

## Chapter 18. Interior Doors

### 18.1 SWINGING DOORS

### 18.2 SLIDING DOORS

### 18.3 BIFOLD DOORS

#### Tools needed by volunteers:

Hammer  
Nail apron  
Tape measure  
Square  
Pencil

#### Materials needed:

Casing material  
Doors  
Paslode 1¼” finish nails  
Paslode 2½” finish nails  
3” [Phillips](#) brass-colored construction screws  
2” Flathead screws  
Tapered cedar shims  
⅛” & ¼” 3”x5” spacers  
Wood putty  
1”x¾” Door edge felt pads  
¾”x⅛” Door edge clear hard flooring pads

#### Tools and equipment needed:

Extension cords  
Chop saw  
Paslode nailers  
Drill driver  
Utility knife  
Sheetrock rasp  
6’ Level

#### Personal Protection Equipment:

Safety glasses (required)

#### Reference Materials:

House Plan

**Safety First! Review the Safety Checklist before performing tasks in this chapter.**

## 18.1. SWINGING DOORS

### 18.1.1. Door and Rough Opening Preparation

1. Before removing packaging and shipping parts, check door and frame for damage. If damaged, notify Construction Supervisor or Site Leader.
2. Verify correct door and size. Verify proper door swing according to the House Plan.

**NOTE:** Before starting the following steps, using a framing or carpenter's square, check the bottom of the hinge and strike side jack studs for excessive twist. If either is clearly out of square and is likely to cause difficulty in installing the door, replace the King/Jack stud pair with straight pieces.

3. The following Steps 4 and 5 are designed to reduce the difference between the width of the door frame and the width of the rough opening at the hinge locations to  $\frac{3}{8}$ " or less. Doing so helps to
  - Center the door in the rough opening;
  - Avoid trying to install spacers and/or thick shims once the door is in place; and,
  - Equalize the overlap of the interior trim.
4. Mark the location of the hinges on the hinge side Jack stud. Using a 6' level, check if the Jack stud is plumb.
  - a. If PLUMB, measure the width of the door frame at the head jamb. Measure the width of the rough opening at the top and bottom hinge locations. If the difference between the door frame and the rough opening at either location is greater than  $\frac{5}{8}$ " proceed as follows. Otherwise, go to Step 5 below.
    - i. Nail (with 2½" Paslode nails) a combination of  $\frac{1}{8}$ " and  $\frac{1}{4}$ " 3"x5" spacers to the hinge side Jack stud at the top and bottom hinge locations until the difference is less than  $\frac{5}{8}$ " at both locations. In all cases, here and below, nail with 5" dimension vertical.
    - ii. Place the level against the top and bottom spacers/shims and install spacers and/or shims at the middle hinge area until flush with the level.
    - iii. Proceed to Step 5 below.
  - b. If NOT PLUMB, measure the width of the door frame at the head jamb and the width of the rough opening at the top and bottom hinge locations.
    - i. If the difference between the head jamb and the rough opening at either location is more than  $\frac{5}{8}$ ", nail (with 2½" Paslode nails) the appropriate

combination of 1/8" and 1/4" 3"x5" spacers and/or shims to the top and/or bottom hinge locations of the hinge side Jack stud until the width of the door frame is less than 5/8" at both locations.

- ii. Place the 6' level against the spacers. If not plumb, shim top or bottom hinge areas until it is plumb and then install spacers and/or shims at the middle hinge area until flush with the level.
5. Add one or two layers of 1/4" spacers and/or shims to the strike side stud at the top and bottom hinge locations until the differences in opening width at the top and bottom hinge locations is less than 3/8". Place the 6' level against the spacers and then install spacers and/or shims at the middle hinge area until flush with the level.

### 18.1.2. Position and Temporarily Secure Door in Opening

1. Set door into the rough opening, tight to the hinge side Jack stud. If in a carpeted area (see the House Plan), insert a piece of 3/8" scrap floor trim under each side jamb; otherwise, set the jambs directly on the finished flooring.
2. Center the hinge side jamb between both wall surfaces.
3. Temporarily secure the door in the rough opening by installing shims at the very top of the strike jamb (even with the head jamb). Wedge (do NOT nail) these shims in TIGHTLY (they can be adjusted later).

