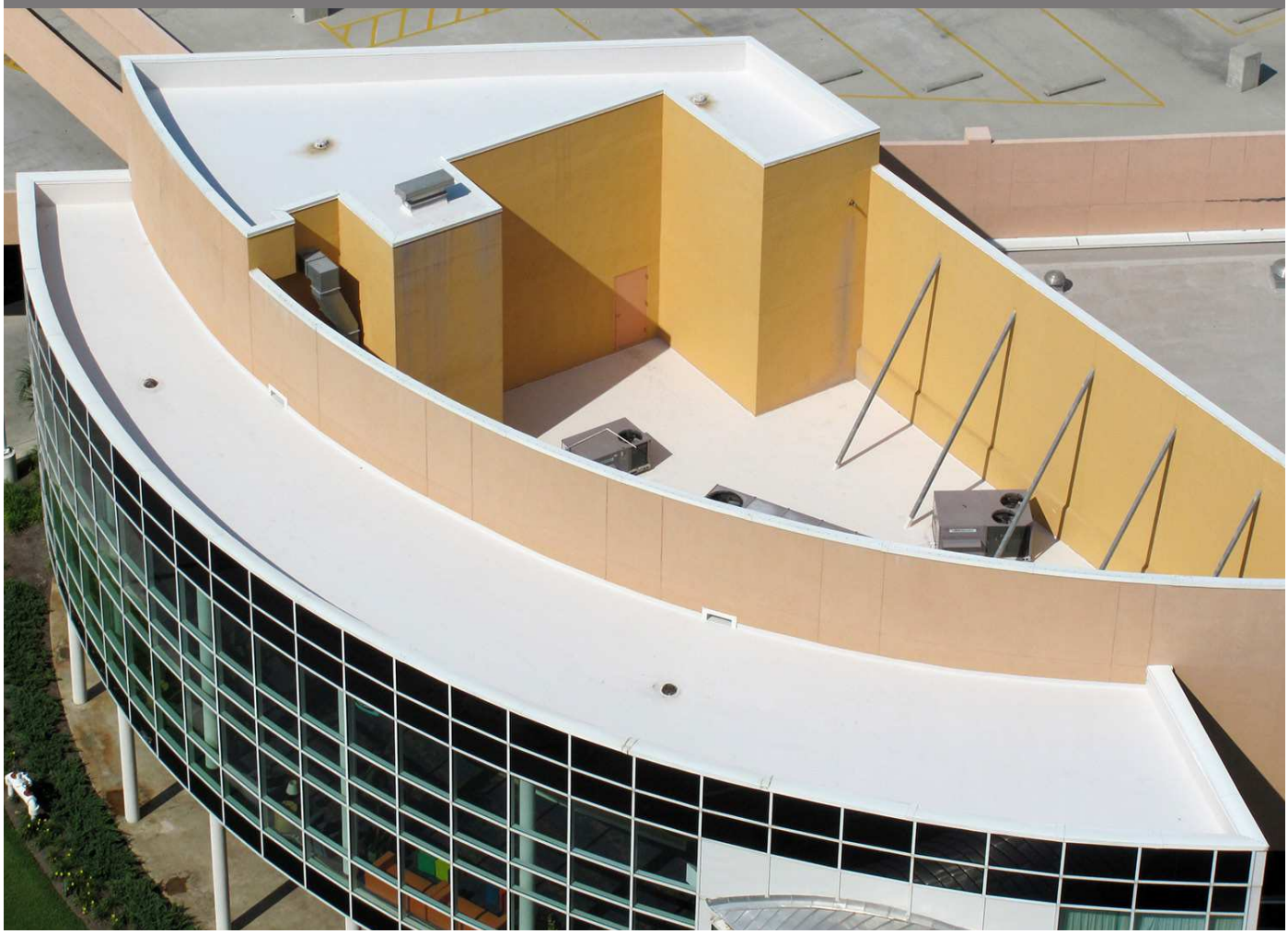
# NEOGARD®

# Application Manual

Fluid-Applied Roof Coating Systems • November 2016



# Introduction

Dear NEOGARD® Customer,

This manual covers many important technical aspects of NEOGARD® Waterproofing systems and is intended for all Applicator personnel who are involved in selling, estimating, administration and application.

It is our intention to make changes and additions to this handbook as technology evolves. For specific application questions or technical assistance, contact the NEOGARD® Technical Service Department by phone at (800) 321-6588, or email at techservice@neogard.com. Additionally, technical resources are also available at http://www.neogard.com.

Thank you for your help in making this manual possible.

Your NEOGARD® Team

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# Project and Substrate Conditions

The NEOGARD® Roofing Initiative includes roof coating systems designed to protect and preserve a variety of roof systems including spray polyurethane foam, smooth and mineral surfaced built-up roof membranes, modified bitumen, metal, concrete and all types of single-ply membranes. Gravel-surfaced, built-up roofs should receive an application of spray polyurethane foam prior to coating. Ballasted single-ply membranes are not candidates for NEOGARD® fluid-applied roof coating systems. The following guidelines apply to all roof surfaces to receive a fluid-applied roof coating system.

## All surfaces to be coated should always be:

- CLEAN: An absence of any substances other than the surface being coated. Contaminants such as dirt, pollen, rust, mold, algae, leaves, limbs, nuts, water, and other similar substances must be removed.
- DRY: An absence of any liquid both on the surface and in the existing roof assembly. Please see the Moisture Detection Survey section of this Application Manual.
- SOUND: The existing roof components should be structurally sound.
- SECURE: Seams must be tight. All metal work must be intact and free of damage. All screws and fasteners must be tight.

## Examination

- Inspect surfaces which will receive the roof coating system to make sure they are clean, dry, sound, and properly secure.
- Identify any areas of ponding water and correct as necessary. Ponding water is defined as water that remains on a roof surface longer than 48 hours after conditions conducive to drying.
- Verify that all roof penetrations, mechanical equipment, cants, edge metal, and other on-roof items are in place, secure, and functioning as intended.
- Verify that all critical areas around the immediate vicinity of the application area are suitably protected.
- Verify that roof deck has sufficient slope for water to drain and that all drains and drain lines are clean and in working order including air conditioning condensate lines.
- Verify that all air conditioning and air intake vents are suitably protected or closed.

## Field Adhesion Test

- Always perform an adhesion test to determine material compatibility and/or the need for a primer. See Field Adhesion Testing in this Application Manual. Record and maintain results for future reference.

## Project Conditions

- Prior to starting work, read and follow the Material Safety Data Sheets (MSDS) and container labels for detailed health and safety information, as well as appropriate Guide Specification.
- Do not proceed with application of materials when substrate temperature is less than 40°F (4°C), if precipitation is imminent, or to a damp, unclean or frosty surface. Ambient temperature should be a minimum 40°F (4°C) and rising, and more than 5°F (3°C) above dew point. Special precautions are to be taken when ambient and/or substrate temperature are approaching, at or above 100°F (38°C). Refer to “Weather Impact on Polyurethane Coating Materials” in the Support Information section of this Application Manual.

- Coordinate roofing work with other trades to ensure coatings are protected from traffic and other abuse until completely cured and application is complete. Applicator shall have sole right of access to the specified area for the time needed to complete the application.
- Keep products away from spark or flame. Do not allow the use of spark-producing equipment during application and until all vapors have dissipated. Post “No Smoking” signs.
- Maintain work area in a neat and orderly condition, removing and properly disposing of empty containers, rags and trash from the site daily.

# Surface Preparation

NEOGARD® offers roof coating systems to protect and preserve a variety of roof substrates. From aged asphalt and concrete roofs, to the new single-ply and spray polyurethane foam roofs, NEOGARD® has a roof coating system to protect your roof. One of the most critical aspects to a successful roof coating application is surface preparation. Below are some general surface preparation guidelines.

## Spray Polyurethane Foam (SPF) Systems

- Protect all adjoining areas that are not to receive the fluid-applied roof coatings and provide a suitable work station to mix the coating materials.
- NEOGARD® coatings are available to protect roof-grade spray polyurethane foam applications, provided the applications are compliant with Spray Polyurethane Foam Alliance (SPFA) guidelines. SPFA is the standards body for spray polyurethane foam and can be found on the internet at www.sprayfoam.org. Refer to SPFA Technical Document AY-145 for more information.
- Surface Texture of SPF: The texture of the spray polyurethane foam is important to the performance of the roof coating system. The rougher the texture, the more coating is required to provide the minimum dry film thickness specified. When the surface becomes too rough or uneven, it is difficult to successfully provide the minimum specified coating thickness to all surface areas of the foam. SPF surface texture is the resulting surface from the final pass of SPF. Per SPFA Technical Document AY-121, *Spray Polyurethane Foam Estimating Reference Guide*:

  > "When coatings are applied over sprayed polyurethane foam, many factors, such as the polyurethane surface texture, overspray loss, container residue, equipment characteristics, applicator technique, etc. will directly affect the amount of coating material required to meet the designed in -place minimum dry film thickness (DFT). Therefore, it is very important that additional material be added to the theoretical quantities to ensure that the proper minimum coating thickness is applied."

  Theoretical coverage rates cannot be used without adding additional material to adequately cover the foam's texture.

  **The following terms are used to describe the types of SPF surfaces and are acceptable to receive protective coating:**

  - Smooth: The surface shows minimal spray undulation.
  - Orange Peel: The surface shows a fine texture and is compared to the exterior skin of an orange.
  - Coarse Orange Peel: The surface shows a texture where nodules and valleys are approximately the same size and shape.
  - Verge of Popcorn: The verge of popcorn surface texture is the roughest texture suitable for receiving the protective coating. The surface shows a texture where nodules are larger than valleys with the valleys relatively curved. This surface is acceptable for receiving a protective coating only because of the relatively curved valleys. However, the surface is considered undesirable because of the additional amount of coating material required to protect the surface properly.

  **The following surfaces are unacceptable for protective coating application and must be scarified and SPF re-applied prior to coating application:**

  - Popcorn: The surface shows a coarse texture where valleys form sharp angles and the surface is similar to popcorn.

- Tree bark: The surface shows a coarse texture where valleys form sharp angles and is similar in appearance to rough tree bark.

SPFA offers the following guidelines for estimating additional material requirements due to the SPF surface texture:

| Surface Texture | Additional Coating Material Requirements |
|---|---|
| Smooth Surface Texture | + 5% |
| Orange Peel Surface Texture | + 10% |
| Coarse Orange Peel Surface Texture | + 25% |
| Verge of Popcorn Surface Texture | + 50% |

# Direct Bond Systems

Surface preparation for Direct Bond roof coating systems will vary according to the substrate.

## Concrete

- Protect all adjoining areas that are not to receive the fluid-applied roof coatings and provide a suitable work station to mix the coating materials.
- Concrete surfaces to receive roof coatings must be a minimum of 3,000 psi compressive strength.
- Concrete must have a full 28 day cure period prior to coating. Water curing of the decks is the preferred method. However, if a curing compound is to be used, it must be of the sodium silicate type. Other types of curing compounds require prior written approval by NEOGARD®. Chlorinated rubber, wax or resin based curing compounds must not be used.
- Insulating concrete (Zonolite, Vermiculite, Perlite, etc.) must never be coated directly with NEOGARD fluid-applied roof coatings.
- If the concrete finish is rougher or smoother than a light hair broom finish, consult NEOGARD for additional surface preparation procedures.
- Remove all abandoned, unnecessary and non-functional equipment, deteriorated and/or water saturated roofing materials, adhesives and foreign materials down to sound substrate. Replace these areas with materials and components to match existing roof system and seal water tight. The width, adhesion and/or fastening requirements of the new materials must be compatible with the existing roof and meet local codes. Seal all edges.
- Ridges and sharp projections should be ground off and pits, holes, low spots and spalled areas should be filled with NEOGARD® 70714/70715 Series epoxy and sand mixture at a ratio of one part epoxy to four parts sand so they are flush with the surrounding substrate.
- Concrete patches must have a full 28 day cure period prior to coating.
- Cracks and Cold Joints: Visible hairline cracks (up to 1/16” in width) in concrete and cold joints shall be cleaned, primed and treated with polyurethane Base Coat material extended a minimum distance of 2” on either side of crack to yield thickness of 30 dry mils. Large cracks (over 1/16” in width) shall be routed, blown clean, and filled flush with 70991 or 70995 polyurethane sealant. Sealant shall be applied to inside area of crack only, not applied to deck surface. After sealant has cured, detail sealed cracks with polyurethane Base Coat material extended a minimum distance of 2” on either side of crack to yield thickness of 30 dry mils. **Note: Sealant must be solvent wiped. Allow solvent to flash off prior to installation of Base Coat detail stripe.**
- Control Joints: Seal control joints equal to or less than 1” with 70995 polyurethane sealant. Be sure to maintain proper width to depth ratio. After sealant has cured, detail sealed cracks with polyurethane Base Coat material extended a minimum distance of 2” on either side of crack to yield thickness of 30 dry mils, feathering edges. Preparation and treatment of joints > 1” in width is beyond the scope of this Application Manual and an expansion joint manufacturer should be consulted for those applications.

**Note: Sealant must be solvent wiped. Allow solvent to flash off prior to installation of Base Coat detail stripe.**

- Thoroughly clean all exposed metal surfaces such as pipe sleeves, drains, boxes, ducts, etc. Remove all loose paint, rust and asphalt or loose roofing materials of any kind.
- Clean and seal all drains, gutters, parapet walls, wall flashing and caps to watertight condition. Repair any damaged metal. Caulk and seal to watertight condition, all screws, seams, skylights, joints, pipes, voids, protrusions and any areas where water could enter through the roof.
- As needed, reinforce all vertical/horizontal interfaces, including roof termination points, base of all vent pipes and other protrusions, HVAC units and other roof mounted equipment 70690 Roof Mastic or elastomeric Base Coat with TieTex fabric.
  - 70690 Roof Mastic: Apply a 2” wide band of 70690 mastic material to the interface at a rate sufficient to create a smooth transition, minimum 80 wet mils. Taper the edges to the existing substrate.
  - Base Coat Material with TieTex Fabric: Apply 24 wet mils of elastomeric base coat material, 10” wide, over interface. Apply and center 6” wide TieTex fabric over wet base coat material. Work the reinforcing fabric into wet coating material using a brush or roller to eliminate air pockets, wrinkles and gaps. Apply additional 16 wet mils of base coat material over the entire detail and allow to cure.
- All roof surfaces, whether old or new, shall be cleaned using NEOGARD® 8500 BioDegradable Cleaner at the rate of 1 part concentrate to 10 parts water. Apply the diluted cleaning solution under low pressure spray at a rate of 150–200 square feet per gallon and allow to stand for 15 minutes. **Do not allow the solution to dry.** Thoroughly rinse with fresh water to remove the cleaning solution. The use of stiff-bristle brooms or mechanical scrubbers may be required to remove heavy deposits of dirt or other contaminants from surface. Allow roof surface to thoroughly dry.

  **Note: If algae is present on the surface, the cleaning must include bleach in the washing of the substrate.**
- Before proceeding with coating application, ensure that substrate and repairs are clean, sound, dry (cured) and secure.

## Metal

- Protect all adjoining areas that are not to receive the fluid-applied roof coating and provide a suitable work station to mix the coating materials.
- Remove all abandoned, unnecessary and non-functional equipment, deteriorated and/or water saturated roofing materials, adhesives and foreign materials down to sound substrate. Replace these areas with materials and components to match existing roof system and seal water tight. The width, adhesion and/or fastening requirements of the new materials must be compatible with the existing roof and meet applicable local codes. Seal all edges.
- Inspect existing metal roof surface to receive coatings. Metal panels which no longer have integrity due to excessive rust and deterioration must be replaced. Metal panels with seam gaps greater than 1/8” should be stitched as tight as possible with additional stitch screw fasteners.
- Tighten all loose fasteners and replace stripped fasteners with oversized version of the same fastener, i.e. aluminum, galvanized, or stainless. Maintain integrity of original fastening pattern design.
- Loose scale or rust must be removed from metal surfaces and primed with metal primer prior to roof coating application as job conditions dictate. See ***Primers*** in the ***Support Information*** section of this Application Manual.
- Detail horizontal metal seams with NEOGARD® 70690 Roof Mastic or elastomeric Base Coat with embedded 6” wide reinforcing fabric.
  - 70690 Roof Mastic: Apply a 2” wide band of 70690 mastic material to the seam at a rate sufficient to create a smooth transition, minimum 80 wet mils. Taper the edges to the existing substrate.
  - Base Coat Material with TieTex Fabric: Apply 24 wet mils of elastomeric base coat material, 10” wide, over seam. Apply and center 6” wide TieTex fabric over wet base coat material. Work the reinforcing fabric into wet coating material using a brush or roller to eliminate air pockets, wrinkles

and gaps. Apply additional 16 wet mils of base coat material over the entire seam detail and allow to cure.

- Apply polyurethane sealant around fasteners and strike or tool into place to achieve a smooth transition and allow to thoroughly cure.
- Round projections, machine legs, sign posts, guide wire straps, inside and outside corners, etc. can be flashed with NEOGARD® flashing materials.
- Clean and seal all drains, gutters, parapet walls and caps to watertight condition. Repair any damaged metal. Caulk and seal to watertight condition, all screws, seams, skylights, joints, pipes, voids, protrusions and any areas where water could enter through the roof.
- As needed, reinforce all vertical/horizontal interfaces, roof termination points, base of all vent pipes and other protrusions, HVAC units and other roof mounted equipment with NEOGARD® 70690 Roof Mastic or elastomeric Base Coat with TieTex fabric.
  - 70690 Roof Mastic: Apply a 2” wide band of 70690 mastic material to the interface at a rate sufficient to create a smooth transition, minimum 80 wet mils. Taper the edges to the existing substrate.
  - Base Coat Material with TieTex Fabric: Apply 24 wet mils of elastomeric base coat material, 10” wide, over interface. Apply and center 6” wide TieTex fabric over wet base coat material. Work the reinforcing fabric into wet coating material using a brush or roller to eliminate air pockets, wrinkles and gaps. Apply additional 16 wet mils of base coat material over the entire detail and allow to cure.
- All roof surfaces, whether old or new, shall be cleaned using NEOGARD® 8500 BioDegradable Cleaner at the rate of 1 part concentrate to 10 parts water. Apply the diluted cleaning solution under low pressure spray at a rate of 150–200 square feet per gallon and allow to stand for 15 minutes. **Do not allow the solution to dry.** Thoroughly rinse with fresh water to remove the cleaning solution. The use of stiff-bristle brooms or mechanical scrubbers may be required to remove heavy deposits of dirt or other contaminants from surface. Allow roof surface to thoroughly dry.

