

State of Illinois
DEPARTMENT OF TRANSPORTATION
Bureau of Local Roads and Streets
SPECIAL PROVISION
FOR
BITUMINOUS HOT MIX SAND SEAL COAT

Effective August 1, 1969
Revised January 1, 2007

All references to Sections or Articles in this specification shall be construed to mean a specific Section or Article of the Standard Specifications for Road and Bridge Construction, adopted by the Department of Transportation.

Description. This item shall consist of the furnishing and spreading of a bituminous hot mix sand seal coat mixture to a compacted thickness of 19 mm (0.75 inch) or less all in accordance with the requirements of these specifications, and to the lines, grade, thickness and cross sections shown on the plans or established by the Engineer.

Materials. Materials shall meet the requirements of the following Articles of Section 1000 - Materials.

Item	Article/Section
(a) Fine Aggregate (Note 1)	1003.03 (a, b)
(b) Coarse Aggregate (Note 2)	1004.03 (a, b)
(c) Bituminous Materials (Note 3)	1032.01-1032.03, 1032.05, 1032.06, 1032.08

Note 1. The fine aggregate shall be of gradation FA-1. Stone sand shall not be permitted.

If approved by the Engineer, the material may be produced by blending aggregates from more than one source. The method of blending shall be by the use of aggregate feeders of the apron, drum, reciprocating, or other type approved by the Engineer, which shall provide for proportional and total feeding of the aggregates. The components of a blend need not be of the same kind of material. The source of material and blending proportions shall not be changed during the progress of the work without written permission from the Engineer.

Note 2. The coarse aggregate shall be of gradation CA-16.

Note 3. The contractor may use any one of the types of bituminous materials as shown in the table below. When more than one grade is shown for particular mixture, the Engineer reserves the right to specify the grade that shall be used.

Type of Construction	Bituminous Material
Prime Coat	MC-30 PEP
Bituminous Hot Mix Sand Seal Coat	MC-3000 RS-1, RS-2, HFE-90, HFE-150 PG 46-28, PG 52-28, PG 58-28, PG 58-22

Equipment. The following required items of equipment shall conform to Section 1100 - Equipment:

Item	Article/Section
(a) Tandem Rollers	1101.01 (e)(1)
(b) Three-wheel Rollers	1101.01 (e)(2)
(c) Hot Mix Plant	1102.01
(d) Spreading and Finishing Machine	1102.03

CONSTRUCTION REQUIREMENTS

General. The seal coat mixture shall be laid only on a base which is dry and only when weather conditions are suitable. No mixture shall be laid when the temperature of the air in the shade is below 10 °C (50 °F). No work shall be started if local conditions indicate rain is imminent.

Rolling shall be done with three-wheel and tandem rollers. The rollers shall weigh 7 to 11 metric tons (8 to 12 tons).

All surfaces shall be cleaned of dirt, debris, and loose material prior to placing the bituminous mixture.

Preparation of Base. When an existing bituminous concrete pavement is to be sealed, all excess crack filler and bituminous patches that contain an excess of bitumen or which are unstable in hot weather shall be removed. All bitumen shall be removed from cracks more than 38 mm (1.5 inches) wide. The Contractor shall perform this work in the most economical manner practicable and as directed by the Engineer. All waste material placed on the shoulders during the pavement cleaning operations shall be removed at the close of each day's work and shall be disposed of outside the limits of the right-of-way at locations acceptable to the Engineer. This work will be paid for in accordance with Article 109.04.

Prior to placing the seal coat mixture, all open cracks having a width of 13 mm (0.5 inch) or more, cracks that have been cleaned and depressions of 25 mm (1 inch) or more in the existing pavement or base, shall be completely filled with a bituminous mixture meeting the approval of the Engineer.

The mixture shall be tamped in place with hand tools. This work shall be completed at least 24 hours prior to placing the seal coat mixture.

Preparation of Aggregate and Bituminous Materials. The bituminous material for the prime coat, if required by the Engineer, shall be prepared according to Article 403.07 and applied according to Articles 403.10 and 403.11.

