

Chapter 16: Roof Steel

Most Common Mistakes:

1. **Failure to read appropriate chapter on overhangs (if building has them)!**
2. Roof fully recessed purlins out of alignment.
3. Inadequately squared roof.
4. Reversing steel laps.
5. Using too few or too many screws.
6. Over or under driving screws.
7. Using incorrect driver bits.
8. Neglecting to pre-drill roof sheets.
9. Inside closures missing at eave strut.
10. Failure to maintain proper overlap past eave strut.
11. Neglecting to place screws into every underlying framing member.
12. Placing screws through overlaps, unless specified on building plans.
13. On slopes less than 3:12 omitting 3/8" x 3/32" tape sealer between laps.
14. Placing foam insulation boards between purlins and roof steel.



Other than in an instance where a roof steeper-to-flatter pitch break occurs (**See Chapter 44**), entire roof surface is best sheathed or sheeted prior to any wall framing installation. No wall steel or trims (or in cases with overhangs – soffit, fascia purlin or fly rafter trims) should be installed prior to roof steel.

Follow instructions explicitly, or installing roof steel will be an unhappy experience.

Inspect roof framing for any structural damage such as bowing or sagging rafters and warped or loose fully recessed purlins or solid decking. Repair these areas prior to installing roofing panels.

Prior to installation, confirm no fasteners protrude from roof framing or wood substrate as these could damage panels and impede installation process.

When installed, panel distortion may occur if not applied over properly aligned and uniform substructure.

Overlap/Underlap

Steel roofing and siding has a full rib on one edge and a 3/4 rib on other edge. 3/4 rib is OVERLAP. Full rib MAY have a siphon groove on one side and will be UNDERLAP.

See Figure 16-1

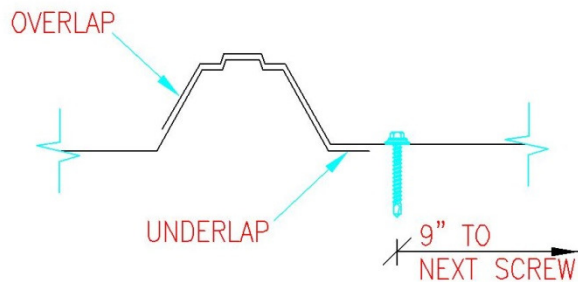


Figure 16-1: Steel Underlaps/Overlaps

CAUTION

If AT ALL unsure about steel edge underlap and overlap, request Technical Support prior to any steel panel installation. To prevent leaks, as well as an unsightly fit, properly lap panels. Even experienced installers have made errors in installing some or all panels lapped incorrectly.

Photo below is an example of an overlap done wrong; underlap has been placed over overlap at each blue arrow:



Basic Installation Skills

To install steel roofing and siding, master three basic skills:

- Making accurate measurements.
- Cutting accurately to assure proper fit and minimum waste.
- Fastening panels to assure lasting quality.

Once learned, these skills will be used at all installation steps.

Steel Sheeting Through Screws

No major steel roofing and siding manufacturer recommends steel be fastened to framing below with screws through steel high ribs, into framing below. From a strength standpoint, screws driven through high ribs provide inadequate shear strength. This is due to screw's ability to flex or bend in airspace created between steel high rib and wood below. From a leak standpoint, screws placed in high ribs are far more likely to be leak causes. This is due to steel's ability to "flex" at rib due to overdriven screws or natural expansion and contraction from temperature. This can cause poorly seated or under driven screws to leak. A screw properly driven in flats should never result in a leak.

See Figure 16-2 below for sheeting screws.

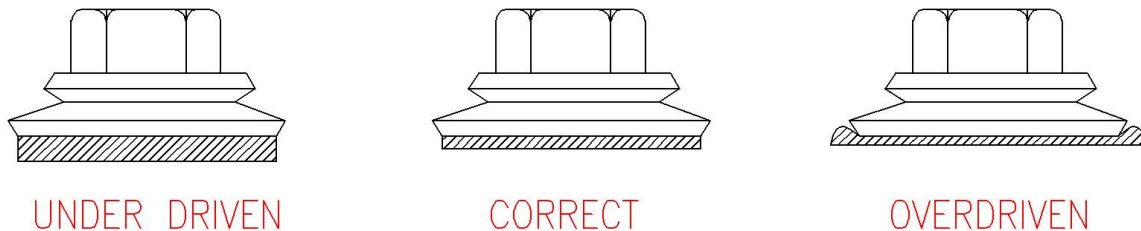


Figure 16-2: Screw Heads



Helpful hint – To prevent screw wobbling during installation, fully engage fastener head in socket. If screw head fails to go entirely into socket – tap magnet deeper into socket to allow full head engagement. Metal chips will build up from drilling, so remove from time to time.



