



# HOLLOW METAL DOORS



# **Hollow Metal Manufacturers Association**

**Division of the National Association of Architectural Metal Manufacturers**

This manual was developed by representative members of the Hollow Metal Manufacturers Association Division (HMMA) of the National Association of Architectural Metal Manufacturers (NAAMM) to provide information and guidance on the selection of hardware for hollow metal doors and frames. This manual contains advisory information only and is published as a public service by NAAMM and its HMMA Division.

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**National Association of Architectural Metal Manufacturers**

8 South Michigan Avenue Chicago, Illinois 60603

# HOLLOW METAL DOORS

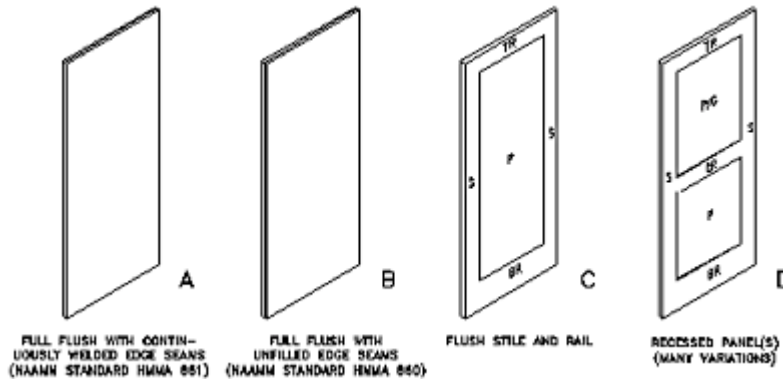
Generally speaking, doors may be classified, by their method of operation, as being of three basic types: swing doors, sliding doors and revolving doors. Though revolving doors are seldom, if ever, made of carbon steel, sliding doors of various types may, of course, be hollow metal. The great majority of hollow metal doors, however, are swing doors, mounted on either hinges or pivots, and the following information and details pertain only to that type.

Most custom hollow metal doors are of the full flush type with continuously welded edges (Type A). When glazed openings, recessed panels or louvers are to be provided, they are built into the door during fabrication, rather than being cut out of a flush panel door by field modification. The details shown on the following pages pertain chiefly to this type.

Fire-rated doors may differ in certain details of construction; see NAAMM Standard HMMA 850, Fire-Rated Hollow Metal Doors and Frames.

## TYPES OF CONSTRUCTION

The four basic types of construction for hollow metal swing doors are illustrated and identified below. The type usually specified in commercial work is the continuously welded edge seam construction, Type A, and it is this type which is the basis of NAAMM Standard HMMA 861.



The top edge of Types A and B doors may have only an inverted channel (standard construction) or may have an additional closing channel. Types C and D have tubular rails and stiles, with no edge seams. See page 4 for edge construction details of Type A doors.

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## IDENTIFICATION OF DOOR PARTS

S - Stile

**Hinge Stile** is stile at edge where hinges or pivots are located.

**Lock Stile** is stile in which a lock or latch is installed.

**Meeting Stile** is stile adjacent to another door, in a pair of doors.

TR - Top Rail

CR - Center Rail

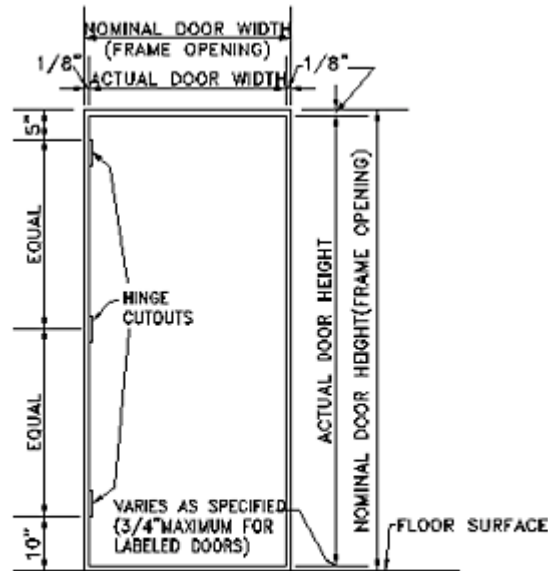
BR - Bottom Rail

P - Panel

P/G - Panel or Glass

# DOOR DETAILS

## DIMENSIONS AND HINGE LOCATIONS



DIMENSIONS AND HINGE LOCATIONS  
HINGE LOCATIONS SHOWN REPRESENT THE INDUSTRY  
STANDARD,  
BUT MAY BE ALTERED TO SUIT REQUIREMENTS.

