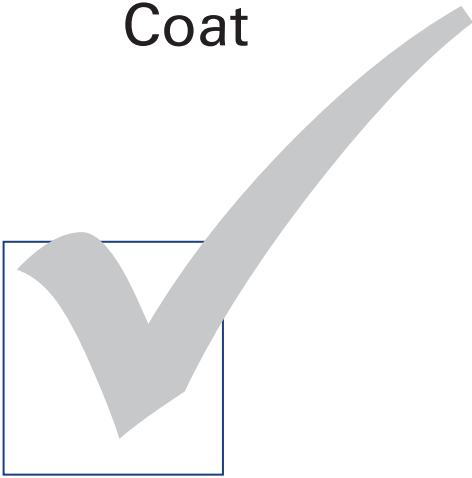
Pavement Preservation
Checklist Series

11

Asphalt Emulsion-Based Tack Coat



U.S. Department of Transportation
Federal Highway Administration

Asphalt Emulsion-Based Tack Coat Checklist

This checklist is one in a series created to guide State and local highway preservation/maintenance and inspection staff on the use of innovative pavement preservation techniques.

FHWA uses its partnerships with different pavement preservation organizations including American Association of State Highway and Transportation Officials, and State and local transportation agencies to promote pavement preservation.

To obtain other checklists or to find out more about pavement preservation, contact your local FHWA division office or check the following FHWA Web page:

www.fhwa.dot.gov/pavement/preservation/resources.cfm

Other valuable resources on pavement preservation:

- www.roadresource.org
- www.fp2.org
- www.tsp2pavement.pavementpreservation.org

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Preliminary Responsibilities

Document Review

- ☐ Project specifications
- ☐ Emulsion specifications (if applicable)
- ☐ Traffic control plan
- ☐ Agency application requirements
- ☐ Safety data sheets
- ☐ Applicable Occupational Safety and Health Administration (OSHA) safety requirements
- ☐ Contractor quality control (QC) plan

Project Review

- ☐ Determine the existing surface type and condition.
- ☐ Review project for bid quantities.

Material Checks

- ☐ Asphalt emulsion selection: type and dilution rate.
- ☐ Confirm the type of asphalt emulsion being used meets project specifications.
- ☐ The emulsion is from an approved source.
- ☐ The emulsion is sampled and submitted for testing.

- ☐ Confirm that the asphalt emulsion is diluted by the manufacturer at the terminal and not by the contractor.
- ☐ Review agency requirements for the maximum amount of time tack coat can be exposed before it must be covered by a hot mix asphalt/ warm mix asphalt (HMA/WMA) overlay or surface treatment.

Pre-Application Inspection Responsibilities

Surface Preparation

- ☐ The existing pavement must be clean before application of the tack coat. A clean surface can be achieved by mechanical sweeping, flushing the surface with water, or blowing with high-pressure air. Verify that the cleaning method used meets agency requirements.
- ☐ If milling is performed, excess fine material may be deposited in the bottom of the milled groove. This material may require additional effort to effectively remove.
- ☐ The existing pavement should be dry. Note: Damp pavement may slow the break time and cure time.

Equipment Inspections

Broom for Cleaning the Existing Surface

- ☐ Bristles are the proper length and clean.

Asphalt Distributor

- ☐ The spray bar is at the proper height.
- ☐ All nozzles are uniformly angled 15° to 30° from the spray bar.
- ☐ All nozzles are free of clogs and correctly sized.
- ☐ Nozzles should be checked for signs of wear periodically.
- ☐ The spray pattern has been checked for uniformity and proper triple overlap.
- ☐ Application pressure has been checked.
- ☐ The distributor has been calibrated and the application rate has been checked.
- ☐ There is a working and calibrated thermometer on site.

Weather Requirements

- ☐ Air and surface temperatures have been checked at the coolest location on the project.
- ☐ Air and surface temperatures meet agency requirements.
- ☐ Note: High winds can create problems with the diluted asphalt emulsion application.

- ☐ Note: High temperatures, humidity, and wind will affect how long the asphalt emulsion takes to break.
- ☐ The application of the asphalt emulsion tack coat does not begin if rain is likely.

Determining Application Rates

- ☐ Agency guidelines and project specifications are being followed.
- ☐ Application rates are based upon the existing surface type and surface condition. Dense surfaces require less tack coat than open textured, raveled, or milled surfaces. Residual asphalt application rates will generally fall within the following range:

Surface type	Residual application rate (gsy)
New asphalt	0.020–0.045
Existing asphalt	0.040–0.070
Milled surface	0.040–0.080
Portland cement concrete	0.030–0.050

Calibrating Application Rates

- ☐ Distributor calibration should occur a minimum of once per year.

Emulsion—Test Method A

- ☐ Select enough 12 x 12 in. geotextile fabric pads so that there is a continuous strip when placed transversally end-to-end across the width of the roadway.
- ☐ Record the weight of each geotextile fabric.
- ☐ Place the geotextile on the road surface.
- ☐ Have the distributor apply emulsion over the geotextile.
- ☐ Record the weight of the geotextile and asphalt.
- ☐ Subtract the two weights to obtain the weight of the emulsion applied.
- ☐ Account for any dilution by the emulsion supplier.
- ☐ Calculate residual asphalt by accounting for the water in the undiluted emulsion.
- ☐ Calculate residual emulsion application rate, which is the gallons of residual emulsion applied divided by the area of application.
- ☐ Repeat this process for a series of geotextile fabric pads aligned in the longitudinal direction.

