

NEW CONSTRUCTION ROOF DETAILS

SIMPLE SAVER SYSTEM[®] INSTALL INSTRUCTIONS

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SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

INTRODUCTION

Thermal Design is the nation's leader in the ongoing development of thermal insulation technologies for pre-engineered and other non-residential buildings.

Born out of a successful contracting business, Thermal Design brought together practical methodology and cost efficient materials to solve the problems of insulating pre-engineered buildings. With well over 40,000 installations to date, the Simple Saver System® is still being improved with superior quality control of materials and installation procedures. A new United States Patent was issued covering the use of the Simple Saver System® as a means of providing fall protection for insulation and roofing workmen. Because of the life saving importance, Thermal Design has included this recently patented feature in the standard Simple Saver System® without any extra charge. Due to the critical, life-dependent importance of the materials and installation, only legitimate, quality controlled Simple Saver System® materials, installation drawings and instructions should be used. By rights granted under U.S. patent law, only authorized licensed distributors will be allowed to sell the products used in the patented systems and marketed under the Simple Saver System service mark.

The content of this manual contains proprietary information, drawings and instructions which are copyrighted and made available for use under the shrink wrap license agreement on the cover or the wrapper of this manual. This manual and associated video tapes, CD's, software and other documents covered under the license agreements remain property of Thermal Design, Inc. and are solely intended for the exclusive use with the legitimate materials and systems of Thermal Design.

We request that all designers and users only allow the purchase of legitimate materials from authorized sources and follow installation drawings and instructions to assure satisfactory performance of the products. We take job site safety very seriously and we expect that no exceptions will be allowed that breaches the integrity of our quality control processes. A persons life could depend on it! Caution! Look-a-like products designed to be sold put workmen and end users at risk of installed product failures. Experience can not be copied!

Technical information, support and quotations may be obtained by calling Thermal Design at (800) 255-0776 or an authorized Simple Saver System® distributor.

Thermal Design is dedicated to improving the quality and performance of these multipurpose systems for insulating pre-engineered buildings and providing an economically desirable means of building energy efficient buildings.

SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

ACTUAL R-VALUES

Designed for optimal performance, the Simple Saver System® uses the space required for the full specified insulation thickness, isolates the conductive steel purlins/girts, and seals the insulation from interior air and moisture infiltration. Insulative thermal breaks are used to minimize conduction. Every roof system is designed to perform at the specified R-value (+/- 10%), based on roof system with 3/4 " thermal spacer block between roof panels and tops of purlins/joists. All thermal performance claims in these instructions assume purlins are spaced an average of 60" apart on center. Performance will decrease as purlin and girt spaces are narrowed. Proper insulation thicknesses are the depth of the purlins, plus any space created above and below the purlins created by standoffs. Two additional inches should be included to take advantage of bottom side deflection. Additional space can be created using Simple Saver System® Stand-Off Products to accommodate virtually any specified insulation thickness. Flexible insulation is considered within specifications with +/- 10% of thickness and performance by Thermal Design.

PRE-INSTALLED R-VALUE (THICKNESS)	INSTALLED R-VALUES/U-VALUES FOR 60" O.C. PURLIN SPACINGS (NARROWER SPACINGS REDUCE PERFORMANCE)
R-38 (12.5 inches)	R=38 U= 0.026
R-35 (11.5 inches)	R=34 U= 0.029
R-30 (9.5 inches)	R=30 U= 0.033
R-25 (8 inches)	R=25 U= 0.040
R-22 (7 inches)	R=22 U= 0.045
R-19 (6 inches)	R=19 U= 0.053

In-place insulation values are obtained by installing insulation in an actual structure, determining the average thickness and multiplying by the tested R-value per inch. The conductive losses through purlins are negligible when thermally broken and isolated from interior air by the Simple Saver liner fabric system.

The calculations of ASHRAE accurately predict insulation values of the Simple Saver roof method. Insulation R-values and thicknesses shown are for 0.6 lb./cu. ft. density fiberglass installed horizontally. High density fiberglass yields higher R-values for these calculated methods, with less overall thickness.

NOTE: R-values refer to fiberglass manufacturer's published label R-values for description purposes. This does not necessarily mean installed system insulation values which differ due to conduction through steel members. Studies are currently being conducted to improve wall variability.

SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

NEW PRE-ENGINEERED BUILDING INSULATION INSTRUCTIONS WITH FREE OSHA COMPLIANT FALL PROTECTION

The Simple Saver System® is a multi-purpose system that performs many functions with minor variations such as strap patterns, color, insulation thicknesses and types, layers, thermal break options, vented systems, etc. The system can also be used in many different types of structures, thus it is important to read the project instructions carefully and call Thermal Design (800-255-0776) or your distributor if there are any questions regarding installation procedures.

We have attempted to cover each type of installation in sufficient detail; however it is impossible to cover every circumstance. Common sense and experience with the system will answer most questions. The basic concept of the Simple Saver System® is:

1. Create a platform with tensioned steel straps (installed in the entire area to be insulated).
2. Position and pull out the specially folded fabric liner on the strap platform and clamp it squarely in position (generally a bay at a time).
3. Fasten the steel strap platform supporting the fabric liner to the bottom of the purlin flanges with the self-drilling washer head screws provided for that purpose.
4. Seal the fabric liner perimeter edges to the abutting main frames and eave struts with the special contact adhesive provided for that purpose. Syseal® Tape by Thermal Design will be used at any fabric liner splices. Inspect the fabric liner for any holes, patch and seal so that it is air tight. As an option, Syseal® Tape may also be used to seal the fabric liner to the bottom of the eave struts.
5. Unroll and position the insulation in the purlin cavity. It is recommended to thermally break the roof panels from the top of the purlins with a second layer of insulation and/or a thermal spacer block, typically provided by the roof system manufacturer as a tested component.

Production rates for an R-30 two-layer roof insulation system with thermal spacer block, typically provided by the roof system manufacturer as a tested component are generally in the range of 150-200 sq. ft. per man-hour for the complete system installation in a typical pre-engineered metal building. Upwards to 300 sq. ft. per man-hour have been reported in larger buildings with experienced installers. The labor is approximately 1/2 strapping, 1/4 fabric liner and 1/4 insulation placement. Poor site conditions will affect the production rates. The fall protection feature can dramatically increase production rates by allowing workers to insulate and roof safely without being restrained by lanyards. Workmen must use a safety harness connected to an OSHA compliant lifeline within 6' of any roof edge or liner system edge.

Installation training is available to contractors for a fee and is highly recommended. Video taped instructions are available free of charge. Written instructions and project detail drawings take precedence over video instructions which are general in nature and intended to show technique.

SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

DEGREE OF DIFFICULTY AND PRODUCTION RATES

Installation of the Simple Saver System® during the roof sheeting operation is much faster than retrofit installation, which is completely installed from the underside of the structure. The chart below gives ranges of production rates for use in estimating labor costs for installation.

There are many factors that affect production rates on every type of construction. Insulation systems are no exception, therefore judgement is required in considering variables such as experience of the crew, available equipment, building height, weather likely during installation period, etc. The production rates below are ranges normally encountered under average conditions with an experienced erection crew properly equipped to perform the work. We have timed many installations and find it fairly easy to achieve 150 square feet per man-hour on first time new construction installations. Experienced crews are known to achieve nearly 300 square feet per man-hour under ideal new construction conditions. We suggest close observation of production rates to obtain experience rates for your own crew as being the best method of determining production rates.

*These rates are for typical metal buildings with eave height up to 30 feet. Add for additional height costs.

TOPSIDE INSTALLATION IN NEW BUILDINGS	
Description	Production Rates
Installing a single- or double-layer Simple Saver System® during sheeting process (includes labor to install Quik-Stop™ Thermal Block in single-layer systems)	Roof: 150-200 sq. ft./man-hour
	Walls: 120-170 sq. ft./man-hour
Installation of thermal blocks alone to top side of structure located 5' on-center	600 to 800 sq. ft./man-hour

Call (800) 255-0776 or your distributor for assistance if you have questions or if a stand-off bracket system is required to create added insulation space.

SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

Tools:

TOOLS AND EQUIPMENT REQUIRED



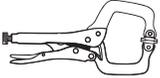
Screw guns (two recommended, 0-1000 RPM 4.5 amp minimum, three wire)*



Five-sixteenths inch (5/16") long shank magnetic nutsetter (two recommended plus spares)



Double-grounded, three-wire extension cords as required to reach power source



8-10 self-locking clamps (with pads preferred for clamping fabric in position)

Utility knives with extra blades (minimum of two)



One pair of safety glasses per worker

Extension ladder with tie off



GoJo® Brand cream hand cleaner (regular type dissolves the Simple Saver High Tack™ Adhesive)



Towels for hand cleaning



25-foot tape measure

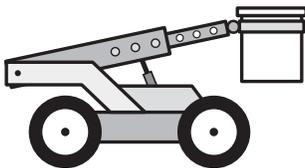


Wrenches to fit rafter brace bolts (two sets of two wrenches)

A good quality caulking and caulking gun to seal liner system at junctions of rafters, rafter braces, fasteners, and other trade hangers.

Equipment:

Lifts operable from the basket allow installation with one less crew member and normally pay for themselves in production labor savings.



Lifts:

- A. Basket type boom lift-best
- B. Scissor lift- OK on solid, level surfaces
- C. Scaffolding

Power Generators:

- A. Power Generator or grounded temporary electrical service.



Note: Use scaffolding if automatic lifts are not available. Safety equipment is required for compliance with all applicable State and Federal safety standards. Once the liner system is properly installed and certified it provides the through fall protection for the workers above. CAUTION: Fall protection requires a signed installer agreement. Requires workers be tied off with OSHA compliant safety harness and equipment within six feet of any edge of the Simple Saver System®.

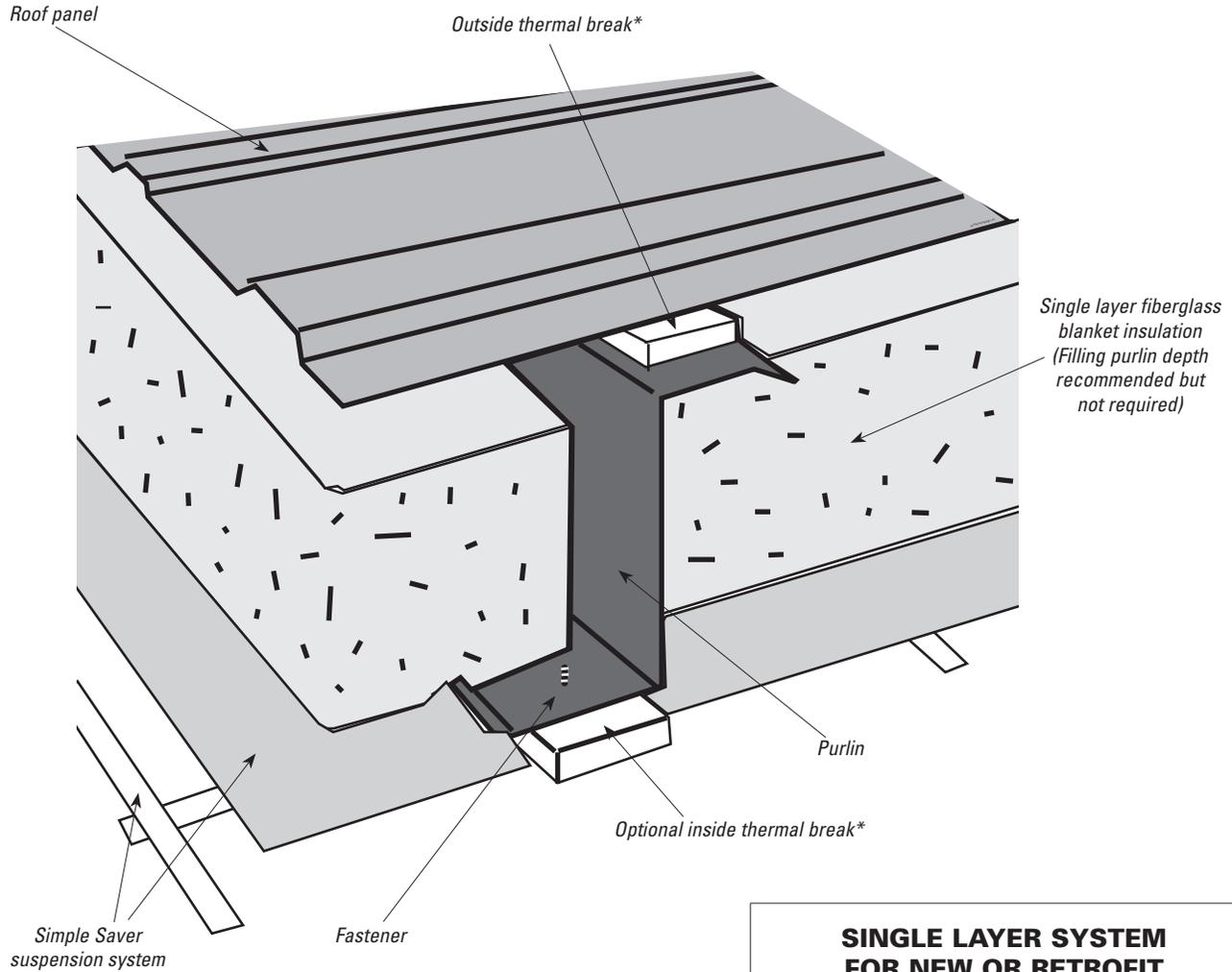
*When drilling, it is very important to use a variable speed RPM/high torque screw gun. A variable speed DeWalt 269 (DW269) with maximum 0-1000 RPMs is an example of a suitable tool. A variable speed 0-2,500 RPM screw gun may be used, however the electric motor in the screw gun may burn out prematurely due to lower torque ratings. Fastener tips may be ruined by using too high of a speed screw gun for installation. Once the tip of a fastener is ruined it is almost impossible to use.

