

ITEM 318

HOT ASPHALT-RUBBER SURFACE TREATMENTS

318.1. Description. Construct a surface treatment consisting of 1 or more applications of a single layer of hot asphalt-rubber (A-R) binder covered with a single layer of aggregate.

318.2. Materials.

A. Asphalt-Rubber Binder. Furnish Type II or Type III A-R binder in accordance with Section 300.2.I, "Asphalt-Rubber Binders," as shown on the plans. Furnish a blend design for approval. Include in the design, at a minimum, the following:

- manufacturer and grade of asphalt cement;
- manufacturer and grade of crumb rubber;
- manufacturer, type, and percentage of extender oil, if used;
- test report on crumb rubber gradation in accordance with Tex-200-F, Part I;
- design percentage of crumb rubber versus asphalt content;
- blending temperature; and
- test results on the properties at reaction times of 60, 90, 240, 360, and 1,440 min. in accordance with Section 300.2.I, "Asphalt-Rubber Binders."

Furnish a new blend design if the grade or source for any of the components changes.

- B. Tack Coat.** Unless otherwise shown on the plans or approved, furnish CSS-1H, SS-1H, or a performance grade (PG) binder with a minimum high temperature grade of PG 58 for tack coat binder in accordance with Item 300, "Asphalts, Oils, and Emulsions." Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use. If required, verify that emulsified asphalt proposed for use meets the minimum residual asphalt percentage specified in Item 300.
- C. Aggregate.** Furnish aggregate meeting Item 302, "Aggregates for Surface Treatments," of the type and grade shown on plans. For final surfaces, unless otherwise shown on the plans, furnish aggregate with a minimum B surface aggregate classification.

318.3. Equipment.

- A. Distributor.** Furnish a distributor calibrated in accordance with Article 316.3, "Equipment," capable of keeping the rubber in uniform suspension and adequately mixing the asphalt, rubber, and any additional additives. If equipped with an onboard scale system or micro-motion meters for proportioning or payment, they must weigh or measure the load within a 0.4% accuracy in accordance with Item 520, "Weighing and Measuring Equipment."
- B. Aggregate Spreader.** Use a continuous-feed, self-propelled spreader to apply aggregate uniformly at the specified rate or as directed.
- C. Rollers.** Unless otherwise shown on the plans, furnish medium pneumatic rollers in accordance with Item 210, "Rolling."
- D. Broom.** Furnish rotary self-propelled power brooms.
- E. Asphalt Storage and Handling Equipment.** Furnish a recording thermometer in each tank to indicate the asphalt temperature continuously. Keep equipment clean and free of leaks.
- F. Hot Asphalt-Rubber Blending and Storage Equipment.** Provide a mechanical blender for proper proportioning and thorough mixing of the asphalt and rubber. Use proportioning, weighing, and measuring devices meeting the requirements of Item 520, "Weighing and Measuring Equipment." If an A-R binder storage tank is used, equip it with:
- a heating system to maintain the proper temperature of the binder,

- recording thermometer in each tank to indicate the asphalt-rubber binder temperature continuously,
- an internal mixing unit capable of maintaining a homogeneous mixture of asphalt and rubber, and
- a sampling port.

Keep A-R binder free of contamination.

- G. Aggregate Haul Trucks.** Unless otherwise authorized, use trucks of uniform capacity to deliver the aggregate. Provide documentation showing measurements and calculation in cubic yards. Clearly mark the calibrated level. Truck size may be limited when shown on the plans.
- H. Digital Measuring Instrument.** Furnish a vehicle with a calibrated, digital measuring instrument, accurate to ± 6 ft. per mile.
- I. Truck Scales.** Provide standard platform scales in accordance with Item 520, "Weighing and Measuring Equipment." Truck scales will not be required if the distributor has an adequate calibrated scale system.
- J. Aggregate Heating System.** If required, furnish a heating system that will:
- heat aggregate to the specified temperature,
 - not damage aggregate,
 - not leave fuel residue on heated aggregate, and
 - provide a continuous recording thermometer to indicate aggregate temperature as it leaves the system.

318.4. Construction.

- A. General.** Asphalt application season will be as shown on the plans. Asphalt and aggregate rates shown on the plans are for estimating purposes only. The Engineer will adjust the rates for the existing conditions.
- B. Temporary Aggregate Stockpile.** The Engineer will approve the location of temporary aggregate stockpiles on the right of way before delivery. Place stockpiles in a manner that will not:
- obstruct traffic or sight distance,
 - interfere with the access from abutting property, or
 - interfere with roadway drainage.
- Locate stockpiles a minimum of 30 ft. from the roadway when possible. Sign and barricade as shown on the plans.
- C. Department-Furnished Aggregate.** When shown on the plans, the Department will furnish aggregate to the Contractor without cost. Stockpile locations will be shown on the plans.
- D. Adverse Weather Conditions.** Do not place hot asphalt-rubber surface treatment when, in the Engineer's opinion, general weather conditions are unsuitable. Apply surface treatment when the air temperature is 80°F and above, or above 70°F and rising. In all cases, do not apply surface treatment when surface temperature is below 70°F.
- E. Mixing Hot A-R Binder.** Mix in accordance with the approved blend design required in Section 318.2.A, "Asphalt-Rubber Binder."

