

CITY OF ALBANY

Standard Specifications Technical Provisions

Section 11

Hot Surface Recycling

11-1 General — The work covered by this section of the specifications consists of furnishing all labor, equipment and materials and performing all operations in connection with heating, scarifying, leveling, compacting, and applying a recycling agent.

11-2 Cleaning — Prior to commencing heater scarifying operations, the pavement shall be cleaned of all loose material and vegetation. Power brooms shall be supplemented when necessary by hand brooming and such other tools as required to bring the surface to a clean, suitable condition, free of deleterious material. Any required failed area repair shall be completed prior to beginning the process. The locations of required repair will be marked in the field by the Engineer. Intruding concrete and asphalt concrete ramps in the street shall be removed as approved by the Engineer.

11-3 Equipment — The equipment used to heat and scarify asphalt surfaces shall fully meet State and Local Air Pollution Standards. The combustion chamber shall be insulated and totally enclosed to provide sufficient heat to the pavement in order to achieve specified performance. The machine shall be equipped with multiple rows of spring equalized scarifier to insure a viscous shearing of the heated asphalt and to provide uninterrupted scarification contiguous to rigid structures. A competent operating crew shall be provided.

The equipment used to distribute and level the scarified material shall be an approved paving machine equipped with a heated tamping or vibratory screed. The contractor may furnish another type screed if approved by the Engineer. The machine must be capable of screeding the full width of scarified material. A competent operating crew shall be provided.

One twelve (12) ton or greater pneumatic-tired roller and operator shall be furnished to compact the scarified material.

On cab-controlled, liquid spreader with operator shall be furnished to distribute the asphalt recycling agent.

11-4 Construction Methods — Contractor shall heater-scarify from the gutters toward the center of streets in a manner as approved by the Engineer. A minimum of two heater units will be utilized in tandem so that the heat emitted and the rate of travel will achieve specified requirements.

The number of additional heater units shall be determined by the contractor; however, only the scarifier rake on the final heater unit of the series shall scarify.

The existing asphalt surface shall be heated from 6 to 12 inches wider than the width to be processed. The temperature of the scarified material shall be a minimum of 220°F and shall not exceed 300°F when measured with a stick thermometer immediately behind the scarifier.

The weight of existing asphalt surface has been estimated to be approximately 144 pounds per cubic foot. On this basis, a minimum of nine pounds per square foot of existing surface shall be scarified to obtain a depth of not less than 0.07 feet. IF the tests indicate that the material weighs either less than 137 or more than 151 pounds per cubic foot, the weight per square foot requirement will be adjusted accordingly by the Engineer.

Scarification will be deemed acceptable when the moving average of three consecutive random weight tests per hour indicates that the required depth has been scarified. The weight of the existing asphalt surface will be determined in accordance with the requirements of AASHTO T-166 from scarified material compacted in accordance with requirements of AASHTO T-245, with the exception that the compaction temperature shall be a minimum of 260°F.

The scarified material shall be distributed and leveled only for the width processed and rolled immediately while it possesses sufficient heat to be properly compacted. The specified grade of recycling agent shall be applied diluted 2 parts recycling agent, preferably within 30 minutes, but in no event more than 8 hours after compaction. The rate of application shall be determined by the Engineer based on preconstruction laboratory analysis and adjustments for varying field conditions.

It is the contractor's responsibility to notify and arrange with utility companies for the protection and modification of their improvements in hot surface recycling areas, and to protect all City-owned utility covers, of no expense to the City.

The asphalt recycling agent shall be composed of a petroleum base resin uniformly emulsified with water and shall conform to the following physical and chemical requirements:

GUIDELINES FOR ASPHALT RECYCLING AGENTS

	Test Method		Requirements			
			Light Grade		Medium Grade	
Test on Emulsion:	ASTM	AASHTO	Min.	Max.	Min.	Max.
Viscosity @ 25°C, SFS	D244-77	T59-74	15	85	15	85
Residue, %	D244-77 (Mod) ¹	T59-74 (Mod) ¹	60	—	60	—
Cement Mixing Test, %	D255-77	T59-74	—	2.0	—	2.0
Sieve Test, %	D244-77 (Mod) ²	T59-74 (Mod) ²	—	0.1	—	0.1
Particle Charge Test	D244-77	T59-74	Positive		Positive	
Test on Base Oil³:						
Original						
Viscosity @ 60°C, cST	D2170-76	T201-74	80	500	1000	4000
Flash Point, COC, °C	D92-78	T48-74	204	—	210	—
Saturates, % ⁴	D2007-75	—	—	30	—	2.5
Asphaltenes, %	D2006-70	—	—	1.5	—	9.0
PC/S Ratio ⁵	D2006-70	—	0.5	—	0.5	—
Maltenes Distribution Ratio (PC+A ₂)/(S+A ₂) ⁵	D2006-70	—	0.2	1.0	0.2	1.2
Test on Residue From RTF-C Oven Test @ 163°C						
Viscosity Ratio ⁶	D2170-76	T201-74	—	3.0	—	2.5
RTF-C Oven Wt. Change, %	D2872-77	T240-73	—	6.5	—	2.0

¹ASTM D244 Modified Evaporation Test for percent residue is made by heating a 50 gram sample to 149°C until foaming ceases, then cool immediately and calculate results.

²Test procedure identical with ASTM D244 except that distilled water shall be used in place of 2% sodium oleate solution.

³Values obtained on the emulsion's residue may vary slightly from the base oil.

⁴ASTM D2006-70 can be used for the determination of saturates.

⁵In the Maltenes Distribution Ratio Test by ASTM Method D2006-70

PC = Polar Compounds A₁ = First Acidaffins
A₂ = Second Acidaffins S = Saturates

⁶Viscosity Ratio =
$$\frac{\text{RTC-C Viscosity @ 60°C, cST}}{\text{Original Viscosity @ 60°C, cST}}$$

11-5 Prequalification Clause — The Engineer shall require the successful bidder to submit a list of five comparable size projects performed using the equipment and techniques specified. Said list shall include the agency, name, address and telephone number of Engineers in charge.

In lieu of the above, the Contractor may qualify his equipment by a demonstration on this or comparable work to the satisfaction of the Engineer. Equipment not approved by the Engineer shall be removed from the project and acceptable machines supplied. The cost of this demonstration shall be borne by the supplier.

Street trees and plants in the parking strip area shall be sprayed with water to protect from heat and flame immediately prior to heater scarifying operation.

11-6 Air Quality Preservation — The machine shall be operated in compliance with standards of the Bay Area Air Quality Control District.

11-7 Application of overlay — Asphalt concrete surfacing in accordance with Section 9 of these specifications shall be done immediately after hot surface recycling. The Contractor shall clean the surface of the area to be paved prior to the paving operation.

11-8 Measurement — Heating, scarifying, leveling and compacting of the pavement shall be paid for at the contract unit price per square yard.

11-9 Payment — The contract unit price paid per square yard of hot surface recycling shall include full compensation for furnishing all labor, materials, tools, recycling agent and equipment, and doing all other incidental work involved in recycling the existing asphalt concrete surface as specified, and no additional payment should be made therefor.