

proSeal - Loose Laid and Ballasted - Roof System

1. GENERAL CONDITIONS

1.1 Description

A. Scope of Work

1. To install a **proSeal** Loose Laid and Ballasted Roof System including membrane, flashing, accessories and other items to comprise a complete roofing system.
2. All work is to be completed as per current published **proSeal** drawings, details and specifications.

B. Related work

The work includes but is not necessarily limited to the installation of:

1. Protection Board/Leveling Layer (where specified/required)
2. Vapor retarder (where specified)
3. Insulation
4. Slip sheet (where required)
5. Fasteners for membrane fixation
6. Roof field membrane
7. Roof flashing membrane
8. Adhesives
9. Sealants
10. Ballast
11. Roof walkways
12. Metal flashing

1.2 Quality Assurance

- A.** The **proSeal** Loose Laid and Ballasted Roof System shall be applied only by a contractor authorized by the **proSeal** Roof Systems™
- B.** The roofing contractor shall furnish with their bid written documentation stating that they are a **proSeal** Roof Systems™ authorized contractor.
- C.** The roofing contractor shall employ **proSeal** Roof Systems™ trained field personnel for the installation of this roof system.
- D.** The roofing contractor shall provide a completed Project Award Notification (PAN) form prior to commencement of the project and shipping of materials. The RPW Associates Technical Department will review and return an approved (amended if necessary) copy to the contractor.
- E.** No deviations in the published **proSeal** drawings, details and specifications are permitted without the written consent of the RPW Associates Technical Department.
- F.** Upon total completion of the installation of the roof system and submittal to RPW Associates by the contractor a certification that all work has been installed in strict accordance with the contract specifications and **proSeal** drawings, details and specifications, a final site review shall be conducted by a RPW Associates Technical Representative.

1.3 Submittals

At the time of bid submission or prior to commencement of the project (as applicable), the roofing contractor shall submit to the owner's representative the following items:

1. A copy of the project specifications.
2. Samples of all **proSeal** materials to be used in the roof system.
3. Written **proSeal** product literature.
4. Written approval by the insulation and non-**proSeal** roofing component suppliers/manufacturers (as applicable) for use and performance of the product in the proposed roof system and compliance with all pertinent industry standards and codes.
5. Sample copy of the **proSeal** warranty.
6. Sample copy of the contractor's warranty.
7. Dimensioned roof plans and proposed **proSeal** roofing detail.
8. Certification that the roof system complies with all pertinent codes and industry standards.
9. A representative sample of ballast shall be submitted to **proSeal** by the contractor and accepted by the RPW Associates Technical Department prior to any installation of ballast.

1.4 Product Delivery, Storage and Handling

- A. All materials delivered to the job site shall be in the original unopened containers or wrappings.
- B. All materials shall be clearly identified with the manufacturer's/suppliers product identification labels.
- C. All materials must be free from damage during delivery, storage, handling and installation. Place all materials on pallets and fully protect from moisture as required by the manufacturer/supplier.
- D. Membrane rolls shall be stored in a horizontal position, and fully protected from the elements.
- E. Bonding adhesives shall be stored at temperatures above +40°F (+5°C).
- F. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions as outlined by material manufacturer/supplier and the product container.
- G. Any materials that are determined by the owner's representative to be damaged are to be removed from the job site and replaced with new material.

1.5 Job Conditions

- A. The **proSeal** Loose Laid and Ballasted Roof System specification is designed to be used in structures that can support the anticipated dead load capacity. The adequacy of the structural support must be verified in writing by the owner or the owner's design professional, architect, or engineer and is the sole responsibility of the owner. Potential live loads, such as snow and ponding water, must be considered in the total load calculations. The effects of wind scouring on the ballast must also be considered.
- B. Some project conditions may require modifications to the standard **proSeal** Loose Laid and Ballasted Roof System specification:
 1. Roof slopes greater than a ratio of 2:12.
 2. Building heights exceeding 60 feet (18 m).
 3. Geographical areas with wind zones in a 100 mph (180 kph) or greater as determined by the National Building Codes interval wind isotach maps.
 4. Geographical areas in wind zone three as identified by Factory Mutual Loss Prevention Data Sheet 1-28.
 5. Specific code requirements or site situations.
- C. The roofing contractor shall take care during application and storage to prevent overloading of the deck and structure.

- D.** *proSeal* materials may be installed under various adverse and extreme weather conditions (temperature, moisture, humidity), but only after consultation with and written authorization from the RPW Associates Technical Department, as performance of *proSeal* materials and roof system may be negatively affected.
- E.** All work shall be scheduled and executed without exposing the interior building areas and its contents to the effects of inclement weather. The existing building shall be protected against all risks.
- F.** Install only as much of the new roofing system as can be made weather tight each day. This includes all related flashing work necessary to maintain a weather tight roof system.
- G.** All substrates/surfaces, which are to receive new insulation, membrane, or flashing, shall be thoroughly dry and free from dust, debris, dirt and other contaminants which may adversely affect the performance of the products and or roof system. The roofing contractor shall provide the necessary means to rectify the substrate/surface condition prior to the commencement of the installation of the roof system.
- H.** All new and temporary construction, including equipment and accessories, shall be secured in such a manner, at all times, as to preclude wind blow off or wind damage.
- I.** The roofing contractor shall verify that all roof drains and soil pipes are free from obstructions. The owner or the owner's representative shall be notified in writing of any obstructions. All obstructions shall be removed so that the roof drains and soil pipes are functioning properly prior to the installation of the new roof system.
- J.** Temporary water stops shall be installed at the end of each day's work or as inclement weather or adverse conditions warrant. The temporary water stops shall be removed before continuing or proceeding with the next day's work. The water stops shall not adversely affect the new roof system and be disposed of in a proper manner.
- K.** The contractor is cautioned that certain *proSeal* membranes are not compatible with asphalt, coal tar pitch, oil-based materials, cements, creosote and penta-based materials. Such materials shall not come into contact with the *proSeal* membranes at any time. If such contacts occur, the material shall be removed and disposed of in a proper manner. The contractor should consult RPW Associates with respect to material compatibility, precautions, and recommendations.
- L.** The contractor should take necessary precautions when using solvent based adhesives around air intakes. The smell of the adhesive could be a disturbance to the building owner and occupants. It is the roofing contractor's responsibility to coordinate equipment to be turned off and on with the owner if necessary.
- M.** The contractor shall follow all National, State, Provincial and Local safety regulations.
- N.** Schedule work events to avoid the use of the newly constructed roof system as a storage area, foot-traffic surface and equipment movement area. Where such use is absolutely required, the contractor shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent roof areas. Both plywood and polyester felt protection or other approved barriers must be provided for all new and existing roof areas that receive traffic during construction.
- O.** All new and existing roofing, insulation, flashing, metal, etc. removed for construction shall be removed from the job site in a timely manner and legally transported to a legal dumping facility/site authorized to receive such materials.
- P.** Installation of a *proSeal* membrane over a coal tar pitch, or resaturated roof, requires special installation precautions and techniques. Contact the RPW Associates Technical Department for such installation information.
- Q.** Liquid materials such as solvents and adhesives shall be stored and used away from open flames, sparks, and excessive heat.

