

**proSeal Roof Systems™ .....ROOFTOP GARDEN SPECIFICATION**

GUIDE SPECIFICATION FOR THE INSTALLATION OF AN INSULATED PROTECTED **proSeal C3**  
WATERPROOFING MEMBRANE IN A ROOFTOP GARDEN SYSTEM

**1.0 GENERAL CONDITIONS**

**1.01 Description**

- A. Scope: To install a Loose Laid **proSeal** C3 Single-Ply Membrane with prefabricated flashings and other items to comprise a waterproofing system.
- B. Related Work: The work includes, but is not necessarily limited to the installation of:
  - 1. Substrate preparation
  - 2. Water Stop (where specified)
  - 3. Leak Detection Drains (where specified)
  - 4. Separation Sheet (where specified)
  - 5. Waterproofing Membrane
  - 6. Protection Layer
  - 7. Insulation (Extruded Polystyrene)
  - 8. Drainage Layer
  - 9. Precast Concrete Pavers and Pedestals or Ballast
  - 10. Prefabricated Flashings for Protrusions of Pipes
  - 11. Fasteners
  - 12. Clad Metal/Edge Metal & Detail Metal
  - 13. Sealants and Adhesives
- C. Related Work by others: The work includes, but is not necessarily limited to the installation of:
  - 1. Soil
  - 2. Retention grids (where specified)
  - 3. Plants, trees, grasses etc.
  - 4. Irrigation system (where specified)
  - 5. Leak detection system (where specified)

- D. Upon successful completion of the work, and depending on the chosen thickness of **proSeal** C3 Single-Ply Membrane 60, or 80 mil, the following warranties may be obtained:
1. Commercial Limited Material Warranty (15 or 20 years)
  2. Commercial Limited Labor and Material Warranty\* (15 or 20 years)
- \*Labor Warranty by Installer (2 Years)

## 1.02 Quality Assurance

- A. This roofing system shall be applied only by a contractor authorized by **proSeal** Roof Systems™ prior to bid.
- B. The roofing membrane used in **proSeal** Single-Ply waterproofing system shall be a product of a membrane manufacturer having over 20 years of waterproofing experience.
- C. The installation of the waterproofing system, from the water stop to the installation of the drainage layer shall be the responsibility of the waterproofing contractor.
- D. Pre-construction meeting is to be held between the owner and/or the owner's representative and/or the design professional, waterproofing contractor, general contractor and **proSeal** Roof Systems™
- E. If a Manufacturer's Labor and Material Warranty is requested, an inspection shall be made by a representative of **proSeal** Roof Systems™, to observe the installation of the waterproofing system. The representative will check and test all welded seams prior to the installation of the separation layer, protection layers, insulation layers and drainage layer. If any items are found to be deficient and cannot be corrected at the time of inspection a punch list will be made and sent to the waterproofing contractor for correction. The waterproofing contractor will not proceed with the installation of the separation layer, protection layers, insulation layers and drainage layer until the completion of any deficiencies in the waterproofing membrane. Upon completion of the punch list items, the waterproofing contractor will inform **proSeal** Roof Systems™ in writing.
- F. There shall be no deviation made from the contract specification or the approved shop drawings without prior written approval from the owner and/or the owner's representative and/or the design professional and **proSeal** Roof Systems™.
- G. The waterproofing contractor will conduct a 24 hour water test on the completed waterproofing membrane prior to the installation of the separation layer, protection layers, insulation layers and drainage layer. The water test shall be witnessed and confirmed by the owner and/or the owner's representative and/or the design professional, the waterproofing contractor, the general contractor and **proSeal** Roof Systems™.
- H. Upon completion of the waterproofing project, the waterproofing contractor shall submit, to **proSeal** Roof Systems™, a Request for Inspection Form or Notice of Completion Form, certifying that all work has been done in accordance with the contract specification and **proSeal** Roof Systems™ requirements.

## 1.04 Submittals

- A. The waterproofing contractor shall submit to the owner's representative and/or the design professional the following:
1. Copies of specifications.

2. Written approval by the insulation manufacturer (as applicable) for use and performance of the product in the proposed system.
  3. Written approval by the drainage board manufacturer for use and performance of the product in the proposed system.
  4. Specimen copy of **proSeal** Roof Systems™ warranty.
  5. Dimensioned shop drawings, which should include:
    - a. Outline of roof/s, dimensions & height of each building.
    - b. Special details not in the **proSeal** Roof Systems™ Specification Manual, submit for approval (use the System/Detail Deviation Request Form).
    - c. Technical acceptance from RPW Associates, Inc.
- B. The roofing contractor shall submit to RPW Associates Technical Department.
1. For an L&M Warranty a completed Notice of Award, Roof Plan and non **proSeal** Roof Systems™ details prior to starting the project for technical approval.
  2. For a Material Warranty, the commercial Material Request form is the only form required to submit to **proSeal** Roof Systems™.

#### 1.05 Product Delivery, Storage, and Handling

- A. All products delivered to the job site shall be in the original unopened containers or wrappings.
- B. Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture. (Do not lay the materials directly on existing roofing)
- C. Membrane rolls shall be stored lying down on pallets and fully protected from moisture.
- D. Bonding adhesives shall be stored at temperatures above 40° F.
- E. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on container or supplied by RPW Associates.
- F. Materials that are damaged are to be removed from the job site and are to be replaced at the waterproofing contractor's expense.

