Quick Reference Guide

March 2025
Version 25.0

Chapter 1 - Installing Laminate Beam

Beam Preparation	1. Refer to House Plan and mark beam location on concrete foundation wall 2. Remove any protective cover on beam and check for "UP" designation 3. Determine required length of beam a. Measure from back edge of beam pockets – TWICE! b. Subtract 1" from measured length c. Mark beam at that length and score both faces of beam ½" deep with circular saw
Move Beam to Pockets	4. Attach a temporary 2x4 (long enough to extend at least 6" past outside edge of foundation) to middle of beam with 16d duplex nails 5. Carefully move beam to the pockets a. Assign person to hold end of 2x4 and stabilize beam during beam set b. Position beam along a non-pocket wall so both ends of the beam rest on the pocket wall foundations (or sill plates, if present) c. Carefully jockey the ends of the beam to slide the beam toward the pockets d. Slowly position the scored end over its pocket e. Carefully move beam until unscored end drops into its pocket 6. Cut beam to length a. Elevate scored end of beam 6-12" with pieces of scrap 2x4 on the foundation b. Trim beam with reciprocating saw using score marks as guide c. Carefully remove pieces of 2x4 scrap, one piece at a time, to lower beam into pocket
Complete Beam Installation	7. Position beam with ½" gap between end of beam and back of pocket 8. Align beam with marks on concrete wall 9. Stabilize beam by nailing the long 2x4 from Step 4 to sill plate (or drill hole and attach to foundation bolt) 10. Flush beam with top of sill plates at center mark on both short walls using steel shims 11. Cut scrap treated lumber, wedge between beam and concrete side of pocket. Secure permanently 12. Refer to House Plan and attach support posts to underside of beam with 1½" lag screws and washers a. Position plate to be flush with <u>finished side</u> of basement b. Set bottom of posts on concrete pad and roughly plumb. i. Do not anchor at this time ii. REQUIREMENT: Threaded adjustment screw/plate must be on the concrete pad
Straighten and Secure Beam	13. Attach Beam String Jigs, one near each end of the beam 14. Tightly stretch a string line between both jigs and secure 15. If beam is bowed, nail additional 2x4 braces—between joist locations, 2" from outside edge of sill plate 16. Using gauge block between string and beam, adjust braces until beam is straight 17. Plumb posts, check for straight/level, anchor to concrete w/1¾" concrete screws and ¼"x1" fender washers —four per post 18. Cut and install (with wording right-side up) I-joists at each end of the long walls and over each of the posts 19. Check I-joists for crown; adjust beam as needed until each I-joist is straight along its top edge 20. Remove adjustment pins from support posts 21. Leave string from Step 14 in place to confirm beam location during I-joist installation
Install Egress Safety Covers	1. Install egress well metal cover and temporary wood safety cover

Quality Points

Chapter 1 – Installing Laminate Beam

- Verify beam is in correct location (according to House Plan) and correct orientation (top edge is up)
- At each end of the beam, the top of the beam is flush with the top of sill plates at their center mark
- Beam is perpendicular to top of foundation (use a framing square) and tightly, permanently wedged in place
- All required support posts:
  - are installed threaded side down, in proper location (according to House Plan) and flush to finished side of beam
  - Are secured to underside of beam with 1½" lag screws and washers
  - Are secured to support pad with four ¼"x1¾" concrete screws and ¼"x1" fender washers
  - Are plumbed in two directions and all posts are in alignment (site at BOTTOM of posts or use a string)
- Beam is straightened side to side (no bow) using string and secured at each post
- Each supporting I-joist is nailed (3¼" collated nails) to sill plates at both ends and to beam, one nail on each side of I-joist at each location. Wording on the face of the I-joists is right-side up. Double check for if straightness (no bow) by sighting along BOTTOM flange of I-joist
- Beam is level using string and checking any supporting I-joists installed by sighting the TOP flange for any crown. If crown up, lower beam posts or beam shims until level, if crown down then raise beam posts or beam shims until level
- Metal and temporary wood egress safety covers are installed.

Quick Reference Guide

March 2025
Version 25.0

Chapter 1 - Installing Sill Plates and Egress Ladders

Foundation Preparation	1. Trim any foamboard extending above the top surface of the foundation 2. Remove any debris from the top surface of the foundation 3. Check straightness of the chalk lines with a string line 4. Install sill plates on pocket walls first; then proceed to non-pocket walls
Install Sill Plates	5. Place foam sill seal on top of foundation, secured by impaling it onto foundation bolts and held at least 1" back from the chalk lines 6. Determine layout of sill plates on the walls and cut pieces to appropriate lengths 7. Mark locations of the foundation bolts on the sill plate material 8. Drill ¾" or ⅞" holes for the bolts 9. Place the sill plate so it slides over the foundation bolts and is aligned with the chalk line 10. Secure the sill plate with a ½" nut on top of a 5/16" washer, which is on top of a rectangular concrete form tab
Caulk Sill Plates	11. Apply air sealing caulk between all sill plates where they abut and toenail seams with 8d nails 12. Lay a thick bead of air sealing caulk on the interior side of the sill plate where it meets the foundation
Install Egress Ladder(s)	13. Install egress ladder(s) in egress well(s), making sure ladders are plumb 14. Replace metal and wood egress covers

Quality Points

Chapter 1 – Installing Sill Plates and Egress Ladders

- No sill seal extends over the foundation chalk line
- All sill plates are flush with the chalk line
- All sill plates are attached to at least two foundation bolts
- Sill plates are secured at each foundation bolt with a washer, concrete form tab, and nut, as needed
- Sight along the top of the sill plates to ensure they are straight and there are no valleys or hills
- Sill plate seams are toenailed together with 8d nails
- Sill plate seams are completely filled with air sealing caulk
- Caulk completely seals the joint where the sill plate meets the foundation
- Egress ladder(s) are installed in window well(s). Ladder(s) are plumb, centered on the wall opposite to the window, and secured with two 1¾" concrete screws
- Metal and temporary wood egress covers are installed

Quick Reference Guide

March 2025
Version 25.0

Chapter 2 - Installing I-joists, Sill Box

Preparation	1. Check Manufacturer's Layout Plan a. Verify all materials are present and in stated dimensions b. Note areas where specific dimensions required 2. Measure thickness of rim boards (should be 1⅛") a. Snap chalk lines at this dimension around outside perimeter of sill plates b. Check lines for straightness
Layout & Install I-Joists	3. Starting at zero corner, layout I-joist spacing per House Plan (typically, on 19.2" centers - diamond mark on tape) on both long wall sill plates and on lam beam 4. If a foundation bolt interferes with I-joist location, secure sill plate to foundation on either side of foundation bolt with ½" wedge anchors and cut foundation bolt flush to top of sill plate 5. To install an I-joist a. Verify one end is square. If not, square up one end. b. Determine the length between rim board chalk lines on the long walls and cut the joist to that length using joist-cutting jig. 6. Install I-joist, so wording on its face is right-side up, with 3¼" collated nails. 7. To allow concrete crew access to the basement a. Install I-joists at both ends of foundation, near each support post, and a few in the middle (especially if it supports rim board at porch locations) b. Cut, and stack remaining I-joists next to installed I-joists 8. Layout and frame stair opening per House Plan
Layout & Install End Blocking	9. Beginning at zero corner, layout end block locations 32" o.c. on the short walls from OUTSIDE edge of long wall sill plate. Adjust the last blocking, as necessary, to allow for access from the basement into this area 10. Measure distance from rim board chalk line to the first I-joist at the beam and two ends of the I-joist. a. Cut scrap pieces of I-joists to this length b. Set block on chalk line, make sure it is square and flush with the top of the I-joist, and nail to sill plate, rim board and I-Joist. Use long clamp to stabilize blocking, if required.
Install Rim Boards	11. Measure width of rim board and rip if greater than the height of the I-joists. Must be = or +⅛" max. 12. Check rim boards for crown and set with crown up. 13. Lay bead of caulk on sill plate and between rim boards, set rim board on the plate, and secure to I-joists and sill plate. Do NOT join two boards at an I-joist. 14. Mark the location of end blocking on the outside of the rim board with black marker to later aid nailing bottom wall plates to the blocking. 15. For any rim board behind porch areas a. If foundation poly extends above the 2" foundation foamboard pull up and staple to rim board. b. Cover with house wrap extending 1-2' beyond the edge of the porch. c. Cover with1" foamboard, 10⅞" wide, flush with top of rim board, and extending 6-12" beyond the edge of the porch.
Layout & Frame Stair Opening	16. Layout stair opening per House Plan 17. Cut three pieces of LVL beam material to create the two perpendicular and one parallel stairway opening LVL beams. Also cut a piece of rim board material the same length as the parallel LVL beam 18. Layout the location of the parallel LVL beam on the two perpendicular LVL beams 19. Install the two perpendicular LVL beams by toenailing them to the sill plate 20. Transfer I-joist locations from sill plate to the parallel LVL beam and install I-joist hangers at these locations 21. Install parallel LVL beam between the perpendicular LVL beams at the location marked in Step 18 above 22. Install rim board material from Step 17 above between the perpendicular LVL beams on the lam beam, and flush with the face of the beam 23. Square the stairway framing and toenail the perpendicular LVL beams to the lam beam 24. Check the perpendicular LVL beams for bow; straighten, if necessary

Quality Points

Chapter 2 – Installing I-joists, Sill Box

- I-joists are cut to proper length making sure they do NOT extend past the chalk line (too long). If anything, it is better to be SLIGHTLY short so as not to push out the rim board.
- All I-joists are nailed to sill plates and beam.
- Check that each I-joist is straight (no bow) by sighting along BOTTOM flange of I-joist.
- All end blocking are installed, squared to long I-joist both horizontally and vertically and secured to long I-joist, sill plate, and rim board (at both top and bottom flanges).

- Rim board:
  - is no more than ⅛" higher than I-joists
  - is caulked at sill plate and at all joints
  - joints do not fall on an I-joist (must be in between I-joists)
  - is nailed to each I-joist at top and bottom flanges
  - is toe nailed every 6" into sill plates
  - is straight (adjust/shim as needed)
  - is covered with house wrap and foamboard behind each porch/stoop (if zero grade entrance add ¾" decking strip along entire rim board/porch stoop length for top of porch/stoop concrete)

- Stairway framing:
  - is in proper location
  - is parallel to closest foundation wall rim board
  - is secured to the sill plate and the lam beam
  - I-joist hangers on the parallel LVL beam are facing the sill plate on the long wall

Quick Reference Guide

March 2025
Version 25.0

Chapter 2 – Decking, Sump Pump Hose and Basement Preparation

Plan & Install Floor Decking	1. Begin decking at zero corner on side of house that does NOT contain the stairway opening 2. Determine best layout pattern to minimize waste 3. Snap chalk lines at 1" less than 4' intervals across the width of the foundation 4. Install the first course of decking a. Apply continuous bead of adhesive to the tops of rim boards, I-joists and end blocking b. Drop a sheet of decking on the I-joists, with its grooved edge aligned with the first 48" chalk line c. Square the sheet with the underlying I-joists and nail corners with 8d nails d. Adjust the I-joists to 19.2" centers and nail with 8d nails e. Repeat with all subsequent sheets of decking for the first course (leaving a 1/8" gap between ends of sheets) 5. Install remaining courses of decking a. Apply continuous bead of adhesive to the tops of rim boards, I-joists and end blocking b. Drop a sheet of decking on the I-joists, with its tongue edge facing the grooved edge of the previous course c. Use a sledge hammer and 6 – 8' piece of scrap 2x4 to move the new piece tightly to the previously installed course of decking d. Square the sheet with the underlying I-joists and nail corners with 8d nails. e. Adjust the I-joists to 19.2" centers and nail with 8d nails f. Be sure to leave a ⅛" gap between ends of sheets 6. Complete nailing of all sheets of decking with seven 8d nails on the edges and five 8d nails in the field 7. Cut away decking over stairway opening, leaving a 1¼" overhang where the top of the stairs will be attached. 8. Cut two 1" wide by 1¼" deep notches in the decking overhang, one on each side of the stairwell opening. 9. Securely cover stairwell opening
Install Sump Pump Hose	10. Determine best location for hose to exit the sill box 11. Drill 2½" hole through rim board 12. Reposition hose so it exits through that hole
Basement Preparation	13. Cut floor drain flush with surface of concrete floor 14. Remove all debris from basement floor, window frames and egress wells 15. Sweep floor clean next to foundation walls 16. Apply radon caulk all around the perimeter of the basement floor where it meets the foundation wall 17. Cut drain tile 2"-3" below the bottom of the window sill and cover it with a piece of foamboard and at least 2" of stone

Quality Points

Chapter 2 – Decking, Sump Pump Hose and Basement Preparation

- All seams between decking sheets are no more than ⅛" wide
- Each decking sheet is properly nailed:
  - seven 8d nails on the edges and five 8d nails in the field
  - nails are sunk to the proper depth
  - any nails that missed the framing below the deck have been removed and re-nailed
- Each decking sheet has been marked with a red "OK"
- End blocking marks have been transferred to the top of the decking
- Notches in the decking overhang have been cut on each side of the stairwell opening
- The stairwell opening is securely covered by the end of the work day
- Sump pump hose is repositioned to exit through rim board
- All debris has been removed from basement floor, the egress wells, and around the basement window frames
- Basement floor perimeter is caulked with radon caulk
- Basement floor drain is cut flush with surface of concrete floor
- Drain tile is trimmed to proper height and covered with foamboard and at least 2" of stone

Quick Reference Guide

March 2025
Version 23.0

Chapter 3 - Cutting Exterior Wall Plates

Identify Full-Length and Pre-Defined Plate Lengths	1. Before cutting wall plates consult the Plate Layout Drawing typically in the construction trailer. If not there, consult the Construction Supervisor. Note while using the Drawing, a. Full-length plates labeled +/- should be used without cutting. b. Plates labeled with exact dimension should be cut precisely to that dimension. REQUIREMENT: Top plate joints MUST be over a stud or over door or window header. 2. Identify any 18-20 ft 2x6 lumber. Set aside 4 straightest, wrap in shrink wrap, label with red crayon, "Gable end use only." 3. Note which walls are long (i.e., extend to the edge of the deck) and which are short.
Cut Long Wall Plates	4. Starting at zero end of LONG wall, lay one end of upper and bottom plates 5½" **past the beam pocket wall chalk line.** Tack together with duplex nails. 5. Cut and place the remaining upper and bottom plates per the hand-drawn lengths on the Plate Layout Drawing. Keeping joints tight, tack together with duplex nails. **NOTE:** The chalk line of the beam pocket walls may not be exactly 5½" from the outside of the sill box. Therefore, when measuring ALWAYS use these lines as your reference, not the outside of the sill box. Be sure to use lumber with good, clean, and square edges at each end of the wall plates. 6. Field cut the last pieces by measuring **to the chalk line and adding 5½".** a. Before measuring, be sure the first plate is in correct position and that all joints between plates are tight. b. When finished cutting, both ends of the wall must be cleanly cut, square, and flush 7. Mark the inside edge of the bottom plates 5½" from the end. This mark must align with the chalk line of the beam pocket wall (will aid wall construction). 8. Tack top and bottom plates together with duplex nails and set in location on the deck. 9. Repeat the above for the opposite long wall.
Cut Short Wall Plates	10. As with long walls, consult Plate Layout Drawing for full-length and pre-defined plate lengths a. Set end of first set of plates tight to long wall **chalk line** b. Cut/place intermediate plates and tack with duplex nails c. Measure to opposite **chalk line** and field cut remaining pieces to fit 11. Repeat with opposite short wall
Complete Plate Layout	12. Recheck the lengths of both sets of opposite walls to be sure they are equal and ends match their chalk lines. If lengths differ by more than 1/8" a. Trim the long set of plates or b. At the zero end of the short set of plates, move the end stud past the end of the plates—e.g., at 1 3/8" rather than usual 1½". Label mark DO NOT MOVE.

Quality Points

Chapter 3 - Cutting Exterior Wall Plates

- At least four, straight 18-20 ft. 2x6's are set aside, labeled for gable use only and shrink wrapped
- End cut square
- Bottom and upper plates lengths are equal (ends are flush)
- Lumber with good, clean, and square edges used at each end of the wall plates
- Did NOT use extremely crowned, bowed or twisted lumber
- Opposite walls plate sets are equal in length
- Mark both ends of long wall bottom plates 5 1/2" from end of plates (marks must align with beam pocket wall chalk lines)

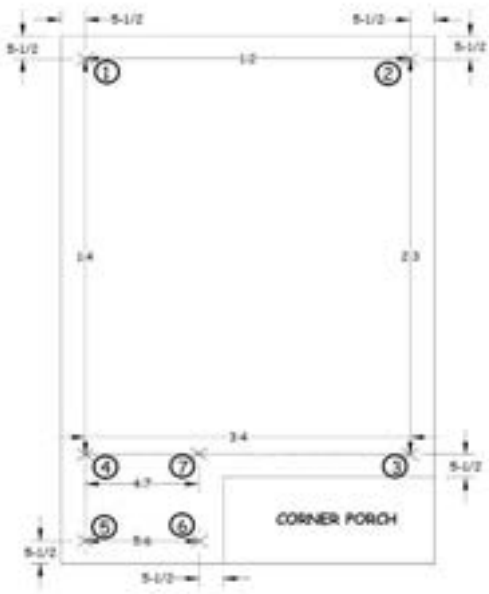
Quick Reference Guide

March 2025
Version 25.0

Chapter 3 - Laying Out Exterior Walls

Layout Exterior Corners	1. Before laying out walls on the deck, check the perimeter of the deck and stair opening for excess decking or glue and trim as needed. 2. At each corner measure in 5½" from the outside surface of rim box. Using a square and sharp pencil, create a large initial corner mark (an X, 1-2" in length). 3. Remove the "Wall Layout Worksheet" page (figure 3-1) from the manual for recording wall measurements.
Create a Rectangle	4. With long steel tape, 'burn a foot', and carefully measure the lengths of opposite walls using the initial corner marks from "2" above. Record on the worksheet. • If opposite wall lengths differ by 1/8" OR MORE, add ½ the difference at each end of the shorter wall • If walls differ by less than 1/8", ignore the difference and proceed to Step 5. • Remark the corners. NOTE: If house includes a corner porch, see Steps 9,10 below.
Square the Rectangle	5. With a long steel tape, burn a foot and carefully measure the diagonals between the corner marks to check for square. Record on the worksheet. 6. If they differ by 1/8" or more, adjust the marks as follows: • At EACH end of the SHORT diagonal, lengthen the LONG wall by ½ the difference. • Recheck for square and adjust as needed.
Check for Rim Bow	7. Check all four sides of the rim box for bow. Pull a tight string line over the new corner marks at each end of the wall. 8. Measure between the string line and the outside of the rim board every 4' to 5' and record on the Worksheet. • If the maximum measurement is greater than 5⅝", move BOTH ends of the line equally toward the rim board until maximum =5½". Remark the deck at each end. • If the difference is equal to or less than 5⅝", ignore the difference and proceed to Step 9. NOTE: If Bow adjustment is ≥3/8", recheck the rectangle for square and adjust as cited in 5&6 above.
Layout Walls on L-Shaped Deck	9. Square and check bow of main deck as done in Steps 4-8 above 10. Adjust front deck extension (see Fig on back) • Stretch tight string line Point 3 to Point 4. Measure line 5-6 and use measurement to locate Pont 7 on Line 3-4. Mark deck with X • Measure Line 4-5 and Line 6-7. If not equal adjust Point 5 or Point 6 to ensure Line 5-6 is parallel with Line 3-4 • In similar manner, adjust Points 6 or 7 to ensure Line 6-7 is parallel with Line 1-5 • Check porch walls for bow and adjust as necessary.
Complete Layout	11. Once all corner mark adjustments have been made, carefully re-measure the precise distances between the corner marks in all directions. Adjust the marks as needed to ensure opposing walls differ by 1/8" or less. 12. Using these final marks, snap red chalk lines for all exterior wall locations. 13. Finally, spray all chalk lines with all clear varnish to protect them from the elements.

