

Tex-239-F, Asphalt Release Agent

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Section 1

Overview

Effective date: November 2004

Use this test procedure, which consists of four parts, to determine the effect of an asphalt release agent on a bituminous mixture.

Use Part I to determine the susceptibility of asphalt stripping off the aggregates after contact with an asphalt release agent.

Use Part II to determine the susceptibility of a paving mixture for sticking to or adhering to the beds of the haul trucks after adding an asphalt release agent.

Use Part III to determine the susceptibility of hot asphalt binders for sticking to or adhering to paving equipment, rakes, shovels, etc. when using an asphalt release agent.

Use Part IV to evaluate the susceptibility of a hot asphalt mixture for sticking to or adhering to truck beds or other paving equipment.

Units of Measurement

The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.

Section 2

Part I, 7-day Asphalt Stripping Test

Use this procedure to determine the susceptibility of bituminous paving mixtures to asphalt stripping off the aggregates after contact with an asphalt release agent. Use Part I to evaluate asphalt release agents used to coat truck beds and other paving equipment.

Apparatus

Use the following apparatus:

- ◆ Two 1 pt. (0.473 L) glass canning jars or equivalent with a lid for sealing
- ◆ Oven capable of attaining a temperature of 302 °F (150 °C) or more
- ◆ Balance, readable to 0.1 g and accurate to 0.5 g

Preparing Mix

Use either a plant-mixed sample or prepare a laboratory sample according to the procedure outlined in “Tex-205-F, Laboratory Method of Mixing Bituminous Mixtures.”

Procedure

Follow these steps to evaluate the susceptibility of stripping of asphalt from aggregates when using asphalt release agents in truck beds and on other paving equipment.

7-day Asphalt Stripping Test	
Step	Action
1	Obtain a representative sample of bituminous mixture. Heat the mixture to 290 °F (143 °C).
2	Place 50 g of mix into a 1 pt. (0.473 L) glass jar.
3	Place a minimum of 3 fl. oz. (100 mL) of the release agent at full strength into the glass jar containing the bituminous mixture. NOTE: Be sure the mixture is completely covered by the release agent.
4	Place 3 fl. oz. (100 mL) of the release agent at full strength into the second jar as a comparison sample.
5	Cover the samples and leave them undisturbed for 168 ± 2 hours.
6	At the end of the specified time, compare the color of the release agent containing the mix to the comparison sample. Separate the mixture from the release agent and examine for any stripping of the asphalt from the aggregate.
7	From Step 6, rate the release agent according to the following rating system: <i>No Stripping</i> - No stripping or discoloration occurred. <i>Slight Stripping</i> – Discoloration of the release agent. <i>Moderate Stripping</i> – Discoloration and stripping of the fine aggregate. <i>Severe Stripping</i> – Discoloration, stripping of the coarse and fine aggregate.

Report

For each release agent tested, report the amount of visual stripping that is noted. Compare these results with the requirements of the current specification to determine if the asphalt release agent is approved for use.

Section 3

Part II, Mixture Slide Test

Use this procedure to determine the susceptibility of bituminous paving mixtures for sticking to or adhering to the bed of the haul truck after adding an asphalt release agent.

Use Steps 2-11 for truck bed evaluation only. Include Step 12 with Steps 2-11 for evaluating other paving equipment.

Apparatus

Use the following apparatus:

- ◆ Oven capable of attaining a temperature of 302 °F (150 °C) or more
- ◆ A 0.1 ft.³ (2831.7 cm³) unit weight bucket filled with sand to a weight of 9.1 kg (20 lbs.)
- ◆ One 16 gage steel or aluminum plate, 12 x 12 in. (305 x 305 mm) to 18 x 18 in. (457 x 457 mm), with a textured surface that simulates the inside of an average truck bed used for hauling bituminous mixtures
- ◆ Balance, readable to 0.1 g and accurate to 0.5 g
- ◆ Waxed paper
- ◆ Spray bottle used to apply the release agent

Procedure

Follow these steps to evaluate the susceptibility of a bituminous paving mixture sticking to or adhering to the beds of haul trucks when using asphalt release agents.

Mixture Slide Test	
Step	Action
1	Obtain a representative sample of bituminous asphalt mixture. Heat a minimum of 1600 g of mixture to 290 °F (143 °C) for 45 to 60 minutes.
2	Place a 0.1 ft. ³ (2831.7 cm ³) unit weight bucket filled with sand to a weight of 20 lbs. (9.1 kg) in an oven and heat to 290 °F (143 °C) for 45 to 60 minutes.
3	Spray the metal plate placed in the horizontal direction, with the asphalt release agent at the recommended dilution rate and provide an even coating.
4	Allow the metal plate to stand undisturbed for 5 minutes.
5	Weigh the metal plate to the nearest 0.1 g and record.
6	Place 500 ± 10 g of the mixture on the metal plate.
7	Place a sheet of waxed paper on top of the mixture.
8	Place the sand filled bucket on top of the waxed paper and mixture.
9	Allow the mixture and the sand filled bucket to stand for 1 hour ± 5 minutes, then remove the bucket from the top of the mixture.
10	Tilt the metal plate to approximately a 45° angle and tap the plate three times on the table to help loosen the mixture from the plate.
11	Reweigh the metal plate to the nearest 0.1 g and record.
12	Repeat Steps 6 through 11 two additional times, without respraying the metal plate.

