SUNWARD
STEEL BUILDINGS

BUILDING ERECTION MANUAL

INTERNATIONAL ACCREDITATION SERVICE®

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INTRODUCTION

THE MANUFACTURER'S ERECTION DRAWINGS AND ERECTION MANUAL SUGGEST THE SEQUENCE OF THE ERECTION AND APPROPRIATE CONNECTION OF THE METAL BUILDING COMPONENTS. THE ERECTION DRAWINGS ARE NOT INTENDED TO SPECIFY ANY PARTICULAR METHOD OF ERECTION TO BE FOLLOWED BY THE ERECTOR.

THE ERECTOR REMAINS SOLELY RESPONSIBLE FOR THE SAFETY AND APPROPRIATENESS OF ALL TECHNIQUES AND METHODS UTILIZED BY ITS CRES IN THE REECTION OF THE METAL BUILDING SYSTEM. THE ERECTOR IS ALSO RESPONSIBLE FOR SUPPLYING ANY SAFETY DEVICES, SUCH AS SCAFFOLDS, RUNWAYS, NETS, ETC. WHICH MAY BE REQUIRED TO SAFELY ERECT THE METAL BUIDLING SYSTEM. THE OSHA MAUNAL "SAFETY STANDARD FOR STEEL ERECTION 66:5317-5325" AND THE METAL BUILDING MANUFACTURERES ASSOCIATION MANUAL ARE TO BE UTILIZED BY ALL PARTIES INVOLVED IN CONSTRUCITON OF A BULDING PROJECT.

This Building Manual was prepared with the thought of the Final Owner acting as an over-seer of the building construction, either hiring an Erector or a do-it-yourself approach. This manual in not intended for use with a complex building or a building using materials other than steel components supplied by the Manufacturer. To erect a building and/or prepare a concrete foundation, one should have considerable construction experience, a good working knowledge of the tools and equipment required and be in good physical condition. Certain parts of erecting a building and preparing a foundation are easy, while other parts are complicated and even dangerous. Keep in mind your own abilities and the areas of construction you do not feel comfortable with and have a professional or experienced person complete them.

CAREFULLY CHOOSE YOUR ERECTOR AND INSPECT THE ERECTORS WORK

This guideline is not deemed as complete. It is provided as a basic tool to understand the erection process. The building's Final Owner is ultimately responsible for an approved and complete building project.

Obtain a Permit and Estimate for the Erection of your Building

Building Permits

It is the Final Owner's responsibility to be in compliance with the local building authority's requirements and obtain all the necessary plans and specifications required to obtain a building permit. The Manufacturer is only responsible for the structural design of the metal building as defined on the Manufacturer's verification of the purchase order or the Manufacturer's contract. The Manufacturer's Engineer is not the Engineer of record for the construction project.

Permit Drawings

The permit drawings, including field drilling holes, cutting girts, and cutting sheeting for walkdoor and window framed openings, are provided by the Manufacturer, and give the Erector adequate information to prepare an estimate on the erection of the building. The Final Owner will provide a list of components such as doors, windows, insulation, etc. to be included in the estimate.

- Required field work is noted or detailed in the drawings.
- Foundation design drawings (NOT provided by the Manufacturer) will provide the proper information for an estimate on a concrete foundation.

Written Estimate

To protect yourself from incomplete work and unforeseen expenses, a written estimate assigning and describing the construction project processes, time schedule, and cost, such as (but not limited to) site preparation, foundation and slab, steel erection and electrical, etc. should be generated and agreed upon by the parties involved in the construction.

Choosing an Erector

A qualified, experienced Erector should naturally be the best choice for obtaining a finished product to meet or exceed your needs for many years to come. Request and contact references from Erector's past projects. Ask about workmanship, timeliness, and satisfaction. Check the Erector's availability to start and stay until completion. The Erector should be properly insured for liability, accidents, or injury.

Final Owner's Insurance

It is especially important the Final Owner carry insurance for the duration of the construction project, such as: Comprehensive General Liability, Comprehensive Automobile Liability and Builder's Risk.

YOU MAY CHOOSE TO ERECT THE BUILDING YOURSELF; MANY PEOPLE DO.

Inspect the Erectors work Before and During Construction

Anchor Bolt Settings

Anchor bolts shall be set in strict accordance with the Manufacturer's anchor bolt plan. Correct improper anchor bolt placement. Setting columns on anchor bolts which have been set incorrectly will not allow the rest of the building to bolt together properly. These issues are resolved in many ways, Manufacturer's customer service and your Foundation Engineer should be contacted prior to making any modifications due to improper placement.

Construction Drawings and Shipping List

The Erector is provided with "For Construction" drawings and a shipping list (Bill of Materials) by the truck driver at time of delivery of building components. Do not use "Permit Drawings" for construction, and Manufacturer is not liable for any claims resulting from usage of any drawings not specifically released for construction on the project.

Details to Pay Attention To

The list below is provided as a basic tool and is not limited by its contents, to be used during the erection of the building:

- Are cable braces tight (not sagging or loose)?
- Is there proper ridge cap placement?
- From inside the building, do you see sunlight at panel or ridge cap laps?
- Has roof, gutter, and trim ledges been swept clean of all drill shavings?
- Is there proper panel closure placement?
- Is trim level or plumb and fastened to the building or building panel?
- Are framed openings trimmed properly?
- Are screws set properly?
- Are trim pieces overlapped and riveted together?
- Do a random bolt inspection to detect loose connections
- Has touch up paint been used to cover scratches and scrapes?
- Insulation should not be exposed to weather at panel edges or openings
- Test gutter and downspout for leaks
- Are parts or components left on the ground and not installed? Why?
- Is clean up around the building complete? No dropped screws or sharp objects visible
- Is finish grade sloped properly for water drainage away from building?
- Are concrete approaches sloping properly for water drainage away from openings?

PREPARE A LIST OF ITEMS FOR YOUR ERECTOR TO CORRECT AND REPAIR

Building Department Inspections

Building Departments may require bolting or structural inspections. A local Engineer can provide these at your expense or can be provided by the Manufacturer upon request at an additional cost not included in your building's purchase price.

The building Manufacturer only provides assistance and service on the products it manufactures. Determining errors which are unacceptable or have caused damage will require the cooperation of all parties involved in your building project. Be sure to document the names and contact information of all parties involved, along with a description of work to be completed. Our experienced, factory trained customer service representatives are available during normal business hours to assist you at (701) 252-7380.

Materials Not Provided by the Building Manufacturer

The following items are not provided by the building Manufacturer. This list is not limited to its contents.

- Building erection
- ** Foundation design, foundation materials, any item embedded in concrete
- Electrical equipment or mechanical equipment
- Anchor bolts, anchor bolt templates, or leveling plates
- Flashing or counterflashing to structures by others
- Interior downspouts or drains
- Fire protection designs, materials, or systems
- Any item not listed as included on the verification of the purchase order or contract, or not included with the building components

***** NOTE: Foundation design may be provided by the Manufacturer with limited buildings, if noted as included on the Manufacturer's verification of the purchase order. Foundation inspections are not included***.

Building Concrete Foundation General Information

Only the Anchor Bolt Plan marked “For Construction” is to be used for foundation design and anchor bolt placement. Anchor bolts marked “Not for Construction,” or unmarked anchor bolts should not be used.

Foundation Design

Foundation design and construction are important steps in the building process. The Contractor and/or Final Owner is ultimately responsible for the adequacy and quality of the foundation. It is essential the building foundation be professionally designed by a professional Engineer in accordance with your local city, county, or state building code. The building Manufacturer cannot be held responsible for any damage or repairs to the building due to the use of an improper foundation.

Anchor Bolt Plan

The Anchor Bolt Plan provides the location, quantity, projection, and diameter of the anchor bolts required for the building. Reactions (or loads imposed by the building foundation) are shown. Typically, the Foundation Engineer provides specific details for the anchor bolts length (embedment). The building column base plates are prepared to match the bolt diameter and hotel pattern as specified by the building Manufacturer’s “For Construction” Anchor Bolt Plan. Any pre-existing foundation plan must be adjusted to fit the Manufacturer’s anchor bolt pattern and placement.

Dimension Tolerances

The top of the floor or foundation must be square, level, and smooth. Anchor bolts must be accurately set to a tolerance of 1/16” within the group spacing for an individual column. All other dimensions shall be within 1/8” (+/-). Maintain the projection of the anchor bolts above the floor surface as shown on the plans.

Embedded Items

**All items embedded (cast in place) in the concrete or masonry, along with the anchor bolt templates and leveling plates are to be designed and provided by others.

Anchor Bolts

All anchor bolts should be specified as ASTM A307 or F1554 Gr. 36 Rod to conform with the building Manufacturer’s design.

Epoxy or Expansion Anchors

Typical building design is for cast-in-place anchor bolts, which conform to the Manufacturer’s “For Construction” Anchor Bolt Plan. Special base plate sizes and hole patterns may be required if epoxy or expansion anchors are used. Epoxy or expansion anchor designs are not provided by the building Manufacturer. If details are provided, base plates can be manufactured to accommodate epoxy or expansion design.

Using Existing Concrete Slabs

If you are using an existing concrete slab, the adequacy and modification of it must be determined by your local Engineer. It is recommended that new cast-in-place anchor bolts and concrete be incorporated to accommodate the new column locations.

Ensure Slab is Elevated

Ensure the slab/foundation is elevated above the adjacent grade. It is important to avoid having the wall sheeting or trim in contact with any soil. Refer to “Base Trim Section.” Failure to do so will VOID your Panel/Trim Warranty.

***** NOTE: Foundation Design may be provided by the Manufacturer with limited buildings, if noted as included on the Manufacturer’s verification of the purchase order. Foundation inspections are not included***.

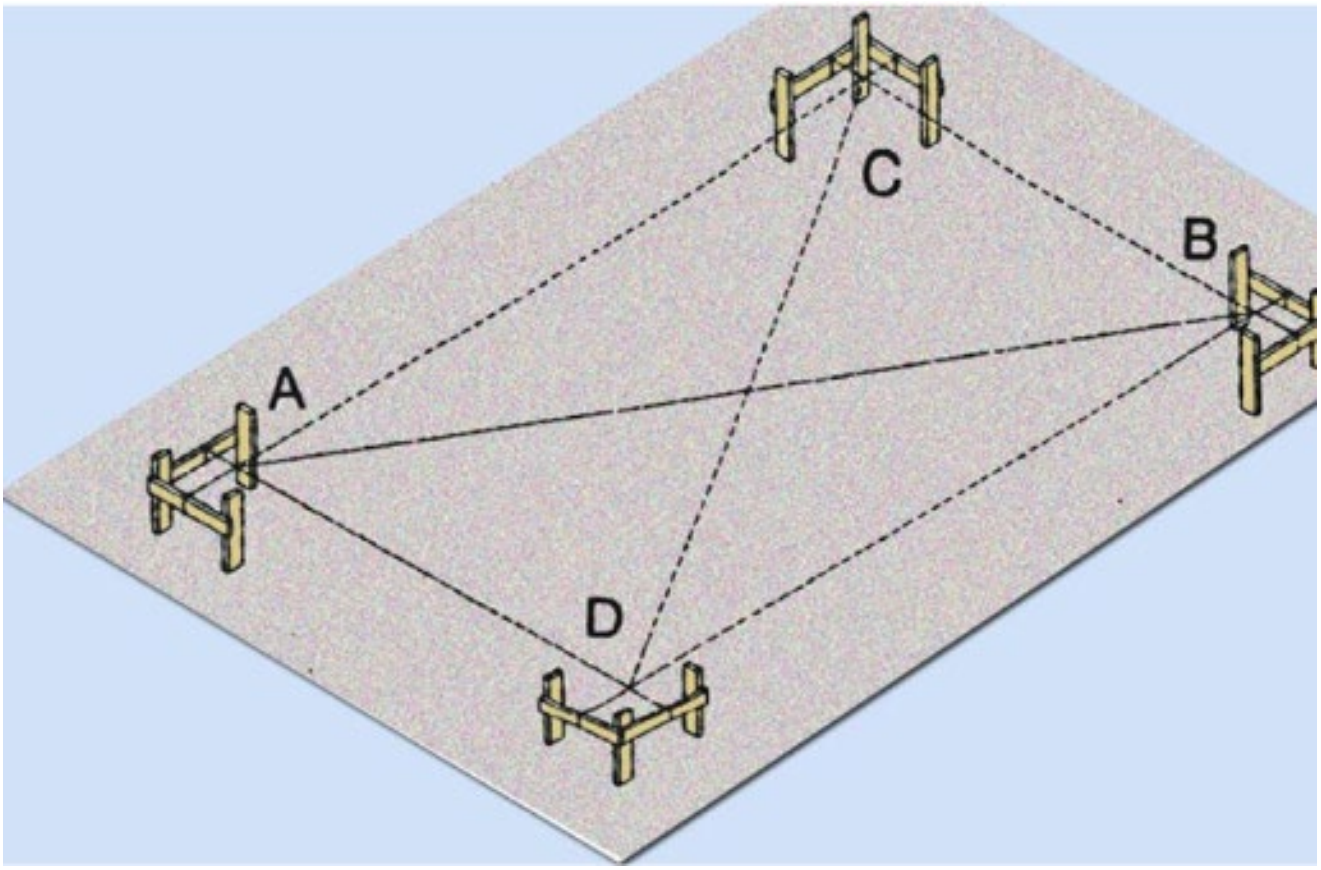
Squaring Forms and Setting Anchor Bolts

Squaring the Forms

Your building is manufactured to close tolerances and therefore requires a square and level foundation. Several methods may be used to achieve this.

Whenever possible, use a transit or similar instrument to layout the foundation perimeter, insuring a square foundation.

Using steel measuring tapes and the Diagonal Method will suffice on small projects. See Illustration:

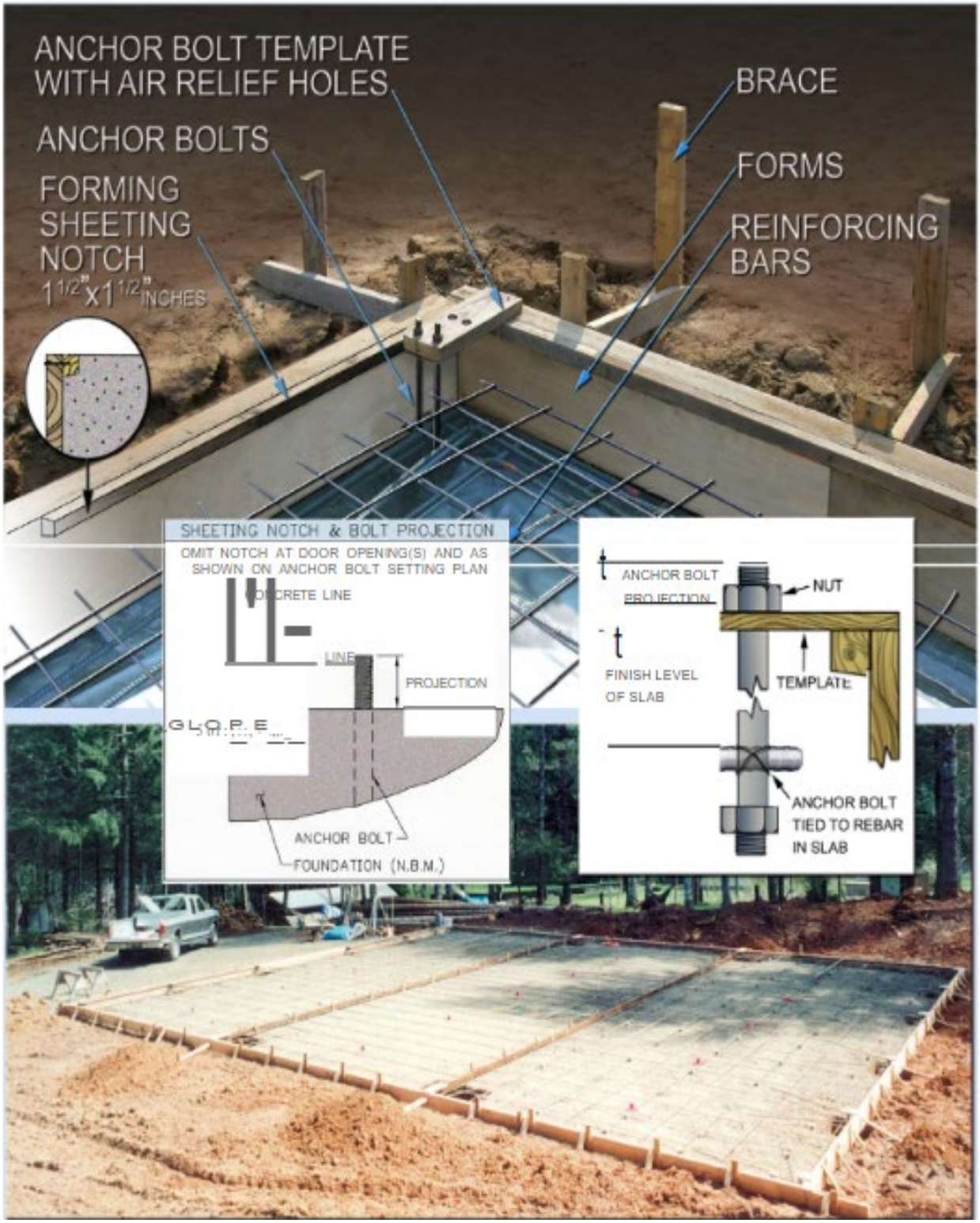


For the greatest accuracy, measure the diagonal and adjust the string lines until the two diagonal dimensions are equal. If length AB=CD, the foundation will be square (In addition, AD=CB and AC=BD).

