

Rhino Linings DuraTite 1395 and DuraTite Spray Polyurethane Foam (SPF) system over Modified Bitumen or Built-Up Roofing substrates

NOTE: These specifications were current at the time of publication but are subject to change without notice. Please confirm the accuracy of these specifications with the manufacturer and/or distributor prior to installation.

SPECIFIER NOTE: This guideline does not outline all procedures for preparation and finishing of penetrations, drains, flashings, etc. This work should be outlined separately by the contractor/applicator before the work commences and shall be performed in a manner consistent with best trade practices and local building code.

This specification is based on systems manufactured by Rhino Linings Corporation, 9747 Businesspark Avenue, San Diego, CA 92131 Telephone: 1-800-422-2603, FAX 858-450-6881, www.rhinolinings.com. For assistance with specific product applications or with editing sections for your specific application, please contact the manufacturer.

Compliance with all Application Guide Specifications contained herein is required for participation in the Rhino Linings® DuraTite® Warranty Program. Prior to the start of a project a Rhino Technical Representative must inspect the proposed project and give written approval before project is eligible for warranty.

PART 1 — GENERAL

1.1 SUMMARY

- A. These Application Guide Specifications outline the materials, methods and conditions required for the proper application of the **Rhino Linings DuraTite® Spray Polyurethane Foam (SPF) and DuraTite 1395 silicone coating roofing system on existing Modified Bitumen (Mod Bit) and BUR substrates**. Actual application requirements may vary and are the responsibility of the contractor.
- B. The existing roof deck and substrate must be in sound condition and must demonstrate industry acknowledged typical effects from aging and use. With proper application the DuraTite foam and coating systems will provide a weather tight seal that protects the substrate from further damage caused by ultra violet light, water and other normal weathering hazards. When applied in accordance to the following specifications, the DuraTite foam and coating system will renew, seal from elements, have reflective properties, add R-value and extend the life of an existing roof.
- C. To qualify for application of this coating system a roof must have positive drainage and no standing water prior to application of foam and coating system.

1.2 APPROVED CONTRACTOR

- A. All Rhino Linings DuraTite foam and coatings shall be applied by a Rhino Linings qualified contractor in order to qualify for the DuraTite Warranty Program.

- B. This guideline does not outline all procedures for preparation and finishing of penetrations, drains, flashings, etc. This work should be outlined separately by the contractor/applicator before the work commences and shall be performed in a manner consistent with best trade practices.

1.3 SUBMITTALS

- A. Product data shall consist of product Safety Data Sheets (SDS) and Technical Data Sheets (TDS) and Application Guide Specifications.
- B. Warranty documentation: Submit manufacturer's standard warranty.
- C. Additional installation procedures from Rhino Technical Representative as required for any unique roof characteristics or desired performance standards.
- D. For any job which will require a **Rhino Linings DuraTite® Labor & Material Warranty**, certification from Rhino Linings that the Contractor is qualified to perform the application and eligible to submit the job for a warranty.

1.4 PREINSTALLATION MEETINGS

- A. A pre-installation meeting shall be held a minimum of one week prior to the start of the project. All parties, including the General Contractor, Architect, applicators and manufacturer's representative must be present. A review of the materials, protection of surrounding property, surface preparation, application, cleaning, safety, coordination with other trades and field quality control shall be discussed.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
 - 1. Manufacturer has produced spray polyurethane foam roofing systems similar to that specified for a minimum of 10 years.
 - 2. Manufacturer is certified to ISO 9001:2008
- B. Applicator's Qualifications:
 - 1. Applicator regularly engaged, for a minimum of 5 years, in application of spray polyurethane foam roofing systems of similar type to that specified.
 - 2. Certified by manufacturer to submit project for manufacturer's warranty.
 - 3. Use persons trained by manufacturer in spray polyurethane foam roofing system application OR certified by SPFA Professional Certification Program as SPF Roofing Master Installer.

