# Application Manual

Polyurethane Foam Roof Coating Systems • November 2012 • 2nd Edition

# Introduction

**Dear Customer,**

This handbook covers many important technical aspects of NEOGARD®'s Polyurethane Foam Roof Coating 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 handbook possible.

Your NEOGARD® Team

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# General Guidelines to Determine Application Suitability

NEOGARD's Polyurethane Foam Roof Coating program targets intact asphalt based roofs and metal roofs. Asphalt based roofs, whether granulated cap sheets, smooth surface asphalt, or gravel are a primary target. Metal roofs (R, M, Multi rib, corrugated, etc.) are also a target particularly when original install was for non conditioned space and is now used for conditioned space. Typical targets of the NEOGARD program are roofs which have exceeded the manufacturer's warranty date and are still water tight. When the original roof has been breached by water, polyurethane foam insulation can be used to replace areas where the original roof has been removed due to wet insulation. No roof, including coated polyurethane foam roofs, should be installed over an existing wet roof.

## Disqualified Roofs

1. Any roof containing water inside the assembly is disqualified. Water entrapped in any assembly will not pass through a NEOGARD System, and thus will be blistered, and or weakened by rust.

2. Most Single Ply roofs. Though it is possible to foam single ply roof systems, adhesion issues must be addressed. When the foam manufacturer and contractor mutually agree the specific single ply can be adhered to, then foam and coating can be installed. However, it is not advised to typically bid, or install polyurethane foam and coatings on single ply systems without prior agreement of the contractor and foam manufacturer. Ballasted single ply systems are not considered an acceptable substrate for polyurethane foam and NEOGARD coatings and should be avoided.

## Coated Surfaces Should Always Be...

1. CLEAN: Means an absence of any substances other than the membrane being coated. Common substances which need to be removed from existing roofs are dirt, pollen, rust, mold, algae, leaves, limbs, nuts, water, and other similar substances.

2. FLAT: Means single planes up to 3 in 12 slopes for most systems, (metal unlimited). Self leveling liquids will not move due to gravity at normal application rates until slopes exceed 3 in 12. NEOGARD manufactures vertical additives for increased slopes. Sharp changes of slope as the 1/8" shoulder of a seam has to be treated to avoid both loss of coating on the top edge of the seam and excessive coating at the bottom. Common methods to treat sharp angle changes are sealant, polyester fabric, or detail stripping.

3. DRY: Means an absence of any liquid both on the surface and in the assembly. **NEVER** coat over water.

4. HARD: Means over 40 psi.

# Polyurethane Foam Coating Product Line

## Primers

**Primers under foam are selected by mutual agreement of the foam supplier and the contractor. Primers above foam are rarely used and not the standard method of application.**

1. Non Metal Primers
   - 7780/7781 - Standard, most common used primer for non metals, water based epoxy
   - 7760/7761 - Solvent based version of 7780/7781 primer for non metals
   - 7790 - Water borne urethane

2. Metal Primers
   - Ureprime HS2 (33010/99951) - Solvent borne general use metal primer
   - Urethane HS4 (33014/99951) - Preferred metal primer with low VOC's
   - Mist Coat II (942/188) - Self etching primer, used after cleaning rust, or on aluminum, copper or other specialty metals
   - Chem-O-pon (33304/99953) - Replacement option for Ureprime, designed for ferrous metals

3. Foam to Substrate Primer
   - 7005 - Solvent cut polychloroprene primer capable of use between polyurethane foam and other substrates, must be cleared for use by foam manufacturer.

4. Concrete Only Primers
   - 70714/70715 - 100% solids epoxy used to fill and recondition damaged concrete surface, typically a fine sand is spread in the surface when wet.

## Base Coats

1. Polyurethane
   - 7419 w/7932 - Preferred base coat for Permathane. Older version of polyurethane. Requires use of on site accelerator.
   - 70620 - Preferred base coat for Permathane II. A newer high build polyurethane base coat
   - 7419HB - substitute for standard base coat for Permathane and Permathane II. Produces higher wet builds than original 7419. Does not require accelerator add.
   - 70680/70685 - A two component mixed on site minimal odor, minimum VOC, fast cure, base and topcoat used for odor, VOC, or cure sensitive roof jobs.

2. Acrylic
   - 7251 & 7261 - Serve as both base and topcoats for water based acrylic roof coating systems. 7261 contains an additive to speed curing which is called a drying agent.
3. Silicone
   - 7860-LO series - Serves as base and topcoat for silicone roof system.

4. Butylthane
   - 7810 - Specialty solvent based butyl-urethane coating used for low permeability.

# Foam Coating Product Line

## Topcoats

1. Polyurethane (Permathane System)
   - 7441 (w/7923) - Older generation of gray topcoat. Must use on site accelerator.
   - 7442 (w/7923) - Older generation of tan topcoat. Must use on site accelerator.
   - 7443 (w/7923) - Older generation of white topcoat. Must use on site accelerator.

2. Polyurethane (Permathane II System)
   - 70611 - Single component standard grade in gray.
   - 70612 - Single component standard grade in tan.
   - 70613 - Single component standard grade in white.

3. Acrylic (Elastacryl System)
   - 7251 & 7261 - Serves as both base and topcoats for water based acrylic roof coating systems. 7261 contains an additive to speed curing which is called a drying agent.

4. Silicone (Silicone System)
   - 7860-LO series - Serves as both base and topcoats for silicone based roof coating systems. Available in gray, tan or white.

5. Polyurethane FC (Fast Cure)
   - 70680/70685 - Two component, mixed on site, minimal odor, minimum VOC, fast cure, base and topcoat used for odor, VOC, or cure sensitive roof jobs. Must not be applied thick, 1.0 - 1.5 gallon per 100 sq ft per application.

## Accelerators

7931 - Light product accelerator typically used in low humidity areas
7932 - Standard accelerator for 7419 urethane
7923 - Standard accelerator for 7440 series urethane

(NOTE for a strength comparison 1 can of 7923 = ~4 cans of 7932 = ~8 cans of 7931)

## Vertical Additive

7922 - Vertical additive used to increase film build. Common uses are coating parapets or other vertical or high slope applications. **NOTE: 7922 creates an accelerator effect reducing pot life dramatically, but speeding cure**.

## Fabrics for Detailing

86218 - Peel and stick fabric backed product used to repair and/or reinforce suspect areas. Commonly used on seams, substrate transitions, etc. This repair can be coated immediately after installing the flashing tape.

86220 - A polyester fiber based fabric used to repair and/or reinforce suspect areas (seams, substrate transitions, etc). This repair must be installed with base coat a minimum of 16 hrs prior to coating.

### Olfactory Additive/Odor Mask

7986 - Olefactory Additive (0.75 oz/gallon, 3 oz/pail, 32 oz/drum)

### Thinning Agent

7055 - Odorless reducer

### NEOGARD Sealant

70991 - 10.3 ounce Sealant tubes (-1 white, -3 tan, -4 gray)
70995 - 1.5 gallon pail (available in gray)

### Other Items

81012 - Lamp black used to tint a white coating to assure full coverage of a second layer.

#11 Roofing Granules - Roof granules are supplied by others through common roof supply houses. Typically 3M, ISP, Lucas or another industrial supplier is used. Granule selection greatly affects finished color. White, gray, and browns are often chosen for colors.

# Product Selection

## NEOGARD Cheat Sheet

Typical Product Application

| | Permathane II | Permathane | Elastacryl | Silicone |
|---|---|---|---|---|
| Primer | None | None | None | None |
| Base Coat | 70620 | 7419/7419HB | 7251 or 7261 | 7860-LO |
| Intermediate (if needed) | None | None | 7251 or 7261 | None |
| Topcoat | 70611 Series | 7441 Series | 7251 or 7261 | 7860-LO Series |

## Strength and Weakness

1. Permathane II
   - Strength - Easiest install, easiest repair, easiest recoat
   - Weakness - Higher material cost, solvent base

2. Permathane
   - Strength - More cost effective than Permathane II, easiest repair, easiest recoat
   - Weakness - Higher material cost than non-urethanes, solvent base, will not high build

3. Elastacryl
   - Strength - A cost effective option, easy repair, easy recoat, water base (solvent free)
   - Weakness - Needs slope , no ponding water allowed, requires more labor, no high build

4. Silicone
   - Strength - A cost effective option for urethane, excellent wear, excellent chemical resistant
   - Weakness - More difficult to repair or recoat, will develop a dingy finish, can only be recoated with Silicone

# Surface Preparation

## Examination

1. Inspect surfaces which will receive the polyurethane foam coating system to make sure they are clean, smooth, sound, properly prepared, and free of moisture, dirt, debris, or other contaminants.

2. Verify that all roof penetrations, mechanical equipment, cants, edge metal, and other on-roof items are in place and secure.