Regardless of the type of foundation used and its specific configuration, the foundation outline should be carefully and accurately laid out before any excavation is made.

Anchor Bolt Templates

Anchor bolts should be held plumb with the template at the top, which is fastened to the formwork. The bottom of the anchor bolt is tied to the slabs reinforcing steel. Templates are prepared in advance along with the formwork. The templates should have air relief holes drilled in, allowing trapped air to escape. Vibrating the concrete assures trapped air is forced out as the wet concrete rises to the top of the relief holes. See illustration:



Tools and Equipment Required

Checklist:

- ✓ Personal Safety Equipment (Hard hat, Goggles, etc.)
- ✓ Electric power source, power cords
- ✓ Impact wrench
- ✓ Plumb line
- ✓ Level (short levels will not show an out of plum condition, use of a plum line is recommended)
- ✓ Vise grips and large C-clamps
- ✓ Drift pins or punches
- ✓ Hoisting equipment, Spreader bars
- ✓ Come-along
- ✓ Taglines, chain, or cables with chokers
- ✓ Ladders, Scaffolding or Man-lifts
- ✓ Steel Shims (flat steel plates or various thickness or washers)
- ✓ Padded C-clamps
- ✓ Electric nibbler or shear
- ✓ Steel cutting saw
- ✓ Rope or cable temporary bracing
- ✓ Box wrench, open end wrench and sockets from ½" to 2"
- ✓ Screw gun socket drivers sizes 5/16" and 3/8"
- ✓ Power actuated nail gun
- ✓ Concrete drill with masonry bits
- ✓ Steel measuring tapes 25' and 100' long
- ✓ Heavy duty drill and bit set
- ✓ Chalk line
- ✓ Abrasive blade saw
- ✓ Torch
- ✓ 4x4 blocking 4' long (to store materials off the ground)
- ✓ Large tarps (to protect stored materials from rain)

Inventory, Handling and Storage

"For Construction Drawings" are delivered with the building components. The Shipping List (Bill of Materials) provided with the drawings list the quantity, piece marks, part names and descriptions of the building components, along with various part lengths. This list corresponds with the drawings.

Inventory

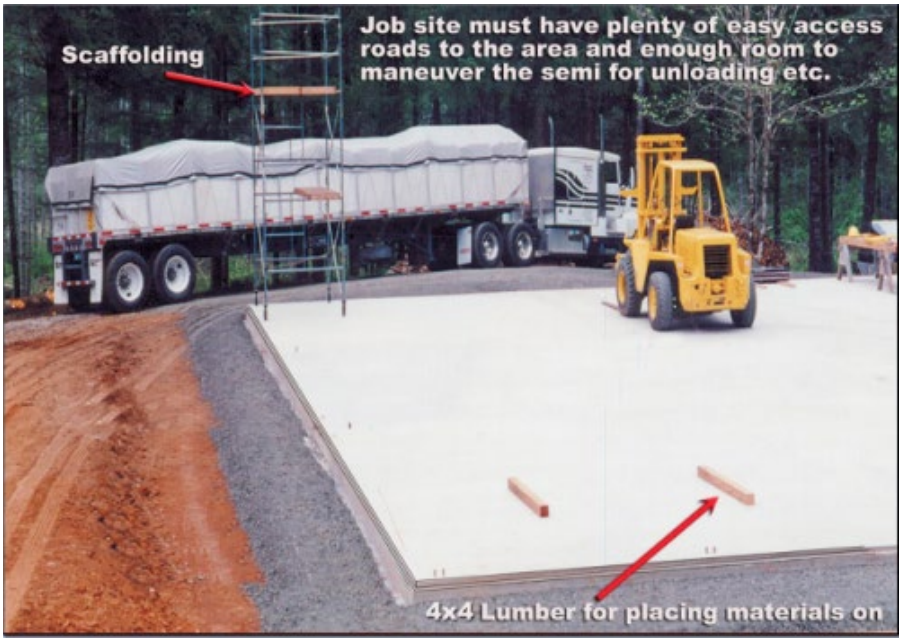
It is especially important to inventory the building parts as they are removed from the truck using the Shipping List. Smaller parts (bolts and screws) are boxed and bagged with labels for inventory. The Manufacturer or the Carrier is not responsible for material shortages or visible damage that not reported at the time of delivery. All shortages or damages must be noted on the Shipping Bill of Lading and acknowledged in writing by the Carrier's agent.

Handling

Building Components are Susceptible to Damage During Unloading. Do not lift long bundles or pieces from one end, this places the weight of the piece or bundle on the other end, which can cause buckling or bending. Lifting long pieces or bundles should be done with proper equipment and professional equipment operators.

Storage

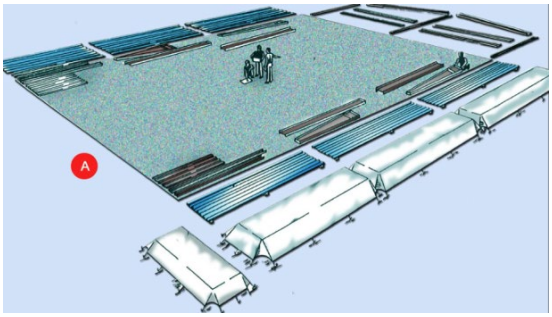
Framing that is not erected should be kept off the ground and placed as to not hold water or accumulate dirt and debris. Unprotected framing can lead to poor assembly, corrosion, and an unsightly finished product. Repairs of damage to the building components, or the removal of foreign matter due to improper storage or site conditions, are not the responsibility of the Manufacturer.

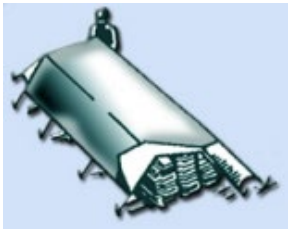


Layout and Erecting the Frame

Identifying Framing, Hardware, Angles, Sheeting and Trim

Identify the main frame I-beam columns and rafters by using the piece marks and coordinate each piece's location at the frame lines using the Elevation Drawings. Identify roof main frame rafters using the Roof Framing Plan and place near the point at which they will be lifted. *See Illustration A*





Identify boxes and bags containing bolts, clips, and cable bracing. Keep bolts and screws together (as boxed or bagged) until you are ready to use them. *See Illustration B*

Galvanized angles can be set aside along with the sheeting and trim packages. Place bundles on blocking off the ground and keep covered and protected from moisture, weather, or damage until they are ready for use. Allow air to circulate around bundles and keep one end higher than the other for water to run off. Store in a place away from construction traffic.

If the sheeting or trim should get wet, inspect for moisture, and dry each piece during re-stacking. Do not allow panel or trim to remain loose. Wind can pick up, create a danger to people and damage the panel.

Note: Temperature sensitive materials are included.

Pre-Assembly on the Main Frames

Eave Strut Clips and Flange Bracing

Attach eave strut clips to the columns prior to erecting them. Attach Flange braces (attaches to wall girt and roof purlins) to the main frame columns and rafters prior to erecting them. *See Illustrations.*

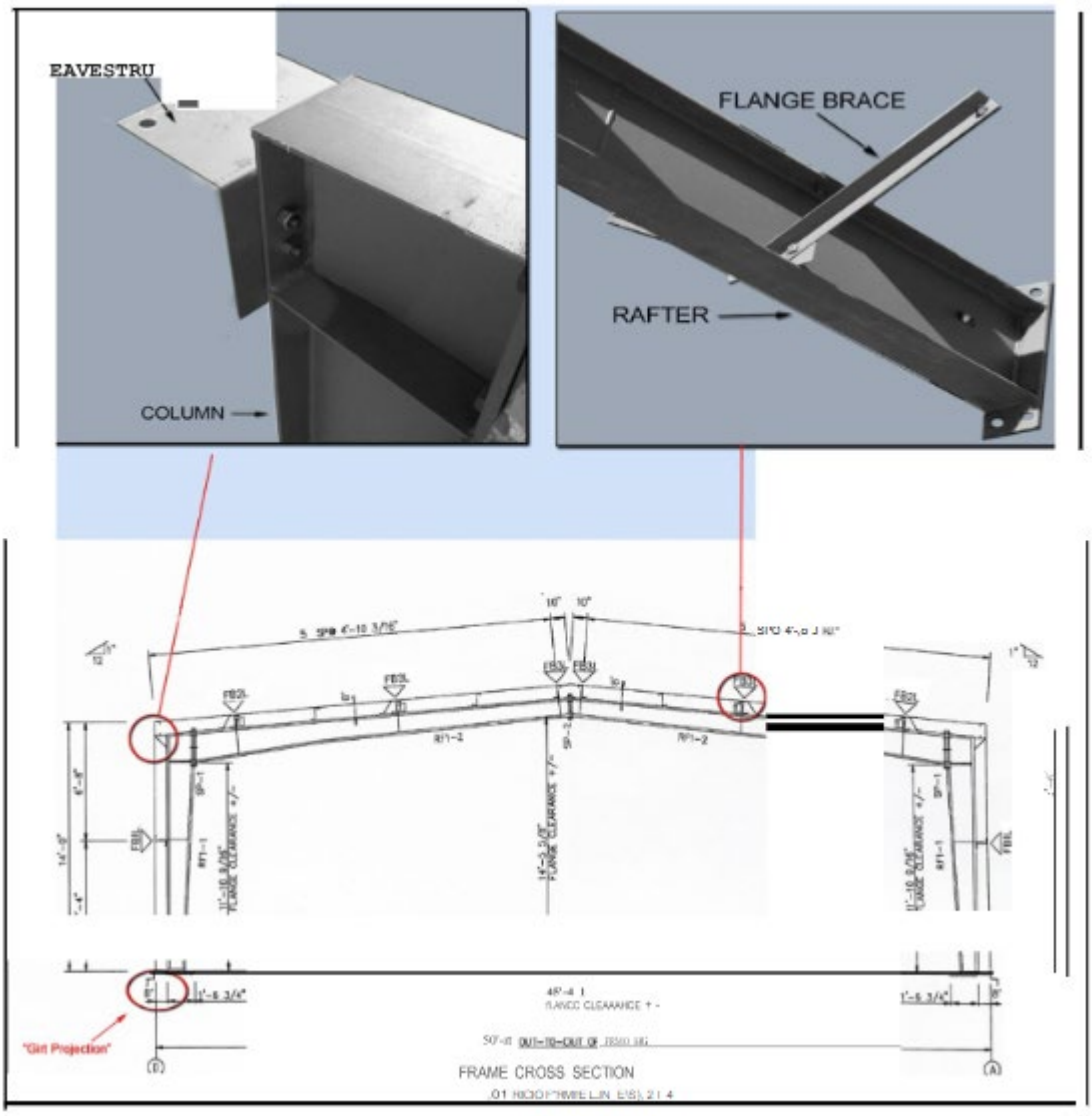
The Frame Cross Section in the Construction Drawing specifies flange brace locations at girt or purlin locations. The connection bolts for the main frame rafter to column connection are also shown. *See example of Erection Drawing of Frame Cross Section illustration.*

SPLICE PLATE & BOLT TABLE

Mark	Qty Top	Bot	Int	Type	Dia	Length	Width	Thick	Length
SP-1	4	4	4	A.325	7/8"	2 .3/4"	6"	5/8"	.3'-0 7/8"
SP-2	4	4	2	A.325	3/4"	2"	6"	1/2"	2'-6 11/16"

FLANGE BRACES: BOTH SIDES (U.N.) OR
PIECE MARK FOLLOWED BY (1)= 1 SIDE ONLY

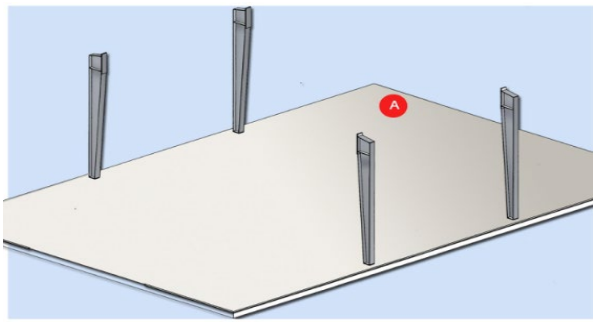
FBxL= 1 1/2"x 1 1/2"x 1/8" H.R. ANGLE
FBxH=2 1/2"x2 1/2"x3/16" H.R ANGLE



Erecting the Main Frames

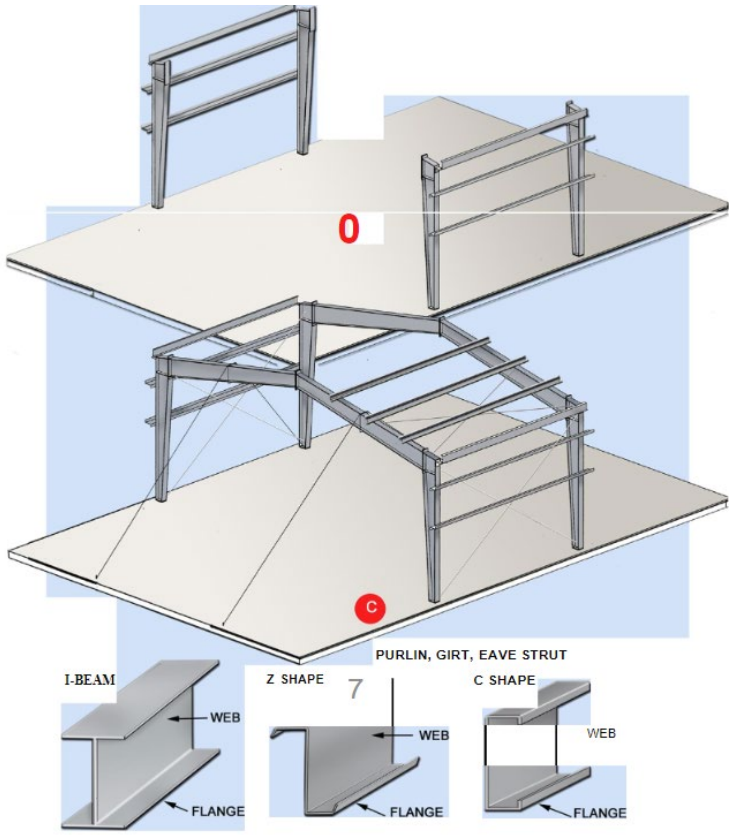
Setting the First Bay

Begin by erecting the columns of an interior bay, preferably a bay with cable bracing (no windows or doors). Set the columns over the anchor bolts and check columns for plumb. Use shims under the base plates for uneven concrete. Turn the nuts down on the anchor bolts to secure the columns allowing for slight movement for adjustment. Use temporary guys or bracing such as chains or ropes to secure columns as they are erected. After standing the adjacent column, wall girts and eave struts are attached to the columns for stability. Lift the rafters in line with the columns and bolt them together. Install and tighten all bolts in the column to rafter connection before releasing hoisting equipment. *See illustration A*.