(Continued on next page)



Quality Points

Chapter 3 - Laying Out Exterior Walls

- Main floor wall layouts are complete:
  - Perimeter of deck and stair opening has been trimmed of all excess decking and glue
  - Exterior and interior walls are marked on deck
  - Opposing walls are of equal length (within 1/8”)
  - Rectangle is square (within 1/8”)
  - Corner porch (if existing) properly laid out
- All wall plates are cut and marked for studs, windows, and doors
- Verify both ends of long wall bottom plates 5 1/2” from end of plates (marks must align with short wall chalk lines)
- All Studs (X and SX), Kings (K), Jacks (J) marked, door and window areas labeled with size on top edges of wall plates
- All Wall plates are securely nailed together with duplex nails
- 2 exterior short walls are off the deck and set aside

Quick Reference Guide

March 2025
Version 24.0

Chapter 3 – Marking Windows, Doors-Exterior Wall Plates

Mark Window and Door Locations	1. Starting at zero end, lay out the long walls first (See the House plan for zero corner). a. Stand plates up with outside edges facing up b. Hook long tape on end of plate, mark center-line locations (℄) of windows and doors c. Label window/door size—e.g., 3040 window, 3068 door—on both plates 2. Layout windows and doors on beam pocket walls next a. Again, start at zero corner b. Extend tape 5½" past end of plates (to account for width of intersecting wall) 3. Referring to window/door sizes on Plate Layout Drawing a. Mark the location of King and Jack studs NOTE: The first two digits represent width of unit in feet and inches – NOT inches. The second two digits represent height, again feet and inches b. For windows, the separation between Jack studs (rough opening) equals the width of the window—e.g., separation equals 3'-6" for a 3640 window c. For exterior doors, the separation equals the width of the door plus 2½"—e.g., the rough opening equals 38½" for a 3068 door. NOTE: When laying out the location of the exterior doors, take special note of the location of the porch slabs and adjacent walls. The door King studs must be at least 3" from an adjacent wall to allow for trim. Verify with the Construction Supervisor where the door should be located relative to the porch center. d. Mark all King studs with a "K" and Jack stud with a "J". i. The Jack studs will always be inside the Jack studs. ii. Label location of both King and Jack studs on the bottom plate iii. Label location of the King studs only on upper plate REQUIREMENT: Any opening 6' or wider requires two Jack studs at each end

Quality Points

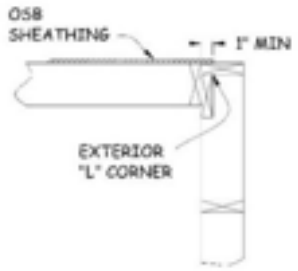
Chapter 3 – Marking Windows, Doors-Exterior Wall Plates

- All window and door centers are marked on the outside edges of the upper and bottom plates per the Plate Layout Drawing
    - Centers on long walls are measured from the zero end of the plates
    - Centers on beam pocket walls are measured from the zero end of the plates plus 5½”
- The rough opening for windows equals the size of the window specified in the Plate Layout Drawing
- The rough opening for exterior doors equals the size of the door specified in the Plate Layout Drawing + 2½”
- Exterior door King studs are at least 3” from adjacent interior walls and the doors are properly located over the porch slab.
- King studs are marked on both upper and bottom plates
- Jack studs are marked only on the bottom plates
- Any windows 6’ wide or wider have 2 Jack studs at each end of the crude opening

Quick Reference Guide

March2025
Version 24.0

Chapter 3 – Marking Studs-Exterior Wall Plates

Lay Out Studs on LONG WALLS	1. Lay out long walls first. Before starting, check opposite walls to be sure they are precisely the same lengths (within 1/8"). If not, trim to equalize. NOTE: This is very important with 24" o.c. framing because it ensures the studs are located directly under roof trusses. 2. Hook a tape on the zero end of the plates and mark the location of all studs on 24" centers a. Mark both edges of studs at +/- ¾" from center and place an "X" within edge marks on all four plates where no window or door. (If using the 50-foot steel tape, do not hook the tape but burn 24" and mark after that.) b. If 24" center falls at King stud, leave the "K" designation on that set of plates. If the "K" location is not on center it may have to be moved. See Construction Supervisor or Site Leader. c. If 24" center falls within a window, mark a "SX" ("Short Stud") on bottom plate. (DO NOT mark an "SX" within a door) 3. If length of walls not a multiple of 24", may be necessary to add extra stud at 48" a. If wall long by ¾" or less, ignore the difference b. If >¾", measure back from end and center stud at 48" i. If it overlaps stud on 24" centers, locate extra stud tight to the one on 24" centers ii. Otherwise, center stud at 48" from the end c. If house plan does not show OSB sheathing at wall end or if door or window prevents installation of a full 48" wide sheet, see Construction Supervisor. 4. At each end of long walls, layout a corner with two 2x6 studs, making an L-corner a. Make one mark at 1½" from end, mark with "X" (like a normal stud) b. Make second mark 5½" from the first mark (the width of a 2x6) c. Mark this "L" as "Corner Down" 
Lay Out Studs on BEAM POCKET WALLS	5. Extend tape 5½" past zero end and mark studs on 24" centers. Mark "X's" and "SX's" as usual. 6. At the non-zero end, again extend tape 5½" past the end and measure back 48". If no stud at that location, proceed as follows: a. If any stud is centered between 48" and 52½" from the outside corner, the edge of OSB can be centered on that stud during wall building. b. If no stud is centered within that range, add a stud at 48" from the end.
Finish Marking Plates	7. Mark the inside edge of the upper plate with "UPPER" and the inside edge or the bottom plate with BOTTOM. Mark the upper plate with a compass orientation (N,S,E,W) as it lays on the deck. 8. Lay plates flat on deck with inside edges facing in with ends at prescribed locations 9. Mark inside edge of long wall bottom plates 5½" from end to aid wall building 10. Check drawing or deck for intersecting 2x4 or 2x6 walls. At these locations, mark top edges with lines 3 ½" or 5 ½" apart and mark a "W" between the lines. Helps during wall building.

Quality Points

Chapter 3 – Marking Studs-Exterior Wall Plates

- All studs marked on 24” on centers from the zero end
- Additional stud marked (usually needed) on non-zero end of long walls
- Additional stud marked (usually NOT needed) on non-zero end of beam pocket walls
- All “SX” studs under window sills are marked
- Both ends of long walls must have “L-corners” marked
- Verify both ends of long wall bottom plates 5 1/2” from end of plates (marks must align with beam pocket wall chalk lines)

Quick Reference Guide

March 2025
Version 24.0

Chapter 3 – Cutting Interior Wall Plates

Cutting Plates	1. Cut upper and bottom plates to match the layout on the deck. 2. Recheck wall intersections to determine which will be "long" and which will be "short" at the intersection (this may be dictated by an adjoining door). NOTE: All closet side walls are typically the "short" wall in the layout and are typically 25" long. 3. On walls that require multiple upper and bottom plates (or have a joint), stagger the upper and bottom plates by placing upper and bottom plates at opposite ends of the wall. a. Join the ends of top and bottom plates on separate studs. b. The upper plate joint must be centered on a stud, not over a door. 4. On walls that include both full-height and 42"-height sections: a. Cut separate plates for each section. b. Cut the bottom plate to span the joint. 5. Tack plates together with duplex nails, label plates with letter or number and compass orientation when in position on the deck. Label deck with matching number or letter
Label Short Wall Plates	6. For any 42"-height walls, label the TOP AND BOTTOM plates with "42" WALL/39" STUDS. 7. For any short wall that supports the closet platform above the stairway, label the plates with "13¾" WALL/10¾" STUDS".

Quality Points

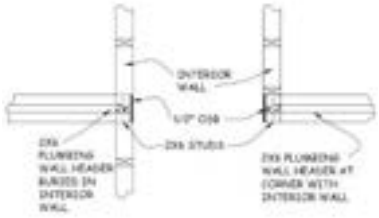
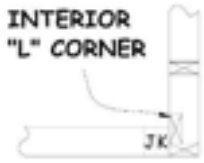
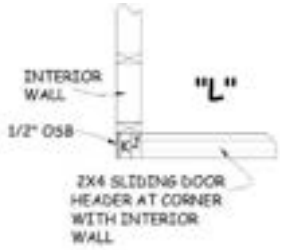
Chapter 3 – Cutting Interior Wall Plates

- Upper and bottom plates are tacked together with duplex nails
- Upper and bottom plates match layout on the deck and are marked with number/letter and compass orientation
- At intersection of two walls where one includes a door at the intersection end, the door wall abuts the adjoining wall
- On walls requiring multiple upper and bottom plates, plates are staggered, and plate ends are centered on top of studs, not over doors
- On 42”-height walls, plates are labeled “42” WALL/39” STUDS”
- On short wall supporting closet platform over stairway, plates are labeled with Wall height, Stud Lengths

Quick Reference Guide

March 2025
Version 24.0

Chapter 3 - Laying Out Interior Walls

Lay Out Walls on Deck	1. Referring to House Plan, layout location of all interior walls. Snap blue chalk lines on each side. Location of walls labeled "Ref" may not match House Plan owing to foundation differences. 2. All interior walls that intersect an exterior wall are measured from the inside of the exterior wall. 3. Start by laying out walls around the stairway opening (provide reference for other walls). Extend these walls 5" beyond the lip of the stairway opening. 4. At corners and intersections, pay attention to which wall end should abut the side or the other wall. **REQUIREMENT:** Bath tub/shower **MUST** be 60 1/8"
Lay Out "Plumbing Walls"	5. Check the house plan for special **2x6** "plumbing" wall (for piping between basement and attic). 6. If 2x6 wall is a simple extension of 2x4 interior wall, lay out with flush side per house plan. 7. If walls intersect at 90° (see figure below): a. If two walls create an "L", butt the side of the 2x6 wall against the end of the 2x4 wall. b. If the two walls create a "T", extend the 2x6 wall into the 2x4 wall. c. In both cases, lay out the Jack stud flush with the closet side of the 2x4 wall. Note that ½" OSB will be added to the King/Jack pair to match the 3½" width of the 2x4 wall
Plumbing Wall Configurations	
Door/Wall Intersections	8. At corners, intersections, if a door is be be at that location, include an "L-Corner" at the end of the adjoining room wall. Allows for easy nailing into the King stud of the door:  9. Check the house plan for flush sliding closet doors that end at the inside corner of the closet. Similar to plumbing wall, layout end of flush slider with 3½" sandwich of Jack, King, ½"OSB: 
Identify Walls of Unusual Height	10. Referring to the House Plan, a. For a 42"-hight wall, label the deck with "42" WALL/39" STUDS. Mark the full wall length including the 3½" end post (see Fig 3-12 in Manual). b. For a combination of full-height and 42"-height wall, mark the location of the joint between the two sections on the DECK. c. For any wall at the end of the stairway where a platform will be built, label the DECK with "13-3/4" WALL/7-3/4" STUDS. 11. Spray all chalk lines with varnish to protect them from the environment.

Quality Points

Chapter 3 - Laying Out Interior Walls

- Main floor wall layouts are complete:
    - All Studs (X), Kings (K), Jacks (J) marked, door and window areas labeled with size on top edges of wall plates
    - All Wall plates are securely nailed together
    - All interior walls are labeled directionally and numbered with matching numbers on the deck
    - All interior walls are off the deck and set aside
- Component assemblies are complete and labeled:
    - Interior components
- Basement Wall Layout is complete

Quick Reference Guide

March 2025
Version 24.0

Chapter 3 – Marking Doors-Interior Wall Plates

Mark Door Locations	1. Referring to the House Plan and Table of Door Measurements on the Floor Plan, begin by locating and marking door centerlines with ℄. NOTE: The rough opening for all swinging doors is 2" wider than the door size. For sliding doors, the rough opening is ½" wider than the stated door width. 2. Referring to the door size table on the Floor Plan, locate the King/Jack combinations at each end of the door. a. Label both upper and bottom plates with a "K" and "J". b. Label only the bottom plate with a "J". 3. Mark the location of each door and label with the door size and type—e.g., 4068 sliders. a. For bedroom and bathroom doors, locate the hinge-side King/Jack combination <u>at the intersection</u> with the adjoining wall. (This places the hinge side "tight" to the corner but still allows room for trim.) b. For <u>swinging</u> closet doors except for those at platform end of stairs), and for non-flush sliding doors, locate the centerlines per the House Plan. c. For the closet door at the platform end of the stairway opening, locate the outside edge of the King stud flush with the outside edge of the platform short wall. d. For <u>sliding</u> doors built flush with the exterior wall, locate the inside of the <u>single</u> King/Jack pair the specified distance from the exterior wall—e.g., 60 ½" from the exterior wall for a 5068 door.

Quality Points

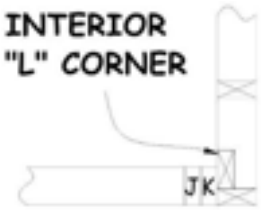
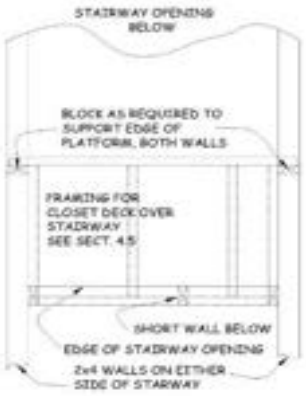
Chapter 3 – Marking Doors-Interior Wall Plates

- Door centers located per House Plan and marked with ℄
- KJ pairs located per Door Measurements Table
- Bedroom and bathroom doors located tight to the room wall for proper door swing
- King studs marked on both upper and bottom plates, Jack studs on bottom plates only
- L-Corners marked adjacent tub/shower flange location and at intersection of bedroom/bath doors with adjoining walls

Quick Reference Guide

March 2025
Version 24.0

Chapter 3 – Marking Studs-Interior Wall Plates

Lay Out Studs	1. Lay out the studs on 24” centers on both top and bottom plates a. If the wall intersects an exterior wall, start from the exterior wall end. b. If the wall intersects another interior wall, start layout to match likely sheetrock installation. 2. Where a bathroom or bedroom door connects with an adjoining wall, locate a 2x4 L-corner in the adjoining wall to allow nailing through the L-corner into the King stud of the door.  3. For walls adjoining the stair opening, one wall typically includes a sliding closet door next to the exterior wall and includes a platform of the bottom of the stairs. a. If so, layout the wall opposite the closet as usual, starting at the exterior wall. b. On the closet side, layout the closet KJ studs and then continue laying out studs on same centers as opposite wall.  4. Locate the plates labeled “13¼” WALL/10¼” STUDS” and layout three studs 24” o.c. 5. For walls adjoining tub/shower, layout studs as usual on 24” centers, starting at intersecting wall. a. At the opposite end of the short, 36” wall, layout an L-Corner with base of L on surface facing tub (provides vertical blocking for tub flange. b. On opposite wall, center another L-Block opposite that on the short wall (~31½” from back wall). 6. Make certain that door rough openings are at least 3” from the end of the wall to permit later installation of door trim 7. On top edges of plates, mark the location of any intersecting walls with lines and a large “W” between the lines to aid in locating intersecting walls during wall building 8. When complete, label top and bottom plates and tack together with duplex nails. Mark compass orientation and label both plates and deck with identifying number or letter.

Quality Points

Chapter 3 – Marking Studs-Interior Wall Plates

- Stud layouts start at an exterior wall or at a junction matching expected sheetrock layout
- All studs are laid out on 24” centers, including
    - Both sides of stairway
    - The 13½” wall supporting the stairway platform
- Layout of both walls next to the tub/shower include L-Corners 31½” from back wall
- Walls adjacent bath and bedroom doors include L-Corner next to KJ studs
- Intersecting walls are marked with lines and “W” to aid wall building

Chapter 4 – Assembling Exterior Wall Components

Identify & Sort Component Lumber	1. Before marking and cutting any component pieces, crown, mark and sort general 2x6 lumber. a. Mark and set aside very straight pieces for use in the kitchen, tub wall, and ends of sliding closet doors. 2. Locate and confirm separate Component Package expressly intended for component construction. It should consist of 2x10's, 2x6's, and 2x4's along with one 8'1x6. 3. Determine window and door sizes and dimensions from House Plan Supporting Documents.
Cut Pre-Defined Component Pieces	4. Referring to the Component Cut List, cut pre-defined pieces of 2x10 and 2x6 header pieces, 2x6 window sill pieces, and 2x6 Jack studs. a. Locate the set of cutting diagrams and package of Component Assembly Drawings in a 3-ring binder in the site support box. b. From the Component Package, select a lumber piece of the specific length shown on the bar chart—e.g., a 12' or 16' piece. c. Label each piece with its length and set aside for assembly. d. Make a check mark on the cutting diagram to record each piece has been cut.
Assembling Exterior wall Components	5. Refer to the Component Assembly Drawings showing the specific number of windows and doors required for that house, including the dimensions of individual pieces. 6. Work on a flat surface. If on concrete, work on a piece of OSB to protect the concrete from protruding nails. 7. Obtain 3" Collated nails from the Component Bin for use when assembling headers and assembling King/Jack studs. Return unused nails to the Component Bin. 8. Carefully align pairs of 2x10 pieces to create an exterior door or window header (windows greater than six feet may require three 2x10 pieces). a. Ensure that at least one end and one long edge are flush. b. Nail with three rows of 3" Collated nails, 2" from each edge and middle, no more than 12" apart, and staggered on the opposite side. c. Once assembled, if needed, trim the end, or rip the long edge to insure all edges are flush 9. Select two stud-length 2x6's for use as King studs from the pre-sorted pile and nail to the ends of the 2x10 header assembly with the crown down. Be sure that a flush, long edge of the header is positioned "down" towards where the Jack studs will be located. Take care that both the tops and sides of the King studs are flush with the ends of the header. Nail with three 3 1/4" Collated nails into each header piece (six nails per King Stud). 10. Place the matching-length 2x6 header piece between the King studs and tack to the long, flush edge of the header. Square each end of the 2x6 to the adjoining King stud and nail through the King Stud into the end of the 2x6 with three 3 1/4" Collated nails. Finish nailing the 2x6 to the header. 11. Select two precut 82" 2x6's for use as the exterior Jack Studs. These pieces are specifically cut long to allow trimming to match the length of the King Studs. a. Place each 82" piece next to one of the King Studs, tight to the underside of the header assembly, mark, and field cut to length. b. Check the crowns of the King and Jack Studs and pair them to match a "crown up" with a "crown down" and any "bows" opposite. 12. **For exterior doors,** a. Place the field cut Jack Stud tight to the header, flush the edges with the King Stud, clamp and nail from the Jack stud into the King Stud with pairs of 3" Collated nails 12" apart, staggered on opposite edges. b. Cut a 38-1/2" length of 1x6 and nail into the underside of the header with 3" collated nails. 13. **For windows**, a. Place the field cut Jack Stud tight to the header, flush with the King Stud, clamp and nail from the Jack Stud into the King Stud with pairs of 3" Collated nails no more than 12" apart and staggered on opposite edges. b. Mark the location of the window sill on the edges of the Jack studs and secure the matching 2x6 sill piece to each King/Jack pair with two 5" Wafer Head screws, obtained from the Construction Supervisor. 14. When complete, label the face of the header with window or door size and set aside with labeled surface of the header is face up.