1.6 PRODUCT HANDLING, STORAGE, & SAFETY

- A. Materials shall be delivered to jobsite or contractor in original, unopened containers with manufacturer's original labeling intact and clearly displaying product name, safety information, and batch/lot numbers.
- B. Material shall be handled in accordance with manufacturer's storage and handling requirements as outlined on Product Data Sheets (PDS) and shall comply with local fire & safety requirements.
- C. Material that appears to have been damaged or frozen in transit, or bearing any other visible defect shall not be used or installed and shall be immediately removed from work site and returned to manufacturer upon discovery. All received materials should be stored out of direct sunlight and protected from extreme hot or cold temperatures. Extreme temperatures will adversely affect the product within the containers.
- D. Do not heat "B" drums with band heaters unless specifically designed as low mass and suitable for 245fa blown material. Do not recirculate 'B' material through the main heaters, as it will froth when heated to over 60F when pressure is released. Heating material with band heaters or recirculation through main heaters is not recommended.
- E. Prior to SPF roof installation all who are going to be present during installation shall review Center for the Polyurethane Industry (CPI) Bulletin AX-205, "Working with MDI and Polymeric MDI: What You Should Know", or complete the on-line health and safety course at www.spraypolyurethane.org.
- F. Prior to SPF roof and/or coating installation all who are going to be present during installation shall review appropriate Safety Data Sheets (SDS) provided by manufacturer.
- G. Proper PPE should always be used throughout the entire roofing project.
- H. Reinstall bungs on empty drums and dispose of containers in accordance with local and state regulations. Do not reuse empty containers.
- I. Refrain from open flame such as welding and smoking while loading, pouring or application of Spray Polyurethane Foam or coating system.
- J. Prior to SPF roof and/or coating installation contractor must post all appropriate hazard signs in accordance with OSHA jobsite safety standards and take appropriate measure to notify building occupants and jobsite workers of any potential risks if necessary.

1.5 JOBSITE AND ENVIRONMENTAL CONDITIONS

- A. Contractor shall not proceed with application of any DuraTite® SPF or coatings unless jobsite, Ambient, surface, material, material component temperatures and moisture conditions are acceptable as specified by manufacturer on Product Data Sheets (PDS).
- B. Apply DuraTite CC spray polyurethane foam when temperatures are above 50F. Substrate temperatures should be 60 degrees and rising. Note: Cold ambient and substrate temperatures will adversely affect the finished product resulting in poor product application and performance.
- C. Recommended processing temperatures depend on environmental and substrate conditions. Optimum ISO and resin temperature range is between 110 and 145 degrees F. Smaller spray tip sizes may be needed in order to allow material to achieve optimal temperature.

- D. Products should not be applied if the wind velocity is over 12 mph. The use of windscreens and enclosures may be used for overspray protection. Caution should be taken to avoid overspray. Blisters in the top pass of the foam may appear if applied to areas of overspray.

NOTE: For application within a tented enclosure all workers within the tent must wear fresh air respirators.

- E. Do not apply DuraTite products over moist substrates or when rain or inclement weather is imminent.

PART 2 — PRODUCTS

2.1 SPRAY POLYURETHANE FOAM (SPF), COATINGS AND RELATED MATERIALS

- A. All Materials used shall be supplied by Rhino Linings and shall meet or exceed specifications and physical properties as outlined in Product Data Sheets (PDS).
- B. Materials approved for use in the Rhino Linings DuraTite® Spray Polyurethane Foam (SPF) Roofing Program include:
1. DuraTite® CC Roofing SPF available in 2.5 – 3.0 lbs./cu. ft. densities
 2. Primer – DuraTite Prime 1025 or DuraTite Prime 2100
 3. DuraTite® 1395 High Solids Silicone Base & Top Coat
- C. No Substitutions may be used in this specification, Rhino Linings shall be a single source for spray polyurethane foam, silicone coating and primer. All materials shall be from a single manufacturer.

2.2 SPRAY POLYURETHANE FOAM

- A. Spray Polyurethane Foam: DuraTite CC 3.0 closed-cell, spray-applied, polyurethane foam (SPF) insulation. Reference Rhino Linings Product Data Sheets for specific physical properties.

2.3 PRIMERS

- A. DuraTite Prime 1025 is a single component, water-based, black primer used to enhance adhesion of SPF to a variety of substrates, to help gain solar heat to dry or condition a substrate, and to protect newly sprayed SPF until the next day. Reference Rhino Linings Product Data Sheet for information on physical properties
- B. DuraTite Prime 2100 is a two-component epoxy-based primer used to seal porous surfaces and enhance adhesion of SPF and silicone coating to a variety of substrates. Reference Rhino Linings Product Data Sheet for information on physical properties

2.4 ROOF COATINGS

- A. Silicone Roof Coating: DuraTite 1395 High Solids single-component, liquid applied, silicone roof coating. Reference Rhino Linings Product Data Sheet for information on physical properties

NOTE: Ponding water is a sign of possible mechanical failure in the roof. Water must be intentionally diverted from ponding areas using accepted roofing practices and low areas in any roofing system should be inspected for structural integrity.

