

POLYURETHANE FOAM SYSTEM SUMMARY

This is a generic summary of **IPC's** more detailed **POLYURETHANE FOAM SYSTEM SPECIFICATION**. For warranty purposes, Approved Applicators are responsible for studying, understanding, and following the specification. As always, contact **IPC** for technical assistance.

I. SURFACE PREPARATION

1. Install vapor barrier, one-way vents, expansion joints, flashings, and control joints where specified by foam manufacturer.
2. Pressure wash surface to be coated using TSP or other suitable cleaner and rinse with water.
3. Prime all non-painted or galvanized metal that will be coated (e.g., flashings, counterflashing, air handlers, penetrations, and the like).
4. Prepare surfaces to be foamed as specified by foam manufacturer.

II. POLYURETHANE FOAM APPLICATION

1. Apply a minimum foam thickness of 1 inch uniformly over entire surface. Variations are permitted where required for proper drainage (each lift must be at least 0.5" and ground down if less foam is desired).
2. Terminate foam cleanly a minimum of three inches above roof line on penetrations and parapets.
3. Repair damaged foam.
4. Complete expansion and control joints with **ACRYCAULK™**.
5. Caulk termination points requiring flashings with **ACRYCAULK™** and coat with **ACRYLINK G™**.

III. COATING APPLICATION

1. The surface to be coated must be clean and dry.
2. Apply **ACRYLINK G™** elastomeric roof coating with an airless sprayer or roller, giving special attention to bridged, flashed, and repaired areas.
3. Use an appropriate number of coats to achieve the correct millage. For **IPC** purposes, "pitched" refers to a roof with at least 1 in 12 pitch.
 - a. 5-year: 3.0 gallons of **ACRYLINK G™** per square total.
 - b. 10-year (pitched): 3.5 gallons of **ACRYLINK G™** per square total.
 - c. 10-year (flat): 4.0 gallons of **ACRYLINK G™** per square total.
 - d. 15-year (pitched): 4.0 gallons of **ACRYLINK G™** per square total.
 - e. 15-year (flat): 4.5 gallons of **ACRYLINK G™** per square total.
 - f. 20-year (pitched): 5.0 gallons of **ACRYLINK G™** per square total.
 - g. 20-year (flat): 6.0 gallons of **ACRYLINK G™** per square total.
4. Allow each coat to dry, inspect and repair as necessary before applying next coat.

IV. LIMITATIONS

1. This procedure is to be used only in conjunction with commonly accepted roofing and waterproofing standards.
2. No material shall be applied to wet, dirty, or frozen surfaces, or to areas of gross ponding water.
3. Polyurethane foam shall not be applied during inclement weather, at temperatures within 5 °F. of the dew point, or in winds above 15 mph (without adequate shielding).
4. **ACRYLINK G™**, **ACRYCAULK™** and **ISOPRIME™** shall not be applied during inclement weather, when a precipitation appears imminent, when the temperature is below 45 °F, when the relative humidity exceeds 85%, or within 4 hours of sundown.
5. In order to qualify for factory warranty, applicator must have Approved Applicator status, the roof must meet the square foot minimum, the **ACRYLINK G™** membrane must be continuous, and the membrane must meet the TDM minimum.
6. In conjunction with the final inspection, all debris, material, and equipment are to be removed from the job site, leaving the area in an undamaged and acceptable condition.

POLYURETHANE FOAM SYSTEM SPECIFICATION

Section 1.0 Scope

The intention of this specification is to outline procedures for the application of an **ACRYLINK G™** elastomeric coating membrane for the purposes of installing a polyurethane foam and **ACRYLINK G™** roof. This specification describes materials, methods, and conditions necessary for the proper installation of this membrane.

- 1.1 This integrated system complies with all model building codes for roofing. Additionally, it constitutes one of the most cost-effective methods of insulating and waterproofing commercial and industrial roofs.
- 1.2 This system is only to be used in conjunction with commonly accepted roofing and waterproofing standards.
- 1.3 Any substantial deviation from these specifications shall be referred to an authorized representative of **Isothermal Protective Coatings, Inc. (IPC)**.

