THIN POLYMER OVERLAY

**From Jericho STP FTBR(3)

xx. DESCRIPTION. This work shall consist of furnishing and applying a thin polymer overlay at the locations shown on the Plans and as directed by the Engineer.

xx. MATERIALS.

(a) General. The Contractor shall have the option of using any of the polymer overlay systems included in this specification, with the exception that only one system may be used on any one structure.

(b) Thin Polymer Overlay for Vehicular Traffic. Materials shall be one of the following systems or approved equal:

(1) FLEXOLITH. This overlay shall consist of any epoxy type polymer binder and aggregate, all as manufactured by Tamms/A.C. Horn Industries Company, 7405 Production Drive, Mentor, OH 44060.

(2) TRANSPO T18. This overlay shall consist of methyl-methacrylate polymer concrete and aggregate (PCMMA) as manufactured by Transpo Industries, Inc., New Rochelle, NY 10801-6024.

(3) BRIDGEMASTER. This overlay shall consist of methacrylate based polymer concrete, as manufactured by Stirling Lloyd Products Inc., 420 Sackett Point Road, Unit 4A, North Haven, CT 06473.

(c) Thin Polymer Overlay for Pedestrian Traffic. Materials shall be one of the following systems or approved equal:

(1) FLEXOLITH. This overlay shall consist of any epoxy type polymer binder and aggregate, all as manufactured by Tamms/A.C. Horn Industries Company, 7405 Production Drive, Mentor, OH 44060.

(2) TRANSPO T18. This overlay shall consist of methyl-methacrylate polymer concrete and aggregate (PCMMA) as manufactured by Transpo Industries, Inc., New Rochelle, NY 10801-6024.

(3) BRIDGEMASTER. This overlay shall consist of methacrylate based polymer concrete, as manufactured by Stirling Lloyd Products Inc., 420 Sackett Point Road, Unit 4A, North Haven, CT 06473.

(4) TRANSPO T48. This overlay is a two-component, polysulfide epoxy-based blended material that may have an aggregate cast into it, as manufactured by Transpo Industries, Inc., New Rochelle, NY 10801-6024.

(d) Samples. Samples of materials for all of the components of the overlay system, excluding patching material, shall be submitted by the Contractor to the Agency's Materials and Research Engineer prior to overlay application, if requested. Samples shall be representative of the materials to be used in the overlay application and shall consist of a 3.8 liter (1 gallon) sample of each liquid component and a 2.3 kg (5 pound) sample of each dry component.

(e) Packaging and Shipment. A Material Safety Data Sheet shall be furnished prior to use for each shipment of polyester resin binder and high molecular weight methacrylate resin. All components shall be shipped in strong, substantial containers, bearing the manufacturer's label specifying date of manufacture, batch number, brand name, quantity, and date of expiration or shelf life. In addition, the mixing ratio shall be printed on the label of at least one of the system components. If bulk resin is to be used, the Contractor shall notify the Engineer in writing 10 days prior to the delivery of the bulk resin to the job site. Bulk resin is any resin that is stored in containers in excess of 209 liters (55 gallons).

(f) Aggregate. Aggregate type, gradation, and volume shall be as specified by the overlay system supplier.

(g) Basis of Acceptance. Project acceptance of thin polymer overlay materials will be based on the following:

(1) Delivery of the overlay materials to the project site in acceptable containers bearing all the label information as required in this specification.

(2) Agreement of the Engineer that the overlay system chosen by the Contractor is appropriate for the intended use.

(3) Test patch shall achieve 1.7 Mpa (250 psi) minimum bond strength as tested according to ACI 503R-93, Appendix A.

See CONSTRUCTION REQUIREMENTS, part (e) of this Section for additional requirements.

(h) Certification. A Type D certification shall be furnished in accordance with Subsection 700.02.

xx. CONSTRUCTION REQUIREMENTS.

(a) General. At least (10) days prior to the start of any work, the Contractor shall provide the Engineer with two (2) copies of the manufacturer's written instructions for the application of the overlay system for information only.

A manufacturer’s technical representative, knowledgeable in all aspects of polymer overlays, shall be made available on the project for up to five (5) working days to make recommendations.

During surface preparation and blast cleaning work, precautions shall be taken to assure that traffic and the environment are protected from rebound and dust. Furthermore, the Contractor shall control blast cleaning of concrete such that the concrete dust shall not cause a hazard to traffic, pedestrians, work places, and homes. Reasonable precautions shall be taken with this operation at all times. All particles of sand and concrete shall be captured, picked up, and properly disposed of, and shall not be allowed to enter any stream.

