

**Installation**  
*and*  
**Troubleshooting Guide**  
*for*  
**Standard**  
**Steel Doors and Frames**



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## **Foreword**

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

The Steel Door Institute does not condone or encourage repair methods which would adversely affect product performance or violate and/or void product warranties.

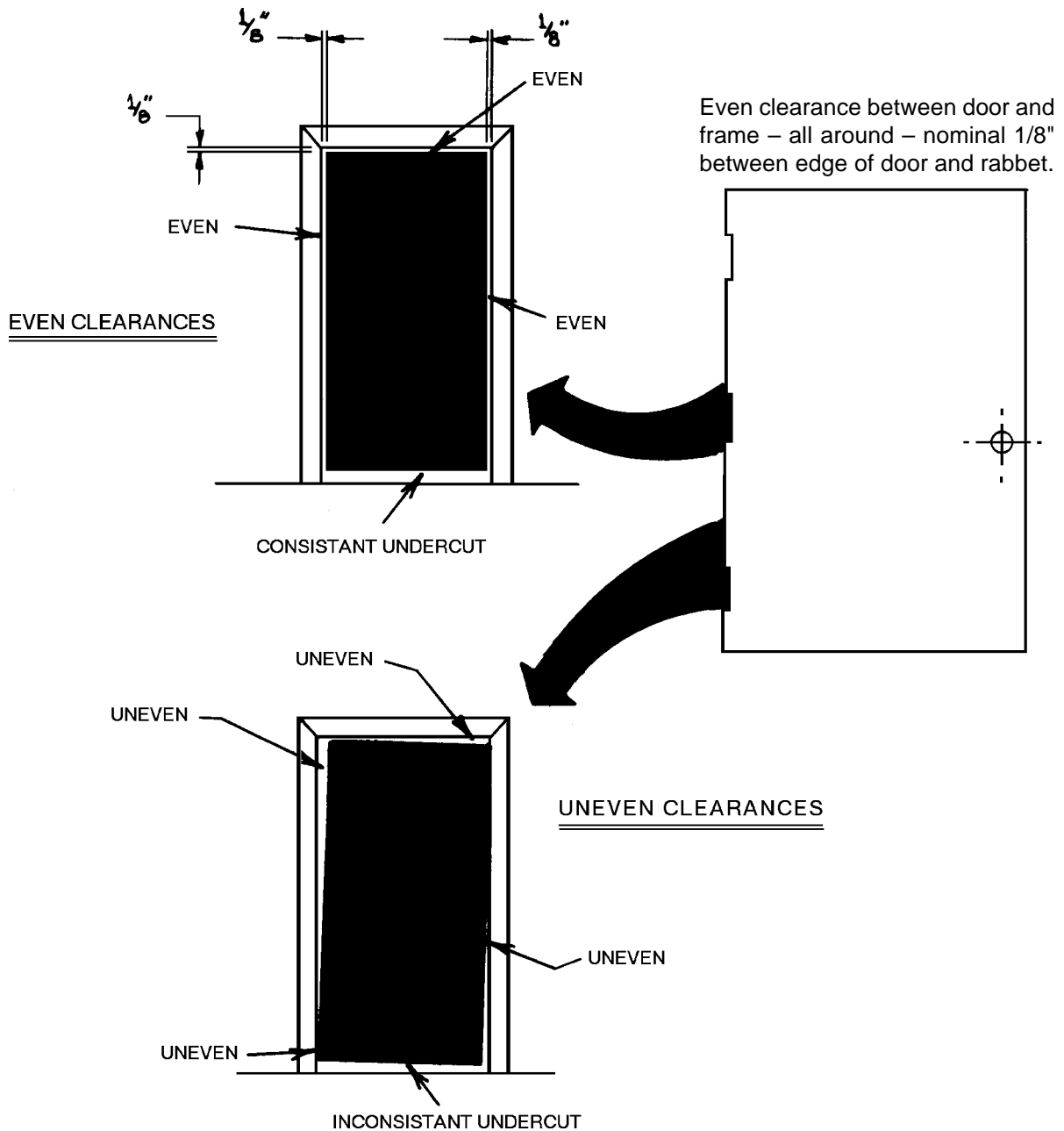
The user of this document assumes all responsibility associated with but not limited to product performance and violation of product warranties for any product associated with the installation and suggested repair methods in this document.

## **Purpose**

The intent of this document is to cover field installation problems most commonly experienced with standard steel door and frame installations. It should be understood that most problems encountered are because of inappropriate application of the products and/or improper installation.

The suggested methods of repair require only basic hand tools and relatively little time. It should be understood that more complex problems or compound problems could exist which warrant extensive field repairs and modification to products. These types of field installation problems are not intended to be covered in this document and should not be made without first consulting the manufacturer.

## IMPROPER DOOR / FRAME CLEARANCE



A door and frame are both the same geometric figure, that is, a rectangle. One rectangle, the door, must open and close within another rectangle, the frame. To do so, the clearance between the two must be properly maintained. All standard steel door and frame manufacturers closely hold tolerances which result in a nominal clearance between the door and frame of  $\frac{1}{8}$  inch. If this clearance is not maintained, an interference will develop and/or hardware misalignment may occur.

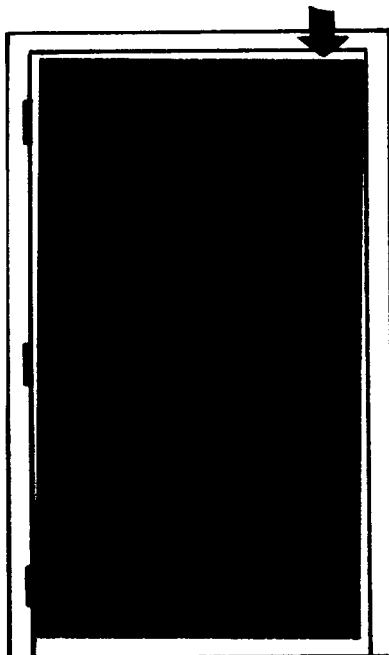
From this, it can be seen that proper installation is extremely important in establishing clearances and will prevent a multitude of potential problems from developing.

The Steel Door Institute has many publications which were developed to establish industry standards and assist in specifying as well as installing standard steel doors and frames. One publication, SDI- 105 will be of assistance regarding the erection and installation of standard steel frames.

## **IMPROPER DOOR / FRAME CLEARANCE**

### **In your door binding ?**

Frames which are out of plumb are frequently the cause of faulty operation of locksets and binding of bolts in the strike. Check carefully.

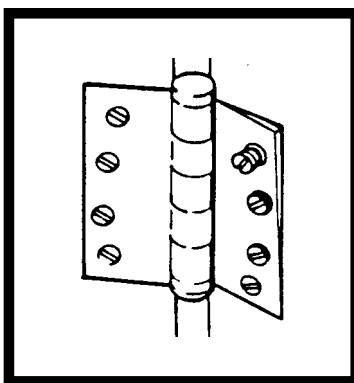


### **Is door sagging?**

If sag cannot be corrected and door and frames returned to plumb relationship, repositioning or shimming the strike may relieve this condition. Additionally filing the strike will compensate for minor misalignment (refer to section "Lock fits too tight in strike").

### **Are hinges worn ?**

If excessive wear has occurred on hinge knuckles, door will not be held tightly. Replace hinges.



### **Are hinges loose ?**

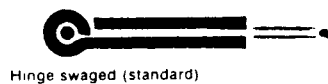
If hinge screw will not remain tight, the screw can be held in place by the use of a "loctite" type product which prevents the screw from loosening. Additionally, "Nylok" type fasteners can be used to replace the normal machine screws.

### **Are hinges properly swaged?**

The hinge manufacturers specifications should be checked to determine what the proper hinge swage should be.

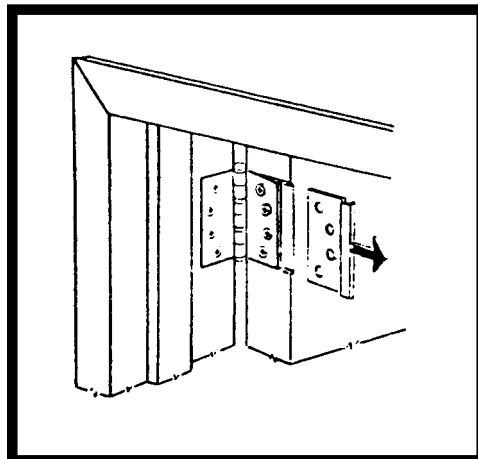
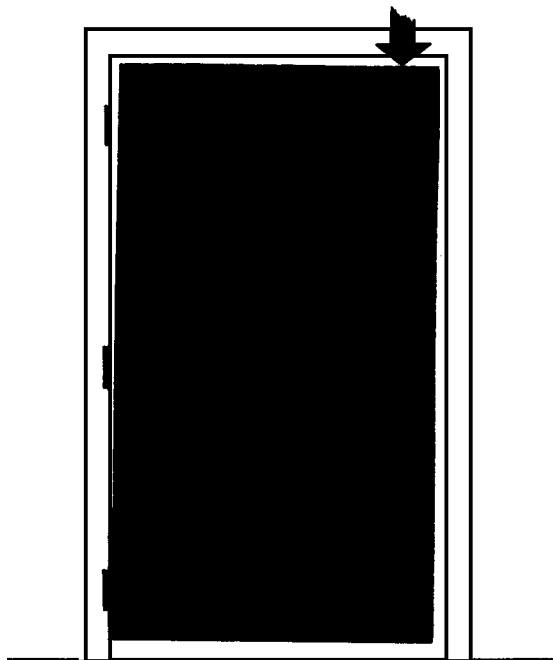
Swaging is a slight offset of the hinge leaf at the barrel which permits the leaves to come together.

Standard swaging of standard weight and heavy weight full mortise hinges when closed to the parallel position provides a 1/16" clearance between leaves.



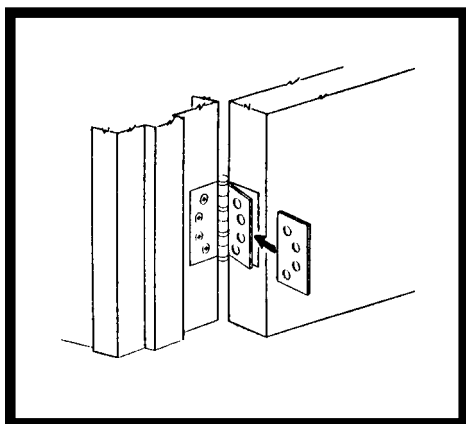
Hinge swaged (standard)

## IMPROPER DOOR / FRAME CLEARANCE



### Remove top hinge filler

The door sag condition may be improved by removing the top hinge leaf attached to the door and taking out the filler (hinge filler) from behind the leaf. Reattach hinge leaf to door. A hinge filler is generally used on non-handed doors.



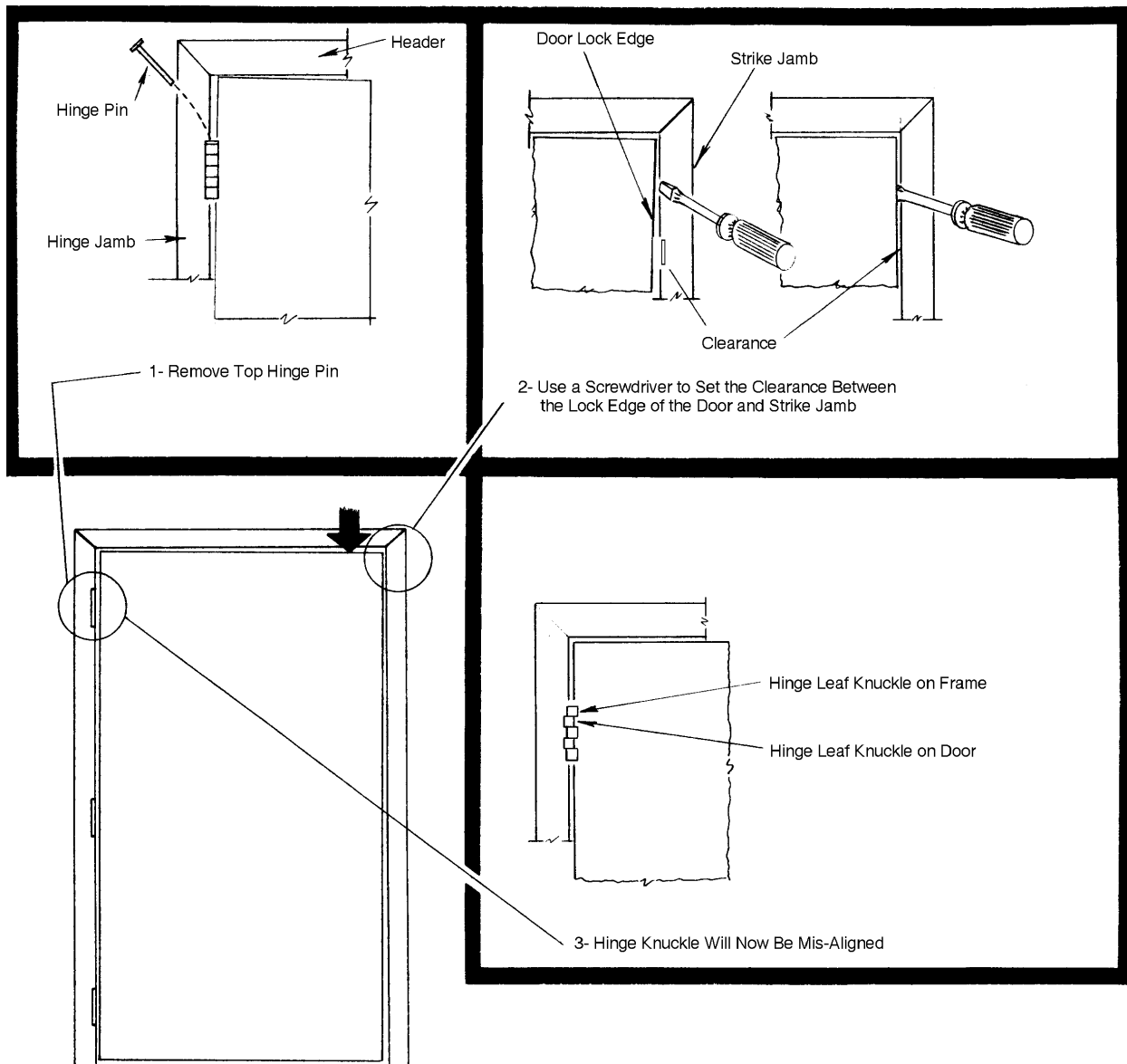
### Add shims to bottom and/or middle hinge

On handed doors, the lower half of the door can be shifted upward and toward the strike jamb. Remove the screws which attach the middle and/or bottom hinge(s) to the door. Insert shims between the hinge leaf and door. Reattach hinge leaf to door.

