

# Door Thickness

- Typical door thickness is \_\_\_\_\_
- Many moons ago, the standard door thickness was \_\_\_\_\_
- Custom thickness doors are available from your friends at HMF Express

# Door Materials & Gauges

## Materials

- Cold rolled steel (\_\_\_\_)- most common
- Galvanneal (\_\_\_\_)
- Galvanized (\_\_\_\_)
- Stainless steel (\_\_\_\_)

## Gauges

- \_\_\_\_ (most common)
- \_\_\_\_
- \_\_\_\_
- \_\_\_\_

# Door Cores

- The core of a door is the material in between the door skins
- The three types that are available from HMF Express are:

1) \_\_\_\_\_

2) \_\_\_\_\_

3) \_\_\_\_\_

# Door Cores

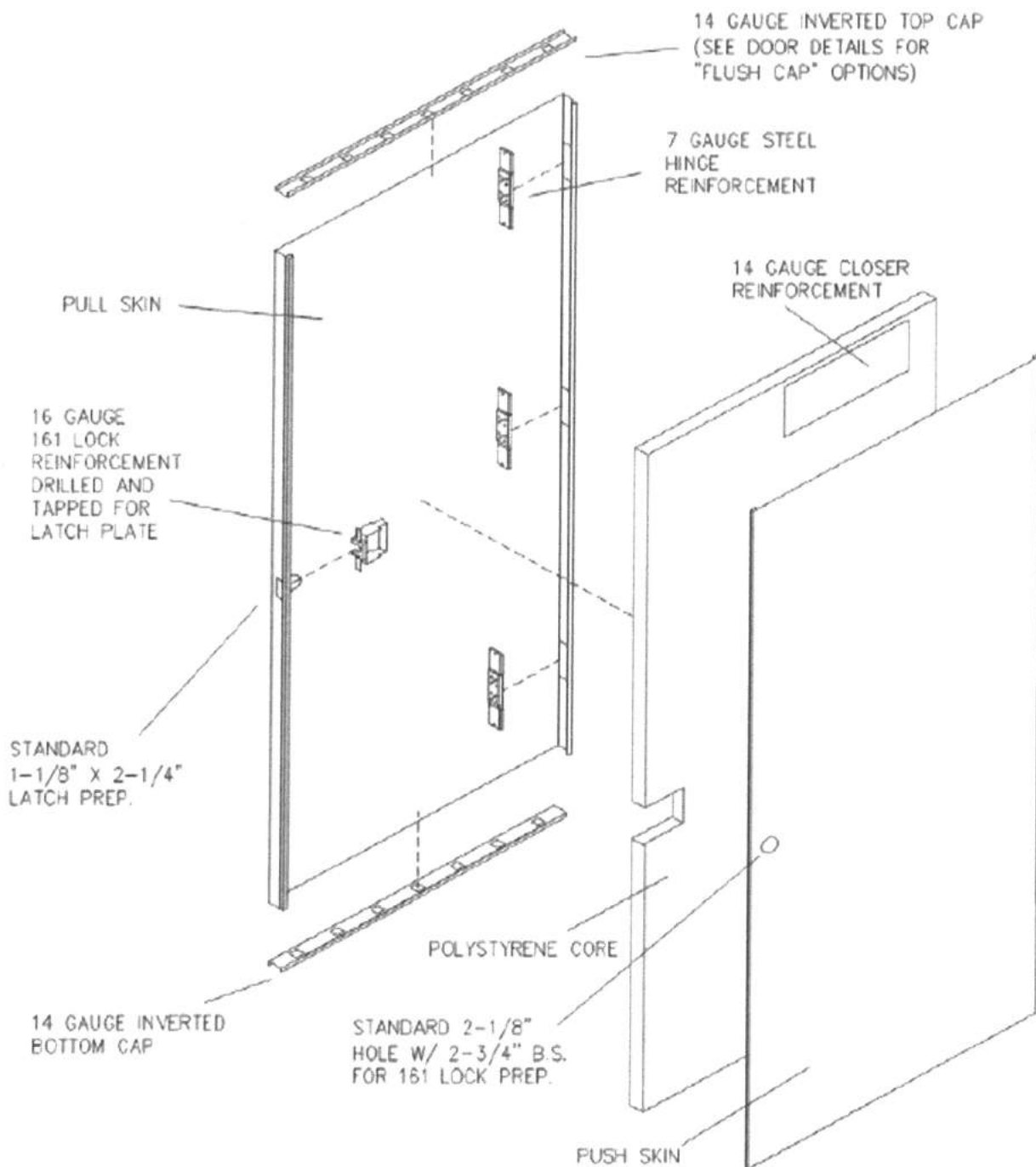
## Polystyrene

- Most \_\_\_\_\_ door core
- Drop in slab construction
- \_\_\_\_\_ approximate insulating value
- Works with hemmed or butted edge type doors.
- Used with \_\_\_\_\_ or \_\_\_\_\_ thick door

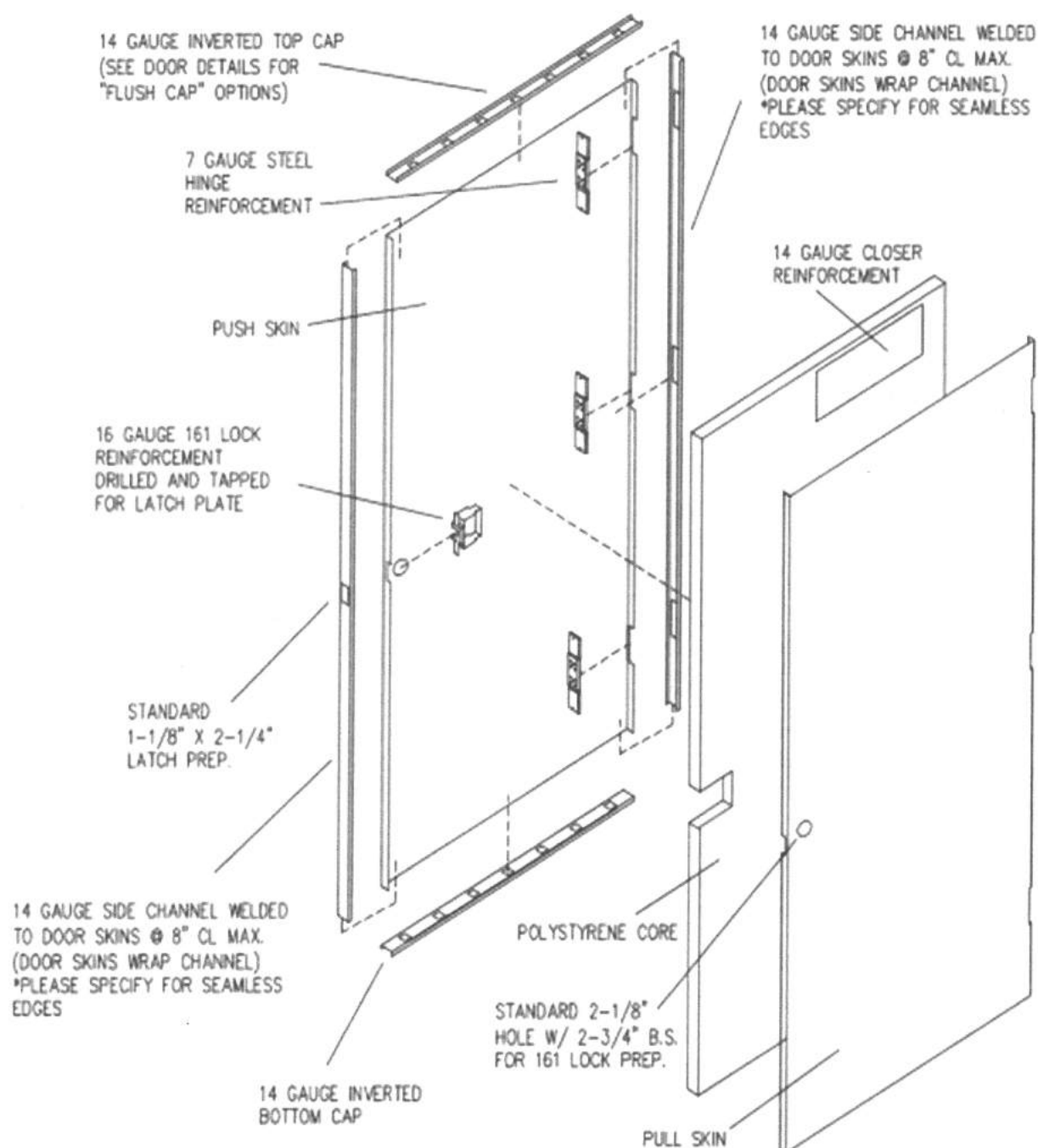


# Door Cores

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# Door Cores



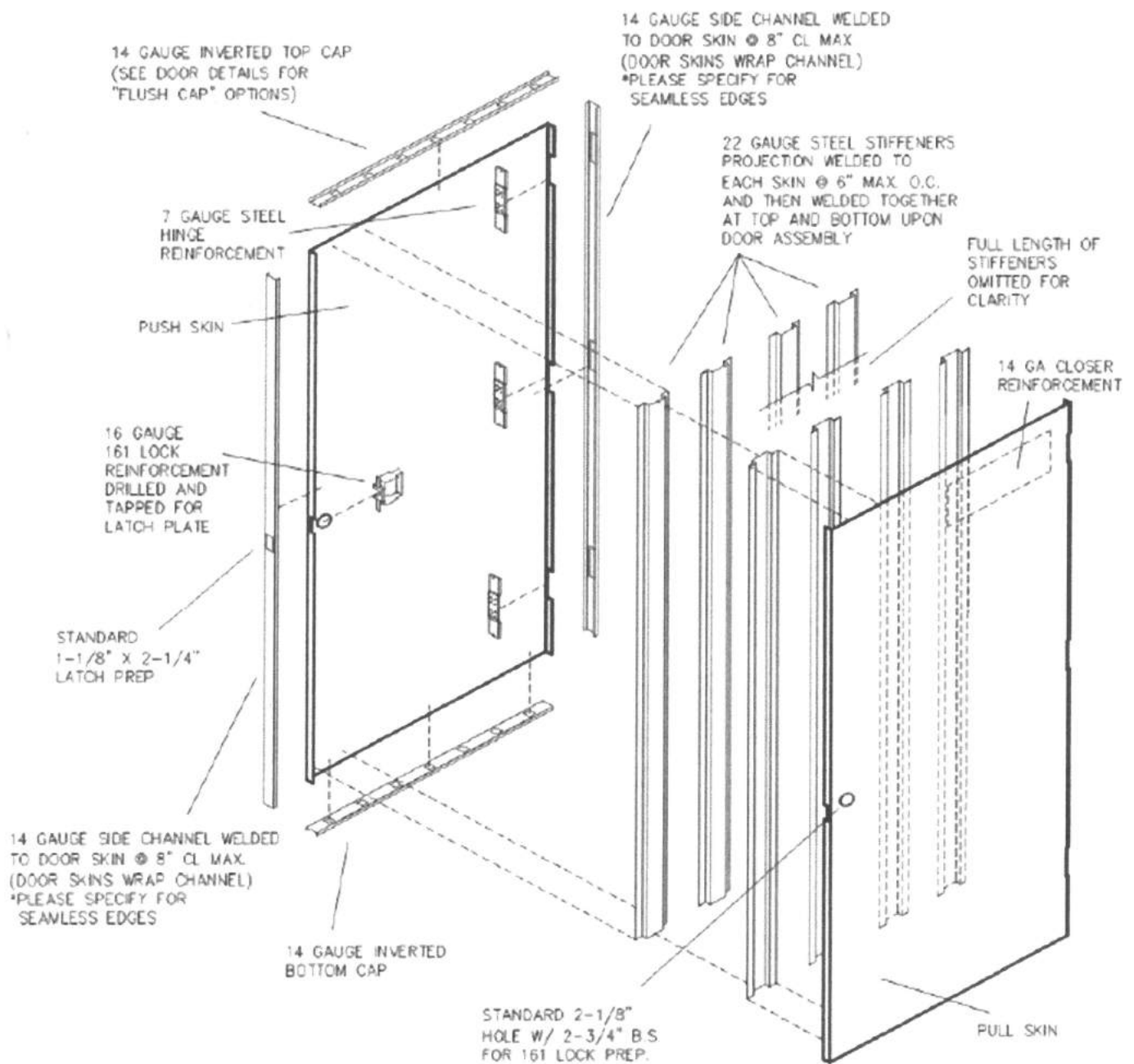
# Door Cores

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- “\_\_\_\_\_” stiffeners, made of 22 gauge steel, span the entire \_\_\_\_\_ of the door.
- Used in custom, heavy traffic, or \_\_\_\_\_ applications
- Butted edge construction.

**\*To ensure quality and structural integrity, all doors manufactured by HMF Express greater than 48” wide or 96” tall will be steel stiffened\***

# Door Cores



# Door Cores

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- Limits the transmission of \_\_\_\_\_ from \_\_\_\_\_ side of the door to the \_\_\_\_\_ side
- Rated by the temperature \_\_\_\_\_ over 30 and 60 minutes (250/30 is the best)
- Most common in \_\_\_\_\_ applications
- Fire rated mineral slab core up to \_\_\_\_ hours
- For \_\_\_\_\_ thick hemmed edged doors only.

## **\*Hemmed Edge Construction\***

| Temp Rise | Minutes |
|-----------|---------|
| 450       | 60      |
| 250       | 30      |

# Door Cores

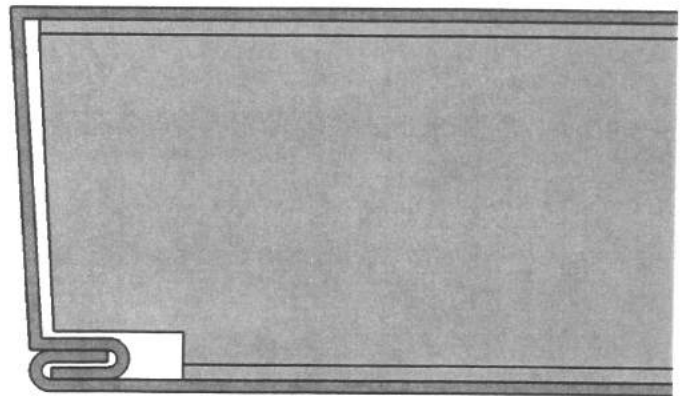
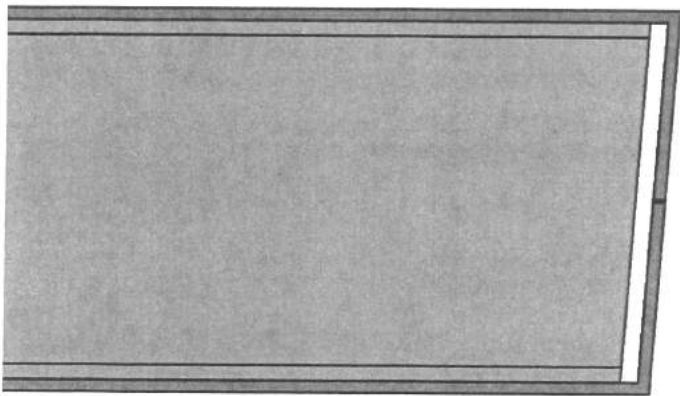
## **Alternative Cores by other Manufacturers**

- \_\_\_\_\_ cores (the other economy core)
- \_\_\_\_\_ (great insulator, but very hazardous to people and the environment)  
Banned by the IBC for buildings over 3 stories
- \_\_\_\_\_ (high insulating value) alternative to Polyurethane

# Door Edges

## Beveled Edges

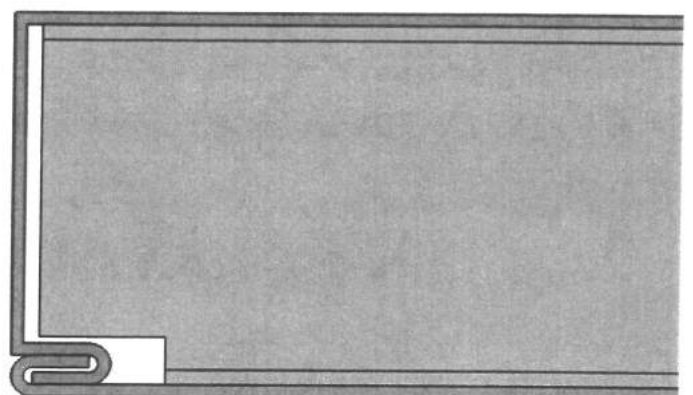
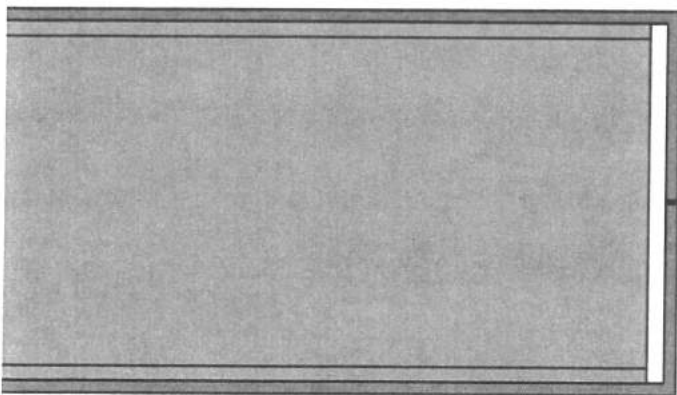
- Beveled \_\_\_\_\_ over \_\_\_\_\_ (\_\_\_\_° angle)
- Available hemmed or butted edge
- Allows the corner of the \_\_\_\_\_ to pass the \_\_\_\_\_ without \_\_\_\_\_ as the door is opened or closed
- Less “\_\_\_\_\_” issues
- Can be beveled at \_\_\_\_\_ edge, \_\_\_\_\_ edge, or both edges



# Door Edges

## Square Edges

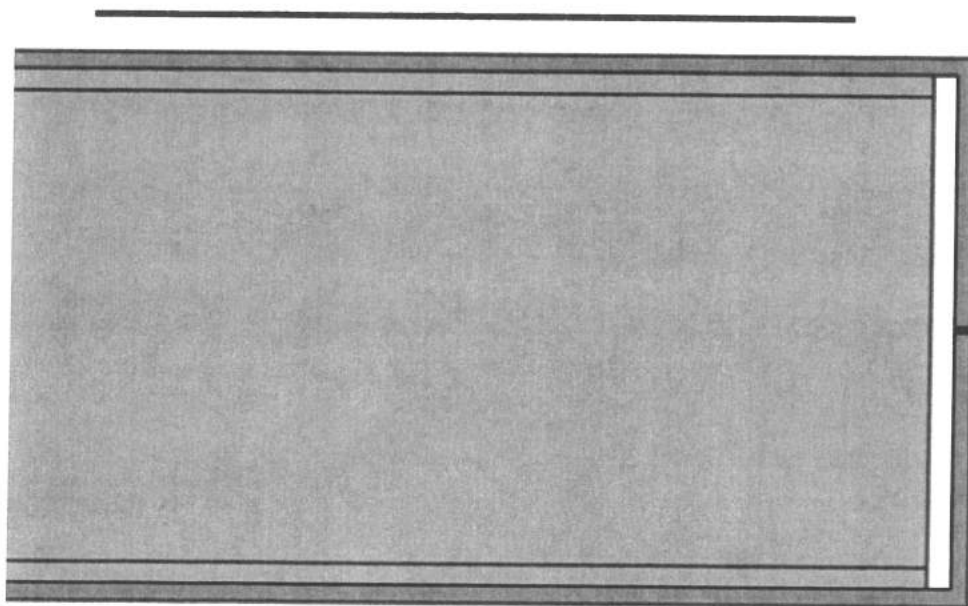
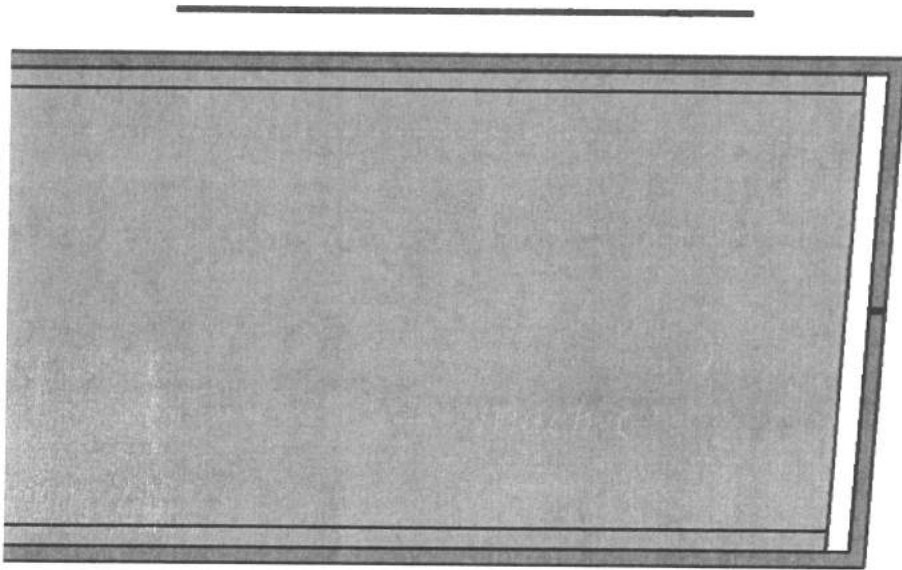
- All edges \_\_\_\_\_ degrees
- Available hemmed or butted edge
- Allows for making non-handed doors
- Better for use on \_\_\_\_\_ leaf of pair (better connection with latch bolt)





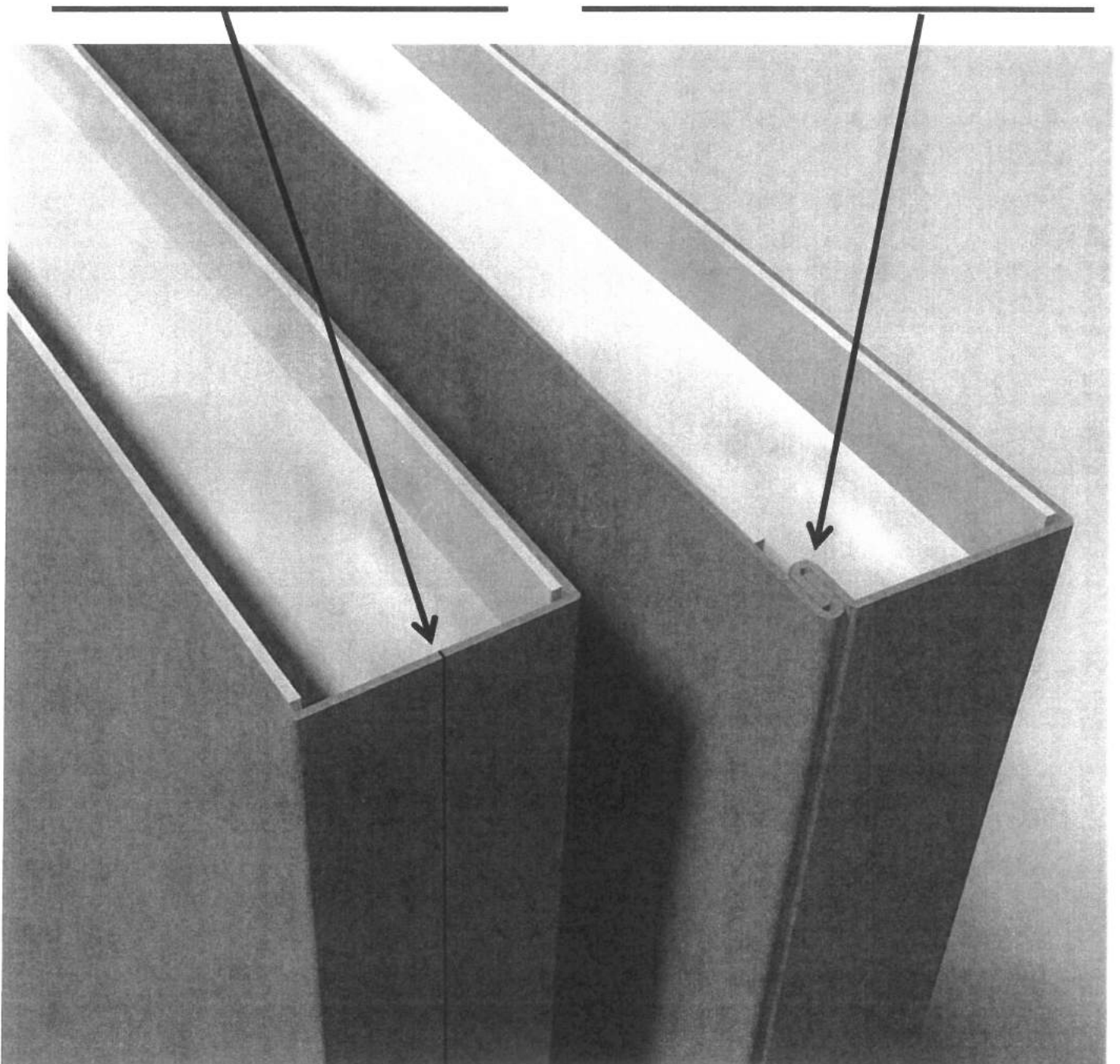
# Door Edges

## Comparison View



# Door Edges

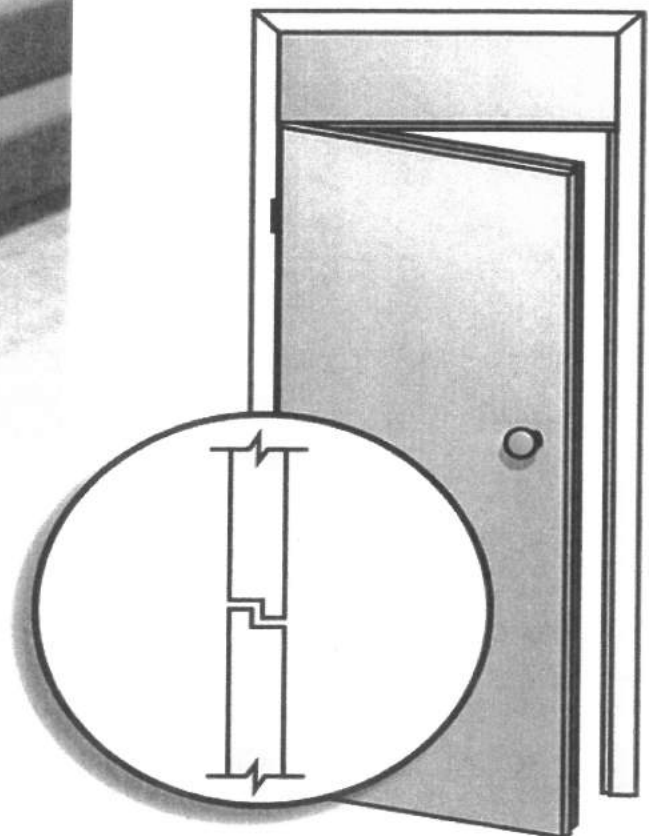
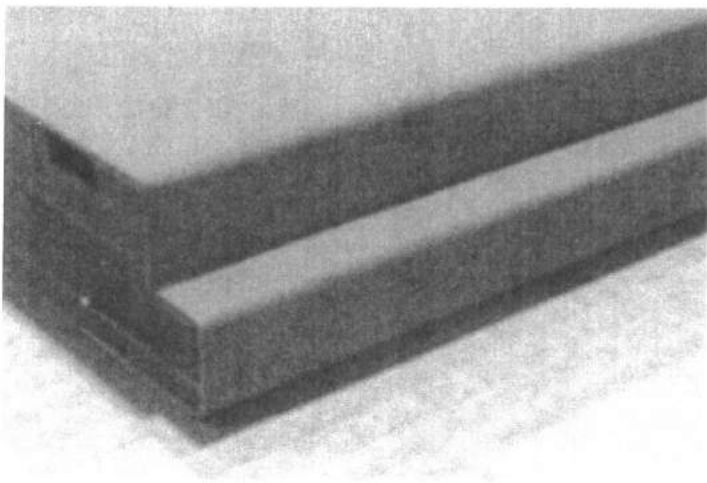
## Comparison View



# Door Edges

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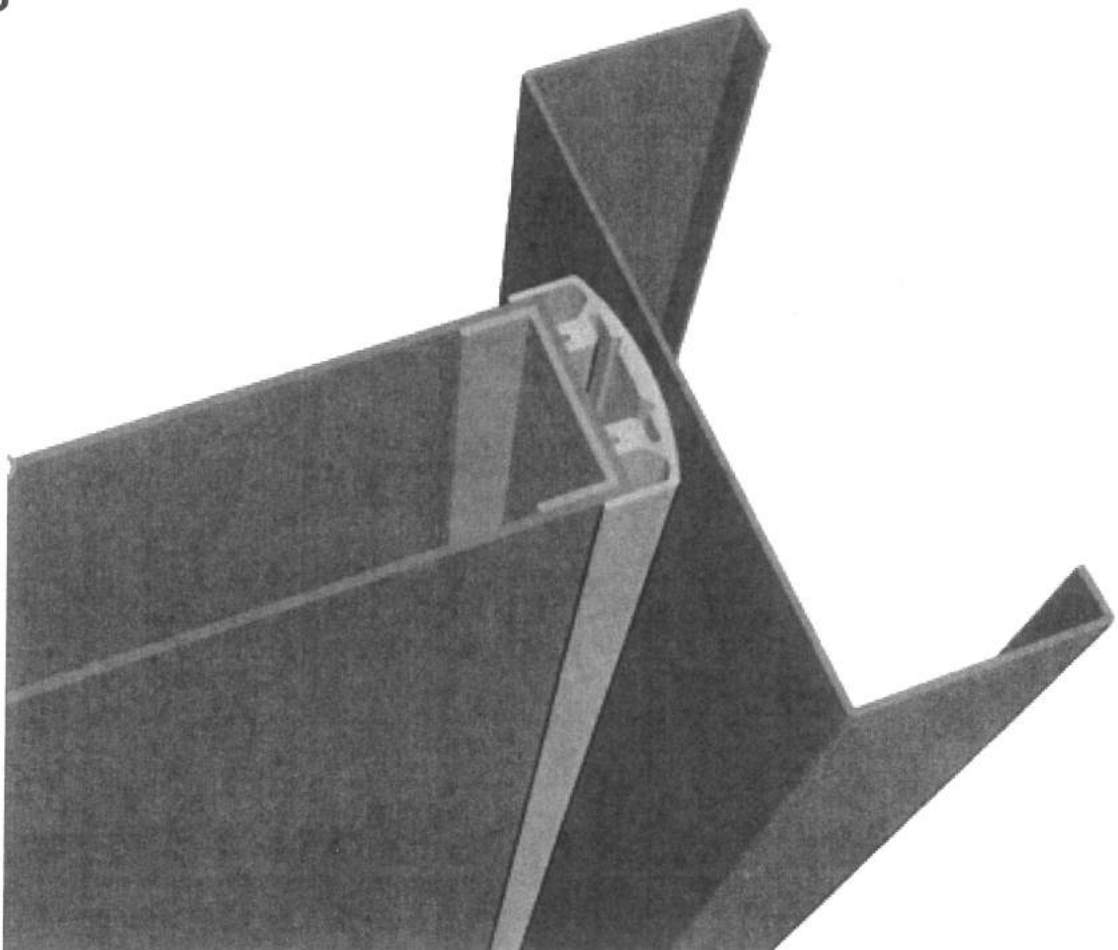
- Notch in \_\_\_\_\_ or \_\_\_\_\_ of door/panel
- Most commonly seen on \_\_\_\_\_ panels meeting the top of doors
- Fairly \_\_\_\_\_ option



# Door Edges

\_\_\_\_\_

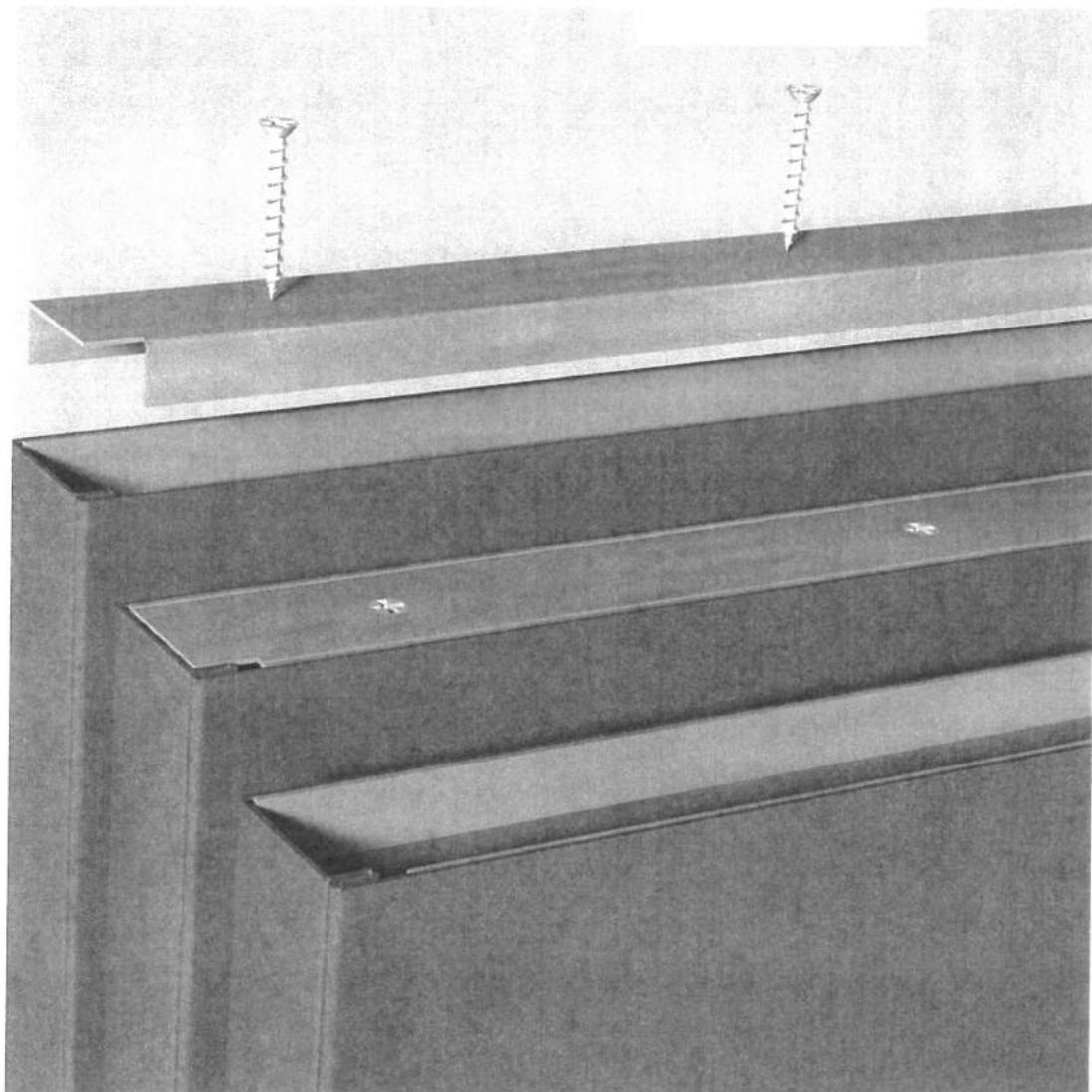
- Curved trim added to \_\_\_\_\_ of door
- Reduces the \_\_\_\_\_ between the frame and the door
- Most commonly used on \_\_\_\_\_ doors



# Door Edges

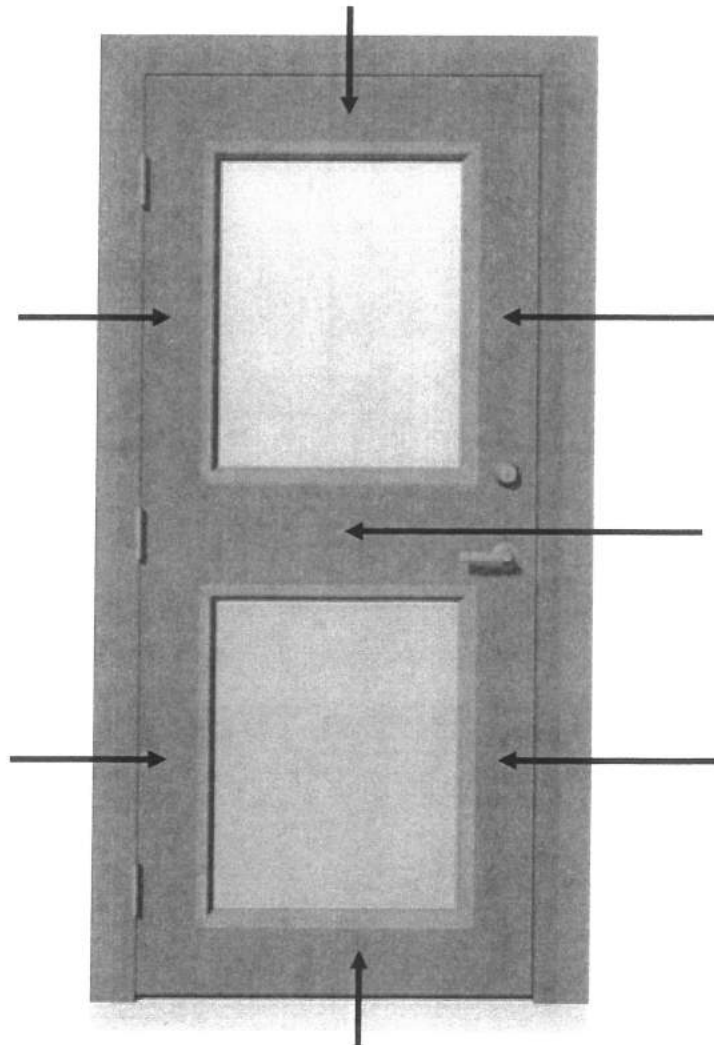
## \_\_\_\_\_ & \_\_\_\_\_ Channels

- Standard is \_\_\_\_\_ at top and bottom
- \_\_\_\_\_ in top and bottom caps available
- Welded in flush caps \_\_\_\_\_



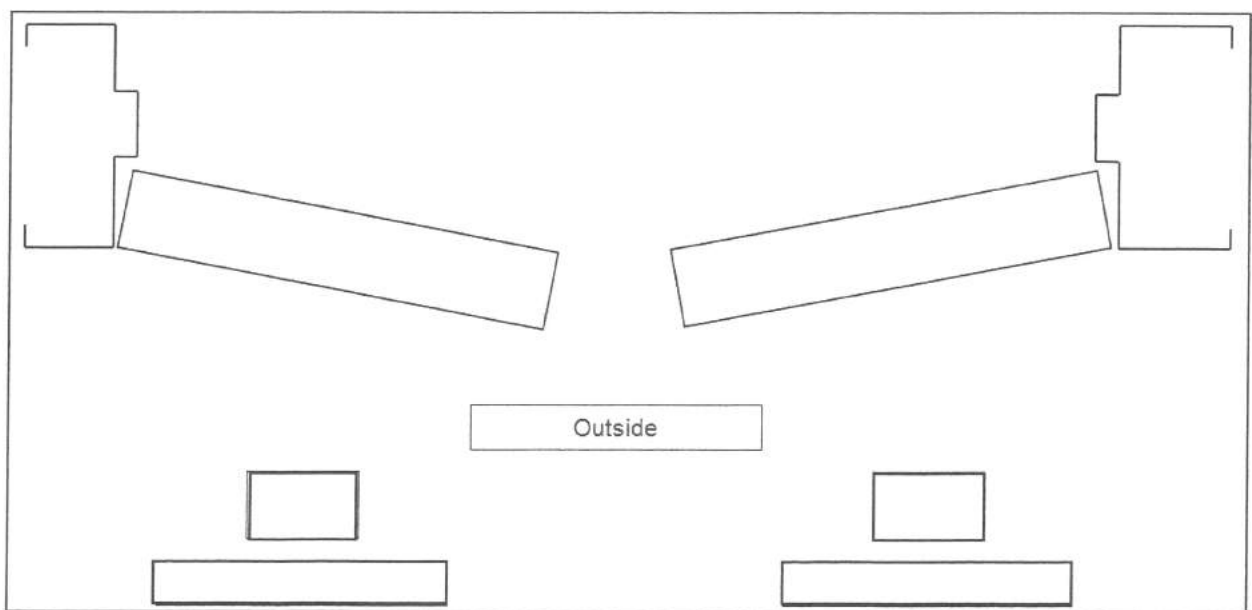
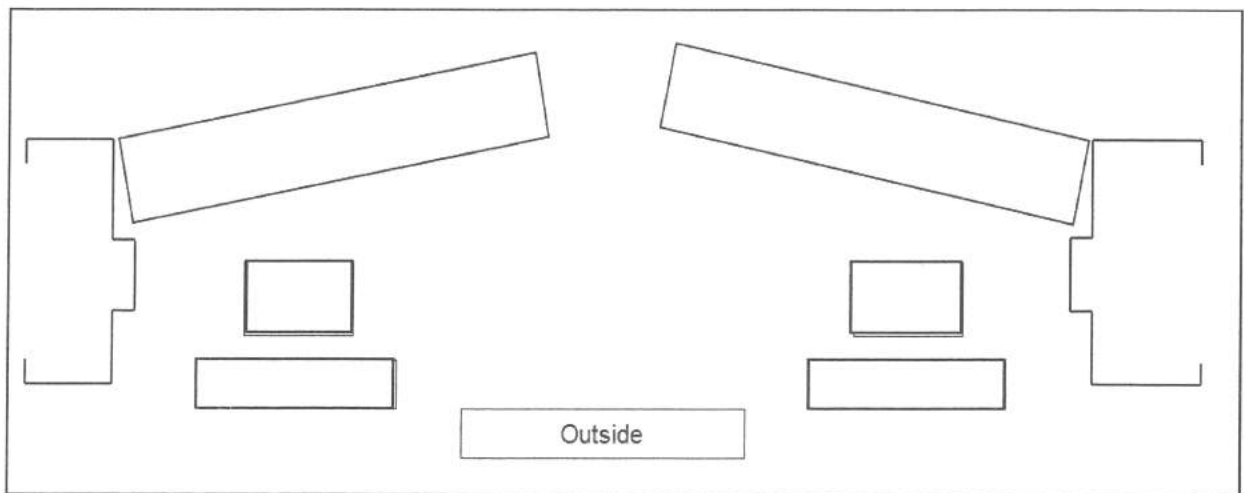
# Door Components

- A \_\_\_\_\_ is the horizontal area of a non-flush door.
- A \_\_\_\_\_ is the vertical area of a non-flush door.



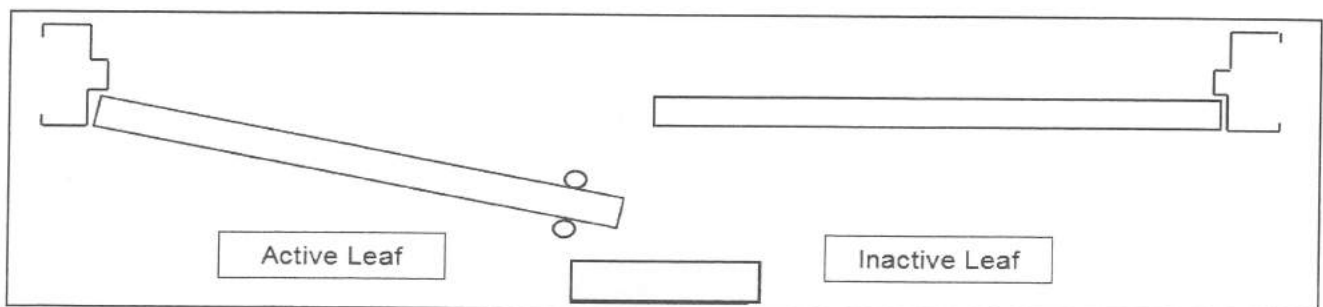
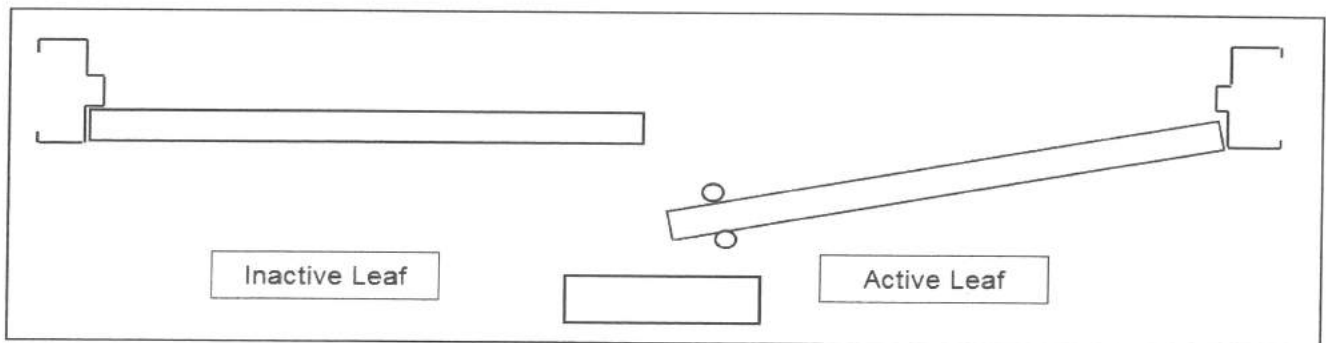
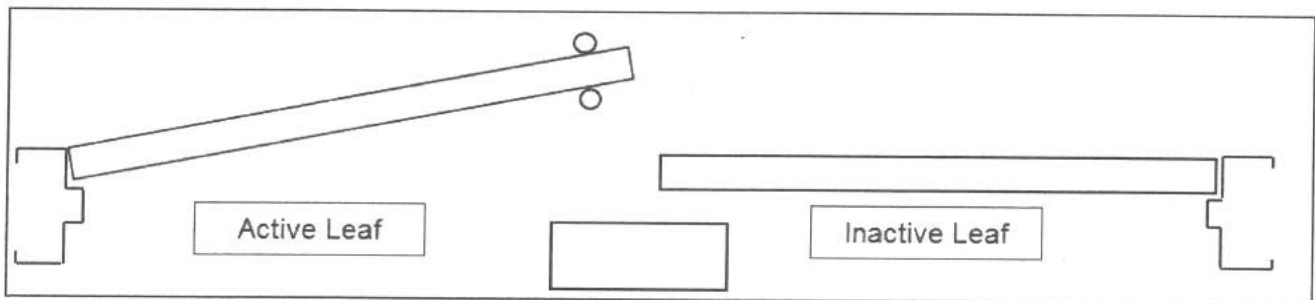
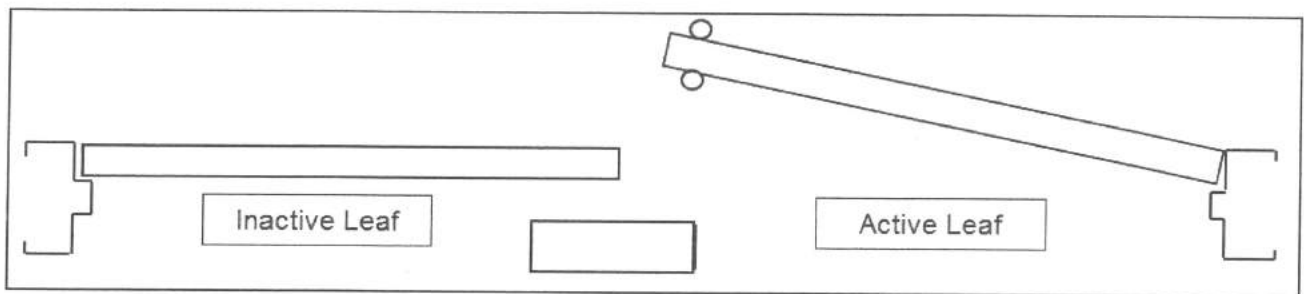
# Handing

## Single Openings



# Handing

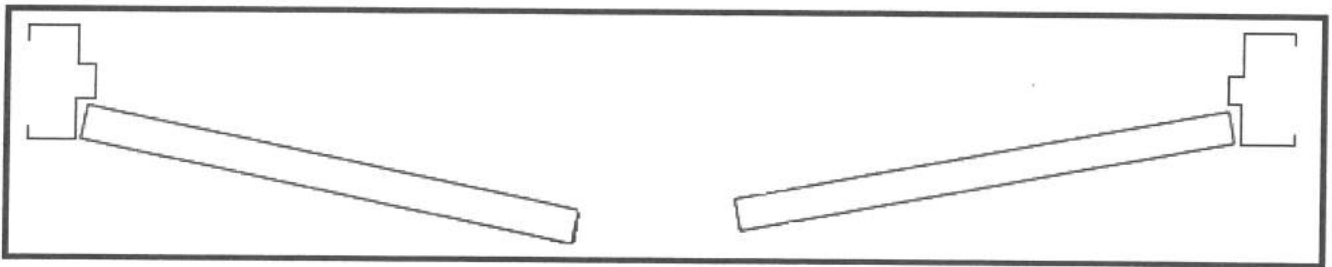
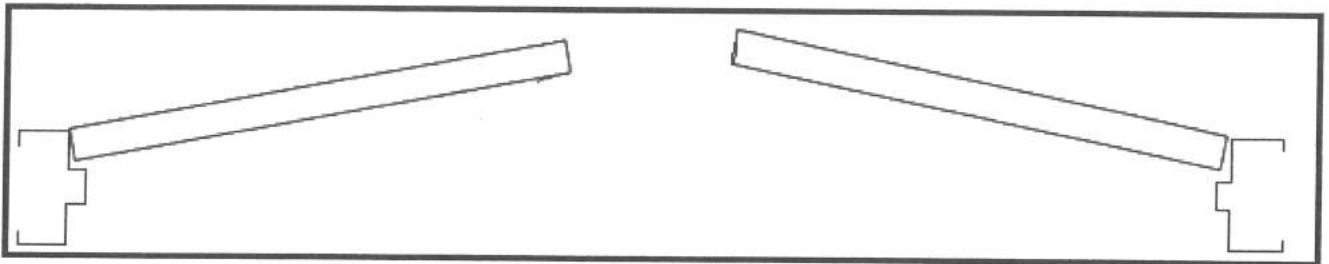
## Paired Openings



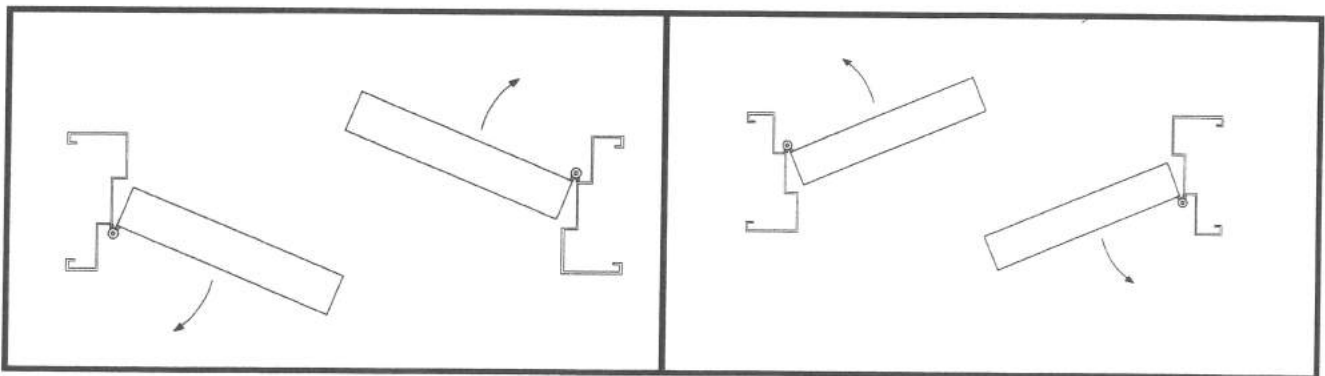


# Handing

## Paired Openings

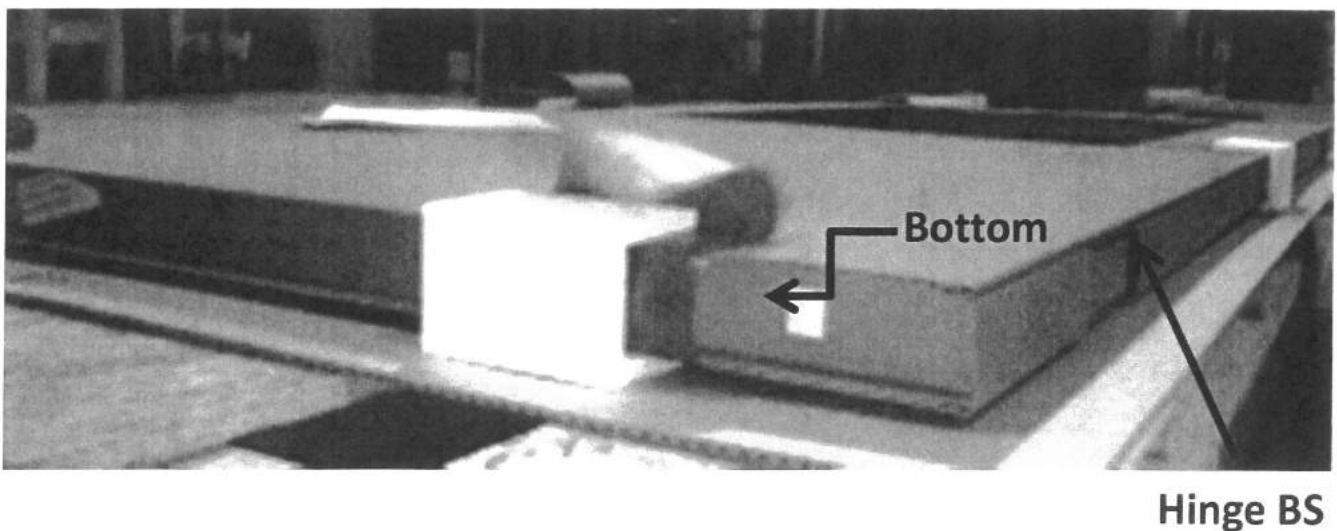
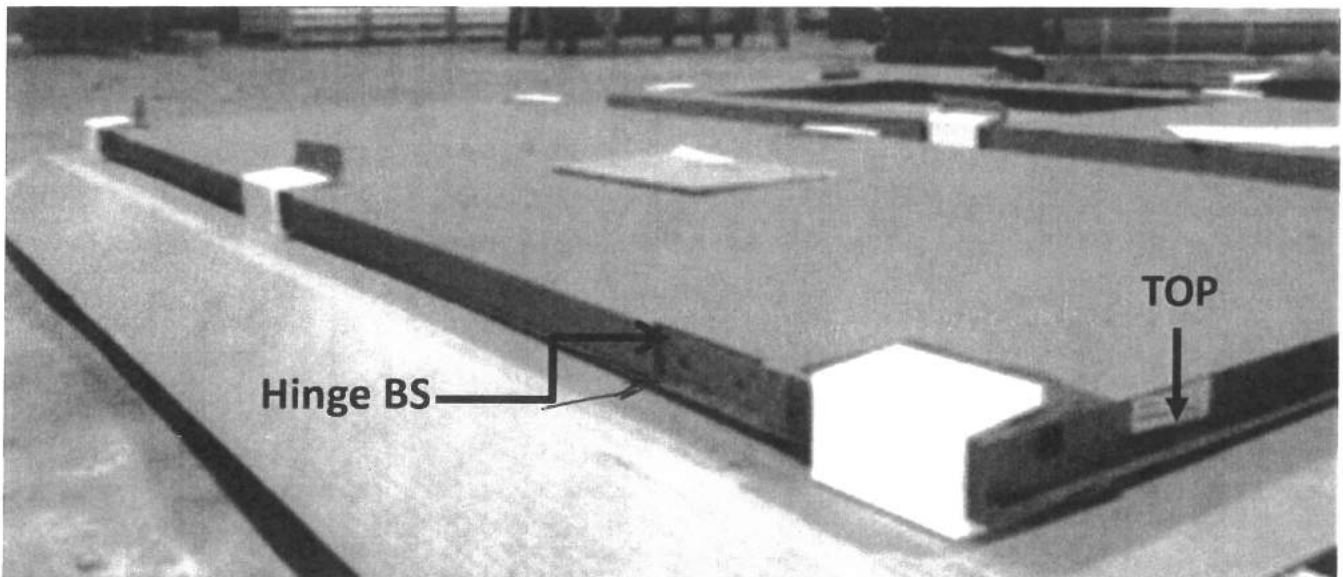


## Double Egress



# Handing

- Identify top and bottom of door



# Locations

## Door \_\_\_\_\_ Locations

- Hinge locations are measured  
“\_\_\_\_\_ to \_\_\_\_\_”
- (Some are given top to \_\_\_\_\_)
- \_\_\_\_\_ standard clearance between  
top of frame and top of door.

Ex. Frame:      5”      37 1/4”      69 1/2”

Door:      4 7/8”      37 1/8”      69 3/8”

# Locations

## Door \_\_\_\_\_ Locations

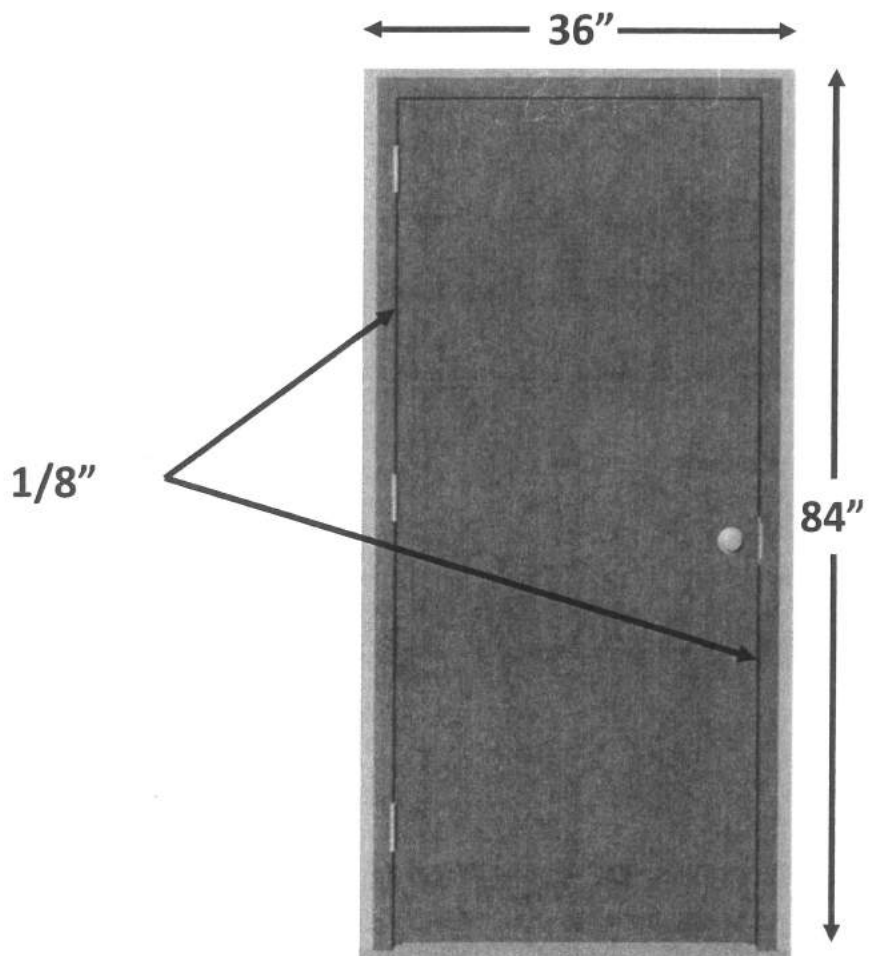
- Locations can be measured from \_\_\_\_\_ or \_\_\_\_\_ to centerline of lock
- Calculate \_\_\_\_\_ when prepping doors based on frame strike locations
- Red Flag: \_\_\_\_\_ CL (Centerline) are located 3/8" \_\_\_\_\_ ASA strike
- \_\_\_\_\_ CL are often located at \_\_\_\_\_ manufacturers suggested location versus hollow metal location

# Door Downsizing/Pre-fit

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- Net door width is \_\_\_\_\_ than nominal frame opening
- Net door width equals the frame opening width less \_\_\_\_\_ from both sides (unless hardware dictates otherwise).

On this example the width of the door would be  $35 \frac{3}{4}"$



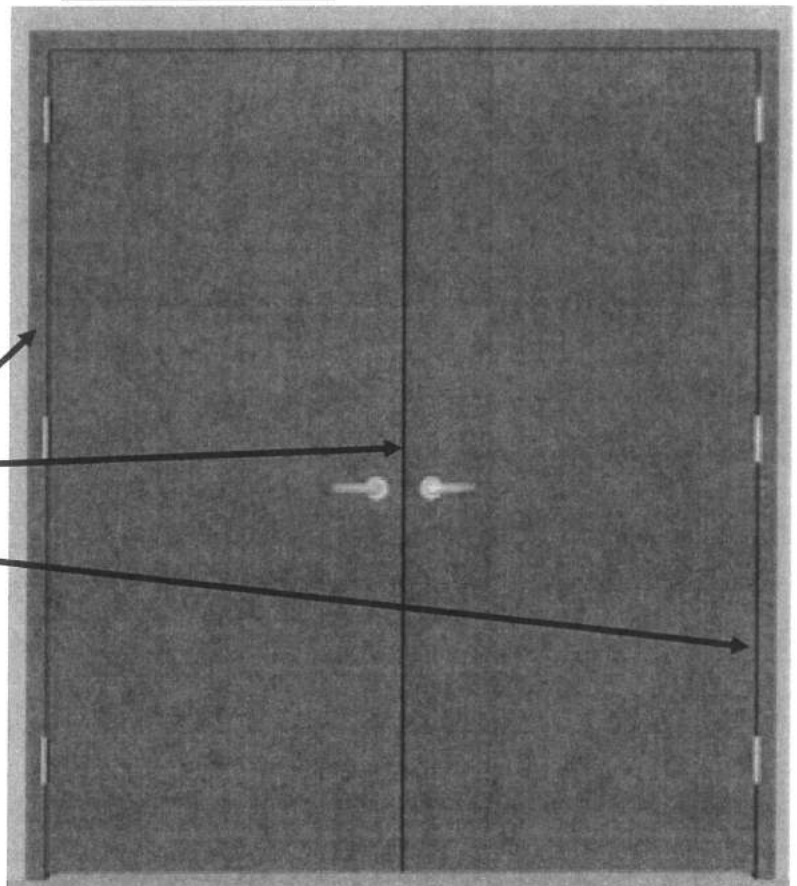
# Door Downsizing/Prefit

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- Net door width equals the nominal door width less \_\_\_\_\_ from \_\_\_\_\_ side and \_\_\_\_\_ from \_\_\_\_\_ side (unless hardware dictates otherwise)

\*Astragal: when mounted between the doors subtract the astragal thickness from the net door width

Typical edge clearance is 1/8" on the hinge side and an 1/8" total between the two doors

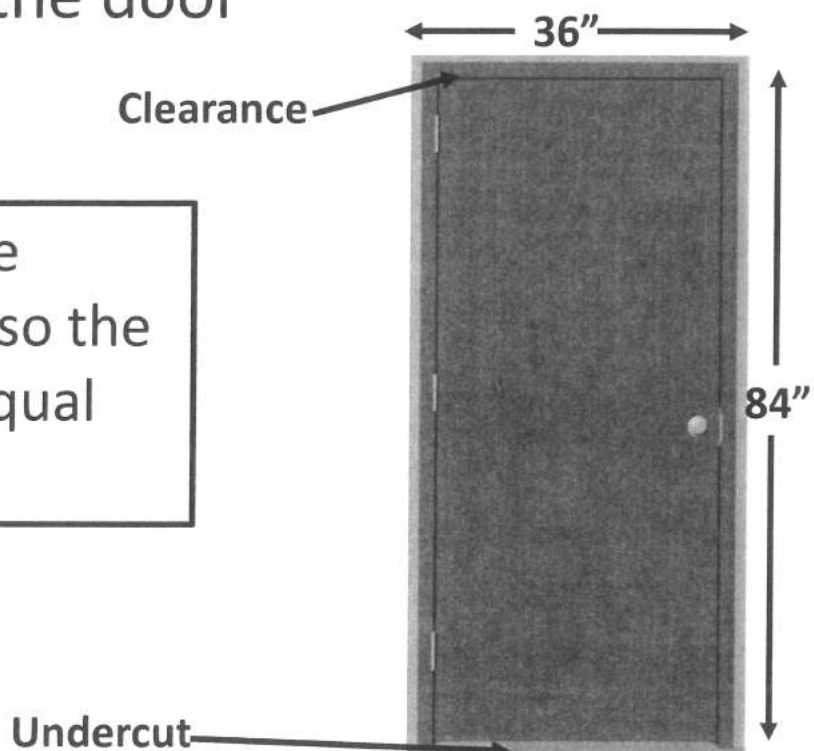


# Door Downsizing/Pre-fit

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- Net door height is \_\_\_\_\_ than nominal frame opening
- Net door height equals the frame opening minus \_\_\_\_\_ (unless hardware dictates otherwise) from the \_\_\_\_\_ of the opening and less the \_\_\_\_\_ size (per manufacturer specs, hardware, or floor conditions) from the \_\_\_\_\_ of the door

On this example the undercut was  $\frac{3}{4}$ " so the net height would equal  $83 \frac{1}{8}$ "

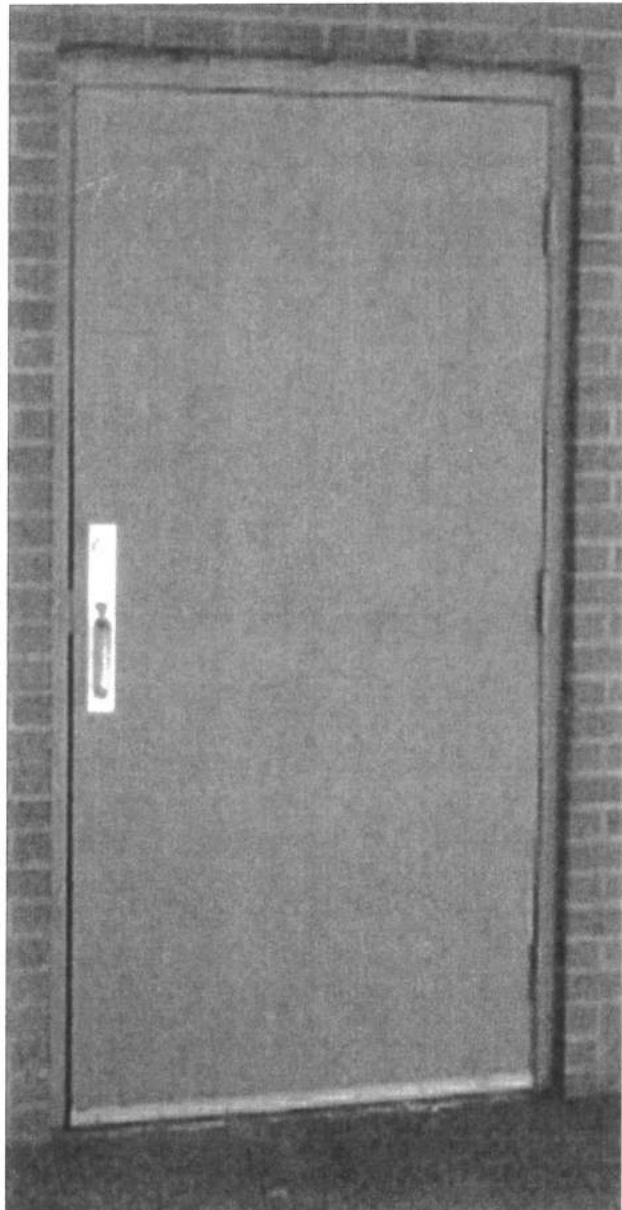


# Door Styles

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- Has no \_\_\_\_\_ cutouts
- Standard door profile – U.N.O.