DO NOT use drywall variable speed screw guns with 0 to 4000 RPM speed as it will simply ruin the fastener tips due to fast heat build-up. Use only screw guns, which have clutches; do not use regular drills as they will torque the heads off the fasteners!

SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

SINGLE-LAYER FIBERGLASS BLANKET ROOF INSULATION SYSTEMS FOR NEW BUILDINGS

Figure 1-1.



Thermal breaks should be installed continuously on the top or bottom surface of the purlin. See section on various thermal breaks available for the Simple Saver System.

*Thermal breaks are recommended between the roof panels and the purlins or on the inside between the vapor retarder and the purlins if no other thermal break material is being used or exists. Steel is a good conductor and readily conducts heat into or out of the conditioned space if an adequate separation is not provided. Condensation may also form on the face of the vapor retarder if the purlins are cold.

NOTE: R-values refer to fiberglass manufacturer's published label R-values for description purposes. This does not necessarily mean installed system insulation values which differ due to conduction through steel members. Studies are currently being conducted to improve wall variability.

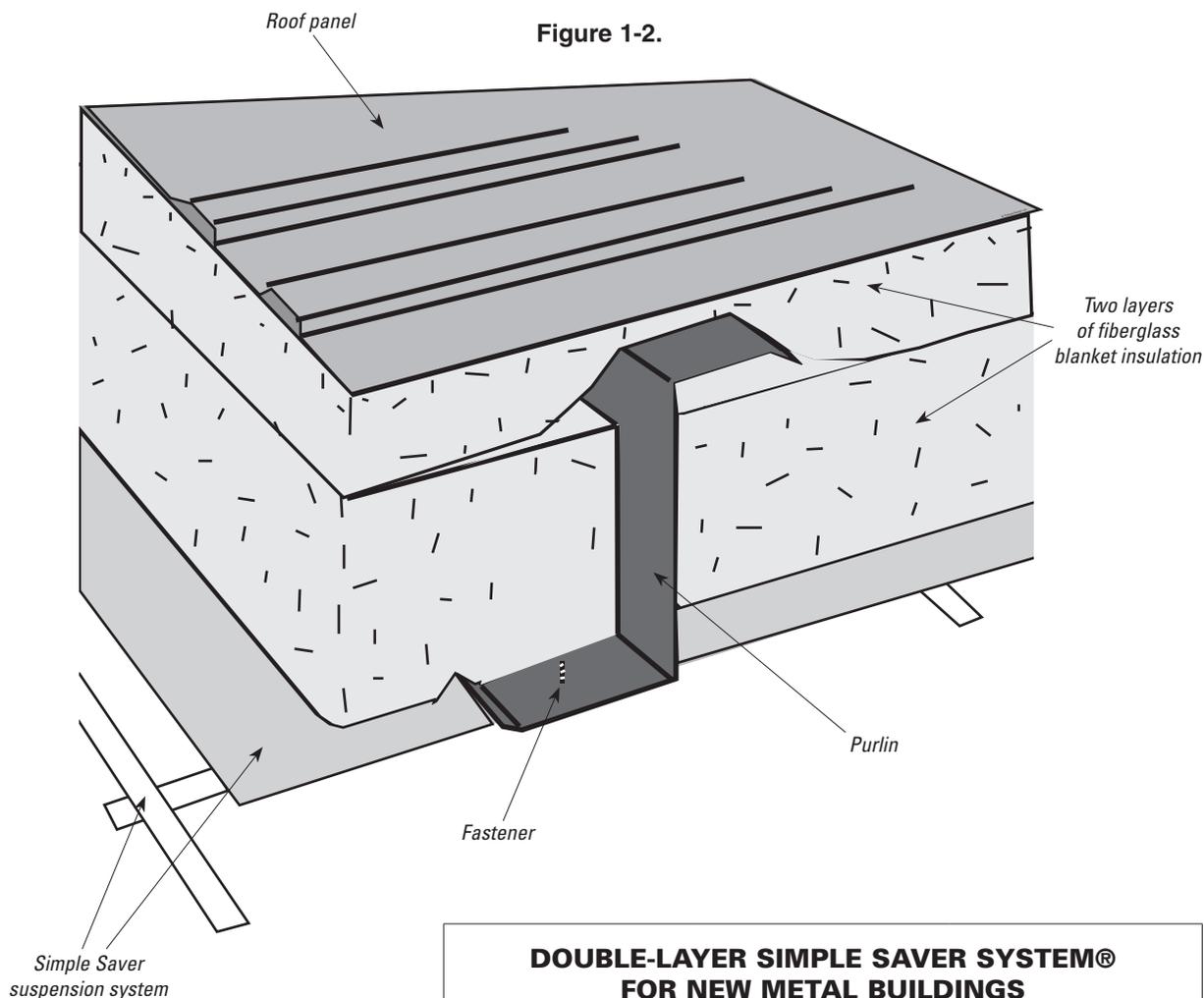
IMPORTANT NOTICE: For the optimum performance of each Simple Saver System® by Thermal Design, space must be created above or behind the liner system for the full insulation thickness to be achieved, including the deflection of the liner below the purlins of about two inches and a stand-off of the roof panels of about one inch. Performance will typically vary by +/- 10%. This applies to all systems and the customer are to provide a suitable structure to meet this criteria or install a stand-off system that will meet the criteria.

SINGLE LAYER SYSTEM FOR NEW OR RETROFIT (TOTAL 'R' THICKNESS OF INSULATION)

Total 'R'	Thickness of Insulation
R-10	3 1/4"
R-11	3 1/2"
R-13	4 1/4"
R-19	6 1/2"
R-24	8"
R-30	9 1/4"
R-30+	Requires Batt or Blow-in

SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

DOUBLE-LAYER FIBERGLASS BLANKET INSULATION SYSTEMS FOR NEW BUILDINGS



Optional topside thermal blocks may be used in two layer systems to reduce conduction and create more space. Bottom side thermal breaks may be utilized for the same purpose. All thermal performance claims in these instructions assume 3/4" in thermal blocks between the purlins and roof sheets, and assume purlins are spaced an average of 60" apart on center. Performance will decrease if purlin and girt spaces are narrowed and/or if thermal blocks are not used.

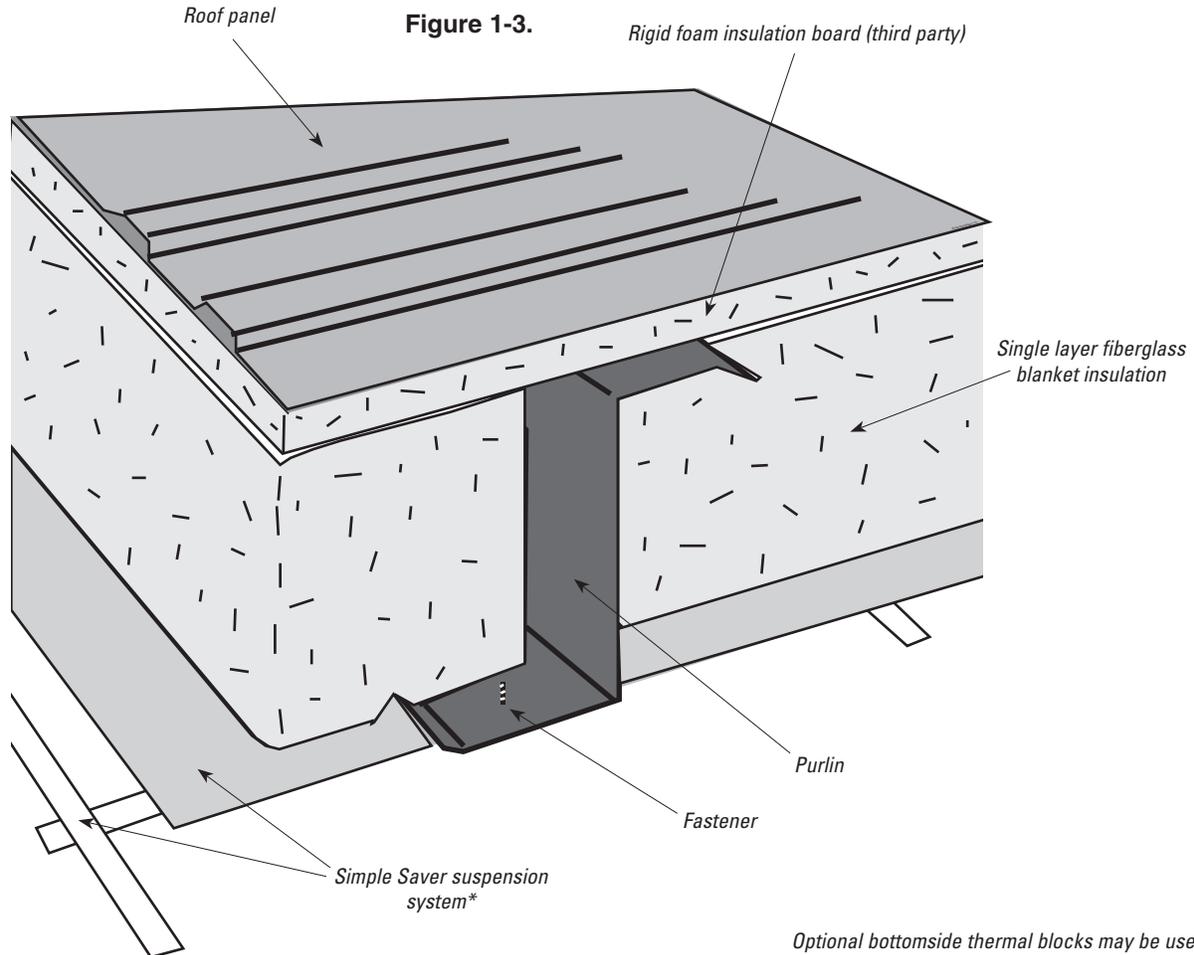
NOTE: R-values refer to fiberglass manufacturer's published label R-values for description purposes. This does not necessarily mean installed system insulation values which differ due to conduction through steel members. Studies are currently being conducted to improve wall variability.

IMPORTANT NOTICE: For the optimum performance of each Simple Saver System® by Thermal Design, space must be created above or behind the liner system for the full insulation thickness to be achieved, including the deflection of the liner below the girts of about two inches and a stand-off of the roof panels of about one inch. Performance will typically vary by +/- 10%. This applies to all systems and the customer are to provide a suitable structure to meet this criteria or install a stand-off system that will meet the criteria.

DOUBLE-LAYER SIMPLE SAVER SYSTEM® FOR NEW METAL BUILDINGS		
First Layer	Second Layer	Total R-value
R-10 = 3 1/4"	R-10 = 3 1/4"	R-20
R-19 = 6 1/2"	R-10 = 3 1/4"	R-29
R-19 = 6 1/2"	R-13 = 4 1/4"	R-32
R-19 = 6 1/2"	R-19 = 6 1/2"	R-38
R-30 = 9 1/4"	R-10 = 3 1/4"	R-40
R-30 = 9 1/4"	R-13 = 4 1/4"	R-43
Note: Higher R-values and other combinations available		

SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

SINGLE-LAYER FIBERGLASS BLANKET INSULATION SYSTEMS WITH RIGID FOAM INSULATION BOARD BETWEEN ROOF SHEET AND PURLIN



Optional bottomsides thermal blocks may be used in a single layer system to reduce conduction and create more space for additional insulation thickness. This would allow higher R-values to be achieved.

NOTE: R-values refer to fiberglass manufacturer's published label R-values for description purposes. This does not necessarily mean installed system insulation values which differ due to conduction through steel members. Studies are currently being conducted to improve wall variability.

IMPORTANT NOTICE: For the optimum performance of each Simple Saver System® by Thermal Design, space must be created above or behind the liner system for the full insulation thickness to be achieved, including the deflection of the liner below the purlins of about two inches and a stand-off of the roof panels of about one inch. Performance will typically vary by +/- 10%. This applies to all systems and the customer are to provide a suitable structure to meet this criteria or install a stand-off system that will meet the criteria.