Emulsion—Method B

- ☐ Place an elliptical container beneath each nozzle on the distributor.
- ☐ Discharge emulsion into the container for a set period of time.
- ☐ Measure the volume of emulsion in each container.
- ☐ Compare the quantity of emulsion in each container.
- ☐ If the quantity of emulsion in any container deviates by more than 10% from the average, adjustment of the corresponding nozzle(s) is required. After the nozzle(s) is/are adjusted, the test should be repeated until all nozzles are within 10% of the average.

Traffic Control

- ☐ Verify that traffic control conforms to plans and specifications and complies with the *Manual on Uniform Traffic Control Devices (*MUTCD).
- ☐ Verify that traffic control personnel are trained and qualified in accordance with agency requirements.
- ☐ Determine whether conditions warrant use of a pilot vehicle. The pilot car leads traffic slowly, 25 mph or less, through the work zone.
- ☐ Ensure that flaggers do not hold the traffic for extended periods of time. Long work zones need two-way communication between flaggers.

- ☐ Any unsafe conditions are reported to a supervisor.
- ☐ Signs are removed or covered when they no longer apply.

Project Inspection Responsibilities

- ☐ The tack coat should be placed slightly wider than the width of the asphalt layer being placed over it to assist in bonding along the longitudinal joint.
- ☐ Ensure that emulsion is within the required application temperature range.
- ☐ Verify that the tack coat is placed uniformly and free of streaking.
- ☐ Nozzles are checked for signs of plugging.
- ☐ Application rate checks are performed periodically.
- ☐ The distributor is stopped if any problems are observed.
- ☐ Tack must be kept clean and maintain bonding ability until covered by an HMA/WMA overlay or surface treatment layer.
- ☐ If multiple lifts of HMA/WMA are being placed, sweeping should be performed between lifts before the next layer of tack coat is placed.
- ☐ A spray wand should not be used in areas accessible to the asphalt distributor.

Tack Coat Acceptance

- ☐ Stop the distributor on level ground and measure the quantity of emulsion in the distributor truck tank in gallons by using a pre-calibrated dipstick.
- ☐ Have the distributor apply emulsion to a specified distance.
- ☐ Stop the distributor on level ground, and remeasure and record the gallons of emulsion in the distributor truck tank.
- ☐ Subtract the two numbers to obtain the gallons of emulsion applied.
- ☐ Correct for temperature back to the standard reference temperature of 60°F by multiplying the volume by a correction factor for the measured temperature. A table of correction factors is available in the *Basic Asphalt Emulsion Manual* from the Asphalt Institute.
- ☐ Account for any dilution by the emulsion supplier.
- ☐ Calculate residual asphalt by accounting for the water in the undiluted emulsion.
- ☐ Calculate residual emulsion application rate, which is the gallons of residual emulsion applied divided by the area of application.
- ☐ Determine whether the calculated residual application rate is within the tolerance of the agency's specified residual application rate.

Common Problems and Solutions

(Problem: Solution)

Tracking of the Tack Coat:

- ☐ Require tack coat to break or set before haul trucks are allowed on it.
- ☐ Minimize the distance that haul trucks are allowed to drive on the tack coat.
- ☐ Use a trackless tack product.
- ☐ If the work zone allows, use material transfer vehicles in an adjacent lane.

Sources

Information in this checklist is based on or refers to the following sources:

Basic Asphalt Emulsion Manual, 4th Edition. 2009. Lexington, KY: Asphalt Institute.

Manual on Uniform Traffic Control Devices. 2009, Revised May 2012 Washington, DC: Federal Highway Administration.

Optimization of Tack Coat for HMA Placement, NCHRP Report 712. 2012. Washington, DC: Transportation Research Board, National Cooperative Highway Research Program.

Tack Coat Best Practices. FHWA Tech Brief (Pub. No. FHWA-HIF-16-017). 2016. Washington, DC: Federal Highway Administration.

Tack Coat Specifications, Materials, and Construction Practices, NCHRP Synthesis 516. 2018. Washington, DC: Transportation Research Board, National Cooperative Highway Research Program.

For more information on the Pavement Preservation Checklist Series, contact:

Construction Management Team, HICP-30
Office of Preconstruction, Construction, and Pavements
Federal Highway Administration
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www.fhwa.dot.gov/pavement/preservation

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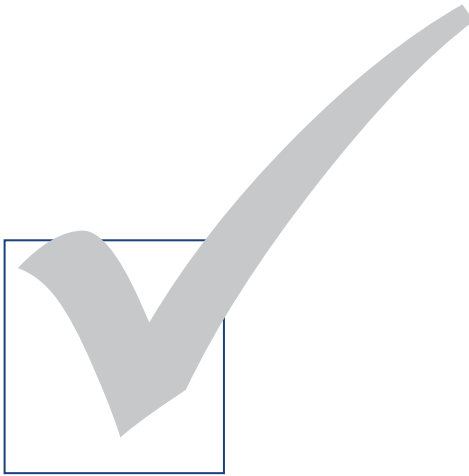

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