Section 2.0 Materials

All materials shall be manufactured or approved by **IPC**, and shall meet the following minimum specifications:

- 2.1 Polyurethane Foam

In Place Density (Nominal).....	3.0 lbs/ft ³
Core Density (Nominal).....	2.8 lbs/ft ³
Moisture Vapor Transmission	2-3 perm in.
k Factor (varies with age and use conditions)	0.15
Compressive Strength	45 psi
Closed Cell Content	Over 90%
Flame Spread, 2 in. thick (ASTM E-84)	Less than 75
- 2.2 **ACRYLINK G™** Elastomeric Coating

Vehicle Type.....	Crosslinking Acrylic
Pigment to Vehicle Ratio	1.5 to 1
Solids (Volume).....	63%
Elongation	360%
Tensile Strength.....	304 psi
Permeance @ 45 mils	2.21 perms
Reflectivity (White)	79%
- 2.3 **ACRYCAULK™** Brush or Trowel Grade Sealant

Vehicle Type.....	100% Acrylic
Pigment to Vehicle Ratio	1.97 to 1
Solids (Volume).....	70%
Elongation	325%
- 2.4 **ISOPRIME™** Corrosion Inhibiting Primer

Vehicle Type.....	Phenolic Modified Alkyd
Solids (Weight)	57.5%
Weight (per gallon)	11.25 lbs.
Color	White
- 2.5 **ISOPHOS™** Phosphating Solution

Active Ingredient	Phosphoric Acid (H ₃ PO ₄)
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- 2.6 Delivery and Storage
 - 2.6.1 Materials shall be delivered in their original, tightly sealed containers or unopened packages, clearly labeled with the manufacturer's name, Underwriter's Laboratories file number, and—where appropriate—product identification and lot numbers.
 - 2.6.2 Materials shall be kept from freezing, and shall be stored out of the weather, in their original tightly sealed containers or unopened packages, as recommended by the manufacturer.

Section 3.0 Contractor

- 3.1 The polyurethane foam and **ACRYLINK G™** elastomeric coating membrane system shall be applied by a single, experienced, and competent contractor or applicator, approved by **IPC**.
- 3.2 Contractor or applicator shall be responsible for selecting and supplying all labor and supervision and shall be responsible for furnishing all materials required to complete the job satisfactorily, in accordance with manufacturer's specifications.

- 3.3 Contractor or applicator shall be responsible for assessing and determining the integrity of the existing substrate. All structural repairs (including, but not limited to, the installation or repair of crickets, scuppers, roof drains, one-way vents, and the like) as well as the elimination of areas of gross ponding water, shall be the exclusive responsibility of the contractor or applicator.
 - 3.3.1 All installations or repairs shall be completed before foam or coating application commences.
 - 3.3.2 The industry standard definition of gross ponding water is ½ inch or more of water, standing on a 100 square foot or more area, 24 hours or more after a precipitation. Contractor shall be responsible to address and eliminate all such areas before coating application commences.
 - 3.3.3 All installations or repairs shall be performed in accordance with commonly accepted roofing and waterproofing standards and practices.
 - 3.3.4 An authorized representative of **IPC** may be consulted for technical assistance in such matters.

Section 4.0 Surface Preparation—Cleaning and Priming

Preparations shall include all requirements specified by the foam manufacturer and/or **IPC** to ensure adequate adhesion of the polyurethane foam to the substrate surface.

Preparation shall include, but shall not be limited to, the following:

- 4.1 All unnecessary and non-functional equipment, conduit, and debris shall be removed from the roof.
- 4.2 All structural repairs or installations shall be completed before polyurethane foam or coating application commences, including but not limited to the following:
 - 4.2.1 A vapor barrier shall be installed where specified or required by the foam manufacturer.
 - 4.2.2 One-way or pressure-relief vents shall be installed where specified or required by the foam manufacturer.
 - 4.2.3 Expansion joints shall be installed where specified or required by the foam manufacturer.
 - 4.2.4 Flashings shall be installed where specified or required by the foam manufacturer.
 - 4.2.5 Control joints shall be installed where specified or required by the foam manufacturer.
- 4.3 **PLEASE NOTE:** Polyurethane foam and coating shall be applied to parapet walls, the bases of air handling equipment, penetrations, and the like. Consult sections 5.0 and 7.0 of this specification for further details. These surfaces must be adequately prepared in order to ensure adhesion.
 - 4.3.1 All masonry surfaces to be foamed or coated shall be wire-brushed before pressure washing in order to remove all dust.
 - 4.3.2 All oxidized metallic surfaces to be coated shall be wire-brushed or otherwise abraded before pressure washing in order to remove as much rust and scale as possible.
- 4.4 The entire surface to be foamed or coated—including, but not limited to, sections of parapet walls, penetrations, air handling equipment, and the like—shall be pressure washed as necessary in order to remove all dust, dirt, debris, chalk, oil, tar, and the like the substrate surface. A suitable cleaner, such as TSP, and a broom shall be used as necessary. If a cleaner is required, the surface shall be rinsed with water to remove residue.
- 4.5 Priming of Metallic Surfaces

