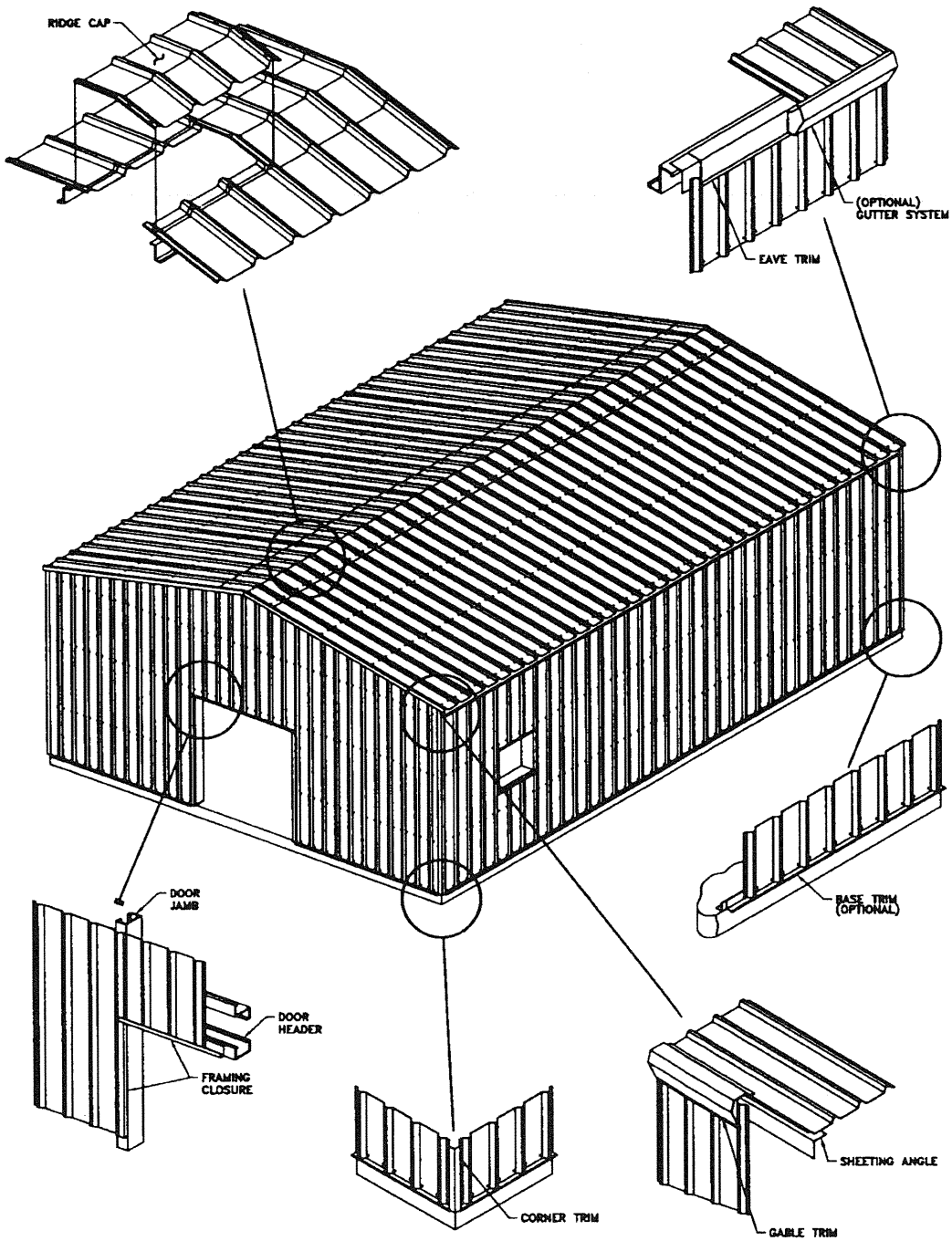
Building Erection Guide



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INTRODUCTION

The Steel Building Manufacturer produces high quality, pre-engineered metal buildings. However, these buildings become structures only after erection. Quality erection is essential if the manufacturer, its dealers, the erection crew, and the owner are to realize lasting pride and satisfaction in the buildings.

This manual has been prepared to help guide the erection of the buildings. It is a summary of the techniques in use in the metal building industry, which are believed to be most representative of good erection practices. These procedures and methods are by necessity general in nature. The erector should always, especially in special circumstances, use proven and safe erection methods.

This erection manual is intended only as a supplement to the erection drawings that are furnished with each building. These drawings show the customer's buildings as engineered and fabricated according to his/her requirements. The buildings erection drawings will always govern with regards to construction details and specific building parts.

The information contained in this manual is believed to be reliable. However, the manufacturer disclaims any responsibility for damages that may result from use of this manual since the actual erection operations and conditions are beyond the manufactures control. It is assumed that only experienced, knowledgeable erectors with trained crews and proper equipment will be engaged to do the erection.

It is emphasized that the manufacturer of metal building components is not engaged in the erection of its products. Opinions expressed about erection practices are intended to present only a guide as to how the components should be assembled to create a building. The experience, expertise and skills of the erection crews as well as the equipment available for handling the metal determines the quality of erection and the ultimate customer satisfaction of the completed building.

IMPORTANT CONSIDERATIONS

Upon request, the manufacturer or its marketing service may supply the name(s) of potential vendors that supply additional components and contractors to install concrete and erect the building components or to perform other work pertaining to the installation and erection of the building components. Neither the manufacturer nor its marketing service has investigated such vendors and contractors. The provision of the name(s) does not constitute a recommendation of their skill or competence.

It is important to the buyer to rely solely on his own investigation when selecting a vendor or contractor. It is also important to check for comparisons and to be completely satisfied as to price, quality, and timeliness as to the job. The manufacturer and its marketing service or other affiliates are not, nor will be involved in construction. Any representation or agreement between dealer or contractor and buyer concerning delivery, construction, modifications or other items are between the parties thereto.

This manual is intended to provide buyers and their erectors with some recommended procedures for erecting their building components. However, the manufacturer is not liable for the quality of erection, safety procedures during erection, poor foundation design or construction, site preparation, site selection, including soil and drainage testing or the negligence of other parties.

Because of the wide variations throughout the country in loading and zoning requirements and environmental conditions (snow, wind, ect.), it is the responsibility of the builder or owner to make certain that the building conforms to all codes and is adequate to withstand local environmental conditions. When necessary, and upon specific request, the building manufacturer can engineer and supply building components to meet special requirements, at moderate additional cost.

Your purchase order requires that you purchase liability coverage for before, during and after construction to insure against any loss or damage during or after construction.

Before starting construction, we suggest that you read the erection procedure and thoroughly study the specific erection drawings marked "For Construction" supplied with your building. This will allow you to plan the work properly and could avoid unnecessary delays during construction. You should also familiarize yourself with the laws and regulations governing permitting, labor and employment, safety, materials handling and disposal, and any other issues which may apply to your business.

Corrections of minor misfits and a reasonable amount of cutting and reaming are considered a part of erection. Errors in fabrications which prevent the proper assembly and fitting of parts by moderate use of reaming, chipping, or cutting should be reported to the fabricator, so that he may either correct the error or approve the method of correction to be used.

SAFETY COMMENT

The manufacturer has a commitment to produce quality building components that can be safely erected. However, the safety commitment and job site practices of the erector are beyond the control of the manufacturer.

It is strongly recommended that safe working conditions and accident prevention practices be the top priority on any job site.

Local, State and Federal safety and health standards should always be followed to help insure worker safety.

Make certain all employees know the safest and most productive way of erecting a building. Emergency telephone numbers, location of first aid stations and emergency procedures should be known by everyone present at the site.

The manufacturer intends that this manual be interpreted and administered with sound judgment consistent with good safety practices.

PRE-ERECTION

While your building is being fabricated, numerous pre-erection plans can be made to simplify the buildings erection. The contract department will advise dealers of scheduled completion and delivery dates and details in order that the erector may schedule personnel and equipment.

Access to the Site

The vehicles transporting tons of building parts must gain access to the building site from adjacent highway or road. Such access should be visualized and prepared in advance of arrival. All obstructions overhead and otherwise must be removed and the access route graveled or planked if the soil will not sustain the heavy wheel loads.

Permission should be obtained to trespass over other owner's property in gaining access to the building. Even though such permission is thought unnecessary, the good will of the other owner should be solicited and is generally assured when such permission is requested.

The buildings site should be carefully inspected to insure that there is enough room to physically perform the tasks required to erect the building. Application of sheeting and trim can be expensive when there is not sufficient working space because of the nearness of adjacent buildings or other obstructions.

The availability of any required utilities should also be considered at this time. Take careful note of any overhead electric lines or other utilities to avoid hazards and damage.

Foundation

General information

Foundation design and construction are the most important steps in the building process, and the contractor or owner is ultimately responsible for the quality of the foundation. It must be noted that improper or inadequate foundation construction will severely limit the building performance and could lead to costly repair or rebuilding.

It is essential that the building foundation meet certain design assumptions and load conditions. For this reason, all building foundations should be designed by a local soils engineer, in accordance with the local city, county and state codes.

Certain basic guidelines and considerations for foundation design are outlined on the anchor bolt drawings furnished by the company. Careful consideration of the following notes will be helpful in completing the foundation.

Important Notes

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

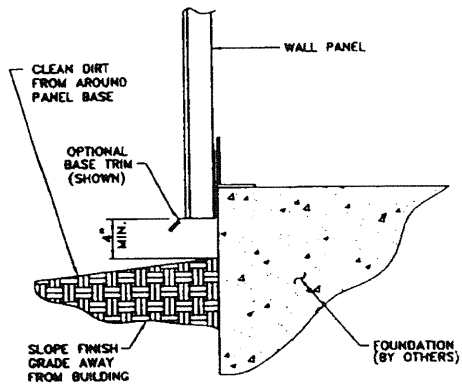
2. The top of the floor or foundation must be square, level and smooth, and the anchor bolts accurately set to a tolerance of +/- 1/16" on dimensions within the group spacing for and individual member. All other dimensions shall be within +/- 1/8"

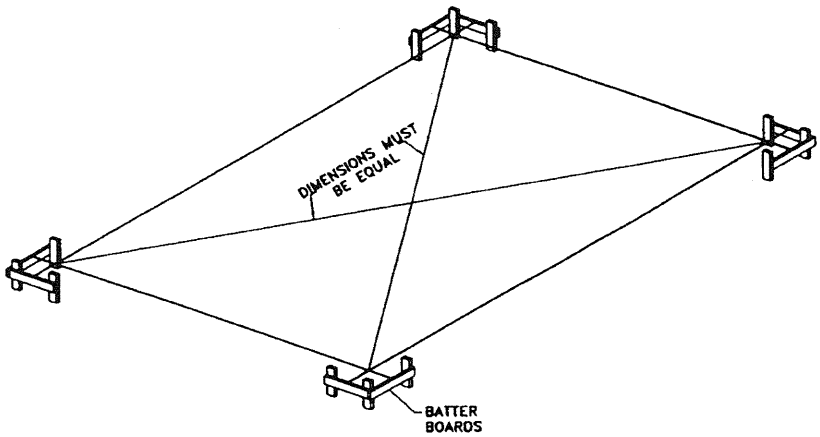
3. All embedded structural steel (including reinforcing bars, wire mesh and anchor bolts) will not be supplied by the building manufacture

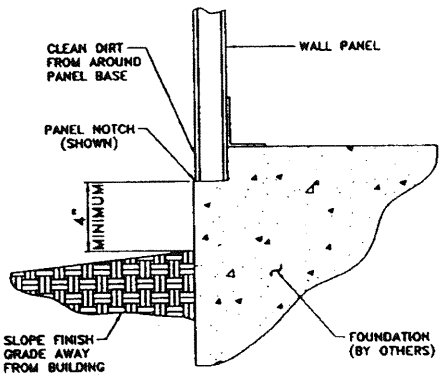
Foundation Layout.

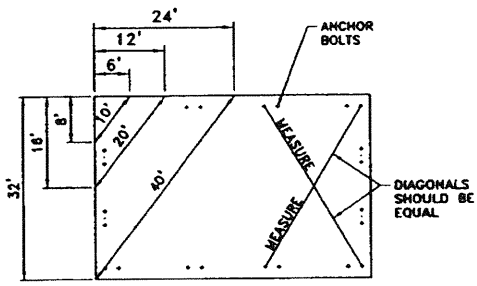
Regardless of the type of foundation that is used and its specific configuration, the foundation outline should be carefully and accurately laid out before any excavation is made. Whenever possible, a transit or similar means should be used to layout the foundation perimeter: this will insure accurate placement of corner measures and in turn, insure a square foundation.

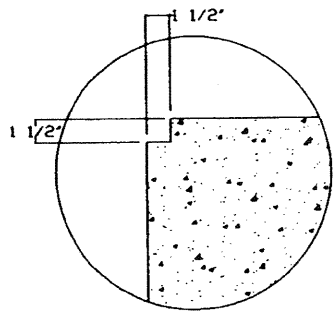
For the greatest accuracy, measure the diagonal and adjust the string lines until the two diagonal dimensions are equal. If the diagonal lengths are equal, the framing will be square.









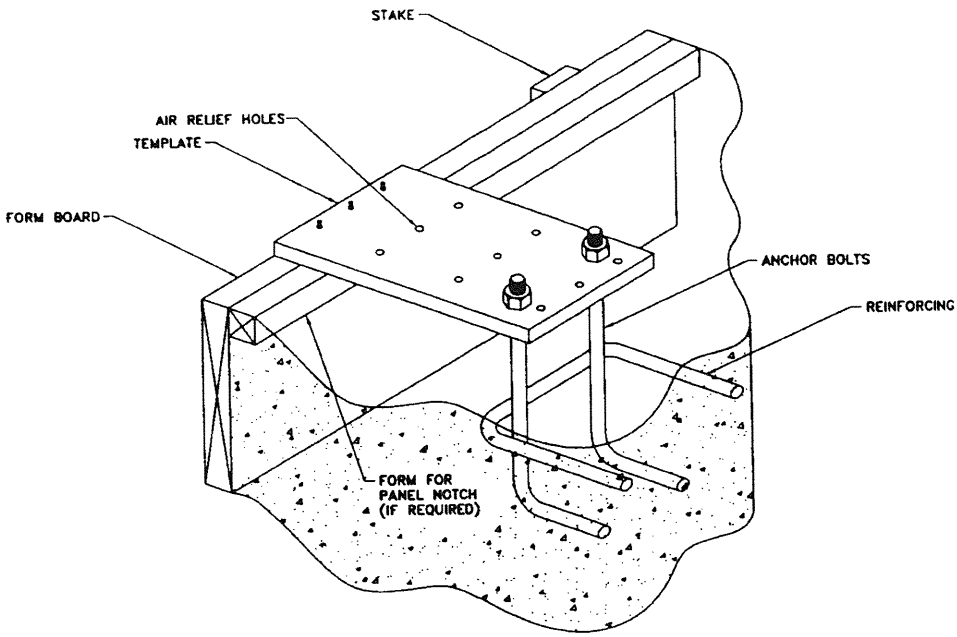


$1\frac{1}{2}$" x $1\frac{1}{2}$" Notch Forming (Optional)
Notice Above

Another method of assuring a square foundation is the Right Triangle Method. Use the dimensions of the two sides of the right triangle A and B as shown in the chart and adjust the string lines to obtain the proper length for C. Check Square at all four corners.

In no case should building erection be started on green concrete. Anchor bolt may pull loose, concrete can spall (chip out along edges) and equipent may crush or crack slab. Normal Portland cement concrete should cure at least seven days, and high-early-strength concrete at least three days befor the structural columns are erected.

It is extremely important that all anchor bolts be placed accurately in accordance with the anchor bolt plan. Before pouring concrete, study carefully the following general notes describing size, type and position of anchor bolts



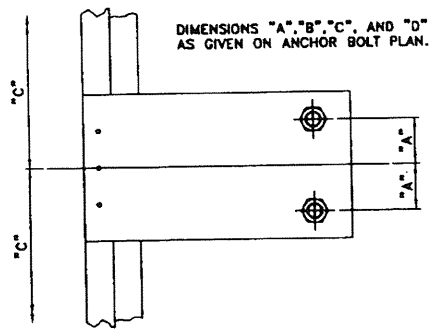
Setting Anchor Bolts

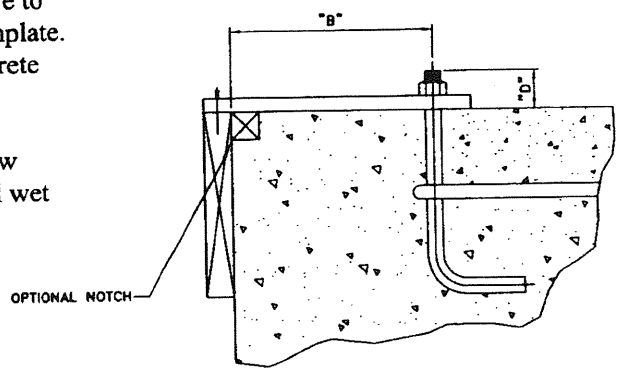
1. Use ASTM a307 Anchor Bolts or equivalent. **Not supplied by building manufacturer.**

2. The threaded portion of the bolt should be a minimum of 2-1/2". Anchor bolts should project 2" minimum above surface concrete. (Refer to Anchor Bolt setting plan)

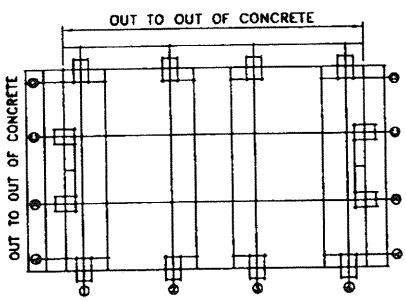
3. All Anchor Bolts should be held in place with a template (see Diagram) or similar means in order to remain plumb during the pouring of the concrete. All templates should be prepared in advance so that they can be quickly nailed in place. Be sure to clean all machine oil from bolts before placing them in template. The bolt threads should be covered or protected from concrete during pouring.

4. Air Relief holes should be drilled in the template to allow trapped air to escape. When floating concrete, vibrate until wet concrete appears at top of air relief holes





USE 1 1/2" x 1 1/2" BLOCK TO FORM OPITIONAL BASE NOTCH. THIS WILL CLOSE PANEL CORRUGATION FROM BELOW PANEL.



Dimensions given on the anchor bolt plan, provided with the construction drawings.

Unloading Operations

Pre-planning unloading operations involving careful, safe and orderly storage of all materials is an important part of the erection. Job sites where storage space is restricted require detailed planning. An efficient layout of materials in the order of the erection process can save a great deal of money, by eliminating costly double handling of materials. While set procedures are not possible in all cases, special attention should be given to the following items.

NOTE- Trucks are loaded to maximize efficiency, trailer weight and insure safety. Unfortunately, the shipping department cannot load trucks per customer request.

THINK SAFETY AT ALL TIMES

1. Location of carrier vehicle during unloading
Unload material near their usage points to minimize lifting, travel, and re-handling during building assembly

2. Prepare necessary ramp for truck
The edge of the concrete slab should be protected to minimize the danger of chipping or cracking from truck traffic if the materials are to be laid out on the slab. One important consideration is the fact that materials stored on the slab may subject workers to possible injury from falling objects.

3. Schedule lifting equipment (by Erector)
The type and size of lifting equipment is determined by the size of the building and the site conditions. Length of boom, capacity and maneuverability of lifting equipment will determine its location for both unloading and erection. Combining the unloading process with building erection usually minimizes lifting equipment costs.

4. Considerations of overhead electric wires
Overhead power lines are continuing source of danger, extreme care must be used in locating and using lifting equipment to avoid contact with power lines.

5. Schedule crew
Depending on the size, valuable time can generally be gained if the supervisor plans and watches ahead instead of getting tied up with a particular unloading chore.

As previously mentioned, a great amount of time and trouble can be saved if the building parts are unloaded at the building site according to a pre-arranged plan. Proper location and handling of components will eliminate unnecessary handling

Check Shipment and Filing Claims.

-When shipments are received in the field, two inspectors are necessary.

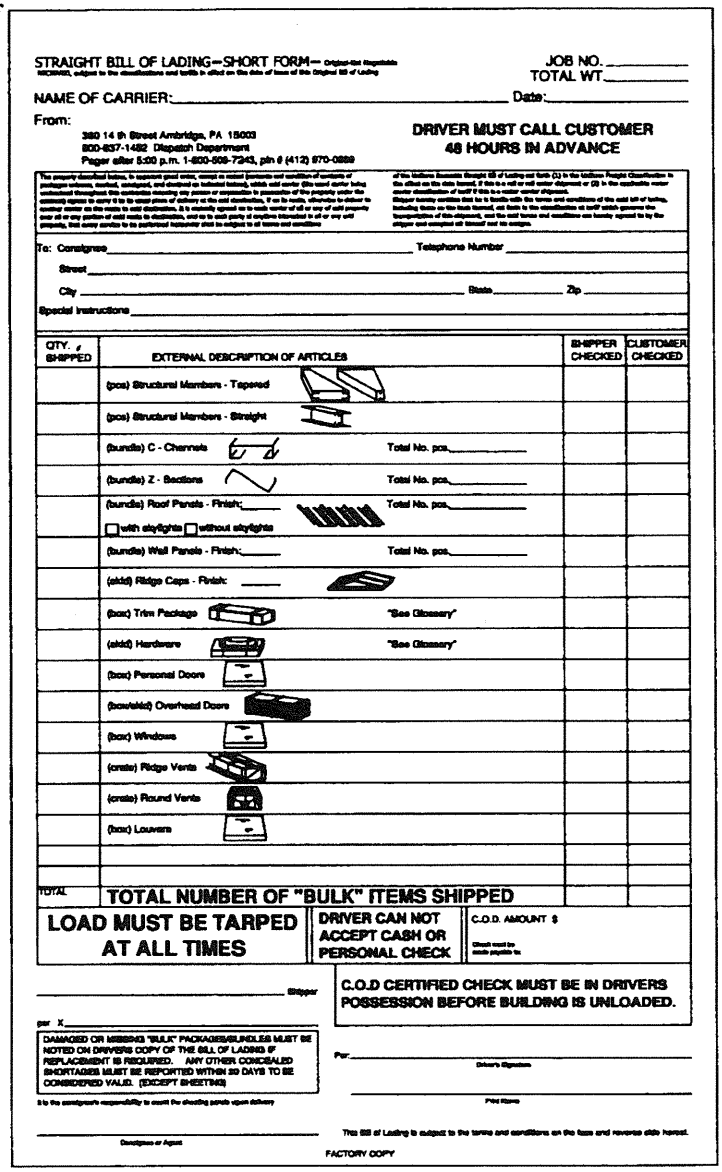
-Note: Inspect all shipments prior to releasing the tie-downs for loads that may have shifted during transit.

1. If during the inspection, damages, or shortages of items are found, a report should be filed with the carrier immediately at the site. When damages are evident from the exterior at the time of receiving shipments. Panel crates should be opened and inspected for water damage. Galvanized or galvalume panel crates should always be opened and inspected for white or black rust.

2. Another check must be performed to determine the quantity received and their condition. If during this inspection damages or shortages of items are found upon opening the crates or cartons, a claim should be sent to the manufacture, no later than thirty (30) days after delivery.

Unless these two important inspections are made and any reports or claims are filed immediately, settlements become very difficult and usually all parties involved suffer the loss.

When filing claims either with the carrier, or with the manufacture, the claim should indicate the items in question, the bundle or container in question (if any), the actual quantity received, the quantity which should be received, or that which was damaged. This is important for quickly retrieving the necessary information. Also, other information such as the numbers, names and addresses of consignee's and consignors should be indicated on claims, as well as invoice numbers.



STRAIGHT BILL OF LADING—SHORT FORM— JOB NO. _____ TOTAL WT. _____

NAME OF CARRIER: _____ Date: _____

From:

DRIVER MUST CALL CUSTOMER 48 HOURS IN ADVANCE

To: Consignee _____ Telephone Number _____

Street _____

City _____ State _____ Zip _____

Special Instructions _____

QTY. SHIPPED	EXTERNAL DESCRIPTION OF ARTICLES	SHIPPER CHECKED	CUSTOMER CHECKED
	(pcs) Structural Members - Tapered		
	(pcs) Structural Members - Straight		
	(bundle) C - Channels Total No. pcs.		
	(bundle) Z - Sections Total No. pcs.		
	(bundle) Roof Panels - Finish: ☐ with skylights ☐ without skylights Total No. pcs.		
	(bundle) Wall Panels - Finish: Total No. pcs.		
	(skid) Ridge Caps - Finish:		
	(box) Trim Package "See Glossary"		
	(skid) Hardware "See Glossary"		
	(box) Personal Doors		
	(box/skid) Overhead Doors		
	(box) Windows		
	(crate) Ridge Vents		
	(crate) Round Vents		
	(box) Louvers		
TOTAL	TOTAL NUMBER OF "BULK" ITEMS SHIPPED		

LOAD MUST BE TARPED AT ALL TIMES

DRIVER CAN NOT ACCEPT CASH OR PERSONAL CHECK

C.O.D. AMOUNT $

C.O.D CERTIFIED CHECK MUST BE IN DRIVERS POSSESSION BEFORE BUILDING IS UNLOADED.

Shipper

per X

DAMAGED OR MISSING "BULK" PACKAGES/BUNDLES MUST BE NOTED ON DRIVERS COPY OF THE BILL OF LADING IF REPLACEMENT IS REQUIRED. ANY OTHER CONCEALED SHORTAGES MUST BE REPORTED WITHIN 30 DAYS TO BE CONSIDERED VALID. (EXCEPT SHEETING)

It is the consignee's responsibility to count the shipping parts upon delivery

Per: _____ Driver's Signature

Print Name

Consignee or Agent

This Bill of Lading is subject to the terms and conditions on the face and reverse side hereof.

FACTORY COPY

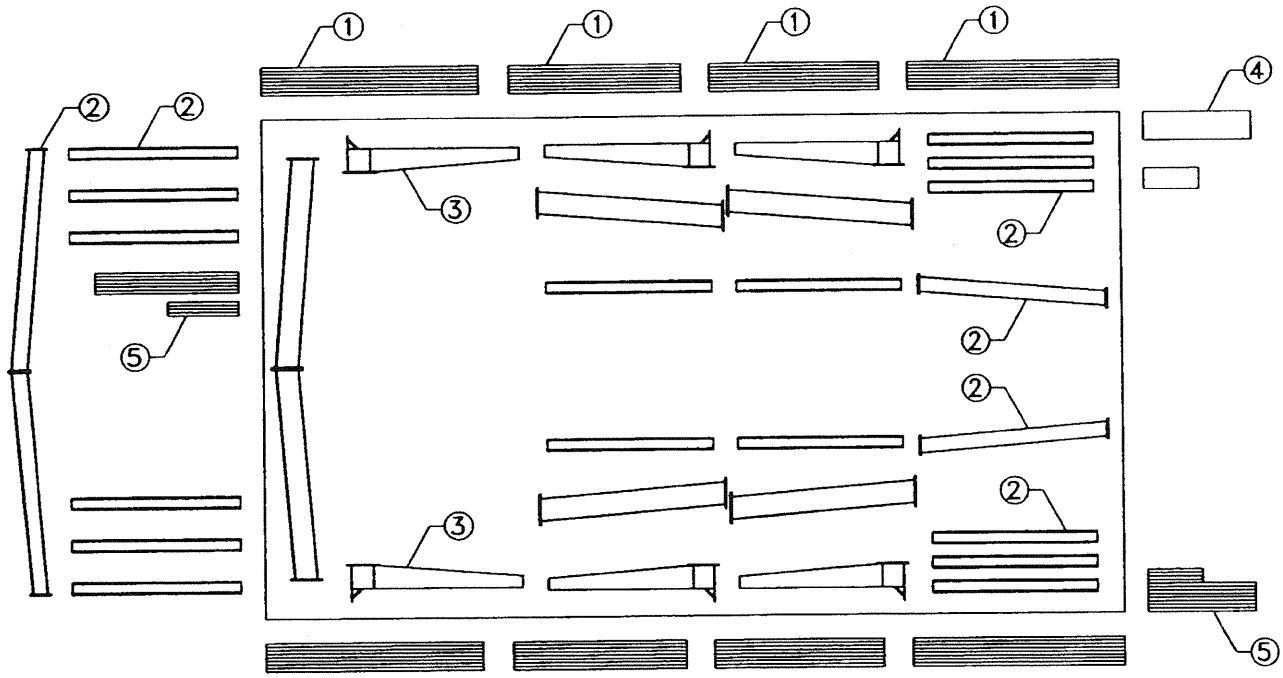
These procedures are primarily for your protection. A shortage discovered later than 30 days, can be caused by theft, misplacement, or other causes, and neither the carrier nor manufacture can accept responsibility.

Material Layout

While the building material is unloaded, it should be placed in and around the building site near the place where it will be used. This is referred to as "Shaking Out". While each job will vary according to the size or site conditions, the layout below typifies an arrangement, which offers conveniences for assembly. Columns and roof beams are laid in position for rising. girts, purlins, columns and braces are divided according to the requirements of each bay.

Each part is numbered for quick identification. Carefully check these numbers against shipping lists to insure that the correct parts and quantities have been received. Be sure to write any discrepancies on Bill of Lading while unloading.

The layout of materials illustrated below is provided as an aid to identify and locate building parts. Once the erection procedure has begun, however erection crews and machinery must have access to that portion of the building which is under construction.



1. GIRTS, EAVE CHANNELS AND PURLINS
2. END FRAMES AND ENDPOSTS
3. MAIN FRAMES
4. CLIPS, BOLTS, SCREWS, ETC.
5. ENDWALL GIRTS

Material Handling and Storage

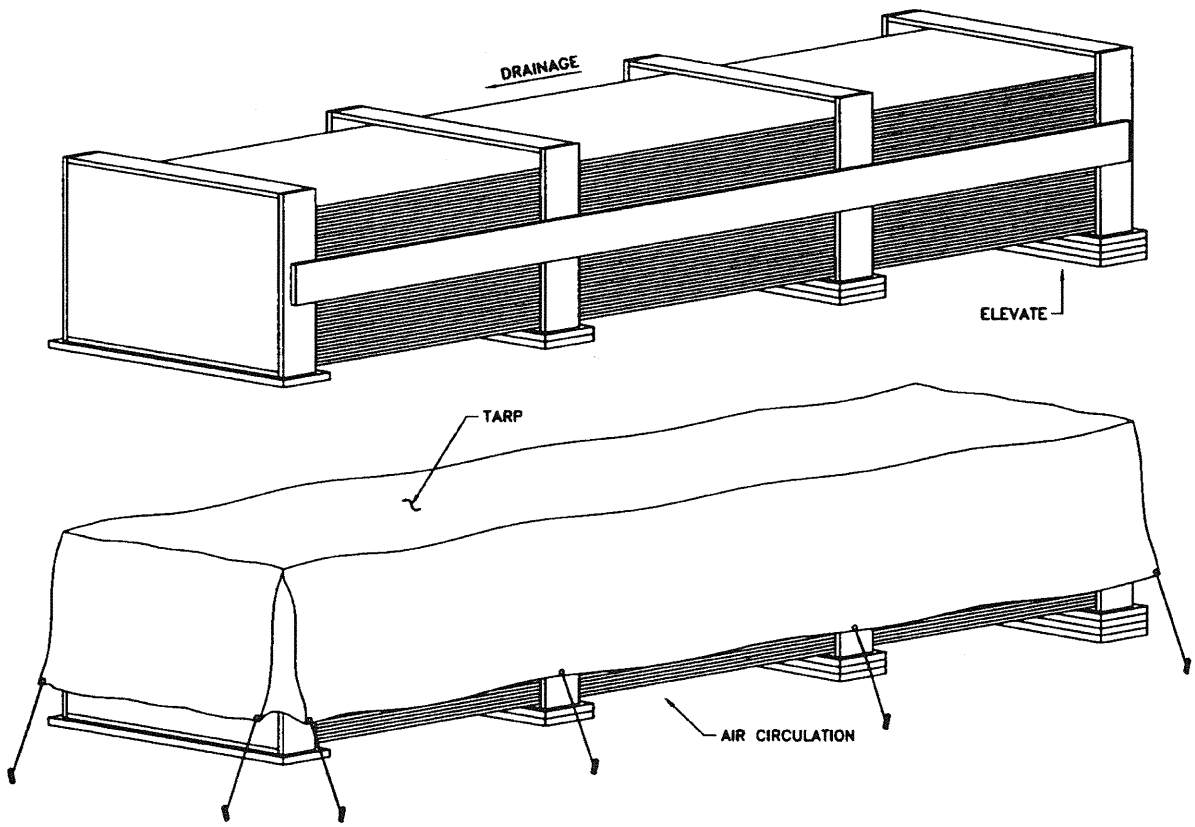
A tractor with loading forks and/or an all terrain forklift is necessary for unloading the components of a metal building. Care should always be taken to avoid damaging material.

NOTE: Long panels may be difficult to handle by lifting the bundle from beneath.
Always spread the forks as wide as possible to prevent panels from bending. Even with the forks as wide as possible, it still may be necessary to lift certain loads with a spreader bar and a crane to avoid damaging material.

Blocking under the gray iron protects the slab from damage during the unloading process.
It also facilitates the placing of slings or cables around the members for later lifting and allows members to be bolted together into sub-assemblies while on the ground. Extra care should always be exercised in the unloading process to prevent injuries from handling the steel and to prevent damage to materials and the concrete slab.

