State of Illinois
DEPARTMENT OF TRANSPORTATION
Bureau of Local Roads and Streets

SPECIAL PROVISION FOR BITUMINOUS STABILIZED BASE COURSE PLANT MIX

Effective February 20, 1963
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 work shall consist of constructing a bituminous stabilized base course consisting of a mixture of aggregates and bituminous material on a prepared subgrade. Each layer of the base course shall be less than 100 mm (4 inches) compacted thickness.

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

	Item	Article/Section
(a)	Coarse Aggregate (Note 1)	1004.03, 1004.04
(b)	Bituminous Materials (Note 2)	1032.01 - 1032.04, 1032.06, 1032.08, 1032.09

Note 1. The granular material shall be of gradation CA-6 or CA-10

Note 2. 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 a particular method the Department reserves the right to specify the grade which shall be used.

Type of Construction	Bituminous Material
Prime Coat	MC-30 PEP
Base Course	MC-250, MC-800, SC-250, SC-800 HFE-150, HFE-300, MS-1, MS-2, CMS-1, CMS-2, SS-1, CSS-1

The same gradation of aggregate and grade of bituminous materials shall be used throughout the work.

Equipment. Equipment shall meet the requirements of the following articles of Section 1100 - Equipment.

	Item	Article/Section
(a)	Tandem Rollers	1101.01 (e)(1)
(b)	Three-wheel Rollers	1101.01 (e)(2)
(c)	Pneumatic-tired Rollers	1101.01 (a) or (c)
(d)	Vibratory Roller	1101.01 (g)
(e)	Mechanical Sweepers	1101.03
(f)	Hot Mix Plant (Note 1)	1102.01
(g)	Spreaders	1102.04
(h)	Pressure Distributor	1102.05
(i)	Heating Equipment	1102.07

(j) Graders 1102.10

Note 1. For bituminous aggregate mixture using Medium Curing Liquid Asphalt, a hot-mix plant conforming to Article 1102.01 will be required except: Articles 1102.01(a)(3), (b)(2), (b)(6), (b)(7), (b)(8), (b)(9), and (c)(1).

Metal housing or covers will not be required for the hot elevator, weigh hopper, and mixer. Aggregate feeders shall be of the apron, drum, reciprocating, or other type approved by the Engineer.

For bituminous aggregate mixture using Emulsified Asphalt Type, the above-described hot-mix plant may be used with modifications, or a plant meeting the following requirements may be used: The plant shall be continuous mixing or batch-type plant of approved design having a nominal capacity of not less than 60 tons (54 metric tons) per hour. The plant shall include a device for obtaining separate and accurate volume or weight measurements of the aggregate and bituminous material used in the bituminous mixture. The device shall be a type approved by the Engineer. The maximum capacity of the pug mill mixer shall be set by the Engineer.

At least one 10,000 gallon (38,000 liter) storage tank shall be located at the plant site for the storage of the emulsified asphalt. Suitable feeders shall be provided for conveying the aggregate to the pug mill mixer. A scalping device shall be provided for removing the oversized material.

Subparagraph (e) applies

CONSTRUCTION REQUIREMENTS

General. Except in specific cases when permitted by the Engineer in writing, this work shall be done only between April 15 and September 15. Bituminous materials shall be applied and bituminous mixtures placed only when the temperature of the subgrade, measured 2 to 3 inches (50 to 75 mm) below the surface, is above 50 °F (10 °C), and the air temperature in the shade is above 40 °F (4 °C). No work shall be started if local conditions indicate rain is imminent.

The subgrade shall be cleaned of all loose dirt, debris or other materials prior to placing any bituminous mixture thereon.

Sequence of Work. The construction operations shall be undertaken in the following sequence:

(a) Preparation of subgrade.
(b) Preparation and application of bituminous material for the prime coat.
(c) Preparation, transporting, spreading and rolling bituminous mixture.

Preparation of Subgrade. The subgrade shall be prepared in accordance with Section 301. It shall be compacted as specified in Article 301.05.

Preparation and Application of Bituminous Materials for Prime Coat. The bituminous material for the prime coat, if required by the Engineer, shall be prepared according to Article 403.05 and applied according to Articles 403.08 and 403.09.

