

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

SPECIAL PROVISION  
FOR  
BITUMINOUS STABILIZED BASE COURSE, ROAD MIX OR TRAVELING PLANT MIX

Effective: October 1, 1973  
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 blended together by road mixing or a traveling plant on a prepared subgrade . Each layer of the base course shall be not more 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, SC-250 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) Rotary Speed Mixer.....	1101.06
(g) Traveling Plant.....	1102.02
(h) Aggregate Spreaders .....	1102.04

(i) Pressure Distributor.....	1102.05
(j) Road Mixer .....	1102.06
(k) Heating Equipment .....	1102.07
(l) Drag.....	1102.08
(m) Windrow Evener .....	1102.09
(n) Graders.....	1102.10

## 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 50 to 75 mm (2 to 3 inches) below the surface, is above 10 °C (50 °F), and the air temperature in the shade is above 4 °C (40 °F). 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 the subgrade.
- (b) Preparation and application of bituminous material for the prime coat
- (c) Proportioning and placing base aggregate.
- (d) Preparation of bituminous mixture
- (e) 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 403.09 and 403.10.

Composition of Mixtures. 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 residual bitumen shall be 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.

Proportioning and Placing Base Aggregate. If the aggregate consists of a single graded aggregate within the limits specified, the Engineer will notify the Contractor as to the quantity of aggregate per station to be placed in the windrow.

If a single graded aggregate is used for the mixture, it shall be placed in a uniform windrow by means of an aggregate spreader.

If two or more gradations of aggregates are blended for the mixture, the Engineer will determine the proportions necessary to obtain an aggregate uniformly graded within the limits specified, and will notify the Contractor as to the quantity per station of each that shall be placed in the windrow.

If two or more gradations of aggregates are blended for the mixture, each gradation shall be placed in a uniform windrow with an aggregate spreader meeting the approval of the Engineer and then mixed thoroughly and placed in a windrow. If small quantities of aggregate are to be added to the windrow, and it is not feasible to use an aggregate spreader, they shall be placed by methods approved by the Engineer.

Aggregate shall not be hauled when the weather or road conditions are such that the hauling operations will cause cutting up or rutting of the base.

The base course aggregate shall contain not less than 3% or more than 6 1/2% moisture by weight at the time the first application of bituminous material is made. If the aggregate does not contain sufficient moisture, water in the amount specified by the Engineer shall be added to the bituminous material prior to application. For aggregates containing more than 6 1/2% but not more than 10% moisture, the moisture content shall be reduced either by aerating the aggregate or, at the option of the contractor and at his expense, up to 4.5 kg (10 pounds) of hydrated lime per metric ton (ton) of aggregate may be added by methods approved by the Engineer. Aggregate containing more than 10% moisture shall be dried in a manner acceptable to the Engineer before any lime is added or bituminous materials are applied.

Preparation of Bituminous Mixture. The aggregate shall be relatively free of surface moisture. If necessary to reduce the moisture content, the aggregate shall be aerated by blading the aggregate back and forth across the base until the moisture content has been reduced to the satisfaction of the Engineer. Immediately before the application of the bituminous material, the aggregate shall be shaped with a windrow evener. The windrow evener shall be adjusted so that the windrowed aggregate will have the desired uniform cross section.

The aggregate and bituminous material shall be mixed with graders, road mixers, traveling plants, or other equipment approved by the Engineer. When graders are used, not less than two will be required for each 800 m (1/2 mile) or fraction thereof under preparation at one time.

Bituminous material shall be added to the aggregate at a rate of 3.5 to 5.5 percent by weight of total mixture; the percentage will be set by the Engineer. The percent of bituminous material shall be based upon the residual bitumen content.

The aggregate and bituminous material shall be mixed so that a homogeneous mixture is obtained in which all particles of the aggregate are coated uniformly.

- (a) Grader and Road-Mixer Methods. When graders or road mixers are used for mixing, the windrow of aggregate shall be flattened before applying the bituminous material. The bituminous material shall be applied by means of a pressure distributor. There shall be at least three applications of bituminous material. The first application shall not exceed 1/2 of the total quantity required. In general, the mixing operations shall be carried on in the central portion of the base. The mixing operations shall not be closer than 450 mm (18 in.) to the edges of the existing or new base. When mixing has been carried on in such a manner that at the time of the second or subsequent application of bituminous material, the layer of mixed material is not uniform in cross section, the mixed material shall be reshaped to a uniform cross section by means of a windrow evener or other equipment approved by

the Engineer, so that the bituminous material is applied to the mixed material at a uniform rate.

When graders are used for mixing, the treated aggregate shall be given a preliminary mixing with either a spring-tooth harrow, a disk or a rotary speed mixer meeting the approval of the Engineer immediately after each application of bituminous material. After the preliminary mixing of the aggregate and bituminous material, the mixing shall be continued with graders. The windrow shall be moved from one side of the primed base to the other until the mixture is free from lumps, homogeneous, and of uniform color. When longitudinal drifting of material occurs, the direction of mixing operations shall be varied, or other methods used, so as to obtain a windrow of uniform cross section.

