



Storage Shed

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Note to the Reader: Due to differing conditions, tools, and individual skills, the authors of this manual and Charlotte Region Habitat For Humanity assume no responsibility for any damages, losses incurred, deaths, or injuries suffered as a result of following the information published in this manual. Although this manual was created with safety as the foremost concern, every construction site and construction project is different. Accordingly, not all risks and hazards associated with homebuilding could be anticipated by the authors of this manual and Charlotte Region Habitat For Humanity. Always read and observe all safety precautions provided by any tool or equipment manufacturer, and always follow all accepted safety procedures. Because codes and regulations are subject to change, you should always check with authorities to ensure that your project complies with all local codes and regulations.

Introduction:

This manual documents the general construction methods used by Charlotte Region Habitat for Humanity to build an 8x8 foot storage shed which is a standard home feature. The objectives of this design are to provide an easy to build structure that is very efficient in terms of construction time and materials used.

Shed Framing Safety Guidelines:

- Review these guidelines with each crew member at the start of the day or when you arrive on site
- **“NO JOB IS SO IMPORTANT THAT IT CANNOT BE DONE SAFELY”**
- **Speak Up** if something looks unsafe. An observer can spot danger quicker than a worker.
- Know where **water** and a **first aid** kit are located. Tell the site supervisor immediately in case of an injury.
- Habitat requires safety glasses at all times (not just when operating a power saw).
- Habitat requires Hard Hats when working on a shed build.
- Utility Knives – keep your hand out of the blade’s path. Retract blade immediately when not in use. A sharp blade is safer than a dull one. Safely dispose of used blades.
- Power Saws:
 - Only crew members with power saw **experience** can use them.
 - Habitat advises that **eye and ear protection** be used when using power saws.
 - Don’t bind the blade of the saw – listen for it. Back off and re-support lumber.
 - Keep electric cords out of the way of the saw and out from underfoot. Cordless saws are recommended for use when available.
 - Don’t cross hands over to stabilize material on the miter saw. Find another way or get help.
 - Guards on saws must be in place and operating.
- Use a **ladder** that will reach the work. An extension ladder should reach 3 feet above the step off point. Move the ladder with your work. Move the bottom of the ladder 1 foot away from the wall for every 4 foot of height. Place ladders on solid footing. Block extension ladders at the top to prevent sideways movement.
- Scaffolding – See the site supervisor for the numerous safety requirements for scaffolding (i.e. using triple widths of walk-boards, placing scaffolding on solid footing, and guardrail requirements).
- Keep the entire work area, inside and out, **free of trip and fall hazards**. Don’t leave loose objects on scaffolding or ladders.
- **Remove nails** before discarding lumber. Discarded material must be placed in the designated area.
- Keep tools not in use in your tool belt at all times. Select the correct tool for your work. Carry only those you need.
- No loose clothing or hair that can be caught in power tools is permitted.

- Wear appropriate clothing for the task including work boots that protect from falling objects, have a nonskid sole and resist nail penetrations. No open toed shoes allowed.
- Tools must be in safe condition (Meet OSHA standards. i.e. no nicks in cords or missing grounds),
- **Think** and concentrate on your task.
- Ask your crew leader if you are uncertain about how to do a task or to operate a power tool.

Staffing:

Task Leader

3-5 Additional Volunteers

A 4-6 man crew should be able to build the shed complete with roof dried in with felt paper on the roof in one day. This “dried in” shed will then be reasonably protected from weather damage until the roofing shingles, door installation, flashing and siding can be completed.

Quality Checkpoints:

- Floor framing is level
- Galvanized nails are used in treated lumber.
- The top edge of sheathing on front and back walls is placed mid height on the top wall plate.
- No nails from wall OSB are showing on the inside of the shed.
- Gutter board is straight (rafter tails are all in one plane).
- OSB for the gable ends are marked for cutting after the roof OSB is installed. (Top edge of gable OSB is flush with the top of roof OSB.)
- Rake boards installed with top surface flush with roof OSB.
- Roofing “H” clips are installed between large and small OSB panels on roof.
- Ridge Beam support posts are flush with outer edges of the Ridge Beam and top plate of front and back walls. Support post is vertical.
- Bottom edge of roof OSB is nailed into the gutter boards

Shed Tool and Equipment List – Framing:

<p>Tools Each Framing Crew Member will need: Hammer (16 Oz minimum) Nail Apron Retractable Utility Knife (with extra blades, hook blade helpful for roofing) Measuring tape (16 foot minimum) Square (Speed or combination) 2 Pencils Safety Glasses Work Gloves Water</p>

<p>Framing Tools and Equipment Needed On Site: Generator if electrical service is not available 3 or 4 way Heavy Duty Electrical Box / Splitter 100 Ft Grounded Drop Cord Ear Protection/ Safety Glasses / Hard Hats Electric Miter Saw (10" or 12") Circular Saw (Portable preferred) Reciprocating Saw (with Extra Blades) 4 foot level Two 8 Foot Step Ladders One 10 or 12 Foot Step Ladder Handy Bar / Crowbar Saw Horses (pair) Saw Table Nail Puller / Claw Air Compressor and Air Hoses (Desired) Construction Nail Gun (Desired) Clamps for plumbing walls (Desired) Impact Driver (Desired) Caulk Gun Shovel</p>

Material and Supplies List:

Materials and supplies should be delivered to the job site only 1 or 2 days prior to build date. This will avoid weather damage to materials and reduce the potential for theft.

<p>(9)- 2x4x10' (2 required if precut Rafters and Rake Boards are provided) (11)-2x4x14' (8)-2x4x8' (11)-2x4x8' pressure treated (1)-2x6x8' (2)-4x6x8' pressure treated for support beams. (10)-4x8x1/2" Oriented Strand Board (OSB) (2)-4x8x3/4" Pressure Treated Plywood (not tongue and groove) (1)-32" Outswing door with security hinge, Vinyl Brick mold with integrated nailing flange. (1)-Door Knob/Lock hardware (1)-Bundle of Starter Shingles (1)-Bundle of Hip and Ridge Shingles (3)-Bundles of Architectural Roofing Shingles (1)-Tube of Roof Cement</p>