The bituminous material for the mixture shall be transferred to the asphalt tanks and heated to the temperatures as follows:

	Temperature	
Type of Bituminous Material	Minimum	Maximum
Emulsified Asphalts	Workable	185 °F (85 °C)
Medium Curing Liquid Asphalts	Workable	Flash Point
Slow Curing Liquid Asphalts	Workable	Not to exceed Flash Point or 275 °F (135 °C)

Composition of Mixture. The base course mixture prepared by the methods of mixing described herein shall conform to the following composition limits by weight:

Ingredient	Percent by Weight
Aggregate	96.0 to 97.5%
Residual Bitumen	2.5 to 4.0%

The percentage of bituminous material will be determined by the Engineer. The percentage of bituminous material shall be based upon the residual bitumen content. The percentage of residual bitumen shall be controlled within ±0.5 percentage points of the percentage set by the Engineer. The right is reserved to make such changes in the proportions of bituminous material and aggregates as the Engineer may consider necessary within the limits of the specifications.

Preparation of Bituminous Mixture. The aggregates for the bituminous mixture shall be dried and heated in the revolving drier according to the following table when equipment meeting the requirements of Article 1102.01(a) through (d) is used. When a plant meeting the requirements of Article 1102.01(e) is used, the bituminous material shall be performance graded asphalt binder with a minimum temperature of 95 ºC (200 ºF) and there will be no limitations on moisture of the aggregates.

Bituminous Material	Maximum Moisture, %	Temperature Range, °F (°C)
Emulsified Asphalts		< 185 (<85)
Medium Curing Liquid Asphalts	1.0	< 225 (< 105)
Slow Curing Liquid Asphalts	0.5	200 - 275 (95 - 135)
Performance Graded Asphalt Binders		250 - 325 (120 - 165)

The aggregate and bituminous material used in the mixture shall be measured separately and accurately by weight or by volume. The devices used in weighing or measuring the aggregate and bituminous material shall be of a type approved by the Engineer. When the aggregate is in the mixer, the bituminous material shall be added and mixing continued until a homogeneous mixture is produced in which all the particles of the aggregate are coated uniformly. The mixing time will be determined by the Engineer.

The ingredients shall be heated and combined in such a manner and at such a temperature as to produce a mixture which when discharged from the mixer, will not in general, vary more than 20 ºF (10 ºC) from the temperature set by the Engineer. The temperature of the bituminous mixture shall not be more than the maximum temperature noted in the above table for the bituminous material being used.

Aggregate containing more than 6.5% moisture shall be stockpiled at the plant site before it is used. Material containing more than 10% moisture shall be dried in a manner acceptable to the Engineer before being placed in the stockpile. Aggregates shall contain sufficient moisture to

assure coating of all particles. When conditions require that water be added, the addition of water shall be interlocked with the flow of aggregate and bitumen into the mixer. Aggregates containing more than 6.5% but not more than 10% moisture may be dried at the option of the contractor, and at his expense, by adding hydrated lime at a maximum rate of 10 pounds (4.5 kg) of lime per metric ton (ton) of aggregate. Aggregate containing more than 10% moisture shall not be used.

The base course mixture shall be stockpiled until the free and absorbed moisture content of the mixture is 5% or less. However, the contractor shall not be required to stockpile the material more than 30 days.

The base course mixture shall be prepared in an approved mixer. When the aggregate is in the mixer, the bituminous material shall be added and mixing continued until a homogenous mixture is produced in which all particles of the aggregate are uniformly coated. The mixing period shall be determined 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.

Spreading.

The temperature of the bituminous mixtures delivered shall be according to the following table when a batch, continuous or dryer drum plant for HMA is used. When a dryer drum plant for other than HMA mixes is used, the minimum temperature shall be 90 °C (200 °F).

	Temperature	
Type of Bituminous Material	Minimum	Maximum
Emulsified Asphalts	Workable	185 °F (85 °C)
Medium Curing Liquid Asphalts	Workable	225 °F (105 °C)
Slow Curing Liquid Asphalts	175 °F (80 °C)	275 °F (135 °C)
Performance Graded Asphalt Binder	250 °F (120 °C)	325 °F (160 °C)

The bituminous mixtures shall be placed with a spreading and finishing machine or Mechanical aggregate spreader to the typical cross section shown on the plans. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable, the mixture shall be spread, raked and luted by hand tools. Where the specified thickness of the finished compacted surface is greater than 50 mm (2 in.), the bituminous mixture shall be spread and compacted in two or more layers. When the bituminous mixtures are placed in partial widths, the individual widths of the top layer shall conform to the traffic lanes.