## IMPROPER DOOR/ FRAME CLEARANCE

### Reswaging hinges

The following example shows how a hinge leaf can be reswaged to correct minor improper door/frame clearances. This particular method allows the reswaging to be accomplished while the door remains in the opening and the hinge leaves remain on the door and frame. The example shows a top hinge reswaged to correct a sag type condition. However, any of the hinges can be reswaged in this manner to compensate for conditions opposite to that of a sag condition.

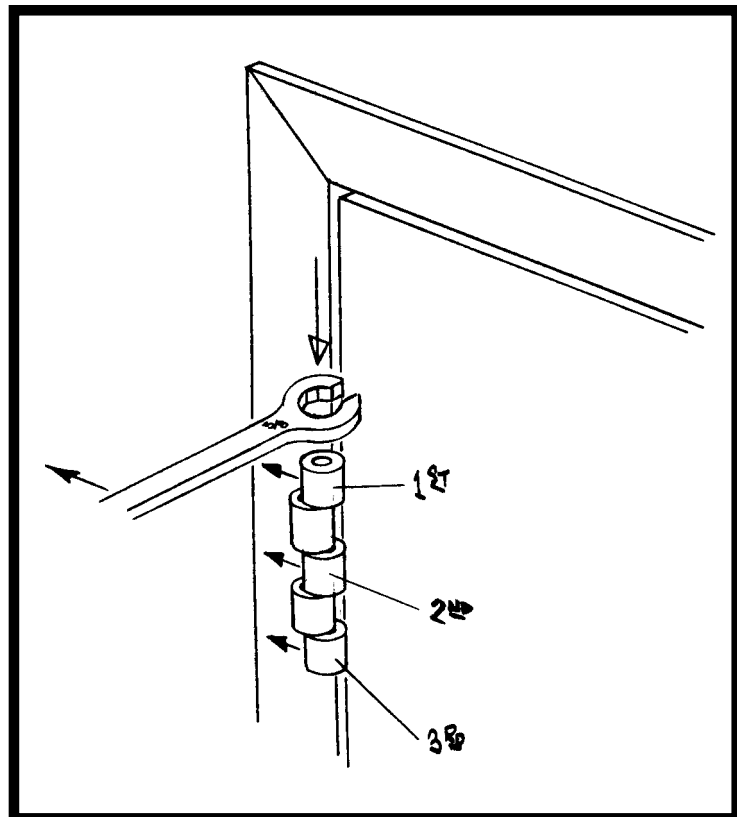


## IMPROPER DOOR / FRAME CLEARANCE

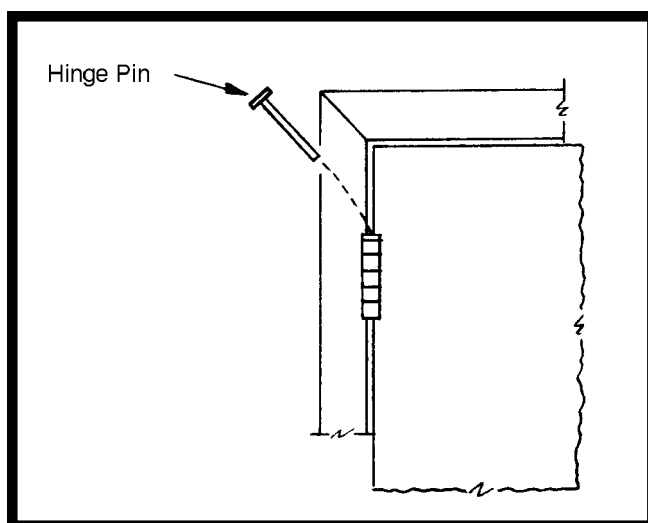
### Reswaging hinges

As can be seen, the hinge leaf knuckles on the door move to a new location once the clearance at the strike jamb was set. The hinge leaf knuckles on the frame must now be reswaged (bent) to align with the new location of the hinge leaf knuckles on the door. The easiest way to do this is to use a 5/8" – 11/16" tube wrench (a crescent wrench will do as a second choice). Simply slip the tube wrench down around the 1st knuckle and align it with the new location. You can now slip the tube wrench down to the 2nd knuckle and align it. Repeat this for the third knuckle as well.

All of the hinge knuckles on the frame have now been aligned with the new location of the hinge leaf knuckles on the door.



4 Reswage and align all hinge knuckles



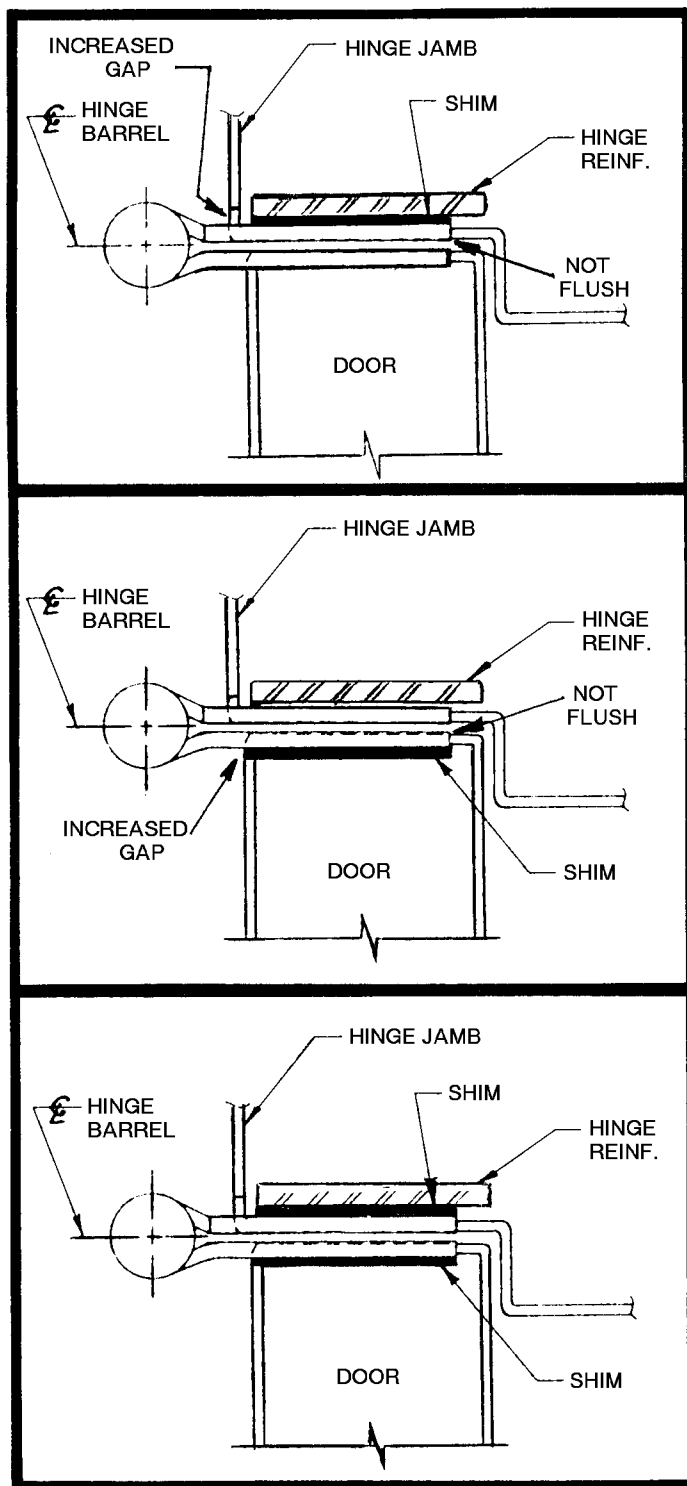
5 Reinsert the hinge pin and remove the screwdriver

**NOTE:** As always caution should be exercised when the hinge leaves are not removed. Excessive pressure could possibly damage some doors/frames. As an alternate reswaging method, the hinge can be removed and clamped in a vise for reswaging.



## HINGE BIND, AGAINST RABBET

Normally, hinge bind is found between the door and rabbet. There are several ways of shimming which will move the door in different directions. The following guidelines should be used in shim applications.



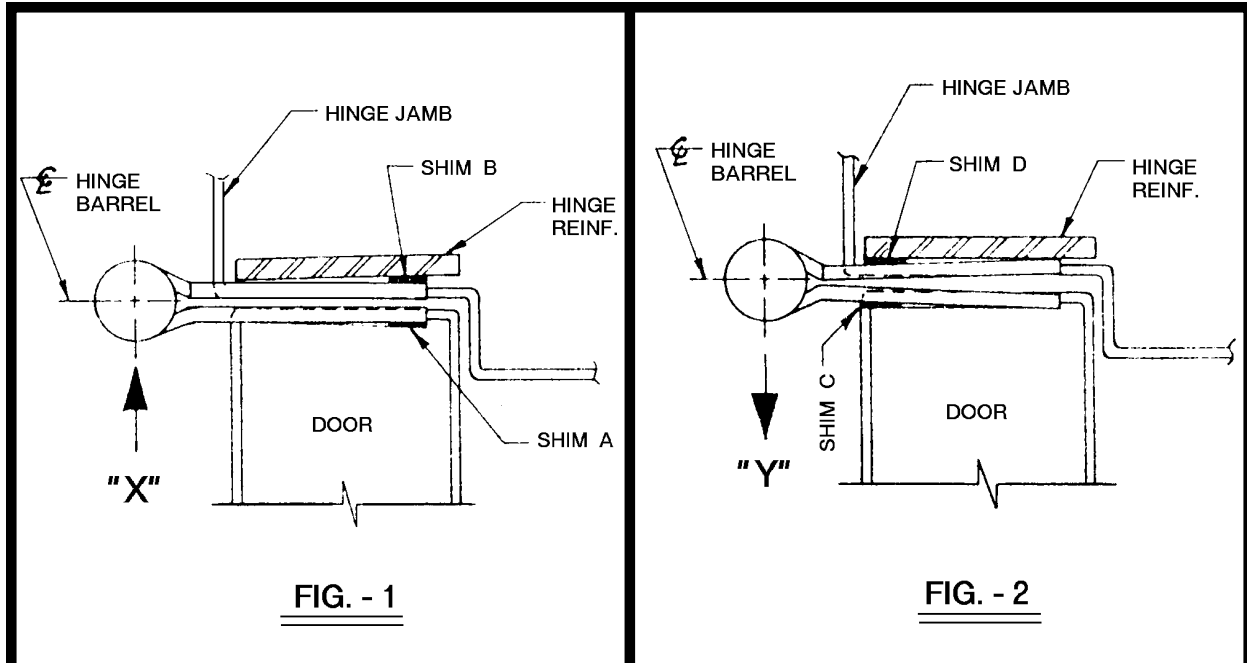
1. A shim can be placed between the frame hinge reinforcement and the hinge leaf. This will move the door towards the strike jamb. However, the hinge notch face gap will be increased and the hinge leaf surface will not be flush with the rabbet surface.

2. A shim can be placed between the door and the hinge leaf. This will also move the door towards the strike jamb. However, an increased gap will be created by the shim and the hinge leaf surface will not be flush with the backset surface on the door.

3. To minimize the gaps and the hinge leaf surfaces not being flush in #1 and #2 above, two shims can be used. These two shims would be half the thickness as those used in #1 or #2. This would minimize gaps and out of flush conditions.

## HINGE BIND, AGAINST STOPS

Hinge bind against the frame stops is also another item to consider. Again, there are several ways of shimming which will move the door in the desired direction. The following guideline should be used in shim application.

