

SECTION TABLE OF CONTENTS
DIVISION 32 - EXTERIOR IMPROVEMENTS
SECTION 32 01 13.62
ASPHALT SURFACE TREATMENT

05/18

Table of Contents

PART 1	GENERAL	2
1.2	REFERENCES	2
1.3	SUBMITTALS	3
1.4	QUALITY CONTROL	3
1.5	DELIVERY, STORAGE, AND HANDLING	3
1.6	EQUIPMENT, TOOLS AND MACHINES	3
1.7	ENVIRONMENTAL REQUIREMENTS	5
PART 2	PRODUCTS	5
2.1	MINERAL AGGREGATE	5
2.2	BITUMINOUS MATERIALS	7
PART 3	EXECUTION	7
3.1	SURFACE PREPARATION	7
3.2	APPLICATION OF FIRST COURSE	8
3.3	APPLICATION OF SECOND COURSE	8
3.4	APPLICATION TEMPERATURE OF MATERIALS	9
3.5	PROTECTION	9

SECTION 32 01 13.62
ASPHALT SURFACE TREATMENT
05/18

PART 1 GENERAL.

1.1 Payment.

1.1.1 Waybills and Delivery Tickets

Submit copies of waybills and delivery tickets during progress of the work. Before the final statement is allowed, file with the Contracting Officer certified waybills and delivery tickets for aggregate and bituminous material used in the bituminous surface treatment. Do not remove bituminous material from the tank car or storage tank until initial outage and temperature measurements have been taken. Do not release the car or tank until final outage has been taken.

1.2 REFERENCES.

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C29/C29M	(2017a) Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C88	(2018) Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C131/C131M	(2020) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136/C136M	(2019) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D75/D75M	(2019) Standard Practice for Sampling Aggregates
ASTM D140/D140M	(2016) Standard Practice for Sampling Asphalt Materials
ASTM D946/D946M	(2020) Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D977	(2019a; E 2019) Standard Specification for Emulsified Asphalt

ASTM D1139/D1139M	(2015) Aggregate for Single or Multiple Bituminous Surface Treatments
ASTM D1250	(2019; E 2020) Standard Guide for Use of the Joint API and ASTM Adjunct for Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils: API MPMS Chapter 11.1
ASTM D2028/D2028M	(2015) Cutback Asphalt (Rapid-Curing Type)
ASTM D2397/D2397M	(2019a) Standard Specification for Cationic Emulsified Asphalt
ASTM D2995	(1999; R 2009) Determining Application Rate of Bituminous Distributors
ASTM D3625/D3625M	(2012) Standard Practice for Effect of Water on Bituminous-Coated Aggregate Using Boiling Water
ASTM D6373	(2016) Standard Specification for Performance Graded Asphalt Binder

1.3 SUBMITTALS.

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the government officer that will review the submittal for the Government.

SD-03 Product Data

Waybills and Delivery Tickets
Emulsified Asphalt
Asphalt Cement

SD-06 Test Reports

1.4 QUALITY CONTROL.

1.4.1 Safety Precautions

Smoking or open flames will not be permitted within 25 feet of heating, distributing, or transferring operations of bituminous materials other than bituminous emulsions.

1.5 DELIVERY, STORAGE, AND HANDLING.

Inspect the materials delivered to the site for contamination and damage. Unload and store the materials with a minimum of handling. Store aggregates preventing segregation and contamination.

1.6 EQUIPMENT, TOOLS AND MACHINES.

Provide equipment dependable and adequate for the purpose intended and properly maintained in satisfactory and safe operating condition at all times. Discontinue the use of equipment which fails to produce satisfactory work and replace with satisfactory equipment. Equipment such

as asphalt distributors, scales, batching equipment, spreaders and similar equipment, must have been calibrated by an approved calibration laboratory within 12 months prior to commencing work and every 12 months thereafter, by such laboratory from the date of last calibration, during the term of the contract.

