

# American National Standard

## *Recommended Erection Instructions for Steel Frames*

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SPONSOR  
**Steel Door Institute**  
Approved March 30, 2001



American National Standard  
**Recommended Erection Instructions  
for Steel Frames**

Secretariat  
**Steel Door Institute**

Approved March 30, 2001  
**American National Standards Institute, Inc.**

# American National Standard

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**Foreword** (This Foreword is not part of American National Standard A250.11-2001)

The material contained in this document has been developed under the auspices of the Technical Committee of the Steel Door Institute.

Suggestions for improvement gained in the use of this standard will be welcome. They should be sent to the Steel Door Institute, 30200 Detroit Road, Cleveland, OH 44145-1967.

The organizations that have approved this standard are part of the ANSI A250 Accredited Standards Committee, formed February 8, 1991, and are as follows:

American Institute of Architects  
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Builders Hardware Manufacturers Association  
Door and Hardware Institute  
Factory Mutual Research Corporation  
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Insulated Steel Door Institute  
Manufactured Housing Institute  
Hollow Metal Manufacturers' Association/Division of NAAMM  
National Association of Home Builders  
Steel Door Institute  
Underwriters Laboratories Inc.  
Wood Door Manufacturers' Association

The Technical Committee of the Steel Door Institute, which has developed this Standard, had the following personnel at the time of approval:

Claus D. Heide, *Chairman*  
Tom R. Janicak, *Vice Chairman*  
J. Jeffery Wherry, *Manager*

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Steel Door Institute .....	J. Jeffery Wherry

## American National Standard

# Recommended Erection Instructions for Steel Frames

## 1 Scope and references

### 1.1 Scope

Recommended methods for the installation of steel frames for swinging doors in a variety of wall conditions, commonly used in commercial buildings, are covered within this standard.

The installation of transom/sidelite (or panel) type frames and single or multiple borrowed lites are not covered in this standard.

It is not the intention of this document to obstruct the development of alternative installation methods, nor is it intended to restrict frame installation solely to the wall types noted herein.

### 1.2 Reference documents

Further information concerning wall construction, erection, anchoring, fire ratings, etc. may be found in the following:

- SDI 111, *Recommended Standard Details for Steel Doors and Frames*
- SDI 122, *Installation and Troubleshooting Guide for Standard Steel Doors and Frames*
- ANSI/DHI A115.IG-1994, *Installation Guide for Doors & Hardware* (Door and Hardware Institute, 14150 Newbrook Dr., Chantilly, VA 22021-2223)
- NFPA 80, *Standard for Fire Doors and Fire Windows, 1999 Edition* (National Fire Protection Association, P.O. Box 9101, Quincy, MA 02269-9101)
- HMMA 840-99, *Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames* (NAAMM, 8 South Michigan Ave., Chicago, IL 60603)
- GA600-97, *Fire Resistance Design Manual* (Gypsum Association, 8 First Street NE #510, Washington, DC 20002)

## 2 Storage and installation

### 2.1 Storage of frames at the job site

All frames shall be stored under cover. Assembled frames shall be stored vertically. The units shall be placed on at least 4" (102 mm) high wood sills or in a manner that will prevent rust or damage. The use of non-vented plastic or canvas shelters that can create a humidity chamber shall be avoided.

Note: Refer to project specifications for required cleanup and touchup work.

### 2.2 Grouting of frames

When temperature conditions necessitate the use of anti-freezing agents in plaster or mortar, the inside of the frame shall be coated with a corrosion resistant coating by the contractor responsible for installation.

Where grouting is required in masonry installations, frames shall be braced or fastened in such a way that will prevent the pressure of the grout from deforming the frame members. Grout shall be mixed to provide a 4" (102 mm) maximum slump consistency, and be hand troweled into place. Grout mixed to a thinner "pumpable" consistency shall not be used.

Note: Standard mortar protection in frames is not intended for thin consistency grout.

Note: Steel frames, including fire rated frames, do not require grouting. Grouting is not recommended for frames installed in drywall.

### 2.3 Assembly of frame/anchor provisions

Follow manufacturers' recommended procedure for assembly of frame and quantity and spacing of anchors. If not indicated, install anchors at hinge levels and directly opposite at strike jamb.

Note: Prior to installation, jobsite personnel shall ensure correct swing, size and labeling.