<p>(4-6) 4"x8"x16" CMU (Solid Concrete Block for Foundation Support Beams) 4 blocks needed for level sites, additional blocks when sloped 16d Galvanized Nails (Floor System) 16d Common nails 8d Galvanized Ring Shank Nails 8d Common Ring Shank Nails 1 1/2" roofing nails #12 x 7/8 or 1 inch Steel Round Plastic (Button) Cap Roofing Nails (8)-Plywood "H" clips (for roof) 4" construction screws (desired) 1 Pack (~12 Count) #10 3" Brass Colored Construction Screws (Doors) 15 # Roofing Paper 16d and 8d Galvanized Nails for Construction Framing Nail Gun (if used) (1)-Pack of Shims (for door installation) 1 Bag Sand (Optional) for leveling foundation blocks</p>

Cut List:

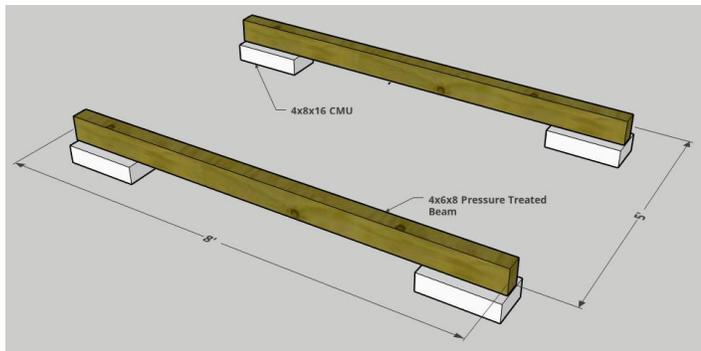
Quantity	Component	Dimension	Cut From (Mat'l List Item)
2	Foundation Support Beam	4x6x8'	4x6x8' Pressure Treated
2	Band Joists	2x4x8'	2x4x8' Pressure Treated
9	Floor Joists	2x4x93"	2X4X8' Pressure Treated
4	Side Wall Top and Bottom Plates	2x4x8'	2x4x8'

4	Front and Back Wall Top and Bottom Plates	2x4x89"	2x4x8'
19	Wall Studs	2x4x84"	2x4x14'
2	Jack Studs	2x4x80.5"	2x4x14'
1	Ridge Beam	2x6x8'	2x6x8'
2	Ridge Beam Support Posts	2x4x 12 ¾"	2x4x10 (scrap-gutter boards)
10	Rafters	2x4xX (see dimensional dwg)	2x4x10' (Normally provided pre-cut)
4	Rake Boards	2x4xX (see dimensional dwg.)	2x4x10' (Normally provided pre-cut)
2	Gutter Boards	2x4x~97" (Measure and cut to OSB outside face to face dimension on Ft and Rear Walls)	2x4x10' (use scrap for Ridge Beam Support Posts)
4	Side Wall Sheathing	4'x88 1/2"	4'x8' OSB
2	Back Wall Sheathing	4'x87 ¾"	4'x8' OSB
2	Front Wall Sheathing	31'x87 ¾"	4'x8' OSB (Remainder (17" by 8' used for gable ends)
1	Front Wall Sheathing (above door opening)	4 1/4" x34"	Cut from Scrap ½ " OSB
2	Gable End Sheathing	17"x96"	From Front Wall Sheathing
2	Door Header	2x4x37"	2x4x8 (Remainder of 14')
1	Door Header "Spacer"	3.5"x37"	Make from scrap ½ " OSB
1	Door threshold Support	2x4x32"	2x6x8 pressure treated (from scrap from house)

Shed Location and Foundation Beams:

The shed should be square to the house, meet setback requirements and be located in an aesthetically pleasing and functional location. The site superintendent can speak with the homeowner to determine best location, if available.

The 4x6x8 pressure treated shed foundation beams are located 5' 0" apart outside to outside. The ends of each beam are supported by a 4x8x16 CMU at each end.



The beams must be level along length and at equal elevation. The beams should be as low to the ground as possible without embedding the beams into the soil. Use a level and a “straight” 2x4 across the beams to ensure beams are both level and at equal elevation. Excavation may be required to remove roots and rocks.

Hint: The leveling of the CMU may be facilitated if a temporary frame is made from 4-2x4x8’. Two are placed in position shown for the 4x8 beams and 2 placed across ends and temporarily connected with construction screws. This frame allows quick checking for level between all CMU blocks and is easily moved when level adjustments are necessary.

Floor System:

Crown all of the floor joists so that all joists may be placed with the crown up in the structure

Cut the two band joists to 96 inch length

Cut the 9 remaining joists to 93 inch length

Mark the two band joists for 16 inch O.C. joist spacing.

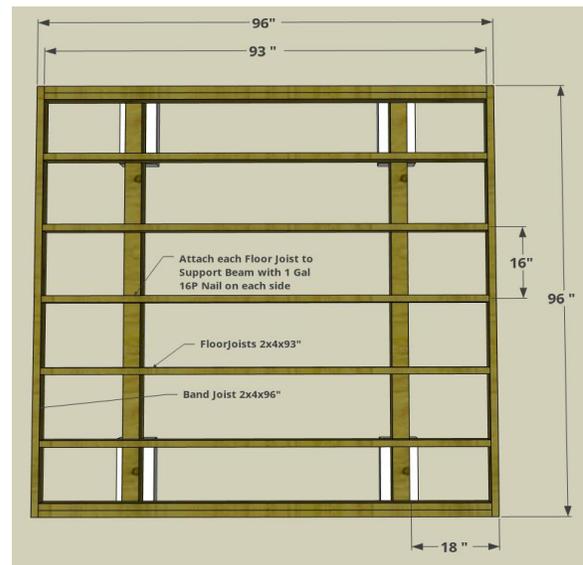
Assemble the floor joist system by nailing the floor joists to the band joists with 2 galvanized 16d nails at each end with the crowned edge up. Note select the straightest 2x4 for use as band joists and for the “doubled” joists.

The floor joist system may be assembled by supporting it on the foundation beams. Another option is to place two sheets of OSB or the pressure treated floor plywood on the ground to create a flat surface to work on. This is recommended when you have sufficient crew to construct the floor joist system while the foundation beams are being leveled.

The floor joist system is placed on the foundation beams with an 18 inch overhang on each side as shown.

