DRYWALL

Approved Methods

August 22,2020

Note to the Reader: Due to differing conditions, tools, and individual skills, the authors of this manual and Habitat For Humanity of Cabarrus 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 Habitat for Humanity of Cabarrus. 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.

Table of Contents

Introduction To The Drywall Section

This Section Includes

Task Lists

Safety Review

Tool, Equipment and Material List

Material Description

Construction Details and Drawings

Schedule: Drywall Days 1 & 2

On most Habitat projects the drywall installation can be completed during two scheduled workdays. The drywall cannot be installed until all of the rough-in inspections have been completed and the wall insulation has been installed and inspected. At the end of the second day of drywall, the house should be cleaned out, its floors swept, and ready for the drywall finishers.

Crew Assignments

It is suggested that approximately 15 volunteers, including one task leader and 3-4 crew leaders, be recruited for Drywall. Divide the crews up by distributing the experience level among the crew leaders. On workdays when there are a large number of workers assigned, they can be divided into small crews and each crew assigned to complete all the drywall installation in a particular room: ceilings, walls, closets, and window wraps. With a smaller number of workers, it may be desirable to have all the volunteers concentrate on installing the ceiling panels throughout the house, then continue with the walls in one or two rooms at a time.

Drywall Safety Guidelines

Review these guidelines with each crew member at the start of the day or as they arrive on site.

“NO JOB IS SO IMPORTANT THAT IT CAN’T BE DONE SAFELY”

Speak up if something looks unsafe. An observer can spot danger quicker than a worker.

Stack material so that it is stable and secure. Do not pull the stack away from the wall because shifting stacks have broken bones. Drywall is very heavy!

Dust masks are strongly recommended when using the router.

Utility knives - keep your hand out of the blade's path. Retract blade when not in immediate use. A sharp blade is safer than a dull one. Safely dispose of used blades.

Drywall preachers (tees) are top heavy and work loose as ceiling is screwed. Hold these supports by hand while they are in use.

Know where **water** & a **first aid** kit are located. Tell the site supervisor immediately in the event of an injury.

Habitat **requires safety glasses** at all times.

Power Saws:

- Only crew members with power saw **experience** can use them. A busy work day is not the time to teach saw skills nor is it the time to learn saw skills.
- Habitat advises that **ear and eye protection** be used when using power saws. Don't bind the blade of any saw – listen for it. Back off and re-support lumber. Keep electric cords out of the way of the saw.
- 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 & operating.

Keep the entire work area, inside and out, **free of trip and fall hazards**.

Don't leave loose objects on top of ladders. 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 get caught in power tools.

Wear appropriate clothing for the task including work boots that protect from falling objects, have a nonskid sole & resist nail penetrations. No open toed shoes allowed.

Tools must be in a safe condition (meet OSHA standards, i.e. no cuts in cords or missing ground prongs.)

Think & concentrate on your task.

If you are uncertain about how to do a task, or how to operate a power tool, ask your crew leader.

Task List - Drywall Installation

Staffing

House Leader
Drywall Task Leader
3-4 Crew Leaders
10-11 Additional Volunteers

Tasks to Be Completed and Crew Sizes

Mark location of studs, trusses, electrical boxes etc.	2 to 3 people
Install drywall panels on ceilings	3-4 crews
Install drywall panels on walls	3-4 crews
Install drywall wraps around windows	1 crew
Clean-up site, put away tools and equipment	All crews

Quality Checkpoints

- Drywall panels installed so butt joints are over framing members and staggered
- Nail & screw patterns complete
- Nail and screw heads straight and paper dimpled
- 1/8" maximum space at cuts around electrical boxes and other openings
- Top edges of all drywall panels are sealed with caulk or Sill Plate gasket material
- Floor symbols checked against wall penetrations (none covered up)
- All materials re-stacked, site cleaned, tools accounted for and put away

Drywall Tool, Equipment & Material List

Tools Each Drywall Crew Member Will Need	**Tools Each Drywall Crew Will Need**
Hammer (16 oz. Min)	Measuring Tape (20')
Nail Apron	Drywall Square (4')
Retractable Utility Knife with extra blades	Keyhole Saw
Retractable Measuring Tape (16' Minimum)	Drywall Saw
Square (Speed or Combination)	Chalk Line (Blue Chalk Only)
2 Pencils	Radius Cutter (Optional)

Safety Glasses	Toe-Operated Drywall Lifters
Work Gloves	Electric Drywall Screw Guns with Extra Bits
Water	18 Volt Drivers with Extension and Drywall Screw Setter
	Surform® Drywall Plane
	2 Drywall benches
	12 Gauge Drop Cord (50’)

Drywall Tools and Equipment Needed On Site	**Drywall Material List- For Crews:**
Twelve-Gauge Drop Cords (100')	Drywall
Three or Four-Way Electrical Box	Drywall Screws
Circular Saw (7¼”)	Drywall Nails
	2x4s for miscellaneous Deadwood
Lumber Marking Crayon or Marker	Window Wraps
Drywall Benches/Work Platforms - 6-8 total	
Step Ladders (6’)	**Drywall Material List- For Drywall Finishers:**
Drywall “Preachers” (“T” Posts) 6-8 total	Corner Bead
Toe-Operated Drywall Lifters (4 pair)	Tape
Routers (Rotozips®)	Drywall Mud

Drywall Material Description

Deadwood

Framing material that provides nailing area for drywall where wall and ceiling framing is not adequate.