Temporary Bracing

The Erector will provide temporary guys and bracing where needed for squaring, plumbing, and securing the exposed structural framing against loads, including wind, seismic forces, erection equipment and erection operation loads, but excluding loads resulting from the performance of work by others. Do not assume bracing provided by the Manufacturer for the metal building is adequate during erection. Remove temporary bracing upon completion of erection. *See illustrations B, and C.*



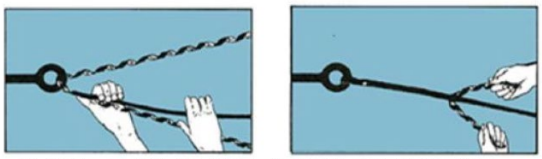
Sorting Girts, Purlins, and Eave Struts

Sort and identify girts and purlins (usually a Z shape) and eave struts (C shape) and place near the sidewall or endwall at which they will be used. Each girt, purlin, and eave strut is piece marked. Coordinate locations using piece marks from Elevations and Roof Framing Plan. *See Illustration.*

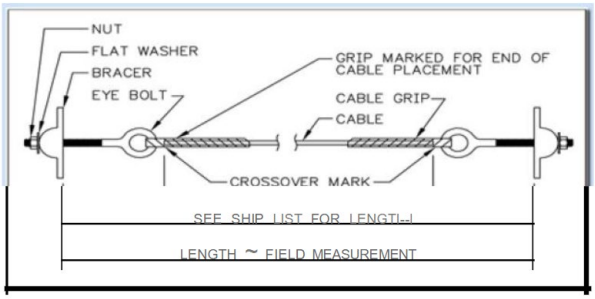
Illustration above shows a bay under construction. The cable bracing on the sidewall has been highlighted to better show the detail.

Prepare Cable Bracing

Prepare the cable bracing by applying the brace grips and pre-assembling the hardware. Place the cables between the erected frames for stability and squaring. **Do not leave frames standing without cable bracing, as wind can cause severe damage.** Plumb and square the framework by shimming and adjusting the tension of the cable bracing.

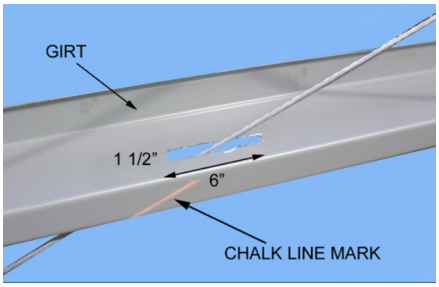


CABLE BRACE APPLICATION
Insert one leg through the eye.
crossover as shown



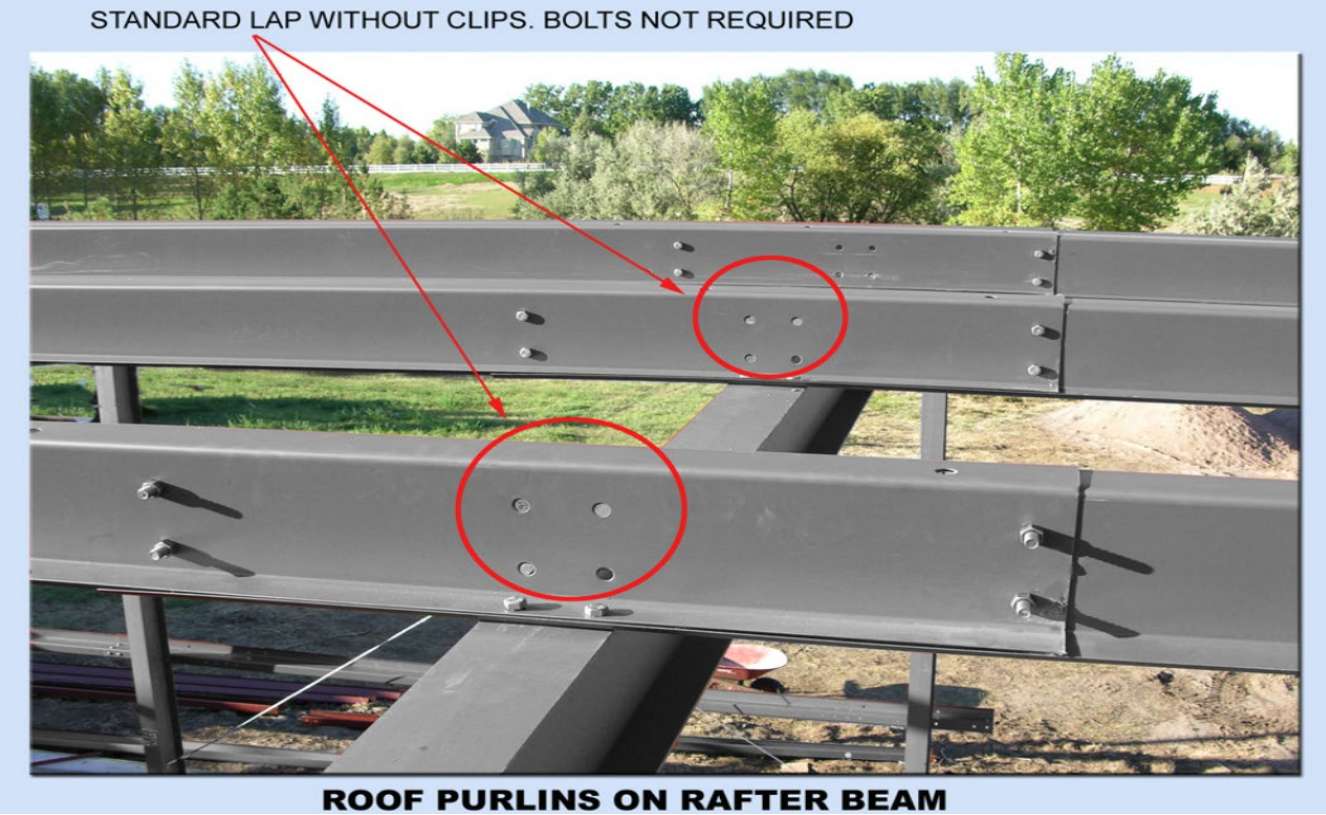
Field Locating and Cutting Cable Slot

Girts in the braced bay that are flush either on sidewall or endwall, require a slot to be field located to allow cable or rod bracing to pass through. The slot should not exceed 1 ½" wide or 6" long. Use a saw or torch to cut the slot. With all the girts erected in the bay with the cable or bracing, hook a chalk string line to the slots in the columns as you would the bracing itself and mark the inside of the first where the string crosses it. Mark the center of the slot. The size of the slot should allow the bracing to move feely when adjusted and tightened. *See illustration.*



Girt and Purlin Laps

Attach roof purlins as the rafters are placed. Follow girt and purlin overlap details carefully, measure and mark the holes on the purlins and girts used on your building. Purlins and girts are typically punched for various conditions that may not apply to your building, using the wrong set of holes will set the building out of square and out of plumb. Wall girts are typically toed-up (except base girts, which are toed-down).



Square and Plumb the Erected Bay

Square Interior Bay

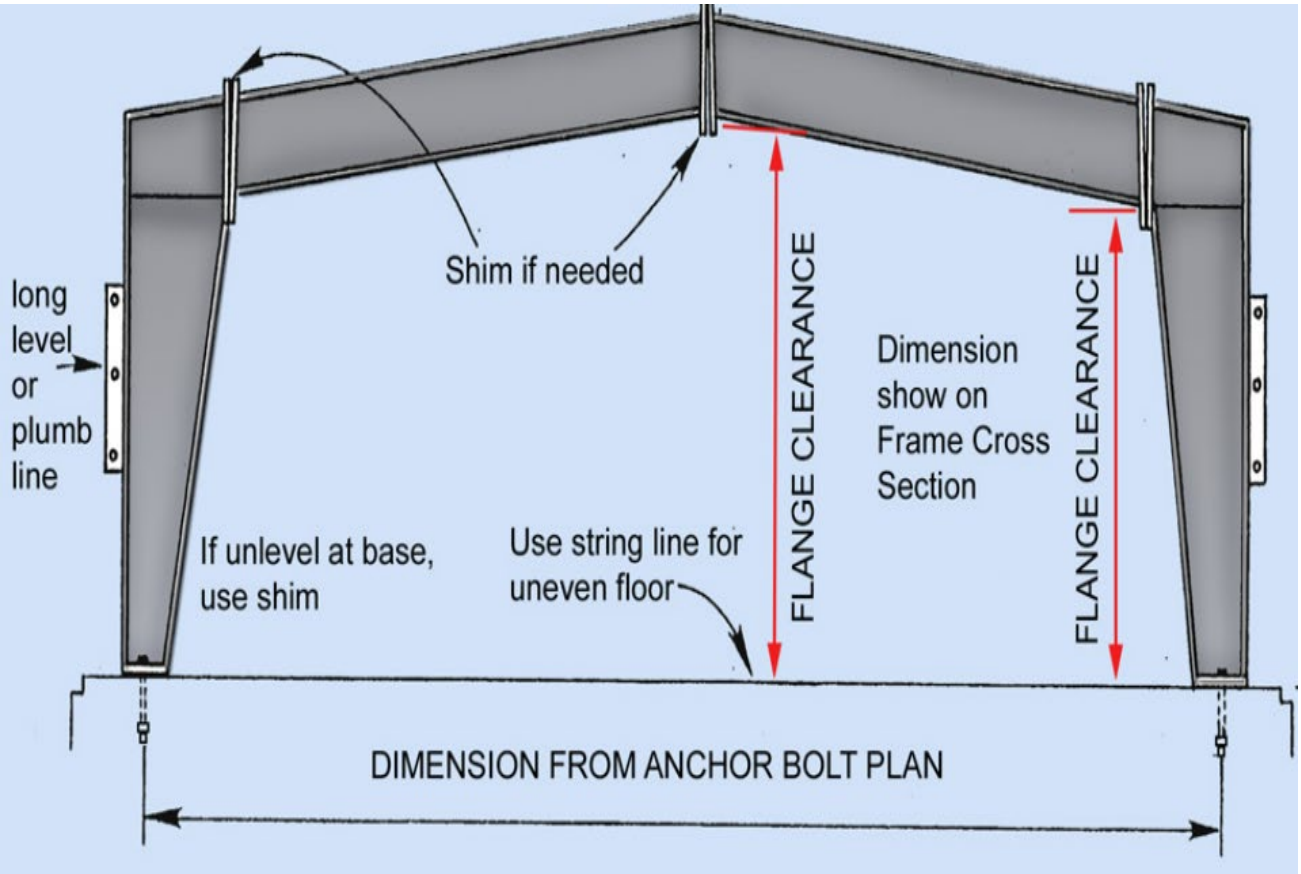
Squaring the erected interior bay and building from that bay makes squaring the entire building easier in the end.

Plumb the Columns

If the columns are not plumb, obstructions under the base plate of the column or improper placement of the anchor bolts are the most common reasons. Clean away all debris and allow the column to set flush on the concrete. Torque the anchor bolts tight and check for plumb. Concrete which was set up unevenly requires steel shims under the column. Place a non-shrinking grout under the based plates for a uniform bearing surface.

Achieve the Best Results

To achieve the best results: Before measuring, be sure the columns are plumb, and the top of the eave strut is level. If the eave strut is not level (due to uneven concrete), shim under the base plate of the columns to bring the eave strut level, using a long level or plumb line. Short levels will not reveal an out-of-plumb or level condition. Measure from the centerline of the column's bottom side of the base plate to the adjacent column's centerline marked on the top of the column. Repeat the opposite procedure (measure two lines forming an X). If the dimensions match or are remarkably close, the framing is square. *See Illustration.*



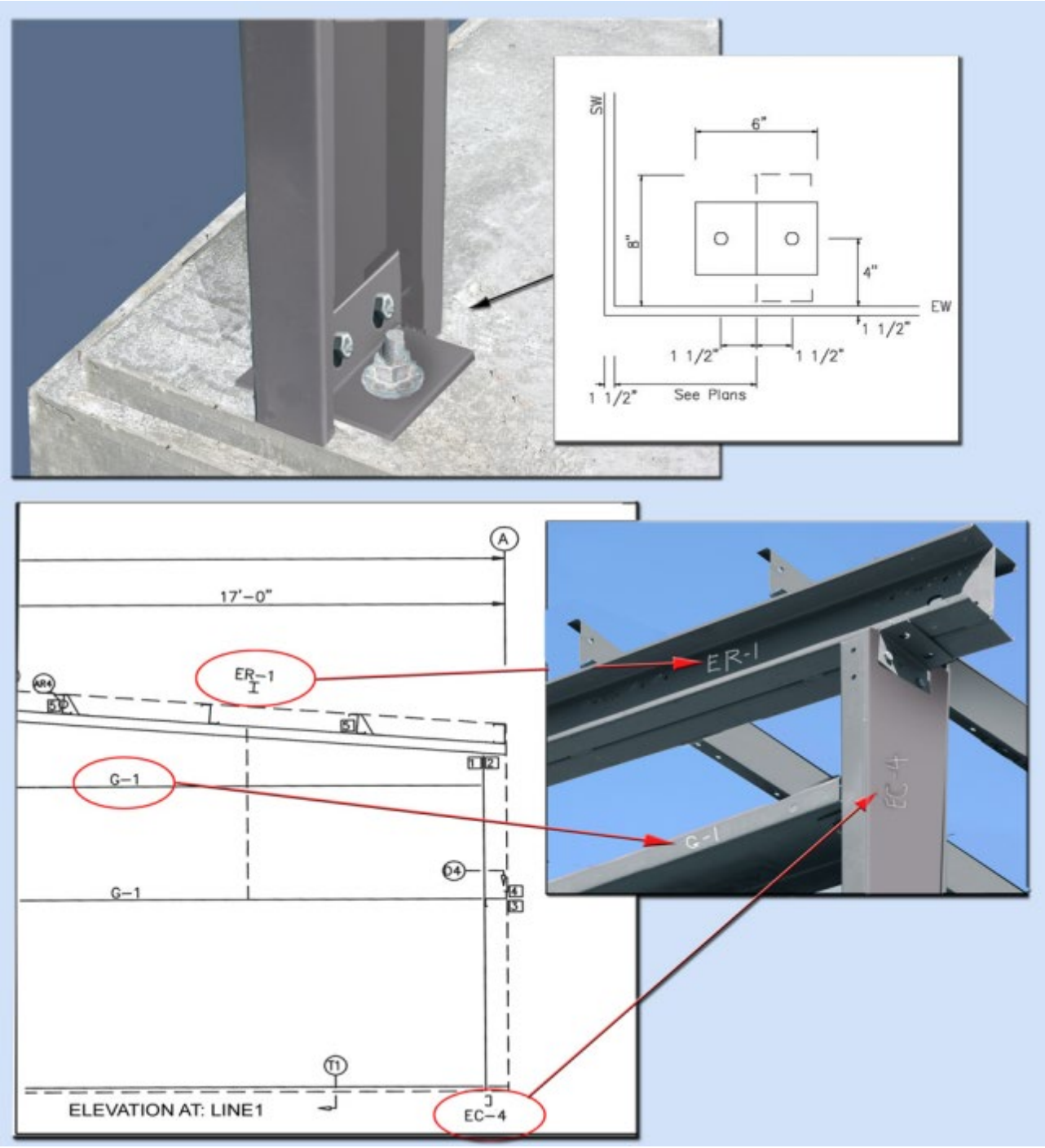
Correction of Errors and Repairs

The correction of minor misfits by use of drift pins to draw the components into line, shimming, and moderate amounts of reaming, chipping, and cutting, and the replacement of minor shortages of material are a normal part of erection and are not subject to claim. Approval to make corrections to components supplied incorrectly by the Manufacturer must be made prior to work being performed. The Project Consultant and/or consultant is not authorized to bind the Manufacturer to financial issues or design change. **PLEASE CONTACT CUSTOMER SERVICE AT (702) 252-7380.**