  **Note: If algae is present on the surface, the cleaning must include bleach in the washing of the substrate. Follow local ordinances regarding runoff from this procedure.**
- Before proceeding with coating application, ensure that substrate and repairs are clean, sound, dry (cured) and secure. All detail work should be inspected to ensure good, sound attachment.

## Single-Ply

- Prior to installation of coatings all laps and detail areas should be probed to ensure that all seams are intact.
- Protect all adjoining areas that are not to receive the fluid-applied roof coating system and provide a suitable work station to mix the coating materials.
- Remove all abandoned, unnecessary and non-functional equipment, deteriorated and/or water saturated roofing materials, adhesives and foreign materials down to sound substrate. Replace these areas with materials and components to match existing roof system and seal water tight. The width, adhesion and/or fastening requirements of the new materials must be compatible with the existing roof and meet local codes.
- All single-ply patches shall be examined to determine whether or not the patch is aged or new. All new patches must be sanded to develop a profile before coating materials are applied for repair or recoat. See “Field Adhesion Testing” in the Support Information section of this Application Manual.
- Repair deteriorated flashings, seams, cracks, blisters, splits, fishmouths, holes and other surface imperfections including but not limited to all vertical/horizontal interfaces, roof termination points, base of all vent pipes and other protrusions, HVAC units and other roof mounted equipment using NEOGARD® 70690 Roof Mastic or 6” wide reinforcing fabric embedded in 24 wet mils of elastomeric base coat, then apply 16 wet mils of additional base coat. **Note: If elastomeric base coat and reinforcing fabric are used, work reinforcing fabric into wet base coat using a brush or roller to eliminate air pockets, wrinkles and gaps, applying additional base coat material as necessary to totally encapsulate the reinforcing fabric.**

- Fasteners which are backing out shall be repaired by re-tightening or relocating to adjacent area. Single-ply membrane shall then be patched with Roof Mastic and in accordance with the single ply manufacturer standards for roof repair.
- Thoroughly clean all exposed metal surfaces such as pipe sleeves, drains, boxes, ducts, etc. Remove all loose paint, rust and asphalt or loose roofing materials of any kind.
- Repair or replace damaged metal and seal drains, gutters, parapet walls and cap to a watertight condition. Caulk and seal to watertight condition all screws, seams, skylights, joints and any other areas where water could enter through the roof.
- As needed, reinforce all vertical/horizontal interfaces, roof termination points, base of all vent pipes and other protrusions, HVAC units and other roof mounted equipment with NEOGARD® 70690 Roof Mastic or elastomeric Base Coat with TieTex fabric.
  - 70690 Roof Mastic: Apply a 2” wide band of 70690 mastic material to the interface at a rate sufficient to create a smooth transition, minimum 80 wet mils. Taper the edges to the existing substrate.
  - Base Coat Material with TieTex Fabric: Apply 24 wet mils of elastomeric base coat material, 10” wide, over interface. Apply and center 6” wide TieTex fabric over wet base coat material. Work the reinforcing fabric into wet coating material using a brush or roller to eliminate air pockets, wrinkles and gaps. Apply additional 16 wet mils of base coat material over the entire detail and allow to cure.
- All roof surfaces, whether old or new, shall be cleaned using NEOGARD® 8500 BioDegradable Cleaner at the rate of 1 part concentrate to 10 parts water. Apply the diluted cleaning solution under low pressure spray at a rate of 150–200 square feet per gallon and allow to stand for 15 minutes. Do not allow the solution to dry. Thoroughly rinse with fresh water to remove the cleaning solution. The use of stiff-bristle brooms or mechanical scrubbers may be required to remove heavy deposits of dirt or other contaminants from surface. Allow roof surface to thoroughly dry.

  **Note: If algae is present on the surface, the cleaning must include bleach in the washing of the substrate. Follow local ordinances regarding runoff from this procedure.**
- Before proceeding with coating application, ensure that substrate and repairs are clean, sound, dry (cured) and secure.

## Smooth or Mineral-Surfaced Built-Up and Modified Bitumen

- Protect all adjoining areas that are not to receive the fluid-applied roof coating system and provide a suitable work station to mix the coating materials.
- Remove all abandoned, unnecessary and non-functional equipment, deteriorated and/or water saturated roofing materials, adhesives and foreign materials down to sound substrate. Replace these areas with materials and components to match existing roof system and seal water tight. The width, adhesion and/or fastening requirements of the new materials must be compatible with the existing roof and meet local codes. Seal all edges.
- Repair deteriorated flashings, seams, cracks, blisters, splits, fishmouths, holes and other surface imperfections including but not limited to all vertical/horizontal interfaces, roof termination points, base of all vent pipes and other protrusions, HVAC units and other roof mounted equipment using NEOGARD® 70690 Roofing Mastic or 6” wide reinforcing fabric embedded in 24 wet mils of elastomeric base coat and topped with 16 wet mils of base coat. **Note: If elastomeric base coat and reinforcing fabric are used, work reinforcing fabric into wet base coat using a brush or roller to eliminate air pockets, wrinkles and gaps, applying additional base coat material as necessary to totally encapsulate the reinforcing fabric.** Over the repair, apply NEOGARD® epoxy primer at the rate of 1/3 gallon per 100 square feet (300 sf/gal) and allow to cure until primer will not transfer when touched. When primer has cured, apply elastomeric base coat and fabric a minimum of 4 inches beyond the edges of the repair at 24 dry mils. Work reinforcing fabric into wet base coat using a brush or roller to eliminate air pockets, wrinkles and gaps, applying additional base coat material as necessary to totally encapsulate the reinforcing fabric.

- Thoroughly clean all exposed metal surfaces such as pipe sleeves, drains, boxes, ducts, etc. Remove all loose paint, rust and asphalt or loose roofing materials of any kind.
- Seal gutters, parapet walls and caps to watertight condition. Repair any damaged metal. Caulk and seal to watertight condition all screws, seams, skylights, joints, pipes, voids, protrusions and any areas where water could enter through the roof.
- As needed, reinforce all vertical/horizontal interfaces, roof termination points, base of all vent pipes and other protrusions, HVAC units and other roof mounted equipment with NEOGARD® 70690 Roof Mastic or elastomeric Base Coat with TieTex fabric.
  - 70690 Roof Mastic: Apply a 2” wide band of 70690 mastic material to the interface at a rate sufficient to create a smooth transition, minimum 80 wet mils. Taper the edges to the existing substrate.
  - Base Coat Material with TieTex Fabric: Apply 24 wet mils of elastomeric base coat material, 10” wide, over interface. Apply and center 6” wide TieTex fabric over wet base coat material. Work the reinforcing fabric into wet coating material using a brush or roller to eliminate air pockets, wrinkles and gaps. Apply additional 16 wet mils of base coat material over the entire detail and allow to cure.
- All roof surfaces, whether old or new, shall be cleaned using NEOGARD® 8500 BioDegradable Cleaner at the rate of 1 part concentrate to 10 parts water. Apply the diluted cleaning solution under low pressure spray at a rate of 150–200 square feet per gallon and allow to stand for 15 minutes. **Do not allow the solution to dry.** Thoroughly rinse with fresh water to remove the cleaning solution. The use of stiff-bristle brooms or mechanical scrubbers may be required to remove heavy deposits of dirt or other contaminants from surface. Allow roof surface to thoroughly dry.

  **Note: If algae is present on the surface, the cleaning must include bleach in the washing of the substrate. Follow local ordinances regarding runoff from this procedure.**
- Before proceeding with coating application, ensure that substrate and repairs are clean, sound, dry (cured) and secure.

# Moisture Detection Survey

It is the responsibility of the applicator to determine whether an existing roofing system is a suitable candidate for a roof coating system. An important factor in determining whether or not a roof is a good candidate is the amount of moisture located within the existing roof assembly. NEOGARD® recommends that a moisture detection survey be conducted prior to the application of any roof coating system. Typically, if 25% or more of the roof system contains moisture, it is not a candidate for coating.

Moisture detection surveys typically fall into two categories; destructive and nondestructive. However, it should be noted that all surveys should involve some destructive testing (i.e. core sampling) to verify results. Nondestructive tests may be employed to help reduce the amount of destructive testing needed. The following are examples of different types of nondestructive test methods:

- Electrical Capacitance (EC): Electrical capacitance moisture meters can measure the electrical resistance within a roof system and detect changes in roofing conditions that may indicate the presence of moisture.
- Infrared Thermography (IR): An infrared camera is used to detect temperature of areas within a roof system assembly. As the air temperature decreases at sunset, dry insulation allows the roof surface above to cool quickly, while areas where moisture is present, either in the insulation or between membrane plies, have a large thermal mass and take much longer to cool.
- Nuclear Hydrogen Detection (NHD): A nuclear scanning meter emits neutrons from a radiation source within the scanning meter, downward to the roof system assembly. Neutrons which encounter hydrogen atoms are slowed down; a portion of which “bounce back” to be counted by a detector within the scanning meter. Since water contains significant hydrogen atoms, areas of moisture within the roofing plies and/or insulation record high levels of slowed neutrons.

Regardless of the method used to identify areas of suspected moisture contamination, a destructive test such as core sampling must be used to verify the findings. If moisture is verified within the existing roof assembly, a determination must be made as to whether or not the roof should be coated or replaced. If the decision is made to coat the roof, any saturated and/or water damaged materials must be removed and replaced with compatible materials and appropriate repairs made to meet all applicable building codes.

# Product Mixing Instructions

**Important: This section does not apply to components of spray polyurethane foam. Consult foam manufacturer for instructions concerning mixing foam components.**

**Important: If a film of cured material is found on the top of the coating product when opened, remove the film. NEVER mix cured material into coating.**

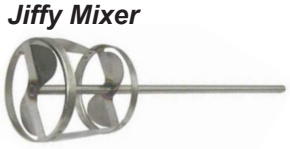
## Single-Component Polyurethane Coatings

- Read labels and Application Manual prior to mixing materials.
- If applicable, the accelerator—or small container—is always to be added to the color side; one gallon containers in 55-gallon drums, and half pint and pint containers in 5-gallon buckets in accordance with "Additives" in the Support Information section of this Application Manual.
- Always pre-mix the color side thoroughly prior to the addition of the accelerator. Pre-mix 55 gallon drums for 5 to 10 minutes and 5 gallon pails for 3 to 5 minutes. Time will vary depending on climatic conditions.
- Add the accelerator slowly at the end of the pre-mix time while still mixing. After all of the accelerator has been added, continue to mix the material for a minimum of 20 minutes for 55 gallon drums and a minimum of 5 to 10 minutes for 5 gallon pails. Time will vary depending on temperature conditions.

  **Note: Use a low-medium speed drill and a Jiffy Mixer, shown at right, to mix all materials thoroughly.**

  **Caution: Mixing at too high rate of speed or with the wrong mixer can introduce air bubbles into the coating. These bubbles may develop into blisters during application.**

  ***Jiffy Mixer***

- Any thinning of the materials should come after the materials are mixed, and only if necessary. Do not thin materials more than 10%. See "Thinning and Cleaning Solvents" in the Support Information section of this Application Manual.

  **Note: When thinning CA formulated coatings, use only VOC-exempt solvents.**

## Two-Part Polyurethane Coatings or Epoxies

- Read labels and Application Manual prior to mixing materials. Proper ratios are essential for optimum coating performance and development of physical properties. Pay particular attention to pot life instructions.
- The catalyst or clear side of the mix is always to be added to the color side. Never add the color to the catalyst, as mixing will be poor.
- Always mix the pigmented or color side thoroughly (3 to 5 minutes) prior to addition of the catalyst.
- Once the two parts are combined, mix for a minimum of 5 minutes. It is essential that all two-component materials be mixed thoroughly so that off-ratio materials are not produced.

  **Note: Use a low-medium speed drill and a Jiffy Mixer (shown above) to mix all materials thoroughly.**

**Caution: Mixing at too high rate of speed or with the wrong mixer can introduce air bubbles into the coating. These bubbles may develop into blisters during application.**

Any thinning of two-part materials should come after the materials are mixed, and only if necessary. If solvents are added prior to mixing, proper coating ratios will not be achieved. Do not thin materials more than 10%. See “Thinning and Cleaning Solvents” in the Support Information section of this Application Manual.

**Note: When thinning CA formulated coatings, use only VOC-exempt solvents.**

- If the Applicator elects to pump the two-part polyurethane through plural-component equipment, be sure to mix the pigmented side thoroughly prior to pumping.

  **Note: Thinning in this application must be done equally to both sides prior to spraying.**

# System Application: SPF Systems

## Permathane Aliphatic

### Materials

- Liquid Flashing: 70620 Series single component, moisture-cured polyurethane.
- Reinforcing Fabric: 86220 reinforcing fabric (Tietex T-272).
- Sealant: 70991 single component or 70995 two component polyurethane sealant.
- Base Coat: 70620 Series single component, moisture-cured polyurethane.
- Intermediate Coat: 70630 Series single component moisture-cured polyurethane.
- Topcoat: 7490 Series single component, aliphatic polyurethane.
- Granules (Optional): Granules shall be #11 screen size, dust free, ceramic-coated roofing granules. Use only granules as approved by NEOGARD®.
- Optional Granule Coat: 7490 Series single component, aliphatic polyurethane.
- Cleaning Solvent: 20653 Xylene thinner or 7055 Odorless Reducer.

### Dry Film Thickness

#### Average

- Base Coat: 12 dry mils, 70620 Series
- Intermediate Coat: 12 dry mils, 70630 Series
- Topcoat: 12 dry mils, 7490 Series
- Total: 36 dry mils

#### Minimum

Total roof coating system thickness shall average 36 dry mils (DFT), exclusive of Optional Granule Coat and granules. Minimum dry film thickness (DFT) at any point on the roof shall not be less than 24 dry mils of which 16 dry mils must be above the Base Coat material and 8 dry mils must be 7490 Series material. Applicator is responsible to meet these requirements and should consider *Factors That Affect Dry Film Thickness* when estimating material requirements.

#### Factors That Affect Dry Film Thickness

Many factors can affect the amount of wet coating required to yield proper dry film thickness, including: Volume of solids; thinning; surface profile; application technique and equipment; overspray; squeegee; brush and roller wet out; container residue; spills and other waste.

To ensure that specified dry film thickness is achieved, use a wet mil gauge to check thickness of wet coating applied, adjusting as needed for those factors which directly affect the dry film build.

Utilize an optical comparator to verify actual dry film thickness and adjust coverage rates accordingly.

### Application Instructions

**Caution: The following instructions are for horizontal surfaces. Vertical or inclined surfaces may require additional coats to build film to design thickness.**

**Caution: Rough surface profiles of spray polyurethane foam and roof slope may increase the number of coats required to achieve uniform film coverage and minimum dry film thickness requirements of 24 dry mils at any point on the roof.**

**Prior to the application of material, please refer to the Product Mixing Instructions section in this Application Manual.**

1. Surface preparation. See the Surface Preparation section of this Application Manual.
2. Apply spray polyurethane foam in strict accordance with manufacturer's published specifications.
3. Base Coat: Base coat shall be applied the same day as the sprayed polyurethane foam. Thoroughly mix and apply 70620 Series single component moisture cured polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) to yield 12 dry mils and allow to cure.

   **Note: Do not leave base coat exposed for more than 5 days.**
4. Intermediate Coat: Thoroughly mix and apply 70630 Series single component moisture cured polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) to yield 12 dry mils and allow to cure.
5. Topcoat: Thoroughly mix and apply 7490 Series single component aliphatic polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) to yield 12 dry mils and allow to cure.
6. Optional Granule Coat: Thoroughly mix and apply 7490 Series single component aliphatic polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) and immediately broadcast #11 roofing granules at the rate of 30 lbs/100 sf. After cure, remove loose granules from roof surface.

### Summary Application Table for Permathane Aliphatic

| Coat | Product | Color | Coverage Rate (sf/gal) | Mils WFT/DFT | Approx. Recoat Time @ 75ºF (24ºC) |
|---|---|---|---|---|---|
| **Base Coat** | 70620 Series | Dark Gray | 100 sf/gal | 16 WFT/12 DFT | 8–12 hrs or tack-free |
| **Intermediate Coat** | 70630 Series | White, Gray, Tan | 100 sf/gal | 16 WFT/12 DFT | 6 hrs or tack-free |
| **Topcoat** | 7490 Series | White | 100 sf/gal | 16 WFT/12 DFT | 8–12 hrs or tack-free |
| **Optional Granule Coat** | 7490 Series *#11 Granules* | White | 100 sf/gal *30 lbs/100 sf* | 16 WFT/12 DFT | N/A |

# Elastacryl FR

## Materials

- Liquid Flashing: 7251 or 7261 elastomeric acrylic coating.
- Reinforcing Fabric: 86220 reinforcing fabric (Tietex T-272)
- Sealant: 70991 single-component or 70995 two component polyurethane sealant.
- Coating: 7251 standard single-component, elastomeric acrylic; 7261 quickset single component elastomeric acrylic.
- Granules (Optional): Granules shall be #11 screen size, dust free, ceramic-coated roofing granules. Use only granules as approved by NEOGARD®.
- Optional Granule Coat: 7251 standard single-component, elastomeric acrylic; 7261 quickset single component elastomeric acrylic.
- Cleaning Solvent: 20653 Xylene thinner or 7055 Odorless Reducer.

## Dry Film Thickness

### Average

- Total: 36 dry mils, 7251 or 7261

### Minimum

Total fluid-applied roof coating system thickness shall average 36 dry mils (DFT), exclusive of Optional Granule Coat and granules. Minimum dry film thickness at any point on the roof shall not be less than 24 dry mils (DFT). Applicator is responsible to meet these requirements and should consider *Factors That Affect Dry Film Thickness* when estimating material requirements.

### Factors That Affect Dry Film Thickness

Many factors can affect the amount of wet coating required to yield proper dry film thickness, including: Volume of solids; thinning; surface profile; application technique and equipment; overspray; squeegee; brush and roller wet out; container residue; spills and other waste.

To ensure that specified dry film thickness is achieved, use a wet mil gauge to check thickness of wet coating applied, adjusting as needed for those factors which directly affect the dry film build.

Utilize an optical comparator to verify actual dry film thickness and adjust coverage rates accordingly.