Quality Points

Chapter 4 - Assembling Exterior Wall Components

- Verify correct # of each component and that they are properly labeled with type and size
- All king/Jack pairs are properly nailed (tight together, no gaps) from Jack stud into King stud and are flush at the bottom and along the edges and with top of header and exterior surface of header
- All exterior headers are properly nailed (tight together, no gaps) on both sides and flush at ends and along the top and bottom edges
- Exterior door header includes the 1x6 filler board underneath header
- Header bottom 2x6 is installed square to jack stud/king stud
- All Window headers contain the sill plate
- All components are labeled with size
- No protruding nails

Quick Reference Guide

January 2025
Version 25.0

Chapter 4 – Assembling Main Floor Interior Wall Components

Identify & Sort Component Lumber	1. Before marking and cutting any component pieces, crown, mark and sort 2x4 stud lumber. a. Mark and set aside very straight pieces for use in kitchen, tub wall, and sliding closet doors. 2. Locate and confirm separate Component Package expressly intended for component construction. It should consist of 2x10's, 2x6's, and 2x4's along with one 8' 1x6. 3. Determine door sizes and dimensions from House Plan Supporting Documents.
Cut Pre-defined Component Pieces	4. Referring to the Component Cut List, cut pre-defined pieces of 2x6 and 2x4 headers and 2x4 Jack studs. a. Locate the Components Binder (cutting diagrams, package of Component Assembly Drawings). b. From the Component Package, select a lumber piece of the specific length shown on the bar chart. c. Label each piece with its length and set aside for future assembly. d. Make a check mark on the cutting diagram to record that each piece has been cut. 5. Refer to the Component Assembly Drawings for the specific number of interior doors needed. For Bi-Level homes, do not pre-build basement door components 6. Obtain 3" Collated nails from the Component Bin, for use when assembling King/Jack studs.
Assembling Components for Swinging Doors	7. Select two matching lengths precut 2x4's and nail together lengthwise to create a "T" header. NOTE: Some houses may include a door in a 2x6 wall to accommodate piping from the basement. The T-header for these walls will consist of a vertical 2x4 and horizontal 2x6 per the component cut list. 8. Assemble the door components: a. Select two **81"** 2x4 pieces from the precut component package for use as Jack studs for each main floor swinging door or two **82" pieces for each basement swinging door**. b. Nail each Jack stud to a 92-5/8" 2x4 King stud with one crown up and the other crown down and any bows opposite. Flush the sides and one end, clamp and nail with 3" Collated nails, no more than 12" apart, and staggered on opposite sides. c. Place the T-header upside-down on top of the Jack studs and nail through the King studs into the ends of both header pieces with two 3 1/4" Collated nails. **Do not nail basement king/jacks to their headers.** d. Label the header with the door size and set assembled component aside. e. **For basement doors label the header with size of door & "Basement", label the king/jack pairs with the jack stud length & bundle all pieces together and put in basement.**
Assembling Components for Sliding Doors	9. Construct the T-headers as Step 8 above. 10. For non-flush doors, select two **82"** 2x4 Jack studs for each main floor door or two **83" Jack studs for basement doors**, pair with two 92-5/8" 2x4 studs and assemble as Step 9b above. **Do NOT attach king/jack pairs to their corresponding header** (bundle and label header with door size, type and jack studs with jack stud length). 11. For <u>flush</u> sliding doors, select only <u>one</u> **82"** Jack stud for each main floor door or **one 83" Jack stud for basement doors**, pair with one 92-5/8" 2x4 stud and assemble as Step 9b above. 12. **Do not attach king/jack pairs to its corresponding header.** Label the header with size of door and each King/Jack pair with the jack stud length, bundle together and set aside. 13. **For basement doors add "Basement" to all pieces.**
Assembling Components for Bifold Doors	14. Construct the T-headers as Step 8 above. 15. Select two 80" 2x4 Jack studs for each main floor door or two **81" Jack studs for each basement door**, pair with two 92-5/8" 2x4 studs and assemble as Step 9b above. 16. **Do not attach king/jack pairs to their corresponding header.** 17. Bundle and label the header with door size and each king/jack pair with jack stud length. **18. For basement doors add "Basement" to all pieces.**

Quality Points

Chapter 4 - Assembling Interior Wall Components

- Verify correct # of each component
- All king/Jack pairs are properly nailed from Jack stud into King stud and are flush at the bottom and along the edges and with top of header and exterior surface of header
- All interior headers are properly nailed
- Main Floor Sliding and Folding door component pieces are bundled together
- Main Floor door component jack stud lengths are as follow: Swinging doors – 81”, Sliding doors – 82”, Folding doors – 80”
- Basement door component jack stud lengths are as follow: Swing doors – 82”, Sliding doors – 83”, Folding doors – 81”
- All components are labeled with door size and type and Jack stud length
- All basement door components are bundled and properly labeled with “Basement” on header and King/Jack pairs.
- No protruding nails

Quick Reference Guide

March 2025
Version 25.0

Chapter 5 – Framing Exterior Walls

Preparation	1. Assemble each wall on the deck, then erect in one complete section. Assemble long walls first, short walls after long walls are up. 2. Remove the temporary nails connecting the plates and separate on deck with 8' between. a. Be sure the words "Upper" and "Bottom" remain in the same orientation. b. Align the 5½" marks on the bottom plate with the chalk lines of the adjoining short walls. c. Place all components in place between bottom and upper plates making sure the flush side of the header is up. d. If not presorted, check all studs for crown and place in position with crown up. Place components in position. Make certain that the flush side of the window and door headers faces up. NOTE: Use the straightest studs for the kitchen walls and bathroom tub wall.
Assemble Walls	3. Preassemble 2x6 corners for long walls, ensure end and side surfaces are flush. a. Place the "L" down at the ends of the <u>long wall</u>, flush with the ends and sides of the upper and bottom plates. 4. Nail top and bottom plates to the studs and components a. Mark the inside face of each plate at each layout mark. Use to ensure the studs are square to the plates when nailing. b. Flush the edges of the studs with ends of the plates, align with the marks, and nail with <u>one</u> 3¼" collated nail or 16d nail through the plate into the <u>bottom</u> third of the stud. c. Square the stud to the line and nail with two more 3¼" collated nails or 16d nails, taking care to keep hands or body parts away from the nailer. Use a tool to twist the stud to square if necessary. 5. Field cut short-cut studs for under each window, measuring for length next to the nearest stud. a. Transfer locations for these pieces from the bottom plate to the window sill. b. Nail with three 3¼" collated nails or 16d nails at each end. 6. Check the non-zero end of each wall for an extra stud near the second-last 24" o.c. stud. a. If the two are in direct contact, screw them together with three 2½" deck screws. b. If the two studs are separated, fill the gap with multiples of ½" foamboard. Screw the studs together with three 4" timber screws to create a tight stud/foamboard "sandwich."

Quality Points

Chapter 5 – Framing Exterior Walls

- All studs (3 nails) and components nailed in place and tight to plates, flush on ends
- Bottom plate of long walls aligned at 5½" marks
- "L" corners in place and nailed
- Non-zero wall ends with extra studs are screwed together with deck screws and foam/stud "sandwiches" screwed with timber screws.

Quick Reference Guide

March 2025
Version 25.0

Chapter 5 – Squaring, Sheathing Exterior Long Walls

Preparation	1. Assemble each wall on the deck 2. Align the bottom plate with the chalk line along the entire length and align 5½" mark to short wall chalk line. Use a hammer, toenail through the bottom face of the bottom plate into the deck about every 8' with 8d nails.
Square the Walls	3. Use diagonal measurements to square the wall, moving the top of the wall until both measurements are within 1 /16". (Be sure you have good "corners" when making measurements.) 4. Use a hammer to tack the upper plate to the deck through the top face with 3-4 16d duplex nails so it doesn't go out of square.
Insulate the Corners and Stud Gaps	5. Before attaching OSB, cut four 5¼" x 92⅝" pieces of 1" foamboard (or two pieces of 2" foamboard) and insert into each L-corner. Tape in place. 6. Cut additional 5¼"-wide pieces of foamboard to create stud-foamboard-stud "sandwiches" where studs are less than 3" apart.
Install OSB Wind Bracing and Sheathing	7. Check the House Plan for location of OSB wind bracing. Position wind bracing OSB on studs. a. At the ends of the wall, center on the stud nominally 48" from the end and flush with the bottom plate, but not necessarily flush with the end studs. b. The "reveal" at the wall end should be consistent top to bottom—a sign the wall is square. c. OSB sheets not at wall ends should be centered on studs and flush with the bottom plate. Do not position over stove plenum location. If possible, place behind electric service meter base location. 8. If a long wall is the front wall of the house, check with Construction Supervisor if entire wall should be sheathed with OSB. If yes, sheathe the rest of the wall, except above windows and doors. 9. Draw a line on the OSB marking all studs to ensure nails don't miss the studs. Tack OSB in place, check wall for square, then fasten **wind bracing** with 2⅜" collated nails or 8d nails a maximum of 6" spacing, fasten **non-wind-bracing** OSB with 2⅜" collated nails or 8d nails following the Non-Wind Bracing OSB Nailing Pattern. (See Figure 5-1.) 10. After all required OSB sheets have been nailed, pull the nails securing the upper plate to the deck.
Attach House Wrap	11. Measure the width of house wrap and subtract 15" from the width—e.g., 18"- 15" = 3". a. Measure up that amount from the bottom of the wall and snap a chalk line the length of the wall. b. Staple the top of the wrap to that line at each stud, extend the wrap 12" past the end of the wall.
Install Foamboard Sheathing	12. Install 1" foamboard between OSB wind bracing, over the house wrap and flush to the bottom of the bottom plate, grooved side butted up against any OSB. If this is not possible, cut off the "tongue" of the foamboard before placing it next to the OSB. Nail with 2" button nails following the Foamboard Nailing Pattern (See Figure 5-2). . Nails should be shared between two abutting pieces of foamboard. Nail only into King studs and into the header (2¼" away from opening) around windows and doors. **Do not nail into window sills.** 13. Install ½" foamboard over OSB, flush on all sides. 14. Tape all seams. **CAUTION:** Install ½" foamboard over wind bracing OSB only if inspection is not required (see Construction Supervisor). 15. Fold bottom of house wrap onto sheathing and tape with air sealing tape every 3'-5'.

Quality Points

Chapter 5 – Squaring, Sheathing Exterior Long Walls

- Bottom of wall aligned with chalk line and 5½" mark
- Wall squared and bottom plate tacked to deck
- Wind bracing and non-wind bracing OSB installed and properly nailed
- House wrap installed over OSB and under foamboard, taped up over sheathing
- Foamboard installed and properly nailed and taped

Quick Reference Guide

March 2025
Version 25.0

Chapter 5 – Erecting Exterior Long Walls

Preparation	1. Apply two generous beads of air sealing caulk parallel to each other along the entire length where the wall will stand except at door openings. Stay at least 2" away from chalk line and deck edge. Apply a bead of caulk perpendicular to the two long beads at ends of deck and each door opening. 2. Assemble two braces for each long wall. With one 16d duplex nail, attach the 2x4 brace to each end stud near the upper plate to serve as a temporary support.
Erecting the Long Walls	3. Stand the wall section up, keeping the inside of the floor plate flush to the chalk line on the deck. a. Align the 5½" marks on the bottom plates with the adjoining wall chalk lines (the ends of the wall may not align with the edge of the deck). b. Working from one end of the wall to the other, nail the wall to the deck. 4. Brace the wall at each end using the long 2x4 braces attached to the wall. a. Tip the wall out slightly (about ½"). b. Rotate the 2x4 spacer block attached to the brace horizontally, nail to the rim. Add a second nail through the brace into the 2x4 spacer block. c. Secure the top of the brace with a second 16d duplex nail. 5. Install turnbuckle pipe braces in the middle sections of the wall for extra support. a. Use three 2½" drywall screws in the upper plate and through the floor into an I-joist. b. Or, screw the brace into 2x blocking secured to two I-joists with 16d duplex nails. c. Install the braces 10' to 12' apart, but don't place the brace where an interior wall will intersect an exterior wall.

Quality Points

Chapter 5 – Erecting Exterior Long Walls

- Thick, double line of caulk laid on deck under bottom plate
- Wall bottom plate is properly secured along chalk line and lined up with short wall marks
- Wall is braced at ends and center
    - Bottom of brace has a 2x spacer against rim board
- Wall is slightly ‘out’ at top

Quick Reference Guide

March 2025
Version 25.0

Chapter 5 – Sheathing, Erecting Exterior Short Walls

Preparation	1. Locate blocking between rim board and first/last, I-joist in the basement. Transfer location of blocking to deck or rim board. (Maximum 32" centers.) 2. Assemble wall and align bottom with chalk line along entire length. Toenail through the bottom face of the bottom plate into the deck every 6'-8' with 8d nails.
Install OSB Wind Bracing and Sheathing	3. Check House Plan for required to see if OSB wind bracing. OSB wind bracing not located at the wall end should be centered on studs and flush with the bottom plate. Do not locate where the stove plenum will be installed. If possible, place where the electric service meter base will be located. 4. If a short wall is the front wall of the house, check with Construction Supervisor if entire wall should be sheathed with OSB. If yes, sheathe the rest of the wall with OSB, except above windows and doors. **CAUTION:** Do not put OSB sheathing or wind bracing on the ends of the short walls at this point. 5. Draw a line on the OSB marking all studs to ensure nails don't miss but do not nail at this point. **Tack** wind bracing and any OSB sheathing to bottom and upper plates with an 8d nail in each corner.
Attach House Wrap	6. Measure the width of house wrap and subtract 15" from the width—e.g., 18"- 15" = 3". a. Measure up that amount from the bottom of the wall and snap a chalk line the length of the wall. b. Staple the top of the wrap to that line at each stud, extending the wrap 12" past the end of the wall. For short walls do not staple wrap that will go over any end OSB. Leave this wrap loose, fold back over the installed sheathing and tape in place.
Install Foamboard Sheathing	7. Install foamboard sheathing to short walls that are **not** the front wall of the house. a. Install 1" foamboard between any OSB wind bracing over house wrap and flush to bottom of the bottom plate. Position so grooved side butts against any OSB. If not possible, cut off the "tongue" of the foamboard before placing it next to the OSB. Nail with 2" button nails following the Foamboard Nailing Pattern (See Figure 5-2). Nails should be shared between two abutting pieces of foamboard. Nail only into King studs and into the header (2¼" away from opening) around windows and doors. **Do not nail into window sills.** b. Install ½" foamboard over OSB, flush on all sides. Nail with 1" button nails. Tape all seams. c. Do not install foamboard over OSB on any short wall that is the front wall of the house. This will be done after wall is erected. **CAUTION:** Install ½" foamboard over wind bracing OSB only if inspection is not required (see Construction Supervisor). 8. Fold bottom of house wrap onto sheathing and tape with air sealing tape every 3'-5'.
Erecting the Walls	9. Following the same procedure as long walls, apply two generous beads of caulk on the deck, raise the wall, and lean against the long wall braces. 10. Align with the chalk line then put two 3¼" collated nails into each I-joist block 11. Remove brace on long wall to let walls come together, check that top plates are flush with each other at the top of each corner and corners are plumb 12. Flush adjoining end studs and nail every 12" from the bottom plate to upper plate with 3¼" collated nails. Brace all corners with 12'-16' 2x4 bracing from bottom to upper plate on INSIDE of all walls. Keep top of brace less than 1" above upper plate and avoid crossing interior walls. 13. Install end-of-wall OSB on short walls, if required. Cover all OSB with ½" foamboard.

Quality Points

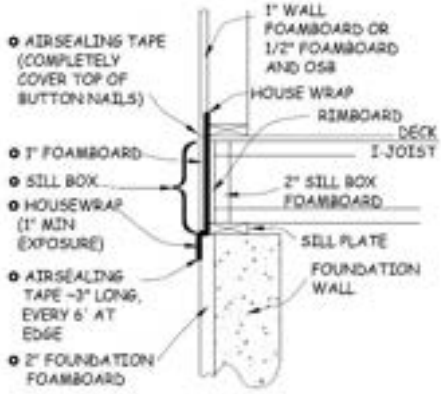
Chapter 5 – Sheathing, Erecting Exterior Short Walls

- Bottom plate secured to deck along chalk line and lined up with 5 ½" marks on long walls
- House wrap installed over OSB and under foam board, taped up over sheathing
- Foam board installed and properly nailed and taped
- Thick, double line of caulk laid on deck under bottom plate
- Wall is secured to long walls at ends/corner is flush and plumb
- All corners are correctly braced on the inside.
- All required OSB is nailed in place and covered with foamboard.

Quick Reference Guide

March 2025
Version 25.0

Chapter 5 – Completing Exterior Walls

Cut & Install Foamboard	1. At each wall panel, measure and cut 1" foamboard to fit **tightly** between the bottom of the wall foamboard and the foundation foamboard. Do the same below any OSB/½" foamboard. NOTE: When installing the sill box foamboard, be sure the house wrap is <u>behind</u> the sill box foamboard, leaving the extra wrap protruding from the seam between the bottom of the sill box foamboard and the top of the foundation foamboard.  2. Nail with 2" button nails about 8" apart and 2" away from the top and bottom seams of the sill box foamboard. 3. As needed, measure, cut, nail 1" foamboard around porch corners and under door. Fill in gaps at corners. If too narrow to nail, simply tape in place using flashing tape
Tape Seams	4. Tape the seam between the wall foamboard and top of the sill box foamboard with air sealing tape—**completely cover** the nail buttons above the seam by at least ½". a. Ensure the tape is tight to the foamboard above the buttons. b. Do not use additional row of tape to cover nails below the seam. That is not critical. c. House wrap must extend at least 1" over surface of foundation foamboard. If not, see Construction Supervisor. 5. Continue taping other seams <u>except</u> for the seam between the sill box foamboard and foundation foamboard. **Do not tape the seam where the house wrap emerges from below the sill box foamboard.** Instead, tape the bottom of the house wrap to the foundation foamboard every 6' with a 3" piece of air sealing tape just to hold it down. 6. If not already done, fill all exterior corner gaps (both inside and outside corners) with foamboard and tape into place with flashing tape. 7. At other seams, tape shingle style, starting from the bottom, beginning with the horizontal seams, overlapping any vertical seam above. a. When taping horizontal seams, be sure to completely cover button nails above the seams. b. Only tape button nails at the seams, not in the field.
Cut, Dispose of Scrap Foamboard	8. If not yet done, cut out foamboard around windows and doors. Take time to make square cuts. 9. Fill the inside of window and door headers with 2" of foamboard. Fill any gaps > ⅛" with caulk or spray foam. Cover perimeter and joints with flashing tape. 10. Do not throw **ANY** foamboard scraps in the dumpster. Set aside in basement or in black plastic bags.