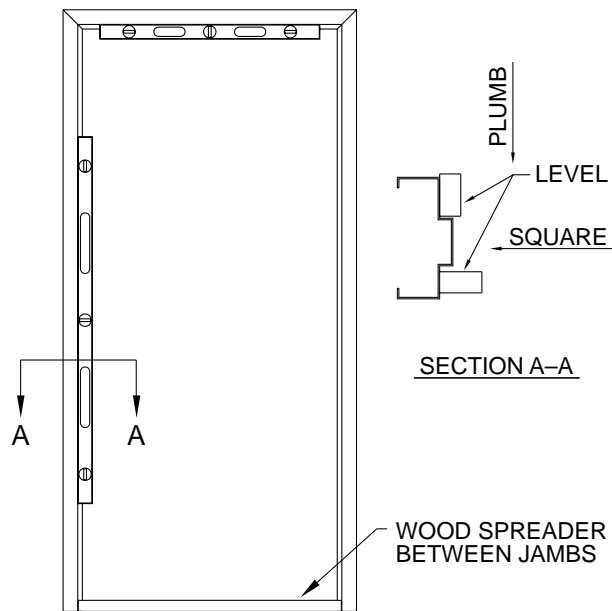


Figure 1 – Plumbing the frame

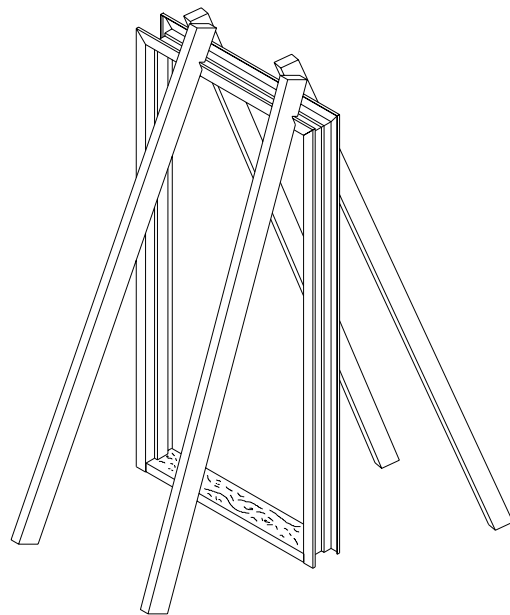


Figure 2 – Bracing the frame

## 2.4 Installation tolerances

Refer to Annex A, excerpted from "Installation Guide for Doors & Hardware", ANSI/DHI A115.IG.

## 3 Plumbing and bracing frames

### 3.1 Plumbing the frame (see figure 1)

The contractor should be equipped with a carpenter level, square and **wood spreaders**. Where welded frames are provided with spreader bars, they shall be removed before setting frames. Set the frame in the desired location and level the header. Square jambs to header. Shim under jambs if necessary. With frame on line, set wood spreader and fasten jambs to floor through floor anchors.

### 3.2 Bracing the frame (see figure 2)

Brace the frame as shown or shore to a structure above. *Do Not Brace In The Direction Of Intended Wall*. Plumb and square jambs. Install vertical brace to support header for openings over 4'-0" wide.

### 3.3 Spreader (see figure 3)

Wood spreader shall be square and fabricated from lumber no less than 1" thick. Correct length is the door opening width between the

jambs at the header (i.e., Single Door 3'-0" = 36"). Cut clearance notches for frame stops. Spreader shall be nearly as wide as frame jamb depth for proper installation.

NOTE: Spreader bars for shipping purposes should not be used as installation spreaders.

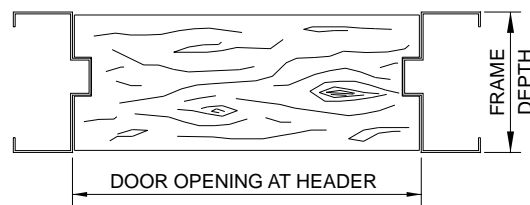


Figure 3 – Spreader

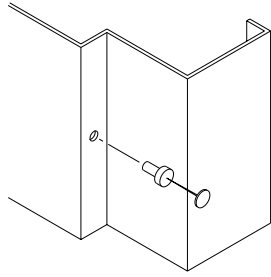
## 4 Accessories

### 4.1 Install rubber silencers (see figure 4)

Cut the point from a #6d box or finishing nail. Insert nail in hole to elongate rubber silencers. Moisten the end and insert rubber silencers in predrilled holes on frame stop, remove nail. The thickness of the silencer shall permit latching of door with  $\frac{1}{16}$ " clearance between face of door and stop of frame.

NOTE: *Install rubber silencers before frame erection to avoid grout filling rubber silencer holes*. In some cases rubber silencers are factory installed.

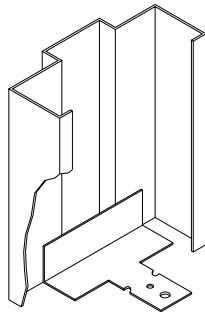




**Figure 4 – Rubber silencers**

#### 4.2 Extended base anchor (see figure 5)

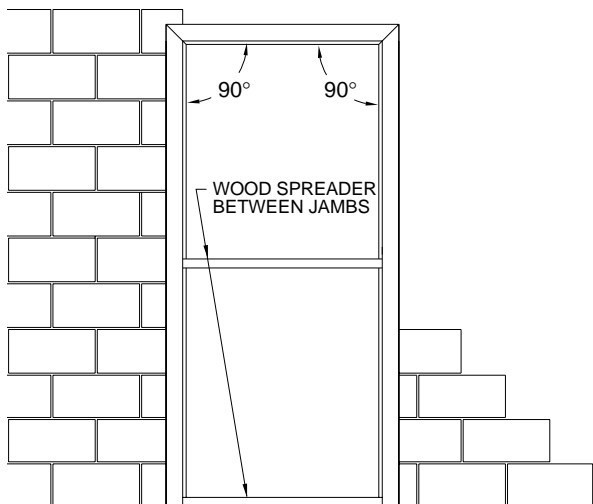
Extended base anchors are supplied upon request only. (If required for tool attachment.)