### MOST COMMON SIZES FOR 1 3/4-INCH THICK DOORS\*

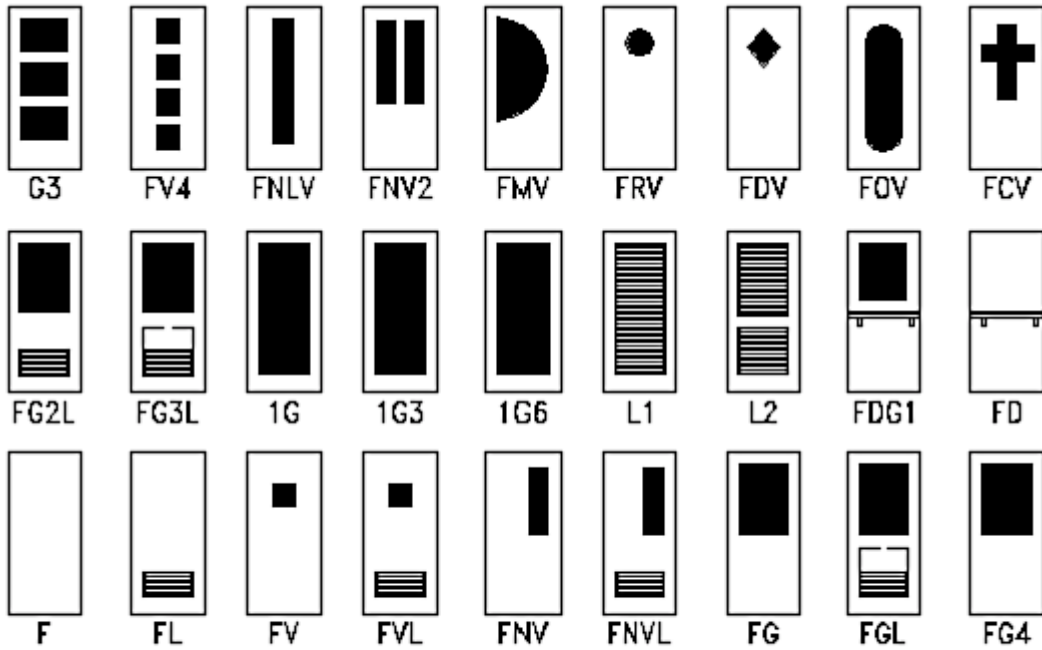
Width of Opening	Height of Opening				
	6'8"	7'0"	7'2"	7'10"	8'0"
2'0"	6'8"	7'0"	7'2"	7'10"	8'0"
2'4"	6'8"	7'0"	7'2"	7'10"	8'0"
2'6"	6'8"	7'0"	7'2"	7'10"	8'0"
2'8"	6'8"	7'0"	7'2"	7'10"	8'0"
3'0"	6'8"	7'0"	7'2"	7'10"	8'0"
3'4"	6'8"	7'0"	7'2"	7'10"	8'0"
3'6"	6'8"	7'0"	7'2"	7'10"	8'0"
3'8"	6'8"	7'0"	7'2"	7'10"	8'0"
4'0"	6'8"	7'0"	7'2"	7'10"	8'0"

\*Sizes shown are for single doors only; for pairs of doors, use twice the width indicated.

**OTHER DOOR SIZES:** The sizes listed are those most commonly used, but custom hollow metal doors are available in any width, height and thickness desired. It is not uncommon to supply them in widths of 5' or more and/or heights of 10' or more. Standard doors, on the other hand, are generally available from inventory only in the most commonly used sizes.

**LISTING DESIGNATION:** Always preface the door listing with "SGL" or "PR," followed by the designation of the opening size. For example, a single flush door for a 4'0" X 8'0" frame opening is listed SGL 4080F, and a pair of flush doors for an 8'0" X 8'0" frame opening is listed as PR 8080F.

## REPRESENTATIVE DOOR DESIGNS



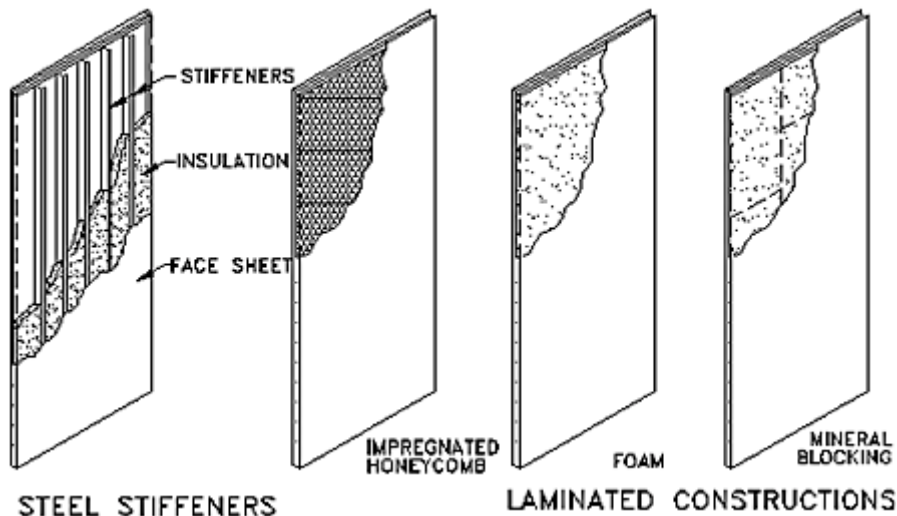
NOTE: SOME MANUFACTURERS MAY USE  
DIFFERING DESIGNATIONS FOR SOME  
DESIGNS

## PANEL CONSTRUCTION

There are two basic types of panel construction:

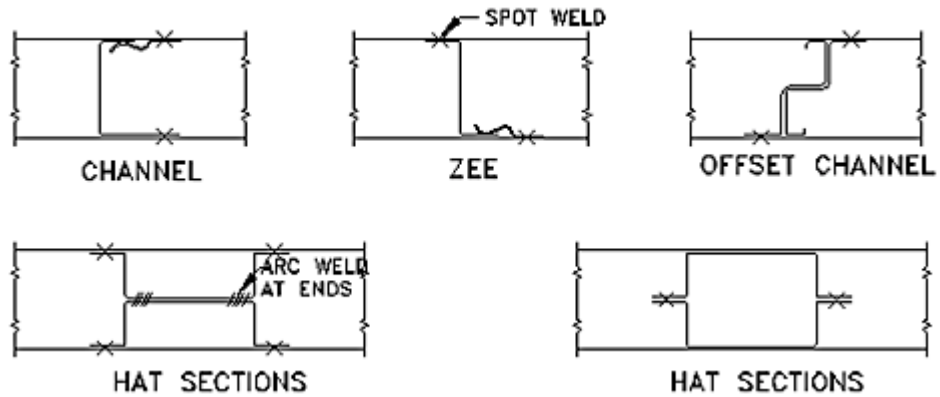
**STEEL STIFFENED** -- Face sheets supported by steel stiffeners, which are channels, Z-shaped sections, hat-shaped sections or similar members, positioned vertically. Sheets are attached to these members by spot welding.

**LAMINATED CORE** -- Sandwich construction employing a core of impregnated kraft paper honeycomb, plastic foam or structural mineral blocking, to which the steel face sheets are laminated, using a structural adhesive.