#### 1.06 Job Conditions

- A. Commence waterproofing only after the substrate preparation is complete and accepted by the owner and/or the owner's representative and/or design professional and RPW Associates
- B. The waterproofing contractor must obtain in writing from the owner, the owner's representative, and the design professional that the structure can withstand the anticipated loads.
- C. Only install as much new waterproofing and flashings as can be made watertight each day.
- D. All waterproofing shall be completed without exposing the building interior, its contents or employees to inclement weather. Relative to the waterproofing project the contractor assumes all responsibility for maintaining the building in a dry condition during the project

- E. All surfaces to receive new insulation, membrane, or flashings shall be thoroughly dry. Should surface moisture occur, the waterproofing contractor shall provide the necessary equipment to dry the surface prior to installation.
- F. Temporary water stops shall be installed at the end of each work day, and shall be removed before proceeding with the next day's work.
- G. Arrange work sequence to avoid use of newly constructed waterproofing for storage, walking surface, and equipment movement. Where such access is absolutely required, the waterproofing contractor shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas.
- H. Prior to and during application, all dirt, debris, and dust shall be removed from surfaces by vacuuming, sweeping, blowing with compressed air, and/or similar methods.
- I. All new and existing roofing, insulation, flashings, adhesive cans, metal work, and general construction debris shall be properly disposed of following all applicable local, state, and federal regulations.
- J. The waterproofing contractor shall follow all safety regulations as recommended by OSHA.
- K. The waterproofing contractor should take care during application and storage that overloading of the deck and structure does not occur.
- L. Liquid materials such as solvents and adhesives shall be stored and used away from open flames, sparks, and excessive heat.
- M. The waterproofing contractor shall verify that all drain lines are unblocked before starting work. Report any such blockages to the owner's representative and **proSeal** Roof Systems™ in writing.
- N. If any unusual or concealed condition is discovered, stop work and notify the owner and RPW Associates immediately in writing.
- O. All areas affected by construction activities shall be cleaned.
- P. The waterproofing contractor should take necessary precautions when using **proSeal** adhesives around air intakes. The smell of the adhesive could be a disturbance to the building occupants. It is the roofing contractor's responsibility to coordinate equipment to be turned off and on, with the owner, if necessary.

### **1.07 Bidding Requirements**

Bidders need to visit the site and carefully examine any areas in question as to conditions that could possibly affect proper execution of the work. All dimensions and quantities shall be determined or verified by the contractor.

## 1.08 Warranties

- A. Commercial Limited Material Warranty: 15 or 20 year warranties are available at no charge to the owner.
- B. Commercial Limited Labor and Material Warranty\*: The manufacturer will warranty the **proSeal** Roof Systems™ material, plus the labor for the reinstallation of new materials if the material becomes defective and leaks. These warranties may be issued on a fee basis for a period of 15 or 20 years. The cost of removal and replacement of overburden to expose the waterproofing membrane for inspection and repair is at the sole expense of the owner.

\*The Roof Contractor will be responsible for (workmanship) labor for the first two years after roof completion.

## 2.00 PRODUCTS

### 2.01 General

- A. The **proSeal** roofing / waterproofing membranes and its related components confirm having over 25 years experience in producing PVC Single-Ply Membrane.
- B. Any components other than those supplied or manufactured by **proSeal** Roof Systems™ may be submitted for review and acceptance.

### 2.02 Approved Membrane

- A. **proSeal** C3 Single-Ply 60, or 80 mil nominal thickness, polyester-reinforced membrane.
- B. Even thickness Top and Bottom film.
- C. Acrylic Top Finish.
- D. **proSeal** C3 Single-Ply Membrane shall conform to ASTM D4434 - 96 Standard for polyvinyl chloride sheet roofing. Classification: Type 3.
- E. Sheet size:

60 mil	78" X 90'	(585 square feet)
80 mil	78" X 75'	(487.5 square feet)
- E. As manufactured, the membrane shall conform to the physical properties.

**proSeal C3 Roofing Membranes: Typical Properties**

Property	Method	Requirement	60 mil	80 mil
<b>Thickness [in]</b>	ASTM D751	0.045	0.06 (+/- 10%)	0.080 (+/- 10%)
<b>Breaking Strength [lbf/in.]</b>				
<b>MD</b>	ASTM D751	200	465	540
<b>XMD</b>	A-Grab Method	200	400	480
<b>Elongation @ Break [%]</b>				
<b>MD</b>	ASTM D751	15 <sup>A</sup>	40	40
<b>XMD</b>	A-Grab Method	15 <sup>A</sup>	38	38
<b>Retention of Properties after Heat Ageing:</b>				
Breaking Strength [%]	ASTM D3045	90%	Pass	Pass
Elongation @ Break [%]	80°C for 56 days	Original	Pass	Pass
Tearing Strength [%]			Pass	Pass
<b>Tearing Strength [lbf]</b>	ASTM D751			
<b>MD</b>	B-Tongue Tear Method	45	73	74
<b>XMD</b>		45	60	70
<b>Low Temperature Bend [°C]</b>	ASTM D2136			
	-40°C	Pass	Pass	Pass
<b>Accelerated Weathering</b>				
Cracking (7x Magnification)	ASTM G53	None	None	None
Crazing (7x Magnification)	5,000 h min	None	None	None
Discoloration (Visual)		Negligible	Negligible	Negligible
<b>Linear Dimensional Change [%]</b>	ASTM D1204			
<b>MD</b>	80°C for 56 days	0.5	-0.4	-0.4
<b>XMD</b>	for 6 hours	0.5	0.0	0.0
<b>Change in Weight After Immersion in Water [%]</b>	ASTM D570			
	70°C for 168 hours	3	1.2	1.2
<b>Static Puncture Resistance</b>	ASTM D5602			
	33 lbf @ 23°C	Pass	Pass	Pass
<b>Dynamic Puncture Resistance</b>	ASTM 5635			
	20J @ 23°C	Pass	Pass	Pass
<b>Seam Strength</b>	D751	75%	100%	100%
<b>Warranty (years non-prorated)</b>			15 Material	20 Material

<sup>A</sup> For reinforcing fabric only; elongation of PVC material shall be 250% MD and 220% XMD

The table presents typical properties of **proSeal** C3 roofing membranes. Requirements are taken from ASTM D4434-96.