Calculations

Calculate the amount of binder that remains adhered to the plate to the nearest 0.1 g. Use the following formula:

$$\text{Amount of binder} = \text{Final weight of plate} - \text{initial weight of plate}$$

Report

For each release agent tested, report the amount of binder in grams that remained adhered to the plate. Compare these results with the requirements of the current specification to determine if the asphalt release agent is approved for use.

Section 4

Part III, Asphalt Performance Test

Use this procedure to determine the susceptibility of hot asphalt binders for sticking to or adhering to paving equipment, rakes, shovels, etc. when using an asphalt release agent.

Apparatus

Use the following apparatus:

- ◆ Balance, readable to 0.1 g and accurate to 0.5 g
- ◆ Spray bottle used to apply the release agent
- ◆ Oven capable of attaining a temperature of 302 °F (150 °C) or more
- ◆ A 1 qt. (0.95 L) metal container, large sample pan, scoop, spatula, etc.
- ◆ One 16 gage steel or aluminum plate, 12 x 12 in. (305 x 305 mm) to 18 x 18 in. (457 x 457 mm), with a textured surface that simulates the inside of an average truck bed used for hauling bituminous mixtures

Preparing Asphalt

Use a PG 64-22, or equal, that has been modified by adding either SBS or SBR at a rate of 3.0% by weight of the binder.

Procedure

Follow these steps to determine the susceptibility of hot asphalt binders for sticking to or adhering to paving equipment, rakes, shovels, etc.

Asphalt Performance Test	
Step	Action
1	Pour the binder into a 0.95 L (1 qt.) container and place the container into a 290 °F (143 °C) oven for 45 ± 5 minutes.
2	Spray the metal plate with the asphalt release agent at the recommended dilution rate and provide an even coating.
3	Allow the metal plate to stand undisturbed for 5 minutes.
4	Weigh the metal plate to the nearest 0.1 g and record.
5	Remove the asphalt binder from the oven and stir for 30 ± 5 seconds.
6	Pour 20 ± 2 g of asphalt binder on the metal plate. Return the 1 qt. (0.95 L) container to the oven.
7	Allow the binder to cool to touch (normally 5 minutes). Using a small spatula, lift up one edge of the binder, and then attempt to remove the remainder of the binder with one continuous pull.
8	Weigh the metal plate to the nearest 0.1 g and record.
9	Pour another 20 g of hot asphalt binder on the same spot as in Step 6. Return the 1 qt. (0.95 L) container to the oven.

Asphalt Performance Test	
Step	Action
10	Allow the binder to cool to touch, then remove it from the metal plate again as in Step 7.
11	Weigh the metal plate to the nearest 0.1 g and record.
12	Repeat Steps 9 through 11 until failure or 3 times maximum, whichever occurs first.

Calculations

Calculate the amount of binder that remains adhered to the plate to the nearest 0.1 g. Use the following formula:

$$\text{Amount of binder} = \text{Final weight of plate} - \text{initial weight of plate}$$

Report

For each release agent tested, report the amount of binder in grams that remained adhered to the plate. Compare these results with the requirements of the current specification to determine if the asphalt release agent is approved for use.

Section 5

Part IV, Release Agent Field Performance Test

Use this procedure to evaluate the susceptibility of hot asphalt mixtures for sticking to or adhering to truck beds or other paving equipment. Evaluations for field testing of truck beds shall be done separately from field testing of other paving equipment.

Apparatus

Use the following apparatus:

- ◆ Haul trucks beds, steel wheel rollers, pneumatic rollers, pavers or lay-down machines, motor graders, shovels, rakes, lutes, and any other equipment used during the paving operation
- ◆ Spray bottle used to apply the release agent

Preparing Mix

Bituminous mixtures prepared at a hot mix plant.

Procedure

Follow these steps to evaluate the susceptibility of hot asphalt mixtures sticking to or adhering to the truck beds or other paving equipment.

Release Agent Field Performance Test	
Step	Action
1	Field inspectors or maintenance personnel shall perform the evaluation at the time of the paving operations.
2	Clean all parts coming in contact with the bituminous mixture prior to coating with the release agent. Parts shall be free of solvents and or petroleum based products before testing. Clean all parts that contain rubber prior to use, then coat with the release agent two or three times before the evaluation. NOTE: Rubber absorbs solvents that may have been previously used, necessitating the proper reconditioning of the parts to provide a legitimate test.
3	Apply the release agent at the manufacturer's recommended application rate.
4	During paving operations, rate the performance of the release agent using the 'Field Performance Test' (see <i>Note</i>) form. "Pass" means that there is no sticking of the asphalt mix, or that it is easily cleaned off the part while still warm. "Fail" means that there is sticking of the asphalt mix and that it will not be easily cleaned off the part.
5	Return the evaluation form to the TxDOT testing laboratory for further processing.
<i>Note:</i> Please contact CST/M&P at 512/506-5838 for more information on this form.	

Section 6
Report

For each release agent tested, rate the asphalt release agent based on the criteria shown in Step 4 of the 'Release Agent Field Performance Test' procedure. Report the asphalt release agent as “Passing” or “Failing.”

Section 7
Notes

A list of approved release agents is maintained on the TxDOT Internet site.