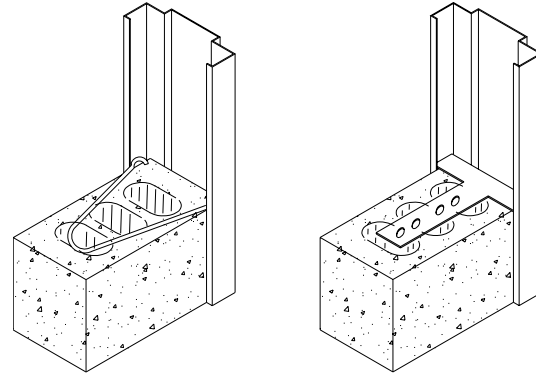
**Figure 5 – Extended base anchor**

#### 5 New masonry construction (see figure 6)

1. Assemble frame per manufacturer's instructions.
2. Install wood spreaders, set brace and plumb frame.



**Figure 6 – New masonry construction**

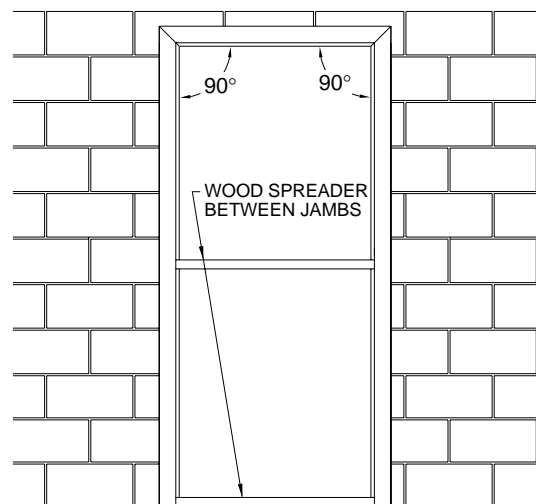


**Figure 7 – Anchors**

3. Set second spreader at the mid point of the door opening to maintain the door opening dimension.
4. Install anchors (see figure 7). Grout frame in the area of the anchors as block courses are laid up. Frames may also be supplied with anchors welded in place.
5. Continually check plumb and square as wall progresses.

#### 6 Existing masonry construction (see figure 8)

1. Assemble frame per manufacturer's instructions.
2. Install snap-in anchors to align with pierced holes in jambs. (Frames may also be supplied with anchors welded in place.)



**Figure 8 – Existing masonry construction**

3. Slide frame into wall opening; install wood spreaders.
4. Use tapered shims between anchors and wall and spreaders to maintain squareness and alignment of frame, and to maintain door opening.
5. Where possible, one jamb should be butted tightly to the wall. Backer rod or caulking shall be used where gaps occur between frame and wall.
6. Insert anchor bolts and tighten securely, checking for frame alignment periodically (see figure 9).
7. Install plugs to cover bolt heads (if so equipped).

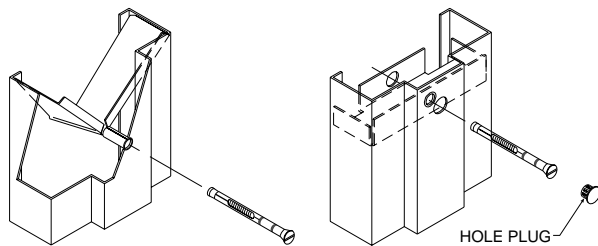


Figure 9 – Anchors

## 7 Steel stud wall construction (see figure 10)

1. Assemble frame per manufacturer's instructions.
2. Install anchors. Position anchors in frame through the throat and tap in with a hammer. Frames may also be supplied with anchors welded in place.
3. Square, brace and plumb frame as shown.
4. Set spreader. Attach jambs to floor through floor anchor or floor extension. Install jamb studs to floor and ceiling runners and tightly against frame anchors.
5. Position studs in frame throat and attach to anchors with screws or weld. If using screws, drill from the back side of the stud, through both the stud and anchor, then attach with (2) screws per anchor location (see figure 11).