Note: As well as ASTM D4434-96, **proSeal/C3** roofing membranes meet the following standards:

1. Factory Mutual 4470
2. UL/ULC Class A
3. CAN/CGSB 37.54-95

### 2.03 Approved Membrane Accessories

- A. Sealants and Pitch Pocket Fillers
  - 1. The following caulking/sealants, as supplied by RPW Associates, are acceptable to use with the **proSeal**C3 Single-Ply Membrane:
    - a. **proSeal** Polyurethane Caulking
    - b. **proSeal** Water Stop tape
    - c. **proSeal** Pitch Pan Filler
- B. Adhesives
  - 1. **proSeal** 1700 Adhesive
- C. Drains
  - 1. **proSeal** / Thaler Drain
- D. Fasteners, Plates & Termination Bars
  - 1. Corrosion-resistant screws, membrane plates, and termination bars as supplied by RPW Associates.
- E. Flashings
  - 1. **proSeal** C3 Single-Ply polyester-reinforced membrane, as supplied by RPW Associates.
- F. Prefabricated Flashings
  - 1. Inside/outside corners, cone flashings, as supplied by RPW Associates, Inc.
- G. PVC Coated Metal Flashings
  - 1. .025 inch thick PVC membrane laminated to 24 ga. galvalume metal, as supplied by RPW Associates, Inc.
  - 2. Prefabricated Flashings

### 2.04 Separation, Protection and Drainage Layers

- A. Drainage/Separation Sheet
  - 1. **proSeal** Separation Sheet 4 oz polyester, as supplied by RPW Associates.
  - 2. Roll Size: 15' x 360'
  - 3. Roll Weight: 220 lbs
  - 4. As manufactured, drainage separation sheet shall conform to the following physical properties:

**proSeal Roof Systems™ Protection Drainage/Separation Sheet: Typical Properties**

Property	Method	4 oz
Grab Tensile (lbs)	ASTM D4632	110
Elongation (%)	ASTM D4632	50
Tear (lbs)	ASTM D4533	50
Puncture(lbs)	ASTM D4833	65
Mullen Burst (psi)	ASTM D3786	210
AOS (sieve)	ASTM D4751	70
Permittivity (sec-1)	ASTM D4491	2.0
Water Flow (gpm/ft <sup>2</sup> )	ASTM D4491	140
Weight <sup>1</sup> Nominal (oz/yd <sup>2</sup> )	ASTM D5261	4.0
Thickness <sup>1</sup> Nominal [mil]	ASTM D5199	45
UV - 500 hrs (%)	ASTM D4355	70

Note<sup>1</sup>: Typical values. All other values are minimum average roll values (MARV)

B. Protection Layer

1. **proSeal** 40 mil HDPE (High Density Poly Ethylene) Protection Layer, as supplied by RPW Associates, Inc.
2. Roll Size: 7.5' x 107'
3. Roll Weight 167 lbs
4. As manufactured, the HDPE protection layer shall conform to the following physical properties:

**proSeal Roof Systems™ HDPE Protection Layer: Typical Properties**

Property	Method	40 mil
Thickness [in]	ASTM D5199	0.40 (min)
Density (g/cc)	ASTM D792	.94 (min)
Carbon Black Content (%)	ASTM D1603	2.0 – 3.0
Carbon Black Dispersion (category)	ASTM D5596	1 or 2
Tensile Properties	ASTM D638 (Modified Type IV Die)	
Stress @ Yield [ppi]		84 (min)
Strain @ Yield (%)		12 (min)
Stress @ Break (ppi)		152 (min)
Strain @ Break (%)		700 (min)
Tear Resistance (lbs)	ASTM D1004	28 (min)
Puncture Resistance (lbs)	ASTM D4833	72
Dimensional Stability [%]	ASTM D1204	±2

C. Drainage Panel

**proSeal** Drainage Panel, as supplied by RPW Associates, Inc..

Roll Size 4' x 50'

Roll Weight 40lbs

As manufactured, the Drainage Panel shall conform to the following physical properties.



**proSeal Roof Systems™ Drainage Panel: Typical Properties**

Property	Method	PROSEAL Drainage Panel
<b>Core Properties Material</b>		
Weight (oz/ft <sup>2</sup> )	ASTM D3776-96	Polypropylene 2.75
Thickness (in.)	ASTM D1777-96	.40
Compressive Strength (lbs/ft <sup>2</sup> )	ASTM D1621-94	15,000
<b>Filter Fabric Material</b>		
Grab Tensile (lbs)	ASTM D4632-91	Non-woven PP 110
Elongation (%)	ASTM D4632-91	50
Tear (lbs)	ASTM D4533-91	50
Puncture(lbs)	ASTM D4833-88	65
Mullen Burst (psi)	ASTM D3786	215
AOS (sieve)	ASTM D4751-99	70
Permittivity (sec-1)	ASTM D4491-99	2.0
Water Flow (gpm/ft <sup>2</sup> )	ASTM D4491-99	140
Weight <sup>1</sup> Nominal (oz/yd <sup>2</sup> )	ASTM D5261	4.0
UV - 500 hrs (%)	ASTM D4355	70
<b>Composite System Properties</b>		
<b>Water Storage Capacity</b>		
<b>Perforation Open Area</b>		
Horizontal Flow – gradient = 1.0 gpm/ft2	ASTM D4716-99	12.5
Horizontal Flow – gradient = 0.1 gpm/ft2	ASTM D4716	3.2

**2.05 Insulation Layer by Others**

A. Insulation

1. Extruded Polystyrene Insulation (ASTM C578 Type VI).

- a. As manufactured, the insulation shall conform to the following physical properties.