Quality Points

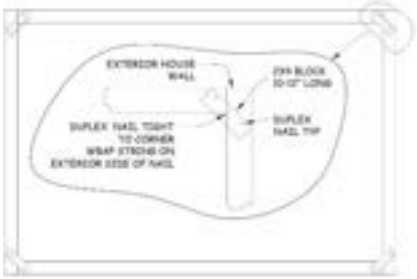
Chapter 5 – Completing Exterior Walls

- Foamboard fits **tightly** between the bottom of the wall foamboard and the foundation foamboard, nailed with 2" button nails about 8" apart and 2" away from the top and bottom seams of the sill box foamboard
- House wrap is behind sill box foamboard and extends at least 1" over foundation foamboard
- There is foamboard around porch corners and under door. Corner gaps are filled and taped.
- Seams are taped, except for seam between sill box foamboard and foundation foamboard
- Bottom of house wrap is taped to foundation foamboard every 6' with air sealing tape
- Foamboard around windows and doors is cut squarely.
- Window and door headers are filled with foam and caulked/foamed and taped

Quick Reference Guide

March 2025
Version 25.0

Chapter 5 – Straightening Exterior Walls

Mount Corner String Line Supports	1. To straighten exterior walls, a very taut string line is stretched from one inside corner to an adjacent inside corner. The wall is aligned with the string line every 8' - 10' and braced to hold it in place. 2. For each exterior wall corner, cut a scrap of 2x4 10" - 12" long. 3. Drive a 16d duplex nail into the center of this 2x4. Be sure the nail is straight since the nail represents the inside of the wall corner. 4. Place the 2x4 piece on top of the 2x6 upper plates at roughly a 45º angle so the protruding end of the 16d duplex nail rests tightly against the "inside" corner of the upper plates of both walls.  5. Nail the 2x4 to the upper plates with one 16d duplex nail on each end. Nail securely. 6. Repeat at each exterior corner. 7. Treat an extended house/garage wall as one continuous wall during this process.
Install String Line	8. In the first corner, start the string line on any nail other than the centered nail. (Feel free to add additional "tie-off" nails as needed.) 9. Wrap the string line on the exterior side of the protruding centered nail, this should align the string line near the inside edge of the upper plate. 10. Run the string line to the next corner, wrap it around the exterior of the protruding centered nail again. Continue until back to the starting corner. Make sure the string line is not obstructed between corners and is VERY taut. 11. Verify the string line around each corner nail is aligned with the inside of the upper plates. Adjust as necessary using an additional 8d nail to move the string line in or out. The string line may not be aligned to the inside of the upper plate all along the wall expanse at this point but it **must** be aligned at each corner before straightening the walls between corners.
Straighten the Walls	12. Start 5'-7' from the corner. 13. Place one end of a 6' level against the upper plate and the other end against a nearby stud – not the stud immediately below. (This 2-pt contact avoids problems with a bowed or twisted stud.) 14. Slide the level up the wall until it reaches the string line. a. If the top of the level moves the string, use the turnbuckle pipe bracing to move the wall in until the inner edge of the level lines up with the string line. b. If the level misses the string line, move the wall out until the inside edge lines up with the string line. The wall is now straight in that section. 15. Do this at each pipe brace, each interior wall intersection, and every 5'-7' in between. Add pipe bracing or 2x4 bracing as needed to hold the wall straight. 16. Re-check alignment with string line a second time. Verify wall is plumb at each brace and each intersecting wall location. Consult with Construction Supervisor or Site Leader if difference is more than ⅛". 17. After all bracing is complete, recheck alignment by sighting along inside/outside edges of upper plate at each corner. Remove string line and blocks.

Quality Points

Chapter 5 – Straightening Exterior Walls

- String line properly attached and VERY, VERY Taut
- String line calibrated to upper plate at corners (before straightening)
- Pipe bracing or 2x4 bracing installed to keep walls straight
- Each wall is plumb at each brace and each intersecting wall location with any difference less than ⅛”
- Extended wall of attached garage is aligned with corresponding house wall
- Alignment re-checked by sighting along inside/outside edges of upper plate at each corner

Quick Reference Guide

March 2025
Version 25.0

Chapter 5 – Framing and Erecting Interior Walls

Preparation	1. Start by building and erecting the longer walls that intersect the exterior walls. 2. Separate upper and bottom plates on the deck. Be sure the words “Upper” and “Bottom” remain in the same orientation. 3. Use only straight studs for kitchen walls and bathroom tub wall. 4. Install blocking between the exterior wall studs where the interior wall will be located. 5. Where a flush sliding door intersects an exterior wall, install blocking with the top edge 83½” above the floor.
Building the Walls	6. Place studs, crown up, and door components in position between the plates. Make sure studs are flush with edges of the plates and end studs are flush with ends of the plates. Make sure king/jack pairs in sliding closet walls and door components are not crowned or twisted. 7. If a 42” half-height wall is planned with a full-height post, build the post separately and set aside for later installation. Build the wall 3½” short to accommodate the post. If a full-height post is not planned, the wall is also built 3½” short to accommodate a post. Build the post 9” longer than the height of the wall and cut a hole in the sub-floor where the hole will be positioned. Erect the 42” half-height wall, insert the post into the hole, secure it to the wall and to blocking positioned between joists below the sub-floor.
Erecting the walls	8. Build walls, stand them up positioning them to the chalk line, then or screwing bottom plates to the deck. Bottom plates must be tight to exterior walls with the end stud plumb and tight to exterior wall blocking. Nail the end stud at an angle through the exterior wall upper plate and into the exterior wall blocking. Make sure all joints are tight and the wall is plumb. 9. For walls that include a flush sliding door, measure the length of the upper plate and cut a 2x4 3⅝” shorter to be used as the TOP plate. Nail this piece to the wall upper plate, extending it 2” beyond the end of the wall upper plate and 3⅝” short of the interior end. Nail the King/Jack pair to the upper plate. Stand the wall up and into position tight to the exterior wall with the top plate resting on the exterior all upper plate. Nail the bottom plate to the floor tacking the loose end of the plate. Align and plumb the closet upper and bottom plates making sure they are plumb and nail the end of the upper plate into the exterior wall upper plate. Make certain the king/jack side of the closet is straight and plumb. 10. Continue building interior walls, positioning to the chalk lines and nailing or screwing to the deck. 11. Install blocking wherever two interior walls intersect and there is no stud at the point of intersection. 12. Make certain each wall is plumb before nailing it to an adjacent wall.

Quality Points

Chapter 5 – Framing and Erecting Interior Walls

- All studs (2 nails) and components nailed in place and tight to plates
- Wall bottom plates are properly secured along chalk lines and nailed or screwed to sub-floor
- Walls are secured at exterior wall intersections and are plumb
- All walls are secured properly to intersecting walls and are plumb
- King/jack pairs in sliding closet walls and door components are not crowned or twisted
- Sliding closet king/jacks are plumb and straight
- Sliding closet header is level

Quick Reference Guide

March 2025
Version 25.0

Chapter 5 – Installing Top Plates

Requirements	1. Before installing top plates, VERIFY WALL INTERSECTIONS ARE PLUMB and have been marked OK. 2. Walls must be tied together by nailing overlapping top plates to the tops of the walls. 3. Top plates at the intersection of interior and exterior walls are done first. 4. Top plates on all bearing walls must extend a minimum of 4' on each side of the wall plate joint and at each corner. 5. Top plates on non-bearing walls that extend into the 2" notch of the exterior top plates must be at least 16" long. 6. At all corners of exterior walls and at all corners and intersections of inside walls, the top plate must cross the joint of the wall plates below. 7. Where interior walls intersect exterior walls, create a notch 2" deep in the top plate of the exterior wall so it can receive the intersecting interior wall top plate. 8. Verify that the interior wall is plumb before locating and cutting the notch. NOTE: Notching 2" deep leaves 3½" of material on exterior 2x6 top plates
Installing Top Plates	9. To locate the notches in exterior wall plates, lay the exterior wall top plate on the wall in its final position. a. Mark the location of each intersecting interior wall. b. Place the top plate on the deck, and using a speed square, mark lines at each location. c. Set the blade of a circular saw to a 2" depth. d. Cut the marked edge of the top plate at the outside of each line (this should allow clearance for the width of the intersecting top plate). e. Make multiple cross-cuts between these two cuts and knock the piece out with a hammer. 10. Nail the wall top plates, using three 16d or 3¼" collated nails across the 2x6 plates and two nails across 2x4 plates. a. Before nailing, be sure the interior edges of the top plates are flush with the edges of the plates below and that interior walls are tight to the exterior walls. b. Nail at each intersection of top plates and at each stud location. c. Nail two to four pairs of nails across exterior window and door headers. NOTE: Occasionally the house will include a 2x4 interior wall butting against the end of a 2x6 plumbing wall (in a straight line). In this case, install a 2x4 top plate the full length of the wall, on the flush side. Install a 2" wide "filler" on the 2x6 section of the wall (necessary to provide nailing surface for wall sheetrock).

Quality Points

Chapter 5 – Installing Top Plates

- BEFORE installing Top Plates be sure ALL WALL INTERSECTIONS ARE PLUMB and marked OK or Painted GREEN.
- Intersections of interior and exterior walls completed first
- Top plates on bearing walls extend minimum 4’ on each side of wall plate joint and each corner
- Non-bearing wall top plates extending into 2” notch of exterior top plates are minimum 16” long
- Interior top plates notched into exterior top plates 2” and nailed to exterior wall upper plate
- Top plate crosses joint of wall plate joints below at all corners of exterior walls and all corners and intersections of interior walls
- Interior edges of top plates are flush with edges of plates below, interior walls are tight to exterior walls
- Top plates nailed with three 16d or 3¼” collated nails across 2x6 plates and two nails across 2x4 plates

Quick Reference Guide

March 2025
Version 24.0

Chapter 9 – Installing Windows

General Preparation	1. Unpack windows (strapping, etc.) and check for proper size & damage. Report any damage. 2. Measure the rough opening dimensions and check for obstructions. If dimensions exceed specs >⅝" consider corrections. 3. Remove the screens and sashes and set aside for later installation. Trim any excess sheathing around the perimeter of the opening. 4. Consult Construction Supervisor if sill pans or flashing tape are to be used 5. Using longest level that fits within rough opening, check level to determine shimming needs (must be at least 1/8" thick). 6. From trailer, obtain tapered shims, cardboard shims, ¼" x 1" and 1/8" x 1" variable-length shims. 7. Cut variable-length shims 2-3" long for each end, one in middle for sliders and windows equal to or >36". None can extend past inside of window frame.
SILL PROTECTION using Flashing Tape	8. Cut a length of tape 8-10" longer than the width of the window rough opening. 9. Lay on the sill with outside edge about 2½" down the outside of the sheathing and about 3" up each side (inside edge must be at least ½" inside window frame) 10. Make 45° cut at each corner and fold tape down and out to the outside of frame. 11. Cover cut corner completely with 2"x4" piece of flashing tape. 12. Cover entire sill with more tape, overlapping first tape about 1"
SILL PROTECTION using Sill Pans	13. Run a continuous bead of air sealing caulk on the sill and about 3" up the sides, ~1/2" from edge of frame (not foamboard) 14. Caulk outside foamboard under window, up ~6" each side, ~1/4" from edge 15. Install ½ of sill pan, seated completely flat on sill. Caulk across the pan near end, install second pan on top and press both tight to the sill. 16. Trim shims (if necessary) to ensure no pieces extend past the inside of the window frame and place within the pan, one at each end under end frame, at center if required
Position, Temporarily Secure Window	17. Run a continuous bead of air sealing caulk on foamboard <u>sides</u> and <u>top</u> (outside of window opening), **¼" or less** from edge 18. Set window frame in opening, add shims right/left corners to center <u>up/down</u>, then center **TOP** <u>left/right</u>, (**hold for safety**) 19. Place level on <u>top of</u> bottom window frame and level by adjusting shims as necessary. 20. Nail bottom corners w/ 2½" roofing nails (protect window edge) **NOTE: Pound nails in straight. Hold putty knife, shim, flat pry bar against frame to protect it while hammering.** 21. <u>Tack</u> top corners (for safety), centered in slot (for adjustment) 22. Hold frame from outside, carefully insert top/bottom frames. 23. With <u>double hung</u> windows, open top and bottom sashes slightly, check both reveals. 24. Use pry bar to rack top of window if required to equalize reveal (install shims to hold) 25. With <u>sliders</u>, lift center frame using small pry bar. 26. Complete nailing top corners
Permanently Secure Window	27. Using the longest level that will fit within the rough opening, check the sill for level. Assemble a minimum of 1/8" shims to provide drainage clearance on top of the sill

	protection until the window sill is level. Ensure that no shims extend past the inside of the window frame. Trim as required. 28. Place level against outside or inside frame, verify all four sides are straight. Draw 4-5"-long line on foamboard above/below center holes each side 29. Holding frame on line, nail center of flange snugly to hold –all four sides 30. Recheck reveal, window operation 31. Finish nailing (hold to center quality marks/protect window edge) 32. Remove shims installed in Step 24 above
Weatherize the Window	33. If sill pan used, tape bottom edge of sill pan to foam with air sealing tape, (do NOT tape **bottom nailing flange of window to sill pan.** 34. Tape sides with air sealing tape, overlapping horizontal tape at the bottom 35. Tape top with flashing tape, overlapping side air sealing tapes

Quality Points

Chapter 9 – Installing Windows

- Window is properly caulked
- Shims placed on top of sill pan or flashing tape are under corner of windows and in the center supports of larger windows
- Bottom frame of window is level, all reveals/margins are consistent
- Every slot in the window flange has a 2½" siding nail
- All weep holes are open and clear
- Side and top flanges taped with appropriate tape in "shingle" style
    - Side flanges taped with air sealing tape
    - Top flange taped with flashing tape
    - Sill pan (if used) is taped to foamboard with air sealing tape
    - BOTTOM flange of window IS NOT taped to sill pan or flashing tape.
    - Top tape fully overlaps/covers side tape
- Window operation:
    - Window sash(es) slides "easily" (using one or two fingers)
    - Window closes, locks and unlocks easily
    - Tilt-in type windows functions properly for easy cleaning
    -
    - Screens are installed

Quick Reference Guide

May 2025
Version 24.0

Chapter 9 – Installing Exterior Doors

Door & Opening Preparation	1) Inspect for damage. Notify Construction Supervisor if damaged. Remove/discard shipping strike plate. Nail accessories to a king stud. 2) Verify correct door type, size, and swing according to the House Plan. Verify hole for deadbolt. Confirm exterior door from house to garage is "Fire Rated". If not DO NOT INSTALL. Notify Construction Supervisor. 3) Pre-drill 1/8" holes (5,5,1) uniformly-spaced in brickmold (6" from mitered corners). Angle slightly to hit studs/headers. 4) Keeping flush, install #8 2-1/2" trim screws through each side of the brickmold into the middle of the top brickmold. 5) If house wrap extends thru doorway, fold down over threshold area and staple to the deck in the doorway. 6) If not already installed, cut and install length of flashing tape sufficient to cover width and up 2" each side of Jack studs. Install with about half of width on deck, half on foamboard. Cut corners, fold, attach to outside. 7) Install threshold seal tape snug to corners and flush to outside edge of threshold.
Adjust Hinge Side Jack Stud	8) Measure the height of the hinges off the floor and mark these heights on both the hinge and strike side Jack studs 9) Install 3"x5" shims with 5" dimension horizontal and flush with hinge pin side (using 1¼" soffit nails) 10) With 6' level check if Jack stud is plumb. If NOT PLUMB, shim top or bottom hinge locations until it is plumb 11) Measure width of door frame at head jamb and width of rough opening at top and bottom hinge locations a) If difference between door frame and rough opening at either location is GREATER than 5/8", attach combination of 1/8" & ¼" 3x5 cardboard shims to Jack stud top & bottom locations until difference is less than 3/8" but greater than or equal to ¼" at BOTH locations. (At minimum, each Jack stud hinge location should have a 1/8" shim.) b) At either or both locations, if gap is greater than 3/8", add shims to bring the gap to 3/8". c) Keeping 6' level against top & bottom spacers, attach 1/8" and ¼" flat and/or tapered shims at middle hinge location until flush with the level
Adjust Strike Side Jack Stud	12) Add combination of 3"x5" cardboard shims to strike side Jack stud at top/bottom hinge locations until difference < 3/8" at both locations 13) Place the level against shims and install flat and/or tapered shims at middle hinge location until flush (less than 3/16" gap)
Temporarily Secure the Door	14) Set door in rough opening, tight to foamboard and to hinge side stud. 15) Using tapered shims against the head and threshold, wedge door against hinge side with horizontal pressure. 16) Check reveals between the top of door and head jamb at left & right corners. Shim hinge or strike jamb as needed. 17) Recheck hinge side is still plumb (set level on hinge or hinge plates) 18) Tack brickmold tight to foamboard w/4 16d galvanized finish nails, 2 on each side near top and bottom. 19) Check complete door operation, verify consistent contact with the weatherstripping. If necessary, adjust one or both side jambs and brickmold slightly away from foamboard to ensure proper contact with weatherstripping (max 1/8" gap). Shim behind brickmold to hold in place. Confirm latch and strike are aligned.
Permanently Secure the Door	20) With brickmold tight to foamboard, secure hinge side jamb with 2½" exterior screws at each hinge location, behind weather stripping and through shims. Recheck plumb (on hinges). Adjust shims as required. 21) At top door hinge, replace two screws closest to the doorstop with #10 3" /COMBO construction screws. (Screws can be found in Door Finish Kit.) Adjust for door top reveals. 22) Recheck head jamb reveals are equal at both ends. Adjust strike jamb up/down if needed. 23) Check complete door operation including uniform contact with weatherstripping, latch and strike alignment and all reveals. Adjust shims as required. If necessary, move/shim brickmold away from foamboard (max 1/8" gap). Shim behind brickmold to hold in place. 24) Check reveals at top and bottom of hinge jamb. a) Adjust/reinstall tight shims against the head jamb as required until top reveal equals reveal below top hinge. b) Shim bottom of jamb to match the reveal at the top, secure with 2½" exterior screw behind weather stripping. 25) Check reveals top of strike and hinge jambs (minimum 1/8"). Split difference as needed. 26) Check reveals at the top and bottom of the strike jamb. Shim the bottom of jamb until reveals are equal. 27) To ensure proper latch engagement, it may be necessary to have a narrower reveal in the latch area than above and below. Install strike side shims above the deadbolt location, between the deadbolt and latch, and just below the latch location. Install the deadbolt shims where the strike plate security screws will be located. Secure the shims with 2-1/2" exterior screws behind the weatherstripping. Use enough shim to reduce the reveal in the latch area to 1/8". After tightening the screws in all three locations, check that the reveal is no more than 3/16". This step may require multiple adjustments of the shims to ensure that the reveal does not change as the screws are tightened. **NOTE: Continued on next page**

	28) Install shims across from the top and bottom hinge locations, and midway between the latch and top and bottom hinge. If latch area reveal is narrower than at the top and bottom, adjust shims so reveal changes gradually from latch area to top and bottom. This will result in total of seven shims behind the strike side jamb. 29) Install & screw shims (behind weather-stripping) at center of head jamb. Adjust for consistent reveal. Secure with 2½" exterior screws behind the weatherstripping. 30) Recheck complete door operation, ensuring that contact with the weatherstripping is uniform (no gaps or light visible). Adjust as required. 31) Install and secure additional shims between hinge locations to obtain consistent reveals along both side jambs (total 5 each side plus one extra set above the deadbolt. Secure with 2½" exterior screws behind weatherstripping. 32) At all shim locations, nail exterior side of jamb into jack stud about 1½'-2' from outside edge of each jamb (between doorstop and brickmold) w/16d galvanized casing nails. 33) Conduct final verification of complete door operation, uniform contact with weatherstripping. Adjust as needed. 34) Nail brickmold in all remaining predrilled holes with 16d galvanized casing nails. Note: Drill ¼" hole in 3x5 flat shim as a nailing guard. 35) Set and caulk all nails with white finish caulk 36) Install temporary threshold support (scrap 2x4 or 2x6), tight to the underside of threshold. Use four 4" timber screws.

