



**PREMIUM**

SPRAY PRODUCTS CANADA

An Accella Brand

## **SPECIFICATION GUIDE**

### **Spray Polyurethane Foam Systems for New & Remedial Roofing**

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**Roof Detail Illustrations are Available upon request**

# DESIGN CONSIDERATIONS

## GENERAL CONSIDERATIONS

The performance of a spray applied polyurethane foam roofing system can be affected by all the component parts of a roof structure, as well as the atmospheric conditions inside and outside the structure. Proper structural design, specification review, contractor and material selection, coupled with the compatibility and positioning of the various components of a roof structure, are a necessity to produce a successful roofing system.

# SURFACE/DECK PREPARATION, PROCEDURES AND CONSIDERATIONS

Spray polyurethane foam can be successfully applied to most surfaces. PSP CANADA recommends the following procedures which are to receive spray applied polyurethane foam.

## **A. General Surface/Deck Preparation Procedures**

- a. The roof deck shall be securely fastened to the building structure and conform to proper load limits and fire ratings of good engineering practices and required Building Codes. Special attention should be focused on the deflection rate under all type roof conditions, including but not limited to, foot traffic, mechanical equipment utilization, wind uplift, as well as live and dead loads.
- b. When a primer is specified, there must be adequate adhesion between all components of the system to secure the entire system against wind uplift and movement.
- c. Prior to application of primer and/or polyurethane foam the deck shall be dry, free of loose dirt or any contaminants that may interfere with proper adhesion of any of these respective components.
- d. Deck contaminants, depending on their severity and quantity, may be removed by use of air pressure, vacuum equipment, hand power broom, chemical solvents, abrasive blasting, manual scraping, etc.

## **B. Wood Surfaces/Decks**

- a. Priming is necessary to achieve maximum adhesion of the polyurethane foam to a wood deck.
- b. Joints in excess of 1/4" in width shall be sealed with a single component urethane caulking prior to the application of the primer or polyurethane foam.

## **C. Metal Surfaces/Decks**

- a. A pitch of 1/4" in 12" or more is recommended.
- b. A structural metal deck should not be lighter than 22 gauge.
- c. Sloped metal roof panels should not be lighter than 29 gauge.
- d. All joints should be correctly lapped, sealed and fastened.
- e. Primers are recommended over all galvanized and or pre coated surfaces.

## **D. Concrete Surfaces/Decks**

- a. In all cases, concrete should be free of laitance and chemical release agents.
- b. Priming is required on concrete surfaces, and it is recommended that poured concrete decks be permitted to cure for twenty-eight (28) days or concrete has met design strength prior to the application of primers or sprayed polyurethane foam.
- c. All expansion joints should be filled with single component urethane caulking and fabric reinforced.
- d. Sprayed polyurethane foam is not recommended for lightweight or insulating concretes unless tests have been made to determine that adequate adhesion can be obtained.

## SELECTION OF PRIMER

PSP CANADA recommends the application of the following primers on the mentioned substrates. Follow guidelines for application of the primer systems as per PSP CANADA technical data sheets.

PRIMER	SUBSTRATE	THICKNESS
PremiCOTE™ 429	Galvanized, Aluminum	0.5 dry mil
PremiCOTE™ 900	Concrete, Wood, Carbon Steel	3 - 5 dry mils
PremiCOTE™ 1007	Recoat Adhesion	1 - 2 dry mils

## SELECTION OF POLYURETHANE FOAM SYSTEM

PSP Canada offers a full range of polyurethane foam products including industrial, tank, roofing and CCMC listed wall foams. If your application requires a special type of product consult PSP Canada to ensure that the product specified is correct for your application.

## SELECTION OF PROTECTIVE COATING SYSTEM

PSP Canada offers many varieties of coatings to suit the project. The selection of coating may vary depending on life expectancy, colour required, slope of roof and overall environment of the project. Consult PSP Canada for your needs.

