Coating Fundamentals

Dan White, APOC Technical Product Manager

We know why we coat roofs. Roof coatings protect the existing roof from Mother Nature. They can cool the roof surface in warm climates or build surface heat in cooler environments. Coatings can adhere granules or gravel broadcast on the surface. And they can improve the roof aesthetics and/or change the roof color with pigmented coatings.

We also know what not to coat and under what conditions. We know that Florida skies can unleash unexpected showers and wash away uncured coatings, and that a North Florida freeze can wreak havoc too. Not every roof is a candidate for coating and some can be coated, but with a caveat of course. See the coating chart below for some examples in which coating is not an option and be aware of other special circumstances that may pertain to your projects.

Test, Test, Test

Unless you were born with supernatural powers or inherited a crystal ball, it's important to test the roof being considered. Non-destructive tests include infrared scan, nuclear, vectoring and capacitance. Drones are great at capturing key images and newer digital technology can make measurements a breeze. Never underestimate the value of a thorough visual walk through, with notes and photos.

A peel adhesion test, while a little more involved, helps to determine the viability of coating solutions and gives you a built-in opportunity for a follow up. You have to come back in a few days to complete the peel test, right? And then there's the core cut. While destructive, core cuts can be an eye opener. They can help to verify the moisture survey, reveal the quality of the membrane and allow for confirmation of how many layers of roofing actually exist.

The 4 P's

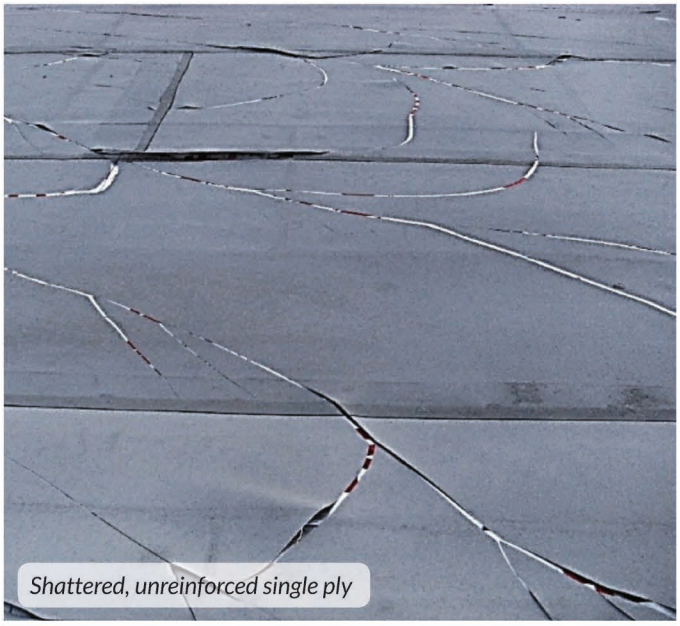
Prep – Proper preparation helps to ensure good adhesion of both the repair products and the roof coating. It's important to remove surface contamination – oxidation, dirt, dust, debris, pollen, algae, loose granules, grease, rust and incompatible existing coatings. In some cities, roofers aren't allowed to power wash so brooming and blowing is the default prep. Roof surface cleaning is similar to cleaning your car – a water hose alone will not remove grime. Ideally, power washing with appropriate cleaning agents should be completed.

Prep also can include removal of wet insulation, unused and obsolete equipment and pipes. If more than 20 percent of the roof insulation is wet, the owner should be given a reroof option, a requirement if deck and structure is to be repaired.

Prime – NRCA Guide to Roof Coatings Chapter 5 explains the importance of peel tests and outlines how to perform them. Peel testing should be done BEFORE bidding a project since the test reveals the quality of the membrane and adhesion strength of the intended primer. Most single plies and rusted metal should be primed. "Bleed blocking" primers are typically used to reduce discoloration when silicone coatings are applied over asphalt roofs. An adhesion failure indicates a failed primer and other options should be considered. A cohesive failure within the coating is a "pass," indicating that the primer bond is stronger than the coating itself.

Patch – Plenty of repair products have been designed to effectively stop leaks, some of them in the rain. A few weeks ago, my own organic BUR roof developed two, 4'

ROOF TYPE	POTENTIAL ISSUES	NOTES
Metal with Rust Holes	Unsafe	
Kynar coated metal	Peeling	Peel Testing Required
Single Plies with Exposed Polyester	Cracking, Shattering & Blistering	
Ponded water areas	Deterioration	Affects Acrylic & Aluminum
Gravel	Voids & Blisters	Unless all gravel is spudded
Grease Covered (Restaurant)	Adhesion	Unless EXTREME cleaned
Asphalt Shingles	Condensation	See ARMA position
Concrete and Clay tile	Blistering & Adhesion	
2+ Roof Layers	Code Requirements, Safety, Difficult to Find Leaks	



Shattered, unreinforced single ply

long splits, allowing water to drip into a bedroom. During the tropical storm, I was able to make immediate repairs using a wet and dry modified silicone flashing sealant. The leaks stopped immediately and the sealant was fully cured by the next morning. Unlike asphalt flashing cement, these newer products set up faster and better resist the reopening of a split. Even so, when the sun returned, I returned to the roof for a more permanent three-course repair using polyester reinforcement. Never underestimate the value of reinforcement!