**NOTE:** This process is designed to apply horizontal pressure to hold the top of the hinge jamb tight against the hinge side Jack stud. The top of the door may rub on the strike jamb at this stage but this is normal and will be corrected later.

4. Check the reveal between the top of the door and the head jamb at the left and right corners of the door. If necessary, shim under the strike jamb or hinge jamb until these reveals are equal.
5. Verify that the bottom of the hinge jamb is still centered between wall surfaces, add appropriate spacers/shims at the bottom of the jamb, and temporarily secure it with one 2 1/2" Paslode nail just above the spacers/shims. Do the same for the strike side jamb. (This will help to hold the bottom of the side jambs in place for the remainder of the installation but can still be moved if necessary.)
6. Recheck that the hinge side is still plumb (set level on hinges or hinge plates).

### 18.1.3. Permanently Secure Door

1. With the door held tight to the hinge side Jack stud and still centered between both wall surfaces, secure the hinge side jamb with one 2 1/2" Paslode nail at the top, middle, and bottom hinges.

2. Check that the hinge side of the door is still plumb. Adjust shims as needed.
3. At the top door hinge, replace the screw closest to the doorstop with a #8 3” construction screw (brass colored). Make sure the screw is driven into the Jack stud. This screw ensures the door does not sag over time.

**NOTE:** Tightness of the 3” brass screw in the top hinge can affect the reveals at either end of the head jamb. Tighten or loosen the screw and/or adjust shims as needed.

4. Recheck that the reveals remain equal at both ends of the head jamb. Adjust the strike side jamb up or down as needed.
5. Check complete door operation and verify that contact between the door and the doorstop is consistent (no gaps or light visible) along the head jamb and the strike jamb. It may be necessary to adjust one or both side jambs from the centered position (a maximum of 1/8” past or shy of the wall surface). Confirm that latch and strike are aligned.
6. Check the reveal on the top and the bottom of the hinge jamb. If necessary, adjust the shims against the head jamb until the top hinge jamb reveal matches the reveal just below the top hinge. If necessary, shim the bottom of the hinge jamb to match the reveal at the top. Shim as needed and secure with a 2 1/2” Paslode nail on one side of the doorstop.

**NOTE:** Adjusting the reveal at the top of the hinge jamb will affect the reveal at the top of the strike jamb. Check to be sure the reveal at the top of the strike jamb is 1/8” or greater. If not, it may be necessary to “split the difference.”

7. Check the reveal at the top and the bottom of the strike jamb. If necessary, adjust and shim at the bottom of the strike jamb until there is a consistent reveal at both locations.
8. While keeping consistent reveals top to bottom, install all remaining shims (nailing with 2 1/2” Paslode nails on the same side of the doorstop) in the following strike side locations: across from the top and bottom hinges and above the door latch location.
9. Install shims in the center of the head jamb, adjusting for a consistent reveal across the jamb. Secure the jamb with a 2 1/2” Paslode nail on one side of the doorstop.
10. Recheck the complete door operation, making sure that contact with the doorstop is consistent (no gaps) along the head jamb and the strike jamb and that all reveals are consistent. Adjust as needed by:
  - lightly tapping on a scrap piece of 2x4 placed on the edge of the jambs to ensure proper contact with the doorstop (no more than 1/8” past or short of the plaster); or,

- tapping the doorstop with 2x4 scrap or a ¼” spacer (moving the doorstop less than ⅛”); or,
  - removing the doorstop, closing the door, and re-installing the doorstop against the door (a last resort option).
11. To ensure consistent reveals along the side jambs, install additional shims on the hinge side, about halfway between the hinges and at similar locations on the strike side. This should result in six sets of shims on each side jamb. Secure the jambs with 2½” Paslode nails on one side of the doorstop.
  12. Finish securing the door on all three jambs at each shim location by putting a 2½” Paslode nail into the jamb along the opposite side of the doorstop.
  13. Conduct a final verification of the complete door operation - uniform contact with the doorstop and all reveals are consistent. Adjust as needed.
  14. Set and putty all nail holes.