## MAINTENANCE PROCEDURES

It is strongly recommended by PSP Canada that maintenance procedures, including yearly inspections be established between contractors and building owners for any roofing system in order to yield its full value. Failure to do so will void PSP Canada issued warranties.

## RECOMMENDED GUIDE SPECIFICATION FOR NEW AND REMEDIAL ROOFING

NOTE: This guide is designed to help the specifier achieve a successful PSP Canada supplied polyurethane foam and coating roofing system. It is the responsibility of the specifier to consult with PSP Canada as to the specific recommendations.

### PART 1 — GENERAL

This outline discusses the application of seamless sprayed-in-place polyurethane foam with a protective coating for use as an insulated roofing system for new or retrofit roofing.

#### 1.1 SCOPE OF WORK

- a) Furnish all labour, materials, tools and equipment necessary for the application of a polyurethane foam roofing system, including accessory items, subject to the general provisions of the contract.

## **1.2 RELATED WORK SPECIFIED ELSEWHERE**

- a) Cast-in-Place Concrete Section 03300
- b) Metal Decking Section 05300
- c) Rough Carpentry Section 06100
- d) Insulation Section 07200
- e) Membrane Roofing Section 07500
- f) Flashing and Sheet Metal Section 07600
- g) Roof Specialties and Accessories Section 07700
- h) Skylight Section 07800
- i) Mechanical Division 15
- j) Electrical Division 16

## **1.3 QUALITY ASSURANCE**

- a) Inspections: PSP CANADA may wish to have a qualified representative on site to monitor and inspect the installation of PSP CANADA products during application of PSP CANADA warranted projects. All applications are to be completed by a PSP CANADA qualified installer.

## **1.4 SUBMITTALS**

- a) PSP CANADA to provide published data sheets of the materials specified to the specifier and contractor. This is to include primers, polyurethane foam and protective coatings.
- b) Drawings if required.
- c) Evidence of Qualified applicator status from PSP CANADA.
- d) A completed application for warranty to PSP CANADA for warranty on the project.
- e) Safety and handling instructions for storage, handling and use of the materials as included on the appropriate Materials Safety Data Sheets (MSDS) and Technical Data Sheet (TDS).

## **1.5 MATERIALS, DELIVERY AND STORAGE**

- a) Materials shall be delivered in PSP CANADA original, tightly sealed containers or unopened packages, all clearly labeled with product identification, safety information, and batch or lot numbers where appropriate.
- b) Containers shall be stored out of the weather and direct sunshine where the conditions are within the temperature limits as outlined by PSP CANADA on the product label.
- c) All materials shall be stored in compliance with local fire and safety requirements.

## **1.6 ENVIRONMENTAL CONDITIONS**

- a) The polyurethane foam applications shall not proceed during periods of inclement weather. Do not apply the polyurethane foam for roofing applications below 5°C (10°F), when conditions are within 4°F of dew point or ambient air is above 85% relative humidity.
- b) Do not apply protective coatings when there is ice, frost, UV damage, surface moisture or visible dampness present on the surface to be coated. Apply protective coatings in accordance with PSP CANADA application instructions.
- c) Wind barriers may be used if wind conditions could affect the quality of the polyurethane foam or protective coating installation or concern of overspray.

## 1.7 SEQUENCING AND SCHEDULING

a) IN NEW CONSTRUCTION projects the spray polyurethane foam is installed when the deck, parapet walls, rough openings, and curbs are completed. Plumbing vents, drains, and electrical penetrations should all be in place prior to project beginning. There should not be any other trades-people working on the roof when PSP CANADA spray polyurethane foam and coating is being installed.

## 1.8 WARRANTY

a) PSP CANADA warranty agreements are available. Request for Warranty documents must be submitted to PSP Canada prior to project commencement with project to be completed by a PSP CANADA approved applicator in order to qualify for factory warranty.