U.N.O. = Unless  
Noted Otherwise

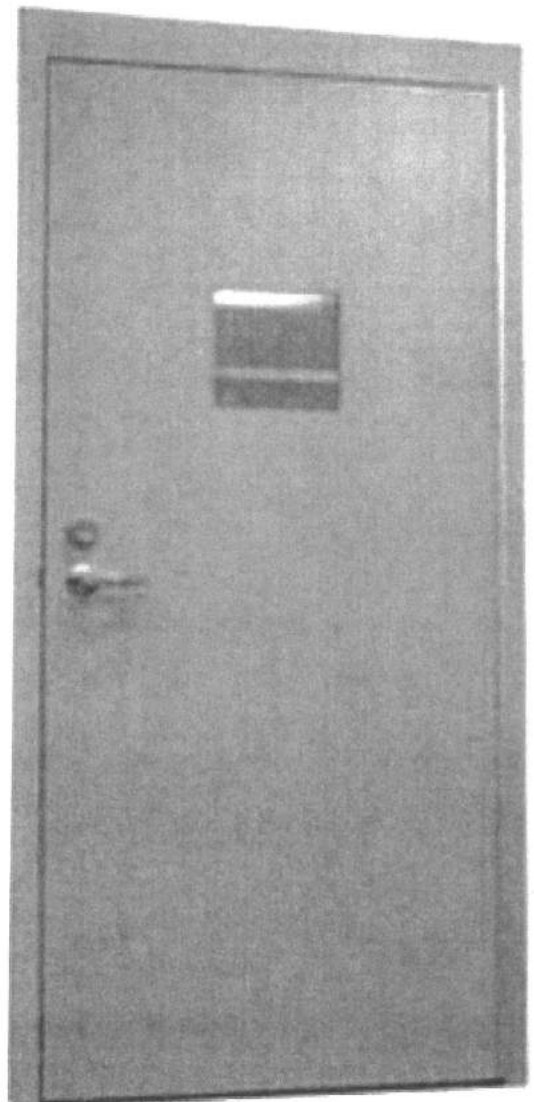




# Door Styles

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- Small light (window) at \_\_\_\_\_ level; normally centered in width of door
- Center line is usually \_\_\_\_\_ above finished floor
- Normally \_\_\_\_\_ visible light



# Door Styles

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- Light normally \_\_\_\_\_ wide and \_\_\_\_\_ inches tall.
- Generally about \_\_\_\_\_ sq inches of exposed glass.
- Size and location varies based on preference, fire ratings, or \_\_\_\_\_ requirements



# Door Styles

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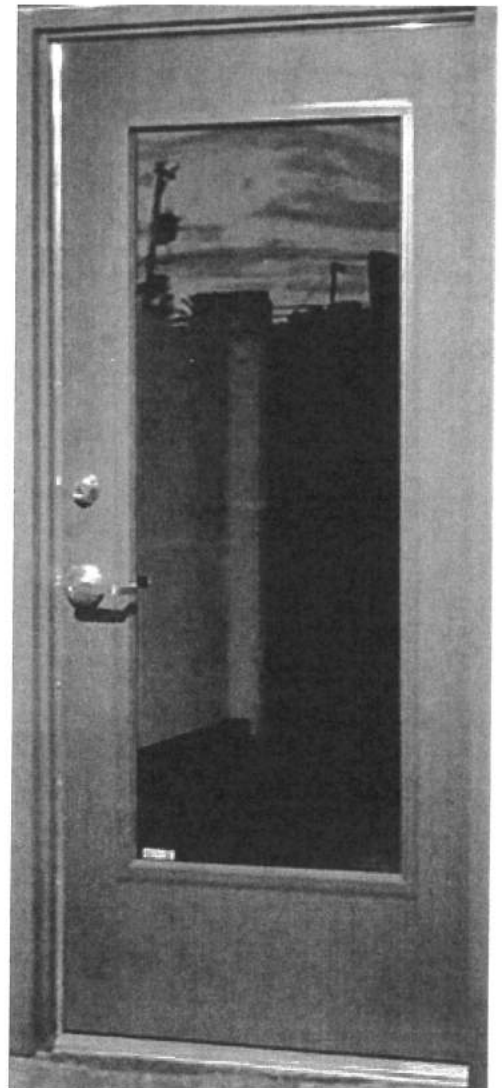
- Light generally is in \_\_\_\_\_ half of door
- Location may vary depending on ADA and other requirements.



# Door Styles

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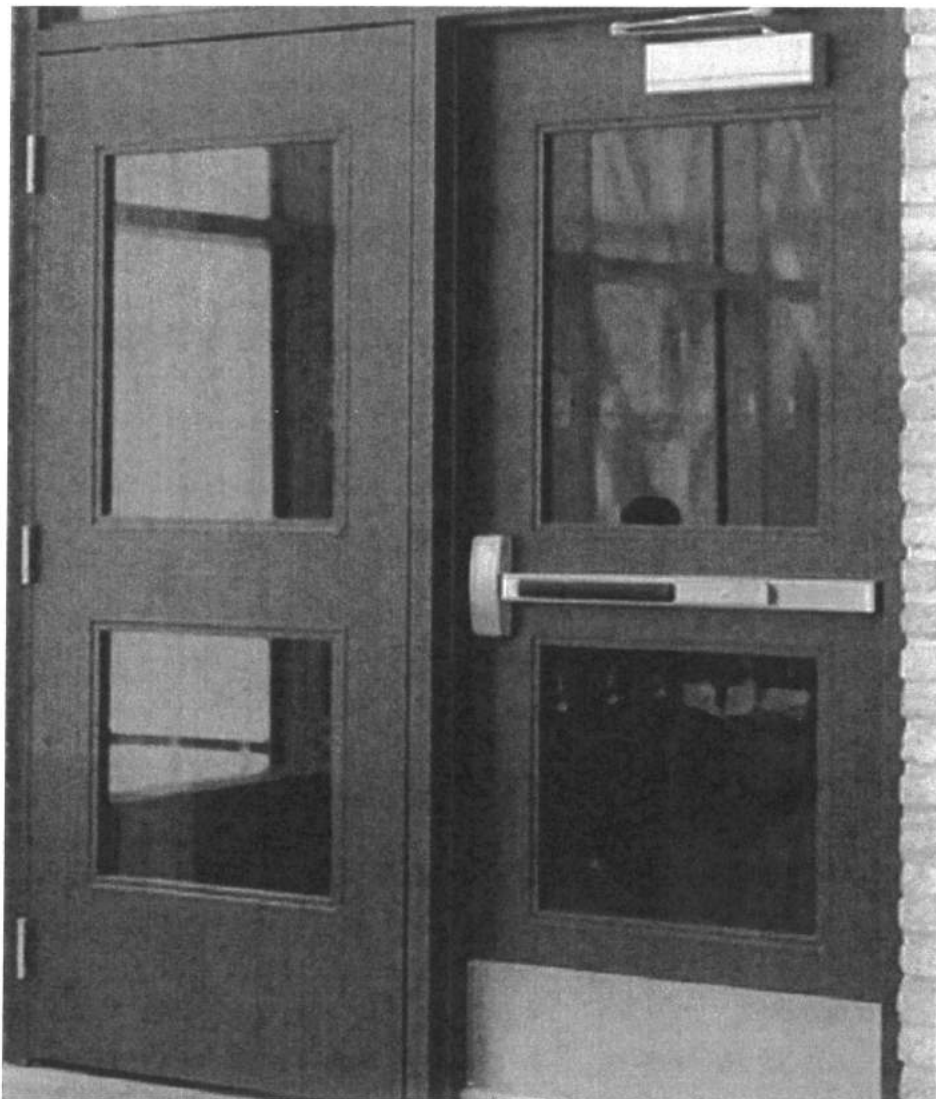
- Glass typically takes up \_\_\_\_\_ of the door area
- Minimum of \_\_\_\_\_ of bottom rail to meet ADA requirements
- \_\_\_\_\_ can vary based on hardware used



# Door Styles

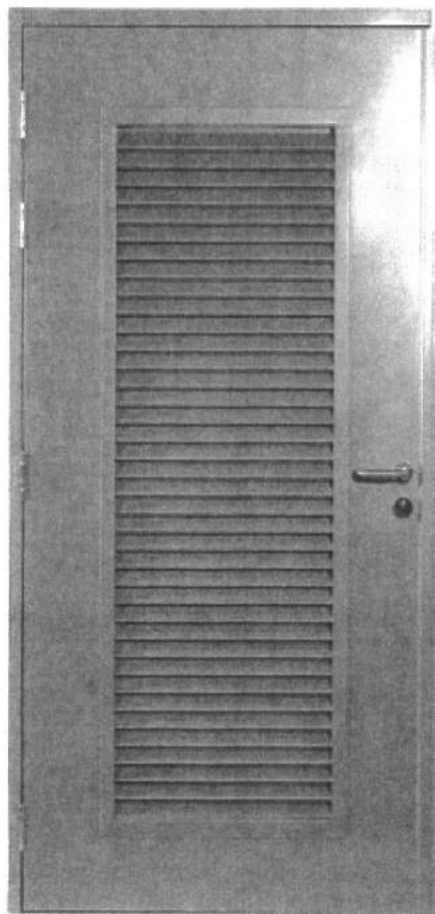
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- Used primarily when extra \_\_\_\_\_ is needed (versus full-light construction) or when \_\_\_\_\_ requires a mid-rail



# Door Styles

- Provide \_\_\_\_\_ to utility rooms, rooms with machinery, wet rooms, and anywhere opening ventilation is essential.
- Custom sizes available

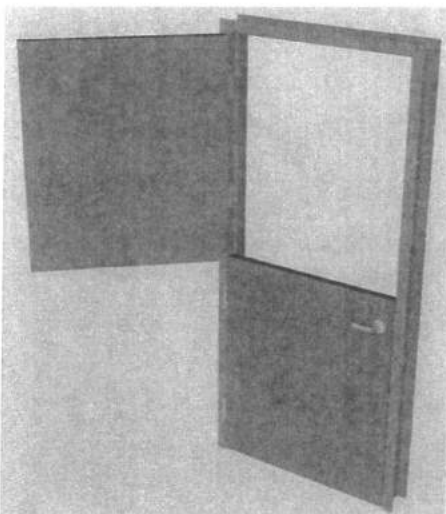


# Door Styles

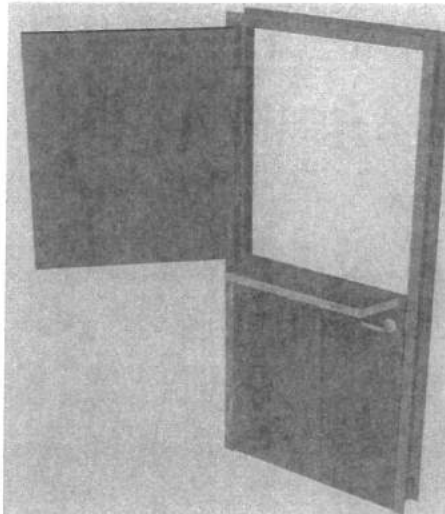
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- \_\_\_\_\_ and \_\_\_\_\_ leaves can be operated independently or together
- At least \_\_\_\_\_ hinges per door or continuous hinge
- Can be manufactured with or without a (half or full) \_\_\_\_\_

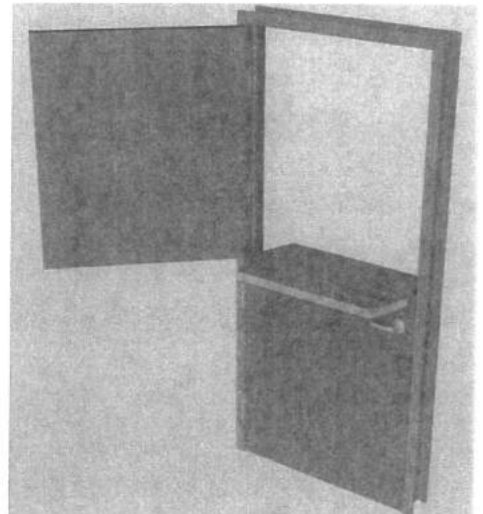
**No shelf**



**Half Shelf**



**Full Shelf**

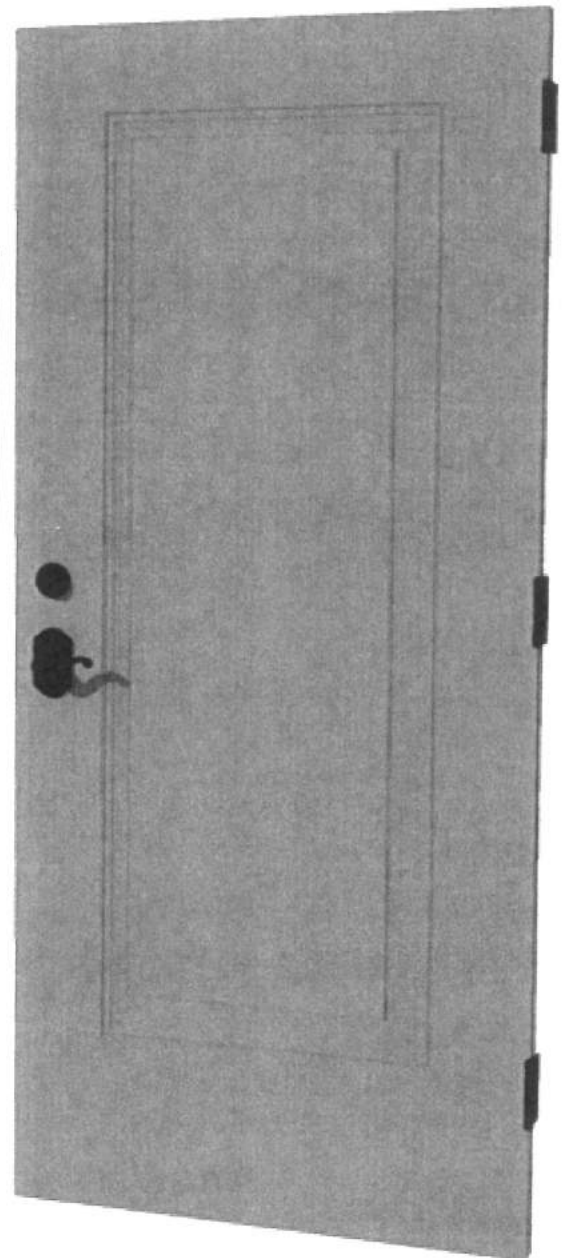


# Door Styles

## Embossed Doors

\_\_\_\_\_ (18 gauge)

- Minimum 31 1/2" wide with 4 1/4" stiles
- Maximum 40 7/16" wide butted edge
- Maximum 37 1/2" wide hemmed edge
- Available 6'8" and 7'0" high



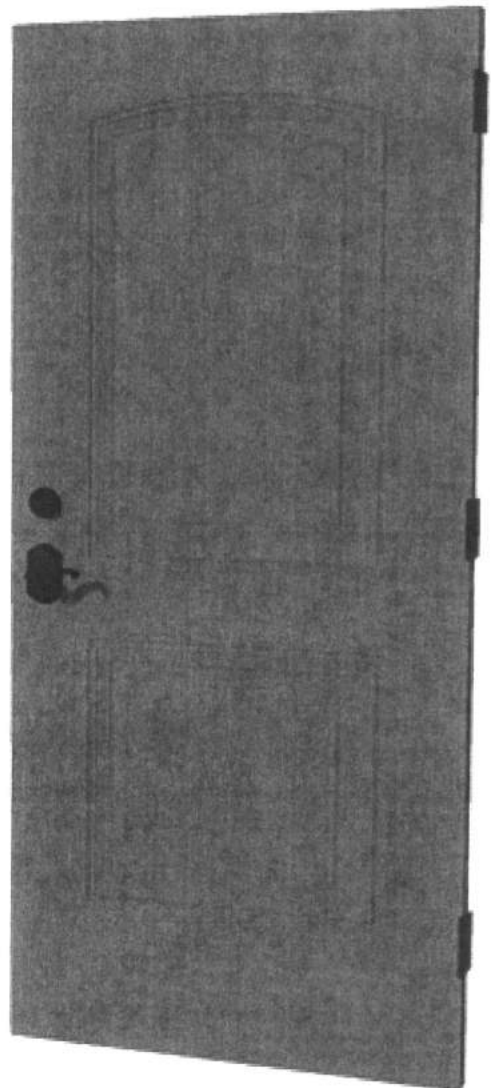


# Door Style

## Embossed Doors

\_\_\_\_\_ (18 gauge)

- Minimum 31 1/2" wide with 4 1/4" stiles
- Maximum 43 15/16" wide butted edge
- Maximum 41" wide hemmed edge
- Available in 6'8" and 7'0" high



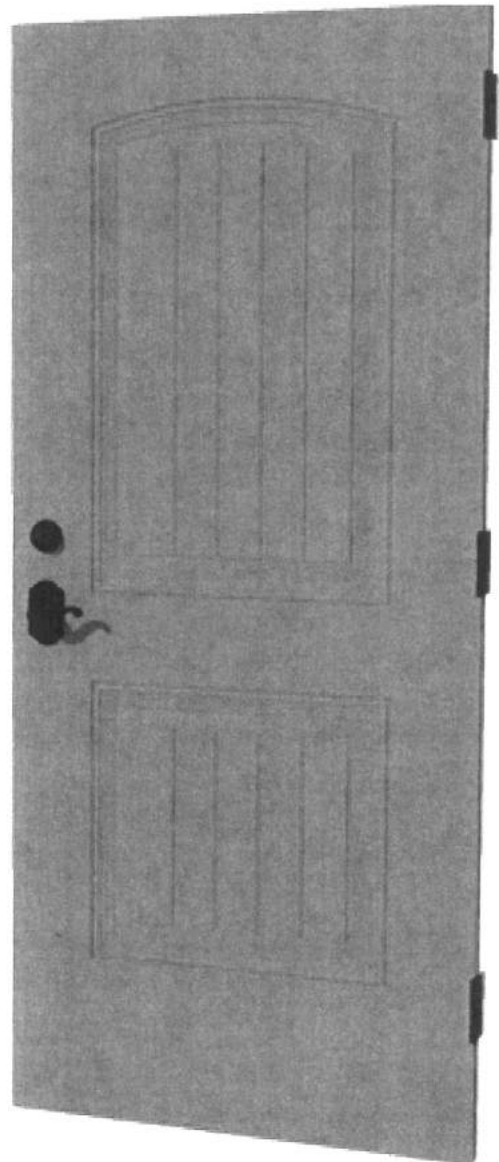
# Door Style

## Embossed Doors

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(18 gauge)

- Minimum 31 1/4" wide with 4 1/4" stiles
- Maximum 39 1/8" wide butted edge
- Maximum 36 1/4" wide hemmed edge
- Available 6'8" and 7'0" high

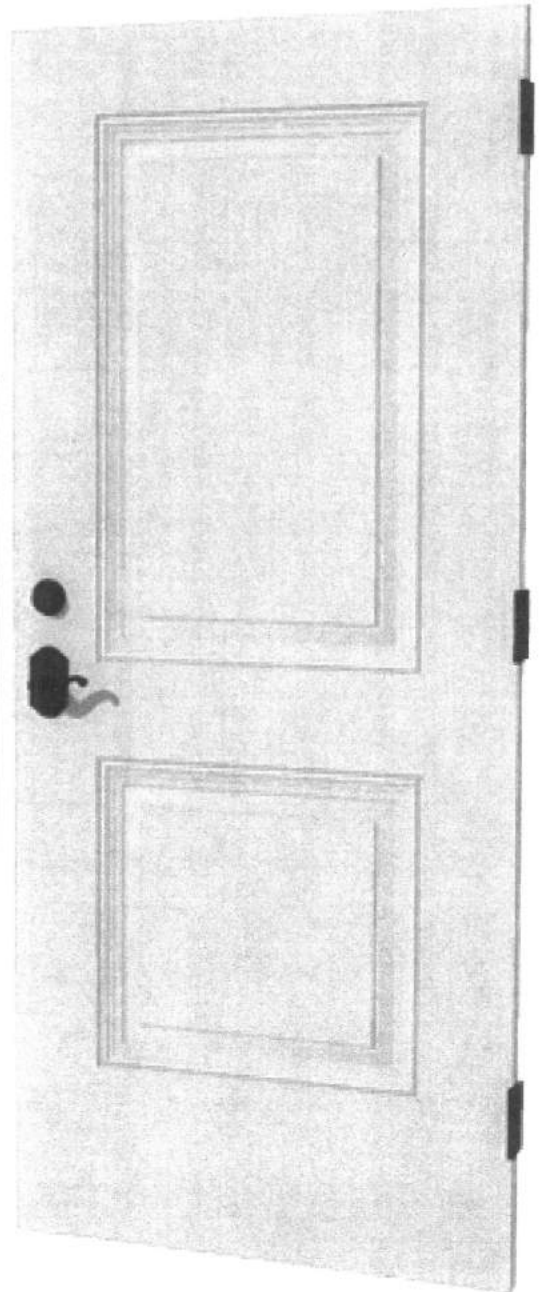


# Door Style

## Embossed Doors

\_\_\_\_\_ (18 gauge)

- Minimum 31 1/2" wide with 4 1/4" stiles
- Maximum 39 1/8" wide butted edge
- Maximum 36 1/4" wide hemmed edge
- Available 6'8" and 7'0" high

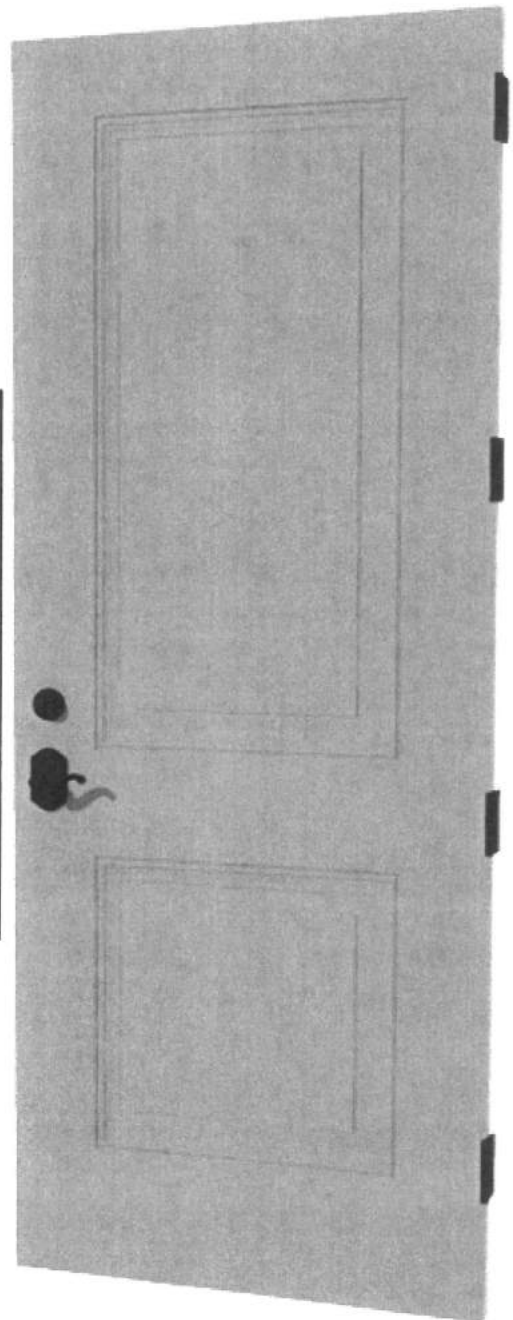


# Door Styles

## Embossed Doors

\_\_\_\_\_ (18 gauge)

- Minimum 31 1/2" wide with 4 1/4" stiles
- Maximum 46 7/16" wide butted edge
- Maximum 43 1/2" wide hemmed edge
- Available in 8'0 high



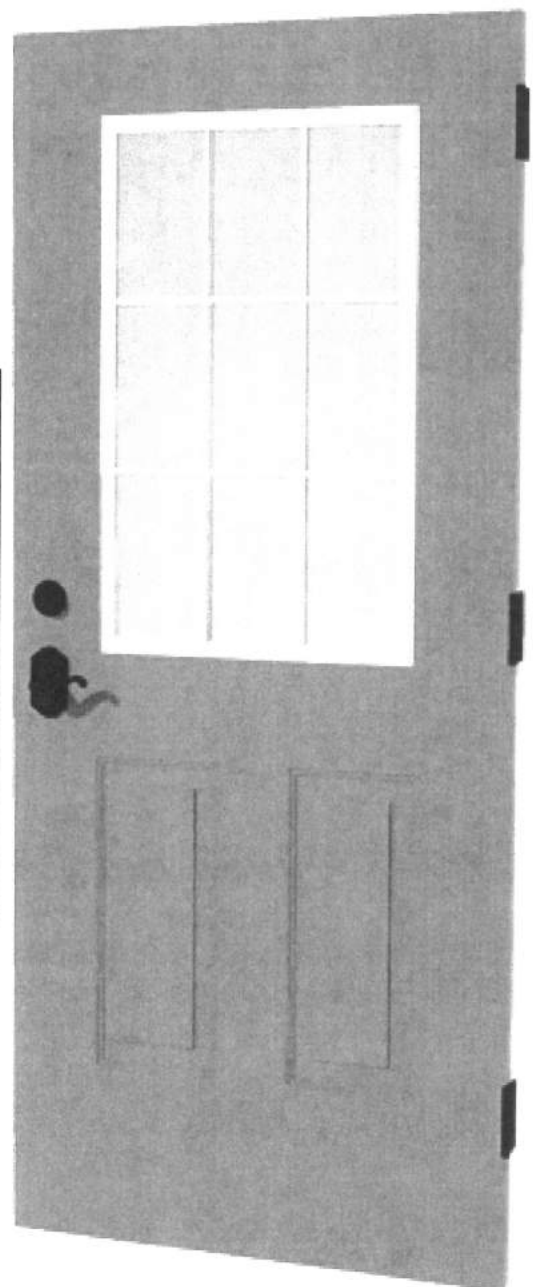
# Door Style

## Embossed Doors

(16 gauge)

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- Minimum 31 9/16" with 4 1/4" stiles
- Maximum 38 15/16" wide butted edge
- Maximum 36" wide hemmed edge
- Available in 6'8" and 7'0" high

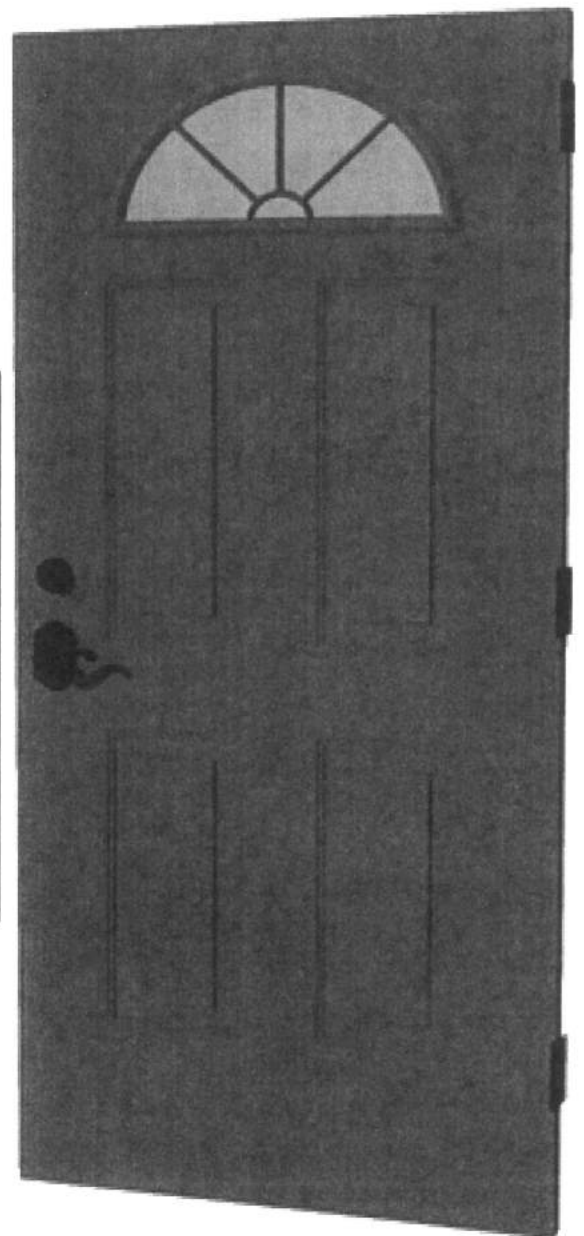


# Door Styles

## Embossed Doors

\_\_\_\_\_ (18 gauge)

- Minimum 31 9/16" wide with 4 1/4" stiles
- Maximum 46 7/16" wide butted edge
- Maximum 43 1/2" wide hemmed edge
- Available in 6'8" or 7'0" high

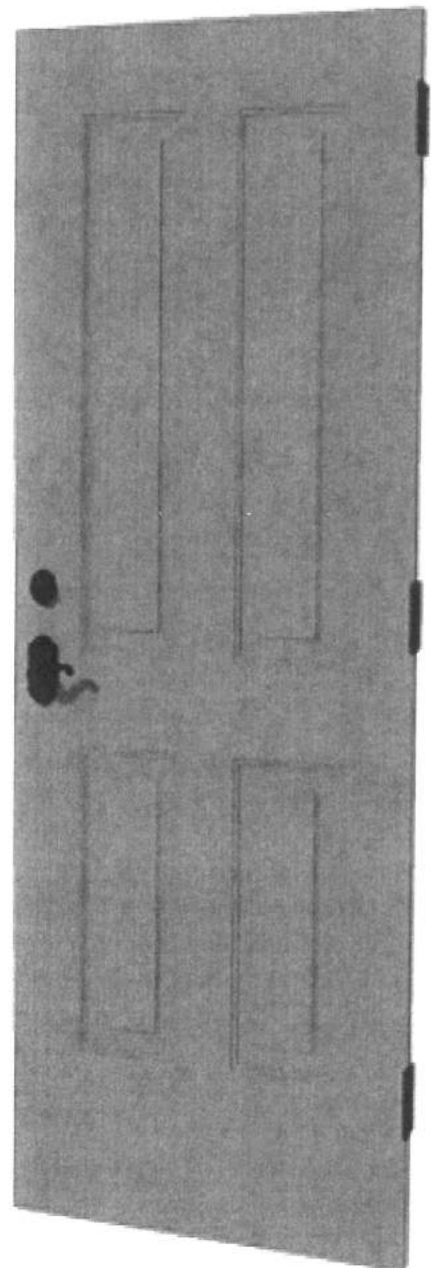


# Door Styles

## Embossed Doors

\_\_\_\_\_ (18 gauge)

- Minimum 31 1/2" wide with 4 1/4" stiles
- Maximum 39 1/8" wide butted edge
- Maximum 36 1/4" wide hemmed edge
- Available in 6'8" or 7'0 high

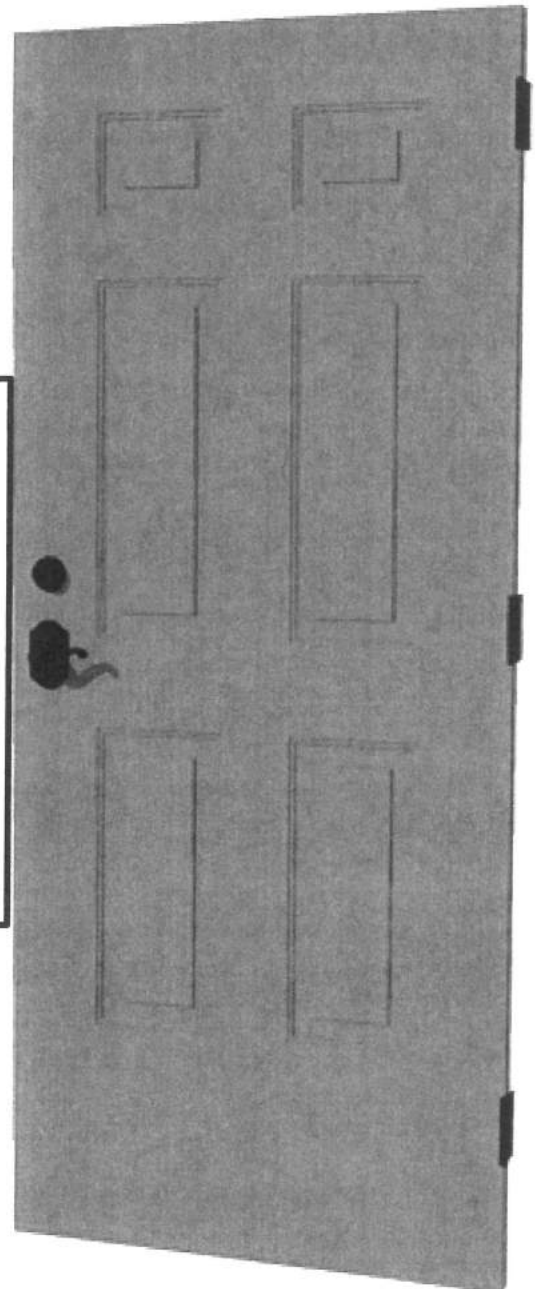


# Door Styles

## Embossed Doors

\_\_\_\_\_ (18 gauge)

- Minimum 31 9/16" wide with 4 1/4" stiles
- Maximum 45 15/16" wide butted edge
- Maximum 43" wide hemmed edge
- Available in 6'8" or 7'0" high



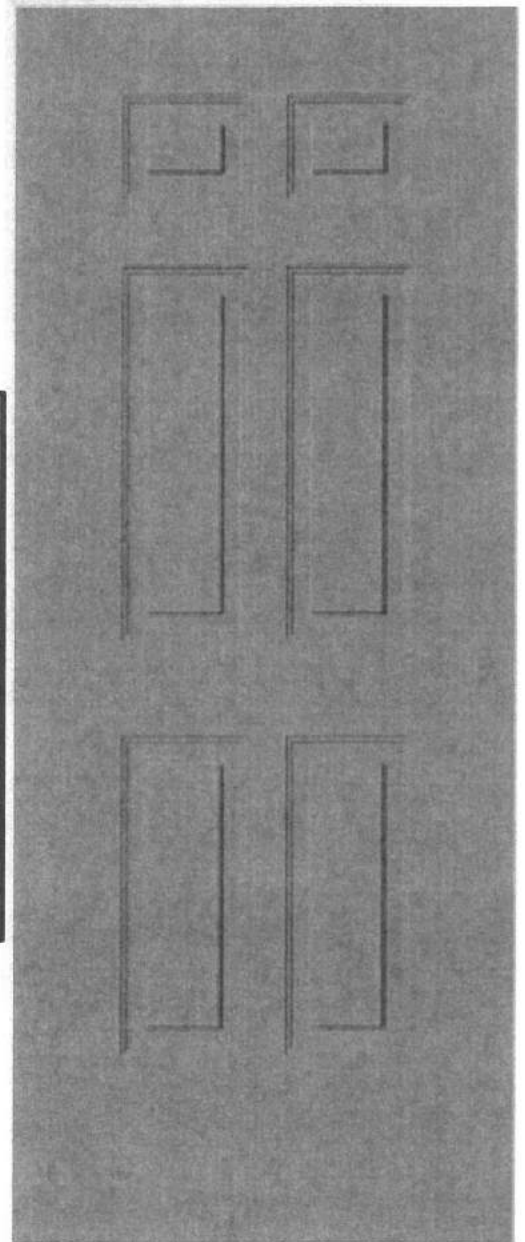


# Door Styles

## Embossed Doors

(18 gauge)

- Minimum 29 9/16" wide with 4 1/4" stiles
- Maximum 35 1/8" wide butted edge
- Maximum 32 1/4" wide hemmed edge
- Available in 6'8" or 7'0" high

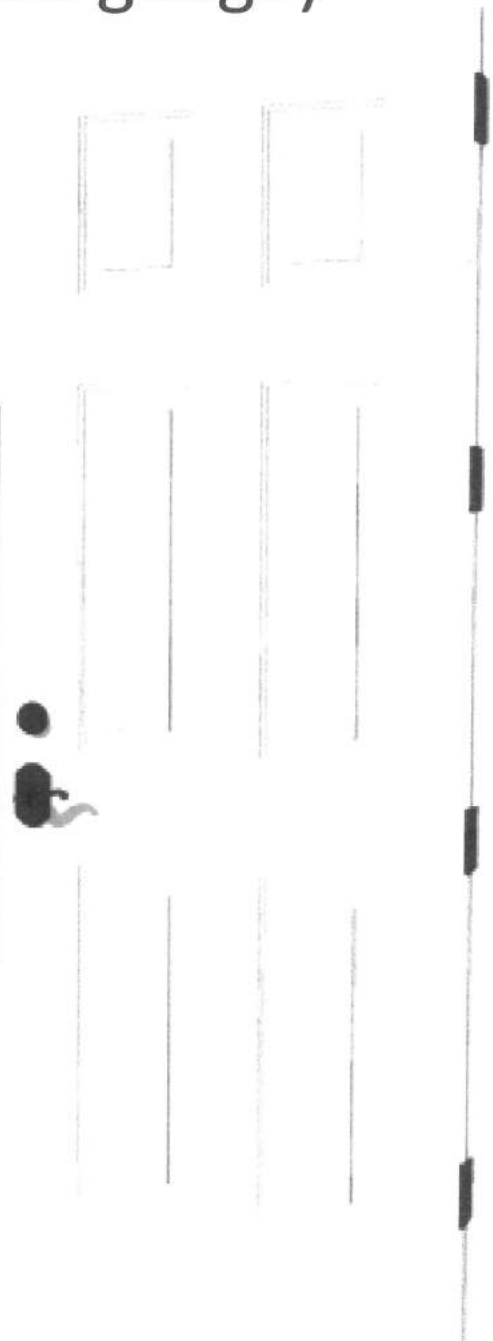


# Door Styles

## Embossed Doors

\_\_\_\_\_ (18 gauge)

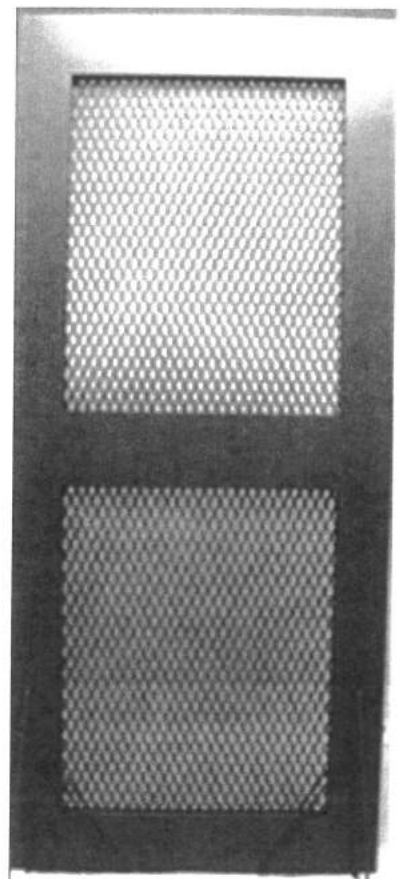
- Minimum 31 1/2" wide with 4 1/4" stiles
- Maximum 39 1/8" wide butted edge
- Maximum 36 1/4" wide hemmed edge
- Available 8'0" high



# Door Styles

## Heavy Duty Screen Door

- \_\_\_\_\_ and \_\_\_\_\_ thick doors
- 12, 14, or 16 gauge construction
- \_\_\_\_\_ or \_\_\_\_\_ core
- \_\_\_\_\_ or \_\_\_\_\_ edge,  
seamless available
- Used in exterior kitchen or restaurant applications
- 2 layers of 3/4" expanded metal with insect screen included



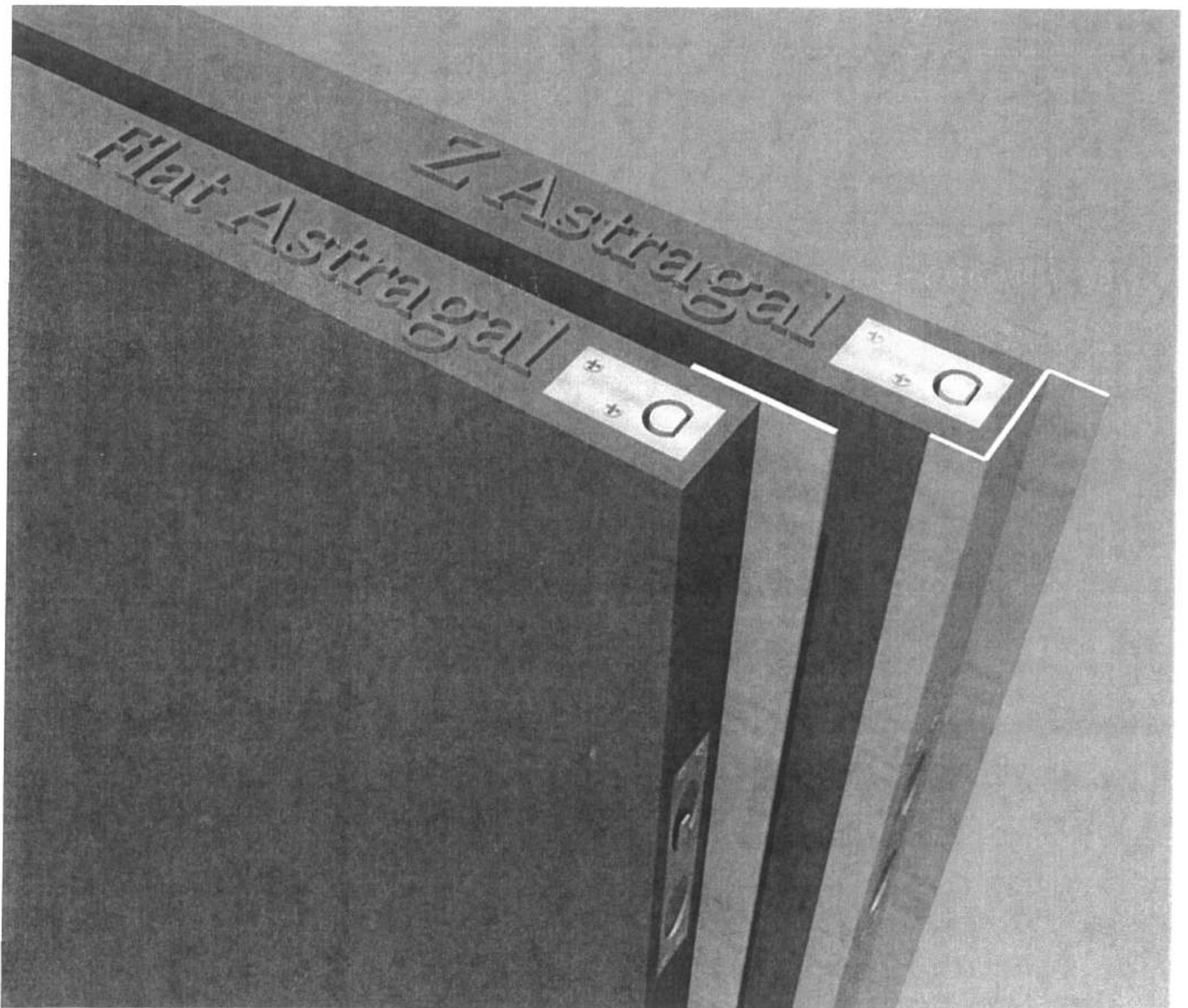
# Astragals

- Closes the \_\_\_\_\_ between a pair of doors
- Helps to seal opening from \_\_\_\_\_
- Exterior mounted, will provide some security from unwanted entry.
- Three types: \_\_\_\_\_  
\_\_\_\_\_

**\*If both doors are active:  
A coordinator must be installed**

# Astragals

## Z and Flat

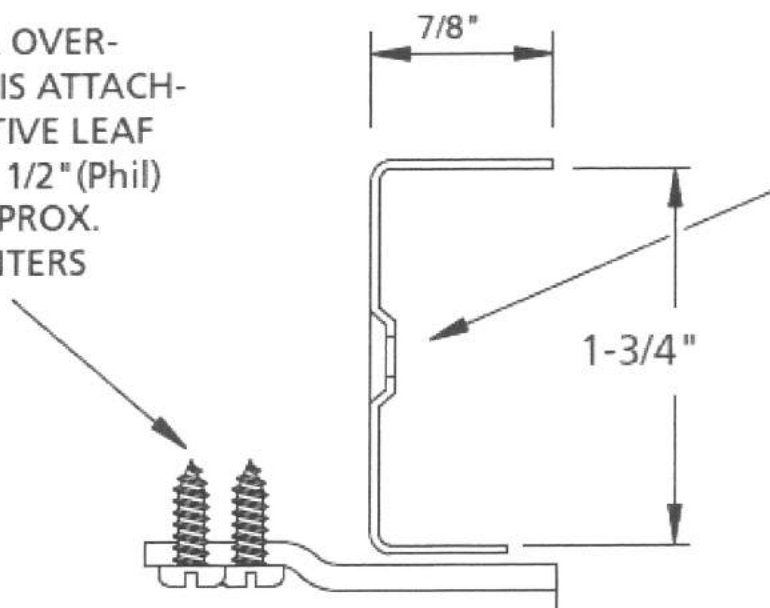


# Astragals

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- Can be screwed or welded on door
- Mounted to inactive (& active) leaf
- Contains hardware preps (ASA, FB, etc)
- Offered by \_\_\_\_\_ manufacturers
- Can be 1 piece or 2 piece application

1/8" STEEL OVER-  
LAP STRIP IS ATTACH-  
ED TO ACTIVE LEAF  
WITH #8 x 1/2" (Phil)  
PHSMS APPROX.  
6" ON CENTERS



18 GAGE STEEL  
EDGE CHANNEL IS  
ATTACHED TO IN-  
ACTIVE LEAF WITH  
#10 x 1/2" (Phil)  
UCFHMS

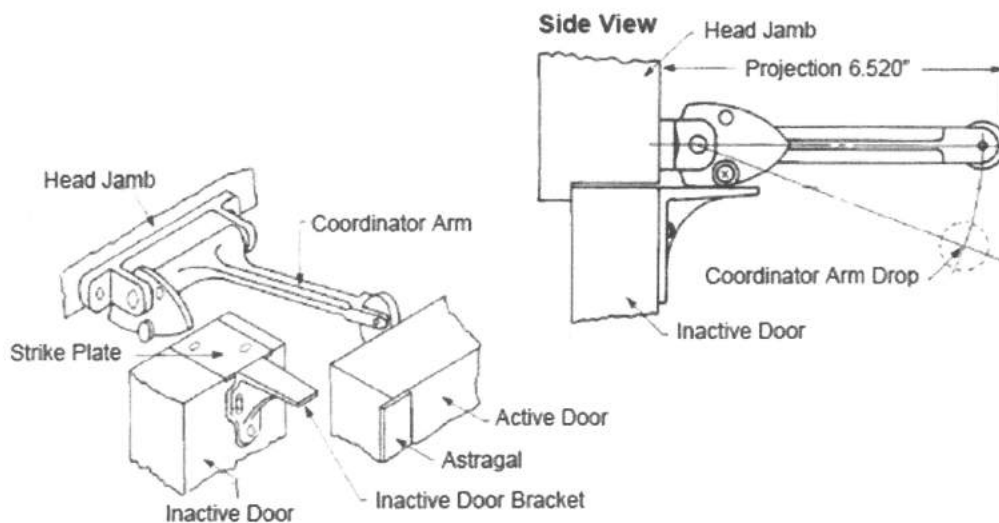
# Coordinators

- 2 types: \_\_\_\_\_ or \_\_\_\_\_ Mounted
- Holds \_\_\_\_\_ door open until \_\_\_\_\_ leaf closes – no door prep required



Bar type mounts on \_\_\_\_\_ of frame – requires rein.

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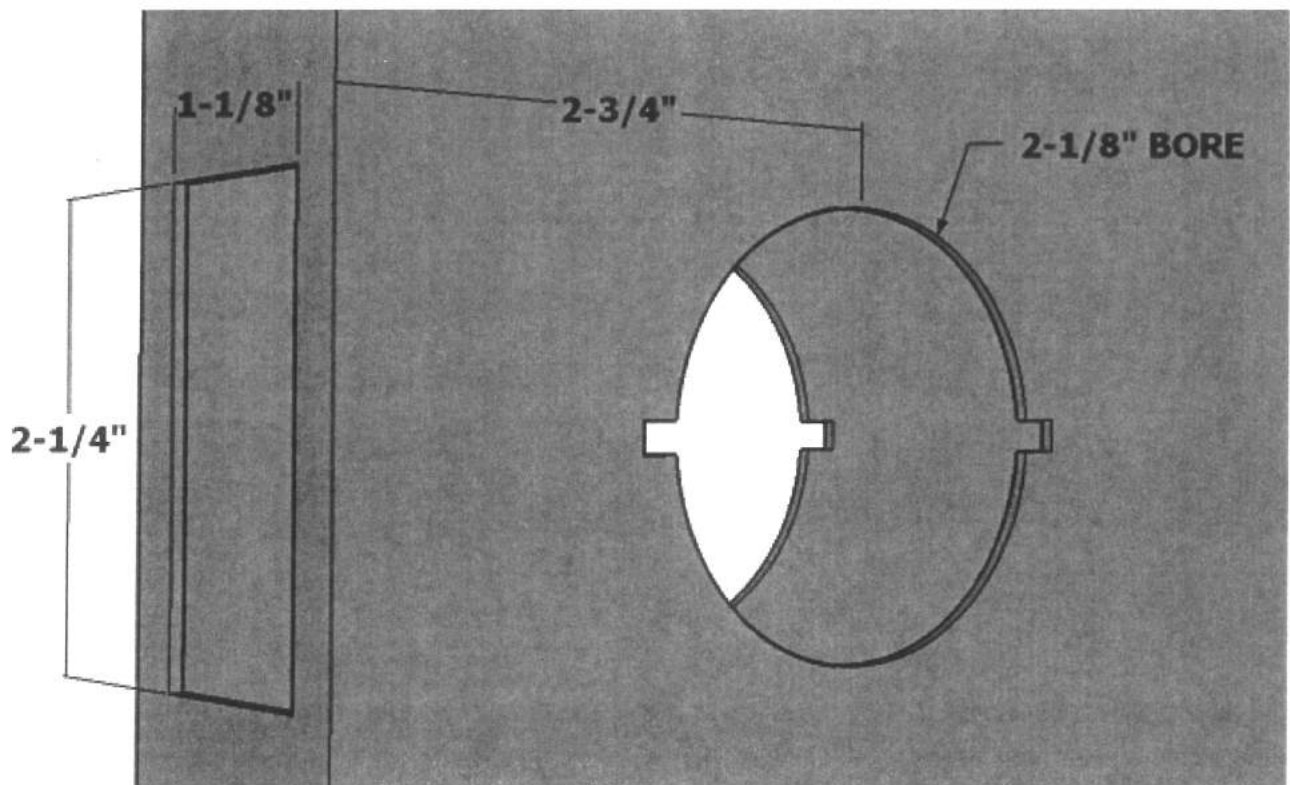


Mounted on \_\_\_\_\_ of frame – requires rein.

# Hardware Preps

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- \_\_\_\_\_ bore
- \_\_\_\_\_ backset (2 3/8" available)
- \_\_\_\_\_

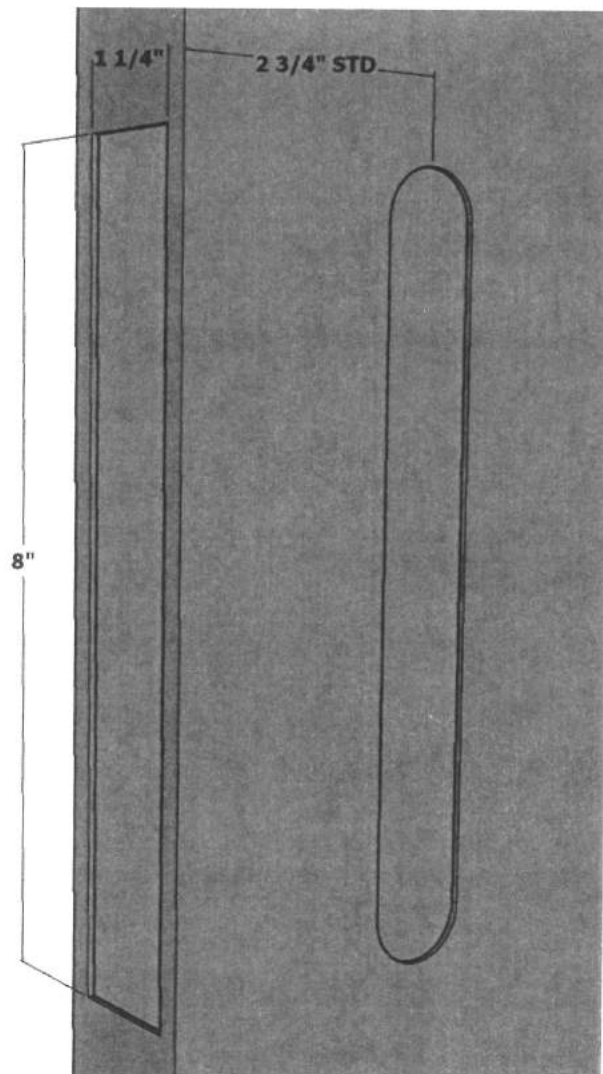




# Hardware Preps

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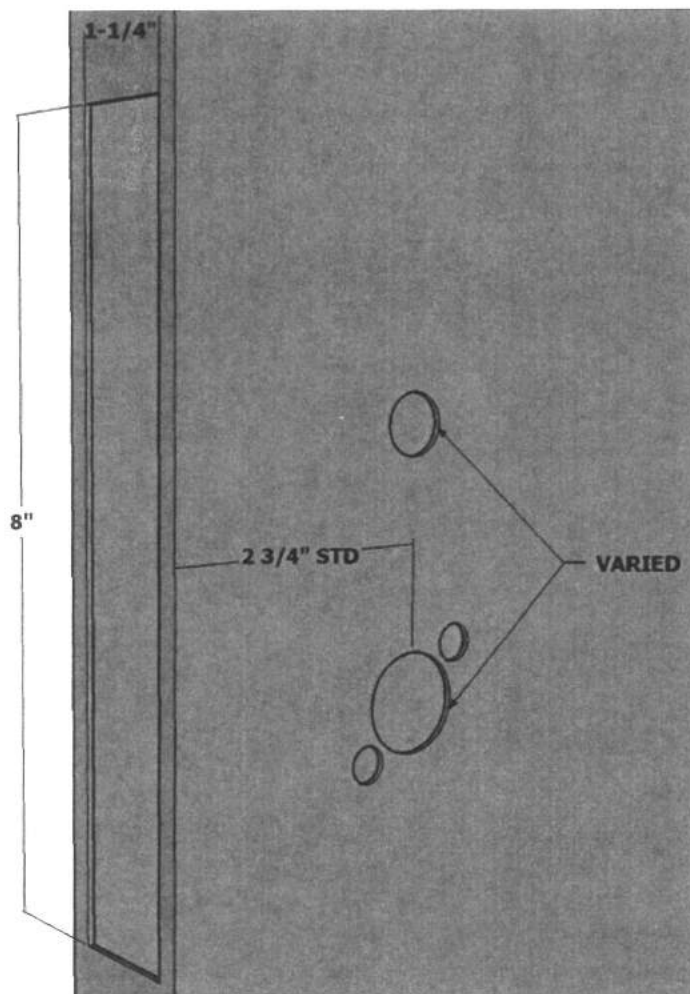
- \_\_\_\_\_ edge prep on door
- \_\_\_\_\_ backset is standard
- Universal prep for escutcheon trim



# Hardware Preps

## Mortise Lock (86) \_\_\_\_\_ Prep

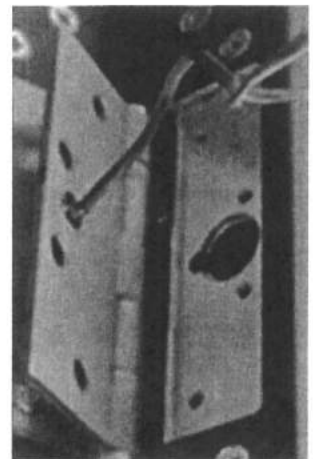
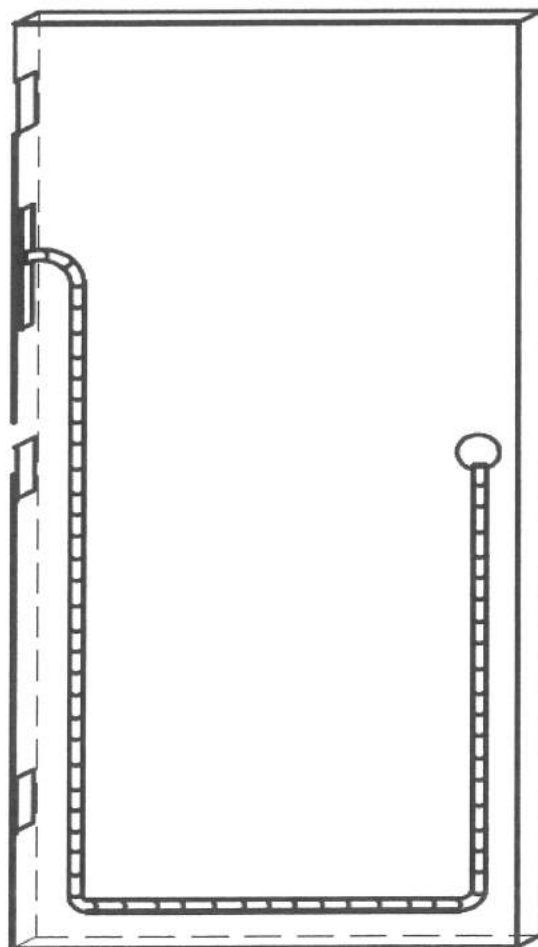
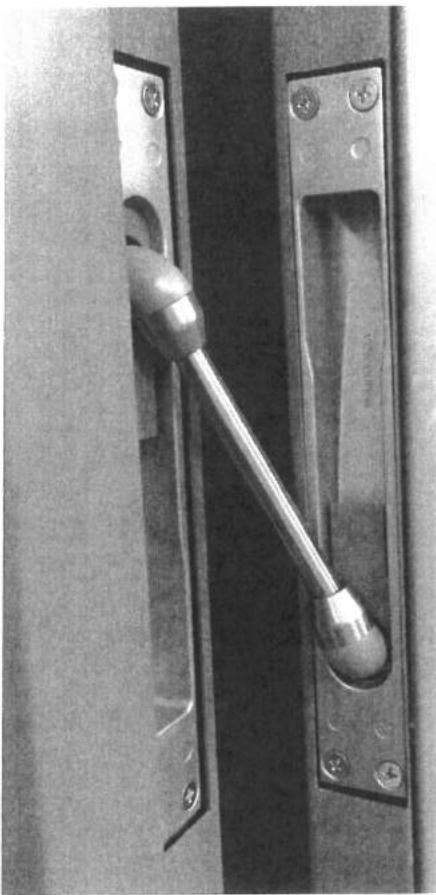
- \_\_\_\_\_ edge prep on door
- \_\_\_\_\_ backset is standard
- Universal prep for escutcheon trim



# Hardware Preps

---

- Conduit for power from electric \_\_\_\_\_ or \_\_\_\_\_ to electric \_\_\_\_\_ or \_\_\_\_\_
- Best if ran down hinge edge, across bottom, and up lock edge of door



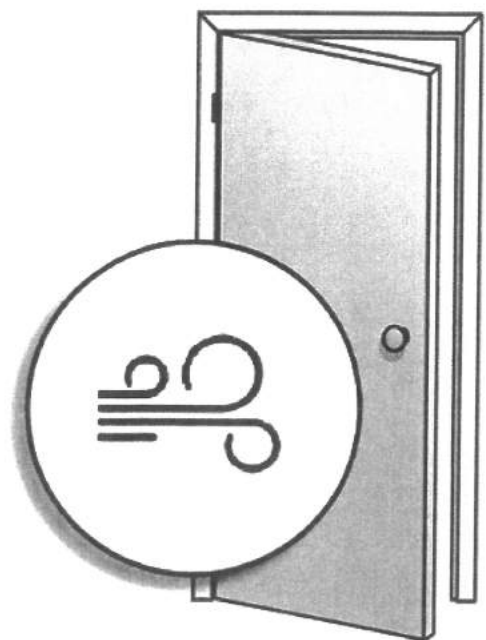
## \_\_\_\_\_ Ratings

- \_\_\_\_\_ , \_\_\_\_\_ up to \_\_\_\_\_ thick doors
- 14, 16 & 18 gauge CRS, A60, G90, and \_\_\_\_\_
- Polystyrene, steel stiffened and temperature rise cores
- Hemmed and butted edge, square or beveled, seamed or seamless
- Fire ratings up to \_\_\_\_\_ hours
- Ratings by Underwriters Laboratories and Warnock Hersey International.
- Singles, pairs, double egress, lead lined, stainless, embossed, detention, oversized & panels
- Label located on door \_\_\_\_\_ between top and second hinge. Located on \_\_\_\_\_ of door when using continuous hinges.