3. Verify that all critical areas around the immediate vicinity of the spray area are suitably protected.

4. Verify that roof deck has sufficient slope for water to drain and that all drains and drain lines are clean and in working order.

5. Verify that all air conditioning and air intake vents are suitably protected or closed.

**The following substrates are for the application of polyurethane foam and/or coating when terminating the coating system beyond the polyurethane foam and contains general information. For specific questions regarding the polyurethane foam application to any substrate listed, please contact the polyurethane foam supplier for details**.

## Concrete (New Construction)

1. General Construction Practices
   - Surfaces to receive sprayed polyurethane foam and/or coating must be a minimum of 3,000 psi concrete.
   - Insulating or lightweight concrete is not recommended.
   - Structural decks must be permitted to cure for twenty-eight (28) days prior to the application of sprayed polyurethane foam and/or coating system.
   - Under certain conditions, a vapor retarder may be required beneath the polyurethane foam. Consult NEOGARD Technical Services for further information.

2. Finish Requirements
   - A wood float or steel trowelled finish is generally an acceptable substrates for sprayed polyurethane foam and/or coating systems. No projections or voids should be present in the concrete surface.
   - Water curing of deck 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.
   - Deck must be free from contaminants such as oils, tars, asphalt's, grease, dirt, etc., prior to polyurethane foam and/or coating application.

3. Method for Cleaning Concrete Deck
   - Sprayed polyurethane foam and/or coating systems generally adhere well to clean, dry concrete

surfaces. However, contaminants such as oil, grease, form release agents, etc., must be removed using tri-sodium phosphate and water, stiff bristle brooms or a power scrubber. Completely rinse away residue and allow deck to dry thoroughly. Zep Pride E Concentrated Degreaser and Cleaner may also be used with water at a 1 to 3 ratio mix. Heavily contaminated areas may require mechanical cleaning before coating.
- Remove loose dirt, dust and debris by using compressed (oil-free) air, vacuum equipment or brooming.

4. Concrete Patching
   - Very little repairing should be necessary in new concrete if the slab is placed according to specifications, but minor imperfections must be corrected. Ridges and sharp projections should be ground off and pits, holes and damaged areas be restored to match original surface with 100% solids epoxy and sand mixture at a ratio of one part epoxy to four parts sand. The repairs should be done after any chemical cleaning and the epoxy patch allowed to cure approximately 24 hrs at 75$^{o}$ to 80$^{o}$F.
   - One gallon of mixed epoxy mixed with four gallons of 20 - 40 mesh clean dry sand will yield approximately 6.42 square feet of epoxy patching material one inch thick.

5. Joint Preparation
   - All joint openings in concrete decks that exceed 1/4” in width shall be blown clean and grouted or filled flush with a polyurethane sealant prior to the application of sprayed polyurethane foam.

### Concrete (Remedial Construction)

1. General Construction Practices
   - Surfaces to receive sprayed polyurethane foam and/or coating must be a minimum of 3,000 psi concrete.
   - Insulating or lightweight concretes are not recommended.
   - Structural deck repairs must be permitted to cure for twenty-eight (28) days prior to the application of sprayed polyurethane foam and/or coating system.
   - Under certain conditions, a vapor retarder may be required beneath the polyurethane foam. Consult NEOGARD Technical Services for further information.

2. Finish Requirements
   - A wood float or steel trowelled finish is generally an acceptable substrate for sprayed polyurethane foam and/or coating systems. No projections or voids should be present in the concrete surface.
   - Deck must be free from contaminants such as oils, tars, asphalt’s, grease, dirt, etc., prior to polyurethane foam and/or coating application.

3. Method for Cleaning Concrete Deck
   - Sprayed polyurethane foam and/or coating systems generally adhere well to clean, dry concrete surfaces. However, contaminants such as oil, grease, form release agents, etc., must be removed using tri-sodium phosphate and water, stiff bristle brooms or a power scrubber. Completely rinse away residue and allow deck to dry thoroughly. Zep Pride E Concentrated Degreaser and Cleaner may also be used with water at a 1 to 3 ratio mix. Heavily contaminated areas may require mechanical cleaning before coating.
   - Remove loose dirt, dust and debris by using compressed (oil-free) air, vacuum equipment or brooming.

4. Concrete Patching
   - Patching of concrete in remedial applications is usually required. Ridges and sharp projections should be ground off and pits, holes and low spots should be filled with 100% solids epoxy and sand mixture at a ratio of one part epoxy to four parts sand. The repairs should be done after any cleaning procedure and the epoxy patch allowed to cure approximately 24 hrs at 75° to 80°F.
   - One gallon of mixed epoxy mixed with four gallons of 20 - 40 mesh clean dry sand will yield approximately 6.42 square feet of epoxy patching material one inch thick.

5. Joint Preparation
   - All joint openings in concrete decks that exceed 1/4" in width shall be blown clean and grouted or filled flush with a self-leveling polyurethane sealant and allowed to cure prior to the application of sprayed polyurethane foam and/or coating system.

## Plywood Decks

1. General Construction Practices
   - Plywood should be a minimum of B-C exterior grade and a minimum of 1/2 inch thickness with joist spacing 16" on center. Plywood shall not have a deflection of greater than 1/240 of the span when subjected to maximum design load. "B" side to be exposed to receive sprayed polyurethane foam.
   - Plywood shall contain no more than 18% water, as measured in accordance with ASTM D-2016.
   - Nails should not be countersunk, but simply nailed flush.
   - Nails used should be spiral or "non-backing" nails (coated). Attachment must meet building code requirements for resistance to wind uplift.
   - A joint of 1/32" to 1/16" should be left between sheets. Tongue and groove plywood is available with 1/16" joint built in. Plywood joints in excess of 1/4" shall be taped or filled with self-leveling polyurethane sealant.
   - Plywood imperfections are to be filled flush with self-leveling polyurethane sealant.
   - Pressure treated or "Wolmanized" plywood requires a six month aging period to insure complete adhesion.
   - Priming of wood deck with 7750/7751 primer or other primer as recommended by NEOGARD may be required to prevent the wood grain from showing through the foam and/or coating system. This also helps in minimizing moisture absorption and eliminates potential problems with polyurethane foam adhesion.

2. Cleaning Procedure
   - Plywood deck shall be free of loose dirt, grease, oil or other contaminants prior to priming or sprayed foam and/or coating system application. Remove loose dirt or debris by use of compressed (oil-free) air, vacuum or brooming. No washing shall be permitted.

3. Joint Preparation
   - Joints at changes in plane, or expansion details should be detailed with polyurethane sealant 70991 and allowed to cure.

## Metal Decks

1. General Construction Practices
   - The metal roof deck shall be constructed of a minimum 22 gauge steel and deflection shall be less than 1/240 of the span. Construction shall conform to local building codes.

- Sandblast steel surfaces which are not primed, shop painted, or otherwise protected in accordance with SSPC (Society for Protective Coatings) SP-6, Commercial Blast Cleaning. Remove loose rust and unsound primer from shop-primed steel surfaces by scraping or wire brushing. Prime metal with Zinc Chromate Epoxy primer 39916/99906 in strict accordance with procedures recommended by NEOGARD.
- For Galvanized steel and other non-ferrous metals, remove dust and dirt by blowing off the surface with high pressure (oil-free) air or wiping with clean dry rags. Oil, grease and protective mill coatings should be removed by solvent cleaning. White rust should be removed from galvanized steel by hand or power brushing. Care should be taken not to damage or remove the galvanizing. Rust should be removed from old galvanized steel by hand or power tool cleaning. Prime with Mist Coat II primer 942/188 in strict accordance with procedures recommended by NEOGARD.
- If the metal surface is free of loose scale, rust, weathered or chalking paint it can be cleaned using compressed (oil-free) air jet, vacuum equipment, hand or power boom to remove loose dirt. Grease, oil or other contaminants shall be removed with proper cleaning solutions.
- Fluted metal decks require a suitable method of covering or filling the flutes prior to polyurethane foam application. Flutes may be covered with mechanically fastened board stock, special polyester tapes, pre-cut board stock or sprayed polyurethane foam.

### Metal Surfaces (Vents, Pipes, Drains, Flashings, Etc.)

1. Ferrous Metal (Carbon Steel)
   - Surface must be wire brushed, ground with wire wheels or sandblasted to a near-white metal blast finish. This is the removal of all visible rust, mill scale, paint and other foreign matter from the surface.
   - Prime metal with Zinc Chromate Epoxy primer 39961/99906 in strict accordance with procedures recommended by NEOGARD.

