INTRODUCTION

Welcome to the commercial steel door and frame industry. We at Fleming Door Products Ltd. are proud and privileged to have you on our team of professionals in the non-residential steel door and frame industry.

This manual is designed to give you an understanding of exciting and profitable product lines which, in many instances, sell themselves by virtue of their strength, durability, versatile application and building or life safety code requirements, which after all, are the backbone of every building.

This “Basic Hollow Metal Training Manual” (Third Edition), is a starting point and a reference guide to provide you with a working knowledge of steel doors, frames and, because of their inter-relationship, builders’ hardware.

The manual has been formatted in the following sections;

- Forward
- Table of Contents and Illustrations
- Steel Door Frames
- Hollow Metal Doors
- Builders’ Hardware
- Estimating and Ordering
- Glossary and Abbreviations
- Index
- Catalogues

The Forward, Table of Contents and Table of Illustrations are provided as an overview for quick reference. The Frame, Door and Hardware sections are extensively illustrated with over 230 drawings and tables. Following the Estimating and Ordering section are a Glossary, Abbreviations, a comprehensive Index for the Manual and both our Steel Door and Frame Catalogue and the Fleming Fire Labeling Specifications brochure.

To provide you with support and assistance, our industry renowned Customer Support, Engineering and Technical Services people are there for you, just a 1-800 (263-7515) call away.

To augment your training Fleming also offers other basic, intermediate and advanced level factory seminars and programs, designed to target specific areas of specialization.

This manual, like everything else at Fleming, is the result of the combined efforts of our sales, marketing, engineering and manufacturing groups. The manual was developed by Bud Bulley, our Manager for Technical Services. Your comments or suggestions are appreciated and welcomed. Any questions you have can be directed his way.
HISTORY

Fleming Door Products was originally incorporated January 1st, 1959. Our founder, Sam Fleming, started in a 1,250 square foot building in Scarborough, a suburb of Toronto and set about establishing his reputation as a premier custom sheet metal fabricator.

Originally Fleming manufactured a variety of sheet metal and stainless steel products, including toilet partitions, lockers, pre-fabricated fireplaces, drafting tables, commercial coolers and freezers, louvers, vents, polio vaccine vessels, radar equipment, storage tanks, hoppers and nuclear fuel containers, along with steel doors and frames.

In 1963 the company moved to a larger plant which initially covered 30,000 square feet. Over the ensuing years, this building would be expanded several times, two other buildings were added, totaling 108,000 square feet of office, manufacturing and warehouse space.

By the mid-60’s Fleming had reduced the product lines to include only steel doors, frames and toilet partitions. In 1978 the toilet partition division was sold in order to concentrate exclusively on our core business, steel doors and frames.

We began in the non-residential market as a small, custom manufacturer, providing product only in greater Toronto. A combination of quality, product depth and service allowed Fleming to grow into the largest supplier in the area.

In the early 1970’s, after establishing ourselves in Toronto, Fleming instituted a national marketing program through stocking distributors, who perform final fabrication and sell directly to General Contractors. Between 1973 and 1986 the Fleming team grew to include distributors in every major Canadian city and today we are the largest manufacturer of non-residential steel doors and frames in the country. As a testament to our commitment and their success, our original group of Canadian distributors continue to represent Fleming to this day.

In 1986 Fleming launched into the United States and overseas markets. With our team of factory and manufacturer representatives and distributors throughout the US, we are a serious force and significant supplier in most major cities. Fleming also has distributors in the Middle East, Asia, the United Kingdom, the Caribbean and Mexico.

At the same time, to support and ensure continued growth, planning began for new Head Office and manufacturing facilities. In 1987 our state-of-the-art, 140,000 square foot plant opened in Ajax, Ontario, just east of Toronto. Sitting on 9½ acres of prime industrial property, we have the potential to almost double our existing manufacturing space to meet customer demands.
Fleming’s reputation as one of North America’s fastest growing steel door and frame manufacturers is based on our commitment to quality, service, research and development and leading edge technology.

Our senior executives, management group, engineering, customer support and administrative staff are all career professionals. The depth of industry specific experience is unrivalled. Our management team averages 28+ years, engineering and customer support are 21+ years and the shop floor is 18+ years, with over 20% having 20 years or more with the company. For you, it means a stable, knowledgeable support network.

The use of CAD/CAM and real-time production planning affords the Fleming team the best delivery lead-times in the industry at competitive prices. The latest production equipment and processes, in-plant, engineering and order-entry automation, bound together under our ISO 9001:2000 Registered Quality Management System, allows Fleming to provide the highest quality product, support and service available.

You will be drawing on over forty-five years of manufacturing experience, an exceptional product line, on-going research, development and quality programs, with service and support from committed and professional in-house staff, factory and manufacturers reps. Together with our international network of stocking distributors, we have established ourselves as world leaders in the commercial, industrial and institutional steel door and frame market.

As you begin your journey of learning and growth, we wish you every success and are here to encourage and support your continued efforts.

Thank you for joining our team.

FLEMING DOOR PRODUCTS LTD
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GALVANNEAL STEEL

All hollow metal doors and frames manufactured in North America are produced from the identical base cold rolled steel, which conforms to ASTM A1008.

The galvanneal process begins in the Hot Strip Mill where a billet is reduced in thickness to a coil of steel.

The hot rolled steel, meeting ASTM A1011, is then moved to a Cold Strip Mill where it is uncoiled, pickled, cleaned and rinsed. The steel is heated, passed through dimensioning rolls to reduce it to the exact thickness required, the edges are trimmed for tension leveling and the product is oiled to prevent rusting of the now Cold Rolled Steel, meeting ASTM A1008. It is then recoiled or slit into sheets.

It is how the cold-rolled steel is further processed that creates galvanized and paintable galvanneal.

Figure 1 : Hot Strip Mill Process

Figure 2 : Cold Strip Mill Process
For galvanneal and galvanized steel, the cold-rolled coil is processed through a Galvanizing Mill. It is uncoiled, degreased and run into a continuous hot-dip zinc coating bath. For galvanized steel the free zinc is removed by a series of mechanical wipers. For galvanneal, the excess molten zinc is removed using air knives. The galvanneal coil enters an annealing furnace and heat converts the zinc coating to a zinc-iron alloy. Next the galvanneal goes through a passivation wash to retard storage stain. Finally both galvanized and galvanneal steels are recoiled or slit into sheet stock.

A relative comparison of the coatings and protection provided by them can be easily see in Figure 4, below.

**ASTM STANDARDS FOR STEEL**

The process of steel making is a highly sophisticated one, relying on leading edge technology and is covered by a multitude of ASTM Standards. ASTM Standards for steel have evolved drastically over the past few years. The changes reflect the availability of steels with improved base metal characteristics, as well as terminology revisions that are intended to provide a better understanding of steel sheet formability for hot-dip products.
In the late eighties hot-dip steel products were covered by the following ASTM Standards: ASTM A366 for the base cold-rolled steel, ASTM A525 for the general requirements of zinc coated hot-dip steels and ASTM A526 through A528 for the specific forming qualities of zinc coated steels.

In 1994 A525, together with a number of associated standards, were withdrawn and replaced by A924-94 which covers all hot-dip coated steels. At the same time A526 through A528 were discontinued and amalgamated under A653.

In 1996 and 1997 ASTM made further changes to A653 where the description of steels with the "Quality" designations have been made obsolete and a new system of designations has been developed. Future uses of the "Quality" term are intended for reference to levels of surface and shape parameters.

ASTM A653-97 designations are for the "Type" of steel, with categories ranging from Commercial Steel (CS) through to High Strength Low Alloy Steel (HSLAS). Several "Types" have further designations, the letters "A", "B", and "C".

The ASTM Standards currently applicable to all Fleming paintable Galvanneal are as follows:

- **ASTM A1008-03**: Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High Strength Low-Alloy and High Strength Low-Alloy with Improved Formability.

  This standard describes the general chemical and mechanical properties of cold-rolled steel.

- **ASTM A924-99**: Specification for General Requirements for Sheet Steel, Metallic-Coated by the Hot-Dip Process

  This standard describes the permitted tolerances for chemical composition, mechanical properties, coating thickness, widths, lengths, camber, square and flatness of sheet steels which are metallic-coated by a hot-dip process. The metallic coatings referenced in this standard include zinc, zinc-iron alloy, aluminum, aluminum-zinc alloy, and lead-tin alloy (terne).

- **ASTM A653-03**: Specification for Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

ASTM A653 specifically covers zinc and zinc-iron alloy coated steel. Zinc coated steel, known as "galvanized", is a full spangled finish product. Zinc-iron alloy coated or "galvannealed" steel is a spangle-free, matte-gray, uniform finish. This standard describes six (6) types of steel based on formability. A653 details the nominal and minimum weight of each type of coating by recognized designations. Galvanized steel coating designations
are prefixed with "G" and galvanneal coating designations are prefixed with "A". Chemical and mechanical property requirements for both the base steel and the coating are also included in this standard.

SPECIFICATIONS

The material specifications for Fleming Commercial Steel Door and Frame product is:

Door and frame product shall be manufactured from tension leveled steel to ASTM A924-99, galvanized to ASTM A653-03, Commercial Steel (CS), Type B, coating designation A40, known commercially as paintable galvanneal.

PROPERTIES

<table>
<thead>
<tr>
<th>Gage</th>
<th>Nominal Thickness</th>
<th>Nominal Weight (lbs/ft²)</th>
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<tr>
<td>22</td>
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<td>20</td>
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<td>16</td>
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<td>14</td>
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<td>12</td>
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<td>10</td>
<td>0.138”</td>
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Table 1: Galvanneal Steel Thickness and Weights

<table>
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<th>Coating Designation</th>
<th>Coating Weight (Total Both Sides)</th>
<th>Coating Thickness Per Side</th>
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<tr>
<td></td>
<td>Minimum Check Limit (oz/ft²)</td>
<td>µm (microns)</td>
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<td></td>
<td>Triple Spot Test</td>
<td>Single Spot Test</td>
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<tr>
<td>A40</td>
<td>.40</td>
<td>.3</td>
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<tr>
<td>G90</td>
<td>.90</td>
<td>.8</td>
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Table 2: Galvanized and Galvanneal Coatings

Chemical Analysis: Carbon = 0.15% max, Manganese = 0.60% max, Phosphorus = 0.035% max and Sulphur = 0.040% max

Mechanical Properties: Yield Strength = 43ksi, Ultimate Tensile Strength = 53ksi, Percentage Elongation in 2” = 36%
GALVANNEAL ADVANTAGES

When specifying materials for hollow metal doors and frames what are the characteristics you are looking for?

- A smooth, consistent paint surface
- A minimum of surface preparation in the field
- Maximum paint adhesion
- Complete corrosion protection, inside and out
- Maximum compatibility with and flexibility in the selection of finish paints
- Resilience to job site exposure from humidity and water
- Maximum product performance and warranty

Galvanneal has been developed to specifically address these characteristics. In addition, galvanneal will not fracture when formed and provides maximum arc, spot and projection weld performance when compared to cold rolled or electro-galvanized steels.

Galvanneal is passivated with a phosphate wash. It presents a dull gray matte surface which is almost mirror smooth the touch. The surface however, provides microscopic keying for finish paint at the zinc-iron alloy surface.

Primed painted cold rolled steel on the other hand yields one of two extremes. Cementisious type factory applied proprietary primers are inherently uneven and rough. Baked-on electrostatically or conventional spray applied, flow-coat or dip types provide a glazed egg shell affect which must be fully sanded before finish painting. Flow-coat or dip process systems can result in uneven coverage, runs and drips.

Galvanneal’s zinc-iron alloy is an integral part of the steel surface. It is on the front, the back and the edges of the material. Fleming manufactures all door and frame components and reinforcement from galvanneal steel. There are no unprotected surfaces.

With cold rolled product, the factory primers are added after the product is completely assembled. The consistency and coverage will vary. The inside of frame profiles generally do not receive the same coverage as the surfaces which will be exposed after installation. There will be areas on the mortised hardware reinforcements which will receive limited, if any primer protection. The inside faces of a cold rolled steel door or mullion and the cold rolled steel internal components and reinforcements receive no primer.

All steel doors and frames need to be cleaned prior to finish painting to remove the dirt, dust, tar and other foreign matter which end up on the products during shipping, handling and installation. Scratches in the surface need to be remedied before painting as well.

For galvanneal doors and frames, cleaning is a simple matter of wiping down the surface to be painted with a cleaner compatible with the finish paint. If latex or alkyd paints are specified, then detergent and clean water will do the job. For some of the more exotic
finishes such as epoxies and the like, the paint manufacturer will recommend appropriate materials. The zinc-iron coating will not wash off.

With cold rolled and primed steel there can problems with cleaners removing the primer or the primer absorbing and trapping foreign materials.

Scratches inflicted on galvanneal doors and frames are repaired with the application of any off the shelf, zinc-rich galvanized primer, either brush or spray applied after the surface has been cleaned. You are applying the same material as is already part of the steel surface. There is never a compatibility problem. The steel surface will not appear different in the primed areas after finish painting.

With cold-rolled and primed product, the scratches must be sanded out, feathered and a touch-up primer, compatible with the factory proprietary primer, is applied.

There can be compatibility problems between the proprietary factory primers and standard commercial primers used by the finish painters. Adhesion of standard commercial primers, used by the finish painter, may be compromised between his primer and the factory’s.

Paint adhesion and corrosion resistance can be measured using several methods. The most widely specified test standard for steel door and frame products is ANSI A250.10. This standard requires that separate sets of prepared samples are subjected to salt spray and water fog exposures together with a series of unexposed sample tests.

This standard, although useful, does not provide a thorough evaluation. The salt spray exposed samples are only evaluated for corrosion resistance (rust). The water fog exposed samples only for paint blistering. The unexposed samples are evaluated only for tape test paint adhesion after impacting and lattice style scribing of the painted surface. The exposures do not address severe acid rain, industrial environments.

Through a nationally recognized independent lab, extensive testing and evaluations comparing Fleming galvanneal and cold rolled steels, each with or without primers and finish paints, were done. These tests went well beyond the requirements of the ANSI A250.10 standard, all the way to simulating the demands of an acid rain, industrial environment. For each type of exposure the samples were evaluated to ASTM standards for rust, film adhesion, paint blistering and paint creepage.

The results consistently confirm galvanneal’s superior performance prior to and after the application of finish paint under all tested conditions.

In the last section of the manual you will find our publication “Effective Rust Protection”. It provides more answers to many of the myths and realities on paintable galvanneal steel.

These are the reasons that Fleming paintable galvanneal comes with a 10 year rust perforation and paint adhesion warranty.
FRAME PRODUCT DEFINITIONS

Frame products fall into 4 categories: frames, transom frames, sidelight frames and windows.

**Frames** are defined as units that contain single or multiple door openings without horizontal transom members. Frames may be 3 or 4 sided. They may contain flush or rabbetted panels immediately above the doors. They are available in set-up and welded, knocked-down or knocked-down slip-on drywall construction. Typical frame elevations are shown in Figure 5.

![Figure 5: Typical Frame Elevations](image)

**Transom Frames** are units that contain single or multiple door openings with single or multiple openings above, separated from the doors with a horizontal mullion. The openings above the doors are called ‘transoms’. The transoms may be filled with glazing materials, panels or louvers. Transom frames are generally available only in set-up and welded construction. Typical transom frame elevations are shown in Figure 6.

![Figure 6: Typical Transom Frame Elevations](image)

**Sidelight Frames** contain single or multiple door openings with adjacent openings for glazing materials, panels or louvers, separated with vertical mullions. The openings adjacent to the doors are called ‘sidelights’. Sidelight frames may also incorporate single or multiple transom openings. They are available only in set-up and welded construction. Typical sidelight frames are shown in Figure 7.

![Figure 7: Typical Sidelight Frame Elevations](image)
Windows are frame products which contain single or multiple openings for glazing materials only. They do not have any provision for mounting doors. A window which contains only one opening is also called a ‘borrowed light’ or ‘view window’. Borrowed lights are available in set-up and welded, knocked-down or knocked-down drywall construction. All other configurations are available only as set-up and welded. Figure 8 illustrates some typical elevations of borrowed lights and window assemblies.

![Figure 8: Typical Borrowed Light and Window Elevations](image)

**FRAME COMPONENTS**

Fleming frame products, from the simplest frame to the most complicated window, are constructed of formed steel components. Each component can be identified by its placement in the finished assembly and the builders’ hardware it is prepared to receive.

Three-sided frames for single doors are the most basic units. As shown in Figure 9, they are constructed from 3 components: a hinge jamb, a strike jamb and a head. The jambs are handed to suit the swing of the door.

![Figure 9: Single Frame Components](image)
Three-sided frames for pairs of doors also contain 3 components: 2 hinge jambs and a head as shown in Figure 10. The hinge jambs, as indicated, are handed for the swing of each door.

When a four-sided frame for singles or pairs is required, a bottom member, called a sill, is added to connect the 2 jambs. Figure 11 illustrates this condition.

All the components in frames for simple singles or pairs are constructed with “open sections”. An open section is one that contains a throat opening into which a wall can be inserted. These occur at the perimeter of the frame.
Transom, sidelight and window frames are built with open sections (jambs, head and sills) at the perimeter and “closed sections”, creating the individual door and/or glass openings required.

There are a number of closed sections available which include mullions, center rails and corner posts. Figure 12 shows the general profile details for each of these components.

Figure 13 shows various open and closed sections assembled into a finished sidelight frame.
FRAME PROFILES

On the previous pages we covered the 4 categories of frame product and the terminology used to describe each of the components needed to build them.

The components also have a set of terms to describe their basic shape or profile.

PROFILE TYPES

Masonry Profile components are the most common open sections. Illustrated in Figure 10, as the term suggests, they are utilized mostly in unit masonry or concrete walls. The contractor generally requires them as soon as the foundations are complete as they are installed with the wall.

Masonry profile frames are available as set-up and welded or knocked-down (for field assembly) construction. They can also be used in drywall or plaster and stud partitions and should be available to the contractor before the walls are constructed. Masonry profiles can include a number of variations as discussed below.

![Figure 14: Double Rabbet Masonry Profile](image)

Double Rabbet masonry profiles are standard for Fleming F, Miter and Notch and Stick-Series welded or knocked-down product. They are designed to accommodate a door or glazing materials on either side of the profile. Double rabbet profiles are available in both open sections (Figure 14) and closed sections as illustrated in Figure 15.

![Figure 15: Double Rabbet Mullion](image)
**Single Rabbet** profiles are the first variation in custom product and have provision for a door or glazing materials on one side of the frame only. Figure 16 shows an open section profile and a typical single rabbet mullion.

![Single Rabbet Profiles](image1)

**Drywall Profile** open sections, shown in Figure 17, can be used when drywall is the final layer of material on the wall. This is the second most common profile in commercial steel frame product. This profile adds legs, called “drywall returns”, formed parallel to the wall inside the profile which protect the drywall.

Drywall profile frames are available as set-up and welded or knocked-down slip-on drywall construction. Welded drywall profile frames should be on site to be installed with the walls. Knocked-down slip-on drywall frames are installed after the steel or wood studs and drywall partitions are finished. Double rabbet knocked-down slip-on drywall frames, the DW-Series, are also a standard profile for Fleming.

![Drywall Profiles](image2)
Cased Open profiles are another custom variation shown in Figure 18. This profile is generally used simply as a finishing element over an opening in a wall. Cased open frames are not normally prepared for doors. With certain types of hinges or pivots these sections can be used as double acting frames. Cased open knocked-down slip-on drywall profile is standard for Fleming’s CODW-Series.

![Figure 18: Cased Open Sections](image1)

Double Egress profiles are used in frames designed to permit each leaf in a pair to swing in the opposite direction. A plan view of the frame and typical double egress masonry and drywall profile jambs are shown in Figure 19. The application of this frame design will be discussed later in greater detail.

![Figure 19: Double Egress](image2)
Mullions and center rails also come in standard and optional profiles. Figure 20 illustrates a standard double rabbet mullion and a custom single rabbet mullion. For center rails, both single and double rabbet profiles are available. Double rabbet is a standard for Fleming’s Miter and Notch and Stick Series product.

![Figure 20: Mullion Profiles](image)

PROFILE TERMINOLOGY

Over the years terminology has evolved to describe each of the formed elements of open and closed sections. Industry has adopted a number of different terms. The most widely accepted and those used by Fleming, are shown on the following pages.

**Jamb Depth**: The distance on a frame section measured from face to face, perpendicular to the face of the door.


![Figure 21: Jamb Depth](image)
**Face:**

The portion of the exposed frame section which runs parallel to the wall on the door side of the section.

The industry and Fleming’s standard is 2” for jambs, heads and mullions. Masonry profile heads are also available standard with a 4” face. For center rails 6”, 8” and 12” are the standards. Sill standard sizes include 6-13/16”, 8” and 8-13/16” faces. Fleming Trimwall Series jamb and mullion sections have 5/8” faces.

Typical non-standard face widths include 1-1/4”, 1-1/2” and 1-3/4”.

**Opposite Face:**

The portion of the exposed frame section which runs parallel to the wall on the non-door side.

On standard masonry and drywall, double rabbet profile components the opposite face matches the face on the door side. To meet specific architectural requirements, non-standard profiles can be provided where the faces are not equal.
Return: The portion of an open frame section extending back from the faces, perpendicular to the wall surface.

Except for 5-3/4” jamb depth masonry profile product, the standard return dimension is 1/2”. The 5-3/4” product has 7/16” returns which creates a 4-7/8” throat opening to wrap walls constructed with a single layer of 5/8” drywall on each side of 2” x 4” wood studs or 3-1/2” steel studs. These are two of the most common walls in commercial construction.

Non-standard returns from 1/4” to 3/4” on either side are available.

Drywall Return: The portion of an open section formed inside the profile, parallel to the wall.

In set-up and welded frames the drywall is secured to the studs after the frame has been installed. The drywall returns allow the boards to be slid into position without tearing or marring the board.

For knocked-down slip-on drywall frames the drywall is attached to the studs before the frame is installed. The drywall returns in this application permit the frame to be pushed over the partition without damaging the board.

Fleming’s standard drywall return measures 3/8”. Non-standard drywall returns from 1/4” to 3/4” are available.
**Throat Opening**

The area in the back of an open section which wraps a wall.

The size of the throat opening is dependent on the actual wall thickness, the type of frame and installation method required.

For masonry, concrete or drywall partitions where a welded or knocked down frame wraps the wall, the throat opening should be 1/8” larger than the actual wall thickness. The gap between the frame and the partition is sealed with caulking materials.

Where drywall partitions and knocked-down slip on frames are specified, the throat opening should be equal to the actual wall thickness.

![Figure 26: Throat Opening](image)

**Door Rabbet**

The portion of the frame section in which the hinge or strike are mortised or where glazing materials or panels are located.

There are two standard door rabbet sizes. For 1-3/4” thick doors the door rabbet is 1-15/16” or 1-9/16” for 1-3/8” doors. On double egress profiles, 1-3/4” thick doors require a door rabbet of 2”.

![Figure 27: Door Rabbet](image)
**Opposite Rabbet** : In a double rabbet section, the recess in the profile which is not prepared for hardware, glazing materials or panels.

For Fleming product the opposite rabbet in frames for 1-3/4” thick doors is 1-9/16”. Where 1-3/8” thick doors are required, the Fleming opposite rabbet is 1-15/16”. These are called “unequal rabbet” profiles.

A communicating frame (a double rabbet frame prepared to receive a door in each rabbet) with doors of the same thickness is called an “equal rabbet” frame.

**Soffit** : The portion of the section which connects the stops on a double rabbet profile or connects the stop and the opposite face on a single rabbet section.

For Fleming standard product, door and opposite rabbets are fixed dimensions and the soffit size varies with jamb depth.
Stop:
The portion of the section which connects the door or opposite rabbet to the soffit. On the door side of the profile, the part against which the door closes. Also called the "Stop Height".

The standard stop for Fleming commercial product is 5/8".

![Figure 30: Stop](image)

Reveal:
The portion of a double egress hinge jamb profile which connects the door rabbet to the door reveal. For Fleming product this dimension is 5/8".

![Figure 31: Reveal](image)
Reveal Rabbet: The portion of a double egress hinge jamb profile which connects the reveal to the face. Because double egress doors are centered on the jamb depth, the reveal rabbet and the soffit are equal in size.

Backset: The distance in the door rabbet from a cutout, for a hardware preparation, to the stop. For Fleming, 4-1/2" hinges and ASA (4-7/8" x 1-1/4" lipped) strikes have a standard backset of 3/8".

Gage: A numeric designation used to define the nominal thickness of steel. Fleming standard F, Miter and Notch, Stick, KD-DW and A-Series frames are manufactured from 16 gage galvanneal steel. Non-standard frames are available in 12, 14, 16 and 18 gage galvanneal. The lower the number, the thicker the steel.
The illustrations in Figures 35 bring together the terms from the previous pages with various standard and non-standard profiles.

Figure 35: Profile Terminology Summary
FRAME ASSEMBLY METHODS

There are 3 basic methods of assembling frame product: knocked-down, knocked-down slip-on drywall or set-up and welded.

**Knocked-Down** (abbreviated as KD) jambs and heads are provided to the contractor unassembled. The contractor assembles the components together, stands the completed frame in position, anchors it to the floor and builds the adjacent partition around it.

Knocked-down frames are suitable for new unit masonry, drywall or plaster partitions in either wrap-around or butted applications. They can also be used in existing partitions.

Knocked-down frames are masonry profile components and are generally used only for simple 3 or 4 sided frames.

As shown in Figure 36 below, Fleming knocked-down jambs are machine mitered at the top and provided with a 2 corner clip / 4 tab system for alignment and assembly with the head. Heads are also machine mitered with 4 slots at each end. Once the frame components have been assembled, the jamb corner clip tabs protruding through the head slots are bent over to hold the frame together. The jamb/head corner presents a hairline miter joint.

Knocked-down frames can easily be converted to set-up and welded product.

Fleming F-Series frames are knocked-down units.

![Figure 36: F-Series Knocked-Down Frames](image)
Knocked-Down Slip-On Drywall, (abbreviated as KD-DW) units are also provided to the contractor unassembled. This type of frame is installed after the rough stud opening is constructed and the drywall is applied. The contractor “slips” the individual components over the finished wall.

These units are always drywall profile components. Fleming DW-Series units, as shown in Figure 37, have machine mitered jambs and heads. Jambs are provided with 2 corner clips, 3 tabs, a compression anchor at the top and each face is punched and dimpled at the bottom for securing with drywall screws. Heads are provided with 3 slots at each end.

Once the frame components are assembled in the opening, the tabs on each jamb corner clip are bend over to align and hold the head in place. The frame is squared and secured at the top with the jamb compression anchors and the base secured with drywall screws through the faces into the floor runners. The jamb/head corner presents a hairline miter joint.

Knocked-down slip-on drywall frames are used for 3 and 4-sided frames and borrowed lights only.

Fleming A-Series are also considered knocked-down slip-on frames because of their installation method. A-Series jambs use a 4-tab corner clip system, have the jamb and head faces dimpled for screw fixing to the partition but do not have compression anchors.

![Figure 37: DW-Series Knocked-Down Slip-On Drywall Frames](image-url)
Set-Up and Welded frames (abbreviated as SUW) are assembled at the factory or the distributor’s shop. The contractor places the assembled frame in position, anchors it to the floor and constructs the required partition around it.

They can be used in new unit masonry or drywall partitions in either wrap-around or butted applications. For existing walls, set-up and welded frames are used in a butted application only.

Set-up and welded frames can be masonry or drywall profile.

Knocked-down components can be converted to a set-up and welded frame. As shown in Figure 38, the top portion of the jamb corner clips are removed and the jambs and head are assembled in the usual manner. The remaining jamb rabbet clip tabs, inserted through the head slots, are bent over. The intersecting face miter joints are continuously welded on the inside of the profile.

When transom, sidelight or window frames are required, this is the assembly method employed. Intersecting face miters and sill butt face joints are continuously welded on the inside of the profile, where as mullion and center rail faces are butted and continuously welded on the outside and ground smooth.

All exposed face miters and butted face joints are body filled, ground to a smooth, uniform finish and touched up with a zinc-rich primer.

Fleming F, A, Miter and Notch and Stick Series product can be assembled using the set-up and welded method.

Figure 38 : Set-Up and Welded Frames
WALLS AND ANCHORS

As discussed earlier, certain frame profiles and assembly methods are intended for specific types of walls and they can be installed in several different ways. In this section we will cover basic wall construction, frame recommendations and anchoring methods.

Figure 39 below shows a stripped down plan view of a small commercial building that uses the 3 basic types of wall: unit masonry, drywall partitions and poured concrete. It also shows combinations of brick and block and brick, block and drywall together.

The architect will use specific types of line work and/or symbols to indicate which type of wall is required in each location. Figure 39 is fairly typical for most architectural firms today. It is important that you determine the type of wall so that you can provide the appropriate frame and anchorage needed.

Figure 39: Typical Floor Plan
The illustrations below detail the most common types of wall construction. We have provided both isometric and plan views of each. The plan views are generally what shows up on the large scale architectural details.

Figure 40: Typical Wall Details

- Masonry Concrete Block
- Poured Concrete
- Channel Type Steel Stud and Drywall
- Wood Stud and Drywall
MASONRY CONSTRUCTION

Brick or block are manufactured in various standard sizes, the most common of which are 4", 6", 8", 10" and 12" nominal thickness. Blocks are actually 3/8" thinner than their nominal size (ie: 3-5/8", 5-5/8", 7-5/8", 9-5/8" or 11-5/8").

There are two masonry installation methods: wrap around or butted applications.

Wrap Around application is where the masonry wall is placed inside the throat opening. The throat opening should be 1/8" greater than the actual wall thickness. The remaining gap between the wall and the frame is sealed with caulking materials. Figure 41 illustrates typical wrap around applications and the standard F, Miter and Notch and Stick-Series jamb depths used with each. The wrap around application is not generally used for 10" or 12" block.

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Figure 41: Wrap Around Masonry Applications
**Butted** application is the other installation method for masonry walls. In this situation the jamb depth of the frame is equal to or less than the actual wall thickness. Figure 42 shows typical butted applications and the different standard F, Miter and Notch and Stick-Series jambs depths which can be used with each. The butted application is not generally used for 4” block.

Wrap around and butt application masonry frames, whether knocked-down or set-up and welded, are stood in place, anchored to the floor and the wall is constructed around them. As the block work progresses up each jamb, wall anchors, positioned above or below the hinge reinforcements and directly opposite on the strike jamb, are embedded in the mortar joints between the block courses. The space inside the frame is filled with mortar, which is referred to as a “fully grouted frame”. The gap between the frame and the wall is sealed with caulking materials.

![Butted Masonry Application](image.png)
MASONRY WALL ANCHORS

Two types of anchors are used to secure frame product in new unit masonry walls: wire or bridge and strap fire anchors.

These anchors are embedded into the horizontal mortar joints between courses, as the wall is built-up around the frame.

The number of anchors per jamb is dependent on the frame height not the anchor type. Industry and Fleming standards are as shown in Table 3, below.

<table>
<thead>
<tr>
<th>Maximum Frame Rabbet Height</th>
<th>Quantity of Anchors per Jamb</th>
</tr>
</thead>
<tbody>
<tr>
<td>5'0&quot; (60&quot;)</td>
<td>2</td>
</tr>
<tr>
<td>7'6&quot; (90&quot;)</td>
<td>3</td>
</tr>
<tr>
<td>10'0&quot; (120&quot;)</td>
<td>4</td>
</tr>
<tr>
<td>12'0&quot; (144&quot;)</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 3: Anchors in Masonry Partitions

**Wire anchors**, shown in Figure 43, are the most versatile and commonly used. These anchors are manufactured from malleable steel, drawn into a loop. The open ends can be bent to suit any jamb depth. Wire anchors are shipped loose to the job site and installed by the contractor.

Wire anchors can be used in all non-rated fire door frame product, frames up to 96" x 96" with up to 1-1/2 hour fire ratings and 3/4 hour fire rated sidelight and window assemblies up to 96" width or 98" height.

![Butted Application](image1)

![Wrap Application](image2)

![Brick & Block Wrap Application](image3)

![Figure 43: Masonry Wire Anchor](image4)
Bridge and strap fire anchors are used exclusively in fire rated frame product. This type of anchor is used only for fire rated: 3 hour frames, frames over 96" x 96", transom frames or sidelight or window units exceeding 96" width or 98" height.

As shown in Figure 44, the bridge of the anchor is welded inside the soffit of the jamb either at the factory or the listed distributor’s shop. The strap slides up and down the bridge to allow for placement within the horizontal mortar joints.

This type of anchor can be used with all jamb depths and profiles of frame product.

Figure 44 : Bridge and Strap Masonry Fire Anchor
DRYWALL CONSTRUCTION

With these types of walls, single or multiple layers of drywall, gypsum, sheet rock or plaster and lath are affixed to wood or steel studs. Drywall, gypsum and sheet rock are basically the same thing, a board of gypsum, plaster or cement composition faced with paper, available in 1/2” or 5/8” thickness.

Plaster and lath are not used very often but can be applied from 3/8” to 1/2” thickness.

STEEL STUD WALLS

There are 3 basic designs of steel stud: truss, nailable and channel. By far the most common is the channel type. Channel studs are available in 6 different sizes: 1-5/8”, 2-1/2”, 3-1/2”, 3-5/8”, 4” and 6”. With steel studs, the nominal size is the actual size. Not all sizes are available in all areas of the country.

Frames in drywall, in most situations, are installed in a wrap around application. When welded or knocked-down frames are used, the throat opening should be 1/8” larger than the wall. For knocked-down slip-on drywall frames the throat should be same as the wall thickness.

Double steel studs should be used at all jambs and back-to-back runners at all heads. Figure 45 shows the recommended practice at head and jamb stud intersections.
Typical steel stud and drywall partitions, together with the standard jamb depths used with each, are shown in Figure 46.

- **2-1/2" Steel Stud + 1/2" Drywall Each Side**
- **2-1/2" Steel Stud + 5/8" Drywall Each Side**
- **3-1/2" Steel Stud + 5/8" Drywall Each Side**
- **3-5/8" Steel Stud + 1/2" Drywall Each Side**
- **3-5/8" Steel Stud + 5/8" Drywall Each Side**
- **3-5/8" Steel Stud + 2 Layers of 1/2" Drywall Each Side**
- **3-5/8" Steel Stud + 2 Layers of 5/8" Drywall Each Side**
- **4" Steel Stud + 5/8" Drywall Each Side**
- **6" Steel Stud + 5/8" Drywall Each Side**
- **6" Steel Stud + 2 Layers of 5/8" Drywall Each Side**

Figure 46 : Typical Steel Stud and Drywall Partitions
STEEL STUD WALL ANCHORS

Four types of anchors are used to secure frame product in steel stud and drywall partitions: combination stud anchors, 'Z' anchors, compression anchors and face dimpled anchors. The selection of anchor type is dependent upon the frame assembly method and the profile of the jambs.

Combination stud anchors (CSA) are used for standard profile, welded or knocked-down F, Miter and Notch or Stick-Series frame product where the wall is constructed after the frame is in place.

The 2 piece CSA, in Figure 47, is available in 2 sizes. One is suitable for all standard drywall profiles from 4-1/2" to 6-5/8" jamb depth, plus 4-3/4" and 5-3/4" F, Miter and Notch or Stick-Series masonry profiles. The other size covers standard drywall profile jamb depths from 7-1/8" to 9-1/2" plus 6-3/4" and 7-3/4" masonry profiles. This anchor is made of 2 identical size parts which interlock to form the completed anchors. They can easily be put together to form various sizes to fit multiple standard jamb depths.

The one-piece CSA, also illustrated in Figure 47, is used only in standard masonry profile frames. It is available in sizes to suit F, Miter and Notch or Stick-Series 4-3/4", 5-3/4", 6-3/4", 7-3/4" and 8-3/4" jamb depths.

Both the 1 and 2-piece designs are manufactured from 20 gage galvanneal steel and are friction fitted inside the profile before the studs are erected.

For all non-fire rated frame product or frames up to 1-1/2 hour rating, either anchor design may be shipped loose to the site for installation by the contractor.

For 3 hour rated frames and all rated transom, sidelight and window frames, these anchors must be tack welded into the jambs at the factory or the listed distributor’s shop.
Both designs of CSA are secured through the inner most steel stud with 2 standard 1/2" long pan head sheet metal screws per anchor. Figure 47 provides a typical completed installation detail.

‘Z’ anchors, the second type of steel stud anchor, are used for non-standard jamb depth double rabbet profiles in welded or knocked-down frames. Shown in Figure 48, they are available in widths of 2”, 3”, 5” and 7” to suit jamb depths up to 9-3/4” and are manufactured from 16 gage galvanneal steel.

These anchors are tack welded in two places to the inside of the profile at the factory or distributor’s shop directly above or below the hinge reinforcings and directly opposite on strike jambs. As with the CSA designs, ‘Z’ anchors are secured through the inner most stud with 2 standard 1/2” long pan head sheet metal screws per anchor.

![Typical Installation](image)

Figure 48: ‘Z’ Anchor

Like masonry wall anchors, the number of anchors per jamb, when using CSA or ‘Z’ anchors is based on the height of the frame. Table 4 below details the requirements.

<table>
<thead>
<tr>
<th>Maximum Frame Rabbet Height</th>
<th>Quantity of CSA or ‘Z’ Anchors per Jamb</th>
</tr>
</thead>
<tbody>
<tr>
<td>5’0” (60&quot;)</td>
<td>2</td>
</tr>
<tr>
<td>7’6” (90&quot;)</td>
<td>3</td>
</tr>
<tr>
<td>10’0” (120&quot;)</td>
<td>4</td>
</tr>
<tr>
<td>12’0” (144&quot;)</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 4: Anchors in Steel Stud Partitions
Compression anchors are the third type used in steel stud partitions. They are provided as part of an anchoring system in Fleming DW-Series knocked-down slip-on drywall frames only, where the frame is installed after the wall is completed.

These anchors are factory welded into the upper portion of each jamb. By turning an adjusting screw located in the jamb soffit, the internal portion of the anchors press snugly against the steel studs, plumbing and squaring the frame in the opening. Figure 49 illustrates the 18 gage galvanneal compression anchor assembly.

Faced dimpled anchors is the remaining type for steel stud partitions. The method is used only on Fleming’s A-Series adjustable frames.

The faces of A-Series jambs and heads are factory punched and dimpled for # 8 drywall screws. After the frame is in place, plumbed and squared, it is anchored to the partition with 2-1/2" drywall screws. Jambs up to 86" rabbet height receive 3 dimples per face and jambs up to 96" have 4. Head faces are dimpled at each end, with pairs having an additional set at the center of the rabbet width. Figure 50 illustrates typical corner intersection and installation details.
WOOD STUD WALLS

Wood studs are nominally 2" x 3", 2" x 4", 2" x 6" or 2" x 8". Unlike steel studs, they are actually 1/2" smaller than their nominal size (i.e.: a 2" x 4" is really measures 1-1/2" x 3-1/2").

Frames in wood stud and drywall partitions are installed in a wrap around application. As in most wrap applications, with welded or knocked-down frames, the throat opening should be 1/8" larger than the actual wall thickness. Knocked-down slip-on drywall frames, Fleming’s DW-Series, should be sized so that the throat opening is the same as the actual wall thickness.

Wood stud partitions are built prior to the installation of the frame in a method called ‘tilt-up construction’. The wall, complete with rough openings for frames, is built flat on the floor and then stood or tilted-up into position. Double studs should be used at all jambs with solid blocking at either side of a framed opening. Figure 51 shows a typical wood stud partition framed for a single door opening.

| Rough Stud Opening Width | F, M&N or Stick-Series Frames | Over-All Width + 1/2" | DW-Series Frames | Frame Rabbet Width + 1-7/8" | A-Series Frames | Frame Rabbet Width + 1-5/8"
|--------------------------|-------------------------------|------------------------|-------------------|-----------------------------|----------------|-----------------------------|
| Rough Stud Opening Height| F, M&N or Stick-Series Frames | Over-All Height + 1/4" | DW-Series Frames | Frame Rabbet Height + 3/4" | A-Series Frames | Frame Rabbet Height + 13/16"

Table 5 below provides the minimum rough stud opening sizes for Fleming F, Miter and Notch, Stick, DW and A-Series frame product.
Typical wood stud and drywall partitions, together with the standard jamb depths used with each, are shown in Figure 52.

Figure 52: Typical Wood Stud and Drywall Partitions
WOOD STUD WALL ANCHORS

Four types of anchors are also used to secure frame product in wood stud and drywall partitions. Three of them are also used with steel studs: combination stud anchors, compression anchors and face dimpled anchors. The fourth, wood stud anchors, are used only in wood stud partitions. Again, as with steel stud construction, the selection of the appropriate wood stud anchor is dependent on the frame assembly method and profile of the jambs.

Combination stud anchors (CSA), previously described on Page 33, are used for standard profile, welded or knocked-down F, Miter and Notch or Stick-Series frame product where the drywall is applied after the frame is in place.

When used in wood stud partitions, the ‘legs’ on the CSA are bent away from the throat opening, parallel to the wall and the anchor is secured to the faces of the adjacent jamb studs with 4 nails per anchor. Figure 53 illustrates these anchors and provides a typical installation detail.

Wood stud anchors (WSA) are used specifically in 2” x 4” partitions with welded or knocked-down F, Miter and Notch or Stick-Series frames where the drywall is installed after the frame. These 20 gage galvanneal steel anchors are tack welded inside the jamb profile at the factory or the distributor’s shop directly above or below the hinge reinforcements and directly opposite on strike jambs.

Wood stud anchors can be used on all non-fire rated and all fire rated frame product. They are secured to the face of the stud wall with 4 nails per anchor as shown in Figure 54.
The number of anchors recommended for CSA and WSA in wood stud and drywall partitions is shown in Table 6, below.

<table>
<thead>
<tr>
<th>Maximum Frame Rabbet Height</th>
<th>Quantity of CSA or WSA per Jamb</th>
</tr>
</thead>
<tbody>
<tr>
<td>5'0” (60”)</td>
<td>2</td>
</tr>
<tr>
<td>7'6” (90”)</td>
<td>3</td>
</tr>
<tr>
<td>10'0” (120”)</td>
<td>4</td>
</tr>
<tr>
<td>12'0” (144”)</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 6 : Anchors in Wood Stud Partitions

**Compression and face dimpled anchors** were covered on Page 35 and shown in Figures 49 and 50. They are used in the same fashion whether installed in steel or wood stud partitions. Figure 54 illustrates the installation details of both anchors in wood stud walls.
EXISTING CONSTRUCTION

Existing construction is any wall that has been built prior to the installation of the frame. It occurs in new buildings or those being renovated where frame product is to be installed against pre-cast, poured concrete or structural steel.

Existing construction is also found in renovation work where masonry or stud and drywall partitions are to ‘punched-out’ for new openings or where an old frame is to be replaced with a new one.

Knocked-down and welded frame product, the F, Miter and Notch and Stick-Series, must utilize a butted application when installed in existing walls. In this application, the jamb depth is equal to or less than the actual wall thickness.

Knocked-down slip-on frames, either Fleming’s KD-DW or A-Series, are used in a wrap around application in existing walls and the throat opening should be equal to the wall thickness.

EXISTING PRE-CAST, CONCRETE OR MASONRY WALLS

Figure 56 illustrates typical pre-cast or poured concrete walls and the standard F, Miter and Notch or Stick-Series jamb depths used with each.

![Figure 56: Typical Pre-Cast or Poured Concrete Walls](image)

On Page 28, Figure 42, details of butted frames in 6", 8", 10" and 12" masonry were provided and these apply whether the wall is newly constructed or existing.
EXISTING PRE-CAST, CONCRETE OR MASONRY WALL ANCHORS

As with new partitions, the selection of anchor types in existing walls is governed by the frame assembly method and profile of the frame.

Existing pre-cast, poured concrete or masonry partitions, with knocked-down or welded frames, have two styles of existing wall anchor (EWA) available: butterfly or strap and spacer.

In both cases, the soffit of the jamb is punched and dimpled for 1/4" diameter expansion shell anchor bolts or Tapcon concrete screws. The anchor preparations are located in the soffit, 6" from the top and bottom of each jamb, adjacent to the center hinge and directly opposite on strike or blank jambs. EWA guides are tack-welded inside the jamb profile at the factory or the distributor's shop. The frame is placed in the opening, squared and plumbed. For expansion shell type anchors, holes to suit the expansion shell anchor are drilled in the partition. The expansion shell anchors are placed into the holes and tightened, securing the frame in place. For Tapcon concrete screws, after the frame is squared and plumbed in the opening, pilot holes are drilled and the Tapcons are screwed in place. Expansion bolt anchors and Tapcons are supplied by the contractor.

Butterfly type existing wall anchor guides, shown in Figure 57, are manufactured from 18 gage galvanneal steel. This style is used in 2" face, double rabbet, masonry profile sections.

Strap and spacer type existing wall anchor guides, illustrated in Figure 58, are 16 gage galvanneal steel. There are 5 standard strap widths to suit jamb depths from 4-3/8" to 9-5/16". This style is used in single or double rabbet masonry profiles where the butterfly type is not suitable.
**Face dimpled anchors**, standard with Fleming’s A-Series frame, as detailed in Figure 59, are the only option when a wrap application in existing pre-cast, concrete or masonry is needed. The frame is secured with 2-1/2” long 3/16” diameter flat head Tapcon screws in the jambs and head.

![Diagram of A-Series Frame with Face Dimpled Anchors](image)

**EXISTING DRYWALL PARTITIONS**

In renovation work, openings are sometimes ‘punched-out’ of an existing drywall partition for a new frame. In this type of work only KD-DW or A-Series, knocked-down slip-on frames in a wrap application will work.

The installation of either series of frame and its anchorage is identical to new construction in drywall. Compression and face dimpled anchors in steel stud walls are detailed on Page 35 and for wood stud partitions on Page 39.
FLOOR ANCHORS

As well as being secured to the wall, most frames are fixed to the floor. There are 3 basic types: floor anchor straps, face-dimpled drywall base anchors and mullion floor anchors.

**Floor anchor straps** are available in 3 designs: one for standard double rabbet and cased open profiles, another for non-standard single rabbet sections and the third for double egress hinge jambs. As shown in Figure 60, each type is welded to the inside of the frame profile and is ram set or bolted to the floor through the 2 holes provided.

These 16 gage galvanneal steel anchors are used in welded or knocked-down frames installed in new masonry or stud and drywall partitions.

Welded or knocked-down frames in existing pre-cast, concrete or masonry frames cannot be anchored to the floor. The EWA preparations and guide located 6” from the bottom of each jamb act as the floor anchor.
Face-dimpled base anchors are used in knock-down drywall KD-DW Series frames. Each jamb face is punched and dimpled 3/4" from the bottom for standard # 8 drywall screws which secure the base of the frame to the steel floor runner or wood sill plate.

A similar base anchor is used in Fleming A-Series frames. As illustrated in Figure 62, each jamb face is punched and dimpled 4" from the bottom and screws secure the base of the frame to the partition.
Mullion floor anchors are used to secure mullions which terminate at the floor. These anchors are manufactured from 12 gage galvanneal steel and are provided with 2 holes through which they are ram set or bolted to the floor.

There are 5 standard sizes to suit 4-3/4", 5-3/4", 6-3/4", 7-3/4" and 8-3/4" standard jamb depth, 2" face mullions. Non-standard sizes are also available.

As shown in Figure 63, the mullion is placed over the installed anchor and holes are drilled through the mullion face and the anchor. The mullion is then secured to the anchor with # 12 x 1/2" long pan head sheet metal screws.

Non-fire rated mullions receive 1 screw per face. Mullions in fire rated frames require 2 per face.

Figure 63: Mullion Floor Anchors
HARDWARE

LOCATIONS

All Fleming frame products utilize standard locations for hinge and strike jamb preparations. Hinge jambs for frames 6'8" through 7'2" height are prepared for three 4-1/2" standard weight (.134" leaf thickness) hinges with a 3/8" backset. All strike jambs are prepared for an ASA (1-1/4" x 4-7/8") strike with a 3/8" backset and 3 silencers.

Figure 64 illustrates the standard hardware locations for Fleming frame product, 6'8" to 7'2" rabbet height.

<table>
<thead>
<tr>
<th>Frame Rabbet Height</th>
<th>4-1/2&quot; Hinges</th>
<th>ASA Strike</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F (Pitch)</td>
<td>A</td>
</tr>
<tr>
<td>6'8&quot; (80&quot;)</td>
<td>29 15/16&quot;</td>
<td>37 7/16&quot;</td>
</tr>
<tr>
<td>6'10&quot; (82&quot;)</td>
<td>30 15/16&quot;</td>
<td>38 7/16&quot;</td>
</tr>
<tr>
<td>7'0&quot; (84&quot;)</td>
<td>31 15/16&quot;</td>
<td>39 7/16&quot;</td>
</tr>
<tr>
<td>7'2&quot; (86&quot;)</td>
<td>32 15/16&quot;</td>
<td>40 7/16&quot;</td>
</tr>
</tbody>
</table>

Figure 64 : Standard Hardware Locations
REINFORCINGS

Fleming frame products utilize common components beyond their floor and wall anchors. Hinge, strike and closer reinforcements, both standard and optional, are typical through the product lines.

The following section provides you with basic information on the most common preparations and reinforcements.

High frequency hinge reinforcements, shown in Figure 65, are provided at all hinge cutouts as a standard with Fleming. This unique 10 gage galvanneal steel angle design is far superior to traditional 3/16” thick flat bar hinge reinforcements. Each reinforcing is secured in the section with 6 projection welds. All hinge cutouts (except on A-Series frames) are protected with 20 gage galvanneal steel mortar guard boxes.

The hinge reinforcements supplied standard are off-set, drilled and tapped for 4-1/2” standard weight hinges. A standard weight hinge has a leaf thickness of .134”. Each reinforcing bar is provided with 4 raised ‘donuts’ which may be ground off by the distributor to convert from standard weight to heavy weight (.180” thick leaf) hinges.

Fleming can also provide reinforcing for non-standard hinge leaf thickness, 5” hinges, anchor hinges, pivots, continuous and other specialized type hinges.

Figure 65: High Frequency Hinge Reinforcing
**ASA strike reinforcing**s are provided standard in all Fleming strike jambs and mullions. An ASA strike is 4-7/8” tall, 1-1/4” wide and has a lip 3-3/8” tall which allows the latch bolt to retract without marring the frame.

In addition, all strike jambs are provided with 3 bumper holes, factory punched in the stop. One is centered at the strike height, the other two, 10” from the top and bottom of the frame rabbet opening.

Two designs of reinforcing are utilized: one for open sections, the other for mullions and A-Series strike jambs. Both designs are secured to the frame with 6 projection welds per reinforcing.

In Figure 66, the left unit is the design used in open sections. This 16 gage galvanneal component has an integral mortar guard box sized to take up to 1” long latch or dead bolts. The strike mounting holes are extruded and tapped to an effective 12 gage material thickness to ensure a high performance product.

The right side illustrates the 12 gage galvanneal steel strike reinforcing for mullions and A-Series strike jambs.

![Figure 66: ASA Strike Reinforcings](image-url)
SMALL ASA/NL strike reinforcing is an optional preparation on all Fleming product.

Shown in Figure 67, they can be used as a stand alone prep or in conjunction with an ASA strike.

These 14 gage galvanneal steel reinforcements are coined, drilled and tapped to suit standard 2-3/4” x 1-1/8” no lip strikes provided with most cylindrical and mortise deadlocks.

Small ASA/NL strike reinforcements are secured to the inside of the profile with 3 tack welds each and for all open sections (except A-Series frames) are protected with 22 gage galvanneal steel mortar guard boxes.

Figure 67 : Small ASA/NL (Deadlock) Strike Reinforcing
**Surface strike reinforcing** is another option available on all Fleming frame product. This type of strike is used on openings equipped with rim exit devices. Shown in Figure 68, this 12 gage galvanneal steel reinforcing plate is secured to the inside of the strike jamb soffit with 3 tack welds.

The flat bar reinforcing is 11-7/8” long and from 3/4” to 2” wide in 1/4” increments. The reinforcing is generally 1/4” narrower than the soffit width and is installed tight against the door stop.