If water is allowed to remain on or in bundles of painted or coated parts for extended periods of time degradation will occur. The end result is shorter matrial life do to corrosion. Therefore, upon receipt of a job, all bundles of primed parts should be stored at an angle to allow any trapped water to drain away and permit air circulation for drying. If environmental conditions are such, tarps should be used to protect materials. Puddles of water should not be allowed to collect and remain on columns or rafters for the same reason.

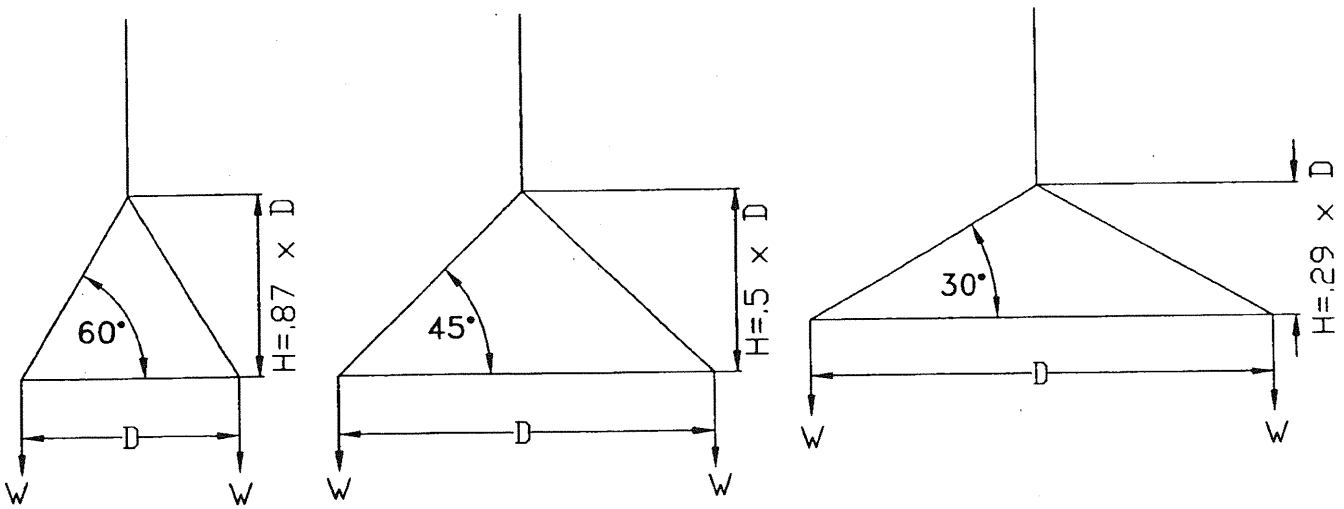
All primer should be touched up as required before and after the erection.



Hoisting General Information and Precautions

NOTE! Erectors with experience in light steel member rigging, and lifting should do hoisting

The diagrams below show tension and hook height for lifting weights at various angles.



Note that cable tension increases as the lifting angle is decreased. It is of inerest to note that if this angle is reduced to 15°, the cable tension is 3.9 times the vertical lift; at 10° it is 5.7 and at 5° it is 11.5. When tension in the cable increases, the compressive or bucking load on the peak rafter section also increases. Slings with low lifting angles should therefore be avoided both to protect the cable and to prevent bucking the rafter.

Safety Note! Check wire rope for broken strands, broken wires and kinking. Replace damaged, unsafe rope immediately. Always use equipment with an adequate safety margin over the lifted load!

Tools

Bridge reamer
Broom, Push
Brush, wire
Cable, ½" diameter
Cable Clamps
Caulking Gun, open barrel
Chalk line, 100' long and chalk
Channel Locks
Chokers ½" cable, 6' long, eyes both ends
5/8" cable, 6' long, eyes both ends
½" cable, 10'-14' long, eyes both ends
Cold Chisel
Come-a-long,
Dolly
Drift pin (barrel pin, bull pin)
Fire Extinguisher
Files, assorted
Hammers
Hand lines (rope), ½" - 5/8" dia., 40' - 60' long with hooks
Load Binders
Pliers, Side cutters
Pop rivet gun (manual or electric)
Punch, center
Sawzall
Sawhorses
Scaffold - section with wheels
Screwdriver sets, flat and Phillips
Shear, portable panel
Slings, nylon, 4" wide, 10'-12' long
Snips, aviation (2 right-hand, 2 left-hand, straight cut)
Snips, large (bulldogs)
Spirit level 4' long
Spreaders, 1 set of ¾" diameter, 20' long, center eye with hook ends
Square, framing
Square, try
Tape measure
Transit & Level rod
Vise grips, sheet metal
Vise grips, standard
Vise grips, welding clamp
Wedge, steel
Wrecking bar
Wrenches
Adjustable
Open or Box end wrenches - (various sizes)
Socket wrench set
Cutting torch with 100' hose, bottle cart
Power Drill & Drill bits
Hammer drill with 6 bits
Impact wrench and sockets
Power nibbler
Power shears
Screw gun
1900 RPM electric screw gun for self-drill screws
Welding hood with spare lens
Welding unit

Structural Framing Precautions

Responsible personnel, experienced in rigging and handling light steel members in a safe manner, should complete the layout, assembly and erection of steel. Improper handling can easily result in injury, delays and unexpected added costs. This is particularly true when raising assembled frames.

Keeping erection costs down

1. When safety practices are discussed and initiated in advance of any work procedures.

2. When the overall work of erecting the building is divided into individual jobs, and when each job is assigned (in proper sequence) to teams of workers consisting of from two to four workers each.

3. When individual workers are properly trained and instructed in advance as to what they are to do and in the safest way to do it. This eliminates time wasted while waiting to be told what to do next.

4. When building parts are properly laid out according to advance planning so as to avoid lost time in repetitive handling or in searching for specific items.

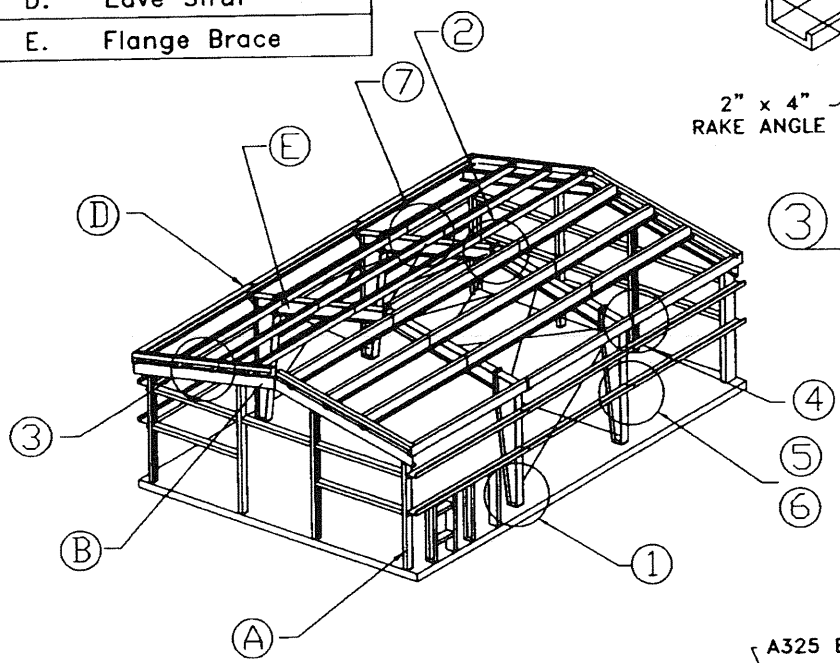
5. When as many parts as can be safely raised in a single lift are bolted together in subassemblies on the ground where assembly work is faster and safer, thereby, requiring fewer lifts and fewer connections to be made in the air.

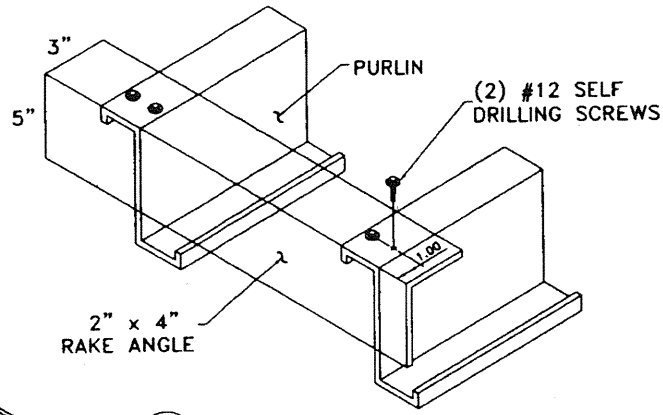
6. When erection of the steel framework starts at one end and continues bay by bay to the other end of the building.

7. When the first bay is completed, the individual frames are erected and tied together by skeleton purlins, and the fill-in purlins are installed after the costly lifting equipment has been released.

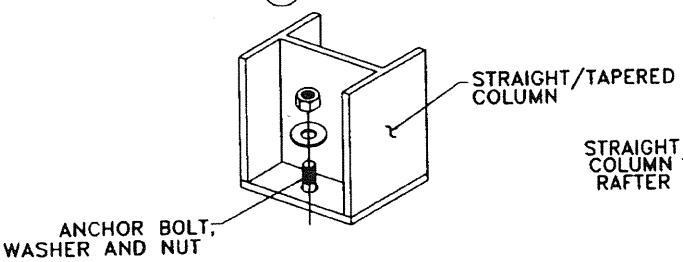
8. When tools and equipment of the proper kind, in good, safe condition, available in sufficient quantity.

Standard Components	
A.	Column
B.	Rafter
C.	Girt
D.	Eave Strut
E.	Flange Brace

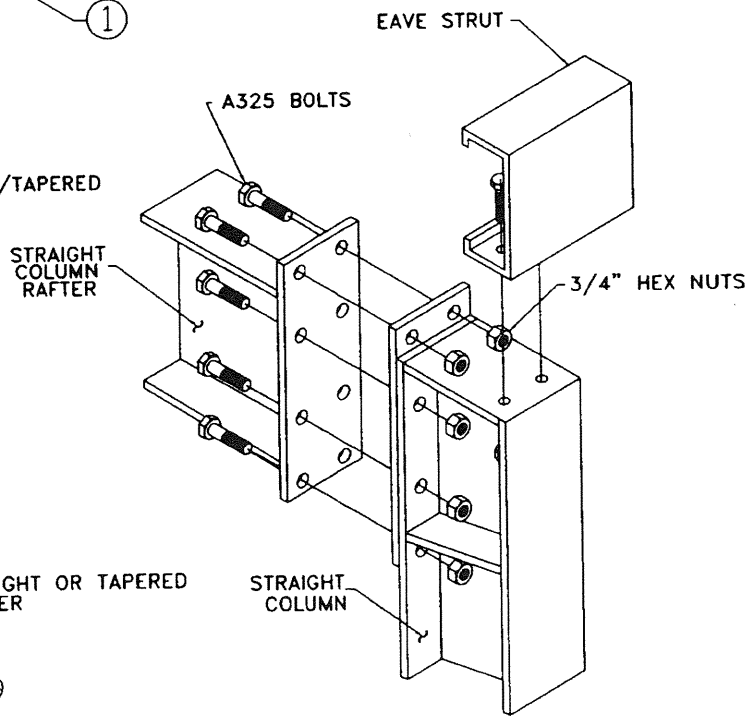




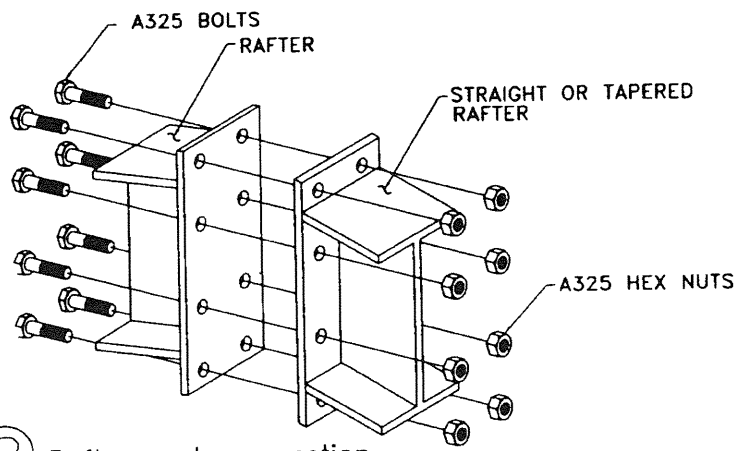
3 Rake angle to purlins



1 Column to anchor bolt



4 Rafter to column



2 Rafter peak connection

	FRAMING DETAILS	PAGE # : 15
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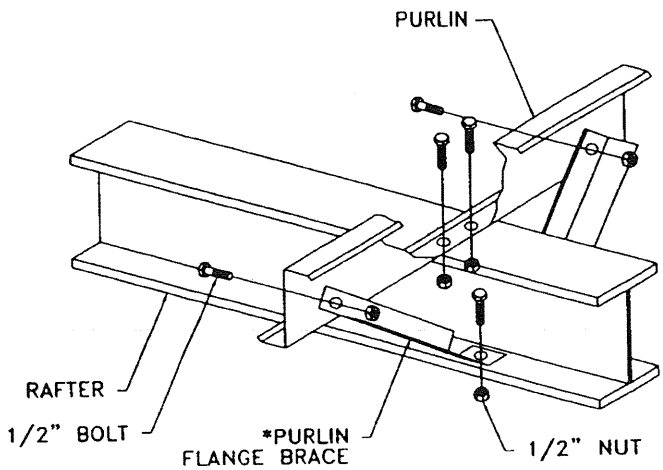
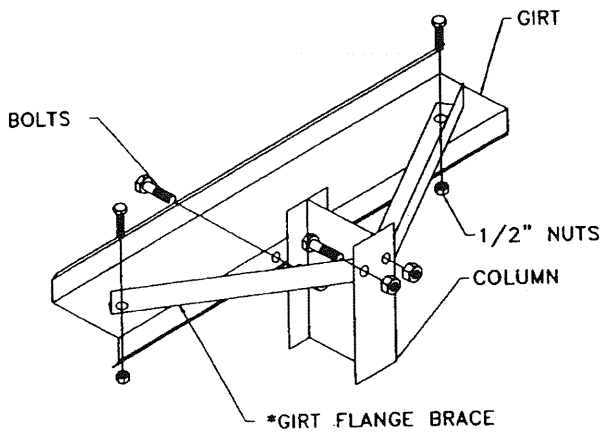
Standard Framing Connections	
1.	Column to anchor bolt
2.	Rafter peak connection
3.	Rake angle to purlins
4.	Rafter to column
5.	Bypass girt to column
6.	Flush mounted girt
7.	Purlin to rafter



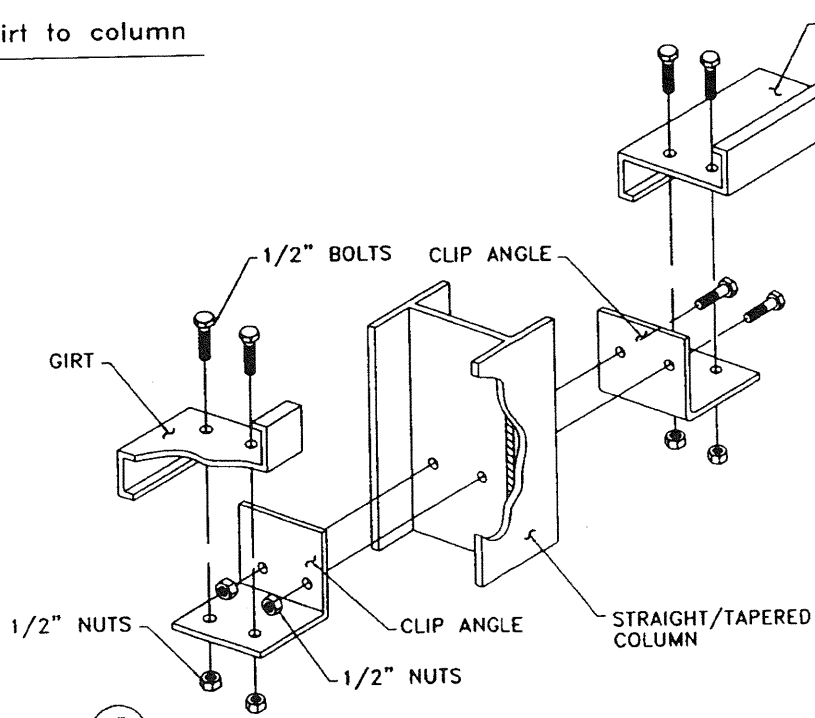
* = SEE CONSTRUCTION DRAWINGS FOR PROPER LOCATIONS.

7 Purlin to rafter



* = SEE CONSTRUCTION DRAWINGS FOR PROPER LOCATIONS IF REQUIRED

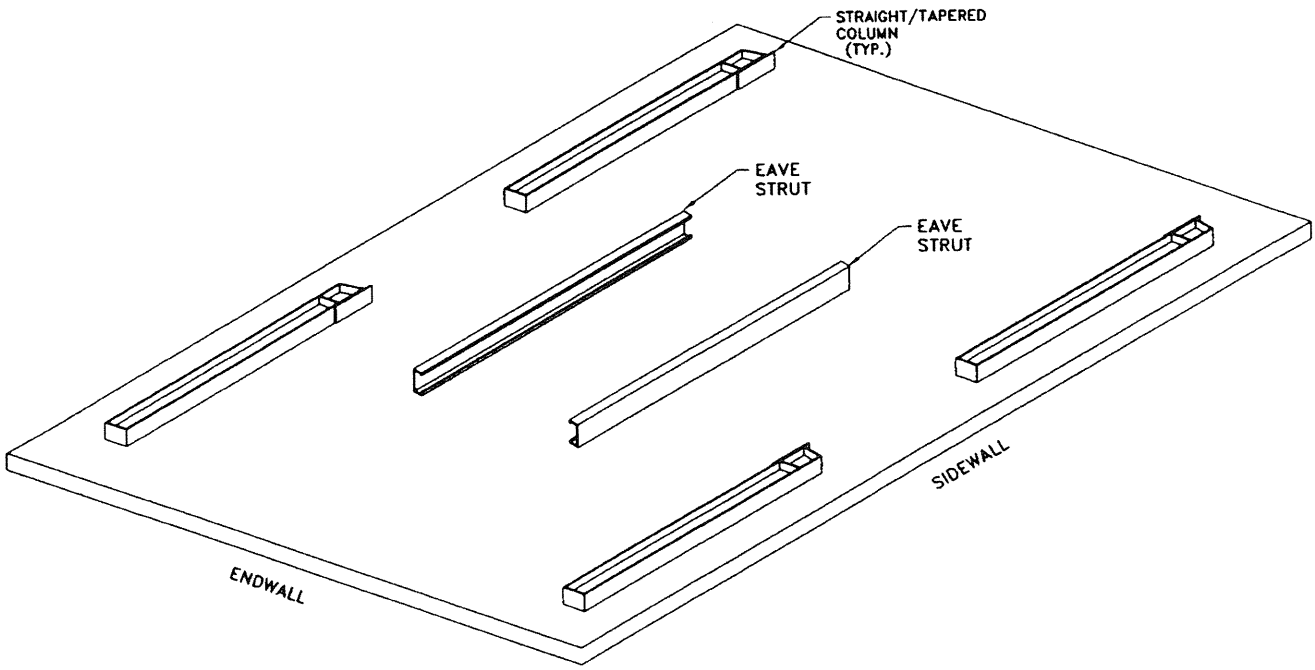
5 Bypass girt to column



6 Flush mounted girt

PRE-ERECTING THE FRAMING

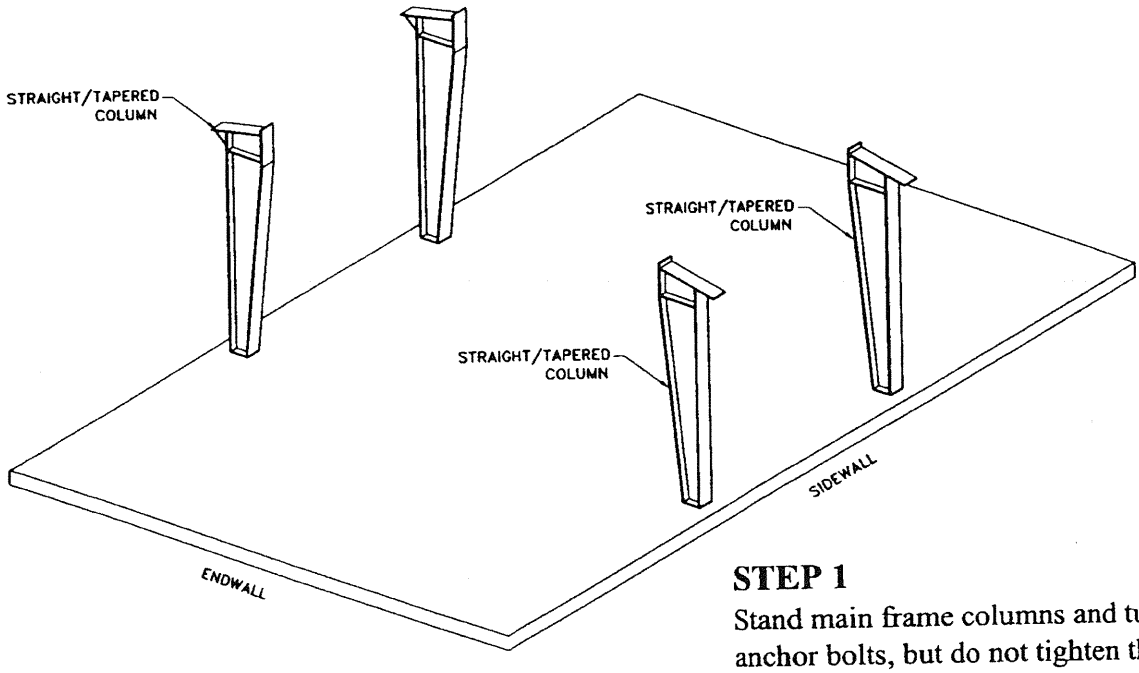
Lay out one bay of columns and eave struts as shown in below diagram. When material is laid out as in the below diagram, it is much simpler to keep the erection speed at a constant during the erection of the building.



Note:
Remember before erection of the building that all the checklist has been gone through and all needed equipment is onsite. If not all the proper equipment is at the job site, the erection may take longer and also raise the cost of the erection.

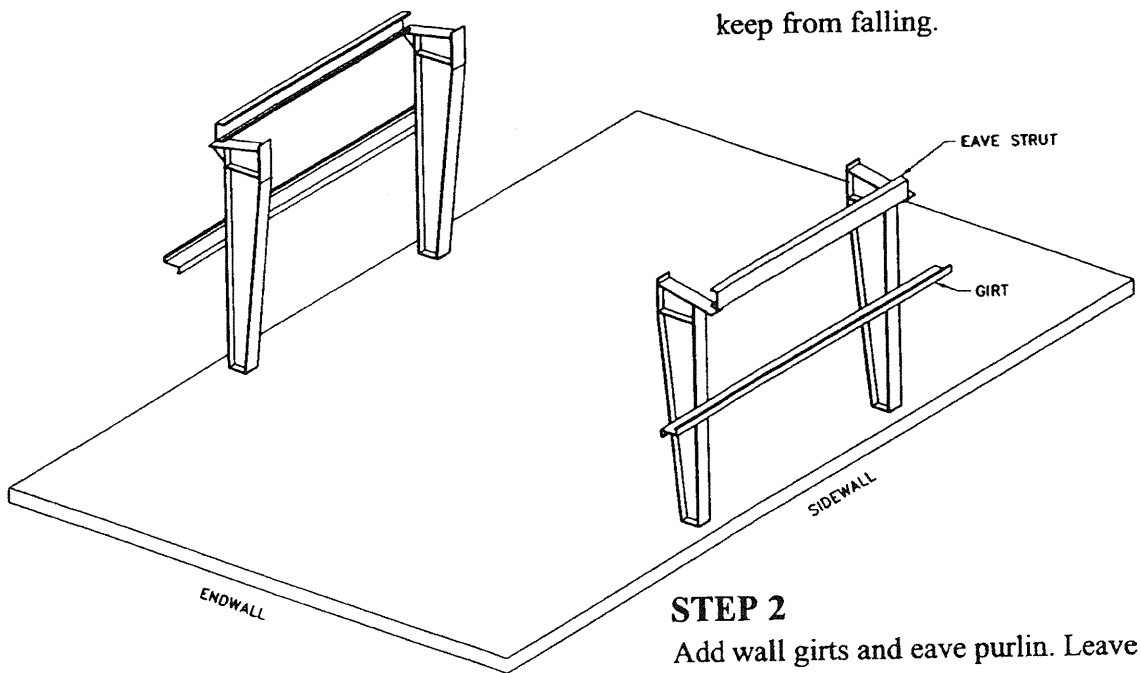
ERECTING THE FRAMING

The intermediate or interior frames nearest the bearing endwall are usually erected first. This bay usually contains the diagonal bracing. The proper completion and plumbing of this bay is extremely important to the successful completion of the building.



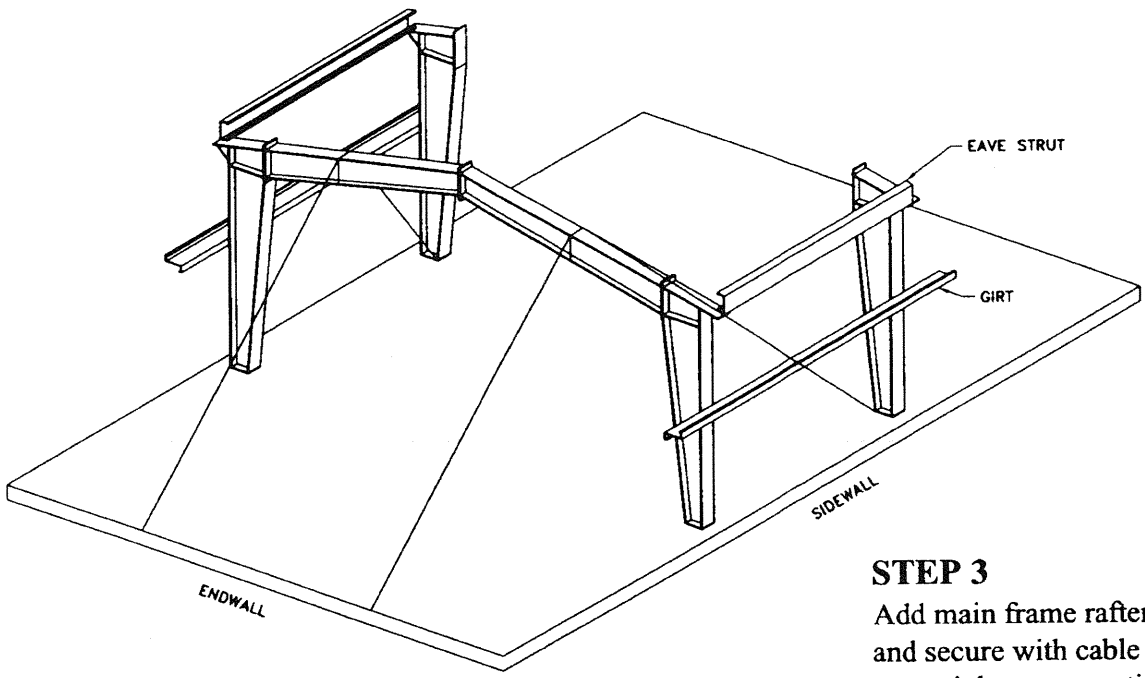
STEP 1

Stand main frame columns and turn nuts on anchor bolts, but do not tighten them now. Frames may need temporary bracing to keep from falling.



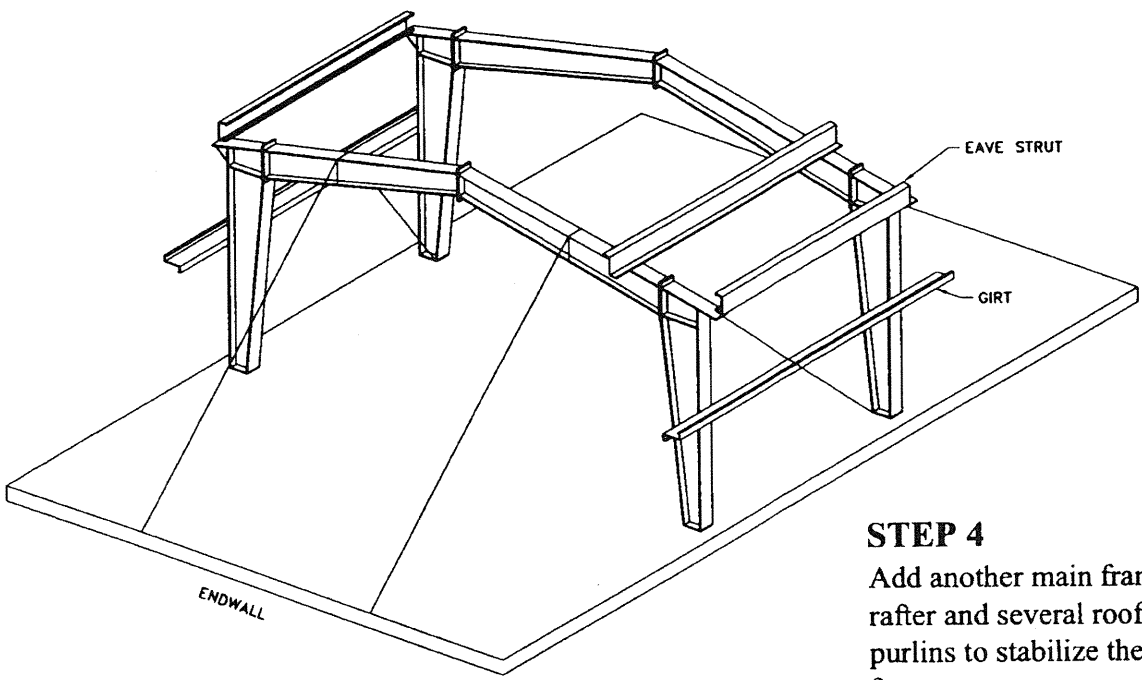
STEP 2

Add wall girts and eave purlin. Leave bolts and nuts finger-tight for now.



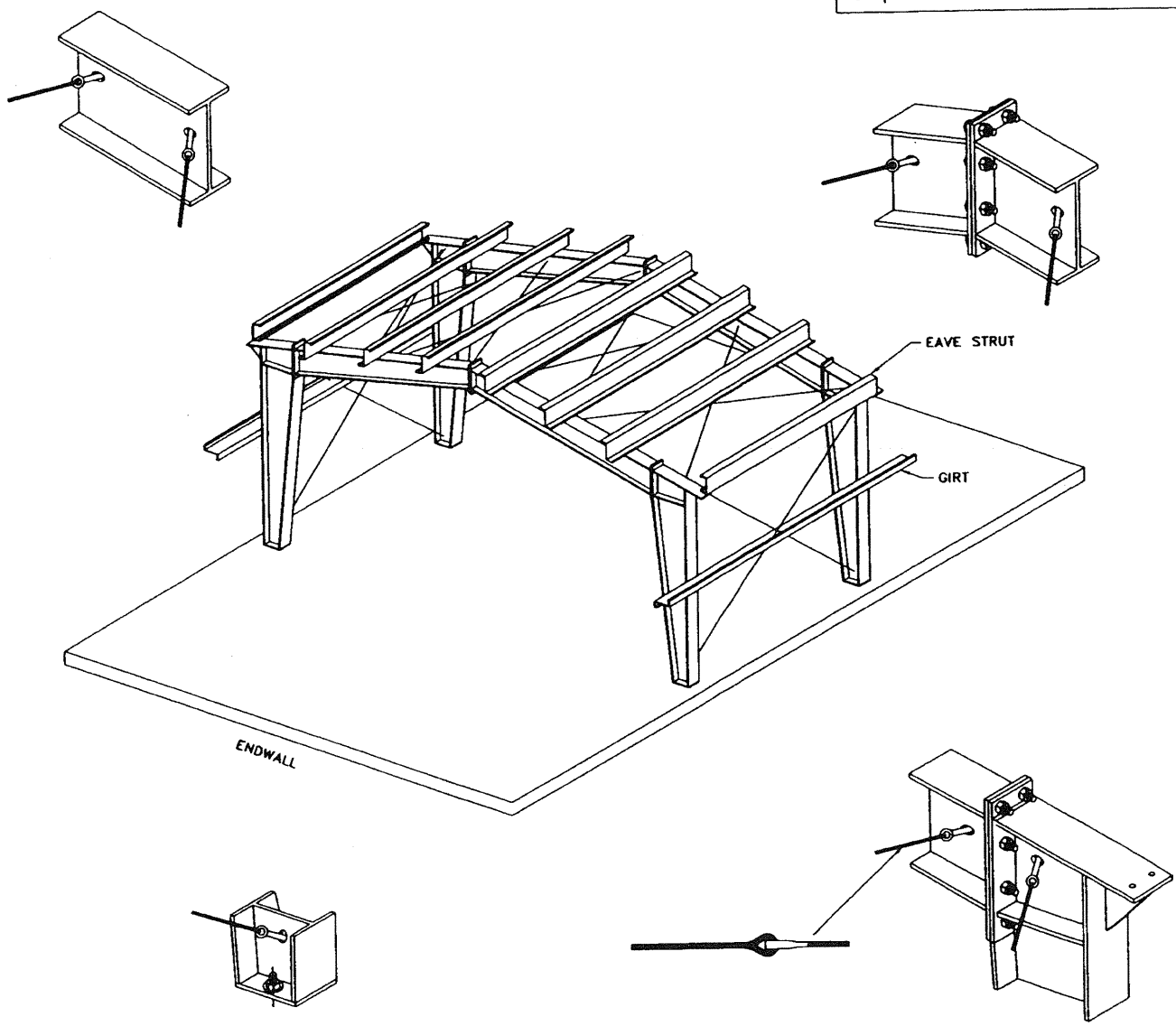
STEP 3

Add main frame rafter and secure with cable or rope, tighten connection bolts snug.