**Extruded Polystyrene Insulation Type VI: Typical Properties**

Property	Method	
Thermal Resistance <sup>1,4</sup> Aged R Value per inch @ 75°F Mean Temperature	ASTM C518	5
Compressive Strength (lb/in <sup>2</sup> )	D1621	40 (min) <sup>2</sup>
Water Absorption (% by volume)	C272	.1 (max)
Water Vapor Permeance <sup>3</sup> (Perm)	E96	.8 (max)
Dimensional Stability (% Linear Change)	ASTM 2126	2 (max)
Coefficient of Thermal Expansion (in/in°F)		3.5x10 <sup>-5</sup>
Flame Spread <sup>5</sup>	E84	5
Smoke Development	E84	175
Dead Load (psf)		1910 (max)
Live Load (psf)		1150 (max)

2. Extruded Polystyrene Insulation (ASTM C578 Type VII).

- a. As manufactured, the insulation shall conform to the following physical properties.

**Extruded Polystyrene Insulation Type VII: Typical Properties**

Property	Method	
Thermal Resistance <sup>1,4</sup> Aged R Value per inch @ 75°F Mean Temperature	ASTM C518	5
Compressive Strength (lb/in <sup>2</sup> )	D1621	60 (min) <sup>2</sup>
Water Absorption (% by volume)	C272	.1 (max)
Water Vapor Permeance <sup>3</sup> (Perm)	E96	.8 (max)
Dimensional Stability (% Linear Change)	ASTM 2126	2 (max)
Coefficient of Thermal Expansion (in/in°F)		3.5x10 <sup>-5</sup>
Flame Spread <sup>5</sup>	E84	5
Smoke Development	E84	175
Dead Load (psf)		2880 (max)
Live Load (psf)		1720 (max)

- 3. Extruded Polystyrene Insulation (ASTM C578 Type V).  
As manufactured, the insulation shall conform to the following physical properties.

**Extruded Polystyrene Insulation Type V: Typical Properties**

Property	Method	
Thermal Resistance <sup>1,4</sup> Aged R Value per inch @ 75°F Mean Temperature	ASTM C518	5
Compressive Strength (lb/in <sup>2</sup> )	D1621	60 (min) <sup>2</sup>
Water Absorption (% by volume)	C272	.1 (max)
Water Vapor Permeance <sup>3</sup> (Perm)	E96	.65 -.8 (max)
Dimensional Stability (% Linear Change)	ASTM 2126	2 (max)
Coefficient of Thermal Expansion (in/in°F)		3.5x10 <sup>-5</sup>
Flame Spread <sup>5</sup>	E84	5
Smoke Development	E84	165
Dead Load (psf)		4800 (max)
Live Load (psf)		2880 (max)

NOTES:

- 1. Values are consistent with the criteria of ASTM C578 and the requirements of the FTC R-value rule (16 CFR Part 460).
- 2. Vertical compressive strength is measured at 5% deformation or at yield, whichever occurs first. Since the extruded insulations are viscoelastic materials, adequate design safety factors should be used to prevent long term creep. For static loads, 3-1 is suggested.  
For dynamic loads, 5-1 is suggested.
- 3. Water vapor permeance varies with product type and thickness. Values are based on the desiccant method and they apply to insulation 1 in. or greater in thickness.
- 4. R means resistance to heat flow. R-values are expressed in °F•ft<sup>2</sup>•h/BTU.

5. This numerical flame spread rating is not intended to reflect hazards presented by this or any material under actual fire conditions.

## 2.06 Related Materials by Others

### A. Pavers & Pedestals

1. 2" precast concrete pavers specifically designed and manufactured for roofing applications to withstand freeze/thaw cycles and wind uplift. Minimum weight of 25 lb/ft.<sup>2</sup>. Compressive strength 8,500 psi. Density 155 lb/ft.<sup>3</sup>.

### B. Ballast

1. Nominal 2½" (62 mm) in size, smooth, washed, clean, well rounded gravel, to ASTM D448 #2, #1.

### C. Miscellaneous Fasteners & Anchors

1. All fasteners shall be the same type as the metal being secured. In general, all fasteners, anchors, nails, and straps shall be of zinc or cadmium plated steel, or stainless steel. All fasteners and anchors shall have a minimum embedment of 1" and shall be approved for such use by the fastener manufacturer. Fasteners for attachment of metal to wood blocking should be angular ring shank nails with 1" minimum penetration. Fasteners for attachment of metal to masonry should be expansion type fasteners. All fasteners shall meet Factory Mutual Standard 4470 for corrosion resistance.

### D. Divider

1. Precast concrete divider/curb specifically designed and manufactured for roofing applications to withstand freeze/thaw cycles and wind uplift. Minimum height of 6". Compressive strength 8,500 psi. Density 155 lb/ft.<sup>3</sup>.
2. Wood divider/curb should be treated for fire and rot resistance (wolmanized or osmose treated), #2 or better lumber. Minimum size 6" x 6". All wood shall have a maximum moisture content of 19% by weight on a dry weight basis.

### E. Wood Nailers

1. Wood nailers should be treated for fire and rot resistance (wolmanized or osmose treated), #2 or better lumber. Creosote or asphaltic-treated lumber is not acceptable.
2. All wood shall have a maximum moisture content of 19% by weight on a dry weight basis.

## 3.00 EXECUTION

### 3.01 General

- A. The waterproofing contractor has inspected and found the substrate suitable for the installation of the **proSeal** C3 membrane system.
- B. The waterproofing contractor should coordinate the installation so that each area is made watertight at the end of the day.

**3.02 Deck Preparation:** The structural deck shall be structurally sound to provide support for the new waterproof system.

