SPECIFICATION AND INSTALLATION OF COLD FLUID-APPLIED COATINGS FOR PEDESTRIAN TRAFFIC

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There are many factors that must be considered and addressed to achieve a successful application of a cold fluid-applied pedestrian traffic coating. To achieve a successful application, a suitable product must be specified, along with appropriate detailing, and the product installation must comply with the project and manufacturer requirements.

PRODUCT SELECTION

To select an appropriate product, it is helpful to begin by identifying the specific objectives and constraints for the particular pedestrian traffic coating project. Once all the project objectives and constraints have been clearly identified, a pedestrian traffic coating can be selected that best meets the project requirements.

The following are some typical objectives, constraints, and questions to consider:

1. **Waterproofing**: Does the traffic coating need to serve as a waterproof barrier? Although pedestrian traffic coatings are most often installed for the functional purpose of waterproofing and protecting a substrate, sometimes a coating may be installed strictly for aesthetic reasons.

2. **Chemical Resistance**: What chemicals may the coating be exposed to, and does the specified product have testing to confirm appropriate resistance?

3. **Substrates**: What substrates will the coating be applied to? Can the coating achieve adhesion to the intended substrates? What surface preparation is necessary? Is a primer needed?

4. **Service Temperature**: What temperature range will the coating see when in service, and is the coating suitable for the intended temperature range?

5. **Manufacturer/Material Track Record**: Do the manufacturer and the specific material have a successful track record?

6. **Installer Qualifications**: Does the manufacturer require installer training and certification, or can anyone purchase and install the product?

7. **Installation Temperature**: What air temperature and substrate temperature ranges are necessary for a successful application?

8. **Initial installed cost**: What is the initial installed cost for the selected coating system? Does this meet project budget constraints?

9. **Maintenance**: What maintenance will be required, and at what frequency? What are the expected life-cycle maintenance costs?

10. **Warranty**: What warranty does the manufacturer offer?

11. **Physical Wear**: What physical wear will the coating be subjected to, and does it provide suitable abrasion resistance for the expected wear?

12. **Cure Time**: How long does the coating need to cure before it can be put into service?

13. **Color/Aesthetics**: What color and finishes are available? Does the color meet the project’s aesthetic goals?

14. **Volatile Organic Compound (VOC) content**: What is the VOC content of the material? Is this accept-
able for the project? Will the product be installed at an existing facility or in a confined space where off-gassing is not acceptable?

INDUSTRY STANDARDS

There are several industry standards that can be helpful in the evaluation and comparison of pedestrian traffic coatings. (A list of some common standards is provided in a sidebar on page 26.) Unfortunately, not all manufacturers use the same set of test standards, which can make side-by-side evaluation of materials challenging. In general, test data for criteria important to the project should be provided by the manufacturer and reviewed by the designer to ensure the product is suitable for the intended application. If a manufacturer cannot provide necessary test data, the product should not be specified.

A useful resource for side-by-side comparison of materials is the SWRI Sealant Validation Program. The SWRI Sealant Validation Program is an independent program, which requires independent testing for validation of manufacturer-stated material properties and results in the granting of an SWRI Institute Validation Seal, which provides the test data in a clear, concise, and consistent manner. The SWRI program can be useful in providing an “apples-to-apples” comparison of materials.

TYPES OF COATINGS

Cold fluid-applied pedestrian traffic coatings generally fall into two main categories: liquid urethane, and PMMA resin-based coatings. Although most manufacturers will allow the use of liquid urethane pedestrian coatings over occupied spaces, these coatings are generally not preferable for roofing applications, especially when they are not protected by a wear surface such as ceramic tile. Resin membrane systems such as polymethyl-methacrylate (PMMA) membranes are generally harder, with better physical damage and degradation due to ultraviolet exposure, making them more durable than liquid urethanes. PMMA membranes are a suitable choice for pedestrian coating applications over occupied space. However, they typically have lower flexibility than urethanes, so it is important to consider the flexibility of the substrate before specifying a PMMA membrane. Although liquid urethanes cost substantially less than PMMA membranes, they are generally less durable than PMMA membranes.
COMMON INDUSTRY STANDARDS FOR COATINGS


4. ASTM D1004, Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting. Used to evaluate tear resistance.


Urethane Coatings

Liquid urethane coatings are available in several varieties, including single-component, solvent-based, moisture-cured formulations; water-cured formulations; and multi-component, fast-cure formulations. (See Figures 1 and 2.) Liquid urethanes are available in low-VOC formulations, which are recommended for use in nonvented spaces and other projects with low VOC requirements.

