

SECTION 7

ASPHALTIC CONCRETE SURFACING

7.01 SCOPE

This section covers the construction of hot mix, hot laid Asphaltic Concrete Pavement, Asphalt Pavement Patching, Micro-Surfacing, Ultrathin Bonded Asphalt Surface (UBAS), crack sealing, Street Sweeping, Cold Milling, and related work.

A. Traffic Control. The Contractor shall provide work zone traffic control as specified in Section 4.24 for asphaltic concrete paving, asphalt patching, micro-surfacing, ultrathin bonded asphalt surfacing (UBAS), crack sealing, street sweeping, and cold milling operations unless it is stated otherwise in the Project Documents. Work zone traffic control shall be subsidiary to the paving, patching, surfacing, or milling work unless pay items for work zone traffic control are included in the Project Documents.

7.02 ASPHALTIC CONCRETE PAVEMENT

A. General Description. Asphaltic concrete pavement shall consist of placing a leveling, base, intermediate, or surface course of hot-mixed, hot-laid asphaltic concrete on a prepared subgrade, base, or existing pavement in accordance with these Standard Technical Specifications and in conformity with the lines, grades, widths, thicknesses, and typical sections shown in the Project Documents.

B. Materials. Materials shall conform to the requirements specified in Division 1200, Asphalt Materials, of the KDOT Standard Specifications except as amended herein.

(1) Asphalt Binder. Asphalt binder shall conform to the requirements of Performance Graded Asphalt Binder as specified in Subsection 1202.2 of the KDOT Standard Specifications. Unless otherwise specified or approved by the Engineer, PG 70-28 Performance Grade Asphalt Binder shall be used for the binder in BM-2A asphaltic concrete surface courses and PG 64-22 Performance Grade Asphalt binder shall be used in all other courses. Asphaltic concrete shall be comprised of all new materials or a blend of new materials in combination with a maximum of 10 percent reclaimed asphalt pavement unless specified otherwise in the Project Documents.

Only performance graded asphalt binders that are supplied by producers included on KDOT's "Prequalified List" shall be used.

i. Basis of Acceptance. Asphalt Binder shall be accepted based upon the Engineer's receipt and approval of a certification prepared by the producer indicating the quality and quantity of material in each shipping container meets the requirements specified. Certifications must be based upon the producer's quality control testing as required for KDOT prequalification.

(2) Asphalt for Tack Coats. Cutback asphalt and emulsified asphalt for tack coats shall conform to the requirements of the KDOT Standard Specifications Section 1203 for Emulsified Asphalt and Section 1204 for Cutback Asphalt. Grades may vary for surface and temperature conditions.

i. Basis of Acceptance. Asphalt for tack coat material shall be accepted based upon the Engineer's receipt and approval of a certification prepared by the producer indicating the quality and quantity of material in each shipping container meets the requirements specified. Certifications must be based upon the producer's quality control testing as required for KDOT prequalification.

(3) Aggregate. Aggregates for asphaltic concrete shall conform to the requirements specified in Section 1103, Aggregates for Hot Mix Asphalt (HMA) of the KDOT Standard Specifications, except as amended herein.

The mix may be composed of any combination of aggregates and mineral filler supplements meeting the applicable requirements in Table 1103-1 and 1103-2 of Section 1103, Aggregates for Hot Mix Asphalt, of the latest edition of the "Standard Specifications for State Road and Bridge Construction", Kansas Department of Transportation and the latest Special Provisions. Not more than 30% of the material passing the No. 200 sieve shall be present in the uncrushed aggregate. Surface course shall contain natural sand from an alluvial deposit of such grading that the portion of the sand passing the No. 8 sieve and retained on the No. 200 sieve will be not less than 15% of the total mix.

i. Gradation. The gradation for the combined aggregates in the bituminous mixture shall be as follows:

<u>Sieve Size</u>	<u>% Retained</u>	<u>Job Mix Tolerance</u>	
	³ / ₄ inch	0	--
3/8 inch	6-21	± 5	
No. 4	23-40	± 5	
No. 8	38-56	± 5	
No. 30	61-82	± 4	
No. 100	88-99	± 3	
No. 200	92-99	± 2	

ii. Quality of Individual Aggregates.

Soundness, minimum 0.90
 Wear, maximum 40%
 Absorption, maximum 4.0%
 The Plasticity Index shall not exceed 6.
 The maximum moisture shall not exceed 0.5%.

iii. Deleterious Substances. The combined aggregates shall be free from alkali, acids, organic matter, or injurious quantities of other foreign substances. Other deleterious substances shall not exceed the following percentages by weight:

Sticks..... 0.1%
 Shale, shale-like or soft or friable particles
 singly or in combinations..... 1.0%
 Coal..... 0.5%

Aggregates shall be tested for deleterious substances by the aggregate producer by the test methods identified in Section 1115 - “Test Methods for Division 1100, Aggregates” of the KDOT Standard Specifications.

iv. Basis of Acceptance. Aggregates for asphaltic concrete shall be accepted based upon the Engineer’s receipt of a certification from the aggregate producer that the material meets the requirements specified.

C. Mix Designation. The asphaltic concrete shall conform to the mix designation BM-2A as defined and specified in the KDOT Standard Specifications for State Road and Bridge Construction, 1990 Edition. The asphaltic concrete shall be comprised of all new materials or a blend of new materials with a maximum of 10 percent reclaimed asphalt pavement (RAP) unless otherwise specified in the Project Documents and approved by the City or County Engineer.

D. Asphaltic Concrete Mix Design. The Marshall method of mix design shall be used to test specimens of asphaltic concrete. Specimens shall be compacted at a temperature of 200°F to 300°F. A minimum of five sets of Marshall Stability properties shall be plotted on standard graph paper. The range of asphalt binder content shall be wide enough so that the Marshall Stability Curve peaks. Determination of the design mix binder content shall be made from these graphs. The mix design shall meet the following criteria:

TABLE 7.02 D. - ASPHALTIC CONCRETE MIX DESIGN

Mix Design Criteria	Street or Road Functional Classification	
	Principal/Minor Arterial and Major/Minor Collector	Local
Compaction – Blows per side of specimen	75	50
Marshall Stability (minimum)	1800	1200
Flow (1/100 inches)	8 – 16	8 – 18
% Binder (deviation from target binder content)	+/- 0.6%	+/- 0.6%
% Voids – Total Mix ^{Note 1}	3 – 5	3 – 5
% Voids in Mineral Aggregate (minimum)	14% All Courses	14% All Courses

^{Note 1} The target air voids for determining asphalt content shall be 4%. See Subsection 7.02 I. (4).

No asphaltic concrete shall be produced for payment until an asphaltic concrete mix design, including a design job-mix gradation, has been approved by the Engineer. The preparation of the asphaltic concrete mix design shall be performed by an approved testing laboratory and technicians certified in Asphalt Marshall Design (AMD). The preparation of the mix design shall be subsidiary to the bid item “Asphaltic Concrete”.

E. Equipment. Equipment shall conform to the requirements specified herein. No diesel fuel shall be allowed on an asphaltic concrete lift.

(1) Hot Mix Asphalt Plant. The hot mix asphalt plant shall conform to the requirements specified in Subsections 155.6 (a) and 155.6 (c) of the KDOT Standard Specifications.

(2) Storage or Surge Bins. Storage or surge bins for asphaltic concrete shall be used only with written approval of the Engineer. If, after approving the use of storage or surge bins, the Engineer determines that segregation is occurring with their use, the Engineer

may prohibit their continued use. Storage or surge bins shall conform to requirements specified in Subsection 155.3 of the KDOT Standard Specifications.

(3) Weighing Equipment. The weighing equipment for truck-hauled material shall consist of 1) an accurate and reliable platform scale or 2) an electronic system in which the scale is equipped with an automatic printout system that will print the weights of the material being delivered.

The scale shall be accurate to 0.5% throughout the range of use. The scale shall be checked, adjusted and certified by a qualified manufacturer's representative or an approved testing firm at 1) a maximum of 6 months intervals, 2) when the scale is repaired, and 3) any other time deemed necessary by the Engineer to assure the scale's accuracy. Platform scales shall have a platform of adequate length to weigh the longest truck in use on the project in one operation.

(4) Hauling Equipment. Any truck used for hauling asphaltic concrete shall have a tight, clean, smooth metal bed which has been thinly coated with a minimum amount of paraffin oil, lime solution, or other approved material to prevent the asphaltic concrete from adhering to the bed. The coating material shall not contaminate or alter the characteristics of the asphaltic concrete being hauled. The use of petroleum derivatives for coating the truck beds is prohibited. Trucks shall be equipped with a canvas cover or other suitable material of such size as to protect the mixture from the weather.

(5) Asphalt Distributor. The distributor shall conform to the requirements specified in Subsection 155.2 of the KDOT Standard Specifications. The distributor shall be calibrated and checked before being used. The Contractor shall provide to the Engineer a certificate indicating that the distributor meets the specified requirements and has been calibrated.

(6) Paver. The paver shall conform to the requirements specified in Subsection 155.4 of the KDOT Standard Specifications.

(7) Thermometers and Heat Sensing Guns. The Contractor shall provide to the Engineer certificate indicating that thermometers and heat sensing guns have been calibrated at the frequency and manner recommended by the manufacturer.

(8) Compaction Equipment. Self-propelled steel rollers shall conform to the requirements specified in Subsection 151.4 (c) of the KDOT Standard Specifications. Heavy self-propelled pneumatic-tired rollers shall conform to the requirements specified in Subsection 151.3 (c) of the KDOT Standard Specifications.

F. Construction Requirements. Any base course shall be compacted, tested, and approved before the placement of an intermediate or surface course. Unless otherwise specified, any and all leveling, base and intermediate courses shall be the same mix designation as the surface course.

(1) Preparation of the Asphalt Binder. The asphalt binder shall be heated to a temperature within the range recommended by the liquid supplier and in manner that avoids local overheating.