Erecting the Endwall Frames

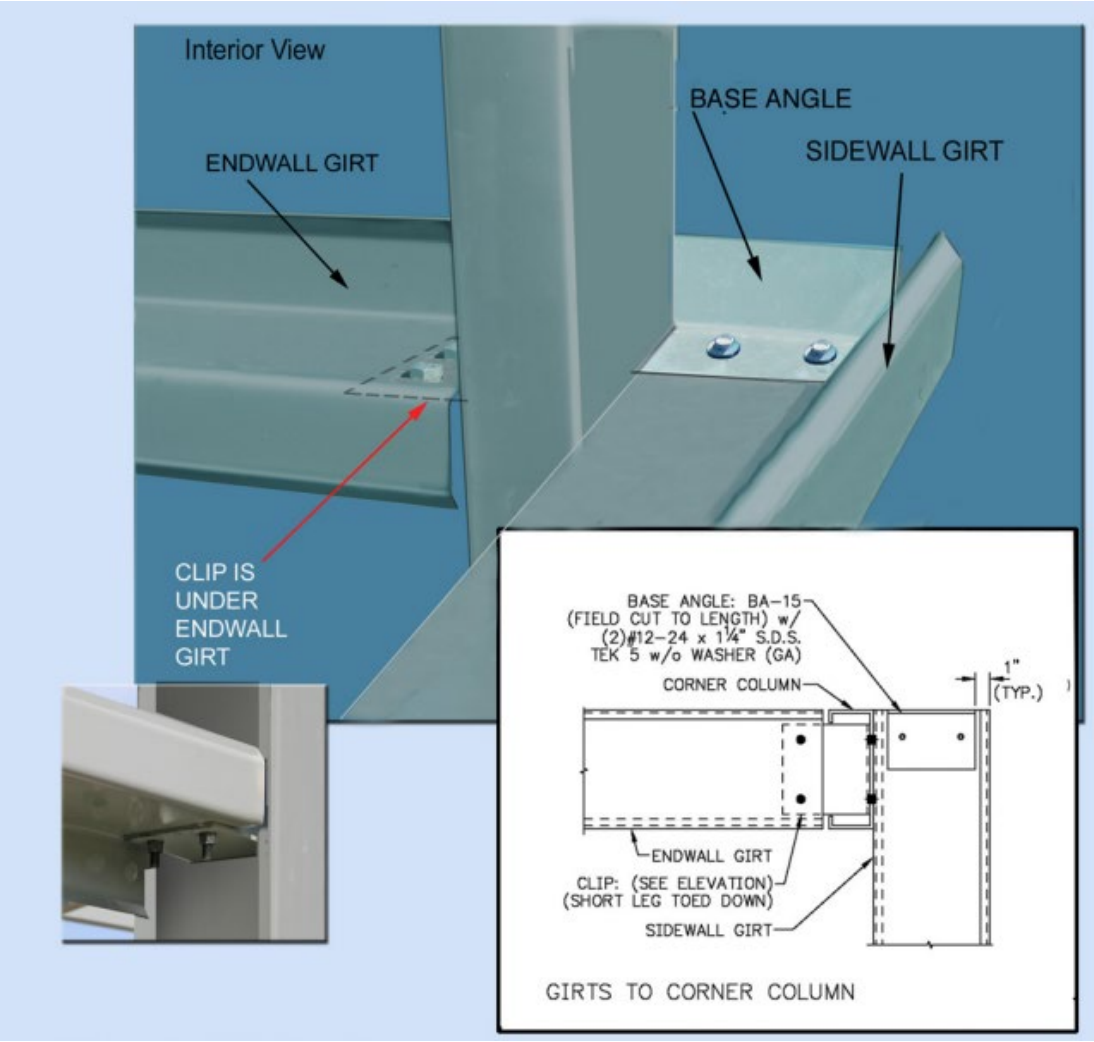
Endwall Layout and Erecting

Lay out endwall columns and rafters along with endwall girts as they appear on the Elevation Drawings. Keep in mind the drawings view the building as if you are standing on the outside of the building. Endwall columns and rafters can be made of C shapes, back-to-back C or even I-beam. It is important to turn or toe the C endwall columns in the direction as they are shown on the Anchor Bolt Plan. Set the endwall columns over the anchor bolts, plumb the columns, and tighten the anchor bolts. Lift the rafters into place and bolt them to the columns. Then bolt the endwall girts (place cable bracing if required). *See Illustration*



Clips and Brackets

Clips and brackets are used to connect the girts to the columns, the eave strut to endwall rafter, and endwall columns to endwall rafters. Using the enwall framing details, attach these clips to the columns/rafters prior to erecting the endwalls. *See Illustration.*



Square the Entire Building

Measure from the top left corner steel line to opposite end bottom right corner steel line. Then complete the opposite to make sure dimensions match. Do this to all 4 sides. Check all columns for plumb using a long level or plumb line. **Square the building as best as possible, this will pay off when it comes time to sheet the building.**

Bolt Inspection

Conduct a final inspection and tighten all bolts. **Make sure the proper number of bolts are installed at each connection.**

Nut Tightening

Turn of the Nut Method: There should be enough bolts in a snug tight condition to ensure the parts of the joint are in good contact with each other. Snug tight is defined as the tightness at the low-impact setting of an impact wrench or the full effect of a man using an ordinary spud wrench. All nuts are to be turned an additional 1/3 of a turn to produce minimum allowed tension.

Walkdoor and Window Framed Openings

Field Locating Sub-Jambs, Headers and Sills, and Field Cutting Girts

Be sure to verify the exact location of the windows and walkdoor openings before modifying the building girts. Refer to Erection Drawings for walkdoor and window details.

Sub jams, headers, and sills (C shapes) for walkdoors and windows are prepared by the factory for use with the building wall girt spacing. Headers may or may not be required on all walkdoors. Windows typically have a header (top) and sill (bottom).

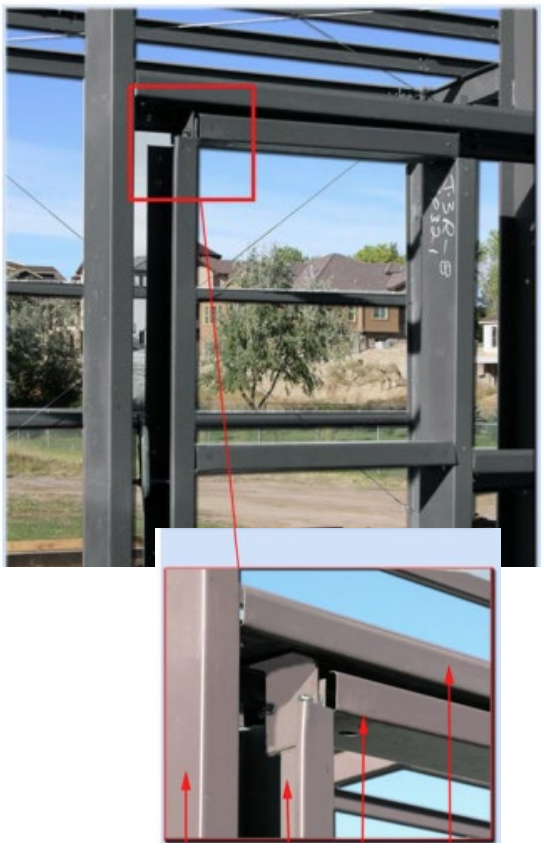
The window sub-jambs are factory drilled for the bolting of the header and sill. Window headers are 7’ above floor level, matching the tops of the walkdoors.

Welded clips at the top of the sub-jambs will bolt to a girt. The girt must be field drilled to attach to the sub-jamb (2- 9/16” diameter holes per jamb.

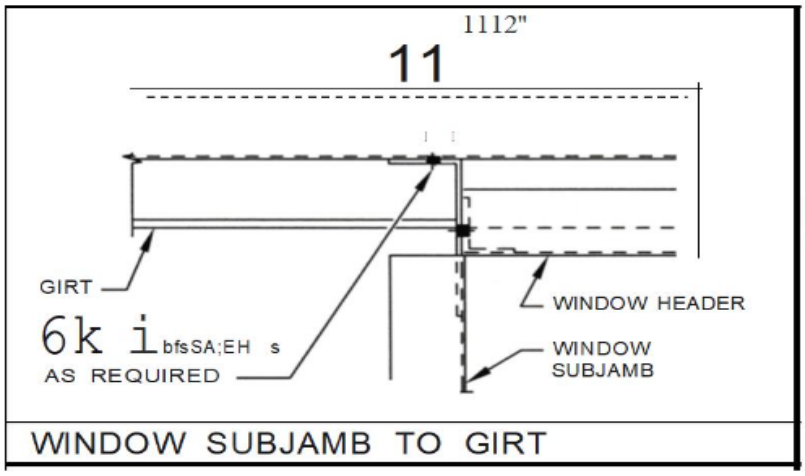
Wall girts which are below the header height must be cut and attached to the sub-jambs using a factory welded or loose clip. The sub-jamb is prepared by the factory. Field cut the wall git to length and drill 2- 9/16” diameter holes. Use the primer touch-up paint to coat the areas that were cut or drilled.

Check the framed openings for square and plum and attached the jambs to the concrete with expansion anchors. The expansion anchor size and placement details are on the Anchor Bolt Plans (expansion anchors are not provided with the building).

WINDOW FRAMED OPENING



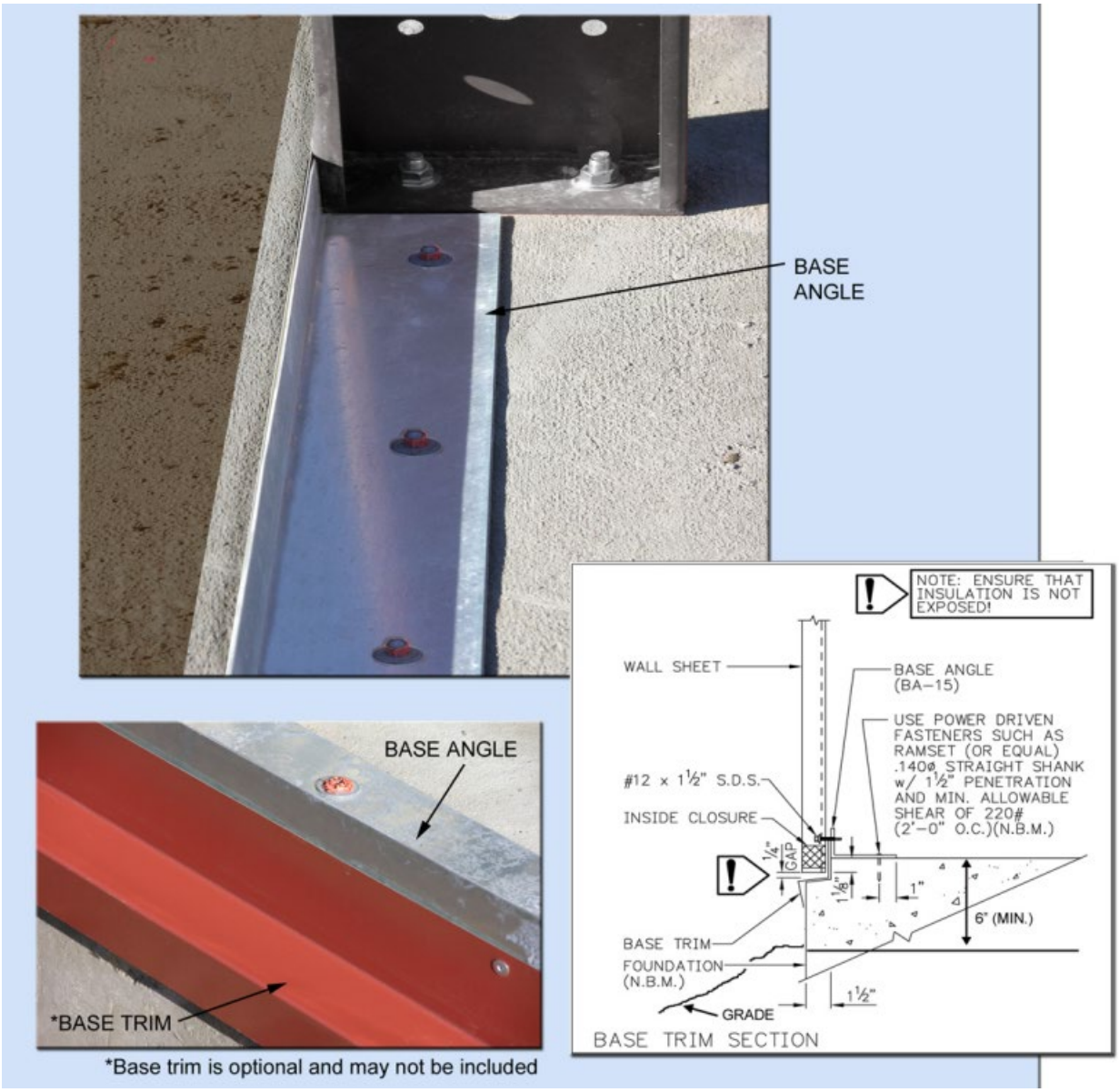
BUILDING SUB HEADER GIRT COLUMN JAMB



Installing Base Angle, Sheeting Angle and Purlin Angle

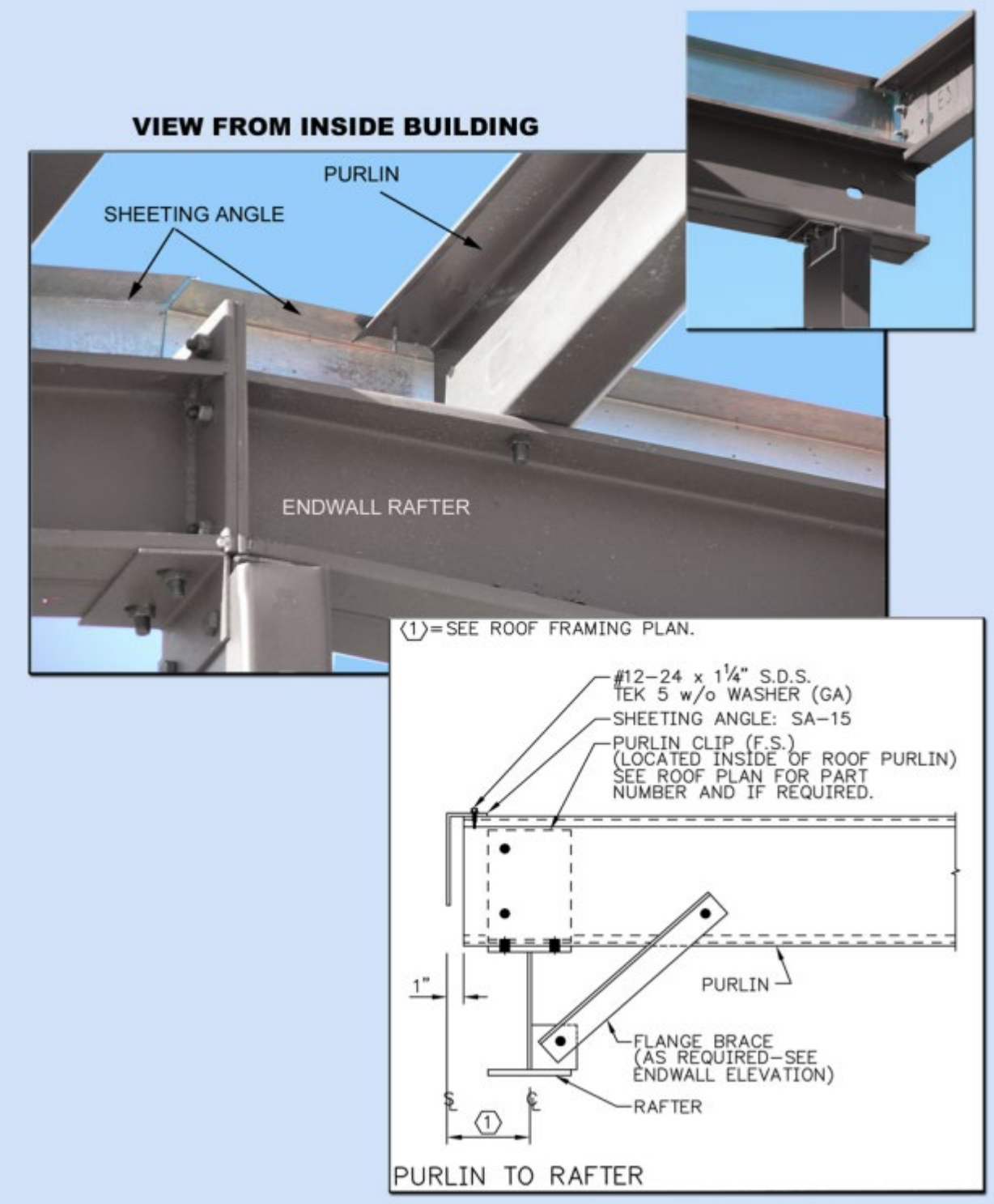
Base Angle

Base angle is a G90 galvanized 16-gauge material for use on a concrete slab. For extra moisture protection you may place a bead of sealant (not provided by the Manufacturer) between the base angle and the concrete. Base angle is omitted at door openings and should be cut or coped around and up top each column. **Use power driven fasteners such as "Ramset" (or equal) of 0.14" diameter, straight shaft with a minimum allowable shear of 220 lbs. Locate 2' on center and at the ends with 1 ½" penetration into concrete. Take care not to get too close to the edge of the slab, which can cause a break.** If your building columns are setting on concrete piers (no floor slab), a base girt is required in place of base angle. If your building includes liner panel, use base channel in place of base angle. *See Illustration.*



