

Introduction to Drywall

Standard Work Practices
of Habitat for Humanity of Metro Denver

Common Safety Concerns

Personal Protective Equipment:

Everyone should always have hard hats and safety glasses on.

In addition:

- Be prepared for **drywall dust**:
 - Have wider and goggle-style **safety glasses** available.
 - Have **dust masks** available and encourage volunteers to take “fresh air” breaks.
- Some folks are sensitive to latex and fiberglass – skin contact can make them itchy or even elicit an allergic reaction.
 - Have **gloves** available.
- A whole house full of drywall guns and roto-zips can be *very* loud.
 - Always have **hearing protection** available and encourage its use.



Common Safety Concerns

Lifting and Carrying:

Drywall is heavy and volunteers are enthusiastic.

- Make sure workers *always* work in teams to lift and carry.
- ***Always lead by example.***



Drywall Storage:

Sheets are often stocked leaning against walls.

- Be extremely careful moving and working around these piles – they *can* tip, and they are dangerously heavy.
- ***Never*** attempt to lean or move *whole* piles – move sheet by sheet, if necessary.
- ***Never*** climb or work on piles.



Common Safety Concerns

Trip Hazards

Drywall days can seem hectic. Dozens of volunteers, each seemingly with their own drywall gun and power cord, piles of huge, heavy board leaning against walls, and mountains of scrap.

Always maintain a clean and safe work space.

Specifically:

- Constantly inspect for **cords** spanning common walkways and stairways or tangling up.
 - **Untangle, move, and re-route cords** as necessary.
 - Remind volunteers to do the same *every time they move*.
 - Protect cords from sharp edges and pinch points if running through windows.
- Designate specific areas for **scrap** drywall, and make sure teams are clearing scrap out of work areas *as they work*.
- Clear **trash** drywall (unusable, broken, too small, etc) *immediately* out of the work areas.
- Have trash bags available so teams can **clean** as they work.
 - Don't worry about *sweeping* until the end of the day; until then it just kicks dust into the air.



Intro to Drywall

HfHMD uses three different types of drywall for different applications:

- **Ceiling board**
 - Yellow edges
 - 4' wide, can be 8' or 12' long
- **Wall board**
 - Blue edges
 - 4' wide, can be 8' or 12' long
- **5/8" Type-X (fire-rated)**
 - Red edges
 - 4' wide, only comes in 8' long

Each has its own prescribed locations for installation and specific screw patterns.



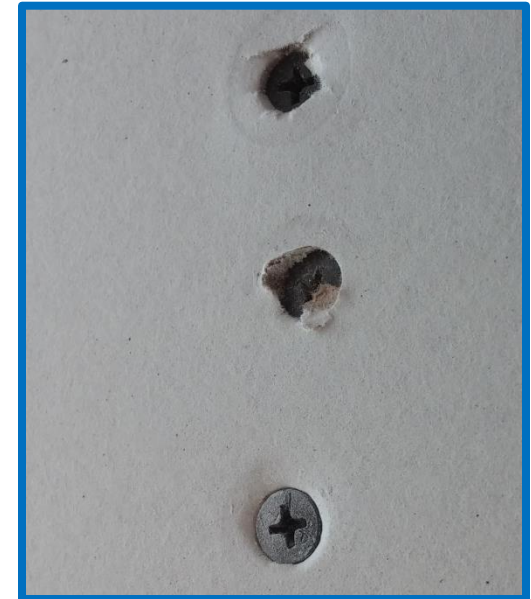
Working with Drywall

Important things to know (and teach) about drywall

It is made of (basically) three things:

1) Paper: On both sides.

- This is the **structural integrity of drywall** – compromise the *paper* with cuts or tears, and you compromise the strength of the *entire thing*.
- For example, if a screw pulls through the paper, that screw is no longer supporting any aspect of the drywall.



Working with Drywall

Important things to know (and teach) about drywall

It is made of (basically) three things:

2) Gypsum: In the middle.

- Gypsum is a naturally occurring mineral. (This is why the first drywall was called “sheet rock.”)
- This is the **weight**, the **rigidity**, and the **fire-resistant component** of drywall.
- Gypsum is what makes drywall *brittle*, not what makes it strong.