STEP 4

Add another main frame rafter and several roof purlins to stabilize the frame.



STEP 5

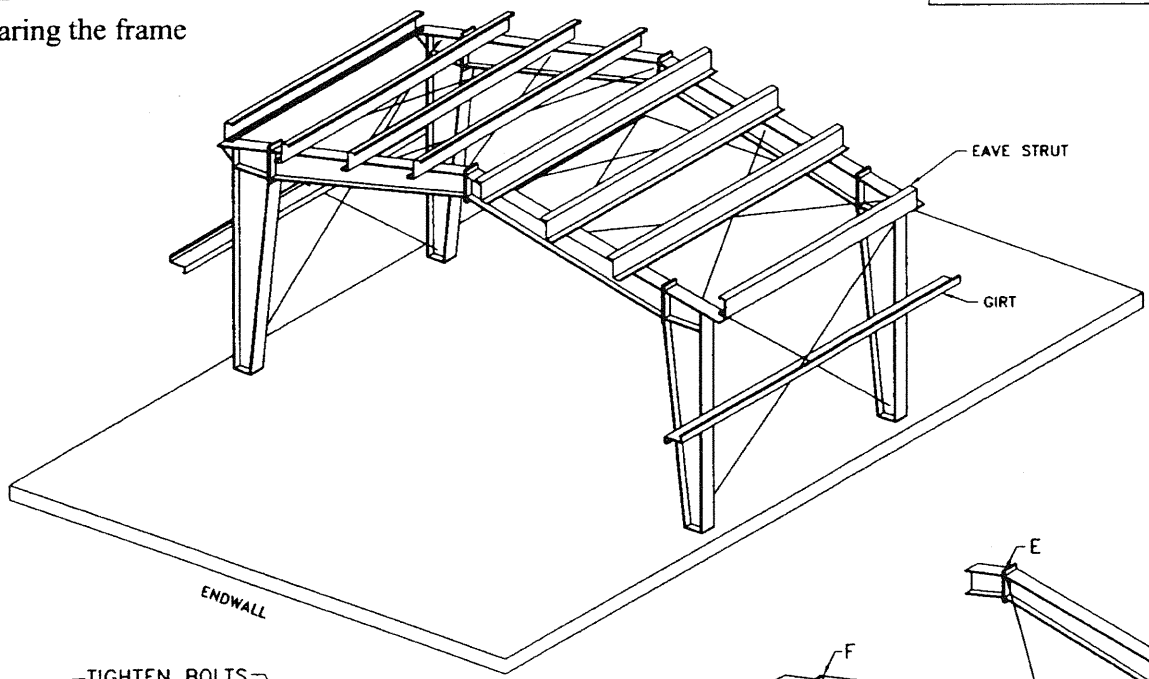
COMPLETING, ADDING CABLE BRACING AND PLUMBING THE FIRST BAY

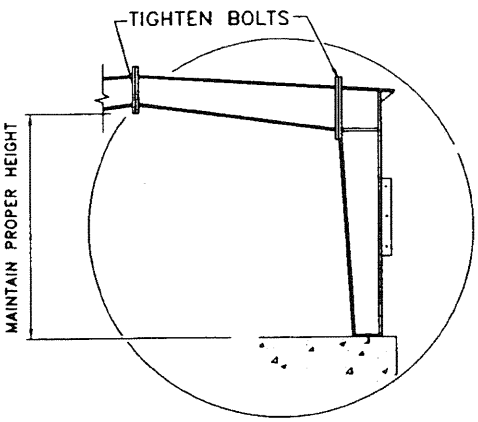
After the first interior frames have been set, it is recommended that all purlins, girts and eave strut be installed with all bolts only snug. Additionally, the cable bracing should be added to the entire bay before proceeding further.

When this bay is properly and accurately plumbed and braced, the remaining members will automatically plumb and align themselves, when installed, to a large degree. Only a final check of the building plumb remains, and few adjustments, if any will be necessary.

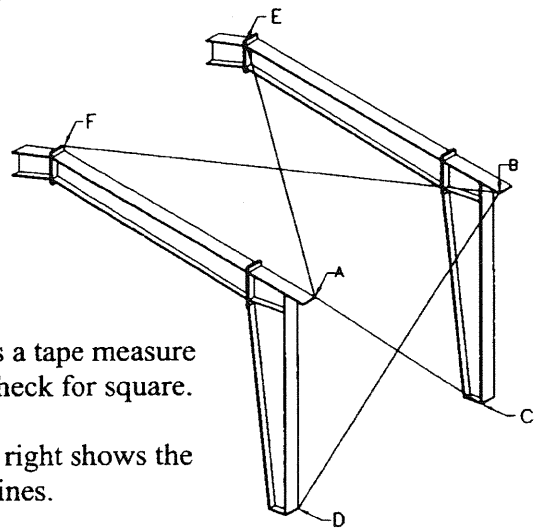
STEP 6

Squaring the frame





For buildings with an eave height of less than 16', a level with a minimum length of 4' can be used to plumb the framing.



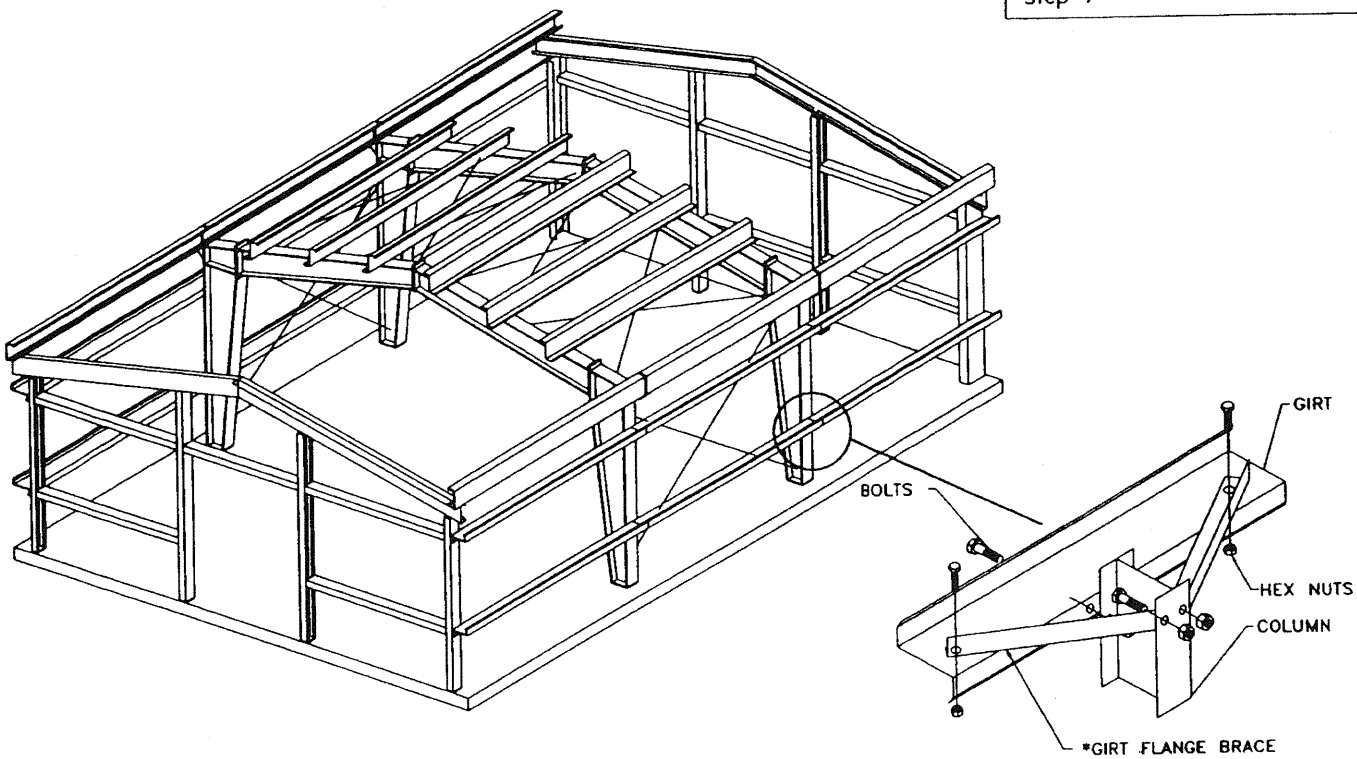
For larger buildings a tape measure should be used to check for square.

The example to the right shows the typical measuring lines.
Distance AC = BD
Distance AE = BF

Every column must be checked for plumb and every bay must be checked for square. A final check of building plumb is necessary and required adjustments must be made.

To adjust the building, start by putting minimal tension on the x bracing in an even fashion, measure and check for plumb and square. When the building is close to square, tighten all bolts to snug, and measure again. Continue to measure and tighten all around the frame until all bolts and cable bracing are tight, and the building is square.

Other methods of squaring such as the use of a transit are acceptable, however these processes are too in-depth to cover in this manual.



STEP 7

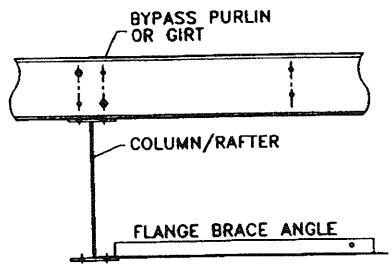
Endwall Framing: Add endwall columns, girts, rafters and eave struts.

When the remaining frame work is standing, the structure should be plumbed and squared. Refer to page 22 for basic plumbing and squaring techniques. Square the roof with the use of the cable braces. Taking diagonal measurements and adjusting the tension of the x-bracing will square the roof and aid in plumbing the endwalls. Some buildings will also have cable bracing in the endwalls which will additionally need to be adjusted tight while the frames are square.

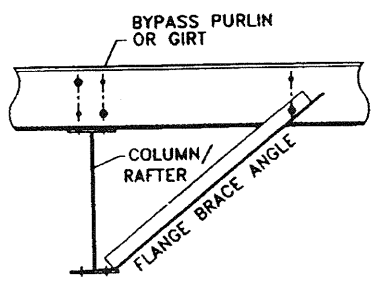
When the entire frame is square add the remaining girts and purlins in the same fashion as before. Additionally install flange braces, as defined in the erection drawings provided with your building. See example at right.

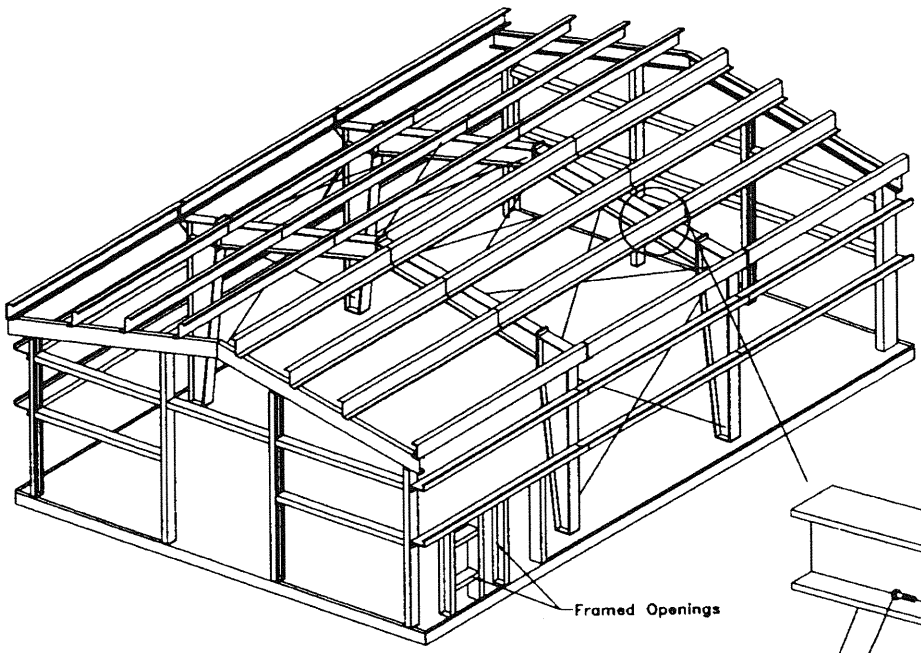
Typical examples of flange brace applications used to support roof purlins, and wall girts. In most applications the braces are on both sides of the column or rafter. (Refer to the erection drawings specific to your building for the exact locations of the flange braces)

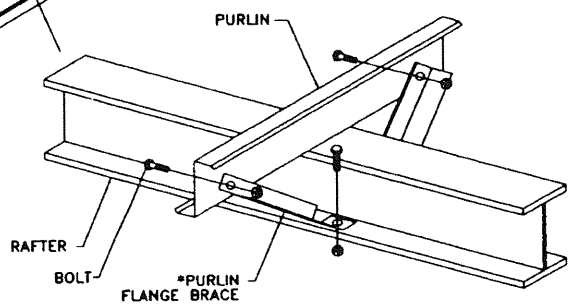
Step 1
Attach the flange to the column or rafter



Step 2
Bend the flange to the girt or purlin and attach







* = SEE CONSTRUCTION DRAWINGS FOR PROPER LOCATIONS.

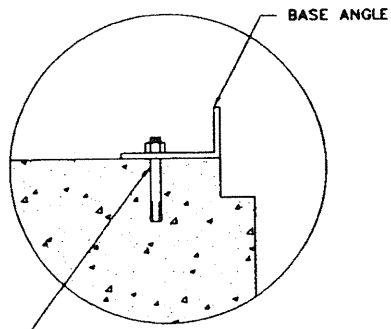
STEP 8

At this point in the erection, any accessories that you have ordered with your building such as doors and windows should be accommodated for. Refer to the accessories section of this manual for any accessories that are pertinent to your building, and then refer to the erection manuals for details specific to your building.

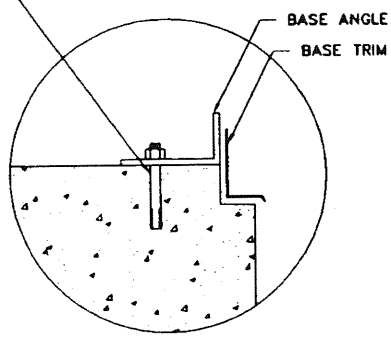
STEP 9

After accommodations for any framed openings have been made, it is necessary for the base angle to be applied. Base angle is to be applied all the way around the concrete slap, except where openings are located. The base angle provides a clean solid edge for the bottom of the wall panel to anchor to.

Fastener must be adequate to safely resist the loads in the reaction report. (If applicable)



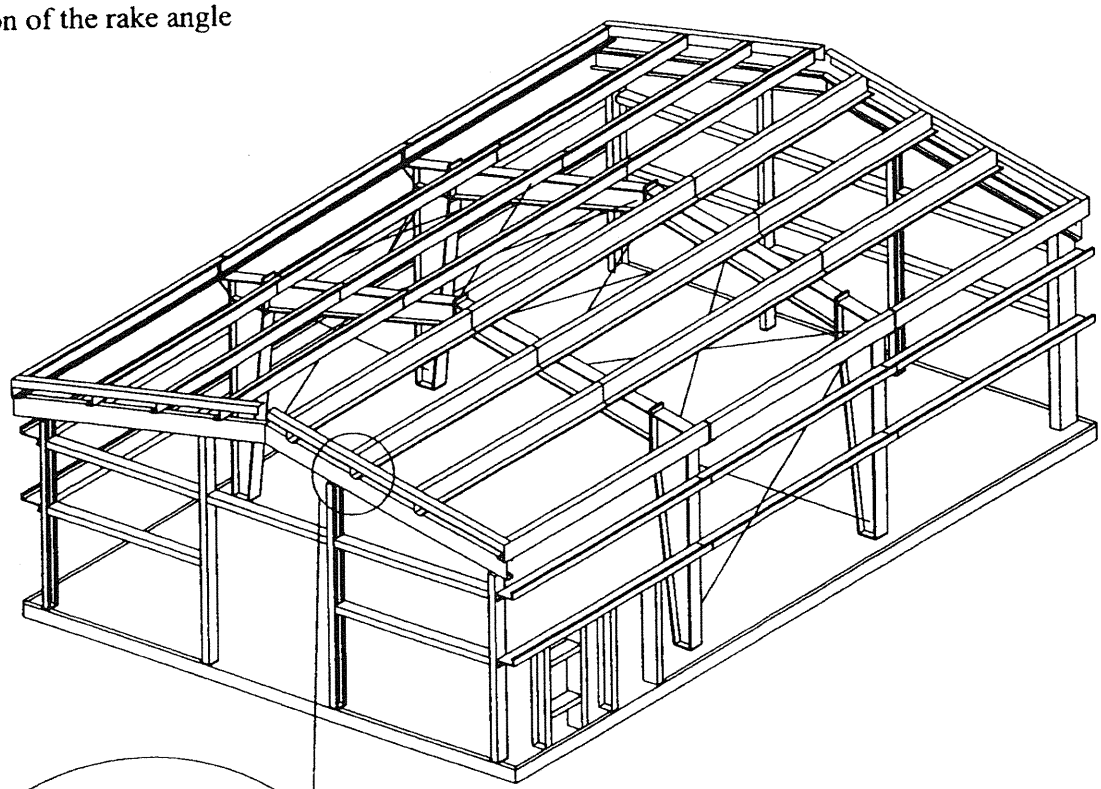
BASE ANGLE DETAIL

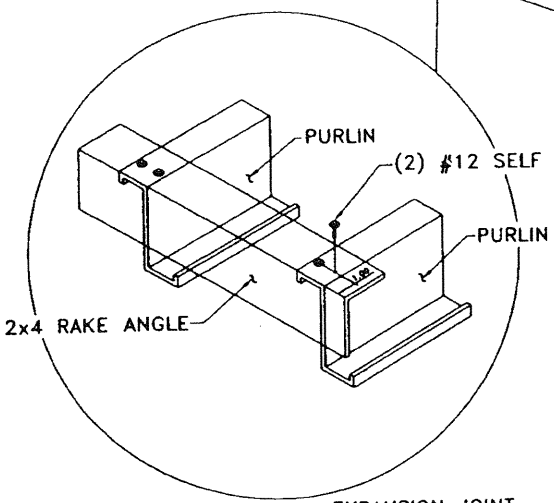


BASE ANGLE DETAIL / W BASE TRIM (OPTIONAL)

STEP 10

Installation of the rake angle

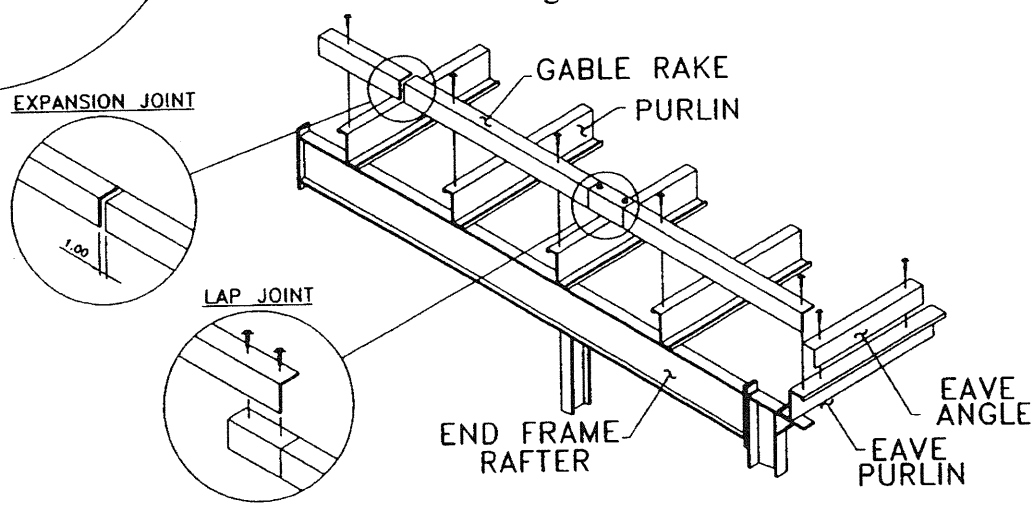




STEP 10

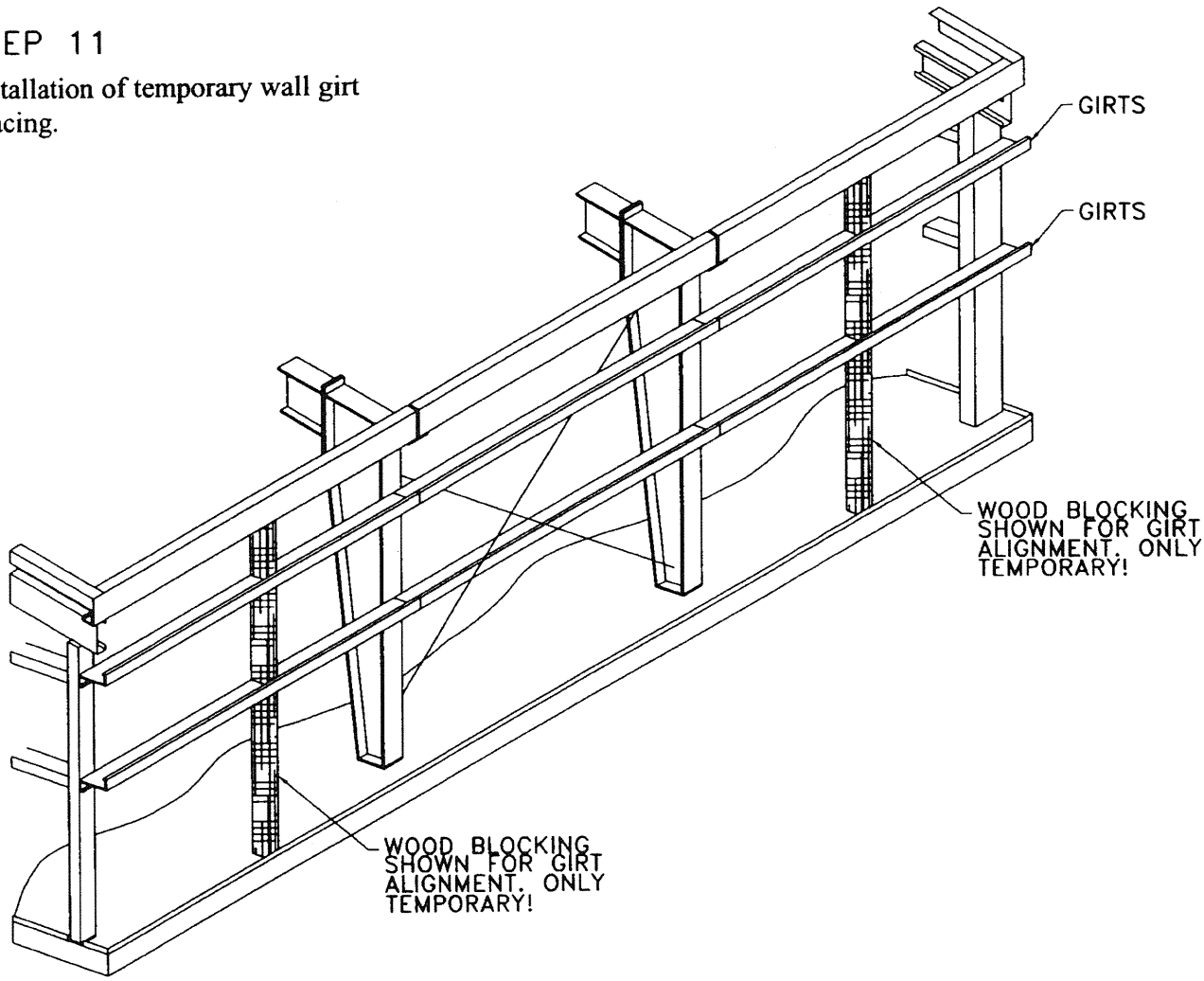
Installation of the rake angle.

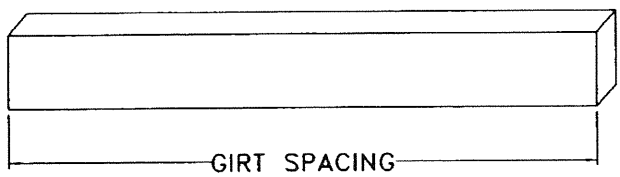
The rake angle provides added rigidity to the purlins and gives the wall panels a clean mounting surface.



STEP 11

Installation of temporary wall girt bracing.





Use rough lumber as temporary braces for wall girts. Cut brace length that will hold girts at the same height in center of bays as the height where girts attach to the structural columns. This will provide uniform screw lines when attaching wall sheets to girts. After the wall sheets are in place, remove these braces from the inside.

Step 12

Final Structural Framing Inspection

•Conduct final inspection on all structural bolts

Be sure that all connections have proper amount, size, and type of bolts installed, and are properly tightend.

Note: Turn of the nut method:
Bolts shall be installed in all holes of the connection and brought to a snug tight condition. Snug tight is defined as the tightness that exist when the plies of the joint are in firm contact. This may be attained by a few impacts of an impact wrench or the full effort of a man using an ordianry spud wrench. Snug tightening shall progress systematically from the most rigid part of the connection to the free edges, and then the bolts of the connection shall be retightened in a similar systimatic manner as neccessary until all bolts are simultaneously snug tight and the connection is fully compacted. Then all bolts shall be further tightened by 1/3 of a turn. During the tightening operation there shall be no rotation of the part not turned by the wrench. Tightening shall progress from the most rigid part of the joint to it's free edges.

•Check wall for plumb and make necessary adjustments using shims where required

Check all framed openings for square and plumb.

•Apply touch-up primers to areas where field modifications were performed.

SHEETING INSTALLATION

General Sheeting Instructions

- Identify the sidewall sheets, the end wall sheets, and roof sheets. Prearrange them in a convenient location near the portion of the building being worked on. Be certain to use the correct length of sheet before fastening it to the building.

- Be sure all sheets are secured or protected from the wind at all times.

- Install the sidewalls sheets first, beginning on the side away from the primary source of the building, such as the rear of the building. This will produce the best appearance, because the sheeting laps will be on the side away from the viewer.

> -Do not use tape sealant on laps when sheeting sidewalls

- Install the endwall panels next, again concealing the laps away from the front view of the building.

> -Do not use tape sealant on laps when sheeting the endwalls

- The roof sheets are installed last. Start these so that the laps are away from the prevailing wind. It is standard practice to use tape sealant on laps when sheeting the roof.

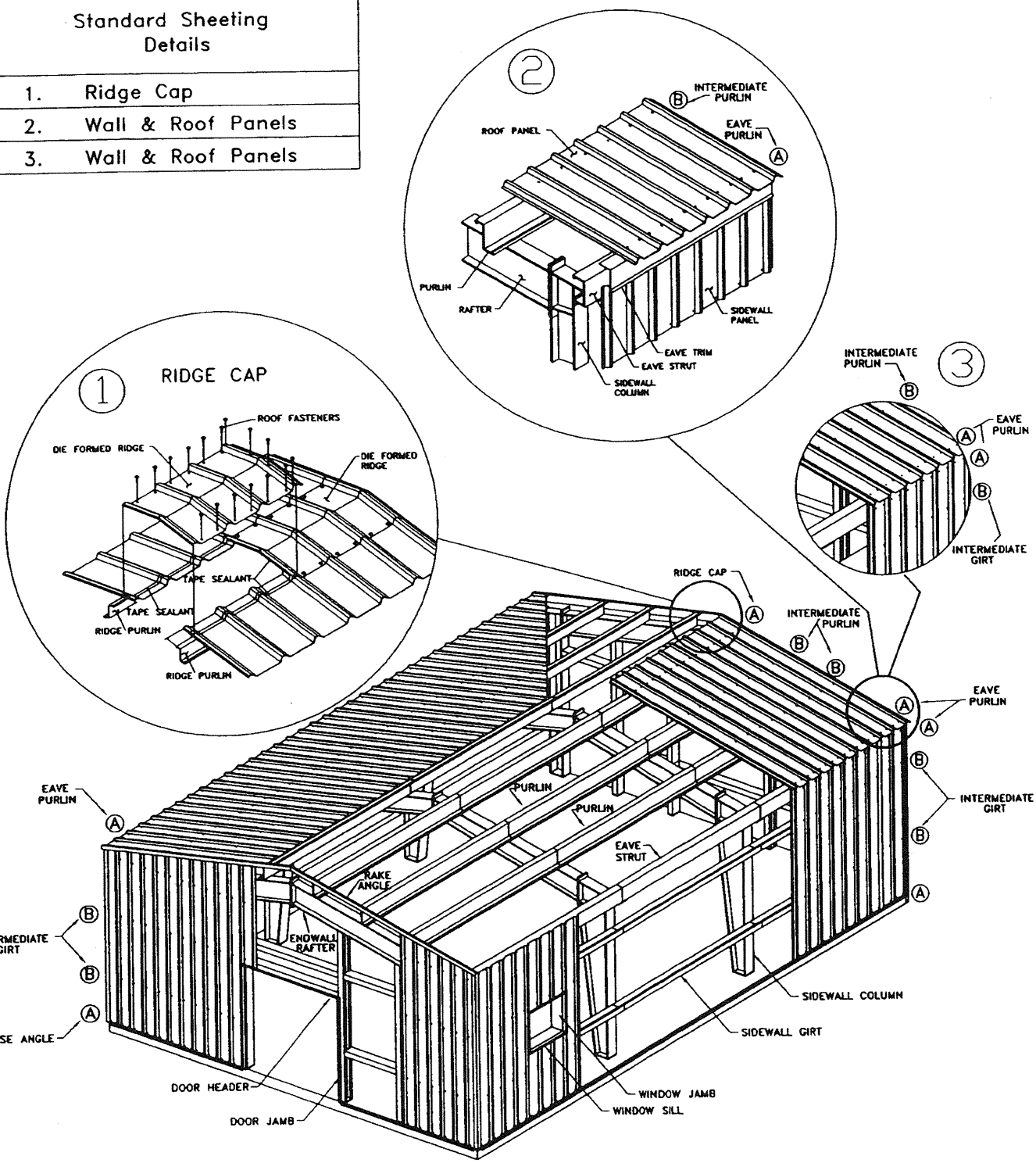
- Use self-drilling screws #14 S.D.S at all locations where screws go through only sheeting or trim. Use self-drilling screws #12 S.D.S at all locations where they go through both sheeting and purlins or girts.

- For effective results, it is vital that an adjustable torque screw gun with 2,500 RPM be used for the self-drilling screws supplied with your building. Failure to use a 2,500-RPM gun speed will result in broken drill points on these screws.

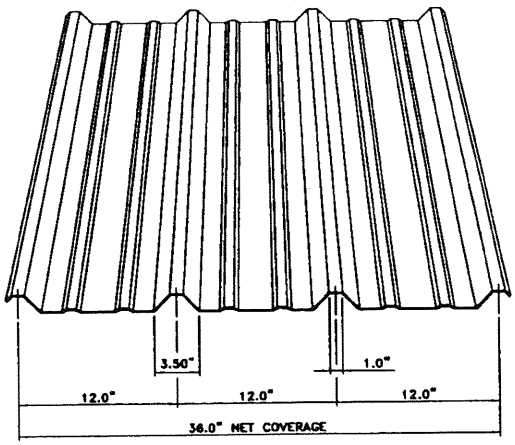
> Note - Occasionally the rubber washer may spin out from under the self-drilling screw head, replace it with a new self drilling screw. If this becomes frequent, reduce the torque on the screw gun or replace it as needed.

> Note - Occasionally the screw holes of a self tapping screw may become oversized, use a #17 x ¾" (by others) self tapping screw to correct this. If this becomes frequent, reduce the torque on the screw gun or replace it as needed.