(2) Preparation of the Aggregate. Except for the minor fluctuations, the aggregate for the asphaltic concrete shall be dried and heated at the time of mixing to be within a temperature range of 260 °F. to 335 °F. Flames used for drying and heating shall be properly adjusted to avoid damage to the aggregate and to avoid soot on the aggregate.

(3) Preparation of the Asphaltic Concrete. Dried aggregate shall be combined in the plant in accordance with the approved design job-mix gradation and asphaltic concrete mix design. The combined aggregate shall be thoroughly dry mixed prior to adding the bind. The binder shall be introduced into the mixture in proportion to the approved asphaltic concrete mix design. The wet mixing time shall not be less than 40 seconds, but in all cases shall be sufficient to produce a homogeneous mixture in which all the aggregate is uniformly coated. At the time of discharge from the plant, the asphaltic concrete shall be within the temperature range recommended by the binder supplier.

Sampling and testing of the asphaltic concrete to determine conformance with the asphaltic concrete mix design and the design job-mix gradation shall be made at intervals corresponding to the production of approximately 500 tons of asphaltic concrete, but not less than one set of tests shall be made each day asphaltic concrete is produced. This sampling and testing shall be performed by an approved testing laboratory and shall be subsidiary to the bid item "Asphaltic Concrete". The Contractor or the testing laboratory shall submit written test results to the Engineer's Project Representative as soon as the testing is complete.

(4) Grade Control. The Project Surveyor will conduct the survey required for the reference grade and will establish the center line points. The Contractor shall maintain the location of the points until the completion of the surface course or as directed by the Engineer.

The Contractor shall erect and maintain a reference string line and operate the paver to conform to the string line for the initial lift and any other lifts if specified by the Engineer. The string line shall be erected parallel with the reference grade, and the asphaltic concrete shall be spread at a constant elevation above, below or at the string line elevation as directed.

If automatic profile road building type equipment is used to prepare the subgrade, the requirements for an erected reference string line may be waived by the Engineer. The Contractor shall furnish and maintain an approved mobile string line for all lifts not laid with the erected string line and operate the paver to conform to that string line. The longitudinal and transverse controls of the paver shall operate independent of each other to the extent necessary for the surface of the asphaltic concrete to conform to the string line and be uniform in cross section or crown.

(5) Preparation of the Subgrade or Base. The requirements for the preparation of earth or treated subgrade are specified in Subsections 3.10 and 3.11. No asphaltic concrete shall be placed on frozen subgrade.

i. Cleaning Surface. Concrete or asphalt pavement bases shall be cleaned of all dirt and other foreign material. Power brooms will not be acceptable for cleanup work without adequate dust control procedures. Clean and fill cracks and joints.

ii. Tack Coat. After the surface has been cleaned, a tack coat of SS-1HP emulsified asphalt shall be applied at a rate of 0.06 to 0.10 gallon per square yard to ensure a bond between pavement surfaces. Tack coat should be applied to uniformly cover the entire surface, including all vertical surfaces of joints, curbs, gutters, manholes and inlets, and brick or concrete base. Areas that cannot be coated from a distributor truck shall be coated by use of a spray wand.

The tack coat shall be applied to the top of base, intermediate and leveling courses the same day the subsequent lifts are to be laid. Tack coat is required for all subsequent lifts regardless of whether or not the lower lift was paved the same day. The tack coat shall be applied only to the area on which the asphaltic concrete is to be placed that same day. The Contractor shall re-apply tack coat to areas not paved the same day the tack was applied at no additional expense to the Owner.

Traffic, both construction and local, should be kept off fresh tack. A freshly applied tack coat surface may be slick, particularly before the asphalt emulsion has broken. To limit disruption of traffic and to keep traffic off the fresh tack, the Contractor shall reduce the length ahead of the asphalt laydown operation that the tack is applied. Workers shall be provided by the Contractor to prevent traffic from traveling over the tack coat.

If exposure of the tacked surface to traffic is unavoidable, the Contractor shall sand the surface at the rate of 6 lbs. per square yard. The Contractor shall broom the sand from the surface before the new pavement is placed to ensure a proper bond and then reapply the tack coat. The Contractor shall also clean and reapply tack to areas where traffic has tracked dirt onto the tacked surface or where traffic has pulled tack off of the surface.

(6) Protection of Concrete Contact Surfaces. Asphaltic concrete shall not be laid against concrete contact surfaces such as curb and gutter, inlets, etc. until the concrete is at least 5 days old and has reached 75% of its design strength.

(7) Contact Surfaces. Contact surfaces of curb and gutters, manholes, valve boxes, monuments boxes, and other similar structures shall be sprayed or painted with a thin, uniform tack coat. Streaking or partially coated contact surfaces shall be recoated.

(8) Lift Thickness. The nominal thickness of the compacted mat shall not exceed 2 inches for surface courses and 4 inches for other courses, unless specified otherwise in the Project Documents or requested by the Engineer. The Engineer may adjust the lift thickness when such adjustment is more adaptable to the total pavement thickness and when, in the opinion of the Engineer, it is not detrimental to placement and rolling conditions. The Engineer may also adjust the lift thickness to utilize the most efficient method of acquiring the required density and surface characteristics.

(9) Laydown Temperature Requirements. All asphaltic concrete shall be delivered to the paver at a temperature between 260⁰F and 335⁰F. Laydown operations shall be discontinued if, in the opinion of the Engineer, wind velocities create excessive cooling of the asphaltic concrete or moisture conditions cause excessive steam.

TABLE 7.02 F. (9): RECOMMENDED MINIMUM LAYDOWN TEMPERATURE (°F) FOR BASE COURSES *

Base or Subgrade Temperature (°F)	Lift Thickness					
	½”**	¾”**	1”	1 ½”	2”	3+”
32-40	---	---	---	305	295	280
40-50	---	---	310	300	285	275
50-60	---	310	300	295	280	270
60-70	310	300	290	285	275	265
70-80	300	290	285	280	270	265
80-90	290	280	275	270	265	260
90+	275	270	265	260	260	260
Recommended Minimum Rolling Time (minutes)	4	6	8	12	15	15

*Surface course must be installed with ambient air temperature 50° F and rising.

**Thicknesses less than 1 inch may be used only with written approval of the Engineer.

(10) Paving Operations. The asphaltic concrete shall be placed reasonably true to crown and grade by an automatically controlled paver. On arterial and collector streets, a material transfer device shall be utilized when laying surface lifts before May 1st or after October 31st at the discretion of the project manager. On multi-lane roads, when specified in the contract documents, the Contractor shall use two paving machines running side by side for the surface lift to eliminate a longitudinal cold joint between the traffic lanes. Both the material transfer device and the requirement for a second paving machine may be waived by the Project Engineer. Asphaltic concrete may be placed by hand methods only where machine methods are impractical. The paver shall spread the asphaltic concrete without tearing, shoving or gouging the surface and shall strike a finish that is smooth, true to cross section, free of segregation, uniform in density and texture, seamless at center joints, true and straight at the edge lines, and free from hollows, transverse corrugations and other irregularities. If the pavement does not conform to all of these requirements, the plant production and paving operations shall be suspended until the deficiency is corrected.

All asphaltic concrete shall be delivered to the paver in time to permit the completion of the placement and compaction of the asphaltic concrete during daylight hours. Nighttime work on projects not open to traffic may be permitted only with written approval of the Engineer. The Contractor shall supply ample, appropriate lighting.

Tickets certifying asphalt mix and binder shall accompany each load of asphaltic concrete delivered to the project and shall be given to the Engineer’s Representative.

(11) Compaction. The asphaltic concrete shall be uniformly compacted immediately following placement without tearing, shoving or gouging the surface. Delays in compacting freshly placed asphaltic concrete shall not be permitted.

Compaction of the mixture shall be accomplished using a steel-wheel roller or a pneumatic tire roller. Breakdown rolling shall be as close behind the paver as possible. The breakdown roller shall be a steel-wheel roller and operating in the vibratory mode or a pneumatic tire roller. The intermediate roller shall also roll closely behind the breakdown roller and shall be either a steel-wheel roller or a pneumatic tire roller. Finish rolling shall be accomplished by a steel-wheel roller operating in the static mode for the purpose of eliminating roller marks.

Rolling shall be continued until density is obtained in all portions of each course. Rollers and rolling procedures that result in crushing of the aggregate shall not be permitted. Compaction shall be sufficient to achieve field densities equal to or greater than 92% of the Maximum Theoretical Density as determined by tests made on specimens taken from the compacted course in accordance with the requirements of 7.02 H, testing of completed Asphaltic Concrete Pavement.

Compaction necessary to achieve the specified 92% of the maximum theoretical density shall be accomplished before the surface temperature of the bituminous mixture falls below 175°F. Subsequent lifts shall not be placed until the specified densities have been achieved, the temperature of the existing bituminous mat is below 175°F, and placement does not cause deformation of the existing bituminous mixture.

Compaction in all places inaccessible to the rollers, such as locations adjacent to curbs, driveways, inlets manholes, valve boxes, monument boxes and other similar structures, shall be completed to the specified 92% density using a vibratory plate compactor.

(12) Construction Joints. Joints between old and new pavements or between successive days paving work shall thoroughly and continuously bond the two pavements. The transverse construction joint between old and new pavements or between successive days work shall be constructed by cutting the asphaltic concrete back for its full depth so as to expose a fresh, vertical surface. Before placing asphaltic concrete against the cut joint, the contact surface shall be sprayed or painted with a thin, uniform tack coat. Starter blocks shall be placed beneath the entire length of the paver's screed, front to back, when beginning placement of asphaltic concrete from the transverse construction joint. The paver's screed shall not be set directly on the previously laid mat and dragged off of the existing asphaltic concrete. The thickness of the starting blocks shall allow for the additional thickness needed for placing the uncompacted lift prior to its compaction to the required thickness for the asphaltic concrete. The approximate thickness of the starting blocks should be equal to the compacted lift thickness in inches multiplied by ¼ inch per inch.