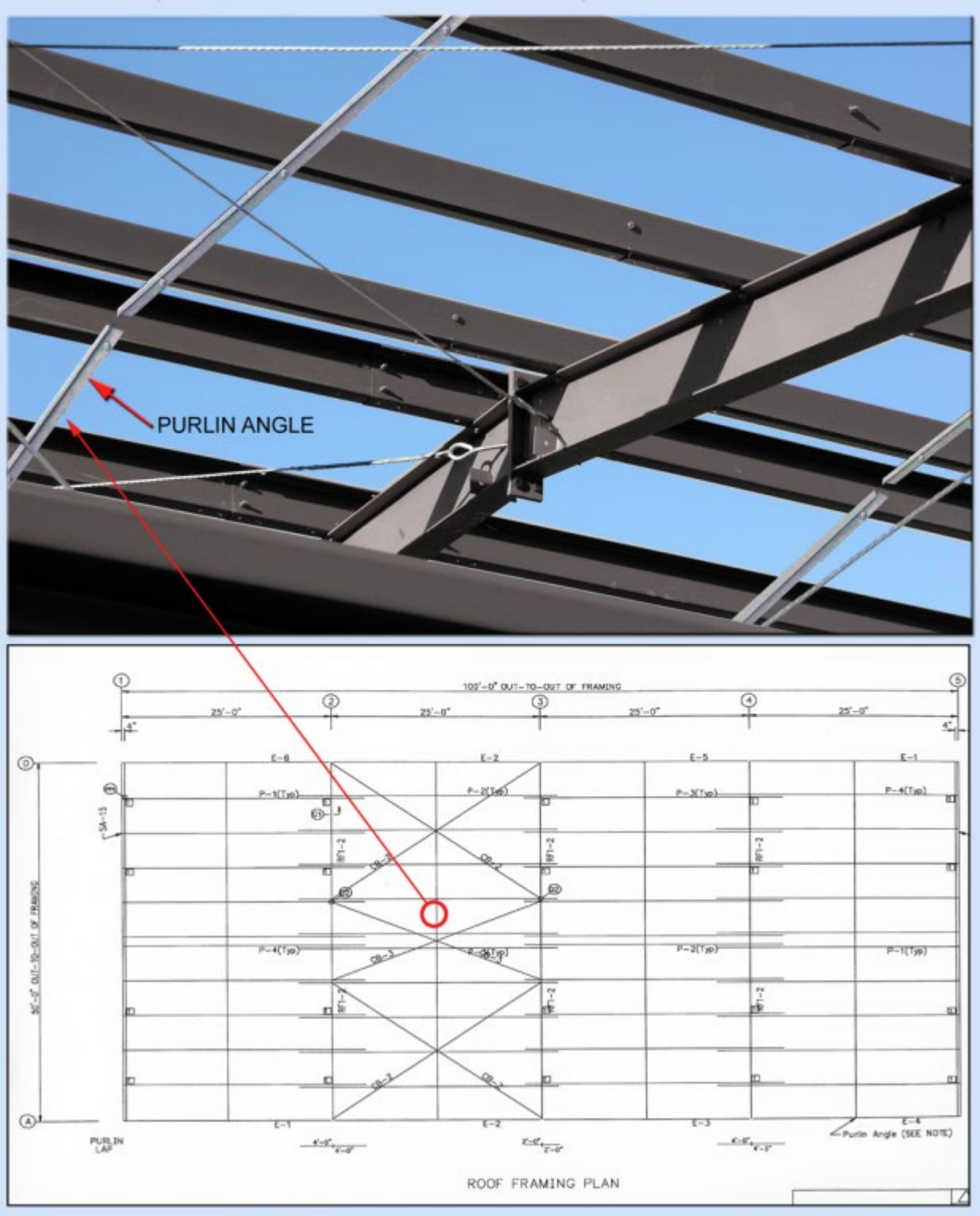
Sheeting Angle

Attach sheeting angle to the ends of the roof purlins along the gable ends of the building. Large C-clamps are ideal for holding and maintaining a straight sheeting angle prior to screwing it to the purlins. A gap of 1” for the purlin end to the outside of the sheeting angle is standard. Verify this with your plans prior to placing the sheeting angle. Use a plum line to line up the sheeting angles and base angle with the outside of the first, making for a smooth sheeting application. *See Illustration.*



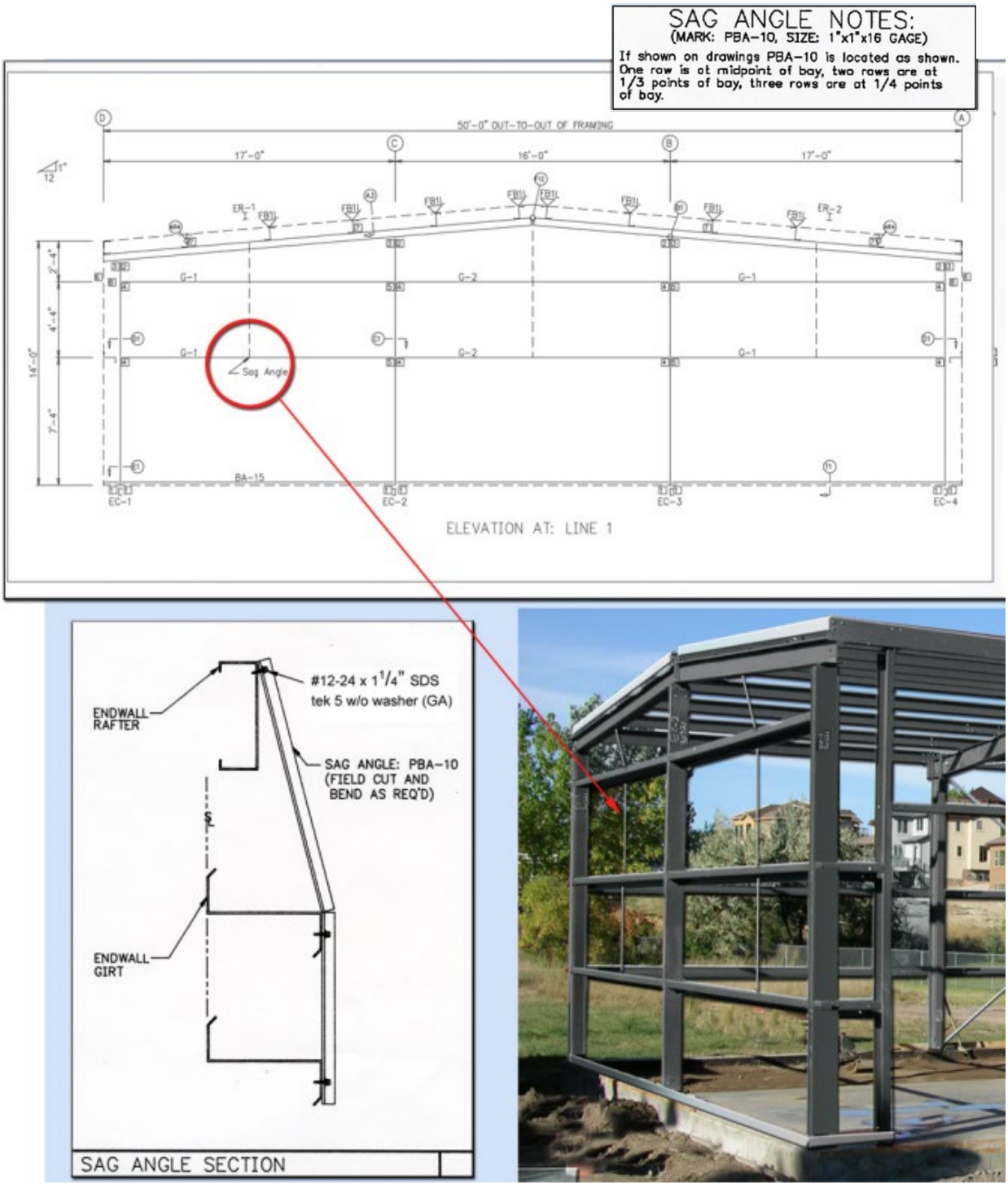
Purlin Angle

Install the angles to the spacing described on the Roof Framing Plan. Purlin angle applications vary with the bay size. Make certain to maintain the purlin space the same as it is over the frame lines. Purlin angle cannot be omitted or removed without prior approval from the building manufacture. Splice the pieces of angle by lapping them and fastening the laps with 2 screws. *See details in drawings.*



Sag Angle

Install a sag angle on the inside of the girts as shown on the Elevations. Not all buildings require girt sag angles (and it will not be shown on the plans). Sag angles cannot be omitted or removed without prior approval from the building Manufacturer. Start sag angles from the inside top lip of the eave strut or endwall rafter and continue it down to the lowest girt (base girts typically do not require sag angle). Splice the pieces of sag angles together by lapping them and fastening the laps with 2 screws. *See details in drawings.*



Primer Touch-up Paint

Inspect, Clean and Prime

Inspect all framing (before beginning insulation or sheeting) for areas not covered or scrapes in the primer. Be sure touch-up areas are clean and dry. Primer supplied by the Manufacturer is for touch-up and is not intended to re-prime all the building frame components. Primer touch-up paint can be brushed, sprayed, or rolled on. The single shop coat of primer is intended to protect the steel framing for only a brief period of exposure to ordinary weather conditions. The shop coat of primer does not provide the uniform appearance or durability and corrosion resistance of a field applied finish coat of paint over the primer.

TOUCH UP PRIMER
(in quart containers)

***** NOTE: The pictures and diagrams in the erection manual show gray painted primary and secondary material, the actual primer used on your building will be red.***

Sticker applied to panel bundles.

BEFORE TOUCHUP

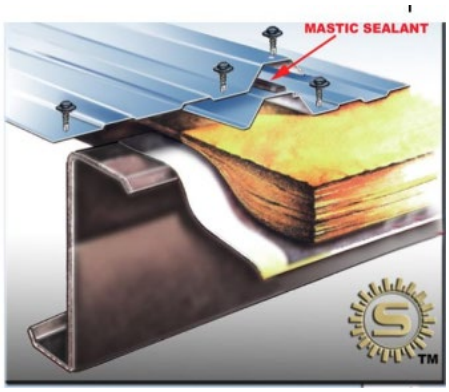
AFTER USE OF TOUCH UP PRIMER AND FRAMING WIPED CLEAN OF DIRTAND DEBRIS

Insulation, Trim, and Sheeting Installation

About Insulation

A word about fiberglass insulation: if used and correctly installed, it will slow down the movement of heat in and out of the building. Vapor retarder facing on the insulation helps prevents condensation. Insulation reduces noise and the facing reflects (spreads) lighting.

Residential grade insulation is not designed for metal buildings. Fiberglass insulation for metal buildings should maintain 100% of the R value after its lamination process. This insulation is specified as **NAIMA** 202-96 (REV 200).



Store insulation should in a dry, protected area, and always use as soon as possible. Prolonged storage exposes insulation to damage.

Insulation application instructions are provided by the insulation Manufacturer on consult the “NAIMA Recommendations for Installing Fiberglass Insulation in Metal Buildings.”

Trim back all excess insulation at eaves, gables, and at the bottom of wall panels to avoid water absorption. Insulation should not be exposed, the vinyl backing should be folded back over any cut ends and taped down.

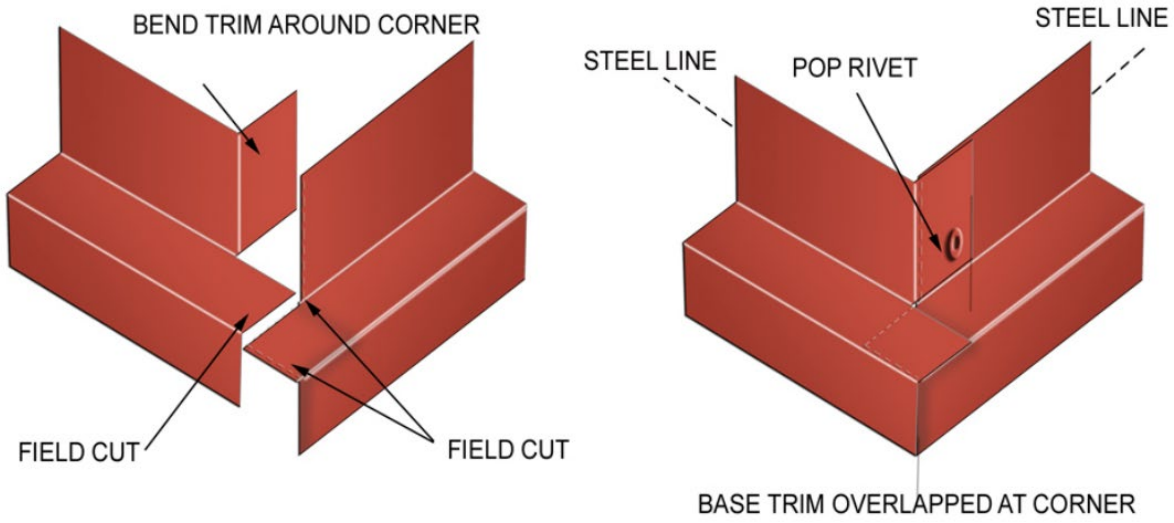
Using Panel Fasteners

1/4” x 7/8” Lap self-drilling screws are used at sheeting to sheeting and trim to sheeting. #12 x 1 ½” self-drilling screws (SDS) are used at sheeting to framing connections. An adjustable torque (non-impact) screw gun with 1800-2000 RPM is required to properly apply the self-drilling screws. The washer under the screwhead should seat properly. **When fastening the panel near a closure, place screw above or uphill from the closure.** *See Illustration.*

Base Trim and Opening Trim

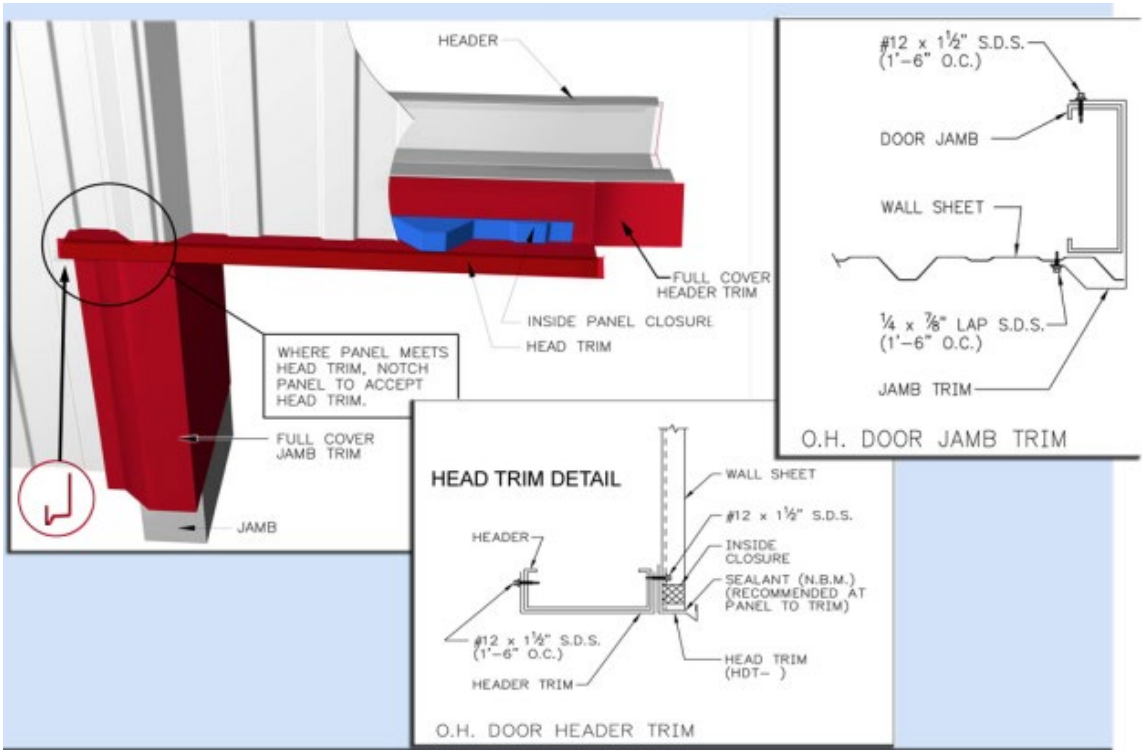
Base Trim

Install base trim (optional) over the insulation (prior to wall sheeting). Begin the base trim 2” past the steel line at the corners. Bend the trim tightly around the corner and pop rivet the overlaps together. *See Illustration.*



