

## SPECIFICATION 07550.1

### CUSTOM SEAL TPO Ballasted Systems Specifications

#### 7.01 DESCRIPTION

- A. This system is a loose laid ballasted design utilizing 1.1 mm (.045 mil) or 1.5mm (.060 mil) nominal thickness of Custom Seal TPO roofing membrane.
- 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) | 9. Wood Nailer  |
| 2. Custom Seal Insulation           | 10. Custom Seal Walkways                                |
| 3. Custom Seal Anchor Bars          | 11. Custom Seal Approved Sealants                       |
| 4. Custom Seal Polyester Felt       | 12. Custom Seal Adhesives                               |
| 5. Custom Seal Fasteners            | 13. Metal Coping (as required)                          |
| 6. Custom Seal Roof Membrane        | 14. All metal work to be fastened per SMACNA standards. |
| 7. Custom Seal Flashing             |   |
| 8. Custom Seal Metal Flashing       |   |

#### 7.02 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

#### 7.03 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.

#### 7.04 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.

## 7.05 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.

**7.06 WARRANTY-** Refer to section 1.06 of the design section.

**7.07 PRODUCTS-** Refer to section 2.01 of the design section.

## 7.08 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.

## 7.09 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.

## 7.10 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. For Standard Design, IRMA Design and Paver Designs, the insulation is not required to be attached, but is loose laid.
2. For High Wind Design, Custom Seal Roofing Systems adheres to the recommendations as outlined in FM 1-28 and 1-29 Loss Prevention Data Sheet. The insulation can be mechanically attached using approved fasteners. All fasteners must pass the requirements established by Factory Mutual 4470 for corrosion resistances, refer to 3.05 of the design section for acceptable fasteners. Contact Custom Seal Technical Department for recommendations and approval prior to application.

### 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. Position the Custom Seal TPO membrane over approved substrate without stretching.
2. Allow the membrane to relax one-half (1/2) hour prior to any seaming or fastening.
3. Position all adjoining sheets in the same manner. Using the solid line, lap the edges a minimum of 6.3cm (2 1/2").

### E. Seaming

Important: Ensure both mating surfaces are free of debris and no moisture is present on the splicing surfaces.

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 the 5.1cm (2") Custom Seal seam plate on the appropriate dots that have been applied to the bottom sheet 15.2cm (6") o.c. Fasten with approved fasteners. Follow appropriate fastener spacing or contact Custom Seal Technical Department. (See specification detail 42.04)
5. Using an approved automatic heat welding machine or hand held heat gun and teflon roller, continuously weld a minimum 3.8cm (1 1/2") wide seam. Custom Seal recommends that only approved Automatic Walker Welders be used to weld all field seams (see Hot Air Welder Specifications).
6. 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. Membrane Attachment

NOTE: It is the roofing contractor's responsibility to monitor all ballast deliveries for conformance to ASTM standards, however, as ballast is a product by others and excluded from warranty coverage, it is ultimately the project designers responsibility to ensure that the ballast conforms to all project specifications.

1. The following attachment is recommended when using the Custom Seal TPO Standard Design Zone 1-up to 15.2m (50 feet).
  - a. A minimum of 48.9kg/m<sup>2</sup> (10 lbs. per square foot) of ASTM #4 ballast must be provided. Additional ballasting may be required to provide sufficient wind uplift protection. All ballast must be washed round river gravel no less than 1.9cm (3/4") in diameter and no greater than 3.8cm (1 1/2") in diameter. Ballast must contain no more than five (5) percent fines by volume and no more than seven (7) percent fractured material. Consult ASTM C-136 method for sizing gravel.
  - b. The Ballasted TPO Standard Design may be used for roofs meeting the Zone 1 wind uplift criteria contained in Loss Prevention Data I-28, as published by Factory Mutual Research Corporation.\*  
\*This does not mean that the system is approved by the Factory Mutual Research Corporation.
2. The following attachment is recommended when applying Custom Seal TPO IRMA Design Zone 1 - up to 15.2m (50 feet). See Specification detail 40.04.
  - a. Custom Seal TPO is to be loose laid over the approved substrate. All seams and flashings must be completed.
  - b. Prior to applying the IRMA insulation board and ballast a flood test is recommended to ensure water tightness. Also, an inspection must be scheduled to ensure compliance to Custom Seal written specifications as it relates to application.
  - c. An approved insulation is then placed over the watertight TPO.
  - d. An approved woven rock/stone mat shall be placed over the approved insulation. The rock/stone mat must overlap at all edges by no less than 10.2cm (4 inches).
  - e. An approved ballast material will then be installed over the rock/stone mat and insulation with a coverage of no less than 48.9kg/m<sup>2</sup> (10 lbs. per square foot).
3. The following attachment is recommended when applying the Ballasted TPO High Wind Design Zone 1 and 2 - up to 15.2m (50 feet).