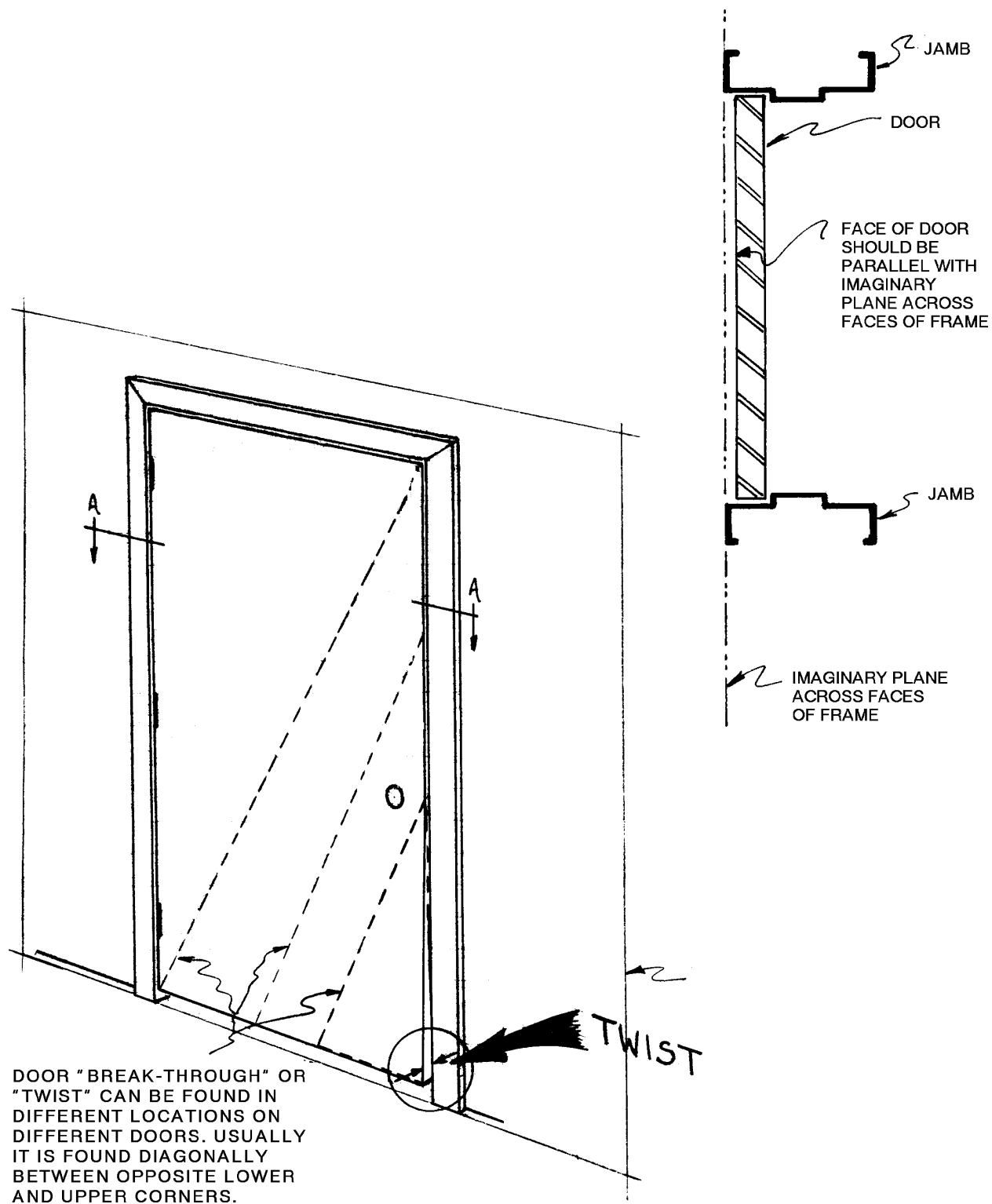


Adjustment of clearance between the door and the frame may be accomplished by the following:

1. Using shim "A" only, door will be relocated in direction of arrow "X".
2. Using shim "B" only, will move both door and centerline of hinge barrel in direction of arrow "X".
3. Using both shims "A" and "B" will relocate the door in direction of arrow "X" by a greater amount than by using shim "B" alone.
4. Using shim "C" only, door will be relocated in direction of arrow "Y".
5. Using shim "D" only, both door and centerline of hinge barrel will move in direction of arrow "Y".
6. Using both shims "C" and "D" will relocate the door in direction of arrow "Y" by a greater amount than by using either "C" or "D" alone. The centerline of hinge barrel will be relocated the same as by using shim "D" alone.

## TWISTED DOOR

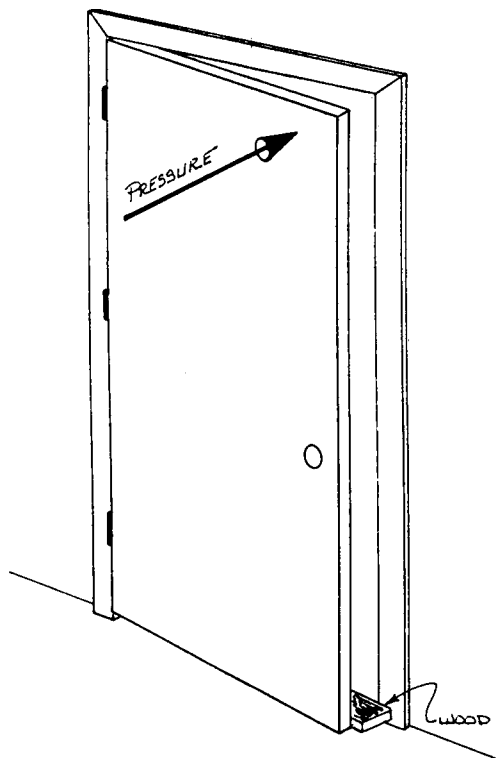
Normal installation results in the plane of the door face being parallel with the plane of the frame faces. If the frame is square and plumb, all face surfaces of the frame will be in the same plane. A twisted door will "break through" the frame's face plane surface. **BE SURE** the frame is square and plumb. If it is not, then the problem is probably with the frame installation and **NOT** the door.



DOOR "BREAK-THROUGH" OR "TWIST" CAN BE FOUND IN DIFFERENT LOCATIONS ON DIFFERENT DOORS. USUALLY IT IS FOUND DIAGONALLY BETWEEN OPPOSITE LOWER AND UPPER CORNERS.

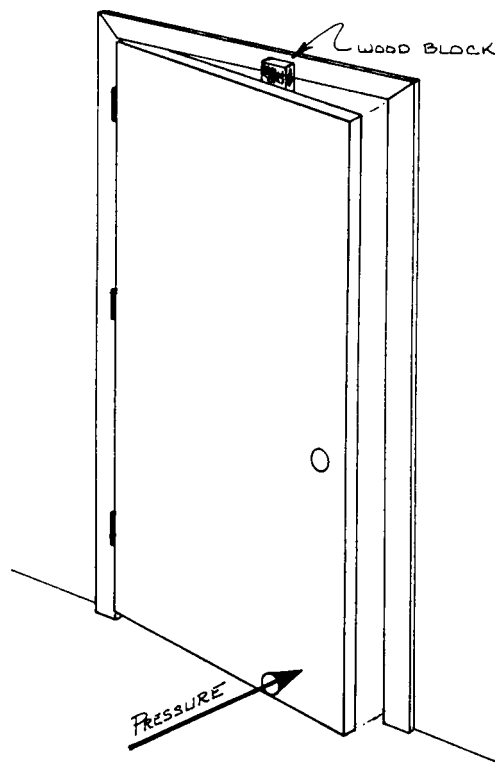
## TWISTED DOOR

It is possible, in some cases, to “spring” the door back to (or much closer to) its ideal position of being parallel with the imaginary plane across the faces of the frame. This can usually be done with the door remaining in the frame. A piece of wood blocking must be placed between the door and frame and pressure is then applied at the twisted area to “spring” the door. However, caution should be exercised on drywall installations since the frame could possibly work loose from the wall, particularly on slip-on drywall type frames.



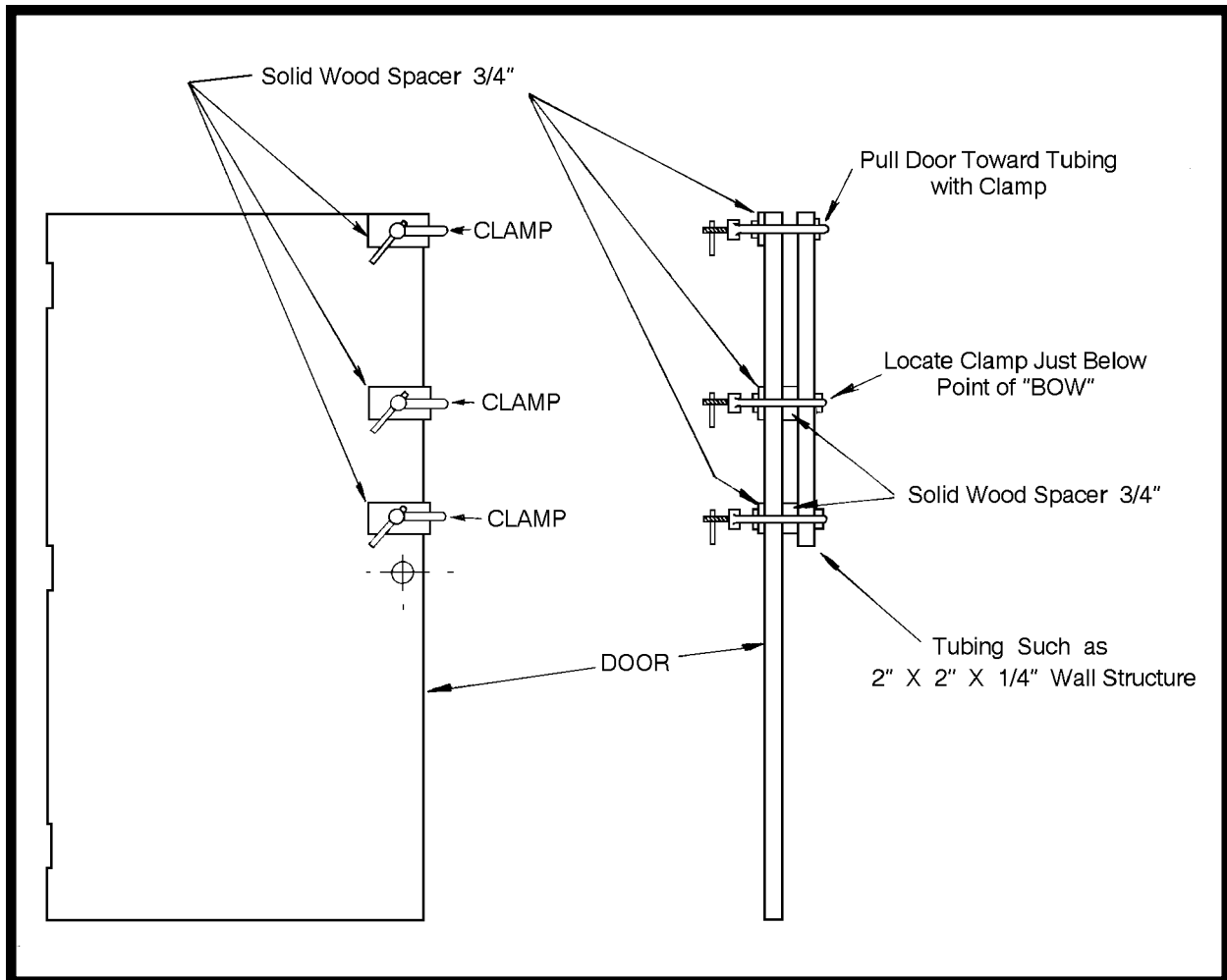
Twisted door, with top lock area of door “breaking-through” the imaginary plane. Place wood block on floor, between door and frame as shown. Apply pressure to top lock area as shown to “spring” door back into position. Remove wood block, close door and check condition. Repeat if necessary.

Twisted door, with bottom lock area of door “breaking through” the imaginary plane. Place wood block between frame head and door as shown. Apply pressure to the bottom lock area as shown to “spring” door back into position. Remove wood block, close door and check condition. Repeat if necessary.



## **TWISTED DOOR**

An alternate method can also be used which will allow the door to remain in the opening. This might be appropriate in drywall installations as previously mentioned. Although the example shown reflects the top half of the door, this method could be used on the bottom half of the door as well.