- R. For Chemical resistances please review the **proSeal** chemical compatibility.
- S. If any unusual or concealed conditions are discovered which may adversely affect the performance of the products or roof system, stop work immediately and notify the owner or the owner's representative and RPW Associates in writing. Do not proceed with the installation of the roof system until all conditions have been rectified.
- T. Site cleanup, including both interior and exterior building areas that have been affected by construction, shall be completed to the owner's satisfaction.
- U. All landscaped areas affected by construction activities shall be restored to their original condition or better.
- V. All building codes and authorities having jurisdiction over this project must be adhered to where applicable. Where there is a conflict in design with building codes, authorities and the **proSeal** Roof Systems™ manual, the more stringent situation shall apply.

1.6 **Site Meeting/Review**

- A. A prebid conference may be held with the owner or the owner's representative and all involved trades to discuss all aspects of the project. The contractor's field representative or roofing foreman for the project should be in attendance.
- B. All bidders shall visit the site and carefully examine the areas in question as to conditions that may affect proper execution of the work. All dimensions and quantities shall be determined or verified by the roofing contractor. No claims for extra costs will be allowed because of lack of full knowledge of the existing conditions, which may have been reasonably ascertained from a thorough site review.

1.7 **Warranties**

A. **proSeal** Warranties

proSeal offers several roofing warranties to the owner as outlined below. All warranties are for a period of, 15 or 20 years.

1. Material and Workmanship Warranty

The **proSeal** Material and Workmanship Warranty protects the building owner against leaks in the roof system, which are a result of membrane material defects and/or the workmanship involved in the membrane installation. This warranty provides for the supply of labor and membrane materials to bring the roof back into a watertight condition.

2. System Warranty

The **proSeal** System Warranty protects the building owner against leaks in the roof system resulting from material defects and/or workmanship involved in the installation of all material components (e.g. membrane, fasteners, insulation, etc.) of the roof system supplied by **proSeal**. This warranty provides for the supply of labor and material components to bring the roof back into a watertight condition.

B. Roofing Contractor's Warranty.

The roofing contractor shall supply the owner with a minimum two-year workmanship warranty. In the event any workmanship related to the installation of the roofing system is found to be defective or otherwise not in accordance with the contract documents or **proSeal** drawings, specifications and details, within two years of substantial completion, the roofing contractor shall remove and replace, said defects at no cost to the owner. The contractor's warranty obligation shall run directly to the owner and a copy shall be sent to RPW Associates.

2. PRODUCTS

2.1 General

A. The **proSeal** - Loose Laid and Ballasted Roof System components are to be produced or supplied by **proSeal**. These components are identified in the attached specification, drawings and details.

B. Components to be used that are other than those supplied or produced by **proSeal** may be accepted based on product chemical compatibility and published performance data. The designer for acceptability for use with **proSeal** products must review the specifications, installation instructions, limitations, and/or restrictions of the respective manufacturers. All components not supplied or produced by RPW Associates may affect the **proSeal** warranty and, as such, must be considered on a project-by-project basis and must be approved in writing by the RPW Associates Technical Department.

2.2 **proSeal Roofing Membrane**

A. **proSeal C3** – polyester reinforced membranes **minimum** thickness is 60 mil (1.5 mm), Colour white **proSeal C3** is also available in 80 mil (2.0 mm) thickness for the **proSeal** - Loose Laid and Ballasted Roof System. Roll size: 60 mil 78" x 90' (2m x 32.8 m) 80 Mil 78" x 75' (2m x 20M)

B. **proSeal C3** membrane shall conform to ASTM D4434.85 Standard. Classification: Type III.

C. **proSeal C3** membrane may meet or exceed the CAN/CGSB37.54-95 Standard for Polyvinyl Chloride Sheet roofing. Classification: Type 4, Class B, C & D

D. **proSeal C3** membrane, when manufactured, shall conform to or exceed the physical properties noted in the **proSeal** Product Data Sheets.

2.3 **Related Materials Supplied by the proSeal**

The following products are supplied by **proSeal** and may be incorporated in specifications as required or detailed on the drawings:

A. **ProVap 6 / ProVap 10** polyethylene sheet 6 mil (.15 mm) nominal thickness with anti-oxidants, used as a vapor retarder. Meeting or exceeding CGSB-51.34-M86

B. **ProTape** - pressure sensitive isobutyl tape used for sealing terminations, vapor retarder and air and condensation seals.