2. Galvanized Steel and Other Non-Ferrous Metals
   - Remove dust and dirt by blowing off the surface with high-pressure (oil-free) air or wiping with clean dry rags. Oil, grease and protective mill coatings should be removed by solvent cleaning. White rust should be removed from galvanized steel by hand or power brushing. Care should be taken not to damage or remove the galvanizing. Rust should be removed from old galvanized steel by hand or power tool cleaning.
   - Prime metal with Mist Coat II primer 942/188 in strict accordance with procedures recommended by NEOGARD.

### Tectum, Gypsum Board, Isocyanurate Board, Etc.

1. General Construction Practices
   - These materials are generally used over fluted metal decks and must be installed with mechanical fasteners approved by Factory Mutual to meet building code requirements for resistance to wind uplift.
   - Boards shall be firmly butted together along all edges without gaps or openings. Joints exceeding 1/4” shall be filled flush with polyurethane sealant and allowed to cure prior to the application of sprayed polyurethane foam and/or coating system.
   - Special care must be taken to prevent these materials from getting wet in storage on the jobsite and after installation prior to being protected by foam. Moisture exposure will damage these materials and may be a cause for replacement.

2. Cleaning Procedure
   - Remove loose dirt and debris by using compressed (oil-free) air, vacuum or light brooming. No power brooming is permitted due to possibility of damage.

## Existing Built-Up Roofing

1. General Construction Practices
   - The roof shall be thoroughly inspected or tested to determine if moisture is present within the roof assembly. If damp insulation is found, the insulation might be able to be vented with one-way relief vents. If the existing roof system is saturated with water, it may require complete tear-off. Consult NEOGARD for recommendations.
   - The existing roof shall be thoroughly inspected for adhesion between felts, insulation and deck. Areas of poor adhesion should be fastened. Blisters, buckles, wrinkles and fishmouths shall be cut out and/or fastened.
   - Remove or refasten all loose base flashing, counterflashing and gravel stops as required.
   - Lightning rods shall be masked prior to foaming. Lighting rod cables shall not be embedded in the polyurethane foam and/or coating system and should be removed prior to either application. Electrical and mechanical conduits should be relocated or raised above the finished roof surface.
   - Existing low areas where water ponds and areas with obviously poor drainage to roof scuppers, drains, or roof edges shall be corrected by tapering the sprayed foam.

2. Cleaning Procedure
   - All soft mastic or asphaltic materials that impede polyurethane adhesion shall be removed.
   - All loose gravel, dust and residue shall be removed using power vacuum equipment, power sweeper, air blowing, or other suitable means. (If asbestos products are a part of roof removal, special considerations may be required). **Note: Care should be taken to not accumulate large amounts of gravel in any one place that might overload the roof deck structure**.

## Existing Polyurethane Foam Roofing System

1. General Construction Practices
   - Before any project work begins, the existing roof coating type must be determined for any special preparation procedures. Consult NEOGARD for specific recommendations.

2. Basic Surface Preparation Guidelines
   - Thoroughly clean all roof surfaces with a light pressure wash, 300 - 600 psi. Hold the nozzle at a 45 degree angle far enough distance from the surface so that the water will not be forced into the existing system, or damage the roof. If detergent is needed, a non-sudsing type is recommended. The use of stiff bristle push brooms may be required to remove the existing membrane chalk residue and other contaminants as necessary. After cleaning, rinse roof thoroughly with plenty of fresh potable water and allow to dry.
   - Inspect all surfaces. Areas of spongy, water saturated, or delaminated foam insulation are to be cut out and replaced with new sprayed polyurethane foam. Exercise care to protect adjacent surfaces from polyurethane foam overspray. Thickness of new insulation to match existing. **Note: If the substrate below the foam is wet, it must be replaced with sound materials to match existing**.
   - Surfaces containing exposed or degraded polyurethane foam, pot holes, pinholes, foam cracks, hail damage, etc. are to be thoroughly tested with a moisture meter. Polyurethane foam containing more than 15% moisture content is to be removed and replaced.

# Surface Preparation

- Large cracks caused by impact shall have the surface cleaned to remove oxidized polyurethane foam and/or coating residue and repaired with polyurethane sealant.
- Exposed polyurethane foam, pinholes and small coating craze cracks shall have the surface cleaned to remove oxidized polyurethane foam and/or coating residue. Apply elastomeric base coat (based on system being used) to all prepared surfaces at the rate of 1/2 to 3/4 gallons per 100 square feet. Immediately broadcast 30/60 mesh aggregate into wet coating at the rate of 15 to 30 pounds per 100 square feet. Aggregate may need to be worked into wet coating to help fill voids. After coating has cured, apply an additional one gallon per 100 square feet of base coat to the same area.
- Large polyurethane foam cracks in the surface must be cleaned to remove coating residue and detailed with a four inch wide piece of uncured neoprene securely adhered with bonding adhesive.
- Existing coating that is loose and/or marginally adhered must be peeled back to where excellent adhesion between coating and polyurethane foam exists. If existing coating is thick at the edges (greater than 1/16 inch thick), use sealant similar to coating system to smooth out the edges. **Note: If polyurethane foam is exposed where the coating was removed, apply one gallon per 100 square feet of base coat to that area, allow to cure and then reinspect the area to make sure the suface is sealed. Additional coating may be required**.

# System Application

## Permathane II FR

1. Material
   - Single-component, moisture-cured base coat (70620 series) urethane.
   - Single-component, moisture-cured topcoat (70611 series) urethane.

2. Average Dry Film Thickness
   - 26 dry mils (70620 base coat)
   - 13 dry mils (70611 series)

     39 dry mils total

3. Minimum Dry Film Thickness
   - 20 dry mils total system.

4. Application Instructions
   - Surface preparation. See the **Surface Preparation** section of the application manual.
   - Apply sprayed polyurethane foam in strict accordance with manufacturer's published specifications.
   - Apply first base coat of single component urethane (70620 series) to yield an average of 13 dry mils and allow to cure.
   - Apply second base coat of single component urethane (70620 series) to yield an average of 13 dry mils and allow to cure.
   - Apply topcoat of single component urethane (70611 series) to yield an average of 13 dry mils and allow to cure.
     - **Caution: Rough surface profiles of sprayed polyurethane foam 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**.

5. Theoretical DFT Table for Permathane II FR
   - After proper surface preparation and application of polyurethane foam, proceed to apply...

| Coat | Product | Vol. Solids | Color | Mix Time | Mils WFT | Mils DFT | Cure Time @ 75°F |
|---|---|---|---|---|---|---|---|
| 1st Base | 70620 | 77 | Gray | 5 min. + | 16 | 13 | 8 - 12 hrs or until tack free |
| 2nd Base | 70620 | 77 | Gray | 5 min. + | 16 | 13 | 8 - 12 hrs or until tack free |
| Top | 70611 series | 75 | White, Gray or Tan | 5 min. + | 16 | 13 | 8 - 12 hrs or until tack free |

Minimum total (base plus topcoat) DFT of 20 dry mils is required at any point on the roof. Applicator is responsible to meet these requirements and should consider foam texture and product waste from mixing, spraying, etc. when estimating material requirements.

# Permathane FR - System Application

## Permathane FR

1. Material
   - Single-component, moisture-cured (7419 series) urethane.
   - Single-component, moisture-cured (7441 series) urethane.

2. Average Dry Film Thickness
   - 33 dry mils (7419 series base coat)
   - 18 dry mils (7441 series)
     51 dry mils total

3. Minimum Dry Film Thickness
   - 30 dry mils total system, of which 10 must be topcoat.

4. Application Instructions
   - Surface preparation. See the **Surface Preparation** section of the application manual.
   - Apply sprayed polyurethane foam in strict accordance with manufacturers published specifications.
   - Apply first base coat of single component urethane (7419 series) to yield an average of 16.5 dry mils and allow to cure.
   - Apply second base coat of single component urethane (7419 series) to yield an average of 16.5 dry mils and allow to cure.
   - Apply first topcoat of single component urethane (7441 series) to yield an average of 9 dry mils and allow to cure.
   - Apply second topcoat of single component urethane (7441 series) to yield an average of 9 dry mils and allow to cure.
     - **Caution: Rough surface profiles of sprayed polyurethane foam may increase the number of coats required to achieve uniform film coverage and minimum dry film thickness requirements of 30 dry mils at any point on the roof of which 10 dry mils must be topcoat**.