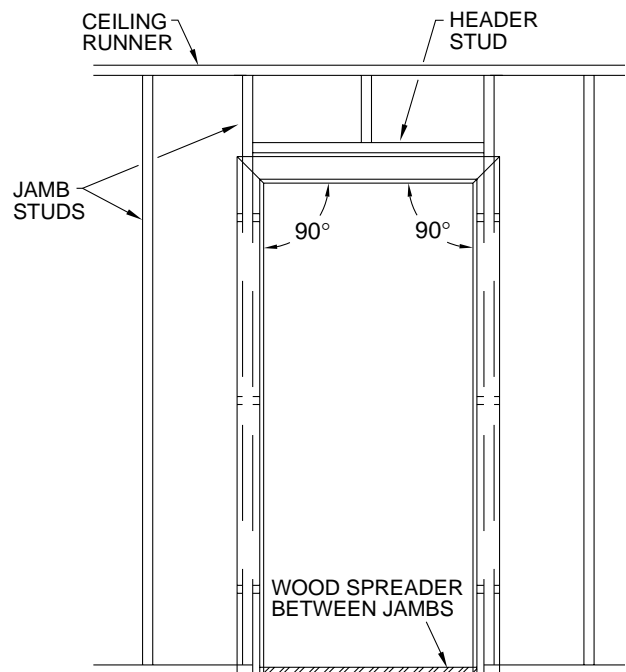


Figure 10 – Steel stud wall construction

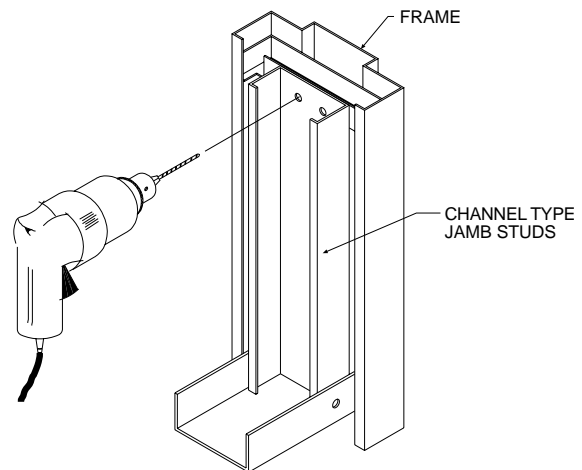


Figure 11 – Channel type steel stud

Screws shall be #6 x  $\frac{3}{8}$ " (min.) steel sheet metal or self tapping type.

NOTE: When attaching header stud to jamb studs, be sure the stud is above frame header. This will assure ample room for attaching plaster lath or drywall and will not interfere with installation of hardware attached to frame header.

NOTE: Drywall must extend at least  $\frac{1}{2}$ " into frame at fire rated installations.

## 8 Double egress frames in steel stud wall construction

### 8.1 Erect frame (see figure 12)

Stand frame up in desired location. Anchor one jamb to floor and set spreader on floor from anchored jamb to loose jamb. Position and anchor second jamb. Plumb, level and square frame, then brace. Also install a vertical brace at center of frame.

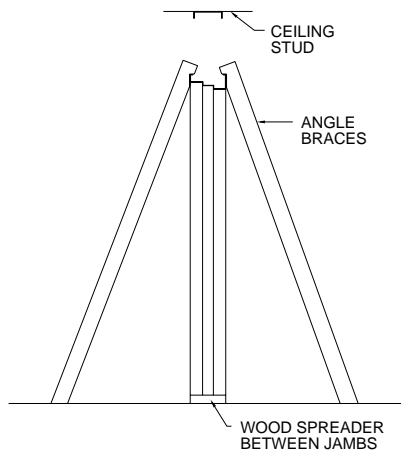


Figure 12 – Erect frame

### 8.2 Anchor jambs (see figure 13)

Erect jamb studs and attach frame anchors to studs using screws or welding. If using screws, drill from the back side of the stud, through both the stud and anchor, then attach with (2) screws per anchor location (see figure 11).

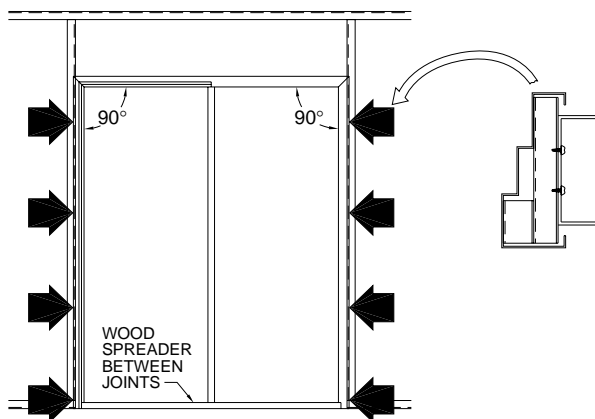


Figure 13 – Anchor jambs

Screws shall be #6 x 3/8" (min.) steel sheet metal or self tapping type. Number of anchors and locations will vary with manufacturer.

Note: Drywall must extend at least 1/2" into frame at fire rated installations.

### 8.3 Anchor header (see figure 14)

Header anchor requirements will vary. The manufacturer's installation requirements should be followed.

NOTE: Drywall must extend at least 1/2" into frame at fire rated installations.