Drywall Panels

Drywall panels that are normally used on Habitat Projects are either 4’x10' or 4’x12' sheets of ½” gypsum wallboard.

Drywall Screws

1¼” Phillips head screws that are specifically designed for attaching gypsum wall board.

Drywall Nails

1¼” coated nails that are specifically designed for attaching gypsum wallboard. Note: No longer used in typical installation.

Drywall Window Wraps

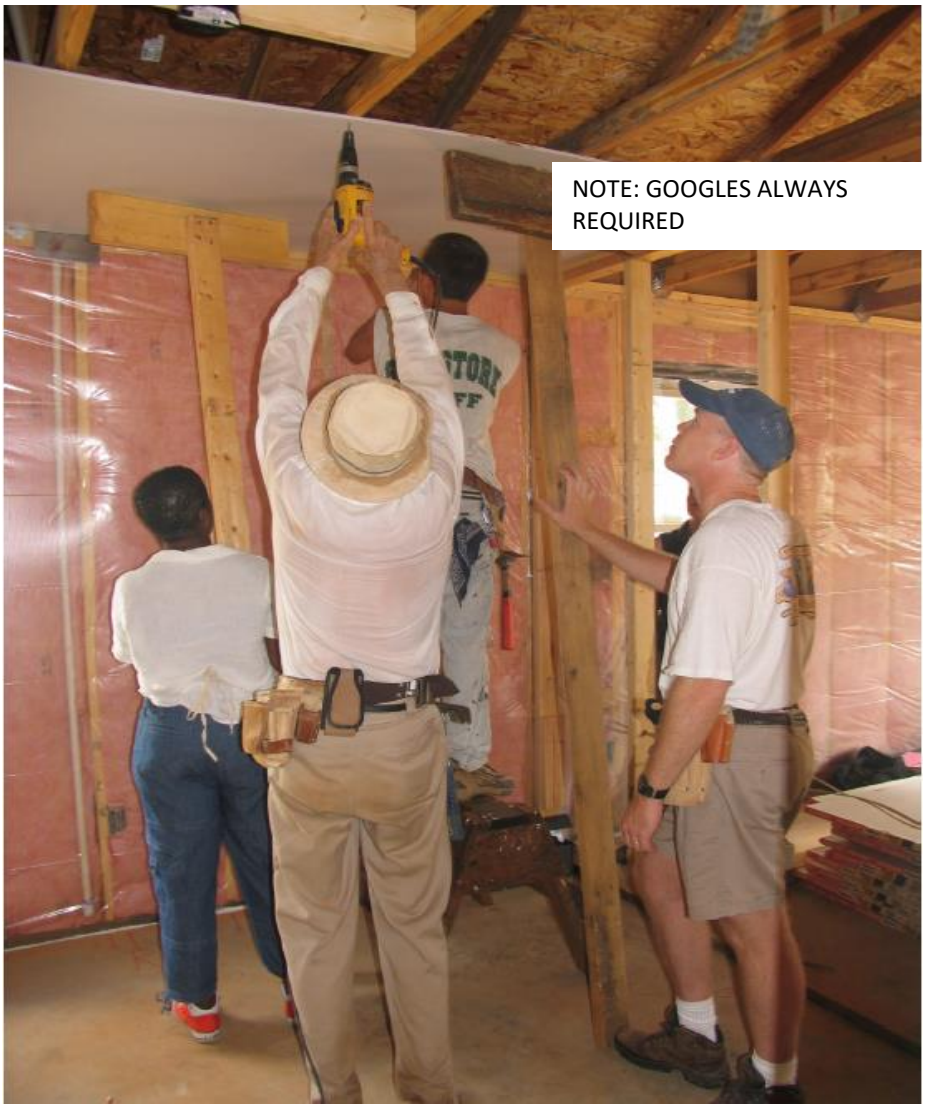
Rectangular pieces of drywall that are installed against the rough framing on the sides and top

of a window opening. These can be made on site if not prefabricated.

Drywall Preachers

Supports that are used to help hold drywall panels against the ceiling during installation. They consist of a 2x4 post with a horizontal support at one end and are sometimes called T-Posts.