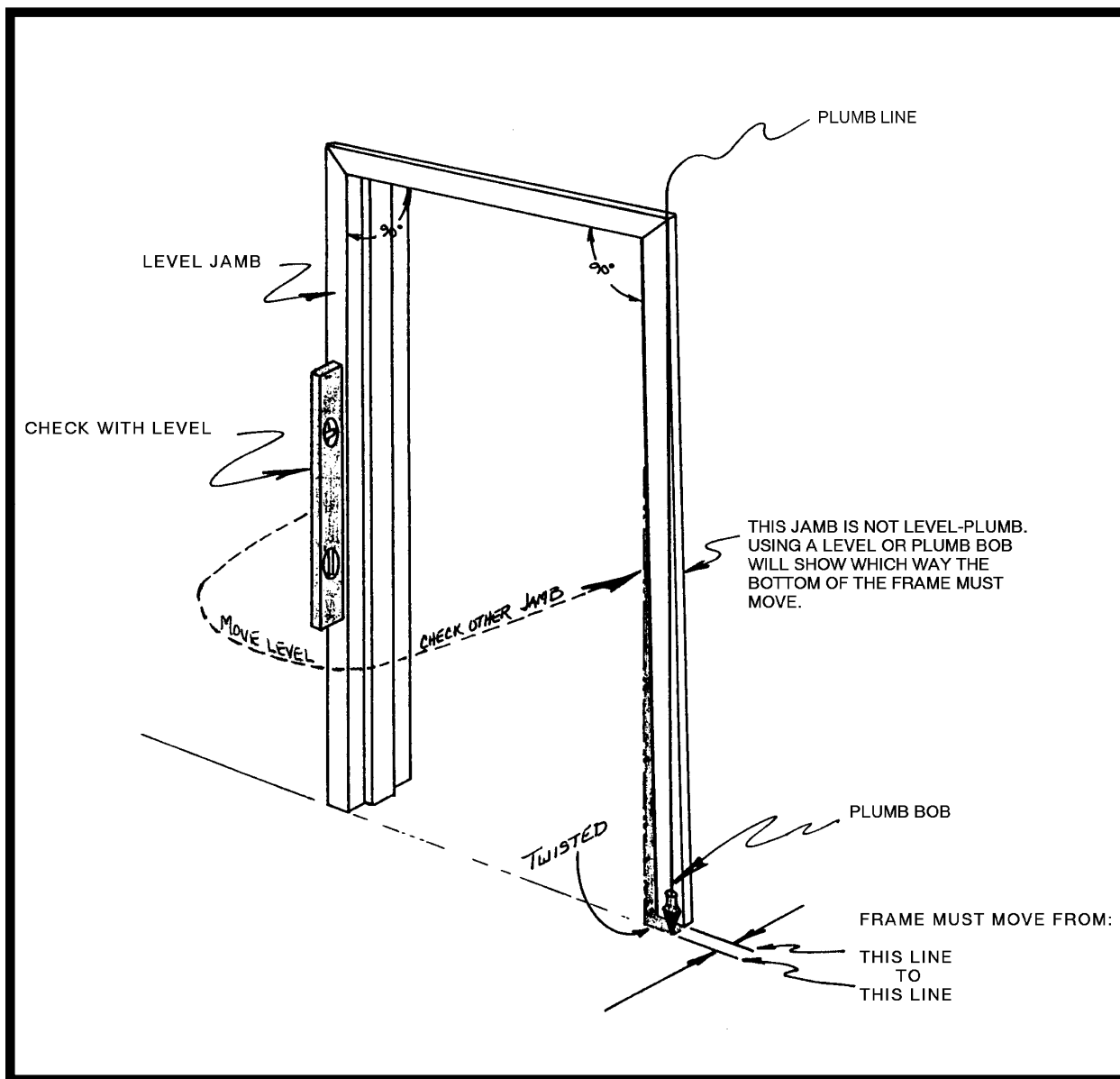


## TWISTED FRAME

In some instances, wall conditions and anchoring methods cause the frame to be “twisted” in the opening. The two jamb (hinge and strike) faces are not in the same imaginary plane as discussed in the twisted door section. Again, this can be checked by using a level and/or plumb bob. Remember, frames do not have adjustments when it comes to “twist.”

The “twist” condition is generally caused by the wall conditions. The frame jamb faces are prevented from being set in the same plane because the walls are out of plane to begin with.

The options available to correct this problem depend, to a large extent, on the wall construction.

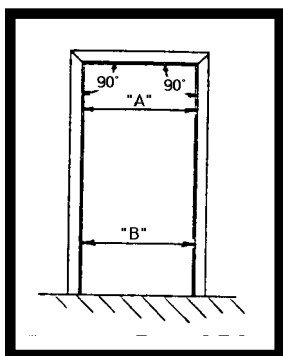


## **FRAME SET OUT OF SQUARE**

Proper frame installation cannot be over-emphasized. In the majority of wall constructions, except for the “slip-on” drywall type frames, “quick,” “easy” field fixes are limited. Improperly set frames which are drastically out of square will cause severe door and hardware problems. These types of situations would require extensive field repair and in most cases, the wall must be entered to gain access to the frame anchoring.

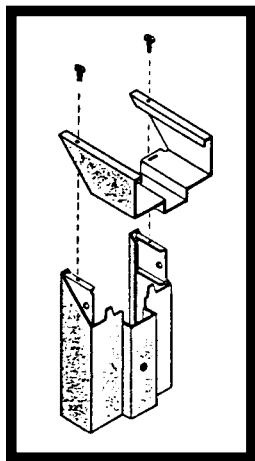
However, in some cases, the “out of square” condition is only a slight amount. In these cases, some adjustment can be made by shimming and/or adjusting anchors slightly if a slip-on drywall frame is being worked on.

The most versatile frame to work with in correcting these types of conditions is the “slip-on” drywall frame. The manufacturers instructions should be referenced, but generally most “slip-on” drywall frames have a sill anchor on each jamb as well as a compression anchor. The compression anchor is located at the top of each jamb generally between the top hinge and the header. Also, most jambs have corner clips which have a hole to accept a screw. The corner clip and hole align with a hole in the header. The adjustment of these frames can be made using these three items.



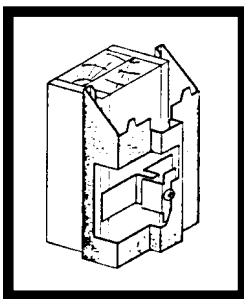
### **PROPERLY SET FRAME**

All corners are 90°. The dimension taken at Point “A” remains the same when checked at Point “B.” Both hinge and strike jambs are plumb and level.



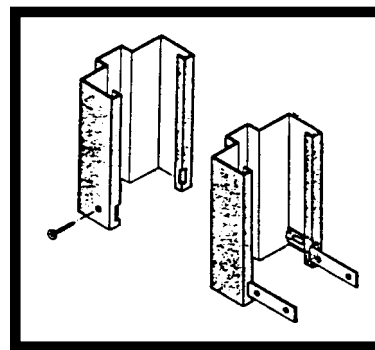
### **CORNER CLIP**

Header to jamb connection



### **COMPRESSION ANCHOR**

(Cut away view)

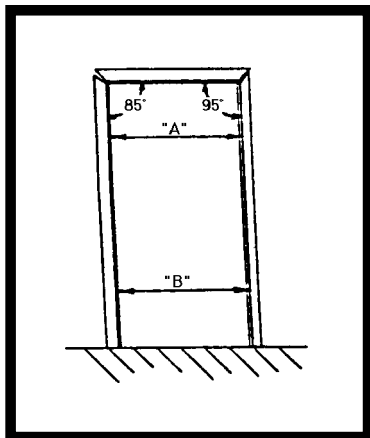


### **SILL ANCHORS**

Snap-in type or screw type

## FRAME SET OUT OF SQUARE

The following illustrations show some of the ways in which a frame can be set out of square.

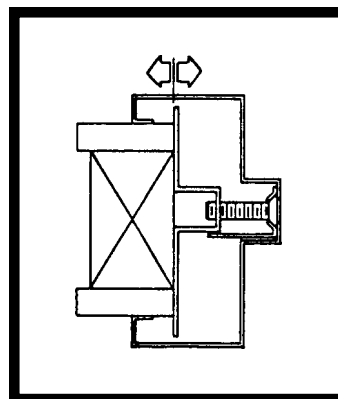
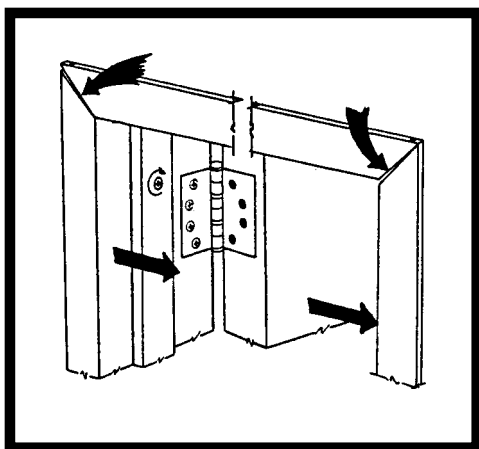


### IMPROPERLY SET FRAME

One corner is greater than 90° and one corner is less than 90°. The miters do not properly align with one another and “gaps” are created in the miters which are opposites of one another. The dimension taken at point “A” would remain the same when checked at point “B” if the 90° corners are out of square an equal number of degrees.

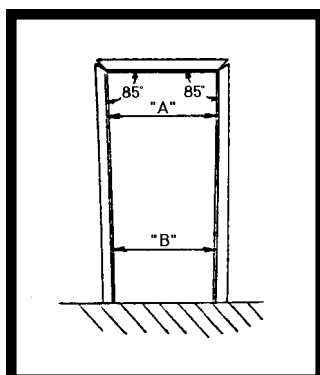
Generally, this condition can be corrected by adjusting the compression anchors in and/or out for each jamb as required. Loosen the corner clip screws if the frame is so equipped, before making adjustments, then retighten. The compression anchors must be adjusted (turned) in opposite directions to allow the jambs to move.

For the illustration shown, the strike jamb compression anchor screw must be turned counter-clockwise to retract the compression anchor and give room for the frame to be adjusted back into position using the hinge jamb compression anchor. The hinge jamb compression anchor screw is then turned clockwise to advance the anchor and push the frame towards the room made at the strike jamb. The frame should be brought into square with the header with the hinge jamb compression anchor. Once this is done, the strike jamb compression anchor screw can be turned clockwise, advancing the anchor snug against the stud. The corner clip screws should then be retightened.

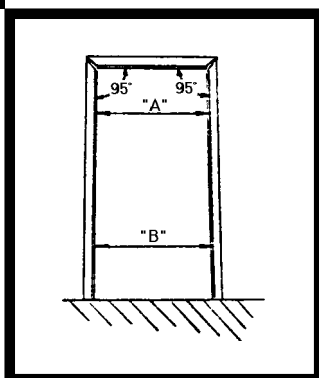




## FRAME SET OUT OF SQUARE



Jambs Toed In At Sill



Jambs Toed Out At Sill

### IMPROPERLY SET FRAME

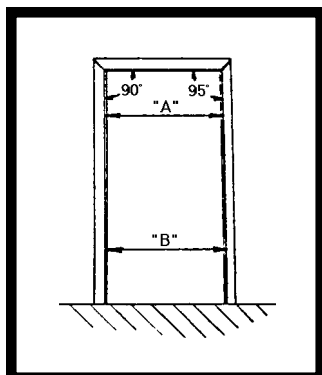
The corners are both greater than or less than 90°. The miters do not properly align with one another. When the corner is less than 90° the miter will have a gap which increases as it goes towards the return. When the corner is greater than 90° the miter will have a gap, which increases as it goes towards the rabbet. Dimensions taken at point "A" and "B" will be different. This condition will always result in dimension "B" being either greater than or less than the nominal opening dimension which would be obtained if checked between jambs along the header.

To correct this condition, the sill anchors must be loosened to allow the bottom of each jamb to be moved in and/or out. In the case of the snap-in type sill anchor, the baseboard trim might have to be removed to gain access to the anchors. This type of anchor is generally used because it can be hidden by covering it with the baseboard trim.

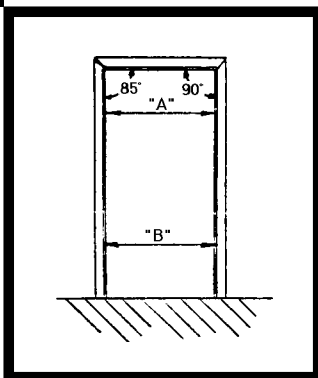
If the jambs are toed in at the sills, the compression anchors might have to be retracted slightly so the sill (base) of the jambs can be pushed out. The jambs should be plumbed, squared with the header and leveled as they are pushed out into their proper position. The sill anchors should be reset, the compression anchors adjusted and retightened. The baseboard trim should be reattached to the wall if it had been removed.

A similar procedure should be used if the jambs are toed out at the sills. The sill (base) of the jambs should be pushed in towards the opening. The jambs should be plumbed, squared with the header and leveled as they are pushed into their proper position. The sill anchors should be reset, the compression anchors adjusted (extended) and retightened. The baseboard trim should be reattached to the wall if it had been removed.

## FRAME SET OUT OF SQUARE



One Jamb Toed Out



One Jamb Toed In

### **IMPROPERLY SET FRAME**

One corner is properly set at 90° while the other corner is greater or less than 90°. The dimension taken at point "A" will constantly change when checked at various points going towards point "B." The corner miter will not properly align between the header and jamb which is not set at 90°.

The jamb which is not 90° to the header must be moved. To correct this condition, the sill anchor must be loosened to allow the bottom of the jamb to be moved in or out as required. In the case of the snap-in type sill anchor, the baseboard trim might have to be removed to gain access to the anchor. This type of anchor is generally used because it can be hidden by covering it with the baseboard trim.

If the jamb is toed in at the sill, the compression anchor might have to be retracted slightly so the sill (base) of the jamb can be pushed out. The jamb should be plumbed, squared with the header and leveled as it is being pushed out into its proper position. The sill anchor should be reset, the compression anchor adjusted and retightened. The baseboard trim should be reattached to the wall if it had been removed.

A similar procedure should be used if the jamb is toed out at the sill. The sill (base) of the jamb should be pushed in towards the opening. The jambs should be plumbed, squared with the header and leveled as it is pushed into its proper position. The sill anchor should be reset, the compression anchor adjusted (extended) and retightened. The baseboard trim should be reattached to the wall if it had been removed.

## **FRAME WITH RABBETS TOED IN OR OUT**

Once again, the importance of proper initial frame installation is evident in this condition. In the majority of wall constructions, except for the “slip-on” drywall type frames, “quick,” “easy” field fixes are limited. Improperly set frames which have the rabbets drastically toed in or out would require extensive field repair and in most cases require that the wall be entered to gain access to frame anchoring.

Generally, the toed in or out condition is at its worst near the floor. The header prevents the upper portion of the jambs from toeing in or out but as you move away from the header towards the floor, the jambs have greater potential to be toed in or out during installation.

The only frame with this condition which can be corrected with little difficulty is the “slip-on” drywall frame. Since the “slip-on” drywall frame uses only compression anchors near the head and sill anchors near the bottom of the jambs, this condition is easily corrected.

