Components of a Pre-hung Door Unit

Section two

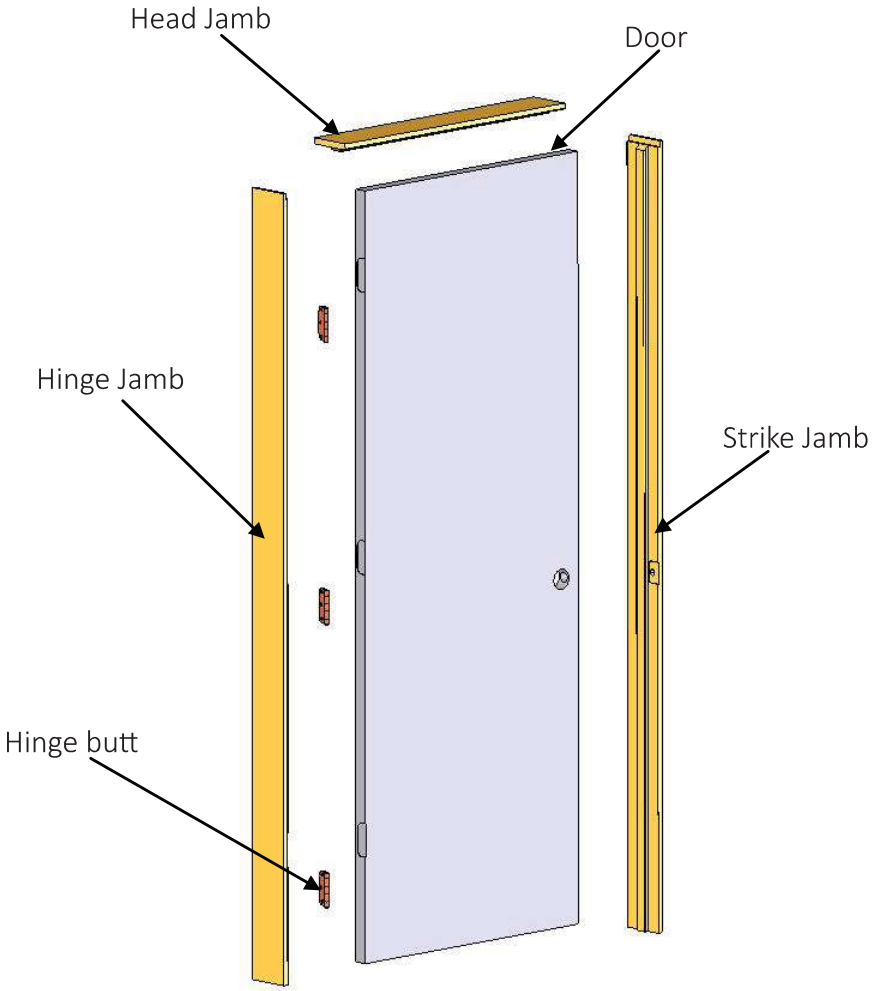
COMPONENTS OF A TYPICAL PRE-HUNG DOOR

The drawing on the following page illustrates the components of a typical pre-hung door. All pre-hung door units, whether interior or exterior, consist of at least these basic components:

- Door
- Head jamb (header)
- Hinge jamb
- Strike jamb
- Hinge butts

The door is attached to the hinge jamb with hinges. Lock and latch hardware is not generally considered part of the pre-hung door as it is installed after the unit has been installed in the opening. In addition to these components, some units will include casing on one or both sides and exterior units can have a sill installed.

In general terms, if a door unit is assembled when it is shipped from the manufacturer to its destination, it is referred to as a "pre-hung door." If the components are machined but not assembled when shipped, it is known as a K.D. ("knock-down") unit.



DOOR HAND

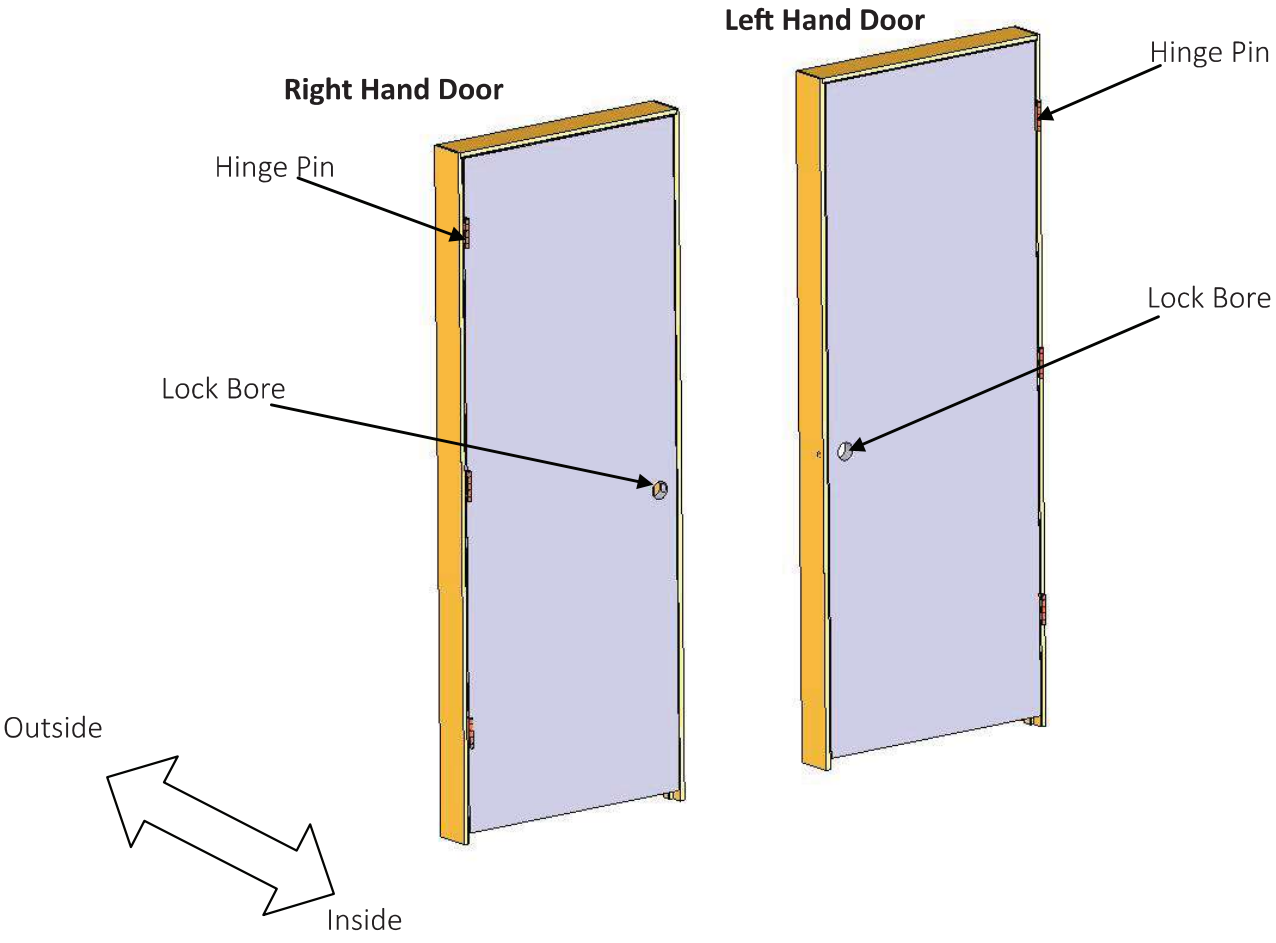
All doors are denoted by the direction of their swing, or their "hand." Before a door can be hung, its swing must be known.

Currently, there are two methods used to determine the hand of a door. The first method, the one most straightforward and commonly used, designates the door simply as Right Hand (RH) or Left Hand (LH). To determine the swing of the door, simply face the hinge pin side of the door and note the location of the door knob. If the knob is to the left, it is a Left Hand door. If the knob is to the right, it is a Right Hand door.

The other method currently in use designates the door as either Right Hand Reverse (RHR) or Left Hand Reverse (LHR). To determine the swing of the door in this method, face the outside of the door. The outside is the street side of an entrance door, the corridor (hall) side of a room door, or the side opposite the hinge pins on a communicating door (a door that connects two rooms). If the door opens toward you and the hinges are on the left, it is a Left Hand Reverse. If the hinges are on the right, it is a Right Hand Reverse.

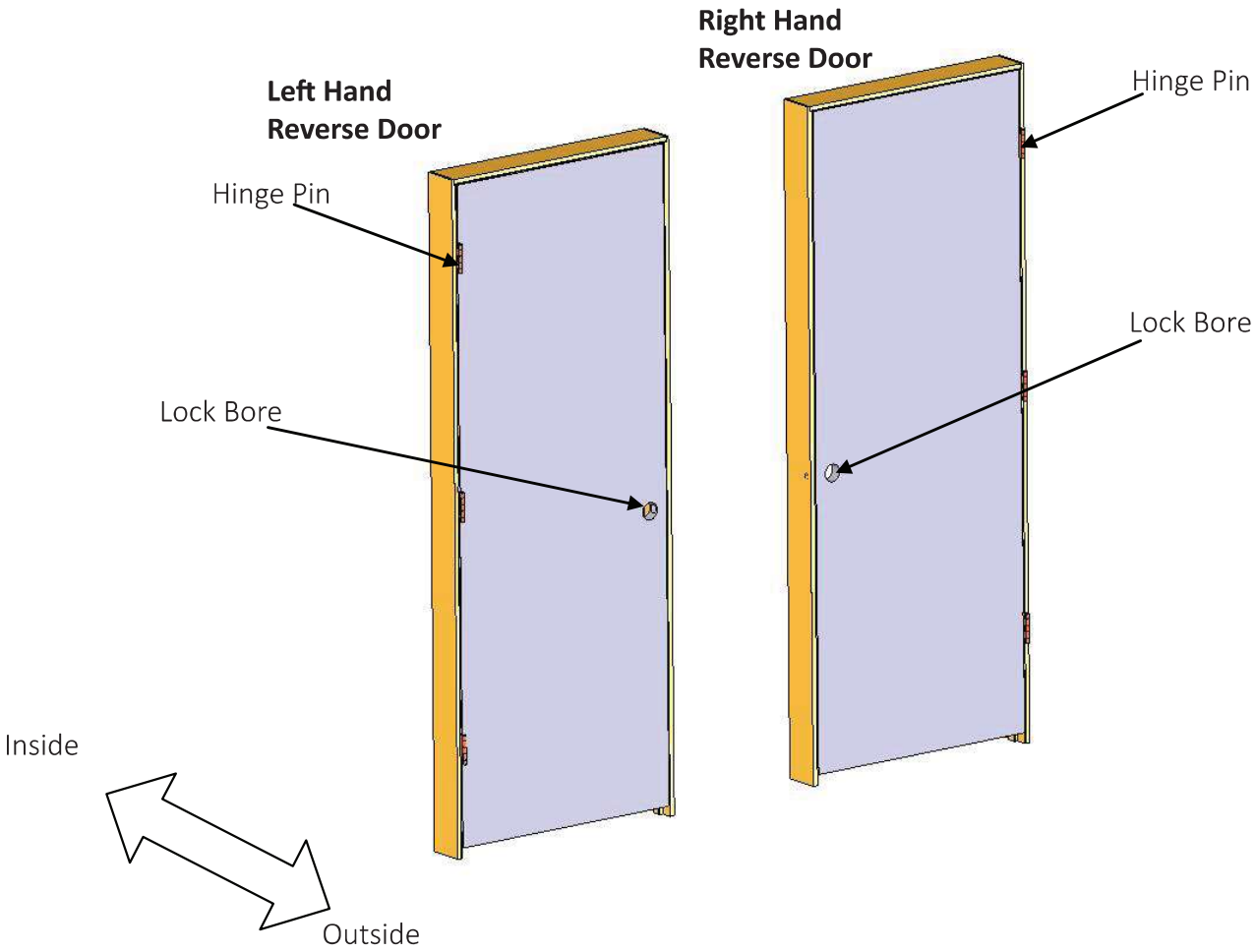
Although both methods are equally accurate and achieve the required results, the first system is preferred. Before hanging a door, make sure that all concerned agree on the method that will be used. This will prevent confusion down the line when the pre-hung doors are actually being installed.