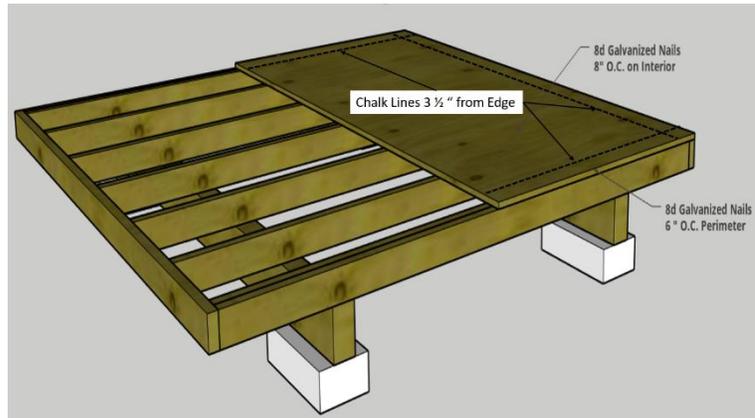
Toe-nail each joist (or doubled joist) to the foundation beams with one galvanized 16d nail from each side of the joist at each location where joist contacts the foundation beam (4 nails per joist).

Square the foundation support system by checking the diagonal measurements of the floor system and adjusting support beam locations as required.



Floor Sheathing:

To complete the floor system use two sheets of 2x4x8 by $\frac{3}{4}$ inch thick pressure treated plywood. Place the sheets side by side, flush to each other and perpendicular to the floor joists. Fasten the plywood to the floor joists by using 8d galvanized ring shank nails every 6 inches on the perimeter and every 8 inches on the interior.



Snap chalk lines 3 $\frac{1}{2}$ inches in from each exterior edge of the floor to provide a visual aid to ensure walls are properly placed when walls are erected onto the floor.

Double check that the floor is level prior to erecting any walls.

Wall Framing:

Cut the following materials for wall construction and crown all 2x4's used.

- 4 Side wall top and bottom plates at 96 inches length
- 4 Back and Front wall top and bottom plates at 89 inches length
- 19 wall studs at 84 inches length (cut two per each 14' 2x4)
- 2 Jack Studs 80 $\frac{1}{2}$ inches length.

Side Wall Framing:

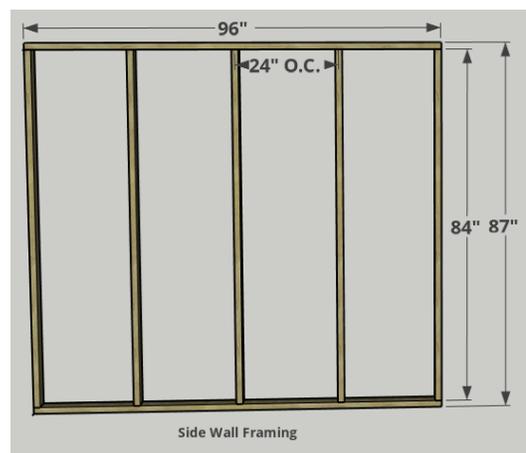
Side walls are 96 inches long and 87 inches high with 84 inch studs spaced on 24 inch centers. Mark top and bottom plates for stud locations.

Studs and floor plates are placed so the crowned side of 2x4 is toward the outside of the shed.

Construct the wall using 2 16d nails to attach each stud to the top and bottom plate

Each side wall is covered with 2 nominal $\frac{1}{2}$ inch thick 4'x8' OSB sheets cut to 88 $\frac{1}{2}$ inch length.

The OSB is placed so it is flush with top and sides of wall and extending 1 $\frac{1}{2}$ inch below the bottom of the wall bottom plate. This extension will cover the edge of the floor sheathing and will provide a nailing flange to nail wall into floor



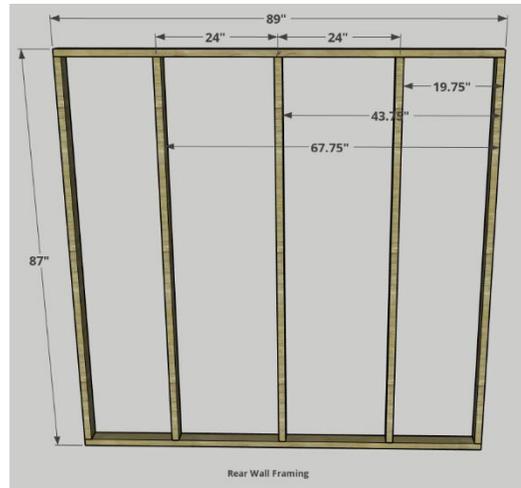
system when erecting walls. The nailing schedule for the OSB is 6 inch spacing on perimeter and 12 inches on interior.

Hint: Be very careful to keep the factory edges of the OSB on the top edge of the top plate and outside edge of the of the end stud. This will ensure that the wall is square and will be plumb when erected on a level floor.

Rear Wall Framing:

The rear wall framing is 89 inches long and 87 inches high with 84 inch studs placed on placed on 24 inch centers. Run tape 3.5" past end of wall when marking layout to account for sheathing overhang onto side wall. The first spacing will not be 24", but interior spacing remains 24". Construct the wall using 2 16d nails to attach each stud to the top and bottom plate

The rear wall is covered with 2 nominal ½ inch thick 4'x8' OSB sheets cut to 87 ¾ inches length. The OSB is secured with 8d nails. The nailing schedule for the OSB is 6 inch spacing on perimeter and 12 inches on interior.



The OSB is placed so it extends 3 ½ inches past the sides of the wall. The top edge is placed ¾ inch below the top surface of the top wall plate and extends 1 ½ inch below the bottom of the wall bottom plate. The space below the top surface of the wall plate is to provide a surface to nail the gable OSB to the wall top plate.

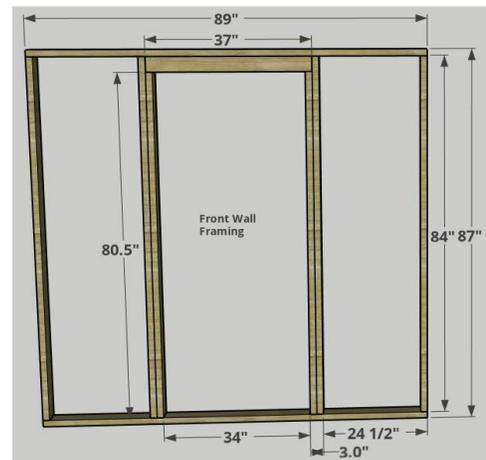
Hint: Mark the mid height of the edge of the top plate carefully. Be very careful to keep the factory edges of the OSB on the line at the mid-height of the top plate and a consistent 3 ½ inches from the outside edge of the end stud (use scrap pieces of 2x4 as gauges). This will ensure that the wall is square and will be plumb when erected on a level floor.