## Application Instructions

**Caution: The following instructions are for horizontal surfaces. Vertical or inclined surfaces may require additional coats to build film to design thickness.**

**Caution: Rough surface profiles of spray polyurethane foam and roof slope may increase the number of coats required to achieve uniform film coverage and minimum dry film thickness requirements of 24 dry mils at any point on the roof.**

**Prior to the application of material, please refer to the Product Mixing Instructions section in this Application Manual.**

1. Surface preparation. See the Surface Preparation section of this Application Manual.
2. Apply spray polyurethane foam in strict accordance with manufacturer's published specifications.
3. First Coat: Apply 7251 or 7261 single component elastomeric acrylic coating at approximately 66 sf/gal (1.5 gal/100 sf or 24 wet mils) to yield 12 dry mils and allow to cure.
4. Second Coat: Apply 7251 or 7261 single component elastomeric acrylic coating at approximately 66 sf/gal (1.5 gal/100 sf or 24 wet mils) to yield 12 dry mils and allow to cure.
5. Third Coat: Apply 7251 or 7261 single component elastomeric acrylic coating at approximately 66 sf/gal (1.5 gal/100 sf or 24 wet mils) to yield 12 dry mils and allow to cure.

6. Optional Granule Coat: Apply 7251 or 7261 single component elastomeric acrylic coating at approximately 66 sf/gal (1.5 gal/100 sf or 24 wet mils) and immediately broadcast #11 roofing granules at the rate of 30 lbs/100 sf. After cure, remove loose granules from roof surface.

### Summary Application Table for Elastacryl FR

| Coat | Product | Color | Coverage Rate (sf/gal) | Mils WFT/DFT | Approx. Recoat Time @ 75ºF (24ºC) |
|---|---|---|---|---|---|
| **First Coat** | 7251<br>7261 | White | 66 sf/gal | 24 WFT/12 DFT | 2–4 hrs or tack free |
| **Second Coat** | 7251<br>7261 | White | 66 sf/gal | 24 WFT/12 DFT | 2–4 hrs or tack free |
| **Third Coat** | 7251<br>7261 | White | 66 sf/gal | 24 WFT/12 DFT | 2–4 hrs or tack free |
| **Optional Granule Coat** | 7251<br>7261<br>*#11 Granules* | White | 80 sf/gal<br>*30 lbs/100 sf* | 20 WFT/10 DFT | N/A |

# Silicone FR

## Material

- Liquid Flashing: 7860 Series low-odor RTV silicone.
- Reinforcing Fabric: 86220 reinforcing fabric (Tietex T-272).
- Sealant: silicone sealant approved by NEOGARD®.
- Coating: 7860-LO Series low-odor RTV silicone.
- Granules (Optional): Granules shall be #11 screen size, dust free, ceramic-coated roofing granules. Use only granules as approved by NEOGARD®.
- Optional Granule Coat: 7860-LO Series low-odor RTV silicone.
- Cleaning Solvent: 20653 Xylene thinner or 7055 Odorless Reducer.

## Dry Film Thickness

### Average

- Total: 30 dry mils, 7860-LO Series

### Minimum

Total fluid-applied roof coating system thickness shall average 30 dry mils (DFT), exclusive of Optional Granule Coat and granules. Minimum dry film thickness at any point on the roof shall not be less than 20 dry mils (DFT). Applicator is responsible to meet these requirements and should consider *Factors That Affect Dry Film Thickness* when estimating material requirements.

### Factors That Affect Dry Film Thickness

Many factors can affect the amount of wet coating required to yield proper dry film thickness, including: Volume of solids; thinning; surface profile; application technique and equipment; overspray; squeegee; brush and roller wet out; container residue; spills and other waste.

To ensure that specified dry film thickness is achieved, use a wet mil gauge to check thickness of wet coating applied, adjusting as needed for those factors which directly affect the dry film build.

Utilize an optical comparator to verify actual dry film thickness and adjust coverage rates accordingly.

## Application Instructions

**Caution: The following instructions are for horizontal surfaces. Vertical or inclined surfaces may require additional coats to build film to design thickness.**

**Caution: Rough surface profiles of spray polyurethane foam or roof slope may increase the number of coats required to achieve uniform film coverage and minimum dry film thickness requirements of 20 dry mils at any point on the roof.**

**Prior to the application of material, please refer to the Product Mixing Instructions section in this Application Manual.**

1. Surface preparation. See the Surface Preparation section of this Application Manual.
2. Apply spray polyurethane foam in strict accordance with manufacturer's published specifications.
3. First Coat: Apply 7860-LO Series low odor RTV silicone coating at approximately 62 sf/gal (1.6 gal/100 sf or 24 wet mils) to yield an average of 15 dry mils and allow to cure.
4. Second Coat: Apply 7860-LO Series low odor RTV silicone coating at approximately 62 sf/gal (1.6 gal/100 sf or 24 wet mils) to yield an average of 15 dry mils and allow to cure.
5. Optional Granule Coat: Apply 7860-LO Series low odor RTV silicone coating at approximately 80 sf/gal (1.25 gal/100 sf or 20 wet mils) and immediately broadcast #11 roofing granules at the rate of 30 lbs /100 sf. After cure, remove loose granules from roof surface.

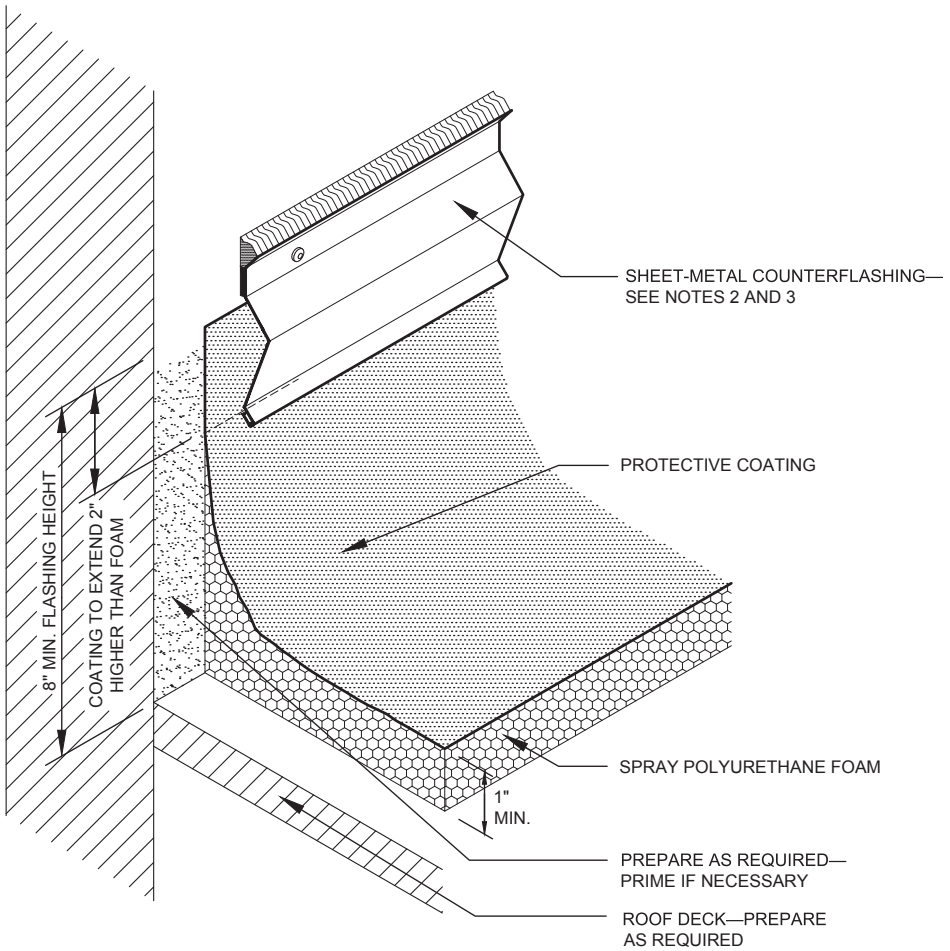
## Summary Application Table for Silicone FR

| Coat | Product | Color | Coverage Rate (sf/gal) | Mils WFT/DFT | Approx. Recoat Time @ 75ºF (24ºC) |
|---|---|---|---|---|---|
| **First Coat** | 7860 Series | Dark Gray, Gray, White, Tan | 62 sf/gal | 24 WFT/15 DFT | 2–4 hrs or tack-free |
| **Second Coat** | 7860 Series | Dark Gray, Gray, White, Tan | 62 sf/gal | 24 WFT/15 DFT | 2–4 hrs or tack-free |
| **Optional Granule Coat** | 7860 Series *#11 Granules* | Dark Gray, Gray, White, Tan | 80 sf/gal 30 lbs/100 sf | 20 WFT/12 DFT | N/A |

# SPF Details

The following details are utilized in the specification and design of NEOGARD® polyurethane foam roof coating systems in both new and retrofit applications. They are provided to show a generally recommended procedure for dealing with the condition shown. They will not and can not provide a specific solution for every condition likely to be encountered in field application. Where field conditions differ, the use of applicable portions of the details shown on their adaptation by an experienced and conscientious applicator should result in a quality project. If you have specific project related questions, contact NEOGARD® Technical Services at (800) 321-6588, or e-mail at techservice@neogard.com.

## Base Flashing with Counterflashing



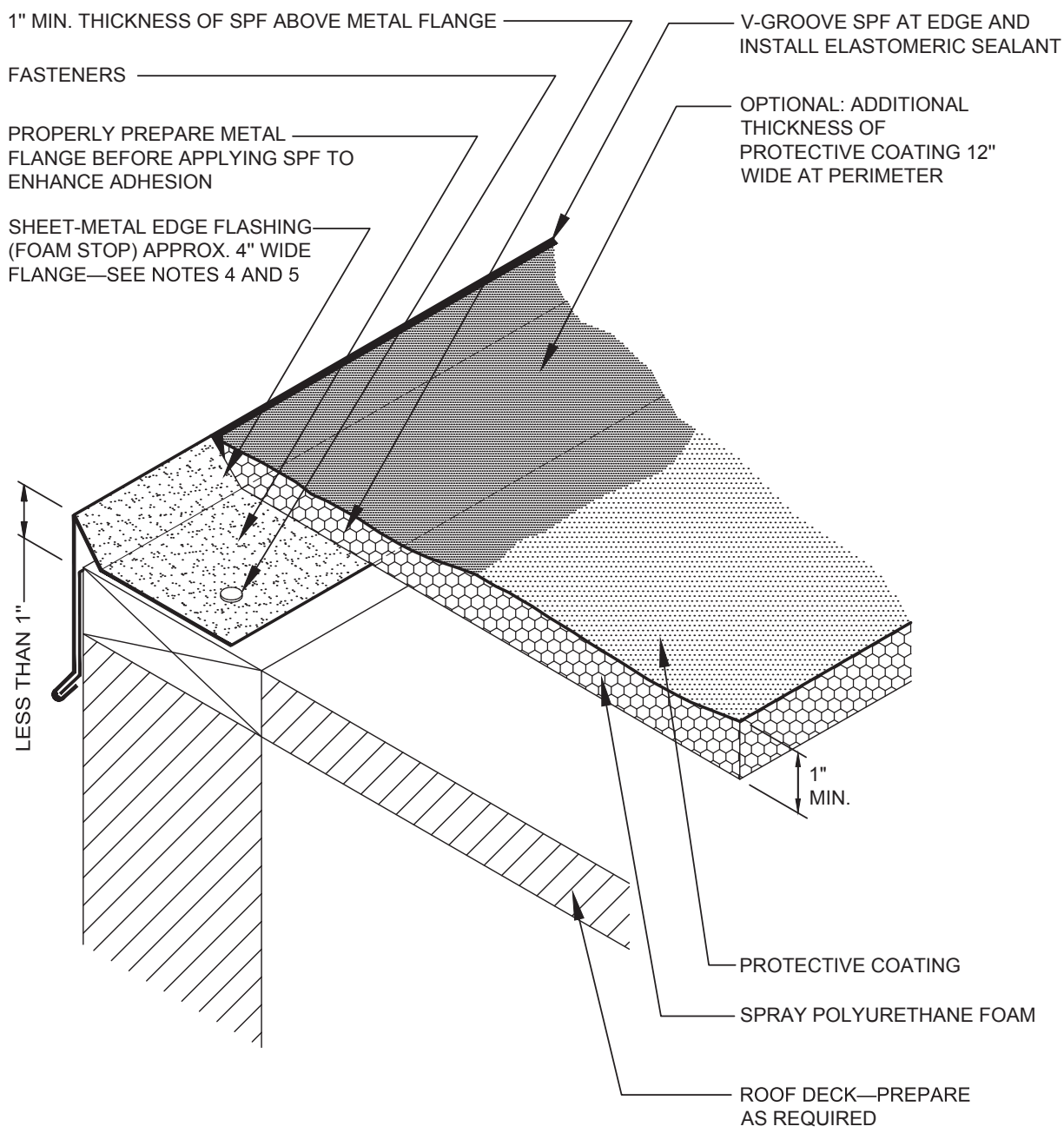

NOTES:

1. THIS DETAIL DOES NOT ALLOW FOR DIFFERENTIAL MOVEMENT BETWEEN THE DECK AND WALL. SEE DETAIL SPF-4 FOR EXPANSION JOINT AT A DECK-TO-WALL LOCATION.
2. REFER TO THE ARCHITECTURAL METAL FLASHING SECTION OF THE NRCA ROOFING MANUAL: ARCHITECTURAL METAL FLASHING, CONDENSATION CONTROL AND REROOFING FOR DESIGN, JOINERY AND SECUREMENT OPTIONS FOR COUNTERFLASHINGS.
3. REFER TO THE INTRODUCTION IN CHAPTER 8—CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION.

**BASE FLASHING WITH COUNTERFLASHING**

2012 *NOT DRAWN TO SCALE* **SPF-3**

## Perimeter Edge-Metal Flashing with Sealant (Foam Stop)



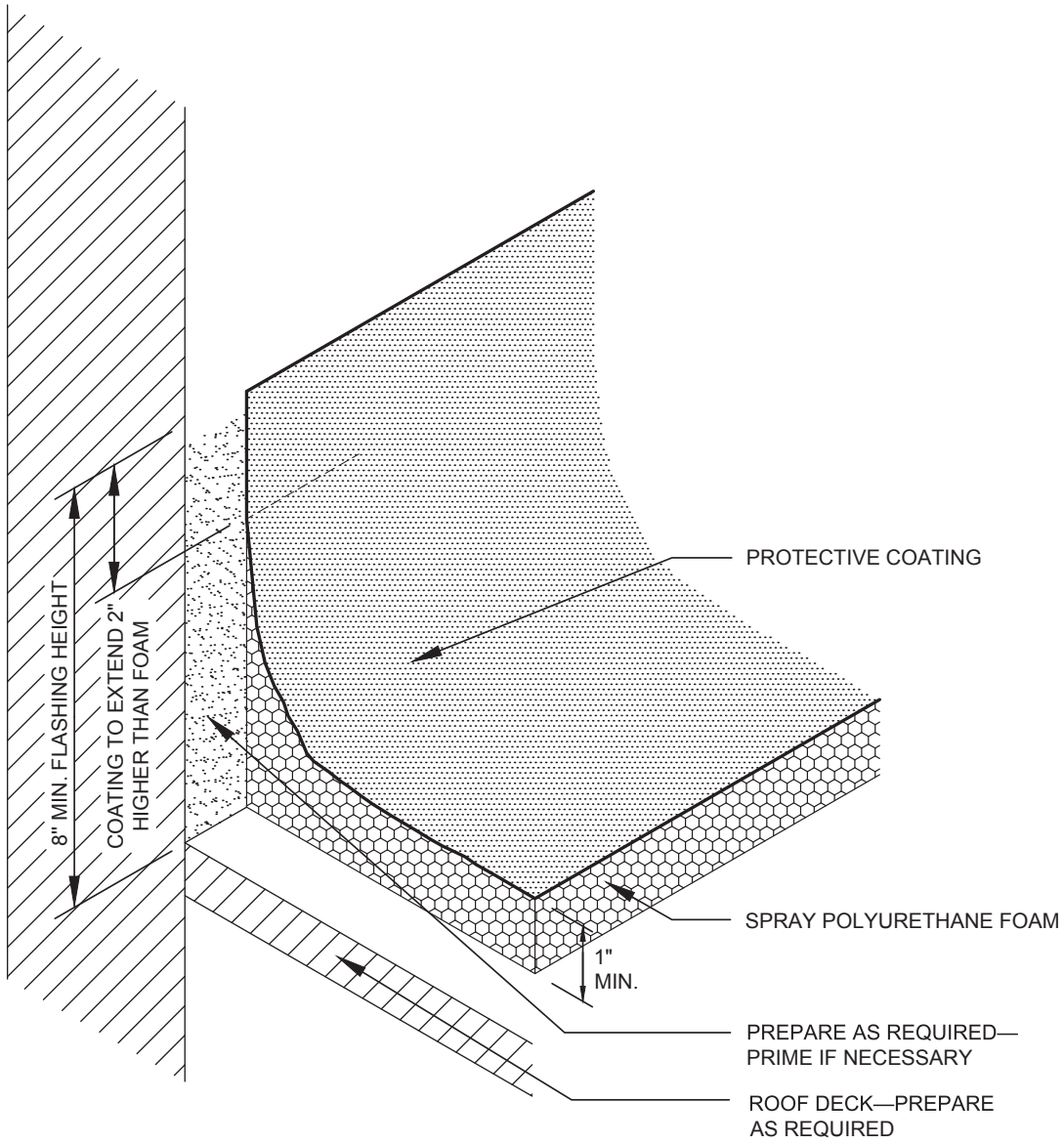

NOTES:

1. WHERE THE SPF IS TRIMMED OR GROUND FLUSH, ADDITIONAL COATING THICKNESS IS REQUIRED.
2. THIS DETAIL SHOULD BE USED ONLY WHEN THE DECK IS SUPPORTED BY THE OUTSIDE WALL.
3. ELASTOMERIC SEALANT TO BE COMPATIBLE WITH COATING.
4. REFER TO THE ARCHITECTURAL METAL FLASHING SECTION OF THE NRCA ROOFING MANUAL: ARCHITECTURAL METAL FLASHING, CONDENSATION CONTROL AND REROOFING FOR DESIGN, JOINERY AND SECUREMENT OPTIONS FOR COPINGS.
5. REFER TO THE INTRODUCTION IN CHAPTER 8—CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION.