3) Fiberglass and Latex: Mixed in with the gypsum for strength and a *little* flexibility.

- The fiberglass is what makes some folks itchy when they work with drywall, and there is enough of a latex component to cause an *allergic reaction* for someone with sensitivity.
- Make sure to note this when teaching drywall installation, and make **gloves** available for anyone who wants them.

Drywall tool kits from the warehouse include:

Roto-zips

Exposed-bit power cutting tools



Drywall screw guns

Specialized for installing drywall screws



T-squares

4' drywall squares



Rasps

To clean up/shave off edges



Keyhole saws

For cutting notches and holes by hand



Lifters Or “kickers”

For lifting lower wall sheets



Cheat sticks

For marking screw locations



Make sure all of these tools go back in their kits at the end of each day.

Using a Drywall Screw Gun

Drywall screw guns are **different** from normal drills in **two** ways:

1. They have a **clutch** (*inside the motor*) which only engages the bit to spin when *significant pressure* is applied to it.

2. They have a **collar** around the bit that, when it pushes against the drywall, *relieves* that pressure.



So if you just pull the trigger, the bit won't spin.

But push the bit against a screw into drywall, and it will.

The two work together to set each drywall screw at the same depth.

Using a Drywall Screw Gun

This depth is adjustable.

- The adjustable gauge may be different on various brands of screw gun, but every drywall screw gun has one.
- **Test and adjust** each gun *before* handing them out to volunteers.

To test:

- Sink a screw into drywall until the collar catches and relieves the clutch. This the standard depth.
- If the screw breaks through the paper or doesn't dimple it (if it sticks out), then adjust the depth according to the gauge's guide.
 - For example, on Dewalt guns, twist this black plastic collar to the right to set screws *deeper*, and the to left to set them *less* deep.



Using a Drywall Screw Gun

Don't strip the bits!

- **Let pressure off** as soon as the bit “zips” against the screw.
- If the bit becomes *rounded* it won't grip screws and will spin, causing *more* damage to bit and screw head.
 - Replace bits as necessary.

Changing bits:

- Use pliers to grip the bit and pull it straight out.
 - Replace in the same fashion, making sure to use careful, strong pressure to set it completely into the collar.
- **Note:** If the bit is stuck, the entire *bit collar* may pull out.
 - *Please notify a supervisor when this happens.*
- **Caution:** The bits are slightly magnetized, watch for metal filings.



Cordless Drills and Drywall

A **cordless drill** *can* be an efficient drywall gun when equipped with a **collared Phillips bit**.

However, the constant on/off wear is terrible for the drill's motor and will shorten its life.

- ***Only* use cordless drills for:**
 - Extremely **awkward spaces** where cords could increase hazard, *and*
 - **Screw-checking** before inspection for increased mobility.
- With practice, a **corded drywall gun** is ***much more efficient***.



Using a Roto-Zip



Note: Only *trained* staff, AmeriCorps, and Crew Leaders are allowed to use Roto-zips.

The **exposed bit** and **auto-on** features of Roto-zips make them potential **safety hazards** and significant sources of **material damage** when used inappropriately or by untrained workers.



- **Clearly communicate** the limited use of Roto-zips to all volunteers.
- **Maintain a clear safety radius** around all cuts.
 - Pay special attention to the backs of boards; make sure no workers or hands are within range of the cut.
- **Always check** for easily-damaged materials *before* making a cut.
 - For example, the black plastic cable boxes are much softer and easier to damage than blue electrical boxes – and wires are extremely easy to damage *inside* a box.

Using a Roto-Zip

Roto-zips use a **two-stage bit** combined with an **adjustable collar** to cut drywall along solid edges.



Smooth tip rides along solid surfaces like studs or outlet boxes.

Cutting edge cuts through drywall.

If you notice the **tip of the bit turning black** – or worse, **smell heat or smoke**– the *bit is too dull* and the friction of the bit rubbing instead of cutting will cause serious damage.

Immediately change the bit.