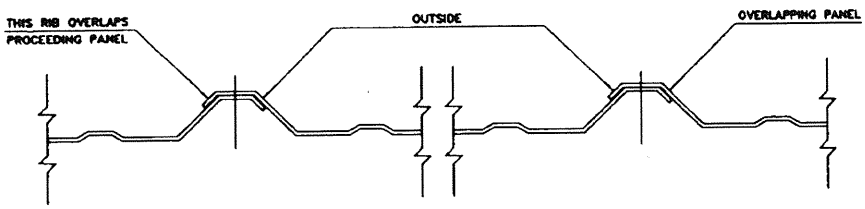
Standard Sheeting Details	
1.	Ridge Cap
2.	Wall & Roof Panels
3.	Wall & Roof Panels



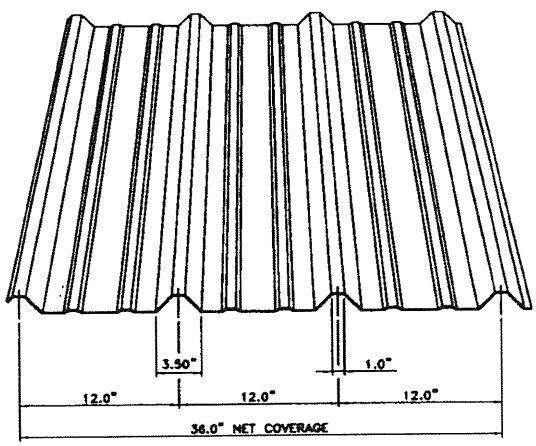
R PANEL DETAIL



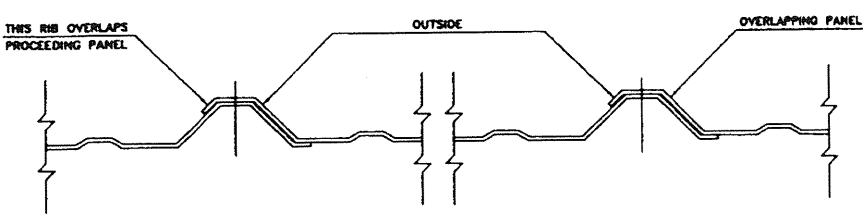
The "R" panels are designed for both roof and wall applications. Its symmetric profile allows for installation without regard to sheeting direction. Sheeting can be started from either end of the building; however, by applying the sheets towards the direction of the prevailing view, the overlap line on the side of every third rib will be less visible. Where heavy prevailing winds occur, place the edge to be lapped into the wind.



PBR PANEL DETAIL



The "PBR" panels are designed for roof applications, but may be installed on the wall. The profile is the same as the R panel except for the addition of the support leg on the leading edge on one side. Erection of this panel requires that the proper direction of its application be established. The support leg allows for better nesting with the overlapping rib of the next panel. As shown below, the installation of the panels would proceed from left to right.

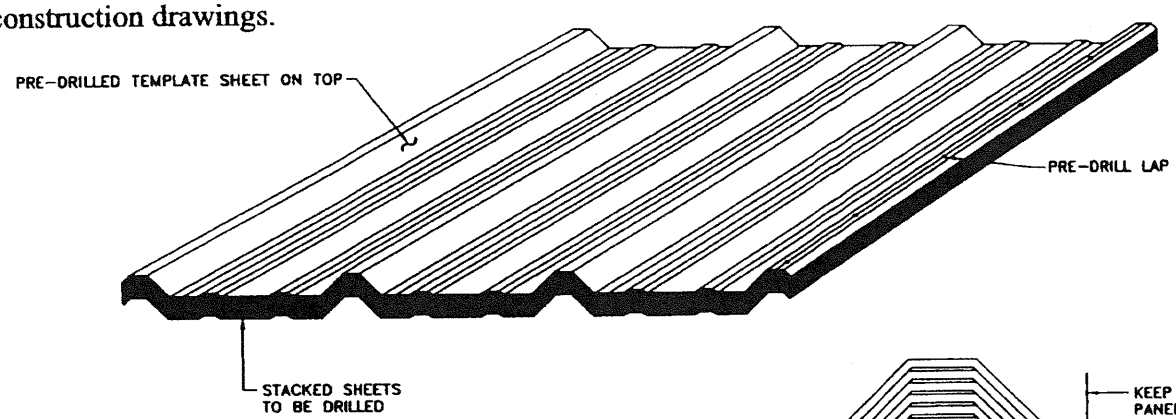


Step 1 wall panel installation preparation

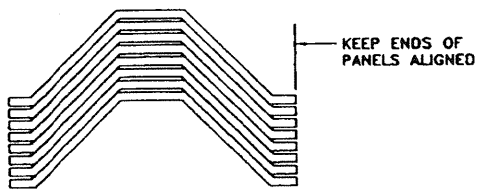
Pre-drilling the High Lap Rib for Self Tapping Screws

Good alignment of the screws on the wall panels, will give the wall paneling a professional appearance. The best way to accomplish good fastener spacing is to pre drill fastener holes in the panels in identical locations.

WARNING - Reverse rolled panels require a differnt screw patterns. Please refer to your construction drawings.



Prearrange the sheeting in stacks near the area convenient to where they will be attached to the building. Measure the lengths of the sheets and check them with the area to be covered (pay special attention to the lengths so that you have appropriate materials to complete the sheeting.)



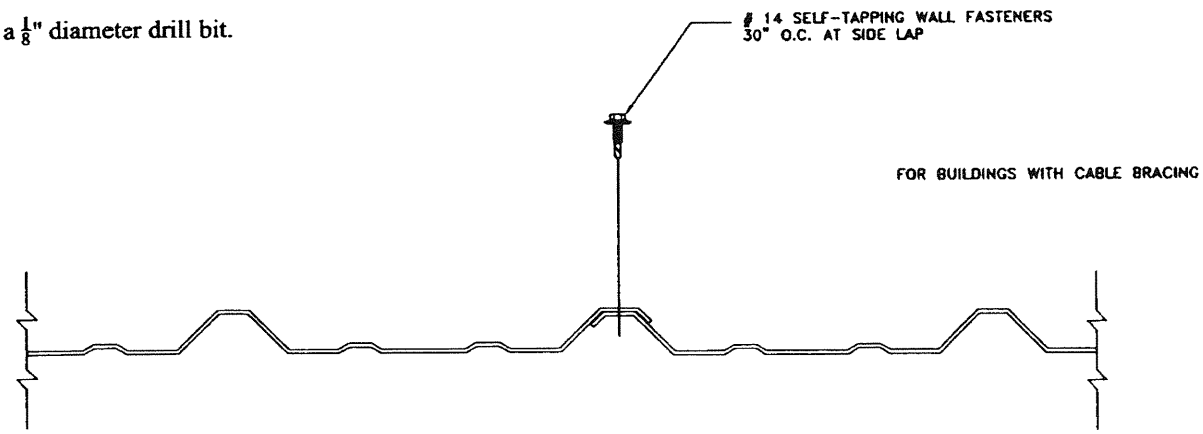
Make certain that the sheets at one end of the stack are lined up - this end should be set at the base of the building. Secure the stack firmly while drilling to prevent misalignment.

Stack the wall sheets to be pre-drilled with no more than 6 sheets to a stack.

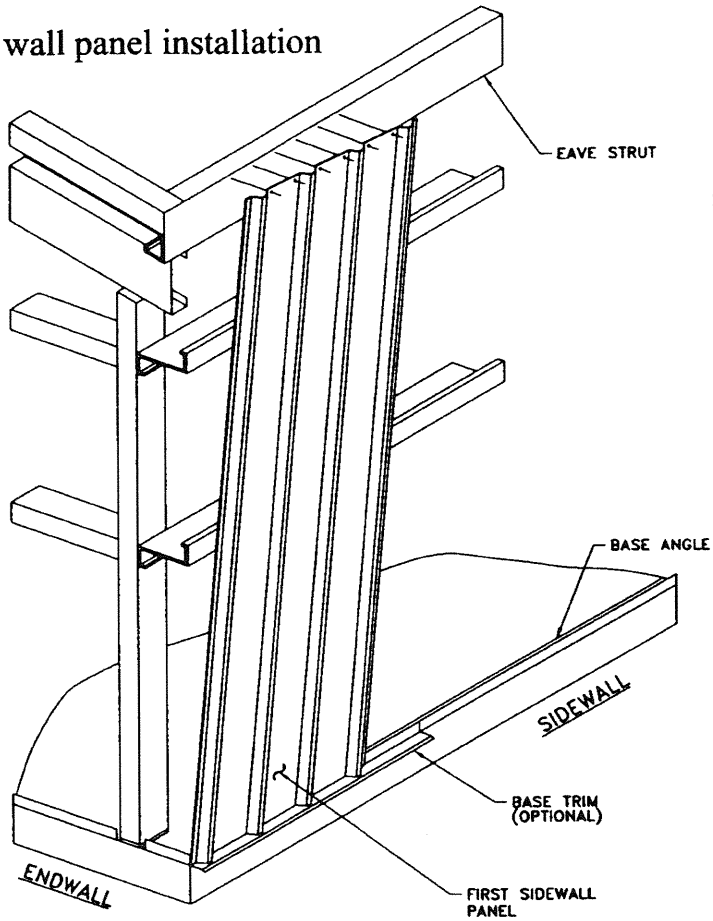
On the exterior lapping rib, mark the pilot hole to be pre-drilled. Start the pilot holes $1\frac{7}{8}$" from the base, and space them at every 30". (Refer to the erection drawings provided for specific spacings.)

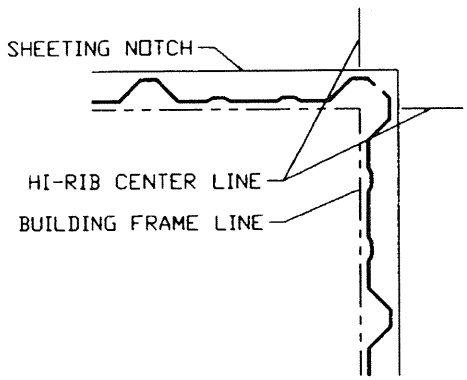
Pre-Drilling one lap on each panel should be sufficient, giving uniform spacing at panel connection. Screw placements for girt attachments can easily be marked with a chalk line as panels go up.

Use a $\frac{1}{8}$" diameter drill bit.



Step 2 wall panel installation





Note: If wall insulation is in your building, it should be installed prior to sheeting the walls Refer to the Insulation section.

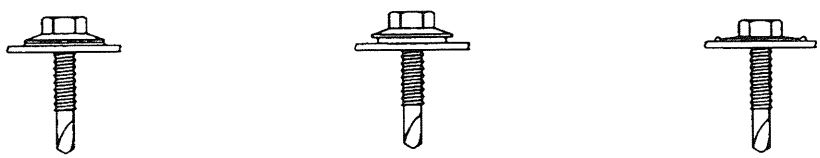
Take note of the primary point of view of the building. Start the siding at the opposite end of the building so the the laps will be hidden from view.

Start the paneling so that the first high rib center line is in line with the edge of the framing. As shown in the top right corner of this page. (Unless noted on construction drawings)

Before installing the first wall panel, notice the diagram on the next page, illustrating the standard ways of fastening the panel to the girts, base angle and the purlin angle.

Continue the sheeting until the entire sidewall is covered.

FASTENER INSTALLATION *

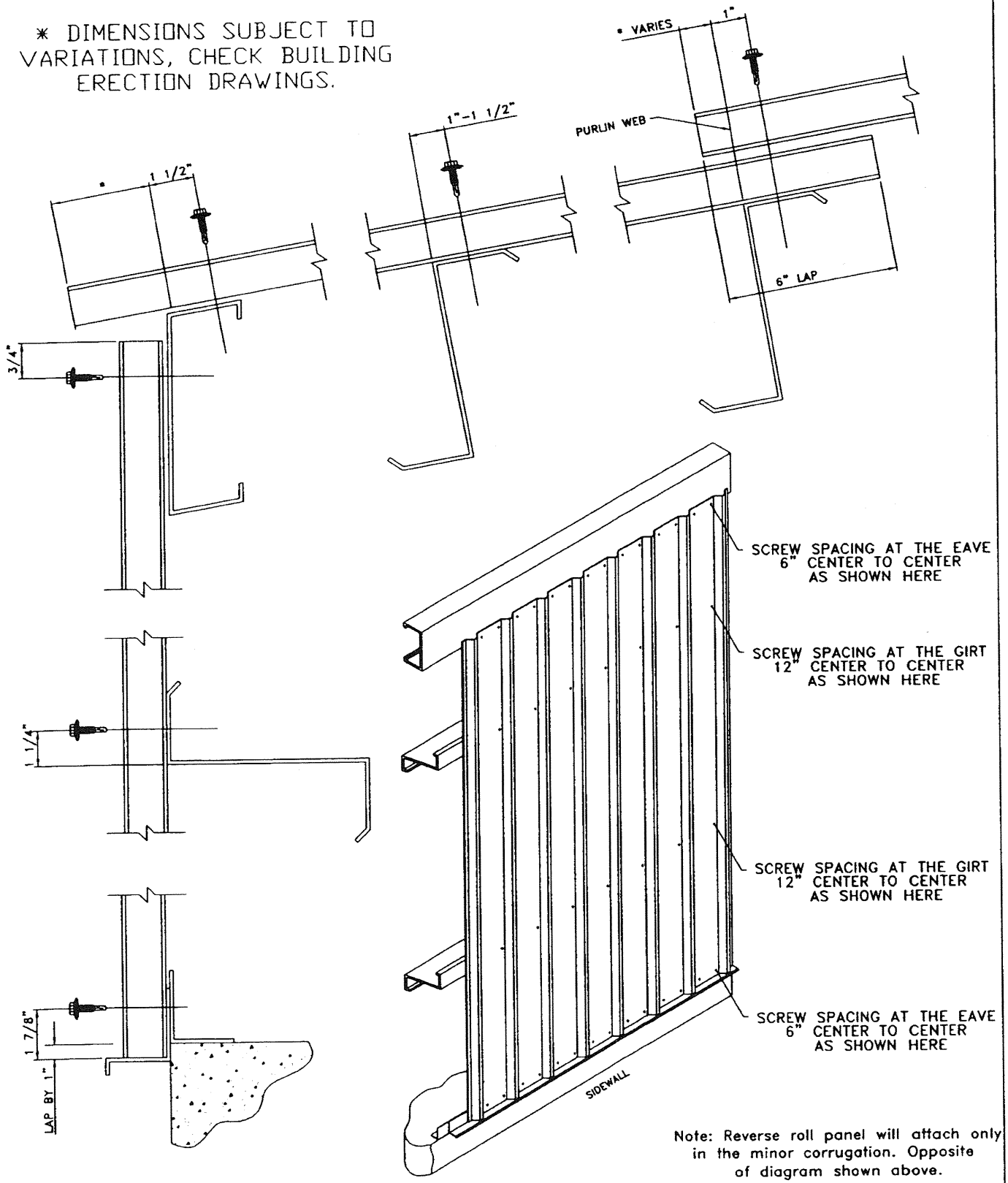


CORRECT | TOO LOOSE | TOO TIGHT

IT IS EXTREMELY IMPORTANT THAT PANEL FASTENERS BE INSTALLED PERPENDICULAR TO THE PANEL SURFACE AND WITH THE CORRECT AMOUNT OF TORQUE APPLIED FOR TIGHTENING TO INSURE PROPER SEALING OF THE WASHER.

* FOR PANEL FASTENERS WITH WASHERS ONLY.

* DIMENSIONS SUBJECT TO VARIATIONS, CHECK BUILDING ERECTION DRAWINGS.



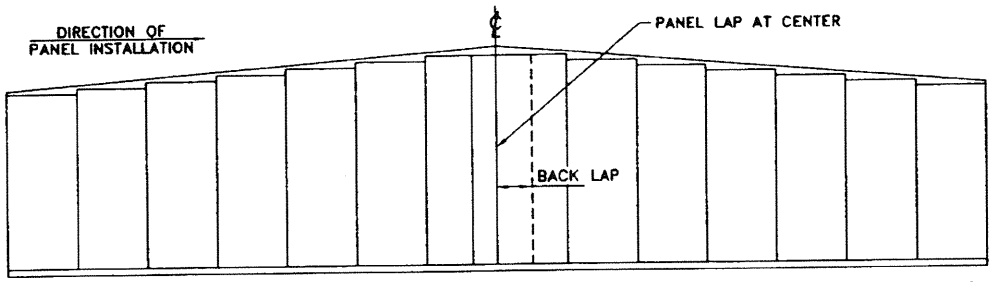
Note: Reverse roll panel will attach only in the minor corrugation. Opposite of diagram shown above.

Diagram represents the #12 self-drilling fasteners.

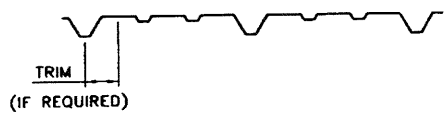
Step 3

Installation of the endwall panels

Install the endwall panels in the same fashion that the sidewall panels were installed. For the endwall, you will have to pay more attention to the panel length due to the slope. Take measurements of the area to be covered, and lay the appropriate panels out ahead of installation to ensure the correct panel placement.

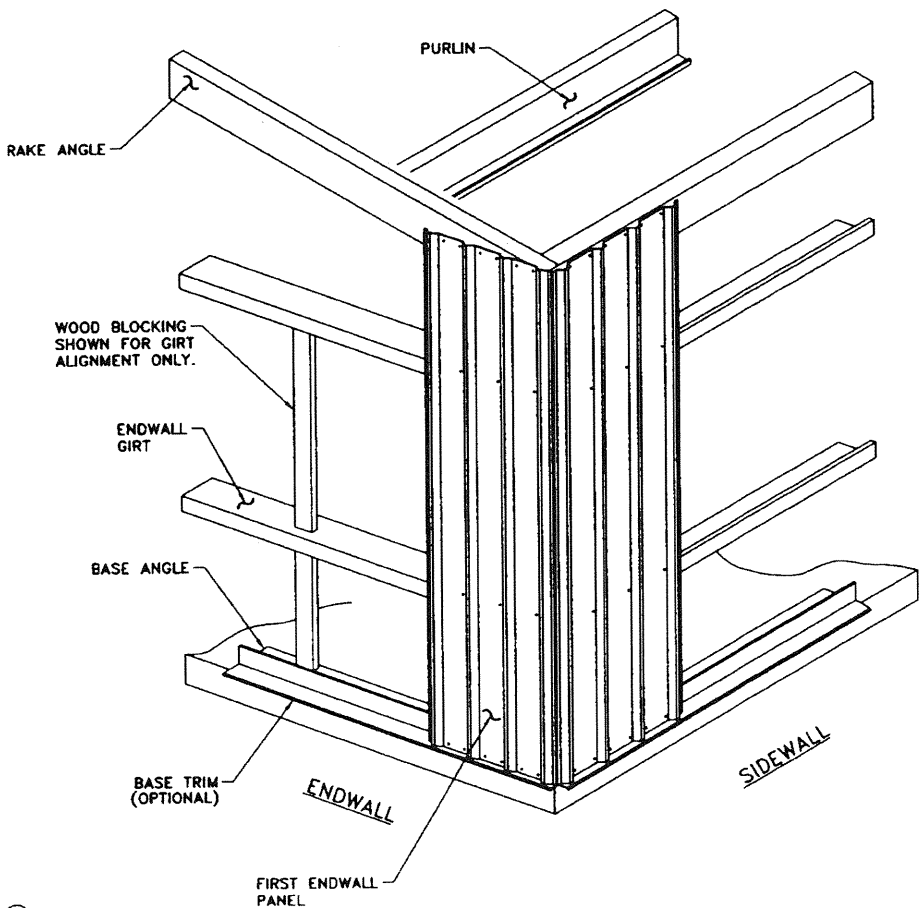


ENDWALL ELEVATION



THE TRIM DIMENSION IS MEASURED FROM THE CENTER OF THE FIRST MAJOR RIB. (REFER TO THE ERECTION DRAWINGS)

Note: For slopes of 2:12 or greater, top of endwall panels will have to be cut to follow the slope of the roof.



Roofing Safety Precautions

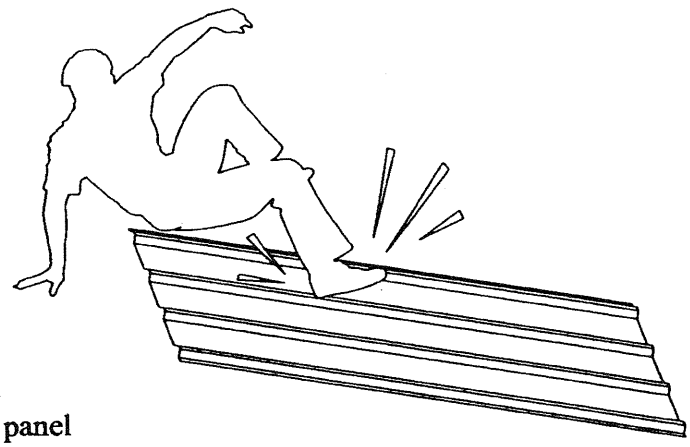
The manufacture strongly recommends that the erection crew is continuously trained in safe and productive work practices.

Installation of roof structures, insulation, or roof panels require workers with proper training, correct equipment, and constant alertness to minimize the danger of falls.

Hard hats should be worn on job sites to prevent injury from falling objects.

Roof panels must be completely attached to the purlins and to panels on either side before they can be a safe walking surface.

Partially attached or unattached panels should never be walked on!



Do Not
1. Step on high rib, especially at edge of panel
2. Step near crease in rib at edge of unsecured panel
3. Step on an unsecured panel

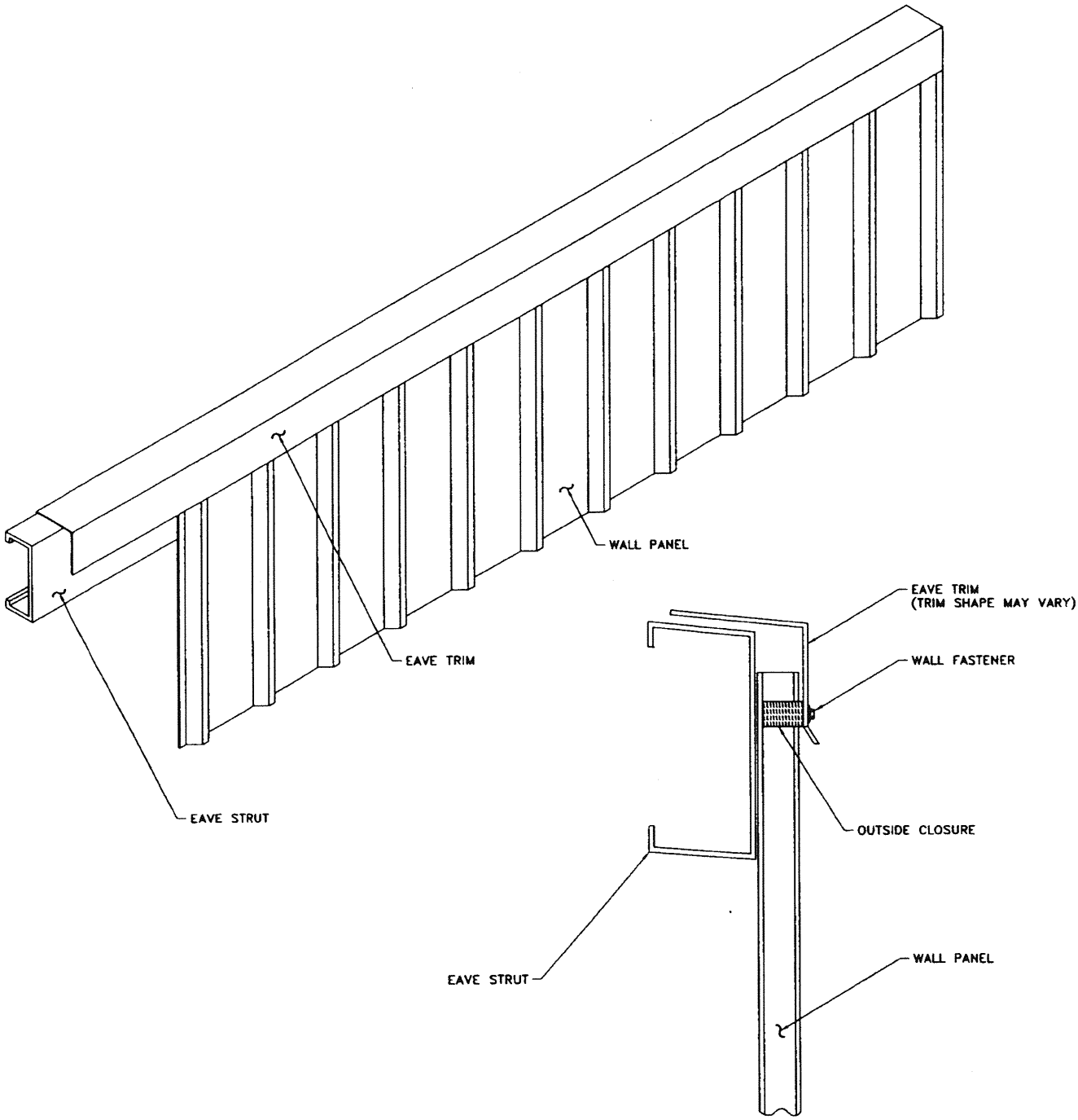
A single roof panel must never be used as a work platform. An OSHA approved runway as specified in OSHA safety and health regulations for the construction industry should be used for work platforms.

Panels may be oiled and slick. Oil protects the panel coil stock and finished panels from rust during shipping and storage. Additionally dew, frost or any other moisture may cause panels to be slippery. Be certain to wipe panels clean before installation begins.

Wear rubber sole work boots. When on the roof, use OSHA approved protection devices such as safety lines, safety nets or catch platforms. Employees should be continuously warned to never step on unsecured roof panels while on the roof.

All safety precautions referred to throughout this manual, all OSHA safety requirements or other customary or statutory requirements must be adhered to in order to maximize employee safety.

Step 4 Install the eave trim

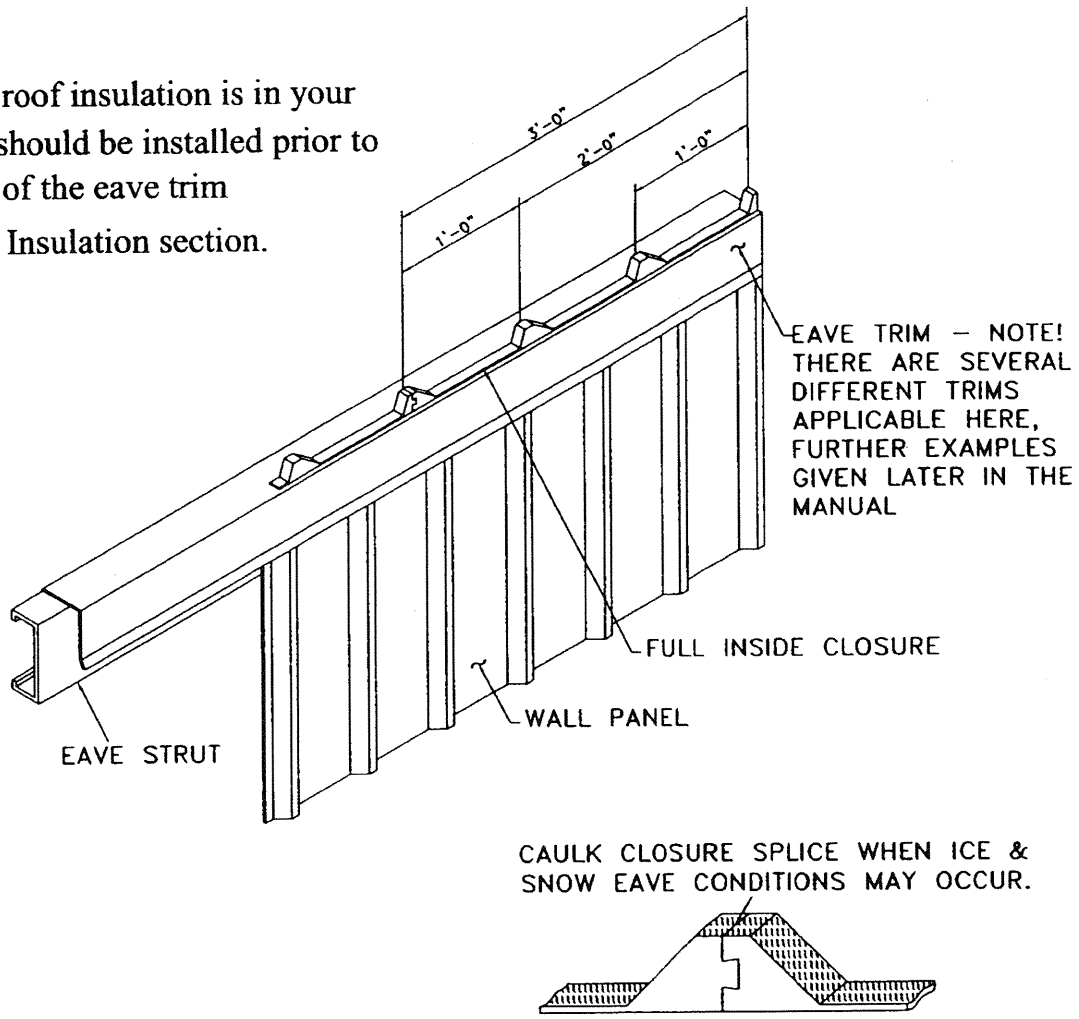


After installing the wall panels, the eave trim needs to be installed over top of the wall panels, and mounted to the eave strut. This will allow the roof panel to be installed without hitting the fastener, allowing a clean, distortion free installation. Additionally notice in the side view the foam outside closure strips.

Step 5 Preparation of the eave

Note: If roof insulation is in your building, it should be installed prior to Preparation of the eave trim

Refer to the Insulation section.

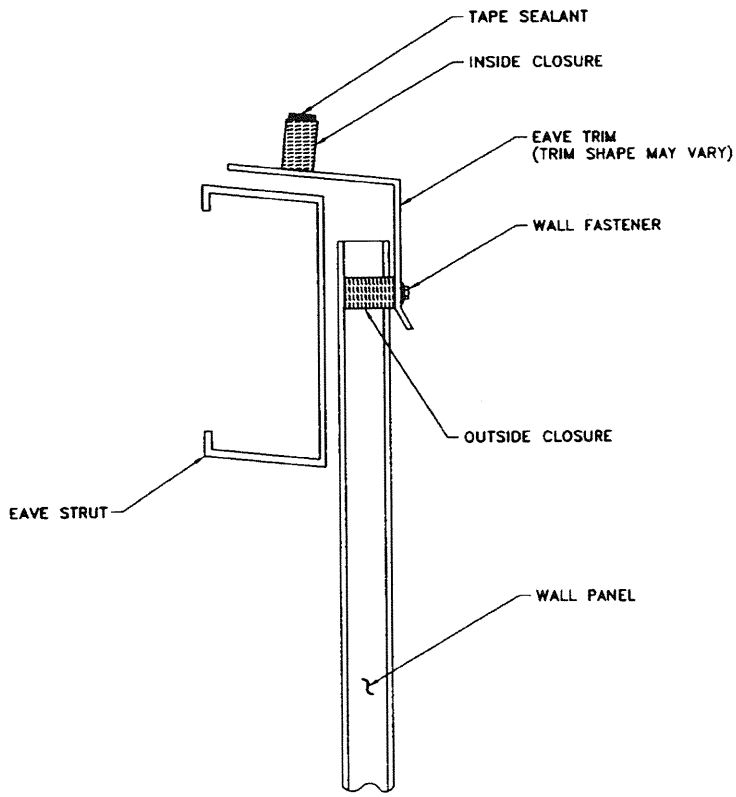


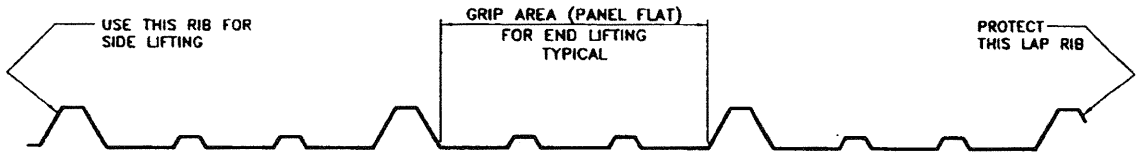
After installing the first run of insulation, prepare the eave for the first roof panel by applying foam closures along the eave outside of the insulation. Foam closures must be appied in a straight line and without voids. Do not stretch the foam closures. As shown, remove paper backing, and place starter piece on top of the eave angle. Align the major rib of the closure with the edge of the endwall roof line. Splice a full closure to the starting closure and apply along the top of the eave angle. If roof is subject to ice and snow buildup, the splice in the closure strip must be caulked to insure weathertightness.

Step 5 (Continued)

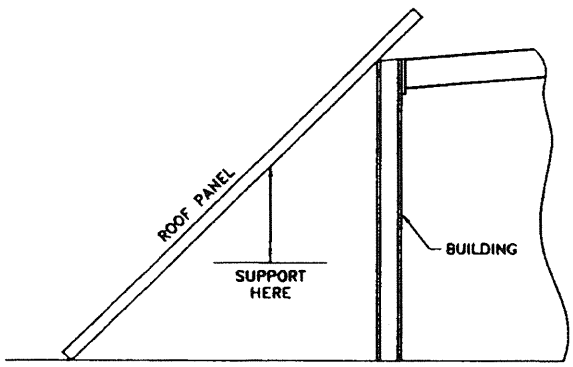
Preparation of the eave

Along the top of the foam inside closure strips that have been placed along the roof eave, apply a run of tape sealant along the roof foam closure. Prior to removing the paper backing from the tape sealant, check and mark for proper alignment of the first roof panel. Note that self-tapping screw will require holes to be drilled in the supporting structure prior to installation. Continue mastic and closure run along the roof eave in preparation for the next roof panel.



