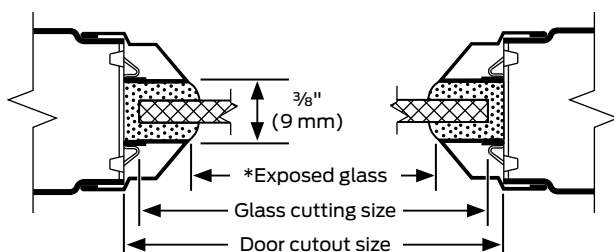
GCS = Glass Cutting Size

DCS = Door Cutout Size

### Notes:

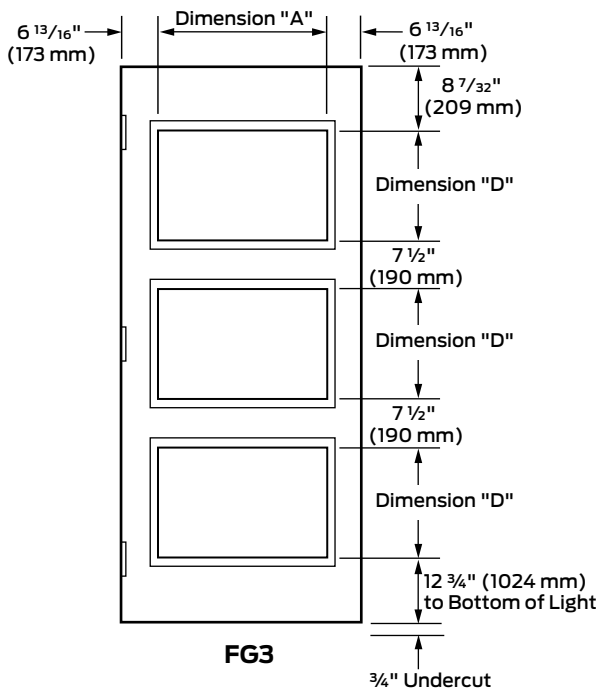
- For Flush door construction, the center rail of the FG2 glass lights vary with the door height.
- If consistent rail heights are required, refer to page 173 and the A14 Series full glass entrance door construction.

### Glazing details



**Note:** For fire rated applications using ceramic type glazing, consult the glass manufacturer's glazing instructions for glass, caulking and/or glazing tape requirements. Details will vary as required by glazing selections

### Full glass with multiple lights: FG3



\* Dimensions shown are to Exposed Glass Size

#### Full glass (FG3) door lights

Designation for a door with three (3) glass lights each separated by an integral rail. Glass sizes will vary with the size of the door.

#### Glazing bead system

$\frac{1}{4}"$  (6 mm) thick glass lights are available as standard with the Steelcraft Dezigner® trim system for L Series doors.

$\frac{1}{2}"$  (13 mm) thick insulated glass lights, are available as an option with the Steelcraft Dezigner® trim system for insulated glass.

$\frac{1}{2}"$  is standard on H Series doors.

Insulated glass lights thicker than  $\frac{1}{2}"$  (13 mm) are available as an option with specially designed overlapping steel trim.

Flush mounted steel trim not available on 14GA doors.

Reinforcement Channels are used in all Full glass applications.

#### Ordering nomenclature

The door ordering nomenclature is suffixed with the letter: **FG3**.

#### Door series available

Full Glass FG3 kits are available for the following door series in all of their standard options and gauges: L and H Series.

#### Special size doors

Standard policy for special size doors is the next smaller glass size will be supplied unless noted differently on the order.

The following critical dimensions apply to the standard Steelcraft FG3 designs with multiple glass lights

#### Window widths

	Door widths (Dim "A")											
	2' 0"	2' 4"	2' 6"	2' 8"	2' 10"	3' 0"	3' 4"	3' 6"	3' 8"	3' 10"	4' 0"	
EGS	10 3⁄16"	14 3⁄16"	16 3⁄16"	18 3⁄16"	20 3⁄16"	22 3⁄16"	26 3⁄16"	28 3⁄16"	30 3⁄16"	32 3⁄16"	34 3⁄16"	
GCS	11 7⁄16"	15 7⁄16"	17 7⁄16"	19 7⁄16"	21 7⁄16"	23 7⁄16"	27 7⁄16"	29 7⁄16"	31 7⁄16"	33 7⁄16"	35 7⁄16"	
DCS	11 25⁄32"	15 25⁄32"	17 25⁄32"	19 25⁄32"	21 25⁄32"	23 25⁄32"	27 25⁄32"	29 25⁄32"	31 25⁄32"	33 25⁄32"	35 25⁄32"	

#### Window heights

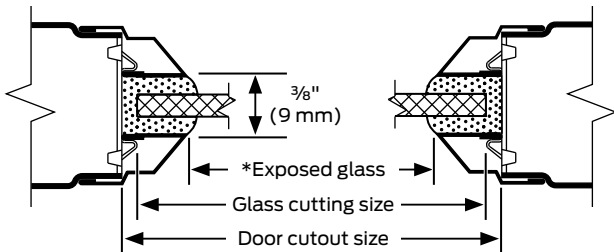
	Door heights (Dim "D")				
	6' 8"	7' 0"	7' 2"	7' 10"	8' 0"
EGS	14 $\frac{5}{16}"$	15 $\frac{5}{8}"$	16 $\frac{5}{16}"$	16 $\frac{15}{16}"$	19 $\frac{5}{8}"$
GCS	15 $\frac{1}{2}"$	16 $\frac{13}{16}"$	17 $\frac{1}{2}"$	18 $\frac{3}{16}"$	20 $\frac{13}{16}"$
DCS	15 $\frac{7}{8}"$	17 $\frac{3}{16}"$	17 $\frac{7}{8}"$	18 $\frac{9}{16}"$	21 $\frac{3}{16}"$

**Note:** EGS = Exposed Glass Size

GCS = Glass Cutting Size

DCS = Door Cutout Size

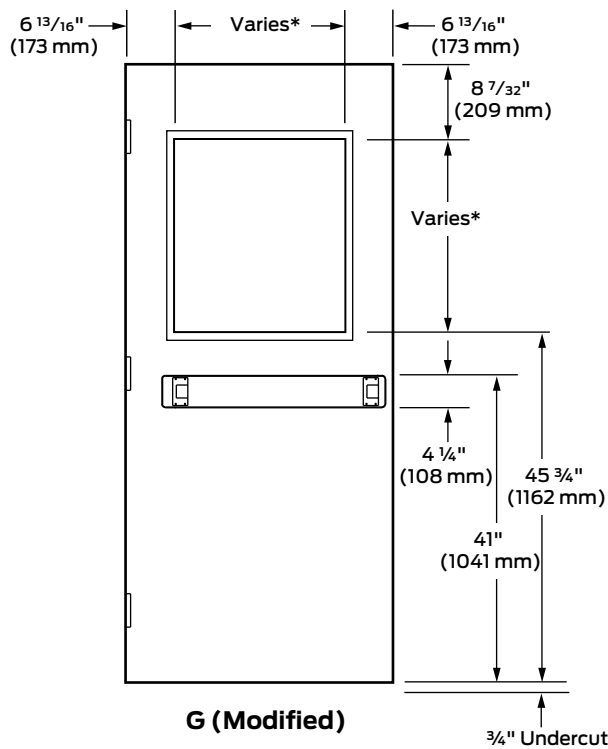
#### Glazing details



**Note:** For fire rated applications using ceramic type glazing, consult the glass manufacturer's glazing instructions for glass, caulking and/or glazing tape requirements. Details will vary as required by glazing selections.

## Special glass lights

## Von Duprin® INPACT™ glass lights (mortise and concealed vertical rod)



\* Dimensions shown are to Exposed Glass Size

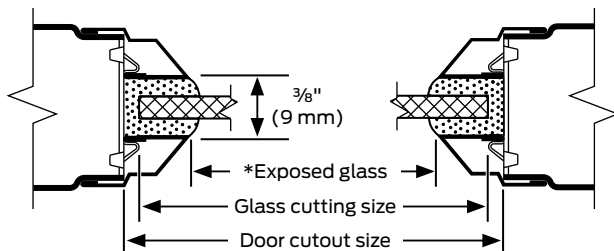
## Glass light sizes

The following dimensions outline the maximum glass heights available with the INPACT™ door preparation:

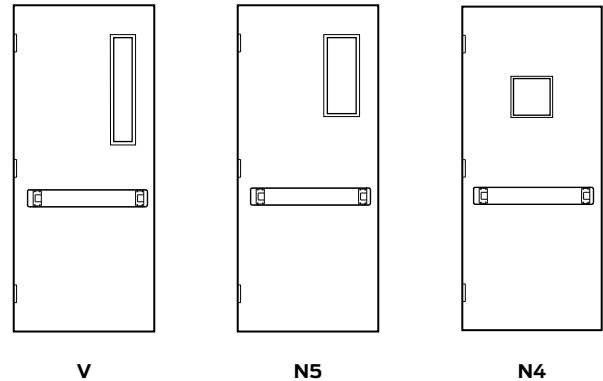
<b>Door heights* (Nominal)</b>	<b>6' 8"</b>	<b>7' 0"</b>	<b>7' 2"</b>	<b>8' 0"</b>
<b>Maximum Exposed Glass Height</b>	<b>25 1/8"</b>	<b>29 1/8"</b>	<b>31 1/8"</b>	<b>41 1/8"</b>

\*To determine maximum glass light height for other sized doors, for exposed glass, subtract 54" (1372 mm) from net door size.

## Glazing details



## Optional details



## Glass lights

Glass light cutouts are available in N4, N5 and V Light designs without modification. Other lights are available but have limited height due to the exit device preparation.

### Glazing bead system

1/4" (6 mm) thick glass lights are available as standard with the Steelcraft Designer® Series trim system.

½" (13 mm) thick insulated glass lights, are available as an option with the Steelcraft Designer® Series trim system for insulated glass.

Insulated glass lights thicker than ½" (13 mm) are available as an option with specially designed overlapping steel trim.

The following critical dimension applies to the standard Steelcraft light designs with INPACT™ preparation:

**Glass Cutting Size** = exposed glass size + 1 1/8"

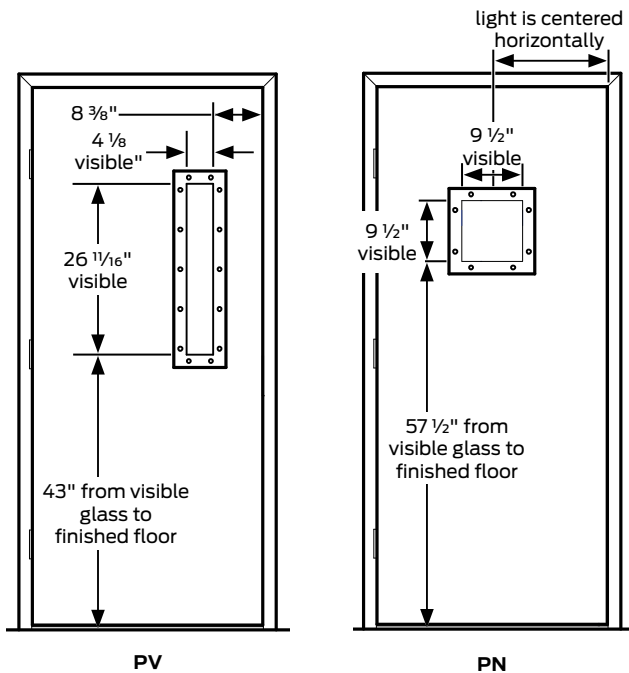
**Door Cutout Size** = exposed glass size + 1 1/2"

Notes:

1. Consult code for ADA requirements on glass cutouts.
2. Refer to pages 270–271 for specific INPACT™ device preparation requirements.

**Note:** For fire rated applications using ceramic type glazing, consult the glass manufacturer's glazing instructions for glass, caulking and/or glazing tape requirements. Details will vary as required by glazing selections.

## Paladin glass lights



Dimensions shown are to exposed glass size

### Glass lights

Fully installed from the factory Glass lights with trim included in PV and PN label Light designs without modification. Lights can be added to any Paladin door available in a 3-sided frame. Lights are not available in variable sizes or locations. Fire rated versions (PVF and PNF) are available up to 90 minutes.

### Glazing trim system

Paladin lights come fully installed from the factory and cannot be replaced or modified without nullifying tornado code labels.

### Care and Instructions

When you receive your door, the glass will have a care instructions which include the below information:

1. Do not remove the label until after finish paint and ready to seal the glass trim
2. **Painting:** Do not powder coat your door to avoid exposing to extremely high temperatures that could damage components and affect performance.
3. **Caulk/Sealant:** A quality glass trim sealant must be applied to any weather-facing glass and trim to avoid water infiltration and corrosion over time. Apply sealant along full perimeter with no gaps between trim and glass, and between trim and door. Caulk may also be added to the non-storm side of the door as well for added protection and for visual preference.
  - For fire rated assemblies with glass, a UL classified fire rated sealant must be used (contact [Technical product support](#). See page iv).
4. **Do not cut on/take care not to damage:** The outer layers of your Paladin glass are typical of other window glass that can be scratched and can break. Please take care. Broken glass will void your tornado label and must be replaced by replacing the entire tornado door with glass.
5. **Film layer:** The non-storm facing side of the glass has a protective film. Take care not to damage or remove. Do not use masking tape and do not otherwise scratch, damage or pull this film off.
  - The film layer side is on the non-storm side of the door, identified by the side of the glass trim with visible Phillips head trim bolts.
6. **Cleaning:** Do not use abrasive agents and/or bristle brushes when cleaning your glass surface. Use synthetic/soft cloths. Use common window cleaning solutions (ammonia solutions allowed 30 days after installation).
7. **Replacement:** If the film is damaged, call Steelcraft support at (877) 671-7011 to schedule replacement by an authorized representative. It is critical to door performance to resolve this condition as soon as possible.

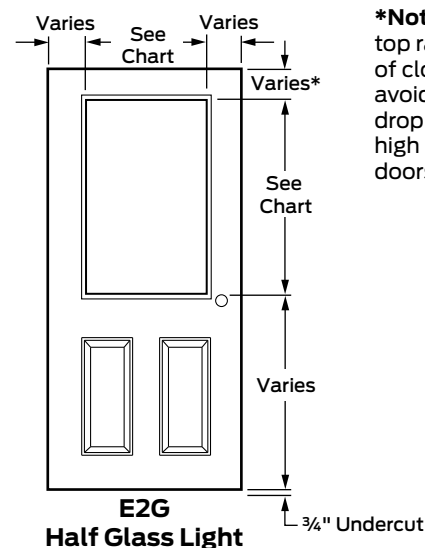
### Notes:

1. PN lights only are ADA compliant / 43" from visible glass to finished floor.
2. Refer to "[PW Series flush doors](#)" on page 205 for specific Paladin preparation requirements.

## Embossed door glass lights

### Half glass light: Fixed sizes

#### CE and HE Series doors



**\*Note:** Due to the narrow top rail dimension, the use of closers should be either avoided or be mounted with drop brackets on all 6' 8" high embossed 6 Panel doors.

\* Dimensions shown are to Exposed Glass Size

#### Glass light sizes (for E2G)

The following critical dimensions apply to the standard CE Half Glass and 9 Light window designs:

##### Window widths

	Door widths	
	2' 6" thru 2' 8"	2' 10" thru 3' 8"
EGS	18 5/8"	20 5/8"
GCS	19 3/4"	21 3/4"
DCS	20 7/32"	22 7/32"

##### Window heights

	Door heights	
	6' 8" & 7' 0"	8' 0"
EGS	34 5/8"	46 1/4"
GCS	35 3/4"	47 3/8"
DCS	36 7/32"	48 7/32"

#### Glazing bead system

1/4" (6 mm) thick glass lights are available as standard with the Steelcraft Designer® trim system on CE Series doors.

1/2" (13 mm) thick insulated glass lights, are available as an option with the trim system for insulated glass. 1/2" is standard on HE Series doors.

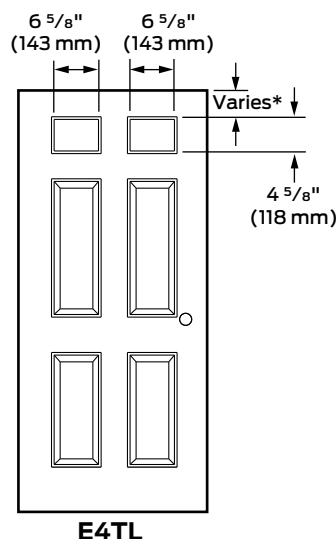
#### Ordering nomenclature

The door ordering nomenclature is suffixed with the letters **E2G** or **E4TL**.

#### Door series available

Light kits are available for the following door series in all of their standard options and gauges: CE, CF, and HE Series.

**Note:** EGS = Exposed Glass Size  
GCS = Glass Cutting Size  
DCS = Door Cutout Size



#### Glass light sizes (for E4TL)

The following critical dimensions apply to the standard E6 (individual) dual vision light window design:

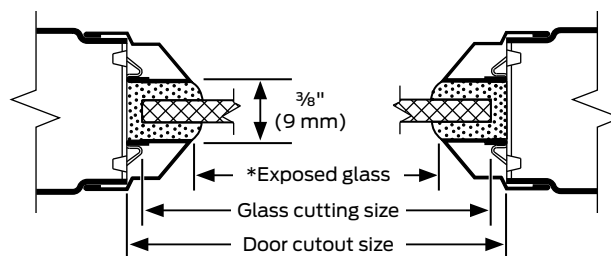
##### Window Widths

	Door widths
	2' 6" thru 3' 8"
EGS	6 5/8"
GCS	7 3/4"
DCS	8 7/32"

##### Window heights

	Door heights
	6' 8", 7' 0", & 8' 0"
EGS	4 5/8"
GCS	5 3/4"
DCS	6 7/32"

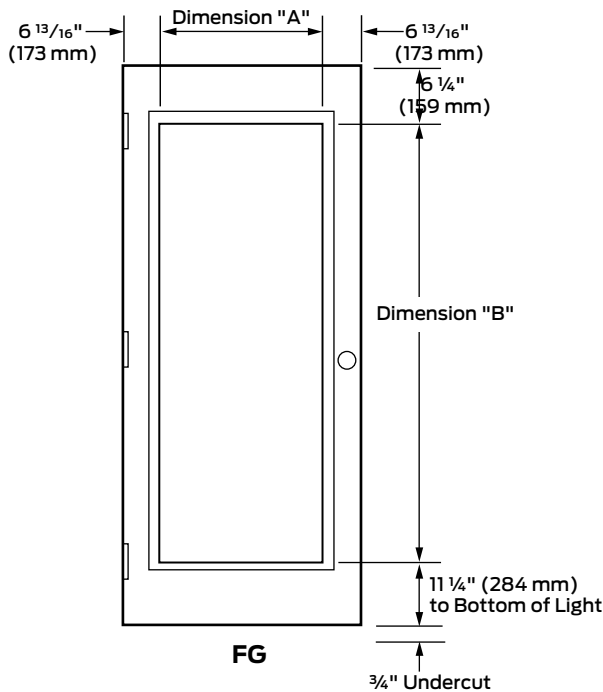
#### Glazing details



**Note:** For fire rated applications using ceramic type glazing, consult the glass manufacturer's glazing instructions for glass, caulking and/or glazing tape requirements. Details will vary as required by glazing selections.

## Full glass light: FG

### A14 Series full glass entrance doors



\* Dimensions shown are to Exposed Glass Size

### Full glass (FG) door lights

Designation for a door with a full vision glass light. The glass size will vary with the size of the door.

### Glazing bead system

1/4" (6 mm) thick glass lights are available as standard with the Steelcraft Dezigner® trim system.

1/2" (13 mm) thick insulated glass lights, are available as an option with the Steelcraft Dezigner® trim system for insulated glass.

Insulated glass lights thicker than 1/2" (13 mm) are available as an option with specially designed overlapping steel trim.

Flush mounted steel trim not available on 14GA doors.

Reinforcement Channels are used in all Full glass applications.

### Ordering nomenclature

The door ordering nomenclature is suffixed with the letter: **FG**.

### Door series available

Full Glass kits are available for the following door series in all of their standard options and gauges: A14 Series.

### Special size doors

Special glass sizes are available; however, A14 vertical stiles are always fixed at 6 13/16" wide regardless of the glass size.

The following critical dimension apply to A14 Series FG Light window designs and are based on typical door sizes (special sizes available). \*Check your acknowledgement for the recommended GCS (glass cutting size) as certain hinges and other hardware options can affect sizes.

### Window widths

	Door widths (Dim "A")										
	2' 0"	2' 4"	2' 6"	2' 8"	2' 10"	3' 0"	3' 4"	3' 6"	3' 8"	3' 10"	4' 0"
EGS	10 3/16"	14 3/16"	16 3/16"	18 3/16"	20 3/16"	22 3/16"	26 3/16"	28 3/16"	30 3/16"	32 3/16"	34 3/16"
GCS	11 7/16"	15 7/16"	17 7/16"	19 7/16"	21 7/16"	23 7/16"	27 7/16"	29 7/16"	31 7/16"	33 7/16"	35 7/16"
DCS	11 25/32"	15 25/32"	17 25/32"	19 25/32"	21 25/32"	23 25/32"	27 25/32"	29 25/32"	31 25/32"	33 25/32"	35 25/32"

### Window heights

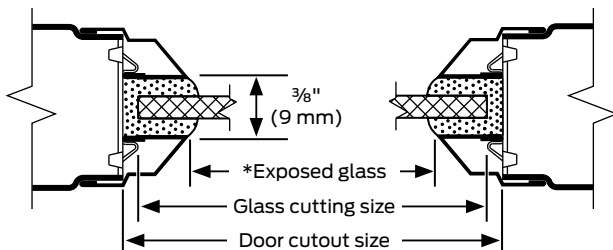
	Door heights (Dim "B")					
	6' 8"	6' 10"	7' 0"	7' 2"	7' 10"	8' 0"
EGS	61 1/2"	63 1/2"	65 1/2"	67 1/2"	75 1/2"	77 1/2"
GCS	62 23/32"	64 23/32"	66 23/32"	68 23/32"	76 23/32"	78 3/4"
DCS	63 1/8"	65 1/8"	67 1/8"	69 1/8"	77 1/8"	79 1/8"

**Note:** EGS = Exposed Glass Size

GCS = Glass Cutting Size

DCS = Door Cutout Size

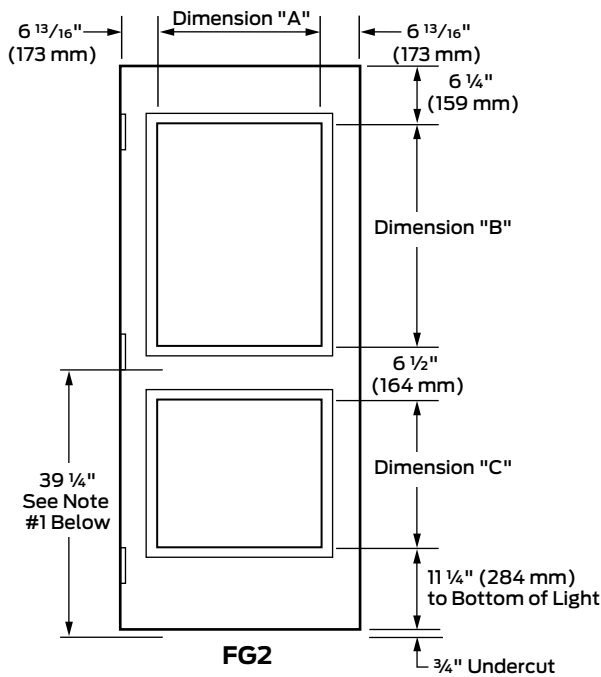
### Glazing details



**Note:** For fire rated applications using ceramic type glazing, consult the glass manufacturer's glazing instructions for glass, caulking and/or glazing tape requirements. Details will vary as required by glazing selections.



## Full glass with multiple lights: FG2



\* Dimensions shown are to Exposed Glass Size

The following critical dimension apply to A14 Series FG2 designs with multiple lights, based on typical door sizes (special sizes available). \*Check your acknowledgement for the recommended GCS (glass cutting size) as certain hinges and other hardware options can affect sizes.

### Window widths

	Door widths (Dim "A")											
	2' 0"	2' 4"	2' 6"	2' 8"	2' 10"	3' 0"	3' 4"	3' 6"	3' 8"	3' 10"	4' 0"	
EGS	10 3⁄16"	14 3⁄16"	16 3⁄16"	18 3⁄16"	20 3⁄16"	22 3⁄16"	26 3⁄16"	28 3⁄16"	30 3⁄16"	32 3⁄16"	34 3⁄16"	
GCS	11 7⁄16"	15 7⁄16"	17 7⁄16"	19 7⁄16"	21 7⁄16"	23 7⁄16"	27 7⁄16"	29 7⁄16"	31 7⁄16"	33 7⁄16"	35 7⁄16"	
DCS	11 25⁄32"	15 25⁄32"	17 25⁄32"	19 25⁄32"	21 25⁄32"	23 25⁄32"	27 25⁄32"	29 25⁄32"	31 25⁄32"	33 25⁄32"	35 25⁄32"	

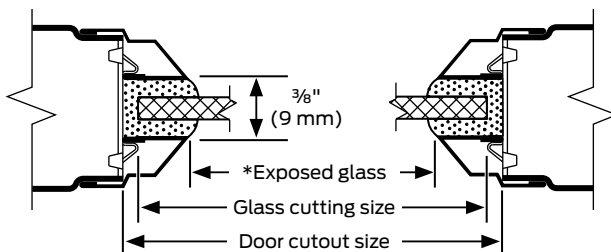
### Window heights

	Door heights (Dim "B")						(Dim "C")
	6' 8"	6' 10"	7' 0"	7' 2"	7' 10"	8' 0"	All Doors
EGS	30 <sup>9</sup> / <sub>32</sub> "	32 <sup>9</sup> / <sub>32</sub> "	34 <sup>9</sup> / <sub>32</sub> "	36 <sup>9</sup> / <sub>32</sub> "	44 <sup>9</sup> / <sub>32</sub> "	46 <sup>9</sup> / <sub>32</sub> "	24 <sup>21</sup> / <sub>32</sub> "
GCS	31 <sup>7</sup> / <sub>16</sub> "	33 <sup>7</sup> / <sub>16</sub> "	35 <sup>7</sup> / <sub>16</sub> "	37 <sup>7</sup> / <sub>16</sub> "	45 <sup>7</sup> / <sub>16</sub> "	47 <sup>7</sup> / <sub>16</sub> "	25 <sup>7</sup> / <sub>8</sub> "
DCS	31 <sup>7</sup> / <sub>8</sub> "	33 <sup>7</sup> / <sub>8</sub> "	35 <sup>7</sup> / <sub>8</sub> "	37 <sup>7</sup> / <sub>8</sub> "	45 <sup>13</sup> / <sub>16</sub> "	47 <sup>7</sup> / <sub>8</sub> "	26 <sup>1</sup> / <sub>4</sub> "

**Note #1:** The center rail of the FG2 door is located 40" above the bottom of the frame (with a <sup>3</sup>/<sub>4</sub>" door undercut).

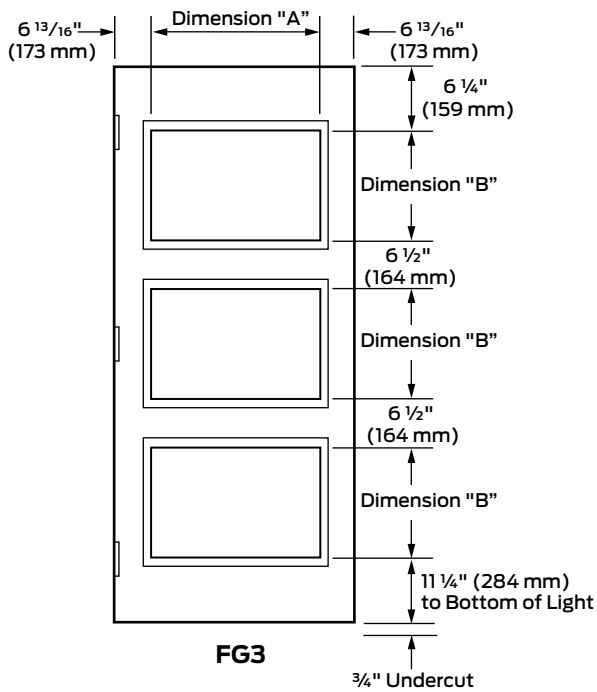
**Note:** EGS = Exposed Glass Size  
GCS = Glass Cutting Size  
DCS = Door Cutout Size

### Glazing details



**Note:** For fire rated applications using ceramic type glazing, consult the glass manufacturer's glazing instructions for glass, caulking and/or glazing tape requirements. Details will vary as required by glazing selections.

### Full glass with multiple lights: FG3



\* Dimensions shown are to Exposed Glass Size

#### Full glass (FG3) door lights

Designation for a door with three (3) glass lights each separated by an integral rail. Glass sizes will vary with the size of the door.

#### Glazing bead system

1/4" (6 mm) thick glass lights are available as standard with the Steelcraft Designer® trim system.

1/2" (13 mm) thick insulated glass lights, are available as an option with the Steelcraft Designer® trim system for insulated glass.

Insulated glass lights thicker than 1/2" (13 mm) are available as an option with specially designed overlapping steel trim.

Flush mounted steel trim not available on 14GA doors.

Reinforcement Channels are used in all Full glass applications.

#### Ordering nomenclature

The door ordering nomenclature is suffixed with the letter: **FG3**.

#### Door series available

Full Glass FG3 kits are available for the following door series in all of their standard options and gauges: A14 Series.

#### Special size doors

Special glass sizes are available; however, A14 vertical stiles are always fixed at 6 13/16" wide regardless of the glass size.

The following critical dimension apply to A14 Series FG3 designs with multiple lights, based on typical door sizes (special sizes available). \*Check your acknowledgement for the recommended GCS (glass cutting size) as certain hinges and other hardware options can affect sizes.

#### Window widths

	Door widths (Dim "A")										
	2' 0"	2' 4"	2' 6"	2' 8"	2' 10"	3' 0"	3' 4"	3' 6"	3' 8"	3' 10"	4' 0"
EGS	10 3/16"	14 3/16"	16 3/16"	18 3/16"	20 3/16"	22 3/16"	26 3/16"	28 3/16"	30 3/16"	32 3/16"	34 3/16"
GCS	11 7/16"	15 7/16"	17 7/16"	19 7/16"	21 7/16"	23 7/16"	27 7/16"	29 7/16"	31 7/16"	33 7/16"	35 7/16"
DCS	11 25/32"	15 25/32"	17 25/32"	19 25/32"	21 25/32"	23 25/32"	27 25/32"	29 25/32"	31 25/32"	33 25/32"	35 25/32"

#### Window heights

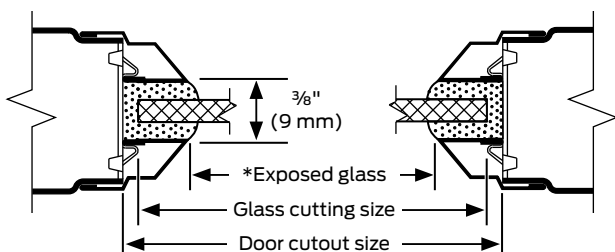
	Door heights (Dim "B")			
	6' 8"	7' 0"	7' 2"	8' 0"
EGS	16 3/32"	17 7/16"	18 3/32"	21 7/16"
GCS	17 5/16"	18 11/16"	19 5/16"	22 11/16"
DCS	17 11/16"	19 1/32"	19 11/16"	23 1/32"

**Note:** EGS = Exposed Glass Size

GCS = Glass Cutting Size

DCS = Door Cutout Size

#### Glazing details



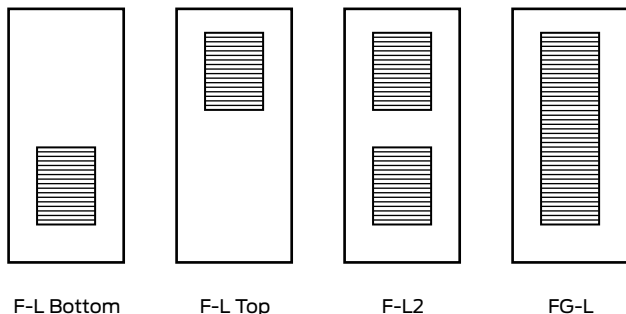
**Note:** For fire rated applications using ceramic type glazing, consult the glass manufacturer's glazing instructions for glass, caulking and/or glazing tape requirements. Details will vary as required by glazing selections.

## Louver prep

### Louver prep: -L

L, SL, B, A14, and H Series doors

#### Optional details



#### Louver (-L) door prep

Designation for a door with one (1) or two (2) louver cutouts with or without installed reinforcement channels.

Welded-in reinforcement channels are used on labeled applications or when specified on an order.

Louver provided by others.

#### Ordering nomenclature

The door ordering nomenclature is suffixed with the letter: **-L**.

#### Special size doors

Standard policy for special size doors is the next smaller.

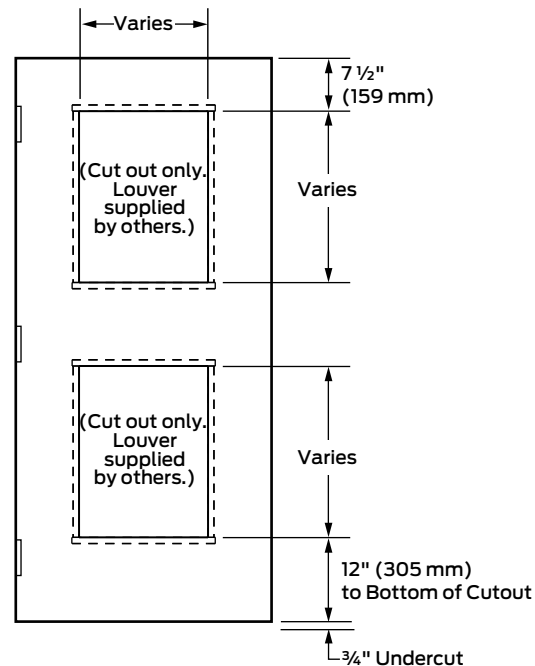
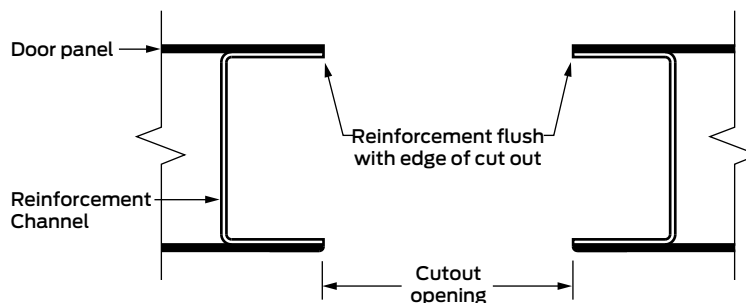
#### Cutouts available

Standard policy for special size doors is the next smaller.

#### Labeled louvers

See Fire rated section for approvals. Channels are used on all labeled door.

#### Reinforcement channels



#### Door series available

Louver cutouts are available for the following door series in all of their standard options and gauges: L, SL, B, A14, and H Series.

Full louver cutouts with channels available in A14 Series doors only. Louvers are not available on CE, T, or PW Series.

**Note:** For fire rated applications using ceramic type glazing, consult the louver manufacturer's glazing instructions for louver, caulking and/or glazing tape requirements. Details will vary as required by glazing selections.

This page intentionally left blank.

# Elevations

General information.....	166
General frame information.....	166
Usage and application .....	166
Installation .....	166
Introduction.....	167
General elevations information .....	167
Typical elevations .....	168
Architectural sticks .....	169
End Jamb: Right or left hand.....	171
Intermediate mullions: Right or left hand.....	171
Intermediate mullions: Right or left hand .....	172
10' 6" Square end cut corner post .....	173
12' 1" Weld-in and snap-in filler plates.....	173
12' 1" Head or sill sections .....	174
Flush and Recessed sill sections .....	174
Partial sidelight mullion.....	175
Screw-in glazing beads.....	175
Typical elevations.....	176
Elevation 1: Transom and side panel or light assemblies	176
Elevation 2: Partial side panel or light assemblies .....	177
Field joint/splice details: Typical details.....	178
Field joint/splice details: Corridor and room enclosures	179
Transom panels without transom bars.....	180
Splicing head and jamb sections.....	182
Installation details .....	183
Jamb anchor applications.....	183
Base anchor applications .....	184

## General information



### General frame information

The Steelcraft Architectural Stick Systems are designed to fit virtually all construction requirements for commercial building applications. These frame assemblies are fabricated (cut and welded) from various framing components, to meet a wide range of architectural requirements based on aesthetics, functionality, and durability. These frames and their components are specifically designed to meet the high usage levels of all commercial and institutional buildings.

This section of the manual is designed to give an overview of the flexibility available in the Steelcraft Architectural Stick Systems. For maximum flexibility and functionality, the perimeter framing (open sections which attach to the wall systems) is available in several frame series. Anchorage to the wall and floor may vary from the details shown in the applicable frame Specification Sheets.

The Steelcraft Architectural Stick Systems are available in the following frame series:

- **Flush Frames (F and FN Series):** Available as transom light/panel, side light/panel, transom and side light/panel, borrowed lights and frames with corner enclosures.
- **Drywall Frame (DW and K Series):** Available only as borrowed lights. These frames are KD (knock down).
- **Multi-Use Frames (MU Series):** Available as transom light/panel, side light/panel, transom and side light/panel, borrowed lights and entrance frames with corner enclosures.

### Usage and application

To help simplify the use, selection and specification of Steelcraft framing systems, the following guidelines for base material selection can be used:

**Material gauge:** the following base material thickness are available:

- **16 gauge (1.3 mm):** for Heavy Commercial and Institutional applications with high usage.
- **14 gauge (1.7 mm):** for Extra-heavy Commercial and Institutional applications with potential of extremely high usage.

**Material selection:** in addition to the thickness of base material, the following base material types of metal are available:

- **Cold Rolled Steel (CRS)** conforming to ASTM A1008 and ASTM A568 recommended for interior opening with normal humidity exposure.
- **Hot-Dip Galvannealed Steel** conforming to ASTM A924 and ASTM A653 recommended for exterior opening or interior openings with high humidity.

### Installation

Installation of all Steelcraft Framing Systems shall conform to the published Steelcraft installation instructions, SDI 105 *Recommended Installation Instructions for Steel Frames*. All fire rated frames must be installed in accordance with NFPA Pamphlet 80, and/or the local *Authority Having Jurisdiction*.

Glaze and seal all exterior elevations, or interior elevations subjected to high humidity exposure, in accordance with HMMA's Tech Note (HMMA820-TN03-07). Guidelines for Glazing Hollow Metal Transoms, Sidelights, and Windows.

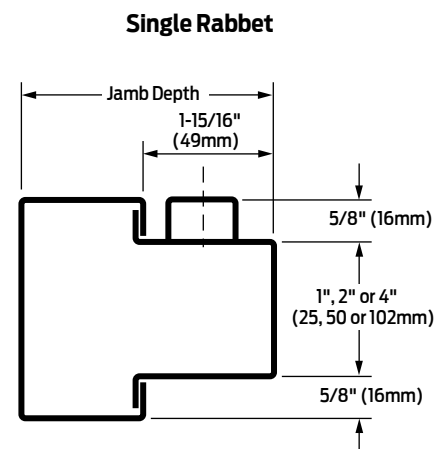
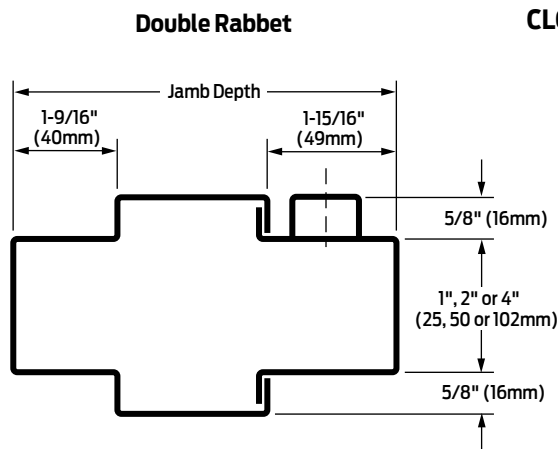
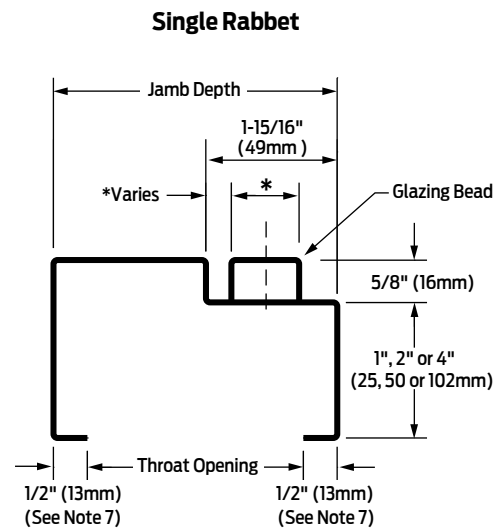
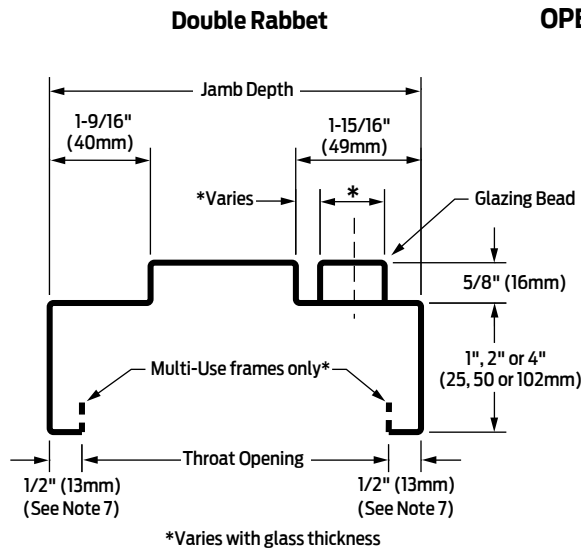
## Introduction

"Stick Sections", which are lengths of component frame material, are used to produce transom, transom & sidelight, sidelight and borrowed lights. The components are cut to length, notched and/or mitered, assembled and welded into an assembly to meet the requirements and specifications of the opening. The individual sections and the welded assembly can be fabricated at the factory or at the distributor's fabrication shop.

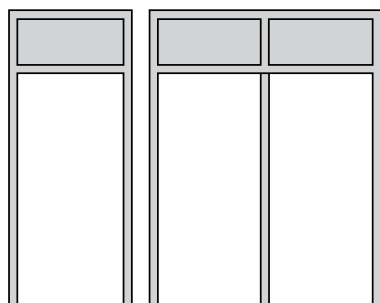
This publication is designed to show the assembly flexibility, and the components along with general cutting and assembly details. Other details include methods of splicing (for a frame when it exceeds shipping limitations), and other miscellaneous details.

## General elevations information

1. Standard components are either open (anchoring into the wall), or closed (mullions and dividers) sections.
  2. Components are available in 16 and 14 gauge non-galvannealed or optional galvannealed steel (except as noted otherwise).
  3. Components are available as either single or double rabbet. For the purpose of simplicity, all details are shown as double rabbeted.
  4. Hardware preparations and reinforcements are in accordance with ANSI A250.6. Locations are in accordance with ANSI/DHI A115.
1. All sill sections (members attached to the floor) are recommended to be galvannealed steel.
  2. Closed sections are shown for 3 3/4" (95 mm) jamb depth. 3" (76 mm) jamb depth section has two-piece.
  3. All frame open sections have standard 1/2" returns except MU Series and 5 3/4" jamb depth which have 7/16" returns.

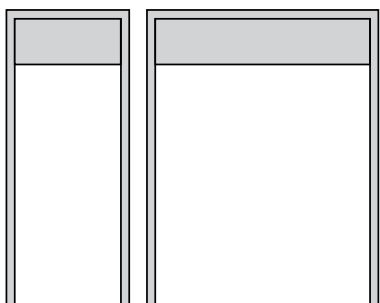


## Typical elevations



### Transom frames

Door frame having a transom bar and glass, panel or louver above the door opening. The transom bar separates the door opening from the transom opening. The frame height will vary but normally extends to the ceiling above.



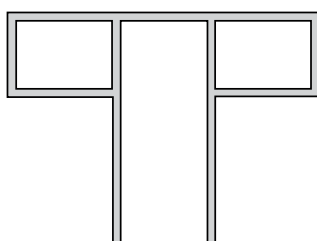
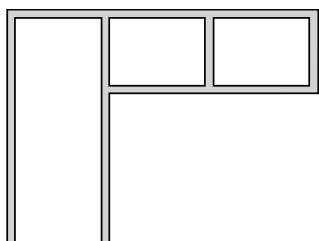
### Ceiling height frame

Door frame without a transom bar and a panel mounted above the door. The panel is normally the same thickness and material as the door. The frame height will vary but normally extends to the ceiling.



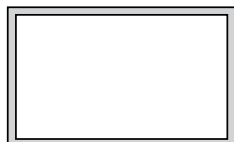
### Transom sidelight frame

Door frame with transom bars and mullions dividing the entire frame into door and glass or panel openings. The frame height will vary but normally extends to the ceiling above.



### Sidelight frame

Door frame with glass openings attached to one or both sides of the door opening. The sidelight portion can be partial height of the door opening or extend the entire height of the door. The frame is only the door height. If the frame is greater than the door height the frame is defined as a transom sidelight frame.



### Borrowed light

Four-sided frame without a door opening, prepared for glass installation in the field. The borrowed light can be designed for one or multiple pieces of glass. The frame can be located in the wall off the floor or sit on the floor and extend to the ceiling above.













































## Architectural sticks
































### TSF parts list





































Sticks are frame components used by the distributor to produce transom, transom/sidelight, sidelight and borrowed light frames. The components are cut to length, notched or mitered, assembled and welded into an assembly by the distributor to meet the requirements of the opening.







Sticks are commonly identified as TSF (Transom Sidelight Frame) sections. Each component has a unique TSF number that identifies it from another section. The frame jamb depth and gauge of steel are also used in the identification and ordering since the TSF number is only a basic identification number.

Stick components are available in 12' 1" (open sections), 10' 6" (closed sections) lengths and pre-sized lengths for 6' 8", 7' 0", 7' 2" and 8' 0" door heights. Sections can be blank (no cutouts), have strike or hinge preps to match doors and other three sided frames. See the exact TSF number for the hardware prep that is included.

Single rabbet	Double rabbet	Part no.	Description	Page no.
		TSF-6	6' 8" Double Hinge Mullion	
		TSF-7	6' 8" Double Strike Mullion	
		TSF-8 R/L	6' 8" Hinge & Strike Mullion	
		TSF-9 R/L	6' 8" Single Hinge Mullion	
		TSF-10 R/L	6' 8" Single Strike Mullion	
		TSF-11	7' 0" Double Hinge Mullion	
		TSF-12	7' 0" Double Strike Mullion	
		TSF-13 R/L	7' 0" Hinge & Strike Mullion	
		TSF-14 R/L	7' 0" Single Hinge Mullion	
		TSF-15 R/L	7' 0" Single Strike Mullion	
		TSF-16	Blank Mullion 2" Face 10' 6"	
		TSF-20	7' 0" Blank Mullion	
		TSF-21	Head or Sill 2" Face 12' 1"	
		TSF-22	Filler with 5/8" Stop 12' 1"	
		TSF-23	Head or Sill 4" Face 12' 1"	
		TSF-24 R/L	6' 8" End Hinge Jamb 12' 1"	
		TSF-25 R/L	7' 0" End Hinge Jamb 12' 1"	
		TSF-26 R/L	End Strike Jamb 12' 1" (All heights)	
		TSF-27 R/L	Filler without Stop 12' 1"	
		TSF-32 R/L	7' 2" Double Hinge Mullion	
		TSF-33	7' 2" Double Strike Mullion	

Single rabbet	Double rabbet	Part no.	Description	Page no.
		TSF-34 R/L	7' 2" Hinge & Strike Mullion	
		TSF-35 R/L	7' 2" Single Hinge Mullion	
		TSF-36 R/L	7' 2" Single Strike Mullion	
		TSF-39 R/L	7' 2" End Hinge Jamb 12' 1"	
		TSF-40	Cased Open Section 12' 1"	
		TSF-41 R/L	Single Strike Mullion 10' 6" (All heights)	
		TSF-42 R/L	6' 8" Single Hinge Mullion 10' 6"	
		TSF-43 R/L	7' 0" Single Hinge Mullion 10' 6"	
		TSF-44 R/L	7' 2" Single Hinge Mullion 10' 6"	
		TSF-44 R/L	6' 8" Hinge & Strike Mullion 10' 6"	
		TSF-46 R/L	7' 0" Hinge & Strike Mullion 10' 6"	
		TSF-47 R/L	7' 2" Hinge & Strike Mullion 10' 6"	
n/a		TSF-51	2 Way Corner Post Outside 10' 6"	
n/a		TSF-52	2 Way Corner Post Outside 10' 6"	
n/a		TSF-53	3 Way Corner Post Outside 10' 6"	
n/a		TSF-54	3 Way Corner Post Outside 10' 6"	
See TSF 93		TSF-56	6' 8" Removable Mullion Double Strike	
See TSF-93		TSF-57	7' 0" Removable Mullion Double Strike	
See TSF-96		TSF-58	7' 2" Removable Mullion Double Strike	

Single rabbet	Double rabbet	Part no.	Description	Page no.
See TSF-98		TSF-59	8' 0" Removable Mullion Double Strike	
		TSF-80	8' 0" Double Hinge Mullion	
		TSF-81	8' 0" Double Strike Mullion	
		TSF-82 R/L	8' 0" Hinge & Strike Mullion	
		TSF-83 R/L	8' 0" Single Hinge Mullion	
		TSF-84 R/L	8' 0" Single Strike Mullion	
		TSF-85 R/L	8' 0" End Hinge Jamb 10' 6"	
		TSF-86	8' 0" Blank Mullion	
		TSF-87 R/L	8' 0" Single Hinge Mullion 10' 6"	
		TSF-88 R/L	8' 0" Hinge & Strike Mullion 10' 6"	
n/a		TSF-89	Snap-in Filler with 5/8" Stop 12' 1"	
	See TSF-56	TSF-93	6' 8" Removable Mullion Double Strike	
	See TSF-6	TSF-94	7' 0" Removable Mullion Double Strike	
n/a		TSF-95	MU Filler Plate 5/8" Stop 12' 1"	
	See TSF-58	TSF-96	7' 2" Removable Mullion Double Strike	
	See TSF-59	TSF-98	8' 0" Removable Mullion Double Strike	
		TSF-99	Blank Mullion 4" Face 10' 6"	
n/a		TSF-102	Un-assembled Transom Bar Side A 1 9/16" 10' 6"	
n/a		TSF-103	Un-assembled Transom Bar Side B 1 15/16" 10' 6"	
		TSF-104	Flush Sill Section Galvannealed 8 1/8" High 12' 1"	
		TSF-105	Flush Sill Section Galvannealed 6 1/8" High 12' 1"	
		TSF-106	Flush Sill Section Galvannealed 16 1/8" High 12' 1"	
	n/a	TSF-107	Recessed Sill Galvannealed 8 8" Face x 1 16" Deep 12' 1"	

Single rabbet	Double rabbet	Part no.	Description	Page no.
n/a		TSF-108	Recessed Sill Galvannealed 8 1/8" Face x 1 15/16" Deep 12' 1"	
n/a		TSF-132 R/L	Blank Partial Sidelite Mullion 40" Notch 10' 6"	
n/a		TSF-133 R/L	Single Strike Partial Sidelite Mullion with 40" Notch 10' 6"	
n/a		TSF-134 R/L	Blank Partial Sidelite Mullion 40" Notch 7' 0"	
n/a		TSF-135	Single Strike Partial Sidelite Mullion with 40" Notch 7' 0"	
		3GB0080P012	Screw-in Glazing Bead 5/8" x 10' 0"	

## End Jambs: Right or left hand

**Description:** 12' 1" open frame section with square end cutoff.

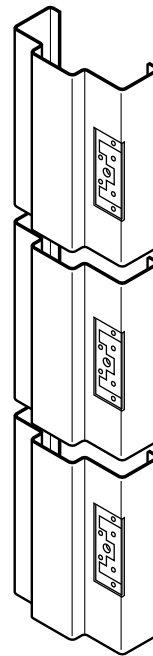
**Nomenclature:**

Description	Nominal Door Size	TSF No.
End Hinge Jamb 12' 1"	6' 8"	TSF-24
	7' 0"	TSF-25
	7' 2"	TSF-39
	8' 0"	TSF-85
End Strike Jamb 12' 1" ASA Not shown	6' 8"	TSF-26
	7' 0"	
	7' 2"	
	8' 0"	

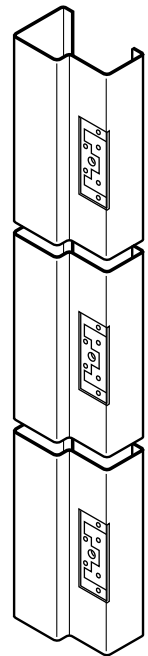
### Notes:

- Specify right or left hand when ordering.
- Not available with transom bar notch.

End Hinge Jamb shown



Double Rabbet



Single Rabbet

## Intermediate mullions: Right or left hand

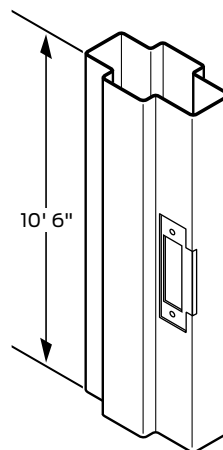
**Description:** 10' 6" closed frame section with square end cutoff.

**Nomenclature:**

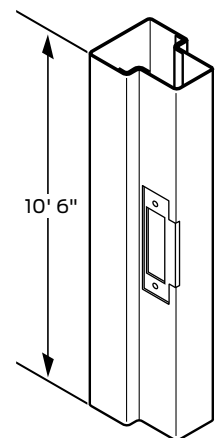
Description	Nominal Door Size	TSF No.
Single Strike Mullion. ASA Strike prepped on one (1) rabbet. Opposite rabbet blank.	6' 8"	TSF-41
	7' 0"	
	7' 2"	
	8' 0"	
Single Hinge Mullion Hinges prepped on one (1) rabbet. Opposite rabbet blank	6' 8"	TSF-42
	7' 0"	TSF-43
	7' 2"	TSF-44
	8' 0"	TSF-87
Hinges prepped on one (1) rabbet. ASA Strike prepped on opposite rabbet.	6' 8"	TSF-45
	7' 0"	TSF-46
	7' 2"	TSF-47
	8' 0"	TSF-88

**Notes:** Specify right or left hand when ordering.

Single Strike Mullion shown



Double Rabbet



Single Rabbet

### Intermediate mullions: Right or left hand

Intermediate mullions are sized to the specified nominal door height and notched for the frame head stop.

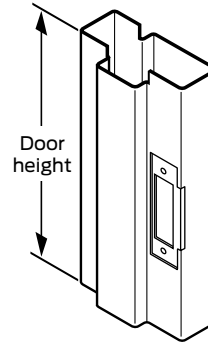
**Description:** Closed frame section with notched end cutoff, cut to door height shown.

#### Nomenclature:

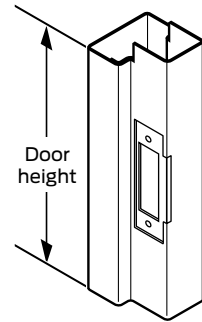
Description	Size	TSF No.
Double Strike Mullion ASA Strikes prepped on both rabbet	6' 8"	TSF-6
	7' 0"	TSF-11
	7' 2"	TSF-32
	8' 0"	TSF-80
Double Hinge Mullion Hinges prepped on both rabbet	6' 8"	TSF-7
	7' 0"	TSF-12
	7' 2"	TSF-33
	8' 0"	TSF-81
Single Hinge Mullion Hinges prepped on one (1) rabbet. Opposite rabbet blank.	6' 8"	TSF-9
	7' 0"	TSF-14
	7' 2"	TSF-35
	8' 0"	TSF-83
Single Strike Mullion ASA Strike prepped on one (1) rabbet. Opposite rabbet blank.	6' 8"	TSF-10
	7' 0"	TSF-15
	7' 2"	TSF-36
	8' 0"	TSF-84
Hinges prepped on one (1) rabbet. ASA Strike prepped on opposite rabbet.	6' 8"	TSF-8
	7' 0"	TSF-13
	7' 2"	TSF-34
	8' 0"	TSF-82
Blank Mullion No hardware preps	7' 0"	TSF-20
	8' 0"	TSF-86

**Notes:** Specify right or left hand when ordering.

#### Double Strike Mullion shown



Double Rabbet



Single Rabbet

### Removable mullion

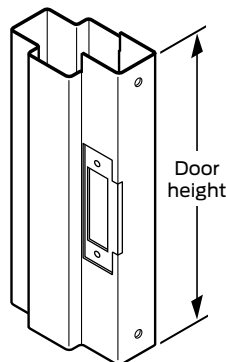
**Description:** Closed frame section with double strike and with ends notched for installation into frame with mounting clips.

#### Nomenclature:

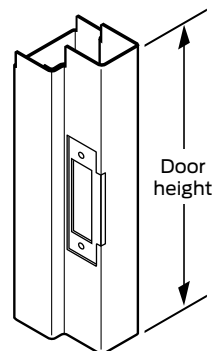
Description	Size	TSF No.
Double Rabbet Mullion ASA	6' 8"	TSF-56
	7' 0"	TSF-57
	7' 2"	TSF-58
	8' 0"	TSF-59
Single Rabbet Mullion ASA	6' 8"	TSF-93
	7' 0"	TSF-94
	7' 2"	TSF-96
	8' 0"	TSF-98

#### Notes:

1. See Parts Price List to order mounting clips.
2. Single rabbet mullions can be used with double rabbet frames.
3. Refer to page 197 for installation details.



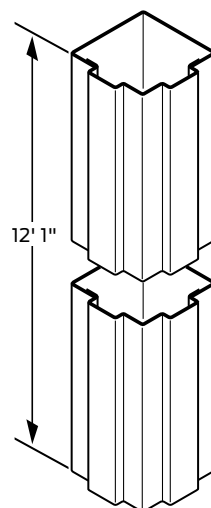
Double Rabbet



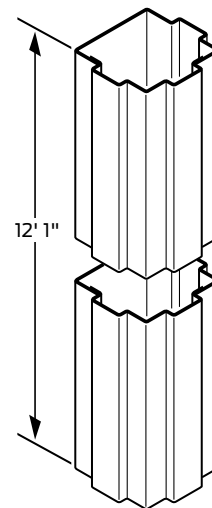
Single Rabbet

**10' 6" Square end cut corner post****Description:** Corner post with square end cutoff**Nomenclature:**

Description	Size	TSF No.
2 Way Corner Post		
1 5/16" Outside Rabbet	10' 6"	TSF-51
1 15/16" Outside Rabbet	10' 6"	TSF-52
3 Way Corner Post		
1 5/16" Outside Rabbet	10' 6"	TSF-53
1 15/16" Outside Rabbet	10' 6"	TSF-54



2-Way Corner Closure



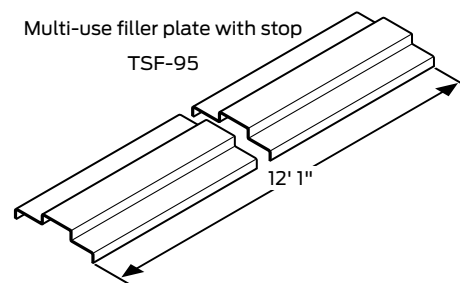
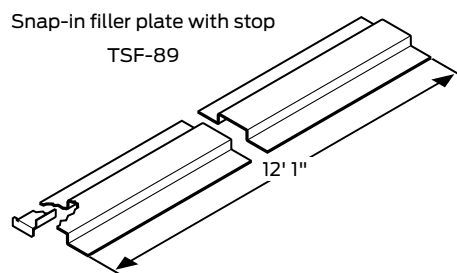
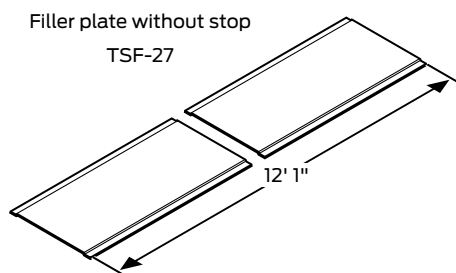
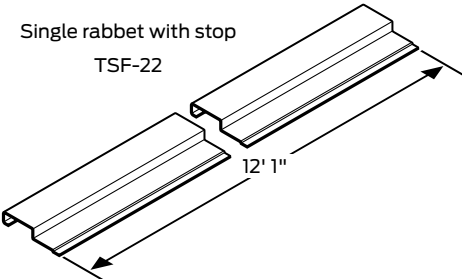
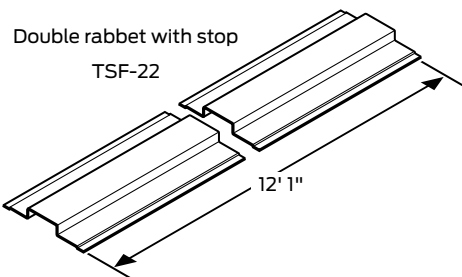
3-Way Corner Closure

**12' 1" Weld-in and snap-in filler plates****Description:** filler plate for use in open sections with square end cutoff.**Nomenclature:**

Description	Size	TSF No.
For F Series frames with 5/8" Stop	12' 1"	TSF-22
For F Series frames without Stop	12' 1"	TSF-27
For F Series frames, snap-in with 5/8" Stop	12' 1"	TSF-89
For MU Series frames with 5/8" Stop	12' 1"	TSF-95

**Notes:**

1. TSF-22, 27 and 95 are designed to be welded into throat opening of frame section.
2. TSF-89 snaps into the throat opening of the F Series frame.
3. See Parts Price List for additional snap-in filler clips.



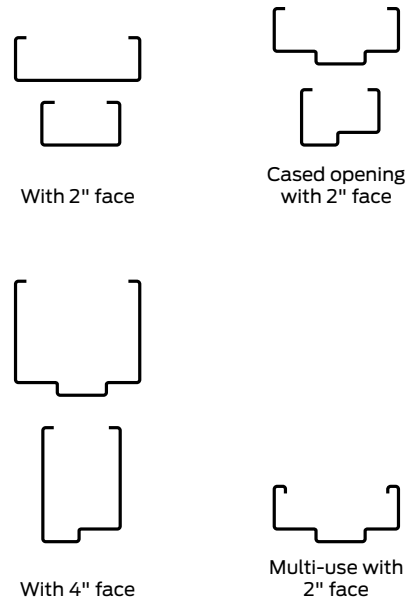
## 12' 1" Head or sill sections

**Description:** open frame section with square end cutoff.

**Nomenclature:**

Description	Size	TSF No.
Rabbetted F section 2" Face	12' 1"	TSF-21
Rabbetted F section 4" Face	12' 1"	TSF-23
Cased Open F section 2" Face	12' 1"	TSF-40
Rabbetted MU section 2" Face	12' 1"	TSF-21

**Notes:** F Series rabbetted and cased open sections are available with 1" face.



## Flush and Recessed sill sections

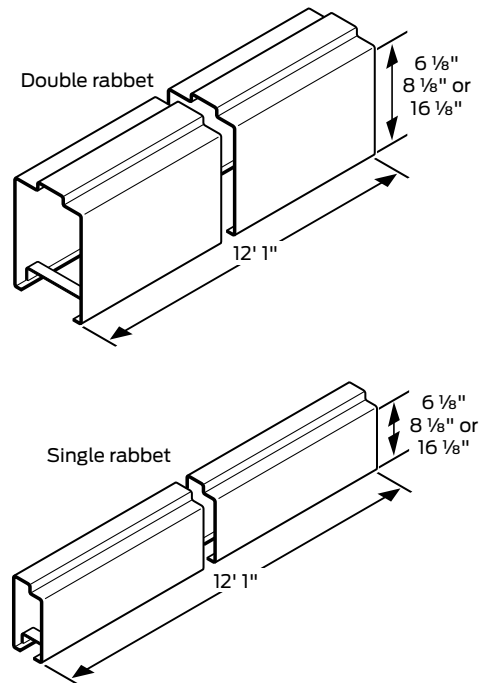
**Description:** open frame section with square end cutoff.

**Nomenclature:**

Description	Size	TSF No.
<b>Double Rabbet</b>		
6 1/8" Face	12' 1"	TSF-105
8 1/8" Face	12' 1"	TSF-104
16 1/8" Face	12' 1"	TSF-106
<b>Single Rabbet Sill</b>		
8 1/8" Face x 1 15/16" Deep	12' 1"	TSF-108

**Notes:**

1. Sill sections are galvanized as standard.
2. Sill sections anchors are recommended for flush sill when length exceeds 5' 0".



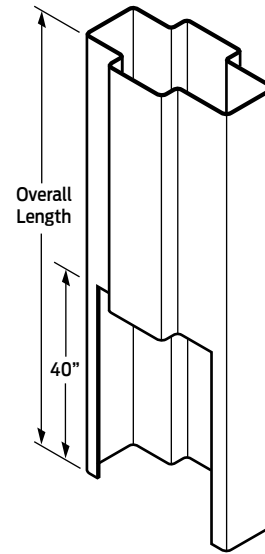
## Partial sidelight mullion

### Partial sidelight mullion: Right and left hand

**Description:** Closed frame section with a 40" notch in the bottom, forming an open section with the proper throat opening. End cutoff as noted below. See chart for lengths available.

#### Nomenclature:

Description	TSF No.	Overall Length	End cutoff
<b>Blank mullions</b>			
Stick length	TSF-132	126"	Square
7' 0" mullion	TSF-134	84"	Notched
<b>Strike mullions</b>			
Stick length w / ASA	TSF-133	126"	Square
7' 0" mullion w / ASA	TSF-135	84"	Notched
<b>Hinge mullions</b>			
6' 8" Hinge mullion	TSF-138	80"	Notched
7' 0" Hinge mullion	TSF-139	84"	Notched
Stick length w/ 6' 8"	TSF-140	126"	Square spacing
Stick length w/ 7' 0"	TSF-141	126"	Square spacing



## Screw-in glazing beads

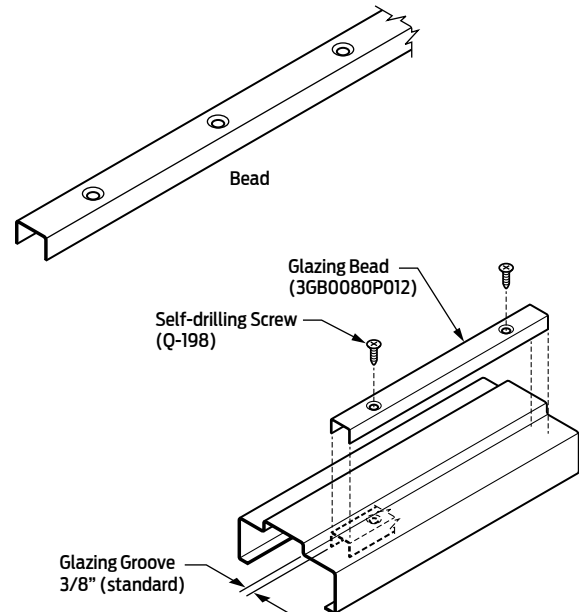
### Screw-in Bead

**Description:** 1" wide x 5/8" high x 10' 0" long. 18 gauge galvanized glazing bead with square end cutoff. Beads are dimpled for, and supplied with #8 x 1 1/4" oval head self drilling screws.

**Nomenclature:** 3GB0080P012

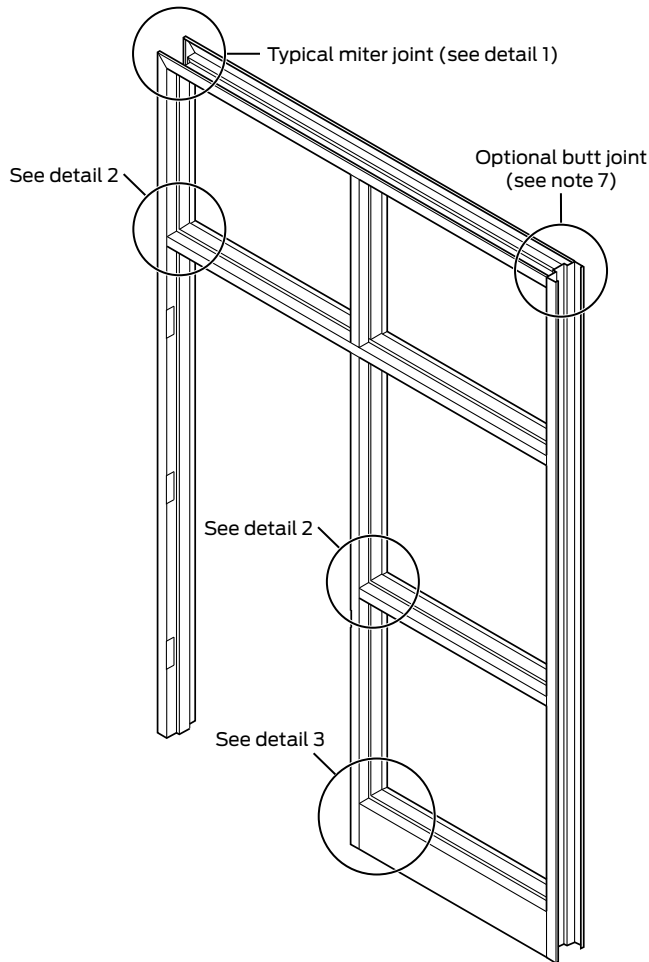
#### Standard Bead Installation

1. Cut glazing bead to length required (Note: horizontal glazing beads run the full width of the openings and vertical glazing beads stop when they meet the horizontal beads).
2. Locate the bead from the stop as required. The normal location for 1/4" glass is 3/8".
3. Using the glazing bead as a template, install screws through the pre-punched holes as required.
  - If an automatic screw gun driver is being used, the screws will drill the necessary hole in the frame section.
  - If an automatic screw gun driver is not being used, drill a .149" diameter hole (number 25 drill) in the frame and install the screws.

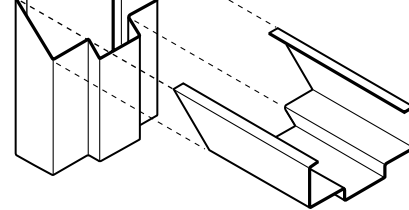


# Typical elevations

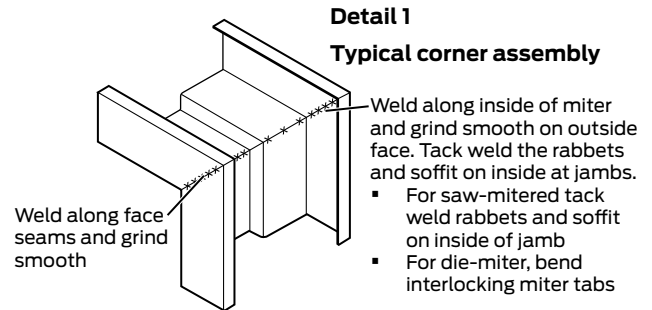
## Elevation 1: Transom and side panel or light assemblies



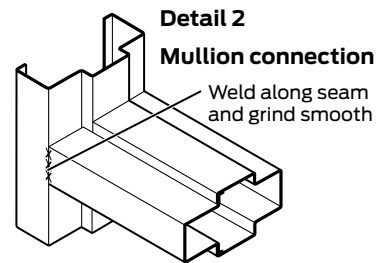
**Saw miter (shown)  
(die miter similar)**



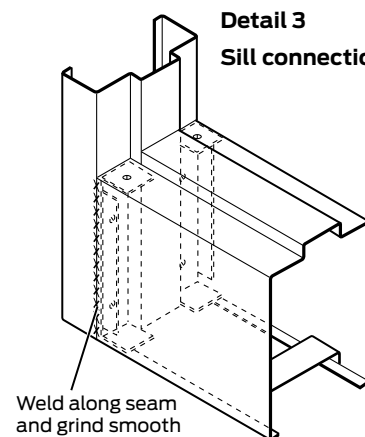
**Detail 1  
Typical corner assembly**



**Detail 2  
Mullion connection**



**Detail 3  
Sill connection**



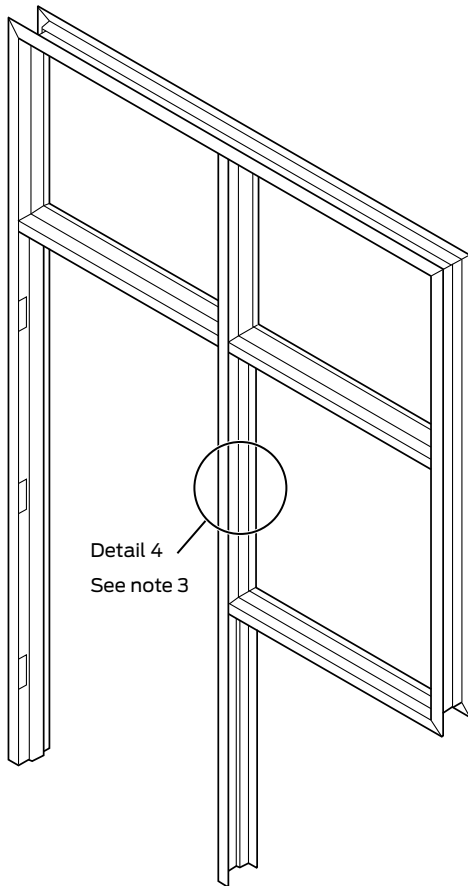
### Notes:

Transom and Side Panel/Light Assemblies are supplied in a multitude of elevation designs and sizes. The elevation and related details shown above are for reference.

- The most common elevations used are with lights (windows). Glass can be of varying thickness which must be specified.
- Perimeter jambs and head can be supplied either factory die mitered or saw mitered. Corner connections are usually supplied as welded (SUA).
- Removable transom bars** (above the door opening) can be supplied (when specified), to allow for passage of large equipment or objects through the door opening. If required, this feature must be specified, and the unit above the door would be a panel and not a light (glass).
- Transom panels** (above the door) are the same thickness as the door, and can be supplied (when specified) as:
  - With Transom Bar (fixed or removable) as shown above.
  - Without the Transom Bar (fixed or removable) for aesthetics or functionality.
- Removable mullions** (separating double doors) can be supplied (when specified), to allow for passage of large equipment or objects through the door opening.
- All joints between meeting frame members are to be welded and finished in accordance with ANSI A250.8-2014 (SDI 100).
- If end jambs are specified as butt welded, frame must be installed in butted wall applications. Additional field notching by others will be required if the frame is installed in wrap wall applications.