Standard Door Swings



Standard Door Swings for “Out Swing” Doors

By Switching inside to outside orientation of door, swinging out rather than in, the hand is called reversed.

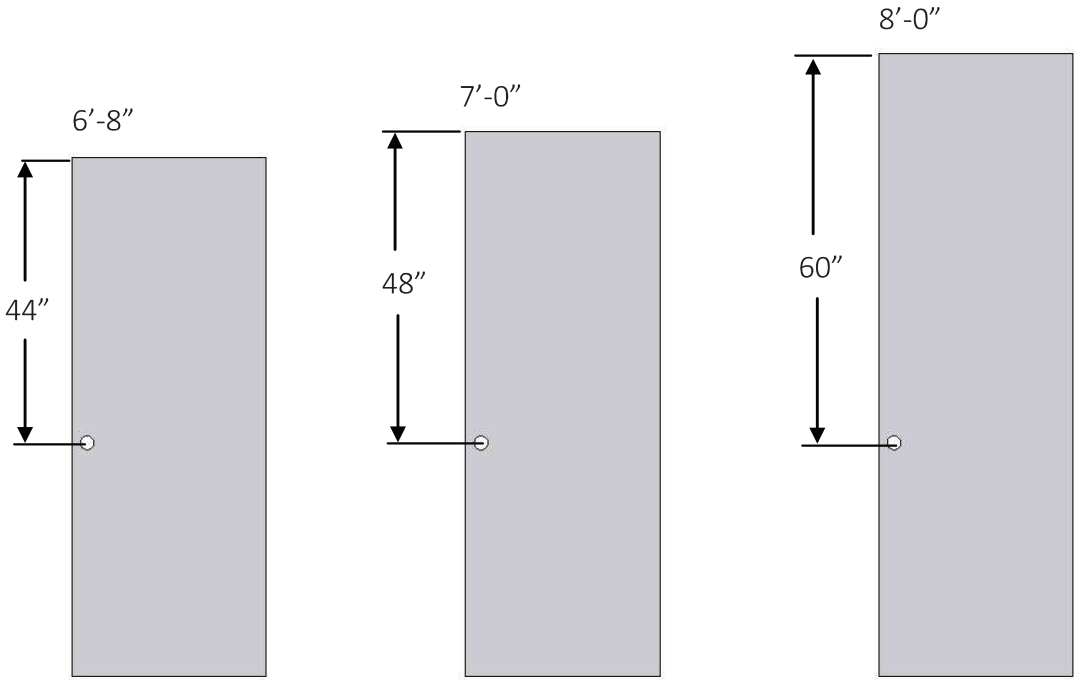


LOCK HEIGHT

Lock height is the distance from the top of the door to the center of the lock bore. Normal lock heights are 44" and 40" on 6'8" doors and 48" on 7'0" doors, 60" on 8'0" doors.

Because of variation in door length (i.e., doors are not necessarily the precise length their labeling would indicate), lock height is always measured from the top of the door. This insures that proper header clearance is maintained and that the lock hardware aligns with the machining and hardware in the strike jamb.

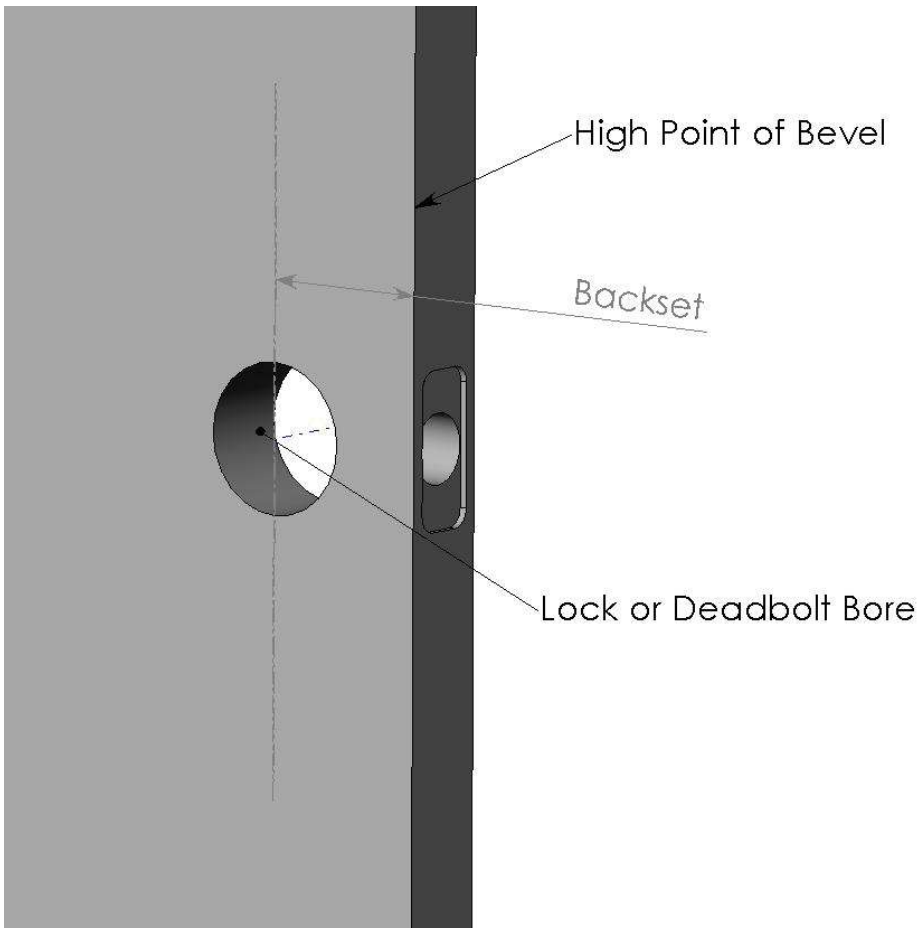
Typical Lock Heights



BACKSET

Backset is the distance a lock is centered from the front edge of the door.
For residential applications the backset is 2-3/8" (most common) or 2-3/4". For the commercial market backsets are usually, 2-3/4" or 5". Correct backset is necessary to insure that lock hardware fits the machined door properly.

One method of defining backset is measuring from the centerline of the door's edge to the center of the lock bore.



LOCK BORE

The lock bore (or cross bore) is a hole drilled through the face of the door at a specific "backset." The lock bore must be of sufficient diameter to accommodate the lock hardware. Lock bore diameters range in size from 1-3/8" to 2-1/8," with 2-1/8" being the most common. The dead bolt bore is the same as the lock bore and must be the right diameter and backset to accommodate dead bolt hardware.

Some lock hardware does not require a through-lock bore (i.e. "pulls" for pocket doors or certain dead bolt locks). In this case, care must be taken to drill the proper face of the door relative to the beveled edge.

LATCH BORE

The latch bore (or edge bore) is a hole drilled into the edge of the door for the latch bolt. It is drilled on the centerline of the lock bore and is centered in the edge of the door. Latch bore sizes run from 7/8" diameter to 1" diameter, with 1" being the most common.

The latch bore and dead bolt edge bore are always drilled into the lock bore. However, some dead bolts require that the edge bore be drilled deeper than the back edge of the lock bore.