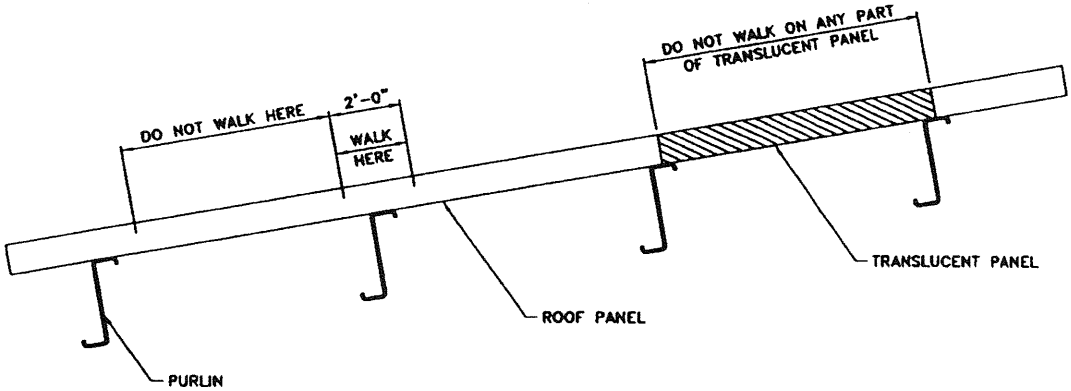


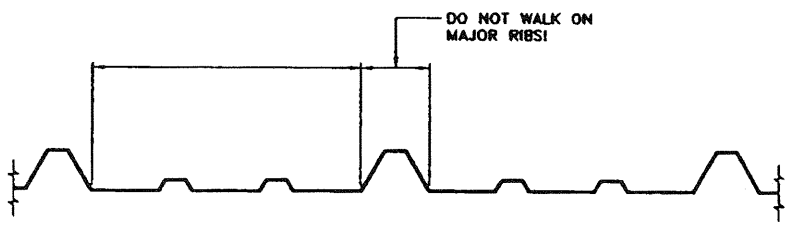
WHEN LIFTING SINGLE PANELS,
USE ONLY THE POINTS SHOWN IN DRAWING ABOVE



UPON COMPLETION OF ROOF INSTALLATION, ANY EXCESS FASTENERS, BLIND RIVETS, DRILL SHAVINGS, ETC. MUST BE REMOVED FROM ROOF AND GUTTERS TO PREVENT RUSTING.

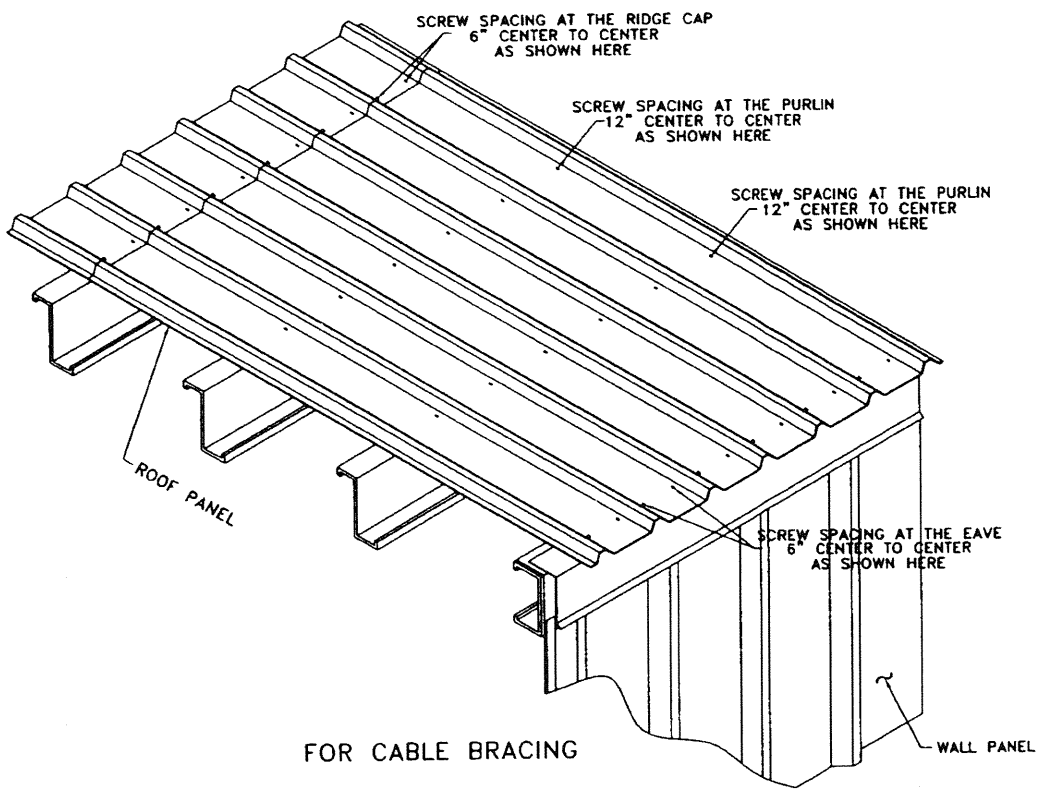
ALWAYS SUPPORT PANELS
FROM THE BACK WHILE LIFTING TO THE ROOF



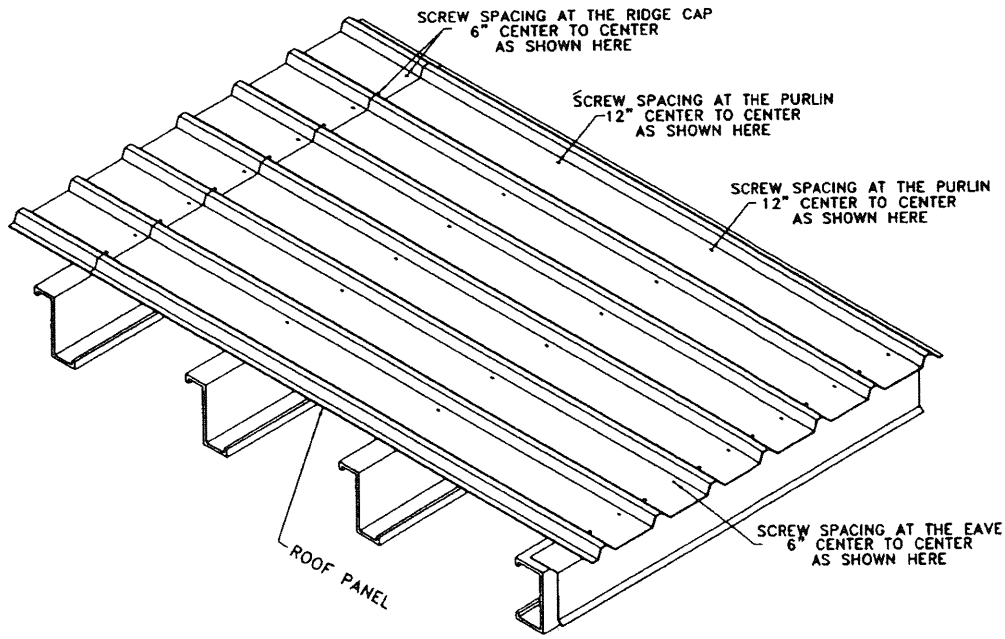


AVOID DAMAGE TO ROOF PANELS,
WALK ONLY ON THE AREA INDICATED ABOVE.

FOR DIAPHRAM BRACING



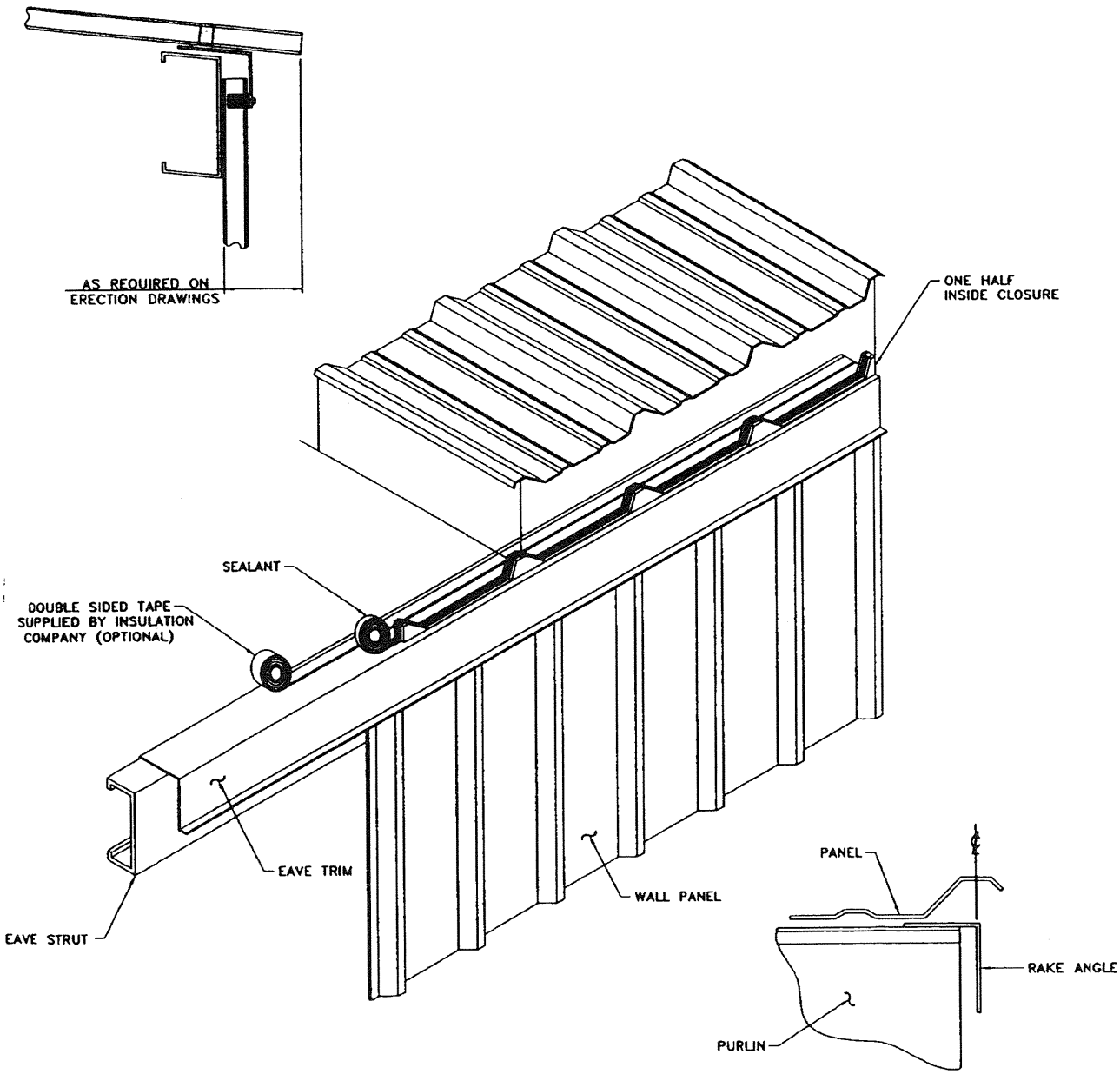
FOR CABLE BRACING



Step 6

Installation of the first panel

Once the eave is prepared, the first roof panel may be installed. Set the roof panel in place over the inside closure (after removing the paper from the mastic) insuring the major ribs of the panel nest properly with the inside closure. Extend the panel past the eave strut, (refer to the erection drawings for the exact distance,) or past the high rib on the wall panel. With the panel properly placed, secure the panel to the structure with appropriate fasteners. Refer to the previous page for fastener spacings.

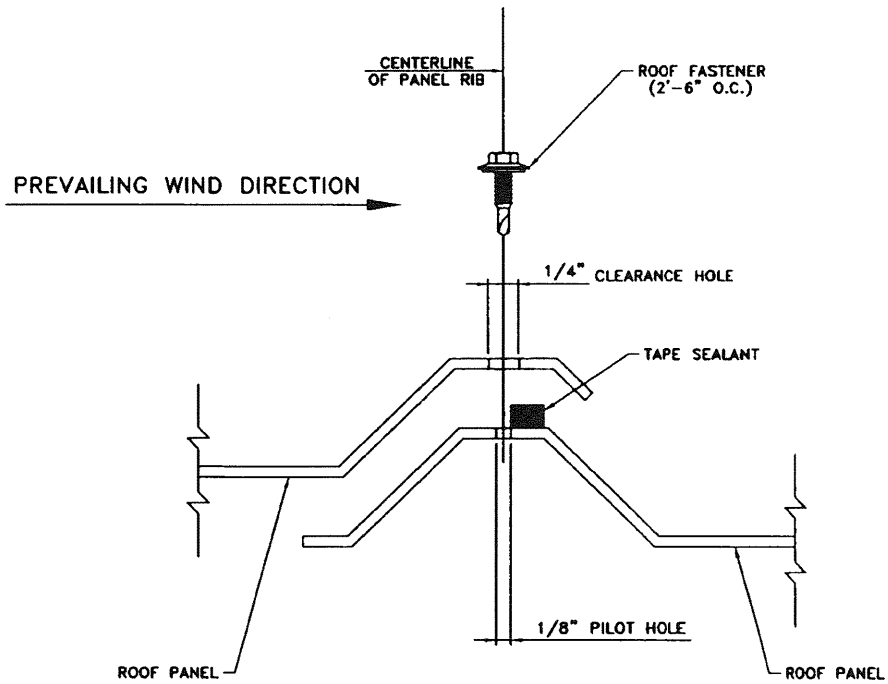


As on the wall panel installation, align the center of the high rib with the edge of the endwall rake angle. (Unless noted in erection drawings.)

Step 7

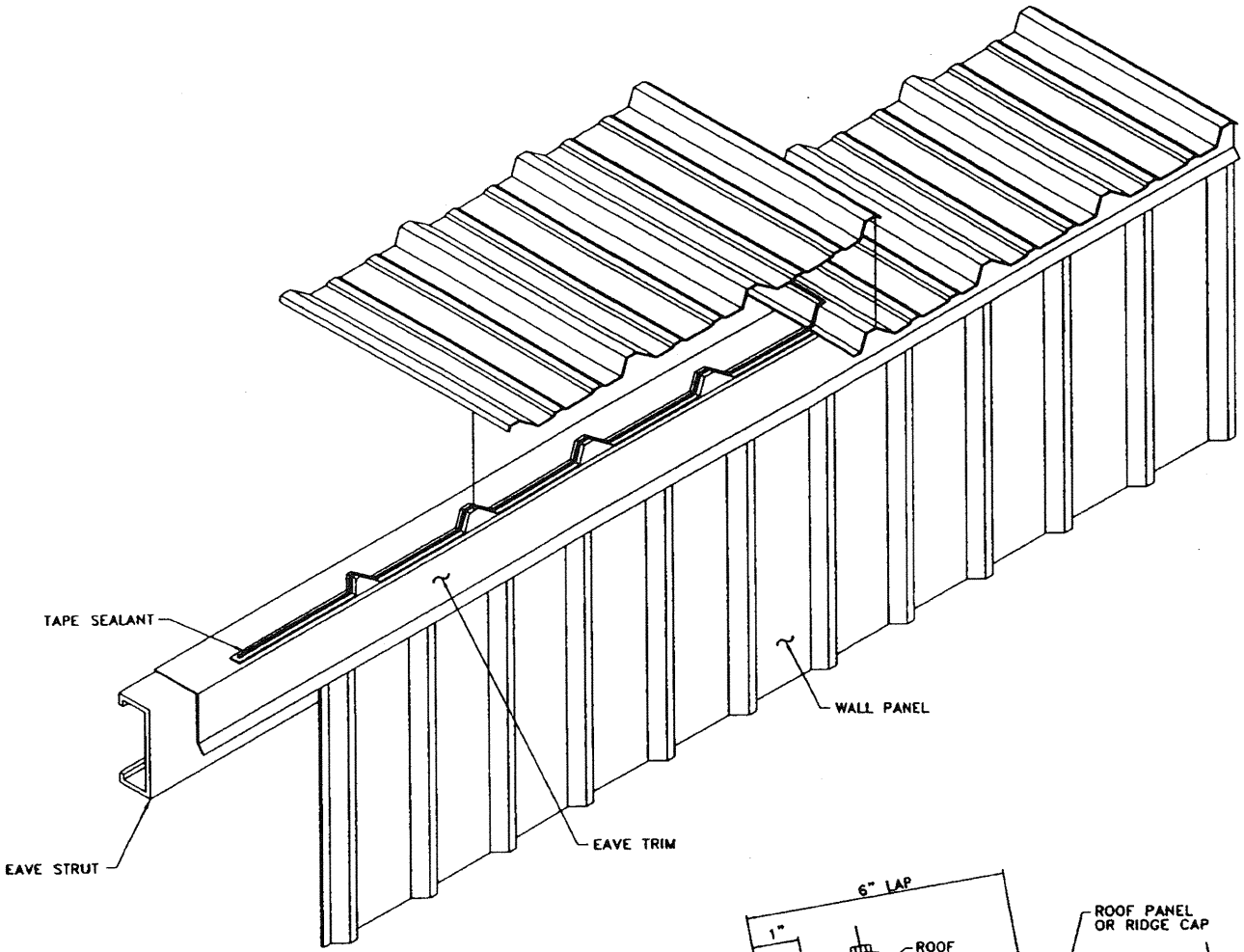
Sealing the panel side lap to accept the next panel

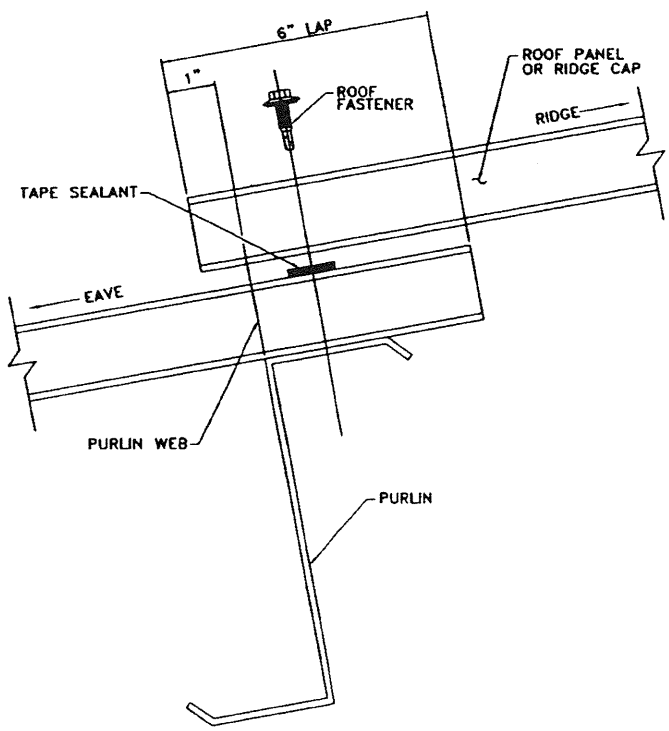
Apply the side lap tape sealant to the weather side edge of the lower panel's major rib as shown. The tape sealant should only be applied to clean dry surfaces. With the release paper in place, press firmly along the length of the sealant to insure proper adhesion. While removing the protective paper from the tape sealant, care should be taken not to pull the tape sealant away from the panel. Install the adjoining panel, positioning the overlapping rib with care. Drill at the center of the clearance holes in the overlapping panel, 1/4" clearance holes for the lap fasteners. Stitch the lap with the #14 self drilling fasteners supplied with the job. Never allow the sealant to be placed in other locations.



Step 8

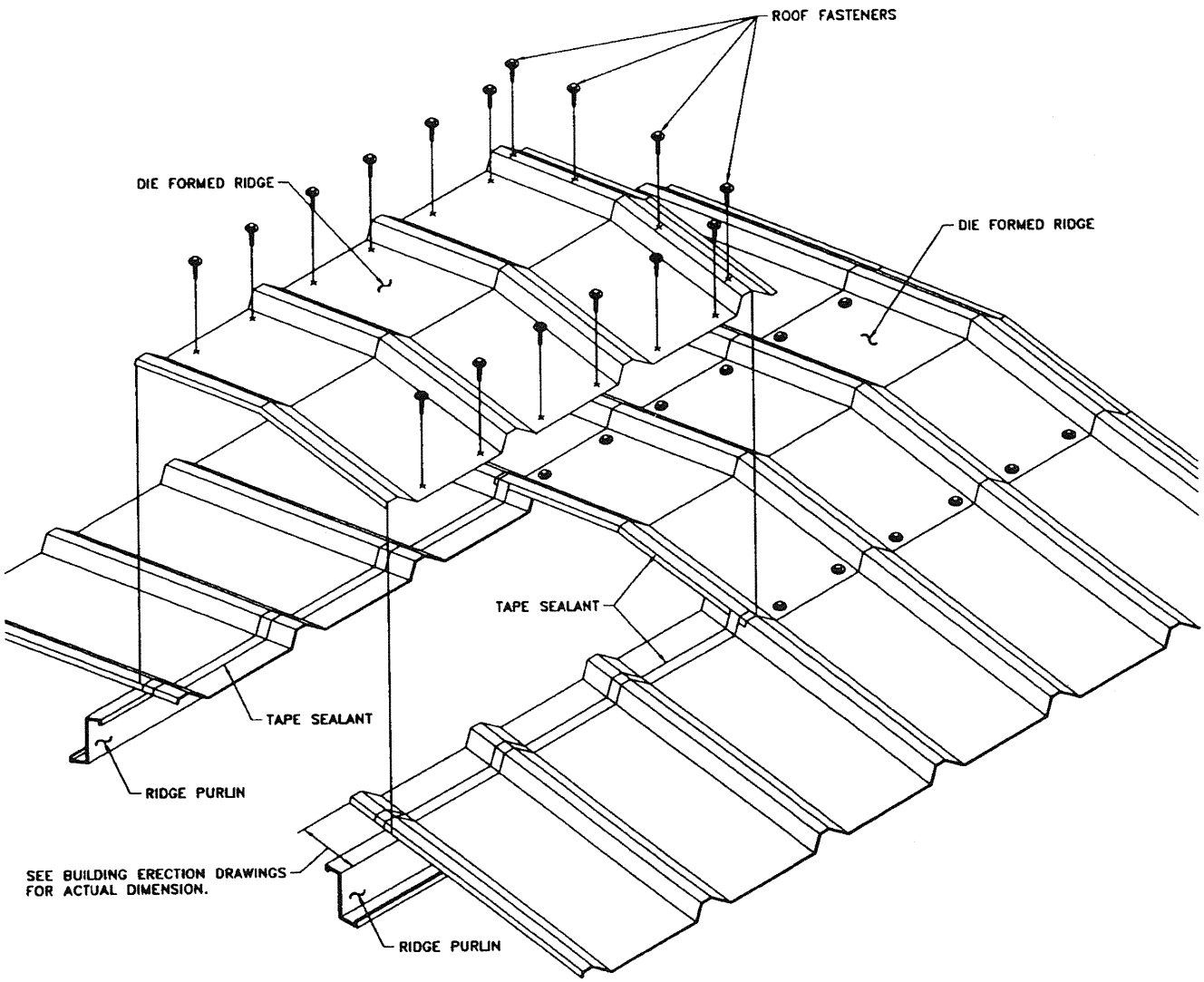
Installation of the second roof panel





Step 9

Installation of the ridge cap

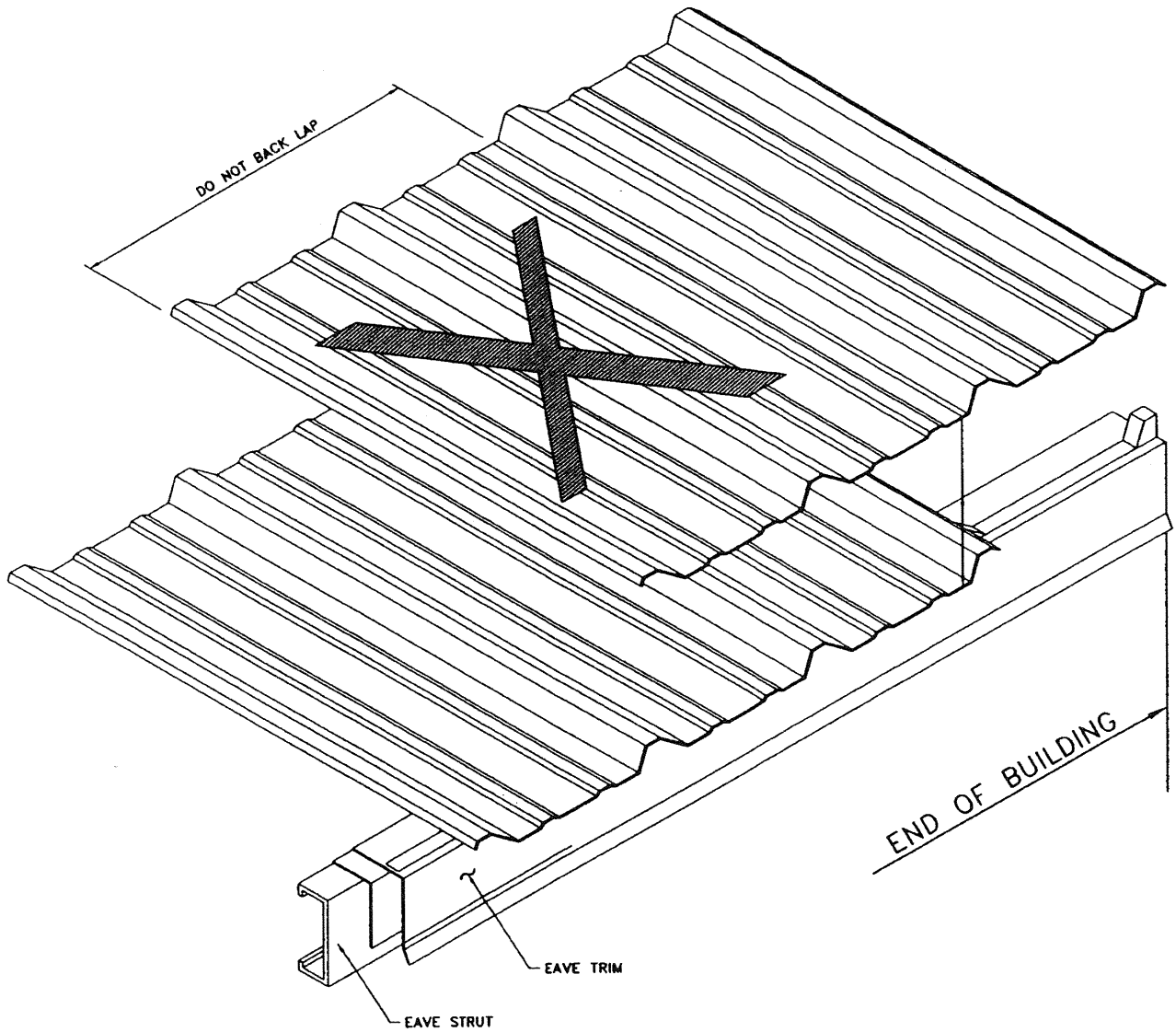


Notice: Install your ridge cap panels as the roof sheets are installed. Do not place all your roof sheets and place your ridge caps later.

Die Formed ridge panels are to be installed as each side of the roof is sheeted. This will aid in keeping both sides of the roof aligned. After having installed a run of roof panels on each side of the roof, apply sealant to the panels as shown. Set die formed ridge panel in place and install lap purlin fasteners. Apply tape sealant along the top of the leading rib to prepare for the next sidelap.

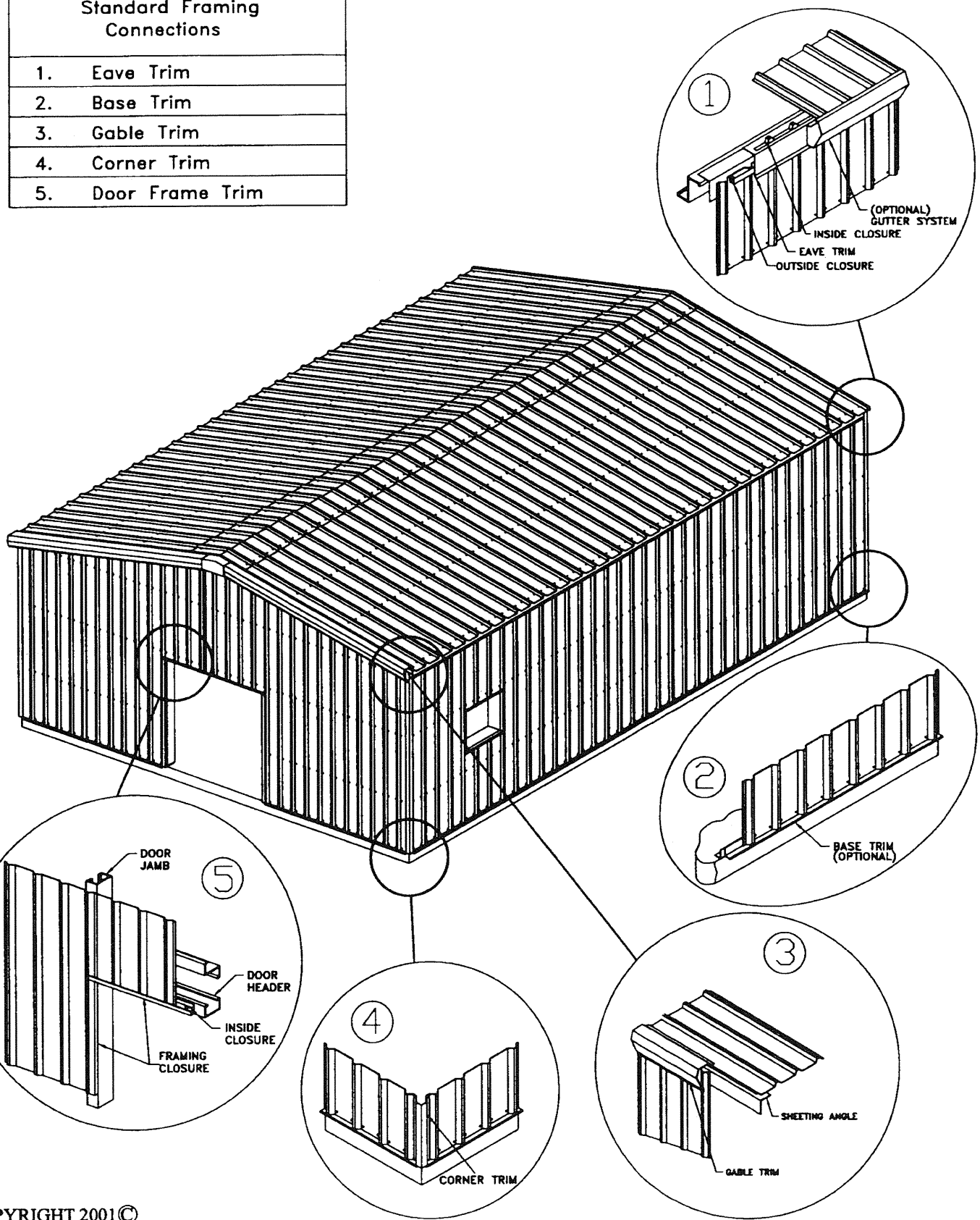
Step 10

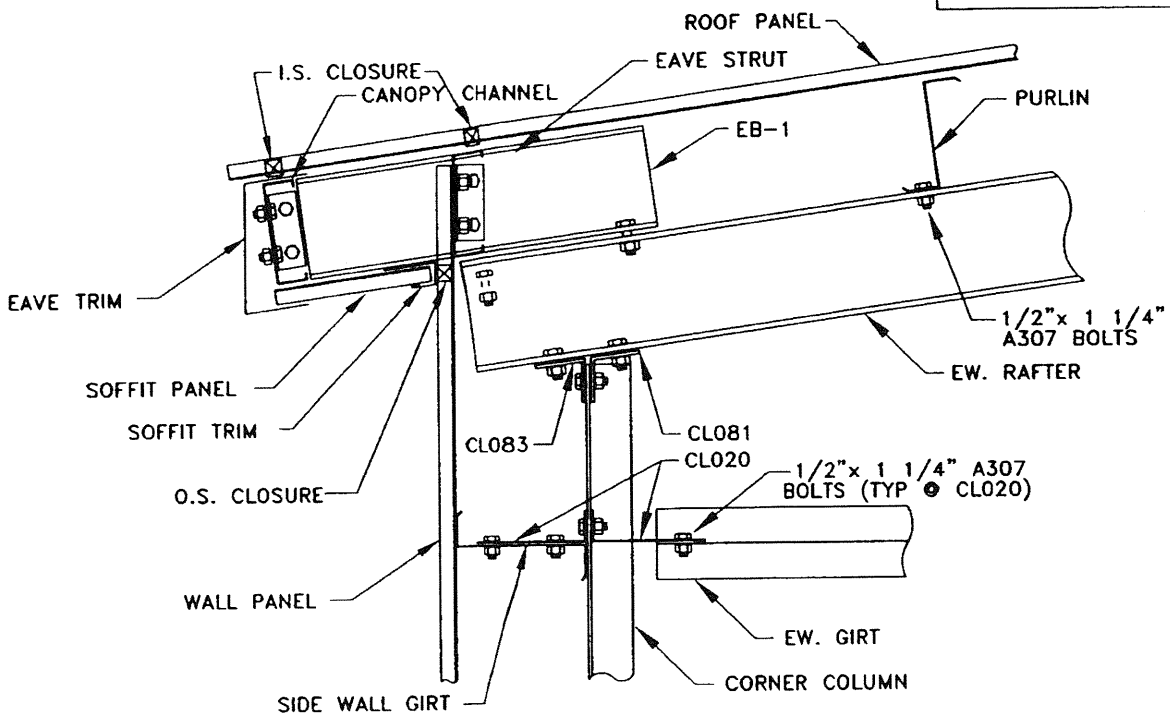
Installation of the final roof panel



While back lapping the last roof panel (to match coverage with the building length) is routinely done, this installation method can compromise the integrity of the roof by trapping moisture between the panels. This moisture could, in time, create an environment conductive to rust and metal failure. It is recommended that the final panel be cut lengthwise to create the desired panel width necessary to finish off the building. The cut edge of the panel should always be installed on the outside edge, not the lap edge. The "narrow" panel should be handled with care, and foot traffic avoided until the final panel is completely installed.

