

CUSTOM SEAL PVC ROOFING SYSTEMS

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Please note that the pages that were required to be left blank in the printing process in order for the manual to be properly assembled were deleted from this version in order to save space. The page numbers listed above are based on the location of the named section in this PDF version of the manual and will match the page counter at the bottom of your screen for ease of use.

GENERAL

1.01 DESCRIPTION

- A. The Custom Seal family of (PVC) Roof Systems is composed of numerous assembly configurations to meet most any roofing need. The systems are based on providing a suitable substrate for a single-ply application of Custom Seal (PVC) Membrane. Securement of the single-ply of Custom Seal (PVC) Membrane can be by means of adhesion or mechanical securement. Once installed, the membrane seams are hot air welded forming a monolithic layer of weather protection over the building structure. In the design portion of this manual you will find tables referencing minimum requirements for decks, roof substrates, fasteners and other construction aspects relating to the installation of a quality Custom Seal Roof System. The design guide will assist you in determining which roof system would best serve your needs.
- B. A complete guide to the installation of the various Custom Seal (PVC) Roof Systems can be found under the appropriate tab. The installation guide will contain information specific to the chosen roof system as well as specialized details that supplement the standard details for completion of that particular roofing assembly.

1.02 QUALITY ASSURANCE

- A. The roofing system must be installed by an authorized Custom Seal Roofing Systems Applicator in order for the project to receive a manufacturer's systems warranty.
- B. There shall be no deviation made from this specification or the detail drawings without written approval from Custom Seal Roofing Systems 14 days prior to the start of the roofing project.
- C. Upon completion of the installation, an inspection shall be conducted by a Technical Representative of Custom Seal Roofing Systems to ascertain that the roofing system has been installed according to Custom Seal Roofing Systems most current published specifications and details. This inspection is not intended to be a final inspection for the benefit of the owner but for the benefit of Custom Seal Roofing Systems to determine whether a warranty shall be issued.
- D. It is the roofing applicator's responsibility to adhere to all applicable building codes (local and national) for roofing system installation requirements and limitations in their geographical areas applicable at the time of the bid.
- E. For specific code and testing agency approvals achieved by Custom Seal Roofing Systems, refer to the agency's published listings or call Custom Seal Roofing Systems Technical Department.

1.03 SUBMITTALS

- A. Submit a "Pre-Job Survey" form to Custom Seal Roofing Systems Technical Department for approval PRIOR to the job start to enable the Technical Department to approve the project. This submittal may include "deviation request forms" and "pullout test" results.
 - 1. The "Pre-Job Survey" MUST be filled out completely and accurately to include any prior deviations approved from this specification.
 - 2. A roof drawing or shop drawing may be provided to the Technical Department with each "Pre-Job Survey". If provided, the drawings must show dimensions and all penetrations. Please note that roof drawings are not required in order to process the "Pre-Job Survey", however, roof drawings on file with Custom Seal do provide a certain amount of protection to the roofing contractor should the roof system be altered by other parties after installation.
- B. When Material & Workmanship warranties are desired, Custom Seal Roofing Systems MUST receive the "Pre-Job Survey" or be contacted PRIOR to project bid and installation. Information may be required for the wind design of the system.
- C. Upon completion of the project the roofing contractor shall submit a signed and dated "Request for Final Inspection".
- D. Upon completion of the roof inspection by Custom Seal Technical Services, satisfactory completion of any punch list items, and receipt of applicable fees, the warranty will be issued to the installing contractor.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original, unopened containers.
- B. Containers shall be labeled with manufacturer's name, brand name, installation instructions and identification of various items.
- C. All materials, except membrane, must be stored between 16°C (60°F) and 27°C (80°F). If exposed to lower temperatures, restore to 16°C (60°F) minimum temperature before using.
- D. Store all materials, including membrane, in a dry protected area. Damaged materials must not be used. Installed materials found to be damaged shall be replaced at contractor's expense.
- E. Store the membrane in a manner to protect it from abrasion or puncture.
- F. It is recommended that insulation is stored on skids (or insulation bunking) and completely covered with a breathable material such as a tarp or canvas if the insulation is not installed the same day as being loaded on the roof.

1.05 JOB CONDITIONS (CAUTIONS AND WARNINGS)

Prior to the use of any Custom Seal Roofing Systems product, consult Material Safety Data Sheets for applicable cautions and warnings.

- A. Do not use oil base or bituminous base roof cement with Custom Seal (PVC) products.
- B. Do not install Custom Seal (PVC) Membrane directly in contact with new or resaturated asphalt.
- C. Do not expose membrane or accessories to a constant temperature of 82°C (180 °F) or above.
- D. Do not allow waste products (petroleum grease, oil or solvents, etc.) or direct steam venting to come in contact with the Custom Seal (PVC) Roofing System. Any exposures not typical for normal roofing installation must be presented to Custom Seal Roofing Systems for assessment of any impact on the performance of the roofing system.
- E. Do not install Custom Seal (PVC) Membrane directly in contact with coal tar roof surfaces.

1.06 WARRANTY

NOTE: Custom Seal fasteners are required on all 15-year warranted projects. If the metal work (i.e. edging) is to be included in the warranty, only Custom Seal (PVC) Coated Metal or an approved metal manufacturer can be used. Contact Custom Seal technical department for approved manufacturers of metal components.