5. Theoretical DFT Table for Permathane FR
   - After proper surface prep, patching and proper application conditions, proceed to apply...

| Coat | Product | Color | Mix Time | Coverage Rate (sf/gal) | Mils DFT | Cure Time @ 75°F |
|---|---|---|---|---|---|---|
| Base Coat | 7419<br>7419HB<br>7419-CA | Gray | 5 min. + | 81 | 16.5 | 8 - 12 hrs or until tack free |
| | | | | 73 | | |
| | | | | 84 | | |
| 2nd Base | 7419<br>7419HB<br>7419-CA | Gray | 5 min. + | 81 | 16.5 | 8 - 12 hrs or until tack free |
| | | | | 73 | | |
| | | | | 84 | | |
| 1st Topcoat | 7441 Series | White, Gray or Tan | 5 min. + | 133 | 9 | 8 - 12 hrs or until tack free |
| 2nd Topcoat | 7441 Series | White, Gray or Tan | 5 min. + | 133 | 9 | 8 - 12 hrs or until tack free |

Minimum DFT of 30 dry mils of which 10 dry mils must be topcoat is required at any point on the roof. Applicator is responsible to meet these requirements and should consider foam texture and product waste from mixing, spraying, etc. when estimating material requirements.

## Elastacryl FR

1. Material
   - Single-component, elastomeric acrylic. Standard (7251) and Quickset (7261) acrylic coatings are available. Single-component, elastomeric acrylics do not require accelerator.

2. Average Dry Film Thickness
   - 36 dry mils (7251 or 7261) total

3. Minimum Dry Film Thickness
   - 25 dry mils total system.

4. Application Instructions
   - Surface preparation. See the **Surface Preparation** section of the application manual.
   - Apply sprayed polyurethane foam in strict accordance with manufacturers published specifications.
   - Apply 7251 or 7261 to yield an average of 36 dry mils. Maximum recommended application rate is 1.5 gallons per square per coat.
     - **Caution: Rough surface profiles of sprayed polyurethane foam may increase the number of coats required to achieve uniform film coverage and minimum dry film thickness requirements of 25 dry mils at any point on the roof**.

5. Theoretical DFT Table for for Elastacryl FR
   - After proper surface prep, patching and proper application conditions, proceed to apply...

| Coat | Product | Color | Mix Time | Coverage Rate (sf/gal) | Mils DFT | Cure Time @ 75°F |
|---|---|---|---|---|---|---|
| 1st | 7251<br>7261 | White | 5 min. + | 72<br>66 | 12 | 8 - 12 hrs or until tack free |
| 2nd | 7251<br>7261 | White | 5 min. + | 72<br>66 | 12 | 8 - 12 hrs or until tack free |
| 3rd | 7251<br>7261 | White | 5 min. + | 72<br>66 | 12 | 8 - 12 hrs or until tack free |

Minimum DFT of 25 dry mils is required at any point on the roof. Applicator is responsible to meet these requirements and should consider foam texture and product waste from mixing, spraying, etc. when estimating material requirements.

# Silicone FR - System Application

## Silicone FR

1. Material
   - Single-component, room temperature vulcanized (7860-LO series) silicone. Silicone does not require accelerator.

2. Average Dry Film Thickness
   - 32 dry mils

3. Minimum Dry Film Thickness
   - 20 dry mils total system.

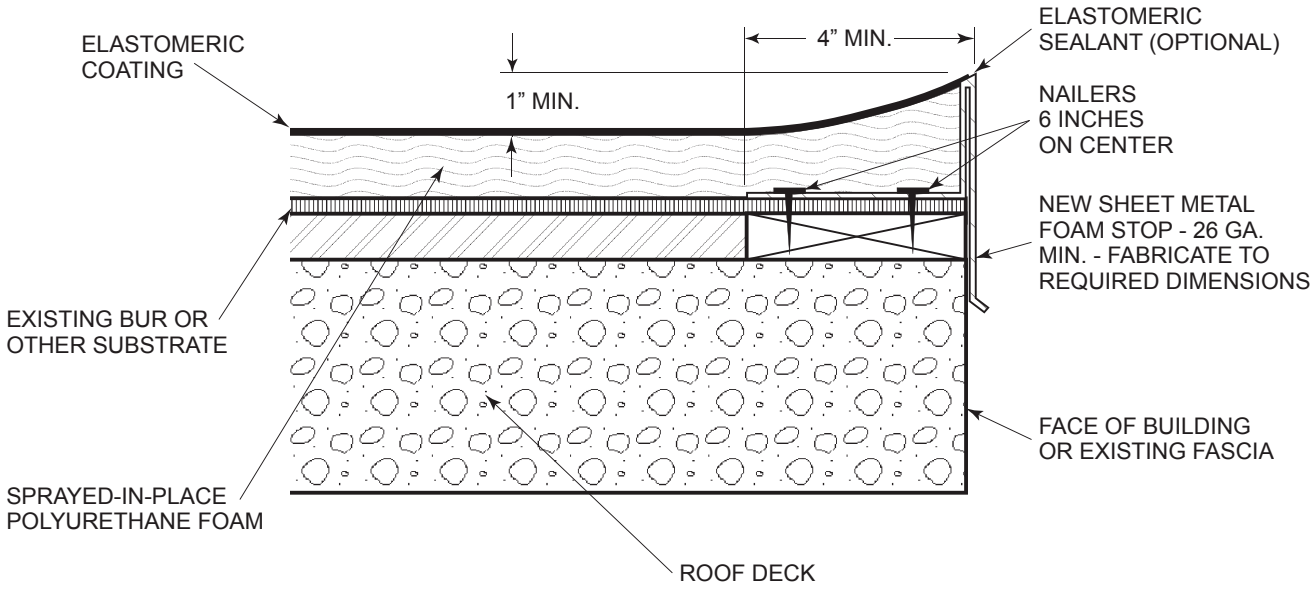
4. Application Instructions
   - Surface preparation. See the **Surface Preparation** section of the application manual.
   - Apply sprayed polyurethane foam in strict accordance with manufacturers published specifications.
   - Apply 7860-LO series to yield an average of 32 dry mils. Maximum recommended application rate is 1.5 gallons per square per coat.
     - **Caution: Rough surface profiles of sprayed polyurethane foam 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**.

5. Theoretical DFT Table for Silicone FR
   - After proper surface prep, patching and proper application conditions, proceed to apply...

| Coat | Product | Color | Mix Time | Coverage Rate (sf/gal) | Mils DFT | Cure Time @ 75°F |
|---|---|---|---|---|---|---|
| 1st | 7860-LO Series | Gray | 5 min. + | 62 | 16 | 8 - 12 hrs or until tack free |
| 2nd | 7860-LO Series | Gray, White or Tan | 5 min. + | 62 | 16 | 8 - 12 hrs or until tack free |

Minimum DFT of 20 dry mils is required at any point on the roof. Applicator is responsible to meet these requirements and should consider foam texture and product waste from mixing, spraying, etc. when estimating material requirements.

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. These details are available to print and/or download at http://www.neogard.com.

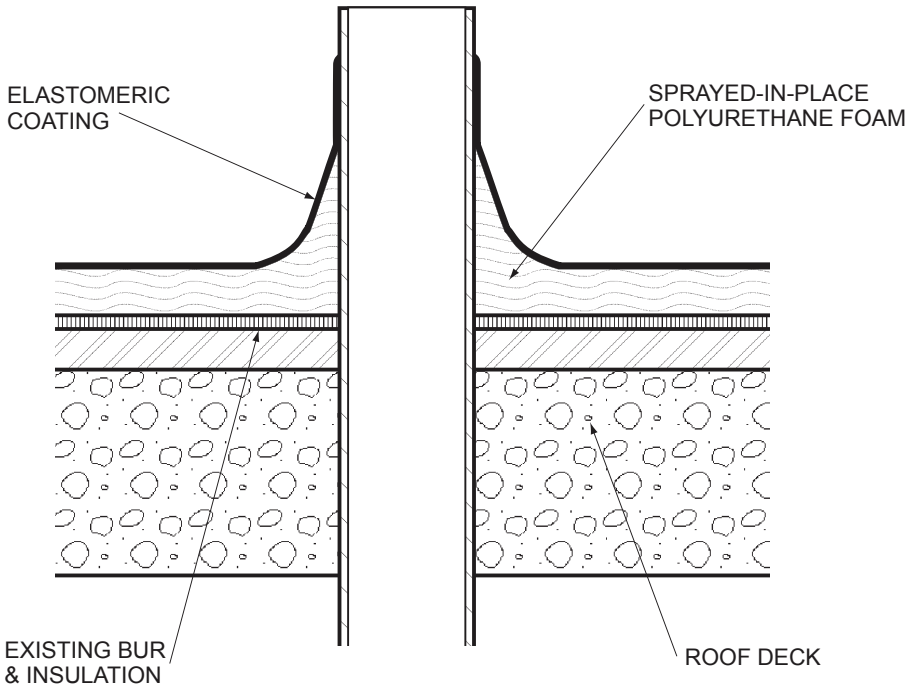



Note: This detail is utilized in the specification and design of NEOGARD Polyurethane Foam Roof Coating Systems, in both new and retrofit applications. It is provided to show a generally recommended procedure for dealing with the condition shown. It will not and cannot provide a specific solution for every condition likely to be encountered in field application. Where field conditions differ, the use of applicable portions of the detail shown or its adaptation by an experienced and conscientious applicator should result in a quality project.

