

DIVISION 500
Bituminous Pavement

**SECTION 502 -- ASPHALTIC CONCRETE
PAVEMENT SMOOTHNESS**

502.01 -- General

Paragraph 2. of Subsection 502.01 is void and superseded by the following:

2. Pavement smoothness will be evaluated as prescribed in this Section when the pay item "Asphalt Pavement Smoothness Testing" is included in the contract.

502.06 -- Pavement Surface Correction

Paragraph 6. of Subsection 502.06 is void.

SECTION 503 -- ASPHALTIC CONCRETE

503.02 -- Material Requirements

Paragraphs 3., 4., 6., and 7a. and 7b. of Subsection 503.02 are void.

Paragraph 8. of Subsection 503.02 is renumbered as Paragraph 3.

503.04 -- Construction Methods

Paragraph 2.b.(1) of Subsection 503.04 is void and superseded by the following:

(1) The Contractor shall take at least four (4) control strip mixture samples and evaluate the air voids, the voids in mineral aggregate, and the performance graded binder content.

Paragraph 2.b.(2) of Subsection 503.04 is void and superseded by the following:

2. b. (2) Random samples shall be taken, and the air voids shall be between the values shown in Table 503.02

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**Table 503.02
Control Strip Sampling**

Sample #	Ton (Mg)	Air Voids
1	0 to 200 (0-180 Mg)	2.0 to 6.0
2	201 to 400 (181 – 350 Mg)	2.5 to 5.5
3	401 to 700 (351 – 650 Mg)	3.0 to 5.0
4	701 to 1000 (651 – 900 Mg)	3.0 to 5.0

Paragraph 3.c.(1) of Subsection 503.04 is void and superseded by the following:

3. c. (1) After September 15, if the haul distance exceeds 3miles (5 km), all hauling vehicles shall be equipped with a tarp. Tarping and insulation will be required if it is determined by the Engineer that uniform temperature control of the mixture is not being maintained.

Paragraph 2.b.(4) of Subsection 503.04 is void and superseded by the following:

2. b. (4) The test results must fall within the specified tolerances, but if subsequent tests continue a trend toward the target values specified, the Department may tentatively accept the control strip with assurance from the Contractor that adjustments will be made in an effort to attain and then maintain target Specifications.

Paragraph 2.i. of Subsection 503.04 is amended to include Asphaltic Concrete Type SPS.

Paragraph 2. of Subsection 503.04 is amended by adding Paragraph 2.j.

2. j. The Contractor will be allowed to select three of the four individual air void tests within the control strip and apply those three selected individual values to the individual air void test result of the first 750 ton (680 Mg) subplot of Lot 1 to calculate the initial moving average of four and resulting pay factor for the initial 750 ton (680 Mg) subplot. The Contractor must select the three results to be used prior to the testing of the first 750 ton (680 Mg) subplot of Lot 1.

In Paragraphs 2.a. and 2.h. of Subsection 503.04, the following change shall be made.

Wherever it shows 440 tons (400 Mg) in the above paragraphs, it shall read 1000 tons (900 Mg) instead.

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Paragraphs 5.c.(3), (4), (5), (6), and (7) of Subsection 503.04 are void.

Paragraph 9. of Subsection 503.04 is void and superseded by the following:

9. Any core hole made in the pavement by the Contractor or the Department shall be filled with asphaltic concrete and compacted to the same density as the surrounding material.

Subsection 503.04 is amended by adding Paragraph 11. as follows:

11. Pavement smoothness:

a. If the pay item "Asphalt Pavement Smoothness Testing" is included in the contract, then the asphalt pavement shall be evaluated as prescribed in Section 502 of the *Standard Specifications for Highway Construction*.

b. The Engineer may evaluate any surface irregularities caused by workmanship with a 10-foot (3 m) straight edge. The maximum allowable deviation will be 1/8 inch (3 mm) in 10 feet (3 m) measured longitudinally. If the deviation exceeds 1/8 inch (3 mm) in 10 feet (3 m), then the area shall be corrected by grinding with a machine equipped with diamond blades with spacers until the deviation is less than 1/8 inch (3 mm) in 10 feet (3 m) or the Engineer may authorized a \$500.00 deduction for each irregularity.

503.05 -- Method of Measurement

Paragraph 6. of Subsection 503.05 is void.