Front Wall Framing:

The front wall is 89 inches long and 87 inches high with 4- 84 inch studs and 2 80 ½ inch jack studs.

Mark the top and bottom plates for the stud (and jack stud) locations shown in figure. Hint: Mark and install the interior wall and jack studs very precisely because these stud locations establish how plumb the door opening is.

There is a header in the door opening. This is constructed from 2-2x4x37 inches long and 1 piece of ½ inch OSB 3.5 inches x37 inches long. The OSB is “sandwiched” between the 2 2x4 pieces. This gives the header the same thickness as the wall stud 3.5 inch dimension.



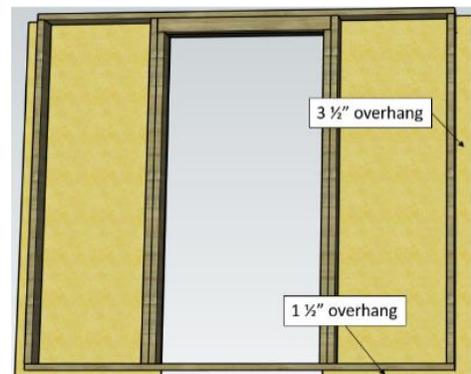
The front wall is covered with 3 nominal ½ inch thick OSB sheets.

The OSB is placed so it extends 3 ½ inches past the sides of the wall. The top edge is placed ¾ inch below the top surface of the top wall plate and extends 1 ½ inches below the bottom of the wall bottom plate. The space below the top surface of the wall plate is to provide a surface to nail the gable OSB to the wall top plate.

Rip 2 31 inches wide pieces of OSB from 2 4'x8' sheets. Then trim their length to 87 ¾ inch. Note: preserve the remaining nominally 17 inch by 96 inch pieces for use as the gable ends of the shed roof!

These two sheets of OSB are placed vertically from the edge of the door opening extending 3 ½ inches past the sides. The top edge is ¾ inch down from top surface of top wall plate and extends 1 ½ inches below the bottom plate.

Hint: Mark the mid height of the edge of the top plate carefully. Be very careful to keep the factory edges of the OSB on the line at the mid-height of the top plate and a consistent 3 ½ inches from the outside edge of the end stud (use scrap pieces of 2x4 as a gauges). This will ensure that the wall is square and will be plumb when erected on a level floor.



Cut a 4 ¼ inch by 34 inch piece of OSB to cover the header from the top of the door opening extending to ¾ inch down from top surface of top wall plate.

The OSB is secured with 8d nails. The nailing schedule for the OSB is 6 inch spacing on perimeter and 12 inches on interior.

Erecting Walls:

Ensure that you have sufficient manpower to safely lift and support walls while they are secured.

Prepare a diagonal brace (use 2x4x10' gutter board) by starting 16d nails where the brace will be attached to floor joists and wall stud.

Erect Side Wall:

Starting with a side wall lift the wall into position and install a diagonal brace at the front wall opening with nails spaced 5 to 6 foot from the corner where the wall sits on shed floor with 2 16d nails.

Position the wall to ensure that the ends of the wall are at the edges of the floor and also that the bottom plate of the wall is aligned with the chalk line which is 3 ½ inches from the edge of the floor.

Secure the wall by nailing 8d galvanized nails in the bottom flange of the OSB to secure the OSB firmly against the band joist of the floor on nominal 12 inch spacing.

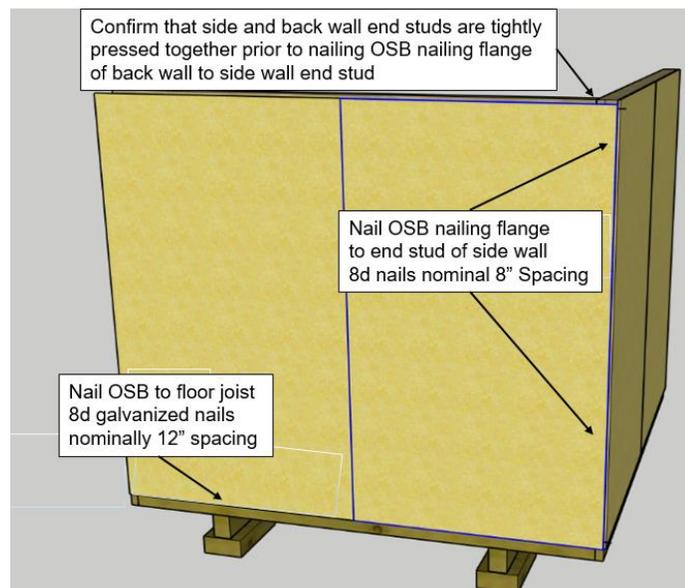


Hint: Check that the wall is “reasonably” plumb and adjust the corner brace if required. The wall will be flexible enough to move the far end a few inches to align with the back wall.

Erect Rear Wall:

Lift the rear wall into position. Position the wall to ensure that the bottom of the back wall is tight against the side wall and confirm that other end of bottom plate of the back wall ends at the chalk line marking inner edge of other side wall. Verify that the inner edge of bottom plate is aligned with the chalk line which is 3 ½” from the edge of the floor.

Secure the wall by nailing 8d galvanized nails in the bottom flange of the OSB to secure the OSB firmly against the band joist of the floor on nominal 12 inch spacing.



Press the side wall firmly against the rear wall and then secure the rear wall to the side wall with 8d nails in the 3 ½ inch wide OSB nailing flange which covers the end stud of the side wall nominally 8 inch spacing. Nail the 8d nails at an angle to prevent the nails from penetrating

through the corner wall stud. The diagonal brace for side wall may be removed after the two walls are securely fastened to the floor and to each other.

Hint: Confirm that the top corner where the side and back wall end studs meet are in firm contact before nailing back wall OSB flange to the side wall end stud. This may be achieved by: 1) Volunteers pressing firmly on both the side and back wall at the corner, 2) Using 4” construction screw through back wall end stud to draw side wall end stud firmly in place, or 3) using clamps if available.

