

## ASPHALT SURFACE RECYCLING OF EXISTING PAVED SURFACES

### 1. SCOPE

1.1 This item shall be part of a multi-step process of asphalt surface rehabilitation that consists of softening the existing flexible pavement with heat and thoroughly stirring, spinning or tumbling the mixture, applying an asphalt plasticizing or softening agent, reshaping and compacting the scarified surface and installing a surface treatment or overlay.

### 2. EQUIPMENT

#### 2.1 Heater Scarifier:

2.1.1 The heater-scarifier machine shall be one self-contained machine specifically designed to reprocess upper layers of existing asphaltic pavements. The heater-scarifier machine shall be self propelled and completely self contained unit capable of operating at speeds of ten (10) to twenty (20) feet per minute while uniformly heating, scarifying, applying plasticizer, mixing, and screeding the existing pavement to a minimum depth of one and one half inches (1 1/2") at a minimum temperature of 225 degrees F. The wheel base shall not be less than eighteen feet (18') and the total weight shall not be less than 25,000 pounds.

#### 2.2 Heating Unit:

2.2.1 The heating unit shall consist of multi-rows of burners of a type specifically designed for and capable of producing 48 million BTUH; LPG will be used for the heating fuel to prevent detrimental sooting or oil coating of aggregate or asphaltic materials and to be in compliance with the standards of the State's Air Pollution Control Laws. The BTUH production rate is based upon heating twelve (12') feet wide. Burners shall be located on the front and/or rear of the heater boxes spaced twenty-four (24") inches apart to achieve proper heat penetration at the required temperature while causing no injury due to overheating of the asphaltic surface.

2.2.2 The entire burner assembly shall be so designed so that it may be raised or lowered by a single control and capable of articulation. The burner assembly shall be adjustable in width from four (4') to twelve (12') feet. The entire heating unit shall be enclosed and vented to contain the heat and prevent damage to plant material or any structures along the roadway. Each unit shall be equipped with an on board 1,000 gallon water system to be used to adequately reduce the temperature of the exhaust in the venting system thereby preventing desiccation of trees and shrubs by evapotranspiration due to high heat. Hand hoses with adjustable nozzles will be placed on each unit to allow for prewetting of specific plants or objects.

2.2.3 All equipment shall conform to Federal, State, and Local DOT and Fire Marshall Regulations, and Laws relative to the transportation of LPG.

#### 2.3 Scarifying Unit:

2.3.1 The scarifying unit shall consist of spring loaded teeth adjustable in width from four (4') to twelve (12') feet in increments of one (1") inch and constructed in one foot (1') sections to conform to the pavement contour to insure uniform penetration of the teeth and prevent damage to utility structures.

**2.4 Spray Unit:**

2.4.1 Immediately behind the teeth of the scarifying unit, an application of plasticizing or softening agent shall be applied to the newly remixed area. Nozzle size on the spray bar and pump pressure shall be of a combination that will deliver the approved rate of application according to the forward speed of the machine. The heating unit on the storage tank for the plasticizing or softening agent shall be thermostatically controlled to maintain an even specified temperature. The application of plasticizer or a softening agent shall be mixed into the scarifier material by mixing tines that are located immediately behind the spray bar.

2.4.2 In addition to the above, it will be required that the spraying unit on the machine be equipped with an electronic, digital measuring system to constantly monitor the quantity of rejuvenating agent being applied. This device will be calibrated to show gallons used to the nearest tenth.

**2.5 Screed and Initial Compaction Unit:**

2.5.1 The hot scarified material shall be uniformly distributed to the desired longitudinal and transverse section by the use of an attached, heated vibratory screed. The screed must be equipped with an adjustable crown control and each end of the screed must have handwheel adjusting screws for providing the desired longitudinal and transverse section.

**3. CONSTRUCTION:**

3.1 The entire area to be resurfaced shall be cleaned of all deleterious material. If required, the owner shall broom clean the area prior to commencement of work or specify contractor to do the same. The existing asphaltic material shall be heated, scarified and mixed to a minimum depth of one and one half inches (1 1/2"). Under no circumstances shall the scarifying teeth penetrate into the existing base.

3.2 The heated plasticizing or softening agent shall be applied immediately following the scarifying teeth. Under no circumstances shall a cold agent or emulsion be considered. The hot scarified material shall then be tined mixed and uniformly distributed to the desired longitudinal and transverse section by the use of an attached, heated, vibratory screed. Directly behind the screeding process shall be an 8 to 12 ton roller for compaction.

3.3 Whenever possible, within ten (10) days, or when weather permits the recycled area shall be covered with a wearing course of Micro-Surfacing, Chip Seal, or Bituminous Concrete (minimum one (1') inch thickness) placed in accordance with standard specifications of each process.

3.4 At all manholes, value boxes, etc., the finished grade of the heater-scarifying process shall be transitioned to blend into the existing grade.

**4. MEASUREMENT:**

4.1 Asphalt recycling performed and application of rejuvenating agent shall be measured by the square yard.

**5. PAYMENT:**

Specification No. 20.

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5.1 Prices shall include all labor, equipment, materials, fuels, supplies, rejuvenating agent, mobilization, bond and insurance required to complete the above item. Payment for the heater, scarifying, screeding and application of rejuvenating agent will be made at the price bid per square yard. Price bid will not include necessary traffic control. Payment shall be made for completing this item according to plans and specifications under the following items:

<u>ITEM #</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
	Asphalt Surface Recycling	Per Square Yard

The properties of the asphalt modifier shall conform to the ones listed below (or approved equal), and shall be heated to a minimum of 150°F prior to application.

**TYPICAL CHARACTERISTICS**

<u>TEST</u>	<u>TYPICAL</u>	<u>PROPOSED</u>	
		<u>ASTM RA-2</u>	<u>MIN. MAX.</u>
Specific Gravity 60/60°F	0.9983		
Viscosity 100°F, cSt	770		
Viscosity 122°F, cSt	320		
Viscosity 140°F, cSt	150	50	350
Viscosity 210°F, cSt	20		
Viscosity 275°F, cSt	7.5		
Flash, COC, °F	500	400	--
Aniline Point, °F	110		
Pour Point, °F	+ 80		
Saturates, %	16	--	30
Thin film Oven Test			
Loss on Heating, %	0.7	--	3
Viscosity 140°F, cSt	230		
Viscosity Ration 140°F	1.40	--	4
Chemical Composition			
Clay-Gel Analysis, Wt. %			
Asphaltenes	0.1		
Polar Compounds	10 - 12		
Aromatics	70 - 75		
Saturates (Paraffins)	13 - 18		
Ratio Resin/Paraffins	0.6 - 0.9	0.5	--

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