Preparing Activity: USACE Superseding
UFGS-32 01 25 (August 2008)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2023
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SECTION 32 01 16.75

HEATER SCARIFYING OF ASPHALT PAVING
02/17

NOTE: This guide specification covers the requirements for heater scarifier procedures for bituminous pavements in connection with surface treatments or asphalt overlays.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).

PART 1 GENERAL

NOTE: Experience and data indicate that scarifying is feasible only on existing asphalt concrete pavements which are structurally sound but in need of surface leveling or sealing, for example, pavements disturbed for utility trenches or other openings or where patches have settled and surface deterioration exists. This specification covers the use of heater scarifiers for the maintenance of bituminous pavements. Heater scarification should not be used on airfields but is useful for relatively low volume roads when applying surface treatments or thin overlays. Heater scarifying is to be used in conjunction with surface treatments

and asphalt overlays; therefore, a surface treatment or asphalt overlay section should be included in the project specifications.
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1.1 UNIT PRICES

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NOTE: When other methods of measurement are desired or are necessary, this paragraph will be modified accordingly.
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1.1.1 Measurement

Determine quantities of [bituminous material] [recycling agent] applied and area of pavement treated in the accepted work by the following methods.

1.1.1.1 Bituminous Material and Recycling Agent

The quantity of [bituminous material] [recycling agent] to be paid for will be the number of liters gallons used in the accepted work as determined by the Contracting Officer, corrected to liters at 15.6 degrees C gallons at 60 degrees F in accordance with ASTM D1250 and using a coefficient of expansion of 0.00045 per degree C 0.00025 per degree F for asphalt emulsion.

1.1.1.2 Treated Pavement

The quantity of pavement treated with [bituminous material] [recycling agent] is the number of square meters yards completed and accepted as determined by the Contracting Officer. Determine the number of square meters yards of treated pavement by measuring the length and width of the specified work area. Take measurements to determine the number of square meters yards along the surface of the pavement and to the closest mm inch for width and the closest meter foot for length.

1.1.1.3 Heater Scarifying

The quantity of heater scarifying of bituminous concrete surfaces is the number of square meters yards completed and accepted, as determined by the Contracting Officer. Determine the number of square meters yards of scarified pavement by measuring the length and width of the specified work area. Take measurements along the surface of the pavement.

1.1.2 Payment

Quantities of heater scarifying, treated pavement and [bituminous material] [recycling agent] will be paid for at respective contract unit prices.

1.2 REFERENCES

****
NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date,

and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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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.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO T 102	(2009; R 2013) Standard Method of Test for Spot Test of Asphaltic Materials

ASTM INTERNATIONAL (ASTM)

ASTM D92	(2012a) Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester
ASTM D140/D140M	(2016) Standard Practice for Sampling Asphalt Materials
ASTM D244	(2009; R 2017) Standard Test Methods and Practices for Emulsified Asphalts
ASTM D977	(2019a; E 2019) Standard Specification for Emulsified Asphalt
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 D2170/D2170M	(2018) Standard Test Method for Kinematic Viscosity of Asphalts (Bitumens)
ASTM D2397/D2397M	(2019a) Standard Specification for Cationic Emulsified Asphalt

1.3 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals

required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item, if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

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Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-04 Samples

Materials; G[, [_____]]

SD-06 Test Reports

Testing

1.4 EQUIPMENT, TOOLS, AND MACHINES

Maintain equipment, tools, and machines used in the performance of the work in a satisfactory working condition at all times and conforming to applicable governing regulations for local air pollution controls.

1.4.1 Heater Scarifier

Provide a heater scarifier that is: 1) a self-propelled machine having, in combination, the means of heating and scarifying the existing asphalt concrete surface and spreading the scarified material in a uniform layer. 2) capable of producing a minimum thickness of 19 mm 3/4 inch of

uncompacted reclaimed mix without damaging the asphalt binder or violating pollution standards of the area. 3) capable of working at a rate of speed that allows heating and scarifying the pavement to meet the specified requirements. Provide a machine that heats, scarifys, and spreads material in equal widths.

1.4.2 Bituminous Distributor

Provide a bituminous distributor mounted on pneumatic tires of such size and number to prevent rutting, shoving, or other damage to the base, surface, or other layers in the pavement structure. Design and equip the bituminous distributor to spray the bituminous material in a uniform double or triple lap at the temperature recommended by the manufacturer, at variable widths up to at least 3.7 meter 12 feet, and at readily determined and controlled rates from 0.09 to 2.3 L/square meter 0.02 to 0.5 gallon/square yard with an allowable variation from the specified rate of not more than plus or minus 5 percent. 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 to areas inaccessible to the distributor. Equip the distributor to circulate and agitate the bituminous material during the heating process.

1.4.3 Cleaning Equipment

Use power brooms, power blowers, and power vacuuming equipment suitable for cleaning the surface and cracks in the existing pavement prior to treatment.

1.5 ENVIRONMENTAL REQUIREMENTS

Perform heater scarifying procedures only when the existing pavement is dry and the pavement surface temperature is above 15 degrees C 60 degrees F.

