



INDUSTRIAL
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A GLOBAL LEADER IN NANOSCIENCE SOLUTIONS

NANSULATE®

AWARD-WINNING ENERGY SAVING & ASSET PROTECTION COATINGS

Crystal Roof Application Handbook



Nansulate® Crystal

Roof Insulation & Mold Resistance Coating

Clear Cool Roof

Designed to provide thermal insulation, UV, moisture and mold resistance for sloped roofs. The coating dries to a clear, matte finish which will keep the beauty of the roof intact and prolong service life.

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Equipment, Mixing and Dry/Cure Times

PRODUCT DESCRIPTION:

One component water-based acrylic latex thermal insulation and protective coating designed for use on sloped roofs over clay, cement or slate tiles and asphalt or wood shingles. Designed to provide thermal insulation, UV, moisture, and mold resistance

EQUIPMENT:

Preferred application method is by brush, roller or paint sprayer. Use either airless sprayer at low pressure, or HVLP (high volume low pressure) sprayer.

Nansulate® coatings can be applied with standard paint spray equipment. Equipment size and performance varies widely, so it is our intention to provide the following suggestions for various sizes of equipment which may be used for the coatings, in addition to other important items to ensure proper application.

Some suggested airless or H.V.L.P. sprayer:

- a) Graco Silver Gun, 395, Titan 440i (or similar)
Wagner/Spraytech hand held sprayers are suitable for small areas.
- b) Wagner Project Pro 115, or Paint Crew
- c) Graco Minimax-battery operated is also suitable.

Tips & Extensions for Airless Sprayers:

You may need various tip fan sizes depending upon surface; such as 2, 4, 8, or 10 inch, and a 0.011-0.013 tip. Smaller surfaces require smaller fan widths, larger surfaces require larger fan widths. Refer to your paint sprayer documentation for suggested tip fan sizes according to surface area to be coated.

MIXING AND PREPARATION:

DO NOT thin the product with paint thinner or other medium. Thinning product can negatively effect insulating properties and void warranty.

Product should be stirred in the can prior to application or after sitting overnight. Care should be taken during stirring prior to application not to cause particle shear of the nanocomposite. Preferred method of stirring is using a mixing paddle (also known as hurricane mixer) at slow speed for approximately 3-5 minutes.

APPLICATION THICKNESS:

Measuring your overall thickness is important during your application to ensure you achieve your desired results and coverage. Each single applied coat of Nansulate® Crystal corresponds to the following approximate thickness.

	<u>Wet Film Thickness (WFT)</u>	<u>Dry Film Thickness (DFT)</u>	
Nansulate® Crystal	100 microns (4 mils)	50 microns (2 mils)	(DFT is 50% of wet film thickness)

All square foot coverage rates are based upon the applied thickness, which is the wet film thickness (WFT).

IMPORTANT: DO NOT apply each coat more than 5 wet mils/127 microns in thickness. If you are experiencing cracking, peeling, or flaking while the application is drying, this may indicate your coat application is too thick.

	Thickness in Mils Roof Insulation Application	Thickness in Microns Roof Insulation Application
Typical Application Wet Film Thickness (WFT)	12 mils WFT (3 coats)	300 microns WFT (3 coats)
Typical Application Dry Film Thickness (DFT)	6 mils DFT (3 coats)	150 microns DFT (3 coats)

DRY AND CURE TIMES:

The touch dry time between individual “coats” of approximately 4 mils (100 microns) in thickness is 1-2 hours, depending upon environmental variables. Drying time will vary depending upon surface and air temperature, humidity, wind or air movement, and exposure to sunlight. Under ideal drying conditions, Nansulate® Crystal dries to a touch dry film in approx. 30 to 60 minutes after application. A longer drying time will be required if the surface being coated is colder than 50°F (10°C)., if the relative humidity is higher than 90%, if the air is calm, or the surface is not exposed to direct sunlight.

DO NOT apply the next coating pass or walk on the surface, until it is completely dry to touch and non-tacky.

Temperature and humidity will affect your dry time between coats. See approximate guidelines below:

IN FULL SUN, WARM (26.7°C/80°F and higher), low to normal humidity.

1st coat (4 mils/100 microns WFT) may dry sufficiently to apply 2nd coat in approximately 15 - 30 minutes.
2nd coat (4 mils/100 microns WFT) may dry sufficiently to apply 3rd coat in approximately 30 - 60 minutes.
3rd coat (4 mils/100 microns WFT) allow a full 72 hrs before being exposed to any rain, condensation or other moisture.

IN SHADE, CLOUDY DAY OR HIGH HUMIDITY

1st coat (4 mils/100 microns WFT) may dry sufficiently to apply 2nd coat in approximately 1-2 hours.
2nd coat (4 mils/100 microns WFT) may dry sufficiently to apply 3rd coat in approximately 2-3 hours.
3rd coat (4 mils/100 microns WFT) allow a full 72 hrs before being exposed to any rain, condensation or other moisture.