SINGLE-LAYER SIMPLE SAVER SYSTEM® WITH 1" RIGID FOAM INSULATION BOARD FOR NEW METAL BUILDINGS		
Thickness of Insulation	1" Rigid Foam	Total 'R'
R-10 = 3 1/4"	R-8	R-18
R-11 = 3 1/2"	R-8	R-19
R-13 = 4 1/4"	R-8	R-21
R-19 = 6 1/2"	R-8	R-27
R-24 = 8"	R-8	R-32
R-30 = 9 1/4"	R-8	R-38

SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

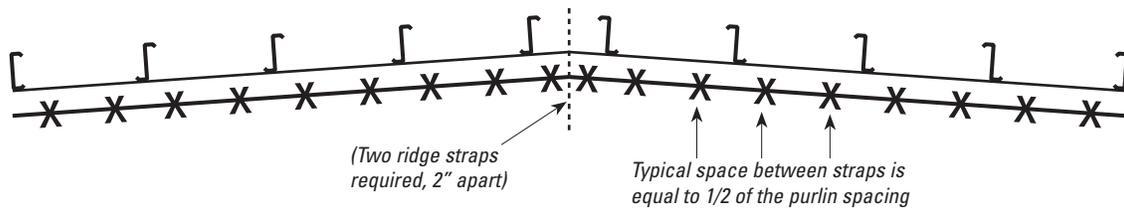
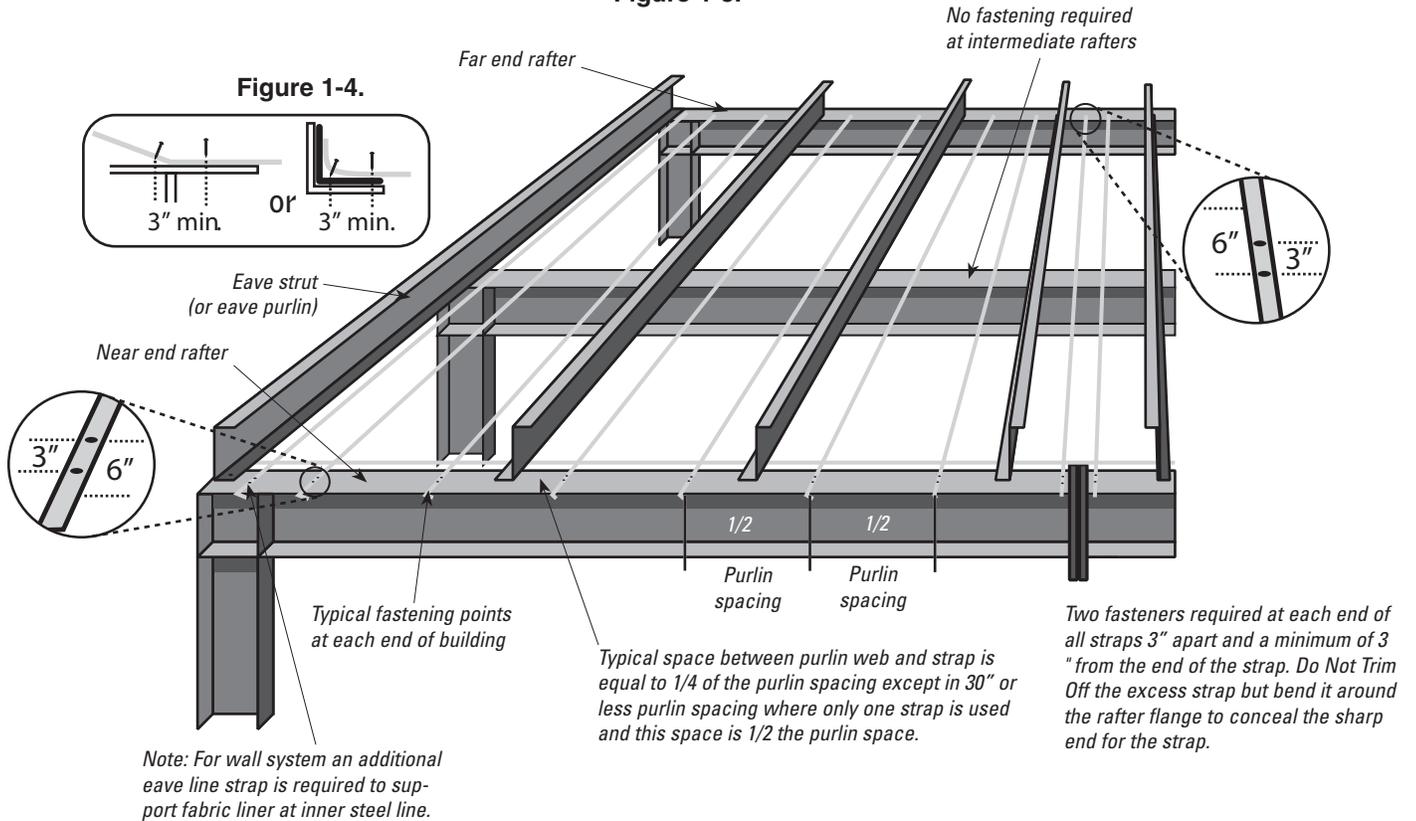
INSTALLATION OF GRID STRAP PLATFORM

- Step 1. To begin the installation of the strap platform, open the package containing the packing list and project drawings. Check to be sure all materials are there and that they are not damaged. If something is missing or damaged, contact Thermal Design at (800) 255-0776 or your distributor. Any damages to materials from shipping must have claims filed directly with the carrier. Do not install damaged materials. Carefully review the project drawings and written instructions.
- Step 2. Assemble the strap dispenser on the ground or floor at one end of the building. Cut a number of steel straps the length of the building plus two feet. Using a lift, feed several straps over the building rafters from one end of the building to the other. (Tip: Bend a sharp hook in the strap about four inches from the end to hook over the top rafter flanges to aid in installation.) Two straps per five foot purlin space are required. See the project drawings for exact spacings. Straps for two or three purlin spaces may be pulled in on each lengthwise pass to save time. (Tip: Always keep finished side down and avoid twisting the straps.)
- Step 3. Pull all the longitudinal straps over the rafters with the finished side (normally white) down and hook them on the far end rafter. Once a number of straps are pulled into position, one crew person fastens the far end of each strap with two self-drilling washer head fasteners to the top of the far end rafter. Complete this process with all straps. Required: Maintain fasteners a minimum of 3" apart and centered on the strap when fastening; also keep the fasteners 3" from the end of strap. Use the fine thread washer-head self-drilling screws for fastening to thicker steel or rake angle. Steel over 3/8" thick may require pre-drilling of holes with a drill bit (not provided).
- Step 4. Hook the other end of the lengthwise straps to the near end rafter and fasten as follows:
- Drill a fastener partially into the rafter to start a hole, being careful to maintain proper spacing as shown in the drawings.
 - Pull each strap tight by hand and fully drill a fastener through the strap about 3/8" to 1/2" short of the started hole. Drill the fastener all the way into the strap, then angle the fastener tip into the started hole and screw it in (see "Figure 1-4." on page 10). This method will tension the lengthwise strap as it screws in to the hole.
 - Then install a second fastener through the same strap 3" away from the first and 3" away from the end of the strap.
- Step 5. Repeat this process until all the longitudinal straps are installed.

SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

INSTALLATION OF GRID STRAP PLATFORM (CONT.)

Figure 1-5.



*See project drawings packed with materials for exact spacing

"Never allow more than 32 inches between lengthwise straps. Refer to the custom project drawings for your specific building for spacings. If there is any questions, always call 800-255-0776 for clarification before relying on the installation for alternative fall protection."

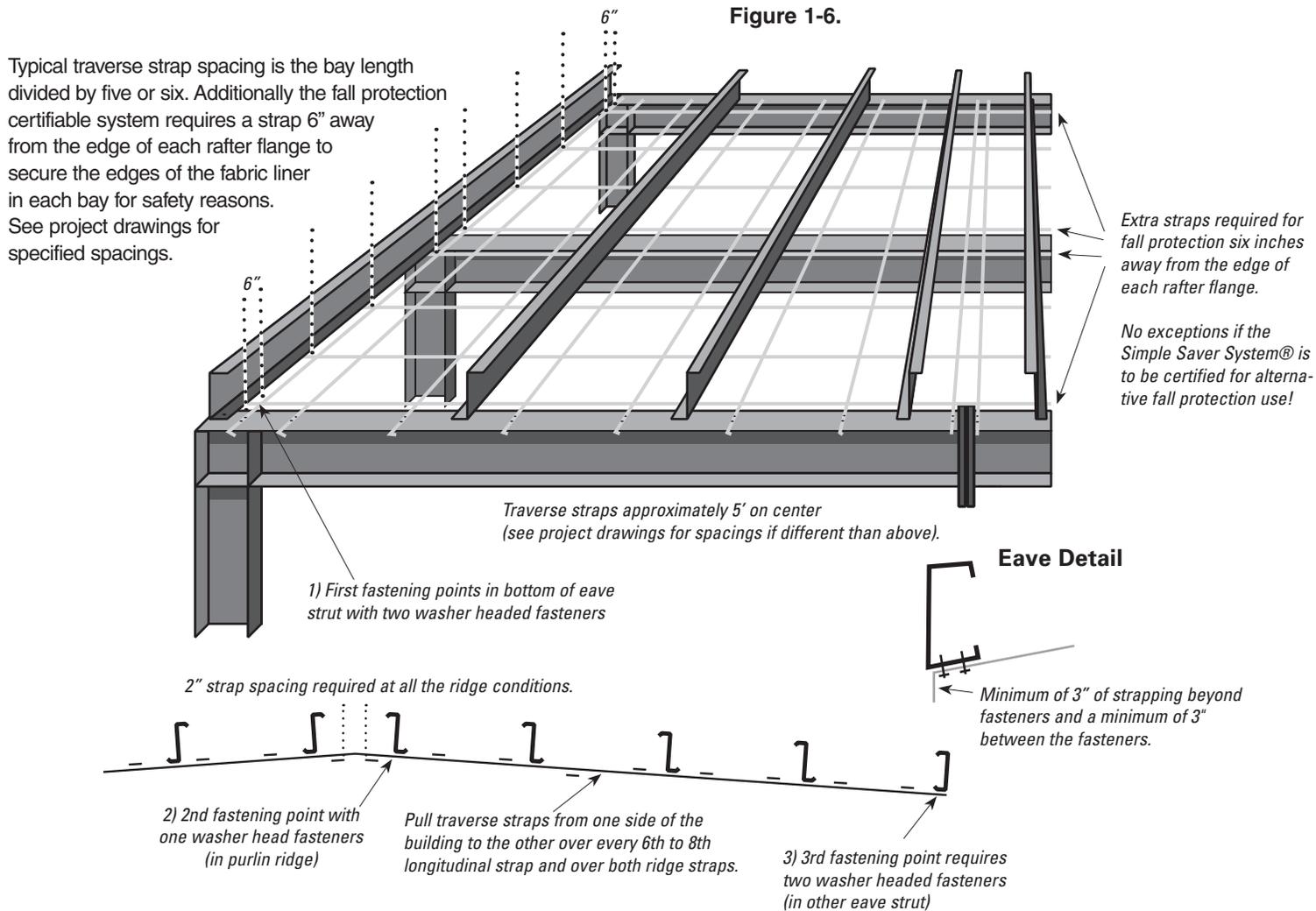
SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

INSTALLATION OF GRID STRAP PLATFORM (CONT.)

Step 6: Cut the traverse straps the width of the building plus two feet. See the project drawings for the number of straps and spacing. (Roofs with 2:12 pitch or greater require additional strapping length to allow for the incline. Multiply the building width by the correction factor in the table [right] to find the proper length, then add two feet.) Pull the traverse straps below the purlins from one eave of the building, over every sixth to eighth longitudinal strap down to the other eave strut, but over both of the ridge straps and under all other longitudinal straps. Be careful not to twist the straps and keep the painted side down. This procedure allows for faster installation and keeps the straps in the same plane. Take all the straps for each bay and feed them at one time. After feeding the traverse straps from one side to the other, fasten the far end of each traverse strap to the bottom of the far eave strut with two fasteners, measuring the proper spacing. Pull the straps tight to the ridge, fasten each traverse strap to one* ridge purlin with one fastener and then pull the strap tightly to the near eave and fasten to the bottom of the near eave strut with two fasteners.

ROOF PITCH WIDTH CORRECTION FACTORS	
2:12 pitch	= 1.02
4:12 pitch	= 1.06
6:12 pitch	= 1.12
8:12 pitch	= 1.21

*Roof pitches of 2:12 or greater require fastening at both ridge purlins to allow for adequate length of strap to reach both ridge purlins upon subsequent fastening. **IMPORTANT SAFETY NOTICE!** All pairs of strap end fasteners must be placed a minimum of three inches apart, centered on the strap, and a minimum of three inches from the end of the strap. No splices are allowed in any of the straps.