The height of the new asphaltic concrete above the existing mat shall allow for the additional thickness needed for placing the uncompacted lift prior to its compaction to the required thickness for the asphaltic concrete; approximate height should be equal to the compacted lift thickness in inches multiplied by ¼ inch per inch. Any excess asphaltic concrete shall be bumped back onto the second lane with a lute or rake. Larger aggregate (>¼") shall be removed prior to bumping the material back onto the material being placed. Excess asphaltic concrete shall not be scattered across the fresh mat.

Compaction of longitudinal construction joint shall be achieved by pinching the bumped excess asphaltic concrete down onto the joint after removing larger sized aggregate (>¼") from this material. The longitudinal construction joints in successive courses shall be offset not less than 6 inches nor more than 12 inches. The widths and placements of the surface course shall conform to traffic lane lines. Joints shall be straight. The final joint surface shall be uniform, sealed tight and free of broken aggregate. If the pavement does not conform to all of these requirements, the plant production and paving operations shall be suspended until the deficiency is corrected.

G. Surface Tolerances. The surface shall be true to established crown and grade. The surface may be checked by the Engineer using a 10-foot straightedge at the Engineer's discretion. The maximum allowable variation of the surface from the testing edge of the straightedge between any

two contacts with the surface shall not exceed $\frac{1}{4}$ inch. Any areas with surface variations greater than the maximum allowable shall be corrected at the expense of the Contractor. The methods for corrections shall be diamond grinding, removal of the surface course by milling and overlay, overlaying with surface course or other methods as approved by the Engineer. The corrective measures shall be applied to the full lane width of the pavement and the corrected areas shall be squared normal to the centerline of the paved surface.

H. Testing of Completed Asphaltic Concrete Pavement. All lifts of asphaltic concrete shall be compacted and tested before the placement of a subsequent lift. Testing for density, and thickness shall be based on random core samples taken from each completed lift. The random test locations may be selected using the method described in Subsection 7.07 or by another random sampling technique approved by the Engineer.

Core samples of the completed lift shall be obtained by the Contractor, or a certified testing laboratory retained by the Contractor. Cores shall be at least 4 inches in diameter. The Contractor shall furnish and operate an approved saw or core drill for cutting pavement samples. The equipment shall be capable of cutting the mixture without shattering the edges or otherwise disturbing the density.

The samples shall be tested and measured by a certified testing laboratory retained by the Contractor to determine the density of the asphaltic concrete. A single test shall be considered the average of three core samples taken at random locations throughout a block or within an intersection/cul-de-sac. Core samples shall not be taken closer than 3.0 feet to the toe of a curb or edge of pavement or within 1.5 feet of a construction joint. A minimum of one test (three cores) shall be taken for each block of completed lift, measured from ECR to ECR, and one test from each completed lift in an intersection or cul-de-sac. Results shall be reported to the Engineer in writing.

The Contractor shall patch the core locations with high strength non-shrink grout or other approved material.

I. Basis of Acceptance. Completed asphaltic concrete pavement shall be accepted based upon the following:

(1) Surface Smoothness. Asphaltic concrete pavement shall meet the surface tolerances specified in Subsection 7.02 G. Pavement not meeting these surface tolerances, after any necessary corrections, shall not be accepted.

(2) Compacted Thickness. Asphaltic concrete pavement shall be accepted for thickness where the thickness in a test area as specified in Subsection 7.02 H. is not more than 0.25 inches less than the thickness specified in the Project Documents. A test area shall be considered the average of three core samples taken at random locations throughout a block or within an intersection/cul-de-sac.

Where the thickness of the asphaltic concrete pavement in a test area is deficient by more than 0.25 inch, but not more than 1.0 inch, the pavement shall be accepted for thickness. However, payment for such deficient pavement shall be made at an adjusted price as specified in Table 7.02 I. (2). Deductions for deficient pavement thickness may be entered on any payment estimate after the information becomes available.

Where the pavement is more than 1 inch deficient in thickness, the Contractor shall remove such deficient areas and replace them with pavement of satisfactory quality and thickness. The Contractor shall receive no compensation for materials or labor involved in the

removal or the replacement of deficient pavement. With the consent of the Engineer, the Contractor may leave the deficient pavement in place and receive no compensation or payment for such pavement. The area of pavement for which no payment is made shall be identical to the area of pavement which the Contractor would be required to remove and replace.

TABLE 7.02 I. (2): PRICE ADJUSTMENT FOR PAVEMENT THICKNESS DEFICIENCY

Deficiency in Specified Pavement Thickness as Determined by Cores	Proportioned Part of the Contract Price Allowed
0.00 to 0.25 inch	100%
0.26 to 0.50 inch	90%
0.51 to 0.75 inch	75%
0.76 to 1.00 inch	60%

(3) Compacted Density. Asphaltic concrete pavement shall be accepted for density where the density, tested as specified in Subsection 7.02 H., is equal to or greater than 92% of the maximum theoretical Marshall density. A test area shall be considered the average of three core samples taken at random locations throughout a block or within an intersection/cul-de-sac.

When the density of any individual lift in any test area is less than 92% and greater than or equal to 90.5% of the maximum theoretical Marshall density, the asphaltic concrete pavement within the test area will be accepted for density but payment shall be made at an adjusted unit price calculated as follows:

Adjusted Unit Price = (Contract Unit Price of Asphaltic Concrete) x (Specified Thickness of Lift Sampled divided by Total Specified Pavement Thickness) x (Appropriate Price Adjustment Factor as Specified in Table 7.02 I. (3))

TABLE 7.02 I. (3): PRICE ADJUSTMENT FOR PAVEMENT DENSITY DEFICIENCY

Pavement Density as a Percentage of Maximum Theoretical Marshall Density in Test Area	Proportioned Part of the Contract Price Allowed
92.00% or above	100%
91.00% - 91.99%	80%
90.50% - 90.99%	70%
Less than 90.50%	0%

Deductions for deficient density may be entered on any pay request after the information becomes available.

Where the density of any individual lift of asphaltic concrete pavement in a test area is less than 90.5% of the Maximum Theoretical Density, the Contractor shall remove the deficient area of asphaltic concrete pavement represented by the test and replace it with pavement material of satisfactory quality and density. Full depth pavement removal and replacement will be required if a bottom or intermediate lift is deficient. The Contractor shall receive no compensation for materials or labor involved in the removal and replacement of the deficient pavement.

(4) Percent Air Voids – Total Mix. Asphaltic concrete pavement shall be sampled and tested to determine percent air voids and conformance with the asphaltic concrete mix design at intervals corresponding to the production of approximately 500 tons of asphaltic concrete, but not less than one set of tests each day asphaltic concrete is produced, as specified in Subsection 7.02 F (3). Asphaltic concrete pavement shall be accepted for air voids when the percent air voids are within the range of 3% to 5%. If the test results for percent air voids are outside of the specified range of 3% to 5%, payment will be made an adjusted price, as specified in Table 7.02 I (4). Deductions for deficient air voids will reflect the area of pavement represented by the corresponding 500-ton test sample. Deductions for deficient air voids in the total mix may be entered on any pay request after the information becomes available.

TABLE 7.02 I. (4): PRICE ADJUSTMENT FOR AIR VOID RANGE DEFICIENCY

Measured %Air Voids - Total Mix	Proportioned Part of the Contract Price Allowed
3% to 5%	100%
2.5% to 2.9% or 5.1% to 5.5%	70%
< 2.5% or > 5.5%	0% or Remove and replace at the discretion of the Engineer.

(5) Surface Condition. The final surface of the asphaltic concrete shall be visually inspected by the Engineer. The surface finish shall be substantially free of tears, shoving, ruts, gouges, segregation, variations in texture, excessive variation at seams and center joints, corrugations or other irregularities identified by the Engineer. The Contractor will be required to repair deficient areas to the satisfaction of the Engineer. No payment will be made for correcting deficiencies in the pavement surface condition.

J. Bid Item, Measurement, and Payment.

(1) Bid Item:
(*) **ASPHALTIC CONCRETE** Unit: Square Yard (nearest S.Y.)

(*) Specified Thickness of Asphaltic Concrete Pavement in inches.

(2) Measurement. “(*) Asphaltic Concrete” shall be measured by the area of the top of the asphaltic concrete pavement constructed. Dimensions of individual areas shall be measured to the nearest 0.1 foot, the areas computed, summed and rounded to the nearest square yard for each pay application. The portion of an asphaltic concrete base placed under curbs and the tapered/sloped portion of the pavement between the top and bottom of the pavement section at the pavement’s edges shall not be measured.

(3) Payment. Payment for completed and accepted asphaltic concrete pavement, measured as provided above, shall be made at the Contract Unit Price for “(*) Asphaltic Concrete” per square yard subject to price adjustments for thickness, density, and air void deficiencies as stipulated in Subsections 7.02 I.(2), 7.02 I.(3), and 7.02 I.(4) above. Such payment shall be full compensation for the drying and screening of the aggregates; the mixing of the asphaltic cement with the aggregates; the preparation of the subgrade, unless bid as a separate bid item; the preparation of the base or surface to which the asphaltic concrete is applied; the application of prime and tack coats; the hauling, placing, finishing, and compaction of the asphaltic concrete; mobilization; providing all

traffic control, unless provided by the owner or established as a separate pay item; and for all labor, equipment, tools, supplies, and incidentals necessary to complete the work.

7.03 ASPHALT PAVEMENT PATCHING.

A. Materials. Unless otherwise specified in the Project Documents, materials used for patching asphalt pavement shall meet the requirements for asphaltic concrete pavement specified in Subsection 7.02 B.