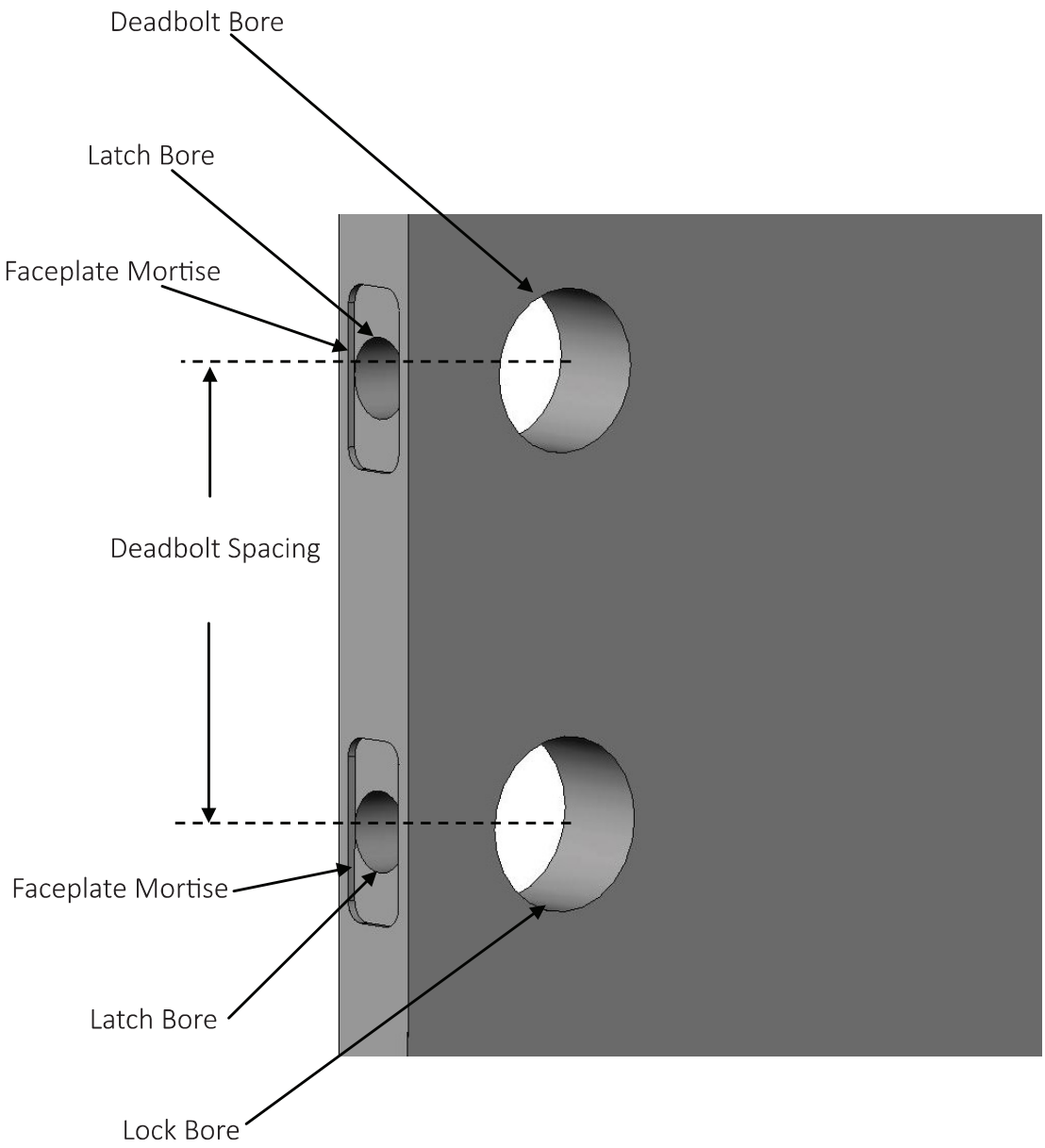
FACEPLATE MORTISE

The faceplate mortise is a relief on the edge of the door for the latch faceplate. Its width and length will vary with the specific lock hardware being used. The most common width and length is 1" x 2-1/4". The mortise depth matches the thickness of the faceplate. If a "drive-in" bolt is used, the faceplate mortise is omitted and a cleaner cut is usually wanted.

DEADBOLT SPACING

Deadbolt spacing is the dimension from the center of the lock bore "up" to the center of the deadbolt cross bore. This dimension varies with the hardware used and the specifications for various door units.

Lock and Deadbolt Machining



HINGE PATTERN

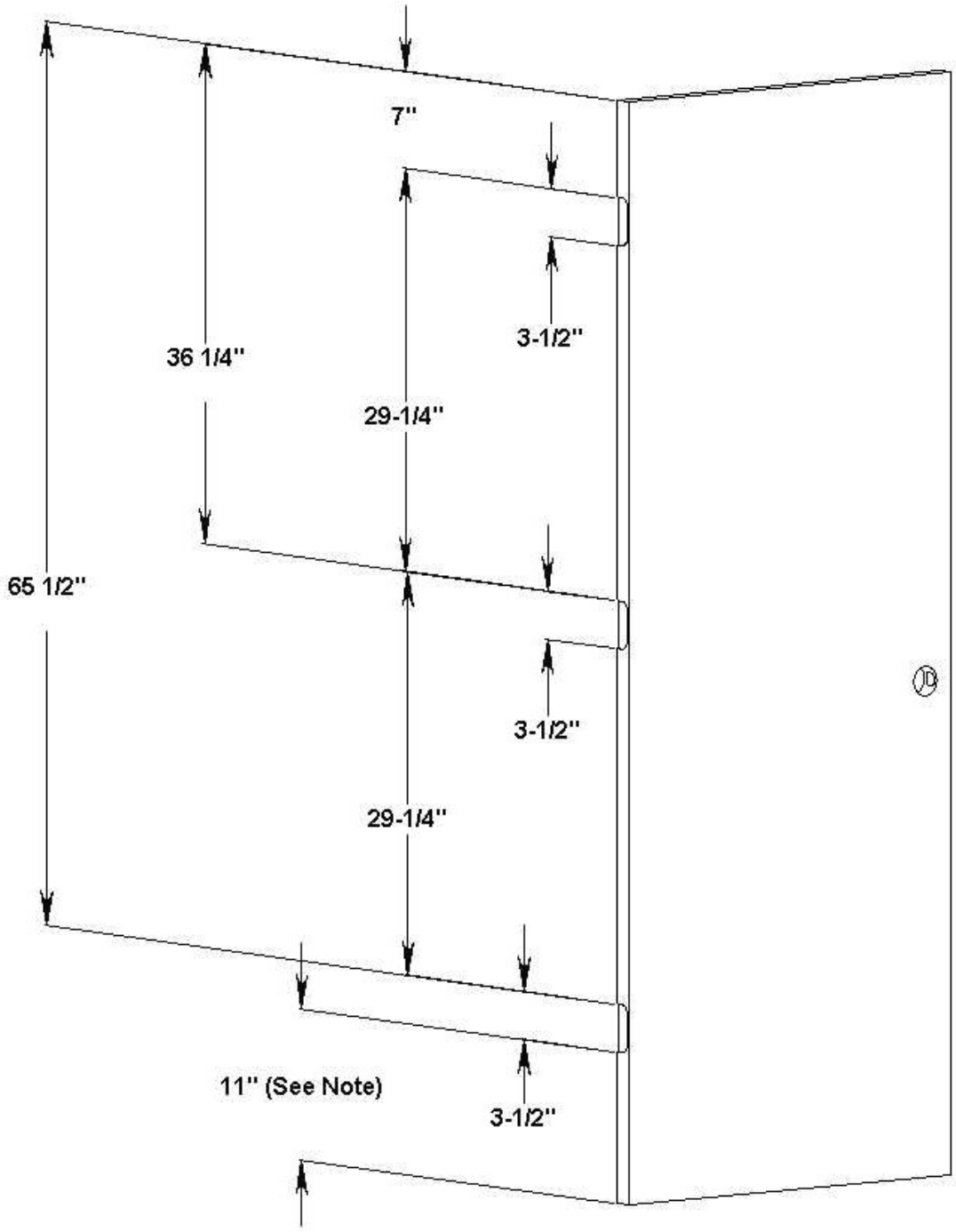
Hinge pattern, or butt spacing, is usually described as a dimension in inches from the top of the door to the top of the top hinge and from the bottom of the door to the bottom of the bottom hinge. Examples of this are "7-11", "8-8", and "9-9".

The more common and accurate method is to measure from the top of the door to the centerline of the top hinge then from this centerline to the center of the middle hinge (if applicable) then to the centerline of the bottom hinge.

If the centerline is used, it is always centered exactly between the top and bottom hinges. If the door has four hinges, the two center hinges are equally spaced between the top and bottom hinges.

The location of the top and bottom hinge remains constant in relation to the door stile, regardless of the door height. For example, if a 6'8" door with a 7-11 hinge pattern has been cut down to 6'7" for floor covering clearance, the dimension from the bottom of the door to the bottom hinge would be 10".

Hinge Pattern



HINGE SIZES

Common hinge sizes are either 3-1/2" x 3-1/2" or 4" x 4". 3-1/2" hinges are used primarily on interior hollow core doors or on fire-resistant doors that connect two rooms. 4" hinges are used primarily on exterior entrance doors.

3" x 3", 4-1/2" x 4-1/2" and 5" x 5" hinges are available but are not commonly used. 3" hinges are found on inexpensive interior door units. 4-1/2" and 5" hinges are found on more elaborate exterior entrance systems or on special commercial applications.

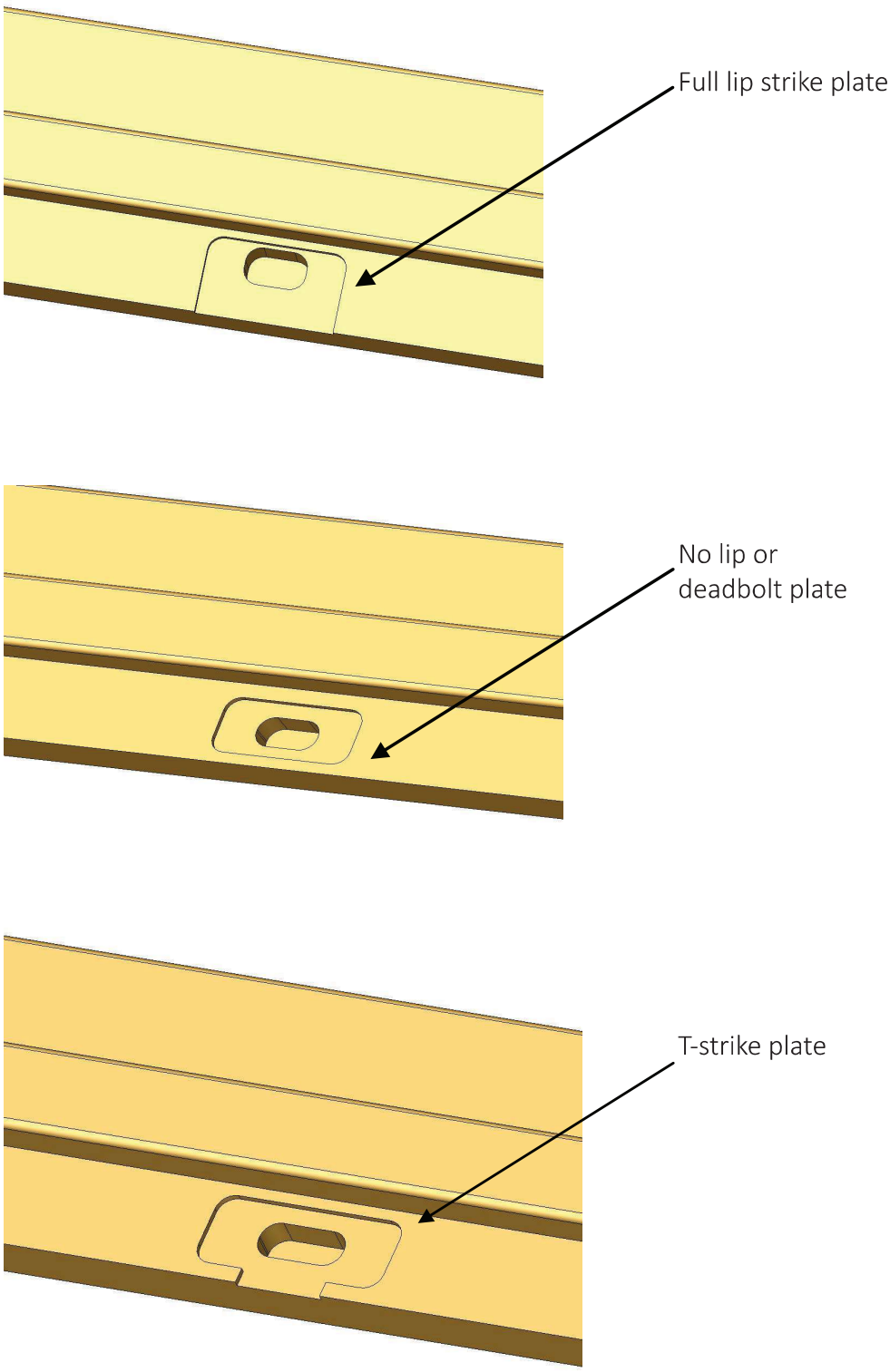
JAMB MACHINING

Both the hinge jamb and strike jamb are machined to accept door hardware. The hinge jamb is mortised the same as the door to receive the hinges. The mortises are measured from the top of the jamb (dado) with an allowance for header clearance. Refer to the paragraphs on "header clearance" (page 24) and "hinge backset" (page 26) in the next section for details.