All metal flashings, expansion joints, penetrations, and other metallic surfaces that are to be foamed or coated shall be prepared according to the following procedure:

 - 4.5.1 As much loose rust and scale as possible shall already have been removed by abrasion (wire brush or other suitable instrument) from oxidized areas that are to be foamed or coated.

- 4.5.2 All oxidized areas shall be pre-treated with **ISOPHOS™** phosphating solution, or equal, according to the following procedure:
- 4.5.2.1 **ISOPHOS™** may be applied by brush, mop, low-pressure hand pump sprayer, or another suitable instrument.
- 4.5.2.2 **ISOPHOS™** shall be applied to all oxidized areas and these surfaces shall be kept wet with **ISOPHOS™** until the reddish color of the rust turns grayish in color. The amount of time required to complete this procedure will vary as the amount and degree of oxidization varies.
- 4.5.2.3 After the reaction has been completed, the areas treated with **ISOPHOS™** shall be rinsed clean with water.
- 4.5.3 Phosphated surfaces shall be allowed adequate time to dry before primer application commences.
- 4.6 Primer application shall not commence during inclement weather, when a precipitation appears imminent, when the temperature is below 45 °F, or when the relative humidity exceeds 85%. To provide adequate curing time, primer application shall terminate a minimum of two (2) hours before sundown.
- 4.7 All surfaces to be primed with **ISOPRIME™** corrosion inhibiting primer shall be free of dust, dirt, tar, oil, moisture, frost, or any other material that would impair the adhesion of the primer to the substrate surface.
- 4.8 Using conventional airless spray equipment or a brush, all galvanized, phosphated, and non-painted metallic surfaces that are to be foamed or coated—including, but not limited to, metal flashings, expansion joints, air handling equipment, penetrations, and the like—shall be primed with **ISOPRIME™** at a rate of 250 to 400 square feet per gallon.
- 4.9 Primer shall be allowed to cure for approximately two (2) hours, depending upon temperature and relative humidity, after which an inspection shall be performed. Additional **ISOPRIME™** shall be applied to any areas where there are voids in the primer coat, in order to make the coat continuous.
- 4.10 Any surface not mentioned above shall be prepared in accordance with foam manufacturer's specifications before polyurethane foam application commences.

Section 5.0 Polyurethane Foam Application

- 5.1 Polyurethane foam application shall not commence during inclement weather, at temperatures within 5 °F. of the dew point, or in winds above 15 mph (without adequate shielding).
- 5.2 Entire surface to be foamed shall be free of dust, dirt, tar, oils, moisture, frost, or any other material that would impair the adhesion of the polyurethane foam to the substrate surface.
- 5.3 All surfaces to be foamed shall have been prepared in accordance with the procedures specified by foam manufacturer.
- 5.4 Polyurethane foam thickness shall be a minimum of one (1) inch, applied uniformly over the entire surface with a tolerance of plus 0.25 inches, minus 0 inches, except where variations are required to ensure proper drainage or to complete a feathered edge.
- 5.5 Polyurethane foam shall be applied in such a way so as to eliminate all areas of gross ponding water, in accordance with section 3.3.2 of this specification.
- 5.6 In roofing applications, polyurethane foam shall be terminated cleanly at least three (3) inches above the roof line on all penetrations and parapet walls. Sprayed-in-place cants shall be smooth and uniform to allow positive drainage.
- 5.7 Polyurethane foam should be deposited in uniform passes of 0.5 to 1.0 inch. Pass thickness will vary as a function of substrate temperature, ambient air temperature, and machine output.