B. Construction Requirements.

(1) Initial Removal of Pavement. The Engineer shall mark in the field the limits of the asphaltic concrete pavement to be removed and replaced. The pavement shall be removed by first saw cutting around the perimeter of the patch area to the full depth of the pavement to be removed. The Contractor shall remove and dispose of the pavement as Specified in Subsection 3.13.

i. Removal of Pavement Containing Bricks (Projects within the City Limits Only). If the area to be patched has one or more underlying layers of brick, the requirements of Subsection 4.05 and the City of Topeka Brick Street, Alley and Sidewalk Policy shall apply. Upon encountering pavement containing bricks, the Contractor shall contact the City Street Maintenance Section and request instructions relative to preservation of the brick. The Contractor shall not proceed with any excavation of pavement containing brick until authorization from the Street Maintenance Section is received.

After the authorization to proceed has been received from the Street Maintenance Section, the Contractor may proceed with removal of bricks as specified in Subsection 4.05 and using care to not damage the bricks. The bricks, including those overlain with asphalt shall be salvaged to the Street Maintenance Section or disposed of as specified in Subsection 4.05.

(2) Subgrade Stabilization. After removal of the pavement, the Contractor shall request an inspection of the subgrade by the Engineer. If the Engineer determines that the subgrade is unstable, it shall be excavated to a depth determined by the Engineer and backfilled with Crushed Aggregate Base – Type AB-3 as specified in Subsection 3.12 or with other material as directed by the Engineer. The aggregate base shall be moistened and deposited in lifts not exceeding 6 inches and compacted to a minimum density of 95% of the standard density with moisture content of +/-3% of the optimum moisture or to the satisfaction of the Engineer when testing of the density of the material is waived by the Engineer. The installation and compaction of the aggregate base shall be paid for by the ton under the pay item “Aggregate Base – Type AB-3” Excavation of the subgrade shall be paid for by the cubic yard under the pay item “Unclassified Excavation”.

(3) Additional Pavement Removal. Additional existing pavement shall be full depth sawcut and carefully removed by the Contractor to provide a minimum shoulder width of 9 inches of undisturbed subgrade on each side of the trench.

If the asphalt patching is necessary due to an excavation into the roadbed, the Contractor shall backfill the excavation as specified in Section 2.10 to the bottom of the adjacent pavement prior to removing additional pavement for the minimum 9 inch subgrade shoulder.

(4) Placing the Patch. The width from sawcut to sawcut shall be filled with asphalt (referred to in the following as “the patch”) as specified in Standard Detail Drawing DT-007 and DT - 008 and matching the thickness of the existing pavement. Pavements consisting of an asphalt overlay on concrete shall be replaced in kind as specified in the Standard Detail Drawing DT -007 and DT - 008.

Before placing the patch, the Contractor shall clean the exposed edges of the existing pavement and apply a thin tack coat of emulsified asphalt to the clean edges of the existing pavement.

Asphaltic Concrete shall be placed and compacted from the depth of the bottom of the adjacent pavement to the final surface elevation in uniform layers of 3 inches or less. The Contractor shall compact each layer until no further consolidation is observed. The surface of the preceding layer shall be cleaned before the succeeding layer of asphalt material is placed. Where the patch area is designated to be finished as specified in Subsection 7.04, the patch asphalt shall be placed and compacted from the depth of the bottom of the adjacent pavement in uniform layers of 3 inches or less, leaving room for the specified depth of surface course.

When patches have a transverse width greater than 8.5 feet and a longitudinal length greater than 10 feet, the final lift shall be placed with a paving machine and compacted with a breakdown roller.

All edges of patched areas shall be sealed with hot type joint sealant. Sealing of the edges of the patch is subsidiary to the patch.

C. Basis of Acceptance.

(1) Surface Tolerances. The surface of the patch may be checked by the Engineer using a 10-foot straightedge at selected locations at the Engineer’s discretion. The maximum allowable variation of the surface from the testing edge of the straightedge between any two contacts with the surface shall not exceed 1/4 inch. Any patch areas with surface variations greater than the maximum allowable shall be corrected at the expense of the Contractor.

(2) Compacted Density. Asphalt pavement patches shall be accepted for density where the density is equal to or greater than 92% of the maximum theoretical Marshall density as tested by a nuclear densimeter. If the patch fails to meet these requirements, the Contractor shall remove and satisfactorily replace the patch to the satisfaction of the Engineer at no additional cost to the Owner.

(3) Surface Condition. The final surface of the asphalt patch shall be visually inspected by the Engineer. The surface condition of the patch shall be accepted if it is substantially free of tears, shoving, ruts, gouges, segregation, variations in texture, excessive variation at joints, corrugations, or other irregularities identified by the Engineer. The Contractor will be required to repair the deficient area to the satisfaction of the Engineer at no additional cost to the Owner.

D. Bid Item, Measurement, and Payment. Crushed rock surfacing used to repair subgrade for asphalt pavement patches shall be measured and paid for as specified in Subsection 4.07.

(1) Bid Item:

ASPHALT PAVEMENT PATCHING Unit: Ton (nearest 0.1 ton)

(2) Measurement. The asphaltic concrete filling the area between the final sawcuts shall be considered “Asphaltic Pavement Patching” and shall be measured as the weight of the material, to the nearest 0.1 Ton, installed. The weight shall be computed based upon the volume of the patch with individual dimensions measured to the nearest 0.1 foot and an assumed unit weight of 145 pounds per cubic foot. Sawcutting, removal of pavement, cleaning, applying emulsified asphalt tack, and compaction of the asphalt shall not be measured and shall be considered incidental to the item Asphalt Pavement Patching.

(3) Payment. Payment for completed and accepted asphalt pavement patches, measured as provided above, shall be made at the Contract Unit Price for “Asphalt Pavement Patching” per Ton. Such payment shall be full compensation for sawcutting, removal of pavement, cleaning, applying emulsified asphalt tack, placing and compaction of the asphalt; providing all traffic control, unless provided by the owner or established as a separate pay item; and for all labor, equipment, tools, supplies, and incidentals necessary to complete the work as specified.

7.04 OVERLAYING ASPHALT PATCHING.

A. General. When indicated in the Project Documents asphalt patches shall be finished as specified herein.

B. Materials. Unless otherwise specified in the Project Documents, overlay materials used for patching asphalt pavement shall meet the requirements for asphaltic concrete pavement specified in Subsection 7.02 B.

C. Construction Requirements. An area surrounding the full depth repair area (the patch) shall be milled to a depth of 2 inches and the patch and milled area overlaid with 2 inches asphaltic concrete. Surface course milling shall meet the requirements of Subsection 7.05. The asphaltic concrete shall be constructed as specified in Subsection 7.02. Final mill and overlay limits shall be perpendicular to the centerline of the roadway unless approved otherwise.

(1) Asphalt Pavements Less Than Three Years Old. When the existing asphalt pavement is less than three years old, the area milled shall surround the patch to the width of the affected lane in the transverse direction and at least 10 feet beyond the patch in longitudinal directions. The milled area shall have at least one foot of milled surface surrounding all squared edges of the patch. If the milled area, as described above, extends into the adjacent lane, then the entire adjacent lane width shall also be milled. If the distance between two milled areas is closer than 20 feet, then the mill and overlay operation shall be extended to combine the areas into one area. If there are more than 3 repair areas in a 100-foot section of street, then the areas shall be combined into one large mill and overlay area. The requirements set forth in this paragraph also apply to asphalt on concrete pavements that have an asphalt surface course less than three years old.

(2) Asphalt Pavements More Than Three Years Old. When the existing asphalt pavement is more than 3 years old, the area milled shall extend 1 foot beyond each squared edge of the patch. If the distance between two milled areas is closer than 10 feet then the mill and overlay operation shall be extended to combine the areas into one area. If there are more than 3 repair areas in a 50-foot section of street, then the areas shall be combined into one large mill and overlay area.

D. Bid Item, Measurement and Payment.

(1) Bid Item:

ASPHALTIC CONCRETE

Unit: Square Yard (nearest 1 Sq. Yd.)

(2) Measurement. “Asphaltic Concrete” shall be measured by the area of pavement milled and overlaid. Dimensions of individual areas shall be measured to the nearest 0.1 foot, the areas computed, summed, and rounded to the nearest square yard for each pay application.

(3) Payment. Payment for the completed and accepted milling and overlay of asphalt patch areas shall be made at the Contract Unit Price per square yard for “Asphaltic Concrete,” which price shall be full compensation shall all materials, labor, equipment, hauling, stockpiling, and incidentals necessary to complete the work as specified.

7.05 COLD MILLING.

A. Construction Requirements. Cold milling shall consist of the removal of pavement surfaces to the depth and limits as indicated in the Project Documents or as directed by the Engineer. Milling will require grade lines using approved equipment automatically controlled with regard to longitudinal grade and cross slope. Surface lifts shall be removed to a depth of not less than 2” or the bottom of the existing surface lift measured in the field.

The longitudinal termini of milled areas shall be sawcut transverse to centerline to provide a clean vertical edge and milled to a depth not less than 2 inches or the actual bottom of the existing surface lift present in the field. Where through traffic crosses the edge of a milled area, or where traffic is being carried on a milled area, and the condition will remain overnight or for a longer period, temporary asphalt wedges 10-feet in length shall be constructed to smooth the transition from the normal pavement surface and the milled surface. Temporary asphalt wedges are subsidiary.

Unless otherwise indicated, all milled material shall be loaded into dump trucks and hauled by the Contractor to designated City or County stockpile locations.

B. Bid Item, Measurement and Payment.

(1) Bid Item:

COLD MILLING

Unit: Square Yard (nearest 1 Sq. Yd.)

(2) Measurement. “Cold Milling” shall be measured by the area of pavement milled. Dimensions of individual areas shall be measured to the nearest 0.1 foot, the areas computed, summed and rounded to the nearest square yard for each pay application.

(3) Payment. Payment for the completed and accepted milling of pavement shall be made at the Contract Unit Price per square yard for “Cold Milling,” which price shall be full compensation for all materials, labor, equipment, hauling, stockpiling, and incidentals necessary to complete the work as specified.