1.6.1 Bituminous Distributors

Provide a self-propelled distributor with pneumatic tires of such size and number to prevent rutting, shoving or otherwise damaging the surface being sprayed. Calibrate the distributor in accordance with ASTM D2995. Design and equip the distributor to spray the bituminous material in a uniform coverage at the specified temperature, at readily determined and controlled total liquid rates from 0.03 to 1.0 gallons per square yard, with a pressure range of 25 to 75 psi and with an allowable variation from the specified rate of not more than plus or minus 5 percent, and at variable widths. Include with the distributor equipment a separate power unit for the bitumen pump, full-circulation spray bars, tachometer, pressure gauges, volume-measuring devices, adequate heaters for heating of materials to the proper application temperature, a thermometer for reading the temperature of tank contents, and a hand hose attachment suitable for applying bituminous material manually to areas inaccessible to the distributor. The distributor will be capable of circulating and agitating the bituminous material during the heating process.

1.6.2 Single-Pass, Surface-Treatment Machines

Use only machines capable of spraying bituminous material and spreading aggregate in one pass. Use only bituminous spraying equipment conforming to the requirements given above for a bituminous distributor. Use only machines capable of spreading aggregates at controlled amounts per square yard as specified. In addition, only use single-pass, surface-treatment machines capable of placing a surface treatment adjacent to an existing surface treatment, forming a joint of the same thickness and uniformity as other portions of the surface treatment. Ridges or blank spaces will not be permitted. Form joints in the second application at least 1 foot from those formed in the first application.

1.6.3 Heating Equipment for Storage Tanks

Use equipment consisting of coils and equipment for producing steam or hot oil and designed to prevent the introduction of steam or hot oil into the material. Affix an armored thermometer with a range of 100 to 400 degrees F to the tank so the temperature of the bituminous material may be determined at all times.

1.6.4 Power Rollers

Use only steel-wheeled or pneumatic-tired type power rollers conforming to the following requirements:

- a. Use only steel-wheeled rollers having at least one steel drum and weigh a minimum of 5 tons. Equip steel wheels of the rollers with adjustable scrapers.
- b. Use only self-propelled pneumatic-tired rollers having wheels mounted on two axles in such manner that the rear tires will not follow in the tracks of the forward group. Maintain uniform tire inflation to not less than 60 psi nor more than 80 psi pressure. Equip pneumatic-tired rollers with boxes or platforms for ballast loading. Load rollers so that the tire print width of each wheel

is not less than the clear distance between tire prints.

1.6.5 Mechanical Spreaders

Use only adjustable spreaders capable of spreading aggregate at controlled amounts per square yard, as specified.

1.6.6 Brooms and Blowers

Use only power type brooms and blowers capable of cleaning surfaces to be treated.

1.7 ENVIRONMENTAL REQUIREMENTS.

Apply bituminous surface treatment only when the existing surface or base course is dry or contains moisture not in excess of the amount that will permit uniform distribution of the asphalt material and provide the desired adhesion between the asphalt material and the materials underneath and above. Do not apply bituminous surface treatment when either the atmospheric temperature, in the shade, is below 50 degrees F or the pavement surface to be treated is below 70 degrees F unless otherwise directed.

PART 2 PRODUCTS.

Use mineral aggregate and bituminous material of the following types, gradations, grades, and consistencies that meet the requirements.

2.1 MINERAL AGGREGATE.

Provide aggregate consisting of crushed stone, crushed gravel, or crushed slag of such nature that thorough coating of bituminous material, used in the work, will not strip off upon contact with water. Maintain aggregate moisture content so that the aggregate will be readily coated with the bituminous material. Drying may be required, as directed. Use aggregate conforming to the gradation shown below. Determine gradation of the aggregates by ASTM /C136M.