## Elevation 2: Partial side panel or light assemblies

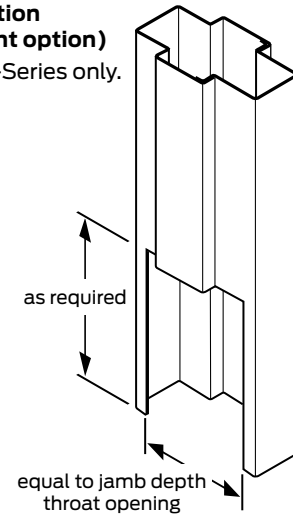


### Notes:

Partial Side Light Assemblies are supplied in a multitude of elevation designs and sizes. The elevation and related details shown above are for reference.

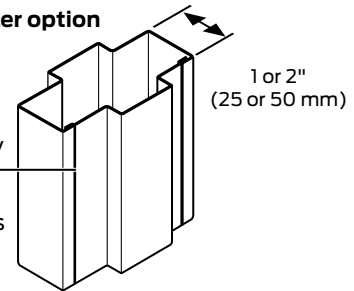
1. All notes shown on the previous page also apply to this type of elevation.
2. Since the side lights do not extend the full height of the mullion (which separate the door and transom area), care must be taken in fabricating the assembly.
3. Vertical mullions (separating the door and transom areas) must include provisions for glazing the sidelight unit, and can be accomplished in different ways:
  - **Closed section:** this section offers the best appearance, but must be supplied with an open frame throat to accommodate the wall construction below the side light. Available in F and FN Series only. See detail 4.
  - **Throat opening filler plate:** can be installed, welded and finished to provide a closed section in the partial sidelight area of the elevation. See detail 5.
  - **Double frame sections:** can be utilized. For these elevations, the door frame and sidelight are one unit, but there is a visible seam separating the units. See detail 6.

**Detail 4 - Closed section (with partial side light option)**  
Available in F and FN-Series only.



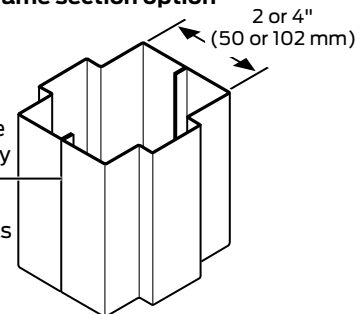
**Detail 5 - Throat filler option**

Tack weld along the seam approximately 8" (203 mm) on center and grind smooth. Fill seam as required with filler and grind smooth.

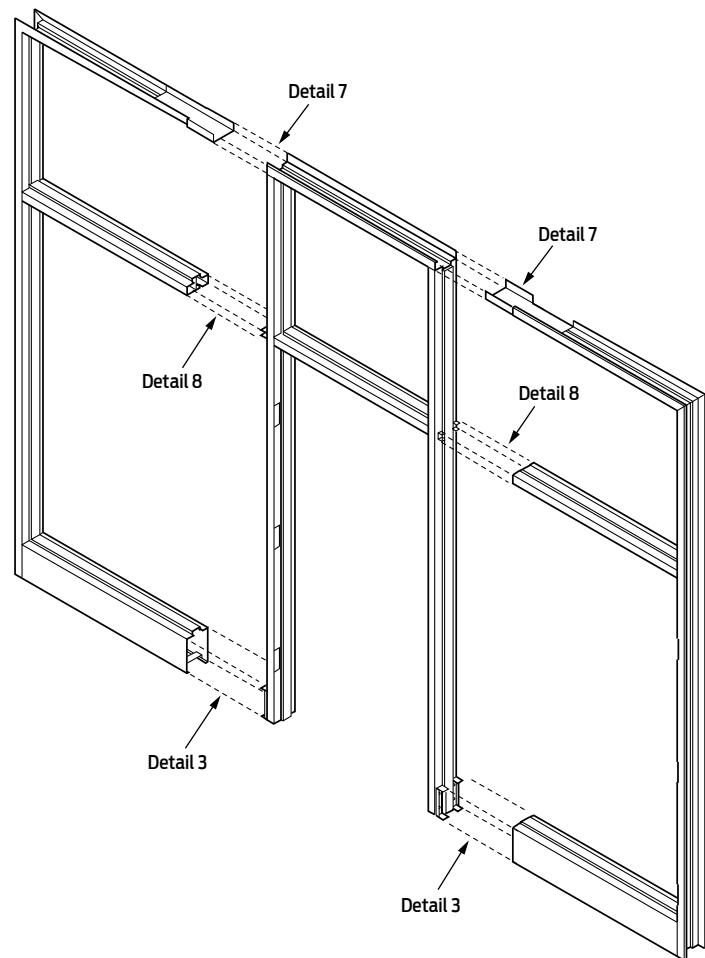
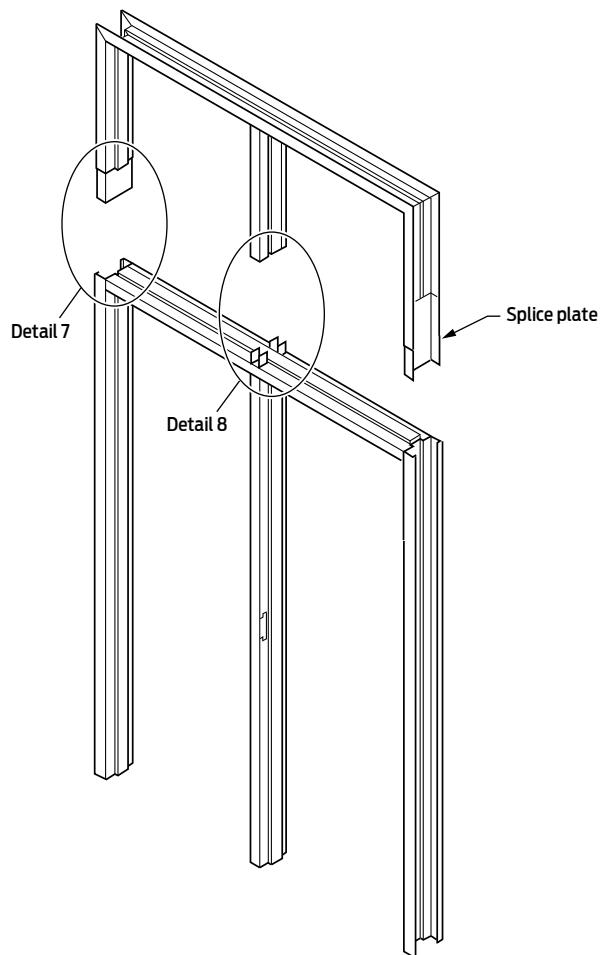


**Detail 6 - Double frame section option**

Tack weld along the seam approximately 8" (203 mm) on center and grind smooth. Fill seam as required with filler and grind smooth.



## Field joint/splice details: Typical details



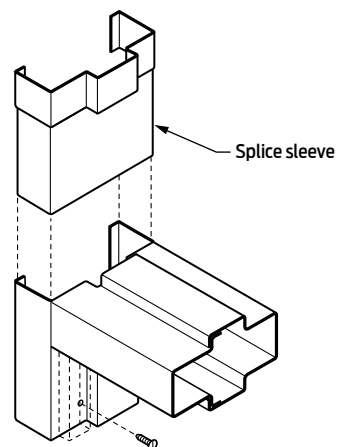
### Notes:

Field joint/splices of elevations are required when the assembly is too large to be fabricated in one piece. Some of the reasons for this practice are as follows:

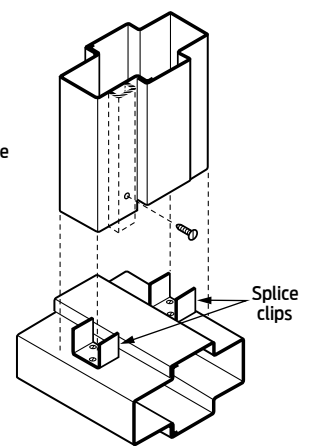
1. Transportation limitations
2. Handling issues related to either the job site or during fabrication
3. Installation limitations

## FIELD JOINT/SPLICE DETAILS

**Detail 7**  
End Jamb Connection



**Detail 8**  
Mullion Connection

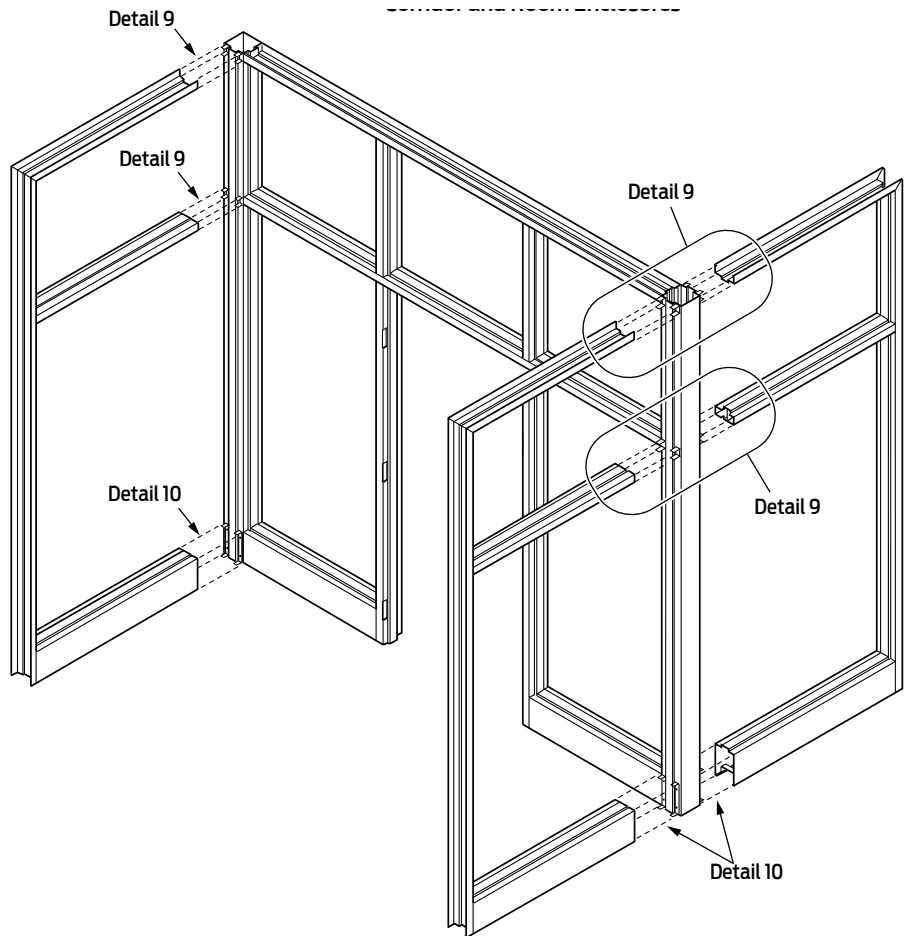


## Field joint/splice details: Corridor and room enclosures

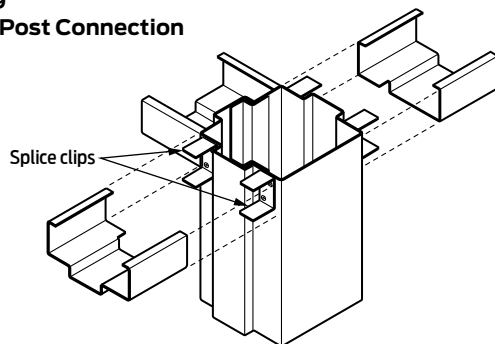
### Notes:

Corridor and room enclosures are accomplished with the use of "corner posts" (a frame stick component), and field joint/splices. The following notes apply.

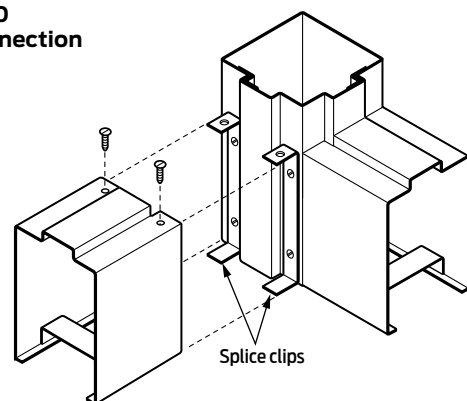
1. All notes shown on the previous pages also apply to this type of elevation.
2. Corner posts are specially designed stick sections that allow for the connection of two Transom and Sidelight Elevations to be field joined to make a corner.
3. At this time, corner connections are not Fire Rated applications.



**Detail 9**  
**Corner Post Connection**



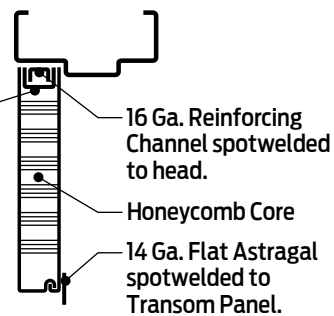
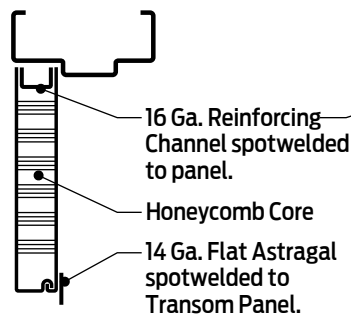
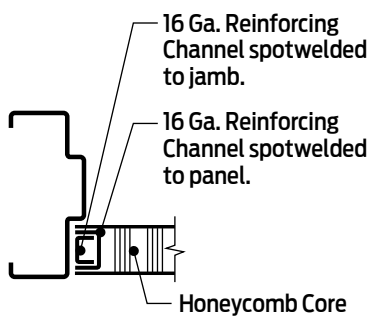
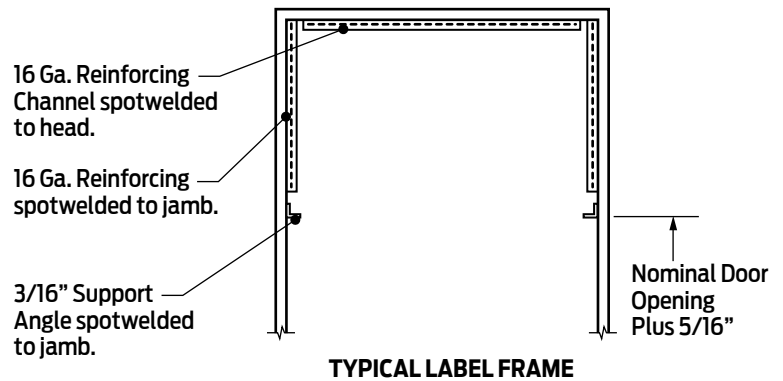
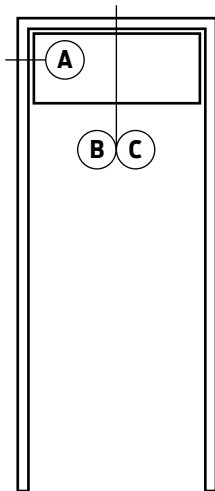
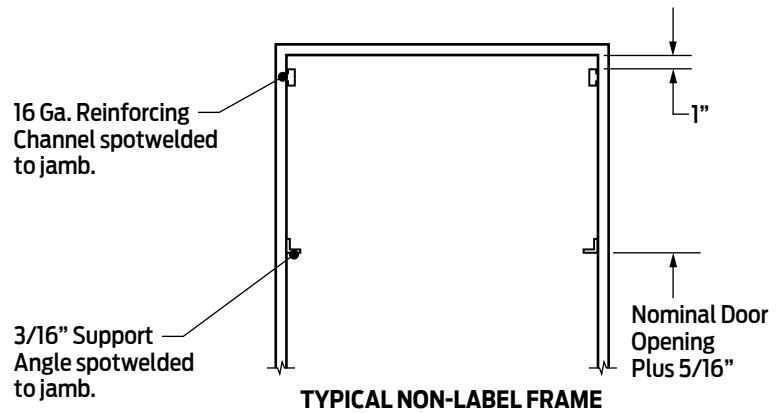
**Detail 10**  
**Sill Connection**



## Transom panels without transom bars

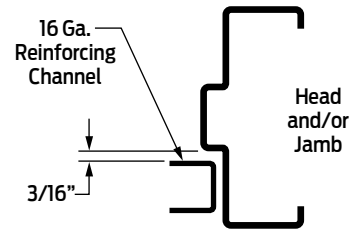
### Notes:

1. Transom panels are shipped loose for installation by others. Screws for attachment are supplied by Steelcraft.
2. Transom panels are phosphatized and finished with one coat of baked-on primer.
3. Transom panels are individually wrapped in corrugated cardboard with wood stripping on vertical edges of package together with metal banding.
4. Labeled panels are available in L18 door type only. For fire ratings and size limitations, see the section of this manual.



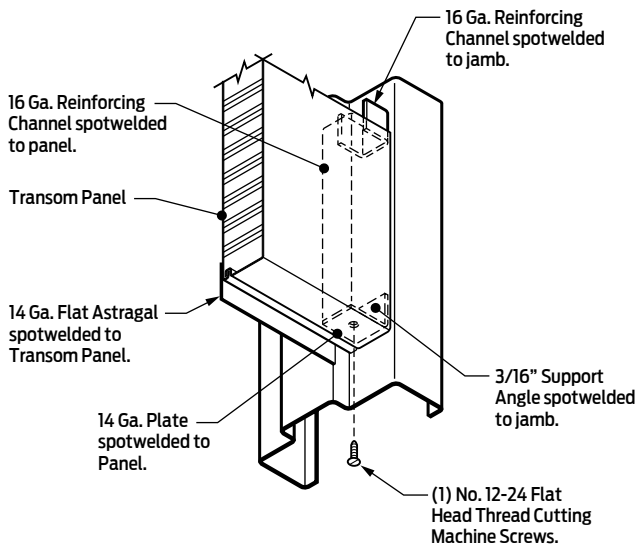
**Installation:**

1. Place panel in frame below channels and support angle.
2. Slide panel toward top of frame over channels until panel bottoms are on support angle.
3. Center punch thru holes on bottom edge of panel of each corner.
4. Drill .199" diameter hole (No. 8 drill) at center punches in support angle.
5. Install No. 12-24 flat head thread cutting machine screws to secure panel in place.

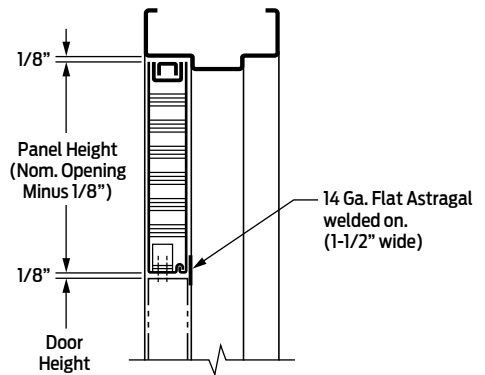
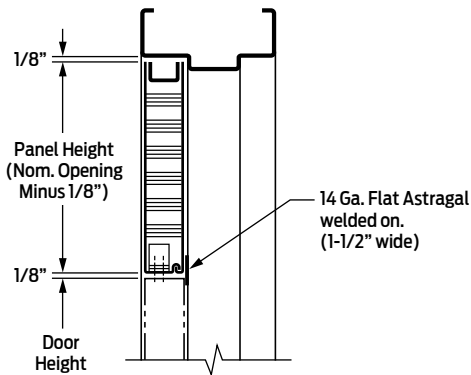
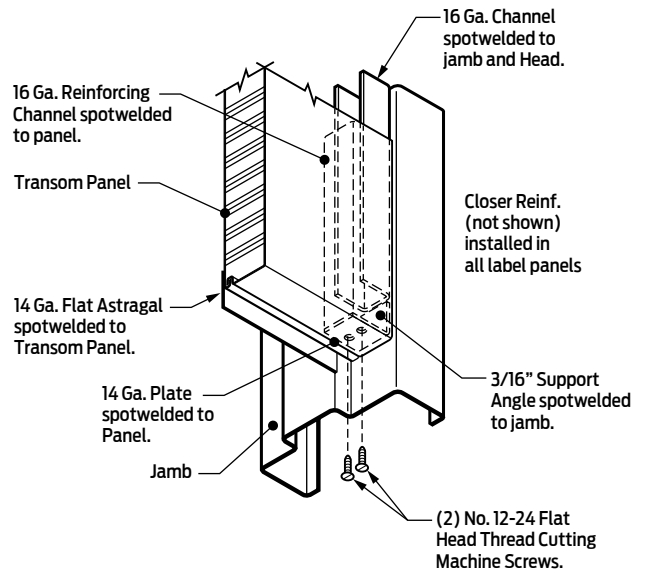


**TYPICAL CHANNEL LOCATION**

**NON-LABELED TRANSOM PANEL**



**LABELED TRANSOM PANEL**



## Splicing head and jamb sections

### Removable mullion: Cutting, notching, and installation

Sometimes it is necessary to splice jambs and/or heads to make a long section. Steelcraft recommends the following method of splicing. It is recommended that the splice always be located over the center of a vertical member.

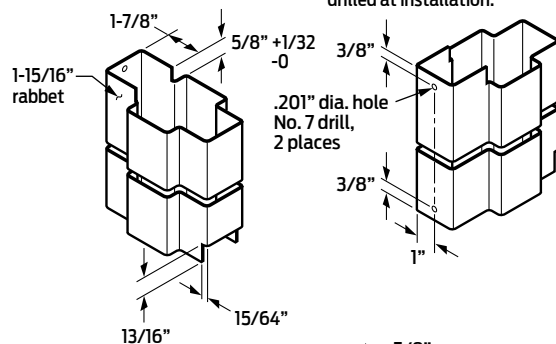
1. Install splice channel into end of one section. Allow half of the splice channel to extend out of the section.
2. Weld the ends of the splice channel to the frame section.
3. Slide other frame section over the splice channel and weld to the channel.
4. Weld the face joint and grind smooth.

### Removable mullions:

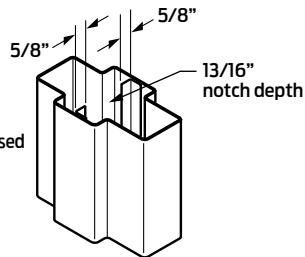
Double rabbet removable mullions can be made from TSF-16 or any intermediate strike mullion. The details shown illustrate the cutting and notching required to make the removable mullion.

Notch mullion as shown  
The mullion stiffener channel must be notched  $13/16"$  deep at the bottom. See detail below.

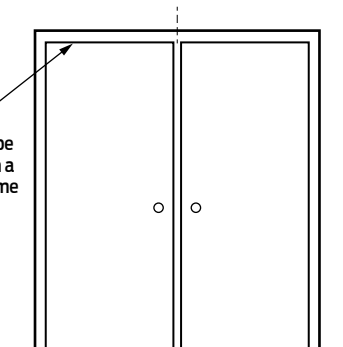
Drill holes as shown. All other mounting holes will be match drilled at installation.



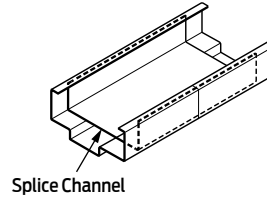
Bottom Notch Detail  
Detail is shown reversed for clarity.



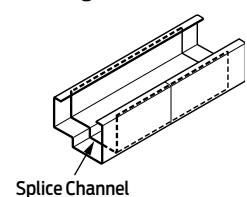
Note:  
Frame must be 2" wider than a standard frame for a pair of doors.



Double Rabbet

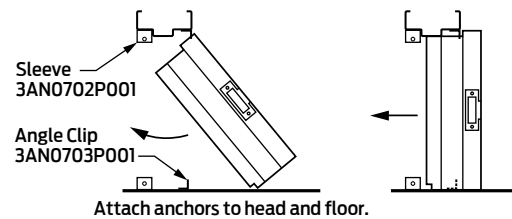


Single Rabbet



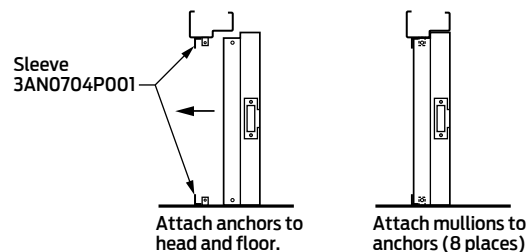
## REMOVABLE MULLION INSTALLATION

Double Rabbet



Attach mullions to anchors (6 places)

Single Rabbet

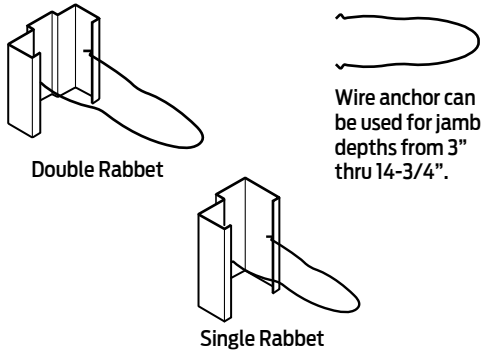


Attach mullions to anchors (8 places)

## Installation details

### Jamb anchor applications

#### Wire anchor - masonry wall



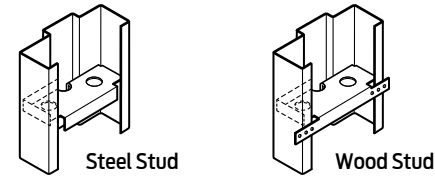
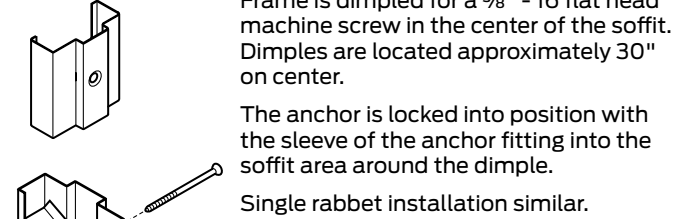
#### Wood or Steel Stud Anchor

Lock anchor into place as shown. Locate anchors at the top of each hinge reinforcement and the corresponding locations of the strike side.

##### Notes:

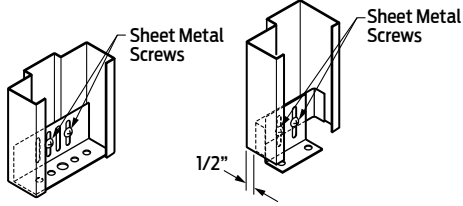
1. Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) *Recommended Erection Instructions for Steel Frames*. Fire Rated Assemblies must be in accordance with NFPA Pamphlet 80. The AHJ is the final authority in issues related to the installation and use of installed Fire Rated Doors.
2. Wall anchors are in accordance with the Specification Sheets applicable to the frame series used.
3. Base (for vertical members) and Sill Anchors (for members along the floor), must be fastened to the floor with expansion shell, or rawl plugs and machine screws (ram-setting, shells, plugs and ram setting is by others). Adjust frame so the head is level, vertical members are plumb, and tighten the adjustable base anchors.

#### Existing masonry wall anchor



## Base anchor applications

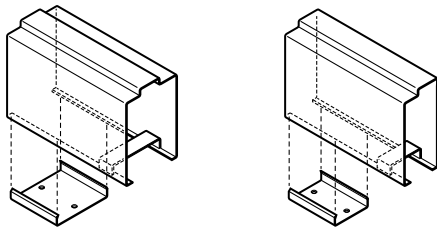
### Jamb Base Anchor



Spot or tack weld the attaching plate to and flush with the bottom of the jamb. Attach the adjustable base anchor to the attaching plate with sheet metal screws supplied with the anchor.

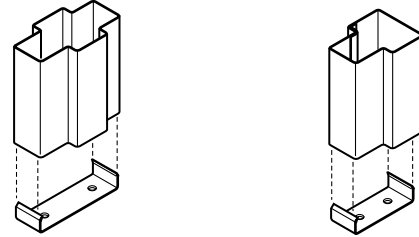
The anchor is fastened to the floor with expansion shields or rawl plugs and machine screws or by Ram-setting (shields, plugs and ram setting by others). Adjust frame so head is level and tighten the adjustable base anchor screws.

### Sill Section Base Anchor



Anchors are recommended for sills that exceed 5' 0" in length. Attach the anchor to the floor following directions shown for mullion base anchors.

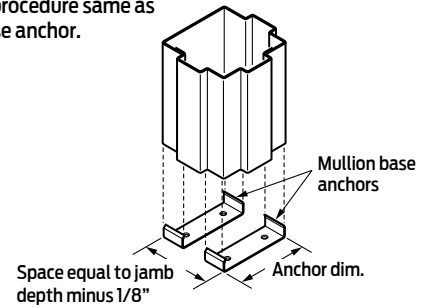
### Mullion Base Anchor



Base anchors are attached to the floor at the locations required for the mullion. Be sure anchors are located at the exact locations of the vertical mullions. The frame is raised above the anchor and then lowered down on to the floor over the anchor.

### Corner Post Anchor (2 and 3 Way Posts)

Fastening procedure same as mullion base anchor.



### Notes:

1. Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) *Recommended Erection Instructions for Steel Frames*. Fire Rated Assemblies must be in accordance with NFPA Pamphlet 80. The AHJ is the final authority in issues related to the installation and use of installed Fire Rated Doors.
2. Wall anchors are in accordance with the Specification Sheets applicable to the frame series used.
3. Base (for vertical members) and Sill Anchors (for members along the floor), must be fastened to the floor with expansion shell, or rawl plugs and machine screws (ram-setting, shells, plugs and ram setting is by others). Adjust frame so the head is level, vertical members are plumb, and tighten the adjustable base anchors.



# Hurricane resistant openings

General test Information .....	186
Storm Resistance H and HE Series .....	186
Approvals and Geographic applications.....	186
Sizes and performance.....	186
Usage and application .....	186
Material Selection: .....	186
Installation .....	186
H16 and H14 Series flush doors .....	187
About the product.....	187
Approvals, design pressure ratings and hardware configurations.....	187
Features and benefits.....	187
Specification compliance .....	187
Florida building code label .....	187
Fire ratings.....	187
Cores.....	188
Standard hardware preparations.....	189
Product Selection.....	189
Door edge construction .....	190
Glass light options.....	190
HE16 Series embossed doors.....	191
About the product.....	191
Design pressure ratings and hardware configurations .....	191
Features and benefits.....	191
Specification compliance .....	191
Florida building code label .....	191
Fire ratings.....	191
Cores.....	192
Standard hardware preparations.....	193
Product Selection.....	193
Door edge construction (H, HF, HE, HEF) .....	193
Approvals.....	194
Inland regions .....	194
Doors with glass lights .....	195
Wind-born debris (coastal) regions.....	197
Borrowed light elevations .....	202
Extreme Exposure: Wind-born debris regions.....	202

## General test Information

Steelcraft doors and frames are designed for virtually all construction requirements in commercial building applications. Their construction, durability and flexibility have been proven in both operation and physical testing of all types.

### Storm Resistance H and HE Series

**The Hurricane (H and HE Series)** exterior doors are suitable for installation in all types of building construction, but are specifically designed to resist cyclic and static wind pressures, and windborne debris impact loads, as prescribed by the Florida Building Code. The continuously bonded cores and full height mechanically interlocked edge seams provide attractive, flat and very durable doors to the commercial construction industry. Many options are available in this product series including edge construction, core variations and finishes.

### Approvals and Geographic applications

For up to date online Approvals and instructions to access, go to [Steelcraft.com](http://Steelcraft.com) > Support > Steelcraft > [Selection, Usage, and Approvals](#).

*The Authority Having Jurisdiction* is the final authority in issues related to the installation and use of any building products.

Steelcraft has conducted extensive testing on various product configurations to meet the severe storm applications related to coastal areas exposed to the ravages of extreme high windstorm systems. Inland and Coastal storm regions are designated by FEMA and local codes. Products and approvals fall into the following categories:

- **Inland Regions with less severe exposure to windstorm damage.** Tests and approvals are based on structural uniform load methods. Several standard frame and door constructions have been successfully tested to meet the requirements for Inland Regions.
- **Wind-Borne Debris (Coastal) Regions with severe exposure to storm damage.** Tests and approvals are based on the Florida Building Code Test Protocols for High Velocity Hurricane Zone (HVHZ) TAS 201, TAS 202 & TAS 203. Steelcraft H Series door constructions have been tested and meet the requirements for Coastal Regions.
- **Enhanced Hurricane Protection Area (EHPA):** typically found in educational facilities, constructed in accordance with the State Requirements for Educational Facilities (SREF) and Florida Building Code. EHPA requirements include resistance to higher windload pressures and windborne debris impacts.
- Steelcraft H Series door assemblies have been tested and meet the requirements for EHPA.
- Refer to the Hurricane Resistant Approval pages of this manual for applicable products.

### Sizes and performance

All doors and frames are manufactured and supplied to meet the dimensional standards and performance levels as published in ANSI A250.8-2014 (SDI 100).

Special size products are available to meet the unique construction, performance and aesthetic requirements of the architectural community. Contact Steelcraft for those requirements.



### Usage and application

To help simplify the use, selection and specification of Steelcraft storm resistant door products, the following guidelines for base material selection can be used:

**Material Gauge:** the following base material thickness values were taken from the Underwriters Laboratories, Inc. publication for gauge number and equivalent thickness and describe the sheet steel products available from Steelcraft:

- **H and HE Series doors: 16 Gauge [0.053" (1.3 mm)]** for Extra Heavy Commercial and Institutional applications having the potential of very high use.
- **H Series doors: 14 Gauge [0.067" (1.7 mm)]** for Extra Heavy Commercial and Institutional applications with extremely high use.

### Material Selection:

- Galvannealed Steel: conforming to ASTM A924 and ASTM A653 is standard on all H and HE Series doors.

### Installation

Installation of all Steelcraft frames and doors shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) *Recommended Erection Instructions for Steel Frames and HMMA 840*.

Installation of all H and HE Series doors must conform to corresponding Miami-Dade County Notice of Acceptance (NOA) and/or the Florida Building Code (FBC) statewide approval.

All Fire Rated doors must be installed in accordance with the National Fire Protection Association Pamphlet 80 (NFPA 80), and/or the local *Authority Having Jurisdiction*.

See page 205 under "Design pressure ratings and hardware configurations" for online resource links to the most current approvals.

## H16 and H14 Series flush doors



### About the product

The H16 and H14 Series doors have been specifically designed and tested to meet the performance-based provisions of the Florida Building Code (FBC) while providing architects, designers and building owners with the broadest choices for their specific applications.

Specifiable options include glass lights, transom and sidelights, louvers, exit hardware, cylindrical or mortise single point locks, as well as a variety of door core and edge construction options.

All H Series doors have been tested to protocols TAS 201, 202 and 203, indicating their ability to withstand the missile impact, structural load and cyclic wind pressure tests prescribed by the Codes.

### Approvals, design pressure ratings and hardware configurations

Design Pressure Ratings are based on ongoing testing for door, frame and hardware configurations. Applications are limited to the configurations tested.

For up to date online Approvals and instructions to access, go to <http://us.allegion.com/en/home/products/categories/doors-and-frames/steelcraft-h.html>. Go to Approvals.

The *Authority Having Jurisdiction* is the final authority in issues related to the installation and use of any building products.

### Features and benefits

Steelcraft's H Series doors offer the following standard unique features, which enhance long term performance and durability:

1. **A-60 Galvannealed steel** face sheets
2. **Core Systems** that enhance structural integrity:
  - **Honeycomb** (Standard): 1" (25 mm) cell kraft honeycomb configuration that increases structural integrity while reducing overall weight
  - **Polystyrene** (optional): enhanced thermal performance
  - **Polyurethane** (optional): extreme thermal performance
  - **Mineral Board** (optional): rigid, temperature rise control
  - **Steel Stiffened** (optional): welded hat section stiffeners

3. **Full Height, Epoxy Filled Mechanical Interlock Edges** provide structural support and stability the full height of the door edges. Available edge options:
  - **Visible Edge Seam (standard)**: full height, epoxy filled mechanical Interlocked edges
  - **Filled Edge Seam (optional add to standard)**: seam filled with structural adhesive and dressed smooth. Includes tack welds above and below edge cutouts for hinges, locks, etc.
  - **Welded Edge Seam (optional add to standard)**: intermittently welded using 1" long welds, then seam filled with structural adhesive and dressed smooth. Option available on L18, L16 and L14 doors.
4. **Full Height Lock Side Reinforcement Channel** ensures structural stability and locking hardware functionality under extreme pressure conditions.
5. **Universal Hinge Preparations** (patented) allow for easy field conversion from standard weight .134" (3.3 mm) hinges to heavy weight .180" (4.7 mm) hinges.
6. **14 Gauge [0.067" (1.7 mm)]** Top and Bottom Channels provide stability and protection for the top and bottom edges from abuse.
7. **3/8" undercut** is standard on all H Series doors, to accommodate hurricane code requirements.
8. **Beveled Hinge and Lock Edges** allow for tighter installation tolerances, ensure easier operation and eliminate binding and sticking.
9. **Recessed Designer™ Glass Trim** provides a clean, neat and flush finish with the door surface.
10. **Screwed-in top caps** provide additional weather protection to exclude water and debris from exterior outswing doors.
11. **Factory Applied Baked-On Rust Inhibiting Primer** paint in accordance with ANSI A250.10-2011.

### Specification compliance

1. Door construction for Steelcraft H Series full flush doors meets the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6-2003 (R2009). Locations are in accordance with ANSI/DHI A115.
3. Florida Building Code test protocols TAS 201, TAS 202 & TAS 203.

### Florida building code label

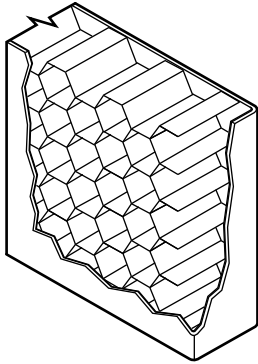
A Florida Building Code Label is applied to all H Series doors. An optional Miami-Dade County label is also available.

### Fire ratings

Steelcraft H Series doors meet fire rating requirements. They are listed for installations requiring compliance to both neutral pressure testing UL-10B and positive pressure standard UL-10C.

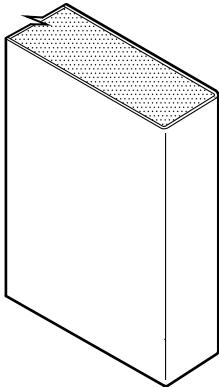
## Cores

### Rigid Honeycomb Core



#### Standard H Series Core

- 1" (25 mm) cell, 99 pound Kraft honeycomb
- Honeycomb surfaces sanded for maximum adhesion
- Impregnated with phenolic resin (resists mildew and vermin)
- Laminated to both face sheets with contact adhesive
- Assembled door is run through high pressure pinch rollers, achieving ultimate bond



#### Optional Polystyrene Core

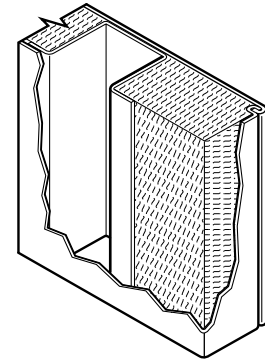
- 1 pound (453.6g) per ft<sup>3</sup> density slab
- Laminated to both face sheets with contact adhesive
- Labeled applications

#### Optional Polyurethane Core

- 1.8 pound (816.5g) per ft<sup>3</sup> density slab
- Laminated to both face sheets with contact adhesive
- Non-Labeled applications

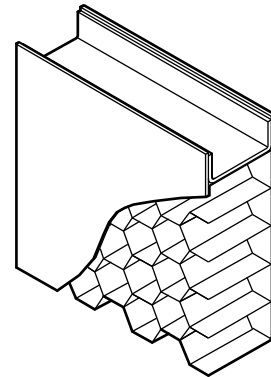
#### Optional Mineral Fiber Board Core

- TH Series 250°F (121°C) or 450°F (232°C) Temperature Rise Hurricane door



#### Optional Steel Stiffened Core

- Stiffeners welded to inside of face sheets
  - Located 6" (152.4 mm) on center
  - Weld spacing 6" (152 mm) maximum along the full height of each stiffener
- Areas between stiffeners filled with 1 pound (453.6g) per ft<sup>3</sup> density fiberglass batt



#### STANDARD Edge Construction

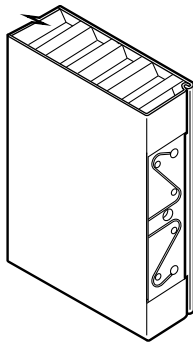
- Beveled hinge & lock edges
- Full height mechanical interlock with epoxy adhesive
- Visible edge seam standard
- Seamless edge optional

#### STANDARD Rigid 14 gauge End Channel Construction

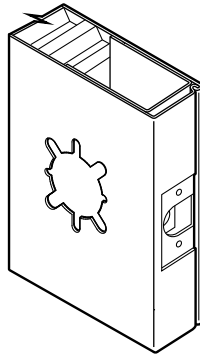
- 14 gauge inverted galvanized top & bottom channels
- Projection welded to both face sheets
- For optional caps, see "[Weather seals](#)" on page 75

Door Application and Usage				
Series	Steel Thickness	Opening	Usage Frequency	
H16	16 Ga (1.3 mm)	Exterior: Galvanized Steel	Extra Heavy Duty	Extra Heavy Commercial & Institutional applications with potential of very high use
H14	14 Ga (1.7 mm)	Exterior: Galvanized Steel	Maximum Duty	Extra Heavy Commercial & Institutional applications with extremely high use

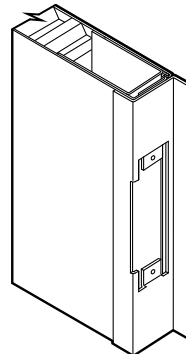
## Standard hardware preparations



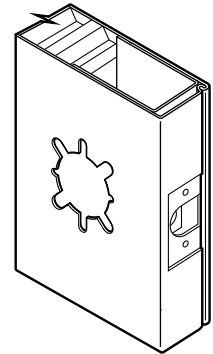
Universal mortise hinge prep



61L lock preparation



Inactive leaf: ASA strike preparation



Optional 14 gauge closer reinforcement

### Standard: mortised and reinforced for

- Patented Universal hinge preparations allow for easy field conversion from standard 4 1/2" (114 mm) x .134" (3.3 mm) standard weight hinges to 4 1/2" (114 mm) x .180" (4.7 mm) heavy weight hinges. Optional hinge preparation for 5" (127 mm) x .146" (3.7 mm) standard weight hinges or for 5" (127 mm) x .190" (4.8 mm) heavy weight hinges is also available.
- The cylindrical 161, 61L and mortise 86 lock preps are the most commonly used active leaf preparations. The 4 7/8" (124 mm) strike prep is the most commonly used inactive leaf preparation.
- Optional reinforcements for surface closers are available.

## Product Selection

### Door Sizes and ANSI A250.8 Conversions

Steelcraft product selection for H Series doors has been matched to SDI designations for Level and Model. Recommended minimum frame gauge also applies to the frequency of operation of the opening.

Series	ANSI A250.8 - SDI 100			Edge Construction	Maximum Sizes		Recommended Gauge of Frame
	Level	Model	Description		Single	Pair	
Level 3 - Extra Heavy Duty Commercial & Institutional							
H16	3	1	Full Flush	Visible	4' 0" x 8' 0" 1219 mm x 2438 mm	8' 0" x 8' 0" 2438 mm x 2438 mm	14 Gauge [0.067" (1.7 mm)] 16 Gauge [0.053" (1.3 mm)]
HF16		2	Seamless	Filled			
HW16				Welded			
Level 4 - Maximum Duty Commercial & Institutional							
H14	4	1	Full Flush	Visible	4' 0" x 8' 0" 1219 mm x 2438 mm	8' 0" x 8' 0" 2438 mm x 2438 mm	12 Gauge [0.093" (2.3 mm)] 14 Gauge [0.067" (1.7 mm)]
HF14		2	Seamless	Filled			
HW14				Welded			

### Code Compliance

- Florida Building Code test protocols TAS 201, TAS 202 & TAS 203.
  - A mylar Florida Building Code label is included as standard
  - Optional mylar Miami-Dade County label

## Door edge construction

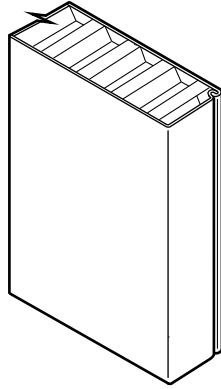
### Optional Edge Seams available in the L Series doors:

- **H:** Standard feature includes visible edge seams with full height interlocked edges.
- **HF:** The mechanical edge seam is filled and dressed smooth prior to applying the factory primer.
- **HW:** The mechanical edge seam is welded and dressed smooth prior to applying the factory primer.

### Standard visible edge seam

#### H Series Visible Seam Features

- Full height mechanical interlock
- Interlock filled with epoxy adhesive
- Visible edge seam



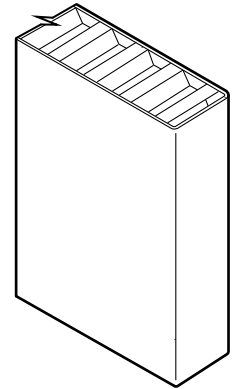
### Optional seamless edge

#### HF Series Seam Filled Features

- Standard Visible Edge Seam is tack welded above and below edge cutouts for hinges, locks, etc.
- Edge Seam is then filled with structural adhesive and dressed smooth
- No visible edge seam

#### HW Series Seam Welded Features

- Standard Visible Edge Seam is intermittently welded using 1" long welds
- Edge Seam is then filled with structural adhesive and dressed smooth
- No visible edge seam

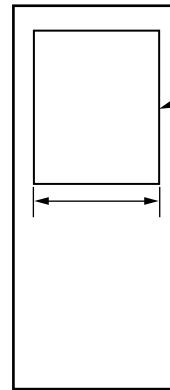
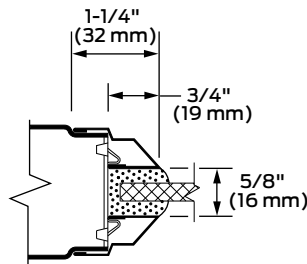


## Glass light options

(Refer to the Lights section for further details and options)

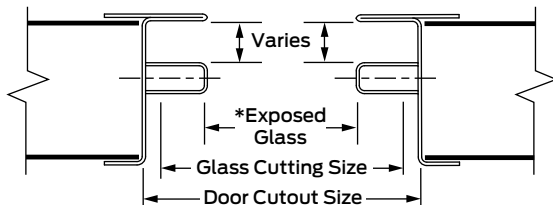
### Designer® Trim

- Standard for 1/2" Thick Glass
- Optional for 1/4" Thick Glass



**Note:** Glazing type and thickness vary per job requirements.

### Typical Optional Overlapping Steel Trim for Glass Over 1/4" to 5/8" or 3/4" to 1" Thick



Divider Muntins Are Not Available

### Note:

1. Glazing material and methods of glazing are subject to approval by applicable authorities and may change without notice. Refer to the applicable product approvals.
2. Doors used in elevations must use 1/2" or 3/4" glass only per NOA.



## HE16 Series embossed doors

### About the product

The HE16 Series embossed panel doors have been specifically designed and tested to meet the performance-based provisions of the Florida Building Code (FBC) while providing architects, designers and building owners with the broadest choices for their specific applications.

Specifiable options to meet application, specification and performance requirements include mechanical and electrical hardware preparations for exit hardware, cylindrical or mortise single point locks and double locks. No glass lights are allowable.

All HE16 Series doors have been tested to protocols TAS 201, 202 and 203, indicating their ability to withstand the missile impact, structural load and cyclic wind pressure tests prescribed by the Codes.



### Design pressure ratings and hardware configurations

Design Pressure Ratings are based on ongoing testing for door, frame and hardware configurations. Applications are limited to the configurations tested. For up to date online Approvals and instructions to access, go to <http://us.allegion.com/en/home/products/categories/doors-and-frames/steelcraft-h.html>. Go to Approvals.

The *Authority Having Jurisdiction* is the final authority in issues related to the installation and use of any building products.

### Features and benefits

Steelcraft's HE16 Series doors offer the following standard unique features, which enhance long term performance and durability:

1. **A-40 Galvannealed Steel** face sheets.
2. **Polystyrene Core (Standard)**: enhances the structural integrity of the door with enhanced thermal capabilities
3. **Full Height, Epoxy Filled Mechanical Interlock Edges** provide structural support and stability the full height of the door edges. Available edge options:
  - **Visible Edge Seam (standard)**: full height, epoxy filled mechanical interlocked edges
  - **Filled Edge Seam (optional add to standard)**: seam filled with structural adhesive and dressed smooth. Includes tack welds above and below edge cutouts for hinges, locks, etc.
  - **Welded Edge Seam (optional add to standard)**: intermittently welded using 1" long welds, then seam filled with structural adhesive and dressed smooth. Option available on L18, L16 and L14 doors.
4. **Full Height Lock Side Reinforcement Channel** ensures structural stability and locking hardware functionality under extreme pressure conditions.

5. **Universal Hinge Preparations** (patented) allow for easy field conversion from standard weight .134" (3.3 mm) hinges to heavy weight .180" (54.7 mm) hinges.
6. **14 Gauge [0.067" (1.7 mm)] Inverted Top and Bottom Channels** provide stability and protection for the top and bottom edges from abuse.
7. **3/8" undercut** is standard on all H Series doors, to accommodate hurricane code requirements.
8. **Beveled Hinge and Lock Edges** allow for tighter installation tolerances, ensure easier operation and eliminate binding and sticking.
9. **Screwed-in top caps** provide additional weather protection to exclude water and debris from exterior outswing doors.
10. **Factory Applied Baked-On Rust Inhibiting Primer** paint in accordance with ANSI A250.10-2011.

### Specification compliance

1. Door construction for Steelcraft HE16 Series embossed panel doors meets the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6-2003 (R2009). Locations are in accordance with ANSI/DHI A115.
3. Door construction for the HE16 Series embossed panel doors meets ANSI A117.1-1998 (ADA) requirements for minimum 10" (254 mm) bottom rail height measured from the floor.
4. Florida Building Code test protocols TAS 201, TAS 202 & TAS 203.

### Florida building code label

A Florida Building Code Label is applied to all H Series doors. An optional Miami-Dade County label is also available.

### Fire ratings

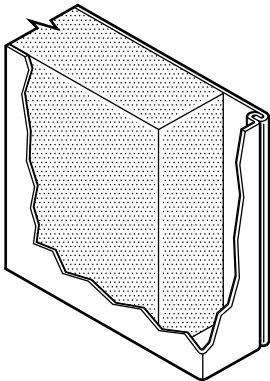
Steelcraft HE16 Series doors meet fire rating requirements.

They are listed for installations requiring compliance to both neutral pressure testing UL-10B and positive pressure standard UL-10C.

Cores

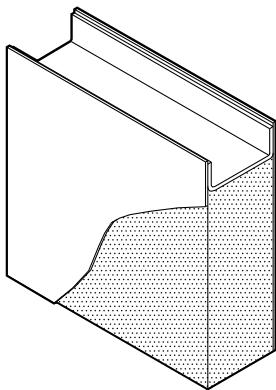
Insulated Core

- 1 pound (453.6 g) per ft<sup>3</sup> density slab
- Preferred for extreme temperature variations
- Laminated to both face sheets with contact adhesive
- Assembled door is run through high pressure pinch rollers achieving ultimate bond



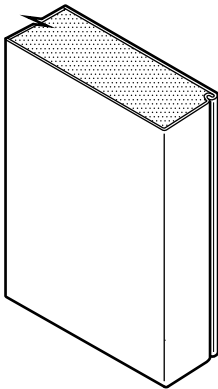
Standard Rigid 14 gauge End Channel Construction

- 14 gauge inverted galvanized top & bottom channels
- Projection welded to both face sheets
- For optional caps, see [""Weather seals" on page 145](#)



Standard Edge Construction

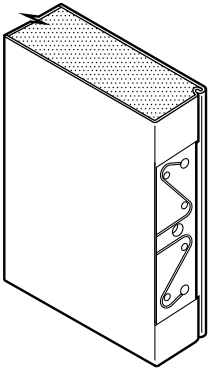
- Beveled hinge & lock edges
- Full height mechanical interlock with epoxy adhesive
- Visible edge seam standard
- Seamless edge optional



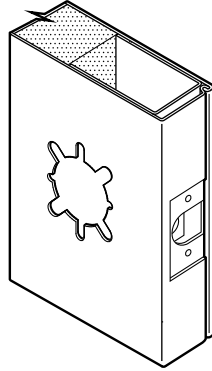
Door Application and Usage				
Series	Steel Thickness	Opening	Usage Frequency	
HE16	16 Ga (1.3 mm)	Exterior - Galvanized Steel	Extra Heavy Duty	Extra Heavy Commercial & Institutional applications with potential of very high use



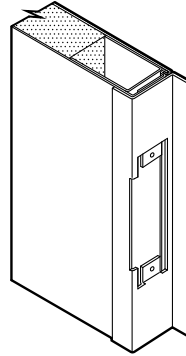
## Standard hardware preparations



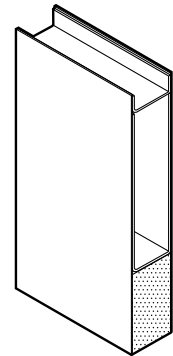
Standard Mortise Hinge Prep 4  
1/2" x .134" or 4 1/2" x .180"



61L Lock Preparation



Inactive Leaf: ASA Strike  
Preparation and Astragal



Optional 14 Gauge [0.067"  
(1.7 mm)] Closer Reinforcement

### Standard: mortised and reinforced for

- Patented Universal hinge preparations allow for easy field conversion from standard 4 1/2" (114 mm) x .134" (3.3 mm) standard weight hinges to 4 1/2" (114 mm) x .180" (4.7 mm) heavy weight hinges. Optional hinge preparation for 5" (127 mm) x .146" (3.7 mm) standard weight hinges or for 5" (127 mm) x .190" (4.8 mm) heavy weight hinges is also available.
- The cylindrical 161, 61L and mortise 86 lock preps are the most commonly used active leaf preparations. The 4 7/8" (124 mm) strike prep is the most commonly used inactive leaf preparation.
- Optional reinforcements for surface closers are available.

### SDI Conversion Chart

Steelcraft product selection for HE Series doors has been matched to SDI designations for Level and Model. Recommended minimum frame gauge also applies to the frequency of operation of the opening.

### Code Compliance

- Florida Building Code test protocols TAS 201, TAS 202 & TAS 203.
  - A mylar Florida Building Code label is included as standard
  - Optional mylar Miami-Dade County label

## Product Selection

### Door Sizes and ANSI A250.8 Conversions

Series	ANSI A250.8 - SDI 100			Edge Construction	Maximum Sizes		Recommended Gauge of Frame
	Level	Model	Description		Single	Pair	
Level 3 - Extra Heavy Duty Commercial & Institutional							
HE16	3	1	Full Flush	Visible	3'0" x 8'0"	6'0" x 8'0"	14 Gauge [0.067" (1.7 mm)]
HEF16		2	Seamless	Filled	914 mm x 2438 mm	1829 mm x 2438 mm	16 Gauge [0.053" (1.3 mm)]

## Door edge construction (H, HF, HE, HEF)

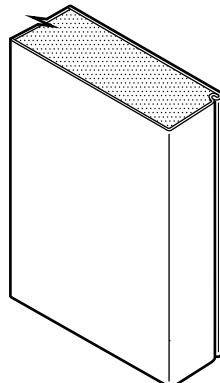
### Optional Edge Seams available in the HE Series doors:

- HE:** Standard feature includes visible edge seams with full height interlocked edges.
- HEF:** the mechanical edge seam is filled and finished prior to applying the factory primer.

### Standard visible edge seam

#### HE Series Visible Seam Features

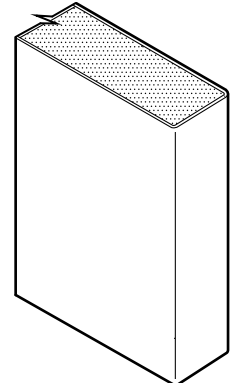
- Full height mechanical interlock
- Interlock filled with epoxy adhesive
- Visible edge seam



### Optional seamless edge

#### HEF Series Seam Filled Features

- Standard Visible Edge Seam is tack welded above and below edge cutouts for hinges, locks, etc.
- Edge Seam is then filled with structural adhesive and dressed smooth
- No visible edge seam



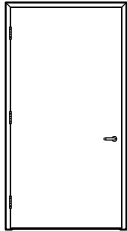
## Approvals

### Inland regions

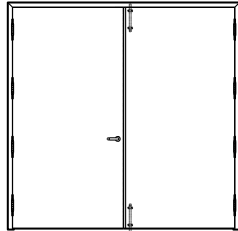
Tested in accordance with ASTM E-330

#### Flush doors

#### Locking applications



Single Door

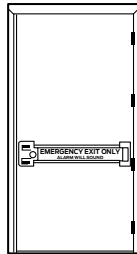


Double Door

Maximum Door Size	Singles	4' 0" x 8' 0"
	Pairs	8' 0" x 8' 0"
Door Design	Flush doors only	
Hardware Application	Active	Cylindrical or Mortise locks
	Inactive	IVES® Surface or Flush Bolts

Lock type	Lock series			Florida approval	Design pressure	Door series
	Schlage®		Falcon			
	Mechanical	Electronic				
Cylindrical (Bored)	ND, AL, A, S	5100	T, B, X, Z, S, H	FL10356-R4	+/- 50 PSF	L, B, CE, SL, T
Mortise	L9000, L9400	5500	T, B, X, Z, S, H	FL10356-R4	+/- 50 PSF	L, B, CE, SL, T

#### Exit alarm applications

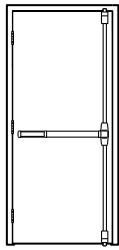


Single Door Only

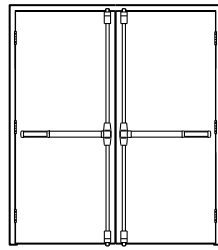
Maximum Door Size	Singles	4' 0" x 8' 0"
	Pairs	not available
Door Design	Flush doors only	
Hardware Application	2670 GUARD-X Alarm Lock	

Exit type	Exit series		Florida approval	Design pressure	Door series
	Von Duprin®	Monarch			
Alarm	2670 GUARD-X Alarm Lock	No	FL10356-R4	+ 55 PSF / - 40 PSF	L, B, CE, SL, T

## Exit device applications



Single Door



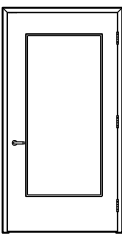
Double Door

Maximum Door Size	Singles	4' 0" x 8' 0"
	Pairs	8' 0" x 8' 0"
Door Design	Flush doors only	
Hardware Application	Exit Device As Noted Below	

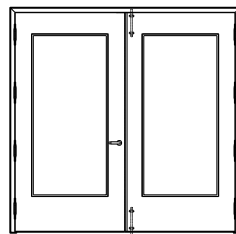
Exit type	Exit series			Florida approval	Design pressure	Door series
	Von Duprin®	Monarch	Falcon			
RIM	33A, 55, 88	17-R, 18-R, 19-R, XX-R	No	FL10356-R4	+/- 50 PSF	L, B, CE, SL, T
	22, 99/98	No			+50/-40 PSF	
SVR	2227, 3327A, 3527A, 8827, 8827, 9927	No	No	FL10356-R4	+50/-40 PSF	L, B, CE, SL, T
	No	17-V, 18-V, 19-V, XX-V	24-V, 25-V		+/- 50 PSF	
CVR	3347A, 3547A, 9447, 9847, 9947	No	No	FL10356-R4	+/- 50 PSF	L, B, CE, SL, T
	No	17-C, 18-C, 19-C, XX-C	24-C, 25-C		+/- 60 PSF	
	5547	No	No			
3 POINT	9957	No	No	FL10356-R4	+50/-40 PSF	L, B, CE, SL, T
	No	17-TPL, XX-TPL			+/- 50 PSF	
Mortise Single Door Only	8875, 9475, 9575, 9875, 9975	No	No	FL10356-R4	+ 50 / -45 PSF	L, B, CE, SL, T
	No	17M, 18M, XX-M	24-M, 25-M		+/- 50 PSF	

## Doors with glass lights

## Locking applications



Single Door

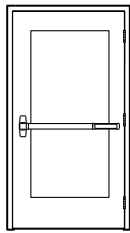


Double Door

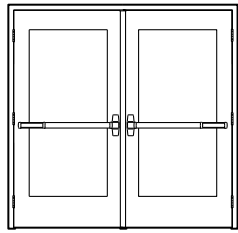
Maximum Door Size	Singles	4' 0" x 8' 0"
	Pairs	8' 0" x 8' 0"
Door Design	FG, FG2, FG3, G,V, N, N3, N4, LNL glass designs only	
Hardware Application	Active	Cylindrical or Mortise locks
	Inactive	IVES® Surface or Flush Bolts
Approved Glass	Refer to the appropriate Florida Approval for glass and glazing types	

Lock type	Lock series			Florida approval	Design pressure	Door series
	Schlage®		Falcon			
	Mechanical	Electronic				
Cylindrical (Bored)	ND, AL, A, S	No	T, B, X, Z, S, H	FL10356-R4	+50 / -40 PSF	L, B, CE, SL, T
Mortise	L9000/9400 LV9000/9400	No	M	FL10356-R4	+50 / -40 PSF	L, B, CE, SL, T

## Exit device applications



Single Door

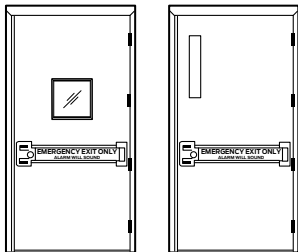


Double Door

Maximum Door Size	Singles	4' 0" x 8' 0"
	Pairs	8' 0" x 8' 0"
Door Design	FG, FG2, FG3, G,V, N, N3, N4, LNL glass designs only	
Hardware Application	RIM Exit Devices as noted below	
Approved Glass	Refer to the appropriate Florida Approval for glass and glazing types	

Exit type	Exit series			Florida approval	Design pressure	Door series
	Von Duprin®	Monarch	Falcon			
RIM	33A, 55, 88	17-R, 18-R 19-R, XX-R	No	FL10356-R4	+/- 50 PSF	L, B, CE, SL, T
	22, 99/98	No			+50/-40 PSF	
SVR	2227, 3327A, 3527A, 8827 8827, 9927	No	No	FL10356-R4	+50/-40 PSF	L, B, CE, SL, T
	No	17-V, 18-V, 19-V, XX-V	24-V, 25-V		+/- 50 PSF	
CVR	3347A, 3547A, 9447, 9847, 9947	No	No	FL10356-R4	+/- 50 PSF	L, B, CE, SL, T
	No	17-C, 18-C, 19-C, XX-C	24-C, 25-C		+/- 60 PSF	
	5547	No	No			
3 POINT	9957	No	No	FL10356-R4	+50/-40 PSF	L, B, CE, SL, T
	No	17-TPL, XX-TPL			+/- 50 PSF	
Mortise Single Door Only	8875, 9475, 9575, 9875, 9975	No	No	FL10356-R4	+ 50/-45 PSF	L, B, CE, SL, T
	No	17M, 18M, XX-M	24-M, 25-M		+/- 50 PSF	

## Exit alarm applications



Single Door Only

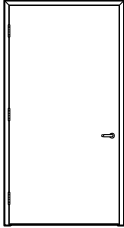
Maximum Door Size	Singles	4' 0" x 8' 0"
	Pairs	not available
Door Design	V or N3, N4 and N5 glass designs only	
Hardware Application	2670 GUARD-X Alarm LockV	

EXIT TYPE	EXIT Series		Florida Approval	Design Pressure	Door Series
	Von Duprin®	Monarch			
Alarm	2670 GUARD-X Alarm Lock	No	FL10356-R4	+ 55 PSF - 40 PSF	L, B, CE, SL, T

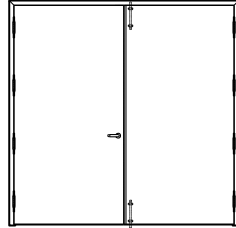
**Note:** See 75 or 191 for online resource links to access the most current approvals.

**Wind-born debris (coastal) regions****Tested in accordance with Florida Building Code test:**

- Protocols (TAS 201, TAS 202 & TAS 203)
- Large missile impact and ASTM E-330 applications

**Flush doors****Locking applications**

Single Door

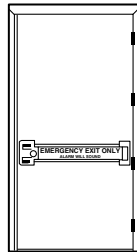


Double Door

Maximum Door Size	Singles	4' 0" x 8' 0"
	Pairs	8' 0" x 8' 0"
Door Design	Flush doors only	
Hardware Application	Active	Cylindrical or Mortise locks
	Inactive	IVES® Surface (360)

Lock type	Lock series			Miami-Dade NOA	Florida approval	Design pressure	Door series
	Schlage*		Falcon				
	Mechanical	Electronic					
Cylindrical (Bored)	ND*	5100	T	Single Door 17-0320.06 Double Door 17-0320.08 Exp. 05/23/17	Single Door FL12400.3 Double Door FL12400.1	+/- 75 PSF	H, HE
	ND	No	No			+/- 65 PSF	
	AL	No	No			+/- 55 PSF	
Mortise	L9400	5500	M			+/- 75 PSF	

\* requires a ¾" projection latch

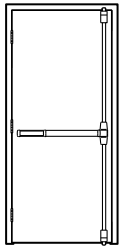
**Exit alarm applications**

Single Door

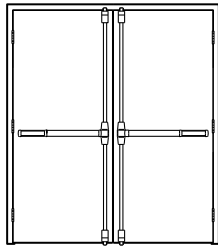
Maximum Door Size	Singles	4' 0" x 8' 0"
	Pairs	not available
Door Design	Flush doors only	
Hardware Application	2670 GUARD-X Alarm Lock	

Exit type	Exit series		Miami-Dade NOA	Florida approval	Design pressure	Door series
	Von Duprin®	Monarch				
Alarm	2670 GUARD-X Alarm Lock	No	17-0320.06 Exp. 05/23/17	FL12400.3	+/- 55 PSF	H, HE

## Exit device applications



Single Door



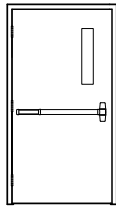
Double Door

Maximum Door Size	Singles	4' 0" x 8' 0"
	Pairs	8' 0" x 8' 0"
Door Design	Flush doors only	
Hardware Application	Exit device as noted below	

Exit type	Exit series			Miami-Dade NOA	Florida Approval	Design Pressure	Door Series
	Von Duprin®	Monarch	Falcon				
RIM	99, 98	DL 18-R	No	Single Door 17-0320.06  Double Door 17-0320.08  Exp. 05/05/2017	Single Door FL12400.3  Double Door FL12400.1	+/- 70 PSF	H, HE
RIM	No	No	25R			+70 /- 55 PSF	
SVR	9927		25-V			+/- 70 PSF	
CVR	9947-F		25-C			+/- 70 PSF	
3-POINT	9957		No			+/- 70 PSF	
Mortise Single Door Only	8875 & 98/9975	18M	25-M			+/- 70 PSF	
Enhanced Wind-Born Debris (Coastal) Regions							
RIM	XP98/99	No	No	Single Door 17-0320.06  Double Door 17-0320.08  Exp. 05/23/17	Single Door FL12400.3  Double Door FL12400.1	+/- 100 PSF  With Water Infiltration +/- 75 PSF	H, HE
SVR	WS98/9927	No	No	Single and Double Door 15-0930.03  Exp. 05/05/20	Single and Double Door FL124022-R3	+/- 150 PSF  With Water Infiltration +/- 75 PSF	

## Doors with glass lights

## Exit alarm applications

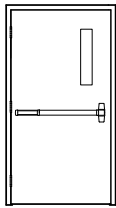


Single Door

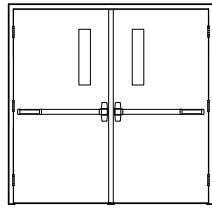
Maximum Door Size	Singles	4' 0" x 8' 0"
Door Design	V, N3, N4, N5 glass designs only	
Hardware Application	2670 Guard-X Alarm Lock	
Approved Glass	Refer to the appropriate Florida Approval for glass and glazing types	

Exit type	Exit series		Miami-Dade NOA	Florida Approval	Design Pressure	Door Series
	Von Duprin®	Monarch				
<b>Alarm</b>	2670 GUARD-X Alarm Lock	No	Single Door 17-0320.05 Exp. 05/23/17	Single Door FL12400.4	+/- 55 PSF	H, HE

## Exit device applications



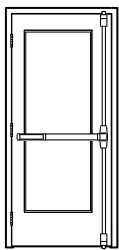
Single Door



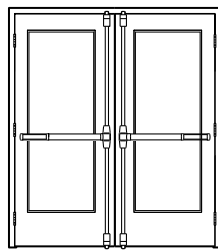
Double Door

Maximum Door Size	Singles	4' 0" x 8' 0"
	Pairs	8' 0" x 8' 0"
Door Design	V, N3, N4, N5 Glass Designs only	
Hardware Application	Exit device as noted below	
Approved Glass	Refer to the appropriate Florida Approval for glass and glazing types	

EXIT TYPE	EXIT Series		Miami-Dade NOA	Florida Approval	Design Pressure	Door Series
	Von Duprin®	Falcon				
RIM	XP98/99(F)	No	Single Door 17-0320.05 Exp. 05/23/17	Single Door FL12400.4	+/- 100 PSF	H, HE
RIM	XP98/99(F)	No	Double Door 17-0320.07 Exp. 05/23/17	Double Door FL12400.2	+/- 90 PSF	



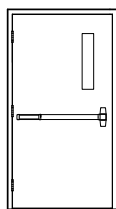
Single Door



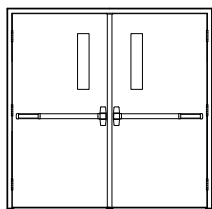
Double Door

Maximum Door Size	Singles	3' 0" x 7' 0"
	Pairs	6' 0" x 7' 0"
Door Design	FG, FG2, FG3, G, V, N, N3, N4, LNL	
Hardware Application	Exit device as noted below	
Approved Glass	Refer to the appropriate Florida Approval for glass and glazing types	

EXIT TYPE	EXIT Series		Miami-Dade NOA	Florida Approval	Design Pressure	Door Series
	Von Duprin®	Falcon				
RIM	98/99(F)	No	Single Door 17-0320.05	Single Door FL12400.4	+/- 60 PSF	H, HE
	88-F					
SVR	98/9927(F)	(F)25-V	Double Door 17-0320.07 Exp. 05/23/17	Double Door FL12400.2		
CVR	98/9947(F)	F-25-C				
	33/3547(F)					
3-Point	98/9957(F)	No				



Single Door

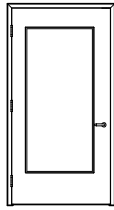


Double Door

Maximum Door Size	Singles	4' 0" x 8' 0"
	Pairs	8' 0" x 8' 0"
Door Design	FG, FG2, FG3, G, V, N, N3, N4, LNL	
Hardware Application	Exit device as noted below	
Approved Glass	Refer to the appropriate Florida Approval for glass and glazing types	

EXIT TYPE	EXIT Series		Miami-Dade NOA	Florida Approval	Design Pressure	Door Series
	Von Duprin®	Falcon				
RIM	98/99(F)	No	Single Door 17-0320.05	Single Door FL12400.4	+/- 50 PSF	H, HE
3-Point	98/9927(F)	No	Double Door 17-0320.07 Exp. 05/23/17	Double Door FL12400.2		

## Locking applications



Single Door

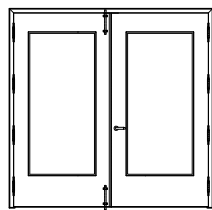
Maximum Door Size	Singles	3' 0" x 7' 0"
Door Design	FG, FG2, FG3, G, V, N, N3, N4, LNL glass designs only	
Hardware Application	Cylindrical or Mortise locks	
Approved Glass	Refer to the appropriate Florida Approval for glass and glazing types	

LOCK TYPE	LOCK Series			Miami-Dade NOA	Florida Approval	Design Pressure	Door Series
	Schlage*		Falcon				
	Mechanical	Electronic					
Cylindrical (Bored)	D/ND/AD	5100, CO	T	Single Door 17-0320.05 Exp. 05/23/17	FL12400.4	+/- 75 PSF	H, HE
Mortise	L9000/9400 LV9000/9400	5500, AD	M				

\* requires a ¾" projection latch



Single Door



Double Door

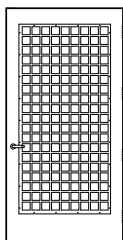
Maximum Door Size	Singles	4' 0" x 8' 0"
	Pairs	8' 0" x 8' 0"
Door Design	FG, FG2, FG3, G, V, N, N3, N4, LNL glass designs only	
Hardware Application	Active	Cylindrical or Mortise locks
	Inactive	IVES® Surface Bolts (360)
Approved Glass	Refer to the appropriate Florida Approval for glass and glazing types	

LOCK TYPE	LOCK Series			Miami-Dade NOA	Florida Approval	Design Pressure	Door Series
	Schlage*		Falcon				
	Mechanical	Electronic					
Cylindrical (Bored)	D/ND/AD	5100, CO	T	Single Door 17-0320.05	Single Door FL12400.4	+/- 75 PSF	H, HE
Mortise	L9000/9400 LV9000/9400	5500, AD	M	Double Door 17-0320.07 Exp. 05/23/17	Double Door FL12400.2		

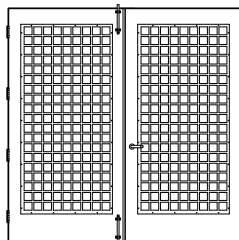
\* requires a ¾" projection latch

## Doors with louvers

## Locking applications



Single Door



Double Door

Maximum Door Size	Singles	4' 0" x 8' 0"
	Pairs	8' 0" x 8' 0"
Door Design	Louvered Doors Only	
Hardware Application	Active	Cylindrical or Mortise locks
	Inactive	IVES® Surface or Flush Bolts

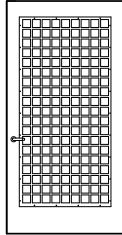
LOCK TYPE	LOCK Series			Miami-Dade NOA	Florida Approval	Design Pressure	Door Series
	Schlage*		Falcon				
	Mechanical	Electronic					
Cylindrical (Bored)	D/ND	No	T	Single and Double Door 15-0427.03 Exp. 11/13/18	Single and Double Door FL1591-R5	+/- 60 PSF	H, HE
Mortise	L9000/9400 LV9000/9400		M				



LOCK TYPE	LOCK Series		Falcon	Miami-Dade NOA	Florida Approval	Design Pressure	Door Series
	Schlage*						
	Mechanical	Electronic					

\* Fire louver, max opening is 24" x 24" for ± 60 psf rating.