7.06 ASPHALT OIL PRICE ADJUSTMENT.

A. General. When the item “Asphalt Oil Price Adjustment” is included as a pay item in the Project Documents, the total Contract amount for asphaltic concrete work will be adjusted for variations in the price of asphalt binder material.

B. Commencement and Timely Completion of Work. The parties recognize that asphalt prices are volatile, and that timely completion of the Project is essential. Upon Commencement of Contract time as defined in Section 2.3 of the General Conditions of the Project Manual, the Contractor shall begin work on the Project as soon as possible and pursue the work in an expeditious manner. The Contractor may not move off the Project without the written permission of the Owner. If the Contractor moves off the Project without the written permission of the Owner, the Owner will discontinue additional payments to the Contractor for asphalt oil price adjustments due to price increases for the remainder of the Project Contract. However, deductions for asphalt oil price adjustments will continue to be applied regardless of whether or not the additional payments are discontinued for price increases. The Owner’s written permission will not be withheld unreasonably.

C. Bid Item, Measurement and Payment.

(1) Bid Item.

ASPHALT OIL PRICE ADJUSTMENT (*Maximum) Unit: Dollars
(nearest \$0.01)

*Maximum price of adjustment in Dollars, bid form amount for this bid item will be set at \$0.00

(2) Measurement. When included as a pay item in the Project Documents, “Asphalt Oil Price Adjustment” shall be measured based upon an Asphalt Material Index (AMI) established by Shawnee County each month and the volume of asphalt constructed in that same month. Shawnee County will determine the AMI by averaging the rack prices for PG 64-22 as quoted to the County by Conoco Oil and Ergon Inc. in Kansas City. The County will publish the AMI monthly on the Shawnee County Public Works web page. The AMI for the month the Project Contract is let becomes the Starting Asphalt Index (SAI) for the project regardless of the grade of asphalt oil used on the project. The Contractor’s bid price for each Asphaltic Concrete bid item shall be based on the SAI.

Asphalt Oil Price Adjustment (increases/decreases) will be included in each pay application based on the following computations:

Asphalt Oil Price Adjustment

$$= [(** \text{Area of Asphalt Placed} \times \text{\#thickness} \times \Psi 145 \text{ pcf} \times \Phi .05) / 2000] \times \text{“A”}$$

Where: "A" = (AMI - SAI)

**Area of Asphalt Placed is the area of asphalt pavement constructed in a particular month and shall be measured as the surface area of the top of the asphaltic concrete pavement constructed. Dimensions of individual areas shall be measured to the nearest 0.1 foot, the areas computed, summed, and rounded to the nearest square foot for each pay application. The tapered/sloped portion of the pavement between the top and bottom of the pavement section at the pavement's edges shall be measured.

#Thickness is in feet of corresponding pavement areas constructed in a particular month, which may not be the final plan thickness if all lifts have not been constructed.

ψ assumed unit weight = 145 pcf

φ assumed oil in mix = 5%

Example:

Given the following:

Area = 18,000 SF

Thickness = 3" (.25') plan thickness

SAI = \$400/ton

AMI = \$450/ton for the month

Asphalt Oil Price Adjustment = $[(18,000 \times .25 \times 145 \times .05) / 2000] \times \$50 = \$815.63$

(3) Payment. When included as a pay item in the Project Documents, payment or deductions for "Asphalt Oil Price Adjustment", measured as provided for above, shall be made as the project progresses by adjusting the item "Asphalt Oil Price Adjustment" on the Contractor's Applications for Payment. The Contractor shall prepare and submit a form similar to Form 1 on the next page:

Asphalt Oil Price Adjustment – Form 1

Month: July 2012
 Contractor Name: John Doe Paving, Inc.
 Contract No. XXX
 Project No. XXX
 Project Name: NW ROUGH ROAD PAVING
 Pay Applications: 4

Asphaltic Concrete Paving Completed in June 2012

Station to Station	*Width (feet)	Thickness (feet)	Volume (cubic feet)
10+55 to 11+25	10.00 to 12.00	0.58	446.60
11+25 to 15+00	12.00	0.75	3375.00
15+00 to 16+25	12.00 to 10.00	0.75	1031.25
Total Volume of Asphalt =			4853

*The tapered/sloped portion of the pavement between the top and bottom of the pavement section at the pavement's edges shall be measured.

Starting Asphalt Index (SAI) = \$400.00/ton

Pay App. No. 4

(1) Pay App. No.	(2) Month Paving Completed	(3) Total Volume (cubic feet)	(4) Column (3) x 5% x (145/2000) = Tons of Oil	(5) (AMI) for Month of Paving	(6) Change in Oil Price SAI - AMI	(7) Asphalt Oil Price Adjustment Col. 4 x Col. 6
1	April	1000	3.625	\$440.25	40.25	\$145.91
2	May	4500	16.3125	\$450.00	\$50.00	\$815.63
3	June	0	0	NA	NA	0.00
4	July	4853	17.5921	\$335.65	-64.35	-1132.05
Total Asphalt Oil Price Adjustment =						-\$170.51

The Contractor shall submit a "Form 1" with each Pay Application.

No payments for increases in "Asphalt Oil Price Adjustment" will be made for asphalt paving completed after the expiration of the Contract Time for Final Completion as set forth in

Article 3 of Document 530 of the Project Documents. Deductions for "Asphalt Oil Price "

Deductions for "Asphalt Oil Price Adjustment" will be made for asphalt paving regardless of whether the Contract Time for Final Completion has expired or not.

7.07 RANDOM TEST LOCATIONS

A. General. It is intended that all test locations be selected in an unbiased manner. Random test locations may be selected using Method A described below or by another random sampling technique approved by the Engineer.

A single test shall be considered the average of three core samples taken at random locations throughout a block or within an intersection/cul-de-sac. A minimum of one test (three cores) shall be taken for each block of completed lift, measured from ECR to ECR, and one test (three cores)

from each completed lift in an intersection or cul-de-sac. Core samples shall not be taken closer than 3.0 feet to the toe of a curb or edge of pavement or within 1.5 feet of a construction joint. When a core location falls within an area that is not appropriate (i.e., a joint, a manhole lid), the location shall be moved 10 feet ahead on stationing as appropriate.

B. Method A Location Determination. To determine the first random location for Method A, find the X and Y coefficient from the table below for the day of the month that the asphalt was placed.

Date	X	Y	Date	X	Y	Date	X	Y
1	0.290	0.170	12	0.183	0.530	23	0.389	0.170
2	0.119	0.760	13	0.669	0.310	24	0.626	0.710
3	0.594	0.510	14	0.971	0.860	25	0.930	0.440
4	0.953	0.140	15	0.314	0.400	26	0.742	0.230
5	0.784	0.420	16	0.508	0.720	27	0.473	0.680
6	0.284	0.800	17	0.877	0.130	28	0.203	0.870
7	0.576	0.250	18	0.193	0.610	29	0.504	0.400
8	0.069	0.540	19	0.430	0.770	30	0.913	0.590
9	0.691	0.780	20	0.751	0.240	31	0.620	0.320
10	0.973	0.290	21	0.508	0.460			
11	0.328	0.850	22	0.221	0.831			

Start with the beginning station of the block or intersection to be tested. Add the longitudinal distance to the first core location by multiplying the length of the block or intersection by the X coefficient for the day the asphalt was placed. Determine the transverse distance from the right edge of asphalt pavement by multiplying the asphalt width at that X location by the Y coefficient for the day the asphalt was placed. Both longitudinal and transverse distances should be rounded to the nearest 0.1 feet.

To calculate the next test location, determine the X and Y coefficients for the following day of the month. For example, if the day the asphalt was placed was the 10th, then the next location is calculated from the X and Y coefficients for the 11th. Calculate the longitudinal distance to the second core location by multiplying the length of the block or intersection by the X coefficient for the following day. Calculate the transverse distance from the right edge of asphalt pavement by multiplying the asphalt width at that X location by the Y coefficient for the following day.

The third location is determined by taking the X and Y coefficients for the second day following asphalt placement. From the example above, the second day would be the 12th. The longitudinal distance to the third core location is determined by multiplying the length of the block or intersection by the X coefficient for the second day. The transverse distance from the right edge of asphalt pavement is calculated by multiplying the asphalt width at that X location by the Y coefficient for the second day.

Example:

Beginning Block Station = 20 + 00
 Block Length = 500 feet
 Asphalt Pavement Width = 34 feet
 Day Asphalt was placed = 10th

First Test Location:
 X coefficient for 10th = 0.973

Y coefficient for 10th = 0.290
 First Test Location = 2000 + (500 x 0.973) = Sta. 24 +86.5
 Transverse Offset = (34 x 0.290) = 9.9 feet from right asphalt pavement edge
 Second Test Location:
 X coefficient for 11th = 0.328
 Y coefficient for 11th = 0.850
 Second Test Location = 2000 + (500 x 0.328) = Sta. 21 + 64.0
 Transverse Offset = (34 x 0.850) = 28.9 feet from right asphalt pavement edge

Third Test Location:
 X coefficient for 12th = 0.183
 Y coefficient for 12th = 0.530
 Third Test Location = 2000 + (500 x 0.183) = Sta. 20 + 91.5
 Transverse Offset = (34 x 0.530) = 18.0 feet from right asphalt pavement edge

7.08 MICRO-SURFACING

A. General. When indicated in the Project Documents Micro-Surfacing and Micro-Surfacing Crack Fill shall be finished as specified herein.

B. Materials. Materials evaluation and mix design shall be completed in accordance with the International Slurry Surfacing Association’s Recommended Performance Guidelines for Micro-Surfacing A143 (latest version) for items not specifically noted herein. Minimum thickness of micro-surfacing shall be ¼”.