NEOGARD CONSTRUCTION COATINGS
2728 Empire Central
Dallas, Texas 75236
(214)-353-1600
www.neogard.com
JONES-BLAIR INDUSTRIAL COATINGS

Project: Foam Stop
(For Use On Roofs With Interior Drains)

| Drawn by: | Scale: | Date: | Drawing/Index No. |
|---|---|---|---|
| D. Bigley | NTS | 11/08/12 | R-001 |

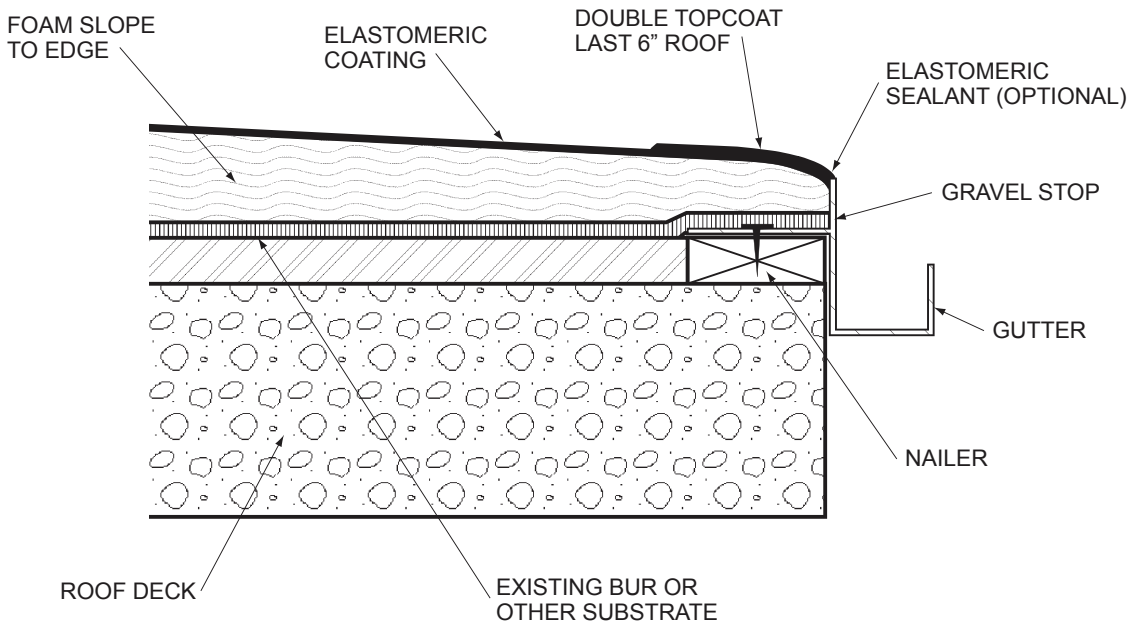



Note: This detail is utilized in the specification and design of NEOGARD Polyurethane Foam Roof Coating Systems, in both new and retrofit applications. It is provided to show a generally recommended procedure for dealing with the condition shown. It will not and cannot provide a specific solution for every condition likely to be encountered in field application. Where field conditions differ, the use of applicable portions of the detail shown or its adaptation by an experienced and conscientious applicator should result in a quality project.

NEOGARD CONSTRUCTION COATINGS
2728 Empire Central
Dallas, Texas 75236
(214)-353-1600
www.neogard.com
JONES-BLAIR INDUSTRIAL COATINGS

Project: Vertical Projection

| Drawn by: | Scale: | Date: | Drawing/Index No. |
|---|---|---|---|
| D. Bigley | NTS | 11/08/12 | R-002 |

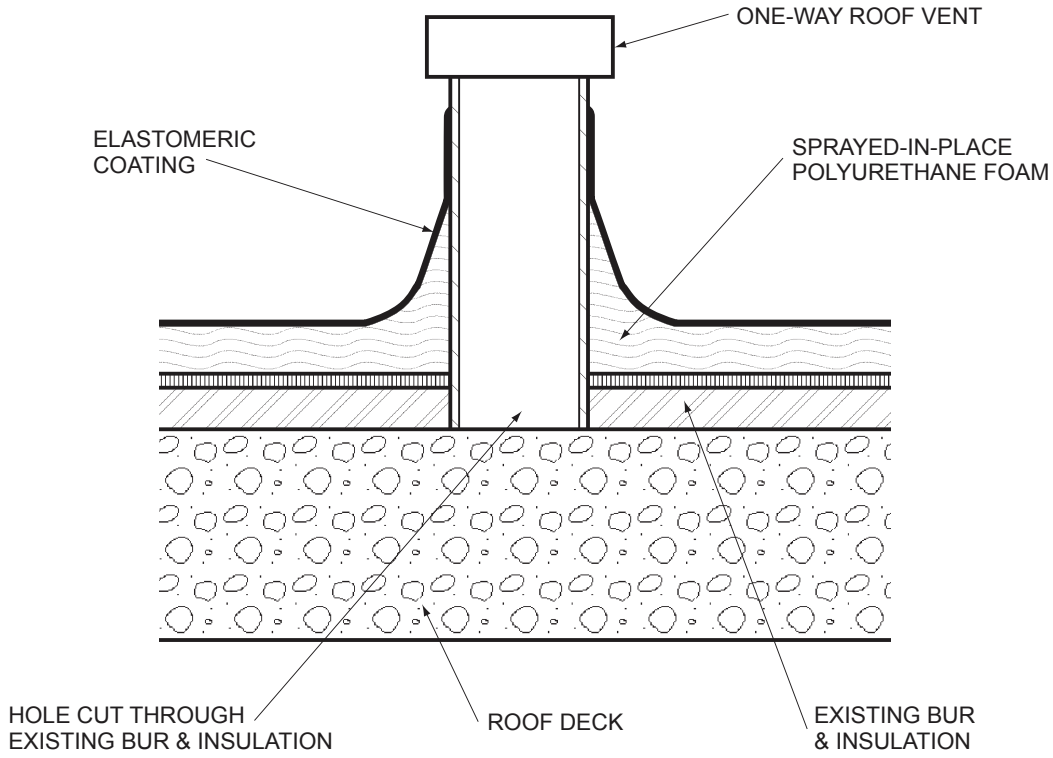



Note: This detail is utilized in the specification and design of NEOGARD Polyurethane Foam Roof Coating Systems, in both new and retrofit applications. It is provided to show a generally recommended procedure for dealing with the condition shown. It will not and cannot provide a specific solution for every condition likely to be encountered in field application. Where field conditions differ, the use of applicable portions of the detail shown or its adaptation by an experienced and conscientious applicator should result in a quality project.

NEOGARD CONSTRUCTION COATINGS
2728 Empire Central
Dallas, Texas 75236
(214)-353-1600
www.neogard.com
JONES-BLAIR INDUSTRIAL COATINGS

Project: Gravel Stop

| Drawn by: | Scale: | Date: | Drawing/Index No. |
|---|---|---|---|
| D. Bigley | NTS | 11/08/12 | R-003 |

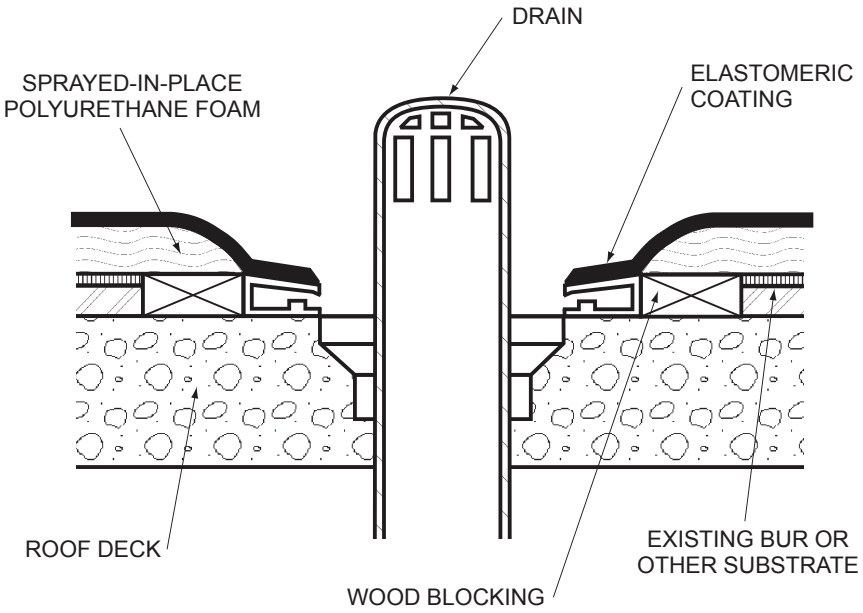



Note: This detail is utilized in the specification and design of NEOGARD Polyurethane Foam Roof Coating Systems, in both new and retrofit applications. It is provided to show a generally recommended procedure for dealing with the condition shown. It will not and cannot provide a specific solution for every condition likely to be encountered in field application. Where field conditions differ, the use of applicable portions of the detail shown or its adaptation by an experienced and conscientious applicator should result in a quality project.