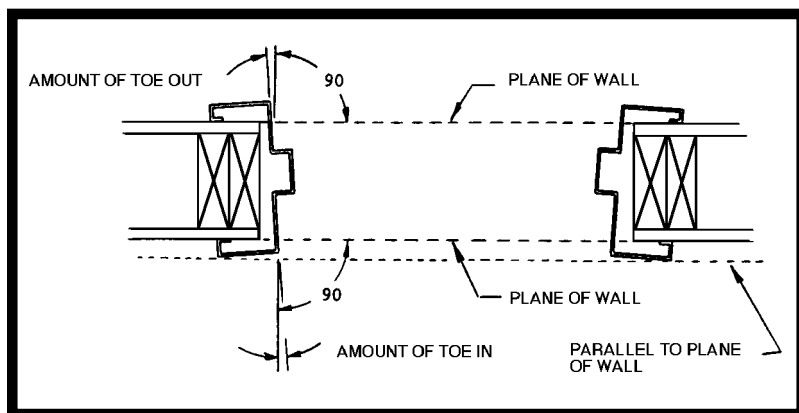


Figure 1

This shows a typical toed in or out condition. Note that the rabbet surfaces are not 90° to the plane of the wall. This can be checked by placing a straight edge across the face of both jambs.

The straight edge should set flat across both faces at the same time. If the jambs are twisted, a “gap” will be created as shown in figure 1.

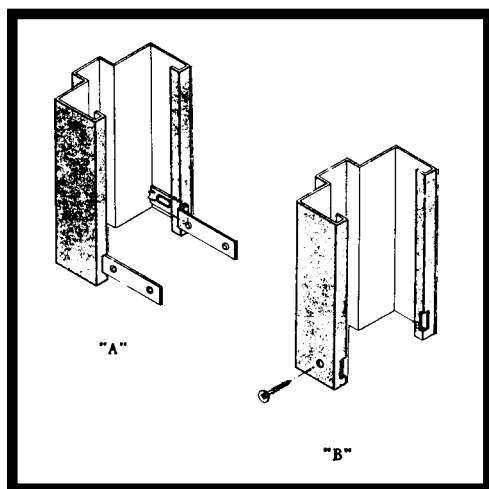


Figure 2

This shows the two typical types of sill anchors used on the “slip-on” drywall frame.

2A shows an anchor which gets covered up by the baseboard trim. To gain access to this anchor you first have to remove the baseboard trim. Next, the nails or screws holding the anchors to the wall should be removed. This will “free-up” the jamb and allow it to be “squared-up” in the opening. If both jambs are toed in/out, then they both should be “squared-up.” This can be checked by taking measurements as shown in figure 3. Both the “A” and “B” dimensions will be the same when the frames are properly set.

## **FRAME WITH RABBETS TOED IN OR OUT**

2B shows a screw which goes through the face of the frame into the wall. This holds the sill of the frame in position. This screw is exposed and is readily accessible. Removing the screw will “free-up” the jamb and allow it to be “squared-up” in the opening. If both jambs are toed in/out, then they both should be “squared-up.” This can be checked by taking measurements as shown in figure 3. Both the “A” and “B” dimensions will be the same when the frames are properly set. However, it must be remembered that the frame jambs must be plumb, level and square with the head of the frame.

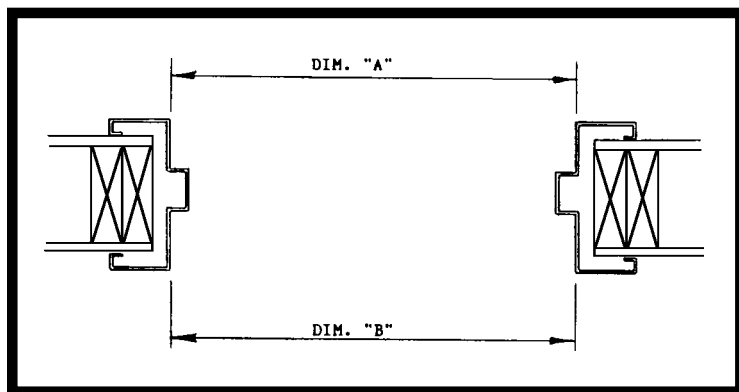


Figure 3

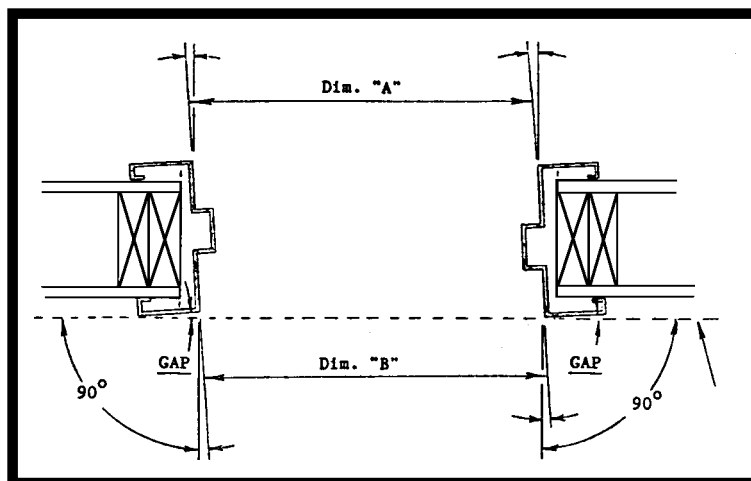


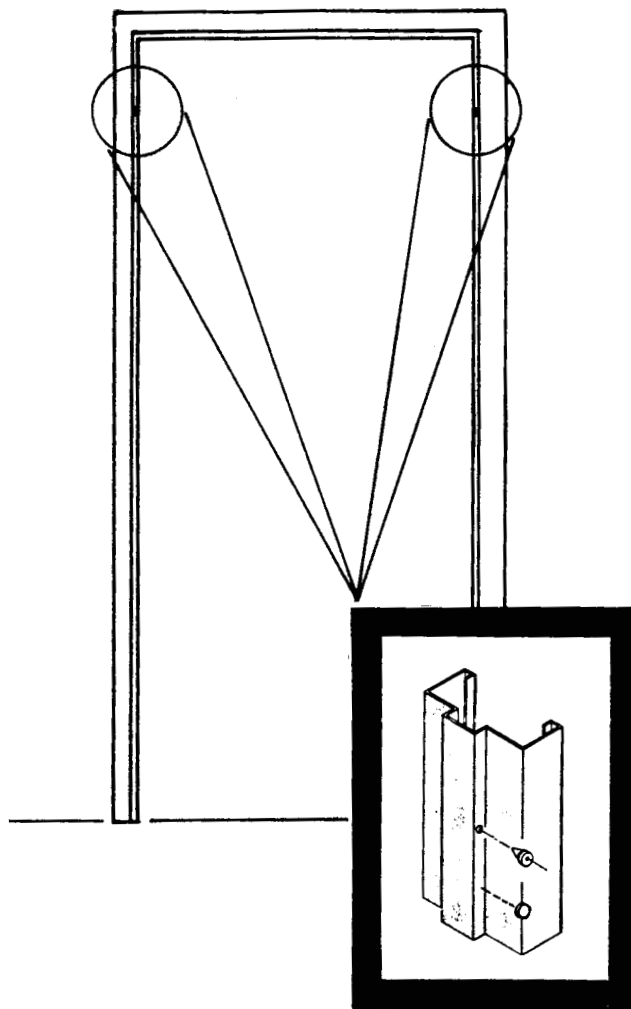
Figure 4

Figure 4 shows a condition which can give the impression that the frame is properly installed. Both dimensions “A” and “B” will be equal but the frame will not be square in the opening. Both jambs can be twisted to create a parallelogram. This can be checked by placing a straight edge across the face of both jambs (the straight edge is represented by the dotted line in figure 4). The straight edge should set flat across both faces at the same time. If the jambs are twisted, a “gap” will be created as shown in figure 4. The “gaps” will be to the same side if a parallelogram was created. The gaps could also be to opposite sides as shown in figure 1.

This condition can be corrected as outlined for the other “toe out” or “toe in” examples.

## **MUTES**

Were mutes intended to be applied to the frames stop? Some manufacturers provide a mute hole in the frame stop to accept a push-in mute. A “stick-on” mute is also available for application to frames without the mute hole. The mute acts as a “rubber bumper” which evenly holds the door off the stop at a constant distance. If the door is held off of the stop rather than being allowed to move slightly towards the stop, the latch tube will fit tighter into the strike. Generally; three mutes are placed on the strike jamb, one towards the top of the jamb (nearer the header) and one towards the bottom of the jamb (nearer the sill) and the third near the strike preparation.

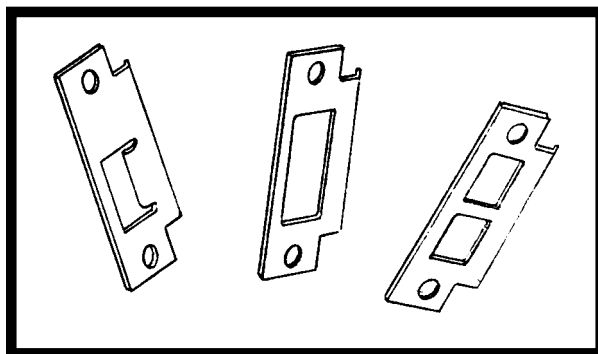


## **LOCK FITS LOOSE ON STRIKE**

This condition cannot be caused by an improperly set door and/or frame. If the lockset on the door was not properly aligned with the strike on the frame, an interference would occur or the latch bolt would bind in the strike. Since this is not the case, the cause is something other than improper installation. The following items should be checked:

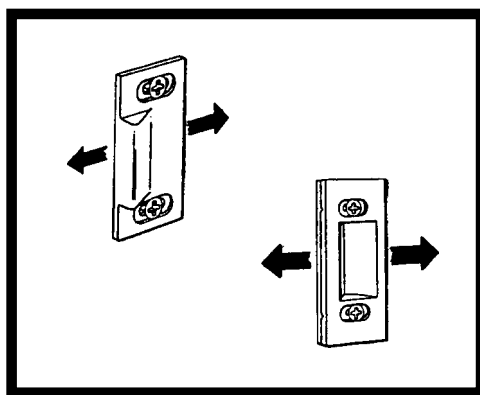
### **PROPER STRIKE**

Is the proper strike plate attached to the frame?



### **RIM EXIT DEVICES**

Generally an adjustable strike plate is provided. Is the strike plate properly adjusted to provide positive and secure latching?



## **LOCK FITS TOO TIGHT IN STRIKE**

Once again, proper installation of the door and frame are essential. If the door and frame are not properly aligned, the latch bolt could bind in the strike. The following items should be checked:

### **DOOR SAG**

For various conditions of door sag, refer to page 3.

### **HINGE BIND**

For various conditions of hinge bind, refer to page 5.

### **TWISTED DOOR**

For various conditions of twisted doors, refer to page 7.

### **TWISTED FRAME**

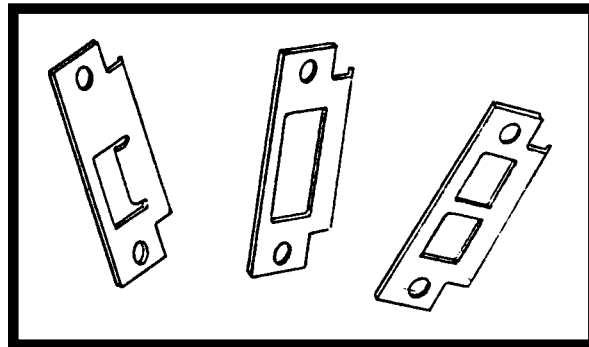
For various conditions of twisted frames, refer to page 9.

### **FRAME SET OUT OF SQUARE**

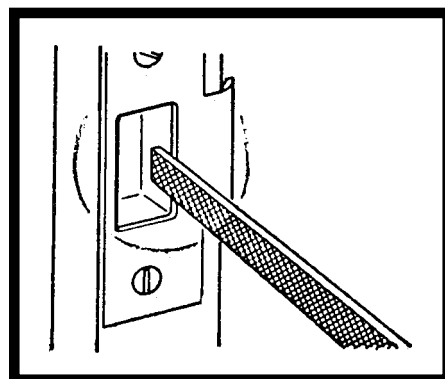
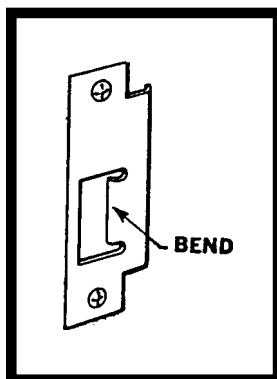
For various conditions of frames set out of square, refer to page 10.

### **PROPER STRIKE**

Is the proper strike plate attached to the frame?



The previously mentioned items should be checked and any problems found corrected. If the latch continues to tightly engage the strike, additional clearance can be created by filing the strike or bending the latch bolt lip as shown. However, this should only be done as a final option.



## **LOCKSET OFF LOCATION ON DOOR** **STRIKE OFF LOCATION IN FRAME IN WALL**

Minor location adjustments usually can be accomplished by altering the strike plate. The strike plate alteration would "extend" the opening to allow the latchtube to properly engage the strike. This is similar to the section which covers "Lock Fits Too Tight in Strike" except that the amount of material removed from the strike is greater. This could compensate for minor mislocation of the strike plate on the frame and/or location of the lockset on the door. These general steps should be followed for modifying the strike plate.

\*Mark the area on the strike plate which must be removed.