PART 3 — PREPARATIONS

3.1 EXAMINATION

- A. Examine areas to receive spray polyurethane foam roofing system for trapped moisture, poor attachment, blistering and total number of roof systems currently on the roof. The substrate should be clean, dry and in sound condition.
- B. Notify Architect, general contractor and Rhino Linings Representative of conditions that would adversely affect application
- C. Application of system may not commence until unacceptable conditions are corrected and all surface preparation is complete.

3.2 SURFACE PREPARATION

- A. Preparation shall include all requirements contained herein and potentially additional requirements as specified by Rhino Linings after roof inspection to ensure proper adhesion and performance of SPF and/or coatings. An adhesion test is required and shall be the responsibility of the contractor for all roofs submitted for a **Rhino Linings DuraTite® Labor & Material Warranty**. New galvanized metal flashings and surfaces must be cleaned or treated with surface conditioners approved by the manufacturer.
- B. Remove dirt, dust, debris, oil, grease, rust, loose scale, ice, frost, moisture, and other surface contaminants which could adversely affect application of spray polyurethane foam roofing system.
- C. The roof shall be thoroughly inspected or tested to determine if moisture is present within the roof assembly, through use of non-destructive infra-red thermal scanning or nuclear testing equipment. Saturated insulation and substrate materials must be removed and replaced with compatible materials. Test cuts must be made to evaluate layers of existing roofing material and confirm the adhesion and/or attachment of existing roof systems.
- D. The existing roof shall be thoroughly inspected for adhesion between felts, insulation, and deck. Areas of poor adhesion should be fastened. All blisters, buckles, wrinkles and fish mouths shall be cut out and/or fastened.
- E. Blisters larger than 6 inches should be cut and removed from the deck. All Blisters less than 6 inches in diameter flashing cement may be used if existing roofing will conform to deck. For blisters in need of additional work, spud the gravel surface from the blister area, slit and fasten

- to the roof deck using appropriate size screws and plates. When on non-nailable substrates, blisters must be removed down to the original deck.
- F. Remove ridging of felts by cutting out and obtaining a smooth surface for re-roofing. For roofs with gravel surfacing, spud the gravel from edges to provide a smooth surface and to allow new fasteners to seat well over these areas. Cut the ridge and re-attach both sides of the ridge with screws and plates. Any deep voids left from the removal of the ridge may be filled with elastomeric caulking material (not silicone).
 - G. When insulation board has been compromised and in need of replacement, the area must be leveled prior to re-roofing. Insulation boards or spray in place polyurethane foam may be used. The replacement material must match the original roof level. Any loose material at the perimeter of the removal area must be re-attached to the substrate using screws and plates 6 inches on center.
 - H. Wet or dry vacuum to remove gravel, dirt and debris from the roof surface to receive coating system. Oil, grease, and other contaminants may be removed with appropriate cleaning solutions and or methods. Note: repairs and attachment of the substrate should be done prior to cleaning. Care should be taken so water does not get under the substrate.
 - I. For roofs with 2 or more layers, the roof must be brought down to its original deck. Remove all existing build-up roofing, base flashing, pitch pans, parapet wall coverings and insulation down to the original substrate. Excess asphalt in the form of nodules needs to be removed by spudding. Mechanical fasteners should be removed or ground or cut flush with original substrate. Any deteriorated decking or sheathing must be replaced, and fastened using fastening patterns that conform to wind uplift resistance requirements for the area. If applicable, check with code officials for proper deck preparation. Do not remove more material than what can be complete in one day. New roofing may need protection from rain and dew.
 - J. When used, insulation or cover boards shall be firmly butted together along all edges without gaps or openings. Joints exceeding 1/4 inch shall be caulked with a suitable sealant material. Special care must be taken to prevent these materials from getting wet in storage on the job site and after installation prior to being protected by polyurethane foam. Moisture exposure will damage these materials and may be a cause for replacement. The installed materials shall be protected from spills of contaminants such as oil, grease, solvents, etc., as these materials cause soiling that cannot be readily removed from the board surfaces.
 - K. The roof may require structural design analysis to determine expansion joint requirements. Existing expansion joints should be inspected and repaired if necessary.
 - L. Lightning rods shall be masked prior to foaming. Lightning rod cables shall not be embedded in the polyurethane foam or coating and should be moved prior to application of foam and coating. Electrical and mechanical conduits should be relocated or raised above the finished roof surface. Only qualified personnel must install lightning protection equipment and perform electrical work.
 - M. All soft mastic or other materials that impede polyurethane adhesion shall be removed or covered with a mechanically fastened recover board.
 - N. Roof surfaces must be free of all loosely adhered asphaltic or granular roofing elements. Removal efforts may include the use of pressure-washers, scrapers, wire brushes, wire-wheels, or other similar tools