### Deadlocking applications



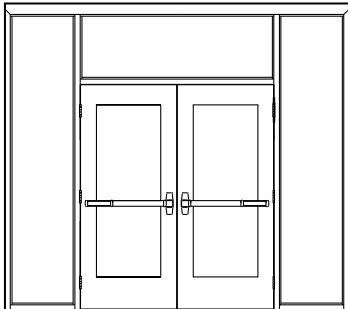
Single Door

Maximum Door Size	Singles	4' 0" x 8' 0"
	Pairs	not available
Door Design	Louvered Doors Only	
Hardware Application	Active	Deadlock

LOCK TYPE	LOCK Series			Miami-Dade NOA	Florida Approval	Design Pressure	Door Series
	Schlage*		Falcon				
	Mechanical	Electronic					
Deadlock	B600, B700, B800	No	D100, D200	15-0427.03 Exp. 11/13/18	FL1591-R5	+/- 60 PSF	H, HE

### Transom and side lights

#### Glass doors: Exit device applications

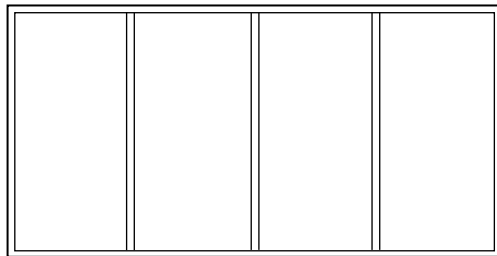


Single or Double Door

Maximum Overall Frame Size	10' 8" x 9' 6"	
Maximum Door Size	Singles	3' 0" x 7' 0"
	Doubles	6' 0" x 7' 0"
Door Design	Glass doors only FG, FG2, FG3	
Hardware Application	Von Duprin® Exit Devices as Noted Below	
Approved Glass	Refer to the appropriate Florida Approval for glass and glazing types	

EXIT TYPE	EXIT Series		Miami-Dade NOA	Florida Approval	Design Pressure	Door Series
	Von Duprin®	Monarch				
RIM	99, 88	No	15-0930.06 Exp. 05/23/17	FL1592-R5	+/- 60 PSF	H, HE
SVR	9927					
CVR	9947-F, 3347F					

## Borrowed light elevations



Maximum Door Size	14' 8" x 10' 2"
Door Design	FG, FG2, FG3, G, V, N, N3, N4, LNL glass designs only
Approved Glass	Refer to the appropriate NOA or Florida Approval for glass and glazing types

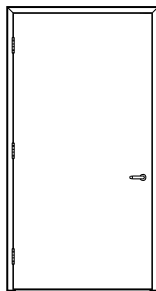
\* When max height of 10' 2" is designed the max width can not exceed 9' 8". If width exceeds 9' 8" then height cannot exceed 8' 2".

Miami-Dade NOA	Florida Approval	Design Pressure	Missile Impact
15-1102.13 Exp. 06/30/17	FL4622-R7	+/- 60 PSF	YES

## Extreme Exposure: Wind-born debris regions

## Flush doors

## Locking applications



Single Door

Maximum Door Size	Singles	3' 0" x 7' 0"
	Pairs	not available
Door Design	Flush doors only	
Hardware Application	Mortise locks	

LOCK TYPE	LOCK Series			Miami-Dade NOA	Florida Approval	Design Pressure	Door Series
	Schlage*		Falcon				
	Mechanical	Electronic					
Mortise	L9400	No	M	In-Swing 15-0427.04	In-Swing and Out-Swing FL-3905-R6	+/- 170 PSF Stainless Steel Strike	H, HE
				Out-Swing 15-0427.05 Exp. 02/24/17		+/- 120 PSF Standard Strike	

**Note:** See [186](#) or [191](#) for online resource links to access the most current approvals.

# Tornado resistant openings

General information.....	204
Approvals .....	204
How are frames supplied.....	204
Sizes and performance.....	204
Usage and application .....	204
Installation .....	204
PW Series flush doors.....	205
About the product.....	205
System features and benefits.....	205
Specification compliance .....	205
Fire ratings.....	205
Standard construction .....	206
Standard hardware preparations (ICC500-2014 and FEMA 361/320 compliant) .....	207
Meeting edge details for pairs of doors.....	208
Glass light options.....	209
Paladin handing.....	210
Shutter handing.....	210
FP14 Series flush frames.....	211
About the product.....	211
Features and benefits.....	211
Specification compliance .....	211
Fire ratings.....	211
Approvals.....	214
Openings with Von Duprin® and Schlage® hardware .....	214



## General information

The Paladin™ Series door systems are specifically designed and tested to conform to the Federal Emergency Management Agency (FEMA) 320 and 361 guidelines and ANSI ICC500 standards providing security and safety for tornado shelters and severe storm areas of refuge.

The PW14 Paladin™ Series doors include unique internal steel stiffeners which are welded to the face sheets. The full height mechanically interlocked edge seams and rigid end closures are welded and provide attractive and very durable doors.

The FP14 Paladin™ Series frames are designed for installation in either interior or exterior locations as a part of the wall framing process. Three sided steel frames are furnished in three pieces (two jambs and a head) which are anchored to the wall systems.

### Approvals

For up to date online Approvals and instructions to access, go to <http://us.allegion.com/en/home/products/categories/doors-and-frames/steelcraft-pw.html>, then click Approvals.

The *Authority Having Jurisdiction* is the final authority in issues related to the installation and use of any building products.

Paladin™ Systems offer a range of hardware applications based on ongoing testing for door, frame and hardware configurations. Applications are limited to the configurations tested.

### How are frames supplied

The connecting corners of the 3-piece frame include precision factory die miters and interlocking tabs and corner clips. The corner miters are specially designed to insure a tight closed corner connection when installed properly. There are two methods of furnishing 3-sided frames to the jobsite:

- **Knock Down (KD):** Frames are supplied in 3 pieces for assembly prior to installation at the jobsite by the installing contractor.
- **Set-Up and Welded (SUA):** Prior to arriving at the jobsite, the 3-sided frame (with factory miters) is assembled (at the distributor's fabrication location, or by Steelcraft). The miters are welded (in accordance with ANSI A250.8-2014 [SDI 100]), finished and supplied to the jobsite ready for installation. SUA frames are shipped to the jobsite with temporary shipping bars attached.

### Sizes and performance

All doors and frames are manufactured and supplied to meet the dimensional standards and performance levels as published in ANSI A250.8-2014 (SDI 100).

Special size products are available to meet the unique construction, performance and aesthetic requirements of the architectural community. Contact Steelcraft for those requirements.

### Usage and application

To help simplify the use, selection and specification of Steelcraft Storm Resistance door and frame products, the following guidelines for base material selection can be used:

**Material Gauge:** the following base material thickness values were taken from the Underwriters Laboratories, Inc. publication for gauge number and equivalent thickness and describe the sheet steel products available from Steelcraft:

- **14 Gauge [0.067" (1.7 mm)]** for Extra Heavy Commercial and Institutional applications with extremely high use.

**Material Selection:** in addition to the thickness of base material, the following base material types of metal are available from Steelcraft:

- **Galvannealed Steel:** conforming to ASTM A924 and ASTM A653 recommended for exterior opening or interior openings with high humidity.

### Installation

Proper installation is very important in providing reliable doors and frames for life-safety.

1. It is recommended that all installers of Paladin products attend Steelcraft Distributor training. A certificate of completion is provided to communicate compliance which may be required in some areas.
2. The following industry standards should be referenced and followed:

Installation of all Steelcraft frames and doors shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) Recommended Erection Instructions for Steel Frames and HMMMA 840.

Installation of Paladin™ Systems must conform to corresponding Intertek opening requirements, in compliance with FEMA 361 and ANSI ICC500-2014.

All Fire Rated doors must be installed in accordance with the National Fire Protection Association Pamphlet 80 (NFPA 80), and/or the local Authority Having Jurisdiction.

3. Follow general instructions and videos in collaborative efforts from Steelcraft and SDI (for all Steel door and frame applications, not specific to Paladin).

#### Frames:

PDF of steps with images: "Steel Door Frame Installation in Masonry" [www.steeldoor.org/pdf/steeldoorinstallationinmasonryconstruction.pdf](http://www.steeldoor.org/pdf/steeldoorinstallationinmasonryconstruction.pdf)

Installation video: [www.steeldoor.org/videos.php#videos](http://www.steeldoor.org/videos.php#videos). Select "How to Install Frames in Masonry Construction"

#### Doors:

Door installation videos: [www.steeldoor.org/videos.php#videos](http://www.steeldoor.org/videos.php#videos). Select "How to Install a Steel Door"

- Note in addition to checking for fire labels as stated in this video, check also for ICC500-2014 / FEMA 361/320 labels on doors and frames.

#### Troubleshooting:

Troubleshooting videos: [www.steeldoor.org/videos.php#videos](http://www.steeldoor.org/videos.php#videos). See Troubleshooting Videos section

4. For installation of hardware and accessories, follow applicable installation instructions from the manufacturer.

See "ITS/WHI Intertek Approved hardware & components per ICC500-2014" on page 215 for online resource links to the most current approvals.

## PW Series flush doors



### About the product

The Paladin™ PW14 Series Flush doors and FP14 Frame have been specifically designed, tested and approved to withstand extreme wind-load and flying missile impact. Unique engineered designs combined with the durability of superior corrosive resistant steel make Steelcraft PW14 Paladin™ Series Flush doors an excellent solution for added building protection from severe weather.

Specifiable options to meet application, specification and performance requirements include mechanical and electrical hardware preparations for exit hardware.

The PW14 Paladin™ Door and FP14 Frame System has been designed and tested to address the requirements of FEMA 361/320 guidelines and ANSI ICC500-2014 standards to protect the general public from the extreme effects of tornados. For compliance with the standards, the PW14 Paladin™ Door and FP14 Frame must be supplied as a system.

### System features and benefits

#### DOOR: PW14 Paladin™ Series Flush Door:

1. **Steel Stiffened core construction** with stiffeners welded to one face sheet and attached with epoxy to the opposite face sheet.
2. **Full Height, Epoxy Filled Mechanical Interlock Edges** at lock and hinge edges with edge seams welded, filled and dressed smooth provide structural support and stability the full height of the door.
3. **Full Height Lock Side Reinforcement Channel** ensures structural stability under extreme pressure conditions.
4. **Universal Hinge Preparations** (patented) allow for easy field conversion from standard weight .134" (3.3 mm) hinges to heavy weight .180" (54.7 mm) hinges.
5. **14 Gauge (0.067") Inverted Top and Bottom Channels** with additional 12 Gauge (0.105") flush channel top cap.
6. **Custom Undercuts.** ¾" maximum allowable undercut to finished floor is provided standard to allow for a ½" saddle threshold. Specify your undercut needs based on latching hardware, finished floor, threshold and whether your strike sits flush.

Hardware installation instructions must be followed. Use the instructions that came with the product or search

online at [www.steelcraft.com](http://www.steelcraft.com). Required distance from bottom of door to top of strike (for rabbetted, or bumper, thresholds on WS, bottom of latch housing to top of strike):

- Schlage LM9300: ⅛" min, ¼" max
- Von Duprin WS98/9927 & WS98/9957: ⅛"

The manufacturer's strike must be used, cannot be unduly modified, and must be anchored/grouted into the slab.

- For finished floors, strikes should sit on the finished floor and be anchored (LM) and/or grouted (WS) into the concrete slab securely.
- For thresholds, cut a hole for the strike plate (LM) to sit flush with top of threshold, or cup strike lip (WS) to sit on or flush with top of threshold. Cut slab 1" min below and ¾" around the strike perimeter, then with threshold in place, grout full in the strike area, and embed the cup strike (WS) into the grout in the hole cut in the threshold, or anchor the strike plate (LM) after set. Note in using rabbetted, or bumper, thresholds with the WS, the bottom latch housing is mounted higher on door.
- Hardware and concrete guidance above are Steelcraft recommendations only. Hardware and industry specific building standards must be followed and should take precedence, although any differences in recommendations should be investigated and understood.

7. **Beveled Hinge and Lock Edges** allow for tighter installation tolerances, ensure easier operation and eliminate binding and sticking.
8. **Factory Applied Baked-On Rust Inhibiting Primer** paint in accordance with ANSI A250.10-2011.
9. **Standard A-60 Galvannealed Steel** face sheets for superior corrosion resistance on exterior openings

### Specification compliance

1. Door construction for Steelcraft PW14 Paladin™ Series Flush doors meets the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6-2003 (R2009). Locations are in accordance with ANSI/DHI A115.

### ICC500-2014 / FEMA COMPLIANCE LABEL

Factory Label from Intertek (ITS/WHI) is applied to all PW14 Paladin™ Series Flush doors and FP14 Frame System.

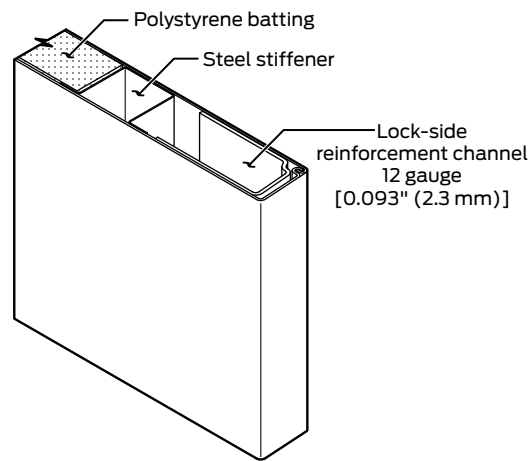
### Fire ratings

Steelcraft PW14 Paladin™ Series Flush doors meet the broadest fire rating requirements. They are listed and labeled by Intertek (ITS/WHI). Installations requiring compliance to both neutral pressure testing UL-10B and positive pressure standard UL-10C.

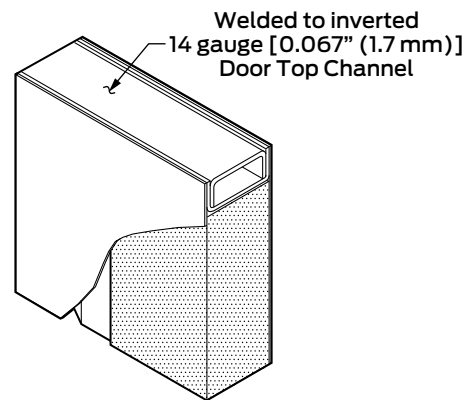
Paladin Flush doors and frames can be fire rated up to and including 3 hours.

Paladin Glass Light doors and frames can be fire rated up to and including 1 ½ hours.

Standard construction



Standard 12 gauge [0.093" (2.3 mm)]  
Galvannealed Top Channel



Standard PW14 Paladin™ series core

- Galvannealed Steel Stiffeners welded to one face sheet and attached with epoxy adhesive to the opposite face sheet
- 1 pound density insulation inserted between the steel stiffeners
- 12 Gauge (0.105") reinforcement channel at the lock edge

Standard Premium Edge Construction

- Beveled hinge and lock edges
- Full height mechanical interlock with epoxy adhesive
- Mechanical edge seam is welded and dressed smooth prior to applying the factory primer. No options
- Lock edge with 12 Gauge (0.105") channel

Standard Rigid End Channel Construction

- 14 gauge inverted galvannealed top and bottom channels
- Top channel includes an additional 12 Gauge (0.105") top channel.

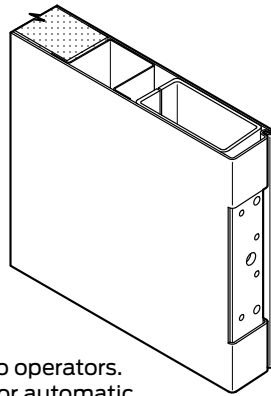
Door Application and Usage				
Series	Steel Thickness	Opening	Usage Frequency	
PW14	14 Ga (1.7 mm)	Interior - Galvannealed Steel Exterior - Galvannealed Steel	Maximum Duty	Tornado resistance in accordance with FEMA 361 and ANSI ICC500-2014 standards

## Standard hardware preparations (ICC500-2014 and FEMA 361/320 compliant)

### Universal mortise hinge prep

Patented Universal hinge preparations allow for easy field conversion from standard 4 1/2" (114 mm) x 0.134" (3.3 mm) standard weight hinges to 4 1/2" (114 mm) x 0.180" (4.7 mm) heavy weight hinges.

- Optional preps for 5" (127 mm) x 0.146" (3.7 mm) standard weight hinges or for 5" (127 mm) x 0.190" (4.8 mm) heavy weight hinges.
- High frequency hinge prep is also available and is required with auto operators. For reinforcement requirements for automatic operators, see ["High frequency hinge reinforcement F and FE Series" on page 73.](#)
- The 12 gauge lock side reinforcement shown beside the center hinge prep supports the panic bar on a WS device.

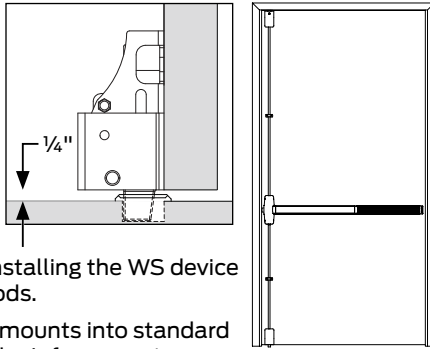


### WS98/9927/9957

Prep for Von Duprin Windstorm devices:

- 2-point WS98/9927(F)
- 3-point WS98/9957(F)

The 12 gauge lock side reinforcement provides support for installing the WS device with surface vertical rods.



Bottom latch housing mounts into standard 12 ga lock side channel reinforcement.

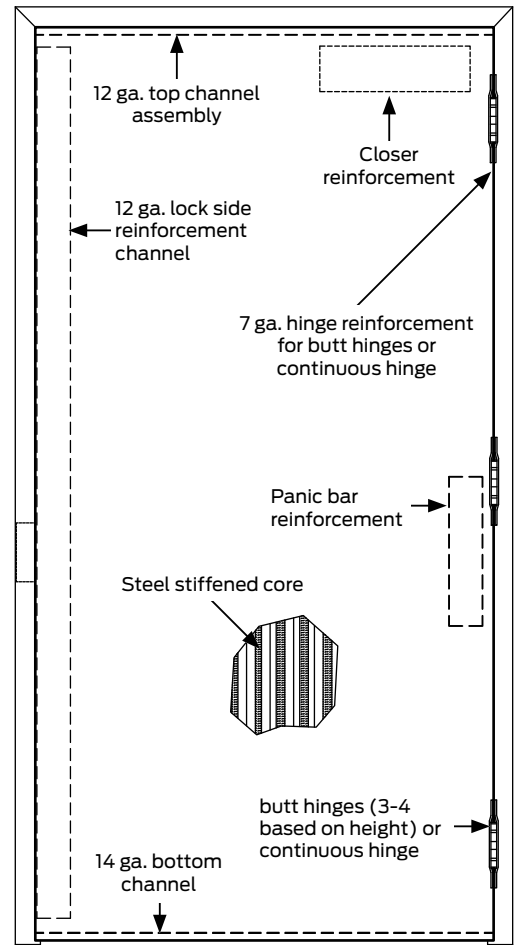
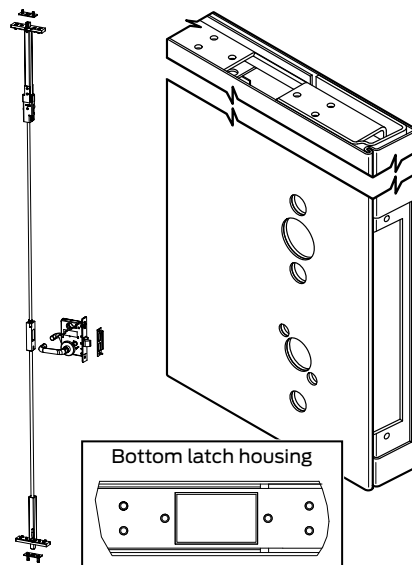
See [Figure 11.1: PW-Series hardware preparations](#) for reinforcement locations.

**Note:** Housing will be mounted higher on door for rabbetted threshold. See [page 205, #6.](#)

### LM9300

Prep for LM9300 MultiPoint (3-pt).

- CVR (concealed vertical rod) assembly is installed at the factory
- Center latch is shown with 8" high cutout for astragal prep. Typical prep is 4 7/8" ASA prep. See ["Hardware preparations" on page 229.](#)
- See [Figure 11.1: PW-Series hardware preparations](#) for reinforcement locations.



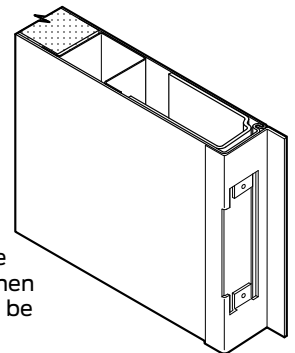
**Figure 11.1:** PW-Series hardware preparations

### Inactive leaf ASA strike prep with astragal attached

Mounting tabs for the ASA 4 7/8" (124 mm) mortise strikes are attached to the door edge for direct mounting

- Astragals, cut-out only for the flush mounting of the strike to the door. There are no tabs attached to the astragal. Note astragals can be used with LM9300 pairs but should not be used with panic exit devices. When not using astragals, the gap can be filled with Zero gasketing

Surface bolt reinforcement is provided for inactive leaves

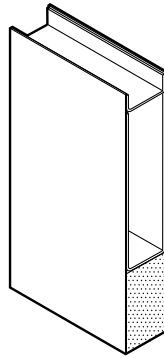




**Standard 14 gauge [0.067" (1.7 mm)] with optional full width reinforcement**

20" closer reinforcements are provided.

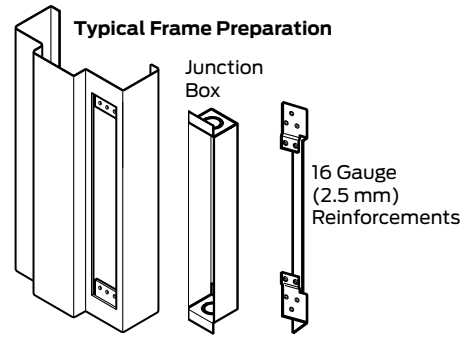
- Full width surface closer
- Surface overhead holder/stop
- Surface Floor & Wall stops/holders



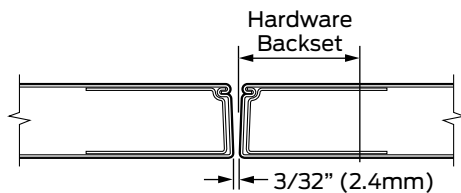
**Electrical Preps**

Options will be reviewed by engineering at the time of order and will not be available in OEW. The following options are available:

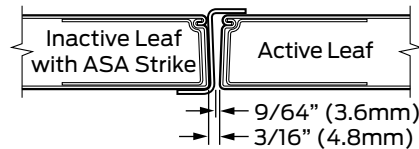
- Power transfer units (EPT2, EPT10)
- Electric hinge
- Electric door closer utilizes the same preps shown in "closers"
- Magnetic hold opens utilize the same preps shown in "closers." Must be outswing and must be located away from hardware/rod locations to avoid interference.
- Door position switch (round) must be mortised into edge or top of door
- Magnetic switch (rectangle) must be mounted to exterior or storm side only
- Auto operator allowed on exterior, or storm side, only and must use high frequency hinge reinforcement and 5" heavyweight hinges.



**Meeting edge details for pairs of doors**



Without astragal



With astragal

Door Sizes and ANSI A250.8 Conversions							
Series	ANSI A250.8 - SDI 100	Edge Construction	Minimum and Maximum Sizes				Recommended Gauge of Frame
			Single		Pair		
			Min	Max	Min	Max	
PW 3-sided flush	Not Applicable	Welded	3' 0" x 6' 8" 914 x 2032 mm	4' 0" x 8' 0" 1219 x 2438 mm	6' 0" x 6' 8" 1829 x 2032 mm	8' 0" x 8' 0" 2438 x 2438 mm	14 Gauge [0.067" (1.7 mm)]
PW 3-sided PV/PVF							
PW 3-sided PN-PNF							
PW 4-sided flush (shutters)			2' 8" x 4' 3" 813 x 1295 mm	4' 0" x 8' 0" 1219 x 2438 mm	5' 4" x 4' 3" 1629 x 1295 mm	8' 0" x 8' 0" 2438 x 2438 mm	

**NOTE:** Review "ITS/WHI Intertek Approved hardware & components per ICC500-2014" on page 215 for approved hardware, notes and restrictions.



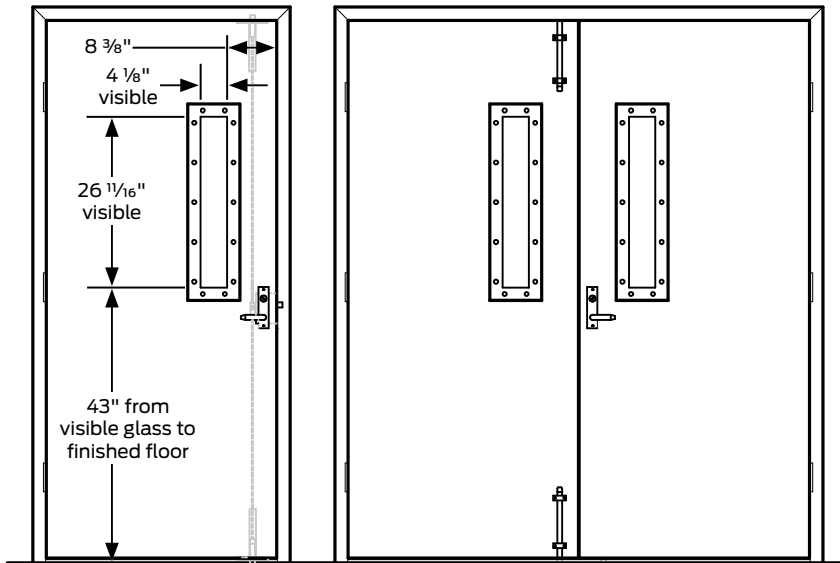
### Glass light options

Fully installed from the factory Glass lights with trim included in PV and PN label Light designs without modification. Lights can be added to any Paladin door available in a 3-sided frame. Lights are not available in variable sizes or locations. Fire rated versions (PVF and PNF) are available up to 90 minutes.

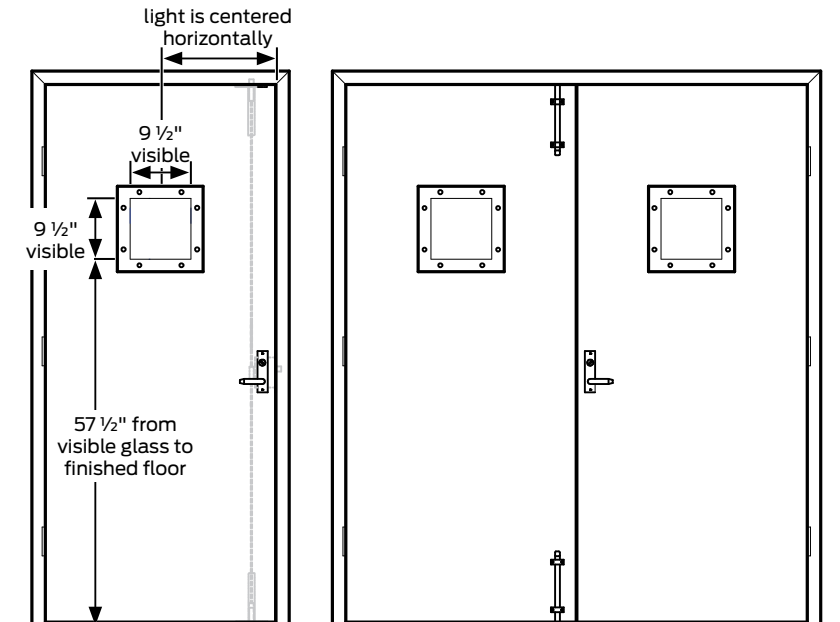
See "[Paladin glass lights](#)" on page 158 for further details and options, including care and instructions concerning your glass lights before and after installation.

- Standard 1" Thick Glass. Fire rated glass is slightly, but not noticeably, thicker.

#### Narrow light with Schlage LM9300 concealed rods lock and latch\*



#### Vision light with Schlage LM9300 concealed rods lock and latch\*

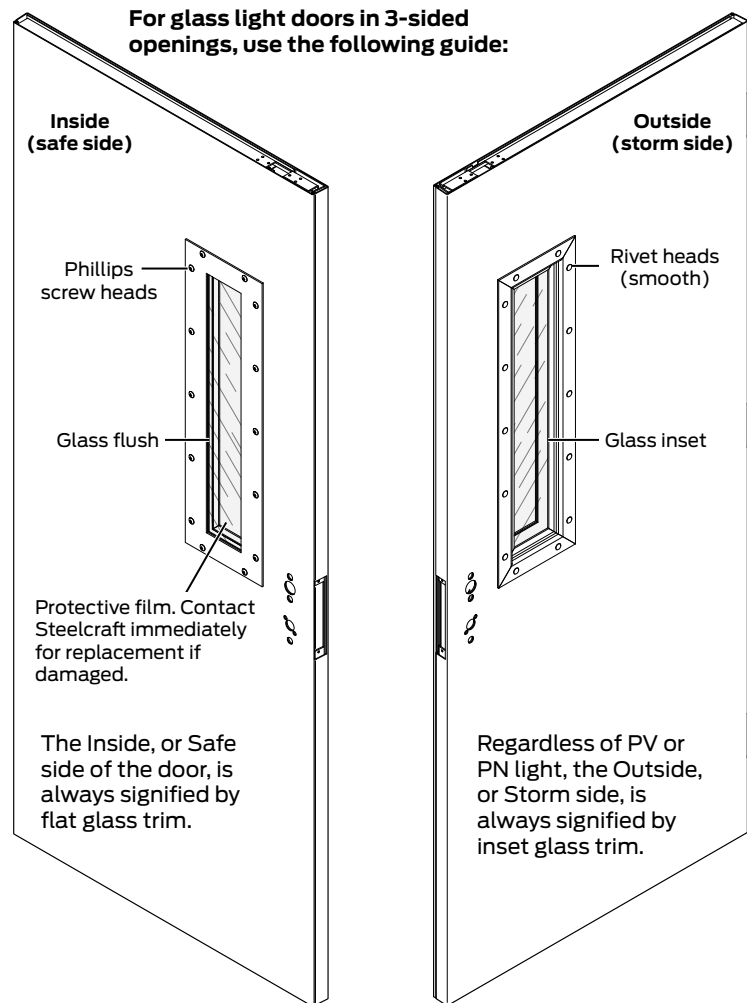


\* Also available with WS98/9927 2-pt Panic Exit and WS98/9957 3-pt Panic Exit (same size and location glass)

## Paladin handing

Correctly understanding handing in ordering and installing tornado products is critical to life safety. In referencing "Handing procedures diagrams" on page 11, use the following IMPORTANT rules when considering Tornado openings.

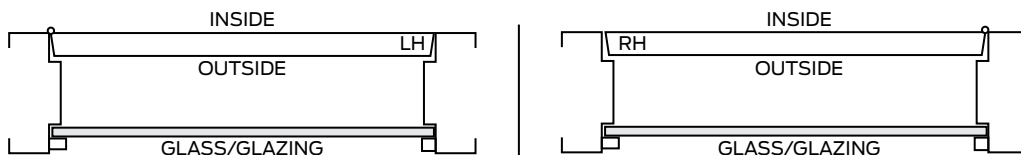
- The Exterior, or Outside, is always the Storm side (the side of the door that faces a storm). Typically this is the Key Side, but not always (e.g. not typical, but if the shelter is the hallway and a connected classroom is outside of the shelter, the outside of your door would face the classroom since that is the side facing the outside, or storm side, of the shelter).
- The Interior, or Inside, is always the Safe side (the side on the inside of your shelter or safe room). Typically this is the non-Key Side, but not always (e.g. not typical, but if the shelter is the hallway and a connected classroom is outside of the shelter, the inside of your door would face the hall since that is the side facing the inside, or safe side, of the shelter).
- Note that PW doors may be inswing or outswing when using lever trim. But PW doors with panic exit hardware will always be outswing with the panic bar on the safe side and the door opening out towards the Outside, or Storm side.



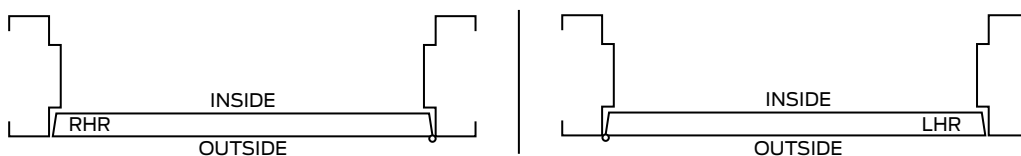
## Shutter handing

Most shutter applications should be ordered as straight handed.

- Straight handed shutters (Figure 11.2: Straight handed shutters): Shutters with glass in a 4-sided frame are always straight handed. If the shutter opening does not have glass, but is still installed into the rabbet nearest to the inside/shelter/safe side of the opening, then the shutter is still straight handed.
- Reverse handed shutters (Figure 11.3: Reverse handed shutters): Shutters without glass that are installed into the rabbet nearest to the storm side of the opening is reverse handed. This option would not have glass.



**Figure 11.2:** Straight handed shutters



**Figure 11.3:** Reverse handed shutters

## FP14 Series flush frames

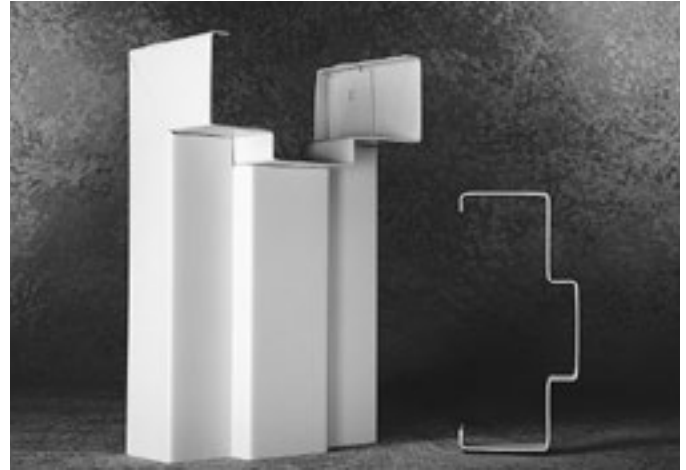
### About the product

The FP14 Paladin™ Series 3 Sided flush frames are designed to meet requirements of ICC500-2014 code, FEMA 361/320 guidelines, and ANSI compliance to protect the general public from the extreme effects of tornadoes. These frames are available in 14 gauge [0.067" (1.7 mm)] only. They are installed in both interior and exterior locations, and in virtually all types of buildings and wall constructions. These frames are to be installed as part of the wall framing sequence. They can be specified and supplied as KD (knock-down) for field assembly prior to installation or SUA (set-up and welded) for installation as a pre-welded unit. All FP14 Paladin™ Series frames include the ICC500-2014 / FEMA 361/320 Label.

### Features and benefits

Steelcraft FP14 Paladin Series flush frames offer the following unique features which enhance long term functionality and durability:

1. **14 Gauge A60 galvanized steel for superior corrosion resistance** on exterior openings.
2. **Die-mitered corner connections** at the head and jamb. Standard corners insure attractive, tight and closed miters.
3. **Patented universal hinge preparations** allow for easy field conversion from standard weight .134" (3.3 mm) thick hinges to heavy weight .180" (4.7 mm) hinges.
4. **Adjustable base anchors** allow for installation adjustment when the floor is not level.
5. **Factory prepared** for field installed silencers.
6. **Factory applied baked on rust inhibiting**



### Specification compliance

1. Overall frame construction for the Steelcraft FP14 Paladin™ Series flush frames meets the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6-2003 (R2009). Locations are in accordance with ANSI/DHI A115.

### ICC500-2014 / FEMA COMPLIANCE LABEL

The FP14 Paladin Series flush frames meet fire rating requirements. They are listed by Intertek (ITS/WHI) installations requiring compliance to both neutral pressure testing UL 10B and positive pressure standard UL 10C. Refer to the Fire Rated Section of this manual for particular listings.

Hardware and concrete recommendations from Steelcraft are only guidelines. Hardware and industry specific building standards must be followed and should take precedence, although any differences in recommendations should be investigated and understood.

### Fire ratings

Steelcraft FP14 Paladin Series Flush doors meet the broadest fire rating requirements. They are listed and labeled by Intertek (ITS/WHI). Installations requiring compliance to both neutral pressure testing UL-10B and positive pressure standard UL-10C.

Paladin Flush doors and frames can be fire rated up to and including 3 hours.

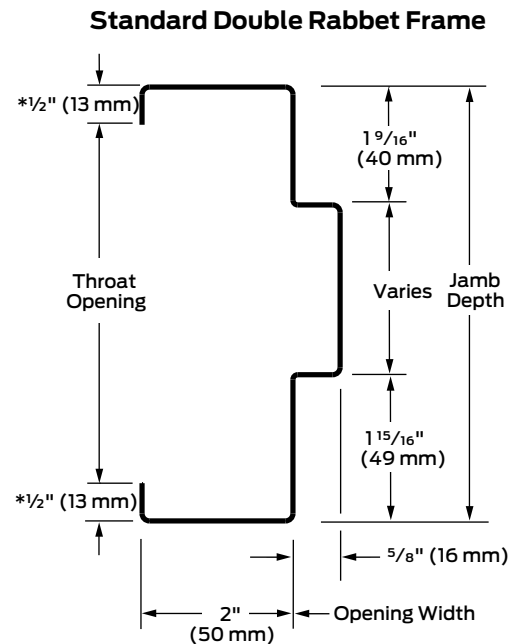
Paladin Glass Light doors and frames can be fire rated up to and including 1 ½ hours.

### Applications

FP14 Paladin Series flush frames are typically installed in wall construction types as defined in the chart below:

Frame Applications			
Profile	Steel Thickness	Wall Construction	Typical Wall Anchors
FP14	14 Gauge [0.067" (1.7 mm)]	New Masonry - CMU Block	Masonry T
		Existing Masonry* <ul style="list-style-type: none"> <li>▪ Concrete (e.g. tilt-up or prefab)</li> <li>▪ CMU Block</li> </ul>	Bolted through Soffit and Tube and Strap anchor

**\*Note:** Frames in existing masonry wall constructions are not required to be grouted, except for 4" face heads, which must be grouted.

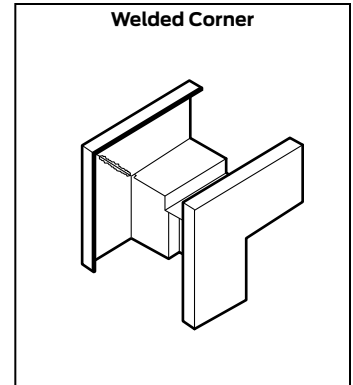
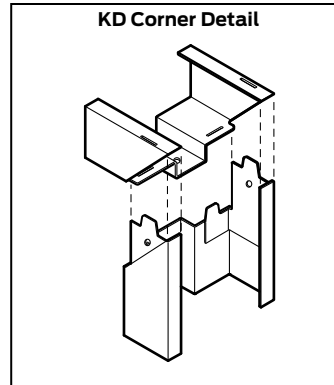
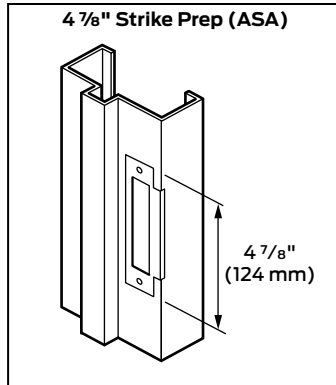
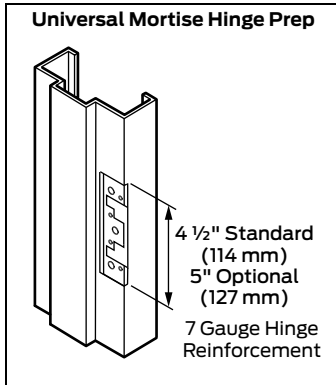


**Note:** FP14 Paladin™ Series Frame are available as double rabbet only.

Frame Sizing Options											
Series	Minimum and Maximum Size				Jamb Depth Availability (Profile)			Standard Profile Dimensions (Variations Available)			Corners
	Single		Pair		Single Rabbet	Double Rabbet		Face	Stop	Returns	Standard
	Min	Max	Min	Max	N/A	Min	Max				
	FP14 3-sided	3' 0" x 6' 8" 914 x 2032 mm	4' 0" x 8' 0" 1219 x 2438 mm	6' 0" x 6' 8" 1829 x 2032 mm		8' 0" x 8' 0" 2438 x 2438 mm	5 ¾"	14 ¾"	2"	⅝"	½" *
FP 4-sided (shutters)	2' 8" x 4' 3" 813 x 1295 mm	4' 0" x 8' 0" 1219 x 2438 mm	5' 4" x 4' 3" 1629 x 1295 mm	8' 0" x 8' 0" 2438 x 2438 mm							

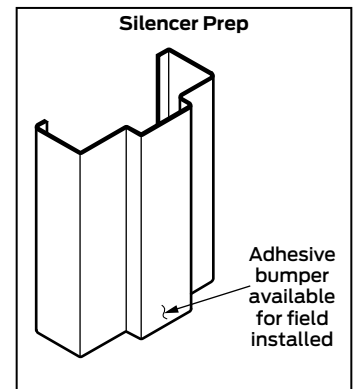
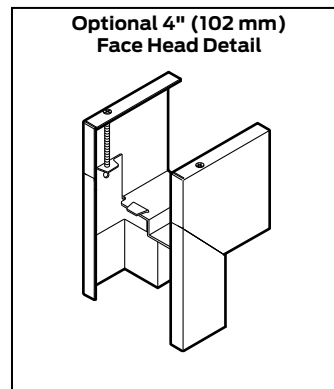
n/a = not available

\* except 5 3/4" (146 mm) depth, which is 7/16" (11 mm)



### General notes

- Variations in jamb depths available in  $\frac{1}{8}$ " (3 mm) increments.
- All FP Paladin™ Series Frames are supplied standard with Masonry T anchors for new masonry. For existing masonry, Tube and strap anchors welded in from the factory with punch and dimpled frames including approved anchor bolt. Anchors and bolts are designed and selected for maximum wall/frame engagement for Tornado applications. Additional information is available upon request.
- FP Paladin™ Series Frames are to be installed as part of the framing sequence.
- All frames are supplied with a factory applied baked-on primer for ultimate field paint adhesion.
- Steelcraft provides Galvannealed steel for both interior and exterior applications.



### Door Sizes and ANSI A250.8 conversions

Series	Frame Profile		Corner Connections				4" (182 mm) Heads
	Single Rabbet	Double Rabbet	KD (Knock-Down)		SUA (Up and Welded) (Set)		
			Single Rabbet	Double Rabbet	Single Rabbet	Double Rabbet	
FP14	N/A	Typically for walls 4 ¾" (121 mm) thick or greater	N/A	4 tabs per factory die-miter	N/A	Available when specified, and in accordance with ANSI A250.8-2014 (SDI 100).	Die-mitered for use with 2" (51 mm) face double rabbet jambs. Available when specified for KD or SUA applications.

### Anchoring systems

All anchors are included with your order. Installation instructions will accompany your shipment. If you have questions, please contact technical support for Steelcraft.

See ["Anchoring systems" on page 78](#) for drawings and general information on the FP anchors below:

### New Masonry (CMU Block Walls)

- Masonry T anchors and adjustable base anchors are provided standard with your order when specifying new masonry shelter walls

### Existing Masonry (Concrete or CMU Block Walls)

- Tube and Strap anchors provided standard with punch and dimple frame prep and approved bolts from the factory when specifying existing masonry walls. You must specify shelter wall type when ordering to ensure the correct number of preps for your openings:
  - Concrete (tilt-up/pre-fab) walls (TSCONC)
  - Concrete-filled CMU block walls (TSBLOCK)
- When specifying a 4" face head, you will have a different bolt set than 2" face jamb and heads
- Refer to your shipment installation instructions included with your bolts shipment

### Framing applications

Series	Steel Type	Building Type	Opening	KD Corner	SUA Corner	Applications
FP14	Non-Galvanneal Galvannealed	Institutional and Commercial	Mainly Interior Exterior if Specified	X	X	Tornado Shelters in accordance with ICC500-2014 and FEMA 361

## Approvals

### Openings with Von Duprin® and Schlage® hardware

The **Paladin™ Series** door system (PW14 Series doors and FP14 Series frames) are available in compliance with FEMA 361 and ANSI ICC500-2014 with factory attached ITS/WHI Intertek listed or approved opening labels in the configurations shown below.

For complete Assembly Approvals, see ["ITS/WHI Intertek Approved hardware & components per ICC500-2014" on page 215](#), or go online to [Steelcraft PW Series](#) and click on "Approvals" for a link to ITS/WHI Intertek website approvals..

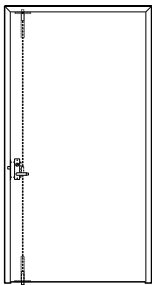
*The Authority Having Jurisdiction is the final authority in issues related to the installation and use of any building products.*

Steelcraft's Paladin™ Series door system is tested as a complete door frame and hardware system. Door, frame and anchors must be ordered from Steelcraft.

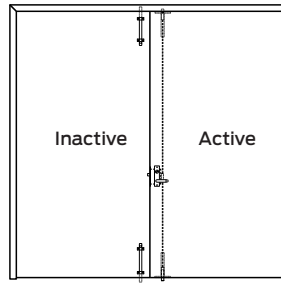
When specified, ITS/WHI fire door labels are factory attached stating listings in accordance with UL10C Fire Resistance Ratings in the configurations shown below.

Schlage and Von Duprin Latches				Single Outswing		Single Inswing		Pair Outswing		Pair Inswing		Figure	
Model	Vertical Rod	Latches	Exit	Tornado	Fire	Tornado	Fire	Tornado	Fire	Tornado	Fire	Single	Pair
Schlage LM9300	Concealed	3-point	Lever	Yes	3 hr	Yes	3 hr	Yes	3 hr	Yes	3 hr	Figure 11.4	Figure 11.6
Von Duprin WS98/9927	Surface	2-point	Panic bar	Yes	none	No	n/a	Yes	90 min	No	n/a	Figure 11.5	Figure 11.7
Von Duprin WS98/9957	Surface	3-point	Panic bar	Yes	3 hr	No	n/a	No	n/a	No	n/a	Figure 11.5*	n/a

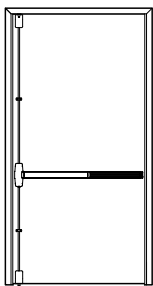
\* WS98/9957 not shown in images. See notes under referenced images.



**Figure 11.4:** LM9300 3-point latch (shown)

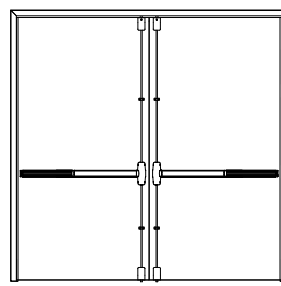


**Figure 11.6:** LM9300 3-point latch (shown)



**Figure 11.5:** WS98/9927 2-point latch (shown)

WS98/9957 (not shown) is similar but is a 3-point latch, adding a center latch point.



**Figure 11.7:** WS98/9927 2-point latch (shown)

#### Notes:

- See page 205, note 6 for information regarding undercuts and installation.
- LM 9300 Inactive leaf must use IVES SB360 surface bolts. See LM9300 data sheets and installation instructions in the online library at <http://us.allegion.com/en/home/document-library.html> for more information.
- WS devices available with EO (exit only). NL (night latch) not available. Electrical options include LX, RX, RX-2, ALK, SS, QEL, E996L E-Trim. See WS98/9927 data sheets and installation instructions in the online library at <http://us.allegion.com/en/home/document-library.html> for more information.
- See ["ITS/WHI Intertek Approved hardware & components per ICC500-2014" on page 215](#).
- Available glass light options may be added to any PW flush door in a 3-sided frame.

ITS/WHI Intertek Approved hardware & components per ICC500-2014			
Item	Manufacturer and description	Approval listing	Notes
Latching hardware			
LM/LMV9300 series 3-point latch	Schlage (lock)	UL file R27031	Outswing & inswing applications
	Von Duprin (rod assemblies)	UL file R21149	
WS98/9927 (F) vertical rod	Von Duprin vertical rod	UL files R4504 & SA163	Outswing applications only
WS98/9957 (F) 3-point latch	Von Duprin 3-point latch	UL files R4504 & SA163	
SB360 surface bolts	Ives top & bottom surface bolts	UL file R4942	
Butt hinges			
3CB1, 3CB1HW, 3CB1NRP, 3CB1HWNRP, 3CB1SH, 3CB1HWSH, 5BB1, 5BB1HW, 5BB1WT, 5BB1NRP, 5BB1HWNRP, 5BB1SH, 5BB1HWSH, 5BB1HW WT	Ives butt hinges - 4.5 High (0.134 Min) or 5 high (0.146 Min)	UL file R16697	
TW4, TW8	Ives electric hinge options	UL file BP9752	
Continuous hinges			
112HD, 112XY, 224HD, 224XY	Ives aluminum geared continuous hinge - nominal leaf thickness 0.110	UL file R16697	
600, 700, 700Cs, 705	Ives steel pin & barrel continuous hinge - nominal leaf thickness 14 gage	UL file R16697	
TW8, TWP	Ives electric continuous hinge options	UL file BP9752	
Electric power transfer			
EPT-2, EPT-10	Von Duprin electric power transfer	UL file SA163	
Closers			
4000T, 4010, 4010T, 4020, 4020T, 4030, 4030T, 4040XP, 4040XPT, 4050, 4110, 4110T	LCN surface mounted closer	UL file R1943	All surface mounted closers must be attached to door with through bolts per manufacturer's installation instructions. Covers must be attached with steel screws. 4010, 4040XPT, 4000T & 4050 do not open to 180 degrees, so application should be confirmed.
FALCON SC70 (heavy duty), SC80A, SC60A	Falcon surface mounted closer	UL file R1943	
Overhead holder/stop			
70S, 79S, 81S, 90S	Glynn Johnson surface mount overhead holder/stop	UL file R18895	79 Series does not open to 180 degrees, so application should be confirmed.
Electronic door closer			
4040SE, 4310ME	LCN-sentronic electronic door closer	UL file R1943	To be mounted only to the exterior side of storm shelter or safe room
Auto-door operator			
9542, 9553	LCN auto door operator	UL file R7303	To be mounted only to the exterior side of storm shelter or safe room
Magnetic holder			
SEM 7800	LCN magnetic holder	UL file R8327	Extenders not permitted on inswing applications
Door position switch			
1076, 1078 (round), 2757 (rectangular)	Sentrol door position switch	UL file R13778	Must be mortised into the edge or top of the door, and into the door rabbet of the jamb or head of the frame.
MSS-1 (high security)	Securitron door position switch	UL file BP6799	
679-05 (round), 7764 (rectangular)	Schlage door position switch		
Kick plates			
8400 (Metal or plastic), 8402 (metal)	Ives kick plate	UL file R22142	Must be secured with steel screws. 48" Max height bottom of door only.
Thresholds & gasketing			
	Zero	UL file R18465	Must not impede or affect the function of the opening or latching hardware.
Floor & wall stops/holders			
	Ives		Attached to exterior with steel screws per manufacturer's instructions. Interior application must be Ives FS495 through bolted to the door, at the bottom only, minimum 6" from lock or strike side of door.

This page intentionally left blank.



# Specialty products

Stainless steel doors and frames.....	218
General information .....	218
Typical hardware locations .....	219
Standard hardware preparations.....	220
Sizes and performance.....	221
Sound openings.....	222
General information .....	222
STC Tested doors .....	222
Hardware options.....	222
Sound transmission ratings .....	223
Thermal break frames .....	224
FT Series.....	224



## Stainless steel doors and frames

### General information

#### About the product

Steelcraft Stainless Steel Doors (LS Series) and Frames (FS, KS & MS Series) are engineered to meet the architectural requirements for stainless steel doors and frames in building applications requiring exceptional corrosion resistance and/or high design appearance.

This LS Series 1 3/4" door construction combine unique product features to withstand harsh environments while providing exceptional design.

To meet application requirements, the door is available in single and double door sizes, with optional visions, louvers, fire ratings and a wide range of hardware preparations.

Steelcraft Stainless steel doors and frames are Hurricane approved and models have been acoustically tested up to STC 51 (addition of vision light and/or doors swinging in pairs reduce the STC performance).

#### Installation

- Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) *Recommended Erection Instructions for Steel Frames and NAAMM-HMMA 840-07.*

#### Specification compliance

1. Stainless steel astm a666 and astm a167; type 304 or type 316
2. NAAMM-HMMA 866-12 Guide Specifications for Stainless Steel Hollow Metal Doors and Frames
3. NAAMM-HMMA 860-92 Guide Specifications for Hollow Metal Doors and Frames

Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) *Recommended Erection Instructions for Steel Frames and NAAMM-HMMA 840-07.*

### Features and benefits

All Steelcraft's LS Series doors and FS, MS & KS Series frames are fabricated from 100% stainless steel both external and internal. Offered in two stainless steel alloys, 304 or 316, these Doors and frames provide excellent corrosion resistance, durability, performance, as well as a sleek aesthetic appearance.

### Performance

#### Door: LS18 and LS16 Series:

1. **Door Cores** to suit various applications:
  - **Polystyrene, Honeycomb or Polyurethane**
  - **Steel Stiffened** available on quote basis
2. **Gauge:**
  - **18 gauge** and **16 gauge (standard)**
  - Heavier gauge available on a quote basis
3. **Vertical Edge Seams:** Seamless and Interlocking Edge.
4. **Beveled Hinge and Lock Edges**
5. **Component Parts and Hardware Reinforcements**
  - Made of 100% Stainless Steel

#### Frame: FS16, MS16, KS16 Series:

1. **Gauge:**
  - **16 gauge (standard)**
  - Heavier gauge available on a quote basis
2. **Component Parts, Reinforcements and Anchors:** all made of 100% Stainless Steel.
3. **Machine Mitered** corners factory welded and refinished to match face trim with no visible seam.
4. **Knock-Down (KD)** frame options available.
5. **Anchors:** masonry T, wire anchors, metal stud, existing wall anchors.

### Ratings: actual tests conducted on stainless steel assemblies.

1. **Fire-rated** up to Class A (3 hour)
2. **Sound-rated** Door and Frame Assemblies up to STC 51
  - Seals not included
3. **Hurricane** approved (NOA Dade County Florida)

### Durability

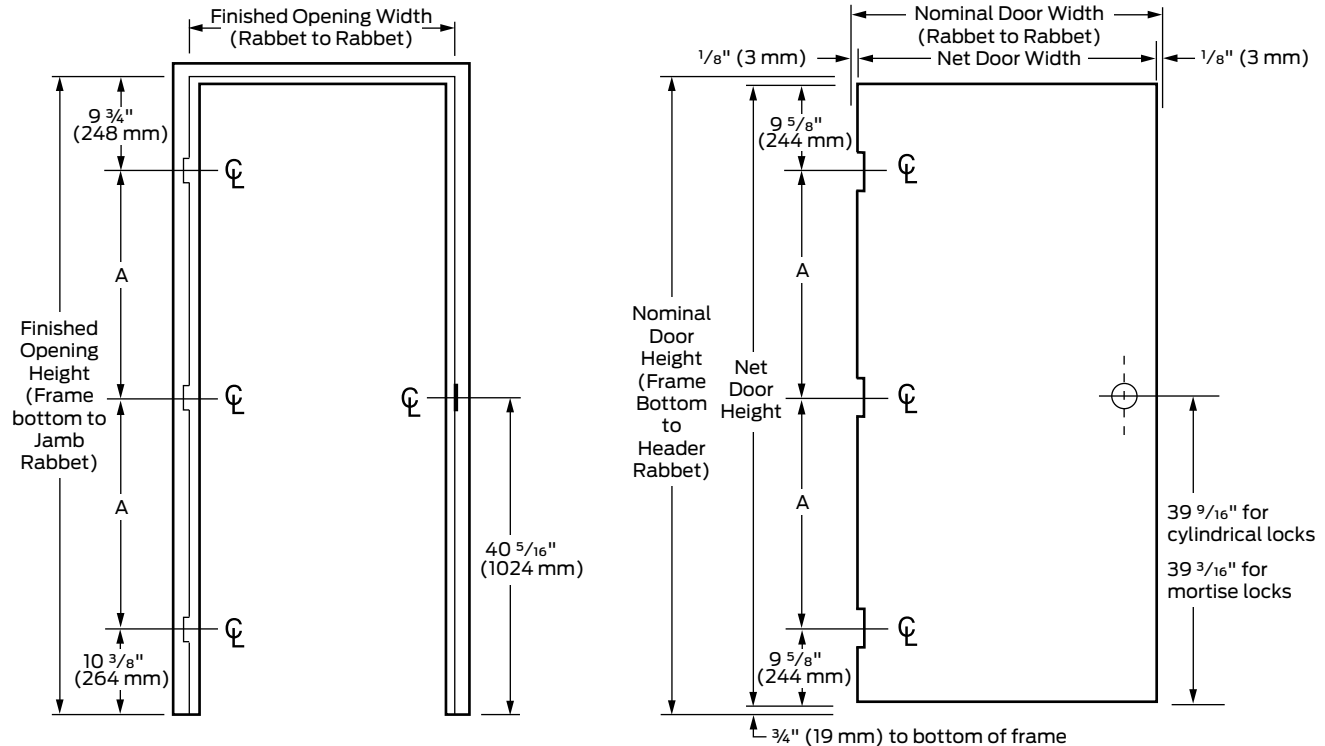
1. **Exceptional corrosion resistance:** conforming to ASTM A666:
  - **Type 304 Alloy:** typical corrosion resistance.
  - **Type 316 Alloy:** heavy duty corrosion resistance.

### Fire ratings

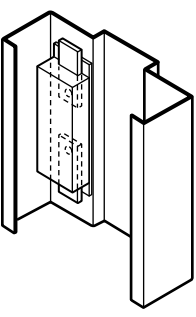
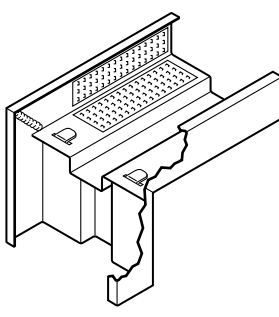
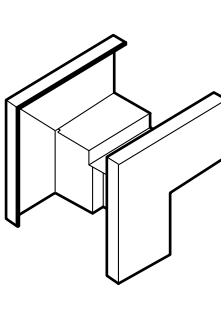
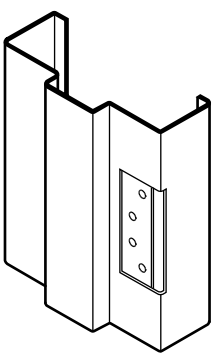
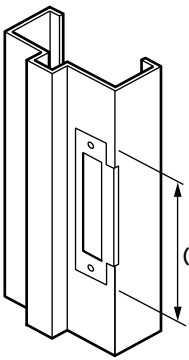
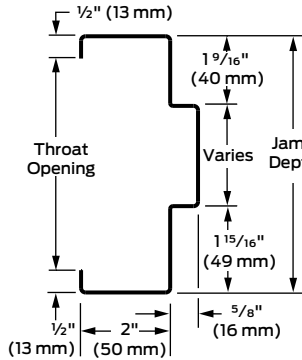
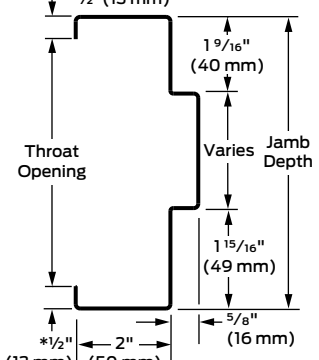
Steelcraft Stainless Steel Series doors and frames meet the broadest fire rating requirements. They are listed for installations requiring compliance to both neutral pressure testing (ASTM E152 and UL -10B) and positive pressure standards (UL-10C).

## Typical hardware locations

### Doors and frames with 3 hinges (1 ½ pair)

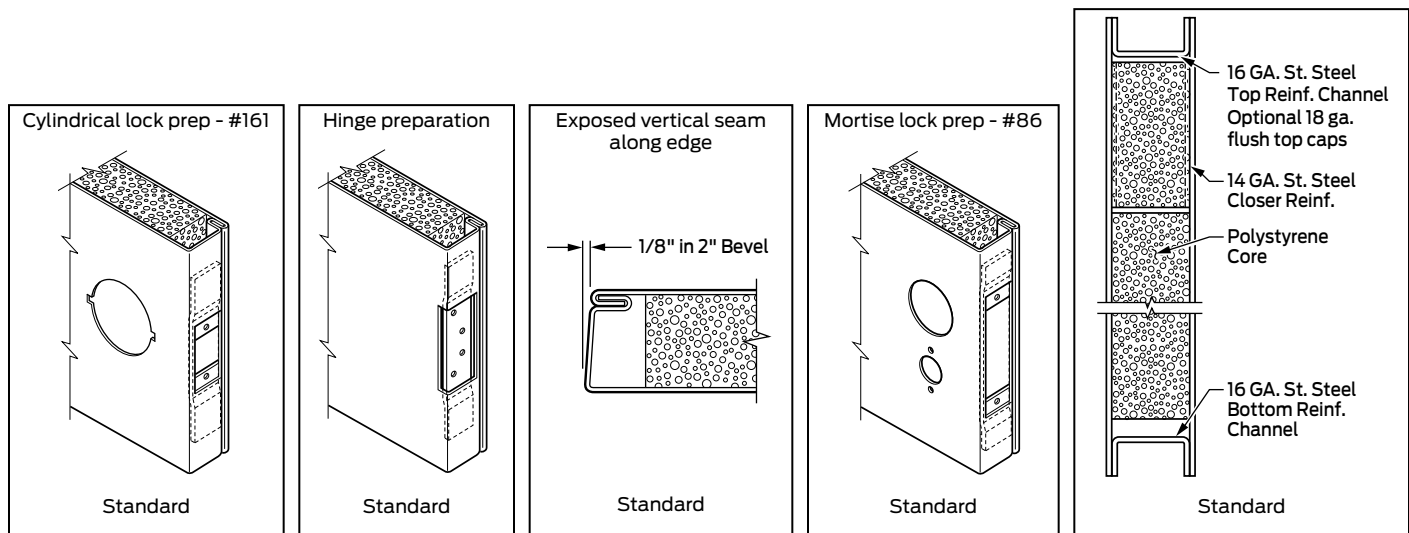


### Standard door frame details

			Door opening height	Dimension "A"
 <p>Dust box</p> <p>Standard</p>	 <p>Closer reinforcement</p> <p>Standard</p>	 <p>Corner profile</p> <p>Standard-face welded</p>	6' 8" (2032 mm)	29 15/16" (760 mm)
			7' 0" (2134 mm)	31 15/16" (811 mm)
			7' 2" (2184 mm)	32 15/16" (837 mm)
			7' 6" (2286 mm)	34 15/16" (887 mm)
 <p>Hinge preparation</p> <p>Standard</p>	 <p>4 7/8" Strike prep (ASA)</p> <p>Standard</p>	 <p>Head detail</p> <p>2" Head standard</p>	 <p>Jamb detail</p> <p>Standard</p>	

## Standard hardware preparations

Typical hardware applications shown



### Hinges:

- **Template hinge preparations** for 4 1/2" or 5" standard weight or heavy weight butt hinge preparations.
- Continuous hinge preparations are full mortise reinforced.

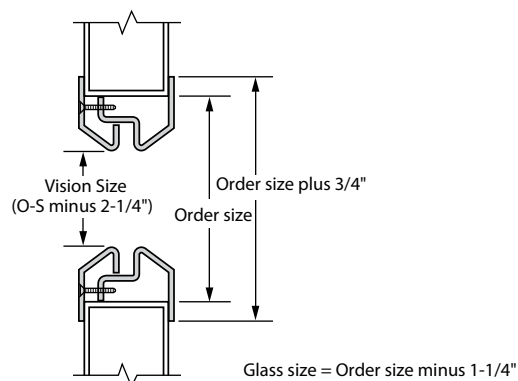
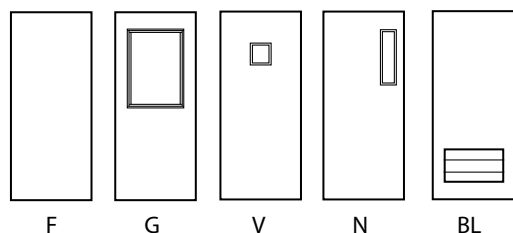
### Locks:

- **Cylindrical** 161, 61 L and **Mortise** 86 lock preps are available for single door and active leaves.
- **Templated hardware preps**

### Exit devices preps are available as follows:

- **Single/Active doors** = Rim or Mortise
- **Inactive leaves** = Surface Vertical Rods

### Glass light options



### Closers:

- **Surface applied closer** reinforcements standard in both doors and frames.
- **Concealed closer** preparations available as specified.

### Strikes:

- **Strike** preparations will accommodate specified locking hardware.

### Electric hardware:

- **Electric Hinge preparations** are available as specified.
- **Electric lock preparations with conduit** are available as specified.
- **EPT (Electric Power Transfer)** preps are available as specified.

### Astragals:

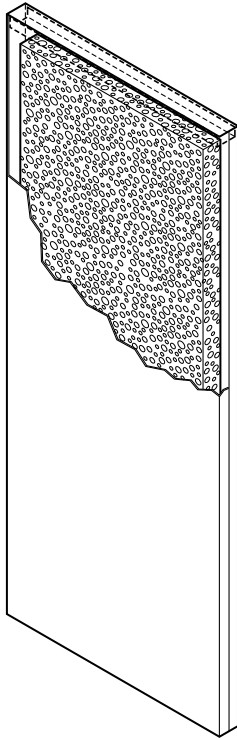
- **Surface mounted:** flat for active or inactive leaf

### Notes:

1. V-Light: Exposed glass size is true **10" x 10"** located at Steelcraft standard location.
2. N3, N4 and N5 light: Exposed glass size and locations at Steelcraft standard dimensions.
3. **NOT AVAILABLE WITH DESIGNER® TRIM.**
4. Light kits are Anemostat LoPro design.
5. **Vision lites on pairs must match.**
6. Louvers can be installed upon request
7. Standard 1/4" glass, other available upon request.

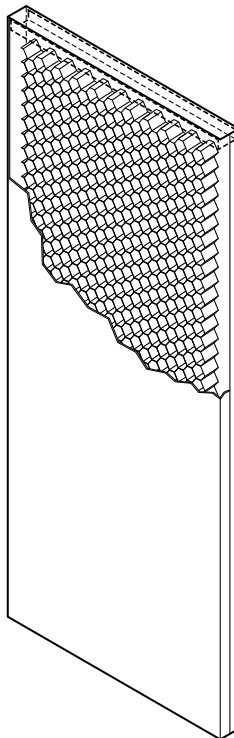
Glass Option	Exposed Glass Size	Glass Cutting Size
V	10" x 10"	11" x 11"
N3	3" x 33"	4" x 34"
N4	4" x 25"	5" x 26"
N5	5" x 20"	6" x 21"

## Sizes and performance

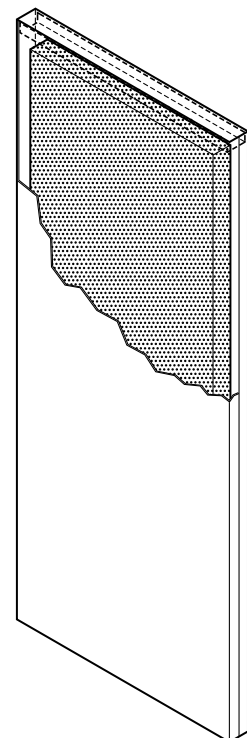


Polyurethane

U-0.10  
R-9.72



Honeycomb



Polystyrene

U-0.15  
R-6.73

### General information

Steelcraft Stainless Steel doors and frames are designed to fit virtually all construction requirements for commercial and institutional building applications. Doors and Frames are shipped separately. All stainless steel product is packaged with protective pad and crated in heavy wood containers. Proper installation of Door and Frame Systems is critical to insure proper performance. It is imperative that materials are inspected thoroughly for shipping damage. If damage has occurred en route, please note it on the bill of lading and shipping documents.

### Sizes and performance

All stainless steel doors and frames are manufactured and supplied to meet the dimensional standards and performance levels as published in ANSI A250.8- 2014 (SDI 100).

### Custom options

Special size products are available to meet the unique construction, performance and aesthetic requirements of the architectural community. Contact Customer Care for these requirements at: 1-877-671-7011 (ask for estimating) or email [Steelcraftestimating@allegion.com](mailto:Steelcraftestimating@allegion.com)

### On-site storage

Store doors under cover, in a dry area and in an upright position. All ferrous metal products should be stored where they will not be exposed to, or come in contact with water. This is particularly true of products such as doors, which have large flat surfaces on which water may collect if they are stacked horizontally. Do not use non-vented plastic or canvas. These materials create a humidity chamber, which promotes blistering and corrosion. Place no more than 5 doors in a group, with all material on planking or blocking at least 4 in. (100 mm) off the ground, 2 in. (50 mm) off a paved area or the floor slab. Provide a least ¼ in. (6.4 mm) space (wood strip).

### Installation

Installation of all Steelcraft frames and doors shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) *Recommended Erection Instructions for Steel Frames and HMMA 840*. All Fire Rated doors must be installed and maintained in accordance with the National Fire Protection Association Pamphlet 80, and/or the local Authority Having Jurisdiction.

## Sound openings

### General information

Doors are often used to block the passage of sound from one area to another. The sound rating of a door is expressed as Sound Transmission Class (STC). The higher the STC ratings, the better the performance.

### STC (Sound Transmission Classification)

The Sound Transmission Class (STC) is a single-number rating of a material's or an assembly's ability to resist airborne sound transfer at the frequencies 50-5000 Hz. In general, a higher STC rating blocks more noise from transmitting through a door opening.

The sound transmission loss performance is measured using ASTM E 90 "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements" and calculated according to ASTM E 413 "Classification for Rating Sound Insulation."

The ASTM E90 test is conducted on a 3070 door and frame assembly in a laboratory. The assembly is built into a wall, dividing the sound-proof acoustical test room in to two sections. Sound is introduced into the source section of the room at different frequencies and the amount of sound, transmitted through the unit is recorded in decibels.

A door assembly is given an STC rating per ASTM E413 by measuring its *Transmission Loss* over a range of 21 different frequencies between 50 and 5000 Hz. Measured Transmission Loss (number of blocked dB) at each frequency gets rounded and adjusted with standardized coefficients. The STC rating is then calculated based on formula, when certain conditions of sound deficiencies have been met.

### Products

Steelcraft offers different types of door, frame and gaskets for the various STC ratings. The standard Steelcraft door (honeycomb, styrene or STC stiffened core) will provide a range of STC ratings. The gauge of the door does not normally affect the STC rating. The core and the gaskets used are the determining factors.

The installation is also a critical factor in the performance. The gaskets must meet the face of the door and sill (floor), making a good seal. In addition any construction that passes from one area to another will also carry sound. As an example, heating and air conditioning ducts will carry sound from one area to another.

### STC Tested doors

The following STC ratings have been achieved with standard Steelcraft door and frame products with the inclusion of gasket seals.

Door Series	Core	STC Rating	Gasket Notes
B Series B14	STC - Steel Stiffened	44	1, 2, 3 & 4
B Series B18, 16	STC - Steel Stiffened	40	1, 2, & 3
L Series L18, 16, 14	Honeycomb	35	1 & 3
L Series L18, 16, 14	Polystyrene	25	1 & 3
H Series H16, 14	Honeycomb	36	1 & 3
H Series H16, 14	Polystyrene	28	1 & 3
CE Series CE18, 16	Polystyrene	30	1 & 3

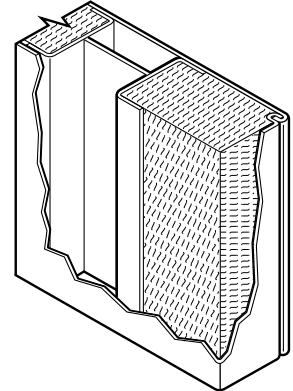
### Gasket Notes (supplied by others):

1. Perimeter Seals: Zero #475 applies to the stop of the head and jambs.
2. Door bottom: Zero #367, surface applied.
3. Threshold: Zero #560 (non-ADA). Zero #566 (ADA compliant).
4. Cushion Spring: Zero #119W.

### B Series STC - Stiffened core construction

#### Standard B Series core:

- 20 gauge stiffeners
- Stiffeners welded to inside of face sheets
  - Vertical interior webs located 6" (152 mm) apart
  - Welded to face sheet 5" (127.6 mm) on center
- Stiffeners welded to each other at the top and bottom
- Areas between stiffeners filled with nominal 1 pound (453.6g) per ft<sup>3</sup> density fiberglass batt insulation



### Hardware options

**Note:** Hardware preps and internal reinforcements will vary due to acoustical requirements.

#### Hinges:

- Template hinge preparations for 4 1/2" or 5" heavy weight butt hinges
- Continuous hinge preparations available when specified.

#### Locks:

- Cylindrical 161, 61L and Mortise 86 (sectional or escutcheon trim) lock preps are available for single door and active leaves.

#### Exit devices: preps are available as follows:

- Single doors = Rim or Mortise exit devices
- Inactive leaves = Surface Vertical Rods

#### Closers:

- Surface applied closer reinforcements are available in both doors and frames.
- Concealed closer preparations are not available.

#### Strikes:

- Strikes preparations will accommodate specified locking hardware.

#### Electric hardware:

- Electric Hinge preparations are available as specified.
- Electric lock preparations with conduit are available as specified.
- EPT (Electric Power Transfer) preps are not available.

## Sound transmission ratings

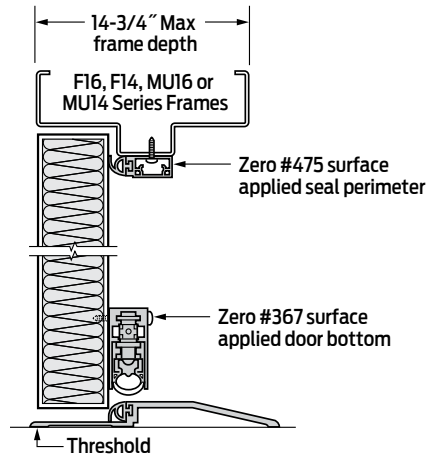
Sound transmission classification (STC) ratings are a measurement of the amount of sound passing through a building product. To help understand the STC ratings, the following table compares the ratings of various building products:

Product Description		STC
Doors	Hollow core wood door	19
Doors	Solid core wood door	26
Doors	Solid core wood door (perfect seal)	28
Doors	(2) Solid core wood doors	33
Doors	Steel door with urethane core (perfect seal)	26
Doors	L18 Honeycomb door (perfect seal)	35
Doors	L18 Honeycomb door (PS074 Weatherstrip)	35
Glass (Glazed)	¼" plate glass	26
Glass (Glazed)	⅛" insulated plate glass, ½" air space	32
Wall	6" concrete block	43
Wall	2" x 4" wood stud with ½" gypsum board	34
Wall	2 ½" steel stud with (2) layers of ½" gypsum board each side	46

## Application details

The following door, frame and gasket details represent the standard products tested.

