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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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.

![](image)

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

<table>
<thead>
<tr>
<th>Letter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Stile</td>
</tr>
<tr>
<td>TR</td>
<td>Top Rail</td>
</tr>
<tr>
<td>CR</td>
<td>Center Rail</td>
</tr>
<tr>
<td>BR</td>
<td>Bottom Rail</td>
</tr>
<tr>
<td>P</td>
<td>Panel</td>
</tr>
<tr>
<td>P/G</td>
<td>Panel or Glass</td>
</tr>
</tbody>
</table>

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.
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.
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.

CHANNEL
ZEE
OFFSET CHANNEL

HAT SECTIONS

COMMON MEETING STILE EDGE PROFILES

V-BEVEL
BULLNOSE
USED ON DOUBLE-ACTING CENTER-PIVOTED DOORS

RABBETED
THESE TWO TYPES MAY BE USED ON DOUBLE ENTRANCE DOORS

PARELLEL BEVEL

V-BEVEL
WITH FLAT SURFACE ASTRAGAL

PARALLEL BEVEL
WITH MOLDED SURFACE ASTRAGAL

RECESSED
ADJUSTABLE ASTRAGAL
SURFACE-MOUNTED TYPE ALSO USED

RECESSED
WEATHERSTRIPPING
DOOR HAND DESIGNATIONS

SINGLE

RIGHT HAND (RH)

LEFT HAND (LH)

RIGHT HAND REVERSE BEVEL (RHRB)

LEFT HAND REVERSE BEVEL (LHRB)

DOUBLE ACTING (DA)

PAIR

RIGHT HAND ACTIVE (RHA)

LEFT HAND ACTIVE (LHA)

RIGHT HAND REVERSE BEVEL ACTIVE (RHRBA)

LEFT HAND REVERSE BEVEL ACTIVE (LHRBA)

DOUBLE ACTING (DA)

DOUBLE EGRESS (DE)

▲ = KEY SIDE

STILE EDGE DETAILS - TYPE A DOORS

ALL JOINT SEAMS CONTINUOUSLY WELDED AND GROUND SMOOTH

TOP EDGE DETAILS

SEAL IF DESIRED

STANDARD INVERTED CHANNEL

FILLER CHANNEL
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.

Standard  Flush  Automatic

(Shutting Channel)  Weatherstrip

Other designs available as required

TOP EDGE DETAILS WITH FLUSH TRANSOM PANEL ABOVE

GLASS LIGHT AND RECESSED PANEL MOLDINGS

Typical glass moldings

Typical muntins

Special moldings and muntins of architect’s design may be provided on custom doors

Flush types

Overlap type

These types may be used with any glass moulding
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

A BUTT HINGE
- Internal Edge Strip
- 7 Ga OFFSET PLATE
- 1/4" (6.4 mm) STD. BRACKET
- CONTINUOUSLY WELDED INVISIBLE SEAM

B TOP PIVOT
- 7 GA. PLATE WELDED TO TOP CHANEL
- CUTOUT FOR PIVOT ARM

C INTERMEDIATE
- 7 GA. OFFSET PLATE
- CUTOUT FOR PIVOT ARM

D BOTTOM PIVOT
- 7 GA. PLATE WELDED TO BOTTOM CHANNEL
- MAY BE DRILLED FOR SOME TYPES OF PIVOT
- CUTOUT FOR PIVOT ARM
TYPICAL HARDWARE PREPARATION, CONT.

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.

<table>
<thead>
<tr>
<th>Opening #</th>
<th>Type</th>
<th>Mat’l.</th>
<th>Nominal Size*</th>
<th>Door Frame Details</th>
<th>Fire Rating</th>
<th>Hardware Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>F</td>
<td>HM</td>
<td>1 3-0 7-0 1.75</td>
<td>24/17 TEMP</td>
<td>1</td>
<td>HM 1/17</td>
</tr>
<tr>
<td>102</td>
<td>1G</td>
<td>AL</td>
<td>2 6-0 8-0 1.75</td>
<td>25/17 TEMP</td>
<td>2 AL</td>
<td>6/17 6/17</td>
</tr>
<tr>
<td>103</td>
<td>FGL</td>
<td>WD</td>
<td>1 3-0 7-0 1.75</td>
<td>28/17</td>
<td>1 HM</td>
<td>6/17</td>
</tr>
<tr>
<td>104</td>
<td>FG</td>
<td>HM</td>
<td>1 3-0 7-0 1.75</td>
<td>1/4&quot; WIRE</td>
<td>5 HM</td>
<td>2/17</td>
</tr>
<tr>
<td>105</td>
<td>FV</td>
<td>HM</td>
<td>3 4-0 7-0 1.75</td>
<td>29/17 TEMP</td>
<td>2 HM</td>
<td>1/17</td>
</tr>
<tr>
<td>106</td>
<td>F</td>
<td>HM</td>
<td>2 7-0 7-0 1.75</td>
<td>28/17</td>
<td>2 HM</td>
<td>1/17</td>
</tr>
<tr>
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<td>FL</td>
<td>HM</td>
<td>1 3-0 7-0 1.75</td>
<td>24/17 31/17</td>
<td>3 HM</td>
<td>1/17</td>
</tr>
<tr>
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<td>F</td>
<td>WD*</td>
<td>1 2-10 7-0 1.75</td>
<td>28/17</td>
<td>1 HM</td>
<td>3/17</td>
</tr>
<tr>
<td>109</td>
<td>-</td>
<td>-</td>
<td>- 12</td>
<td>-</td>
<td>1 HM</td>
<td>5/17</td>
</tr>
<tr>
<td>110</td>
<td>FGL</td>
<td>HM</td>
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<td>HM</td>
<td>1 3-0 7-0 1.75</td>
<td>24/17</td>
<td>1 HM</td>
<td>8/17</td>
</tr>
</tbody>
</table>

*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”