AGGREGATE GRADATION SINGLE BITUMINOUS SURFACE TREATMENT (PERCENT BY WEIGHT PASSING)			
Sieve Designation	No. 1	No. 2	No. 3
1 inch	100	--	--
3/4 inch	90-100	100	--
1/2 inch	20-55	90-100	100
3/8 inch	0-15	40-70	85-100
No. 4	0-5	0-15	10-30
No. 8	--	0-5	0-10

No. 16	--	--	0-5	
AGGREGATE GRADATION DOUBLE BITUMINOUS SURFACE TREATMENT (PERCENT BY WEIGHT PASSING)				
Sieve Designation	No. 1	No. 2	No. 3	No. 4
1 inch	100	--	--	--
3/4 inch	90-100	--	100	--
1/2 inch	20-55	100	90-100	--
3/8 inch	0-15	85-100	40-70	100
No. 4	0-5	10-30	0-15	85-100
No. 8	--	0-10	0-5	10-40
No. 16	--	0-5	--	0-10
No. 50	--	--	--	0-5

2.1.1 Crushed Stone

Provide crushed stone consisting of clean, sound, durable particles, free of soft or disintegrated pieces, dust, or foreign matter.

2.1.2 Crushed Gravel

Provide crushed gravel consisting of clean, sound, durable particles, free of soft or disintegrated pieces or foreign matter. At least 90 percent by weight of the particles must have at least two fractured faces.

2.1.3 Crushed Slag

Provide crushed slag which is an air-cooled blast-furnace product having a dry weight of not less than 70 pcf, and consists of angular particles uniform in density and quality and free of dust and foreign matter.

Determine the weight of a cubic foot of slag aggregate by ASTM C29/C29M.

2.1.4 Aggregate Quantities

Spread the bituminous material and aggregate within the quantity limits shown below. The individual quantities of bituminous material and aggregate may be varied to meet specific field conditions at all times during progress of the work, as directed, without adjustments to contract unit prices. Aggregate weights shown are for aggregates having a specific gravity of 2.65. Adjust the number of pounds required if the specific gravity of the aggregate used is other than 2.65 in order to ensure a constant volume of aggregate per square yard of treatment.

QUANTITIES (PER SQUARE YARD) FOR SINGLE SURFACE TREATMENT		
Gradation No.	Bituminous Material (Gallons)	Aggregate (Pounds)

1	0.30-0.45	35-50
2	0.15-0.30	20-35
3	0.10-0.20	15-25

QUANTITIES (PER SQUARE YARD) FOR DOUBLE SURFACE TREATMENT				
Gradation No.	Bituminous Material (Gallons) First Application	Aggregate (Pounds) First Spreading	Bituminous Material) (Gallons) Second Application	Aggregate (Pounds) Second Spreading
1	0.20-0.30	28-34	--	--
2	--	--	0.20-0.30	20-25
3	0.15-0.20	20-25	--	--
4	--	--	0.15-0.20	10-15

2.2 BITUMINOUS MATERIALS.

2.2.1 Cutback Asphalt

Cutback Asphalt or solvent (jet fuel) products shall not be used by Contractor.

2.2.2 Emulsified Asphalt

Emulsified Asphalt. Use rapid-setting emulsified asphalt conforming to ASTM D977, Grade RS-1 or RS-2 or ASTM D2397/D2397M, Grade CRS-1 or CRS-2.

2.2.3 Asphalt Cement

Asphalt Cement. Use asphalt cement conforming to ASTM D946/D946M, Penetration Grade 120-150 or ASTM D6373, Performance Graded Asphalt Binder PG 64-22. Submit temperature-viscosity relationship of asphalt cement.

PART 3 EXECUTION.

3.1 SURFACE PREPARATION.

Immediately before applying the first course of bituminous material, clean the surface of loose material with power brooms or power blowers. Take care to remove all dirt, clay, and other loose or foreign matter. Flush the surface with water, when necessary to achieve a clean surface, only when directed by the Contracting Officer; allow the surface to dry after flushing.