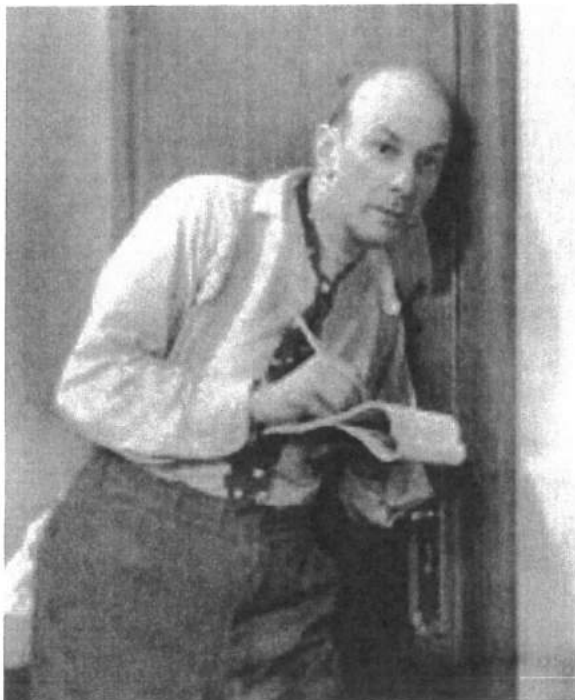
## \_\_\_\_\_ Ratings

- Florida Building Code (\_\_\_\_\_) listings
- \_\_\_\_\_ thick doors
- 16 or 18 gauge \_\_\_\_\_
- \_\_\_\_\_ or \_\_\_\_\_ core
- Hemmed edge, square or beveled
- Full glass or full louver available
- Flush doors are approved for High Velocity Hurricane Zones (\_\_\_\_\_)
- \_\_\_\_\_ ratings available



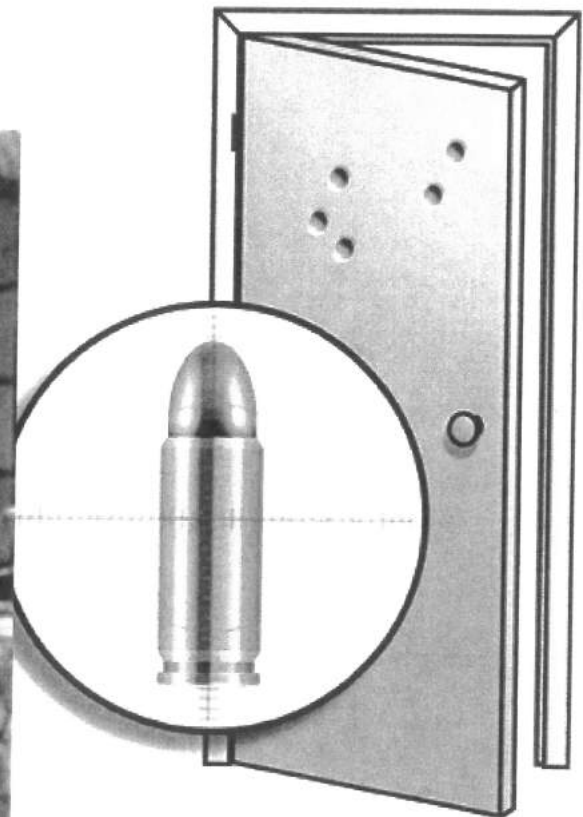
# \_\_\_\_\_ Ratings

- \_\_\_\_\_ thick doors
- 16 gauge CRS or A60
- Proprietary core
- Butted, welded \_\_\_\_\_, square or beveled edge
- Up to \_\_\_\_\_
- STC Ratings \_\_\_\_\_
- STC 38 can be embossed
- Not fire rated
- Provided as \_\_\_\_\_ (door, frame, and seals)

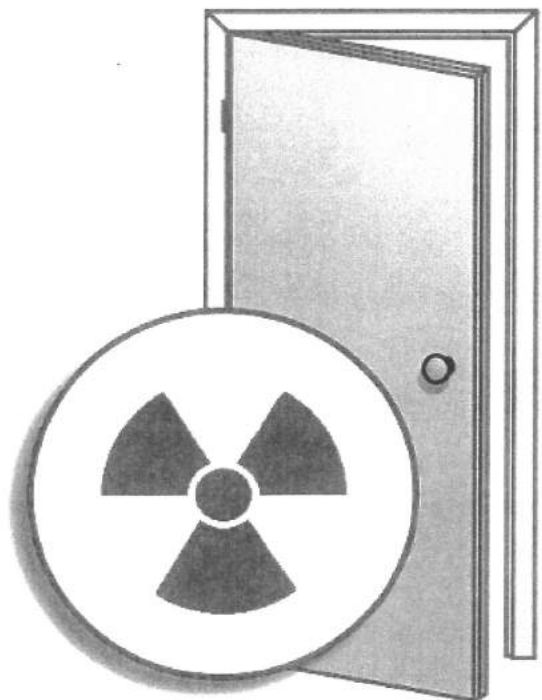


## \_\_\_\_\_ Ratings

- \_\_\_\_\_ thick doors
- 12, 14 or 16 gauge CRS , A60, or G90
- \_\_\_\_\_ plated with steel stiffeners
- Butted, welded seamless, square or beveled edge
- UL-752 Level \_\_\_\_ (44 magnum)
- \_\_\_\_\_ only
- Not fire rated



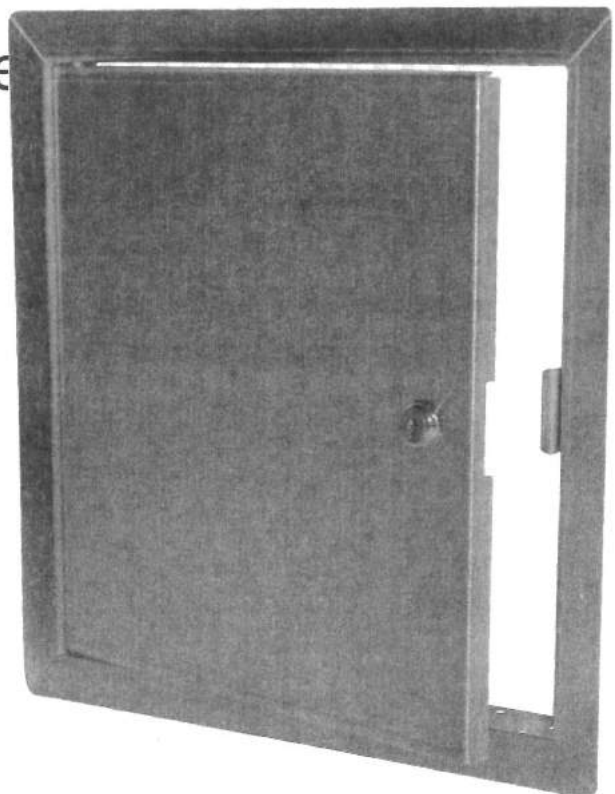
- 
- \_\_\_\_\_ thick doors (Can be wider – No UL)
  - 12, 14, 16 or gauge CRS, A60 or G90
  - \_\_\_\_\_ core
  - Butted, square or beveled edge, seamed or seamless
  - Fire rated up to \_\_\_\_ hours
  - Available in \_\_\_\_\_ or thicker lead





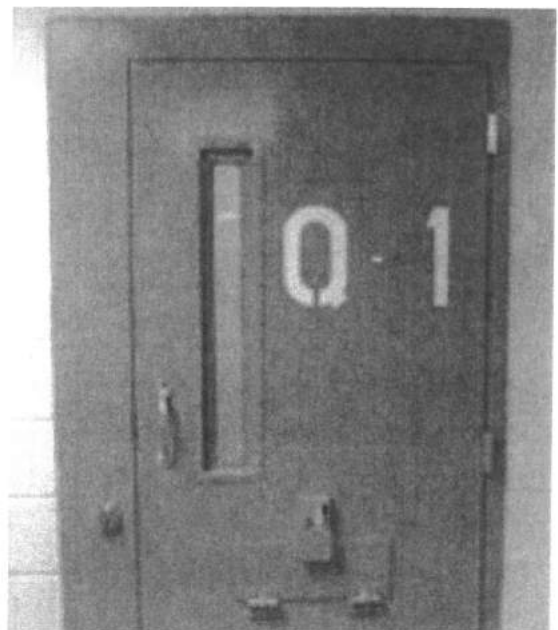
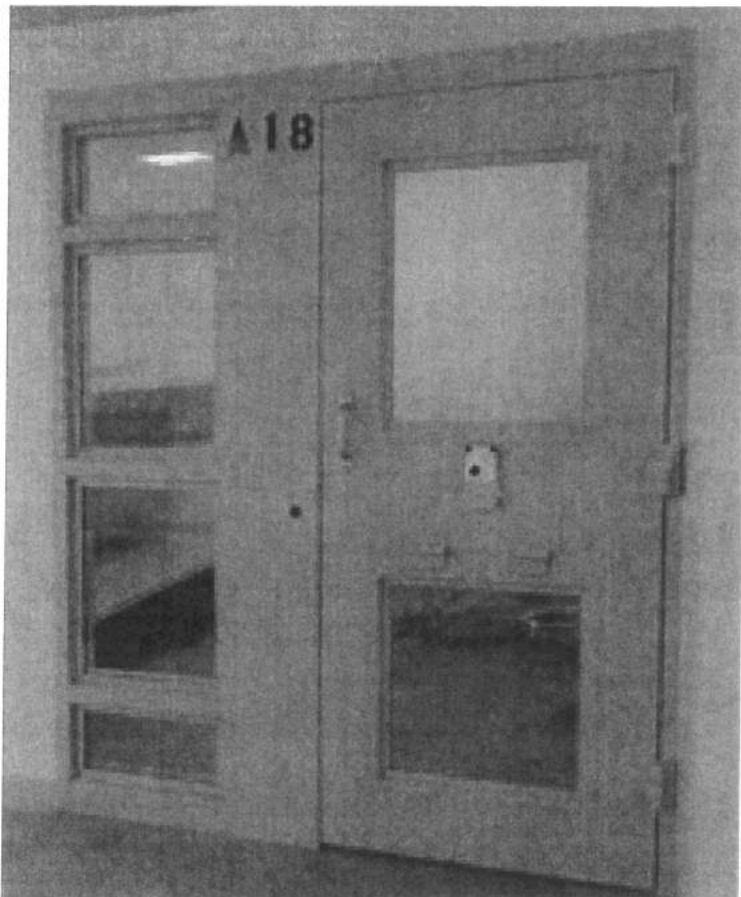
## \_\_\_\_\_ Doors

- \_\_\_\_\_ door in a \_\_\_\_\_ frame
- \_\_\_\_\_ door in a \_\_\_\_\_ frame
- 12, 14, 16, or 18 gauge CRS, A60, G90, and stainless steel
- Polystyrene, steel stiffened, or temperature rise cores
- Available in unlimited widths and heights
- Can be fire rated
- Handed or non-handed
- \_\_\_\_\_ undercut \*



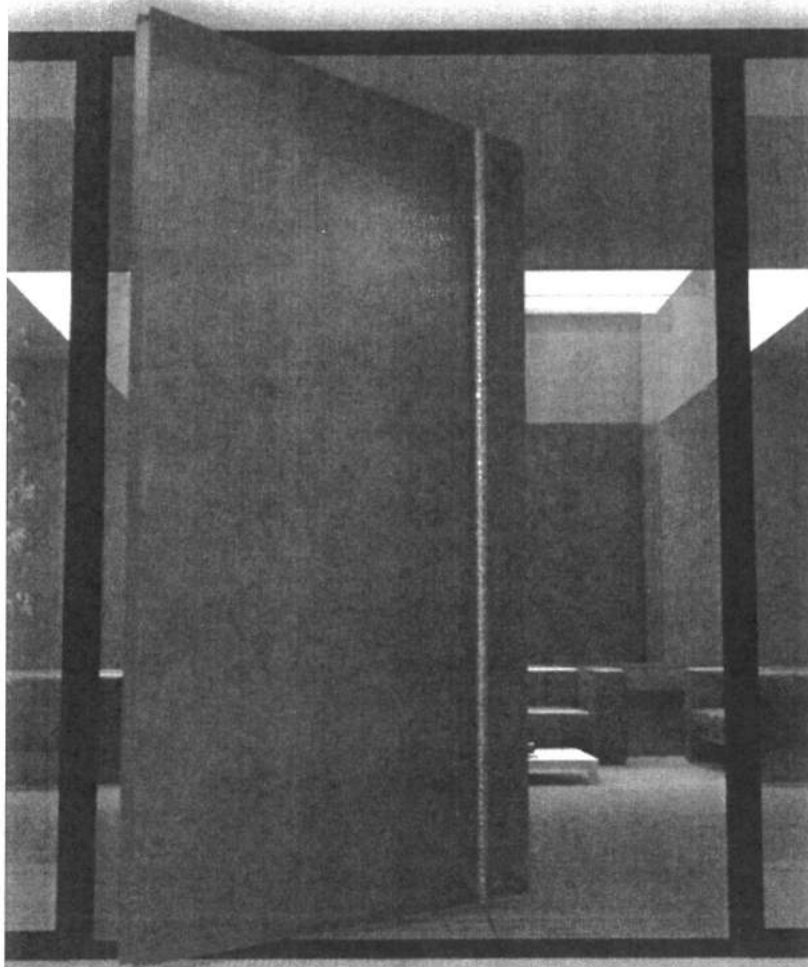
# \_\_\_\_\_ Doors

- \_\_\_\_\_ doors
- \_\_\_\_\_ to \_\_\_\_\_ thick doors
- 12 or 14 gauge CRS, A60 or G90
- \_\_\_\_\_ core
- Requires high-security hinges, lock, strike, and other \_\_\_\_\_ hardware preps
- Can be fire rated
- Be very \_\_\_\_\_!!!



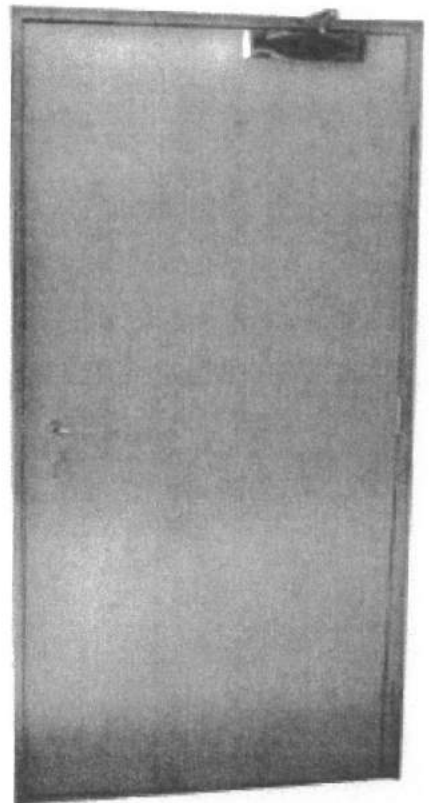
# Doors

- Openings \_\_\_\_\_ than \_\_\_\_\_ wide or \_\_\_\_\_ tall
- 14 or 16 gauge CRS and A60
- \_\_\_\_\_ core
- Butted edged, seamed or seamless
- Fire rated up \_\_\_\_\_
- \_\_\_\_\_ sizes available



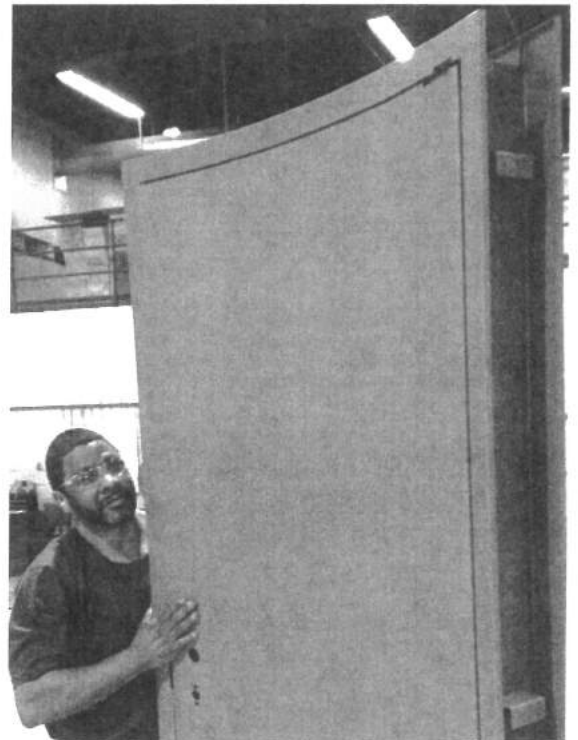
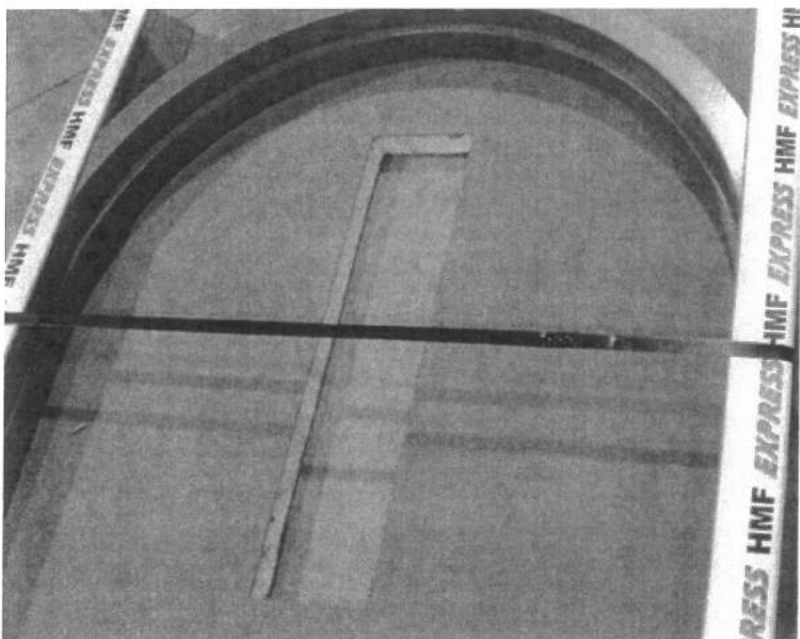
## \_\_\_\_\_ Doors

- Array of \_\_\_\_\_ available
- Standard and custom door thicknesses
- 12, 14, 16, or 18 gauge stainless steel
- Available in custom heights and widths
- Polystyrene, steel stiffened, or temperature rise cores
- Hemmed or butted edge, square or beveled, seamed or seamless
- Fire ratings available
- Array of \_\_\_\_\_ available
- Type \_\_\_\_ or \_\_\_\_ available



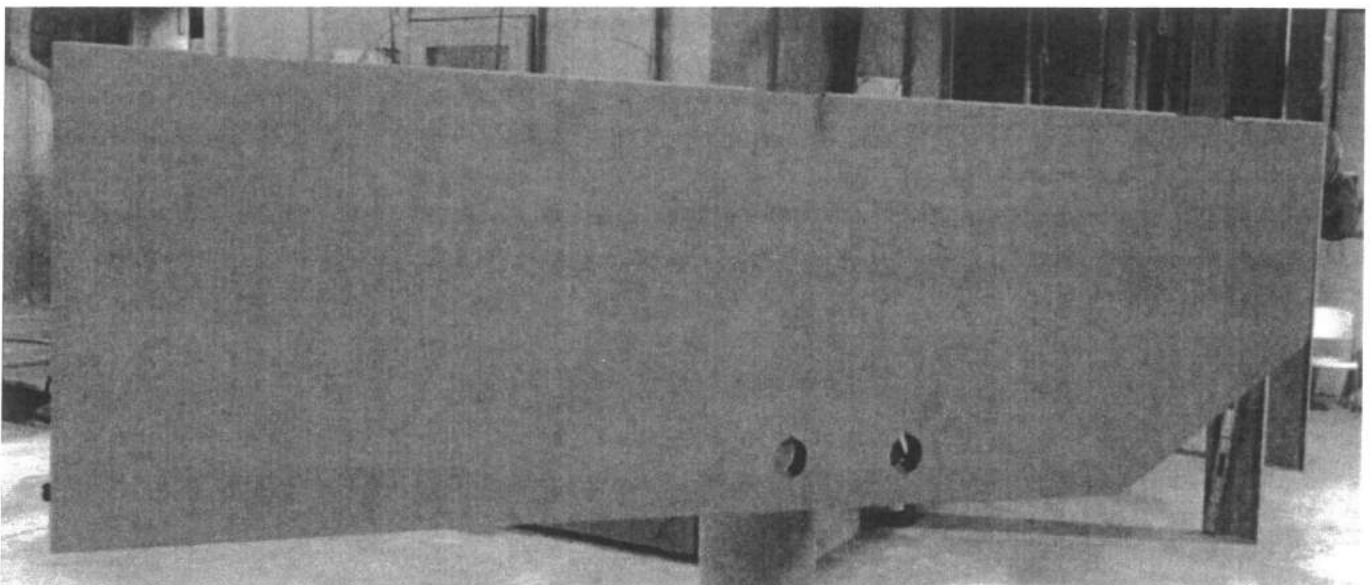
# \_\_\_\_\_ Doors

- \_\_\_\_\_ or door \_\_\_\_\_
- Standard and custom door thicknesses
- 12, 14, 16, or 18 gauge CRS, A60, G90, and stainless steel
- Polystyrene or steel stiffened core
- Butted, square or beveled edge, seamed or seamless available
- Custom and templated design
- \_\_\_\_\_ fire rated



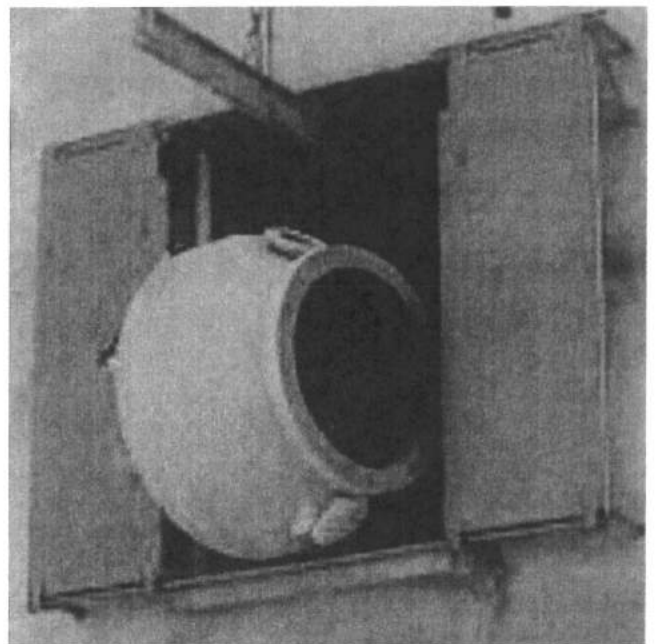
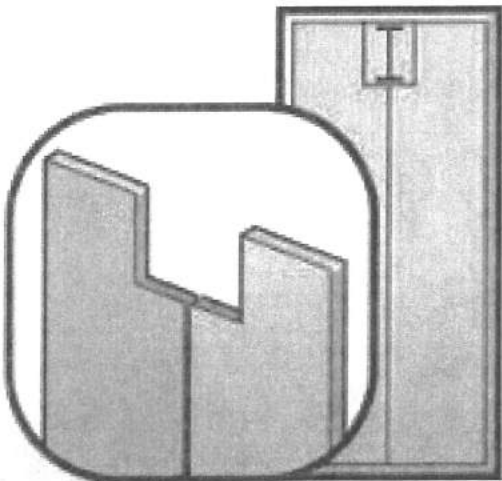
## \_\_\_\_\_ Doors

- \_\_\_\_\_ or \_\_\_\_\_ or \_\_\_\_\_ of door
- Standard and custom door thicknesses
- 12, 14, 16, or 18 gauge CRS, A60, G90, and stainless steel
- Polystyrene or steel stiffened core
- Butted, square or beveled edge, seamed or seamless available
- Custom and templated design
- Not fire rated
- Any \_\_\_\_\_ or \_\_\_\_\_ available



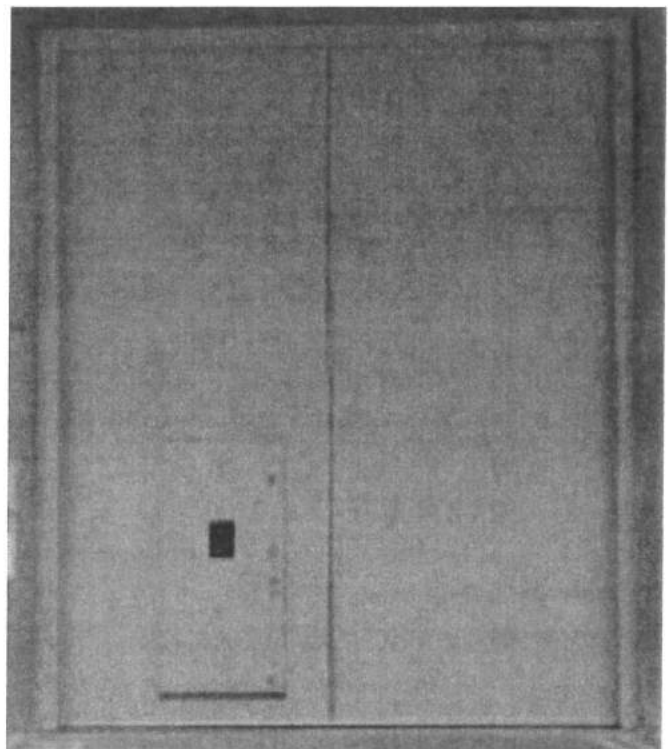
# Doors

- \_\_\_\_\_ doors
- Standard and custom door thicknesses
- 12, 14, 16, or 18 gauge CRS, A60, G90 and stainless steel
- Polystyrene or steel stiffened cores
- Butted edge, squared or beveled, seamed or seamless
- Notch at \_\_\_\_\_ on \_\_\_\_\_ of doors
- Accommodate an overhead track with any combination of top, \_\_\_\_\_ and \_\_\_\_\_ cutouts
- Not fire rated



# Doors

- A \_\_\_\_\_
- Standard and custom door thicknesses
- 12, 14, 16, or 18 gauge CRS, A60, G90, and stainless steel
- Polystyrene or steel stiffened cores
- Butted edge with square or beveled and seamed or seamless
- Not fire rated



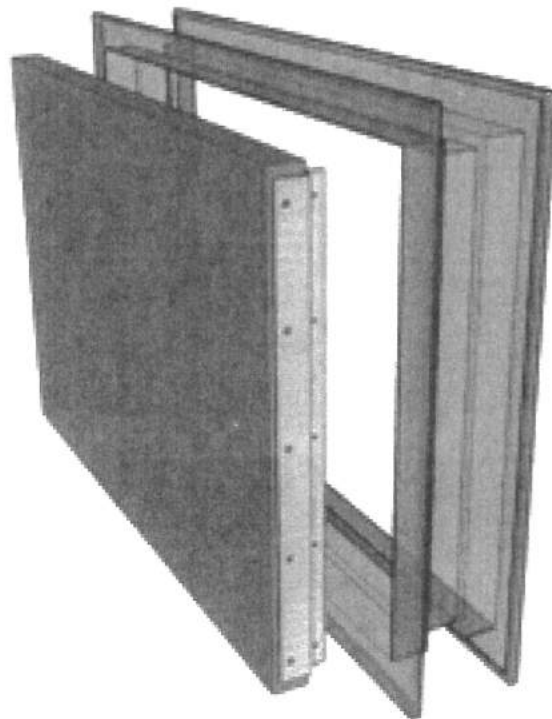


## Panels

- Panels can be mounted in our frames with our removable \_\_\_\_\_ system, \_\_\_\_\_, or delivered uninstalled for your custom applications.
- Varying thickness
- 12, 14, 16, or 18 gauge CRS, A60, G90, and stainless steel
- Polystyrene or steel stiffened
- Custom widths and heights
- \_\_\_\_\_ Rated
- Available in flush or embossed skins



- 
- Allows transom and sidelight panels to be installed in a \_\_\_\_\_ application.
  - Panel clips are welded to the edges of the panels
  - Can be fire rated when used in HMF Express Transom frames





## **Information needed for a door!**

### **Information needed for a quote**

- Quantity?
- Material?
- Opening size?
- Thickness?
- Fire label?
- Door style?
- Core?
- Edge seam?
- Hinges?
- Lock/Strike?
- Astragal?

### **Additional information needed for an order**

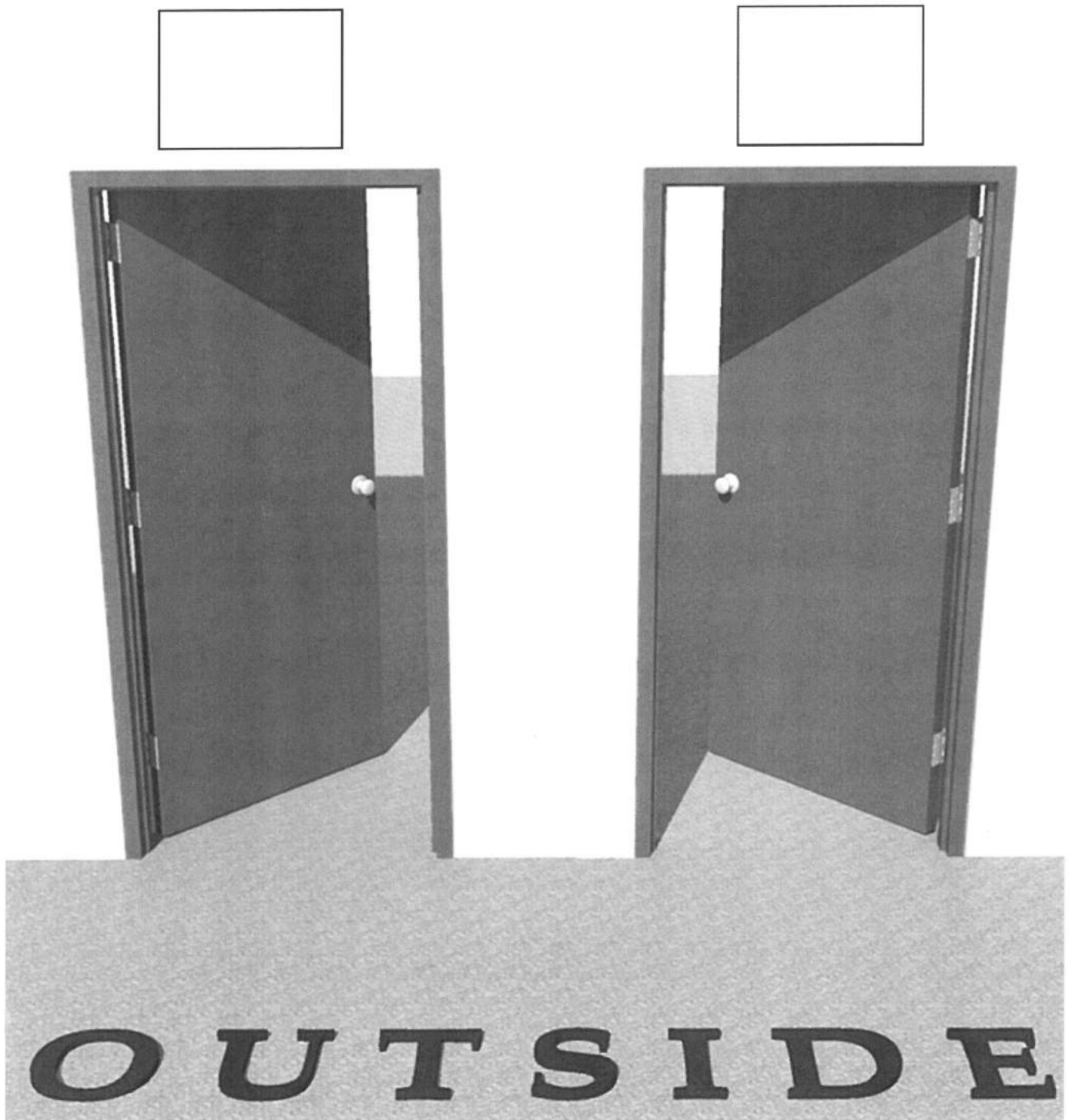
- Handing?
- Net Size?
- Undercut?
- Bevel?
- Locations?



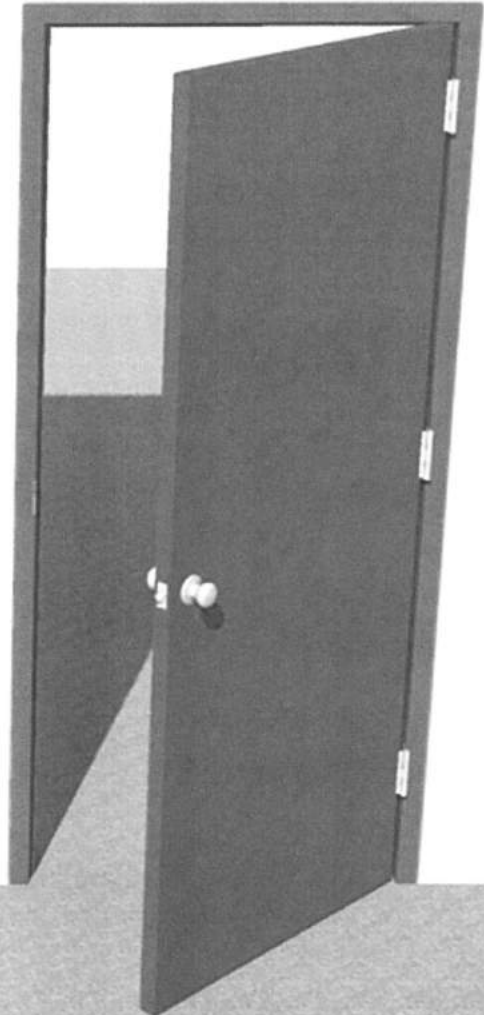
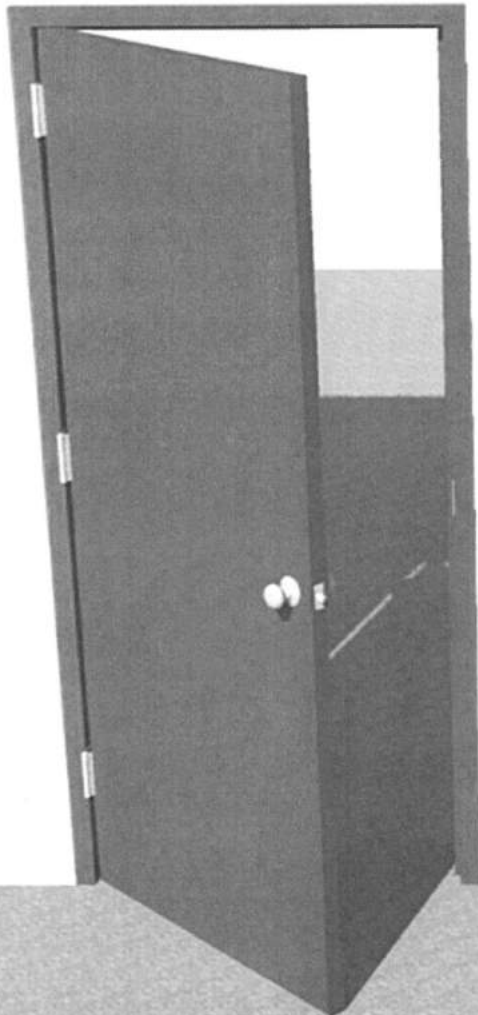
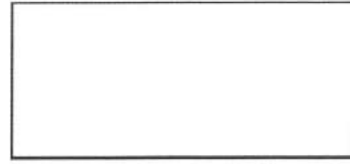
# Handing

- Designation for \_\_\_\_\_ of door opening
- Identified by \_\_\_\_\_ or  
\_\_\_\_\_
- \_\_\_\_\_ (swinging) exit doors in commercial applications must  
\_\_\_\_\_

# Handing Single Doors

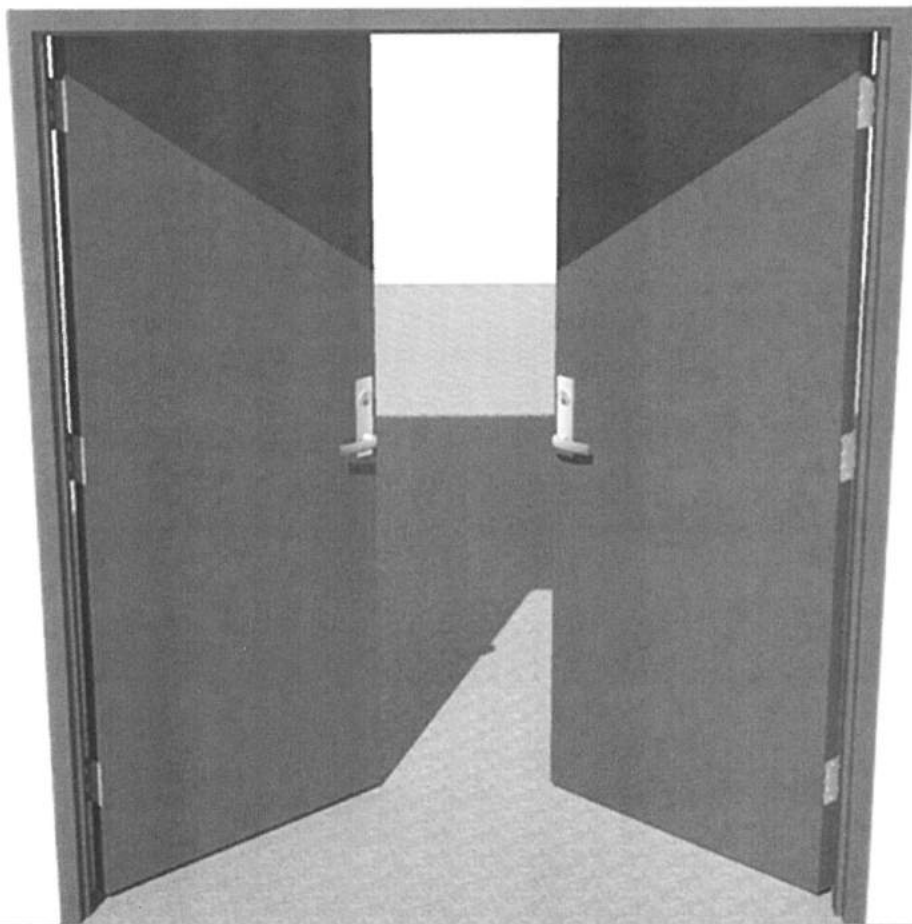
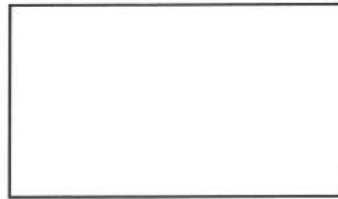


# Handing Single Doors



***O U T S I D E***

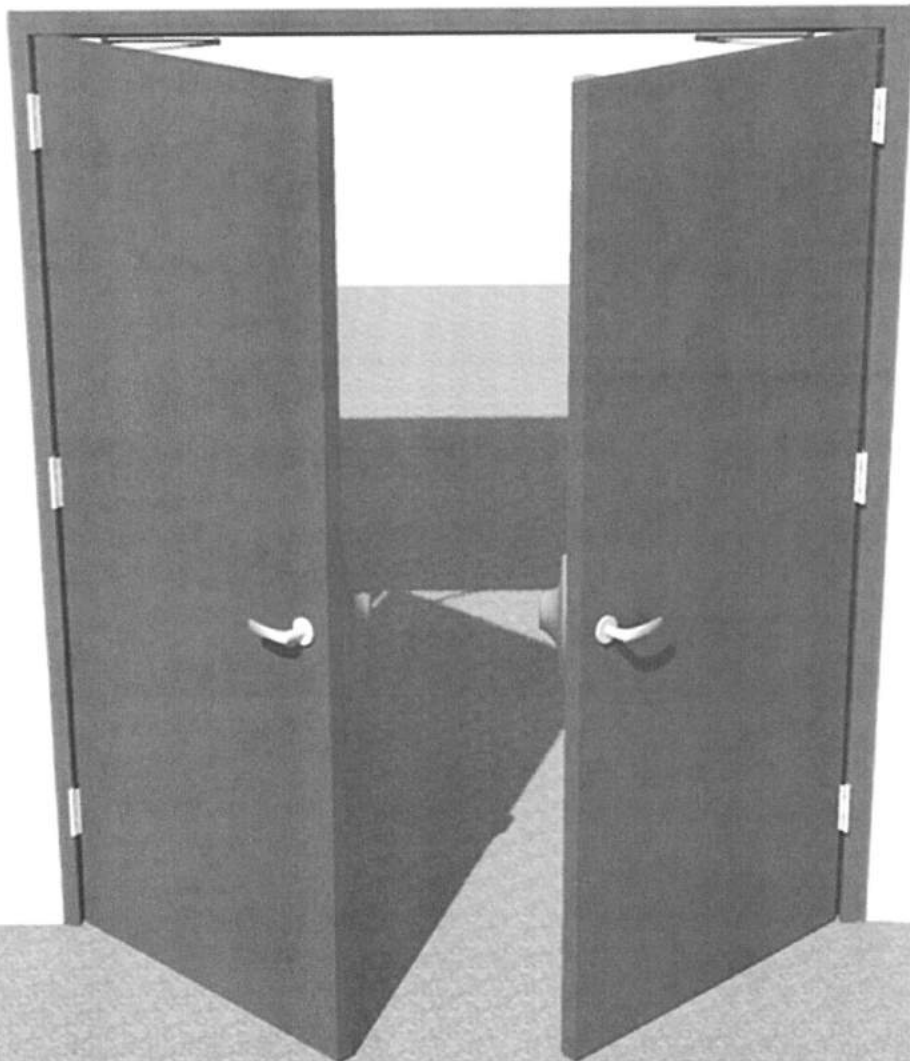
# Handing Pair of Doors



***O U T S I D E***



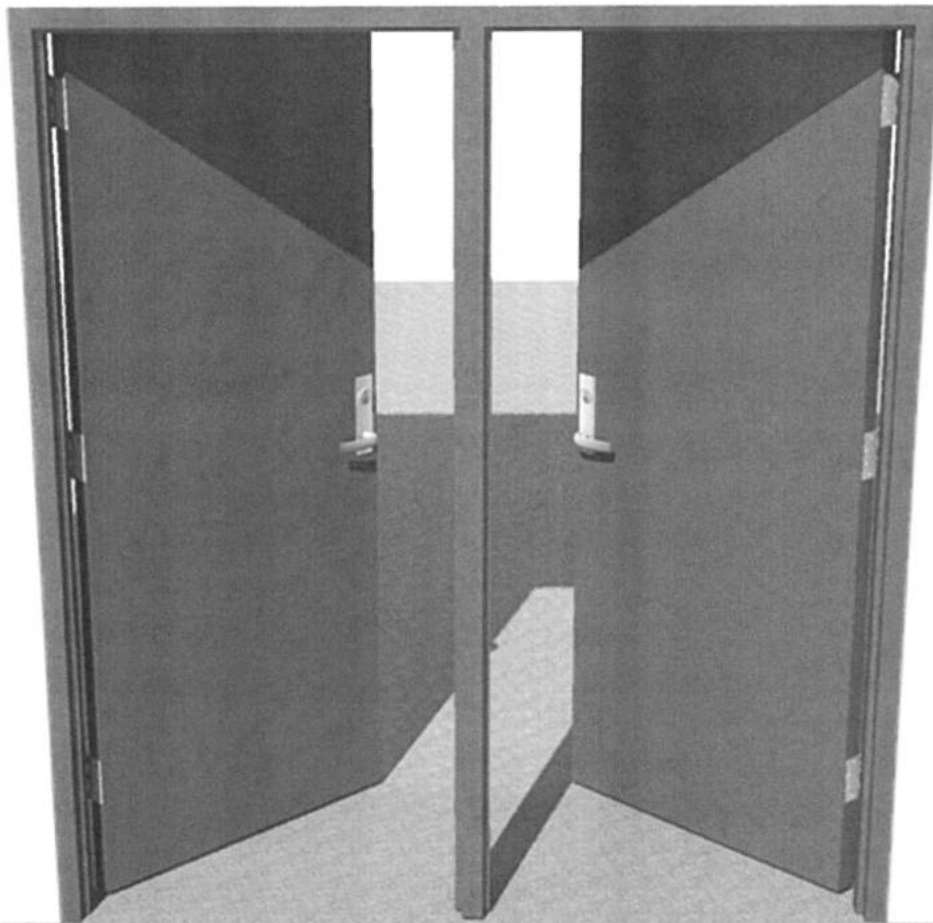
# Handing Pair of Doors



***OUTSIDE***

# Handing

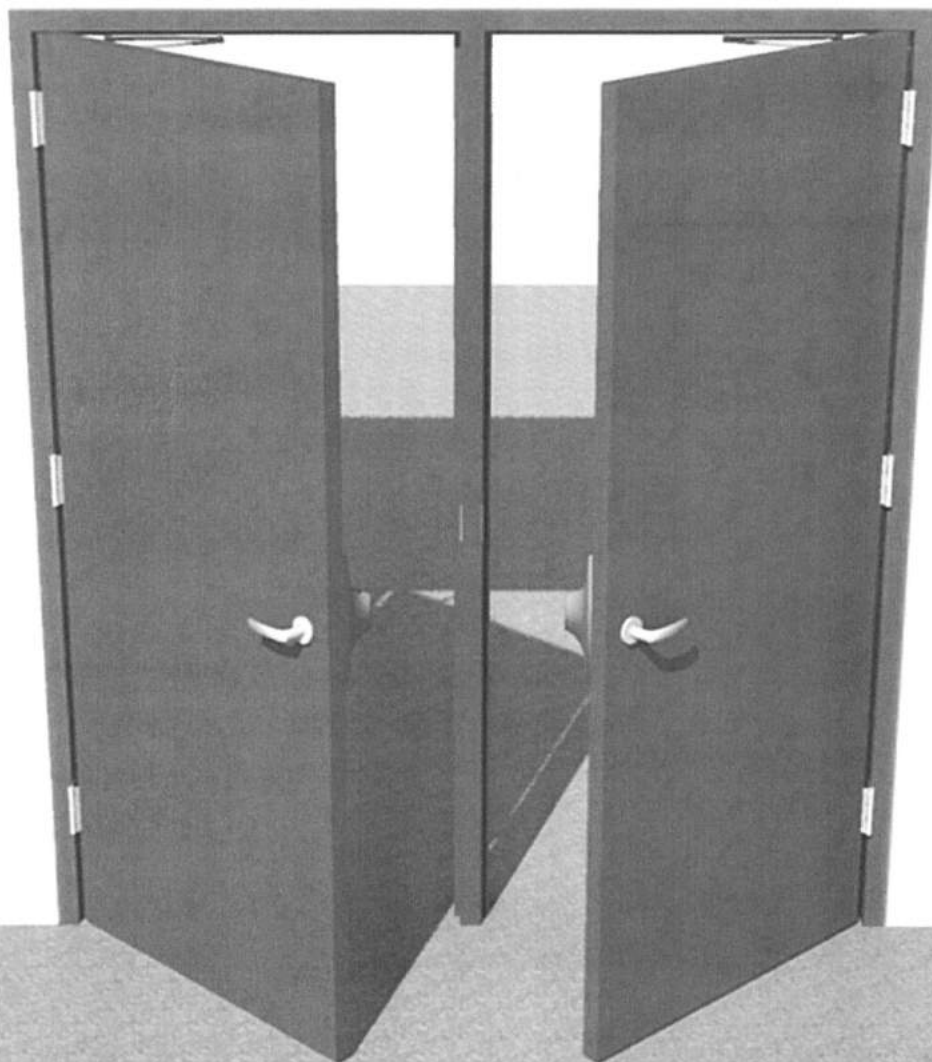
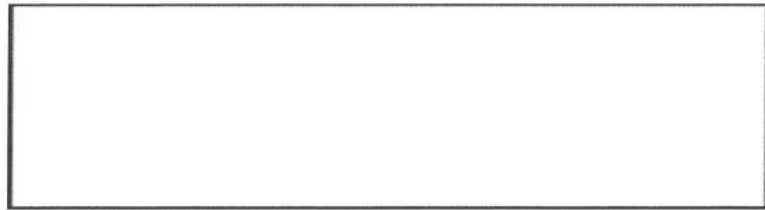
## Pair of Doors w/Center Mullion



**OUTSIDE**

# Handing

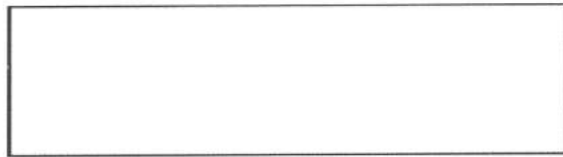
## Pair of Doors w/ Center Mullion



***O U T S I D E***

# Handing

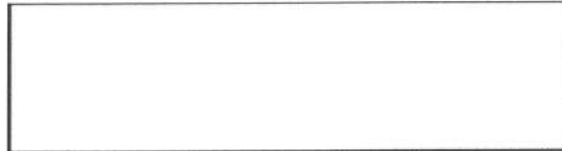
## Pair of Doors (Inswing)



**O U T S I D E**

# Handing

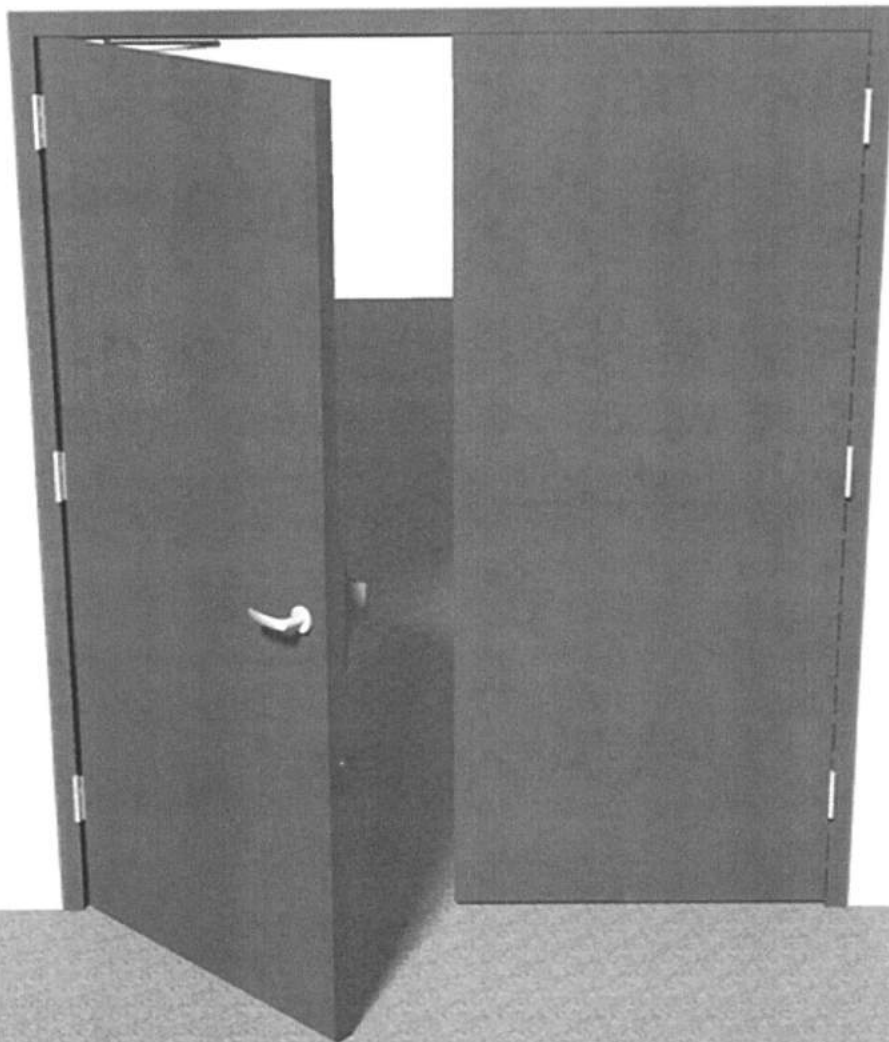
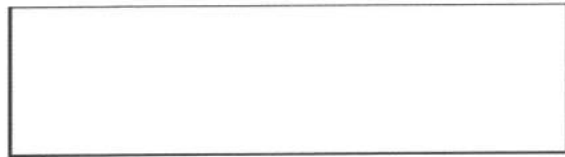
## Pair of Doors (Inswing)



***OUTSIDE***

# Handing

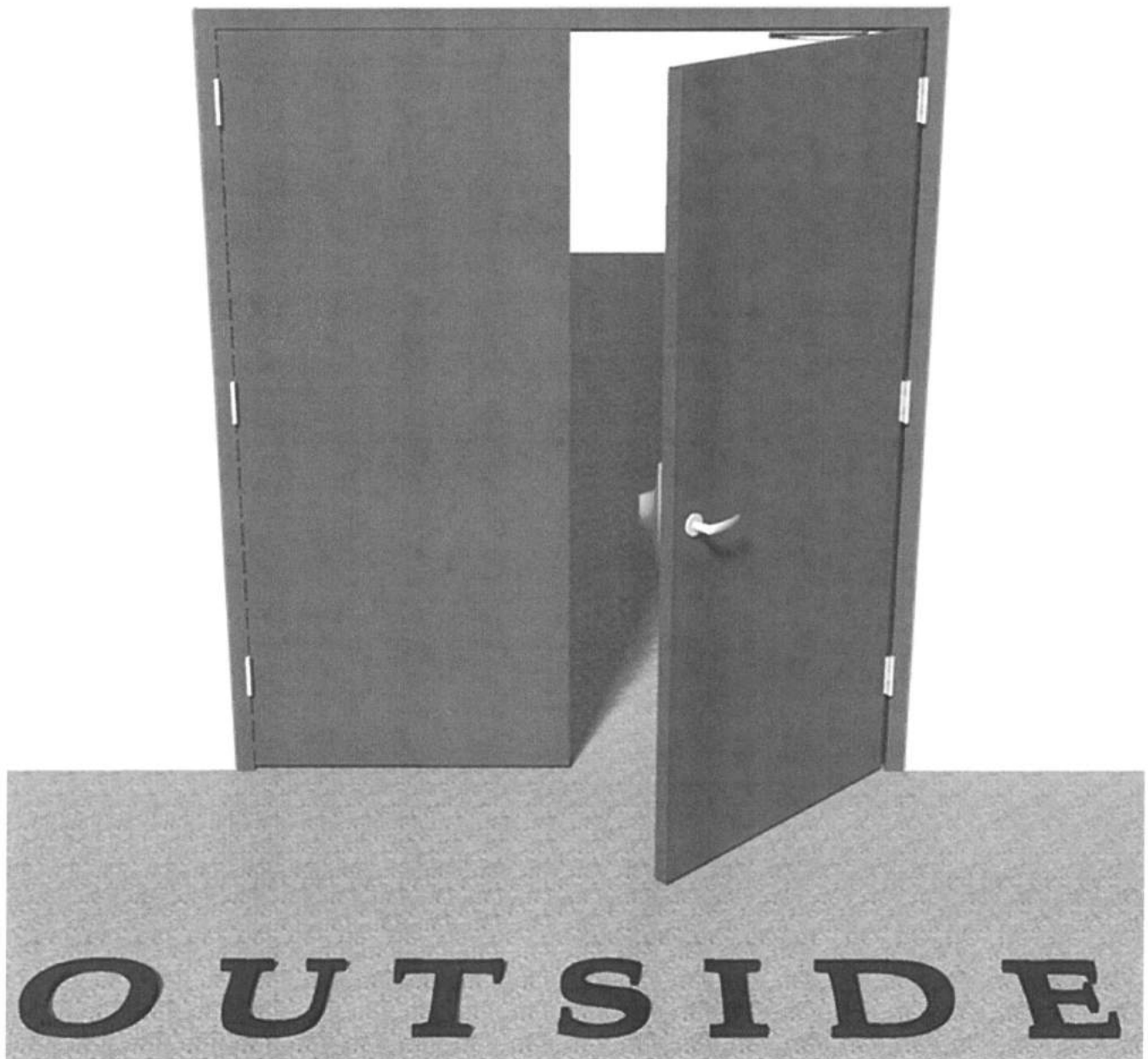
## Pair of Doors (Outswing)



***O U T S I D E***

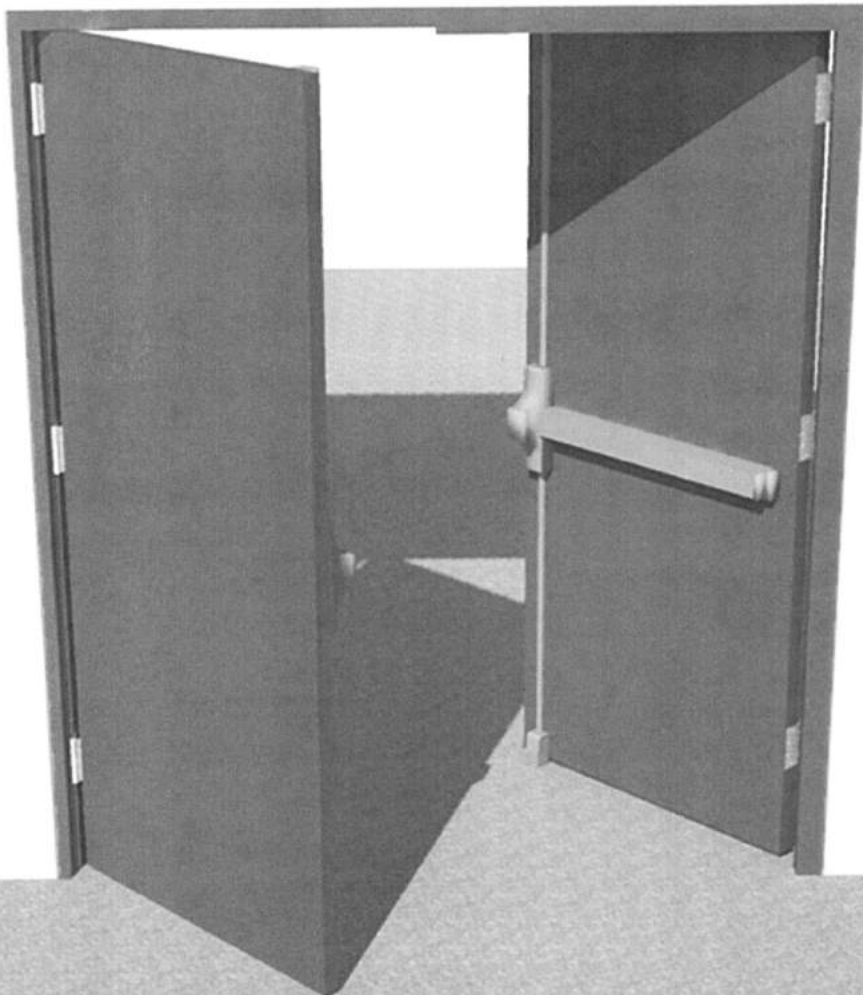
# Handing

## Pair of Doors (Outswing)





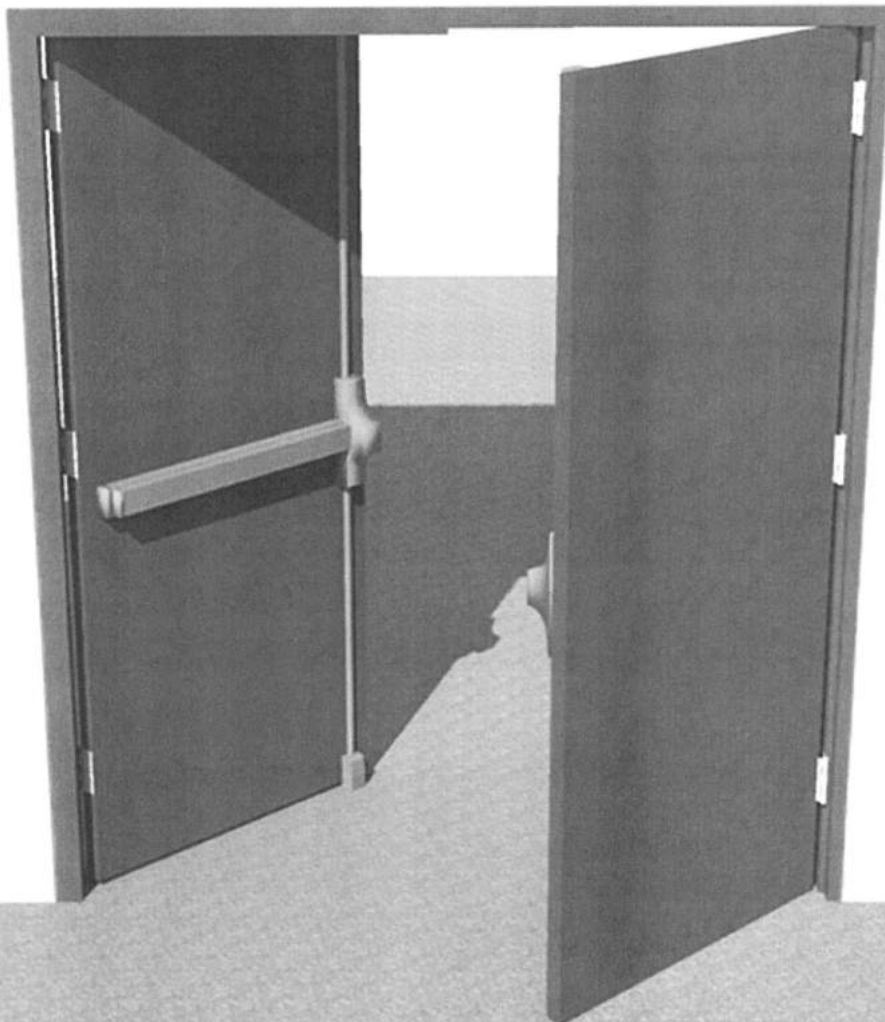
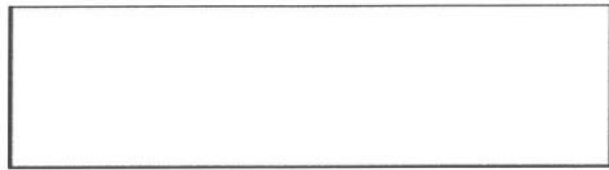
# Handing Double Egress



***OUTSIDE***

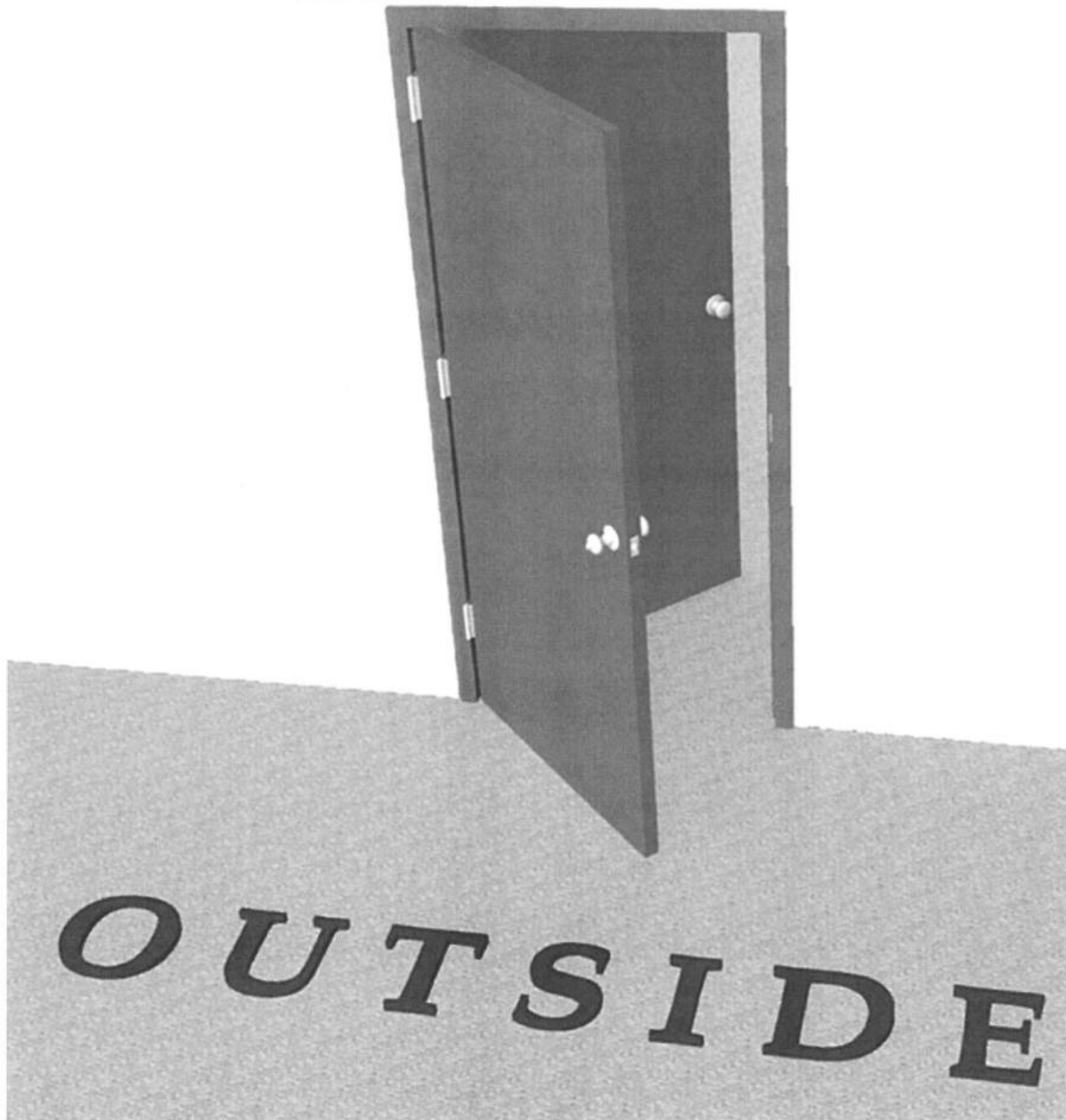
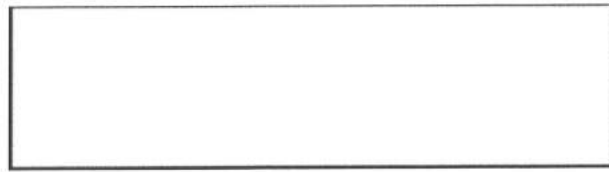


# Handing Double Egress

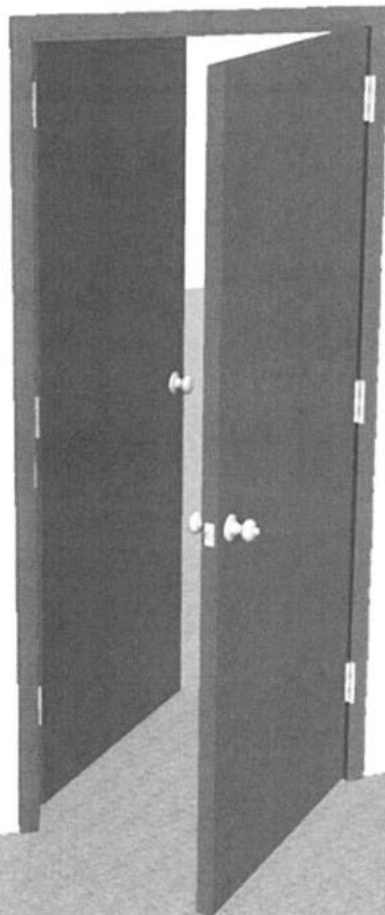
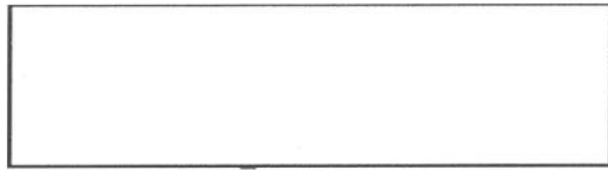


**O U T S I D E**

# Handing Communicating

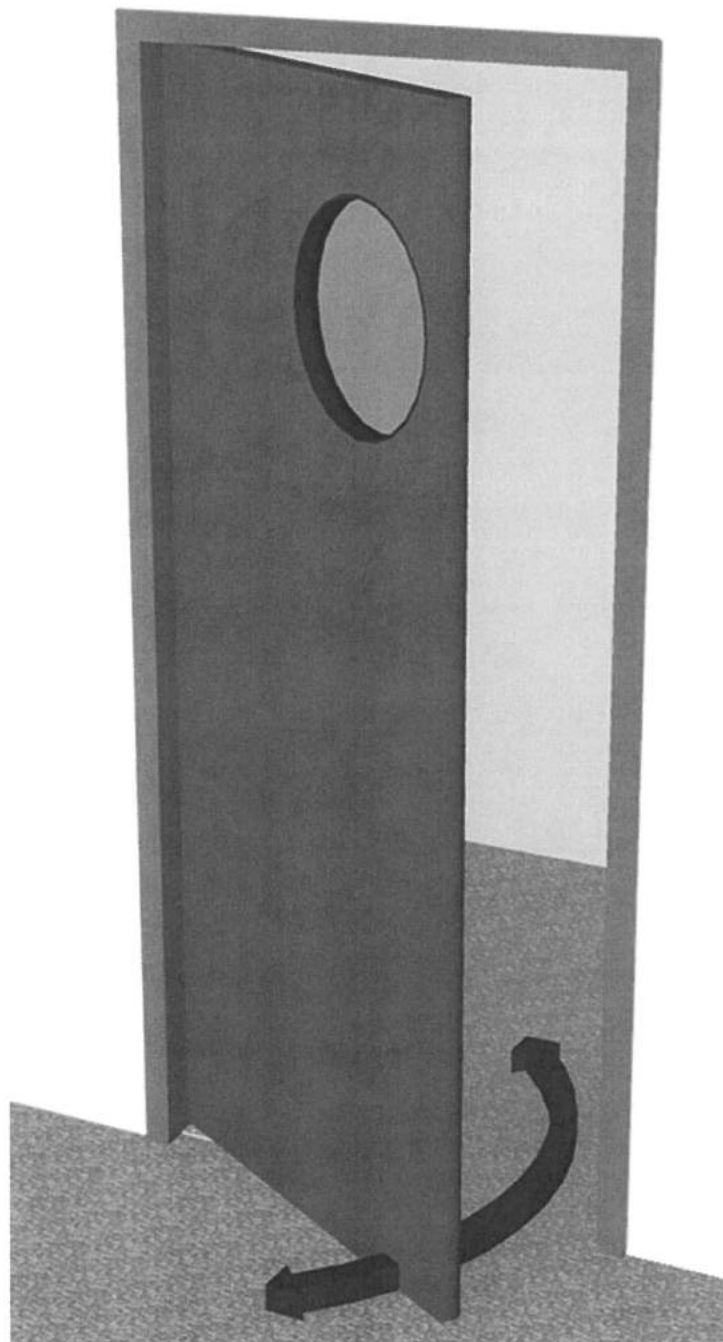
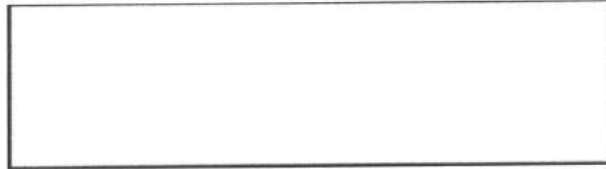


# Handing Communicating



**OUTSIDE**

# Handing



# Types of (Carbon) Steel

- \_\_\_\_\_ (CRS):
  - \_\_\_\_\_ interior frame material
- \_\_\_\_\_ (HRS):
  - Used mainly for \_\_\_\_\_
- \_\_\_\_\_ (A60):
  - \_\_\_\_\_ is an \_\_\_\_\_ part of the steel
- \_\_\_\_\_ (G90):
  - \_\_\_\_\_ coating is on \_\_\_\_\_ of the steel

# Stainless Steel

## Types and Finishes

\_\_\_\_\_ – \_\_\_\_\_, most used

\_\_\_\_\_ – Higher level of \_\_\_\_\_ against  
\_\_\_\_\_ / oxidation (higher nickel content)

\_\_\_\_\_ – 120-150 grit mesh abrasive creates  
a bright \_\_\_\_\_ finish.