Adjust the collar so that only $\frac{1}{2}$ " of cutting edge protrudes through.



If *too much cutting surface* is exposed, bit will damage electrical boxes and wires.

Using a Roto-Zip

Zippering out outlet boxes

Remind volunteers **not** to install any screws within *two feet* of the box.

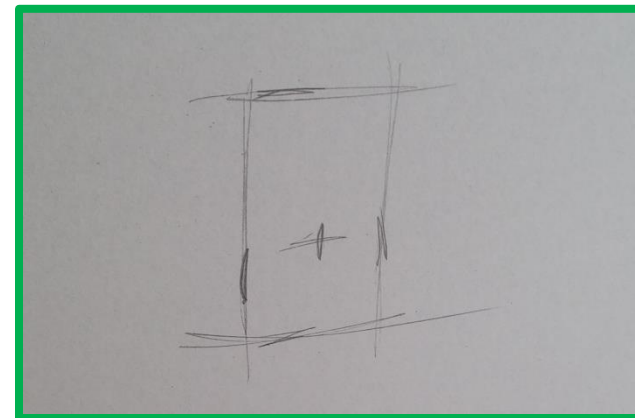
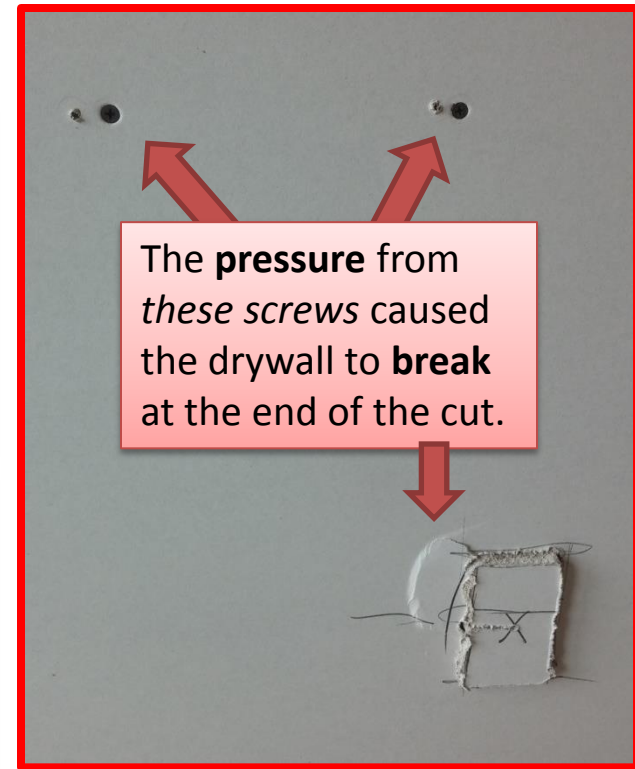
- A screw too close to the box will create a lot of pressure pulling the drywall towards framing – this can cause the piece to **break** while you're cutting it!

While cutting, ***push gently but firmly*** against the drywall to keep firm contact between the box and the drywall.

- **Big gaps** between the drywall and the box mean your bit can *lose contact with the box* and go anywhere it wants.

Using previous measurements, **mark the center** of your box.

- While you're learning and practicing, it's a good idea to ***draw the rough shape*** of the box, too – then if you get way off track it's immediately obvious.



Using a Roto-Zip

Zippering out outlet boxes

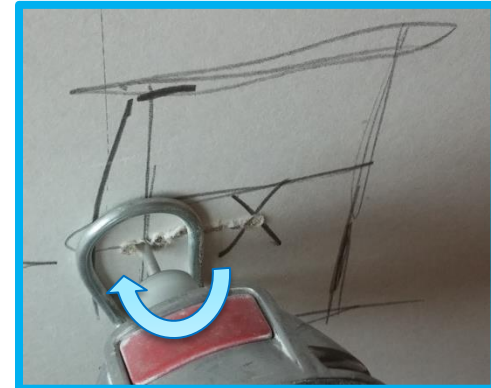
1) Push router bit through center.