The strike jamb is machined to accept the strike plate. This is a specially shaped piece of metal that is attached to the strike jamb to accept the latch bolt when the door is closed. There are three basic types of strike plates: "full-lip", "T-strike" and "no-lip". The type used for any particular application depends solely on the type of lock hardware used. There are many types and shapes of plates within the three groups but the most common of each type is shown in the illustration.

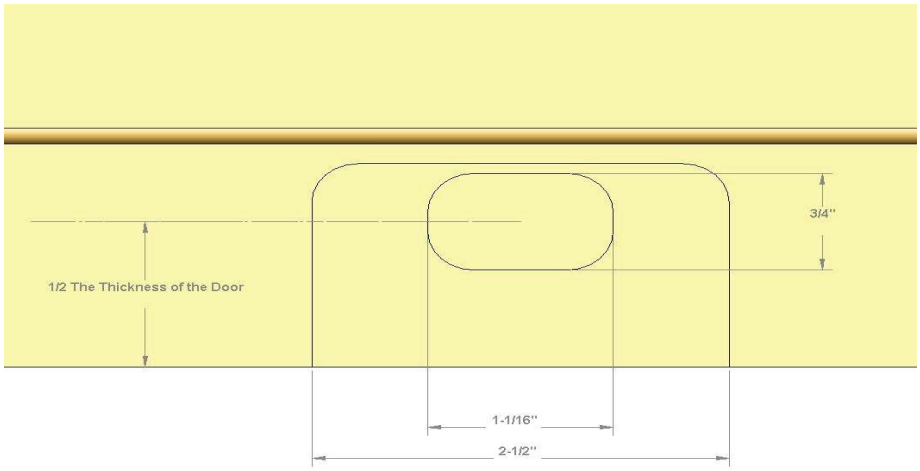
The location for the strike plate mortise is dependent on the lock height. The distance from the dado on the top of the jamb, to the center of the strike plate mortise is equal to the lock height plus the header clearance. The distance from the edge of the jamb to the center of the deep pocket is ½" the thickness of the door being used.

Strike Plate Types



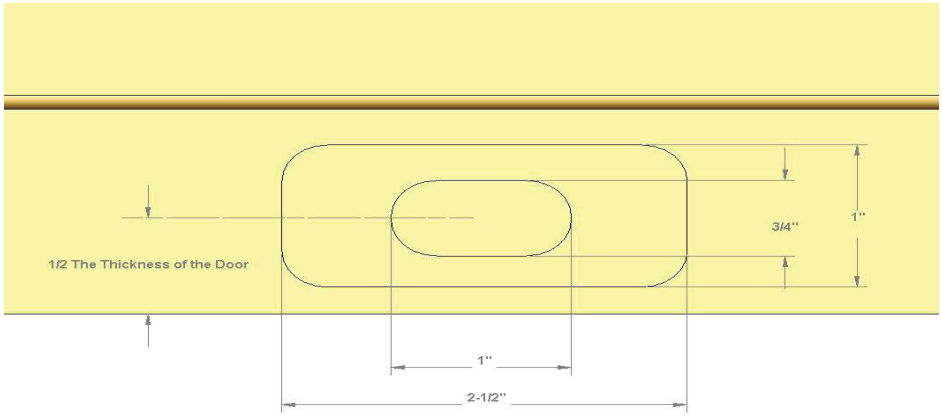
Template Number 9202-001

The most common size of full lip strike plate



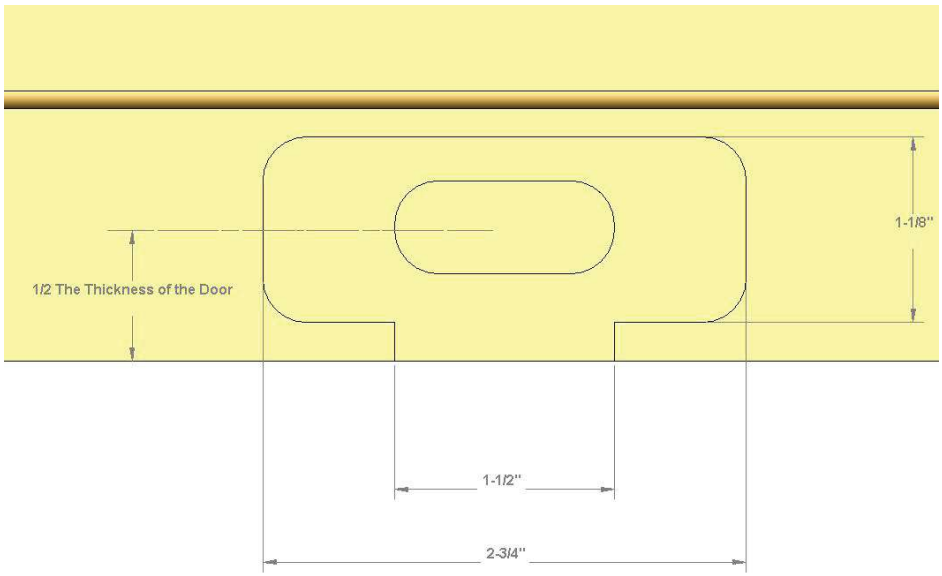
Template Number 9206-001

The most common size of deadbolt strike plate



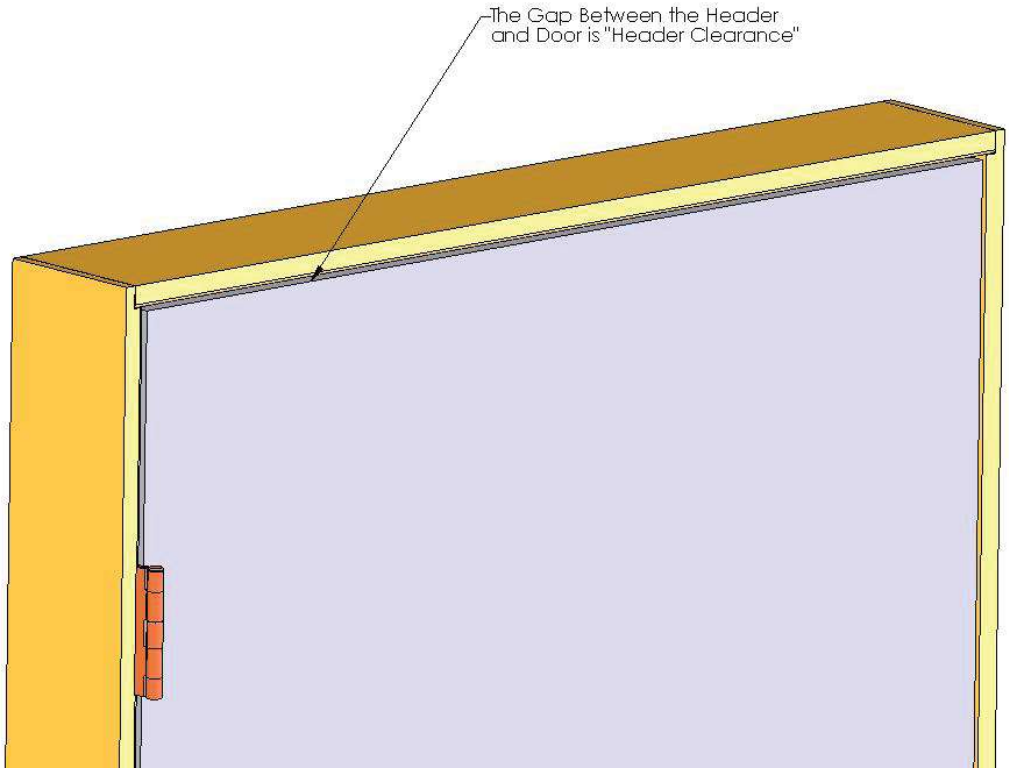
Template Number 9204-001

The most common size of t-strike plate



HEADER CLEARANCE

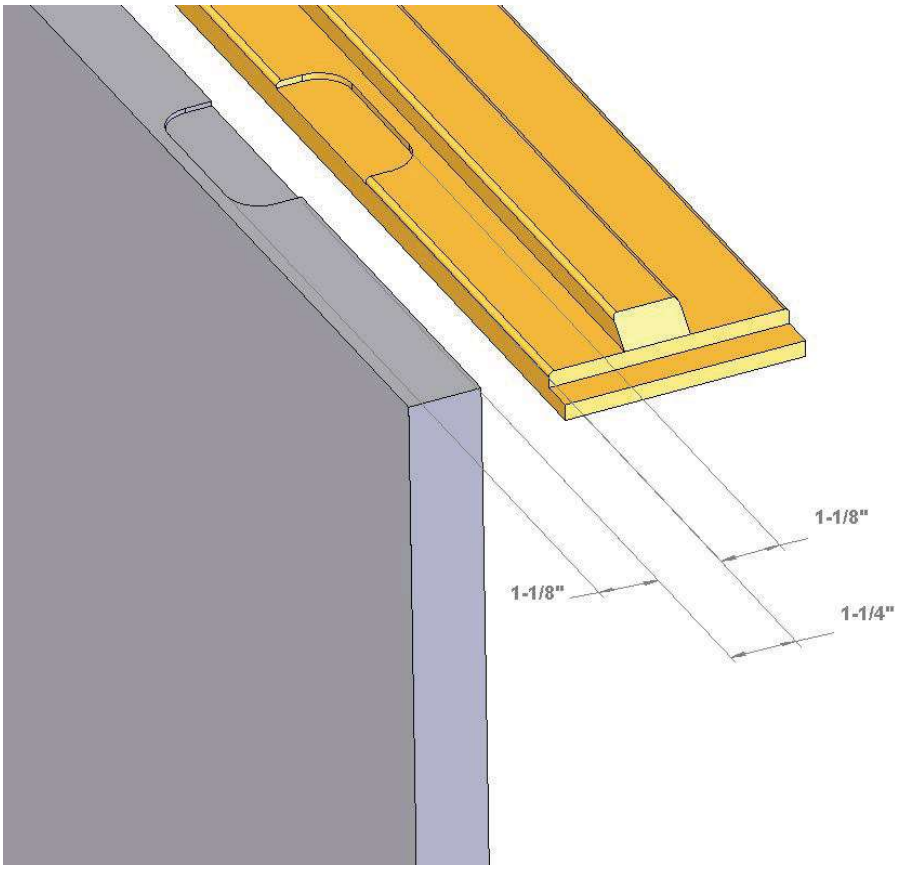
Header clearance (head jamb clearance) is the gap between the top of the door and the head jamb when the door is closed. It is usually between 1/16” and 3/16”, with 1/8” being the most common.