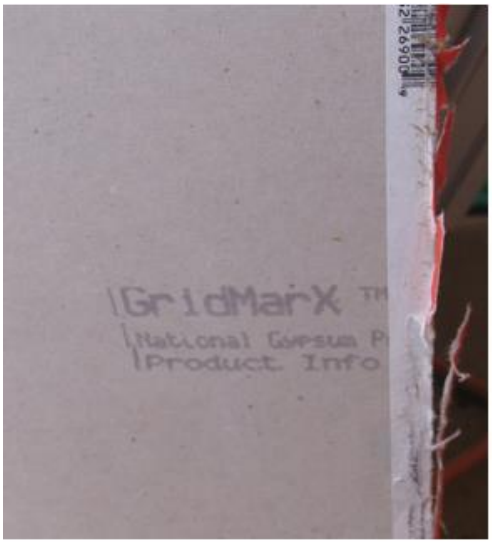
General Instructions For Working With Drywall



This is a good drywall crew. Each support is perpendicular to the trusses and is being held by a volunteer. The bench is well built and safe.

Panel Basics

Panels come in pairs, good side facing in, and paper tape binding their edges. Take them apart by pulling the tape free. The front side of a panel has a beveled edge for taping seams. The back side has faint markings and tape. Remind beginner crews to layout accordingly because it is easy to transfer hole measurements to the wrong side. This is important even on straight cuts because factory edges need to go in the center of walls and ceilings.



Back side of a Drywall panel

Drywall is heavy. An easy way to carry it is to keep a hand on the top and palm facing out.

Cutting Panels

To cut a panel to the desired length, mark the dimension on the top edge of the panel and cut across the 4' face with a utility knife. Use a 4' drywall square as a straight edge to guide the knife. After cutting through the paper face of the panel, snap the panel away from the face side and cut along the crease on the back of the panel.

To cut along the 12' dimension of the panel, mark the desired width on the face of the panel in at least two places. Then strike a chalk line between these points and score through the paper with a utility knife as before.

Sequence for Cutting Panels

A T-Square is set to the mark and used as a straight edge for cutting. Don't forget to take advantage of its rulers. When cutting more than 4', use a blue chalk line (red will bleed through paint.)

Step One: Measure. Set T-Square in position. Cut first side of panel using square as a guide. Keep hands out of path of blade. Panels are cut 3/8" short of full dimension.

Step Two: Snap board.

Step Three: Cut paper along crease.

Board ready for placement. Use a Surform® to smooth rough edges.

Use the Surform®

After cutting boards 3/8" short, use a Surform® to smooth rough edges, then bevel the edges toward the backside of the board. Accurate cuts will keep broken corners to a minimum. Replace panels that have badly broken edges due to being forced into place. Utility knives can be used for small areas. Each crew should have its own Surform®. Small ones are best because they fit in your tool belt.

After cutting panels it may be necessary to clean off the uneven edges. Forcing bumpy edges into corners is often what snaps the drywall corner.

Check with the site supervisor to see if it will be necessary to replace a panel that has a broken corner due to being forced into place.

This small rasp fits into a nail pouch.

"NO JOB IS SO IMPORTANT THAT IT CAN'T BE DONE SAFELY"

Utility knives - keep your hand out of the blade's path. Retract blade when not in immediate use. A sharp blade is safer than a dull one. Safely dispose of used blades.

Cutting Holes in Panels

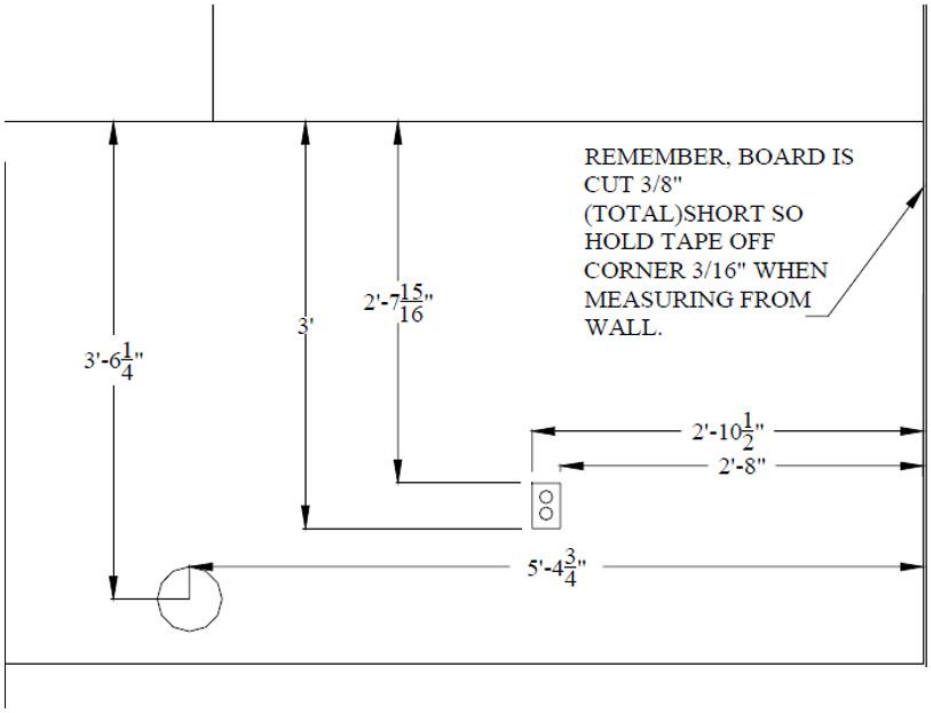
Holes in panels can be cut with a keyhole saw before the panel is installed, or a router can be used after the panel is in place (preferred).