![Surface Strike Reinforcing](image)

**Figure 68 : Surface Strike Reinforcing**

In addition to the 3 presented, Fleming can provide frame product prepared for non-standard strike sizes or locations and specialized units such as electric strikes.
Surface closer reinforcing in heads is another option available. Abbreviated as CRW, for closer reinforcing – welded, this option provides the necessary material thickness and strength required to mount surface closers.

As shown in Figure 69, the standard 12 gage galvanneal steel flat bar reinforcements, measuring 11-7/8” long and 1-1/2” wide, are secured to the inside of the head or transom mullion face with 3 tack welds at the factory or distributor’s shop.
Parallel arm closer reinforcing is a second type available on all Fleming heads and transom mullions. Abbreviated as P/A, it also uses 12 gage galvanneal steel flat bar reinforcements 11-7/8" long.

Parallel arm closers are soffit mounted. When the soffit is less than 2" in width an additional reinforcing is provided in the opposite rabbet. Soffit reinforcements are available from 3/4" to 1-3/4" widths, in 1/4" increments. Opposite rabbet reinforcements are from 3/4" to 1-1/2" width. When the opposite rabbet reinforcements are required, the total width of the 2 reinforcements is 2-1/4".

Figure 70 : Parallel Arm Closer Reinforcing
**Reversible flush bolt strikes and reinforcing**s are also available for all Fleming frame product heads and transom mullions. Used in pairs only, this combination head cut-out, strike reinforcing and flush both strike are illustrated in Figure 71.

The cut-out is made in the door rabbet, centered over the meeting edges of the two doors. The 16 gage chromated galvanneal steel reinforcing is spot welded into place inside the head or transom mullion in two places.

The strike itself, also 16 gage chromated galvanneal steel, has a rectangular hole punched at one end. The strike is screw fixed to the reinforcing with the hole on the left side when the inactive leaf, the one with the flush bolt, is left hand swing. Reverse the strike and it is ready for a right hand door.

![Diagram of reversible flush bolt strike and reinforcing](image)

**Figure 71 : Reversible Flush Bolt Strike and Reinforcing**

Fleming can also provide a number of non-standard head preparations including: mortise closers and holders, door position switches, surface maglocks and mortise vertical rod strikes.
HANDING

Frame product is manufactured to suit the handing of the doors hung in them.

Although the terms “hand” and “swing” are used interchangeably, technically “swing” describes the direction of egress for the frame and “hand” defines the operating direction of a door.

The hand of every door can be defined using one of the following terms: Left Hand, Right Hand, Left Hand Reverse or Right Hand Reverse.

**Left or Right Hand** doors are those where the key for the latching device is located on the push side (or back) of the door. In other words, when you are locking or unlocking the door, you will push the door away from you to operate it.

**Reverse Hand** doors (also referred to as reverse bevel doors) are those where the key is located on the pull side (or front) of the door. When you are locking or unlocking the door, you will pull the door towards you to operate it.

There are 6 types of frame swing configurations with variations of each recognized in industry. The illustrations on the following pages detail the various door and hardware handings and frame swings available.
**Singles** are the simplest type of frame available. Single frames are either left or right-hand swing. Figure 74 illustrates “single acting” doors, those which operate in one direction only. A left hand swing frame will use either a left hand or a right hand reverse door. Conversely, a right hand swing frame uses either right hand or left hand reverse doors.

![Diagram of Singles (Single Acting)](image-url)

Figure 74 : Singles (Single Acting)
Pairs are frames with two doors hung in the same rabbet opening without a vertical center mullion between them. In a pair, one or both doors may contain a latching device. A door with a latching device is called an "active" leaf. The door in a pair prepared for a strike is called the "inactive" leaf. Figure 75 details the 6 variations of pairs available based on door handing.

**Double Egress** is a specialized type of frame with a pair of doors operating in opposite directions. The doors in double egress frames are always reverse handed and both leaves are active.
R/L, L/L and R/R units are similar to pairs, but have a fixed or removable mullion between the doors. They are in fact two single doors, each with its own rabbet opening. They can be reverse handed, but both leafs are active.

Contra-Swing is similar in function to a double egress unit. The two doors swing in the opposite direction but latch into a vertical mullion placed between them. Either door can be reverse handed, but both leafs are active.
Double Acting frames permit doors to operate in both directions, towards or away from their closed position. They are available in singles or pairs. Double acting frames are usually fabricated from cased open components.

Figure 79: Double Acting
Communicating frames are double rabbet units prepared to accept a door in each rabbet. They typically facilitate access and control between individual hotel or motel rooms.

Multi-Opening frames, transom and sidelight frames are also available. These units contain 3 or more doors in combinations of singles, pairs, double egress, contra-swing or double acting configurations. In Figure 81 a few straight forward units are detailed.
FRAME SERIES

Now that you have an understanding of frame profiles, assembly methods, anchoring, hardware reinforcing, handing and terminology in general terms, the following pages will cover Fleming’s five basic series of frame product.

This section is intended to provide you with a working knowledge and over-view of our varied standard frame series and how they can apply to the projects you are supplying.

F-SERIES

The F-Series is our standard knocked-down masonry frame product with applications in block, concrete and drywall partitions.

This series can utilize wire or bridge and strap fire anchors, one or two-piece combination stud anchors, wood stud anchors or the butterfly existing wall anchor guides.

The F-Series is eligible for fire ratings up to an including 4’0” x 10’0” singles and 8’0” x 10’0” pairs at 3 hours.

The standard features of this series are:

- 16 gage punch-mitered, double rabbet, masonry profile, commercial frame for 1-3/4” thick doors
- Jambs, heads and all components fabricated from paintable galvanneal steel
- All components projection welded
- All hinge locations provided with Fleming 10 gage high frequency hinge reinforcing (see Figure 65, Page 47)
- All hinge reinforcements dimpled to convert from standard to heavy weight
- All hinge reinforcements protected with dust boxes
- 16 gage ASA strike reinforcing with 1” deep integral dust box (see Figure 66, Page 48)
- Strike jambs and double heads machine punched for door silencers
- Knocked-down, convertible to set-up and welded construction. Each jamb provided with 2 projection welded KD corner clips and head machine slotted for corner clip tabs
- Floor anchor projection welded into all jambs (see Figure 60, Page 43)
- 2” face x 5/8” stop profile with unequal rabbets
- Available in standard widths, heights and jamb depths
- All hinge jambs provided with embossed (die stamped) UL fire label

Figure 82 on the next page will provide you with illustrations of typical heads, jambs and the standard jamb head intersection after assembly along with profile and standard size information.
Figure 82: F-Series Standard Profiles and Sizes
DW-SERIES

The DW-Series is a knocked-down drywall profile product installed in steel or wood stud partitions after the application of the drywall.

DW-Series is eligible for fire ratings up to and including 1-1/2 hours at 3’6” x 7’2” or 3’0” x 8’0” singles and 7’0” x 7’2” pairs.

Standard Features
• 16 or 18 gage punch-mitered, double rabbet, drywall profile, commercial frame for 1-3/4” doors
• 18 gage punch-mitered, double rabbet, drywall profile, commercial frame for 1-3/8” doors
• 16 gage punch-mitered, cased open drywall profile commercial frame
• Jambs, heads and all components fabricated from paintable galvanneal steel
• All components projection welded
• All hinge locations provided with Fleming 10 gage high frequency hinge reinforcing (see Figure 65, Page 47)
• All hinge reinforcing dimpled to convert from standard to heavy weight
• 16 gage ASA strike reinforcing with 1” deep integral dust box (see Figure 66, Page 48)
• Strike jambs and double heads machine punched for door silencers
• Knocked-down (slip-on) construction. Each jamb provided with 2 projection welded KD corner clips and head machine slotted for corner clip tabs
• Adjustable compression anchor projection welded into top of each jamb (see Figure 49, Page 35)
• Each jamb face punched and dimpled for drywall screw attachment to floor studs (see Figure 61, Page 44)
• 2” face x 5/8” stop profile with unequal rabbets.
• Available in standard widths and heights and jamb depths
• All hinge jambs for 1-3/4” doors are provided with an embossed (die stamped) UL fire label

Figure 83, below, details typical jambs, heads and the standard DW-Series knocked-down drywall corner intersection. Figure 84 on the next page provides the profile and standard sizes available.
### DW16 Series Standard Frame Rabbet Sizes

<table>
<thead>
<tr>
<th>Heights</th>
<th>Singles (W)</th>
<th>Pairs (W)</th>
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<tbody>
<tr>
<td>6'8&quot; (80&quot;)</td>
<td>2’0&quot; (24&quot;)</td>
<td>4’0&quot; (48&quot;)</td>
</tr>
<tr>
<td>6'10&quot; (84&quot;)</td>
<td>2’2&quot; (26&quot;)</td>
<td>4’8&quot; (56&quot;)</td>
</tr>
<tr>
<td>5'0&quot; (60&quot;)</td>
<td>2’4&quot; (28&quot;)</td>
<td>5’0&quot; (60&quot;)</td>
</tr>
<tr>
<td>5'2&quot; (64&quot;)</td>
<td>2’6&quot; (30&quot;)</td>
<td>5’4&quot; (64&quot;)</td>
</tr>
<tr>
<td>6’0” (72&quot;)</td>
<td>2’8&quot; (32&quot;)</td>
<td>6’0&quot; (72&quot;)</td>
</tr>
<tr>
<td>6’10&quot; (84&quot;)</td>
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<td>6’4&quot; (76&quot;)</td>
</tr>
<tr>
<td>7’0” (86&quot;)</td>
<td>3’0&quot; (36&quot;)</td>
<td>6’8&quot; (80&quot;)</td>
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<tr>
<td>8’0” (96&quot;)</td>
<td>3’6” (42&quot;)</td>
<td>7’4” (88&quot;)</td>
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### DW18 Series Standard Frame Rabbet Sizes

<table>
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<th>Heights</th>
<th>Singles (W)</th>
<th>Pairs (W)</th>
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<td>2’2&quot; (26&quot;)</td>
<td>4’8&quot; (56&quot;)</td>
</tr>
<tr>
<td>6’10&quot; (84&quot;)</td>
<td>2’4” (28&quot;)</td>
<td>5’0” (60&quot;)</td>
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<tr>
<td>7’0” (86&quot;)</td>
<td>2’6” (30&quot;)</td>
<td>5’4” (64&quot;)</td>
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<td>8’0” (96&quot;)</td>
<td>3’0” (36&quot;)</td>
<td>6’4” (76&quot;)</td>
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</tbody>
</table>

### Table

<table>
<thead>
<tr>
<th>Heights</th>
<th>Singles (H)</th>
<th>Pairs (H)</th>
</tr>
</thead>
<tbody>
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<td>2’6” (30&quot;)</td>
<td>5’4” (64&quot;)</td>
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<tr>
<td>8’0” (96&quot;)</td>
<td>3’0” (36&quot;)</td>
<td>6’0” (72&quot;)</td>
</tr>
</tbody>
</table>

**Figure 84**: Standard DW-Series Profiles and Sizes
DE-SERIES (DOUBLE EGRESS) FRAMES

Double egress is a set-up and welded, masonry profile frame installed in block, concrete or drywall partitions.

It contains a pair of doors operating in opposite directions, generally installed in a cross-corridor situation. Figure 85 shows typical plan views of double egress assemblies, both right and left hand swinging.

These frames can utilize wire or bridge and strap fire anchors, special “Z” stud anchors or the strap and spacer type existing wall anchor guides.

DE-Series frames are eligible for fire ratings up to 8’0” x 10’0” at 3 hours.

The standard features are:

- 16 gage, masonry profile, commercial frame for 1-3/4” thick doors
- 2” face, double 5/8” stopped jambs, factory notched at top to suit wrap around applications
- 2” face, single rabbet heads factory assembled, exposed stop ends at center completely finished and heads factory notched at each end for set-up and welded butt joint at jambs
- Welded-in inverted channel provided at the center of each head
- Jambs, heads and all components fabricated from paintable galvanneal steel
- All components projection welded
- All hinge locations provided with Fleming 10 gage high frequency hinge reinforcing (see Figure 65, Page 47)
- All hinge reinforcing dimpled to convert from standard to heavy weight
- All hinge reinforcements protected with dust boxes
- Floor anchor projection welded into all jambs (see Figure 60, Page 43)
- Available in standard widths, heights and jamb depths
- All hinge jambs are provided with an embossed (die stamped) UL fire label

Figure 86, on the next page, illustrates typical hinge jamb, head, set-up and welded corner details.
Figure 86 : Standard Double Egress Frame Details

- Factory notched at each end to suit jamb butt joint
- Factory notched for wrap-around applications
- Inverted Channel
- Typical Factory Assembled Head
- Typical Hinge Jamb
- Welded Inside Face
- Seamless Face Butt Joint
- Typical Section through Head
- Typical Assembled Hinge Jamb and Head
Because the doors in double egress frames are centered on the jamb depth, the door rabbet is 2" instead of 1-15/16" and the soffit and reveal rabbets on the hinge jambs are equal. As shown in Figure 87 below, the jambs are 'double stopped' and the heads are single rabbet profiles.

Figure 87 : Standard Double Egress Series Profiles and Sizes
A-SERIES (ADJUSTABLE) FRAMES

The A-Series is our adjustable jamb depth frame product. It is a knocked-down slip-on drywall profile which can be used in stud and drywall, existing block and concrete partitions.

This series is available in 3 sizes: 4-1/2”, 5-1/16” and 7-7/8” to suit walls from 3-1/2” to 12-1/2” thickness, designated as "S" (small for 4-1/2"), "M" (medium for 5-1/16") and "L" (large for 7-7/8”).

The hinge and strike jambs and the heads of this series are face dimpled for either #8 drywall screws or 3/16” diameter Tapcon screws which anchor the frame securely to the wall.

A-Series frames are eligible for fire ratings up to 4'0” x 8'0” singles, 8'0” x 8'0” pairs, to 1-1/2 hour rating.

The standard features of this frame series are:

- 16 gage punch-mitered, adjustable jamb depth, drywall profile, commercial frame for 1-3/4” doors
- Jambs, heads and all components fabricated from paintable galvanneal steel
- Standard jamb depths; 4-1/2” (to wrap 3-1/2” through 5-5/8” walls); 5-1/16” (to wrap 4-1/16” through 6-7/8” walls) and; 7-7/8” (to wrap 6-7/8” through 12-1/2” walls)
- All components projection welded
- All hinge locations provided with Fleming 10 gage high frequency hinge reinforcing (see Figure 65, Page 47)
- All hinge reinforcing dimpled to convert from standard to heavy weight
- 12 gage ASA strike reinforcing (see Figure 66, Page 48)
- Strike jambs and double heads machine punched for door silencers
- Knocked-down, convertible to set-up and welded construction. Each jamb provided with 2 projection welded KD corner clips and head machine slotted for corner clip tabs
- Jamb and head components connected with 2-piece, 14 gage sliding angle bracket assemblies
- Jambs and heads punched and face dimpled for #8 drywall or 3/16” diameter Tapcon screw anchors (see Figure 50, Page 35)
- 2” face x 5/8” stop profile
- Available in standard widths and heights
- All hinge jambs are provided with an embossed (die stamped) UL fire label

Figure 88 on the next page, provides you with standard profile and jamb/head intersection details.
Figure 88: Standard A-Series Profiles and Sizes
MN-SERIES (MITER AND NOTCH) AND ST-SERIES (STICKS)

These two Series are used for multi-opening frames, transom, sidelight and window assemblies. Both are 16 gage galvanneal steel, masonry profile, distributor assembled product.

With the MN-Series, jambs, heads, mullions, sills, center rails, corner posts and filler pieces are ordered from the factory as machine mitered or notched to length components, to suit the specific requirements of the unit to be built.

ST-Series components are ordered and inventoried by the distributor in standard 10’ length “sticks”. The distributor does the miters, notches and assembles them into the final unit.

Both MN and ST-Series products are constructed as set-up and welded units for installation in block, concrete or drywall partitions.

The standard features common to both Series are:

- 16 gage double rabbet, masonry profile, paintable galvanneal steel, commercial frame components for 1-3/4" doors
- All hardware reinforcements projection welded
- All hinge locations provided with Fleming 10 gage high frequency hinge reinforcing (see Figure 65, Page 47)
- All hinge reinforcements dimpled to convert from standard to heavy weight
- In open hinge sections, reinforcements protected with dust boxes
- In open strike sections, 16 gage ASA strike reinforcing with 1" deep integral dust box (see Figure 66, Page 48)
- In strike mullions, 12 gage ASA strike reinforcing (see Figure 66, Page 48)
- Floor anchor projection welded into all open section hinge and strike jambs (see Figure 60, Page 43)
- Full compliment of standard hinge/strike prep combinations in open and mullion sections
- 2" face hinge, strike and blank open sections
- Mullions - 2" face
- Heads and sills – 2", 4", 6-13/16", 8", 8-13/16" and 12" face
- Center rails - 6", 8" and 12" face
- Cased open sections - 2" face
- Stopped and cased open filler pieces
- Corner posts - 2 and 3 way
- Available in standard widths, heights and jamb depths
- All hinge sections are provided with an embossed (die stamped) UL fire label

Figure 89, on the next page, provides profile details for the various standard MN and ST-Series components available.
The illustration below in Figure 90 shows an exploded version of the components for a typical sidelight frame with the various miters and notches and the finished set-up and welded assembly.

Figure 90: MN or ST-Series Components for a Typical Sidelight Frame
FIRE RATED FRAME PRODUCT

Steel door and frame assemblies play a crucial role in providing the fire and life safety protection required in most buildings today. Fire protection requirements are established by the building code governing the area in which the building is to be erected and the uses to which the building will be put.

The fire protection of a wall opening requires a complete assembly which includes the door, frame, glazing materials, builders’ hardware and the installation.

The basic requirements relating to doors and frames are included in this manual. For information on installation the National Fire Protection Association (NFPA) standard, NFPA 80, “Fire Doors and Windows” should be consulted. This standard is specified as a governing document in most North American Building Codes.

The manufacturers of builders’ hardware and the Door and Hardware Institute publish documents which cover that facet of the industry.

Another good reference guide is the National Association of Architectural Metal Manufacturers, Hollow Metal Manufacturers division (NAAMM-HMMA) publication entitled “Fire-Rated Hollow Metal Fire Doors and Frames”, manual number HMMA-850. This document brings together information from various sources into one booklet.

Our manual, the “Basic Hollow Metal Training Manual”, provides a general overview only of our capabilities for fire rated product. Fleming publishes a stand-alone, comprehensive guide to the subject, entitled the “Fleming Fire Labeling Specifications” catalogue which has been included in the last section of the manual. When you need specific, detailed information on the requirements and limitations which apply to Fleming fire labeled products, you will find this an invaluable source.

Fire doors and frames, since the early 1900’s, have been run to what has evolved into the UL10b standard, published by Underwriters Laboratories. Other standards, which mirror the UL one, include NFPA 252. These standards have been historically known as ‘negative or neutral pressure’ tests. The neutral plane for these has been located at the top of the frame assembly.

In 1997 the International Conference of Building Officials (ICBO) adopted and published an alternate test method to be run under ‘positive pressure’, called UBC 7-2 (1997) for the Uniform Building Code. UL has developed UL10c which addresses all the requirements of the UBC standard. UL10c and UBC 7-2 (1997) require the neutral plane to be located 40” from the bottom of the assembly.
Other changes, such as the development of positive pressure standards by NFPA and ASTM and the International Building Code (IBC), a single model code for the United States, will evolve and be adopted over the next few years.

From a fire rating standpoint, there are three basic levels of performance or endurance, each tied to the rating of the wall. The basic rule of thumb is: door, frame and hardware fire protection ratings equal three-quarters of the wall’s fire resistance rating. Table 7 outlines the relationship between opening location, wall rating and door and frame rating. It is the responsibility of the architect to determine and schedule the requirements of all openings in the building based on the local building code.

<table>
<thead>
<tr>
<th>Opening Description</th>
<th>Wall Fire Resistance Rating</th>
<th>Door and Frame Fire Protection Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Openings in walls which separate buildings or divide a single building into fire areas</td>
<td>4 Hour</td>
<td>3 Hour</td>
</tr>
<tr>
<td>Openings in; enclosures of ‘vertical communication’ such as stairwells and elevator shafts or; exterior walls subject to severe fire exposure from outside the building</td>
<td>2 Hour</td>
<td>1-1/2 Hour</td>
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<tr>
<td>Openings between occupancies</td>
<td>1 Hour</td>
<td>1 Hour</td>
</tr>
<tr>
<td>Openings in; corridors and room partitions or; exterior walls subject to light to moderate fire exposure from outside the building</td>
<td>1 Hour</td>
<td>3/4 Hour</td>
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<tr>
<td>Openings where smoke control is the primary consideration or; between a habitable room and a corridor when the wall has a fire resistance rating not more than 1 Hour or; across corridors where a smoke partition is required</td>
<td>1 Hour</td>
<td>1/3 Hour (No Hose Stream - US)</td>
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<tr>
<td></td>
<td></td>
<td>(With Hose Stream - Canada)</td>
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</tbody>
</table>

Table 7: Fire Ratings – Walls, Doors and Frames

Our products are available with labels from the most recognized certification agencies and laboratories in North America: Underwriters Laboratories (UL), and Warnock Hersey / Intertek Testing Services (WHI/ITS).

Fire door and frame product are identified as such only by the presence of a label issued by the certification agency. Labels are available in a number of materials which include metal drive riveted, adhesive-backed mylar or for frames, labels embossed (stamped) directly into the product. Facsimiles of the various labels available from Fleming are provided on Pages 32 and 33 of the Fire Labeling Specification brochure.

Fire labels are applied only at the factory or a ‘listed’ distributor shop. Distributors eligible to apply fire labels have been approved by the certification agency under an In-Plant Labeling Program. These programs have been developed to ensure that the distributor has the facilities and expertise to assemble and / or modify product in accordance with the requirements of the agency. Approved distributors are subject to on-going, unannounced inspections by agency personnel to ensure compliance with the program.

The field application of fire labels, except under the direct supervision of lab inspection services, is strictly forbidden. A separate program, called a Special Field Inspection (SFI), is available to rectify problems related to the field labeling of Fleming fire door and frame product. Please contact the factory for additional information.
Fleming has been testing fire doors and frame product for over 35 years and has some of the most extensive and comprehensive listings in North America. The Tables below provide an overview summary of our capabilities for fire door frame product.

<table>
<thead>
<tr>
<th>Construction</th>
<th>Product</th>
<th>Gage</th>
<th>Assay Method</th>
<th>3 Hour</th>
<th>1-1/2 Hour</th>
<th>3/4 Hour</th>
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<td>Singles</td>
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Table 8: Maximum Rabbet Opening Sizes for Frame Product
Another area presently undergoing major changes is the glazing materials industry. Many new materials have been introduced over the past few years and are available for use in fire rated transom, sidelight and window assemblies. Table 10 provides a summary of maximum individual exposed light sizes available. Please refer to Pages 28 to 31 of the Fire Labeling Specifications for more detailed information.

### Table 9: Maximum Over-All Unit Size for Frame Products

<table>
<thead>
<tr>
<th>Listed Glazing Material</th>
<th>2 &amp; 3 Hour</th>
<th>1 &amp; 1-1/2 Hour</th>
<th>1/3, 1/2 &amp; 3/4 Hour (With Hose Stream - Canada Only)</th>
<th>1/3 Hour (No Hose Stream - US Only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4&quot; Georgian Wired Glass</td>
<td>-</td>
<td>-</td>
<td>1296 in² area 54&quot; w or 54&quot; ht</td>
<td>5268 in² area 110-3/8&quot; w 110-3/8&quot; ht</td>
</tr>
<tr>
<td>Specialized Wired Glass</td>
<td>-</td>
<td>-</td>
<td>4608 in² area 48&quot; w x 96&quot; ht</td>
<td>5268 in² area 110-3/8&quot; w 110-3/8&quot; ht</td>
</tr>
<tr>
<td>Laminated or Ceramic Glazing</td>
<td>(c) 3288 in² area 94-5/8&quot; w 126&quot; w or 126&quot; ht</td>
<td>4990 in² area 96&quot; w or 96&quot; ht</td>
<td>5605 in² area 96&quot; w or 96&quot; ht</td>
<td>6272 in² area 106-1/2&quot; w 106-1/2&quot; ht</td>
</tr>
<tr>
<td>3/8&quot; Thick Cement Board Panels</td>
<td>3456 in² area (a) 96&quot; w x 54&quot; ht</td>
<td>3456 in² area 96&quot; w x 54&quot; ht</td>
<td>3456 in² area 96&quot; w x 54&quot; ht</td>
<td>3456 in² area 96&quot; w x 54&quot; ht</td>
</tr>
<tr>
<td>1/2&quot; Thick Gypsum Board Panels</td>
<td>-</td>
<td>-</td>
<td>1296 in² area 54&quot; w or 54&quot; ht</td>
<td>1296 in² area 54&quot; w or 54&quot; ht</td>
</tr>
<tr>
<td>1-3/4&quot; Honeycomb or Vertically Stiffened Panels</td>
<td>5760 in² area 48&quot; w x 120&quot; ht</td>
<td>5760 in² area 48&quot; w x 120&quot; ht</td>
<td>5760 in² area 48&quot; w x 120&quot; ht</td>
<td>5760 in² area 48&quot; w x 120&quot; ht</td>
</tr>
</tbody>
</table>

(a): Available in Transom Frames only
(b): Maximum sizes for each rating, not the same material for each
(c): 2 Hour rating maximum

Table 10: Maximum Individual Exposed Light Sizes – Transoms, Sidelight and Window Frames
INSTALLATION

The final area to be covered in this section is that of frame installation. Fleming, as you have seen from the previous pages, manufactures 6 basic series of frame product: F, DE, MN, ST, DW and A-Series. The F-Series are available as knocked-down or welded product. DE, MN and ST-Series frames are all set-up and welded. Our DW-Series is a knocked-down slip-on drywall application. The A-Series is a special knocked-down slip-on drywall application which can be converted to welded construction.

Installation methods and sequence varies with the construction of the frame and wall type.

F, DE, MN AND ST-SERIES WELDED AND F-SERIES KNOCKED-DOWN FRAMES

Welded and knocked-down frames are set in place with the wall being constructed around them.

For knocked-down frames start at Step 1, welded frames at Step 2.

1. **Assemble Frame**
   a) Insert jamb corner clip tabs into 4 slots at each end of head
   b) Ensure that face miters on jambs and heads are tight and corners are square
   c) Bend the tabs at each head rabbet slot downwards away from the door opening and the tabs at each head return slot downwards towards the throat opening

![Figure 91 : KD Corner Assembly](image-url)
2. **Remove Temporary Spreaders**
   a) Welded frames are provided with temporary steel spreaders to maintain alignment and minimize other damage during shipping and handling. They are not intended to be used during the installation and must be removed.

   ![Figure 92: Temporary Shipping Spreaders](image)

   For new unit masonry or steel stud partitions proceed to Step 3.
   For wood stud partitions go to Step 7.
   For existing unit masonry or poured concrete walls proceed to Step 8.

3. **Place and Anchor to Floor**
   a) Stand frame in position
   b) Place a wooden spreader between the jambs at the floor. The spreader must be square, at least 1" thick, almost as wide as the frame jamb depth with clearance notches at each end for the frame stops/soffits

   ![Figure 93: Wooden Spreaders](image)

c) Level the frame head, placing shims under the jamb floor anchors as necessary
d) Adjust frame for alignment and twist. Rabbets must be parallel
e) Fasten jambs to the floor through the floor anchors

   ![Figure 94: Floor Anchor](image)
4. Set Frame  
   a) Brace the frame as shown. Do not brace in the direction of the adjacent wall  
   b) Install a second wooden spreader at the mid-height of the frame to maintain correct frame rabbet width and to prevent bowing of the jambs  

![Figure 95: Braced Frame](image)

5. New Unit Masonry Wall Anchorage  
   a) As the wall is laid up, embed wire or masonry fire anchors in mortar coursing immediately above or below each hinge and directly opposite on the strike jambs  
   b) Although not mandatory, even for fire-rated frames, grouting of the jambs is recommended in all units to ensure a more secure and stable installation  

![Figure 96: Masonry Wire Anchor Installation](image)
6. Steel Stud Partition Anchorage
   a) Where loose combination stud anchors are provided, install in frame throat opening
directly above or below each hinge reinforcing and immediately opposite on the strike
jamb
   b) Remove or bend legs of combination stud anchors back inside the frame profile

   Figure 97 : Combination Stud Anchor

   c) Place and secure floor and ceiling steel runners
   d) Place, plumb and secure the first vertical steel studs inside the floor and ceiling runners
with stud fitting snug against the wall anchors in each jamb. The open webs of the first
studs should be facing away from the frame
   e) With standard 1/2” long pan head sheet metal screws, secure studs to each anchor
   f) Check plumb and square of frame, alignment and twist of jambs
   g) Place and secure a second vertical steel stud inside the floor and ceiling runners with
stud returns abutting the first steel stud returns
   h) Install and secure steel lintel runners at the head of the frame

   Figure 98 : Securing Steel Studs and Anchors

7. Wood Stud Partition Anchorage
Wood stud partitions are constructed prior to the installation of the frame in a method called ‘tilt-up construction’. The wall, complete with rough openings for frames, is built flat on the floor and then stood or tilted-up into position. Double studs should be used at all jambs with solid blocking at both sides of the framed opening.

a) The rough stud opening width should be 1/2” greater than the over-all frame width

b) The rough stud opening height should be 1/4” greater than the over-all frame height

c) Install and secure optional adjustable floor anchors to the floor anchor straps with the floor legs extending into the frame rabbet opening

d) Where loose combination stud anchors are provided, install in frame throat opening, directly above or below each hinge reinforcing and immediately opposite on the strike jamb, with the anchor legs bent outwards, parallel to the finished wall
e) Set the assembled frame, centered in the rough stud opening width, with the wall anchors wrapping the faces of the jamb studs
f) Place a wooden spreader between the jambs at the bottom of the frame. See Step 3b for additional information on the wooden spreaders
g) Level the frame head, placing shims under the floor anchors as necessary
h) Adjust the frame for alignment and twist. Rabbets must be parallel

![Figure 102: Frame in Wood Stud Partition](image)

i) Fasten jamb to floor through the floor anchors
j) Install a second wooden spreader at the mid-height of the frame to maintain correct rabbet width and to prevent the bowing of the jambs
k) Plumb and square frame
l) Secure frame to studs with 4 nails per anchor
m) Check plumb and square of frame, alignment and twist of jambs

![Figure 103: Anchors for Wood Stud Partitions](image)
8. **Existing Masonry or Poured Concrete Wall Anchorage**
   a) Set the assembled frame centered in the completed opening
   b) Place wooden spreaders between the jambs at the floor and at mid-height of the frame
   c) Level the head by placing shims under the jambs as necessary
   d) Adjust the frame for plumb, square, alignment and twist. Rabbets must be parallel
   e) Mark the wall through the dimpled holes in each jamb soffit to locate the anchor points
   f) Drill the wall for 1/4” diameter anchor bolts in non-rated frames or 3/8” diameter anchor bolts for rated product, at the marks
   g) Install sleeve or expansion shell anchors in the wall holes
   h) Insert anchor bolts through the dimpled holes into the wall sleeve anchors
   i) Place shims snugly between the frame and the wall above each anchor bolt
   j) Tighten bolts, checking plumb, square, alignment and twist

![Figure 104 : Existing Wall Anchors](image)
DW-SERIES KNOCKED-DOWN SLIP-ON DRYWALL FRAMES

These frames, our DW-Series, are installed by slipping the components over the completed partition.

1. Size Opening
   a) Install double steel or wood studs at all jambs. See Figure 105 for recommended practice at head and jamb stud intersections.

   ![Figure 105: Head and Jamb Stud Intersection](image)

   It is important to ensure that the rough stud openings for double rabbet profiles are sized as follows:
   
   Rough stud opening width (RSOW) = rabbet width + 1-7/8"
   Rough stud opening height (RSOH) = rabbet height + 3/4"

   b) For cased open drywall profiles (CODW), RSOW = rabbet width + 2-3/4" and RSOH = rabbet height + 1-3/8"

   c) The tolerances are + 1/4"/- 0” on RSOW and RSOH for all DW and CODW-Series frames

   ![Figure 106: Rough Stud Openings](image)

2. Install Head
a) For fire rated pairs only, install snap-in anchors in each face at the center line of the head. See Figure 108 for installation of anchors.

b) Slide head into position in the center of the rough stud opening. Wedges may be used to temporarily hold the head in position.

![Figure 107: Head Installation](image)

3. **Install Hinge Jamb**

a) If optional snap-in anchors are to be used to secure the base of the frame to the stud sill plates / runners, install in each face at the bottom of the jamb. The drywall does not need to be notched.

![Figure 108: Snap-In Anchor Installation](image)

b) Retract the tension anchor at the top of the jamb by turning the screw clock-wise.

![Figure 109: Adjusting Tension Anchor](image)
c) Insert the integral soffit tab on the jamb and tabs on the corner clip into the slots in the head. Pivot the jamb into place over the wall.

![Figure 110: Install Hinge Jamb](image)

4. **Install Strike (or 2\textsuperscript{nd} Hinge) Jamb**
   a) For fire rated singles only, install a snap-in anchor in each face of the strike jamb immediately above the strike reinforcing.
   b) Repeat Steps 3a through 3c

![Figure 111: Install Strike Jamb](image)
5. **Anchor Frame**
   a) Place a temporary wooden spreader between the jambs at the floor to ensure the correct frame rabbet width at the base of the frame. The spreader must be square, at least 1" thick, almost as wide as the frame jamb depth with clearance notches at each end for the stop/soffits.
   b) Shim the bottom of the jambs to the same elevation so that the head is level.
   c) Secure the bottom of the frame through the dimpled holes at the base of each jamb with standard drywall screws into the sill plate / runner. If the optional snap-in anchors are used, secure to the sill plate / runner with 2 standard # 8 x 1-1/4" drywall screws per anchor. Both jambs rabbets must be parallel.

![Figure 112: Anchor Frame](image1)

6. **Set Frame**
   a) Plumb and square-up the frame by adjusting the tension anchors at the top of each jamb, ensuring that they press tightly against the studs.

![Figure 113: Plumb and Square Frame](image2)
b) On fire rated frames, secure the snap-in anchors at the strike jamb or head to studs with 2 standard drywall screws per anchor
c) Bend over the corner clip tabs at the head slots, over towards the wall
d) Remove the temporary wooden spreader

![Figure 114: Bend Tabs at Head](image)

**A-SERIES ADJUSTABLE KNOCKED-DOWN DRYWALL FRAMES**

Our A-Series (adjustable jamb depth) frames are designed for wrap applications in existing partitions. They can be used in unit masonry, concrete and steel or wood stud and drywall locations. A-Series frames, like our DW-Series, slip over the completed wall.

1. **Size Opening**
   a) It is imperative that the rough opening sizes are as follows:
      - Rough opening width (ROW) = rabbet width + 1-5/8”
      - Rough opening height (ROH) = rabbet height + 13/16”
   b) The tolerances are + 1/4” / - 0 for both ROW and ROH

![Figure 115: Rough Opening Sizing](image)
2. **Set Frame Throat Opening**
   a) Adjust each jamb and head to suit the measured wall thickness
   b) Tighten all adjustable sliding assembly screws. Failure to do so may create installation and operational problems and will void the warranty

![Figure 116: Adjustable Sliding Assembly](image)

3. **Install Head**
   a) Slide the head into position in the center of the rough opening width. Wedges may be used to temporarily hold the head in position

![Figure 117: Head Installation](image)
4. **Install Hinge Jamb**
   a) Insert the tabs on the jamb corner clips into the slots in the head
   b) Pivot the jamb into place over the wall

   ![Figure 118: Install Hinge Jamb](image)

   c) Jamb corner clip tabs should protrude through the slots in the head rabbets and returns

   ![Figure 119: Corner Clips at Head](image)

5. **Install Strike (or 2\textsuperscript{nd} Hinge) Jamb**
   a) Repeat Steps 4a through 4c

   ![Figure 120: Install Strike Jamb](image)
6. **Set Frame**
   a) Center the head in the rough opening width
   b) Bend the corner clip tabs extending through the head returns down towards the throat opening to tighten the miters
   
   ![Figure 121: Securing Miter](image)

   c) Place a temporary wooden spreader between the jambs at the floor to ensure the correct frame rabbet width at the base of the frame. The spreader must be square, at least 1" thick, almost as wide as the frame jamb depth with clearance notches at each end for the stop/soffits.
   d) Shim the bottom of the jambs to the same elevation so that the head will be level
   e) Plumb and square the frame in the opening. Adjust for alignment and twist
   f) Install a second wooden spreader at the mid-height of the frame to maintain the correct frame rabbet width and to prevent bowing of the jambs

   ![Figure 122: Temporary Wooden Spreaders](image)
7. **Anchor Frame**

a) Screw fix the head to the wall through the dimpled holes in each face. (4 per single, 6 per double)

b) Anchor each jamb to the wall through the dimpled holes in each face. For drywall partitions use #8 x 2-1/4” drywall screws. For masonry or concrete walls use 3/16” diameter x 2-1/4” flat head Tapcon screws

c) Remove the temporary wooden spreaders and re-check plumb, square, alignment and twist

---

Figure 123 : Wall Anchors
CONSTRUCTION

Hollow metal doors fall into two basic design categories: vertically stiffened and lock seam construction. Both types are considered as “full flush doors”, that is they have no seams on their faces. They are available in various gauges and with numerous options to suit specific design requirements.

**Lock seam doors** are designed for most commercial applications. They can be manufactured with 16, 18 or 20 gage steel face sheets and utilize a core of kraft paper honeycomb. As an option for exterior doors, polystyrene or polyisocyanurate cores are also available. The vertical edge seams on lock seam doors are exposed, adhesive reinforced, sealed and mechanically interlocked. Fleming D and E-Series are both lock seam construction doors.

Vertically stiffened doors are designed specifically for openings subjected to extremes in abuse, frequency of use or for commercial security applications. They are generally manufactured with 16 gage steel face sheets and have fully welded vertical edge seams. The cores are constructed from 20 gage interlocking steel vertical stiffeners spaced 6” apart and welded to each face sheet at 6” on center. The spaces between the stiffeners are filled with fiberglass batt insulation. Fleming H-Series are vertically stiffened doors.

The specifics of our H, D and E-Series doors will be covered in more detail later on.
TERMINOLOGY

As with frame product, terminology has evolved over the years to describe different elements and components of doors and their construction.

All hollow metal doors are fabricated from two sheets of steel formed to create the faces and edges of the finished product. The most basic terms are the door front and the door back. Fleming uses the terms “front” and “back” which relate to the direction that the door operates and is not dependent on the edges, swing of the door or handing of the builders hardware. Using the definitions and Figure 126 below, there is never any confusion.

Front  The pull side of a door.
Back  The push side of a door.

![Figure 126: Door Front and Back](image)

Figure 127 on the following page and the terms listed below, define the other elements of the door.

Hinge Edge  The vertical portion of a door in which the hinges are usually mortised.
Lock Edge  The vertical portion of a door in which the lock or latching device is mortised or mounted.
Head  The top edge of a door.
Sill  The bottom edge of a door.
Hinge Stile  The vertical faces of a door at the hinged side.
Lock Stile  The vertical faces of the door at the latching side.
**Top Rail**  The horizontal face of a door above a glass light.

**Bottom Rail**  The horizontal face of a door below the lowest glass light, panel or louver.

**Center Rail**  The horizontal face of a door between two glass lights, panels or a glass light and a louver.

---

**Figure 127 : Door Terminology**
FEATURES

Fleming doors, regardless of construction, utilize common features, componentry and have available, for the most part, the same options.

The Figures on the next few pages illustrate the standard door head, sill, edge configurations, along with several of the more common options available.

Heads of doors can be treated in several ways. Interior doors are typically provided as Fleming’s standard, shown in Figure 128. For exterior doors, the top of the door can be closed with either a galvanneal or vinyl snap-in top cap as illustrated in Figure 129.

Figure 128: Standard Head Detail

Figure 129: Optional Exterior Head Details
In certain instances the top must be closed off with an inverted channel, recessed inside and tack-welded to the end channel as shown in Figure 130. When rabbetted panels are used, the top of the door is provided with a mating top cap as shown in Figure 131.

Sills of hollow metal doors are supplied standard with 16 gage galvanneal, extra deep end channels as shown in Figure 132. For exterior applications, a 16 gage galvanneal inverted channel, as shown in Figure 133 can be tack-welded inside the end channel.
Lock and hinge edge conditions are dependent on the door Series.

D and E-Series are both lock-seam construction products with deep pocket, adhesive reinforced and sealed, exposed mechanically interlocked edge seams.

The H-Series utilizes a continuously welded construction which yields a door with no visible edge seams as shown in Figure 135.
In pairs of doors where the lock edges come together is called the meeting edge. Meeting edges can be handled in several ways.

The standard for non-labelled pairs is to provide two beveled doors, which presents a 1/8" (nominal) gap between them as illustrated in Figure 136 for D and E-Series doors. H-Series are similar.

![Figure 136: Standard Meeting Edge: Non-Labeled Pairs](image)

For fire rated pairs, three options are available. The most common option for D and E-Series doors, is a flat bar astragal screw fixed to the front of the active leaf, as shown in Figure 137. With certain hardware the astragal is screw fixed to the back of the inactive leaf.

![Figure 137: Flat Bar Astragal](image)

The second option for labelled pairs of D and E-Series doors is a “Z” astragal which is screw fixed to the edge of the inactive leaf. Two types of “Z” astragals are available; one with cutouts to clear door mounted lock or strike reinforcings, the other with integral lock or strike reinforcings. Figure 138 provides a detail of an installed “Z” astragal.

![Figure 138: Z Astragal](image)
Figure 139 illustrates a “Z” astragal with integral ASA strike and flush bolt reinforcings and Figure 140 the “Z” astragal with cut-outs to clear door mounted hardware.

All astragals are shipped loose to the job site for installation by the contractor, after the doors are hung.
The third option is used when it is necessary to have no astragal at all. This option is available only for pairs of fire doors up to 8'0" height and to 1-1/2 hour rating maximum. In this situation, the astragal may be omitted when the lock edge seams of each door are tack-welded immediately above and below each hardware cutout and at 6" on center maximum. Because H-Series doors are already a fully welded edge seam door, this can be used as the standard for them. For D and E-Series doors, Figure 141 illustrates the requirements.

Figure 141 : Tack-Welded Lock Edge Seam for Fire Rated Pair Without Astragal
DOOR TYPES

Hollow metal doors manufactured by Fleming are all considered “flush doors”. That is, they are fabricated without any seams in the faces of the door.

Another construction utilized by some door manufacturers is called “stile and rail”. The hinge and lock stiles, top, bottom and center rails are fabricated from 16 gage steel tubing and the openings created are filled with 18 gage steel panels or glazing materials. Butt joints on the faces at the vertical stiles and horizontal rails are left exposed.

For Fleming doors with glass lites (or louvers), there are 4 options available to the distributor.

Lited doors can be order as finished product. The required cut-outs, trim and snap-in glazing stops are all done at the factory.

They can also be ordered as “cut-out only”. The factory provides only the cut-out in the door skins. The trim and snap-in stops are added at the distributor’s shop.

A variation on the “cut-out only” option is “bridged cut-out”. In this case the skins are factory pre-punched for the lite except for 1/2” tabs at 4 sides. The distributor cuts the tabs and installs the trim and stops in their shop.

The final option, available on lock seam doors only, is for the distributor to order a non-lited or slab door. The cut-out operation and the trim and stop installation are done entirely at their facilities.

Fleming’s snap-in glazing stops and trim are available for all standard door types detailed on the following pages. Figure 142 illustrates a section through our standard trim. Non-standard door types, lite sizes and glazing trims to suit single and double glazed units are available.

Figure 142 : Snap-In Steel Glazing Trim
Fleming manufactures standard door types to suit most commercial applications. The illustrations below detail the various light sizes and locations for standard door types. Except for those specifically noted for the E-Series, all door types are available for all Fleming door series.

Figure 143: Standard Door Types
Figure 144: Standard Door Types Continued
Figure 145: Standard Door Types Continued
Figure 146: Standard Door Types Continued
HARDWARE

LOCATIONS

Fleming utilizes industry recognized standard hardware locations for all door series. The illustration below in Figure 147 details the locations for hinges in Fleming doors up to 7’2” nominal height. These doors are prepared for 1-1/2 pairs of 4-1/2” standard weight hinges with the top and bottom hinges located equally from the top and bottom of the door. This feature permits “blank” doors to be used as either left or right hand swing by simply turning the door upside-down. Doors over 7’2” and up to 10’0” nominal height are prepared for 2 pairs of 4-1/2” standard weight hinges. The locations of the top and bottom hinge cutouts are standard for all door heights.

![Diagram of hinge locations](image)

| Nominal Height | P (Pitch) | A | B
|----------------|----------|---|---
| 6’8” (80”)     | 29 15/16 | 37 5/16 | 67 1/4
| 6’10” (82”)    | 30 1/8    | 38 5/16 | 69 1/4
| 7’0” (84”)     | 31 15/16  | 39 5/16 | 71 1/4
| 7’2” (86”)     | 32 15/16  | 40 5/16 | 73 1/4

Figure 147: Standard Hinge Locations
The locations of hardware preparations on the lock edge of the door are shown in Figures 148 through 153. These details provide the relationship between preparation in the strike jamb or the opposing door in pairs and the lock in the door.

Figure 148: Cylindrical Lock (161)

Figure 149: Mortise Lock (86ED)
Figure 150: Cylindrical (Tubular) Deadlock

Figure 151: Cylindrical Lock (161) X Cylindrical (Tubular) Deadlock
Figure 152: Cylindrical Lock (161) x ASA Strike x Flush Bolt Pair

Figure 153: Mortise Lock (86ED) x ASA Strike x Flush Bolt Pair
TYPICAL APPLICATIONS

Doors must be provided to the job site with reinforcements appropriate to the hardware specified for them. The details in Figures 154 through 158 illustrate Fleming standards for typically specified finished doors. These standards apply to all Fleming door series.

**Cylindrical lock doors** are prepared and reinforced for the ANSI 161 lock and face cutouts, surface closers and 4-1/2" hinges.

---

Figure 154 : Cylindrical Lock Door
86ED or mortise lock doors are provided with an 8" x 1-1/4" lock edge cutout and are reinforced for mortise locks at the lock edge. In addition, a plate reinforcing is provided in the hinge stile in the back or push side of the door for mortise panic or fire exit hardware. Surface closer reinforcing and 4-1/2" hinge reinforcements are provided standard in these doors.

Figure 155: 86ED (Mortise Lock) Door
Blank doors are probably the most versatile standard door available. A 16 gage channel in the lock stile provides reinforcing for distributor prepared mortise locks. The 16 gage plate reinforcing in the door back, at the hinge stile, allows for the mounting of mortise or rim exit hardware. The 16 gage reinforcements provided in the door back (push side) at the top and bottom of the lock stile, are utilized for surface vertical rod exit devices. The blank door can also be used in a simple "push/pull" application.

Blank doors are prepared for 4-1/2" hinges and have closer reinforcements in both the top and bottom of the door.

Because the lock stile reinforcing channel and hinge stile reinforcing plate are centered on the actual door height and the hinge cutouts are located at the same distance from the top and bottom, blank doors are reversible. They can be used for both right and left hand applications.

Figure 156: Blank Door
ASA strike doors are used as the inactive leaf in a pair of doors. They are prepared and reinforced to the ANSI standard for 1-1/4" x 4-7/8" lipped strikes to suit cylindrical and mortise locks. The strike is centered at 39-9/16" from the bottom of the door, which for 6'8" doors is the mid height location. This makes 6'8" doors with the ASA prep reversible and these doors are provided with closer reinforcing in the top and bottom of the door. All other height doors receive closer reinforcing at the top only.

Figure 157 : ASA Strike Door
ASA x flush bolt doors are also used as the inactive leaf in a pair application. The ASA strike prep and reinforcements are identical to those in the ASA door. The flush bolt edge preparations and reinforcements comply with the ANSI standards for 6-3/4" x 1" mortise bolts. Only 6’8” doors are reversible and they receive closer reinforcing channels in the top and bottom. All other height doors are provided with top closer reinforcements.

Figure 158: ASA Strike x Flush Bolt Door
REINFORCINGS AND PREPARATIONS

Figures 159 to 164 provide details of the specific hardware reinforcements and their preparations indicated on the previous pages. They are typical for all Fleming door series.

High frequency hinge reinforcing, shown in Figure 159, are provided at all hinge cutouts as a Fleming standard. The 4-1/2” standard weight hinge reinforcing provided on all Fleming door product contains 4 raised donuts which can be drilled out by the distributor to convert to a heavy weight application.

Fleming can also provide reinforcing for non-standard hinge leaf thickness, 5” hinges, anchor hinges, pivots, continuous and other specialized type hinges.

The detail below depicts lock-seam D or E-Series doors and the vertically stiffened H-Series preparations and reinforcements are identical.

Figure 159 : High Frequency Hinge Reinforcing
End channels and integral closer reinforcing channels are provided standard at the top of all Fleming doors. All standard reversible doors are also provided with the integral closer reinforcing channel in the bottom of the door.

Figure 160 illustrates these components for our D and H-Series non-lited and lited doors, as well as for the 6 panel, embossed face sheet E-Series.
Cylindrical lock (161) preparations and reinforcings are the most common lock stile/edge option provided for commercial hollow metal doors.

The illustration in Figure 161 shows the standard ANSI preparation and our 1-piece reinforcing unit provided when either a 161 or cylindrical (tubular) deadlock are specified together or separately.
Mortise locks, also called the “86ED” preparation, is also available on all Fleming door series as a lock edge option. This 16 gage galvanneal box reinforcing is provided with intergal lock centering clips and is ready for the distributor or site preparation of the required lock function holes.

Figure 162 details the standard preparation and reinforcing unit provided. As an additional option the factory can pre-punch door skins and reinforcing for the specified lock function.

Figure 162 : Mortise (86ED) Lock
ASA and ASANL strikes are provided on the inactive leaf of pairs of doors. The ASA strike is used with cylindrical and mortise locks where as the ASANL (no lip) strike is supplied for cylindrical deadlocks. In both instances the identical reinforcement are provided. The preparation in the door and the height off the floor are different.

Figure 163 illustrates the differences for the two strikes.

Figure 163: ASA and ASANL Strikes
Flush bolt preparations and reinforcements are also provided for the inactive leaf in pairs of doors. Used in conjunction with ASA strikes they provide a latching mechanism into the head of the frame and floor. The edge reinforcements are 12 gage galvanneal and the top/bottom of door reinforcements are 10 gage. The preparations and reinforcements are provided at both the top and bottom of the door.

Figure 164 shows the component parts and cutouts provided as an option from the factory and the requirements if added by the distributor shop.

Figure 164 : ASA Flush Bolts
FLEMING DOOR SERIES

Having reviewed the terminology, door types, hardware locations, applications, preparations and reinforcements provided in Fleming doors, we can look at the details of the three basic door series offered. As was discussed at the start of this section, there are two basic constructions of doors: lock seam and vertically stiffened.

D-SERIES

The Fleming D-Series door is a lock seam construction product designed for all but the most extreme commercial applications. It provides the most versatile construction and the widest variety of options.

Three gages of face sheet are available: 16, 18 and 20 all with a kraft paper honeycomb core standard. Available as an option for exterior applications are polystyrene or polyisocyanurate insulated cores. The D-Series are available in singles, pairs, double egress and contra-swing configurations. From a fire rating standpoint, singles up to 4’0” x 10’0”, simple pairs and double egress units up to 8’0” x 10’0” at 3 hours are available.

With a specialized core, fire doors with temperature rise ratings up to 250ºF at 1/2 hour for 3 hour fire protection ratings are available in our TRR-Series doors.