- A. Custom Seal Roofing Systems will warrant the installation, to include workmanship for those materials supplied by Custom Seal Roofing Systems when the project is completed by an authorized Custom Seal thermoplastic roofing applicator.
- B. When a fifteen year warranty is specified for a project, a complete tear off to the structural deck is required or an independent moisture survey with core cuts must be performed to identify all wet insulation and/or wet substrate that must be removed prior to roofing.
- C. When a Custom Seal Roofing Systems Technical Representative has inspected the completed installation and, upon approval of the installation and payment of the appropriate warranty fee, a warranty may be issued.
- D. The warranty is available for roofing systems on commercial, industrial, or institutional buildings only and is not available for residences, walking decks, terraces, patios or areas subjected to conditions not typically found on roofing systems.
- E. The warranty period is expressed on the warranty certificate which reflects the inclusive dates of coverage.
- F. Contact Custom Seal Roofing Systems for additional warranty information.
- G. When it is anticipated that Custom Seal thermoplastic membranes will be exposed to animal fats, petroleum grease or other grease products, the owner or owner's representative is responsible for specifying that a sacrificial sheet, sand trap or grease guard product must be used to protect the waterproofing roof membrane.
- H. It shall be the owner's responsibility to expose the membrane in the event that warranty service is required when access is impaired. Such impairment includes, but is not limited to:
 - a. Design features, such as window washer systems, which require the installation of traffic surface units in excess of 36.3 kg (80 pounds) per unit.
 - b. Any equipment, ornamentation, building service units and other roof top surfacing materials which are not defined as part of this specification.
 - c. Rooftop equipment that does not provide Custom Seal with reasonable access to the membrane system for purposes of warranty investigation and related repairs.
 - d. Severely ponded water, snow and other unrelated materials.

PRODUCTS

2.01 GENERAL

A. The components of the Custom Seal (PVC) Roof System are to be products of Custom Seal Roofing Systems or approved by Custom Seal Roofing Systems as compatible and acceptable. Unless specifically included in the warranty coverage by Custom Seal Roofing Systems, products by others are excluded from coverage.

2.02 MEMBRANE

A. Custom Seal (PVC) membrane is available in the sizes, thicknesses and colors shown in the following table. Custom colors and thicknesses are available (minimum order restrictions apply). Contact the Custom Seal Customer Service Department for availability, pricing and lead time on the membrane types indicated by an asterick.

PVC Membrane			
Thickness	Widths Available	Lengths Available	Colors Available
.048 (1.2mm) Standard Membrane	37.5", 6',12' (95.3cm, 1.8m, 3.6m)	100' Standard (30.4m)	White Tan* Gray*
.060 (1.5mm) Standard Membrane	37.5", 6',12' (95.3 cm, 1.8m, 3.6m)	100' Standard (30.4m)	White Tan* Gray*

2.03 RELATED MATERIALS

The following list contains the names of other Custom Seal products and accessories that could be required in order to complete the roofing system. With the exception of walkpads, which are considered maintenance items, any Custom Seal manufactured or supplied material is covered in the limited warranty.

NOTE: Prolonged exposure of adhesives and sealants to temperatures greater than 27°C (80°F) will reduce their shelf life. Normal shelf life is approximately 9 months from date of manufacturing.

- | | |
|---|--|
| A. Custom Seal (PVC) Half Sheets | 95.3cm (37 1/2") x 30.5m (100') |
| B. Custom Seal (PVC) Roll Goods/Pre-Fab | VARIABLES |
| C. Custom Seal (PVC) Pre-Fab Parapet | VARIABLES |
| D. Custom Seal (PVC) Coated Metal | 1.2m (4') x 2.4m (8') sheets |
| E. Custom Seal Bonding Adhesive "S" | 1.5m ² /l (60 S.F./Gal.) |
| F. Custom Seal Waterbased Bonding Adhesive | 3.6m/l (150 S.F. / Gal.) Standard Application |
| G. Custom Seal Waterstop | 4.6m (15 L.F.) /Tube |
| H. Custom Seal Pourable Sealer A & B | .09m ² (1.0 S.F./Gal.) 5.1cm (2") Thick |
| I. Custom Seal Metal Anchor Bar | 2.5cm (1") x 3.0m (10') |
| J. Custom Seal Termination Caulk | 4.6m (15 L.F.) /Tube |
| K. Custom Seal Polymer Batten Bar | 2.5cm (1") x 600cm (250') |
| L. Custom Seal Termination Bar | 3.2cm (1 1/4") x 3.0m (10') |
| M. Custom Seal Heat Weldable Walkway Pad | 76.2cm (30") x 18.3cm (60') x 3.8mm (5/32") |
| N. Custom Seal Cleaning Solvent | 18.9 l (5 Gal.) Pails |
| O. Custom Seal Separator Sheet | As supplied by Custom Seal Roofing Systems |
| P. Custom Seal 2", 2 3/8" and 3" Seam Plates | 2" & 2 3/8" - 1000 Per Box / 3" - 500 Per Box |
| Q. Custom Seal Pre-Fab Inside/Outside Corners | As supplied by Custom Seal Roofing Systems |
| R. Custom Seal Pre-Fab Pipe Boots | As supplied by Custom Seal Roofing Systems |
| S. Custom Seal Strip Mastic | 1/8" X 1" 3.17mm X 25.4mm 10 Roll at 25 Feet |
| T. Custom Seal Fasteners/Insulation Plates | As supplied by Custom Seal Roofing Systems |
| U. Approved Caulk | As supplied by Custom Seal Roofing Systems |
| V. Custom Seal Low Rise Insulation Adhesive | 4.2m/l (166 S.F. / Gal.) |

PROJECT DESIGN AS IT PERTAINS TO THE Custom Seal ROOF SYSTEM

Note: This portion of the manual has been sequenced in the order of construction from the deck up. Custom Seal has given a brief summary for each potential component. The actual design of the roof system is the responsibility of the appropriate design professional.

3.01 ACCEPTABLE DECKS (STRUCTURAL)

A suitable deck must provide sufficient load capacity to support the specified roof assembly, any roof top equipment and live & dead loads as determined appropriate by a design professional. Additionally, the substrate must provide a suitable surface for the installation of a Custom Seal Roof Assembly. In many cases the substrate will also be designed to facilitate drainage of the roof surface by being constructed with built-in slope. For Fully Adhered and Mechanically Attached Systems the deck must also provide acceptable pullout resistance for the fasteners used to secure the roof assembly to the structure. Listed below are the decks acceptable for use under a Custom Seal Roof System and any conditions placed on that acceptability. If a particular deck is not listed, Custom Seal will review acceptability on a case to case basis as submitted to the Custom Seal Technical Department.