- Zero #560 for non-ADA applications. Used with standard ¾" undercut.
- Zero #566 for ADA applications - door requires special undercut.



## Sound measurements

The following is a quick reference to the decibel ratings and hazardous time exposures of common sounds:

Typical Decibel	Example
1	Lowest sound audible to the human ear
30	Lowest sound audible to the human ear
40	Living room, quiet office, bedroom away from traffic
50	Light traffic at a distance, refrigerator, gentle breeze
60	Air conditioner at 20 feet (6 meters), conversation, sewing machine
70	Busy traffic, office calculator, noisy restaurant. <b>At the 70 decibel level, noise may begin to affect your hearing if you're exposed to it constantly.</b>
<b>Hazardous Zone</b>	
80	Subway, heavy city traffic, alarm clock at two feet, factory noise. <b>These noises are dangerous if you are exposed to them for more than eight hours.</b>
90	Truck traffic, noisy home appliances, shop tools, lawn mower. <b>As loudness increases, the "safe" time exposure decreased; damage can occur in less than eight hours.</b>
100	Chain saw, stereo headphone, pneumatic drill. <b>Even two hours of exposure can be dangerous at 100dB; and with each 5 dB increase, the "safe time" is cut in half.</b>
120	Rock band concert in front of speakers, sandblasting, thunderclap. <b>The danger is immediate; at 120 dB exposure can injure your ears.</b>
140	Gunshot blast, jet plane. <b>Any length of exposure time is dangerous; noise at 140 dB may cause actual pain in the ear.</b>
180	Rocket launching pad. <b>Without ear protection, noise at this level causes irreversible damage; hearing loss hearing is inevitable.</b>



# Thermal break frames

## FT Series



### About the product

FT frames are separated at the stop by a durable polymer extrusion that serves as a thermal break.

FT Series 3-sided frames are designed to meet requirements for light to maximum duty applications in both commercial and institutional buildings. Although the most common use is exterior masonry opening, these frames are installed in both interior and exterior locations, and in virtually all types of buildings and wall constructions. These frames are to be installed as part of the wall framing sequence. They can be specified and supplied as KD (knock-down) for field assembly prior to installation or welded for installation as a complete unit.

### Installation

1. Installation shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 *Recommended Erection Instructions for Steel Frames* and HMMMA 840.
2. Care should be taken throughout the installation process to maintain the thermal break designed into anchors and reinforcements.

### Application

FT Series frames are best used for energy cost savings on exterior openings or interiors where temperature control is desired between locations. They are typically installed in wall construction types as defined in the table below

### Features and benefits

Steelcraft FT (Frame Thermal) Series frames offer the following unique features, which enhance long term functionality and durability:

1. **Thermal Break:** By separating the frame along the stop, the transfer of exterior heat or cold into your building is reduced. FT frames provide 95% better resistance to thermal conductivity over non-thermal break frames.
  - Lower thermal costs and improved comfort
  - Jamb and Head components are each factory assembled, with 3-sided frames supplied KD or Face welded
  - Uses Galvannealed A-60 steel
  - Frame and weld-in anchors are specially designed to achieve a true thermal break
2. **FT thermal separator:** This durable polymer extrusion provides a more secure barrier over time and is more durable in freezing conditions compared to traditional vinyl separators.
3. **Die-mitered corner connections:** Die-mitered corner connection at the head and jamb insure an attractive, tight and closed mitered connection. The miter includes 4 corner tabs designed with concealed connection eliminating the need for continuous profile welding.
4. **Patented universal hinge preparations** allow for easy field conversion from standard weight .134" (3.3 mm) thick hinges to heavy weight .180" (4.7 mm) hinges.
5. **Factory applied baked on rust inhibiting primer** in accordance with ANSI A250.10-2011.

### Specification compliance

1. Frames tested to ASTM C1363 for Thermal Performance, with a U-factor of 0.45. Zero 525 Rabbetted Aluminum Thermal Break Threshold was used in this test. See "Anchoring and installation notes" for options.
2. Overall frame construction for the Steelcraft FT Series frames meets the requirements of ANSI A250.8-2014.
3. Hardware preparations and reinforcements are in accordance with ANSI A250.6-2003 (R2009). Locations are in accordance with ANSI/BHMA.
4. FT frames are not fire-rated.

Frame applications			
Profile	Steel thickness	Wall construction	Typical wall anchors
FT16	16 Gauge [0.053" (1.3 mm)]	Wood or steel stud	Weld-in nailing strap anchors
FT16	16 Gauge [0.053" (1.3 mm)]	Masonry	Wire masonry
FT16	16 Gauge [0.053" (1.3 mm)]	Existing masonry	Weld-in FT EMAs bolted through both rabbets
FT14	14 Gauge [0.067" (1.7 mm)]	Wood or steel stud	Weld-in nailing strap anchors
FT14	14 Gauge [0.067" (1.7 mm)]	Masonry	Wire masonry
FT14	14 Gauge [0.067" (1.7 mm)]	Existing masonry	Weld-in FT EMAs bolted through both rabbets



### FT Thermal separator

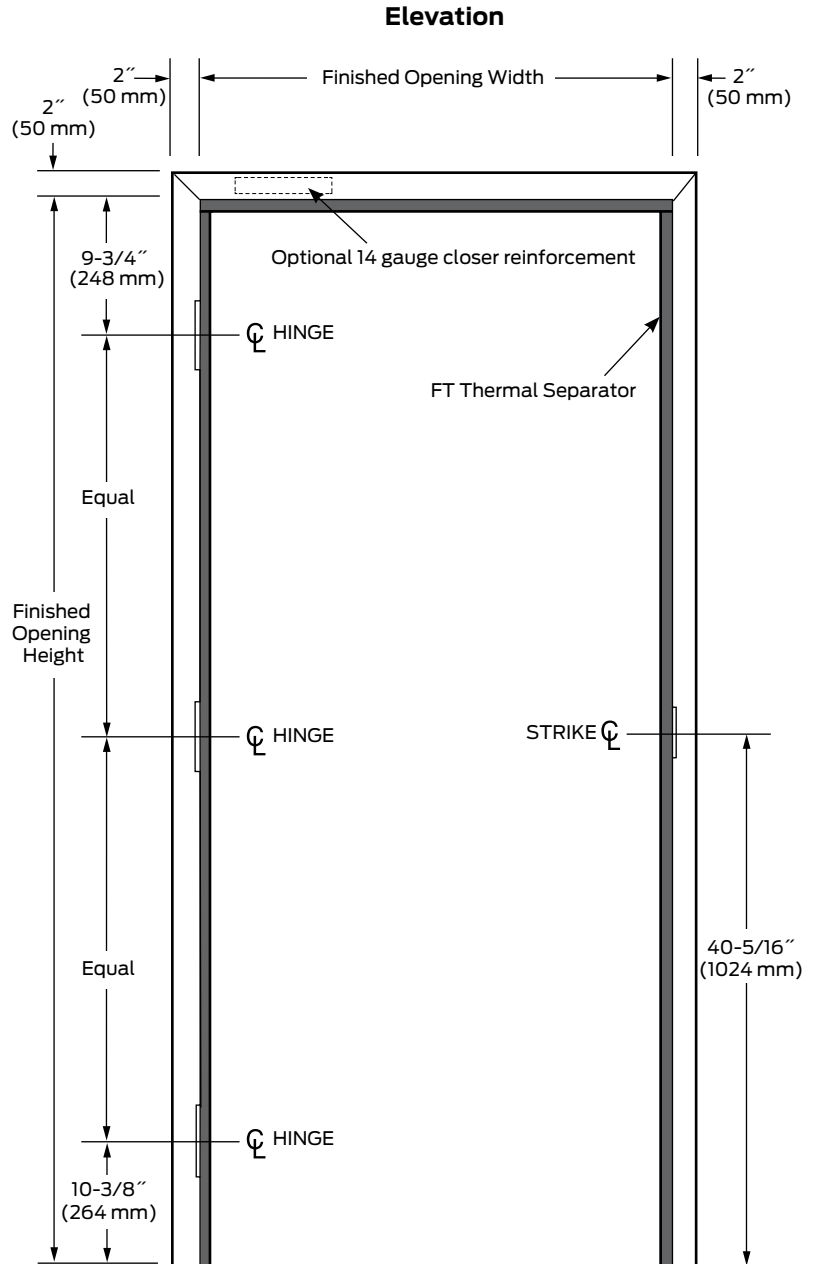
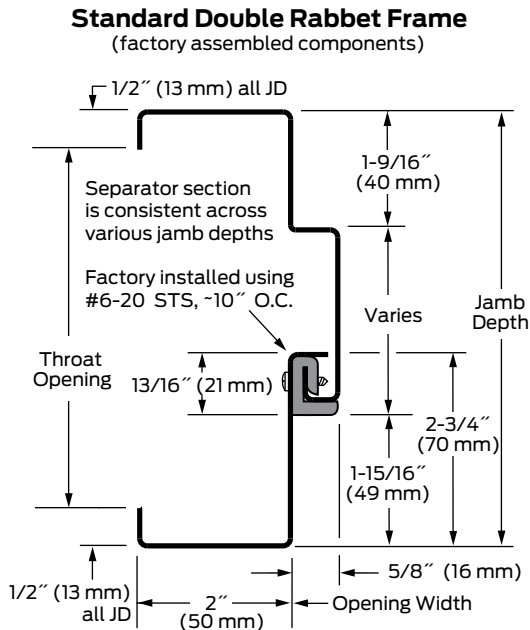
Separates the door side and the non-door side of the frame. The 3-pieces are joined with screws as shown.

- While our separator is durable, care should be taken in transporting and handling until frame is installed, especially with longer components and wider jamb depths.
- Do not stack welded frames in storage or in transport
- Do not weld on or near separator
- Separator material is not paintable

### Hardware interference

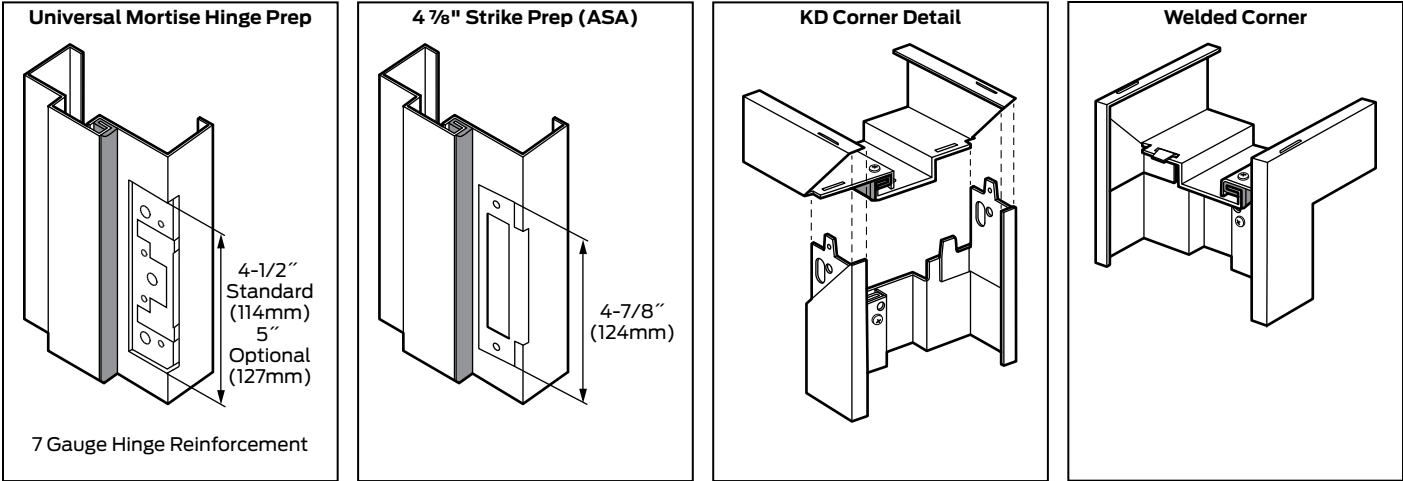
Specific hardware preps can be reviewed by Steelcraft Engineering upon request. Installation may be limited; it is best to avoid attaching to the soffits. If unavoidable, review the drawing and dimensions above and become familiar, taking special care when drilling or attaching to this area. Steelcraft is not responsible for issues caused by modification, reinforcement or hardware installation outside of the factory.

FT Thermal Break frames must maintain the thermal separation between the door side and the non-door side of the frame.



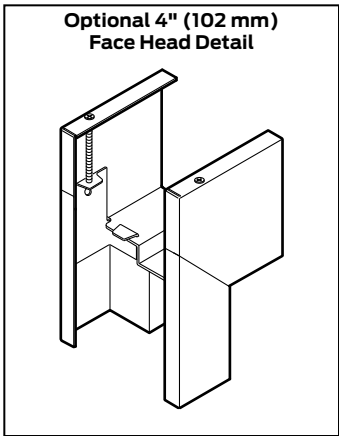
### Frame sizing options

Series	Opening size ranges		Jamb depth availability (profile)		Standard profile dimensions (variations available)			Corners
	Single	Pair	Equal or unequal double rabbet		Face	Stop	Return	Standard
			Minimum	Maximum				
FT16	1' 6"x6' 8" thru 4' 0"x8' 0" (457 mm x 2032 mm thru 1219 mm x 2438 mm)	4' 0"x6' 8" thru 8' 0"x8' 0" (1219 mm x 2032 mm thru 2438 mm x 2438 mm)	5 3/4" (146 mm)	12 3/4" (324 mm)	2" (50 mm)	5/8" (16 mm)	1/2" (13 mm)	DIE MITERED with four (4) concealed tabs interlocking head and jambs
FT14								

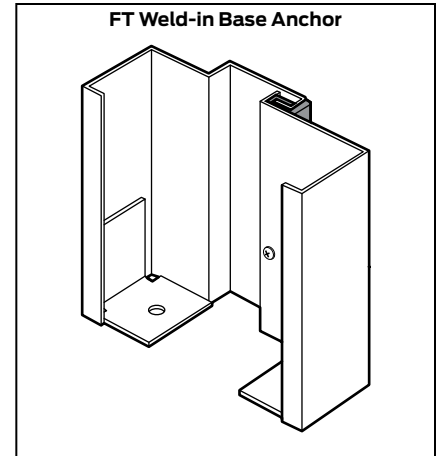
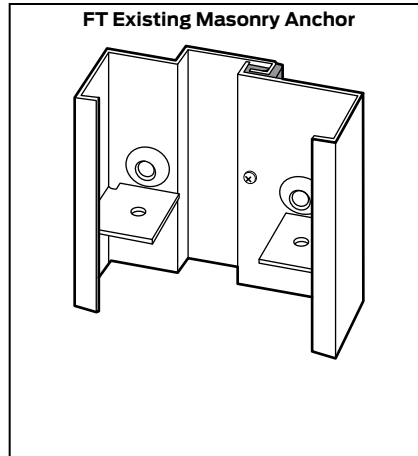
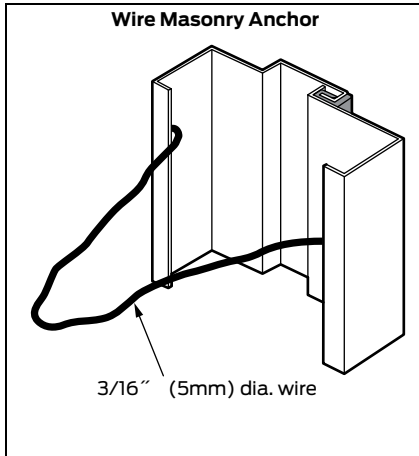


**General notes**

- 1. Variations in jamb depths available in 1/8" (3 mm) increments.
- 2. FT Series frames are to be installed as part of the wall framing sequence.
- 3. Available in Galvannealed A-60 steel only.
- 4. For KD Corners, tabs in rabbeted area should be bent outward, not inward, during assembly.
- 5. FT frames are face welded only (backwelding and full profile can damage separator).
- 6. FT Series frames with optional 4" heads are mainly used in masonry applications when 2" face heads do not match course blocking. Note separator is not shown (hidden) in this illustration of the 4" head.



Frame options				
Series	Frame profile	Corner connections		4" (102 mm) heads
		KD (Knock-down)	SUA (Set-up & weld)	
	Double rabbet	Double rabbet	Double rabbet	
FT16	Typical for walls 4 3/4" (121 mm) thick or greater (single rabbet not available)	4 interlocking corner tabs per factory die-miter. See the "KD Corner Detail"	Available when specified, and in accordance with ANSI A250.8-2014 (SDI 100).	Die-mitered for use with 2" (51 mm) face double rabbet jambs. Available when specified for KD or SUA applications.
FT14				



### Anchoring and installation notes

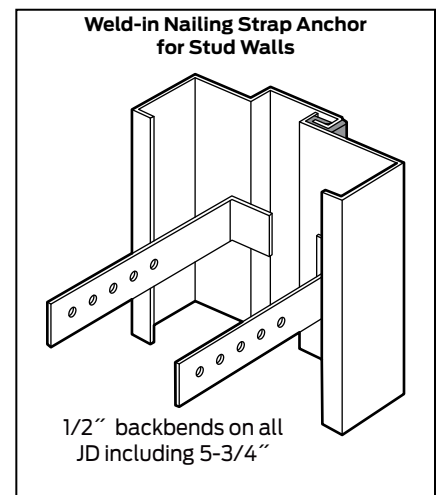
- FT Series commercial and Institutional frames** are specially designed to maintain thermal break functionality as well as for maximum wall/frame engagement and installation flexibility.
  - FT frames supplied standard with weld-in base anchors (n/a when using EMA)
  - Any jamb anchors needed for FT Series frames must be specified in the order
  - All except wire are weld-in only
  - Anchor options:
    - New masonry (wire anchors)
    - Existing masonry wall (FT EMA anchors)
    - Stud wall (nailing strap jamb anchors)
  - Any additional field anchoring must take care to maintain the thermal break or use non-metallic materials with low thermal conductivity (e.g. wood)

FT anchors unique and not shown in the typical "Frames: Anchoring systems" section of manual.

- To achieve rating provided**, use with Zero 525 Rabbetted Aluminum Thermal Break Threshold or similar.
- For additional thermal benefits**, use with Steelcraft Polystyrene or Polyurethane insulated doors, insulate frame, and add Zero products:
  - Zero Thermal break threshold options: 624, 625, 626, 724, 8724, 726, or 8726
    - For recessed applications use 722, 723, 729, 8729, or 8730
  - Zero PSA self-adhesive gasketing: 188, 488, or other
    - Apply to separator stop above 50°F (70°-100°F ideal). Allow 72 hrs to set prior to use or conditions (min 24hrs, depending on application temperature).

Refer to "Zero International Catalog" for additional options at <http://www.zerointernational.com/catalogcadlibrary.aspx>

- Installation Caution Notice: Grouted frames:** Grouted frames are not recommended as this increases thermal transmission.



Framing applications							
Series	Steel type	Building type	Opening	Usage frequency <sup>1</sup>	KD <sup>3</sup> Corner	SUA <sup>4</sup> Corner	Applications
FT16	Galvannealed <sup>2</sup>	Commercial	Interior	Heavy to extra heavy duty	✓	✓	Typical building conditions
			Mainly Exterior				High humidity and/or weather exposure
FT14	Galvannealed <sup>2</sup>	Commercial	Interior	Extra heavy to maximum duty	✓	✓	Typical building conditions
			Mainly Exterior				High humidity and/or weather exposure

<sup>1</sup> Usage frequency is based on ANSI A250.8-2014 (SDI 100)

<sup>4</sup> Set-up and Welded for installation as a pre-welded unit

<sup>2</sup> Reinforcements for galvannealed frames are also galvannealed

<sup>3</sup> Knock-Down for field assembly prior to installation

This page intentionally left blank.

# Hardware preparations

General information.....	230	Door preps: Inactive leaves.....	252
Hardware.....	230	ASA Prep without astragal.....	252
Hardware preparation types.....	230	ASA Prep with astragal.....	253
Hardware categories.....	230	Flush bolts with astragal.....	254
ANSI compliance.....	230	Flush bolts with astragal (astragal attachment detail).....	255
Locations: Hinging, locking, closing.....	231	Flush bolts without astragal.....	256
General information.....	231	Flush bolts without astragal (flush bolt prep detail).....	257
Locations.....	231	Surface bolts without astragal.....	258
Specification compliance.....	231	Closer prep.....	259
Fire ratings.....	231	Frame preps: Hinges.....	260
Doors and frames with 1 ½ pair of hinges.....	232	Hinge prep.....	260
Doors and frames with 2 pairs of hinges.....	232	Frame preps: Strikes.....	261
Doors and frames with 2 ½ pairs of hinges.....	233	ASA Strike prep.....	261
Dutch doors and frame.....	234	CYL Strike prep.....	262
Hardware preparations: Nomenclature.....	235	Dead lock strike prep.....	263
Doors.....	235	RPD Rim panic strike prep.....	264
Frames.....	238	Surface vertical rod strike prep.....	265
Door preps: Locks.....	241	Universal flush bolt strike prep.....	266
161 Lock prep.....	241	Frame preps: Closers.....	267
160 & 160-4 Lock prep.....	242	Surface closer prep.....	267
61L Lock prep.....	243	Frame preps: Hinges.....	268
86 Lock prep.....	244	Hinge prep.....	268
86 Lock prep for commercial and institutional applications	245	Continuous hinge prep.....	269
Door preps: Exit devices.....	246	Frame preps: Miscellaneous.....	270
Push/Pull Prep.....	246	EPT Power transfer prep.....	270
Rim panic prep.....	247		
Vertical rod prep.....	248		
Special: Concealed vertical rod exit device prep.....	249		
Special: Von Duprin inpack™ (94/9547) concealed vertical			
rod integral exit device.....	250		
Special: Von Duprin inpack™ (94/9575) mortise lock device	251		

## General information

All Steelcraft frames, doors and stick systems are routinely prepared for various types and grades of architectural hardware. The preparations for the specified hardware are in accordance with the hardware manufacturer's registered and/or published template information.

This section of the Steelcraft TD Manual is designed to help educate users of how Steelcraft products interface and function with the major architectural hardware products. It is also intended to be a frame and door supplement to the information published by the hardware manufacturer being used and/or specified.

### Hardware

Architectural hardware items are any device, sensor or auxiliary item attached to a frame or door, which is either specified and/or required for the operation and functionality of the door assembly. The hardware attached to the frame and/or door can be purely mechanical, electrical (wired into the alarm and monitoring systems of the building) or pneumatic.

The architect, specification writer and/or the purchaser of the door assembly specifies these hardware items.

### Hardware preparation types

There are three (3) major types of hardware preparations to be considered.

- **Mortised hardware:** Any hardware device or item (including sensors) attached to the frame or door that requires a cutout and reinforcement be made prior to attaching the hardware item to the door and/or frame.
- **Surface applied and reinforced hardware:** Any hardware device or item (including sensors) attached to the frame or door which do not require a cutout be made prior to attaching the hardware item to the frame and/or door, however, the hardware manufacturer or specifier requires a reinforcement be built into the frame or door to support the attached piece of hardware or its function.
- **Surface applied hardware:** Any hardware device or item (including sensors) attached to the frame or door which does not require either a cutout or reinforcement to be made prior to attaching the hardware item to the frame and/or door.

### Hardware categories

The architectural hardware attached to a door assembly, usually falls into one of the following device categories:

- **Hinging:** These devices perform the functions of suspending and swinging the door in the frame. Hinging systems are usually attached to the door edge and hinge jamb. The most commonly used hinging devices are:
  - Butt hinges: mortised to both the door edge and hinge jamb
  - Continuous hinges: surface applied and reinforced to the door edge and hinge jamb
  - Pivots: mortised to both door edge and hinge jamb.

- **Locking:** These devices perform the functions of holding the door in a closed position by the means of a latch or lock bolt projecting from the door into a strike. The strike is located in either the frame or inactive leaf of a pair of doors. All of these devices are mortised into the door edge and the strike jamb. The most commonly used locking devices are:
  - Latches and locks
  - Deadlocks
  - Exit devices (some are surface applied on the door face)
  - Auxiliary locks
- **Closing:** These devices perform the functions of mechanically closing the door once it is opened, and are mainly categorized as:
  - Surface closers: surface applied and reinforced on the door face and head of the frame.
  - Concealed closers: mortised to both door top channel and head of the frame.
  - Floor closers: mortised into the door bottom channel and attached into the floor.
- **Protecting:** These devices are designed to protect the frame and door against foreseen damage from abuse and function. They are mainly surface applied and internally reinforced only when specified. The most commonly used devices in this category are:
  - Kick plates
  - Push pull plates
  - Coordinators
  - Holders: may be concealed and reinforced when specified
  - Stops: may be concealed and reinforced when specified
- **Weather Sealing:** These devices perform the functions of limiting weather, smoke and sound penetration through the operating clearances around the installed and operable door, frame and hardware assembly. These devices are mainly surface applied. The most commonly used devices in this category are:
  - Perimeter weather seals: usually surface attached to the rabbet of the jambs and head
  - Door bottoms: mortised into the bottom of the door, or surface applied to the bottom of the door face.
  - Astragals: used in double door applications and surface attached to the edge of one of the doors.

### ANSI compliance

Steelcraft hardware preparations and reinforcements are in accordance with ANSI A250.6. Locations are in accordance with ANSI/DHI A115.

## Locations: Hinging, locking, closing

### General information

Steelcraft's hardware locations are the same from product to product.

The ANSI A115.1 or ANSI A115.2 (4 7/8" [124 mm] high) strike preparation is normally supplied on all frames prepared for 1 3/4" (45 mm) thick doors. The strike is located at 40 5/16" centerline (1024 mm) from the bottom of the frame. This strike locations allows the use of either the Mortise (ANSI A115.1) or Cylindrical (ANSI A115.2) locks. The 4 7/8" (124 mm) strike also allows the use of mortise exit devices.

The ANSI A115.3 (2 3/4" [70 mm] high) strike preparation is normally supplied on frames for 1 3/8" (35 mm) thick doors. The strike preparation is also located at 40 5/16" centerline (1024 mm) from the bottom of the frame.

### Locations

Steelcraft's hinge locations are listed on the elevations shown on pages 255-257. All openings for 1 3/4" (45 mm) doors up to and including 7'6" (2286 mm) in height have 1 1/2 pair of hinges. Openings over 7'6" (2286 mm) through 10'0" (3048 mm) in height have 2 pair of hinges. Openings over 10'0" (3048 mm) have 2-1/2 pair of hinges.

Other hardware locations are shown on the table below:

Hardware	Location on Frame to centerline of prep	Location on Door to centerline of prep
ANSI 115.1 mortise lock	40 5/16" (1024 mm)	39 3/16" (995 mm)
ANSI 115.2 cylindrical (bored in) locks	40 5/16" (1024 mm)	39 9/16" (1005 mm)
ANSI A115.6 preassembled locks	40 5/16" (1024 mm)	39 9/16" (1005 mm)
Mortise exit devices	See Note 1	See Note 1
Rim/vertical rod exit devices	See Note 2	See Note 2
Deadlock	48" (1219 mm)	To accommodate strike
Push plate	Not available	44 1/4" (1124 mm)
Pull plate	Not available	41 1/4" (1048 mm)
Combinations push & pull bars	Not available	41 1/4" (1048 mm)
Hospital latches	40 5/16" (1024 mm)	39 9/16" (1005 mm)
Hospital arm pulls	Not available	44 1/4" (1124 mm)
Hinges	See elevations	See elevations

### Notes:

- Standard location for single doors is to match the ANSI A115.1 strike location of 40 5/16" (1024 mm) from the bottom of the frame. Pairs of doors are located per template to insure the devices on both leaves align.
- Rim and vertical rod exit devices are located per template.
- Locations on frame are from bottom of frame.
- Locations on door are from bottom of door (with the standard 3/4" undercut).
- Locations are for openings over 5'0". Consult factory for under 5'0".

### Specification compliance

Steelcraft's hardware locations follow the standards established by the Steel Door Institute (SDI) and the Door and Hardware Institute (DHI).

### Fire ratings

Fire ratings are not affected by hardware locations. The proper hardware must be used. Refer to the Fire Rated Section of the Steelcraft Spec Manual for hardware requirements.

Doors and frames with 1 1/2 pair of hinges

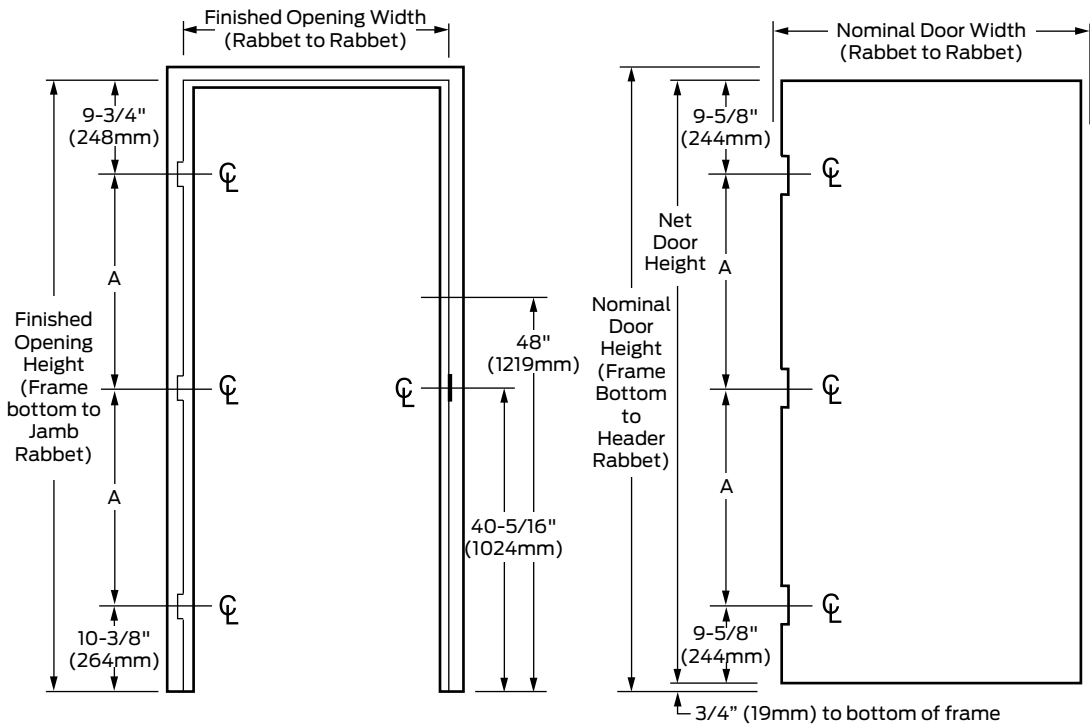


Table 1	
Door opening height	Dimension "A"
6'8" (2032 mm)	29 15/16" (760 mm)
7'0" (2134 mm)	31 15/16" (811 mm)
7'2" (2184 mm)	32 15/16" (837 mm)
7'6" (2286 mm)	34 15/16" (887 mm)

Doors and frames with 2 pairs of hinges

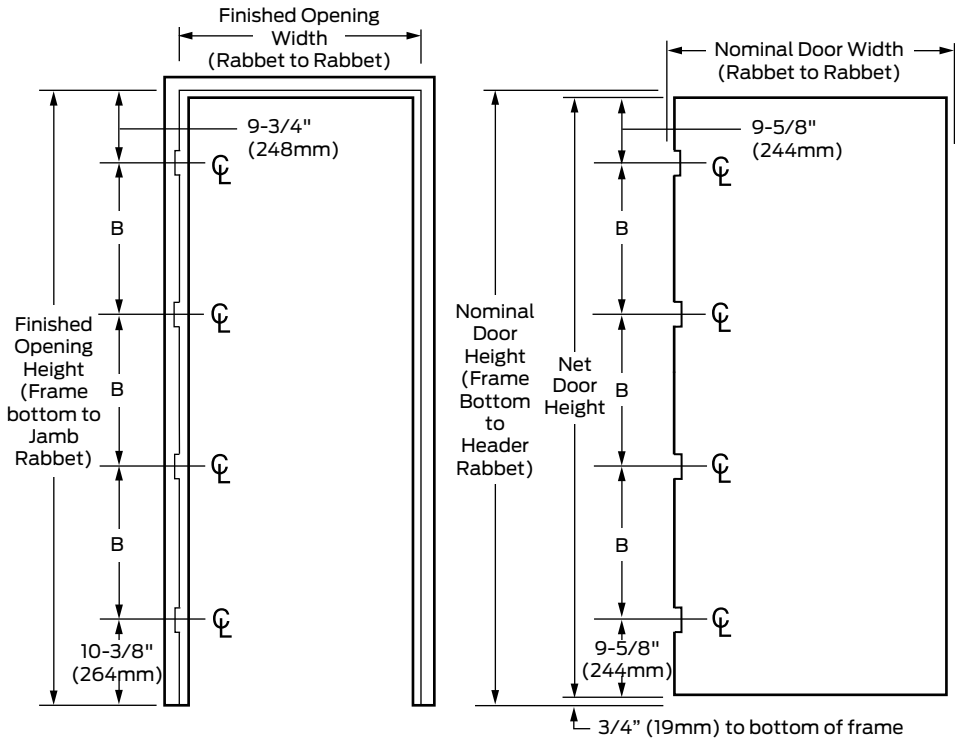


Table 2	
Door opening height	Dimension "B"
6'8" (2032 mm)	19 61/64" (507 mm)
7'0" (2134 mm)	21 19/64" (541 mm)
7'2" (2184 mm)	21 61/64" (558 mm)
7'6" (2286 mm)	23 19/64" (592 mm)
7'10" (2388 mm)	24 5/8" (625 mm)
8'0" (2438 mm)	25 19/64" (643 mm)
8'6" (2591 mm)	27 19/64" (693 mm)
8'10" (2692 mm)	28 5/8" (727 mm)
9'0" (2743 mm)	29 19/64" (744 mm)
9'6" (2896 mm)	31 19/64" (795 mm)
9'10" (2997 mm)	32 5/8" (829 mm)
10'0" (3048 mm)	33 19/64" (846 mm)

Notes:

- 1. Steelcraft standard hinge spacing for doors up to and including 7'6" (2286 mm) high is 1 1/2 pairs (3 hinges) as shown in Table 1. Information shown in Table 2 is for reference when 4 hinges are specified for those door heights.
- 2. Steelcraft standard for doors over 10'0" (3048 mm) is 2 1/2 pairs (5 hinges). See Table 3.
- 3. For special door heights, dimensions "A" and "B" will vary accordingly unless specified differently.



## Doors and frames with 2 ½ pairs of hinges

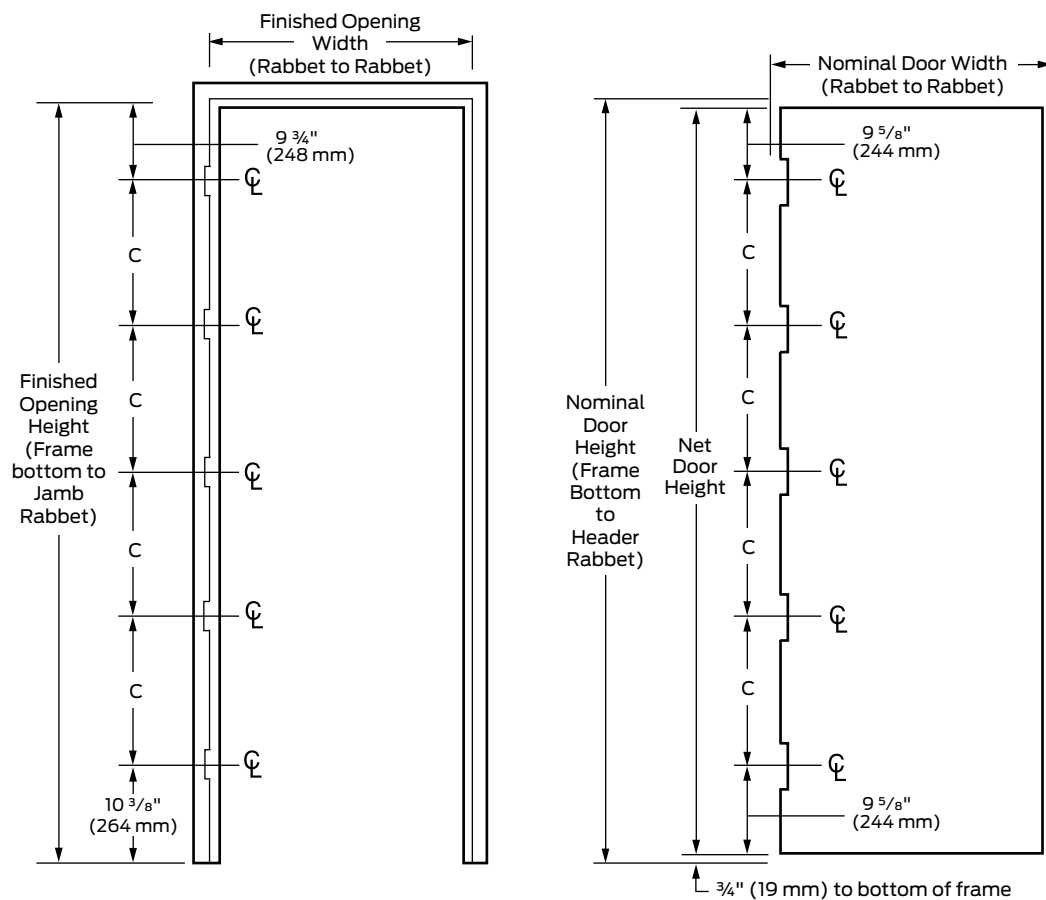


Table 3

Door opening height	Dimension "C"
10'2" (3049 mm)	25 15/32" (647 mm)
10'4" (3154 mm)	25 31/32" (660 mm)
10'6" (3200 mm)	26 15/32" (672 mm)
10'8" (3251 mm)	26 31/32" (685 mm)
10'10" (3302 mm)	27 15/32" (698 mm)
11'0" (3353 mm)	27 31/32" (710 mm)

**Note:** Door diagram is for reference only -- max door height is 10' (varies with series).

## Dutch doors and frame

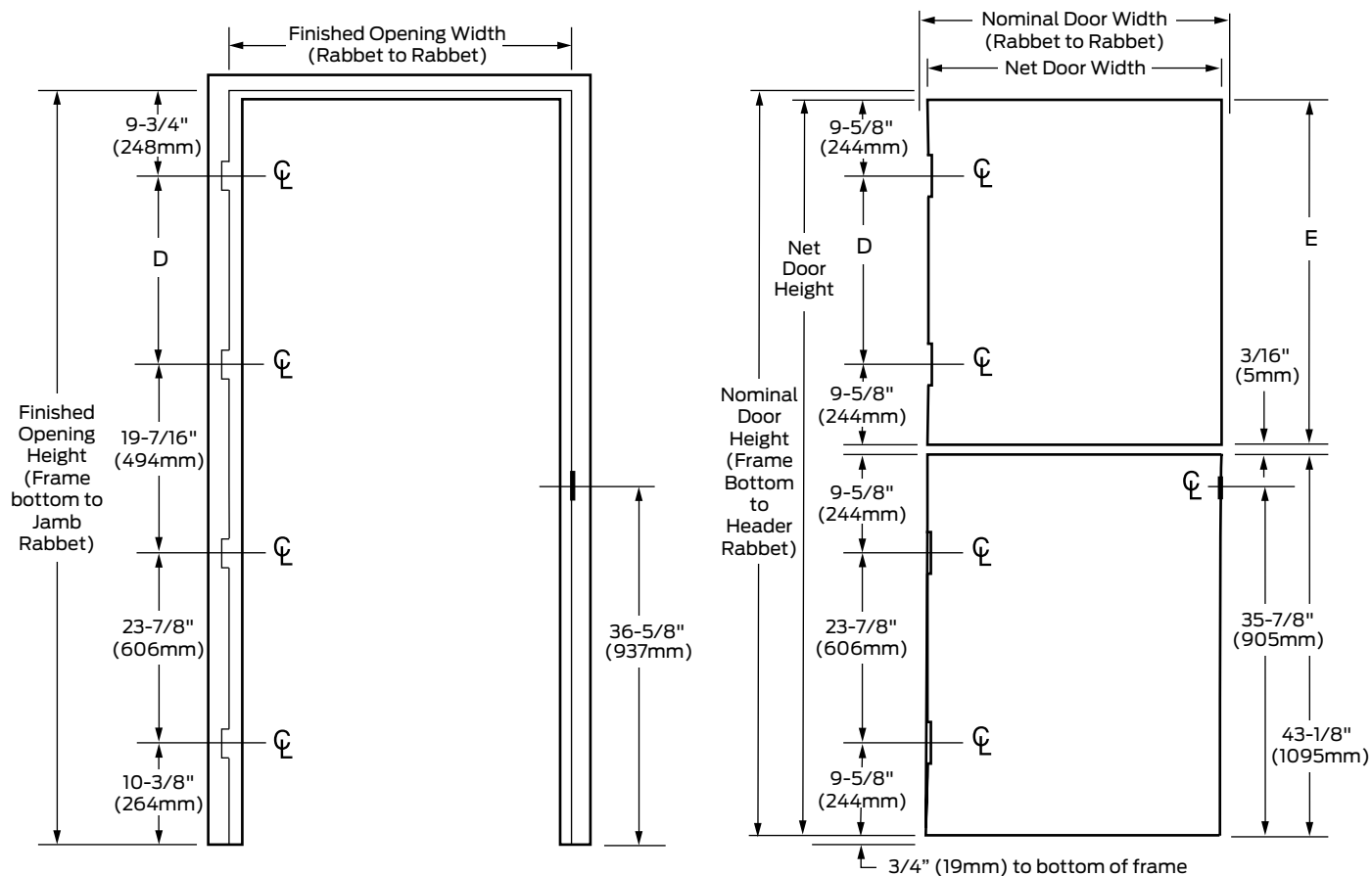


Table 4

Door opening height	Dimension "D"	Dimension "E"
6'8" (2032 mm)	16 9/16" (421 mm)	35 13/16" (910 mm)
7'0" (2134 mm)	20 9/16" (522 mm)	39 13/16" (1011 mm)
7'2" (2184 mm)	22 9/16" (573 mm)	41 13/16" (1062 mm)

**Note:** For Fire Rated Hardware requirements, refer to the Fire Rated Section. An additional listed latch is required in the top leaf.

# Hardware preparations: Nomenclature

## Doors

### Door hardware prep nomenclature options

Steelcraft ordering nomenclature is described in the General Section of this manual on page 12-13. The following information deals only with the nomenclature for ordering hardware preparations in Steelcraft doors. In addition to the guide shown on page 12-13, the following is a detailed list of hardware ordering codes which will be additional suffixes to the top line Steelcraft ordering nomenclature.

Door lock preparation designations	
Code	Preparation description
<b>160</b>	Bored/Cyl Knobset: (1" x 2 ¼" front with 2 ¾" backset) per ANSI A115.2
<b>160-4</b>	Bored/Cyl Knobset: (1" x 2 ¼" front with 2 ¾" backset) per ANSI A115.2
<b>160ED</b>	Edge cutout only: (1" x 2 ¼" front) per ANSI A115.2
<b>161</b>	Bored/Cyl Knobset: (1 ⅞" x 2 ¼" front with 2 ¾" backset) per ANSI A115.2
<b>161ED</b>	Edge cutout only: (1 ⅞" x 2 ¼" front): per ANSI A115.2
<b>161EDR</b>	Edge cutout only: (1 ⅞" x 2 ¼" front): per ANSI A115.2 with RPD reinforcements
<b>161EDV</b>	Edge cutout only: (1 ⅞" x 2 ¼" front): per ANSI A115.2 with VRPD reinforcements
<b>161R</b>	Bored/Cyl Knobset: (1 ⅞" x 2 ¼" front with 2 ¾" backset) per ANSI A115.2 with RPD reinforcements
<b>161V</b>	Bored/Cyl Knobset: (1 ⅞" x 2 ¼" front with 2 ¾" backset) per ANSI A115.2 with VRPD reinforcements
<b>61L</b>	Bored/Cyl 2 ¾" backset for universal Leverset: (1 ⅞" x 2 ¼" front with 2 ¾" backset) per ANSI A115.2 (3 ½" minimum rose)
<b>86</b>	Mortise lock: (1 ¼" x 8" front with 2 ¾" backset) per ANSI A115.1
<b>86ED</b>	Edge cutout only: (1 ¼" x 8" front) Mortise lock per ANSI A115.1
<b>86EDR</b>	Edge cutout only: (1 ¼" x 8" front) Mortise lock per ANSI A115.1 with RPD reinforcements
<b>86EDV</b>	Edge cutout only: (1 ¼" x 8" front) Mortise lock per ANSI A115.1 with VRPD reinforcements
<b>86R</b>	Mortise lock for escutcheon trim: (1 ¼" x 8" front with 2 ¾" backset) per ANSI A115.1 with RPD reinforcements
<b>86V</b>	Mortise lock for escutcheon trim: (1 ¼" x 8" front with 2 ¾" backset) per ANSI A115.1 with VRPD reinforcements
<b>RPD</b>	Internal Reinforced for surface Rim Panic Device
<b>VRPD</b>	Internal Reinforced for surface Vertical Rod Device
<b>BLANK</b>	Blank without prep or reinforcement. Must also be used to designate devices like deadlock only. Active lock is "BLANK"
<b>PP</b>	Internal Reinforcements for Push / Pull plates
<b>SPCL</b>	Special active lock prep per hardware manufacturer's template. Must also be used to designate devices like Concealed Vertical Rods, Mag Locks, etc.
<b>UNIT</b>	Unit lock prep

Door lock preparation designations using catalog codes	
Code	Preparation description
<b>L7F</b>	Schlage mortise lock: Refer to Steelcraft lock ordering catalog # 652
<b>R7A</b>	Von Duprin Rim® exit device: Refer to Steelcraft lock ordering catalog # 541
<b>M4R</b>	Von Duprin® Mortise exit device: Refer to Steelcraft lock ordering catalog # 556
<b>SV2EW</b>	Von Duprin® Vertical Rod exit device: Refer to Steelcraft lock ordering catalog # 705

#### Example:

- Top line door ordering nomenclature example: L 18 UL 4 30 70 F R
- Door lock prep:** [61L](#) (see below for other hardware code options)
- Complete ordering nomenclature: L 18 UL 4 30 70 F R [61L](#)

**Note:** Refer to Steelcraft ordering nomenclature description on pp 12-13.

## Deadlock options

Door deadlock preparation	
Code	Preparation description
<b>160-48</b>	Bored/Cyl: (1" x 2 1/4" front with 2 3/8" backset per ANSI A115.2) @ 48" above bottom of frame
<b>160-60</b>	Bored/Cyl: (1" x 2 1/4" front with 2 3/8" backset per ANSI A115.2t) @ 60" above bottom of frame
<b>160-SP</b>	Bored/Cyl: (1" x 2 1/4" front with 2 3/8" backset per ANSI A115.2) @ special location
<b>160-4-48</b>	Bored/Cyl: (1" x 2 1/4" front with 2 3/4" backset per ANSI A115.2) @ 48" above bottom of frame
<b>160-4-60</b>	Bored/Cyl: (1" x 2 1/4" front with 2 3/4" backset per ANSI A115.2) @ 60" above bottom of frame
<b>160-4-SP</b>	Bored/Cyl: (1" x 2 1/4" front with 2 3/4" backset per ANSI A115.2) @ special location
<b>161-48</b>	Bored/Cyl: (1 1/8" x 2 1/4" front with 2 3/4" backset per ANSI A115.2) @ 48" above bottom of frame
<b>161-60</b>	Bored/Cyl: (1 1/8" x 2 1/4" front with 2 3/4" backset per ANSI A115.2) @ 60" above bottom of frame
<b>161-SP</b>	Bored/Cyl: (1 1/8" x 2 1/4" front with 2 3/4" backset per ANSI A115.2) @ special location
<b>161ED-48</b>	Edge cutout only: (1 1/8" x 2 1/4" front per ANSI A115.2): @ 48" above bottom of frame
<b>161ED-60</b>	Edge cutout only: (1 1/8" x 2 1/4" front per ANSI A115.2): @ 60" above bottom of frame
<b>161ED-SP</b>	Edge cutout only: (1 1/8" x 2 1/4" front per ANSI A115.2): @ special location
<b>86-48</b>	Mortise lock: (1 1/4" x 8" front with 2 3/4" backset) per ANSI A115.1 @ 48" above bottom of frame
<b>86-60</b>	Mortise lock: (1 1/4" x 8" front with 2 3/4" backset) per ANSI A115.1 @ 60" above bottom of frame
<b>86-SP</b>	Mortise lock: (1 1/4" x 8" front with 2 3/4" backset) per ANSI A115.1 @ special location
<b>86ED-48</b>	Edge cutout only: (1 1/4" x 8" front) Mortise lock per ANSI A115.1 @ 48" above bottom of frame
<b>86ED-60</b>	Edge cutout only: (1 1/4" x 8" front) Mortise lock per ANSI A115.1 @ 60" above bottom of frame
<b>86ED-SPL</b>	Edge cutout only: (1 1/4" x 8" front) Mortise lock per ANSI A115.13 @ special location
<b>PP</b>	Additional push/pull reinforcements
<b>SPCL</b>	Special Deadlock prep per hardware manufacturer's template. Must also be used to designate deadlocks

Door lock preparation designations using catalog codes	
Code	Preparation description
<b>D7J</b>	Schlage Deadlock: Refer to Steelcraft Deadlock ordering catalog # 535

## Example:

- Top line door ordering nomenclature example: L 18 UL 4 30 70 F R
- Door lock prep: **61L**
- Door deadlock prep: 161-60** (see below for other hardware code options)
- Complete ordering nomenclature: L 18 UL 4 30 70 F R 61L **161-60**

**Note:** Refer to Steelcraft ordering nomenclature description on pp 12-13.

### Inactive leaf options

Door inactive leaf strike preparation	
Code	Preparation description
<b>ASA</b>	4 7/8" ASA with lip @ standard location per ANSI A115.2
<b>ASA-48</b>	4 7/8" ASA with lip per ANSI A115.2 @ 48" above bottom of frame
<b>ASA-60</b>	4 7/8" ASA with lip per ANSI A115.2 @ 60" above bottom of frame
<b>ASAR</b>	4 7/8" ASA with lip per ANSI A115.2 and RPD reinforcements
<b>ASA-SP</b>	4 7/8" ASA with lip per ANSI A115.2 @ special location
<b>ASAV</b>	4 7/8" ASA with lip per ANSI A115.2 and VRPD reinforcements
<b>BLANK</b>	No preparation or reinforcement
<b>CYL</b>	2 3/4" with lip per ANSI A115.2 @ standard location
<b>CYL-48</b>	2 3/4" with lip per ANSI A115.2 located @ 48" above bottom of frame
<b>CYL-60</b>	2 3/4" with lip per ANSI A115.2 located @ 60" above bottom of frame
<b>CYL-R</b>	2 3/4" with lip per ANSI A115.2 and RPD reinforcements
<b>CYL-SP</b>	2 3/4" with lip per ANSI A115.2 @ special location
<b>CYLV</b>	2 3/4" with lip per ANSI A115.2 and VRPD reinforcements
<b>RPD</b>	Internal reinforced for surface Rim Panic Device
<b>SPCL</b>	Strike prep per template
<b>VRPD</b>	Internal Reinforced for surface Vertical Rod Device

Door lock strike preparation designations using catalog codes	
<b>Example:</b> Schlage #10-055 strike in inactive leaf	
Code	Preparation description
<b>DA3 (60" location)</b>	Refer to Steelcraft Deadlock ordering catalog # 535 (page 15)
<b>NA3 (48" location)</b>	Refer to Steelcraft Deadlock ordering catalog # 535 (page 15)

#### Example:

- Top line door ordering nomenclature example: L 18 UL 4 30 70 F R
- Door lock prep: **61L**
- Door deadlock prep: **161-60**
- Door inactive leaf strike prep:** **ASA** (see below for other hardware code options)
- Complete ordering nomenclature: L 18 UL 4 30 70 F R 61L 161-60 **ASA**

**Note:** Refer to Steelcraft ordering nomenclature description on pp 12-13

### Closer and hinge options

Door closer preparations	
Code	Preparation description
<b>CLOSER</b>	Closer reinforced @ hinge side on both faces
<b>OMIT CLOSER</b>	No closer reinforcement (labeled doors with spring hinges)
<b>FULL WIDTH</b>	Closer reinforced, full width both faces
<b>FULL WIDTH T/B</b>	Closer reinforced full width both faces top & bottom of door
<b>TOP / BOTTOM</b>	Closer reinforced @ hinge side both faces and at top and bottom of door
<b>12 Gauge CLOSER</b>	Closer reinforced @ hinge side both faces
<b>SPCL</b>	Special or concealed prep per template

#### Example:

- Top line door ordering nomenclature example: L 18 UL 4 30 70 F R
- Door lock prep: 61L
- Door deadlock prep: 161-60
- Door inactive leaf strike prep: ASA
- Door closer prep:** **CLOSER** (see below for other hardware code options)
- Complete ordering nomenclature: L 18 UL 4 30 70 F R 61L 161-60 ASA **CLOSER**

**Note:** Refer to Steelcraft ordering nomenclature description on pp 12-13.

Door hinge preparations	
Code	Preparation description
<b>4 1/2 STD HINGE</b>	4 1/2" template hinge prep for standard duty (.134 wt) hinge
<b>4 1/2 UNIVERSAL</b>	4 1/2" universal hinge prep for standard/heavy duty (.134/.180 wt) hinge – field converted
<b>4 1/2 OMIT HOLES</b>	4 1/2" hinge prep without attaching holes
<b>4" HINGES</b>	4" template hinge prep for standard duty (.134 wt) hinge
<b>5" UNIVERSAL</b>	5" template hinge prep for standard duty (.134 wt) hinge
<b>BLANK HINGE</b>	No prep or reinforcement
<b>BLANK HINGE W/ EDGE REINF FOR CONTINUOUS HINGE</b>	With internal edge reinforcement no edge preparations: Steelcraft's standard door width (WITH STANDARD 3/16" UNDERSIZE) Note: When ordering, downsize nominal door width accordingly.
<b>BLANK HINGE W/ FACE REINF FOR CONTINUOUS HINGE</b>	With internal face reinforcement no edge preparations: Steelcraft's standard door width (WITH CONTINUOUS HINGE STANDARD 3/16" UNDERSIZE). Note: when ordering, downsize nominal door width accordingly. <b>SPCL</b> Prep per template.
<b>SURFACE BUTT HINGE REINF</b>	Internally reinforced for surface hinge per template
<b>CONTINUOUS HINGE PER MANUFACTURERS' PART NUMBER (UNDERSIZED PER TEMPLATE)</b>	Reinforcement and door sizing per hinge manufacturer's templates

## Frames

### Strikes in strike jambs

Frame strike preparation	
Code	Preparation description
<b>ASA</b>	4 7/8" ASA with lip located @ standard location per ANSI A115.2
<b>ASA-48</b>	4 7/8" ASA with lip per ANSI A115.2 located @ 48" above bottom of frame
<b>ASA-60</b>	4 7/8" ASA with lip per ANSI A115.2 located @ 60" above bottom of frame
<b>ASA-SP</b>	4 7/8" ASA with lip per ANSI A115.2 located @ special location above bottom of frame
<b>BLANK</b>	No preparation or reinforcement
<b>CYL</b>	2 3/4" with lip per ANSI A115.2 located @ standard location
<b>CYL-48</b>	2 3/4" CYL with lip per ANSI A115.2 located @ 48" above bottom of frame
<b>CYL-60</b>	2 3/4" CYL with lip per ANSI A115.2 located @ 60" above bottom of frame
<b>CYL-SP</b>	2 3/4" CYL with lip per ANSI A115.2 located @ special location above bottom of frame
<b>RPD</b>	Reinforced in the soffit for surface Rim Panic Device
<b>SPCL</b>	Strike prep per template
<b>SB FACE</b>	Internally reinforced for surface bolt on face
<b>SB SOFFIT</b>	Internally reinforced for surface bolt in soffit
<b>SPCL</b>	Special flush bolt reinforcement per manufacturer's template (pairs or double doors)
<b>UNIVERSAL</b>	Universal Flush bolt strike per ANSI A115.4

Common frame strike preparation using catalog codes	
Code	Preparation description
<b>S27</b>	3 -1/2" Deadlock strike located @ 60" above bottom of frame
<b>S38</b>	2 3/4 " Deadlock strike located @ 60" above bottom of frame
<b>S40</b>	3 1/2" Deadlock strike located @ 48" above bottom of frame
<b>S41</b>	3" Deadlock strike located @ 48" above bottom of frame
<b>S43</b>	2 3/4 " Deadlock strike located @ 48" above bottom of frame
<b>S91</b>	3" Deadlock strike located @ 60" above bottom of frame

#### Example:

- Top line frame ordering nomenclature example: F16 UL 4 5 3/4 70 SJ R
- Frame strike prep in strike jamb:** [ASA](#) (see below for other hardware code options)
- Complete ordering nomenclature: F16 UL 4 5 3/4 70 SJ R [ASA](#)

**Note:** Refer to Steelcraft ordering nomenclature description on pp 12-13.

## Closer preps in single door frames

Frame closer preparations	
Code	Preparation description
CB	Corner bracket reinforced: Single door frame
CS	Closer sleeve reinforced: Single door frame
CS C/L IN HEAD	Closer sleeve reinforced located @ center of the double door opening
CS FULL WIDTH	Closer sleeve reinforced full width of head
OMIT CLOSER	No closer reinforcement: used on labeled frames with spring hinges
PA	Reinforced in soffit for parallel arm application: Single door frame
PA C/L IN HEAD	Reinforced in soffit for coordinator application: located @ center of the double door opening
PA FULL WIDTH	Reinforced in soffit for coordinator application: reinforced full width of head
PA/RA	Reinforced in soffit and face for both parallel and regular arm application: Single door frame
PA/RA FULL	Reinforced in soffit and face for both parallel and regular arm application: reinforced full width of head
RA	Reinforced in face for regular arm application: Single door frame
RA C/L IN HEAD	Reinforced in face for regular arm application: located @ center of the double door opening
RA FULL WIDTH	Reinforced in face for regular arm application: reinforced full width of head
SPCL	Special closer reinforcement per manufacturer's templates. Designation also used for Concealed Closers, Holders & Stops

TJ	Reinforced for top jamb closer application: Single door frame
TJ C/L IN HEAD	Reinforced for top jamb closer application: located @ center of the double door opening
TJ FULL WIDTH	Reinforced for top jamb closer application: reinforced full width of head
TJ/PA	Reinforced for both top jamb and parallel arm closer application: Single door frame
TJ/PA C/L HEAD	Reinforced for both top jamb and parallel arm closer application: located @ center of the double door opening
TJ/PA FULL	Reinforced for both top jamb and parallel arm closer application: reinforced full width of head
TJ/RA	Reinforced for both top jamb and regular arm closer application: Single door frame
TJ/RA C/L HEAD	Reinforced for both top jamb and regular arm closer application: located @ center of the double door opening
TJ/RA FULL	Reinforced for both top jamb and regular arm closer application: reinforced full width of head

## Example:

- Top line frame ordering nomenclature example: F16 UL 4 5 ¾ 30 HD
- Frame closer prep in single door frame head:** PA/RA (see below for other hardware code options)
- Complete ordering nomenclature: F16 UL 4 5 ¾ 30 HD PA/RA

**Note:** Refer to Steelcraft ordering nomenclature description on pp 12-13.

## Closer preps in double door frames

Frame closer preparation	
Code	Preparation description
CB ACTIVE SIDE	Corner bracket reinforced: Double door opening, reinforce active only
CB BOTH ENDS	Corner bracket reinforced: Double door opening, reinforce both openings
CS ACTIVE SIDE	Closer sleeve reinforced: Double door opening, reinforce active only
CS BOTH ENDS	Closer sleeve reinforced: Double door opening, reinforce both openings
PA ACTIVE SIDE	Reinforced in soffit for parallel arm application: Double door opening, reinforce active only
PA BOTH ENDS	Reinforced in soffit for parallel arm application: Double door opening, reinforce both openings
PA/RA ACTIVE	Reinforced in soffit and face for both parallel and regular arm application: Double door opening, reinforce active only
PA/RA BOTH ENDS	Reinforced in soffit and face for both parallel and regular arm application: Double door opening, reinforce both openings
PA/RA C/L HEAD	Reinforced in soffit and face for both parallel and regular arm application: located @ center of the double door opening
RA ACTIVE SIDE	Reinforced in face for regular arm application: Double door opening, reinforce active only
RA BOTH ENDS	Reinforced in face for regular arm application: Double door opening, reinforce both openings

TJ ACTIVE SIDE	Reinforced for top jamb closer application: Double door opening, reinforce active only
TJ BOTH ENDS	Reinforced for top jamb closer application: Double door opening, reinforce both openings
TJ/PA ACTIVE	Reinforced for both top jamb and parallel arm closer application: Double door opening, reinforce active only
TJ/PA BOTH ENDS	Reinforced for both top jamb and parallel arm closer application: Double door opening, reinforce both openings
TJ/RA ACTIVE	Reinforced for both top jamb and regular arm closer application: Double door opening, reinforce active only
TJ/RA BOTH ENDS	Reinforced for both top jamb and regular arm closer application: Double door opening, reinforce both openings

## Example:

- Top line frame ordering nomenclature example: F16 UL 4 5 ¾ 60 HD
- Frame closer prep in double door frame head:** PA/RA BOTH ENDS (see below for other hardware code options)
- Complete ordering nomenclature: F16 UL 4 5 ¾ 60 HD PA/RA BOTH ENDS

**Note:** Refer to Steelcraft ordering nomenclature description on pp 12-13.

## Hinge preps in door frames

Frame hinge preparations	
Code	Preparation description
3 ½ STD WT	3 ½" template hinge prep for standard duty (.123 wt) hinge for 1 ¾" door frames
4 ½ HVY WT	4 ½" template hinge prep for heavy duty (.180 wt) hinge
4 ½ STD WT	4 ½" template hinge prep for standard duty (.134 wt) hinge
4 ½ UNIV FULL	4 ½" universal hinge prep for standard/heavy duty (.134 /180 wt) hinge: field converted. Reinforced full width of jamb.
4 ½ UNIVERSAL	4 ½" universal hinge prep for standard/heavy duty (.134 /180 wt) hinge: field converted
4 STD WT	4" template hinge prep for standard duty (.130 wt) hinge
5 UNIV FULL	5" universal hinge prep for standard/heavy duty (.145 /190 wt) hinge: field converted. Reinforced full width of jamb
5" UNIVERSAL	5" universal hinge prep for standard/heavy duty (.145 /190 wt) hinge: field converted
5" HVY WT	5" hinge prep for heavy duty (.190 wt) hinge
5" STD WT	5" hinge prep for standard duty (.145 wt) hinge
BLANK HINGE	No preparation or reinforcement
CONT FACE REINF	Continuous Hinge, surface mounted to the frame face: internally reinforced on face
CONT FACE W/O	Continuous Hinge, surface mounted to the frame face: not internally reinforced
CONT RABT REINF	Continuous Hinge, mounted to the frame rabbet: internally reinforced on rabbet
CONT RABT W/O	Continuous Hinge, surface mounted to the frame rabbet: not internally reinforced
CONT SPECIAL	Continuous Hinge, located and reinforced per manufacturer's template
FULL SURFACE	Reinforced for butt type hinge per size and template specified
SPCL	Hinge prep per template

## Example:

- Top line frame ordering nomenclature example: F16 UL 4 5 ¾ 70 HJ
- Frame hinge prep in hinge jamb: 5" UNIVERSAL** (see below for other hardware code options)
- Complete ordering nomenclature: F16 UL 4 5 ¾ 70 HJ **5" UNIVERSAL**

**Note:** Refer to Steelcraft ordering nomenclature description on pp 12-13.

## Miscellaneous preps in door frames

Frame coordinator preparation	
Code	Preparation description
FACE MOUNTED	Coordinator (Cam action) reinforcement: face reinforced at center of frame head
SOFFIT MOUNTED	Coordinator (Soffit mounted) reinforcement: soffit reinforced full frame width
SPCL	Coordinator: reinforced per template

## Example:

- Top line frame ordering nomenclature example: F16 UL 4 5 ¾ 60 HD
- Frame closer prep in single door frame head: **PA/RA**
- Frame coordinator prep in head: FACE MOUNTED** (see below for other hardware code options)
- Complete ordering nomenclature: F16 UL 4 5 ¾ 60 HD PA/RA **FACE MOUNTED**

**Note:** Refer to Steelcraft ordering nomenclature description on pp 12-13.

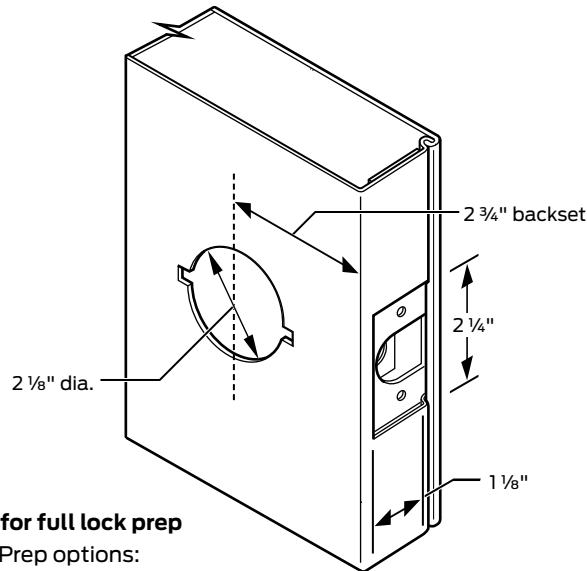
Frame removable mullion preparations	
Code	Preparation description
DBL RABBET HM MULL PREP	Removable mullion preparation for double rabbeted hollow metal mullion
REM HDWE MULL REINF ONLY	Removable mullion reinforcement for double rabbeted hollow metal mullion
SGL RABBET HM MULL PREP	Removable mullion preparation for single rabbeted hollow metal mullion



## Door preps: Locks

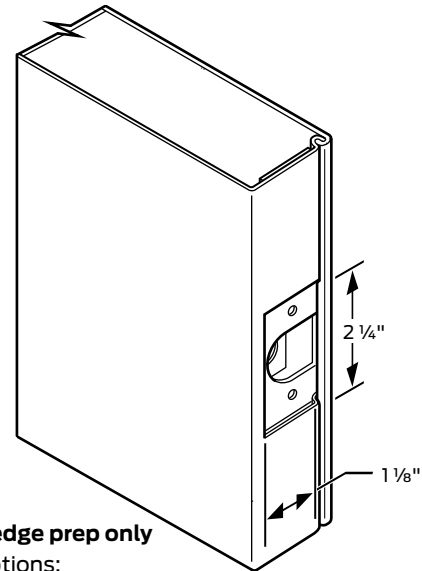
### 161 Lock prep

- For Bored/Cylindrical locksets conforming to ANSI A115.2
- KNOB trim or deadlock applications



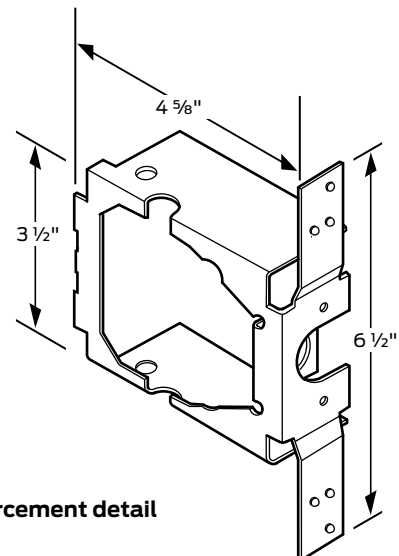
#### 161 for full lock prep

- Prep options:
  - **161-48** = 48" above bottom of frame
  - **161-60** = 60" above bottom of frame
  - **161-SPL** = special location
  - **161R** = with RPD reinforcements
  - **161V** = with VRPD reinforcement



#### 161ED for edge prep only

- Prep options:
  - **161ED-48** = 48" above bottom of frame
  - **161ED-60** = 60" above bottom of frame
  - **161ED-SPL** = special location
  - **161EDR** = with RPD reinforcements
  - **161EDV** = with VRPD reinforcement

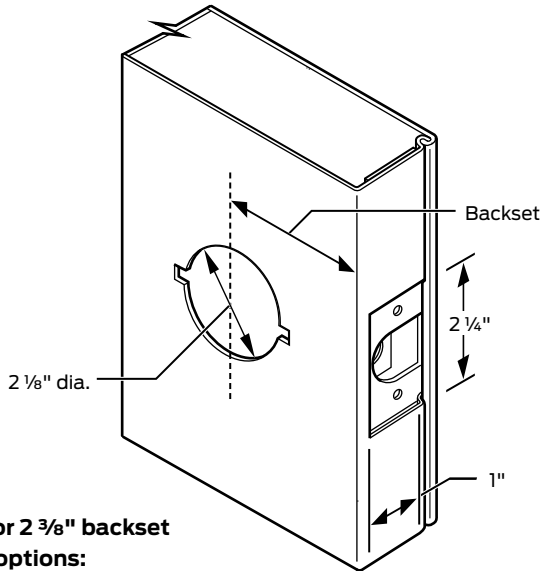


#### Lock reinforcement detail

- 16 gauge
- Projection welded Format Textor edge
- Extruded and tapped holes for lock front attachment

### 160 & 160-4 Lock prep

- For Bored/Cylindrical locksets conforming to ANSI A115.2
- KNOB trim or deadlock applications



#### 160 for 2 3/8" backset

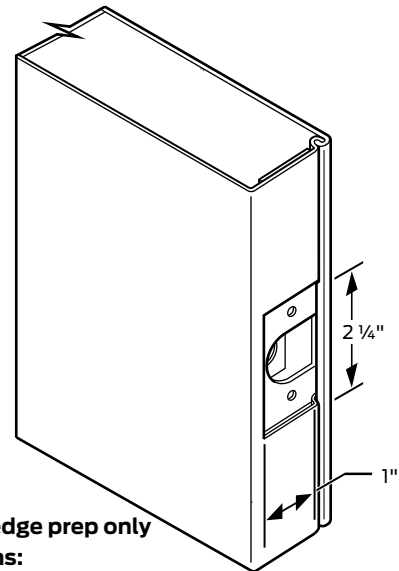
##### Prep options:

- 160-48 = 48" above bottom of frame
- 160-60 = 60" above bottom of frame
- 160-SPL = special location

#### 160-4 for 2 3/4" backset

##### Prep options:

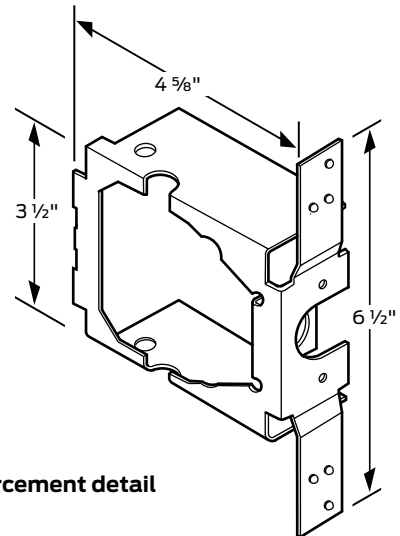
- 160-4-48 = 48" above bottom of frame
- 160-4-60 = 60" above bottom of frame
- 160-SPL = special location



#### 160ED for edge prep only

##### Prep options:

- 160ED-48 = 48" above bottom of frame
- 160ED-60 = 60" above bottom of frame
- 160ED-SPL = special location

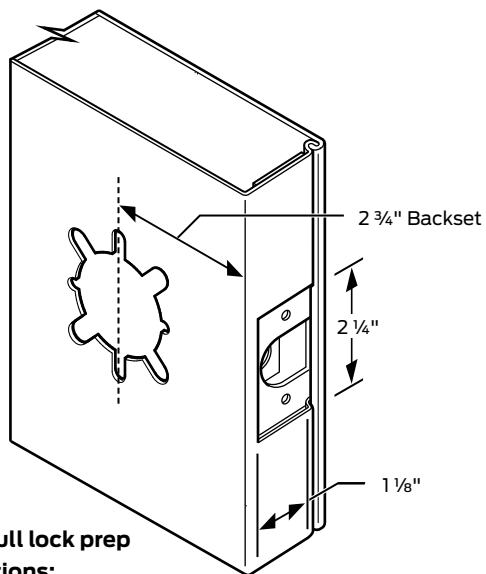


#### Lock reinforcement detail

- 16 gauge
- Projection welded Format Text or edge
- Extruded and tapped holes for lock front attachment

### 61L Lock prep

- For Bored/Cylindrical locksets conforming to ANSI A115.18
- LEVER trim or deadlock applications

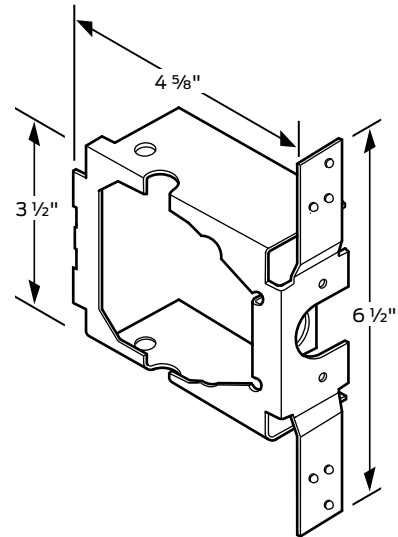
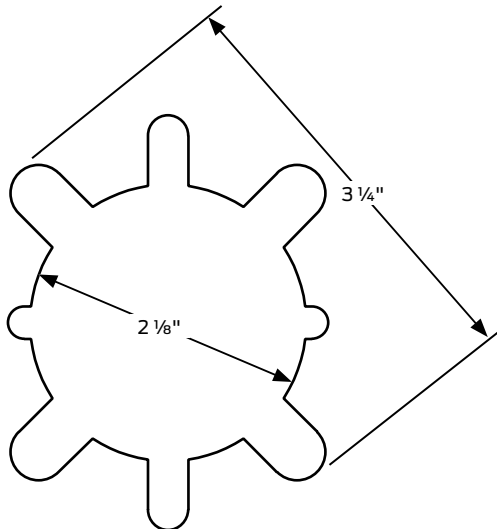