Section 6.0 Polyurethane Foam Surface Preparation

- 6.1 Finished surface of applied polyurethane foam shall be free of ridges, bumps, and depressions, and shall be in an acceptable condition to be coated. Rough surfaces described as popcorn or tree bark shall be unacceptable.

- 6.2 **ACRYLINK G™** coating shall be applied to the polyurethane foam surface as soon as possible after foam has cured sufficiently, in accordance with foam manufacturer's recommendations. Typically, this is one to two (1-2) hours after application. In no case shall polyurethane foam be left uncoated for more than forty-eight (48) hours.
- 6.3 Any damage to the polyurethane foam surface shall be repaired before coating application commences.
- 6.4 Expansion and control joints shall be completed using **ACRYCAULK™** sealant, or approved equal, if required, in accordance with foam manufacturer's recommendations, before coating commences.
- 6.5 Flashing Installation
All additional flashings specified or required by foam manufacturer shall be installed and completed before coating application commences.
- 6.5.1 All areas to be flashed shall be free of dust, dirt, tar, oils, moisture, frost, or any other material that would impair the adhesion of **ACRYCAULK™** sealant or **ACRYLINK G™** elastomeric coating to the substrate surface.
- 6.5.2 Termination points requiring flashing shall be caulked with **ACRYCAULK™** sealant or equal.
- 6.5.3 After sealant has skinned over, **ACRYLINK G™** shall be applied at a rate of one (1) gallon per 100 square feet to an area at least four (4) inches on either side of the sealant bead.
- 6.6 After completing this procedure, the newly flashed areas shall be allowed to cure overnight. Before coating application commences, all such areas shall be inspected and repaired, as necessary, with **ACRYCAULK™** sealant, or approved equal.
- 6.7 **ACRYLINK G™** coating shall again be applied over flashed areas during normal coating operation procedures.

Section 7.0 Coating Application

- 7.1 Coating application shall not commence during inclement weather, when a precipitation appears imminent, when temperature is below 45 °F, or when relative humidity exceeds 85%. To provide adequate curing time, coating application shall terminate at least four (4) hours before sundown.
- 7.2 Entire surface to be coated shall be free of dust, dirt, tar, oil, moisture, frost or any other material that would impair the adhesion of **ACRYLINK G™** elastomeric coating to the substrate surface.
- 7.3 All metallic surfaces to be coated shall have been prepared in accordance with the procedures specified in sections 4.0 of this specification.
- 7.4 **ACRYLINK G™** elastomeric coating: Base Coat
- 7.4.1 The base coat of **ACRYLINK G™** shall be applied at 1½ gallons per 100 square feet using conventional airless spray equipment or rollers.
- 7.4.2 Coating shall be applied so as to cover the substrate uniformly. All flashed, bridged or repaired areas (as described in section 6.0) shall be coated again at this time, and during each subsequent coat.
- 7.4.3 Wherever possible, coating shall be applied at least three (3) inches beyond the polyurethane foam termination point on all parapet walls, penetrations, air handling equipment, and the like.
- 7.4.4 The base coat may be applied in more than one pass, if desired, to accelerate curing, provided adequate curing time has been allowed between passes to prevent damage from being done to the membrane when it is walked upon.
- 7.4.5 **IPC** recommends the use of a darker color, like gray, for the base coat, as it cures much faster than a lighter color, such as white.