NEOGARD CONSTRUCTION COATINGS
2728 Empire Central
Dallas, Texas 75236
(214)-353-1600
www.neogard.com
JONES-BLAIR INDUSTRIAL COATINGS

Project: Roof Vent

| Drawn by: | Scale: | Date: | Drawing/Index No. |
|---|---|---|---|
| D. Bigley | NTS | 11/08/12 | R-004 |

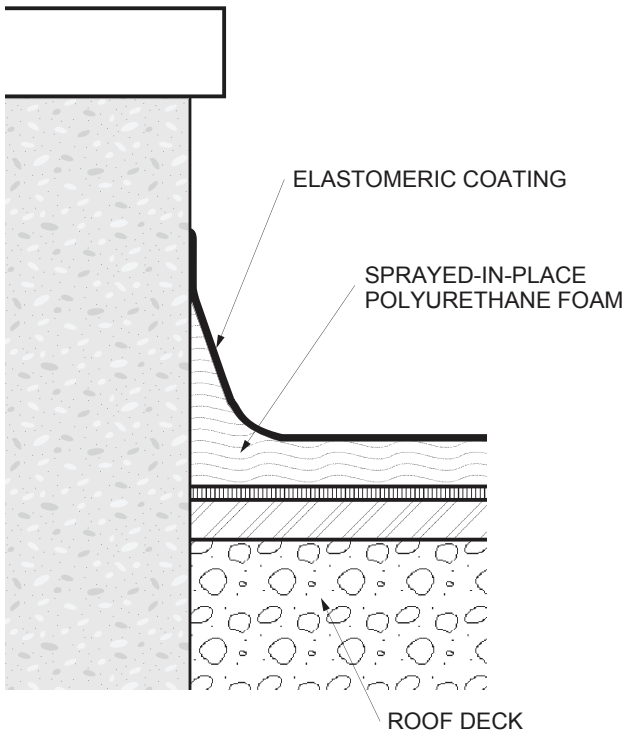



Note: This detail is utilized in the specification and design of NEOGARD Polyurethane Foam Roof Coating Systems, in both new and retrofit applications. It is provided to show a generally recommended procedure for dealing with the condition shown. It will not and cannot provide a specific solution for every condition likely to be encountered in field application. Where field conditions differ, the use of applicable portions of the detail shown or its adaptation by an experienced and conscientious applicator should result in a quality project.

NEOGARD® CONSTRUCTION COATINGS
2728 Empire Central
Dallas, Texas 75236
(214)-353-1600
www.neogard.com
JONES-BLAIR® INDUSTRIAL COATINGS

Project: Roof Drain

| Drawn by: | Scale: | Date: | Drawing/Index No. |
|---|---|---|---|
| D. Bigley | NTS | 11/08/12 | R-005 |




Note: This detail is utilized in the specification and design of NEOGARD Polyurethane Foam Roof Coating Systems, in both new and retrofit applications. It is provided to show a generally recommended procedure for dealing with the condition shown. It will not and cannot 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 detail shown or its adaptation by an experienced and conscientious applicator should result in a quality project.

NEOGARD CONSTRUCTION COATINGS
2728 Empire Central
Dallas, Texas 75236
(214)-353-1600
www.neogard.com
JONES-BLAIR INDUSTRIAL COATINGS

Project: Roof Parapet Wall

| Drawn by: | Scale: | Date: | Drawing/Index No. |
|---|---|---|---|
| D. Bigley | NTS | 11/08/12 | R-006 |

# Safety & Storage

The following covers safety and storage of NEOGARD® coating materials. **Failure to follow these instructions can result in bodily injury or property damage**. Material Safety Data Sheets (MSDS) must be on jobsite at all times. Two basic types of coatings for surface applied waterproofing systems are produced by NEOGARD®. They are solvent solution and solvent free coatings. Each type has specific hazard potentials and storage requirements. Solvent solution 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 recommendations.

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 & 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 spray guns and compressed air nozzles, which 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 & 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 even 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.

- 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). **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

Footwear must be safety shoes with steel toe protection. 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 glare blindness.

## 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. Foods, even those stored in freezers, can pick up a solvent taste and should be protected from vapors.

# Safety & Storage

## Storage

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.

Do not keep open containers in confined places.

Protect emulsion coatings (water borne) from freezing.

## Volatile Organic Compounds (VOCs) & Health

### Worker Safety & 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 paint coatings that may be regulated by OSHA. These ingredients include heavy metals in paint pigments, isocyanates in urethane paint binders, and several other chemical ingredients.

### Zero VOC versus VOC COMPLIANT

- Under the EPA's Clean Air Act regulations, use of low-VOC paint 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 in some paints can also have odors. 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, usually with animal exposures. 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 whether they are toxic. 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 indicate 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.

# 5 Spray Equipment

## Airless Spray Equipment Guidelines

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

### 1. 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 ¾ to 1 inch in diameter, nylon or teflon lined, and no more that fifteen feet in length. Five to ten feet is the standard length. A gravity or siphon feed can result in cavitation at the pump and is not recommended.

### 2. Airless Coating Pump

The single component coating materials require a single component high pressure, airless coating pump, capable of maintaining 2700 - 3000 psi fluid pressure at the gun. Although a 45:1 ratio pump is acceptable, a 68:1 is preferred to accommodate variances in application parameters. Factors such as material temperature, ambient temperature, hose length, etc. influence sprayability and the equipment required.

### 3. 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 ¾ inch I.D. and the last 100 feet, to the gun should be ½ inch I.D. For hose lengths to a total of 250 feet, the first 100 feet should be ¾ inch I.D. followed by ½ inch 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.

### 4. 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” to 14” fan width should be used.

# Estimating & Coverage Rates

## Theoretical vs Actual

Theoretical coverages are those calculated for 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. Losses due to overspray, material left in hoses or containers, spillage, etc., will affect material yield under field conditions. Also, surface irregularities such as roughness, undulations, corrugations, etc., will reduce material coverage on the job.

## 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 are meaningless in this formula.

Example

50% solids by volume = 16 (wet mils) x .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

System = 32 dry mils total
Material (50% solids by volume) = 8 dry mils per gallon
32 divided by 8 = 4 gallons per 100 square feet
% 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).

# 5 Mixing Instructions

### Single Component Coatings

- Read labels and application manual prior to mixing materials.
- If accelerator is required, the accelerator or small container is always to be added to the color side. One gallon containers in 55's and half pint and pint containers in 5's.
- 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 temperature 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 to mix all materials thoroughly. 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 the materials should come after the materials are mixed. Do not thin materials more than 15%. See compatible thinners in the thinning section of this manual.

### Two-Part Coatings

- Check mix ratio on labels and in 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 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 no off-ratio materials are produced.
    - **Note: Use a low-medium speed drill and a Jiffy Mixer to mix all materials thoroughly. 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. If solvents are added prior to mixing, proper coating ratios will not be achieved. When thinning materials, always know local VOC restrictions for coating applications in your area before thinning. Carefully read and observe warning on thinner labels. See compatible thinners in the thinning section of this manual.

# Solvents for Thinning & Cleaning

## General Practices

1. Use only commercial grade solvents with NEOGARD products.

2. Be sure there is no moisture contamination in solvents, as it can produce adverse reactions.

3. When thinning materials, always know local VOC restrictions for coating applications in your area before thinning. Excessive thinning may affect physical properties of coating.

4. Never use solvents that contain alcohol in NEOGARD urethane products. Alcohols react with polyurethane hardeners creating a permanent liquid state, or under-cured membrane.

5. Thin and clean only with recommended products. Consult NEOGARD for questions regarding solvents.

## Recommended Solvents

| Product | Equipment Cleaning | Material Thinning |
|---|---|---|
| 7251 or 7261 | Water | Water |
| 7419 | Xylene* | Xylene* |
| 7419HB | Xylene* | Xylene* |
| 7441 Series | Xylene* | Xylene* |
| 7810 | Xylene* | Xylene* |
| 7860-LO Series | Xylene* | Xylene* |
| 70611 Series | Xylene* | Xylene* |
| 70620 | Xylene* | Xylene* |
| 70680/70685 | Xylene* | Xylene* |
| Ureprime (if rolled) | Xylene* | Xylene* |
| Chem-O-Pon (if rolled) | Xylene* | Xylene* |
| 70840/7952 (if rolled) | Xylene* | Xylene* |
| 7780/7781 | Water | Do NOT Thin |
| Mist Coat II (942/188) | Xylene* | Do NOT Thin |
| 70714/70715 series | Xylene* | Do NOT Thin |

When spraying Ureprime, Chem-o-pon, 70840/7952

| | | |
|---|---|---|
| (if sprayed) | Xylene* | JB Retarder 21093 |
| (if sprayed) | Xylene* | JB Reducers 21092 |
| (if sprayed) | Xylene* | JB Fast Reducers 21102 |

* NOTE: NEOGARD Xylene is ordered as item #20653. Odorless version is 7055.