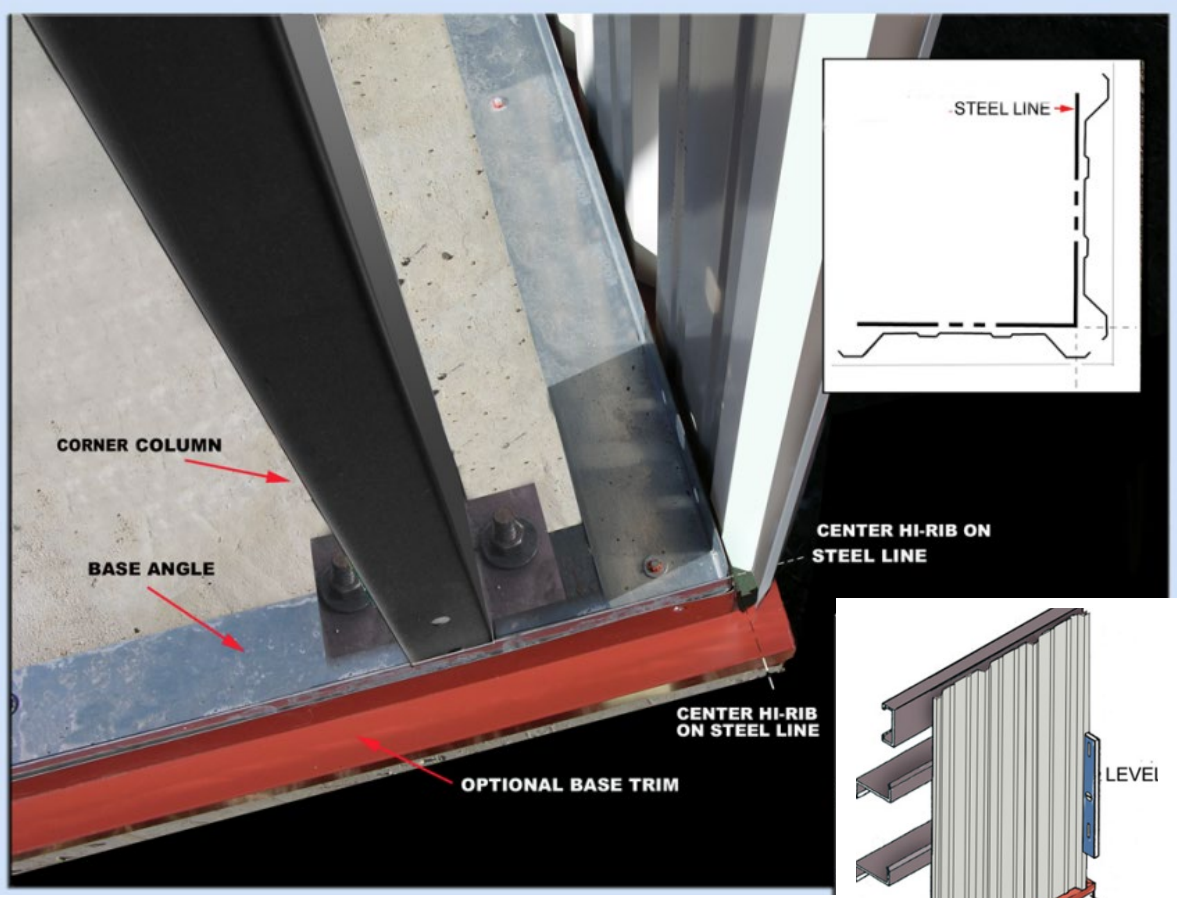
Header Sill Trim

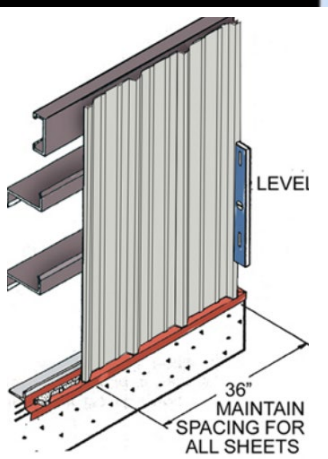
Be sure to install the head/sill trim so it covers the top of the trims at the sides of an opening. Complete this by cutting a small slit in the wall sheet, at the same height as the top and the same width of the trim at the side of the opening. This will allow the head/sill trim to slide behind the wall sheet. Use tube caulking suitable to metal around window openings, along framing closure, and head/sill trim where it meets the full cover opening trim. *See Illustration.*



Apply Wall Sheeting and Wall Trim First

Using the “For Construction” drawings, identify and layout the sheets required near the portion of the building to be sheeted. **BE SURE ALL SHEETING AND TRIM IS SECURED FROM THE WIND AT ALL TIMES.** Place marks on the eave strut (sidewall), sheeting angle (endwall), and base angle in 3’ increments starting at the corner steel line. The marks will indicate where the center line of the sheeting hi-rib will be (each sheet has 3’ coverage from the first to the last hi-rib). Keeping the sheets on module will ensure the trims fits correctly. Lapping the sheets at 1’ increments, if required, is shown on the drawings.





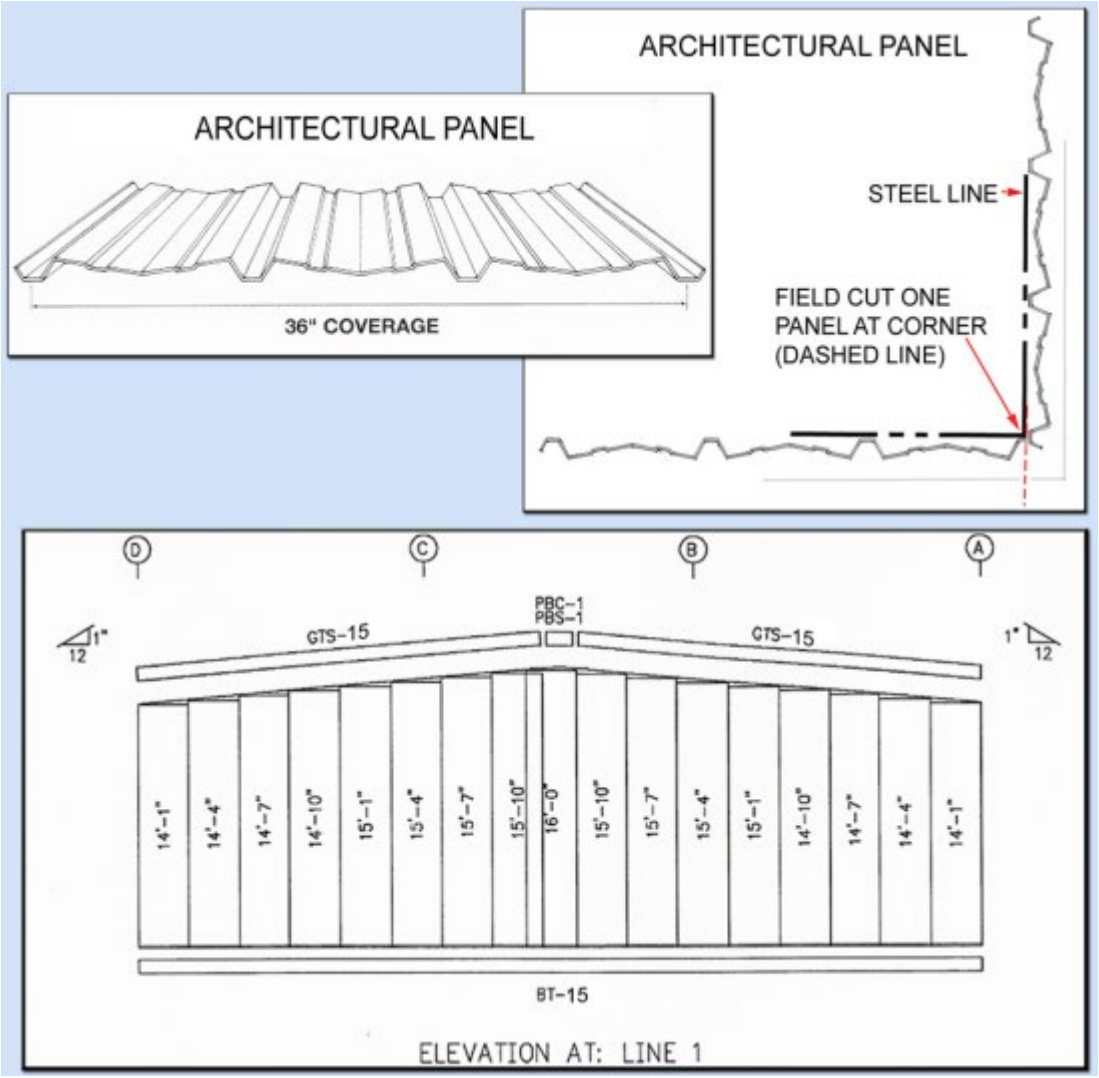
Sidewalls

Install sidewall sheets first. Begin at the corner away from the primary visual source. Place the centerline of the hi-rib in line with the outside face of the wall girt (steel line). Be sure the rib with siphon groove is under the next overlapping sheet.

PROPER POWER SAW CUTTING OF COLOR-COATED STEEL SHEETING. Cut steel color coated sheeting with a power saw. Be sure to saw away from other panels. Make sure the interior (bottom) surface of the panel is up and cover with a tarp (this protects the exterior (top) surface from hot filings and minimizes the chance of damage). Be sure to wipe off filings from surfaces before installation. **IF THESE CUTTINGS PRECAUTIONS ARE NOT TAKEN, RUST SPOTS ARE LIKELY TO DEVELOP.**

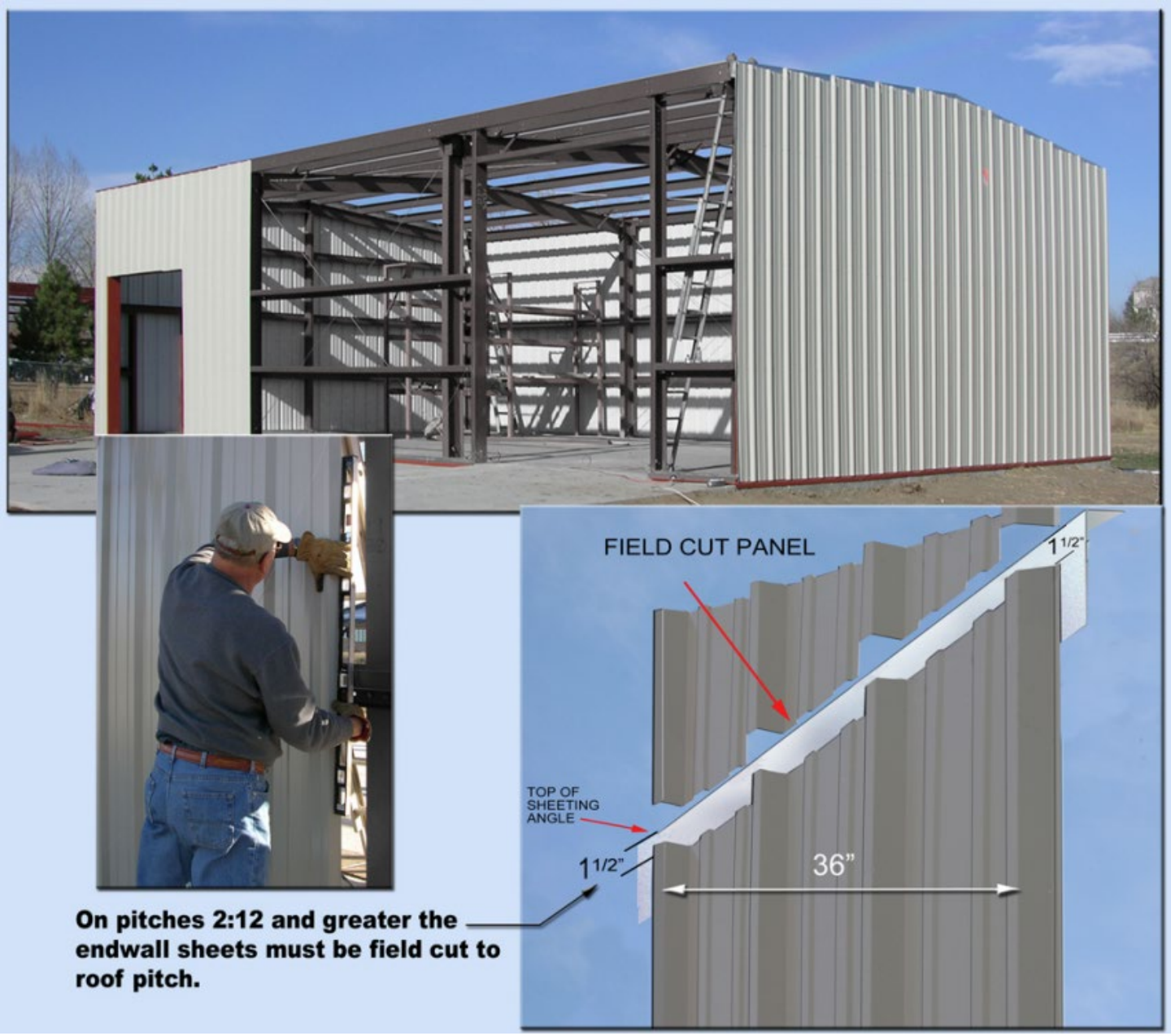
With architectural wall sheet, one edge is to be field cut away, so it allows for a proper fit at the corner.

***** NOTE: architectural panel does not include a siphon groove).*** *See Illustration.*



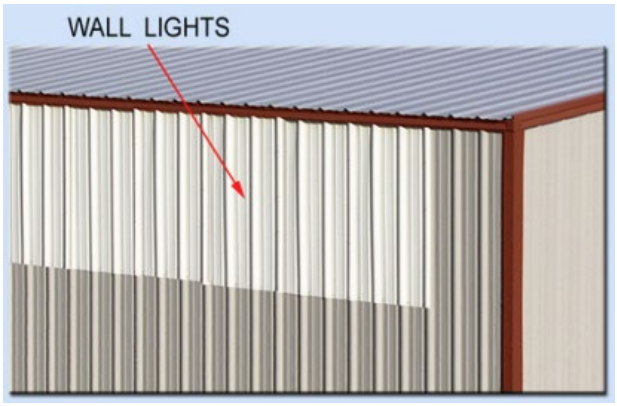
Endwalls

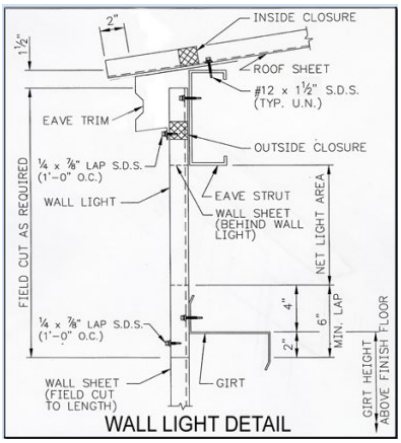
Install the endwall sheets next, follow the sheeting layout on the Elevation Drawings carefully. Install inside closures at the base of each sheet.



Wall Lights

Wall lights (translucent fiberglass panels) if included, are typically shown on the Elevation Drawings. **The wall sheeting is factory cut; however, the wall light panels will require field cutting to the required length.** Wall lights are only available in the hi-rib (not architectural) profile.





NOTICE: Our trim is covered with a removable film to protect the trim during manufacturing and shipping. **Completely remove this film must prior to installation.** Remove protective film within 7 days after exposure to sunlight, if not exposed to sunlight, remove film within 30 days.

Lift film from end of trim piece approximately 1” around entire piece.

Grab both sides and lift, pull film straight back over itself completely down entire length of the trim piece as shown below:

Corner Trim

Install corner trim. Place the longest supplied piece at the bottom and overlap the top piece over the outside of the bottom piece. Place corner trim the full length of the wall sheet. If corner trim is field cut to length, place the field cut edge at the very top (this hides rough cuts under the eave trim).