#### 18.1.4. Install Door Trim

1. Pre-cut door trim is provided for interior doors. Uncut trim is provided for exterior doors and must be field-cut to fit. Refer to the House Plan to see if the door is over carpeting or over a finished floor.
2. Check wall thickness vs. doorjamb thickness. If the wall is thicker, trim or scrape plaster with a utility knife or rasp so door trim will fit properly.
3. For exterior doors, miter-cut top pieces to extend about 3/16” past each corner of the door jamb. For all doors, cut side pieces to fit.
4. If the door is over a carpeted area, keep the trim off the floor with a piece of ¾” floor trim. If the door is over finished flooring, cut the trim to be tight to the floor.
5. Door trim **MUST** be tight to the jamb. Before nailing, hold the trim piece in place and check the inside edge. If it is tight the **ENTIRE** length, push the outside edge tight to the wall. If the inside edge stays tight to the jamb, proceed with nailing. If the trim rocks back and forth and the inside edge does not stay tight to the jamb, chip away or hammer the plaster until the trim is **TIGHT** against the jamb.
6. Most trim is delivered in separate pieces. If this is the case, start installation with the top mitered trim piece. Maintaining a 3/16” jamb-to-trim reveal below the top trim, center the piece between the side jams (so that the extensions past the inside corners of the side and head jambs are the same and consistent with the top jamb reveal).

**NOTE:** If trim is delivered preassembled (glued and screwed at the corners), be sure that jamb-to-trim reveals are consistent on three sides before nailing.

7. Using a 2½” Paslode finish nail, attach one end of the top trim to the header, placing the nail about 2” from the end and one-third of the way down from the top edge. Repeat at the other end. Angle the nails slightly up to ensure hitting the header.
8. Install the side trim butted to the mitered top trim, maintaining a consistent reveal from top to bottom.
  - a. If the side trim is too long and the miter joint is good, turn the side trim upside down and mark where it meets the top edge of the top trim; cut the side trim to that length.
  - b. Test for proper length and for a tight miter joint. Trim either if needed.
  - c. Apply glue to the mitered joint and attach side trim using five 2½” Paslode finish nails evenly spaced top to bottom (be sure the top and bottom nails are at least 2” away from the end and all are about one-third of the way from the outside edge of the trim). Angle the nails slightly outward to ensure hitting the Jack stud.
9. Finish securing the top trim by installing a 2½” Paslode finish nail at the center, about one-third of the way down from the top edge.
10. Recheck that the entire length of the inside edge of each trim piece is tight to the jamb. If not, at any loose spots hold the inside edge tight to the jamb, angle a 2½” Paslode finish nail from the center of the trim piece, away from the jamb into the Jack stud.

**NOTE:** Do not attempt to drive nails into the edge of the jamb (this is likely to split the trim). If necessary, pre-drill pilot holes through the trim piece only with a 2½” finish nail and hand nail with 1¼” trim nails.

11. Set nails as needed and fill with putty.
12. For exterior doors, follow the same procedure as for preassembled interior door trim.

### **18.1.5. Install Door Hardware**

1. Install lockset, verify door lockset operation and adjust as needed. Lockset should operate easily and door should rest against entire doorstop and latch snugly with no play. If the door does not latch snugly, bend the tab inside the strike plate with a flat-blade screwdriver until it does. (In the worst case, the strike plate may have to be moved toward the door stop.)

2. For interior doors that will swing against a wall at 90°, install a door bumper where the door handle will hit the wall. To locate this spot, rub the center of the doorknob with a red crayon, press the doorknob against the wall, and turn the knob to mark the wall. Center the door bumper on this mark and install with the screw and anchor provided with the bumper (if not hitting a stud or blocking). If hitting a stud or blocking, simply anchor with the screw provided.
3. For both exterior doors and any interior doors that will not hit a wall at 90°, install hinge stop bumper - one in the middle hinge of interior doors and one in the top and bottom hinges of exterior doors