#### 61L for full lock prep

##### Prep options:

- 61L-48 = 48" above bottom of frame
- 61L-60 = 60" above bottom of frame
- 61L-SPL = special location
- 61LR = with RPD reinforcements
- 61LV = with VRPD reinforcement

**Note:** for locks installed in this prep must include Rose (trim with minimum  $3 \frac{7}{16}$ " diameters).

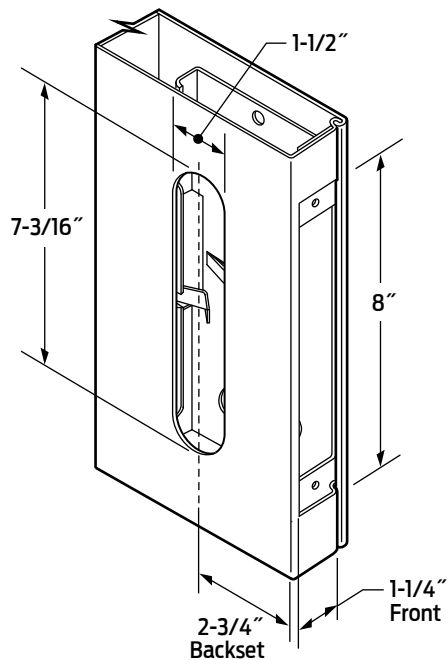


#### Lock reinforcement detail

- 16 gauge
- Projection welded Format Textor edge
- Extruded and tapped holes for lock front attachment

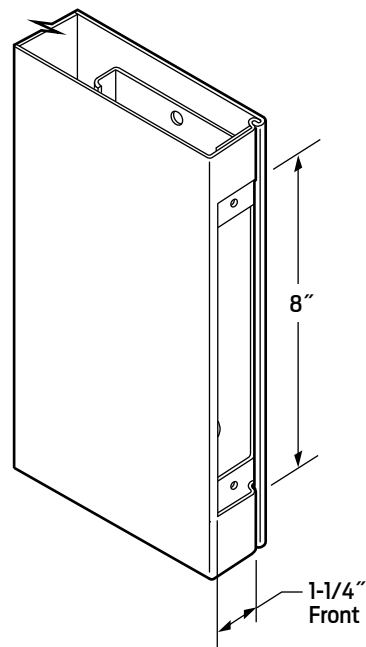
## 86 Lock prep

- For Mortise locksets conforming to ANSI A115.1
- Preparation for full escutcheon trim



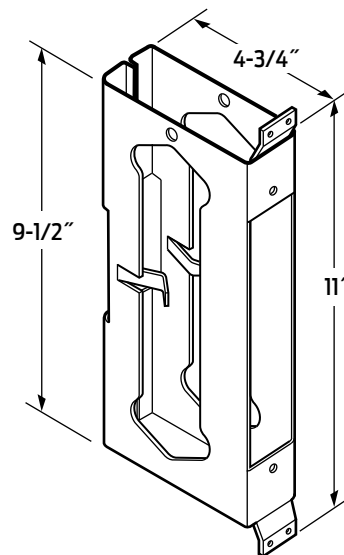
### 86 for full lock prep options:

- **86-48** = 48" above bottom of frame
- **86-60** = 60" above bottom of frame
- **86-SPL** = special location
- **86R** = with RPD reinforcements
- **86RV** = with VRPD reinforcement



### 86ED for edge prep only options:

- **86ED-48** = 48" above bottom of frame
- **86ED-60** = 60" above bottom of frame
- **86ED-SPL** = special location
- **86DR** = with RPD reinforcements
- **86EDV** = with VRPD reinforcement



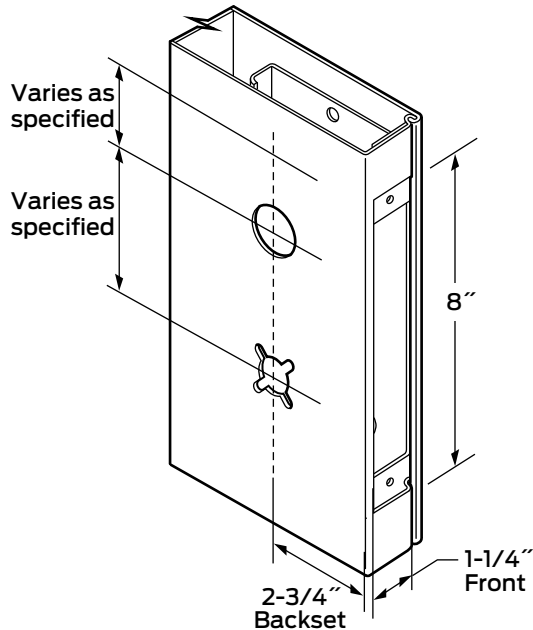
### Lock reinforcement detail

- 14 gauge
- Projection welded Format Textor edge
- Extruded and tapped holes for lock front attachment

## 86 Lock prep for commercial and institutional applications

### 7C6 Lock prep

- For Mortise locksets conforming to ANSI A115.1
- Preparation for sectional trim per Steelcraft hardware catalogs
- Nomenclature varies with lock catalogue requirements



### 7C6 for Schlage L9050, L9453, L9456, L9473, L9485 (RH/LH)

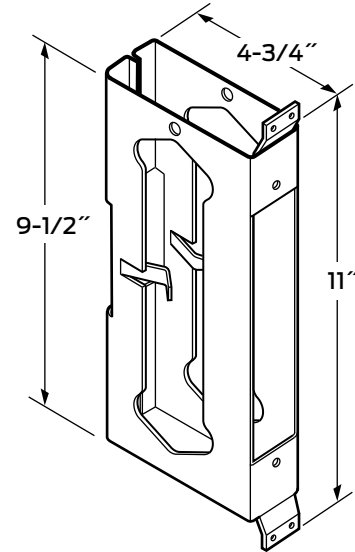
- **7C6** = Refer to Steelcraft Hardware Catalogs for all prep designations

### Special

- Designation for sectional trim when ordered by manufacturers template numbers

### Special lock prep

- Nomenclature "SPECIAL" designates templated hardware prep is required. Lock number and template number must be specified



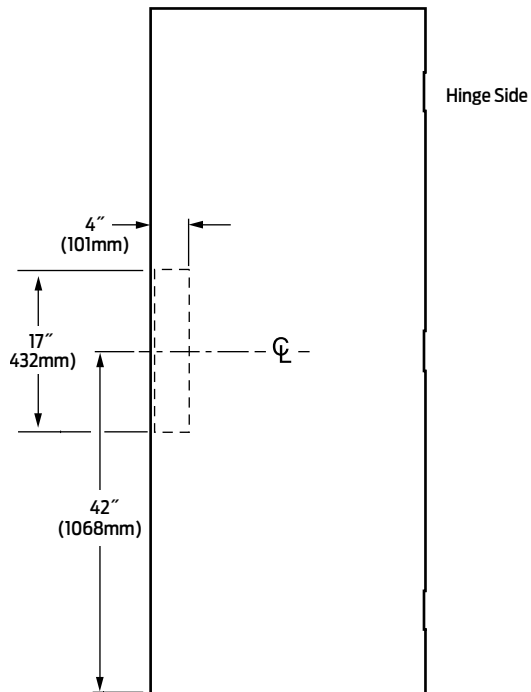
### Lock reinforcement detail

- 14 gauge
- Projection welded Format Textor edge
- Extruded and tapped holes for lock front attachment

## Door preps: Exit devices

### Push/Pull Prep

- For Push/Pull plate trim

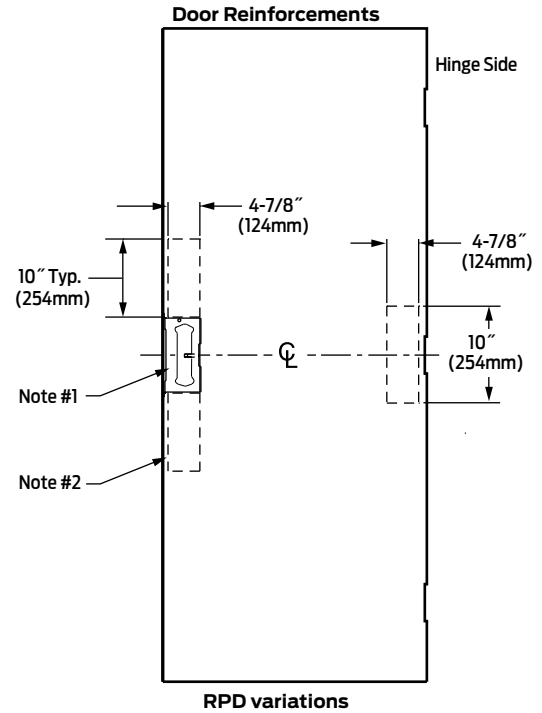
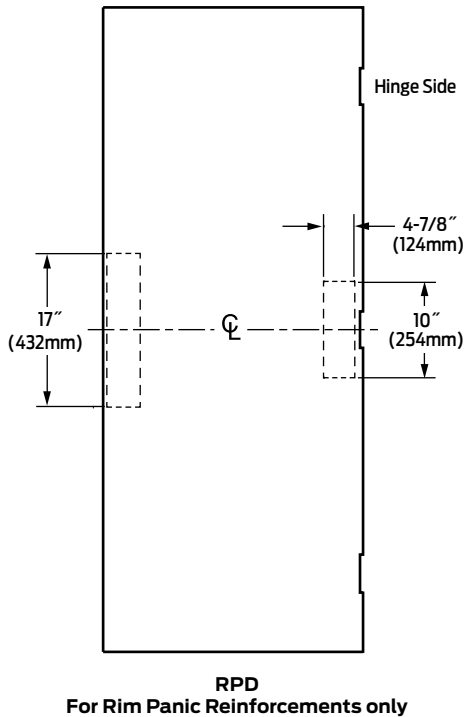


#### Notes:

1. Push Pull reinforcements are 14 gauge steel.
2. Both faces are reinforced as shown.

## Rim panic prep

- For surface Rim Panic Devices



Rim Panic reinforcements on hinge side with Standard lock prep and reinforcement

### Full lock prep options:

- 86R = 86 lock prep for full escutcheon trim
- 61LR = 61L lock prep for lever trim
- 160R = 160 lock prep for knob trim
- 161R = 161 lock prep for knob trim

### Edge only lock prep options:

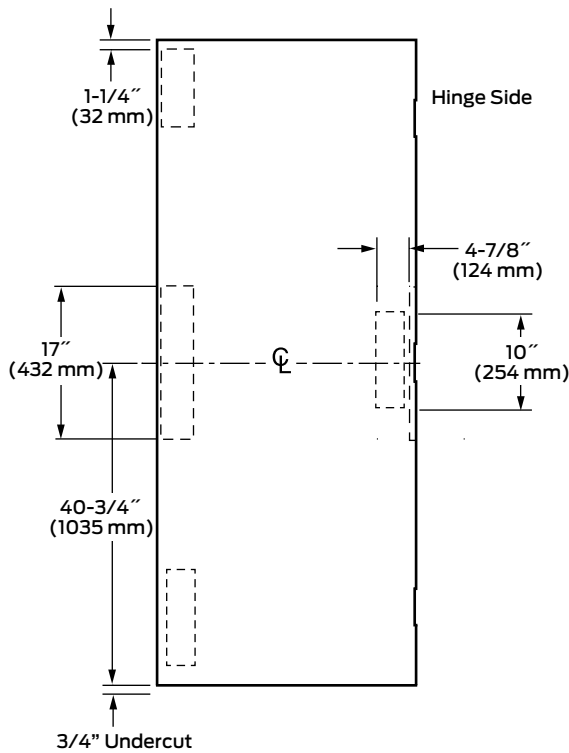
- 86EDR = 86 lock prep with edge prep only
- 161EDR = 161 lock prep with edge prep only
- 160EDR = 160 lock prep with edge prep only

### Notes:

- RPD variation preps include the primary (standard) lock prep as specified
- Primary lock ordering codes suffixed with the letter "R" (i.e. 86R, 86EDR) include additional exit reinforcements above and below the primary reinforcements
- Reinforcement is made of 14 gauge material

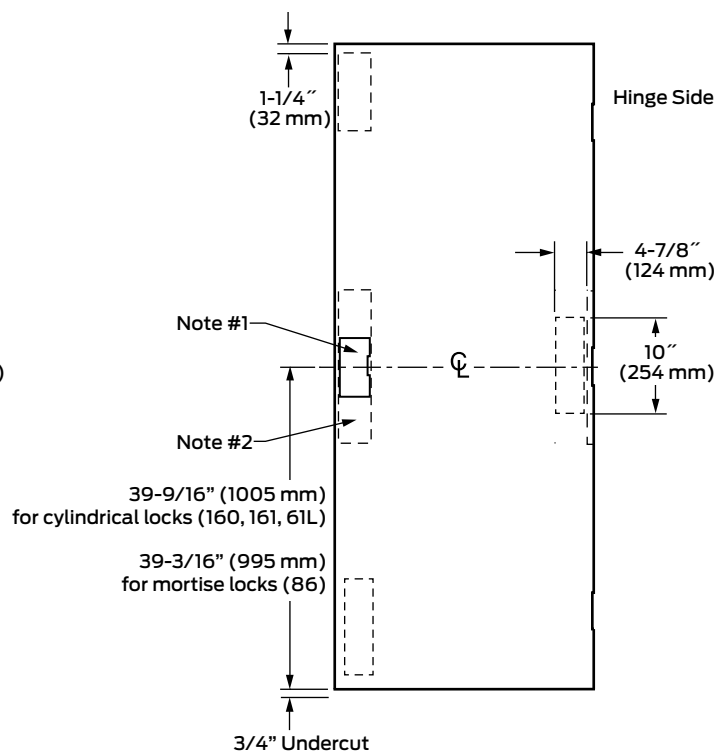
## Vertical rod prep

- For surface Vertical Rod Panic Devices



### VRPD

For Vertical Rod Panic Reinforcements only.  
Prep options are not available.



### VRPD variations

Vertical Rod Panic reinforcements on hinge side with standard lock prep and reinforcement

#### Full lock prep options:

- 86V** = 86 lock prep for full escutcheon trim
- 61LV** = 61L lock prep for lever trim
- 160V** = 160 lock prep for knob trim
- 161V** = 161 lock prep for knob trim
- Edge only lock prep options:
- 86EDV** = 86 lock prep with edge prep only
- 161EDV** = 161 lock prep with edge prep only
- 160EDV** = 160 lock prep with edge prep only

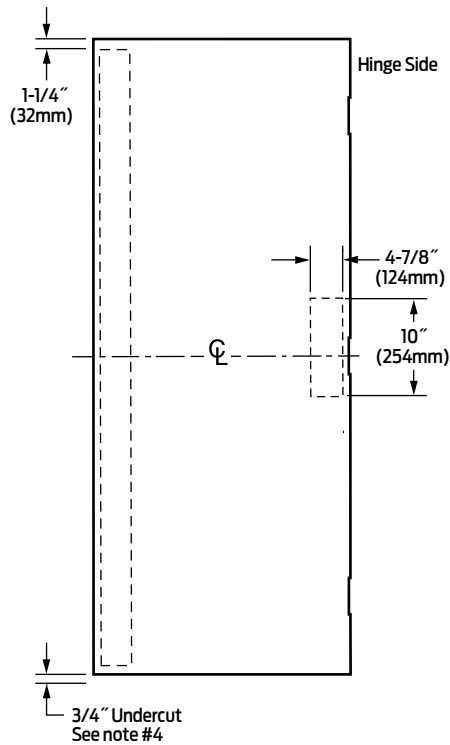
#### Notes:

- VRPD variation preps include the primary (standard) lock prep as specified.
- Primary lock ordering codes suffixed with the letter "V" (i.e. 86V, 86EDV) include additional exit reinforcements above and below the primary reinforcements
- Prep is located to accommodate Steelcraft's standard 3/4" undercut. **If special undercuts are required, it must be specified and prep location will be adjusted accordingly.**
- Reinforcement is made of 14 gauge material



**Special: Concealed vertical rod exit device prep**

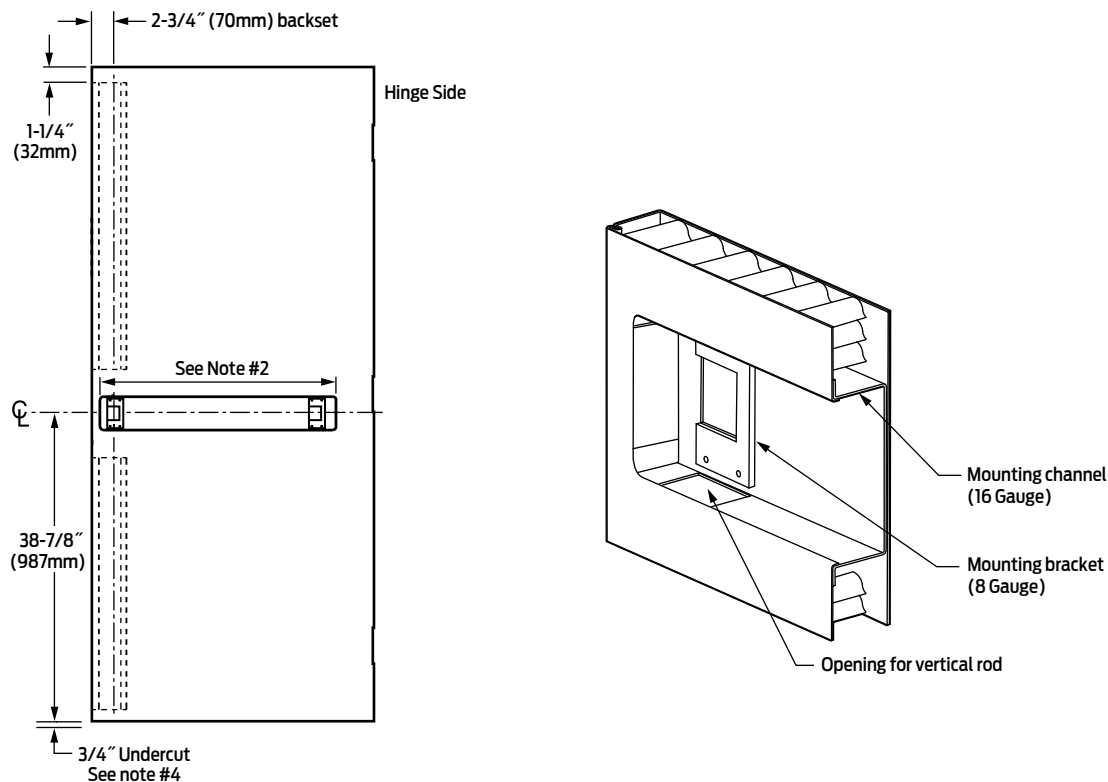
- Preparation concealed vertical rod devices



**Notes:**

1. Concealed vertical rod preps are always ordered as "SPECIAL", per manufacturer's templates.
2. Illustrated above are the typical internal reinforcing channels for L, B, CE, and T Series doors.
3. Top and bottom channel preparations vary per manufacturer's templates.
4. Prep is located to accommodate Steelcraft's standard  $3/4"$  undercut. **If special undercuts are required, it must be specified and prep location will be adjusted accordingly.**

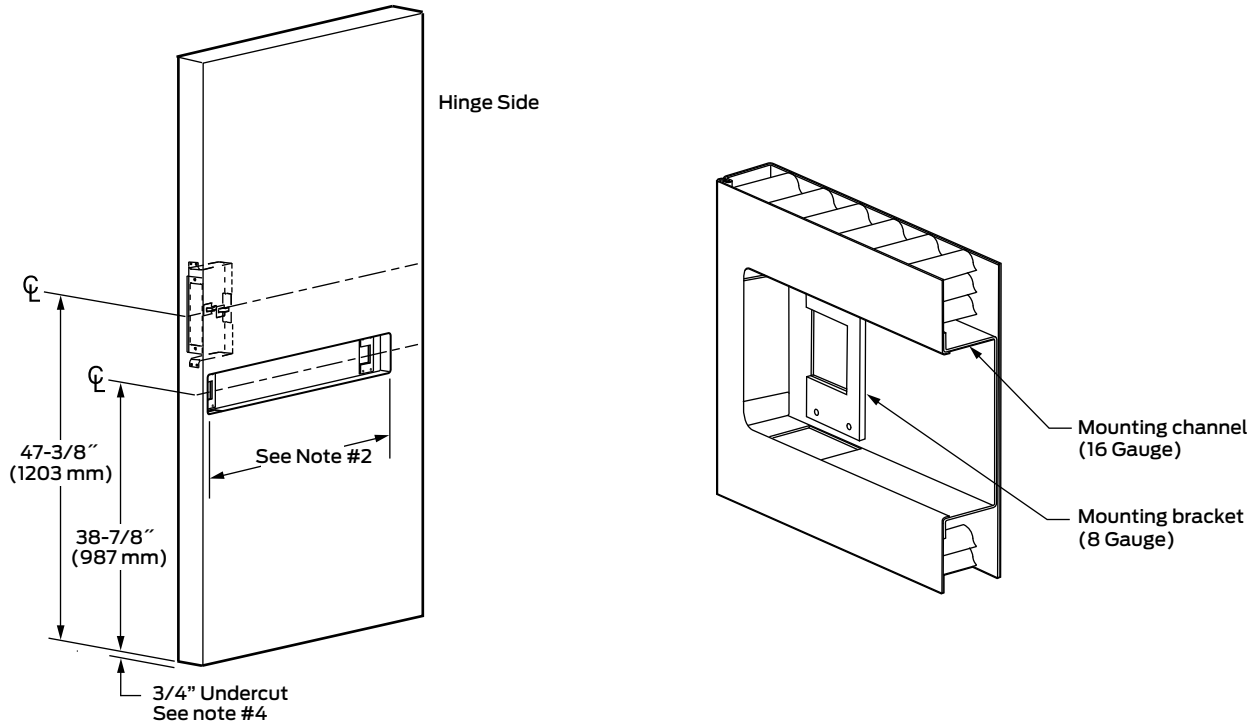
**Special: Von Duprin impact™ (94/9547) concealed vertical rod integral exit device**



**Notes:**

1. Minimum nominal door width is 2'6"
2. Cross bar (prep) width:
  - $24\frac{1}{16}$ " for doors under 2'10" in nominal door width.
  - $30\frac{1}{16}$ " for doors 2'10" and over in nominal door width
3. Illustrated above are the typical internal reinforcing channels for L and T Series doors.
4. Prep is located to accommodate Steelcraft's standard  $\frac{3}{4}$ " undercut. **If special undercuts are required, it must be specified and prep location will be adjusted accordingly.**

**Special: Von Duprin impact™ (94/9575) mortise lock device**



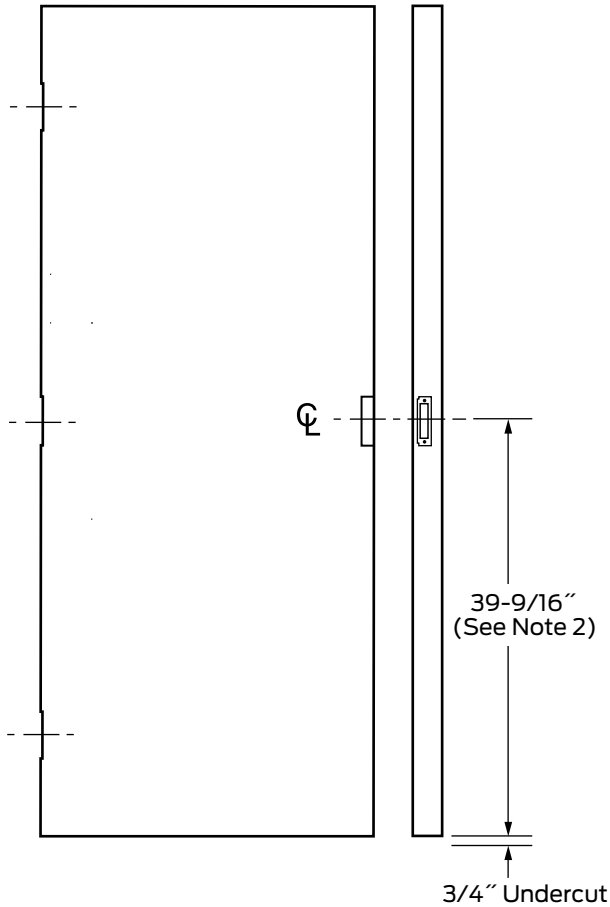
**Notes:**

1. Minimum nominal door width is 2'6"
2. Cross bar (prep) width:
  - 24 1/16" for doors under 2'10" in nominal door width.
  - 30 1/16" for door 2'10" and over in nominal door width
3. Illustrated above are the typical internal reinforcing channels for L and T Series doors.
4. Prep is located to accommodate Steelcraft's standard 3/4" undercut. **If special undercuts are required, it must be specified and prep location will be adjusted accordingly.**
5. Prep requires special strike location in frames.

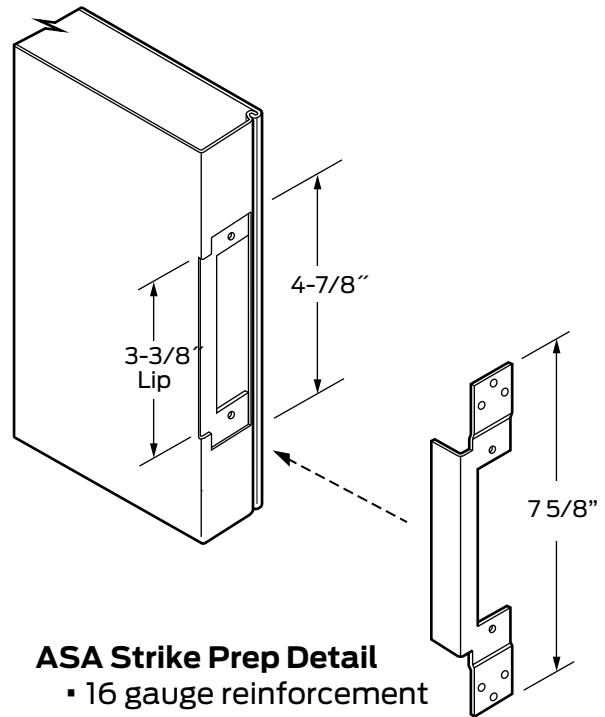
## Door preps: Inactive leaves

### ASA Prep without astragal

- For 4 7/8" lip strike
- Preparation for full inactive leaf with astragal



**Elevation Detail with ASA Strike**



### ASA Strike Prep Detail

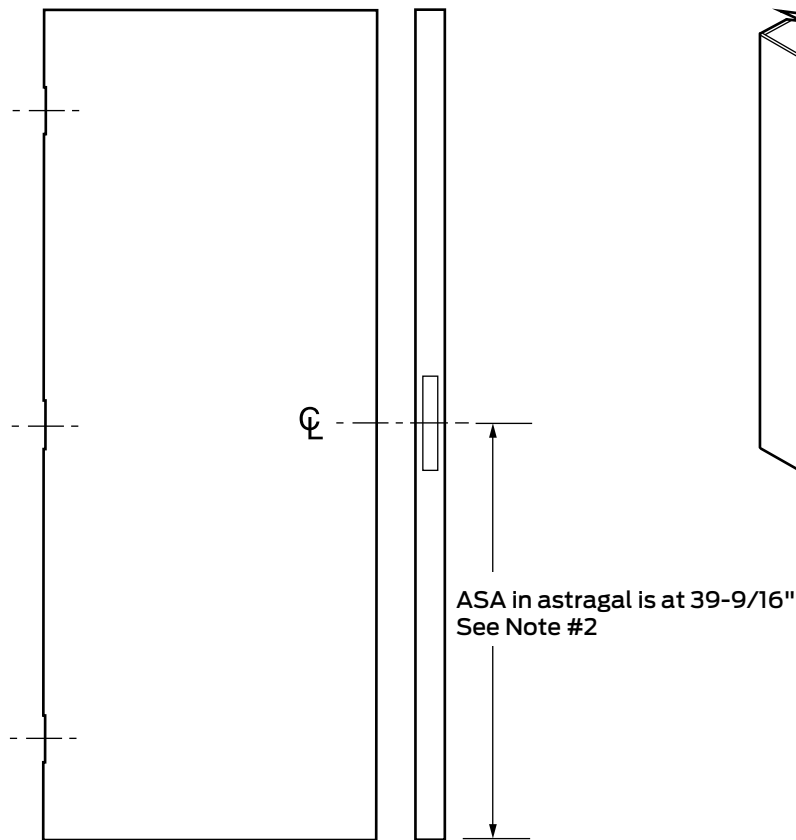
- 16 gauge reinforcement

#### Notes:

1. Prep is for fully mortised 4 7/8" ASA strike, commonly used on a wide inactive leaf.
2. Prep is located to accommodate Steelcraft's standard 3/4" undercut. **If special undercuts are required, it must be specified and prep location will be adjusted accordingly.**

### ASA Prep with astragal

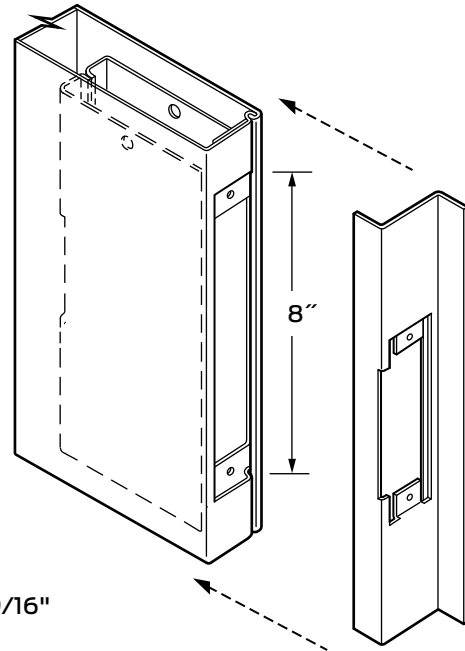
- For 4 7/8" lip strike
- Preparation for full inactive leaf with astragal



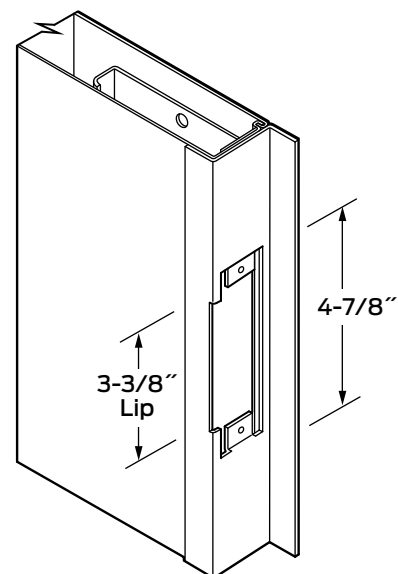
**Strike Prep Elevation Detail**

#### Notes:

1. "Z" Astragal is required. Prep is for fully mortised 4 7/8" ASA strike.
  - Cut outs on the edge of the door are for clearance only.
  - Astragals are shipped loose for field attachment.
  - Attaching tabs for strike attachment are included on the astragal.
2. Center line of bottom prep is located 39 9/16" above the bottom edge of the door, unless otherwise specified
3. Prep is located to accommodate Steelcraft's standard 3/4" undercut. **If special undercuts are required, it must be specified and prep location will be adjusted accordingly.**



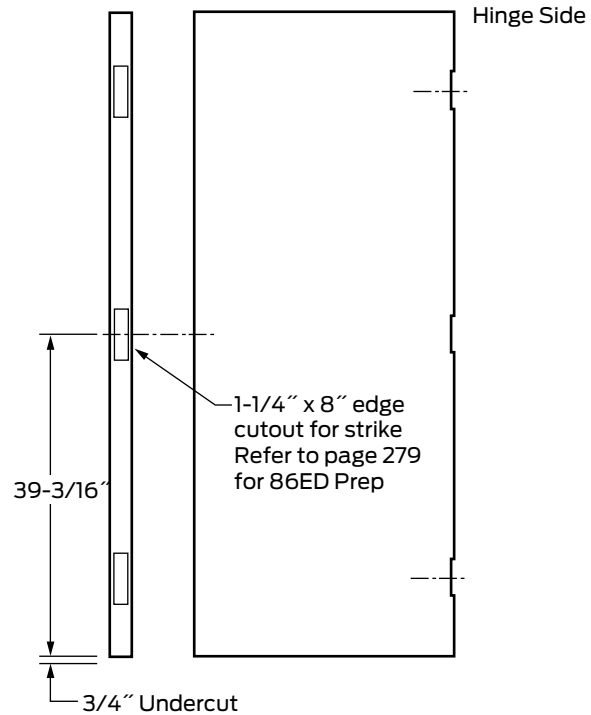
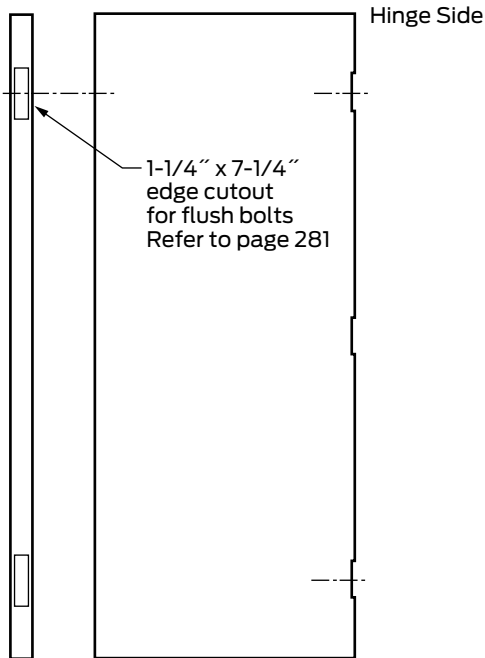
**Astragal attachment Detail**



**Final Assembly Detail**

### Flush bolts with astragal

- Door leaf ordered as a separate inactive leaf not as a pair
- Cutouts for Flush bolts in inactive leaves
- For Flush Bolts (Manual or Automatic) conforming to ANSI A115.4



### Inactive leaf with astragal

**Note:** option does not have a strike preparation on the edge

#### Notes:

1. Astragals are shipped loose for field attachment.
2. Attaching tabs for flush bolts and strikes are included on the astragal. Cut outs on the edge of the door are for clearance only.
3. Details above, address inactive leafs when ordered as individual leafs.
4. When ordering double doors as pairs specify the primary lock and auxiliary locks on the active leaf. Primary Strike designations for the inactive leaf are not required, however strikes for auxiliary locks must be specified.

### Inactive leaf with astragal ASA

#### Prep options:

##### Strike for primary lock:

- **ASA** = 4 7/8" strike @ 40 5/16" above bottom of frame
- **CYL** = 2 3/4" strike @ 40 5/16" above bottom of frame
- **BLANK** = no prep but deadlock above
- **SPECIAL** = Special strike per manufacturer's template

##### Strike for deadlock lock:

- **ASA-48** = 4 7/8" strike @ 48" above bottom of frame
- **ASA-60** = 4 7/8" strike 60" above bottom of frame
- **CYL-48** = 2 3/4" strike @ 48" above bottom of frame
- **CYL-60** = 2 3/4" strike 60" above bottom of frame
- **SPECIAL-48** = 48" above bottom of frame
- **SPECIAL-60** = 60" above bottom of frame

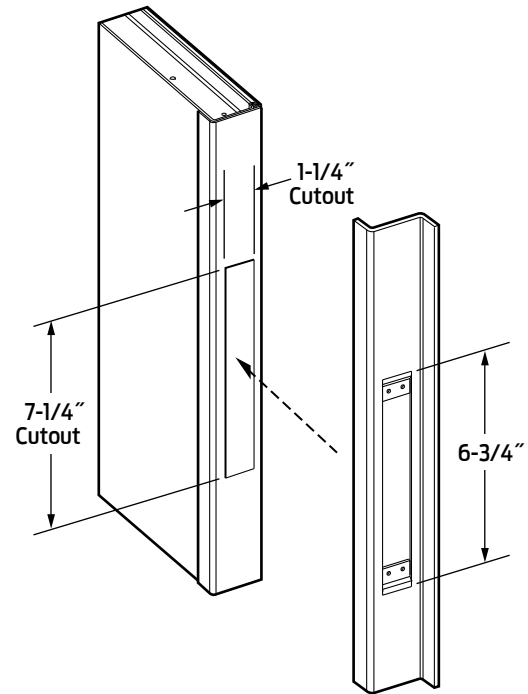
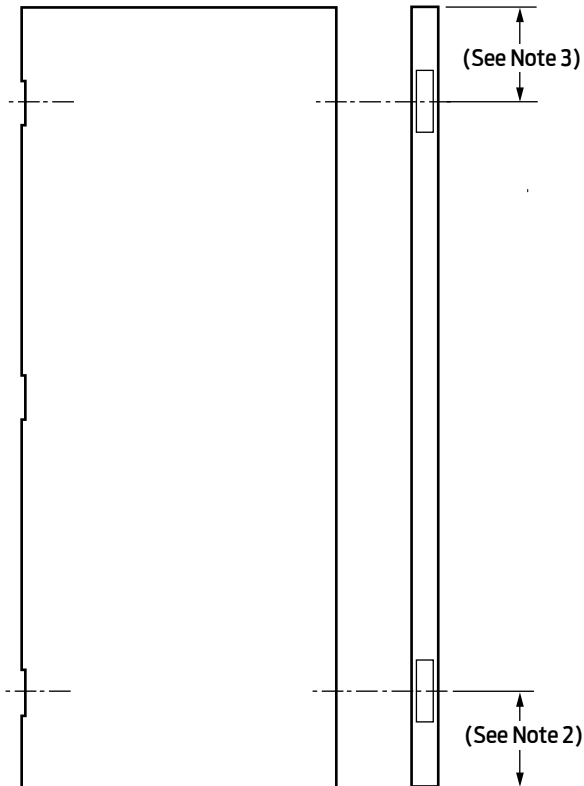
##### Strike for both primary lock and deadlock lock:

Specify nomenclature coded for both locks

**Example:** ASA x ASA-60 = primary strike @ 40 5/16" and deadlock strike @ 60" above bottom of the frame

### Flush bolts with astragal (astragal attachment detail)

- Door leaf ordered as a separate inactive leaf not as a pair
- Preparation for Flush bolts and strikes in the inactive leaf and Astragal
- For Flush Bolts (Manual or Automatic) conforming to ANSI A115.4

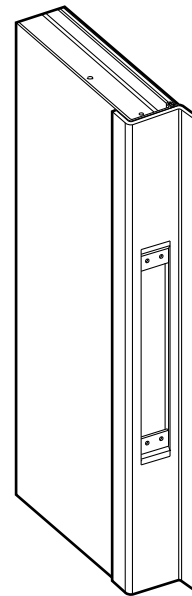


**Astragal attachment Detail**

### Flush bolt Elevation Detail

#### Notes:

1. "Z" Astragal is required. Prep is for fully mortised Flush Bolts (manual or auto).
  - Cut outs on the edge of the door are for clearance only.
  - Astragals are shipped loose for field attachment
  - Attaching tabs for Flush bolts attachment are included on the astragal.
2. Center line of bottom prep is located 12" above the bottom edge of the door, unless otherwise specified
3. Top prep location varies as specified. Standard location options are 12", 18", 24", 30" or 36" from the top edge of the door.

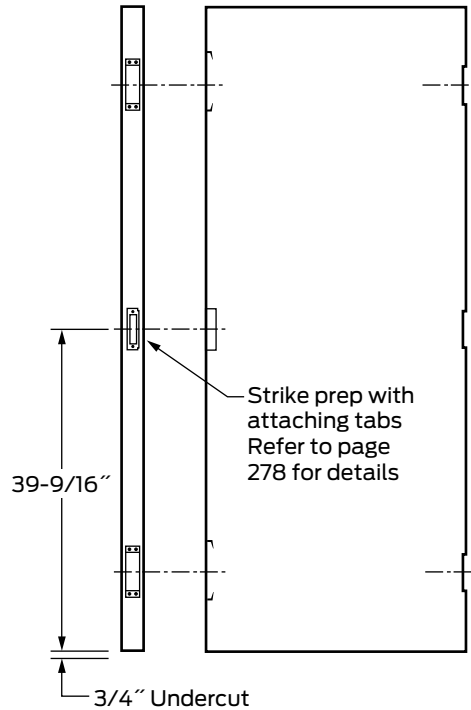
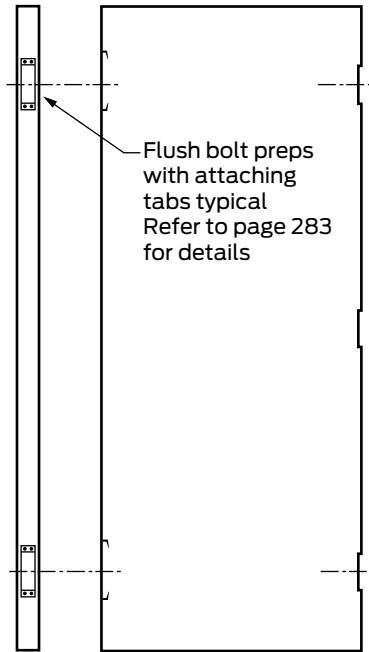


**Final Assembly Detail**

Details are subject to change without prior notice.

### Flush bolts without astragal

- Door leaf ordered as a separate inactive leaf not as a pair
- Cutouts for Flush bolts in inactive leaves
- For Flush Bolts (Manual or Automatic) conforming to ANSI A115.4



### Inactive leaf without astragal

**Note:** option does not have a strike preparation on the edge

#### Notes:

1. Flush bolt and strike preparations are fully mortised into the in active leaf door edge.
2. Details above, address inactive leaves when ordered as individual leaves.
3. When ordering double doors as pairs specify the primary lock and auxiliary locks on the active leaf. Primary Strike designations for the inactive leaf are not required, however strikes for auxiliary locks must be specified.

### Inactive leaf without astragal ASA

#### Prep options:

#### Strike for primary lock:

- **ASA** = 4 7/8" strike @ 40 5/16" above bottom of frame
- **CYL** = 2 3/4" strike @ 40 5/16" above bottom of frame
- **BLANK** = no prep but deadlock above
- **SPECIAL** = Special strike per manufacturer's template

#### Strike for deadlock lock:

- **ASA-48** = 4 7/8" strike @ 48" above bottom of frame
- **ASA-60** = 4 7/8" strike 60" above bottom of frame
- **CYL-48** = 2 3/4" strike @ 48" above bottom of frame
- **CYL-60** = 2 3/4" strike 60" above bottom of frame
- **SPECIAL-48** = 48" above bottom of frame
- **SPECIAL-60** = 60" above bottom of frame

#### Strike for both primary lock and deadlock lock:

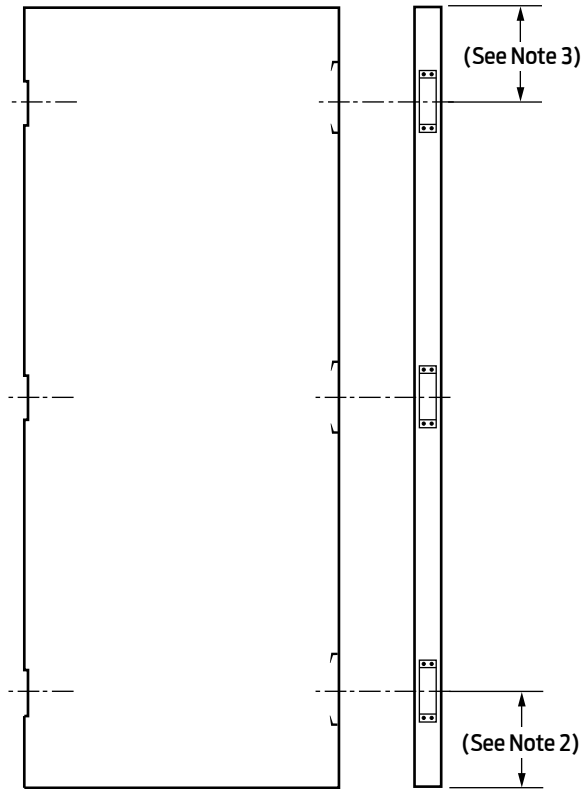
Specify nomenclature coded for both locks

**Example:** ASA x ASA-60 = primary strike @ 40 5/16" and deadlock strike @ 60" above bottom of the frame

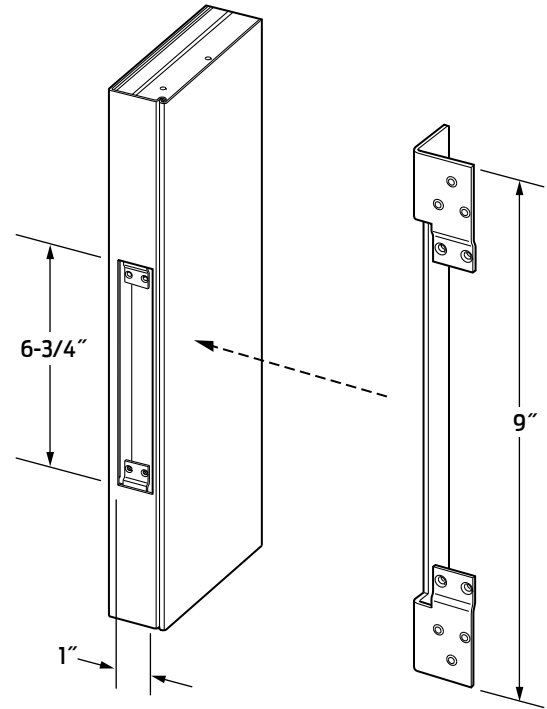


### Flush bolts without astragal (flush bolt prep detail)

- Used in a wide inactive leaf
- Door leaf ordered as a separate inactive leaf not as a pair
- Preparation for Flush bolts and strikes in inactive leaves
- For Flush Bolts (Manual or Automatic) conforming to ANSI A115.4



**Flush bolt Elevation Detail**



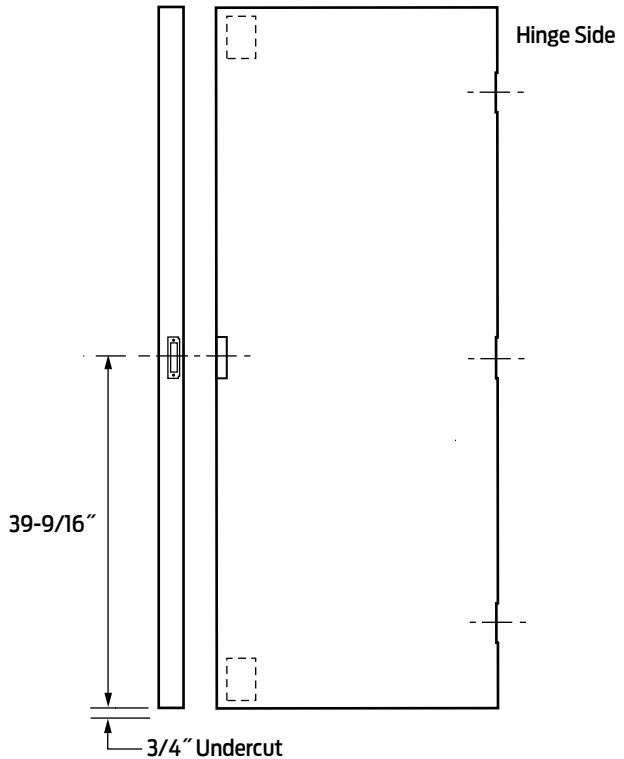
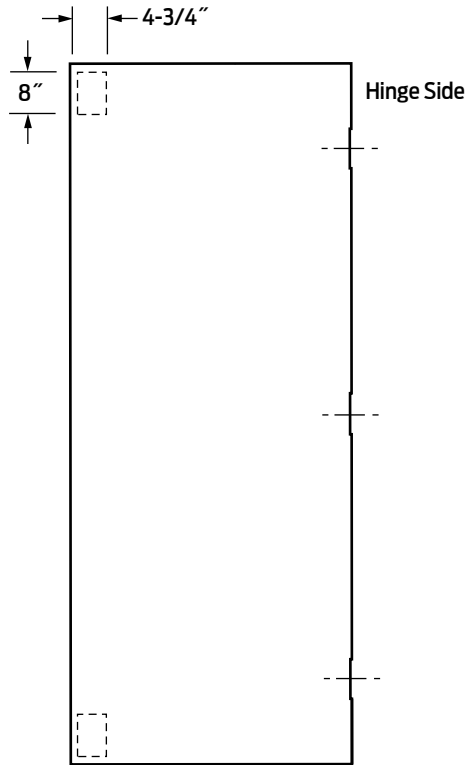
**Flush bolt Prep Detail**  
• 16 gauge reinforcement

#### Notes:

1. Prep is for fully mortised Flush Bolts (manual or auto)
2. Center line of bottom prep is located 12" above the bottom edge of the door, unless otherwise specified.
3. Top prep location varies as specified. Standard location options are 12", 18", 24", 30" or 36" from the top edge of the door.

### Surface bolts without astragal

- Door leaf ordered as a separate inactive leaf not as a pair
- Surface Bolt reinforcements in inactive leaves



### Inactive leaf without astragal

**Note:** option does not have a strike preparation on the edge

#### Notes:

1. Details above, address inactive leaves when ordered as individual leaves.
2. When ordering double doors as pairs specify the primary lock and auxiliary locks on the active leaf. Primary Strike designations for the inactive leaf are not required, however strikes for auxiliary locks must be specified.
3. Surface bolt reinforcement data:
  - Reinforcements are 14 gauge steel
  - Both faces are reinforced at the top and bottom on the lock edge

### Inactive leaf without astragal ASA

#### Prep options:

#### Strike for primary lock:

- **ASA** = 4 7/8" strike @ 40 5/16" above bottom of frame
- **CYL** = 2 3/4" strike @ 40 5/16" above bottom of frame
- **BLANK** = no prep but deadlock above
- **SPECIAL** = Special strike per manufacturer's template

#### Strike for deadlock lock:

- **ASA-48** = 4 7/8" strike @ 48" above bottom of frame
- **ASA-60** = 4 7/8" strike 60" above bottom of frame
- **CYL-48** = 2 3/4" strike @ 48" above bottom of frame
- **CYL-60** = 2 3/4" strike 60" above bottom of frame
- **SPECIAL-48** = 48" above bottom of frame
- **SPECIAL-60** = 60" above bottom of frame

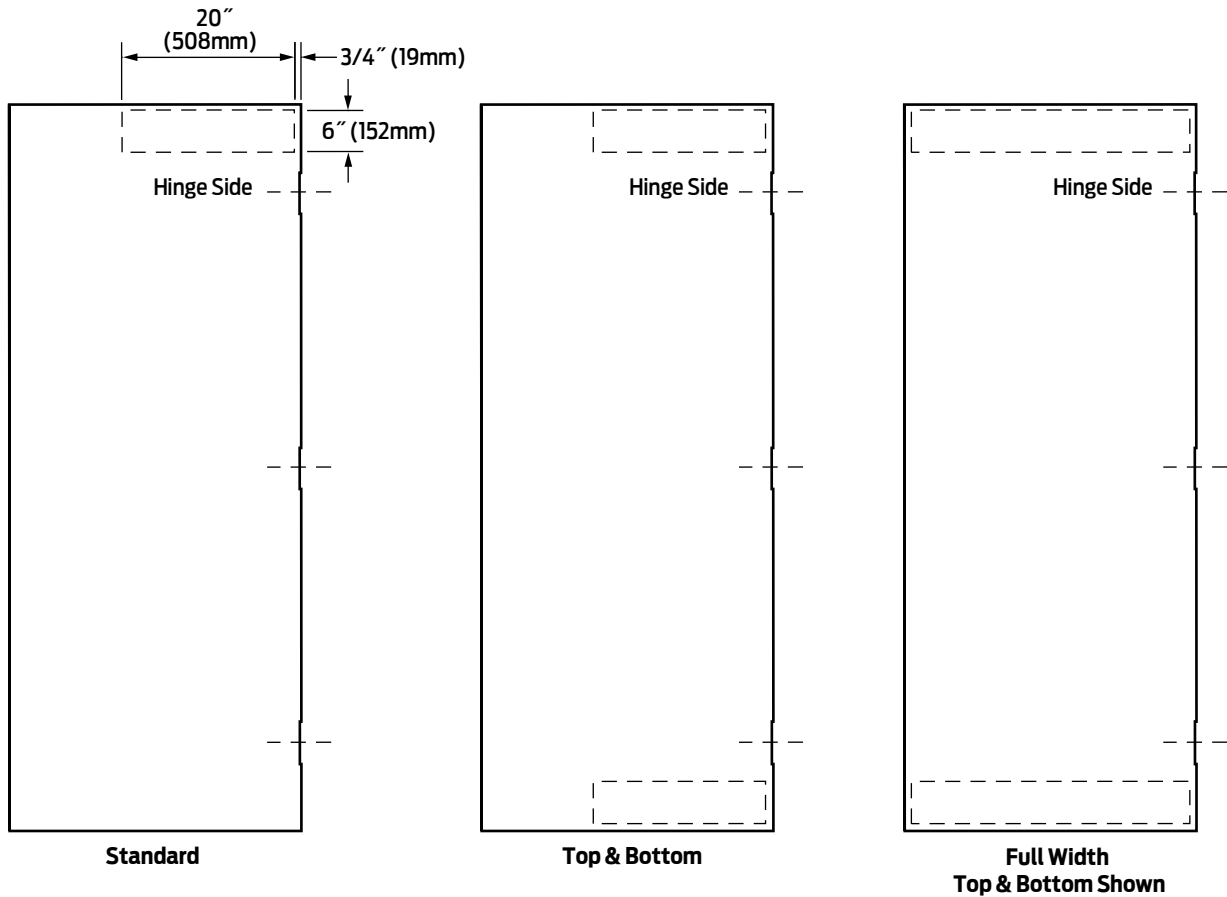
#### Strike for both primary lock and deadlock lock:

Specify nomenclature coded for both locks

**Example:** ASA x ASA-60 = primary strike @ 40 5/16" and deadlock strike @ 60" above bottom of the frame

### Closer prep

- For Surface Closers
- Internally reinforced on both faces



### Closer for surface closers

#### Prep options:

- **SPECIAL** = special size reinforcement

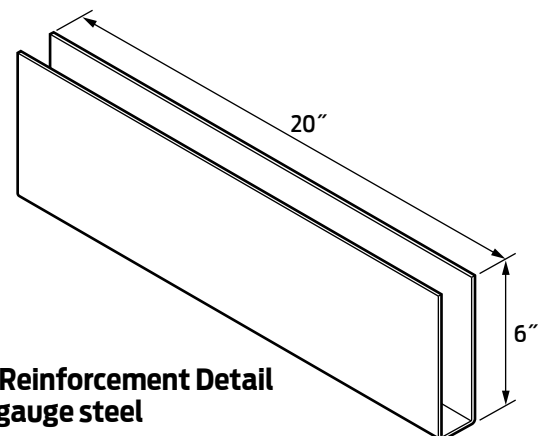
#### Notes:

1. All surface closer reinforcements are 14 gauge unless otherwise specified.
2. Reinforcement heights are as follows:
  - 6" = all door designs except doors with G, LG or FG glass lights
  - 4 7/8" = doors with G, LG or FG glass lights

### Closer

#### Prep options:

- **TOP/BOTTOM** = standard reinforcement at top and bottom
- **FULL WIDTH** = 14 gauge reinforcement full door width
- **FULL WIDTH TB** = 14 gauge reinforcement full door width at top and bottom

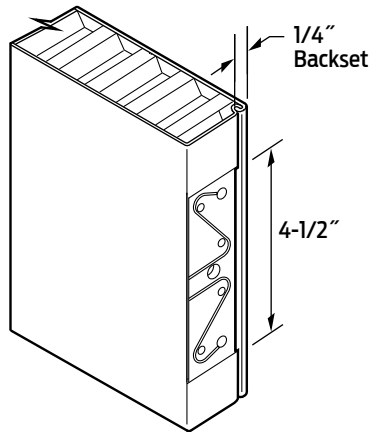
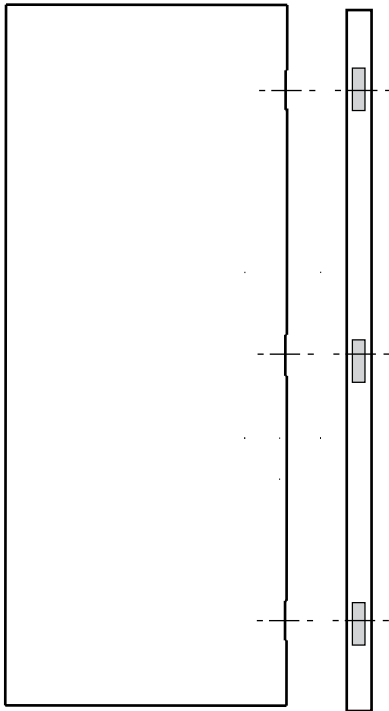


**Closer Reinforcement Detail**  
▪ 14 gauge steel

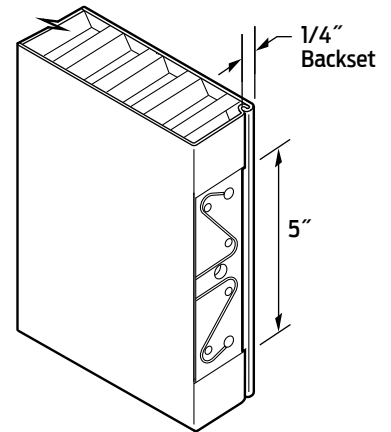
## Frame preps: Hinges

### Hinge prep

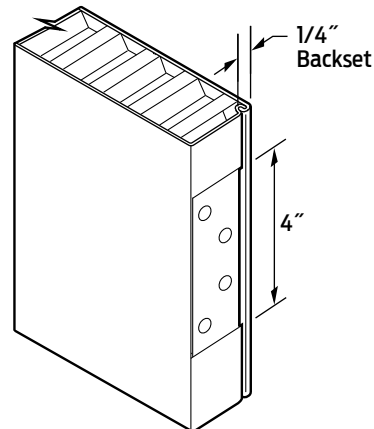
- For templated mortise hinges
- Internally reinforced with 7 gauge (.187")



**4-1/2" Universal Hinge Detail**



**5" Universal Hinge Detail**

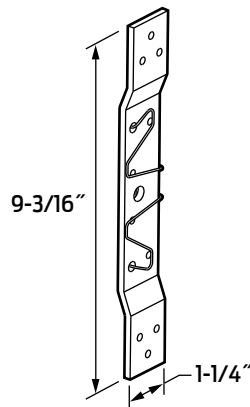


**4" Hinge Detail  
L20 & CE 20 Series Only**

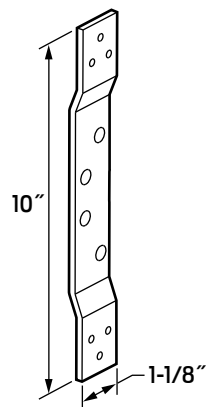
### Standard hinge prep elevation detail

#### Hinge options:

- When no hinge prep is specified door is prepped for 4 1/2" universal hinges:
  - **5" HINGE** = 5" Universal hinge: see below
  - **4" HINGE** = 4" standard duty template hinge
- **Note:** L20 & CE 20 Series only
- **SPECIAL** = Special hinge prep per template
- **BLANK HINGE** = No hinge preps, standard door width



**4-1/2" & 5"  
Universal Hinge Detail  
7 Gauge Reinforcement  
.187" thick**

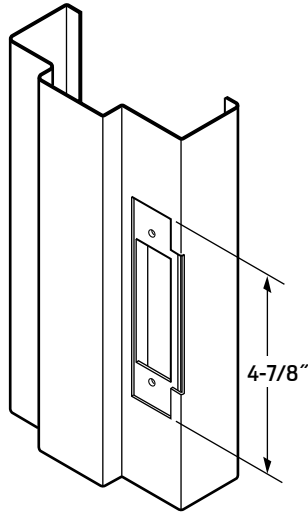


**4" Hinge Detail  
Reinforcement  
.125" thick**

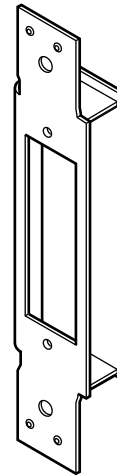
## Frame preps: Strikes

### ASA Strike prep

#### Typical Preparation



#### Reinforcement



#### General information

The ANSI A115.1 and ANSI A115.2 strikes are designed to function with the ANSI A115.1 and 115.2 locks and mortise exit devices. Some mortise and bored-in deadlocks will function with these strikes.

#### Description

ANSI A115.1 and ANSI A115.2 strikes are 4  $\frac{7}{8}$ " (124 mm) high and  $\frac{1}{4}$ " (32 mm) wide. The centerline of the strike is located 40  $\frac{5}{16}$ " (1024 mm) from the bottom of the frame. This location will function with the ANSI A115.1 and A115.2 locks and the mortise exit devices. The location for deadbolts must be adjusted (normally 48" [1219 mm] from the bottom of the frame) to match the deadlock being used. The centerline of the strike is located  $\frac{15}{16}$ " (24 mm) from the stop of the strike jamb.

The normal lip on the strike is 1  $\frac{1}{4}$ " (32 mm). This allows the strike lip to extend beyond the frame face providing a guide for the latch bolt. The lip is omitted on deadlock strikes.

#### Reinforcement

The reinforcement used is a specially formed 16 gauge steel part and is projection welded to the door rabbet of the strike jamb. The reinforcement includes extruded attaching holes to provide adequate threads for the strike plate screws. The reinforcement includes a dust (mortar) box that is deep enough to receive the 1" (25 mm) throw latch bolt or deadlock.

#### Template

Lock manufacturers template should be reviewed carefully to insure the strike being used will function in the preparation. Although Steelcraft's preparation meets or exceeds the ANSI standard, some manufacturer's strikes may not fit properly in the cutout or provide enough lip extension.

#### Specification compliance

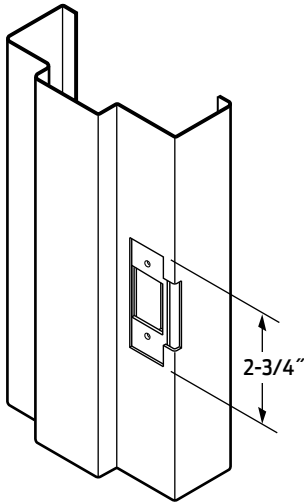
The ANSI A115.1 and ANSI A115.2 strike preparation meets or exceeds the requirements of the Steel Door Institute (SDI) and the Door and Hardware Institute (DHI).

#### Fire ratings

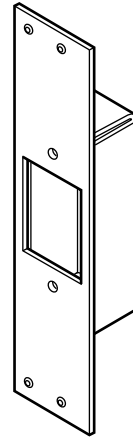
The ANSI A115.1 and ANSI A115.2 strikes can be used in fire rated frames with ratings from 20 minute to 3 hours.

## CYL Strike prep

### Typical Preparation



### Reinforcement



### General information

The ANSI A115.3 strike is designed to function with the ANSI A115.2 and 115.3 locks and bored-in deadlocks.

### Description

ANSI A115.3 strike is 2 3/4" (70 mm) high and 1 1/8" (28 mm) wide. The centerline of the strike is located 40 5/16" (1024 mm) from the bottom of the frame. This location will function with the ANSI A115.2 and A115.3 locks. The location must be adjusted (normally 48" [1219 mm] from the bottom of the frame to match the deadlock being used. The centerline of the strike is located 15/16" (24 mm) from the stop of the strike jamb

The normal lip on the strike is 1 1/4" (32 mm). This allows the strike lip to extend beyond the frame face providing a guide for the latch bolt. The lip is omitted on deadlock strikes.

### Reinforcement

The reinforcement used is a 14 gauge steel part and is projection welded to the frame rabbet. The reinforcement includes extruded attaching holes to provides adequate threads for the strike plate screws.

The reinforcement includes a dust (mortar) box welded to the reinforcement that is deep enough to receive the 1" (25 mm) throw latch bolt or deadbolt.

### Template

Lock manufacturers template should be reviewed carefully to insure the strike being used will function in the preparation. Although Steelcraft's preparation meets or exceeds the

ANSI standard, some manufacturer's strikes may not fit properly in the cutout or provide enough lip extension.

### Specification compliance

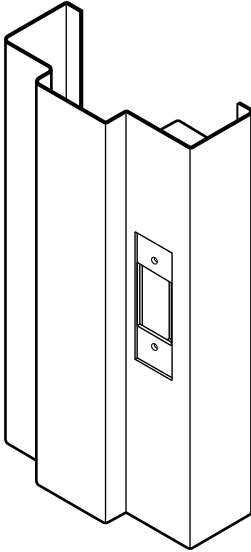
The ANSI A115.3 strike preparation meets or exceeds the requirements of the Steel Door Institute (SDI) and the Door and Hardware Institute (DHI).

### Fire ratings

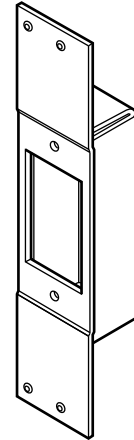
The ANSI A115.1 and ANSI A115.2 strikes can be used in fire rated frames with ratings from 20 minute to 3 hours.

## Dead lock strike prep

### Typical Preparation



### Reinforcement



14 Gauge (1.7mm) Reinforcement

### General information

Deadlock strikes are normally rectangular shaped non-lip type strikes that are designed to work with bored-in or mortise deadlocks. A lip strike can be used if the cutout for the deadbolt is located properly and is the correct size.

### Description

The deadlock strike preparation is a rectangular shaped cutout in the door rabbet of the strike jamb. The centerline of the deadlock strike is located 48" (1219 mm) from the bottom of the frame and the door preparation adjusted to match the strike.

### Reinforcement

The reinforcement used is a formed 14 gauge steel plate that is welded to the door rabbet of the strike jamb. The reinforcement provides adequate threads for the strike plate screws. In addition the reinforcement includes a dust (mortar) box that is deep enough to receive the 1" (25 mm) throw deadbolt.

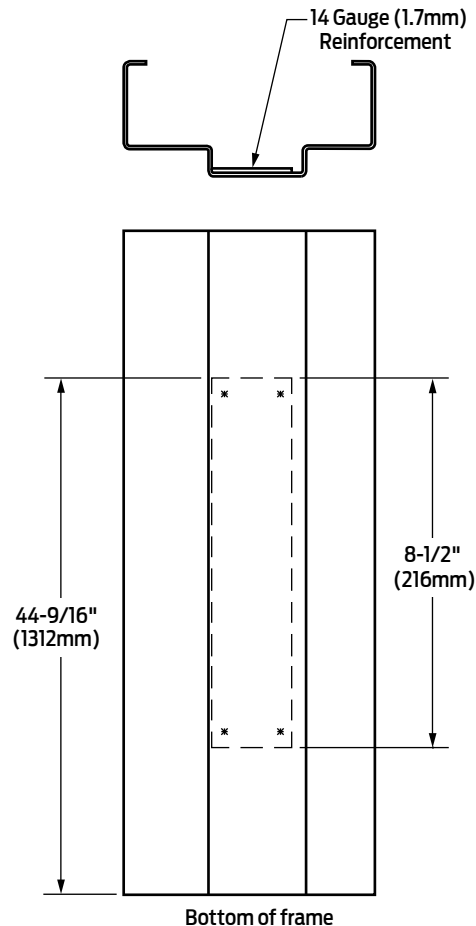
### Template

Deadlock strike manufacturer's template should be reviewed carefully for the preparation required in the frame.

### Specification compliance

The deadlock strike preparation meets or exceeds the requirements of the Steel Door Institute (SDI) and the Door and Hardware Institute (DHI).

## RPD Rim panic strike prep



### General information

Steelcraft's rim exit device strike preparation is designed to function with all rim exit devices.

### Description

The preparation is designed to accept the surface mounted strike supplied by the exit device manufacturer. The strike jamb is reinforced only and all drilling and tapping is done in the field by others.

The centerline of the preparation is located per the exit device manufacturer's template.

### Reinforcement

The preparation consists of a 14 gauge steel plate 8 1/2" (216 mm) long by minimum 2" (950 mm) wide, welded to the soffit of the strike jamb. A dust (mortar) guard is not provided.

### Template

Exit device manufacturer's template should be reviewed.

### Specification compliance

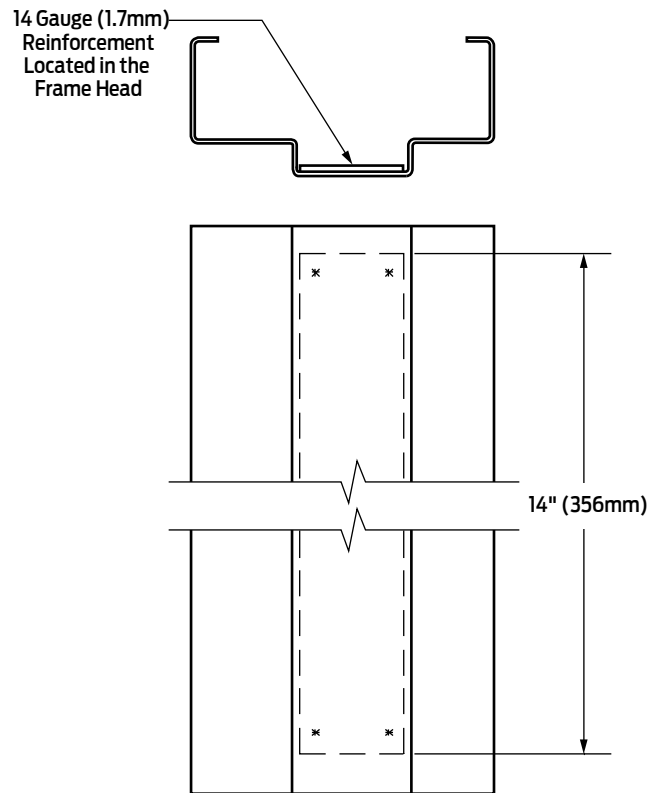
The rim exit device strike preparation meets or exceeds the requirements of the Steel Door Institute (SDI) and the Door and Hardware Institute (DHI).

### Fire ratings

RPD strikes are used in fire rated frames in conjunction with doors equipped with Rim Fire Exit Hardware, in ratings from 20 minute to 3 hours.



## Surface vertical rod strike prep



### General information

Steelcraft's vertical rod exit device strike preparation is designed to function with all vertical rod exit devices.

### Description

The preparation is designed to accept the surface mounted strike supplied by the exit device manufacturer. The head of the frame is reinforced only and all drilling and tapping is done in the field by others. The preparation is located in the soffit area and in the center of the frame head.

### Reinforcement

The preparation consists of a 14 gauge steel plate 14" (356 mm) long by 2" (50 mm) wide, welded to the soffit of the frame header. The plate is held to the door side of the jamb. A dust (mortar) box is not provided.

### Template

Exit device manufacturers template should be reviewed carefully to insure the strike being used will function in the preparation.

### Specification compliance

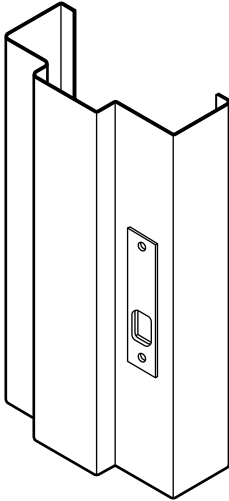
The vertical rod exit device strike preparation meets or exceeds the requirements of the Steel Door Institute (SDI) and the Door and Hardware Institute (DHI).

### Fire ratings

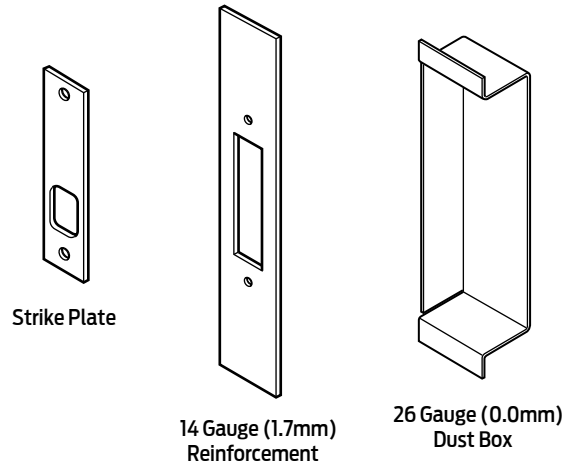
Vertical Rod strikes are used in fire rated frames in conjunction with pairs of doors equipped with Surface Vertical Rod Fire Exit Hardware, in ratings from 20 minute to 3 hours.

## Universal flush bolt strike prep

### Universal Flush Bolt Strike Preparation



### Lock Reinforcement



#### General information

Steelcraft's Universal flush bolt strike preparation is designed to be non-handed. The preparation includes a cutout, reinforcement and strike plate that will function with all ANSI flush bolts.

#### Description

The preparation includes a cutout located in the door rabbet of the frame header that is large enough to cover both right hand and left hand active openings. A reinforcing plate that is offset to accept a reversible strike/filler is welded into the door rabbet of the frame header. A prime painted strike/filler plate is supplied installed. To change hands it is necessary to remove the strike/filler plate and reinstall for the other hand using the same strike/filler plate and screws.

#### Reinforcement

**Reinforcement:** The preparation consists of a 14 gauge steel plate of such design to function properly with the flush bolt. The reinforcement is drilled and tapped at the factory. The reinforcements are welded to the door rabbet of the frame header.

**Strike Plate:** Preparation includes a universal prime painted strike plate with attaching screws. A dust (mortar) box is provided.

#### Template

Flush bolt manufacturer's template should be reviewed carefully to insure the bolt being used will function in the preparation.

#### Specification compliance

The flush bolt strike preparation meets or exceeds the requirements of the Steel Door Institute (SDI) and the Door and Hardware Institute (DHI).

#### Fire ratings

Universal Flush Bolt strikes are used in fire rated frames in conjunction with pairs of doors equipped with inactive leaf flush bolts, in ratings from 20 minute to 3 hours.

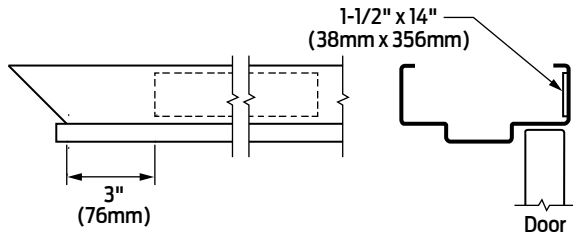
#### Notes:

1. The flush bolt strike/filler plate is prime painted and installed at the factory for right hand openings.
2. For left hand openings, remove the plate and reinstall as required.