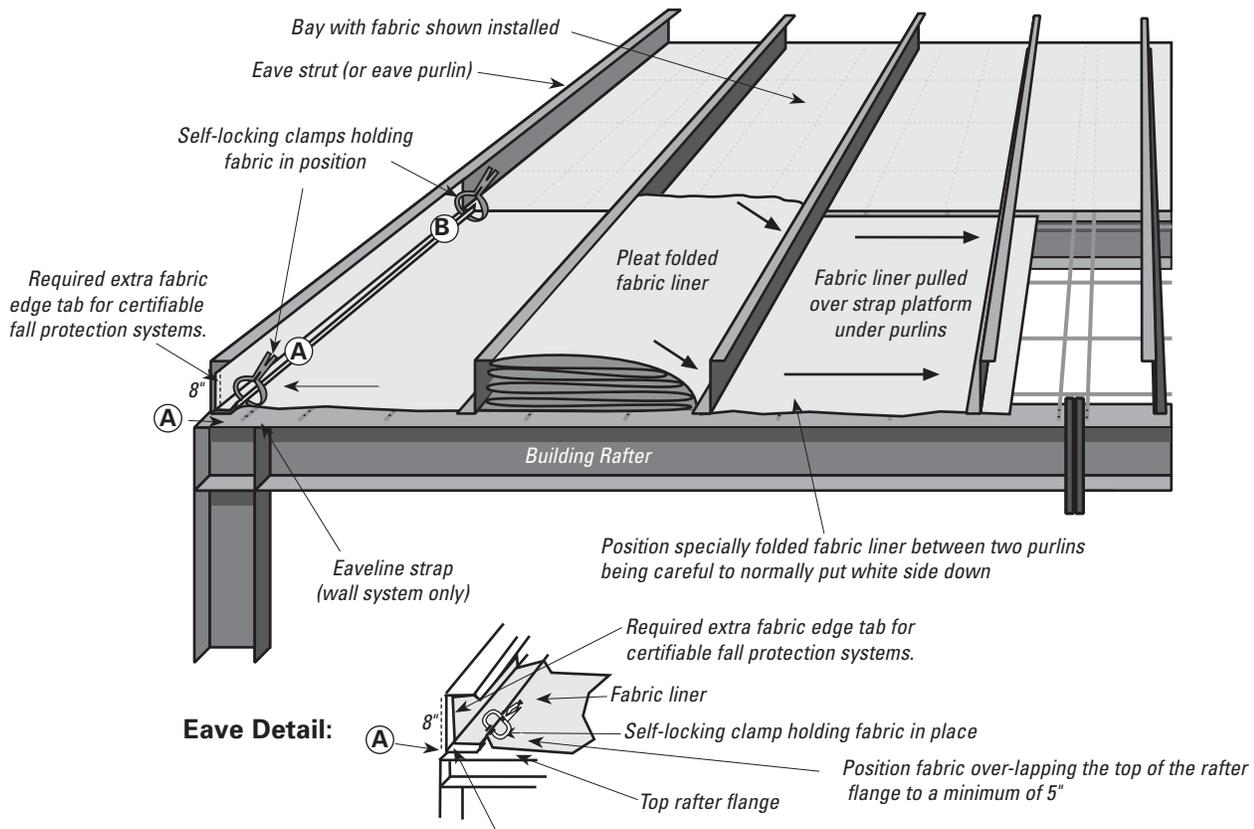


SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

FABRIC LINER INSTALLATION (APPROX. 600 SQ. FT./MAN-HOUR)

- Step 1: Select the package clearly marked with the specified piece of fabric liner, which will be marked to match the custom project drawing layout, and remove the protective packaging. Unroll the factory-folded fabric liner on the tensioned strap platform from one rafter to another. Position the fabric between any two purlins, normally at the ridge or eave. Be sure the correct color side will be down since the fabric can be reversed and be different colors.
- Step 2: Pull the bottom edge of the fabric liner at least eight inches beyond the outside corner (A) of the eave strut and clamp one corner securely in position above the near rafter with a self-locking clamp. Then pull the other corner (B) above the other rafter plus eight inches, while keeping the fabric tight and square with the eave strut. Clamp the fabric in that position. Be sure to allow for the extra eight inches of fabric. Important! Keep the fabric square with the eave struts and centered on the bay. This will minimize potential wrinkles. Due to the flexible nature of the fabric and the large sizes used, some wrinkles are inevitable. See project drawings for each bay's fabric sizes.

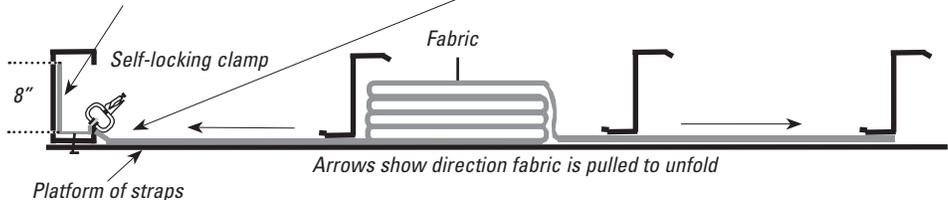
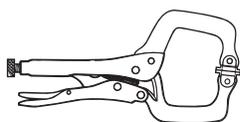
Figure 1-7.



Minimum of 8" of extra fabric beyond the outside corner of the eave strut and securely clamp the fabric in the position. Always keep the fabric edge square with the eave line by keeping the dimensions of the vertical fabric edge eight inches up from the lower corner of the eave strut as shown. Clamp the fabric to in that position pending permanent fastening.

Important!
Keep fabric square with eave!

Recommended type of self-locking clamps



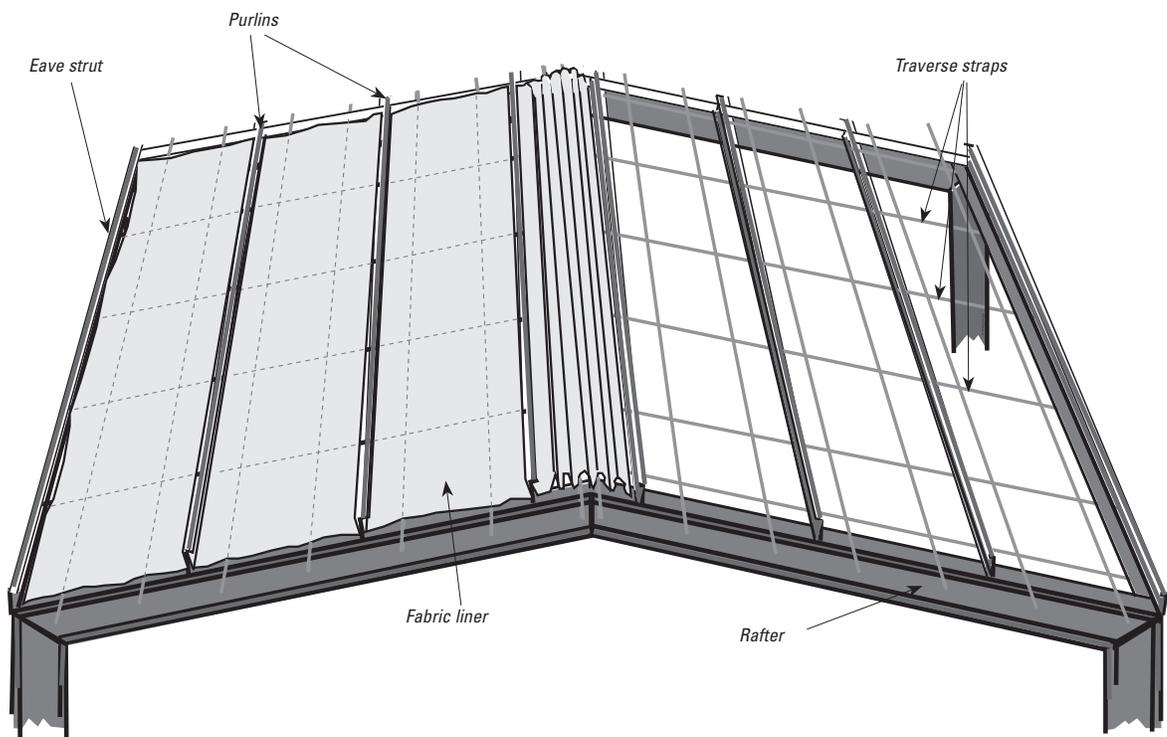
SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

FABRIC LINER INSTALLATION (CONT.)

Step 3: Pull the other end of fabric liner off of the top of the folded pile to the ridge space. Pull all the excess fabric into the ridge space. Pull the fabric tight from the eave strut to the ridge purlin space. Center the fabric squarely between the rafters and clamp it into position. Then, from a lift below, install the washer head fasteners (B, next page) through the traverse straps and fabric liner at each intersection point of the traverse straps and the ridge purlin. Clamping the edges of the liner to the rafter flanges every 20-25 feet along the rafters aids in the installation. If both sides of the roof are sheeted at the same time, remove the (A2) fasteners (installed when strapping was installed) and pull the fabric taut to the other eave strut and clamp snugly into position. If only one side of the roof is to be sheeted at a time, the fabric may be left in the ridge purlin space until the second slope is ready to cover or start the fabric from the ridge space. (Take precautions that rain or snow will not enter the system if the fabric is stored in the ridge purlin space. Pushing the fabric back under the roof sheets and/or covering the ridge space will protect against water entry.)

When the fabric is clamped in position in the second slope, install the (C) fasteners where the traverse straps cross below each purlin. Care must be taken when installing the fasteners. If a hot burr is created and falls from the purlin to the liner fabric, it can melt a small hole in the liner fabric. If this occurs the fastener shall be backed out of the hole, a square piece of Syseal® repair tape shall be placed over the small hole. Rub the Syseal® repair tape onto the liner surface to get the tape adhesive to bond, then the fastener can be screwed back into the original hole. After installing the (C) fasteners near the eaves, back out the (A1) or (A3) fasteners from one strap end at a time, pull the fabric tight toward the outer wall line and reinstall the fasteners through the fabric and into the same holes from which they came. The Simple Saver System® with fall protection requires two fasteners at the end of each strap, a minimum of three inches apart and a minimum of three inches from the end of the strap for safety reasons. Finally install a strap along the bottom of each eave strut and at any field splices with fasteners a maximum of 30 inches apart from rafter to rafter (see Eave Detail on the following page). Any intermediate fabric liner splices done on-site must be done on the bottom side of a purlin and requires fastening at least six inches from the edge of the fabric liner for safety reasons. Use Syseal® Sticky Tape by Thermal Design to position and seal the fabric splices on the bottom of a purlin prior to fastening. Use the Simple Saver High Tack™ Adhesive provided to seal fabric liner to eave struts. As an option, you may order Syseal® Sticky Tape for this purpose. Care must be taken at the eave strut to make sure the liner fabric closes and seals all holes that maybe present in the eave strut. Cover and seal any holes in the bottom of the eave strut with the liner fabric or otherwise seal them.

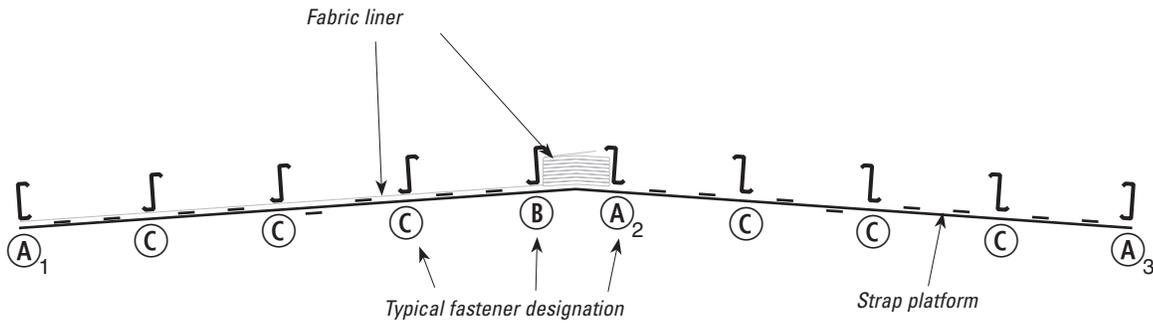
Figure 1-8.



SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

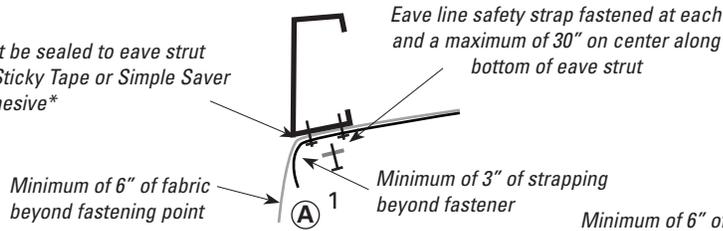
FABRIC LINER INSTALLATION (CONT.)

Figure 1-9.



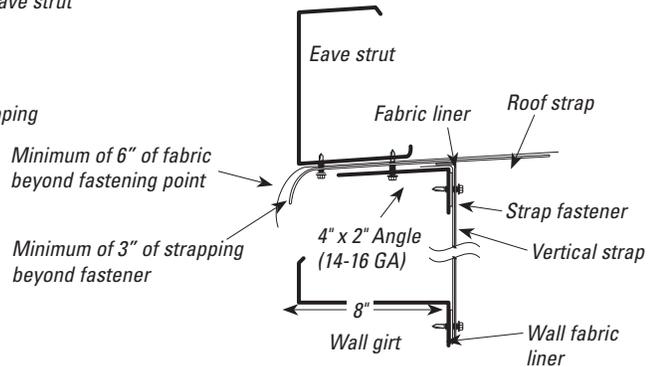
Standard Eave Detail

Fabric liner must be sealed to eave strut using Syseal® Sticky Tape or Simple Saver High Tack™ Adhesive*



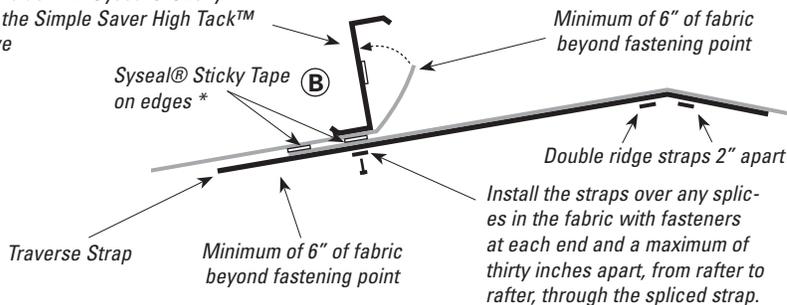
*Make sure all holes in the eave strut are covered and sealing of the fabric is done between any hole and the wall of the building.