NEW CONSTRUCTION OR TEAR OFF TO DECK				
Deck Type	Conditions (if any)		Deck Type	Conditions (if any)
Plywood	15/32" (1.2cm) min.		Lumber	3/4" (1.9cm) min.
Steel Deck	22 gauge min		Structural Concrete	3000 psi (20.7MPa) min
Concrete Plank*	2" (5.1cm) min		Gypsum Deck	Poured in place or plank
Cementitious Wood Fiber	2" (5.1cm) min		Lightweight Concrete**	2" (5.1cm) min

* Acceptable for use under ballasted systems only.
 **When used as a substrate for an Adhered or Mechanically Attached System securement must be made through the lightweight concrete and into the structural deck.

RECOVER SYSTEMS

Refer to section 3.04 Acceptable Substrates. Please note that the deck requirements spelled out in section 3.01 apply to recover assemblies also.

3.02 VAPOR RETARDERS & AIR BARRIERS

Vapor retarders have been employed in all types of low slope roof systems when required to mitigate the effects and possible damage of vapor drive and condensation. Condensation can occur when there are significant internal / external temperature and humidity differences and also when the roof is installed over a severe atmospheric area such as over a pool or freezer. There are several methods for determining whether or not a vapor retarder should be included in a roof system but the most common two are; conduct dew point calculations for the project or refer to the U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL) Vapor Drive Map with associated information available in the Moisture Control Section of the NRCA Low Slope Roofing Manual. In either event, if a vapor retarder is deemed appropriate it will be the responsibility of the roof designer to determine the type, location, and the installation method.

Air barriers are occasionally utilized in roof assemblies to prevent internal / external air pressure differences from affecting the performance of the roof system. Over pressurization can occur for a number of reasons and are occasionally related to large openings in the building shell, building canopies or other features that allow air to enter a building quicker than it can be exhausted. In some cases the positive building pressure can be traced back to mechanical air handling units. In cases where air barriers are used, the barrier must be on the deck side of the insulation and be covered with a roof insulation of appropriate type and thickness to be secured to the structural deck in accordance with FM 1-90 Adhered Roof System criteria - regardless of roof assembly type installed. The use of air barriers are occasionally used in mechanically attached roof systems to minimize membrane "flutter". In situations involving air barriers contact the Custom Seal Technical Department for assistance.

3.03 ROOF DRAINS & SCUPPERS

Low slope roofs generate vast amounts of water run off when subjected to inclement weather. Roofing drains must be designed to handle loads that in some cases may completely submerge the drain assembly therefore making it necessary to not only ensure a sound plumbing connection but also an adequate membrane seal to prevent back flow into the roof system. Roof drains must consist of a compression ring and matching bowl flange, include drain basket, and be solidly connected to the building's storm sewer plumbing. The membrane seal to the drain assembly must be by means of a compression seal facilitated by compressing Custom Seal Waterstop between the membrane and the bowl flange by mechanical securement of the drain compression ring above the membrane. In cases where retrofit drains are required, not only does the drain need to meet the sealing criteria as stated above, but the retrofit assembly must also be mechanically sealed to the inside of the plumbing pipe. Regardless of drain type utilized, Custom Seal warranty coverage ends at the membrane to drainbowl seal.

Scuppers are typically vertically mounted exhaust flumes for water discharge. The flume is normally constructed of a

See <http://www.Custom Seal.com> for specification updates and promotional information.

suitable metal in a configuration meeting the drainage requirements of the building and is typically mounted in conjunction with a downspout leaderhead to prevent exterior wall saturation due to drainage. The actual fabrication of the scupper assembly (flume and mated flange) should be constructed according to criteria detailed in the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Manual. The SMACNA Manual fully explains the points to be considered when determining the appropriate size of scuppers. Custom Seal requirements regarding scuppers are as follows: the scupper assembly must be fabricated from Custom Seal factory fabricated scupper flashing.

3.04 Acceptable Roof System Substrates

An acceptable substrate will provide a smooth surface capable of fully supporting a Custom Seal Roof Assembly and anticipated roof loads. When used to support an Adhered Roof System, with either mechanically attached or bonded insulation to the deck, the acceptable substrate must also possess sufficient structural integrity to secure the roofing membrane to the structure when the membrane is bonded to it. Thermal value to the roof assembly must also be considered when choosing a substrate. When insulation is used as a roof substrate, the insulation must be capable of being supported by the structural deck, i.e. a typical steel deck would not support wood fiber alone but would support an isocyanurate insulation board with a wood fiber overlay. A suitable substrate can be an existing roof surface, a structural deck or insulation as detailed in the following list.

Substrate Type	Conditions (if any)
Plywood or Wood Plank	Custom Seal roof systems may be installed directly over plywood and wood plank decks provided the substrate is free of contamination, sharp edges and protrusions. Voids between boards greater than 1/4" in width must be filled with a suitable material to provide a smooth, bondable surface. It is also strongly recommended that the substrate be mechanically attached to the structural support in lieu of nailing or stapling to prevent damage caused by fastener back out as the structure moves due to expansion/contraction and settling. Damage caused by building movement is excluded from warranty coverage.
Lightweight Concrete	Standard Custom Seal (PVC) may not be applied directly over lightweight insulating concrete.
Smooth Surface BUR	Custom Seal (PVC) Mechanically Attached Systems MAY NOT be installed directly over smooth surface BUR and Modified Bitumen roofs (smooth and granulated) in sound condition without the use of a separator sheet.
Separator Sheet	When the condition of a smooth surface BUR or Modified Bitumen roof would prevent the use of the existing roof as a direct substrate for a standard (PVC) membrane, a Custom Seal separator sheet may be used to smooth the BUR or Modified Bitumen surface to an acceptable level or to isolate the existing roof from the standard (PVC). Please consult the Custom Seal Technical Department regarding suitability of using a separator sheet versus insulation.
Existing PVC & Hypalon Roofs - All types, or Ballasted TPO or EPDM Roofs	In reroof situations that involve leaving the existing PVC membrane, or ballasted EPDM or (PVC) in place, the existing membrane must be cut into 10'x10' pieces and then overlaid with an acceptable rigid board insulation to ensure that any contraction or shrinkage of the original roof membrane is isolated from the new Custom Seal (PVC) Roof System. The rigid board type and mechanical securement of the insulation must comply with the securement requirements of the new roof system being installed.