3.2 APPLICATION OF FIRST COURSE.

3.2.1 Bituminous Material

Apply bituminous material by means of a bituminous distributor at the temperature specified in paragraph APPLICATION TEMPERATURE OF MATERIALS, below or as directed; and within the limits specified in paragraph QUANTITY LIMITS in PART 1. Apply bituminous material in such a manner that uniform distribution is obtained over all surfaces treated. Unless the distributor is equipped to obtain a satisfactory result at the junction of previous and subsequent applications, spread building paper on the surface for a sufficient distance back from the ends of each application so that flow through the sprays may be started and stopped on the paper in order that all sprays will operate at full force on the surface treated. Immediately after application, remove and destroy the building paper. Properly treat areas inaccessible to the distributor with bituminous material using the hose attachment. Protect adjacent buildings, structures, and trees to prevent their being splattered or marred.

3.2.2 Spreading of Aggregate

Immediately following application of bituminous material, spread aggregate uniformly over the surface within the limits of the quantities specified in paragraph QUANTITY LIMITS in PART 1 using mechanical spreaders. Spread aggregate evenly by hand on all areas missed by the mechanical spreader. Operate equipment spreading aggregate so that the bituminous material will be covered ahead of the truck wheels. When hand spreading is employed on inaccessible areas, spread aggregate directly from trucks. Spread additional aggregate by hand over areas having insufficient cover. Continue spreading during these operations when necessary.

3.2.3 Brooming and Rolling

Roll the surface with a pneumatic-tired and a steel-wheeled roller after sufficient aggregate is spread. Continue rolling until no more aggregate can be worked into the treated surface. The use of the steel-wheeled roller will be discontinued, or a lighter weight steel wheel roller substituted, as directed, if the roller being used causes excessive crushing and shattering of the aggregate. If the aggregate is not distributed properly, broom the surface as soon as possible after the first coverage by the roller, but not until the surface has set sufficiently to prevent excessive marking. Continue brooming, rolling, and supplemental spreading of aggregate until the surface is cured and rolled sufficiently to key and set the aggregate. In places not accessible to rollers, compact the aggregate with pneumatic tampers. Remove aggregate that has become contaminated with foreign matter and replace with clean aggregate and reroll as directed. Maintain and protect the treated areas by use of barricades until properly cured.

3.3 APPLICATION OF SECOND COURSE.

3.3.1 Bituminous Treatment

Apply the bituminous material for the second course within 48 hours after construction of the first course, weather permitting. Remove excess aggregate prior to the second application of bituminous material. If the treated surface is excessively moistened by rain, allow the surface to dry for such time as deemed necessary. Perform the second application of bituminous material in the manner specified in paragraph APPLICATION OF FIRST COURSE, including temperature and QUANTITY LIMITS.

3.3.2 Aggregate

Immediately following the second application of bitumen, spread aggregate conforming to the gradation and limits specified in paragraph QUANTITY LIMITS uniformly over the bituminous material and process in the manner specified for the first course.

3.3.3 Brooming and Rolling Second Course

Roll and broom the surface in the manner specified for the first course until a thoroughly bonded, smooth, even-textured surface is produced. Sweep off the surface surplus aggregate and remove it prior to final acceptance.

3.4 APPLICATION TEMPERATURE OF MATERIALS.

3.4.1 Cutback Asphalt

Cutback Asphalt or solvent (jet fuel) products shall not be used by Contractor.

3.4.2 Emulsified Asphalt

Apply asphalt emulsions in the range of 90 to 160 degrees F.

3.4.3 Asphalt Cement

Apply asphalt cement in the range of 325 to 375 degrees F.

3.5 PROTECTION.

Keep all traffic off surfaces freshly treated with bituminous material. Provide sufficient warning signs and barricades so that traffic will not travel over freshly treated surfaces. Protect the treated areas from traffic for at least 24 hours after final application of bituminous material and aggregate, or for such time as necessary to prevent picking up. Immediately prior to opening to traffic, roll the entire treated area with a self-propelled pneumatic-tired roller.

-- End of Section --