503.06 -- Basis of Payment

In Paragraph 1. of Subsection 503.06, delete "Asphalt Concrete Thickness Core Each (ea)"

In Paragraphs 2.b.(1), 5.b., 5.c.(1) and 6. of Subsection 503.06, the following change is made:

Wherever it shows 2750 tons (2500 Mg) in the above paragraphs, it shall read 3750 tons (3400 Mg) instead.

Paragraph 2.a., 2.b.(2), and 2.b.(3) of Subsection 503.06 are void and superseded by the following:

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2. a. For each lot of Asphaltic Concrete Type SPS, the asphaltic concrete unit price is multiplied by the average density per lot pay factor for the item "Asphaltic Concrete, Type SPS".

b. (2) For each subplot of Asphaltic Concrete Type SP0, SP1, SP2, SP3, SP4, and SP5, the asphaltic concrete unit price is multiplied by the product of the subplot pay factors for single test air voids and running average of four air voids and average density per lot for the item "Asphaltic Concrete, Type ____". Included in a subplot, following approval of the control strip(s), may be any roadway Asphaltic Concrete Type SP0, SP1, SP2, SP3, SP4, or SP5 which is produced, sampled and tested and approved by the Engineer for use as Patching, State Maintenance Patching, and Asphalt for Intersections and Driveways on project shall be eligible for inclusion in subplot(s) tonnage pay factor determination using the roadway Asphaltic Concrete Type ____ unit price.

(3) (i) The final pay factor for total project tonnage for any one type of superpave asphaltic concrete, expressed as a percentage, shall be computed as follows:

$$\frac{P1(T1) + P2(T2) + P3(T3)...}{T1 + T2 + T3...}$$

Where P1, P2, P3 = % pay factor for each subplot
T1, T2, T3 = tons (Mg) at respective pay factor

Paragraph 13. of Subsection 503.06 is void and superseded by the following:

13. Density cores are subsidiary to "Asphaltic Concrete, Type ____".

SECTION 509 -- BITUMINOUS SAND BASE COURSE

509.02 -- Material Requirements

Paragraph 3. of Subsection 509.02 is void and superseded by:

3. The type of asphaltic material to be applied to the bituminous mixture will be indicated in the plans. The percentage of asphaltic material to be applied to the mixture will be determined by the Materials and Research Division.

509.04 -- Construction Methods

In Paragraph 6.i. of Subsection 509.04, replace "Tack Coat" with "Fog Seal" in both sentences.

509.06 -- Basis of Payment

Paragraph 3. of Subsection 509.06 is void and superseded by:

3. The fog seal is not subsidiary to "Bituminous Sand Base Course" and is paid for as a separate pay item.

SECTION 510 -- COLD MILLING

510.01 -- Description

Paragraph 2.c. of Subsection 510.01 is void and superseded by:

c. Concrete Surface Milling. The concrete surface shall be milled as shown in the plans or described in the special provisions.

510.04 -- Construction Methods

Paragraph 3.c. is void and superseded by the following paragraph:

c. Transitions between milled and unmilled surfaces will be feathered either by milling or with wedges of bituminous material (maximum slope 1 vertical to 4 horizontal).

SECTION 514 -- MICROSURFACING

514.02 -- Material Requirements

In Table 514.02 delete the note "Aggregate shall be at least 70% crushed" and replace it with "Aggregate shall have a minimum fine aggregate angularity of 43%."

Subsection 514.02 is amended by adding Paragraph 11.:

11. Aggregates shall have a soundness loss of not more than 12 percent by weight at the end of 5 cycles using sodium sulfate solution.

SECTION 515 -- ARMOR COAT

515.02 -- Material Requirements

In Paragraph 2., change the reference from "Paragraphs 1., 2., and 7." and make it "Paragraphs 1., 2., and 6."

SECTION 519 -- CRACK SEALING BITUMINOUS SURFACING

Division 500 is amended by adding Section 519.

SECTION 519 -- CRACK SEALING BITUMINOUS SURFACING

519.01 -- Description

This work shall consist of preparing and sealing the transverse and longitudinal cracks in bituminous surfacing at the various locations shown in the plans.