C. **1700** – solvent-based contact adhesive used for adhering **proSeal** flashing membrane to approved substrates.

D. **proFix 650** - one part co-polymer caulking used as a termination sealant.

E. **ProFelt 400** - non-asphaltic, non-woven geotextile fabric used as an asphalt barrier or leveling layer for extruded or expanded polystyrene insulation

F. **ProClad** – PVC coated, 26 gauge galvanized (G-90) sheet metal used where the **proSeal** membranes are to be welded directly to the metal flashing. Colour white

G. **ProFastener #12** - self-tapping, corrosion-resistant fasteners, modified buttress thread, FMRC approved for use in steel and wood decks. Thread diameter .24" (6.1 mm). Corrosion resistance ASTM D-4470.

- H. ProFastener #14** - self-tapping, corrosion-resistant fasteners, modified buttress thread, FMRC approved for use in steel, concrete and wood decks (concrete decks require predrilled holes). Corrosion resistance ASTM D-4470. Thread diameter .26" (6.6 mm).
- I. ProNails** - FMRC approved for use in concrete decks (concrete decks require predrilled holes).
- J. ProDisc** - 20 gauge 2" (50 mm) round diameter plate used for anchoring around penetrations such as roof drains, pitch pans, stacks, etc. Galvalume coated, meets FMRC 4470 standard.
- K. ProBar** - extruded aluminum base fixation bar, center punched 6" (150 mm) O.C., used at all transitional changes (e.g. parapet, wall, curb, etc.).
- L. ProBar J** - extruded aluminum bar, center punched 8" (200 mm) O.C., used as a termination bar on vertical surfaces.
- M. ProStrip** - 18 gauge galvanized (G-90) steel bar, center punched 12" (300 mm) O.C., used as a termination bar behind siding and as a fixation bar on a vertical surface (e.g. parapets, walls, etc.).
- N. ProCorner** - 60 mil (1.5 mm) prefabricated PVC inside/outside corners.
- O. ProStack** - 60 mil (1.5 mm) prefabricated PVC vent stacks flashing. Fits pipe sizes 2" to 10" (50 mm to 250 mm).
- P. proSeal Walkway** - polyester reinforced non-slip embossed PVC walkway. Thickness 60 mil (1.5 mm). Colour Red or Grey
- Q. ProDrain** - PVC coated spun aluminum drain complete with a cast strainer for use in new construction. Sizes 3" (75 mm), 4" (100 mm) and 6" (150 mm).
- R. ProDrain R** - PVC coated, spun aluminum drain insert, complete with a cast strainer and U-Flow Seal for uses in reroof or retrofit construction. Sizes 2¾" (69 mm), 3¾" (94 mm) and 5¾" (114 mm).
- S. ProDrain II** – spun aluminum drain complete with a cast strainer utilizing a clamping ring termination for uses in reroof or retrofit construction. Sizes 3" (75 mm), 4" (100 mm) and 6" (150 mm).
- T. proSeal Detail** - non-reinforced **PVC** membrane, used to detail inside and outside corner flashing. Thickness 60 mil (1.5 mm). Color white.

2.4 Related Materials (supplied by others)

- A. Wood blocking**
1. Wood blocking shall be #2 quality or better can be treated for fire and rot resistance (wolmanized or osmose treated). Creosote or asphaltic treated lumber is not acceptable. **proSeal** membrane may be directly adhered to wolmanized or osmoses treated lumber but it is not recommended.
 2. Wood blocking shall conform to Factory Mutual's Loss Prevention Data Sheet 1-49
 3. Wood shall have maximum moisture content of 19% by weight on a dry weight basis.
- B. Plywood**
1. When bonding directly to plywood, a minimum standard ½" (50 mm) smooth surfaced, exterior grade plywood, good one side, non-pressure treated, with exterior grade glue shall be used.
 2. Plywood shall have maximum moisture content of 19% by weight on a dry weight basis.

C. Vapor retarders (other than ProVap)

1. Vapor retarders for use in a **proSeal** Loose Laid and Ballasted Roof System shall meet identified code and/or insurance requirements, i.e. UL, ULC, FM, ASTM, CGSB-51.34-M86 standards.
2. Vapor retarders are to be approved in writing by the vapor retarder manufacturer for their intended use.
3. Vapor retarders are to be compatible with insulation and other accessories.
4. The RPW Associates Technical Department shall review for acceptance all non-ProVap vapor retarders.
5. ProVap vapor retarders must be used in all **proSeal** System warranties.

D. Insulation

1. Where specified or required, insulation shall be installed over the structural deck or as a separation layer over the existing substrate and/or to obtain the desired thermal value.
2. Insulation for use in a **proSeal** Loose Laid and Ballasted Roof System shall meet identified code and/or insurance requirements, i.e. UL, ULC, FM, ASTM, CGSB standards.
3. Insulations are to be approved in writing by the insulation manufacturer for their intended use and for use with **proSeal** materials.
4. Insulation shall be compatible with **proSeal** membrane or an acceptable slip/separation sheet is required.
5. The RPW Associates Technical Department shall review for acceptance all non-approved insulations.
6. The following insulation boards are acceptable below **proSeal** membrane in a **proSeal** Loose Laid and Ballasted Roof System. For insulations not specified contact the RPW Associates Technical Department for acceptability.
 - a) Polyisocyanurate insulation with non-asphaltic, fiberglass facers, meeting the requirements of UL, ULC, FM, ASTM, CGSB standards and have a minimum compressive strength of 18 p.s.i. (125 kpa).
 - b) Type II or greater Expanded polystyrene (EPS) with kraft laminated facer or in conjunction with a slip/separation sheet. Meeting ASTM and CGSB standards.
 - c) Type II or greater Extruded polystyrene (XPS) with kraft laminated facer or in conjunction with a slip/separation sheet. Meeting ASTM and CGSB standards..
7. The **proSeal** Systems Warranties require specific insulation products to be incorporated into the roof composition. Please contact the **proSeal** Technical Department for the specific requirements.
8. Insulation shall have a minimum "R" ("RSI") value of _____ based on the jurisdictional authority, i.e. ASTM, CGSB, NRCA, NRC standards.
9. The insulation manufacturer shall send its technical recommendations, for the use of its product in the **proSeal** Loose Laid and Ballasted Roof System to the owner and a copy to the RPW Associates Technical Department with its specific warranty conditions.