Full cure time is approximately 30 days for a typical 12 wet mils application, applied in three coats of 4 wet mils each, depending on climate, overall thickness of application, and humidity.

NOTE: The product does not reach full insulating ability until the full cure time is completed. Full cure time for a 3-coat coverage is approximately 30 days, depending upon overall thickness of application. See our FAQ section at www.nansulate.com/faq_nansulate.htm for testing tips and information regarding thermometers.

PAINTING OVER/COVERING THE COATINGS:

The product can be painted over with a water-based paint after it has dried for at least 72 hours. It can be painted over with a non-water-based paint after it has fully cured (approximately 30 days for a 6 mil/150 micron DFT (3-coat coverage), or 60-90 days for thicker coverages).

The product can be covered with tile, carpet, or other building material, after it has fully cured (approximately 30 days for a 6 mil/150 micron DFT (3-coat coverage), or 60-90 days for thicker coverages). Thicker coverages and higher humidity will increase dry and cure times. Application on warm or hot surfaces, and air movement (such as using fans) will decrease dry and cure times.

WEATHER CONSIDERATIONS:

Temperature and weather conditions are considerations for any exterior painting project. Weather conditions should be above freezing for at least 30 days after application. Optimum temperature for exterior painting is between 50°F-85°F (10°C-29°C). Rain is also a factor, you will want to check the weather forecast and choose a timeframe with no rain in the forecast for the day of and for three days after your planned application.

Apply only at temperatures above 50°F (10°C). Do not apply late in the afternoon or early evening when a heavy dew could develop on the coating surface before it completely dries.

IMPORTANT: Do not allow an application to be exposed to rain, condensation, or moisture during application or within the first 72 hours after application, nor be exposed to below freezing temperatures during the first 30 days after application. Either of these situations could cause loss of adhesion, peeling or flaking. Do not apply the coating over a wet or moist surface - the surface should be completely dry prior to application to ensure proper adhesion.

STEP BY STEP:

Application can be done with a brush, roller, or sprayer.

STEP 1:

Apply a first pass of 4 wet mils/100 microns to the entire substrate, measure wet film thickness immediately after applying the coating, note whether you need to increase, decrease, or maintain the pass thickness, and adjust accordingly to meet the applied wet film thickness of 4 mils/100 microns. Allow coat to completely dry to non-tacky (1-2 hours) before applying the next coat. Whenever possible, always apply the next coat in a cross-coat method to the previous coat.

STEP 2:

Apply your next pass at a thickness of 4 wet mils/100 microns to the entire surface, allow to completely dry to non-tacky.

STEP 3:

Apply additional passes at 4 wet mils/100 microns each until you have achieved your target film thickness. Allow each to dry completely to non-tacky prior to applying next pass.

NOTE: It is best to measure the applied wet film thickness as you are applying each coat.

Surface Preparation

Proper surface preparation must be done to ensure proper adhesion of the coatings. All surfaces must be clean, free of any residue, and dry prior to application.

<p>Roof Surfaces:</p>	<p>The roof should be pressure washed by a Roof Pressure Washing Professional prior to application to remove all dirt, grease, mildew, and other debris.</p> <p>Patch all cracks and seams.</p> <p>You should have a completely clean, dry and firm surface before any coating is applied. Make any necessary repairs or replacements to damaged or leaking roof materials. Avoid using cleaners with built-in wax or silicon additives since this may affect coating bond.</p> <p>Ponding Water: Any area of a roof where water may pond must be repaired by installing drains, or any means necessary to remove and prevent ponding water.</p>
<p>Painted/Coated Surfaces:</p>	<p>Ensure paint is not flaking or peeling. Remove all loose dirt, oil, grease or other contaminates. Abrade the surface prior to Nansulate® application if necessary.</p> <p>If applying over wood paneling or other surface with u/v cured or urethane coating use appropriate primer for that surface, which is compatible with water-based coatings. If you are painting Nansulate® over a pre-painted surface, make sure that the paint, coating, or sealant is compatible with a water-based acrylic latex. If it is not, then a suitable primer may be necessary (check with that product manufacturer for information).</p> <p>IMPORTANT: If you are unsure of the surface that you are overcoating, try Nansulate® on a small area first to ensure it is suitable for your application and has proper adhesion before coating a larger area. If painting over a non-water-based paint, you should test a small area for adhesion first by coating the area with three coats (1-2 hours dry time between each) and observing adhesion after 72 hours. Certain paints will not be compatible with water-based acrylic latex coatings, and require a suitable primer (such as Kilz or similar) to be used prior to coating Nansulate® over them.</p>
<p>Concrete and Porous Surfaces:</p>	<p>Concrete or other material should be fully cured. Be sure there is no moisture in the substrate that will escape after application, and interfere with proper adhesion of the coatings. Moisture escaping from the underlying surface causes loss of adhesion. Follow same surface preparation procedures as 'other surfaces'.</p>
<p>Glass/Smooth Non-Porous Surfaces:</p>	<p>Apply the first pass (1/2 coat) very thinly (approximately 2 wet mils) and allow to dry for 24 hours before applying the next coat. This can aid adhesion to these types of difficult to adhere to surfaces.</p>
<p>Other Surfaces:</p>	<p>Remove all loose contamination by wire brushing. Remove any dirt, oil, grease, etc. using a suitable cleaner/degreaser that does not leave a residue. Surface should be clean and dry.</p>

Limitations and Safety Precautions

Substrate must be structurally sound, cured and free of bond inhibiting contaminants.