Special Eave Detail - Roof and Wall System



Splice Detail at a Purlin

Adhered to purlin on uphill side with Syseal® Sticky Tape or the Simple Saver High Tack™ Adhesive



For use if a more finished look is desired where the roof and wall systems adjoin each other. Recommended when roof and wall systems are different colors.

*Syseal® Sticky Tape must run continuous from along the edge of liner fabric from rafter to rafter to seal against any air infiltration.

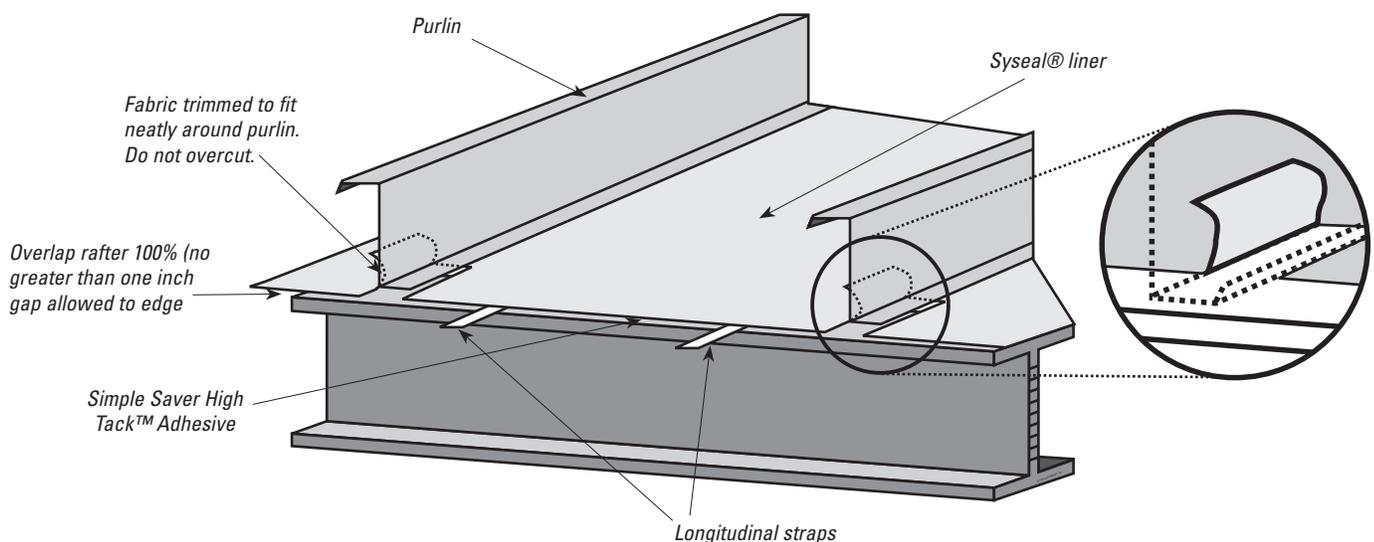
SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

FABRIC LINER INSTALLATION (CONT.)

Step 4: Trim the fabric edges to fit neatly around all of the purlins or other obstacles. Find the point where the purlin intersects with the edge of the rafter and place one cut in the fabric from this point to the edge. Then push down slightly on the fabric and cut at a 90° angle to the first cut beneath the purlin so the fabric fits neatly around the purlin. Care must be taken to cut very neatly and DO NOT over cut the liner fabric at the purlins to prevent air infiltration (see "Figure 1-10.")

Step 5: Once trimmed, the next step is to seal the edges of the fabric to the topside of the rafter and eave strut. Make sure Simple Saver High Tack™ Adhesive is applied continuous from purlin to purlin along the entire rafter. Apply the multiple purlin spaces at one time, usually from the ridge point to eave point on top of the rafter. Allow Simple Saver High Tack™ Adhesive to tack a few minutes and neatly seal the first fabric tab down to the topside of the rafter to check for adhesion. Allow sealant to tack a few minutes and then stick all the tabs down firmly going from the eave to the ridge. The field test for adhesion should be that the applied fabric should stay stuck and is difficult to pull off the rafter once adhered and should not be able to slide after the fabric is applied. Once proper adhesion is verified, neatly and securely seal each successive fabric tab down to the rafter in the same manner. Each time you move to the next purlin space, do so by walking on top of rafter and the secured fabric to firmly adhere it to the rafter. Finally, neatly seal the ends of Simple Saver System® fabric liner to the bottom of the eave struts securely and install any remaining required fasteners.

Figure 1-10.



SIMPLE SAVER SYSTEM[®] INSTALL INSTRUCTIONS BY THERMAL DESIGN

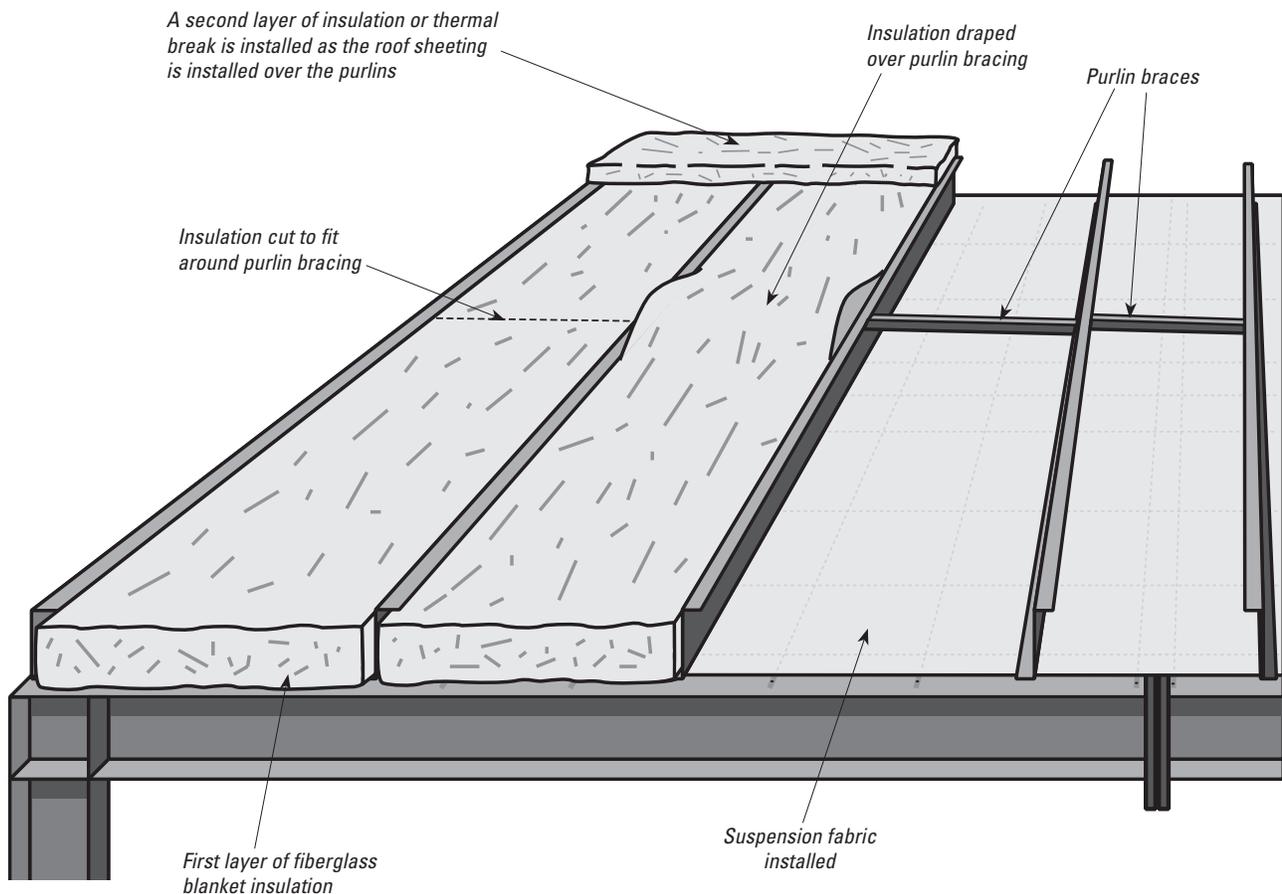
INSULATION PLACEMENT (APPROX. 600 SQ. FT./MAN-HOUR)

Step 6: Unwrap unfaced insulation rolls or batts and position them neatly on top of the liner system between the purlins. (Refer to insulation sizing verification sheet for the widths of rolls or batts shipped for each unique spacing and the insulation placement.) If the building uses bracing between the purlins, install the insulation over the top of the purlin stiffener braces and apply the roof sheets to the point where the insulation over the brace can be cut along the brace with a knife and the insulation is allowed to drop down on each side of the brace. This step allows for full expansion of the insulation thickness in the purlin cavities on each side of the bracing. Repeat this process at all braces.

With two-layer systems, a second layer of insulation can be installed over the top of the purlins and the first layer of insulation to provide added insulation and a thermal break. For thick single-layer insulation or blown-in insulation systems, a separate thermal break material is recommended on the purlins. The roof panels are then sequentially installed along the roof and fastened.

Plan the installations so that the insulation is not left exposed and the installed areas are covered each day to prevent damage to the materials from potential bad weather. Installing a bay or two of the liner fabric at a time is typical.

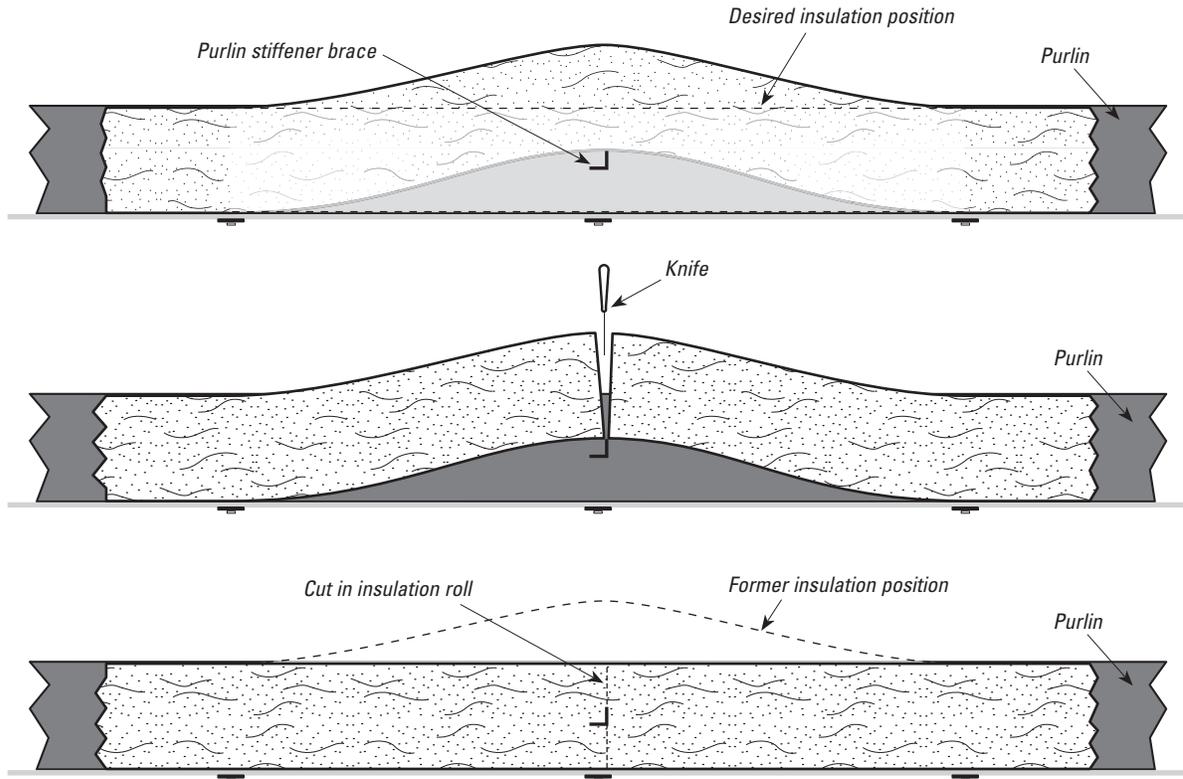
Figure 1-11.



SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

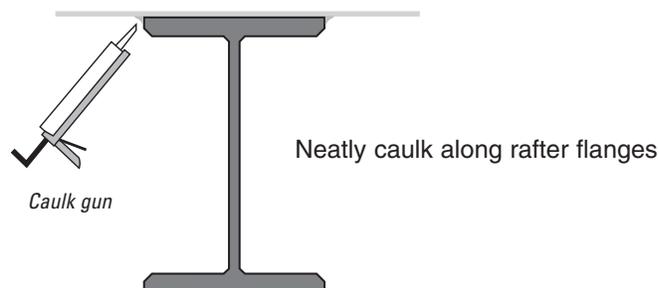
INSULATION PLACEMENT (CONT.) AND CAULKING CUTS AND PENETRATIONS

Figure 1-12.