- Emulsified Asphalt. The emulsified asphalt shall meet the requirements of a CSS- 1HM (Cationic) which conforms to KDOT standard specifications. A minimum of 3.0% Polymer Solids content, certified from an approved source shall be mixed into the asphalt emulsion by the emulsion manufacturer. The formulation used for the work must cure sufficiently so that normal traffic can be allowed one hour after application without damage to the surface.
- Mineral Aggregate. The mineral aggregate shall meet the requirements of applicable Sections of Division 1100 of the KDOT specifications, including but not limited to Sections 1101, 1109 and 1115. The gradation of the Micro-surfacing aggregate shall meet the requirements as follows:

<u>Sieve Size</u>	<u>% Retained</u>	<u>Job Mix Tolerance</u>
3/8 inch	0	
No. 4	0-10	± 5
No. 8	10-35	± 5
No. 16	30-55	± 5
No. 30	50-70	± 5
No. 50	70-82	± 4
No. 100	79-90	± 3
No. 200	85-95	± 2

Contractor shall supply certifications of aggregate and aggregate soundness. Certifications of aggregate soundness shall be not older than one year from the date of certification testing.

- Mineral Filler. The mineral filler shall be a recognized brand of non-air entrained

- Portland cement that is free from lumps.
- Water. Water shall be potable, free of harmful soluble salts and conform to KDOT Section 2402.
- Sand Equivalency. 60% min. per ASTM D 2419 (AASHTO T 176)
- Soundness. 15% max. using Na₂SO₄ or 25% max using MgSO₄. per ASTM C 88 (AASHTO T 104)

C. Mix Design and Proportioning

The Contractor shall develop and submit a mix design for approval by the Engineer prior to use. The components shall be proportioned within the following limits:

- Mineral Aggregate. 20-25 lbs/SY dry weight
 - a. In order to allow heavy turning vehicles to get on the pavement sooner without damaging the micro-surfacing, the Contractor may reduce application rate on cul-de-sac bulbs with permission from the Engineer. The adjusted rate shall be agreed upon by the Engineer after placing a test strip, otherwise the work may not be accepted.
- Modified Emulsion. 8.0% min. - 9.0% max. percent residue by weight
- Mineral Filler. 1.5% min. – 3.0% max. by dry weight of aggregate

D. Construction Requirements. Immediately prior to application of Micro-Surfacing, the surface of the roadway shall be thoroughly cleaned and flushed of all vegetation, loose aggregate, dirt, mud and other debris. It may be necessary to use compressed air and/or a torch to remove debris and vegetation from un-sealed cracks including the joint between asphalt and the concrete gutter. Manholes, valve boxes, inlets and any other structures located within the limits of the area to be surfaced shall be masked prior to surfacing, and the masking shall be removed as soon as practical. Micro-surfacing Crack Fill shall be completed prior to Micro-Surfacing. Immediately ahead of the spreader box, the pavement surface shall be damp, but without any free-flowing water.

Micro-Surfacing shall not be applied if either the pavement or air temperature is below 50 degrees F and falling, but application may start when both pavement and air temperatures are above 45 degrees F and rising. No Micro-Surfacing shall be applied when the possibility exists that the finished product will freeze within 24 hours.

E. Bid Item, Measurement and Payment.

(1) Bid Item:

MICRO-SURFACING Unit: Square Yard (nearest 1 Sq. Yd.)

(2) Measurement. “Micro-Surfacing” shall be measured by the square yard. The unit price bid for Micro-Surfacing shall be full compensation for all mobilization, surface preparation, application of the micro-surfacing material, clean-up, any hauling or disposal; and for all labor, equipment, materials, tools and incidentals necessary to complete the work as specified for Micro-Surfacing. Street widths vary, the square footage in the bid documents is an estimate only. Actual square footage for payment will be measured in the field. Curb and gutter is not included in the square footage.

7.09 CRACK SEALING OF WIDE CRACKS

A. General. When indicated in the Project Documents Crack Sealing of Wide Cracks shall be finished as specified herein.

B. Materials. Cracks wider than 1.0” but less than 2.0” in width shall be filled with a mixture of emulsified asphalt and aggregate. The aggregate shall consist of limestone, volcanic ash, sand, or other material that will cure to form a hard substance. The combined gradation shall be as shown in Table 1.

<u>Sieve Size</u>	<u>% Retained</u>
3/8 inch	0
No. 4	0-10
No. 8	10-35
No. 16	30-55
No. 30	50-70
No. 50	70-82
No. 100	79-90
No. 200	85-95

Up to 3% cement can be added to accelerate the set time. The mixture shall not contain more than 20% natural sand without approval in writing from the Engineer.

The proportions of asphalt emulsion and aggregate shall be determined in the field and may be varied to facilitate construction requirements. Normally, these proportions will be approximately one part asphalt emulsion to five parts aggregate by volume. The material shall be poured into the cracks or shall be placed in the crack and compacted to form a voidless mass. The crack shall be filled within 0 to 1/8 inch of the surface. Any material spilled outside the width of the crack shall be removed from the surface prior to seal coating.

They use of an approved repair mastic such as DEERY Level & Go or other mastics may be used if approved by the Owner.

C. Construction Requirements. Crack Sealing of Wide Cracks is intended for use on localized areas of wide cracking (1.0” to 2.0”). The crack shall be thoroughly cleaned and flushed of all vegetation, loose aggregate, dirt, mud and other debris prior surfacing. It may be necessary to use compressed air and/or a torch to remove debris and vegetation from the cracks. Crack Sealing of Wide Cracks shall be completed prior to “regular” resurfacing – not after. Furthermore, the Crack Sealing of Wide Cracks shall be in place for a minimum of 24 hours prior to placement of surfacing material.

D. Bid Item, Measurement and Payment.

(1) Bid Item:

CRACK SEALING OF WIDE CRACKS Unit: Linear Foot (nearest 1 LF)

(2) Measurement. “Crack Sealing of Wide Cracks” shall be measured by the linear foot. The actual length shall be verified by a City of Topeka or County representative.

The unit price bid for Crack Sealing of Wide Cracks linear foot shall be full compensation for all mobilization, surface preparation, application of the crack fill material, clean-up, any hauling or disposal; and for all labor, equipment, materials, tools and incidentals necessary to complete the work as specified for Crack Sealing of Wide Cracks. Street widths vary; the linear footage in the bid documents is an estimate only. Actual linear footage for payment will be measured in the field.

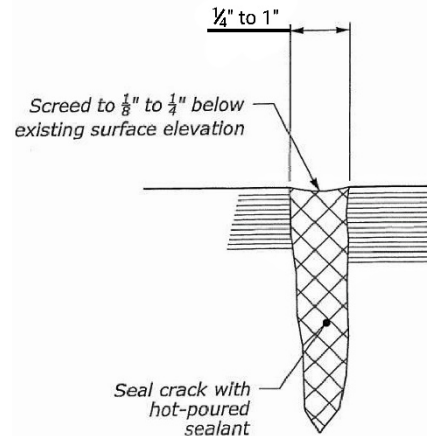
7.10 CRACK SEALING OF NARROW CRACKS

- A. General. This bid item shall include all work necessary to fill cracks in asphalt pavement surfaces that are greater than 0.25 inches wide, but less than 1.0 inch wide. The City reserves the right of final determination as to which cracks will/will not be sealed using this bid item. The joint/seam between concrete curb/gutter and asphalt pavement is considered a crack to be filled, provided it is between 0.25 inches wide and 1.0 inch wide.
- B. Material. The sealant used shall be hot-applied asphalt-based product. The material used should be Crafcro RoadSaver 221 or an approved equivalent. The material used shall meet the requirement of ASTM D6690 (AASHTO M324), Type IL "Joint and Crack Sealants, Hot-Applied, for Concrete and Asphalt Pavements".

Equipment. The equipment provided shall be safe and in good condition (as determined by the Engineer on a day-day basis), adequate in size to accomplish the work, and conform to the sealant manufacturer's recommendations.

- Air Lance. A hot compressed air lance capable of providing clean, oil-free compressed air at a volume of 100 cfm, a pressure of 120 psi, and a temperature of 2,000°F (1,100°C).
 - Application Wand. A wand attached to a heated hose, which is attached to a heated material chamber that maintains material temperature within manufacturer's tolerances. The wand tip shall be selected which provides the desired finished profile as shown in the attached detail. Approval of the tip by the Engineer will be based on a demonstration that the tip can provide the desired finished profile. Material flow through the application wand shall be controlled with a toggle switch or in-line valve. Pour pails are not acceptable.
 - Heating Kettle. The heating kettle shall be an indirect-heating double boiler capable of constant and effective agitation that promotes proper mixing and maintains uniform heat distribution throughout the kettle. The unit must be capable of heating the material within a range that meets the sealant manufacturer's recommendations. The unit must include an easily read and accurate thermometer to ensure the sealant is not heated to a temperature in excess of that specified by the sealant manufacturer.
- C. Construction Requirements
- Crack Preparation. Cracks shall be cleaned, dry and free of dust, dirt, loose material, foreign materials, including grit, debris, weeds, old sealant, trash, standing water and/or moisture along the sidewalls of the crack. The crack channel shall be cleaned, heated, and dried with a hot compressed air lance within (10) minutes of the application of the sealant. The foreign material resulting from crack preparation shall be removed from the roadway before an area is opened to traffic.

Sealant Application. Asphalt crack-sealing material should not be applied when the pavement surface is wet or when the temperature of the pavement surface is less than 40°F without the approval of the Engineer. The sealant should be applied to fill the crack from the bottom to the top in order to prevent air bubbles from forming and creating a point of weakness in the sealant. Application of the sealant material shall be made in such a way as to completely fill the crack to the desired profile (a slightly recessed flush fill). To the satisfaction of the Engineer or Inspector, care shall be taken to keep extraneous hot-pour material off adjacent pavement surfaces. Blotting material shall be available on-hand in case of a spill or significant over-pour.