Existing TPO & EPDM
(MAS & Adhered)

In reroof situations that involve leaving the existing fully adhered and mechanically fastened TPO or EPDM roofs in place, the existing membrane must be cut into 10'x10' grids and overlaid with an approved rigid board insulation in accordance with the insulation requirements of the new system being installed. Mechanically fastened and fully adhered TPO and EPDM roofs may also be roofed directly over, consult the Custom Seal Technical Department for recover requirements.

Acceptable Insulations			
Insulation Type	Manufacturer Names	Minimum Thickness	Acceptable for use on these systems:
Isocyanurate	Custom Seal Iso ; Atlas AC Foam & AC Foam II; Celotex HyTherm AP, Top R II, Star AP; ManvilleE"NRG "Y I I, E"NRG"Y II Composite*; R Max MultiMax, MultiMax II	1" (2.5cm) min. *1½" (3.8cm) min.	All (1)
Wood Fiber	Woodfiber; Continental; Celotex; Domtar; Georgia Pacific; Huebert; Temple Inland; USG; Milcore; International Buildrite; Building Products of Canada	1" (2.5cm) min. for Std. 1/2" (1.3cm) min. for High Density	All (1)
Perlite	Celotex Celo-Therm; Domtar Cel-U-Con; GAF Perlite Roof Insulation; Johns Manville Fesco	¾" (2.5cm) min.	Mechanically Attached & Ballasted Only (1)
Polystyrene (Expanded or Extruded)	Dow Chemical Styrofoam; Owens Corning Foamular, Premier Industries EPS	1" (2.5cm) min.	All (1 & 2)
Gypsum Board	G-P Gypsum Corporation Dens-Deck	¼" (overlay only) ½"	All
NOTES: 1. Insulation thickness must be minimum thickness required by manufacturer to span openings in the deck. In some cases it may be necessary to use a support layer of insulation. 2. EPS insulation must be 1 pcf minimum density and be overlaid with minimum 1/2" (2.5cm) Wood Fiberboard.			

3.05 ACCEPTABLE FASTENERS

Roofing fasteners are used for two purposes in the installation of a roof system; for insulation securement and membrane securement. When the fastener is being utilized for membrane securement only those fasteners marketed by Custom Seal are acceptable for use in the assembly. Instances of membrane securement are when the fasteners penetrate the roofing membrane or when it secures the insulation that the roofing membrane is then bonded to. An example of when a fastener is not securing the membrane to the deck is when the fastener is used to secure the roof insulation to the deck in a mechanically fastened roof assembly. On all warranted projects only Custom Seal Fasteners are acceptable for use in the roof assembly. See Fastener Application Guide on next page.

3.06 EXPANSION JOINTS

Expansion joints allow for normal building movement without jeopardizing roof system integrity. This is accomplished by providing a point of securement and termination for the roof system on each side of a flashed opening in the building structure. Any building movement is isolated to those controlled areas thus saving the roof from having to endure the stresses related to thermal movement and settling. In the event an expansion joint is deemed appropriate, it will be the responsibility of the roof designer to determine the type, location, and the installation method.

3.07 PENETRATION POCKETS

Penetration Pockets are used as a means to flash irregularly shaped or densely concentrated roof penetrations and are typically fabricated of metal in a configuration allowing for placement around a fixed object. Penetration pocket fabrication techniques can be found in the SMACNA manual. Field fabricated penetration pockets may be acceptable for use in a warranted assembly, contact Custom Seal Technical Department for options. The goal when creating a penetration pocket is to form a pocket at least 2" deep and of sufficient size to accommodate the roof penetration plus 1" on all sides of the penetration,. In cases of multiple penetrations, a 1" space must be maintained between all penetrations, and between the penetrations and the walls of the penetration pocket. Once this containment area is constructed, it is to be flashed with the Custom Seal Pre-Fab flashing material, with the flashing terminating inside of the pocket. Once flashed, the interior of the penetration pocket must then be primed with a coating of bonding adhesive or EPDM Splice Adhesive to create a bondable surface for the pourable sealer to seal to and can then be filled with Custom Seal Pourable Sealer to a point that the pocket is full and mounded to shed water. In the event that a penetration pocket larger than 18" is required, the pocket must be fabricated with a continuous 3" wide base flange with rounded corners and be secured through the roofing membrane to a wood nailer of equal height to the roofing insulation in order to provide membrane securement around the penetration opening.

Custom Seal Fastener Application Guide

<i>Fastener Type</i>	<i>Approved Accessories (see accessory codes below)</i>	<i>Insulation Attachment (when used w/ listed plate)</i>	<i>Membrane Attachment (when used w/ listed plate)</i>	<i>Deck Types</i>	<i>Codes (see list below for accessory codes, assemblies must consist of listed components in order to meet referenced rating)</i>
#14 Screw	1,2,3,6,7,-8,9	Yes	Yes	Steel, Wood	N/A
#15 Screw	1,2,3,6,7,-8,9	Yes	Yes	Steel, Wood, Concrete	FM 1-90 with seam plate #5 spaced 12" o.c.
#15 WH Screw	7, 12	No	Yes	Steel, Wood Concrete	FM 1-90 with seam plate #5 or bar #7 secured at 12" o.c., FM 1-60 secured at 18" o.c.
#12 Preassembled (Insul. Attachment)	N/A	Yes	No	Steel, Wood	N/A
#15 XHD Preassembled (Memb. Attachment)	N/A	No	Yes	Steel, Wood Concrete	FM 1-90 when spaced 12" o.c.
CD-10 Nail	1,2,3,6,7,8	Yes	Yes	Concrete	FM 1-90 with seam plate #5 spaced 12" o.c.
Lite Deck Screw	4,9	Yes	Yes	Gypsum, Cementitious Wood Fiber	N/A
Purlin Screw	2,3,7	Yes	Yes	Steel Purlins	N/A
NTB Plastic Auger (with or without wire)	5,11	Yes	Yes	Gypsum, Cementitious Wood Fiber	N/A