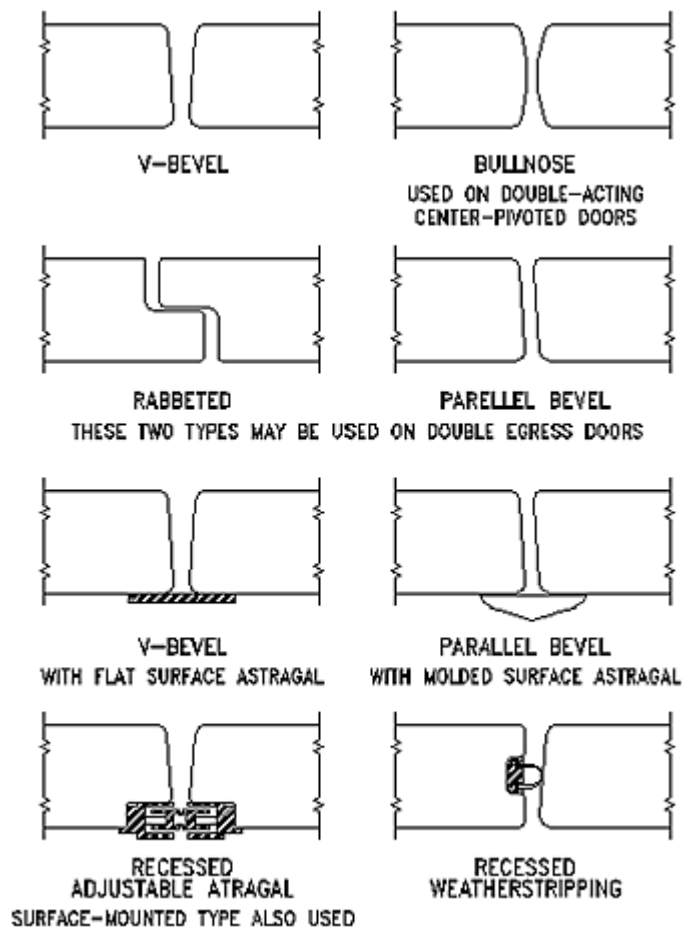


## REPRESENTATIVE STIFFENER SECTIONS

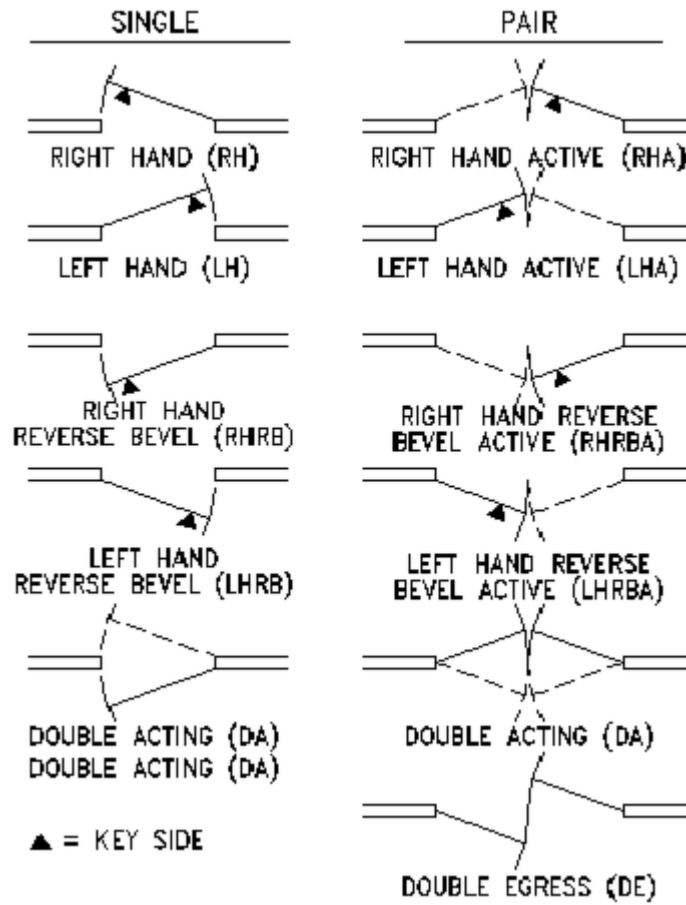
Other sections used by some manufacturers.