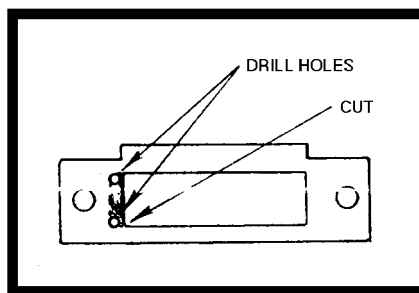
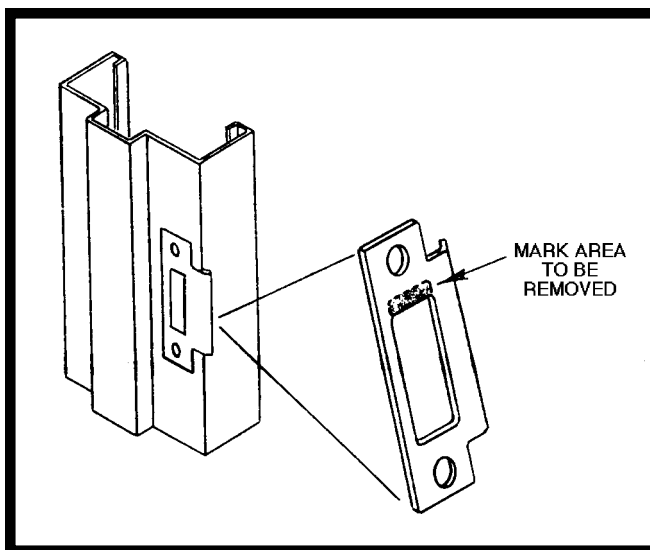
\*Remove strike plate from frame.

\*Center punch corners of area to be removed and drill a 1/8" diameter hole in each corner.

\*Use a sabre saw and cut from the existing opening up to the 1/8" diameter holes. The remaining material between the two 1/8" holes should be filed away.

\*Dress off all rough edges and corners with a file. This must be done since any irregular edges or edges with burrs could cause the latch tube to "drag" or "hang-up" in the strike plate.

\*Reassemble strike plate to frame and check alignment with lockset on door as well as latchtube function in and out of strike plate.



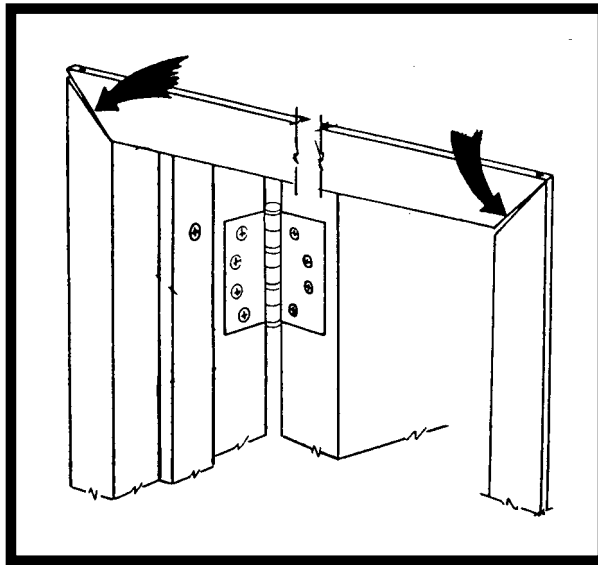
**UNDER NO CIRCUMSTANCE SHOULD MODIFICATIONS BE MADE TO HARDWARE ON FIRE RATED-LABELED DOORS AND FRAMES.**



## **MITER NOT CLOSED ON FRAME**

The major cause of miters not properly lining up and “closing” is incorrect installation. The effects of improper installation on the miter seams is covered under the previous section of “Frame Set Out of Square.” This section should be referenced for detailed explanations of conditions which could occur along with alternatives for correcting the problems.

This condition could also be caused by conditions as explained in the “Frame Loose on Drywall” Section, figures 5 and 6.



## **CLEARANCE AT BOTTOM OF DOOR TOO SMALL**

Usually the available options for correcting this problem are limited. Frames which are permanently anchored to the wall construction (such as masonry or steel stud) leave few alternatives. In most cases the only available “fix” is to trim the bottom of the door. In some cases, even trimming the bottom of the door is not possible since the door’s construction will not permit trimming. As can be seen in figure 1, the nominal “sill clearance” should be  $\frac{3}{4}$  of an inch. The  $\frac{3}{4}$  of an inch is the dimension from the bottom of the door to the bottom of the frame jambs. This is a standard dimension which is industry-wide.

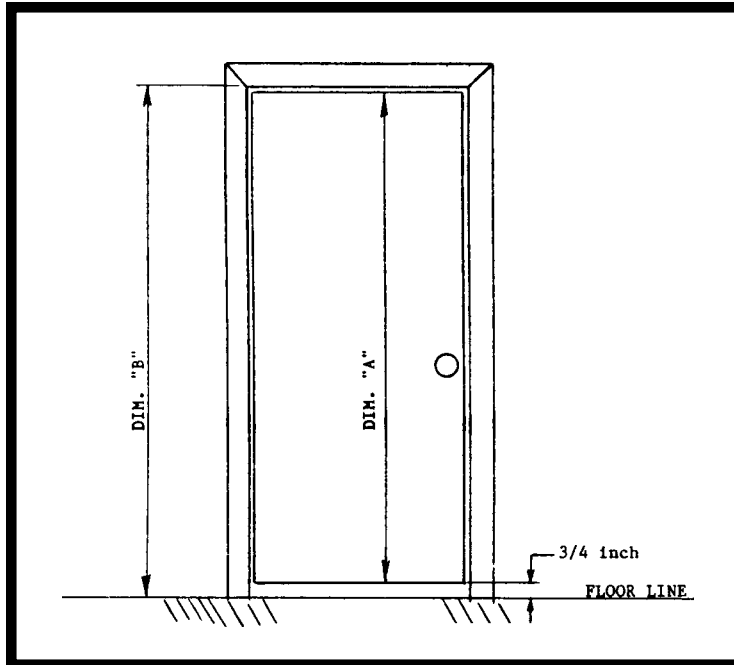


Figure 1

The frame jambs should be “set” at floor level which then results in  $\frac{3}{4}$  of an inch between the bottom of the door and floor.

The  $\frac{3}{4}$  of an inch also provides enough room to allow the installation of a “raised sill” which is a type of flat threshold. If a raised sill is used, the  $\frac{3}{4}$  inch clearance is decreased to generally  $\frac{3}{8}$  of an inch.

Before any alterations are made some basic dimensions should be checked.

Is the door the correct height? The door height is determined by taking a measurement represented by dimension “A” in figure 1. If the door height is “oversize” the clearance at the bottom will be too small.

Are the frame jambs the correct height? The frame jamb height (which is the same as the opening height) is determined by taking a measurement represented by dimension “B” in figure 1. If the jamb height is “undersize,” the clearance at the bottom will be too small.

Are the bottom of the frame jambs set on the floor? The jambs should be set “on” the floor not “in” the floor. In some special cases the jambs can be actually set “in” the floor BUT this requires special design consideration and adjustments in door height and jamb heights. If this was not compensated for in the designed heights, the clearance at the bottom could be too small.

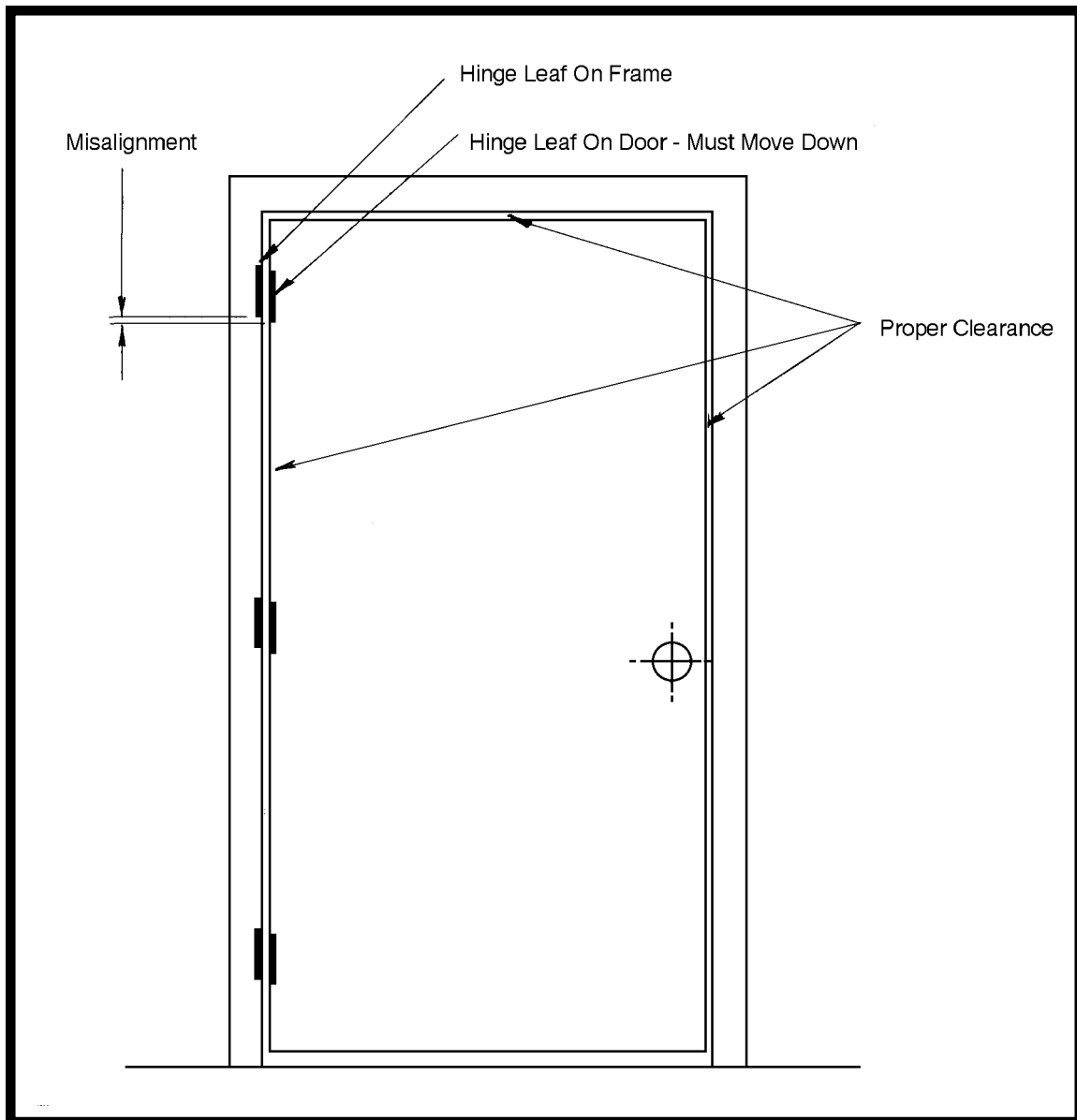
By taking these basic dimensions, you can confirm what element of the opening is in error. If trimming the bottom of the door is considered, you must make sure that the door’s design will allow such a modification to be made. Generally it is best to contact the distributor or the manufacturer to determine if and how much the door can be trimmed. In some cases, the trimming can be relatively easy. In other cases, due to the door design, the modification could be rather extensive.