519.02 -- Material Requirements

1. The sealant shall be a mixture of paving grade asphalt, vulcanized recycled rubber, and polymer modifier(s) that conform to the following requirements and Specifications:

a. The sealant shall contain between 10% and 15% vulcanized recycled rubber by total weight of product. The sealant shall be pre-reacted blend of product. The material shall not require additional heating time after it has reached the manufacturer's recommended application temperature. New material may be added to the material that has already been heated to proper application temperature. When heated in accordance with ASTM D-5078 to the safe heating temperature, the sealant shall meet the following test parameters:

Test	Specification
Cone Penetration @ 77° F (25° C) (ASTM D-5329)	45-70
Cone Penetration @ 39.2° F (4°C) (ASTM D-5329)	30 minimum
Resilience (ASTM D-5329)	30% minimum
Softening Point (ASTM D-36)	195° F (91°C) min.
Ductility @ 77° F (25C) (ASTM D-113)	30 cm minimum
Asphalt Compatibility (ASTM D-5329)	Pass
Bitumen Content (ASTM D-4)	60% minimum
Tensile Adhesion (ASTM D-5329)	500% minimum

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b. Sampling and heating shall be in accordance with ASTM D-5078.

c. The vulcanized recycled ground rubber shall be free of wire, fabric, or other contaminating materials. The gradation shall be 100% passing the Number 8 sieve (2.36 mm) and a maximum of 5% passing the Number 200 (75 μ m) sieve.

d. Acceptance of the manufactured material will be based on a certificate of compliance for each lot or batch furnished by the supplier. The certificate of compliance shall state the type of rubber used, the lot number, and a copy of the test result for the lot. The date of manufacture must also be shown on the certificate.

e. One sample per lot of material shall be sent to the Nebraska Department of Roads, Materials and Research Division for specification compliance testing with ASTM D-5078 or the sample may be tested by an approved independent testing laboratory. If the test results show the sealant sample conforms to Specifications, the NDOR will absorb the cost for testing. If the sealant sample test results do not conform to Specifications, the Contractor shall be assessed the costs for testing and shall be required to provide acceptable sealant for the project including additional samples for retesting.

f. The rubber asphalt crack sealant shall be meltable at 300° F (150°C). The use of metal staples or fasteners of any kind is prohibited for closing the lids of the containers. Tape or other like materials will be accepted.

g. Each container shall include information regarding lot number, type of product, safe heating temperature and specific gravity of crack sealing material.

519.03 -- Construction Methods

1. Preparation of Transverse and Longitudinal Cracks

a. Cracks shall be formed and prepared as follows:

(1) Cracks 3/8" (10 mm) or less in width shall be widened using a router to form a reservoir which is 1/2" (12.5 mm) wide by 3/4" (20 mm) to 1" (25 mm) deep. The formed crack shall be thoroughly cleaned with compressed air to remove all dust, dirt, loose material, and moisture so that at the time the sealant is applied, the crack will be clean and dry.

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(2) Cracks wider than 3/8" (10 mm) shall be cleaned for the entire crack depth using sandblasting, or brushing and air-blowing techniques as required to provide a crack free of all dust, dirt, loose material and moisture. It may be necessary to remove incompressible deep in the crack by gouging or plowing.

(3) A hot air heat lance shall be used to warm the sidewalls of the crack immediately prior to placing the sealant.

b. The surface of the bituminous pavement shall be dry at the time of crack preparation and sealing operations.

c. No more than 500 linear feet (150 m) of crack preparation shall be left unsealed after the end of each working day. The Engineer will inspect any prepared crack, left unsealed at the end of each working day to determine if they need to be recleaned prior to being sealed.

2. Sealing Transverse and Longitudinal Cracks

a. When the sealant is at the temperature for proper pouring consistency, the crack shall be filled using a pressure type applicator equipped with a nozzle that will fit into the crack. The design of the pressure applicator and nozzle shall be approved by the Engineer. The crack shall be filled with sealant from the bottom up. The crack shall be slightly overfilled with sealant and squeegeed to surface level leaving a 2 to 4 inch (50 to 100 mm) width of sealant over the crack.

519.04 – Method of Measurement

1. The work of crack sealing bituminous surfacing will be measured for payment by the linear foot (meter) of cracks sealed.

2. Measurement shall be to the nearest foot (0.3 m), complete, in place and accepted by the Engineer.

519.05 – Basis of Payment

1. Pay Item	Pay Unit
Crack Sealing Bituminous Surfacing	Linear Feet (LF) [Meter (m)]

2. a. When sealant materials comply with the Specification requirements, crack sealing shall be paid for at the contract unit price per linear foot (meter). When sealant materials are outside of the specified property ranges, crack sealing shall be paid for at the contract unit price

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multiplied by the product of the pay factors determined by the following pay factor table. Pay factors shall be determined for the properties shown below.