Step 7: In high humidity applications, it is recommended that the junction of the liner fabric along the rafter flanges and the fabric be caulked with a clear siliconized acrylic latex caulk (caulking is not provided with the system). See "Figure 1-13." where it has been trimmed to fit around purlins, rafters, braces, etc. It is recommended that the installation be inspected and any cuts, pinholes or other such breaches in the fabric liner be sealed with caulking, tape or a flashing upon installation completion (see "Figure 1-13."). If no Simple Saver wall system will be installed, trim off any excess fabric and steel strapping at the eave lines, however not before all fall protection use of the Simple Saver liner fabric in the roof is finished.

Figure 1-13.

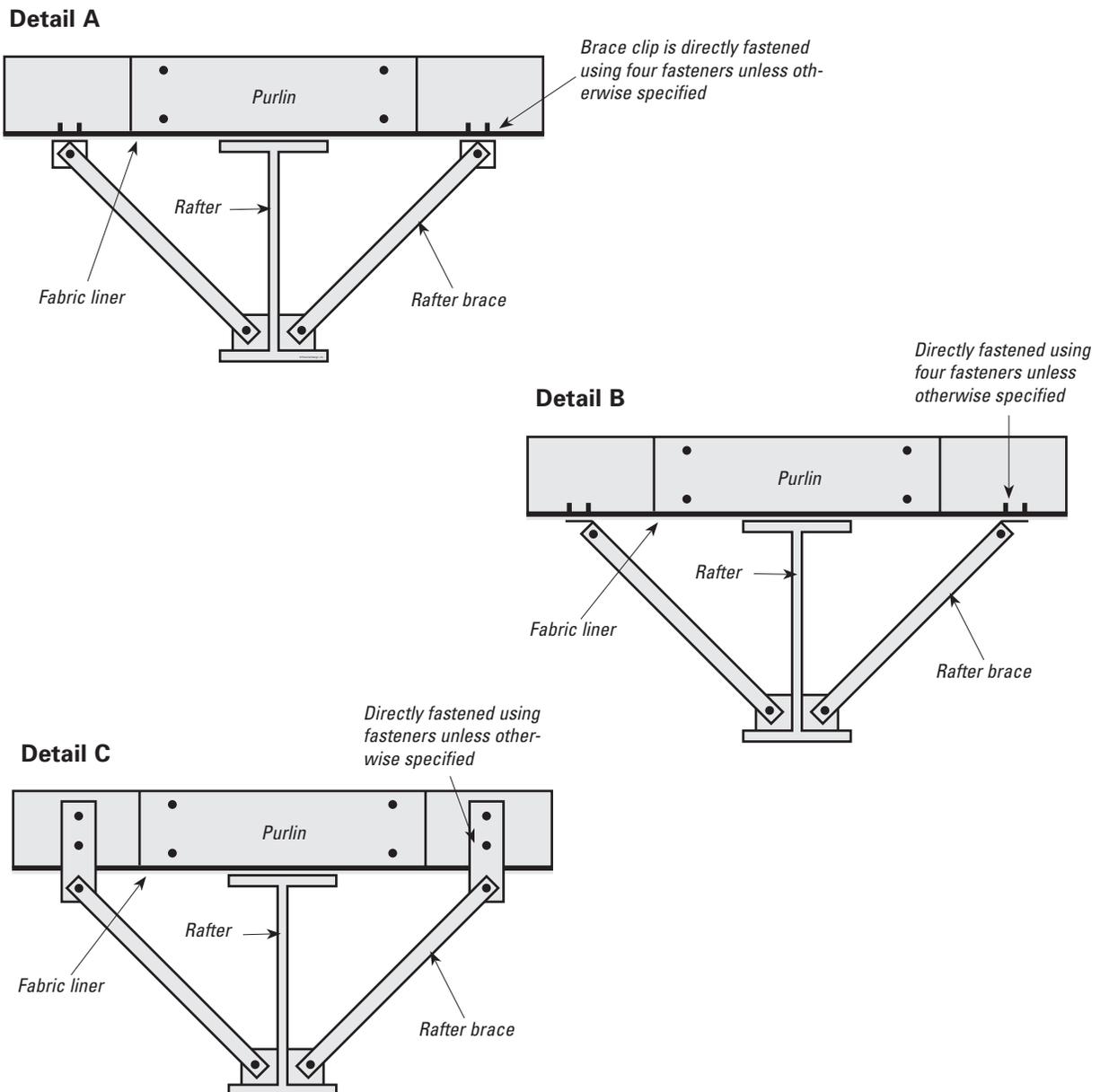


SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

RAFTER BRACE DETAILS

These fastening methods are routinely approved by building manufacturers for use with liner systems. Specify this option when ordering the building. If this is not possible, call the building manufacturer's engineering department for the number of fasteners needed to attach the braces or brace clips. These methods preserve the integrity of the high quality vapor retarder membrane. Brace clips in Detail A are available from Thermal Design. Contractor is to verify the use of these connections with the building manufacturer. The manufacturer's standard method, if different from above, can be utilized but may require additional sealing materials.

Figure 1-14.

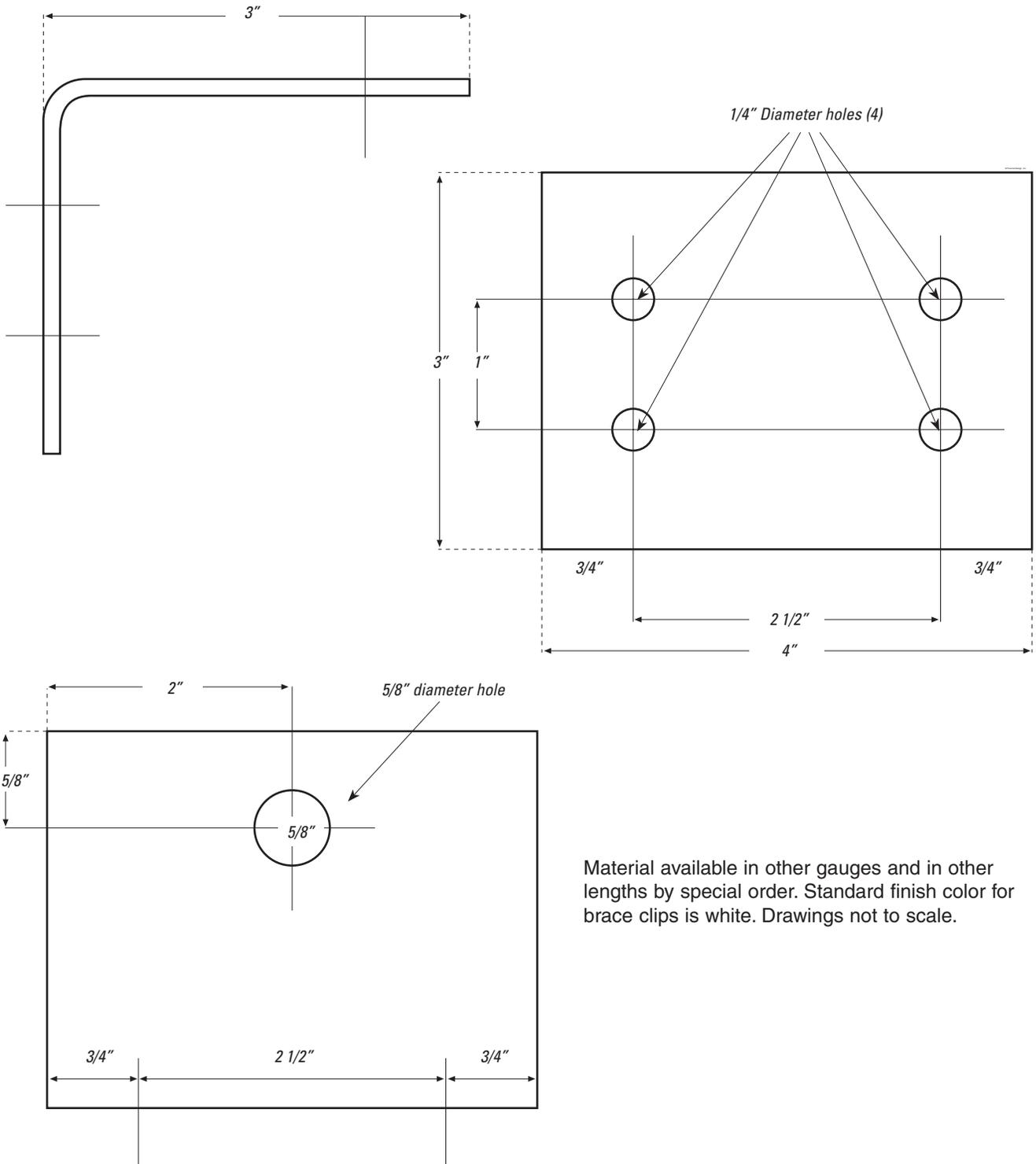


SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

RECOMMENDED MINIMUM BRACE CLIP DETAILS (CONSULT YOUR BUILDING MANUFACTURER)

Brace clips are 14 GA. (stock item)

Figure 1-15.

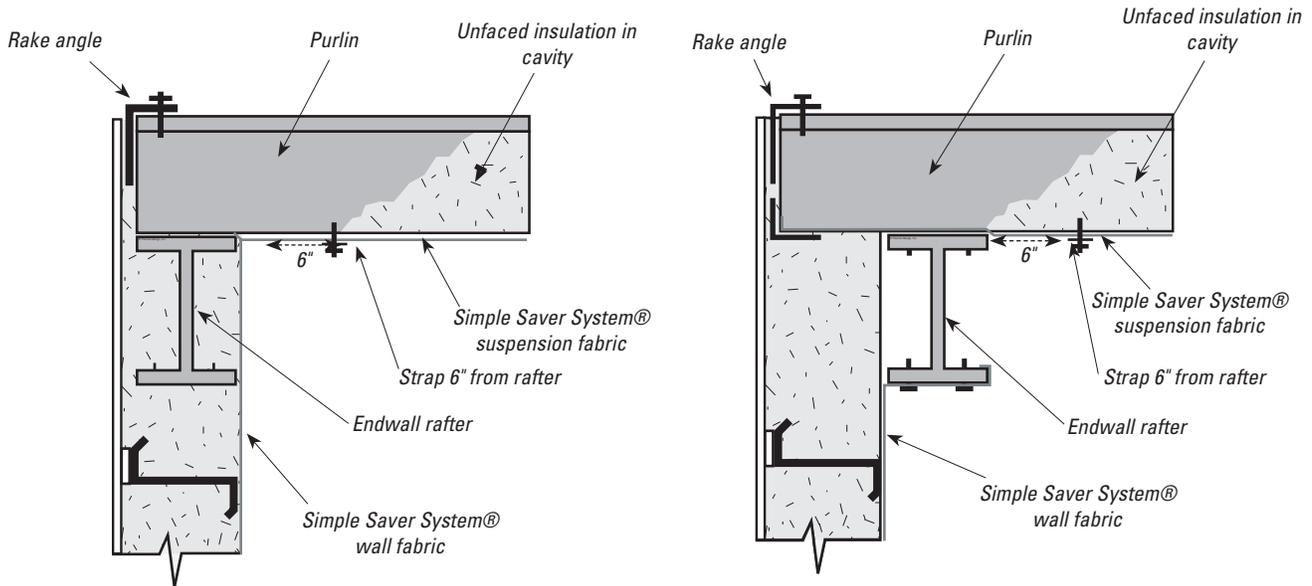


Material available in other gauges and in other lengths by special order. Standard finish color for brace clips is white. Drawings not to scale.

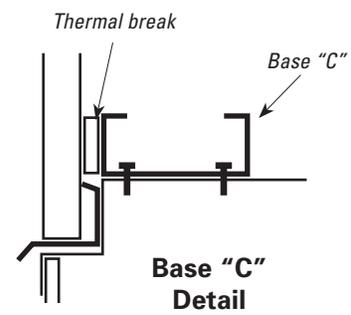
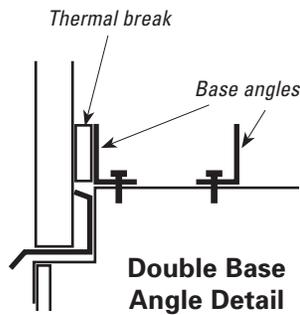
SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

PREFERRED DETAIL FOR EXPANDABLE OR HEAVY IRON END RAFTER

Figure 1-16.

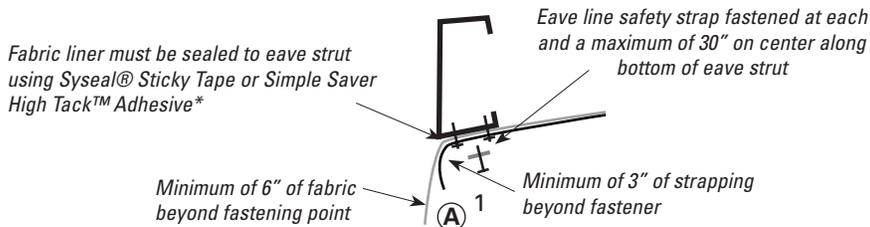


Double base angle or base "C" required for wall systems.