A. New Construction

1. The Poured Structural, Lightweight Structural, or Precast, Pre-stressed Concrete Deck shall be cured and dry to industry standards, and the surface shall be smooth, level, and free from moisture or frost. Sharp ridges or other projections above the surface shall be removed before roofing. On precast, pre-stressed concrete decks all joints shall be grouted. Applying a lightweight fill over the entire deck or a grout applied over the joints and feathering out to create a smooth transition must correct differentials in deck elevation of more than  $\frac{1}{4}$ ".

B. Re-roofing With Removal of Existing Roofing

1. General Criteria: All existing overburden, waterproofing, flashings, deteriorated wood blocking, and metal flashings shall be removed. Remove only that amount of waterproofing and flashing that can be made watertight with new materials during a one-day period or onset of inclement weather.
2. The deck surface shall be smooth, level, and free from moisture or frost. Sharp ridges or other projections above the surface shall be removed before waterproofing. On precast, pre-stressed concrete decks all joints shall be grouted. Applying a lightweight fill over the entire deck or a grout applied over the joints and feathering out to create a smooth transition must correct differentials in deck elevation of more than  $\frac{1}{4}$ ".

**3.03 Substrate Preparation**

- A. A proper substrate shall be provided to receive the Loose Laid **proSeal** C3 Single-Ply Membrane with prefabricated flashings and other items to comprise a waterproofing system.
- B. The waterproofing contractor shall inspect the substrate for defects, such as, excessive surface roughness, contaminated surfaces, structurally unsound substrates, and anything that will adversely affect the quality of work.
- C. The substrate shall be clean, smooth, dry, and free from flaws, sharp edges, loose and foreign material, oil, and grease. Waterproofing shall not start until all defects have been corrected.
- D. All surfaces to be waterproofed shall be free from water, ice, or snow.

**3.04 Wood Nailers**

- A. Install continuous treated wood nailers at the perimeter of the entire waterproof area and around projections and penetrations as specified on project drawings.
- B. Nailers shall be anchored to resist a minimum force of 175 pounds per lineal foot in any direction. Fastener spacing shall be a maximum of 3' o.c. Fasteners shall be installed within 6" of each end. Spacing and fastener embedment shall conform to Factory Mutual Loss Prevention Data Sheet 1-49.

- C. Thickness shall be as required to match substrate or insulation height.
- D. Any existing woodwork that is to be reused shall be firmly anchored in place (it shall resist a minimum force of 175 pounds per lineal foot in any direction) and free from rot. Only woodwork designated to be reused in detail drawings shall be left in place, all other woodwork shall be removed.

### 3.05 Water Stop Installation

- A. proBond water stop is to be installed on structural decks (refer to Section 3.03).
- B. Install water stop in accordance with the layout shown on the design drawings/approved shop drawings. The water stop is to be installed in intervals across the length and width of the deck surface (recommended maximum area is 3,000 sf) as well as at all transitions to the perimeter, wall, curb, drain, stack or other protrusions.

### 3.06 Deck Separation Sheet Installation

- A. The **proSeal** Separation Sheet, if required, shall be applied over the insulation substrate. Overlap separation sheets a minimum of 6".
- B. The separation sheet shall be protected from damage. If punctured or damaged an additional piece shall be installed overlapping the underlying layer a minimum of 6" and sealed with **proSeal** Polyurethane Caulking.
- C. The installation of a separation sheet is to be followed immediately by the installation of **proSeal** membrane.
- D. Install only as much separation sheet as can be covered by the **proSeal** membrane in one day.

### 3.07 Waterproofing Membrane Installation

- A. The surface of the leveling layer shall be inspected prior to installation of the **proSeal** membrane. Repair and/or replace the leveling layer as required to ensure complete coverage of the deck between water stop.
- B. **proSeal** membrane is to be installed according to **proSeal** Roof Systems™ specifications and details.
- C. Over the properly prepared leveling layer unroll the **proSeal** membrane and draw tight without folds or wrinkles. Adjacent sheets shall be overlapped 3". All sheets shall be applied in the same manner lapping all sheets as specified.
- D. Roll out the membrane in a direction determined by deck configuration and working conditions. If shop drawings have been prepared for specific projects, install membrane in accordance with drawings. Install membrane in a parallel course to the substrate (where applicable) and position the membrane (where possible) to minimize the flow of water against the seam.

### 3.08 Hot-air Welding Seams & Overlaps

- A. General.
  - 1. All surfaces areas to be welded are to be dry, clean and free of dirt, debris and adhesives according to **proSeal** Roof Systems™ recommendations.

2. Adjacent sheets shall be welded in accordance with the manufacturer's written instructions. All side and end laps shall be hot-air welded.

*Note:* Overlap is to be 5½" when the plates are installed in the overlap.

3. Welding equipment shall be provided by or approved by **proSeal** Roof Systems™.
4. Prior to commencement of welding process, determine correct temperature setting and welding speed of equipment using test samples.

B. Hand Welding: Perform hand welding in the following stages.

*Note:* **proSeal** Roof Systems™ requires 220V automatic welders be used as much as possible. We encourage hand welding kept to detail work and smaller seams.

1. Warm up hot-air welding equipment as recommended by the equipment manufacturer.
2. All mechanics that intend to use the equipment shall have successfully completed a course of instruction provided by RPW Associates prior to welding.
3. Position the membrane in place with specified seam joint overlaps.
4. Pre-weld back edge, with narrow continuous weld, approximately ½" wide to prevent heat loss during the final welding stage. The pre-weld shall be positioned, from the outside edge, the distance of the width of the nozzle used for the welding application.
5. Finally, weld outside edge with a continuous seam of approximately 1" width. Insert the nozzle into the seam at a 45-degree angle. When the membrane begins to flow and the proper welding temperature is reached, position the hand roller perpendicular to the nozzle and press adequately to achieve a continuous homogeneous weld. Move the hot-air welder and roller in smooth continuous motion along the seam. Welding seam ranges from 1' to 2' per minute. For straight laps use a 1½" wide nozzle. For corners and compound connections use a ¾" wide nozzle. Remove residue collected at nozzle with steel wire brush prior to start of new seam.