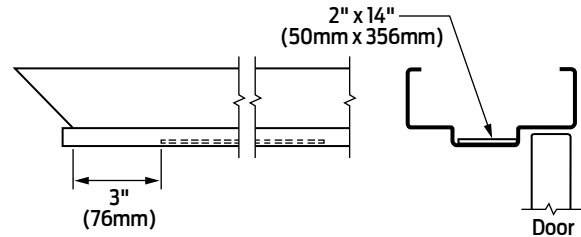
## Frame preps: Closers

### Surface closer prep

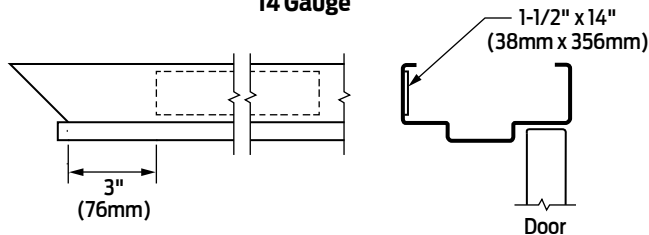
#### Regular Arm (RA) Closer Reinforcement 14 Gauge



#### Parallel Arm (PA) Closer Reinforcement 14 Gauge



#### Top Jamb (TJ) Closer Reinforcement 14 Gauge



### General information

The use of closer reinforcements allows for the surface mounting of a closer or holder on a frame. The extra material that is added to the inside of the frame head provides sufficient material for drilling and taping for the closer or holder mounting screws.

### Description

The reinforcement is welded to the inside face or rabbet of the frame (depends on the closer or holder mounting method). The locations of the reinforcement for each mounting type are as follows:

- **Regular arm closers** are used on interior doors. The closer is mounted on the face of the door on the pull side of the opening. The closer arm is mounted to the face of the head member. Steelcraft identification: **RA**.
- **Parallel arm closers** are used on exterior and interior openings. The closer is mounted on the door face on the push side of the opening. The closer arm is mounted to the 1 9/16" rabbet or the soffit of the head member. Steelcraft identification: **PA**.
- **Top jamb mounted closers** are used on interior and exterior openings. The closer is mounted on the head of the frame on the non-door head face on the push side of the opening. The closer arm is mounted to the door face. Steelcraft identification: **TJ**.

The location of the individual reinforcement is such that the degree of opening or the size of the closer or holder does not affect the preparation. Reinforcements for surface mounted holders are similar to the PA mounting for a closer. The holder feet are attached to the soffit of the frame head.

### Reinforcement

The reinforcement used in the frame is a 14 gauge (1.7 mm) steel plate 1 7/8" x 14" (48 mm x 356 mm) long.

### Specification compliance

The closer preparation in both frames and doors meets or exceeds the requirements of the Steel Door Institute (SDI) and the Door and Hardware Institute (DHI).

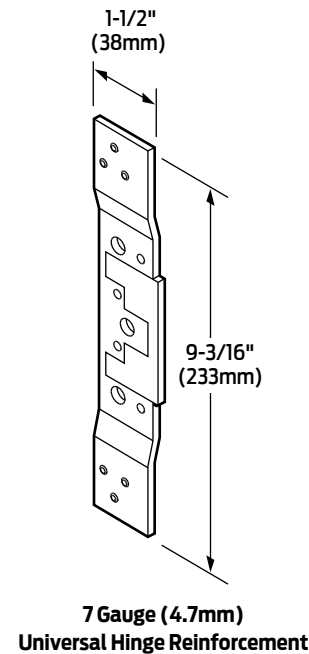
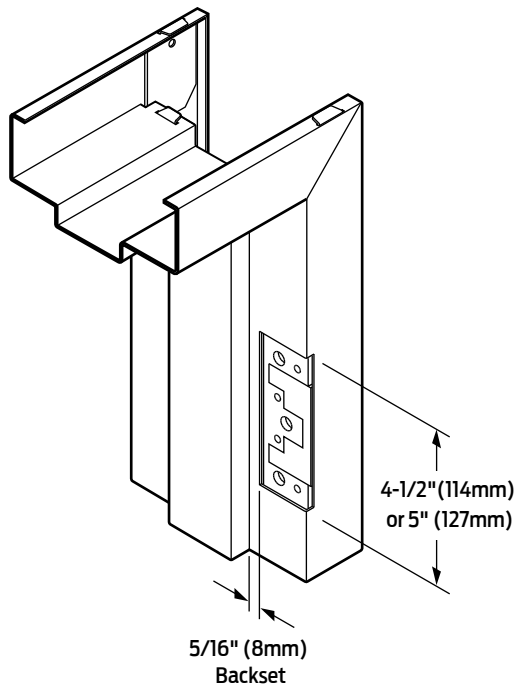
### Fire ratings

Closer reinforcements are required in all fire rated products. If the reinforcement is omitted, a special marking is required (see Fire Rated Section for information).

**Note:** Frames are not supplied with the closer or holder.

## Frame preps: Hinges

### Hinge prep



### General information

Standard 4 1/2" (114 mm) and optional 5" (127 mm) butt hinges are normally used in 1 3/4" (45 mm) doors. Either hinge will support doors up to 4'0" (1219 mm) wide and 10'0" (3048 mm) high (quantity will vary, refer to pages 249-250).

The preparation in the door and frame are described as the "Universal" preparation. This means the preparation will convert from a standard to a heavy weight hinge prep by removing the break-off spacer in the field.

### Description

Both the standard 4 1/2" (114 mm) and the optional 5" (127 mm) hinges come in standard and heavy weight.

- 4 1/2" (114 mm) = Standard .134" (3 mm) Heavy .180" (5 mm)
- 5" (127 mm) = Standard .140" (4 mm) Heavy .190" (5 mm)

Hinges used must be the "TEMPLATED"

### Reinforcement

The reinforcement used in the door and frame are 7 gauge (4.7 mm) steel and are projection welded to the rabbet of the hinge jamb. The reinforcements include an auxiliary steel

spacer. Leave the spacer in place and the standard weight hinge can be used. Remove the spacer and the heavy weight hinge can be used. Refer to the appropriate frame series to insure the patented universal hinge is available.

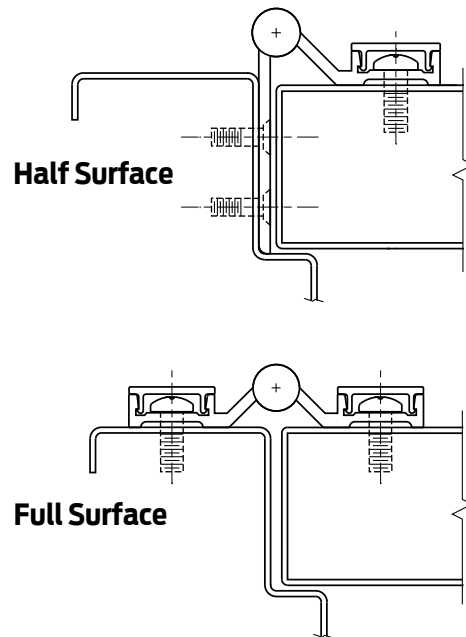
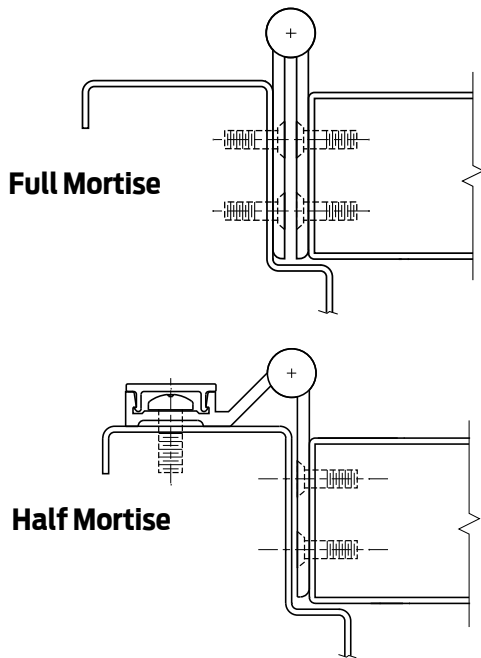
### Specification compliance

Both the 4 1/2" (114 mm) and 5" (127 mm) hinge preparations meet or exceed the requirements of the Steel Door Institute (SDI).

### Fire ratings

The 4 1/2" (114 mm) or 5" (127 mm) hinge can be used in fire rated products with ratings from 20 minute to 3 hours.

## Continuous hinge prep



### General information

**Continuous hinges** are generally used on large heavy doors. They are also used when an opening is subjected to high frequency usage.

### Description

The type of attachment to the door identifies continuous hinges. The attachment can be

- Full mortise (attached to the door edge and frame rabbet)
- Half surface (attached to the door face and frame rabbet)
- Half mortise (attached to the door edge and frame face)
- Full surface (attached to the door and frame faces)

Attachment to the door and frame can be by sheet metal screws or machine screws. All holes are field drilled or field drilled and tapped. The clearance on the hinge side of the door is adjusted depending on the hinge template.

### Reinforcement

When sheet metal screws are used, a reinforcement in both door and frame is not required. Using the hinge as a template or the template supplied, field drill the proper place on the door and frame for the screws and attach the hinge.

When machine screws are used or when specified additional reinforcement for both the door and frame may be required. The reinforcement is 14 gauge steel, welded to the inside of the door or frame as required by the attachment. Using the hinge as a template, or the template supplied, field drill and tap the

proper place on the door and frame for the machine screws and attach the hinge.

### Template

Hinge manufacturer's information should be reviewed carefully to insure the correct attachment and that the hinge is capable of meeting the requirements of your opening.

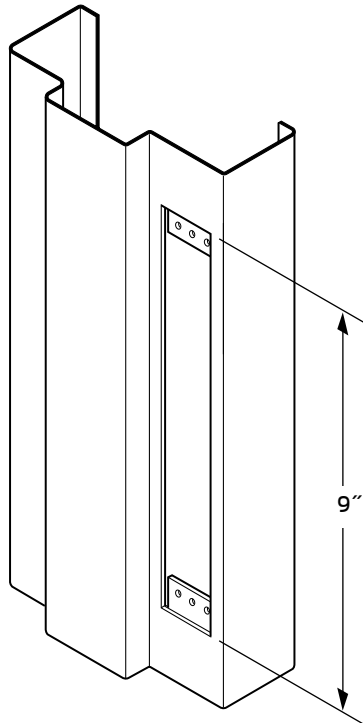
### Fire ratings

Fire rated continuous hinges are available for openings with ratings from 20 minutes to 3 hours. Check the hinge manufacturer's information on this requirement.

## Frame preps: Miscellaneous

### EPT Power transfer prep

#### Typical Frame Preparation



Junction Box



16 Gauge (2.5 mm)  
Reinforcements



#### General information

Power transfers are used to provide wiring to a swinging door for electric locks, exit devices etc.

#### Description

Power Transfers are mortised into the door rabbet of the hinge jamb and into the hinge edges of the door.

#### Reinforcement

The reinforcements are 16 gauge steel plates welded to the jamb. The plate is drilled and tapped for the necessary mounting screws. A dust (mortar) box or junction box is included with this preparation.

Junction boxes are provided for EPT's and most electrical hardware reinforcements. Knockouts are designed to support both 1/2" or 3/4" conduit.

#### Fire ratings

EPT Power Transfers are considered auxiliary hardware items and can be used on in ratings from 20 minute to 3 hours.

# Fire rated products

General information.....	272	Three sided frames .....	278
Glossary of abbreviations and acronyms used in this section .....	272	General information .....	278
Fire door assembly components.....	273	Approvals .....	279
The AHJ (Authority Having Jurisdiction) .....	273	Profile variations.....	286
Installation .....	273	Doors.....	287
Functions of fire door assemblies.....	273	General information .....	287
Fire rated steel frames and doors .....	273	Approvals .....	289
Listing agencies .....	274	Transom and side lights and/or panels.....	302
Doors, frames, and walls.....	274	General information .....	302
Steps to follow.....	274	Approvals .....	303
Fire testing.....	274	Fire window frames.....	307
Steelcraft frames and doors approved for positive pressure .....	275	General information .....	307
Guidelines & requirements.....	275	Approvals .....	308
Astragals.....	275	Smoke and draft control .....	313
Clearances .....	275	Frames (steel) .....	314
Closing devices.....	275	Doors (steel).....	314
Coordinators .....	276	Hardware.....	314
Dutch doors.....	276	Gasketing.....	314
Exit devices.....	276	Fire rated wall.....	314
Gasketing & edge seals.....	276	Hourly ratings.....	314
Glass & glazing.....	276	Approved products .....	314
Hinges .....	276	Listing information covered .....	314
Labels.....	276	Installation .....	314
Locks.....	276	Smoke Barrier Doors and Frames .....	315
Louvers .....	277		
Latch throw .....	277		
Pairs of doors.....	277		
Protective plates & plant-ons.....	277		
Smoke & draft .....	277		
Temperature rise doors.....	277		
Vision light requirements.....	277		

## General information

### Glossary of abbreviations and acronyms used in this section

#### Term

- **AHJ** - Authority Having Jurisdiction
- **ANSI** - American National Standards Institute
- **DHI** - Door and Hardware Institute
- **FEH** - Fire Exit Hardware (Exit devices which are listed for both fire and panic applications)
- **FM** - Factory Mutual
- **IBC** - International Building Code
- **ITS/WHI** - Intertek Testing Services / Warnock Hersey
- **MPD** - Mortise Panic Device
- **NFPA** - National Fire Protection Agency
- **NFPA 80** - Nationally accepted standard for the use and installation of fire frames and doors
- **RPD** - Rim Panic Device
- **SD** - Steel Door Institute
- **UL** - Underwriters Laboratories
- **VRPD** - Vertical Rod Panic Device

#### Hourly ratings

Steel fire doors are rated by time (hours or minutes) that a door assembly can withstand exposure to fire test conditions. Hourly (minute) ratings are shown below:

Hourly Ratings		Description
Door	Wall	
3 hour (180 minutes)	4 hour	Opening in walls separating buildings or dividing a building into fire areas.
1 ½ hour (90 minute)	2 hour	Openings in enclosed or vertical communications through buildings. These could be stairwells or elevator shafts.
1 hour (60 minute)	1 hour	Openings in corridors and room partitions dividing building into areas of occupancy. Historically, the 1 hour ratings have been wood door ratings. Steel doors are starting to be used in these openings depending on the AHJ.
¾ hour (45 minute)	1 hour	Openings in corridors and room partitions.
1 ½ hour (90 minute)	2 hour	Openings in walls where there is the potential of severe fire exposure from the exterior of the building.
¾ hour (45 minute)	1 hour	Openings in walls where there is the potential of moderate to light fire exposure from the exterior of the building.
20 minute	1 hour	Openings in corridors where smoke and draft control is required.

#### Fire door assemblies:

Steelcraft fire rated doors, three sided frames, transom and/or sidelight frames and fire window frames are required to comply with building codes and the local AHJ. This section of the manual has been compiled as an aid to help understand the ratings of the door and frame products, and to provide a broad overview of the products Steelcraft offers to meet the increasingly stringent needs of the fire protection community.



### Fire door assembly components

Care should be taken in the selection of the components used in a fire door assembly. If any of the listed components are omitted, or if a non-rated component is substituted, the door assembly rating will be violated. Fire rated components (with the exception of the wall) are listed in the UL Certifications Directory or the IT/WHI Directory of Listed Products.

Required Fire Door Assembly components are as follows:

- **Listed frames:** Frames are required to be labeled with the appropriate fire door frame label. The frame label carries an hourly rating, which is generally valid for any rating up to and including the rating on the label.
- **Listed doors:** Doors are required to be labeled with the appropriate fire door label. The fire door label carries an hourly rating. Doors can be labeled with a higher hourly rating than required, but, it is not acceptable to substitute a door with a lower hourly rating than required.
- **Listed hardware:** Most hardware components are also required to be labeled with the appropriate fire label. The location and type of label will vary with the device being used. The required minimum hardware components for a fire door assembly are as follows:
- **Listed latch or locking device:** may be single point locks, latches, fire exit devices or other listed devices.
- **Approved hinge(s):** may be butt hinges, pivots, continuous hinges or other approved hinge constructions. Hinges generally are not labeled.
- **Listed closing device:** may be surface mounted or concealed attachment to the door and frame.
- **Fire rated wall:** Wall construction must be fire rated as dictated by the building code and the AHJ.

### The AHJ (Authority Having Jurisdiction)

The local AHJ must be the final authority in fire door assembly issues. Steelcraft Fire Doors and Fire Door Frames are produced under the listing programs of Underwriters' Laboratories Incorporated (UL) Warnock Hersey (IT/WHI) and FM Global (FM).

### Installation

Installation of all Steelcraft doors and frames shall conform to the published Steelcraft installation instructions, and ANSI/SDI A250.11 *Recommended Installation Instructions for Steel Frames*, ANSI A250.11 and HMMA 840. All fire rated frames must be installed in accordance with NFPA 80, and/or the local AHJ.

### Functions of fire door assemblies

Fire Doors must serve four main functions:

1. Serve as a regular door at all times.
2. Provide ready egress from a fire area during a fire.
3. Inhibit the spread of fire and smoke throughout the building or to an adjacent building.
4. Protect life and property by reducing smoke hazards.

When a fire starts, it is most important to evacuate the people safely from the building. After evacuation, the doors must serve as a fire and smoke barrier. It is a well known fact, that in a fire more people are killed by either smoke asphyxiation or by panic, than by the fire.

The same length of protection from the fire is not required of all openings in buildings. The location in the building determines the length of time that the door must withstand a fire. It is the responsibility of the building code and the AHJ to indicate the type of Fire Doors Assemblies that are to be used at the required locations in a building.

### Fire rated steel frames and doors

Manufacturers of steel frames and doors choose from several methods of classifying their product as Fire Doors. Municipalities, state governments, insurance regulations and building codes vary in the requirements for Fire Doors.

Users of fire doors can specify the type of label that offers the desired fire protection. Regardless of the label chosen, serious consideration should be given to the company manufacturing the product and the performance expected.

The National Fire Protection Association publishes NFPA Pamphlet 80, which is the generally accepted standard throughout the United States for the installation of fire doors and windows. This standard is generally accepted by state fire code officials and municipal building officials.

Some of the topics covered in NFPA Pamphlet 80 are:

- allowable glass area in doors for different locations and ratings
- maximum sizes for various kinds of fire doors
- latching device and hinge quantity
- dimensional requirements, as they relate to different ratings, sizes and types of fire door classifies a door or a frame only if it meets the following conditions

It is the responsibility of the architect and/or specification writer to specify the proper materials for complete safety. They should be aware of the issues that constitute maximum safety in Fire Frames and Doors. All persons responsible for the design, installation and operation of any building involving people or valued property should insist upon the type of labeled door and frame that will afford the maximum fire protection.

### Listing agencies

There are currently three (3) listing systems available from Steelcraft.

1. **Underwriters Laboratories (UL)** Fire Testing and Certification Program. UL is an independent agency with testing, listing, in-plant inspection, and labeling capabilities.
  - The manufacturer's design has been accepted by UL (under their performance standard UL10C or UL9) which uses NFPA Pamphlet 80 as the basis for their decision.
  - The door or frame is manufactured in accordance with the accepted design in the presence of a UL inspector.
  - The product passes the UL10C or UL9 fire test conducted by UL.
  - UL finds that the product meets the additional criteria (such as durability, stability, etc.) in addition to passing the fire test.
  - It is subject to a continual follow-up service, including unannounced, in-plant inspections during the manufacturing process to be sure that the frames and doors continue to be made exactly the same as tested.
2. **Intertek Testing Services / Warnock Hersey (ITS/WHI)** Fire Testing and Certification Programs. ITS/WHI is an independent agency with testing, listing, in-plant inspection, and labeling capabilities.
  - The manufacturer may, at their option, submit drawings of the product to be tested to ITS/WHI for review. If potential problem areas are noted ITS/WHI will notify the manufacturer of these so that he may consider design changes.
  - ITS/WHI personnel witness manufacturing of the product to be tested and verify components and assembly methods.
  - The product is then tested by ITS/WHI to determine if it meets the stringent requirements of the fire door test standards.
  - A factory follow-up inspection, listing and labeling agreement is issued. This agreement allows ITS/WHI to make unannounced in-plant inspections.
3. **FM Global/Approvals** follow-up certification programs. FM Global is an independent underwriting agency with listing, in-plant inspection, and labeling capabilities.
  - Examine and test production samples
  - Examine manufacturing facilities and audit quality control procedures.
  - A factory follow-up inspection, listing and labeling agreement is issued. This agreement allows FM to make unannounced in-plant inspections.

### Doors, frames, and walls

Frames and doors are normally rated at three-quarters of the rating of the walls. If the rating for the wall is 4 hours, the rating for the door and frame is generally 3 hours. If the rating for the wall is 2 hours, the rating for the door and frame would be 1 ½ hours, etc. There are two current exceptions to this practice: 20 min. openings used for smoke control applications and 1-hour openings. Both used in 1-hour walls.

The reason that door and frame assemblies are normally rated at 75% of the total ratings of the wall is that the actual fire testing program for walls is completely different than that of frames and doors and the requirements and acceptance criteria vary. It should also be noted that the severity of fire is generally considered to be less at a door opening than at a wall. Normally doorways are open for passage of pedestrians and walls have a tendency to have furniture and other items stored against them.

### Steps to follow

The following steps should be followed in specifying fire door requirements:

1. Investigate the appropriate building code(s).
2. Determine the fire resistance of the wall or partition in which the opening is to be located and select a door assembly (frame, door and hardware) having a proper fire-protection rating. The effectiveness of the entire assembly as a fire barrier may be destroyed if any component is omitted or one of substandard quality is used.
3. Make sure that fire doors, frames and hardware are produced under the auspices of a nationally recognized certification agency.
4. Insure products comply with the AHJ.
5. Insure products comply with NFPA 80. This pamphlet is the widely accepted standard for the use and installation of fire frames and doors.

### Fire testing

Steel frames and doors have historically been subjected to full scale fire tests as a standard method for evaluating their performance and integrity relative to fire protection of property and life safety. Hollow metal doors were first submitted to Underwriters Laboratories for investigation and fire exposure testing in 1904. The agencies now associated with the testing, listing and labeling of products are two well known entities, Underwriters Laboratories and ITS/Warnock Hersey.

While the agencies have remained a constant in the industry, the standards against which products are evaluated are undergoing significant changes. This document will provide an overview of the changes and describe how Steelcraft has positioned their product line in compliance with NFPA 252 and UL10C Positive Pressure Fire Tests of Door Assemblies or NFPA 257 and UL9 Fire Tests of Fire Window Assemblies..

### Steelcraft frames and doors approved for positive pressure

The products that conform to the positive pressure criteria (UL10 C) or NFPA252 are shown on the following sheets. These products also conform to the negative pressure test criteria (ASTM E152, UL10 B, etc.) and may be used in areas that do not require positive pressure fire frames and doors.

Steelcraft products do not require the use of intumescent seals to comply with UL10 C or NFPA252.

### Guidelines & requirements

**All fire door applications are subject to product and component limitations and requirements.** The following are general guidelines in the use and selection of fire rated assemblies and their components

1. Listed or approved fire door components are published and listed in Underwriters Laboratories' "Certifications Directory", the ITS/Warnock Hersey "Directory of Listed Products" or the online FM "Approval Guide".
2. Only labeled doors and frames can be used in a fire rated opening.
3. Every labeled swing type fire door must include an approved self latching device, closing device and hinges.
4. Viewers must be listed in the Underwriters Laboratories "Certifications Directory", the ITS/Warnock Hersey "Directory of Listed Products" or the online FM "Approval Guide".
5. The actual fire rating of a Fire Door Assembly is the rating of the least rated component (door, frame or hardware)
6. Approved electronic monitoring devices can be used on fire doors.
7. The local AHJ is the final authority in application acceptance.

### Astragals

1. Astragals are required per the manufacturer's published listings.
  - Astragals may not be required on double egress or other applications with 1 ½ hour or less ratings. Refer to the appropriate listing pages in this section.
2. Astragals must be steel overlapping type. Weather stripping astragals rated for 3 hours (180 minutes) do not satisfy the astragal requirements for steel fire doors.
3. When astragals are used on pairs of doors equipped with fire exit hardware, a coordinator must be used to insure proper closing and latching sequence.
4. An astragal may be used on a pair of doors equipped with a mortise exit device on the active leaf and a vertical rod on the inactive leaf.
5. An astragal can not be used on pairs of doors swinging in the same direction equipped with double vertical rods, since the astragal will prevent the operation of one of the door leaves. Since 3 hour (180 minute) rated openings require an astragal, double vertical rod applications can not be used in pairs swinging in the same direction.
6. Astragals can be either screw attached or welded to the appropriate door.
7. Astragals are not used on pairs of doors with an open back strike.

### Clearances

All clearances must be in accordance with NFPA Pamphlet # 80.

### Closing devices

1. An approved closing device must be installed on every swinging fire door. Exception:
  - The inactive leaf of mechanical equipment room doors may omit a closer. Verify acceptance with the local building code and the AHJ.
2. Fire doors must be internally reinforced for closing devices. Exceptions:
  - Internal reinforcement is omitted if the closer is attached with sex bolts.
  - Internal reinforcement is omitted if spring hinges are used.
3. Overhead stops may be used if they do not inhibit the door from closing and latching.
4. Door holder/release devices are permitted when acceptable to the AHJ. These fail-safe devices release the door in the event of fire.
5. Labeled opening may incorporate concealed closers and stops.

### Coordinators

1. A coordinator is required if an astragal or projecting latch bolt prevents the inactive door from closing before the active door.
2. A coordinator is not required if both leafs of a pair of doors closes and latches independently of each other.
3. When astragals are used on pairs of doors equipped with fire exit hardware, a coordinator must be used to insure proper closing and latching sequence.

### Dutch doors

1. The upper and lower leaf may latch into the frame or the upper leaf may latch into the lower leaf, which latches into the frame.
2. The opening must include a closing device located on the upper leaf, and a horizontal astragal which will coordinate the closing and latching of the bottom leaf.
3. A label is required on each leaf of a dutch door and one on the frame.

### Exit devices

1. Listed Fire Exit Hardware must be used. These exit devices are listed for both fire and panic applications.
2. The door size must not exceed the maximum listed size for the individual hardware manufacturers' listing for the device being used.
3. Doors which are reinforced for Fire Exit Hardware must bear a label which states "Fire Door to be Equipped with Fire Exit Hardware".
4. Vertical rod FEH may not be used on single doors. The exception would be a listed 3 point exit device.
5. Pairs of doors, swinging in the same direction, with vertical rod FEH on both leaves can not be used in 3 hour (180 minute) applications.
6. Rim FEH can not be installed with blade strikes in double door applications.
7. Rim FEH in pairs must include the use of a listed hardware mullion.

### Gasketing & edge seals

1. Only listed gasket material can be used. Refer to the UL Fire Resistive directory or the ITS/WHI Directory of Listed Products.
2. Smoke and draft control assemblies must include gaskets listed for smoke and draft control.
3. Steelcraft fire rated doors do not require the use of edge seal (intumescent) systems.

### Glass & glazing

1. Only approved glass can be installed in a fire door assembly.

### Hinges

1. The proper quantity of hinges must be used. Based on NFPA Pamphlet 80:
  - Doors up to 60 inches in height shall be provided with 2 hinges and an additional hinge for each additional 30" of door height or fraction thereof.
2. Steelcraft doors over 96 inches may be prepared for .134" standard weight hinges.
3. Listed continuous hinges, electric hinges and pivots can be used on Steelcraft fire rated doors.
4. Doors with 4" hinges are limited to 20 gauge and a maximum door size of 3'0" x 7'0".

### Labels

1. Steelcraft doors and frames can be supplied with a variety of metal or Mylar fire labels, attached by permanent adhesive. Other methods of attachment have been welding, rivets or drive screws.
2. Labels are attached only at the factory or at an authorized labeled distributors' shop.
3. All jobsite labeling must include a field (jobsite) inspection by the labeling agency and may require involvement of the AHJ.
4. Fire rated doors with continuous hinges have the fire label attached in the top channel of the door.

### Locks

1. The door size must not exceed the maximum listed size for the individual hardware manufacturers' listing.
2. Dead locks may not be used on doors which are in a means of egress. Locks with deadbolts that are interconnected with latch bolts are retracted simultaneously when the latch bolt is retracted may be used with in a means of egress.
3. Deadbolts may be used on doors in addition to an active latch bolt on doors not in the means of egress, or as otherwise permitted by the AHJ.

### Louvers

1. Any listed automatic fusible link louver can be used on a Steelcraft labeled door.
2. Glass lights are not permitted in doors equipped with louvers.
3. Fire Exit Hardware can be used on doors equipped with a louver, but only where approved by code.
4. Fire ratings for doors equipped with a louver can be either 1 ½ hour (90 minutes) 1-hour (60 minutes) or ¾ hour (45 minutes).
5. Maximum listed louver size 24" x 24" (one louver per door)
6. Location in the door:
  - Located in bottom half
  - Minimum 12" from door bottom
  - Minimum 5 ½" from door edge to cutout.
7. Louvers cannot be installed in a means of egress and in:
  - The upper half of the door
  - 20 minute doors
  - Smoke & draft opening

### Latch throw

1. Single doors:
  - ½" latch bolt throw for all door series, gauges and fire ratings.
2. Pairs of doors
  - A Series = ⅝"
  - B Series
    - a. B18, B16 = ⅝"
    - b. B14 = ⅝" For pairs of doors up to and including 1 ½ hour (90 minute) and ¾" over 1 ½ hour
  - L Series:
    - a. L20, L18, L16 = ⅝" up to 3 hours
    - b. L14 = ⅝" For pairs of doors up to and including 1 ½ hour (90 minute). ¾" over 1 ½ hour
  - T Series = ¾"

### Pairs of doors

1. The inactive leaf of doors must be provided with self-latching top and bottom bolts or automatic flush bolts or labeled two point latches. Manual flush bolts either mortised or surface may be used on doors to rooms not normally occupied by humans.
2. Double egress doors can only be provided with concealed or surface vertical rod FEH.
3. Open back strikes can be used on pairs of doors (L18/16/14, CE18/16, B18/16/14). Maximum height of 8'0" and a maximum 1 ½ hour (90 minute) ratings. Astragals can not be used in this application.
4. Two doors in the same frame separated by a hollow metal mullion are considered to be two single doors applications.

### Protective plates & plant-ons

1. Protection plates or kick plates can be a maximum 48" x 48" in size and attached to both faces of a door (3 hour maximum fire rating).
2. Plant-ons can be used if covered by a manufacturer's listing service.

### Smoke & draft

1. All components used in a Smoke and Draft Control assembly must pass a 20 minute without hose stream test.
2. Only gaskets listed for smoke and draft control may be used on smoke and draft control assemblies.
3. Gaskets must be listed for the appropriate door type (hollow metal, wood, etc.).
4. Wood doors which do not have an integral intumescent seal in the door edge, may require an intumescent edge seal and draft control gasket attached to the frame. Review the wood door manufacturer's listing and requirements.

### Temperature rise doors

1. Steelcraft T Series doors prepared for single point latches, rim or mortise FEH are labeled for 250°F temperature rise and may be used in either 250°F or 450°F temperature rise location.
2. Doors prepared for vertical rod (CVR or SVR) or INPACT™ devices carry a 450°F temperature rise label and can only be installed in 450°F temperature rise location.

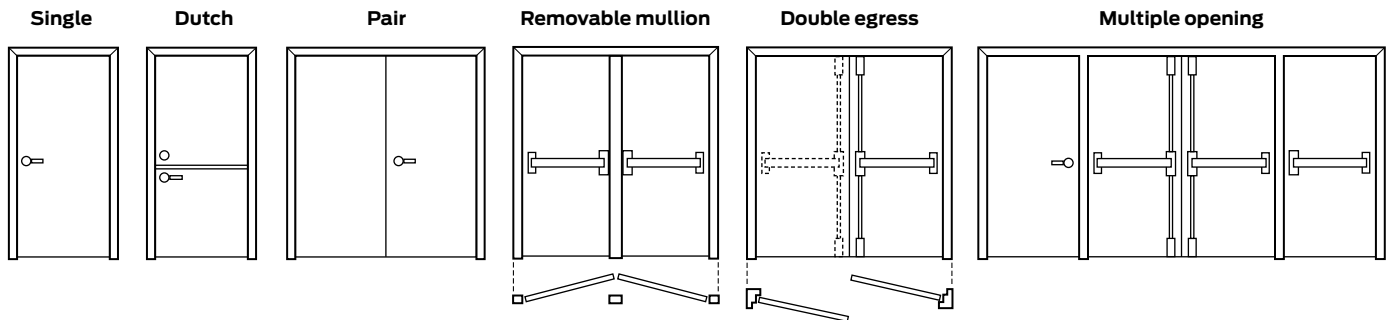
### Vision light requirements

1. Glass cannot be installed in exterior locations subject to severe fire exposure.
2. Any listed fire door vision kit can be used in a Steelcraft door. Vision kits should be listed for the appropriate door construction (hollow metal, wood, etc.) used.
3. Steelcraft vision kits are not approved for use in any other door manufacturers' doors

## Three sided frames

### General information

#### Typical Elevations



#### Fire rated three sided frame

The three sided frames covered in this section have been tested in accordance with UL10C and NFPA252-1999, and listed by either Underwriters Laboratories (UL), Warnock Hersey (IT/WHI) and FM Global (FM). The ratings and sizes available are shown on the following pages.

Three sided frames are designed to be set on the floor and anchored to the wall construction. All frame anchoring must be in accordance with the installation instructions for the appropriate frame construction.

#### Three sided frames configurations

Labeled three (3) sided frames are available in the following configurations:

- Single opening: hinge jamb, strike jamb and head.
- Double opening: two hinge jambs and a head. Commonly referred to as pairs swinging in the same direction.
- Double swing with a mullion: two hinge jambs, a head and a mullion (stationary or removable). This opening configuration is actually considered as two single door openings.
- Double egress: a unique contoured frame (profiles) with two hinge jambs and a head. This opening configuration is used in corridor applications and consists of a pair of doors, each swinging in the opposite direction.
- Dutch doors: hinge jamb, strike jamb and head, used in storeroom applications.
- Multiple opening: a unique application having a combination of hinge and/or strike jambs, vertical mullions and head.
- Communicating openings: an application including a door(s) mounted in both rabbets, usually used in the hospitality markets and installed between adjoining rooms.

#### Approved frame series

Frames covered in this section are F, FN, FE, FP, FS, DE, DW, K, KS, MU and MS. Regardless of the frame series being used, all frames must be installed into a fire rated wall.

#### Listing information covered

All listings covered in this section are for reference and assistance in developing overall parameters of approvals. Several variables such as hardware, wall construction, installation and application will affect the fire ratings. Individual manufacturer's listings will take precedence.

All listings shown in this section conform to the requirements of UL 10C & NFPA252 test requirements.

#### Installation

Installation of all Steelcraft framing systems shall conform to the published Steelcraft installation instructions, ANSI/SDI A250.11 [Recommended Installation Instructions for Steel Frames and HMMA-840](#). All fire rated frames must be installed in accordance with NFPA Pamphlet 80, and/or the local AHJ.

*Details are subject to change without prior notice.*



## Approvals

### Three sided frames for single door

Maximum Rating	Wall Applications	Frame Series					Listings		
		Series	Jamb Depth		Corner		Maximum Sizes (Door Openings)		
			Min.	Max.	KD	Weld	UL	ITS/WH	FM
3 HR Max	Masonry	F16, F14	3	20	X	X	4'0" x 10'0"	4'0" x 10'0"	4'0" x 8'0"
		FS16	4	12	N.A.	X	Not Listed	4'0" x 8'0"	Not Listed
		FN16, FN14	4 ½	14	X	X	4'0" x 10'0"	4'0" x 10'0"	4'0" x 8'0"
		F12	4 ¾	14	N.A.	X	4'0" x 10'0"	4'0" x 10'0"	Not Listed
		MU16, MU4	3 ½	14	X	X	4'0" x 9'0"	4'0" x 9'0"	Not Listed
		MS16	4	12	N.A.	X	Not Listed	4'0" x 8'0"	Not Listed
		FP14	5 ¾	10 ¾	X	X	Not Listed	4'0" x 8'0"	Not Listed
	Stud	F16, F14	3	14	X	X	4'0" x 8'0"	4'0" x 8'0"	Not Listed
		FS16	4	12	N.A.	X	Not Listed	4'0" x 8'0"	Not Listed
		F12	4 ¾	14	N.A.	X	4'0" x 8'0"	4'0" x 8'0"	Not Listed
MU16, MU14		3 ½	14	X	X	4'0" x 8'0"	4'0" x 8'0"	Not Listed	
MS16		4	12	N.A.	X	Not Listed	4'0" x 8'0"	Not Listed	
1 ½ HR (90 Min) Max	Stud	F16, F14	3	14	X	X	4'0" x 10'0"	4'0" x 10'0"	4'0" x 8'0"
		FS16	4	12	N.A.	X	Not Listed	4'0" x 8'0"	Not Listed
		F12	4 ¾	14	N.A.	X	4'0" x 10'0"	4'0" x 10'0"	Not Listed
		MU16, MU14	3 ½	14	X	X	4'0" x 9'0"	4'0" x 9'0"	Not Listed
		MS16	4	12	N.A.	X	Not Listed	4'0" x 8'0"	Not Listed
		DW16, DW14	3 ½	14	X	N.A.	4'0" x 9'0"	4'0" x 8'10"	4'0" x 8'0"
		K16, K14	3 ½	14	X	N.A.	4'0" x 9'0"	4'0" x 8'10"	4'0" x 8'0"
		KS16	4	12	X	N.A.	Not Listed	4'0" x 8'0"	Not Listed

#### F Series frame construction



Double rabbet



Single rabbet



Double rabbet

#### MU Series frame construction

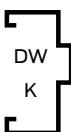


Double rabbet



Narrow double rabbet

#### DW and K Series frame construction



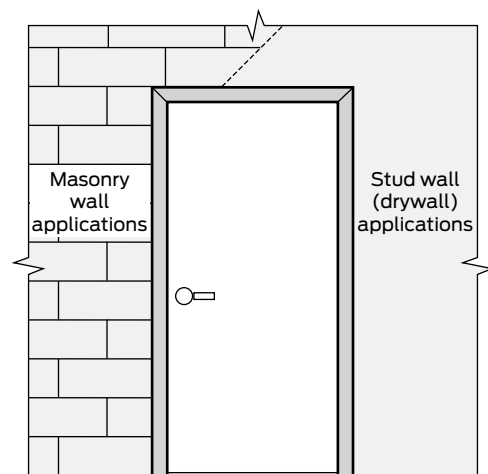
Double rabbet



Narrow double rabbet

#### Notes:

- Frames over 9'0" in height and installed in stud walls require the jamb anchors to be welded to the frame. 2.4" heads are approved for all applications.



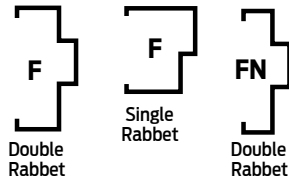
#### Minimum Hardware Requirements:

- Strike for single point latch
- Closer
- Approved hinges

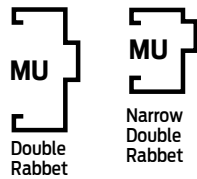
## Three sided frames for double doors

Maximum Rating	Wall Applications	Frame Series					Listings		
		Series	Jamb Depth		Corner		Maximum Sizes (Door Openings)		
			Min.	Max.	KD	Weld	UL	ITS/WH	FM
3 HR Max	Masonry	F16, F14	3	20	X	X	8'0"x 10'0"	8'0"x 10'0"	8'0"x 8'0"
		FS16	4	12	N.A.	X	Not Listed	8'0"x 8'0"	Not Listed
		FN16, FN14	4 ½	14	X	X	8'0"x 10'0"	8'0"x 10'0"	8'0"x 8'0"
		F12	4 ¾	14	N.A.	X	8'0"x 10'0"	8'0"x 10'0"	Not Listed
		MU16, MU4	3 ½	14	X	X	8'0"x 9'0"	8'0"x 9'0"	Not Listed
		MS16	4	12	N.A.	X	Not Listed	8'0"x 8'0"	Not Listed
		FP14	5 ¾	10 ¾	X	X	Not Listed	8'0"x 8'0"	Not Listed
	Stud	F16, F14	3	14	X	X	8'0"x 8'0"	8'0"x 8'0"	Not Listed
		FS16	4	12	N.A.	X	Not Listed	8'0"x 8'0"	Not Listed
		F12	4 ¾	14	N.A.	X	8'0"x 8'0"	8'0"x 8'0"	Not Listed
		MU16, MU14	3 ½	14	X	X	8'0"x 8'0"	8'0"x 8'0"	Not Listed
		MS16	4	12	N.A.	X	Not Listed	8'0"x 8'0"	Not Listed
1 ½ HR (90 Min) Max	Stud	F16, F14	3	14	X	X	8'0"x 10'0"	8'0"x 10'0"	8'0"x 8'0"
		FS16	4	12	N.A.	X	Not Listed	8'0"x 8'0"	Not Listed
		F12	4 ¾	14	N.A.	X	8'0"x 10'0"	8'0"x 10'0"	Not Listed
		MU16, MU14	3 ½	14	X	X	8'0"x 9'0"	8'0"x 9'0"	Not Listed
		MS16	4	12	N.A.	X	Not Listed	8'0"x 8'0"	Not Listed
		DW16, DW14	3 ½	14	X	N.A.	8'0"x 9'0"	8'0"x 8'10"	8'0"x 8'0"
		K16, K14	3 ½	14	X	N.A.	8'0"x 9'0"	8'0"x 8'10"	8'0"x 8'0"
		KS16	4	12	X	N.A.	Not Listed	8'0"x 8'0"	Not Listed

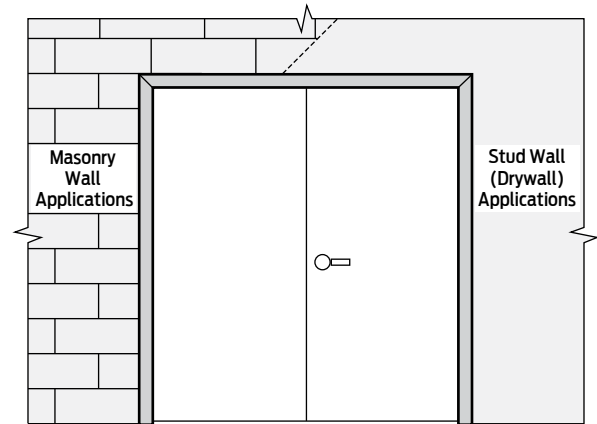
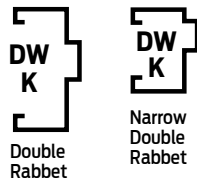
## F Series Frame Construction



## MU Series Frame Construction



## DW and K Series Frame Construction



## Minimum Hardware Requirements:

- Strike(s) depending on application for either:
  - Flush, surface or automatic bolt in head
  - Vertical rod inactive or both leaves
- Closer(s) depending on hardware applications and AHJ
  - Active leaf
  - Both leaves
- Approved hinges



### Three sided frames for double doors with mullions

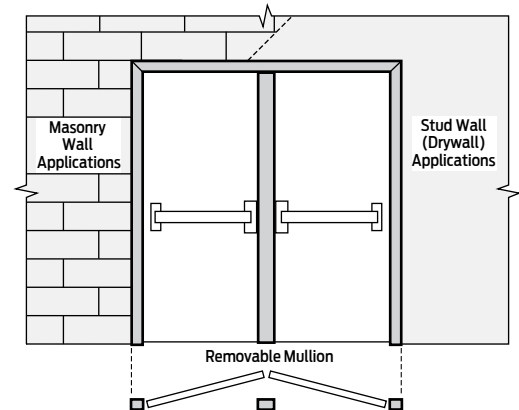
Double doors with removable mullions are used at entrances to buildings, corridor and equipment room applications. There are 2 types of removable mullion applications:

- Removable hardware mullion: for Rim FEH on each leaf application. Mullion must be fire rated
- Removable hollow metal mullion: for either Rim or Mortise FEH or listed latching hardware applications (8'0" x 8'0" maximum).

Maximum Rating	Wall Applications	Frame Series					Listings		
		Series	Jamb Depth		Corner		Maximum Sizes (Door Opening)		
			Min.	Max.	KD	Weld	UL	ITS/WHI	FM
3 Hr Max	Masonry	F16, F14	3	20	X	X	8'0" x 10'0"	8'0" x 10'0"	8'0" x 8'0"
		FN16, FN14	4 ½	14	X	X	8'0" x 10'0"	8'0" x 10'0"	8'0" x 8'0"
		MU16, MU14	3 ½	14	X	X	8'0" x 9'0"	8'0" x 9'0"	Not Listed
		FP14	5 ¾	10 ¾	N.A.	X	8'0" x 8'0"	Not Listed	Not Listed
	Stud	F16, F14	3	14	X	X	8'0" x 8'0"	8'0" x 8'0"	Not Listed
		MU16, MU14	3 ½	14	N.A.	X	8'0" x 8'0"	8'0" x 8'0"	Not Listed
1 ½ Hr (90 min) Max	Stud	F16, F14	3	14	X	X	8'0" x 10'0"	8'0" x 10'0"	8'0" x 8'0"
		MU16, MU14	3 ½	14	X	X	8'0" x 9'0"	8'0" x 9'0"	Not Listed

#### Notes:

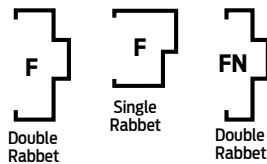
- Frames over 9'0" in height and installed in stud walls require the jamb anchors to be welded to the frame.
- 4" heads are approved for all applications.
- Three sided frame options for double doors:
  - Removable hardware mullion
    - Maximum 3 hour rating.
    - Check hardware manufacturer's listings for maximum ratings & height.
  - Removable Steelcraft Hollow metal mullion
    - 2" face: only
    - 1 ½ hour rating maximum, 8'0" maximum height
    - Application for either FEH or listed latching hardware
- Frames with fixed (welded) Steelcraft mullions are considered to be two (2) single door frames.
  - 2" face minimum, 4" face maximum
  - Maximum 3 hr. rating



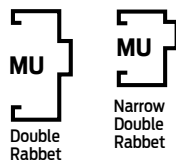
#### Minimum Hardware Requirements:

- Listed hardware mullion or Steelcraft hollow metal mullion
- Strike for both leaves
- Closer for both leaves
- Approved hinges

#### F Series Frame Construction



#### MU Series Frame Construction



### Three sided frames for double egress

Double Egress frames are designed to separate corridors into fire areas. The frame incorporates a pair of doors, which swing in opposite directions, without the use of a center mullion. Once the door and frame are installed, the doors line up in the center of the frame.

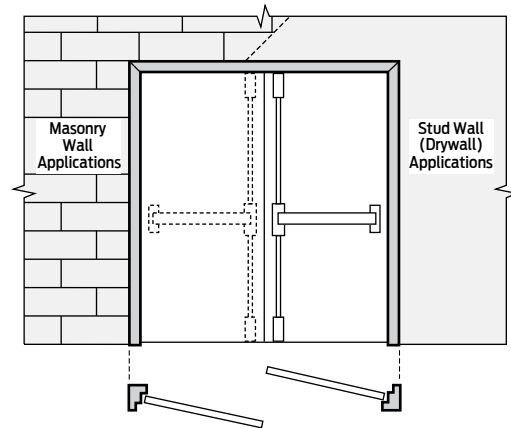
- **FE Series Double Egress Frames:** The jamb profile reduces the corridor width by 5 1/4" (133 mm). Swing clear hinges cannot be used with a standard FE Series frame. A special profile FE Series frame can accommodate swing clear hinges.
- **DE Series Double Egress Frames:** The DE Series frame is designed to maximize corridor clear opening width. The jamb profile accommodates the use of swing clear hinges which is a major consideration in areas where the code requires a minimum clear opening width in corridor applications.

Maximum Rating	Wall Applications	Frame Series					Listings		
		Series	Jamb Depth		Corner		Maximum Sizes (Door Opening)		
			Min.	Max.	KD	Weld	UL	ITS/WHI	FM
3 Hr Max	Masonry	FE16, FE14	5 3/4	14	X	X	8'0" x 10'0"	8'0" x 10'0"	Not Listed
		DE16, DE14 (Notes #3,4)	5 3/4	14	N.A.	X	8'0" x 10'0"	8'0" x 10'0"	Not Listed
	Stud	FE16, FE14	5 3/4	14	X	X	8'0" x 8'0"	8'0" x 8'0"	Not Listed
		DE16, DE14 (Notes #3,4)	5 3/4	14	N.A.	X	8'0" x 8'0"	8'0" x 8'0"	Not Listed
1 1/2 Hr (90 min) Max	Masonry/Stud	FE16, FE14	5 3/4	14	X	X	8'0" x 10'0"	8'0" x 10'0"	Not Listed
		DE16, DE14	5 3/4	14	N.A.	X	8'0" x 10'0"	8'0" x 10'0"	Not Listed

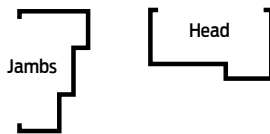
#### Notes:

Double Egress frame options

1. Frames over 9'0" in height and installed in stud walls require the jamb anchors to be welded to the frame.
2. Net head width is 1/8" narrower than standard double door frames.
3. Surface or concealed vertical rod FEH is the only approved latching hardware.
4. DE Series frame depth refers to the frame depth of the head section.
5. DE Series frames must be supplied welded
6. Mullions are not approved
7. 4" heads are approved for all applications.



#### FE and DE Series Double Egress Frame Construction



FE Double Egress



DE Double Egress

#### Minimum Hardware Requirements:

- Vertical rod on both leaves
- Closers both leaves
- Approved hinges

### Three sided frames for multiple door openings

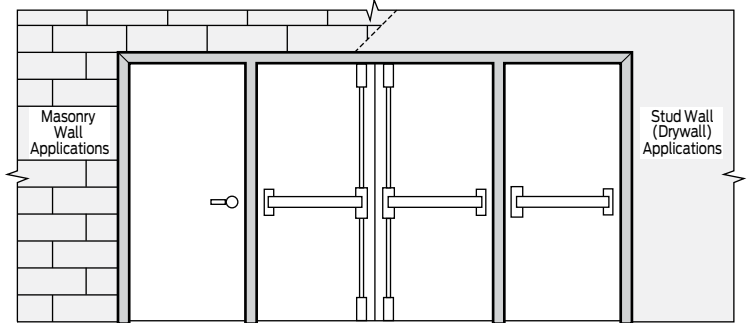
Multiple opening frames include 3 or more doors in one frame and are usually used in corridor applications which lead to theater or arena locations.

Maximum Rating	Wall Applications	Frame Series					Listings		
		Series	Jamb Depth		Corner		Maximum Sizes (Overall frame Width & Height)		
			Min.	Max.	KD	Weld	UL	ITS/WHI	FM
1 ½ Hr (90 min) Max	Masonry/Stud	F16, F14	4 ¾	14	N.A.	X	12'8" x 8'4"	12'8" x 8'4"	Not Listed
		MU16, MU14	4 ¾	14	N.A.	X	12'8" x 8'4"	12'8" x 8'4"	Not Listed
	Masonry	FN16, FN14	4 ¾	14	N.A.	X	12'8" x 8'4"	12'8" x 8'4"	Not Listed

#### Notes:

Three sided frame options for multiple door openings:

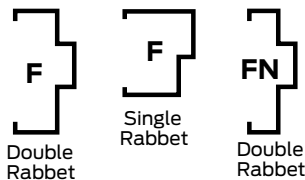
- Frames must be welded
- Hollow metal hinge mullions must be welded in place
- Face dimensions:
  - Jambs & head 4" maximum
  - Mullion face dimensions = 2" minimum 4" maximum
- Elevation options:
  - Single doors
    - 4'0" x 8'0" max door size
  - Double doors (vertical mullion optional)
    - 8'0" x 8'0" max door size
    - doors must swing in same direction
  - Frames can not include transoms or side lights or panels
- 4" heads are approved for all applications.



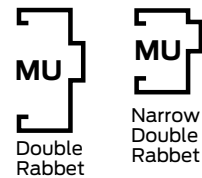
#### Minimum Hardware Requirements:

- Strike for each leafs
- Closer for each leafs
- Approved hinges

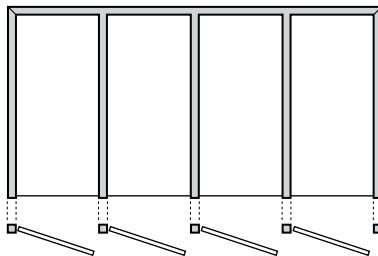
### F Series and FN Series Frame Construction



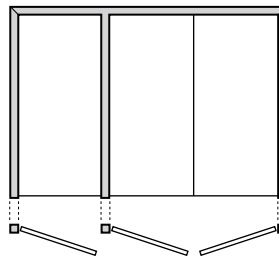
### MU Series Frame Construction



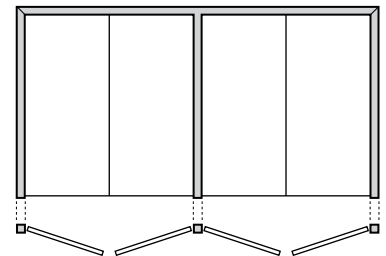
### Elevation Variations



Single Door Applications



Single and Double Door Applications



Double Door Applications

### Three sided frames for dutch door frames

Dutch door frames are designed for use with Steelcraft labeled dutch doors, and are used in storeroom areas.

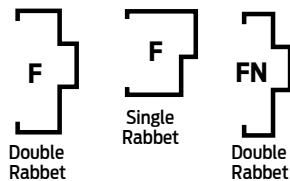
Maximum Rating	Wall Applications	Frame Series					Listings		
		Series	Jamb Depth		Corner		Maximum Sizes (Door Openings)		
			Min.	Max.	KD	Weld	UL	ITS/WH	FM
3 HR Max	Masonry	F16, F14	3	20	X	X	4'0" x 7'2" Single	4'0" x 7'2" Single	4'0" x 7'2" Single
		FN16, FN14	4 1/2	14	X	X	4'0" x 7'2" Single	4'0" x 7'2" Single	4'0" x 7'2" Single
	Stud	F16, F14	3	14	X	X	4'0" x 7'2" Single	4'0" x 7'2" Single	4'0" x 7'2" Single
	Masonry/Stud	MU16, MU14	3 1/2	14	N.A.	X	4'0" x 7'2" Single	4'0" x 7'2" Single	Not Listed
1 1/2 HR (90 Min) Max	Masonry/Stud	MU16, MU14	3 1/2	14	X	X	4'0" x 7'2"	4'0" x 7'2"	Not Listed

#### Notes:

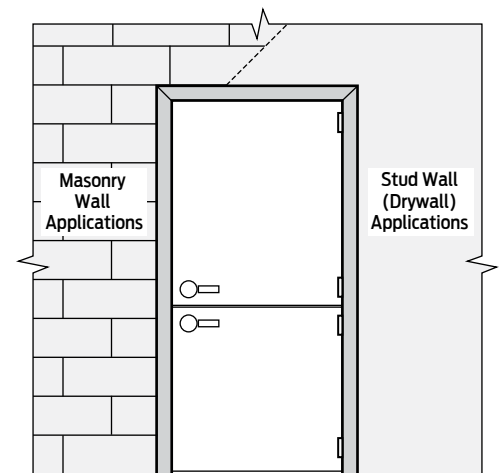
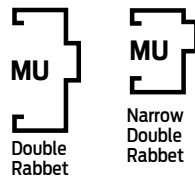
Three sided frame options for dutch doors:

- Strike preparations are required for both the top and bottom leafs, unless the top leaf latches into the bottom leaf.
- 4" Face heads are approved for all applications

#### F Series Frame Construction



#### MU Series Frame Construction



#### Minimum Hardware Requirements:

- Strike for top and bottom leaf (see note 1).
- Closers (top leaf)
- Approved hinges

### Three sided communicating frames

Communicating openings: an application including a door(s) mounted in both rabbets, usually used in the Hospitality markets and installed between adjoining rooms.

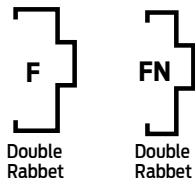
Maximum Rating	Wall Applications	Frame Series					Listings		
		Series	Jamb Depth		Corner		Maximum Sizes (Door Openings)		
			Min.	Max.	KD	Weld	UL	ITS/WH	FM
3 HR Max	Masonry	F16, F14	4 1/2	20	X	X	4'0" x 10'0"	4'0" x 10'0"	4'0" x 8'0"
		FN16, FN14	4 1/2	14	X	X	4'0" x 10'0"	4'0" x 10'0"	4'0" x 8'0"
		MU16, MU14	4 1/2	14	X	X	4'0" x 5'0"	4'0" x 5'0"	Not Listed
	Stud	F16, F14	4 1/2	14	X	X	4'0" x 8'0"	4'0" x 8'0"	4'0" x 8'0"
		MU16, MU14	4 1/2	14	N.A.	X	4'0" x 8'0"	4'0" x 8'0"	Not Listed
1 1/2 Hr (90 Min) Max	Stud	F16, F14	4 1/2	14	X	X	4'0" x 10'0"	4'0" x 10'0"	4'0" x 8'0"
		MU16, MU14	4 1/2	14	X	X	4'0" x 9'0"	4'0" x 9'0"	Not Listed
		DW16, DW14	4 1/2	14	X	N.A.	4'0" x 9'0"	4'0" x 8'10"	4'0" x 8'0"
		K16, K14	4 1/2	14	X	N.A.	4'0" x 9'0"	4'0" x 8'10"	4'0" x 8'0"

#### Notes:

Three sided frame options for single doors:

1. Frames over 9'0" in height and installed in stud walls require the jamb anchors to be welded to the frame.
2. 4" heads are approved for all applications.
3. The IBC currently allows for the omission of closers on communicating door assemblies in hotel/motel applications.
4. For DW & K Series, doors must be hung on opposite jambs.

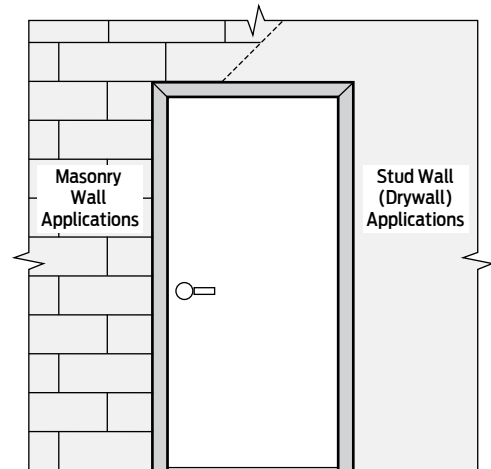
#### F Series Frame Construction



#### MU Series Frame Construction

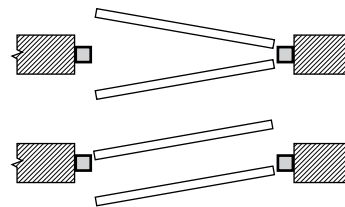


#### DW and K Series Frame Construction



#### Minimum Hardware Requirements:

1. Strike for single point latch
2. Closer (see note 2)
3. Approved hinges



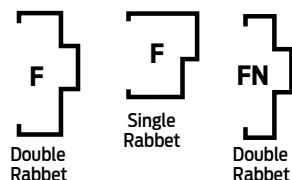
## Profile variations

The following frame profile variations or options may be specified on 3 sided frames and are approved as noted below by UL, ITS/ WH and FM. For hourly ratings and approved opening sizes, refer to the appropriate frame applications pages of this manual.

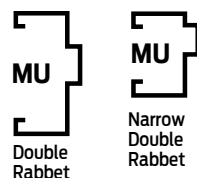
Profile Variation	Frame Applications					
	Single swing	Pairs	Pairs with Removable Mullion	Double Egress	Multiple Opening	Dutch (Single swing)
<b>Hospital Stops</b>	F, FN, MU, DW, K	F, FN, MU, DW, K	N. A.	N. A.	F, MU	F, MU
<b>Equal Rabbet</b>	F, FN, MU, DW, K	F, FN, MU, DW, K	F, FN, MU, DW, K	N. A.	F, MU	F, MU
<b>Lead Lined*</b>	F, MU	F, MU	N. A.	N. A.	N. A.	N. A.

\*For masonry wire anchoring applications only with all others being subject to the authority having jurisdiction.

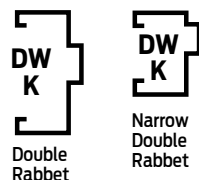
## F Series Frame Construction



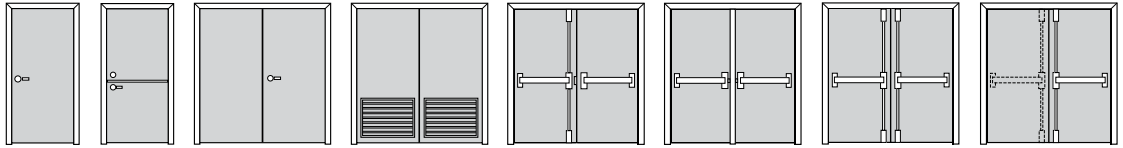
## MU Series Frame Construction



## DW and K Series Frame Construction



## Doors



## General information

## Fire rated steel doors

Doors covered in this section have been tested in accordance with NFPA252 & UL10c, and listed by either Underwriters Laboratories (UL), Warnock Hersey (IT/WH) or FM (FM). The ratings and sizes available are shown on the following pages.

Listed Steelcraft doors are for all commercial building applications. Variations in hardware and glass lights must be considered in the selection of the correct door construction.

## Lights

Fire rated doors can be prepared for listed glass lights. The required hourly rating will dictate the approved glass lights available. (NOTE: Glass manufacturers listings and local/project-specific code requirements should be confirmed for each project. Maximum sizes will vary per rating/manufacturer.) Basic guidelines on glass are as follows:

- **3 hour**
  - Standard listed wire glass cannot be used.
  - Firelite or other appropriately listed glass:
    - FM maintains no glass with 3-hour rating.
    - UL & ITS/WH allow one (1) light with 100 in<sup>2</sup> (.06 m<sup>2</sup>) maximum visible glass. Maximum visible width of 12" (305 mm), maximum height of 33" (838 mm).
- **1 1/2 hour**
  - Standard listed wire glass: one (1) light with 100 in<sup>2</sup> per door leaf max.
  - Firelite or other appropriately listed glass:
    - FM maintains one (1) light with 100 in<sup>2</sup> per door leaf max.
    - UL & ITS/WH available up to 1850 in<sup>2</sup> max visible glass per light, max width 36", max height 54" (Designer trim max area is 1296 in<sup>2</sup>). Multiple lights permitted:
    - UL: provided each light does not exceed the 1850 in<sup>2</sup> maximum.
    - ITS/WH: provided each light does not exceed the 1850 in<sup>2</sup> max: maximum combined glass area may not exceed the published maximum glass area listing of the glass manufacturer.

▪ **1 hour (UL or ITS/WH only)**

- Standard listed wire glass: one (1) light with 100 in<sup>2</sup> per door leaf max.
- Firelite or other appropriately listed glass:
  - Available up to 2700 in<sup>2</sup> max visible glass per light, max width 36", max height 78" (Designer trim max height 54", max area 1296 in<sup>2</sup>)
  - Multiple lights permitted

▪ **3/4 hour**

- Standard listed wire glass:
  - 1296 in<sup>2</sup> max visible glass per light, max width 36", max height 54". Multiple lights permitted, provided each light does not exceed the 1296 in<sup>2</sup> maximum.
- Firelite or other appropriately listed glass:
  - FM maintains 1296 in<sup>2</sup> per door light max: multiple lights permitted, provided the 1296 in<sup>2</sup> maximum per light is not exceeded.
  - UL & ITS/WH available up to 2700 in<sup>2</sup> max visible glass per light, max width 36", max height 78" (Designer trim max height 54", max area 1296 in<sup>2</sup>).
  - Multiple lights permitted.

▪ **20 minutes without hose stream test: (UL&ITS/WH only)**

- Standard listed wire glass:
  - 2700 in<sup>2</sup> max visible glass per light, max width 36", max height 78" (Designer trim max height 54", max area 1296 in<sup>2</sup>).

## Louvers

Fire rated door can be prepared for one listed fire rated louver located in the bottom half of the door. Doors with louvers can only be located in equipment and mechanical areas of the building. FM does not allow the use of louvers in fire rated doors. Basic guidelines on louvers for UL & ITS/WH are as follows:

- 3/4 hour, 1 hour and 1 1/2 hour listings.
- 24" x 24" maximum louver size
- Glass lights can not be used in conjunction with louvers

## Door viewers

- 1 1/2 hour maximum fire listings.
- 3/4" maximum hole size.
- 2 viewer preps maximum per door, minimum 12" apart.

### Approved door series

Regardless of the door series being used, all doors must be installed with labeled hardware, and into labeled frames and firewalls. Door constructions covered in this section are listed below:

- **A14 Series:** full glass with beveled edges
- **B Series:** welded steel stiffened core with beveled edges
- **CE Series:** laminated core with beveled edges and panel embossed face sheets
- **H & HE Series:** specifically designed for hurricane code applications
- **L Series:** laminated core with beveled edges and either honeycomb or polystyrene cores
- **PW Series:** specifically designed for tornado code applications.
- **SL Series:** laminated core with square edges and either honeycomb or polystyrene cores
- **T Series:** specially designed for maximum 250° F or 450° F temperature rise applications. 100 in<sup>2</sup> max visible listed glass.
- **TH Series:** 250°F or 450°F temperature rise for hurricane code applications - 100 in<sup>2</sup> max visible listed glass
- **LS Series:** laminated core with beveled edges and stainless steel face sheets

### Temperature rise ratings

The Steelcraft doors are rated for temperature rise as follows:

- **T & TH series:** 250°F or 450°F temperature rise @ 30 minutes
- **All other series:** > 650°F @ 30 minutes

### Listing information covered

All listings covered in this section are for reference and assistance in developing overall parameters of approvals. Several variables such as glass lights, hardware, wall construction and application will affect the fire ratings. Individual manufacturer listings will take precedence.

### Installation

Installation of all Steelcraft doors shall conform to the published Steelcraft installation instructions, ANSI/SDI A250.11 [Recommended Installation Instructions for Steel Frames and HMMA 840](#). All fire rated frames must be installed in accordance with NFPA Pamphlet 80, and/or the local AHJ.

**Note:** When steel top caps (screw-in) are applied to a fire labeled door with a continuous hinge prep or pocket pivots, the fire certification label is located underneath the cap. See other cap options and label locations in ["Weather seals" on page 145](#).

*Details are subject to change without prior notice.*

### Door light designs

Fire rated doors are available in the following door designs:

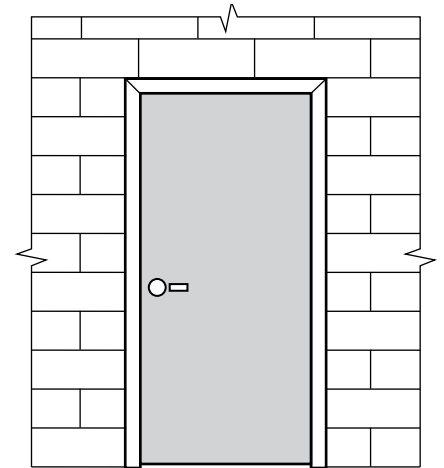
- **F** = Flush door with no glass cutout. 3 hour maximum listing.
- **V** = Vision light with a nominal 100 in<sup>2</sup> located in the upper half of the door. 3 hour maximum listing with appropriately listed glass (UL & WH). 1 ½ hour maximum listing (FM, or standard wire glass).
- **N3, N4, N5** = Narrow light variations, which are 100 in<sup>2</sup> exposed glass area, and located at eye level, near the lock edge. 3 hour maximum listing with appropriately listed glass (UL & WH). 1 ½ hour maximum listing (FM, or standard wire glass).
- **N** = Narrow light varies with the door height, exceeds 100 in<sup>2</sup> of exposed glass area, and is located near the lock edge. 1 ½ hour maximum listing with appropriately listed glass (UL & WH). ¾ hour maximum listing (FM, or standard wire glass).
- **LNL** = Long narrow light, exceeds 54" visible glass height. 1 hour maximum listing with appropriately listed glass (UL & WH). Fire rating not available with standard wire glass, or with FM label.
- **G** = Half glass light (size will vary with the door size) located in the upper half of the door. 1 ½ hour maximum listing with appropriately listed glass (UL & WH). ¾ hour maximum listing (FM, or standard wire glass).
- **FG** = Full glass light. 1 hour maximum listing on L, A14 & H Series doors.
- **FG2 / FG3** = Full glass with multiple lights (size will vary with the door size). 1 ½ hour maximum listing with appropriately listed glass (UL & WH: see notes on WH limitations on page 317). ¾ hour maximum listing (FM, or standard wire glass).
- **Door viewers** = Must be fire rated construction. 1 ½ hour maximum. ¾" diameter hole maximum.



## Approvals

### Single doors with single point locks and latches

Maximum Rating	Door Series	Maximum Door Size		
		UL	ITS/WHI	FM
<b>3 Hr Max</b>	L18, L16	4'0" x 10'0"	4'0" x 10'0"	4'0" x 8'0"
	L14	4'0" x 10'0"	4'0" x 7'2"	4'0" x 8'0"
	LS18, LS16	N/A	4'0" x 8'0"	N/A
	B18, B16	4'0" x 10'0"	N/A	N/A
	T18, T16, T14	4'0" x 9'0"	N/A	4'0" x 8'0"
	T20	3'0" x 8'0"	N/A	N/A
	SL18	4'0" x 8'0"	4'0" x 8'0"	N/A
	B14	4'0" x 8'0"	N/A	N/A
	TH16, TH14	4'0" x 8'0"	N/A	N/A
	H16, H14	4'0" x 8'0"	N/A	N/A
	HE16 (E6)	3'0" x 8'0"	N/A	N/A
	CE18, CE16 (E6)	3'0" x 8'0"	N/A	N/A
	L-20	3'0" x 7'2"	3'0" x 7'2"	N/A
	SL-20	3'0" x 7'2"	3'0" x 7'2"	N/A
	CE18, CE16 (HD2, HD2A)	3'8" x 7'0"	N/A	N/A
	CE18* (E6)	3'8" x 7'0"	N/A	N/A
	HE16 (E6)	3'0" x 7'0"	N/A	N/A
	CE20 (E6)	3'0" x 7'0"	N/A	N/A
	CE18, CE16 (E6)	3'0" x 7'0"	N/A	N/A
<b>1 ½ Hr (90 min) Max</b>	L18, L16	4'0" x 10'0"	4'0" x 10'0"	4'0" x 8'0"
	B14	4'0" x 10'0"	N/A	N/A
	L20	3'0" x 8'0"	3'0" x 8'0"	N/A
	SL20	3'0" x 8'0"	3'0" x 8'0"	N/A
	CE20 (E6)	3'0" x 8'0"	N/A	N/A
	A14 (FG2, FG3)	4'0" x 8'0"	N/A	N/A
<b>1 Hr (60 min) Max</b>	A14 (FG)	4'0" x 8'0"	N/A	N/A



#### Minimum Hardware Requirements:

- Single point lock/latch  
Example: 161, 61L, 160, 160-4, 86, 86ED, 86 w/sectional trim
- Closer
- Approved hinges

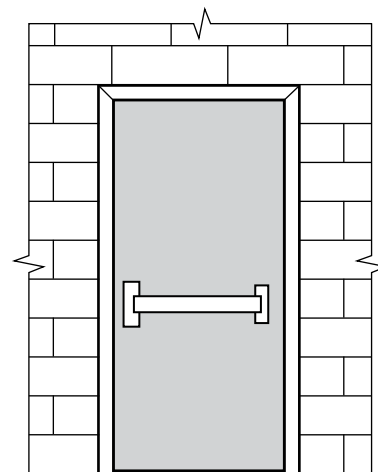
#### Notes:

1. For maximum rating and glass size requirements refer to glass light information
2. Embossed 6 panel CE18 series door design is available and listed up to and including 3'8" x 7'0" door size. All other CE Series doors designs are available as noted above.

Details are subject to change without prior notice.

## Single doors with fire exit hardware

Maximum Rating	Door Series	Maximum Door Size		
		UL	ITS/WHI	FM
<b>3 Hr Max</b>	L18, L16	4'0" x 10'0"	4'0" x 8'0"	4'0" x 8'0"
	L14	4'0" x 10'0"	4'0" x 7'2"	4'0" x 8'0"
	B18, B16	4'0" x 10'0"	N/A	N/A
	T18, T16, T14	4'0" x 9'0"	N/A	4'0" x 8'0"
	SL18	4'0" x 8'0"	4'0" x 8'0"	N/A
	B14	4'0" x 8'0"	N/A	N/A
	TH16, TH14	4'0" x 8'0"	N/A	N/A
	H16, H14	4'0" x 8'0"	N/A	N/A
	T20	3'0" x 8'0"	N/A	N/A
	HE16 (E6)	3'0" x 8'0"	N/A	N/A
	CE18, CE16 (E6)	3'0" x 8'0"	N/A	N/A
	L20	3'0" x 7'2"	3'0" x 7'2"	N/A
	SL20	3'0" x 7'2"	3'0" x 7'2"	N/A
	HE16 (E6)	3'0" x 7'0"	N/A	N/A
	CE20	3'0" x 7'0"	N/A	N/A
	CE18, CE16 (E6)	3'0" x 7'0"	N/A	N/A
	CE18 (E6)	3'8" x 7'0"	N/A	N/A
	LS 18, LS16	N/A	4'0" x 8'0"	N/A
	CE18, CE16 (HD 2 & HD2A)	3'8" x 7'0"	N/A	N/A
<b>1 ½ Hr (90 min) Max</b>	L18, L16	4'0" x 10'0"	4'0" x 10'0"	4'0" x 8'0"
	B14	4'0" x 10'0"	N/A	N/A
	CE20 (E6)	3'0" x 8'0"	N/A	N/A
<b>1 ½ Hr (90 min) Max</b>	A14, (FG2, FG3)	4'0" x 8'0"	N/A	N/A
<b>1 Hr (60 min) Max</b>	A14 (FG)	4'0" x 8'0"	N/A	N/A



## Minimum Hardware Requirements:

- RPD or MPD Fire Exit Hardware
- Closer
- Approved hinges

## Notes:

1. For maximum rating and glass size requirements refer to glass light information

Details are subject to change without prior notice.