Hinge Mortise Dimensions

When setting the dimensions of a mortise on a door machine the hinge reveal or hinge dimension is used. As an example a Magnum can be set to control the reveal, and the automated machines are adjusted using the hinge mortise dimensions,

The mortise is set equal distance into the door and jamb and is typically 1-1/8” on a 3-1/2” hinge used on a 1-3/8 thick interior door.

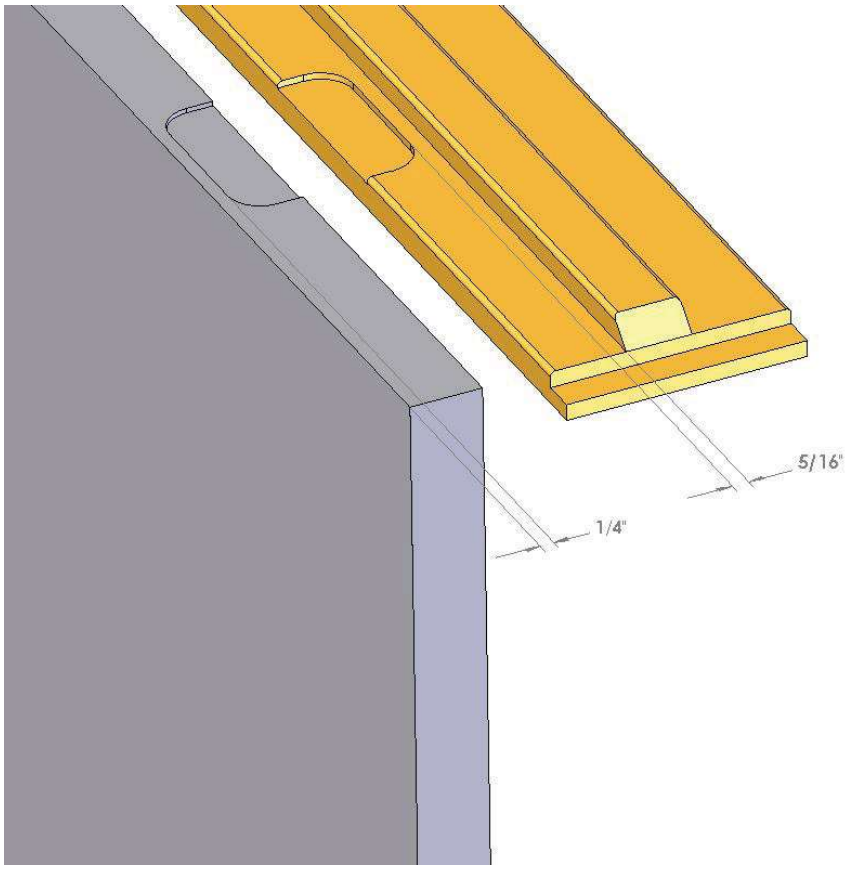


HINGE BACKSET (REVEAL)

Hinge backset is the distance from the stop on the jamb to the edge of the hinge mortise and from the face of the door to the edge of the mortise. The hinge backset must be correct to insure a clearance (reveal) between the face of the door and the doorstop on the jamb when the door is closed. If weather-stripping is used on the jamb, the hinge backset may have to be adjusted to compensate for the thickness of the weather-stripping.

Accepted hinge backsets are:

1-3/8" Doors	**1-3/4" Doors**
1/4" - Door	3/8" - Door
5/16" - Jamb	7/16" - Jamb



DOOR JAMBS

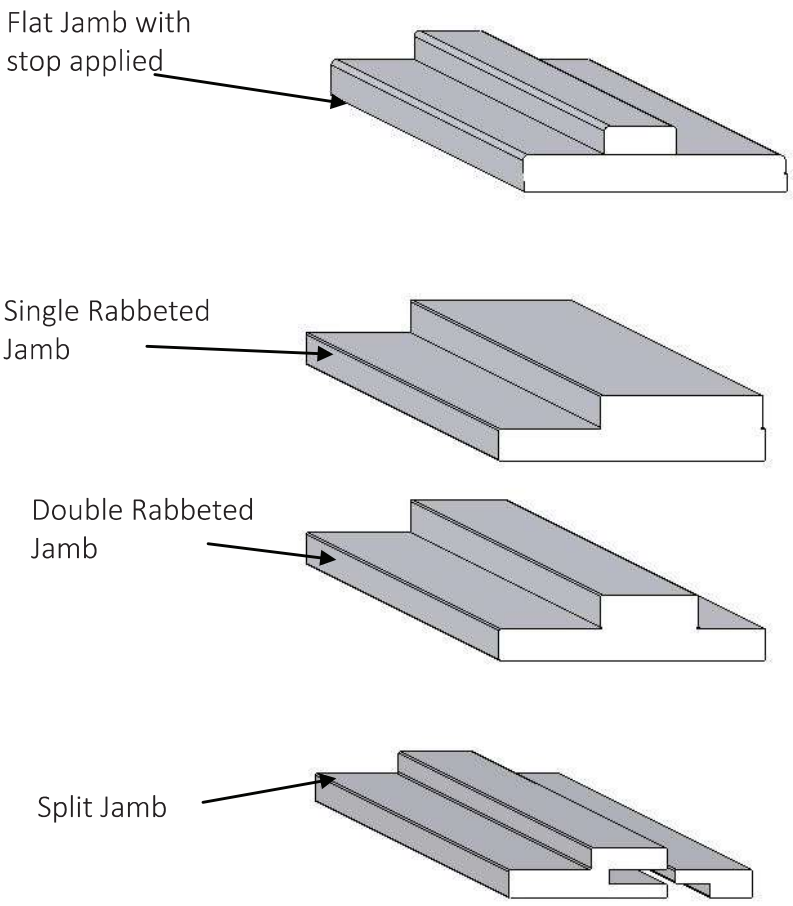
The term "jamb" refers to the wood members of the frame of a pre-hung door. They can be made from any wood species, particleboard, MDF, plastic or other materials. However a few types of wood are most commonly used. Pine is the most common wood for interior doorjambs and Fir is most often used for exterior jambs. (Philippine Mahogany and Oak are used also, but on a limited basis.) When Pine and Fir are used, it is becoming more and more common to see the jambs made up of short pieces of wood "finger-jointed" together to make up the longer lengths.

Doorjambs are divided into two major categories: interior and exterior. Standard interior jambs consist of two parts--a **"flat jamb"** and a stop. The stop is stapled to the jamb, usually through the stop into the jamb, but sometimes through the back of the jamb into the stop. The stop can be applied either before the jamb is machined (most common) or after the pre-hung door assembly is complete.

Another type of jamb used exclusively on interior units is the **"split jamb."** This is normally made of two pieces of wood that fit together to form a single unit. The advantage of this type is that it can be adjusted to match exactly the thickness of the wall when the pre-hung door is installed. Split jambs can also be made from three pieces: two similar pieces that fit together to make a "flat jamb" and another piece attached to one of them to form the "stop".

Exterior jambs are either **"single-rabbeted"** or **"double-rabbeted."** They differ from interior jambs in that they are made from thicker material, and the stop and jamb are machined from the same piece of wood. Single rabbeted jambs are the most common. Double rabbeted jambs are used in entry door systems where a screen door or insulated weather door is used.

Cross Section of Different Jamb types



JAMB ASSEMBLIES

The previous section discussed the different types of jambs. This section will discuss the ways that jambs are put together to form the doorframe.

Side jambs are machined at one end to accept the head jamb. This is commonly referred to as the "dado." The dado can be cut on the end of the jamb (as shown on the standard jamb, page 30) or a little in from the end (as shown on the lugged jamb page 31). The standard jamb is most common and is preferred when the door units are assembled using an automated assembly machine. The lugged jamb has an advantage in that it captures the head jamb more securely which makes the doorframe easier to assemble manually.