10. The following slip/separation sheets are acceptable separation layers between incompatible insulations and substrates:
 - a) ProFelt 400 for uses over polystyrene (EPS and XPS) insulation
- E. Ballast**
1. Nominal 1½" (38 mm) in size, smooth, washed, clean, well rounded gravel, to ASTM D448 #4, #3, #24.
 2. Nominal 2½" (63 mm) in size, smooth, washed, clean, well rounded gravel, to ASTM D448 #2, #1.
 3. Precast concrete pavers specifically designed and manufactured for roofing applications to withstand freeze/thaw cycles and wind uplift. Minimum weight of 22 lb./ft.² (.09 kg/m²). RPW Associates recommends the use of compatible pedestals or acceptable protection layer between the **proSeal** membrane and pavers. When XPS insulation is used as the protection layer ProFelt 250 is required.
- F. Walkways (Other than **proSeal** Walkway)**
1. Roof walkways shall consist of precast concrete pavers specifically designed and made for roofing and traffic pads. RPW Associates recommends the use of compatible pedestals or an acceptable protection layer between the **proSeal** membrane and pavers. When XPS insulation is used as the protection layer ProFelt 250 is required.
 2. Wood/Steel walkways shall be installed with adequate protection between the **proSeal** roof membrane and the wood supports. Contact the RPW Associates Technical Department for project specific recommendations.
- G. Miscellaneous fasteners and anchors**
- All fasteners shall be the same types as the metal being secured. In general, all fasteners, anchors, screws, and straps shall be of zinc or cadmium plated steel, galvanized, or stainless steel. All fasteners and anchors shall have a minimum embedment of 1" (25mm) and shall be approved for such use by the fastener manufacturer. All fasteners shall meet Factory Mutual Standard 4470 for corrosion resistance.

3. EXECUTION

3.1 General

The Roofing contractor shall coordinate the installation of the roof system to ensure that each area is left in a weathertight condition at the end of each work period.

3.2 Deck Conditions/Preparation

The following general conditions apply to the structural deck that is to receive a **proSeal** Loose Laid and Ballasted Roof System.

- A.** The roof deck must be structurally sound to provide support for the **proSeal** Loose Laid and Ballasted Roof System and other anticipated loads.
- B.** Roof slope shall be a maximum of 2:12.
- C.** The specifier and/or the roofing contractor shall determine the condition of the existing roof deck. Areas with deteriorated decking or showing loss of structural integrity shall be repaired and/or replaced prior to installing the new roof system.

D. The roof deck shall be installed to the structural framing as per the applicable building codes and/or Factory Mutual's requirements to resist all anticipated wind loading for the geographical area. **proSeal** requires that fastener pullout tests be completed prior to project commencement to ensure that sufficient pullout values are achieved.

E. The roofing contractor shall load the roof in such a manner as to eliminate the risk of deck overload due to point loading of materials and equipment.

F. The contractor shall consult the RPW Associates Technical Department when the deck substrate is exposed to excessively high humidity levels and/or a corrosive environment is present. These conditions may require specific details and/or installation requirements.

G. The following structural decks are acceptable substrates to install the **proSeal** Loose Laid and Ballasted - Roof System when an acceptable insulation and/or an appropriate separation layer is incorporated in the design.

1. Steel Deck

- a)** The roof deck shall be a minimum 22 ga. and shall conform and be installed to Factory Mutual's Loss Prevention Data Sheet 1-28 and/or manufacturer's and/or local building code requirement.
- b)** All rusted or deteriorated decking shall be treated with rust-inhibiting paint and sections that have rusted through shall be completely removed and replaced.

2. Wood Deck

- a)** The roof deck shall be minimum nominal 2" (50 mm) and shall conform to Factory Mutual's requirements for Class I impregnated decks. Deck shall conform and be installed according to Factory Mutual and/or local building code requirements.
- b)** All rotted and deteriorated wood shall be completely removed and replaced.

3. Plywood Deck

- a)** The roof deck shall be minimum nominal 5/8" (59 mm) and shall conform to Factory Mutual's requirements for Class I impregnated decks. Deck shall conform and be installed according to Factory Mutual and/or local building code requirements.
- b)** All rotted and deteriorated wood shall be completely removed and replaced.

4. Poured Structural Concrete Deck

The roof deck shall be a minimum of 3000 p.s.i. cured and dry to industry standards. The surface shall be smooth, level and free from debris, dust and moisture or frost. Sharp ridges or other projections above the surface shall be removed. Deck shall conform and be installed according to local building code requirements.

5. Precast and Prestressed Concrete Deck

The roof deck shall be a minimum of 3000 p.s.i. cured and dry to industry standards. The surface shall be smooth, level and free from debris, dust and moisture or frost. Sharp ridges or other projections above the surface shall be removed before roofing over precast, prestressed concrete decks.

All joints shall be grouted. Differentials in deck elevation of more than ¼" (6.4mm) must be corrected by applying a lightweight fill over the entire deck, or a grout applied over the joints and feathered out to create a smooth transition. Deck shall conform and be installed according to manufacturers and/or local building code requirements.

6. Cementitious Wood Fiber Deck

- a) The deck shall be installed in accordance with the manufacturer's requirements and industry standards. Please contact the RPW Associates Technical Department for acceptability of the specific deck to be installed. Voids and joints over bulb tees shall be grouted. Grouting shall be done with materials supplied or recommended by the deck manufacturer. Deck planks shall be secured to structural supports as recommended by the deck manufacturer. Deck shall conform and be installed according to manufacturers and/or local building code requirements.
- b) All wet and deteriorated sections of decking shall be removed completely and replaced.

