

SPECIFICATION 07552.1

CUSTOM SEAL TPO Mechanically Attached System - Dual Weld Specifications

4.01 DESCRIPTION

- A. This system is a mechanically attached system design utilizing 1.1mm (.045 mil) & 1.5mm (.060 mil) nominal thickness Custom Seal TPO roofing membrane in a dual weld configuration over an approved mechanically secured insulation or applied directly over an approved substrate.
- B. Roof Application and related work shall be installed by a single firm authorized by the roofing manufacturer. A Single firm is required so that there is undivided responsibility for performance of all roof components.
- C. Furnish and install the Custom Seal Thermoplastic membrane roofing system in strict accordance with drawings and specifications approved by Custom Seal Roofing Systems.
- D. Related Work
The work includes, but is not necessarily limited to the installation of:
 - 1. Vapor Retarders (where required)
 - 2. Custom Seal Insulation
 - 3. Custom Seal Anchor Bars
 - 4. Custom Seal Polyester Felt
 - 5. Custom Seal Fasteners
 - 6. Custom Seal Roof Membrane
 - 7. Custom Seal Flashing
 - 8. Custom Seal Metal Flashing
 - 9. Wood Nailer
 - 10. Custom Seal Walkways
 - 11. Custom Seal Approved Sealants
 - 12. Custom Seal Adhesives
 - 13. Metal Coping (as required)
 - 14. All metal work to be fastened per SMACNA standards.

4.02 QUALITY ASSURANCE

- A. This roofing system must be installed by an authorized Custom Seal Roofing Systems TPO applicator.
- 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 local 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 published listings or call Custom Seal Roofing Systems Technical Department at 1-800-370-7325.

4.03 SUBMITTALS

- A. Submit a "Pre-Job Survey" to Custom Seal Roofing Systems Technical Department for approval PRIOR to the job start to enable the Technical Department to approve and assign a job number to the project.
 - 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". Drawings must show dimensions and all penetrations.
- B. When Material & Workmanship or Full Systems warranties are desired, it is recommended Custom Seal Roofing Systems be contacted PRIOR to project bid and installation regarding system requirements. Information may be required for the wind design of the system.

4.04 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.

4.05 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 TPO materials.
- B. Do not install Custom Seal TPO membrane directly over asphalt or smooth surfaced modified bitumen without consulting the Custom Seal Technical Services department.
- 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 TPO 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 TPO membrane directly over coal tar roof surfaces.
- F. Cements and solvents and their fumes contain petroleum distillates and are extremely flammable. Do not breathe vapors or use near fire. Care must also be exercised to ensure that open containers are not placed near fresh air intake ventilators on the roof. Consult container labels and Material Safety Data Sheets for specific information.
- G. All seaming and bonding surfaces must be dry and clean.
- H. Contact Custom Seal Roofing Systems Technical Department for procedures when installing Custom Seal TPO roofing systems during temperatures less than 4°C (40°F).
- I. Roofing surface must be free of ponded water, ice or snow prior to and during the roofing project.
- J. Rubber gloves are recommended when using any solvents or adhesives.
- K. Safety glasses, goggles or a face shield are recommended for eye protection.
- L. When using automatic heat welding equipment consult manufacturer's warnings.

4.06 WARRANTY- Refer to section 1.06 of the design section.

4.07 PRODUCTS- Refer to section 2.01 of the design section.

4.08 SUBSTRATE CRITERIA

- A. The building owner or owner's representative is responsible for providing and determining that the substrate is suitable to receive the Custom Seal TPO roofing system and the Custom Seal authorized contractor should not proceed until all defects have been corrected. If possible, install roofing system at the high point of the roof and work to the lowest point.
- B. Custom Seal Roofing Systems has compiled a list of the most common deck types found in the construction field. Custom Seal Roofing Systems strongly recommends that you review our requirements and restrictions prior to each roofing project. Refer to section 3.01 of the design section.