Use sheeting screws **ONLY** on one side of each high rib at **EVERY** underlying framing member (**See Figure 16-3**) with following exception:

- Roof – each high rib side at Eave Strut and Ridge Fully recessed purlin (as well as at any end over end splices).

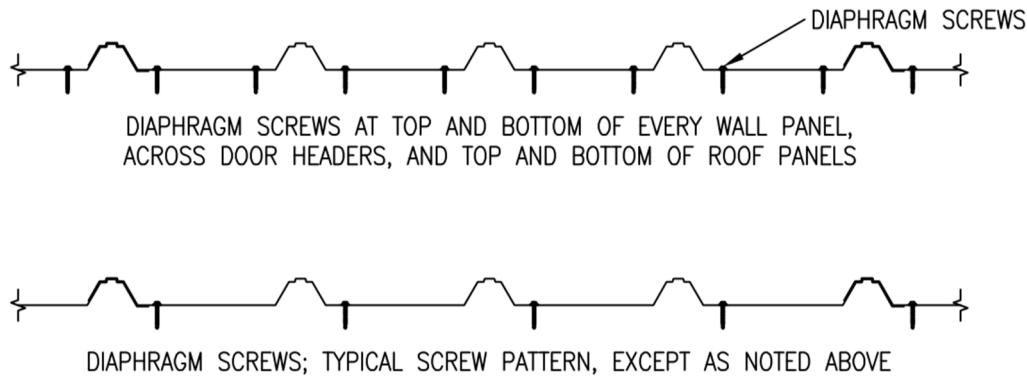


Figure 16-3: Steel Panel Screw Patterns

Use 1-1/2" long diaphragm screws at eave strut and ridge fully recessed purlin, installing one screw on EACH high rib side (unless instructions state otherwise).

If screws on each high rib side are used at any other locations, extra screws will be needed.

Use a diaphragm screw next to each high rib (one side only) on field fully recessed purlins. These will be 9" on center, with first screw next to overlap rib.

Installing Roof Steel

From a look's standpoint, recommendation is to install roof steel starting at rear endwall, working towards front (start steel at edge furthest away from home or street).



Tip: To maintain straight screw lines and avoid roof leaks, stack roof steel in a pile, mark screw locations (we've found a "dry erase white board" marker works well) and pre-drill steel sheets with a lesser diameter drill bit than screws. For best results, drill no more than four sheets at a time.

Attempting to drill through large steel sheet quantities may result in damage to panels and cost money to replace! 

Carefully remove any steel shavings caused by pre-drilling, from sheeting. Lift, do not drag, pre-drilled roof panels from stack (dragging will scratch paint surface).

Roof steel installation process is best done with two or more people. One person located at roof peak, standing safely on a ladder or scaffold inside building. Another person placed on building exterior at eave. An additional person on building interior on a ladder next to side wall is also helpful.

Distance from roof framing edge to first roof steel sheet edge is to be consistent from top to bottom. Otherwise, end wall is improperly aligned, straighten before roof steel can be properly applied.

CAUTION

First roof panel positioning is critical. This panel establishes alignment and layout for installation balance. Accurately position and square before fastening.

Starting at roof edge, hold first steel sheet “overlap” edge even with end truss top chord siding backing center. **See Figure 16-4**

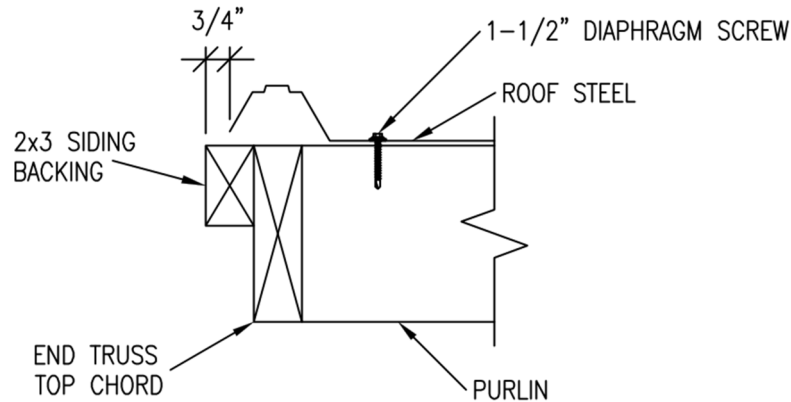


Figure 16-4: Roof Steel First Panel



It is ESSENTIAL to follow these sidewall steel overhang dimensions:

For buildings without extended sidewall overhangs, roof steel **MUST** extend past eave strut **ONLY** by 2-1/4" to 2-1/2". With sidewall overhangs refer to appropriate Chapter (50, 51, 54 or 55). **See Figure 16-5**

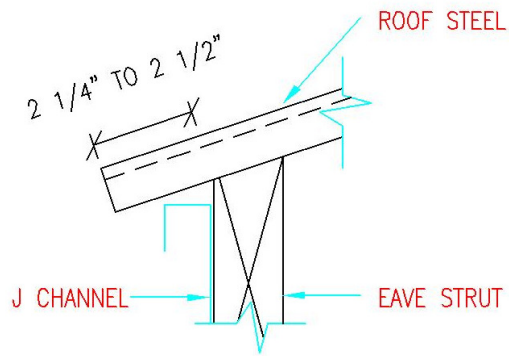
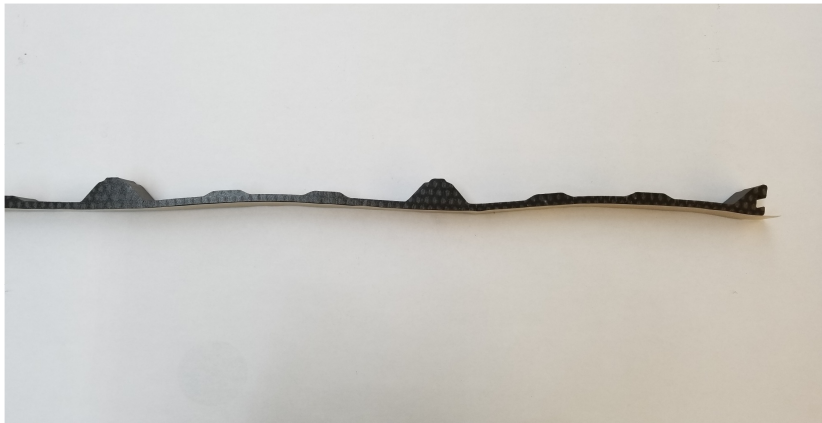


Figure 16-5: Roof Steel Overhang Lower Sidewall Edge

Failure to adhere to these dimensions *will* cause a plethora of problems, including one or more of these: water to either flow behind or to shoot over any future gutter tops and/or improper ridge cap fit.

Steel from each roof side will **not meet** at ridge line. Ridge cap covers this space. If done correctly, roof steel will end about 4" from truss peak. This means steel from each side will be about 8" apart. Steel overhanging eave strut IS crucial dimension, rather than space at ridge.

Once first roof steel panel is located correctly, carefully lift steel eave edge and place an inside foam closure, on eave strut top, aligning closure "fat" portion with roof steel rib undersides.



Inside Closure



Important hint – Inside closures stretch very easily, use a tape measure or place a mark along eave strut to keep coverage at exactly 36".

Once inside closure is placed person at panel bottom installs a screw, next to overlapping edge, into eave strut. These screws also go through Inside Foam Closure. Person at panel top then installs a screw, next to overlapping edge, into ridge fully recessed purlin. Install balance of screws working from overlapping edge across panel.

CAUTION

Failure to thoroughly screw off each steel panel, as installed, can result in panel damage, or removal from building, in a sudden high wind event. Flying steel panels can cause severe injuries or death.

Some steel manufacturers suggest “Roll Tape Sealant” or butyl sealant use between overlapping steel panels. Either are non-included options in a Hansen Pole Buildings Kit. Steel manufacturers and Hansen Pole Buildings advise these sealants are *nonessential* to most building’s adequate performance, unless roof slope is less than 3/12. In fact, any lap sealant use could cause overlapping steel panels to not fit securely or tightly against under-lapping panel. This will potentially cause leaks and overlaps not laying down smoothly can prove to be unsightly.