- O. Verify that edge-nailer boards are in sound condition and well-attached. Remove or refasten all loose base flashing, counter flashing and foam edge metal or gravel stops as required.
- P. Fasteners & Gutter Straps must be re-tightened; all loose or stripped fasteners must be replaced with larger diameter fasteners, and the area re-secured by adding a new fastener next to the one that was stripped. All missing fasteners must be replaced.
- Q. All roof penetrations, curbs, vent stacks and related roof penetrations are to be flashed in accordance with roof manufacturer's specifications. All laps and wall flashings are to be repaired in accordance with roof manufacturer's specifications.

3.3 DETAILS - GENERAL

- A. Where detail involves SPF, use primer as needed for adhesion to new or existing surfaces. Detail work should be completed and SPF flashing done before SPF is applied to the field of roof.
- B. When new curbs or equipment stands are needed, consult with HVAC supplier, structural engineer, architect and owner for design requirements.
- C. New wood box platforms should be built so the top is at least 8 inches above the height of the foamed roof. The top should be covered by a waterproofing membrane and a seamless sheet of galvanized or stainless steel metal, formed to extend down the sides at least 2 inches. Tie in to the SPF roof deck should be done the same as instructions for other curbed supports.
- D. If existing equipment is on wood sleepers or other support on the roof and needs to be raised to allow for application of SPF, the existing ducts, gas and/or coolant piping, and electrical conduit should be removed by a qualified person and re-attached upon completion of the SPF work.
 - 1. If gas line, coolant or condensate connections are new and only stubbed- out, they must be a minimum of 24 inches above the finished grade of the roof and supported at the roof deck.
 - 2. Lines which penetrate through the roof assembly should be run through a roof penetration housing which limits water, air and thermal transfer between the inside and outside of the building envelope.
 - 3. All conduit and gas lines must be raised off the roof. After the roof has been foamed, the conduit can be reset on conduit or pipe supports, or 2"x4" redwood set on top of the foam with walk pads under the wood. Old wood supports shall not be reused.

3.4 DETAILS – ROOF DRAINS, SCUPPERS, AND EDGES

- A. All internal roof drains shall be flushed with water to insure that the drains are clear to the discharge level prior to starting the roofing work.
- B. Remove the clamping ring from the drain bowl. Remove and replace broken bolts as necessary. Remove all BUR materials from the drain bowl flange and for a minimum distance of 18-inches around drain. Fasten the edge of the remaining BUR materials to the roof deck with appropriate fasteners. Apply a bead of urethane sealant to the bottom of the clamping ring and refasten it with new bolts. Remove excess sealant.