Insulation Plate options: 1) 3" Flat Steel Insulation Plate, 2) 3" Recessed Steel Insulation Plate, 3) 3" Locking Plastic Insulation Plate 4) 3" Lite Deck Insulation Plate, 5) 3" NTB Steel Plate

Membrane securment options: 6) 2" Round Steel Seam Plate, 7) 2 3/8" Barbed Round Steel Seam Plate, 8) Metal Anchor Bar, 9) Poly Anchor Bar, 10) Lite Deck Anchor Bar, 11) 2" NTB Steel Plate, 12) 2 3/8" Barbed WH Plate

The codes listed above are only a partial representation of the codes achieved by Custom Seal Roofing Systems. Please contact the Custom Seal Technical Department if you have any code related questions regarding assemblies not referenced.

NOTE: Custom Seal fasteners are required for all labor and material Warranties.

- All fasteners shall be corrosion resistant coated and comply with Factory Mutual Standard 4470.
- The use of fasteners by others in a Custom Seal warranted roofing assembly must be pre-approved by Custom Seal Technical prior to installation and comply with the corrosion resistance specifications referenced in item 1.
- All non Custom Seal screw type fasteners shall be a minimum #14 or #15 shank diameter as required to comply with the Mechanically Attached PVC Code Matrix on page 11.
- No hex head fasteners.

Custom Seal Roofing Systems requires a pullout test to be conducted by an independent agency on the following types of decks and the results submitted to Custom Seal Technical Department prior to project bid: Gypsum, Tectum, Oriented strand board, Lightweight Concrete, Concrete Plank Deck 1334N (300 lbs.) and any metal decks under 22 gauge.

<u>Roof Size</u>	<u>Number of Pull-Out Tests</u>
1) Less Than 929m ² (10,000 sq. ft.)	6
2) 929m ² (10,000 sq. ft.) - 4645m ² (50,000 sq. ft.)	10
3) 4645m ² (50,000 sq. ft.) - 9290m ² (100,000 sq. ft.)	20
4) Over 9290m ² (100,000 sq. ft.)	1 per 464.5m ² (5,000 sq. ft.)

CAUTION: Use appropriate fastener for substrate.

3.08 ROOF CURBS

Roof curbs typically serve three purposes; they support rooftop equipment; they are designed and fabricated to level and raise the equipment to an appropriate flashing height and they provide a suitable substrate to tie-in the roof system. Curbs can be fabricated from metal, wood or in special applications, structural plastic and fiberglass. The basic components of a roof curb are the base which generally includes a flange to be mounted to the structural deck, a support surface to mount the equipment to and in some cases a wood nailer to terminate the roofing system into. If circumstances prevent mounting the curb to the structural deck, the curb must be supported on a continuous wood nailer wider than the mounting flange and equal in height to the installed roof insulation. Curbs cannot be supported by roof insulation alone due to the compressible nature of insulation.

3.09 ROOF PENETRATIONS (NON-CURB)

Roof penetrations are anything that protrudes from the roof surface that must be flashed. These include plumbing vents, structural support elements, conduit, etc. In cases where the penetration is round and with one end free of obstructions, the preferred method of flashing would be to install a Custom Seal Pre-Fab pipe boot.

3.10 WALLS & PARAPETS

Wall and parapet flashing is accomplished by securing the factory fabricated membrane at the angle change of the roof and vertical substrate. The Custom Seal factory fabricated parapet material has a 6" skirt at the base of the wall. The 6" skirt is raised to expose the 3" fastening tab. The fasteners are placed through the tab and through the substrate into the existing decking. The 6" skirt is then hot air welded onto the field sheet of membrane.

3.11 TIE INS TO DISSIMILAR MATERIALS, OTHER ROOF SYSTEMS, ETC.

Tie Ins to dissimilar materials such as roof systems by others can be accomplished by installing a positive break between the two systems and then waterproofing that break. Contact Custom Seal Technical Department for assistance.

3.12 METALWORK

No roof system is complete until all the edges are terminated in such a way as to prevent water infiltration into the roofed structure. This typically involves the use of manufactured or shop fabricated metal detailing such as coping caps, gravel stops, roof edging, flashing and counter-flashing components. All metalwork should be fabricated and installed according to SMACNA and National Roofing Contractors Association (NRCA) guidelines. Unless specifically agreed to in writing prior to installation, metalwork manufactured by others is not included in warranty coverage.

3.13 WALKWAYS

1. Custom Seal Walkway Pads - (PVC) roll walkway material to be installed by hot air welding to the deck membrane. Refer to the walkway installation detail in the general details section of this manual.
2. Formed concrete walkway pads manufactured for use on roofing systems that do not contain any asphaltic or coal tar derivative. A membrane slip sheet extending three inches from the pads in all directions is required when using formed concrete walkway pads.