EXCEPTION: For roof slopes of LESS than 3:12 3/8” x 3/32” roll tape sealant is REQUIRED by Building Code to be installed between overlapping steel panels and will be included with your Hansen Pole Buildings kit.



Important hint – Keep panels from stretching or compressing in width as they are installed. Panels cover 36” from major rib center on one panel side to major rib center at other side of panel. Measure each panel as installed or pre-mark building frame every 36” to check panel width.

Why would this be important? If roof plane is square, endwall is straight and a 36” panel coverage is maintained, eave edges of each panel will come out straight. If eave edges begin to “stair step”, this is a sign one of these has occurred: roof plane out of square, eave strut boards are out of straight alignment, or each panel net coverage was other than exactly 36”.

Provided overall roof length is a three-foot multiple (plus 3” to allow for framing), upon roof plane completion, last panel should not require trimming. Should last panel extend more than 3/4” past roof framing end, rip panel lengthwise so cut edge falls no more than 3/4” outside roof framing edge.



If an ODD roof panel total number has been supplied, last roof panel cutoff edge, becomes starting panel for opposite roof side. Pre-drill screw holes in this panel, only AFTER it has been ripped lengthwise. Failure to follow these instructions will result in needing to purchase an extra roof steel panel.

CAUTION

Important! Keep traffic over installed system to a minimum. Damp, wet or frosty steel will be extremely slick.

When standing or walking on previously installed panels is unavoidable, do so carefully to avoid damage to roofing or personal injury. Safest practice is to stand directly on screw tops, as they create a “traction” point.

Avoid attempting to stand on steel high ribs, as this will damage panels. Weight is to be kept evenly distributed over both feet soles to avoid concentrating weight on either heels or toes. Wear smooth soft-rubber soled shoes, as ribbed soles may pick up and hold small stones,

swarf and other objects. These could scuff or damage steel. When walking on wet or newly laid sheets, take particular care, especially on steeply pitched roofs.

Oops, Missed!



As roof steel panels were predrilled, if a screw (or screws) misses a purlin, remove errant screw, plus screws within three or four feet along each side of miss (along same purlin). From inside building, have someone push purlin either “uphill” or “downhill” until screw(s) can be driven through each hole into purlin.

If a “random miss” occurs, repair is to have someone hold a wood block underneath hole and drive a screw through hole into block. This is manufacturer’s only approved repair for a missed screw.

Do **NOT**, under any circumstance, attempt to fix a missed screw hole with caulking.

Snow Retention Systems

In snow country, it may be beneficial to have snow retained on steel roofs, rather than sliding down in front of eave side doors and openings. To utilize these systems, your building must be engineered to NOT take advantage of reductions for snow sliding off slippery roofs. Snow retention trims run parallel with building eave side. With sidewall overhangs, install ‘downhill’ screws into eave strut, without overhangs, move uphill to next purlin. **See Figure 16-6**

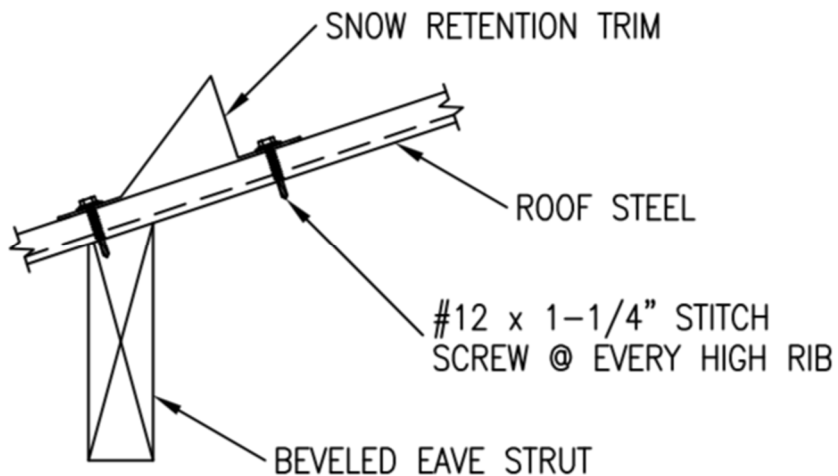


Figure 16-6: Snow Retention Trim