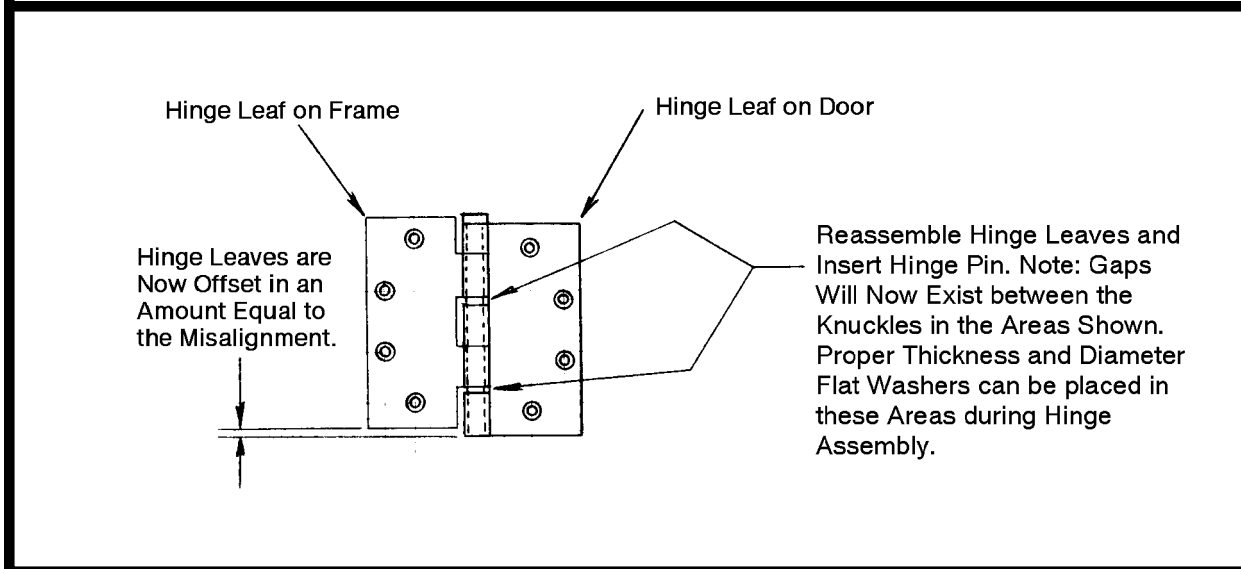
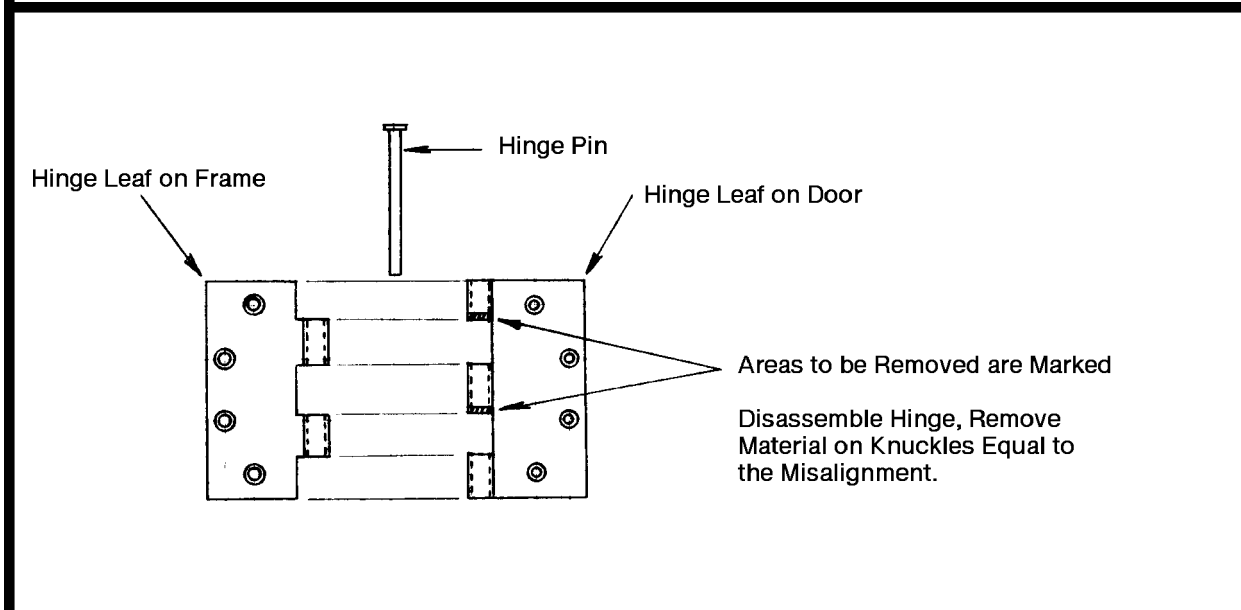
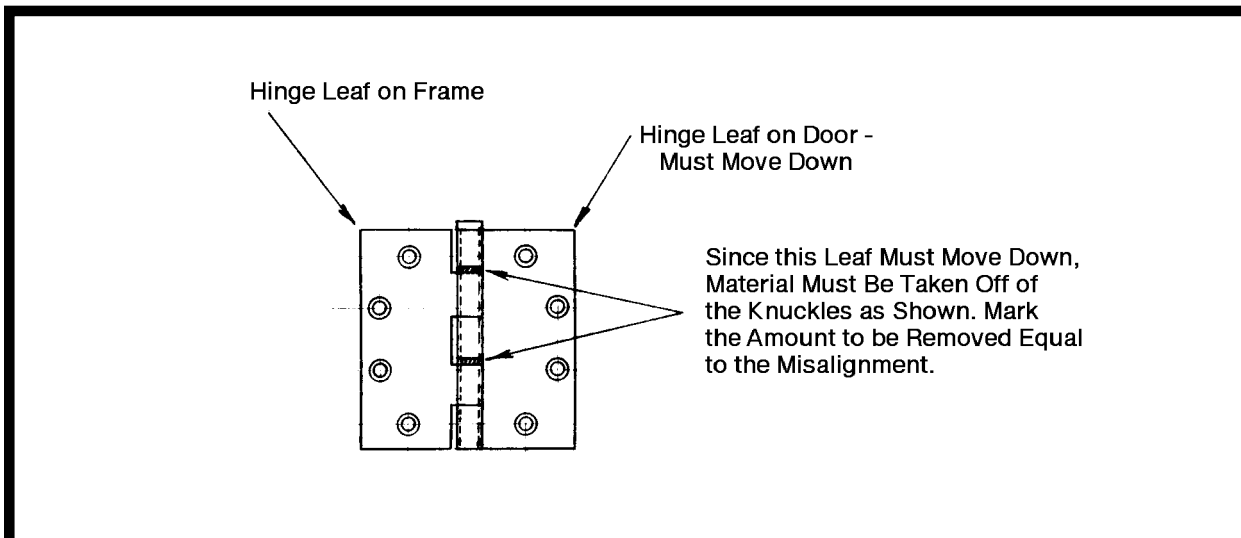
**UNDER NO CIRCUMSTANCES SHOULD MODIFICATIONS BE MADE TO FIRE RATED-LABELED DOORS AND FRAMES.**

## **FRAME AND DOOR HINGE MISALIGNMENT**

Frame and door hinge misalignment can cause a variety of problems. When misalignment occurs, it is obvious that either the door's hinge locations or frame's hinge locations are slightly off. This can apply to retrofitting existing openings where either the door or frame is being replaced, but not both. Generally when new product, both doors and frames, are provided from a single manufacturer, this problem does not exist.

The example shown reflects the dropping of the hinge leaf which attaches to the door from its relationship to the hinge leaf on the frame. However, by removing material from the opposite end of the knuckles, the door hinge leaf could be raised as well. The frame hinge leaf can also be relocated in similar fashion.





## **FRAME LOOSE ON DRYWALL**

Frame manufacturers closely control the dimensions which their frames are manufactured to. Since automated equipment is used, these dimensions are easily repeated from piece to piece. The majority of cases will reveal that the overall wall thickness has not been properly maintained. Wall thickness conditions can easily vary from undersize to oversize. The thickness should be checked, if possible, to verify the wall's compliance with the Job Specification.

Frames installed in drywall walls can use two different anchoring methods as follows

### **WELDED OR SNAP-IN STEEL OR WOOD STUD ANCHORS**

Some frames use welded or snapped in steel or wood stud anchors. These frames are installed prior to the drywall material being attached to the studs. In this case, the drywall can either be "butted-up" against the return of the frame or be "tucked in" behind the return of the frame. Only in the installation where the drywall is "tucked in" behind the return can there be a condition where the frame is loose on the drywall. Refer to figure 1 and figure 2. This gap could be uniform along the entire length (height) of the jamb or could be only in certain areas. Since the frame cannot be removed, the only available options are to caulk the gap or cover it with trim.

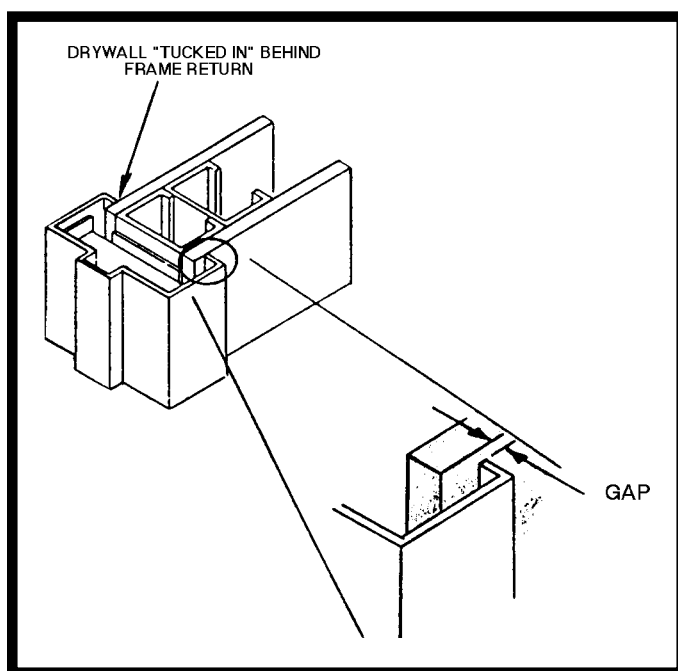


Figure 1

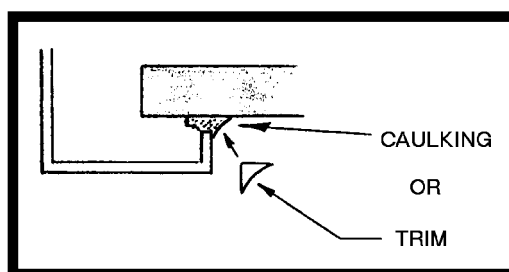


Figure 2

## **FRAME LOOSE ON DRYWALL**

### **DRYWALL FRAMES WITH COMPRESSION ANCHORS**

These frames are intended to be installed after the wall construction is completed. Therefore, the anchoring methods that this type of frame uses allows the removal of the frame if so desired. As always, the manufacturers installation instructions should be followed anytime the frame is removed and reinstalled. Three conditions could possibly exist for drywall slip-on frames which are "loose on the wall."

- A) The first is a uniform gap along the entire length (height) of the frame jambs. The frame should be removed from the opening and the wall thickness checked at numerous places around the opening. Refer to figure 3. These measurements should be compared to the Job Specifications. If the wall thickness is undersize, several options are available.
- I) If the gap is relatively small, the use of caulking or trim can be considered to cover the gap when the frame is installed.
  - II) If the gap is larger, the use of "spacers" can offset the lacking wall thickness. Refer to figure 4. The use of the "spacer" requires that the frame be removed from the opening, the spacer(s) attached and the frame reinstalled. The spacers can be used on either one or both of the frame returns which would result in spacers on either one side or both sides of the wall. These spacers are readily available from the frame manufacturer.

**NOTE:** Spacers are not to be used on labeled fire door frames.

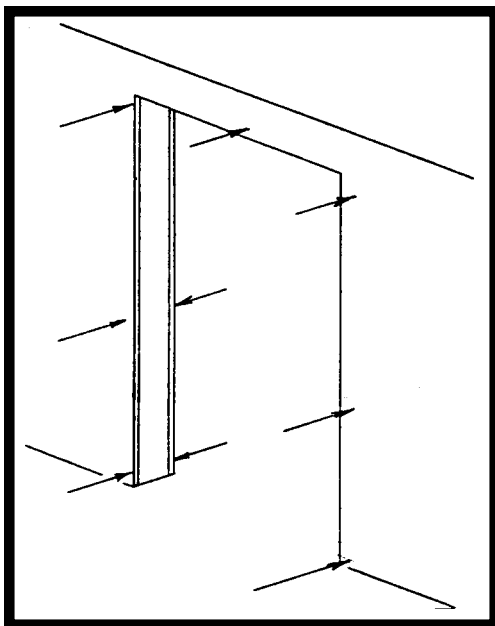


Figure 3

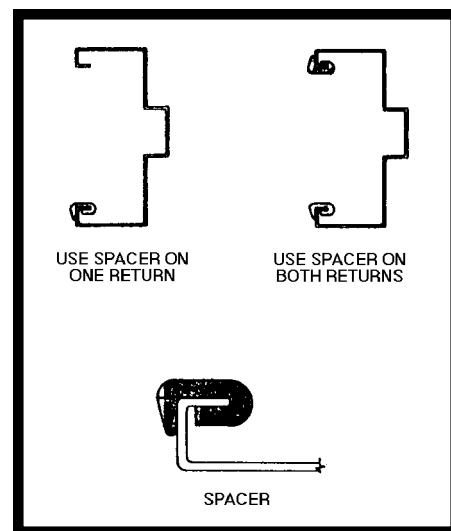


Figure 4

## FRAME LOOSE ON DRYWALL

- B) The second condition would be a gap that changes along the length (height) of the jamb. This condition is generally found in steel stud construction and results in "over thick" walls in the upper corners of the opening, refer to figure 5. This is generally a direct result of how the steel stud headers were attached to the vertical steel studs to form the opening.\* When the wall is oversize in this area it will force the header and jamb miters to spread apart and actually open up the throat dimensions to accept the oversize wall, refer to figure 6. This will cause the corners of the frame to be extremely tight on the wall and as you progress down the jamb, a gap will begin to develop and then gradually disappear as you get closer to the floor, refer to figure 7.

\* Extra thickness of the wall at the corners of the opening is caused by the attempt to "nest" the steel studs of equal dimensions.

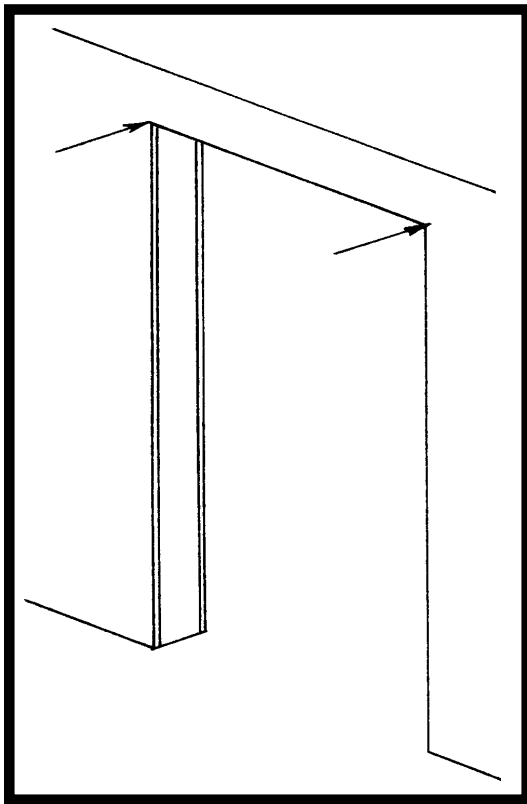


Figure 5

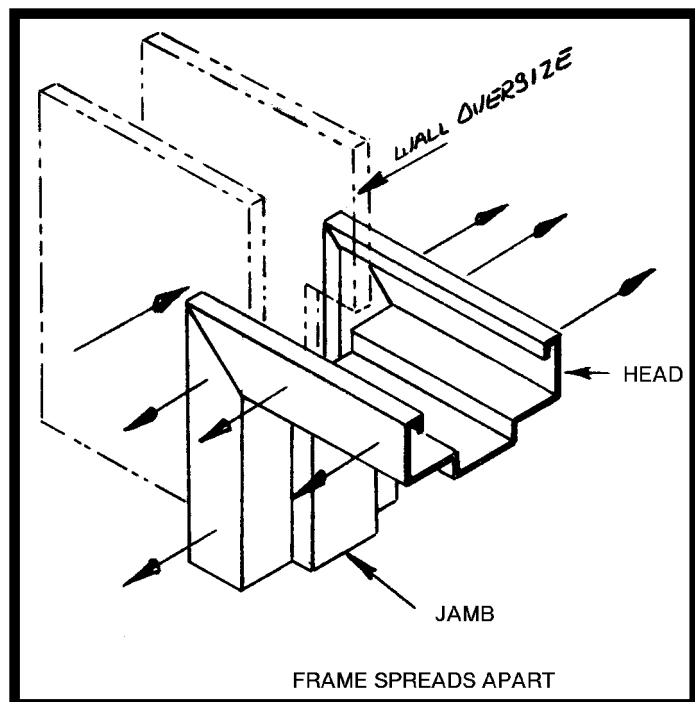


Figure 6

## FRAME LOOSE ON DRYWALL

This condition should be reported to the appropriate jobsite personnel. The condition can be corrected by putting a bearing plate on each side of the corner and compressing the internal steel studs with a clamp, refer to figure 8. However, the responsibility for correcting this condition belongs to the subcontractor responsible for the actual wall construction.