**Pairs with astragal: Swing in the same direction**

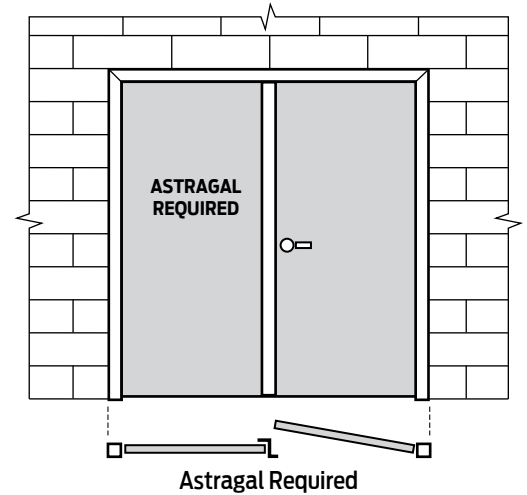
- **Active Leaf:** single point lock or latch
- **Inactive leaf:** closed back strike and surface or flush bolts
- **Coordinator required**

Maximum Rating	Door Series	Maximum Door Size		
		UL	ITS/WHI	FM
<b>Rating 3 Hr Max</b>	L18, L16	8'0" x 8'0"	8'0" x 8'0"	8'0" x 8'0"
	L14	8'0" x 8'0"	8'0" x 7'2"	8'0" x 8'0"
	SL18	8'0" x 8'0"	8'0" x 8'0"	N/A
	B18, B16, B14	8'0" x 8'0"	N/A	N/A
	T18, T16, T14	8'0" x 9'0"	N/A	8'0" x 8'0"
	TH16, TH14	8'0" x 8'0"	N/A	N/A
	H16, H14	8'0" x 8'0"	N/A	N/A
	T20	6'0" x 8'0"	N/A	N/A
	HE16 (E6)	6'0" x 8'0"	N/A	N/A
	CE18, CE16 (E6)	6'0" x 8'0"	N/A	N/A
	HE16 (E6)	6'0" x 7'0"	N/A	N/A
	CE16 (E6)	6'0" x 7'0"	N/A	N/A
	CE18 (E6)	7'4" x 7'0"	N/A	N/A
	CE18, CE16 (HD2, HD2A)	7'4" x 7'0"	N/A	N/A
	LS18, LS16	N/A	8'0" x 8'0"	N/A
<b>1 ½ Hr (90 minute) Max</b>	B18, B16, B14	8'0" x 10'0"	N/A	N/A
	L18, L16	8'0" x 10'0"	8'0" x 10'0"	8'0" x 8'0"
	L14	8'0" x 9'0"	8'0" x 7'2"	8'0" x 8'0"
	L20	6'0" x 7'2"	6'0" x 7'2"	N/A
	SL20	6'0" x 7'2"	6'0" x 7'2"	N/A
	CE20 (E6)	6'0" x 7'0"	N/A	N/A
<b>1 ½ Hr (90 min) Max</b>	A14 (FG2, FG3)	8'0" x 8'0"	N/A	N/A
<b>1 Hr (60 min) Max</b>	A14 (FG)	8'0" x 8'0"	N/A	N/A

**Notes:**

1. For maximum rating and glass size requirements refer to glass light information

Details are subject to change without prior notice.


**Minimum Hardware Requirements:**
**Active leaf**

- Single point lock/latch  
Example: 161, 61L, 160, 160-4, 86, 86ED, 86 w/ sectional trim
- Closer
- Approved hinges
- Inactive leaf
- Closed back strike
- Auto flush bolts
- Approved hinges
- Closer

Coordinator is required

**Note:** flush bolt sets omit bottom bolt, using Fire Latch (pin), is acceptable per hardware manufacturer's listing approval.

### Pairs without astragal: Swing in the same direction

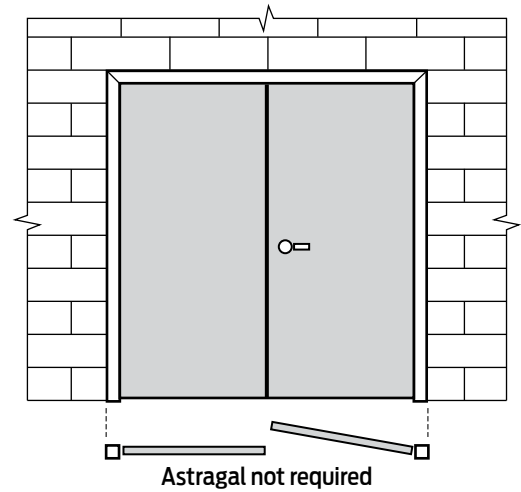
- **Active Leaf:** single point lock or latch
- **Inactive leaf:** closed back strike and surface or flush bolts
- **Coordinator required**

Maximum Rating	Door Series	Maximum Door Size		
		UL	ITS/WHI	FM
<b>1 ½ Hr (90 min) Max</b>	B18, B16, B14	8'0" x 8'0"	N/A	N/A
	L18, L16	8'0" x 7'2"	8'0" x 7'2"	8'0" x 7'2"
	SL18	8'0" x 7'2"	8'0" x 7'2"	N/A
	CE18 (E6)	7'4" x 7'0"	N/A	N/A
	CE16 (E6)	6'0" x 7'0"	N/A	N/A
	LS18, LS16	N/A	8'0" x 7'2"	N/A
	CE18, CE16 (HD2, HD2A)	7'4" x 7'0"	N/A	N/A

### Notes:

1. For maximum rating and glass size requirements refer to glass light information

Details are subject to change without prior notice.



### Minimum Hardware Requirements:

#### Active leaf

- Single point lock/latch  
Example: 161, 61L, 160, 160-4, 86, 86ED, 86 w/ sectional trim
- Closer
- Approved hinges

#### Inactive leaf

- Wide inactive leaf
- Closer
- Strike preparation
- Auto flush bolts
- Approved hinges

#### Coordinator is required

Note: flush bolt sets omit bottom bolt, using Fire Latch (pin), is acceptable per hardware manufacturer's listing approval.

**Pairs with astragal: Swing in the same direction**

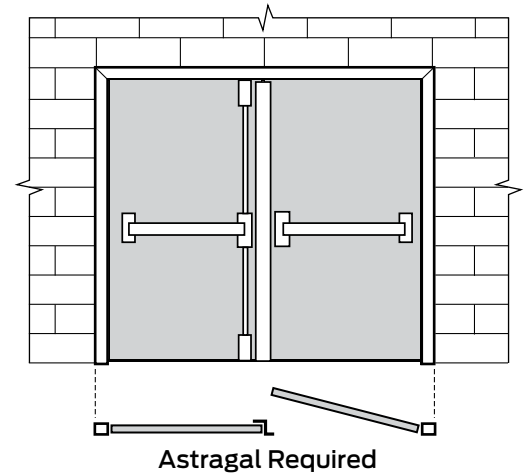
- **Active Leaf: Mortise FEH**
- **Inactive leaf: Vertical Rod FEH, closed back strike**
- **Coordinator required**

Maximum	Door Series	Maximum Door Size		
		UL	ITS/WHI	FM
<b>Rating 3 Hr Max</b>	L18, L16	8'0" x 8'0"	8'0" x 8'0"	8'0" x 8'0"
	L14	8'0" x 8'0"	8'0" x 7'2"	8'0" x 8'0"
	LS18, LS16	N/A	8'0" x 8'0"	N/A
	B18, B16, B14	8'0" x 8'0"	N/A	N/A
	T18, T16, T14	8'0" x 9'0"	N/A	8'0" x 8'0"
	CE18, CE16 (E6)	6'0" x 8'0"	N/A	N/A
	CE16 (E6)	6'0" x 7'0"	N/A	N/A
	CE18 (E6)	7'4" x 7'0"	N/A	N/A
<b>1 ½ Hr (90 min) Max</b>	B18, B16, B14	8'0" x 10'0"	N/A	N/A
	L18, L16	8'0" x 10'0"	8'0" x 10'0"	8'0" x 8'0"
	L14	8'0" x 9'0"	8'0" x 7'2"	8'0" x 8'0"
	A14 (FG2, FG3)	8'0" x 8'0"	N/A	N/A
<b>1 Hr (60 min) Max</b>	A14 (FG)	8'0" x 8'0"	N/A	N/A

**Notes:**

1. For maximum rating and glass size requirements refer to glass light information
2. Pairs for 3 hour rating, the Inactive leaf with Surface or Concealed Vertical rod must be top and bottom latching (NO LBR)
3. Pairs for 1 1/2 hour rating can be equipped with LBR devices if the hardware manufacture is approved for that application.
4. Mortise Fire Exit Devices x Closed back strike, w/Surface or Flush Bolts. Flush Bolts sets omit bottom bolt, using Fire Latch (pin), is acceptable per hardware manufacturer's listing approval
5. Open back strike not permitted on this application

Details are subject to change without prior notice.


**Minimum hardware requirements:**
**Active leaf**

- Mortise FEH
- Closer
- Approved hinges

**Inactive leaf**

- Surface or concealed vertical rod FEH. (LBR) Less Bottom Rod option is available based on hardware manufacturer's listing approval (1 ½ hour maximum)
- Closer
- Approved hinges

Coordinator is required

**Pairs without astragal: Swing in the same direction w/OBS**

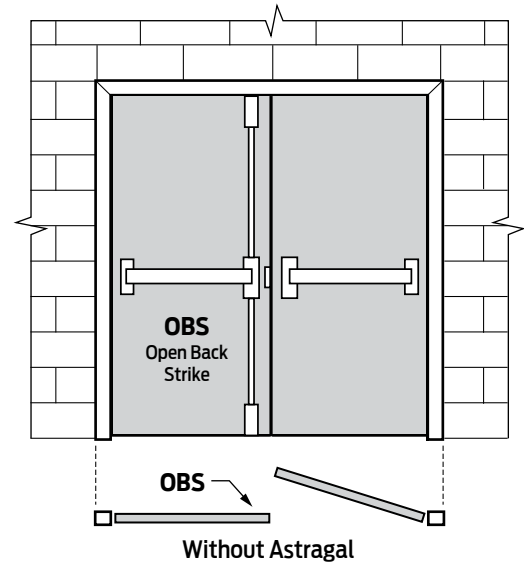
- **Active Leaf: Mortise FEH**
- **Inactive leaf: Vertical Rod FEH, OBS (open back strike)**

Maximum Rating	Door Series	Maximum Door Size		
		UL	ITS/WHI	FM
<b>1½ Hr (90 min) Max</b>	L18, L16, L14	8'0" x 7'2"	8'0" x 7'2"	8'0" x 7'2"
	LS18, LS16	N/A	8'0" x 7'2"	N/A
	SL18	8'0" x 7'2"	8'0" x 7'2"	N/A
	B18, B16, B14	8'0" x 8'0"	N/A	N/A
	CE18 (E6)	7'4" x 7'0"	N/A	N/A
	CE18, CE16 (E6)	6'0" x 8'0"	N/A	N/A
	CE16 (E6)	6'0" x 7'0"	N/A	N/A
	CE18, CE16, HD2, HD2A	7'4" x 7'0"	N/A	N/A

**Notes:**

1. For maximum rating and glass size requirements refer to glass light information

Details are subject to change without prior notice.

**Minimum hardware requirements:****Active leaf**

- Mortise FEH
- Closer
- Approved hinges

**Inactive leaf (Wide Inactive Leaf)**

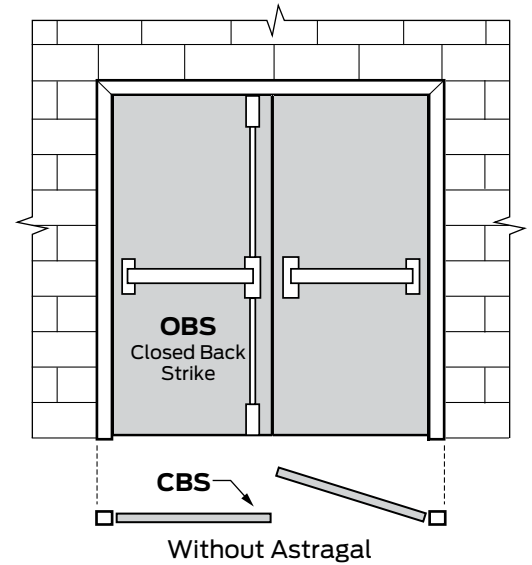
- Surface or concealed vertical rod FEH. (LBR) Less Bottom Rod option is available based on hardware manufacturer's listing approval
- Open back strike preparation
- Closer
- Approved hinges

### Pairs without astragal: Swing in the same direction w/CBS

- **Active Leaf: Mortise FEH**
- **Inactive leaf: Vertical Rod FEH, closed back strike (CBS)**
- **Coordinator Required**

Maximum Rating	Door Series	Maximum Door Size		
		UL	ITS/WHI	FM
<b>1 ½ Hr (90 min) Max</b>	L18, L16, L14	8'0" x 8'0"	N/A	8'0" x 7'2"
	SL18	8'0" x 8'0"	N/A	N/A
	B18, B16, B14	8'0" x 8'0"	N/A	N/A
	CE18, CE16 (E6)	6'0" x 8'0"	N/A	N/A
	CE16 (E6)	6'0" x 7'0"	N/A	N/A
	CE18 (E6)	7'4" x 7'0"	N/A	N/A
	CE18, CE16 (HD2 & HD2A)	7'4" x 7'0"	N/A	N/A

Details are subject to change without prior notice.



### Minimum hardware requirements:

#### Active leaf

- Mortise FEH
- Closer
- Approved hinges

#### Inactive leaf (Wide Inactive Leaf)

- Surface or concealed vertical rod FEH.
- Closed back strike preparation
- Closer
- Approved hinges

(LBR) Less Bottom Rod option is available based on hardware manufacturer's listing approval

Coordinator is required

### Pairs without astragal: Swing in the same direction

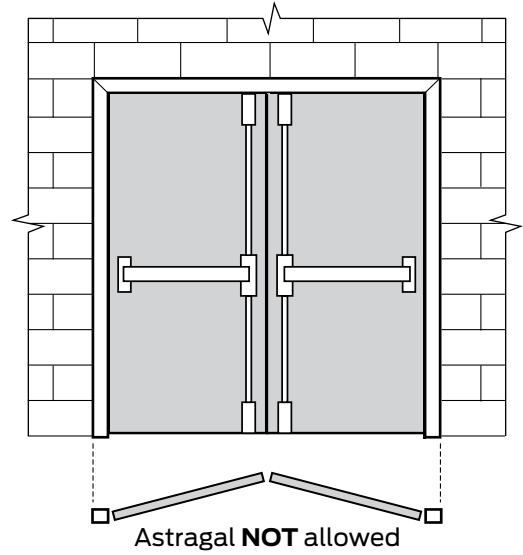
- **Active Leaf: Vertical Rod FEH**
- **Inactive leaf: Vertical Rod FEH**

Maximum Rating	Door Series	Maximum Door Size		
		UL	ITS/WHI	FM
<b>1 ½ Hr (90 minute) Max</b>	B18, B16, B14	8'0" x 10'0"	N/A	N/A
	L18, L16	8'0" x 9'0"	8'0" x 10'0"	8'0" x 8'0"
	L14	8'0" x 9'0"	N/A	N/A
	PW14	8'0" x 8'0"	N/A	N/A
	T18, T16	8'0" x 9'0"	N/A	8'0" x 8'0"
	T14	8'0" x 9'0"	N/A	N/A
	SL18	8'0" x 8'0"	8'0" x 8'0"	N/A
	TH16	8'0" x 8'0"	N/A	N/A
	H16	8'0" x 8'0"	N/A	N/A
	HE16 (E6)	6'0" x 8'0"	N/A	N/A
	CE18, CE16 (E6)	6'0" x 8'0"	N/A	N/A
	HE16 (E6)	6'0" x 7'0"	N/A	N/A
	CE16 (E6)	6'0" x 7'0"	N/A	N/A
	LS18, LS16	N/A	8'0" x 8'0"	N/A
	CE18, CE16 (HD2 & HD2A)	7'4" x 7'0"	N/A	N/A
	CE18 (E6)	7'4" x 7'0"	N/A	N/A
<b>1 ½ Hr (90 min) Max</b>	A14 (FG2, FG3)	8'0" x 8'0"	N/A	N/A
<b>1 Hr (60 min) Max</b>	A14 (FG)	8'0" x 8'0"	N/A	N/A

### Notes:

1. Pairs of doors without an astragal are not listed or available for 3 hour applications. **Astragals can not be used in this hardware application.**
2. For maximum rating and glass size requirements refer to glass light information
3. Maximum 450°F degree on all temperature rise doors.
4. Paladin (PW14-Series) tornado resistant doors require Von Duprin WS9927(F) or 237 (F) vertical rod FEH. LBR option is not available.

Details are subject to change without prior notice.



### Minimum Hardware Requirements:

#### Active leaf

- Surface or concealed vertical rod FEH
- Closer
- Approved hinges

#### Inactive leaf (Wide Inactive Leaf)

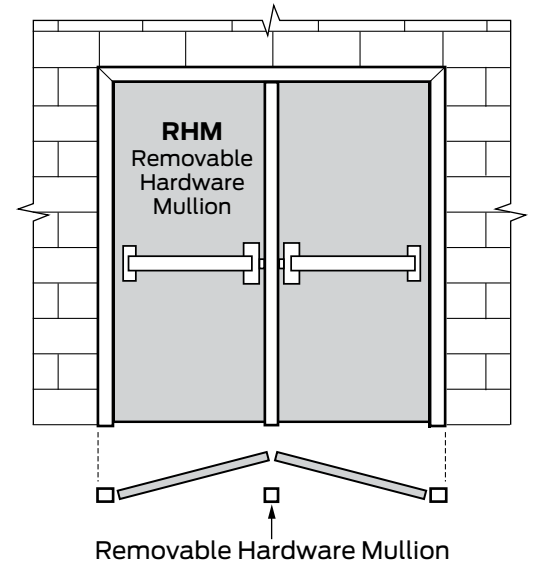
- Surface or concealed vertical rod FEH
- Closer
- Approved hinges

(LBR) Less Bottom Rod option is available based on hardware manufacturer's listing approval.



**Pairs with removable hardware mullion: Swing in the same direction**
**▪ Rim FEH x Rim FEH**

Maximum Rating	Door Series	Maximum Door Size		
		UL	ITS/WHI	FM
<b>3 Hr Max</b>	L18, L16	8'0" x 10'0"	8'0" x 8'0"	8'0" x 8'0"
	L14	8'0" x 10'0"	8'0" x 7'2"	8'0" x 8'0"
	SL18	8'0" x 8'0"	8'0" x 8'0"	N/A
	B18, B16	8'0" x 10'0"	N/A	N/A
	B14	8'0" x 8'0"	N/A	N/A
	H16, H14	8'0" x 8'0"	N/A	N/A
	T18, T16, T14	8'0" x 9'0"	N/A	8'0" x 8'0"
	T20	6'0" x 8'0"	N/A	N/A
	CE18, CE16 (E6)	6'0" x 8'0"	N/A	N/A
	L20	6'0" x 7'2"	6'0" x 7'2"	N/A
	SL20	6'0" x 7'2"	6'0" x 7'2"	N/A
	HE16 (E6)	6'0" x 8'0"	N/A	N/A
	CE20, CE16 (E6)	6'0" x 7'0"	N/A	N/A
	LS18, LS16	N/A	8'0" x 8'0"	N/A
	CE18, CE16 (HD2 & HD2A)	7'4" x 7'0"	N/A	N/A
	CE18 (E6)	7'4" x 7'0"	N/A	N/A
<b>1 ½ Hr (90 min) Max</b>	L18, L16	8'0" x 10'0"	8'0" x 9'0"	8'0" x 8'0"
	B14	8'0" x 10'0"	N/A	N/A
<b>1 ½ Hr (90 min) Max</b>	A14, (FG2, FG3)	8'0" x 8'0"	N/A	N/A
<b>1 Hr (60 min) Max</b>	A14 (FG)	8'0" x 8'0"	N/A	N/A


**Minimum Hardware Requirements:**

- RPD, Rim FEH
- Closer
- Fire rated and listed removable hardware mullion
- Approved hinges

**Notes:**

1. Pairs of doors with removable mullions are treated and listed as 2 single doors
2. For maximum rating and glass size requirements refer to glass light information
3. Removable mullions must be listed. Maximum door size depends on the hardware manufacturer's approved and listed mullion height.

Details are subject to change without prior notice.

## Pairs with Steelcraft removable mullion: Swing in the same direction

### Applications:

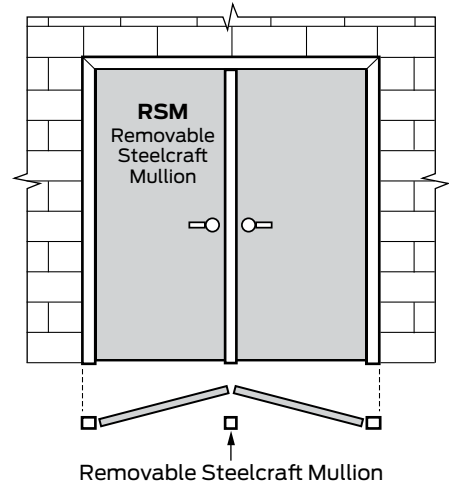
1. Single point lock or latch x single point lock or latch
2. Mortise or Rim FEH x Mortise or Rim FEH

Maximum Rating	Door Series	Maximum Door Size		
		UL	ITS/WHI	FM
1 ½ Hr (90 minute) Max	L18, L16	4'0" x 8'0"	4'0" x 8'0"	4'0" x 8'0"
	LS18, LS16	N/A	4'0" x 8'0"	N/A
	SL18	4'0" x 8'0"	4'0" x 8'0"	N/A
	L14	4'0" x 8'0"	4'0" x 7'2"	4'0" x 8'0"
	B18, B16, B14	4'0" x 8'0"	N/A	N/A
	T20	3'0" x 8'0"	N/A	N/A
	T18, T16, T14	4'0" x 8'0"	N/A	4'0" x 8'0"
	CE18, CE16 (E6)	3'0" x 8'0"	N/A	N/A
	CE20 (E6)	3'0" x 7'0"	N/A	N/A
	CE18 (E6)	3'8" x 7'0"	N/A	N/A
	CE18, CE16, HD2, HD2A	3'8" x 7'0"	N/A	N/A
	L20 Sgl. Pt. Lock	3'0" x 8'0"	3'0" x 8'0"	N/A
	L20 Rim/Mort Panic	3'0" x 7'2"	3'0" x 7'2"	N/A
1 ½ Hr (90 min) Max	A14 (FG2, FG3)	4'0" x 8'0"	N/A	N/A
1 Hr (60 min) Max	A14 (FG)	4'0" x 8'0"	N/A	N/A

### Notes:

1. Pairs of doors with removable mullions are treated and listed as 2 single doors.
2. Minimum rating and glass size requirements refer to glass light information
3. AN series available with Rim Fire Exit hardware only
4. Steelcraft single or double rabbet Hollow Metal Mullion

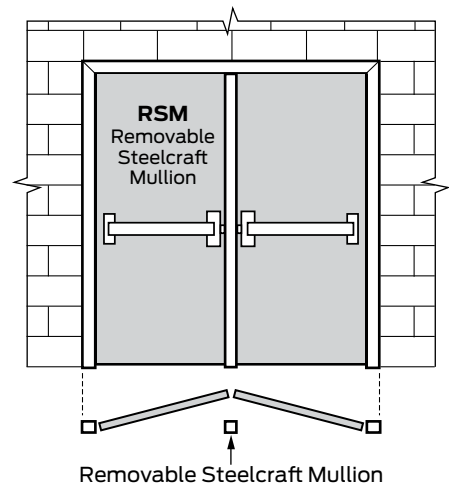
Details are subject to change without prior notice.



### 1. SINGLE POINT LATCH

#### Minimum Hardware requirements:

- Single point lock/latch  
Example: 161, 61L, 160, 160-4, 86, 86ED, 86 w/sectional trim
- Closer
- Approved hinges



### 2. RIM or MORTISE FEH

#### Minimum Hardware requirements:

- Rim or Mortise FEH  
Example: RPD, 86EDR  
Listed FEH per manufacturers' listings
- Closer
- Approved hinges

**Double egress pairs with astragal: Swing in opposite direction**

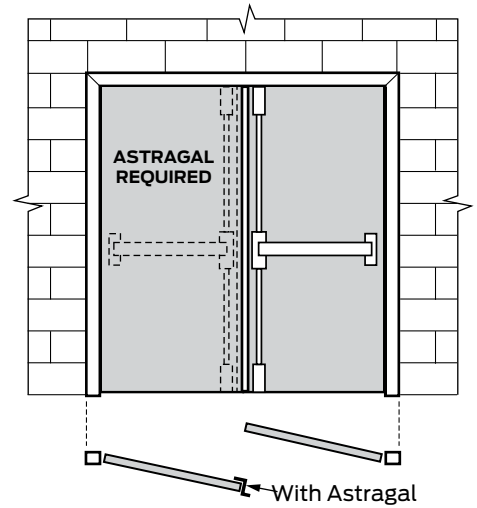
1. Vertical Rod FEH: Both doors active
2. Non-latching, for cross-corridor smoke barrier. Both doors active.

Maximum Rating	DoorSeries	Maximum Door Size		
		UL	ITS/WHI	FM
<b>3 Hr Max</b>	B18, B16	8'0" x 10'0"	N/A	N/A
	L18, L16	8'0" x 8'0"	8'0" x 7'2"	8'0" x 8'0"
	LS18, LS16	N/A	8'0" x 7'2"	N/A
	SL18	8'0" x 8'0"	8'0" x 7'2"	N/A
	B14	8'0" x 8'0"	N/A	N/A
	T18, T16, T14	8'0" x 9'0"	N/A	N/A
<b>1 ½ Hr (90 min) Max</b>	B14	8'0" x 10'0"	N/A	N/A
	L18, L16	8'0" x 9'0"	8'0" x 8'0"	8'0" x 8'0"
	L14	8'0" x 9'0"	N/A	N/A
	A14	8'0" x 8'0"	N/A	N/A
	SL18	8'0" x 8'0"	8'0" x 8'0"	N/A
<b>Cross-corridor smoke barrier</b>	L18, L16	N/A	8'0" x 9'0"	N/A
	SL18	N/A	8'0" x 8'0"	N/A

**Notes:**

1. For maximum rating and glass size requirements refer to glass light information
2. Less Bottom Rod (LBR) option is available based on MFG Hardware listing approval
3. Refer to Technical Data Manual for cross-corridor smoke barrier requirement and limitations.

Details are subject to change without prior notice.


**Minimum Hardware Requirements:**

- Surface or concealed vertical rod FEH
- Non-latching for cross-corridor smoke barrier only
- Closers
- Approved hinges

### Double egress pairs without astragal: Swing in opposite direction

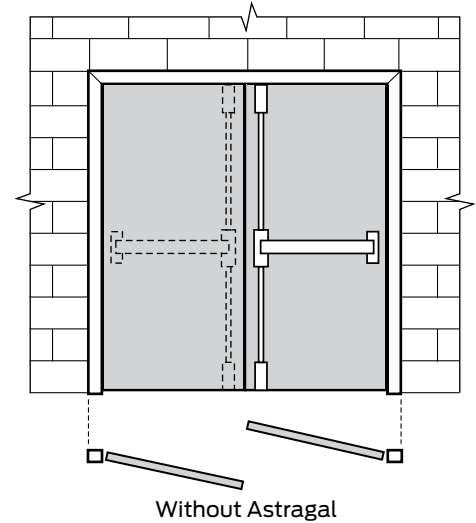
- Vertical Rod FEH
- Vertical Rod FEH

Maximum Rating	Door Series	Maximum Door Size		
		UL	ITS/WHI	FM
1 ½ Hr (90 minute) Max	L18, L16	8'0" x 8'0"	8'0" x 8'0"	8'0" x 8'0"
	LS18, LS16	N/A	8'0" x 8'0"	N/A
	SL18	8'0" x 8'0"	8'0" x 8'0"	N/A
	B18, B16, B14	8'0" x 8'0"	N/A	N/A

#### Notes:

- For maximum rating and glass size requirements refer to glass light information
- (Less Bottom Rod LBR) option is available base on MFG Hardware listing approval

Details are subject to change without prior notice.



#### Minimum Hardware requirements:

- Surface or concealed vertical rod FEH
- Closers
- Approved hinges

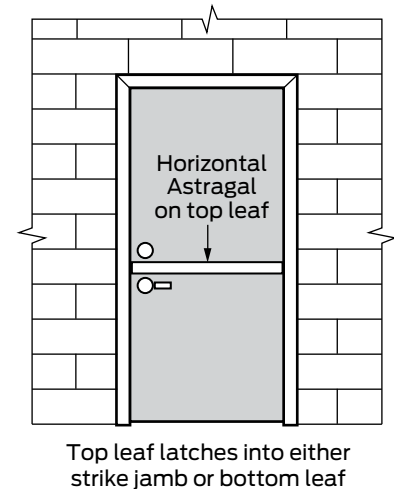
### Single dutch doors with single point locks & latches

Maximum Rating	Door Series	Maximum Door Size		
		UL	ITS/WHI	FM
3 Hr Max	L18, L16	4'0" x 7'2"	4'0" x 7'2"	4'0" x 7'2"

#### Notes:

- Door construction with honeycomb or polystyrene cores.
- Maximum exposed glass light 100 square inches for doors 1 ½ hour rated or less. Limited to one light in top leaf.
- Top leaf must have a listed cylindrical lock, latching into strike jamb or into bottom leaf.
- Bottom leaf must have a listed cylindrical lock or mortise lock design.
- Dutch door shelf is optional, approved for ½ shelf only.
- Dutch Door can only be used in single door applications. No double door configurations.

Details are subject to change without prior notice.



#### Minimum Hardware Requirements:

##### Top leaf

- Listed cylindrical lock or latch
- Closer
- Approved hinges

##### Bottom leaf

- Listed lock or latch

### Single doors with fire rated louvers

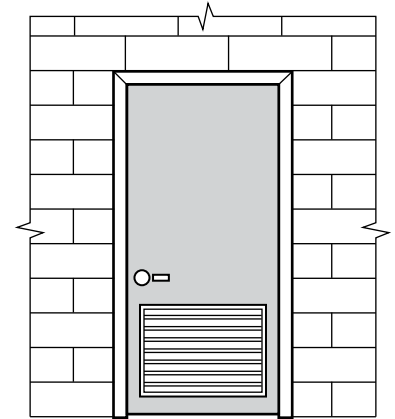
#### • WITH SINGLE POINT LOCKS AND LATCHES

Maximum Rating	Door Series	Maximum Door Size		
		UL	ITS/WHI	FM
1 ½ Hr (90 minute) 1 Hr (60 minute) OR ¾ Hr (45 minute)	B18, B16, B14	4'0" x 10'0"	N/A	N/A
	L18, L16	4'0" x 10'0"	4'0" x 10'0"	N/A
	L14	4'0" x 10'0"	4'0" x 7'2"	N/A
	SL18	4'0" x 8'0"	4'0" x 8'0"	N/A
	L20	3'0" x 8'0"	3'0" x 8'0"	N/A
	SL20	3'0" x 8'0"	3'0" x 8'0"	N/A
	H16, H14	4'0" x 8'0"	N/A	N/A

#### Notes:

- "L" Door construction with honeycomb or polystyrene cores.
- Louver must be a listed fusible link louver.
- Louver must be located at the bottom of the door. Only one per door, maximum size 24" x 24".
- Louvers permitted in 1 ½, 1 or ¾ hour rated doors only.
- Doors can not include glass lights.
- Minimum 12" from bottom of door to cut out.

Details are subject to change without prior notice.



#### Minimum Hardware requirements:

##### Single door

- Single point lock/latch  
Example -161, 61L, 160, 160-4, 86, 86ED
- Closer
- Approved hinges

### Pairs with fire rated louvers & astragal: Swing in same direction

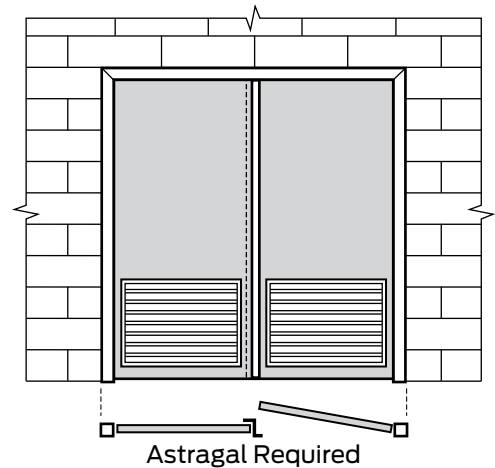
#### • WITH SINGLE POINT LOCKS AND LATCHES

Maximum Rating	Door Series	Maximum Door Size		
		UL	ITS/WHI	FM
1 ½ Hr (90 minute), 1 Hr (60 minute) OR ¾ Hr (45 minute)	B18, B16, B14	8'0" x 10'0"	N/A	N/A
	L18, L16	8'0" x 10'0"	8'0" x 10'0"	N/A
	L14	8'0" x 9'0"	8'0" x 7'2"	N/A
	SL18	8'0" x 8'0"	8'0" x 8'0"	N/A
	L20	6'0" x 7'2"	6'0" x 7'2"	N/A
	SL20	6'0" x 7'2"	6'0" x 7'2"	N/A

#### Notes:

- "L" Door construction with honeycomb or polystyrene cores.
- Louver must be a listed fusible link louver.
- Louver must be located at the bottom of the door. Only one per door, maximum size 24" x 24".
- Pairs require an Astragal.
- Louvers permitted in 1 ½, 1 or ¾ hour rated doors only.
- Doors can not include glass lights.
- Minimum 12" from bottom of door to cut out.
- Flush Bolts sets omit bottom bolt, using Fire Latch (pin), is acceptable per hardware manufacturer's listing approval.

Details are subject to change without prior notice.



#### Minimum Hardware requirements:

##### Active leaf

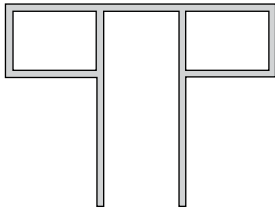
- Single point lock/latch
- Closer
- Approved hinges

##### Inactive leaf

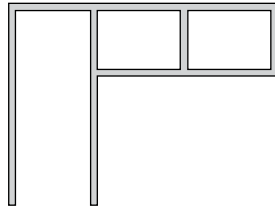
- Strike preparation
- Flush, surface auto bolts
- Approved hinges

## Transom and side lights and/or panels

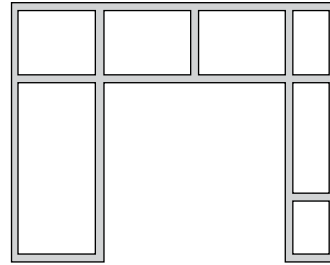
### Typical Elevations



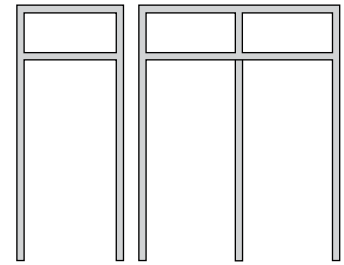
Sidelight Frame



Sidelight Frame



Transom/Sidelight Frame



Transom Frames with Bar

### General information

#### Fire rated transom and sidelights

The transom and sidelight frames covered in this section, have been tested in accordance with UL 10C, NFPA 252 - 1999 and listed by either Underwriters Laboratories (UL), Warnock Hersey (ITS/WHI) and FM Global (FM). The ratings and sizes available are shown on the following pages.

Labeled transom and sidelight frames are welded prior to arriving at the jobsite and are available in the following configurations:

- **Transom Light frame:** A frame assembly which includes a fixed horizontal transom bar, and a light (window) directly above the door. The transom bar separates the door opening from the transom light. The door opening can be for:
  - Single door latching into end jamb or window/panel mullion
  - Two single doors with a center mullion
    - Rim FEH latching into hardware manufacturer's mullion
    - Lock/latch sets latching into hollow metal mullion
    - Double (pair) door without a mullion & swinging in same direction
- **Sidelight frame:** A frame assembly which includes both a fixed vertical mullion bar, and a light (window) adjacent to one or both sides of the door. The mullion bar separates the door opening from the side light. The door opening can be for:
  - Single door latching into end jamb or window/panel mullion
  - Two single doors with a center mullion
    - Rim FEH latching into hardware manufacturer's mullion
    - Lock/latch sets latching into hollow metal mullion
  - Double (pair) door without a mullion & swinging in same direction

- **Transom and Sidelight frame:** A frame assembly which includes a fixed horizontal transom bar, and a light directly above the door, and a fixed vertical mullion bar, and a light adjacent to one or both sides of the door. The door opening can be for:
  - Single door latching into end jamb or window/panel mullion
  - Two single doors with a center mullion
    - Rim FEH latching into hardware manufacturer's mullion
    - Lock/latch sets latching into hollow metal mullion
  - Double (pair) door without a mullion & swinging in same direction

#### Approved frame series

Frames covered in this section are F and MU. Regardless of the frame series being used, all frames must be installed into a fire rated wall.

#### Size limitations

Transom and side light frames must be shipped as welded units. Frames may be field spliced. For splicing details, refer to the Elevation Section of this manual. Maximum width, height and ratings shown on the following pages.

#### Listing information covered

All listings covered in this section are for reference and assistance in developing overall parameters of approvals. Several variables such as hardware, wall construction and application will affect the fire ratings. Individual manufacturer's listings will take precedence. All listings shown on this section conform to UL 10C and NFPA 252.

#### Installation

Installation of all Steelcraft framing systems shall conform to the published Steelcraft installation instructions, ANSI/SDI A250.11 [Recommended Installation Instructions for Steel Frames and ANSI A250.11 and HMMA 840](#). All fire rated frames and doors must be installed in accordance with NFPA Pamphlet 80, and/or the local AHJ.

## Approvals

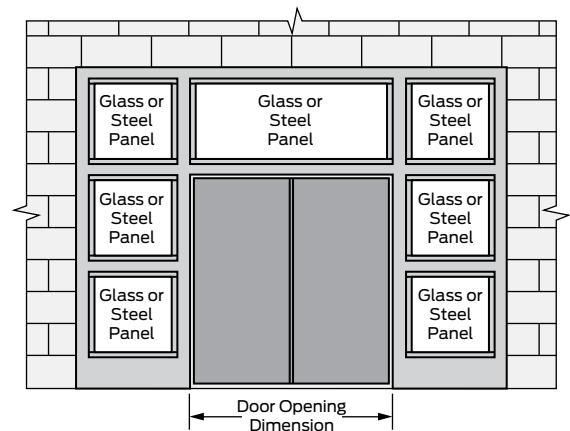
### Transom sidelight frame with glass and/or ½" Steelcraft laminated steel panels

Maximum Rating	Wall Application	Frame Information			Listings		
		Series	Jamb Depth		Maximum Overall Frame Width & Height		
			Min.	Max.	UL	ITS/WHI	FM
<b>1 ½ Hr (90 min) Max</b>	Masonry	F16, F14	3"	14"	13'6" x 12'2"	13'6" x 12'2"	N/A
	Masonry	MU16, MU14	3 ½"	14"	13'6" x 12'2"	13'6" x 12'2"	N/A
	Stud	F16, F14	3 ¾"	14"	13'2" x 12'2"	13'2" x 12'2"	N/A
	Stud	MU16, MU14	3 ¾"	14"	13'2" x 12'2"	13'2" x 12'2"	N/A

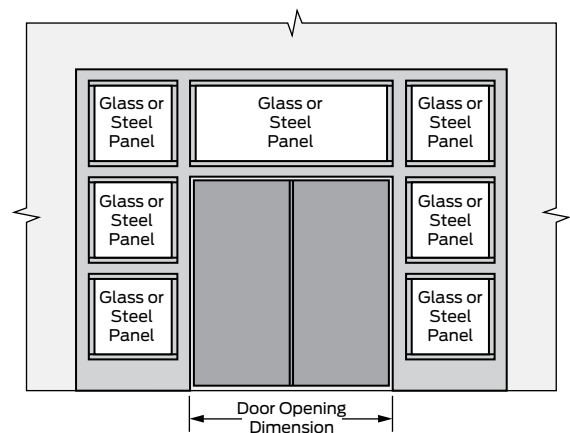
#### Notes:

- All frames must be shipped as welded units. Frames can be field spliced.
- Door opening:
  - All frames can be prepared for use with a single or double door.
    - Maximum single door size = 4'0" x 10'0".
    - Maximum double door size = Max. 8'0" x 10'0".
  - Double door can be with or without vertical mullion.
  - Frame can have up to two single door openings or one pair door opening.
  - Pair opening doors must swing in same direction.
- Glazing requirements:
  - All glass must be listed glazing material.
  - ½" thick laminated panels with mineral board core. Panel sizes are as follows:
    - Transom panels = 96" wide x 38" high
    - Side panels = 38" wide x 96" high
  - Glazing stop/bead requirements:
    - Stop width minimum 7/16" or as required by glazing manufacturer.
    - Stop height minimum 5/8" or as required by glazing manufacturer.
    - Glazing bead minimum 18 gauge, or as required by glazing manufacturer.
- Special profile may be necessary due to special thickness of glazing.
- Frame profile variations:
  - Perimeter (Head and Jambs) frame
    - Masonry walls = minimum face 1" (FN)
    - Stud walls = minimum face 1 ¼"
    - Maximum face 4" masonry, steel or wood stud walls.
  - Interior dividing members
    - Members at door opening minimum face 1".
    - Vertical maximum face 4 ½"
    - Horizontal maximum 8".
  - Sill section Minimum Face 2", maximum 16 ⅛"

Typical Elevation



Masonry Walls



Drywall Partitions

- The use and installation of frames with 1 ½ hour (90 minute) ratings are subject to the approval of the local AHJ. These assemblies are tested and listed in accordance with UL10C and NFPA 252. Fire-protection-rated glazing materials must be installed in these assemblies. These assemblies are not tested in accordance with ASTM E119 or UL 263 (Fire Tests of Building Construction and Materials) and use of Fire-resistance-rated glazing materials will not make the frame compliant with ASTM E119 or UL 263.

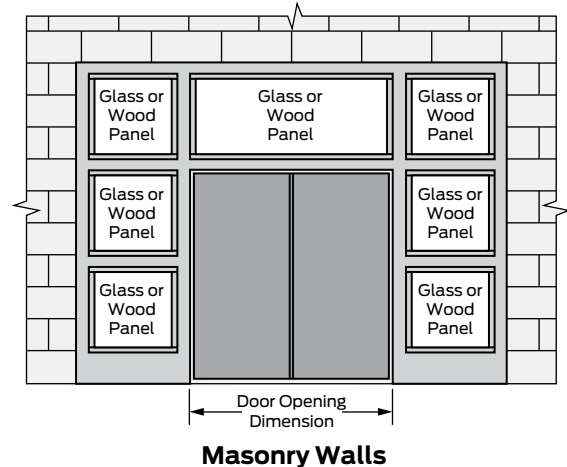
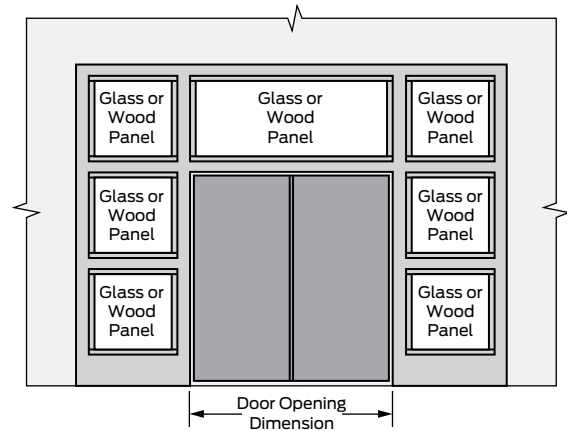
Transom Frame / Sidelite Frame assemblies are tested and listed for fire protection in accordance with UL10C and NFPA 252. Where fire protection ratings are required, fire protection rated glazing shall be installed. The installation of fire resistance rated glazing does not qualify these assemblies for compliance with ASTM E119 or UL 263. The use and installation of transom sidelite frames are subject to approval of the AHJ.

**Transom sidelight frame with glass and/or 1 ¾" Rated wood panels**

Maximum Rating	Wall Application	Frame Information			Listings		
		Jamb Depth			Maximum Overall Frame Width & Height		
		Series	Min.	Max.	UL	ITS/WHI	FM
1 ½ Hr (90 min) Max	Masonry	F16, F14	4 ¾"	12 ¾"	13'6" x 12'2"	13'6" x 12'2"	N/A
	Masonry	MU16, MU14	4 ¾"	12 ¾"	13'6" x 12'2"	13'6" x 12'2"	N/A
	Stud	F16, F14	4 ¾"	12 ¾"	13'2" x 12'2"	13'2" x 12'2"	N/A
	Stud	MU16, MU14	4 ¾"	12 ¾"	13'2" x 12'2"	13'2" x 12'2"	N/A

**Notes:**

- All frames must be shipped as welded units. Frames can be field spliced.
  - Door opening:
    - All frames can be prepared for use with a single or double door.
    - Maximum single door size = 4'0" x 10'0".
    - Maximum double door size = Max. 8'0" x 10'0".
    - Double door can be with or without vertical mullion.
    - Frame can have up to two single door openings or one pair door opening.
    - Pair opening doors must swing in same direction.
  - Wood doors and panels:
    - Maximum width, height, and rating based on wood door manufacturer's listing.
  - Glazing requirements:
    - All glass must be listed glazing material.
    - Glazing stop/bead requirements:
      - Stop width minimum 7/16" or as required by glazing manufacturer.
      - Stop height minimum 5/8" or as required by glazing manufacturer.
      - Glazing bead minimum 18 gauge, or as required by glazing manufacturer.
  - Special profile may be necessary due to special thickness of glazing.
  - Frame profile variations:
    - Perimeter (Head and Jambs) frame.
      - Masonry walls = minimum face 1" (FN).
      - Stud walls = minimum face 1 ¼".
      - Maximum face 4" masonry, steel or wood stud walls.
    - Interior dividing members.
      - Members at door opening minimum face 1".
      - Vertical maximum face 4 ½".
      - Horizontal maximum 8".
    - Sill section Minimum face 2", maximum 16 ⅛".
  - Wood panels can be used in conjunction with metal panels or glass.
  - Maximum jamb depth:
    - 14" if any glass is installed.
    - 12 ¾" if all wood panels.
  - The use and installation of frames with 1 ½ hour (90 minute) ratings are subject to the approval of the local AHJ. These assemblies are tested and listed in accordance with UL10C and NFPA 252. Fire-protection-rated glazing materials must be installed in these assemblies. These assemblies are not tested in accordance with ASTM E119 or UL 263 (Fire Tests of Building Construction and Materials) and use of Fire-resistance-rated glazing materials will not make the frame compliant with ASTM E119 or UL 263.
- Transom Frame / Sidelite Frame assemblies are tested and listed for fire protection in accordance with UL10C and NFPA 252. Where fire protection ratings are required, fire protection rated glazing shall be installed. The installation of fire resistance rated glazing does not qualify these assemblies for compliance with ASTM E119 or UL 263. The use and installation of transom sidelite frames are subject to approval of the AHJ.

**Typical Elevation**

**Masonry Walls**

**Drywall Partitions**

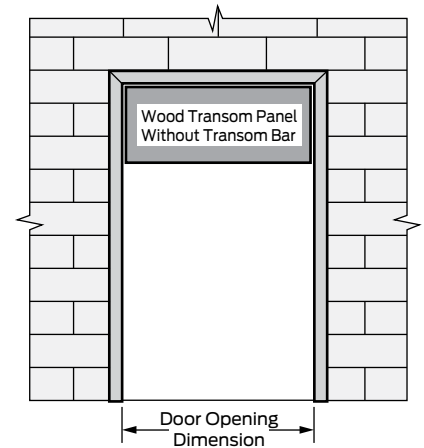
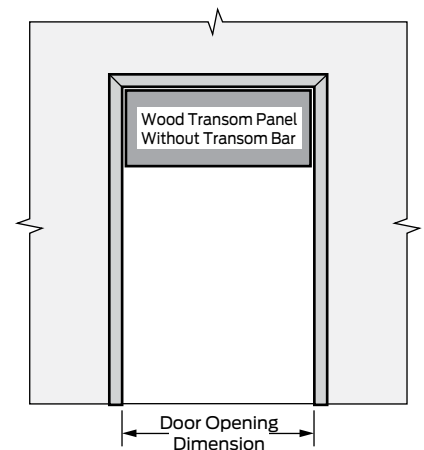


**Transom frame without transom bar (1 ¾" wood panel installations)**

Maximum Rating	Wall Application	Frame Information			Listings		
		Series	Jamb Depth		Maximum Door and Panel Opening Width & Height		
			Min.	Max.	UL	ITS/WHI	FM
<b>1 ½ Hr (90 min) Max</b>	Masonry	F16, F14	4 ¾"	12 ¾"	4'0" x 11'0"	4'0" x 11'0"	N/A
	Masonry	FN16, FN14	4 ¾"	12 ¾"	4'0" x 11'0"	4'0" x 11'0"	N/A
	Masonry	MU16, MU14	4 ¾"	12 ¾"	4'0" x 11'0"	4'0" x 11'0"	N/A
	Stud	F16, F14	4 ¾"	12 ¾"	4'0" x 11'0"	4'0" x 11'0"	N/A
	Stud	MU16, MU14	4 ¾"	12 ¾"	4'0" x 11'0"	4'0" x 11'0"	N/A

**Notes:**

- Sizes may vary based on wood door manufacturer's listings.
- F Series frames can be knocked down (KD)
- MU Series must be shipped as welded units.
- Maximum door size:
  - Single doors = see wood door manufacturer's listing.
  - Double doors = not approved
- Panel requirements:
  - 1 ¾" thick wood panel.
  - Maximum panel size = 4'0" wide x 4'0" high.
  - Wood panel installed with spring bolts requires reinforcing or frame preparations.
- Frame profile variations:
  - Perimeter (Head and Jambs) frame
  - Masonry walls = minimum face 1" (FN)
  - Stud walls = minimum face 1 ¼"
  - Maximum face 4" masonry, steel or wood stud walls.
- Hardware applications:
  - Single door: follow standard label requirements.
- Refer to wood panel manufacturer's listing for spring bolt attachment into the frame.

**Typical Elevation**

**Masonry Walls**

**Drywall Partitions**

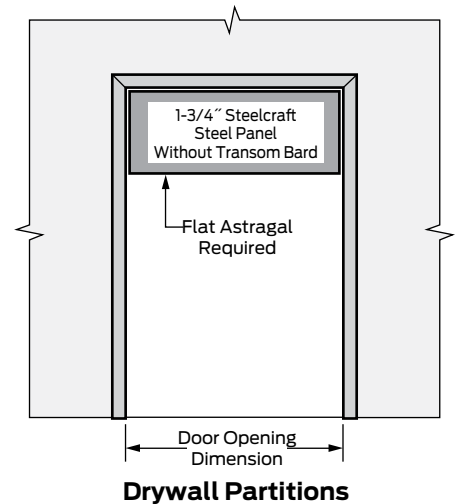
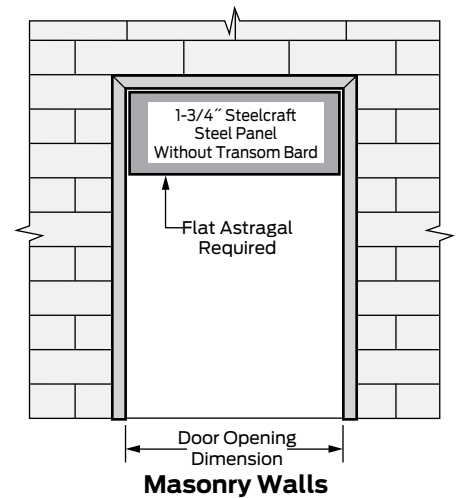
See Note # 8 For Panel Attachment

**Transom frame without transom bar (1 3/4" Steelcraft steel panel installed)**

Maximum Rating	Wall Application	Frame Information			Listings: Maximum Door and Panel Opening Width and Height		
		Series	Jamb Depth		UL & ITS/WHI		
			Min.	Max.	Single Doors	Double Doors	FM
<b>3 Hr Max</b>	Masonry	F16, F14	4 3/4"	12 3/4"	4'0" x 11'2"	8'0" x 11'2"	N/A
	Masonry	FN16, FN14	4 3/4"	12 3/4"	4'0" x 11'2"	8'0" x 11'2"	N/A
	Masonry	MU16, MU14	4 3/4"	12 3/4"	4'0" x 11'2"	8'0" x 11'2"	N/A
<b>1 1/2 Hr (90 min)</b>	Stud	F16, F14	4 3/4"	12 3/4"	4'0" x 10'0"	8'0" x 10'0"	N/A
	Stud	MU16, MU14	4 3/4"	12 3/4"	4'0" x 10'0"	8'0" x 10'0"	N/A

**Notes:**

1. F Series frames can be knocked down(KD)
2. MU Series must be shipped as welded units.
3. Maximum door size:
  - Single doors = 4080i
  - Double doors = 8080 must swing in same direction
4. Panel requirements:
  - 1 3/4" thick steel panel
  - Maximum panel size:
    - Single doors = 48" wide x 48" high
    - Double doors = 96" wide x 48" high
5. Frame profile variations:
  - Perimeter (Head and Jambs) frame
  - Masonry walls = minimum face 1" (FN)
  - Stud walls = minimum face 1 1/4"
  - Maximum face 4" masonry, steel or wood stud walls.
6. Hardware applications:
  - Single door: follow standard label requirements.
  - Double doors: limited to flush bolts x single point latch or Mortise FEH.

**Typical Elevation**


## Fire window frames

### General information

#### Fire rated window frames

The fire window (borrowed light) frames covered in this section, have been tested in accordance with NFPA 257, and UL9 and listed by either Underwriters Laboratories (UL), Warnock Hersey (IT/WHI) and FM Global (FM). The ratings and sizes available are shown on the following pages.

Fire window frames are commonly referred to as Labeled Borrowed Light Frames, and can be installed in labeled masonry, wood and steel stud wall constructions. They are available in both single and multiple lights and in the following applications:

- Sitting on the floor: Frame is located on the floor and anchored to both the floor and adjacent wall structures
- Above the floor: Frame is located above the floor line and is anchored into the surrounding wall structure.

The overall size of the fire window will vary with the type of wall construction it is installed in, and the location of the window in the wall. Generally, fire windows that sit on the floor can be of a larger size than those located above the floor and in the wall.

#### Approved frame series

Frames covered in this section are F, DW and MU Series. Regardless of the frame series being used, all frames must be installed into fire rated walls.

#### Size limitations

F and MU Series Fire Window frames with multiple lights must be shipped as welded units. Single glass pane F, MU and DW Series lights can be supplied KD (knock-down). Some frames may be field spliced. For splicing details, refer to the Elevation Section of this manual. Maximum width, height and ratings shown on the following pages. Width and height dimensions as shown in this manual can not be reversed.

#### Listing information covered

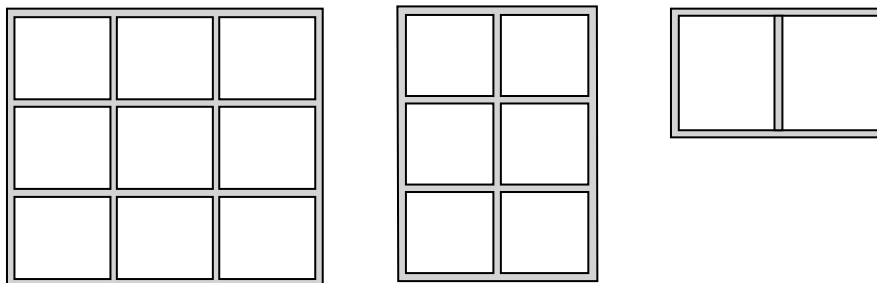
All listings covered in this section are for reference and assistance in developing overall parameters of approvals. Several variables such as wall construction and application will affect the fire ratings. Individual manufacturer's listings will take precedence.

#### Installation

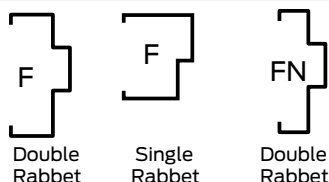
Installation of all Steelcraft framing systems shall conform to the published Steelcraft installation instructions, ANSI/SDI A250.11 and HMMA 840. All fire rated doors and frames must be installed in accordance with NFPA Pamphlet 80, and/or the local AHJ.

All listings shown in this section conform to the requirements of NFPA 257, and UL9.

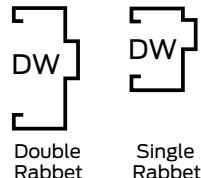
### Typical Elevations



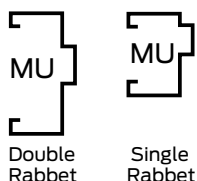
#### F Series Frame Construction



#### DW Series Frame Construction



#### MU Series Frame Construction



## Approvals

### Masonry walls: Fire window located on or above the floor

Maximum Rating	Wall Application	Frame Information			Listings		
		Series	Jamb Depth		Maximum Overall Frame Width & Height		
			Min.	Max.	UL	ITS/WHI	FM
1 ½ Hr (90 min) Max	Masonry Wall	F16, F14, FN16, FN14	3"	14"	13'6" x 12'0"	13'6" x 12'0"	N/A
	Masonry Wall	MU16, MU14	3 ½"	14"	13'6" x 12'0"	13'6" x 12'0"	N/A

#### Notes:

- All frames must be shipped as welded units, except single four sided frames with one light opening the maximum size depends on the glazing being used.
- Glazing requirements:
  - All glass must be listed glazing material.
  - Glazing stop/bead requirements:
    - Stop width minimum  $\frac{7}{16}$ " or as required by glazing manufacturer.
    - Stop height minimum  $\frac{5}{8}$ " or as required by glazing manufacturer.
    - Glazing bead minimum 18 gauge, or as required by glazing manufacturer.
- Special profile may be necessary due to special thickness of glazing.
- Frame profile variations:
  - Perimeter (Head and Jambs) frame.
    - Minimum face 1".
    - Maximum face 4".
  - Interior dividing members.
    - Minimum face 1".
    - Maximum face 4 ½".
    - Horizontal maximum 8".
  - Sill section.
    - Minimum face 2".
    - Maximum face 16 ⅛".

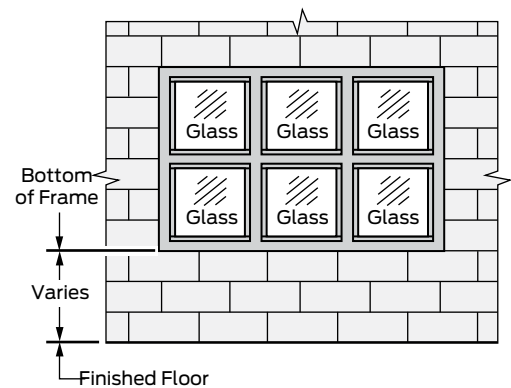
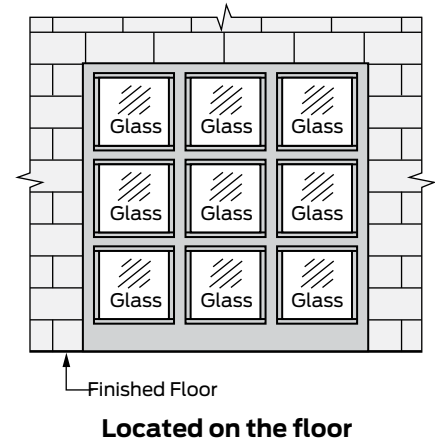
NOTE: The use and installation of fire window frames with 1 ½ hour (90 minute) ratings are subject to the approval of the local AHJ. These assemblies are tested and listed in accordance with UL9 and NFPA 257. Fire-protection-rated glazing materials must be installed in these assemblies.

These assemblies are not tested in accordance with ASTM E119 or UL 263 (Fire Tests of Building Construction and Materials) and use of Fire-resistance-rated glazing materials will not make the frame compliant with ASTM E119 or UL 263.

Fire Window assemblies are tested and listed for fire protection in accordance with UL9, and NFPA 257. Where fire protection ratings are required, fire protection rated glazing shall be installed. The installation of fire resistance rated glazing does not qualify these assemblies for compliance with ASTM E119 or UL 263. The use and installation of transom sidelite frames are subject to approval of the AHJ.

Details are subject to change without prior notice.

### Typical Elevation

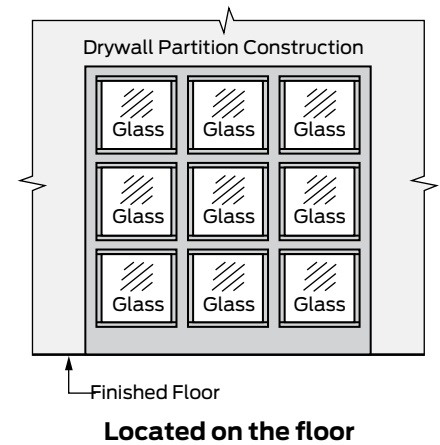


**Stud walls: Fire window located on the floor**

Maximum Rating	Wall Application	Frame Information			Listings		
		Series	Jamb Depth		Maximum Overall Frame Width & Height		
			Min.	Max.	UL	ITS/WHI	FM
<b>1 ½ Hr (90 min) Max</b>	Stud	F16, F14	3 ¾"	14"	13'2" x 11'7"	13'2" x 11'7"	N/A
	Stud	MU16, MU14	3 ¾"	14"	13'2" x 11'7"	13'2" x 11'7"	N/A

**Notes:**

- All frames must be shipped as welded units, except single four sided frames with one light opening the maximum size depends on the glazing being used.
- Glazing requirements:
  - All glass must be listed glazing material.
  - Glazing stop/bead requirements:
    - Stop width minimum 7/16" or as required by glazing manufacturer.
    - Stop height minimum 5/8" or as required by glazing manufacturer.
    - Glazing bead minimum 18 gauge, or as required by glazing manufacturer..
- Special profile may be necessary due to special thickness of glazing.
- Frame profile variations:
  - Perimeter (Head and Jambs) frame
    - Minimum face 1 ¼".
    - Maximum face 4".
  - Interior dividing members
    - Minimum face 1"
    - Maximum face 4 ½"
    - Horizontal maximum 8"
  - Sill section
    - Minimum face 2".
    - Maximum face 18".

**Typical Elevation**


**NOTE:** The use and installation of fire window frames with 1 ½ hour (90 minute) ratings are subject to the approval of the local AHJ. These assemblies are tested and listed in accordance with UL9, and NFPA 257. Fire-protection-rated glazing materials must be installed in these assemblies.

These assemblies are not tested in accordance with ASTM E119 or UL 263 (Fire Tests of Building Construction and Materials) and use of Fire-resistance-rated glazing materials will not make the frame compliant with ASTM E119 or UL 263.

Fire Window assemblies are tested and listed for fire protection in accordance with UL9, and NFPA 257. Where fire protection ratings are required, fire protection rated glazing shall be installed. The installation of fire resistance rated glazing does not qualify these assemblies for compliance with ASTM E119 or UL 263. The use and installation of transom sidelite frames are subject to approval of the AHJ.

*Details are subject to change without prior notice.*

**Masonry sill with stud walls: Fire window located off the floor**

Maximum Rating	Wall Application	Frame Information			Listings		
		Series	Jamb Depth		Maximum Overall Frame Width & Height		
			Min.	Max.	UL	ITS/WHI	FM
<b>1 ½ Hr (90 min) Max</b>	Stud	F16, F14	4 ½"	14"	13'2" x 11'7"	13'2" x 11'7"	N/A
	Stud	MU16, MU14	4 ½"	14"	13'2" x 11'7"	13'2" x 11'7"	N/A

**Notes:**

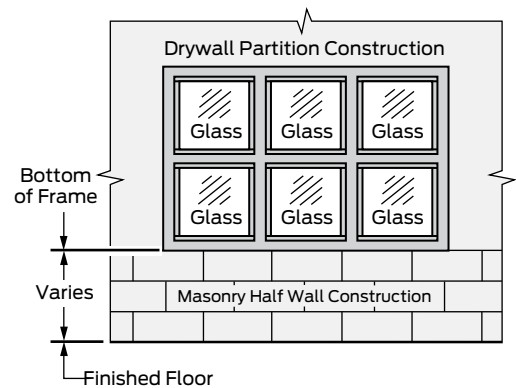
- All frames must be shipped as welded units, except for single four sided frames with one light opening the maximum size depends on the glazing being used.
  - All glass must be listed glazing material.
  - Glazing stop/bead requirements:
    - Stop width minimum 7/16" or as required by glazing manufacturer.
    - Stop height minimum 5/8" or as required by glazing manufacturer.
    - Glazing bead minimum 18 gauge, or as required by glazing manufacturer.
- Special profile may be necessary due to special thickness of glazing.
- Frame profile variations:
  - Perimeter (Head and Jambs) frame
    - Minimum face 1 ¼".
    - Maximum face 4".
  - Interior dividing members
    - Minimum face 1"
    - Maximum face 4 ½"
    - Horizontal maximum 8"
  - Sill section
    - Minimum face 2".
    - Maximum face 16 ⅛".

**NOTE:** The use and installation of fire window frames with 1 ½ hour (90 minute) ratings are subject to the approval of the local AHJ. These assemblies are tested and listed in accordance with UL9, and NFPA 257. Fire-protection-rated glazing materials must be installed in these assemblies.

These assemblies are not tested in accordance with ASTM E119 or UL 263 (Fire Tests of Building Construction and Materials) and use of Fire-resistance-rated glazing materials will not make the frame compliant with ASTM E119 or UL 263.

Fire Window assemblies are tested and listed for fire protection in accordance with UL9, and NFPA 257. Where fire protection ratings are required, fire protection rated glazing shall be installed. The installation of fire resistance rated glazing does not qualify these assemblies for compliance with ASTM E119 or UL 263. The use and installation of transom sidelite frames are subject to approval of the AHJ.

*Details are subject to change without prior notice.*

**Typical Elevation**


**Located above finished floor  
Drywall partition construction  
With Masonry half wall**

**Stud walls: Fire window located above the floor**

Maximum Rating	Wall Application	Frame Information			Listings		
		Series	Jamb Depth		Maximum Overall Frame Width & Height		
			Min.	Max.	UL	ITS/WHI	FM
<b>1 ½ Hr (90 min) Max</b>	Stud	F16, F14	3 ¾"	14"	12'10" x 11'4"	12'10" x 11'4"	N/A
	Stud	MU16, MU14	3 ¾"	14"	12'10" x 11'4"	12'10" x 11'4"	N/A

**Notes:**

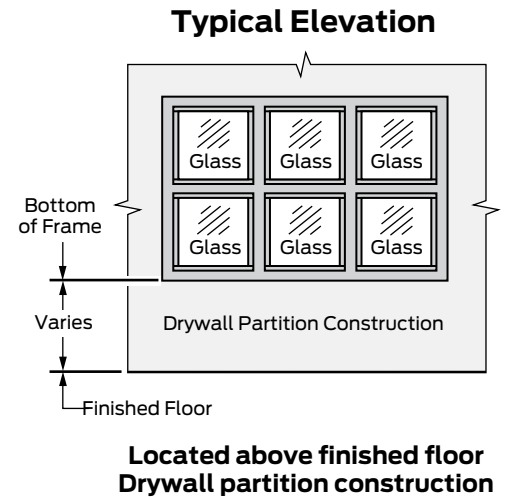
- All frames must be shipped as welded units, except for single four sided frames with one light Opening the maximum size depends on the glazing being used.
- Glazing requirements:
  - All glass must be listed glazing material.
  - Glazing stop/bead requirements:
    - Stop width minimum 7/16" or as required by glazing manufacturer.
    - Stop height minimum 5/8" or as required by glazing manufacturer.
    - Glazing bead minimum 18 gauge, or as required by glazing manufacturer.
3. Special profile may be necessary due to special thickness of glazing.
4. Frame profile variations:
  - Perimeter (Head and Jambs) frame
    - Minimum face 1 ¼" steel or wood stud walls.
    - Maximum face 4" steel or wood stud walls.
  - Interior dividing members
    - Minimum face 1"
    - Maximum face 4 ½"
    - Horizontal maximum 8"
  - Sill section
    - Minimum face 1 ¼".
    - Maximum face 4".

**NOTE:** The use and installation of fire window frames with 1 ½ hour (90 minute) ratings are subject to the approval of the local AHJ. These assemblies are tested and listed in accordance with UL9, and NFPA 257. Fire-protection-rated glazing materials must be installed in these assemblies.

These assemblies are not tested in accordance with ASTM E119 or UL 263 (Fire Tests of Building Construction and Materials) and use of Fire-resistance-rated glazing materials will not make the frame compliant with ASTM E119 or UL 263.

Fire Window assemblies are tested and listed for fire protection in accordance with UL9, and NFPA 257. Where fire protection ratings are required, fire protection rated glazing shall be installed. The installation of fire resistance rated glazing does not qualify these assemblies for compliance with ASTM E119 or UL 263. The use and installation of transom sidelite frames are subject to approval of the AHJ.

*Details are subject to change without prior notice.*



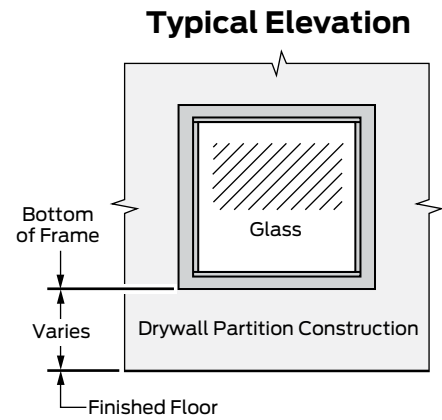
**Stud walls: Fire window located above the floor DW Series**

Maximum Rating	Wall Application	Frame Information			Listings UL, ITS/WHI and FM			FM
		Series	Jamb Depth		Maximum Rabbet to Rabbet Dimension			
			Min.	Max.	Width	Height	Max Visible Area	
60 minutes or 45 Min. (Std. listed glass)	Stud	DW16, DW14	3 ¼"	14"	78 ¼"	78 ¼"	2721 squ. inches	N/A
45 min. (Std. listed wire glass)	Stud	DW16, DW14	3 ¼"	14"	55 ¼"	55 ¼"	1296 squ. inches	N/A
20 min. without hose (Any listed glass)	Stud	DW16, DW14	3 ¼"	14"	96"	82"	5268 squ. inches	N/A

**Notes:**

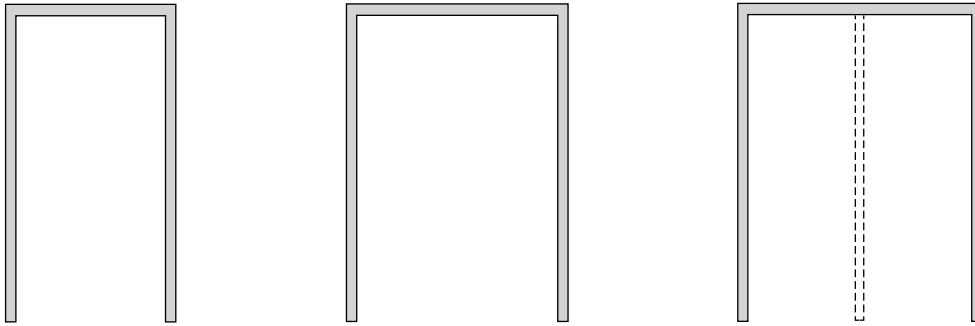
- All frames with one light opening (without mullion dividers) are with KD corner connections.
- Glazing requirements:
  - Glazing stop/bead requirements:
    - Stop width minimum 7/16" or as required by glazing manufacturer.
    - Stop height minimum 5/8" or as required by glazing manufacturer.
    - Glazing bead minimum 18 gauge, or as required by glazing manufacturer.
  - Frame profile variations:
    - Perimeter (Head and Jambs) frame
    - Perimeter frame Minimum face 2"
    - Perimeter frame Maximum face 2"

Details are subject to change without prior notice.



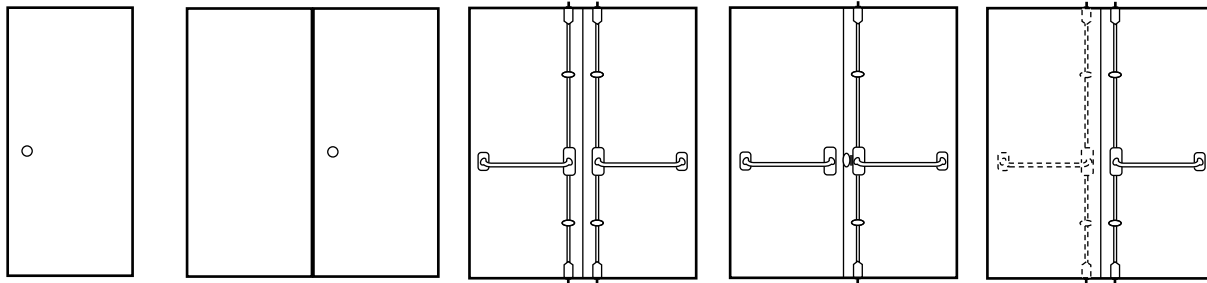


## Smoke and draft control Typical Frame Elevations

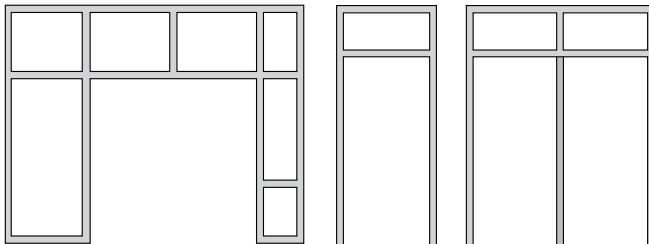


All three (3) sided frame series and elevations shown in the **Fire Rated Products section** of this manual are approved for Smoke and Draft label applications.

## Typical Door Elevations

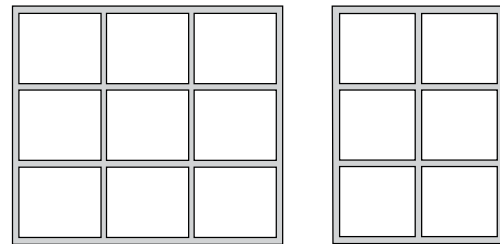


## Transom and Side Light Frames



Transom/Sidelight Frame elevations are listed for Smoke and Draft Control applications.

## Fire Window (Borrowed Light) Frames



Fire Window (Borrowed Light) Frame elevations are not required to be listed for Smoke and Draft Control applications.