Standard Framing Connections	
1.	Eave Trim
2.	Base Trim
3.	Gable Trim
4.	Corner Trim
5.	Door Frame Trim

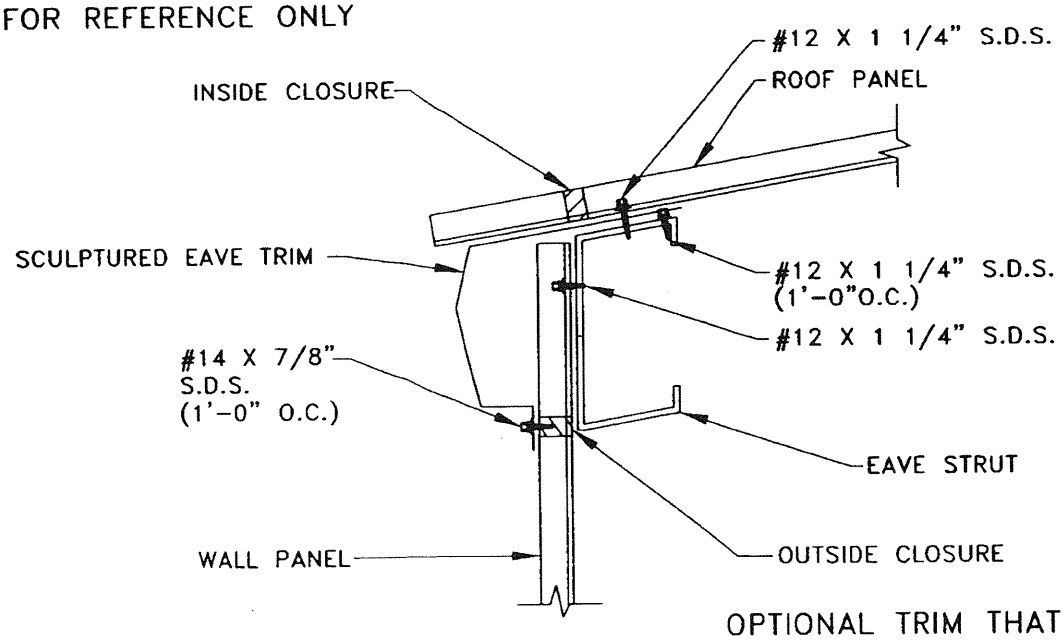




NOTE: SEE ERECTION DRAWINGS FOR OVERHANGS SPECIFIC TO YOUR BUILDING.

DESIGN VARIES PER BUILDING: USE FOR REFERENCE ONLY

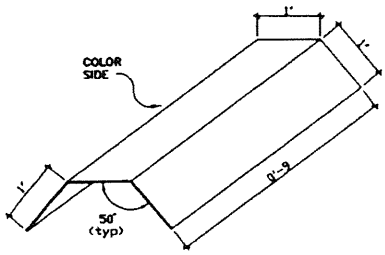
TYPICAL ENDWALL SECTION SHOWING AN OPTIONAL EAVE OVERHANG, WITH EAVE AND SOFFIT TRIM



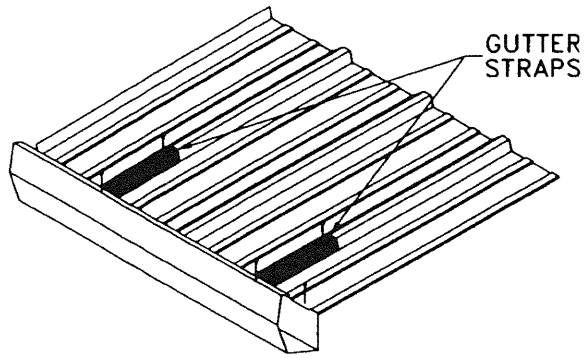
OPTIONAL TRIM THAT COULD REPLACE THE SIMPLE EAVE TRIM SHOWN EARLIER IN THE MANUAL DURING PREPARING THE EAVE.

INSTALLATION OF THE GUTTERS

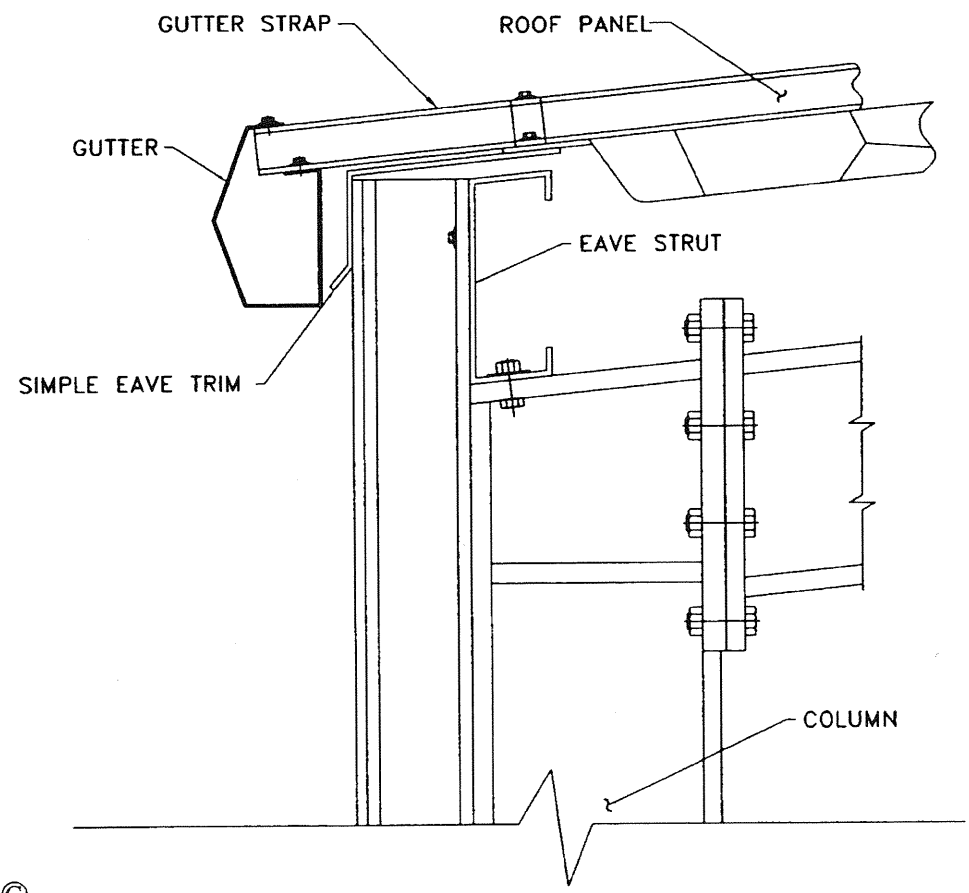
The gutter straps are brackets designed to nest over the major rib of the roof panels. The strap extends past the edge of the roof panel to provide support for the gutter. The straps receive 3 typical roof fasteners, 2 holding the straps of the roof panel, and 1 holding the high side of the gutter. Space gutter straps one strap per panel, or every three feet. Additionally the low side of the gutter is fastened to the under side of the roof panel from the top of the roof panel using the typical roof fasteners on 12" center spacing

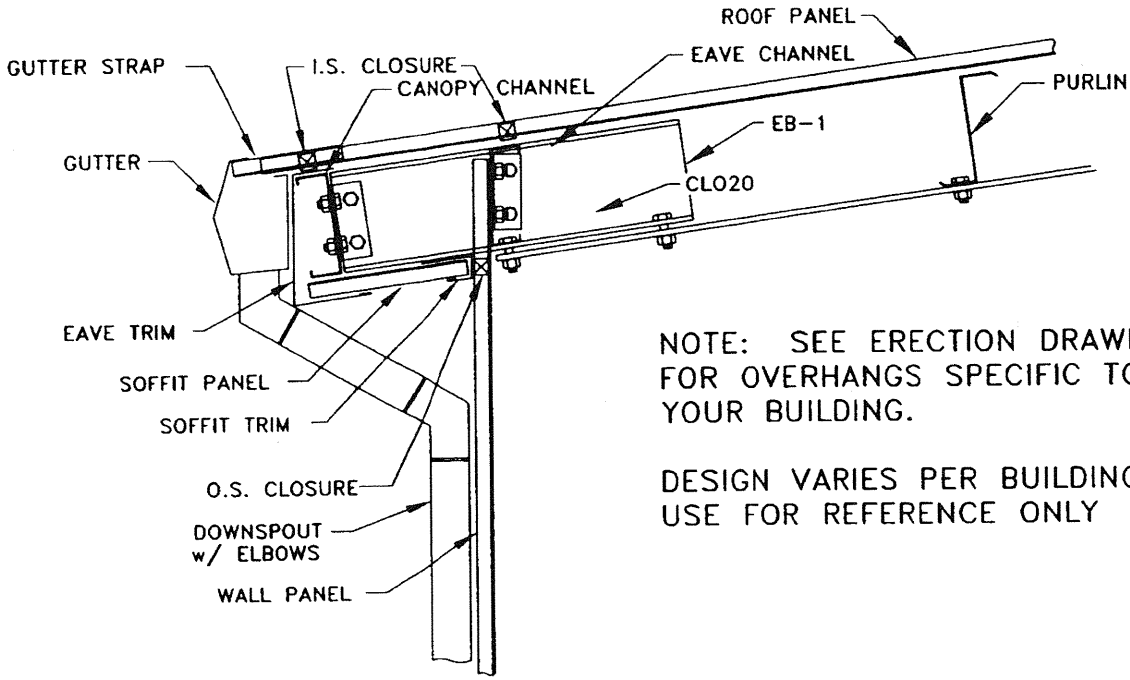


GUTTER STRAP
MTL = 3" x 26 Ga. x 9"



SECTION AT SIDEWALL



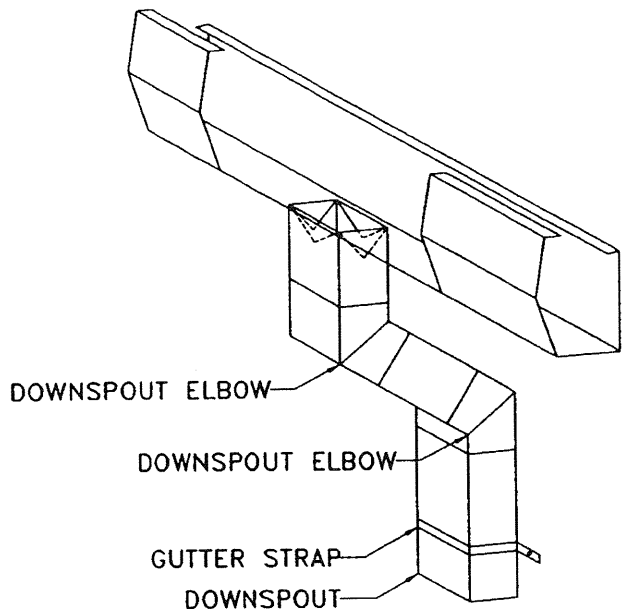


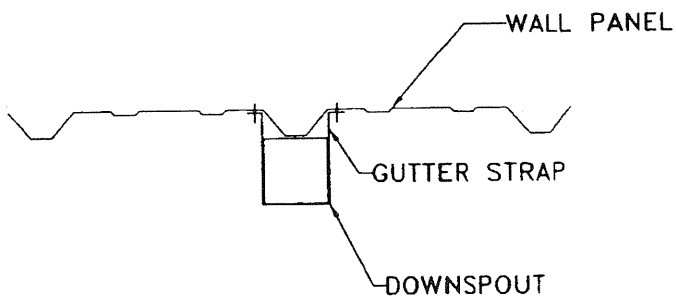
NOTE: SEE ERECTION DRAWINGS FOR OVERHANGS SPECIFIC TO YOUR BUILDING.

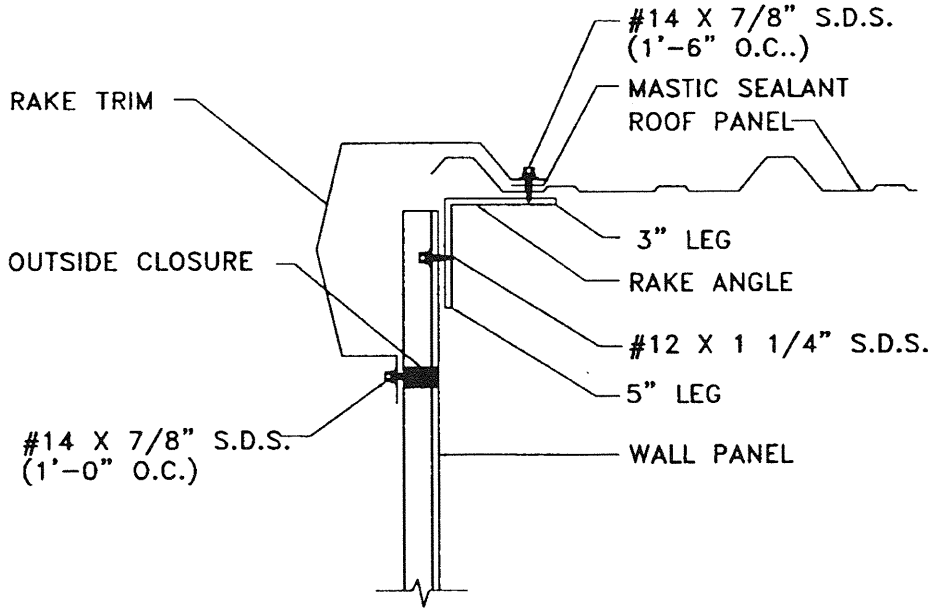
DESIGN VARIES PER BUILDING: USE FOR REFERENCE ONLY

To attach downspouts to the gutters, cut the bottom of the gutter with 2 diagonal cuts. Bend the 4 triangle shaped tabs down to receive the downspout. Seal the gutter joint with gun grade caulk and fasten with a minimum of 3 blind rivets.

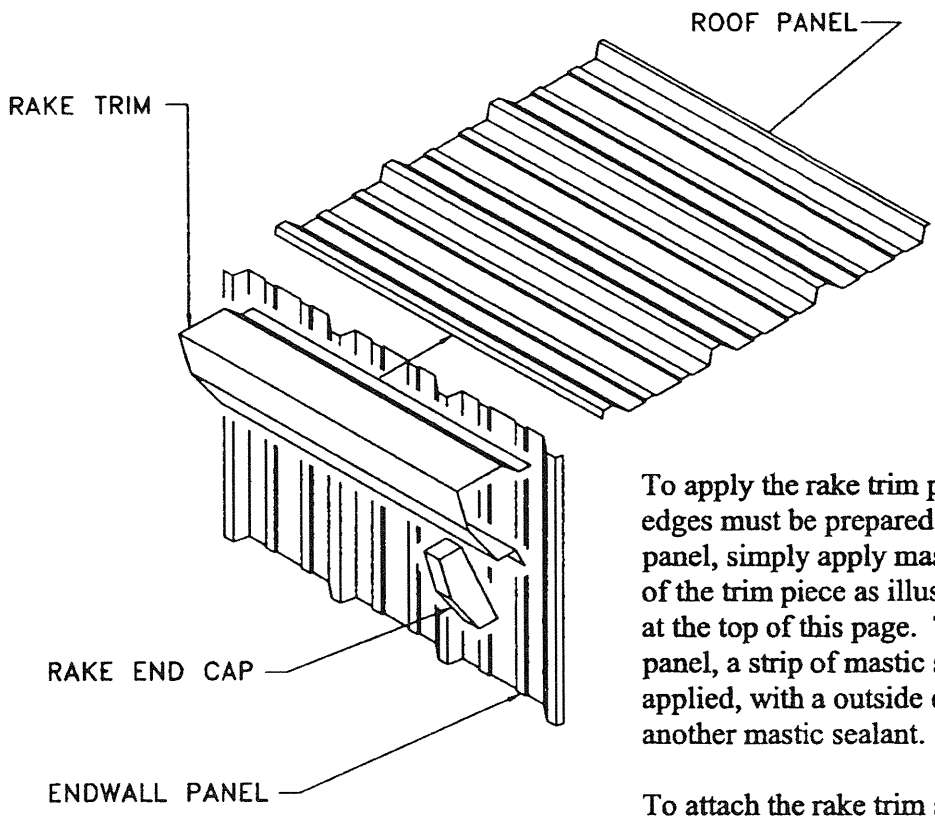
For eaves without overhang install the gutters and downspouts in a similar fashion excluding the elbows and offset.





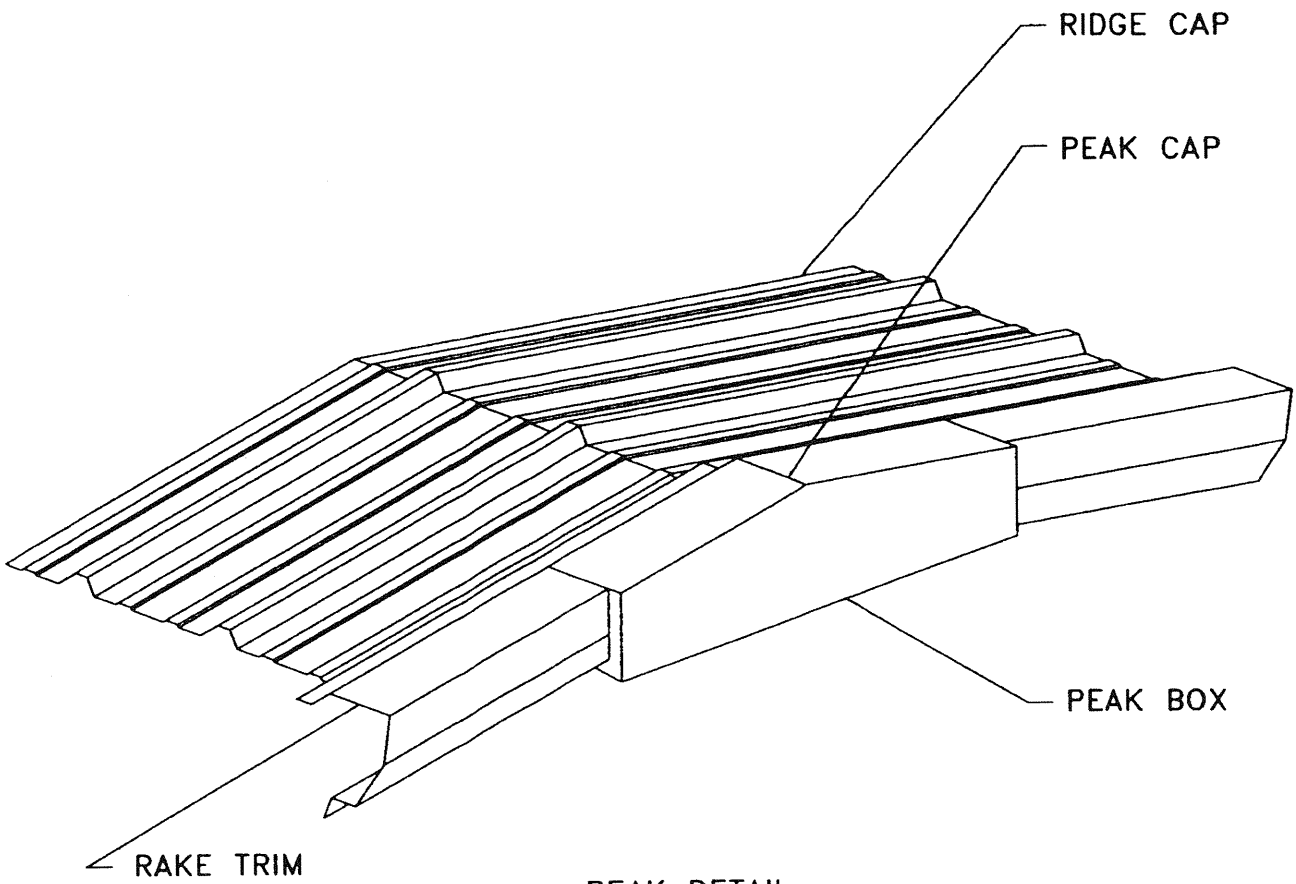


RAKE TRIM SECTION



To apply the rake trim properly, both of the edges must be prepared. To prepare the roof panel, simply apply mastic sealant the length of the trim piece as illustrated in the side view at the top of this page. To prepare the wall panel, a strip of mastic sealant must be applied, with a outside closure strip and another mastic sealant.

To attach the rake trim simply fasten with #14 self drilling and sealing screws at 12" centers along the length of the trim.

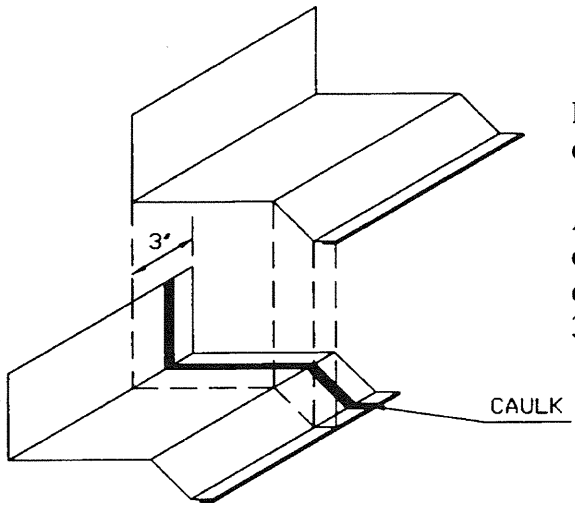


PEAK DETAIL

To properly fit the peak cap in position first make sure the peak cap overlaps the rake trim by at least two inches on both sides. Seal the connection at the roof with mastic sealant. Seal the connection at the wall panel with mastic sealant on the outside of an outside closure strip. Seal the overlap with the rake trim with gun grade caulk. Attach the peak box to the roof and wall panels with #14 self tapping screws and stitch the peak box and rake trim together by pre drilling holes, and fastening with blind rivets.

Caulking is required at many joints to provide a water tight seal. The examples shown here are meant to provide a standard example of how to caulk and lap trim pieces in general. Their are additional trim pieces that will need to be sealed.

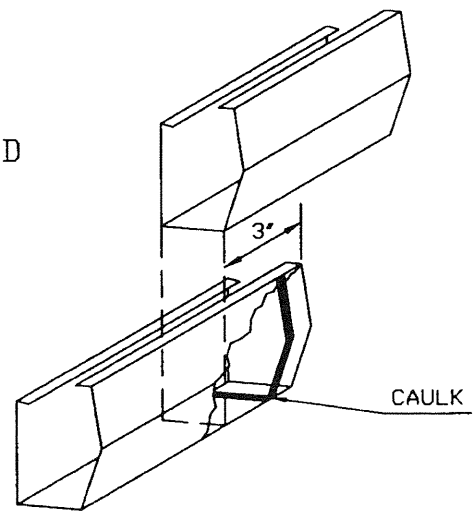
TRANSITION TRIM



Most simple trims can be overlapped simply.

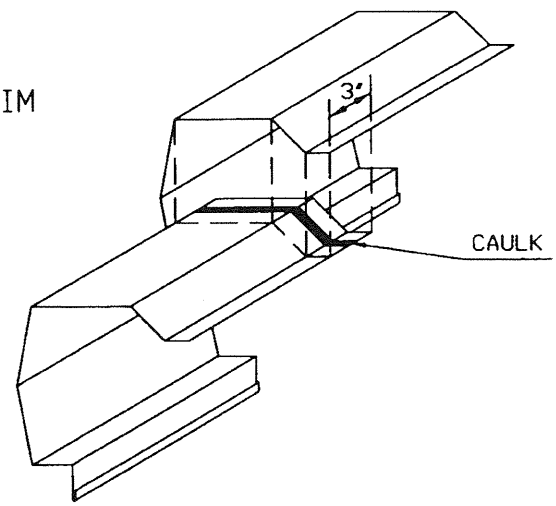
Apply a bead of gun grade caulk or mastic sealant 1" from the edge, and overlap a minimum of 3"

STANDARD GUTTER



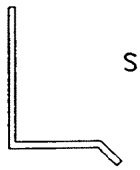
Apply caulking as stated above, position gutter pieces together, Pre-drill holes, and fasten with blind rivets. Then caulk inside gutter lap.

RAKE TRIM



Rake trim is spliced as shown.

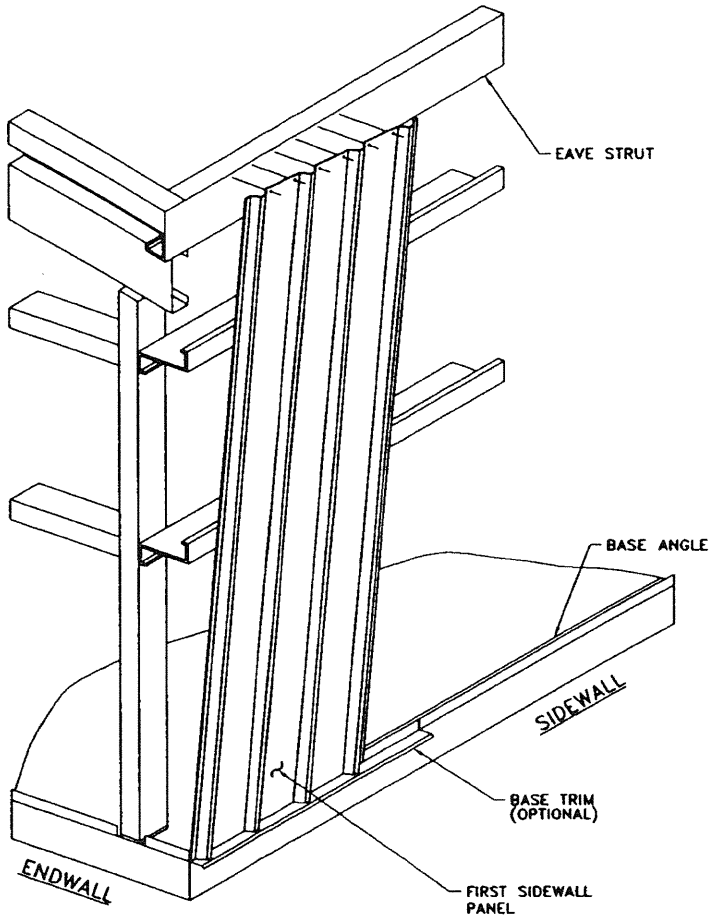
Base Trim Installation

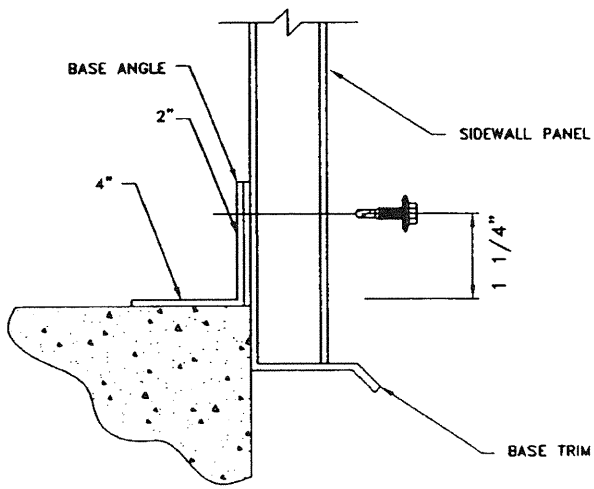


SIDE VIEW OF
BASE TRIM

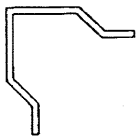
Base trim is an optional simple trim. If this trim is to be used, it is installed prior to the wall panels. It gets located at the base of the wall panel, and is held in place by the bottom wall panel fastener.

To install, simply hold the trim in place as the wall panels go up.



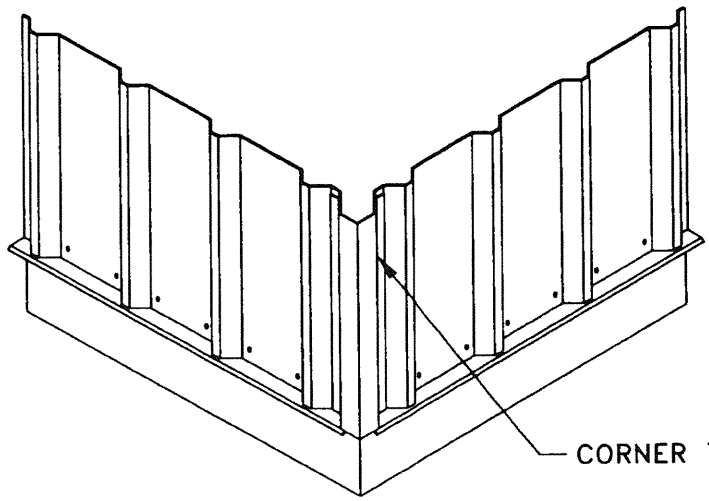


Corner Trim Installation



SIDE VIEW OF CORNER TRIM

Corner trim is a simple trim used to finish the corners of the buildings. This trim is installed after all of the wall panels are installed. It gets held in place by standard wall fasteners. The fasteners should start from the bottom of the panel, aproximately 2" off of the foundation. Fasteners should be located on 1'-6" o.c. the entire length of the trim.



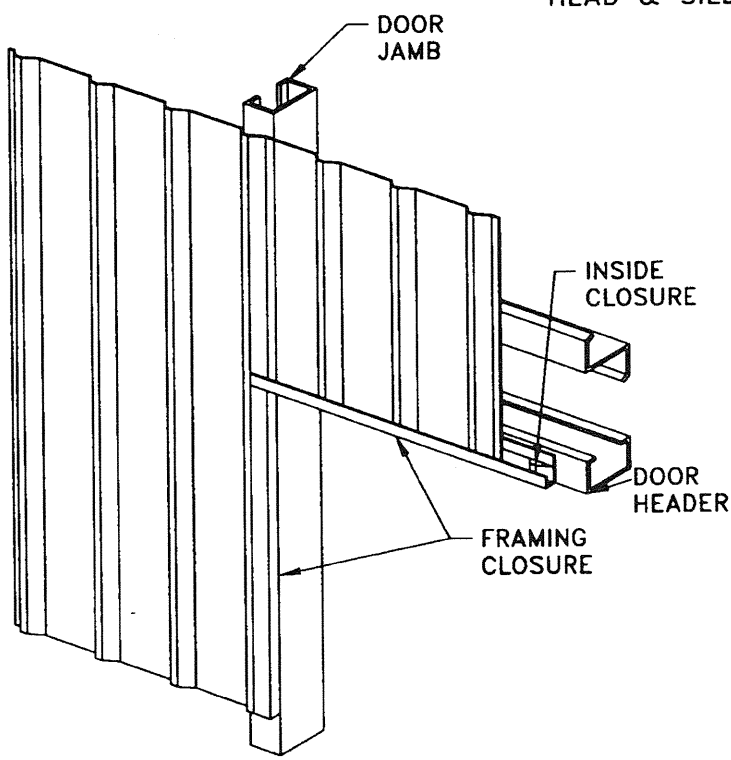
Door Jamb Trim Installation

SIDE VIEW OF TRIMS

* JAMB, HEAD & SILL WRAP (OPTIONAL)

JAMB TRIM

HEAD & SILL TRIM



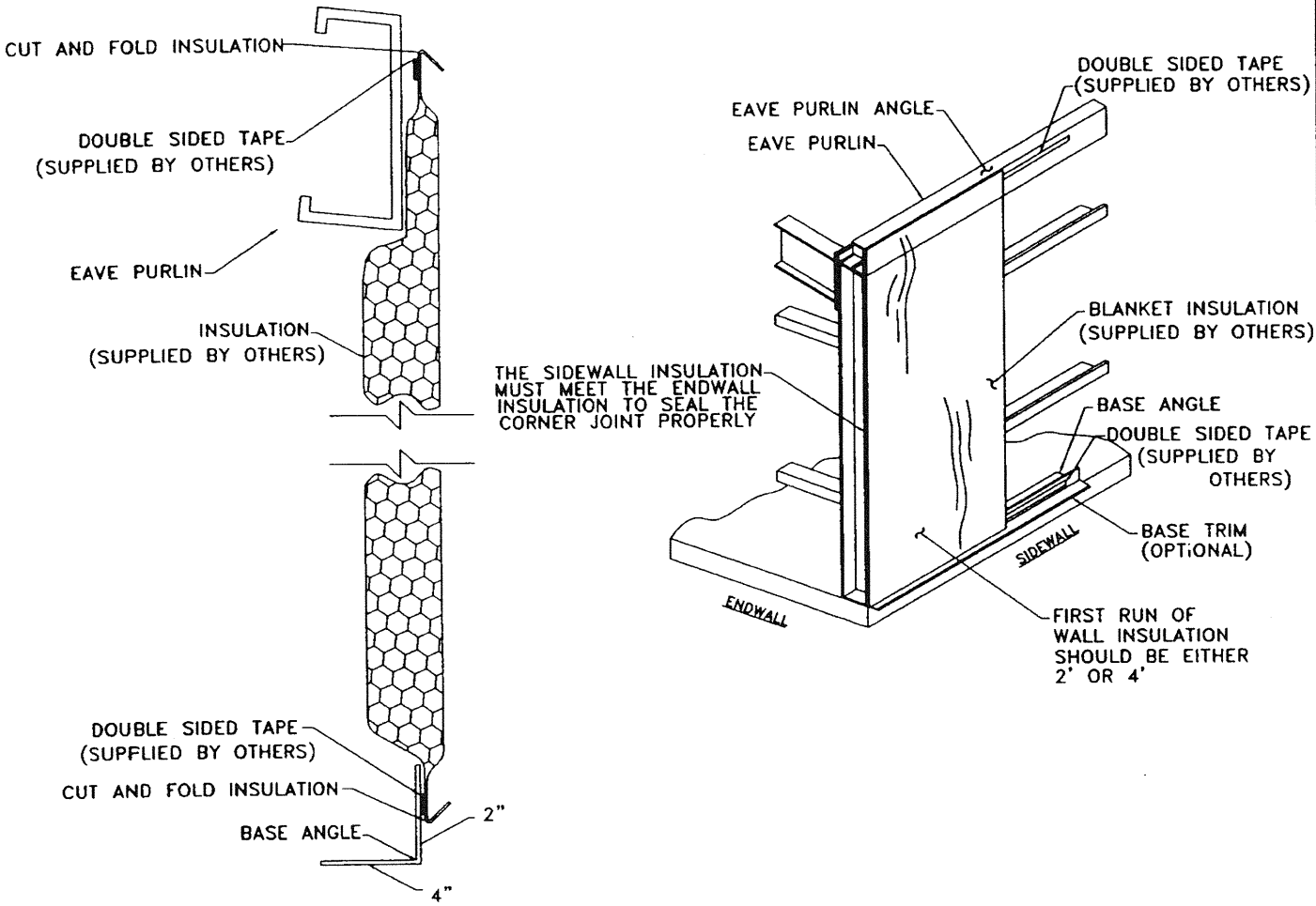
The door jamb has several different trims. The head and sill wrap is used to add color and finish the framing of the door frame. It is held in place on the outside by the wall panel fasteners, and on the inside by #12 self drilling fasteners.