Eave Trim

Along each sidewall, install the eave trim and outside closures (not required if using gutters). Eave trim or gutter should continue over the corner trim and stop flush with face of the corner trim. Place any field cut ends at the corner (this hides rough cuts under the end cap trim). *See Illustration (gutter and inside closures are optional, see Erection Drawings for application).*

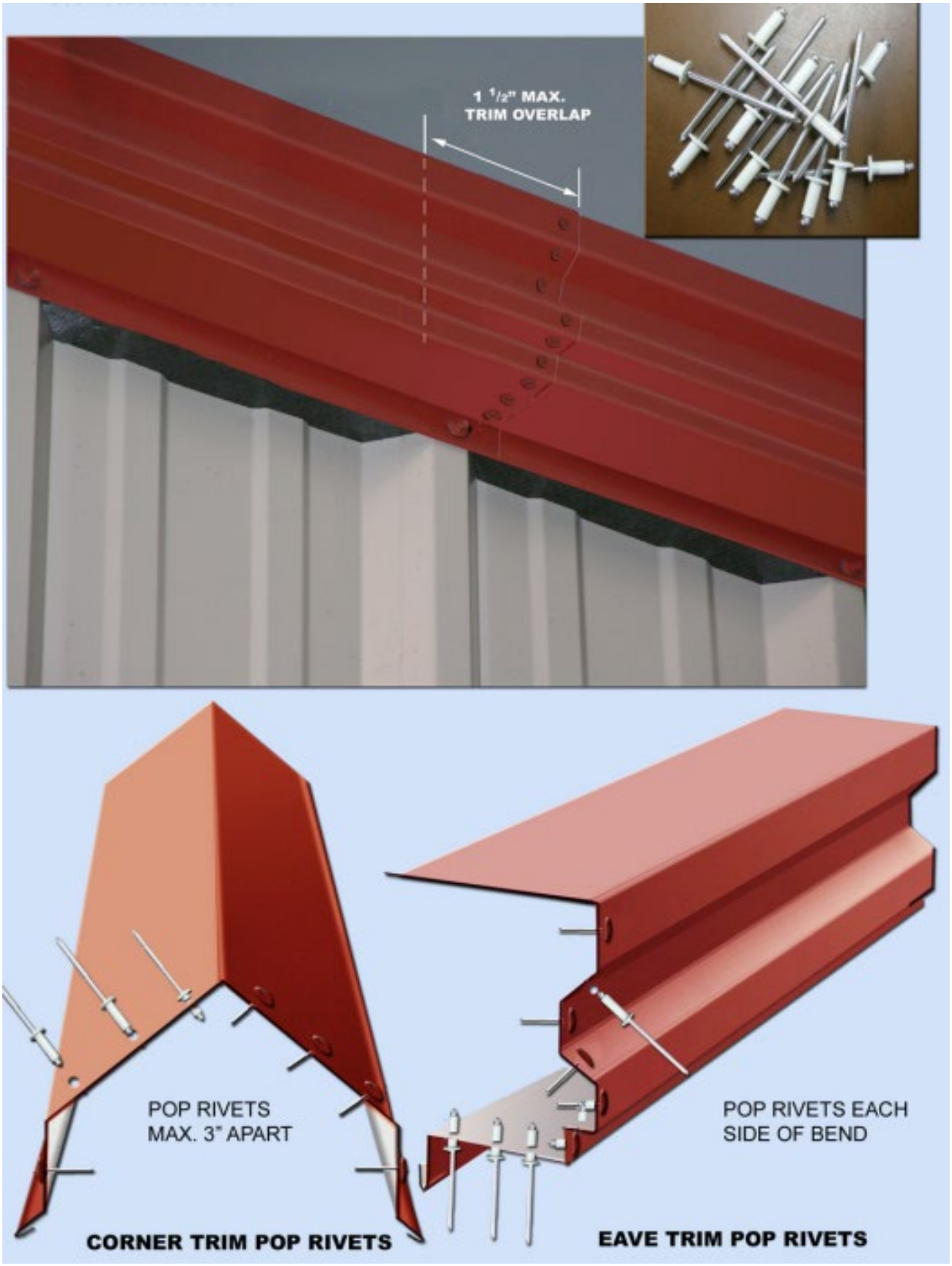
***** NOTE:***

For Eave and Roof Closure application, see page 34.

If using gutter, install an inside closure at the top of each sidewall sheet. Do not use Mastic Sealant on the wall sheeting.

Trim Laps and Pop Rivets

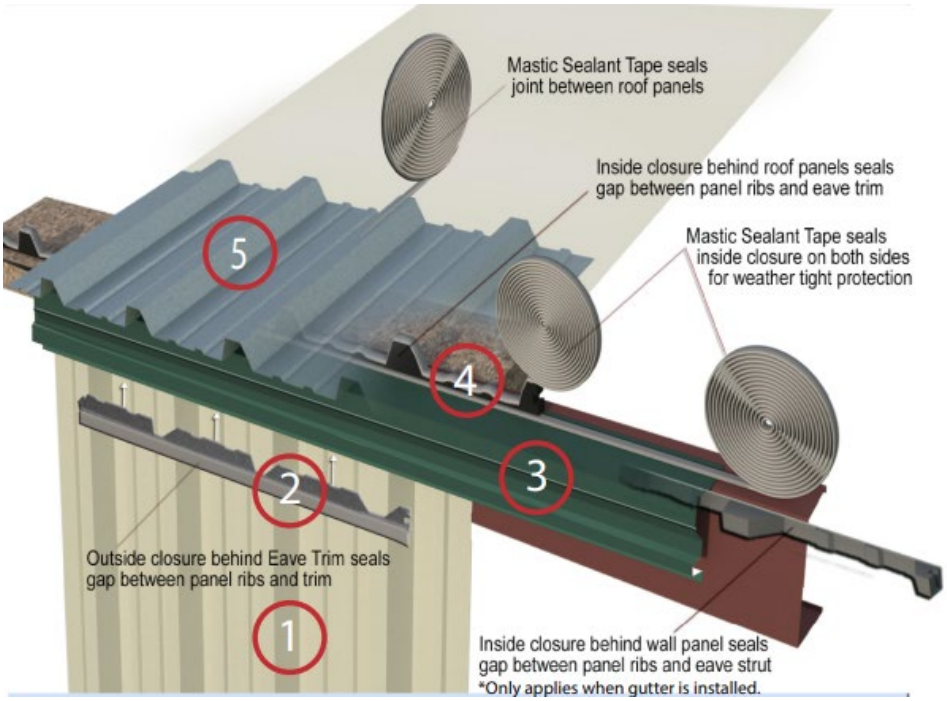
Trims should overlap a total of 1 ½” and laps are joined with pop rivets. A pop rivet should be placed every 3” on flat trim surfaces and adjacent to a bend. *See Illustration*



Eave and Roof Closure Application Order

1. Sheeting on sidewalls
2. Outside closure
3. Eave trim “or gutters”
4. Inside closure
5. Roof sheet

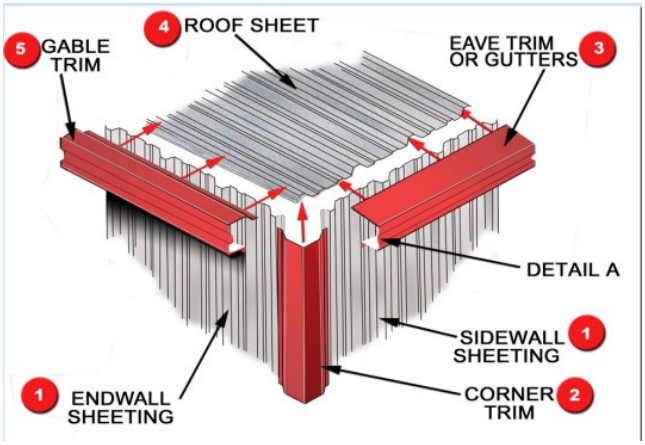
***NOTE: Fasteners not shown for clarity.**

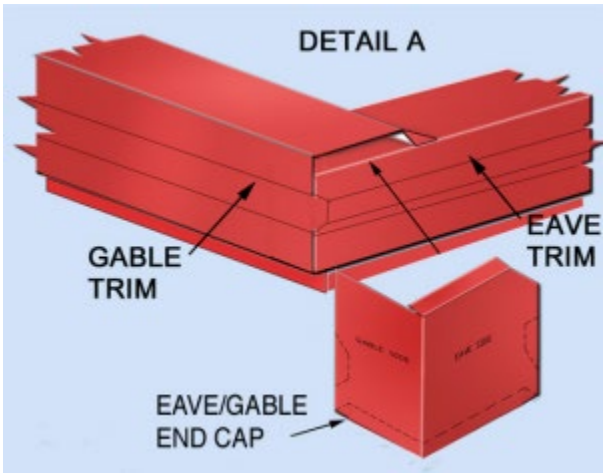


Sheeting and Trim Application Order

1. Sheeting on walls
2. Corner trim
3. Eave trim
4. Roof sheet
5. Gable trim

***NOTE: Closures and pop rivets not shown for clarity, see previous pages. Fasteners not shown for clarity.**



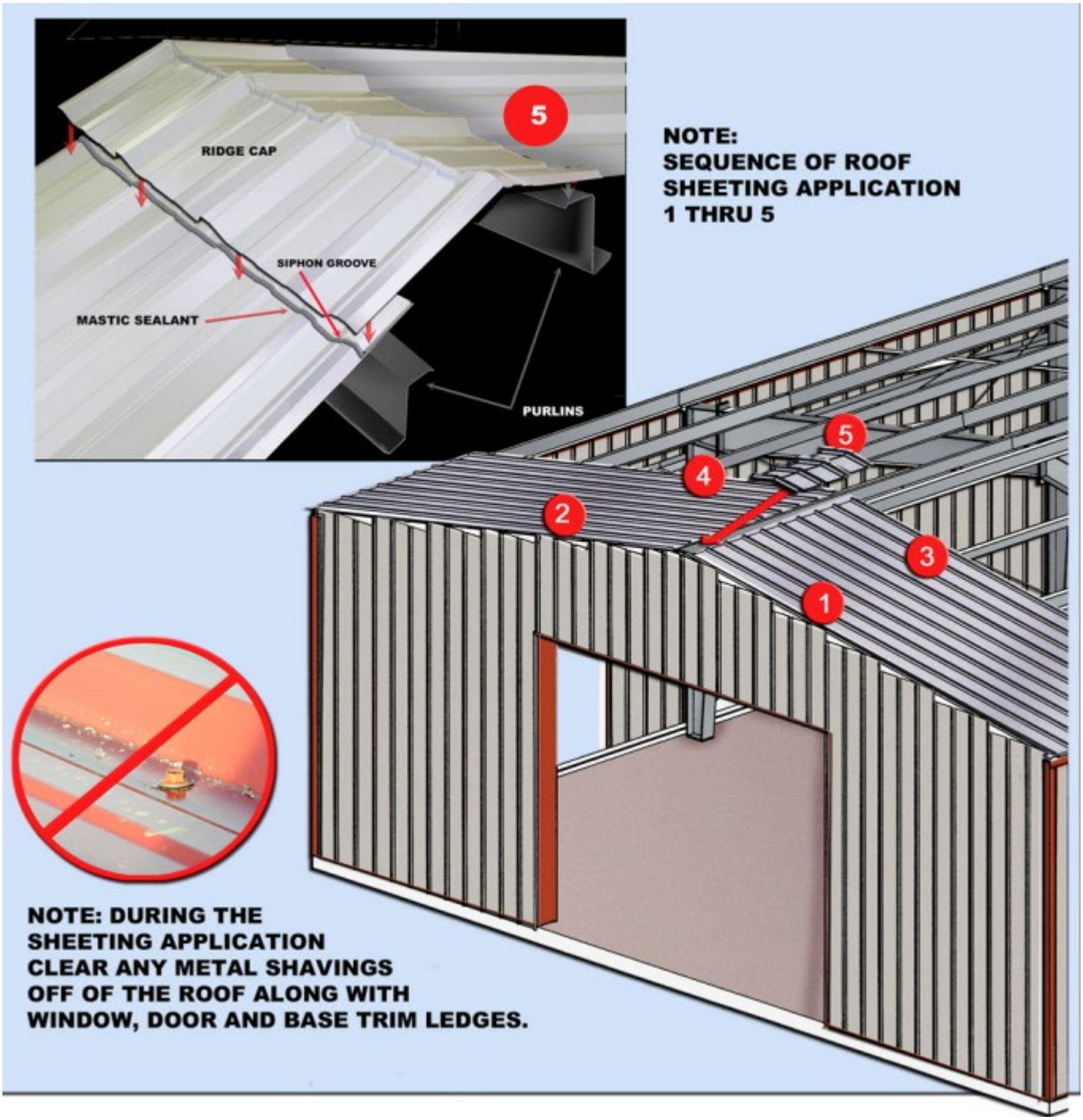


Roof Panel and Ridge Cap Placement Sequence

NEVER WALK OR STEP ON THE HI-RIB PART OF THE SHEETING. TO WALK ON A ROOF SHEET, ALWAYS STEP IN THE FLAT PARTS OF THE SHEETING LOCATED OVER A PURLIN.

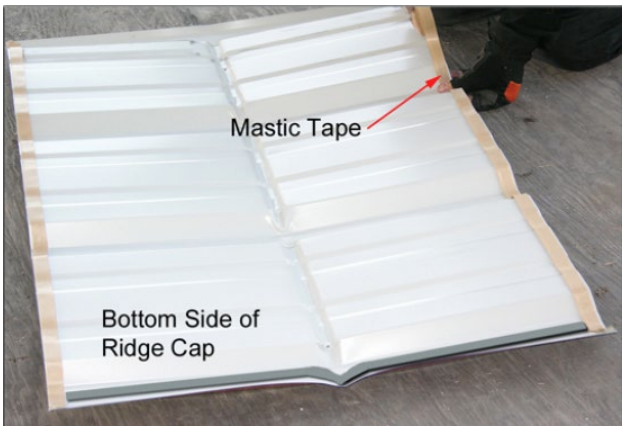
Roof Panel and Ridge Cap Fit

Place roof sheeting squarely on a square building with the ribs in line from one side of the ridge across to the ribs on the other side of the ridge. (*See Sequence Illustration below)*. This will allow the corrugated ridge cap to fit with minimal or no gaps as it laps over the roof sheets. Do not allow excessive gaps, correcting large gaps with excessive amounts of sealant or deformation of the ridge cap by forcing it into place can lead to frustrating leak repairs over time.