- Make sure first that the **collar is adjusted** properly so that the $\frac{1}{2}$ " of exposed *cutting bit* enters drywall *but does not enter the box*.



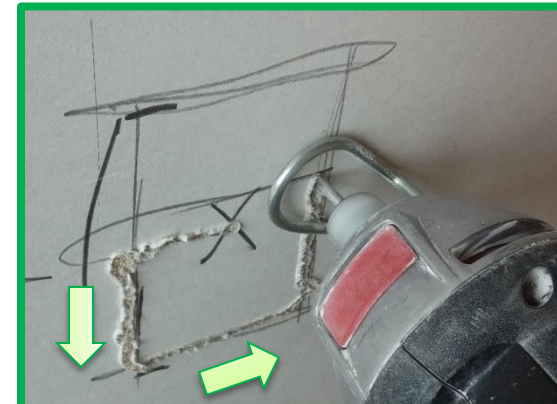
2) Move the bit slowly to the **left** until you feel the pressure of the **box's edge**.

- Slowly pull the bit out until you can **jump over the edge** of the box.
- Then push it back in, keeping as **tight to this outside edge** as possible.



3) Start moving **counter-clockwise** around the box.

- **Roto-zips pull to the right**; moving *clockwise* can make the rotation *harder to control*.
- **Move slowly**, keeping slight and constant pressure against the sides of the box.



Using a Roto-Zip

Nope.

Feel the bit, be the bit.
Keep practicing!

Better.

Pay more attention
to those corners and
clean up the edges.

Excellent.

Our finishers
thank you!

Roto-Zips Around Finish Outlets

When wiring a house, our electricians may install one to two **temporary rough outlets** so we can have temporary power access *inside* the home.

Clearly mark these outlets – *even if the power is not currently on.*

Never push the zip's bit through the center of these boxes.

- Either start on the **outside** of the box, *or*
- Measure and cut the outlet's hole **before installing** this piece of drywall.

Always start well ***outside*** the box's edge.



Using a Roto-Zip

Zippering out door and window openings:

Have volunteers install **as many screws** as close to the opening as possible *before* you zip.

- If they have trouble finding the edges of the opening, at least have them *completely fasten the top plate*.



The **more screws installed in a sheet**, the closer it hugs the framing. Around *outlets* this can be a *problem*, but around windows and doors it is a benefit.

The more screws, the **easier and more accurate** your cut will be.

- **Big gaps** between drywall and framing mean your bit can lose contact with framing and go anywhere it wants.

Start at the bottom-right corner and move **counter-clockwise** around the door opening.
*Remember, zips **pull** to the **right**, so **move** to the **left**.*

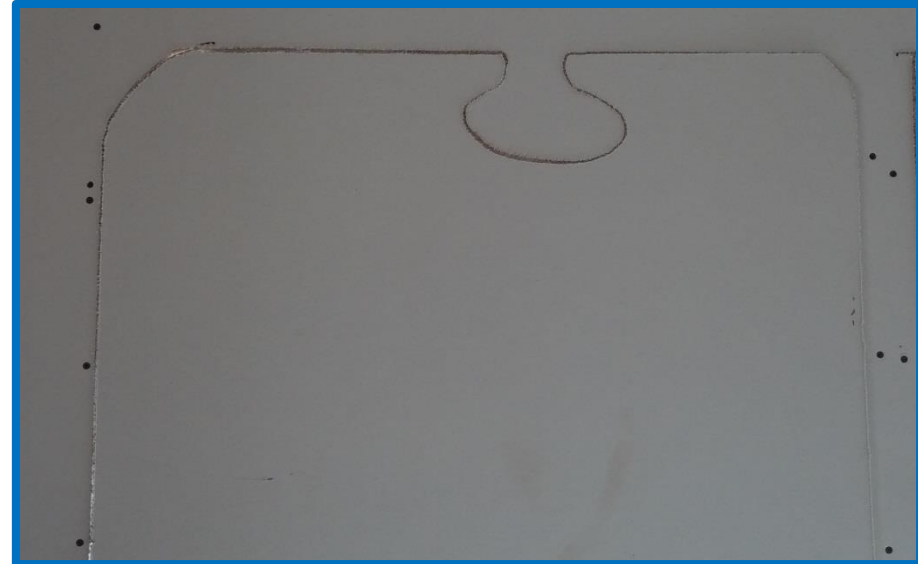
Using a Roto-Zip

Zippering out door and window openings:

- To avoid having any hands within range of the cut, **zip some handles** right into the opening.
 - This way you can keep **two hands on the tool** and there are **no volunteers at risk**.
 - Let volunteers know they *don't* need to hold it or grab it halfway through cut!

