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

SPECIAL PROVISION FOR BITUMINOUS SURFACE PLANT MIX (CLASS B)

Effective: January 1, 2008

All references to Sections and Articles in this Special Provision shall be construed to mean specific Sections and Articles in the Standard Specifications for Road and Bridge Construction adopted by the Department of Transportation.

Description. This work shall consist of constructing one or more courses of a mixture of aggregates and bituminous material on a prepared base.

Materials. Materials shall meet the requirements of the following Articles of Division 1000:

Item	Article/Section
(a) Aggregate	1004.03
(b) RAP Material (Note 1)	1031
(c) Bituminous Materials (Note 2)	1032

Note 1. The original pavement or hot mix bituminous materials need not contain crushed coarse aggregate.

Note 2. The particular type and grade of bituminous material to be used will be specified in the contract. The Contractor may use any one of the following types of bituminous materials listed in the table below. When more than one grade is shown for a particular type, the Engineer reserves the right to specify the grade which shall be used.

Type of Construction	Bituminous Materials Recommended
Prime	MC-30
Bituminous Surface Plant Mix	SC-800, SC-300 MC-3000 PG52-28, PG58-28, PG64-22

Equipment. Equipment shall meet the requirements of the following Articles of Section 1100 - Equipment:

Item	Article/Section
(a) Self-propelled Pneumatic-Tired Roller (Note 1)	1101.01
(b) Three-Wheel Roller (Note 2)	1101.01
(c) Tandem Roller (Note 2)	1101.01
(d) Pneumatic-Tired Roller	1101.01
(e) Mechanical Sweeper	1101.03
(f) Heating Equipment	1102.07

(g)	Pressure Distributor	1102.05
(h)	Drier	1102.01
(i)	Pugmill-Mixer	1102.01
(j)	Continuous Mixer	1102.01
(k)	Temperature Recording Instrument	1102.01
(l)	Spreading and Finishing Machine	1102.03
(m)	Hot-Mix Surge Bins	1102.01
(n)	Drier Drum Hot-Mix Plant (Note 3)	1102.01
(o)	Vibratory Roller (Note 4)	1101.01

Note 1. The self-propelled pneumatic-tired roller shall develop a compression of not less than 300 lb/in. (53 N/mm) nor more than 500 lb/in. (88 N/mm) width of tire tread in contact with the bituminous surface. The tires shall be inflated to an air pressure of not less than 60 psi (415 kPa). When the tires are operating in a hot condition and there is no tire pick up, the water system may be turned off.

Note 2. The three-wheel or tandem rollers shall weigh 6 to 10 tons (5.5 to 9 metric tons) and develop a unit compression on the compression wheels of not less than 200 lb/in (35 N/mm) nor more than 350 lb/in (61 N/mm) of wheel width.

Note 3. When a drier-drum hot-mix plant is used to produce Class B surface mixture incorporating RAP material, the plant shall be suitably modified to produce recycled bituminous mixes in a manner approved by the Engineer.

Note 4. The vibratory roller shall develop a total applied force of not less than 200 lb/in (35 N/mm) nor more than 350 lb/in (61 N/mm).

CONSTRUCTION REQUIREMENTS

General. The bituminous mixture shall be constructed only on a dry base under the following conditions unless otherwise authorized in writing by the Engineer:

(a) When slow curing asphalts are used;
  (1) Between May 1 and October 1, and
  (2) The air temperature in the shade is above 50 ºF (10 ºC).

(b) When medium curing asphalt is used;
  (1) Between May 1 and October 15, and
  (2) The air temperature in the shade is above 40 ºF (5 ºC).

(c) When asphalt cements are used, the air temperature in the shade is above 40 ºF (5 ºC).

No work shall be started if local conditions indicate rain is imminent.

When the aggregate for the bituminous mixture consists of a single graded aggregate, the Contractor shall unload the graded aggregate into the stockpile and shall use only the graded aggregate from the stockpile. In addition, the Contractor shall have available fine or coarse aggregate to be blended with the graded aggregate to the satisfaction of the Engineer when it is necessary to correct non-uniformity in the gradation of the graded aggregate.

If approved by the Engineer, separate sizes of aggregates may be blended to produce the bituminous mixture. 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 the blend need not be of the same source or of the same kind of material.

The sources of material shall not be changed during the progress of the work without written permission from the Engineer. All surfaces shall be cleaned of dirt, debris and loose material prior to placing any bituminous material or bituminous mixture.

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

(a) Repair and preparation of base.
(b) Preparation and application of bituminous material for prime coat.
(c) Preparing, transporting, spreading, and rolling bituminous mixture.

Repair and Preparation of Base. The base shall be prepared according to Section 358.

Preparation and Application of Bituminous Materials. The bituminous material for prime coat shall be prepared according to Article 403.05 and shall be applied according to Articles 403.09 and 403.10.

