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USACE / NAVFAC / AFCESA / NASA UFGS-32 01 25 (August 2008)  
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Preparing Activity: USACE Superseding  
UFGS-32 01 25 (April 2006)

## UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMLR dated October 2008

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SECTION 32 01 25

HEATER SCARIFYING OF BITUMINOUS PAVEMENTS  
08/08

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

Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable items(s) or insert appropriate information.

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

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).

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PART 1 GENERAL

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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 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 MEASUREMENT AND PAYMENT PROCEDURES

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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 Methods of 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 D 1250** 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 to the closest **mm** **inch** for width and the closest **meter** **foot** for length.

### 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

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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 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 (1983; R 2004) Spot Test of Asphaltic Materials

ASTM INTERNATIONAL (ASTM)

ASTM D 1250 (2007) Standard Guide for Use of the Petroleum Measurement Tables

ASTM D 140 (2001; R 2007) Sampling Bituminous Materials

ASTM D 2170 (2007) Kinematic Viscosity of Asphalts (Bitumens)

ASTM D 2397 (2005) Standard Specification for Cationic Emulsified Asphalt

ASTM D 244 (2004) Emulsified Asphalts

ASTM D 92 (2005a) Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester

ASTM D 977 (2005) Emulsified Asphalt

### 1.3 SYSTEM DESCRIPTION

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.

#### 1.3.1 Heater Scarifier

Provide a heater scarifier that is: 1) a self-propelled machine having, in combination, the means of heating and scarifying the existing asphaltic 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. The heating, scarifying, and spreading widths of the machine shall be equal.

### 1.3.2 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 distributor to spray the bituminous or recycling material in a uniform coverage at the specified temperature, and at readily determined and controlled rates with an allowable variation from the specified rate of not more than plus or minus 5 percent. The distributor shall be capable of being operated 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, a thermometer for reading the temperature of tank contents, and a hose attachment suitable for applying bituminous material to inaccessible areas and patches. Equip the distributor for circulation and agitation of the bituminous material during the heating process.

### 1.3.3 Cleaning Equipment

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

## 1.4 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation 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.

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" designation; submittals not having a "G" designation are for [Contractor Quality Control approval.][information only. When used, a designation following the "G" designation 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][; G, [\_\_\_\_]]

Samples of proper size for approval, not less than [\_\_\_\_] days before commencing the work. Furnish additional samples of materials as required during construction.

#### SD-06 Test Reports

##### Testing

Before delivery of materials, 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.

### 1.5 QUALITY ASSURANCE

#### 1.5.1 Sampling

Take all samples of [bituminous material] [recycling agent] in accordance with the requirements of ASTM D 140, unless otherwise specified. All materials will be subject to approval before use.

#### 1.5.2 Testing

Testing [will be the Government's responsibility] [is the responsibility of the Contractor, performed by an approved commercial testing laboratory or by Contractor's testing laboratory, subject to the approval of the Contracting Officer]. Test the materials to establish compliance with the specified requirements.

### 1.6 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 material 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 material 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 bituminous material which is an emulsified asphalt, Grade [\_\_\_\_], conforming to [ASTM D 977] [ASTM D 2397]. The asphalt from which emulsion is made shall 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 D 244 (1) |
| Viscosity at 60 degrees C, sq mm/sec (2)            | 80-500      | ASTM D 2170    |
| Flash Point (3) Cleveland Open Cup (COC), degrees C | 350 minimum | ASTM D 92      |

| RECYCLING AGENT                                     |             |                |
|---|-------------|----------------|
| Property  | Requirement | Test Method    |
| Residue, percent                                    | 55 minimum  | ASTM D 244 (1) |
| Viscosity at 140 degrees F, centistokes (2)         | 80-500      | ASTM D 2170    |
| Flash Point (3) Cleveland Open Cup (COC), degrees F | 350 minimum | ASTM D 92      |

(1) Modify ASTM D 244 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.

## 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.  
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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 shall result in no pavement damage 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. Depth of scarification shall be at least 19 mm 3/4 inch. The pavement shall not be heated while in a loosened, scarified condition.

### 3.3 APPLICATION OF BITUMINOUS EMULSION AND RECYCLING AGENTS

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NOTE: It is recommended that the bituminous material or recycling agent be added after the heating process.  
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Uniformly apply the [bituminous emulsion] [recycling agent] with a bituminous distributor or other approved equipment at a temperature between 23 and 54 degrees C 75 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.

### 3.4 COMPLETION OF PAVEMENT

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NOTE: Specifier will insert in the blanks the type of overlay or surface treatment to be used in conjunction with the heater scarifying procedures.  
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After application of [bituminous emulsion] [recycling agents] complete pavement construction in accordance with Section [\_\_\_\_\_].

-- End of Section --