4.09 SUBSTRATE PREPARATION

- A. The building owner or owner's representative is responsible for ensuring that all wet insulation and/or substrate has been removed in a re-roofing application. The best diagnostic technique is taking and evaluating a series of roof cuts. There are three other techniques that are currently available to make this determination by indirect means: nuclear moisture detection, infrared thermography and electric capacitance. These techniques provide measurements of factors that can be associated with the presence of moisture.
- B. A positive slope is recommended to provide adequate drainage. There should be no ponding water on the roofing system 48 hours after it has stopped raining.
- C. Existing sprayed-in-place urethane foam roofs must be removed prior to the installation of this roofing system.

4.10 INSTALLATION

- A. Insulation Selection
 - 1. Custom Seal Roofing Systems has certain requirements on insulation type, manufacturer, thickness, density and facer. Only insulations listed in 3.04 of the design section are to be used beneath the Custom Seal TPO mechanically attached system.
- B. Treated Wood Nailers
 - 1. Nailers must be pressure treated wood with salt preservatives. Creosote and asphaltic preservatives are not acceptable.
 - 2. Wood nailers are required along roof edges wherever metal gravel stops, drip edges or gutter systems are specified. Wood nailers are also required when roof curbs are to be mounted at finished roof level and not directly to the structural deck.
 - 3. Wood nailers must be equal in height to the roof insulation and be wider than the flange of the roof edge metal or curb being installed but not less than 3½" wide.
 - 4. Wood nailers must be installed by an industry accepted method to resist 200 pounds (889N) of force in any direction with fasteners spaced a maximum of 24" apart.

C. Insulation Attachment

1. Secure the Custom Seal Insulation to the structural deck with one Custom Seal Fastener and Insulation Plate per 6.5 square feet, if using a 4'x4' insulation panel the securement of the insulation must be achieved with one fastener and plate per 4 square feet in order to attach the insulation in a manner to control bowing. Refer to the insulation attachment guidelines in the design section of this manual for securement patterns and fastener requirements.

NOTE: In the event the insulation is installed over an air barrier the insulation securement must be in accordance with FM 1-90 criteria for a Custom Seal Fully Adhered Roof System.

D. Membrane

NOTE: The TPO membrane must be installed lines and dots up. The lines on the membrane are used to determine proper overlap.

1. Custom Seal 6', 8', 10' and 12' wide panels can be used with the dual weld systems.
2. Position the Custom Seal Membranes over approved substrate without stretching.

NOTE: It is recommended that when using Custom Seal 148.5" (12.4') panels that the material be unrolled and allowed to relax for as long as possible. This can be accomplished by stacking the unrolled sheets on top of one another in a location adjacent to the work area. When the material is needed, simply float the material into place as you would other single-ply membranes. This method will reduce fullness wrinkles and improve the dual weld seaming process.

3. Membrane should be allowed to relax as long as possible prior to any hot air welding.
4. Position all adjoining sheets in the same manner lapping edges a minimum of 4 1/2" (11.4cm). Check overlap area for compliance. It is recommended that field sheets run perpendicular to the deck flutes to correctly engage the metal deck (Top Flutes) with the metal or polymer anchor bars.
5. Half sheet will be required. Building height x 0.4 = number of feet of additional perimeter attachment, or 0.1 times the lesser plan dimension whichever is the lesser.
6. To determine fastener type and spacing requirements for membrane securement refer to the TPO Mechanically Secured Fastener Matrix in the back of this application section.
7. Any wrinkles found in the outside 1" minimum seam area (step-off), or if the wrinkle impedes the flow of water drainage, it must be cut, laid flat and repaired using unreinforced membrane over the cut area with standard heat welding procedures.