The standard features of this Series are:

- 16, 18 or 20 gage galvanneal face sheets, 1¾" thick
- Face sheets and all components fabricated from galvanneal steel
- All hinge locations provided with projection welded Fleming 10 gage high frequency 4½" hinge reinforcements (see Figure 159, Page 114)
- All hinge reinforcements dimpled to convert from standard to heavy weight
- Projection welded, 1½" extra deep, 16 gage end channels with integral 14 gage, 4½" deep closer reinforcing channel (see Figure 160, Page 115)
- Integral closer reinforcing provided in top and bottom of all reversible doors
- Small cell kraft paper honeycomb core laminated to face sheets under pressure with PUR contact adhesive
- Longitudinal edges interlocked with deep pocket mechanical seam, sealed and reinforced with resin reinforced polyvinyl chloride (RRPC) adhesive (see Figure 134, Page 96)
- Edges beveled 1/8" in 2"
- Cylindrical lock (161) reinforcing, face and edge cutouts for 2¾" back set (see Figure 161, Page 116)
- Available in standard widths and heights.

On the following page, Figure 165 details the D-Series door, its' features and the standard sizes available.
**Figure 165 : Standard D-Series Door Details and Sizes**

<table>
<thead>
<tr>
<th>Standard Nominal Door Sizes</th>
<th>Heights</th>
</tr>
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<tbody>
<tr>
<td>Widths</td>
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</tr>
<tr>
<td>2'0&quot; (24&quot;)</td>
<td>6'8&quot; (80&quot;)</td>
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<tr>
<td>2'2&quot; (26&quot;)</td>
<td></td>
</tr>
<tr>
<td>2'4&quot; (28&quot;)</td>
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</tr>
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<td>2'6&quot; (30&quot;)</td>
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</tr>
<tr>
<td>2'8&quot; (32&quot;)</td>
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</tr>
<tr>
<td>2'10&quot; (34&quot;)</td>
<td></td>
</tr>
<tr>
<td>3'0&quot; (36&quot;)</td>
<td>7'2&quot; (86&quot;)</td>
</tr>
<tr>
<td>3'4&quot; (40&quot;)</td>
<td></td>
</tr>
<tr>
<td>3'6&quot; (42&quot;)</td>
<td></td>
</tr>
<tr>
<td>3'8&quot; (44&quot;)</td>
<td>8'0&quot; (96&quot;)</td>
</tr>
<tr>
<td>4'0&quot; (48&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

Deep pocket, adhesive reinforced and sealed mechanical edge seam
1-1/2" deep 16 gauge and channel
4-1/2" deep 14 gauge integral closer reinforcements
10 gauge high frequency hinge reinforcements

Small cell Kraft paper honeycomb core bonded with PUR adhesive
16, 18, or 20 gauge galvanized face sheets
E-SERIES

The E-Series is a 6 panel, embossed face sheet, lock-seam, commercial quality door. Utilizing the identical construction and componentry as the D-Series, this door is also appropriate to most commercial applications.

The E-Series is available in either 18 or 20 gage galvanneal face sheets and has a solid slab of polystyrene as its' core.

This series is eligible for fire rating up to 3'8" x 7'0" singles and 7'4" x 7'0" pairs to 1-1/2 hour.

Lite cutouts are limited to type ‘G’ (half lite) and a ‘NL1’ at 9-1/4" width x 37-1/4" height because of the face sheet embossing.

E-Series doors have the same features as our D-Series:

- 18 or 20 gage galvanneal face sheets, 1¾" thick, 6 panel embossed commercial door
- Face sheets and all components fabricated from galvanneal steel
- All hinge locations provided with projection welded Fleming 10 gage high frequency 4½" hinge reinforceings (see Figure 159, Page 114)
- All hinge reinforceings dimpled to convert from standard to heavy weight
- Projection welded, 1½" extra deep, 16 gage end channels with integral 14 gage, 4½" deep closer reinforcing channel (see Figure 160, Page 115)
- Integral closer reinforcing provided in top of all doors
- Solid slab of polystyrene (R 6.0) core laminated to face sheets under pressure with PUR contact adhesive
- Longitudinal edges interlocked with deep pocket mechanical seam, sealed and reinforced with resin reinforced polyvinyl chloride (RRPC) adhesive (see Figure 134, Page 96)
- Edges beveled 1/8" in 2"
- Cylindrical lock (161) reinforcing, face and edge cutouts for 2¾" back set (see Figure 161, Page 116)
- Available in standard widths and heights

Figure 166 on the next page, details the standard and dimensional features together with the sizes available for the E-Series door.
Figure 166: Standard E-Series Door Details and Sizes

<table>
<thead>
<tr>
<th>Door Height</th>
<th>&quot;B&quot; Actual</th>
<th>&quot;Z&quot; Actual</th>
</tr>
</thead>
<tbody>
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<td>Actual</td>
<td>Actual</td>
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<td>6'8&quot; (80&quot;)</td>
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<td>7-3/16&quot;</td>
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<tr>
<td>6'10&quot; (82&quot;)</td>
<td>81-1/8&quot;</td>
<td>9-3/16&quot;</td>
</tr>
<tr>
<td>7'0&quot; (84&quot;)</td>
<td>83-1/8&quot;</td>
<td>11-3/16&quot;</td>
</tr>
</tbody>
</table>
**H-SERIES**

The H-Series is our vertically stiffened door. It is designed specifically for openings subjected to extremes in abuse and frequency and where security applications in commercial construction are required.

The H-Series door is eligible for fire ratings up to and including 4'0" x 10'0" singles, 8'0" x 10'0" pairs and double egress pairs to 3 hour, with all listed hardware, 5'0" x 12'0" singles and 10'0" x 12'0" pairs to 1-1/2 hour with listed 3/4" throw mortise locks.

The standard features of the H-Series door are:

- 14 or 16 gage galvanneal face sheets, 1¾" thick
- Face sheets and all components fabricated from galvanneal steel
- All hinge locations provided with projection welded Fleming 10 gage high frequency 4½" hinge reinforcements (see Figure 159, Page 114)
- All hinge reinforcements dimpled to convert from standard to heavy weight
- Projection welded, 1½" extra deep, 16 gage end channels with integral 14 gage, 4½" deep closer reinforcing channel (see Figure 160, Page 115)
- Integral closer reinforcing provided in top and bottom of all reversible doors
- 20 gage galvanneal vertical interlocking stiffeners at 6" on center, spot welded to each face sheet at 6" on center with voids between stiffeners filled with loose batt type fiberglass insulation
- Longitudinal edges continuously welded the full height of the door, filled and ground smooth with no visible seams (see Figure 135, Page 96)
- Edges beveled 1/8" in 2"
- Cylindrical lock (161) reinforcing, face and edge cutouts for 2¾" back set (see Figure 161, Page 116)
- Available in standard widths and heights.

Figure 167 on the next page will provide you with illustrations of the standard H-Series door together with standard size information.
Figure 167: Standard H-Series Door Details and Sizes
The previous pages in this section have covered our three basic doors: H, D and E-Series. Fleming also manufactures several specialized constructions for stainless steel, acoustic and detention security applications which are beyond the scope of this publication. For information on these products, please contact the factory directly.

PRODUCT SELECTION AND APPLICATION

To assist in the selection of the appropriate Series and Gage of door product for various openings in different types of buildings, the two charts below, in Tables 12 and 13, are provided. Table 12 outlines Fleming’s Series-Gage combinations by size, door type and classifies them in categories ranging from standard to extra-heavy duty. Table 13 classifies building types and their openings by their expected exposure to abuse and frequency of use for the same categories.

<table>
<thead>
<tr>
<th>S = Standard Duty</th>
<th>M = Medium Duty</th>
<th>H = Heavy Duty</th>
<th>X = Extra Heavy Duty</th>
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<table>
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<th>SWF Series-Gage</th>
<th>30 x 72</th>
<th>40 x 80</th>
<th>40 x 100</th>
<th>30 x 72</th>
<th>40 x 80</th>
<th>40 x 100</th>
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<td>E20(1)</td>
<td>M</td>
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<tr>
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<td>H</td>
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<td>X</td>
<td>H</td>
<td>H</td>
<td>X</td>
<td>H</td>
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<tr>
<td>H16</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>H</td>
<td>M</td>
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<td>H14</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>H</td>
<td>M</td>
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</table>

(1) : 7’0” maximum door height

Table 12: Fleming Door Series-Gage Classifications
### Table 13: Building / Opening Type Classifications

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<tr>
<th>Building Types</th>
<th>Entrance</th>
<th>Exit Only</th>
<th>Stairwell</th>
<th>Cross Corridor</th>
<th>Room Access</th>
<th>Washroom</th>
<th>Utility</th>
<th>Kitchen</th>
<th>Operating Room</th>
<th>Examining Room</th>
<th>Production</th>
<th>Office</th>
<th>Classroom</th>
<th>Auditorium</th>
<th>Gymnasium</th>
<th>Dressing Room</th>
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</tr>
</tbody>
</table>
From a specification standpoint, an Architect may require compliance with SDI-100 for doors on their projects. SDI-100 is a 'standard specification' published by the Steel Door Institute. The current edition, released as SDI-100/ANSI A250.8-03, is a Level and Model type specification, versus a Level and Design one. For the Table below, from the '03 to the '98 edition, nothing has changed. We have summarized ANSI A250.8-03 / A250.8-98, and their predecessor, ANSI/SDI A250.8-91 below in Table 14, together with the Fleming equivalents.

There have been changes made with each edition of SDI-100 since 1985, and earlier ones do not line up with the current requirements. Please contact Technical Services for assistance when SDI-100-91 or earlier is specified.

In addition to the "Level" and "Model", when utilizing SDI-100/ANSI A250.8-03 / A250.8-98, users must also specify which core is to be included for a complete project specification.

Project specifications may contradict the requirements indicated below. Always refer to Part 2 - Products, in the project specification for clarification.

<table>
<thead>
<tr>
<th>SDI</th>
<th>FLEMING</th>
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<tr>
<td>ANSI A250.8-03 and ANSI A250.8-98</td>
<td>ANSI/SDI-100-91</td>
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<tr>
<td>Level</td>
<td>Model</td>
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<tr>
<td>1</td>
<td>1</td>
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<tr>
<td>2</td>
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<tr>
<td>3</td>
<td>2</td>
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<tr>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

Notes:
*1 : Test procedure in accordance with ANSI A250.4 (formerly ANSI A151.1)
*2 : Flush refers to exposed edge seams
   Seamless refers to unexposed edge seams, either body filled only, tack-welded and body filled or continuously welded
*3 : Continuously welded edge seam included standard in Fleming H-Series construction

Table 14: ANSI A250.8 (SDI-100) versus Fleming Doors
# HOLLOW METAL FIRE DOORS

A general overview of fire doors, frames, their testing and governing standards has already been provided starting on Page 71 of the Frame Section.

The Tables which appear on the next few pages serve to provide you with a summary of our capabilities for hollow metal fire doors. As with the Frame Product, this is not an in-depth covering of the subject and when additional detail and specifics are required, refer to the Fleming Fire Labeling Specifications brochure included in the last section of the manual.

## Table 15: Maximum Rabbet Sizes for Fleming Hollow Metal Fire Doors

<table>
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<tr>
<th>Construction</th>
<th>Series Gage</th>
<th>Cores</th>
<th>2 &amp; 3 Hour</th>
<th>1 &amp; 1/2 Hour</th>
<th>1/3, 1/2 &amp; 3/4 Hour</th>
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<tbody>
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<td>Singles</td>
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<td>or</td>
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<td>Standard</td>
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<td></td>
<td></td>
<td>or</td>
</tr>
<tr>
<td>D16(a)</td>
<td>HC or PolyS</td>
<td>3(\times)10(^0)</td>
<td>6(\times)10(^0)</td>
<td>3(\times)10(^0)</td>
<td>6(\times)10(^0)</td>
</tr>
<tr>
<td>D18(a)</td>
<td>HC or PolyS</td>
<td>3(\times)10(^0)</td>
<td>4(\times)9(^0)</td>
<td>8(\times)9(^0)</td>
<td>6(\times)10(^0)</td>
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<tr>
<td>H20</td>
<td>HC or PolyS</td>
<td>-</td>
<td>3(\times)7(^2)</td>
<td>6(\times)7(^2)</td>
<td>3(\times)7(^2)</td>
</tr>
<tr>
<td>E18(b)</td>
<td>PolyS</td>
<td>-</td>
<td>3(\times)7(^0)</td>
<td>7(\times)7(^0)</td>
<td>3(\times)7(^0)</td>
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<tr>
<td>H12</td>
<td>SSFF</td>
<td>4(\times)10(^0)</td>
<td>8(\times)10(^0)</td>
<td>5(\times)12(^0)</td>
<td>10(\times)12(^0)</td>
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<td>H14</td>
<td>SSFF</td>
<td>8(\times)10(^0)</td>
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<td>6(\times)10(^0)</td>
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<td>6(\times)10(^0)</td>
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<tr>
<td>Double Egress</td>
<td></td>
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<td>or</td>
</tr>
<tr>
<td>D16(a)</td>
<td>HC or PolyS</td>
<td>6(\times)10(^0)</td>
<td>6(\times)10(^0)</td>
<td>6(\times)10(^0)</td>
<td>6(\times)10(^0)</td>
</tr>
<tr>
<td>D18(a)</td>
<td>HC or PolyS</td>
<td>-</td>
<td>8(\times)9(^0)</td>
<td>8(\times)9(^0)</td>
<td>-</td>
</tr>
<tr>
<td>H14</td>
<td>SSFF</td>
<td>8(\times)10(^0)</td>
<td>8(\times)10(^0)</td>
<td>8(\times)10(^0)</td>
<td>8(\times)10(^0)</td>
</tr>
<tr>
<td>Dutch Doors</td>
<td>D16</td>
<td>HC or PolyS</td>
<td>3(\times)7(^2)</td>
<td>-</td>
<td>3(\times)7(^2)</td>
</tr>
<tr>
<td></td>
<td>D18</td>
<td>HC or PolyS</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Rabbetted Top Cap</td>
<td>D18</td>
<td>HC or PolyS</td>
<td>4(\times)9(^0)</td>
<td>-</td>
<td>4(\times)9(^0)</td>
</tr>
<tr>
<td>Louvered Doors</td>
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<td>or</td>
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<tr>
<td>D18(a)</td>
<td>HC or PolyS</td>
<td>3(\times)10(^0)</td>
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<td>3(\times)10(^0)</td>
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<tr>
<td>D20</td>
<td>HC or PolyS</td>
<td>3(\times)7(^2)</td>
<td>6(\times)7(^2)</td>
<td>3(\times)7(^2)</td>
<td>6(\times)7(^2)</td>
</tr>
<tr>
<td>H14</td>
<td>SSFF</td>
<td>4(\times)10(^0)</td>
<td>8(\times)10(^0)</td>
<td>4(\times)10(^0)</td>
<td>8(\times)10(^0)</td>
</tr>
<tr>
<td>Temperature Rise Rated</td>
<td>TRR 18</td>
<td>TRR</td>
<td>4(\times)8(^0)</td>
<td>8(\times)8(^0)</td>
<td>4(\times)8(^0)</td>
</tr>
<tr>
<td></td>
<td>TRR E18(b)</td>
<td>TRR</td>
<td>3(\times)7(^0)</td>
<td>7(\times)7(^0)</td>
<td>3(\times)7(^0)</td>
</tr>
</tbody>
</table>

(a): D16 and D18 Series doors are eligible for fire labeling up to 4' x 10' nominal leaf size. From an application standpoint however, the maximum recommended sizes are shown.  
(b): Due to material availability, E-Series doors are limited to the sizes shown above.
As with frame product, there are limits on the types and sizes of glazing materials provided for hollow metal fire doors. Table 16 summarizes the maximum areas, widths and heights of commercially available glazing materials labeled for use with hollow metal fire doors. You are encouraged to consult the UL “Building Materials Directory” or the WHI / ITS “Listed Products Directory” to determine the size limitations of specific glazing materials and the requirements relating to glazing compounds. Also refer to the Fleming Fire Labeling Specifications brochure, Pages 12 to 15 for more detailed information.

<table>
<thead>
<tr>
<th>Listed Glazing Material</th>
<th>2 &amp; 3 Hour (a)</th>
<th>1 &amp; 1-1/2 Hour (b)</th>
<th>1/3, 1/2 &amp; 3/4 Hour (c) (With Hose Stream - Canada Only)</th>
<th>1/3 Hour (c) (No Hose Stream - US Only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4&quot; Georgian Wired Glass</td>
<td>Not Permitted</td>
<td>100 in² area</td>
<td>1296 in² area</td>
<td>3289 in² area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12&quot; w or 33&quot; ht</td>
<td>54&quot; w or 54&quot; ht</td>
<td>35-3/4&quot; w or 92&quot; ht</td>
</tr>
<tr>
<td>Specialized Wired Glass</td>
<td>Not Permitted</td>
<td>Up to 4 Lights</td>
<td>2856 in² area</td>
<td>3289 in² area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>each 552 in² area</td>
<td>34&quot; w or 84&quot; ht</td>
<td>35-3/4&quot; w or 92&quot; ht</td>
</tr>
<tr>
<td>Laminated or Ceramic Glazing</td>
<td>100 in² area</td>
<td>4990 in² area</td>
<td>4990 in² area</td>
<td>4990 in² area</td>
</tr>
<tr>
<td></td>
<td>12&quot; w or 33 ht</td>
<td>126&quot; w or 126&quot; ht</td>
<td>126&quot; w or 126&quot; ht</td>
<td>126&quot; w or 126&quot; ht</td>
</tr>
<tr>
<td>3/8&quot; Thick Cement Board Panels</td>
<td>3072 in² area</td>
<td>3072 in² area</td>
<td>3072 in² area</td>
<td>3072 in² area</td>
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<tr>
<td></td>
<td>36&quot; w or 96&quot; ht</td>
<td>36&quot; w or 96&quot; ht</td>
<td>36&quot; w or 96&quot; ht</td>
<td>36&quot; w or 96&quot; ht</td>
</tr>
<tr>
<td>1/2&quot; Thick Gypsum Board Panels</td>
<td>-</td>
<td>-</td>
<td>1296 in² area</td>
<td>1296 in² area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>54&quot; w or 54&quot; ht</td>
<td>54&quot; w or 54&quot; ht</td>
</tr>
</tbody>
</table>

(a) : Where permitted by the Authority Having Jurisdiction  
(b) : Maximum area per leaf  
(c) : Maximum area per light  

Table 16 : Listed Glazing Materials for Hollow Metal Fire Doors
INTRODUCTION

Builders’ hardware is probably one of the most intricate aspects of the openings industry. With hundreds of manufacturers marketing thousands of unique products, the variations on a theme can be mind numbing.

The purpose of this section is to provide you with an over-view of the hardware typically specified for steel doors and frames and how they relate to Flemings’ products.

Hardware manufacturers have developed many standards through their manufacturing association, the Builders’ Hardware Manufacturers Association (BHMA), which have been adopted by the American National Standards Institute (ANSI).

There are two Series of ANSI Standards : A156 and A115.

The A156 Standards define the different types of builders’ hardware such as : hinges, locks, exit devices, closers, architectural door trim or overhead holders. A separate standard exists for each of these, along with a number of other product groups.

Within each Standard, products are further refined, test procedures, performance criteria and grading systems are outlined and materials, finishes and functions are specified.

The A115 Standards cover the preparation requirements in door and frame product for builders’ hardware. They provide us with cutout, reinforcing and mounting screw sizes, locations, clearances and tolerances to suit specific types of hardware.

A115 generally covers the preparations for bored, cylindrical, mortise, pre-assembled, interconnected, roller or auxiliary lock, latches and deadlocks, flush bolts, certain floor closers, off-set pivots, open back or electric strikes, along with specific butt hinges. Some of the A115 Series also define the locations of related products such as strikes and cylindrical locks.

These standards do not generally define the location of hardware off the floor. Nor do they prescribe specific locations for function holes required for mortise locks or exit devices.

The process of standardization is a well-evolved, recognized and integral part of the steel door and frame industry, but within certain areas of builders’ hardware it continues to elude us.

As an example, each of 5 manufacturers may have 3 or 4 different mortise lock lines, each with upwards of 30 different functions, with levers or knobs, with our without escutcheon trim, all of which are handed. This alone could provide 4800 variations or possible door preparations. Even within a manufacturers own offerings, the location of a lever spindle, in relation to the lock face or cylinder cutout can vary.
Working with the ANSI A115 Series, steel door and frame manufacturers have been able to offer standardized preparations and reinforcing for most commonly specified hardware products.

To understand the hardware requirements of an opening, there are 4 simple criteria which need to be reviewed. Not every opening requires each element. The basic rule of thumb is swing it, latch it, close it and protect it.

The final determination must be based on an informed knowledge of such factors as door size, door weight, door and frame material and construction, frequency of use, level of abuse, security, regulatory requirements, budgetary and aesthetic considerations.

The Door and Hardware Institute (DHI), an organization representing all facets of the openings industry, produces a number of publications which delve into the intricacies of hardware selection and specification and go far beyond the scope of this manual. For our purposes, we are only going to scratch the surface and review the basics.

**HINGES AND PIVOTS**

Every swinging hollow metal door must be provided with hinges or pivots. There are a number of hinge features affecting door and/or frame preparations which include application type, hinge size, swaging and barrel location.

**APPLICATIONS**

There are 4 basic applications of hinges, defined by how they are mounted on the door. These applications are full mortise, half mortise, half surface and full surface. The application type is determined by the material of the door and frame.

**Full mortise hinges** are the most commonly specified. The edge of the door and the rabbet of the frame are both provided with mortises (cutouts) in which the hinge is screw fixed. The leafs of the hinge are flush with the door edge and frame rabbet when installed. Full mortise hinges are used for wood or hollow metal doors hung in steel frames.

![Figure 168: Full Mortise Hinge](image-url)
**Half mortise hinges** are provided typically for hollow metal doors hung in channel iron frames. The edge of the door is provided with mortises, the hinge is screw fixed flush with the edge of the door and either screw fixed or welded to the surface of the face of the frame.

![Figure 169: Half Mortise Hinge](image169)

**Full surface hinges** are available where the hinge is screw fixed or welded to the face of a channel iron frame and through bolt mounted on the face of the door. This application is generally used with mineral core doors and occasionally specified for hollow metal doors.

![Figure 170: Full Surface Hinge](image170)

**Half surface hinges** are typically used for mineral core doors in steel frames or for wood doors and frames. The frames are provided with mortises for flush screw fixing in the rabbet. The other leaf is through bolted mounted on the face of the door.

![Figure 171: Half Surface Hinge](image171)
Swing clear hinges are an option available for all the above applications. Typical hinges opened to their 95º position cause the door to intrude into the frame rabbet opening as shown below. In hospitals and other applications where the clear opening width may be critical, swing clear hinges are specified. These hinges are designed to locate the door so that the back (or push side) is in line with or back from the frame soffit, in the 95º open position.

Figure 172: Traditional vs Swing Clear Hinges

SIZING

There are 3 elements relating to hinge size which must be specified: hinge height, hinge width and hinge weight or thickness. These are shown on Figure 173, with a full mortise hinge illustrated.

Hinge height, the dimension from top to bottom on the hinge leaf (not including the tip) is based on the thickness and width of the door. Fleming 1-3/8" thick doors and their frames are prepared for 3-1/2" height hinges. Our 1-3/4" doors and frames are prepared for 4-1/2" height hinges as shown in Figure 66 on Page 47 for frames and Figure 159 on Page 114 for doors. Other hinge heights are available ranging from 3-1/2" to 8" to suit unusual conditions.

Hinge width is the over-all dimension taken with the hinge in the open position. For full mortise hinges the width of the hinge varies independent of its height and must be specified. This means that 4-1/2" height hinges are available in widths of 4", 4-1/2", 5", 6", 7" and 8". Typically, 4" or 4-1/2" width hinges are specified. The reason for wider hinges is to permit a door to clear frame or wall applied trim or for doors thicker than 1-3/4".

On half mortise, full surface and half surface hinges the hinge width is determined by the hinge height. In other words, a 4-1/2" full surface hinge may only be available in a 4" width and the 6" height version may only be available only in a 4-3/4" width.
**Hinge weight** or thickness is determined by the weight of the door and the frequency of use the door is expected to receive. There are 2 typical weights of hinge available; standard (.134") and heavy (.180"). Other hinge weights are available for specialized applications such as lead-lined or over-sized doors.

The hinge cutouts or mortises in Fleming 1-3/4" door and frame products are manufactured to suit heavy weight hinges. Hinge reinforcements take standard weight hinges and have 4 raised donuts which can be drilled out by the distributor to convert the reinforcing to a heavy weight application. Refer to Figure 66 on Page 47 for reinforcing details.

**Swaging** is the off-set formed in a hinge leaf at the barrel which permits the leaves to come closer together when the door is closed. Standard swaging leaves a gap of 1/16" between the hinge leaves when they are parallel in the closed position as shown in Figure 174, below. Without swaging, closed hinges would have a space of approximately 5/32" which would yield an unsightly gap between the door and frame.

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**Figure 173 : Hinge Sizing**

**Figure 174 : Standard Swaging on Hinges**
SPECIAL PURPOSE PRODUCTS

Spring hinges contain one or more internal springs used to move a door to its closed position. They can be used as a less expensive alternative to the door closer. Adjustable spring tension permits power and speed tuning, but they do not have the control or back check features provided by a closer. Spring hinges are available for both single and double acting applications in sizes ranging from 3” to 12” heights. Some spring hinges are designed to fit into traditional 4-1/2” hinge preparations. When used in fire rated assemblies to replace a closer, a minimum of 2 spring hinges per door leaf are required.

Electric hinges are used to monitor door position or to transfer low voltage current from the frame to the door in order to power electric locks, strikes or exit devices. Some electric hinges can provide both functions. Electric hinges are modified versions of their traditional counter-parts. The electrical features can be either exposed on the surface of the hinge leafs or concealed within them. They are generally specified only in a full mortise application, however they can be provided for half surface applications as well. Hinge reinforcings must be provided with additional drilled-out holes (in accordance with the hinge templates) to allow clearance for wiring, switches or magnets. Hinge manufacturers recommend electric hinges be placed in the middle hinge location.

Figure 175: Electric Hinge
Continuous hinges are, as the name suggests, a hinge which run full length, from top to bottom of the door and frame. These hinges distribute the load of the door over the entire length of the hinge. Continuous hinges are always surface mounted and are available in 2 styles. The first is called a “piano” hinge, the other is a “geared” hinge.

The piano style is constructed with two hinge leaves held together with a continuous pin. They are available in half surface (mounted on the door rabbet and door face), full surface (either on the door rabbet and door edge or on the door and frame faces) and half mortise (surface mounted on the frame face and the door edge) applications. The full surface (mounted on the frame and door faces) and the half mortise units are available with the swing-clear option.

The geared style is made up of 2 continuous geared leaves and a connecting cover. This style is available in full surface (either on the door rabbet and door edge or on the door and frame faces) or half surface (mounted on the door rabbet and door face) applications. Only the full surface (mounted on the frame and door faces) is available with the swing-clear option. Most manufacturers of geared continuous hinges indicate that steel hinge jambs and hollow metal door edges or faces do not require reinforcing in their literature.

One drawback of both styles is that, for the most part, doors must be under-sized from their traditional widths to accommodate the mounting clearances required. The hinge manufacturers’ literature and templates must be reviewed carefully to determine the specifics for each application.
Anchor hinges are a specialized type of 5" full mortise heavy weight hinge which contain an additional bent flange at the top of one or both leafs. They are mortised into the hinge jamb and head of the frame, the edge of the door and optionally in the top of the door. Anchor hinges can be used in heavy, high frequency hollow metal doors or where door closers or holders may cause excessive strain or abuse to the door, frame or hinges. This design prevents the hinge from being distorted or pulled out of position under extreme loads. They are used with 2 conventional hinges to complete the hanging of the door.

![Figure 178: Anchor Hinge](image_url)

PIVOTS

Pivots are another type of hanging device used in sets or individually in conjunction with floor or over head closers. There are 3 basic types of pivots; offset, center hung and pocket pivots. They sit on or are mortised into the floor and carry the entire weight of the door on the floor pivot. The smaller sizes, sitting on the floor, are mortised into the bottom of the hinge jamb. Pivots are generally used when aesthetics are a concern or for very heavy doors.

Offset pivots are used only on single acting doors and are available in either 3/4" or 1-1/2" offsets, as shown in Figure 179 on the next page. The offset is measured from the face of the door out to the centerline of the pivot. Both sizes are also located 3/4" in from the edge of the door. Pivots with the 1-1/2" offset are used to clear frame or wall mounted trim or to increase the clearance between the door and an adjacent wall. Unlike traditional hinges, offset bottom pivots are handed. They must also be used on beveled doors. Offset pivots are available to suit doors weighing up to 1500 pounds. The arm of the bottom pivot is always mortised into the bottom of the door.
Offset top pivots are available in full mortise, half surface, half mortise and full surface applications. All offset pivots should be used with intermediate pivots. Both 3/4” and 1-1/2” offset intermediate pivots are available for full mortise applications. Half surface, half mortise and full surface intermediate pivots are available generally only for the 3/4” offset size.

Figure 179: Full Mortise Off-Set Pivot Set
**Center hung pivots** can be used on single and double acting doors which are not fire rated. Center hung pivot sets are completely concealed inside the door. They are available for doors weighing up to 1000 pounds. The hinge edge of the door is typically bullnosed to clear the frame which is generally a cased open profile. Center hung sets do not use intermediate pivots.

![Diagram of Center Hung Pivot Set]

*Figure 180: Center Hung Pivot Set*
Pocket pivots are a specialized type of hinge with their pivot point within the frame profile, locating the push side of the door in line with the door rabbet similar to a swing clear hinge. The name is derived from the ability to construct a ‘pocket’ or recess in the adjacent partition where the open door will fit completely. Standard lock seam or vertically stiffened door edge construction cannot be used for the hinge stile of pocket pivot doors. As well, the preparations and reinforcings in the frame and door are highly specialized. Figure 181 illustrates typical details of the wall pocket, door and frame requirements.

The next step in the selection of hardware is latching. There are two major product groups to be discussed. The first is locks, the second is exit devices.

Although they perform the same basic function, that of providing a mechanism to secure the door in the closed position, each must be considered separately because of the differences in preparation, reinforcing, function and end use requirements, particularly those dictated by building, fire and life safety code regulations.

LOCKS AND LATCHES

Terminology

Most locks and latches fall into one of 6 product categories. Their names serve to identify the lock construction or the type of installation. These categories are: cylindrical locks, mortise locks, cylindrical deadlocks, mortise deadlocks, interconnected locks and door bolts. There are other types which include pre-assembled, unit, roller, rim, hospital locks and latches and cremone bolts, but these are beyond the scope of this manual.

Figure 182 on the next page, provides an over-view of the terms used to describe various elements of most locks and latches.
Cylindrical locks are the simplest but least secure latching device. They are known by several names: cylindrical locks, bored locks or 161 locks.

The term 'cylindrical' is from the cylinder-in-knob feature available on these units.

The 'bored' lock terminology comes from the fact that for wood doors the preparation consists of 2 holes bored or drilled in the door. One hole, 2-1/8" in diameter, is through the thickness of the door and the other, 1" in diameter, is centered on the lock edge, going back to the 2-1/8" hole. A 2-1/4" x 1-1/8" mortise is provided in the door edge to receive the latch bolt face plate. The lock body and knobs or levers are installed in the 2-1/8" hole and the latch in the 1" hole and edge mortise.

The term ‘161’ is a reference to the US Federal Government Specification Number for these types of locks with a 2-3/4" backset from the centerline of the bevel to the centerline of the 2-1/8" hole in 1-3/4" thick doors.

Cylindrical locks used in commercial 1-3/4" steel doors are generally provided with a 2-3/4" backset, however under certain circumstances 2-3/8", 3-3/4" or 5" backsets may also be provided.
Cylindrical locks may be supplied with either knobs or levers and are provided with ASA strikes. The ASA (American Standards Association) strike is a 4-7/8” tall x 1-1/4” wide strike with a 3-3/8” tall lip. The American National Standards Institute (ANSI) has developed a standard for cylindrical lock preparations, ANSI A115.2, which Fleming follows. The centerline of the lock face and the strike are in line.

The standard location for Fleming products, unless ordered otherwise, is 40-5/16” centerline from the bottom of the strike jamb for the ASA strike and 39-9/16” centerline for the 161 preparation from the bottom of the door with a 3/4” undercut on doors.

Cylindrical locks may be provided with a number of ‘functions’. The term ‘function’ is used to describe the operational features of a device. As an example, a ‘passage’ lock is provided when a door does not require locking and either knob or lever operates the latch bolt at all times. With a ‘bathroom’ lock either knob or lever operates the latch bolt unless locked by the push-button on the inside. The inside button automatically releases when the inside knob or lever is turned and an emergency release is provided on the outside. All the functions are integrated into the knob/lever or latch and the identical preparation serves all functions. Please refer to the hardware manufacturers’ literature for further information on the various functions available.

Most cylindrical locks are provided with 1/2” throw latches and 5/8” or 3/4” throws are optionally available. These latches are spring actuated. This means that they will retract back as they pass over the strike lip and the spring pushes it back out once it is over the strike hole.

Cylindrical locks are available with roses (sectional trim) only. Escutcheon trim is not available. Cylindrical locks are not handed.

The standard 161 preparations and reinforcings in Fleming doors are illustrated in Figure 161 on page 116. ASA strike preparations in frames can be found in Figure 67 on page 48. When pairs of doors are specified, the ASA strike for the inactive leaf is shown in Figure 163 on page 118.
For 1-3/8" thick doors, cylindrical locks, designated as US Federal Government Specification Number ‘160’, are generally provided. The 160 locks utilize 2-3/8” backsets, 2-1/4” x 1” edge mortises and small ASA strikes. These strikes are 2-3/4” tall, 1-1/8” wide and have a 1-1/2” tall lip.

Figure 184 : 160 Cylindrical Lock and Small ASA Strike

**Mortise locks** are a more rugged and secure latching device. They are also called 86ED locks, which is again a reference to the US Federal Government Specification Number for their edge preparation. They derive the reference to ‘mortise’ locks because they are installed in a prepared recess or mortise in the edge of a door.

Figure 185 : Mortise Locks

The working parts are contained in a rectangular case with provision for latch bolts, dead bolts, knobs/levers, cylinders, thumb turns and indicator buttons.

The standard preparation for these locks in 1-3/4” commercial doors is an edge mortise 8” tall and 1-1/4” wide. Fleming’s standard is shown in Figure 162 on page 117.
Mortise locks can be provided with knobs or levers, either sectional or escutcheon trim and are shipped with ASA strikes. The industry standard for ASA strikes locates them 40-5/16” from the bottom of the strike jamb. The standard centerline of the mortised lock edge preparation is 3/8” lower, 39-3/16” from the bottom of the door with a 3/4” undercut.

The number of functions and options available for mortise locks is far greater than those for the cylindrical series. The locations of function holes on door faces, relative to the center of the door edge mortise, not only varies between manufacturers, but can also vary between series from the same manufacturer. For this reason standard face preparations with sectional trim have not been developed. With escutcheon trim, ANSI has a standard face preparation, ANSI A115.1. However, there are a number of manufacturers whose locks will not fit with the door face cutouts specified and care must be taken when using these.

Function hole backsets are standardized at 2-3/4” from centerline of bevel. They can be factory, distributor or field prepared.

Mortise locks are available with 5/8” or 3/4” throw latches and dead bolts, when required, are generally 1” throw to provide security. Latches are spring activated, deadbolts are not.

Another factor for mortise locks is that they are handed, not only from a latch bolt standpoint, but also by function. These locks are available with knob/levers and/or cylinders on one or both sides of the door. Thumb turns to activate dead bolts are always on the “inside” of the door and indicator buttons are on the “outside”. The “inside” can be either the front or back, depending on whether the door swings into or out of the room.

Most manufacturers provide electrified versions of their mortise locks. These are operated with wall mounted key/toggle switches or push buttons tied to the fire alarm. The outside knob/lever can be turned when current is introduced or interrupted, as required by the specific situation. The inside knob/lever always operates the latch bolt.

**Cylindrical deadlocks** are similar to cylindrical locks. The 1” deadbolt is manually operated by means of keys, thumb turns or both. The bolts are not spring activated.

The preparations and reinforcements are identical to those for cylindrical locks but are located higher on the door. Cylindrical deadlocks are centered 48” from the bottom of the frame (47-1/4” from the bottom of the door with a 3/4” undercut) to comply with ADA (Americans with Disabilities Act) requirements.

Cylindrical deadlocks are normally provided with a small ASA no-lip strike which is 2-3/4” tall and 1-1/8” wide. The lock edge mortise, face preparations and strike centerlines are in line, at the same height. Small ASA strikes (2-3/4” x 1-1/8” with 1-1/2” tall lip) are also available and are specified to protect the edge of the frame profile from the deadbolt.
Flemings’ cylindrical deadlock door preparation is illustrated in Figure 161 on page 116 and the small ASA no-lip strike for frame product appears in Figure 68 on page 49.

**Mortise deadlocks** are similar in application and with the same functions as cylindrical deadlocks. However, like mortise locks, they are installed in a prepared recess or mortise in the edge of the door. The face plates sizes vary from manufacturer to manufacturer but are available only in 2-3/4” backsets.

These 1” throw deadlocks are generally provided with 3-1/2” tall x 1-1/8” wide no lip strikes and the centerline of the strike, door edge mortise and face preparations are off-set from each other, again varying from manufacturer to manufacturer. Fleming locates the centerline of the strike at 48” from the bottom of the frame as a standard practice, with the final position of the deadlock adjusted to suit.
**Interconnected locks** are a hybrid of cylindrical locks and cylindrical deadlocks. These locks combine the latch functions of cylindrical locks with a separate dead bolt and the two are linked in an escutcheon housing on the push side of the door. For all functions, turning the inside knob or lever retracts the both the latch and dead bolt simultaneously giving immediate exit. Interconnected locks are available with outside grips and thumb latches. Their latches have 1/2" throws and the dead bolts are 1”.

![Figure 188 : Interconnected Lock](image)

The door requires ‘160’ lock edge and face preparations and reinforcing centered at 40-5/16” from the bottom of the frame for the cylindrical lock portion. For the dead bolt, a ‘160’ edge preparation and reinforcing is provided and the door face holes are sized according to the manufacturers’ templates. The dead bolt is centered 4” above the latch bolt and both are located on a 2-3/8” centerline of bevel backset. Backsets of 2-3/4” and 5” are also available. With these two backsets, the cylindrical lock preparation and reinforcing is a standard ‘161’ type and the dead bolt uses a standard ‘161’ lock edge prep and reinforcing.

Interconnected locks with 2-3/8” backsets are provided with two strikes; a small ASA lipped strike (2-3/4" tall x 1-1/8" wide with 1-1/8" lip) for the cylindrical lock and a small ASA no lip strike (2-3/4" x 1-1/8") for the deadbolt. The strikes are centered on and lined up with the door preparations.

**Bolts** are latching devices mounted at the top and optionally bottom of the inactive leaf of pairs of doors and latch into a strike mounted on the frame head and floor. Bolts may also be used with other locks to provide additional security. Most bolts are available in various lengths ranging from 6” to 48”. There are two categories of bolts: surface or flush mounted.

Surface bolts are screw fixed to either the front or back face of the door. They are a slide type metal piece held in a bracket and are manually latched and unlatched. Flush bolts are mortised with the face plates flush with the edge of the door and guide reinforcements are
provided in the end channels. They are available in three styles depending on the operating method required.

Manual flush bolts, shown in the center of Figure 189, require hand operation of the lever for both latching and unlatching.

Self-latching shown on the right of Figure 189, also called semi-automatic, extend automatically when the inactive leaf is closed but must be manually unlatched.

Automatic flush bolts, on the left of Figure 189, latch and unlatch when the active leaf is opened or closed. Flush bolts are generally used in conjunction with an ASA strike.

NFPA 80, the Standard for Fire Doors and fire Windows, states that where fire doors are not required for exit purposes, labeled top and bottom, self-latching (semi-automatic) or automatic flush bolts are permitted. Manually operated surface or flush bolts are permitted only where the room is not normally occupied by humans, such as transformer vaults or storage rooms.

Most specifications require flush bolts which have 6-3/4” tall x 1” wide edge preparations centered 12” from the top and bottom of the door. This size is called an “ASA Flush Bolt” preparation. The door prep and reinfocings required are illustrated in Figure 164 on page 119.

Fleming frame heads for pairs are available with an optional ‘reversible’ flush bolt strike to suit either leaf being inactive. Details are provided in Figure 72 on page 53.
APPLICATIONS

Locks, latches and bolts can be used with all handing or swing configurations except double egress units, doors in certain means of egress and exterior exit doors in public buildings.

Figure 190 illustrates typical single door applications and Figure 191, those for pairs.

![Diagram of single door applications](image)

- Cylindrical Lock or Latch
- Mortise Lock
- Cylindrical Deadlock
- Mortise Deadlock
- Cylindrical Lock x Cylindrical Deadlock
- Interconnected Lock

Figure 190: Single Door Applications
Cylindrical Lock or Latch
x Flush or Surface Bolts

Mortise Lock
x Flush or Surface Bolts

Cylindrical Deadlock
x Flush or Surface Bolts

Mortise Deadlock
x Flush or Surface Bolts

Cylindrical Lock
+ Cylindrical Deadlock
x Flush or Surface Bolts

Interconnected Lock
x Flush or Surface Bolts

Figure 191: Applications for Paris of Doors
EXIT DEVICES

Exit devices are latching mechanisms which always un latch when activated by means of a cross or touch bar on the push side (back) of the door. Exit devices are generally mandated by building codes for doors in a “required means of egress from an area having an occupancy load of 100 persons or more”. As well, doors in public buildings that are used for egress purposes, such as exterior doors from a corridor, are usually required to be equipped with exit devices.

As indicated above, there are two basic designs of activating mechanism: the traditional cross bar and the more recent touch bar. Both designs are used on all types of exit devices and are illustrated below in their rim application.

![Cross Bar Style](image1.png) ![Touch Bar Style](image2.png)

Figure : 192 : Exit Device Bars

Exit devices are available with a wide range of functions or trim, ranging from “exit only” (latching mechanism activated by the bar on the inside only), through to latching mechanisms activated by the bar on the inside or a thumb piece outside and capable of being locked by cylinders on both sides. The latching mechanisms can be activated from the outside with thumb pieces, knobs, levers or cylinders.

Some exit devices are equipped with an alarm which activates when the bar is depressed. The alarm may be audible or may send a signal to a central monitoring station.

Not all trims or functions are available as both panic and fire exit devices nor are they all available for all types of devices. Refer to each device manufacturers’ catalogues to determine availability.

The bar and their carrying cases are always mounted on the back (push side) of the door and the outside trim is mounted on the front skin. Any function holes required can be factory, distributor or field prepared. Mounting holes for through bolting or drilling and tapping are a field operation.
The device backsets vary from manufacturer to manufacturer and from application to application. A device on a single door will have a different backset than those used with a removable hardware mullion in a pair application. Trim can also affect backsets.

The location of the device off the floor also varies manufacturer to manufacturer. The templates provided for each device need to be reviewed for both sets of criteria. Exit devices are handed and are always either left-hand-reverse or right-hand-reverse.

There are two distinct classes: panic exit devices and fire exit devices.

**PANIC EXIT DEVICES**

Panic exit devices are tested for “casualty” or panic only. There are two test standards: UL 305 and ANSI A156.3.

For UL 305, devices are subjected to “exit” and “loaded exit” tests prior to and after 100,000 repetitions of unlatching, opening, closing and latching, without failure or wear that would impair proper operation. The ‘exit test’ is where the cross bar is subjected to a 15 pound load. The application of the load must depress the cross bar sufficiently to disengage the latch and swing the door open. The ‘loaded exit test’ is a force of 250 pounds applied at the lock stile, adjacent to the latch, in the direction of the door swing. The cross bar is then loaded to a maximum of 50 pounds force and again the latch must disengage and the door operate.

For ANSI A156.3, in addition to the UL 305 criteria, devices are subjected to; additional cycles of up to 250,000 repetitions; security tests with pull side loads of 400 pounds; cross bar loading / device operability tests (400 pounds force pulling away from and towards the door); together with salt spray, humidity, perspiration and finish durability tests. Devices which comply with ANSI A156.3 after 250,000 cycles are Grade 1 or after 100,000, Grade 2.

Panic exit devices are not permitted on fire doors. They do carry a physical label from the test lab indicating that they are in fact tested and listed as panic exit devices.

**FIRE EXIT DEVICES**

Fire exit devices are tested and labeled for both ‘casualty’ and ‘fire protection’. The test standards for casualty are UL 305 and ANSI A156.3, described above. They are then subjected to fire endurance and hose stream tests such as UL10b. The only class of exit device permitted on fire doors is the fire exit device.

One of the major differences between panic and fire exit hardware is the ‘dogging’ feature. When activated, it keeps the latch bolts retracted for a push-pull function. Since all fire doors must be self-latching, this feature cannot be provided on fire exit hardware.

Fire exit devices also physically have a label from the test lab indicating that they are tested and listed as both panic and fire exit devices.
TYPES OF EXIT DEVICES

There are 4 types of panic and fire exit devices: rim, mortise, surface vertical rod and concealed vertical rod.

Rim exit devices are surface mounted on the back (push side) of the door with the latch extending from the side of the case. They are used on single doors, the active leaf of pairs and both leafs of pairs with mullions between or behind the doors. They utilize surface mounted strikes on the strike jamb/mullion soffit or an over-lapping strike, surface mounted on the back of the inactive leaf for pairs without a mullion.

Figure 193: Rim Exit Device

Flemings’ “Blank” door, shown in Figure 156 on page 111, details the standard reinforcements supplied for rim exit devices. A reinforcing channel is provided in the lock stile with a reinforcing plate in the back at the hinge stile. The channel permits the mounting of both the device and any outside trim specified. The plate is used to mount the hinge stile end of the device. Some device manufacturers have rim designs which can utilize a standard ‘161’ (cylindrical lock) preparation when the device is through-bolt mounted on the door.

Mortise exit devices utilize a mortise lock together with the cross or touch bar. The lock is inter-connected with the bar and outside trim which can be provided with options including knobs/levers, cylinders, thumb pieces or grips.

Figure 194: Mortise Exit Device
Mortise exit devices are used in single door applications with an ASA strike in the frame or in the active leaf for pairs. The inactive leaf is prepared for both an ASA strike and a surface vertical rod exit device.

Mortise exit devices utilize a 2-3/4" centerline of bevel to centerline of device backset. The preparation is the standard ANSI A115.1, detailed in Figure 162 on page 117. The 8" tall x 1-1/4" tall edge cutout is centered at 39-3/16" from the bottom of a door with a 3/4" undercut to work with the strike at 40-5/16" centerline off the bottom of the strike jamb.

Our “86ED” door, shown in Figure 155 on page 110 is used for mortise exit devices.

**Surface vertical rod devices** have a rod and latch case mounted on the face of the push side (back) of the door. They are available in single or double rod applications.

In a single rod application, the rod is mounted above the bar and latches in a surface mounted strike on the frame head soffit. This application is referred to as “top-rod-only" or “less-bottom-rod”. When the single rod application is specified for fire doors, an auxiliary latch must be installed in the lower lock edge of the door. When exposed to heat the auxiliary latch releases and extends into an edge preparation in the opposing leaf, keeping the doors closed in a fire.

For the double-rod situation, the rods are mounted above and below the bar. The top rod latches into the frame mounted surface strike and the bottom rod into a mortise strike in the floor. For both applications, depressing the bar disengages the latches.

Figure 195 : Surface Vertical Rod
Surface vertical rods are used for standard and double egress pairs of doors. With standard pairs, a surface vertical rod can be mounted on each leaf or only on the inactive leaf when a mortise exit device is used on the active door. They are rarely used in single applications. Outside trim is available with knobs/levers, cylinders, thumb pieces and grips.

The backsets vary with application, strikes and trim. Mounting heights of surface vertical rods also vary and care should be taken as the top rods are sometimes ordered ‘cut-to-length’ from the manufacturer to specific sizes. This will affect the horizontal bar height and face preparations for devices and trim. Refer to the device manufacturers’ templates for all pertinent information.

Flemings’ “Blank” doors, shown in Figure 156 on page 111, are reinforced to accept surface vertical rod devices and function hole preparations can be provided by the factory, distributor or done in the field.

**Concealed vertical rod devices** also have a rod and latch, but these are mounted inside the door. They are available with the “top-rod-only/less-bottom-rod” option as well. Concealed vertical rod devices are provided with strikes mortised into the door rabbet and floor.

When the single rod application is specified for fire doors, an auxiliary latch is installed in the lower lock edge of the door and functions in the same way as those provided for surface vertical rods.

The top of the back skin (push side) of doors prepared for these devices must be notched-out for the top latch mechanism. The latch retracts inside the door when the bar is depressed. These latches re-engage the head and floor strikes when a release pin/trigger extending from the top latch case is depressed as it contacts the frame head stop.

![Figure 196: Concealed Vertical Rod Device](image-url)
Concealed vertical rod devices are used for standard and double egress pairs of doors. For standard pairs a device can be mounted on each leaf or in the inactive leaf only when a mortise exit device is provided for the active leaf. As with surface vertical rod devices, they are not generally specified for single door applications.

Most concealed vertical rod devices are available with a full compliment of outside trim including knobs/levers, cylinders, thumb pieces and grip handles. The backsets vary with trim, strikes and application and the mounting heights also vary from manufacturer to manufacturer. Again, top rods can be ordered cut-to-length from the factory, so templates should be reviewed carefully when determining backsets and heights for function hole preparations, etc.

Fleming doors for concealed vertical rod devices are custom and must be ordered from the factory for the specific device and function required.

APPLICATIONS

Exit devices are mounted in specific applications: singles, pairs, double egress, left/right or contra-swing. The illustrations in Figures 197 to 201 on the following pages show these with the assumption that each leaf is required for exit purposes. There are times when a pair of doors is specified but only one leaf is required to be an active leaf for exit purposes. This situation usually places the exit device on the active leaf with flush or surface bolts for the inactive door and it has not been included in the details below.

Figure 197: Single Door Applications
Figure 198: Applications for Pairs of Doors
Two Surface Vertical Rod Exit Devices

Two Concealed Vertical Rod Exit Devices

Figure 199: Double Egress Applications

Two Rim Exit Devices with Hollow Metal or Hardware Mullion

Two Mortise Exit Devices with Hollow Metal Mullion

Figure 200: Left-Right Applications

Two Rim Exit Devices with Hollow Metal or Hardware Mullion

Two Mortise Exit Devices with Hollow Metal Mullion

Figure 201: Contra-Swing Applications
CLOSERS

A closer is a device designed to control the operation of a door. They provide the ability to open the door easily, except at the end of the swing where ‘back-check’ is required to cushion the door from slamming into the stop or wall. Through the closing arc, uniform and reasonable speed are provided. In the final stages of closing, latching of the door quietly and securely are ensured.

All of these features are provided through power generated by springs, pistons, valves and hydraulic fluids housed in the body of the closer.

Additional features are available which include delayed action, adjustable spring power and hold-open functions.

Closers are tested and graded to ANSI A156.4, “Door Controls - Closers”. Those in the Grade 1 category are tested to the most severe requirements. In addition to ‘grading’, which relates directly to durability, closers are ‘sized’ according to their closing power. The sizing standards range from 1 through 6, with the larger value indicating greater closing power. Selection of a closer’s size is dependent on door width and weight. Each manufacturer provides information regarding the specific grades and sizes available in their product literature.

Closers can also be evaluated for compliance with ANSI A117.1, “Accessible and Useable Buildings and Facilities” and/or the Americans with Disabilities Act (ADA) for opening force requirements. Non-rated interior doors are required to be capable of opening to a least 90º with an opening force of not more than 5 pounds. Exterior doors are recommended to be capable of being operated to at least 90º opening with a force not exceeding 8.5 pounds.

These devices can be tested to UL 228, “Door Closers, Holders and Integral Smoke Detectors” which covers operational aspects of the device. Closers are not required to be fire tested to UL10b or ASTM E152 like doors and frames. The rational is that the closer gets the door shut and the latching device keeps it that way, therefore during the fire the closer is actually redundant.

Closers can be surface mounted or concealed in the door, frame or floor. They are mounted relative to the centerline of the hinges or pivots in accordance with the manufacturer’s templates.