## 1.9 SAFETY REQUIREMENTS

- a) Read PSP CANADA material safety data sheet (MSDS) and become familiar with the safety details of the product.
- b) Before starting to apply spray polyurethane foam or coating, all HVAC equipment on the roof must be turned off. These units and any other potential sources of air entry into the building must be sealed.

## PART 2 — PRODUCTS

### 2.1 POLYURETHANE FOAM

a) The polyurethane foam to be applied shall be a PSP CANADA product. PremiSeal™ 280 or 300 series is a two component system made by combining an isocyanate (A) component with a polyol (B) component

#### PREMISEAL™ 280 POLYURETHANE FOAM

	ASTM TEST	PROPERTIES	
Density (sprayed-in-place)	D-1692	43 kg/m <sup>3</sup>	2.7 lbs/ft <sup>3</sup>
Compressive Strength	D-1621	351Kpa	51 psi
Tensile Strength	D-1623	441Kpa	64 psi
Closed Cell content	D-2856	-	>93% (Minimum)
R-Value	C-177	-	6.4 initial 5.7 aged

b) Polyurethane Foam Primers: Primers used shall be as outlined by PSP CANADA earlier in this specification.

c) Fire Safety Requirements: Details on individual MSDS for each product being applied.

## 2.2 PROTECTIVE COATING

- a) The Elastomeric Coating System may be one or more of the following PSP CANADA types:
  - i) PremiCote™ 1339 Acrylic, PremiCote™ 929 Silicone (either product for slopes greater than 1 in 20)
  - ii) PremiCote™ 683 UV Polyurethane
  - iii) PremiCote™ 7625 Polyurea
- b) Each roof design may require a unique coating and or coating system. Consult PSP CANADA technical data to specify the type of coating best suited for your application and thickness involved. Note: Special consideration should be given to applications such as freezers and coolers which may exceed conventional moisture vapour drive conditions. Consult PSP CANADA for solutions to these applications.

## 2.3 ACCESSORIES AND MISCELLANEOUS MATERIALS

- a) Flashings and waterproof coverings for expansion joints shall be urethane because of compatibility of the PremiSeal™ 280 or 300 series polyurethane foam and elastomeric coating systems.
- b) Miscellaneous materials such as adhesives, elastomeric caulking compounds, metal, vents and drains shall be a composite part of the roof system and shall be those recommended by PSP CANADA and used with an appropriate primer as outlined earlier.
- c) Granules (Optional): When used, shall be dry and free of impurities and shall be applied in the final coat of the roofing coating system. Approximate coverage is 40 pounds of granules per 100 square feet surface area.

# PART 3 EXECUTION

## 3.1 GENERAL

- a. The issuer of the warranty PSP CANADA shall provide the final specification.

## 3.2 SURFACE PREPARATION AND PRIMING

### a. Built-up Roof (Retrofit)

- i. All loose gravel, dust and residue shall be removed using power vacuum equipment, power sweeper, air blowing, or other suitable means.
- ii. The roof shall be thoroughly inspected or tested to determine if moisture is present within the roof assembly. Saturated insulation must be removed.
- iii. The existing roof shall be thoroughly inspected for adhesion between felts, insulation, and deck. Areas of inadequate adhesion should be fastened. Blisters, wrinkles and fish mouths shall be cut out and deck allowed to dry.
- iv. All soft pitch mastic, silicones or other materials that impede urethane adhesion to be removed.
- v. Remove or re-fasten all loose base flashing, counter flashing and gravel stops as required.
- vi. The need may exist for structural design analysis to determine expansion joint requirements. Existing expansion joints should be inspected and repaired if necessary.
- vii. Lightning rods shall be masked prior to foaming. Lightning rod cables or other loose cables shall not be embedded in the polyurethane foam and should be removed prior to foaming. Electrical and mechanical conduits should be relocated or raised above the finished roof surface.
- viii. It is required to use one vapour relief vent per thousand square feet surface area. The BUR is to be cut down to above the vapour retarder to allow for proper breathing of the roof. Vents are to be spray foamed in place.