7. Poured Gypsum Deck

- a) The gypsum shall be installed by an approved applicator and in accordance with the manufacturer's requirements and industry standards. The roof deck shall be cured and dry to the deck manufacturer's and/or industry standards. The surface shall be smooth, level and free from debris, dust and moisture or frost. Sharp ridges, depressions or other projections above the surface shall be removed. Deck shall conform and be installed according to manufacturers and/or local building code requirements.
- b) All saturated and deteriorated gypsum shall be removed completely and replaced.

8. Lightweight Insulating Concrete Fills

- a) The lightweight fill shall be installed by an approved applicator and in accordance with the manufacturer's requirements and industry standards. The roof deck shall be cured and dry to the deck manufacturer's and/or industry standards. The surface shall be smooth, level and free from debris, dust and moisture or frost. Sharp ridges, depressions or other projections above the surface shall be removed. Proper venting as recommended by the roof deck manufacturer shall be provided. Deck shall conform and be installed according to manufacturers and/or local building code requirements.
- b) All saturated and deteriorated insulating fill shall be removed and replaced.

9. Poured Lightweight Concrete Decks

- a) The lightweight fill shall be installed by an approved applicator and in accordance with the manufacturer's requirements and industry standards. The surface shall be sealed as recommended by the lightweight concrete manufacturer to ensure the surface is free from dust and loose fragments. The roof deck shall be cured and dry to the deck manufacturer's and/or industry standards. The surface shall be smooth, level and free from debris, dust and moisture or frost. Sharp ridges, depressions or other projections above the surface shall be removed. Deck shall conform and be installed according to manufacturers and/or local building code requirements.
- b) All saturated and deteriorated insulating fill shall be removed and replaced.

3.3 Substrate Preparations with Removal (Reroof) of Existing Roof System

Note: a Loose-laid ballast roof should not be installed on any structure without confirmation by a structure engineer for load capacity.

The following general conditions apply to the substrates that are to receive a **proSeal** Loose Laid and Ballasted Roof System.

- A. Remove only as much of the existing roof system that can be replaced in a weathertight condition at the end of the work period. All work shall be scheduled and executed without exposing the interior building areas and its contents to the effects of inclement weather. The existing building shall be protected against all risks.
- B. The substrate shall be dry, clean, smooth, and free of flaws, sharp edges, loose and foreign material, oil and grease.
- C. The substrate shall be inspected for defects such as surface roughness, contamination, structural unsoundness or any other conditions that can affect the integrity of the roof system.
- D. The existing roofing membrane and/or insulation is to be removed to the structural deck and/ or substrate as specified or required. The specifier and/or the roofing contractor shall determine the condition of the existing substrate. All structural decking found to be deteriorated or unsound is to be repaired and/or replaced (refer to Section 3.2). All wet and/or deteriorated insulation substrate is to be removed and replaced as specified or required.
- E. The existing membrane flashing, deteriorated wood blocking and related metal flashing shall be removed to the substrate.
- F. All deteriorated wood blocking shall be removed and replaced as per the specifications.
- G. All materials removed from the roof system are to be disposed of by an authorized contractor at an authorized disposal or recycling facility. The removed materials shall not be stored on the job site and are to be removed from the job site on a daily basis.
- H. All substrates shall be acceptable for the installation of the new **proSeal** Loose Laid and Ballasted Roof System.
- I. All structural substrates shall resist a minimum force of 175 pounds per lineal foot (2.5 kn./m) in any direction
- J. The following substrates are acceptable for the installation of the **proSeal** field membrane:
 - 1. New insulations (refer to Section 2.4D Insulation) that are recommended by their manufacturer for use in a ballasted roof assembly.
 - 2. Existing insulations (refer to Section 2.4D Insulation) that are recommended, by their manufacturer, for use in a ballasted roof assembly and are overlaid with an approved slip/separation sheet (i.e. ProFelt 400).
 - 3. Structural steel decks overlaid with leveling layer of insulation (refer to Section 2.4D insulation) or exterior-grade gypsum board meeting ASTM and CGSB standards.
 - 4. Structural decks (refer to Section 3.2) overlaid with a leveling/separation layer of ProFelt 250 or ProFelt 400. Job site conditions dictate the appropriate leveling/separation layer required. Consult the RPW Associates Technical Department for project specific recommendations.
 - a) Wood.
 - b) Plywood.
 - c) Poured concrete.
 - d) Precast or Prestressed Concrete.
 - e) Cementitious Wood Fiber.

- f) Poured Gypsum.
 - g) Lightweight Insulating Concrete Fills.
 - h) Poured Lightweight Concrete.
- K.** The following substrates are acceptable for the installation of the **proSeal** flashing membrane:
- 1. New polyisocyanurate insulation with fiberglass facer, free of bitumen or other contaminants. The insulation is to be mechanically attached with an appropriate ProFastener and ProPlate, at a rate of 1 per 2 sq. ft. (1 per .2 m²).
 - 2. New ½" (13 mm) "Good One Side" exterior grade plywood free of bitumen or other contaminants. The plywood is to be mechanically anchored with an approved fastener at a rate of 1 per 2 sqft (1 per .2 m²).
 - 3. New 24 gauge (or heavier) galvanized metal flat stock, free of bitumen or other contaminants. The metal is to be anchored as per SMACNA latest edition.
 - 4. New ProFelt 400. Mechanically anchored ProFelt with appropriate ProFastener and ProPlate at a rate of 1 fastener per 2 sqft (1 per .2 m²).
 - 5. Poured Concrete, with steel float finish, free of bitumen or other contaminants.