Most closer manufacturers offer electro-magnetic and/or pneumatic units which hold the door open under normal operation, release manually and with a photo-optic or ionization smoke detector and/or alarm system.
SURFACE CLOSERS

Surface closers are used only on single acting doors and can be mounted in three ways: regular arm, parallel arm or top jamb installations.

They are available in two styles. The first utilizes a two-piece hinged arm assembly to connect the door and frame. The second style replaces one of the arms with a channel track mounted on the door or frame.

Closer arms, tracks and bodies are attached to steel frames with machine screws. When mounted on hollow metal doors, the components can be secured with machine screws or through-bolted. Drilling, tapping and through bolts holes are field work by the installer.

Regular arm closers are mounted on the front (pull side) of the door. The closer body is attached to the door face at the top rail and the arm is fastened to the face of the frame head. The arms extend perpendicular to the closed door. Figure 160 on Page 115 for doors and Figure 70 on Page 51 for frames, illustrates the reinforcings and their locations when regular arm closers are specified.
**Parallel arm closer** applications place the closer on the back (push side) of the door. The body mounts on the face of the door top rail. The arm is affixed to the soffit of the head with the arm running parallel to the closed door, under the frame soffit. The door reinforcing for parallel are closers is shown in Figure 160 on Page 115. The standard reinforcing for these closers on frames is detailed in Figure 71 on Page 52.

![Parallel Arm Closer Diagram](image)

Figure 204: Parallel Arm Closer

In certain applications, such as when a closer’s mounting would interfere with a holder or stop, a drop plate can be mounted on the soffit or opposite rabbet of the head. When a 1-3/4” flush or rabbatted panel over a door is specified, a bracket is required to mount the parallel arm closer arms. Drop plates and brackets are provided by the closer manufacturer.

![Soffit Mounted to Clear Holder or Stop and Panel Mounted Brackets](image)

Figure 205: Parallel Arm Closer Brackets
Top jamb mounted closers are also located on the back (push side) of the door. The arm is affixed to the door with the closer body on the face of the frame head. The arm, like those with regular arm mountings, extends perpendicular to the closed door face. Reinforcing for this type of mounting is identical to that for regular arm closers.

![Figure 206: Top Jamb Mounted Closer](image)

Drop plates are also specified for top jamb mounted closers when the face width of the head is too narrow to mount the closer securely. In instances where there is insufficient clearance above the head of a frame or the jamb depth is very deep, opposite rabbet or soffit mounted brackets can be supplied by the closer manufacturer.

![Figure 207: Top Jamb Mounted Closer Brackets](image)

A variation on the arm style top jamb mounted closer mounting is a corner bracket installation. The closer body is mounted on a bracket, which is in turn attached to both the head and hinge jamb soffits. This mounting is used when the head face width is too narrow to accommodate the closer securely.

Top jamb mounted track style closers are also available with the track mounted on the front (pull side) of the door and the closer body on the face of the frame head. This type of installation generally requires a plate to be mounted on the head.
CONCEALED CLOSERS

These devices are available in three mounting configurations: concealed in the frame, the door or the floor.

Concealed in the frame closers are mortised in the head at the door rabbet, soffit or centered on the jamb depth. They can be used with single or double acting doors. With single acting doors these closers can be used with off-set or center hung pivots or with traditional hinges. Double acting doors require center hung closers, bottom pivots, cased open profile frames and bull-nosed hinge edges on the door.

Concealed in the frame closers are available with a slide arm connected to the closer body, running in a track mortised in the door’s top rail. They are also available with exposed arms, surface mounted on the back (push-side) of the door or with an arm mortised in the door top rail and connected directly to the spindle in the closer body.

Figure 208: Concealed in the Frame Closers
Concealed in the door closers are mortised into the top rail of the door towards the hinge edge. This type of closer is used only on single acting doors, but can be used with hinges, off-set or center hung pivots.

Concealed in the door closers are available with a slide arm connected to the body in a track mortised in the frame’s head door rabbet. They are also available with two styles of exposed arm for mounting on the front (pull-side) of the door. With the first, the frame arm is surface mounted on the face of the head. The second style has the frame arm mortised into the head door rabbet.

Mortise Track Type

Face Mounted Exposed Arm Type

Rabbet Mounted Exposed Arm Type

Figure 209: Concealed in the Door Closers
Concealed in the floor closers, also known as floor closers, are more durable than other types of closing devices. They are more secure and can be more ascetically pleasing. Floor closers are available for hinged, off-set or center hung pivot applications. In all applications a case containing the closer body is sunk into the floor.

Off-set floor closers are restricted to single acting doors and can be used in conjunction with off-set intermediate and top pivots or traditional hinges.

When traditional hinges are used a track is mortised into the bottom rail of the door with an arm running inside it, connected back to a spindle on the floor case. The weight of the door is supported off the hinges.

![Figure 210: Concealed in the Floor Closer – Mortise Track Type for Hinges](image)

When off-set pivots are used the standard bottom pivot (reference Figure 179, Page 139) is replaced by the floor closer. The door is set on top of an arm mortised in the bottom rail and placed on the spindle of the floor case. Only the knuckle from the arm and the floor case cover are visible.

![Figure 211: Concealed in the Floor Closer - Off-set Pivot Type](image)
Center-hung floor closers can be used for both single and double acting doors. They are used in conjunction with center hung top pivots only and are generally provided as a set. The floor closer is substituted for the traditional bottom pivot shown in Figure 180 on Page 140.

As with off-set floor closers, the door is set on top of an arm mortised in the bottom rail and placed on the spindle of the floor case. In this application, only the floor case cover is visible.

![Figure 212: Concealed in the Floor Closer – Center Hung Pivot Type](image)

For both off-set and center hung applications, the entire weight of the door is carried by the floor closer.

All concealed in the door closers require special preparations and reinforcements for their mortised components. When surface mounted exposed arms are used, the standard closer reinforcing in our door shown in Figure 160 on Page 115 and the surface closer reinforcing for frames, detailed in Figure 70 on Page 51, are used.

**HOLDERS AND STOPS**

To control and limit the swing of a door to protect adjacent partitions, the door or its hardware, holders or stops are provided. They can be located on the floor, wall or overhead.

Floor and wall stops are metal bases with rubber centers or tips, available in numerous styles.

![Figure 213: Floor and Wall Stops](image)
OVERHEAD HOLDERS

Overhead holders and stops are available in either surface mounted or concealed applications. They are not permitted in fire doors unless part of a combination electromagnetic and pneumatic closer / holder / smoke detector, which will be discussed later.

Overhead holders and stops have a spring to cushion the stopping action and will limit the door swing to a maximum of 110°. They are available with several options including hold-open, built-in hold-open, non-hold-open or a friction holder which will keep a door open at any position.

**Surface mounted overhead holders** are used only on single acting doors. The track is normally mounted on the push (back-side) of the door with the arm surface mounted on the soffit.

Frame reinforcing generally consists of a 12 gage steel flat bar welded inside the soffit, similar to that shown in Figure 71 on Page 52. In doors our standard integral closer reinforcing channel detailed in Figure 160 on Page 115 is used. There are jamb brackets available from the device manufacturer which permit a pull (front-side) mounting.

![Figure 214 : Surface Holder](image-url)
Concealed overhead holders are available for both single and double acting doors. The track is normally mortised into the top of the door with the arm mortised into the head door rabbet. Inverse mounted concealed overhead holders, where the track is mortised into the head rabbet and the arm into the top of the door, are available. All concealed holders require special preparations and reinforcings.

![Concealed Holder Diagram](image)

**Figure 215 : Concealed Holder**

**COMBINATION CLOSER / HOLDER / DETECTORS**

Fire doors, when required to be held in their open position under normal operating conditions, are provided with these specialized devices. These fail-safe units allow the door to be closed manually as well as by a smoke detector. The hold-open feature can be provided through electric or pneumatic means and the detector will be either photo-optic or ionization activated. These devices are usually connected to the fire alarm system but this is not mandatory. They are most often found on cross-corridor fire and smoke barrier doors or patient rooms in hospitals but can be installed on stair-hall openings as well.

Combination closer / holder / detectors are surface applied and available in regular, parallel arm and top jamb mountings similar to typical surface closers.
CO-ORDINATORS

Co-ordinators are used on pairs of doors with locks, latches, rim or mortise exit devices and door closers. As the doors close the co-ordinator holds the active leaf open until the inactive leaf is closed. The arm is then triggered and releases the active leaf to finish closing.

There are two types of co-ordinator: surface mounted or mortised.

Surface co-ordinators are mounted on the face of the head on the door side of the profile.

Mortise co-ordinators are mortised into the head soffit.

SURFACE APPLIED ACCESSORIES

The final area of basic builders' hardware is that of surface applied accessories. These include door pulls, push plates and protective plates.
Door pulls and push plates are used on doors which do not latch. They are available in hundreds of styles, sizes and finishes. Door pulls should be through bolted to the door and push plates should beveled and be provided with counter-sunk screws to mount them.

The reinforcing channel provided in Fleming ‘blank’ doors, as shown in Figure 156 on Page 111, is typically used for this application.

![Figure 218: Door Pull and Push Plate](image)

Protective plates, manufactured from corrosion resistant materials such as stainless steel, are surface applied to one or both faces of hollow metal doors. They are generally 16 gage material and have a brushed finish. They range in height from 6” to 16” when used in typical commercial applications. Plates designed to protect door faces in hospitals from stretchers and carts can be as tall as 42”. They should also be provided with counter-sunk screws for mounting.

A number of hardware companies also manufacture edge guards of similar material. These are angles or channels applied to the leading lock edge of the door to protect the finish from being damaged.

![Figure 219: Protective Plates](image)
As we stated at the start of this section, builders’ hardware is probably one of the most intricate aspects of the openings industry. Although this section does provide a fair amount of information on the products available and their relationship to the doors and frames we produce, we have only touched the surface.

Entire manuals and books have been written on subjects which we did not even touch, specialized areas such as hospital hardware, electronic hardware and detention security hardware.

The Door and Hardware Institute (DHI), offers a number of technical publications and courses which deal in fair depth with this part of our business and readers are encouraged to contact their local chapter for additional information.
OVER-VIEW

The next area to be covered is that of estimating a project. This task establishes the real requirements of a job and can be divided into four distinct, logical steps: take-off, summarize, checking, and pricing.

1. Take-Off is the process of ascertaining the quantities, types, and details of the steel doors and frames on the project. A proper take-off can assure your profit margin and a poor one will almost always result in losses.

2. Summarize is the process of grouping and totaling like product.

3. Checking is the process of reviewing, a second time, the take-off and summary steps to ensure that nothing has been omitted.

4. Pricing is the application of information from the Price Book against the summarized quantities previously developed.

TAKE-OFF

The steps involved in doing a take-off are as follows:

1. Obtain a complete set of drawings, any separate detail drawing books, hollow metal specifications, door and frame schedules, all addendums or amendments, General Conditions and tender forms.

2. Review the General Conditions for bid closing times, separate or alternate prices, taxes, etc.

3. Read the hollow metal door and frame specifications and highlight all important points such as:
   a) Door and frame gages
   b) Door and frame materials
   c) Door and frame construction
   d) Door cores
   e) Special reinforcing
   f) Channel extensions
   g) Top and bottom caps for doors
   h) Door edge seam requirements

Any questions you have regarding the specifications or special details can be directed to your authorized Fleming distributor, Fleming’s Customer Support or Technical Services departments.
4. Review the Related Work portion of the hollow metal door specifications to determine whether you are responsible for any of the following items:
   a) Installation of hollow metal doors and frames
   b) Drilling and tapping for builders’ hardware
   c) Gaskets and weatherstripping
   d) Louvers, vents, grilles
   e) Glazing materials
   f) Wiring for electronic or electric builders’ hardware
   g) Insulation at exterior frames
   h) Back painting of frames
   i) Field measurements
   j) Lead-lining of frames
   k) Lintels, posts, columns or other load bearing elements adjacent to frames
   l) Field welding

5. Review the specifications to determine whether special door constructions, such as those listed below, are included or excluded from your take-off as appropriate:
   a) Sound door and frame assemblies
   b) Lead-lined doors and frames
   c) Security doors and frames
   d) Stainless steel doors and frames

6. Find and photocopy the door and frame schedules, door elevations, jamb details, sidelight and window elevations and general notes.

7. The architect/designer may provide a door and frame schedule which lists each frame and door on the plans. Alternately, each opening on the plans may include an opening number, frame and door type designation. In this case, you will need to create your own door and frame schedule.

8. Read over all addendums and amendments and make note of any changes which may affect your work.

9. Review and familiarize yourself with the architectural drawings. As you review the drawings, make sure that you check all of the following items:
   a) Elevations
   b) Sections
   c) Large scale details
   d) Wall types
   e) Building cross sections
10. Review the site plans to determine whether there are any out-buildings such as storage buildings, transformer or telephone equipment rooms, parking garages or quiosks, stadiums or track and field facilities or mechanical equipment buildings which may contain steel doors and frames. If there are out-buildings, locate the door and frame schedules for them.

11. Review the exterior elevations to confirm the number of floors in the building. Some architects will include a 13th floor, others will not. This needs to be considered if there is a single drawing which is typical for all or specific floors.

12. Review the mechanical drawings as well as they may provide information relating to louvers, grilles or vents in hollow metal doors and frames.

13. Make a list of the details and drawings that affect your work as you may need to copy them at a later date for reference.

14. Starting first from the plans, confirm the information on the architect’s door and frame schedules. Do not work from the schedules back to the plans. Run your finger over the exterior walls of the building, checking each opening as it is encountered.

15. All large scale details, wall types, sections or elevations, included on the plans, at or near a specific opening, should be checked for relevant information. Also check for consistency between these details and against the door schedule.

16. Mark each opening on the plan in some unique way to designate whether it agrees or is in conflict with the door schedule and whether it is to be supplied by you. Make similar notations on the door schedule. Keep a separate list of your queries, with appropriate opening or detail number cross-references.

17. Since most door schedules do not include interior or exterior windows, it may be necessary for you to create one.

18. Repeat steps 14 through 16 for all the interior walls, starting in one corner of the building and working towards to opposite corner.

19. On a note pad, make a list of all the different frame types encountered in one direction and the different sizes in the other. Add a rows (or columns) to indicate fire ratings and each additional special condition or item you are aware of on the project. Do the same for sidelight frames, windows and doors.

20. Working from the architect’s door schedules (and any schedules you created for windows, etc), place a tick-mark in the appropriate row/column for each component of the opening. (ie : door, frame, sidelight or window)

21. At this stage, other problem areas such are fire rating will come to light and should be noted on your list of queries.
22. Before moving on to the Summary step, go over the drawings, schedules, specifications and addendums once more to ensure that you have covered everything.

**SUMMARIZE**

1. From your note-pad work, add up each distinct group and create a summary listing which includes a separate line and description for each, in an ordered fashion.

2. The next step is to formally submit your queries to the architect. Upon receipt of your answers, you can update your summary and move on the next step, pricing.

**PRICING**

Submit your Summary to your local authorized Fleming Distributor. The Distributor will provide you with complete pricing for the project.

**ORDERING**

Once you are awarded the contract, you need to order product. Ordering terminology is fairly straightforward, once you understand the abbreviations, designations and the parameters.

**FRAMES**

A typical example for frames is shown below together with an explanation for each element.

```
Frame Series: There are 5 basic series available and the features of each are covered back in the Frame Section, Pages 60 through 70. The abbreviations, what they mean and the specific pages describing each are as follows:

- **F** = F-Series, masonry profile frame, pages 60 and 61
- **A** = A-Series, adjustable jamb depth frame, pages 67 and 68
- **CODW** = Cased Open Knocked-Down Drywall Series, pages 62 and 63
- **DE** = DE-Series, double egress frame, pages 64 and 65
- **DW** = DW-Series, knocked-down drywall frame, pages 62 and 63
```

Frame Gage → Frame Type → Frame Series → Door Rabbet → Frame Rabbet Size → Jamb Depth → Swing

- **DW-FS-16-4-30x70-5 5/8-RH**
- **ULx3/4xEmb**
- **CRW**
- **Tag as # 264**
Frame Type: In most cases you will use either of the first two designations. The third is for multiple opening frames. Multiple opening units, for ordering purposes only, are frames which contain 2 or more individual rabbet openings. This covers any frame with a “between the doors” mullion.

- **FS** = Frame, Single: As shown on page 55 for single acting and page 58 for double acting
- **FD** = Frame, Double: See page 56 for single acting pairs and double egress or page 58 for double acting pairs
- **FM** = Frame, Multiple: Illustrated on page 57 for contra-swing or R/L, R/R, L/L, frames and page 59 for R/R/R, R/L/L, Pair/Pair units

Frame Gage: Again, in most cases you will be ordering 16 gage frames as shown in the example. Our DW and CODW-Series are also available in 18 gage galvanneal.

Door Rabbet:

- 4 = 1-15/16" for 1-3/4" thick doors

Frame Rabbet Size: This is the nominal frame rabbet width and height, expressed in feet and inches. For multiple opening frames, each rabbet opening must be specified. Refer to pages 60 through 68 for the standard sizes available in each Series.

- 30x70 = 3'0" (36") wide, 7'0" (84") height door opening
- 60x80 = 6'0" (72") wide, 8'0" (96") height door opening
- 2x28x68 = 2 separate door openings, each 2'8" (32") wide and 6'8" (80") height
- 36 1/8x611 3/4 = 3'6-1/8" (42-1/8") wide, 6’11-3/4” (83-3/4") height door opening

Jamb Depth: The over-all depth of the frame, measured in inches. Refer to Pages 60 to 68 for the standard jamb depths available for each frame series.
**Swing** : Refer to Pages 55 through 59 for illustrations. Do not use ‘reverse handings’ when ordering frame product. For multiple opening frames, (2 or more separate rabbet openings in the same frame) specify the hand of each, working from left to right when viewing the frame in elevation from the pull side of the doors.

- For cased open drywall (CODW) Series frames, this indicates that the frame has no door hung in it, therefore has no handing
- RH = Right hand single or double egress
- LH = Left hand single or double egress
- RHA = Right hand active. Used for pairs only. Indicates (by default) that the LH frame rabbet opening will be prepared for the flush bolt strike
- LHA = Left hand active. Used for pairs only. Indicates (by default) that the RH frame rabbet opening will be prepared for the flush bolt strike
- R/L = Right hand + left hand (with mullion)
- R/R = Right hand + right hand (with mullion)
- L/L = Left hand + left hand (with mullion)
- CS R = Contra-swing, right hand
- CS L = Contra-swing, left hand
- DA R = Double acting right hand
- DA L = Double acting left hand
- DA PR = Double acting pair
- R/R/R = 3 right hand, single acting (with 2 mullions)
- R/L/L = 1 right hand + 2 left hand, single acting (with 2 mullions)
- PR/PR = 2 pairs, single acting (with 1 mullion)

**Options** : Options are defined as preparations, reinforcings, wall anchors, profiles or fire ratings which are not provided ‘standard’ for the specific frame series ordered. Refer to Pages 60 through 68 for the standard features of each series. Options are also standard preparations or reinforcings required at non-standard locations. Each option is listed separately.

The basic options are categorized as follows : wall anchors, assembly methods, hardware and profiles.

**Wall Anchors**:

- CSA = Combination Stud Anchor, pages 33 and 38, (2 piece type supplied standard)
- EWA = Existing wall anchor prep and guides, page 41 (butterfly style supplied standard)
- FA = Fire anchors, bridge and strap type, page 30
- WA = Wire anchors, page 29
- WSA = Wood stud anchors, page 39
- ZA = Z anchors, page 34
Note: CODW, DW and A-Series frames are provided with wall anchorage as part of the standard product and therefore need not be specified. See pages 62 and 67 for details.

Assembly
Method: Except for the DE-Series, all frames are supplied knocked-down (KD or KD-DW), in separate pieces. DE-Series are provided standard as set-up and welded (SUW) product.

- Knocked-down (KD) for F and A-Series frames, knocked-down drywall (KD-DW) for CODW and DW-Series, supplied standard

SUW = Set-up and welded for F, A and DE-Series

Fire Rating:
Specify laboratory, fire rating in hours and label material. Example: ULx3/4xEmb. Distributor will advise appropriate laboratory and label material available. Specify laboratory and fire ratings even when UL embossed label will be utilized.

- Not fire rated

Lab:
UL = Underwriters Laboratories
WHI = Warnock Hersey Inc

Rating:
3/4 = 3/4 hour rating
1 1/2 = 1-1/2 hour rating
3 = 3 hour rating

Material:
Emb = Embossed (UL only, provided standard on all hinge jambs)
Met = Metal
Myl = Mylar

Hardware:
All frames are prepared for 1-1/2 pairs of 4-1/2” standard weight (.134”) hinges up to 7’6” (90”) rabbet height and 2 pairs up to 10’0” (120”). High frequency hinge reinforcements are provided with raised dimples which, when ground off, convert the reinforcing to use heavy weight (.180”) hinges. Hinge locations are as shown in Figure 64 on Page 46. An ASA strike at 40-5/16” from bottom of strike jamb is also standard. Pairs are prepared for 4-1/2” standard weight hinges as above. When any of the above are required, they are not included in the options listing.
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASA@__</td>
<td>ASA (lipped) strike at non-standard location, specified in inches at “__”.</td>
</tr>
<tr>
<td>ASANL</td>
<td>ASA no lip strike in Strike jamb at 48”. If non-standard location is required, specify as ASANL@<strong>, indicating centerline height required, in inches, from bottom of strike jamb at “</strong>”.</td>
</tr>
<tr>
<td>ASAxASANL</td>
<td>ASA strike in strike at 40-5/16” and ASANL strike at 48”. If non-standard locations are required, specify as ASA@<strong>xASANL@</strong>. Indicate required strike centerline heights at “__”, in inches.</td>
</tr>
<tr>
<td>CRW</td>
<td>Closer reinforcing, welded in head. See page 51</td>
</tr>
<tr>
<td>FB</td>
<td>Reversible flush bolt strike and reinforcing at centerline of rabbet width. See page 53</td>
</tr>
<tr>
<td>N/BUTTS</td>
<td>No hinge reinforcing</td>
</tr>
<tr>
<td>N/S</td>
<td>No silencer (door bumper) preparation</td>
</tr>
<tr>
<td>NSHP,<em><strong>,</strong></em></td>
<td>Non-standard hinge pitch. Specify locations, top of rabbet to top of each hinge cut-out in inches at each “__”.</td>
</tr>
<tr>
<td>NSHQ,___</td>
<td>Non-standard hinge quantity for rabbet height. Specify quantity at “__”.</td>
</tr>
<tr>
<td>NSHS,___</td>
<td>Non-standard hinge size. Specify height at “__”</td>
</tr>
<tr>
<td>PA</td>
<td>Parallel arm closer reinforcing, welded in head soffit for each door. See page 52</td>
</tr>
<tr>
<td>S/ASA</td>
<td>Small ASA lipped strike at 48” centerline from bottom of strike jamb. Specify location, in inches, if non-standard</td>
</tr>
<tr>
<td>S/ASANL</td>
<td>Small ASA no-lip strike at 48” centerline from bottom of strike jamb. See page 49. Specify location if non-standard</td>
</tr>
<tr>
<td>SURF STR</td>
<td>Surface strike reinforcing welded in strike jamb soffit at 41” from bottom of jamb or at the centerline of frame rabbet width for pairs. See page 50. Specify location if non-standard.</td>
</tr>
</tbody>
</table>

Profile:

- DW = Standard profile for Series specified.
- DW = Drywall returns on F or DE-Series frames. See Figure 21, Page 10
- ER = Equal rabbet profile; 1-15/16” rabbets for 1-3/4” doors or 1-9/16” rabbets for 1-3/8” doors
- SR = Single rabbet profile. See Figure 12, Page 6
- __F = Other than 2” face head. Specify face size required at “__”

Tagging: To assist in the identification of frame product arriving at and being shipped from your facilities, you can specify that units have the architect’s (or your own) number indicated on the frame.
All other options should be fully described. This would include such things as special profiles, non-standard material, special hinge or strike reinforcing or preparation requirements or concealed holders or closers.

Contact your local authorized Fleming Distributor or the factory for assistance with any requirements not listed here.

**TRANSOM FRAMES, SIDELIGHTS AND WINDOWS**

To process orders for these types of units, please provide dimensioned elevations, section profile details, all hardware, handing and anchor information as shown below, to your local distributor.

---

**Figure 220 : Typical Sidelight Frame Ordering Information**

- Non-labelled, 4-1/2" hinges, ASA Strike, CRW, Wire Anchors, SUW
DOORS

A similar ordering sequence is used when ordering door product. A typical example, with an explanation for each element is shown below.

_D18-PS-M-4-30x70-RH-86ED_
ULx3/4xMyl
Prep for AUR-8707-RH Yale lock
Tag as # 264

**Door Series** : Specify one of the 4 available series shown below. Their designations, descriptions and the pages detailing each are:

- **D** = D-Series, lock seam door, pages 122 and 123
- **E** = E-Series, 6 panel, embossed face sheet lock seam door, pages 124 and 125
- **H** = H-Series, vertically stiffened, fully welded edge seam door, pages 120 and 121
- **TRR** = TRR-Series, lock seam, temperature rise rated fire door, pages 122 and 123

**Door Gage** : Indicate the face sheet gage required based on the specification and availability noted below.

- **16** = 16 gage, available for D, TRR and H-Series doors
- **18** = 18 gage, available for D, TRR and E-Series doors
- **20** = 20 gage, available for D and E-Series doors

**Optional Door Core** : Only D-Series door optional cores are required to be specified. E-Series are available only with a polystyrene core, H-Series are always a vertically stiffened, fiberglass core and the TRR-Series has a specialized core to limit heat passing through the door. The cores for E, H or TRR-Series are not required as part of the order sequence. For D-Series doors the standard core is kraft paper honeycomb with the following as available options:

- **PS** = Polystyrene (R6)
- **PI** = Polyisocyanurate (R12.3)
**Door Type**: This refers to light or louver preparations. Lighted doors are supplied with Fleming standard snap-in glazing system shown in Figure 142 on page 100. Unless noted otherwise with a dimensioned detail, all types are provided to the standards shown on pages 101 through 104 in the door section. The standard designations are:

- **M** = Slab (non-lighted) door, page 101
- **P** = Slab door with peep hole / viewer, page 101
- **L** = Louvered door, page 102
- **V** = 10" x 10" view window, page 102
- **NL1** = Tall narrow light, page 102
- **NL2** = 6" x 16" narrow light, page 103
- **G** = Half light, page 103
- **2G** = 2 light, page 104
- **FG** = Full light, page 104
- **__+L** = Lighted door with louver at bottom. Specify light type at “__”

**Door Thickness**:

- **4** = 1-3/4" thick door

**Nominal Size**: This is the nominal size of the door, expressed in feet and inches. Refer to pages 120 through 125, for the standard sizes available in each Series.

**Note**: Do not provide the actual leaf sizes. Actual leaf sizes are based on our standard clearances, undersizing both the nominal width by 3/16" (3/32" at each jamb) and nominal height by 7/8" (1/8" at head and 3/4" at the sill). A 3'0" x 7'0" nominal door has an actual leaf size of 35-13/16" width by 83-1/8" height. All actual leaf sizes are calculated this way, unless a non-standard undercut (the distance from finished floor to bottom of door) is included in the “Options” portion of the door ordering sequence. As an example, the same 3’0” x 7’0” nominal door, ordered with a 3/8” undercut, will yield an actual leaf size of 35-13/16” width by 83-1/2” height.

- **30x70** = 3’0” (36”) wide by 7’0” (84”) height nominal door size
- **36 1/8x611 3/ 4** = 3’6-1/8” (42-1/8”) wide by 6’11-3/4” (83-3/4”) height nominal door size

**Handing**: The direction of operation for the door, with latching hardware. See pages 55 through 59 for illustrations of the various designations shown below:

- **RH** = Right hand, locked from push side (back) of door
- **LH** = Left hand, locked from push side (back) of door
- **RHR** = Right hand reverse, locked from pull side (front) of door
- **LHR** = Left hand reverse, locked from pull side (front) of door
- **REV** = Reversible, non-handed, only D and H-Series ‘blank’ or 6’8” doors with ‘161’, ASA or ASAxFB preparations are reversible
Lock Stile Preparation: This specifies the standard lock stile hardware applications available from the list below. Refer to pages 109 to 113 for illustrations of the various standard applications. Their designations are as follows:

161 = Cylindrical lock edge and face preparations and reinforcing, 2-3/4” backset, edge prep centered at 39-9/16” from bottom of door, page 109
86ED = Mortise lock (8” x 1-1/4”) edge preparation and reinforcing, edge prep centered 39-3/16” from bottom of door, page 110
Blank = Blank door, reinforced for rim exit hardware, surface vertical rod exit hardware or push / pull applications, page 111
ASA = ASA (4-7/8” x 1-1/4” with lip) strike preparation and reinforcing in edge, centered at 39-9/16” from bottom of door, page 112
ASAXFB = ASA strike (as above) + 6-3/4” x 1” mortise flush bolt preparations and reinforcing centered 12” from top and bottom of door, page 113

When any of the lock stile preparations listed above are required at non-standard locations, they should be specified as shown below, with the required edge prep centerline, in inches, from the bottom of the door indicated at “__”.

161@__ = Cylindrical lock
86ED@__ = Mortise lock
ASA@__ = ASA strike

The inactive leaf of a pair of doors with an ASA strike and flush bolts can have at non-standard locations for either. They should be ordered using the following syntax:

ASA@__xBF = ASA strike (non-standard location, in inches) and ASA flush bolts centered 12” from the top and bottom of door
ASAXBF@__+12 = ASA strike at 39-9/16” from bottom of door, ASA flush bolt at a non-standard centerline from the top specified in inches at “__” and an ASA flush bolt centered 12” from the bottom of the door

Options: As with frame product, options are defined as preparations, reinforcements or fire ratings not provided ‘standard’ for the series ordered. Refer to pages 120 to 125 for the standard features of each series. Again, options are also standard preparations required at non-standard locations.
Fire Rating: Specify laboratory, fire rating in hours and label material. Example: ULx3/4xMyl. The distributor will advise appropriate laboratory and label material available.

= Not fire rated

Lab: UL = Underwriters Laboratories
     WHI = Warnock Hersey Inc

Rating: 3/4 = 3/4 hour rating
       1 1/2 = 1-1/2 hour rating
       3 = 3 hour rating

Material: Met = Metal
         Myl = Mylar

Hardware: The following are provided as standard for the Series indicated and therefore are not required in the order sequence.

All Fleming doors are prepared for 1-1/2 pairs of 4-1/2", standard weight (.134") hinges up to 7’6" (90") nominal height and 2 pairs up to 10’0" (120"). High frequency hinge reinforcements are provided with raised dimples which, when ground off, convert the reinforcing to use heavy weight (.180") hinges.

Hinge locations are as shown in Figure 147 on Page 105. In addition, all Fleming doors have an integral 14 gage galvanneal steel closer reinforcing provided at the top of each door, standard.

When required, the following hardware preparations must be specified:

ASANL = ASA no lip strike at 47-1/4" from bottom of door. If non-standard location is required, specify as ASANL@__, indicating centerline height, in inches, from bottom of door at "__"

ASAxASANL = ASA strike at 39-9/16" and an ASA no lip strike at 47-1/4" from bottom of door. If non-standard locations are required for either, specify as ASA@__xASANL@__, with strike centerlines from the bottom of door at "__" in inches

N/BUTTS = No hinge reinforcing

NSHP,____,____ = Non-standard hinge pitch. Specify locations, top of door to top of each hinge cut-out in inches at "__"

NSHQ,____ = Non-standard hinge quantity for nominal door height. Specify quantity required at "__"

NSHS,____ = Non-standard hinge size. Specify height at "__"

S/ASA = Small ASA lipped strike at 47-1/4" centerline from bottom of door. Specify location if non-standard
S/ASA = Small ASA lipped strike at 47-1/4" centerline from bottom of door. Specify location if non-standard
S/ASANL = Small ASA no lip strike at 47-1/4" centerline from bottom of door. Specify location if non-standard
_____ x ___ = Lock or exit device complete with functions holes. Indicate complete manufacturer’s lock or exit device number x swing

Tagging: To assist in the identification of doors arriving at and being shipped from your facilities, you can specify that they have the architect’s (or your own) number indicated on them.

All other options should be fully described. This would include such things as snap-in vinyl or steel top caps, special hinge reinforcing or preparation requirements, concealed holders or closers, astragals or optional edge seam treatment.

Contact your local authorized Fleming Distributor or the factory for assistance with any requirements not listed here.
161  See Cylindrical Lock Preparation

86ED  See Mortise Lock Preparation

Active Door  The leaf of a pair of doors in or on which the latching or locking hardware is mounted. Both leafs of a pair may be active

Actual Door Size  The distance measured on the front skin (pull side) from lock edge to hinge edge and from top to bottom of the door. Actual door size equals 'nominal size' less 'door clearances'. Actual door size is expressed in inches. Abbrev : Act. Dr. Size

Adjustable Floor Anchor  An angle mechanically fixed to the bottom of a jamb used to lift the base of the frame off the rough or sub-floor in terrazzo or similar applications. Also called Adjustable Base Anchor. Also see Jamb Extension

Adjustable Frame  See A-Series Frame

Anchor  A steel component placed inside a frame profile used to secure the frame to the adjacent construction. Abbrev : Anch

Anchor Hinge  A hinge which contains an additional bent flange at the top of one or both leaves, mortised in the hinge edge and optionally in the top of the door, the other leaf in the hinge jamb and head rabbet

ANSI  American National Standards Institute

Applied Stop  See Glass Stop

Arc Welding  A method of joining metal components by fusion with heat provided by an electric arc between an electrode and the metal or between two electrodes. The arc is shielded from the atmosphere by inert gas
ASA Strike
A 4-7/8" tall x 1-1/4" wide strike with 3-3/8" tall lip, complying with ANSI A115.1. Used with cylindrical and mortise locks

ASANL Strike
A 4-7/8" tall x 1-1/4" wide strike without lip. Used commonly with dead locks and dead latches

A-Series Frame
Fleming designation for a series of adjustable jamb depth frames manufactured in two sections which can be used on walls of various thickness

ASTM
American Society for Testing and Materials

Astragal
A component or combination of components applied to; (a) one or both leafs of a pair at their meeting edges; (b) to the top leaf of dutch doors or; (c) to the bottom of a flush panel above a door. Astragals close the gap between the leafs and provide a weather, light or sound seal or retard the passage of smoke, gases or flame. Also see Mortised Astragal, Overlapping Astragal, Split Astragal. Abbrev : Ast.

Back
The 'push' side of a door

Back Bend
See Return

Backset
The distance to a cutout or a datum line for a hardware preparation from a defined datum on a door or frame. Also see Device Back Set, Flush Bolt Back Set, Hinge Back Set, Lock Back Set, Strike Back Set. Abbrev : BS

Base
See Sill

Base Anchor or Base Clip
See Floor Anchor and Mullion Base Anchor

Bead
See Glass Stop
Glossary

Beveled Edge  The vertical door edge angled relative to the faces of the door. The standard bevel is 1/8" in 2" or 3° from front to back.

Blank Jamb  A vertical open section without hardware preparations. Used where surface mounted hardware, glazing materials or panels are required. Abbrev : BJ

Borrowed Light  A four-sided frame prepared for glazing materials. Also see Window Frame. Abbrev : B/L

Bottom Cap  A metal channel secured inside the end channel which closes the bottom of the door.

Bottom Rail  The horizontal face of a door below the lowest glass light, panel or louver.

Builders Hardware  Per NFPA : Hinges, single, two or three point locks or latches, top and bottom bolts and door closers applied to only swing doors. NFPA defines fire exit hardware separately.

Bull-Nosed Edge  A vertical door edge radiused or segmented relative to the faces of the door. Used on doors with center-hung pivots or double acting doors.

Bumpers  See Door Silencers.

Butt Joint  The intersection of frame members which are not mitered.

Butted Frame  A frame which fits against a partition rather than around it.

Cased Open  A frame profile without a door stop. Abbrev : CO
Ceiling Strut  See Channel Extension

Center Rail  The horizontal face of a door between two glass lights, panels or a glass light and louver. Also a horizontal closed section exceeding 2” face width separating glazing materials or panels in sidelight or window frames

Channel Extension  A vertical assembly extending from the head or sill of a frame to the ceiling or floor to hold the frame securely in place. Used in heads of assemblies installed in drywall partitions where the distance from the head to the ceiling is excessive. Also used to suspend sidelight or window assemblies off the floor in a gypsum knee-wall partition. Abbrev : Chan. Ext.

Cladding  A material affixed to a surface of a door or frame

Closed Section  A mullion, center rail or corner post in frame product

Closer Reinforcing  A steel component in a door or frame providing the necessary strength and material thickness for thread engagement required for mounting door closers. Abbrev : CRW

Cold Rolled Steel  A hot-rolled steel processed by annealing and reduction to a required thickness by a cold rolling process. Cold rolled steel is the base material for galvanneal and galvanized steel. Manufactured to ASTM A366. Abbrev : CRS

Combination Stud Anchor  A steel component used to secure a frame to various designs of wood or steel stud partitions. Abbrev : CSA
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communicating Frame</td>
<td>A double rabbet frame prepared to accept a door in each rabbet. These frames are typically used to facilitate access and control between individual hotel rooms. Abbrev: Comm Fr</td>
</tr>
<tr>
<td>Compression Anchor</td>
<td>A factory installed wall anchor used in slip-on drywall frames (KD-DW Series) to adjust, secure and square the frame in a finished opening. Compression anchors are located on the inside of the soffit, near the top of each jamb</td>
</tr>
<tr>
<td>Concealed Vertical Rod Device</td>
<td>An exit device with mechanism latching into a frame head and optionally into the floor, each housed inside the door, interconnected with a touch bar or crash bar mounted on the back face (push side) of the door. Abbrev: CVR</td>
</tr>
<tr>
<td>Continuously Welded</td>
<td>A vertical door edge seam which is welded over its entire length. Fleming H-Series is a continuously welded door</td>
</tr>
<tr>
<td>Contra-Swing</td>
<td>A frame with two single doors, swinging in the opposite direction with a fixed or removable mullion between the doors. Abbrev: CS</td>
</tr>
<tr>
<td>Core</td>
<td>The internal construction of a hollow metal door</td>
</tr>
<tr>
<td>Corner Joint</td>
<td>The intersection of two perimeter members of a frame</td>
</tr>
<tr>
<td>Corner Post</td>
<td>A closed hollow metal section used to create an &quot;L&quot; (two way) or &quot;T&quot; (three way) intersection in a sidelight or window assembly</td>
</tr>
<tr>
<td>CSDMA</td>
<td>Canadian Steel Door Manufacturers Association. An organization representing full line manufacturers of standard and custom hollow metal doors and frames in Canada</td>
</tr>
<tr>
<td>Cut-Off Stop</td>
<td>See Sanitary Base</td>
</tr>
</tbody>
</table>
Cutout  An opening in a door or frame to accommodate hardware, glazing, louvers, other options or accessories

Cylindrical Lock Preparation  Lock stile and edge cut-outs and reinforcing complying with ANSI A115.2, consisting of a 2-1/8" diameter hole at a 2-3/4" back set in each face sheet and a 2-1/4" tall x 1-1/8" wide edge cut-out, all on the same horizontal center line. Commonly referred to as a "161" preparation

Depth  See Jamb Depth

Device Back Set  The distance from either the lock edge center line or front edge (pull side) of a door, to a vertical datum line used to position fire or panic exit devices. The vertical datum line is established by the exit device manufacturer and can be the center of the device or the cylinder

DHI  Door and Hardware Institute. An international organization representing the architectural openings industry with membership comprising firms, agencies or individuals engaged in the manufacture or furnishing of products or services to the industry

Door Clearance  The distance between: (a) the door rabbet on a frame and a door; (b) the door rabbet on a frame and the top of a door; (c) two doors in a pair or; (d) the bottom of a door and the floor (also called 'under cut')

Door Rabbet  The portion of a frame section in which the hinge or strike are mortised or where glazing materials or panels are located. Fleming standard door rabbet is 1-15/16"
GLOSSARY

Door Silencer: A frame component manufactured from a resilient material secured to the stop of the strike jamb (for singles) or the head (for pairs) to cushion the closing of a door.

Door Size: See Actual Door Size and Nominal Door Size.

Door Stop: The portion of a frame section into which the door closes.

Double Acting: An assembly where the doors can swing in both directions, towards or away from their closed position. Abbrev: DA.

Double Egress: A frame and pair of doors swinging in the opposite direction without a center mullion. Abbrev: DE.

Double Rabbet: A frame profile with recesses on both sides of the soffit. The recess for the door or glazing materials is called the 'door rabbet', the other is the 'opposite rabbet'. Most Fleming Frame Series are double rabbet profile.

Drywall Frame: A knocked-down frame designed to be installed in a gypsum and wood/steel stud partition after the wall is completed. This type of frame is also called a 'slip-on' frame. Fleming's DW Series is a drywall frame.

Drywall Profile: An open frame section designed with additional returns to protect gypsum or plaster. Fleming KD-DW and A-Series frames are both 'drywall profile' products.

Drywall Return: The portion of a frame profile formed 90° from the returns, inside the throat opening, parallel to the frame faces. Also called a 'double return'.
Drywall Series | See DW-Series
---|---
D-Series Doors | Fleming designation for galvanneal, lock-seam, flush face (not embossed) doors
Dust Box | A metal component attached to, covering, or an integral part of a hardware reinforcing, to prevent mortar, grout or plaster from entering tapped holes in the reinforcing. Also called 'mortar guard box' or 'plaster guard box'
Dutch Door | Two separate leafs, swinging independently, hung one above the other in the same frame. Fleming's door type designation is "DD"
Dutch Door Frame | A frame prepared for a dutch door
DW-Series | Fleming designation for slip-on, knocked-down commercial drywall profile frame product. Available in standard and custom jamb depths. Jambs and heads are factory mitered
Electro Galvanized | A process where a 'flash-coat' of zinc is electrostatically applied to cold-rolled steel. The weight of coating is substantially less than that of galvanized or galvanneal steel. ASTM A591 covers steel manufactured in this fashion. This process is used to protect cold-rolled steel from rusting between the steel mill and factory applied paint. Due to the limited amount of coating on the steel, electro galvanized is not used by Fleming.
Embossed Door | See E-Series Door
End Cap | See Top Cap and Bottom Cap
End Channel | An inverted "U" shaped component inserted in the top and bottom of the door, projection welded to each face sheet
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Series Door</td>
<td>Fleming designation for galvanneal, six-panel embossed, lock-seam doors</td>
</tr>
<tr>
<td>Existing Wall Anchor Guide</td>
<td>A steel component secured inside the jamb or head profile, designed to retard the compression of the section when the expansion bolt anchors are tightened. These anchors are used in frames mounted in existing unit masonry, poured concrete or structural steel. Fleming manufactures two types of anchors, a 'butterfly' and a 'strap and channel' type. Abbrev: EWA</td>
</tr>
<tr>
<td>Existing Wall Anchor</td>
<td>A pierced and dimpled (countersunk) 1/4&quot; or 3/8&quot; diameter hole in the soffit of an open section reinforced inside the profile with an existing wall anchor guide</td>
</tr>
<tr>
<td>Exit Device</td>
<td>A door latching mechanism designed to always be operable from the inside (push side) of the door by activating a crash bar, touch bar or lever. There are two classifications; panic exit and fire exit devices. See each for definitions. Within each classification, there are three types of device; rim, mortise and vertical rod. See each for detailed descriptions</td>
</tr>
<tr>
<td>Face</td>
<td>The portion of the exposed frame section, when viewed in elevation, which joins the door rabbet or opposite rabbet to the return</td>
</tr>
</tbody>
</table>
Field Splice  A connection of frame or door components made in the field by others. Product is fabricated in sections when site access, shipping or handling limitations dictate

Filler Section  A formed steel component used to close the throat of an open section. May contain an integral stop and soffit

Finished Floor  The top surface of the floor. Where terrazzo, resilient tile or carpet are used, the finished floor is the top of the surface on which the terrazzo, tile or carpet are installed

Fire Exit Device  An exit device which has been tested for both fire protection and panic exit loading. Abbrev: FED

Floor Anchor  A steel angle welded inside the bottom of a jamb with provision for mechanical attachment to the floor. Also see Mullion Base Anchor

Flush Bolt  A rod or bolt mechanism mortised in the edge of the inactive leaf of a pair of doors, latching into the head and/or floor. Abbrev: FB

Flush Bolt Backset  The horizontal distance from the lock edge center line to the center line of the bolt

Flush Door  A door with each face sheet formed from one sheet, having no seams on the faces
**Frame**
A product category where units contain single or multiple door openings without horizontal transom members. Abbrev: Fr

**Frame Clearance**
The distance between the stop on a frame and the back face (push side) of the door. Fleming standard Frame Clearance is 1/8”

**Frame Rabbet Height**
The vertical distance from the bottom of a jamb to the underside of an intersecting head rabbet or transom mullion rabbet. The frame rabbet height is generally the same as the 'nominal door height' or the 'actual door height' plus 'door clearances'. Frame rabbet heights are expressed in feet and inches. Example: 70 = 7’0” Abbrev: Fr Rab Ht

**Frame Rabbet Width**
The horizontal distance between jamb rabbets. The frame rabbet width for single doors is generally the same as the 'nominal door width'. For pairs, the frame rabbet width is equal to the sum of the 'nominal door widths'. The frame rabbet width is equal to the 'actual door width' plus 'door clearances'. Frame rabbet widths are expressed in feet and inches. Example: 30 = 3’0” Abbrev: Fr Rab Wid

**Front**
The 'pull' side of a door

**F-Series**
Fleming designation for masonry profile, knocked-down or welded, commercial frames. Available in standard or custom jamb depths and profiles. Jambs and heads are factory mitered
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gage</td>
<td>A numeric designation used to define the nominal thickness of steel sheet. Abbrev: Ga</td>
</tr>
<tr>
<td>Galvanneal</td>
<td>Steel with an annealed zinc-iron alloy, coated by the hot-dip process, resulting in a dull matte finish. Manufactured to ASTM A653. Abbrev: Galv</td>
</tr>
<tr>
<td>Galvanized</td>
<td>Steel that is zinc coated by the hot-dip process resulting in a full spangled finish. Manufactured to ASTM A653</td>
</tr>
<tr>
<td>Glass Stop</td>
<td>Removable formed channel or angle used to hold glazing materials or panels in place within door or frame product</td>
</tr>
<tr>
<td>Glazing Trim</td>
<td>The component in a glazed door opening to which the glass stop is applied</td>
</tr>
<tr>
<td>Hand</td>
<td>A term used to describe the direction of door swing. Technically for hardware only four 'handings' are available; left hand (LH), right hand (RH), left hand reverse (LHR), or right hand reverse (RHR). For hollow metal 'hand' and 'swing' are used interchangeably. Also see Swing</td>
</tr>
<tr>
<td>Head</td>
<td>The horizontal member which forms the top of a frame product. Also describes the top portion of a door. Abbrev: Hd</td>
</tr>
<tr>
<td>Hinge</td>
<td>A hardware device used to support and swing a door in a frame</td>
</tr>
<tr>
<td>Hinge Backset</td>
<td>The distance from the back (push side) of a door, or from the stop on a frame to the inside edge of the hinge cutout</td>
</tr>
<tr>
<td>Hinge Edge</td>
<td>The vertical portion of a door in which the hinges are usually mortised</td>
</tr>
</tbody>
</table>
Hinge Jamb  The vertical perimeter member of a frame from which the door is supported and swings.  Abbrev : HJ

Hinge Reinforcing  A steel component on which a hinge is mounted

Hinge Stile  The vertical faces of a door at the hinged side

HMMA  Hollow Metal Manufacturers Association. A division of NAAMM. An organization representing custom steel door and frame manufacturers

Hollow Metal  A general term used to describe doors and frame product manufactured from mild steel.  Abrev : HM

Honeycomb  An internal stiffening component of steel doors or panels constructed of interconnected cells of kraft paper, laminated under pressure to the inside face sheets.  Abrev : HC

Hospital Profile  A type of double rabbet frame profile where the stop at the opposite rabbet is formed as a slope at 30° rather than with two 90° bends

Hospital Stop  See Sanitary Base

Hot-Dip Galvanized  See Galvanized

Hot-Rolled Steel  A steel which is reduced to its final thickness by heating and rolling.  Abbrev : HRS
H-Series Door  Fleming designation for galvanneal, continuously welded edge seam, vertically stiffened doors

Inactive Door  The leaf in a pair of doors which does not contain a latch or lock and is secured in the closed position with top and/or bottom bolts.

Interconnected Frame  See Communicating Frame

ISO  International Standards Organization

ITS  Intertek Testing Services. An international testing and certification organization. Also see WHI

Jamb  The vertical perimeter member of frame products

Jamb Depth  The distance on a frame profile measured from face to face, perpendicular to the face of the door. Abbrev : JD

Jamb Extension  The distance from the top of the rough (or sub-floor) to the top of the finished floor. This distance may be spanned by physically lengthening the jambs. Alternately, angled steel components (called jamb extensions) may be welded or mechanically affixed to the bottom of the jamb to place the base of the jamb even with the top of the finished floor. Abbrev : Jmb Ext

KD-Construction  A frame assembly method. Loose jambs and heads are shipped to site. Frame is assembled and placed in position prior to constructing adjacent partition.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>KD-DW Construction</td>
<td>A frame assembly method. Loose jambs and heads are shipped to site. Frame is assembled in a rough stud opening. Fleming DW-Series is a KD-DW frame.</td>
</tr>
<tr>
<td>Knocked Down Frame</td>
<td>A frame manufactured in three or more pieces for field assembly</td>
</tr>
<tr>
<td>Labeled</td>
<td>A product which bears the mark or symbol of an accredited organization with a follow-up service program, attesting to the product's compliance with the requirements of the appropriate standard</td>
</tr>
<tr>
<td>LD-Series</td>
<td>Fleming designation for galvanneal, lock seam, flush face, lead-lined doors</td>
</tr>
<tr>
<td>Lead-Lined</td>
<td>A door or frame constructed with sheet lead to prevent radiation penetration</td>
</tr>
<tr>
<td>Leaf</td>
<td>An individual door, used singly, in pairs or in multiple opening configurations</td>
</tr>
<tr>
<td>Light or Lite</td>
<td>An opening in a door or frame prepared for glazing materials</td>
</tr>
<tr>
<td>Lock Backset</td>
<td>The horizontal distance from the lock edge center line to the vertical center line of the lock cylinder, knob or lever</td>
</tr>
<tr>
<td>Lock Edge</td>
<td>The vertical portion of a door in which the lock or latching device is mortised or mounted</td>
</tr>
<tr>
<td>Lock Reinforcing</td>
<td>A steel component attached to the inside lock edge or lock stile of a door used to mount and support a lock or latch</td>
</tr>
</tbody>
</table>
Lock Seam  A method of connecting door skins at the door edges by forming mating pockets in the sheet steel. Fleming D, E, LD and DSS-Series are all lock seam doors

Lock Stile  The vertical faces of a door at the latching side

Louver  A device containing a series of fixed or operable slats or blades to allow the passage of air through a door or frame

Masonry Profile  An open frame section with the final legs or returns formed to be perpendicular to the faces

Masonry Wall Anchor  A strap and channel type assembly welded to the inside of an open section used to secure the frame to the adjacent unit masonry partition

Meeting Stile  A lock stile intersection of a pair of doors

Miter Joint  The intersection of two perimeter members where the faces meet at an angle

Mortar Guard  See Dust Box

Mortise  A cutout in a door or frame to receive hardware

Mortised Astragal  An astragal installed in a recess in the edge of a door
Glossary

Mortise Exit Device

An exit device using a single point latching mechanism recessed in the lock edge of a door, inter-connected with a touch bar or crash bar mounted on the back face (push side) of the door.

Mortise Lock

A single point latching mechanism designed to be installed in a recessed preparation in the lock edge of a door. The most common type of mortise lock has an 8" x 1¼" edge preparation generically referred to as an "86ED" lock.

Mortise Lock Reinforcing

Lock edge cut-out and reinforcing complying with ANSI A115.1, consisting of an 8" tall x 1-1/4" wide edge cut-out and lock reinforcing assembly. Commonly referred to as an "86ED" preparation.