Quality Points

Chapter 9 – Installing Exterior Doors

- Flashing Tape and threshold seal tape properly installed
- Brick mold is tight to foam on both sides
- Lockset and Deadbolts are installed, easy to operate, key direction is same for both with notches up, deadbolt strike moves in same direction as deadbolt knob
- Special "security" strike plate is installed for deadbolt with long screws provided
- Door hits weather stripping evenly and no gaps or light show thru door reveals (including installation of "corner seal pads" at bottom of side jambs on weather strip side)
- Long screws installed in top hinge
- Uniform reveal at top and sides (especially near lockset or deadbolt)
- Door opens and closes freely and latches easily and snugly to striker plates
- Brick mold is nailed properly (using 16d galvanized casing nails, 5 on each side and 1 in the center of top being sure to hit jack studs or header)
- Temporary threshold support tight to the underside of the threshold

Quick Reference Guide

March 2025
Version 24.0

Chapter 9 Installing Exterior Door Weatherproofing, Hardware

Install Weatherproofing and Seal the Door	1. If the plastic temporary threshold covers are not available, use the red "floor" tape (this tape is designed for easy and complete removal) 2. Apply 4" or 6" wide Weathermate™ Straight Flashing to foamboard and side of brickmold (so it will be completely covered by siding J-channel). To facilitate: a. Use a short 2x4 or 2x6 block as a template to mark a line on the wall 3½" or 5½" from the brickmold. b. While gradually pealing back the release paper, align edge of tape to line, and stick edge to foamboard. c. Progressing down the wall, use speed square or putty knife to press tape to wall and into corner d. Finally, press edge of tape to brickmold, making sure it is: I. Tucked tightly into the corner and II. Attached tightly to both surfaces III. This should result in ~ ½" of tape on side of brickmold e. Apply tape to sides first and then top (shingle style) I. On sides, tape can be applied shingle style but must be at least 20" in length II. Top piece must be in one piece and must extend past outside edge of side pieces 3. Install bottom "Corner Seal Pads" 4. Set and caulk all nails (use "finish" caulk)
Install Hardware	5. Install lockset and strike plate per instructions. a. Be sure door latches easily but tightly with little rattle b. If it rattles. Bend tab inside the strike plate with flat blade screwdriver 6. Install the security deadbolt strike plate (not that provided with lockset). a. Set strike plate in place, predrill into Jack stud with 3/16" bit, secure with two large screws provided b. Make sure deadbolt is installed so top of lever turns in the direction of bold travel. If it does not, remove deadbolt from door, rotate 180° and reinstall 7. Install lockset per instructions and make sure lockset and deadbolt key direction is the same (notches up). See Fig. 9-2 (Reveres side). If not: a. Unlock the lock and insert the key half-way (do not insert completely) b. Push in retainer pin (H) on neck of knob, pull knob just past the pin c. Holding knob, rotate cylinder (J) to correct orientation d. Push in pin and push knob back in place. 8. Verify Lockset and deadbolt operation. Adjust as needed for easy operation, door closes snugly, latches with little effort, deadbolt engages/disengages easily and moves in same direction as top of lever (Fig. 9-2 next page)
Install Window Trim Caps	9. For doors with a window, install white plastic trim caps a. Be careful to install in correct orientation b. Install by hand until almost flush, then with shim and hammer until flush with trim surface
Install Threshold Support	10. Install temporary threshold support (2x4 or 2x6) with three 4" timber screws.)

Quality Points

Chapter 9 Installing Exterior Door Weatherproofing, Hardware & Trim, Support

- Threshold protected with the temporary plastic threshold cover or the red/orange "floor" tape.
- Weathermate™ Straight Flashing installed tightly in joint between brickmold and foamboard
    - Tape covers no more than ½" of side of brickmold
    - Tape shingled on sides and top
- Bottom corner seal pads installed
- All nails set and caulked (white "finish" caulk)
- Door latches firmly, snug to weatherstripping, and does not rattle
- Deadbolt security strike plate installed with long screws
- Deadbolt moves in same direction as lever
- Latch set and deadbolt key notches are both up
- White window trim caps installed—tight and properly oriented (white "finish" caulk can be used)
- Temporary threshold support installed

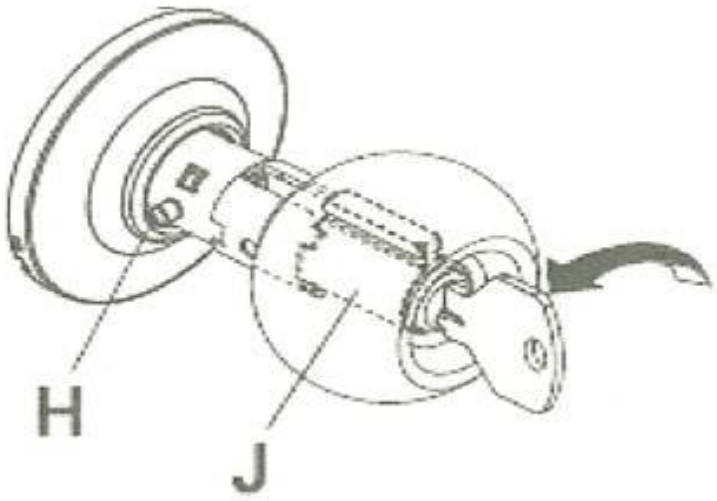


FIGURE 9-2

Chapter 10a – Blocking for Bathroom

Safety Instruction	1. ALL blocking in stud bays MUST be installed by either hand nailing using 16d nails or secured using 3" sheetrock screws. DO NOT USE framing nailers to install this blocking as an improperly aimed nailer can fire a nail that misses or passes through the wood and potentially strike a fellow worker.
Grab-Bar Blocking	2. Install 2x6 blocking adjacent to the shower and along the back side of the toilet and the wall along the side of the toilet. TOP of the blocking to be 36" above the floor. 3. First, install blocking in a corner stud bay by attaching three 16d nails or 3" sheetrock screws through the open stud bay into the blocking. Secure the other end to the corner stud by toenailing or screwing through the top and bottom of the blocking into the corner stud. 4. Successively install blocking into adjacent stud bays using the same procedure as in Step 3.
Bathroom Mirror Blocking	5. Install 2x6 blocking above the vanity area (see House Plan) in all stud bays where the vanity will be installed. TOPS of the blocking to be 40" and 76" above the floor. a. Use the procedure described in Steps 3 and 4 to install the 2x6 blocking.
Short (18") Towel Bar Blocking	6. Consult House Plan and ensure the vanity is to be installed in a corner of the bathroom. 7. Install 2x6 blocking in the wall along one side of the vanity, extending out at least 24" from the back corner of the vanity. TOP of the blocking to be 60" above the floor. a. Use the procedure described in Steps 3 and 4 to install the 2x6 blocking. 8. If vanity is not to be installed in a corner, consult the Construction Supervisor to locate the Short Towel Bar location.
Long (24") Towel Bar Blocking	**9.** Install 2x6 blocking in the wall next to the shower, extending out at least 36" from the edge of the shower. TOP of the blocking to be 60" above the floor. a. Use the procedure described in Steps 3 and 4 to install the 2x6 blocking. If it is not possible to install the Long Towel Bar blocking next to the shower, consult Construction Supervisor about alternative installation location under the window.
Linen Cabinet Blocking	10. Install 2x6 blocking along the back and one side of where the linen cabinet will be located. TOP of the blocking to be 60" above the floor. a. Use the procedure described in Steps 3 and 4 to install the 2x6 blocking.
Toilet Paper Holder Blocking	11. Install 2x6 blocking in the wall next to the toilet, covering at least a 12" span centered 32" from the wall behind the toilet. TOP of the blocking to be 26" above the floor. a. Use the procedure described in Steps 3 and 4 to install the 2x6 blocking.
Tub/Shower Nailing Flange Blocking – Long End Wall	12. Select one straight 2x6 stud for blocking on the long end wall where the tub/shower unit will be installed. Position the FACE of the 2x6 stud vertically and flush with the tub-side of the long end wall. 13. For main floor shower/tub units, position the blocking 32" to center from the back wall. For basement shower units, position the blocking 35" to center from the back wall. a. Secure the 2x6 stud by toenailing 16d nails, or screwing 3" sheetrock screws into the top and bottom plates of the long end wall.
Tub/Shower Nailing Flange Blocking – Short End Wall	• Select one straight 2x6 stud for blocking on the short end wall where the tub/shower nailing flange will be located. Position the FACE of the 2x6 stud flush with the tub-side of the short end wall with one edge of the 2x6 stud butted up against the 2x4 forming the end of the short end wall. • Attach the 2x6 stud to the 2x4 stud to create an "L-corner" o Secure the 2x6 stud by toenailing 16d nails, or screwing 3" sheetrock screws into the top and bottom plates of the short end wall.
Tub on Exterior Wall	• Insulate and apply poly per Section 12.4 & 12.5 • Apply ½" OSB or sheetrock **(gaps of 1-3" are acceptable - NO GAPS 24" DOWN FROM THE TOP PLATE)** • Verify there is sufficient blocking in the tub corners.
Mark Blocking Location	• Mark on the floor with black crayon the location and purpose of blocking for the Grab Bar (GB), Short Towel Bar (STB), Long Towel Bar (LTB), and Toilet Paper Holder (TP). Spray over the crayon marks with clear varnish to avoid crayon marks wearing off.

Quality Points

Chapter 10a – Blocking for Bathroom

- Blocking for Grab Bar runs from the shower, along the back side of the toilet, and along the side of the toilet. TOP of the blocking is 36” above the floor.

- Blocking for Bathroom Mirror is positioned where the vanity will be located. TOPS of the blocking are 40” and 76” above the floor.

- Blocking for the Short Towel Bar is positioned along the side where the vanity will be located extends out at least 24” from the back corner of the vanity. TOP of the blocking is 60” above the floor.

- Blocking for the Long Towel Bar is positioned in the wall next to the shower, extending out at least 36” from the edge of the shower. TOP of the blocking is 60” above the floor.

- Blocking for Linen Cabinet is positioned along the back and one side of where the linen cabinet will be located. TOP of the blocking is 60” above the floor.

- Blocking for the Toilet Paper Holder is positioned in the wall next to the toilet, covering at least a 12” span, centered 32” from the wall behind the toilet. TOP of the blocking is 26” above the floor.

- 2x6 blocking for the Tub/Shower Nailing Flange is positioned in the long end wall, 32” to center from the back wall for main floor units, or 35” to center from the back wall for basement units.

- Black crayon marks are on the floor indicating location and purpose of blocking for the Grab Bar (GB), Short Towel Bar (STB), Long Towel Bar (LTB), and Toilet Paper Holder (TP). Clear varnish is sprayed on the crayon marks.

Chapter 10b – Blocking for House

Safety Instruction	ALL blocking in stud bays MUST be installed by either hand nailing using 16d nails or secured using 3" sheetrock screws. DO NOT USE framing nailers to install this blocking as an improperly aimed nailer can fire a nail that misses or passes through the wood and potentially strike a fellow worker.
Kitchen Cabinet Blocking	• Follow the House Plan and snap chalk lines at 84" for the top row and 59" for the bottom row • Hold top of blocking even with chalk lines. Secure 2x6 blocking with 16d nails or 3" drywall screws through the wall studs. • Ensure that the blocking is flush with the wall studs. **Do not use nail guns**.
Blocking for 42" Height Wall	• Use a 6' level to plumb and locate the area above the end of wall. • Secure two 2x6 pieces flat, between the trusses with 3" drywall screws. • Ensure that the pieces are flush with the bottom of the trusses.
Blocking for Closets	• Use 3" drywall screws to secure 2x blocking vertically, between the non-flush closet wall studs • Ensure the blocking is flush with the wall studs.
Blocking for Garage Overhead Door (OHD)	• Door Center – Use 3 ¼" collated nails to secure 2x6" blocking 4" below the bottom of the truss and ~1/4" short of the vinyl trim • Door Edge – Use 3 ¼" collated nails to secure 2x4" blocking flush to inside edge of the jack studs, 4" below the bottom of the truss and 2" above the floor. • Lower Blocking – Use 3 ¼" collated nails and secure 2x4" blocking between the door center and edge blocking with the long edge resting on the vinyl trim.
Mark Blocking Location	Mark on the floor with black crayon. Spray over the crayon marks with clear varnish to avoid crayon marks wearing off.

Quality Points

Chapter 10b – Blocking for house

- Kitchen Blocking – Top row at 84”, bottom row at 59”. Flush to studs
- 42” Height Wall blocking – Blocking is plumb to end of wall, flush to bottom of trusses.
- Blocking for Closets – Blocking is vertical, between and flush to studs
- Blocking for Garage Overhead Door – Hold center and edge blocking 4” below truss. Center blocking ends ¼” short of vinyl. Edge blocking meets edge of jack studs and ends 2” above the floor. Lower blocking - long edge rests on the vinyl.

- Black crayon marks are on the floor indicating location if needed. Clear varnish is sprayed on the crayon marks.

Quick Reference Guide

March 2025

Version 25 .0

Chapter 12 – Air Sealing (caulk, spray foam, tape), Insulating

Preparation	1. Mark all stud CENTERS on the floor 2. Mark location of all HVAC ducts (warm and cold air), duct dampers and plumbing pipes 3. Verify all wall and ceiling electrical boxes are marked on the floor 4. Verify wall stud ends behind countertop are in the same plane at 41" above floor. 5. Verify jack studs of sliding doors are straight &plumb to within 1/16”. Use cardboard shims if not. Mark OK 6. Verify exterior wall stud ends adjacent sliding doors are straight, plumb and in the same plane @ 41” above floor. Mark OK 7. Verify blocking has been installed for sheetrock per Section 10.6 .3 8. Remove temporary 2x4 brace under range plenum. 9. Clean debris from wall cavities. Vacuum subfloors along exterior wall baseplates, exterior doors, and floor vents 10. Verify basement exterior wall foamboard is in place and secured tight to the exterior wall 11. Verify a folded coil strip was installed at bottom of garage common wall. See 11.1.4.5. 12. Verify exterior door reveals on strike side are between 1/8” – 3/16” wide. Correct if not.
Air Sealing	13. Check with Const. Super. re: using foam or fiberglass behind PVC pipes, electrical boxes and ext. wall blocking for each job day, but only use fiberglass behind kitchen sink outlet and outlet above range. 14. Install foamboard over headers (caulk or foam). Tape if foamboard is flush with framing 15. Fill the following gaps/holes with spray foam (if >¼”) or air sealing caulk (if < ¼”): a. Ceiling and wall electrical boxes (all levels except attic) b. Exterior & interior wall studs (main & basement levels) c. Bottom of windows d. Inside joint between bottom plates and sub-floor e. Holes in top/bottom wall plates, interior AND exterior walls (BOTH levels) f. Exterior wall sheathing or foamboard visible from inside the house g. Range plenum area (use spray foam) h. Rough opening gaps between window (fill partially) & door frames (fill fully) (Trim or remove excess **ONLY AFTER COMPLETELY DRY**). Also caulk bottom of windows i. Inside seam between exterior wall corners j. Subfloor penetrations, e.g., tub drain (cover opening with OSB, seal gaps with spray foam), vent pipe, water supply lines and drains k. Exterior doors along floor and inside edge of threshold to outside of jambs (thin bead of caulk) l. Gaps between the top of foundation wall foamboard and wall upper plate m. Sill box penetrations, e.g., dryer vents, HVAC & plumbing pipes, gas line etc n. Bath fan housing holes, caulk or tape. 16. Tape the inside seam between upper and top plates of exterior walls and inside seams of exterior doors and window components 17. Secure in-floor heat ducts with four soffit nails 18. Apply a 6” width of HVAC tape around floor ducts to seal gaps between sub-flooring and ducts. 19. Install temporary heat duct covers after taping sub-floor openings with HVAC tape 20. Seal sub-floor gap around cold air return ducts with foam from main level and basement level 21. Seal joint between cold air return boots and ducts (from basement) with HVAC tape.
Install Wall Insulation	22. Insulate future bath fan vent ducts. 23. Fill exterior wall cavities < 3" wide with foam board. Fill gaps with caulk or air sealing tape 24. Loosely install unfaced R-19 batt insulation into exterior wall cavities. Take time to fluff it out. 25. Feed doorbell and thermostat wires through insulation. Do not cover. 24. Feed bathroom vanity light wire through insulation IF it is not running through an electrical box. 25. Place scrap fiberglass pieces around exterior of tub enclosure.