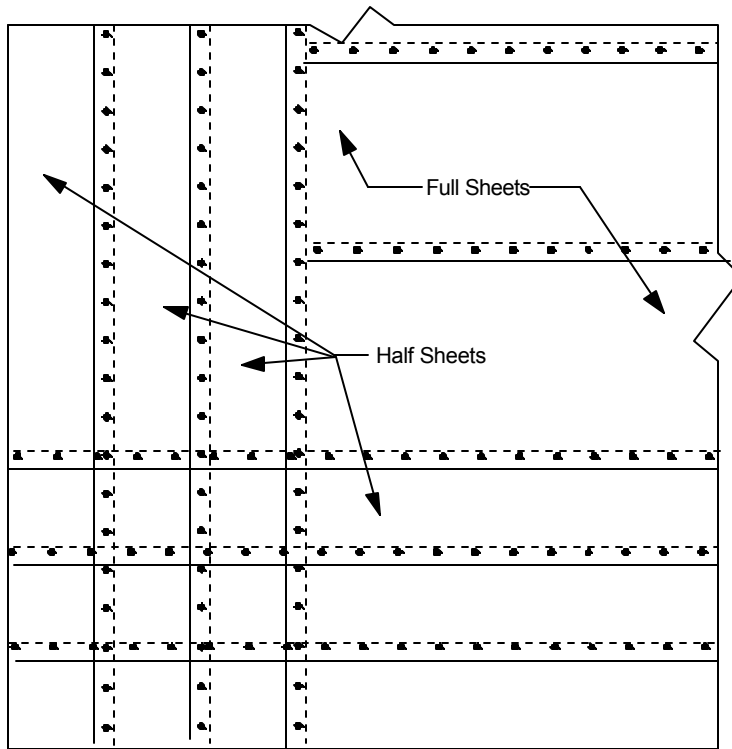
E. Seaming

1. Unroll the membrane and allow to relax as long as possible. (Minimum 1/2 - 1 hour)
2. Position the top membrane to overlap the bottom membrane by 4 1/2" (11.4cm) inches.
3. Using a clean rag saturated with Custom Seal Cleaner, thoroughly clean an area on both sheets at least 4 inches (10.2cm) wide if seam area has become contaminated with dirt, debris, etc. Change rags frequently to avoid depositing previously removed materials.
4. Fold back the top sheet and position Custom Seal metal or polymer anchor bar (see attached detail) in center of the seam directly over the fully adhered line of the bottom sheet using only Custom Seal fasteners. Care must be taken when placing the bar where there are no factory line markings. Fasteners must be located precisely 2" in from the edge of the top sheet. This alignment will provide a 1 1/2" weld area past the bar. Too much material overlap may result in a non-welded seam requiring the seam to be repaired. All bars are to be overlapped and secured with a common screw. Note: Contact Custom Seal Technical Department for anchor bar overlap requirements on FM projects.
5. Using a Custom Seal Dual Seam Welder continuously weld a minimum 1" wide weld on both sides of the Custom Seal metal or polymer anchor bar in the seam. All welded seams must be manually checked for voids or seal deficiencies with a blunt tip metal probe once cooled. Any identified seam deficiencies will be repaired using an approved hand held heat gun, silicone roller and standard seam repair procedures. Upon completion of seaming, quality control check and any subsequent repairs seal all cut edges and end laps of membrane where scrim is exposed with edge sealant. Custom Seal recommends that edge sealant must be applied at the end of each work day.
6. Seam areas where three (3) or more layers of reinforced membrane intersect will require the application of a 6" x 6" non-reinforced joint cover. These areas include but are not limited to dual welds, factory splices, etc.
7. Practice welds are highly recommended when using the thermoplastic single-ply membranes in order to properly set-up the hot air welding equipment.
8. When welding stops and starts in a double weld seam, a dual weld must be achieved by using a hand held welder.
9. Hot Air Equipment (Approved by Custom Seal) and designed for use in dual weld seaming will track over the anchor bar welding on both sides. It is important that the operator maintain a visual check to assure the machine is not riding on the anchor bar. Proper alignment of the anchor bar in the seam area is critical to achieve minimum 1" welds on both sides of the bar.