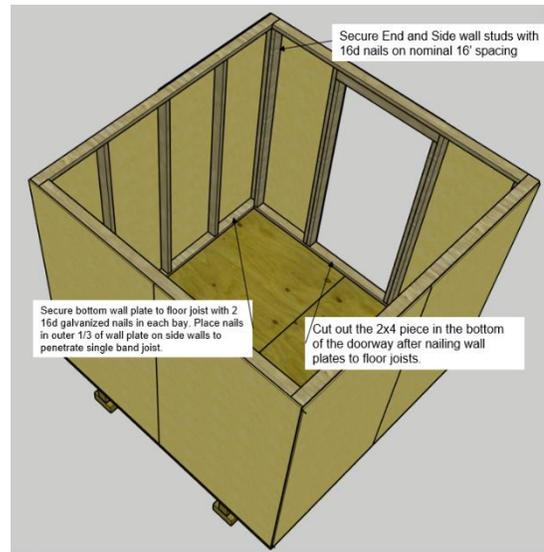
Erect Remaining Walls:

Erect the remaining side wall and front wall following the same procedures.

Complete nailing the walls after all walls are erected:

Nail the vertical studs at the ends of the front and rear wall to the end studs of the side walls with 16d nails on a nominal 16 inch spacing.

Nail the bottom plates of all walls into the floor joists using 2 16d galvanized nails in each stud bay. Note to nail in the outer third of the bottom plate of the side walls because the band joist is only a single width. Hint: Do not nail through bottom plate in the door opening.



The 2x4 section in the door threshold may be cut out with a reciprocating or hand saw after wall plates are secured to the floor joists.

Hint: Visually inspect the inside walls to see if there are any 8d nails securing the OSB that have missed the studs. Drive out any nails that are showing and re-nail as required.

Roof Construction:

The roof structure is constructed from a 2x6 ridge board and 2x4 rafters and rake boards.

Prepare lumber as follows:

Cut the ridge board to 96 inch length

Cut the ridge beam support posts

Cut rafters and rake boards from 2x4x10' as follows:

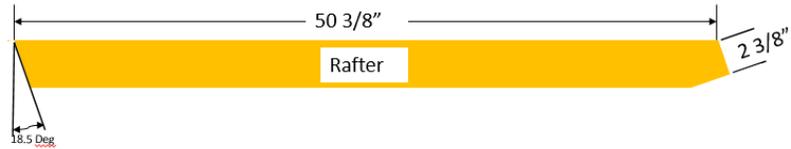
Rafter:

Mark a cut line by scribing a mark with speed square positioned for a 4 by 12 slope. (This corresponds to 18.5 degrees from square end of 2x4 if using a miter saw)

Measure length of top surface of rafter at 50 3/8 inch from cut line.

Mark second cut line with same 4 by 12 slope

Cut the rafter from the 2x4



Measure 2 3/8 inch down from top surface of rafter

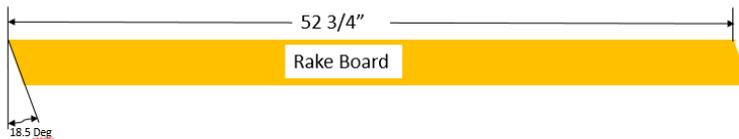
Mark a cut line perpendicular to end face of rafter with square.

Cut off the bottom portion of rafter to provide a seat for rafter to sit on wall top plate.

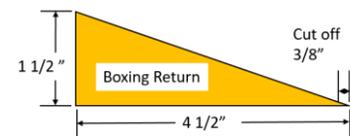
Use the first rafter as a template to mark the other 9 rafters to ensure uniformity.

Rake Boards:

Cut 4 Rake boards per the process of rafters except that the length of top surface is 52 3/4 inches with no “perpendicular cut” at the end.



Each rake board has a Boxing Return. Cut the boxing returns to the dimensions shown and secure them to the bottom end of the rake board with 2 4 inch construction screws. Pre-drilling of screw holes is recommended to avoid splitting.

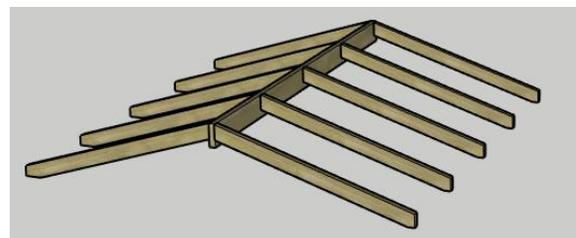


Roof Structure Assembly:

Mark the ridge board for rafters to be placed 24 inches O.C.

Attached the rafters to the ridge beam with 2 16d nails or 4 inch construction screws (preferred).

Note: if crew is limited you may elect to only install 2 rafters per side to reduce weight while erecting roof structure into position. Install remaining rafters after structure is placed in position.

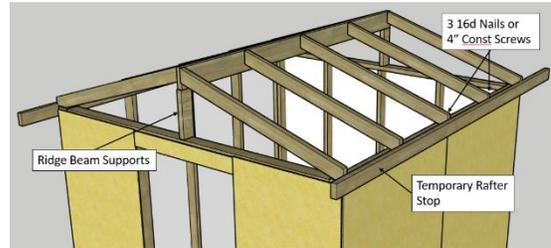


Erecting Roof Structure:

Install temporary stops for the rafter ends at the top of the side walls of the shed. Recommended to use the two 2x4x10' gutter boards attached with only a few nails (leave nail heads protruding). Mark the tops of the side walls for rafter locations 24 inches O.C. (above wall studs).

Place the roof structure on the shed and align the rafters directly above the wall studs.

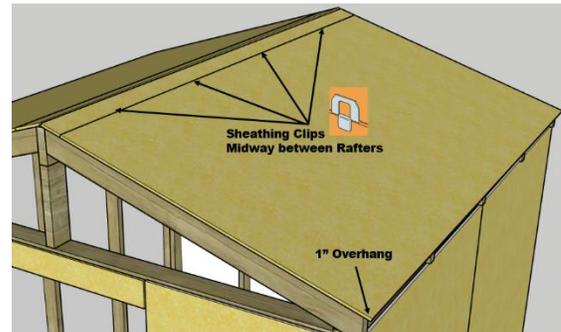
Nail each rafter to the wall with 3 16d nails or 3 4 inch construction screws.



Install the ridge beam supports with 2 16d nails or 4 inch construction screws into ridge beam and top plates. Remove temporary rafter stops and remove any nails.