Most liquid urethane coating assemblies consist of two to three layers. The base layer is typically a liquid urethane, which comprises the primary waterproofing membrane. The intermediate layer is typically a liquid urethane, which is loaded with an aggregate for slip resistance (either pre-mixed or broadcast into the intermediate coat). The top coat is typically an aromatic or aliphatic liquid urethane, which provides toughness and durability to protect the base layer.

In two-coat systems, the aggregate is embedded into the top layer. Urethane coatings generally have a service life of five to eight years (depending on wear exposure), at which point the coating can be renewed by application of a new top coat. Urethane coatings are typically available in a limited number of manufacturer standard color options. Some manufacturers offer tint packs, which can be used to field-mix colors. Other manufacturers offer custom colors, but this is typically only economically feasible for larger projects.

PMMA Resin Coatings

PMMA coatings (Figures 3 and 4) are typically comprised of multiple layers. The base resin coating layers form the waterproofing for most PMMA systems. The intermediate layers provide protection to the waterproofing layer, and a colored finish layer provides the aesthetic wear surface. Quartz chips can also be added to the finish coat.

PMMA systems are available as fleece-reinforced or nonreinforced systems. Fleece-reinforced systems are typically specified for use over occupied space. PMMA systems typically have a service life of 15 to 20 years (depending on wear exposure), at which point the system can be renewed by application of new top coat material. PMMAs offer a wide range of color and finish options. PMMAs have a strong odor due to their chemical composition, and caution should be taken to ensure appropriate ventilation.
during curing. PMMAs are also very sensitive to surface preparation, and additional care should be taken to ensure proper surface preparation with PMMA membranes.

**DETAILING AND INSTALLATION OF COATINGS**

Successful coating application requires proper attention to specifications and detailing. Typical specification requirements and details that should be provided include the following:

1. Preparation of substrates (broom finish, shot-blasting, etc.)
2. Preparation and treatment of substrate cracks
3. Use of primers
4. Wet-mil thickness requirements for each membrane layer
5. Minimum required dry-mil thickness for the complete membrane system. Specifying average thickness is not recommended, as it is virtually impossible to reliably establish an average thickness measurement for a coating with aggregate.
6. Deck edge/balcony edge details
7. Deck-to-wall interface details
8. Drain details
9. Other project-specific details

Most manufacturers have a library of standard details that can be used for many typical project conditions. Job-specific details and conditions should be reviewed with a manufacturer’s technical representative to confirm acceptance of the detailing for warranty purposes. Many manufacturers will also provide project-specific details on request.

**FIELD QUALITY ASSURANCE**

Proper attention to field quality assurance measures is key to a successful installation. The following are recommended measures to ensure a quality installation:

1. Require submittals from the installer, including shop drawings and product data.
2. Conduct a pre-installation meeting to review detailing and installation requirements.
3. Require mock-ups (either stand-alone or in-situ as part of the completed work).
4. Review substrate after surface preparation to check for substrate
defects and cleanliness.
5. Conduct field adhesion tests per ASTM D4541.
6. Require confirmation of coating thicknesses through the use of wet mil thickness measurements.

7. Conduct water testing (nozzle testing and flood testing as applicable).

CONCLUSION

There are many factors to consider when choosing a cold fluid-applied pedestrian traffic coating. The two main coating material types are liquid urethane and PMMA resin. Liquid urethanes offer lower initial cost and better material flexibility, while PMMA membranes offer a longer service life and a wider range of aesthetic finish options. Regardless of the membrane selected, proper specifications, details, installation, and field quality assurance are key elements to a successful coating project.

Figure 4 – PMMA hallway coating with multicolored finish pattern (courtesy Soprema).

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