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 installation and storage of 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 FRAMES

The primary function of the door frame is to provide support for the door and the components required for proper operation of the opening. Hollow metal frames serve other aesthetic or functional purposes, such as trimming a wall opening having no door, or enclosing glazed areas that provide through-wall visibility or admitting light and/or air. Hollow metal frames, which are strong, sturdy and durable, serve all such functions economically. Custom hollow metal frames are available in a broad array of configurations. Illustrated below are some of the more common and representative types, and on the following pages are shown the typical details of frame construction and assembly.
SIDELIGHT FRAMES WITH TRANSOMS

Panels may be used in lieu of glazing at sidelight frames

SIDELIGHT FRAMES

SIDELIGHT FRAMES WITH TRANSOMS

mullion
optional

mullion
optional

muntins
optional
all types

mullion
optional

mullion
optional
Any face profile may be combined with any backbend profile.

REPRESENTATIVE FRAME PROFILES
OTHER DESIGNS AVAILABLE
ROUGH OPENING WIDTH
(overall frame width + 1/2")

DOOR OPENING WIDTH

1/4"

1/4"

HORIZONTAL FRAME DIMENSIONS

ROUGH OPENING HEIGHT

DOOR OPENING HEIGHT

(overall frame height + 1/4")

VERTICAL FRAME DIMENSIONS

For information on undercuts see HMMA-810 TN01-03 "Defining Undercuts"

FRAME ASSEMBLY

HEAD

for corner assembly methods see page 7

CLOSER REINFORCEMENT
(if closer used)

HINGE JAMB

STRIKE JAMB

HINGE CUTOUT & REINFORCEMENT

STRIKE CUTOUT & REINFORCEMENT

TEMPORARY SPREADER
(remove prior to installation)

Floor Anchor

FACE VIEW

BACKSIDE VIEW

HINGE PREPARATION

FACE VIEW

BACKSIDE VIEW

STRIKE PREPARATION

Floor Covering

Floor / Finish Floor

Reinforcement
For information about the choice of anchor type see HMMA 840, "Installation and Storage of Hollow Metal Doors and Frames".

**Common Types of Jamb Anchors.**

Other types are available.

- **Fixed Floor Anchor**
- **Adjustable Floor Anchor**
- **Compression Anchor for Slip-On Drywall Frames**
- **Floor Anchor for Slip-On Drywall Frames**
- **Existing Wall Anchors**
- **Strap & Stirrup (Masonry)**
- **T-Strap (Masonry)**
- **Wire (Masonry)**
- **Pour In Place (Cement)**
- **Wood Stud One Piece**
- **Wood Stud Two Piece**
- **Double Egress Wood Stud Two Piece**

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**Diagram:**

- **Double Egress Steel Stud**
- **Single Rabbet Steel Stud**
- **Single Rabbet Steel Stud**
- **Steel Stud Flush with Return**
- **Steel Stud Inset 1/2 in. Throat**

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**Legend:**

- 1/2 in. back bend

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**Notes:**

- Adjustable Floor Anchor
- Compression Anchor
- Strap or Dimpled
- Fixed Floor Anchor
- Floor Anchor
- Strap & Stirrup
- T-Strap
- Wire
- Pour In Place
- Wood Stud
- Double Egress Wood Stud
- Common Types of Jamb Anchors
- Other Types Available

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**References:**

- HMMA 840, "Installation and Storage of Hollow Metal Doors and Frames".
HOLLOW METAL FRAMES

**FLOOR STILT**
Terrazzo or other base mtl.

**FIXED MULLION ANCHOR**
Design may vary by manufacturer

**SPATS**
Stainless steel wrap-around covering
May be used with either cutoff or full length stops

**PLINTH**
Stainless steel same thickness as frame and flush with all jamb surfaces

**CHANNEL**
Used on grouted masonry door openings over 48" to prevent deflection, see Appendix A, HMMA-820 TN01-03, Grouting Hollow Metal Frames