Cutting with a Key Hole Saw

Before panels are installed, lay out and cut holes for electrical boxes, heating vents, etc. The maximum space allowed around electrical boxes is 1/8", so accurate measuring and cutting is important.

To properly locate a round electrical box (normally on ceilings), measure the distance from two adjacent walls (or from the edges of adjacent panels which have already been installed). Transfer these measurements to the face side of the panel to be installed, marking where the two points intersect. If a radius cutter is available, place the pivot point of the cutter at this point and cut a hole to the required diameter. The hole can also be cut with a keyhole saw after first marking for the hole with a compass or a template of the proper size (another round electrical box makes a good template).

For rectangular holes (heating vents, electrical boxes for switches and receptacles), measure the distance first from one wall (or adjacent panel) to both sides of the box and then from the intersecting wall or panel to the other two sides of the box. Transfer these measurements to the face side of the panel to be installed, then with a drywall square as a guide, draw lines to connect the points. Then cut out the area between these lines with a keyhole saw.



Mark accurately when cutting holes with a key hole saw.

Cutting with a Router

For larger holes or openings (doors, windows, attic stairs), install the panel first, then cut out the opening using a saw or a router using the edge of the frame opening as a guide for the saw.

Routers (Rotozip®) can be used for cutting almost all holes. Work the router counterclockwise (against the turn of the bit). Have extra bits on site. Each separate crew would appreciate its own router.

For larger holes or openings (doors, windows, attic stairs), install the panel first, then cut out the opening using a saw or a router using the edge of the frame opening as a guide for the saw.

Routers make cutting boards easy. Routers make ruining boards easy. Hint: Mark for the center of a hole. Plunge the router in the center. First route out the inside of the box. That gives you a visual. Then plunge
on the outside of the box and feel your way around it.

Protect wires by pushing them far back into the outlet before plunging the router into the center of the box.

Tolerances for Holes

The maximum space tolerated around electrical boxes is 1/8", which is only the width of a router bit. Accurate measuring and cutting is important. Gaps wider than 1/8" mean the board will require extra work for the drywall finisher. Help keep the finishing price down by having a quality installation. Even oversized outlet covers cannot make up for sloppy cuts. Do not trade speed for accuracy. On boards with large overcuts, see the site supervisor.

This cut is within the 1/8" tolerance.

A good cut out around the vent.

A good cut out around this light fixture.

This board will require extra time from the drywall finisher because the 1/2" gap at the bottom is too wide. Too many like this and the price of the finishing may go up.

"NO JOB IS SO IMPORTANT THAT IT CAN'T BE DONE SAFELY"

Stack material so that it is stable and secure. Do not pull the stack away from the wall because shifting stacks have broken bones. Drywall is very heavy!

Habitat requires that **safety glasses** be used at all times.

Construction Details - Drywall Installation

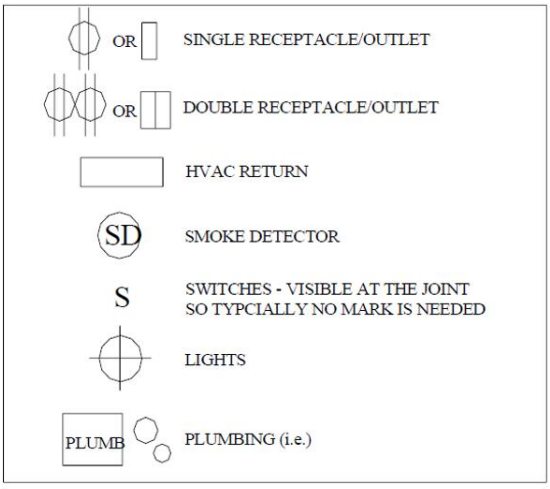
Mark Locations of Studs, Trusses & Electrical Boxes

Before hanging any drywall, mark the center of the trusses (on the top plates), and the center of the studs (on the floor) with a heavy arrow. Mark the location of all electrical boxes, plumbing fixtures, or heating vents by using common symbols, such as those found in the illustration.