Pay Factor	Specified Property	
	Upper Limit	Lower Limit
1.00	+1% to +10%	-1% to -10%
0.95	+11% to 15%	-11% to -15%
0.90	+16% to +20%	-16% to -20%
0.80	+21% to +25%	-21% to -25%
0.70	+26% to +30%	-26% to -30%
0.40 or Reject	+31% and Higher	-31% and Lower

b. If the resultant pay factor for the material is less than 0.70 and the material has not been used, the material shall be rejected. If incorporated in work which is judged to be unsatisfactory, the material shall also be rejected.

c. If the pay factor is less than 0.70 and the material has been incorporated in work which is allowed to remain in place, the pay factor for the material shall be 0.40.

3. Payment is full compensation for all work prescribed in this Section and all sealant manufacturer's requirements.

SECTION 520 -- BITUMINOUS PATCHING OF CONCRETE PAVEMENT

Division 500 is amended by adding Section 520.

SECTION 520 -- BITUMINOUS PATCHING OF CONCRETE PAVEMENT

520.01 -- Description

This work shall consist of repairing certain joint and panel spalls in the concrete pavement with bituminous material. The work will be performed on the mainline roadways and interchange ramps at locations designated by the Engineer. This work shall include removing and disposing of deteriorated pavement and/or existing bituminous patching material, preparation of the repair areas, and furnishing, placing, and compacting the bituminous patch material in the repair area.

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520.02 -- Material Requirements

1. The patching material shall be composed of a suitable aggregate, plant-mixed with a liquid asphalt blend. The bituminous material shall be capable of coating aggregates without stripping. The patching material shall be capable of maintaining adhesive qualities in patched areas which are damp or wet at time of application.

2. Bituminous Material - The bituminous material shall consist of a liquid asphalt blend with chemical additives capable of coating wet aggregates without stripping. The binder shall be homogeneous, free from water, and shall not foam when heated to mixing temperature. The bituminous material shall meet the following requirements:

Requirement	Criteria
ASTM D-1310	Flash Point (TOC): 200°F (94°C) Minimum
AASHTO T201 or ASTM D-2170	Kinematic Viscosity at 140°F (60°C): 300-4000
AASHTO T55 or ASTM D-95	Water: 0.2% Maximum
AASHTO T78 or ASTM D-402	Distillate Test (Volume of original sample): To 437°F (225°C): None
Residue Tests:	
AASHTO T202 or ASTM D-2171	Abs. Viscosity at 140°F (60°C): 125-425 Poises
AASHTO T49 or ASTM D-5	Penetration: 200 Minimum
AASHTO T51 or ASTM D-113	Ductility at 39°F (4°C) 1 cm/min: 100 Minimum
AASHTO T44 or ASTM D-2042	Solubility in Trichloroethylene: 99% Minimum

3. Aggregate - The aggregate shall consist of a crushed limestone complying with the following requirements:

English Sieve Size (Metric)	% Passing
3/8 inch (3.5 mm)	90-100
No. 4 (4.75 mm)	20-55
No. 8 (2.36 mm)	5-30
No. 16 (1.18 mm)	0-10
No. 50 (300 µm)	0-5

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Requirement	Criteria
AASHTO T104 or ASTM C-88	Soundness Loss (Sodium-5 Cycles): 12.0% Max.
AASHTO T96 or ASTM C-131	Los Angeles Abrasion Loss: 40.0% Max.
AASHTO T-11 or ASTM C-117	-200 Sieve (75 µm) (By Wash): 2.0% Max.
AASHTO T-85 or ASTM C-127, 128	Absorption: 1.0%-2.5%
AASHTO T-85 or ASTM C-127, 128	Specific Gravity: Other Deleterious Matter: 2.55-2.75
NDR T504 or ASTM C-123	Soft Pieces 3.0% Max.
NDR T504 or ASTM C-295	Coal and Lignite 1.0% Max.
NDR T504 or ASTM C-142	Shale 2.5% Max.

4. Composition of Mixture - The mixture shall consist of the bituminous material and aggregate as described above, plant-mixed in such a manner as to contain 120 lbs. (54.4 kg) of bituminous material for each finished ton (.9Mg).

5. Certification - The bituminous patching material will be accepted on the basis of a producer certification of the finished product.