The information up to this point was intended to provide those responsible for roof design a general idea of considerations to be contemplated when designing a roof. A partial list of additional design information resources available for use are listed below (this list is by no means complete and makes no attempt to list regional code agencies):

- National Roofing Contractors Association: <http://www.nrca.net/>
- Single Ply Roofing Institute: <http://www.spri.org/>
- Sheet Metal and Air Conditioning Contractors' National Association: <http://www.smacna.org/>
- Roof Consultants' Institute: <http://www.rci-online.org/>

Mechanically Attached PVC Matrix

PVC System	Fastener	#14	#15 WH	#15 XHD (ASAP)	#15 WH	#15 WH	#16 MAX
	Plate/Bar	2in.	2-3/8 in. WH	2-3/8 in. XHD	Poly Bar	Metal Bar	3" MAX
	Weld	Single	Single	Single	Dual	Dual	Single
6 ft	FM I-60	na	na	na	18 in. o.c.	18 in. o.c.	na
	FM I-90	6 in. o.c.	12 in. o.c.	12 in. o.c.	12 in. o.c.	12 in. o.c.	na
	FM I-105	na	na	na	6 in. o.c.	6 in. o.c.	na
	FM I-120	na	na	na	6 in. o.c.	6 in. o.c.	na
	FM I-150	na	na	na	6 in. o.c.	6 in. o.c.	na
	54 mph	18 in. o.c.	18 in. o.c.	18 in. o.c.	18 in. o.c.	18 in. o.c.	na
6 ft	72 mph	12 in. o.c.	18 in. o.c.	18 in. o.c.	18 in. o.c.	18 in. o.c.	na
	80 mph	6 in. o.c.	12 in. o.c.	12 in. o.c.	12 in. o.c.	12 in. o.c.	na
	90 mph	na	6 in. o.c.	6 in. o.c.	12 in. o.c.	12 in. o.c.	na
12ft	FM I-60	na	na	na	12 in. o.c.	12 in. o.c. **	12'***
	FM I-90	na	6 in. o.c.	na	see note G	6 in. o.c. **	6'***
	FM I-105	na	na	na	6 in. o.c.	6 in. o.c.	na
	FM I-120	na	na	na	6 in. o.c.*	6 in. o.c.*	na
	54 mph	na	12 in. o.c.	na	12 in. o.c.	12 in. o.c.	12''
	72 mph	na	6 in. o.c.	na	12 in. o.c.	12 in. o.c.	6''
	80 mph	na	na	na	12 in. o.c.	12 in. o.c.	na
	90 mph	na	na	na	6 in. o.c.	6 in. o.c.	na

* - Grade E deck at 5.5ft bar joist spacing

*** - Grade C or E deck



= Standard Warranted System

Notes:

- A. 100 mph wind speed warranty fully adhered over OSB, contact Technical Department
- B. For FM insured projects, contact Technical Department for deck requirements
- C. Approved decks:
 - 22 ga. Steel
 - Structural Concrete
 - 3/4 in. APA certified plywood or OSB
 - 2 in. wood plank
- D. Custom Seal High Wind Design (80 & 90 mph) must be submitted to Technical Department prior to project bid. Pullout data is required.
- E. Contact Custom Seal Technical Department for perimeter attachment requirements
- F. FM I-90 Approved at 12 in. oc. for structural concrete, Grade E metal deck FM I-90 Approved at 6 in. o.c.

**REDUCED INSULATION ATTACHMENT OPTIONS
FOR FULLY ADHERED SYSTEMS**
(minimum thickness requirements as noted apply)

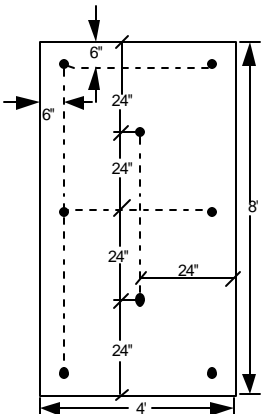
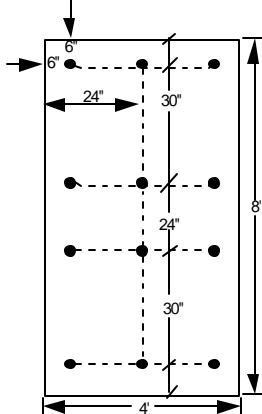
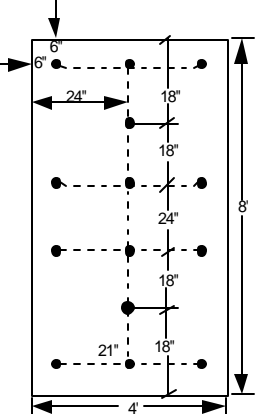
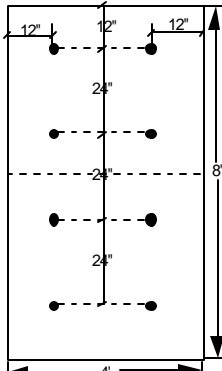
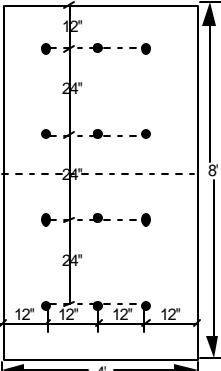
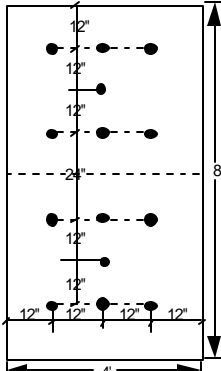
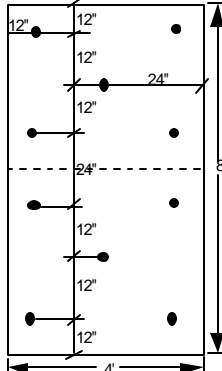
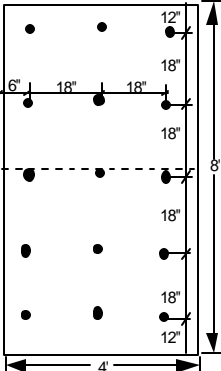
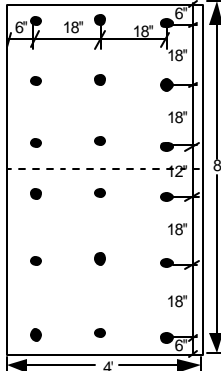
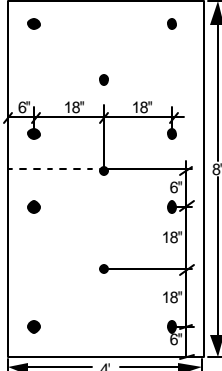
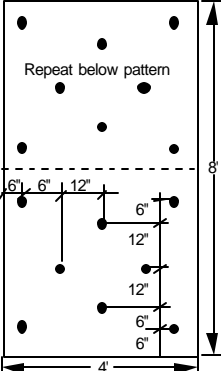
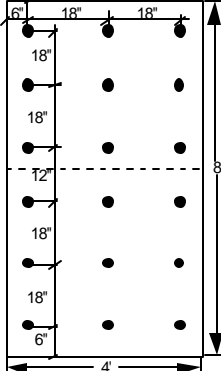