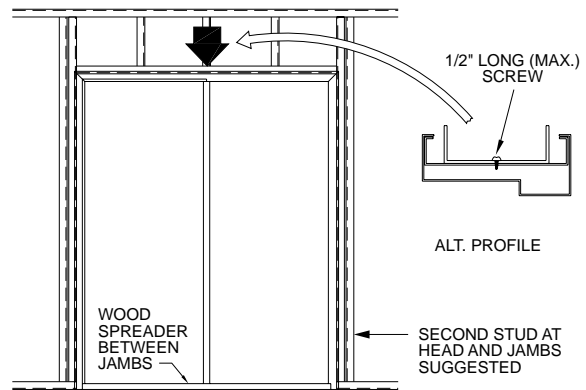


Figure 14 – Anchor header

## 9 Wood stud construction (studs erected with frame)

### 9.1 Erect frame (see figure 15)

Assemble frame per manufacturer's instructions. Stand frame up in desired location. An-

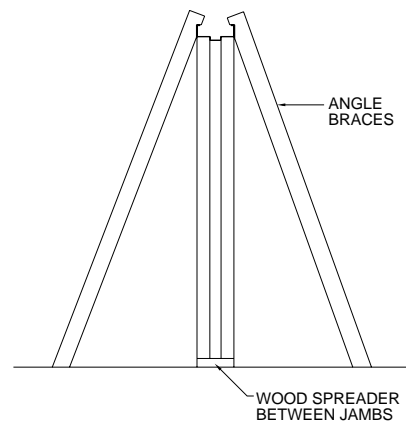


Figure 15 – Erect frame

chor one jamb to floor and set spreader on floor from anchored jamb to loose jamb. Position and anchor second jamb. Plumb, level and square frame, then brace.

**9.2 Anchor installation**  
(see figures 16 and 17)

1. Install anchors. Position anchors in frame throat and tap in with a hammer. Frames may also be supplied with anchors welded in place.
2. Set spreader. Attach jambs to floor through floor anchor or floor extension. Install double jamb studs to floor and ceiling runners and header (see figure 16).
3. Bend anchor tabs around stud leaving desired clearance between frame return and stud for inserting finished wall material.
4. Square and nail top anchor to stud on ONE JAMB ONLY. Check plumb and square and continue to nail balance of anchors to stud. Repeat for opposite jamb.

NOTE: Drywall must extend at least 1/2" into frame at fire rated installations.

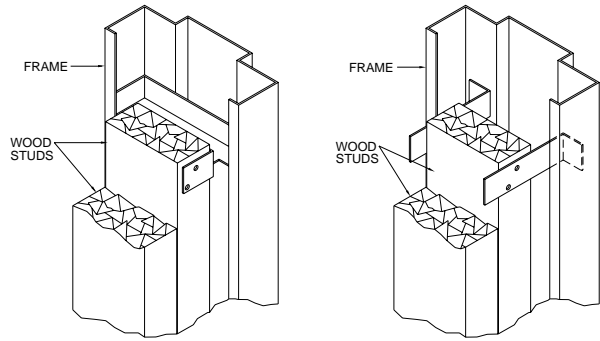


Figure 17 – Wood studs

**10 Wood stud construction (studs erected before frame)**

**10.1 Rough opening** (see figure 18)

Build rough opening according to dimensions and clearances in specific manufacturer's installation instructions.

Note: It is recommended that double studs be used at jambs and headers.