PART 2 PRODUCTS

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NOTE: Designer will specify either bituminous asphalt emulsion or recycling agent to be used for treating the scarified surface, and will delete the inapplicable paragraph and renumber all subsequent paragraphs accordingly. When bituminous asphalt emulsion is to be used, grade SS-1 or CSS-1 asphalt emulsion should be specified in moderate or cold climates and grade SS-1h or CSS-1h should be specified in hotter climates such as the southern or southwestern areas of the United States.

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2.1 BITUMINOUS MATERIAL

Provide an emulsified asphalt, Grade [_____], conforming to [ASTM D977] [ASTM D2397/D2397M]. The asphalt from which emulsion is required to have a negative spot when tested in accordance with AASHTO T 102.

2.2 RECYCLING AGENTS

Provide recycling agents composed of a petroleum base oil uniformly emulsified with water, conforming to the requirements of the table below, and having a proven record of satisfactory service for at least two years prior to use in this contract.

RECYCLING AGENT		
Property	Requirement	Test Method
Residue, percent	55 minimum	ASTM D244 (1)
Viscosity at 60 degrees C, sq mm/sec 140 degrees F, 80-500 centistokes (2)	80-500	ASTM D2170/D2170M
Flash Point (3) Cleveland Open Cup (COC), degrees C F	350 minimum	ASTM D92
(1) Modify ASTM D244 evaporation test for percent residue by heating 50-gram samples to 148 degrees C 300 degrees F until foaming ceases; then cool immediately and calculate results.		
(2) Viscosity on the residue obtained from evaporation test.		
(3) Flash point on residue from evaporation test.		

2.3 SAMPLING AND TESTING

2.3.1 Sampling

Take all samples of [bituminous material] [recycling agent] in accordance with the requirements of ASTM D140/D140M, unless otherwise specified. All materials will be subject to approval before use. Submit samples of proper size for approval, not less than [_____] days before commencing the work. Furnish additional samples of materials as required during construction.

2.3.2 Testing

Testing [will be the Government's responsibility] [is the responsibility of the Contractor. Perform testing using an approved commercial testing laboratory or by the Contractor's testing laboratory, subject to the approval of the Contracting Officer]. Test the materials to establish compliance with the specified requirements. Before delivery of materials, submit certified copies of the test reports establishing compliance with specifications detailed herein and in referenced publications. Submit test results on materials prior to and during construction.

PART 3 EXECUTION

3.1 PREPARATION OF SURFACE

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NOTE: If the surface to be treated contains utility accesses, drainage systems, etc., which require repairs, the method of repairs and extent of work involved should be shown on plans and described in a separate section of the specifications.
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Repair all potholes, defective base areas, utility cuts, and large cracks. Adjust manhole covers, valve boxes, and like structures to the desired grade prior to pavement surface repair operations.

3.2 SCARIFYING OPERATION

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NOTE: Control the amount of heat applied to the pavement so that the heated pavement is not checked, charred, or otherwise damaged. The scarified pavement will not be heated while in a loosened, scarified condition. Experience has indicated that loose material on the surface tends to insulate the pavement, and thus less heat is absorbed by the pavement. Excess heat will burn the asphalt binder; however, sufficient heat should be applied to hold the temperature of the scarified material to a minimum of 90 degrees C 200 degrees F prior to the application of an overlay.
****

Use a heater scarifier to scarify the existing bituminous surface as shown. The temperature at which the work is performed, the nature and condition of the equipment, and the manner of performing the work should be such that no pavement damage occurs during the heating and scarifying operation. Accomplish heating with a unit or units that uniformly heat the pavement to the depth to be scarified. Uniformly spread the scarified material with the scarifier unit. Scarify the surface to a depth of at least 19 mm 3/4 inch. Do not heat the pavement while in a loosened, scarified condition.

3.3 APPLICATION OF BITUMINOUS EMULSION AND RECYCLING AGENTS

Uniformly apply the [bituminous emulsion] [recycling agent] with a bituminous distributor or other approved equipment at a temperature between 23 and 54 degrees C75 and 130 degrees F in quantities of not less than 0.20, nor more than 1.40 L/square meter 0.05, nor more than 0.30 gallon/square yard. The exact quantities, which may be varied to suit field conditions, will be determined by the Contracting Officer. Apply the [emulsion] [recycling material] while the scarified material is hot. The bituminous material or recycling agent should be added after the heating process and before the scarification process.

3.4 COMPACTION

When a surface treatment is to be added, compact the scarified surface to provide a density that results in less than 8% air voids. When a thin asphalt overlay is to be applied the overlay asphalt material will be added on top of the scarified surface behind the scarifier. This can be placed prior to compaction of the scarified material and all material compacted together or it can be added after the scarified material has been compacted. Compact the entire area including the overlay and

scarified material to a density that provides less than 7% air voids.

3.5 COMPLETION OF PAVEMENT

After application of [bituminous emulsion] [recycling agents] complete pavement construction.

-- End of Section --