

**STANDARD SPECIFICATIONS**  
**for**  
**BITUMINOUS CONCRETE PAVEMENT**  
**City of La Crosse, Wisconsin**

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**1. DESCRIPTION:**

This work shall consist of the construction of a plant mixed bituminous surface(s) of pavement(s) of bituminous concrete on the approved prepared roadbed, base course, or existing surface in accordance with the specifications and contract, and in conformity with the lines, grades, and typical section shown on the plans.

The bituminous concrete pavement(s) shall be composed of a mixture of mineral aggregates, mineral filler and bituminous material.

The requirements of Sections 401, 402, 405, 406, 407, and 408 under Part IV, "Surface Courses", and Section 306, "Bituminous Base Course" of the Standard Specifications for Road and Bridge Construction, State of Wisconsin, Department of Transportation, latest edition, except as hereinafter stipulated, shall be applicable to this work.

**2. MATERIALS:**

- (a) All materials used in the work shall conform to the requirements of Section 401 or 306 as stated above.

The aggregate requirements shall conform to Section 401 titled "Materials for Bituminous Mixtures and Surface Treatments" in these specifications.

When a Special Wear Course is specified, the aggregates used in the Special Wear Course shall be 100 percent crushed mine trap rock, quartzite or granite; or shall consist of 100 percent crushed natural gravel.

- (b) The bituminous material to be used in the work shall be asphalt type AC in the penetration grades 60-70, 85-100, 120-150, 200-300. The penetration grade shall be designated by the Engineer in the Special Specifications.

**3. COMPOSITION OF PAVING MIXTURES:**

- (a) General: The paving mixtures shall be composed of homogenous mixture of coarse aggregate, fine aggregate, mineral filler, and bituminous material.
- (b) Base Course: Aggregates to be used shall conform to the gradation requirements for gradation No. 1 of "Aggregates for Bituminous Road Mix and Plant Mix Surfaces and Pavements" or Gradation No. 1 or Gradation No. 2 of "Aggregates for Bituminous Base Course." Bituminous material in the approximate range of 4% to 7% of the composite mix, and as specifically determined by the Engineer on the basis of laboratory tests, shall be incorporated into the mixture.
- (c) Surface Course: The aggregates, including mineral filler, shall conform to the gradation requirements for Gradation No. 3 of "Aggregate Specifications"; except that Gradation No. 4 shall be used when specifically required by the contract; or when the nominal thickness of a given layer or course to be built as a separate operation is less than 1 ¼ inches; or when the characteristics of the material in the deposit are of such a nature as to require crushing to a smaller size in order to obtain 45% or more of particles retained on a No. 4 sieve having at least one surface or face produced by the fracture of a larger particle. The composition of the surface course shall conform to Section 407 of Standard Specifications for Roads and Bridges, State of Wisconsin, and/or as specified on the plans of special specifications.

Not less than one-half of the material passing the No. 200 sieve shall be mineral filler.

Bituminous material in the approximate range of 5% to 8% of the composite mix, and as specifically determined by the Engineer on the basis of laboratory tests, shall be incorporated into the mixture.

- (d) Special Wear Course: The Special Wear Course when specified in the Special Provisions; and/or called for in the bid proposal; and/or as shown on the plans, shall be a ¾ inch thick (or a thickness as specified) wearing course of hot plant mixed asphaltic concrete.

The aggregate shall be 100 percent crushed mine trap rock, quartzite or granite; or shall consist of 100 percent crushed natural gravel and shall be produced from material retained on a square mesh sieve having an opening at least twice as large as the specification permit for the maximum size of the aggregate.

The bituminous material shall be asphalt cement, meeting AASHTO M20 specification with 85/100 penetrations.

Mixture proportions: Asphalt Cement. The percentage of bituminous material, by weight, shall be within the range of 5.0 to 8.0 percent. Aggregate gradation shall conform to Gradation No. 4 as set forth in Section 40 of the Standard Specifications, State of Wisconsin, Department of Transportation.