Sheathing the Roof:

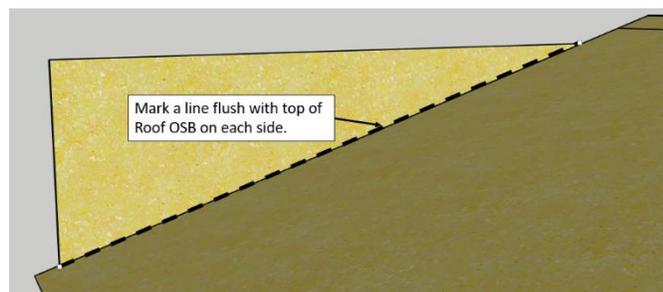
Mark a line (and set a nail) on the rafters above the front and back wall 47 inches from the bottom of the rafter. Install the OSB so that the top edge of the OSB is 47 inches up from the bottom edge of the rafter to provide for a 1 inch overhang. Note that if the roof is not “totally” square then align one of the 48 inch edges of the OSB exactly on edge of rafter and then pull the other 48 inch edge into position to square up the roof. If the roof is significantly out of square check that the floor is level and re-level floor before proceeding to sheath the roof. Nail the OSB to rafters with 8d nails 6 inch spacing on the edges and 8 inch in the interior. Install “H” clips midway between each pair of rafters on the top edge of the OSB. Finish sheathing the roof opening with scrap strips of OSB remaining from side walls. This strips are nominally 4 1/8 inch wide but actual width to be determined from site measurements.



Sheathing Gable Ends:

Place a 17 by 96 inch piece of OSB on the gable end and align ends with edges of front wall OSB.

Press OSB firmly against the roof structure and then scribe a line where the gable end OSB is flush with the top of the roof sheathing on each side of the roof. Trim off the portion that is above the roof and be careful to align the top edge of the gable OSB flush with the top of the roof.

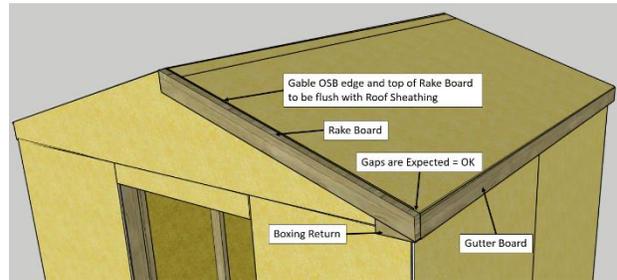


Nail the gable OSB to the rafters and wall top plate with 8d nails every 8 inches.

Cut a small piece of OSB to fill the top of the gable end at the peak.

Installation of Gutter Boards and Rake Boards:

Measure the length of the top of the side wall from the outside faces of the front and back wall OSB and cut the gutter boards to length. Install gutter board with top pressed firmly against the lower edge of the roof sheathing (crowned side up) and with ends aligned with outside faces of front and back walls. Secure with 2 16d nails each rafter location. Nail bottom edge of OSB to gutter board on nominal 6 inch spacing using 8d ring shank nails.



Install the rake boards with the top edge flush with the top surface of the roof and with the end flush with the outside of the gutter board. Secure with 8 16d nails, 2 into gutter board, 2 into the ridge board and 4 into rafter. Hint: Use a speed square or a scrap piece of lumber to ensure that top of rake board is flush with the roof surface. Small gaps between Rake Boards and OSB near bottom of roof are expected and acceptable because they are covered by multiple layers of roofing.

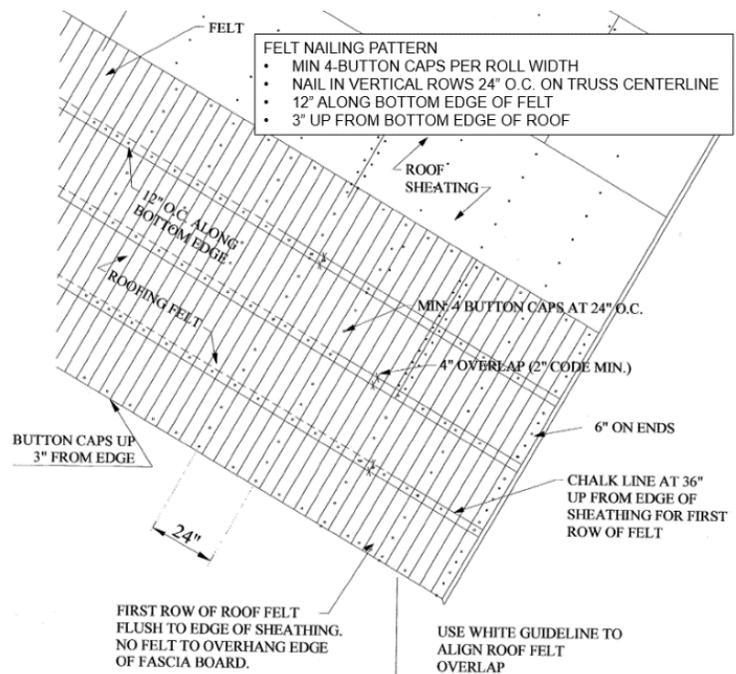
Roofing:

Roofing Felt:

Cut 3 pieces of 15# roofing felt to nominally 105 inches long.

Roll one strip of felt across the lower edge of the roof with the bottom edge of the roofing felt extending to the outer edge of the gutter board. Center the felt so it extends past each edge of the Rake Boards.

Place a bottom row of button cap nails 3 inches up from the outer edge of the gutter board 12 inches O.C. Use a pattern of at least 4 nails vertically centered over the rafters in the field of the roof and the rake boards on the edges. Care must be taken to ensure that the felt paper lies as flat as possible, without wrinkles, since they will show after the shingles are installed.



Roll a second strip on the opposite side of the roof following the same procedure.

Roll the third and final sheet of felt over the peak of the roof. Adjust the position of the felt so that it overlaps the bottom sheets of felt evenly with a minimum of 4 inches overlap. Nail felt placed over roof peak with the same pattern as the others with button cap nails 12 inches O.C. 3 inches up from bottom edge of felt.

Trim the felt paper so the edges on the gable ends of the roof are flush with the outside edge of the Rake Boards.

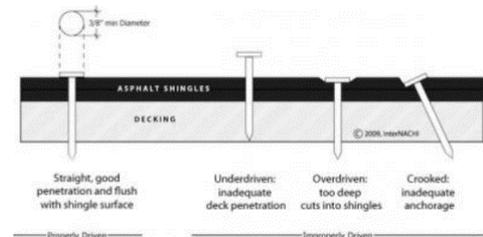
Shingle Installation:

Place chalk lines around perimeter of the roof to mark where the edges of the starter strip will be placed. Chalk Lines should be placed the height of starter shingle minus 2” from the outside edges of the rake boards and similarly up from the outside edge of the gutter boards. This will allow for a 2 inch overhang of the starter shingle This allows for nominally 1 inch supported by flashing with a bent edge supporting the shingles and a 1 inch overhang acting as a drip edge.