## **b. Metal Deck**

- i. The metal roof deck shall be constructed of a minimum 22 gauge steel. Construction shall conform to local building codes.
- ii. Ferrous Metal: Sandblast surfaces which are not pre-primed, shop painted, or otherwise protected in accordance with SSPC SP-6, Commercial Blast Cleaning. Remove loose rust and unsound primer from shop primed surfaces by scraping or wire brushing and apply PremiCote™ 900 over these repaired areas.
- iii. Non-Ferrous Metal: Clean galvanized metal or aluminum to remove any oily residue. Determine surface readiness by trying to bond duct tape to the surface cleaned. If tape has adhesion to surface then the substrate is ready for primer, if tape does not adhere repeat cleansing of surface as necessary.
- iv. If the metal surface is free of loose scale, rust, weathered or chalking paint, it can be cleaned using compressed air jet, vacuum equipment, and hand or power broom to remove loose dirt. Grease, oil or other contaminants should be removed using TSP (Trisodium Phosphate) cleaning solution, then rinsed with water and allowed to dry.
- v. Prime surface of galvanized or pre-finished metal using PremiCote™ 429 primer as outlined earlier.

## **c. Concrete**

- i. Remove loose dirt, dust and debris by brooming and using compressed air or vacuum equipment. Oil, grease, form release agents or other contaminants shall be removed with suitable cleaning solution or abrasive blasting.
- ii. All joint openings in concrete decks that exceed 1/4 inch shall be caulked using high grade polyurethane caulking prior to application of foam.
- iii. PremiCote™ 900 primer is required on all concrete surfaces. Poured concrete decks shall be allowed to cure for twenty-eight (28) days or until they have met design strength, (whichever occurs first) prior to the application of the PremiCote™ 900 primer.
- iv. PremiSeal™ 280 or 300 series sprayed polyurethane foam is not recommended for lightweight or insulating concretes unless tests have been made to determine that adequate adhesion can be obtained.

## **d. Wood**

- i. Plywood shall be exterior grade not less than ½ inch thick, fastened firmly in place. Attachment must meet building code requirements for resistance to wind uplift.
- ii. Plywood shall contain no more than 18% water, as measured in accordance with ASTM D 4444-84 or ASTM D 4442-84.
- iii. All untreated and unpainted wood surfaces shall be primed with PremiCote™ 900 primer. Priming is required to minimize moisture absorption and eliminate potential polyurethane foam adhesion problems.
- iv. Plywood joints in excess of 1/4 inch shall be taped or filled with a suitable urethane caulking material.
- v. Deck shall be free of loose dirt, grease, oil or other contaminants prior to priming or foam application. Remove loose dirt or debris by use of compressed air, vacuum or brooming. No washing shall be permitted.
- vi. Tongue & Groove, Sheathing, and Planking: Due to the frequency of joints, possibility of variable openings and effects of aging and shrinking, these surfaces must be overlaid with minimum 1/4 inch thick exterior grade plywood or suitable covering.



#### **e. Gypsum**

- i. Ensure boards are fastened as per requirements in the National Building Code.
- ii. Joints or gaps exceeding 1/4 inch shall be caulked with a compatible caulk.
- iii. Special care must be given to ensure gypsum products meet National Building Codes for thermal resistance are not allowed to get wet prior to application of urethane foam.
- iv. Remove all loose dirt and debris by compressed air or vacuuming.

### **3.3 POLYURETHANE FOAM APPLICATION**

#### **a. Inspection**

- i. For PremiSeal™ warranted projects the foam surface shall be inspected prior to application of the coating to insure that conditions required by Section 3.02 have been met.
- ii. Substrate shall have sufficient slope to eliminate excessive ponding water. Ponding is defined as an area of 100 square feet or more which holds in excess of 3/4 inch of water as measured 24 hours after a rainfall. If the substrate does not have sufficient slope, then the ponding water must be eliminated by building in slope by the application of additional polyurethane foam, channeling the polyurethane foam or by the proper placement of drains, or a combination thereof.
- iii. The polyurethane foam application shall not proceed during periods of inclement weather. The installer shall not apply the polyurethane foam below the temperature limits as specified by PSP CANADA for ambient air and substrate. It is recommended that wind barriers are used in conditions that may affect quality of installation.