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

Type of Bituminous Material	Temperature	
	Minimum	Maximum
Slow Curing Liquid Asphalts	Workable	Not to exceed Flash Point or 275 ºF (135 ºC)
Medium Curing Liquid Asphalts	Workable	Flash Point
Asphalt Cements	225 ºF (105 ºC)	325 ºF (165 ºC)

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 asphalt cement with a minimum temperature of 200 ºF (95 ºC) and there will be no limitations on moisture of the aggregates.

Bituminous Material	SC	MC	AC
Maximum Moisture	0.5%	1.0%	
Minimum Temperature	200 ºF (95 ºC)	---	250 ºF (120 ºC)
Maximum Temperature	275 ºF (135 ºC)	225 ºF (105 ºC)	325 ºF (165 ºC)

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. The bituminous mixture shall conform to the following composition limits by weight:

Aggregate	94.0 to 96.5%
Bituminous Material	3.5 to 6.0%

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 Using RAP. When RAP materials are being used, the RAP material(s), virgin aggregate(s) and asphalt cement shall be proportioned within the following composition limits by weight:

Ingredient	Percent by Dry Weight
Virgin Aggregate(s)	46 - 93
RAP Material(s)	0 - 50
Mineral Filler (if required)	0 - 5
Bituminous Material	4.0 - 7.0

The virgin aggregates shall be dried and heated in the drier to a temperature that will produce the specified resultant mix temperature when combined with the RAP material.

The heated virgin aggregates and mineral filler shall be combined with the RAP material in such a manner as to produce a bituminous mixture which when discharged from the mixer shall not vary more than 30 ºF (15 ºC) from the temperature set by the Engineer. The combined ingredients shall be mixed for a minimum of 30 seconds or until a homogeneous mixture as to composition and temperature is obtained. For a batch type plant, the standard 15 seconds dry and 30 seconds wet mixing time should normally be used. Variation in wet and dry mixing times may be permitted, depending on the moisture content and amount of RAP material used. The mix temperature shall not exceed 350 ºF (180 ºC). Wide variations in the mixture temperature will be cause for rejection of the mix.

The final mixture(s) shall conform to the following Standard Deviations. These deviations will be verified by extraction tests of the final mixture. If these stipulations are not met, the amount of RAP material used shall be reduced by ten percent increments per day until mix is produced meeting these requirements. When the Contractor is able to produce mixtures within these criteria for three consecutive days, the percent of RAP material may again be increased.

Selected Criteria (CA-6)	Standard Deviation 1/	Tolerance 2/
Passing 1 in (25 mm) sieve	5.0	90 - 100
Passing 1/2 in (12.5 mm) sieve	6.5	60 - 90

Passing No. 4 (4.75 mm) sieve	5.5	30 - 56
Passing No. 16 (1.18 mm) sieve	4.5	10 - 40
Passing No. 200 (75 µm) sieve	2.5	4 - 12
Passing No. 200 (75 µm) sieve	2.5	4 - 12
Bitumen	0.5	3 - 7

Selected Criteria (CA-10)	Standard Deviation 1/	Tolerance 2/
Passing 1 in (25 mm) sieve		100
Passing 1/2 in (12.5 mm) sieve	6.5	65 - 95
Passing No. 4 (4.75 mm) sieve	6.0	40 - 60
Passing No. 16 (1.18 mm) sieve	5.0	15 - 45
Passing No. 200 (75 µm) sieve	2.5	5 - 13
Bitumen	0.5	3 - 7

Selected Criteria (CA-12)	Standard Deviation 1/	Tolerance 2/
Passing 1/2 in (12.5 mm) sieve	5.0	90 - 100
Passing 3/8 in (9.5 mm) sieve	4.0	75 - 95
Passing No. 4 (4.75 mm) sieve	5.0	50 - 70
Passing No. 16 (1.18 mm) sieve	4.5	25 - 45
Passing No. 200 (75 µm) sieve	2.5	5 - 13
Bitumen	0.5	3 - 7

1/ - Represents the Standard Deviation of the overall population.
2/ - Individual tests shall be between these tolerances.

The percentage of bituminous material will be determined by the Engineer. The percent of bituminous material shall be based upon the residual bitumen content. The percentage of residual bitumen shall be controlled within ±0.5 percent of the percent 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.

Transportation. Vehicles used in transporting the bituminous mixtures shall have tight dump bodies which have been previously cleaned of all foreign material and sprayed with asphalt release agents. The beds shall be sprayed with asphalt release agents which have been tested and approved by the Department. After spraying, the bed of the vehicle shall be in a completely raised position and shall remain in this position until all excess release agent has been drained. When the air temperature is below 60 ºF (15 ºC), vehicle bodies including the end, end-gate, sides and bottom shall be insulated with fiberboard, plywood or other approved insulating material and shall have a thickness of not less than ¾ in. (20 mm). When the insulation is placed inside the vehicle body, the insulation shall be covered with sheet steel approved by the Engineer. Each vehicle shall be equipped with a cover of canvas or other suitable material meeting the approval of the Engineer, which shall be used if any one of the following conditions are present:

(a) Ambient air temperature is below 60 ºF (15 ºC).
(b) The weather is inclement.
(c) When asphalt cement is used, the temperature of the bituminous mixture immediately behind the paver screed is below 225 ºF (105 ºC).