Review manufacturer instructions on the package of the starter, hip and valley, and roof shingles carefully. Procedures below may need to be adapted to the dimensions of the shingles or manufacturer recommendations.

Proper Nailing:

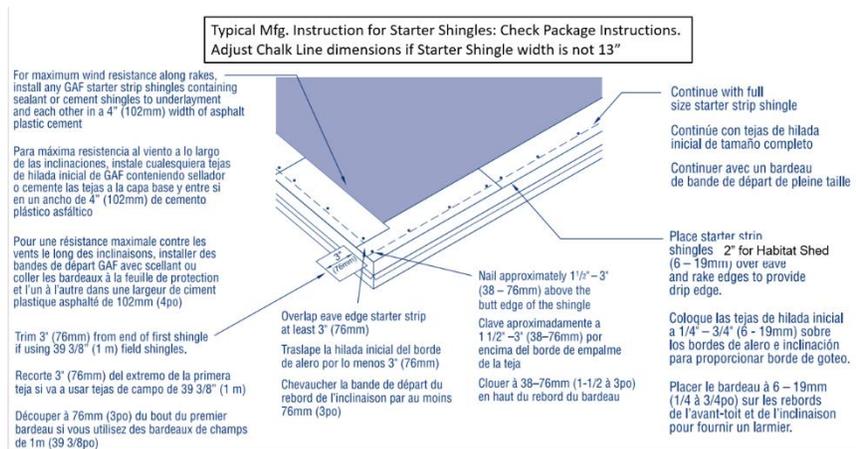
Nails must be properly nailed into shingles to ensure good results. Nails must be perpendicular to the roof deck and must firmly contact the shingle. Do not “over-drive” nail into shingle or drive nails at an angle.



Starter Shingles:

Install the starter shingles on the eaves of the roof with the top edges on the chalk line starting with the left hand side of the roof. The starter shingles shall extend 2 inches past the edges of the gutter and ridge boards. Remove a 3 inch portion of the left side of the first starter shingle to ensure that any “butt joint”

between roof shingles will be 3 inches away from butt joint between starter shingles. Ensure that adhesive strip is toward the eve of the roof. Place 4 nails nominally 3 inches from the edge of the starter shingle to allow for the 2 inch overhang in each starter shingle.



Install starter shingles on the rake edges with the “top” edges on the chalk lines and with the adhesive edge of the starter shingle at the edge of the roof with the specified 2 inch over hang over the edge of the Rake Board. The starter shingle nearest the eave shall overlap the eve starter shingle by at least 3 inches as shown in figure. Each starter shingle shall be attached with 4 roofing nails.

Roof Shingles:

Start installation of roof shingles starting with a full width shingle lower left side of roof. Continue shingle installation across bottom of roof until you reach the far end. Trim excess length of shingle to achieve the desired 2 inch overhang. Use “scraps” cut from left side of shingle where possible to conserve materials.

Review manufacturers instructions for trimming length of subsequent courses of shingles to achieve the desired architectural effect.

It is recommended that a chalk lines be placed after every 6 courses of shingles to be sure shingles are evenly spaced.

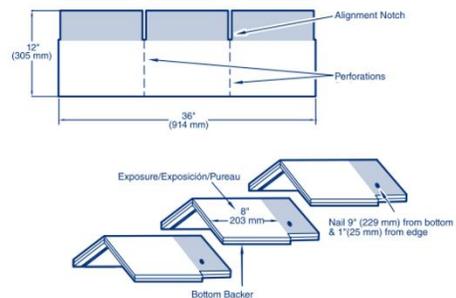
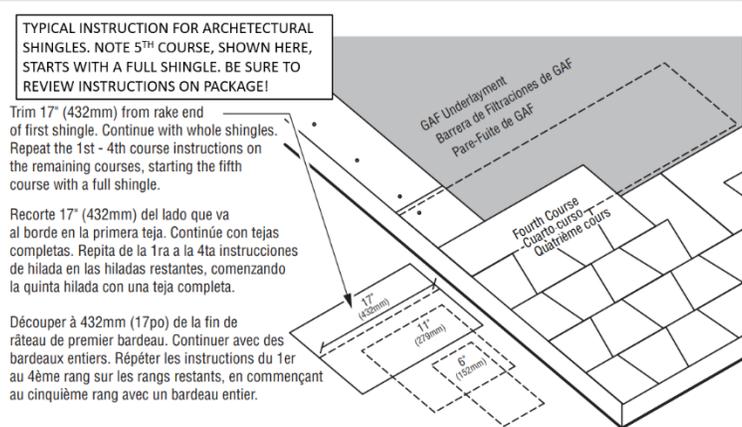
Continue to run additional courses of shingles until the shingles are close enough to the peak that the Hip and Ridge shingles will extend over the top row of shingles with only the normal reveal showing. Any excess shingle, extending beyond the peak of the roof may be cut off or bent over and nailed to the other side of the roof.

Hip and Ridge Shingles:

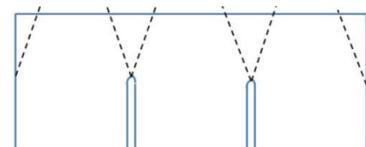
The ridge of the roof may be covered with specific Hip and Ridge shingles or standard 3 tab shingles may be provided. Ridge shingles can then be made from 3 tab shingles by cutting length of the 3 tab shingles into 3 equal lengths.

Trial fit a ridge shingle over the ridge of the roof and ensure that the ridge shingle will cover the roof shingles the full extent of a normal course of shingles leaving only the normal reveal.

Add an additional row of shingles to each side if the cap shingles will not reach far enough down the roof to fully cover the nails and nailing area of the shingles. One of the additional courses may be cut off at the peak, the course on the other side may be bent over the peak of the roof and nailed to the other



Typical Hip and Ridge Shingle Installation



Cutting Ridge Shingles from 3-Tab Shingle

side. The portion nailed over the other side of the roof shall not extend more than 5 inches down the roof to ensure that cap shingle fully covers it.

Strike a chalk line 6 inches down from the peak of the roof on each side to ensure that cap shingles are placed in a straight line on peak of the roof.