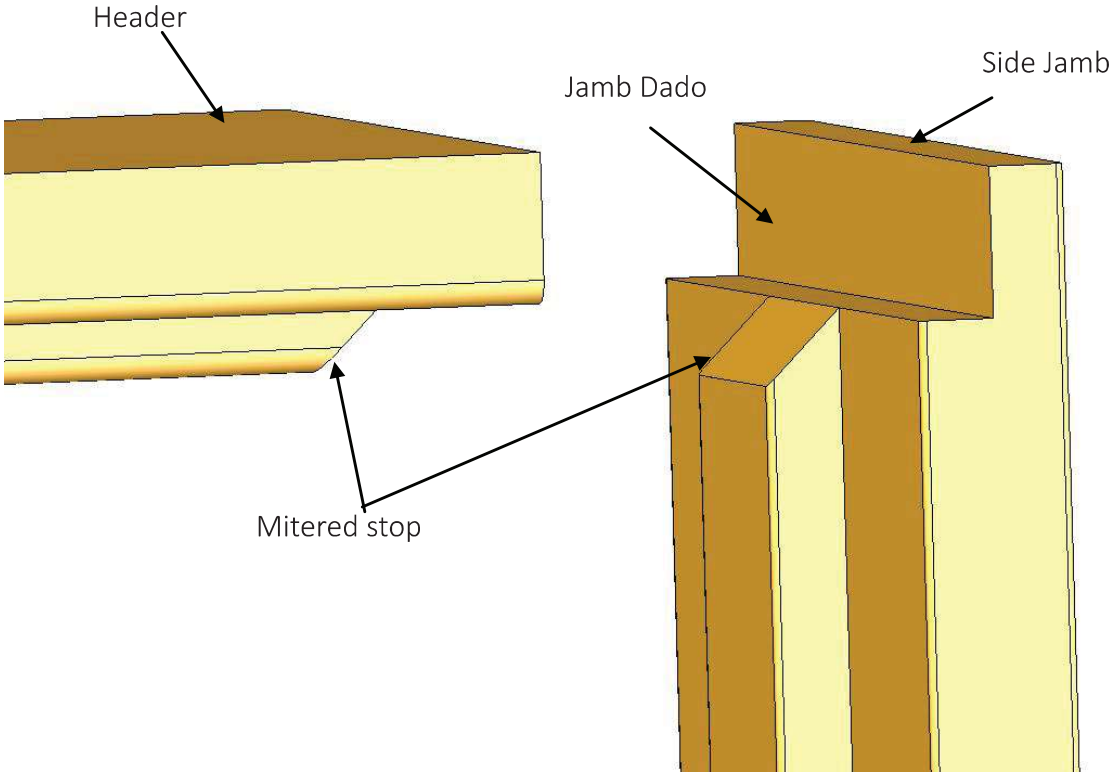
The head jamb fits into the dado on the side jamb. The dado, therefore, is as wide as the head jamb is thick.

When the door stop is applied to the jambs before the units are assembled, it must be positioned correctly to allow the head jamb to fit all the way into the dado and for the stop on the side jamb to butt up against the stop on the head jamb. The stop on the head jamb is recessed the same amount as the depth of the dado on the side jamb. The stop on the side jamb is recessed the same amount as the thickness of the stop material. (see page 30)

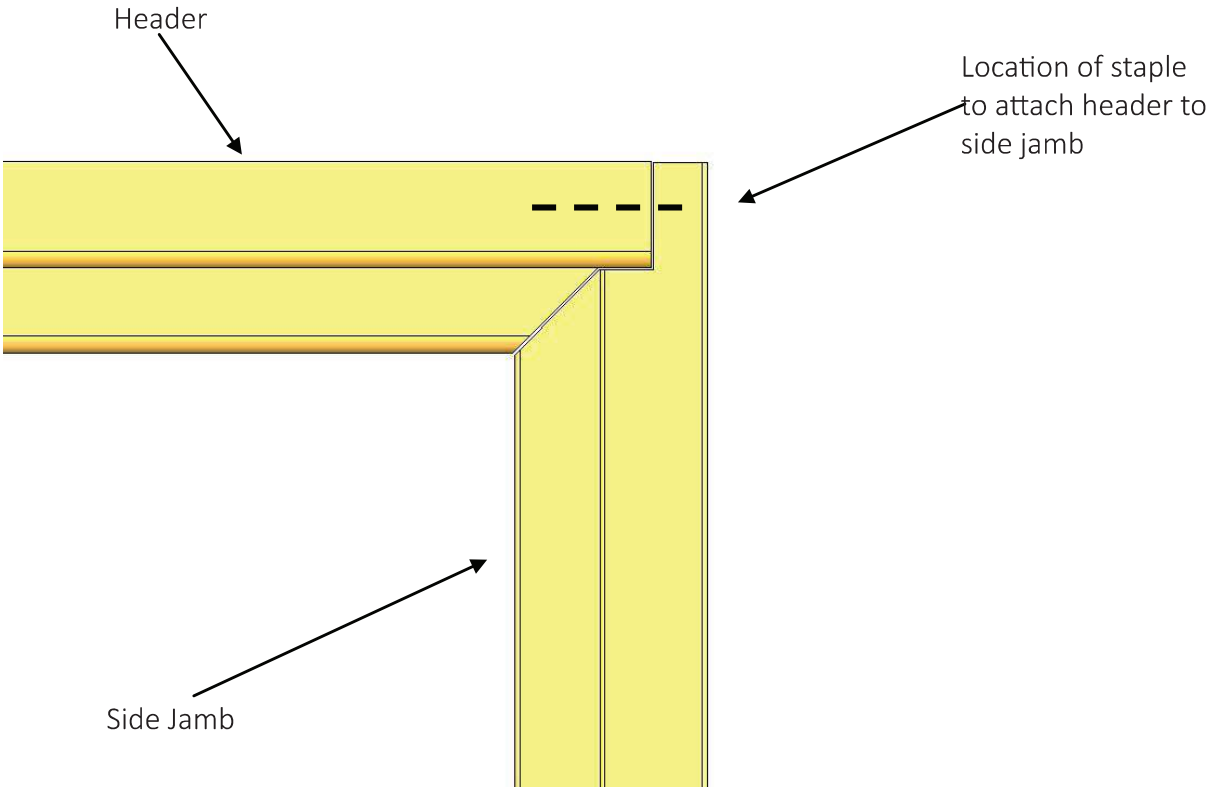
If mitered stop material is used, the stop on the side jambs is positioned flush with the dado. The stop on the head jamb is recessed the depth of the dado. (see below)

On exterior jambs, where the stop and jamb are the same piece of wood, the recesses are produced by saw cuts. Special saws equipped with dado heads are available to do this kind of cutting quickly and efficiently.

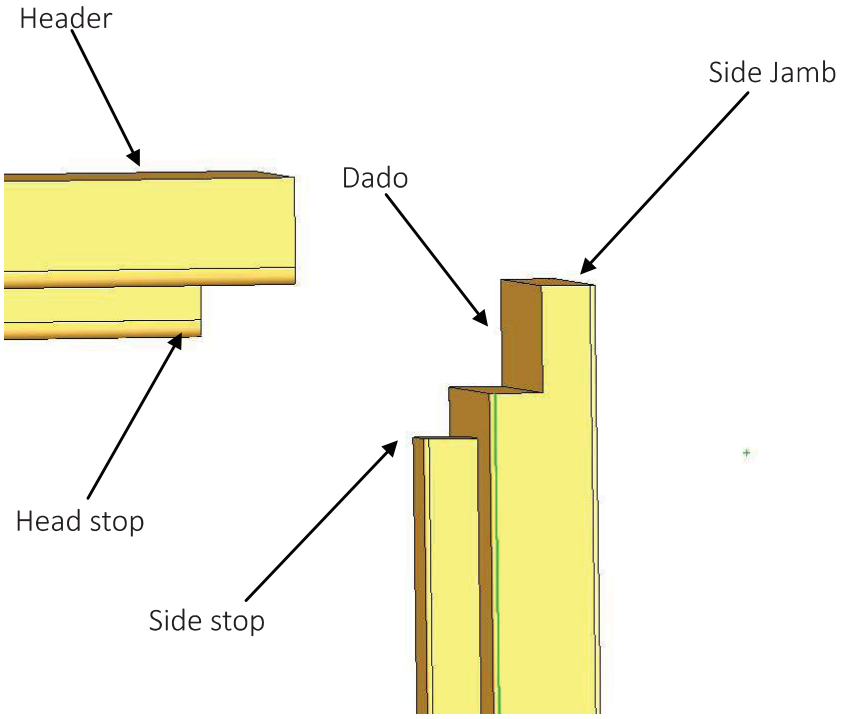
Jamb Assemblies
Flat jamb shown with mitered stop



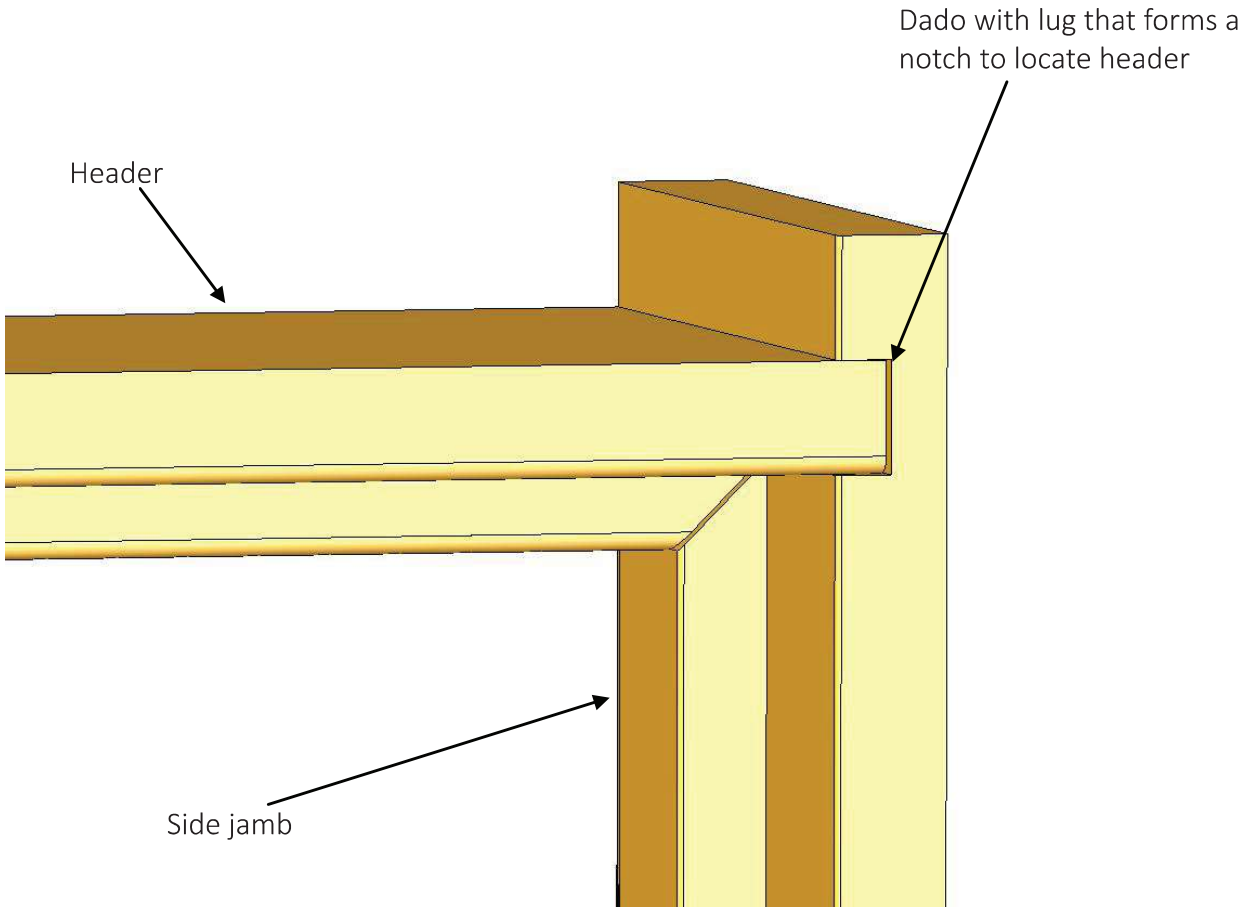
Jamb Assemblies
Flat Jamb shown with mitered stop



Jamb Assemblies
Flat Jamb with square cut stop



Jamb Assemblies
Flat Jamb with lugged dado shown



This method is not commonly used due to the fact that the lug has to be cut-off to install the door unit in the opening. The advantage of this method is that it holds the location of the header secure during shipping.