C. Automatic (Machine) Welding: Perform hand welding in the following stages.

*Note:* **proSeal** Roof Systems™ automatic welding equipment will help to insure that proper field seams are made.

1. Warm up hot-air welding equipment as recommended by the equipment manufacturer.
2. All mechanics that intend to use the equipment shall have successfully completed a course of instruction provided by RPW Associates prior to welding.
3. Position the membrane in place with specified seam joint overlaps.
4. Perform machine welding as per welding machine instructions. Continuously guide and supervise welding machine during entire welding process. Remove membrane residue collected at nozzle with steel wire brush at least every 100' and prior to start of a new seam. Welding speed ranges from 8' to 10' per minute. Local codes for electrical supply, grounding, over-current protection and other related items are to be observed. Typically automatic welding machines require 218 to 230 volts at 30 to 40 amps.

The use of a portable generator (minimum output of 6500W) or direct wiring are the recommended power supplies.

- D. Quality control of seams.
1. Visual evidence of proper welding is minor smoke development during the welding process, shiny membrane surface and an uninterrupted bead of thermally fused material from the underside of the top membrane.
  2. The waterproofing contractor shall physically check all completed hot-air welded seams after cooling for continuity of weld by using a seam probe. Any voids or deficiencies in the membrane seaming are to be repaired by the end of the work period. Apply an additional layer of membrane extending 3", in all directions, beyond the area to be repaired and hot-air weld using the hand welding procedures.
  3. On-site physical evaluation of hot-air welded seams shall be made daily by the waterproofing contractor at various seam locations or as directed by the owner and/or the owner's representative and/or the design professional and by RPW Associates. 2" wide cross-sectional samples shall be taken three times a day (minimum) through completed seams. Correct welds that display failure from shearing of the membrane prior to separation of the weld. The contractor, at no extra charge to the owner, shall patch each test cut. All field hot-air welded seams shall be left exposed until reviewed and accepted by RPW Associates. Any voids or deficiencies in the membrane seaming are to be repaired by the end of the work period. Apply an additional layer of membrane extending 3", in all directions, beyond the area to be repaired and hot-air weld using the appropriate (hand or automatic) welding procedures.
  4. A final probing of all seams and details shall be made at the conclusion of the project. When automatic welding equipment is first started or any time that the equipment is cooled and restarted a minimum of two seam test cuts is required. These test cuts shall be dated, marked for location, and kept by the contractor in case future evaluation is needed.

### 3.10 Mechanical Fixation

- A. Install **proSeal** Plate and Fastener at all transitional changes between the field (horizontal) and flashing (vertical) surfaces (e.g. parapets, walls, curbs, etc.).
- B. Mechanically fasten the **proSeal** Plates 12" o.c., with **proSeal** Fasteners, penetrating into the structural deck/substrate the appropriate depth.
- C. Install **proSeal** Plate and Fastener at all penetrations (e.g. drains, vents pipes, stacks, etc.) on the waterproof surface spaced a maximum of 6" with a minimum of 4 fasteners per penetration.
- D. Position the **proSeal** Plate approximately 1" from the edge of the flange (if applicable), penetrating the horizontal (field) membrane.  
Note:
  1. Fasteners shall penetrate the underside of a steel deck a minimum of  $\frac{3}{4}$ " .
  2. Fasteners shall penetrate the underside of a plywood deck a minimum of  $\frac{3}{4}$ "
  3. Fasteners shall penetrate wood deck a minimum of  $\frac{3}{4}$ "

4. Fasteners shall penetrate poured structural, precast and pre-stressed concrete decks a minimum of 1”.
5. Consult RPW Associates for fastener penetration depths on all other structural decks.

### 3.11 Membrane Flashing

- A. **proSeal** C3 flashing shall be installed concurrently with the **proSeal** C3 membrane as the job progresses. No temporary flashing shall be allowed without the prior written approval of the owner and/or the owner’s representative and/or the design professional and **proSeal** Roof Systems™. Approval shall only be for specific locations on specific dates. All areas where water enters the new waterproof system shall be inspected and the affected area shall be removed and replaced at no expense to the owner. **proSeal** C3 membrane flashing shall be fully adhered to compatible, dry, smooth, and solvent resistant surfaces.
- B. 1700 Contact Adhesive for Flashing
  1. Over the properly installed and prepared substrate surface, 1700 Adhesive shall be applied using approved solvent resistant paint rollers. The adhesive shall be applied to an approved substrate at a rate of approximately 120 sf per gallon. The adhesive shall be applied in smooth, even coatings with no voids, globs, puddles, or similar irregularities. Only an area that can be covered completely in the same day’s operations shall be coated with adhesive. The surface with adhesive coating shall be allowed to dry completely prior to installing the membrane.
    - a. Drying time increases with cooler temperatures and high humidity conditions. The contractor shall check with the **proSeal** Roof Systems™ technical representative prior to waterproof operations on such days.
    - b. The contractor shall count the amount of adhesive used per square, and the number of buckets of adhesive used per area per day to verify that he is conforming to the specified adhesive rate.
  2. When the surface is dry, the **proSeal** C3 flashing membrane is cut to a workable length and the underside shall be coated evenly with 1700 Adhesive at a rate of 120 sf per gallon. NO BONDING ADHESIVE SHALL BE APPLIED IN LAP AREAS. While the adhesive is active (produces strings when touched with a dry finger), the coated membrane shall be rolled carefully onto the previously coated substrate to avoid wrinkles. Do not allow adhesive on the underside of the **proSeal** C3 membrane to dry completely. The amount of membrane that can be coated with adhesive before applying to substrate will be determined by ambient temperature, humidity, and manpower. Adjacent sheets shall be overlapped a minimum of 4”. **proSeal** C3 flashings shall extend 5” onto the roofing membrane. The bonded sheet shall be pressed firmly into place with a hand roller.
  3. No bonding adhesive shall be applied in lap areas that are to be welded to flashings or adjacent sheets. All sheets shall be applied in the same manner, lapping all sheets as required by welding techniques.
- C. All flashings shall extend a minimum of 8” above roofing level unless previously accepted by the owner and/or the owner’s representative and/or the design professional and **proSeal** Roof Systems™.
- D. All flashing membranes shall be fully adhered to solvent-resistant substrates. All interior and exterior corners and miters shall be cut and hot-air welded into place.