Trusses were marked on interior walls. (Hurricane clips will show trusses on exterior walls.)

Mark all studs on floor

Floor is marked for outlets and range outlet. After drywall is complete, it will be easy to see if any electrical devices were missed. Notice metal plate that protects plumbing from screws.



Typical Marking Symbols

Plan the Layout
Ceiling Details

Before any panels are cut, develop a plan for the ceilings and walls in each room.
Layout Basics:

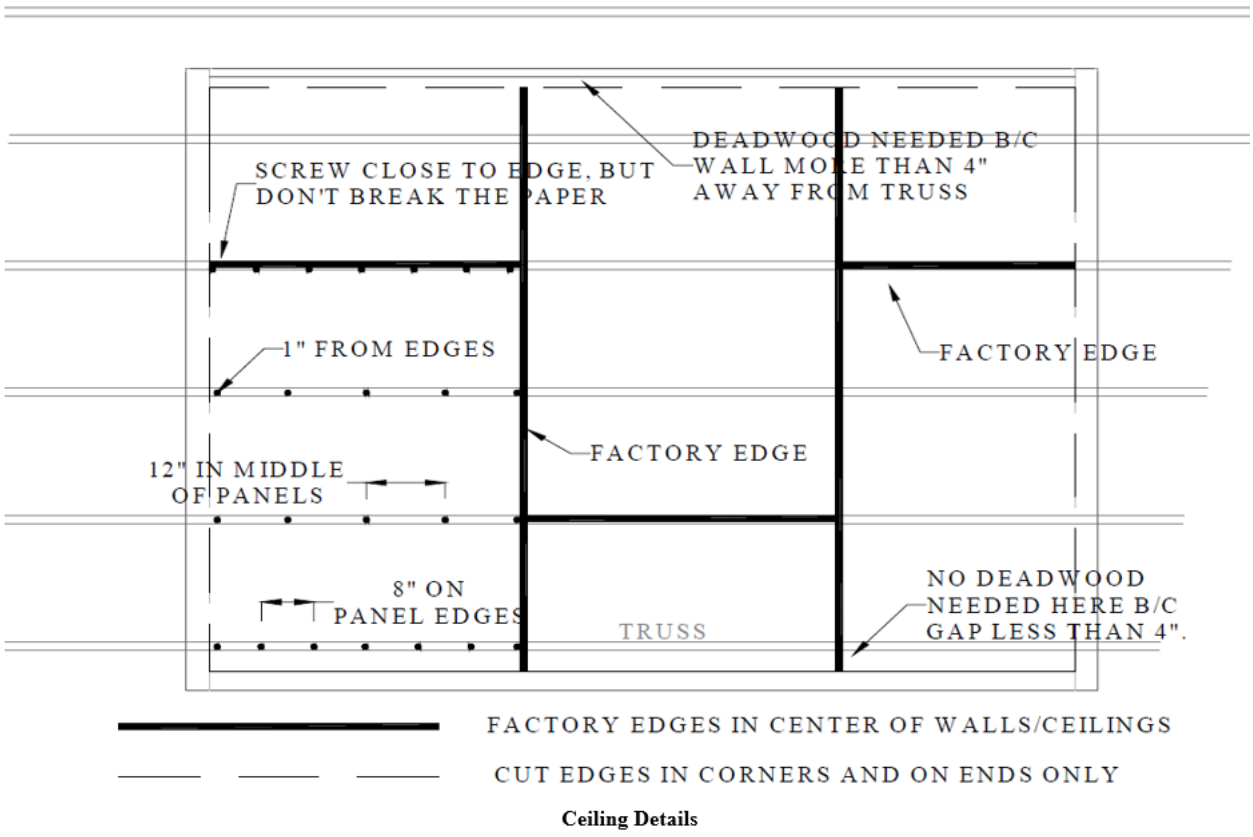
- If boards are available in 10’ and 12’ lengths, save the long boards for long walls (i.e. do not cut a 9’ piece out of a 12’ board).
- The panels must be laid out perpendicular to the ceiling joists and wall studs.
- If the room is less than 12' wide, a single piece can be used.
- When a room is more than 12' wide, panels are laid out with the butt or end joints staggered. Stagger joints at least 4’ if possible.
- Halls use a single width of drywall. Plan the intersection where halls meet living rooms to get as many factory edges together as possible.
- Leave access to rooms and closets. Drywalling certain walls will block access to these areas.
- Panels should attach to a minimum of three framing members.
- Try not to use pieces shorter than 3’.
- Do not use scrap pieces in closets as it creates too much work for the finishers.

Install Ceilings Boards

Ceiling panels are always installed before the walls. Have two drywall preachers and two benches available in the room. Plan the lay out so that only factory (uncut) edges abut at the joints. (The cut ends should abut the edges of the ceilings or the corners of the walls.) Plan the layout so that seams are not on a light fixture.