520.03 -- Construction Methods

1. The Engineer shall designate the areas to be repaired. If the patch area is greater than 10 sq. ft. (0.9 m²), then the Engineer must approve either a bituminous repair or a portland cement concrete (PCC) repair. A PCC repair will be done as extra work if PCC repair is not a bid item. The deteriorated concrete shall be removed to a minimum depth of 4 inches (100 mm) or to sound concrete. The deteriorated concrete may be removed to a depth specified with a self-propelled milling machine or a 15 pound (6.8 kg) maximum chipping hammer. The operation of the machine must be closely monitored to insure that the impact and vibration of the milling head will not cause damage to the slab outside of the area designated for patching by the Engineer. The radii at the ends of each milled area must be cut to a reasonably neat vertical face with a 15 pound (6.8 kg) chipping hammer. For areas smaller than the milling head, removal must be accomplished with a 15 pound (6.8 kg) chipping hammer or other equipment approved by M & R.

2. After the deteriorated concrete and/or the existing bituminous patching material has been removed to the extent practical, the spalled areas at the joints or in the concrete slab shall be cleaned of loose concrete and remaining bituminous patching material using high pressure air until further application of air fails to remove any significant quantity of material. Care shall be taken to avoid blowing any loose material into adjacent lanes which are open to traffic.

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3. After the area has been blown clean and dry, the bituminous patching material shall be placed using hand methods to assure complete filling of the spalls. The spalled areas shall be slightly overfilled with bituminous material and compacted to a density that is satisfactory to the Engineer. A mechanically powered hand-held tamper shall be used for the smaller areas and a steel drum vibratory roller, minimum 2.5 ton (2.3 Megagram), shall be used on the other repair areas. The layer of the bituminous material shall not be in excess of that which the equipment is capable of compacting to a uniform density throughout the layer. If the patched areas have been depressed due to traffic, they shall be filled with bituminous patching material or an Engineer approved hot mix asphaltic concrete and compacted approximately $\frac{1}{4}$ inch (6 mm) above the existing pavement surface prior to the asphaltic concrete overlay.

4. Old concrete and/or bituminous patching material that is removed shall become the property of the Contractor and shall be removed from the project. The material shall be disposed of in accordance with Section 203 in the 1997 English Edition of the Standard Specifications.

5. The bituminous patching of the concrete pavement shall be accomplished at the same time the traffic lane is closed for concrete joint and panel repair.

6. The deteriorated concrete pavement and/or the existing bituminous patch material shall be removed and the patch completed during daylight hours in the same working day.

7. If asphaltic concrete for patching is not available when the pavement repair or joint repair work is performed, and the dropoff created by the repair is greater than one inch (25 mm), the dropoff will be feathered a minimum of three foot (900 mm) in length for each inch (25 mm) in height with a commercially available cold-mix bituminous mixture, or other suitable temporary patch material with a durable surface approved by the Engineer. The Contractor will be required to maintain normal traffic flow across these patches while they are in service. Where it has been necessary to use these "temporary patches", they will be removed, the area cleaned out, and the required permanent asphaltic concrete patch placed. The material, installation, maintenance, removal and disposal of these temporary patches will not be measured and paid for directly, but shall be considered subsidiary to the concrete pavement repair or concrete joint repair work being performed. The asphaltic concrete for the permanent patches shall be any available hot-mix bituminous mixture approved by the Engineer. The hot-mix material will be subsidiary to the items for which direct payment is provided.

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520.04 -- Method of Measurement

1. a. The "Bituminous Patching" shall be measured for payment in tons (megagrams) on approved scales.

b. The scale tickets shall be prepared in duplicate. The truck driver shall carry the original copy of the scale ticket to the delivery point and give it to the NDR placement inspector.

c. (1) The measured quantity shall be the total weight of bituminous patching shown on the scale ticket without deduction for the asphalt binder in the mixture.

(2) The Engineer shall deduct the weight of all material lost, wasted, damaged, rejected, or applied contrary to these Specifications.

2. The tonnage (mass) shall be the actual weight of the mixture including the liquid asphalt and the chemical additive.

520.05 -- Basis of Payment

1. Pay Item	Pay Unit
Bituminous Patching	Ton (Tn) [Megagram (Mg)]

2. Portland cement concrete repairs of areas larger than 10 sq. ft. (0.9 m²) will be paid for as "Concrete Pavement Repair, Type ____". If "Concrete Pavement Repair" is not a bid item, then the PCC repairs will be extra work.

3. Payment is full compensation for all work prescribed in this Section and all sealant manufacturer's requirements.