**PERIMETER EDGE-METAL FLASHING WITH SEALANT [FOAM STOP]**

2012 *NOT DRAWN TO SCALE* **SPF-2**

## Base Flashing



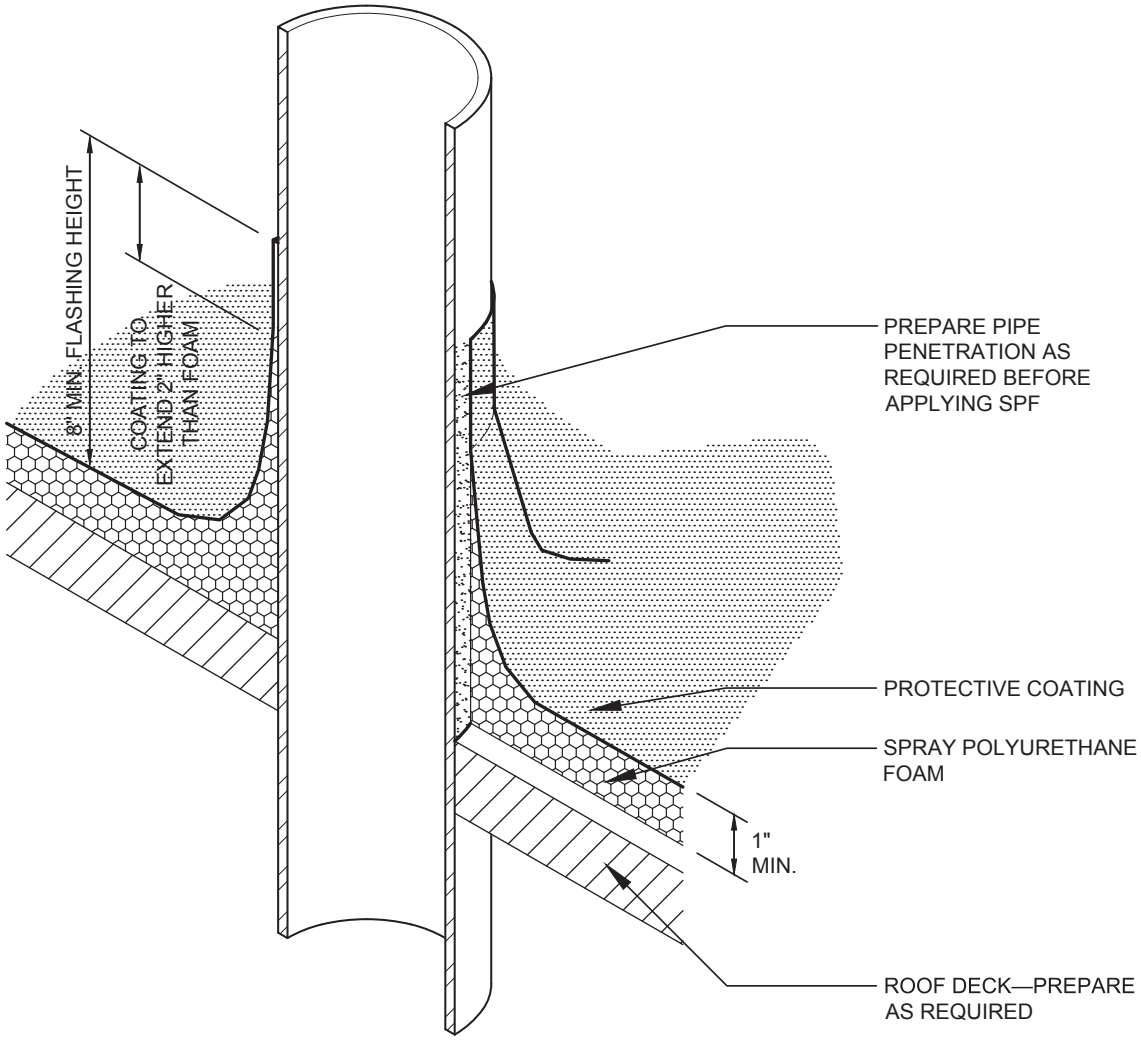

NOTES:

1. THIS DETAIL DOES NOT ALLOW FOR DIFFERENTIAL MOVEMENT BETWEEN THE DECK AND WALL. SEE DETAIL SPF-4 FOR EXPANSION JOINT AT A DECK-TO-WALL LOCATION.
2. REFER TO THE INTRODUCTION IN CHAPTER 8—CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION.

**BASE FLASHING**

2012 *NOT DRAWN TO SCALE* **SPF-3A**

## Pipe Penetration

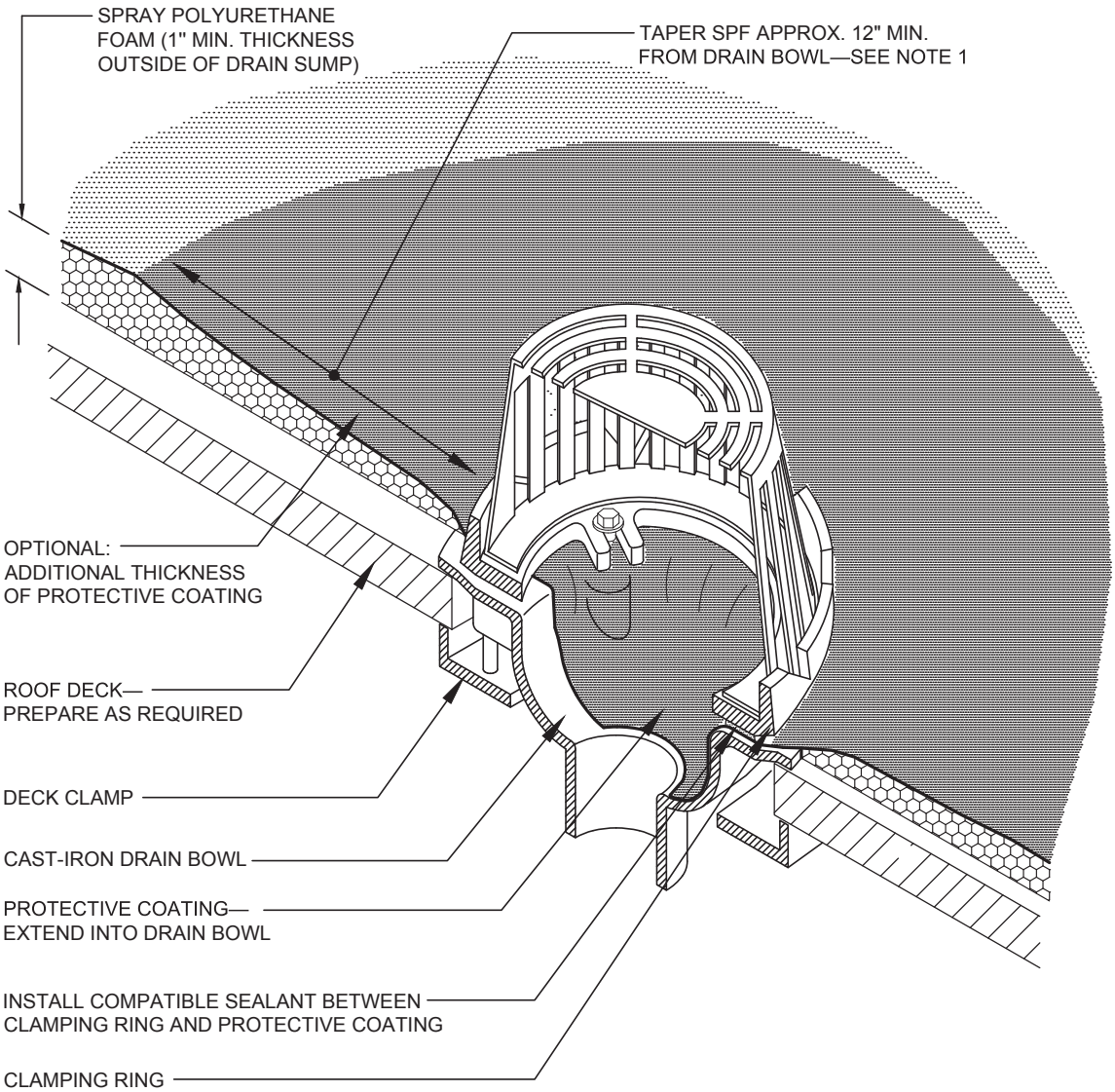



NOTES:

1. VENT STACKS AND OTHER PIPES SHOULD HAVE A MINIMUM 12 INCHES OF CLEARANCE ON ALL SIDES FROM WALLS, CURBS AND OTHER PROJECTIONS TO FACILITATE PROPER FLASHING.
2. REFER TO THE INTRODUCTION IN CHAPTER 8—CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION.

**PIPE PENETRATION**

2012 *NOT DRAWN TO SCALE* **SPF-15**




NOTES:

1. TAPER SPF TOWARD DRAIN BOWL TO PROVIDE POSITIVE DRAINAGE.
2. THE USE OF A METAL DECK SUMP PAN IS NOT RECOMMENDED. HOWEVER, DRAIN RECEIVER/BEARING PLATES ARE APPLICABLE WITH SOME PROJECTS.
3. WHERE THE SPF IS TRIMMED OR GROUND FLUSH, ADDITIONAL COATING THICKNESS IS REQUIRED.
4. THE SPF AND COATING SHOULD NOT REDUCE THE DIAMETER OF THE DRAIN PIPE.
5. REFER TO THE INTRODUCTION IN CHAPTER 8—CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION.

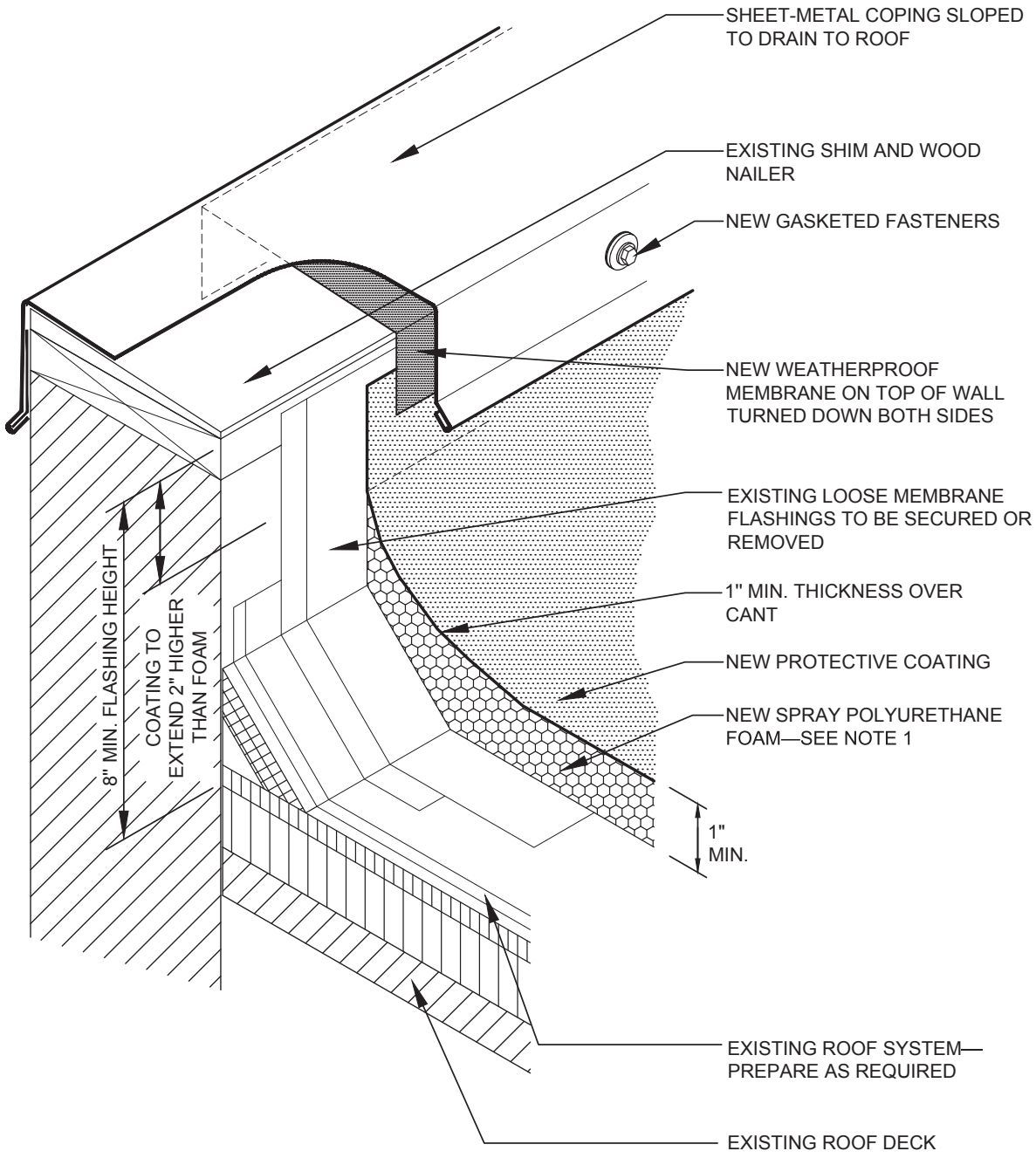
**ROOF DRAIN**

2011

*NOT DRAWN TO SCALE*

**SPF-18**

## Base Flashing at Parapet Wall with New Metal Coping for SPF Re-Cover




NOTES:

1. FOR PREPARED AGGREGATE-SURFACED MEMBRANES, MINIMUM THICKNESS FOR SPF IS 1 1/2 INCHES. REFER TO CHAPTER 7—ROOF RE-COVERING FOR ADDITIONAL INFORMATION.
2. REFER TO THE ARCHITECTURAL METAL FLASHING SECTION OF THE NRCA ROOFING MANUAL: ARCHITECTURAL METAL FLASHING, CONDENSATION CONTROL AND REROOFING FOR DESIGN, JOINERY AND SECUREMENT OPTIONS FOR COPINGS.
3. REFER TO THE INTRODUCTION IN CHAPTER 8—CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION.

**BASE FLASHING AT PARAPET WALL WITH NEW METAL COPING FOR SPF RE-COVER**

2012 *NOT DRAWN TO SCALE* **SPF(R)-1**

# System Application: Direct-Bond Systems

## Elasta-Gard C Aliphatic

**For Structural Concrete Substrate**

### Materials

- Primer: 7797/7798 urethane primer.
- Liquid Flashing: 70620 Series single component moisture cured polyurethane coating.
- Reinforcing Fabric: 86220 reinforcing fabric (Tietex T-272)
- Mastic: 70690 Roof Mastic.
- Sealant: 70991 or 70995 urethane sealant.
- Base Coat: 70620 Series single component moisture cured polyurethane.
- Intermediate Coat: 70630 Series single component moisture cured polyurethane.
- Topcoat: 7490 Series single component aliphatic polyurethane.
- Optional Granule Coat: 7490 Series single component aliphatic polyurethane.
- Cleaning Solvent: 20653 Xylene Thinner or 7055 Odorless Reducer.

### Dry Film Thickness

#### Average

- Base Coat: 12 dry mils, 70620 Series
- Intermediate Coat: 12 dry mils, 70630 Series
- Topcoat: 12 dry mils, 7490 Series
- Total: 36 dry mils

#### Minimum

Total coating system thickness shall average 36 dry mils (DFT), exclusive of Optional Granule Coat and granules. Minimum dry film thickness (DFT) at any point on the roof shall not be less than 24 dry mils of which 16 dry mils must be above the Base Coat material and 8 dry mils must be 7490 Series material. Applicator is responsible to meet these requirements and should consider *Factors That Affect Dry Film Thickness* when estimating material requirements.

#### Factors That Affect Dry Film Thickness

Many factors can affect the amount of wet coating required to yield proper dry film thickness, including: Volume of solids; thinning; surface profile; application technique and equipment; overspray; squeegee; brush and roller wet out; container residue; spills and other waste.

To ensure that specified dry film thickness is achieved, use a wet mil gauge to check thickness of wet coating applied, adjusting as needed for those factors which directly affect the dry film build.

Utilize an optical comparator to verify actual dry film thickness and adjust coverage rates accordingly.

### Application Instructions

**Caution: The following instructions are for horizontal surfaces. Vertical or inclined surfaces may require additional coats to build film to design thickness.**

**Caution: Rough surface profiles or roof slope may increase the number of coats required to achieve uniform film coverage and minimum dry film thickness requirements.**

**Prior to the application of material, please refer to the Product Mixing Instructions section in this Application Manual.**

1. Surface preparation. See the Surface Preparation section of this Application Manual.
2. Primer: Apply NEOGARD® **7797/7798 urethane** primer at a rate of 1/3 gallon per 100 square feet (300 sf/gal) and allow to cure until primer will not transfer when touched.

   **Note: Do not apply epoxy primer over base coat material used for detailing.**

   **Note: Each coat shall be applied perpendicular to the previous coat.**
3. Base Coat: Thoroughly mix and apply 70620 Series single component moisture cured polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) to yield 12 dry mils and allow to cure.

   **Note: If base coat cannot be applied over primer within 24 hours, reprime.**

   **Note: Do not leave base coat exposed for more than 5 days.**
4. Intermediate Coat: Thoroughly mix and apply 70630 Series single component moisture cured polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) to yield 12 dry mils and allow to cure.
5. Topcoat: Thoroughly mix and apply 7490 Series single component aliphatic polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) to yield 12 dry mils and allow to cure.
6. Optional Granule Coat: Thoroughly mix and apply 7490 Series single component aliphatic polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) and immediately broadcast #11 roofing granules at the rate of 30 lbs/100 sf. After cure, remove loose granules from roof surface.

### Summary Application Table for Elasta-Gard C Aliphatic

| Coat | Product | Color | Coverage Rate (sf/gal) | Mils WFT/DFT | Approx. Recoat Time @ 75ºF (24ºC) |
|---|---|---|---|---|---|
| **Primer** | 7797/7798 | N/A | 300 sf/gal | N/A | 1.5 hrs |
| **Base Coat** | 70620 Series | Dark Gray | 100 sf/gal | 16 WFT/12 DFT | 8–12 hrs or tack free |
| **Intermediate Coat** | 70630 Series | White, Tan, Gray | 100 sf/gal | 16 WFT/12 DFT | 6 hrs or tack free |
| **Topcoat** | 7490 Series | White | 100 sf/gal | 16 WFT/12 DFT | 8–12 hrs or tack free |
| **Optional Granule Coat** | 7490 Series *#11 Granules* | White | 100 sf/gal *30 lbs/100 sf* | 16 WFT/12 DFT | N/A |

# Elasta-Gard M Aliphatic

**For Metal Roof Substrate**

## Materials

- Primer: 7797/7798 urethane primer for previously coated or factory finished metal roofs.
- Liquid Flashing: 70630 Series single component moisture cured polyurethane coating.
- Reinforcing Fabric: 86220 reinforcing fabric (Tietex T-272)
- Mastic: 70690 Roof Mastic.
- Sealant: 70991 or 70995 urethane sealant.
- Base Coat: 70630 Series single component moisture cured polyurethane.
- Topcoat: 7490 Series single component aliphatic polyurethane.
- Optional Granule Coat: 7490 Series single component aliphatic polyurethane.
- Cleaning Solvent: 20653 Xylene Thinner or 7055 Odorless Reducer.