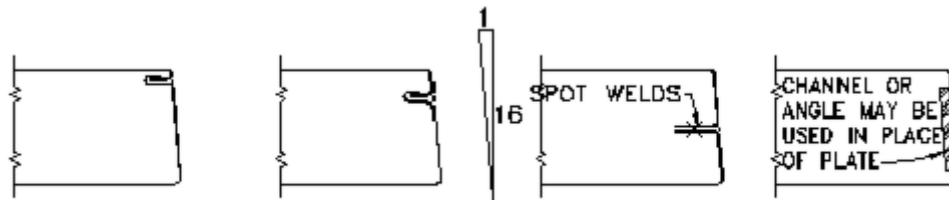
## COMMON MEETING STILE EDGE PROFILES



## DOOR HAND DESIGNATIONS

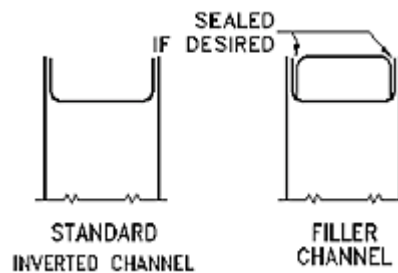


## STILE EDGE DETAILS - TYPE A DOORS



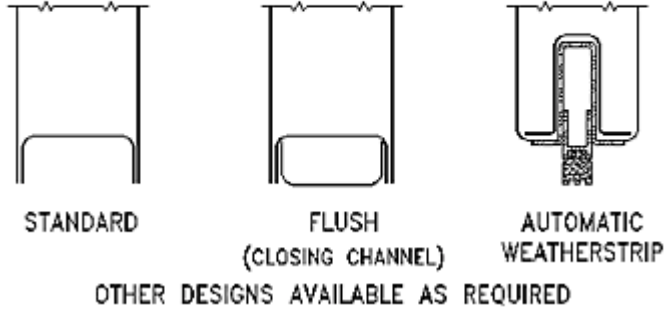
ALL JOINT SEAMS CONTINUOUSLY WELDED AND GROUND SMOOTH

## TOP EDGE DETAILS

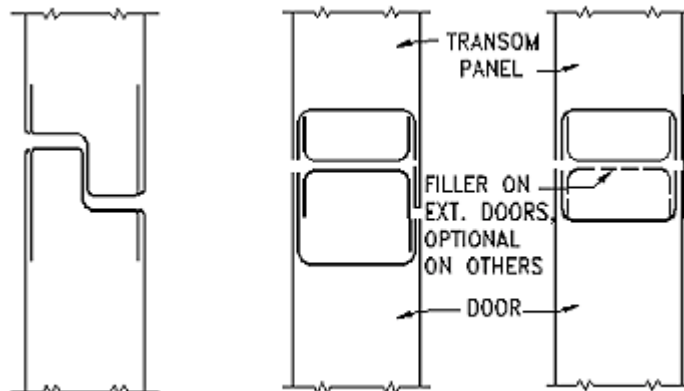


## BOTTOM EDGE DETAILS

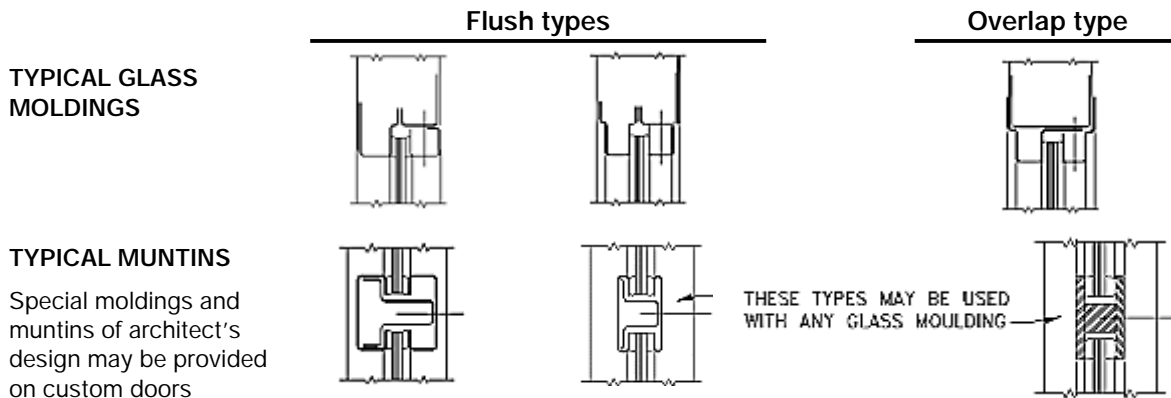
HARDWARE REINFORCEMENTS ARE PROVIDED ON DOORS WHEREVER HARDWARE IS TO BE ATTACHED, TO INSURE THAT IT IS FIRMLY AND SECURELY FASTENED. FOR DETAILS OF HARDWARE PREPARATIONS, SEE PAGE 6.



## TOP EDGE DETAILS WITH FLUSH TRANSOM PANEL ABOVE

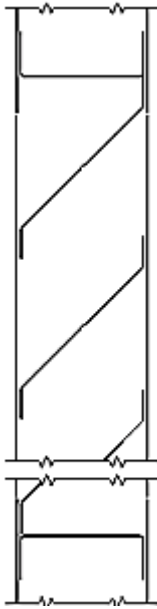


## GLASS LIGHT AND RECESSED PANEL MOLDINGS

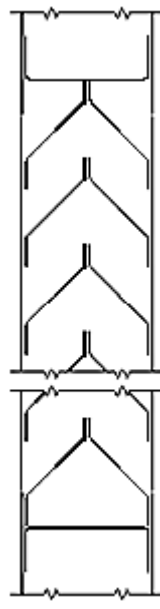




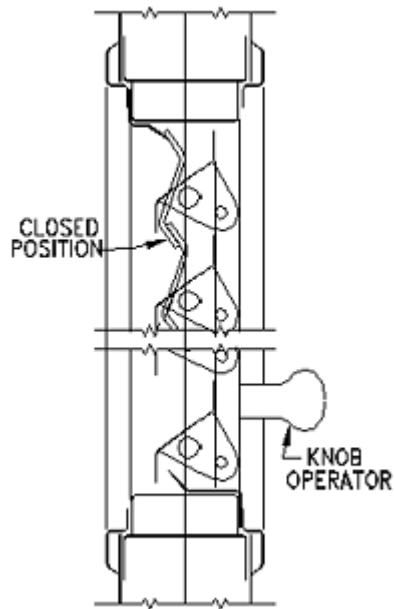
## LOUVER DESIGNS



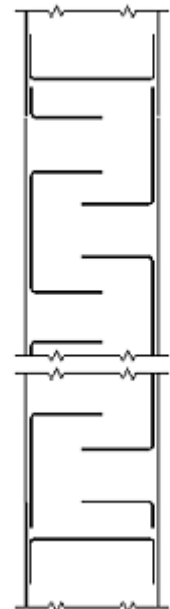
ZEE TYPE



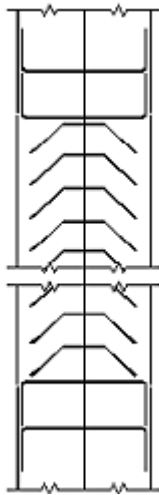
Y TYPE



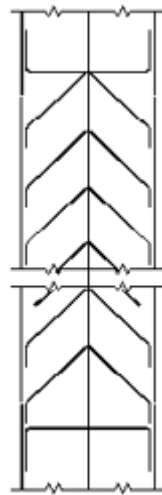
ADJUSTABLE



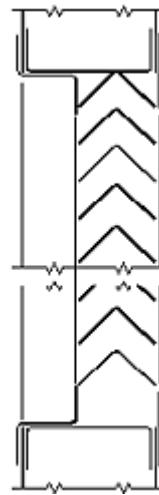
LIGHT-PROOF



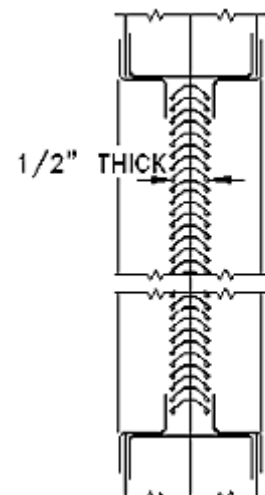
TRUNCATED VEE



HOOD TYPE



VEE TYPE



GRILLE TYPE

Most types may be installed either flush with door faces, or with overlapping edge trim.

**FREE AREA**, as defined by the Air Moving and Conditioning Association, is "the minimum area through which air can pass, and is determined by multiplying the sum of the minimum distances between intermediate blades, top blade and head, and bottom blade and sill, by the minimum distance between jambs."