Mullion Section

A closed member within frame product, separating doors, glazing materials or panels with a maximum face width of 2". Vertical mullions between doors can be fixed or removable. Also see Center Rail. Abbrev: MS

Mullion Base Anchor

A steel component fixed to the bottom of a vertical mullion with provision for mechanical attachment to the floor.

Muntin

A narrow profile member used to separate glazing materials in doors and frame product. Generally these members are recessed from either one or both faces of the door or frame.

Mute

See Door Silencer

NAAMM

National Association of Architectural Metal Manufacturers. An umbrella organization representing manufacturers of diverse metal products. Also see HMMA

Narrow Side

See Back
GLOSSARY

Net Door Size  See Actual Door Size

Nominal Door Height  See Nominal Door Size

Nominal Door Size  A convenient method of describing the size of a door which encompasses both the 'actual door size' plus standard 'door clearances'. The 'nominal door size' equals the 'frame rabbet opening size' for single doors. For pairs of doors the 'nominal door width' is half the 'frame rabbet opening width'. Nominal door size is expressed in feet and inches, width by height. Example: 3070 = 3'0" width x 7'0" height

Nominal Door Width  See Nominal Door Size

Opening Size  See Frame Rabbet Width and Frame Rabbet Height

Open Section  A frame member containing a throat. Jambs, heads and sills are open sections. Abbrev: OS

Opposite Rabbet  In a double rabbet frame the recess in the section profile which is not prepared for hardware or glazing materials

Overlapping Astragal  An astragal surface mounted on either the face or edge of one leaf in a pair which extends over the adjacent leaf. Flat bar and Z astragals are both overlapping

Pair  Two doors swinging in the same direction without a mullion between them. Abbrev: Pr

Panic Exit Device  An exit device which has been tested for cycle, push and pull side exit loading, but not for fire protection
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>Parallel Bevel</td>
<td>A condition at the meeting stile of pairs of doors where the vertical door edges are angled in the same direction rather than in the opposite direction. Used on double egress doors.</td>
</tr>
<tr>
<td>Plaster Guard Box</td>
<td>See Dust Box</td>
</tr>
<tr>
<td>Pocket Frame</td>
<td>A frame assembly designed for a door which slides into a recess in the wall.</td>
</tr>
<tr>
<td>Projection Weld</td>
<td>A method of fusing metals which relies on the application of electric current and pressure through electrodes without the use of filler metal. The location of the weld is determined by the position of embossments (or dimples) in one of the fused pieces.</td>
</tr>
<tr>
<td>Rabbet</td>
<td>A recess formed in a frame section to receive a door, panel or glazing materials. Abbrev: Rab.</td>
</tr>
<tr>
<td>Rail</td>
<td>The horizontal face of a door above, below or between lights or louvers. Also see Bottom Rail, Center Rail, Top Rail.</td>
</tr>
<tr>
<td>Removable Mullion</td>
<td>A closed section which can be taken out of a frame opening to permit the access of larger objects on a temporary basis. Removable mullions may be a frame member or a hardware item. Abbrev: Rem Mull.</td>
</tr>
<tr>
<td>Return</td>
<td>The portion of a frame profile extending back from the face, perpendicular to the wall surface.</td>
</tr>
<tr>
<td>Reverse Bevel</td>
<td>See Reverse Handed</td>
</tr>
<tr>
<td>Reverse Handed</td>
<td>The hand of a door or lock. Used when the key is located on the pull side of the door and the door swings towards the exterior.</td>
</tr>
</tbody>
</table>
Reversible Door  A door where the hinge edge preparations (and lock preparations, if required) are positioned equally from the top and bottom of the door so that the door may be installed as either right or left hand swing

Reversible Flush Bolt  A preparation in the head of a frame for a flush bolt strike which can be mounted to be either left of right handed

Rim Exit Device  An exit device with a single point latching mechanism, interconnected with a touch bar or crash bar, all surface mounted on the back face (push side) of a door

Rough Opening  The size of wall opening in which a frame will be installed

Rough Stud Opening  The clear opening in steel or wood stud partitions, measured between; (a) the vertical studs to which the frame will be anchored or; (b) the floor and the horizontal stud or runner at the frame head. Abbrev : RSO

Sanitary Base  A stop and soffit on a frame section which end at a specified distance above the bottom of the section and is closed at an angle

Seamless Door  A door having no visible seams on the faces or edges

Second Return  See Drywall Return

Set-Up and Welded  An term for frame assembly or construction methods where components are welded together. Abbrev : SUW
Glossary

**Shadow Line Face**
The portion of the exposed frame section, when viewed in elevation, which connects the return to the shadow line return, and extends parallel to the face.

**Shadow Line Return**
The portion of the frame section which is connected to the shadow line face and extends perpendicular to the face.

**Shadow Line Reveal**
An architectural feature on a frame profile comprising the shadow line face and shadow line return.

**Side Light Frame**
A frame product category where units contain single or multiple door openings with provision for adjacent openings for glazing materials, panels or louvers, separated by vertical mullions. These units may also have provision for single or multiple transoms.

**Silencer**
See Door Silencer.

**Sill**
The bottom horizontal perimeter member in a four sided opening prepared for doors, glazing materials or panels.

**Sill Channel**
A steel component fixed in the bottom horizontal perimeter member of a sidelight or window frame used to secure the member to the floor.

**Single Acting Door**
A door which swings in only one direction relative to the plane of the frame.

**Single Rabbet**
A frame profile with one recess for doors, glazing materials or panels.

**Slip-On Frame**
See Drywall Frame.

**Small ASA Strike**
A 2-3/4" tall x 1-1/8" wide strike with a 1-1/2" lip, complying with ANSI A115.2. Also called a "T" strike. Abbrev: SML/ASA.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small ASANL Strike</td>
<td>A 2-3/4&quot; tall x 1-1/8&quot; wide strike without a lip. Abbrev: SML/ASANL</td>
</tr>
<tr>
<td>Soffit</td>
<td>The portion of the frame profile between the stops on a double rabbet section or the stop and the opposite face on single rabbet sections. Also called Stop Width</td>
</tr>
<tr>
<td>Sound Retardant</td>
<td>The ability to resist sound transmission</td>
</tr>
<tr>
<td>Spat</td>
<td>A protective covering, usually light gage stainless steel, wrapping the bottom of a section to prevent or minimize damage to the base of the frame</td>
</tr>
<tr>
<td>Split Astragal</td>
<td>A surface mounted, two component system with one piece installed on each leaf of a pair so that each component abuts the other in the closed position</td>
</tr>
<tr>
<td>Split Frame</td>
<td>See A-Series Frame</td>
</tr>
<tr>
<td>Spot Weld</td>
<td>A method of fusing metals which relies on the application of electric current and pressure through electrodes without the use of filler metal. The location of the weld is determined by the position of the electrode</td>
</tr>
<tr>
<td>Spreader</td>
<td>A temporary stiffening component attached to the base of a rabbet opening in frame product to maintain alignment during shipping and handling. Not to be used for installation purposes</td>
</tr>
<tr>
<td>Square Edge Door</td>
<td>A vertical door edge formed 90° relative to the faces of the door</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-------------------------</td>
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</tr>
<tr>
<td>Stainless Steel</td>
<td>An alloy of iron containing a minimum of 11% chromium. Specified when elevated levels of corrosion resistance or sanitation are required.</td>
</tr>
<tr>
<td>Steel Stud Anchor</td>
<td>See Combination Stud Anchor and Z Anchor</td>
</tr>
<tr>
<td>Stick Series</td>
<td>Fleming designation for unmitered lengths of frame section used in the fabrication of frame product. Available in standard or custom jamb depths and profiles.</td>
</tr>
<tr>
<td>Stiffener</td>
<td>An internal formed steel component for doors and panels used to connect face sheets and make them rigid. Fleming H-Series doors utilize an interlocking type stiffener system.</td>
</tr>
<tr>
<td>Stop</td>
<td>The portion of a frame profile connecting the door or opposite rabbet to the soffit. The part of the profile against which the door closes. Also called Stop Height.</td>
</tr>
<tr>
<td>Stop Width</td>
<td>See Soffit</td>
</tr>
<tr>
<td>Strike</td>
<td>A device for retaining a latch or bolt. May be mortised or surface mounted in the strike jamb, head, floor or leaf.</td>
</tr>
<tr>
<td>Strike Back Set</td>
<td>The distance from the edge of a strike cut-out to the back (push side) of the door or from the edge of a strike cut-out to the stop on the frame.</td>
</tr>
<tr>
<td>Strike Jamb</td>
<td>A vertical open section which receives a latch or lock retaining device. Abbrev: SJ</td>
</tr>
<tr>
<td>Strike Reinforcing</td>
<td>A steel component attached to the interior of the frame profile or door edge used to mount and support a surface or mortise strike.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
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<td>-----------------------------</td>
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</tr>
<tr>
<td>Surface Bolt</td>
<td>A rod or bolt mechanism applied to the face of the inactive leaf of a pair of doors, latching into the head and/or floor.</td>
</tr>
<tr>
<td>Surface Hardware Reinforcing</td>
<td>A factory installed steel plate, channel or angle component providing the necessary strength and material thickness for screw engagement for devices mounted directly upon the surface of door or frame product. Does not include drilling and tapping.</td>
</tr>
<tr>
<td>Surface Vertical Rod</td>
<td>An exit device with an exposed mechanism latching into the frame head, and optionally into the floor, mounted on the back face (push side) of the door. Abbrev: SVR.</td>
</tr>
<tr>
<td>Swing</td>
<td>Technically, describes the direction of egress for frames. RH or LHR doors are used in 'RH' swing frames. Two single doors, one right hand and one left hand are for a frame with a swing called 'pair'. Industry however uses 'swing' and 'hand' interchangeably. Also see Hand.</td>
</tr>
<tr>
<td>T Strike</td>
<td>See Small ASA Strike.</td>
</tr>
<tr>
<td>Temperature Rise Rated</td>
<td>A door which has been tested to determine the amount of heat passing through the assembly after either one half hour or one hour into the standard fire test. Door are classified for 250°F, 450°F or 650°F temperature rise at 30 minute or 250°C at either 30 or 60 minutes. Abbrev: TRR.</td>
</tr>
<tr>
<td>Template</td>
<td>A precise detailed layout or pattern for providing the necessary information to prepare a door or frame for hardware.</td>
</tr>
<tr>
<td>Templated</td>
<td>A hardware product or device manufactured to exactly match the dimensions and locations shown on its drawing (template).</td>
</tr>
<tr>
<td>Terminated Stop</td>
<td>See Sanitary Base.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Tension Anchor</td>
<td>See Compression Anchor</td>
</tr>
<tr>
<td>Thermally Broken</td>
<td>A frame option where the interior and exterior portions of the profile are separated to reduce the transfer of cold from outside to inside. Abbrev: TB</td>
</tr>
<tr>
<td>Threshold</td>
<td>A raised hardware component fastened to the floor in a door opening</td>
</tr>
<tr>
<td>Throat Opening</td>
<td>The distance between the returns in masonry profile sections, or the second returns in drywall profile sections</td>
</tr>
<tr>
<td>Throw</td>
<td>The maximum projection of a bolt or latch when fully extended</td>
</tr>
<tr>
<td>Tolerance</td>
<td>The limit of deviation from the nominal value indicated</td>
</tr>
<tr>
<td>Top Cap</td>
<td>A channel secured inside the end channel which closes the top of a door</td>
</tr>
<tr>
<td>Transom</td>
<td>A framed area immediately above a door opening containing glazing materials, panels or louvers</td>
</tr>
<tr>
<td>Transom Frame</td>
<td>A product category where units contain single or multiple door openings with single or multiple openings above the doors for glazing materials, panels or louvers, which are separated from the door openings by a horizontal mullion. Abbrev: TF</td>
</tr>
</tbody>
</table>
Transom Mullion  A horizontal closed section separating a door from glazing materials, panels or louvers

Transom Panel  An assembly of metal face sheets supported by a core material to be installed a four-sided opening above a door

Trim  See Face

ULC  Underwriters Laboratories of Canada. A standards writing, testing and certification organization in Canada, affiliated with ULI

ULI  Underwriters Laboratories, Incorporated. An international standards writing, testing and certification organization, affiliated with ULC

Undercut  The distance from the bottom of the door to the bottom of the frame. Fleming standard undercut is 3/4". Abbrev: U/C

Vertical Rod Device  An exit device with a mechanism latching into the frame head, and optionally into the floor, interconnected with a touch bar or crash bar mounted on the back face (push side) of the door. The latches are either housed within the door (concealed) or on the back face (surface mounted). Abbrev: VRD

Vertically Stiffened  A door or panel construction utilizing formed steel components to support the face sheets. Fleming H-Series is a vertically stiffened door

View Window  See Window Frame

Wall Anchor  A steel component secured inside a perimeter frame section used to attach the frame to the adjacent construction. Wall anchors may be factory or field installed
Welded Frame  A frame assembled by spot and/or arc welding at intersecting members. Also see Set-Up and Welded

WHI  Warnock Hersey, Incorporated. The registered trademark of Intertek Testing Services Ltd. (ITS). An international testing and certification organization. Also see ITS

Wide Side  See Front

Window Frame  A product category where units contain single or multiple openings for glazing materials, panels or louvers, but not containing doors. Also see Borrowed Light

Wire Anchor  A field installed, malleable steel component, drawn or extruded into a loop shape, used to secure frame product to an adjacent unit masonry partition. Abbrev : WA

Wood Stud Anchor  A steel channel component welded to the inside of an open section used to secure frame product to an adjacent wood stud partition. Abbrev : WSA

Wrap-Around  A frame which fits over a partition

Z Anchor  A formed steel component welded to the inside of an open section used to secure frame product to an adjacent steel stud partition

Z Astragal  A formed steel component applied to the edge of the inactive leaf of a pair of doors which closes the gap between the two leaves. Abbrev : Z Ast
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U/C ........... Undercut
ULI ........... Underwriters Laboratories
U-Value .... Thermal Conductance

VRD .......... Vertical Rod Device

WA ........... Wire Anchor
Wd ........... Wood
WHI .......... Warnock Hersey, Inc.
Wid. ........ Width
Wt .......... Weight
W/LIP ......... With Lip
W/S ........... With Stop
WSA .......... Wood Stud Anchor

XLB ........ XL Buff (Mirror) Finish Stainless Steel
XLS ........ XL Blend S (Brushed) Finish Stainless Steel

ZA ........... Z Anchor
Z Ast ........ Z Astragal
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About Fleming

Founded in 1959, S.W. Fleming Ltd. began as a small custom manufacturer of non-residential steel doors and frames. Due to a combination of quality, product depth and service, Fleming quickly grew to become the largest supplier in their market.

In 1980, Fleming realized that substantial growth would require a change in marketing philosophy. A decision was made to stop selling on a direct basis to general contractors and to implement a distributor program in every major city in Canada. In 1986, Fleming successfully launched this distributor program into the U.S. and overseas markets. Today Fleming distributors are in every major center throughout North America.

Fleming’s reputation as one of North America’s fastest growing steel door and frame manufacturers is due to its commitment to quality, service, product development and the use of state-of-the-art technology. Fleming’s depth of product offerings and fire rating capabilities combine to make Fleming one of the most comprehensive product lines of steel doors and frames in the world.

Company Features

- ISO 9001 Registered Company
- Member NAAMM
- Member Canadian Steel Door Manufacturers Association
- Member DHI
- Complete Product Offerings
- State-of-the-Art Manufacturing Facility

Service

Fleming has always been the industry leader in service. The use of real time production planning affords Fleming the best lead times in the industry at competitive prices. The latest in production equipment, tools and in-plant automation allows Fleming to provide the highest quality product and service available.

Fleming’s friendly and knowledgeable customer service staff are always available to answer your questions and provide any pricing or delivery assistance. Our Technical Services Department is considered one of the finest in the world and is always ready to assist, advise or consult on technical issues.
When it comes to shipping lead times, Fleming leads the way with the fastest lead times in the industry. As well as offering guaranteed Quick Ship Programs, Fleming’s normal lead times for standard product is one week and two weeks for custom product. The most important thing with regards to all of Fleming’s shipping schedules is our “on time” performance level, with an annualized “on time” rate of 99% plus our zero back order policy. You can’t beat Fleming for service.

**Service Features**

- 1 Week Lead Time on Stock Product
- 2 Week Lead Time on Custom Product
- 5 Day Quick Ship Program
- 2 Hour Quick Pack Program
- Real Time Production Planning
- Instant Order and Shipping Acknowledgments
- Web Site Production Schedule Accessibility by Distributors
- Zero Back Order Policy
- Complete Project Management Software

**Other Publications Available**

Other publications are available from Fleming. Please contact our Customer Service Department to receive.

- Architectural Manual
- Technical Manual
- Price Book
- Basic Hollow Metal Training Manual
- Fire Labeling Guide
- Presentation Materials
F Series - Masonry

The F series is Fleming’s masonry profile frame. This frame series is manufactured for both welded or knocked down applications.

- Manufactured from paintable galvanneal or G90 steel
- Available in 16, 14 and 12 gage
- Available in virtually any size and jamb depth
- Hinge jambs are UL embossed
- Provided with Fleming’s standard high frequency hinge reinforcements
- Hinge reinforcing is dimpled for conversion from standard to heavy weight
- Available in a wide range of custom profiles including shadow line, narrow face, hospital profile or with sanitary bases
- Wide variety of anchors available for different wall and installation conditions
- Includes welded in base anchors
- All frames BRAKE FORMED providing consistent and true corners

DW Series - Drywall

The Fleming DW Series is a knocked down drywall profile frame for “after wall” conditions.

- Manufactured from paintable galvanneal steel
- Available in 18 and 16 gage
- Available in a wide variety of sizes and jamb depths
- Hinge jambs are UL embossed
- Provided with Fleming’s standard high frequency hinge reinforcements
- Hinge reinforcing is dimpled for conversion from standard to heavy weight
- Standard tension anchor and dimpled bases for quick and simple installation
- All frames BRAKE FORMED providing consistent and true corners

MAS-PROFILE

DW-PROFILE

ANCHORS

- COMBINATION STUD ANCHOR
- MASONRY FIRE ANCHOR
- EXISTING WALL ANCHOR
- Z ANCHOR

WIRE-ANCHOR

COMPRESSION ANCHOR

BASE ANCHOR
### A Series - Adjustable Jamb Depth

The A Series frame is Fleming's commercial quality adjustable jamb depth frame. Utilized by distributors who need to offer knocked-down or welded frames with custom jamb depths or for installation in unknown or uneven wall conditions.

- Manufactured from 16 gage paintable galvanneal steel
- Hinge jambs are UL embossed
- Available in three different sizes
  - Type S - 4-1/2" to 6-5/8" jamb depths
  - Type M - 5-1/16" to 7-7/8" jamb depths
  - Type L - 7-7/8" to 13-1/2" jamb depths
- Provided with Fleming's high frequency hinge reinforcing
- Hinge reinforcing dimpled for conversion from standard to heavy weight
- Frame faces dimpled for easy installation in masonry concrete or drywall

### R Series - Retrofit

Fleming's R Series was specifically designed to meet the growing need for a slip in steel door frame for the renovation and retrofit building construction market. The R Series Frame easily slides over the existing frame rabbet and is then screw fixed to the existing frame. A square and plumb installation is quickly and accurately accomplished by the use of standard shim stock as necessary. Once installed the R Series readily accepts virtually any steel or wood doors to complete the opening. A variety of face trims and door stops can be added to enhance the opening as directed by the designer.

- Manufactured from paintable galvanneal steel
- Available in 16 gage

### TB Series - Thermally Broken

The TB Series is a thermally broken commercial knocked-down or welded steel frame for use where extreme temperature differences occur. It is manufactured with a PVC spline which eliminates through metal contact, substantially decreasing the thermal conductivity experienced in a normal steel frame.

- Manufactured from 16 gage paintable galvanneal steel
- Available up to 6-3/4" jamb depth
- Exceeds the standards for Insulated Steel doors with frames CGSB 82-Gr-5M
- Provided with Fleming's high frequency hinge reinforcing
- Hinge reinforcing dimpled for conversion from standard to heavy weight
The Fleming D Series Door has earned a reputation for quality, durability and performance throughout the commercial construction industry. The D Series is Fleming’s lockseam door for use in standard, medium, heavy and extra heavy duty applications.

- Manufactured from paintable galvanneal or G90 steel
- Available in 20, 18 and 16 gage
- Available with pre-expanded paper honeycomb, polystyrene or polysocyanurate cores
- Available with labeling up to 3 hours with UL, ULC and WHI
- Southern Building Code compliant including Dade, Broward and Palm Beach Counties
- Available in sizes up to 3'0 x 10'0 or 4'0 x 9'0
- Available with a wide range of glass light and louvre preparations

Features:
- Extra deep end channels at top and bottom of door for lasting integrity
- High frequency hinge reinforcements which outperform typical 3/16" hinge reinforcing
- Dimpled hinge reinforcing for easy conversion from standard to heavy weight hinges
- Adhesive assisted extra deep lockseam which enhances structural rigidity and durability of the door
- Closer reinforcing in all doors
- All interior components made with galvanneal steel
- Level ‘A’ grade in accordance with ANSI A 250.4 (formerly A 151.1) test procedures

www.flemingdoor.com
H Series - Steel Stiffened

When security and lasting performance are the issue, the Fleming H Series should be specified. Recognized as one of the strongest doors in the industry, it is designed to withstand the wear and tear of high abuse areas as well as high security applications. This door is specified in many banks, police stations, detention facilities and schools.

The H Series Door is constructed using interlocking steel stiffeners that are welded to each face of the door at 6” centers. Voids are filled with fiberglass insulation and then the edges are continuously welded for the maximum in durability and security.

Features:
- Extra deep end channels at the top and bottom of the door for lasting integrity
- High frequency hinge reinforcements which outperform typical 3/16” hinge reinforcing
- Dimpled hinge reinforcing for easy conversion from standard to heavy weight hinges
- Closer reinforcing in all doors
- All interior components made with galvanneal steel
- Level ’A’ grade in accordance with ANSI A 250.4 (formerly 1 A 151.1) test
- Continuously welded edge
- Manufactured from paintable galvanneal or G90 steel
- Available in 16, 14 and 12 gage
- 20 gage interlocking stiffeners spot welded to door faces
- Available with labels up to 3 hours with UL, ULC, WHI
- Available in any size
- Available with a wide range of glass light and louvre preparations

E Series

Elegance combines with true Commercial Quality in this exquisite steel door. Manufactured to rigid commercial specifications, the Fleming E Series 6 panel embossed door provides security and durability for today’s demanding markets.

- Manufactured from paintable galvanneal steel
- Available in 20 and 18 gage
- Available with polystyrene core providing needed insulating values
- Available with up to 1.5 hour label from UL, ULC, WHI
- Available in sizes up to 3’8 x 7’0

Features:
- Extra deep end channels at top and bottom of door for lasting integrity
- High frequency hinge reinforcements which outperform typical 3/16” hinge reinforcing
- Dimpled hinge reinforcing for easy conversion from standard to heavy weight hinges
- Adhesive assisted extra deep lockseam which enhances structural rigidity and durability of the door
- Closer reinforcing in all doors
- All interior components made with galvanneal steel
Stainless Series

Whether you are specifying or supplying stainless steel for corrosion resistance or for its aesthetic beauty, Fleming can manufacture stainless steel doors and frames to meet your needs.

For openings that require special corrosion resistance such as pools, chemical storage areas, food processing plants and laboratories, Fleming makes doors and frames using Type 316 stainless steel. All the interior components of these doors and frames are also made with the same 316 stainless steel.

For openings that require the modern clean look of stainless steel but do not require the extra corrosion resistance, Fleming manufactures doors and frames using Type 304 stainless steel with galvanneal internal components. Both types of stainless steel are available in a brush finish (XL Blends) and in a mirror finish (XL Buff).

- Frames available up to 4’0 x 9’0 singles, 8’0 x 9’0 pairs
- Doors available up to 3’6 x 8’0
- Transom, sidelight and borrowed lights available
- Can have fire rating up to 1-1/2 hour
- Available in 16 gage for frames and 18 gage for doors
- Units available welded or knock-down

Acoustic Units

Where the transmission of sound is a factor, Fleming offers acoustic doors and frames. Fleming’s acoustic assemblies have been developed to meet the requirements of all but the most unusual situations.

These units, tested in strict conformance with ASTM E90 AND E413 at Riverbank Acoustic Laboratories, yield sound ratings up to STC 46. Also available are fire rated acoustic assemblies to STC 46 with UL, ULC labels up to 1.5 hours.

TRR Series - Temperature Rise Rated

To reduce the potential hazard of heat radiation through doors in locations where it could interfere with the safe evacuation of occupants, a maximum temperature rise on the unexposed side of certain fire doors is required.

Doors classified for 250˚F, 450˚F, or 650˚F temperature rise at 30 minutes or 250˚C at either 30 or 60 minutes. Fleming can supply labeled TRR doors to accommodate any of these classifications.

- Available with up to 1-1/2 hour fire rating
- Available in sizes up to 4’0 x 8’0 singles or 8’0 x 8’0 pairs
## Detention Series

Besides product for the commercial construction market, Fleming manufactures doors and frames for detention and correctional facilities. All doors and frames are manufactured to meet and exceed all requirements of ANSI/NAAM 863 performance criteria for Detention Security Hollow Metal Doors and Frames.

Contact Fleming's Technical Services Department for more information or specifications for these products.

## Metric Product

Fleming has been an industry leader in metric conversion since its North American inception in the 1970s. In fact, Fleming staff were the industry representatives to the Canadian Metric Commission and are advisers to the USA conversion to metric. As a major manufacturer of steel doors and frames for Canadian and International markets, Fleming produces both stock and custom product to the International SI Metric Standards.

All Fleming literature and technical support data are available in both metric and imperial. Additionally, Fleming offers customized technical data and information specifically for metric standards.

If your requirements are for metric steel doors and frames, Fleming is your obvious choice.
For Sidelight, Transom Frames and Window units, Fleming offers two different programs. Distributors can utilize either our Stick Program or our Mitre and Notch Program.

Both of these programs give the architect virtually unlimited design capabilities as well as ensuring that these units will be supplied in a timely fashion by local distributors.

The Fleming Stick Program provides distributors the ability to buy different components that would make up a sidelight, transom or window. These components come in 10’ lengths and are then cut by the distributor for fabrication of the specific units.

Fleming offers a wide range of standard components such as open and mullion sections prepared for numerous hardware options, center rail and sill sections in standard jamb depths of 4-3/4, 5-3/4, 6-3/4, 7-3/4, and 8-3/4. Custom sticks are also available in virtually any jamb depth, hardware preparation or profile.

Features:
- Available in 16, 14 and 12 gage
- Manufactured from Paintable Galvanneal Steel
- Available in virtually any jamb depth or profile
- Standard length of 10’ 0”
- Mullions shorter than 10’ are pre-notched
- Standard two-week delivery

The other option for distributors when supplying sidelight, transom or window units is the Fleming Mitre and Notch Program. This program allows the distributor to order the material for different units’ pre-cut, mitred and notched for easy assembly in their shops. Each individual piece is engineered, punched, formed and tagged making for a precise fit every time.

Our distributor simply assembles the pre-bundled units to a drawing, adds glass stop and anchors and ships to the project. Regardless which product is required, Fleming can provide exact requirements to fill the order.
At Fleming, we believe that the use of the latest in technology allows both our distributors and ourselves to be more efficient. This in turn allows our distributors to become more profitable by using technology rather than cost-intensive man hours.

The concept behind FLIC is to offer the distributor both tools for communicating with Fleming and to offer software programs to assist the distributors in project management, estimating, drawing and ordering.

Communication with the Factory

Through our website, we offer our distributors the opportunity to communicate with Fleming in a number of different ways. We provide direct E-Mail to factory personnel and we provide downloadable technical information when needed for specification writing or submittal purposes.

Project Management Software

Fleming’s Project Management Software by AVAware Technologies Inc. is a state-of-the-art, user friendly program that allows the distributor to work effortlessly through a project from take-off to estimating, from shop drawings to ordering.

The system is divided into three programs. There is the AVACAD program for drawing and pricing elevations, the AVAPROJECT program for take-offs, door and frame schedules, hardware schedules, shop drawings and estimates, and there is the Fleming Link which is the ordering program with direct links to Fleming. This Link program can also be used as an electronic price book. Although this is separated into three separate programs, these all interact with one another so that you can draw elevations in AVACAD from the AVAPROJECT program or send all the information from either of these programs directly to the Fleming Link.

AVACAD

- Automated shop drawings
- Elevations, Sections and Details made easy
- Elevations and drawings can be saved for use in Projects

AVAPROJECT

- Automated Take-Offs
- Automated Door and Frame Schedules
- Hardware Schedules
- Automated estimating
- Summarization of project materials
- Automated Shop Drawing generation
- Uses Price Book from Link section as well as distributor built pricing for labor, hardware, etc.
- Can interface with distributor’s own system for utilization of existing stock inventory and invoicing (ASCII files)

Fleming Link

- Automated Price Book
- Allows for automatic Price Book revisions
- Allows order to be sent electronically to factory
- Can separate Stock material from Custom components

Call or e-mail us today to find out how Fleming can help grow your business and make your company more efficient and profitable.
Fleming has been testing fire door and frame products for nearly 40 years. Today our listings are some of the most comprehensive in the world.

Fleming's ongoing test programs have yielded a fully integrated line of products complying with national and international standards. Products are available certified by Underwriters Laboratories Inc. (UL), Underwriters Laboratories of Canada (ULC), Intertek Testing Services/Warnock Hersey (ITS/WHI), Factory Mutual Research (FM) and Warrington Fire Research (WFR), the most widely recognized, respected and accepted labs in the world.

Fire test standards have evolved and Building Codes have changed dramatically.

Fire doors in North America, since early 1900s, have been tested to UL10b, ASTM E152, ANSI/NFPA 252 and other similar Standards. The neutral pressure plane for these has been located at the top of the assembly and generally requires a hose stream test.

The International Conference of Building Officials (ICBO) adopted and published a positive pressure fire test, UBC 7-2, for the Uniform Building Code (UBC) in 1997. This standard requires the neutral pressure plane to be located 40" from the bottom of the assembly and requires a hose stream for all tests 3/4 hour and longer in duration.

Underwriters' Laboratories has developed UL10c, a test standard which addresses all the requirements of UBC 7-2 (1997).

Internationally, the predominant test standards, ISO 3008 and BSI 476, have been used. These place the neutral pressure plane at one-third of the assembly height and neither has a hose stream test.

Other changes such as the development of positive pressure standards by NFPA or ASTM and the adoption and enforcement of the International Building Code (IBC), a single Mode Code for the US, may bring new or different requirements into the marketplace. Fleming is well prepared for the demands of today and tomorrow.

Fleming products have been successfully tested to the traditional North American fire test standards, UL9, UL10b, CAN4-S014, CAN4-S106, ASTM E152, ASTM E163, NFPA 252 and NFPA 257.

In addition, Fleming doors and frame products are certified for compliance with the new positive pressure requirements under the Uniform Building Code (UBC), the International Building Code (IBC) and for international markets to UBC 7-2 (1997), UL10c, ISO 3008 and BSI 476.

Fire doors and frames to 8'0" x 10'0" at 3 hour, temperature rise rated doors, sidelight and window assemblies up to 13'6" x 12'0" and fire rated acoustic, lead-lined and detention security assemblies are but a small portion of the products available.

Fleming distributors, under our UL, ULC and ITS/WHI In-Plant Labeling Programs can assemble and/or modify product and provide in-shop fire labeling.

Fleming publishes a comprehensive stand-alone catalogue, the “Fire Labeling Specifications,” which details the complete range of fire door and frame product, available from the factory and our stocking distributors.
### Hurricane Resistant Doors & Frames

To meet the demands of building codes calling for hurricane resistant products, Fleming has submitted product to the Hurricane Test Laboratory (HTL) in Florida. This is one of the very few labs to be independently certified by Miami-Dade County, AAMA, the Texas Department of Insurance and the Southern Building Code Congress International (SBCCI), requiring strict adherence to nationally recognized test methods established by ASTM, AAMA, NWWDA and UL.

Fleming doors and frames with design pressures up to 90 pfs (+ and -) have been tested successfully for compliance with the following hurricane and wind-borne debris related standards:

- **Large Missile Impact**
  - Metro-Dade County, PA 201
  - South Florida Building Code, Sections 2309, 2314 and 2315

- **Cyclic Load**
  - Metro-Dade County, PA 203
  - South Florida Building Code, Sections 2309, 2314 and 2315
  - SBCCI, SSTD 12-94

- **Structural Loading, Air and Water Infiltration and Forced Entry**
  - Metro-Dade County, PA 202
  - ASTM E283, E331 and E330
  - South Florida Building Code, Section 3603.2(b)5

Assemblies certified up to 4’0” x 8’0” singles with cylindrical or mortise locks or rim exit devices are permitted. Pairs to 8’0” x 8’0” with cylindrical or mortise locks and flush bolts, rim exit devices with removable hollow metal mullions or surface vertical rod devices are approved.

Doors can be provided with glass lites up to 100 square inches and approved frame anchors include wire or existing wall types in new or existing masonry or concrete and combination stud anchors for steel or wood stud and drywall partitions.

### Customized Specifications

Fleming's unique “no charge” specification writing service is another way we strive to provide the Architectural market with the most up-to-date, appropriate, and accurate specifications possible. Whether your needs are for specifications that are project specific, building type specific or an office master, Fleming can produce to your requirements.

Our simplified questionnaire can be easily answered in minutes and is used to provide you with proprietary or non-proprietary specifications as you wish. All Fleming specifications are available in a multitude of electronic formats to suit your needs and are usually completed within 24 hours of request.

To obtain more information on this service simply contact Fleming’s Customer Service or Technical Service Department.

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Fleming’s Customer Service or Technical Service Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customized</td>
<td>1-800-263-7515</td>
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Galvanneal Steel

All hollow metal doors and frames manufactured in North America are produced from the identical base cold rolled steel, which conforms to ASTM A366.

- The galvanneal process begins in the Hot Strip Mill where a billet is reduced in thickness to a coil of steel.

The hot rolled steel, meeting ASTM A569, is then moved to a Cold Strip Mill where it is uncoiled, pickled, cleaned and rinsed. The steel is heated, passed through dimensioning rolls to reduce it to the exact thickness required, the edges are trimmed for tension leveling and the product is oiled to prevent rusting of the now Cold Rolled Steel, meeting ASTM A366. It is then recoiled or slit in to sheets.

- It is how the cold-rolled steel is further processed that creates galvanized and paintable galvanneal.

For galvanneal and galvanized steel, the cold-rolled coil is processed through a Galvanizing Mill. It is uncoiled, degreased and run into a continuous hot-dip zinc coating bath. For galvanized steel the free zinc is removed by a series of mechanical wipers. For galvanneal, the excess molten zinc is removed using air knives. The galvanneal coil enters an annealing furnace and heat converts the zinc coating to a zinc-iron alloy. Next the galvanneal goes through a chromate and phosphate passivation wash to retard storage stain. Finally both galvanized and galvanneal steels are recoiled or slit into sheet stock.
Paintable Galvanneal Steel

One of the many things that separate Fleming from its competition is the material from which our products are manufactured. As a standard, Fleming products are manufactured from Paintable Galvanneal, a Hot Dipped Galvanized Steel rather than Cold Rolled Steel with factory applied primers.

Galvanneal was developed for the automotive industry by the steel mills to combat the ravaging effects of corrosion most common on vehicles in the 1960s. Today, North American manufacturers of automobiles use Galvanneal or a sister product Galvalume for all body parts below the splash rail. Fleming pioneered the use of Galvanneal in the steel door and frame industry over 25 years ago for the same reasons as the automotive industry, in that the most troublesome complaint was that of rust.

The seasonal North American climate varying from hot and humid to cold freezing rain and snow proved to be a formidable challenge to any material. Also, steel doors and frames are generally subjected to the worst climatic and environmental conditions while on the job site prior to installation and finish painting. Hence the reason for using Paintable Galvanneal.

Paintable Galvanneal is a Hot Dipped Galvanized, specially processed steel that receives a mill coating of chromate and phosphate at the steel mill to ensure the maximum in finish paint adhesion and low maintenance operation. Independent laboratory testing to strict ASTM test criteria has proven that Fleming Paintable Galvanneal Steel outperforms traditional cold rolled and factory primed painted with regard to corrosion resistance and finish paint film adhesion.

Fleming backs these claims with the only 10-Year Rust Perforation and Finished Paint Film Adhesion Warranty in the industry today. Most manufacturers charge a premium in cost and an increase in lead times for a galvanized product. With Fleming you get a product that is competitively priced with cold rolled steel, the added protection of hot dipped galvanizing, superior finished paint film adhesion, and on-time delivery.

Note: For a copy of the ASTM Corrosion Resistance and Finished Paint Film Adhesion test reports or Fleming’s industry leading 10-Year Rust Perforation and Finished Paint Film Adhesion Warranty, please contact your local Fleming Distributor or Fleming’s customer service department directly.
Fleming

Offering a total manufacturing, supply and service support network, Fleming combines the efficiencies of standardization with the versatility of custom requirements to provide a guaranteed approach to satisfying construction and other industry needs in steel doors and frames.

Factory trained distributors are located throughout North America and the world to provide you with the expertise you require in the door, frame and hardware industry. These distributors also have licensed fabrication shops to ensure you get your product as efficiently, professionally and as quickly as possible.

Please contact Fleming or an Authorized Fleming Distributor today to fulfill all your Hollow Metal needs.

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Authorized Fleming Distributor
All conditions not covered on Pages 4 to 15 must comply with UL File Number R8930 and WHI Reference Number L14896 for Hollow Metal Fire Doors and must be installed in accordance with NFPA 80. All conditions not covered on Pages 16 to 31 must comply with UL File Number R8931 and WHI Reference Number L14896 for Fire Door Frames, Transoms, Sidelights and Windows, the Standard for Fire Door Frames, UL 63, and must be installed in accordance with NFPA 80. Constructions designated with “IPLP” (In-Plant Labelling Program) may be labeled by Fleming Door Products Ltd. or Authorized Fleming Distributors under Follow-Up Service Procedures or Factory Audit Manuals issued by Underwriters Laboratories or Warnock Hersey. Constructions not carrying the IPLP designation must be factory labeled by Fleming Door Products Ltd., Ajax. Field application of fire door or frame product labels is not permitted except under UL or WHI Special Field Inspection Programs. Contact Technical Services, Ajax, for further information. This publication, developed by Fleming Door Products Ltd. to provide guidance on the fire rating of commercial steel door and frame products, contains advisory information only and is provided as a public service. A continuous Research and Development Program is in place; Fleming Door Products Ltd. reserves the right to incorporate changes at any time, without notice and disclaims all liability of any kind for the use or adaptation of the materials contained herein.

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For Additional Information Contact

Your Local Authorized Fleming Distributor
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Fleming
HOLLOW METAL FIRE DOORS
FIRE DOOR FRAMES AND TRANSOM FRAMES
FIRE WINDOWS AND SIDELIGHT FRAMES

CANADIAN STEEL DOOR MANUFACTURERS

ISO 9001:2000
Fleming’s "Fire Labeling Specifications" is intended to assist design, specification and related professionals involved in commercial, industrial, institutional and detention security construction throughout North America. It provides a definitive source of information regarding fire labeled steel doors and frame product.

The information contained in this publication has been compiled from testing authority listings, procedures and policies, NFPA 101, the "Life Safety Code", NFPA 80, "Fire Doors and Windows", industry and National Standards.

This document was first published in 1983. This 2004 edition, the 10th revision, has been updated extensively to reflect the evolution of code and test requirements, as well as the products now available to meet these demands.

Sections have been added to review and clarify Code and Listing Organization fire test methods, Fleming’s UL and WHI distributor In-Plant Labeling Programs (IPLP) and Fleming’s labels.

As well, several tables have been incorporated to detail the requirements and the availability of labeled glazing materials permitted in Fleming’s products.

Finally, a new section, devoted entirely to hardware, as it relates to fire doors and frame product, has been included.

GENERAL REQUIREMENTS - FIRE DOOR ASSEMBLIES

Over-View, Code and Listing Organization Requirements

1. Although applicable to all steel doors and frames, for the purposes of this publication, the requirements detailed in this section are intended to be specific to Fleming labeled product only, regardless of construction, size, rating or listing authority and are applicable in all North American jurisdictions.

Definitions

2. For fire-rated doors, frame product, hardware, glazing materials and other "opening" related accessories, the following terms are defined:

- Listed - A product tested or evaluated for reasonably foreseeable risks associated with the product.
- Classified - A product tested or evaluated for; a specific risk (or risks); performance under specified conditions; or regulatory codes.
- Labeled - A product 'Listed' or 'Classified' by an accredited organization and bearing the Mark, Logo or Symbol of that organization as verification of on-going inspection and compliance with the required Standard performance criteria.
- Listings - A published directory (printed or electronic), detailing products 'Listed' or 'Classified' by an accredited organization, acceptable to the 'Authority Having Jurisdiction'. UL's "Fire Resistance Directories", and WHI's "Directory of Listed Products", are examples of 'Listings'. Neither this document nor manufacturer's catalogues are considered 'Listings'.
- Authority Having Jurisdiction - The individual or entity responsible for approving equipment, installation or procedure and/or enforcement of code, by-law or other regulatory requirements.
- Fire Door Assembly - The combination of labeled components; door, frame product, hardware, glazing trim, glazing materials, accessories and their installation, used to protect an opening in a wall. Building codes and regulatory organizations have developed other terms to describe this concept, such as 'closures' or 'opening-protectives'.
- Frame Product - The term used to describe as a single group; frames, transom, sidelight and window assemblies. See Page 16 for descriptions of each.
- Non-Rated - No fire protection rating.

Wall Versus Fire Door Assembly Ratings

3. The fire protection rating of a fire door assembly is determined by the fire resistance rating of the wall in which it will be installed and the regulatory requirements of the governing building code. Code requirements are based on the uses or 'occupancies' within the building, the specific location in the building and the potential fire hazards in that particular area.

4. NFPA 101, the "Life Safety Code", outlines the typical relationship between opening location, fire resistance rating of the wall and fire protection rating required for the fire door assembly, as shown in Table 1. See NFPA 101, Article 8.2.3.2.3. Building codes and local by-laws may have different requirements, which supersede NFPA-101.

Table 1

<table>
<thead>
<tr>
<th>Opening Location</th>
<th>Fire Resistance Rating - Wall</th>
<th>Fire Protection Rating - Fire Door Assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Openings which separate buildings or divide a single building into fire areas</td>
<td>4 Hours</td>
<td>3 Hours</td>
</tr>
<tr>
<td>Openings in; enclosures of vertical communication (stairwells or elevator shafts) or; exterior walls subject to severe fire exposure from outside the building</td>
<td>2 Hours</td>
<td>1-1/2 Hours</td>
</tr>
<tr>
<td>Openings between occupancies</td>
<td>1 Hour</td>
<td>1 Hour</td>
</tr>
<tr>
<td>Openings in; corridor and room partitions or; exterior walls subject to light to moderate fire exposure from outside the building</td>
<td>1 Hour</td>
<td>3/4 Hour</td>
</tr>
<tr>
<td>Openings where smoke control is the primary consideration or; between a habitable room and a corridor when the wall has a fire resistance rating not more than 1 hour or; across corridors where a smoke partition is required</td>
<td>1 Hour</td>
<td>1/3 Hour (No Hose Stream - US) (With Hose Stream - Canada)</td>
</tr>
</tbody>
</table>
5. The governing building code specifies both the fire protection rating (FPR) and any temperature rise rating (TRR) that may be required on doors. Required ratings include:
   - 1/3, 1/2, 3/4, 1, 2 and 3 hour FPR with no TRR required (ie: the TRR is greater than 650°F (343°C) at 30 Minutes)
   - 3/4, 1-1/2 and 3 hour FPR with 250°F (121°C), 450°F (232°C) or 650°F (343°C) at 30 Minutes TRR (for the US only)
   - 3/4 and 1-1/2 hour FPR with 250°C (482°C) at 30 Minutes TRR (for Canada only)
   - 1-1/2 and 3 hour FPR with 250°C (482°C) at 60 Minutes TRR (for Canada only)
6. The project Architect is responsible for building compartmentalization and the determination and scheduling of:
   - Fire test methodology (traditional/negative versus positive pressure)
   - Fire protection ratings
   - Temperature rise ratings
   - Smoke and draft control ratings
7. Distributors must ensure the product, as specified, detailed and/or scheduled by the Architect, is eligible prior to ordering factory labeling, or applying labels themselves. Ineligible product cannot be labeled. See Page 32, Item 616 for additional information.
8. Enforcement of building code, by-law or other regulatory requirements are the responsibility of the Authority Having Jurisdiction.
9. A fire door assembly’s rating requires that each of its components (door, frame product, hardware and when specified, glazing trim, glazing materials, louvers and any other accessories) is fire labeled, installed and maintained in accordance with their individual listings, NFPA 101 and NFPA 80. If a required component is omitted, is not labeled, or is not installed or maintained in accordance with its listing, NFPA 101 or NFPA 80, it renders the entire assembly non-rated.
10. Fleming fire door and frame product labels may be applied only at the factory, or the facilities of UL or WHI approved distributors in Fleming’s In-Plant Labeling Program (IPLP). See Page 4, Items 28 to 32 for additional information.
11. The field application of fire door or frame product labels or the field modification of labeled doors or frame product is not permitted except under UL or WHI Special Field Inspection Programs. See the Fleming Technical Manual or contact Fleming Technical Services - Ajax, for additional information on these Programs.
12. The following are not considered field modifications and are therefore permitted to be performed on site:
   - Drilling of function holes for locks and fire exit devices
   - Drilling of 3/4” (19) diameter holes (maximum) for labeled door viewers
   - Drilling and tapping required to mount labeled hardware
   - The installation of astragals, labeled hardware, gaskets, glazing materials and other labeled accessories
   - The installation of labeled fire door louvers in prepared door openings as described on Page 8, Items 120 to 134
   - The installation of labeled 3rd party glazing kits in prepared door openings as described on Page 7, Items 94 to 101

Fire Test Methods
13. Two types of fire tests for fire door assemblies are recognized in North America: ‘traditional/negative’ and ‘positive’ pressure.
14. Fleming fire doors and frame product are labeled for compliance to both types and all of the Standards referenced in Items 15 and 16.
15. US codes requiring traditional/negative pressure testing specify Test Standards; UL10B, UL9, NFPA 252 and/or NFPA 257. Canadian codes; CAN4-S104 and/or CAN4-S106.
16. US codes requiring compliance with positive pressure testing reference UL10C, UBC 7-2 (1997) and/or UBC 7-4 (1997). (These test methods are not used in Canada.)
17. A category system has been developed jointly by UL and WHI to differentiate product types by application and the requirements for use in positive pressure jurisdictions. All Fleming labeled doors are Category A - “Fire Doors Not Requiring Additional Components” to be positive pressure labeled. Fleming doors and frame product do not require gaskets of any kind for positive pressure compliance. Refer to the Fleming Technical Manual for additional details on the category system.
18. Hollow metal frame products have also been evaluated for positive pressure and have been found to have no affect on the performance of the assembly under these test methods. Frame products are therefore not required to be labeled for positive pressure.
19. As well, the following products have also been evaluated and found to not adversely affect fire protection performance under positive pressure testing. Labels applied to them are not required to include any reference to the positive pressure test standards:
   - Hinges (except as described in Page 34, Item 630)
   - Electric strikes (See Pg 35, Items 675 and 676)
   - Single-point locks or latches (See Pg 34, Items 643 - 648)
   - Fire exit devices (See Pgs 34 & 35, Items 652 - 667)
   - Flush or surface bolts (See Pgs 34 & 35, Items 649, 650, 668-671)
20. In the US, fire doors may also be tested and labeled for ‘Smoke and Draft Control’. These are separate tests and requirements from fire testing. The test methods used are UL1784, UBC 7-2 Part 2 (1997) or NFPA 105.
21. Fire door labels certifying compliance with these Standards must include the symbol [S].
22. Fleming fire doors, like all others, must utilize Category H - “Labeled Smoke and Draft Control Gaskets”, and be installed in UL or WHI labeled steel frame product to comply with the smoke and draft control requirements. Frame product must utilize positive pressure labeled doors. Doors and frame product must be installed in accordance with their ‘Installation Instructions’. For Fleming products, one (1) copy should be provided with each set of submittal/shop drawings and another copy must be included with the Bill of Lading with each shipment. See the Fleming Technical Manual for Installation Instructions.
23. Smoke and draft control performance is a function of the door and gaskets, not the hollow metal frame product. Therefore hollow metal frame products are not required to be labeled for smoke and draft control.
24. For detailed descriptions of these Test Standards, refer to the Fleming Technical Manual.
25. Products labeled for positive pressure fire testing also comply with and are eligible for labeling to the traditional/negative pressure fire test standards.
26. Products labeled only to the traditional/negative pressure standards, except as noted in Item 19, are not eligible in positive pressure applications.
27. When positive pressure doors by others are required for Fleming frame product, they must be:
   - UL or WHI labeled Category ‘A’ or ‘B’ fire doors
   - Installed in accordance with the installation instructions provided with the door, and
   - Any Category G - “Edge Sealing” systems required for the door must be installed.
In-Plant Labeling Program (IPLP)

28. Fleming distributors authorized by UL and/or WHI under this program, order eligible doors, frame components, anchors and accessories from the factory. These may then be modified and/or assembled at the distributor’s shop within the program limitations and the specified label then applied. Only those “Constructions” identified with the “IPLP” suffix on Pages 4 and 5 (for doors) and 16 to 18 (for frame product) are eligible under this program.

29. Distributors under this program are subject to unannounced on-going inspections by UL and/or WHI to verify compliance with the program requirements.

30. Permitted door modifications include:
   - Preparation and installation of Fleming glazing kits
   - Preparation for and installation of labeled 3rd party glazing kits and fire door louvers
   - Tack-welding of vertical edge seams
   - Conversion from visible to seamless edge seams
   - Preparation and installation of Fleming internal lock edge reinforcing channels for double egress applications
   - Preparation and installation of approved alternate lock, strike, hinge and other hardware reinforcing
   - Installation of in-fill panels

31. Permitted frame modifications are:
   - Assembly of combinations of jambs, heads, Mullions, center rails, corner posts and sills into finished product
   - Welding in of captive anchors (as required)
   - Welding-in of closer reinforcing
   - Preparation for field splices
   - Preparation for and installation of panels and glazing stops
   - Installation of flush steel top and bottom caps
   - Under-sizing of doors to suit non-standard heights

32. Constructions not included in this program must be provided from the factory:
   - Prepared for all hardware
   - With fire label applied
   - For doors:
     - Fleming glazing kits installed, or
     - Prepared for labeled 3rd party glazing kits
     - Prepared for labeled fire door louvers
   - For frame product:
     - Factory assembled (if SUW required)

Notes (See Pages 6-12 and 31-33)

Tables 2 and 3 provide detail relating to maximum nominal door sizes for Fleming fire doors by rating and construction. The sizes indicated are those permitted by UL and WHI respectively and the limitations indicated in Item 44, Page 6.