## Dry Film Thickness

### Average

- Base Coat: 9 dry mils, 70630 Series
- Topcoat: 12 dry mils, 7490 Series
- Total: 18 dry mils

### Minimum

Total coating system thickness shall average 18 dry mils (DFT), exclusive of Optional Granule Coat and granules. Minimum dry film thickness (DFT) at any point on the roof shall not be less than 12 dry mils of which 6 dry mils must be 7490 Series material. Applicator is responsible to meet these requirements and should consider *Factors That Affect Dry Film Thickness* when estimating material requirements.

### Factors That Affect Dry Film Thickness

Many factors can affect the amount of wet coating required to yield proper dry film thickness, including: Volume of solids; thinning; surface profile; application technique and equipment; overspray; squeegee; brush and roller wet out; container residue; spills and other waste.

To ensure that specified dry film thickness is achieved, use a wet mil gauge to check thickness of wet coating applied, adjusting as needed for those factors which directly affect the dry film build.

Utilize an optical comparator to verify actual dry film thickness and adjust coverage rates accordingly.

## Application Instructions

**Caution: The following instructions are for horizontal surfaces. Vertical or inclined surfaces may require additional coats to build film to design thickness.**

**Caution: Rough surface profiles or roof slope may increase the number of coats required to achieve uniform film coverage and minimum dry film thickness requirements.**

**Prior to the application of material, please refer to the Product Mixing Instructions section in this Application Manual.**

1. Surface preparation. See the Surface Preparation section of this Application Manual.
2. Primer: For previously coated or factory-finished metal roofs, apply 7797/7798 urethane primer at a rate of 300 sf/gal (400 sf/gal if sprayed).

   **Note: Each coat shall be applied perpendicular to the previous coat.**
3. Base Coat: Thoroughly mix and apply 70630 Series single component moisture cured polyurethane coating at approximately 133 sf/gal (0.75 gal/100 sf or 12 wet mils) to yield 9 dry mils and allow to cure.

   **Note: If Base Coat cannot be applied over primer within 24 hours, reprime.**

**Note: Do not leave base coat exposed for more than 5 days.**

4. Seam Detail: All seams on the roof must be sealed.
   A. Horizontal seam treatment options are as follows:
      - Mastic: Apply a 2” wide band of 70690 mastic material to the seam at a rate sufficient to create a smooth transition, minimum 80 wet mils. Taper the edges to the existing substrate.
      - TieTex: Apply 24 wet mils of elastomeric base coat material, 10” wide, over seam. Apply and center TieTex fabric over wet base coat material. Work the reinforcing fabric into wet coating material using a brush or roller to eliminate air pockets, wrinkles and gaps. Apply additional 16 wet mils of base coat over the entire seam detail and allow to cure.

   B. Vertical seam treatment: Treat all vertical seams with urethane sealant at a rate sufficient to create a smooth transition.
5. Topcoat: Thoroughly mix and apply 7490 Series single component aliphatic polyurethane coating at approximately 133 sf/gal (0.75 gal/100 sf or 12 wet mils) to yield 9 dry mils and allow to cure.
6. Optional Granule Coat: Thoroughly mix and apply 7490 Series single component aliphatic polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) and immediately broadcast #11 roofing granules at the rate of 30 lbs/100 sf. After cure, remove loose granules from roof surface.

### Summary Application Table for Elasta-Gard M Aliphatic

| Coat | Product | Color | Coverage Rate (sf/gal) | Mils WFT/DFT | Approx. Recoat Time @ 75ºF (24ºC) |
|---|---|---|---|---|---|
| **Primer** | 7797/7798 | N/A | 300 sf/gal (400 sf/gal sprayed) | N/A | 1.5 hrs |
| **Base Coat** | 70630 Series | White, Tan, Light Gray | 133 sf/gal | 12 WFT/9 DFT | 6 hrs or tack-free |
| **Topcoat** | 7490 Series | White, Tan, Light Gray | 133 sf/gal | 12 WFT/9 DFT | 6 hrs or tack-free |
| **Optional Granule Coat** | 70630 Series *#11 Granules* | White, Tan, Light Gray | 100 sf/gal *30 lbs/100 sf* | 16 WFT/12 DFT | N/A |

# Elasta-Gard SP Aliphatic

**For Single-Ply Roof Substrate**

## Materials

- Primer: 7797/7798 urethane primer.
- Liquid Flashing: 70620 Series single component moisture cured polyurethane coating.
- Reinforcing Fabric: 86220 reinforcing fabric (Tietex T-272)
- Mastic: 70690 Roof Mastic.
- Sealant: 70991 or 70995 urethane sealant.
- Base Coat: 70620 Series single component moisture cured polyurethane.
- Intermediate Coat: 70630 Series single component moisture cured polyurethane.
- Topcoat: 7490 Series single component aliphatic polyurethane.
- Optional Granule Coat: 7490 Series single component aliphatic polyurethane.
- Cleaning Solvent: 20653 Xylene Thinner or 7055 Odorless Reducer.

## Dry Film Thickness

### Average

- Base Coat: 12 dry mils, 70620 Series
- Intermediate Coat: 12 dry mils, 70630 Series
- Topcoat: 12 dry mils, 7490 Series
- Total: 36 dry mils

### Minimum

Coating Thickness Requirements: Total coating system thickness shall average 36 dry mils (DFT), exclusive of Optional Granule Coat and granules. Minimum dry film thickness (DFT) at any point on the roof shall not be less than 24 dry mils of which 16 dry mils must be above the base coat material and 8 dry mils must be 7490 Series material. Applicator is responsible to meet these requirements and should consider *Factors That Affect Dry Film Thickness* when estimating material requirements.

### Factors That Affect Dry Film Thickness

Many factors can affect the amount of wet coating required to yield proper dry film thickness, including: Volume of solids; thinning; surface profile; application technique and equipment; overspray; squeegee; brush and roller wet out; container residue; spills and other waste.

To ensure that specified dry film thickness is achieved, use a wet mil gauge to check thickness of wet coating applied, adjusting as needed for those factors which directly affect the dry film build.

Utilize an optical comparator to verify actual dry film thickness and adjust coverage rates accordingly.

## Application Instructions

**Caution: The following instructions are for horizontal surfaces. Vertical or inclined surfaces may require additional coats to build film to design thickness.**

**Caution: Rough surface profiles or roof slope may increase the number of coats required to achieve uniform film coverage and minimum dry film thickness requirements.**

**Prior to the application of material, please refer to the Product Mixing Instructions section in this Application Manual.**

1. Surface preparation. See the Surface Preparation section of this Application Manual.
2. Primer: Apply NEOGARD® 7797/7798 urethane primer at a rate of 1/3 gallon per 100 square feet (300 sf/gal) and allow to cure until primer will not transfer when touched.

   **Note: Do not apply epoxy primer over coating material used for detailing.**

**Note: Each coat shall be applied perpendicular to the previous coat.**

3. Base Coat: Thoroughly mix and apply 70620 Series single component moisture cured polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) to yield 12 dry mils and allow to cure.

   **Note: If Base Coat cannot be applied over primer within 24 hours, reprime.**

   **Note: Do not leave base coat exposed for more than 5 days.**

4. Seam Detail: All seams on the roof must be sealed.
   A. Horizontal seam treatment options are as follows:
   - Mastic: Apply a 2” wide band of 70690 mastic material to the seam at a rate sufficient to create a smooth transition, minimum 80 wet mils. Taper the edges to the existing substrate.
   - TieTex: Apply 24 wet mils of elastomeric base coat material, 10” wide, over seam. Apply and center TieTex fabric over wet base coat material. Work the reinforcing fabric into wet coating material using a brush or roller to eliminate air pockets, wrinkles and gaps. Apply additional 16 wet mils of base coat over the entire seam detail and allow to cure.

   B. Vertical seam treatment: Treat all vertical seams with urethane sealant at a rate sufficient to create a smooth transition.

5. Intermediate Coat: Thoroughly mix and apply 70630 Series single component moisture cured polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) to yield 12 dry mils and allow to cure.

6. Topcoat: Thoroughly mix and apply 7490 Series single component aliphatic polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) to yield 12 dry mils and allow to cure.

7. Optional Granule Coat: Thoroughly mix and apply 7490 Series single component aliphatic polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) and immediately broadcast #11 roofing granules at the rate of 30 lbs /100 sf. After cure, remove loose granules from roof surface.

### Summary Application Table for Elasta-Gard SP Aliphatic

| Coat | Product | Color | Coverage Rate (sf/gal) | Mils WFT/DFT | Approx. Recoat Time @ 75ºF (24ºC) |
|---|---|---|---|---|---|
| **Primer** | 7797/7798 | N/A | 300 sf/gal | N/A | 1.5 hrs |
| **Seam Detail Coat** | 70620 Series | Dark Gray | 50 sf/gal | 32 WFT/24 DFT | 8–12 hrs or tack-free |
| **Base Coat** | 70620 Series | Dark Gray | 100 sf/gal | 16 WFT/12 DFT | 8–12 hrs or tack-free |
| **Intermediate Coat** | 70630 Series | White, Tan, Gray | 100 sf/gal | 16 WFT/12 DFT | 6 hrs or tack-free |
| **Topcoat** | 7490 Series | White | 100 sf/gal | 16 WFT/12 DFT | 8–12 hrs or tack-free |
| **Optional Granule Coat** | 7490 Series *#11 Granules* | White | 100 sf/gal *30 lbs/100 sf* | 16 WFT/12 DFT | N/A |

# Elasta-Gard BUR/MB Aliphatic

**For Smooth and Granulated Cap Sheet,**
**Modified Bitumen and Built-Up Roof Substrate**

## Materials

- Primer: 7780/7781 epoxy primer.
- Liquid Flashing: 70620 Series single component moisture cured polyurethane coating.
- Reinforcing Fabric: 86220 reinforcing fabric (Tietex T-272)
- Mastic: 70690 Roof Mastic.
- Sealant: 70991 or 70995 urethane sealant.
- Leveling Coat: 70620 Series single component moisture cured polyurethane.
- Base Coat: 70620 Series single component moisture cured polyurethane.
- Intermediate Coat: 70630 Series single component moisture cured polyurethane.
- Topcoat: 7490 Series single component aliphatic polyurethane.
- Optional Granule Coat: 7490 Series single component aliphatic polyurethane.
- Cleaning Solvent: 20653 Xylene Thinner or 7055 Odorless Reducer.

## Dry Film Thickness

### Average

- Leveling Coat: 12 dry mils, 70620 Series
- Base Coat: 12 dry mils, 70620 Series
- Intermediate Coat: 12 dry mils, 70630 Series
- Topcoat: 12 dry mils, 7490 Series
- Total: 48 dry mils

### Minimum

Total coating system thickness shall average 48 dry mils (DFT), exclusive of Optional Granule Coat and granules. Minimum dry film thickness (DFT) at any point on the roof shall not be less than 32 dry mils of which 16 dry mils must be above the base coat material and 8 dry mils must be 7490 Series material. Applicator is responsible to meet these requirements and should consider *Factors That Affect Dry Film Thickness* when estimating material requirements.

### Factors That Affect Dry Film Thickness

Many factors can affect the amount of wet coating required to yield proper dry film thickness, including: Volume of solids; thinning; surface profile; application technique and equipment; overspray; squeegee; brush and roller wet out; container residue; spills and other waste.

To ensure that specified dry film thickness is achieved, use a wet mil gauge to check thickness of wet coating applied, adjusting as needed for those factors which directly affect the dry film build.

Utilize an optical comparator to verify actual dry film thickness and adjust coverage rates accordingly.

## Application Instructions

**Caution: The following instructions are for horizontal surfaces. Vertical or inclined surfaces may require additional coats to build film to design thickness.**

**Caution: Rough surface profiles or roof slope may increase the number of coats required to achieve uniform film coverage and minimum dry film thickness requirements.**

**Prior to the application of material, please refer to the Product Mixing Instructions section in this Application Manual.**

1. Surface preparation. See the Surface Preparation section of this Application Manual.

2. Primer: Apply NEOGARD® 7780/7781 epoxy primer at a rate of 1/3 gallon per 100 square feet (300 sf/gal) and allow to cure until primer will not transfer when touched. **Note: Do not apply epoxy primer over coating material used for detailing.**

   **Note: Each coat shall be applied perpendicular to the previous coat.**

3. Leveling Coat: Thoroughly mix and apply 70620 Series single component moisture cured polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) to yield 12 dry mils and allow to cure.

   **Note: If Leveling Coat cannot be applied over primer within 24 hours, reprime.**

   **Note: Leveling Coat is intended to fully encapsulate granulated cap sheet.**

4. Seam Detail: All seams on the roof must be sealed.
   A. Horizontal seam treatment options are as follows:
   - Mastic: Apply a 2” wide band of 70690 mastic material to the seam at a rate sufficient to create a smooth transition, minimum 80 wet mils. Taper the edges to the existing substrate.
   - TieTex: Apply 24 wet mils of elastomeric base coat material, 10” wide, over seam. Apply and center TieTex fabric over wet base coat material. Work the reinforcing fabric into wet coating material using a brush or roller to eliminate air pockets, wrinkles and gaps. Apply additional 16 wet mils of base coat over the entire seam detail and allow to cure.

   B. Vertical seam treatment: Treat all vertical seams with urethane sealant at a rate sufficient to create a smooth transition.

5. Base Coat: Thoroughly mix and apply 70620 Series single component moisture cured polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) to yield 12 dry mils and allow to cure.

6. Intermediate Coat: Thoroughly mix and apply 70630 Series single component moisture cured polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) to yield 12 dry mils and allow to cure.

7. Topcoat: Thoroughly mix and apply 7490 Series single component aliphatic polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) to yield 12 dry mils and allow to cure.

8. Optional Granule Coat: Thoroughly mix and apply 7490 Series single component polyurethane coating at approximately 100 sf/gal (1.0 gal/100 sf or 16 wet mils) and immediately broadcast #11 roofing granules at the rate of 30 lbs/100 sf. After cure, remove loose granules from roof surface.

### Summary Application Table for Elasta-Gard BUR/MB Aliphatic

| Coat | Product | Color | Coverage Rate (sf/gal) | Mils WFT/DFT | Approx. Recoat Time @ 75ºF (24ºC) |
|---|---|---|---|---|---|
| **Primer** | 7780/7781 | N/A | 300 sf/gal | N/A | 1.5 hrs |
| **Leveling Coat** | 70620 Series | Dark Gray | 100 sf/gal | 16 WFT/12 DFT | 8–12 hrs or tack-free |
| **Seam Detail Coat** | 70620 Series | Dark Gray | N/A | 40 WFT/30 DFT | 8–12 hrs or tack-free |
| **Base Coat** | 70620 Series | Dark Gray | 100 sf/gal | 16 WFT/12 DFT | 8–12 hrs or tack-free |
| **Intermediate Coat** | 70630 Series | White, Tan, Gray | 100 sf/gal | 16 WFT/12 DFT | 6 hrs or tack-free |
| **Topcoat** | 7490 Series | White | 100 sf/gal | 16 WFT/12 DFT | 8–12 hrs or tack free |
| **Optional Granule Coat** | 7490 Series *#11 Granules* | White | 100 sf/gal *30 lbs/100 sf* | 16 WFT/12 DFT | N/A |

# Recoat Guidelines

## Inspection

- NEOGARD® recommends a general inspection of the existing roof conditions prior to establishing and/or recommending a repair and recoat procedure. The purpose for the inspection is to check for physical damage, delamination, exposed substrate, cracks, spongy or water saturated roof materials, coating blisters and areas of thin coating.
- Make contact with the owner to discuss any existing roof leaks. If leaks exist, go onto the roof surface and try to establish point of entry and probe the existing roofing system for moisture content. Identify the problem before deciding on corrective action. In many instances, the sources of leaks are from skylights, vents, air conditioning equipment, ducts, flashing and expansion joints.
- Roof surfaces may be damaged by constant physical abuse. Check areas of high traffic such as around vent fans, air conditioner units, roof hatches, exit doors, and other access points.

## Moisture Survey

Determine if there is moisture within the existing roof assembly, requiring removal and replacement prior to recoat. Refer to the Moisture Detection Survey section in this Application Manual.

## Adhesion Test

NEOGARD® strongly recommends adhesion tests, both with and without primer, on all recoat projects. Refer to the Field Adhesion Testing section of this Application Manual.

## Coating and/or Substrate Repair

When preparing to recoat, if it is necessary to expose the substrate, always clean the exposed area, prime if conditions dictate, and apply Base Coat and Topcoat material.

- Delamination/Peeling: Remove any poorly adhered material. Clean affected area with NEOGARD 8500 BioDegradable Cleaner at the rate of 1 part concentrate to 10 parts water, or solvent wipe, extending 6–8” beyond the affected area. Apply Base Coat over primed areas, extending the coating application 6” beyond the repair area. Apply Topcoat over Base Coat and extend Topcoat at least 4” beyond the repair area.
- Coating Blisters: Remove all poorly adhered material. Clean affected area with NEOGARD 8500 BioDegradable Cleaner at the rate of 1 part concentrate to 10 parts water, or solvent wipe, extending 6–8” beyond the affected area. As needed prime any exposed substrate. Apply Base Coat, extending the coating application 6” beyond the repair area. Apply Topcoat over Base Coat and extend Topcoat at least 4” beyond the repair area.
- Pinholes: Clean affected area with NEOGARD® 8500 BioDegradable Cleaner at the rate of 1 part concentrate to 10 parts water, or solvent wipe, extending 6”–8” beyond the affected area. Recoat the area with Topcoat material, after the heat of the day, adding fine sand at 1–3 pounds/100 sq. ft. Work the wet coating and sand with additional backrolling to displace air entrapped in the voids. Repeat if needed. Apply additional Topcoat material to yield 24 dry mils to repair area and allow to cure.
- Wrinkling: Remove any poorly adhered or spongy material. Clean affected area with NEOGARD® 8500 BioDegradable Cleaner at the rate of 1 part concentrate to 10 parts water, or solvent wipe, extending 6”–8” beyond the affected area. As needed, prime any exposed substrate. Apply Base Coat. Apply Topcoat over Base Coat, extending Topcoat application 4” beyond the repair area.