**ANGLE**

**HEAD ADAPTER**
For frames extending from slab to slab

**HEAD REINFORCEMENTS**

**LEAD-LINED FRAME**
90 deg. closed end

**CUTOFF (SANITARY) STOPS**
6" maximum height at fire rated openings

**SOURCE OF RADIATION**
LEAD LINING

**SOURCE OF RADIATION**
LEAD LINING

**LEAD LINING**
gasket

**FLOOR STILT**

**FIXED MULLION ANCHOR**

**SPATS**

**PLINTH**

**CHANNEL**

**ANGLE**

**HEAD ADAPTER**

**HEAD REINFORCEMENTS**

**LEAD-LINED FRAME**

**CUTOFF (SANITARY) STOPS**
6" maximum height at fire rated openings

**SOURCE OF RADIATION**
LEAD LINING

**SOURCE OF RADIATION**
LEAD LINING

**LEAD LINING**
gasket
KEY ELEVATIONS

TYPICAL HEAD SECTIONS
"A"

ALTERNATIVE HEAD SECTION

TYPICAL JAMB SECTIONS
"B"

"C"

JAMB SECTION FOR POCKET PIVOT OR SWING CLEAR HINGE APPLICATIONS,

DETAILS FOR DOUBLE EGRESS FRAME
METHODS OF JOINING FACES OF UNEQUAL WIDTHS

MACHINE MITERED, CONTINUOUS WELD

All exposed welds ground and finished smooth

SAW-MITERED, CONTINUOUS WELD

METHODS OF JOINING FACES OF UNEQUAL WIDTHS

WELDED FRAME CORNER DETAILS

KNOCKDOWN FRAME CORNER DETAILS

Other methods also used - systems vary with manufacturer
FIELD SPLICES FOR LARGE MULTI-OPENING FRAMES

ANCHORING AND ATTACHING REMOVABLE MULLIONS VARY PER MANUFACTURER

To facilitate handling and/or shipping, large frames are spliced and prepared in the shop for mechanical attachment or field welding by others.

See key elevation on page 9

MULLION SECTIONS

BASE (OR SILL) SECTIONS

TYPICAL DETAILS FOR FRAME PRODUCT
BUTTED AND FACE-WELDED ASSEMBLY JOINTS
All welds ground and finished smooth
For more information on welding see Appendix B, HMMA-820 TN02, Continuously Welded Frames
Note; Minimum indent is 1/8 in., maximum is governed by rabbet depth, glass thickness etc.

Glazing material shown door side, glazing material can be installed on opposite side.

OPTIONAL INDENTED MULLION AND SILL SECTIONS @ 4A, 4B AND 5A

SIDELIGHT FRAME ELEVATION WITH REPRESENTATIVE DETAILS
SEGMENTED SIDELIGHT / BORROWED LIGHT FRAME
WITH CORNER MULLION POSTS

CORNER MULLION SECTIONS

A

B

C
Grouting Hollow Metal Frames

Grout, when used in accordance with industry guidelines, can improve frame durability, sound deadening, and, depending on wall construction, increase frame anchorage strength. Grouting of the frame does not increase door durability, nor is it required for fire-rated frames. For most commercial applications, grouting of mullions and other closed sections is not recommended.


Grout is a water-based product. If not used properly, it can destroy the opening in a very short time. Grout can be either “mortar”, which is a masonry mixture of lime, cement, sand, and water, or “plaster”, which is a gypsum-based product.

Plaster grout dries by exposure to air. When a frame member is filled solid with plaster grout, only those areas exposed to air will dry and harden, while the center remains wet (uncured). The water remaining in the plaster grout can rust the frame from the inside. Plaster grout should not be used.

Mortar grout cures by chemical reaction and hardens throughout. Use mortar grout.

Frames are not designed to act as forms for grout. Grout must have a maximum 4 in. slump and be hand troweled in place. Bracing of the frame may be necessary prior to grouting to prevent sagging of the header or bowing of the jamb due to weight or pressure of the grout. Grout should not be installed after gypsum wallboard is installed, as the liquid within the grout will deteriorate the wallboard.