Two methods: Zip a *big handle* in the **top** or *two smaller* on the **sides**.

- The piece *will drop slightly* when free (about 1/8") **but it won't fall**.
- Remove the scrap piece straight to a trash pile and then zip off the handles.



Using a Roto-Zip

Zippering out door and window openings:

Remember, the point of zippering handles in the piece is to **keep *everyone* safely away from the cutting bit.**

- Do not allow volunteers to support the piece unless you can clearly see them.
 - And it's still best to make sure there are **no hands around the piece.**

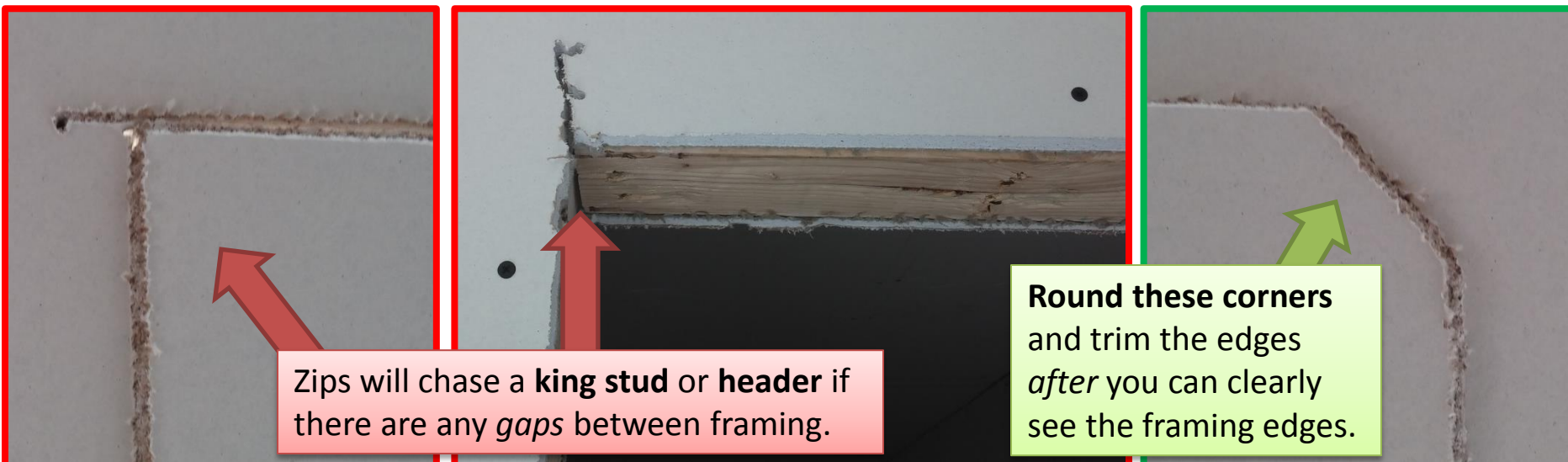


Using a Roto-Zip

Zippering out door and window openings:

Roto-zips will chase the edges of framing – *just not always the framing you want.*

- Watch out at the **top corners** of windows and doors that the bit doesn't follow the jack or king stud straight up and miss the header.
 - Either **measure and mark** the approximate corner (so that it's immediately obvious if you go past it) or **curve over to the header** when you get close and trim this corner off later.



Hand-cutting Drywall: In Principle

Remember your Rock-Paper-Scissors:

- **Scissors (knife) beats paper.** Cut through it.
- **Paper beats rock.** Remember the paper is the strength—so once you've scored the paper, just break the rock.
- **Rock beats scissors.** You can't cut all the way through that gypsum with a knife, so don't bother trying.