During overlay application, the Contractor shall provide suitable coverings (e.g. heavy duty drop cloths) to protect all exposed areas not to be overlaid, such as curbs, sidewalks, parapets, posts, etc. Any damage or defacement resulting from this application shall be cleaned and/or replaced to the satisfaction of the Engineer at no additional cost to the Agency.

(b) Storage of Materials. All materials shall be stored in accordance with the manufacturer’s recommendation to ensure their preservation until used in the work. Applicable fire codes may require special storage facilities for some components of the overlay system.

(c) Equipment.

(1) Surface Preparation. All equipment to be used for surface preparation shall be as specified by the overlay manufacturer and approved by the Engineer. Unless otherwise specified, the Contractor shall use automatic shot blasting units to prepare all concrete surfaces. In those areas not accessible to this machinery, the surface may, with the approval of the Engineer, be cleaned with sandblasting equipment. It may take multiple sandblasting passes to achieve the same surface texture as those areas shot blasted.

(2) Application. The equipment used for proportioning, mixing, and applying overlay materials shall meet the overlay manufacturer's requirements and shall be approved by the Engineer. The proportioning equipment shall be adjustable so that mixing ratios may be altered to accommodate temperature fluctuations.

(3) Finishing. Screeding shall be performed as recommended by the overlay manufacturer. Screeds shall be approved by the Engineer prior to the application of the overlay.

(d) Surface Preparation. All structural slab surfaces and other surfaces shall be prepared as follows:

(1) The edges of all spalled areas to be repaired shall be saw cut in straight lines to a minimum depth of 25 mm (1 inch) and the unsound concrete removed. These spalled areas shall be repaired as specified herein. Surface defects, other than spalled areas, shall be repaired with patching material in accordance with the recommendations of the overlay manufacturer. This work shall be performed to the satisfaction of the Engineer.

(2) The material used to repair concrete surface prior to the overlay application shall be compatible with the overlay system chosen. The patching material shall meet the requirements of Section 501 for Concrete, High Performance Class AA, or as recommended by the overlay manufacturer, and shall be approved by the Structures Engineer prior to commencement of any work.

There shall be no visible moisture present on the surface of the concrete at the time of thin polymer overlay application. Immediately prior to overlay application, the concrete surface will be tested for moisture using a transparent polyethylene sheet (4 mil) in accordance with ASTM D 4263. A 600 mm (24 inch) x 600 mm (24 inch) plastic sheet shall be taped to the surface to be overlaid. All edges shall be sealed with tape that shall stick to the concrete substrate and shall not allow the infiltration of air. The plastic sheet shall be left in place a minimum of two hours to detect the presence of moisture in the concrete. There shall be no moisture visible on the plastic sheet after the minimum time period has elapsed, as verified by the Engineer. This test shall be performed at each concrete repair patch location and also once per concrete surface section location as determined by the Engineer.

At least ten {10) days prior to the start of any work, the Contractor shall submit, to both the Engineer and the Agency's Materials and Research Engineer, a written identification of the patching material proposed for use. At a minimum, this identification shall include the physical characteristics, the directions for use, and the directions for curing of the patching material.

(3) After the patching material has completely cured, all concrete surfaces shall be blast cleaned using the equipment and procedures recommended by the overlay manufacturer. At no time will wet blasting be allowed.

(4) Wherever the overlay will abut transverse steel expansion joints, open steel grates, or scuppers, the existing structural slab concrete shall be removed to a depth equal to the thickness of the overlay or 10 mm (3/8 inch), whichever is greater. This removal shall extend a minimum of 610 mm (2 feet) in all directions, on all surfaces to be overlaid. The method and extent of concrete removal shall be as shown on the Plans and as directed by the Engineer.

Concrete removal shall not be required on structural decks consisting of concrete filled steel grids. If the Engineer determines that a smooth transition over joints, etc. is required, the overlay shall be feathered at joints, grates, and scuppers. Feathered edges shall have a minimum thickness of 3.5 mm (1/8 inch) at their termination edge. The length of transition taper shall be as shown on the Plans or as directed by the Engineer.

(5) All steel surfaces that will be in contact with the overlay shall be cleaned in accordance with SSPC-SP No. 10, Near-White Blast Cleaning, except that wet blasting method will not be allowed.

After cleaning and concrete removal operations are complete, there shall be no visible evidence of oil, grease, dirt, rust, loose particles, spent abrasive, or other foreign material on any of the surfaces to be overlaid.