DOOR TYPES AND SIZES

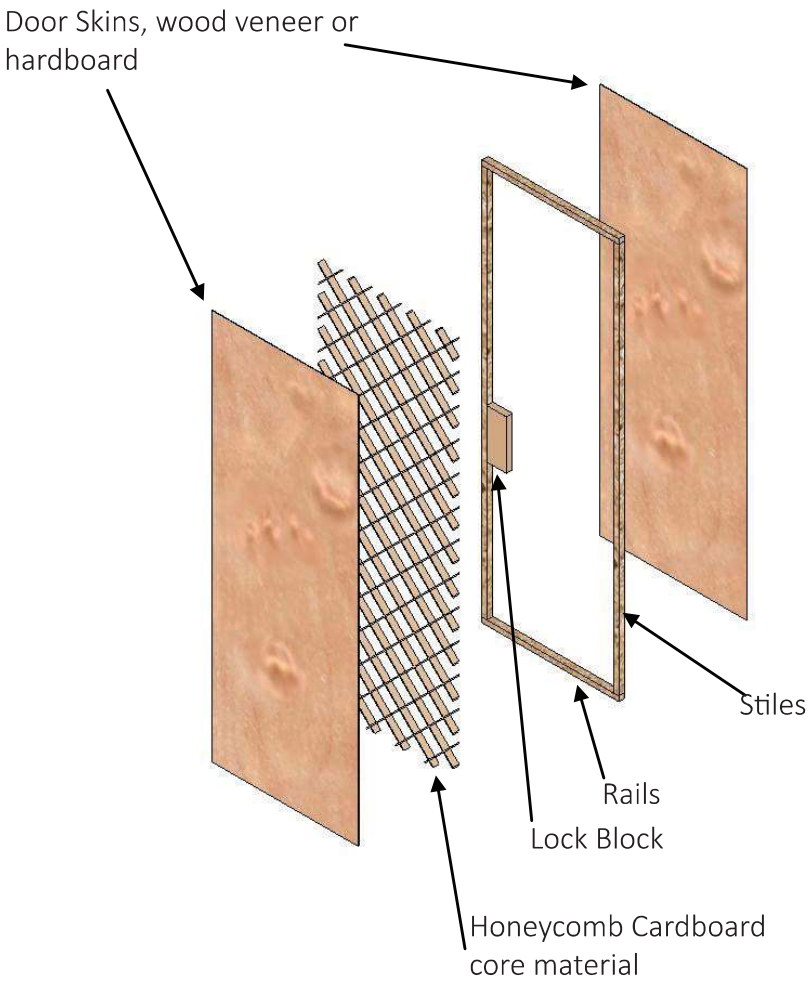
The drawings on the following three pages, show the three most common types of door construction. "Hollow Core" doors are used exclusively for interior applications. "Solid Core" and "Stile and Rail" doors are used primarily for exterior entrance doors but may be found in some interior applications. Hollow Core and Solid Core doors are sometimes referred to as "flush" doors. Stile and Rail doors are a more traditional type door and are used as entrance doors where added aesthetics are desired.

Hollow Core and Solid Core are somewhat similar in their construction. Both have a wood frame, a core and are covered with some kind of wood or wood product skin. Wood veneer or hardboard are the two common materials for door skins.

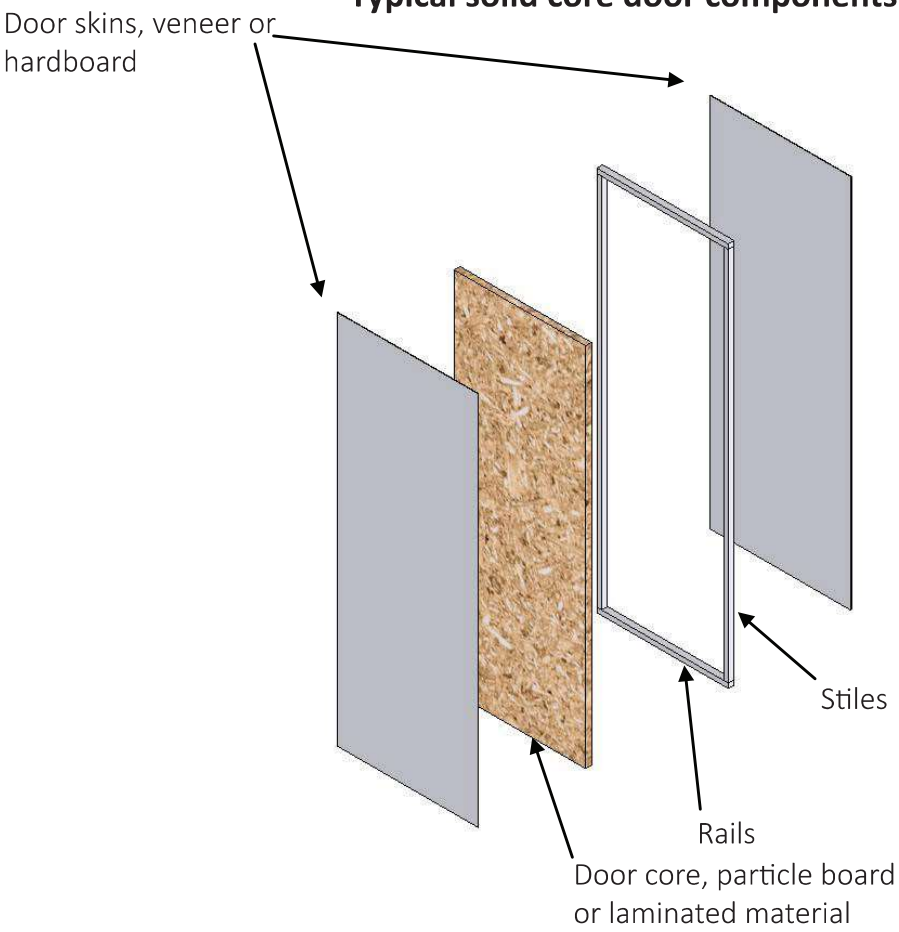
Stile and Rail doors are made up of a number of individual pieces of solid wood that are carefully fit and glued together. The material used can vary from door to door and manufacturer to manufacturer but Douglas Fir, Philippine Mahogany, Red Oak and White Oak are the most common. The value of a Stile and Rail door is in its aesthetic appeal.

Doors are available in widths from 1'0" to 4'0" in 2" increments. The standard length for a door is 6'8". Doors 7, 8, 9, and even 10 feet tall are available and are becoming increasingly more common.

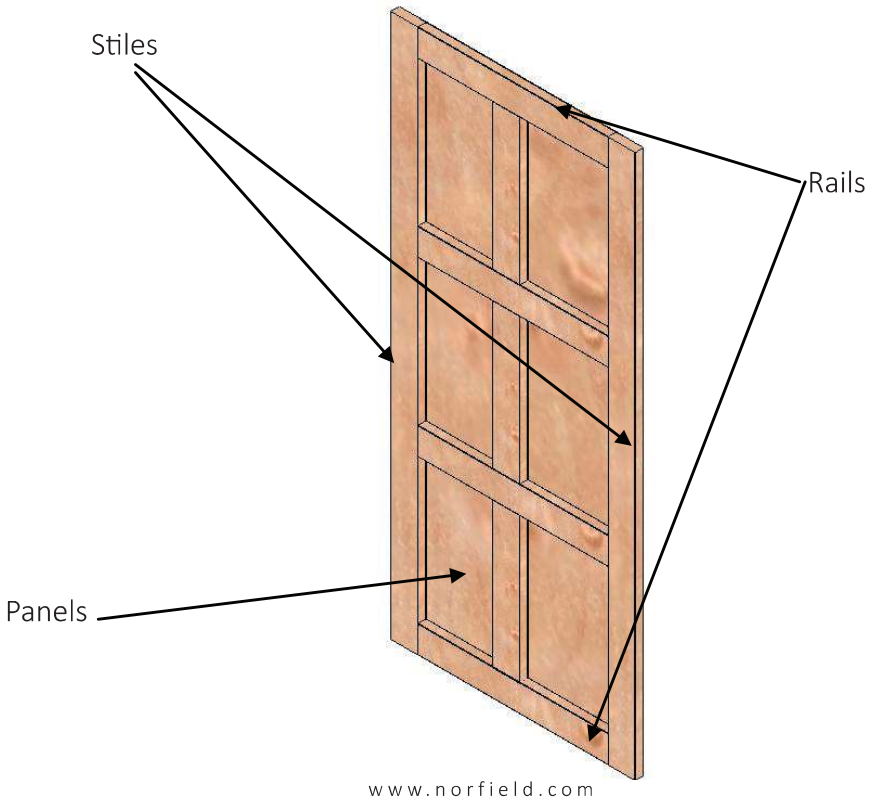
Typical interior hollow core door components