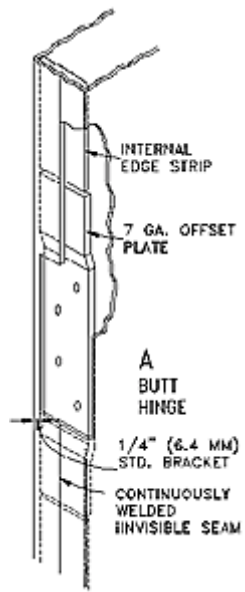
The **PERCENT FREE AREA** is the free area thus calculated, divided by the face area of the louver, multiplied by 100. It varies with both the louver design and the manufacturer's details.

Consult door manufacturers for specific information about free area percentage of selected louver designs.

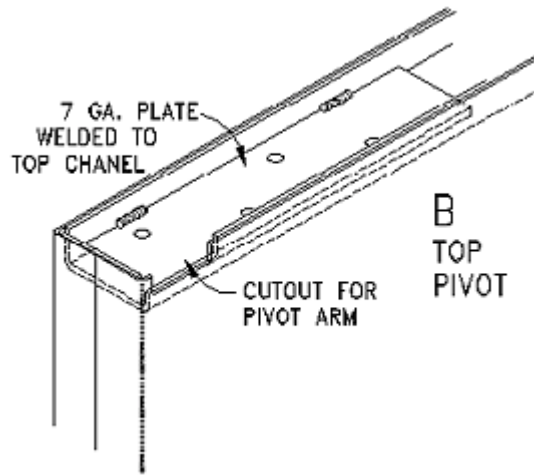
*\*Available either in full door thickness or in lesser thicknesses for recessed installation.*