- Crack and Seam Detail: If not previously treated, all capsheet seams require 70690 Roof Mastic or 86220 reinforcing fabric (Tietex T-272) and Base Coat material.
- Spray Polyurethane Foam Blisters: Refer to SPFA Technical Document AY-107, *Spray Polyurethane Foam Blisters*, for foam blister type identification and repair procedures.

  **Note: It is not an acceptable procedure to cut out blisters and fill with elastomeric roof coating. Such a procedure will result in either a depression in the surface which will hold water or an unacceptable thickness of coating which may itself blister.**

Upon completion of repairs, all roof surfaces shall be cleaned using NEOGARD® 8500 BioDegradable Cleaner at the rate of 1 part concentrate to 10 parts water. Apply the diluted cleaning solution at a rate of 150 to 200 square feet per gallon and allow to stand for 15 minutes. **Do not allow the solution to dry.** Thoroughly rinse with fresh water to remove the cleaning solution. The use of stiff-bristle brooms or mechanical scrubbers may be required to remove heavy deposits of dirt or other contaminants from surface. Allow roof surface to thoroughly dry. **Note: If algae is present on the surface, the cleaning must include bleach in the washing of the substrate.** Follow local ordinances regarding runoff from this procedure.

Before proceeding with coating application, ensure that substrate and repairs are clean, sound, dry (cured) and secure.

## Coating Application

**All Topcoats should be installed in a minimum of two coats.** Each coat should be installed perpendicular to the previous coat. Minimum Topcoat thickness shall be required (see system minimum dry film thickness requirements in the Recoat Guidelines table). When adding granules to the roof coating, apply additional 16 dry mils of Topcoat material to the coating system requirements.

## Recoat Guidelines: DFT Requirements

| System | Topcoat Material | Coverage Rate (sf/gal) | Mils WFT/DFT | Average Mils | Minimum Mils |
|---|---|---|---|---|---|
| **Elasta-Gard Aliphatic Series** | 7490 | 2 coats at 133 each | 24/18 | 18 | 12 |
| **Permathane Aliphatic** | 7490 | 2 coats at 133 each | 24/18 | 18 | 12 |
| **Elastacryl FR** | 7251/7261 | 2 coats at 100 each | 32/16 | 24 | 16 |
| **Silicone FR** | 7860 Series | 2 coats at 100 each | 32/20 | 20 | 13 |
| **70630 Intermediate Coat with 7490 Topcoat** | 70630<br>7490 | 100<br>100 | 16/12<br>16/12 | 24 | 18 |

## Recoat Guidelines Summary

- All coverage rates are based on glass smooth surface.
- Topcoats are applied in a minimum of two coats, each perpendicular to the previous coat.
- When recoating granulated surfaces, an additional coat—Leveling Coat—of 12 mils DFT is required.
- Adding granules to recoat systems requires an additional 12 mils DFT.
- All systems require power wash with NEOGARD® 8500 BioDegradable Cleaner.
- All systems require an adhesion test with and without primer.

# Field Adhesion Testing

It is important to conduct field adhesion tests to confirm the proper procedure for recoating an existing coating system as well as system compatibility. NEOGARD® recommends performing one of the following adhesion tests. It is more useful to conduct adhesion testing in the field than in the lab as it represents the actual job conditions. The following are summaries of adhesions tests. For further information please refer to ASTM standards.

## ASTM D903

Standard Test Method for Peel or Stripping of Adhesive Bonds. This test is also known as the “Adhesion in Peel” or “Peel Adhesion” test and results in a quantitative value stated in lbs./linear inch or PLI.

### Items Needed

- Solvent/Cleaner
- Clean Rags
- Primer (if applicable)
- Coating Material
- 4” Roller/Cover or 3” Brush
- Fabric test strips cut to 1” x 18”-24”
- Painter’s Tape
- Utility Knife
- Spring Scale/Fish Scale (calibrated to pounds and ounces)

### Procedure

1. Clean and prepare substrate as required by relevant specification.
2. If applicable, apply primer and allow to cure.
3. Apply coating at 16 wet mils. Coating is applied to an area 4” x 14” minimum.

4. Work fabric strips into wet coating, allowing 6” of fabric to remain free of coating. Adhere the loose end of fabric to the substrate utilizing painter’s tape.
5. Allow coating to cure.

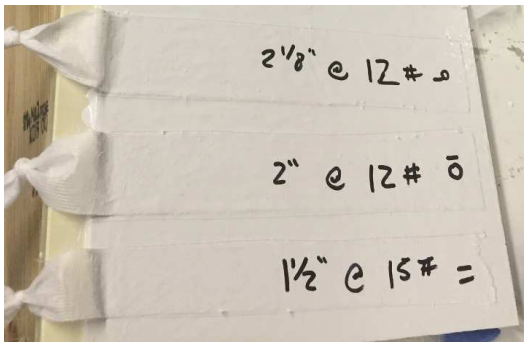
6. Apply topcoat to test area at 16 wet mils.
7. Allow coating to cure 7–10 days.

8. Remove painter's tape and tie a knot in the dry end of the fabric.

9. With the knife, score coating along the perimeter of the fabric.

10. Using a calibrated spring scale, hook the knot and pull back 180 degrees, parallel to the fabric.

11. Record the pounds per inch that separation occurrred, making sure to divide the pounds of the pull by the width of fabric.
    - Test values of at least 4–5 pounds/inch for urethanes are acceptable for recoat situations.
    - Test values of 2 pounds/inch for acrylics are acceptable for recoat situations.

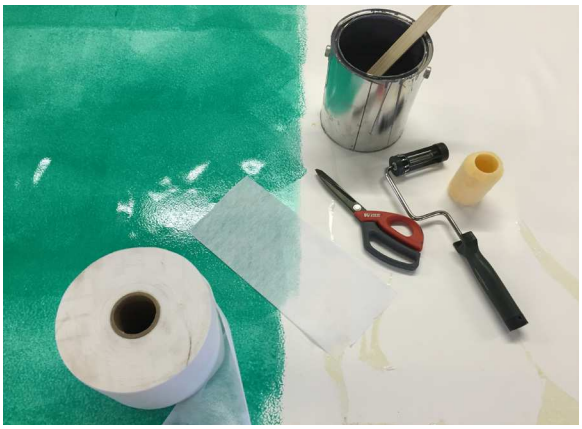



## Rag Test

This test gives an indication of bond strength without numeric value. It is typically the recommended procedure for field adhesion tests. In these photos, the substrate is shown as white, primer is green and the coating is charcoal.

### Items Needed

- Solvent/Cleaner
- Clean Rags
- Primer (if applicable)
- Coating
- Roller or Brush
- Polyester Fabric

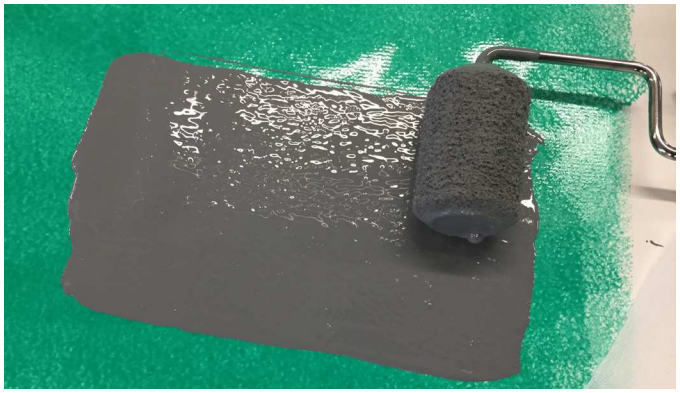


## Procedure

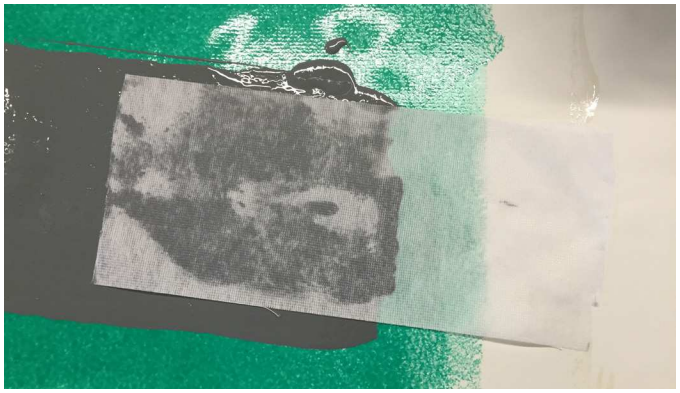
1. The substrate is prepared as required by the relevant specification.

2. If applicable, apply primer and allow to cure.

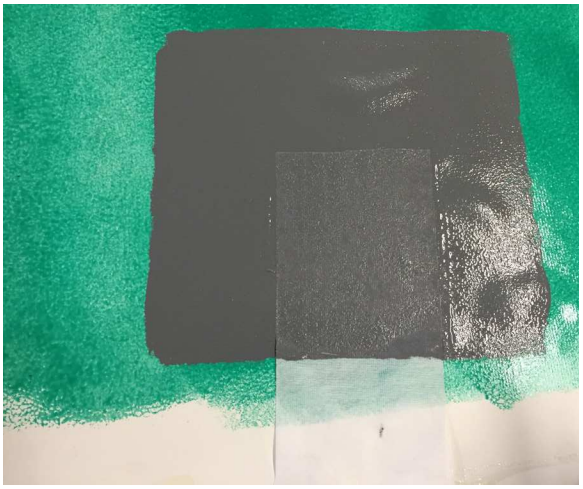
3. Apply coating with roller or brush..



4. Work fabric into wet coating.



5. Apply additional coating to embed fabric, allowing a minimum of 6” in length to remain free of the coating.



6. When coating has fully cured, generally allowing 7–10 days, pull the free end of the fabric back toward the test area for an indication of bond strength.

# ASTM D7234 (Concrete Substrates)

This is a standard test method for determining pull-off strength of coatings using portable pull-off adhesion testers and was developed for concrete substrates. The following is a summary of the test procedure. For further instruction, please see the ASTM standard as well as directions provided by manufacturer of the portable pull-off adhesion tester.

## Items Needed

- Solvent/Cleaner
- Clean Rags
- Utility Knife
- Adhesive
- Portable pull-off adhesion tester
- Puck or Dolly (loading apparatus)


## Procedure

1. Score through coating down to concrete substrate at a diameter equal to diameter of the puck (dolly). Secure the puck (dolly) to the face of the coating with an adhesive.

2. Once the adhesive has cured, the portable pull-off adhesion tester is attached to the puck (dolly) and aligned to apply tension normal to the test surface.
3. The force applied to the puck (dolly) is then increased and monitored until a plug of material is detached.
    - When a plug of material is detached, the exposed surface represents the plane of limiting strength within the system.
    - The nature of the failure is qualified in accordance with the percent of adhesive and cohesive failures and the actual interfaces and layer involved.
    - The pull-off adhesion strength is computed based on the maximum indicated load, the instrument calibration data and the surface area stressed. Strength results using different portable pull-off adhesion testers may vary based on instrumental parameters.
    - Test values above 250 psi are considered acceptable for recoat applications.

# ASTM D4541 (Metal Substrates)

This is a standard test method for determining pull off strength of coatings using portable pull-off adhesion testers and was developed for metal substrates. The following is a summary of the test procedure. For further instruction, please see ASTM standard as well as directions provided by manufacturer of the portable pull-off adhesion tester.

## Items Needed

- Solvent/Cleaner
- Clean Rags
- Utility Knife
- Adhesive
- Portable pull-off adhesion tester
- Puck or Dolly (loading apparatus)


## Procedure

1. Score through coating down to metal substrate at a diameter equal to diameter of the puck (dolly). Secure the puck (dolly) to the face of the coating with an adhesive.

2. Once the adhesive has cured, the portable pull-off adhesion tester is attached to the puck (dolly) and aligned to apply tension normal to the test surface.
3. The force applied to the puck (dolly) is then increased and monitored untiil a plug of material is detached.
    - When a plug of material is detached, the exposed surface represents the plane of limiting strength within the system.
    - The nature of the failure is qualified in accordance with the percent of adhesive and cohesive failures and the actual interfaces and layer involved.
    - The pull-off adhesion strength is computed based on the maximum indicated load, the instrument calibration data and the surface area stressed. Strength results using different portable pull-off adhesion testers may vary based on instrumental parameters.
    - Test values above 250 psi are considered acceptable for recoat applications.

# Support Information

## Application Tips and Things You Ought To Know

### Coating Phase Termination

It is ideal for phase terminations to be at joints. This will provide a neat break and will offer the best aesthetics when project application is completed. Be sure to use the same batch number of topcoat material for all phases of the project.

- Bring current coating on to urethane joint sealant and end on sealant. When continuing coating application, clean and solvent wipe existing coating, apply primer (as needed) and follow with coating system.
- **Do not leave base coat exposed for more than 5 days. If base coat will not be coated within 5 days, terminate full system at straight line. When proceeding with application, clean and solvent wipe existing system approximately 4”–6” and overlap new system over existing system.**

### General Principles

- Do not apply materials when substrate temperature is greater than 110°F (32°C) or below 40°F (4°C).
- Never coat wet or moist surfaces with urethane materials. When in doubt, perform a moisture test or consult a moisture meter.
- Urethane products are incompatible with asphalt compounds.
- It is much easier to keep coating off an adjacent surface during application than to remove it after cure.
- Flush equipment lines thoroughly every night to prevent material from clogging hoses.
- In systems requiring the use of primers, coating materials should be applied the same day as priming.
- When placing two-component (2k) materials, never turn empty pails upside down or scrape sides to capture remaining coating. This material is not fully mixed and will result in uncured areas of coating.
- Always segregate topcoat material by batch number and avoid using different batch numbered material in continuous expanses. If you don’t have enough material from the same batch number to complete the final topcoat application, box the material. NEOGARD® cannot guarantee absolute color consistency between batches.

# Coverage Rates

## Theoretical vs Actual

Theoretical coverages are those calculated for glass-smooth surfaces with no allowances made for loss. Manufacturers publish theoretical coverages instead of actual coverages because they cannot anticipate job or surface conditions. Therefore, published coverage rates should only be used as a guide for estimating material requirements for a given job.

Actual coverage will be less than theoretical coverage. When coatings are applied over concrete, many factors, such as the surface texture, overspray loss, container residue, equipment characteristics, applicator technique, etc. will directly affect the amount of coating material required to meet the designed in-place dry film thickness (DFT). Therefore, it is very important that additional material be added to the theoretical quantities to ensure that the proper coating thickness is applied. Items to consider are:

- Shot-blasted Concrete–Even though the surface texture appears to be fairly smooth, this surface can require 5% to 15% additional material to the theoretical amount.
- Wind Loss–In spray applications, up to 30% of the coating may be lost due to wind. Consider using wind screens and add wind loss to your coating calculations.
- Miscellaneous Loss–A miscellaneous factor must be added to the theoretical coverage rate to cover losses due to material left in containers, equipment problems, etc. Use a percentage factor of between 3% to 10%, depending on the contractor's experience and efficiency.

## Calculating Theoretical Coverage

Any liquid, when applied at a thickness of one mil (1/1000 inch) will cover 1604 square feet per gallon. Another way to state this is that one gallon of any liquid, applied over a 100 square foot surface, will be 16 mils thick when wet. To determine dry mils (or how much is left when the solvents are gone), multiply 16 (wet mils) times the solids content (by volume) of the particular liquid. Solids by weight should not be used in this formula.

### Example:

- 50% solids by volume = 16 (wet mils) x 0.5 (50% solids by volume) = 8 dry mils.

To determine how much total material is required to cover 100 square feet, divide the total system thickness (expressed in mils) by the number of dry mils per gallon.

### Example:

1. System = 32 dry mils total
2. Material (50% solids by volume) = 8 dry mils per gallon
3. 32 divided by 8 = 4 gallons per 100 square feet
4. % Solids by Volume X 1604 ÷ Desired Dry Mils = Coverage Rate

## Calculating Actual Coverage

To determine total material requirements for a job, add estimated losses due to field conditions to theoretical coverages. Depending on jobsite conditions, up to 50% additional material may be required to meet the designed in-place dry film thickness (DFT).

# Thinning and Cleaning Solvents

NEOGARD® products are formulated to be installed as manufactured, without thinning. However, if thinning is required:

- Always consult the NEOGARD® Product Data Sheet prior to thinning the material.
- Use only NEOGARD® manufactured or other commercial-grade solvents with NEOGARD® products.
- Be sure there is no moisture contamination in solvents, as it can produce adverse reactions.
- When thinning materials, always be aware of local VOC restrictions for coating applications before thinning.
- Never exceed recommended thinning rates (typically no greater than 10%). Excessive thinning may affect physical properties of coating.
- Never use solvents that contain alcohol in NEOGARD® urethane products. Alcohols react with polyurethane hardeners creating a permanent liquid state, or under-cured membrane.
- Thin and clean only with recommended products. Consult NEOGARD® for questions regarding solvents.
- Any thinning of materials should occur after materials are mixed.