Typical solid core door components



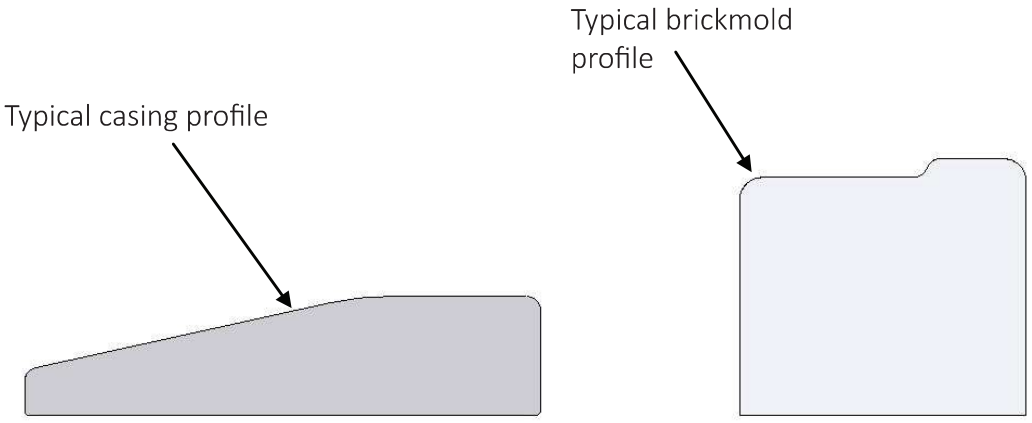
Typical stile and rail door



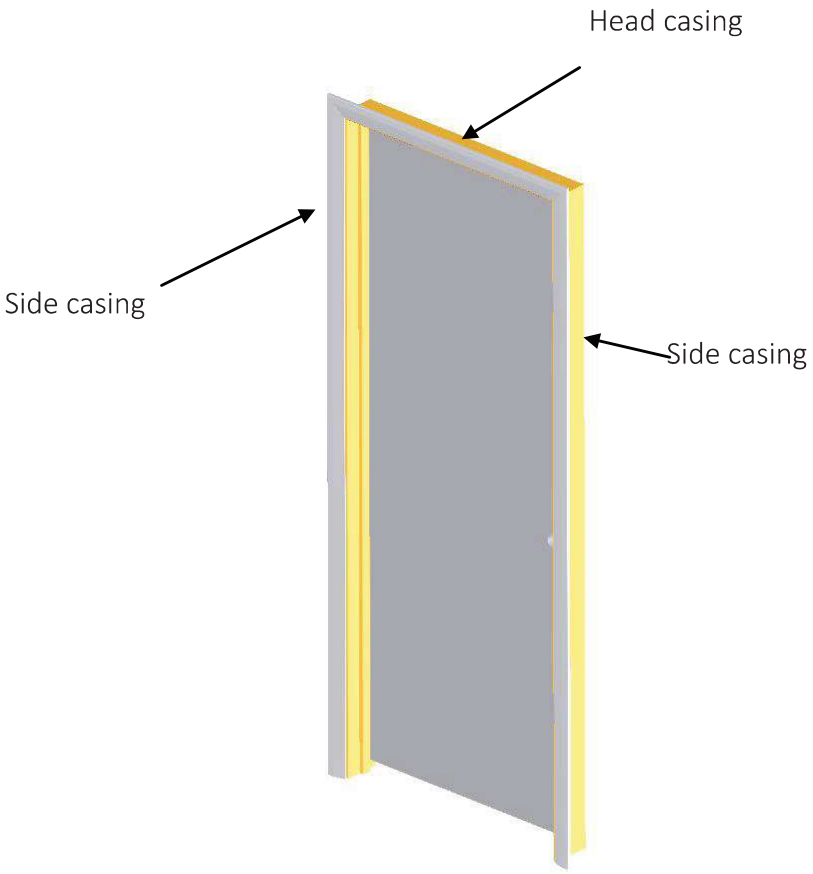
CASING

When a pre-hung door is installed, it is normally trimmed, or cased, around the edges of the jambs on both the inside and outside of the opening. For interior doors, the trim on both sides of the door is referred to as casing. On exterior doors, the trim on the inside is casing and trim on the outside is molding. Brickmold, as shown below, is a common exterior molding.

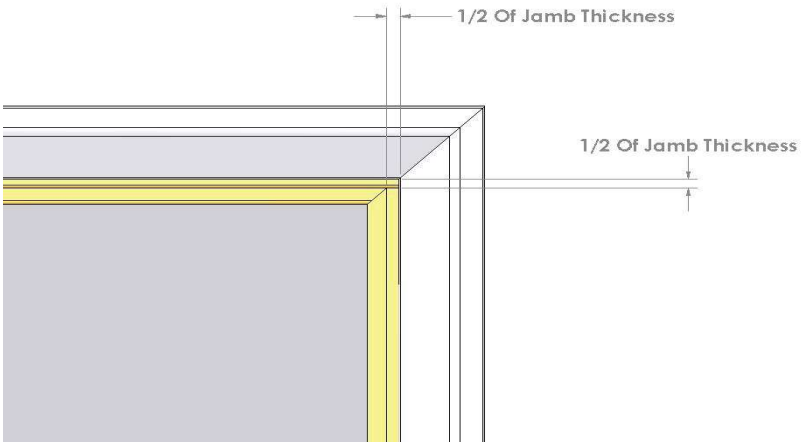
Casing and molding are usually mitered (cut at 45º) where it joins at the top corners. Sometimes, the outside molding is butt jointed (the top piece is set on top of the two side legs). This is usually done to create a rustic appearance or for other design considerations.



Casing

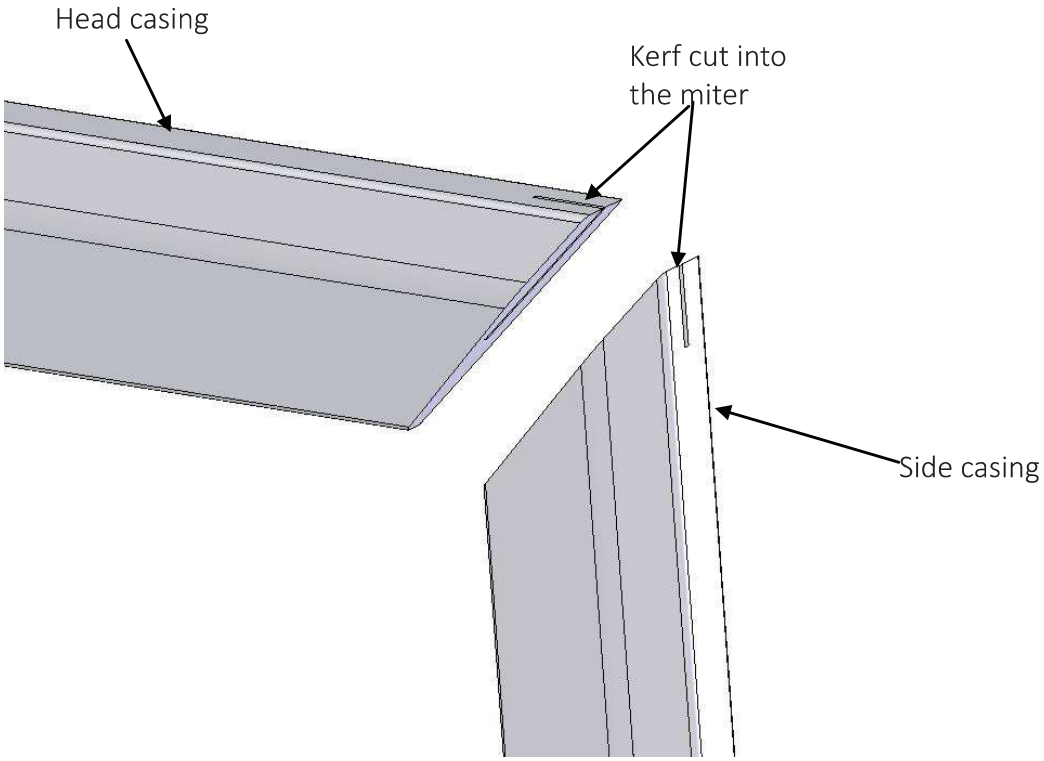


Typical location of casing on jambs edge



Kerfed Casing

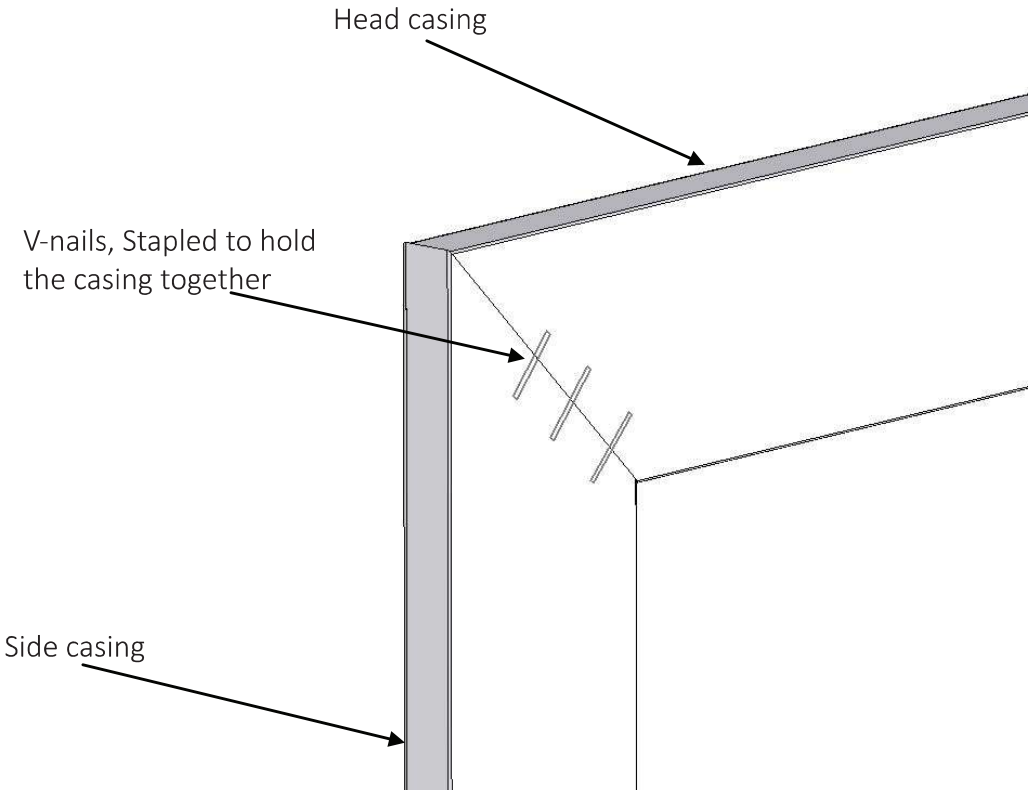
To hold the miters of casing or brickmold tightly aligned a process called “Kerfing” is done to the material after mitering, A thin slot as seen in the illustration is cut into the miter, then a special nail called a “Spline Nail” is driven into the slot of both the head and side casing.



V-Nailed Casing

A common method for attaching the casing pieces to each other before assembly on the door is with a V-Nail machine. This machine will hold, then staple the miter of the head and side casings together.

In this illustration we are viewing the casing from the backside.



Picture Frame Casing

When the three pieces of casing for one side of a door unit are pre-assembled, using either kerfing nails or V-nails, the assembled unit is called “Picture Frame Casing”

The casing, after assembly, would be taken to the door assembly process and attached to the unit. Shipping the casing pre-assembled is done due to it being very fragile and prone to breakage until it is stapled to the door unit.