Insulation	Rating	Min. Thickness	Frequency # per 4'x8' bd.	Fastener & Plate	Pattern Refer to pages 13 & 14
Custom Seal Iso	I-90	1.4"	16	#14 or #15 w/ square or round steel plate	6
	I-90	2.0"	8		1
Custom Seal Iso	I-60	1.25"	16	#14 or #15 w/ square or round steel plate	6
	I-60	1.5"	12		5
	I-90	2.0"	12		5
Custom Seal Iso	I-90	1.3"	16	#14 or #15 w/ square or round steel plate	6
	I-90	1.5"	11		4
	I-90	2.0"	8		2
Custom Seal Iso	I-75	1.4"	10	#14 or #15 w/ square or round steel plate	3
	I-90	1.4"	16		6
	I-90	1.5"	11		4
	I-90	2.0"	8**		1
Wood Fiber Board	I-90	1.0" *	16	#14 or #15 w/ square or round steel plate	6
GP Dens-Deck	I-60	1/4"	12	#14 or #15 w/ square or round steel plate	5
	I-90	1/4"	16		6
	I-60	1/2"	10		3
	I-90	1/2"	12		5
	I-60	5/8"	8		2
	I-90	5/8"	8		2
GP Dens-Deck Prime	I-60	1/4"	12	#14 or #15 w/ square or round steel plate	5
	I-90	1/4"	12		5
	I-60	1/2"	10		3
	I-90	1/2"	12		5
	I-60	5/8"	8		2
	I-90	5/8"	8		2

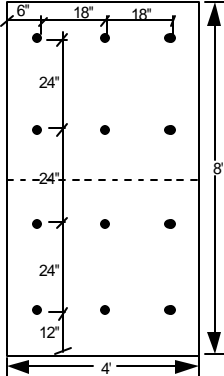
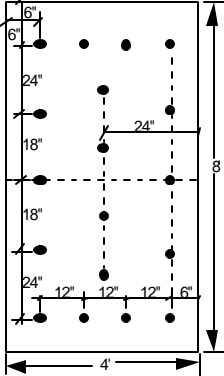
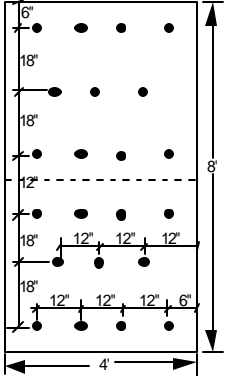
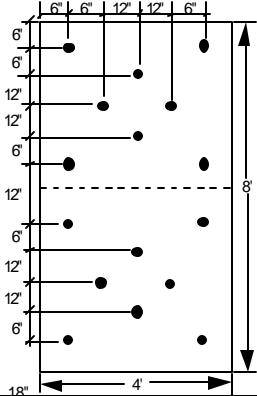
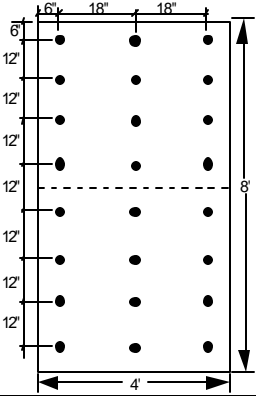
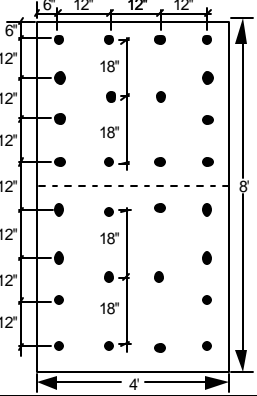
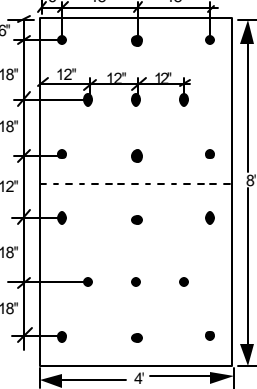
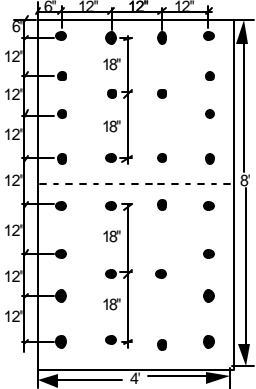
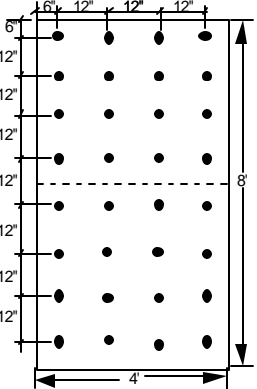
* 1/2" HIGH DENSITY WOOD FIBER BOARD (ROOF RITE & WEATHER GUARD) MANUFACTURED BY INTERNATIONAL BILDRITE APPROVED FOR FM I-90.
** REINFORCED MEMBRANE ONLY.

NOTE: FOR ALL MECHANICALLY FASTENED INSULATIONS OR THERMAL BARRIERS, THE NUMBER OF FASTENERS PER BOARD SHOULD BE INCREASED OVER THE FMRC-APPROVED FIELD OF ROOF SPACING BY:
50% IN THE ROOF PERIMETER
75% IN THE ROOF CORNERS
ROUND UP TO THE NEXT WHOLE NUMBER OF FASTENERS

THE WIDTH OF THE ROOF CORNERS AND PERIMETER IS DEFINED AS THE SMALLER OF:
0.1 TIMES THE BUILDING LESSER PLAN DIMENSION
0.4 TIMES THE EAVE HEIGHT
SUBJECT TO A MINIMUM WIDTH OF 4 FT.