Quality Points

Chapter 12 – Air Sealing (caulk, spray foam, tape), Insulating Exterior Walls

- Jack studs of sliding closet door openings are straight and plumb.
- Wall stud faces adjacent sliding closet doors are straight, plumb and in the same plane, and stud faces behind kitchen countertop are in the same plane
- All electrical boxes are sealed (except attic light) and insulation placed behind boxes
- Kitchen sink outlet and outlet above range have a separate piece of fiberglass insulation behind them
- All exterior basement walls have been insulated with foamboard; foamboard is secured tight to walls
- All foam board edges filling narrow stud bays are tight or sealed with tape
- The gap between windowsills and bottom of windows is sealed
- All holes in **interior and exterior** top/bottom plates are filled
- Seams between exterior wall upper/top plates, exterior wall corners, and exterior door/window components are sealed
- Window component seams and joints between upper and top plates are taped
- Seams between exterior wall base plates and sub-floor are sealed
- All holes in **exterior and interior** wall studs on both main floor and basement levels are filled
- All exterior penetrations are sealed from the inside, e.g., foamboard, OSB, sill box foam, range plenum, dryer vent
- All sub-floor penetrations are sealed, e.g., tub drain, vent stack, water lines, drain lines, cold air return
- Floor vents are nailed and secured with HVAC tape
- Gaps between the rough opening and framing of EXTERIOR doors are fully filled with spray foam or caulk
- Gaps between window rough opening and window framing are partially filled with spray foam or caulk.
- Gap on inside edge of exterior door thresholds (along the floor) is caulked to outside of door jambs
- Window and door header areas are filled with foam board and sealed
- Exterior walls are filled with insulation, with no visible gaps around perimeter.
- Insulation is fluffed out and flush with interior edge of studs (no stud areas covered)
- Vanity, doorbell and thermostat wires are not covered with insulation
- Future bath fan vent duct in basement is lined with plastic and duct and sill box are filled with insulation
- Holes in bath fan housing are taped or caulked
- Sill boxes are filled with batt insulation
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Quick Reference Guide

March 2025
Version 25 .0

Chapter 12 – Air Sealing (Poly)

Installing Poly Vapor Barrier	1. Install vapor barrier on main floor of the house only 2. Minimize staples. Target every 24". Tape holes seams having less than a 2-stud overlap and ceiling poly seams with air sealing tape 3. All poly overlaps must cover two studs or trusses 4. Before stapling at corners: a. Tuck poly TIGHT INTO corners - NO AIR GAPS or "stretched" corners but a nice 90-degree crease formed into corner b. Verify poly is not bunched up (especially at ceiling/wall corners) c. Staple corners with hand stapler tight to corner. Keep staples 1" away from corners 5. Use nominal 12' poly for ceiling: 8' poly for walls 6. Install all ceiling poly before installing wall poly 7. After installing poly, cut an X across electrical box corners and push poly up ½' around box 8. Cut an X across house scuttle and staple to framing 9. Cut an X across windows and staple to framing 10. Cut out poly over bath fan opening and seal poly to housing with air sealing tape 11. Cut out the poly covering the door along the outside edges of the door jamb. Roll up and tape over door 12. Tape around exterior corners along top plates 13. Extend ceiling poly 6" down the top of walls 14. Pull vanity, thermostat, and doorbell wires through poly 15. Install bedrooms and kitchen/living room areas 1st (before bathroom and closets) 16. Use scrap pieces (if available) for bathrooms and closets 17. At intersecting corners, extend wall poly to cover the 1st stud beyond the corner of intersecting wall 18. Move insulation if covering wall studs before covering with poly. 19. Keep poly tight. Tuck poly tightly into to corners before stapling. Keep staples 2' apart. 20. Before stapling free ends at wall corners, staple the factory edge of at least 4 adjacent studs, then staple the down the 4 studs top to bottom before securing the free end wrap. 21. When stapling corners, staple one stud at a time, top to bottom. Staple exterior corner stud 1st before intersecting wall stud 22. Cover all ceiling areas, exterior walls, two studs of intersecting walls and flush sliding closet headers with poly. 23. At ceiling/wall intersections, staple to truss first before securing to top plate

Quality Points

Chapter 12 – Air Sealing (Poly)

- All ceiling area is covered with poly
- Ceiling poly is covering upper and top plates around entire house exterior, " and there's a 2 truss overlap on all overlap seams AND taped along trusses
- Poly corners are tucked tight to framing and will not interfere with sheetrocking
- Poly around exterior corners and posts is sealed to top plates
- Closet headers with flush sliding doors are covered with poly (inside and outside) and header ends are sealed with air sealing tape
- Poly around ceiling and wall electrical boxes has a snug fit (or otherwise taped)
- All exterior wall areas are covered with poly (including 1st 2 studs on intersecting walls)
- Wall poly has minimum 24" (2 stud) overlap of seams (otherwise seams must be taped)
- All holes or tears in poly are taped with air sealing tape. Bath fan perimeter is sealed with air sealing tape.
- Window and house scuttle access poly are cut from each window and excess poly is stapled to framing (Hold off from cutting scuttle poly in the winter. See Construction Supervisor)
- Window poly cut-outs are placed in tub
- Poly covering bath fan is cut along outer edge of the fan flange and taped to flange
- Unusable small scraps of poly (< 3') are stapled to interior wall surfaces (other than bathroom walls) and larger pieces are temporarily stored in the bathtub for painting day
- Poly cut along exterior door jambs is rolled up and taped above door with painter' tape

Quick Reference Guide

March 2025
Version 25 .0

Chapter 13 – Ceiling Sheetrock

Preparation	1. Verify the following: a. Sheetrock staged in house is ½"; garage is 5/8" b. Blocking for sheetrock is complete per Sec. 10.6..3 c. Ceiling poly is tight to corners (not stretched across) Correct if necessary. d. All ceiling electrical box, HVAC duct & damper access locations are marked on the floor e. Truss centerlines are marked where trusses cross INTERIOR wall top plates Verify coil stock has been installed at the base of the garage common wall.
Planning	2. Develop an installation plan. Use as many full width sheets as possible**. NOTE:** Minimum allowable sheetrock width is 16" along interior walls and 12" along exterior walls 3. Before sheeting the living/dining/kitchen area, snap a chalk line parallel to the exterior wall to indicate starting point. Snap line ¼" greater than starting sheet width. 4. Develop an installation team plan (installing/marking truss centers/quality control
General Installation Rules	5. All sheets must be secured to at least three trusses (i.e. have 3 rows of screws). 6. Each sheet must have 7 screws on each end and 5 in the field 7. Screw heads should be installed straight in and slightly recessed below the surface of sheetrock 8. Keep screws 1"-2" away from corners to prevent corner cracking 9. Add additional screw 2" away from any screws driven too deeply 10. Hold screws back 8-10" from interior walls and back 4"-6" from exterior walls where trusses intersect 11. Abutting ends should be factory edges if possible and always centered on a truss (except over headers) 12. Do not force sheetrock if fit is too tight – trim to fit. Do not install sheets with broken corners. 13. Consult Construction Supervisor re: acceptability of sheets that break during installation 14. Cut off and remove any torn sheetrock paper. 15. Stagger sheets at least two and preferably three trusses on adjacent rows. 16. Undercut sheets to go between an installed edge and truss center or end blocking by ¼" 17. Undercut sheets to completely fill a gap between two parallel walls by ½" Spiral cut around all electrical boxes. 18. Hand saw cut sheetrock for bathroom fan opening before installation. Perimeter of cut to be flush with inside edge of opening. 19. Run a vacuum when using a spiral saw 20. Cut a 4 1/8" hole for accessing all basement HVAC dampers 21. Keep screws 24" away from electrical boxes until box is spiral cut
Installing Ceiling Sheetrock	17. Begin installation at an exterior wall corner 18. Install Sheets perpendicular to the trusses a. Measure to determine starting piece length from corner or adjacent edge to a truss centerline. b. Determine location of any HVAC duct or electrical box centers before installing sheet c. Cut piece, load on ceiling lift and secure with enough screws to hold sheet in place (e.g., 2 screws per truss) d. Mark truss center lines before completing installation e. Complete screw installation f. Begin quality checks as soon as each individual sheet has been installed. Chalk "OK" on each sheet after quality checking 19. Cut and remove sheetrock over scuttle access along scuttle framing 20. Upon completion of garage ceiling rock, install 3" wide sheetrock to cover upper & top plates of exterior wall. Use ½" if available 21. Drill a hole near garage door opener outlet box. Pull wire through hole. **NOTE: Continued on next page**

Finishing Scuttle Box Covers	22. Install four sheetrock pieces to the perimeter framing of the house and garage scuttle boxes. Use ½" for house; 5/8" for garage. Install factory edge up, flush to top of framing 23. Locate OSB portion of scuttle box cover. Trace OSB perimeter on sheetrock and secure 24. Locate and install full height post

Quality Points

Chapter 13 – Ceiling Sheetrock

- All rows along interior walls are at least 16" wide. No rows along exterior walls are less than 12" wide.
- All ceiling trusses are covered Sheetrock rows are appropriately staggered (minimum of two, preferably three trusses) and no piece has less than 3 rows of screws
- Openings for attic scuttle, electrical boxes, bathroom fan, HVAC ducts and duct damper accesses (basement) have been cut out. Verify with house plan and markings on floor
- Attic scuttle:
  - Side pieces are installed and do NOT extend above top of framing
  - Sheetrock scuttle covers are screwed to OSB and set aside for plasterer

- All sheets have been quality checked and marked with an "OK"
- Upper and bottom plates of exterior garage walls are covered with 3" sheetrock
- Garage door opener wire is pulled through ceiling sheetrock

Quick Reference Guide

March 2025
Version 25 .0

Chapter 14 – Wall Sheetrock

Preparation	1. Verify the following: a. Stud centers are marked on the main and basement floors b. HVAC ducts, electrical boxes and pipe locations are marked on the floor c. Wall blocking is complete. See "Blocking for Sheetrock", Section 10.6 .3 d. Kitchen wall stud faces behind future countertop have been adjusted to the same plane e. King/Jack studs on sliding door closet framing have been OK'd f. Exterior wall studs adjacent sliding closet doors have been OK'd g. Poly vapor barrier is complete, and any inside corners are fully tucked and NOT stretched across corner h. All outside corner seams, holes and poly seams < two stud overlap are tape sealed i. Doorbell chime & thermostat wires have been poked thru the poly j. Bathroom vanity light wire, if not run into a box, has been poked thru the poly k. Cold air return boots don't extend more than ½" beyond the face of the wall studs. l. Exterior basement walls covered with 1" foam and gaps between top of foamboard and upper plate are sealed m. Basement foamboard is secured tight to the exterior walls 2. Residual caulk/spray foam from window frames has been removed 3. Temporary stairway handrail has been removed
	4.
General Installation Rules	5. Use 1 ¼" screws for house rock; 1 5/8" screws for general garage; 2 ½" screws for garage/house common wall 6. Install all screws per "Quality Points" listed in Section 14.4.1.7 7. All butt joints should be centered on a stud unless above window or door headers 8. Abutting ends should be "factory" edges as much as possible 9. All sheets must be secured to at least three studs (i.e. have 3 columns of screws), except for narrow pieces, pieces above windows or doors with headers and closet side walls 10. Keep screws at the bottom of a stud 3"-4" above the floor 11. Install two screws in the baseplate between each stud 12. Maintain a ½"-3/4" gap between sheetrock and outside edge of exterior door jambs. 13. U 14. 15. Do not force sheetrock to fit 16. Keep basement sheetrock ½" off the concrete floor 17. Cut out cold air returns, switch boxes (mark in place, then saw sides) and plumbing pipes before fastening. 18. Cover ALL exposed wall foamboard, except in sill boxes, which will be covered with fiberglass 19. When cutting with a hand saw, cut facing the finish side and only on the push stroke
Installing Wall Sheetrock	20. Install red dimensioned areas first 21. Position pieces tight to ceiling rock. Hold piece to studs and install 1 -2 screws per stud before releasing 22. Mark stud centerlines before completing individual sheetrock installation 23. Upper rows should completely cover doors and windows, with a single sheet. Two butted scrap pieces can be used over backside of closet headers, but must extend down at least 6" below and beyond header 24. Save window cut-outs for sheetrocking windowsills and bottom of window headers. Save sliding closet door cut-outs for covering upper portion of swinging doors close to adjacent wall corners. Cover corner to corner 25. Cut sheetrock out from window and door openings with a spiral saw. Use a vacuum to control dust 26. Quality check all sheets (refer to Quality Points on back side) and mark "OK" with scrap sheetrock. Begin quality checks as soon as each individual sheet has been installed 27. Keep upper screws 1 ½" down from ceiling rock 28. Keep screws no more than 1" away from corners 29. Measure and handsaw cut out sheetrock for cold air returns before installation 30. Measure and handsaw cut out sheetrock for wall switches before installation 31. Measure and record approximate electrical box centers before covering with sheetrock. Spiral saw cut after installation 32. Be sure thermostat and door chime wires (BUT NOT VANITY WIRE) are pulled thru hole in sheetrock. 33. Vanity wires should be left behind poly. It can be covered with sheetrock 34. Install sheetrock on outside corners flush to the outside edge of the corner stud 35. Cover the range plenum. 36. Do not cover joist hangers below stairway closet platform with sheetrock. Cut just short of the hangers 37. Replace stairway handrail when as soon as stairway is sheet rocked 38. Butt sheetrock up to the tub/shower nailing flange (**DO NOT Overlap Nailing Flange**) 39. Install sheetrock above the door and one stud bay on either side of the door on the unfinished side 40. Use 8' – 12" sheetrock scraps to cover interior horizontal wiring in unfinished side of basement. Cut all to same width **NOTE: Continued on next page**

Window Frames	41. Verify framing is free of protruding nails, caulk and spray foam 42. Use window cut-out for covering sill and bottom of header; Use scrap for side pieces 43. Cut l four window frame pieces. 44. Use cardboard shim to maintain a gap between sheetrock and window frames sheetrock 45. Keep sill screws 2" away from window frames 46. Step back and view window frame pieces for straightness and reveal. Investigate if reveal is not even 47. Install edging strips. Push tight to window.
finishing & Cleanup	48. Leave larger (no full sheets) pieces under stairway if homeowner desires 49. Clean Floors

Quality Points

Chapter 14 – Wall Sheetrock

- All wall sheetrock pieces are installed.
- Basement foamboard is covered with sheetrock
- Joints are staggered a minimum of 2 and preferably 3 studs
- All sheets have been quality checked and verified "OK":
- All screws are secured to wood
- Screws are not too deep or if too deep have extra screws 2" away
- Screw count for full sheets is seven on ends, five in the field
- Narrow sheetrock pieces have two screws on ends, staggered screws in the middle
- Lowest screws installed in studs are 3-4" off the floor
- Bottom row sheets have two screws between each stud secured to bottom plate
- There is a ½"- ¾" gap between sheetrock and exterior door jambs No sheetrock is installed with broken corners
- All pieces have at least 3 columns of screws (exception-closet side walls and pieces over window and door headers)
- All windows and door headers are covered with a single piece of sheetrock (backside of closets are the exception) All interior penetrations (electrical boxes, cold air returns, plumbing, attic scuttle, bath fans, etc.,) have been cut out (verify via house plan and marks on the floor)
- Furnace thermostat and doorbell chime wires have been fed through the sheetrock. Vanity wire has not
- Sheet rock edges on outside corners and sills do not extend beyond the edge of framing corner (up to ⅛" short of corner is ok)
- Basement sheetrock is installed ½" off floor
- Sheetrock around window frames is straight, I.e., fits tight to the frame, no bowing or bulging, sides are parallel
- All windows have edging strips installed tight to the window frames
- Sheetrock is not covering tub/shower nailing flange
- Sheetrock below stairway closet platform is not covering joist hangers

- Stairway handrail has been re-installed

- Wiring between studs on the interior walls of the unfinished side of the basement is covered, sizes uniform

- Full leftover 8' sheets from basement are brought upstairs for return to supplier
- Usable scraps (< full sized sheet) are under stairs, set on by 2X scrap.

Quick Reference Guide

March 2025
Version 25.0

Chapter 15 – Painting

Preparation	1. Determine a painting plan. 2. Cut poly, if needed, as protection from unruly paint/stain. 3. Ready small paint pails, roller pans and liners. Set near paint supply 4. Open windows for fresh air. 5. Dust off window sills and edges above tub/shower 6. Protect exterior doors with poly. . 7. Protect tub/shower flange. 8. Tape window frames if there is no plastic window edging. 9. Mix paint. 10. Protect floor if there is no paper covering. 11. Fill four pails with water.
Priming, Painting and Staining	12. Do not prime or paint garage ceiling or plastered sheetrock in a garage. 13. Prime/paint ceilings before walls 14. Prime walls, ceilings, and house scuttle box cover (if there is one) with one coat of primer. 15. Use brushes to cut in all corners and surfaces inaccessible to rollers. a. Roll out drips and lap marks. b. Wipe splatter off doors, hinges, strike plates, etc. with a damp rag before paint dries. 16. Hold primer and paint back 1" from edges of exterior doors. 17. Remove painter's tape as soon as possible, but leave any window frame tape on 18. Scrape roller covers and brush primer from pans and pails. Transfer leftover primer back to supply 19. Re-use scraped primer roller covers and cleaned brushes for painting. Replace pan liners and small pail liners before painting 20. Finish coat walls, ceilings, and scuttle cover using same techniques as for priming. 21. After painting, check for lightly coated areas using portable lights held 1'- 2' from surface. Touch-up as needed. 22. Stain closet poles and stair handrail and skirt boards 23. Check with Construction Supervisor if house scuttle box trim should be painted, if yes, prime and paint it.
Clean-Up	24. If painting cannot be completed in a day, wrap rollers and brushes tightly in plastic or foil for re-use 25. Scrape roller covers and brush paint from pans and pails. Transfer back to supply 26. Dispose of all roller covers and pan and pail liners, as well as pans or pails with excessive paint build-up 27. Give brushes to Construction Supervisor to evaluate for keeping versus disposal. Clean those suitable for re-use. 28. Leave window tops under eaves and along front porch open 1" before leaving, weather permitting. 29. If floors are covered with paper, remove all paper being careful not to get any spilled paint on the subfloor.
Preparation for Next Build Day	30. Secure covers on leftover primer/paint buckets, mark approximate leftover volume on covers, leave covers off empty buckets 31. Leave all primer and paint buckets inside house. Put two step stools in basement, all other step stools, painting tools, bins, etc. get stacked in living room ready for pick-up.

Quality Points

Chapter 15 – Painting, Staining

- Inside of exterior doors, shower stall flange, and tub/shower are clean of any paint
- Plastid window edging strips or tape around window frames is in place and paint cleaned from glass surfaces
- All painted surfaces have been quality checked and touched up as necessary
- Stair skirt and stair handrail are stained, and quality checked
- All painter's tape (except on window frames) and poly covers removed from doors
- All residual paint has been returned to containers, containers sealed, and marked with approximate volume. (Half full, quarter full, etc.) Empty containers are left open and set aside.
- Any paper floor covering is removed
- Tools and supplies are neatly stacked in living area and two step stools left in basement

Chapter 16 – Installing Handrail

Installing the Handrail	1. At the top and bottom stair treads, measure vertically 31” above the nose of the treads and mark the wall. Pull a string line very tight between these marks. This line represents the location of the bottom holes in the three handrail mounting brackets and will place the top of the handrail about 35” above the stairs (must be between 34”-36”). 2. Along this line, mark the wall for locations of the top and bottom handrail brackets. Locate the top bracket 10-12” from the top end of the stairway wall and the bottom bracket 10-12” from the bottom end of the stairway wall, or from door trim if present. Install handrail brackets at both top and bottom locations. 3. Cut the handrail to a length such that each end will be 2”-3" from the end of the wall or door trim. With the flat side of the handrail firmly on the bed of the saw, cut opposite 45º miters on each end of the handrail. 4. Before attaching the handrail to the top and bottom brackets, locate the center of the handrail and attach the middle bracket to the flat underside at this location. 5. Set the flat side of the handrail on the top and bottom handrail brackets in the position defined in Step 4 and attach the handrail clips to the bottom of the handrail. 6. Sight along the handrail and raise and lower the center bracket along the wall until any bow in the rail is minimized. Screw the middle bracket to the wall. 7. Cut opposite 45º miters on a piece of handrail at least 20” long. Move the handrail mounting brackets under the handrail to their farthest positions from the wall. Measure from the long end of the miter to the wall at each end (the distances may not be the same) and carefully cut two pieces these lengths from the short, mitered piece. 8. At each end of the rail apply wood glue to the miter cuts of both the handrail and the return piece. Set the return piece in place, and hold in place with a clamp. If necessary, wedge a tapered shim between the wall and the end of the return to ensure good contact at the glue joint. 9. Predrill the miter joint and screw the return to the rail using one screw in each direction, with a slight vertical offset. Wipe off excess glue and putty the holes. If the return is not tight to the wall, loosen the screws holding the bracket to the rail, push the return tight to the wall, and retighten the screws.