- (e) Uniformity: The aggregate constituents shall conform to the job-mix formula within the following percentage tolerances:

Aggregates passing on the No. 4 and Larger Sieves.....+7%  
 Aggregates passing the No. 8 to No. 100 sieves.....+4%  
 Aggregates passing the No. 200 sieve.....+2%

Irrespective of such tolerances, gradations shall fall within the applicable master range prescribed in the accompanying "Aggregate Specifications" and the fraction retained between any two consecutive sieves (3/8 inch and smaller) designated for the particular gradation number shall be not less than 5% of the total.

Bituminous material shall be incorporated into the mixtures within a tolerance of +-0.4%.

**4. EQUIPMENT:**

The equipment to be used in the work shall conform to the requirements set forth in Section 405 of the Standard Specifications for Road and Bridge Construction, State of Wisconsin.

**5. CONSTRUCTION METHODS:**

The construction methods shall be as required under Section 405 of the Standard Specifications, State of Wisconsin, for Road and Bridge Construction.

- (a) Preparation of Aggregate: The dried and heated aggregates shall be separated into sizes, stored in separate bin compartments, and recombined in the proper proportions in the mixer.

Aggregates for the binder course and Gradation No. 2 shall be separated into 3 sizes. Aggregates of Gradation No. 3 shall be separated into 2 sizes (at the Contractor's option, he may separate aggregate No. 3 into 3 sizes).

A separate bin and feed shall be used for mineral filler unless the aggregates, as produced, contain stone dust of the required quality and in the amounts necessary to produce a finished mixer of the required composition.

The aggregates used in the binder or lower course mixture shall be dried and heated to a temperature not in excess of 375 degrees F. The aggregates shall be heated to such temperatures so that the mixture when discharged from the mixer will be within 15 degrees F., plus or minus, of the temperature specified for the mixture.

- (b) Preparation of Asphalt Cement: The asphalt cement shall be heated to a temperature of not less than 250 degrees F. and not more than 350 degrees F. The required temperature within this range will be within 25 degrees F., plus or minus or as designated by the Engineer.
- (c) Finished Mixtures: The finished mixtures shall be delivered at a temperature, plus or minus, 20 degrees F. of the temperature designated by the Engineer, but not less than 225 degrees F. for lower or binder course mixtures, and not less than 250 degrees F. for surface course mixtures.

**8. . . . METHOD OF MEASUREMENT:**

Volume Correction: Measurement of asphalt cements, liquid asphalt's, and similar products by the gallons, when applicable, shall be based on volumetric calibration of tank cars, tank trucks, or storage tanks.

The quantity of emulsified asphalt's to be measured for payment shall be net gallonage corrected to a temperature of 60 degrees F. in accordance with the following formula:

$$V = \frac{V1}{0.00025 (T-60) + 1}$$

- Where V = Volume in gallons at 60 degrees F.
- V1 = Volume in gallons at observed temperatures, degrees F.
- T = Observed temperature, degrees F.

Correction factors to be used for the asphalt's, types AC, RC, MC, shall be as per tables 1 and 2, Section 401 of the Standard Specifications, State of Wisconsin, for Road and Bridge Construction.

**8. . . . METHOD OF TESTING:**

Methods of testing asphalt and asphaltic road oils shall be in accordance with the following A.S.T.M. and/or A.A.S.H.O. designations except as otherwise noted:

	<u>A.A.S.H.O</u>	<u>A.S.T.M.</u>
Specific Gravity.....	T 228	D-70
Flash Point, Open Tag.....	T 79	---
Flash Point, Cleaveland Cup.....	T 48	D-92
Kinematic Viscosity.....	T 201	D-2170
Distillation.....	T 78	D-402
Penetration.....	T 49	D-5
Ductility.....	T 51	D-113
Solubility in Trichloroethylene.....	T 44	D-2042
Water.....	T 55	D-95
Thin Film Oven Test.....	T 179	D-1754