The jamb trim is used to finish the wall panel at the sides of the opening. It is held in place by the wall panel fasteners.

The head and sill trim is used to finish the wall panel at the top of the framed opening. It is additionally held in place by the wall panel fasteners.

To install all of these trims simply place the trim in the desired location as the wall sheeting is installed. As the panel fasteners are being installed make certain that the fastener is additionally hitting the trim piece.

Wall insulation installation



Wall Insulation

There are many types of insulation installed in steel buildings. However, fiberglass blanket insulation is the most common type used, and these instructions pertain to this type only. One side of the blanket insulation should have a vapor barrier that must face the inside of the building regardless of whether the insulation is for heating or cooling.

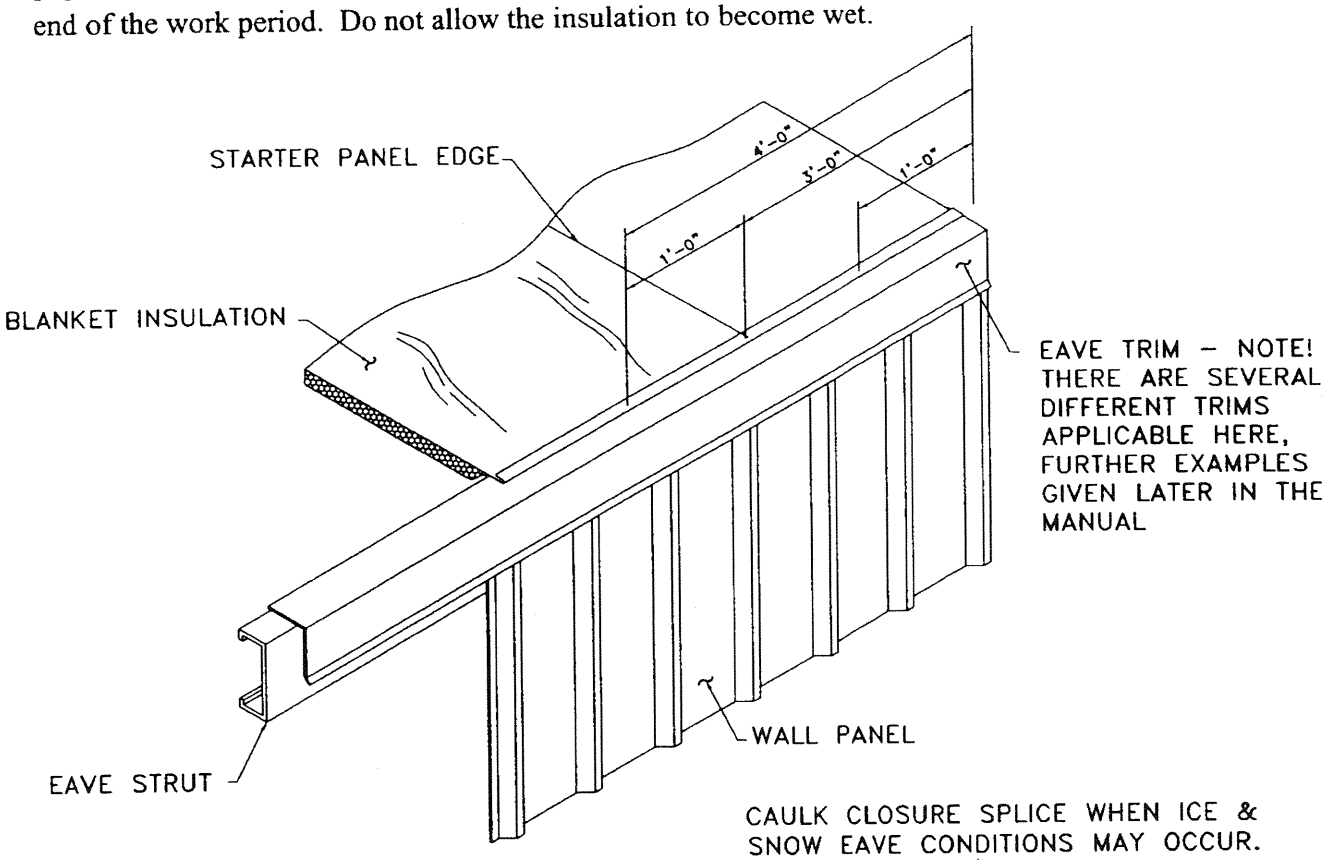
The first run of wall insulation should be installed so that its forward edge is just ahead of the leading edge of the wall panel. The most widely used procedure is to use a 4ft starter run, then switch to 3 or 6 ft. runs. This keeps the forward edge of the insulation 1ft. ahead of the wall panel for joining the next blanket.

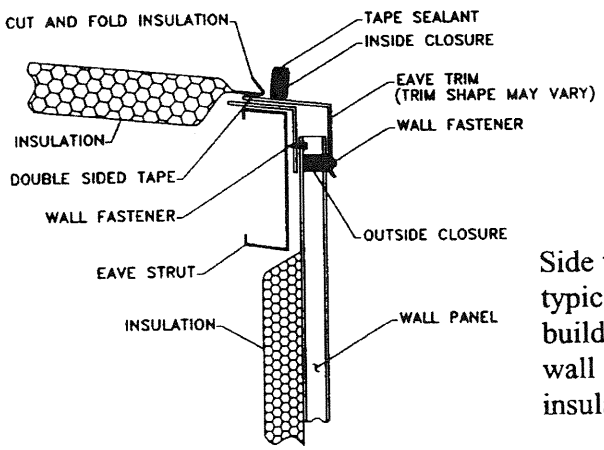
The insulation is installed by removing some of the fiberglass and folding the vapor barrier back to seal the end of the insulation. The insulation is then attached to to top eave purlin angle with double sided tape. Obtain a smooth inside face by pulling the insulation tight from top to bottom. Repeat the removal of fiberglass and folding the vapor barrier at the bottom edge. Use double sided tape to hold the insulation tight to the base angle. Repeat runs of insulation the length of the sidewall.

Installation of roof insulation

Pre-cut roof insulation to reach from eave to eave, allowing approximately one foot of overhang on both sides of the building to facilitate handling. Roll the insulation across the entire roof, making sure that the vapor barrier is to the inside of the building. Attach the insulation to one side of the building on the eave trim, in the same fashion as installing the insulation on the wall panels. Once the insulation is attached to the eave flange on one side of the building, go to the other side of the building and stretch the insulation tight, providing a smooth inside surface, and attach the insulation to the eave purlin angle in the typical fashion.

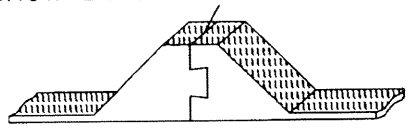
NOTE! Do not install more insulation on the roof than can be covered by roof panels before the end of the work period. Do not allow the insulation to become wet.



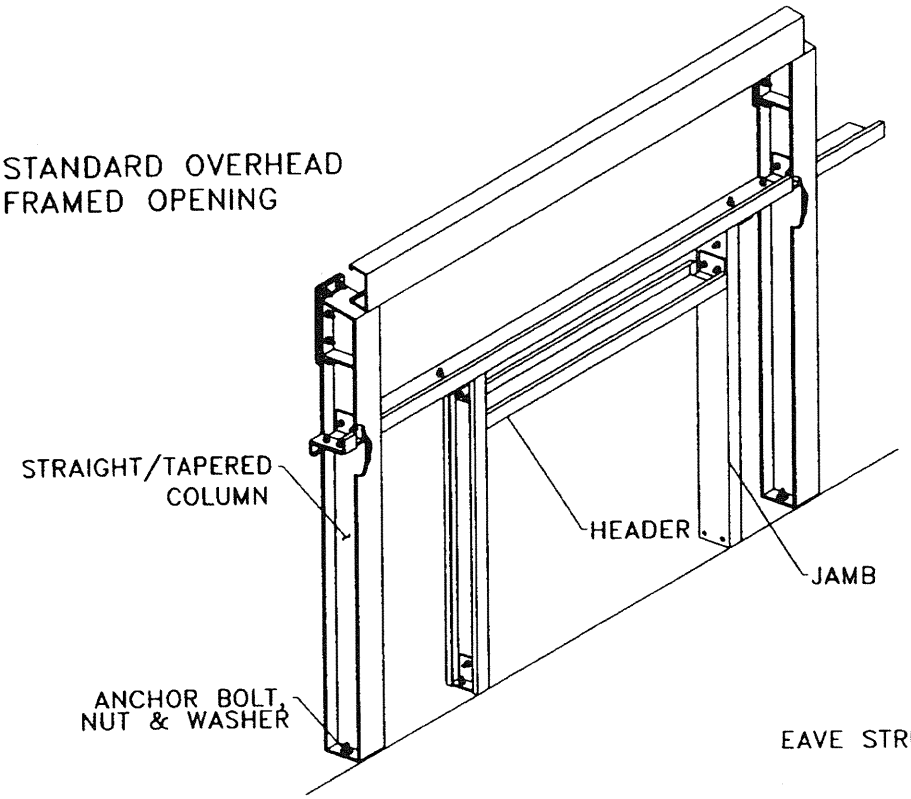


Side view showing a typical Eave on a building that has both wall and roof insulation.

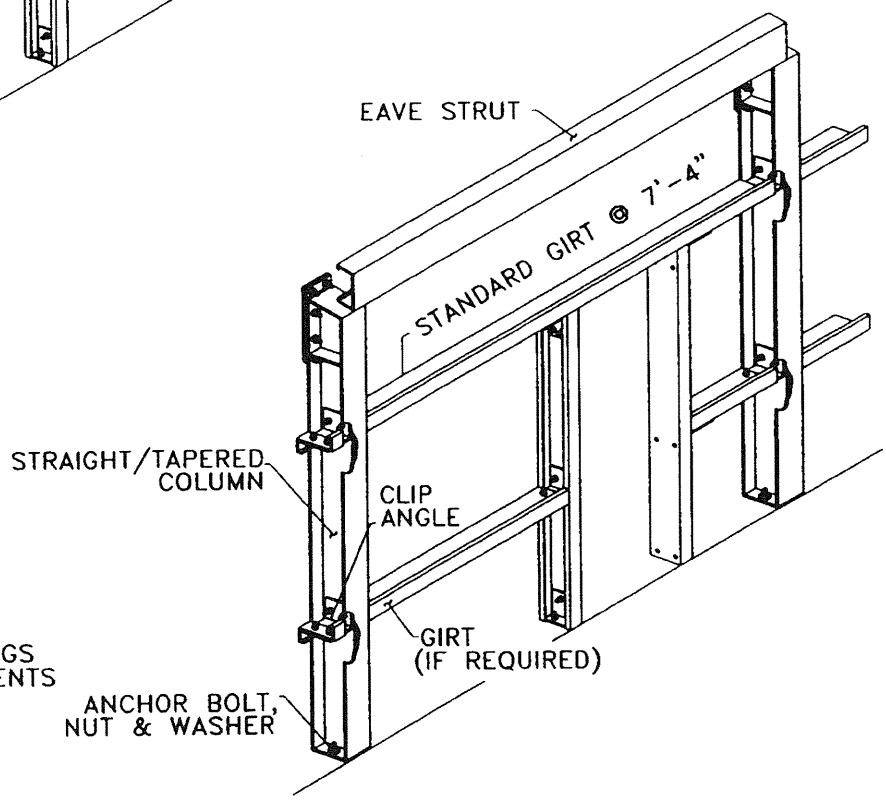
CAULK CLOSURE SPLICE WHEN ICE & SNOW EAVE CONDITIONS MAY OCCUR.



STANDARD OVERHEAD
FRAMED OPENING



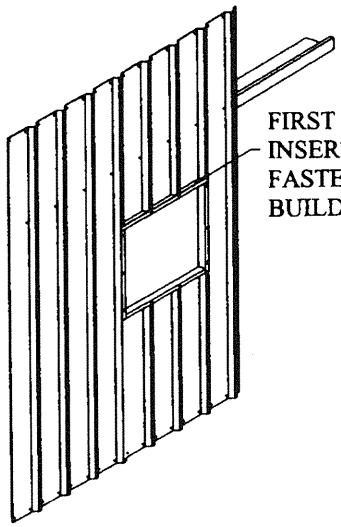
WALK DOOR
FRAMED OPENING
(OPTIONAL)



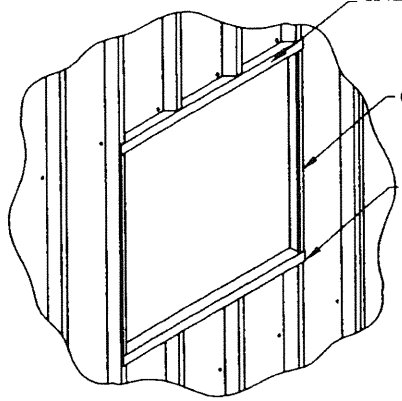
NOTE:
SEE BUILDING ERECTION DRAWINGS FOR CLIP, AND BOLT REQUIREMENTS AND THERE LOCATIONS.

The top example typifies a standard framed opening for an overhead door, and the bottom a standard personnel walk door. Many different frames are possible for conditions of different door sizes, different door types, and framed in the end-walls or side-walls. Additionally the framing will be different if the door is furnished by the manufacture or an outside retailer. Refer to the erection drawings provided with your building for framing details specific to your building.

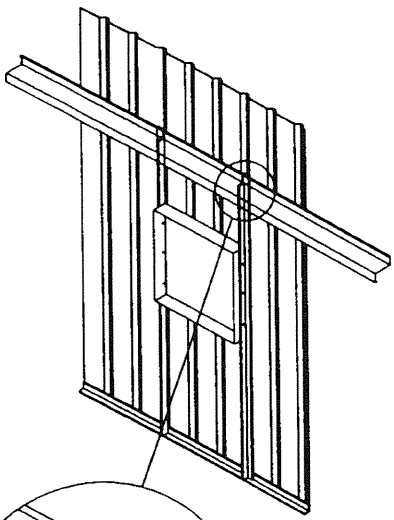
STANDARD SLIDE WINDOW INSTALLATION

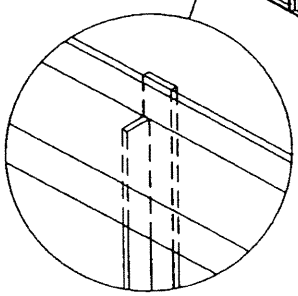


FIRST CUT PANELS OF THE OPENING. INSERT WINDOW FROM INSIDE AND FASTEN TO THE WALL PANEL OF THE BUILDING.

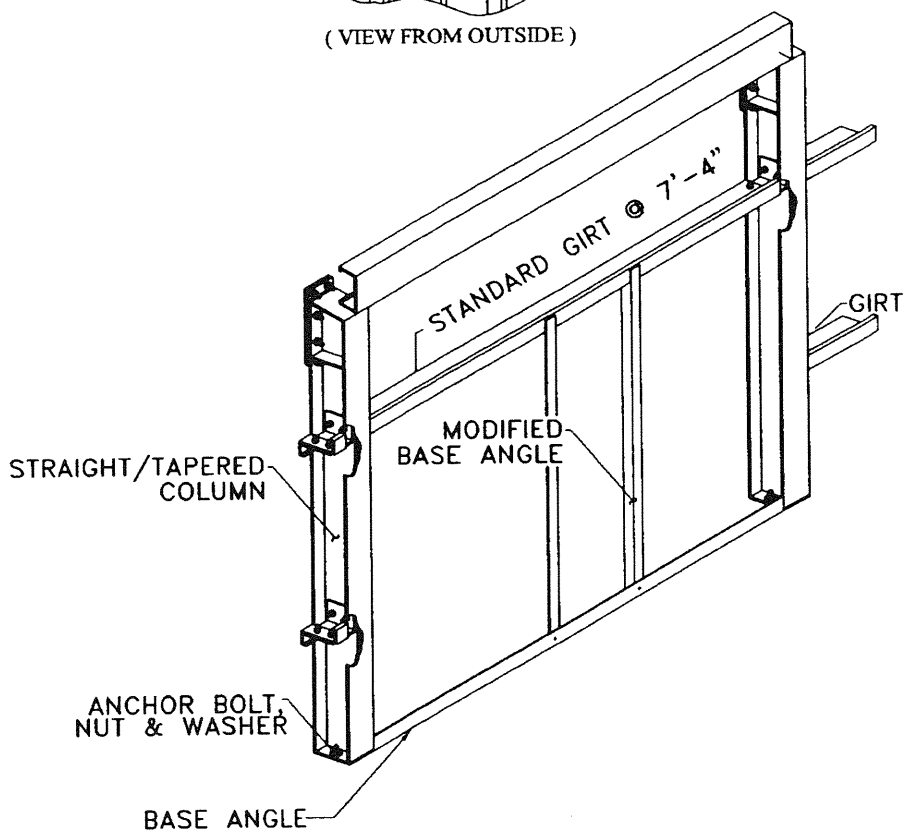


(VIEW FROM OUTSIDE)



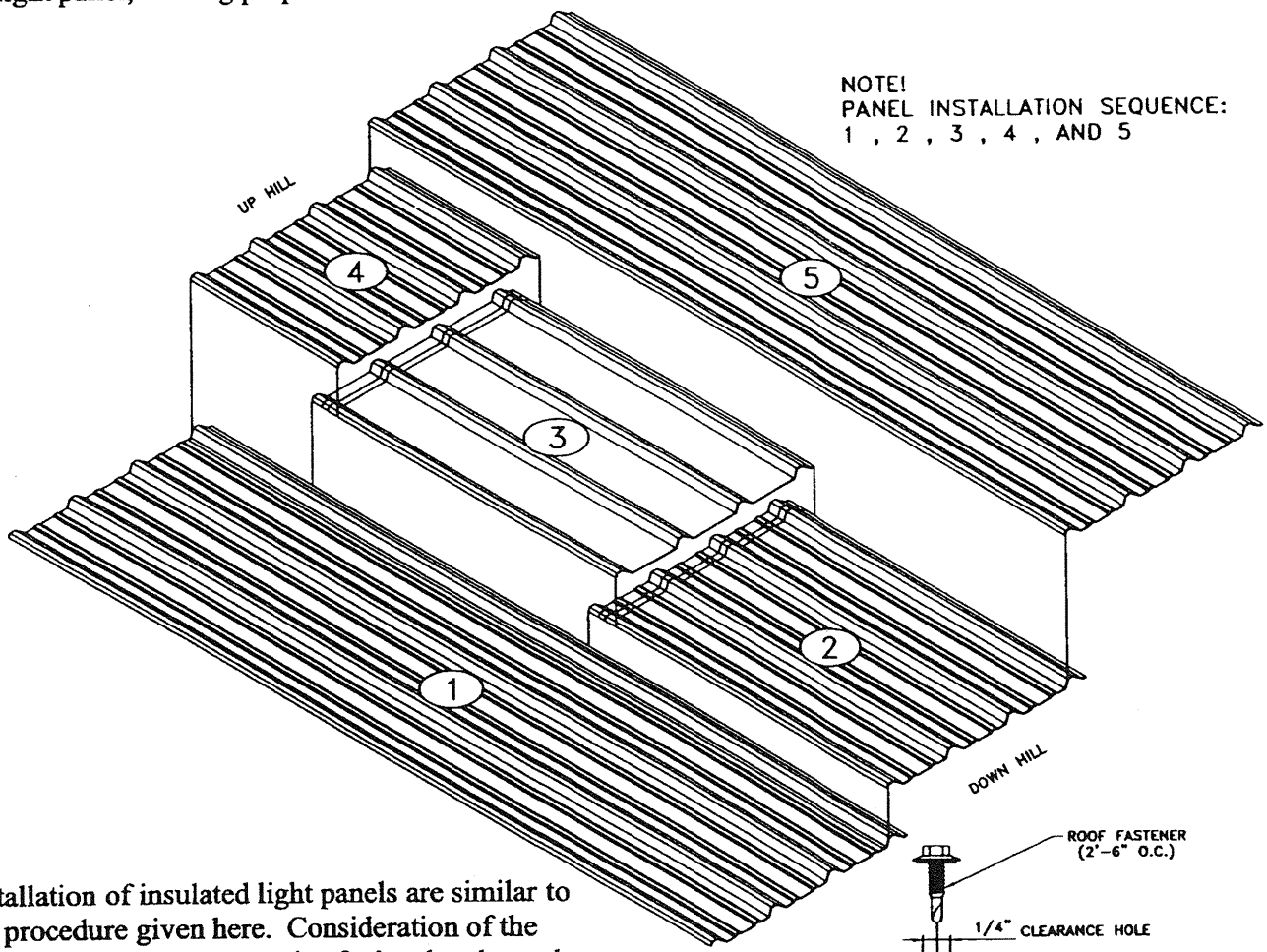


SUPPORT ANGLE NOTCHED AND ATTACHED TO GIRT

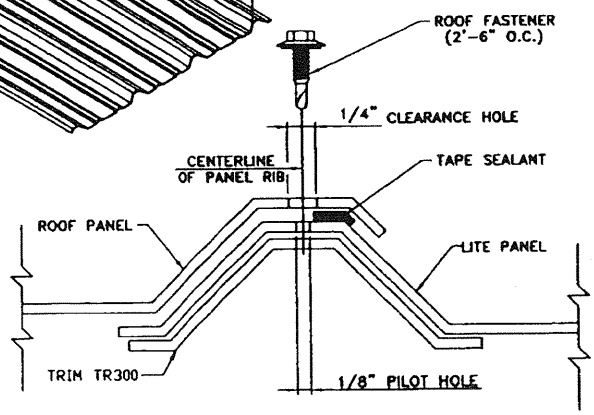


Slide windows come in a variety of sizes, and types. This example shows the windows as simple boxes to help show securing the window in place. The wall panel must be field cut. For accuracy take measurements directly from the window to be installed. After cutting the opening, add inside foam closures to the top and bottom of the window, then the window is attached to the wall panel from the inside of the building. Windows are held in place primarily with the wall panels. However support angle is attached to the base angle and the wall girt to provide extra support. The support angle is square at the bottom, however the top must be notched to attach to the wall girt between the wall panel and girt (refer to the bottom left drawing). Next install the trim ring from the outside of the bldg, and then caulk the entire perimeter of window from the exterior.

Light panels are installed using the same procedures as a steel panel. Care should be taken when installing fasteners in the light panels to avoid cracking the material. Pre-drill 1/4" diameter fastener clearance holes in the overlapping side lap and end lap. One difference is the use of the TR300 trim piece when the light panel is the bottom panel in the lap. It is used to increase the bite of the screw holding the panel, and increase the allowance of building sway without damaging the panel. Disregarding the use of this clip will allow for the screws to strip out of the light panel, making proper installation difficult, and chances of failure significantly higher.



Installation of insulated light panels are similar to the procedure given here. Consideration of the seals between the two panels of a insulated panel needs to be understood during installation. Breaking the seals can result in moisture between the panels.

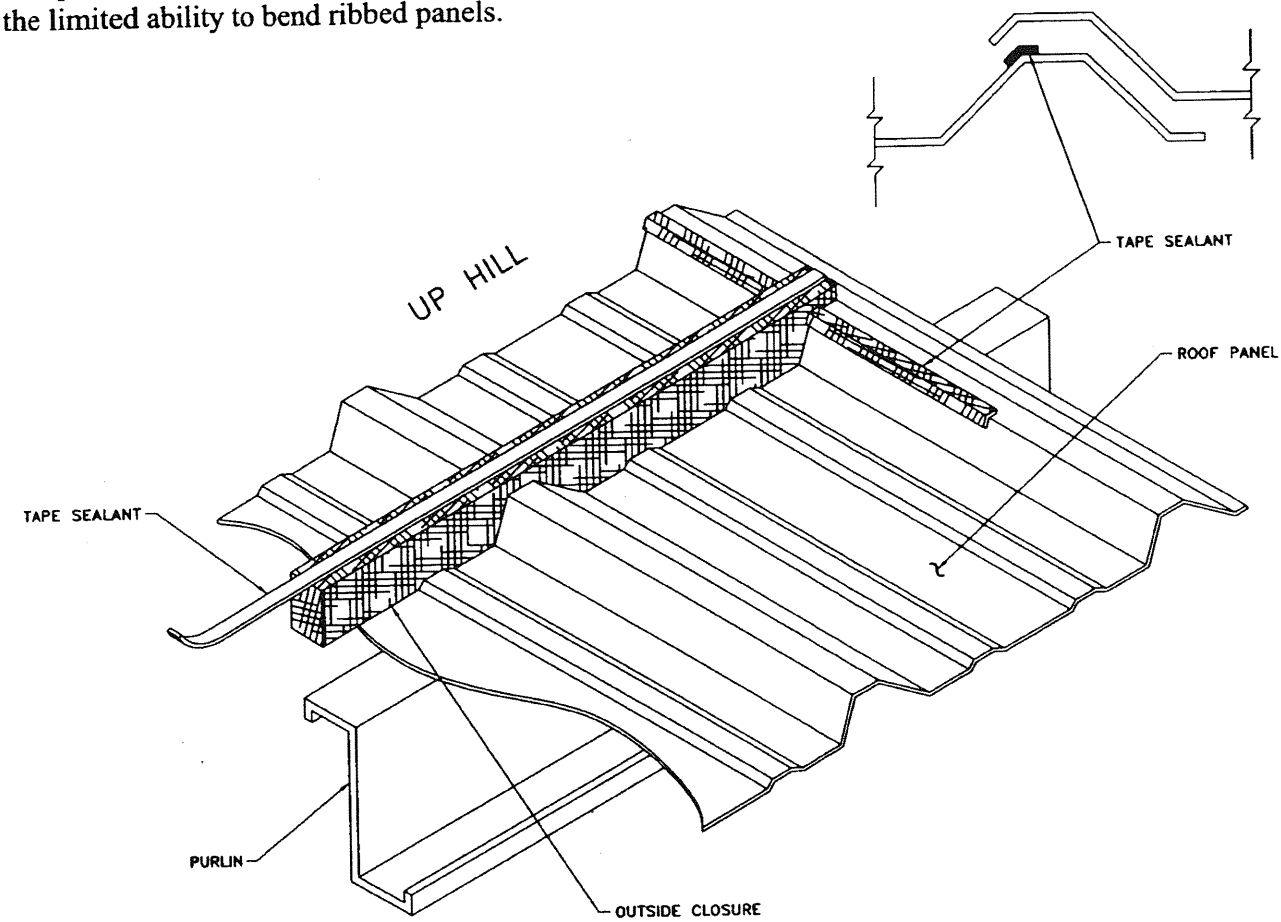


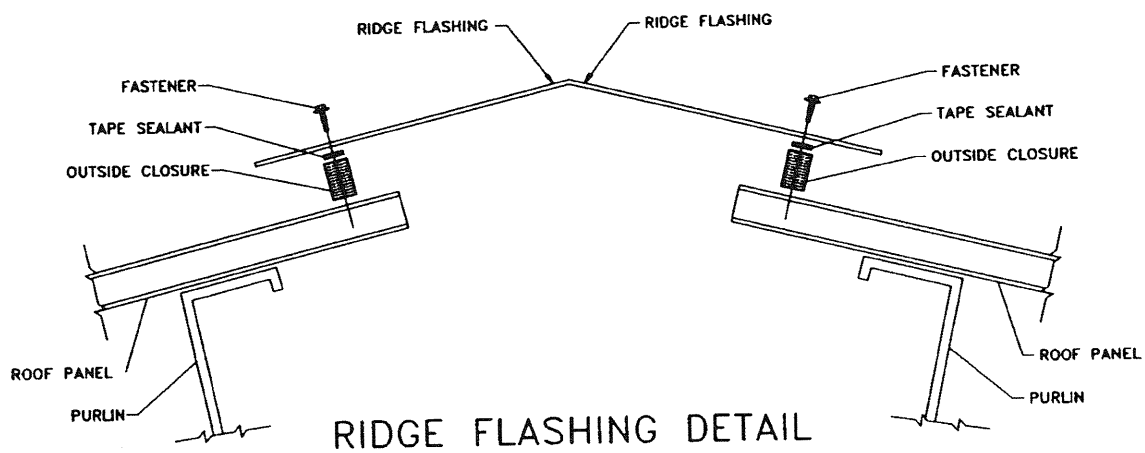
NOTE! THE USE OF THE TR300 TRIM PIECE.

NOTE!!! - Do not under any circumstances step or walk on surface of light panels, If foot traffic is necessary over light, use walk boards that are properly supported by building purlins. Placing of "DANGER, DO NOT WALK" markings on every skylight must be done without fail.

SAFETY FIRST!

Installation of this type of ridge flashing is used for roof slopes that are greater than 4:12. This is due to the limited ability to bend ribbed panels.



