Syneffex™
Effective solutions

CRYSTAL SHIELD™

Roof Insulation, UV & Mold Resistance Coating - Goes on Invisible with Results You can See

Application Handbook

APPLICATION SNAPSHOT

Step 1:
Power wash or rinse roof to remove dirt and allow to dry thoroughly.

Step 2:
Apply coat #1 of CrystalShield™ coating at 5 mils/127 microns

Step 3:
Allow to dry for 20 minutes to 2 hours, depending upon sun and humidity. Should be dry to touch, non-tacky.

Step 4:
Apply coat #2 of CrystalShield™ coating at 5 mils/127 microns

You re done!

Important Tips to Remember:

You can spot check thickness with a wet film thickness gauge. You can also gage proper thickness by ensuring you've used all the product estimated for your coverage area (225 S.F. (2.5 squares) per gallon @ 2-coat coverage)

Don't let the application get rained on in the first 30 minutes after last coat is dry.

Don't let the application be subject to freezing temperatures during the first 30 days.

METAL ROOFS: Since metal roofs tend to be more conductive, we recommend a coverage of 3-coats, each applied at 4-5 mils (100-127 microns) wet film thickness per coat for them.

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: Tile, Wood & Asphalt Shingles, Metal Roofs. FOR TILE ROOFS: CrystalShield™ can be used over "color through" tiles (have a matte, porous texture) but not slurry or glazed tiles (have a shiny surface). Can be used over flat roofs with good drainage. Designed to provide thermal insulation, energy savings, UV, moisture, and mold/bacteria/algae resistance

EQUIPMENT:

Preferred application method is by paint sprayer. Use either airless sprayer at low pressure, or HVLP (high volume low pressure) sprayer. If using roller application, use the shortest nap (about 1/4") so the coating doesn't get applied too thick.

CrystalShield™ roof coating 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:
Graco TrueCoat plus 2, UltraMax 2 1595, Titan 440i (or similar); Wagner/Spraytech hand held sprayers are suitable for small areas; Wagner Project Pro 115, or Paint Crew; Graco Minimax-battery operated.

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 0.017-0.019 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.

Roller equipment information: It is recommended to use a short nap roller cover - approximately 1/4", to ensure you do not apply the coating too thick. The most important factor in selecting a paint roller is the surface that is going to be painted. The smoother the surface, the shorter the nap; the rougher the surface, the longer the nap.

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. Do not scrape the mixer against the sides or bottom of the can or you may damage the nanocomposite.

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 CrystalShield™ corresponds to the following approximate thickness.

	Wet Film Thickness (WFT)	Dry Film Thickness (DFT)	
CrystalShield™ coating per coat	127 microns (5 mils)	24 microns (1 mil)	(19% 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 6 wet mils/152 microns in thickness. If you are experiencing cracking, peeling, whitening, or flaking while the application is drying or afterwards, this may indicate your coat application is too thick. If the coating is applied improperly, your warranty is voided.

	Non-Metal Roofs	Metal Roofs
Typical Application Wet Film Thickness (WFT)	10 mils/254 microns WFT (2 coats)	15 mils/381 microns WFT (3 coats)
Typical Application Dry Film Thickness (DFT)	2 mils/48 microns DFT (2 coats)	3 mils/72 microns DFT (3 coats)

DRY AND CURE TIMES:

The touch dry time between individual "coats" of approximately 5 mils (127 microns) in thickness is 20 minutes to 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, CrystalShield™ 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 60°F (15.5°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 (5 mils/127 microns WFT) may dry sufficiently to apply 2nd coat in approximately 15 - 30 minutes.
2nd coat (5 mils/127 microns WFT) allow a full 30 minutes after 2nd coat is touch dry (non-tacky) before being exposed to any rain, heavy condensation or other heavy moisture.

IN SHADE, CLOUDY DAY OR HIGH HUMIDITY

1st coat (5 mils/127 microns WFT) may dry sufficiently to apply 2nd coat in approximately 1-2 hours.
2nd coat (5 mils/127 microns WFT) allow a full 30 minutes after 2nd coat is touch dry (non-tacky) before being exposed to any rain, heavy condensation or other heavy moisture.

Full cure time is approximately 30 days for a typical 2-coat application, 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. See our FAQ section at www.Syneffex.com for further information.

PAINTING OVER/COVERING THE COATINGS:

The product can be painted over with a water-based, breathable paint after it has dried for at least 72 hours. It can be painted over with a non-water-based, non-breathable paint after it has fully cured for approximately 30 days.

The product can be covered with tile, carpet, or other building material, after it has fully cured for approximately 30 days. 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 your planned application.

Apply only at temperatures above 50°F (10°C).

Both the surface and the coating should not be lower than 10°C (50°F) during application or the coating may dry more opaque (whitish) rather than clear.

IMPORTANT: Do not allow an application to be exposed to rain, heavy condensation, or heavy moisture during application or within the first 30 minutes after the last coat has dried to touch (non-tacky), 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:

STEP 1:
Thoroughly clean and dry roof surfaces. See "Surface Preparation" on next page for full details.

STEP 2:
Apply a first coat pass of 5 wet mils/127 microns to the entire substrate. If using spray application, it is recommended to use a roller to evenly smooth the sprayed coating immediately after spraying, while coating is still wet, over roofs where roller application can be used effectively. 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 5 mils/127 microns.

STEP 3:
Allow coat to completely dry to non-tacky (20 minutes to 2 hours) before applying the next coat. Whenever possible, always apply the next coat in a cross-coat method to the previous coat.

STEP 4:
Apply second coat pass at 5 wet mils/127 microns to the entire substrate until you have achieved your target film thickness. Follow same guidelines as listed in Step 2.

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.

Roof Surfaces:	The roof should be pressure washed or rinsed by a professional prior to application to remove all dirt, grease, mildew, and other debris. Patch all cracks and seams. 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. **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.
Painted/Coated Surfaces:	Ensure paint is not flaking or peeling. Remove all loose dirt, oil, grease or other contaminates. Abrade the surface prior to CrystalShield™ coating application if necessary. 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 CrystalShield™ 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). IMPORTANT: If you are unsure of the surface that you are overcoating, try CrystalShield™ 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 CrystalShield™ coating over them.
Concrete and Porous Surfaces:	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'.
Glass/Smooth Non-Porous Surfaces:	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.
Other Surfaces:	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.

LIMITATIONS AND SAFETY PRECAUTIONS

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

CrystalShield™ roof coating 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.

Do not apply to slurry or glazed tiles (shiny surface).

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:
All Syneffex™ 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.Syneffex.com or request a printed copy by calling 1-800-858-3176 or +1-303.228.3701.

TYPICAL PAINTING ISSUES AND SOLUTIONS

ISSUE	DESCRIPTION	POSSIBLE CAUSE	SOLUTION
Alligatoring	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.

ISSUE	DESCRIPTION	POSSIBLE CAUSE	SOLUTION
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.