#### **b. Application**

- i. The spray polyurethane foam shall be applied in accordance with the PSP CANADA instructions.
- ii. Existing low areas to be built-up to remove ponding water are to be filled in with spray polyurethane foam before the specified thickness of polyurethane foam is applied to the entire roof surface.
- iii. The spray polyurethane foam must be applied in pass thicknesses of 15mm to 50 mm. (1/2 - 2 inches)
- iv. Spray polyurethane foam overall thickness shall be a minimum of one inch (or more if specified). The polyurethane foam shall be applied uniformly over the entire surface with a tolerance of plus 1/4 per inch of thickness minus 1/4 inch, except where variations are required to insure proper drainage or to complete a feathered edge.
- v. The spray polyurethane foam shall be uniformly terminated a minimum of four (4) inches above the roof line at all penetrations (except drains, parapet walls, or building junctions). Foamed in place cants shall be smooth and uniform to allow positive drainage.
- vi. Detailing skylights is particularly important in that the spray polyurethane foam MUST be terminated below existing weep holes. DO NOT COVER WEEP HOLES WITH FOAM OR COATING.
- vii. The polyurethane foam surface shall be allowed to cure sufficiently. The full thickness of polyurethane foam in any area shall be completed prior to the end of each day. If due to weather conditions more than 48 hours elapse between polyurethane foam and coating application, the polyurethane foam shall be inspected for UV degradation, oxidation or contamination. If any of the above conditions exist, the surface shall be brushed and air blown to remove all loose dust prior to spraying any additional coating or urethane foam. After extended times it will be necessary to apply additional 1/2 inch urethane foam or 1-3 dry mils of PremiCote™ 1350 to the old prepared surface to seal the exposed urethane foam and drive off residual moisture.

### **c. Surface Texture**

- i. The final sprayed polyurethane foam surface texture shall be “smooth, orange peel or coarse orange peel.” Polyurethane foam surfaces termed “popcorn” or “tree bark” are not acceptable. Areas with a coarse surface texture shall be planed smooth and refoamed to an acceptable surface profile. Visual comparative references are available from PSP CANADA.
- ii. Any damage or defects to the polyurethane foam surface shall be repaired prior to the protective coating application.
- iii. The polyurethane foam surface shall be free of moisture, frost, dust, debris, oils, tars, grease or other materials that will impair adhesion of the protective coating.

## **3.4 PROTECTIVE COATING APPLICATION**

### **a. Inspection**

- i. Prior to the application of the protective coating the polyurethane foam shall be inspected for suitability of base coat application. The polyurethane foam shall be clean, dry, and sound and have suitable surface texture.
- ii. The cured dry film thickness of the finished multiple coat application shall be checked by taking slit samples and examining using a dial calliper and also under magnification if required. Areas that are found to have less than the thickness specified shall require additional coating. The use of PremiCote™ 1007 primer will be recommended when application of additional coating is beyond the recoat window of the top coat.

### **b. Application (base coat)**

- i. The base coat shall be applied the same day as the polyurethane foam application when possible. Allow one hour between application of the polyurethane foam and application of the base coat. If more than 48 hours elapse prior to the application of base coat, the polyurethane foam shall be inspected for UV degradation as per 3.03 C.
- ii. The polyurethane foam shall be free of dust, dirt, contaminants and moisture before application of the base coat.
- iii. The base coat shall be applied at a uniform thickness with the rate of application being governed by the polyurethane foam surface texture. Coatings shall be applied at such a rate as to give an overall minimum dry mil film thickness specified by PSP CANADA warranty outline.
- iv. The coating shall be allowed to cure and be inspected for pinholes, thinly coated areas, uncured areas or other defects. Any defects should be repaired prior to the second pass of coating. The base coat shall be free of dirt, dust, water and occur within the recoat window of the base coat before application of the top coat.
- v. The coating application shall not proceed during periods of inclement weather. The applicator shall not apply the protective coating below the temperature specified by PSP CANADA for ambient air and dew point conditions. Wind barriers may be used if wind conditions could affect the quality of installation.

