
Standard Practice for

Asphalt Tack Coat Design

AASHTO Designation: PP xxx-yy¹

Technical Section: 2a

Release: Group 3 (Month yyyy)

WORKING DRAFT

AASHTO

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1. SCOPE

- 1.1. This standard determines an application rate of emulsified asphalt or performance graded (PG) asphalt binder for tack coats.
- 1.2. A tack coat is the application of emulsified asphalt or PG asphalt binder on an existing asphalt or concrete pavement, followed immediately by any applied layer. Tack coats are a vital component of an asphalt pavement's structural system as they bond the multiple asphalt lifts into one monolithic layer.

2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standards:*
 - M 320, Performance-Graded Asphalt Binder
 - M 322, Performance-Graded Asphalt Binders Using Multiple Stress Creep Recovery (MSCR)
 - MP XXX, Materials for Asphalt Tack Coats

3. TERMINOLOGY

- 3.1. Tack coats are applied to a number of different pavement surface types (Table 1). Although slow setting emulsified asphalt is most common for tack coats, emulsified asphalt types, dilution ratio, and application rate vary markedly among these applications. Tack coats may also include PG asphalts. The residual asphalt from the emulsified asphalt and the application rate for a PG binder will be the same. Materials specifications for tack coats can be found in MP XXX (Materials for Asphalt Tack Coats).

- 3.2. *Dilution:*

- 3.2.1. Tack coat emulsified asphalt is not commonly diluted. However, some agencies do allow for dilution, which involves the controlled addition of water or a compatible surfactant solution to the manufactured emulsified asphalt before application. Dilution is usually allowed to achieve a more uniform surface coverage when emulsified asphalt application rates are low, so dilution percentages may vary. Slow-setting emulsified asphalt is commonly diluted using one part additional water (1:1). Control of dilution is essential for calculating residual asphalt, as well as for achieving ultimate bond strength. Surfactant solutions are mandatory when diluting rapid-setting or quick-setting emulsified asphalts, and such dilutions are only permitted at the manufacturer's plant site. The final product shall be a fluid, homogeneous mixture that does not plug distributor nozzles.

Note 1—Dilution does not relieve the contractor of the responsibility to satisfy emulsified asphalt residual application rates on the roadway.

- 3.3. Tack coats shall be applied to typical existing paving surfaces, including new or existing hot mix, milled surfaces, Portland cement concrete, cold- or hot-in-place recycled mixes, etc. The rate of application will vary with the type and condition of the surface.

4. SIGNIFICANCE AND USE

- 4.1. This standard may be used to select the residual application quantities of the asphalt materials required for the construction of Asphalt Tack Coats. Consult with supplier for the type of emulsified asphalt or PG asphalt binder, application temperature, tracking and unique handling needs for their product.

Note 2—Many agencies use Special Purpose tack applications that yield much higher bond strengths, reduce tracking, and allow tack coat emulsified asphalt to be applied at much higher rates. Examples include hot-applied materials, trackless tack emulsified asphalt and tack emulsified as applied through a spray paver. These applications may be proprietary and should be specified through local agency standards. Consult supplier recommendations for application rates and special equipment needs.

5. ASPHALT TACK COAT DESIGN REQUIREMENTS

- 5.1. *Material Quantities:*

- 5.1.1. The tack coat application rate varies with the condition of the existing surface to which it is applied. In general, a tight or dense surface requires less tack coat than an open textured, raveled, or milled surface. A flushed or bleeding surface requires less tack coat than a dry or aged surface. The proper application rate also varies with the type of tack coat material used and the asphalt mixture that will be placed as an overlay. Dense graded mixtures including Stone Matrix Asphalt (SMA) require less tack coat than open-graded friction course (OGFC) overlays. Because emulsified asphalt contains water, the tack coat application rates used by contractors are higher in order to achieve the minimum residual rates. Measurement and payment for emulsified asphalt used as tack coat are based on the weight (residual asphalt and water). Therefore, the estimated quantity of tack coat needed should be based on the emulsified asphalt application rate and not on residual application rates.
- 5.1.2. Emulsified asphalt should meet MP XXX specifications and be representative of the materials used for the project. The application rates should conform to those given in Table 1: column 2 for undiluted emulsified asphalt, or column 3 for diluted emulsified asphalt, unless otherwise specified.
- 5.1.3. Application rates for PG tack coats should be the same as the residual rates as shown in Table 1. PG asphalts should meet M 320 or M 322 specifications and be representative of the materials used on the project.

Table 1—Minimum Residual Rates Recommended for Slow Set Emulsified Asphalt Tack Coat

Existing Surface Type	Residual Rate, gal/yd ²	Application Rate Undiluted, ^a gal/yd ²	Application Rate Diluted 1:1, ^a gal/yd ²
New Hot Mix Asphalt	0.020–0.045	0.033–0.075	0.066–0.150
Existing Hot Mix Asphalt	0.040–0.070	0.067–0.117	0.133–0.234
Milled Surfaces	0.040–0.080	0.067–0.133	0.133–0.266
Portland Cement Concrete	0.030–0.050	0.050–0.083	0.100–0.166

^a Assume slow set emulsified asphalt is 40 percent water and 60 percent asphalt.

- 5.1.4. Further options for choosing emulsified asphalt and PG asphalt binder can be shown in Table 2.

Table 2—Recommended Tack Coat for Paving Type/Time

Paving Type/Time	Recommended Tack
Standard	Emulsified Asphalt
High Traffic Volume (>5,000 ADT)	PG Asphalt Binder or Special Purpose ^a
Nighttime Paving with Short Time Windows (<8 hours)	PG Asphalt Binder, Special Purpose ^a or Spray Paver ^{a,b}

^aSee Section 4, Note 2

^bSpray paver applications typically require heavy applications of undiluted polymer-modified RS or CRS emulsified asphalt for tack coat.

5.2. *Method to convert binder content to total emulsified asphalt content based on residual values:*

5.2.1. Calculating residual asphalt application rates need to account for not only the water that is present in the original emulsified asphalt, but also any added water via dilution.

5.2.2. For example, if an application of 0.10 gal/yd² was applied with an emulsified asphalt diluted 1:1 (original emulsified asphalt–water), and the original emulsified asphalt contained 40 percent water, calculation of the residual application rate would need to account for both sources of water. The application rate of 0.10 gal/yd² would be multiplied by 0.50, to account for the dilution, and then by 0.60, to account for the water in the original emulsified asphalt. Therefore, the residual tack coat rate in this example would be 0.030 gal/yd².

6. REPORT

6.1. Report the emulsified asphalt or PG asphalt hot binder spray rate in gallons per square yard to the nearest 0.01 gal/yd².

7. KEYWORDS

7.1. Tack coat; emulsified asphalt, performance grade asphalt binder