# Weather Impact

NEOGARD®s single component and two component polyurethanes are designed to be applied through an ambient temperature range of 70º to 90ºF to provide ideal handling and application characteristics.

## Cold Weather Impact

Polyurethane Coating Materials

**Note: Substrate temperatures can effect the cure of the polyurethane materials as much as or more than ambient temperatures can. Application of heated material to a cold substrate will not reduce the curing time. Consult NEOGARD® for recommendations**.

As material component temperatures become colder and start to drop below 60ºF, 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 together. If a thorough mix is not obtained, the off-ratio mixture can cause improper curing.
- Polyurethanes become more difficult to spray. They produce 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 packaged to provide good potlife and reasonable cure of materials at 70º to 90ºF. As material temperatures become colder and start to drop below 60ºF, the potlife 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 to 80ºF for about 2 days of production. This will minimize the storage space required to keep the material warm. Refer to NEOGARD's Accelerator Curing Charts when these conditions exist. 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

Polyurethane Coating Materials

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 becomed trapped, resulting in blisters and/or bubbles in the coating. Two component products are also affected by high temperatures. 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 Services for specifics.

NEOGARD®'s 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 Chart

Temperature at which moisture will condense on a surface. No coatings should be applied unless surface temperature is a minimum of 5°F above dew point. Temperature must be maintained during curing.

This chart illustrates how to calculate the dew point:

**Ambient Air Temperature**

| Relative Humidity | 20°F | 30°F | 40°F | 50°F | 60°F | 70°F | 80°F | 90°F | 100°F | 110°F | 120°F |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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: Fahrenheit: If ambient air temperature is 70°F and relative humidity is 65%, the dew point is 57°F. No coating should be applied unless the surface temperature is 62°F minimum (57°F + 5°F = 62°F).

# Recoat Guidelines

## General Information

1. This section of the guide has been assembled to provide general information and specific recommendations on properly preparing existing polyurethane foam roofs for recoating with NEOGARD elastomeric coating system. Applicators are expected to have the equipment and common tools to correct and recoat almost any existing polyurethane foam roofing system.

2. The information provided covers the general procedures common to most polyurethane foam roofing systems. For special aspects of repairs contact NEOGARD Technical Service.

## Materials Used for Repairs

1. Polyurethane Foam Insulation - Polyurethane foam insulation is a cellular plastic which is produced on-site using special equipment for mixing and spraying. Within seconds after being sprayed, the polyurethane foam expands, rising and curing. Full cure occurs in about 30 seconds. Several layers can be applied to provide desired thickness. Multiple layers are used to develop drainage for low areas, and achieve desired insulation values.

2. Caulking Compounds and Pourable Sealants - When repairing small roof punctures or beveling the edge of repairs or sheet flashing goods, always use a caulking compound compatible with the base coat material. In most instances the caulking material will be single component. Two-component products are also acceptable. Silicone caulking should only be used when repairing NEOGARD 7860 series silicone roof coating system.

3. A 100% solids, single or two-component polyurethane sealant, can be used when repairing small polyurethane foam blisters. Use single component polyurethane sealant for small and shallow damage and two-component polyurethane sealant for deep and wide blisters up to three inches in diameter. When used to repair small blisters on a silicone coated roofing system, grind the silicone coating material away from the edge of the opening prior to filling with sealant. This will provide a surface for proper bond between sealant and polyurethane foam.

4. NEOGARD Liquid Applied Elastomeric Coatings - NEOGARD liquid applied elastomeric coatings are specialized elastomers designed to protect polyurethane foam from the sun's ultraviolet rays, physical damage, and to resist water. NEOGARD manufactures several types of high quality coatings to meet specific requirements such as roof top traffic, ponded water conditions and specific chemical resistance.

## Inspection

1. 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 caused by people, animals, acts of God, or other debris blowing onto the roof. It is also necessary to check for polyurethane foam delamination (blisters), exposed polyurethane foam, spongy or water saturated polyurethane foam, coating blisters and areas of thin coating.

2. 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 with a moisture meter. If the moisture content of any probe reads 15% or greater on the meter, mark the point of penetration on a roof sketch and establish a perimeter of damage. Always identify the problem before deciding on corrective action. In many instances, the sources of the leaks are from skylights, vents, air conditioning equipment, ducts, flashing and expansion joints.

3. Look for areas of high traffic. Polyurethane foam surfaces can be damaged by constant physical abuse such as around vent fans, air conditioners, roof hatches, exit doors, etc.

### Repair Procedures

1. Spongy or Water Saturated Polyurethane Foam - Areas of spongy or water saturated polyurethane foam are to be cut out and replaced with new spray-in-place polyurethane foam of equal density. The spongy or wet areas must be removed down to the existing substrate, allowed to dry and filled with new polyurethane foam to a thickness to match existing. After the new polyurethane foam has cured for 20 to 30 minutes, plane or grind the repaired area to avoid damming of water and/or unevenness of elevation on the surface. Exercise care to protect adjacent surfaces from polyurethane foam overspray. Note: If the substrate below the foam is wet, it must be replaced with sound materials to match existing.

2. Tears or Punctures - Tears and punctures in the polyurethane foam roofing system are often caused by mechanical damage by sharp instruments.

   To repair tears and/or punctures prior to recoating, remove loose coating and polyurethane foam from damaged area with a utility knife and clean away debris. A caulking compound compatible with the coating system may be used to seal small tears and fill small holes or depressions.

3. Elastomeric Coated Surfaces Containing Small Cavities (<1/4” Dia.) of Exposed Polyurethane Foam Brought About by Abrasion, Erosion, Weathering, Etc. - This type of condition usually occurs in areas where the polyurethane foam has a rough surface profile such as pass lines. These areas must be cleaned of the weak and/or powdery surface before recoating. Sweep with a stiff bristle broom and blow off with oil free air pressure or vacuum up dust. After removing surface contaminants, thoroughly test polyurethane foam areas with a moisture meter. Any area of polyurethane foam containing more than 15% moisture content must be removed and replaced with new polyurethane foam of equal density and thickness to match existing.

   Seal surface with compatible base coat at the rate of 1/2 to 3/4 gallons per square. Immediately broadcast dry sand (40-60 mesh) into wet coating at the rate of 20 to 40 pounds or more per square. A paint roller (typically 9 inch) is used to obtain an even distribution of sand. Please note that this may take several back and forth motions and additional sand in areas where a rough surface exists. Check surface for pinholes in the coating system and if found, add an additional sand coat as above or touch up as needed.

4. Pinholes (< 1/16” Dia.) in Coating Surface - Sweep surface with a stiff bristle broom and blow off with oil free air pressure. After removing surface contaminants, thoroughly test the area which displays the pinholes using a moisture meter similar. Any area containing more than 15% moisture content, as read on the moisture meter, must be removed and replaced with new polyurethane foam of equal density and thickness to match existing.

   Seal surface with compatible base coat at the rate of 1/2 to 3/4 gallons per square. Immediately

broadcast 40/60 mesh dry sand into wet coating at the rate of 20 to 40 pounds or more per square. The sand may need to be worked into the wet coating with 9 inch paint rollers so that it is evenly distributed. Please note that this may take several back and forth motions and additional sand in areas where a rough surface exists. Check surface for pinholes in the coating system and if found, add an additional sand coat as above or touch up as needed.

5. Large Impact Hail Damage - Test the immediate area for moisture content using a moisture meter. Polyurethane foam containing more than 15% moisture content, as read on the moisture meter, must be removed and replaced. If the area is small (within the circumference of hail impact ring), remove with a small knife to sound polyurethane foam and fill with a caulking compound compatible with the coating system. Bevel edges of repair for smooth transition between caulking repair and existing surface. If the area in question is three inches in diameter or less, remove contaminated area down to the existing substrate, bevel polyurethane foam edges, and fill void with a two component, 100% solids, pourable polyurethane sealant. Large areas (greater than three inches in diameter) are to be removed and replaced with new spray-in-place polyurethane foam of equal density to a thickness to match existing foam. If new polyurethane foam is applied, cover with compatible NEOGARD base coat at the rate of 1/2 gallon per square to protect from ultraviolet rays and moisture.