D. Bid Item, Measurement and Payment.

(1) Bid Item:

CRACK SEALING FOR NARROW CRACKS Unit: Linear Foot (nearest 1 LF) or Square Yard (nearest 1 SY)

(2) Measurement. "Crack Sealing for Narrow Cracks" shall be measured by the linear foot, or the square yard as specified in the contract documents. The actual length or area shall be verified by a City of Topeka or County representative. The unit price bid for Crack Sealing for Narrow Cracks linear foot or square yard shall be full compensation for all mobilization, surface preparation, application of the crack fill material, clean-up, any hauling or disposal; and for all labor, equipment, materials, tools and incidentals necessary to complete the work as specified for Crack Sealing for Narrow Cracks. Street widths vary; the linear footage and square yardage in the bid documents is an estimate only. Actual linear footage or square yardage for payment will be measured in the field.

7.11 ULTRATHIN BONDED ASPHALT SURFACE

A. General. When indicated on the contract plans construct the ultrathin bonded asphalt surface (UBAS) as designated in the Contract Documents. When noted, Part V refers to the Kansas Department of Transportation's Construction Manual Part V, latest edition. When noted, a SECTION refers to the designated section of the Standard Specifications for State Road and Bridge Construction, 2015 Edition.

B. Contractor Quality Control Requirements

a. General. Provide qualified personnel and sufficient equipment complying with the requirements listed in Part V to conduct quality control testing that complies with Appendix B - Sampling and Testing Frequency Chart for Asphalt Construction Items for Quality Control/Quality Assurance Projects.

Allow the Engineer access to the Contractor's laboratory to observe testing procedures, calculations, test documentation and plotting of test results.

Calibrate and correlate the testing equipment with prescribed procedures, and conduct tests in compliance with specified testing procedures as listed in Section 5.2.7- Contractor's Quality Control Plan, Part V.

At the completion of the project, all documentation becomes the property of City or County. Provide the following test data to the Project representative:

- Copies of all test results and control charts on a weekly basis, representing the prior week's production.
- Copies of the quality control summary sheet when available and not later than the next working day of obtaining the sample. Include, as a minimum, mix gradation, binder content, theoretical maximum specific gravity (G_{mm}) and film thickness; and
- Copies of all failing test results when available (based on a moving average of 3 tests, when appropriate).

b. Maintain a staff of quality control personnel or contract with a private testing firm having personnel certified according to the Policy and Procedure Manual for the Certified Inspection and Testing (CIT) Training Program. The testing for this type of construction will require personnel certified in Aggregate Field Tester (AGF), Aggregate Lab Technician, and Superpave Field (SF) classifications.

Only persons certified in the appropriate classifications covering the specific tests required shall perform such testing.

c. Required Duties of Certified Inspectors. Be available on the project site whenever UBAS is being produced and being placed on the project site. Perform and utilize quality control tests and other quality control practices to assure that delivered materials and proportioning meet the requirements of the mix designs.

Periodically inspect all equipment utilized in transporting, proportioning, mixing, placing, and compacting to assure it is operating properly and that placement and compaction comply with the contract requirements.

d. Documentation. At all times, have complete records of all inspections and tests available on site for the Engineer. All records documenting the Contractor's quality control inspections and tests become the property of the City or County upon completion of the work.

Indicate the nature and number of observations made, the number and type of deficiencies found, the quantities approved and rejected, and the corrective action taken in the records. Examples of quality control forms and charts are available in Part V, or Contractors may design their own. Documentation procedures are subject to approval by the Engineer before the start of the work and to compliance checks during the progress of the work.

Provide the following test data to the Project Representative:

- Copies of all test results and control charts on a weekly basis, representing the prior week's production.
- Copies of the quality control summary sheet on a daily basis. Include, as a minimum, mix gradation, binder content, theoretical maximum specific gravity (G_{mm}) and film thickness; and
- Copies of all failing test results (based on a moving average of 3 tests, when appropriate). Include all applicable sieves, binder content and film thickness.

e. Testing. **The Owner reserves the right to obtain assurance samples at any time during operations and have an independent lab test the material.**

f. Corrective Action. Identify procedures for notifying the Engineer when corrective measures must be implemented, and for halting production.

g. Non-Conforming Materials. Specifically address how non-conforming materials will be controlled and identified. Establish and maintain an effective and positive system for controlling non-complying material, including procedures for its identification, isolation and disposition. Reclaim or rework non-complying materials according to procedures acceptable to the Engineer. This could include removal and replacement of in- place pavement.

Positively identify all non-conforming materials and products to prevent use, shipment and intermingling with complying materials and products. Provide holding areas, mutually agreeable to the Engineer and Contractor.

C. MATERIALS

a. Asphalt Binder. Provide Asphalt Binder that complies with DIVISION 1200 of the Standard Specifications for State Highway and Bridge Construction. Post a legible copy of the latest bill of lading for the Asphalt Binder in the Contractor’s Field Lab. Use the mixing and compaction temperatures shown on the bill of lading; however, the maximum mixing or compaction temperature is 340°F, unless otherwise approved by the City or County Engineer. Notify the Engineer if the mixing or compaction temperature changes.

Provide Emulsion Bonding Liquid (EBL) that complies with DIVISION 1200.

b. Reclaimed Asphalt Pavement (RAP) and Recycled Asphalt Shingles (RAS). Do not use RAP or RAS in the UBAS.

c. Aggregates. Provide aggregates that comply with SECTION 1103.

d. Combined Aggregates. Provide combined aggregates for the mixes required in the Contract Documents as shown in TABLE 7.11-1.

Mixes may use any combination (except as noted below) of aggregate and mineral filler supplements complying with the applicable requirements in TABLES 1103-1 and 1103-2. When coarse aggregates are blended from 1 or more sources, or if more than 1 type, each source or type shall meet the coarse aggregate properties (CAA, LA Abrasion, and micro-deval) in TABLE 1103-3.

The minimum Uncompacted Void Content of the Fine Aggregate “U” Value, of the combined aggregate is 45%.

The minimum sand equivalency (SE) of the combined aggregates is 45%. Provide materials with less than 0.5% moisture in the final mixture.

The maximum quantity of crushed steel slag used in the mix is 50% of the total aggregate weight. No natural sand will be used in the UBAS.

- Primary aggregates are designated as CS-1 (excluding limestone), CS-2 (excluding limestone), CG, CH-1 and CSSL as described in subsection 1103.2a.(1). Primary aggregate requirements do not apply to the mixture on the shoulder.

e. Contractor Mix Design. UBAS shall conform to Table 7.11-1. Contractor shall certify that his mix meets the requirements specified in the tables.

TABLE 7.11-1: COMBINE AGGREGATE REQUIREMENTS FOR ULTRATHIN BONDED ASPHALT SURFACE*											
Mix Designation / Nom Thickness	Percent Retained – Square Mesh Sieves										Asphalt Content (%)
	¾"	½"	⅜"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	

Type A	- 5/8"	0	0-7	45-60	68-78	75-85	82-90	87-92	90-94	94.0-96.0	5.0 to 6.2
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*For flat and elongated particles in the combined coarse aggregate, use the ratio of 3:1 in lieu of 5:1 shown in KT-59. Do not exceed 25% for the total sample.

Property	Test Method	Limits
Total Amine Value of Antistrip Agent, (mg/g of KOH, min) ^a	ASTM D2074	500
Design Film Thickness (mm, min.)	KDOT Construction Manual	9.0 ^b
Drain Down (% max.)	KT-63	0.10
Gyratory Compacted Revolutions, Ndes	KT-58	100 ^c
Emulsion Bonding Liquid (EBL),(gal/sy)	Equation 1	(0.20 ± 0.07) _d

a – The asphalt binder used in the mix will contain a minimum of 0.25% of an amine based antistripping agent by weight of the asphalt binder.
b – Calculate using the film thickness equation in Section 5.10.4-Calcs for Marshall Mix Design of Bituminous Mixtures, Part V.
c – Compact gyratory specimen to 100 gyrations. Calculate the percent air voids using KT-15, Procedure IV.
d – Calculate the target EBL Shot Rate (S_{ebi} (gal.sy)), using Equation 1; however, the value must be within the limits in this table.

Equation 1:
$$S_{ebi} = 3.93 * P_s * \frac{(V_a + MF)}{100}$$

The particle size (P_s), and the mix factor (MF) are based on the mix designation as shown in the TABLE 7.11-3.

Mix Designation	Particle Size (P _s)	Mix Factor (MF)
Type A	0.25 0	3.2

Consider adjusting the EBL spray rate based on the condition of the existing surface as listed in the TABLE 7.11-4. Consult the supplier of the EBL to obtain the recommended adjustment to the spray rate.

Existing Pavement Type	Condition	Adjustment Rate (gal/sy)
PCCP	Smooth	0.00
	Textured	+0.02 to +0.04
HMA	Flushed	-0.02 to -0.04
	New	0.00
	Matte and OGFC	+0.02
	Dry	+0.03
	Milled	+0.02 to +0.04

Surface Recycle & Cold Recycle	Flushed	-0.02 to -0.04
	Black	+0.02
	Dry	+0.03
Chip Seal	Flushed	-0.02 to -0.04
	Black	+0.02
	Dry	+0.03

D. CONSTRUCTION REQUIREMENTS

a. Plant Operation. Adjust all plant operations to operate continuously.

(1) Preparation of the Asphalt Binder. Heat the asphalt binder to within a range as specified in SECTION 601. When heating the asphalt binder to the specified temperature, avoid local overheating. At all times, provide a continuous supply of the asphalt binder to the mixer at a uniform temperature. Asphalt binder received from the refinery at temperatures less than 375°F may be used as received, if the requirements regarding the reheating of asphalt binder in SECTION 601 are met.

(a) Comingling of Asphalt Binders. Do not add or commingle asphalt binders from 2 or more sources into a storage tank. If this occurs, the contents of the storage tank are considered contaminated. Do not use the contents of the storage tank on the project, except as follows: It is permissible, at the Contractor's option, to thoroughly mix the contents of the tank and request sampling of the mixture. Do not use the asphalt binder until approved, and when needed, a new mix design evaluation is completed.