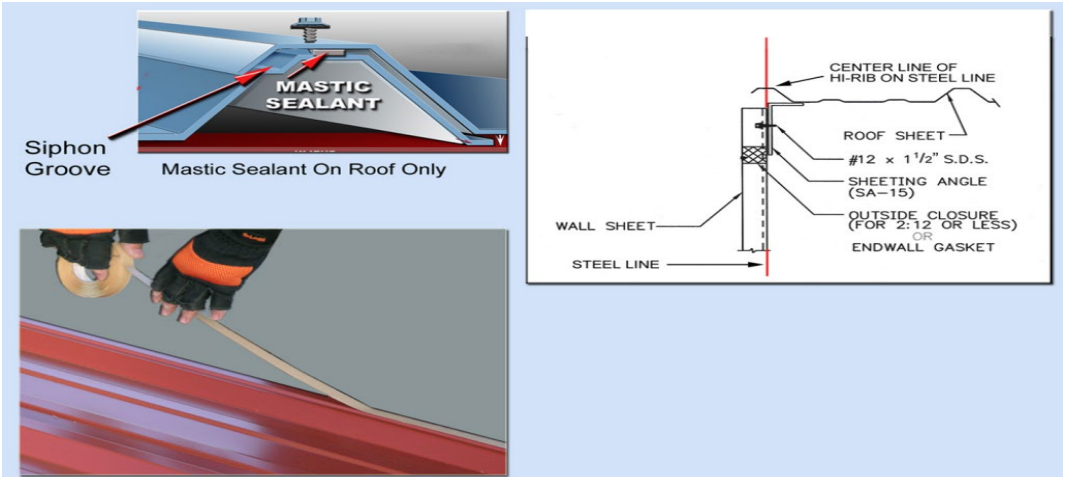


Roof Panel, Ridge Cap, Mastic Tape Placement

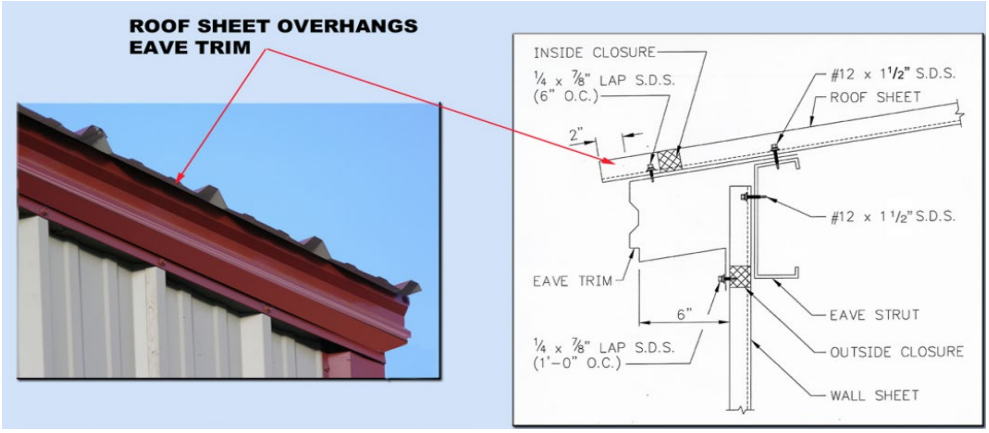
Do not allow mastic tape to obstruct the siphon groove. The bottom side of the ridge cap has mastic tape applied to both sides and ends. On wide buildings, use mastic tape on the panel-to-panel end laps. *See Illustrations.*



Install the roof sheets after the wall sheets and eave trim are in place. The roof sheeting layout is shown on the Frame Cross Section. Start the roof sheeting so that the overlaps are away from the prevailing wind. Begin with the center line of the hi-rib (without siphon groove) in line with the outside face of the sheeting angle. Apply mastic tape along the length of each panel next to the siphon groove. *See Illustrations.*



The roof sheet overhangs the sidewall eave trim, refer to the Eave Trim and Gutter details on the drawings for overhang dimensions. Place inside closures along the top of the eave trim under each roof sheet. When fastening the roof sheet to the eave strut, place the fastener above (uphill from) the inside closure (not into the closure). *See Illustrations.*



DO NOT PLACE ALL THE ROOF SHEETS THEN GO BACK AND PLACE RIDGE CAPS. The sequence to which roof sheets and ridge caps are places is shown on previous page. Self-drilling screws are placed as shown on the drawings.

Field Locating Roof Skylights

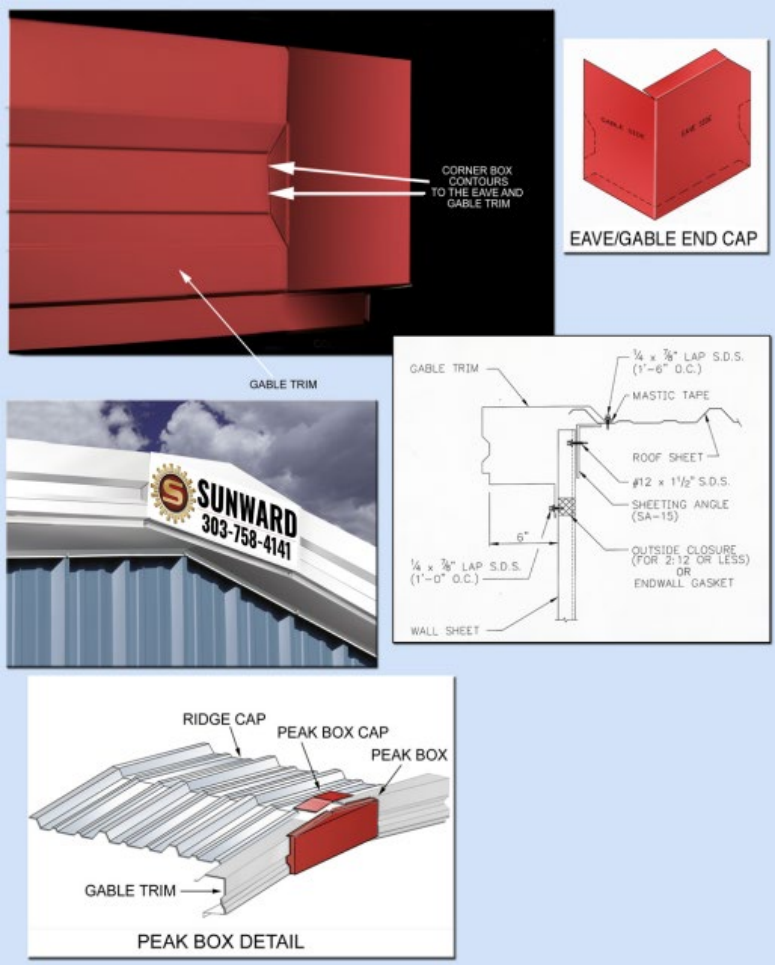
Skylight (Translucent Panel) Sizes and Uses

Skylights are provided in different lengths and typically they will cover one, two or three purlin spaces (this is based on approximately 5’ purlin spaces). A 5’ 8” skylight will cover one 5’ purlin space, an 11’ 4” skylight will cover 2 purlin spaces, and a 17’ 1” skylight will cover 3 purlin spaces. Roof panels are only factory cut for substantial amounts of roof skylights (shown on the Frame Cross Section or Roof Sheeting Plan). Skylights will lap under the up-slope roof sheet and lap over the outside of the down-slop roof sheet. Use mastic tape on the side and end laps of a skylight. Skylight panels are to be field cut to length. The length is determined by the number of purlin spaces they cover x the purlin spacing + 6” lap. Example: Covering 3 purlin spaces 4’ 8” apart - - 3 x 4’ 8” = 14’ + 6 = 14’ 6” …so a 17’ 1” panel would have to have 2’ 7” cut off the panel.

Final Trim Installation

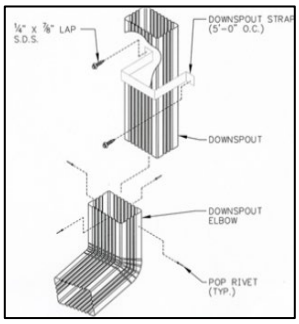
Gable Trim, Peak Box, and Corner Caps

Gable trim along with outside closures or endwall gasket should run from the peak to the corner. Gable trim should overlap the outside of the corner trim and stop flush at the corner. Place the field cut ends of the gable trim at the peak or the corner. Last trims applied are the peak box and eave/gable end caps. The peak box uses mastic tape where it overlaps back on the roof.



“Optional” Gutters and Downspouts

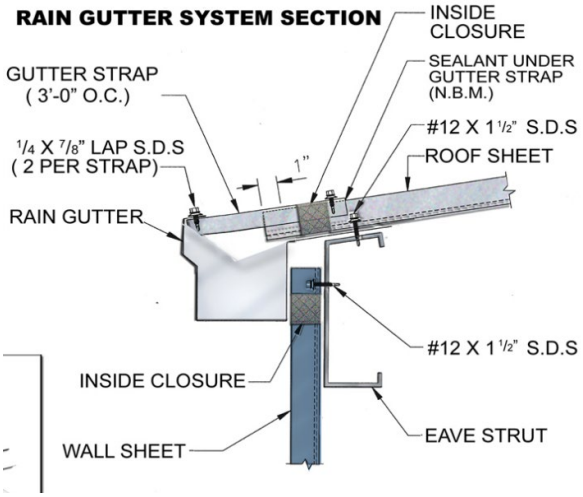
Downspouts are included at each corner of the building and at equal spacing along the length. Attach downspouts to the bottom of the gutter and run vertically to ground level or within 1’ of ground level. Attach the downspout to the gutter suing the downspout outlet. Holding the outlet against the bottom side of the gutter, trace the shape of the hole and cut out the hole. Place sealant (by others) inside the gutter around the hole and place the outlet through the hole.



Attach the outlet flange to the gutter with 4 pop rivets. Downspout straps are included at 5’ intervals and are placed over the downspout and fastened with 2 screws to wall panel. Typically, one elbow per downspout location is included. Place the downspout inside the elbow and the two pieces are pop riveted together.

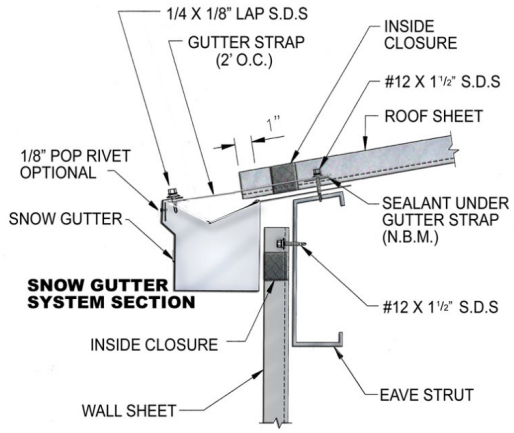
Standard Rain Gutter

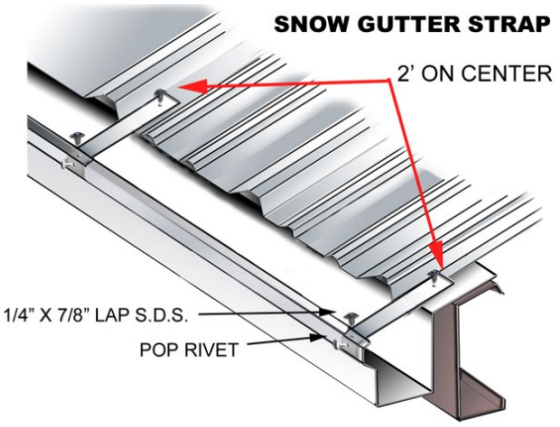
Standard rain gutter straps are 3’ on center and 3 sided. It conforms to panel rib for strength and stability. *See Illustrations.*



Snow Gutter

Snow gutter is “low profile.” This allows sliding snow or ice to pass over the top, helping prevent damage to gutters. Snow gutter straps are 2’ on center. *See Illustration.*





Touch-up Paint for Panel and Trim

Matching touch-up paint is provided for the panel and trim colors. Only use touch-up paint on minor abrasions or scratches. Apply touch-up paint with a small brush. Do not thin paint or use it in a sprayer, this changes the pigment, and it will no longer match. Replace panel or trim that is seriously damaged rather than re-paint.

Features to Prolong "Like New" Condition

Your building includes features that will help prolong the "Like New" condition for many years.

- ✓ The Siphon Groove provides a path for moisture that may accumulate under the sheeting released at the end of each sheet.
- ✓ G90 Galvanized gauge Base Angle provides protection around the base of the building where the presence of water is most likely to start corrosion.
- ✓ 20 yr. or 40 yr. Written Paint Warranty on sheeting and trim assures you of long-lasting color quality.
- ✓ Long-life Screws with Encapsulated Neoprene Washers will help prevent the rust streaking that begins when moisture meets the screw threads and hole drilled in sheeting by the screw.
- ✓ IAS AC472 International Accreditation Services Certification assures you that the materials and methods we use to fabricate your building are of the highest quality.

Building Maintenance

Maintenance and Cleaning of Metal Sheeting

To help maintain the finish on the sheeting, an annual washing is recommended. Discoloration can occur in areas where there is long term exposure to dirty air. Slight chalking can occur where there is strong sunlight. To remove most dirt, you can use common household products mixed with water. Below are recommended solutions:

- ❖ Use Non-toxic, biodegradable cleaner containing less than 0.5% phosphate, such as, Simple Green $_{(RT)}$. Mix 1 cup with 2 gallons of warm water.
- ❖ Household ammonia can also be used. Mix 1 cup with 5 gallons of room temperature water.
- ❖ To remove mildew, use 1 cup of household bleach and 1 cup of mild dish soap to 5 gallons of water.

A sponge, soft bristle brush, or low-pressure sprayer work well. Wash the sheeting starting at the bottom working toward the top. Rinse sheeting thoroughly with clean water. It is important to remove all residue left from the cleaning process or the sheet film coating may be damaged.

Building Roof, Gutter, and Downspout Maintenance

Maintaining the roof and gutter system frequently in areas with blowing sand or dirt, or a building in a heavily treed area is necessary for proper water drainage.

Keep walking on a steel roof to a minimum to prevent damage; however, sweeping off the debris, which can trap or limit the drainage of water, is necessary.

Inspect gutters regularly and clear any debris. Repair any bending or damage to a gutter causing water to pond.

Downspout outlets should drain to a splash block diverting water away from the sides of the building. Ground level around the building should be lower than the foundation top and sloped away and down so water does hot

pond and erode soil next to foundation. Your Foundation Engineer can offer the best advice regarding your job site and how to manage water drainage from building.

Maintaining the Building Structure

Over time, building movement due to expansion/contraction and high winds may affect the cables bracing the building. Tighten any loose or sagging cables. Simply use an open-ended wrench and turn the nut while holding the brace eye to take as much slack out of the cable as possible. This is easy to do on short walls, but not on tall walls or the roof cables. For tall walls and roof cables, it is best performed by a person who can do it safely with the proper equipment and protection.

Keeping excessive dirt and debris off the building framing, and not allowing build up along the floor in the base angle or column base plates will help prevent corrosion. Especially if high humidity is present or water is regularly sprayed inside the building.

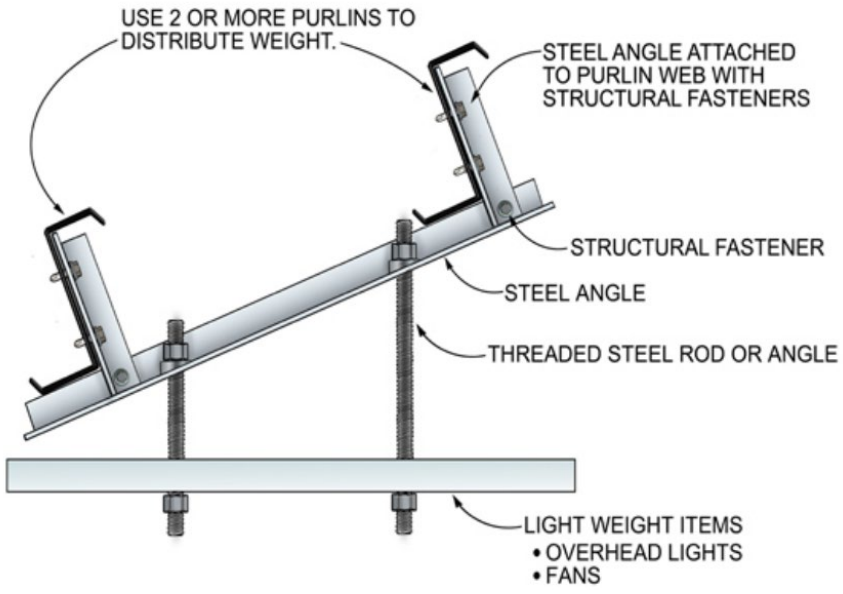
Replace damaged sheeting or trim as soon as possible. Damage to the paint finish can lead to rust and deterioration. Damage allowing water inside the building can ruin insulation and contents of building.

Re-install closures between trim and panels that are loose. Use adhesive if needed.

Replace missing screws or stripped screws using a larger diameter screw. The Manufacturer supplies #17 screws with matching color heads used by the Erector for this situation, the owner should keep any left-over screws for future use.

Hanging Lightweight Items from the Purlins

Minimal lighting and insulation are typically installed in a building. Heavy items or an accumulation of multiple materials require additional collateral loads and/or point loads be designed into the building. **The Project Consultant and/or the Final Owner are responsible for notifying the Manufacturer at the time of order, the description and location of all material supported by the building's roof structure.** When hanging light objects from the purlins, always attach to the purlin web and spread the load over more than one purlin. Do not attach to the purlin stiffening lip or to a flange not reinforced. Heavy items usually require additional framing. Make the Manufacturer aware of items at the time of the building order. *See Illustration.*



Snow Removal

With the variability of snow density, it is possible for a buildup of snow to exceed designs specified by the building code. Fresh snow can be 10-12 lbs. per cubic ft (pcf) and as it compacts can become 16-30 pcf. Excessive loads occur with rain or snow, monitor this condition with extreme caution. Before removing snow, call the Manufacturer's Engineer. Remove snow evenly, as to not create an unbalanced load on the roof. Procedures and suggestions for removing snow are available and should be reviewed by the Final Owner.

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