\_\_\_\_\_ – Most \_\_\_\_\_ finish, polished w/  
successively finer abrasives then buffing.  
Surface free of “grit” lines.

# Gauges

## Thickness

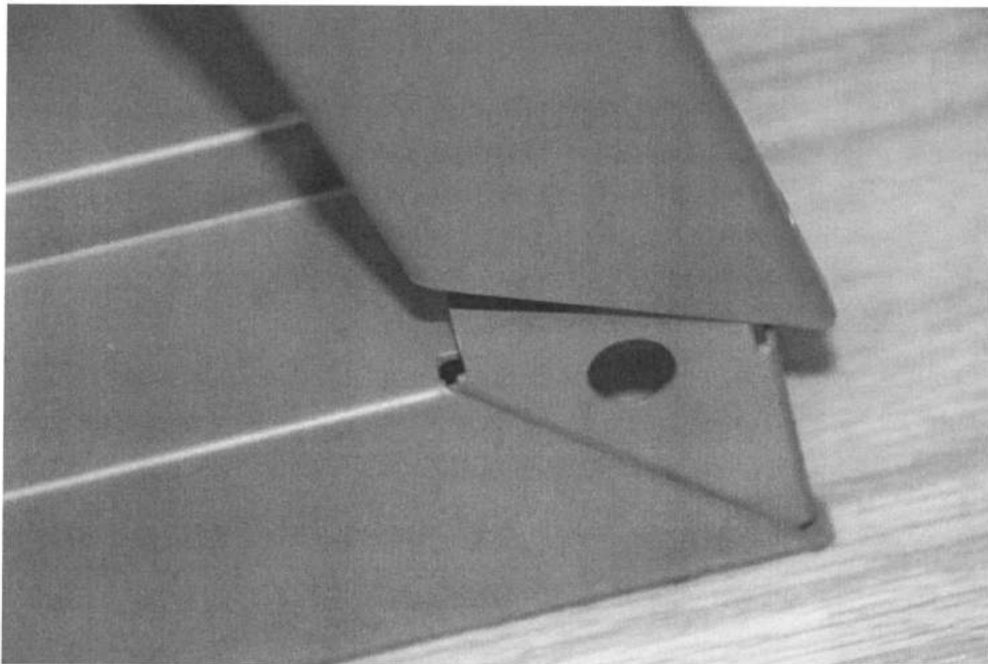
- Determines the thickness of the steel
- \_\_\_\_\_ gauge most \_\_\_\_\_
- \_\_\_\_\_ gauge \_\_\_\_\_ applications
- \_\_\_\_\_ gauge \_\_\_\_\_ applications
- Smaller the number (gauge), \_\_\_\_\_ the metal

| Metal Gauges and Thickness |                     |                      |
|----------------------------|---------------------|----------------------|
| Gauge                      | Thickness (Decimal) | Thickness (Fraction) |
| 12                         | .105                | 7/64"                |
| 14                         | .0747               | 5/64"                |
| 16                         | .0598               | 1/16"                |
| 18                         | .0478               | 3/64"                |
| 20                         | .0359               | 1/32"                |
| 22                         | .0299               | < 1/32"              |
| 24                         | .0239               | < 1/32"              |

# Construction

## \_\_\_\_\_ - Drywall Type

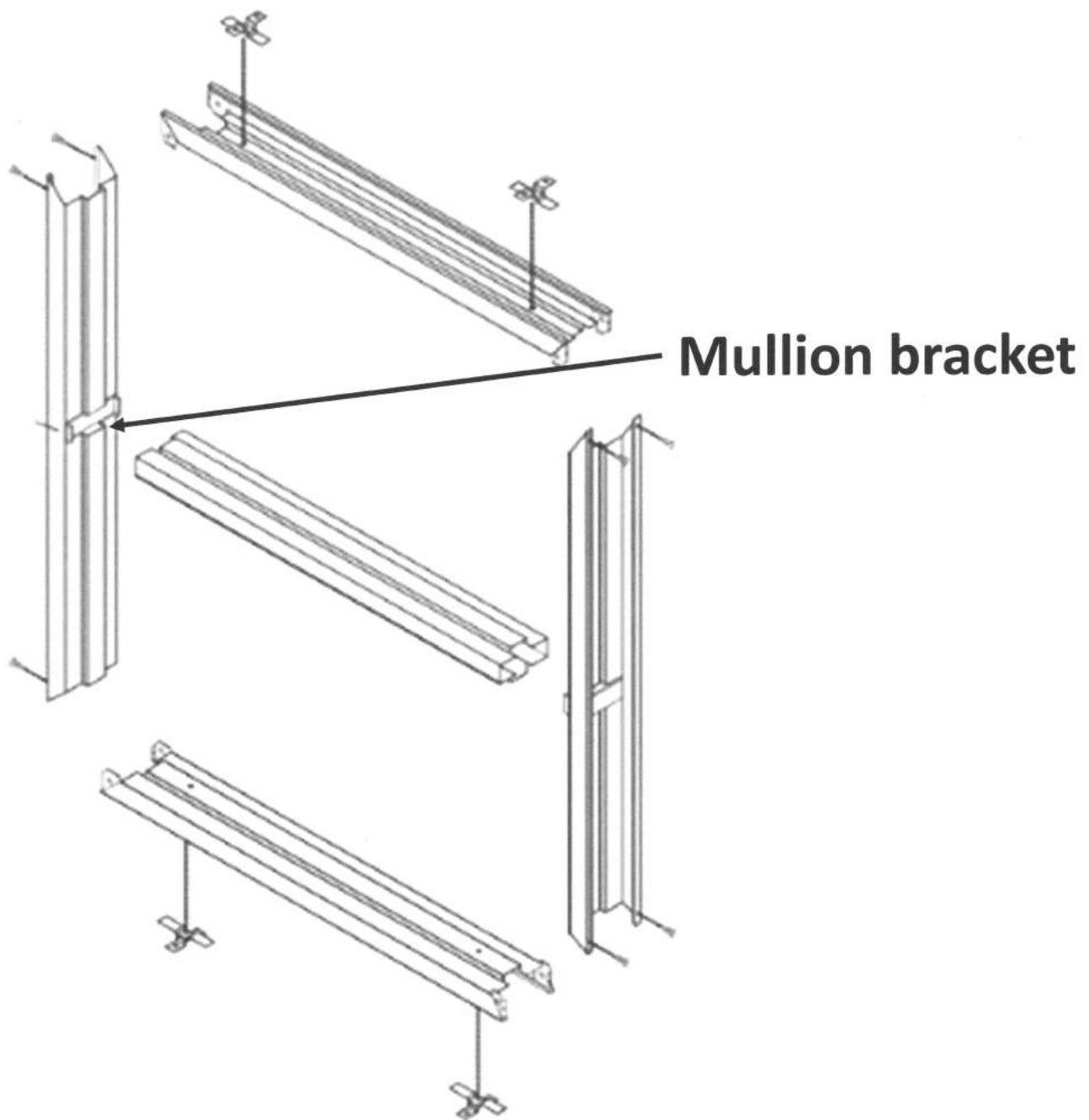
- Can be shipped to the jobsite  
\_\_\_\_\_.
- Frame can be installed inside a  
\_\_\_\_\_ wall opening.
- Available in many configurations.





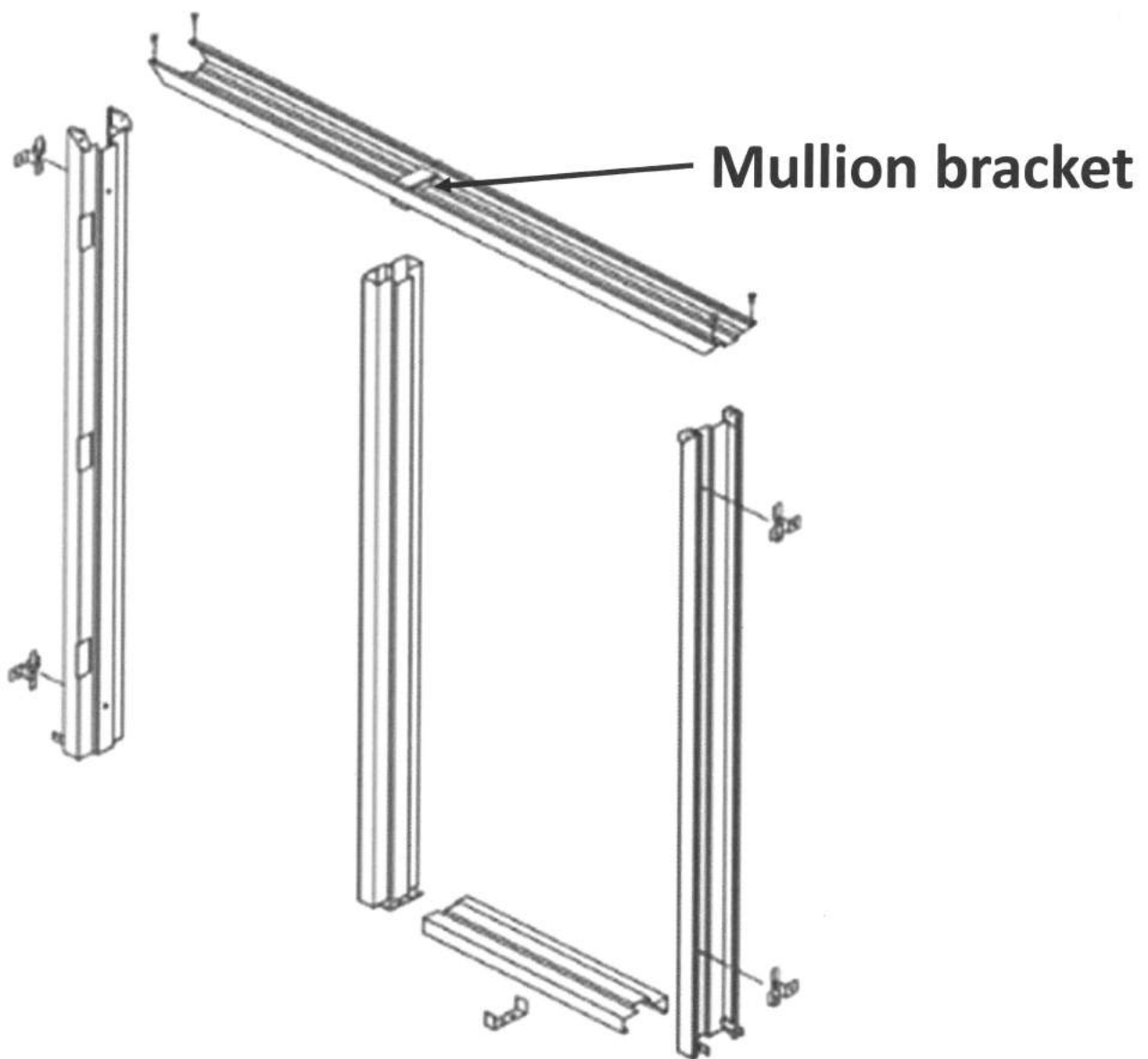
# Construction

## KD Drywall Borrowed Light Frame



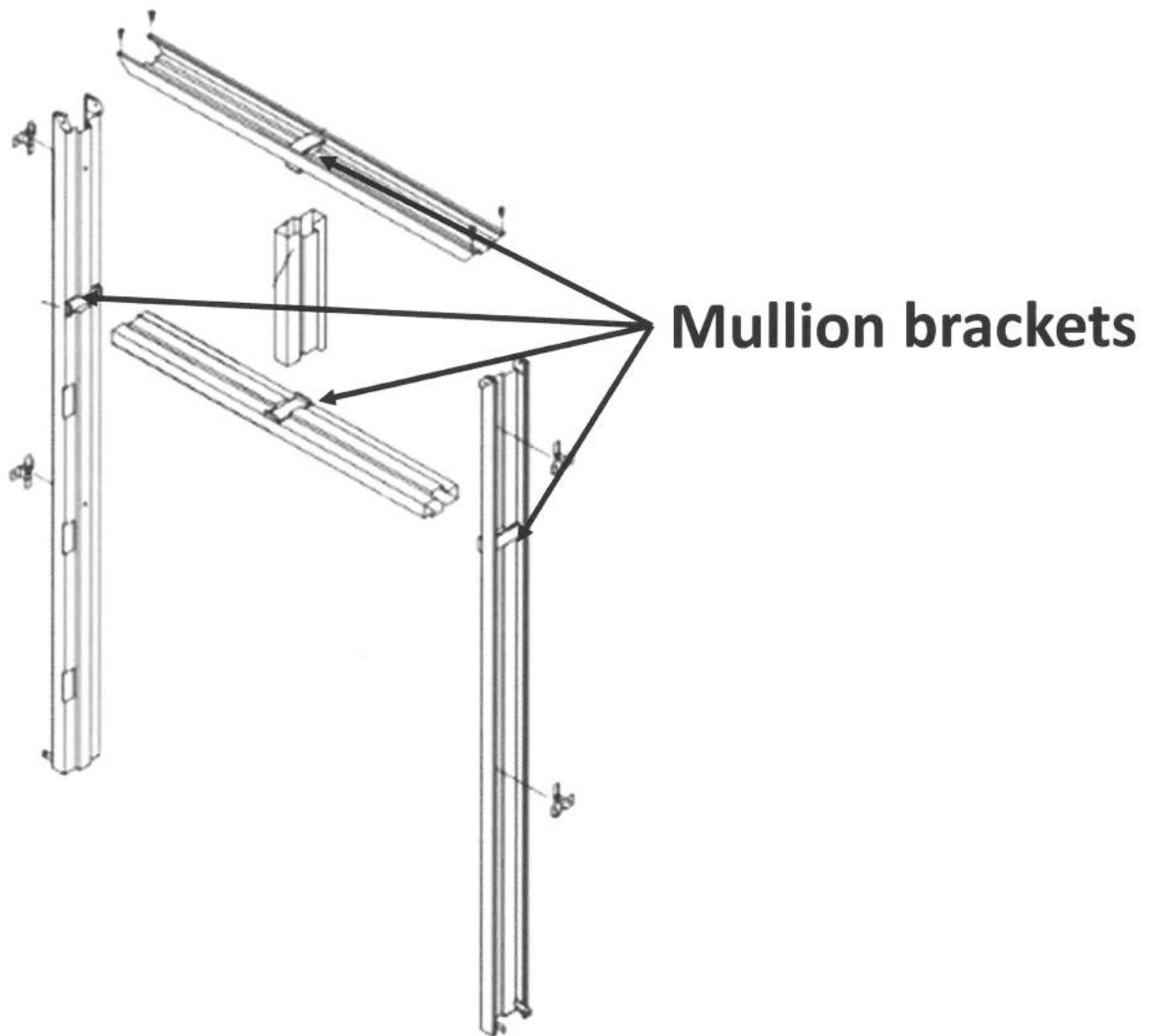
# Construction

## KD Drywall Sidelight Frame



# Construction

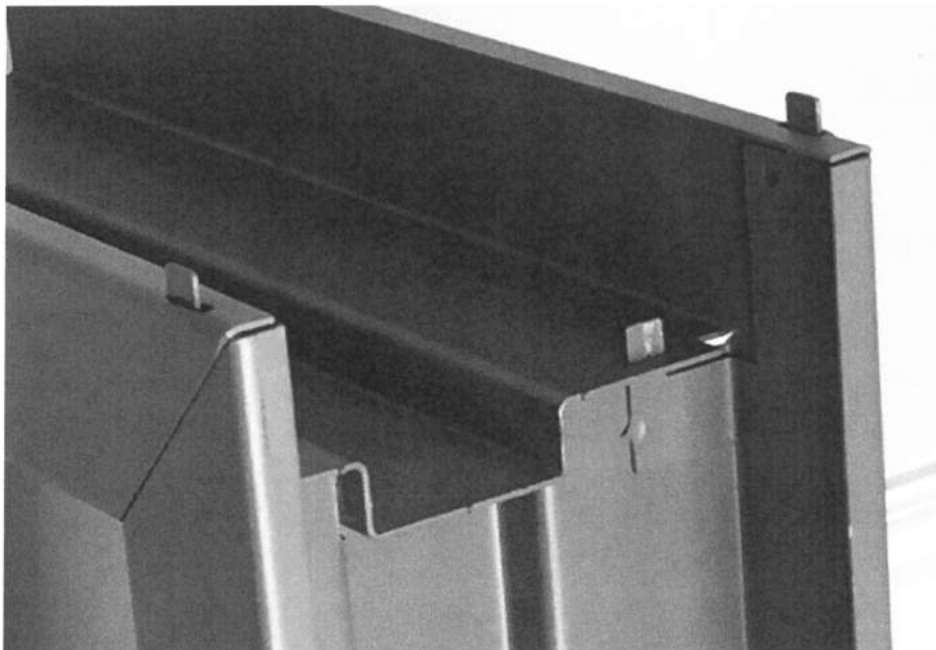
## KD Drywall Transom Frame



# Construction

## KD \_\_\_\_\_ Type

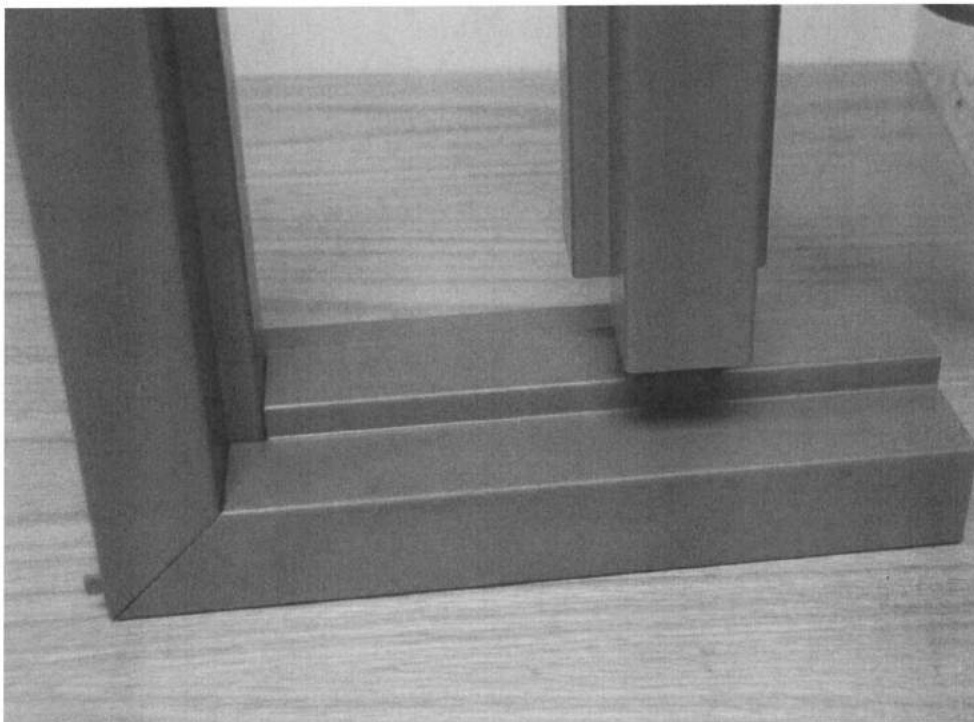
- Could be shipped to the jobsite  
\_\_\_\_\_.
- Must be \_\_\_\_\_, then installed.
- \_\_\_\_\_ and \_\_\_\_\_ lights  
only



# Construction

**KD (KD to be \_\_\_\_\_ )**

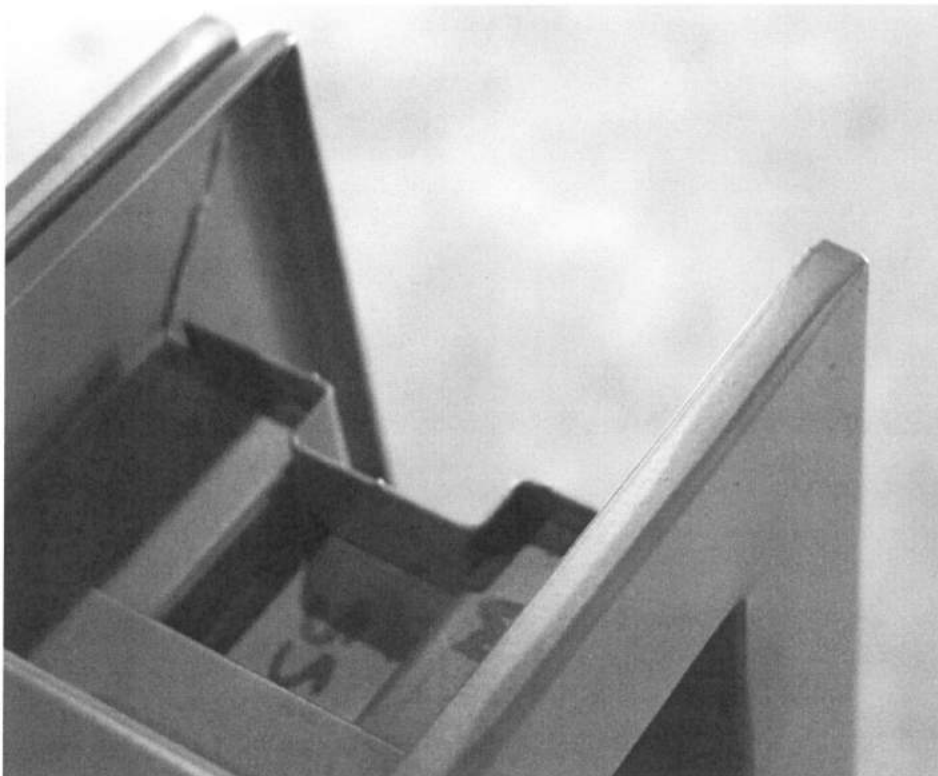
- Shipped KD from factory for welding by others.
- Installed as \_\_\_\_\_ .
- Many configurations available.



# Construction

## Face Welded

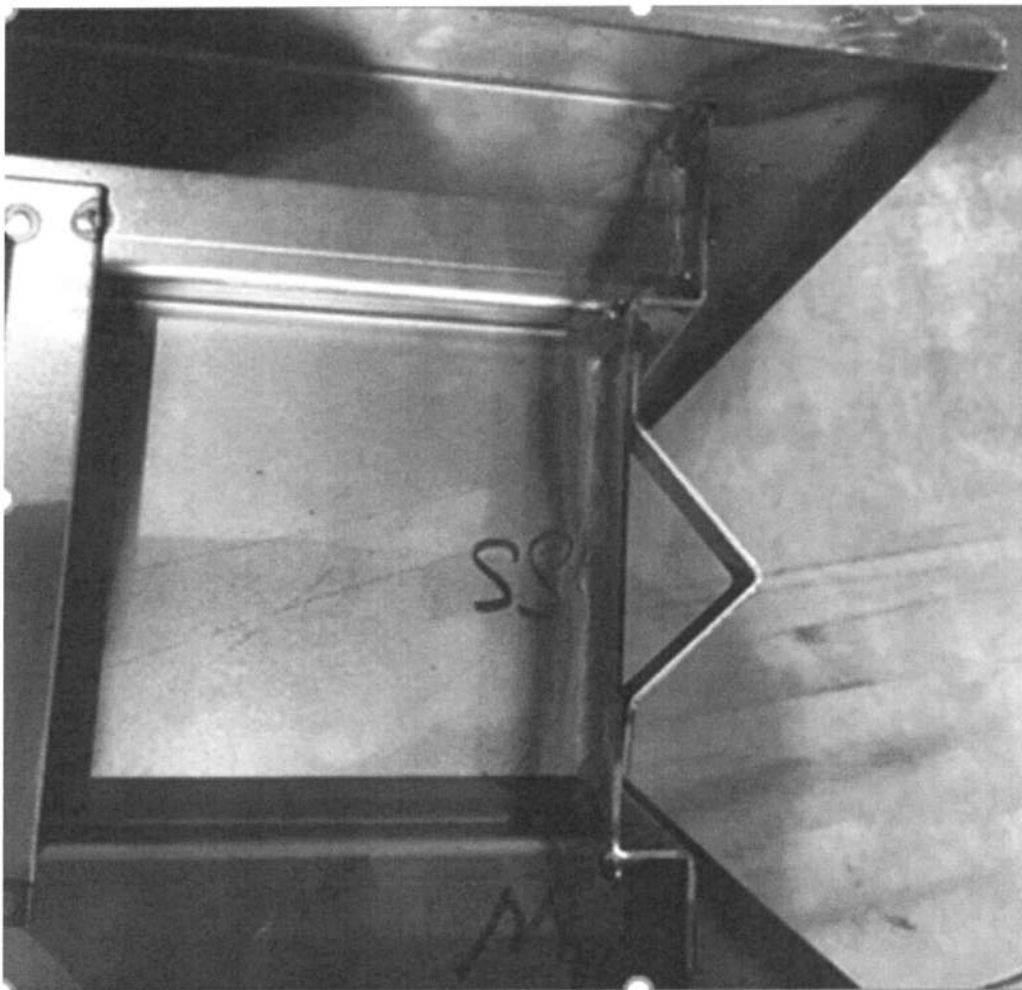
- Ships and installs as an \_\_\_\_\_ and \_\_\_\_\_ unit.
- Continuously welded \_\_\_\_\_ only
- No welding in \_\_\_\_\_ of frame



# Construction

## Continuously Welded

- Ships and installs as an \_\_\_\_\_ and \_\_\_\_\_ unit.
- Continuously welded \_\_\_\_\_



# Construction

## Splices

- Required anytime there is a change of profile type or when the frame is too large for various reasons.

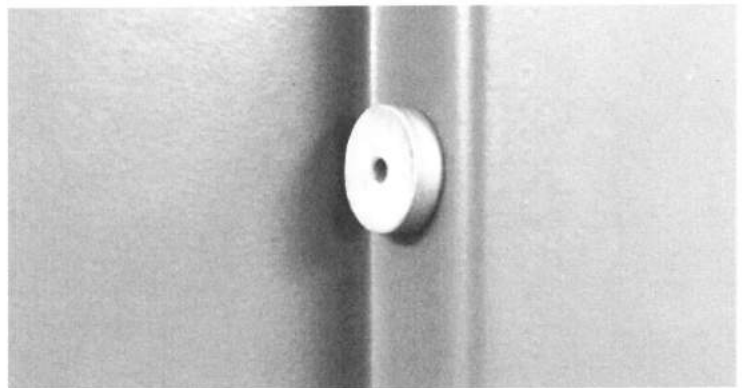
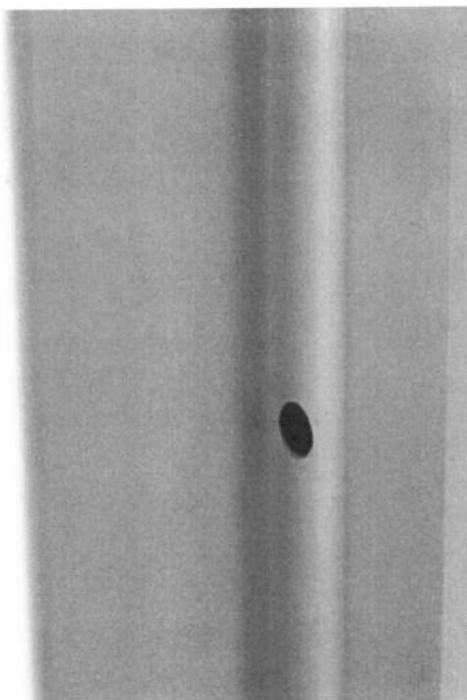
### **3 types of splices:**

- 1) \_\_\_\_\_ - before paint
- 2) \_\_\_\_\_ - before shipping
- 3) \_\_\_\_\_ - after shipping



# Door Silencers

- Prevents wear and tear on the \_\_\_\_\_ and \_\_\_\_\_
- Provides a \_\_\_\_\_ gap between the door and the stop on the frame.



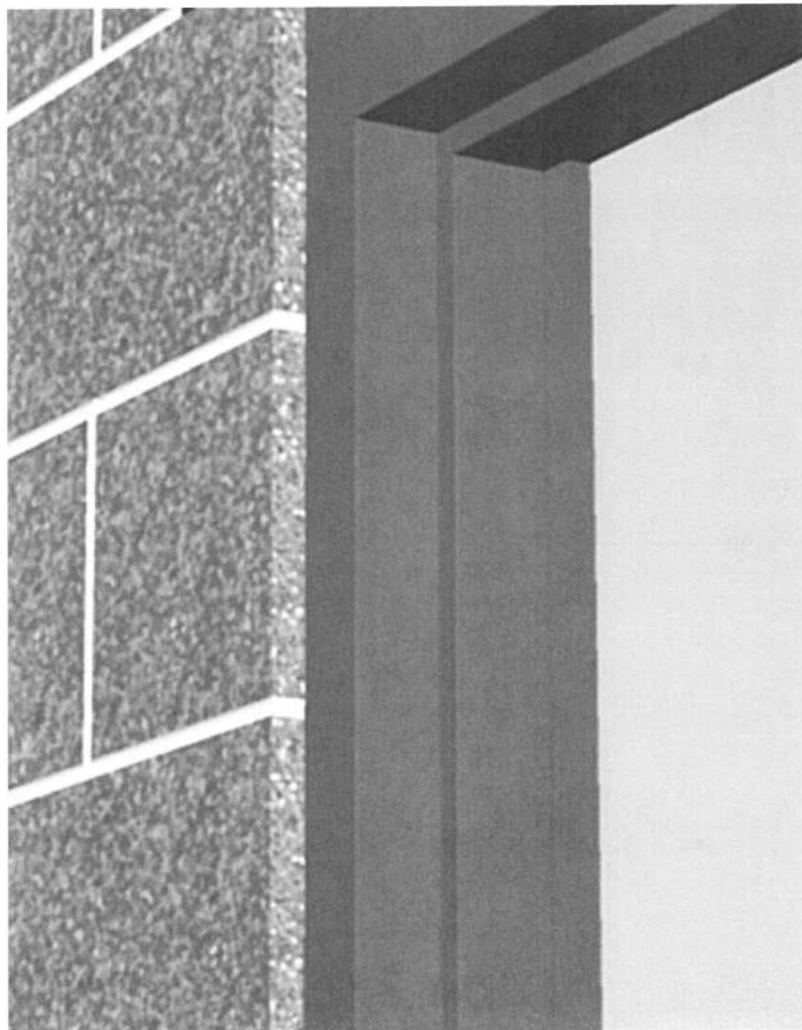
# Anchors

- Attach the \_\_\_\_\_ to the \_\_\_\_\_
- Used for various \_\_\_\_\_ and \_\_\_\_\_ applications.
- For use during and after wall construction (varies by anchor type).
- As a general rule, anchors are normally at the same locations as \_\_\_\_\_ and spaced evenly.

# Frames

## Butted Wall Application

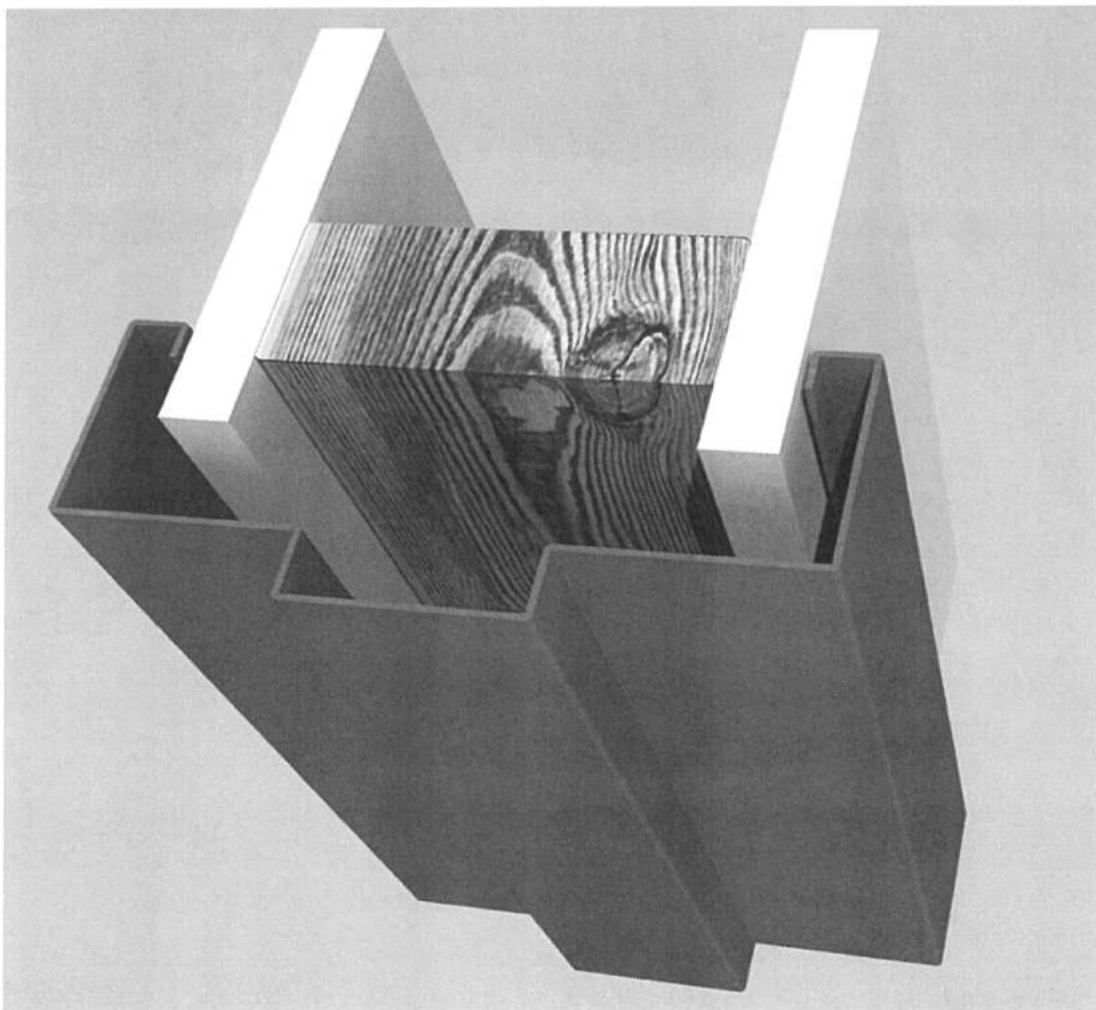
- The frame is \_\_\_\_\_ up to the wall with no part of the wall inside the throat of the frame



# Frames

## Wrapped Wall Application

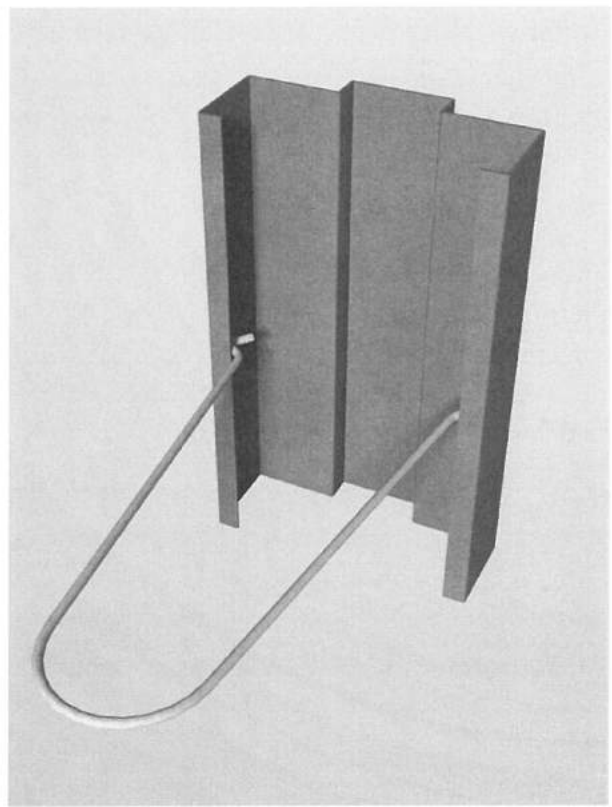
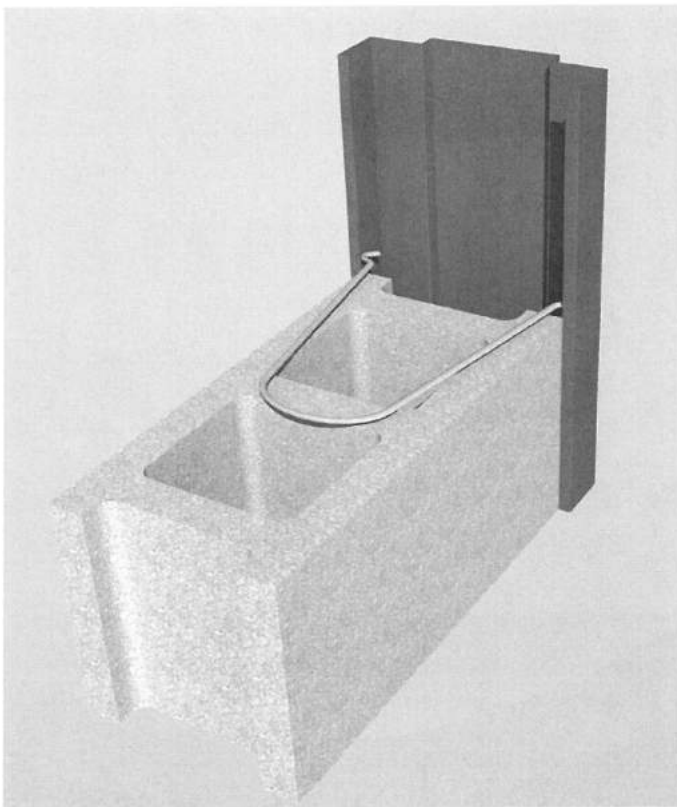
- The frame goes over the wall opening, with part of the wall \_\_\_\_\_ the \_\_\_\_\_ of the frame.



# Anchors – Masonry

## Wire Anchors (WA)

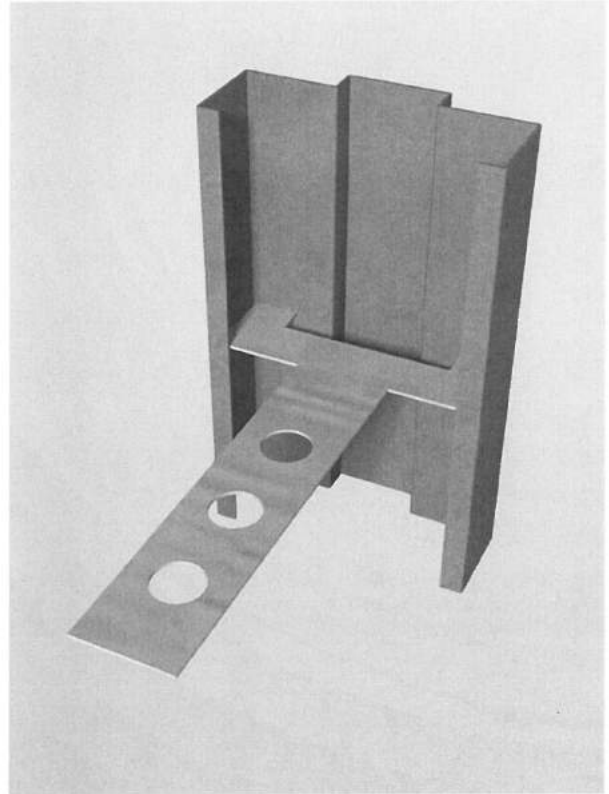
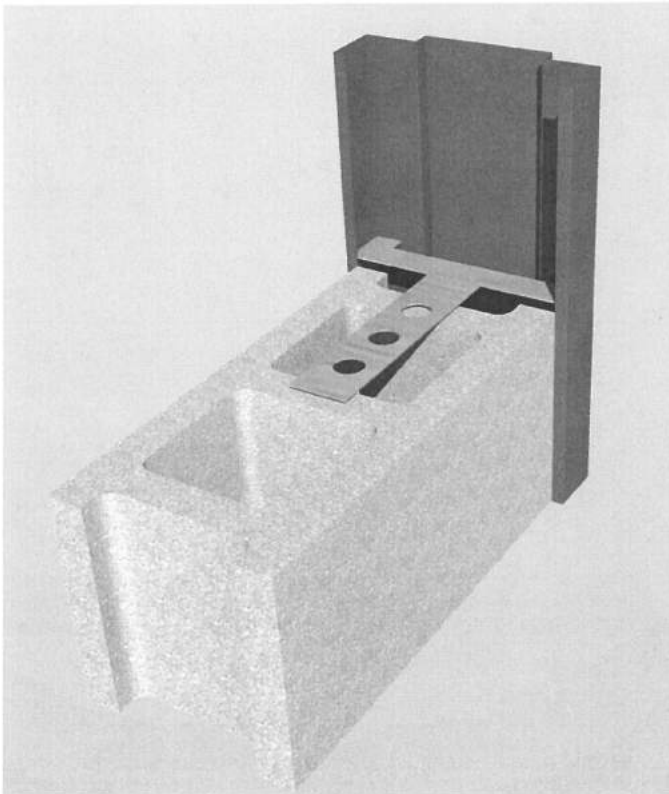
- Masonry anchor
- For use \_\_\_\_\_ wall construction
- Anchor shipped \_\_\_\_\_



# Anchors – Masonry

## T- Anchor (TA)

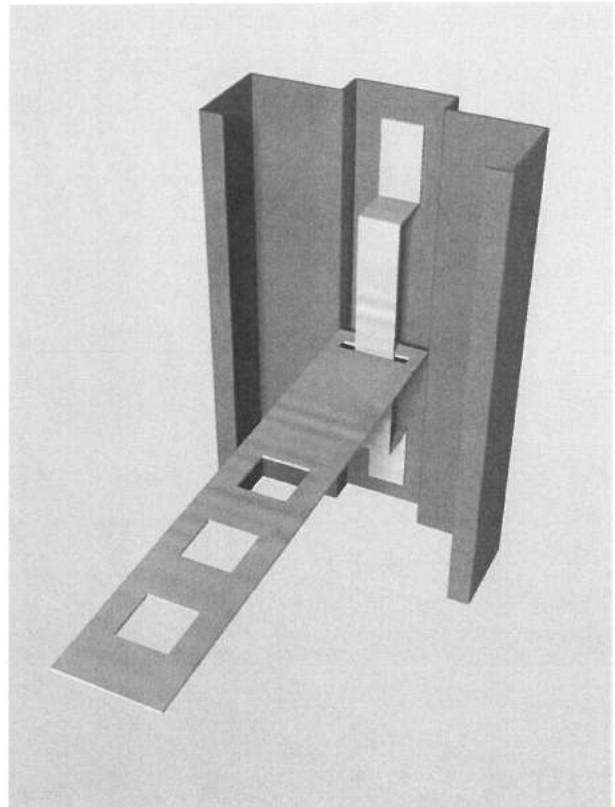
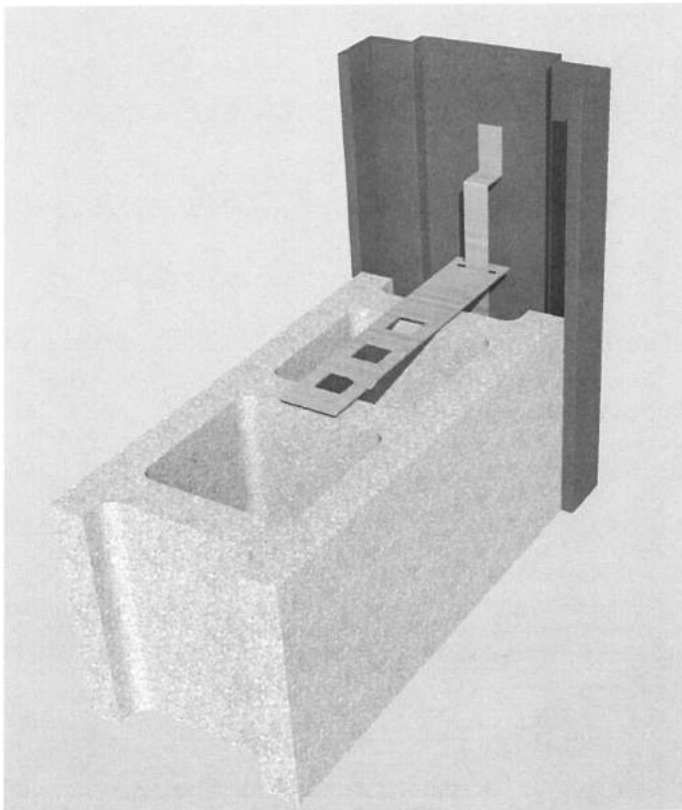
- Masonry anchor
- For use \_\_\_\_\_ wall construction
- Anchor shipped \_\_\_\_\_



# Anchors – Masonry

## Adjustable Strap Anchor (SA)

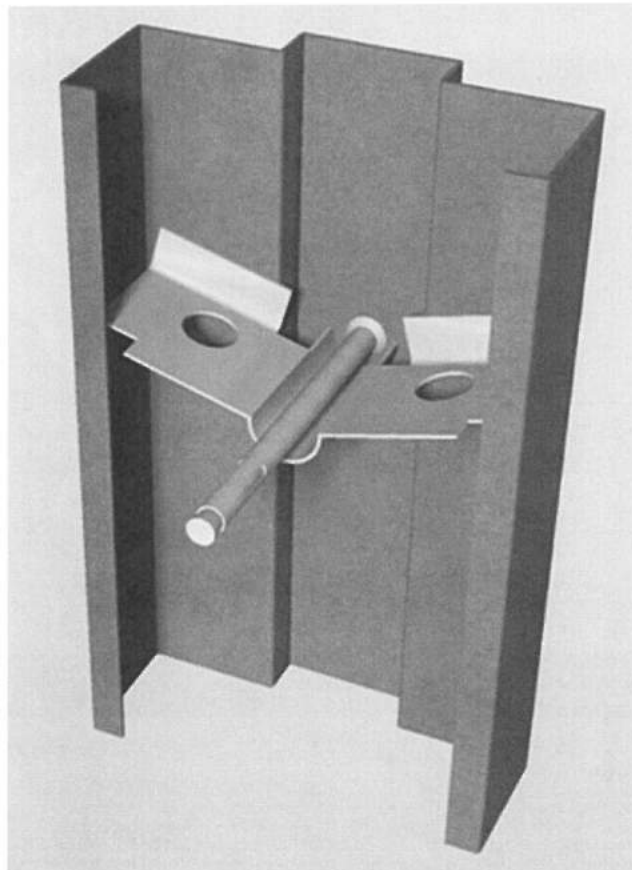
- Masonry anchor
- For use \_\_\_\_\_ wall construction
- Anchor is \_\_\_\_\_ to frame
- Also referred to as \_\_\_\_\_



# Anchors-Masonry

## Existing Masonry (EM) Butterfly

- Masonry anchor
- For use \_\_\_\_\_ wall construction
- Anchor is \_\_\_\_\_ to frame, bolts optional
- Punch and Dimple (P&D) for 3/8" expansion bolt or lag screw
- Used with \_\_\_\_\_ faces

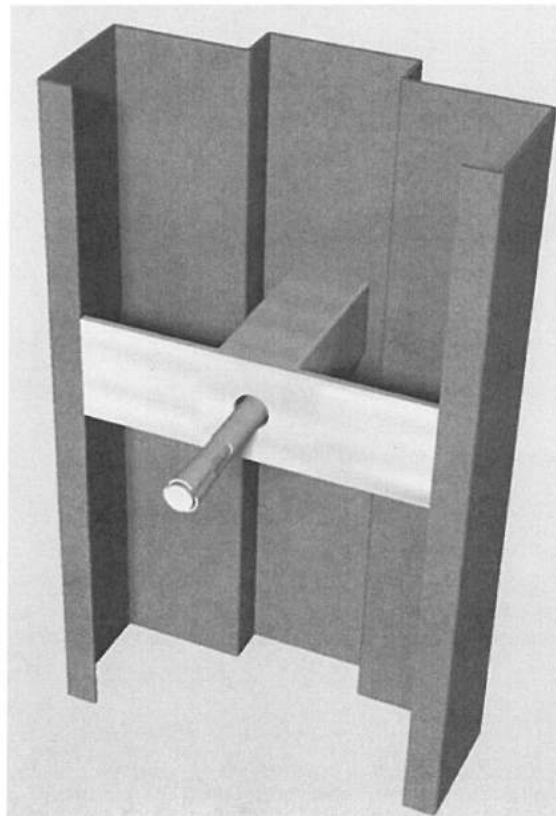




# Anchors – Masonry

## Existing Masonry (EP) Pipe Sleeve

- Masonry anchor
- For use \_\_\_\_\_ wall construction
- Anchor is \_\_\_\_\_ to frame, bolts optional
- Punch & Dimple (P&D) for 3/8" expansion bolt or lag screw
- Used with \_\_\_\_\_ faces

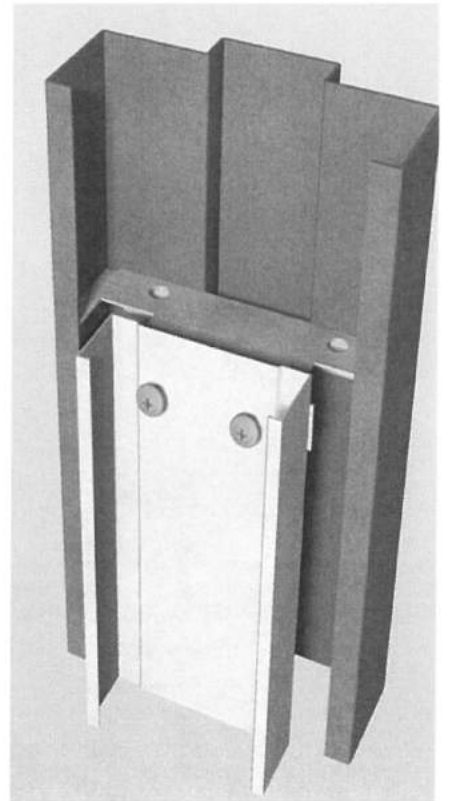
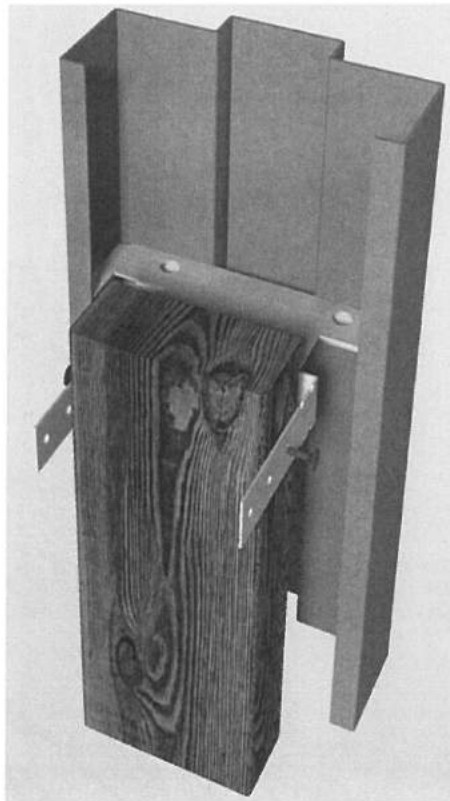
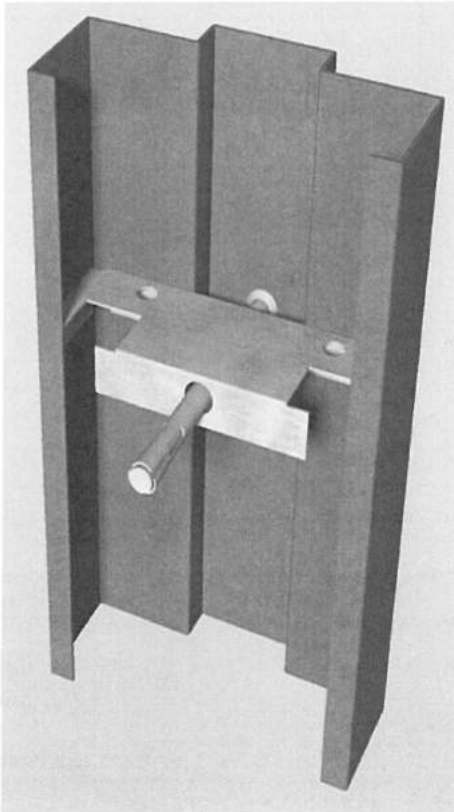


# Anchors

## Masonry / Drywall

### Multi-Purpose Anchors (MP)

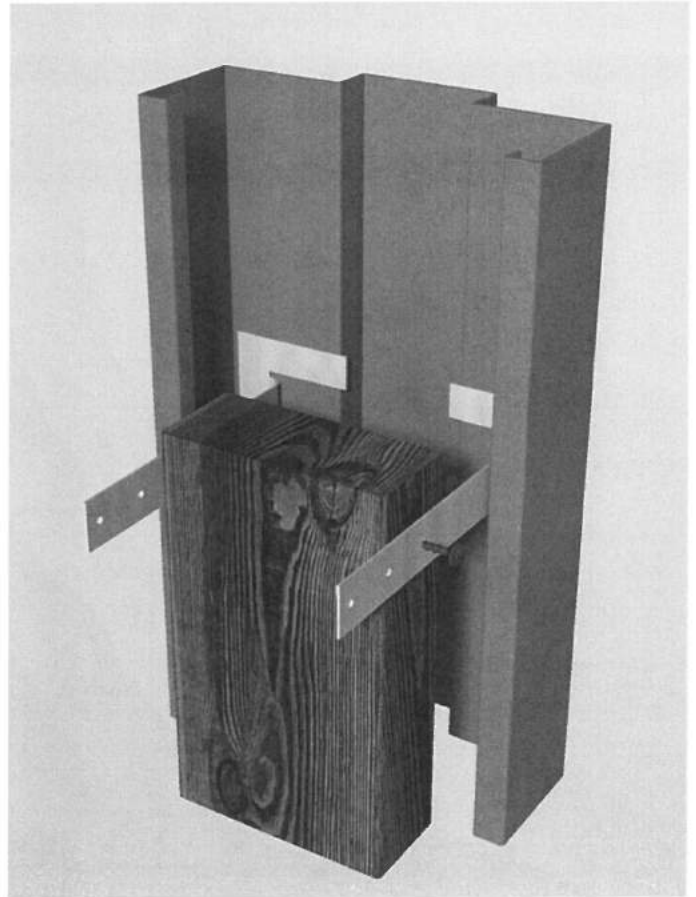
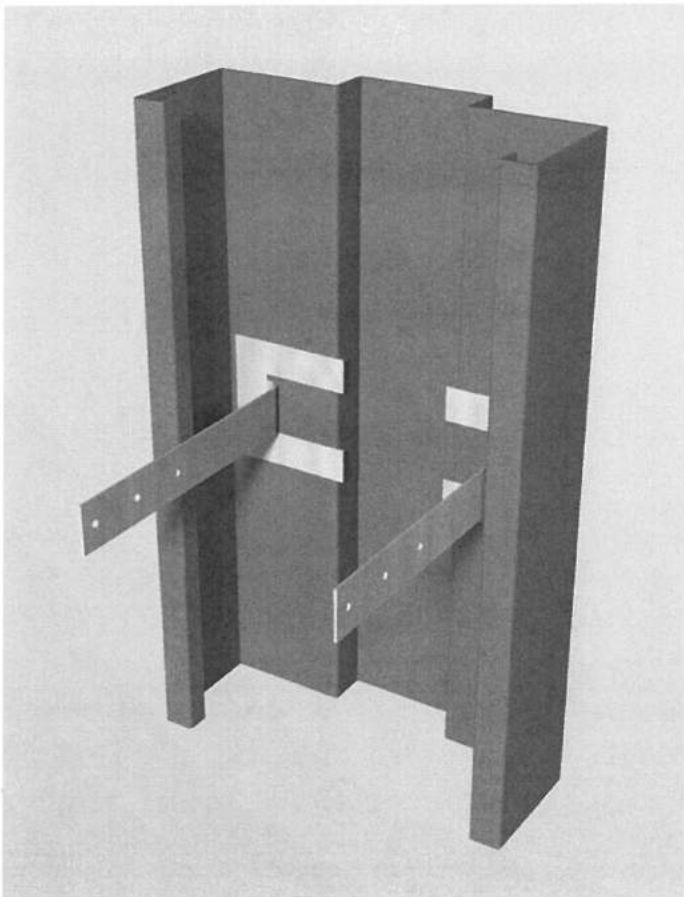
- \_\_\_\_\_ or \_\_\_\_\_ anchor
- During or \_\_\_\_\_ wall construction
- Anchor shipped loose
- Existing \_\_\_\_\_, \_\_\_\_\_ or \_\_\_\_\_



# Anchors – Drywall

## Wood Stud Anchors (WS)

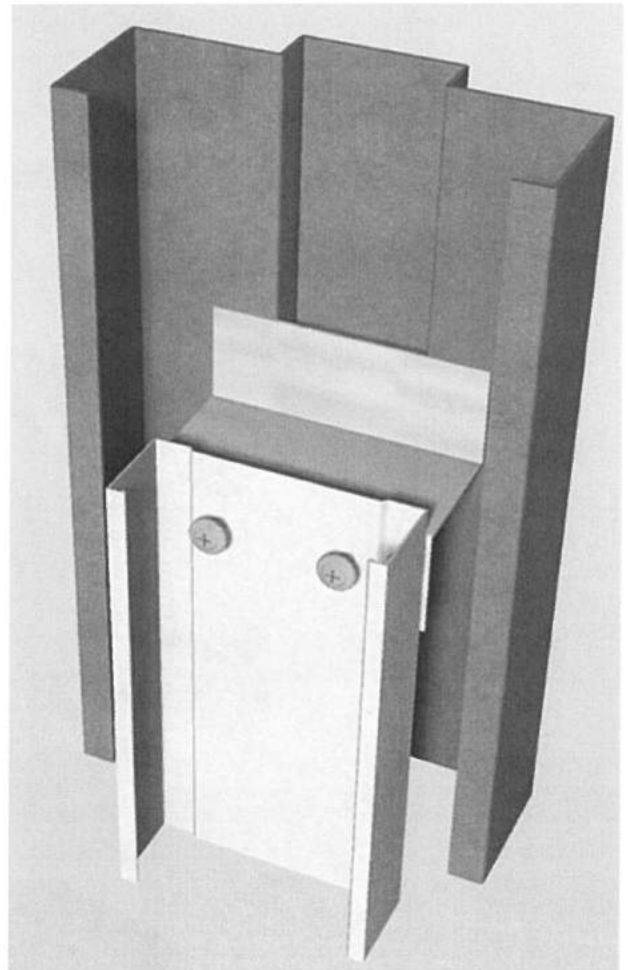
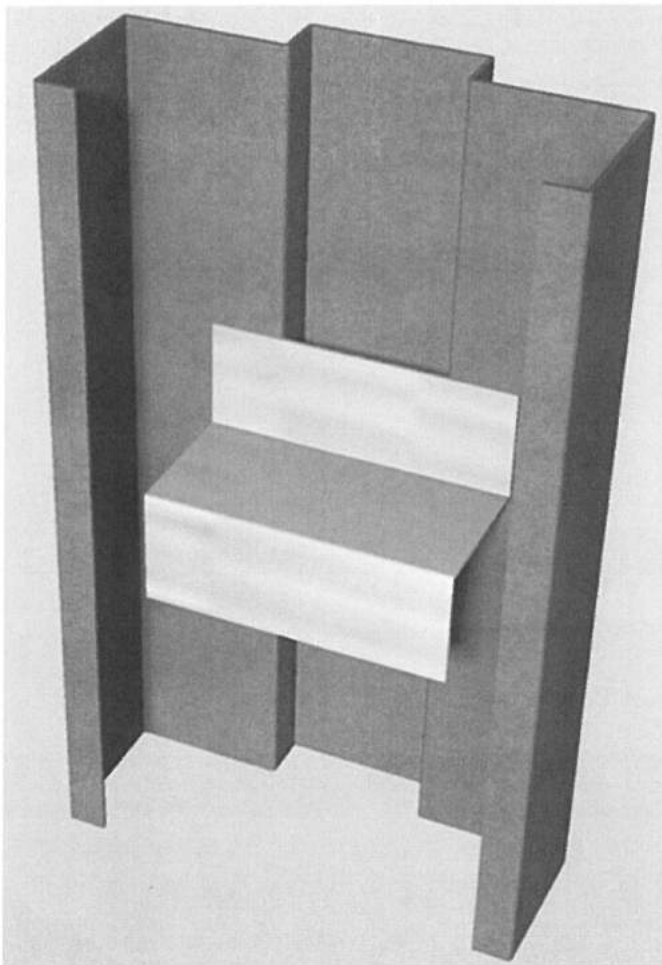
- \_\_\_\_\_ or \_\_\_\_\_ stud
- For use \_\_\_\_\_ wall construction
- Anchor is welded to frame
- Strap \_\_\_\_\_ around wood stud



# Anchors – Drywall

## Steel Stud Anchors (SS)

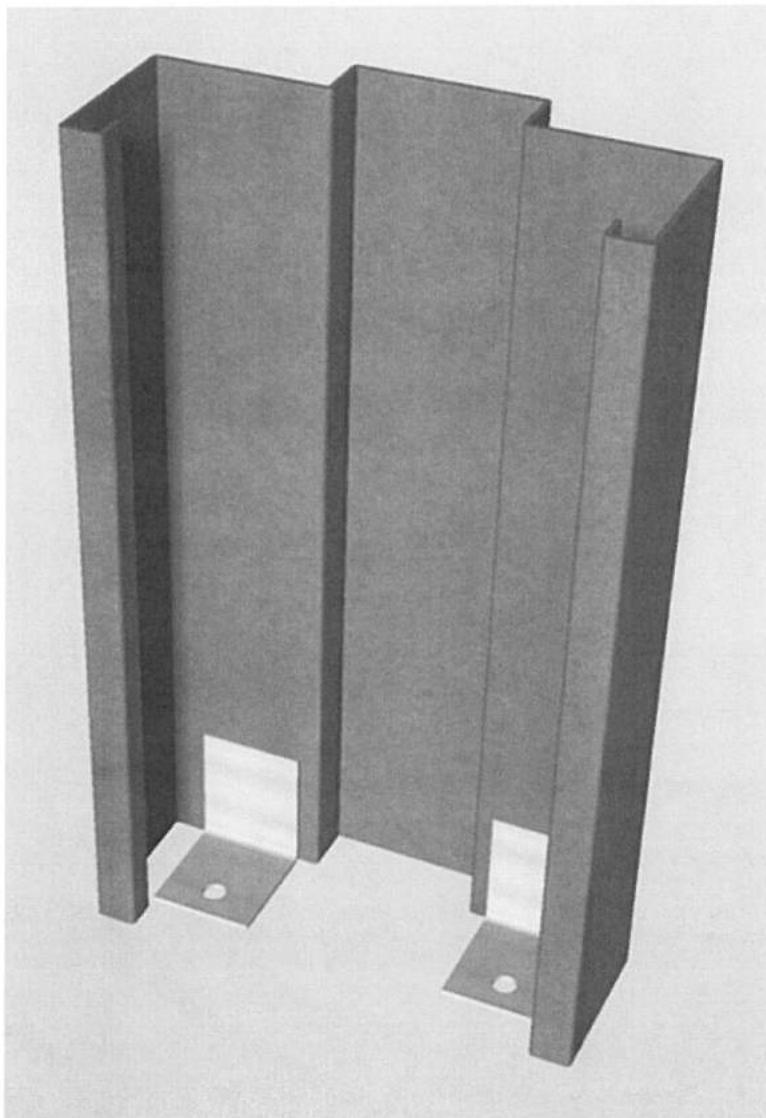
- \_\_\_\_\_ or \_\_\_\_\_ anchor
- For use \_\_\_\_\_ wall construction
- Anchor is welded to frame
- Anchor is \_\_\_\_\_ with back of frame



# Anchors- Drywall

## Base Anchors (BA)

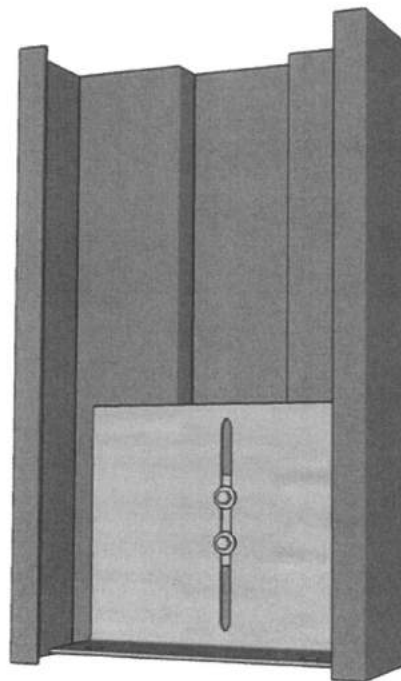
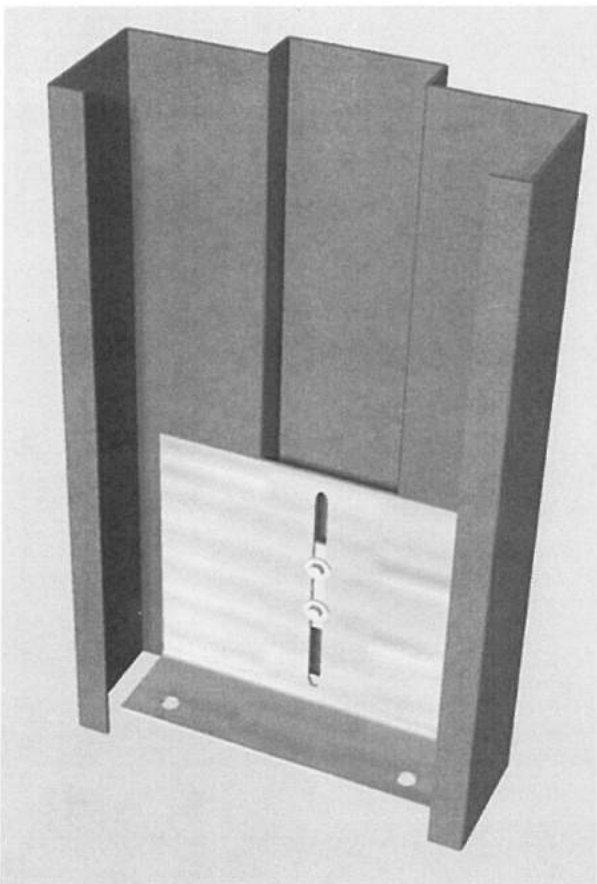
- Stud anchor
- For using \_\_\_\_\_ construction
- Anchor is welded to frame