Attach ceiling panels with 1¼" drywall screws using a drywall screw gun or 18 Volt driver. Use a pattern of one screw every 12" along each interior framing member, beginning approximately 1" from the edge of the panel. Place screws along the edge of a panel at 8" o.c.

NO JOB IS SO IMPORTANT THAT IT CAN’T BE DONE SAFELY. SPEAK UP IF SOMETHING LOOKS UNSAFE. AN OBSERVER CAN SPOT DANGER QUICKER THAN A WORKER.



Ceiling Details

Drywall Preachers

Whenever possible use three crew members to lift the panel and two to set the preachers under the panel to support it while screwing it in place. To keep the drywall from bending up into the trusses, place the preachers perpendicular to the joists. Make sure the screwing pattern is almost complete before removing the preachers. Assign a crew member to keep a hand on the preacher until it is taken down.

One crew member should run a hand or putty knife over all of the screws to make sure that all are properly countersunk, but not cutting the paper.

Hold the board tightly in place while the preacher is put into final position. If the board isn't held tight, the preacher will twist it out of place.

"NO JOB IS SO IMPORTANT THAT IT CAN'T BE DONE SAFELY"

Drywall preachers (tees) are top heavy and work loose as ceiling is screwed. Hold these supports by hand while they are in use.

Place preachers perpendicular to trusses. Keep a hand on them at all times. They are top heavy and dangerous.

Seams are staggered at least 4'. Only factory edges are used in middle of walls or ceilings (not represented in photo).

Habitat work is serious business

Screw Guns, 18 Volt Drivers and Screws

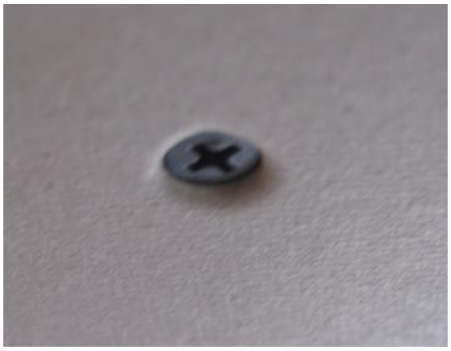
Screw guns have an adjustment that allows the head of the screw to be countersunk just below the surface of the panel. Screws should be $^{1}/_{16}$" below the surface so as not to break through the paper on the face of the panel. A Screw Setter used on 18 Volt Drivers also performs the function of controlling the depth of the drywall screw with no adjustments required.

Remove ALL screws that miss a stud or are not driven in straight. Dimple the paper where screws and nails have been removed.

Before beginning the day, and periodically during the day, check every screw gun's depth setting. Use a scrap piece of drywall against a stud and make the necessary adjustments.

A screw gun adjusted to countersink screws properly is a must.

18 Volt Driver with Extension and Drywall Screw Setter



Screw Set Correctly

Screw Not Deep Enough

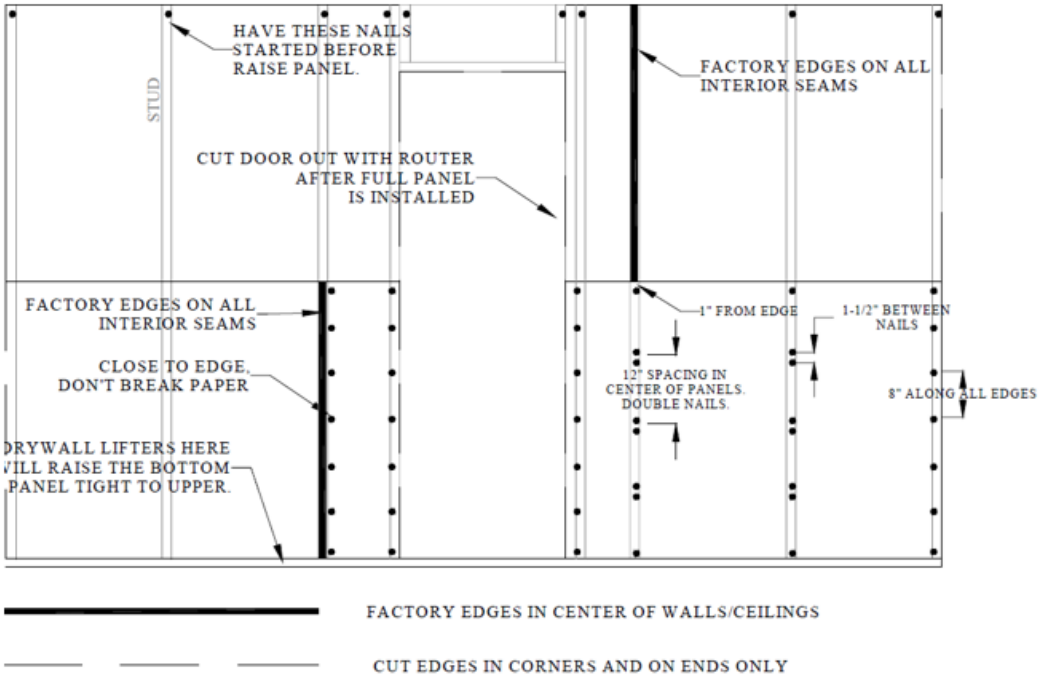
Screw was driven too deep and has broken the paper. Another should be added for support.

