

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
PROTECTIVE OVERLAY FOR PAVEMENT AT SNOWMOBILE TRAIL CROSSINGS

STM:JD

1 of 4

APPR:TES:KPK:01-13-21

FHWA:APPR:01-20-21

a. Description. This work consists of preparing substrate and installing a protective overlay for pavements at snowmobile trail crossings in accordance with the standard specifications and this special provision.

b. Materials. Provide general certification per the MDOT's *MQAP Manual* to the Engineer that the materials meet the requirements specified herein.

1. Portland Cement Concrete Substrates. For snowmobile trail crossings on Portland cement concrete substrates, use a two component, 100 percent solids epoxy overlay system. Ensure containers are marked clearly "Part A" or "Part B". The epoxies that are approved are shown in Table 1. Ensure aggregate meets the gradation requirements in Table 2 and has hardness of seven or higher on the Mohs hardness scale. Ensure aggregate is angular, consists of natural silica sand, basalt, or other nonfriable aggregate, and contains less than 0.2 percent moisture when tested in accordance with *ASTM C566*.

Unless otherwise approved, ensure the aggregate is chosen from an approved supplier from Table 3.

2. Hot Mix Asphalt (HMA) Substrates. For snowmobile trail crossings on HMA concrete substrates select the protective overlay system from the following list of approved materials or a Department approved equal:

<u>Material</u>	<u>Supplier/Approved Contractor</u>
ViaTherm E400 Series	Geveko Markings

c. Construction. Use one of the following processes when placing a new protective overlay.

1. Surface Preparation for Portland Cement Concrete Substrate. Immediately prior to application of the protective overlay, clean the entire concrete surface by shot blasting to remove all materials that may interfere with the bonding or curing of the protective overlay. Ensure the prepared concrete surface meets the *International Concrete Repair Institute Guideline No. 03732*, concrete surface profile (CSP) 7. Ensure mortar which is sound, and sufficiently bonded to the coarse aggregate, has open pores due to cleaning to be considered adequate for bond. Ensure traffic paint lines and tining are removed. Use a vacuum cleaner or oil-free moisture-free air blast to remove all dust and other loose material. Brooms are prohibited.

Do not place the protective overlay on concrete patches less than 28 days of age. The Engineer must inspect and approve patching and cleaning operations prior to placement of

the protective overlay. Remove any contamination of the concrete surface, or to intermediate courses, after initial cleaning. Ensure both courses are applied within 24 hours following the final cleaning and prior to opening area to traffic. Ensure there is no visible moisture present on the surface of the concrete at the time of application of the epoxy overlay. Tape an 18 inch by 18 inch piece of transparent polyethylene sheet (4 mil) to the concrete substrate in accordance with *ASTM D4263*. Seal all edges with tape that will stick to the concrete substrate. Leave the plastic sheet in place for a minimum of 3 hours or the manufacturer's recommended cure time for the conditions, whichever is longer. Ensure there is no moisture visible on the polyethylene sheet. Ensure alternate methods to detect moisture are approved by the Engineer.

Protect utilities, drainage structures, curbs, bridge expansion joint systems, and any other structure within or adjacent to the protective overlay. Ensure the protection is removed once the epoxy and aggregate has been applied and prior to initial set. Ensure removing the protection is done soon enough to in no way harm the adjacent protective overlay. Ensure protection is applied again prior to the second coat and removed again prior to initial set as to not damage adjacent surfaces. Ensure the protection meets the approval of the Engineer.

2. Application. Ensure handling and mixing of the epoxy resin and hardening agent is performed in a safe manner to achieve the desired results in accordance with the manufacturer's recommendations for a two-coat system or as directed by the Engineer. Do not place protective overlay materials when surface is less than 50 degrees Fahrenheit (F) or ambient air temperature is forecast to fall below 50 degrees F within 8 hours after application. Do not place protective overlay materials if weather or surface conditions are such that the material cannot be properly handled, placed, and cured within the manufacturer's requirements and specified requirements of traffic control.

Apply the protective overlay in two separate courses in accordance with the manufacturer's recommendation for a two-coat system with the following rate of application. Ensure the first course is no less than 2½ gallons per 100 square feet. Ensure the second course is no less than 5 gallons per 100 square feet.