3.4 Wood Blocking Installation

- A.** Install continuous wood blocking at the perimeter of the entire roof and around roof projections and penetrations as specified and shown on the detail drawings.
- B.** Blocking shall be anchored to resist a minimum force of 175 pounds per lineal foot (2.5 kn/m) in any direction. Fastener spacing shall be a maximum of 2 ft. (600 mm) on center. Fasteners shall be installed within 6" (150 mm) 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 and shall resist a minimum force of 175 pounds per lineal foot (2.5 kn/m) in any direction and free from rot. Only woodwork designated to be reused in detail drawings shall be left in place and all other woodwork shall be removed.

3.5 Vapor Retarder Installation (where specified)

- A.** Interior and/or exterior climatic conditions (ambient temperature, relative humidity, and internal air pressure) may warrant the use of a vapor retarder/air barrier in the building construction. It is the responsibility of the design professional, based on geographical location and the intended use of the building, to determine if a vapor retarder/air barrier is required. Also, the design professional shall determine the type and location of the required vapor retarder/air barrier.
- B.** **proSeal** Roof Systems™ recommends the use of a vapor retarder to protect the integrity of the insulation and when the interior relative humidity is 45% or greater and/or the outside mean average January temperature is below 40°F. (5°C). **proSeal** may require the use of a vapor retarder to protect the integrity of the roofing system in System Warranty applications and/or special situations such as freezers and high humidity environments. Contact the RPW Associates Technical Department for further information.
- C.** A vapor retarder may also perform as an air barrier within the building envelope. **proSeal** Roof Systems™ recommends that strong consideration should be given to the installation of an air barrier for buildings subject to high internal air pressures such as air plane hangers or structures with sufficient openings in the wall area directly below the structural roof deck to adjust the wind uplift pressures. Contact the RPW Associates for further information.

D. Installation of ProVap 10 or ProVap 6 polyethylene vapor retarders.

Install ProVap to the approved substrate (i.e. deck, insulation or existing roof surface) loose laid and parallel to the roof deck (where applicable). Overlap the joints in the vapor retarder a minimum of 6" (150 mm). Install ProTape in all side laps, end laps, terminations and penetrations and seal to ensure the continuity of the vapor retarder within the roof system. Consult the RPW Associates Technical Department for specific tie-in requirements to other building vapor retarders.

E. Installation of manufactured vapor retarder other than ProVap.

Install the vapor retarder as per the manufacturer's current published specifications to ensure the continuity of the vapor retarder within in the roof system. The vapor retarder may be loose laid over the approved substrate. Asphalt and bituminous-based products must not come in contact with the **proSeal** membranes. Consult the RPW Associates Technical Department for specific detailing requirements.

F. Installation of field fabricated vapor retarder.

Install 2-ply felt & asphalt vapor retarder as per CRCA specifications as determined by the approved substrate. Asphalt and bituminous-based products must not come in contact with the **proSeal** membranes. Consult the RPW Associates Technical Department for specific detailing requirements.

3.6 *Insulation Installation*

A. Insulation shall be installed according to the insulation manufacturer's current published specifications for use with a ballasted roof system.

B. Insulation shall be laid over an acceptable substrate, parallel to the deck (where applicable). Install insulation in parallel courses, butted together in moderate contact without gaps and staggered end joint. 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. Insulation shall be neatly cut to fit around penetrations and projections without gaps.

D. Install tapered insulation in accordance with the insulation manufacturer's shop drawings.

E. Install tapered insulation around drains to create a drain sump.

F. Do not install more insulation than can be covered with **proSeal** membrane by the end of the work period or onset of inclement weather.

3.7 *ProFab/ProFelt Installation (where required)*

A. The slip-sheet (ProFab) shall be installed directly over non-compatible insulations (refer to Section 2.4D) loose laid. Care shall be taken to ensure that the slip-sheet is installed with a minimum of 6" (150 mm) side and end laps.

B. The separation sheet (ProFelt) shall be installed directly over approved substrates when an insulation substrate is not specified or required (refer to Section 3.2 and 3.3), loose laid. Care shall be taken to ensure that the separation sheet is installed with a minimum of 6" (150 mm) side and end laps.

C. The slip/separation sheets shall be protected from damage. If they are punctured or damaged install an additional piece over the damaged area lapping the underlying layer a minimum of 6" (150 mm) and sealing with ProFlex caulking.

D. The installation of the slip/separation sheet is to be followed immediately by the installation of the **proSeal** membrane to prevent displacement of the slip-sheet. In certain applications mechanical fixation of the sheet may be required to prevent migration of the sheet during the installation of the **proSeal** membrane.

3.8 *proSeal Membrane Installation*

A. The surface of the insulation or substrate shall be inspected prior to installation of the *proSeal* field membrane. The substrate shall be swept clean, dry and smooth with no excessive surface roughness and contamination. Any damaged, broken or delaminated insulation boards are to be removed and replaced.

B. Membrane installation

1. Over the properly installed and prepared substrate surface, unroll the *proSeal* membrane and draw tight without folds or wrinkles. Adjacent sheets shall be overlapped 3" (75 mm). All sheets shall be applied in the same manner, lapping all sheets as specified.
2. Roll out *proSeal* membrane in a direction determined by roof 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.

3.9 *Welding of Seams*

A. General.

1. Seam areas are to be dry, clean and free of dirt, debris and adhesives.
2. *proSeal* membrane seams are to be thermally fused (hot air welded).
3. Lap membrane seam joints 3" (75 mm).
4. Welding equipment shall be designed and manufactured for the purpose of thermally fusing PVC roof membranes. Consult the RPW Associates Technical Department for manufacturers of welding equipment.
5. 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.

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 a RPW Associates Technical Representative prior to welding.
3. Position *proSeal* membrane in place with specified seam joint overlaps.
4. Pre-weld back edge, with narrow continuous weld approximately .5" (12 mm) 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 the outside edge with a continuous seam of approximately 0.5" to 1" (12 mm to 25 mm.) 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 a smooth continuous motion along the seam. Welding seam ranges from 1 ft. to 2 ft. (0.30 m to 0.60 m) per minute. For straight laps use a 1½" (40 mm) wide nozzle. For corners and compound connections use a ¾" (20 mm) wide nozzle. Remove residue collected at nozzle with a steel wire brush prior to start of new seam.

