SECTION 409

SEAL COAT

409.1 Description. This work shall consist of the application of bituminous material followed by the application of cover coat material in accordance with these specifications and as shown on the plans or as directed by the engineer.

409.2 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section
Aggregate for Seal Coats (The grade of aggregate will be specified in the contract.)	1003

409.2.1 Asphalt binder shall meet the following criteria:

Asphalt Binder Requirements			
Tests on Asphalt Binder[a]	**Test Method**	**Minimum**	**Maximum**
Penetration @ 77°F	ASTM D 5	60	150
Elastic Recovery @ 50°F, %	AASHTO T 301	65	---

[a]These tests shall be done on the asphalt residue for emulsions and cutbacks.

409.2.2 Pre-coating binder shall be in accordance with Sec 1015 for PG binder or emulsions.

409.3 Job Mix Formula. Prior to placing the seal coat, the contractor shall submit the mix design to the engineer for approval.

409.3.1 The mix design shall contain the following information:

(a) Source, grade and certified test results for the asphalt binder.

(b) Source, type (formation, etc.), ledge number if applicable, and gradation of the aggregate.

(c) The grade and certified test results for the aggregate.

(d) The application rate used to pre-coat the aggregate as allowed in Sec 1003.

(e) The percent binder application rate, gallons per square yard (L/m^2).

(f) The aggregate application rate, pounds per square yard (kg/m^2).

(g) The sweep test results, MoDOT Test Method TM 72, percent loss.

409.3.2 The sweep test of bituminous surface treatment samples shall meet the following criteria:

Sweep Test Requirements				
	Test Method	**Grade A**	**Grade B**	**Grade C**
Sweep Test, conditioned 1 hour at 35 C, % loss (max)	MoDOT Test Method TM 72	15	40	n/a

409.3.3 The application rates shall not vary from the mix design by more than the following amounts:

Material	Tolerance
Asphalt Binder	– 0.05 to + 0.15
Aggregate	+ 5

409.4 Equipment. The following equipment or the equivalent will be required:

(a) A system for heating and applying bituminous material. The system shall be designed, equipped, maintained and operated such that liquid asphalt at even heat may be applied uniformly on variable widths of surface up to 15 feet (4.5 m) at readily determined and controlled rates from 0.02 to 1.00 gallon per square yard (0.1 to 4.6 L/m^2), with uniform pressure, and with an allowable variation from any specified rate not to exceed 0.02 gallon per square yard (0.1 L/m^2). The system shall include a calibrated tank and a thermometer for measuring temperature of tank contents. The system shall be equipped with instrumentation that continuously verifies application rates. The calibration of the system shall be approved by the engineer prior to use, and the contractor shall furnish all equipment, material and assistance necessary if calibration is required.

(b) A rotary power broom or vacuum sweeper.

(c) Self-propelled oscillating-type pneumatic-tire rollers. The tires shall have contact pressure of 80 psi or more on the road. Pneumatic-tire rollers shall be operated at a speed not to exceed 5 miles per hour (8 km/h).

(d) A self-propelled mechanical spreader capable of accurately measuring and uniformly spreading the aggregate over the full width of the bituminous material.

409.5 Construction Requirements.

409.5.1 Test Strip. A test strip 500 feet (150 m) long and the width of one lane shall be provided. The test strip will be evaluated for 24 hours after placement and will be subject to approval from the engineer before any further production. The test strip will be evaluated in accordance with Sec 409.7. If unsatisfactory, the test strip shall be removed and another strip placed for evaluation at the contractor's expense.

409.5.2 Weather Limitations. Bituminous material shall not be applied when either the air temperature or the temperature of the surface to be sealed is below 60 F (15.5 C). Bituminous material shall not be applied on a wet surface or when weather conditions would prevent the proper construction of the seal coat. Temperatures shall be obtained in accordance with MoDOT Test Method TM 20.

409.5.3 Preparation of Surface. The surface to be treated shall be thoroughly cleaned and swept to remove all mud, matted earth, dust and other foreign material.

409.5.4 Application of Bituminous Material. Bituminous material shall be applied in a uniform and continuous spread. Unless otherwise specified, the bituminous material shall be applied to one half the width of the surface at a time, with the center lap of the application

placed at the lane line of the traveled way and kept as narrow as practical. The adjacent lane shall be left open to traffic. On two-lane roadways with two-way traffic, the active work area shall not exceed 3 miles (5 km). The application on one lane shall not exceed that on the adjacent lane by more than 3 miles (5 km). The bituminous material shall be applied within the temperature range recommended by the manufacturer.

409.5.4.1 If the seal coat is to be placed on a bituminous surface, the placing of the seal coat will not be permitted until the underlying bituminous course has cured from 15 to 30 days, as directed by the engineer.

409.5.4.2 When required by the engineer for dust mitigation, the cover aggregate shall be pre-coated at a minimum rate of 0.5 percent residual asphalt by weight of aggregate.

409.5.5 Application of Cover Aggregate. Operations shall proceed in such a manner that bituminous material will not be permitted to chill, set up, dry or otherwise impair retention of the cover aggregate. Spreading shall be accomplished in such a manner that the tires of the trucks or aggregate spreader at no time contact the uncovered and newly applied bituminous material. All portions of the surface not covered by mechanical spreaders shall be hand spotted such that the entire surface will be uniformly covered. Light hand brooming may be necessary to distribute excessive aggregate.

409.5.5.1 After the embedded aggregate has set, the surface shall be broomed to remove all loose aggregate before the roadway, paved shoulders, intersections, etc., are opened to unrestricted traffic flow. At the discretion of the engineer, a second brooming may be required within 24 hours of initial placement to remove any loose aggregate.

409.5.5.2 Any bituminous material on adjacent Portland cement or asphaltic concrete pavements, curbs, bridges or any areas not specified to be sealed shall be removed by the contractor, at the contractor's expense.

409.6 Traffic Control. No traffic shall be permitted on the seal coat until all rolling has been completed. The contractor shall control traffic until all loose aggregate has been removed. The contractor's supply trucks shall observe the traffic controls.

409.7 Basis of Acceptance. Seal coat will be evaluated by the engineer based on the following criteria. Any of the following may be grounds for rejection:

(a) During normal traffic operations, the presence of any loose stone that may be picked off the surface by vehicles.

(b) During normal traffic operations, the presence of any dust that is a nuisance to adjoining properties or impairs visibility.

(c) During normal traffic operations, the presence of any bleeding or moderate tracking.

(d) Transverse or longitudinal construction joints from the chip seal application that are not straight and uniform and create a bump or poor riding joint.

(e) An asymmetric appearance seen in a chip seal surface characterized by longitudinal grooves or ridges in the surface.

(f) A surface not having complete aggregate coverage with holes or failures in the surface.

409.8 Method of Measurement. Final measurement of the completed seal coat will not be made except for authorized changes during construction, or where appreciable errors are found in the contract quantity. Where required, measurement of seal coat, complete in place, will be made to the nearest square yard (m^2). The revision or correction will be computed and added to or deducted from the contract quantity.

Basis of Payment. The accepted quantities of seal coat will be paid for at the contract unit price for each of the pay items included in the contract. No additional payment will be made for removing and replacing test strips. No separate payment will be made for pre-coating aggregate.