### Recommended Solvents

| Product | Type | Thinning | Cleaning |
|---|---|---|---|
| **70611-CA Series** | Urethane | Acetone | Acetone |
| **70620-CA** | Urethane | Acetone | Acetone |
| **7419-CA** | Urethane | Acetone | Acetone |
| **7251 Series** | Acrylic | Water | Water |
| **7261 Series** | Acrylic | Water | Water |
| **7780/7781** | Epoxy Primer | Do Not Thin | Water |
| **7797/7798** | Urethane Primer | Do Not Thin | 20653 Xylene |
| **70611 Series** | Urethane | 7055 Odorless Reducer, 20653 Xylene | 7055 Odorless Reducer, 20653 Xylene |
| **70613-BIO** | Urethane | 7055 Odorless Reducer, 20653 Xylene | 7055 Odorless Reducer, 20653 Xylene |
| **70620 Series** | Urethane | 7055 Odorless Reducer, 20653 Xylene | 7055 Odorless Reducer, 20653 Xylene |
| **70620-BIO** | Urethane | 7055 Odorless Reducer, 20653 Xylene | 7055 Odorless Reducer, 20653 Xylene |
| **70630 Series** | Urethane | 7055 Odorless Reducer, 20653 Xylene | 7055 Odorless Reducer, 20653 Xylene |
| **7419** | Urethane | 7055 Odorless Reducer, 20653 Xylene | 7055 Odorless Reducer, 20653 Xylene |
| **7419-HB** | Urethane | 7055 Odorless Reducer, 20653 Xylene | 7055 Odorless Reducer, 20653 Xylene |
| **7441 Series** | Urethane | 7055 Odorless Reducer, 20653 Xylene | 7055 Odorless Reducer, 20653 Xylene |
| **7490** | Urethane | 7055 Odorless Reducer, 20653 Xylene | 7055 Odorless Reducer, 20653 Xylene |
| **7810** | Butyl Urethane | 7055 Odorless Reducer, 20653 Xylene | 7055 Odorless Reducer, 20653 Xylene |
| **7860-LO** | Silicone | 7055 Odorless Reducer, 20653 Xylene | 7055 Odorless Reducer, 20653 Xylene |

# Primers

### 7797/7798

- Two-component, high-solids, low-odor urethane. Used as a rebond or recoat primer over existing urethane coatings or as a general-purpose primer for use on concrete and most metal substrates.
- Mix Ratio: 2:1
- Kit Size: 3 gallons
- Pot Life: Approximately 30–40 minutes
- Cure Time: 6 hours @ 75°F (24°C)

### 7780/7781

- Two-component, water-borne epoxy primer. Low odor and low VOC.
- Do not apply if temperatures are 40°F or below during curing process.
- Mix Ratio: 4:1
- Kit Size: 5 gallons
- Pot Life: Approximately 6 hours

  **Note: Do not use mixed material after 6 hours.**
- Cure Time: 1.5 hrs @ 75°F (24°C)

### 7760/7761

- Two-component, solvent-borne epoxy primer. Used where odor and low VOC are not a concern.
- Mix Ratio: 1:1
- Kit Size: 2 or 10 gallons
- Pot Life: 3–4 hours
- Cure Time: 1.5 hrs @ 75°F (24°C).

### Ureprime HS4: 33014/99951

- For previously coated or factory-finished metal roofs.
- Mix Ratio: 4:1
- Pot Life: Approximately 2.5 hours
- Recoat time: 4 hrs @ 75°F (24°C) and 50% relative humidity.

### 7005: Foam Substrate Primer (Single-Component)

- A low solids, solvent-based polychloroprene primer.
- Pot Life: Unlimited
- Recoat Time: 3 hours @ 75°F (24°C) and 50% relative humidity

### 70714/70715

- High-performance, 100% solids epoxy. Low odor, moisture tolerant, low VOC. May be applied in high humidity environments.
- Mix Ratio: 2:1
- Kit Size: 3 or 15 gallons
- Pot Life: Approximately 30 minutes
- Cure Time: 8–9 hrs @ 75°F (24°C)

# Addititves

## Accelerators

- **7931:** Low humidity accelerator for single component, solvent-borne, aromatic and aliphatic urethanes.
- **7932:** Standard accelerator for 7419 urethane.
- **7923:** Standard accelerator for 7440 Series urethane.

## Vertical Additive

- **7922:** Vertical additive is designed to enhance the sag resistant properties of single component, solvent-borne, aromatic urethane coatings only, with a 30 minute induction time. Common applications are parapets or other vertical or high slope areas.

  **Note: 7922 creates an accelerator effect reducing pot life dramatically.**

## Olfactory Additive/Odor Mask

- **7986 Vanilla-Scented Odor Mask:** A liquid additive used to mask offensive odors in urethane and silicone coatings. Mix ratio: 3 oz/5 gallon pail, 32 oz/55 gallon drum
- **7987 Orange-Scented Odor Mask:** A liquid additive used to mask offensive odors in urethane and silicone coatings. 7987 is a bio-based/biodegradable solvent and is rated, per FDA guidelines, as being GRAS (Generally Recognized As Safe). Mix ratio: 3 oz/5 gallon pail, 32 oz/55 gallon drum

## Thinning Agents

- **7055 Odorless Reducer:** A mineral spirits-based thinner used to clean equipment and to thin coating. Follow guidelines for thinning on material Product Data Sheets and in the Thinning and Cleaning section of this Application Manual.
- **20653 Xylene Thinner:** A colorless blend of solvents used to clean equipment and to thin coating. Follow guidelines for thinning on material Product Data Sheets and in the Thinning and Cleaning section of this Application Manual.

# Weather Impact on Polyurethane Coating Materials

NEOGARD® single- and two-component polyurethanes are designed to be applied through an ambient temperature range of 70º–90ºF (21º–32ºC) to provide ideal handling and application characteristics. However, substrate temperatures can affect the cure of the polyurethane materials as much as or more than ambient temperatures and roof surface temperatures may far exceed ambient temperatures.

## Cold Weather Impact

**Note: Application of heated material to a cold substrate will not reduce curing time.**

As material component temperatures become colder and start to drop below 60ºF (16ºC), they increase in material viscosity. An increase in material viscosity increases the material's resistance to flow and can result in the following:

- Single component systems that utilize accelerators become difficult to mix. If the accelerator is not thoroughly mixed with the polyurethane, the cure of the material can be slowed down.
- Plural component systems also become more difficult to mix. If a thorough mix is not obtained, the off-ratio mixture can cause improper curing.
- Polyurethanes become more difficult to spray; producing erratic spray pressures, poor atomization, fingering at the spray tip or a complete loss of the spray pattern. Some applicators are tempted to add solvent to the polyurethane material so that it can be sprayed. Unfortunately, adding solvent may slow down the cure time and change the thixotropy and resulting dry film thickness. All of this can lead to material puddles, uneven coating coverage and an added expense to the job cost in the form of downtime.
- Accelerators and catalysts are designed to provide good pot life and reasonable cure of materials at 70º to 90ºF. As material temperatures become colder and start to drop below 60ºF, the pot life of the material is increased and the speed of the cure may be severely reduced. If the material is applied at 60ºF (material temperature) and the air temperature drops to 40ºF or below, the cure is slowed down; particularly if windy conditions exist. The cure is further retarded due to slow solvent evaporation at cold temperatures. Materials that normally cure at a rate of 8–12 hours can be extended to 14–24 hours or more.

Don't risk these problems. Keep enough material at 70º–80ºF (21º–27ºF) for about 2 days of production. This will minimize the storage space required to keep the material warm. When possible, apply the coatings earlier in the day, making sure the substrate is dry, and quit early enough to allow several hours of cure from the sun. Remember, if the application area is enclosed with no exchange of air over the membrane, the relative humidity (moisture) may be severely reduced, resulting in a slow curing time.

## Hot Weather Impact

High substrate, ambient, and material temperatures can impact material viscosity and accelerate the curing process. Single component, solvent based products cure from the top down. If the surface of the coating skins over too quickly, the solvents that are released during the curing process become trapped, resulting in blisters and/or bubbles in the coating. Two component products are also affected by high temperatures as the chemical reaction between the two components is accelerated. Pot life and working time can be reduced significantly. To minimize the impact of high temperatures during coating application:

- Store material in a cool, dry place; never in direct sunlight or in areas of high temperatures. The mixing station should also be in a shaded area.
- Consider coating in the evening as the substrate cools, or if applicable, on the shady side of the building. This will help to minimize outgassing as the material cures and extend working time of the material.
- As the material viscosity decreases, the sag resistant properties will also be affected. In sloped areas, it may be necessary to apply the specified system in thinner coats, increasing the number of coats required to apply the full system. NEOGARD®'s 7922 Vertical Additive is compatible with most NEOGARD® single component, solvent based coatings and will enhance the sag resistant properties of the coating material. Contact NEOGARD® Technical Service for specifics.

**The NEOGARD® Technical Guide Troubleshooting Manual can be found at http://www.neogard.com, and offers additional solutions for many of the challenges presented by both weather impact and project conditions.**

# Dew Point of Moist Air

The NEOGARD® Technical Guide Troubleshooting Manual can be found at http://www.neogard.com. It offers additional solutions for many of the challenges presented by both weather impact and project conditions.

Dew Point is the temperature at which moisture will condense on a surface. No coatings should be applied unless surface temperature is a minimum of 5°F (3°C) above this point. Temperature must be maintained during curing.

This table illustrates how to determine the dew point:

| | | Ambient Air Temperature | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **20°F -7°C** | **30°F -1°C** | **40°F 4°C** | **50°F 10°C** | **60°F 16°C** | **70°F 21°C** | **80°F 27°C** | **90°F 32°C** | **100°F 38°C** | **110°F 43°C** | **120°F 49°C** |
| **Relative Humidity** | **90%** | 18°F | 28°F | 37°F | 47°F | 57°F | 67°F | 77°F | 87°F | 97°F | 107°F | 117°F |
| | **85%** | 17°F | 26°F | 36°F | 45°F | 55°F | 65°F | 75°F | 84°F | 95°F | 104°F | 113°F |
| | **80%** | 16°F | 25°F | 34°F | 44°F | 54°F | 63°F | 73°F | 82°F | 93°F | 102°F | 110°F |
| | **75%** | 15°F | 24°F | 33°F | 42°F | 52°F | 62°F | 71°F | 80°F | 91°F | 100°F | 106°F |
| | **70%** | 13°F | 22°F | 31°F | 40°F | 50°F | 60°F | 68°F | 78°F | 88°F | 96°F | 105°F |
| | **65%** | 12°F | 20°F | 29°F | 36°F | 47°F | 57°F | 66°F | 76°F | 85°F | 93°F | 103°F |
| | **60%** | 11°F | 19°F | 27°F | 36°F | 45°F | 55°F | 64°F | 73°F | 83°F | 92°F | 101°F |
| | **55%** | 9°F | 17°F | 25°F | 34°F | 43°F | 53°F | 61°F | 70°F | 80°F | 89°F | 96°F |
| | **50%** | 6°F | 15°F | 23°F | 31°F | 40°F | 50°F | 59°F | 67°F | 77°F | 86°F | 94°F |
| | **45%** | 4°F | 13°F | 21°F | 29°F | 37°F | 47°F | 58°F | 64°F | 73°F | 82°F | 91°F |
| | **40%** | 1°F | 11°F | 18°F | 26°F | 35°F | 43°F | 52°F | 61°F | 69°F | 78°F | 87°F |
| | **35%** | -2°F | 8°F | 16°F | 23°F | 31°F | 40°F | 48°F | 57°F | 65°F | 74°F | 83°F |
| | **30%** | -6°F | 4°F | 13°F | 20°F | 28°F | 36°F | 44°F | 52°F | 61°F | 69°F | 77°F |

**Example: If ambient air temperature is 70°F (21°C) and relative humidity is 65%, the dew point is 57°F (14°C). No coating should be applied unless the surface temperature is 62°F (17°C) minimum (57°F + 5°F = 62°F, or 14°C + 3°C = 17°C).**

# Spray Equipment

NEOGARD® coating materials are single component, acrylic, silicone and high solids polyurethanes that can be applied by the use of high pressure airless coating equipment. The following components address pump ratios, hose length, hose lining and size, orifice and spray tip sizes and should be used as a guide only. High pressure rated fittings must be used to connect these components.

**Note: Job site conditions, weather, temperature, etc. can have a direct impact on the handling and application characteristics when using airless coating equipment.**

## Transfer System

The high-pressure airless coating pump should be fed from the drum by a transfer pump such as 2:1 or 5:1 drum pump. The transfer hose should be a minimum 3/4" to 1" in diameter, nylon or teflon lined, and no more that fifteen feet in length. Five to 10 feet is the standard length. A gravity or siphon feed can result in cavitation at the pump and is not recommended.

## Airless Coating Pump

The single component coating materials require a single component high pressure, airless coating pump, capable of maintaining 2,700–3,000 psi fluid pressure at the gun. Although a 45:1 ratio pump is acceptable, a higher ratio pump is preferred to accommodate variances in application parameters. Factors such as material temperature, ambient temperature, hose length, etc. influence sprayability and the equipment required.

## Fluid Hose

The high-pressure fluid hose should be nylon or teflon lined and rated for the maximum pump pressure. The specific hose parameters are as follows: For hose lengths up to a total of 200 feet, the first 100 feet of hose from the pump should be 3/4" I.D. and the last 100 feet, to the gun should be 1/2" I.D. For hose lengths to a total of 250 feet, the first 150 feet should be 3/4" I.D. followed by 1/2" I.D. to the gun. These combinations are necessary to minimize the pressure drop through the hose. Keep total hose length to the minimum necessary and no longer than 250 feet.

## Spray Gun

The gun should be an airless type designed for use with viscous materials, and pressure rated for the maximum system pressure. A reverse-a-clean style tip with a 0.017 to 0.037 orifice and 12"–14" fan width should be used.

***Airless Coating Pump***

***Fluid Hose***

***Spray Gun***

# Safety and Storage

**The following covers safety and storage of NEOGARD® coating materials. Failure to follow these instructions may result in bodily injury or property damage.**

## General Guidelines

- Material Safety Data Sheets (MSDS) must be on job site at all times and if possible, in a job box on the roof. Multiple basic types of coatings for fluid applied roof coating systems are produced by NEOGARD®. They are solvent solution and solvent free coatings. Each type has specific hazard potentials and storage requirements. Solvent based coatings have hazards associated with fire, solvent toxicity, and chemical toxicity. Solvent free coatings have low fire risk but may require special care because of chemical toxicity. Both the employer and workman must know precautions necessary to protect against fire, explosive combustion and toxicity. Refer to individual MSDS, product labels, Product Data Sheets and application specifications which describe specific hazards content, proper use, and storage.
- An important safety precaution against fire, explosion and chemical toxicity is to provide ventilation at all times. Most coating applications are in open exterior areas where natural ventilation minimizes hazards.
- When natural air movement is insufficient as in a confined area, forced air ventilation is required. Confined areas are best ventilated by equipment which exhausts the air from near floor level, since solvent vapors are heavier than air and tend to collect in low areas. A competent, properly equipped person must be stationed outside confined areas while work is in progress to assist in case of emergency.

## Fire and Explosion Prevention

- Flash points are listed for each NEOGARD® product containing solvent on the appropriate Product Data Sheet. The workmen and foreman must know the flash point of the material being applied. The flash point is the lowest temperature at which a coating gives off sufficient solvent vapor to form an ignitable mixture with air. This mixture of solvent vapor and air can then be ignited by an outside source such as sparks, flame, lit cigarettes, etc.
- Open flame, welding, smoking or other ignition sources shall not be allowed in a building, overhead, or near a building where coating is being or has been recently applied. Open flame, welding, smoking, etc. shall be restricted downwind of a coating operation. No smoking, welding or open flame shall be allowed near outlets where solvent vapor laden air is being discharged.
- All electrical equipment and outlets must be grounded. This includes switches, connectors, lights and motors. Lights must have a protective enclosure to prevent physical damage. Whenever solvent vapors are present, all electrical equipment must be explosion proof. It is the responsibility of the workmen and their foreman to verify who is to check these precautions. An applicator employee must be appointed this duty.
- Any equipment, such as spray guns and compressed air nozzles, that can produce a static charge must be grounded.
- Work clothes must be of a material such as cotton which does not generate static charges. Beware of synthetic materials. Shoes shall not have metal sole plates since these cause sparking. All hand tools used in solvent vapor areas must be of non-sparking construction. When non-complying tools must be used, remove equipment to an area free of solvent vapor or exhaust solvent-laden air thoroughly before beginning work.
- Have fire extinguishers as prescribed by OSHA within easy access of work areas where solvent coatings

are being applied. Dry chemical and CO2 (carbon dioxide) extinguishers are effective in controlling small solvent fires.

- Ventilation shall be provided to coated areas not only during application but also for sufficient time after, to assure complete evaporation of solvents.

### Toxicity and Health Considerations

- Inhalation of solvent vapors in high concentration, above 200 parts per million, can induce narcosis, a physiological effect similar to intoxication by alcohol. Continued exposure to high concentration can cause loss of consciousness and ultimately death. The maximum allowable concentration of NEOGARD® type solvent vapors on a weighted eight hour working day is limited to 100 parts per million as published by the Occupational Safety & Health Administration (OSHA). This is a concentration at which nearly all workers can be repeatedly exposed without adverse effects.
- Small, portable air sampling equipment is available to measure the content of some solvents in the air. Workmen and foremen must be certain that measurements of this type are being made when men are working in an enclosed area.
- Approved chemical cartridge vapor masks (respirator masks) may be used to protect against low concentrations of solvent vapor (below 200 PPM). At higher vapor concentrations, this type of mask will not provide adequate protection. Cartridges must be replaced on a regular basis to remain effective.

  **Note: Proper selection of respirators shall be made according to the guidance of *American National Standard Practices for Respiratory Protection Z88.2-1992.***

- An approved fresh air supplied respirator with approved source of respirable air must be used for protection when solvent vapor concentrations are high (above 200 PPM). The use of fresh air supplied respirators does not reduce the necessity for good ventilation to lessen fire hazards and ensure proper drying of coatings.
  - Air quality: Compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration shall be of high purity. Oxygen shall meet the requirements of the United States Pharmacopeia for medical or breathing oxygen. Breathing air shall meet at least the requirements of the specification for Grade D breathing air as described in ***Compressed Gas Association Commodity Specification G-7.1-1966***. Compressed oxygen shall not be used in supplied-air respirators or in open circuit self-contained breathing apparatus that have previously used compressed air. Oxygen must never be used with air line respirators.
  - Breathing air may be supplied to respirators from cylinders or air compressors.
  - Cylinders shall be tested and maintained as prescribed in the ***Shipping Container Specification Regulations of the Department of Transportation*** **(49 CFR part 178, Subpart C)**. Compressors for supplying air shall be equipped with necessary safety and standby devices. A breathing air-type compressor shall be used. Compressors shall be constructed and situated so as to avoid entry of contaminated air into the system and suitable in-line air purifying sorbent beds and filters installed to further assure breathing air quality. A receiver of sufficient capacity to enable the respirator wearer to escape from a contaminated atmosphere in event of compressor failure, and alarms to indicate compressor failure and overheating shall be installed in the system. If an oil-lubricated compressor is used, it shall have a high-temperature or carbon monoxide alarm, or both. If only a high-temperature alarm is used the air from the compressor shall be frequently tested for carbon monoxide to ensure that it meets the specifications noted in air quality above. Air line couplings shall be incompatible with outlets for other gas systems to prevent inadvertent servicing of air line respirators with non respirable gases or oxygen.
- Any time a workman begins to feel discomfort or irritation to the eyes, nose or throat the concentration of solvent vapor is too high for steady exposure. If a person feels light headed, giddy, dizzy or exhilarated the solvent vapor concentration is also too high and must be reduced by better ventilation. Any persons so affected must go to an area of fresh air.
- The effectiveness of ventilation depends on the physical barriers which restrict air flow. Open exterior areas on decks ventilate normally by natural air movement. Confined areas in rooms, some pit or

ponded areas, as well as decks surrounded by walls or high parapets require forced air ventilation.