The cover shall extend down over the sides and ends of the truck for a distance of 12 in. (300 mm) and shall be fastened securely. Bituminous mixture, which cannot 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 will 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 Class I mixes is used. When a dryer drum plant for other than Class I mixes is used, the minimum temperature shall be 200 ºF (90 ºC).

Bituminous Material	Temperature	
	Minimum	Maximum
SC	175 ºF (80 ºC)	275 ºF (135 ºC)
MC	Workable	225 ºF (105 ºC)
AC	225 ºF (105 ºC)	(160 ºC)

The bituminous mixtures shall be placed with a spreading and finishing machine 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 2 in. (50 mm), 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.

Joints. Contact surfaces of curbs, gutters, manholes, and similar structures shall be painted with a thin uniform coating of Asphalt: RC-70; just before the bituminous mixture is placed against them. The mixture shall be placed uniformly high, so after compaction it will be 1/4 in. (6 mm) above the edges of such structures.

Joints between old and new pavements or between successive days' work shall be made to ensure thorough and continuous bond between the old and new mixtures.

Transverse construction joints in previously laid material may be constructed by cutting the material back for its full depth to expose a fresh surface. Where a wooden header is used at a construction joint, the cutting may be omitted provided the joint conforms to the specified thickness. Before placing the fresh mixture against a cut joint or against old pavement, the contact surface shall be sprayed or painted with a thin, uniform coating of Asphalt: RC-70.

Bituminous material for painting joints shall be considered as included in the cost of the work and no additional compensation will be allowed.

Surfacing at intersections, alley returns and driveways may be constructed simultaneously with the adjacent areas.

Compaction. After the bituminous mixture has been spread as required, it shall be rolled and compacted thoroughly and uniformly with a three-wheel or vibratory roller. Where initial rolling causes undue displacement, hair cracking, or checking of the bituminous mixture, the time of the rolling shall be adjusted as directed by the Engineer.

One three-wheel, tandem or vibratory roller and one tandem roller will be required where the average placement at the jobsite is 85 tons (75 metric tons) per hour or less. Two steel wheel rollers either three-wheel, tandem or vibratory, will be required when the average placement at the jobsite is more than 85 tons (75 metric tons) per hour. A self propelled pneumatic roller may be used in lieu of a steel wheel roller for breakdown rolling followed by a steel wheel roller for finishing when approved by the Engineer.

Rolling of the first lane of bituminous mixture 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 1/2 the width of the compression 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 1/3 the width of the compaction 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 1/2 the width of the compression wheels.

When the roller or rollers as required for plant production cannot make two coverages each, of the rolling pattern specified above, an additional roller shall be furnished when requested by the Engineer. Final rolling of the last course of bituminous material shall be accomplished by one passage of the roller along each edge of the pavement. All roller wheels shall be moistened lightly to prevent bituminous material from sticking to the wheels. When the rolling has been completed, and the surface of the bituminous mixture has hardened or cured to the satisfaction of the Engineer, traffic may be allowed upon it.

Surface Tests. After the bituminous 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 pavement, parallel to the grade line in each wheel lane and touching the surface. If the ordinates measured from the surface of the straightedge to the surface of the pavement exceed 3/8 in. (10 mm), the entire area so affected shall be corrected as approved by the Engineer.

Method of Measurement. Bituminous material for prime coat will be measured according to Section 1032. The unit of measurement will be as shown on the plans.

Bituminous Mixture will be measured in tons (metric tons). The Contractor shall furnish or arrange for the use of scales of a type approved by the Engineer to measure loaded trucks.

Bituminous Mixture produced by a continuous-type mixing plant shall be weighed on approved platform scales furnished by the Contractor. Bituminous Mixture produced by a batch-type mixing plant may be measured by either weighing the mixture on approved platform scales or on the basis of plant weights. If measured on the basis of plant weights, an occasional check shall be made by weighing full truckloads of the mixture on an approved scale at the plant or on an approved commercial scale. If, during the course of construction, it becomes apparent that the weigher on the mixer platform or the weigher at the platform scale is not exercising proper care in weighing the bituminous mixture, the weigher shall 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 a load ticket (duplicate tickets if required) upon which is recorded the net weight of the bituminous mixture in each truck. The ticket shall have sufficient space for signatures, identification of the mixture, date of delivery, and any other data which the Engineer may require. The Contractor shall submit the load ticket to the Engineer at the work when the truck arrives.

Measurement for payment will not be made for bituminous mixture in excess of 103 percent of the amount specified by the Engineer.

Basis of Payment. This work will be paid for at the contract unit prices per gallon (liter) for BITUMINOUS MATERIALS (PRIME COAT) or per ton (metric ton) for BITUMINOUS MATERIALS (PRIME COAT) and per ton (metric ton) for BITUMINOUS MIXTURE COMPLETE.

If provided as a payment item, the repair and preparation of the base will be measured and paid for as specified in Section 358. If not provided as a payment item, repair and preparation of the base shall be considered as included in the contract unit price for the bituminous surface, and no additional compensation will be allowed.