When road mixers are used for mixing, the treated aggregate shall be mixed after each application of bituminous material. Mixing shall be continued until the mixture is free from lumps, homogeneous, and of uniform color. When the total amount of aggregate necessary to construct the surface to the specified width and depth cannot be mixed at one time, it shall be mixed in portions and the mixed portions placed in a windrow on one side of the base; in which case, after mixing is completed with the road mixer, the total mixed material shall be mixed and blended with a grader until it is uniform in color, consistency and gradation.

The mixing shall be performed in such a manner as to prevent segregation of the various aggregate sizes or loss of the fine aggregate, and to agitate the entire mixture but not disturb the base. The mixture shall be kept within the limits of the base, and no earth or other foreign matter shall be permitted in the mixture. When the work is more than 1600 m (1 mile) in length, the train of mixing equipment shall travel at least 800 m (1/2 mile) before turning around.

If, after mixing, it is the Engineer's decision that the mixture does not contain the proper amount of bituminous material, more bituminous material or aggregate shall be added according to the Engineer's directions, and mixing continued until the bituminous mixture is homogeneous and uniform in color. After the bituminous mixture has been prepared as required, it shall be windrowed on one side of the prepared base. The windrow shall be uniform in size.

- (b) **Traveling-Plant Method.** When traveling plants are used for mixing, the amount of bituminous material applied will be designated by the Engineer and may be adjusted by the Engineer as the work progresses. Material which may fall outside, or which is not picked up by the conveyor, shall be picked up by hand labor and thrown directly into the elevating unit and not onto the windrow ahead. The application of bituminous material shall be made in such a manner that the resulting mixture will be homogeneous and uniform in color.

The use of a windrow evener may be omitted when mixing is done with a traveling plant. The feed control of the traveling plant will be calibrated and set by the Engineer.

If one operation of the traveling plant does not produce a uniform bituminous mixture, the windrow shall be remixed with the traveling plant, grader, road mixer or by other methods approved by the Engineer, until the bituminous mixture is uniform in texture and color. If the mixture does not contain the proper amount of bituminous material, additional bituminous material or aggregate shall be added and the windrow remixed as specified herein.

Spreading of Bituminous Mixture. After the mixture has been prepared, windrowed, and cured, it shall be divided into two equal parts with motor graders having end plates attached to the blades. One part shall be bladed across the centerline and spread uniformly upon that portion of the base. The remaining portion of the windrow shall be spread uniformly upon the other portion of the base. Spreading shall be done so segregation shall be kept to a minimum, and the finished surface will be smooth and of uniform texture. The mixture shall be spread to a true line along the edges of the pavement. Care shall be taken to smooth out junctions of successive operations.

If, after spreading the mixture, there are any portions which are not homogeneous, do not contain sufficient bituminous material, or contain an excess of bituminous material, such portions shall be corrected as directed by the Engineer.

Unless the mixture can be spread to the final cross section and rolled the same day as mixed, it shall be left in the windrow. Should rain fall during road-mixing operations, or after the mixture has been spread and before it has been rolled, the mixture shall be windrowed and not disturbed until the base contains no visible moisture. The mixture shall then be bladed back and forth across the base until the moisture in the mixture has been removed to the satisfaction of the Engineer.

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 5 m (16 foot) straightedge placed parallel to the center line 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 surface of the pavement shall at no place exceed 10 mm (0.375 inch). If the variation from a true surface exceeds 10 mm (0.375 inch), 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 as specified in Section 1032.

Base course aggregate will be measured for payment in metric tons (tons) in accordance with the applicable portions of Article 351.11.

Payment will not be made for aggregate in excess of 108% of the amount specified by the Engineer, or for materials used in the base mixture placed outside the design width plus 150 mm (6 inches).

Processing stabilized base course will be measured in place and the area computed in square meters (square yards) of bituminous stabilized base course completed and accepted or as provided in Article 351. The width for measurement will be the width from the outsides of the completed asphalt stabilized base course as shown on the plans or as directed by the Engineer. Payment will not be made for processing stabilized base course placed outside the design width plus 150 mm (6 inches).

When Emulsified Asphalt Type materials are used, water added to the emulsified asphalt in the road mixing procedure and water added to bring the moisture content of the aggregate up to the required amount for the traveling plant or pug mill mixing procedures will not be measured by payment but the cost thereof shall be included in the contract unit price per square meter (square yard) for processing stabilized base course.

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 liter (gallon) for BITUMINOUS MATERIALS (BASE COURSE) or metric ton (ton) for BITUMINOUS MATERIALS (BASE COURSE), and per metric ton (ton) for BASE COURSE AGGREGATE, measured as specified herein.

Mixing, placing and compacting of the asphalt stabilized base course mixture will be paid for at the contract unit price per square meter (square yard) for PROCESSING STABILIZED BASE COURSE, of the specified thickness.

The cost of preparation of the subgrade shall be included in the cost of the base course aggregate, unless otherwise specified, and no additional compensation for this work will be allowed.