The aggregate and bituminous materials shall be heated to the following temperatures:

	Aggregate	Bituminous Material
Emulsified Bituminous Mixture	Not to exceed 150 °C (300 °F)	60 to 80 °C (140 to 180 °F)
Liquid Bituminous Mixture	Not to exceed 110 °C (225 °F)	Not to exceed 65 °C (150 °F)
Asphalt Cement Mixture	135 to 190 °C (275 to 375 °F)	120 to 180 °C (250 to 350 °F)

Preparation of Seal Coat Mixture. The heated aggregate and the bituminous material for the seal coat mixture shall be measured separately and accurately by weight. The bituminous mixture shall be made in the pug mill mixer. The bituminous material shall be added to the hot aggregate in less than 15 seconds. The wet mixing period shall produce a homogeneous mixture in which all particles of aggregate are coated uniformly. The total time required adding the bituminous material and completing the wet mixing shall be greater than 30 seconds.

The ingredients shall be heated and combined in such a manner as to produce a mixture which when discharged from the mixer should not, in general, vary more than 10 °C (20 °F) from the temperature set by the Engineer. In all cases, the temperature shall not exceed that shown in the table below.

Emulsified Bituminous Mixture	Liquid Bituminous Mixture	Asphalt Cement Mixture
120 °C (250 °F)	110 °C (225 °F)	180 °C (350 °F)

The ingredients of the seal coat mixture shall be combined in such proportions as to produce a mixture conforming to the following table:

MIXTURE COMPOSITION			
Sieve	% Passing ¹		% Residual Bitumen ²
12.5 mm (1/2")		100	
9.5 mm (3/8")	98 -	100	
4.75 mm (No. 4)	75 -	90	
1.18 mm (No. 16)	35 -	70	
300 µm (No. 50)	5 -	20	
150 µm (No. 100)	2 -	6	
Residual Bitumen			

- 1 - Based on percent of total aggregate weight.
- 2 - Based on percent of total mixture weight.

The percentage of residual bitumen will be set by the Engineer. The right is reserved by the Engineer to make such changes in proportions during the progress of the work as deemed necessary. The asphalt content shall not vary \pm 0.5% from the bitumen content set by the Engineer.

Transportation of Mixture. This work shall be done in accordance with Article 1030.08.

Bituminous mixture which may not be spread and compacted during daylight shall not be sent to the work unless artificial light satisfactory to the Engineer is provided. The bituminous mixture shall not be hauled when the weather or road conditions are such that the hauling operations cause cutting up or rutting of the base, or the tracking of mud on the primed base or partially completed work.

Placing of Bituminous Mixture. The seal coat mixture shall be delivered at a temperature established by the Engineer commensurate with the mix temperature. The bituminous mixture shall be placed true to crown and grade with a spreading and finishing machine. The bituminous mixture may be spread and finished by approved hand methods only where machine methods are impractical, as in the case of special areas which because of irregularity, inaccessibility, or unavoidable obstacles do not lend themselves to mechanical placing. When the bituminous

mixture is placed in partial widths, the individual widths of the seal coat shall conform to the traffic lanes.

Placing of the bituminous mixture shall be as continuous as possible, and shall always be away from a transverse joint. The base or existing surface shall be kept clean, and any foreign material shall be removed to the satisfaction of the Engineer before the seal coat is placed.

The spreading and finishing machine shall spread the bituminous mixture without tearing the surface and shall strike a finish that is smooth, true to cross section, uniform in density and texture, free from hollows, transverse corrugations, and other irregularities. When the machine causes surface irregularities such as hollows or transverse corrugations, the machine shall be repaired or adjusted not later than the end of the day's work and it shall be in good working condition before work is resumed.

The machine shall be operated at a speed that will insure, as nearly as possible, continuous operation. The operating speed shall meet the approval of the Engineer. If, in the opinion of the engineer, the production of the plant exceeds the amount that can be laid satisfactorily with one finishing machine, the production shall be decreased or two machines shall be used.

The outside edges of the seal coat shall be sloped and pressed in place by means of a self-adjusting, constant pressure edge plate held in proper position on the finishing machine, except where the edges are supported by a curb, gutter or similar structure. A string line shall be used as a guide for the finishing machine in order to maintain a uniform edge alignment. If any other method is proposed, it shall meet the approval of the Engineer before being used. The edges of the finished seal coat shall be approximately vertical and no material shall extend beyond the limits of the base or existing surface.

Irregularities in alignment along the outside edges and along the longitudinal joint shall be corrected by adding or removing bituminous mixture before the edges are rolled. Excess bituminous mixtures deposited outside the limits of the lane being laid shall be removed immediately and disposed of as directed by the Engineer.

Compaction of Mixtures. Immediately after the seal coat mixture is placed it shall be compacted thoroughly and uniformly with a three-wheel roller or a tandem roller. Where initial rolling causes undue displacement, haircracking, or checking in the seal coat, the time of rolling shall be adjusted by the Engineer to correct these conditions.