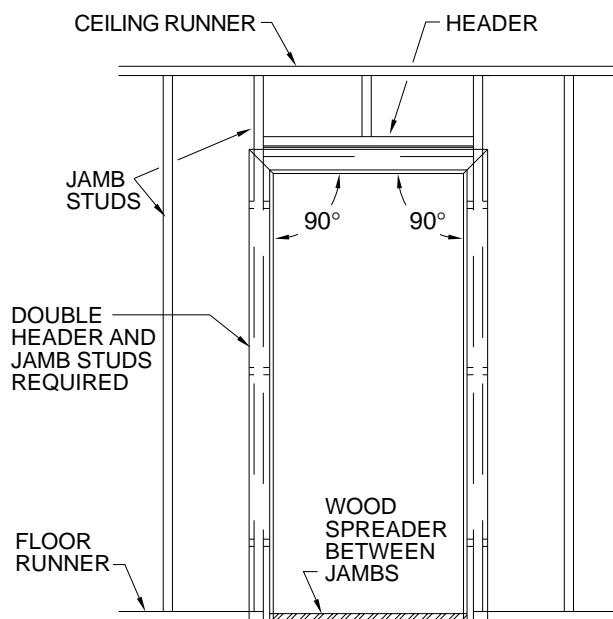


Figure 16 – Wood stud wall construction

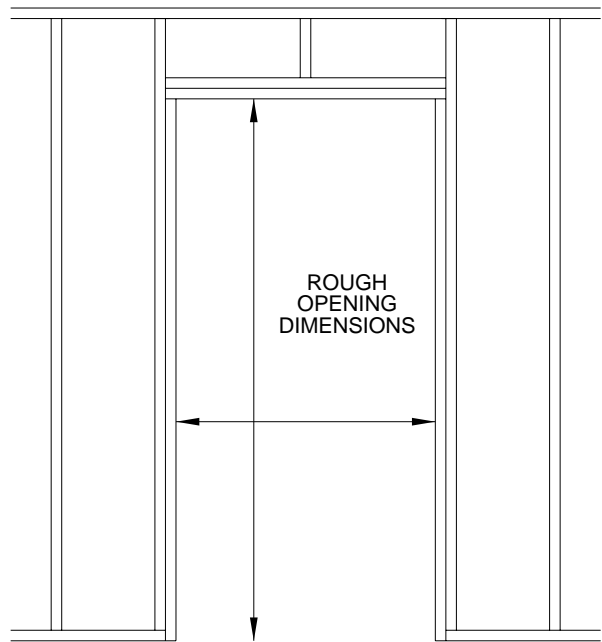


Figure 18 – Rough opening

## 10.2 Installation

1. Assemble frame per manufacturer's instructions.
2. Install anchors. Position anchors in frame throat and tap in with a hammer. Frames may also be supplied with anchors welded in place. Base anchors may also be used. If base anchor cannot be used add one anchor per jamb at bottom.
3. Place frame in rough stud opening (see figure 19).

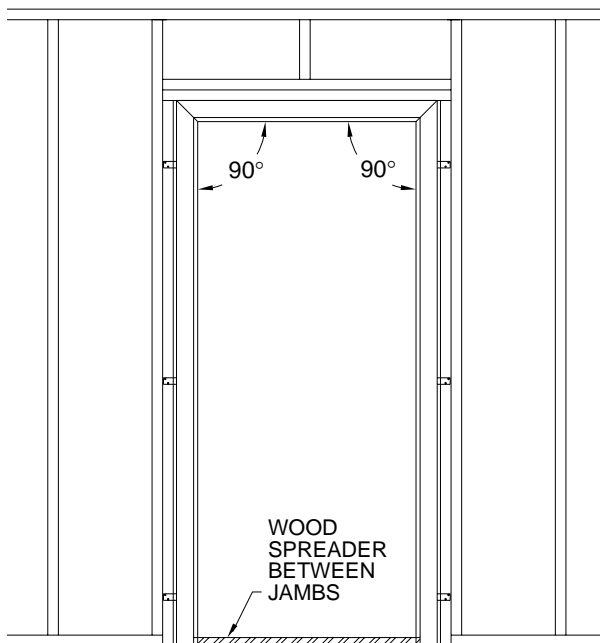


Figure 19 – Wood stud construction

4. Bend anchor tabs around stud leaving desired clearance between frame return and stud for inserting finished wall material.
5. Set spreader and level frame. Shim jambs if necessary.
6. Square and nail top anchor to stud on ONE JAMB ONLY. Check plumb and square and continue to nail balance of anchors to stud. Repeat for opposite jamb (see figure 20).

NOTE: Drywall must extend at least  $\frac{1}{2}$ " into frame at fire rated installations.

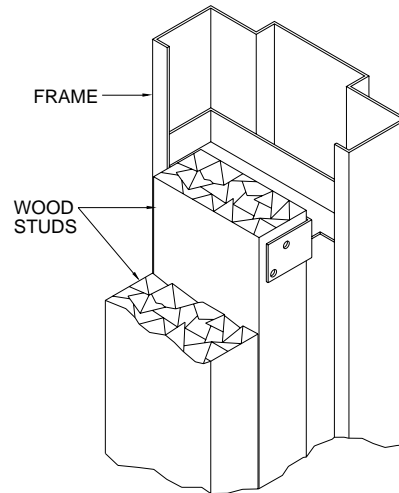


Figure 20 – Wood stud anchor

## 11 Slip-on drywall

### 11.1 Rough opening (see figure 21)

Prepare rough openings per manufacturer's recommendations.