(e) Application. On any portion of the concrete surface, not more than 24 hours shall elapse between the completion of surface cleaning and overlay application. If the overlay is not applied within 24 hours, the concrete shall be recleaned to the satisfaction of the Engineer. No additional payment will be made for recleaning work.

The application of the polymer overlay shall be performed in accordance with the manufacturer's written instructions. Materials shall be applied only to visibly dry surfaces and when surface and ambient temperatures are above 4°C (40° F) and below 38°C (100° F).

Screeding shall be performed continuously to avoid producing an uneven surface.

Termination edges of the overlay may require application and finishing by hand trowel due to obstructions, such as a curb. All hand troweling shall be followed by broadcasting aggregate and/or surface texturing to provide acceptable surface friction characteristics.

Provisions shall be made to protect expansion joints, scuppers, and weep tubes by masking or other approved methods which will ensure that none of the polymer seeps into or contaminates these openings.

A test patch shall be done prior to constructing the overlay. One or more trial overlays shall be placed on the production concrete surface to determine initial set time and to demonstrate the effectiveness of the mixing, placing, and finishing equipment proposed as well as curing period. Each trial overlay shall be at least 3.0 m (10 feet) wide, at least 1.8 m (6 feet) long, and the same thickness as the overlay to be constructed. Conditions during the construction of the overlay and equipment used shall be similar to those expected and to be used for the construction of the polyester concrete overlay. If the cleaning practice, materials, and installation procedure are not acceptable, the Contractor must remove the failed test patches and make the necessary adjustments and test all test areas at no additional cost to the Agency until satisfactory test results are obtained.

The test patch shall have a minimum bond strength of 1.7 MPa (250 psi) as determined by ACI 503R-93, Appendix A to assure that the overlay adheres to the prepared surface.

If the test patch passes, the bond strength test area will be repaired as recommended by the overlay system supplier and the remainder of the undisturbed test area may be incorporated into the accepted work. If the test patch area fails, all material used in the trial overlay shall become the property of the Contractor and shall be disposed of at no additional cost to the Agency. The Contractor will need to redo the surface preparation procedure and complete another test patch.

(f) Surface and Thickness Requirements. The overlay surface will be checked at random by the Engineer during the application of the overlay to assure that no depressions exist that will pond water. The surface shall be tested with a straightedge not less than 3 m {10 feet) long. The straightedge shall be placed in contact with the overlay surface in successive positions parallel to and perpendicular to the centerline of the structure. If the existing concrete surface is parabolic, the straight edge test shall not be used across the parabolic. All depressions greater than 5 mm (3/16 inch) shall be repaired after the overlay hardens in a manner recommended by the manufacturer and approved by the Engineer.

To ensure adequate pavement friction, the completed overlay surface shall be free of any smooth or "glassy" areas, such as those resulting from insufficient quantities of surface aggregate. Any such surface defects shall be repaired in a manner recommended by the manufacturer and approved by the Engineer.

A minimum of a 2-coat system shall be used. One coat may be the primer. Thickness of the overlay shall be checked prior to its initial set using a ruler or other method recommended by the overlay system supplier. If the Engineer determines that the minimum thickness has not been

attained, an additional layer shall be applied after the overlay hardens. This layer shall be a minimum of 6 mm (1/4 inch) thick and shall be applied at the Contractor's expense. Ruler depressions shall be promptly repaired by the Contractor.

(g) Curing. The polymer overlay shall be allowed to reach final cure before subjecting it to traffic or loads of any nature that may damage it. Cure time is dependent upon the ambient and deck temperatures. Actual curing time, degree of cure, and suitability of the overlay for traffic shall be as recommended by the manufacturer and approved by the Engineer, but at no time shall it be less then 4 hours after finishing.

xx. METHOD OF MEASUREMENT. The quantity of Special Provision (Thin Polymer Overlay) to be measured for payment will be the number of square meters (square feet) placed in the complete and accepted work.

xx. BASIS OF PAYMENT. The accepted quantity of Special Provision (Thin Polymer Overlay) will be paid for at the Contract unit price per square meter (square foot). Payment will be full compensation for furnishing, transporting, handling, and placing the materials specified; performing final surface preparation, including concrete repairs where required; providing all necessary environmental and worker protection of adjacent area surfaces and materials; providing a manufacturer's representative, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
900.675 Special Provision (Thin Polymer Overlay)	Square Meter (Square Yard)