When dictated by temperatures, anti-freezing agents for mortar may be recommended by specifications. These agents can adversely affect metal, and all surfaces in contact with the grout must be coated with a corrosion resistant material.

It is recommended that the contractor be responsible for the grouting and for any required barrier coating. It is also his responsibility to use care in the application of the grout.
Continuously Welded Frames

Also called Full, Fully and or Full Profile Welded.

Established definitions and nomenclature:

1. FRAME MEMBER – A part of a frame such as a head, jamb, mullion or sill, also called frame profile, see Figure #1.

2. FRAME ELEMENTS – Specific parts of a frame member such as soffit, stop, rabbet, face and return. See Figure #2. A double rabbeted frame shown for illustration purposes only; alternate designs use the same nomenclature.

3. PERIMETER JOINT – The intersection of two or more frame members or elements that are accessible through the throat or from the unexposed side of the frame member. As perimeter applies, this is the outside boundary of the frame.

Perimeter joints of a continuously welded frame shall have all elements of the frame member continuously welded; soffits, stops, rabbets, faces and returns. Faces and returns may be welded either internally or externally. Soffits, stops, and rabbets shall be welded internally. Figures #3A – #3D illustrates typical perimeter joints; Figure #3A illustrates a saw and punched mitered corner joint.
With many frame configurations the frame perimeter may not be square or rectangular, permitting a mitered corner. Figures #3B – #3D illustrate butted flush perimeter joints.

Figure #3B illustrates a typical sidelight frame where the sidelight does not extend to the floor.

Figure #3C illustrates a sidelight frame where the sidelight extends to the floor.

Figure #3D illustrates a sidelight or smokescreen, where the vertical mullion is designed to extend to the floor.

Occasionally the sill, as with other frame members, is intended to be indented. As this is a perimeter joint, all elements of the frame members should be continuously welded, but due to design and/or construction requirements this is not feasible. Therefore, it is necessary to alter construction methods.

Figure #4A illustrates an indented sill that is continuously welded.
Figure #4B, although drawn similar to Figure #4A, illustrates an indented sill that is reinforced with angles at the faces in lieu of continuously welding. These angles run the full height of the joint and are welded to both frame members. The rabbets, stops and soffit are continuously welded. Internal flush joints shall be face welded only. Joints at soffits, stops and rabbets are not welded and appear as a hairline seam. Figures #5A, #5B and #5C all illustrate internal joints. Note at Figures #5A & #5B that the internal frame member is not accessible from the inside throat of the perimeter frame member. This is the same situation whether it be a mullion and header, two mullions, or mullion and sill as shown in Figure #5C. At Figure #5C the etched line represents where the face joint would be welded. This, of course, would be finished smooth.

Referring to Figure #3D, if this same horizontal frame member is not accessible through the throat or from the unexposed side of the frame member then this would be considered an internal joint, see Figure #5A.
Indented joints at internal frame members shall be internally reinforced and welded. Joints at faces, soffits, stops and rabbets are not welded and appear as hair line seams. Mullions are constructed with an overlapping seam. This seam is internally connected and appears as a hairline seam. See Figure #6.
RECOMMENDED GUIDE SPECIFICATIONS FOR HMMA HOLLOW METAL DOORS AND FRAMES

HMMA 860 — Hollow Metal Door and Frames

ANSI/NAAMM
HMMA 861 — Commercial Hollow Metal Doors and Frames

ANSI/NAAMM
HMMA 862 — Commercial Security Hollow Metal Doors and Frames

ANSI/NAAMM
HMMA 863 — Detention Security Hollow Metal Doors and Frames

ANSI/NAAMM
HMMA 865 — Swinging Sound Control Hollow Metal Doors and Frames

ANSI/NAAMM
HMMA 866 — Stainless Steel Hollow Metal Doors and Frames

ANSI/NAAMM
HMMA 867 — Commercial Laminated Core Hollow Metal Doors and Frames