Start at one end of the roof and secure each ridge shingle with 2 nails starting the first cap shingle with a 2 inch overhang. Continue nailing ridge shingles until you reach the end of the roof. Cut off any excess shingle extending more than 2 inches past the end of roof. Cut a length of ridge shingle the full width that is normally exposed and nail it on the end of the roof with a 2 inch overhang. Cover any exposed nail heads with roof cement.

Shed Door:

Exterior metal shed doors are complete, pre-hung units which are sized to fit easily into the frame opening. First, remove any packing materials around the door unit, and any temporary wood strips nailed across the bottom of the door frame. Without removing the nails or aluminum clips that hold the door in the door frame, position the door in the opening to make sure it will fit.

Note: The instructions below are for a typical door supplied for the Habitat Shed that has an integrated vinyl brick mold and nailing flange. Typically door panels are secured to the frame for shipping. Remove the shipping nails by opening the door and pulling the nails. If a clip is used, it can be removed after the door is installed.

Insert the door into the rough opening of the front wall. If the hinge side of the opening is plumb, the door can be placed directly against this side. If not, use shims and a 4' level to plumb the hinge side. Place any shims just above the door hinges.

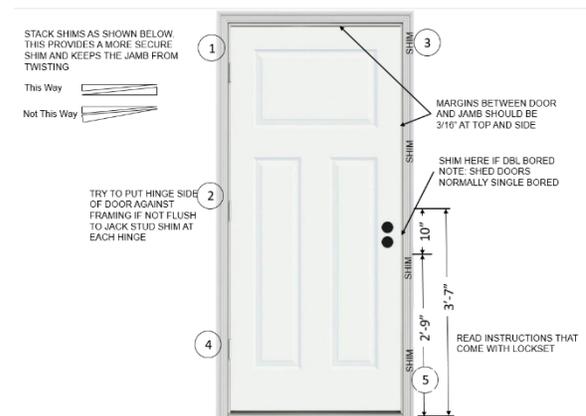
Drive ~3 1 ½ inch roofing nails into the vinyl nailing flange to hold door against the front wall OSB on the hinge side only. These nails should contact the nailing flange but still allow vertical adjustment. All nails in the nailing flange should be nominally in the middle of the nail slot.

Insert wedges at the very top and bottom of the lock side of the door. Tighten wedges so the door frame is pressed firmly against the hinge side.

Check the margin (space between the door and the jamb) at the top of the door from the inside.

Re-check for plumb and raise either the hinge side or lock side jamb so that the margin is the same across the top of the door. The door sweep should close snugly but smoothly and should not bind on the threshold. (An unlevelled floor can be the cause of binding.)

Remove the 1 of the screws closest to the hinge pin in each hinge (locations 1 and 2) and replace with 3 inch long brass colored #10 screws.



Re-check for plumb and adjust any shims behind door hinges, or adjust tension on screws, and raise either the hinge side or lock side jamb so that the margin is the same across the top of the door. The door sweep should close snugly but smoothly and should not bind on the threshold.

Shim the lock side jamb at the 4 locations shown and immediately above or below the lockset location to establish a consistent margin between the door and jamb.

If the door is pre-drilled for both the knob set and deadbolt, shim directly above and below the holes and between the deadbolt and knob.

NOTE: For doors that are not pre-drilled for deadbolts: Shims or nails CANNOT be placed between 33 inches and 43 inches from the floor or they will interfere with the deadbolt installation. They must be located just below the 33 inch mark and just above the 44 inch mark to support the lock.

Place a few 1 ½ inch roofing nails in the vinyl nailing flange on the jamb side to hold door flush with the OSB. These nails should contact the nailing flange but still allow vertical adjustment.

Locally pull the weather strip out of the retaining groove in the door frame and insert 3 inch long brass colored construction screws through the door jamb and wedges into the jack stud.

Install 3 inch long brass colored construction screws in the bottom hinge (Location 4) in one of screw holes closest to hinge pin.

Check door operation and make any adjustments required.

Finish installing nails in the nailing flange of the door in all jambs with 1 ½ inch roofing nails on nominally 12 to 18 inch spacing.

Install the lockset per the instructions included.

Install the threshold support, 2x4x32 pressure treated, below the threshold with 16d galvanized nails.

Shed Siding:

Shed siding installation is generally as described in the Charlotte Region Habitat for Humanity Siding Chapter with modifications as noted below.

Siding Prep

The bottom edge of the starter strip should be 1/2" below the wall sheathing. Measure down from the bottom of the gutter boards to ensure that siding will run level.

Vinyl corner should be cut to length and extend 1" below bottom edge of starter strip.

Vinyl corners should be installed tight to the bottom of the fascia; there is no need to leave space above the corners as no soffit will be installed. Cut a bevel on the bottom corner.

Consult the Siding Chapter of the Charlotte Region Manual for details on the following: Starter Strip, Corner Posts, J-channel, Gables & Eaves, and J-Channel around Door



Starter and corner in place.

Nail Siding Panels General Instructions

Attach panels to the house with a 1½" to 2" galvanized siding nails. Drive the nails into every 24 inch o.c. wall stud. If the center of the pre-punched slots are not located at a stud, the slots must be elongated with snips or a Nail Slot Punch tool. The use of utility knives is prohibited due to



Slot properly elongated to center hole on a stud

safety reasons.



Using a Nail Slot Punch to elongate the hole. Position panels such that few slots need to be elongated as too many will diminish the integrity of the nailing strip.

Check inside the Shed after each panel is installed to ensure that no nails are showing inside shed walls!

CREW LEADERS – LET THE ABOVE PARAGRAPHS BE YOUR PRIORITY

To minimize waste, siding joints will only be separated by one course of siding. This would not be acceptable on the house, but is allowed on the shed. (Seams are exaggerated in photo.)

Paint Brick Molding and Exterior Door

Metal doors come pre-primed, and should already have had one coat of finish paint applied. Both sides of the door are painted with two coats of latex semi-gloss exterior paint. To reduce drips and streaking assign this to a skilled painter. Paint with a good quality paintbrush for a smooth finish. Follow the directions on the paint can for details. Under ideal conditions it will take about four hours for the paint to dry so this task should be started as soon as possible. Weather stripping often comes stapled in place. Do not remove if that is the case. If it is removable, take care not to stretch it. Do not get paint on the weather stripping. Oil Base Note: If the exterior paints are oil based, they will need to be mixed with Penetrol®, according to package directions, to extend the paint and help it go on smoothly. You will need to use paint thinner or mineral spirits to clean brushes and rollers if oil paint is used. Brushes used for oil paint should be kept separate from brushes used for latex.



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