- E. All flashings shall be hot-air welded at their joints and at their connections with the waterproof membrane.
- F. All flashing membranes shall be terminated according to Roof Systems™ recommended details. All mechanical fixations require fastening spaced 12" o.c. max. Grommetted masonry fastener set in predrilled holes shall be used to secure flashings to masonry and concrete surfaces.

### 3.12 Clad Metal Edge (24 GA. White Only)

Notes: All clad metal shall be proClad Metal.

All flashings shall be installed concurrently with the waterproof membrane as the job progresses.

- A. proClad Metal Flashings shall be formed and installed per detail drawings and shall conform to the applicable requirements of the following:
  - 1. Sheet Metal and Air Conditioning National Association Inc. (SMACNA – latest edition).
  - 2. Factory Mutual Loss Prevention Data Sheet 1-49 (or latest edition).
  - 3. National Roofing Contractors Association (NRCA – latest edition).
- B. The fastening flange of the proClad Metal shall be a minimum of 2½" in width.  
Note: Hold back fasteners 1" from the outside edge of the proClad Metal so the membrane and/or flashing can be welded to the clad metal, completely covering all fasteners by 1" minimum.
- C. proClad Metal Flashing shall be mechanically anchored into the approved substrate with approved fasteners. Two rows of fasteners shall be installed 4" o.c. and staggered.
- D. Metal shall be installed to provide adequate resistance to bending and allow for normal thermal expansion/contraction.
- E. proClad Metal shall be spaced ¼"-½" apart. A 5" wide strip of flashing membrane shall be hot-air welded over the center of the joint.
- F. A 24-gauge (minimum) continuous metal cleat is required if proClad Metal fascia exceeds 4" in width. The metal cleat is to be fastened 12" o.c. into the wood nailer or the masonry wall.
- G. proClad Metal may be painted with exterior latex paint after roofing project is completed. Caution should be taken to prevent over spray of paint on roofing or building surfaces.

### 3.13 Waterproofing/Protection Layer Separation Sheet Installation

- A. The **proSeal** Separation Sheet, if required, shall be applied over **proSeal** C3 membrane. Overlap separation sheets a minimum of 6".
- B. The separation sheet shall be protected from damage. If punctured or damaged an additional piece shall be installed overlapping the underlying layer a minimum of 6" and sealed with **proSeal** Polyurethane Caulking.
- C. The installation of a separation sheet is to be followed immediately by the installation of **proSeal** HDPE Protection Layer.

- D. Install only as much separation sheet as can be covered by the **proSeal** HDPE Protection Layer in one day.

### 3.14 Protection Layer Installation

- A. Over the proper separation sheet and/or the waterproofing membrane unroll the **proSeal** HDPE Protection Sheet and draw tight without folds or wrinkles.
- B. Adjacent sheets shall be overlapped 3" and hot-air welded. Overlaps shall be made with the flow of water where possible. All sheets shall be applied in the same manner lapping all sheets as specified.
- C. Install the HDPE Protection Layer on vertical surfaces 2" above the height of the overburden as a minimum.
- D. Intermittently secure the **proSeal** HDPE Protection Layer to the **proSeal** C3 membrane on all vertical surfaces with **proSeal** Foil Tape as per **proSeal** Roof Systems™ recommended details.

### 3.15 Insulation Installation

- A. Extruded Polystyrene Insulation shall be installed according to the insulation manufacturer's current published specifications for use with a Rooftop Garden System
- B. Install Extruded Polystyrene Insulation directly over the protection layer. Install insulation in parallel courses, butted together in moderate contact without gaps, and staggered end joints. Provide full support at ends. When multiple layers of insulation are specified the subsequent layers shall be installed with joints offset from the underlying layer.
- C. Extruded Polystyrene Insulation shall be neatly cut to fit around penetrations and projections without gaps.
- D. Install Tapered Extruded Polystyrene Insulation in accordance with the insulation manufacturer's shop drawings.
- E. Install Tapered Extruded Polystyrene Insulation around drains to create a drain sump.
- F. Do not install more Extruded Polystyrene Insulation than can be covered with **proSeal** Separation Sheet, **proSeal** Drainage Panel and overburden by the end of the day.

### 3.16 Insulation/Drainage Separation Layer Installation

- A. The **proSeal** Separation Sheet shall be applied over Extruded Polystyrene Insulation. Overlap separation sheets a minimum of 6".
- B. The separation sheet shall be protected from damage. If punctured or damaged an additional piece shall be installed overlapping the underlying layer a minimum of 6" and sealed with **proSeal** Polyurethane Caulking
- C. The installation of a separation sheet is to be followed immediately by the installation of the **proSeal** Drainage Panel.
- D. Install only as much separation sheet as can be covered by the **proSeal** Drainage Panel and overburden in one day.