**8. PREPARATION OF ROADBED FOR BITUMINOUS SURFACING:**

Preparation of roadbed for bituminous surfacing shall consist of the work or operations necessary to condition the surface of an existing or newly constructed roadbed preliminary to the application of a bituminous prime coat, or the construction of a bituminous base course or wearing surface. All work necessary, and subsequently defined as within the scope of this item, shall be performed in accordance with Section 304 of the Standard Specifications, State of Wisconsin, for Road and Bridge Construction. See bid proposal to determine if the item appears as a separate contract item to be measured and paid for separately, or is included in unit bid for paving.

**9. AGGREGATES FOR BITUMINOUS MIXTURES AND SURFACE TREATMENTS:**

Material Covered: These specifications cover the quality and size requirements of aggregates used in the construction of bituminous surface courses and pavements.

Source: The City of La Crosse reserves the right to prohibit or forbid the use of aggregates from any source, plant, pit, quarry or deposit where the character of the material or method of operation is such as to make improbable the furnishing of aggregates conforming to the requirements of the specifications.

**10. GENERAL REQUIREMENTS:**

The aggregates shall be free of lumps of clay, loam, organic matter, adherent coatings, other deleterious matter, or an excessive amount of thin or elongated pieces. The aggregate shall be of such nature that when thoroughly coated with the bituminous material proposed for the work, the coating will not slough off upon contact with water. Crushed quarry rock shall be free from shale. The right is reserved to prohibit the production of crushed stone from limestone deposits having thinly bedded strata.

The percentage of wear for aggregate for seal coat cover, as determined by the Los Angeles Abrasion Test, shall not exceed 40. The percentage of wear for other aggregates shall not exceed 50.

The aggregate shall have a plasticity index of not more than 3, except that aggregates for bituminous base course, Section 306, may have a plasticity index of not more than 6.

The blending of aggregates from more than one source, if and as necessary to meet the gradation requirements for bituminous plant mixed pavements, shall be done with a mechanical feeding device or other approved means before the material is introduced into the dryer.

**11. SAMPLING AND TESTING:**

Methods of sampling and testing shall be in accordance with the following A.A.S.H.O. designation:

Sampling Non-Bituminous Highway Materials.....	T 2
Material Finer than No. 200 Sieve.....	T 11
Sieve Analysis of Aggregates.....	T 27
Mechanical Analysis of Extracted Aggregate.....	T 30
Sieve Analysis of Mineral Filler.....	T 37
Liquid Limit of Soils.....	T 89
Plastic Limit of Soils.....	T 90
Plasticity Index of Soils.....	T 90
Los Angeles Abrasion of Coarse Aggregate.....	T 96
Soundness of Aggregate.....	T 104

**12. AGGREGATES FOR BITUMINOUS ROAD MIX & PLANT MIX SURFACES & PAVEMENTS:**

Gradation Requirements: The aggregates for bituminous surfaces and pavements, including mineral filler when and as required for the specific type, shall be well graded between the limits specified and shall conform to the following gradation requirements:

PERCENTAGE BY WEIGHT PASSING

SIEVE SIZE	GRADATION No. 1	GRADATION No. 2	GRADATION No. 3	GRADATION No. 4	GRADATION No. 5
1-1/2 Inch	100	---	---	---	---
1 Inch	95-100	100	---	---	---
¾ Inch	---	95-100	100	---	---
½ Inch	65-90	---	95-100	100	---
3/8 Inch	---	65-90	75-100	95-100	100
No. 4	40-65	---	45-85	70-85	95-100
No. 8	25-50	30-55	30-60	50-70	75-100
No. 16	---	---	---	---	50-95
No. 30	---	---	---	---	35-85
No. 50	7-25	8-28	10-30	10-25	20-70
No. 100	---	---	---	---	10-50
No. 200	3-12	3-12	5-12	5-10	5-20

Mineral Filler: The mineral filler shall consist of thoroughly dry limestone dust, portland cement, or other mineral dust approved by the Engineer. As delivered to the mixer, it shall be free from lumps and loosely bonded aggregations.