At the end of each shift, provide the Engineer with production documentation, which includes the following:

- amount and temperature of asphalt cement before addition of rubber,
- amount of rubber and any extender added,
- viscosity of each hot A-R batch just before roadway placement, and
- time of the rubber additions and viscosity tests.

- F. Surface Preparation.** Remove existing raised pavement markers in accordance with the plans. Remove dirt, dust, or other harmful material. When directed by the Engineer, apply a tack coat before applying the hot asphalt-rubber treatment on an existing wearing surface in accordance with Section 340.4.G.2, "Tack Coat."
- G. Rock Land and Shot.**
- 1. Definitions.**
 - A "rock land" is the area covered at the aggregate rate, as directed, with 1 truckload of aggregate.
 - A "shot" is the area covered by 1 distributor load of asphalt material.
 - 2. Setting Lengths.** Calculate the lengths of each. Adjust shot length to be an even multiple of the rock land. Verify that the distributor has enough asphalt material to complete entire shot length. Mark shot length before applying hot A-R. When directed, mark length of each rock land to verify the aggregate rate.
- H. Hot A-R Binder Placement.**
- 1. General.** Adjust the application temperature, not exceeding 425°F, to obtain the proper application characteristics. Uniformly apply at the rate specified or as directed.
The maximum shot width is 13 ft. Adjust the shot width as directed so operations do not encroach on traffic or interfere with the traffic control plan. Use paper or other approved material at the beginning and end of each shot to construct a straight transverse joint and to prevent overlapping of the asphalt. Unless otherwise approved, longitudinal joints must match lane lines.
 - 2. Limitations.** Do not apply asphalt to the roadway until:
 - traffic control methods and devices are in place as shown on the plans or as directed,
 - the loaded aggregate spreader is in position and ready to begin,
 - haul trucks are loaded with enough aggregate to cover the shot area, and
 - haul trucks are in place behind the spreader box.
 - 3. Test Sections.** Place a test section at an approved location to demonstrate that equipment is capable of uniformly mixing and placing the A-R binder. The Engineer may stop work at any time and require additional test sections to be shot if:
 - the application is not uniform;
 - on 3 consecutive shots, application rate differs by more than 0.03 gal. per square yard from the rate directed; or
 - any shot differs by more than 0.05 gal. per square yard from the rate directed.
 - 4. Nonuniform Application.** Stop application if not uniform due to streaking, ridging, puddling, or flowing off the roadway surface. Verify equipment condition, operating procedures, application temperature, and material properties. Determine the cause of nonuniform application and correct it.
- I. Aggregate Placement.** The aggregate must be surface dry before application. When shown on the plans, preheat aggregate to between 250°F and 350°F. Cover each load with tarping material to minimize the temperature drop of the preheated aggregate. Immediately after the distributor has started spraying the hot asphalt-rubber, uniformly apply the aggregate at the rate specified by the Engineer.
- J. Rolling.** Start the rolling operation on each shot as soon as aggregate is applied. Use sufficient rollers to cover entire mat width in 1 pass (1 direction). Roll in a staggered pattern. Unless otherwise shown on the plans, make at least 5 passes.
If rollers are unable to keep up with spreader box, stop application until rollers have caught up, or furnish additional rollers. Keep roller tires free of asphalt.
- K. Repair.** Repair areas where coverage is incomplete. Make repairs by patching, hand spotting, or other method, as approved. When necessary, apply additional hot A-R binder to embed the aggregate.

- L. Brooming.** After rolling, sweep away excess as soon as aggregate has sufficiently bonded.
- M. Final Acceptance.** Maintain surface treatment until the Engineer accepts the work. Repair any surface failures. Before final project acceptance, remove all temporary stockpiles and restore the area to the original contour and grade.

318.5. Measurement.

- A. A-R Binder.** A-R binder, including all components, will be measured in tons just before delivery to the point of application.
- B. Aggregate.** Contractor-supplied aggregate will be measured by the cubic yard in the trucks as applied to the road.
- C. Loading, Hauling, and Distributing Aggregate.** If the Department furnishes the aggregate, the loading, hauling, and distributing will be measured by the cubic yard in the trucks as applied on the road.

318.6. Payment. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit prices bid for "A-R Binder" of the type specified; "Aggregate" of the type, grade and surface aggregate classification specified; or "Loading, Hauling, and Distributing Aggregate." These prices are full compensation for surface preparation, tack coat, heating and mixing, hauling and placing all materials, rolling and removing excess aggregate, cleaning up stockpiles, test sections, equipment, labor, tools, and incidentals.