Quality Points

Chapter 16 – Installing Handrail

- Handrail is straight and any bow is minimized
- Top and bottom handrail returns are tight to the wall
- Brackets are secure to wall and bottom of handrail
- Top of the handrail is at between 34” – 36” above the nose of the stair treads

Chapter 16 – Installing Skirtboards

Installing Skirtboards	1. Scrape wall surfaces behind the stair stringers and clean off any dirt or plaster on the 2x4 on either side of the outside stringers 2. On both sides at the top of the stairway, cut a 1" wide notch in the subfloor overhang, flush with the header. Using a square, draw a 4" long plumb line on the wall aligned with the face of the header. 3. On both sides at the bottom of the stairway, use a level to draw about an 8" plumb line 4" from the end of the stringer. 4. On one side of the stairs, lay the 24" side of a framing square on the 2x4 next to the outside stringer. Make two marks 11½" up from the 2x4 about 3' apart at each end of the stairway. Repeat on the other side of the stairway. 5. On one side of the stairs, place a 6' level on the two marks at the top of the stairway (from Step 4) and scribe a line across the two marks to a point that intersects the plumb line from Step 2 (this will be Point 1). Using the two marks at the bottom of the stairway (from Step 4), draw a line to a point that intersects the plumb line from Step 3 (this will be point 2). Repeat on the other side of the stairway. 6. On one side of the stairs, measure from Point 1 to Point 2. Then, measure from Point 2 straight down to the floor. This measurement minus ¼" is the dimension to Point 3. Subtract another ¼" if there will be hard flooring at the bottom. If the DriCore is not yet installed, subtract another 3/4". Repeat on the other side of the stairway. 7. Compare measurements from both sides of the stairway. If the measurements on each side are different by more than ¼", make the adjustments described in the Construction Manual. 8. If the bottom of the skirtboard ends close to an outside corner or door opening, adjust the length as described in the Construction Manual. 9. Locate the Skirtboard Template and if necessary, adjust angles to be cut at the top and bottom of the stairs with an adjustable bevel as described in the Construction Manual 10. Mark the unfinished side of a skirtboard with the length along the top of the skirtboard and top and bottom angles using either the Skirtboard Template or the adjustable bevel angle, if necessary. 11. Transfer the Point 2 to Point 3 measurement (from Step 6) to the bottom angled line from Step 10. Create a 90-degree corner with a pencil line at Point 3. 12. Recheck all measurements then cut the first skirtboard with unfinished side up. Test fit on both sides of the stairway. After confirming proper fit, use the first skirtboard as a template to cut the second skirtboard. Confirm proper fit of second skirtboard. 13. Stain both ends of each skirtboard 14. Prior to placing the skirtboard in position, measure from the final Point 1 to the floor and mark the upper edge of the skirtboard at this dimension down from the peak. Drive a 2-1/2" finish nail into the end, leaving about ½" exposed. This will provide a "handle" to help lift the board into position. 15. Place the skirtboard in position so both ends match with Points 1 and 2 (from Step 5). Hold the skirtboard off the basement floor using DriCore and/or ¼" x 3" x 5" shim depending on type of basement flooring to be installed. 16. Nail the skirtboard to the wall with 2-1/2" collated finish nails. Putty the nail holes. 17. Repeat steps 14-16 for the opposite skirtboard.

Quality Points

Chapter 16 – Installing Skirtboards

- Skirtboard is stained on both ends
- At the top of the stairs, Skirtboard is seated firmly into the notch in the floor
- Skirtboard covers any layout pencil lines on the wall
- Top and bottom skirtboard angles are parallel
- Proper spacing exists between bottom horizontal cut of skirtboard and basement floor (1/4” for unfinished floor, 1” if floor to be finished with DriCore

Chapter 16 – Installing Stair Treads and Risers

Installing Stair Treads and Risers	1. Verify the stringer rise is $9^3/_4$" and stair treads are $11^1/_4$" to $11^1/_2$" wide. 2. Prepare a block 2" thick to be used to ensure treads have required nose overhang. 3. For safety reasons, only remove the temporary treads from one step at a time and make certain that the stairway gap is never unattended. 4. Starting at the bottom of the stairs, measure between the skirtboards to get the length of the tread. If the stairs are going to be carpeted, cut the tread ½" short. If the stairs are not going to be carpeted, cut the tread 1/8" short. 5. Apply a bead of construction adhesive on the three stringer sections. Place the tread on the stringers, align so the tread is centered between the skirtboards and the nose of the tread is flush with the 2" thick held against one of the outside stringers. Drill one 5/32" pilot hole through the tread into the stringer about $3^1/_2$" from the nose of the tread and loosely secure the tread using a 2½" exterior screw. 6. With the other outside stringer, check flushness with the 2" block and drill and secure using a 2½" exterior screw as described in Step 5. 7. Drill and insert screws as described in Step 5 so that the tread is secured to each stringer section with three screws. All screws should be inserted until they are flush, or slightly shy of the tread surface. 8. Starting at the bottom of the stairs, install the bottom riser below the tread just installed. Cut the riser to length using the same process as the bottom tread as described in Step 4. 9. Rip the riser to $^1/_8$" less than the height between the two treads (between the tread and the floor for the bottom riser). 10. Center the riser between the skirtboards position the riser tight against the tread above it. Secure the riser to the stringers with two 1-5/8" exterior screws in each stringer. 11. After a tread and riser pair is installed, remove the temporary tread from the step immediately above it. 12. Repeat Steps 4 - 11 for each tread and riser, proceeding up the stairway. Cut no more than 2-3 tread and risers at a time to length, in case distance between the skirtboards varies along the stairway. 13. For the topmost tread, measure from the beam at the top of the stairs to the stringer rise immediately below where the topmost tread will be placed and add 2". Rip the top tread to this width. Install the top tread as described in Steps 4 – 7. 14. Install a riser below the topmost tread using Steps 8 – 10. 15. No riser is required above the top tread.

Quality Points

Chapter 16 – Installing Stair Treads and Risers

- Treads have 1-1/4” overhang from the riser immediately below them.
- Treads and risers are centered between the skirtboards with the appropriate gap on either side (if stairs to be carpeted – ¼” gap, if not carpeted – 1/16” gap
- Risers are attached to stringers with two screws per stringer
- Treads are attached to stringers with three screws per stringer. All screws are flush, or slightly shy of the tread surface.

Quick Reference Guide

March 2025
Version 25 .0

Chapter 17 – Cabinets – Kitchen and Bathroom

	1. Unpack. Inspect for damage. Compare sizes and number to Cabinet Plan (Plan). 2. If Plan has a microwave, verify cabinet above range is a 12" high unit (NOT a 14" high unit) 3. Remove doors. Protect vinyl floors. 4. Set up a temporary workbench to hold materials and tools.
Laying Out Kitchen Upper Cabinets	5. If using blocking, skip to step 7. 6. If not using blocking, layout and install per sections 17.2 and 17.3 then go to step 7.
Installing Kitchen I Upper Cabinets Installing Base Cabinets Installing Range Hood Installing Kitchen Countertop	7. Temporarily assemble countertop and install toggle bolts snugly (if corner arrangement). 8. Mark walls where countertop will end. Verify length with Cabinet Plan. 9. Using Cabinet Plan, mark walls where countertop and upper and base cabinets end. Rip fillers if required. 10. Mark wall studs & window/sink base centerline 38" above floor. 11. Drill 3/16" clearance holes at top/bottom of 30" cabinets; if blocking, top holes only req'd for 12", 14" and 15" units. 12. Begin installing with the corner cabinet. 13. Use 2 1/2" wafer heads to secure to blocking; 1 ¼" screws for support strips. 14. After mounting, verify spacing on each side of window is equal. Adjust filler width as req'd. 15. Attach filler (if req'd) to adjacent cabinet. 16. Attach cabinets adjacent corner unit w/ const. screws through the corner unit side panel into corner stile of filler. 17. Continue installation, checking for level and plumb and flushing up stile fronts. Shim as req'd. 18. After upper cabinet installation, disassemble dry fit of countertop, glue spline and tighten toggle bolts. 19. Remove shelves, drawers and any shipping protectors. 20. Set the lazy susan in place. Level and plumb. Attach to wall w/2 ½" wafer head screws. 21. Center sink base beneath the window. Cut out for water lines, drain and electrical box from inside sink base back. 22. Check Plan to determine filler width(s) between lazy susan unit and sink base. Attach filler to adjacent unit. 23. Check countertop length. Refer to Plan. Ensure end of countertop adjacent range is flush with cabinet above. 24. Assemble cabinets between lazy susan and range. Clamp and secure stiles. 25. Place above assembly next to lazy susan. Use level to align to upper cabinet next to range hood opening. Mount to wall. 26. Verify 30 1/8" clearance front & back for range. 27. Measure gap between corner unit and adjacent unit and rip filler to that width. Attach to stile adjacent corner unit. Repeat on refrigerator end. 28. Check top of assembled cabinets for level. Check face for straightness. Shim as required. 29. If range, frig or dishwasher are adjacent to floor corner cabinet, install a cabinet end cap between appliance & cabinet. 30. If standalone cabinet on one end, install to wall then to a scrap 2x cleat on floor. Attach to wall first, then to the cleat through toe kick. Use a separate toe kick in front of future dishwasher cabinet. 31. Re-install all doors and drawers. Use hinge adjustment screws to plumb and align the doors. 32. Remove knockout & determine best hole location for cord. Drill 1 ¼" spade bit hole in cabinet bottom. 33. Drill (4) 3/16" clearance holes about 2" from each end, and 2" from front & back. Glue & screw 1 x 4 pine strips to cabinet underside with 1 ¼" wafer head screws. 34. Remove vent extension screws. Re-secure extension to range hood with 2" wide flashing tape. Check for gaps. 35. Draw a 4" x 11" rectangle centered ½" below cabinet. Cut sheetrock and plenum on the lines and remove. 36. Use flashing tape to seal sheetrock and plenum cutout. 37. Lift hood in place; slide vent extension into the cutout. 38. Install weatherstripping on face of spacer perimeter. Verify no gaps. 39. Fasten hood to pine strips with 1 ¼" wafer head screws. 40. Draw a ref. line from each corner for 2x4 countertop corner supports. 41. Attach 2 x 4 x ~ 26" to corner. Hold top even with drawn line and attach with 3 ½" Sheetrock screw into studs. 42. Dry fit mitered countertop in place. Check for gaps between splash & wall. If any > 1/8", scribe and remove excess. 43. Determine which corner support areas of the cabinets to secure the countertop. 44. Draw lines along both sides of these cabinet walls. Cut 1x4 x 24" boards for each area. 45. Turn countertop over. Drill clearance holes in boards and mount to underside. DO NOT extend boards inside sink base walls. 46. Center and glue a ¾"x¾" x 10" pine board to the top rail of the sink base. Clamp flush to front face. 47. Glue and screw a 1x4 x cabinet width board behind countertop lip where the dishwasher will or might reside. 48. Glue and screw 1x pine x12" behind the countertop lip. One on each side of the miter joint. 49. If not pre-drilled, drill 3/16" clearance holes through each diagonal corner block req'd for fastening countertop. 50. Fasten countertop to pine boards. **Verify screw length first.** 51. Secure countertop to sink base ¾" x ¾" x10" blocking and miter joint blocking. Drill 1/8" pilot holes from underneath rails. 52. Re-install all doors and drawers. Use hinge adjustment screws to plumb and align the doors. **Continued on next page**

Installing Bathroom Vanity	53. Determine location from Plan. Drill 1" holes for water supply lines & a 2 ½" hole for drain. 54. Level & fasten to wall studs with 2 ½" wafer head screws (or ¼" x 3" winged toggle bolts if no studs) 55. Dry fit countertop to determine if scribing & sanding are req'd. If so, see Section 17.7.1.3 &4. 56. Turn countertop over. Glue & screw 1" x 4" pine strips to underside, attach with 1 ¼" wafer head screws. 57. Set countertop in place & fasten to cabinet same as kitchen countertop with 1 ¼" wafer head screws. **Verify screw length first** 58. If a linen closet in bathroom, a notch in the proud edge of the cabinet stile was made to fit around the countertop (if req'd) 59. Double check to fit. If not correct, remove more material.

Quality Points

Chapter 17 – Cabinets

- Cabinets have been inspected and any damage has been reported to the Construction Supervisor
- Vinyl floors have been protected with broken down cabinet shipping boxes
- Plywood support strip heights have been verified as correct prior to installation (if using)
- Support strips ends without studs have been installed with toggle bolts & bolt holes have been sealed with caulk (if using support strips)
- Upper cabinets have been installed 54" above the floor.
- Cabinet stiles are flush, and cabinets are level across top and front
- Cabinets are installed level across the top front and sides are plumb.
- Sink base is centered under window. Cabinets are located according to Plan and upper and base cabinet ends are aligned plumb.
- Base cabinets adjacent range and refrigerator are flush with upper cabinets
- Base cabinet ends are flush with upper cabinets.
- Holes have been cut out of sink unit and vanity for drain and water lines. Electrical box cut out on back of sink base.
- Clearance for range (30 1/8") has been verified @ front & back
- End cap stiles are plumb to the upper cabinet stile.
- Range hood vent extension screws have been removed and the extension resecured to hood with flashing tape.
- Cut edges of sheetrock and range plenum are sealed with flashing tape.
- Weatherstripping between the wall and back of range hood is installed and checked to ensure seal is not leaking
- 2 x 4 x 26" countertop corner supports have been installed
- Countertop length has been checked with a level to ensure end of countertop is flush with upper cabinet
- Countertop spline has been glued and pieces reassembled tight with t op corner surfaces flush
- Kitchen and vanity countertops have been dry fitted to the wall, fit assessed for gaps, and sanded if required
- If there is a standalone cabinet at one end of the countertop, it is fastened with a cleat
- Toe kicks are installed and if there is a cabinet in a future dishwasher location, toe kick is butt-spliced for easy future removal
- ¼ x1" pine strip has been added where dishwasher (or future dishwasher) has been installed behind countertop lip
- A 1 x 4 x ~ 10" pine has been ripped to ¾" square and glued and clamped to the front edge of the sink base
- A pair of 1 x 2 x 12" pine boards have been glued and clamped behind the countertop lip on each side of the miter joint
- No blocking exists inside of sink cabinet
- Countertop has been secured to base cabinets
- Bathroom vanity location verified by Cabinet Plan.
- Vanity has been leveled and fastened to the wall
- 1 x 4 pine mounting strips have been glued and screwed to underside of vanity
- Countertop has been secured to vanity base cabinet
- Shelves, drawers and doors have been re-installed. Doors are plumb and aligned.

Quick Reference Guide

March 2025
Version 25 .0

Chapter 17 – Cabinets - Optional

Installing Optional Cabinets, Stairway Cabinets	1. If there is an opening prepared in kitchen for a built-in cabinet over stairway, install a lower & upper cabinet in opening 2. Unpack units; inspect for damage. Verify cabinets will fit into opening 3. Remove shelves, drawers/doors from l both units. Cut off bottom off lower unit flush with the top of the toe kick 4. Install lower unit first 5. Drill four 3/16" clearance holes per side, 1 ½" inside the frame of the lower cabinet, and about 2" down from top & bottom 6. Place lower cabinet into opening. Level & plumb. Shim underneath, as necessary 7. Make sure the face frame protrudes ¾" out from wall surface around entire perimeter 8. Secure top of each side with 2 ½" wafer head screws. Tighten gradually & repeatedly check for level & plumb. Add bottom screws & recheck for level & plumb and a uniform ¾" frame reveal 9. Install upper cabinet on top of lower cabinet per step 5. Flush upper & lower frame faces & clamp 10. Drill (2) 1/8" pilot holes 2 ½" deep thru lower cabinet face frame & partially into upper cabinet face 11. Fasten together w/ 2 ½" trim screws. Verify ¾" reveal around frame perimeter. Secure two sides to framing w/2 ½" wafer head screws. 12. Install door trim around perimeter of cabinet frame per 17.8.1.11 Re-install shelves and plumb & align doors
Barista Cabinets (Modified Set of Two Upper Cabinets)	13. Remove shelves & doors. 14. Drill (4) 3/16" clearance holes in back of each cabinet per section 17.4.6 . 15. Check Plan for location. Verify cabinet is centered. Use a 3' level and draw a light line 54" off the floor. 16. If studs aren't available, install support strips per 17.2 and 17.3 17. Mount 54" off floor into two stud's w/2 ½" wafer head screws in top holes, or 1/14" if attaching to plywood. 18. Shim as necessary to ensure level & plumb before installing bottom screws. 19. Build & attach a toe kick base to raise the base cabinet = to height of other base cabinets. See Const. Super 20. Align base to upper cabinet & install cabinet to a cleat per Section 17.5.15 21. Attach toe kick board to toe kick base per Section 17.5.16 22. Dry fit the countertop to the wall. Determine if scribing & sanding is necessary. See sections 17.1.3 and 17.1.4 23.Turn countertop over. Drill 3/16" clearance holes in 1" x 4" pine boards. Glue & screw to underside. 24. Drill 3/16" clearance holes thru corner blocks and attach countertop to cabinets with 1 ¼" wafer head screws 25. Install the shelves & doors. Adjust hinges as required to align door edges.

Quality Points

Chapter 17 – Cabinets – Optional

- If there is a stairway cabinet, cabinets have been inspected and opening has been measured to verify cabinets will fit
- Lower cabinet is installed and checked for level across top; front and side one is plumb
- Upper cabinet is installed with frame flush to lower cabinet frame, frame reveal is consistent ¾" around its perimeter
- Door trim installed with thicker edge against cabinet frame
- Door hinges are adjusted in upper cabinet

- If there is a barista cabinet, location is verified with the Cabinet Plan
- Toe kick height matches kitchen cabinet toe kick height
- Lower cabinet sides are flush with upper cabinet; upper cabinet is mounted 54" off floor
- Base cabinet is fastened to the floor with a cleat
- Vanity has been leveled and fastener to the wall
- Countertop was dry fitted to wall to determine need for sanding
- 1 x 4 pine mounting strips have been glued and screwed
- Countertop is secured to base cabinet

Quick Reference Guide

March 2025
Version 24.0

Chapter 18 – Installing Swinging Doors

Door & Opening Prep	1. Check door/frame for damage. If damaged, notify Construction Supervisor or Site Leader 2. Verify correct door type, size, and size according to the house plan. Set door next to intended location. 3. Check Jack/King studs for excessive twist. If clearly out of square adjust with shims during installation.
Adjust Hinge Side Jack Stud	4. Mark location of hinges on hinge and strike side Jack studs. 5. In all cases, install 3x5" shims using 1½" finish nails or 1-1/4" collated finish nails **with 5" dimension vertical and flush to the hinge pin side of the framing.** 6. Using 6' level, check if the hinge-side Jack stud is plumb. If NOT PLUMB, add shims to the top and bottom hinge areas until it is plumb. 7. Measure the width of door frame at the head jamb and rough opening at top/bottom hinge locations a. If the differenced at either location is >5/8", nail a **combination** of 3"x5"and cardboard shims at top & bottom hinge locations until difference is <5/8" but greater than 3/8"at both locations. b. At either or both locations with a gap >3/8", add 1/8" shims to bring the gap to 3/8". 8. Keeping the 6' level against the top and bottom spacers, attach 3"x5" shims and/or tapered shims at middle hinge location until flush with level
Adjust Strike Side Jack Stud	9. Add combination of 3"x5" and cardboard shims to strike side jack stud at top/bottom hinge locations until difference in opening is <3/8" but equal to or greater than 1/4"at both locations. 10. Place level against spacers and Install shims at middle hinge area until flush with level or <1/8" both locations.
Temporarily Secure Door	11. Set door in rough opening, tight to hinge side Jack stud. If in carpet area (see House Plan), set door on 3/8"-thick shim (1/8" and ¼" shims). Otherwise, set directly on hard finished flooring. 12. Using shims against the head jamb, temporarily wedge door against hinge side with horizontal pressure 13. Check that head jamb left/right reveals are equal. Shim hinge or strike jamb up or down as needed. 14. Recheck hinge side jamb is still plum 15. Verify that bottom of hinge jamb is still centered between wall surfaces. a. Add spacers/shims at bottom of jamb and temporarily secure it with one 2½" collated nail above the spacers/shims. b. Do the same for the strike side jamb. 16. Recheck hinge side is still plumb, centered between wall surfaces 17. Verify consistent door stop contact, adjust side jambs as needed (if >1/4" see Construction Supervisor).
Permanently Secure Door	18. With door still tight to hinge side jamb, secure with one 2½" collated nail at each hinge location on non-hinge side of doorstop and through shims. 19. Re-check plumb (on hinges) and jamb centered in wall. Adjust as required. 20. Replace one short screw in top hinge with #8 3" brass screw. Adjust for equal head jamb reveals. 21. Recheck door operation and head jamb reveal. Adjust strike side jamb up/down as needed 22. Verify uniform contact with door stop, latch & strike alignment, jambs centered within wall (max 1/8") past/shy of wall surface. Adjust as required. 23. Check reveals at top and bottom of hinge jamb a. Adjust shims against the head jamb as required so top reveal equals reveal below top hinge. Secure with 2½" collated nails on one side of doorstop. b. Shim and nail bottom of hinge jamb until reveal equals reveal at top of bottom hinge. 24. Check reveals at top and bottom of strike jamb (minimum 1/8"). Shim and nail at the bottom of jamb until equals top reveal. 25. Install and nail (non-hinge) side of doorstop) remaining shims: strike side top & bottom hinge locations; above the latch location. 26. Install shims in center of head jamb, adjust for consistent reveal across jamb, and nail on one side of doorstop. 27. Re-verify contact between door and doorstop at head jamb and strike jamb. Tap 2x4 scrap or spacer on jamb (<1/8" from plaster) and/or doorstop to adjust. Last resort: remove/re-install doorstop. 28. Install and nail additional shims between hinge locations, strike and hinge side (total 6 sets of shims each side). Adjust for uniform reveals. 29. At all shim locations, nail at opposite side of doorstop. 30. Recheck complete door operation and reveals and adjust if required. 31. Install Door Trim, lockset and door stop. (See manual Chapter 18.1.4 for detailed instructions.) 32. Set and putty all nail holes.