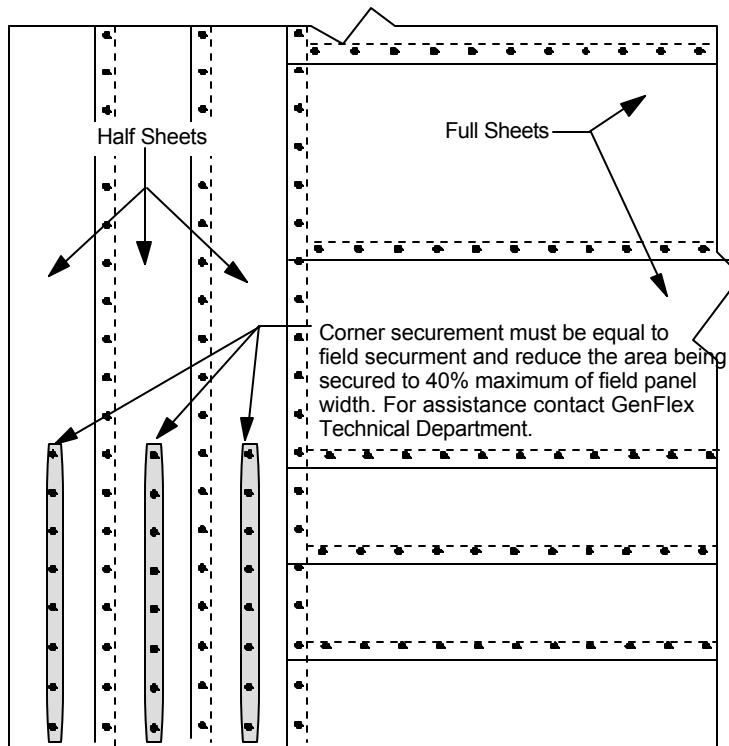
Note: Hot air flow between the dual welds will cause a slight rise in the material over the anchor bar indicating that a weld has been achieved on both sides of the anchor bar. This condition will diminish over time.

10. All welded seams must be manually checked for voids or seal deficiencies by probing the entire seam area with a dull cotter key extractor after the seam has cooled. In addition, there must be destructive testing performed daily at the beginning and every time there is an interruption in the welding process (i.e. Power failure, welder shut down, job site conditions change and after lunch). All deficiencies must be repaired.
- F. Perimeter Membrane Attachment
1. The Custom Seal TPO membrane must be securely attached to the approved roof substrate.
 2. Custom Seal Roofing Systems offers several different attachment methods. Consult Custom Seal TPO standard details.
 3. Perimeter attachment is required at each roof level, curb, skylight, expansion joint and roof penetration over 30.5cm (12 inches) in diameter, or any angle with slope or combined slopes that exceed 5.1cm (2 inches) vertical for every 30.5cm (1 foot) horizontal.
 4. Nailers must be pressure treated wood with salt preservatives. Creosote and asphaltic preservatives are not acceptable.
 - a. Wood nailers are required along roof edges wherever metal gravel stops, drip edges or gutter systems are specified. Wood nailers are also required when roof curbs are to be mounted at finished roof level and not directly to the structural deck.
 - b. Wood nailers must be equal in height to the roof insulation and be wider than the flange of the roof edge metal or curb being installed but not less than 3½" wide.
 - c. Wood nailers must be installed by an industry accepted method to resist 200 pounds (889N) of force in any direction with fasteners spaced a maximum of 24" apart.
- G. Flashing
1. Perimeter wall flashing, flashing around vents, skylights, and miscellaneous roof projections must be installed using Custom Seal TPO membrane, Custom Seal TPO metal, and/or Custom Seal TPO pre-molded corners and pipe boots. Custom Seal Roofing Systems offers numerous alternatives for flashings in our standard details.
 2. Custom Seal TPO unreinforced flashing is only to be used at inside and outside corners and field wrapped pipe boots and **NOT** to be used as a general purpose flashing.
- H. Night Seal
- At the completion of each day's work, temporarily seal any loose edges of membrane with Custom Seal Night Seal. Care must be used to guarantee that no water flows beneath any completed sections of roof. Consult Custom Seal Roofing Systems Technical Specification Manuals standard detail T-19.03 for attachment methods. Custom Seal Night Seal must be cut out and discarded prior to resumption of work.
- I. Walkways
1. If regular maintenance (once a month or more) is required to service rooftop units, Custom Seal walkway pads are recommended.
 2. Walkways are required at all traffic concentration points, such as roof hatches, access doors, rooftop ladders, etc., regardless of traffic frequency.
 3. Walkways are not to be placed over seams.
 4. Consult Custom Seal Technical Specification Manual standard details for attachment method T-16.01, T-16.02.
 5. Walkways are considered a maintenance item and are not warranted by Custom Seal Roofing Systems.
- J. Expansion Joints and Building Control Joints
1. Consult Custom Seal Roofing System standard details for various application methods.
- K. Pitch Pans
1. Fill pitch pans in accordance with Custom Seal Roofing Systems standard details.
- L. Roof Drains
1. Prepare substrate around each drain to prevent any distortion or membrane bridging and to provide a smooth transition from the roof surface to the drain clamping ring.
 2. The surfaces between the clamping ring and the drain must be clean and smooth. Remove all existing flashing, cement or lead on retrofit drains.
 3. One (1) complete tube of Custom Seal Waterstop is required per drain.
 4. **All bolts and/or clamps must be in place to provide constant even compression.**
 5. Do not run seam through roof drain or sumps.
- N. Metal Work
1. Supply and install metalwork meeting project design requirements and SMACNA recommendations, refer to the general details section of this manual for Custom Seal installation requirements.