**OTHER DESIGNS ALSO AVAILABLE - SEE HMMA HOLLOW METAL DOOR MANUFACTURERS' LITERATURE**

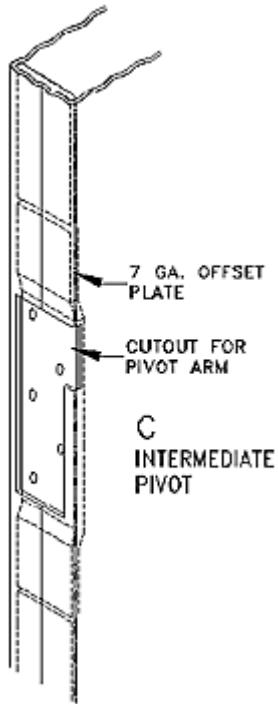
# TYPICAL HARDWARE PREPARATION



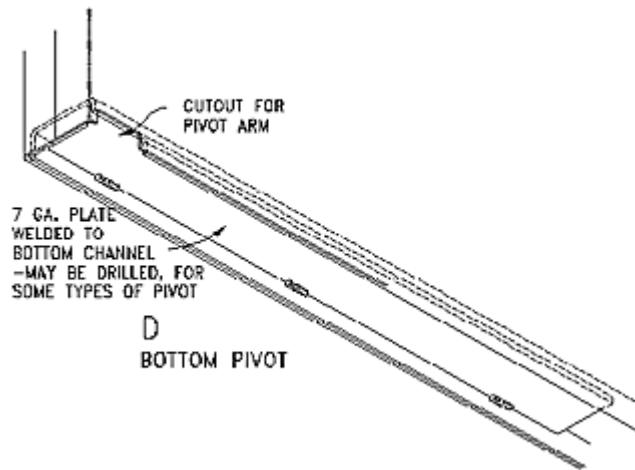
BUTT HINGE



TOP PIVOT

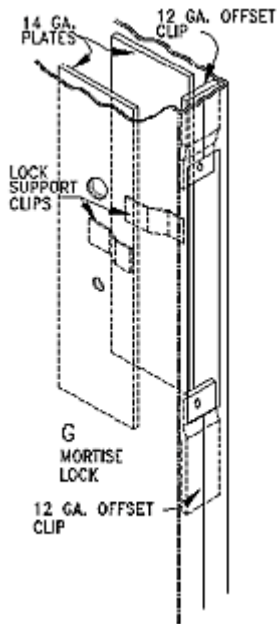


INTERMEDIATE PIVOT

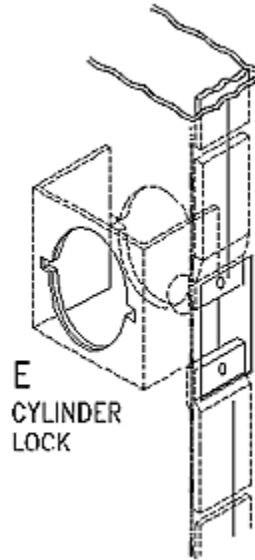


BOTTOM PIVOT

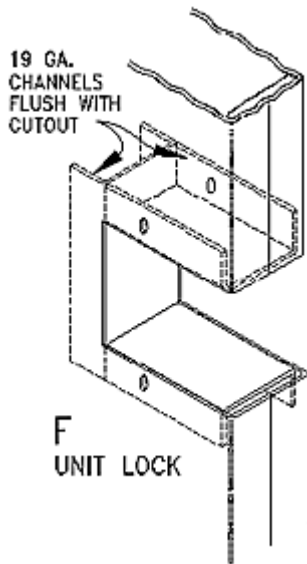
**TYPICAL HARDWARE PREPARATION, CONT.**



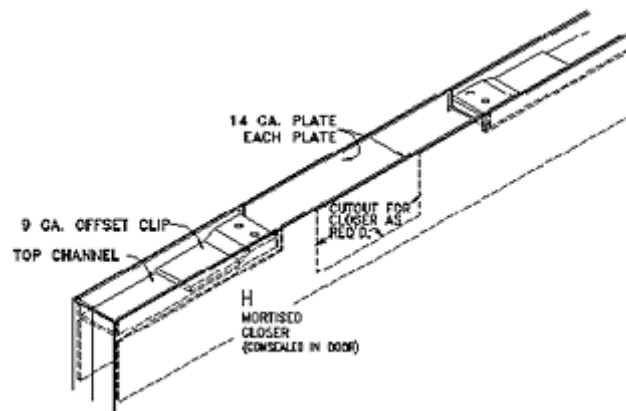
**MORTISE LOCK**



**CYLINDER LOCK**



**UNIT LOCK**



**MORTISED CLOSER**

NOTE: CUTOUTS AND/OR REINFORCEMENTS OF SIMILAR NATURE ARE PROVIDED FOR ALL OTHER HARDWARE ITEMS SUCH AS FLUSH BOLTS, SURFACE-MOUNTED CLOSERS, FIRE EXIT HARDWARE, PULLS, ETC.

## DOOR SCHEDULE

The use of a door schedule like that shown on the following two pages is recommended by the Hollow Metal Manufacturers Association. The format is similar to that published by the Construction Specifications Institute, but has been modified to include certain features recommended by the AIA Committee on Office Practice.

The Schedule on page 8 references graphic representations of door and frame types and details as typified by the drawings on page 9. It is highly desirable that all doors in the building be listed in a single schedule and that these supplementary drawings be placed on the same sheet or on sheets immediately following, as recommended by the AIA Committee. This not only minimizes drafting time and the possibility of errors, but facilitates the subcontractor's take-off, as compared with showing a series of schedules and details on various floor plans.

(column numbers are for reference here only)

Open- ing #	DOOR											FRAME			Fire Rating	Hard- Ware Set	Remarks		
	Type	Mat'l.	Nominal Size*				Sill Detail	Louver		Glass*	Spec'l. Detail	Type	Mat'l.	Sections					
			No.	Width	Height	Thkns.		W	H					Jamb				Head	Sill
101	F	HM	1	3-0	7-0	1.75	24/17	--	--	-	-	1	HM	1/17	1/17	-	-	1	
102	1G	AL	2	6-0	8-0	1.75	25/17	--	--	TEMP	-	2	AL	6/17	6/17	-	-	8	Contin. aluminum threshold
103	FGL	WD	1	3-0	7-0	1.75	25/17	--	--	1/4" TEMP	28/17	1	HM	1/17	1/17	-	-	4	
104	FG	HM	1	3-0	7-0	1.75	24/17	--	--	1/4" WIRE	-	1	HM	6/17	6/17	-	C	6	
105	FV	HM	3	4-0	7-0	1.75	24/17	--	--	1/4" TEMP	-	5	HM	2/17	2/17	-	-	1	Mullions 16/17
106	F	HM	2	7-0	7-0	1.75	29/17	--	--	-	-	2	HM	1/17	1/17	-	A	5	
107	FL	HM	1	3-0	7-0	1.75	24/17	23	12	-	-	3	HM	1/17	1/17	-	-	7	Transom bar 16/17
108	F	WD*	1	2-10	7-0	1.75	24/17	--	--	-	28/17	1	HM	3/17	3/17	-	-	4	Plastic faced door
109	-	-	-	-	-	-	-	--	--	-	-	1	HM	5/17	5/17	-	-	-	Cased opening
110	FGL	HM	1	3-0	7-0	1.75	25/17	23	20	1/4" TEMP	-	4	HM	1/17	1/17	25, 19/17	-	1	Side light mullion 16/17
111	F	HM	1	3-0	7-0	1.75	24/17	--	--	-	31/17	1	HM	8/17	8/17	-	-	2	Sound retardant

\*Use metric units if desired; 1 inch = 25.4 mm, 1 foot = 0.305m.

### 1. Opening Number

Number all openings individually, with the numbering system reflecting floor numbers if practicable.

### 2. Door Type

Use alphabetical designation for types, as shown on elevation views on facing page. Elevations should show door configurations and at features such as louvers, vision lights, etc. Do not use one elevation with dash lines to indicate variations.