Score the paper and break the rock.

Hand-cutting Drywall: In Practice

1) Score the paper.



Hook the top lip of a **drywall square** over the top edge of piece. Use a foot to **push against the bottom** of the square so that it doesn't move as you cut along the edge. This ensures the cut is both **square and straight**.

2) Break the rock.



With help, pull the board away from the pile. **Push a knee into the back of the cut** to break the gypsum along the cut.

3) Cut the back.



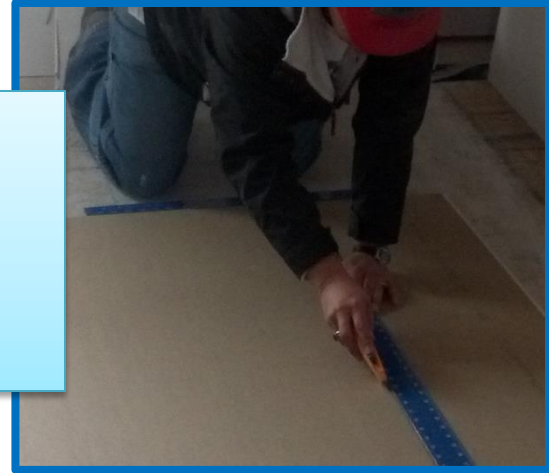
Keeping both pieces of drywall supported, **cut the remaining piece of paper** along the break line. *Make sure all hands are clear of the cut!*

Cutting Drywall: the Weird Cuts

Making long cuts:

Use a **straightedge** when possible to help cut.

- Otherwise, use a *blue* chalkline to mark the straight cut, and either freehand the cut or use smaller straightedges several times over the course of the cut. (*Red* chalk will show later.)



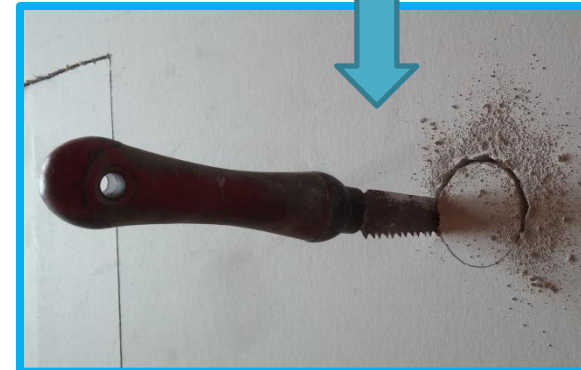
Cutting notches:

Cut the *shorter* line with a keyhole saw.



Cutting penetrations in the *middle* of boards:

Use a keyhole saw.



Then score the *longer* line using a straightedge.

Break gypsum like normal.



Supporting and Measuring

The very basics:

- The 4' factory edges of drywall *must* be fully supported, *and*
- No span of unsupported drywall can exceed *two feet*.

So for *measuring*, this means:

- Make sure all edges will be supported by framing *before* measuring and installing.
- For walls/ceilings *longer* than your drywall boards, always place the **factory edge seam** on a stud, truss, or joist.
 - So always measure to the **center** of this framing member.
 - **Always** stagger the seams where drywall meets.



Always double check for deadwood and drywall clips!