## 18.2. SLIDING DOORS

### 18.2.1. Door and Opening Preparation

1. Before removing packaging and shipping parts, check doors and frame for damage. If damaged, notify Construction Supervisor or Site Leader.
2. Check to see if the doors have been predrilled for door pulls. If they have, pairs will have holes approximately 36" off the floor and on opposite edges.
3. Select a pair of doors that match in visual appearance (grain pattern, color, etc.).
4. Put the two doors together (surface to surface) and check for crown. Install with the concave faces together and with the best side facing toward the room.
5. Be mindful of the critical gap that must be maintained between the bottom of the doors and the floor:
  - a. For doors installed over finished flooring (hard flooring), the gap between the bottom of the doors and the finished floor must be  $\frac{3}{8}$ " to  $\frac{5}{8}$ ".
  - b. For doors installed over carpeting, the gap between the bottom of the doors and door guide spacer blocks must be  $\frac{3}{4}$ " to  $\frac{7}{8}$ ".
6. Before installing the door track, confirm that the door height is 80" and that the rough opening height is ~83" (82" Jack height + 1½" bottom plate - ½" plaster thickness).

**NOTE:** With flush sliding doors, check the rough opening height at both ends of the header to ensure that the header is level. (The flush end is supported on a cleat within the wall and not on a precut 82" Jack stud.) If the difference is  $>\frac{1}{4}$ " check the header for level

7. If the header is clearly not level and either the door height or the rough opening height is not as specified, consult with the Construction Supervisor or Site Leader. In addition, using a 6' level, check that the Jack stud end of the opening is

reasonably straight and plumb. If any gap exceeds ½”, it is sufficiently out of spec that it will create a poor fit of the door edge to the wall. In that case, consult with the Construction Supervisor or Site Leader.

8. Install the track 2” back from wall surface with the open side of the track facing the rear of the closet. Attach with 3” brass-colored Phillips-head construction screws. Attach with only two or three screws in case the track has to be lowered later to achieve the proper gap at the floor.

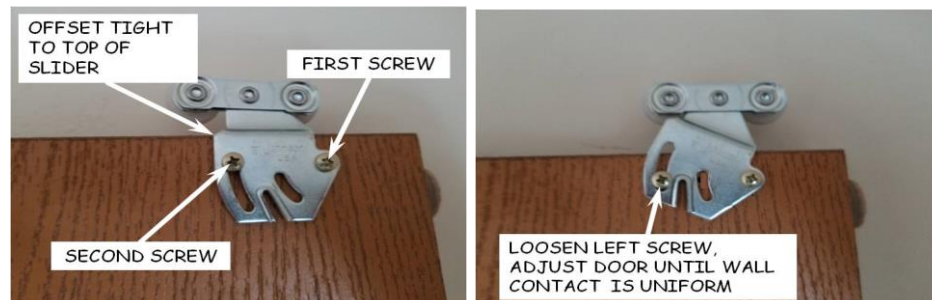
### 18.2.2. Install Door Hardware

1. Do not lean the doors against the wall to install hangers or door pulls. Instead, set up saw horses with padding and lay the doors on them for installation of both.
2. Attach the hangers on the top of each door so there is a 2” gap between the edge of the hanger and the vertical edge of the doors. The hangers with the deep offset are for the back door; those with the shallow offset are for the front door (see Figure 18-1). Using two screws supplied with the sliding door kit, attach each hanger with one screw in the swivel hole and one at the top of the long curve (a third screw will be installed in the small, center slot later). This will result in the door hanging at its upper limit (see Figure 18-2).

**WARNING:** Do not use an impact driver when installing or loosening hanger screws in this or any of the following steps.



**Figure 18-1. Sliding Door Hangers.**



**Figure 18-2. Closet Door Hanger Screw Locations.**



3. If not predrilled, install the door pulls at the same height as the swinging doors (typically 36" above the floor) and 1½" from the edge. Drill the hole with a ¾" Forstner bit to the depth of the bit and tap the pull lightly into the hole. Rather than continuing to hold the pull with the fingers, lay a piece of wood (e.g., a wood shim) on the pull and hammer it tightly into the hole.

**NOTE:** When deciding on which edge of the doors to install the door pulls, remember that the doors will be positioned so you cannot see the overlapping edge of the front door when you enter the room. Install the pulls at the door edges closest to the walls.