ON RECOVER SYSTEMS FACTORY MUTUAL LIMITS THE INSULATION THICKNESS TO A MAXIMUM OF ONE INCH. CONTACT CUSTOM SEAL ROOFING SYSTEMS FOR APPROVALS OVER DECK TYPES OTHER THAN METAL AND CONCRETE (I.E. CEMENTITIOUS WOOD FIBER, GYPSUM, ETC.)

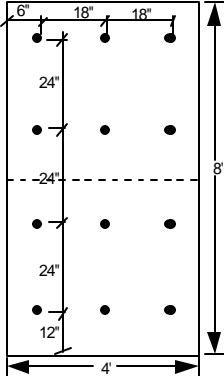
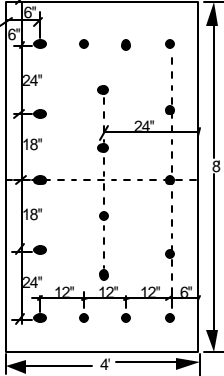
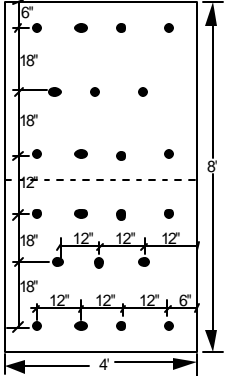
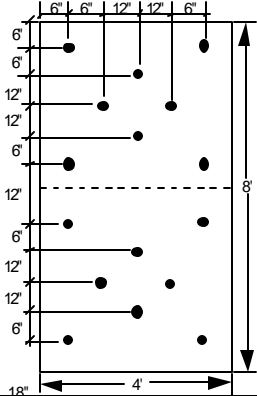
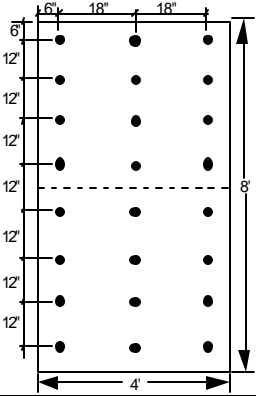
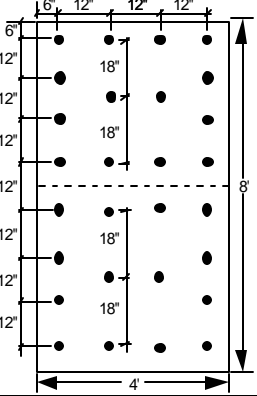
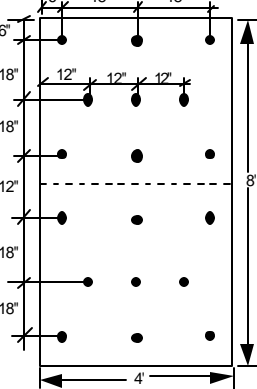
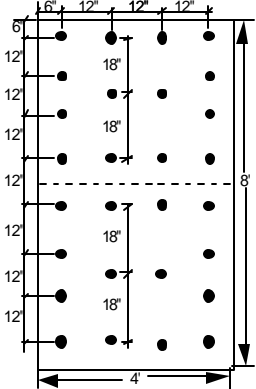
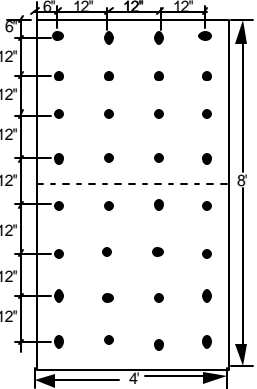
	Base Pattern	Perimeter + 50%	Corner + 75%
<p>Pattern #1</p> <p>For use with 2" min. ISO.</p>			
<p>Pattern #2</p> <p>For use with 2" min. ISO. and 5/8" Dens-Deck & Dens-Deck Prime</p>			
<p>Pattern #3</p> <p>For use with min. 1.4" ISO. and 1/2" Dens-Deck & Dens-Deck Prime</p>			
<p>Pattern #4</p> <p>For use with 1.5" min. ISO. and 2" min. ISO.</p>			
<p>Use this visual reference in conjunction with the Insulation For Fully Adhered Systems table located in the design portion of this manual and in the back of the Fully Adhered Application Specification.</p>			
<p>Insulation Securment Patterns</p>	<p>Detail #: N/A</p>	<p>ADHERED SYSTEMS 06/02</p>	

Pattern #5 For use with 1/4" & 1/2" Dens-Deck and Dens-Deck Plus	Base Pattern 	Perimeter + 50% 	Corner + 75% 
Pattern #6 For use with 1.3" min. Custom Seal ISO. 1.4" Custom Seal ISO. 1.25" Custom Seal ISO. 2, 1" Wood Fiberboard and .25" DensDeck			
Pattern #7 For use with 1/4" Dens-Deck			

Use this visual reference in conjunction with the Insulation For Fully Adhered Systems table located in the design portion of this manual and in the back of the Fully Adhered Application Specification.



Insulation Securment Patterns	Detail #: N/A	ADHERED SYSTEMS 06/02
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Pattern #5 For use with 1/4" & 1/2" Dens-Deck and Dens-Deck Plus	Base Pattern 	Perimeter + 50% 	Corner + 75% 
Pattern #6 For use with 1.3" min. Custom Seal ISO. 1.4" Custom Seal ISO. 1.25" Custom Seal ISO. 2, 1" Wood Fiberboard and .25" DensDeck			
Pattern #7 For use with 1/4" Dens-Deck			

Use this visual reference in conjunction with the Insulation For Fully Adhered Systems table located in the design portion of this manual and in the back of the Fully Adhered Application Specification.



Insulation Securment Patterns	Detail #: N/A	ADHERED SYSTEMS 06/02
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