- C. When applying SPF, mask the inside of the drain and spray foam from the surrounding area and onto the side walls of the drain opening, without reducing the internal diameter of the drain pipe. The foam on the outside of the clamping ring must be to at least the height of the clamping ring, so water flows freely over the ring and into the drain. Grind excess foam flush with the top of the clamping ring. The elastomeric coating shall be applied and “back rolled” to achieve double the coating thickness compared to the field of the roof. Flush drains (a second time) with water to insure that the drains are clear to the discharge level after all roofing work is completed. All internal drains shall have metal strainers or leaf catchers which are securely fastened to the ring.
- D. Scuppers must be evaluated for restrictions on the size of the opening and for the condition of the existing metal. All existing roof material should be removed from the scupper, including the flange. Cut back existing roofing material as needed from the area around the scupper to provide positive drainage. For existing metal which can be reused, clean and prime as needed. Fasten scupper into roof deck and wall according to local codes and instructions for the scupper. Ensure that spout of scupper has proper angle so no water runs from the outside edge back to the building wall. Apply sealant to roof deck and bottom of scupper assembly before installation, and to any joints within the scupper assembly. Spray foam onto the primed scupper flange, and spray coating 4 inches beyond the termination of the SPF. Follow local building code requirements regarding overflow drains and scuppers.
- E. Edges
1. Investigate existing perimeter edge to evaluate nailer/ wood blocking / metal assembly condition. Replace any compromised or degraded material. Install additional fasteners in 2 rows, staggered, as needed to have spacing of 3” on center.
 2. Attach new edge metal / foam stop as needed – minimum fastener spacing of 3” on center. Paint grip or pre-primed material is recommended if metal is used.
 3. Put a bead of sealant in the junction of the metal where it overlaps, to prevent water entering in between the mating pieces of metal. Also put a bead of caulk at all corner cuts.
 4. Maintain minimum SPF thickness of 3/4” within 3” of the edge. Note that the height of the foam should always be above the height of the metal edge so that water does not collect on the surface before flowing over the metal.
 5. After application of SPF and before application of top coat, cut ¼ to ½ inch V groove along metal edge, caulk with compatible material, then topcoat.
 6. At junctions in edge metal fully embed a 6” x 4” piece of polyester fabric into caulk or base coat and allow to cure before application of topcoat. This will reduce the risk of cracks caused by expansion & contraction of the metal edging.

3.5 DETAILS – PARAPET WALLS

- A. May be topped by SPF, coating or metal coping, depending on the construction and condition of the existing wall. When metal coping is used it is critical to put sealant at the end of each

section of metal to seal off any water infiltration. The outward side of the wall should also be evaluated to determine if water might enter the building envelope through the wall.

- B. Cut the existing BUR or Mod Bit or membrane at the cant and mechanically fasten the edges. Then apply the first lift of SPF ½" thick. Allow the first lift to cool slightly before application of the second lift. Each subsequent lift should be 1.5" or less and should be allowed to cool to slightly more than air temperature before application of the next lift. (Excessive heat buildup in thick foam layers over membranes and in cants may loosen the membrane bond or be a factor in delamination from the substrate). It may be necessary to allow the substrate to cool completely, which will take longer than for the surface to cool. In this situation, the SPF surface should be primed before the application of the next lift.
- C. SPF should be carried up onto parapet walls, piping and other vertical surfaces at least 8 inches above the horizontal surface of the immediately surrounding area. In places where it is not possible to extend up 8 inches, it should at least extend 4 inches above the line of any overflow drain.
- D. Do not cover over or foam in any weep holes, or for metal walls, encase the bottom of the wall into the foam. Any water that enters the wall must be able to drain to the top of the roof. Use through wall flashing as needed to give water a path out.
- E. Where the foam and coating are extended up the wall and terminated without any flashing, tape off the wall above the termination point to provide a clean and straight line. Terminate the foam at least 4" above the roof line and the coating 2" above the foam.
- F. Flashing / Coping / Counter-flashing - when used, follow the guidance above regarding adhesion to the substrate and apply foam to just below the reglet so the maximum amount of flashing will overlap the foam and coating.

3.6 DETAILS - SPF UNDERNEATH EQUIPMENT

- A. If the area underneath a piece of equipment is too low for the SPF to be applied at a 90 degree angle (perpendicular) to the deck, a "slip-sheet" should be used so the foam surface profile is acceptable. The specified foam thickness shall be applied to 1/4 inch DensDeck or other comparable flat board, and positioned under the obstruction.
- B. Use screws or fasteners to attach the foamed slip sheet under the obstruction, and then apply foam to the edges of the slip sheet and adjoining roof area to "tie-in". Grind the tie-in area smooth if the profile is irregular and to allow water to flow out from under the obstruction. All trimmed or ground foam shall receive additional coating.
- C. Pipe penetrations and equipment stands can be flashed with SPF that is applied 8 inches above the surface of the roof deck, and then have coating applied and extend 4 inches above the termination of the foam. Where equipment is mounted on pipes, and in areas exposed to wind, collars may be needed to shed water from the foam and/or coating termination.
- D. For roofs where extensive foot traffic is anticipated, raised metal walkways, double coated and double granulated walk paths, or special pavers, should be used to mitigate the potential for damage. Contact Rhino Linings Technical Service for specific recommendations.

PART 4 - INSTALLATION EXECUTION

Apply spray polyurethane foam roofing system in accordance with manufacturer's instructions at locations indicated on the Drawings.