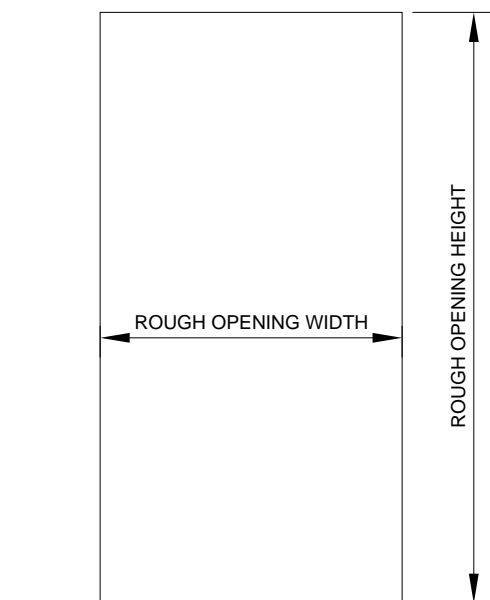


Figure 21 – Rough opening

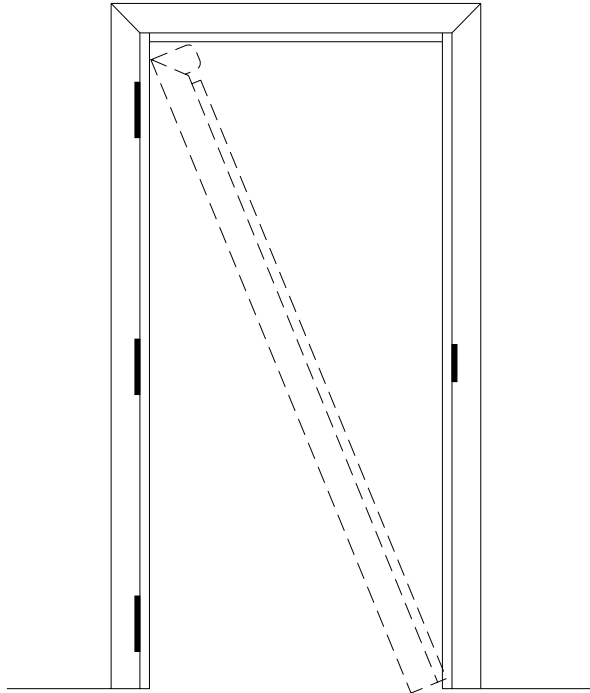


Figure 22 – Align corner gussets

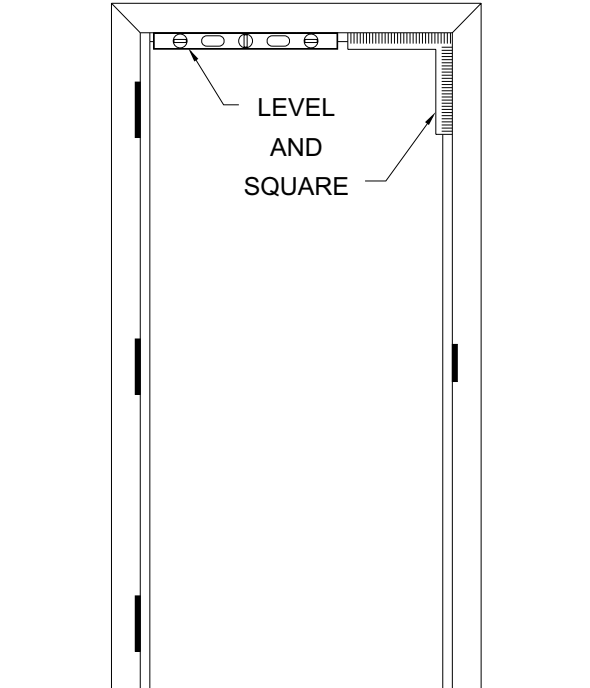


Figure 23 – Level and square frame

### 11.2 Installation

1. Install jambs and header on to wall per manufacturer's instructions, taking care to align corner gussets (as occur). See figure 22.
2. Level and square frame. See figure 23.

3. Turn adjusting screws hand tight until compression anchor contacts jamb studs. Recheck level and square. Adjust via anchor screws as needed (see figure 24).
4. Fasten base anchors to wall stud (see figure 25).