### 3. Door Material

Designate material from which door is made: HM hollow metal; AL = aluminum; WD = wood. \* indicates special facing as noted in Remarks column. Type of core construction should be stated in the specifications.

### 4. Nominal Size

List number of doors per framed opening, plus width, height and thickness of door. State head and jamb clearances in specifications, using Hollow Metal Manufacturers Association recommended standards unless special conditions require otherwise.

### 5. Sill Detail

Reference sill detail, which shows sill clearance, threshold if any, and any special condition. Reference number shows detail number first, followed by sheet number.

**6. Louver**

Note width and height (in inches) of louver panel. Louver types may be either specified or shown in detail drawings.

**7. Glass**

Note thickness and type of glass to be used in glazed opening.

**8. Special Detail**

Reference detail(s) showing special features such as astragal (on pair), dutch door shelf, flush transom panel or other.

**9. Frame Type**

Use numerical designation for type, as shown on elevation views on facing page.

**10. Frame Material**

Designate material from which frame is made, using same symbols as for door materials.

**11. Frame Sections**

Reference details, showing frame sections at head and jamb, and details of such members as transom bars, mullions and other special features.

**12. Fire Rating**

State fire rating, if any, required for opening.

**13. Hardware Set**

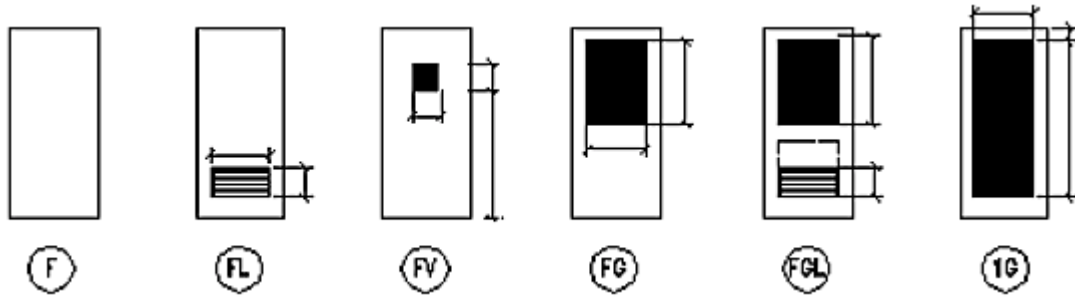
State applicable hardware set numbers described in specifications.

**14. Remarks**

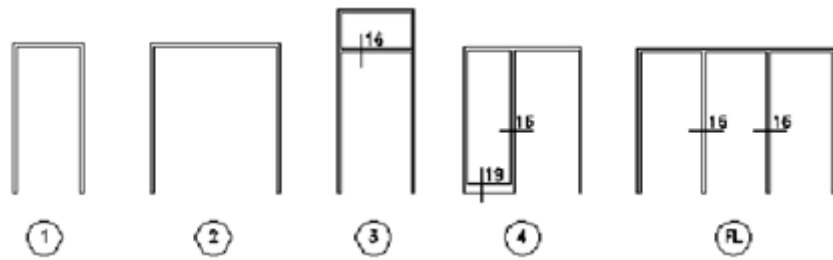
Note here any special characteristics or required features of the opening, to insure that the contractor or supplier will be properly informed.

# REPRESENTATIVE DETAILS ACCOMPANYING DOOR SCHEDULE

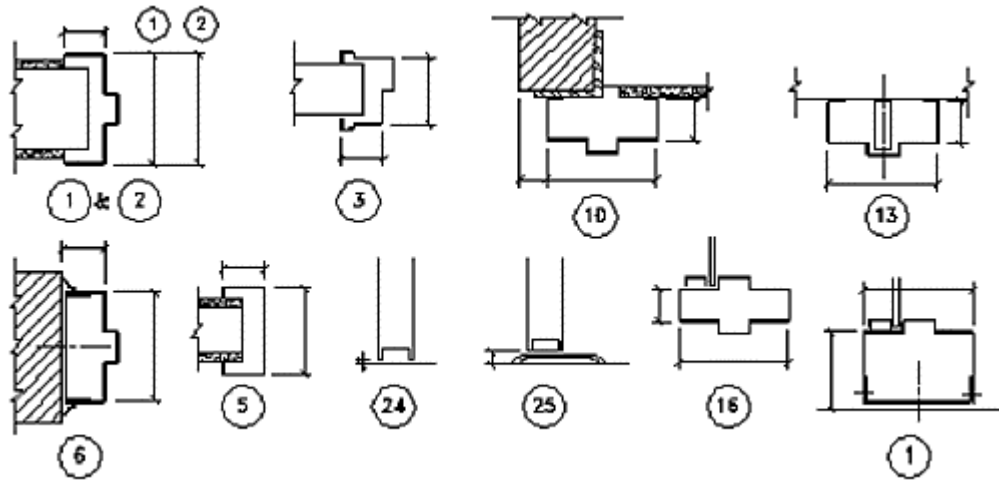
## DOOR TYPES



## FRAME TYPES



## DETAILS



Details should be drawn at scale of 3" = 1'0"