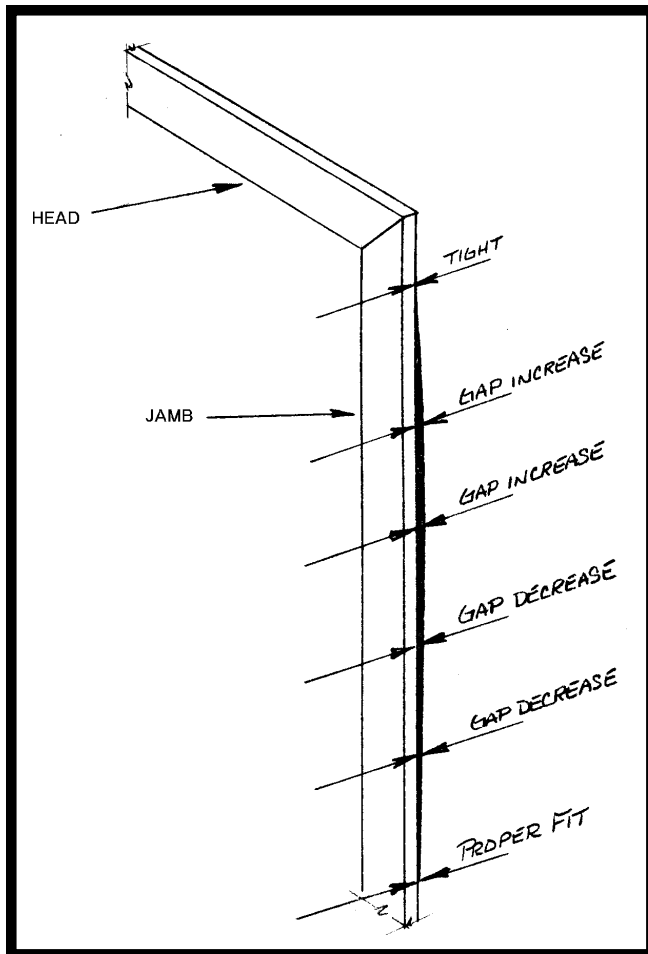


Figure 7

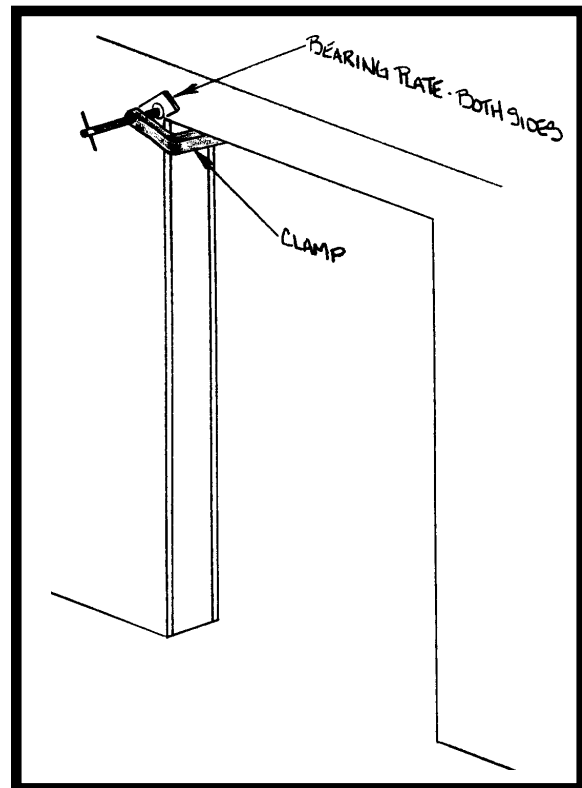


Figure 8

- C) The third condition is different from the first two which talk about the “fit” of the frame over the wall thickness. The third condition is that of compression anchors which have not been tightened. The drywall frame would then be loose across the width of the opening and move from side to side against the rough opening.

The frame should be plumbed, square and secure in the opening by properly adjusting the compression anchors following the manufacturers instructions.



## **LABEL LEFT OFF FIRE RATED DOOR**

Fire rated doors are an important element of compliance with Building Codes and Fire Protection Standards. Consequently, proper control of the labels which are attached to the doors is top priority for the manufacturer, code official and labeling agency. The manufacturer must account for every label used and the label can only be applied at the manufacturer's facility or at an authorized distributor of the manufacturer. These are the only places at which a label can be affixed to product. Once the product is in the field, whether it's installed or not, even the manufacturer is not allowed to attach labels unless a representative of the labeling agency has inspected the product for compliance with the manufacturer's procedures. So as you can see, not just anyone can attach labels to doors in the field and not just anyone can be in possession of fire rating labels. Only authorized individuals can be in possession of and attach labels to fire rated products in the field. Anything other than this is ILLEGAL!

All labels on fire rated doors are located in the same place. Be sure you are looking for the label in the right location. The label will be located on the hinge edge of the door between the top and middle hinge, refer to figure 1.

If the label is not present, you should contact the distributor who provided the door. He in turn, will initiate the appropriate action to correct the missing label problem.

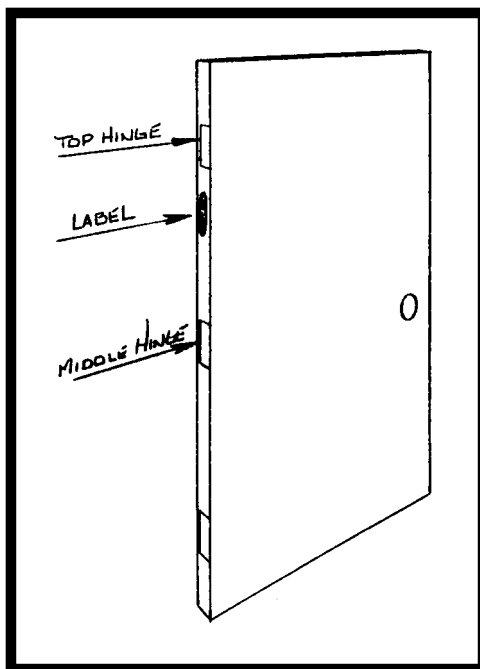


Figure 1

## **LABEL LEFT OFF OF FIRE RATED FRAME**

Just as doors, fire rated frames are an important element of compliance with Building Codes and Fire Protection Standards. Consequently, proper control of the labels which are attached to the frame is top priority for the manufacturer, code official and labeling agency. The manufacturer must account for every label used and the label can only be applied at the manufacturer's facility or at an authorized distributor of the manufacturer. These are the only places at which a label can be affixed to the product by the manufacturer. Once the product is in the field, whether it is installed or not, even the manufacturer is not allowed to attach labels unless a representative of the labeling agency has inspected the product for compliance with the manufacturer's procedures. So as you can see, not just anyone can attach labels to frames in the field and not just anyone can be in possession of fire rating labels. Only authorized individuals can be in possession of and attach labels to fire rated products in the field. Anything other than this is ILLEGAL!

All labels on fire rated frames are located in the same place. However, it should be noted that some frames have an embossed label, rather than the surface attached label. The embossed label is actually "stamped" into the frame rabbet. Whether the label is surface attached or embossed, it is located in the same place, on the hinge jamb between the top and middle hinge, refer to figure 1.

If the label or embossment is not present, you should contact the distributor who provided the frame. He in turn, will initiate the appropriate action to correct the missing label problem.

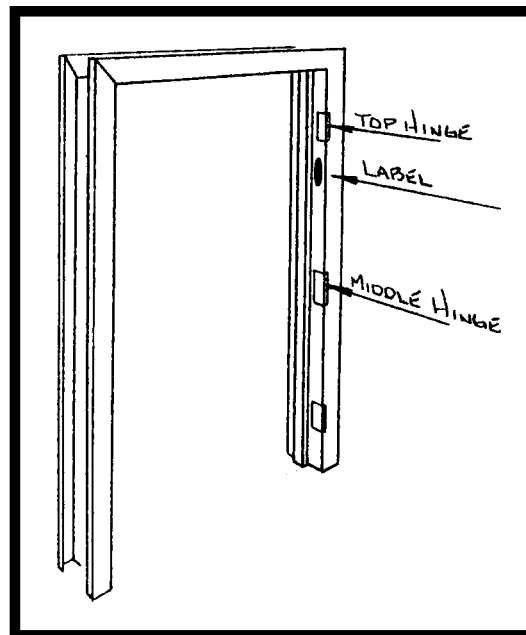


Figure 1

## **PAINT PROBLEMS**

### **PAINT PEELING TO BARE METAL**

Two conditions exist which must be considered when evaluating paint peeling to bare metal.

#### **PRIME PAINT ONLY**

If the product is only prime painted, then poor adhesion between the primer and bare metal has occurred. This can usually be attributed to inadequate surface preparation before prime painting. The bare metal must be adequately prepared to ensure good prime paint adhesion.

The door should be completely sanded, washed with an appropriate solvent and re-primed. The sanding and washing operations should provide an adequate surface to assure good primer adhesion.

#### **PRIME PAINT AND TOP (FINISH) COAT**

The failure could be caused by either poor surface preparation before prime painting or the use of a noncompatible finish paint which has reacted with the primer and lifted all paint to bare metal. In either case the corrective measures would be the same. The door should be completely sanded and washed with an appropriate solvent. The door should then be re-prime painted. Lightly sand the prime coat, wipe and finish paint with a compatible top coat.

In all cases, when the door is being prepared for top, finish coat painting, the surface should be cleaned. Use the same solvent that will be used to thin topcoat paint and thoroughly clean all surfaces to be painted.

### **PAINT IN TAPPED HOLES**

Both hollow metal doors and frames have various holes which are drilled and tapped. These holes are in various components such as reinforcements. All of the components are brought together as an assembly prior to the painting operation.

There are a variety of painting methods which manufacturers can use. Some of these methods could result in a paint buildup in the tapped holes of the reinforcements. The buildup could, occasionally, make installation of the screw difficult. The buildup should be removed to make screw instal-

lation easier and assure that the screws are properly seated.

The best method of cleaning the tapped holes is to use an actual thread tap which matches the screw thread. It will easily cut through and clean the paint buildup by simply running the tap in and out of the hole. If the buildup is not as great and extra screws are available (or can be obtained) the screw can be run in and out of the hole to clean minor buildup prior to final screw installation.

### **WATER STAIN DAMAGE**

Water stain damage is a direct result of improper storage of prime painted products. If the product is still in prime paint (no finish coat has been applied) the condition is easily detectable as follows:

- \* Initially the water stain appears as a discoloration or variance in sheen or gloss in the primer. A specific area or areas can be distinctly noticed which look and possibly feel different from the rest of the product.
- \* If the water stain has existed for a considerable length of time and was caused by enough amounts of water, rust will start to appear through the discolored areas.

If the product has had a finish coat of paint applied, water stain damage can cause failure of the finish coat as well.

- \* This condition can be detected by finish paint failure randomly on the door as well as the appearance of uniform rust development in those areas. In some cases the finish paint will show good adhesion in those areas but will also show a uniform layer of rust developing through the finish paint.

These conditions can be attributed to improperly stored prime painted products which were exposed to water.

- \* For products which are prime painted only, the affected areas should be adequately sanded. If necessary the area should be sanded to bare metal. The entire door/frame surface should then be lightly sanded and "feathered" into any heavily sanded areas. The entire surface should then be re-prime painted.

## **PAIN T PROBLEMS**

- \* For products which are finish painted, the affected areas should be adequately sanded. If necessary the area should be sanded to bare metal. The entire remaining finish painted area should then be lightly sanded and "feathered" into any heavily sanded areas. If bare metal is showing these areas should be re-prime painted and lightly sanded to "feather" into the lightly sanded finish painted areas. The product should then be re-finish painted.
- \*\* In all cases, when the door is being prepared for top, finish coat painting, the surface should be cleaned. Use the same solvent that will be used to thin topcoat paint and thoroughly clean all surfaces to be painted.

## **THERMAL BOW**

Installers should be aware of a condition known as Thermal Bow. Thermal Bow is a temporary condition which may occur in metal doors due to the inside-outside temperature differential. This is more common when the direct rays of the sun are on a door surface. This condition is temporary, and to a

great extent depends on the door color, door construction, length of exposure, temperature, etc. This condition can often be alleviated by painting the exposed surface a light color. In some cases of extreme cold, this condition may occur in reverse.