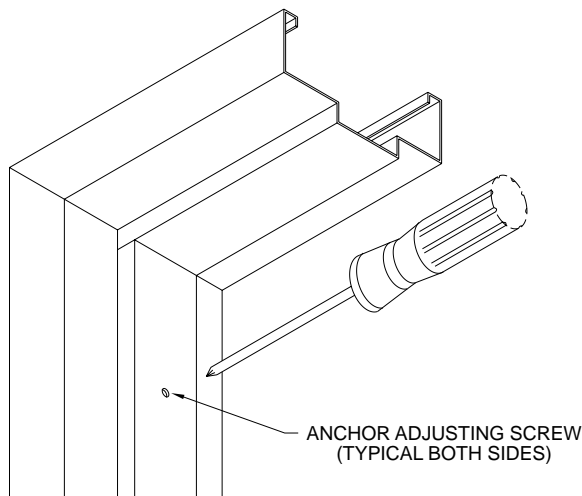


Figure 24 – Anchor adjusting screw

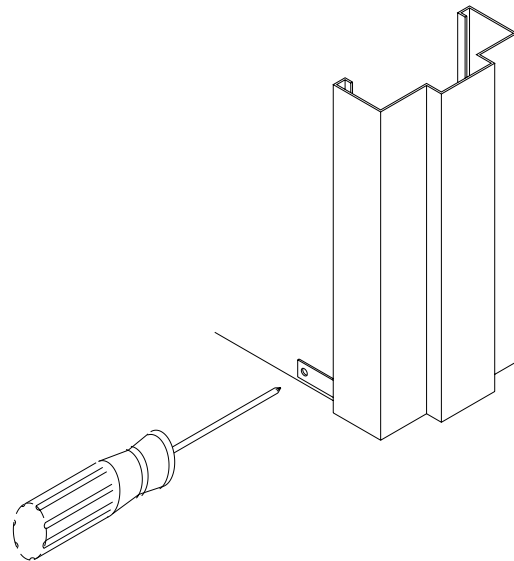


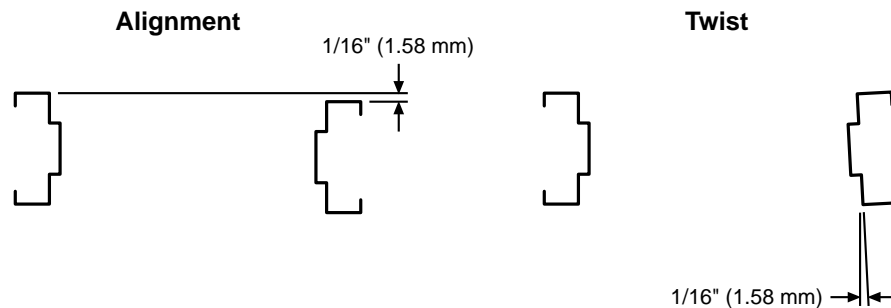
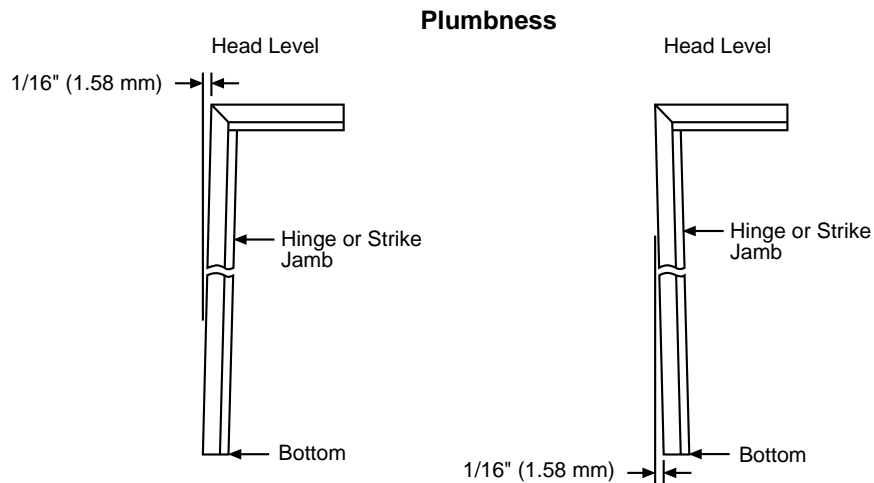
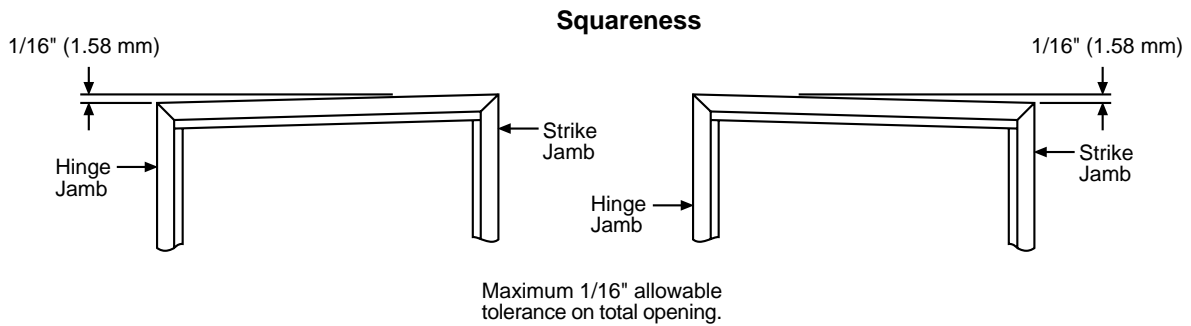
Figure 25 – Fasten base anchors to wall stud

## Annex A

### Tolerances

The detailed descriptions of frame installation techniques that follow refer to plumbing, squaring and aligning the frame. The details in figure A1 indicate the maximum allowable tolerances in this area.

Note: Annex A is excerpted from ANSI/DHI A115.IG, "Installation Guide for Doors & Hardware" in order to define installation tolerances that should not be exceeded in order to maintain the operative integrity of the assembly.



**Figure A1 – Installation tolerances**

### Annex B

The installation instructions contained in ANSI A250.11 are intended to apply to most typical frame installations. There are, however, certain types of frames for which additional wood spreaders are recommended during the frame installation to ultimately assure the proper door operation.

Three-sided frames with face dimensions of 1-1/2" or less of any opening size, frames for doors that weigh over 9 lbs. per square foot and/or frames of heights greater than 8'-0" are more prone to variations in installed tolerances. Under most conditions, frames such as these require more support during the installation process.

For installations such as these, the SDI recommends the use of wood spreaders at the bottom of frames **AND** at 36" intervals between the top and bottom as indicated in the illustration below.