4.1 PRIMER

- A. Apply primer to prepared substrates in accordance with manufacturer's instructions.
- B. Ensure substrates are clean, dry, and sound.
- C. Apply primer at application rate in accordance with manufacturer's instructions.
- D. Apply primer to uniform film thickness.
- E. Avoid pooling of primer during application.
- F. Allow primer to cure in accordance with manufacturer's instructions.
- G. Ensure final cured dry film thickness of primer is free of voids, pinholes, holidays, cracks, and blisters.
- H. If a primer is required, a Rhino Technical Representative prior to installation shall specify the appropriate primer.

4.2 SPRAY POLYURETHANE FOAM (SPF) APPLICATION

- A. Adhesion Test & General Roof Inspection
 - 1. An adhesion test is required to ensure proper adhesion between spray polyurethane foam and existing substrate. Note that adhesion to any existing roof substrate depends on the condition of the substrate surface.
 - 2. Prior to application of the foam, the surface may be inspected to insure that conditions required by the manufacturer have been met.
 - 3. No other trades are permitted to be on the roof during the application of any DuraTite SPF or coating.
 - 4. All intake vents, blowers, HVAC units and evaporative coolers shall be disconnected or otherwise modified to prevent fumes from entering into the building or from contaminating the roof surface with condensate water.
 - 5. It is the responsibility of the contractor to protect unrelated work areas so surfaces near by the application work area to prevent overspray damage. This includes neighboring buildings and parking lots.
 - 6. Always wear the proper protective clothing and respirator protection when spraying, loading, or pouring SPF chemicals and coatings. Respirator cartridge change- out must be followed and change date recorded. All safety precautions shall be observed during the start-up, operation and shutdown of all high-pressure spray equipment.

B. Application of SPF

1. The spray polyurethane foam shall be applied in accordance with the manufacturer's specification and instructions outlined on Product Data Sheets (PDS). Surfaces to receive SPF must be dry, clean and strongly attached to the roof deck or building. Pay careful attention to the temperature of material in drums prior to application, especially during cool or cold weather, and pre-condition drums to proper temperature for 48 hours before use.
2. The minimum total application thickness of DuraTite CC roofing foam is 1 inch, and the minimum for each lift is ½ inch. Multiple, thin lifts are to be avoided as each lift creates an opportunity for inter-layer delamination, and will result in denser foam and lower yield. Tapering to the edge metal is acceptable with an edge metal of at least one inch rise. Roof drains and scuppers may also be tapered no more than three feet from the edge of the drain or outlet. Total thickness and slope should be created to maintain a minimum thickness of 1 inch around drains and edges. When applying in greater thicknesses, additional time will be needed for the foam to cure and cool off between passes.
3. Areas where water has ponded or that need positive drainage, can be built up with foam that is at least ½ inch depth, to match the surrounding grade of the roof. This should be done prior to field application of the foam. Do not channel foam for drainage purposes.
4. Parapet walls, curbs and duct work shall have a minimum of one inch of foam and DuraTite silicone coating. Build up SPF in small lifts and allow to cool, to minimize the risk of subsequent cracking.
5. Edges, projections curbs, pipes and parapet walls along with other detail work should be done prior to field application. Smaller tip sizes or spray guns when building these areas will help reduce lap lines resulting in a smoother finished product.
6. Only spray foam onto surfaces that are dry. When relative humidity is higher than 25% be aware of the potential for any surface, including newly sprayed SPF, to have moisture on it. This is more likely when the surface is under shade or cloudy conditions and when the air is still. To minimize the potential for surface moisture and subsequent delamination, spray subsequent lifts while the lower lift is still slightly warm. Alternatively, use a dark, acrylic primer to help sun exposure dry off the surface.
7. Each day the area to be sprayed should be limited to only the area that can be brought to final thickness in that day. The foam at the tie-in area for the next day should be protected from UV and water exposure by application of DuraTite Prime 1025 (night seal primer) or use of tarps or covers.
8. Application of a top lift of foam the next day or thereafter should be avoided, as there is a greater chance for damage from ultraviolet light, or contamination of the surface from overspray, moisture or dirt, all of which can lead to poor adhesion of the top lift and the potential for future blisters.
9. If a final top lift is applied on the following day:
 - I. Protect the surface of the foam with DuraTite Prime 1025.