<table>
<thead>
<tr>
<th>Typical Door Elevations</th>
<th>Construction (33-39)</th>
<th>Series</th>
<th>Gage</th>
<th>Maximum Rabbet Sizes (43-45)</th>
<th>Notes (See Pages 6-12 and 31-33)</th>
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<tbody>
<tr>
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<td>UL</td>
<td>Materials</td>
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<td></td>
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<td>Singles</td>
<td>Pairs</td>
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<td>Standard (IPLP)</td>
<td>CW14</td>
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<td>72” x 120” (1800 x 3050)</td>
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<td>-</td>
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<tr>
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<td>48” x 108” (1250 x 2750)</td>
<td>96” x 108” (2450 x 2750)</td>
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<td>D20</td>
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<td>-</td>
<td>48” x 96” (1250 x 2450)</td>
<td>96” x 96” (2450 x 2450)</td>
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<td>E18</td>
<td>44” x 84” (1150 x 2150)</td>
<td>88” x 84” (2250 x 2150)</td>
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<tr>
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<td>E20</td>
<td>-</td>
<td>-</td>
<td>44” x 84” (1150 x 2150)</td>
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<td>96” x 120” (2450 x 3050)</td>
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<td>H16</td>
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<td>96” x 120” (2450 x 3050)</td>
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<td>48” x 96” (1250 x 2450)</td>
<td>96” x 96” (2450 x 2450)</td>
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<td>-</td>
</tr>
<tr>
<td></td>
<td>SL20</td>
<td>48” x 96” (1250 x 2450)</td>
<td>96” x 96” (2450 x 2450)</td>
<td>-</td>
<td>-</td>
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<td></td>
<td>SLE18</td>
<td>36” x 84” (900 x 2150)</td>
<td>72” x 84” (1800 x 2150)</td>
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<tr>
<td></td>
<td>SLE20</td>
<td>36” x 84” (900 x 2150)</td>
<td>72” x 84” (1800 x 2150)</td>
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<tr>
<td>Temperature Rise Rated</td>
<td>TRE18</td>
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<td></td>
<td>TR18</td>
<td>48” x 96” (1250 x 2450)</td>
<td>96” x 96” (2450 x 2450)</td>
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</tr>
</tbody>
</table>

- Installation of flush steel top and bottom caps
- Under-sizing of doors to suit non-standard heights

Notes (See Pages 6-12 and 31-33)

2 and 3 Hour Fleming Fire Doors

<table>
<thead>
<tr>
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<th>Series</th>
<th>Gage</th>
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<td>UL</td>
<td>Materials</td>
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<td></td>
<td></td>
<td>Singles</td>
<td>Pairs</td>
</tr>
<tr>
<td>Standard (IPLP)</td>
<td>CW14</td>
<td>48 x 120” (900 x 3050)</td>
<td>72” x 120” (1800 x 3050)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>D16, D18</td>
<td>48” x 108” (1250 x 2750)</td>
<td>96” x 108” (2450 x 2750)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>D20</td>
<td>-</td>
<td>-</td>
<td>48” x 96” (1250 x 2450)</td>
<td>96” x 96” (2450 x 2450)</td>
</tr>
<tr>
<td></td>
<td>E18</td>
<td>44” x 84” (1150 x 2150)</td>
<td>88” x 84” (2250 x 2150)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>E20</td>
<td>-</td>
<td>-</td>
<td>44” x 84” (1150 x 2150)</td>
<td>88” x 84” (2250 x 2150)</td>
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<tr>
<td>Standard (IPLP)</td>
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<td>96” x 120” (2450 x 3050)</td>
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<td>-</td>
</tr>
<tr>
<td></td>
<td>H16</td>
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<td>96” x 120” (2450 x 3050)</td>
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<td>96” x 96” (2450 x 2450)</td>
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<td>SLE18</td>
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<td>SLE20</td>
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<td>Temperature Rise Rated</td>
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<td>96” x 96” (2450 x 2450)</td>
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</table>

- Installation of flush steel top and bottom caps
- Under-sizing of doors to suit non-standard heights

Notes (See Pages 6-12 and 31-33)
<table>
<thead>
<tr>
<th>Typical Door Elevations (33-39)</th>
<th>Construction (IPLP)</th>
<th>Series Gage</th>
<th>Maximum Rabbet Sizes (43-45)</th>
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<td></td>
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<tr>
<td>D20</td>
<td>42&quot; x 86&quot; (1100 x 2200)</td>
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<td>48&quot; x 108&quot; (1250 x 2750)</td>
<td>72&quot; x 120&quot; (1800 x 3050) or 96&quot; x 108&quot; (2450 x 2750)</td>
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<td>E18</td>
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<td>88&quot; x 84&quot; (2250 x 2150)</td>
<td>44&quot; x 84&quot; (1150 x 2150)</td>
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<td>44&quot; x 84&quot; (1150 x 2150)</td>
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<td>96&quot; x 96&quot; (2450 x 2450)</td>
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<td>or 96&quot; x 108&quot; (2450 x 2750)</td>
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<tr>
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<td>-</td>
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<tr>
<td>E18</td>
<td>- 88&quot; x 84&quot; (2250 x 2150)</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>E20</td>
<td>H12, H14, H16</td>
<td></td>
<td>96&quot; x 96&quot; (2450 x 2450)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SL16, SL18, SL20</td>
<td></td>
<td>96&quot; x 96&quot; (2450 x 2450)</td>
<td></td>
</tr>
<tr>
<td>Double Egress</td>
<td>SLE18, SLE20</td>
<td></td>
<td>72&quot; x 84&quot; (1800 x 2150)</td>
<td></td>
</tr>
<tr>
<td>Door with Panel Above</td>
<td>D16, D18, OW16, OW18</td>
<td></td>
<td>48&quot; x 112&quot; (1250 x 2850)</td>
<td></td>
</tr>
<tr>
<td>D20</td>
<td>42&quot; x 86&quot; (1100 x 2200)</td>
<td>-</td>
<td>42&quot; x 86&quot; (1100 x 2200)</td>
<td></td>
</tr>
<tr>
<td>E20</td>
<td>44&quot; x 84&quot; (1150 x 2150)</td>
<td>-</td>
<td>44&quot; x 84&quot; (1150 x 2150)</td>
<td></td>
</tr>
<tr>
<td>Dutch (IPLP)</td>
<td>SL16, SL18</td>
<td></td>
<td>42&quot; x 86&quot; (1100 x 2200)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D16, D18, OW16, OW18</td>
<td></td>
<td>42&quot; x 86&quot; (1100 x 2200)</td>
<td></td>
</tr>
<tr>
<td>D20</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
STANDARD DOOR CONSTRUCTIONS
33. Items 34 to 151 and 272 to 283 are applicable to all Fleming labeled doors unless indicated otherwise.
34. 'Standard' construction refers to single doors or pairs of doors (swinging in the same direction) applications only.
35. The factors determining whether a door is considered a Fleming 'Standard' construction (or not) are: specialized applications; performance based features; or the use of materials that affect fire performance.
36. Preparations for hardware, glass lights, louvers, door thickness or fire test methodology do not determine construction type.
37. Refer to the Fleming Technical Manual for standard and optional features provided or available for each door Series.
38. Those constructions not considered 'Standard' include:
   - Specialized applications; double egress, dutch or door with panel above
   - Performance based; temperature rise, sound, lead-lined, bullet-resistant, or detention security
   - Material based; stainless steel or clad
39. All Standard construction doors are intended for use with all Fleming frames, transom and sidelight frames, unless indicated otherwise.

Face Sheet Material
40. Standard material for all Constructions/Series/Gages; A40 galvanneal (except DSS-Series). Galvanized (G90) is available, except for E and TRE-Series doors.
41. Standard material for DSS-Series; Type 304, ‘XL Blend S’ (brushed) Finish. Type 304, ‘XL Buff’ (mirror) and Type 316, with ‘XL Blend S’ and ‘XL Buff’ Finishes available.
42. Standard material for SL, SLE and TRSL-Series is a textured wood grain, A40 galvanneal with factory-applied stain and UV-resistant clear coat. Galvanized (G90) is not available.

Sizes
43. The sizes indicated on Pages 34 and 5, Tables 2 and 3, reflect the maximums permitted by UL and WHI, prepared for hardware as detailed on Pages 34 to 36, Items 619 to 697 and within the following recommendations.
44. D16, D18, E18, E20 and CW-Series doors are eligable for labeling up to 48” x 120” (1250 x 3050) nominal leaf size. From a recommended application standpoint however, the following are suggested and reflected on Pages 4 and 5:
   - D and CW-Series doors greater than 36” (915) nominal leaf width should not exceed 108” (2750) height
   - Due to material availability, E and TRE-Series doors are limited to 44” x 84” (1150 x 2150) leaf size
   - Due to material availability, SLE-Series doors are limited to 36” x 84” (900 x 2150)
45. There are no minimum nominal leaf sizes imposed from a fire-labeling standpoint. However, NFPA 101, the “Life Safety Code”, limits doors in a ‘means of egress’ to a minimum of 32” x 80” (800 x 2030). (See NFPA 101, Articles 7.15, 7.2.1.2 and Annex A.7.2.1 for further reference.) From a manufacturing perspective, the following minimum nominal leaf sizes apply:
   - E and SLE-Series; 32” x 80” (815 x 2030)
   - All other Series; 12” x 24” (305 x 610).
46. Codes and bylaws may impose additional limitations.
47. Maximum undercut on all hollow metal fire doors, standard for all Fleming doors (except acoustic doors) and minimum for SLE-Series; 3/4” (19).
48. Minimum undercut on all hollow metal fire doors, except SLE-Series, recommended undercut on Fleming doors in 4-sided frame product and Acoustic doors; 1/4” (6.4).

Thickness
49. Standard door thickness; 1-3/4” (44.4) except H12 Series, which are 1-7/8” (47.6) and S-Series which are 2” (50.8).
50. UL D18 and D20 Series doors are available 1-3/8” (35) thick. See Page 34, Item 642 for additional information.
51. H14 and H16 Series doors are available 1-7/8” (47.6) and 2” (50.8) thick. UL H and S-Series doors are also available 2-1/8” (54) and 2-1/4” (57.2) thick.
52. H12 Series are available at 1-3/4” (44.4) thick.

Core Materials
53. For all D and CW-Series fire doors, kraft paper honeycomb is the standard core. Polystyrene (R6/RS1 1.06) is available.
54. Only polystyrene is available for E, DSS, SL and SLE-Series doors.
55. Only vertical stiffeners with fiberglass batt insulation are permitted for S or H-Series fire doors.
56. All other Constructions/Series/Gages (TR, TRE, TRSL, lead-lined, bullet-resistant and acoustic) utilize proprietary cores to achieve their specific performance based requirements.

Vertical Edge Seam Construction
57. Hinge and lock edges are beveled 1/8” in 2” (3 in 50) standard, except SL, SLE and TRSL-Series. Optional square edges are permitted.
58. SL, SLE and TRSL-Series are provided with beveled lock edge and square hinge edge, standard. Bevel on both edges is available on SL and TRSL-Series only.
59. All Fleming Standard construction D and DSS-Series doors up to 96” (2450) height, E, TRE, TR-Series and doors with panel above are provided with exposed mechanical inter-locking seams at both vertical edges.
60. Labeled D and DSS-Series doors over 96” (2450) height and all labeled SD and LD-Series doors, must have both vertical edge seams tack-welded top and bottom, above and below each edge cutout and at 12” (305) on center maximum.
61. Bullet-resistant, H, CW and S-Series doors are provided standard as fully welded and seamless at both vertical edges.
62. SL, SLE and TRSL-Series are provided with an exposed center seam on both vertical door edges, standard. Not available as seamless vertical edge construction.
63. For 1-1/2 hour maximum pairs provided without astragal, tack-welded lock edge seams are required. See Page 8, Items 138 to 140 for additional information.
64. Seamless vertical edges on labeled D, E, TR, TRE, SD, doors with panel above and LD-Series doors are available. Seams are tack-welded top and bottom, above and below each edge cutout and at 12” (305) on center, body-filled, ground smooth and touched-up.
65. Rabatted lock edge pairs, not in a ‘means of egress’, prepared for surface vertical rod fire exit devices only, are permitted, except on SL, SLE and TRSL-Series.

Hardware Preparations
66. See the Fleming Technical Manual for standard and optional hardware locations and preparations provided or available for each door series.
67. As a minimum, each labeled door must be prepared for hinges, labeled self-latching and self-closing devices. Refer to Pages 34 to 36, Items 619 to 697 for detailed information on hardware requirements.
68. All Fleming doors, (except 1-3/8” (35)), are provided with 4-1/2” (114) standard weight (0.134”/3.4) hinge reinforcing, distributor convertible to heavy weight (0.180”/4.6).
69. All doors exceeding 96” (2450) height must be prepared for 4-1/2” (114) heavy weight hinges (minimum).
70. Unless indicated otherwise, Fleming labeled doors can be prepared for all UL and WHI labeled self-latching devices.
71. Concealed or inset type vertical rod fire exit devices are not available on SLE-Series doors.
72. Electro-Lynx wiring harness (or approved conduit) are permitted in Fleming fire doors 1-3/4" (44.4) or thicker, for use with fire labeled electric or electronic hardware, up to the limitations of the hardware manufacturer's listings.
73. Open-backstrikes are permitted in the inactive leaf of 1-1/2 hour pairs of:
   · Standard construction H, CW, D18, D18, SL16 and SL18 Series doors up to 96" x 96" (2450 x 2450)
   · Standard construction E18 Series doors
   · Standard construction SLE Series doors
   · Standard construction WHI D20 Series doors up to 96" x 96" (2450 x 2450)
   · Standard construction WHI E20 Series doors
74. Maximum height of edge cutout for open-back strike is 5-1/4" (133.4). Lock edge seam only on D and E-Series doors must be tack-welded top and bottom, immediately above and below each edge cutout and at 6" (150) on center (maximum).
75. Reinforcing for surface mounted closers is provided standard in all Fleming doors. See Page 35, Items 678 to 682 for additional information.

**Fleming Glazing Kits**
76. Fleming snap-in glazing kits are provided standard for 1-3/4" (44.4) thick D, E, CW and H-Series doors and are for use with labeled glazing materials not exceeding 5/16" (8) thickness.
77. Fleming snap-in kits are eligible for use in both traditional/negative and positive pressure applications.
78. Fleming snap-in steel glazing kits exceeding nominal widths of 30" (765) or nominal heights of 36" (915) must have removable stops screw-fixed at 8" (200) on center, 2" (50) maximum from each end, with #6 x 1-1/2" (38) sheet metal screws.
79. Minimum nominal light width for Fleming snap-in glazing kits; 4-1/2" (114).
80. Textured wood grained light kits, stained to match door, are provided for SL, SLE and TRS-2 Series doors. Trim and stops require inner/outer-reinforcing channels. Standard glazing space; 3/8" (9.5) with 5/8", 7/8" and 1-1/8" (15.9, 22.3 and 28.6) available. Removable glazing stops are secured with #6 oval head sheet metal screws.
81. For applications not covered in Items 76 or 80, Fleming 'thermal glazing kits' (THGLZ), with glazing space as specified in WHI labeled doors.
82. All Fleming glazing kit sizing and locations are based on the 'nominal glass rabbet opening', not the 'exposed glass size'.
83. Minimum recommended nominal lighted door dimensions;
   · Stile widths and center rail heights; 6" (150)
   · Top rail height; 7" (180)
   · Bottom rail height; 6-13/16" (175)
84. No maximums are imposed for stile widths or rail heights.
85. Fleming glazing kits are permitted in UL labeled 'French-Door' type applications. See the Fleming Technical Manual for details.
86. Refer to the Fleming Technical Manual for other approved optional Fleming glazing kits.
87. 'Bridged cutout only' (BRCO) and 'cutout only' (CO) factory door options are available for distributors authorized under Fleming's In-Plant Labeling Program (IPLP). When BRCO and CO options are ordered the distributor is responsible for internal perimeter reinforcing channels that may be required for Fleming or 3rd party glazing kits.
88. Distributors not included in Fleming In-Plant Labeling Program must order doors labeled, with factory installed;
   · Fleming glazing kits or,
   · Cut-out with internal perimeter reinforcing channels (INCNL option) for 3rd party labeled glazing kits
89. Double egress, temperature rise rated, labeled non-metallic clad and detention security door constructions have specific glazing limitations. Refer to the information provided for each construction for details.
90. Glass lights may be provided in operable or fixed doors.
91. Glazing is not permitted in labeled dutch, louvered, non-metallic clad, acoustic or bullet-resistant doors.
92. Round or radiused Fleming glazing kits are not available.
93. Fleming glazing kits are considered 'part of the door' and are therefore not labeled separately.

**3rd Party Glazing Kits**
94. Only UL labeled glazing kits, approved for use in hollow metal fire doors are permitted in Fleming UL labeled doors. UL or WHI labeled glazing kits approved for use in hollow metal fire doors may be used in Fleming WHI labeled doors.
95. For distributors in Fleming's In-Plant Labeling Program, Bridged Cutout Only (BRCO), Cutout Only (CO), or Inner Channel Reinforcing (INCNL) factory options may be specified for doors with 3rd party glazing kits. See Item 87 for details. Doors may also be ordered as slab, with all required preparations and reinforcing by the distributor.
96. For distributors not in the In-Plant Labeling Program, doors for 3rd party glazing kits must be factory ordered as labeled, complete with Inner Channel Reinforcing (INCNL) option.
97. 3rd party glazing kits are usually sized based on 'exposed glass size' rather than 'nominal glass rabbet opening'. Distributors should take this into consideration when ordering or preparing Fleming doors for such kits.
98. 3rd party glazing kits under the joint UL and WHI identification system for positive pressure applications are Category F - "Labeled Light Kits", and must be labeled as such to indicate compliance.
99. Category F labeled light kits are also permitted in traditional/negative pressure jurisdictions.
100. Labeled 3rd party glazing kits may be installed on site, in preparations made at the factory or prepared by IPLP approved distributors.
101. Labeled 3rd party glazing kits are not provided or installed by Fleming.

**Glazing Materials**
102. Glazing materials are investigated to the same test standards as fire door and window assemblies for fire protection only, unless specifically indicated otherwise in their individual listings.
103. UL labeled glazing materials are required in UL labeled doors. UL or WHI labeled glazing materials may be used in WHI labeled doors.
104. Labeled glazing materials must have a fire protection rating at least equal to that of the door in which it will be installed.
105. Except as indicated in Item 91, refer to Table 4, Pages 12 to 15 for a summary of labeled glazing materials eligible for use in Fleming’s UL and WHI fire doors.

106. Labeled glazing materials up to 5/16” (8) thick can be used with Fleming snap-in glazing kits, unless indicated otherwise in the glazing manufacturer’s listings.

107. When labeled glazing materials exceeding 5/16” (8) thickness are specified, Fleming’s ‘thermal glazing kits’ (THGLZ) are provided, except on SL, SLE and TRSL-Series doors, unless distributor ordered otherwise or required by the glazing manufacturer’s listings.

108. When other than 7/16” (11.1) glazing space for 5/16” (8) maximum glazing is required, distributor must specify glazing space requirements.

109. Specific glazing compounds or other installation components may be required for individual glazing materials. Refer to the glazing material manufacturer’s listings for such.

110. As indicated in their listings, labeled glazing materials may require specific 3rd party glazing kits, or stop heights greater than the 3/4” (19) provided standard on Fleming’s kits. For taller stop heights, custom Fleming glazing kits can be provided (except for snap-in).

111. For Fleming fire doors up to 3/4 hour rating, double glazed lights with 1 piece of labeled 1/4” (6) GWG + 1 piece of 1/4” (6) tempered glazing, are also permitted.

112. Each piece of glazing material used in fire doors must labeled.

113. Glazing materials to be installed in positive pressure fire doors must be labeled as such to indicate compliance.

114. Glazing materials that have been evaluated to UL 263, “Fire Tests of Building Construction and Materials”, are intended for installation as ‘walls’ and unless indicated otherwise in their individual listings, are not permitted in fire doors.

115. Glazing materials for use in fire door assemblies, labeled for both fire protection and bullet-resistance (UL 752, “Bullet-Resisting Equipment”) are not currently available.

116. Glazing materials are not supplied or installed by Fleming.

117. Factory or IPLP approved distributor installed in-fill panels are permitted in lieu of labeled glazing materials.

118. Minimum in-fill panel construction for;
   - 1, 1-1/2, 2 and 3 hour doors; 1 sheet of 20 gage steel laminated to each face of 3/8” (9.5) thick inorganic cement board, nominal density - 110 pcf (1760 kg/m³)
   - 1/3, 1/2 and 3/4 hour doors; 1 sheet of 20 gage steel laminated to each face of 1/2” (12.7) thick non-rated gypsum wall board

119. Fleming ‘thermal glazing kits’ (THGLZ) are used for securing in-fill panels.

**Fire Door Louvers and Preparations**

120. Except as indicated in Item 132, labeled louvers are permitted in all 1-1/2 hour maximum Fleming fire doors, to the sizes indicated on Pages 4 and 5, Tables 2 and 3, for each Construction/Series/Gage.

121. Fire door louvers must be UL labeled, installed within the lower 40” (1020) of the assembly for positive pressure applications, and in accordance with the louver manufacturer’s templates and installation instructions.

122. Maximum labeled louver size; 24” x 24” (610 x 610).

123. Minimum stile width; 5-27/32” (148), minimum bottom rail height; 8” (203) (actual front skin dimension).

124. No maximum imposed for stile widths.

125. Only one (1) louver per fire door assembly is permitted. This limits their use to 1 louver per leaf and 1 leaf per pair.

126. Louvers are permitted in fixed or operable doors.

127. Perimeter of louver cutout must be provided with internal reinforcing channels. See the Fleming Technical Manual for additional information.

128. Fleming fire doors may be prepared for labeled louvers by the factory or distributors under Fleming’s In-Plant Labeling Program (IPLP).

129. Distributors not included in the Fleming In-Plant Labeling Program must order labeled doors complete with factory prepared louver cutout and inner perimeter reinforcing channels (INCNL option) installed.

130. Louvers may be installed by the distributor or in the field when the door is prepared and labeled as indicated in Items 120 to 132.

131. Fire door louvers complying with positive pressure test requirements must be labeled to indicate such.

132. Louvers are not permitted in;
   - 2 and 3 hour doors or 1/3 hour (no hose stream) doors
   - Doors with lights
   - Doors prepared for fire exit devices
   - Acoustic doors
   - Lead-lined doors
   - Dutch doors
   - TR, TRE or TRSL doors
   - Clad doors
   - Bullet-resistant doors
   - Stainless steel doors
   - Doors in ‘a means of egress’
   - Smoke and draft control doors

133. Fire door louvers are not provided or installed by Fleming.

134. Except as indicated in Item 132, Fleming Standard construction louvered fire doors are permitted in all Fleming frames, transom and sidelight frames.

**Fleming Astragals (Flat Bar and Z Types)**

135. Astragals are required on;
   - 3 hour pairs
   - 3 hour double egress pairs
   - Pairs of TR-Series doors over 86” (2200) in height
   - Pairs of positive pressure TRSL-Series doors
   - Top leaf of dutch door
   - Bottom of flush (non-rabetted) panel above a door in frame without transom mullion
   - Pairs of LD and SD-Series doors

136. See Page 35, Items 663 to 666 for additional information on 3 hour doors in a ‘means of egress’.

137. The following pairs and double egress doors up to 1-1/2 hour maximum, are provided standard without astragals;
   - H-Series up to 96” x 120” (2450 x 3050)
   - CW, SL and SLE-Series
   - TRSL-Series traditional pressure doors.

138. Pairs of 1-1/2 hour maximum, D, E, DSS, TR and TRE-Series, Standard, Double Egress and Clad construction doors are available without astragal. See Items 139 to 140 for details.

139. For the Series and Constructions detailed in Item 138, the lock edge seam of each leaf, if provided without an astragal, must be tack-welded top and bottom, immediately above and below each edge cutout and at 12” (305) on center (maximum) for;
   - D and DSS-Series doors up to 96” (2450) height
   - E-Series doors
   - TR and TRE-Series up to 86” (2200) height

140. The hinge and lock edge seams on each leaf of D-Series, Standard and Double Egress construction pairs over 96” (2450) height, if provided without an astragal, must be tack-welded top and bottom, immediately above and below each edge cutout and at 12” (305) on center (maximum).
141. D, CW and H-Series. Standard construction UL pairs up to 3 hour rating, with rabbetted lock edges may be provided without an astragal when:
   - Not in a ‘means of egress’, and
   - Both leaves are prepared for surface vertical rod fire exit devices, and
   - The inactive leaf is provided with a labeled coordinator, and
   - The provisions for lock edge seams in Items 139 and 140 are met

142. Where an astragal is required for a pair or double egress doors, flat bar type is provided standard, for screw fixing to the front (pull-side) of the active leaf, or the back (push-side) of the inactive leaf.

143. Where an astragal is required for pairs of SL, SLE or TRSL-Series doors, custom 'h-shaped' textured wood grain astragals are provided standard. Astragals are factory stained to match doors. Astragals are available with integral ASA and flush bolt reinforcing, or blank only, for screw fixing to lock edge of inactive leaf.

144. Z astragals, prepared to clear lock edge hardware preparations, or with integral lock edge hardware reinforcing, are available, for screw fixing to the edge of the inactive leaf of pairs, except for SL, SLE and TRSL-Series.

145. Security type Z astragals, prepared to clear active leaf lock edge hardware, are also available, for screw fixing to the edge of the active leaf of pairs, except for SL, SLE and TRSL-Series.

146. Flat bar type astragal is provided standard for screw fixing to the back (push-side) of a flush panel above a door.

147. See Item 179 for requirements on dutch doors, Page 11, Item 230 for LD-Series and Page 11, Item 240 for SD-Series doors.

148. All Fleming astragals are shipped loose for installation by others on site.

149. Fleming flat bar and Z astragals may be tack-welded to door at the factory or approved distributor’s shop. Not available for SL, SLE or TRSL-Series ‘h-shaped’ astragals.

150. Labeled 3rd party, surface mounted weather, sound or light sealing type astragals are permitted;
   - In conjunction with Fleming's flat bar astragal on all Fleming doors up to 3 hour rating, or
   - As a stand-alone astragal when the requirements on Page 8, Items 137 to 140 are met. (Exception: Acoustic doors. See Page 11, Items 240 to 242 for details)

151. See Page 36, Items 689 to 697 for details on 3rd party astragals.

NON-STANDARD DOOR CONSTRUCTIONS

Double Egress (D/E) Doors

152. All D and E-Series double egress construction doors must utilize Fleming’s internal lock edge reinforcing channel.

153. All D and E-Series double egress doors must have lock edge seam tack-welded top and bottom and at 12” (305) on center maximum.

154. D-Series double egress doors exceeding 96" (2450) height must have lock and hinge edge seams of both leaves tack-welded top and bottom and at 12” (305) on center maximum.

155. The requirements in Items 152 to 154 may be incorporated in Standard construction D or E-Series doors, for conversion to double egress, at distributor locations included in Fleming’s In-Plant Labeling Program.

156. Double egress pairs are restricted to vertical rod fire exit device applications, surface or concealed types, with or without bottom rod.

157. 3 hour double egress must be provided with an astragal.

158. Astragals are not required on double egress pairs up to 1-1/2 hour rating for the following Series. See items 138, 140, 142 and 148 for details;
   - D or CW-Series up to 96" (2450) height
   - E, H, SL and SLE-Series

159. Glass lights in labeled double egress doors are limited to exposed sizes not exceeding 100 in² (0.66m²) area, 12’’ (305) width or 33” (840) height per leaf, for all ratings. Refer to Table 4, Pages 12 to 15 for glazing material availability. Also see Pages 7 and 8, Items 76 to 119.

160. D20 and E20 Double Egress doors are available with WHI label only.

161. D and CW-Series double egress doors are honeycomb core standard. Polystyrene and TRR cores are available.

162. E-Series double egress doors are polystyrene core standard, with TRR core available.

163. H-Series available with vertical stiffeners/fiberglass core only.

164. Double egress construction with honeycomb and polystyrene cores are included in Fleming's distributor In-Plant Labeling Program (IPLP).

165. For use with Fleming Double Egress construction frames and Fleming UL transom frames and sidelight assemblies.

Door with Rabbetted Top Cap

166. Available in single door applications only.

167. Minimum door top cap rabbit height: 3/4” (19)

168. D and CW-Series doors provided with honeycomb core standard, polystyrene optional. Not available for TRR applications.

169. E-Series doors are provided only with polystyrene cores.

170. Glass lights are permitted in rabbetted top cap doors. Refer to Table 4, Pages 12 to 15 for glazing material types, sizes and ratings. Also see Pages 7 and 8, Items 76 to 119.

171. This construction not included in In-Plant Labeling Program.

172. For use in Fleming ‘Frame with Panel Above Door’ construction frames only, with Fleming fixed or removable hollow metal panel above door (no transom Mullion). Panel is considered and labeled as part of the frame in this application. See Page 23, Items 441 to 455 for additional information on frame and panel.

Dutch Doors

173. Available in single door applications only.

174. Top leaf may latch into either the strike jamb or the bottom leaf using a labeled self-latching device.

175. Cylindrical latches or automatic flush bolts are permitted to latch top leaf into bottom leaf.

176. Bottom leaf must latch into strike jamb.
177. Self-closing device is required on top leaf only. Spring hinges may be used as self-closing device. See Page 34. Items 636, 637 and Page 35, Items 679, 680 for additional information.


179. Optional 8" (200) maximum deep shelf on 1 side of door only is permitted. Shelf and support brackets are not available in textured wood grain. Shelf and shelf support brackets are shipped loose for site installation by others. Top leaf must be provided with steel astragal (supplied loose for site installation). Flat bar type required for dutch doors without shelf, special off-set type required with shelf.

180. D and CW-Series dutch doors are provided with honeycomb core standard and are available with polystyrene cores.

181. SL-Series dutch doors available only with polystyrene cores.

182. D and CW-Series dutch doors are included in Fleming’s distributor IPLP.

183. Lighted or louvered dutch doors are not permitted.

184. D20 dutch doors are available with WHI label only.

185. Dutch doors are intended for use in all Fleming single frames and transom frames only.

**Temperature Rise Rated (TR, TRE and TRSL-Series)**

186. Temperature rise rating (TRR) is a measure of the average temperature rise, above ambient, on the unexposed door face during the initial 30 minutes (or 60 minutes in Canada) of the fire test. The lower the TRR, the better the performance.

187. Temperature rise ratings are in addition to a door’s fire protection rating.

188. Available in TR18, TRE18 and TRSL-Series constructions for single, pairs and double egress applications, with a proprietary, solid, asbestos-free, core system in lieu of honeycomb or polystyrene for both traditional/negative and positive pressure jurisdictions.

189. Fleming TRR labels indicate the maximum TRR required by code and attained by the door construction; 250°F (121°C) at 30 Minutes for US requirements and 250°C (482°F) at 60 Minutes for Canada.

190. TR and TRE-Series doors are provided with exposed mechanical interlocking seam standard, with seamless edge available.

191. TRSL-Series are available only with exposed center seam on both vertical edges.

192. Astragal required on TR18 or TRE18 Series pairs exceeding 86" (2200) height or 1-1/2 hour rating and all positive pressure TRSL-Series pairs. See Page 8, Items 135 to 139 and Page 9, Items 142 to 151 for additional information.

193. Unless specifically listed otherwise, maximum exposed labeled glazing material sizes are limited to 100 in² (0.61m²) area, 12" (305) width and 33" (840) height per leaf. See Table 4, Pages 12 to 15 for labeled glazing materials, sizes and ratings. Also see Pages 7 and 8, Items 76 to 119 for additional information.

194. Doors with an average unexposed surface temperature exceeding 650°F (343°C) after 30 minutes of fire test exposure are considered non-temp rise.

195. 1/3, 1/2, 1 and 2 hour fire protection ratings are not recognized in building codes for TRR applications.

196. TR, TRE and TRSL construction doors are not included in Fleming’s distributor In-Plant Labeling Program (IPLP).

197. TRR doors may be used in all Standard, Double Egress, Contra-Swing and Multi-Opening construction frames. TRR doors are not permitted in transom or sidelight frames.

**Stainless Steel (DSS-Series) Doors**

198. Face sheets are fabricated from stainless steel in lieu of galvanneal. Standard material for DSS-Series; Type 304, ‘XL Blend S’ (brushed) Finish. Type 304, ‘XL Buff’ (mirror) and Type 316 with ‘XL Blend S’ or ‘XL Buff’ Finishes are available. Acid etched patterns, logos, etc., are permitted.

199. Pairs up to 1-1/2 hour without astragal are available. See Page 8, Items 138 to 140 for additional information.

200. Glass lights are permitted in DSS-Series doors. Refer to Table 4, Pages 12 to 15 for glazing materials, sizes and ratings. See Pages 7 and 8, Items 76 to 119 for additional information.

201. Polystyrene is the standard core material. TRR applications are not available.

202. Louvers are not permitted in labeled stainless steel doors.

203. Stainless steel construction doors are not included in Fleming’s distributor In-Plant Labeling Program (IPLP).

204. DSS-Series doors are for use in Standard or Stainless Steel construction frames, transom and sidelight frames.

**Clad Doors**

205. Metallic clad constructions are permitted on 1-3/4" (44.4) thick, D, CW and H-Series singles and UL H, CW and D-Series pairs.

206. Metallic cladding must be a factory installed non-combustible material such as brass, bronze, aluminum or stainless steel (except Type 302), with a maximum thickness of 1/16" (1.6), secured to the front and edges and/or back of door.

207. Base door widths are adjusted to meet NFPA 80 required clearances between finished door and adjacent door and/or frame.

208. Maximum door thickness (including cladding); 1-7/8" (47.6).

209. Dand CW-Series doors provided with honeycomb core standard. Polystyrene and TRR are available.

210. H-Series provided with vertical stiffener/fiberglass core only.

211. Pairs up to 1-1/2 hour are available without astragal.

212. The lock edge seam of each leaf, when provided without an astragal, must be tack-welded top and bottom, immediately above and below each edge cutout and at 12" (305) on center (maximum).

213. Glass lights are permitted in metallic-clad construction doors. Refer to Table 4, Pages 12 to 15, for eligible labeled glazing materials, sizes and ratings. Also see Pages 7 and 8, Items 76 to 119.

214. Fleming steel glazing kits are clad to match door (Exception; Fleming kits are fabricated from stainless steel for stainless steel clad doors).

215. Clad or stainless Fleming snap-in kits are not available.

216. Labeled louvers are not permitted in clad construction doors.

217. Metallic clad constructions are permitted in traditional/negative and positive pressure jurisdictions.

218. Metallic clad construction doors are not included in Fleming’s distributor In-Plant Labeling Program (IPLP).

219. UL and WHI labeled non-metallic clad constructions, full door or protective plate type applications, are also permitted on labeled Standard and Double Egress construction fire doors, to the lesser of the size and rating for the Construction/Series/ Gage on used, or the limits of the cladding manufacturer’s individual listings.

220. For positive pressure jurisdictions, non-metallic clad constructions must be labeled as such for compliance and are limited to use on 1/3 hour (no hose stream) doors only, unless cladding is listed otherwise.

221. Labeled non-metallic clad constructions may be installed by the distributor or in the field, in accordance with the cladding manufacturer’s listings and installation instructions.

222. Astragals are as per the base door requirements.
223. Glass lights or louvers are not permitted in Fleming non-metallic clad doors.
224. Labeled non-metallic claddings are not provided or installed by Fleming.
225. Metallic and labeled non-metallic clad doors are for use in all Fleming frames, transom and sidelight frames.

**Lead-Lined (LD-Series) Doors**
226. Available with composite honeycomb and lead-lined core.
227. Lead lining is secured to the inside of the front (pull-side) face sheet and door edges.
228. Lead-lining is specified by thickness or weight. Lead-linings available are:
   - 1/32” / 2 psf (0.8 / 9.8kg/m²)
   - 3/64” / 3 psf (1.2 / 14.6kg/m²)
   - 1/16” / 4 psf (1.6 / 19.5kg/m²)
229. Both vertical edge seams must be tack-welded top and bottom, above and below each edge cutout and at 12” (305) on center maximum.
230. Composite lead/steel flat bar astragal, shipped loose for installation on site, is required for all pairs for radiation shielding purposes.
231. Each leaf must be prepared for 4-1/2” (114) heavy weight hinges (minimum).
232. Labeled 1/4” (6) thick lead-loaded Georgian wired glass (GWG), to the sizes and ratings indicated in Table 4, Page 12 for standard labeled 1/4” GWG, is permitted.
233. Fleming lead-lined glazing kits, similar to thermal glazing (THGLZ) are required.
234. Lead-lined doors are not included in Fleming’s distributor In-Plant Labeling Program (IPLP).
235. Lead-lining is specified by thickness or weight. Lead-linings available are:
   - 1/32” / 2 psf (0.8 / 9.8kg/m²)
   - 3/64” / 3 psf (1.2 / 14.6kg/m²)
   - 1/16” / 4 psf (1.6 / 19.5kg/m²)
236. Available in SD16 Series acoustic construction only, utilizing Fleming’s proprietary sound attenuating core system.
237. Maximum acoustic rating; STC 46.
238. Both vertical edge seams must be tack-welded top and bottom, above and below each edge cutout and at 12” (305) on center maximum.
239. Each leaf supplied with Fleming surface mounted, adjustable automatic door bottom.
240. Pairs of doors are supplied with Fleming acoustic astragal, surface mounted on the back (push-side) of the inactive leaf and a steel flat bar astragal mounted on the front (pull-side) of the active leaf.

241. Automatic doors bottoms and astragals are shipped loose for installation on site by others.
242. Substitutions with other door bottoms or astragals will void the STC rating, as unit is tested as an assembly.
243. Each leaf must be prepared for 4-1/2” (114) heavy weight hinges (minimum).
244. Special back-set locks/latches are not required. Minimum back-set; 2-3/4” (69.9).
245. ASA/NL strike (due to astragal requirements) and flush bolts are required on the inactive leaf of all pairs.
246. Minimum recommended undercut on acoustic doors; 1/4” (6).
247. When fire protection rating and factory acoustic certification are both required, fire exit devices and glass lights are not permitted.
248. If factory acoustic certification is not required, doors may be prepared for fire exit devices.
249. SD-Series doors are not included in Fleming’s distributor In-Plant Labeling Program (IPLP).
250. For use with Fleming acoustic frames and gasketing system only.

**Detention Security (S-Series) Doors**
251. Meets NAAMM HMMA 863-90 static load, impact load, rack and removable glazing stop test requirements.
252. Doors may be prepared for all labeled mortised, pocket or jamb mounted self latching devices.
253. S-Series doors are 2” (50.8) thick standard. UL S-Series are available 2-1/8” (54) and 2-1/4” (57.2) thick.
254. Each leaf must be prepared for 4-1/2” (114) heavy weight hinges minimum.
255. Security glazing materials for use in swinging hollow metal fire doors are permitted. See Pages 7 and 8, Items 102 to 119 and Table 4, Pages 12 to 15 for additional information.
256. Only Fleming’s detention security glazing kits are permitted.
257. Glass lights in all S-Series doors are restricted to maximum exposed glass size per leaf of 100 in² (0.60m²) area, with neither the exposed width nor height exceeding 10” (250).
258. S-Series doors are not included in Fleming’s distributor In-Plant Labeling Program (IPLP).
259. For use with Fleming Detention Security frames only.

**Bullet-Resistant Doors (BR-Series)**
260. Level 3 (44 magnum revolver) rating to UL 752.
261. Only proprietary vertically stiffened core is available in fire labeled bullet-resistant doors.
262. Doors are provided with bullet-resistant face reinforcing on the ‘pull-side’, which must be designated by the project Architect.
263. Edges are beveled 1/8” in 2” (3 in 50) standard, with square edges available.
264. Seamless (tack-welded, body filled and ground smooth) vertical edge seams are standard.
265. Doors are prepared for 4-1/2” (114) heavy weight (0.180” / 4.57) hinges, minimum up to 36” x 84” (900 x 2150), 5” (127) extra-heavy weight (0.190” / 4.8) over 36” x 84” (900 x 2150).
266. Only labeled mortise locks or latches, or mortise fire exit devices are permitted. Only those function holes specifically required for the latching hardware are permitted in the door.
267. As Bullet-Resistant Glazing Materials, evaluated from a fire protection rating standpoint are not currently available, glass lights are not permitted in fire labeled bullet-resistant doors.
268. Louvers are not permitted in bullet-resistant doors.
269. Bullet-resistant door construction is not included in the Fleming In-Plant Labeling Program.
270. Pairs are not available.
271. For use only with labeled Fleming bullet-resistant frames.

**Other Restrictions and Requirements**
272. Items 273 to 283 apply to all Fleming labeled doors regardless of Construction/Series/Gage.
273. Polyurethane, phenolic, polyisocyanurate or other core materials are not permitted in Fleming labeled door constructions.
274. Non-labeled facings, claddings, finishes, protective plates or plant-ons are not permitted (ie: wood veneers, plastic, paper or fabric). See Page 10, Items 205 to 225 for details of approved metallic and labeled, non-metallic claddings permitted for Fleming Clad construction doors.
275. WHL labeled D, CW and E-Series doors are available 1-3/4” (44.4) thick only.
276. Each leaf in a communicating frame assembly must be labeled and equal in fire protection rating to the frame product.

277. Unequal leaf pairs are permitted. Widest leaf of a pair may not exceed the largest single leaf width permitted for the Construction/Series/Gage used.

278. The use of Fleming H-Series doors is not recommended in Fleming DW or A-Series frames.

279. Radiused/bullnosed lock or hinge edges and rabbeted hinge edges are not permitted.

280. Slopéd, round or arched top doors are not permitted.

281. Field spliced or double acting doors are not permitted.

282. Vinyl top caps are not permitted in fire doors.

283. Preparations for, or the installation of mail slots, monorail cutouts or security view ports are not permitted.

The following Table summarizes the maximum exposed areas, widths and heights of labeled glazing material permitted in Fleming's fire doors. Each piece of glazing must be labeled by the glazing manufacturer or their UL and/or WHI approved distributor. The information presented was current at time of publication. Readers are advised to consult UL’s “Fire Resistance Directory”, or WHI’s “Directory of Listed Products”, for additional or up-dated information. These charts must be read in conjunction with Page 7, Items 76 to 93 (Fleming Glazing Kits), Items 94 to 101 (3rd Party Glazing Kits) and Items 102 to 119 (Glazing Materials).

**Table 4: Labeled Glazing Materials For Use In Fleming Fire Doors**

<table>
<thead>
<tr>
<th>Manufacturer / Distributor</th>
<th>'Trade Name' Description</th>
<th>Lab</th>
<th>Rating and Maximum Exposed Area x Width x Height (a,b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asahi, Central or Pilkington</td>
<td>1/4” (6) Georgian Wired Glass (GWG) (f,k)</td>
<td>UL WHI</td>
<td>2 &amp; 3 Hr: 100 in² (0.06m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-1/2 Hr: 100 in² (0.06m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Hr (b): 1296 in² (0.84m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1/3, 1/2 &amp; 3/4 Hr (WHS) (i)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1/3 Hr (NHS) (c)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3/4 &amp; 1-1/2 Hr TRR Doors (d)</td>
</tr>
<tr>
<td>Fleming In-Fill Panels</td>
<td>3/8” (10) Cement Board with 20 Gage Face Sheets</td>
<td>UL WHI</td>
<td>2 &amp; 3 Hr: 3072 in² (1.98m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-1/2 Hr: 3072 in² (1.98m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Hr (b): 3072 in² (1.98m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1/3, 1/2 &amp; 3/4 Hr (WHS) (i)</td>
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<td></td>
<td></td>
<td></td>
<td>1/3 Hr (NHS) (c)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3/4 &amp; 1-1/2 Hr TRR Doors (d)</td>
</tr>
<tr>
<td>Anemostat, Mestek, Nippon Electric or Technical Glass</td>
<td>'FireLITE' and 'FireLITE NT' 3/16” (5) and 'FireLITE Plus' 5/16” (8)</td>
<td>UL</td>
<td>2 &amp; 3 Hr: 100 in² (0.06m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-1/2 Hr: 100 in² (0.06m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Hr (b): 100 in² (0.06m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1/3, 1/2 &amp; 3/4 Hr (WHS) (i)</td>
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<td></td>
<td></td>
<td>1/3 Hr (NHS) (c)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>3/4 &amp; 1-1/2 Hr TRR Doors (d)</td>
</tr>
<tr>
<td>CGI</td>
<td>'Pyroguard' Non-Wired Laminated Glazing</td>
<td>UL</td>
<td>2 &amp; 3 Hr: 1288 in² (0.83m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-1/2 Hr: 1288 in² (0.83m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Hr (b): 1288 in² (0.83m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1/3, 1/2 &amp; 3/4 Hr (WHS) (i)</td>
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<td></td>
<td></td>
<td></td>
<td>1/3 Hr (NHS) (c)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3/4 &amp; 1-1/2 Hr TRR Doors (d)</td>
</tr>
<tr>
<td>GE Polymers</td>
<td>'Insulgard' 13/16” (21) Wired-Laminated Glazing</td>
<td>UL</td>
<td>2 &amp; 3 Hr: 1156 in² (0.75m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-1/2 Hr: 1156 in² (0.75m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Hr (b): 1156 in² (0.75m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1/3, 1/2 &amp; 3/4 Hr (WHS) (i)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>1/3 Hr (NHS) (c)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3/4 &amp; 1-1/2 Hr TRR Doors (d)</td>
</tr>
<tr>
<td>Globe-Amerada (1” Stop Ht Req’d)</td>
<td>'FRP-100 Inferno-Lite' 13/16” (21) Wired-Laminated Glazing</td>
<td>UL</td>
<td>2 &amp; 3 Hr: 1296 in² (0.84m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-1/2 Hr: 1296 in² (0.84m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Hr (b): 1296 in² (0.84m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1/3, 1/2 &amp; 3/4 Hr (WHS) (i)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>1/3 Hr (NHS) (c)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3/4 &amp; 1-1/2 Hr TRR Doors (d)</td>
</tr>
<tr>
<td></td>
<td>'FRP-200 Inferno-Lite' 7/8” (22) Non-Wired Laminated Glazing</td>
<td>UL</td>
<td>2 &amp; 3 Hr: 100 in² (0.06m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-1/2 Hr: 100 in² (0.06m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Hr (b): 100 in² (0.06m²)</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>1/3, 1/2 &amp; 3/4 Hr (WHS) (i)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1/3 Hr (NHS) (c)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3/4 &amp; 1-1/2 Hr TRR Doors (d)</td>
</tr>
<tr>
<td></td>
<td>'FRP-300 Inferno-Lite' 1” (25) Non-Wired (f) and 'FRP-400 Inferno-Lite' 13/16” (21) Wired-Laminated Glazing</td>
<td>UL</td>
<td>2 &amp; 3 Hr: 100 in² (0.06m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-1/2 Hr: 100 in² (0.06m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Hr (b): 100 in² (0.06m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1/3, 1/2 &amp; 3/4 Hr (WHS) (i)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1/3 Hr (NHS) (c)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3/4 &amp; 1-1/2 Hr TRR Doors (d)</td>
</tr>
</tbody>
</table>

Notes:
- Not Positive Pressure compliant (UL10C, UBC 7-2 1997 or UBC 7-4 1997)
- Where permitted by the Authority Having Jurisdiction
- Maximum area per door leaf
- Maximum area per door light
- NHS - No Hose Stream; for 1/3 Hour doors in the US only
- WHS - With Hose Stream; for 1/3 Hour doors in Canada only
- (a,b) : With or without a 2” layer of tempered glass at 1/3, 1/2 & 3/4 Hr only
- (c) : Requires non-standard glazing kits due to glazing manufacturer's stop height requirements and/or glazing thickness
- (d) : See Page 8, Item 110 for additional information
- (e) : Each glazed opening must meet all 3 criteria - area, width and height
- (f) : 1 Hour fire protection rating maximum (1 & 1-1/2 Hour not available)
- (g) : 1/3 Hr fire protection rating maximum (1-1/2 Hour not available)
- (h) : WHS - With Hose Stream; for 1/3 Hour doors in Canada only
## Table 4 (Continued): Labeled Glazing Materials For Use In Fleming Fire Doors

<table>
<thead>
<tr>
<th>Manufacturer / Distributor</th>
<th>Labeled Glazing Materials</th>
<th>2 &amp; 3 Hr (a,b)</th>
<th>1-1/2 Hr (b)</th>
<th>1 Hr (b)</th>
<th>1/3, 1/2 &amp; 3/4 Hr (WHS) (c)</th>
<th>1/3 Hr (NHS) (d)</th>
<th>3/4 &amp; 1/1-1/2 Hr TRR Doors (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tempered Glass</strong></td>
<td>'Pyroedge-20' 1/4' or 3/8' (6 or 10)</td>
<td>UL</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3154 in² (2.04m²)</td>
</tr>
<tr>
<td><strong>Glaverbel</strong></td>
<td>'Pyrobel 45-16' 5/8' (16) Non-Wired Laminated Glazing (g)</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>2747 in² (1.77m²)</td>
<td>58-3/4' (1490)</td>
<td>58-3/4' (1490)</td>
</tr>
<tr>
<td><strong>Pilkington</strong></td>
<td>'Pyrobel 60-25' 1' (25) Non-Wired Laminated Glazing (g)</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>3855 in² (2.49m²)</td>
<td>87-5/8' (2225)</td>
<td>87-5/8' (2225)</td>
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<tr>
<td><strong>Interedge</strong></td>
<td>'Pyrobel 90-37' 1-1/2' (37) Non-Wired Laminated Glazing (g)</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>1243 in² (0.80m²)</td>
<td>45' (1140)</td>
<td>45' (1140)</td>
</tr>
<tr>
<td><strong>O'Keeffe's</strong></td>
<td>'Pyrostop 45-200' 3/8' (10) Non-Wired Glazing (h)</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1080 in² (0.70m²)</td>
<td>36' (915)</td>
</tr>
<tr>
<td><strong>Safti</strong></td>
<td>'Pyrostop 60-101' 7/8' (22) and 'Pyrostop 60-201' 1-1/16' (27) Non-Wired Glazing (g,h)</td>
<td>UL</td>
<td>-</td>
<td>-</td>
<td>3724 in² (2.4m²)</td>
<td>41-5/8' (1060)</td>
<td>41-5/8' (1060)</td>
</tr>
<tr>
<td><strong>Pilkington</strong></td>
<td>'Pyrostop 90-102' 1-7/16' (37) Non-Wired Glazing (g,h)</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>1080 in² (0.70m²)</td>
<td>36' (915)</td>
<td>36' (915)</td>
</tr>
<tr>
<td><strong>Interedge</strong></td>
<td>'Pyrostop 90-102' 1-7/16' (37) Non-Wired Glazing (g,h)</td>
<td>UL</td>
<td>-</td>
<td>-</td>
<td>3724 in² (2.4m²)</td>
<td>41-5/8' (1060)</td>
<td>41-5/8' (1060)</td>
</tr>
<tr>
<td><strong>Pilkington</strong></td>
<td>'Pyrostop 120-104' 2-1/8' (54) and 'Pyrostop 120-202' 1-9/16' (40) Non-Wired Glazing (g,h)</td>
<td>UL</td>
<td>-</td>
<td>-</td>
<td>3724 in² (2.4m²)</td>
<td>41-5/8' (1060)</td>
<td>41-5/8' (1060)</td>
</tr>
<tr>
<td><strong>O'Keeffe's</strong></td>
<td>'Superlite I-W' 1/4' (6) Non-Wired Laminated Glazing</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>552 in² (0.36m²)</td>
<td>12' (305)</td>
<td>48' (1170)</td>
</tr>
<tr>
<td><strong>O'Keeffe's</strong></td>
<td>'Superlite I-20' 1/4', 3/8' or 1/2' (6, 10 or 13) Non-Wired Laminated Glazing (g)</td>
<td>UL</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2678 in² (1.73m²)</td>
</tr>
<tr>
<td><strong>O'Keeffe's</strong></td>
<td>'Superlite I-XL' 1/4' (6) Non-Wired Laminated Glazing</td>
<td>UL</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3341 in² (2.16m²)</td>
</tr>
</tbody>
</table>

### Notes
- (a) Not Positive Pressure compliant (UL10C, UBC 7-2 1997, UBC 7-4 1997)
- (b): Where permitted by the Authority Having Jurisdiction
- (c): Maximum area per door leaf
- (d): Maximum area per door light
- (e): WHS - No Hose Stream; for 1/3 Hour doors in the US only
- (f): WHS - With Hose Stream; for 1/3 Hour doors in Canada only
- (g): Requires non-standard glazing kit due to glazing manufacturer's stop height requirements and/or glazing thickness
- (h): See Page 8, Item 110 for additional information
- (i): Each glazed opening must meet all 3 criteria; area, width and height
- (j): 3/4 Hour fire protection rating maximum (1 & 1-1/2 Hour not available)
- (k): 1 Hour fire protection rating maximum (1-1/2 Hour not available)

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13
<table>
<thead>
<tr>
<th>Manufacturer / Distributor</th>
<th>'Trade Name' Description</th>
<th>Lab</th>
<th>2 &amp; 3 Hr (a,b)</th>
<th>1-1/2 Hr (b)</th>
<th>1 Hr (b)</th>
<th>1/3, 1/2 &amp; 3/4 Hr (WHS) (c)</th>
<th>1/3 Hr (NHS) (d,e)</th>
<th>3/4 &amp; 1-1/2 Hr TRR Doors (b)</th>
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<td>St-Gobain Vetrotech</td>
<td>'Superlite II-20' 21/32&quot; (17) Non-Wired Laminated Glazing (7/8&quot; Stop Ht Req'd)</td>
<td>WHI</td>
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<td>'Superlite II-45' 1-1/2&quot; (38) Non-Wired Laminated Glazing (1-1/4&quot; Stop Ht Req'd)</td>
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<td>'Superlite II-XL' 3/4&quot; (19) Non-Wired Laminated Glazing</td>
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<td>'Pyroswiss' 3/16&quot; (5) Tempered Non-Wired Glazing</td>
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<td>-</td>
<td>-</td>
<td>2910 in² (1.86m²)</td>
<td>35-3/4&quot; (910) 81-1/4&quot; (2065)</td>
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<td>'Pyroswiss G' 5/16&quot; 3/8&quot;,1/2&quot; &amp; 3/4&quot; (8,10,13 &amp; 19) Tempered Non-Wired Glazing</td>
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<td>'Swissflam-45 N2' 5/8&quot; and 3/4&quot; (16 and 19) Laminated Non-Wired Glazing</td>
<td>WHI</td>
<td>-</td>
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<td>'Swissflam-90 N2' 1-3/8&quot; (35) Laminated Non-Wired Glazing</td>
<td>WHI</td>
<td>-</td>
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<tr>
<td></td>
<td>'Keralite FR-R' 3/16&quot; (5) Laminated Non-Wired Glazing</td>
<td>WHI</td>
<td>100 in² (0.06m²) 12&quot; (305) 33&quot; (840)</td>
<td>1511 in² (0.97m²) 60-1/4&quot; (1530) 60-1/4&quot; (1530)</td>
<td>1511 in² (0.97m²) 60-1/4&quot; (1530) 60-1/4&quot; (1530)</td>
<td>1511 in² (0.97m²) 60-1/4&quot; (1530) 60-1/4&quot; (1530)</td>
<td>1511 in² (0.97m²) 60-1/4&quot; (1530) 60-1/4&quot; (1530)</td>
<td>100 in² (0.06m²) 12&quot; (305) 33&quot; (840)</td>
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<td>'Keralite FR-L' 5/16&quot; (8) Laminated Non-Wired Glazing</td>
<td>WHI</td>
<td>100 in² (0.06m²) 12&quot; (305) 33&quot; (840)</td>
<td>490 in² (0.32m²) 26&quot; (660) 26&quot; (660)</td>
<td>490 in² (0.32m²) 26&quot; (660) 26&quot; (660)</td>
<td>490 in² (0.32m²) 26&quot; (660) 26&quot; (660)</td>
<td>490 in² (0.32m²) 26&quot; (660) 26&quot; (660)</td>
<td>100 in² (0.06m²) 12&quot; (305) 33&quot; (840)</td>
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<td>'Keralite FR-L' 3/8&quot; (10) Laminated Non-Wired Glazing</td>
<td>WHI</td>
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</tbody>
</table>

Notes:
- (a) : Not Positive Pressure compliant (UL10C. UBC 7-2 1997, UBC 7-4 1997)
- (b) : Maximum area per door leaf
- (c) : Maximum area per door light
- (d) : NHS - No Hose Stream; for 1/3 Hour doors in the US only
- (e) : WHS - With Hose Stream; for 1/3 Hour doors in Canada only
- (f) : With or without a 2nd layer of tempered glass at 1/3, 1/2 & 3/4 Hour only
- (g) : Requires non-standard glazing kit due to glazing manufacturer's stop height requirements and/or glazing thickness
- (h) : See Page 8, Item 110 for additional information
- (i) : Each glazed opening must meet all 3 criteria; area, width and height
- (j) : 3/4 Hour fire protection rating maximum (1 & 1-1/2 Hour not available)
- (k) : 1 Hour fire protection rating maximum (1-1/2 Hour not available)
### Table 4 (Continued): Labeled Glazing Materials For Use In Fleming Fire Doors

<table>
<thead>
<tr>
<th>Manufacturer / Distributor</th>
<th>'Trade Name' Description</th>
<th>Lab</th>
<th>2 &amp; 3 Hr (a,b)</th>
<th>1-1/2 Hr (b)</th>
<th>1 Hr (b)</th>
<th>1/3, 1/2 &amp; 3/4 Hr (WHS) (c)</th>
<th>1/3 Hr (NHS) (c)</th>
<th>3/4 &amp; 1-1/2 Hr TRR Doors (b)</th>
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</thead>
<tbody>
<tr>
<td>Viracom or Sieracin/ Trans Tech</td>
<td>'Omnilite' 13/16” (21) Non-Wired Laminated Glazing (g) (WHI: 1” Stop Ht Req’d)</td>
<td>UL WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
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<tr>
<td></td>
<td>'Omnilite' 13/16” (21) Wired-Laminated Glazing (g) (WHI: 1” Stop Ht Req’d)</td>
<td>UL WHI</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>'Omnilite FR-45' 13/16” (21) Wired-Laminated Glazing (g) (WHI: 7/8” Stop Ht Req’d)</td>
<td>UL WHI</td>
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<td>-</td>
<td>-</td>
<td>588 in² (0.38m²)</td>
<td>24” (610)</td>
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</tbody>
</table>

Notes:
- : Not positive pressure compliant (UL10C, UBC 7-2 1997 or UBC 7-4 1997)
- (a) : Where permitted by the Authority Having Jurisdiction
- (b) : Maximum area per door leaf
- (c) : Maximum area per door light
- (d) : NHS = No Hose Stream; for 1/3 hr doors in the US only
- (e) : WHS = With Hose Stream; for 1/3 hr doors in Canada only
- (f) : With or without a 2nd layer of tempered glass at 1/3, 1/2 & 3/4 Hr only
- (g) : Requires non-standard glazing kit due to glazing manufacturer's stop height requirements and/or glazing thickness
- (h) : See Page 8, Item 110 for additional information
- (i) : Each glazed opening must meet all 3 criteria - area, width and height
- (j) : 3/4 hour fire protection-rating maximum (1 & 1-1/2 hour not available)
- (k) : 1 hour fire protection rating maximum (1-1/2 hour not available)

### HANDING TERMINOLOGY

- **Left Hand** (L)
- **Right Hand** (R)
- **Pair** (PR)
- **Right/Left** (R/L)
- **Contra-Swing - Right Hand** (C/S R)
- **Right Hand Reverse** (RHR)
- **Left Hand Reverse** (LHR)
- **Double Egress - Right Hand** (D/E R)
- **Right/Right** (R/R)
- **Contra-Swing - Left Hand** (C/S L)
- **Double Acting Single** (D/A) (Non-Labeled Only)
- **Communicating Single** (Com)
- **Double Egress - Left Hand** (D/E L)
- **Left/Left** (L/L)
- **Double Acting Pair** (D/A Pr) (Non-Labeled Only)
Frames
Grouped in this category are units that contain single or multiple door openings without horizontal transom mullions. Frames may be 3 or 4 sided. Units that contain flush or rabbetted panels above the doors are considered frames. Frames are available tack, face or profile-welded, knocked-down or knocked-down drywall (slip-on).