Doors and frames covered in this section have been tested or evaluated in accordance with UL 10C, and UL 1784 listed by either Underwriters Laboratories (UL) or Warnock Hersey. FM Global (FM) does not offer listings for Smoke and Draft rated products. The main components of a Smoke and Draft Rated assembly are:

1. Frame (steel fire rated)
2. Door (steel fire rated)
3. Hardware (fire rated and required)
4. Smoke Seals (fire/smoke control rated)
5. Fire Rated Wall

### Frames (steel)

Smoke and Draft Rated Assemblies must include a Fire Rated Door Frame. Three sided frames are designed to be set on the floor anchored to the wall construction. All frame anchoring must be in accordance with the installation instructions for the appropriate frame construction.

### Doors (steel)

Smoke and Draft Rated Assemblies must include a Fire Rated Door. Steelcraft doors are listed for most commercial building applications. Variations in hardware and glass lights must be considered in the selection of the correct door construction. Smoke and Draft Rated doors can be prepared for glass lights. The required hourly rating will dictate the approved glass lights available. All glass used in fire rated doors must be listed glass, and be either ¼" wire or other listed glazing material. Basic guidelines on glass are as follows:

- **3 hour:** flush door, no glass.
  - Exception: one (1) light with 100 square inches (.06 square meters) maximum of glass is permitted on 3 hour L, B, & T Series doors if Fire Light or other 3 hour listed glazing material is used. Maximum width of 12" (305 mm) or height of 33" (838 mm).

- **1 ½ hour:** 100 sq. in. per door leaf max.

1296 square inches (.84 square meters) maximum of glass is permitted on 1 ½ hour L & B Series doors if Fire Light or other appropriately listed glazing material is used. Maximum width of 36" (914 mm) or height of 54" (1372 mm). UL listed doors may have multiple lights, provided each light does not exceed 1296 square inches of exposed glass area.

- **¾ hour:** 1296 sq. in. per light with neither dimension exceeding 54", unless listed otherwise.
  - Exception: ¾ hour doors may have multiple lights provided the limits of 1296 square inches per light and 54 inches are not exceeded.
- **20 minute:** 1296 sq. in. per light with neither dimension exceeding 54", unless listed otherwise.

Doors with louvers are not listed for use in areas requiring Smoke and Draft Ratings.

### Hardware

Hardware used on Smoke and Draft rated assemblies conform to the same requirements as a conventional fire rated door assembly.

### Gasketing

Smoke and Draft Rated Assemblies must include the appropriate Fire/Smoke Rated Seals.

Steelcraft frames: Must have a UL10C/UL1784 Listed/Classified gasketing applied to the frame head and jambs, installed in accordance with the gasketing manufacturer's installation instructions.

Steelcraft doors: Recommend a UL10C/UL1784 Listed/Classified gasketing applied to the meeting stile edges of pairs of doors which do not include an astragal.

Door bottom gasketing is not required unless required by the local authority having jurisdiction.

Intumescent gasketing is not required for hollow metal doors installed in hollow metal frames.

The clearance between the door and frame, meeting edges of pairs of doors, and the floor and the bottom of the door must meet the requirements specified in NFPA-80.

Wood doors in steel frames: Refer to the wood door manufacturer's listing for gasketing required for their product to comply with UL10C/UL1784 listings.

### Fire rated wall

The wall requirements for Smoke and Draft Control Assemblies are the same as conventional Fire Door Assemblies.

### Hourly ratings

Smoke and Draft Rated Assemblies are mainly intended for use in 20 minute with out hose stream applications. Depending on building code requirements and the AHJ, they may be required in areas requiring ¾, 1 ½ or 3 hour listings.

### Approved products

- Frames: F, FN, DW, K, FE, DE, and MU Series
- Doors: L, B, CE, H, HE, SL, TH, T, and A14 Series.

### Listing information covered

All listing covered in this section are for reference and assistance in developing overall parameters of approvals. Several variables such as hardware, wall construction and application will affect the fire ratings. Individual manufacturer's listing will take precedence.

### Installation

Installation of all Steelcraft framing systems shall conform to the published Steelcraft installation instructions, ANSI/SDI A250.11 *Recommended Installation Instructions for Steel Frames and HMMA 840*. All fire rated frames must be installed in accordance with NFPA 80, and/or the Local AHJ.

## Smoke Barrier Doors and Frames

### **For use in cross corridor applications in healthcare occupancies**

Intertek labeling only, strictly limited to non-latching, cross corridor, double egress applications in healthcare occupancies, and the 2006, 2009 and 2012 versions of the International Building Code as well as the NFPA Life Safety Code (2012) all allow for this special smoke barrier door opening. Basic guidelines as follows:

- Non-latching, double-egress application – latching hardware is not permitted
- No flush doors, louvers or view preps
- Must be a glazed glass door, utilizing listed fire-rated glazing
- Bottom of the visible glass must be 43 inches max from the floor
- Requires the use of overlapping steel astragals
- Max opening size is 8 foot x 9 foot (L18 / L16), 8 foot by 8 foot (SL18)
- Fire-rated double egress (FE/DE) frame must be used
- Must be automatic-closing by smoke detection

Use of this application, and any requirements for gasketing, to be determined and approved by the local AHJ.

This page intentionally left blank.

# Performance and finishes

General information.....	318
Physical endurance .....	318
Cycle tests.....	318
Twist tests.....	319
Insulation factors.....	320
General information .....	320
Thermal tests .....	320
Thermal factors.....	320
Historical statement.....	320
Air infiltration .....	321
General information .....	321
Air infiltration testing .....	321
Terminology.....	321
Finishes .....	322
General Information.....	322
Steelcraft primers.....	322
GRAINTECH™ stain .....	323
Steelcraft finish paints.....	323
Field paint procedures.....	324
Air dry applications .....	324
Field baked-on finishes.....	324
Frame back coating .....	325

## General information

The use of product specifications does not always give a true comparison of the products that are used in today's market place. As an example, one manufacturer may use a different reinforcement in a product which is not included in the product specification. The reinforcement although superior in design and function may be deemed unacceptable using a product specification.

Established and recognized industry performance tests provide the truest method of comparing products. Performance test results give an accurate evaluation of the products being compared.

Manufacturers do not write performance tests. Industry associations, testing laboratories and standard associations write them. Included are:

- Underwriters Laboratories Inc (UL)
- Intertek Testing Services / Warnock Hersery (ITS/WHI)
- National Fire Protection Association (NFPA)
- American Society for Testing and Materials (ASTM)
- Steel Door Institute (SDI)
- Door and Hardware Institute (DHI)

In most cases after the performance test is written many people, groups and associations review the resulting performance specification before it becomes a recognized standard. As a result, the performance specification is accepted as the true measuring tool for products.

### Performance tests

The pages included in this section describe the tests that have been conducted on the various Steelcraft products. Copies of the test report are available upon request through Steelcraft distributors.

### Errors and omissions

Every effort has been made to insure the accuracy and completeness of the Steelcraft Spec Manual. This manual is for use by qualified persons only. The information herein is subject to some interpretation, and from time to time the Spec sheets will be updated whenever it is deemed necessary as new tests are conducted, new products are introduced and as specifications are revised. For these reasons and because of the nature and scope of the subject, the Steelcraft Manufacturing Company and its employees can assume no responsibility or liability for the absolute accuracy of the material contained herein or its use. The information in this Spec Manual is subject to change without notice and does not represent a commitment on the part of Steelcraft.

Please contact the Steelcraft Technical Service Department if you identify an error or an omission.

**Contact Information:** Phone: (877) 671-7011 E-Mail: [doors\\_frames\\_techprodsupport@allegion.com](mailto:doors_frames_techprodsupport@allegion.com)

## Physical endurance

### Cycle tests

Door strength and durability is determined by either ANSI A250.4 or SDI 131-10 Accelerated Physical Test Procedure for Steel Doors, Frames and Anchors (formerly ANSI A250.5 Accelerated Physical Endurance Test Procedure for Steel Doors, Frames and Frame Anchors). These performance standards include both cycle and twist test requirements. In both tests the door is subjected to stresses that exceed those found in typical applications. During and at the end of the test, the technician is looking for metal fatigue, weld breakage, panel separation, delaminating, reinforcement failure and any other failures that occur.

ANSI/SDI A250.8-20 14 "Recommended Specifications for Standard Steel Doors and Frames" specifies the minimum number of cycles for doors:

Door Gauge	Cycles Tested
20 gauge door	250,000 (Level C)
18 gauge door	500,000 (Level B)
16 and 14 gauge door	1,000,000 (Level A)

### ANSI A250.4

The door is mounted in a frame and is pushed to an open position of 60 degrees. The door is then closed using a conventional door closer.

**Cycle Test:** The cycle is repeated approximately 15 times per minute. The forces placed on the door in this test are determined by adjusting the closer speed.

**Twist Test:** At intervals prescribed by the test procedure, three corners of the door are clamped in place and a prescribed load applied to the fourth corner.

**Steelcraft doors tested in accordance with ANSI A250.4 for extended life cycle.**

Door Series	Cycles Tested	Frame Series
L18	5 million	MU16
L16	5 million	MU16
L14	3 million	F16
B18	3 million	F16
B16	3 million	F16
CE18	2 million	DW16

This test simulates a door in actual operation. Steelcraft's L Series door construction was successfully tested in accordance With ANSI/SDI A250.4 for 5,000,000 cycles and 103 twist tests conducted at specified intervals throughout the cycle test.

All tests are UL certified.

### SDI 131-10 (Previously ANSI A250.5)

The door is mounted in a test fixture and is rapidly cycled (opened and closed) by an air cylinder, or by an arm connected to an electric motor through a cam mechanism.

**Cycle Test:** The cycle is repeated a minimum of 60 cycles per minute. The closing forces applied to the door.

**Twist Test:** At test intervals prescribed by the test procedure, three corners of the door are clamped in place and the fourth corner is twist tested.

**Steelcraft doors tested in accordance with SDI 131-10 for extended life cycle.**

Door Series	Cycles Tested
L18	10 million
T18	250,000

This test simulates an actual door in operation. Steelcraft's L18 honeycomb core door was successfully tested in accordance with SDI 131-10 for 10,000,000 cycles and 21 twist tests conducted at different intervals throughout the cycle test.

**Products tested:** Door Model: L-18 3070

**Test Results:** After 10,000,000 cycles and 21 twist tests, the L-18 door demonstrated the following:

### Cycle Test:

1. Edge Condition: no visible signs of metal fatigue, cracking, or deformation along edges or channels
2. Hardware Preparations: no visible issues
3. Core condition: no notable issues
4. Panel condition: no de-lamination or weld damage

### Twist Test:

- Initial deflection at 300 lbs = .132"
- Initial residual deflection (0 lbs) = .002"
- After 10 million cycles max. deflection at 300 lbs = .528"
- After 10 million cycles residual deflection (0 lbs) = .0045"

### ANSI A 250.4



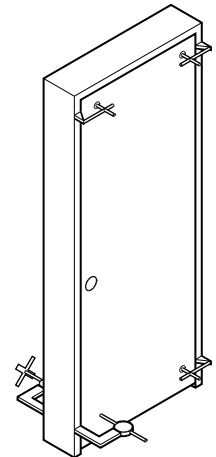
### Twist tests

The twist test evaluates the door structure and clearly establishes the strength of the bonding or welding of the core material to the panels and the connection of the panels. The twist test is a required part of both ANSI 250.4 and SDI 131-10.

The door is placed into a structural steel opening and clamped into place at three corners. The unclamped corner is subjected to a force applied in 30 pound increments until a total of 300 pounds of force is applied. The force is removed in the same 30 pound increments until all of the force is off the door.

Measurements are taken at each 30 pound increment and at the 300 pound force. Additional measurements are taken at every 30 pound increment as the force is being removed. Five minutes after the force has been removed, a final reading is taken. This is the residual deflection the door has taken.

ANSI A250.4 and SDI 131-10



Twist test fixture

### ANSI 250.4

Door opening	Cycles tested	Test standard	Average Deflection in test 300 lbs load, 1.25" max. See note #2	Residual Deflection at Completion of test (load removed), 0.125" max. See note #2	Total Number of twist tests conducted
L18	10 million	SDI 131-10	.033"	0.01"	.21
L16	5 million	ANSI 250.4	0.76"	0.05"	103
L14	5 million	ANSI 250.4	0.62"	0.03"	103
B18	3 million	ANSI 250.4	0.45"	0.01"	63
B16	3 million	ANSI 250.4	0.75"	0.06"	63
CE18	2 million	ANSI 250.4	1.02"	0.125"	43

### Notes:

1. All tests are UL certified
2. Maximum deflection shown is the pass/fail criteria in accordance with ANSI A250.4 and SDI 131-10.

## Insulation factors

### General information

Exterior doors are often used to block the transmission of temperature from one side to the other. Energy lost through a door opening is the result of both:

- **Thermal transmission**, through the door assembly, is stated as either the U-Factor or the R-Factor. These factors are covered on this page.
- **Air infiltration**, around the perimeter of the door, is stated as air leakage in CFM. This rating is covered on Page 2 of this sheet.

### Thermal tests

Doors are tested in accordance with ASTM C1363 and SDI 113. The door assembly (or door only) is subjected to heat with the amount of loss measured.

Honeycomb core doors provide insulation through the small air pockets created by the hexagonal cells. The insulation of the honeycomb core is far better than a solid core wood door, insulated glass and concrete block walls. Polystyrene and polyurethane core doors are recommended where extreme temperature variations are prevalent.

### Thermal factors

The following terms are used to describe thermal transmission through building products:

- **U-Factor:** Overall co-efficient of heat transmission passage through a built-up panel section. Technically, it is heat transmission in BTU per hour per square foot per degree Fahrenheit of temperature difference from air to air for a complete panel sectional (the lower the U-factor, the better the insulation).
- **R-Factor:** Thermal resistance is a measure of ability to retard heat flow. **R** is an expression of the total resistance to heat flow through a complete panel section or construction assembly. **R** represents a value of the thermal resistance, per hour per square foot of a typical panel section. **R** is the numerical reciprocal of the **U-factor** (the higher the **R**, the higher the insulating value).
- **K-Thermal:** Conductivity (**K**) is the amount of heat that passes through a homogenous material one inch thick and one square foot in area per hour. Values of **K** are expressed in BTU per hour (the lower the **K**, the higher the insulating value). The **K** unit is for a single component material one inch thick and one square foot in area. Therefore, it does not apply to a 1-3/4" thick door panel consisting of several materials. (Conductivity is not a method of measuring heat transmission through built up panels.)

Thermal performance test results per SDI 113-01			
Door series	Core	Tests per ASTM C1363 U-Factor	Tests per ASTM C1363 R-Factor
B18 Series	Steel Stiffeners	0.50	2.01
B16 Series	Steel Stiffeners	0.53	1.89
L18 Series	Honeycomb	0.56	1.80
L18 Series	Polystyrene	0.38	2.64
L18 Series	Polyurethane	0.36	2.81
L16 Series	Honeycomb	0.57	1.74
L16 Series	Polystyrene	0.39	2.54
L16 Series	Polyurethane	0.38	2.67
CE18 Series	Polystyrene	0.41	2.44
H16 Series	Honeycomb	0.60	1.67
H16 Series	Polystyrene	0.42	2.36
A14 Series	Honeycomb	0.78	1.28

**Note:** Corrected to ASHRAE winter design with 15 mph wind outside, still air inside.

### Historical statement

Historically, SDI 113 required thermal transmission testing in accordance with ASTM C236-89(1993) "Standard Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box". In 2001 ASTM C236-89(1993) was withdrawn as an ASTM standard. SDI 113-01 was subsequently revised to require testing in accordance with ASTM C1363-05 "Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus". This change in test methods results in significant changes in performance values which are not comparable between the current standard ASTM C1363 and the old standard ASTM C236. Architectural specifications must be carefully reviewed for compliance with the appropriate standard.



# Air infiltration

## General information

Air infiltration is one of the major factors in energy loss in a building. Poorly weather-stripped doors will lose far more heat and/or air conditioning due to infiltration of outside air than those from transmission through the door.

## Air infiltration testing

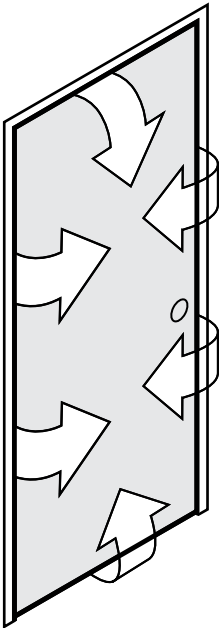
Tests were conducted in accordance with ASTM E 283-04 to determine the air infiltration rate of a door and frame with and without weather stripping and door bottoms.

## Terminology

The following terms are used to describe air infiltration around a door opening:

- CFM = Cubic Feet per Minute
- Air infiltration: a measurement of the air leakage around the perimeter of a door opening.

Air infiltration test results per ASTM E 283-04							
Door opening	Door series	Frame series	Tested door opening	Air Infiltration (cfm/sq.ft)	Weather stripping		
					Gasket	Door bottom	Astragal
Single Swing	L, H, B, CE	F, MU	4'0" x 8'0"	0.64	PS074	FAS-SEAL™	N/A
Double Swing	L, H, B, CE	F, MU	8'0" x 8'0"	0.34	PS074	FAS-SEAL™	Z Astragal



## Finishes

### General Information

Commercial steel frames and doors are designed to meet the requirements of ANSI/SDI A250.8-2014 (R2008) (previously known as SDI 100), and must receive a factory applied primer. The applied primer must be tested and meet the passing criteria of ANSI A250.10-2011 *Test Procedure and Acceptance Criteria for Prime Painted Steel Doors and Frames*.

### Factory pre-treatment (surface preparation) prior to prime paint

Steel must be thoroughly cleaned and treated (phosphatized [also known as bonderize]) and a rust inhibiting primer applied. After fabrication the door panels or frame members are washed and de-greased through an automatic washing system. Phosphatizing is one of steps in this pretreatment process.

### Phosphatizing

Phosphatizing makes it possible for paint to give the maximum protection to metal. There are two basic functions of phosphatizing:

1. Phosphatizing etches the metal and thereby provides an effective anchor for the paint. Bare metal surfaces allow only the minimum of paint adhesion. Phosphatized metal surface have an affinity for paint and keeps the paint from lifting off or peeling.
2. The phosphate coating is non-metallic and acts to keep out any moisture which might break the paint film and reach the base metal.

A scratch on untreated metal breaks through the paint and allows rust to work back from the scratch and lifts the paint off. Phosphatizing prevents the creep of rust and restricts the damage to the scratch itself.

When phosphatized metal is combined with Steelcraft's top quality baked-on, rust-inhibiting, prime paint, the maximum protection against rust has been achieved.

### Steelcraft primers

All Steelcraft Frames, Doors and Architectural Stick components shall be cleaned, phosphatized and finished standard with one coat of factory baked-on, rust-inhibited primer in accordance with ANSI A250.10-2011 *Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames*.

Omit prime paint is available for Steelcraft doors as cold rolled or galvanized material. Frames must be primed from Blue Ash, OH, but can be omit prime paint from Chino, CA as galvanized material only. Doors and frames without prime paint from the factory will limit the manufacturer's warranty.

### Primer paint testing

The industry standard ANSI A250.10-2011 *Test Procedure and Acceptance Criteria for Prime Painted Steel Doors and Frames* is comprised of the following paint surface tests:

- Salt spray testing in accordance with ASTM B117-09.
- Condensation testing (humidity) in accordance with ASTM D4585-99.
- Impact test in accordance with ASTM D2794-93 (2010)e1.
- Film adhesion test in accordance with ASTM D3359-09e2.

### Primer test results

Steelcraft factory applied baked-on primers conform to the industry standard ANSI A250.10-1998 with the following performance:

Test	Standard	Hours	Results
Salt Spray	ASTM B117-09	120	Passed
Condensation	ASTM D4585-99	480	Passed
Impact Test	Gardner Direct 20 in. lbs. with 1/2" ball	N.A.	Passed
Adhesion	ASTM D3359-09e2	N.A.	See Note 1

### Notes:

1. 4B adhesion, which exceeds the test acceptance level of 3B.
2. Test procedure ANSI A250.10 is for factory primed steel doors and frames. To insure integrity of the prime painted coating, jobsite storage must be in accordance with sections 2 and 3 of this manual, ANSI/SDI A250.10 and HMMA 840.
3. Test procedure ANSI A250.10 is a performance standard for the factory prime applied to steel doors and frames. Film thickness of the primer is not mandated by this standard.

**GRAINTECH™ stain**

All doors and frames shall be cleaned, phosphatized and prime painted with one coat of baked-on prime paint capable of accepting an oil-based stain.

The door shall be stained to simulate a ([specify one] Ash, Birch, Mahogany, Maple, Oak or Walnut) wood door. The finished stained product shall be protected with a clear top coat incorporating UV inhibitors. After finishing, the door shall be placed in a polybag and adequately wrapped to eliminate marring the surface finish during shipment and installation.

The frame shall be field-stained to match the door after installation. The finished stained product shall be protected with a clear top coat incorporating UV inhibitors. Embossed (CE) doors shall be field stained to match the color selected. The finished product shall be protected with a clear top coat incorporating UV inhibitors.

**GRAINTECH™ stain testing**

The industry standard ANSI A250.3-2007 (R2011) *Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Doors and Frames* is comprised of the following paint surface tests:

- Salt spray testing in accordance with ASTM B117-03
- Condensation testing (humidity) in accordance with ASTM D4585-99
- Impact test ASTM D2794-93 (2004)
- Film adhesion test in accordance with ASTM D3359-02

**GRAINTECH™ stain test results**

Steelcraft factory applied baked-on finishes conform to the industry standard ANSI A250.3 with the following performance:

Test	Standard	Hours	Results
Salt Spray	ASTM B117-03	120	Passed
Condensation	ASTM D4585-99	480	Passed
Impact Test	ASTM D27 94-93 (2004)	N.A.	Passed
Adhesion	ASTM D3359-02	N.A.	N.A.

**GRAINTECH™ colors chart**

Colors may vary based on your monitor, printer, and settings. Request a physical GRAINTECH™ swatch for color matching.

Custom colors are available.



Birch



Ash



Oak



Maple



Mahogany



Walnut

**Steelcraft finish paints**

All Steelcraft Doors are available as optional factory finish products. These products are cleaned, phosphatized and finished with a factory baked-on, rust-inhibitive finish paint in accordance with ANSI/SDIA250.3-2007 (R2011) *Test Procedure and Acceptance Criteria for Factory Applied Finish Steel Surfaces for Steel Doors and Frames*.

- Gloss shall be 20°+/-5°F in accordance with ASTM Method Test D523
- See Steelcraft Literature Downloads to reference the 16 available standard colors <http://us.allegion.com/IRSTDocs/DataSheet/105175.pdf>
- Special colors are available upon request
- Available for all door series and all standard door heights (see Steelcraft Price Manual)
- Available in CRS and Galvanealed A-60 Steel
- Frames not available with factory finish paint

**Finish paint testing**

The industry standard ANSI A250.3-2007 (R2011) *Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Doors and Frames* is comprised of the following paint surface tests:

- Salt spray testing in accordance with ASTM B117-03
- Condensation testing (humidity) in accordance with ASTM D4585-99
- Impact test ASTM D2794-93 (2004)
- Film adhesion test in accordance with ASTM D3359-02

**Finish paint test results**

Steelcraft factory applied baked-on finishes conform to the industry standard ANSI A250.3 with the following performance:

Test	Standard	Hours	Results
Salt Spray	ASTM B117-03	120	Passed
Condensation	ASTM D4585-99	480	Passed
Impact Test	ASTM D27 94-93 (2004)	N.A.	Passed
Adhesion	ASTM D3359-02	N.A.	N.A.

### Field paint procedures

Steelcraft frames and doors are furnished with a high grade, low gloss, baked-on prime paint that provides the best possible protection against corrosion, abrasion and weather, and is an excellent base for finish paint.

This is a primer and requires field finishing. If the primed surface is removed or damaged, the exposed metal must be reprimed with a suitable rust inhibitive primer before top coating with a latex finish paint.

The application of the paint, using either a brush, roller or spray equipment, shall be in accordance with the paint manufacturer's recommendations. If spray equipment is used, consult with the paint supplier on recommendations for correct thinner or solvents. Do not use lacquer thinner or other solvents that may react on the primer coat.

### Products

These field painting procedures apply to ALL Steelcraft products.

### Air dry applications

To obtain the best results, use the following procedures:

1. Avoid painting in extremely cold or damp weather. Suggested temperature range 50°F to 90°F.
2. Sand door and frame surfaces lightly with No. 300 or 320 emery cloth or steel wool.
3. Clean door and frame surfaces using a mild solvent such as mineral spirits or a mild citrus cleaner. **Do not use strong cleaning agents, acids or lacquer thinner.**
4. Dry door and frame surfaces. **Do not use oiled or tack rags to dry door and frame surfaces.**
5. Apply finish paint following manufacturer's recommendations.

#### Notes:

1. Latex paints may require, depending on atmospheric conditions, up to 30 days before the paint is fully cured.
2. To avoid rusting with latex topcoat paints, it is recommended to sand and re-prime with a rust inhibitive primer any areas where the factory applied primer has been removed or scratched through.
3. **THE USE OF HIGH GLOSS PAINT IS NOT RECOMMENDED ON B SERIES.** All internal steel stiffeners are welded to both face sheets. High gloss paint accentuates the visibility of all welds.
4. Steelcraft hollow metal doors and frames are factory painted providing finish integrity in accordance with test procedures ANSI A250.10 or ANSI A250.3. Jobsite storage and handling is critical. To insure integrity of the prime painted coating, jobsite storage must be in accordance with sections 2 and 3 of this manual, ANSI/SDI A250.10 and HMMA 840.

### Field baked-on finishes

To obtain the best results, use the following procedures:

1. Avoid painting in extremely cold or damp weather. Suggested temperature range 50°F to 90°F.
2. Sand door surfaces lightly with No. 300 or 320 emery cloth or steel wool.
3. Clean door surfaces using a mild solvent such as mineral spirits or a mild citrus cleaner. **Do not use strong cleaning agents, acids or lacquer thinner.**
4. Dry door surfaces. **Do not use oiled or tack rags to dry door surfaces.**
5. Apply finish paint following manufacturer's recommendations.
6. Bake frames and doors as specified by paint manufacturer and outlined below:

Oven Temperatures:	
<b>Frames</b>	300° F Or as specified by paint manufacturer
<b>Doors</b>	
L (honeycomb), T, B, SL, and A14 Series	300° F
L (polyurethane), L, and SL (polystyrene)	160° F
CE doors	160° F

## Frame back coating

### (bituminous alternative) certification and benefits

Steelcraft Frame Back Coating is UL certified up to 3-hours in fire rated masonry applications. The back coating is to be applied by distributors in their shop or in the field for the purpose of creating a secondary barrier to resist corrosion from moisture on the interior of frames (frame throats) prior to grouting masonry frames.

We offer this coating in an aerosol spray can as well as (1) one-gallon and (5) five gallon pails which can be applied by spraying or brushing.

Steelcraft's Frame Back Coating is a bituminous alternative. It is a specially formulated, modified asphaltic emulsion with significant advantages over traditional bituminous coatings which can be hazardous, difficult to apply and messy.

Benefits include the following:

- Non-flammable (UL certified up to 3-hours in fire-rated masonry applications)
- Virtually odorless
- VOC & HAPS Free
- Waterborne Safe
- Dries Quickly
- Excellent Adhesion
- Sprayable
- Won't easily rub off

### Technical information

- Composition: Waterborne Asphaltic Emulsion Coating (bituminous alternative)
- Solids: 57-63%
- Finish: Black, semi-gloss
- Flash Point: None (flash point is the lowest temperature at which the emulsion can vaporize to for an ignitable mixture in the air)
- Shelf life: 12 months
- Storage: Suggested Storage temperature 50°F to 130°F. **DO NOT ALLOW BACK COATING EMULSION TO FREEZE.**
- Odor: Minimal
- VOCs: None
- HAPS: None
- US DOT: Not Regulated Usage

A quality corrosion-resistant coating should be applied.

### Usage

A quality corrosion-resistant coating should be applied to the interior of metal frames (frame throats) in circumstances where moisture might enter the frame, causing degradation of the frame. This is a particularly good practice when grouting frames with mortar in masonry applications. (Note grouting frames in drywall applications and using plaster-based grout is not recommended.)

Some of the common circumstances for grouting are listed here:

- Stability for heavy or frequent usage
- Security to deter break-ins where the frame might be compromised

- Sound deadening
- To increase frame anchorage strength

Industry guidelines recommend that the installer be responsible for grouting and any barrier coating required.

### Air dry application instructions

To obtain the best results, use the following information:

1. Steelcraft factory applied primer should be in place (see page 358). Reapply as needed. Be sure primer is dry before applying back coating (normally 15-30 minutes for water-based primers in ambient conditions); Use the thumb test (put full weight behind thumb against surface and twist 90°).
2. Avoid applying back coating in extremely cold or damp weather: suggested temperature range is 50°F to 90°F. Best practice is to allow back coating and frame to warm to room temperature before applying. Agitate (shake/stir) prior to use. Water may be added to thin as needed, but care must be taken as this may change dry times, DFT (dry film thickness) and/or ability of coating to provide the proper corrosion resistance.
3. No scuffing is recommended when applying back coating over Steelcraft Primer.
4. Make sure the Surface is clean, dry and free of grease, rust and wax. Do not use strong cleaning agents, acids or lacquer thinner. Do not use oiled or tack rags to dry frame surfaces.
5. Mask off or protect areas from overspray, if necessary.
6. Apply frame back coating by spraying or brushing.
7. At installation, it is recommended to touch up areas of the frame with Steelcraft Primer and Back Coating in order to cover any bare metal on the inside of the frame to avoid corrosion. Reference (1) above.
8. Recommended application of coating is to spray or brush at 5-6 mils WFT (wet film thickness) for a cure to 3 mils DFT (dry film thickness). A minimum 2.5 mil DFT should be held to avoid performance issues and a maximum 5 mil DFT to avoid sagging. Results may vary depending upon specific application and conditions.
9. Allow to dry to touch/non tacky (10 minutes in ambient conditions) before applying a second coat, if necessary.
10. See product packaging for further recommendations. Technical support can be reached at 877-671-7011, option 2, then option 5.

**Note:** Information, recommendations and suggestions provided on this page may differ based on specific material, conditions and other variables.

This page intentionally left blank.

# Architectural

Specifications .....	328
General information .....	328
Types of specifications.....	328
Section 08110 steel doors and frames .....	329
Part 1: General .....	329
Part 2: Products .....	331
Part 3: Execution .....	335
SDI selection and usage guide.....	336
Door construction and design .....	337
Cores.....	339
Wall construction .....	340
F, FN, MU, FE, and DE Series flush frames.....	340
DW and K Series drywall frames.....	341
Green buildings construction: LEED certification.....	342
LEED program compliance: U.S. Green building council	
LEED-NC rating system version 2.2 Statement .....	342
U.S. Green building council: LEED-NC rating system version	
2.2 Statement.....	342

## Specifications

### General information

Steelcraft doors, frames and stick systems are subject to compliance with specifications and information published by architects, specification writers, industry associations and regulatory agencies. Compliance with the architect's plans and specifications is expected, however, the accuracy, content and structure of the specification are critical to insure that the product construction and expected performance levels are achieved.



Utmost experience and care should be taken in the preparation and submission of Architectural Specifications, to ensure that the proper product construction and performance is supplied to the purchaser. Privately written material specifications sometimes combine selective attributes and performance levels of various products. In the end, an improperly prepared Hollow Metal Specification may compromise the intended products' construction and performance, and possibly compromise the integrity, and complicate the enforcement of the specifications and required products.

This section of the Technical Manual has been compiled to help understand the content and intent of the specifications used with the Steelcraft Steel Doors and Frames.

### Types of specifications

The published specifications most commonly used in the Door and Hardware Industry fall into four broad categories:

- **Architectural specifications:**

- These specifications are prepared by specification writers and published by individual architectural firms. These specifications are based on either historical preference or an Architectural and Industry Association such as the Construction Specification Institute (CSI), the Steel Door Institute (SDI) or the National Association of Metal Manufacturers (NAAMM).
- A Steelcraft reference guide specification, in the CSI format, can be found in this manual starting on the next page.

- **Manufacturer's specifications:**

- These specifications are published by the manufacturer of a product. The product's construction and performance levels are documented through tests conducted either privately or independently.
- Steelcraft product specifications are found in this manual starting on the next page.

- **Industry/Trade association specifications:**

- (Reference Standard) These specifications are developed and published by Industry Associations as a result of the input of all member companies.
- Steelcraft conforms to specification ANSI A 250.8-2014, published by the Steel Door Institute (SDI).

- **Performance and material specifications:**

- These specifications will specify required results and will describe product life cycles with focus on the design criteria, assembly and performance of the components used in door and frame products, such as steel and paint.



## Section 08110 steel doors and frames

### Part 1: General

#### 1.01 Section includes

- A. Steel doors
- B. Steel frames
- C. Steel architectural stick systems

#### 1.02 Related sections

- A. Section 08210: Wood Doors
- B. Section 08220: Plastic Doors
- C. Section 08710: Door Hardware
- D. Section 08800: Glazing
- E. Section 09900: Paints and Coatings
- F. Section 13710: Intrusion Detection: Security system
- G. Section 13800: Building Automation and Control: Building monitoring system
- H. Section 16123: Building Wire and Cable: Power supply to electric hardware devices

#### 1.03 References

It is the intent of this specification that all hollow metal and its application will comply or exceed the standards as listed. The latest published edition of each reference applies.

##### A. **ASTM:** American Society for Testing and Materials

- 1. **ASTM A 653/A 653M:** Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- 2. **ASTM A 924:** Specification for General Requirements for Steel Sheet, Metallic Coated by the Hot Dip Process.
- 3. **ASTM A 1008/A 1008M:** Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, High Strength Low-Alloy, High Strength Low Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
- 4. **ASTM E 90:** Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
- 5. **ASTM E 413:** Classification for Rating Sound Insulation.
- 6. **ASTM C1363:** Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of Hot Box Apparatus.

##### B. **ANSI:** American National Standards Institute

- 1. **ANSI/DHI A 115:** Specifications for Hardware Preparations in Standard Steel Doors and Frames.
- 2. **ANSI A156.7:** Hinge Template Dimensions.
- 3. **ANSI A 250.3: Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames.**
- 4. **ANSI A250.4: Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcing.**
- 5. **ANSI A 250.8: SDI-100 Recommended Specifications for Standard Steel Doors and Frames.**
- 6. **ANSI A 250.10: Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.**
- 7. **ANSI/SDI 250.11:** Recommended Erection Instructions for Steel Frames
- 8. **ANSI/DHI A 115.IG:** Installation Guide for Doors and Hardware.

##### C. **SDI:** Steel Door Institute

- 1. **SDI 105:** Recommended Erection Instructions for Steel frames.
- 2. **SDI 111:** Recommended Details and Guidelines for Standard Steel Doors and Frames and Accessories.
- 3. **SDI 111-H:** High Frequency Hinge Preparation
- 4. **SDI 112:** Zinc-Coated (Galvanized/Galvannealed) Standard Steel Doors and Frames.
- 5. **SDI 117:** Manufacturing Tolerances for Standard Steel Doors and Frames.
- 6. **SDI 118:** Basic Fire Door Requirements.
- 7. **SDI 122:** Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
- 8. **SDI 124:** Maintenance of Standard Steel Doors and Frames.

##### D. **NAAMM/HMMA:** Hollow Metal Manufacturers Association

1. **HMMA 840:** Guide Specification for Installation and Storage of Hollow Metal Doors and Frames
2. **HMMA 820 TN01-03:** Grouting Hollow Metal Frames

---

**Spec Writer's Note:** Delete the standards which are not applicable to your area.

---

E. Building Code references

1. **NFPA 80:** Standard for Fire Doors and Other Opening Protectives.
2. **NFPA 105:** Standard for the Installation of Smoke Door Assemblies and Other Opening Protectives
3. **NFPA 252:** Standard Method of Fire Tests of Door Assemblies
4. **ANSI/UL 10C:** Standard for Safety for Positive Pressure Fire Tests of Door Assemblies
5. **UL 1784:** Air Leakage Tests of Door Assemblies
6. **UL:** Building Materials Directory; Underwriters Laboratories Inc.
7. **WH:** Certification Listings; Warnock Hersey International Inc.
8. **Federal Emergency Management Agency (FEMA)** 361 Guidelines
9. **Miami–Dade County** test protocols PA 201, PA 202 and PA 203.
10. **Florida Building Code** test protocols TAS 201, TAS 202 and TAS 203

**1.04 Requirements of regulatory agencies**

- A. Doors and frames to conform to applicable codes for fire ratings. It is the intent of this specification that all hardware and its application comply or exceed the standards for labeled openings. In case of conflict between types required for fire protection, furnish type required by NFPA and UL.
1. Interior vertical stairwell doors will carry a minimum 250°F (121°C) temperature rise rating in addition to the required fire rating.

**1.05 Submittals**

- A. Submit for review six (6) complete copies of the hollow metal shop drawings covering complete identification of items required for the project. Include manufacturer's names and identification of product. Included six (6) complete copies of catalog cuts and/or technical data sheets and any other data as may be required to show compliance with these specifications.
1. The data on the Shop Drawing will be complete with respect to quantities, dimensions, specified performance, and design criteria, materials and similar data to enable the Architect to review the information as required.
- B. Indicate frames configuration, anchor types and spacing, location of cutouts for hardware, reinforcement, to ensure doors and frames are properly prepared and coordinated to receive hardware.
- C. Indicate door elevations, internal reinforcement, closure method, and cutouts for glass lights and louvers.
- D. Submit manufacturer's installation instructions, including a copy of ANSI A250.11-2012 as part of the shop drawing submittal.
- E. Shop drawings, product data, and samples to bear the Contractor's stamp verifying they have been coordinated and reviewed for completeness and compliance with the contract documents.
- F. Shop drawings submitted without the above requirements will be considered incomplete, will NOT be reviewed, and will be returned directly to the Contractor.
- G. Follow the same procedures for re-submittal as the initial submittal with the appropriate dates revised.

**1.06 Quality assurance**

- A. Select a qualified hollow metal distributor, who is a direct account of the manufacturer of the products furnished. In addition that distributor must have in their regular employment an Architectural Hardware Consultant (AHC), a Certified Door Consultant (CDC) or an Architectural Openings Consultant (AOC), who will be available to consult with the Architect and Contractor regarding any matters affecting the door and frame opening.
- B. Furnish materials and work performed in conformity with the contract documents.
- C. Conform to requirements of the above reference standards. Submit test reports upon request by the Owner or Architect.
- D. Underwriters' Laboratories and Warnock Hersey, labeled fire doors and frames:
1. Label fire doors and frames listed in accordance with Underwriters Laboratories standard UL10C, Positive Pressure Fire Tests of Door Assemblies and Uniform Building Code Standard 7-2, Fire Tests of Door Assemblies.
  2. Construct and install doors and frames to comply with current issue of ANSI/NFPA 80.
  3. Manufacture Underwriters' Laboratories labeled doors and frames under the UL factory inspection program and in strict compliance to UL procedures, and provide the degree of fire protection, heat transmission and panic loading capability indicated by the opening class.
  4. Manufacture Warnock Hersey labeled doors and frames to meet the specific requirements of that labeling agency's current procedure for the tested hourly rating designated and inspected by representatives of the labeling agency.

5. Affixed physical label or approved marking to fire doors and/or fire door frames, at an authorized facility as evidence of compliance with procedures of the labeling agency. Label embossment is not permitted.
6. Conform to applicable codes for fire ratings. It is the intent of this specification that hardware and its application comply or exceed the standards for labeled openings. In case of conflict between types required for fire protection, furnish type required by NFPA and UL.
7. Fire door assemblies in exit enclosures and exit passageways must have a maximum transmitted temperature end point of not more than 250°F (121°C) above ambient at the end of 30 minutes of the standard fire test exposure.

---

**Spec Writer's Note:** Choose the appropriate Severe Storm Products where applicable. Delete this section if not applicable.

---

**E. Severe Storm Products:**

1. **Tornado Doors:** Door, Frame, Hardware and Accessory Systems for Federal Emergency Management Agency (FEMA) community shelters and other areas of refuge to resist the design wind pressures and missile impact loads as detailed in Design and Construction Guidance for Community Safe Rooms - FEMA 361. Door and Frame Systems shall also be listed in compliance with ANSI / ICC500-2014 - Standard for the Design and Construction of Storm Shelters.
2. **Hurricane Doors:** Door systems required to comply with the Miami-Dade County Product Control Approval System or the Florida Building Code Approval System meeting the requirements of Miami-Dade County test protocols PA 201, PA 202, PA 203 and Florida Building Code test protocols TAS 201, TAS 202 and TAS 203.

**F. Manufacturer Qualifications:** Member of the Steel Door Institute.

**g. Installer:** Minimum five years documented experience installing products specified in this Section.

**1.07 Delivery, storage, and handling**

**A. Storage of Doors**

1. Store doors vertically in a dry area, under proper cover. Place the units on at least 4" high wood sills on floors in a manner that will prevent rust and damage. Avoid use of non-vented plastic or canvas shelters, which create a humidity chamber and promote rusting. If the door becomes wet, or moisture appears, remove any protective wrapping immediately. Provide a 4" space between the doors to permit air circulation. Proper storage is required to meet the requirements of ANSI/SDI A250.10 and HMMA 840.

**B. Storage of Frames**

1. Store frames in an upright position with heads uppermost under cover on 4" wood sills on floors in a manner that will prevent rust and damage. Do not use non-vented plastic or canvas shelters, which create a humidity chamber and promote rusting. Store assembled frames in a vertical position, five units maximum in a stack. Provide a 2" space between frames to permit air circulation.
2. Provide proper storage for doors and frames, to maintain the quality and integrity of the factory applied paint, and maintain the requirements of ANSI/SDI A250.10 and HMMA 840.
3. Sand, touch up and clean prime painted surfaces prior to finish painting in accordance with the manufacturer's instructions.

**1.08 Coordination**

- c. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal cutouts and reinforcement for door hardware, electric devices and recessed items.
4. Coordinate work with frame opening construction, door and hardware installation.
5. Sequence installation to accommodate required door hardware.
6. Verify field dimensions for factory assembled frames prior to fabrication.

**Part 2: Products**

**2.01 Doors**

A. Construct exterior/interior doors to the designs and gauges as specified:

---

**Spec Writer's Note:** Choose one of the appropriate steel thickness and type.

---

1. Exterior Doors: Hot-dip galvanized steel, ASTM A 653, Class A60, 18 gauge [0.042" (1 mm)], 16 gauge [0.053" (1.3 mm)] or 4 gauge [0.067" (1.7 mm)] hot dipped galvanized steel, with closed tops.
  - a. Include galvanized components and internal reinforcements with galvanized doors.
  - b. Close tops of exterior swing-out doors to eliminate moisture penetration. Galvanized steel top caps are permitted.
2. Interior Doors: Cold rolled steel, A 1008, 20 gauge [0.032" (.8 mm)], 18 gauge [0.042" (1 mm)], or 16 gauge [0.053" (1.3 mm)] cold rolled or galvanized steel.
  - a. Include galvanized components and internal reinforcements with galvanized doors.

---

**Spec Writer's Note:** GRAINTECH™ and finish paint are finish options. Delete these options when not applicable.

---

3. GRAINTECH™ factory finished doors indicated on door schedule as HMGT.
4. Factory prime painted doors indicated on door schedule as HM.
5. Hardware Reinforcements:
  - a. Hinge reinforcements for full mortise hinges: minimum 7 gauge [0.180" (4.7 mm)].
  - b. Lock reinforcements: minimum 16 gauge [0.053" (1.3 mm)].
  - c. Closer reinforcements: minimum 14 gauge [0.067" (1.7 mm)], 20" long.
  - d. Galvannealed doors include galvanized hardware reinforcements.
  - e. Projection welded hinge and lock reinforcements to the edge of the door.
  - f. Provided adequate reinforcements for other hardware as required.

**B. Full Flush Type Doors Construction**

1. Doors construction conforming to ANSI-A250.4 criteria and tested to 5,000,000 operating cycles.
2. Approved door core constructions:

---

**Spec Writer's Note:** Choose one of the appropriate door core types.

---

- a. **Honeycomb:** Reinforced, stiffened, sound deadened and insulated with impregnated Kraft honeycomb core completely filling the inside of the doors and laminated to inside faces of both panels using contact adhesive applied to both panels and honeycomb core.
- b. **Polystyrene:** Reinforced, stiffened, sound deadened and insulated with a rigid polystyrene core bonded to the inside faces of both panels with contact adhesive. All Polystyrene doors are full width and height polystyrene core filled.
- c. **Steel Stiffened:** Vertically steel stiffeners and sound deadened with fiberglass batt insulation. Fabricate hat shaped stiffeners from 20 gauge [0.026" (0.6 mm)] steel. Vertical interior webs located 6" (152 mm) apart, welded to the inside of one face sheet and bonded to opposite face at 5" (127 mm) on center. Fill areas between stiffeners with fiberglass.
- d. **Temperature Rise Doors:** Mineral fiber core material to comply with the 250° F (121° C) maximum temperature rise rating.

---

**Spec Writer's Note:** GRAINTECH™ is a finish options. Delete this section when not applicable.

---

- e. GRAINTECH™ **Doors:** Fabricated from steel that has an embossed wood grain pattern extending the full height and width of the door. Provide doors with continuous vertical mechanical inter-locking joints at lock and hinge edges with visible edge seams. The wood grain embossment minimum .005" deep. The wood grain face sheets must be cleaned, phosphatized and prime painted with a stain absorbing primer. Vertical edges must be stained using conventional stains to achieve a (select 1) [ash, birch, mahogany, maple, oak, walnut,] color. After staining, the door must be clear coated with UV inhibitors. Applied grain pattern or material will not be permitted.
3. **Vertical edge seams:** Provide doors with continuous vertical mechanical inter-locking joints at lock and hinge edges with visible edge seams, or a one piece full height 14 gauge channel. Apply a continuous bead of structural epoxy in the internal vertical connection.

---

**Spec Writer's Note:** Choose one of the appropriate door edges.

---

**Edges seam options:**

- a. **Filled Vertical Edges (F):** Continuous vertical mechanical interlocking joint with internal epoxy seal; edge seams filled with structural adhesive and ground smooth.
- b. **Welded Vertical Edges (W):** Continuous vertical mechanical interlocking joint; edge seams welded, filled with structural adhesive, and ground smooth.
4. Bevel hinge and lock door edges 1/8 inch (3 mm) in 2 inches (50 mm). Square edges on hinge and/or lock stiles are not acceptable.
5. Reinforce top and bottom of doors with galvannealed 14 gauge, welded to both panels.

---

**Spec Writer's Note:** Choose the appropriate Severe Storm Products where applicable. Delete this section when not applicable.

---

**C. Tornado Door, Frame, Hardware and Accessory Systems must comply with Federal Emergency Management Agency (FEMA) 361 Guidelines and provides the highest level of security and safety for tornado shelters and severe storm areas of refuge. Door Systems shall also be listed in compliance with ANSI / ICC500-2014 - Standard for the Design and Construction of Storm Shelters.**

1. Face sheets: 14 gauge [0.067" (1.7 mm)] hot-dipped galvannealed steel having an A60 zinc-iron alloy coating conforming to ASTM designations A653 and A924.
2. Hinge and lock edges: include continuous vertical mechanical joints with edge seams welded, filled and ground smooth.

3. Bevel all hinge and lock door edges  $\frac{1}{8}$  inch (3 mm) in 2 inches (50 mm). Square edges on hinge and/or lock stiles are not acceptable
  4. Galvannealed 14 gauge [0.067" (1.7 mm)] top and bottom steel reinforcement channels projection welded to both face sheets on 4 inches (102 mm) centers.
  5. **Hinge reinforcements:** minimum 7 gauge [0.167" (4.4 mm)] galvanized steel, projection welded to the edge of the door.
  6. Reinforce door faces with vertical stiffeners manufactured from steel conforming to ASTM A653 and A924 and welded to each face sheet.
  7. Reinforce lock stiles with full-height 12 gauge [0.093" (2.5 mm)] channels.
  8. **Fire Rated doors:** Provide door units bearing Labels for fire ratings required in locations indicated.
- D. **Hurricane Doors:** Designed to resist the cyclic pressures, static pressures and missile impact loads as detailed in the Miami-Dade County Product Control Approval System of the Florida Building Code Approval System and meets the requirements of Miami-Dade County test protocols PA 201, PA 202, PA 203 and Florida Building Code test protocols TAS 201, TAS 202 and TAS 203.
- E. **Electrical Requirements:**
1. **General:** Coordinate electrical requirements for doors and frames. Make provisions for installation of electrical items arranged so that wiring can be readily removed and replaced.
  2. **Doors with Electric Hinges:**
    - a. **General:** Furnish conduit raceway to permit wiring from electric door hardware.
    - b. **Hinge Locations:** Provide electric hinge at intermediate or center location. Top or bottom electric hinge locations are not acceptable.
    - c. Refer to 08710 for electrified hardware items.

## 2.02 Door frames

- A. Construct exterior and metal door frames to the profiles, designs and gauges as specified.

---

**Spec Writer's Note:** Choose one of the appropriate steel thickness and type.

---

1. **Exterior Frames:** Hot-dip galvannealed steel, ASTM A 653, Class A60, 16 gauge [0.053" (1.3 mm)] or 14 gauge [0.067" (1.7 mm)] hot dipped galvannealed steel.
    - a. Include galvannealed components and internal reinforcements with galvannealed frames.
  2. **Interior Frames in Masonry:** 16 gauge [0.053" (1.3 mm)] cold rolled or galvannealed steel.
    - a. Include galvannealed components and internal reinforcements with galvannealed.
  3. **Interior Frames in Drywall:** 16 gauge [0.053" (1.3 mm)] cold rolled frames.
- B. **Flush Frames:** knocked down for field assembly or set-up and arc-welded with temporary shipping bars. Factory die-mitered corner connections reinforced with four integral tabs to secure and interlock at jambs to head. Unless otherwise indicated, frame will have 2" faces and  $\frac{3}{8}$ " stops. Frame depths per the architectural door schedule
1. Provide frames with a minimum of six wall anchors and two adjustable base anchors of manufacturer's standard design.
- C. **Drywall Frames:** same as flush frames, 16 gauge except:
1. Form frames with double return backbends to prevent cutting into drywall surface. Design knock down frames to be securely installed in the rough opening after wallboard is applied.
    - a. **Drywall frames:** knocked down for field assembly. Factory die-mitered corner connections reinforced at miters, including soffit tabs to secure and interlock at jambs to head
  2. Locate adjustable anchors in each jamb 4" from the top of the door opening to hold frame in rigid alignment.
    - a. Provide security anchor at strike jambs on all frames 7' 6" high and over.
  3. **Base anchor options:**

---

**Spec Writer's Note:** Choose one of the appropriate base anchoring systems.

---

- a. Weld-in base anchor attaching plate in each jamb for field installation of loose base anchors to allow proper anchoring at base of frame.
  - b. Dimpled holes and face screw application.
- D. **Thermal Break Frames:** Provide true thermally-broken hollow metal frames in accordance with ASTM C1363.
1. Provide in either 14 gauge or 16 gauge galvannealed steel.
  - b. Door and non-door side of frame shall not be bridged by thermally conductive materials, including steel anchors, reinforcements, hardware, or concrete (no grouted frames).
  - c. Jamb and Head components shall be factory assembled, with 3-sided frames supplied KD or Factory welded.

- d. Use with thermal break threshold for external openings.
- E. Prepare all frames to receive inserted type door silencers (3) per strike jamb on single doors, and (2) per head for pair of doors. Stick on silencers are not permitted.
- F. **Frame Hardware Reinforcements:**
  - 1. Mortise hinge reinforcement: minimum 7 gauge [0.180" (4.7 mm)].
    - a. Provide high frequency hinge reinforcement for top hinge on all exterior, cross corridor, and stairwell frames, in accordance with SDI 111-H, Example "A" Application, where full mortise hinges are specified.
  - b. **Strike reinforcements:** minimum 16 gauge [0.053" (1.3 mm)] and prepared for an ANSI-A115.1-2 strike.
  - c. **Closer reinforcement:** minimum 14 gauge [0.067" (1.7 mm)] steel.
  - d. Projection weld hinge and strike reinforcements to the door frame.
  - e. Provide metal plaster guards for all mortised cutouts.
  - f. Provide adequate reinforcements for other hardware as required.
  - g. Include galvanized hardware reinforcements in all galvanized frames.
- G. **Electrical Requirements:**
  - 1. **General:** Coordination all electrical requirements for doors and frames. Make provisions for installation of electrical items arranged so that wiring can be readily removed and replaced.
    - a. Provide cutouts and reinforcements required for metal door frame to accept electric components.
    - b. Frame with Electrical Hinges: Weld UL listed grout guard cover box welded over center hinge reinforcing. Top or bottom hinge locations are not permitted. Contractor to reference 3.01.D, for continuous hinges.
    - c. Provide cutouts and reinforcements required to accept security system components.
    - d. Refer to 08710 for electrified hardware items.

---

**Spec Writer's Note:** Insert paragraph #2 when applicable monitoring switch may be required.

---

- 2. Provide mortar box, welded in head of door frame at exterior frames for future door contact switch provided by owner. Size, type, location and conduit requirements to be provided by owner.

### 2.03 Construction of architectural stick components

- A. Fabricate architectural stick frame assemblies from standard frame components, fabricated from 14 gauge galvanized steel A60 for exterior, and 16 gauge cold rolled steel for interior.
- B. Construct architectural stick frame assemblies of standard frame components, fabricated as specified.

---

**Spec Writer's Note:** Choose one of the appropriate steel thickness and type.

---

- 1. **Exterior Frames:** Hot-dip galvanized steel, ASTM A 653, Class A60, 16 gauge [0.053" (1.3 mm)] or 14 gauge [0.067" (1.7 mm)] hot dipped galvanized steel, with closed tops.
  - a. Include galvanized components and internal reinforcements with all galvanized frames.
- 2. **Interior Frames in Masonry:** 16 gauge [0.053" (1.3 mm)] cold rolled or galvanized steel.
  - a. Include galvanized components and internal reinforcements with all galvanized frames.
- C. **Frame component requirements:**
  - 1. Prepare required sticks at door openings and frame assemblies for hardware as specified.
  - 2. Fabricate frame assemblies from three basic components:
    - a. Open Sections (perimeter members) identical in configuration to standard frames
    - b. Closed sections (intermediate members) with identical jamb depth, face dimensions, and stops as open sections.
    - c. Sill sections: Fabricated from galvanized steel, flush with both faces of adjacent vertical members. Cut individual components to length and notched to assure square joints and corners.
  - 3. Welded and ground smooth joints and corners of the frame assembly at the intersecting faces of the sections. Externally welded face joints at meeting mullions or between mullions and other frame members on the face surfaces only.
  - 4. Ship frame assemblies to the jobsite completely welded. Field joints will be permitted only with the size of the total assembly exceeds shipping limitations.
  - 5. Field splice joints will be permitted when the fabricated frame assemblies if large openings are subject to shipping limitations. Oversized frames will be fabricated in sections designated for splicing in the field. Frames to be provided with joint reinforcements 14 gauge, 8" long. Field weld joint reinforcement inside and tack weld outside joint at both faces, grind, and finish smooth and uniform in appearance, after installation.
  - 6. Pierced and dimpled glazing beads for use with manufacturers' standard fasteners.



7. Provide necessary anchors for jambs, heads, and sills of assemblies.
  - a. Verification of field dimensions as required. Frame fabrication will not begin until these dimensions have been verified, submitted, and approved.

## 2.04 Fabrication

### A. Face Welded Frames:

1. Continuous face weld the joint between the head and jamb faces along their length either internally or externally. Grind, prime paint, and finish smooth face joints with no visible face seams.
2. Externally weld, grind, prime paint, and finish smooth face joints at meeting mullions or between mullions and other frame members as per ANSI/SDI A250.8 – 2003.
3. Provide two temporary steel spreaders (welded to the jambs at each rabbet of door openings) on welded frames during shipment. Remove temporary steel spreaders prior to installation of the frame.

## 2.05 Finish

- A. Doors, frames and frame components are required to be cleaned, phosphatized, and finished with one coat of baked-on rust inhibiting prime paint in accordance with the ANSI/SDI A250.10 "Test Procedures and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames."

## Part 3: Execution

### 3.1 Examination

#### 3.01 Installation

- A. Install doors and frames in accordance with Steel Door Institute's recommended erection instructions for steel frames ANSI A250.11.
- B. Install label doors and frames in accordance with NFPA-80.
- C. **Remove temporary steel spreaders prior to installation of frames.**
- D. Set frames accurately in position; plumb, align and brace until permanent anchors are set. After wall construction is complete, remove temporary wood spreaders.
  1. Field splice only at approved locations indicated on the shop drawings. Weld, grind, and finish as required to conceal evidence of splicing on exposed faces.
- e. Provide full height  $\frac{3}{8}$ " to 1  $\frac{1}{2}$ " strip of polystyrene insulation at frames requiring grouting where continuous hinges are specified. Apply the strip to the back of the frame, where the hinge is to be installed, to allow for field drilling or tapping.
- F. Where grouting is required in masonry, provide and install temporary bottom and intermediate wood spreaders to maintain proper width and avoid bowing or deforming of frame members. Refer to ANSI A250.11-2012, Standard.
  1. Hollow Metal Frames to receive grouting comply with ANSI/SDI Standard A250.8.2003, 4.2.2, whereby grout will be mixed to provide a 4" maximum slump consistency and hand troweled into place. Do not use grout mixed to a thinner, pumpable consistency is not recommended and not be used. Refer to HMMA 820 TN01-03 Grouting Hollow Metal Frames
- G. Provide a vertical wood brace during grouting of frame at openings over 4' 0" wider, to prevent sagging of frame header.
- h. Apply hardware in accordance with hardware manufacturers' instructions and Section 08710 FINISH HARDWARE of these Specifications. Install all hardware with only factory provided fasteners. Adjust door installation to provide uniform clearance at head and jambs, to achieve maximum operational effectiveness and appearance.

#### 3.02 Adjusting

- A. **Final Adjustments:** Adjust operating doors and hardware items just prior to final inspection and acceptance by the Owner and Architect. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames that are damaged, bowed or otherwise unacceptable.
- b. **Prime Coat Touch-Up:** Immediately after erection, sand smooth any rusted or damaged areas of prime coat, and apply touch-up of compatible air-drying primer.

#### 3.03 Protection

- A. Provide protective measures required throughout the construction period to ensure that door and frame units will be without damage or deterioration, other than normal weathering, at time of acceptance.

## SDI selection and usage guide

Steelcraft product selection and usage guides have been compiled as tools for preparing architectural specifications for Hollow Metal doors, frames and stick systems.

The tables that follow show recommended Steelcraft doors and frames for a variety of entry locations and wall construction. Locate the entry way or wall requirements on the tables, then find the doors and frames most suitable to the application. Please refer to the appropriate catalogue section for detailed information about each door and frame.

Recommended door usage								
Door style	Core/Construction							Recommended gauge of frame
	Honeycomb, Polystyrene, or Polyurethane	Honeycomb	Polystyrene	Vertical steel stiffeners	Mineral board	Embossed	Full glass entrance	
Level 1: Light commercial								
Model 1 full flush	L20	SL20	SL20		T20	CE20		16 Gauge [0.053" (1.3 mm)] or 18 Gauge [0.042" (1.0 mm)]
Model 2 seamless	LF20				TF20	CF20		
Level 2: Heavy duty commercial								
Model 1 full flush	L18	SL18	SL18	B18	T18	CE18		16 Gauge [0.053" (1.3 mm)]
Model 2 seamless	LF18 or LW18			BF18 or BW18	TF18 or TW18	CF18		
Level 3: Extra heavy duty commercial								
Model 1 full flush	L16			B16	T16	CF16		14 Gauge or 16 Gauge [0.053" (1.3 mm)]
Model 2 seamless	LF16 or LW16			BF16 or BW16	TF16 or TW16	CF16		
Model 3 stile & rail							A14	
Level 4: Maximum duty commercial								
Model 1 full flush	L14			B14	B14			14 Gauge [0.067" (1.7 mm)]
Model 2 seamless	LF14 or LW14			BF14 or BW14	TF14 or TW14			

**This table is based on ANSI A250.8-2014 (SDI 100). Recommended Specification for Standard Steel Doors and Frames.**



## Door construction and design

The following tables show recommended Steelcraft doors for a variety of entry locations. Simply locate the entry way requirements on the tables that follow, then find the doors most suitable for the specified usage. Please refer to the codes listed at right for a description of Door Construction Level and Door Design Nomenclature.

- Door Construction Level:**
  - 1** = Light Commercial 20 F Series [0.032" (0.8 mm)]
  - 2** = Heavy Duty 18 F Series [0.042" (1.0 mm)]
  - 3** = Extra Heavy Duty 16 F Series [0.053" (1.3 mm)]
  - 4** = Maximum Duty 14 F Series [0.067" (1.7 mm)]
- Door Design Nomenclature:**
  - F** = Flush
  - G** = Half Glass
  - V** = Vision Light
  - FG** = Full Glass
  - N** = Narrow Lit
- Recommended Fire Ratings** are based on nationally published ratings. The local *Authority Having Jurisdiction* must be suited with, to insure compliance with local building codes.
- 3 Hour Fire Door Assemblies** are limited to use in locations separating two buildings. Depending on the size of any building covered in this selection guide, a 3 hour door may be required.
- Temperature Rise Ratings** may be required on stair tower doors. Consult the AHJ.

Apartment buildings													
	Door construction level <sup>1</sup>				Door design nomenclature <sup>2</sup>					Recommended fire rating <sup>3</sup>			
	1	2	3	4	F	G	V	FG	N	3Hr <sup>4</sup>	1 ½ Hr	¾ Hr	20 Min
Main entrance			■			■		■					
Unit entrance	■	■			■					■		■	■
Stairwell <sup>5</sup>		■					■				■		
Bathroom	■				■								
Bedroom	■				■								
Interior rooms	■				■								
Closet	■				■								
Storage		■	■	■	■								
Laundry/Utility	■	■			■	■	■		■				
Garage/Parking				■	■		■		■		■	■	■

Hotels / Motels													
	Door construction level <sup>1</sup>				Door design nomenclature <sup>2</sup>					Recommended fire rating <sup>3</sup>			
	1	2	3	4	F	G	V	FG	N	3Hr <sup>4</sup>	1 ½ Hr	¾ Hr	20 Min
Main entrance		■	■		■		■	■	■				
Unit entrance	■	■			■		■					■	■
Secondary entrance/Exit			■	■	■		■						
Stairwell <sup>5</sup>		■	■				■				■		
Fire Exit	■	■			■		■		■	■	■	■	
Smoke Barrier (Double Egress)		■			■		■		■	■		■	■
Bathroom	■				■		■		■	■		■	■
Connecting rooms	■				■		■						
Closet	■				■		■						
Kitchen		■	■		■		■		■				
Office	■				■	■	■		■				
Storage/Utility		■	■	■	■	■	■		■				
Laundry		■	■		■		■		■				

Health care facilities													
	Door construction level <sup>1</sup>				Door design nomenclature <sup>2</sup>					Recommended fire rating <sup>3</sup>			
	1	2	3	4	F	G	V	FG	N	3Hr <sup>4</sup>	1 ½ Hr	¾ Hr	20 Min
Main entrance			■			■		■	■				
Service entrance			■	■	■		■						
Stairwell <sup>5</sup>		■	■				■				■		
Corridor		■	■				■				■		
Bathroom	■				■	■	■		■			■	■
Patient room		■			■								■
Operating & Exam room		■	■		■								■
Pharmacy			■	■	■		■						■
Recreation & Lounges		■			■		■						
Closet	■				■								
Kitchen		■	■				■						

Apartment buildings													
	Door construction level <sup>1</sup>				Door design nomenclature <sup>2</sup>					Recommended fire rating <sup>3</sup>			
	1	2	3	4	F	G	V	FG	N	3Hr <sup>4</sup>	1 ½ Hr	¾ Hr	20 Min
Main entrance			■	■				■	■				
Unit entrance	■	■			■				■				
Stairwell <sup>5</sup>		■	■				■				■		
Bathroom	■				■								
Bedroom	■				■								
Closet	■				■								

Schools													
	Door construction level <sup>1</sup>				Door design nomenclature <sup>2</sup>					Recommended fire rating <sup>3</sup>			
	1	2	3	4	F	G	V	FG	N	3Hr <sup>4</sup>	1 ½ Hr	¾ Hr	20 Min
Main entrance			■			■		■	■				
Secondary entrance/Exit			■	■	■		■						
Stairwell <sup>5</sup>		■	■				■		■		■		
Restroom		■			■								
Classroom		■							■				■
Locker room		■	■										
Closet	■				■								
Cafeteria/Kitchen	■	■				■			■				

Industrial/Offices													
	Door construction level <sup>1</sup>				Door design nomenclature <sup>2</sup>					Recommended fire rating <sup>3</sup>			
	1	2	3	4	F	G	V	FG	N	3Hr <sup>4</sup>	1 ½ Hr	¾ Hr	20 Min
Main entrance			■			■		■					
Secondary entrance			■	■	■		■						
Stairwell <sup>5</sup>		■	■		■								
Restroom		■	■		■								
Individual office	■				■								■
Closet	■				■								

Industrial/Manufacturing													
	Door construction level <sup>1</sup>				Door design nomenclature <sup>2</sup>					Recommended fire rating <sup>3</sup>			
	1	2	3	4	F	G	V	FG	N	3Hr <sup>4</sup>	1 ½ Hr	¾ Hr	20 Min
Main entrance			■					■	■				
Secondary entrance			■	■	■		■						
Restroom			■		■								
Cafeteria			■			■							
Equipment room	■	■			■								
Boiler room			■		■						■		
Parts crib		■			■								
Tool room			■		■	■							

## Cores

- f. **Honeycomb:** 1" (25.4 mm) Kraft honeycomb core is laminated to both face sheets with contact adhesive. The honeycomb is phenolic resin impregnated with edges sanded to insure ultimate lamination and performance. To further enhance the structural ability of the door, the honeycomb core material is subjected to several unique operations prior to assembly. If any of these operations are eliminated, the strength and durability of the door is compromised.
7. **Polystyrene:** for exterior applications in extreme weather conditions.
8. **Polyurethane:** for exterior applications in arctic weather conditions. This core is not available Fire Rated.
9. **Steel Stiffened:** 20 gauge [0.032" (0.8 mm)] hat shaped steel stiffeners are welded to the inside face sheets as internal reinforcement. The stiffeners are located a maximum of 6" (152.4 mm) on center and are welded to the face sheet on 4" (101.6 mm) centers. The areas between the stiffeners are filled with fiberglass insulation.
10. **Mineral Fiber:** The mineral fiber core material is laminated to both face sheets with contact adhesive. This core provides a 250°F (121°C) Temperature Rise rating or 450°F (232°C) depending on hardware application. See Fire Rated products section for additional information.

Door cores												
Series	Standard/Optional core					Edge construction			Edge features			
	Honey-comb	Polysty-rene	Polyure-thane	Steel stiffened	Mineral fiber	Visible seam	Filled	Welded	Lock		Hinge	
									1/8" in 2" bevel	Square	1/8" in 2" bevel	Square
A14	■						■		■		■	
B				■		■	■	■	■		■	
CE		■				■	■		■		■	
H	■	■	■	■	■	■	■	■	■		■	
L	■	■	■			■	■	■	■		■	
PW				■		■		■	■		■	
SL	■	■				■				■		■
T					■	■	■	■	■		■	

■ Standard      ■ Optional

## Wall construction

### F, FN, MU, FE, and DE Series flush frames

The following table shows recommended Steelcraft frames for a variety of wall constructions. Locate the wall requirements on the table that follows, then find the frame most suitable for the specified usage.

Flush (F, FN, MU, FE, and DE Series) frames					
Wall detail and type	Frame depth (size of frame to specify)				
	4 3/4" (121 mm)	5 3/4" (146 mm)	6 3/4" (171 mm)	7 3/4" (197 mm)	8 3/4" (222 mm)
Wrap around concrete block					
4" (101.6 mm) masonry unit	■				
6" (152.4 mm) masonry unit			■		
8" (203.2 mm) masonry unit					■
Butted masonry					
6" (152.4 mm) masonry unit	■	■			
8" (203.2 mm) masonry unit	■	■	■	■	
Cavity wall, 4" (101.6 mm) masonry units			■	■	■
Cavity wall, 6" (152.4 mm) masonry units					■
Concrete block and tile					
Cavity wall, 4" (101.6 mm) masonry units	■				■
4" (101.6 mm) masonry unit, brick veneer plater inside		■			
4" (101.6 mm) masonry unit, brick veneer			■		
Cavity wall, 4" (101.6 mm) masonry unit, brick veneer				■	
Existing wall					
Poured concrete or concrete block	■	■	■	■	■
Wood/steel stud walls					
2" x 3" (50.8 mm x 76.2 mm) wood stud, 1/2" (12.7 mm) wallboard ea.	■				
Closed steel stud, gypsum	■	■	■	■	
2" x 4" (50.8 mm x 76.2 mm) wood stud gypsum		■			
2" x 4" (50.8 mm x 76.2 mm) wood stud, brick veneer			■	■	
2" x 4" (50.8 mm x 76.2 mm) wood stud, 5/8" (15.8 mm) gypsum				■	
2" x 4" (50.8 mm x 76.2 mm) wood stud, 1/2" (12.7 mm) & 5/8" (15.8 mm) gypsum both sides				■	

#### Notes:

1. Size of frame to specify will vary with stud size.
2. Frames can also be used in wall conditions other than those shown above.
3. Frames for these walls can be KD (knock-down) or SUA (set-up and welded).

**DW and K Series drywall frames**

The following table shows recommended Steelcraft frames for a variety of steel and wood stud drywall wall constructions. Locate the wall requirements on the table that follows, then find the frame most suitable for the specified usage.

<b>Drywall (DW and K Series) frames</b>				
<b>Stud size</b>	<b>Stud type</b>	<b>Thickness Drywall</b>	<b>Thickness wall</b>	<b>Frame depth Size of frame to specify</b>
<b>1 Layer of gypsum board each side of the wall</b>				
1 5/8" (41.2 mm)	Steel	1/2" (12.7 mm)	2 5/8" (66.6 mm)	3 5/8" (92.0 mm)
1 5/8" (41.2 mm)	Steel	5/8" (15.8 mm)	2 7/8" (73.0 mm)	3 7/8" (98.4 mm)
2 1/2" (63.5 mm)	Wood or steel	1/2" (12.7 mm)	3 1/2" (88.9 mm)	4 1/2" (114.3 mm)
2 1/2" (63.5 mm)	Wood or steel	5/8" (15.8 mm)	3 3/4" (95.2 mm)	4 3/4" (120.6 mm)
2 1/2" (63.5 mm)	Wood or steel	3/4" (19.0 mm)	4" (101.6 mm)	5" (127.0 mm)
3 1/2" (88.9 mm)	Wood	1/2" (12.7 mm)	4 1/2" (114.3 mm)	5 1/2" (139.7 mm)
3 1/2" (88.9 mm)	Wood	5/8" (15.8 mm)	4 3/4" (120.6 mm)	5 3/4" (146.0 mm)
3 5/8" (92.0 mm)	Steel	5/8" (15.8 mm)	4 7/8" (123.8 mm)	5 7/8" (149.2 mm)
<b>1 Layer of gypsum board one side of the wall</b>				
2 1/2" (63.5 mm)	Wood or steel	1/2" (12.7 mm)	4" (101.6 mm)	5" (127.0 mm)
3 1/2" (88.9 mm)	Wood	1/2" (12.7 mm)	5" (127.0 mm)	6" (152.4 mm)
<b>2 Layers of gypsum board each side of the wall</b>				
2 1/2" (63.5 mm)	Wood or steel	5/8" (15.8 mm)	5" (127.0 mm)	6" (152.4 mm)
<b>3 Layers of gypsum board each side of the wall</b>				
3 5/8" (92.0 mm)	Steel	5/8" (15.8 mm)	6 1/8" (155.5 mm)	7 1/8" (180.9 mm)
1 5/8" (41.2 mm)	Steel	1/2" (12.7 mm)	4 5/8" (117.4 mm)	5/8" (15.8 mm)

**Notes:**

1. Size of frame to specify will vary with stud size.
2. Frames can also be used in wall conditions other than those shown above.
3. Frames for these walls can be KD (knock-down) or SUA (set-up and welded).

## Green buildings construction: LEED certification

### LEED program compliance: U.S. Green building council LEED-NC rating system version 2.2 Statement

#### Recycled content

**MR Credit 4.1:** Recycled content: 10% (post-consumer + ½ pre-consumer) **1 Point.**

**Intent:** increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.

**Requirements:** use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% (based on cost) of the total value of the materials in the project. The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.

\* Recycled content shall be defined in accordance with the international organization of standards document, ISO 14021—environmental labels and declarations—self-declared environmental claims (type ii environmental labeling).

Post-consumer material is defined as waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose.

Pre-consumer material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.

**MR Credit 4.2:** Recycled content: 20% (post-consumer + ½ pre-consumer). **1 Point in addition to MR Credit 4.1.**

**Requirements:** use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes an additional 10% beyond MR Credit 4.1 (Total of 20%, based on cost) of the total value of the materials in the project.

**Note:** For our LEED brochure, go to <http://us.allegion.com>, search “LEED” to find current Recycle Content and Regional Material for LEED program compliance.

### U.S. Green building council: LEED-NC rating system version 2.2 Statement

#### Regional material

**MR Credit 5.1:** Regional materials: 10% extracted, processed, and manufactured regionally **1 Point.**

**Intent:** increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

**Requirements:** use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10% (based on cost) of the total materials value. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value.

**MR Credit 5.2:** Regional materials: 20% extracted, processed & manufactured regionally. **1 Point in addition to MR Credit 5.1.**

**Intent:** increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

**Requirements:** use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for an additional 10% beyond MR Credit 5.1 (Total of 20%, based on cost) of the total materials value. If only a fraction of the material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value.

Information found in our LEED brochure outlines the Allegion brands and products that may support MR Credit 5.1 and MR Credit 5.2 depending on the location of the specific project being certified.

**Note:** For our LEED brochure, go to <http://us.allegion.com>, search “LEED” to find current Recycle Content and Regional Material for LEED program compliance.



## About Allegion™

Allegion (NYSE: ALLE) is a global pioneer in safety and security, with leading brands like CISA®, Interflex®, LCN®, Schlage® and Von Duprin®. Focusing on security around the door and adjacent areas, Allegion produces a range of solutions for homes, businesses, schools and other institutions. Allegion is a \$2 billion company, with products sold in almost 130 countries.

For more, visit [www.allegion.com](http://www.allegion.com).

*aptiQ* ■ LCN ■ **SCHLAGE** ■ STEELCRAFT ■ VON DUPRIN