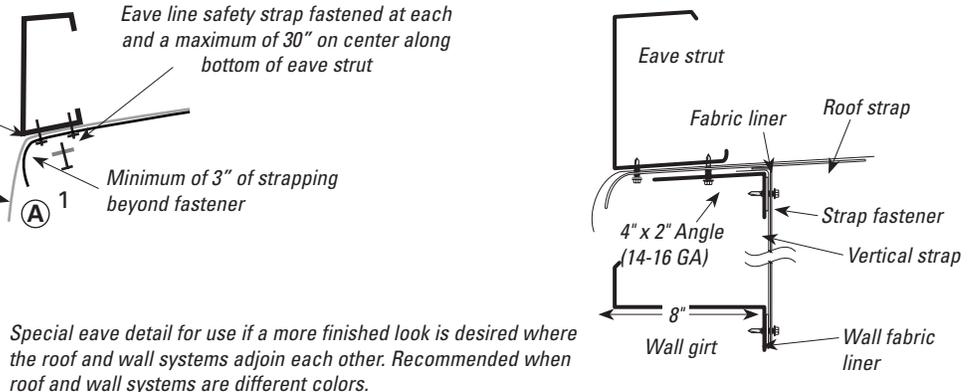


Standard eave strut detail preferred, although other details may also work.

Standard Eave Detail



Special Eave Detail



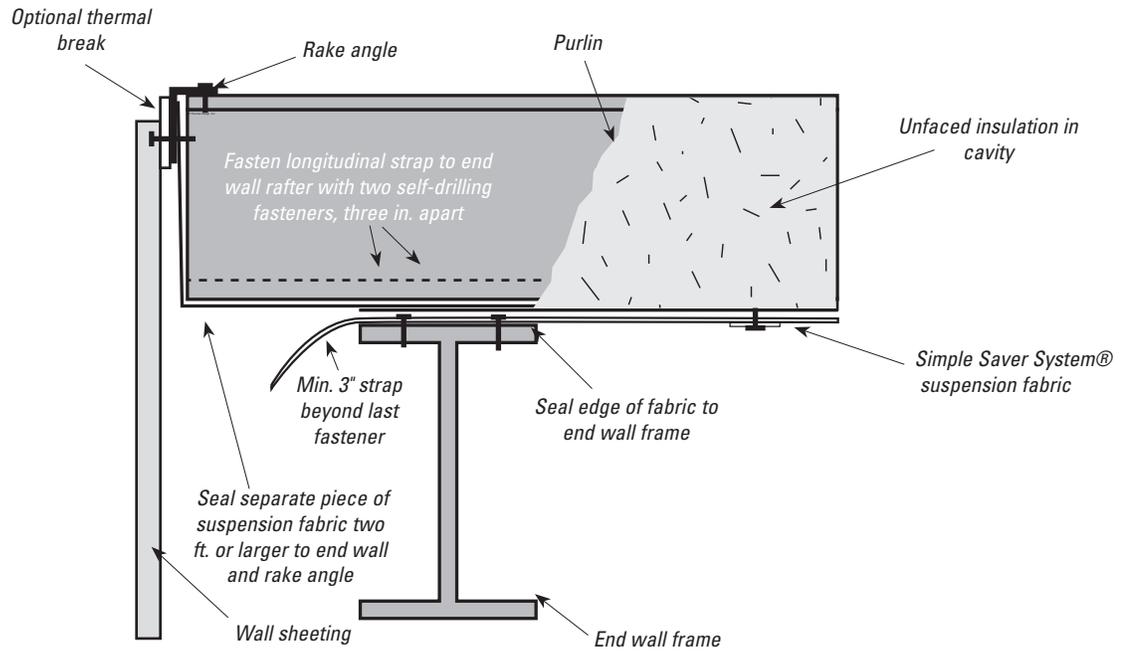
Special eave detail for use if a more finished look is desired where the roof and wall systems adjoin each other. Recommended when roof and wall systems are different colors.

SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

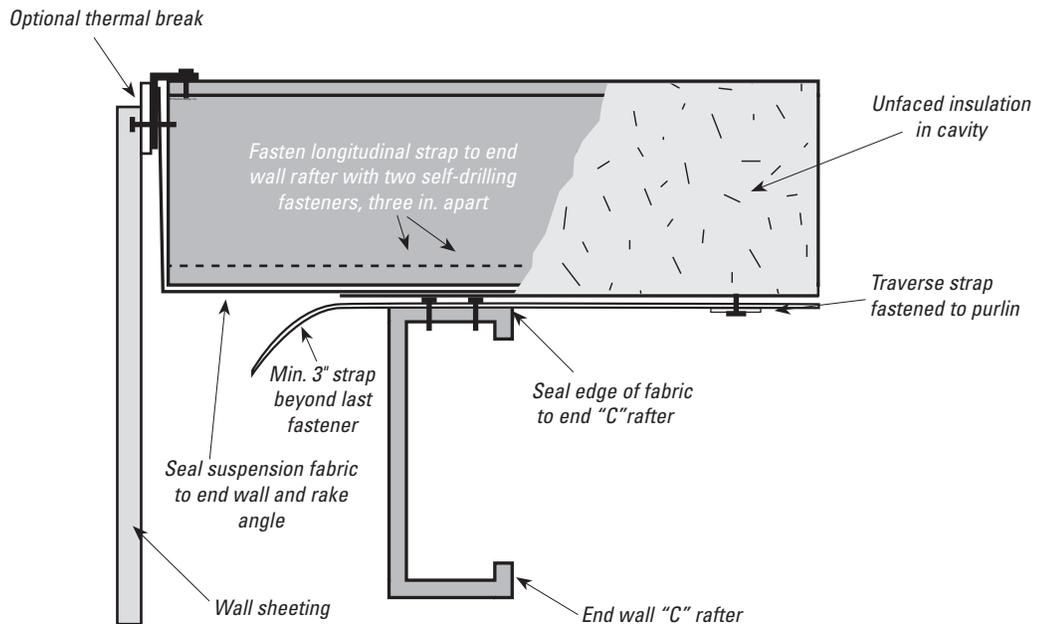
INSTALLATION OF TWO-FOOT WIDE (OR SIMILAR) INSET FABRIC LINER BETWEEN ENDWALL FRAME AND RAKE ANGLE

Expandable End Wall or Heavy Iron Rafter

Figure 1-17.



Non-Expandable End Wall

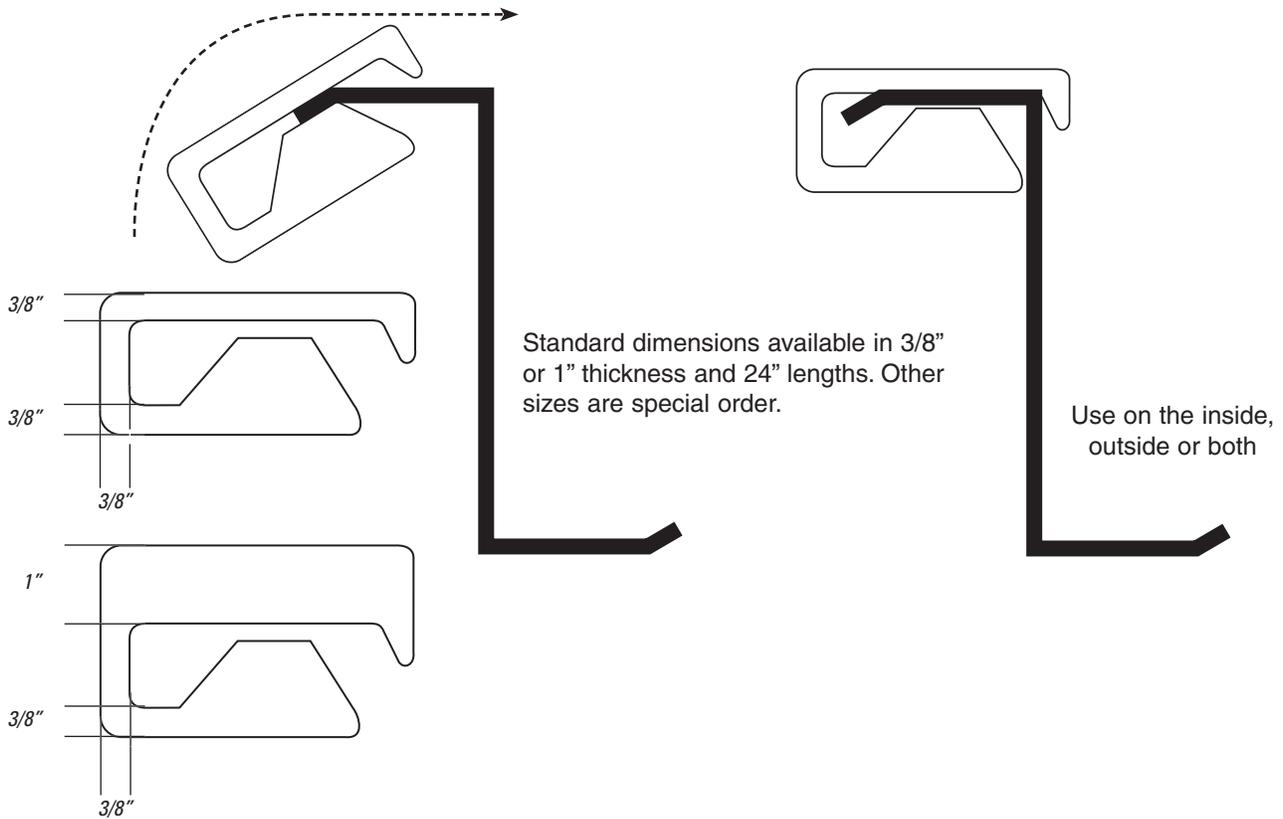


SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

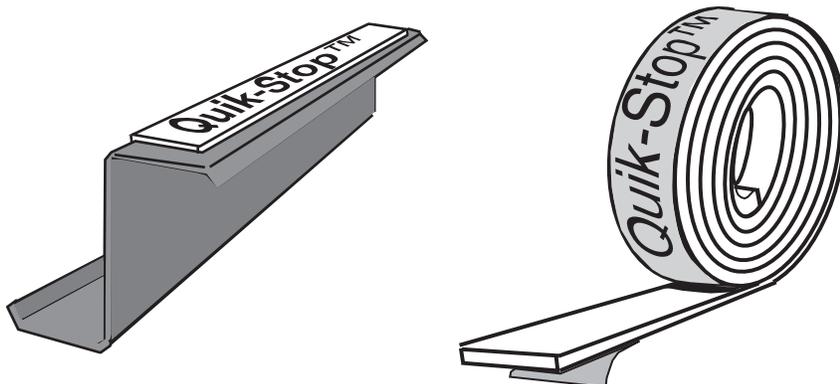
SNAP-R® THERMAL BLOCK AND QUIK-STOP™ TAPE THERMAL BREAK

To install, snap on with a twist motion then slide along the purlins. They won't blow away!

Figure 1-18.

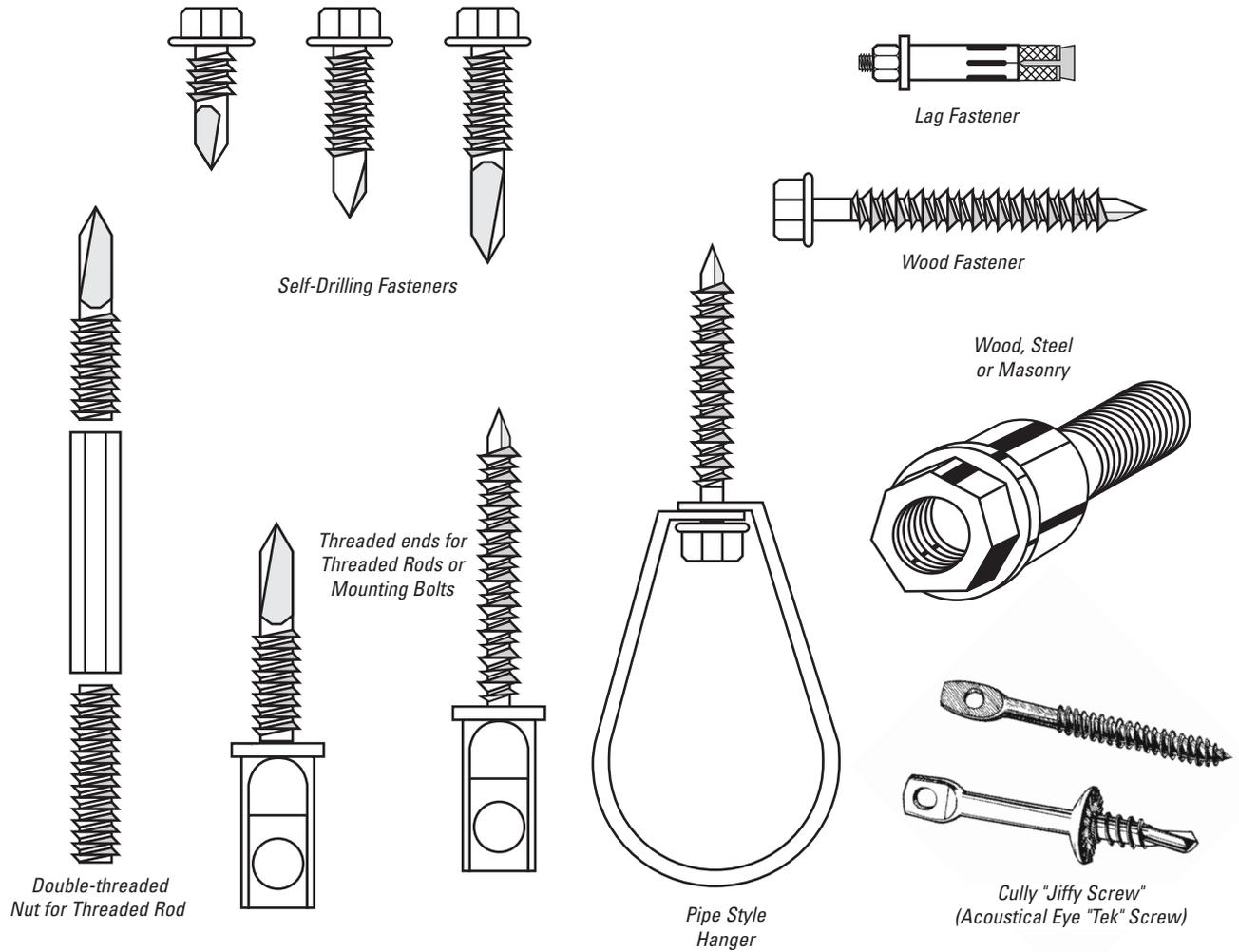


Quik-Stop™ Thermal Break Tape adheres to the purlins and/or girts and won't blow away while sheeting is being applied. Quik-Stop™ Thermal Break Tape provides a thermal break between the conductive metal sheeting and purlins or girts. Use on the topside, bottomside or both.