For Use On Roofs Requiring Factory Mutual Rating Compliance

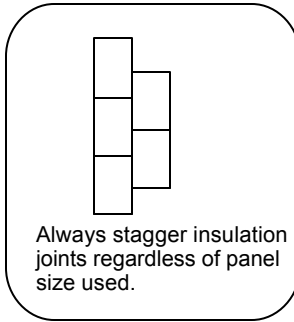
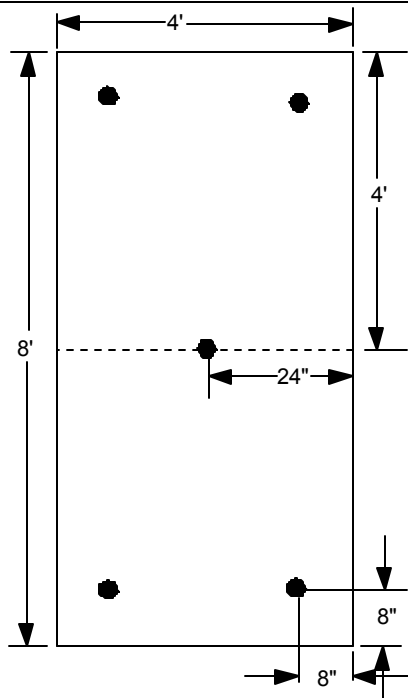


The width of the enhanced perimeter and corner securement areas on a Mechanically attached TPO roof system is determined by multiplying the building height by .4 or the lesser building dimension by .1 whichever is less. The perimeter area must be roofed with half sheets (half sheets up to 60% of the field sheet width are acceptable) secured at the same rate as the full width field sheets of membrane. The corner areas must be further enhanced as shown by criss crossing the half sheets in the corners. Caution: When installing to Factory Mutual requirements all fasteners used to enhance the corner areas must penetrate the uppermost layer seam assembly.

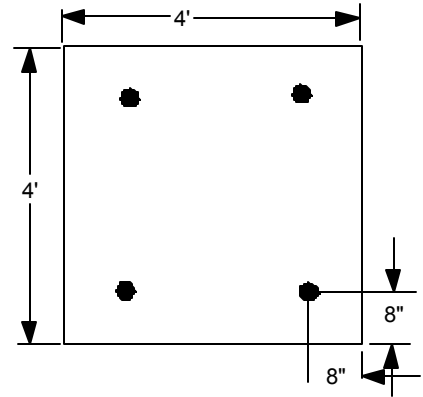


As an option, corner enhancement may be accomplished by installing additional rows of securement through the half sheets and then striping in those rows of securement with either TPO flashing or TPO Cover Tape installed to Custom Seal specification.





Always stagger insulation joints regardless of panel size used.



For use on buildings up to 15.2m (50') high. If building height exceeds 15.2m (50') high contact Custom Seal Roofing Systems for attachment pattern.