The spreading and finishing machine shall be operated at a speed that will ensure, as near as possible, continuous operation. The operating speed will be approved by the Engineer. A string line shall be used as a guide for the finishing machine in order to maintain uniform edge

alignment; if any other method is proposed, it shall meet the approval of the Engineer before being used. Irregularities in the alignment of the outside edges shall be corrected by adding or removing bituminous mixture before the edges are rolled. In spreading the bituminous mixture, care shall be taken to prevent any damage to the prime coat. The bituminous mixture shall be placed away from a transverse joint.

Compaction of Bituminous Mixture. After the mixture has been spread and when it will bear the weight of the roller without excess lateral movement, it shall be rolled longitudinally. Rolling shall start at the edges and progress toward the center, overlapping on successive trips by at least 1/2 the width of the roller. The entire surface shall be rolled twice in this manner, unless in the opinion of the Engineer, additional rolling is necessary. Final rolling shall be accomplished by one passage of the roller along each edge of the pavement. The edges shall be compacted to form an angle of approximately 45 degrees with the surface of the bituminous mixture.

All roller wheels shall be moistened lightly with water to prevent bituminous material from sticking to them. If the bituminous surface has absorbed moisture before rolling is completed, it shall be torn up, bladed back and forth across the base until dry and then relaid at the Contractor's expense. When the rolling has been completed and the surface has cured, traffic may be allowed upon it.

No traffic shall be allowed upon the base mixture prior to the initial rolling.

The base mixture shall be compacted to 100% maximum density. The maximum density shall be determined in accordance with applicable portions of Article 351.05(a).

Surface Test. After the final layer of base course mixture has been compacted, the surface shall be tested for smoothness by means of a 16 ft (5 m) straightedge placed parallel to the centerline of the improvement, parallel to the grade line in each wheel lane and touching the surface. Ordinates measured from the face of the straightedge to the pavement shall at no place exceed 0.375 inch (10 mm). If the variation from a true surface exceeds 0.375 inch (10 mm), the entire area so affected shall be corrected as directed by the Engineer.

Tolerance in Thickness. It is the intent that the base course shall be constructed to the nominal thickness shown on the plans. Thickness determinations shall be made at such points as the Engineer may select. When the constructed thickness is less than 90% of the nominal thickness shown on the plans, stabilized base mixture shall be added to obtain the required design thickness.

Method of Measurement. Bituminous material will be measured for payment as specified in Section 1032. Bituminous stabilized base course will be measured for payment in metric tons (tons) or square meters (square yards) of the thickness specified. The unit of measurement will be shown on the plans.

(a) When the unit of measurement for bituminous stabilized base course is the ton (metric ton), the Contractor shall furnish or arrange for the use of scales of a type approved by the Engineer to measure loaded trucks, except payment will not be made in excess of 108 percent of the amount specified by the Engineer, nor for materials used in the base mixture placed outside the design width plus 6 inches (150 mm).

(b) When the unit of measurement for bituminous stabilized base course is the square yard (square meter), the bituminous mixture will be measured in place and the area computed in square yard (square meter), or as provided in Article 202.07(a). The width for measurement will be as shown on the plans.

Basis of Payment. This work will be paid for at the contract unit price per liter (gallon) for BITUMINOUS MATERIALS (PRIME COAT) or per metric ton (ton) for BITUMINOUS MATERIALS (PRIME COAT) and per metric ton (ton) for BITUMINOUS STABILIZED BASE COURSE, or per square meters (square yard) for BITUMINOUS STABILIZED BASE COURSE, measured as specified herein.

The cost of preparation of the subgrade shall be included in the cost of the Bituminous Stabilized Base Course Plant Mix, unless otherwise specified, and no additional compensation for this work will be allowed.

If provided as a pay item, the work in connection with the preparation of the base will be measured as specified in Section 358.