- II. Make sure that the top lift of foam is at least 1 inch thick and sloped to drain. The minimum acceptable slope is ¼-inch in 12-inches (approximately 2%). Build up foam thickness as needed to create the minimum slope across the field of the roof, and to create crickets as needed to move water off the roof.
- III. The spray polyurethane foam shall be uniformly terminated a minimum of eight (8) inches above the roofline at all penetrations (except drains, parapet walls, or building junctions). Foamed in place cants shall be smooth and uniform to allow positive drainage. Foam thickness in cants or at the base of curbs or parapet walls shall not be more than 2" for any one lift, and the new foam shall be allowed to cool to within 10°F of ambient temperature prior to the application of the next lift of SPF.
- IV. When detailing skylights or high walls, care must be taken so that weep holes are not covered with SPF or coating.

C. Foam Quality Control

1. **Polyurethane Foam Thickness:** Depth of the polyurethane foam shall be verified by the application Contractor prior to applying the protective coating. Foam thickness shall be recorded on the roof plan as part of the Daily Report Form. Any areas found to be deficient shall receive additional foam to bring these areas up to minimum thickness. Polyurethane foam thickness may be verified at a final inspection, however this is done after application of coating so is too late to apply more foam.
2. **Foam Surface Finish:** The final sprayed polyurethane foam surface shall be "smooth, orange peel, coarse orange peel, or verge of popcorn." Polyurethane foam surfaces termed "popcorn" or "tree bark" are not acceptable. These areas shall be removed and re-foamed to an acceptable surface.
3. Any damage or defects to the polyurethane foam surface shall be repaired prior to the protective coating application.
4. **Foam Blisters and mechanical damage** Any blisters or delamination, within the substrate, between the substrate and foam, within the foam, or between the foam and coating, must be repaired. Cut out the blistered area, clean, dry and apply primer before applying new foam and or coating. Follow the same procedures to repair any areas of mechanical damage.
5. Prior to installation of coating 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.
6. The foam applicator should always attempt to apply the foam with the least amount of texture. -More texture in the foam application increases the amount of coating needed to provide the specified coating dry film thickness (DFT). The following measures may be used to reduce foam texture;

4.3 COATING APPLICATION

- A. Sprayed polyurethane foam must be protected from ultraviolet light in order to avoid damage. Coating protects the foam from UV light, water, adverse weather conditions and minor foot

- traffic. If more than 24 hours elapse prior to the application of base coat, the polyurethane foam shall be inspected for UV degradation. Coating must be specifically formulated for use over polyurethane roofing foam. Prior to the application of the protective coating the polyurethane foam shall be inspected for suitability of base coat application as per manufacturers' requirements. Ensure spray polyurethane foam is clean, dry and sound, with no loose particles, dirt, dust, oil, grease, frost, mildew or other surface contaminants which could adversely affect application of roof coating.
- B. The base coat shall be applied the same day as the polyurethane foam application when possible. In no case shall less than two hours elapse between application of the polyurethane foam and application of the base coat.
 - C. At the roof perimeter, all access points to the roof, and all areas where the foam surface has been shaped or ground, the coating shall be back-rolled. The coating shall be applied to **1.5 times** the specified thickness. This procedure shall ensure proper sealing of these critical areas.
 - D. If the roof features include drainage over edge metal, use 2 inch by 6 inch pieces of roofing fabric at each joint of the edge metal to minimize the potential for cracking of the foam at the joint. Apply some coating to the SPF, embed the fabric into the wet coating and apply more coating over the top to fully encase the fabric in the base coat.
 - E. The coating application shall not proceed during periods of inclement weather. The applicator shall not apply the protective coating below the temperature and/or above the humidity specified by the manufacturer for ambient air and substrate. Wind barriers may be used if wind conditions could affect the quality of installation.
 - F. Inspection
 - 1. Ensure final cured dry film thickness of coating is free of voids, pinholes, holidays, crack and blisters.
 - 2. Measure total dry film thickness by taking slit samples and using an optical comparator to measure the mils.

4.4 BASECOAT

- A. Spray or roll one coat of DuraTite 1395 basecoat to coat all surfaces including expansion joint covers and flashings. Coating must cover all surfaces completely. Refer to the Application Rate section below for the wet mils to apply to achieve specified dry film thickness for each target term.
- B. Extend DuraTite 1395 basecoat up protrusions (vent pipes, parapets, curbs and other protrusions a minimum of 3" above existing flashing termination or substrate if existing flashings have been removed, creating a self-terminating flashing. An extra pass of coating is required at all flashings, edge terminations and penetrations.
- C. A visual inspection of the basecoat should take place before application of the topcoat to confirm an acceptable surface/substrate to accept the topcoat, with no pinholes or voids in the coating. Any deficiencies must be repaired prior to application of the topcoat. Base coat should be completely cured prior to proceeding with topcoat.