One three-wheel roller and one tandem roller will be required on each project where the hourly production of the plant is 68 metric tons (75 tons) or less. One three-wheel roller and two tandem rollers will be required on each project where the hourly production of the plant is more than 68 metric tons (75 tons).

Rollers shall be operated by competent and experienced roller operators and shall be kept in operation as continuously as possible so that all parts of the pavement will receive substantially equal compaction at the time desired. During each 8 hour day of laying bituminous mixtures, each roller shall be engaged in actual rolling for more than 6.5 hours, and less than 1.5 hours shall be allowed for refueling, watering, and similar work. Delays in rolling freshly placed bituminous mixtures will not be permitted.

Rolling of the first lane of seal coat to be placed shall start longitudinally at the edge having the lower elevation and progress to the other edge, overlapping uniformly on successive trips by at least one-half the width of the rear wheels. Where laying the bituminous mixture adjacent to a previously placed lane, the first pass of the roller shall be along the longitudinal joint in such a manner that not more than one-third the width of the rear wheel is on the freshly placed mixture; after which the rolling shall proceed from the outside edge toward the longitudinal joint, overlapping uniformly on successive trips by at least one-half the width of the rear wheels. Succeeding trips of

the roller shall be terminated at least 1 m (3 feet) from the preceding stop. Each stop shall be regulated to prevent trapping of water on the rolled surface.

The roller shall not pass over an unprotected edge of the freshly laid bituminous mixture except when lying of the course is to be discontinued for any extended length of time.

The speed of the roller at all times shall be slow enough to avoid displacement of the bituminous mixture. If displacement occurs, it shall be corrected at once by raking and applying fresh bituminous mixture where required. To prevent adhesion of the bituminous mixture to the roller, the wheels shall be kept properly moistened but an excess of water will not be permitted.

Immediately after the initial rolling of the seal coat, the Contractor shall test the surface for smoothness with a 5 m (16 foot) straight-edge to locate high and low spots so that they may be corrected while the mixture is still workable. Rolling of the seal coat shall be continued until all roller marks are eliminated and the bituminous mixture is satisfactorily compacted.

When required by the Engineer, the seal coat shall be rolled diagonally in two directions with a tandem roller, the second rolling crossing the lines of the first, and if the width of the pavement permits, it shall also be rolled at right angles to the center line.

In all places inaccessible to the rollers, such as locations adjacent to curbs, gutters, headers, manholes, and similar structures, the required compaction shall be secured with hot tampers.

Any bituminous mixture that becomes loose, broken, mixed with foreign material, or which is defective in finish or density, or which does not comply in all other respects with the requirements of the specifications, shall be removed, replaced with suitable material, and finished in accordance with these specifications.

Protection of Pavement. The Contractor shall protect all sections of newly constructed seal coat from traffic until they have hardened to the satisfaction of the Engineer.

Method of Measurement. Bituminous priming material will be measured for payment as specified in Section 1032.

The seal coat mixture will be measured by weight in metric tons (tons). The mixture may be measured either by weighing the mixture on platform scales approved by the Engineer or on the basis of plant weights. If measured on the basis of plant weights, an occasional check will be made by weighing full truckloads of the bituminous mixture on an approved platform scale at the plant or an approved commercial scale. When the method of measurement is by truck weight, the weight of each load will be determined by weighing the truck each time before and after loading. If, during the course of construction, it becomes apparent that the weighman on the mixer platform or the weighman at the platform scale is not exercising proper care in weighing the bituminous mixture, he will be removed at the direction of the Engineer and replaced by a competent and qualified worker. Quantities of materials wasted or disposed of in a manner not called for in the contract will be deducted from the final total measured quantities. The contractor shall furnish approved duplicate load tickets upon which is recorded the net weight of the bituminous mixture in each truck. The tickets shall have sufficient space for signatures, identification of the bituminous mixture, date of delivery, and any other data that the Engineer may require. The Contractor shall submit one load ticket to the Engineer at the plant after the truck is loaded and the other load ticket to the Engineer at the work when the truck arrives.

Payment will not be made for seal coat mixture in excess of 105 % of the amount specified by the Engineer.

Basis of Payment. Prime Coat will be paid for at the contract unit price per metric ton (ton) or per liter (gallon) for BITUMINOUS MATERIALS (PRIME COAT)

The seal coat mixture will be paid for at the contract unit price per metric ton (ton) for BITUMINOUS HOT MIX SAND SEAL COAT.