- 7.4.6 The base coat shall be allowed to cure for at least two (2) hours, depending on temperature and humidity conditions, after which an inspection shall be performed. Any defects in the coating membrane shall be repaired with **ACRYLINK G™** or an approved building sealant.
- 7.5 **ACRYLINK G™** elastomeric coating: Subsequent Coats
- 7.5.1 **IPC** recommends that **ACRYLINK G™** coating be applied in contrasting color coats to improve coverage and spray pattern. Order of application shall be as contractor specifies.
- 7.5.2 The surface of the **ACRYLINK G™** base coat, and all subsequent coats, shall be free of all moisture, dirt, and debris before a subsequent coat is applied.
- 7.5.3 The second coat of **ACRYLINK G™** shall be applied as soon as practical, within 24-72 hours of the application of the base coat.
- 7.5.4 The second coat, and all subsequent coats, shall be applied at a right angle to the direction in which the previous coat was applied. For example, if the previous coat was applied with a north-south motion, the subsequent coat shall be applied with an east-west motion.
- 7.5.5 The second coat, and all subsequent coats, shall be applied by conventional airless spray or roller at the rate specified to achieve the TDM minimum in a reasonable number of coats. Each coat shall completely mask the color of the previous coat.
- 7.5.6 The second coat, and all subsequent coats, may be applied in more than one pass, if desired, to accelerate curing, provided adequate curing time has been allowed between passes to prevent damage from being done to the membrane when it is walked upon.
- 7.5.7 Subsequent coats shall be applied by conventional airless spray or roller at the rate required to achieve the TDM minimum. It is essential to realize that the true surface area may be greater than the apparent surface area because of surface texture or profile. In order to achieve the TDM minimum on such a surface, the application rate must be increased appropriately.
- 7.5.8 Each coat shall be allowed to cure for at least four (4) hours, depending upon temperature and humidity conditions, and inspected and repaired as necessary, before a subsequent coat is applied.
- 7.6 The cured **ACRYLINK G™** elastomeric coating system membrane shall be TDM minimum in all areas and shall be free of all pinholes and defects.
- 7.7 Required spread rates for the **ACRYLINK G™** membrane are as follows:
- 7.7.1 5-year application: 3.0 gallons per 100 square feet of **ACRYLINK G™** total (30 dry mil average, 25 dry mil minimum).
- 7.7.2 10-year application (pitched): 3.5 gallons per 100 square feet of **ACRYLINK G™** total (35 dry mil average, 30 dry mil minimum).
- 7.7.3 10-year application (flat): 4.0 gallons per 100 square feet of **ACRYLINK G™** total (40 dry mil average, 35 dry mil minimum).
- 7.7.4 15-year application (pitched): 4.0 gallons per 100 square feet of **ACRYLINK G™** total (40 dry mil average, 35 dry mil minimum).
- 7.7.5 15-year application (flat): 4.5 gallons per 100 square feet of **ACRYLINK G™** total (45 dry mil average, 40 dry mil minimum).
- 7.7.6 20-year application (pitched): 5.0 gallons per 100 square feet of **ACRYLINK G™** total (50 dry mil average, 45 dry mil minimum).
- 7.7.7 20-year application (flat): 6.0 gallons per 100 square feet of **ACRYLINK G™** total (60 dry mil average, 55 dry mil minimum).
- 7.7.8 For the purposes of **IPC** specifications, "pitched" refers to a roof with a minimum slope of 1 in 12.
- 7.8 Having completed the procedures specified above, and having achieved the TDM minimum in all areas, the **ACRYLINK G™** membrane shall be given adequate time to cure.
- 7.9 For a minimum of thirty (30) days after the **ACRYLINK G™** membrane has been applied, contractor shall be responsible to inspect the membrane after every precipitation.
- 7.9.1 Contractor shall carefully remove water from small ponding areas ("birdbaths") with an air blower, without damaging the **ACRYLINK G™** membrane.
- 7.9.2 Areas of gross ponding water shall have been addressed and eliminated prior to coating application, in accordance with commonly accepted waterproofing and roofing practices.

Section 8.0 Clean-Up

Upon completion of all work covered in this specification, and before the job is inspected, the contractor shall remove all equipment, material, and debris, leaving the area in an undamaged and acceptable condition. In no case shall the job be considered complete before the job site has been properly cleaned.

Section 9.0 Limitations

This system is to be used only in conjunction with commonly accepted waterproofing and roofing standards including but not limited to the following:

- 9.1 In order to qualify for a factory warranty, applicator must have Approved Applicator status, the roof must meet the square foot minimum, the **ACRYLINK G™** membrane must be continuous, and the membrane must meet the TDM minimum.
- 9.2 No application of component materials shall commence during inclement weather, when a precipitation appears imminent, when temperature is below 45 °F, or when relative humidity exceeds 85%.
- 9.3 No material shall be applied to wet, dirty, or frozen surfaces.
- 9.4 Coating application shall not commence until all other trades are off of the roof.
- 9.5 Coating shall not be applied to areas of gross ponding water. Contractor shall address and eliminate areas of gross ponding water prior to coating application.
- 9.6 In conjunction with the final inspection, all debris, material, and equipment are to be removed, leaving the area in an undamaged and acceptable condition.