# Anchors - Masonry

## Adjustable Base Anchor (AB)

- For use with \_\_\_\_\_ and before \_\_\_\_\_ installation
- For use when frame will not be sitting on floor when installed

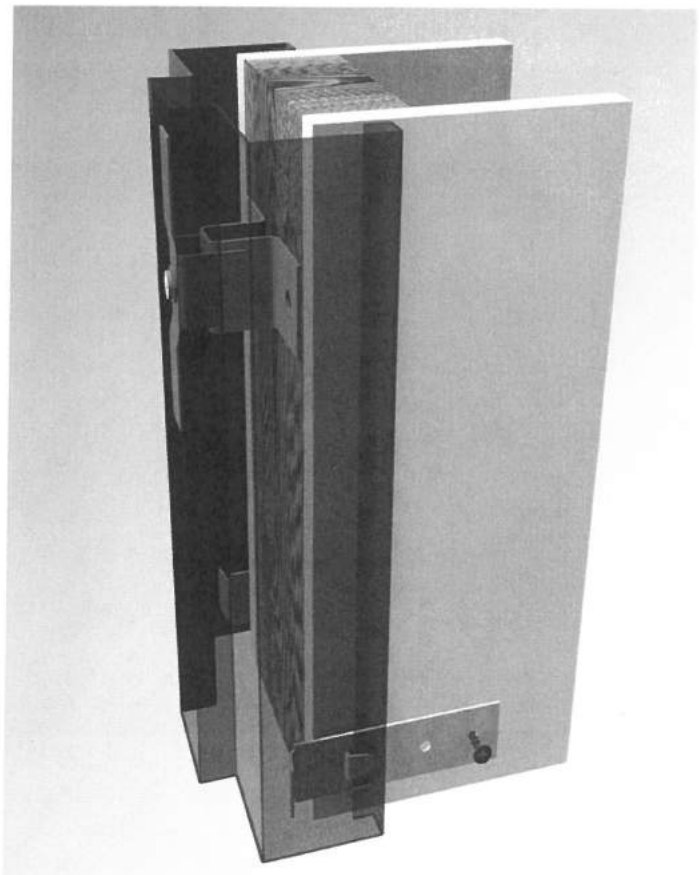
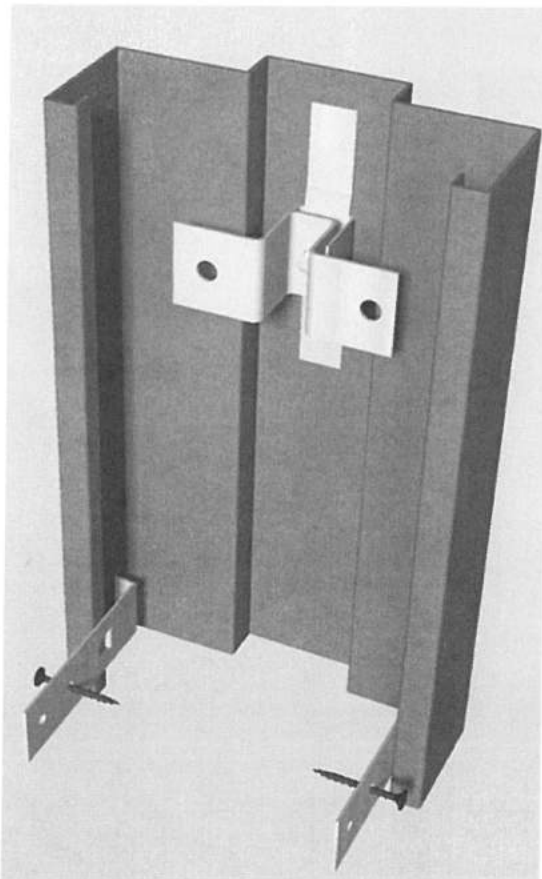


# Anchors-Drywall

## Compression (CO)

### Loose Base Clips

- \_\_\_\_\_ anchor
- For use after wall construction
- Welded in \_\_\_\_\_ with loose  
\_\_\_\_\_ for \_\_\_\_\_ & \_\_\_\_\_ faces

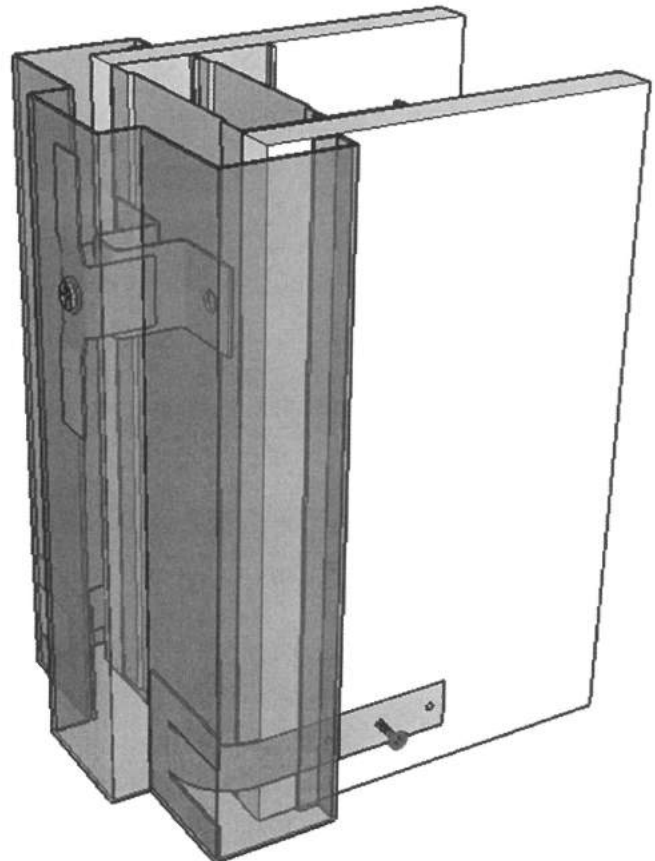
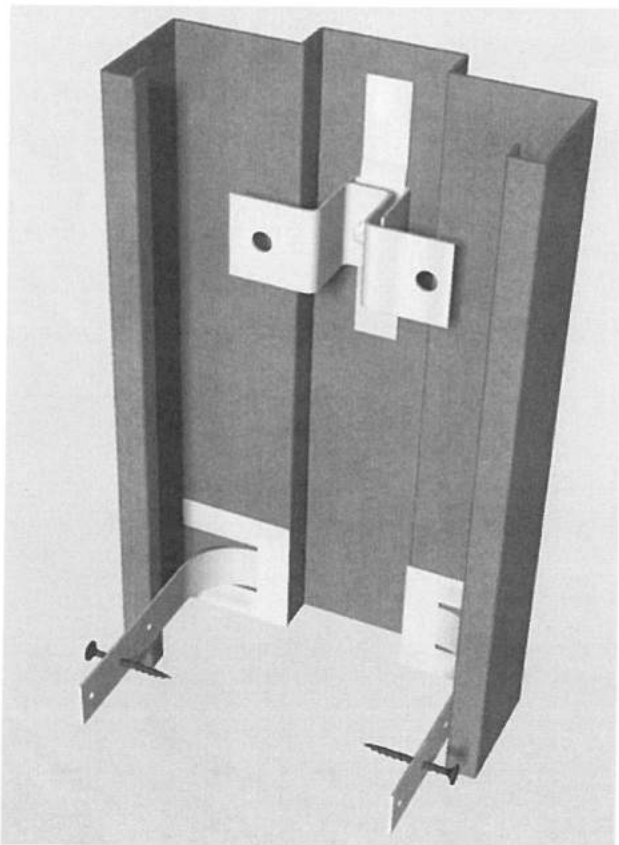


# Anchors - Drywall

## Compression (CW)

### Welded in Base Anchor Strap

- \_\_\_\_\_ anchor
- For use \_\_\_\_\_ construction
- Welded in compression anchor with welded-in (WS) at base



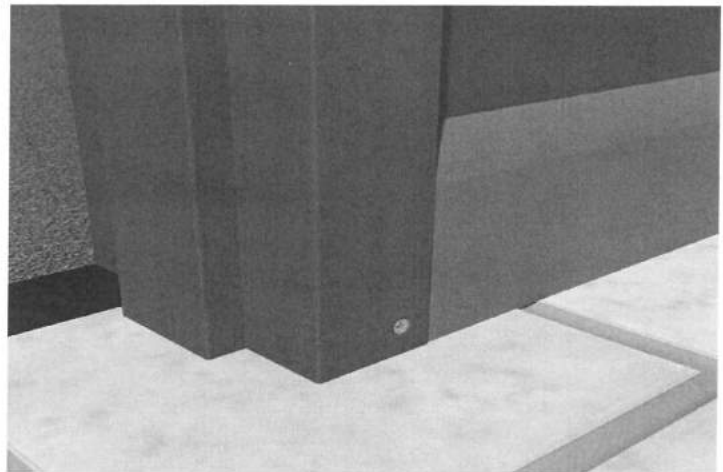
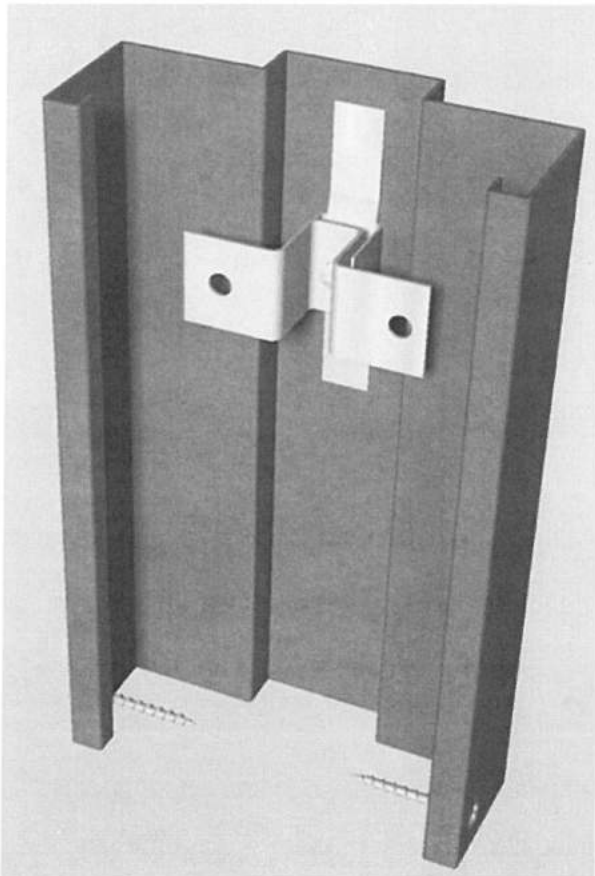


# Anchors - Drywall

## Compression (CP)

### Punch & Dimple Base Anchor

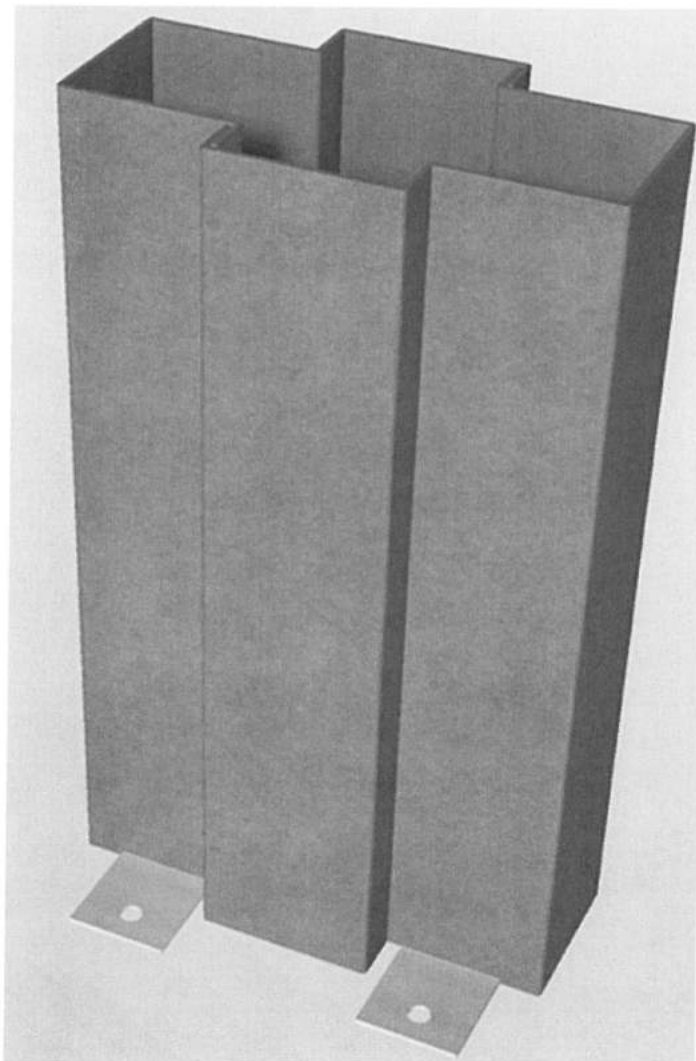
- \_\_\_\_\_ anchor
- For use \_\_\_\_\_ wall construction.
- Welded in compression anchor with P&D for #8 screw at base.



# Anchors - Drywall

## Reverse Base Anchor

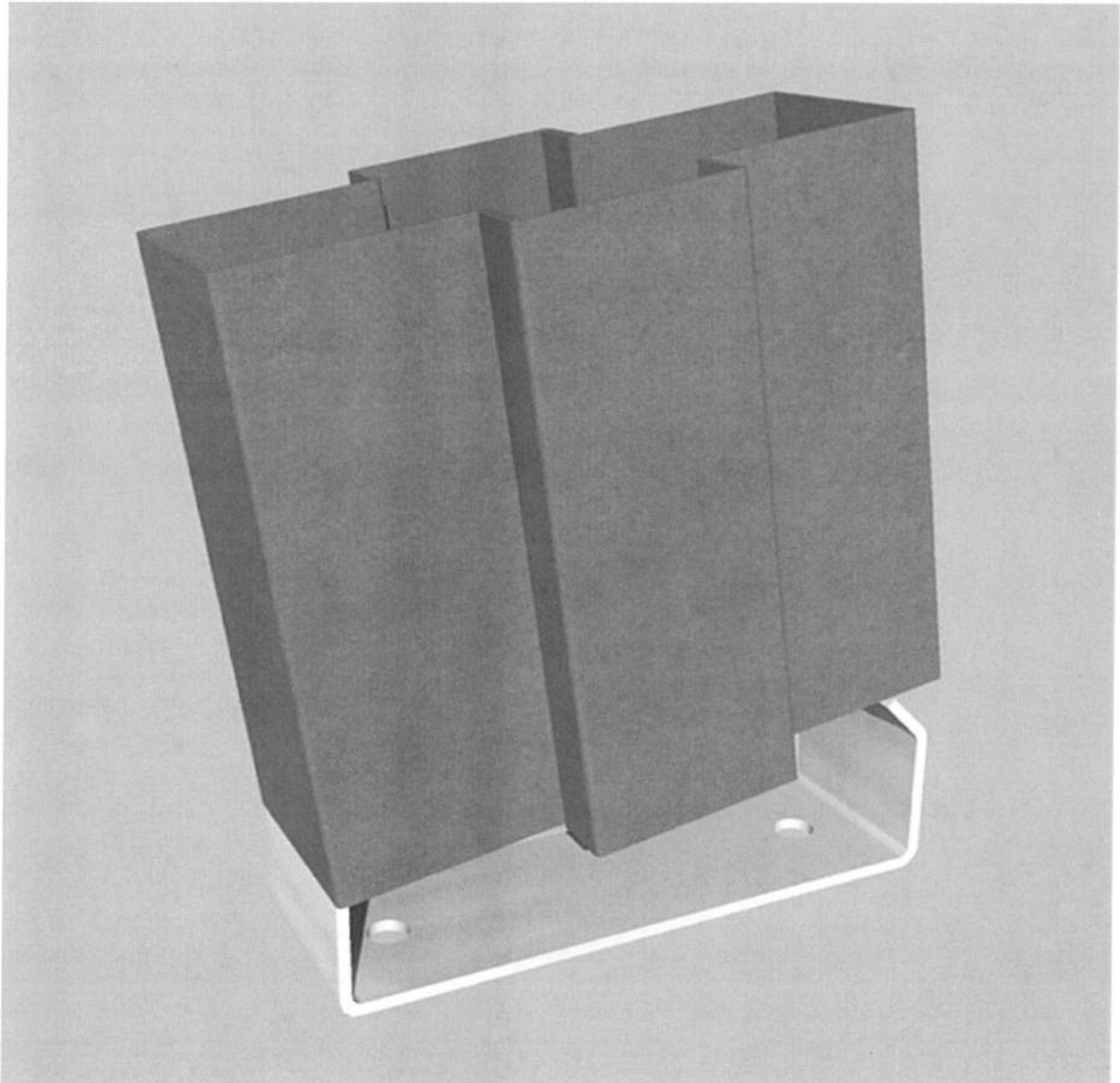
- \_\_\_\_\_ anchor
- For use \_\_\_\_\_ wall construction
- Secures KD DW mullion to the floor



# Anchors

## Mullion Base Anchor

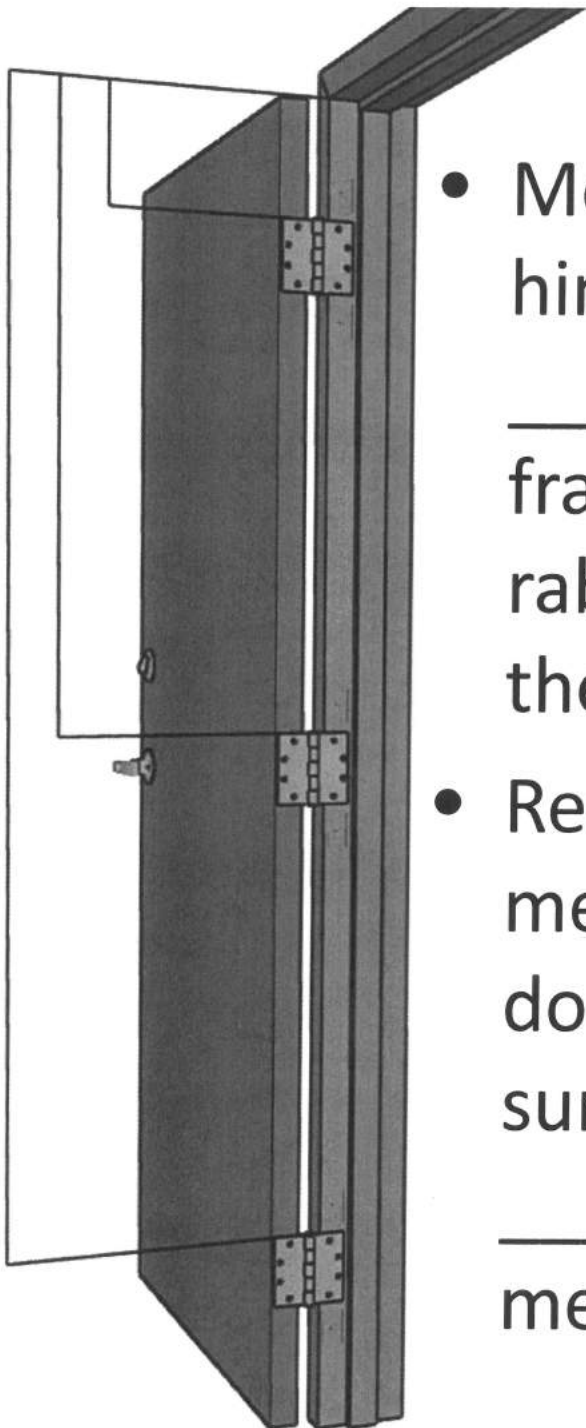
- Secures welded \_\_\_\_\_ to the floor



# Hardware Locations

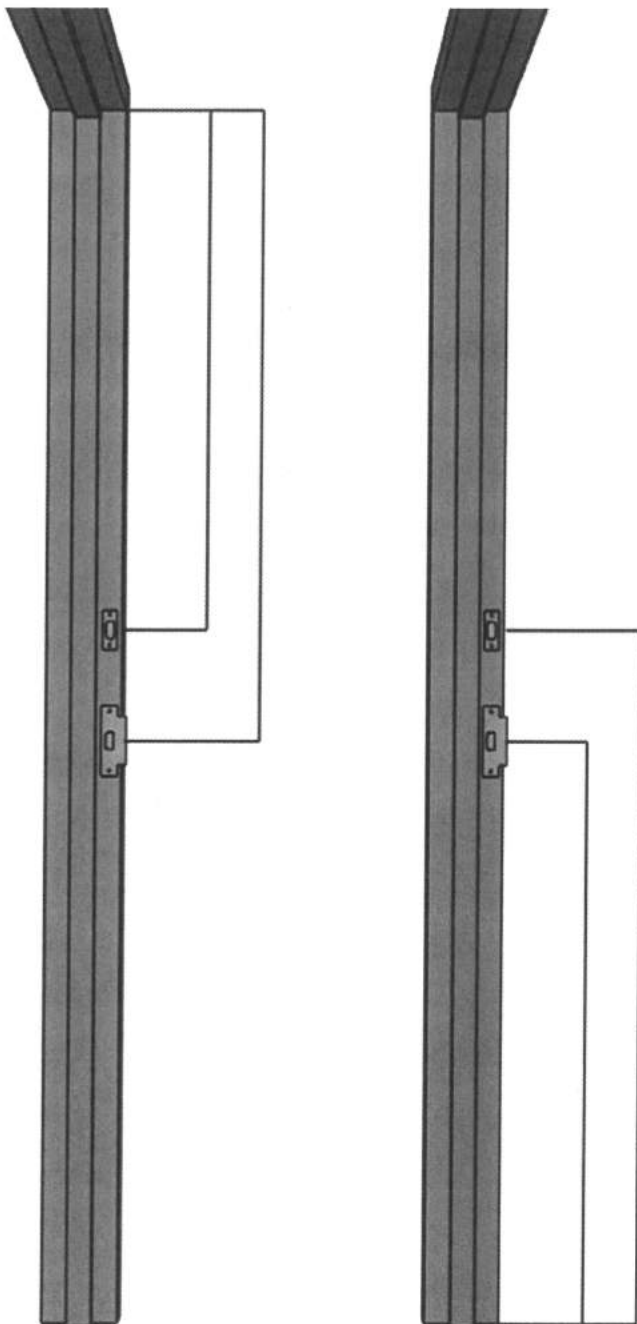
- Main-line manufacturers have \_\_\_\_\_ placement specifications for \_\_\_\_\_ and \_\_\_\_\_.
- Current large manufacturers – Ceco, Curries, Deansteel, Mesker, Pioneer, Republic and Steelcraft.
- Manufacturers out of business – Allied, Amweld, Fenestra, and Firedoor.

# Hardware Locations



- Measure & identify hinge locations from \_\_\_\_\_ inside of the frame (at hardware rabbet) to the \_\_\_\_\_ of the \_\_\_\_\_.
- Red Flag: When field measuring existing doors and frames, be sure to keep \_\_\_\_\_ at each measurement.

# Hardware Locations



- Identify strike centerline from \_\_\_\_\_ of frame
- Field measure strike from \_\_\_\_\_ of the frame (at \_\_\_\_\_ rabbet) to the centerline of the strike prep.

# Swinging the Door

- All hinges \_\_\_\_\_ the door and \_\_\_\_\_ the weight.
- Help to prevent the door from warping.
- Available in different \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and finishes

# Swinging the Door

## Full Mortise Butt Hinge

- Most \_\_\_\_\_ type of hinge.
- Most common size 4 1/2" x 4 1/2"
- Available in two thicknesses
- Standard weight = \_\_\_\_\_ (4.5")
- Heavy weight = \_\_\_\_\_ (4.5")
- Thickness varies based on hinge size (& weight of course)
- 3 1/2", 4", 5", & 6" available



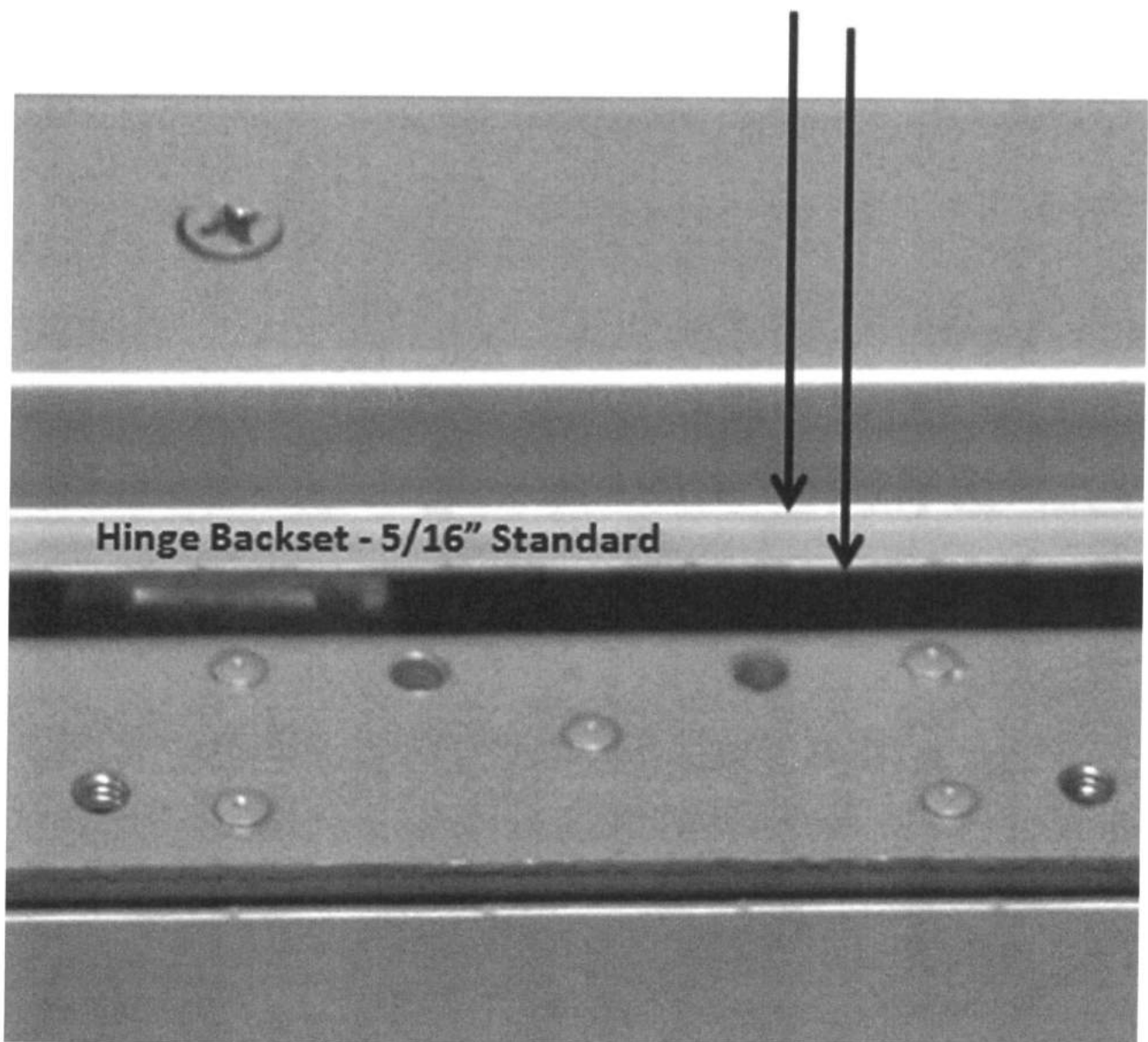
# Swinging the Door

## Hinge Types

- \_\_\_\_\_ Hinge – hinge is \_\_\_\_\_ into the \_\_\_\_\_ and \_\_\_\_\_ into the hinge \_\_\_\_\_ of the \_\_\_\_\_
- \_\_\_\_\_ Hinge – hinge is \_\_\_\_\_ into the \_\_\_\_\_ but \_\_\_\_\_ mounted to the hinge \_\_\_\_\_ of the \_\_\_\_\_
- \_\_\_\_\_ Hinge – hinge is \_\_\_\_\_ mounted to the \_\_\_\_\_ but \_\_\_\_\_ into the hinge \_\_\_\_\_ of frame
- \_\_\_\_\_ Hinge – when the hinge is \_\_\_\_\_ mounted to the \_\_\_\_\_ **AND** to the hinge \_\_\_\_\_ of the \_\_\_\_\_

# Swinging the Door

## Hinge Backset



# Swinging the Door

## Continuous Hinge

- No \_\_\_\_\_ prep or template
- Provides \_\_\_\_\_ over entire length of hinge.
- Used on \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ / \_\_\_\_\_ doors.
- Barrel or gear driven

# Swinging the Door

## Continuous Hinges

- \_\_\_\_\_ Continuous Hinge – hinge is \_\_\_\_\_ into the \_\_\_\_\_ and \_\_\_\_\_ into the hinge \_\_\_\_\_ of the \_\_\_\_\_
- \_\_\_\_\_ Continuous Hinge – hinge is \_\_\_\_\_ into the \_\_\_\_\_ but \_\_\_\_\_ mounted to the hinge \_\_\_\_\_ of the \_\_\_\_\_
- \_\_\_\_\_ Continuous Hinge – hinge is \_\_\_\_\_ mounted to the \_\_\_\_\_ but \_\_\_\_\_ into the hinge \_\_\_\_\_ of frame
- \_\_\_\_\_ Continuous Hinge – hinge is \_\_\_\_\_ mounted to the \_\_\_\_\_ **AND** to the hinge \_\_\_\_\_ of the \_\_\_\_\_

# Swinging the Door

## Hinges

\_\_\_\_\_ Hinge:

- Hinge with a \_\_\_\_\_ added to \_\_\_\_\_ the door.

\_\_\_\_\_ Hinge:

- Used in \_\_\_\_\_ rated doors
- Usually \_\_\_\_\_ tall and \_\_\_\_\_

\_\_\_\_\_ Hinge:

- Heavy duty hinge used for \_\_\_\_\_ of \_\_\_\_\_  
\_\_\_\_\_ or heavy door.
- Helps prevent door from \_\_\_\_\_.

# Swinging the Door

## Hinges

### Reinforcing Pivot Hinge:

- Used in \_\_\_\_\_ or \_\_\_\_\_ applications to \_\_\_\_\_ / \_\_\_\_\_ door \_\_\_\_\_.

### Concealed Hinge:

- Fully \_\_\_\_\_ and completely \_\_\_\_\_ (concealed) whenever door is \_\_\_\_\_.

### Swing Clear:

- Allows door to extend \_\_\_\_\_ the frame creating a \_\_\_\_\_ opening.
- Used primarily in \_\_\_\_\_ and \_\_\_\_\_.

### Olive Knuckle:

- \_\_\_\_\_ hinge with knuckle \_\_\_\_\_ when door is closed

# Swinging the Door

## Hinges

### Electric Hinge:

- Allows \_\_\_\_\_ power to pass from the \_\_\_\_\_ into the \_\_\_\_\_

### Electronic Power Transfer:

- Allows electrical power to pass from the frame into the door
- \_\_\_\_\_ in \_\_\_\_\_ jamb
- See template for recommended location

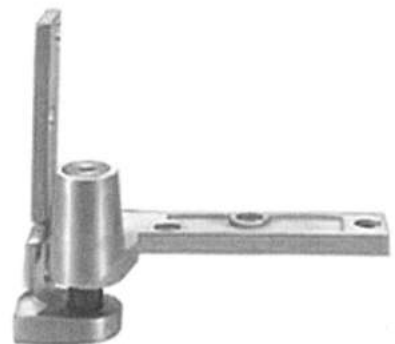
### Conduit Boxes:

- Are used to run electrical wiring through the \_\_\_\_\_ to electric \_\_\_\_\_ or \_\_\_\_\_
- Are commonly used in frames where the wiring is \_\_\_\_\_ running in a \_\_\_\_\_ path

# Swinging the Door

## Pivot

- For use with \_\_\_\_\_ or \_\_\_\_\_ area doors
- Mounted in \_\_\_\_\_ and \_\_\_\_\_ of \_\_\_\_\_
- \_\_\_\_\_ pivot often used with \_\_\_\_\_ acting applications
- Can be \_\_\_\_\_ or \_\_\_\_\_ mounted





# Locking & Latching the Door

- Provides a handle
- \_\_\_\_\_ and \_\_\_\_\_ the door into the frame
- Generally - locks are mounted in the door and connect to the frame via \_\_\_\_\_ / \_\_\_\_\_
- The frame will have a mortised strike or reinforcement for a surface mounted strike

# Locking & Latching the Door

## Bored Cylindrical Lock:

- Most \_\_\_\_\_ due to ease of prep and cost
- **Govt.** \_\_\_\_\_

| <u>Hole</u> | <u>Backset</u> | <u>Prep on Door</u> |
|-------------|----------------|---------------------|
| 2 1/8"      | 2 3/4"         | 1 1/8" W X 2 1/4" H |

- **Govt.** \_\_\_\_\_

| <u>Hole</u> | <u>Backset</u> | <u>Prep on Door</u> |
|-------------|----------------|---------------------|
| 2 1/8"      | 2 3/8"         | 1" W X 2 1/4" H     |

## ASA Strike:

- Most \_\_\_\_\_ strike
- Height on strike is \_\_\_\_\_

## T Strike:

- Used when ASA is too \_\_\_\_\_
- \_\_\_\_\_ Backset

## Full Lip Strike:

- \_\_\_\_\_ wide X \_\_\_\_\_ high
- \_\_\_\_\_ used in commercial applications

# Locking & Latching the Door

## Mortise Lock:

- More \_\_\_\_\_ and \_\_\_\_\_ than a cylindrical lock
- Uses \_\_\_\_\_ strike

| <u>Hole</u> | <u>Backset</u> | <u>Prep on Door Edge</u> |
|-------------|----------------|--------------------------|
| Varies      | 2 3/4"         | 1 1/4" w X 8"H           |

## ASA Strike:

- Most \_\_\_\_\_ strike
- Height on strike is \_\_\_\_\_

# Locking & Latching the Door

## **Bored Cylindrical Deadlock:**

- Same dimensions as a cylindrical lock. (different \_\_\_\_\_ )
- Can be operated by either a \_\_\_\_\_ or \_\_\_\_\_.

## **Bored Cylindrical Deadlock Strike:**

- No \_\_\_\_\_ on the deadbolt strike
- \_\_\_\_\_ wide X \_\_\_\_\_ high

# Locking & Latching the Door

## Mortise Deadlock:

- A mortise lock which contains only a \_\_\_\_\_.
- Used for added \_\_\_\_\_.

## Mortise Deadlock Strike:

- No \_\_\_\_\_ on the deadbolt strike
- Some mortise deadlock strikes have 15/32" between the \_\_\_\_\_ on the door lock prep and the frame strike prep
- Check template

# Locking & Latching the Door

## Strikes

### Hospital Latch:

- Mostly found in \_\_\_\_\_ and more specifically \_\_\_\_\_ or operating rooms.
- Design allows the \_\_\_\_\_ or \_\_\_\_\_ of a door without using one's \_\_\_\_\_.
- Handles can be in the \_\_\_\_\_ or \_\_\_\_\_ direction.

### Push/Pull:

- Does not \_\_\_\_\_ or \_\_\_\_\_ into the frame
- No \_\_\_\_\_ on frame

### Unit Lock (rarely used):

- Requires a large \_\_\_\_\_ in \_\_\_\_\_ of the \_\_\_\_\_ for installation
- All parts of the lock are \_\_\_\_\_.

# Locking & Latching the Door

## Panic/Exit Devices

### Rim Panic / Exit (reinforced):

- \_\_\_\_\_ mounted on \_\_\_\_\_ of door
- Reinforce \_\_\_\_\_ in jamb for \_\_\_\_\_

### Mortise Panic (reinforced):

- Push bar is \_\_\_\_\_ mounted on the \_\_\_\_\_ of the door.
- Lock and latch are \_\_\_\_\_ in the doors.
- Uses standard \_\_\_\_\_ strike

### Surface Vertical Rod Panic / Exit (reinforced):

- \_\_\_\_\_ mounted on face of door
- \_\_\_\_\_ strike or reinforced \_\_\_\_\_ in head

### Concealed Vertical Rod Panic / Exit (Mortised – Can be):

- Push bar is \_\_\_\_\_ mounted on the \_\_\_\_\_ of the door.  
Rods are \_\_\_\_\_ in the door.
- \_\_\_\_\_ strike or reinforced \_\_\_\_\_ in head

# Locking & Latching the Door

## Panic/Exit Devices

### Concealed Vertical Cable:

- Push bar is \_\_\_\_\_ mounted on the \_\_\_\_\_ of the door.
- Concealed \_\_\_\_\_ in lieu of rods

### Impact Exit Device:

- \_\_\_\_\_ and \_\_\_\_\_ or \_\_\_\_\_ are mortised in the door.
- Mortised strike or reinforced soffit in head
- Very tricky - check templates



# Locking & Latching the Door

## Coordinators and Open Back Strike

### Bar Mounted Coordinator:

- Mounts on \_\_\_\_\_ of frame and requires a \_\_\_\_\_
- Holds \_\_\_\_\_ leaf open until \_\_\_\_\_ leaf closes – no door prep required

### Face Mounted Coordinator:

- Mounts on \_\_\_\_\_ of frame and requires a \_\_\_\_\_

### Open Back Strike:

- Used on \_\_\_\_\_ of doors with \_\_\_\_\_ \_\_\_\_\_ on active leaf and \_\_\_\_\_ \_\_\_\_\_ on inactive leaf.
- Allows the inactive leaf in a pair of doors to be operated \_\_\_\_\_ of the active leaf (when active door has 161 or 86 prep).

# Locking & Latching the Door

## Strikes

### Removable Hardware Mullion:

- Allows \_\_\_\_\_ / \_\_\_\_\_ to be used for a paired frame, while only requiring \_\_\_\_\_ in the \_\_\_\_\_ of \_\_\_\_\_ for mullion.

### Electric Strike:

- Strike is \_\_\_\_\_ controlled to temporarily allow access while lock remains \_\_\_\_\_.
- Can be activated by button, card, code, etc.

### Dust Box:

- Aka “mortar guard”
- \_\_\_\_\_ hardware preps from anything in the \_\_\_\_\_ of the frame

# Locking & Latching the Door

## Flush Bolt

- For a \_\_\_\_\_ of doors (mounted on the top and bottom of the inactive leaf)
- Bolt or latch extends into \_\_\_\_\_ at \_\_\_\_\_ and in \_\_\_\_\_ to secure inactive door
- Strike can be \_\_\_\_\_ or \_\_\_\_\_
- Types: \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.

# Locking & Latching the Door

## Flush Bolt

### \_\_\_\_\_ Flush Bolt:

- Bolt is \_\_\_\_\_ extended or retracted by lever mechanism

### \_\_\_\_\_ Flush Bolt:

- Bolt is extended as \_\_\_\_\_ door closes and \_\_\_\_\_ as active door opens

### \_\_\_\_\_ \_\_\_\_\_ Flush Bolt Strike:

- Uses a \_\_\_\_\_ strike
- Manually retracted, latches \_\_\_\_\_

# Closers

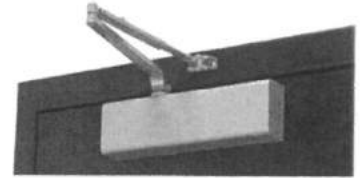
- Do what they say (\_\_\_\_\_ the door)
- Closers also control the opening and closing of the door.

## Features

- Back check (cushioning feature as door approaches the fully opened position)
- \_\_\_\_\_ speed (closing speed)
- \_\_\_\_\_ speed (takes over in last 10 degrees of opening to latch the door).
- The closer can be either mounted on the \_\_\_\_\_ of frame / \_\_\_\_\_ or \_\_\_\_\_ inside the frame or door.
- Requires reinforcement (or prep if concealed) within the frame or door.

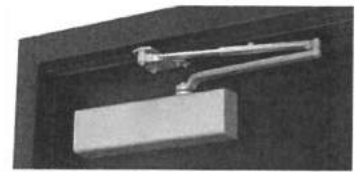
# Closers

\_\_\_\_\_ **Arm:**



- Closer is mounted on \_\_\_\_\_ side surface of door and the \_\_\_\_\_ of frame.

\_\_\_\_\_ **Arm:**



- Closer is mounted on \_\_\_\_\_ side surface of door and the \_\_\_\_\_ of the frame.

\_\_\_\_\_ **Jamb:**



- Closer is mounted on the \_\_\_\_\_ of the frame and the \_\_\_\_\_ side of the door.

# Closers

## **Concealed Closer in Frame Head:**

- Most heads are \_\_\_\_\_ open with a removable \_\_\_\_\_ / \_\_\_\_\_.
- \_\_\_\_\_ prep could be \_\_\_\_\_ or \_\_\_\_\_ mounted.
- Check template, 4" face head or special prep in wall may be required.

## **Concealed Closer in Top of Door:**

- Frame prep could be \_\_\_\_\_ or \_\_\_\_\_ mounted – check template

## **Concealed Closer in Floor:**

- For \_\_\_\_\_ applications
- Door prep will be \_\_\_\_\_.
- Will require \_\_\_\_\_ pivot prep and possibly \_\_\_\_\_ pivot(s) - check template.
- Provision for mounting must be made while concrete floors are being poured.

## **Concealed Closer in Jamb:**

- \_\_\_\_\_ prep in \_\_\_\_\_ and \_\_\_\_\_.
- Check template, deep closer prep may require wider stiles.

# Closers

## **Automatic Operators:**

- Most common is \_\_\_\_\_ mounted
- Check \_\_\_\_\_ for sizing and prep/reinforcement
- May require larger \_\_\_\_\_ face
- Opens and closes the door (opens when activated)

## **Overhead Stop:**

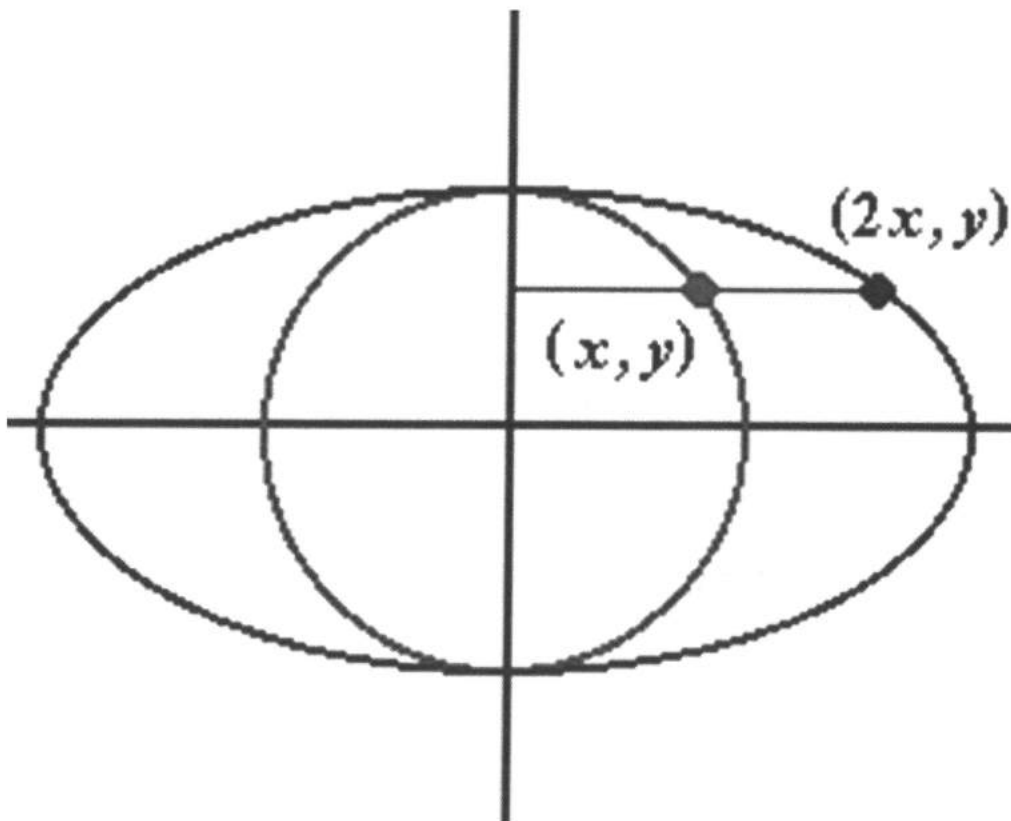
- Can be \_\_\_\_\_ or \_\_\_\_\_ mounted to the frame
- Will require \_\_\_\_\_ or \_\_\_\_\_, check template
- Coordinate with other hardware, preps could overlap
- \_\_\_\_\_ then \_\_\_\_\_ the door from over extending in the open position



# Radius Frames

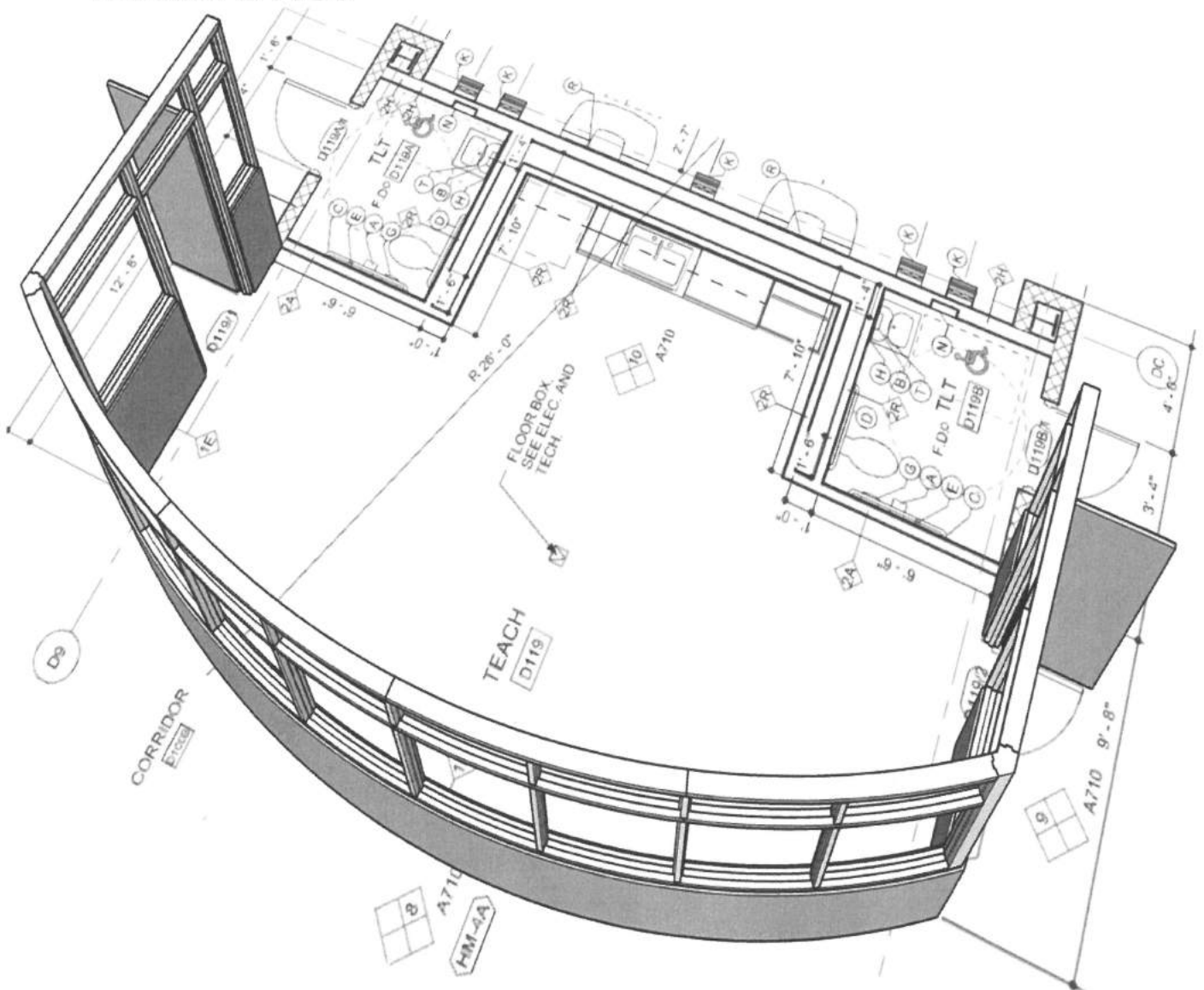
## Radius vs. Elliptical

- \_\_\_\_\_ frames will have a smooth and consistent curve.
- \_\_\_\_\_ frames will have an ever changing curve.



## Curved Wall Radius

- Frame pieces are \_\_\_\_\_ with straight mullions.



## Curved Wall Segmented Radius

- [illegible]

# Special Applications

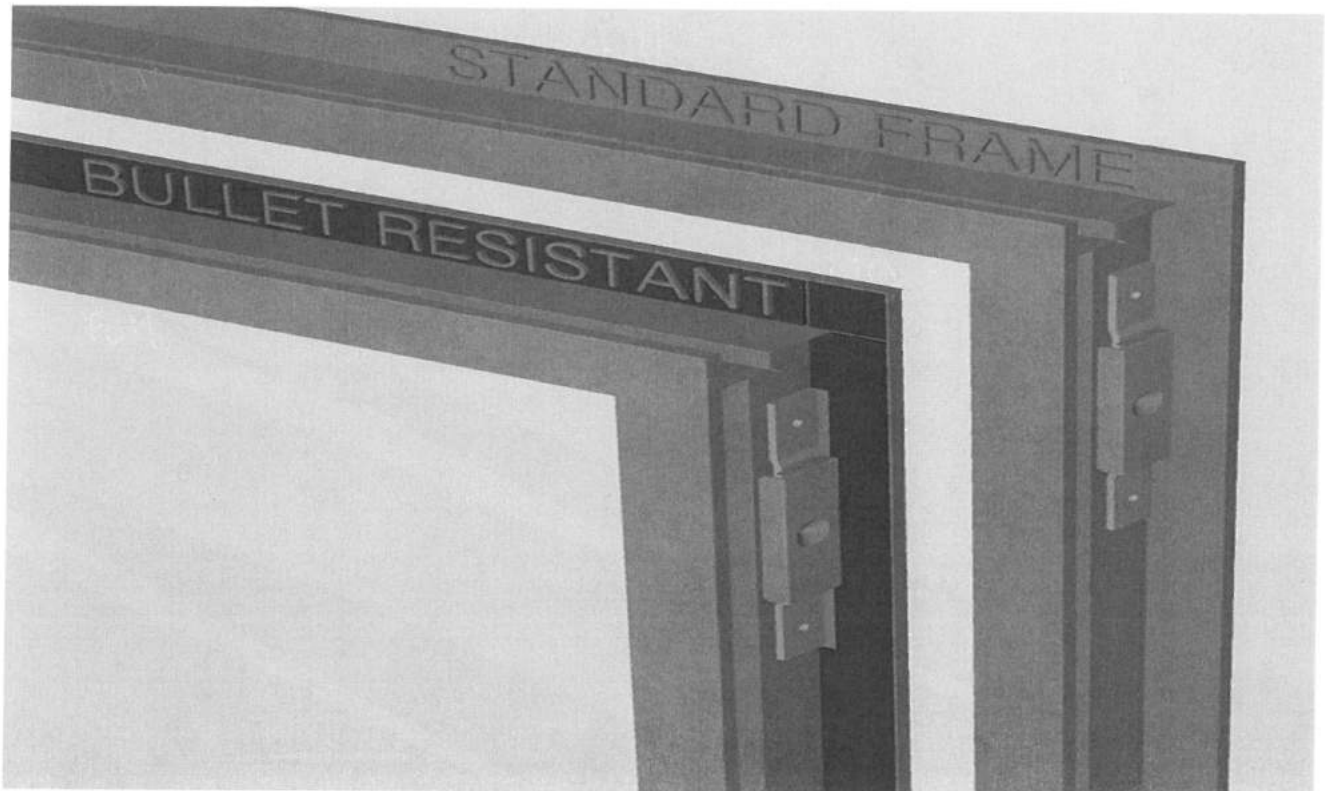
## Lead Lined

- Available welded (KD upon request – caution against KD)
- UL fire rated to \_\_\_\_\_ minutes
- \_\_\_\_\_, \_\_\_\_\_, or thicker lead lined available
- \_\_\_\_\_ wrap or \_\_\_\_\_ wrap options
- \_\_\_\_\_ wrap is for \_\_\_\_\_ openings
- \_\_\_\_\_ wrap is for \_\_\_\_\_ openings

# Special Applications

## Ballistic (Bullet Resistant)

- \_\_\_\_\_ test protocol
- Identified by test level #
- Heavy duty armor plating
- Bullet resistant does not mean bulletproof



# Special Applications

## Ballistic (Bullet Resistant)

| Rating   | Ammunition   | Weight (grains) | Weight (grams) | min fp | max fp | number of shots |
|----------|--|-----------------|----------------|--------|--------|-----------------|
| Level 1  | 9mm Full Metal Copper Jacket with Lead Core                                  | 124             | 8.0            | 1175   | 1293   | 3               |
| Level 2  | .357 Magnum Jacketed Lead Soft Point   | 1585            | 10.2           | 1250   | 1375   | 3               |
| Level 3  | .44 Magnum Lead Semi-Wadcutter Gas Checked                                   | 240             | 15.6           | 1350   | 1485   | 3               |
| Level 4  | 30 Caliber Rifle Lead Core Soft Point (.30-06 Caliber)                       | 180             | 11.7           | 2540   | 2794   | 1               |
| Level 5  | 7.62mm Rifle Lead Core Full Metal Copper Jacket Military Ball (.308 Caliber) | 150             | 9.7            | 2750   | 3025   | 1               |
| Level 6  | 9mm Full Metal Copper Jacket with Lead Core                                  | 124             | 8.0            | 1400   | 1540   | 5               |
| Level 7  | 5.56mm Rifle Full Metal Copper Jacket with Lead Core (.223 Caliber)          | 55              | 3.6            | 3080   | 3383   | 5               |
| Level 8  | 7.62mm Rifle Lead Core Full Metal Copper Jacket Military Ball (.308 Caliber) | 150             | 9.7            | 2750   | 3025   | 5               |
| Level 9  | 30-06 caliber rifle, steel core, lead point filler, FMJ (APM2)               | 166             | 10.8           | 2715   | 2987   | 1               |
| Level 10 | .50 caliber rifle, lead core FMCJ Military Ball (M2)                         | 709.5           | 45.9           | 2810   | 3091   | 1               |
| Shotgun  | 12-Gauge Rifled Lead Slug  | 1 oz            | 28.3           | 185    | 1744   | 3               |
|          | 12-Gauge 00 Buckshot (12 pellets)  | 1.5 oz          | 42.0           | 1200   | 1320   | 3               |

# Fire Ratings

3 companies who test and list fire ratings:

1) UL – \_\_\_\_\_

Oldest and most recognized.

2) WH- \_\_\_\_\_

Second largest ratings company.

3) FM - \_\_\_\_\_

Only used when building is insured by Factory Mutual.

# Fire Ratings

| Wall Rating   | Frame    | Label    |
|---|----------|----------|
| 4 Hr  | 180 min  | A        |
| 2 Hr  | 90 min   | B        |
| 1 Hr  | 45 min   | C        |
| *2 Hr   | *90 min  | *D       |
| *1Hr  | *45 min  | *E       |
| **1 Hr  | **20 min | **20 min |
| <b>*For exterior buildings, that are in close proximity to one another, two other labels are also available.*</b> |          |          |
| <b>**In cases where needed, a 20 min "corridor" rating is available as well.**</b>                                |          |          |
| <b>Frame and Door ratings are typically 3/4 rating of the wall.</b>   |          |          |



# Fire Ratings

## General Parameters

- All openings must be \_\_\_\_\_ and \_\_\_\_\_
- Must use fire rated hardware

### Most Manufacturers:

- Throat sizes range from 2" to 13"
- Face size 1 1/4" to 4"
- 16, 14, and some 12 gauge frames can be rated
- Return size must be between 3/8" to 3/4"
- Stop height 5/8" Minimum

# Wind Ratings

- \_\_\_\_\_ (FBC) or similar
- Single, Paired, Side Light, Transom, Transom Side Light, and Borrowed Lights available.
- \_\_\_\_\_ and \_\_\_\_\_ doors available.
- Tests both Positive and Negative Pressure (PSF) ratings
- Also tests large and small “missile” impact

\*Each manufacturer has their own tested limitations and abilities\*

# Sound Ratings

- Sound Transmission Core (STC)
- \_\_\_\_\_ and \_\_\_\_\_ units available
- Value communicated by STC #
- Sold as an \_\_\_\_\_ with door and all seals.
- Field ratings will be less than tested.
- \*Each manufacturer has their own tested limitations and abilities\*

# **HMF EXPRESS**

## **Information needed for a frame!**

### **Information needed for a quote**

- Lead time?
- Quantity?
- Material?
- Frame type?
- Opening size?
- Jamb depth?
- Frame profile?
- Face sizes?
- Fire rated?
- Anchors?
- Hinges?
- Strike?
- Closer?
- Construction?

\*If an elevation, include a drawing or a picture

### **Additional information needed for an order!**

- Handing?
- Equal or unequal rabbet?
- Hardware locations?
- Any notes or details about hardware, face sizes, lock locations, etc



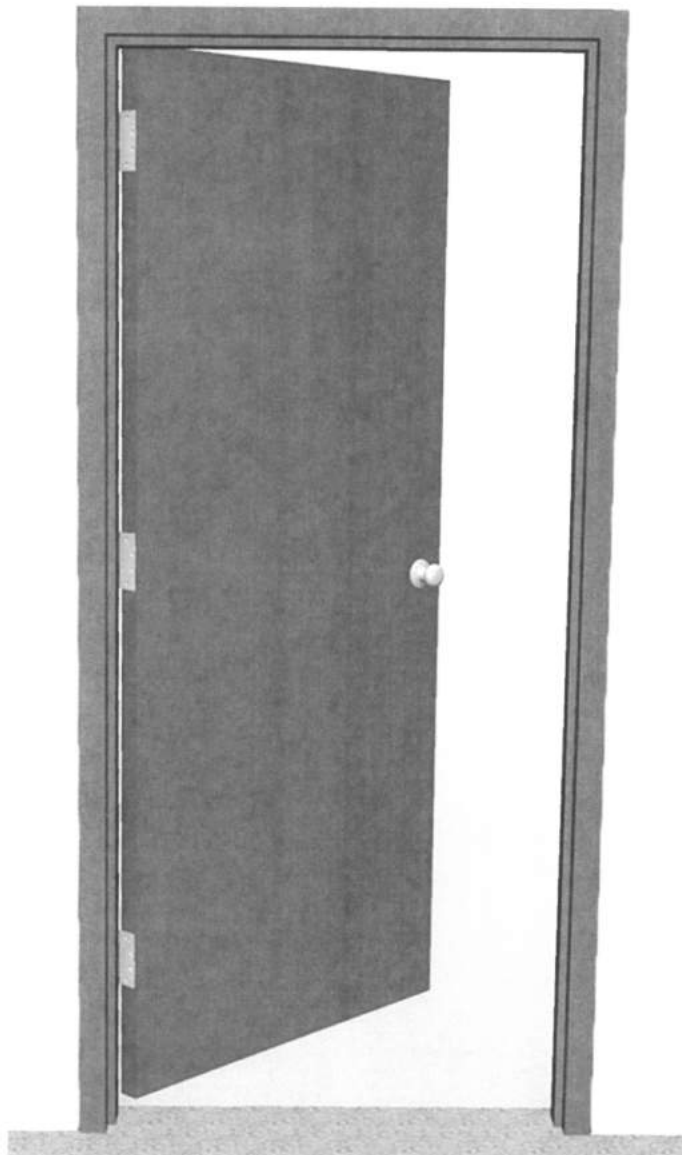
# Frames

- Frames cover the \_\_\_\_\_ and attach the \_\_\_\_\_ opening to the wall.
- Frames provide \_\_\_\_\_ for the \_\_\_\_\_ and components ensuring proper operation.
- Frames hold glass or panels
- Hollow metal frames are available in many sizes, types, and configurations.