Ensure application of aggregate to both the first and second courses is of sufficient quantity so the entire surface is covered in excess. Ensure no bleed through, or wet spots are visible in the protective overlay. Remove and replace any areas within course applications with wet spots or where epoxy has bled through.

After the epoxy mixture has been prepared for the protective overlay, immediately and uniformly apply it to the concrete surface with a notched squeegee. Apply the dry aggregate in such a manner as to cover the epoxy mixture completely within 5 minutes. Minimize all foot traffic on the uncured epoxy and ensure any foot traffic will only be done with steel spiked shoes approved by the Engineer. Cure each course of protective overlay until vacuuming or brooming can be performed without tearing or damaging the surface. Do not allow traffic or equipment on the protective overlay surface during the curing period. Remove by vacuuming or brooming all loose aggregate after the first course curing period. Immediately apply the next protective overlay course to complete the protective overlay. Ensure the minimum curing periods are in accordance with the manufacturer's recommendations, as shown in Table 4, or as directed by the Engineer. Remove by vacuuming or brooming all loose aggregate after the second course curing period. Ensure all strip-seal style expansion joints are free of loose aggregate, epoxy and other debris

resulting from overlay operations. Plan and execute the work to provide the minimum curing periods as specified in Table 4, or other longer minimum curing periods as recommended by the manufacturer prior to opening to public or construction traffic, unless otherwise permitted. Ensure first course applications are not opened to traffic. Remove any contamination, detrimental to adhesion of the second course, from the first course at Contractor's expense prior to the application of the second course.

Remove and replace any areas damaged or marred by the Contractor's operations in accordance with this special provision at no additional cost to the contract.

3. Surface Preparation for HMA Concrete Substrate. When a new protective overlay is being applied onto a HMA concrete substrate, perform all work in accordance with the approved material supplier's recommendations with the respective approved Contractor. Apply a minimum of three layers. Center the seams of the underlying layers in the center of each successive layer to avoid any cold joints. Silica sand will be metered onto the surface of the material as it is being applied as recommended by the manufacturer.

e. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item

Pay Item

Protective Ovly, Snowmobile Trail Crossing.....Square Yard

Protective Ovly, Snowmobile Trail Crossing will be measured based on actual field quantity.

Table 1: Approved Two Component 100% Solids Epoxy Systems

Supplier	Product	Telephone
BASF	MasterSeal 350	(800) 433-9517
E-Bond	526 Lo-Mod	(616) 532-0782
E-Chem	EP50	(505) 217-2121
Euclid Chemical	Flexolith Flexolith Summer Grade Flexolith HD	(800) 321-7628
Poly-Carb	Flexogrid Mark – 163 Flexogrid Mark - 154	(817) 797-1113
Sika	Sikadur 22-Lo Mod	(248) 866-8956
Transpo	T-48 Chip Seal	(573) 808-1040
Unitex	Propoxy Type III DOT	(800) 745-3700

Table 2: Angular Aggregates Gradation Requirements

Sieve Size	Minimum % Passing	Maximum % Passing
3/8	100	100
4	98	100
8	30	75
16	0	5
30	0	1
Pan	0	0
	Minimum	Maximum
Fineness Modulus	2.28	2.81

Table 3: Approved Aggregate Suppliers

Aggregate Supplier	Telephone
Earth Work Solutions	(307) 682-4346
Flint Rock Products	(918) 673-1737
Red Flint Sand and Gravel	(800) 238-9139
Sand Products Corp.	(906) 292-5432
Washington Rock Quarries, Inc.	(253) 262-1661
Imerys Refractory Minerals	(478) 472-7581

Table 4: Anticipated Cure Time (Hours)

Average Temperature of Deck, Epoxy and Aggregate Components, Degrees F.							
Temp Range	<60	60-65	65-70	70-75	75-80	80-85	>85
1 st Course		2	2	1.75	1.75	1.5	1
2 nd Course	(a)	2	2	1.75	1.75	1.5	1

- a. Second course must be cured for minimum of 8 hours if the air temperature drops below 60 degrees F during the curing period, or per the manufacturer's recommendations.