- Most people do not find solvent vapors irritating to the skin, even in high concentrations. Contact with liquid solvent has a drying effect on the skin; however, most individuals find no lasting effects. Special hand creams can be used to protect persons who handle NEOGARD® solvents or coatings frequently. Protect the sensitive areas of the face, armpits and groin from contact with solvent. These areas can suffer an astringent burn and should be washed with soap and water immediately if exposed to liquid solvents.
- Some individuals have a very low resistance to irritants. Should a person develop respiratory problems or skin rash, have him or her consult a physician. Particularly sensitive individuals may have to be assigned to work free of exposure to solvents or, in some cases, certain chemicals.
- Should solvent or solvented coatings be splashed in the eye, flush immediately with water; then consult a physician.

## Other Health Considerations

- Safety shoes with steel toe protection must be worn. 55-gallon drums of coating are very heavy and can cause considerable damage if set on an unprotected foot. The sole should be of a soft, resilient material to give best traction without damaging coated areas.
- Use extreme caution when working on sloped areas. Use lifelines. Wet coatings are very slippery.
- When working in bright sun with light color coating, wear dark glasses to prevent damage to the eyes.

## Property Precautions

- Consider possible damage to property. Overspray can ruin finishes on vehicles and other surfaces (brick, paint, plastic, etc.). Solvent vapors in confined areas can damage plants and pets, including tropical fish and birds. Food, even stored in freezers, can pick up a solvent taste and should be protected from vapors.

## Storage

- Do not store material in direct sunlight. All material should be stored in a cool shaded place, preferably at a temperature of 75°F. Higher storage temperature for extended periods can cause thickening and even gelation of elastomeric coatings.
- Whenever work is stopped for the day, all coatings and thinner should be stored in tightly sealed factory containers to prevent evaporation and fire hazard. Materials left on unsupervised job sites may attract the curious or the malicious. Protect your materials properly and avoid potential harm to others. Contractors are responsible for the safety and proper handling of material.
- Do not keep open containers in confined places.
- Protect emulsion (water borne) coatings from freezing.

## Volatile Organic Compounds (VOCs) and Health

### Worker Safety and Public Health

- VOCs as solvents in paint coatings are regulated by EPA because of their public health hazard. VOCs are one class of chemicals which when released into the air will begin chemical reactions in the atmosphere that result in smog, which is a health hazard to people, especially the young, old, and those with respiratory problems. Some solvents are legally not VOCs, but still hazardous.
- VOCs as solvents in paint coatings are regulated by OSHA because of the occupational exposure hazards to workers in the industries of construction, shipbuilding, and general trades.
- Besides VOCs, there are often other hazardous ingredients in coatings that may be regulated by OSHA. These ingredients include heavy metals in pigments, isocyanates in urethane binders, and several other chemical ingredients.

### Zero VOC versus VOC Compliant

- Under the EPA's Clean Air Act regulations, use of low-VOC coatings—typically where VOCs are less

than 2.1 pounds per gallon (lbs/gal) of paint—is one of the best ways to reduce hazardous air pollutants (actual VOC restrictions vary by area and coating type). Alternative coatings are now available that are essentially "Zero VOCs." These include waterborne coatings (80% water) and powder coatings (100% solids). These alternative coatings eliminate the VOC problem and are "EPA-friendly," but they have their own disadvantages in application limitations, unproven performance, and they can still contain chemical ingredients that may be hazardous to workers and are regulated by OSHA.

### VOCs and Odor

- Most, if not all, VOCs have some odor, and some are "better smelling" than others. Some VOC exempt solvents have odor. Certain binders and pigments can also have odor. However, the amount or type of odor is not the best measure of the health hazard or toxicity from breathing a certain chemical or compound. Odors are subjective to different people, and some chemicals can saturate the nose, thereby reducing the apparent smell.
- Comparing odors and toxicity is like comparing apples and oranges. The best way to measure the toxicity of a chemical is by laboratory testing. The best way to measure a person's exposure to a chemical is by using air sampling and laboratory analysis. When this air sampling is for a worker in an occupational setting, this becomes part of the OSHA-recognized practice of industrial hygiene.
- Odor cannot be ignored, as it is often the most difficult issue that a building owner or employer using chemicals has to deal with, regardless of the toxicity. In some cases, a so-called "VOC-free" paint coating can be more odorous than a "low-odor" coating that contains small amounts of VOCs. The mere perception of irritating odors is enough to warrant an owner to consider sacrifices in cost and product performance just to buy some "peace of mind" and reduce the risk of complaints or lawsuits from the building occupants and neighbors. On the other hand, some product specifiers may insist on "VOC-free" coatings, whereas the "low-odor" coating with small amounts of VOCs would perform better as a coating and may even have a less irritating odor than the "VOC-free" coating.

### When and What Air Testing Is Needed For Coating Applications?

- Air testing is driven by the owner's concerns and the employer's responsibilities. Relatively few chemicals and substances are used in paint coatings for which OSHA requires the employer to collect air samples during the paint application. An example of where OHSA sampling is required is when coatings contain the heavy metals of lead or chromium.
- If conditions of the application are extreme—such as a confined area with no ventilation—it's best to take extra measures to reduce exposures (e.g., safer paints, added ventilation, and respirators) for workers. Air sampling can verify the adequacy of these control measures. The owner often requires air sampling to address concerns that nearby occupied areas are not being contaminated by the coating application. VOCs are often the target of air sampling, but some other constituents of coatings are hazardous and should have their exposures evaluated.
- An industrial hygienist typically makes a judgement on what and when to air sample, considering all of the above factors and issues. The hygienist first identifies the paint coating ingredients as listed on the manufacturer's Material Safety Data Sheet (MSDS). This document lists hazardous ingredients, known hazards and health effects, and known exposure limits, as established by OSHA or recommended by a professional body, such as the American Conference of Government Industrial Hygienists (ACGIH).

**The above information is based on standard industrial practices and is meant to outline the hazards, but is not necessarily all inclusive. Local conditions on specific jobs may require other precautions. Common sense and care in evaluating the possibility of hazards is essential.**

**Nothing contained herein should supersede local laws, codes, ordinances or regulations, or the instructions of other manufacturers for the use of their products.**

**The standards and regulations published by the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, where applicable, should be consulted for further detail and compliance.**

# Glossary

**1K & 2K:** 1K is a term used to describe a coating that has only one component and does not require a hardener, catalyst or activator. 2K describes a coating that has two components in that the resin side needs to be mixed with a hardener, catalyst or activator.

**Accelerator:** A chemical typically mixed in small quantities with coating that increases the speed of the chemical reaction thereby hastening the curing of the coating system.

**Additive:** Product added to coating during mixing that enhances physical or chemical properties.

**Activator:** The curing agent / hardener of a two component coating system.

**Adhesion:** The degree of attachment between a coating film and the underlying substrate. There are several test methods to measure the amount of adhesion.

**Aggregate:** Hard material typically comprised of stone, sand, glass or synthetic material that is added to a coating system to provide build and skid resistance to the final system.

**Aliphatic Coating:** Type of hydrocarbon that displays aliphatic straight chains or branches as part of its chemistry. Aliphatic polyurethanes have certain improvements in characteristics over aromatics, such as less chalking effect and better color retention, but typically require longer cure times.

**Ambient Temperature:** Room temperature or the existing temperature of the surrounding air.

**Aromatic Coating:** Type of hydrocarbon that displays an aromatic (benzene) ring as part of its chemistry. Aromatic polyurethanes are commonly used in moisture cured coating systems.

**Base Coat:** The first layer of coating applied to the primed surface of a coating system. The Base Coat typically provides the waterproofing capability of a liquid applied coating system.

**Below Grade:** Part of the structure below ground level. Usually these areas have to be designed to resist the passage of water under hydrostatic head pressure.

**Bird Bath:** The National Roofing Contractors Association (NRCA) defines a bird bath as random, inconsequential amounts of residual water on a roof membrane.

**Blast Cleaning:** The cleaning and roughing of a surface by the use of sand, artificial grit, or fine metal shot which is projected at a surface by compressed air or mechanical means.

**Boxing:** The process of combining all the coating you will be using as the topcoat into one large container. This is especially important when coating a large surface area or if there is insufficient coating from a single batch, where a color variation from one batch to another is likely.

**Broadcasting:** Evenly distributing over an area (ie. to evenly broadcast aggregate).

**Broom Finish:** A finishing profile of concrete in which concrete surface is given a final textured finish by dragging a stiff bristled broom over it as it starts to cure.

**CA Formulated Coating:** Coatings that NEOGARD® has formulated to meet the VOC content requirements for coatings established by South Coast Air Quality Management District (SCAQMD), the air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernadino counties.

**Catalyst:** An accelerator, activator, or curing agent which chemically increases the rate of reaction in a coating.

**CSP (Concrete Surface Profile):** CSP is a measurement of roughness of the surface of concrete as determined by set guidelines provided by ICRI (International Concrete Repair Institute). CSP's measure from smooth/flat (CSP 1) to very rough (CSP 9).

**Cure:** The process of development of fluid applied coatings through the stages of polymerisation. In the application of NEOGARD® coating systems we describe four phases: initial cure, tack-free, traffic cured and fully cured.

**Degreaser:** A chemical solution or compound designed to remove grease, oil, and similar contaminants.

**Dew Point:** The temperature of air at which condensation of moisture will occur.

**DFT (Dry Film Thickness):** Thickness of coating measured in Mils after coating has fully cured and thus taken its solid form. DFT is always equal to or less than WFT depending on the percent of solids contained within the coating.

**Direct Bond:** NEOGARD® roof coating systems designed to be applied directly to existing non-ballasted single-ply membranes, granulated cap sheet, modified bitumen, concrete, metal and smooth surface BUR roof substrates.

**Elastomeric:** Products that are "elastic" in nature and are capable of withstanding significant movement as seen in some building structures.

**Etching:** The treatment of the surface of concrete with an acid in order to dissolve loose particles and laitance and/or provide a profile.

**Expansive Concrete:** Concrete designed to offset the effects of curing shrinkage.

**Film:** A monolithic layer of coating.

**Film Build:** The dry film thickness of a coat.

**Flash Point:** The flash point of a material is the lowest temperature at which it can vaporize to form an ignitable mixture in the air.

**Fully Cured:** Describes the fluid applied coatings cure phase at which materials have reached the physical properties required to withstand the traffic, use, and exposures for which they are designed.

**Granule:** A mineral which may be granite or sand used on the top of some coatings for ultraviolet protection, and fire protection.

**Grout Coat:** The first coat of epoxy over a trowelled flooring system, designed to lock in or seal the epoxy mortar.

**Hardener:** A chemical co-reactant that activates and/or accelerates the curing of a product to produce a coating film.

**High Build :** A term referring to a coating that can produce a thick film in a single coat.

**Initial Cure:** Describes the fluid applied coating cure phase during which the material is progressing from a liquid or gel to tack free.

**Jiffy Mixer:** A cylindrical mixing tool used for mixing coatings that does an excellent job of preventing air entrapment. It is manufactured exclusively by the Jiffy Mixer Company.

**Laitance:** An accumulation of fine particles, loosely bonded, on the surface of fresh concrete, caused by upward migration of moisture through the concrete.

**Liquid Applied Membrane:** A seamless coating system applied to a substrate that protects the substrate from the environment and/or traffic.

**MEK (Methyl Ethyl Ketone):** A commonly used solvent which has good solubility for most urethanes and some other coatings.

**Mesh (Sieve Size):** The size of a particle or aggregate reported in fraction of inch. A number 12 sieve is 1/12th of an inch; a number 60 sieve is 1/60th of an inch.

**Mil:** A Mil is one thousand of an inch (0.001”). It is a unit typically used in the measurement of coating thickness with the help of a Mil Gauge.

**Mil Gauge:** A device used to measure the thickness of coating while in a liquid state.

**Mortar:** A heavy application of coating (50 to 250 Mils thick) typically involving use of aggregate either mixed or broadcast. Mortars can be of three types:

- **Broadcast:** Neat resin over the substrate and where the aggregate is broadcast into the resin while it is still wet.
- **Slurry:** Very fine aggregate (consistency of flour) is mixed into the resin to create a self leveling consistency.
- **Trowel:** A blend of medium to fine aggregates is mixed into the resin to create a paste consistency that can be troweled.

**MSDS (Material Safety Data Sheet):** Document available for each product that is intended to provide workers and emergency personnel with procedures for working with and handling that substance in a safe manner.

**Muriatic Acid:** Hydrochloric acid often diluted with water and used for etching concrete.

**NRCA:** National Roofing Contractors Association.

**Odor Mask:** Chemical with pleasant / non offensive odor which is mixed into coating to mask the coating’s odor.

**On-Grade:** Part of the structure at ground level.

**pH:** A measure of acidity and alkalinity; pH 1–7 is acid and pH 7–14 is alkali.

**Ponding Water:** NEOGARD® defines roofing ponding as “water that remains on a roof surface longer than 48 hours after the termination of the most recent rain event.

**Porcupine Roller:** Spine quill appearing roller that releases bubbles trapped in the more viscous coatings.

**Pot Life:** The length of time a coating material is useful after its original package is opened or a catalyst or other curing agent is added. At the end of the pot life the product’s viscosity increases so much to make it difficult/impractical to apply.

**Primer:** The first coat applied to a surface, formulated to have good bonding, wetting and inhibiting properties. Primers act as a bond between the substrate and coating system.

**Relative Humidity:** The ratio, expressed as a percent, of the quantity of water vapor actually present in the air to the greatest amount possible at a given temperature.

**Resin:** A class of organic substances used in the making of coating products. Resins are often mixed with smaller quantities of a hardener/activator/catalyst to initiate or speed up the curing process.

**Respirator:** An apparatus worn over the mouth and nose or the entire face to prevent the inhalation of dust, smoke, or other noxious substances. For coatings products, the Material Safety Data Sheet will outline the need for using a respirator when applying the product.

**Seal Coat:** The first coating application over a broadcasted flooring system or the final coats over a trowelled flooring system.

**Seed and Backroll:** A type of coating application method where aggregate is dispersed onto the coating surface and then worked in using a roller. System is then allowed to dry.

**Seed and Lock:** A type of coating application method where aggregate is dispersed onto the coating surface and allowed to dry. At this point, excess aggregate is blown off the surface and the remaining aggregate is “locked” into the system using additional coating.

**Shelf Life:** The maximum time interval in which a material may be kept in a usable condition during ideal storage.

**Shot-blasting:** Abrasive blasting with round iron shot, or any material which retains its spherical shape, for substrate roughening purposes.

**Solids By Volume:** The percentage of the total volume of substance occupied by nonvolatile compounds.

**Solids by Weight:** The percentage of the total weight of substance occupied by nonvolatile compounds.

**Solvent:** A liquid in which another substance may be dissolved, forming a solution.

**Spalling:** Type of concrete surface erosion in which inverted cones of concrete break away from main body and thereby reveal exposed aggregate.

**SPF:** Spray Polyurethane Foam, defined by the Spray Polyurethane Foam Alliance is a spray-applied insulating foam plastic that is installed as a liquid and then expands many times its original size.

**Spray:** A common application method in which a person pressurizes the liquid and releases the liquid through an orifice onto the substrate. Alternate application methods are by using a roller or trowel.

**Square:** A measurement used frequently in roofing, equal to 100 square feet.

**Squeegee:** A flat rubber blade typically used to distribute coating evenly on the substrate surface. Squeegees may be flat or notched depending on the type of work being done.

**SRI:** Solar Reflectivity Index is defined by the U.S. Green Building Council as “a measure of the constructed surface’s ability to stay cool in the sun by reflecting solar radiation and emitting thermal radiation.”

**Tack Free:** Describes the fluid applied coating cure phase during which the material is progressed beyond initial cure but has not yet reached the cured phase. Tack free material will not displace, print, track, or damage when touched or walked on while continuing the system application, while remaining soft enough to coat without requiring additional surface preparation or priming.

**Thinning Agent:** A liquid (solvent) added to a coating to improve its viscosity and thus make it easier to apply. Common thinning agents include MEK (Methyl Ethyl Ketone), Xylene and Mineral Spirits.

**Topcoat:** The final layer/layers of coating applied to a liquid applied coating system. Topcoats typically seal in the system and may provide resistance to wear, UV, chemicals, and traffic.

**Traffic Cured:** Describes the fluid applied coatings cured phase at which the material has progressed beyond tack free but not yet reached fully cured. The cured material has reached the physical properties required to withstand the various traffic loads progressing from durable to: foot traffic first, light vehicular traffic next, and finally, heavy load traffic.

**UV (Ultraviolet) Light:** Type of radiation present in sunlight that may have a detrimental effect on some types of coatings causing discoloration/fading and in some cases, premature wearing of the coating system.

**Vapor Barrier:** A layer which retards the passage of water vapor into a material.

**Vapor Drive:** The pressure exerted on the underside of a coating system from moisture/water vapor which has migrated through the substrate.

**Vapor Transmission Rate:** The rate at which moisture passes through a material like concrete or coating system.

**Viscosity:** A measure of fluidity of a liquid. Easily flowing liquids are low in viscosity and slow flowing liquids are high in viscosity.

**VOC (Volatile Organic Compounds):** Organic compounds that evaporate from the coating as it cures.

**Waterproofing:** The use of coating systems for the resistance of the passage of water.

**Wear/Intermediate Coat:** A layer of coating applied in between the Base Coat and Topcoat of a liquid applied coatings system. Wear/Intermediate coats typically provide build and wear resistance for the coating system.

**WFT (Wet Film Thickness):** Thickness of coating measured in Mils typically right after the application of the coating product while coating is still in its liquid form.

**Xylene Thinner:** A common solvent used to dilute certain epoxies and urethanes and also to clean equipment.

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# Application Manual

Fluid-Applied Roof Coating Systems • November 2016

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