Install Wall Boards

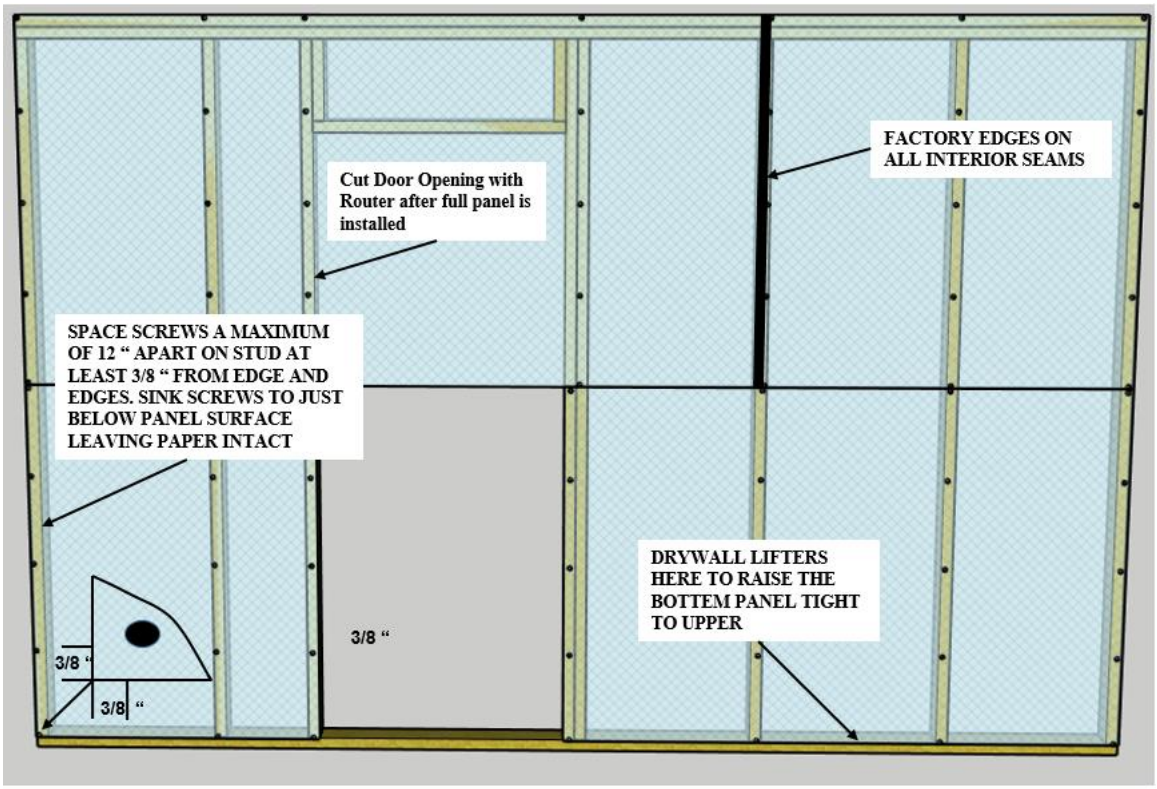
Wall Details

- Exterior walls should be completed first. Place panels of drywall in the room prior to completing interior walls or you may lose access to the room. Attach wall panels using 1¼” drywall nails.
- Upper panels are installed before lower ones. Start drywall nails along the top of the panel before raising it. Lift the panel so the upper edge is touching the ceiling so the upper nails can quickly be set to hold the panel in place. Place drywall screws every 12 inches along each stud location. Alternately nail every 8” along edges and every 12” on the interior of the panel. Interior nails are doubled at 12", 24" and 36".
- After the upper panels are in place, install the lower ones. A toe-operated drywall lifter or fulcrum is used to lift the panel off the floor to close the joint between the upper and lower panels, leaving a space (approximately 1" wide) at the floor.
- Plan to install drywall in the closets before all the walls in a room are covered. It may be difficult to get panels into these areas after walls are done.
- Pull the kitchen vent wire through the wall 32½” down from the ceiling.

Drywall lifters raise lower panel tight to upper panel. Baseboard will hide the gap left at the floor.



Wall Details-Nail Application



Wall Details-Screw Application

Air Seal Drywall to Top Plates

The top edge of the drywall must be sealed to the top plate of the wall framing. This is normally done by applying a heavy bead of caulk mid-height of the top plate just before the drywall panel is lifted into place. An alternate method is to staple a band of Sill Gasket to the top plate. Ask construction manager for his/her preferred method.