# Frame Types

---

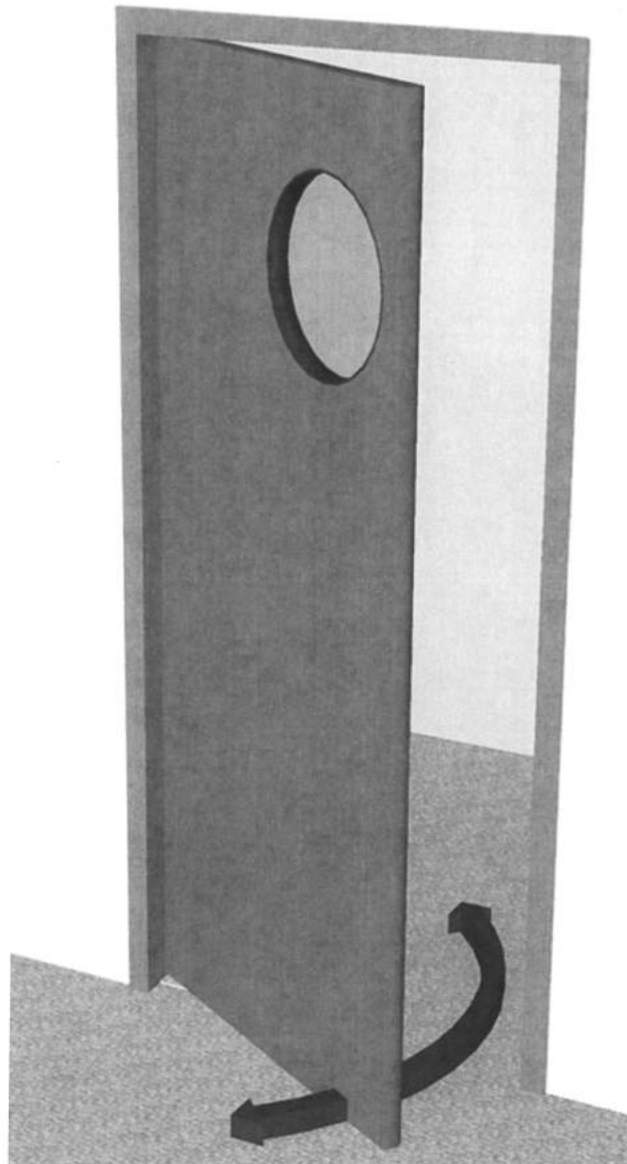
1 frame with 1 door opening in one direction



# Frame Types

---

1 frame with 1 door swinging in both directions

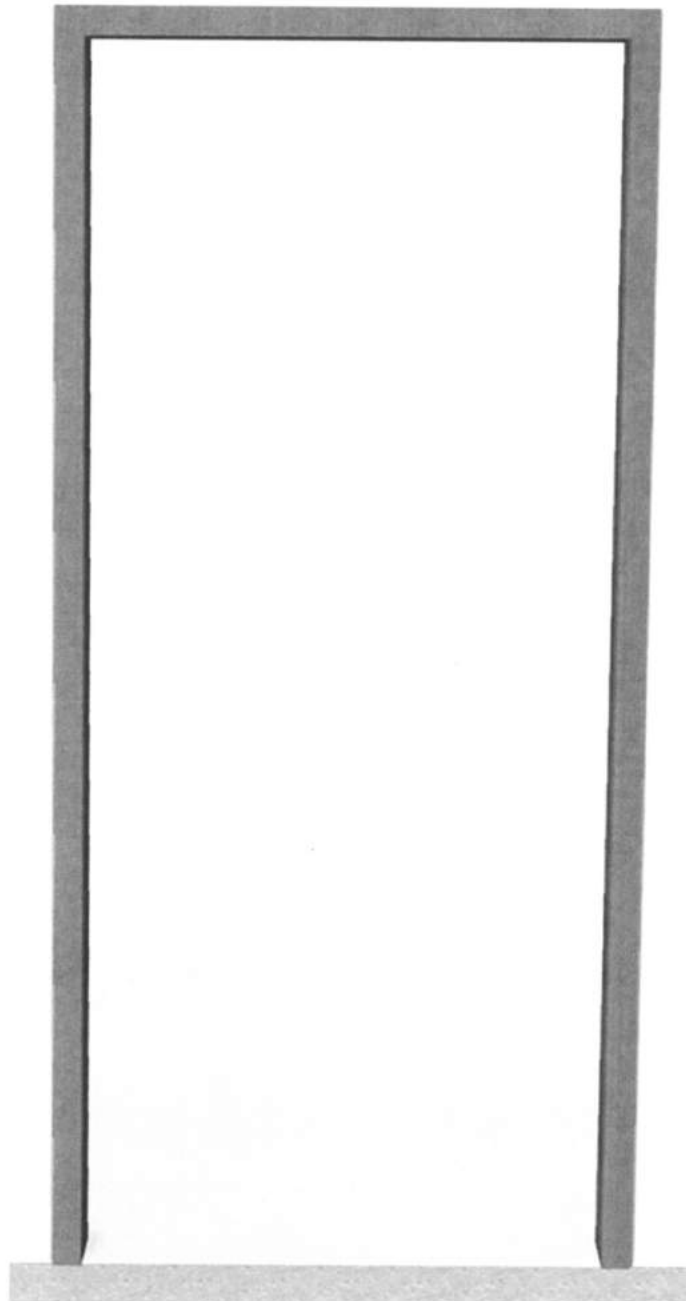




# Frame Type

---

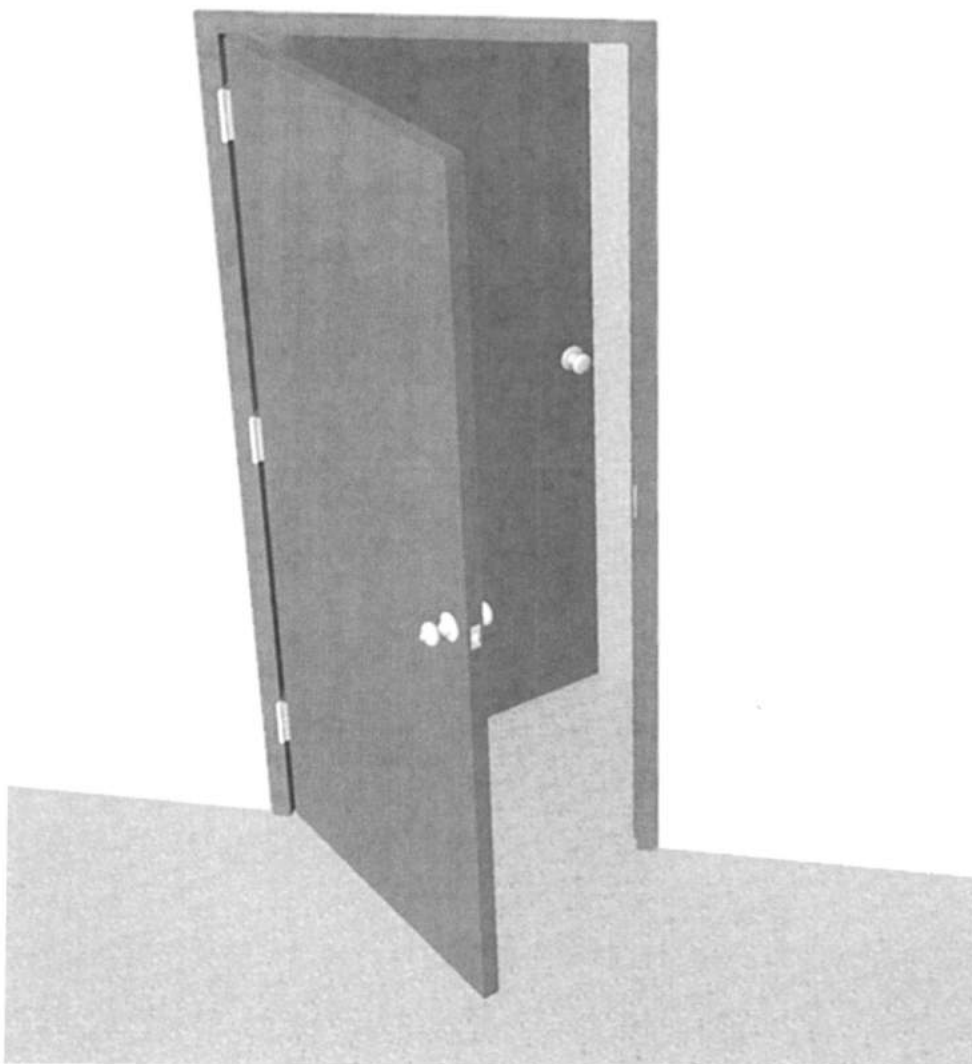
1 frame only with no door



# Frame Type

---

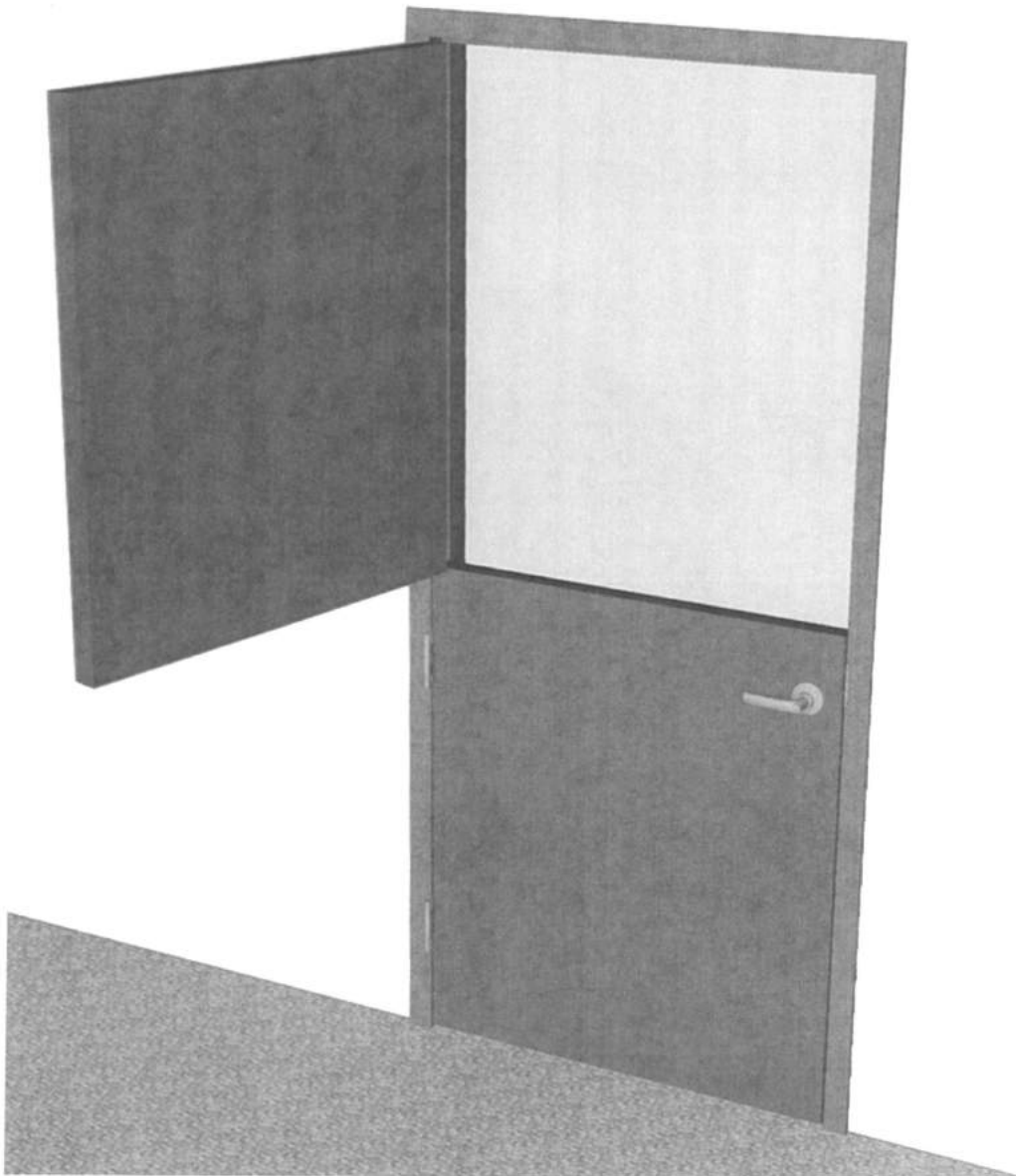
1 frame with 2 doors swinging in opposite direction



# Frame Type

---

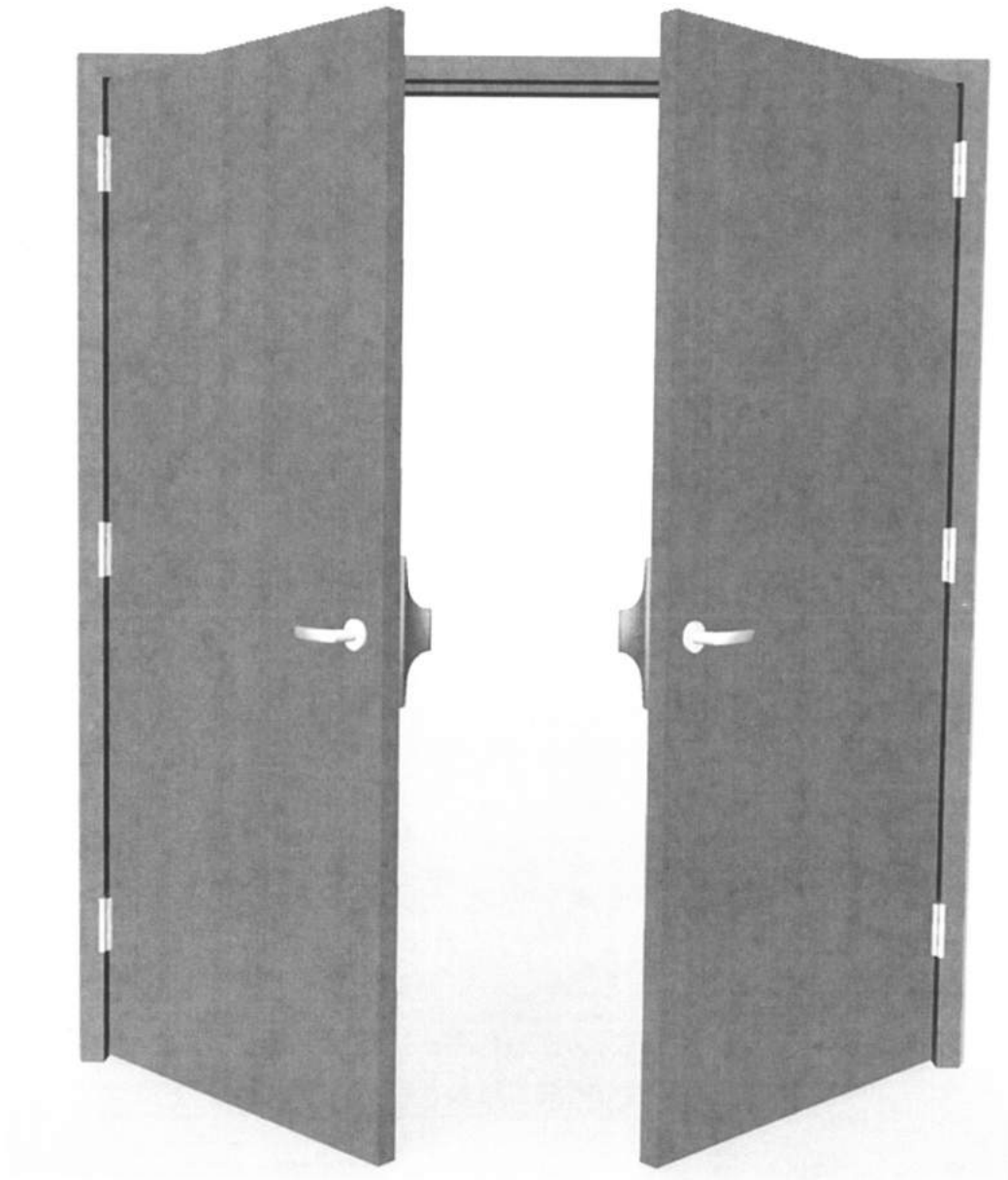
1 frame with 2 half doors swinging in same direction



# Frame Types

---

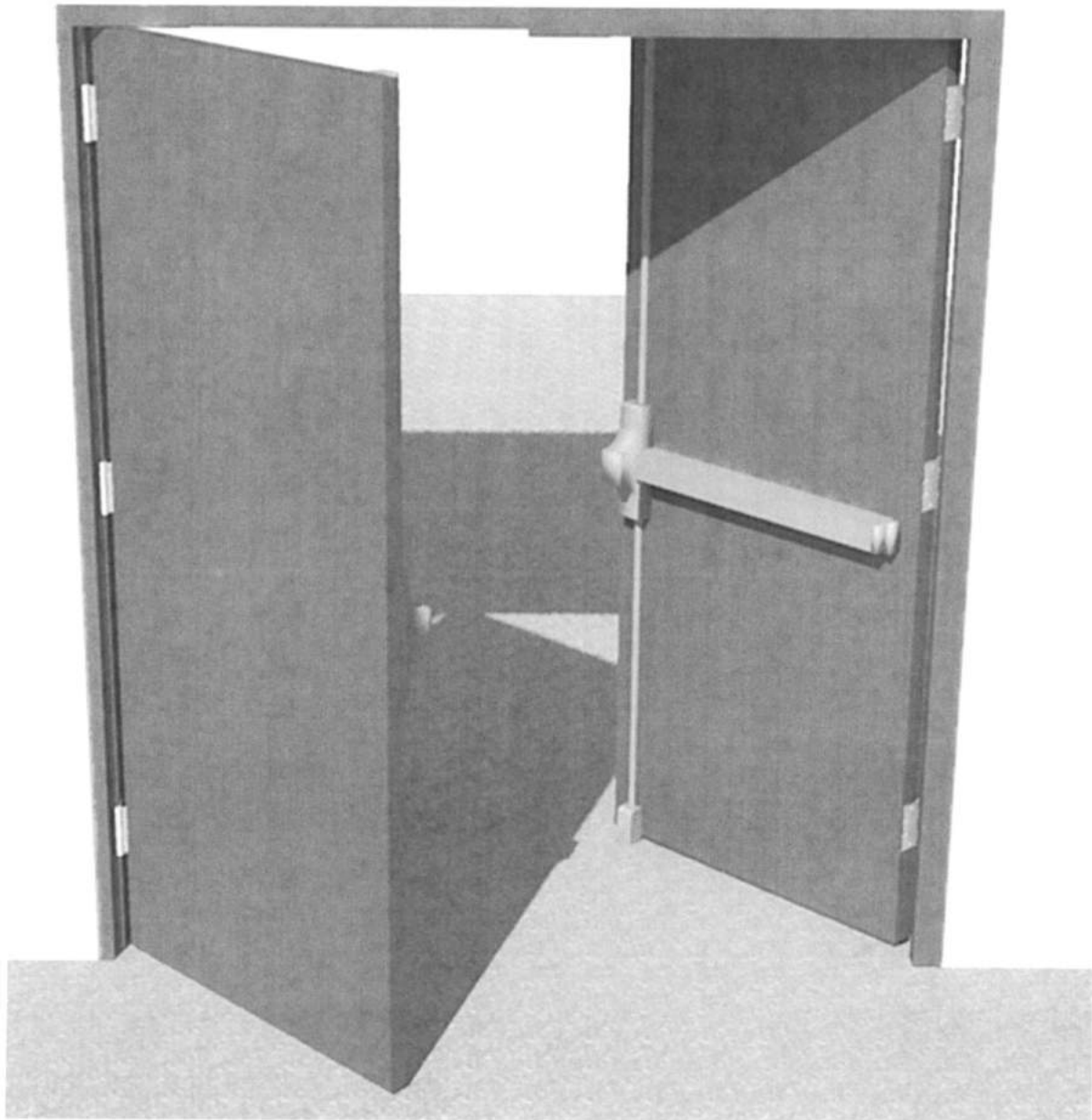
1 frame with 2 doors swinging in the same direction



# Frame Type

---

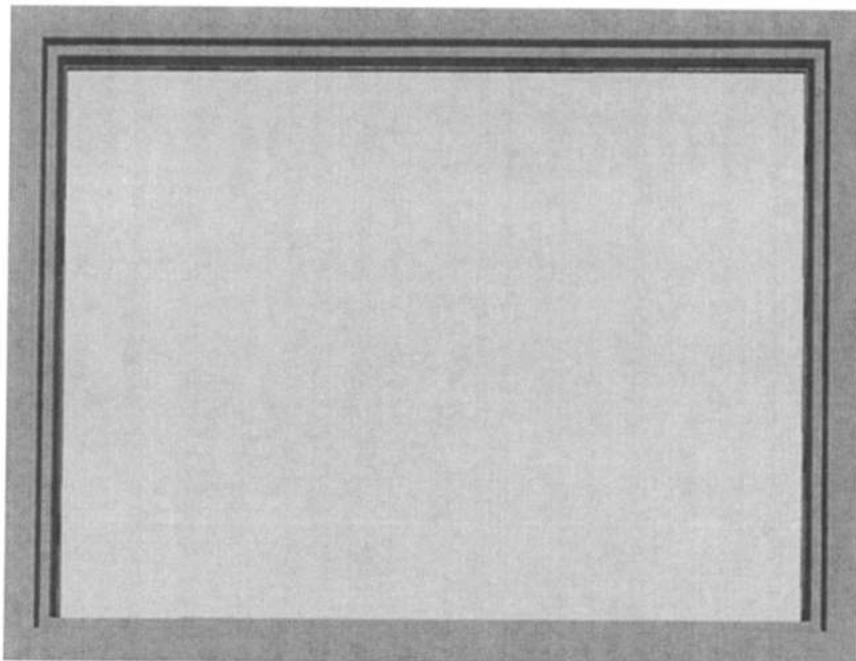
1 frame with 2 doors swinging in opposite directions



# Frame Type

---

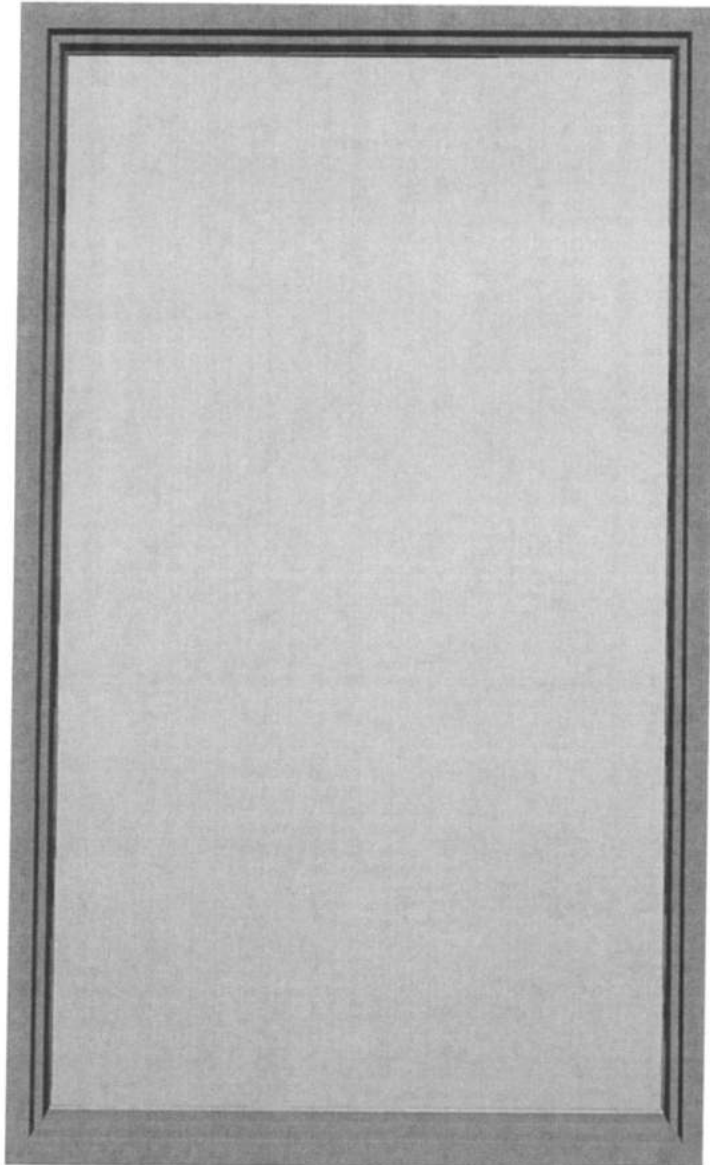
4 sided frame with fixed glass and no  
door opening



# Frame Type

---

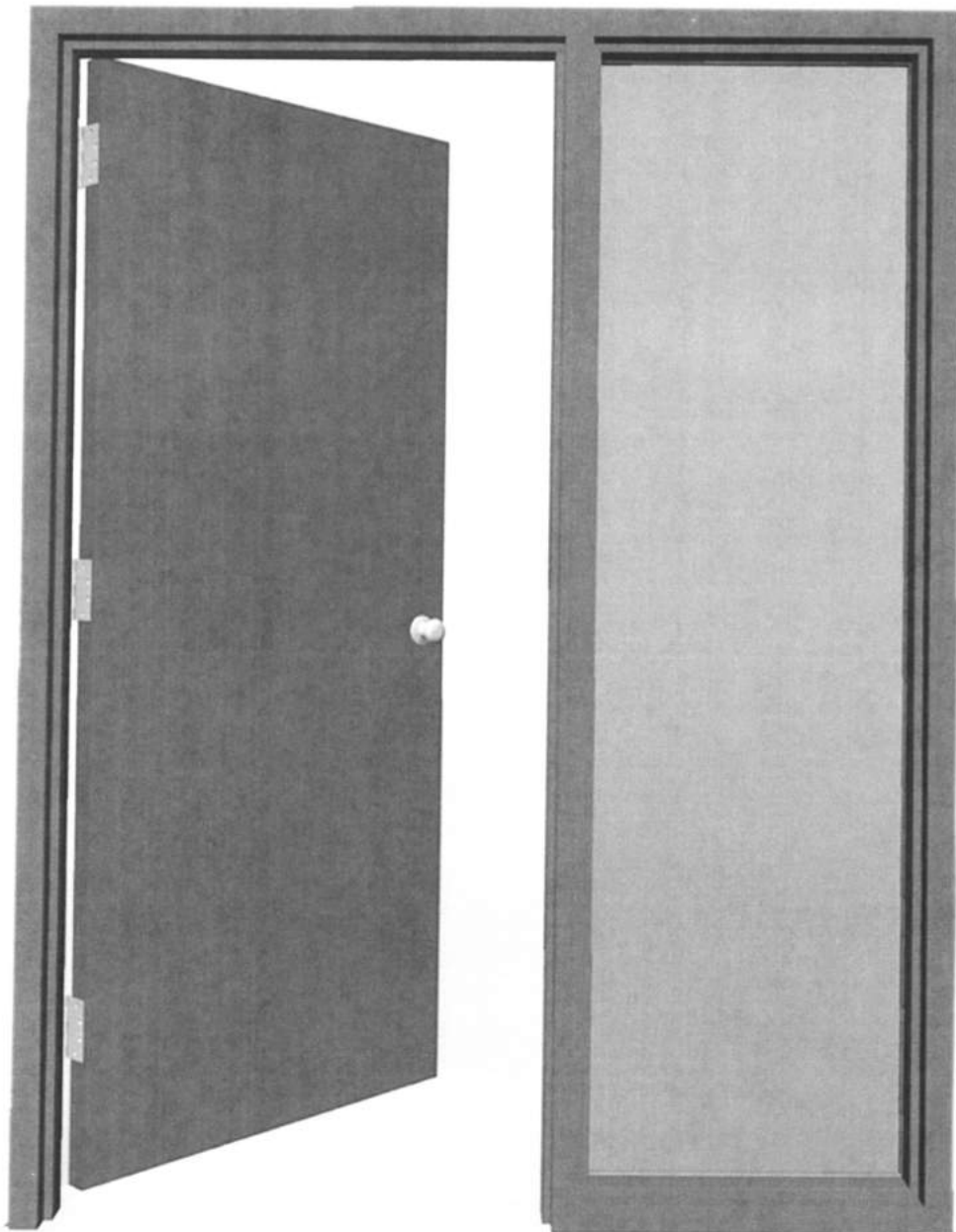
Called window frame, floor or wall mounted  
Sometimes incorrectly called a sidelight



# Frame Type

---

Door frame with glass on 1 or both sides of door opening

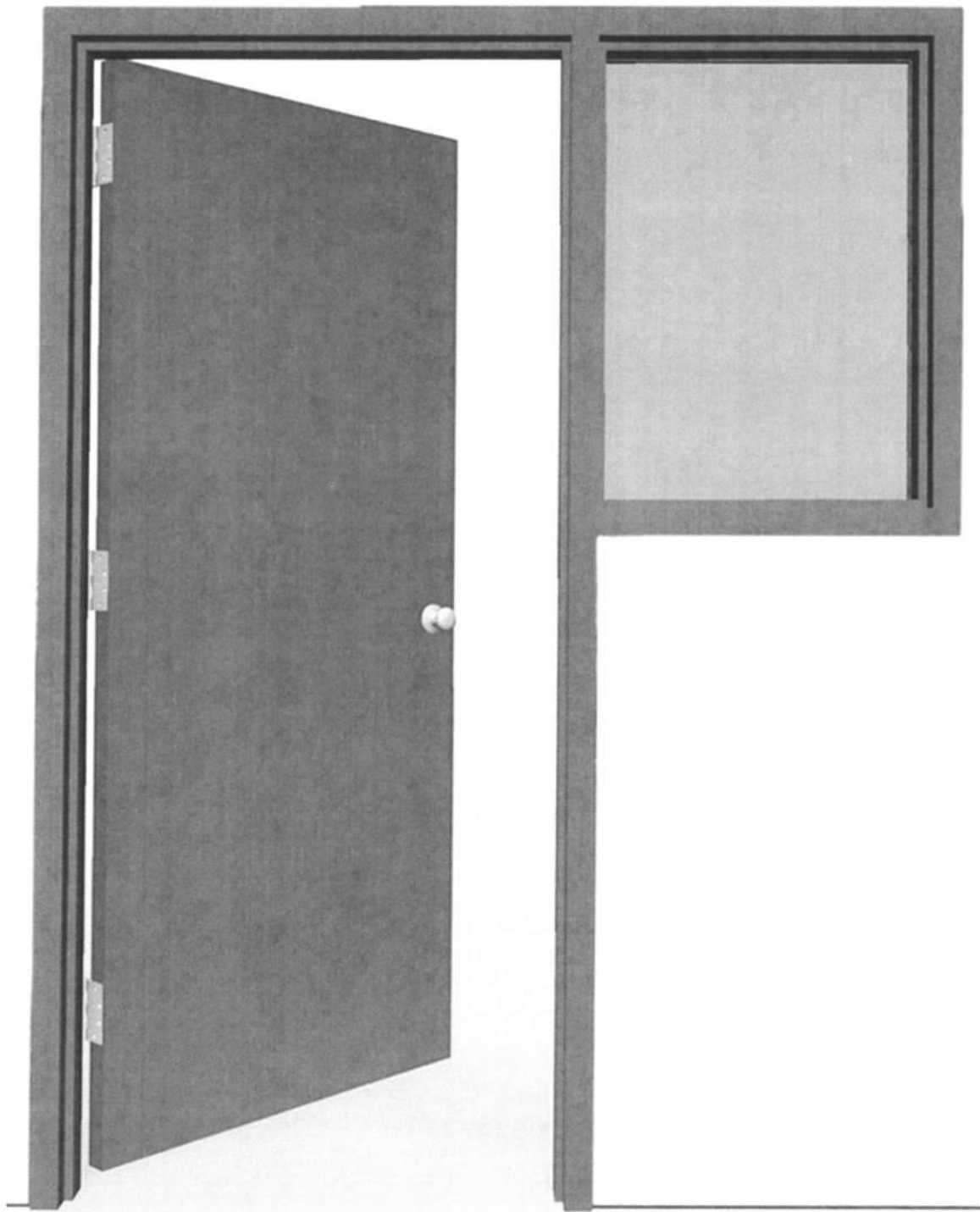




# Frame Type

---

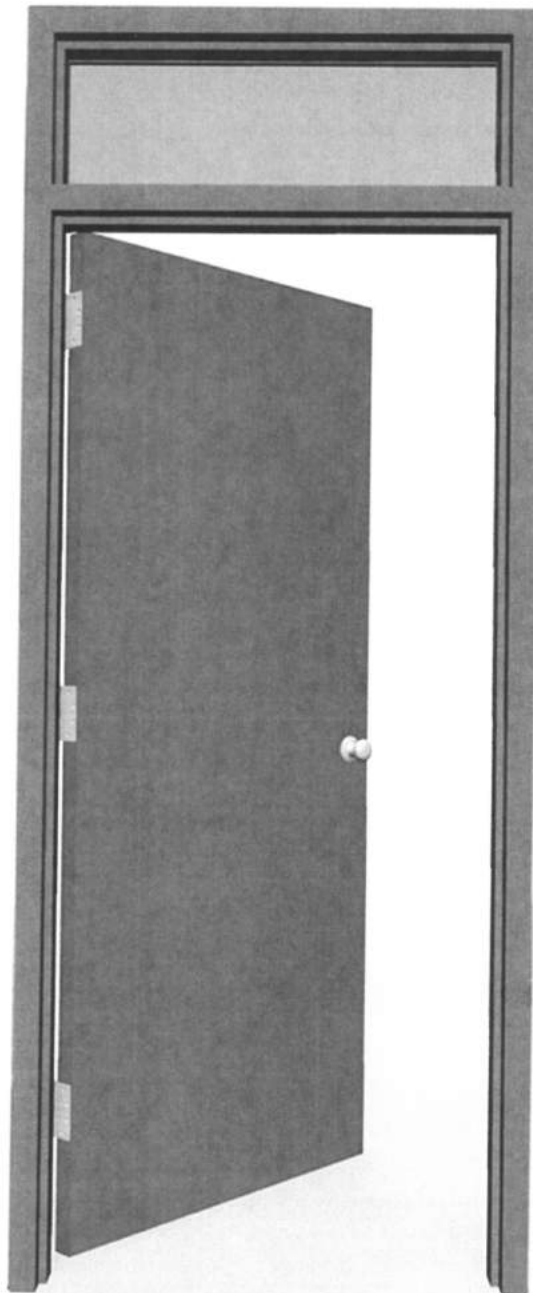
Can be full height or partial



# Frame Type

---

Frame with opening for glass or panel  
above door area only

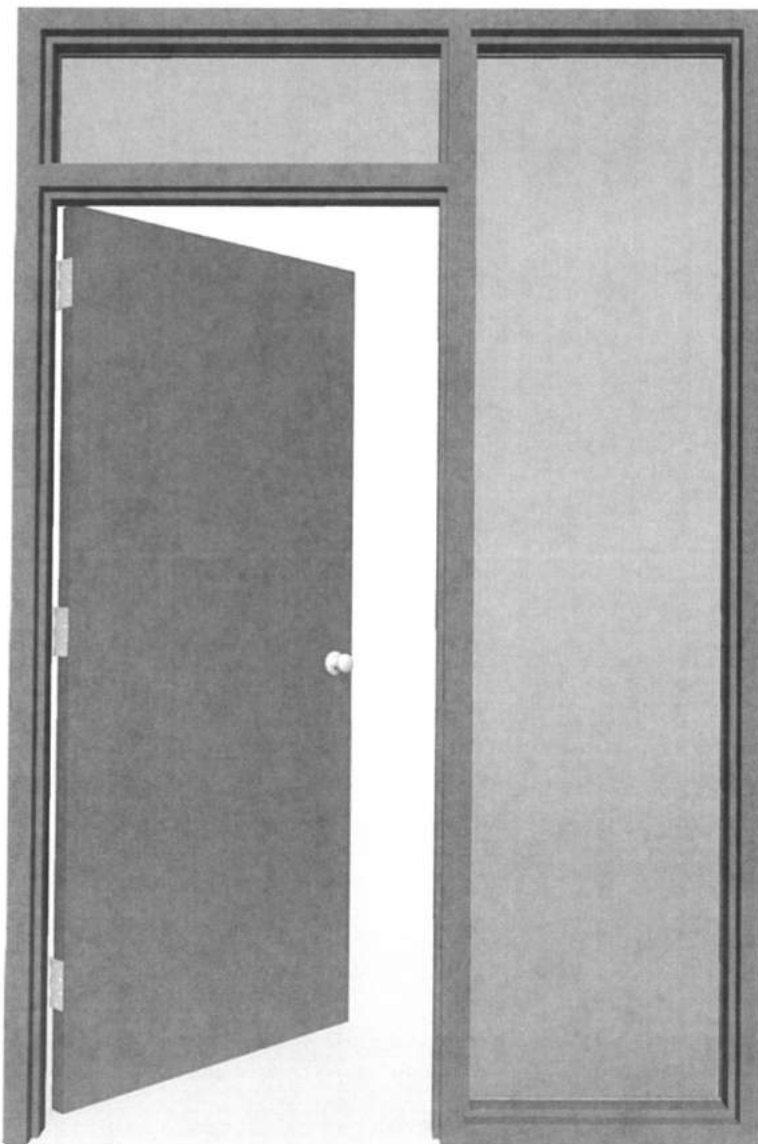


# Frame Type

---

Frame with transom above and sidelight  
on either or both sides

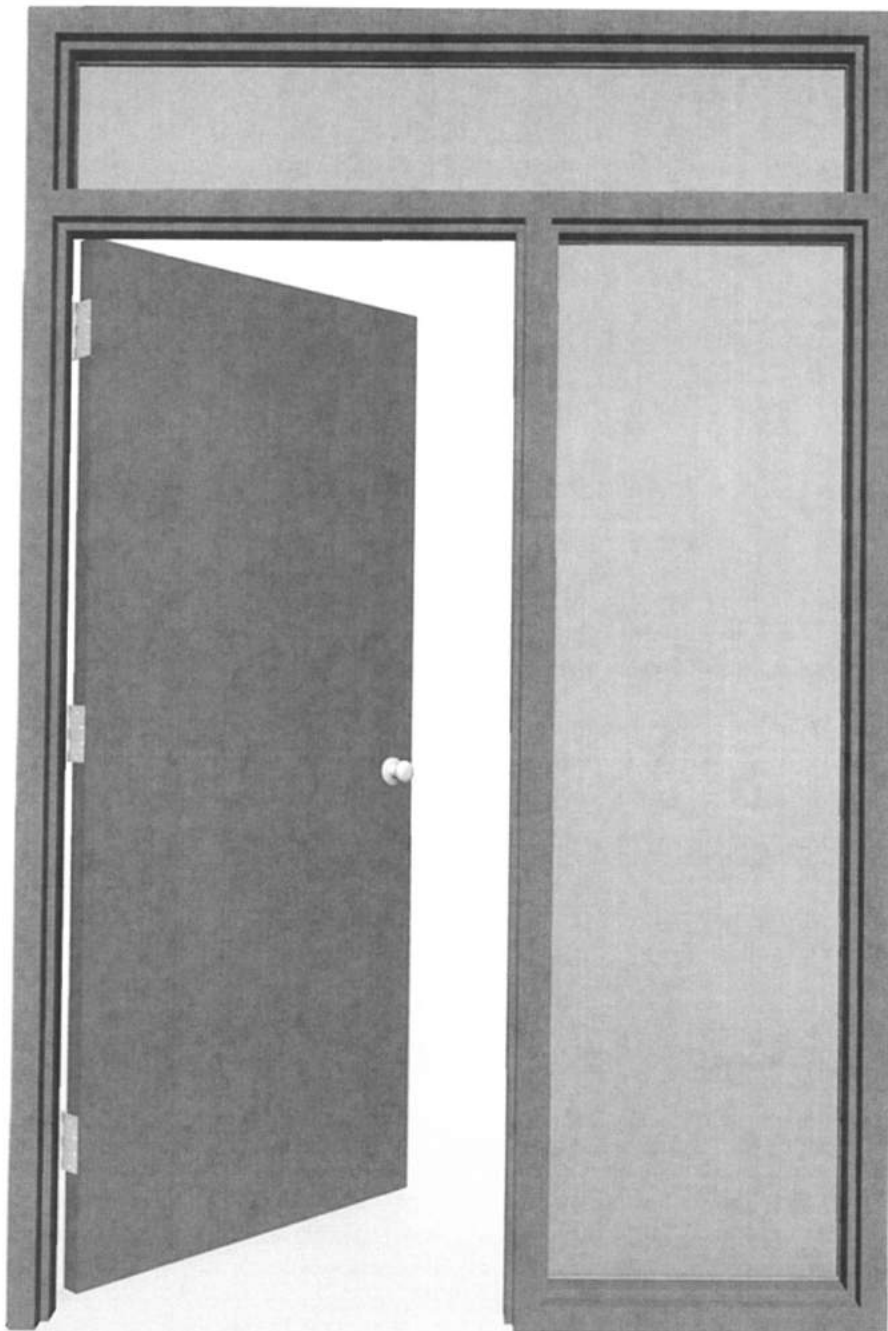
Can be full height or partial



# Frame Type

---

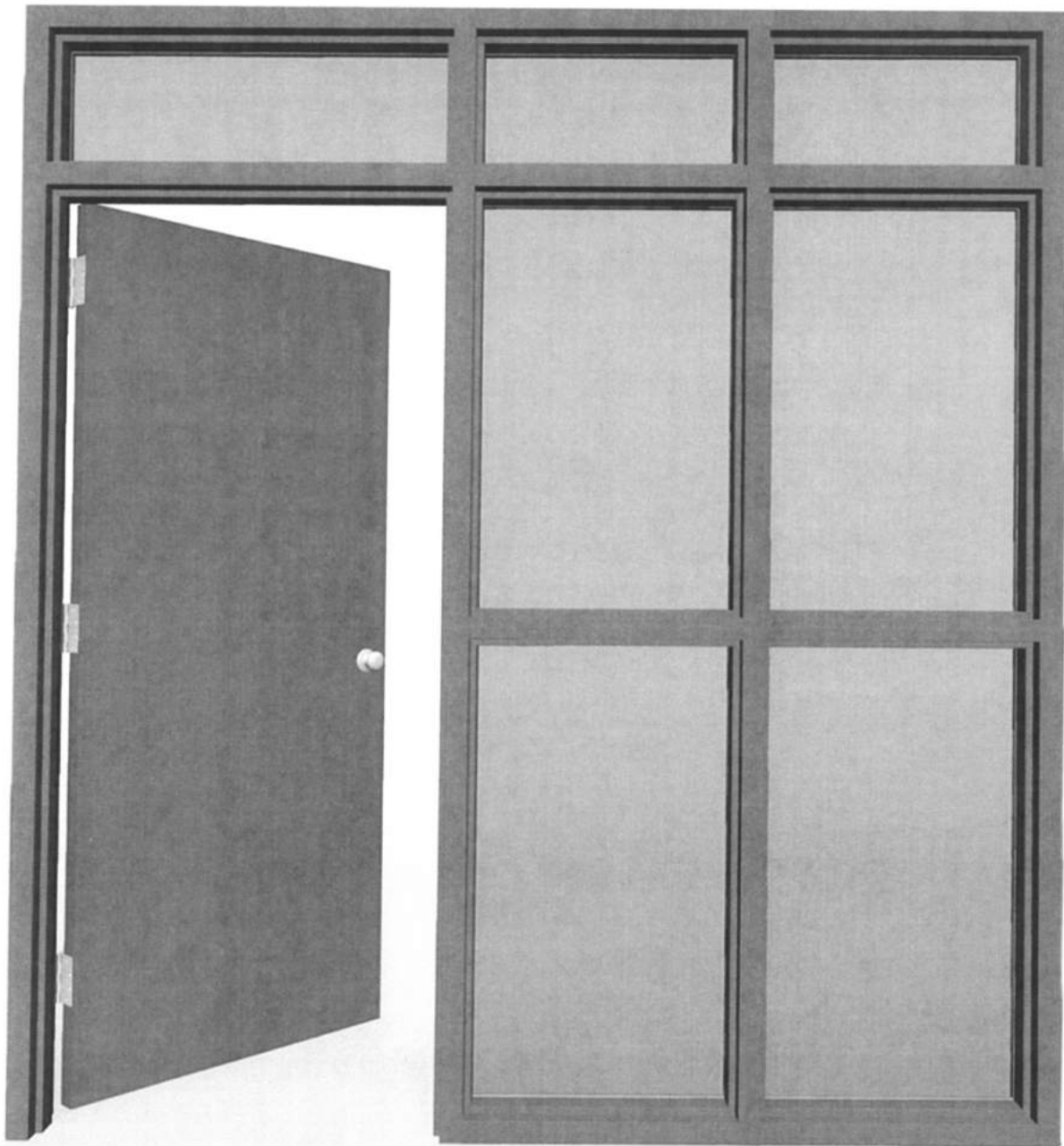
Transom or sidelight may or may not be divided with frame material



# Frame Type

---

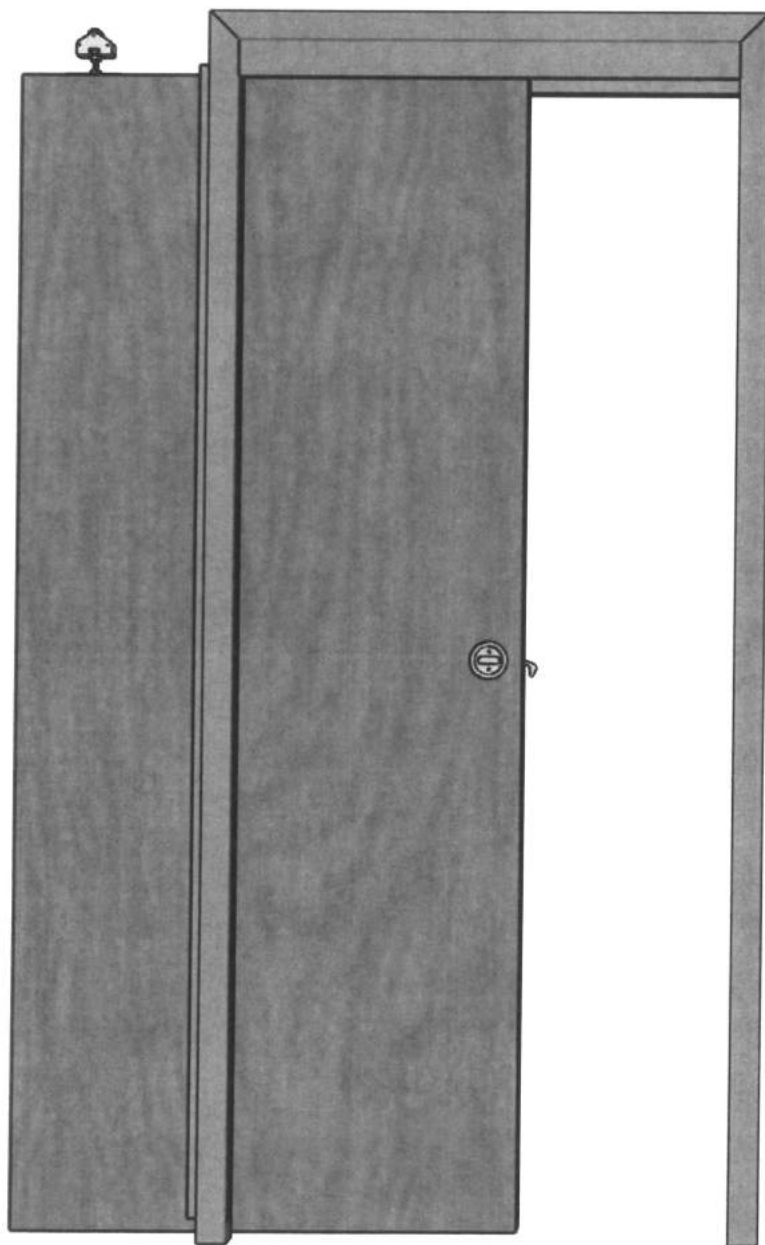
Transom or sidelight may or may not be divided with frame material



# Frame Type

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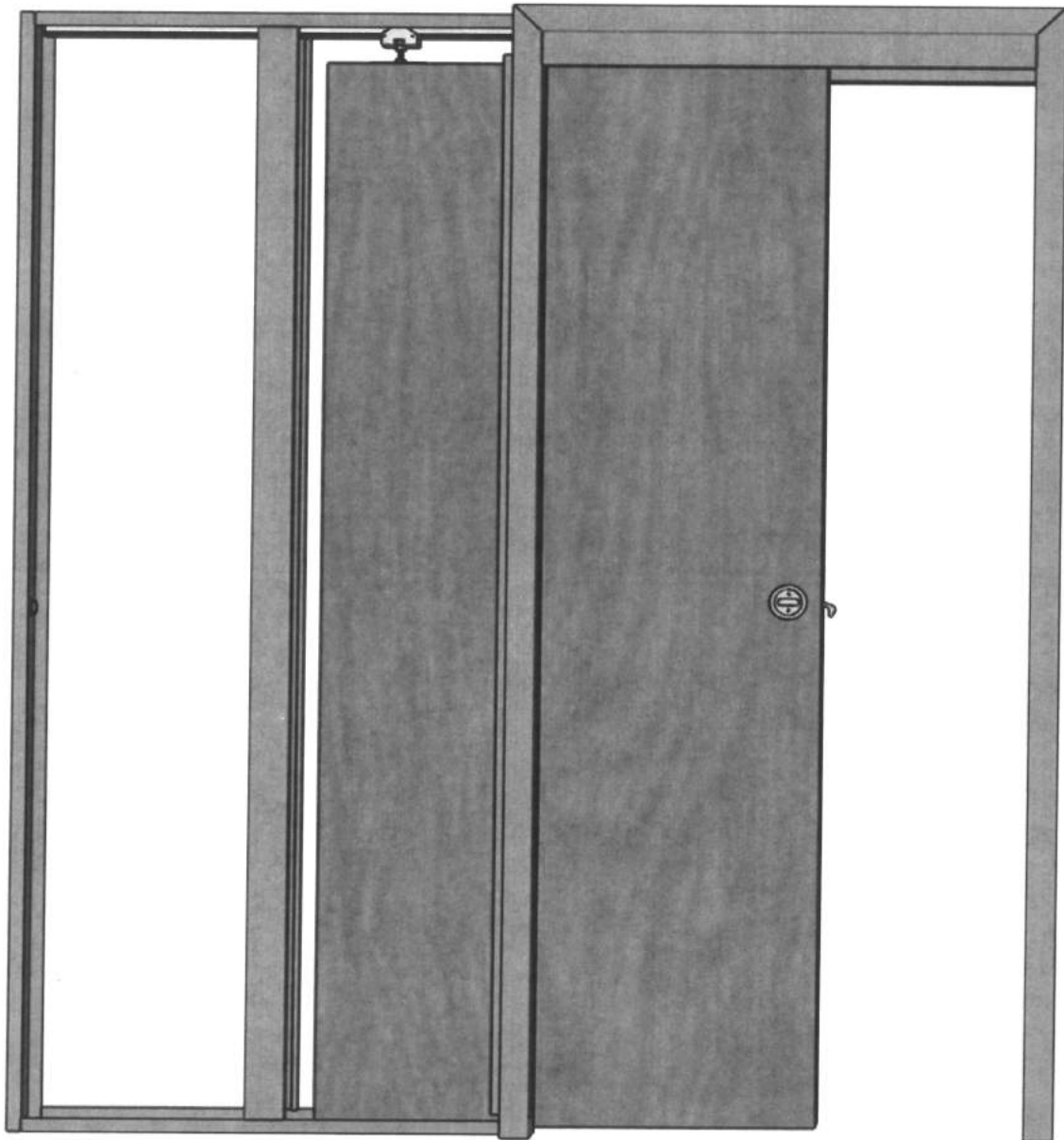
1 frame with without cage for 1 door that slides back inside the wall



# Frame Type

---

1 frame with cage (sub-frame) for  
1 door that slides back inside the wall



# Frame Type

---

1 frame without cage for  
2 bi-parting doors that slide back inside  
the wall in opposite directions





# Frame Type

---

1 frame with cage (sub-frame) for  
2 bi-parting doors that slide back inside  
the wall in opposite directions

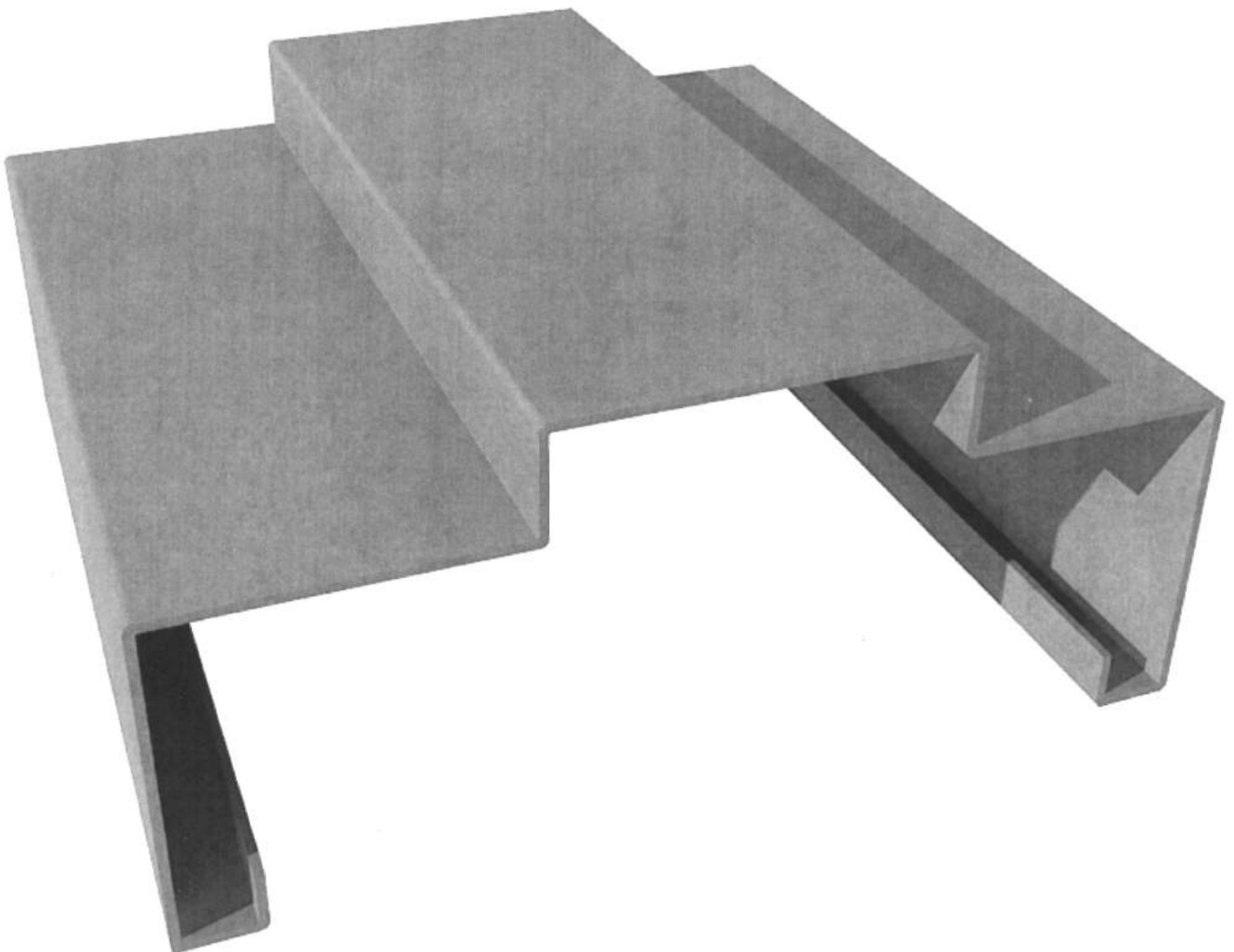


# Frame Profiles

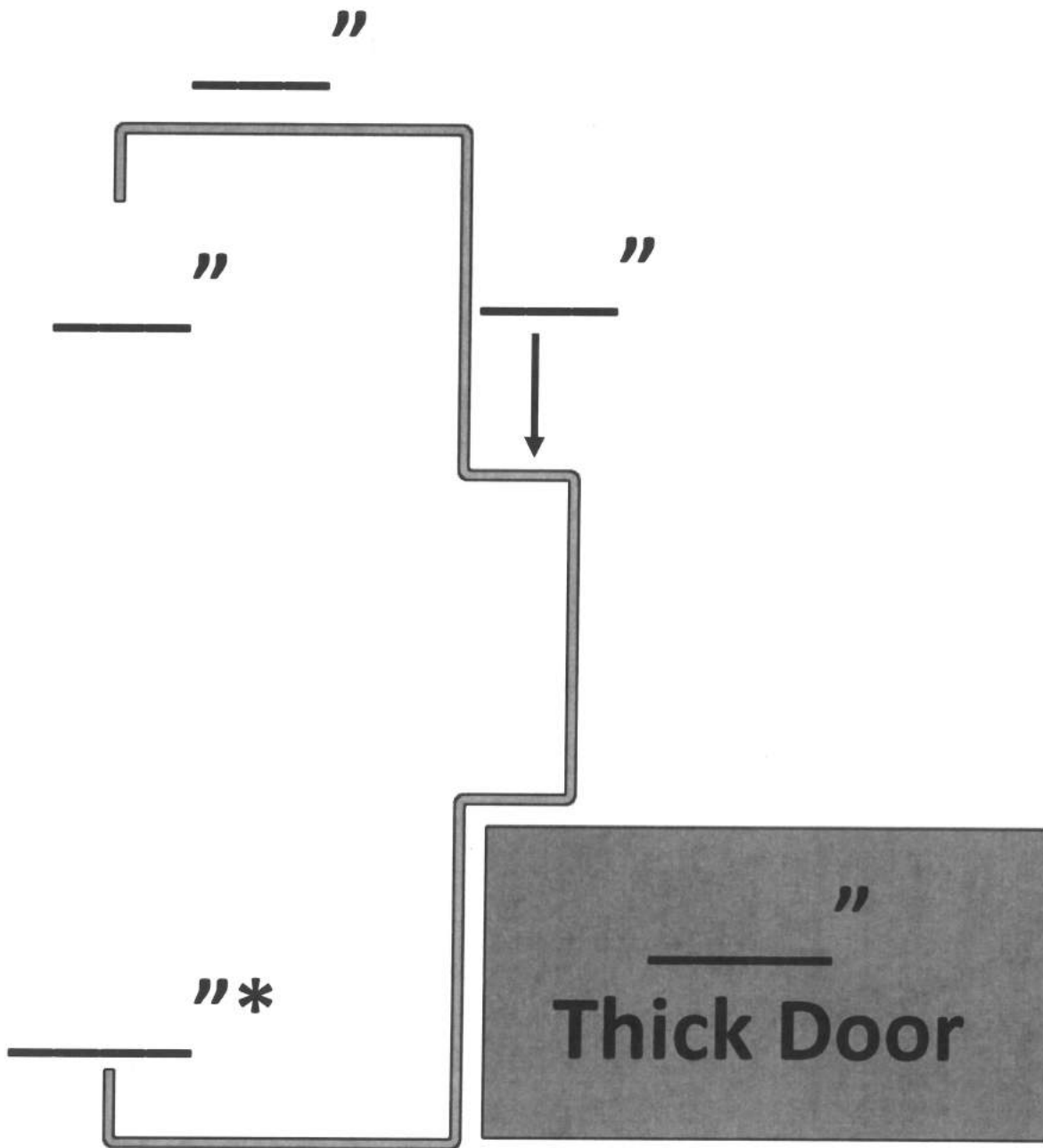
- Classified by number of \_\_\_\_\_ and number of \_\_\_\_\_.
- \_\_\_\_\_ return used primarily for \_\_\_\_\_ applications. Commonly called “\_\_\_\_\_” profile.
- \_\_\_\_\_ return used for drywall Knock-Down (KD) applications. Commonly called “\_\_\_\_\_” profile.