C. Automatic (Machine) Welding:

Perform automatic welding in the following stages.

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 a RPW Associates Technical Representative prior to welding.
3. Position **proSeal** 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 a steel wire brush at least every 100 ft. (30.5 m) and prior to the start of a new seam. Welding speed ranges from 8 ft. to 10 ft. (2.40 m to 3.00 m) 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 roofing contractor shall physically check all completed hot-air welded seams after cooling for continuity of weld using a flat #3 screwdriver. 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" (50 mm), 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 roofing contractor at various seam locations or as directed by the owner's representative or RPW Associates' Technical Representative. 2" (50 mm) wide cross-sectional samples shall be taken three times a day (minimum) through completed seams. Correct welds 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 a RPW Associates Technical Representative. 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" (75 mm), in all directions, beyond the area to be repaired and hot-air weld using the appropriate (hand or automatic) welding procedures.

3.10 Mechanical Fixation Installation

- A.** Install the ProBar at all transitional changes between the field (horizontal) and flashing (vertical) surfaces (e.g. parapets, walls, curbs, etc.). Provide a ¼" (6 mm) expansion joint space between all fastening bars.
- B.** Position the ProBar approximately 1" (25 mm) from the flashing surface on the field surface or place the ProBar on the flashing surface with the edge of the ProBar flush with the field surface.
- C.** Mechanically fasten the ProBar 12" (300 mm) O.C., with approved fasteners, penetrating into the structural deck/substrate the appropriate depth.

Note:

1. Fasteners shall penetrate the underside of a steel deck a minimum of ½" (13 mm).
 2. Fasteners shall penetrate the underside of a plywood deck a minimum of ½" (13 mm).
 3. Fasteners shall penetrate wood deck a minimum of 1" (25 mm).
 4. Fasteners shall penetrate poured structural; precast and prestressed concrete decks a minimum of 1" (25 mm).
 5. Consult the Technical Department for fastener penetration depths on all other structural decks.
- D. Install ProDisc at all penetrations (e.g. drains, vent pipes, etc.) on the roof surface spaced a maximum of 6" (150 mm) O.C. with a minimum of 4 fasteners per penetration.
- E. Position the ProDisc approximately 1" (25 mm) from the edge of the flange (if applicable), penetrating through the field membrane.
- F. Mechanically fasten the ProDisc, with approved fasteners, penetrating into the structural substrate the appropriate depth.

3.11 *proSeal Membrane Flashing Installation*

- A. *proSeal* flashing shall be installed concurrently with the roof membrane as the job progresses. No temporary flashing shall be allowed without the prior written approval of the owner's representative and/or the technical Department. All areas where water enters the new roof system shall be inspected and the effected area shall be removed and replaced at no expense to the owner. *proSeal* membrane flashing shall be fully adhered to compatible, dry, smooth, and solvent resistant surfaces.
- B. *proSeal* flashing shall extend a minimum of 8" (200 mm) above the field surface level unless previously accepted by the owner's representative and the Technical Department.
- C. *proSeal PVC* membranes installed over the properly installed and prepared substrate surface,
- D. **1700** adhesive shall be applied using approved solvent-resistant paint rollers. The adhesive shall be applied at a rate of approximately 1.5 gal/100 sqft (.75 L/m²) depending upon the surface of the substrate. The adhesive shall be applied in smooth, even coatings with no 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 adhesive on the substrate surface shall be allowed to dry completely prior to installing the membrane. Refer to **1700** Product Data Sheet for adhesive application rates on approved substrates.
- E. On a dry surface, the *proSeal* flashing membrane is cut to a workable length, approximately 6 ft. (1.83 m), and the underside shall be evenly coated with **1700** adhesive at a rate of .5 gal/100 sqft (.25 L/m²). While **1700** adhesive is tacky (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* membrane to dry completely. Ambient temperature, humidity, and personnel will determine the amount of membrane that can be coated with adhesive before applying to substrate. No **1700** adhesive shall be applied in lap areas that are to be hot-air welded to flashing or adjacent sheets. All sheets shall be applied in the same manner, lapping all sheets as required by welding techniques. Adjacent sheets shall be overlapped a minimum of 3" (75 mm) and hot-air welded.
- F. The *proSeal* adhered flashing membrane sheet shall be pressed firmly into place with a hand roller.
- G. *proSeal* flashing shall extend approximately 5" (125 mm) onto the field roofing membrane. The *proSeal* field and flashing membrane shall be thermally fused (hot-air welded) together to form a monolithic membrane.
- H. *proSeal* 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 as per details and procedures.

I. **proSeal** flashing membrane shall be terminated according to recommended details. All fixation bars (ProBar, ProStrip and ProBar J) shall be fastened a minimum of 12" (300 mm) O.C. Install ProTape and ProFlex caulking as detailed.

3.12 **Ballasting of proSeal Membrane**

A. Ensure roof surface is free of debris. Install **proSeal** profelt separation sheet (after seam inspection, refer to Section 3.10.D) over the **proSeal** roof membrane. Unroll profelt to be wrinkle free. Adjacent sections of the profelt are to be over lapped a minimum of 6"

B. Install ballast as specified, or Factory Mutual Technical Advisory Bulletin 1-29, or the ANSI/RMA/SPRI/RP-4 bulletin or according to local code requirements. The minimum rate shall be 10 lbs/100 sqft (50 kg/m²).