4.5 TOPCOAT

- A. Thickness of the base coats shall be verified by the application contractor each day prior to applying the next coat. The measured thicknesses shall be recorded on the roof plan on the Daily Report Form. Special attention must be taken to drain areas, roof edges, equipment installation areas, scarified foam areas to ensure that they meet minimum thickness requirements. Any defects should be repaired prior to subsequent applications. The base coat shall be free of dirt, dust, water, or other contaminants before application of the top coat.
- B. Spray or roll top coat of DuraTite 1395, if needed to achieve the total dry film thickness shown in the Application Rates shown below. Coat all surfaces including expansion joint covers and flashings. The total dry mil thickness of the coating shall be at least the thickness as shown below for the time period specified.
- C. The top coat and any subsequent coats should be applied in a perpendicular direction to the previous coat(s).
- D. Extend DuraTite 1395 basecoat up protrusions (vent pipes, parapets, curbs and other protrusions a minimum of 3" above existing flashing termination or substrate if existing flashings have been removed, creating a self-terminating flashing. An extra pass of coating is required at all flashings, edge terminations and penetrations.
- E. The top coat shall completely cover the base or intermediate coat including expansion joint covers parapets and flashing.
- F. Spray additional coats when required of contrasting color, at an application rate designed to achieve the required total dry mil thickness for the project.

4.6 APPLICATION RATE

- A. DuraTite 1395 has 96% solids based on volume. The application rates below are based on this solid content, and are a guide but not a guarantee of dry film thickness. Actual dry film thickness will depend on the efficient and consistent application of the wet coating. The terms shown below are for the estimated service life of the roof before recoating is recommended.
- B. 5-year term: Apply 1.3 gallons per 100 square feet to achieve a target dry film thickness of 20 mils.
- C. 10 year term: Apply 1.5 gallons per 100 square feet to achieve a target dry film thickness of 22 mils.
- D. 15 year term: Apply 1.8 gallons in total per 100 square feet, in 2 separate applications of .9 gallons each, to achieve a target dry film thickness of 25 mils.
- E. 20 year term: Apply 2.4 gallons in total per 100 square feet, in 2 separate applications of 1.2 gallons each, to achieve a target dry film thickness of 36 mils.

4.7 GRANULE APPLICATION & WALK PADS (OPTIONAL)

- A. Depending on the type of warranty requested, roofing granules may be required.
- B. Granules, when required, should be embedded in the top coat while it is still wet.

- C. Granules should be broadcast to rejection at a rate of 30-40 lbs per 100 square feet using a method recommended by the granule manufacturer.
- D. If necessary an additional finish coat may be applied at the rate of 3/4 gallon per 100 square feet for the purpose of application of granules. Immediately following finish coat broadcast roofing granules into finish coat at the rate of 30-40 lbs per 100 square feet.
- E. Do not allow traffic on finished area for at least twenty-four (24) hours after granule application is completed.
- F. After forty-eight (48) hours, remove all excess loose granules with soft bristled broom, blower, or vacuum.
- G. Walk pads (walkways) may be installed for heavy traffic areas and around frequently serviced roof top units.

4.8 FIELD QUALITY CONTROL

- A. Do not allow foot traffic on completed spray polyurethane foam roofing system for a minimum of 72 hours after application.
- B. Protect work of this Section for damage during construction.
- C. Inspect application of spray polyurethane foam roofing system:
 - 1. Primer: Final cured dry film thickness not to exceed dry film thickness in accordance with manufacturer's instructions.
 - 2. Spray Polyurethane Foam: Minimum total thickness. Adhesion to substrate with no delamination or blisters. Adequate slope to drain.
 - 3. Final Cured Thickness: Smooth and free of voids, pinholes, cracks, and crevices.
 - 4. Roof Coating: Minimum dry film thickness.
 - 5. Final Cured Dry Film Thickness: Free of voids, pinholes, holidays, cracks, and blisters.

4.9 CLEAN UP

In conjunction with the final inspection, all debris, containers, materials and equipment are to be properly removed from the job site. Grounds are to be cleaned, undamaged, and acceptable to the owner.