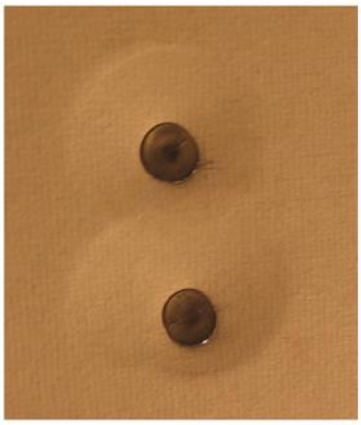
Heavy bead of caulk applied to the top plate typical all walls. Alternate Sill Sealer also shown.

Nailing Technique

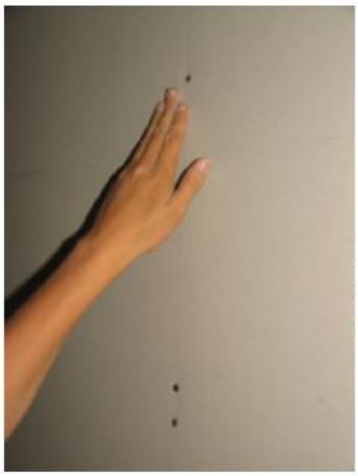
Nails should be driven into the face of the panel so that the nail head is slightly below the surface. On the final stroke, the face of the hammer depresses the drywall around the head so that it is indented $^{1}/_{16}$" to form a "dimple". Do not break the paper surface of the panel. (Using a drywall hammer with a slightly rounded face makes this task easier.) Remove ALL nails that miss a stud or are not driven in straight. Dimple where the nails were removed. Dimples hold drywall mud.

Nail being driven in straight.

This nail is being driven in crooked and will break the paper. The hammer head will also break the paper because it is not square to the board.



Dimple paper in 1/16" when setting nails. Do not tear with nail or hammer. It is the paper that gives drywall its strength. Dimples are needed for the drywall compound.



Establish the habit of feeling for dimples and set nails.

Do not bend nails or break paper. This nail should be removed and the paper dimpled. (If removing it is too damaging, it can be sunk as long as it has hit a stud.)

Start the top nails while the panel is on the ground. Placing nails over studs will show the top of the stud's location, which will be helpful when nailing in the center of the panel. Start nails 1 1/2" down from the top to make nailing easier.

Raising top board together.

Using a T-Square to mark boards for stud locations can be helpful. Top of stud is easily located if nails in upper panel were started over studs. This is especially helpful when panels are not marked for studs.

Nails that were started are now easy to set.

The top board is in place. Window and door openings can be cut flush or 1/4" short but never long.

Install Drywall Wraps around Windows

Before wrapping the window jambs, make sure the drywall on the walls does not overhang past the window framing. It should be flush or 1/4" short of the corner.

If requested, wrap the tops and both sides of each window opening with drywall strips. These can be cut from scrap pieces to fit just inside the frame opening. Nail the strips in place using 1¼" drywall nails about every 12" near the center of the strip. The room side of the Drywall Wrap should be flush or 1/4" short. Plane any protruding drywall using a Surform® Drywall Plane.

Drywall Wrap installed in window opening
Normally Installed with Drywall Screws

"NO JOB IS SO IMPORTANT THAT IT CAN'T BE DONE SAFELY"

Utility knives - keep your hand out of the blade's path. Retract blade when not in immediate use. A sharp blade is safer than a dull one. Safely dispose of used blades.

Clean Up Site, Put Away Tools

Scrap pieces of drywall will be generated during the workday and should be stacked in two separate stacks. In one stack place all the usable scraps (pieces that are large enough to be used elsewhere in the house). In the other stack place all the broken or damaged pieces and those that are too small to be used. At the end of each workday, remove from the house all the scrap drywall to be thrown away and sweep the floors.

On the final day of Drywall Installation any full unused drywall panels, and all leftover nails, screws, and equipment should be removed from the house and returned to storage. Remove debris and sweep the floors. The house should be ready for the professional drywall finisher.

Final Nail and Screw Check

After the house has been swept out, do a final walk through checking for the following:

- Screw and nail pattern complete
- Screws set below surface
- Nails dimpled

- Bent, crooked, overdriven nails and screws removed and paper dimpled
- Additional screws added in places where screws have broken the paper.
- No outlets or other penetrations covered up (check against floor markings).

Drywall Appendix

Reducing Nail Pops

To minimize future nail pops, use a nailing pattern that begins in the center of the panel and works its way towards the edges. Think of it as smoothing out a piece of wrinkled paper.

Drywall Benches and Work Platforms

Drywall benches and work platforms are preferred because they are easier to use than ladders.

Drywall benches are easier to use than ladders.

Typical Work Platform