### 3.17 Drainage Panel Installation

Note: A 2% slope in the substrate is required. Contact RPW Associates, Inc. if the slope is less than 2%.

- A. Install the **proSeal** Drainage Panel at the lowest point to create a shingling effect to ensure sound drainage. The drainage panels must be shingled in the direction of the water flow.
- B. Install the drainage panel filter side up. The drainage panel may be adhered at 10' intervals using two sided masking tape.
- C. Overlap the flat tab.
- D. Overlap the fabric onto the preceding panel and adhere the overlapped fabric with duct tape to prevent overburden from entering the drainage panel during installation.
- E. Inspect the fabric and repair any holes or tears with new filter fabric lapping the repair area by 6" in all directions and seal with duct tape.
- F. Around all protrusions cover all cut areas with extra piece of filter fabric lapping the cut area by 6" in all directions and seal with duct tape.
- G. Ensure any exposed core is covered with filter fabric.
- H. Do not leave the drainage panel exposed to direct sunlight for prolonged periods. The installation of the overburden should occur on the same day as the installation of the drainage panel.

### 3.18 Precast Paver Installation

- A. Prior to the installation of the pavers install a divider (as detailed) between the area to receive the overburden and the pavers. The divider may be pressure treated wood (minimum 6" x 6") or concrete divider (minimum 4" x 4").
- B. Install the divider on a 1" Extruded Polystyrene insulation spaced intermittently to allow for the flow of water.
- C. Install **proSeal** Separator Sheet 6" onto the drainage panel and up the vertical surface of the divider to retain the overburden.
- D. Install **proSeal** Separator Sheet 6" onto the drainage panel and up the vertical surface covering the **proSeal** HDPE Protection Sheet.
- E. Install pavers a minimum of 24" from all vertical surfaces (e.g. perimeter, walls, dividers etc.) and all penetrations (e.g. drains, vent pipes etc.).
- F. Install pavers in parallel rows. Cut and fit all pavers neatly at all vertical surfaces and penetrations.
- G. Pavers are to be installed on pedestals and fully supported at all edges. Shim and adjust all pavers/pedestals as required to provide a level surface.

### 3.19 Ballast Installation

- A. Prior to the installation of the ballast install a divider (as detailed) between the area to receive the overburden and the ballast. The divider may be pressure treated wood (minimum 6" x 6") or concrete divider (minimum 4" x 4").
- B. Install the divider on a 1" Extruded Polystyrene insulation spaced intermittently to allow for the flow of water.
- C. Install **proSeal** Separator Sheet 6" onto the drainage panel and up the vertical surface of the divider to retain the overburden.
- D. Install **proSeal** Separator Sheet 6" onto the drainage panel and up the vertical surface covering the **proSeal** HDPE Protection Sheet.
- E. Install ballast a minimum of 24" from all vertical surfaces (e.g. perimeter, walls, dividers etc.) and all penetrations (e.g. drains, vent pipes etc.) at a rate of 60 lb/sf.

### 3.20 Miscellaneous Metal Flashings

- A. Metal, other than that supplied by RPW Associates, is not covered under the **proSeal** Roof Systems™ warranty.
- B. Metal shall be installed to provide adequate resistance to bending and allow for normal thermal expansion/contraction.
- C. All fabrication practices and installation procedures shall conform to the applicable requirements of the following, unless otherwise specified and/or detailed:
  - 1. Sheet Metal and Air Conditioning National Association Inc. (SMACNA – latest edition).
  - 2. Factory Mutual Loss Prevention Data Sheet 1-49 (or latest edition).
  - 3. National Roofing Contractors Association (NRCA – latest edition).

### 3.21 Temporary Cutoff

- A. All flashings shall be installed concurrently with the waterproof membrane in order to maintain a watertight condition as the work progresses. When a break in the day's work occurs in the central area of a waterproof, a temporary water stop shall be constructed to provide a 100% watertight seal. When work on the new system is suspended, the stagger of the insulation joints shall be maintained by installing partial fillers. The new membrane shall be carried into the water stop. The water stop shall be sealed to the deck and/or substrate so that water will not be allowed to travel under the new or existing waterproofing. The outside edge of the membrane shall be sealed in a continuous heavy bead of mastic Water Stop. When work resumes, the contaminated membrane shall be cut out. All water stop, contaminated membrane, insulation fillers, etc. shall be removed from the work area and disposed of off-site. None of these materials shall be used in the new work.
- B. If inclement weather occurs while a temporary water stop is in place, the contractor shall provide the necessary labor to monitor the situation and maintain a watertight condition.
- C. If any water is allowed to enter under the newly completed waterproofing, the affected area shall be removed and replaced at the contractor's expense.

### **3.22 Completion**

- A. Prior to leaving the site, the owner/project manager and contractor shall review the work. All defects noted, non-compliances with the specifications, and the recommendations of **proSeal** Roof Systems™ shall be itemized in a punch list. The Contractor must immediately correct these items to meet the satisfaction of the owner/project manager.
- B. All warranties, as required in section 1.00 of this specification, shall be submitted to RPW Associates, Inc. for approval. All materials purchased from RPW Associates, Inc. for the **proSeal** Roof Systems™ shall be paid in full prior to the issuance of any warranty.

### **DISCLAIMER**

RPW Associates, Inc. has attempted to obtain information from the manufacturers of other products often used in conjunction with **proSeal** Roof Systems™ products with respect to the characteristics of such products, as well as their compatibility with those of **proSeal** Roof Systems™. In as much as these other products, as supplied in the field, are subject to possible variation in their production, and in as much as their specifications and performance characteristics are subject to change without notification by the manufacturers, RPW Associates, Inc. expressly excludes from its warranty any responsibility for the performance or quality of the products of others used in conjunction with **proSeal** Roof Systems™ products.