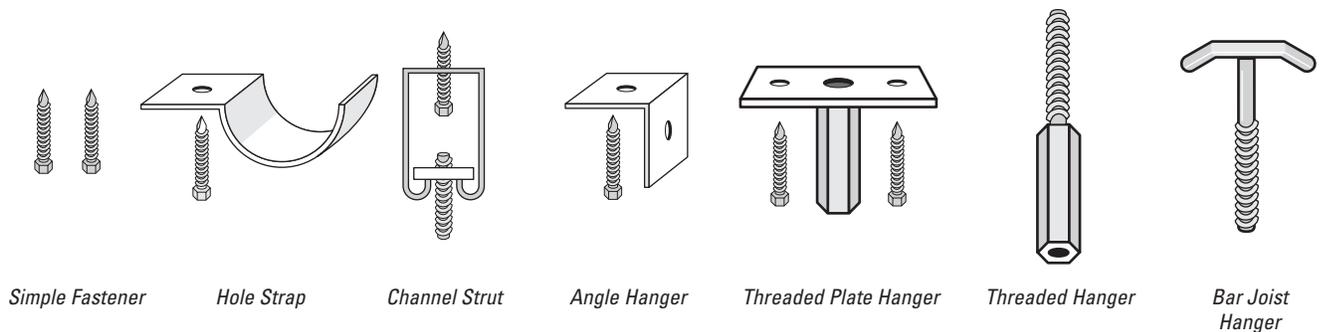


SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

COMMON FASTENERS, HANGERS AND METHODS



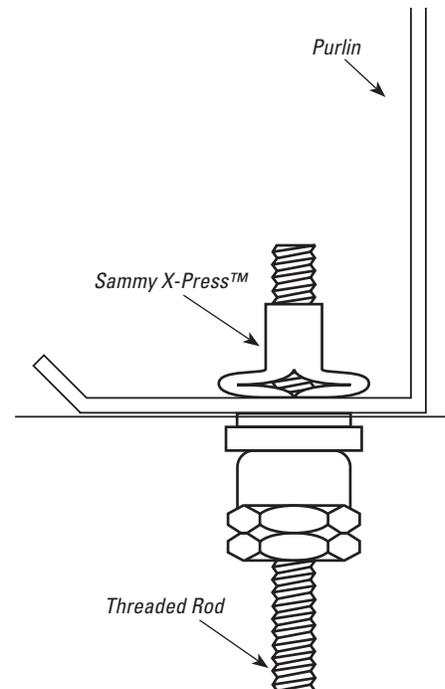
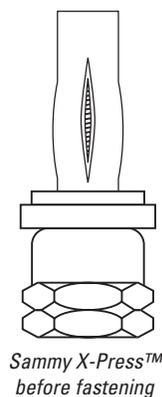
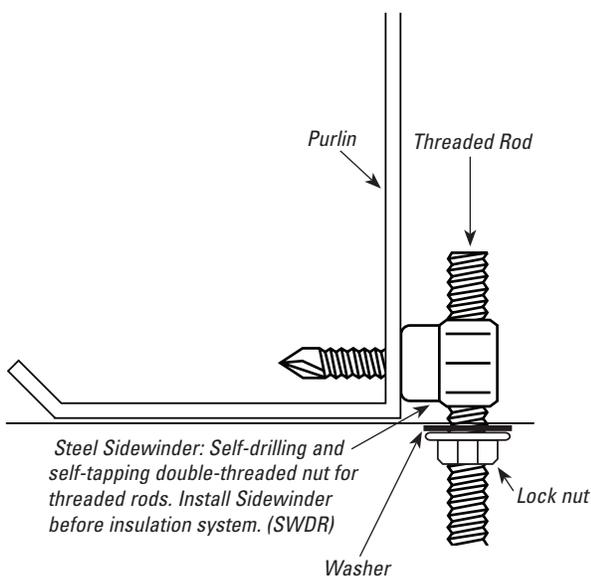
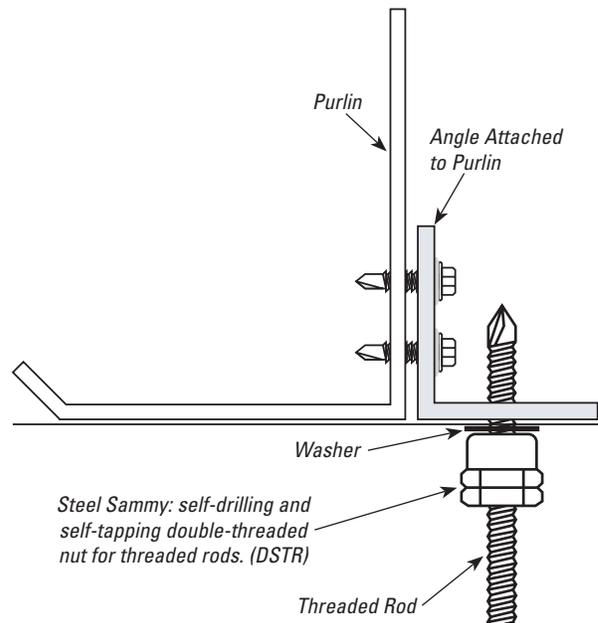
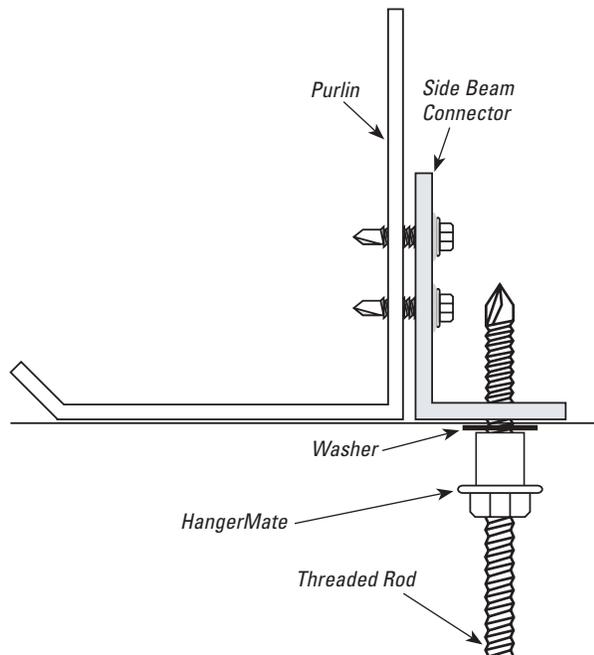
Common Hanging Methods



SIMPLE SAVER SYSTEM® INSTALL INSTRUCTIONS BY THERMAL DESIGN

SPECIFIC THIRD-PARTY HANGERS AND METHODS

Third-party fasteners are available from Thermal Design for distinct fastening methods. These products specialize in hanging ductwork, pipes, and other items from ceiling without having to cut large holes in the vapor retarder. Ask your salesperson about these and other suspension methods. (Check with your building manufacturer for all applications to meet building requirements. Be sure to fasten optional angle irons or side beam connectors before installing the fabric.)



Thermal Performance Guarantee: Thermal Design, Inc. will guarantee to the building owner/user that the thermal performance of a Simple Saver System roof assembly, spaced nominally 5', will perform at the average purchased insulation level, plus or minus 10%, when properly installed at the prescribed thickness and sealed against air and water vapor infiltration. Thermal Design shall, at its option, correct any deficiencies of thermal performance or credit to the owner/ user the percentage of the insulation material cost equal to the percentage of any deficiency if a valid claim is filed within one year after delivery.

Ten-Year Limited Material Warranty: The Simple Saver System is warranted against manufacturing defects in materials that are provided by Thermal Design that may become evident within ten years after delivery. This warranty is specifically limited to providing materials for replacement of specific areas affected and only to the extent that the defect is adversely affecting performance, and does not include any expense to remove or install materials, site workmanship or damages that may be caused by defective materials, installation, damage to materials caused by others, abuse and misuse of the product, or design. The warranty is pro-rated (e.g. 100% of the material replacement cost during the first year, 90% during the second year, 80% during the third year, etc.). Labor is typically covered by contractor's warranty for at least one year after installation completion. Thermal Design shall make the final decision as to the validity and extent of any defect claim. Valid claims will be limited to the pro-rated value of the purchased materials cost or the cost value thereof, as determined by Thermal Design. Any claims should be submitted in writing by US Mail to Thermal Design, Inc., P.O. Box 468, Madison, NE, 68748. There are no other expressed or implied warranties that extend beyond these limitations and these are a condition of the sale of these goods. The company shall not be held responsible for consequential, liquidated or other damages under any theory of law.

Notices: All customers will be charged Nebraska sales tax on all products unless sales and use tax certificates are provided. Point of sale and venue for all claims shall be Madison County, Nebraska. Any material not specifically included on a quotation is excluded although additional materials may be provided solely at the discretion of Thermal Design.

Unauthorized making, using or selling of this patented technology or trademarks or service marks or copyrighted works shall be each subject to a minimum royalty and lost profit per square foot of surface insulated from such unauthorized acts. Sellers of any component with the knowledge or intent that such component is to be used to evade the purchase of legitimate materials from authorized sources shall be held liable as contributory infringers and otherwise as lawful. All costs of collection, including legal fees and costs, shall be sought as damages for unauthorized use and infringement.

The EnergyCraft units are factory run tested. Minor adjustment may have to be made on site. Installation of these appliances and framing kits normally do not require a license. Installation of gas piping and electric power to the appliance receptacles should be done by a qualified licensed installer. See Goodman manufacturing warranty documents for limitations and exclusions pertaining to the HVAC products. All sales are subject to the limitations and conditions set forth in those documents as well as the contract of sale.

Simple Saver System is not designed or intended to be walked or stood upon. Any such use will void the fall protection certification. The fall protection feature is strictly for accidental falls while insulating and roofing.

To obtain a project fall protection certificate, all system materials must be purchased from an authorized distributor of Thermal Design, Inc. The erectors/ installers will be required to thoroughly read the installation instructions and sign the form provided that they have read, understood and agree to install the Simple Saver System in accordance with the instructions. A copy of the signed form must be received by Thermal Design, Inc. along with a current erector/ installer insurance certificate listing Thermal Design a certificate holder and show required coverages of liability, property damage and worker's compensation coverage for the project. The primary limits of the insurance coverage shall be those already provided by the erector/installer to cover their workers and liability. The secondary limits shall be that liability coverage carried by Thermal Design.

Safety lines along the rafters and a safety harness with shock absorbing lanyards must be used while installing the Simple Saver liner system for topside workers. A safety harness with lanyard in combination with a suitable lift must be used by bottom-side workers when installing the Simple Saver liner system. Once the Simple Saver System liner is properly installed in the affected building roof area, the through fall protection certificate will become effective for topside workers for subsequent insulation and roof sheeting work. **Workmen must use a safety harness connected to an OSHA compliant lifeline within 6' of any roof edge or liner system edge.**

The Simple Saver liner system must be completely installed in each affected building area prior to reliance on the system as an alternative means of fall protection for that area. Only one installation of the Simple Saver Systems materials will be allowed per certificate. A copy of the installation instructions and the "Certificate of Alternative Fall Protection" signed by the erector/installer must be prominently posted at the job site as notice to all contractors, workers and inspectors. **Workmen must use a safety harness connected to an OSHA compliant lifeline within 6' of any roof edge or liner system edge.**