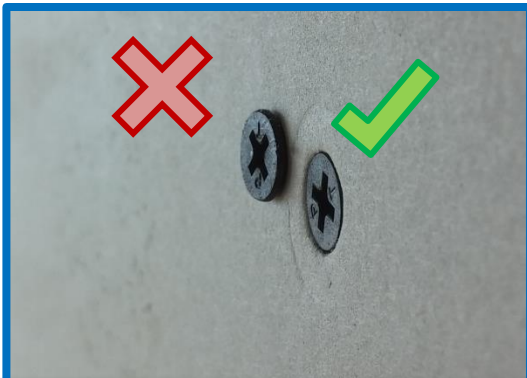


Get a **tight measurement** (framing to framing) **then subtract 1/4"**

Supporting and Fastening

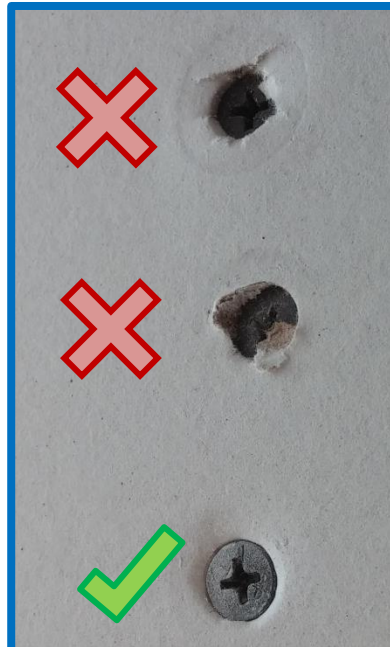
All screws must gain purchase in framing or support clips.

A properly set screw will **dimple the paper slightly** *without breaking through it*. This way the finisher's mud and tape will **cover it** *without bulging out over it*.



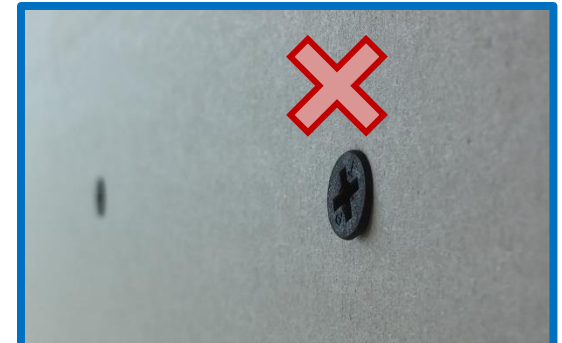
The *left* screw **missed the stud**. You can immediately tell because it *freely spins in the drywall*.

Remove it completely and **replace** with one that fastens securely into the stud, slightly dimpling the paper.



Screws which **break through the paper** must be **replaced**.

They *don't* have to be removed, but they're *not doing any good*.



Screws which hit framing but **stick out** must be **re-set** (sunk deeper) or **removed and replaced**.

If the screw is **slightly angled**, *one side* will stick out and *the other* will break through the paper— and any time the paper is compromised, that screw is *doing no good*.

Specifications for Fastening

For all **wall** and **ceiling** drywall, use:

1 ¼" course drywall screws
(unless otherwise noted)

For all ½" Type-X drywall, use:

1 ⅝" course drywall screws



Ceiling drywall

- Every 7" on *seams* (edges)
- Every 7" in the *field* (middle of the board)

Remember:

Every Seven on the Ceiling

Wall board

- Every 7" on *seams*
- Every 12" in the *field*

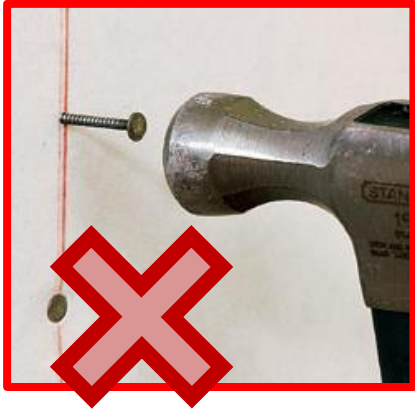
And for walls:

*Every Seven on the Seam;
Every Foot in the Field.*

Note: **Seam** spacing includes **all edges**, such as around **windows and doors**.

Note: **Field** spacing includes all studs in the **middle** of boards **and top/bottom plates**.

Specifications for Fastening



Note: Unless specifically called out *do not use nails to fasten drywall.*



“Nail pops happen because as wood dries, it shrinks. Nails do not shrink. Actually, nails do not pop. The wood shrinks away from the back face of drywall as it dries.”

Builder's Guide to Cold Climates, p. 361

Drywall **screws** are *less susceptible* to “nail pops.”

- *Especially* because it is obvious when a screw *misses framing*.
 - These “missed” screws are most likely to pop out of drywall mud later in the house’s life – so pay special attention to screw depth.