- a. A minimum of 48.9kg/m<sup>2</sup> (10 lbs. per square foot) of ASTM#2 ballast and 100% coverage of the membrane must be provided. In addition, all insulation must be mechanically attached using approved fasteners. (See Specification details 40.07 through 40.09.) All ballast must be washed round river gravel no less than 2.5cm (1 inch) in diameter and no greater than 5.1cm (2 inches) in diameter. The ballast shall contain 3% fines by volume and no more than 7% shall be fractured material.
  - b. The ballasted High Wind Design may be used for roofs requiring the Zones 1 and 2 uplift criteria contained in Loss Prevention Data I-28 and I-29, as published by Factory Mutual Research Corporation.\*  
\*This does not mean that the system is approved by Factory Mutual Research Corporation.
4. The following attachment is recommended when applying Custom Seal TPO Paver Design Zone 1 and 2 up to 15.2m (50 feet). See Specification detail 40.05.
- a. Custom Seal TPO is to be loose laid over the approved substrate. All seams and flashings must be completed.
  - b. Prior to applying the paver block a flood test is recommended to ensure water tightness. Also, an inspection must be scheduled to ensure compliance to Custom Seal written specifications as it relates to application.
  - c. An approved interlocking, smooth bottom surface paver is installed over TPO, per manufacturer's instructions.
- NOTE: A slipsheet is not required when an approved ballast paver is used.
- d. The ballasted paver design may be used for roofs requiring the Zones 1 and 2 uplift criteria contained in Loss Prevention Data I-29, as published by Factory Mutual Research Corporation.\*  
\*This does not mean that the system is approved by Factory Mutual Research Corporation.
- G. 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.
- H. 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.
- I. Night Seal
- At the completion of each day's work, temporarily seal any loose edge 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 standard detail T19.03 for method of attachment. Night Seal must be cut out and discarded prior to resumption of work.
- J. 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 recommended at all traffic concentration points, such as roof hatches, access doors, rooftop ladders, etc., regardless of traffic frequency.
  - 3. Consult Custom Seal TPO standard details for attachment method.
  - 4. Walkways are considered a maintenance item and are not warranted by Custom Seal Roofing Systems.
  - 5. See 3.13 of the design section for approved list of walkways.
- K. Expansion Joints and Building Control Joints
- 1. Consult Custom Seal Roofing Systems standard details for various application methods.

L. Pitch Pans

1. Fill pitch pans in accordance with Custom Seal Roofing Systems standard details.

M. Roof Drains

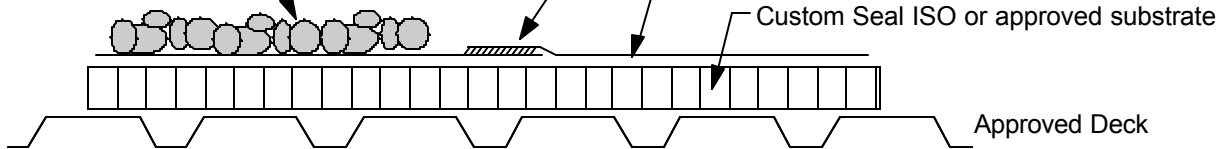
1. Prepare substrate around each roof drain to prevent any distortion or membrane bridging and to provide a smooth transition from the roof surface to the drain clamping ring.
2. The surfaces between the clamping ring and the drain must be clean and smooth. Remove all existing flashing, cement or lead 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.

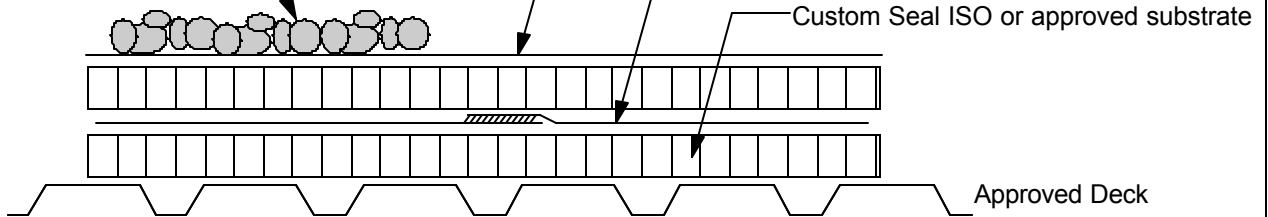
**Standard Ballasted Assembly**

Minimum 10lbs per square foot of Approved Ballast



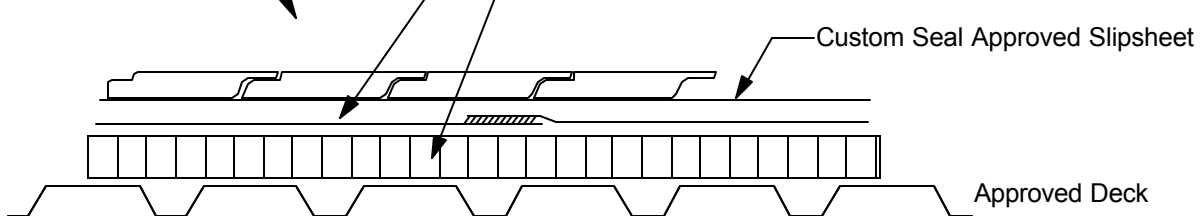
**IRMA Assembly**

Minimum 10lbs per square foot of Approved Ballast



**Paver Ballasted Assembly**

Minimum 10lbs per square foot of Approved Pavers



Position insulation with board ends resting on the top flutes.

The property owner's design professional must ensure that the structure is sound and capable of supporting the intended roof system. Care must be taken when installing a ballasted roof system to prevent overloading the deck during ballasting operations. If the ballasted roof is installed in a high wind area and mechanical securement of the insulation is specified by the roof system designer contact Custom Seal Technical to discuss securement requirements.