During installation and initial cure cycle substrate and ambient air temperature must be at a minimum of 10°C/ 50°F. Substrate temperature must be at least 3°C/5°F above the dew point.

Nansulate® is not meant to be used in an underwater or submerged environment. For flat roofs where standing water is an issue, we suggest an alternate application on the interior ceiling.

Strictly adhere to published coverage rates.

Do not thin product with paint thinner, water or other medium.

DO NOT ALLOW PRODUCT IN THE CAN TO FREEZE.

SAFETY PRECAUTIONS

Follow all MSDS/label precautions even after container is emptied because it may retain product residues. Avoid contact with skin and eyes.

FIRST AID: In case of skin contact, flush with plenty of water. Remove contaminated clothing. Seek medical attention if irritation develops or persists. For eye contact, flush immediately with large amounts of water. Obtain medical treatment. If swallowed, DO NOT induce vomiting, obtain medical treatment immediately. If inhalation causes physical discomfort remove to fresh air. If symptoms persist, get medical help. **KEEP OUT OF THE REACH OF CHILDREN.** Wear gloves and goggles during application. For additional safety information, refer to Material Safety Data Sheet for this product. **IMPORTANT!** Spray equipment must be operated with care in strict accordance with manufacturer's instructions. Use of an approved dust/mist respirator during spray application is recommended. Wear approved dust respirator when grinding or sanding on cured product. Follow respirator manufacturer's directions for respirator use.

IN CASE OF SPILL: Keep material away from drains. Absorb with inert material and dispose of in accordance with applicable regulations.

DISPOSAL: Contains no chromium, lead or mercury. Consult your sanitation department for more information on disposal of empty containers. Disposal of waste containing free-liquids in landfills is prohibited. Contact your state-designated environmental agency for information concerning re-use, recycling or disposal of unused paint.

CLEAN UP:

Nansulate® coatings are water-based and cleanup can be done with soap and water. If coating is spilled or splashed, remove it at once, using water and mild detergent. Clean hands, brushes, rollers, tools and other equipment immediately after use in warm, soapy water.

WARRANTY:

You can find a full copy of product warranty information at www.nansulate.com or request a printed copy by calling 1-800-767-3998 or +1-239-254-0346.

Typical Painting Issues and Solutions

ISSUE	DESCRIPTION	POSSIBLE CAUSE	SOLUTION
Alligating	Patterned cracking in the surface of the paint film resembling the scales of an alligator.	1) Application of a top coat before the undercoat is completely dry.	Remove loose and flaking coating with a scraper or wire brush, sand the surface smooth. Thoroughly clean and dry surface. Reapply.
Blistering	Bubbles resulting from localized loss of adhesion and lifting of the coating film from the underlying surface.	1) Exposure of the coating film to moisture shortly after paint has been applied and/or before it has thoroughly dried.	Remove blisters by scraping and sanding. Thoroughly clean and dry surface. Remove source of moisture. Reapply.
Cracking/ Flaking	The splitting of a dry coating film through at least one coat. Begins as cracking of coating film which results in flaking.	1) Thinning or over spreading of the coating. 2) Inadequate surface preparation.	Remove loose and flaking coating with a scraper or wire brush, sanding the surface. Thoroughly clean and dry surface. Repaint. Ensure no thinning of the coating is being done.
Mud Cracking	Deep, irregular cracks resembling dried mud, in dry paint film.	1) Coating is applied too thickly, can occur with inexperienced use of airless sprayer. 2) Coating is allowed to build up in corners or crevices upon application.	Remove excess coating by scraping and sanding. Thoroughly clean and dry surface. Reapply.
Sagging	Downward drooping/movement of the coating immediately after application, resulting in an uneven coating.	1) Application of too heavy a coat. 2) Application in excessively humid and/or cool conditions. 3) Thinning of coating. 4) Airless spraying with the gun too close to the substrate being painted or moving the gun too slowly.	If coating is still wet, immediately brush out to redistribute the excess evenly. If the coating has dried, sand, thoroughly clean and dry surface, and reapply. The coating should be applied at its recommended spread rate: avoid "heaping on" the coating. Two coats at the recommended thickness are better than one heavy coat.
Wrinkling	Rough, crinkles in the coating surface, which occurs when uncured paint forms a "skin."	1) Coating applied too thickly. 2) Painting during extremely hot weather or cool damp weather, which causes the coating film to dry faster on the surface than under the surface. 3) Exposing uncured coating to excess moisture. 4) Painting over a contaminated surface (e.g. dirt or wax).	Scrape or same to remove wrinkled coating. Thoroughly clean and dry surface. Reapply.