### 18.2.3. Hang the Door

1. Hang the doors on the track and measure the gap from the bottom of the doors to the finished floor or to the spacer blocks. If the door height and rough opening height are at expected levels (see Section 18.2.3 above):
  - a. The gap from the bottom of the door to the finished floor should be about 1½".
  - b. The gap from the bottom of the door to the top of one ¼" spacer block should be about 1¼" and about 1" above two ¼" spacer blocks.
  - c. If these gaps are as expected, they will be greater than the upper limit of the specifications: ⅜" to ⅝" over hard flooring, ¾" to ⅞" over future carpeting.
  - d. In either case (carpeting or finished flooring), if the gap is less than the lower limit, it will be necessary to cut off the bottom of the doors or reorder shorter ones. See the Construction Supervisor for direction.
2. Loosen the slotted screws on both hangers and lower the doors until they are within the target range. Measure the gap to the finished floor or to the spacer blocks to confirm.
3. If the doors have been lowered to their lowest level and the gap is still greater than the upper limit, remove the doors and the track, and install a shim of appropriate thickness between the track and the header to create the desired space between the bottom of the doors and the finished floor or spacer blocks.
4. Loosen the screws in the long slot and adjust the doors up and down as necessary until the gap below the doors falls within specification and the door edges have uniform contact with the walls. (If the floor trim has already been installed, check that the gap between the door edge and the wall is uniform from top to bottom.
5. Check that the two doors are at the same height off the floor and adjust as necessary. Add the third screw to each hanger, in the bottom of the small, curved slot, and hand tighten all the screws (see Figure 18-3).



**Figure 18-3. Closet Door Hanger with 3<sup>rd</sup> Screw Installed.**

#### **18.2.4. Finish Doorway**

1. Finish screwing the track to the header.
2. Cut a  $\frac{3}{4}$ "x $1\frac{1}{4}$ " pine strip. With the  $\frac{3}{4}$ " face against the track, install the strip along the front of track so trim can be attached. Nail this to the header with  $2\frac{1}{2}$ " Paslode nails.
3. Install one or two **layers of 5"x6"x $\frac{1}{4}$ "** spacer blocks as required where carpeting is planned. (If the doors will be over finished flooring, skip to Step 4 below.)
  - a. Measure the door opening and make a mark at the midpoint.
  - b. Move the front door panel tight to the Jack stud end of the opening (non-flush side). Slide the door guide under the door edges and adjust it front to back until the reveal between the door and the corner of the wall is uniform from top to bottom.
  - c. Mark the floor at the center of the guide.
  - d. Create a 5"x6" spacer block by laying a pair of 3"x5"x $\frac{1}{4}$ " underlayment pieces on the floor with the 5" dimension left to right. Using the mark on the floor from Step "c" above, center the pair on these marks and nail with  $1\frac{1}{4}$ " Paslode nails. If two layers of spacer blocks are required, add the second pair before nailing.
  - e. Leave the door guide and screws provided on the window sill for later installation.

4. Measure the width of the door opening and cut a piece of **door** trim that long. Using **1¼” Paslode** nails, attach the floor trim to the pine strip, with the square edge tight to the plaster, to hide the track.

**WARNING:** Do not use 2½” Paslode nails because they will penetrate into the track and interfere with door movement.

5. At the final hanging of the doors, install 1”x¾” felt pads at the top of the vertical edges and ¾”x¼” clear vinyl pads at the of the bottom vertical edges of both doors. Over finished flooring, install the sliding door guides so that the doors slide easily. Verify that the reveal on the Jack stud (non-flush) wall is uniform.

**NOTE:** The pads prevent the doors from marring the floor trim.

### **18.3. BIFOLD DOORS**

1. Install the track 1¼” back from the outer edge of the doorjamb. Fasten using 2” flathead screws.
2. Location of the pivot hole determines the direction the door will open.
3. Bottom pivot point locations must be plumb with top pivot points. The bottom pivot bracket may need to be shimmed up ½” to allow for carpet. Attached the bracket to the deck and doorjamb.
4. Door pulls should be installed at the same height as interior doorknobs and in the middle of the two inner panel fronts.
5. On 4-panel doors (two bi-fold doors opening in opposite directions), align the doors by moving the top or bottom pivot point.
6. Measure the width of the door opening, add 3” to that measurement, and cut a piece of baseboard that long. Place the bottom edge of the baseboard flush with the top edge of the door opening and centered so that 1½” of the baseboard extends horizontally beyond each door jamb. Using 2½” Paslode nails, attach the baseboard to the wall.
7. Set nails and putty.