Transom Frames
This category includes units that contain single or multiple doors with single or multiple openings above, separated from the doors with a horizontal mullion. The openings above the doors are called ‘transoms’. Transoms may be filled with glazing materials, panels or louvers (non-labeled only). Labeled transom frames are available only as face or profile-welded.

Sidelight Frames
This category includes units that contain single or multiple doors with adjacent openings for glazing materials, panels or louvers (non-labeled only), separated by vertical mullions. The openings for glazing materials, etc. are called ‘sidelights’. Sidelight frames may also incorporate single or multiple transoms. Labeled sidelight frames are available only as profile-welded.

Window Frames
This group includes units that contain single or multiple openings for glazing materials and/or panels but not containing doors. A window that contains only one opening is also referred to as a ‘borrowed light’ or ‘view window’. Non-labeled borrowed lights are available in tack, face or profile-welded, knocked-down or knocked-down drywall (slip-on) construction. Labeled configurations are available as profile-welded only.

Tables 5, 6 and 7 provide detail relating to maximum frame rabbet opening sizes for Fleming labeled frame product by rating, construction, gage and assembly method. The sizes indicated are those permitted by UL and WHI, and reflect the limitations indicated in Item 294, Page 19.

Table 5

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<td>Material</td>
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<td>12, 14, 16</td>
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<td>48” x 120” (1250 x 3050)</td>
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<td>284-290</td>
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<td>18</td>
<td>SUW</td>
<td>42” x 86” (1100 x 2200)</td>
<td>84” x 86” (2150 x 2200)</td>
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<td>465-470</td>
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<td>SUW</td>
<td>48” x 120” (1250 x 3050)</td>
<td>96” x 120” (2450 x 3050)</td>
<td>KD</td>
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<td>465-470</td>
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<td>465-470</td>
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<td>Lead-Lined (IPLP)</td>
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<td>36” x 96” (950 x 2200)</td>
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<td>465-470</td>
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Transom Frames

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<td>SUW</td>
<td>48” x 96” (1250 x 2450)</td>
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<td>465-470</td>
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<td>Clad</td>
<td>14, 16</td>
<td>SUW</td>
<td>48” x 96” (1250 x 2450)</td>
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<td>291</td>
<td>465-470</td>
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Notes (See Pages 19-27 and 31-33)

(Items in () apply to all Constructions unless noted otherwise)
Table 6

1 and 1-1/2 Hour Fleming Fire Door Frames, Transom Frames, Sidelights and Windows

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<tr>
<th>Product</th>
<th>Typical Elevation and/or Plan</th>
<th>Construction (284-290)</th>
<th>Gage</th>
<th>Assembly Method (377-383)</th>
<th>UL and WHI Maximum Rabbet Sizes (293,294)</th>
<th>Notes (See Pages 19-27 and 31-33)</th>
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<td>96&quot; x 120&quot; (2450 x 3050)</td>
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<td>SUW</td>
<td>42&quot; x 86&quot; (1100 x 2200)</td>
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<td>14,16</td>
<td>SUW</td>
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<td>12</td>
<td>14,16</td>
<td>SUW</td>
<td>48&quot; x 96&quot; (1250 x 2450)</td>
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</table>

Notes: ( ) apply to all Constructions unless noted otherwise.

Frames

Singles Pairs

Maximum Rabbet Sizes

Singles Pairs

Material 346-368 Anchorage 322-326 Existing 336 Drywall 337 Glazing 338 Construction Specific Notes 333-337
Table 7

1/3 (With or Without Hose Stream), 1/2 and 3/4 Hour Fleming Fire Door Frames, Transom Frames, Sidelights and Windows

<table>
<thead>
<tr>
<th>Product</th>
<th>Typical Elevation and/or Plan</th>
<th>Construction (284-290)</th>
<th>Gage</th>
<th>Assembly Method (373-383)</th>
<th>UL and WHI Maximum Rabbet Sizes (293, 294)</th>
<th>Notes (See Pages 19-27 and 31-33)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>W</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18</td>
<td>1/3</td>
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<tr>
<td>Standard (PLP)</td>
<td></td>
<td>12, 14, 16</td>
<td>SUW</td>
<td>48” x 120” (1250 x 3050)</td>
<td>96” x 120” (2450 x 3050)</td>
<td>291</td>
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<tr>
<td></td>
<td></td>
<td>14, 16</td>
<td>KD</td>
<td>42” x 86” (1100 x 2200)</td>
<td>84” x 86” (2150 x 2200)</td>
<td>291</td>
</tr>
<tr>
<td>Stainless (PLP)</td>
<td></td>
<td>14, 16</td>
<td>SUW</td>
<td>48” x 120” (1250 x 3050)</td>
<td>96” x 120” (2450 x 3050)</td>
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<td>DW-Series (PLP)</td>
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<td>16, 18</td>
<td>KD-DW</td>
<td>42” x 86” (1100 x 2200)</td>
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<td>Adjustable (PLP)</td>
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<td>16</td>
<td>SUW</td>
<td>48” x 96” (1250 x 2450)</td>
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<tr>
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<td>14, 16</td>
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<td>Bullet Resistant</td>
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<td>14</td>
<td>SUW</td>
<td>36” x 96” (900 x 2450)</td>
<td>72” x 96” (1800 x 2450)</td>
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<tr>
<td>Lead-Lined (PLP)</td>
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<td>12, 14</td>
<td>SUW</td>
<td>48” x 86” (1250 x 2200)</td>
<td>346-368 323 333-337 484-494</td>
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<tr>
<td>Acoustic</td>
<td></td>
<td>14</td>
<td>SUW</td>
<td>42” x 86” (1100 x 2200)</td>
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<tr>
<td>Detention Security</td>
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<td>10, 12, 14</td>
<td>SUW</td>
<td>48” x 96” (1250 x 3000)</td>
<td>291 327-331 336 337 441-455</td>
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<tr>
<td>Flush or Rabbetted Panel</td>
<td></td>
<td>16, 18</td>
<td>SUW</td>
<td>48” x 118” (1250 x 3000)</td>
<td>346-368 322 333 337 430-440</td>
<td></td>
</tr>
<tr>
<td>Dutch (PLP)</td>
<td></td>
<td>12, 14, 16</td>
<td>SUW</td>
<td>42” x 86” (1100 x 2200)</td>
<td>291 346-360 333-337 408-419</td>
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<tr>
<td></td>
<td></td>
<td>14, 16</td>
<td>KD</td>
<td>42” x 86” (1100 x 2200)</td>
<td>291 346-360 333-337 408-419</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>16, 18</td>
<td>KD-DW</td>
<td>42” x 86” (1100 x 2200)</td>
<td>291 346-360 333-337 408-419</td>
<td></td>
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<tr>
<td>Contra-Swing (PLP)</td>
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<td>14, 16</td>
<td>SUW</td>
<td>48” x 96” (1250 x 2450)</td>
<td>96” x 96” (2450 x 2450)</td>
<td>291 346-376 333-337 420-429</td>
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<tr>
<td>Multi-Opening (PLP)</td>
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<td>12, 14</td>
<td>SUW</td>
<td>48” x 96” (1250 x 2450)</td>
<td>322-323 333-337 429-407</td>
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<tr>
<td>Double Egress (PLP)</td>
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<td>14, 16</td>
<td>SUW</td>
<td>48” x 96” (1250 x 2450)</td>
<td>399-401 333-337 429-407</td>
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<tr>
<td>Standard (PLP)</td>
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<td>12, 14, 16</td>
<td>SUW</td>
<td>48” x 120” (1250 x 3050)</td>
<td>96” x 120” (2450 x 3050)</td>
<td>291 346-368 333-337 471-483</td>
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<tr>
<td>Stainless (PLP)</td>
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<td>14, 16</td>
<td>SUW</td>
<td>48” x 120” (1250 x 3050)</td>
<td>96” x 120” (2450 x 3050)</td>
<td>292 465-470</td>
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<tr>
<td>Clad</td>
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<td>14</td>
<td>SUW</td>
<td>48” x 96” (1250 x 2450)</td>
<td>96” x 96” (2450 x 2450)</td>
<td>291 346-368 333-337 540-557 566 567 430-440</td>
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<tr>
<td>Dutch (PLP)</td>
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<td>12, 14</td>
<td>SUW</td>
<td>42” x 86” (1100 x 2200)</td>
<td>- 323 327-331 333-337 540-557 566 567 430-440</td>
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<tr>
<td>Contra-Swing (PLP)</td>
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<td>14, 16</td>
<td>SUW</td>
<td>48” x 96” (1250 x 2450)</td>
<td>- 323 327-331 333-337 540-557 566 567 430-440</td>
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<tr>
<td>Multi-Opening (PLP)</td>
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<td>12, 14</td>
<td>SUW</td>
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<tr>
<td>Double Egress (PLP)</td>
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<td>12, 14</td>
<td>SUW</td>
<td>48” x 96” (1250 x 2450)</td>
<td>- 399-401 333-337 429-407</td>
<td></td>
</tr>
<tr>
<td>Stainless (PLP)</td>
<td></td>
<td>14, 16</td>
<td>SUW</td>
<td>48” x 120” (1250 x 3050)</td>
<td>96” x 120” (2450 x 3050)</td>
<td>292 346-376 333-337 429-407</td>
</tr>
</tbody>
</table>

Notes (See Pages 19-27 and 31-33) (Items in ( ) apply to all Constructions unless noted otherwise)
FLEMING FIRE DOOR FRAME PRODUCT REQUIREMENTS

STANDARD FRAME PRODUCT CONSTRUCTIONS
284. Items 285 to 389 are applicable to all Fleming frame products, unless indicated otherwise.
285. 'Standard' construction refers to frame, transom frame and sidelight assemblies with single doors or pairs of doors (swinging in the same direction) and window applications only.
286. The factors determining whether frame product is considered a Fleming 'Standard' construction (or not) are; specialized applications, performance based features, or the use of materials that affect fire performance.
287. Preparations for hardware, lights, panels, profile, assembly type or fire test methodology do not determine construction type.
288. Refer to the Fleming Technical Manual for standard and optional features provided and available for each frame series.
289. Those constructions not considered 'Standard' include:
   · Specialized applications; double egress, dutch, adjustable, multi-opening or panel-over-door
   · Performance based; sound, lead-lined, bullet-resistant, or detention security
   · Material based; stainless steel or clad
290. All Standard Construction frame products are intended for use with all Fleming doors, unless indicated otherwise.

Frame Material
291. Standard material for all Constructions/Gages/Series; A40 galvanneal, except when stainless steel is specified. Galvanized (G90) is permitted and available.
292. Standard for stainless steel; Type 304, 'XL Blend S' (brushed) Finish. Type 304, 'XL Buff' (mirror), Type 316 'XL Blend S' and 'XL Buff' Finishes are available.

Sizes
293. The sizes indicated on Pages 16 to 18, Tables 5, 6 and 7, reflect the maximums permitted by UL and WHI, prepared for hardware as detailed on Pages 34 to 36, Items 619 to 697 and within the following limitations.
294. Fleming door sizes may limit the maximum frame rabbet opening permitted. E-Series doors are available up to 44" x 84" (1150 x 2150) maximum leaf size. Lead-lined, dutch and clad frames are also limited by the Fleming doors used in them. See Page 6, Items 44 and 45 regarding minimum door sizes.

Hardware Preparations
295. See the Fleming Technical Manual for standard and optional hardware locations, preparations provided and available for each frame series.
296. As a minimum, each door opening in labeled frame product must be prepared for hinges, labeled self-latching and self-closing devices. Refer to Pages 34 to 36, Items 619 to 697 for detailed information on hardware requirements.
297. All Fleming frame products, (except those for 1-3/8" (35) doors), are provided with 4-1/2" (114) standard weight (0.134'/3.4) hinge reinforcing, distributor convertible to heavy weight (0.180'/4.6), unless noted otherwise.
298. All door openings exceeding 96" (2450) height must be prepared for 4-1/2" (114) heavy weight hinges (minimum).
299. Frame product must be prepared for the strikes indicated on the labeled self-latching device manufacturer's templates.
300. Fire labeled electric or electronic hardware is permitted in all Fleming frame product prepared for 1-3/4" (44.4) or thicker doors with Electro-Lynx wiring harnesses or approved conduit.
301. Each door opening must be reinforced for a separate self-closing device for each leaf, except as noted below.
302. Reinforcing for self-closing device is not mandatory;
   · On inactive leaf of pairs in mechanical equipment rooms
   · With labeled floor closers (pivots)
   · When labeled spring hinges are used
303. When labeled spring hinges are used, a minimum of 2 per door leaf are required. See Page 34, Items 636 and 637 and Page 35, Items 679 and 680 for additional information.
304. Labeled gaskets, weather-stripping and door seals are permitted on all Fleming labeled frame products. Such products are supplied and installed by others. See Page 36, Items 689 to 697 for additional information.
305. If doors are by others, hardware preparations in Fleming frame product are governed by the door manufacturer's listings.
306. Also see Pages 34 to 36, Items 619 to 697, "Hardware Requirements for Fleming Fire Doors and Frame Product".

Anchorage
307. Items 308 to 344 apply to all Fleming frame products and ratings, unless noted otherwise.
308. Each jamb of frame product must be provided with anchorage to suit the partition in which it will be installed. See the Fleming Technical Manual for details of anchors provided for fire rated frame products.
309. All frame product, except DW-Series and frames with faced-dimpled anchors, may be installed to wrap or butt the adjacent partition.
310. DW-Series frames and face-dimpled anchors are designed for wrap applications only.
311. Wall anchors (except faced-dimpled or snap-in drywall types) are positioned inside the jamb profile directly above or below each hinge preparation and directly opposite the strike jamb.
312. Except as noted, the quantity of anchors per jamb must be as per Table 8.

<table>
<thead>
<tr>
<th>Maximum Over-All Unit Height</th>
<th>Quantity of Wall Anchors Per Jamb (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>62&quot; (1575)</td>
<td>2</td>
</tr>
<tr>
<td>92&quot; (2340)</td>
<td>3</td>
</tr>
<tr>
<td>122&quot; (3100)</td>
<td>4</td>
</tr>
<tr>
<td>144&quot; (3660)</td>
<td>5</td>
</tr>
</tbody>
</table>

(*1): Except face-dimpled or snap-in type drywall anchors

313. Jambs in the same assembly may be provided with different anchor types (ie; unit masonry at one jamb, drywall at the other), but must be secured to the partition. They may not be anchored to an adjacent frame product.
314. Although recommended (to add rigidity and for its sound deadening properties), grouting of jambs at cast-in place concrete and new or existing unit masonry is not required to maintain the validity of the fire rating.
315. Grouting of jambs in drywall partitions is not recommended.
316. Grouting of 'closed' sections is not recommended.
317. Floor anchors are provided on jambs terminating at the floor.
318. When a jamb is prepared for EWA guides, face-dimpled or snap-in drywall type anchors, the floor anchor is not required and may be omitted.
319. Mullions adjacent to door openings are supplied with loose, 12 gage floor anchors, screw fixed through the face and bolted to the floor.
320. Concrete or drywall screws, bolts or expansion shells, required for floor or wall anchorage, are not supplied or installed by Fleming.
321. Exposed screw heads of wall anchors may be body-filled, ground smooth and touched-up, by others after installation.

**New Unit Masonry Partitions**

322. Loose masonry wall anchors (wire or T-strap) are permitted on the following:
- Standard and stainless steel construction, 1-1/2 hour frames up to:
  - 48" x 96" (1250 x 2450) singles
  - 96" x 96" (2450 x 2450) pairs
- Double egress, 1-1/2 hour frames to 96" x 96" (2450 x 2450)
- Multi-opening frames up to 100" (2540) O/A width and 96" (2450) rabbet height
- Contra-swing frames
- Dutch door frames
- Frames with rabbeted or flush hollow metal panels
- Sidelight and window assemblies up to 3/4 hour rating, with over-all unit sizes up to:
  - 100" (2540) width, and
  - 98" (2490) height

323. Captive (welded to jamb) masonry anchors (bridge and strap type) are required on:
- 3 hour frames
- All frames over 96" (2450) rabbet height
- Transom frames, lead-lined, acoustic, bullet-resistant and detention security frames
- Multi-opening frames over 100" (2540) O/A width
- Multi-opening frames over 100" (2540) O/A width and 96" (2450) rabbet height
- Contra-swing frames
- Dutch door frames
- Frames with rabbeted or flush hollow metal panels
- Sidelight and window assemblies exceeding:
  - 3/4 hour rating
  - 100" (2540) width or
  - 98" (2490) height

324. For A-Series frames, jamb and head faces are pierced and dimpled for 1/4" diameter x 2-1/4" long (6.4 x 57), flat head Tapcon concrete screws.

325. A-Series frame jambs up to 86" (2200) rabbet height require 3 dimples per face, and up to 96" (2450) rabbet height require 4 per face. Jamb face dimples are located 4" (100) from top and bottom, with intermediate dimples equally spaced between.

326. A-Series single frame heads require 2 dimples per face, located 4" (100) from each end. Heads for pairs require an additional dimple in each face at the mid-point of the rabbet width.

**Existing Partitions: Cast-In Place Concrete, Structural Steel and Unit Masonry Walls**

327. Frame product jamb soffits are pierced and dimpled for 1/4" (6.4) diameter, flat head Tapcon concrete screws or 3/8" (9.5) diameter machine bolts and steel expansion shell anchors. Distributor must specify required diameter.

328. Existing Wall Anchor (EWA) guides, welded in place, are provided for all sizes, constructions and ratings.

329. Preparations are located 6" (150) maximum from the top and bottom of the jamb, with intermediate preparations equally spaced between.

330. For machine bolt applications, steel expansion shell anchors are installed in cast-in place concrete and existing unit masonry. Structural steel must be drilled and tapped.

331. Quantity of anchors per jamb must be as per Table 8.

332. For A-Series frames see Items 324 to 326.

**Drywall Partitions**

333. Steel Stud Anchors (SSA), 1 or 2-piece Combination Stud Anchors (CSA) and Wood Stud Anchors (WSA) are permitted in all frame products within the following limitations;
- 2 or 3 Hour:
  - KD or SUW standard or stainless steel frames
  - SUW double egress frames
  - SUW standard or stainless steel transom frames
  - All other ratings;
  - All frame product

334. Steel stud anchors and wood stud anchors must be captive (welded to jamb).

335. Combination stud anchors may be shipped loose on frames up to 1-1/2 hour rating, but must be captive on 3 hour frames and on all contra-swing, lead-lined, transom frame, sidelight and window assemblies.

336. For butted applications in drywall partitions, Existing Wall Anchor (EWA) guides are welded in place at each preparation. Preparations are located 6" (150) maximum from the top and bottom of the jamb and head, with intermediate preparations spaced at 24" (600) on center. SUW frame products have jamb and head soffits pierced and dimpled for 1/4" (6.4) diameter, #8 x 3-1/2" (89) flat head bugle type drywall screws;
  - Up to 1-1/2 hour rating
  - Not exceeding;
    - 100" (2550) unit width, or
    - 120" (3050) unit height

337. Welded-in custom, 'deep off-set' steel stud anchors may also be used for butted applications in drywall partitions. See Table 8 for quantity of anchors per jamb.

338. Face-dimpled wall anchors, described in Items 324 to 326 are permitted in A-Series frame wrap applications. Drywall screws, #8 x 2-1/4" (57) flat head bugle type, secure the frame to the partition.

339. Face-dimpled base anchors and adjustable tension anchors are provided standard on DW-Series construction frames only.

340. Face-dimples, 1/4" (6.4) diameter, are required in each face of hinge and strike jambs of DW-Series frames at their base to secure the jambs to the board and studs with #8 x 2-1/4" (57) flat head bugle type drywall screws.
341. Snap-in type drywall wall anchors required in the face of:
   · Each strike jamb, above the strike reinforcement
   · Each head, centered on the opening, for pairs only
342. In lieu of face-dimpled type base anchors, DW-Series jambs may be provided with snap-in type.
343. Snap-in type anchors are available with 1/2” (12.7) off-sets for mounting on the face of the wall board, or 1” (25.4) for mounting between wall board and studs. Snap-in type drywall anchors are shipped loose.
344. Each DW-Series jamb is also provided with a welded-in, adjustable tension anchor, located 5” (125) from top of jamb.
345. Rough stud opening sizes for Fleming 'after wall' wrap application frames are as indicated in Table 9. Tolerances are + 1/4” (6) / - 0.

### Table 9

<table>
<thead>
<tr>
<th>Fleming Frame Series</th>
<th>Rough Opening Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frame Rabbet Width</td>
</tr>
<tr>
<td>DW-Series</td>
<td>+ 1-7/8” (48)</td>
</tr>
<tr>
<td>A-Series</td>
<td>+ 1-5/8” (41)</td>
</tr>
</tbody>
</table>

Profile Requirements

346. Unless noted otherwise, Items 348 to 376 apply to all frame components; jambs, heads, sills, center rails, corner posts and mullions. Detention, bullet-resistant, DW, A-Series and double egress construction frames have specific restrictions for various profile elements. Refer to each for details.

347. Refer to the Fleming Technical Manual for standard profiles for each frame Series.

348. Jamb Depths (A)
   · Minimum (also see Items 361 and 362)
     · Single Rabbet (also see Item 349)
       · UL: 2-1/2” (63.5)
       · WHI
       · Sidelights and windows: 4” (101.6)
       · All other frame product; 3” (76.2)
     · Double Rabbet
       · WHI sidelights and windows: 4” (101.6)
       · All other frame product; 3-1/2” (88.9)
   · Maximum
     · Frames and transoms frames; 14-1/2” (368)
     · Sidelights and windows; 10-1/2” (267)

349. Single rabbet profiles less than 4” (101.6) jamb depth are permitted for single frames only

350. Door Rabbet (B)
   · For doors
     · 1-3/4” thick; 1-15/16” (49.2)
     · 1-7/8” thick; 1-9/16” (39.7)
     · All others; door thickness + 3/16” (4.8)
   · For glazed or paneled openings
     · Standard; 1-15/16” (49.2)
     · Minimum; Glazing space + 7/8” (22.2)

351. Soffit (C)
   · Minimum
     · Frames; 3/16” (4.8)
     · All other frame product; 1” (25)
     · Maximum; none

352. Opposite Rabbet (D)
   · Minimum (single rabbet); 0
   · Standard (double rabbet); 1-9/16” (39.7)
   · Maximum; None

353. Stop Heights (E)
   · Minimum
     · At doors and paneled openings; 5/8” (16)
     · At glazed openings, unless labeled glazing material manufacturer’s listings indicate otherwise; 5/8” (16)
   · Maximum; none

354. Face Widths (F)
   · Minimum
     · Single Rabbet
       · JD less than 4” (100); 2” (50)
       · JD 4” (100) and larger
       · At perimeter of doors; 1-1/4” (32)
       · Not at perimeter of doors; 1” (25)
     · Double Rabbet
       · At perimeter of doors; 1-1/4” (32)
       · Not at perimeter of doors; 1” (25)
   · Maximum (Also see Item 355)
     · Jambs, heads and mullions
     · Sidelights and windows exceeding 3/4 hour rating; 4” (102)
     · All others; 12” (305)
     · Sills and center rails; 12” (305)

355. The face width appearance of a section may be increased by constructing a 4-sided opening, installing an approved construction in-fill panel and a 20 gage fascia sheet tack-welded into the opening, flush with the surrounding section faces. Alternately, for UL labeled frame product, 1-3/4” (44.4) thick panels may be used. See Page 28, Items 548 to 550, 554 and 557 for in-fill and panel constructions. Exposed face joints may be body filled and ground smooth.

356. All sills with face widths exceeding 4” (100) are supplied with 2” (50) wide, 16 gage channel clips, welded in place at 14” (350) on center maximum.

357. Returns (G)
   · Minimum; 0 (1/4” (6.4) when a return is specified)
   · Maximum; 3/4” (19.1)
358. 2nd (or Drywall) Returns (H) (when required)
   · Minimum: 1/2" (12.7)
   · Maximum: 3/4" (19.1)

359. Shadow-Line Returns (J) (when required)
   · Minimum: 1/4" (6.4)
   · Maximum
     · WHI: 3/4" (19.1)
     · UL: 2-1/2" (64) with combined Shadow-Line Return (J) and Return (G) not to exceed 3" (76)

360. Shadow-Line Face Widths (K) (when required)
   · Minimum: 1/4" (6.4)
   · Maximum: 4" (101.6)
   
361. Center rails, sills and mullions, not surrounding a door opening, may be recessed from jambs and other mullions.

362. Minimum jamb depth (A) of recessed components
   · Single Rabbet: 2-3/8" (60.3)
   · Double Rabbet: 4-1/4" (107.7)

363. Doors may be hinged off fixed mullions in all frame product up to 1-1/2 hour rating.

364. Sloped and curved components (as viewed in elevation), not immediately surrounding openings for doors, are permitted in UL labeled transoms, sidelights and windows.

365. Vector-Series option (V2 or V3) is available on 2" (50) face, 16 gage, 3-sided, KD and KD-DW frame product only. Not available on A-Series or double egress. V-Series KD frames may be factory or IPLP distributor converted to SUW.

366. Hospital profile sections are permitted

367. Sanitary bases, 6" (150) maximum off floor are permitted, except on lead-lined, bullet-resistant and acoustic frames.

368. Cased open frame profiles are permitted only for:
   · Sills in 4-sided door openings in frames and Fleming acoustic frames

**Hollow Metal Removable Mullions**

369. Fleming hollow metal removable mullions between doors are permitted in SUW:
   · UL Standard, Contra-Swing and Multi-Opening construction frames, transoms and sidelights up to 1-1/2 hour rating
   · WHI Standard and Contra-Swing construction frames, transoms and sidelights up to 1-1/2 hour rating
   · WHI Multi-Opening frames up to 3/4 hour

370. Maximum individual rabbet opening size on either side of Fleming removable mullion; 48" x 96" (1250 x 2450) with all self-latching devices.

371. Fleming between door removable mullion fronts and backs are assembled;
   · With 1-piece mullion clip, or
   · With 2-piece mullion clips, spot-welded 2" (50) from each end and at 12" (300) on center, or
   · Without clips, plug welded 2" (50) from each end and at 18" (450) on center

372. For contra-swing removable mullion details see Page 23, Item 410.

373. Fleming hollow metal removable mullions behind doors are permitted in Standard construction SUW frames up to 1-1/2 hour rating. Maximum rabbet size, 96" x 96" (2450 x 2450) with listed rim type fire exit devices only.

374. Fleming behind door mullion fronts and backs are assembled plug-welded 2" (50) from each end and at 9" (230) on center.

375. Fleming hollow removable mullions are considered part of the frame product, however, a "Component for Field Assembled Listed Fire Door Frame" mylar sticker is required on the inside of the mullion front, applied at the labeling facility. See Part Number 52097, Page 33.

376. Doors may not be hinged off removable mullions.

**Assembly Methods**

377. For frames noted as KD (knocked-down) or KD-DW on Pages 16 to 18, Tables 5, 6 and 7, components are provided unassembled to the project with the contractor responsible for installation assembling them in accordance with the Installation Instructions provided.

378. KD frames can be provided for conversion to SUW construction with the 'Punch Miter Only' (PMO) option.

379. SUW (set-up and welded) is a term used to describe frame product assembled by the factory or UL/WHI approved distributor. Unless indicated otherwise for a specific frame series, the following are the **minimum** SUW assembly methods required for fire rating:
   · Standard construction frames; tack-welded (TW)
   · Non-standard construction frames and all transom frames; face-welded (FW)
   · Sidelight and window frames;
     · Not exceeding 3/4 hour rating; profile-welded (PW)
     · Exceeding 3/4 hour rating; see Page 26, Item 568

380. Tack-Welded (TW); Interior of each corner joint to be tacked in 3 places, 2 at each face and 1 at each return. A hairline joint is visible. Used to convert standard construction KD frames to SUW.

381. Face-Welded (FW); Exposed intersecting face joints are continuously welded, body filled and ground smooth, presenting seamless faces. Welds are on the interior of the profile for open sections, exterior for all others.

382. Profile-Welded (PW); Exposed intersecting face joints continuously welded, body filled and ground smooth, presenting seamless faces. Interior welds for open sections, exterior welds for all others. For open sections, intersecting rabbits, softs and returns have continuous interior welds.

383. Fixed mullion, center rail and corner post fronts and backs are assembled;
   · With 1-piece mullion clip, or
   · With 2-piece mullion clips, spot-welded 2" (50) from each end and at 12" (300) on center, or
   · Without clips, plug welded 2" (50) from each end and at 18" (450) on center

**Available Options**

384. Communicating frame products are permitted up to the maximum rabbet sizes noted for each Construction/Series/Gage. Each leaf in a communicating frame assembly must be labeled and equal in fire protection rating to the frame product.

385. 4-sided frame products are permitted up to the maximum rabbet size noted for each Construction/Series/Gage. Sills in 4-sided assemblies may have an integral door stop or may be cased open type section.

386. Standard undercut on Fleming doors in 4-sided frames; 1/4" (6.4)

387. 4-sided assemblies are restricted to use with Fleming labeled doors only and are not permitted in floors or ceilings (horizontal applications).

388. Split (2 piece) frames for wrapping existing partitions are permitted up to 3 hour rating in;
   · 12, 14 or 16 gage SUW Standard construction frames
   · 48" x 96" (1250 x 2450) singles
   · 96" x 96" (2450 x 2450) pairs

389. Frame product with unequal leaf width pairs are permitted. Widest leaf of the pair cannot exceed the largest single leaf width permitted for the Construction/Series/Gage of door used.
NON-STANDARD FRAME CONSTRUCTIONS

Knocked-Down Slip-On Frames (DW-Series)

390. DW-Series frames are designed for ‘after wall’ installation in wrap applications (studs and wallboard are constructed, frame components are then installed in the prepared rough opening).

391. Face widths; 2” (50) only. For all other profile requirements see Page 21, Items 346 to 358. V2 and V3 option available.

392. Face-dimpled base anchors and tension anchors are provided standard. Snap-in type base anchors are permitted. See Page 20, Items 338 to 343 for anchor requirements.

393. See Page 21, Table 9 for rough stud opening sizes.

394. DW-Series frames prepared for 1-3/8” (35) doors are permitted up to 36” x 84” (915 x 2150) prepared for 3-1/2“ (88.9) or 4” (101.2) templated, standard weight (0.134”/3.4) hinges and small ASA strike (ANSI A115.3). See Page 34, Item 642 for additional information.

395. DW-Series frames are included in Fleming’s In-Plant Labeling Program (IPLP).

396. DW-Series are intended for use with all Fleming D, E, CW, SL, TR, TRE and TRSL-Series doors and labeled hollow or solid core wood doors.

397. H-Series doors are not recommended with DW-Series frames.

398. DW-Series transom and sidelights are not available.

Double Egress (D/E)

399. Head profile at door opening may be single rabbet or ‘double stopped’ (like D/E jambs).

400. Face widths (F);
   - Minimum; 1-1/4” (32)
   - Maximum; 4” (102)

401. All other profile requirements see Page 21, Items 346 to 368.

402. Anchorage - See Pages 19 and 20, Items 307 to 337.

403. DW-Series frame products may have equal or unequal door faces; required when rabbet height exceeds 96” (2450) and for 3 hour ratings.

404. Face-welded construction required when rabbet height exceeds 96” (2450) and for 3 hour ratings.

405. Face-welded double egress transom and profile-welded sidelight assemblies are permitted.

406. Double egress frame products are included in the Fleming In-Plant Labeling Program (IPLP).

407. Double egress frames are intended for use with labeled double egress doors only (Fleming or solid core wood).

Contra-Swing (C/S)

408. Fleming proprietary internal reinforcing required in all contra-swing Mullions.

409. Contra-swing Mullions may be fixed or removable.

410. Contra-swing Mullion fronts are assembled without Mullion clips, plug-welded 2” (5) from each end and at 18” (450) on center maximum.

411. Doors may not be hinged off removable contra-swing Mullions.

412. Contra-swing frame products may have equal or unequal door and opposite rabbets.

413. Single rabbet contra-swing Mullions are permitted.

414. Profile requirements - See Page 21, Items 346 to 376.

415. Anchorage - See Pages 19 and 20, Items 307 to 337.

416. Contra-swing face-welded construction frames and transom frames and profile-welded sidelight assemblies are permitted.

417. Contra-swing frame products are included in the Fleming In-Plant Labeling Program (IPLP).

418. Contra-swing removable Mullions are not permitted in KD construction frame products.

419. Restricted to use with D, E, CW, SL or SLE-Series doors.

Multi-Opening (Banks of Doors)

420. Face-welded multi-opening frames and transom frames, and profile-welded sidelight assemblies are required.

421. Maximum over-all unit width for frames up to 3/4 hour; 154” (3900) in drywall, 162” (4100) in all other partitions. For 1-1/2 hour frames; 154” (3900) in all partitions. For transom and sidelight sizes see Table 10, Page 25.

422. Maximum individual door leaf size; 48” x 96” (1250 x 2450). Number of door openings is not restricted.

423. Profile requirements - See Page 21, Items 346 to 376.

424. Anchorage - See Pages 19 and 20, Items 307 to 337.

425. Frame product may incorporate combinations of;
   - Singles, Pairs
   - Double egress
   - Contra-swing
   - Fixed or removable Mullions between the doors

426. Doors may not be hinged off removable Mullions.

427. Multi-Opening construction not available KD or KD-DW.

428. Multi-Opening frame products are included in the Fleming In-Plant Labeling Program (IPLP).

429. Multi-Opening assemblies are restricted to use with D, E, CW, SL or SLE-Series doors

Dutch Door

430. Dutch door construction frames are available KD, tack-welded and in DW-Series.

431. Dutch door construction transom frames are face-welded.

432. Profile requirements - See Page 21, Items 346 to 368.

433. Anchorage - See Pages 19 to 21, Items 307 to 344.

434. Strike jamb must be prepared for 1 strike for self-latching device in bottom leaf.

435. Strike jamb may be prepared for 2 strikes when both leaves latch into frame.

436. Closer reinforcing in head of frame may be omitted when top leaf utilizes labeled spring hinges. See Page 34, Items 636 and 637 for additional information.

437. Dutch door frame products are included in the Fleming In-Plant Labeling Program (IPLP).

438. Pairs of dutch doors are not eligible for fire labeling.

439. Dutch doors are not permitted in labeled sidelight frames.

440. For use with Fleming’s labeled dutch doors only.

Frame with Panel Above Door

441. Maximum door/panel rabbet opening height; 118” (3000)

442. Nominal panel size;
   - 1-3/4” (44.4) thick only
   - 32” (815) height maximum
   - 6” (150) height minimum
   - 1344 in² (87m²) area maximum

443. Panel face sheets; 16, 18 or 20 gage (matching door gage)

444. Panels may be fixed or removable.

445. Bottom of panel may be rabbed or flush.

446. Rabbeled panel bottom height; 3/4” (19) minimum

447. Flush type requires flat bar astragal affixed to back (push-side) of panel. Astragals are shipped loose for installation on site by others.

448. Core material; kraft honeycomb standard, polystyrene optional. TRR construction not available.

449. Removable panels are provided with mylar “Component for Field Assembled Listed Fire Frame Frame” label, Fleming part number 52097, installed in the top end channel. Fixed panels do not require this label.

450. Face-welded assembly minimum.
451. Profile requirements - See Page 21, Items 346 to 368.
452. Anchorage - See Pages 19 and 20, Items 307 to 337.
453. Frame with Panel Above Door construction is not included in the Fleming In-Plant Labeling Program (IPLP).
454. With flush panels, only single D16, D18, D20 or CW-Series Standard construction doors are permitted.
455. With rabbetted panels, only D16, D18, D20 or CW-Series Rabbetted Top Cap construction doors are permitted.

**Adaptable Jamb Depth (A-Series)**
456. Three (3) profiles to suit jamb depths (A) of:
   - 4-1/2” to 6-3/4” (114 to 172)
   - 5-1/16” to 7-7/8” (129 to 200)
   - 7-7/8” to 13-1/2” (200 to 343)
   - Door rabbet (B): 1-15/16” (49.2)
   - Stop width (C): Fixed by jamb depth
   - Opposite rabbet (D): Varies by jamb depth
   - Stop height (E): 5/8” (16)
   - Face width (F): 2” (50)
   - Returns (G): 1/2” (12.7)
   - Drywall returns (H): 13/32” (10.3)
   - Shadow-line faces (J) or returns (K): Not available
   - Sanitary bases: Not available
457. Profile dimensions other than indicated above, shadow-line or hospital profiles, mullions or sanitary bases are not available for A-Series frames.
458. A-Series frames with face-dimpled wall anchors are for wrap applications only. See Table 9, Page 21, for rough opening size requirements.
459. Anchorage - See Page 20, Items 324 to 326 and 338.
460. Optional wall anchors; wire, bridge and strap, existing wall anchors, Z and wood stud types. See Pages 19 and 20, Items 307 to 338 for details of each.
461. A-Series frames are provided KD standard and can be converted to tack-welded or face welded by the factory or the UL/WHI approved distributor.

462. Transom, sidelight or window applications are not available.
463. A-Series frames are included in the Fleming In-Plant Labeling Program (IPLP).

**Stainless Steel**
465. Section components are fabricated from stainless steel in lieu of A40 galvanneal. Stainless steel, Type 304 or 316, in XL-Blend S (brushed) or XL-Buff (mirror), are permitted.
466. Type 304 and 316 frames are KD, standard. Type 304 and 316, frames and transom frames are available in face-welded construction. Only Type 304, XL Blend S Finish sidelight and window frames are available profile-welded.
467. Profile requirements - See Page 21, Items 346 to 368.
468. Anchorage - See Pages 19 and 20, Items 307 to 337.
469. Stainless steel frame products are included in the Fleming In-Plant Labeling Program (IPLP).
470. Stainless steel frame product is intended for use with all Fleming Standard, Clad, Lead-Lined, TR, TRE, TRSL and DSS-Series doors.

**Clad**
471. All SUW Standard construction frames and transom frames are available with factory installed, non-combustible metallic cladding (ie; stainless steel (Types 304 or 316), brass, bronze, aluminum) with a maximum thickness of 1/16” (1.6). Not available for sidelights and windows.
472. Metallic cladding may be applied to the door side and/or opposite side of the frame profile.
473. Removable glazing stops are clad to match the transom frame. Exception: Glazing stops for stainless steel clad transom frames are fabricated from stainless steel.
474. Hardware back-sets and door rabbet size of the base frame are adjusted from 1-15/16” (49.2), to suit cladding thickness.
475. Frame rabbet opening widths are not adjusted. Doors are undersized to suit cladding applied to the door and/or frame.
476. Metallic clad frame product is not included in the Fleming In-Plant Labeling Program (IPLP).
477. Metallic clad frames and transom frames are intended for use with Fleming Standard, Clad, Lead-Lined, TR, TRE, TRSL and DSS-Series doors only.
478. UL and WHI labeled non-metallic cladding are permitted on Fleming labeled Standard construction frames and transom frames. to the lesser of the size and rating of the Frame Construction/Series/Gage used, or the limits of the cladding manufacturer’s individual listings. Not permitted for sidelite or window frames. Such materials are classified as fire protection only.
479. For positive pressure jurisdictions, non-metallic cladding must be labeled as such for compliance and are limited to use on 1/3 hour (no hose stream) frames only, unless listed otherwise.
480. Labeled non-metallic cladding may be installed by the distributor or in the field, in accordance with the cladding manufacturer’s listings and installation instructions.
481. Labeled non-metallic cladings are not provided or installed by Fleming.
482. Base frame and transom frame profile requirements with either metallic or non-metallic cladings - See Page 21, Items 346 to 368.
483. Anchorage with either metallic or non-metallic cladings - See Pages 19 and 20, Items 307 to 337.

**Lead-Lined**
484. All Standard construction frames are available with factory installed lead-lining.
485. Lead-lined frames are profile-welded.
486. Lead-lining thickness or weight must be specified. Available lead-linings are:
   - 1/32” / 2psf (0.8 / 9.8kg/m²)
   - 3/64” / 3psf (1.2 / 14.6kg/m²)
   - 1/16” / 4psf (1.6 / 19.5kg/m²)
487. Lead-lining is secured to the inside of the frame section from the stop/soffit intersection to the end of the return, on the door side only.
488. Frame lead-lining may also be installed by others as part of the wall construction. The lead-lining provided in the partition is extended into the frame profile and secured to the inside of the soffit as shown below.
489. Lead lined frames must be prepared for 4-1/2” (114) heavy weight hinges (minimum).
490. Profile requirements - See Pages 21 and 22, Items 346 to 368
491. Anchorage - See Pages 19 and 20, Items 307 to 337.
492. Sanitary bases are not permitted on lead-lined frames.
493. Lead-Lined frame construction is included in the Fleming In-Plant Labeling Program (IPLP).
494. For use with Fleming LD16 Series doors only.

**Acoustic (SF-Series)**
495. Maximum rating; STC 46.
496. Available in SF14 Series frames only.
497. Acoustic frames are profile-welded.
498. Profile requirements - See Pages 21 and 22, Items 346 to 364
499. Captive anchors are required in all types of partitions
500. Anchorage - See Pages 19 and 20, Items 307 to 337 for additional information.
501. Sanitary bases are not permitted on acoustic frames.
502. Frame must be prepared for 4-1/2" (114) heavy weight hinges (minimum)
503. Frame supplied with factory installed Fleming surface mounted gasket/stop system. Substitutions of other doors or gasketing systems will void the STC rating as unit is tested as an assembly.
504. When fire protection rating and factory acoustic certification are required, fire exit devices are not permitted.
505. If factory acoustic certification is not required, frames may be prepared for fire exit devices.

506. Acoustic Frame construction is not included in the Fleming In-Plant Labeling Program (IPLP).
507. For use with Fleming SD16 Series Acoustic doors only

**Detention Security**
508. Assembly meets NAAMM HMMA 863-90 static load, impact load, rack and removable glazing stop test requirements.
509. Available in 14 gage frames only.
510. Detention security frames are profile-welded.
511. Profile requirements;
   - Jamb Depth (A)
     - Minimum: 4" (100)
     - Maximum: 14-1/2" (368)
   - Door Rabbit (B); 2-3/16" (55.6) standard
   - Stop Height (E); 3/4" (19) standard
   - Face Width (F)
     - Minimum: 2" (50)
     - Maximum: 6" (152)
   - All other elements - See Page 21, Items 351 & 357 to 360
512. Detention security frames are not permitted in drywall partitions.
513. Captive anchors are required in all other types of partitions
514. Anchorage - See Pages 19 and 20, Items 307 to 332.
515. Frame must be prepared for 4-1/2" (114) heavy weight hinges (minimum).
516. Frames may be prepared for all labeled mortised, pocket or jamb mounted self-latching devices or strikes.
517. Detention security frame construction is not included in the Fleming In-Plant Labeling Program (IPLP).
518. For use with S-Series (Detention Security) doors only.

**Bullet-Resistant (BR-Series)**
519. Available with Level 3 (.44 Magnum revolver) rating maximum, in accordance with UL 752.
520. Available in single frame applications only.
521. Face widths;
   - 2" (50) minimum
   - 4" (100) maximum

522. For all other profile requirements, see Page 21, Items 346, 348, 350 and 351 to 357.
523. Bullet-resistant frames are face-welded construction.
524. Frame internally reinforced on 'threat side' only. For 'pull-side' threat, full door side face bullet-resistant reinforcing provided. For 'push-side' threat, bullet-resistant reinforcing required;
   - Single rabbit; full opposite face
   - Double rabbit; full opposite face and stop side
525. Available with welded-in anchorage to suit cast-in-place, new or existing unit masonry partitions only. See Pages 19 and 20, Items 307 to 331 for detailed information.
526. Bullet-resistant frames must be prepared for 4-1/2" (114) heavy weight hinges, 5" (127) extra heavy over 36" x 84" (900 x 2150). Continuous, labeled, full surface, geared hinges are permitted.
527. Only ASA strikes are permitted for mortise lock or mortise fire exit devices.
528. Bullet-resistant frames are not included in the Fleming In-Plant Labeling Program (IPLP).
529. Labeled bullet-resistant frames are for use only with Fleming bullet-resistant labeled doors

**TRANSOM, SIDELIGHT AND WINDOW ASSEMBLIES**
530. Maximum over-all transom, sidelight and window unit widths, heights, areas and ratings available are detailed in Table 10.