6. Craze Cracks in Coating Surface - Thoroughly clean surface of all contaminants, allow area to dry if any water was used. If solvents were used to clean the area, allow the solvent to evaporate. Seal area with compatible coating to yield an average thickness of 20 dry mils.

7. Polyurethane Foam Cracks (For All Coating Systems Except Silicone) - Polyurethane cracks usually occur from building shifts. Cracks maybe opened or closed, crack may have in plane surfaces or rough tattered edge. To repair the crack open the crack with a “V” cut. All tattered edges, dirt, mold must be removed as part of the “V” cut. Clean the cut typically by air. When “V” cuts exceed 3/8” use only solvent free two component polyurethane, for smaller “V” cuts single component polyurethane. Strike top of sealant flush to deck. Allow sealants to fully cure. Two methods are allowed to detail the crack Method 1 apply NEOGARD 86218 Flashing Tape with a minimum 2” lap on each side of the crack. Or Method 2 apply a wet layer of NEOGARD® basecoat at 30 mils install a woven polyester fabric 3 oz minimum (typically Tietex or equal) into the wet coating, roll the polyester to remove air and saturate the fabric. After rolling the fabric, additional coating may be used if needed to saturate the fabric. Allow detail to fully cure prior to installing the NEOGARD coating system.

8. Polyurethane Foam Blister Repairs - The method of repairing sprayed polyurethane foam blisters largely depends on the type of blister. The following is a list of repair procedures for polyurethane foam blisters encountered.

   As a general rule before repairing or during the repairing operation, adequate test cuts (core and/or slit samples) should be taken to determine the exact extent of the problem. It may be necessary to remove polyurethane foam beyond the actual area of an individual blister in order to prevent reoccurrence. The surface area adjacent to the cut should be prepared and cleaned.

   When cutting out a blister, always remove the polyurethane foam down to the existing substrate. Always make sure the surface is dry before proceeding to repair the blister with compatible caulking compounds, 100% solids polyurethane sealants or new sprayed-in-place polyurethane foam.

   Small blisters (less than 1” in diameter) can be repaired with a caulking compound compatible with the coating system. The area to be repaired should be clean, dry, and the edges beveled to assure proper adhesion. The caulking compound used must not be installed in a greater thickness than

is recommended by the manufacturer for proper cure. It must be installed so as to insure the final surface is slightly higher than the surrounding area so that water will not pond on the repaired area. All caulking must be thoroughly cured before the application of elastomeric coating materials.

Blisters (less than 3" in diameter) can be repaired with a pourable, 100% solids, two component polyurethane sealant. After the sealant has cured, plane or grind the repaired perimeter smooth to avoid damming of water.

Large blisters (greater than three inches in diameter) must be cut out to the existing substrate. The perimeter of the blister must be cut back to an area determined to be dry (less than 15% moisture content) when tested with a moisture meter and tapered at a 45 degree angle. Spray new polyurethane foam to match existing density and thickness. After the new polyurethane foam has cured, plane or grind the repaired perimeter smooth to avoid damming of water. Coat repaired areas with compatible NEOGARD base coat at the rate of 1/2 gallon per square to protect from ultraviolet rays and moisture.

**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**.

9. Coating Blisters - Blisters in coating should be repaired using a sharp knife to cut around the coating blister. Use care not to damage the polyurethane foam and remove only coating to a clean, dry surface. Check the polyurethane foam under the blister for moisture and/or surface oxidation. If moisture is present, allow the surface to dry before cleaning. Clean the area in question of all foreign debris and/or oxidation and seal the edges with a caulking compound compatible with the coating system. Allow the caulking to cure per manufacturer's recommendations, solvent wipe repaired area, and apply a compatible NEOGARD base coat to the affected area.

## Low Pressure Cleaning

1. After all of the previous repairs have been completed, thoroughly clean all roof surfaces with a light pressure wash, 300-600 psi. Hold the nozzle at a 45 degree angle far enough distance from the surface so that the water will not be forced into the existing system, or damage the roof. If detergent is needed, a non-sudsing type is recommended. The use of stiff bristle push brooms, especially in low areas, may be required to remove the existing membrane chalk residue and other contaminants as necessary. After cleaning, rinse roof thoroughly with plenty of fresh potable water and allow to dry.

## Recoating Application with NEOGARD Products

1. NEOGARD roof coating can be reapplied over existing coating to extend the roof life provided the existing roof is intact with no failed spots or the areas not intact are repaired prior to recoating. Consult NEOGARD for elastomeric coating recommendation and application procedures for each roof being proposed.

# 5 General Maintenance

## General Maintenance and Cleaning for NEOGARD Roofing Systems

NEOGARD roof coating systems are long lasting, monolithic membranes, designed for years of trouble free waterproofing. Maintenance of NEOGARD roof coating systems must be performed at regular intervals to assure that the coating system will continue to provide service for which it is intended. NEOGARD strongly suggests the original contractor be retained for these inspections, repairs, and cleaning to simplify the warranty issues involved in changes or repairs by others.

Suggested maintenance procedures should include:

- Repeated physical inspections are recommended twice per year
- Periodic cleaning typically once per year
- Coating system repairs
- Structural repairs
- Topcoat surface restoration typically after 10 yrs depending on system installed

## Physical Inspections

Roof coating systems are subject to abrasive conditions as well to physical damage from general use and damage resulting from structural problems, traffic, and natural processes. Some of the more common causes of damage to roof coating systems are:

- HVAC repair, and or HVAC maintenance
- Limbs, leaves, birds, animals and other natural events.
- Drainage failures of any and every type
- Other roof traffic
- Oil or grease releases from oven vents or other similar types
- Excessive cracking in structural concrete slabs.
- Damage caused by storms, or storm winds.
- Damage caused by snow or ice to the system.

Physical inspections should be conducted at least semi-annually to identify detrimental issues if present. A thorough physical inspection should be conducted annually as follows:

- Inspect all sealant joints for proper adhesion to the substrate, adhesive or cohesive failure and physical damage.
- Identify all foreign materials such as limbs, leaves, abandoned equipment or parts.
- Inspect drains or scuppers to ensure there is nothing clogging or blocking drains.
- Inspect areas where change of plane occurs to determine if there has been excessive movement which may have caused the roof coating to split, crack or the sheet rubber flashing to come loose.
- Inspect roof coating surface to determine if there are any holes, cuts or ruptures present.
- Inspect areas which are subject to increased traffic damage for abrasion and wear for physical damage.
- Where applicable, inspect the underside of structure for evidence of leaks.

# General Maintenance

## Storm Events Inspection(s)

Large storm events can damage any roof through wind, hail, or excessive water. A specific storm inspection usually is restricted to a visual inspection specific to storm damage.

## Cleaning of Roof Coating System

Excessive roof cleaning can cause problems by adding excessive erosion damage. All cleaning should be designed to remove debris and common dirt, fungus, and algae.

Our recommendations for cleaning are:

- Annually remove all large debris screws, abandon equipment or parts, sticks, leaves, nuts, etc.
- Hose down entire deck with water and NEOGARD's 8500 biodegrade cleaner, sweep with a soft bristle broom to loosen dirt, and similar.
- Rinse thoroughly preferably with a water hose with clean potable water.
- Make an inspection for coating damage and report the damage to a licensed NEOGARD applicator and/or NEOGARD for immediate attention and repair recommendations.

## Emergency Roof Coating Repairs

This section is included for emergency roof coating repairs only. Minor repairs may be made by owner's maintenance personnel, however, it is recommended to contact a licensed NEOGARD applicator to make major repairs to protect the manufacturer's warranty.

To make an emergency repair, carefully remove loose coating from damaged area back to well adhered material and thoroughly clean the exposed substrate and existing coating surrounding the area with a clean cloth that has been wet with xylene solvent. Allow solvent to evaporate.

Compatible polyurethane sealant (caulk) or polyurethane waterproofing materials may be used to fill tears or punctures. Do not use asphalt or tar modified products.

After emergency repairs are made, report them to a licensed NEOGARD applicator and/or NEOGARD immediately.

In order for the material and workmanship warranty to be honored, all emergency repairs must be inspected or reworked by a licensed applicator of NEOGARD when available. Do not use asphalt or tar modified products to patch or repair NEOGARD products.

# 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.

**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.

**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.

**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:** Is 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.

# Glossary (Continued)

**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.

**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.

**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.

**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:

1. Broadcast - Neat resin over the substrate and where the aggregate is broadcast into the resin while it is still wet.
2. Slurry - Very fine aggregate (consistency of flour) is mixed into the resin to create a self leveling consistency.
3. 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.

**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.

**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.

# Glossary (Continued)

**Solids by Weight:** The percentage of the total weight of a 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.

**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.

**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.

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

# NOTES

# Application Manual

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