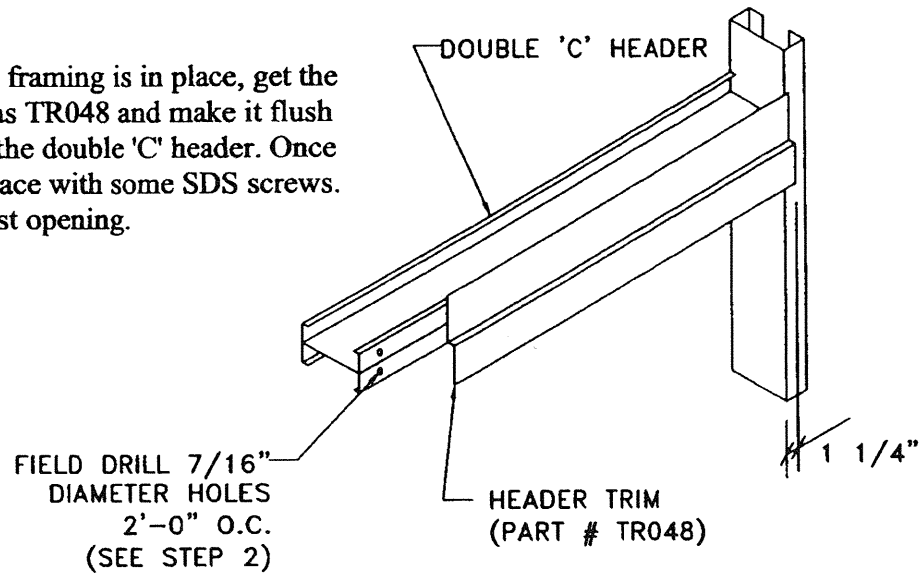


RIDGE FLASHING DETAIL

SECOND OPTION FOR RIDGE PANEL INSTALLATION

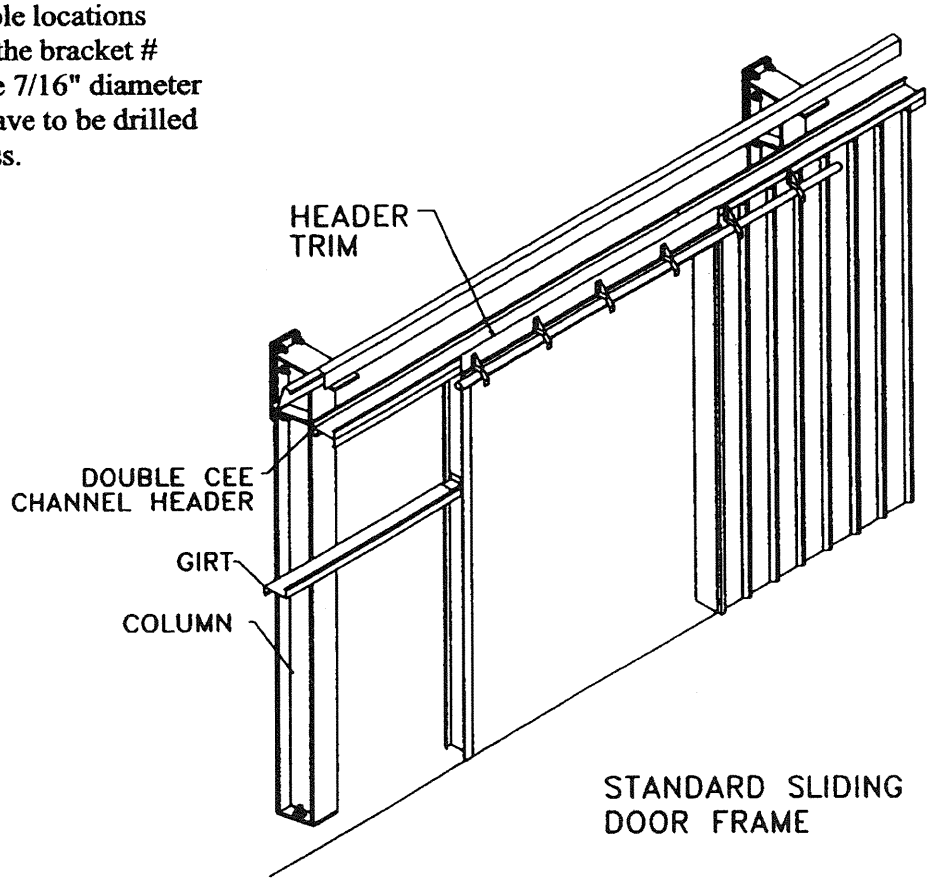
Installing Slide Doors

Step 1
After the slide door framing is in place, get the header trim labled as TR048 and make it flush with the bottom of the double 'C' header. Once flush, tack it into place with some SDS screws. Stop trim 1 1/4" past opening.



Step 2
Install lower wall sheets up to the center line of the double header. Before attaching the sheeting, insert foam closures behind the top of the panel. Lay out the round sliding door track in front of the opening as it would be hung upon the building. Next transfer the bolt hole locations from the track to the header. Use the bracket # 712138 as a template to layout the 7/16" diameter holes along the header that will have to be drilled as part of the door erection process.

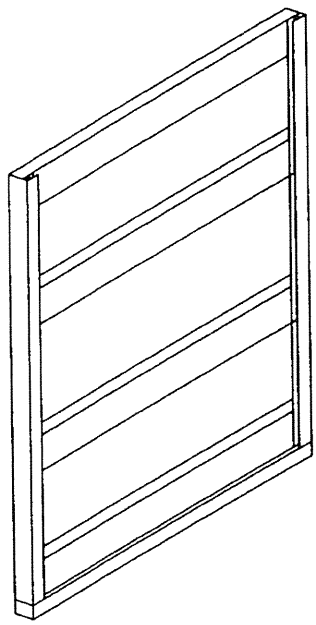
Step 3
Once the holes are drilled and the track bracket (Part #712138) is in place, install the track into the track bracket with retainer bracket (#712138) and bolt together. When the track is completely installed, it should resemble the drawing to the right.



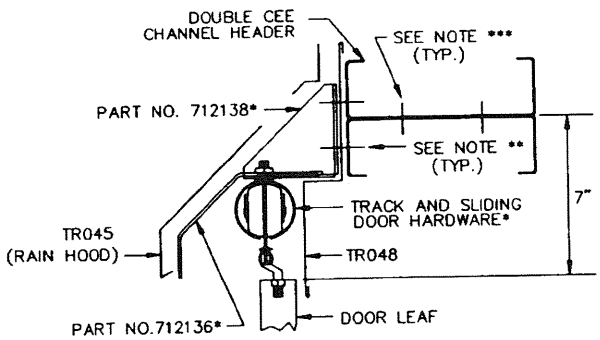
STANDARD SLIDING DOOR FRAME

Installing Slide Doors

Step 4
Once the sliding door track and all of it's components are assembled on the building, next assemble the sliding door. For instructions on the assembly please refer to the "Kwik-Frame" assembly instructions. Once the sliding door is fully assembled, begin to sheet the door with the excess sheeting from your building.

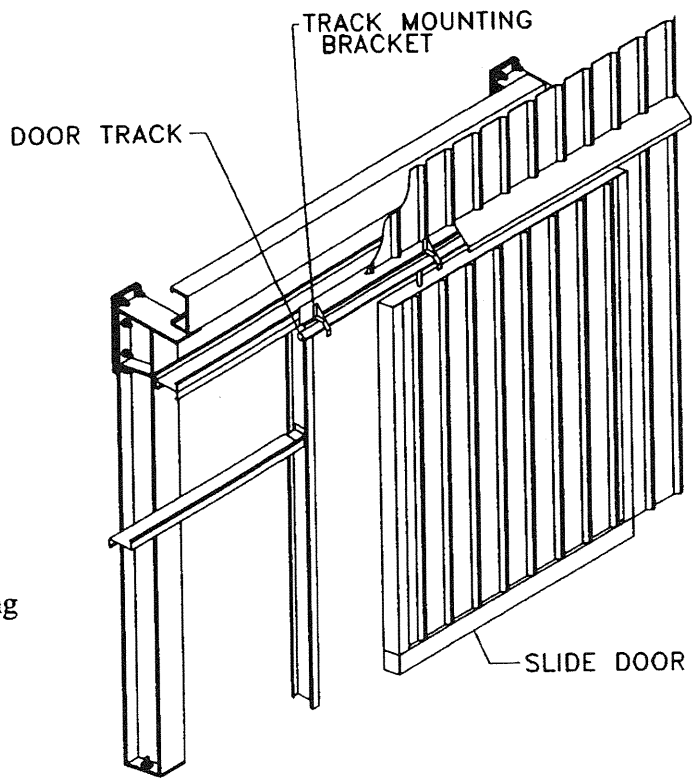


Step 5
Once the sliding door is sheeted and all the hardware is installed, next install the door by inserting the trucks into the track. After the door is hung, you can begin to install the rain hood and rain hood end caps. Once the rain hood is in place, next install foam closures along the bottom of the upper sheeting for the rain hood. Once the upper sheeting has been fastened to the building, it should rememble the drawing in the lower right.



* = SUPPLIED WITH DOOR KIT
** = FIELD DRILL 7/16"ø HOLES EVERY 2'-0" O.C & USE 3/8"x1" A325 BOLT & HEAVY HEX NUT
*** = BOLT TOGHTER WITH 1/2" x 1 1/4" A307 BOLTS & NUTS EVERY 5'-0" O.C. MAX

SLIDING DOOR CROSS SECTION



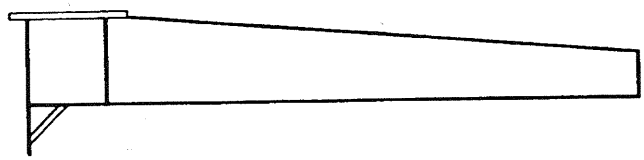
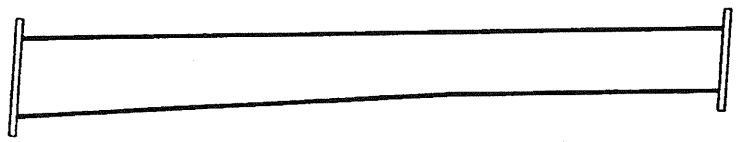
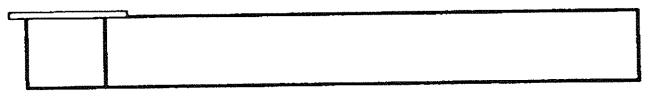
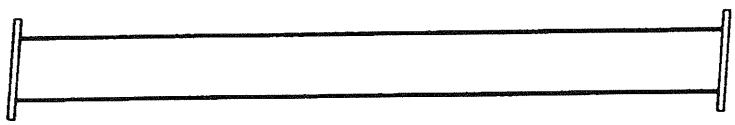
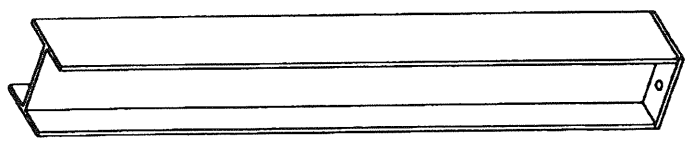
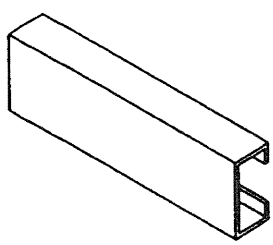
Note:
If the slider door did not come from the building manufacturer, this slider door section does not apply.

Building Erection Checklist

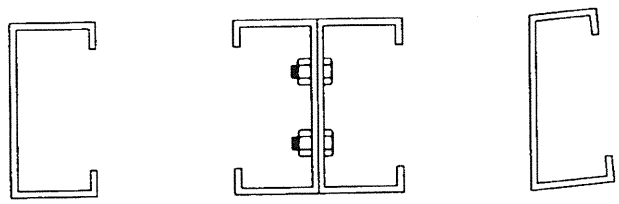
- ☐ 1. Were anchor bolt locations checked before starting erection?
- ☐ 2. Were all anchor bolts the proper size as given on the anchor bolt plan?
- ☐ 3. Had concrete properly cured before starting erection?
- ☐ 4. Were materials checked against tally sheets while unloading?
- ☐ 5. Were materials unloaded carefully without unloading damages?
- ☐ 6. Was blocking used to keel materials out of mud or water?
- ☐ 7. Was material unloaded to minimize rehandeling?
- ☐ 8. Were sheets stored off the ground, covered, and one end elevated to allow run-off with adequate space for ventilation?
- ☐ 9. Were workmen instructed not to walk on the gray steel with muddy shoes and not to walk on the sheets at all while they are on the ground?
- ☐ 10. Was the maximum amount of subassembly work done on the ground?
- ☐ 11. Was intermediate endwall columns used to support post and beam endwall rafters?
- ☐ 12. Was the first braced bay plumbed and braced, including cable bracing, before proceeding?
- ☐ 13. Was the building properly braced and guyed in all stages of erection to prevent wind damage, in the event of sudden gusts of wind?
- ☐ 14. Were nuts left loose to expedite plumbing the entire frame?
- ☐ 15. Was framework properly plumbed and squared, and then all bolts tightened?
- ☐ 16. Were all high-strength bolts tightened using "the turn of the nut method"?
- ☐ 17. Were all anchor bolts properly tightened?
- ☐ 18. Were all diagonal brace cables properly tightened to prevent twisting and distortion of the structural members?
- ☐ 19. Were all framed openings properly sized, squared, plumbed and secured?
- ☐ 20. Were all purlins straight, true and properly positioned?
- ☐ 21. Were all girts straight, true and properly blocked to prevent sagging?
- ☐ 22. Have all clip angles, flange braces and connections been made up properly?
- ☐ 23. Is the primer paint on all structural parts clean and free of foot marks?
- ☐ 24. Have all welding burn and smoke marks and other marks on the structures have properly cleaned and painted?
- ☐ 25. Were sheet screw holes pre-drilled using a tested template?
- ☐ 26. Was framework rechecked for alignment before sheeting was started?
- ☐ 27. Was net coverage of sheeting checked carefully, especially at frame lines?
- ☐ 28. Were the ribs on the roof sheets in alignment with the rafters?
- ☐ 29. Were the wall sheets installed in the direction of the prevailing view?
- ☐ 30. Are the wall sheet corrugations closed on the lower edge?
- ☐ 31. Were the drillings swept off the roof sheet daily to prevent rusting and scratching?
- ☐ 32. Are all screws well aligned?

- ☐ 33. Are all sheet side laps tight fitting and properly stitched?
- ☐ 34. Has mastic been properly applied on roof laps?
- ☐ 35. Are all sheet surfaces free from mud, dirt, grease, sealer or any other foreign material?
- ☐ 36. Were all scratches, if any, neatly touched up?
- ☐ 37. Is the insulation free from sag, rips, tears or snags?
- ☐ 38. Were any holes in the vapor barrier, neatly sealed?
- ☐ 39. Were all seams in the insulation properly sealed to ensure an efficient vapor barrier?
- ☐ 40. Are all eaves, rakes and corners properly insulated?
- ☐ 41. Is the insulation properly trimmed and folded at the base angle?
- ☐ 42. Are all closure strips properly inserted and is mastic applied at top and bottom where it is required?
- ☐ 43. Are all closure strips well aligned?
- ☐ 44. Are all flashings straight and true and properly fastened with all joints neatly fitted together?
- ☐ 45. Are all gutters straight and level?
- ☐ 46. Are all gutter laps, gutter ends and dropouts water tight and properly fastened?
- ☐ 47. Are all downspouts plumb and installed according to plan?
- ☐ 48. Have roof or wall panels damaged before or during erection?
- ☐ 49. Have doors and windows been installed according to plans and erection details
- ☐ 50. Have skylights, roof vents, louvers, windows and doors been checked for possible leaks?
- ☐ 51. Do all windows and screens operate smoothly?
- ☐ 52. Do all accessories with manual or mechanical movement operate freely and smoothly?
- ☐ 53. Do all doors open freely and smoothly?
- ☐ 54. Are all lock sets operating smoothly?
- ☐ 55. Are all keys accounted for?
- ☐ 56. Is all glazing complete and clean?
- ☐ 57. Was the construction site properly cleaned and cleared of debris?
- ☐ 58. Were concrete floors swept clean?
- ☐ 59. Was dirt, grease and soil removed from sheets, doors, flashing, etc..?
- ☐ 60. Was the building constructed and completed to the purchaser's satisfaction?
- ☐ 61. Have roof and wall panels been checked to see that all holes drilled in them have been filled with screws or rivets?

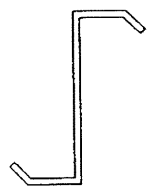
STRUCTURAL MEMBERS

DESCRIPTION	PART #	ILLUSTRATION
TAPERED RIGID FRAME COLUMN	X	
TAPERED RIGID FRAME RAFTER	X	
STRAIGHT RIGID FRAME COLUMN	X	
STRAIGHT RIGID FRAME RAFTER	X	
ENDWALL COLUMN	X	
ENDWALL RAFTER	X	

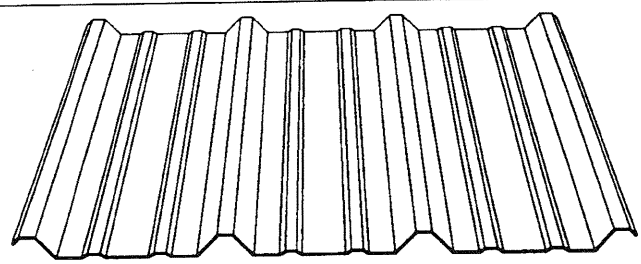
C–CHANNELS

DESCRIPTION	PART #	ILLUSTRATION
ENDWALL COLUMN, DOOR HEADER, RAFTER, JAMB, EAVE STRUT	X	

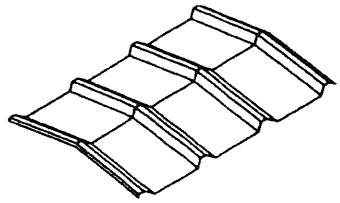
Z–SECTIONS

DESCRIPTION	PART #	ILLUSTRATION
GIRT, PURLIN	X	

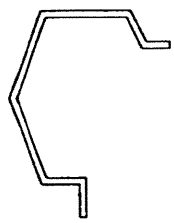
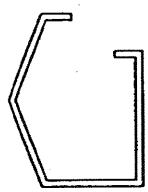
WALL & ROOF PANELS

DESCRIPTION	PART #	ILLUSTRATION
ROOF & WALL SHEETING	X	

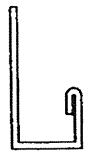
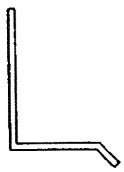
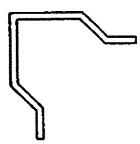
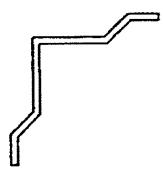
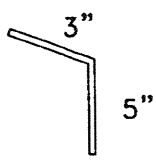
RIDGE CAPS

DESCRIPTION	PART #	ILLUSTRATION
DIE FORMED RIDGE CAP	X	

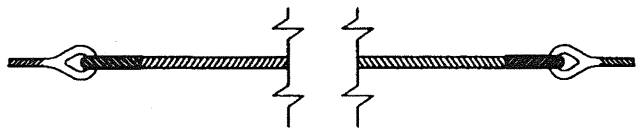
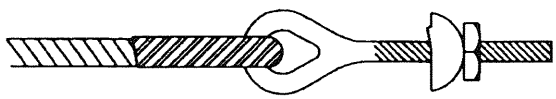
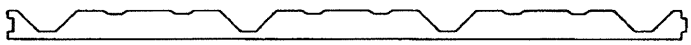
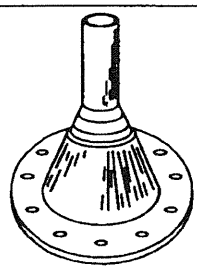
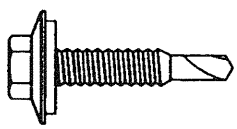
TRIM PACKAGE

DESCRIPTION	PART #	ILLUSTRATION
RAKE TRIM	TR080	
GUTTER	TR120	
JAMB, HEAD & SILL WRAP	TR042 & TR043	
JAMB TRIM	TR040	

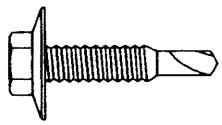
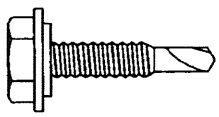
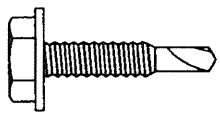
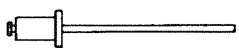
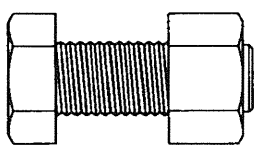
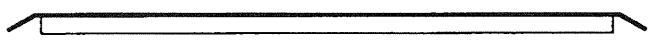
TRIM PACKAGE – CONTINUED

DESCRIPTION	PART #	ILLUSTRATION
HEAD & SILL TRIM	TR041	
BASE FLASHING	TR001	
OUSIDE CORNER	TR020	
INSIDE CORNER	TR021	
EAVE PURLIN ANGLE	PF–	

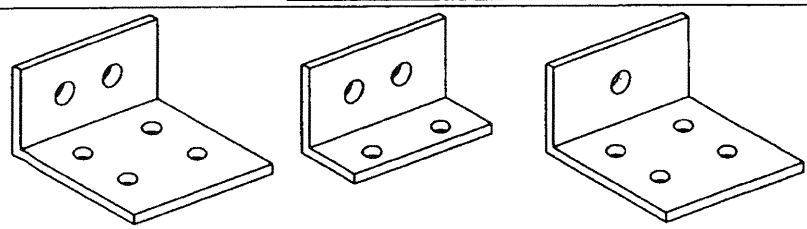
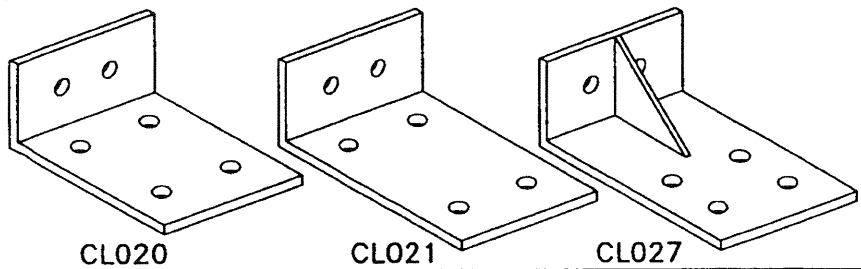
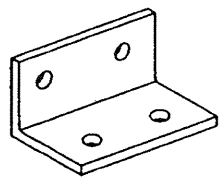
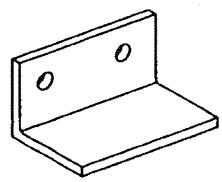
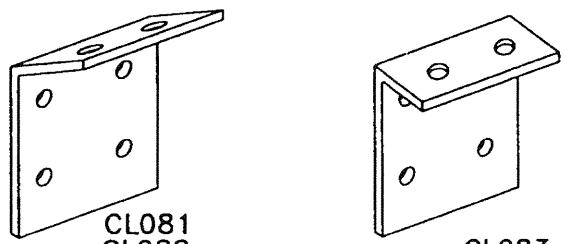
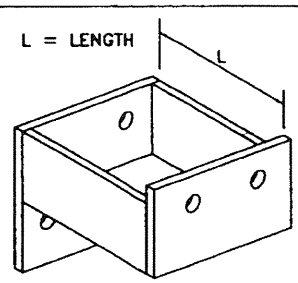
HARDWARE – CONTINUED

DESCRIPTION	PART #	ILLUSTRATION
CABLE BRACES	X	
EYE BOLT	X	
INSIDE PANEL CLOSURE	X	
OUTSIDE PANEL CLOSURE	X	
RUBBER ROOF JACK	X	
SELL–DRILLER W/WASHER (ROOF)	X	

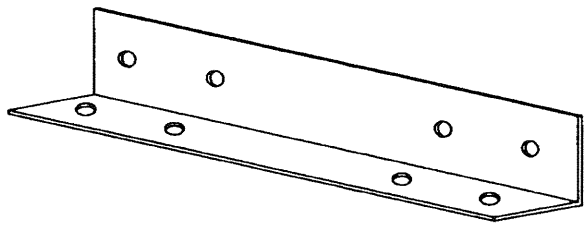
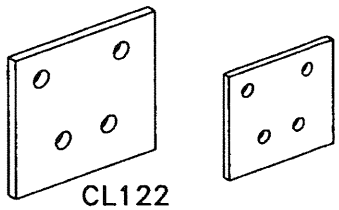
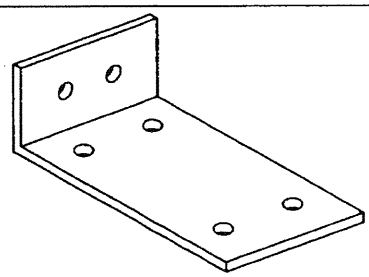
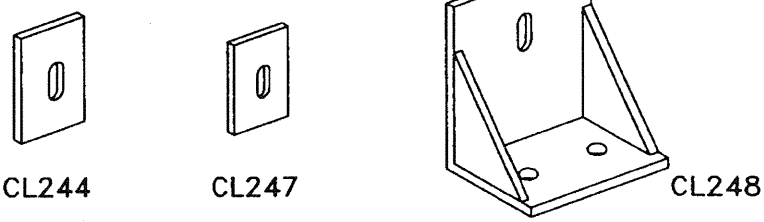
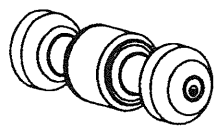
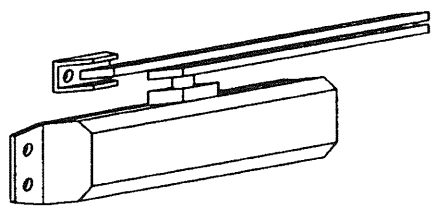
HARDWARE – CONTINUED

DESCRIPTION	PART #	ILLUSTRATION
SELL-DRILLER W/O WASHER (WALLS)	X	
STITCH SCREW W/WASHER (ROOF)	X	
STITCH SCREW W/O WASHER (WALLS)	X	
POP RIVET	X	
STRUCTURAL BOLTS WITH NUTS	X	
FLANGE BRACE	X	

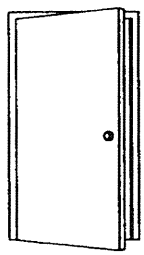
HARDWARE – CONTINUED

DESCRIPTION	PART #	ILLUSTRATION
BASE CLIPS	CL001 CL002 CL003	 CL001 CL002 CL003
GIRT CLIP	CL020 CL021 CL027	 CL020 CL021 CL027
HEADER CLIP	CL025	 CL025
GIRT CLOSURE	CL058	 CL058
EW POST CLIP	CL081 CL082 CL083	 CL081 CL082 CL083
EW POST CLIP	CL095 CL096 CL097	 L = LENGTH NOTE: LENGTH VARIES

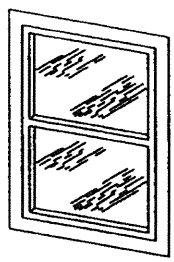
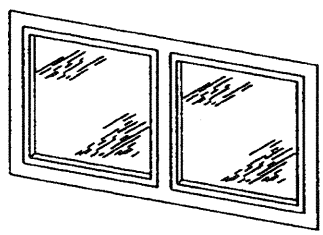
HARDWARE – CONTINUED

DESCRIPTION	PART #	ILLUSTRATION
COLUMN TO RAFTER CLIP	CL098 CL099	 NOTE: ANGLE VARIES
PEAK/SHEAR PLATE	CL122 CL123 CL127	 CL122 CL123 CL127 NOTE: PLATE SIZE DEPENDS ON RAFTER SIZE.
PURLIN/EAVE CLIP	CL153	
BRACE CLIPS	CL244 CL247 CL248	 CL244 CL247 CL248
LOCK SET	x	
CLOSER	x	

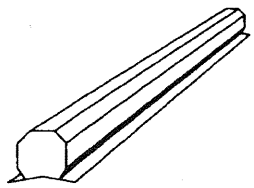
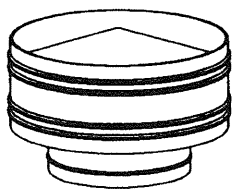
PERSONNEL DOORS

DESCRIPTION	PART #	ILLUSTRATION
DOORS	X	

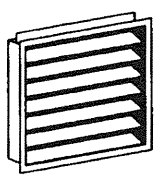
WINDOWS

DESCRIPTION	PART #	ILLUSTRATION
S.H. WINDOW	X	
H.S. WINDOW	X	

RIDGE VENTS

DESCRIPTION	PART #	ILLUSTRATION
CONTINUOUS VENT (WITH BIRD SCREEN)	X	
ROUND VENTS	X	

LOUVERS

DESCRIPTION	PART #	ILLUSTRATION
LOUVERS (WITH SCREEN)	X	

Anchor Bolts - Bolts used to anchor structural members to a foundation or other support. Usually refers to the bolts at the bottom of all columns, wind posts, endwall posts and door posts. When embedded in the concrete foundation of a building or other structure, they resist all tensile or shear forces acting on the structural piers and columns, which they anchor.

Auxiliary Loads - All specified dynamic live loads other than the basic design loads which the building must safely withstand such as cranes, sprinkler systems, ventilators, material handling systems, machinery, elevators, vehicles, and impact loads.

Base Angle - an angle secured to a wall or foundation used to attach the base of the wall paneling.

Bay - The space between frame centerlines or primary supporting members in the longitudinal direction of the building.

Beam and Column - A primary structural system consisting of a series of roof beams supported by columns. Often used as the end wall of a metal building. Commonly known beam and post endwall.

Brace Rods - Rods used in the roof and walls to transfer loads, such as wind loads, seismic loads and impact loads to the foundation. (Also often used to plumb buildings but not designed to replace erection cables.)

Building Code - Regulations established by a recognized agency describing design loads, procedures and construction details for structures. Usually applying to designate political jurisdiction (city, county, state, etc.).

"C" Section - A member formed from sheet steel into the shape of a block "C", that may be used either singularly or back-to-back.

Clear Height - Dimension from floor line to lowest point of primary roof beams or purlins.

Collateral Load - All specified additional dead loads other than the metal building framing, such as sprinklers, mechanical and electrical systems and ceilings.

Column - A primary member used in a vertical position on a building to transfer loads from main roof beams or trusses to the foundation.

Concentrated Load - A load applied to a structural element that can be considered as being applied at a point rather than being applied uniformly across a span. An example is a heater unit hung from a beam.

Dead Load - The dead load of a building is the weight of all permanent construction, such as floor, roof, framing, and covering members.

Design Load - The loads expressly specified in the contract documents, which the metal building system is designed to safely resist.

Eave - The line along the sidewall formed by the intersection of the planes of the roof and wall.

Eave Height - The vertical dimension from finished floor line to the eave line.

End Bay - The bays adjacent to the endwalls of a building. Usually the distance from the endwall to the first interior main frame measured parallel to the ridge.

Endwall - An exterior wall, which is perpendicular to the ridge of the building.

Endwall Post - A vertical member located at the endwall of a building, which supports the girts. In beam and post endwalls, the endwall posts also support the endwall roof beams.

Flange Brace - A bracing member used to provide lateral support to the flange of a beam, girder or column.

Gable - The triangular portion of the endwall located above the elevation of the eave.

Gage (or Gauge) - A standard unit of measurement for dimension, thickness, etc.

Girt - A secondary horizontal structural member attached to sidewall post or endwall post columns to which wall covering is attached and supported horizontally.

"H" Section - A steel member with an H cross-section.

Haunch - The deepened portion of a column or roof beam designed to accommodate the higher bending moments at such points. (Usually occurs at connection of column and rafter.)

Header - A horizontal member above a door, window, etc.

High Strength Bolts - Any bolt made from steel having a tensile strength in excess of 100,000 pounds per square inch. Some examples are ASTM A-325, A-449, A-490.

Hot-Rolled Shapes - Steel sections (angles, channels, W-shapes, etc.), which are formed by rolling mills while the steel is in a semi-molten state.

Jamb - The vertical-framing members located at the sides or an opening.

Knee - The connecting area of a column and roof beam of a structural frame such as a rigid frame.

Lean-To - A structure such as a shed, having only one slope or pitch and depending upon another structure for partial support.

Live Load - Live load means all loads exerted on a roof except dead, wind snow and lateral loads.

Parapet - That portion of the vertical wall of a building, which extends above the roofline at the intersection of the wall and roof.

Pier - A plain, detached mass of masonry, timber, or concrete usually serving as a foundation support. An upright projection portion of a wall, usually concrete as used with a metal building.

Portal Frame - A rigid frame structure so designed that it offers rigidity and stability in its plane. It is normally used to resist longitudinal loads where x- bracing is not permitted.

Primary Members - The main load carrying members of a structural system, including the columns, endwall posts, roof beams, or other main support members.

PSF - Pounds per square foot.

PSI - Pounds per square inch.

Purlin - A secondary horizontal structural member attached to the primary frame which transfers the roof loads from the roof covering to the primary members.

Purlin Brace - A tension member used to support purlins in the direction of the week axis.

Rake - The intersection of the plane of the roof and the plane of the gable.

Rafter - A primary beam supporting the roof system.

Ridge - Highest point on the roof of the building which describes a horizontal line running the length of the building.

Roof Slope - The angle that a roof surface makes with the horizontal. Usually expressed in units of vertical rise to 12 units of horizontal run. Example: ½:12 (one-half inch rise in every 12 horizontal inches).

Roof Live Load - Gravity loads applied to the roof of a structure which tend to vary in magnitude over time, such as snow load.

Roof Snow Load - The live load induced by the weight of snow on the roof of the structure.

Secondary Members - Members which carry loads to the primary members. This term includes Purlins, Girts, eave purlins, rod bracing, flange braces, and knee braces, headers, jambs, sag members, and other miscellaneous framing members.

Seismic Load - The assumed lateral load acting in any horizontal direction. Used in designing for earthquake conditions.

Self Drilling Screws- A fastener that attaches paneling to a structural element or that attaches paneling to paneling (a panel splice).

Simple Span - A term used in structural analysis to describe a support condition for a beam, girt, purlin, etc., which offers no resistance to rotation at the supports.

Snow Load - A load imposed on buildings or other structures due to snowfall.

Soffit - A panel which covers the underside of an overhang or fascia.

Span - The distance between supports of beams or trusses.

Tributary Area - The area which contributes load to a specific structural component.

Turn-of-the-Nut-Method - A method for pre-tensioning high strength bolts. The nut is turned from the snug-tight position, corresponding to a few blows of an impact wrench or the full effort of a man using an ordinary spud wrench, the amount of rotation required being a function of the bolt diameter and length. Usually an additional 1/3 of a rotation.

Uplift - Wind load on a building which causes a load in the upward direction.

Ventilator - An accessory, usually used on the roof, that allows the air to pass through.

Wainscot - Wall material, used in the lower portion of a wall, that is different from the material in the rest of the wall. Decorative facing applied to the lower portion of an interior wall.

Weights - All stated weights are approximate. Weights shown are based on size of material required by design. Mill tolerances and material substitutions may cause weight variation. Weight of crating and packing material is not included.

Wind Load - The load on a structure caused by the wind blowing from any direction (usually horizontal).

"X" Bracing - Brace rods, or cables to carry tension only, placed in a bay in the form of an "X" between two frames of a building to receive loads applied from the side or weak direction of a frame such as the wind load on the endwall of a building.

"Z" Section - A member cold formed from steel sheet in the shape of a block "Z".

NOTES