C. Ballast shall be applied with caution so that the field membrane and roofing system are not damaged. Mechanical devices used for applying ballast shall not run over previously ballasted areas of membrane. All field hot-air welded seams shall be left exposed until reviewed and accepted by an Technical Representative

D. Precast concrete pavers shall be applied with caution so that the field membrane and the roofing system are not damaged. We recommend the use of compatible pedestals or acceptable protection layer such as 1" (25 mm) XPS insulation pads. ProFab, or another acceptable separation layer, is required between the field membrane and the XPS insulation pads. All field hot-air welded seams shall be left exposed until reviewed and accepted by the Technical Representative. In areas of high wind exposure the pavers shall be strapped together with stainless steel metal straps that are flush with the pavers. Contact the Technical Department for project specific recommendations.

3.13 **Roof Walkway Installation**

A. General:

Walkways shall be provided for regular maintenance of rooftop equipment and for roof areas subject to foot traffic. Walkways shall consist of **proSeal** Walkway, precast concrete pavers or other approved surface. Contact the Technical Department for project specific recommendations.

B. Installation of **proSeal** Walkway

1. Prior to installation of ProFab and ballast, install chalk lines on the **proSeal** field membrane to indicate where the walkway is to be located.
2. The **proSeal** field membrane shall be clean, dry and free of all debris.
3. Apply 1700 adhesive to the **proSeal** field membrane, at a rate of .67 gal/100 sqft (1.3 L/m²), in the area where the walkways are to be installed, to a width 6" (150 mm) less than the width of the **proSeal** Walkway and allow to dry (allow the adhesive to dry a minimum of 1 hour and a maximum of 3 hours).
4. Apply 1700 adhesive to the backside of the **proSeal** Walkway, at a rate of .5 gal/100 sqft (1 L/m²), Do not apply adhesive within 3" (75 mm) of the edge of the **proSeal** Walkway and allow to dry until the adhesive is tacky (producing strings when touched by a dry finger).
5. The adhesive shall be applied in smooth, even coatings with no globs, puddles, or similar irregularities.
6. Place the **proSeal** Walkway in position, such that the adhesive on the **proSeal** field membrane and the **proSeal** Walkway come in contact, and roll frequently in two directions with a weighted, foam-covered lawn roller.
7. Hot-air weld the edges of the **proSeal** Walkway to the **proSeal** field membrane, and check all seams with a #3 rounded screwdriver.

C. Installation of Precast Walkway (refer to Section 3.13.D)

3.14 ProClad Metal Edge Flashing Installation

- A. ProClad metal flashing shall be installed concurrently with the roof membrane as the installation progresses.
- B. 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)
 4. Canadian Roofing Contractors Association (CRCA – latest edition)
- C. ProClad metal flashing shall be mechanically anchored into wood blocking with approved fasteners. Two rows of fasteners shall be installed 4 " (100 mm) O.C. and staggered. The fasteners shall penetrate the wood blocking a minimum of 1" (25 mm).
- D. ProClad metal flashing shall be installed on a 24 gauge galvanized metal starter strip and the face of the flashing shall be "S-Locked".
- E. Hot-air weld **proSeal** flashing membrane, 4" (100 mm) wide by the width of the flange, over the joint in the ProClad metal.
- F. Hot-air weld **proSeal** flashing membrane, a minimum of 4" (100mm) from the outside edge of the ProClad metal flashing, onto the **proSeal** field membrane.
- G. Check all seams with a #3 rounded screwdriver.

3.15 Metal Flashing Installation (other than ProClad)

- A. 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)
 4. Canadian Roofing Contractors Association (CRCA – latest edition)
- B. Metal, other than ProClad metal, is not covered under the **proSeal** warranty.

3.16 Tie-ins

A. Temporary

Temporary tie-ins shall be installed at the end of each work period and when work is postponed due to inclement weather conditions. The staggered insulation substrate shall be straightened using partial filler pieces of insulation loose laid. The new **proSeal** field membrane shall be sealed to the deck and/or substrate (creating a water cut-off) to prevent water migration from the existing roof system into the new roofing system. The edge of the membrane shall be sealed in a continuous heavy application of roof cement or hot asphalt 6" (150 mm) wide or other acceptable methods. When work resumes, the contaminated **proSeal** field membrane shall be cut out. All sealant, 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. All temporary tie-ins shall be constructed to provide a 100% watertight seal. If any water penetrates the new completed roof system all affected areas shall be removed and replaced at no cost to the owner.

B. Permanent

Permanent tie-ins shall be installed at the end of the project or as dictated by construction scheduling. Permanent tie-ins shall incorporate a water cut-off to prevent water migration from the existing roof system into the new roofing system. A tie-in to asphaltic built up roof membranes can be performed the C3 membrane Refer to the standard tie-in details or contact the Technical Department for project specific recommendations.

3.17 Project Completion

A. Upon completion the contractor shall clean up and remove from the job site all rubbish, debris and surplus materials.

B. The owner, owner's representative and roofing contractor shall review the completed work and document all deficiencies. Upon inspection of the completed roof system by a **proSeal** Technical Representative, the contractor shall promptly correct all documented deficiencies and non compliance's with **proSeal** current published specifications and details.

C. All **proSeal** warranties (refer to Section 1.7) shall have been submitted and approved prior to the commencement of the project. All approved **proSeal** warranties will be issued upon total completion of the project and in compliance with the **proSeal** current published specifications and details.

3.18 Maintenance

Maximization of the anticipated life cycle of a roofing system is dependent upon the successful implementation of an appropriate maintenance program. RPW Associates requires the building owner to implement an inspection and maintenance program. Please refer to the warranty package, which includes a suggested inspection and maintenance program. Contact the RPW Associates Technical Department for project specific recommendations.

DISCLAIMER

RPW Associates, Inc has attempted to obtain information from the manufacturers of other products often used in conjunction with our roofing systems and / or products with respect to the characteristics of such products, as well as their compatibility with those of the requested roof system.. Inasmuch as these other products as supplied in the field are subject to possible variation in their production, and inasmuch 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 Roofing Systems™ or products whereas prior written acknowledgement and acceptance was obtained**