### Table 10: Over-All Unit Sizes: Width x Height x Area (If Applicable) (1)

<table>
<thead>
<tr>
<th>Product</th>
<th>Material</th>
<th>Application</th>
<th>Fire Protection Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Wall(4)</td>
<td>2 and 3 Hr</td>
</tr>
<tr>
<td>Transom Frames(2)</td>
<td>A40 Galvanneal</td>
<td>Drywall</td>
<td>52&quot; (1350) x 120&quot; (3050)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drywall</td>
<td>52&quot; (1350) x 120&quot; (3050)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drywall</td>
<td>100&quot; (2550) x 120&quot; (3050)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drywall</td>
<td>100&quot; (2550) x 120&quot; (3050)</td>
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<tr>
<td></td>
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<td>Drywall</td>
<td>100&quot; (2550) x 120&quot; (3050)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drywall</td>
<td>100&quot; (2550) x 120&quot; (3050)</td>
</tr>
</tbody>
</table>

### Definitions:
1. Must comply with all 3 criteria; width, height and area (if applicable)
2. Transom frame widths are based on 2" (50) face components and 48" (1250) leaf widths
3. With or without hose stream test
4. A unit is considered 'in drywall' when either the jambs, head or sill contact a drywall and steel or wood stud partition

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*Unit Area*
531. The quantity of door openings, lights and/or panels in a sidelight or window unit is not limited except by the dimensional restrictions outlined in Table 11, Pages 28 to 31, "Labeled Glazing Materials for Transoms, Sidelights and Windows".

532. Approved panel constructions and labeled glazing materials may be utilized in the same assembly.

533. Profile requirements - See Pages 21 and 22, Items 346 to 376.

534. Anchorage - See Pages 19 and 20, Items 307 to 337 and Page 26, Item 572 to 574.

535. Only square or rectangular glazed or paneled openings are permitted in WHI labeled transoms, sidelights or windows.

536. Removable transom mullions are not permitted.

537. Operable transoms or sidelights are not permitted.

538. Louvers or dampers are not permitted in labeled transom, sidelight or window rabbot openings, except as a component in an operable or fixed labeled door leaf.

539. Labeled split transoms, sidelights or windows not available.

**Glazed Frame Product and Glazing Materials**

540. UL labeled glazing materials are required in UL frame product. UL or WHI labeled glazing materials may be used in WHI frame product.

541. Except as indicated in Item 546, refer to Table 11, Pages 28 to 31 for labeled glazing materials eligible for use in Fleming’s UL and WHI transom, sidelight and window assemblies.

542. Labeled glazing materials must have a fire protection rating at least equal to that of the frame product in which it will be installed.

543. Specific glazing compounds or other installation components may be required for individual glazing materials. Refer to the glazing material manufacturer’s listings for such requirements.

544. Each piece of glazing material must be labeled.

545. Glazing materials to be installed in positive pressure assemblies must be labeled as such to indicate compliance.

546. Glazing materials evaluated to UL 263, “Fire Tests of Building Construction and Materials”, are tested as ‘walls’ and unless indicated otherwise in their individual listings, are not permitted in labeled frame product.

547. Glazing materials are not supplied or installed by Fleming.

**Paneled Frame Product**

548. All panel constructions in Items 549 to 557 must be installed at the labeling facility. As such they are considered part of the frame product and the frame label covers both the frame product and its panels.

549. Minimum in-fill panel construction for:
   - 1, 1-1/2, 2 and 3 hour frame product; 1 sheet of 20 gauge steel laminated to each face of 3/8” (9.5) thick inorganic cement board, nominal density - 110pcf (1760 kg/m^3)
   - 1/3, 1/2 and 3/4 hour frame product; 1 sheet of 20 gauge steel laminated to each face of 1/2” (12.7) thick non-rated gypsum wall board

550. In-fill panels are secured in openings with 3/4” wide x 5/8” tall (19 x 16) screw fixed, removable glazing stops.

551. For UL labeled frame product, panels constructed as 1-3/4" (44.4) thick D, H or SL18 Series doors, tack-welded into 3 or 4-sided rabbot openings (3 places per vertical edge), are permitted. For vertical edge seam construction requirements, see Page 6, Items 57 to 60.

552. Size of 1-3/4" (44.4) door panel construction limited to:
   - Minimum; 12” x 24” (305 x 610)
   - Maximum
     - D20 Series; 42” x 86” (1100 x 2200)
     - SL18 Series; 48” x 96” (1250 x 2450)
     - D16, D18, H16, CW-Series; 48” x 120” (1250 x 3050)

553. Cores for 1-3/4” (44.4) ‘door’ construction panels:
   - D and CW-Series; honeycomb std, polystyrene optional
   - H-Series; vertical stiffeners and fiberglass only
   - SL-Series; polystyrene only

554. Fixed 1-3/4” (44.4) panels constructed as a door, may be provided with glass lights or louver. See Page 7, Items 76 to 119 for lights, Page 8, Items 120 to 134 for louvers.

555. For UL labeled transom, sidelight and window frames only, 1-3/4" (44.4) panels, tack-welded into 4-sided rabbot openings (2 places per vertical edge), are permitted. Panels are Fleming tack-welded ‘inner/outer’ construction.

556. Honeycomb is standard core, with polystyrene available.

557. See Table 11, Page 28 for size limitations.

**2 and 3 Hour Transom Frames**

558. Only approved panels are permitted in Fleming UL or WHI 1 and 3 hour transom frames. See Items 548 to 557 and Table 11, Page 28 for approved panel constructions.

559. Labeled in-fill panels are secured with #6 x 1-1/4" (32) oval head sculux self-drilling SMS; 2” (50) from the end of each glazing stop and at 6” (150) on center.

560. Labeled and 3 hour transom frames are face-welded construction minimum.

561. Labeled glazing materials are currently limited to 2 hour fire protection rating, therefore glazed 3 hour transoms are not permitted.

562. Profile requirements - See Page 21 and 22, Items 346 to 376.

563. Anchorage - See Pages 19 and 20, Items 307 to 337 and Items 572 to 574.

564. 2 and 3 hour transom frames are included in the Fleming In-Plant Labeling Program (IPLP).

565. 2 and 3 hour transom frame are intended for use with all Fleming labeled doors.

**1 and 1-1/2 Hour Transom, Sidelight and Window Frames**

566. Labeled glazing materials and/or approved panels are permitted in all Fleming 1 and 1-1/2 hour frame products. See Table 11, Pages 28 to 31 for eligible labeled glazing materials and Items 548 to 557, for approved panel constructions.

567. Labeled glazing materials and/or in-fill panels are secured with #6 x 1-1/4” (32) oval head sculux self-drilling SMS, 2” (50) from the end of each removable glazing stop and at 6” (150) on center.

568. Multi-opening transom frames, sidelights and windows exceeding 3/4 hour rating are profile-welded and intersecting external soffit joints at Mullions and center rails are continuously welded, ground smooth.

569. Labeled transom frame applications are face-welded.

570. Profile requirements - See Page 21 and 22, Items 346 to 372.

571. Anchorage - See Pages 19 and 20, Items 307 to 337 and Item 572 to 574.

572. Heads of 1 and 1-1/2 hour sidelight and window frames must be punched and dimpled for Existing Wall Anchor (EWA) guides as detailed on Page 20, Items 327, 328 and 330, welded in place at 16” (400) on center (maximum), 16” (400) from each end. Tapcon concrete screws or machine bolts and steel expansion shell anchors are required for cast in-place concrete, structural steel and new or existing unit masonry. For drywall applications, #8 x 3-1/2” (89) flat head, bugle type drywall screws are used.

573. Heads of 1 and 1-1/2 hour sidelight and window frames must have the faces continuously reinforced with 3/4” x 3/4” (19 x 19) x 12 gage angles, tack-welded in place at 24” (600) on center (maximum).
574. Sills in sidelights and windows exceeding 3/4 hour rating are reinforced with continuous 16 gage floor channels, notched to fit between the vertical members extending to the floor. Channels are shipped loose and secured to the floor.

575. 1 and 1-1/2 hour transom frames, sidelight and window frames are included in the Fleming In-Plant Labeling Program (IPLP).

576. 1 and 1-1/2 hour transom frames, sidelight and window frames are intended for use with all Fleming labeled doors. 1/3 (With or Without Hose Stream), 1/2 and 3/4 Hour Transom, Sidelight and Window Frames

577. Labeled glazing materials and/or approved panels are permitted in all Fleming 1/3, 1/2 and 3/4 hour frame products. See Table 11, Pages 28 to 31, for eligible labeled glazing materials and Items 548 to 557, for approved panel constructions.

578. Also refer to Testing Authority listings for additional information on individual glazing material manufacturer’s products.

579. Labeled glazing materials and/or in-fill panels are secured with #6 x 1-1/4” (32) oval head sculux self-drilling SMS, 2” (50) from the end of each removable glazing stop and at 12” (300) on center.

580. Labeled single door and pairs of doors transom frames, not exceeding 3/4 hour rating, are face-welded.

581. Labeled multi-opening transoms and all sidelights and windows, not exceeding 3/4 hour rating, are profile-welded.

582. Profile requirements - See Page 21 and 22, Items 346 to 376

583. Anchorage - See Pages 19 and 20, Items 307 to 337.

584. Sidelight and window frames not exceeding 3/4 hour rating in all partition types, may incorporate vertical 2, 3 and 4-way hollow metal corner posts. Typical profiles are shown below.

585. Individual ‘segments lengths’ (shown as ‘*’ on the plan views at right) may not exceed the over-all ‘unit widths’ detailed in Table 10, Page 25.

586. Over-all assembly height may not exceed the ‘unit heights’ detailed in Table 10, Page 25.

587. The number of segments in an assembly is not restricted, except by building code. Codes may restrict the maximum area of an assembly within a separation. (ie: not to exceed 25%). This must be determined by the project architect during the design process.

588. Angle between adjacent segments is not limited.

589. Segmented elements are permitted in plan only. Corner posts used as horizontal components are not permitted.

590. Special reinforcing or grouting of corner-posts is not required or recommended.

591. Corner posts are not permitted in stainless steel construction.

592. Field splices are permitted in sidelight and window frames not exceeding 3/4 hour rating.

593. Field splice alignment channels and/or clips are welded to one segment at the labeling facility. Contractor responsible for installation must:
   - Assemble the field spliced sections over the alignment channels and/or clips
   - Continuously weld the butted outside face joints
   - Body fill, grind smooth, touch-up with zinc-rich primer

594. Field splices may be used in conjunction with hollow metal corner posts and segmented sidelight and window frames.

595. 1/3, 1/2 and 3/4 hour transom frames, sidelight and window frames are included in the Fleming In-Plant Labeling Program (IPLP).

596. 1/3, 1/2 and 3/4 hour transom frames and sidelight frames are intended for use with all Fleming labeled doors.

Other Restrictions and Requirements

597. Only rectangular door openings are permitted in any Fleming labeled frame product.

598. Doors may not be hinged off removable mullions

599. Hollow metal removable mullions, between or behind door applications, are not permitted in 3 hour frame product.

600. Non-labeled facings; claddings, finished, protective plates or plant-ons are not permitted (ie: wood veneers, plastics, paper or fabric). Refer to Page 24, Items 471 to 483 for details of metallic and labeled non-metallic claddings permitted.

601. Fleming Therma-Frame, Trimwall and Replacement (R-Series) frame products are not eligible for labeling.

602. Double acting fire door assemblies are not permitted

603. The use of Fleming H-Series doors is not recommended in Fleming DW or A-Series frames.

604. Transom, sidelight and window frames are not permitted in openings requiring a temperature rise rating (TRR).

605. Fire door assemblies are not permitted in floors or ceilings (horizontal applications).
The following table summarizes the maximum exposed areas, widths and heights of labeled glazing material permitted in Fleming's fire labeled transom, sidelight and window frames. Each piece of glazing must be labeled by the glazing manufacturer or their UL and/or WHI approved distributor. The information presented was current at time of publication. Readers are advised to consult UL's "Fire Resistance Directory", or WHI's "Directory of Listed Products", for additional or up-dated information.

### Table 11: Labeled Glazing Materials For Use In Fleming Transoms, Sidelights and Windows

<table>
<thead>
<tr>
<th>Labeled Glazing Material</th>
<th>Rating and Maximum Individual Exposed Light Area x Width x Height (f)</th>
<th>Lab</th>
<th>2 &amp; 3 Hour (a)</th>
<th>1-1/2 Hour</th>
<th>1 Hour</th>
<th>1/3, 1/2 &amp; 3/4 Hour (WHS)(d)</th>
<th>1/3 Hour (NHS)(b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asahi, Central or Pilkington</td>
<td>1/4&quot; (6) Georgian Wired Glass (GWG) (d)</td>
<td>UL WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1296 in² (3.40m²)</td>
<td>5268 in² (13.90m²)</td>
</tr>
<tr>
<td></td>
<td>1/4&quot; (6) Georgian Wired Glass (GWG) with Specified Glazing Compound (e)</td>
<td>UL WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4608 in² (2.97m²)</td>
<td>5268 in² (3.40m²)</td>
</tr>
<tr>
<td></td>
<td>3/8&quot; (10) Cement Board with 20 Gage Face Sheets In-Fill Panel</td>
<td>UL WHI</td>
<td>3456 in² (2.23m²)</td>
<td>3456 in² (2.23m²)</td>
<td>3456 in² (2.23m²)</td>
<td>3456 in² (2.23m²)</td>
<td>5268 in² (3.40m²)</td>
</tr>
<tr>
<td></td>
<td>1-3/4&quot; (44) Inner/Outer Construction Panel</td>
<td>UL</td>
<td>5760 in² (3.72m²)</td>
<td>5760 in² (3.72m²)</td>
<td>5760 in² (3.72m²)</td>
<td>5760 in² (3.72m²)</td>
<td>5268 in² (3.40m²)</td>
</tr>
<tr>
<td></td>
<td>1-3/4&quot; (44) D or H-Series Construction Panel</td>
<td>UL</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1296 in² (0.84m²)</td>
<td>5268 in² (3.40m²)</td>
</tr>
<tr>
<td></td>
<td>1/2&quot; (13) Gypsum Board with 20 Gage Face Sheets In-Fill Panel</td>
<td>UL WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1296 in² (0.84m²)</td>
<td>5268 in² (3.40m²)</td>
</tr>
<tr>
<td></td>
<td>'FireLite' or 'FireLite NT' 3/16&quot; (5) and 'FireLite Plus' 5/16&quot; (8) Non-Wired Ceramic Glazing</td>
<td>UL</td>
<td>2627 in² (1.69m²)</td>
<td>2627 in² (1.69m²)</td>
<td>2627 in² (1.69m²)</td>
<td>2627 in² (1.69m²)</td>
<td>5268 in² (3.40m²)</td>
</tr>
<tr>
<td></td>
<td>'Fireglass 20' 1/4&quot;, 3/8&quot;, 1/2&quot;, 3/4&quot;, (6, 10, 13, 19) Tempered Non-Wired Glazing</td>
<td>UL WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5268 in² (3.40m²)</td>
</tr>
<tr>
<td></td>
<td>'Pyroguard' 5/16&quot; (8) Non-Wired Laminated Glazing (3/4&quot; Stop Ht Req'd)</td>
<td>UL</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1288 in² (0.83m²)</td>
</tr>
<tr>
<td></td>
<td>'Insulgard' 13/16&quot; (21) Wired-Laminated Glazing (1-1/4&quot; Stop Ht Req'd)</td>
<td>UL</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1288 in² (0.83m²)</td>
</tr>
<tr>
<td></td>
<td>'FRP-100 Inferno-Lite' 13/16&quot; (21) Wired-Laminated Glazing (3/4&quot; Stop Ht Req'd)</td>
<td>UL</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3698 in² (2.39m²)</td>
</tr>
<tr>
<td></td>
<td>'Pyroedge-20' 1/4&quot; or 3/8&quot; (6 or 10) Tempered Glazing</td>
<td>UL WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3698 in² (2.39m²)</td>
</tr>
<tr>
<td></td>
<td>'Pyrobel 45-16' 5/8&quot; (16) Non-Wired Laminated Glazing</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4608 in² (2.97m²)</td>
</tr>
<tr>
<td></td>
<td>'Pyrobel 90-37' 1-1/2&quot; (37) Non-Wired Laminated Glazing</td>
<td>WHI</td>
<td>3419 in² (2.21m²)</td>
<td>3419 in² (2.21m²)</td>
<td>3419 in² (2.21m²)</td>
<td>3419 in² (2.21m²)</td>
<td>3419 in² (2.21m²)</td>
</tr>
</tbody>
</table>

**Notes**
- (a) Where permitted by the Authority Having Jurisdiction
- (b) NHS - No Hose Stream; for 1/3 Hour doors in the US only
- (c) WHS - With Hose Stream; for 1/3 Hour doors in Canada only
- (d) Requires non-standard glazing kit due to glazing manufacturer's stop height requirements and/or glazing thickness
- (e) Requires non-standard glazing kit due to glazing material's exposed height only
- (f) Each glazed opening must meet all 3 criteria; area, width and height
- (g) 2 Hour fire protection rating maximum (3 Hour not available)

[Continue ➔](#)
<table>
<thead>
<tr>
<th>Manufacturer / Distributor</th>
<th>'Trade Name' Description</th>
<th>Lab</th>
<th>Rating and Maximum Individual Exposed Light Area x Width x Height</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 Hour (a,g)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>'Pyrostop 45-200' 3/8' (10)</td>
<td>Non-Wired Glazing (c)</td>
<td>WHI</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>47-1/4' (1200)</td>
</tr>
<tr>
<td>'Pyrostop 45-200' 3/4' (19) and 45-250, 45-350, 45-360 1-5/16' (33)</td>
<td>Non-Wired Glazing (e)</td>
<td>UL</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4500 in² (2.90m²)</td>
</tr>
<tr>
<td>'Pyrostop 60-101' 7/8' (22) and 'Pyrostop 60-201' 1-11/16' (27)</td>
<td>Non-Wired Glazing (1&quot; Stop Ht Req'd) (e)</td>
<td>UL</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4290 in² (2.77m²)</td>
</tr>
<tr>
<td>'Pyrostop 60-251, 60-261 60-351,60-361' 1-5/8' (41)</td>
<td>Non-Wired Glazing (1&quot; Stop Ht Req'd) (e)</td>
<td>UL</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5605 in² (3.62m²)</td>
</tr>
<tr>
<td>'Pyrostop 90-102' 1-7/16' (37), Non-Wired Glazing (e)</td>
<td>UL</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3724 in² (2.40m²)</td>
</tr>
<tr>
<td>'Pyrostop 120-104, 120-262, 120-362' 2-1/8' (54) and 'Pyrostop 120-202' 1-9/16' (40)</td>
<td>2-1/364' (56)</td>
<td>Non-Wired Glazing (e)</td>
<td>UL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3724 in² (2.40m²)</td>
</tr>
<tr>
<td>'Superlite I-W' 1/4' (6)</td>
<td>Non-Wired Laminated Glazing</td>
<td>WHI</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4608 in² (2.97m²)</td>
</tr>
<tr>
<td>'Superlite I-XL' 1/4' (6)</td>
<td>Non-Wired Laminated Glazing</td>
<td>UL</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3341 in² (2.16m²)</td>
</tr>
<tr>
<td>'Superlite I-20' 1/4&quot;, 3/8&quot; or 1/2&quot; (6, 10 or 13)</td>
<td>Non-Wired Laminated Glazing (e)</td>
<td>UL</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3965 in² (2.56m²)</td>
</tr>
<tr>
<td>'Superlite I-X' 1/4&quot; (6)</td>
<td>Non-Wired Laminated Glazing</td>
<td>WHI</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3341 in² (2.16m²)</td>
</tr>
</tbody>
</table>

Notes:
- Not Positive Pressure compliant (UL10C, UBC 7-2 1997, UBC 7-4 1997)
- Where permitted by the Authority Having Jurisdiction
- NHS - No Hose Stream; for 1/3 Hour doors in the US only
- WHS - With Hose Stream; for 1/3 Hour doors in Canada only
- With or without a 3/8" layer of tempered glass at 1/3, 1/2 & 3/4 Hour only
- Requires non-standard glazing kit due to glazing manufacturer's stop height requirements and/or glazing thickness
- Each glazed opening must meet all 3 criteria: area, width and height
- 2 Hour fire protection rating maximum (3 Hour not available)
<table>
<thead>
<tr>
<th>Manufacturer / Distributor</th>
<th>'Trade Name' Description</th>
<th>Lab</th>
<th>2 Hour (a,g)</th>
<th>1-1/2 Hour</th>
<th>1 Hour</th>
<th>1/3, 1/2 &amp; 3/4 Hour (WHS) (c)</th>
<th>1/3 Hour (NHS) (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>St-Gobain or O'Keeffe's</td>
<td>'Superlite II-45' 21/32” (17) Non-Wired Laminated Glazing (7/8” Stop Ht Req’d) (e)</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>'Superlite II-45' 1-1/2” (38) Non-Wired Laminated Glazing (1-1/4” Stop Ht Req’d) (e)</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>'Superlite II-20’ 1-1/2” (38) Non-Wired Laminated Glazing (7/8” Stop Ht Req’d) (e)</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>'Superlite II-XL’ 3/4” (19) Non-Wired Laminated Glazing (e)</td>
<td>UL</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>'Superlite II-XL’ 1” (25) Non-Wired Laminated Glazing (e)</td>
<td>UL</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>'Superlite II-NT’ 1-1/2” (38) Non-Wired Laminated Glazing (e)</td>
<td>UL</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4990 in² (3.22m²)</td>
<td>1/3 Hour (NHS)</td>
</tr>
<tr>
<td></td>
<td>'Pyroswiss' or 'Pyroswiss US’ 3/16” (5) Tempered Non-Wired Glazing</td>
<td>UL</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>'Pyroswiss Extra’ 3/16” (5) Tempered Non-Wired Glazing</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>'Pyroswiss G’ 5/16&quot;, 3/8&quot;, 1/2” &amp; 3/4” (8,10,13 &amp; 19) Tempered Non-Wired Glazing (e)</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td></td>
<td>'Swissflam-45 N2’ 5/8” (16) and 3/4” (19) Laminated Non-Wired Glazing (e)</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>'Swissflam-60 N2’ 1” (25) Laminated Non-Wired Glazing (e)</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td></td>
<td>'Swissflam-60 N2’ 1-1/8” (28) Laminated Non-Wired Glazing (e)</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td></td>
<td>'Swissflam-90 N2’ 1-3/8” (38) Laminated Non-Wired Glazing (e)</td>
<td>WHI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1084 in² (0.70m²)</td>
<td>-</td>
</tr>
</tbody>
</table>

Notes:
- (a) : Where permitted by the Authority Having Jurisdiction
- (b) : NHS - No Hose Stream; for 1/3 Hour doors in the US only
- (c) : WHS - With Hose Stream; for 1/3 Hour doors in Canada only
- (d) : With or without a 2nd layer of tempered glass at 1/3, 1/2 & 3/4 Hour only
- (e) : Requires non-standard glazing kit due to glazing manufacturer's stop height requirements and/or glazing thickness
- (f) : Each glazed opening must meet all 3 criteria; area, width and height
- (g) : 2 Hour fire protection rating maximum (3 Hour not available)
**Table 11 (Continued): Labeled Glazing Materials For Use In Fleming Transoms, Sidelights and Windows**

<table>
<thead>
<tr>
<th>Manufacturer / Distributor</th>
<th>'Trade Name' Description</th>
<th>Lab</th>
<th>Rating and Maximum Individual Exposed Light Area x Width x Height (f)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 Hour (a,g)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WHI</td>
<td>3288 in² (g)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2.12m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>94-5/8&quot; (2400)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WHI</td>
<td>-</td>
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<td>1763 in² (1.14m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>60-1/4&quot; (1530)</td>
</tr>
<tr>
<td>Vetrotech / St-Gobain</td>
<td>'Keralite FR-R' or 'FR-F'</td>
<td>WHI</td>
<td>490 in² (0.32m²)</td>
</tr>
<tr>
<td></td>
<td>3/16&quot; (5) Laminated Non-Wired Glazing</td>
<td></td>
<td>26-1/2&quot; (675)</td>
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<td>'Keralite FR-L'</td>
<td>WHI</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>5/16&quot; (8) Laminated Non-Wired Glazing</td>
<td></td>
<td>1665 in² (1.07m²)</td>
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<tr>
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<td>'Keralite FR-L'</td>
<td>WHI</td>
<td>-</td>
</tr>
<tr>
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<td>3/8&quot; (10) Laminated Non-Wired Glazing</td>
<td></td>
<td>60&quot; (1525)</td>
</tr>
<tr>
<td>Viracom / Sieracin/Trans Tech</td>
<td>'Omnilite' 13/16&quot; (21)</td>
<td>UL</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Non-Wired Laminated Glazing (1) Stop Ht Req'd</td>
<td>WHI</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>'Omnilite' 27/32&quot; (22)</td>
<td>UL</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Wired-Laminated Glazing (e)</td>
<td></td>
<td>500 in² (0.32m²)</td>
</tr>
<tr>
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<td>'Omnilite' 27/32&quot; (22)</td>
<td>UL</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Wired-Laminated Glazing (e)</td>
<td></td>
<td>880 in² (0.57m²)</td>
</tr>
</tbody>
</table>

**Notes**
- (a): Where permitted by the Authority Having Jurisdiction
- (b): NHS - No Hose Stream; for 1/3 Hour doors in the US only
- (c): WHS - With Hose Stream; for 1/3 Hour doors in Canada only
- (d): Requires non-standard glazing kit due to glazing manufacturer's stop height requirements and/or glazing thickness
- (e): Requires non-standard glazing kit due to glazing manufacturer's stop height requirements and/or glazing thickness
- (f): Each glazed opening must meet all 3 criteria; area, width and height
- (g): 2 Hour fire protection rating maximum (3 Hour not available)

**FLEMING FIRE LABELS**

606. Listing authorities, UL and WHI, have developed independent policies regarding the information required and the format of their labels.

607. Mylar labels are pre-printed with all required information. Factory labeled WHI products are available only with mylar labels. Factory labeled UL products are provided with mylar labels standard, metal type available when specified.

608. Fire protection ratings are stamped or scribed into metal labels by the approved labeling facility.

609. For UL frames, transom frames and sidelight frames, Fleming also utilizes an 'embossed' label. The embossment is provided standard on all eligible components prepared for hinges. The embossment is a bona-fide UL label, recognized in NFPA 80. See the Fleming Technical Manual for additional information on the embossed label program.

610. Labels are applied between the two upper hinge preparations. If continuous hinges are provided, metal or mylar labels must be applied to:
- The inside of the top end channel or top of steel top cap, at the hinge end, on doors
- The hinge end of the head/transom Mullion door rabbot, on frame product. (Only 1 fire label is required per frame.)

611. Each UL Fleming jamb and head provided KD or KD-DW, hollow metal removable panels, hollow metal removable Mullions and field spliced frame product, must bear a Fleming "Component for Field Assembled Listed Fire Door Frame" label, Part Number 52097, applied by the labeling facility to the inside of each component.

612. Fleming's UL labels are eligible for use in all North American jurisdictions.

613. Fleming's WHI labels are used in all traditional/negative test jurisdictions in North America. For WHI positive pressure and/or smoke and draft control compliance, Fleming's supplemental labels, Part Numbers 52072, 52073, 52074 or 52075, must also be provided on fire doors adjacent to the fire door label. This label contains additional information required in these jurisdictions. Although not mandatory, distributors may apply Part Numbers 52072 or 52073 to frame product as well.

614. Tables 12 and 13 detail, by Fleming Part Number, the appropriate label to be used for each fire endurance, temperature rise rating and product category. See Pages 32 and 33 for facsimiles of Fleming's UL and WHI fire door and frame labels.

615. An AHJ should not reject a label if it references multiple Standards, so long as it specifically indicates compliance with the Standards mandated in their governing code. As well, NFPA 80 specifically includes the statement, "Labels or classification marks may be of metal, paper, or plastics, or may be stamped or die cast into them." Therefore, all Fleming labels, metal, mylar or embossed type, are in full compliance with all code requirements and should not be rejected by an AHJ based on their 'material'.
If a door or frame product is not eligible for fire rating, a fire label cannot and will not be applied. However, a factory Letter of Certification, covering construction only, may be provided. Such Certifications are project and opening specific, and will detail the reason(s) for ineligibility. Acceptance of a Letter of Certification is at the discretion of the Authority Having Jurisdiction. Contact Fleming Technical Services - Ajax, for further information.

---

### Table 12

<table>
<thead>
<tr>
<th>Fire Endurance Rating</th>
<th>Temperature Rise Rating</th>
<th>Fleming Label Part Number</th>
<th>UL</th>
<th>Mylar</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 or 3 Hour</td>
<td>None</td>
<td>52093</td>
<td>52036</td>
<td>(*2)</td>
</tr>
<tr>
<td>1 or 1-1/2 Hour</td>
<td>250°C, 450°C or 650°F at 30 Minutes</td>
<td>N/A</td>
<td>52094</td>
<td>52037</td>
</tr>
<tr>
<td>3/4 Hour</td>
<td>250°C at 30 Minutes and 250°C at 60 Minutes</td>
<td>N/A</td>
<td>52095</td>
<td>52038</td>
</tr>
<tr>
<td>3 Hour</td>
<td>250°C, 450°C or 650°F at 30 Minutes</td>
<td>N/A</td>
<td>52096</td>
<td></td>
</tr>
<tr>
<td>1-1/2 Hour</td>
<td>250°C at 30 Minutes and 250°C at 30 or 60 Minutes</td>
<td>N/A</td>
<td>52085</td>
<td></td>
</tr>
<tr>
<td>3/4 Hour</td>
<td>250°C, 450°C or 650°F at 30 Minutes</td>
<td>N/A</td>
<td></td>
<td>52038</td>
</tr>
</tbody>
</table>

*1: Required hourly rating stamped or scribed onto label by labeling facility.
*2: For positive pressure and/or smoke and draft control jurisdictions, Fleming’s Supplemental mylar labels are required, in addition to the standard WHI mylar label. For Positive Pressure compliance only, use Pt # 52072. For Positive Pressure and Smoke and Draft Control compliance, use Pt # 52073.
*3: 250°C required for Canadian Code compliance only.
*4: Temperature Rise Rated labels are applied only by the factory. TRR not included in Distributor IPLP Program.
*5: When Temperature Rise Rating and Positive Pressure compliance are specified, supplemental label, Pt # 50274 is also applied. For TRR, Positive Pressure and Smoke and Draft Control, supplemental label, Pt # 50275 is also applied.

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FLEMING FIRE DOOR LABELS

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### Metal - Pt N 52084

- **Fire Rating:** 1-1/2 HOUR
- **Issue Number:** A-1010
- **Product Conforms To:** US 10B, UL 10C
- **UBC 7-4 (1997) AND CAN4-S104**

---

### Mylar - Pt N 52093

- **Fire Rating:** 3 HOUR
- **Issue Number:** A-1010
- **Product Conforms To:** US 10B, UL 10C
- **UBC 7-4 (1997) AND CAN4-S104**

---

### Mylar - Pt N 52094

- **Fire Rating:** 1-1/2 HOUR
- **Issue Number:** A-1010
- **Product Conforms To:** US 10B, UL 10C
- **UBC 7-4 (1997) AND CAN4-S104**

---

### Mylar - Pt N 52095

- **Fire Rating:** 3/4 HOUR
- **Issue Number:** A-1010
- **Product Conforms To:** US 10B, UL 10C
- **UBC 7-4 (1997) AND CAN4-S104**

---

### Mylar - Pt N 52096

- **Fire Rating:** 1/3 HOUR
- **Issue Number:** A-1010
- **Product Conforms To:** US 10B, UL 10C
- **UBC 7-4 (1997) AND CAN4-S104**

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### Mylar - Pt N 52075

- **Fire Rating:** 3/4 HOUR
- **Issue Number:** A-1010
- **Product Conforms To:** US 10B, UL 10C
- **UBC 7-4 (1997) AND CAN4-S104**

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32
### FLEMING FRAME PRODUCT LABELS

<table>
<thead>
<tr>
<th>Product</th>
<th>Fire Endurance Rating</th>
<th>Fleming Label Part Numbers</th>
<th>UL</th>
<th>WHI</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td><strong>Frames</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Double Egress</td>
<td>2 or 3 Hour</td>
<td>52080 (<strong>1)</strong></td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>1/3, 3/4, 1 or 1-1/2 Hour</td>
<td>52090</td>
<td>52003</td>
<td></td>
</tr>
<tr>
<td>All Other Frames</td>
<td>2 or 3 Hour</td>
<td>N/A</td>
<td>N/A</td>
<td>52001</td>
</tr>
<tr>
<td></td>
<td>1/3, 3/4, 1 or 1-1/2 Hour</td>
<td>52090</td>
<td>52002</td>
<td></td>
</tr>
<tr>
<td><strong>Transom Frames</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glazed</td>
<td>2 Hour</td>
<td>52081 (<strong>1)</strong></td>
<td>N/A</td>
<td>52001</td>
</tr>
<tr>
<td></td>
<td>1 or 1-1/2 Hour</td>
<td>52091</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3/4 or 1/3 Hour</td>
<td>52091</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paneled</td>
<td>2 or 3 Hour</td>
<td>52080 (<strong>1)</strong></td>
<td>N/A</td>
<td>52001</td>
</tr>
<tr>
<td></td>
<td>1/3, 3/4, 1 or 1-1/2 Hour</td>
<td>52090</td>
<td>52002</td>
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<tr>
<td><strong>Sidelight Frames</strong></td>
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<td>1 or 1-1/2 Hour</td>
<td>52081 (<strong>1)</strong></td>
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<td>N/A</td>
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<tr>
<td></td>
<td>1/3 or 3/4 Hour</td>
<td>52091</td>
<td>52004</td>
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<tr>
<td>Paneled</td>
<td>1 or 1-1/2 Hour</td>
<td>52080 (<strong>1)</strong></td>
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<td>N/A</td>
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<tr>
<td></td>
<td>1/3 or 3/4 Hour</td>
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<td>52004</td>
<td></td>
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<tr>
<td><strong>Window Frames</strong></td>
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<td></td>
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<tr>
<td>Glazed</td>
<td>1-1/2 Hour</td>
<td>52082 (<strong>1)</strong></td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td></td>
<td>1/3 or 3/4 Hour</td>
<td>52092</td>
<td>52004</td>
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**Table 13**

<table>
<thead>
<tr>
<th>Product</th>
<th>Fire Endurance Rating</th>
<th>Fleming Label Part Numbers</th>
<th>UL</th>
<th>WHI</th>
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<tr>
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<td></td>
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<tr>
<td><strong>Metal - Pt Nq 52080</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Metal - Pt Nq 52081</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Metal - Pt Nq 52082</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Mylar - Pt Nq 52001**

**Mylar - Pt Nq 52002**

**Mylar - Pt Nq 52003**

**Mylar - Pt Nq 52004**

**Mylar - Pt Nq 52005**

**Mylar - Pt Nq 52006**

**Mylar - Pt Nq 52007**

*1: Required hourly rating stamped or scribed onto label by labeling facility

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**FIRE DOOR FRAME**

**FIRE WINDOW FRAME**

**FIRE WINDOW FRAME FOR LIGHTS**

**FIRE WINDOW FRAME**

**FIRE DOOR FRAME**

**FIRE WINDOW FRAME**

Provided standard on all eligible frame components prepared for hinges

Component for Field Assembled Frame Label

Applied inside UL KD and KD-DW Assembly Method frame components, removable hollow metal panels (above door applications), hollow metal removable mullions and field spliced frame product
HARDWARE REQUIREMENTS FOR FLEMING FIRE DOORS AND FRAME PRODUCT

**General**

619. To be eligible for use on Fleming product, hardware must be:
- Labeled for fire protection on swinging hollow metal doors and frames up to 36" x 84" (915 x 2150); steel, bottom, top and intermediate pivot sets, 4" (101.6) minimum height and 0.225" (5.72) thickness minimum are permitted, unless smaller sizes are indicated in the hinge manufacturer's listings.
- To the size and rating required for the assembly in which it will be installed.

620. Exception: Hinges - See Items 629 to 631 for additional information.

621. UL labeled doors and frame product must be prepared for UL labeled hardware. WHI labeled doors and frame product may be prepared UL or WHI labeled hardware.

622. Fire door hardware and accessories must comply with the requirements of NFPA 101, the "Life Safety Code", and NFPA 80, "Fire Doors and Fire Windows".

623. Door and frame preparations must be in accordance with the hardware manufacturer's listings, templates and installation instructions.

624. If doors by others are to be installed in Fleming frame product, hardware preparations in frames must be in accordance with the door manufacturer's listings.

625. Electrically or electronically operated/controlled hardware must be labeled for both Fire and Electrical Protection.

626. Only low voltage devices are permitted. Electrical compliance is based on National Electrical Code Class 1 or 2 Circuit requirements.

627. Refer to Testing Authority listings for limitations on individual hardware manufacturer's products.

628. As a minimum, each labeled fire door and frame product must be prepared for hinges, labeled self-latching and self-closing devices.

**Hinges & Pivots**

629. For all ratings, door and frame product sizes, hinges and pivots (except spring hinges) must be steel, mortise or surface, ball bearing type.

630. Hinges or pivots other than ball bearing type are permitted if they meet the requirements of ANSI A156.1, "Standard for Butts and Hinges", and are labeled for fire protection.

631. Hinges as described in Item 630, when used in positive pressure jurisdictions, must be labeled as complying with these standards.

632. For all ratings, 1 pair of hinges is required on each door leaf up to 60" (1525) rabbet height and 1 additional hinge for each additional 30" (760) of height or fraction of thereof. See the Fleming Technical Manual for standard hinge location information.

633. For all ratings, doors 1-3/4" (44.4) and thicker, and their frames up to 96" (2450) rabbet height; 4-1/2" (114) standard weight (0.134°/3.4 thick) hinges are required minimum, except as noted below.

634. For all ratings, doors 1-3/4" (44.4) and thicker, and their frames exceeding 96" (2450) rabbet height, for S, SD, LD Series, and Bullet-Resistant doors not exceeding 36" x 84" (900 x 2150); 4-1/2" (114) heavy weight (0.180°/4.57 thick) hinges are required minimum.

635. Electric hinges of equivalent height and weight to those detailed in Items 633 and 634 are permitted.

636. For all ratings, doors 1-3/4" (44.4) and thicker, and their frames up to 36" (915) width or 84" (2150) height; 4" (101.6), 0.105° (2.67) thick, labeled spring hinges are permitted, unless indicated otherwise in their listings. Where labeled spring hinges are used, a minimum of 2 per door leaf are required. For door openings exceeding 60" (1525) height using labeled spring hinges, a 3" hinge is required, either:
- Another labeled spring hinge, or
- A steel, mortise or surface, ball bearing type hinge matching the height and weight of the spring hinge.

637. Where labeled spring hinges (as specified in Item 636) or pivot floor closers are used, they are also considered self-closing devices. See Page 35, Item 667 for additional information.

638. Full length, labeled continuous hinges are permitted, within the size and rating limitations of their individual listings. Reinforcing requirements and mounting methods are as per the hinge manufacturer’s listings, templates and installation instructions.

639. For doors 1-3/4" (44.4) and thicker, and their frames up to 38" (965) width or 96" (2450) height, up to 1-1/2 hour rating; steel, olive knuckle or paumelle type hinges, 6" (152.4) height and 0.225" (5.72) thickness minimum are permitted, unless smaller sizes are indicated in the hinge manufacturer's listings.

640. For all ratings, doors 1-3/4" (44.4) and thicker, and their frames up to 48" x 120" (1250 x 3050); steel, top, bottom and intermediate pivot sets, 4" (101.6) minimum height and 0.225" (5.72) thickness, are permitted.

641. Labeled pivot sets, including pocket pivot type, other than described in Item 640, are permitted, except on SLE-Series doors, within the size and rating limitations of their individual listings.

642. For all ratings, UL labeled 1-3/8" (35) thick doors and their frames, up to 36" (915) width or 84" (2150) height; 3-1/2" (88.9) or 4" (101.2) height, 0.123" (2.12) thick, steel, mortise or surface, ball bearing hinges are permitted. Due to mounting screw interference, templated hinges exceeding 4" (101.6) height are not compatible with 1-3/8" (35) thick Fleming doors.

**Self-Latching Devices and Strikes**

643. All labeled self-latching devices are permitted on Fleming labeled doors and frame product to the maximum size and rating indicated on Pages 4 and 5 for doors and 16, 17 and 18 for frame product, for each Construction/Series/Gage, except as indicated below. Also see Item 619.

644. Self-latching devices include:
- Single-point locks/latches (cylindrical/mortise)
- Flush bolts (automatic, self-latching or manual types)
- Surface bolts (manual type)
- Fire exit devices (rim, mortised, surface or concealed vertical rod types [with or without bottom rod] or mortise with top rod only [surface or concealed])
- 2 or 3-point locks/latches

645. Minimum latch throw for single-point latches, unless indicated otherwise in the latch manufacturer’s listings;
- Singles up to 96" (2450) height; 1/2" (12.7)
- Singles over 96" (2450) and for all pairs; 3/4" (19)

646. All labeled, manually operated single-point latches comply with the requirements for positive pressure testing and need not be labeled for such compliance.

647. Electrically or electronically operated single-point latches used in positive pressure applications must be fire labeled as such to verify compliance.

648. Self-latching devices with other than 2-3/4" (69.9) backsets, to a maximum of 5" (127), or as indicated in the individual latch manufacturer's listings, are permitted.

649. Minimum latch throw for flush or surface bolts; 3/4" (19).

650. All labeled, flush or surface bolts comply with the requirements for positive pressure and need not be labeled for such compliance.

651. Roller latches are not permitted as self-latching device on fire door assemblies.

652. Fire door assemblies in a required 'means of egress' having an 'occupancy load' of 100 persons or more, must be equipped with fire exit devices.
653. Fire exit devices are labeled for both panic (cycle, exit and exit loading) and for fire protection.

654. Fire exit devices comply with the requirements of positive pressure and need not be labeled for such compliance.

655. Fire exit device styles permitted, as indicated in the listings of each device manufacturer may include:
   - Crash-bar
   - Touch-bar
   - Inset-touch bar

656. Rim type fire exit devices are permitted on pairs of labeled doors only when used with a;
   - Labeled removable hardware Mullion
   - Fixed hollow metal Mullion
   - Fleming labeled removable hollow metal Mullion

657. Hardware mullions are for behind the door applications only.

658. Fleming hollow metal Mullions are available for both between and behind the door applications.

659. See Page 22, Items 369 to 376 for additional information on Fleming’s labeled removable hollow metal Mullions.

660. Only vertical rod type fire exit devices are permitted as the self-latching device on labeled double egress assemblies.

661. Vertical rod type fire exit devices, except mortise fire exit devices with integrated top rod only, are not permitted for single door applications.

662. When both leaves of a pair are required for exiting purposes;
   - Each may be prepared for fire exit devices, or
   - The inactive leaf may be prepared for a vertical rod fire exit device and open-back strike, with the active leaf prepared for a mortise fire exit device or a single-point latch

663. Pairs and double egress doors within a ‘means of egress’ may not be equipped with astragals, door edges or projecting latches that inhibit the free use of either leaf. See Item 683 for additional information.

664. For 3 hour pairs within a ‘means of egress’, vertical rod fire exit device (surface or concealed) with ASA type strike on one leaf and mortise fire exit device with coordinator and a ‘push-side’ mounted astragal on the other are permitted.

665. For 3 hour pairs within a ‘means of egress’, each prepared for rim fire exit devices and a removable ‘behind the doors’ hardware Mullion are permitted and an astragal is not required. The provisions for lock edge seam requirements of Page 8, Items 138 to 141 apply.

666. For 3 hour applications, when 2 leaves are required for exiting purposes in a ‘means of egress’ and the movement of equipment is not an issue, a L/R configuration, (2 single doors with a fixed hollow metal ‘between the doors’ Mullion), with either rim or mortise fire exit devices, may be used. The provisions for lock edge seam requirements of Page 8, Items 138 to 141 apply.

667. Panic exit devices are not permitted on labeled fire doors.

668. Where the inactive leaf of a pair is not required for ‘exiting purposes’, it may be prepared for automatic or self-latching top and bottom flush bolts, or 2-point locks.

669. Where the inactive leaf of a pair is not required for ‘exiting purposes’, it may be prepared for manually operated flush or surface top and bottom bolts when;
   - The room is not normally occupied by humans, and
   - Acceptable to the AHJ

670. The use of 3-point locks on single doors and the active leaf of pairs is permitted.

671. For pairs using 3-point locks, the inactive leaf must be prepared for 2-point locks. Flush or surface bolts are not permitted in lieu of the 2-point lock.

672. 2 and 3-point locks or latches are not labeled as and cannot be used where fire exit devices are required.

673. Frame product must be prepared for the strike (or strikes) indicated in the self-latching device manufacturer’s listings and templates.

674. Open-back strikes are permitted in the inactive leaf of 1-1/2 hour pairs of;
   - Standard construction H, CW, D16, D18, SL16 and SL18 Series doors up to 96” x 96” (2450 x 2450)
   - Standard construction E16 Series doors
   - Standard construction SLE Series doors
   - Standard construction WHI D20 Series doors up to 96” x 96” (2450 x 2450)
   - Standard construction WHI E20 Series doors

675. Labeled electric strikes, electromagnets (also called maglocks), door position switches and electric power transfer units are permitted in all Fleming fire door assemblies, 1-3/4” (44.4) and thicker, within the size and rating limitations of the individual hardware manufacturer’s listings.

676. All labeled electric strikes comply with the requirements for positive pressure and need not be labeled for such compliance.

677. Labeled deadbolts, (also called auxiliary locks) may be provided in addition to a self-latching device when;
   - Permitted by the AHJ in doors not in a ‘means of egress’,
   - Interconnected with the active-latch, retracting with the operation of the self-latching device

Self-Closing Devices

678. This group includes labeled;
   - Swinging door closers
   - Door holders (for use with automatic detection equipment and self-closing door closers)
   - Combination closer/holders (surface or floor mounted, concealed or semi-concealed - for use with labeled automatic fire detectors)
   - Spring hinges

679. Each leaf and door opening must be prepared for a self-closing device. Exceptions; dutch doors, where a closer is required for the top leaf only; and the inactive leaf of pairs in mechanical equipment rooms.

680. If closers with through bolt mountings, labeled spring hinges, or floor closers ( pivots) are used, closer reinforcing is not mandatory. (Note; All Fleming doors are provided with closer reinforcing as a standard feature.)

681. Labeled combination door closers and holders with integral latches are permitted in single door applications up to 1/3 hour (without hose stream) only, and do not require any additional latching.

682. Labeled fire door operators with automatic closers are permitted for use in pairs of hollow metal, Standard or Double Egress construction doors and frame product with concealed vertical rod fire exit devices only.

Coordinators

683. Labeled coordinators are required for all pairs of doors in a ‘means of egress’ where an astragal, door edge or projecting latch will inhibit the free use of either leaf by preventing the inactive leaf from closing and latching prior to the active leaf.

684. Coordinators are not required for pairs of doors where each leaf closes and latches independently.

Door Viewers

685. Labeled door viewers are permitted on all Fleming doors up to a maximum rating of 1-1/2 hours.

686. Door viewers used in positive pressure jurisdictions must be labeled as such to verify compliance.

687. Each leaf may be prepared for a maximum of 2 viewers.

688. Door may be prepared at factory, distributor’s shop or in the field. See Page 3, Item 12 for additional information.
3rd Party Astragals, Gaskets, Weatherstrip, Door Seals and Door Bottoms

689. These products are investigated to ensure that they do not adversely affect the rating of the fire door assembly and are Classified for fire protection only.

690. Labeled products within this group are permitted for use with all Fleming labeled doors and frame product (except acoustic assemblies) to the size and rating limitations of the individual hardware manufacturer’s listings.

691. Products used at the meeting edges of pairs are not intended to replace a required astragal, nor to alter the clearances between pairs of doors specified in NFPA 80. See Page 8, Item 135 for additional information.

692. Labeled 3rd party, surface mounted weather, sound or light sealing type astragals are permitted; 
   · In conjunction with Fleming’s flat bar astragal on all Fleming doors up to 3 hour rating, or
   · As a stand-alone astragal when the requirements of Page 8, Items 137 to 140 are met

693. For positive pressure and smoke and draft control compliance, a category system has been jointly developed by UL and WHI to differentiate between the types of products, by application. Under this system, all Fleming fire doors are Category A - “Fire Doors Not Requiring Additional Components” to be positive pressure labeled and do not require gaskets of any kind for compliance.

694. For smoke and draft control compliance, all Fleming doors (and all other swinging doors) must be used with Category H - “Labeled Smoke and Draft Control Gaskets”. Category H products must be labeled and bear the “S” symbol.

695. Also permitted for use with all Fleming labeled doors and frame product are Category J - “Labeled Gasket Materials”, such as gaskets, weather stripping, door bottoms, thresholds and other similar products. These have been positive pressure fire tested, but are not intended to assist an assembly in attaining either positive pressure or smoke and draft control compliance.

696. All Category J products are eligible for use with Fleming labeled doors and product in traditional/negative pressure jurisdictions.

697. Labeled 3rd party products are not supplied or installed by Fleming.

REFERENCED STANDARDS AND PUBLICATIONS

List of Equipment and Materials, Volume II, Building Construction

Standard Method for Fire Tests of Door Assemblies
Publication Number: CAN4-S104-M80

Standard Method of Fire Tests of Windows and Glass Block Assemblies
Publication Number: CAN4-S106-M80

Available From: Underwriters Laboratories of Canada
7 Crouse Road, Toronto, ON M1R 3A9
Tel: 416-757-3611
Web: www.ul.com

Directory of Listed Products

Available From: Intertek Testing Services (Warnock Hersey, Inc.)
3933 US Route 11, Courtland, NY 10345
Tel: 607-758-6234
Web: www.etlsemko.com

Standard for Fire Doors and Fire Windows
Publication Number: NFPA 80-1999

Life Safety Code
Publication Number: NFPA 101-2000

Recommended Practice for the Installation of Smoke-Control Door Assemblies
Publication Number: NFPA 105-1999

Available From: National Fire Protection Association
1 Batterymarch Park, Quincy, MA 02269
Tel: 617-770-3000
Web: www.nfpa.org

Fire Resistance Directory - Volume 3

Outline of Investigation for Fire Door Frames, Issue # 4
Publication Number: UL-63

Fire Test of Window Assemblies, 7th Edition
Publication Number: ANSI/UL9-00

Fire Tests of Door Assemblies, 9th Edition
Publication Number: ANSI/UL10B-01

Positive Pressure Fire Tests of Door Assemblies, 1st Edition
Publication Number: ANSI/UL10C-01

Air Leakage Tests of Door Assemblies, 3rd Edition
Publication Number: UL1784-01

Available From: Underwriters Laboratories, Inc.
333 Pfingsten Road, Northbrook, IL 60062
Tel: 847-272-8800
Web: www.ul.com

DHI Installation Guide
Publication Number: ANSI/DHI A115-IG

Available From: Door and Hardware Institute
14150 Newbrook Drive, Chantilly, VA 20151
Tel: 703-222-2010
Web: www.dhi.org

Fire Tests of Door Assemblies
Publication Number: ICBO UBC 7-2 (1997)

Fire Tests of Window Assemblies
Publication Number: ICBO UBC 7-4 (1997)

Available From: International Code Council
5380 Workman Mill Road, Whittier, CA 90601
Tel: 562-692-4226
Web: www.icbo.org
THE STEEL IS ONLY HALF THE STORY

When we say our products are designed to withstand some of the world's most demanding environments, we realize that, on occasion, your workplace can be one of them. Whether it's our second-to-none sales and post sales support, on-line technical services to assist, advise and consult, comprehensive product line, unbeatable shipping lead times or our zero back order policy, you'll see how every aspect of a Fleming Steel Door has been designed to perform beyond your expectations.

Fleming's reputation as one of the fastest growing steel door and frame manufacturers is due to a commitment to quality, service, product innovation and the use of state-of-the-art manufacturing technologies. Fleming's depth of product offering and compliance capabilities combine to make Fleming one of the world's most comprehensive product lines of steel doors and frames.

ON-LINE TECHNICAL SUPPORT
On-line technical services—ready to assist, advise or consult on technical issues, compliance and customized specifications. Plus our no charge specification writing service for the most accurate, appropriate, up to date specifications possible.

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Quote, order and track 24/7 with our exclusive e-business package.

99% ON TIME DELIVERY
Proven 99% on-time shipping. Fully integrated ordering package ensures order accuracy and onsite delivery schedules.

BEST LEAD TIMES
Real time state-of-the-art production and planning affords Fleming the best lead times with zero back order policy.

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