Quality Points

Chapter 18 – Installing Swinging Doors

- Verify install for hard flooring or carpeted area
- Door opens and closes freely and latches snug to striker plate and against door stop
- Uniform reveal at top and sides between door and jamb
- Door trim fits tight to jamb (NO GAP) and is nailed properly (check visually and with “TAP TEST”) and uniform consistent reveal on ALL jambs (sides and top)
- Tight fitting and GLUED miter joints
- All nails set and puttied
- Appropriate door stop installed
- Appropriate lock set installed (passage or privacy type)

Quick Reference Guide

March 2025
Version 24.0

Chapter 18 – Installing Sliding Doors Over Carpet

Door Opening and Preparation	1. Before removing packaging, check doors and frame for damage. If damaged, notify Construction Supervisor (CS). Check to see if doors have been predrilled for door pulls. If they have, pairs will have holes at opposite edges 2. Select pairs of doors that match in visual appearance (grain pattern, color) & correct door pull locations, etc. 3. Put two doors together and check for bow. Plan to install with concave faces together, best side toward the room. 4. Confirm: Door Ht. is 80"; rough opening Ht. at both ends is ~ 83"; header is level within 1/8". If not, see CS. 5. Check Jack stud and flush wall for plumb and gaps. If out of plumb by 1/8" or if any gap exceeds ½", notify CS. 6. Install track 2" back from room side wall surface and attach with three 2 ½" wafer-head screws – middle & both ends. Orient track with roller grooves toward the rear of the closet.
Install Door Hardware	7. Decide which door will be placed in front and rear position in the track. The front door edge should not be visible when entering the room. 8. Place doors on horses, room side up. Protect with padding. Install door pulls. Use a piece of wood to protect the pulls and hammer into holes. If pull holes are not present, use a ¾" Forstner bit and drill 36" up from the bottom and 1 ½" in from the wall edge. 9. Open door packaging including track, hardware, screws, along with either four identical hangers or two pairs with different overhang—deep overhang for rear door. Turn doors over and install hangers by hand tightening a screw in the single hole and the top of the long slot in each hanger. Install 2" from the door edges. (See Fig 18-2, Manual Chapter 18). 10. Hang the doors by tilting the top of door inward into the closet. Install rear door first by engaging rollers in the groove at the back of the track, then the front door in the groove at the inside front of the track. 11. Close the doors. At the middle of the door opening, measure the gap from the bottom of the door to the floor. Gap should be 1" – 1 1/2"; Make sure doors are in correct position (door pulls are next to the walls) and loosen the screws slightly to adjust doors so the door edges make uniform contact with the walls and the door-floor gap is within above specifications. Note: If floor trim has already been installed, install top and bottom bumpers (see step 25) and adjust door hangers so wall/trim contact is made with both. 12. If doors have been adjusted to their highest position and floor-door bottom gap is <u>less than the lower limit</u>, the door may have to be cut off. If so, see the SL or CS for direction. If doors have been adjusted to their lowest position and the gap is greater than upper limit, remove the doors and track and install a shim above the track of proper thickness to bring the gap within limits 13. Verify the door edge-to-wall contact is uniform top-to-bottom, the door-to-floor gap at the middle of the closed doors is within specification and add the third screw to each hanger at the BOTTOM of the short slot.
Install Door Track and Hang Doors Finish Doorway Installation	14. Finish screwing the track to the header using a 2 ½" wafer-head screw in every other hole. 15. Cut a ¾" x 1 ¼" pine strip. With the ¾" face against the track, nail the strip to the header using 2 ½" collated finish nails. 16. Obtain a door guide from the <u>Finish Door Kit</u>. Make a pencil line on the floor at the midpoint of the opening. Keep doors closed and slide two layers of 5" x 6" x ¼" shims under the doors. Place the door guide on the shims, slide it under the doors, visually estimate overlap. If about 1/8". If adjustment is needed, use the appropriate mix of ¼" and 1/8" shims. Note: If 5" x 6" shims are not available, use sets of 3" x 5" shims and tape together with painter's tape. 17. Move both door panels tight to the Jack stud side of the closet. Center the shims on the midpoint mark, oriented so the 5" dimension is parallel to the doors. 18. Adjust the sliding door guide to fit the thickness of the doors and slide it under the door edges and center it on the 5x6 shims. Keeping the shim centered on the midpoint and the guide centered on the shim, move the spacers blocks and the doors until the reveal between the door and the corner of the wall is uniform from top to bottom. (Fig 18.4) Nail the shims to the floor with a 1 ¼" collated finish nail in each corner. If 3" x 5" shims are used, nail four nails in each 3" x 5" piece. Remove door guide and put it on the windowsill with screws provided with the door hardware. 19. Measure the width of the opening at the track and cut a piece of floor trim to that length. With the square edge tight to the plaster, nail with **1 ¼" collated finish nails**. Keep nails 3" away from the edges to avoid splitting. Fill nail holes with putty. 20. Install bumper pads (located in the Finish Door Kit. Attach 1" DIA x 3/8" felt pads at the top of the vertical edges of each door and 1" DIA x 1/8" vinyl pads at the bottom edges of each door.

Quality Points

Chapter 18 – Installing Sliding Doors over Carpet

- Two doors match in visual appearance
- Gap between bottom of doors and 5” x 6” x ¼” spacers is between ¾” – 7/8”. Shims have been nailed to the floor with 1 ¼” collated finish nails. Door guide from Finish Door Kit has been left on the windowsill along with mounting screws
- Door edges contact the walls uniformly from top to bottom (or bumper contact is made to wall/trim if bumpers installed)
- Door(s) against Jack stud(s) show uniform reveal from top to bottom
- Doors slide easily and smoothly after nailing trim piece
- Door pulls have been installed at correct height and distance from the door edges.
- Front door edge is not visible when entering the room.
- Track has been secured with 2 ½” wafer-head screws in every other mounting hole

Quick Reference Guide

March 2025
Version 24.0

Chapter 18 – Installing Sliding Doors Over Hard Flooring

Door Opening and Preparation	1. Before removing packaging, check doors and frame for damage. If damaged, notify Construction Supervisor (CS). Check to see if doors have been predrilled for door pulls. If they have, pairs will have holes at opposite edges 2. Select pairs of doors that match in visual appearance (grain pattern, color) & correct door pull locations, etc. 3. Put two doors together and check for bow. Plan to install with concave faces together, best side toward the room. 4. Confirm: Door Ht. is 80”; rough opening Ht. at both ends is ~ 83”; header is level within 1/8”. If not, see CS. 5. Check Jack stud and flush wall for plumb and gaps. If out of plumb by 1/8” or if any gap exceeds ½”, notify CS. 6. Install track 2" back from room side wall surface and attach with three 2 ½” wafer-head screws – middle & both ends. Orient track with roller grooves toward the rear of the closet.
Install Door Hardware	7. Decide which door will be placed in front and rear position in the track. The front door edge should not be visible when entering the room. 8. Place doors on horses, room side up. Protect with padding. Install door pulls. Use a piece of wood to protect the pulls and hammer into holes. If pull holes are not present, use a ¾” Forstner bit and drill 36” up from the bottom and 1 ½” in from the wall edge. 9. Open door packaging including track, hardware, screws, along with either four identical hangers or two pairs with different overhang—deep overhang for rear door. Turn doors over and install hangers by hand tightening a screw in the single hole and the top of the long slot in each hanger. Install 2” from the door edges. (See Fig 18-2, Manual Chapter 18) 10. Hang the doors by tilting the top of door inward into the closet. Install rear door first by engaging rollers in the groove at the back of the track, then the front door in the groove at the inside front of the track. 11. Close the doors. At the middle of the door opening, measure the gap from the bottom of the door to the floor. Gap should be ⅜”-⅝” (add ¼” if finished floor has not yet been installed). Make sure doors are in correct position (door pulls are next to the walls) and loosen the screws slightly to adjust doors so the door edges make uniform contact with the walls and the door-floor gap is within above specifications. Note: If floor trim has already been installed, install top and bottom bumpers (see step 25) and adjust door hangers so wall/trim contact is made with both. 12. If doors have been adjusted to their highest position and floor-door bottom gap is <u>less than the lower limit</u>, the door may have to be cut off. If so, see the SL or CS for direction. If doors have been adjusted to their lowest position and the gap is greater than upper limit, remove the doors and track and install a shim above the track of proper thickness to bring the gap within limits. Note: If cutting a shim for doors over a finished (installed) floor, target shim thickness to provide a gap of 3/8” in favor of the range of 3/8” – 5/8”. 13. Verify the door edge-to-wall contact is uniform top-to-bottom, the door-to-floor gap at the middle of the closed doors is within specification and add the third screw to each hanger at the BOTTOM of the short slot a.
Install Door Track and Hang Doors Finish Doorway Installation	14. Finish screwing the track to the header using a 2 ½” wafer-head screw in every other hole. 15. Cut a ¾” x 1 ¼” pine strip. With the ¾” face against the track, nail the strip to the header using 2 ½” collated finish nails. 16. Locate the door guide supplied with the doors (Do NOT use a door guide from the Finish Door Kit). 17. Move both door panels tight to the Jack stud. Adjust the sliding door guide to fit the door thickness and slide the door guide under the opposite door edges. Align the left side of the guide flush with the door edges. Move the guide and doors until the reveal between the front door panel and the wall corner is uniform from top-to-bottom (see Manual Fig 18.4). 18. Drill two 1/8” diameter pilot holes through the door guide mounting holes into the flooring and fasten the guide to the floor with two of the screws provided with the door hardware. 19. Measure the width of the opening at the track and cut a piece of floor trim to that length. With the square edge tight to the plaster, nail with **1 ¼” collated finish nails**. Keep nails 3” away from the edges to avoid splitting. Fill nail holes with putty. 20. Install bumper pads (located in the Finish Door Kit. Attach 1” DIA x 3/8” felt pads at the top of the vertical edges of each door and 1” DIA x 1/8” vinyl pads at the bottom edges of each door.

Quality Points

Chapter 18 – Installing Sliding Doors over Hard Flooring

- Two doors match in visual appearance
- Gap between bottom of doors and the floor is between 3/8" – 5/8"
- Doors slide easily in door guides
- Door edges contact the walls uniformly from top to bottom (or bumper contact is made to wall/trim if bumpers installed)
- Door(s) against Jack stud(s) show uniform reveal from top to bottom
- Floor trim piece has been installed with the square edge tight to the plaster and ends snug to the side walls, using 1¼" collated finish nails. Holes have been puttied.
- Doors slide easily and smoothly after nailing trim piece
- Door pulls have been installed at correct height and distance from the door edges.
- Front door edge is not visible when entering the room.
- Track has been secured with 2 ½" wafer-head screws in every other mounting hole

Quick Reference Guide

March 2025
Version 25.0

Chapter 19 – Installing Floor Trim

Preparation	1. Make sure all door trim has been installed 2. Mark studs on floor if not already done 3. Scrape excess plaster from wall near the floor, pay particular attention to corners 4. In carpeted areas, use scrap floor trim pieces (⅜") to hold trim off the floor 5. In areas with hard flooring, install trim directly on and tight to the finished flooring. 6. Do not install trim in kitchen or bathroom until cabinets are in place.
General Instructions	7. Establish a plan for each room. Decide where trim must be coped or mitered. 8. Avoid trim pieces with both ends coped or one end coped and the other beveled, if possible. 9. Install trim in closet platform and around stair skirt boards 10. Run trim under cold air return vent covers 11. Cope all inside corners, miter all outside corners. Glue all mitered corners 12. Bevel splices with matching 22.5º cuts arranged so overlap is angled away from room viewing area and with the overlap falling 2" away from the edge of a stud. Glue ends of the splice before nailing 13. Set all nails and fill holes with putty
Installation	14. Use 2½" collated finish nails, nail about 1" into top of floor trim into each stud 15. Do not nail square cut ends at corners. 16. Use construction adhesive to install very short pieces. 17. Trim that transitions from hard flooring to a carpeted area should be held level as the depth of the hard flooring equals the depth of the scrap floor trim used to position trim over carpeting. If a transition strip has been installed over the carpet/hard floor junction, cut the transition strip away from the wall using a scrap piece of floor trim as a width guide. 18. Hold trim over hard flooring tight to the flooring
Coping	19. Cut a 45º bevel so that back side of trim is longer than the face. 20. Make a 15º relief cut with bottom edge of trim up and face side toward front of saw, blade aligned with intersection of the bevel cut and face of the trim 21. Cut down the edge of the flat face leaving the curved edge in place 22. Use a coping saw held at a 5º back angle to cut the curved edge 23. Smooth or shape as needed for a good fit

Quality Points

Chapter 19 – Installing Floor Trim

- Trim is tight to hard flooring and spaced appropriately over areas to be carpeted

- All inside corners are coped, all outside corners are mitered. Mitered corners are glued
- Coped and mitered corners are tight to one another with no large gaps
- Splices are beveled and glued
- Trim is not split in any area
- Trim is nailed into each stud and all nail holes are set and puttied

Quick Reference Guide

March 2025
Version 25.0

Chapter 20 – Storm Door and Porch Rails

Installing Storm Doors	1. Consult with Construction Supervisor to determine the door swing. 2. Remove the door from packaging and check for any damage. 3. Measure the opening between brickmold at the top, middle and bottom of the opening. 4. Refer to the Door Manufacturer instructions to determine whether flat shims need to be added to reduce the rough opening. If they are, begin by installing strips of ¼"x1" flat shims (in construction trailer) on the hinge side of the door frame with trim nails. 5. Follow Steps 2-4c in the Door Manufacturer instructions. Then, temporarily tack the strike side rail on the strike side of the opening and shim the strike side, if needed. 6. Secure the closer bracket to the door jamb, by replacing two of the screws closest to the center of the jamb with #12x3" screws. 7. Follow the remaining Door Manufacturer instructions. 8. Place a bead of finish caulk on the back side of the door top rail and install it. 9. Install the wind chain. 10. Make sure screen component on the exterior of the door is above the glass component
Installing Porch Rails	11. Slide attachment sleeves onto each end of the front bottom railing, center it on the posts and aligned parallel with the siding, and attach the sleeves to the posts. 12. Insert the spindles along the length of the railing. 13. Slide attachment sleeves onto each end of the top railing. Position the top railing so each spindle slides completely into the corresponding slot on the railing. Center the sleeves on the posts and attach. 14. For side railings, position the bottom railing between the house and a post, a slide attachment sleeves onto each end of the railing, align it so it is parallel to the edge of the porch slab, and adjust the height of the railing nearest the house until it is level. Attach the sleeves to the post and the house (being sure not to drive the screws so tightly as to distort the vinyl siding). 15. Insert the spindles along the length of the railing. 16. Slide attachment sleeves onto each end of the top railing. Position the top railing so each spindle slides completely into the corresponding slot on the railing. Attach the sleeves to the post and the house (being sure not to drive the screws so tightly as to distort the vinyl siding). 17. If plugs are available, install plugs over each screw.

Quality Points

Chapter 20 – Storm Door and Porch Rails

- Storm door is installed so that it
  - Has the desired swing orientation
  - Swings freely
  - Latches tightly
  - Is protected with a wind chain securely attached to the head jamb
  - Has the closer bracket secured to the door jamb with two #12x3” screws
  - Has the screen component on the exterior of the door situated above the glass component

- Porch rails are installed with
  - Front rails parallel to the front siding
  - Side rails level and parallel to the edge of the porch slab
  - All spindles securely in their slots
  - Attachment sleeves secured to siding without distorting the siding or centered on posts and secured
  - Plugs, if available, installed over each screw

Quick Reference Guide

March 2025
Version 25.0

Chapter 20 – House Numbers, Mailbox, Sealing Exterior Penetrations

Installing House Numbers	1. If house numbers are being installed directly on a porch post, arrange them so they are equally staggered in both the vertical and horizontal directions. The top edge of the first digit is 70" above the porch slab. 2. If house numbers are being installed on a board, consult Construction Supervisor for location of the board. If being installed horizontally, arrange the numbers so they are centered horizontally and vertically. If being installed vertically, arrange the numbers so they are equally staggered horizontally and vertically. 3. Install the numbers on the textured face of the board with 1¼" finish nails. 4. Attach the board to a post or wall so its top edge is 70" above the surface of the porch or driveway.
Installing Mailbox	5. House Mailbox • Determine whether the mailbox is being attached to the siding or the porch rail • If to the siding, locate blocking and attach mailbox to siding at that location roughly 43" above the porch slab using 2½" screws • If to the porch rail, position it near the front of the porch (but not interfering with the opening of the storm door) and with its topmost edge flush with the top of the porch rail 6. Curbside Mailbox • Cut a 36" length of 4x4 treated lumber • Install the 4x4 post stake centered 24" back from street pavement or curb • Insert the 36" piece of 4x4 into the sleeve of the stake and plumb with shims • Install mailbox over 4x4 per manufacturer's instructions • Install mailbox numbers on both sides of mailbox
Air Sealing Exterior Penetrations	7. Seal any gaps around exterior penetrations, like the following, with finish caulk: • Water heater exhaust • Furnace intake and exhaust • HVAC fresh air vent • Gas line • Sump pump

Quality Points

Chapter 20 – House Numbers, Mailbox, Sealing Exterior Penetrations

- House numbers are installed either
  - Directly on a porch post equally staggered vertically and horizontally with the top edge of the first digit 70” above the porch slab, or
  - On a board mounted horizontally or vertically on a porch post or wall, 70” above the porch slab or driveway

- Mailbox is installed
  - For house mailbox, either secured to blocking behind siding 43” above the porch slab, or attached to a porch rail near the front of the porch but not interfering with the opening of the storm door
  - For curbside mailbox - supporting 4x4 is plumb and solidly attached to the ground and house numbers are applied to both sides of the mailbox

- All exterior penetrations are sealed