

SPECIFICATIONS FOR  
HOT IN-PLACE ASPHALT RECYCLING  
HEATER SCARIFICATION OF EXISTING ASPHALT PAVEMENT

1.0 DESCRIPTION:

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 rejuvenator, milling/remixing, reshaping and compacting the hot in-place recycled surface. Installing a surface treatment or overlay is a separate and/or concurrent function of this work.

2.0 EQUIPMENT REQUIREMENTS:

A. Preheater: The preheating machine shall be one self-contained machine specifically designed to heat the upper layers of the existing asphaltic pavements. The preheating machine shall be a self-propelled and completely self-contained unit capable of operating at speeds from ten (10') feet to twenty-five (25') feet per minute while uniformly heating the existing surface of the asphalt.

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 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 of the heater boxes spaced no more than ten (10") inches apart to achieve proper heat penetration at the required temperature while causing no injury due to overheating the asphaltic surface.

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 eight (8') feet to fourteen (14') 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 500 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.

B. Heater-Scarifier: The heater-scarifier machine shall be one self-contained machine specifically designed to reprocess upper layers of existing asphalt pavements. The heater-scarifier machine shall be a self-propelled and completely self-contained unit capable of operating at speeds of ten (10') to twenty-five (25') feet per minute while uniformly heating, scarifying, applying rejuvenator, mixing, and screeding the existing pavement to a minimum depth of one (1") to one and one-half (1-1/2") inches at a minimum temperature of 250 degrees Fahrenheit. The wheel base shall not be less than eighteen (18') feet and the total weight shall not be less than 35,000 pounds.

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All equipment shall conform to Federal, State and local DOT and Fire Marshall regulations, and laws relative to the transportation of LPG.

C. Scarifying Unit: The scarifying unit consists of no less than two rows of spring loaded, carbide tip teeth adjustable in width from eight (8') to fourteen (14') feet in increments to one (1") inch and construction in one (1') foot sections to conform to the pavement contour to insure penetration of the teeth and prevent damage to utility structures.

D. Spraying Unit: Immediately behind the teeth of the scarifying unit, an application of a polymer modified rejuvenator shall be applied to the newly remixed area. Nozzle size on the spray bar and pump shall be a combination

that will deliver the approved rate of application according to the forward speed of the machine in conjunction with discretion of Highway Superintendent. The tank on the machine shall be heated, and the heating unit on the storage tank for rejuvenator shall be thermostatically controlled to maintain an even specified temperature.

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

E. Mill/Remixer Unit: Immediately following the application of the recycling agent, a dual-drum enclosed mill shall mill the heated asphalt to the depth of the heat thoroughly mixing the rejuvenating agent with the scarified and milled material. This mill/remixer system shall be an integral part of the scarifying machine and shall be located between the spraying system, which applies the rejuvenator, and the screed. This mill/remixer system shall be fully hydraulically operated and shall be able to work at variable speeds from 0 to 60 rpm, and shall be retractable from 14.6 ft. to 8.6 ft. wide. This mill shall also be able to break in the center to allow for quarter point and crown control.

No heater scarification can take place without this unit present and in operating condition.

F. Screed and Initial Compaction Unit:

1. Screed: The hot Scarified material shall be uniformly distributed to the desired longitudinal and transverse section by the use of a heated, augered 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.

2. Compaction Unit: Immediate compaction shall take place with rolling equipment of sufficient type and size to compact the recycled bituminous material to the required density. Normally this can be accomplished with the application of an eight (8) to twelve (12) ton vibratory roller. State specifications for bituminous concrete surfaces shall apply.

### 3.0 CONSTRUCTION REQUIREMENTS:

- A. Pavement Preparations: 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 the contractor to do the same. The Contractor is required to provide traffic control.
- B. Heating, Scarifying, Leveling, and Rejuvenating: The existing asphaltic material shall be heated, scarified and mixed to a minimum depth of one (1") inch. Under no circumstances shall the scarifying teeth penetrate into the existing base.
- B. The heated polymer modified rejuvenator shall be applied immediately following the scarifying teeth. The polymer modified rejuvenator is specifically formulated for use with the hot in-place recycling, and therefore, shall not be substituted.

The hot scarified material shall then be mill/remixed immediately following the application of the recycling agent to eliminate premature compaction of the hot recycled asphalt resulting in final differential compaction and to the desired longitudinal and transverse section by the use of an attached, heated, augured screed. Directly behind the screed process shall be an 8 to 12 ton roller for compaction

- C. Overlay: The application of the final wearing surface consisting of either hot mix asphalt pavements, nova-chip, micro-paving, or chip seals follow after a prescribed interval or delay. These materials are applied with conventional equipment in conformance with standard construction methods. NOTE: Surface treatment not included in unit price (work to be done by others).

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

### 4.0 METHOD OF MEASUREMENT

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

### 5.0 BASIS OF PAYMENT:

Prices shall include all labor, equipment, materials, fuels, supplies, rejuvenating agent, mobilization, bond and insurance required to complete the above item. Payment for heating, scarifying, application of rejuvenating agent,

milling/remixing, and compaction will be made at the price bid per square yard.

### SPECIFICATIONS FOR EMULSIFIED RECYCLING AGENTS

These specifications cover emulsified recycling agents to be used in cold mix recycling or hot in-place recycling. The final acceptance of these materials shall be based on their performance to (a) restore the aged “old” asphalt characteristics to a consistency level appropriate for construction purposes, (b) restore the aged asphalt to its optimal chemical characteristics for durability, (c) provide sufficient additional binder to coat new aggregate that is added to the recycled mixture, and (d) provide sufficient additional binder to satisfy mixture design requirements.

Note: All samples shall be shipped and stored in clean, airtight, sealed wide mouth jars or bottles made of plastic. The specific gravity of the emulsified recycling agent shall be reported for each shipment.

TEST	ASTM METHOD	MIN.	MAX	ERA-5 ERA-25P	
				MIN.	MAX
Viscosity, Saybold Furol @ 25 C, sec.	D244	15	85	15	85
Storage Stability Test, 1 Day	D244	–	1.0	–	1.0
Sieve Test, Retained on No. 20 Sieve Percent	D244	–	0.1	–	0.1
Cement Mixing, Test Percent	D244	–	2.0	–	2.0
Residue by Evaporation Percent	D244	65	–	65	–
Tests on Residue Viscosity @ 60 C cst	D2170	200	800	1000	5000
Torsional Recovery				20	–
Base Recycling Agent (ie. Prior to emulsification)	D4552		RA-5	RA-25	