### **c. Top Coat and/or Subsequent Coat**

- i. Application or Subsequent coat should be applied within the recoat window of the base coat to insure proper adhesion between coats. The use of PremiCote™ 1007 primer shall be used if the recoat window has been surpassed. Surface texture of polyurethane foam will affect dry film thickness—additional material may be required in areas of coarse foam surface profile. Top coat shall be applied to a thickness of 10 dft (dry film thickness).

### 3.5 GRANULE APPLICATION (Optional)

- a. When used shall be of the size and type (3M basaltic aggregate HV 105 white) or approved alternate by PSP CANADA. The granules must be embedded in the final pass of top coat while the coating is still wet. Application of roof granules to be done by broadcast methods or the use of sandblast equipment with air pressure reduced to allow the granules to slowly exhaust from the nozzle.

### 3.6 WALKWAYS

- a. Walkways may be installed for heavy traffic areas and around frequently serviced roof top units. Double coating thickness and slip resistant surfaces are recommended.

### 3.7 SAFETY REQUIREMENTS

- a. *Smoking and all sources of direct flame to be eliminated during foam and coating application.*  
 b. Refer to appropriate Materials Safety Data Sheets (MSDS) for additional safety information.  
 c. Before starting to apply spray polyurethane foam or coating all HVAC equipment on the roof must be turned off. These units and any other potential sources of air entry into the building must be sealed.

### 3.8 WARRANTY REQUIREMENT

#### QUALIFIED APPLICATOR GUIDELINES

##### Purpose of The Program

PSP CANADA has implemented programs to continually improve the public awareness and performance of Urethane Roofing Systems. These programs include training for the applicators on fixed ratio two component equipment, urethane foams and coating systems. Applicators that have successfully completed the PSP CANADA training can be certified as a PSP CANADA Qualified Applicator for roofing applications. This training is done to provide:

- 1) A service to the Owner and or specifier.
- 2) To enhance the knowledge and skills of those involved at all levels of the industry.

Projects requiring a warranty must be discussed and agreed upon prior to commencing the application. The procedure is:

1. Complete application for PSP CANADA Warranty
2. Substrate Inspection
3. Application & Final Inspection
4. Photos of Project
5. Slit Samples (for foam roofs only), document mil thickness for coatings on metal roofs
6. Applicator must be trained or approved by PSP CANADA for roofing applications

#### Base Criteria for PSP CANADA issued roofing warranty:

ROOF DESIGN	SYSTEM	5 YEAR	10 YEAR
Sloped Roofs – Sprayfoam Insulated (1 in 20 pitch or greater)	primer foam coating	1-1.5 dft 1.0 inch minimum 30 dft	1-1.5 dft 1 inch minimum 40 dft
Sloped Roofs - Coatings only (1 in 20 pitch or greater) not using urethane foam	primer coating	1-1.5 dft 15 dft total on steel 30 dft on Butyl tape only	1-1.5 dft 20 dft on steel 40 dft on Butyl tape only
Low Slope Roofs – Sprayfoam Insulated	primer foam coating	1-1.5 dft 1 inch minimum 40 dft	1-1.5 dft 1 inch minimum 50 dft
Minimum Square Footage	-	5,000 square feet	10,000 square feet
Additional Cost for Warranty	PSP CANADA inspection required	10 cents per square foot & \$500 plus expenses	15 cents per square foot & \$1000 plus expenses

dft = dry film thickness  
 All fees are in Canadian Funds