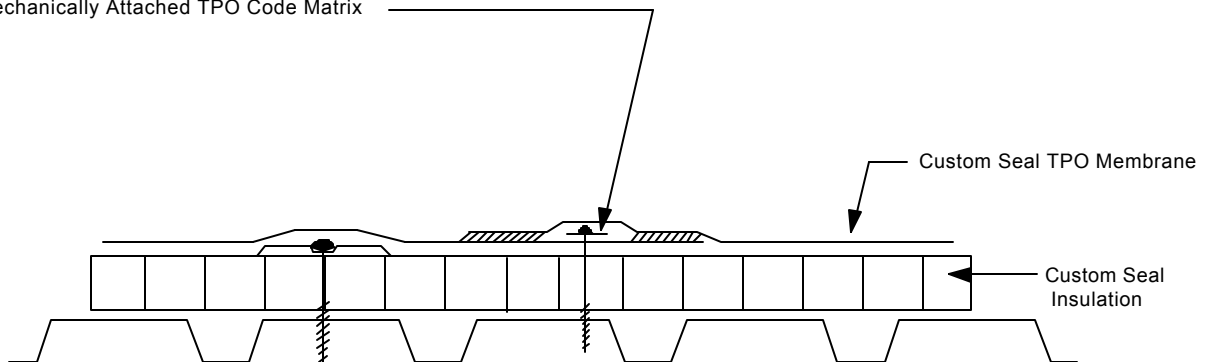
Insulation Securment For Mechanically Attached Systems

Detail #: 42.08r

TPO Systems

04/01

Custom Seal Bar Anchor secured with Custom Seal Fasteners spaced according to the Mechanically Attached TPO Code Matrix



Position insulation and membrane sheets to enable securment into the top flutes on steel decks to ensure positive attachment and to reduce fastener movement. Insulation should be installed with board ends resting on the flute tops.

Refer to detail T-6.03 for seam specifications



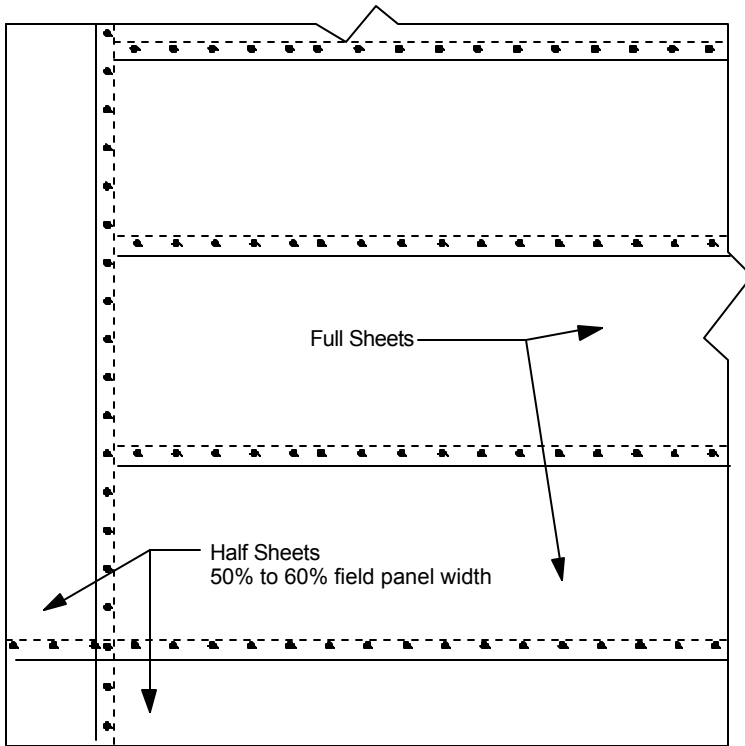
Mechanically Attached System Cross Section

Detail #: 42.02dw

TPO Systems

04/01

For Use On Roofs 0' To 50' Above Ground Level



All Custom Seal TPO Mechanically Attached Systems require half sheet perimeter securement. A half sheet width of up to 60% of the width of the field panels may be used. Half sheet securement is equal to the membrane securement used in the field of the roof. See the Mechanically Attached TPO Code Matrix for fastener and spacing requirements. If the project must meet Factory Mutual criteria refer to detail 42.04-3 and contact Factory Mutual for review.

Half sheets are required at all exterior edges of the roof system and at the upper level edges of transitions in surface height greater than 3'

If the building being roofed has any of the following conditions contact Custom Seal Technical for assistance in determining half sheet requirements:

- A) Large wall openings totalling 10% or more of any wall area.
- B) Canopies open below the roof deck.
- C) In the immediate vicinity of large bodies of water or coastline.
- D) Building height in excess of 75'.

For projects requiring a warranty wind speed in excess of 54mph contact Custom Seal Technical Department for perimeter securement requirements - additional half sheets and / or fasteners and seam plates may be required.

