

Section 2309. Surface Recycling by Heater Scarification

2309.01 DESCRIPTION.

- A.** Recycle the existing asphalt pavement surface by heater scarification, and resurface with HMA.
- B.** Heater scarification and resurfacing is part of a multi-step process of asphalt surface rehabilitation. This rehabilitation consists of:
 - 1. Preparing the existing asphalt surface,
 - 2. Softening the surface with heat,
 - 3. Scarifying the surface, and
 - 4. Thoroughly stirring or tumbling and leveling the mixture in preparation for an asphalt surface course overlay.
- C.** The work includes furnishing and placing the new surface course.

2309.02 MATERIALS.

Use surface course materials that meet the requirements for the type of mixture specified.

2309.03 CONSTRUCTION.

A. Equipment.

1. Heater Scarifier.

- a.** Use a heater scarification operation consisting of preheater and heater scarification unit, capable of processing at a rate of at least 1500 square yards per hour (1250 m²/h) over a minimum one lane width of 12 feet (3.6 m).
- b.** Use an equipment type for preheating, heating, and scarifying that has either:
 - Operated successfully on similar work for the Contracting Authority, or
 - Has proven through test results or other previous experience, or both, that it is satisfactory to the Engineer.
- c.** Equipment test results and other previous experience may be submitted to the Engineer prior to the letting for review.
- d.** Use preheating and heater scarification equipment designed for the purpose of pavement heating and capable of producing at least 10 million BTUs per hour (10 GJ/h). Apply heat under an enclosure or shielded hood.
- e.** Accomplish scarifying with pressure loaded rakes or scarifiers. Where scarifying to an existing curb and gutter line is required, equip the scarifying unit to scarify, and move away from gutter aprons, a 1/2 inch (13 mm) by 4 foot (1.2 m) path of existing material. Use a scarifier that will ensure continuous and

undiminished pavement contact without damaging utility accesses and valve boxes.

- f. Use a leveling unit capable of:
 - Distributing the heated and scarified material over the width being processed to produce a uniform cross section, and
 - Windrowing excess material to one side for removal when necessary.

2. Hot Mix Asphalt Construction Equipment.

For batching, mixing, hauling, placing, and compacting the surface course, use equipment meeting the requirements for the type of mixture specified.

B. Paving Plant Operation.

Meet the requirements for the type of mixture specified.

C. Construction.

1. Surface Preparation.

- a. Complete base repair, if required, according to [Section 2212](#). Locations of full depth patches will be designated by the Engineer.
- b. Prepare the surface to be heater scarified by cleaning trash, debris, earth, or other deleterious substances present in sufficient quantity to interfere with the work.

2. Heating and Scarifying.

- a. Evenly heat and scarify the pavement surface (as a continuously moving operation) for the full width designated in the contract documents. Ensure this combination will not char or otherwise damage the existing pavement material through exposure to heat or fire. Rate of delivery of the overlay mixture may limit the processing rate.
- b. Control the heating operation to prevent open flame from exiting from under the heater. The Engineer may require that the operation be stopped when:
 - The prevailing wind velocity exceeds approximately 10 mph (16 km/h) and a potential hazard exists, or
 - Heating and scarifying are not possible.
- c. Scarify to a minimum depth of:
 - 1) 3/4 inch (20 mm) at the highest points, such as the edge and the high point between the wheel paths.
 - 2) 1/2 inch (15 mm) at the lowest points, such as the wheel paths.
- d. The required depth of scarification may be changed by the contract documents. Scarify to at least the depth specified with pressure loaded scarifiers that plow through the pavement and loosen it without fracturing or segregating the aggregates.
- e. Ensure the surface temperature of the old pavement is below 475°F (245°C) during heating. Ensure the heated material has a temperature in a range between 220°F to 260°F (105°C to 125°C), measured immediately behind the heater scarifier. Uniformly and evenly heat the remixed layer throughout. Uncontrolled heating,

causing differential softening of the upper surface, will not be permitted. Extend the heating operation at least 4 inches (100 mm) beyond the width of the scarification on both sides.

- f. When a heater scarifier pass is being made adjacent to a previously placed mat, remove all damaged material and replace.

3. Leveling.

- a. Following the heater scarification, level the surface to provide a uniform cross slope.
- b. Use a method that consists of either of the options below, following the scarifier as closely as possible, to redistribute and level the scarified material:
 - An approved system of augers with a strike off plate or screed which is an integral part of the scarifying machine, or
 - An asphalt paving machine meeting the requirements of [Article 2001.19](#).

4. Hot Mix Asphalt Surface Course Overlay.

- a. After reshaping the scarified mix and before the temperature drops below 170°F (77°C), place a uniform layer of new surface course material at the rate shown in the contract documents. The Engineer may direct additional mixture to be added to correct irregularities.
- b. Use equipment that meets the requirements of [Article 2001.19](#) for placing and finishing the new surface. A non self propelled paving machine attached to the heater scarifier may be used provided the screeding unit complies with the requirements of that specification.
- c. When a self propelled paving machine is used, place the new surface within 400 feet (120 m) of the scarification operation or before the surface temperature cools to 170 °F (77 °C), whichever occurs first.
- d. Provide for alignment and control of the scarification operation. Obtain the Engineer's approval for the method used.

D. Compaction of Mixture.

After the new surface course is spread, promptly and thoroughly compact all the mixture according to [Article 2303.03, C, 5, c](#).

E. Joints.

Construct joints according to the requirements of [Article 2303.03, C, 6](#), and as shown in the contract documents.

F. Finished Surface.

1. Ensure the finished pavement elevations comply with the requirements of the contract documents, and the finished cross slope is a plane surface with a slope as shown.
2. Ensure all edges, radii, and handwork have a neat and finished appearance.

G. Safety Procedures.

1. Prior to construction in cities, towns, or built up areas; contact the fire chief to solicit a recommended safety procedure to be followed. Follow these recommendations. In addition to any other recommendations, follow the procedure below:
 - a. Ensure owners of underground utilities in the areas have checked the areas for possible gas leaks in or around their lines.
 - b. Ensure the city has checked storm sewers and sanitary sewers in the area for accumulations of sewer gas.
 - c. Ensure service stations and other businesses handling flammable fuels have been advised not to dispense these fuels while the heater burner is being operated within 100 feet (30 m) of their business places.
 - d. Plan the operation so as to be as safe as possible for persons and property adjacent to the work, including the traveling public. Keep this route open to traffic. Limit the operation so as to provide for this traffic. Work may need to be conducted during periods of light traffic.
2. Take such additional precautions as is reasonable for the safety of the operation.
3. The Contractor shall hold the Contracting Authority and the State harmless for any damage or loss resulting from an accident, during the heating operation, caused by failure to fulfill the obligations as outlined in these requirements.

H. Limitations.

Apply [Article 2303.03, C, 4](#).

2309.04 METHOD OF MEASUREMENT.

Measurement will be as follows:

A. Surface Recycling by Heater Scarification.

Computed as provided in [Article 2303.04, A, 3](#), for the areas satisfactorily prepared, heated, scarified, leveled, and resurfaced (new mix excluded).

B. Hot Mix Asphalt Mixture.

As provided in [Article 2303.04](#) for the type specified.

2309.05 BASIS OF PAYMENT.

Payment will be as follows:

A. Surface Recycling by Heater Scarification.

1. Contract unit price for the square yards (square meters) measured as provided above.
2. Payment is full compensation for furnishing labor and materials for surface recycling by heater scarification as described above.

B. Hot Mix Asphalt Mixture.

As provided in [Article 2303.05](#) for the type specified.