The mineral filler, Type 1, shall conform to the following gradation requirements:

	<u>Per Cent</u>
Passing No. 30 Sieve	100
Passing No. 50 Sieve	95-100
Passing No. 100 Sieve	90-100
Passing No. 200 Sieve	70-100

**13. TESTING AND DESIGN MIXES:**

At least 10 days prior to use, representative samples of the aggregates, sand, and bituminous material to be used shall be furnished by the successful contractor or his suppliers to an independent testing laboratory, such as the Twin City Testing and Engineering Laboratory, for testing purposes and for preparation of design mixes under Sections 306, 405 and 407 of the Standard Specifications, State of Wisconsin, for Road and Bridge Construction. Design mixes shall be prepared by the independent testing laboratory and submitted to the City Engineer for each of the courses (base course, surface course, and/or Wear Course). The cost of the preliminary testing of materials and preliminary design of asphaltic concrete mixtures is to be borne by the Contractor.

The City may engage an independent testing laboratory to inspect the project and the plant during the course of the work to verify materials and procedures as to meeting specifications. The latter will be done at City cost.

**14. BITUMINOUS PAVER:**

As per Subsection 405.4.2 of the Standard Specifications, State of Wisconsin, for Road and Bridge Construction, the paver, when used for paving side street intersections and other irregular areas, shall be equipped with an approved automatic control system capable of automatically controlling the elevation and slope of the screed.

The automatic control device shall be of a standard commercial quality adjusted for the type of paver used and shall provide control for producing a uniform surface conforming to required grade and section. The control system shall be designed to permit the sensor to operate on either side of the paver.

The paver shall operate, in placing the surface course, with the sensor riding on either a tautly erected stringline, a mobile stringline, or a traveling straightedge, subject to the Engineer's approval of the appropriate method under specific field conditions. On the base course, the paver may operate with a shoe type sensor or straightedge riding on the surface of the adjacent lane.

In the event of a breakdown of the automatic control system during paving operations, the paver may continue to operate under manual control for not more than twenty-four hours while repairs are being made.

The Engineer reserves the right to direct that the longitudinal automatic control system not be used in construction of the surface course.

**15. TRANSVERSE JOINTS:**

The placing of any course of bituminous material shall be as continuous as possible, and the roller shall not pass over any unprotected end of freshly laid mixture except where the laying of the course is to be discontinued long enough to become cold. In such cases when laying is discontinued, joints shall be made for proper bond with the new surface for full depth of the course by cutting back on the previous run so as to form a true transverse vertical face. When the laying of the course is resumed, the fresh mixture shall be placed against the joint to form intimate contact with the previous course.

**16. LONGITUDINAL JOINTS:**

Longitudinal joints for surface courses produced by concurrent paving of adjacent lanes shall be treated to insure a tightly bonded and sealed joint. Such treatment shall be either the painting of the edge of the course in place with hot asphalt cement, or heating the edge with an approved infrared or radiant heating device at the time the abutting course is placed.

The longitudinal joints for the surface course shall be on centerline and a minimum of 11 feet either side of centerline so that no joint falls in the center lane of travel.

The longitudinal joints in the base course shall not coincide with longitudinal joints in the surface course.

**17. BASIS OF PAYMENT:**

The item(s) of bituminous concrete pavement(s) shall be measured by the square yard or by weight and be paid for at the contract unit price bid on the square yard basis or by the ton. The bid price(s) shall be full compensation for furnishing, preparing, hauling, and placing all materials including the crushed rock base, the bituminous base course, and the bituminous surface course, as per the bid proposal, and for all machinery, labor, tools, and incidentals necessary to complete the work. The Contractor shall also furnish all maintenance necessary until acceptance of the project, including maintenance due to other contractors, temporary traffic or local traffic using the streets prior to final acceptance.