On that topic, polyester reinforced tape should be a staple in roofing trucks everywhere. It is self-adhered, sticks to most substrates and may be coated with flashing cements or coatings for a more permanent repair. All the major coating categories have compatible brush or trowel grade flashing materials – silicone, acrylic, aluminum, asphalt, SEBS and urethane.

Patching products are effective only if the contractor can find the source of the leak. If not, sometimes desperation kicks in and coatings are used to flood entire areas of the roof in the hopes that the split, puncture or cut will be sealed. While this could buy time for the building owner to secure re-roof funding or for other considerations, it's not a long-term solution.

Protect – After the leaks have been stopped with reinforced patches and tapes, the roof is ready for a protective coating. Which coating should I use? Acrylic or silicone, asphalt-based aluminum or SEBS?

There's a huge performance gap between a reinforced coating and one that is not reinforced. In most cases, a reinforced coating restoration will still be less costly and time-consuming than a roof tear off over occupied space. Many of the roofing disasters of the last 100 years are the result of manufacturers or contractors reducing the number of plies in a system, cheapening the strength of a ply or worst of all, removing the reinforcing plies altogether. Ask a roofer over 60 if he remembers Trocal, GRM or Bond Ply.

Twenty years ago, roofing industry icon Dick Fricklas lamented in articles and interviews that the industry had transitioned from a four-ply coated felt system to two-ply. History revealed those systems to be under-engineered and yet the strategy to avoid reinforcement remains.

For a general guide to different substrates see the chart below. Slopes less than 1/2-inch may have ponding water and can potentially be coated with silicone. Slopes of 1/2-inch or greater pose a greater slip hazard, so there's a strong case for avoiding silicone.

Checklist for Preventing Coating Failures

Involve the owner. What type of visibility does the roof have and will they be concerned about the aesthetics of it? Does the building have a lot of visitors, or massive bay doors that remain open during business hours or outdoor customer break areas? In that case, they might be sensitive to product odors. Building decision makers need to know about cure times, length of the project and expected service life, and there are a number of other considerations too. Learn what the decision makers need, want and expect. Then educate them and provide relevant choices along the spectrum of repair vs. good, better, best and restoration. Or do they need to replace? You have the answers and are in the best position to drive consideration. The tendency is to grab the most economical option. As a contractor, it's in your best interest to provide realistic expectations. Educate the client and show them the differences. Simple project profiles can be a very powerful tools for your client. Don't forget to keep documentation of those communications and the client's decisions, and to include future considerations for maintenance and inspections.

SUB-STRATE	SLOPE	PRIMER	REINFORCEMENT	RECOMMENDED COATING
Single-ply	> or = 1/2	Yes	Seams w/ Fleece Tape	Acrylic
Single-ply	< 1/2	Yes	Seams w/ Fleece Tape	Silicone
BUR	> or = 1/2	Not needed	Field w/ Polyester	Acrylic
BUR	< 1/2	Not needed	Field w/ Polyester	Silicone
APP	> or = 1/2	Not needed	Seams w/ Polyester	Solvent-Based Aluminum
Metal	> or = 1	Rusty areas	Vertical Seams w/ Fleece Tape	Acrylic

Involve the manufacturer and distributor. Ask the manufacturer for their expertise in matching the best system for your particular project. There is a wealth of information on product labels and data sheets. Can't find the information you need? Call the manufacturer and ask for Technical. This is the next best thing to having a factory rep on your roof. Send the rep photos and basic information about the project – existing roof type, slope, height, building use, size, location and timeframe for application. Use their expertise to your advantage.

Take advantage of manufacturers' training too. If there's not a training event scheduled in your neck of the woods, ask for one. A trained employee is a benefit to you, your client, to the manufacturer – to everyone involved!

Most of the time we're in waiting mode, but what happens when we get the thumbs up to move quickly on a project? Contact your distributor in advance and make sure you know the latest lead times on the products you want and need. And don't accept substitutions unless you are familiar with the substituted product and know it will perform to your satisfaction.

Save yourself some headaches.

- Follow prep and application specifications to the letter – including peel adhesion tests.
- Find and fix the leaks first with repair mastics, plies and reinforcements.
- Don't mix polymer families – use silicone patches with silicone coatings, asphalt cement with asphalt-based aluminum coatings, and pair acrylic patching cements with acrylic coatings.
- Negotiate maintenance and warranty terms in advance and promote your maintenance program. A comprehensive maintenance program provides you with recurring revenue and helps maintain the viability of the roof.

As a Technical guy, it's really rewarding to transform a dangerous, leaking roof into a beautiful, fully functional building component. And of course, time is money and labor is tight. Therefore, the best strategy in roof restoration and coating is always to install the right coating system for the substrate, slope, conditions and client.

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Dan White is Technical Product Manager for APOC. Over the course of his 35-year roofing career, Dan has worked in contracting, consulting and as a manufacturers rep. As former chairperson for the Roof Coatings Manufacturers Association (RCMA) Technical Affairs Committee, he served as the liaison between the RCMA and the National Roofing Contractors Association (NRCA) to revise the NRCA coating manual. He has served as a presenter at a number of national and regional roofing conferences and holds two patents. Prior to joining the roofing industry, Dan was involved in design-build of 'super-insulated' and earth sheltered buildings. Dan joined APOC in 2005.