# Frame Profile

## Identification



# Common Dimensions

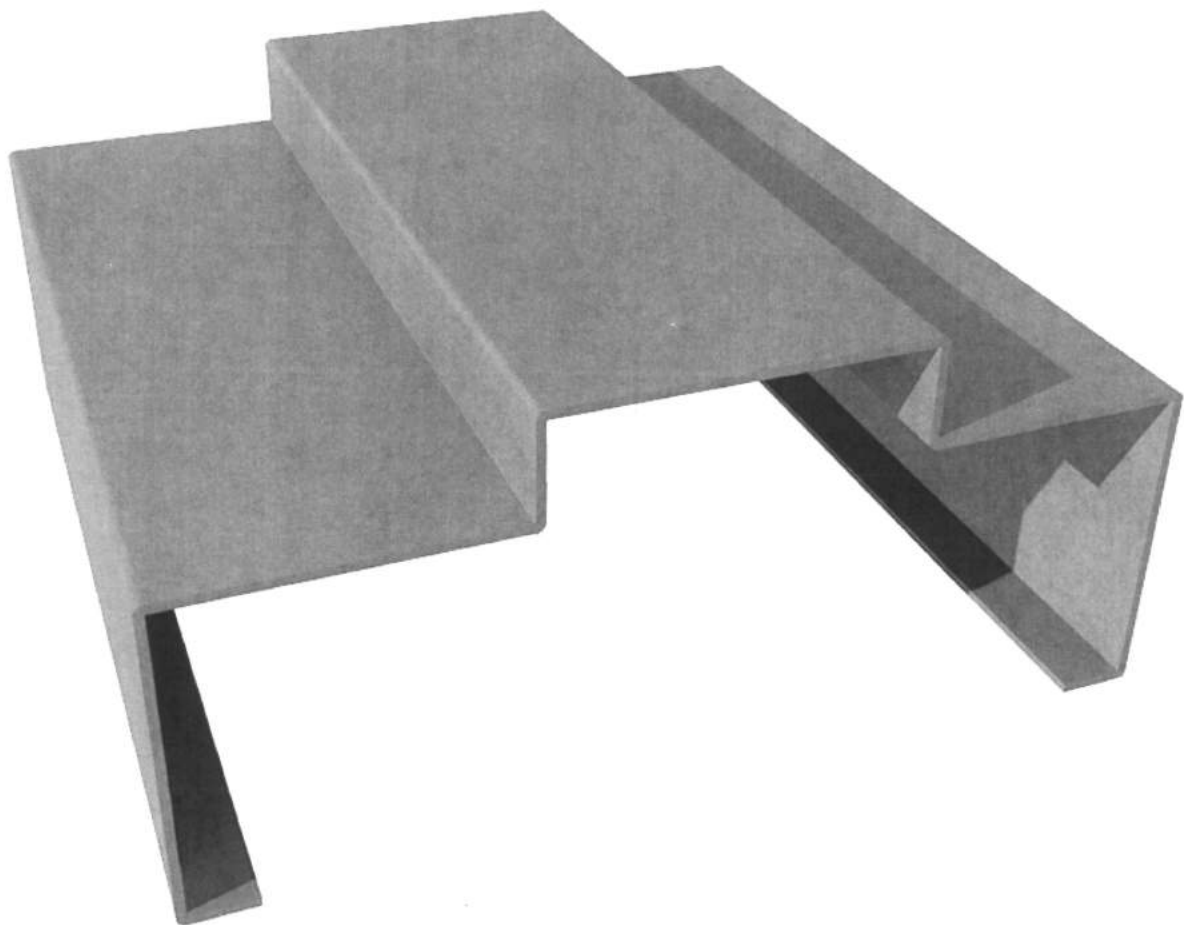


\* \_\_\_\_\_" jamb depth has \_\_\_\_\_" returns

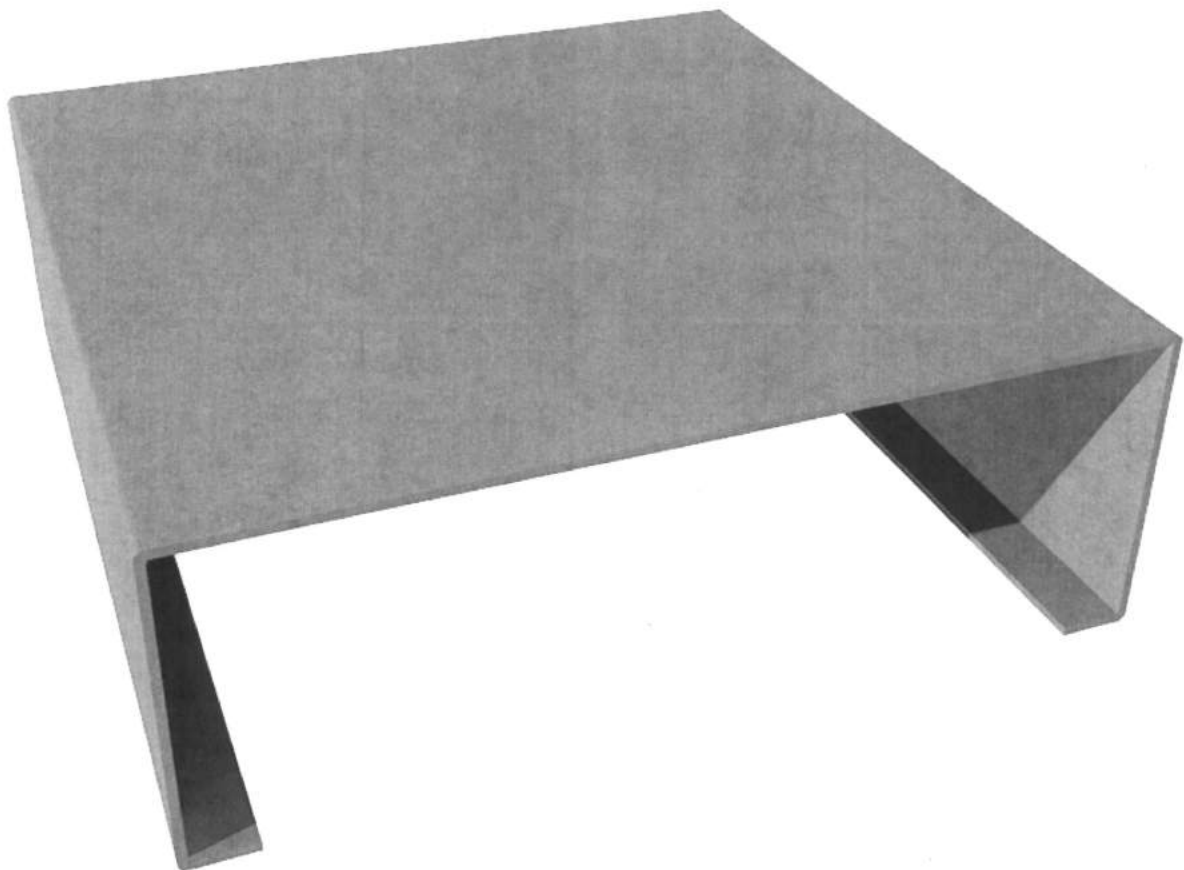
# Profiles – Single Return

---

- Most popular single return profile

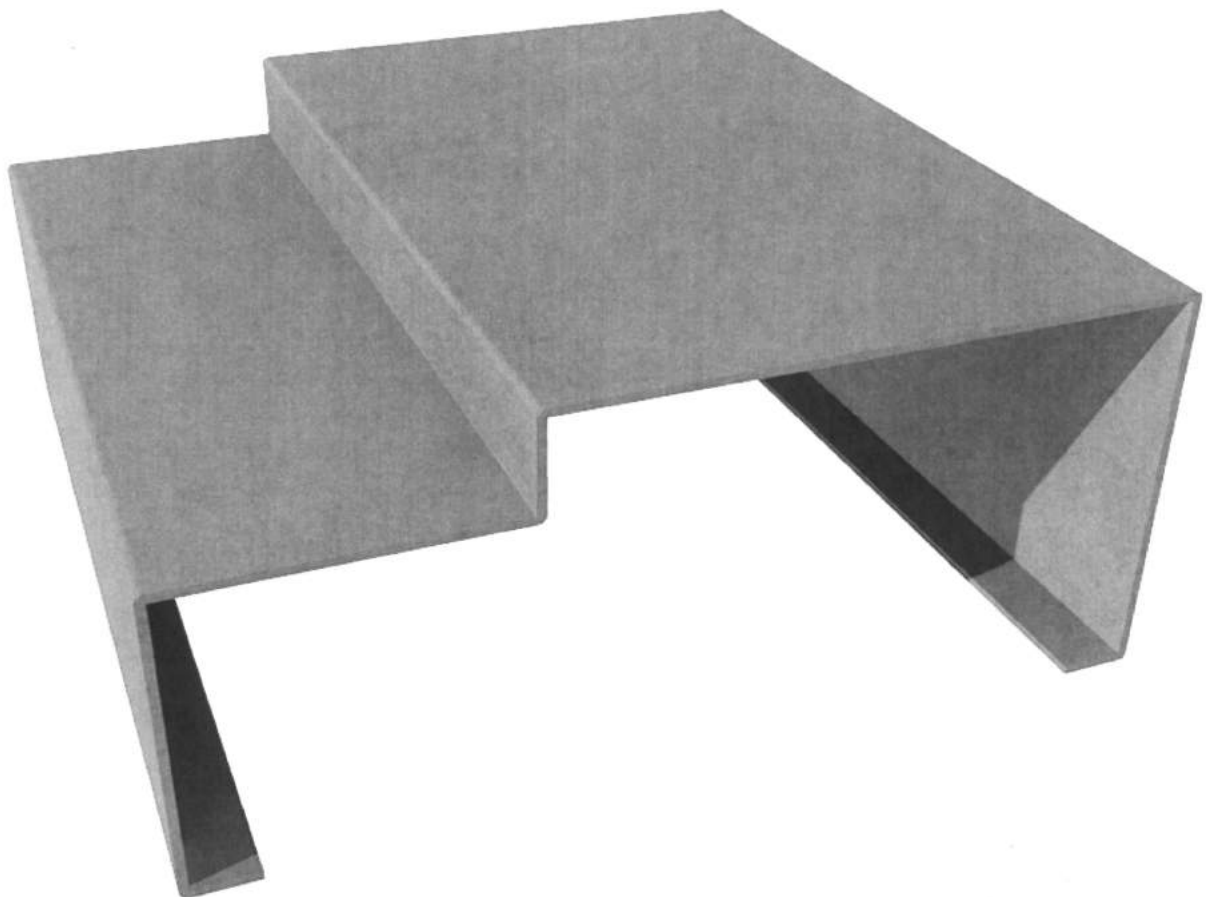


# Profiles – Single Return



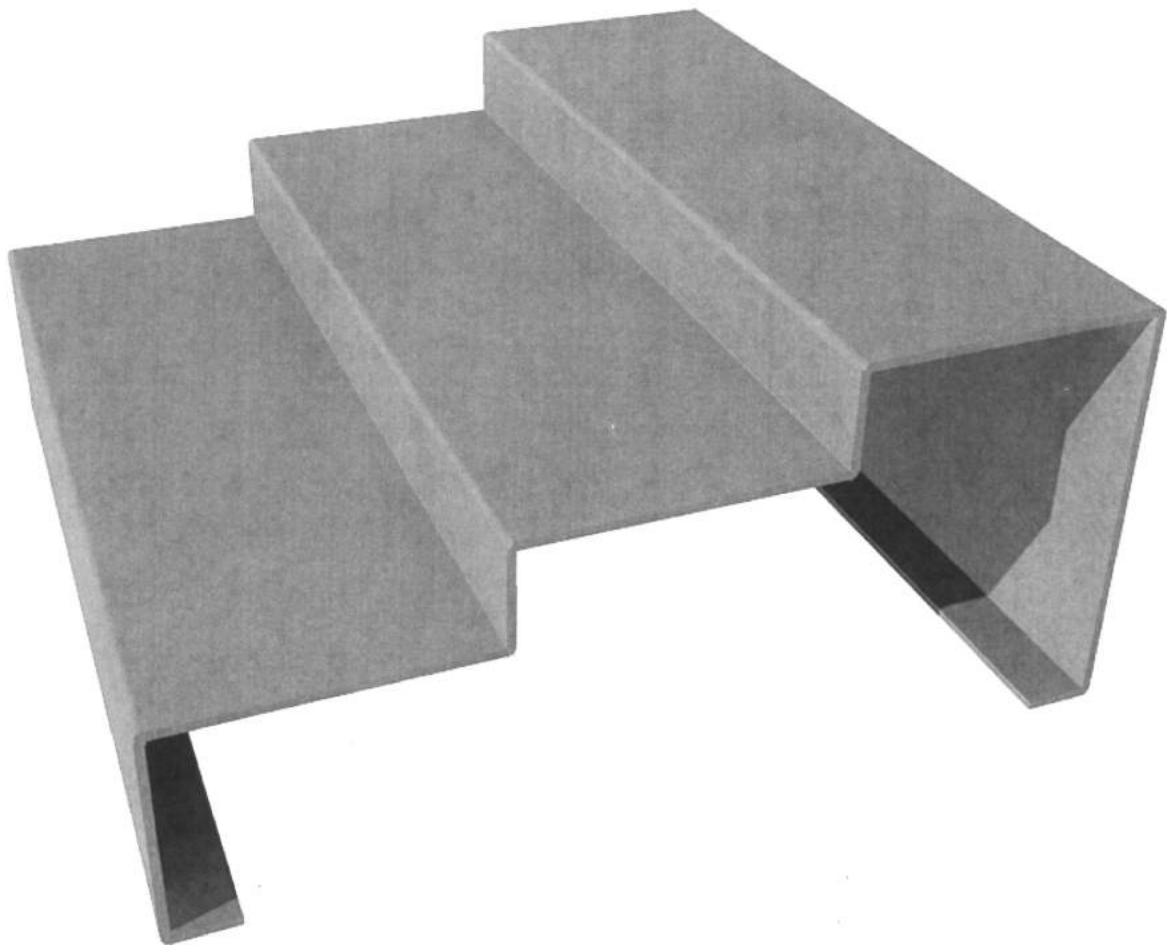
# Profiles – Single Return

---



# Profile – Single Return

---

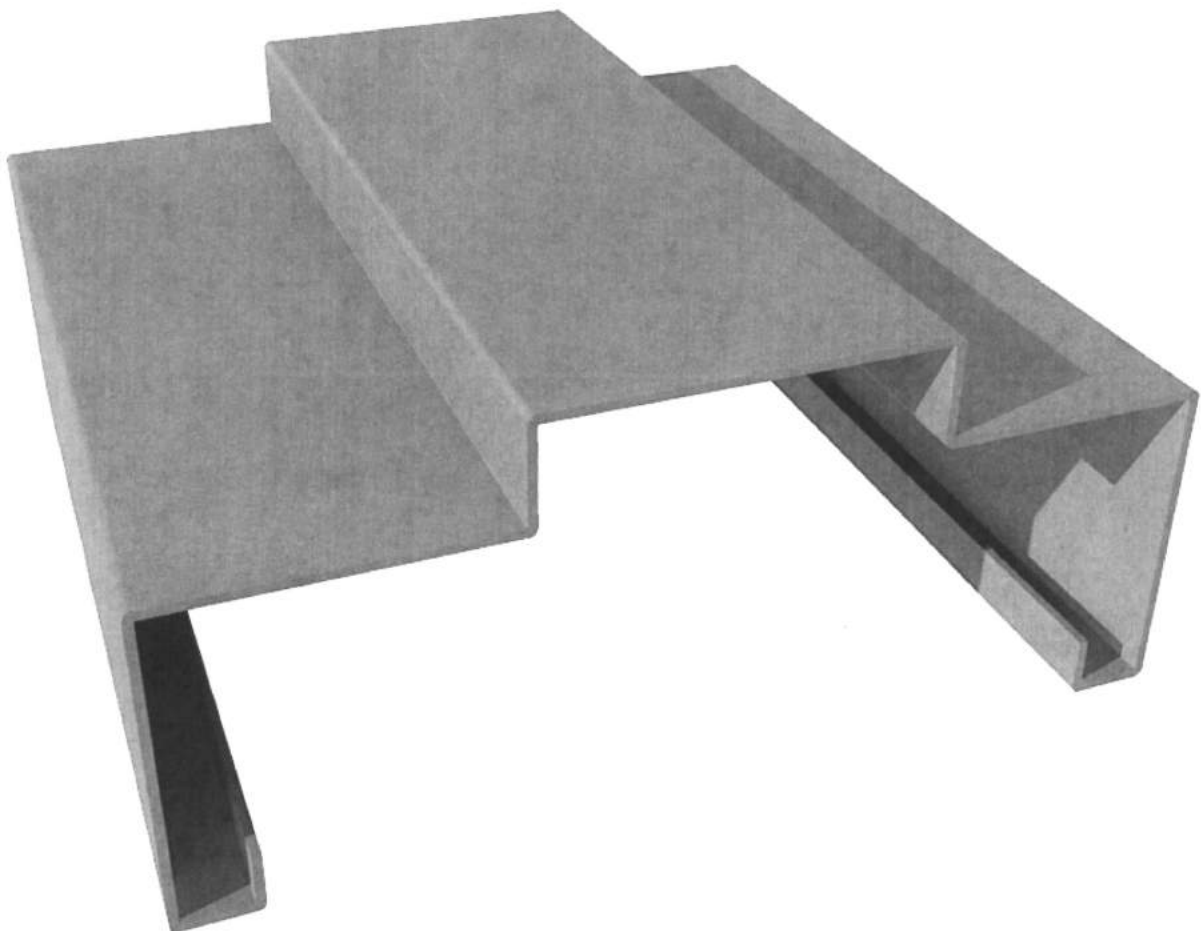




# Profile – Double Return

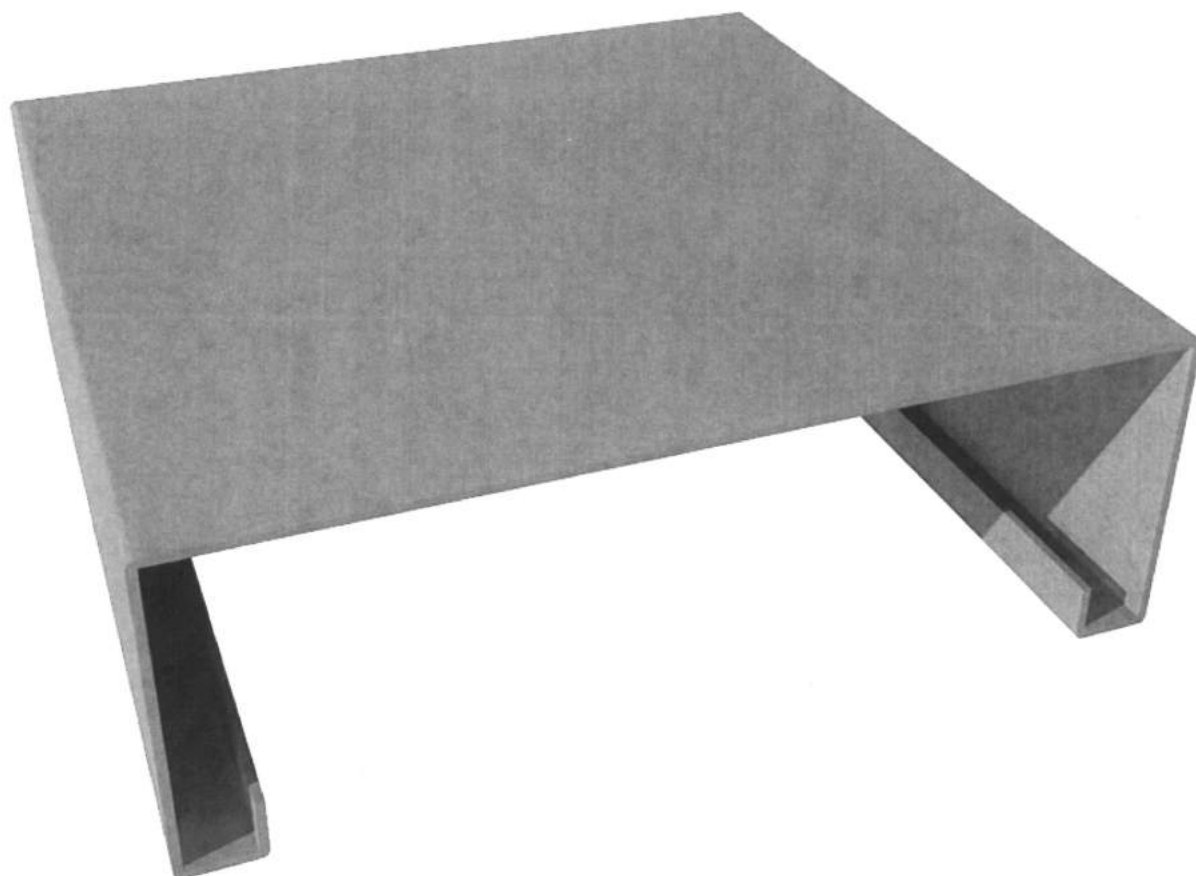
---

- Most popular double return profile



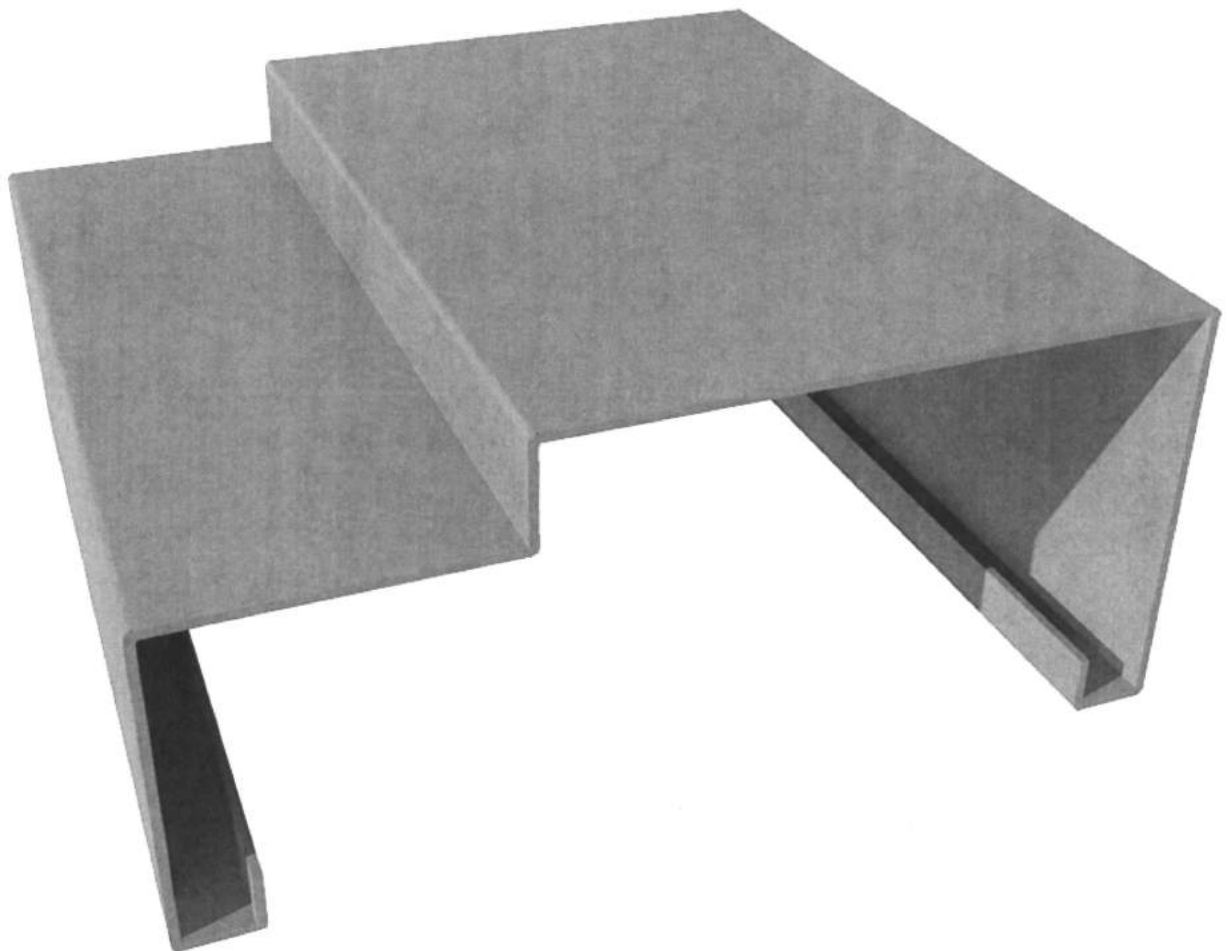
# Profile - Double Return

---



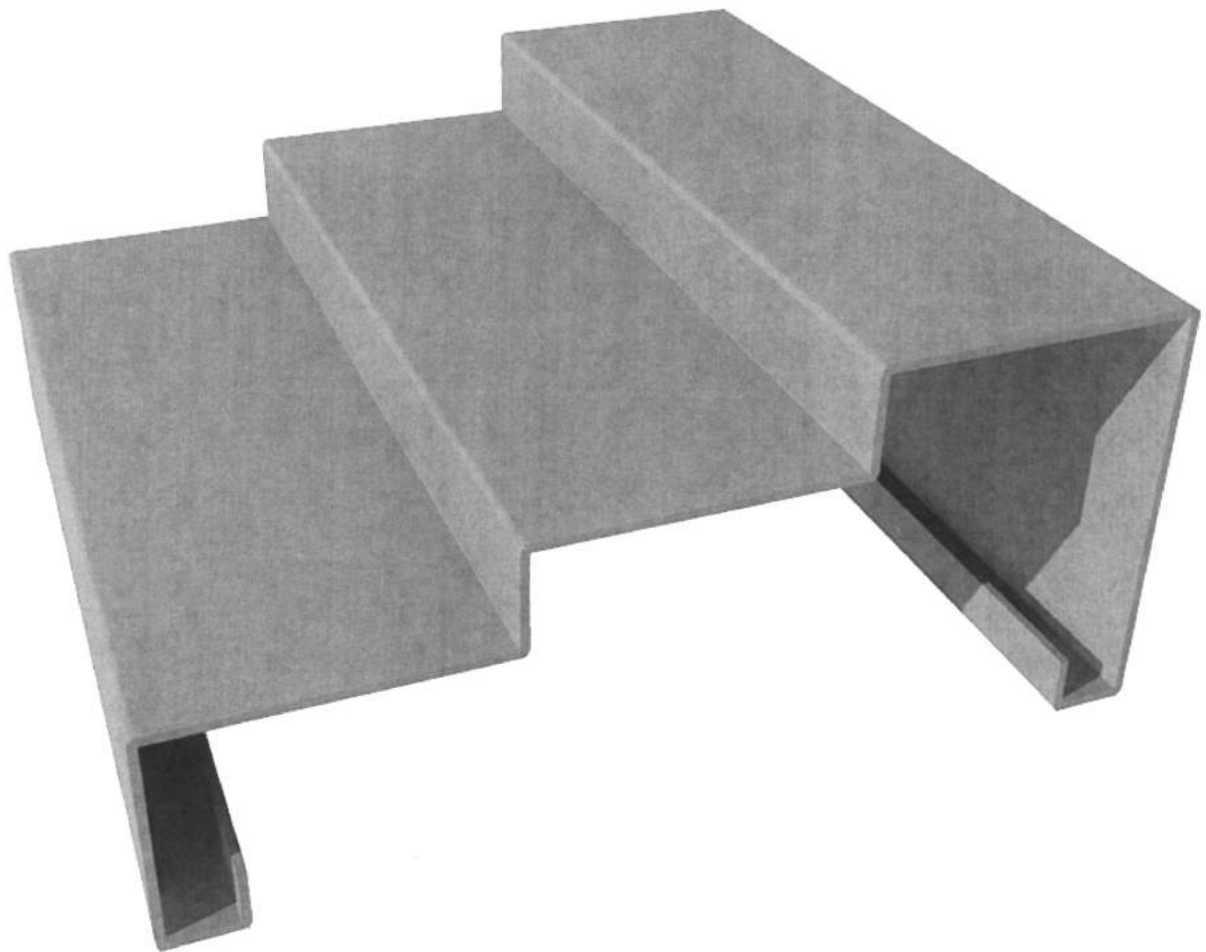
# Profile - Double Return

---



# Profile - Double Return

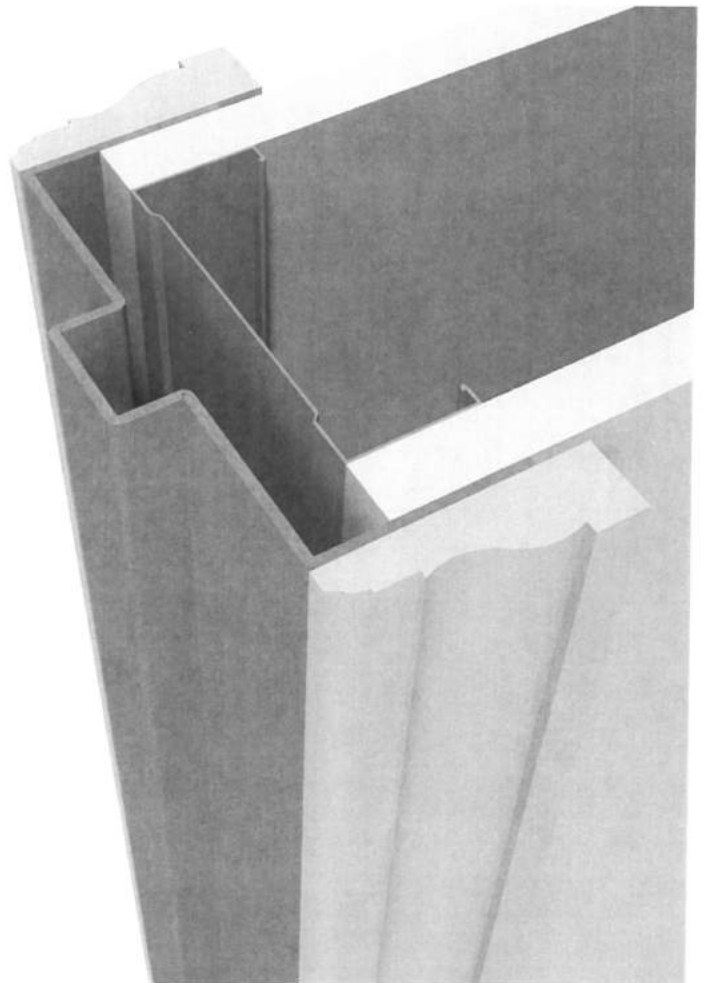
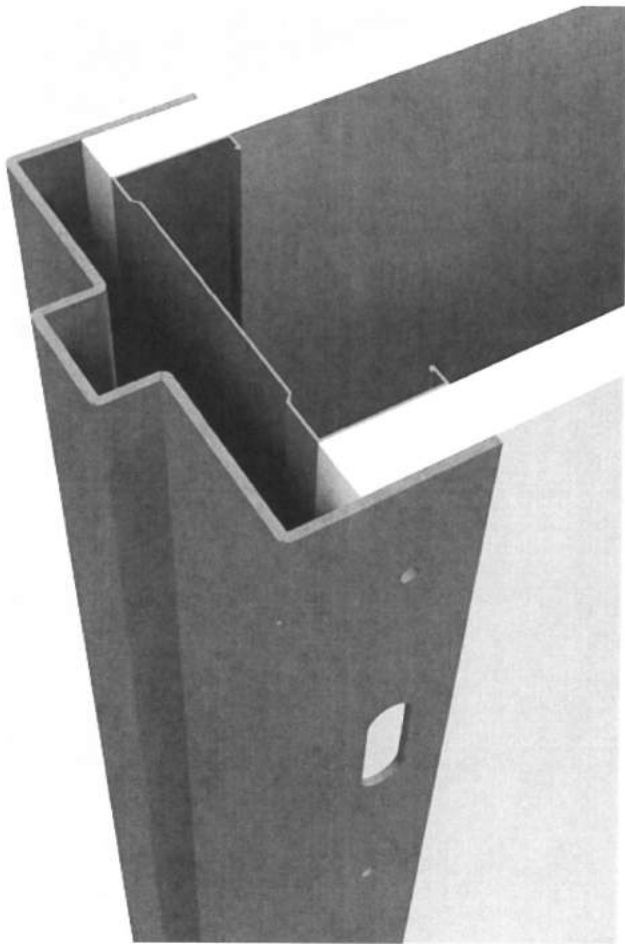
---



# Profile

---

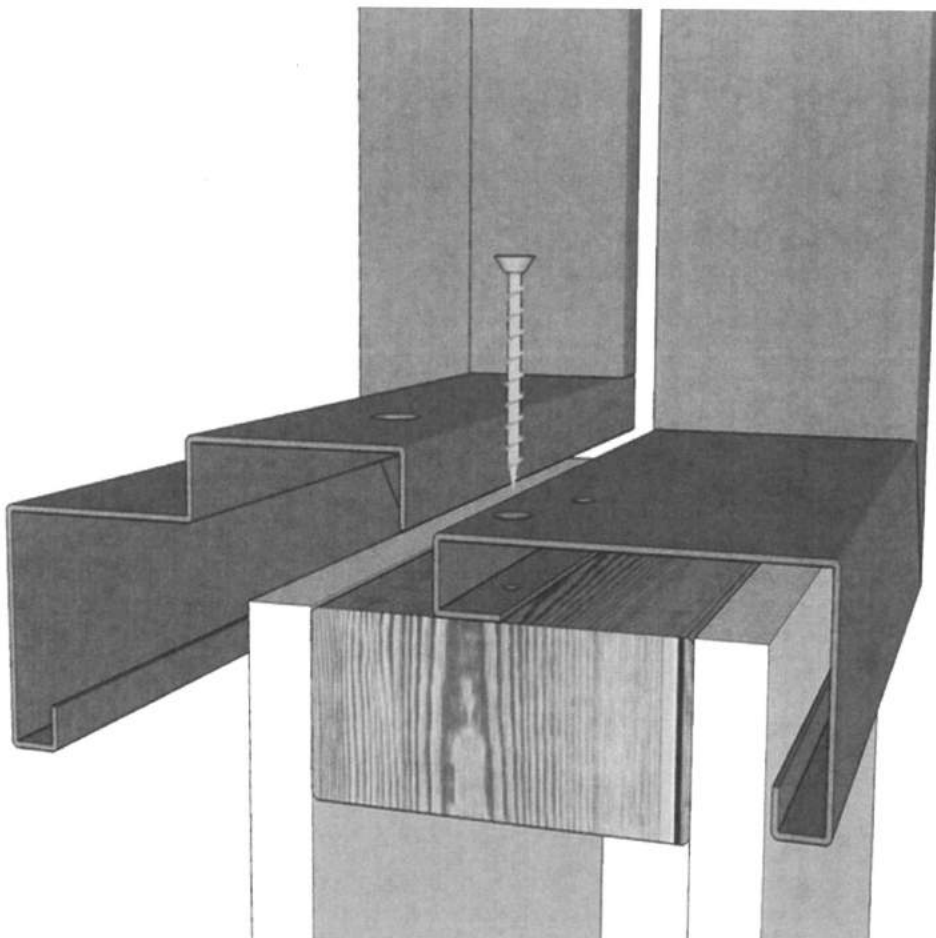
- Frame with \_\_\_\_\_ returns
- Allows frame to sit flush on the wall and easily allows trim to be added to the opening.



# Profile

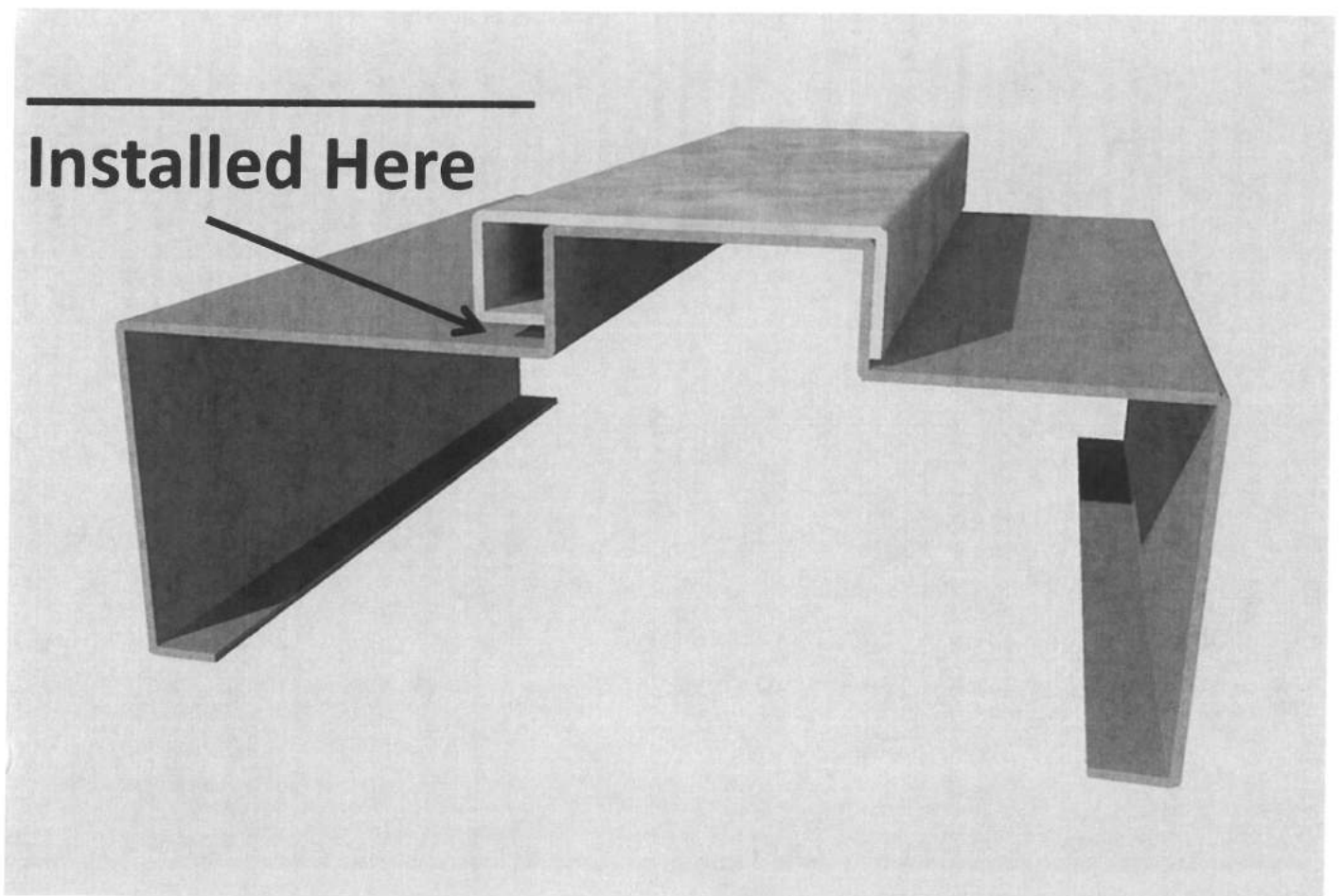
---

- To wrap an \_\_\_\_\_ and when welded corners are preferred or wall thickness is unknown.



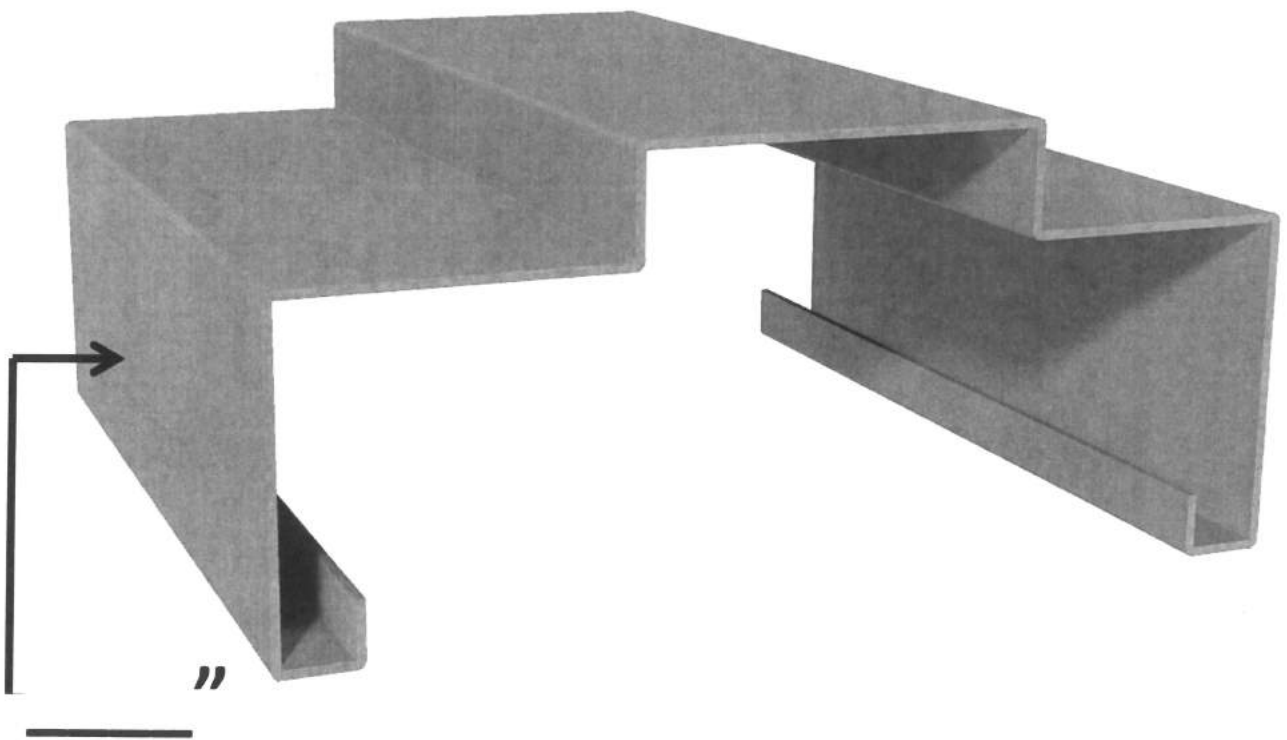
# Profile

- 
- Integral area in a frame for the installation of \_\_\_\_\_.



# Faces

- Most common/standard is \_\_\_\_\_
- Available any size \_\_\_\_\_ or greater
- Most common variation is the \_\_\_\_\_ face head

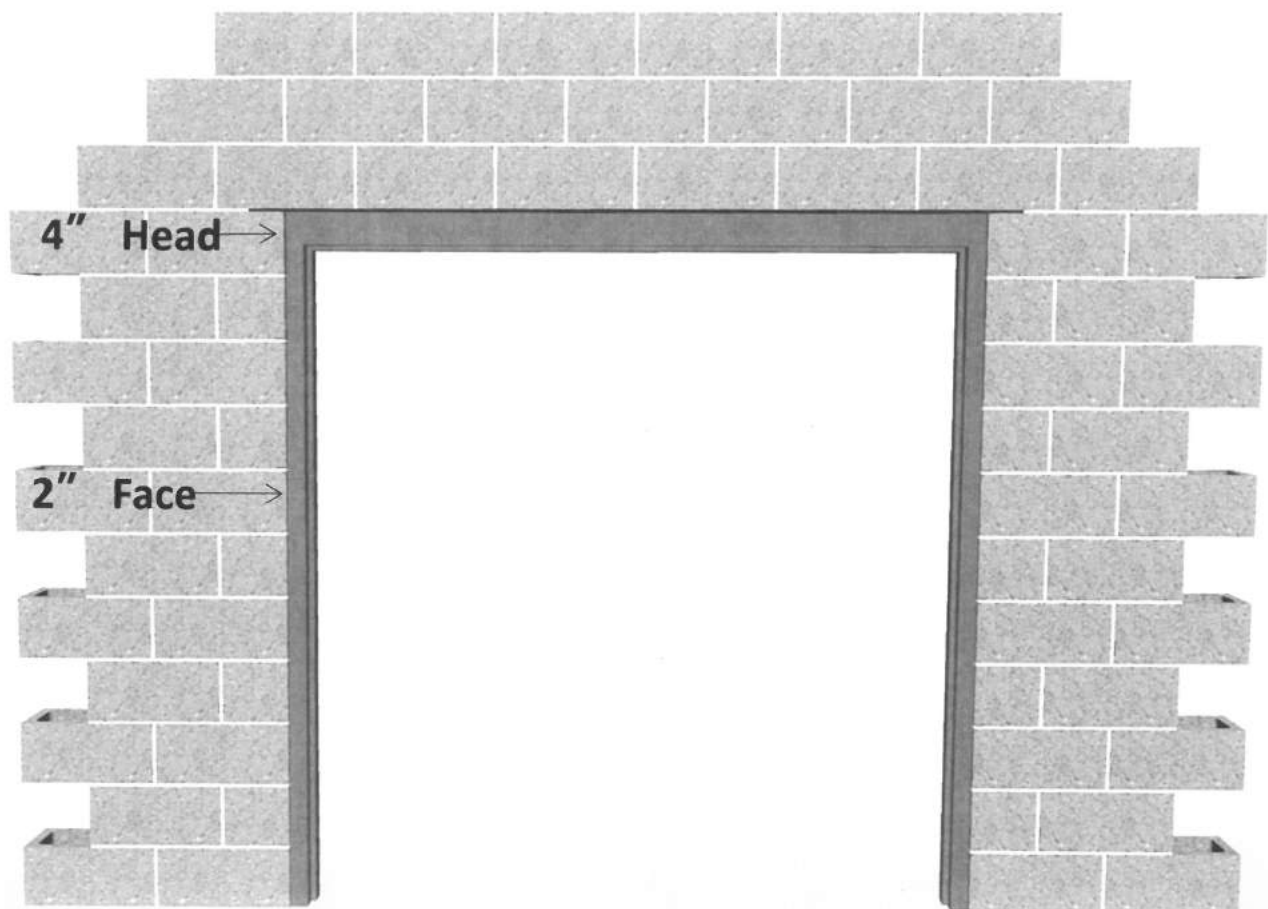




# Faces

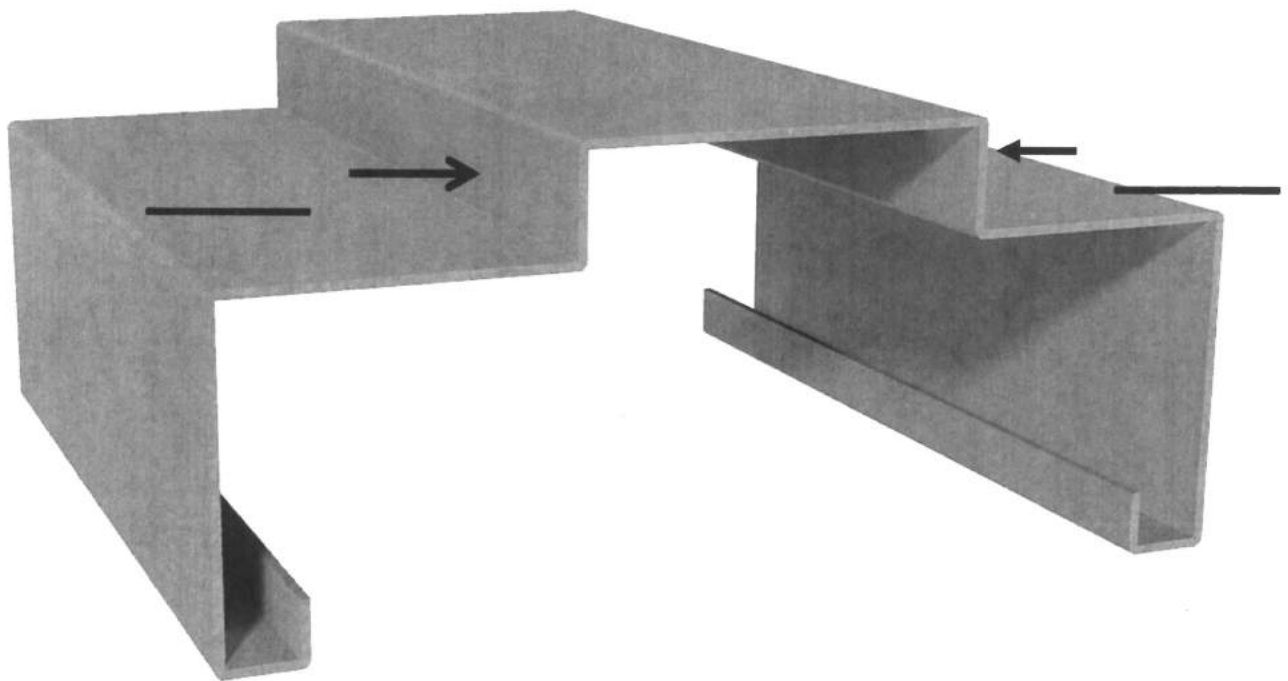
## Reasons for 4" face head

- For the overall frame height to be even with an un-cut masonry \_\_\_\_\_.
- (7-0 height frame with \_\_\_ head = \_\_\_  
\_\_\_ each \_\_\_ block = 88").



# Stops

\_\_\_\_\_ " minimum size

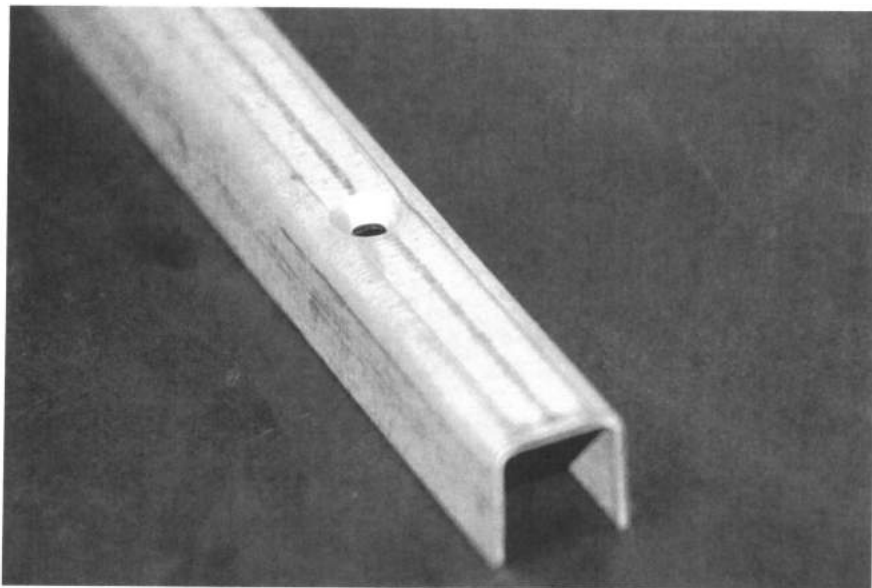


# Stops

- Provides a solid \_\_\_\_\_ for the \_\_\_\_\_ to \_\_\_\_\_ against
- Provides a barrier against light and air from the inside of the opening to the outside of the opening
- Holds \_\_\_\_\_ or \_\_\_\_\_ in place when present
- 5/8" high is the \_\_\_\_\_
- Available virtually any size greater than 5/8"

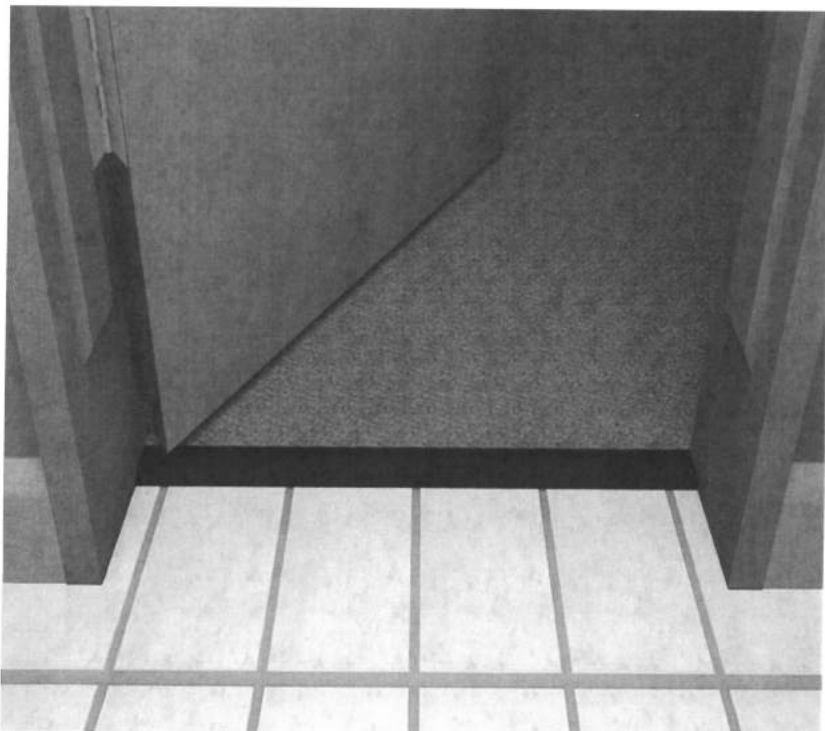
# Glazing Bead

- Aka \_\_\_\_\_
- A piece of formed metal used to secure either glass or a thin metal panel inside a door or frame.
- Standard size is \_\_\_\_\_X \_\_\_\_\_

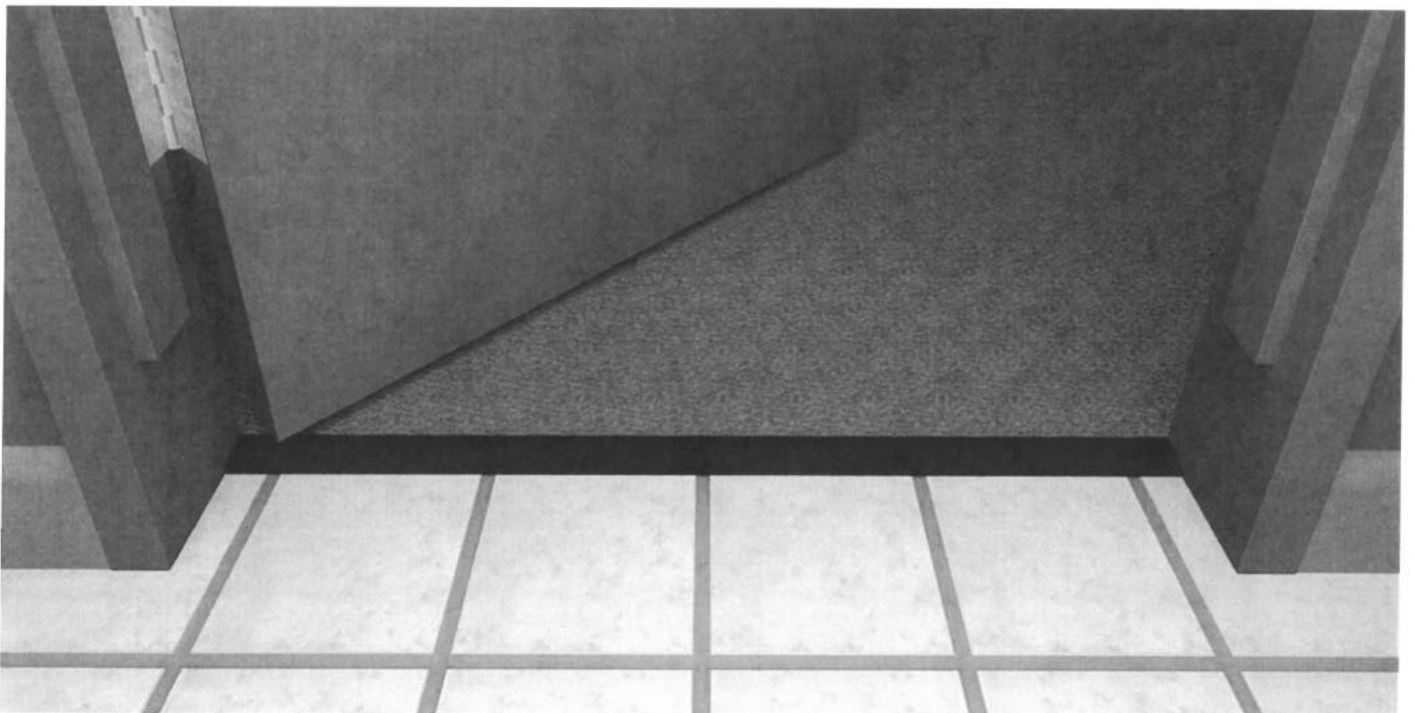
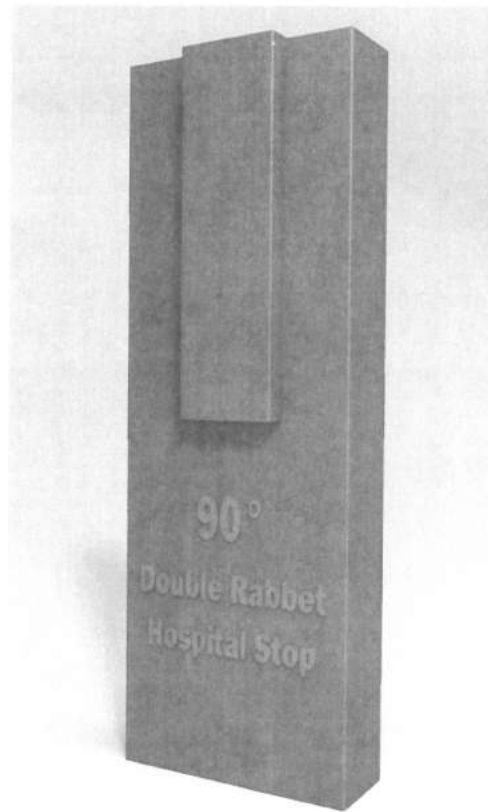


# Hospital Stops

- Stops at either a \_\_\_\_\_ or \_\_\_\_\_ degree angle
- Can be either 4", 6", or other dimension from floor.
- Aids in the cleaning of floors.

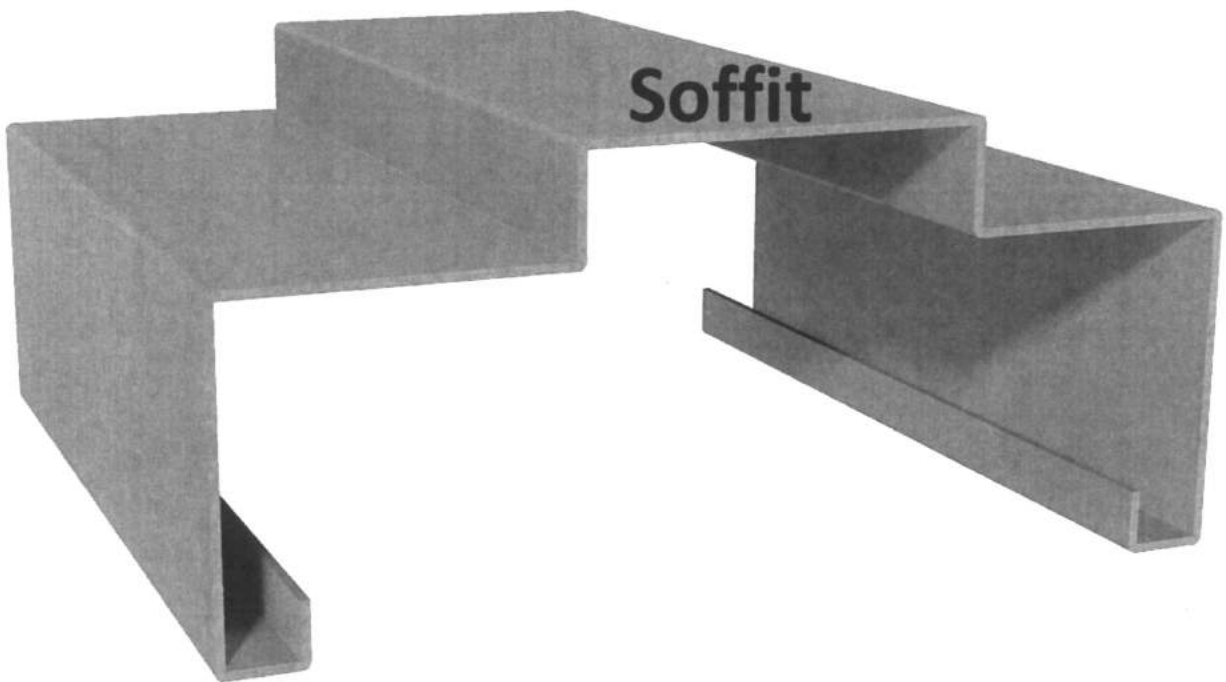


# Hospital Stops



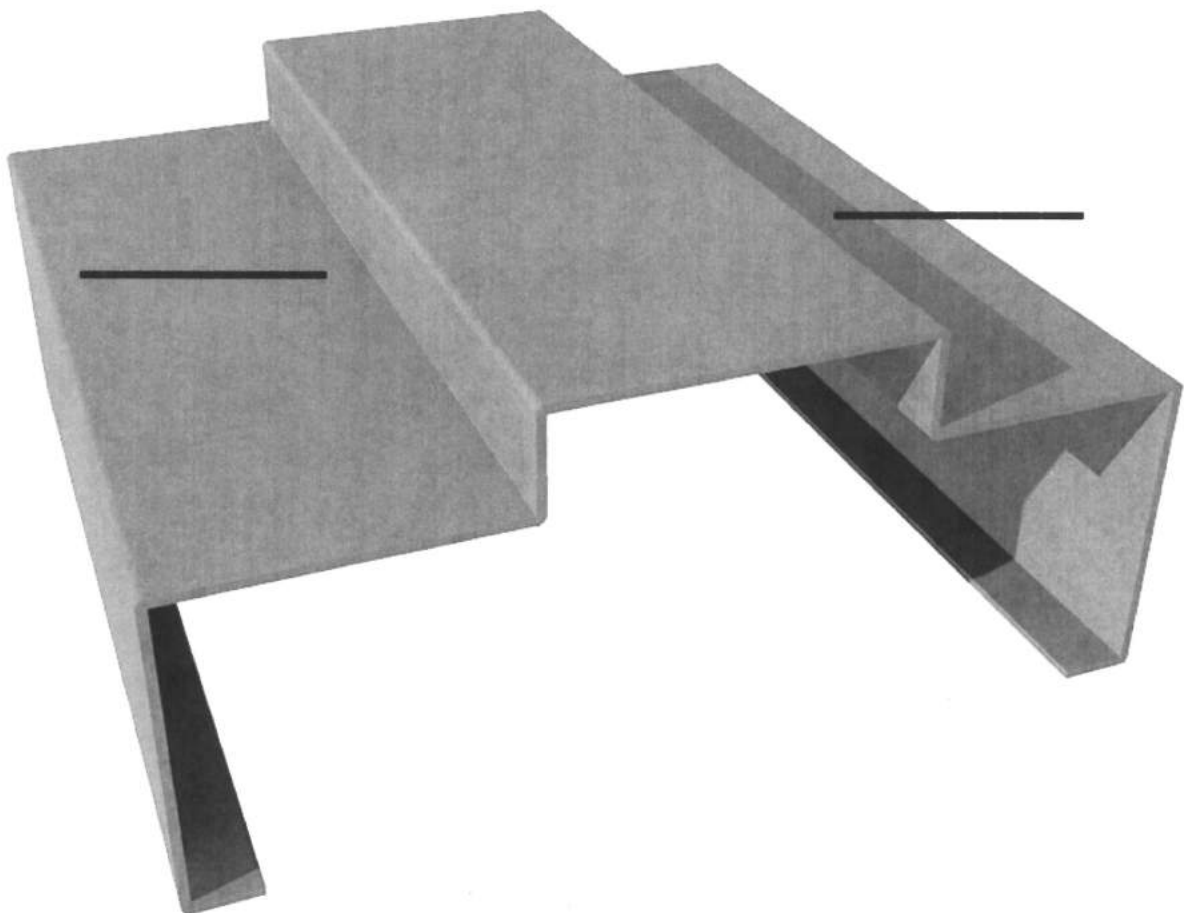
# Soffit

- Provides a \_\_\_\_\_ place for some \_\_\_\_\_
- Soffit \_\_\_\_\_ is normally a function of \_\_\_\_\_ and desired \_\_\_\_\_ sizes



# Rabbets

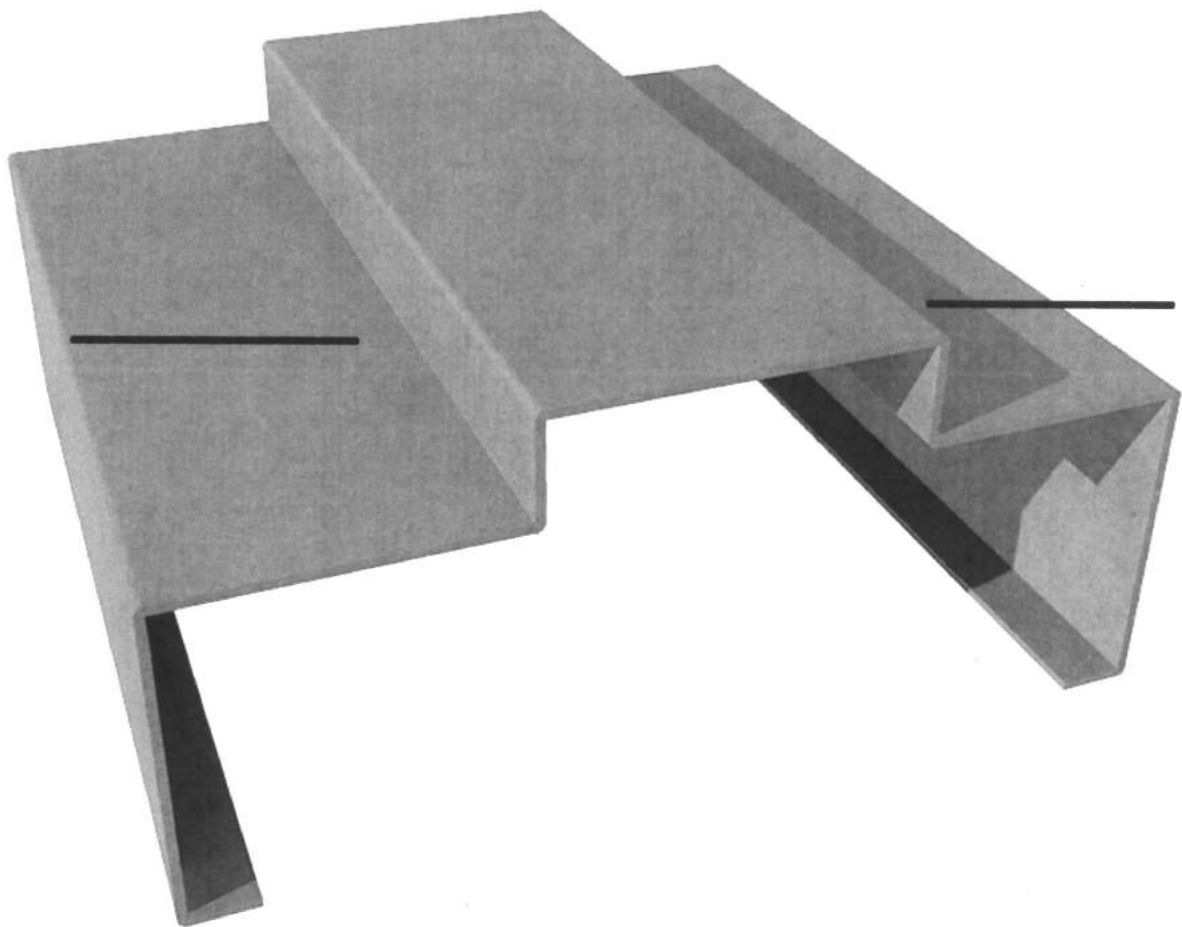
\_\_\_\_\_” larger than door thickness





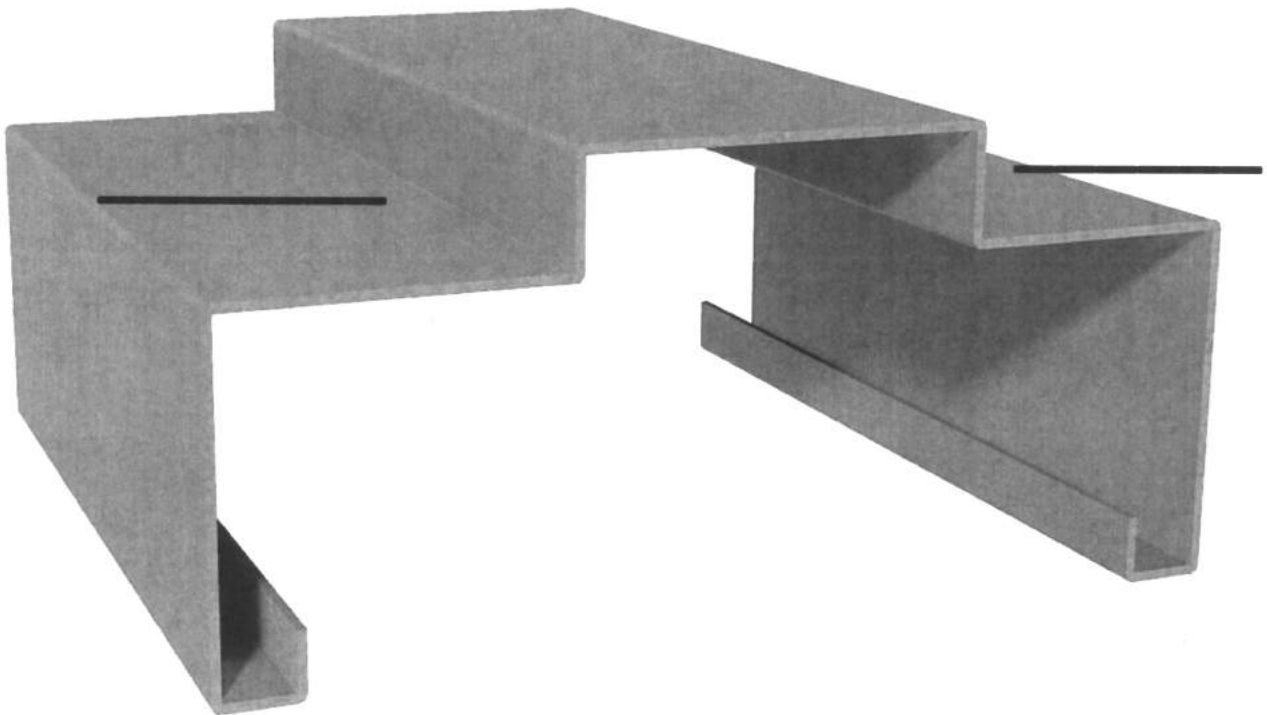
# Rabbets

## Unequal Rabbets



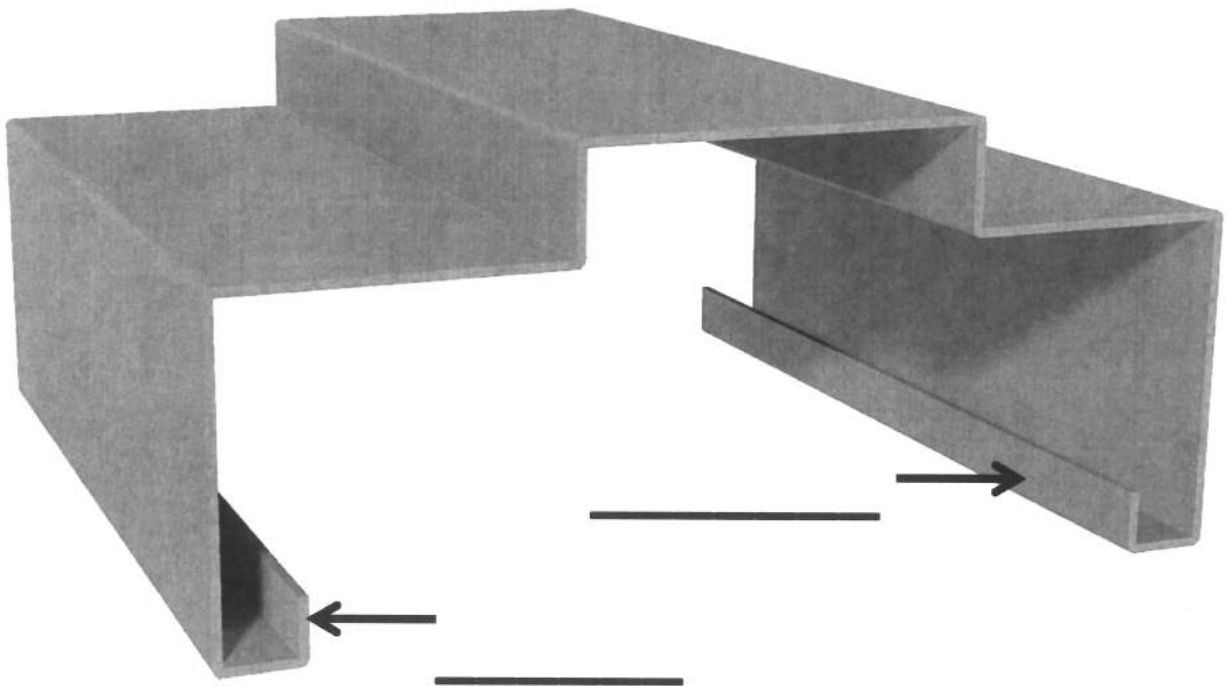
# Rabbets

## Equal Rabbets



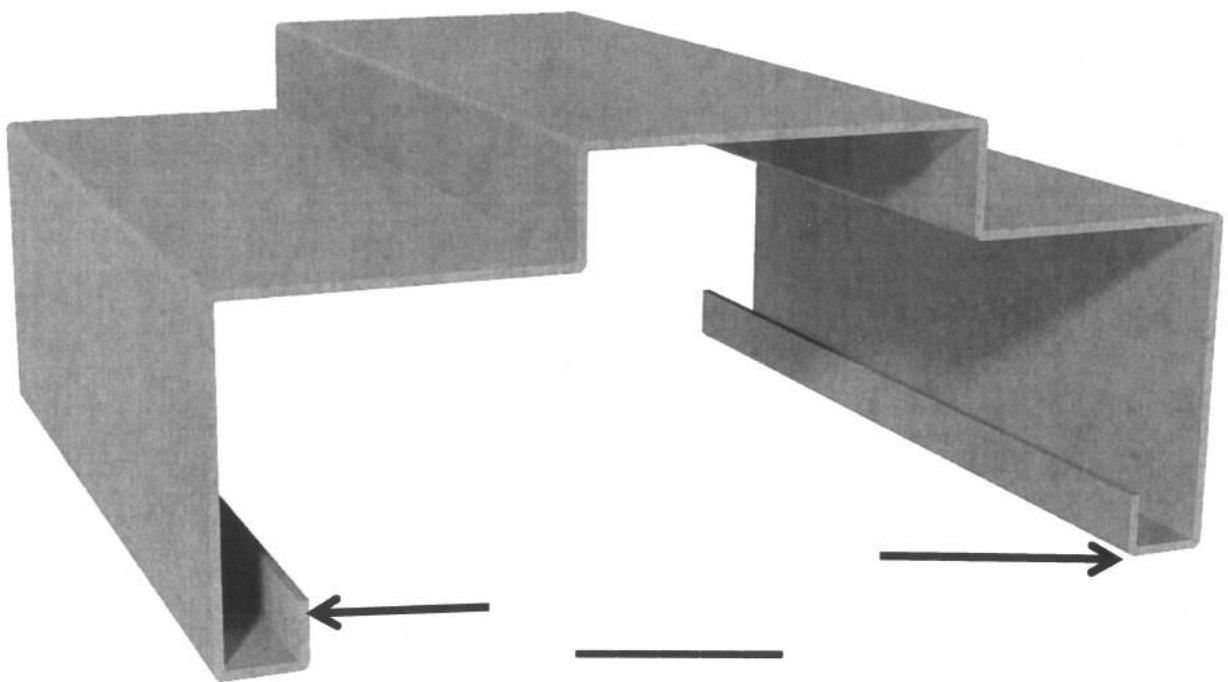
# Returns

- \_\_\_\_\_ profiles have \_\_\_\_\_ returns
- \_\_\_\_\_ profiles have \_\_\_\_\_ returns
- Standard size is \_\_\_\_\_"



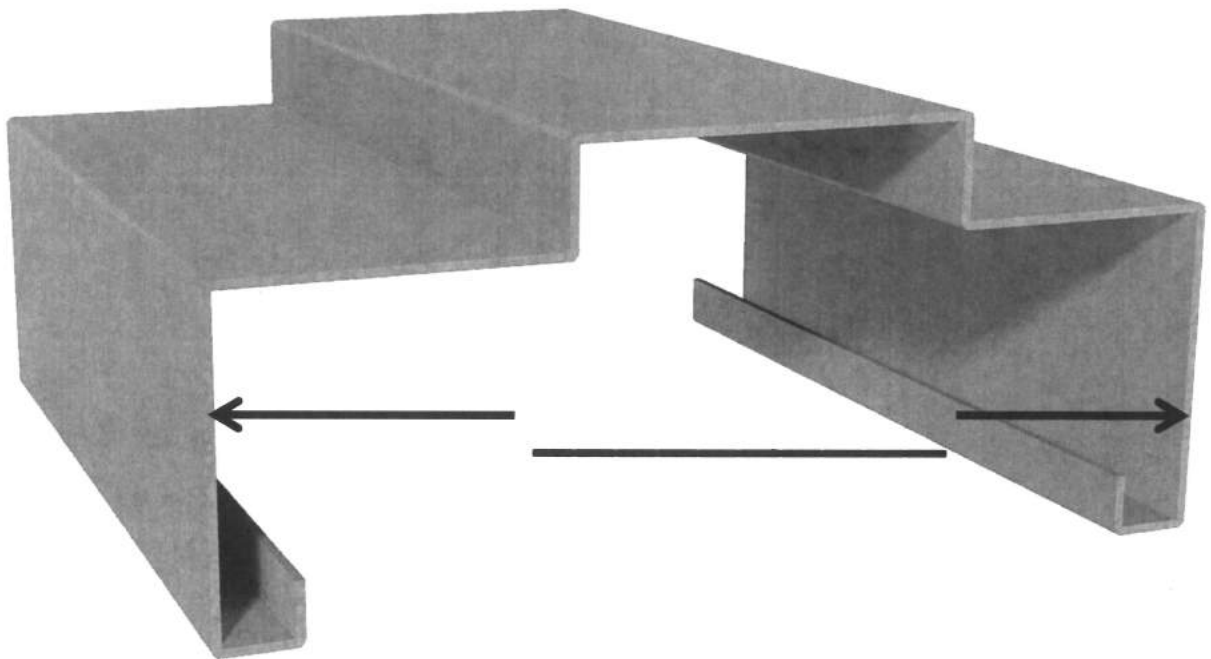
# Throat

- Throat is the \_\_\_\_\_ between the \_\_\_\_\_
- Throat size is commonly same dimension as the \_\_\_\_\_ when \_\_\_\_\_ the wall



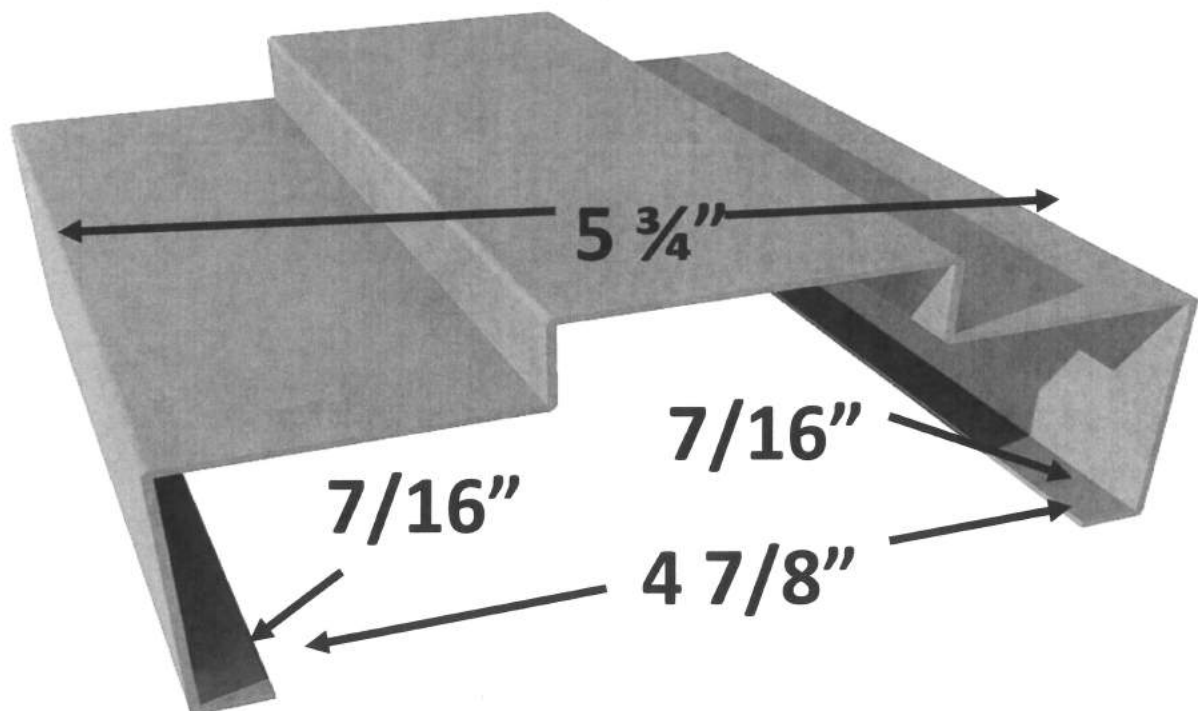
# Jamb Depth

- Jamb depth is the \_\_\_\_\_ of the \_\_\_\_\_
- Jamb depth = \_\_\_\_\_ + \_\_\_\_\_
- Jamb depths are available 3" and above



## 5 3/4" Exception

- Most popular jamb depth is \_\_\_\_\_"
- Throat size of \_\_\_\_\_ (7/16" returns)
- Standard throat = JD – \_\_\_\_\_ (1/2" returns)
- Most are unequal rabbet to fit \_\_\_\_\_ or \_\_\_\_\_ thick doors
- How did this happen?

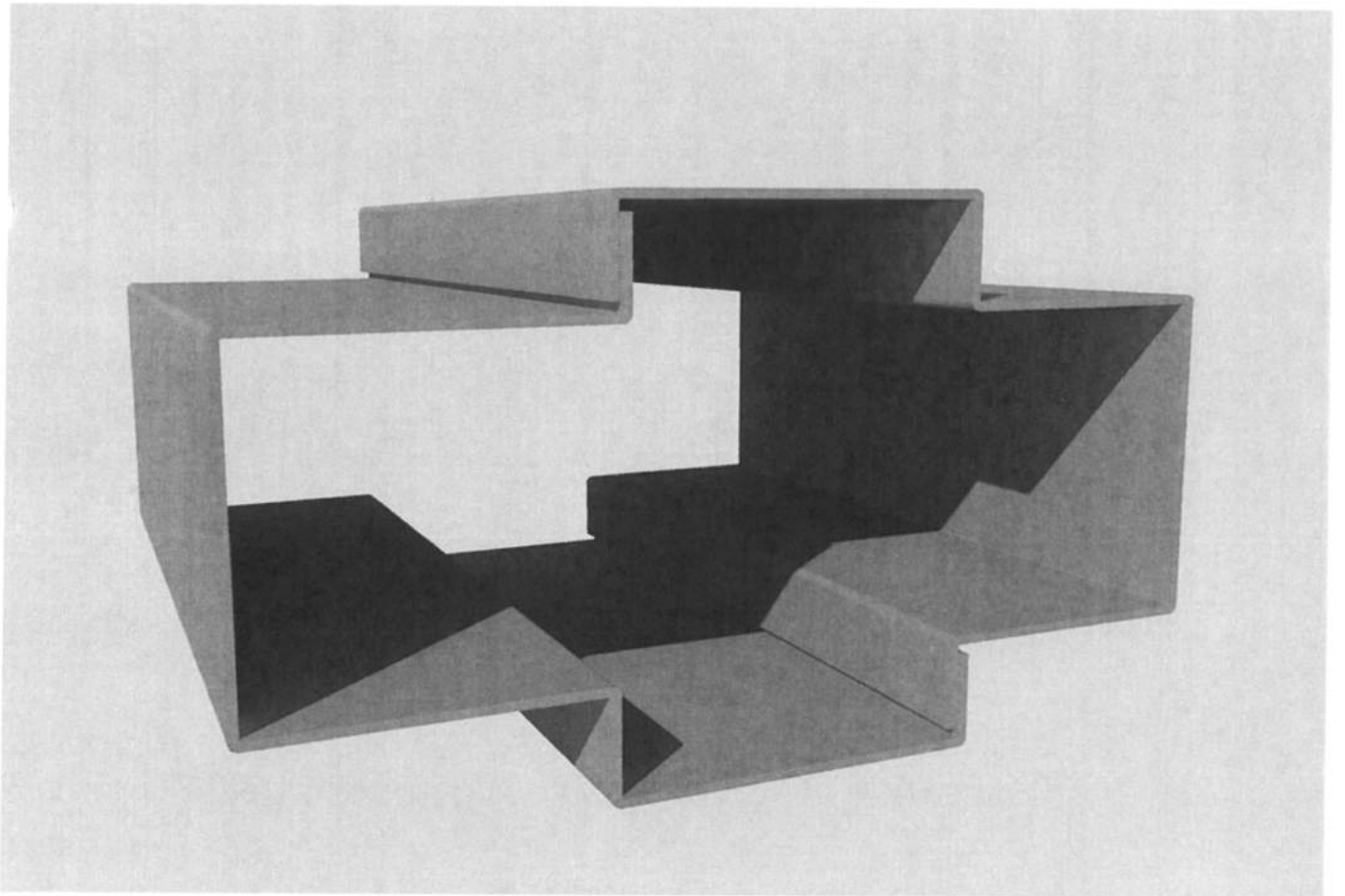


# Mullions

- Available in \_\_\_\_\_ or \_\_\_\_\_ configurations
- Used for separating doors, door to light, or light to light
- Also known as “\_\_\_\_\_”
- Custom profiles are available

# Mullions

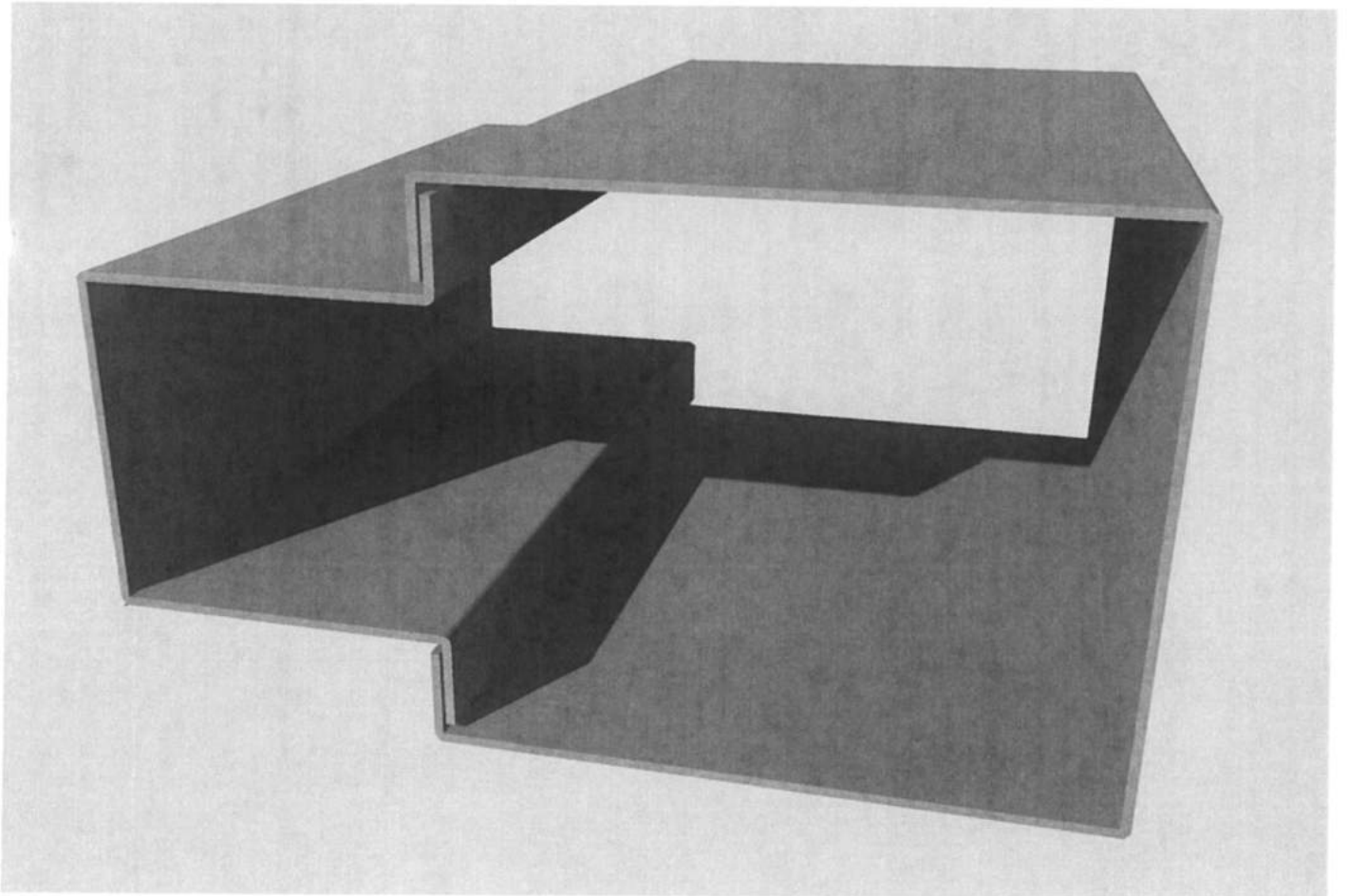
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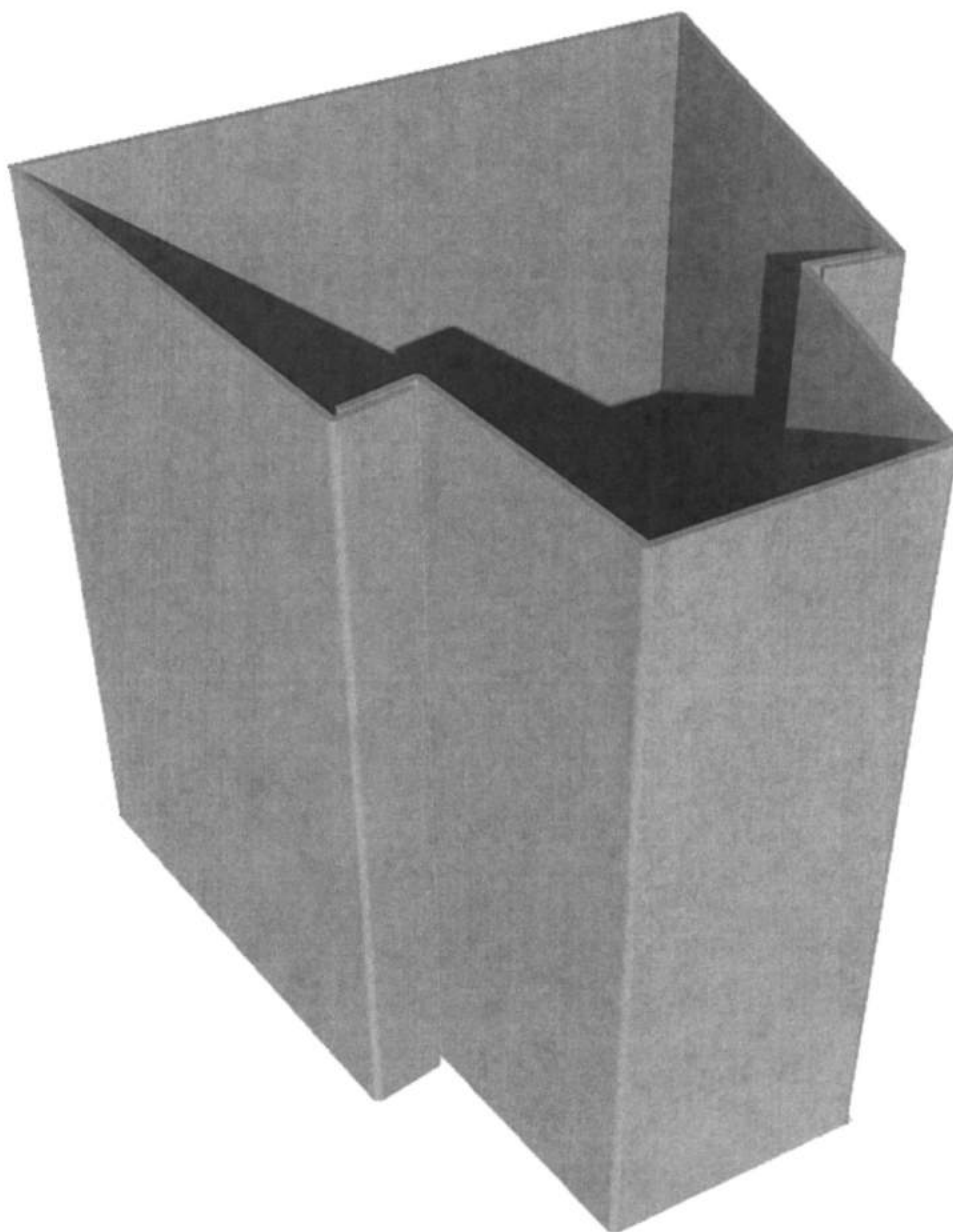
# Mullions

---



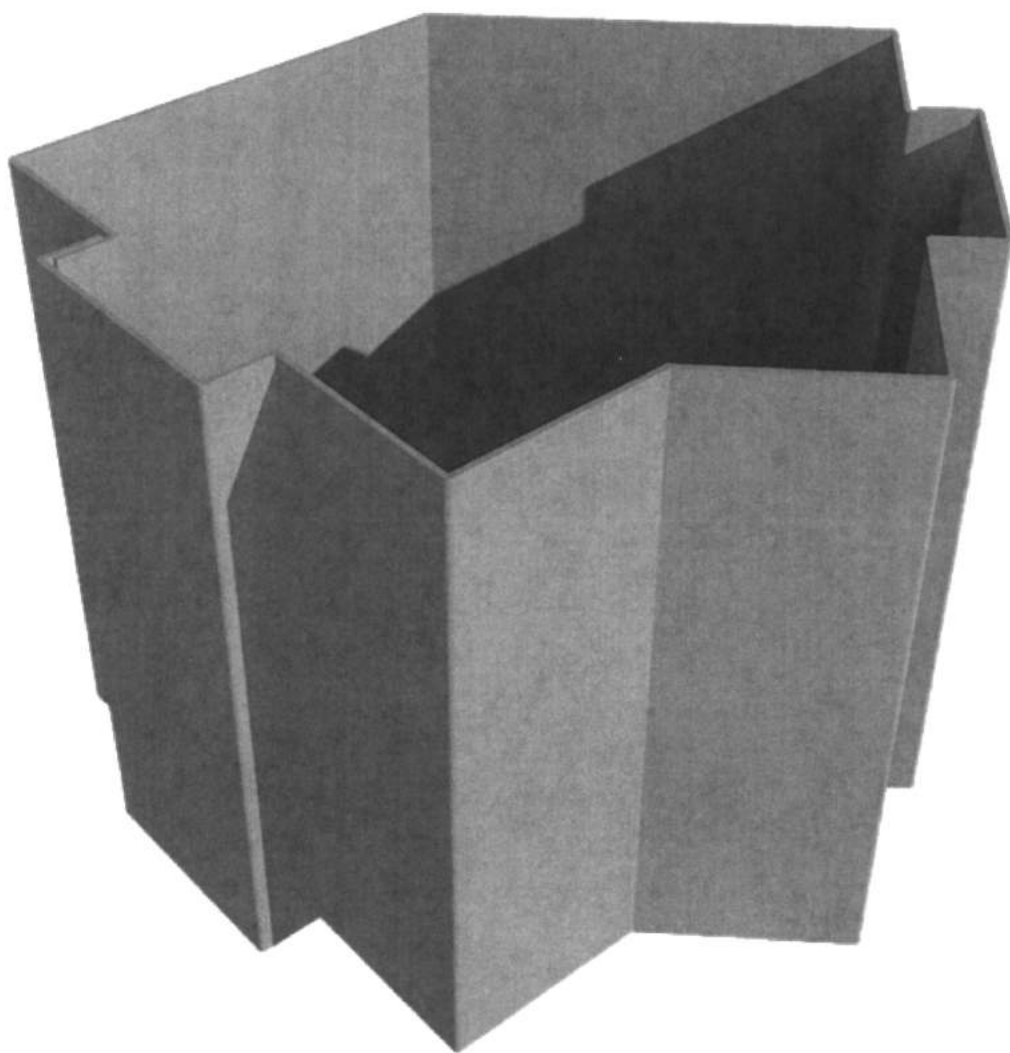
# Mullions

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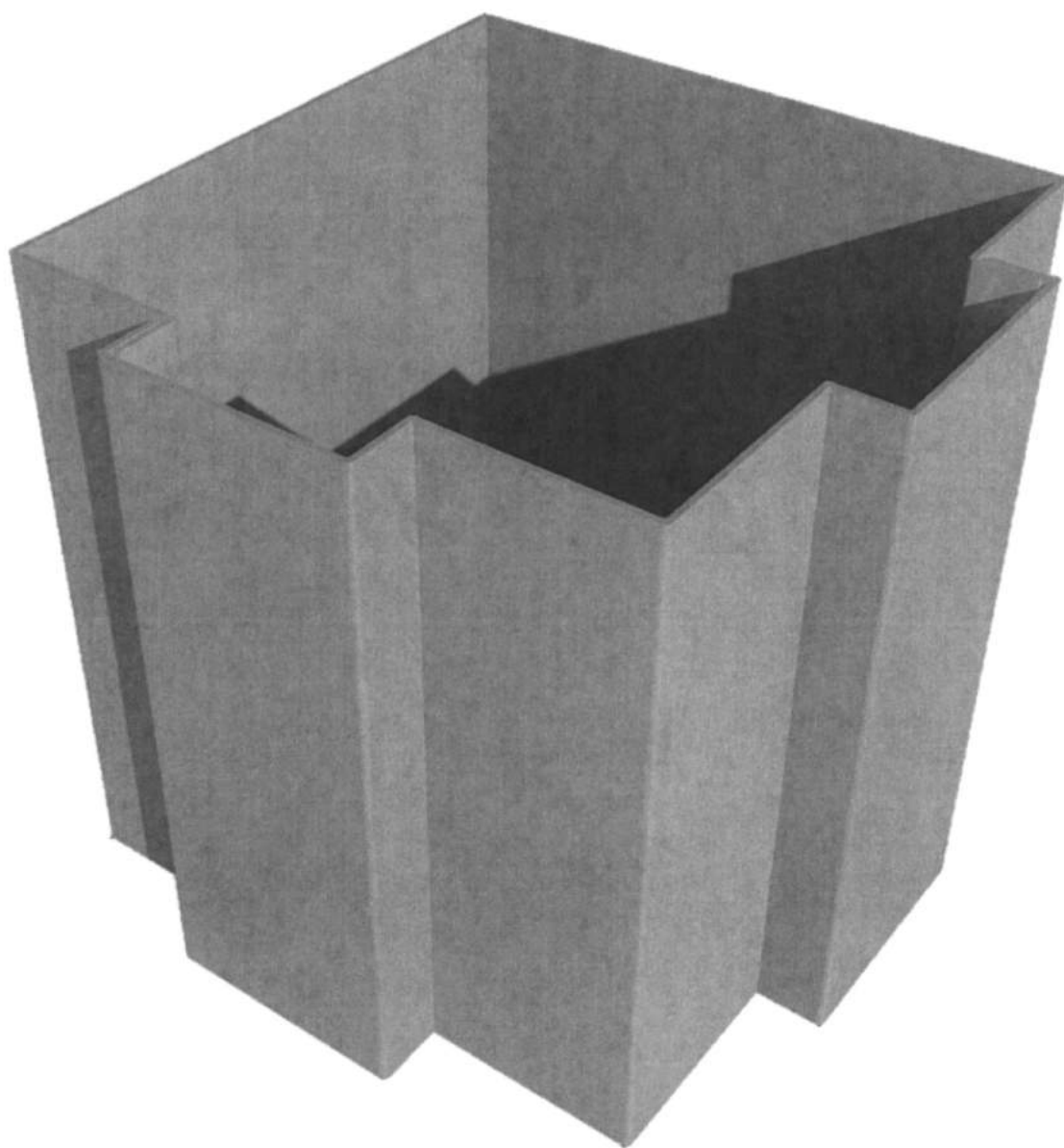
# Mullions

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# Mullions

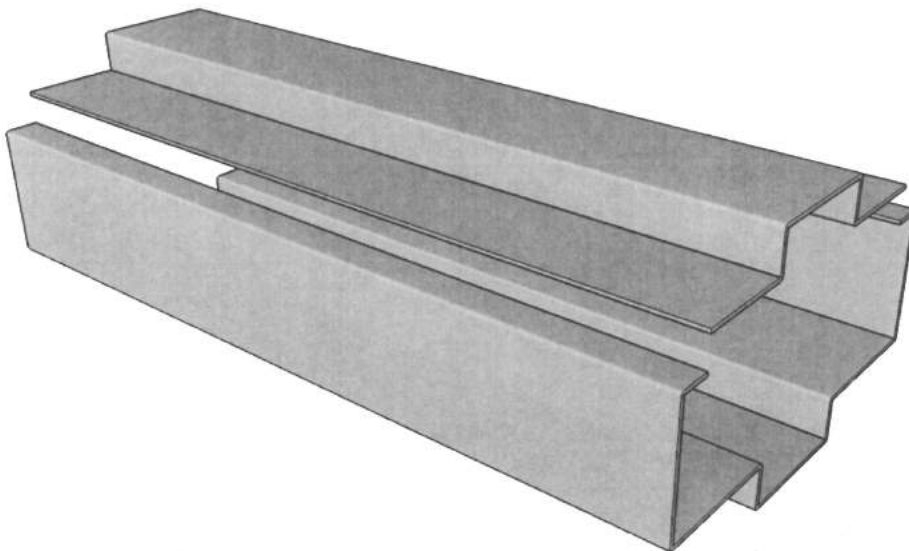
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# Filler Plate

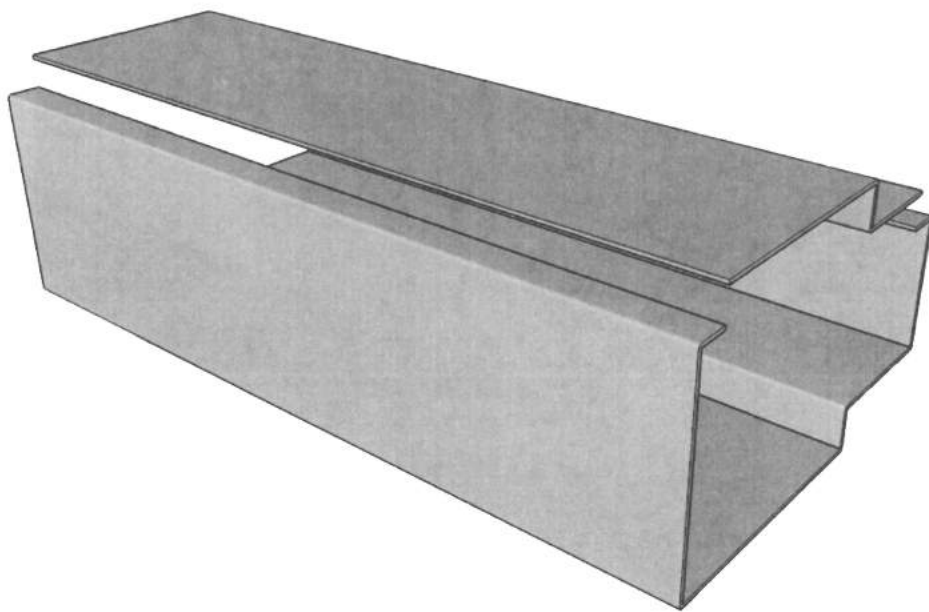
\_\_\_\_\_ **mullion with filler plate**

- Required when mullions cannot be made in 2 pieces and interlocked



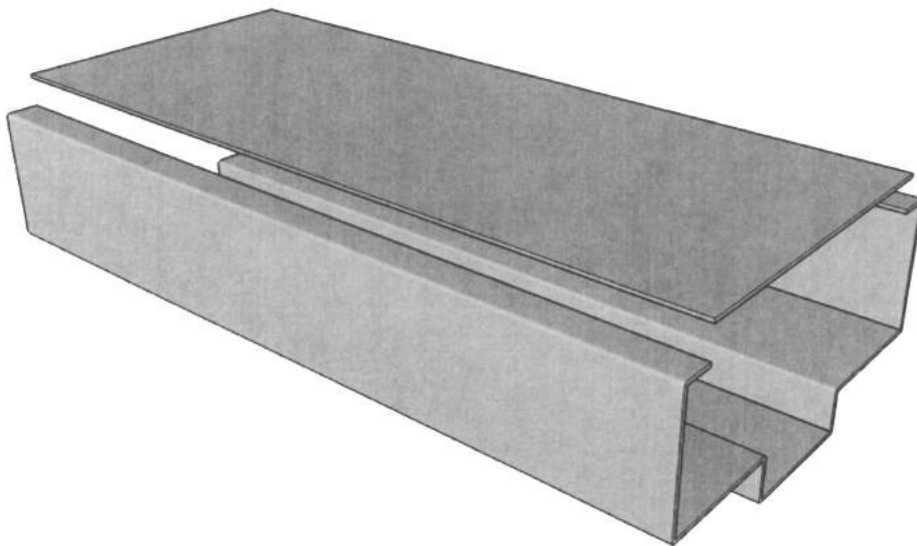
# Filler Plate

\_\_\_\_\_ mullion with filler plate



# Filler Plate

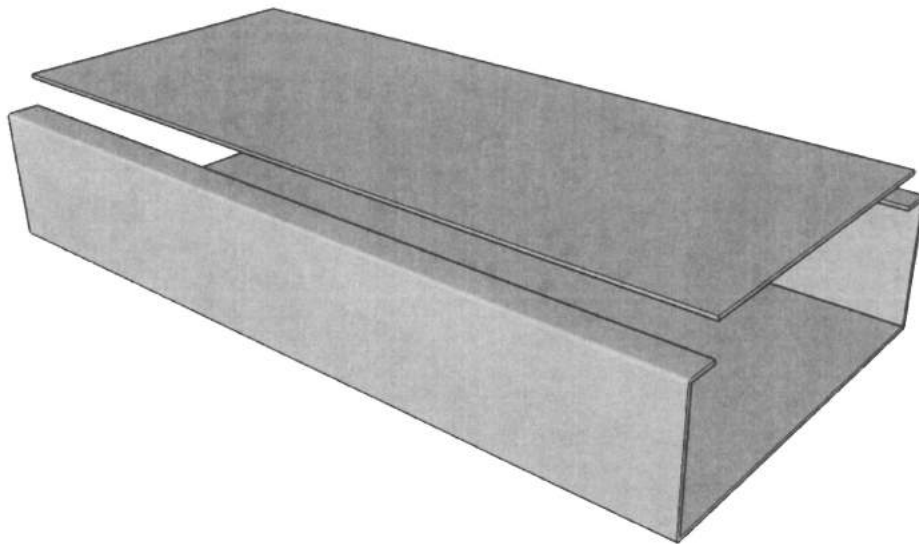
\_\_\_\_\_mullion with  
\_\_\_\_\_filler plate



# Mullions

## Cased Open Mullion

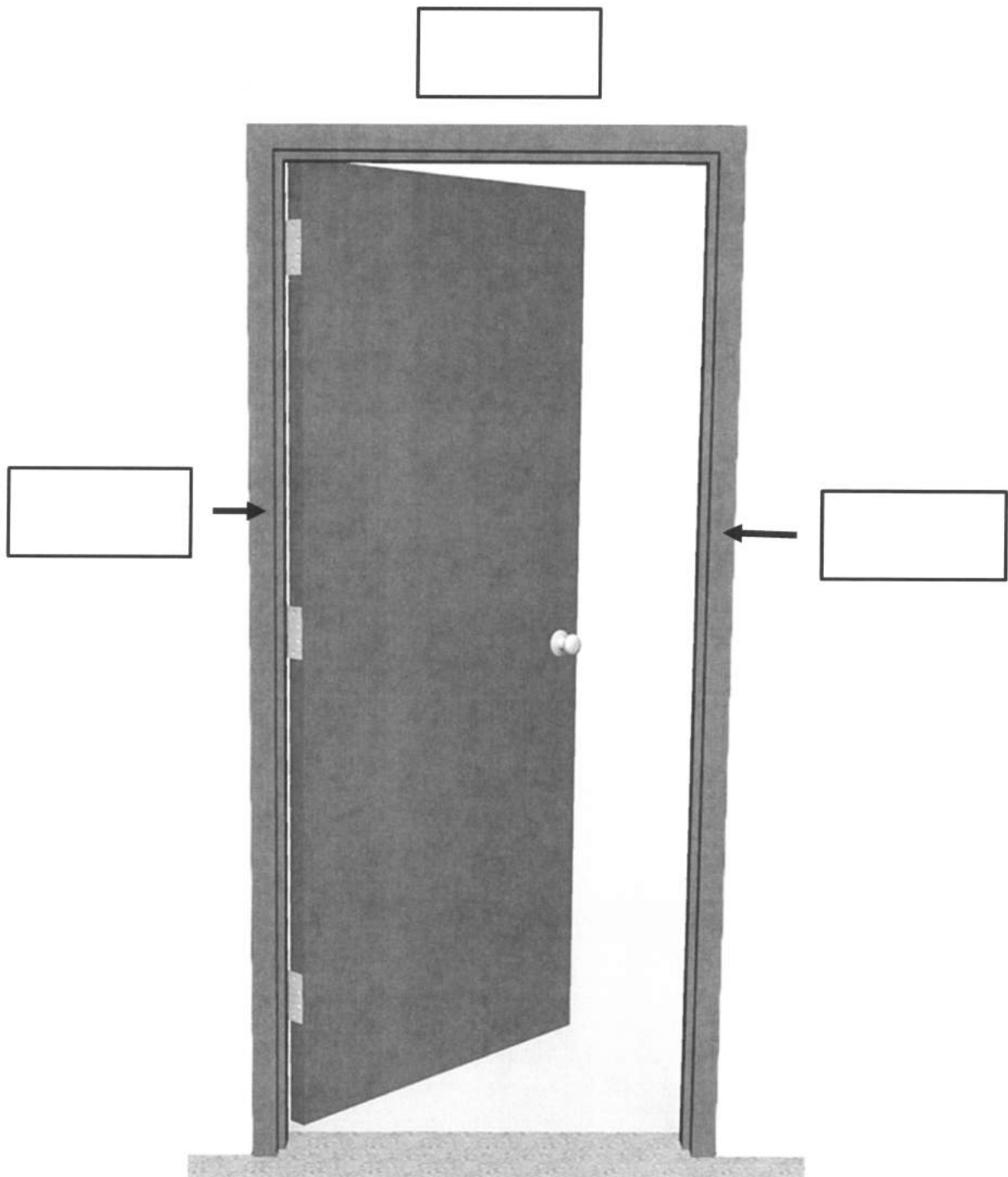
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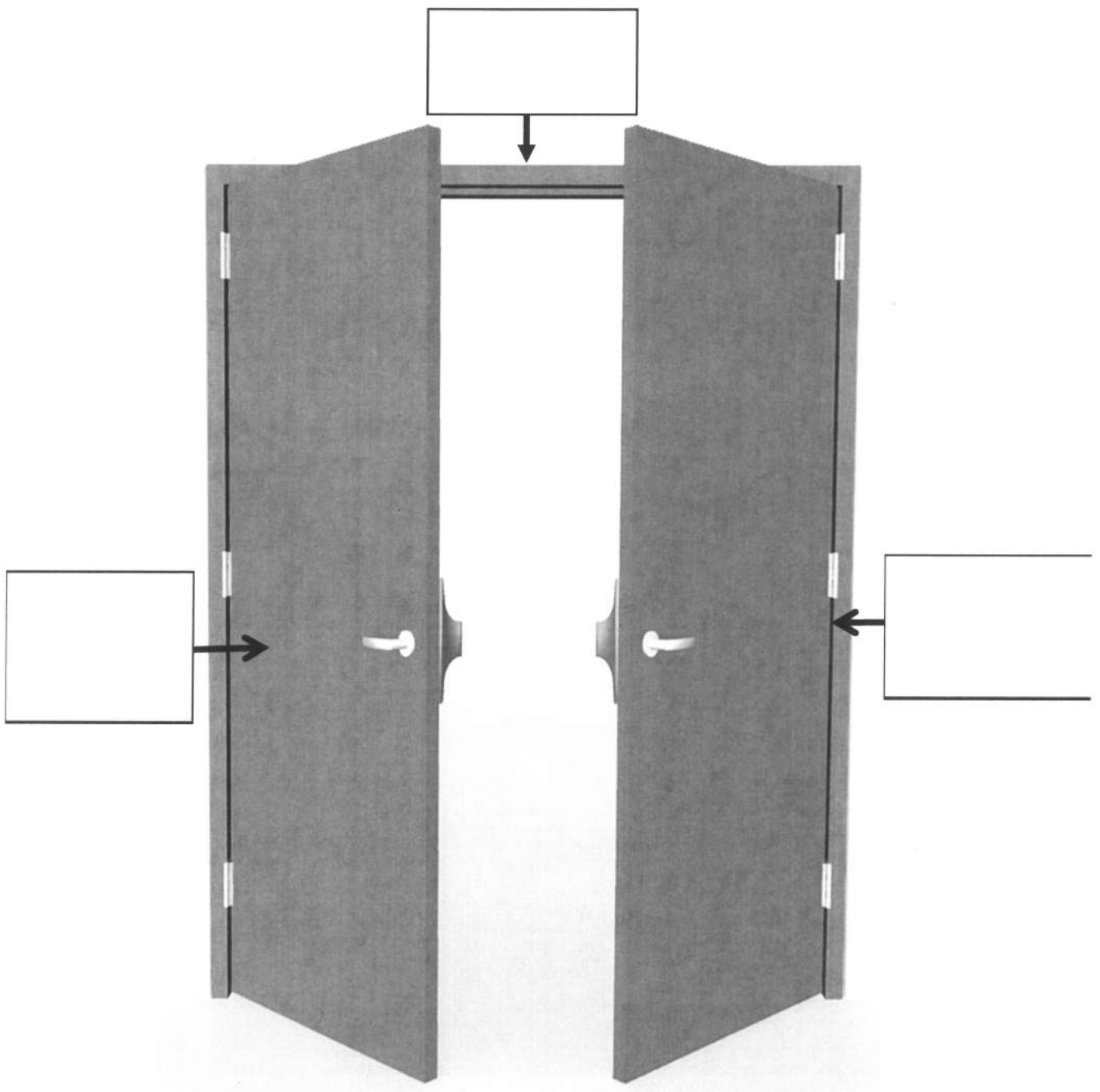
# Frame Component Names

## Single Door Opening



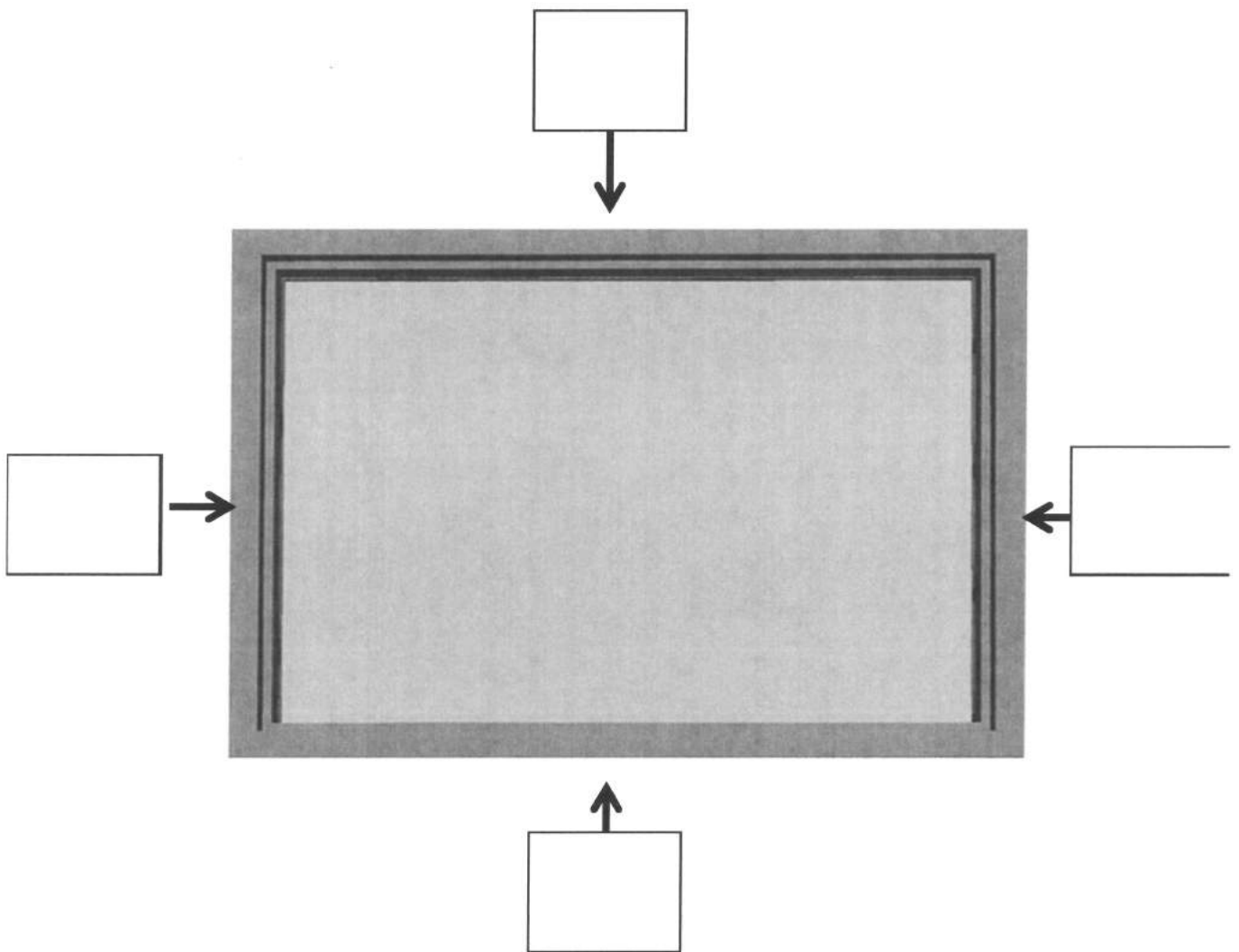
# Frame Component Names

## Paired Door Opening



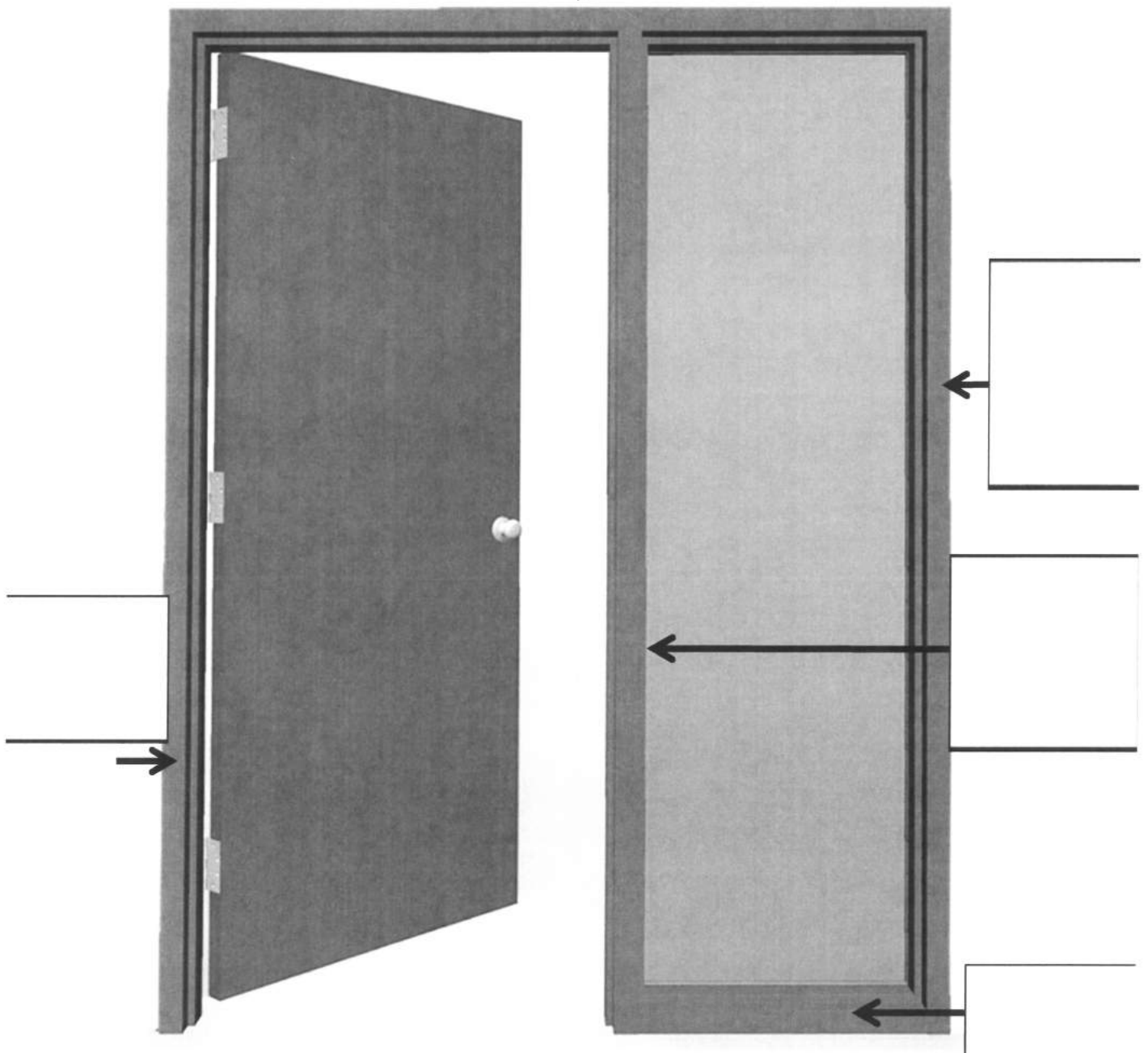
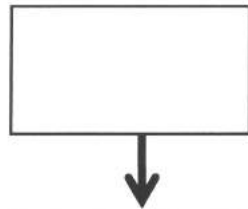
# Frame Component Names

## Borrowed Light



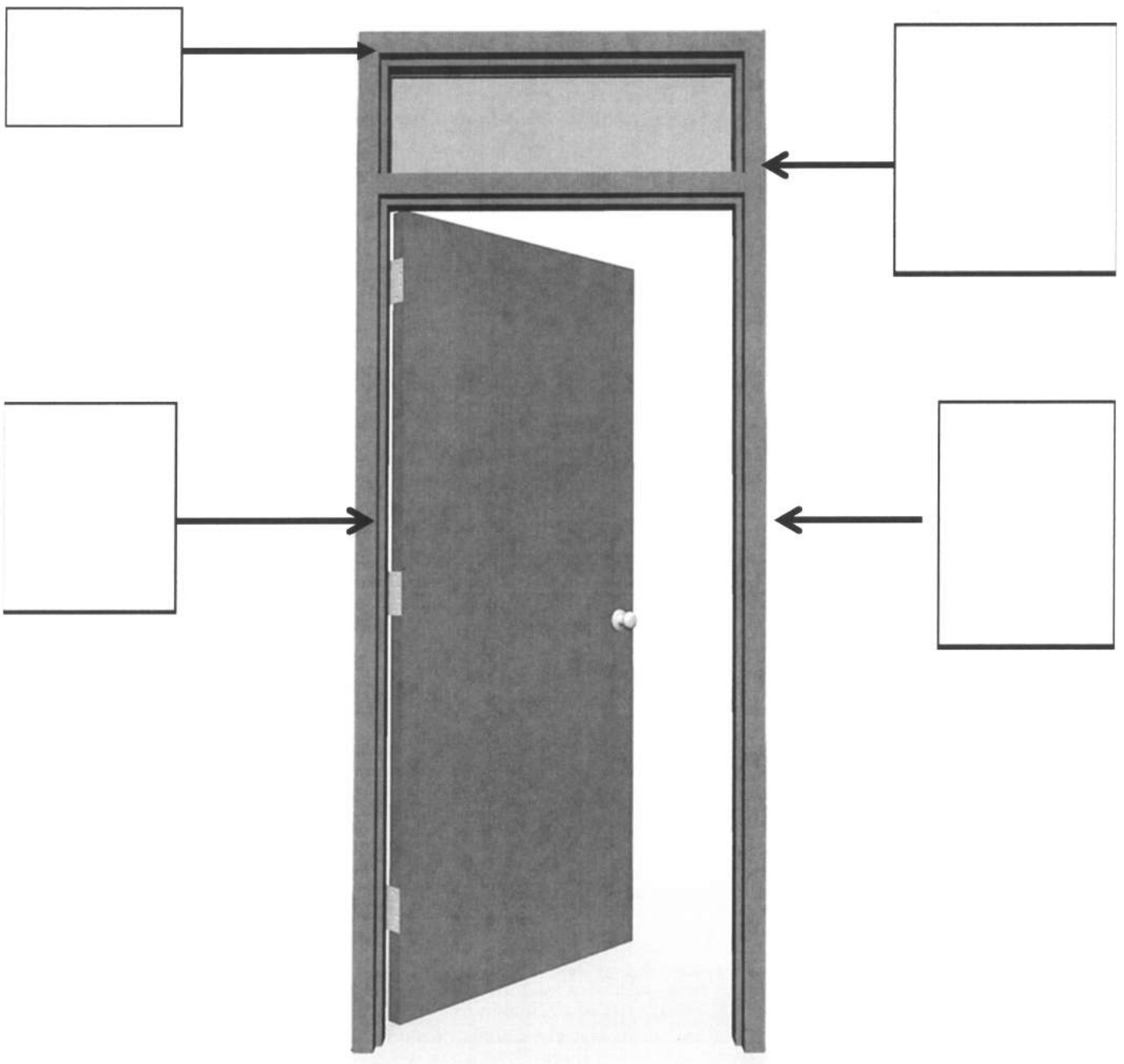
# Frame Component Names

## Side Light



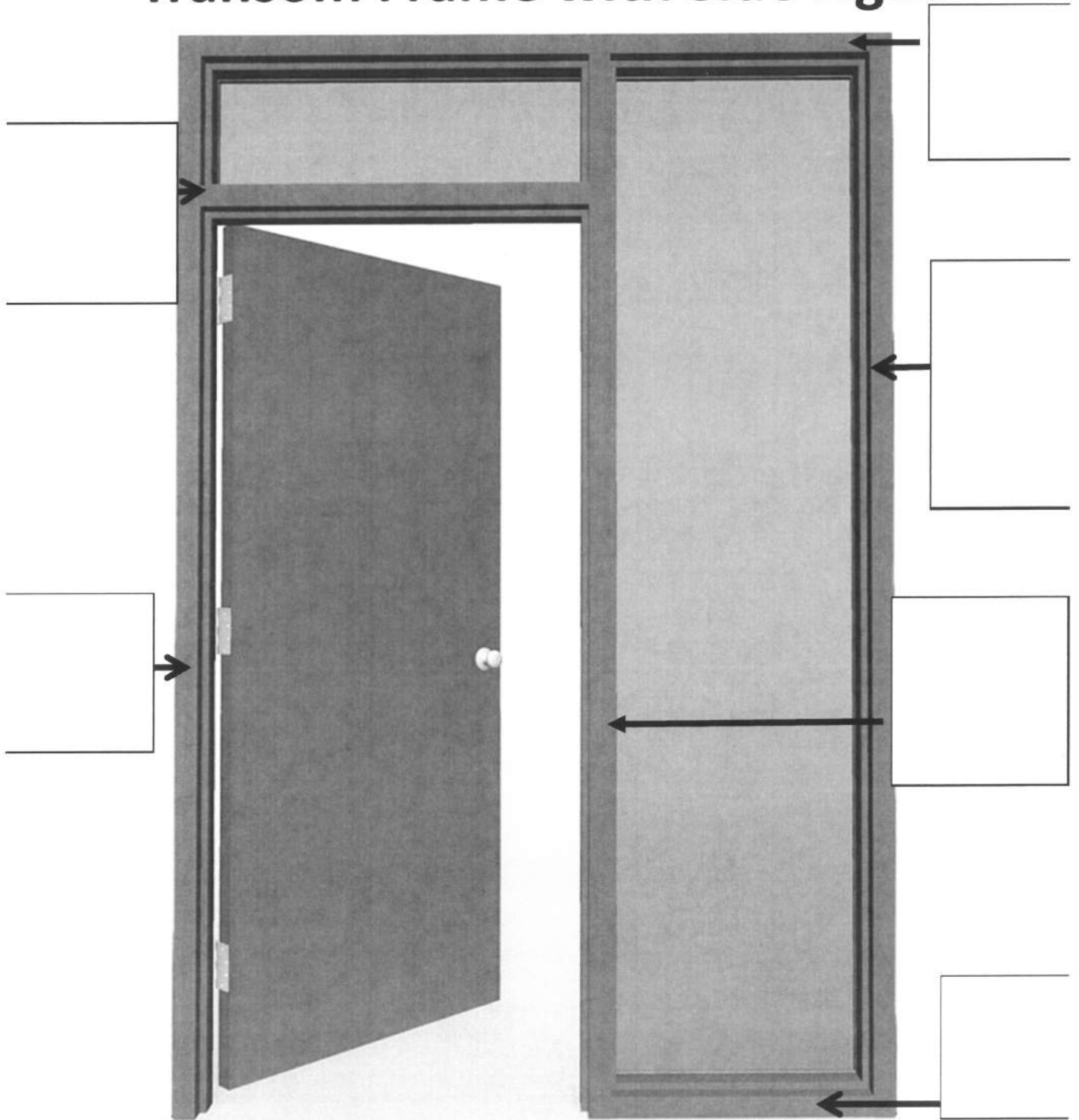
# Frame Component Names

## Transom Frame



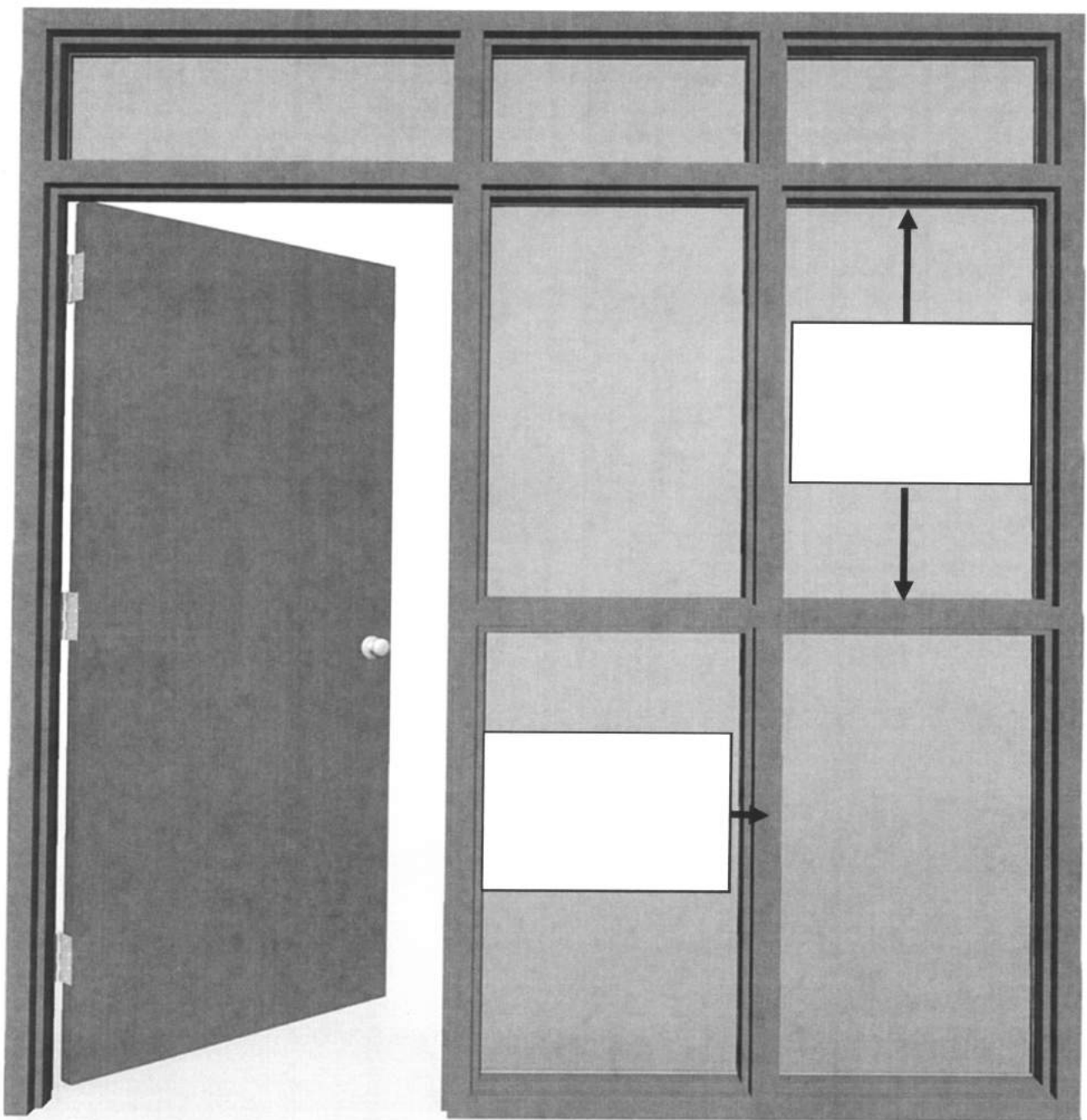
# Frame Component Names

## Transom Frame with Side Light



# Frame Component Names

## Transom Frame with Side Light



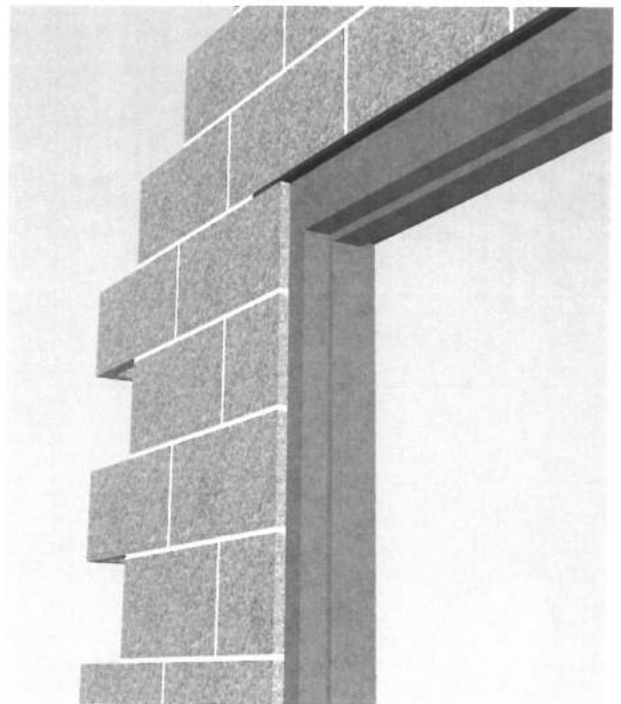
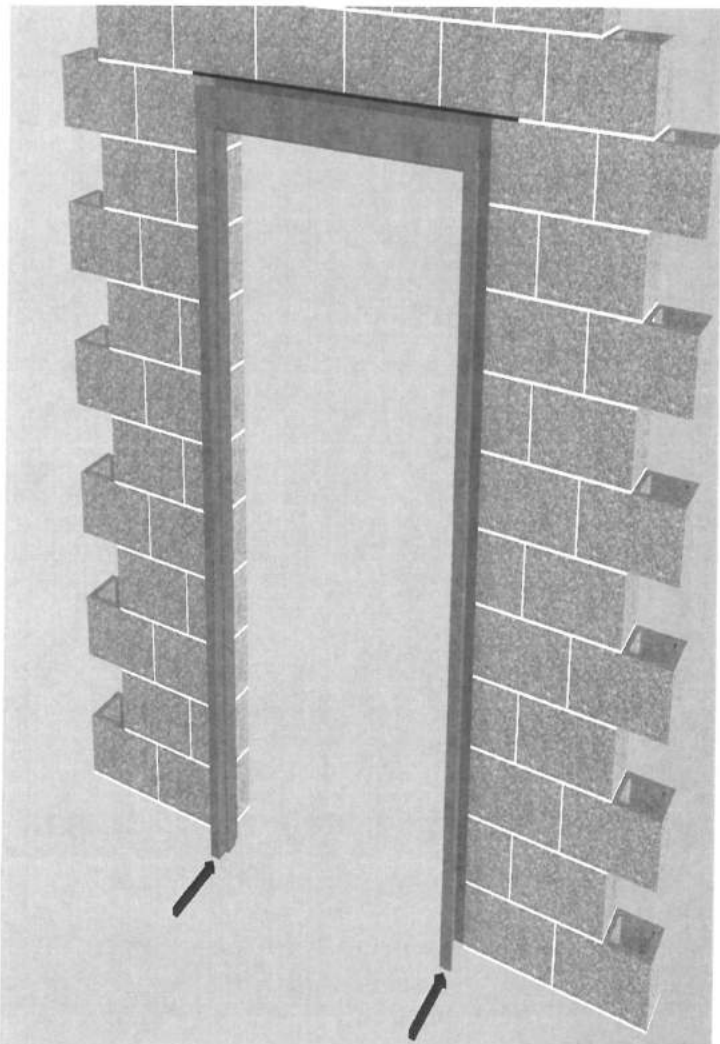
# Opening Sizes

- This refers to the \_\_\_\_\_ opening for the door.
- \_\_\_\_\_ Most common size on single openings
- \_\_\_\_\_ Most common size on paired openings



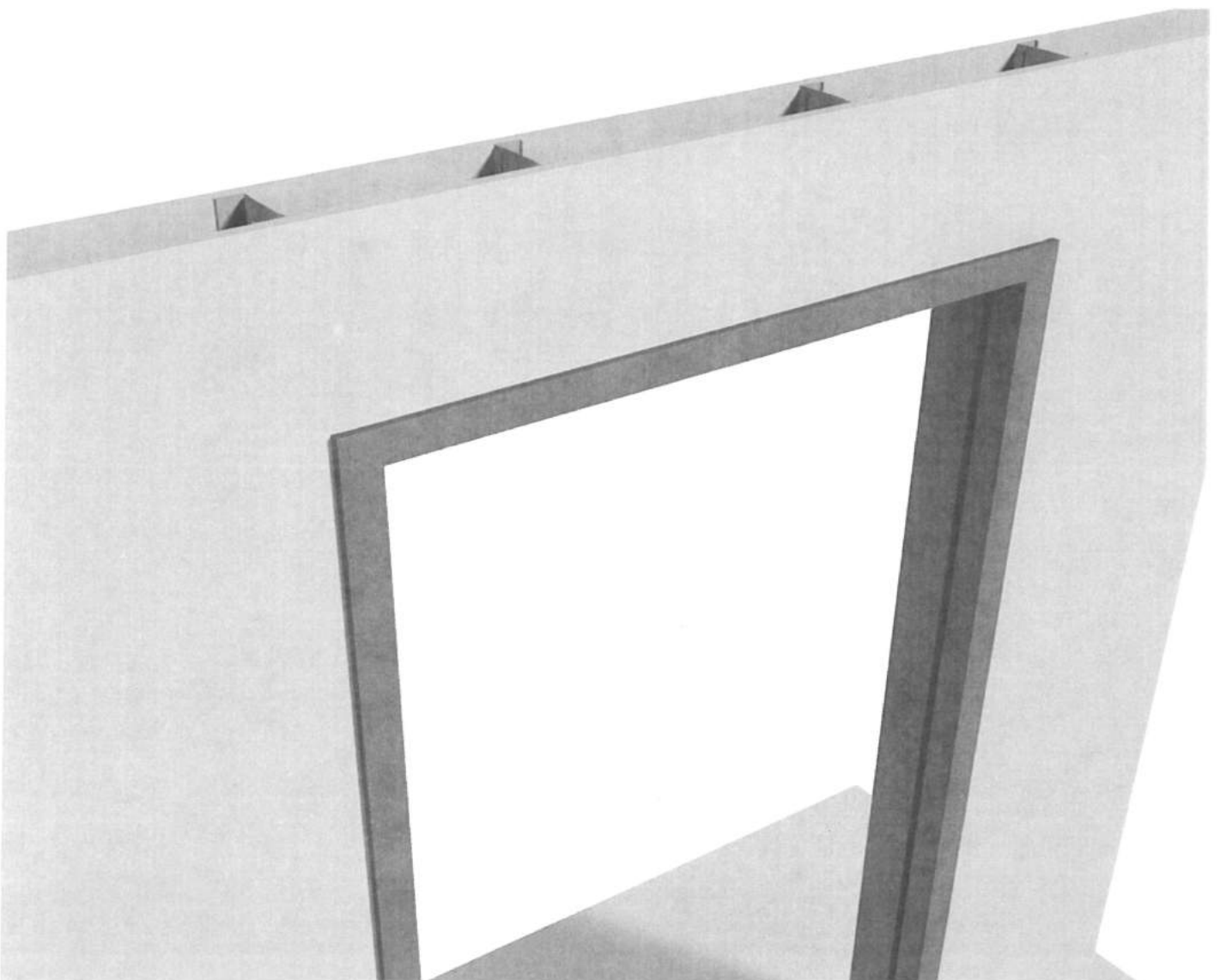
# Rough Openings

- \_\_\_\_\_ for frame to be installed
- Rough opening for butted wall applications = \_\_\_\_\_ + some \_\_\_\_\_



# Rough Openings

- Rough opening for \_\_\_\_\_ wall applications varies depending upon type
- See KD Drywall rough opening chart



# Rough Openings

## Rough Opening Guide for KD Drywall Frames

# HMF*EXPRESS*

### Rough Opening Guide for Knockdown Drywall Frames

| Frame Type                           | Add to opening width                               | Add to opening height |
|--------------------------------------|--|-----------------------|
| Std. 3 Sided                         | 2"   | 1"                    |
| 3 Sided Cased Open                   | 3"   | 1"                    |
| Double Egress                        | 3"   | 1"                    |
| 4 Sided Borrowed Light - Wall Mount  | 2-3/4"   | 2-1/4"                |
| 4 Sided Cased Open BL - Wall Mount   | 3"   | 3"                    |
| 4 Sided Borrowed Light - Floor Mount | <b>Overall Frame Size -2" on Width, -1" Height</b> |                       |
| KD Sidelight                         |  |                       |
| KD Transom                           |  |                       |
| KD Transom Sidelight                 |  |                       |

\*Varying face dimensions will not change rough opening sizes in most applications. Please verify before ordering.

Ph: 866-452-1845

[www.hmfexpress.com](http://www.hmfexpress.com)

Fax: 866-452-9173

# Quick Ship as a Profit Strategy

- There are 5 ways to use Quick Ship as a \_\_\_\_\_ Strategy
  1. Lower \_\_\_\_\_
  2. Lower \_\_\_\_\_
  3. Increase \_\_\_\_\_
  4. Reduce \_\_\_\_\_ to Customers
  5. Reduce \_\_\_\_\_ / \_\_\_\_\_

# Lower Inventory

- Only stock \_\_\_\_\_ – high use inventory
- Utilize \_\_\_\_\_ or \_\_\_\_\_ for special items
- Improves \_\_\_\_\_ by lowering \_\_\_\_\_
- Reduces \_\_\_\_\_ by decreasing \_\_\_\_\_ (or) \_\_\_\_\_
- Allows \_\_\_\_\_ for \_\_\_\_\_ activities
- Much easier to manage \_\_\_\_\_

# Lower Overall Shop Costs

- Use shop for \_\_\_\_\_ high volume  
\_\_\_\_\_
- Utilize \_\_\_\_\_ or \_\_\_\_\_ for  
special \_\_\_\_\_, building \_\_\_\_\_  
from “stick”, etc.
- Wages much \_\_\_\_\_ for basic  
\_\_\_\_\_ vs. \_\_\_\_\_ prep  
\_\_\_\_\_
- Lower “soft costs”: \_\_\_\_\_  
\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_  
\_\_\_\_\_, etc.

# Increase Capabilities

- Quick ship mfr's prep for any \_\_\_\_\_, offer \_\_\_\_\_ sizes, special \_\_\_\_\_, & \_\_\_\_\_
- Quick ship mfr's also offer \_\_\_\_\_
- You grow your \_\_\_\_\_ exponentially
- Your \_\_\_\_\_ do not need \_\_\_\_\_ suppliers
- Special products can sell at \_\_\_\_\_
- You \_\_\_\_\_ more and (maybe) make more \_\_\_\_\_

# Reduce Lead Times to Customers

- Utilize stock for \_\_\_\_\_ items on projects
- Order balance from \_\_\_\_\_
- Offer \_\_\_\_\_ lead times on frames (& doors)
- Be the \_\_\_\_\_ supplier in your market
- Differentiate yourself – get more \_\_\_\_\_, \_\_\_\_\_
- \_\_\_\_\_ your business



# Reduce Risks / Errors

- Utilize stock for \_\_\_\_\_ items on projects
- Order balance from \_\_\_\_\_
- \_\_\_\_\_ orders get outsourced
- Manufacturer is \_\_\_\_\_ for hard items
- Greatly reduce your \_\_\_\_\_  
(Easy = Easy)
- Quick ship mfr's take  
\_\_\_\_\_ for order