(b) Asphalt Binder Sources. Before changing asphalt binder sources on a project, obtain approval from the City or County Engineer.

(c) Anti-Strip Additives. If liquid anti-strip additives are added at the Contractor's plant, install a "totalizer" to monitor the quantity of anti-strip additive being added. The Engineer may approve alternative methods for including anti-strip additives in a batch plant. If added at the plant, the anti-strip will be added in line with the asphalt binder as it is being transferred from the transit unit to the asphalt binder storage tank. Provide a method for the Engineer to monitor the percent of additive being added.

(2) Preparation of Mineral Aggregate. When the mineral aggregate is composed of 2 or more ingredients, combine as shown in the approved JMF.

Temperature Requirements. Dry the aggregate for the mixture and heat to a temperature to obtain an asphalt-aggregate mixture temperature immediately after mixing within the 75 to 150 second Saybolt viscosity range of the asphalt binder used. Obtain the temperature for this viscosity range from the Asphalt Binder Producer. No mixing or compaction temperatures are to exceed 340°F without approval from the Engineer. The minimum temperature may be revised by the City or County Engineer provided it is demonstrated that satisfactory results may be obtained at a lower temperature. In such event, deliver the UBAS to the paver at a temperature sufficient to allow the material to be satisfactorily placed and compacted to the specified density and surface tolerance requirements.

(3) Preparation of UBAS. Introduce asphalt binder into the prepared aggregate in the proportionate amount determined by the P_{br} in the JMF.

(a) Basis of Rejection. UBAS will be rejected if the aggregate, as it is discharged from the drum or the pugmill, contains sufficient moisture to cause foaming of the mixture, or if the temperature of the aggregate is such that the asphalt-aggregate mixture temperature is outside the range specified in SECTION 601.

(b) Mixing Time. Operate drum mixers at a rate to provide uniform aggregate coating in a continuous operation. For batch and continuous type plants, the minimum wet mixing time is 40 seconds. In all cases, mix a sufficient time to produce a uniform

mixture in which all the aggregate particles are thoroughly coated. On batch plants, begin the timing at the start of the asphalt binder introduction into the pugmill, and end upon the opening of the discharge gate. For continuous flow plants, mixing time in seconds shall equal:

[pugmill dead capacity in pounds] divided by [pugmill output in pounds per second].

(c) Manufacturer's Specifications. Operate all drying, pumping and mixing equipment within the limits specified by the manufacturer, unless it can be demonstrated to the satisfaction of the Engineer that such limits may be exceeded without detriment to the UBAS.

(d) Batch Operation. Coordinate UBAS batchers (Gob Hoppers) with the plant production rate at all times so the hopper is more than $\frac{3}{4}$ full before the gates open, and the gates close before material can drop through the gob hopper directly into the surge bin, weigh hopper or truck.

(e) Wasted Material. Wasted material is not measured for pay.

If after an interruption of production, the drum-mixer contains cold, uncoated or otherwise unsuitable material, waste material through a diversion chute. In a continuous or batch plant drier, waste unsuitable material through the pugmill.

At the end of a production run, waste any segregated material in the cone of the storage bin.

b. Road Surface Preparation.

(1) Preparation of an Existing Asphalt Pavement. The street shall be cleaned in accordance with the requirements of "Street Sweeping" to remove all foreign material and dust. Excavate areas shown in the Contract Documents to be patched to a depth directed by the Engineer. Fill with UBAS and compact.

(2) Preparation of an Existing Concrete or Brick Pavement. The street shall be cleaned in accordance with the requirements of "Street Sweeping" to remove all foreign material and dust. Clean and fill cracks and joints, and construct surface leveling as shown in the Contract Documents.

c. Weighing Operations. See subsection 109.1 for details regarding weighing operations.

d. Hauling Operations. Schedule operations to minimize hauling over a surface course.

Deliver UBAS to the paver at a temperature sufficient to allow the material to be placed and compacted to the specified density and surface tolerance.

e. Paving Operations.

(1) Equipment Use a transfer device between the haul units and the paver to assist in maintaining continuous placement. Use equipment such as a shuttle buggy, material transfer vehicle or mobile conveyor. (The material will not be deposited on the roadway and a pick-up device will be used to transfer the material to the paver.)

Use a self-priming spray paver approved by the Engineer.

Use a spray paver that conforms with asphalt paver requirements in SECTION 155 and the following:

- equipped with a receiving hopper, feed conveyor, asphalt emulsion storage tank, a system for measuring the EBL volume applied, a spray bar, and a heated, variable width, vibratory screed;
- capable of uniformly spraying the EBL at the specified rate, applying the hot mix surface course and leveling the surface of the mat in one pass;
- capable of paving at a controlled speed from 30-100 feet/minute;
- equipped so no wheel or other part of the paving machine is in contact with the EBL before the hot mix surface course is applied; and

- has a screed with the ability to crown the pavement at the center and extensions that can be adjusted vertically to accommodate the desired pavement profile.

The Engineer will check the pavement for longitudinal streaks and other irregularities. Make every effort to prevent or correct any irregularities in the pavement, such as changing pavers or using different and additional equipment.

Do not raise (dump) the wings of the paver receiving hopper at any time during the paving operation.

(2) Application: Spray the EBL by a metered mechanical pressure spray bar at the temperature specified in TABLE 7.11-1, or as recommended by the EBL supplier. Use a sprayer that accurately and continuously monitors the rate of spray and provides a uniform application across the entire width to be overlaid. The Engineer may make adjustments to the spray rate based upon the existing pavement surface conditions and the recommendations of the EBL supplier.

Apply the UBAS at a temperature of 290-330°F. Place the UBAS over the full width of the EBL with a heated vibratory screed. Control the amount of mix in front of the screed so it does not interfere with the application of the asphalt emulsion. Adjust the screed and its extensions to eliminate variances in surface texture caused by density segregation. Operate the paver as continuously as possible.

The target application rate of the UBAS will be stated in the Contract Documents. Use a field application rate as necessary to minimize fracturing of the top size aggregate by the screed. The Engineer will determine the acceptable extent of fracturing at the edge of the paving for tapering purposes.

The finished asphalt surface shall be free of oversized material. The Engineer will determine the extent of the oversized material in the UBAS. Take immediate corrective action to eliminate the source. If the source of the oversized material is determined to be a stockpile or a process of plant operations, cease production until corrective actions are complete.

Spread the UBAS without tearing the surface. Strike a finish that is smooth, free of segregation, true to cross section, uniform in density and texture and free from surface irregularities. If the pavement does not comply with all of these requirements, plant production and paving will be suspended until the deficiency is corrected.

(3) Compaction: Roll the UBAS with a minimum of 1 pass and a maximum of 3 passes with 2-axle tandem steel rollers having a minimum weight of 10 tons, before the material temperature has fallen below 195°F. The Engineer will determine the number of passes necessary based on appearance of the rolled material. Do not allow the roller or rollers to remain stationary on the freshly placed UBAS. Perform rolling immediately following the placement of the UBAS with approved asphalt rollers. Supply adequate roller units so the rolling will be accomplished promptly following the placement of the material. A release agent (added to the water system) may be required to prevent adhesion of the fresh mix to the roller drum and wheels. Normally, rolling in static mode. Do not excessively roll the driving lanes, to the extent of aggregate degradation. The Engineer will determine the acceptable extent of fracturing at the edge of the pavement from the rolling operation. Do not open the new pavement to traffic or allow any roller to sit idle on the pavement until the rolling operation is complete and the material has cooled below 160°F.

Damaged Areas: Replace any defective areas, as determined by the Engineer, at no additional cost to the City or County.

(4) Construction Joints.

- Transverse Construction Joints. Use a method of making transverse construction joints which provide a thorough and continuous bond and provide an acceptable surface texture. Do not vary the surface elevation more than 3/16 inch in 10 feet, when tested longitudinally across the joint. When required, repair the joints or paving operations will be suspended.
- Longitudinal Joints. Construct well bonded and sealed longitudinal joints to

obtain maximum compaction at the joint.

(5) Adjustment of Manholes (Set Price). When required, this work will be performed and paid for under this bid item.

f. Treatment of Adjacent Areas. Pave sideroads, entrances and turnouts for mailboxes as shown in the Contract Documents. Overlay all widening areas designated in the Contract Documents or ordered by the Engineer.

g. Pavement Smoothness. UBAS is excluded from profilograph testing, and not eligible for pay adjustments.

E. WEATHER LIMITATIONS

Do not place UBAS on any wet or frozen surface or when weather conditions otherwise prevent the proper handling and finishing of the mixture.

Only place UBAS when either the minimum ambient air temperature is 50°F or the minimum road surface temperature is 55°F.

F. MIXTURE ACCEPTANCE

a. General. Test the UBAS at each plant for compliance with TABLE 7.11-1. Acceptance will be made contingent upon satisfactory test results. Obtain quality control and verification samples of the UBAS using KT-25 sampling procedure C.1 Plant Discharge or C.2 Truck Bed.

A load or loads of mixture which, in the opinion of the Engineer, are unacceptable for reasons such as being segregated, aggregate being improperly coated, foaming aggregate or being outside the mixing temperature range may be rejected.

b. Suspension of Mix Production. Suspend production of the mix until appropriate corrections have been made, if 2 consecutive test results for any single mix characteristic fail to fall within the limits established.

The Engineer may stop production of UBAS at any time the mix or process is determined to be unsatisfactory. Make the necessary corrections before production will be allowed to resume. Failure to stop production of UBAS subjects all subsequent material to rejection by the Engineer or acceptance at a reduced price, as determined by the Engineer.

G. MEASUREMENT AND PAYMENT

1. Bid Item.

ULTRATHIN BONDED ASPHALT SURFACE (UBAS) Unit: Ton (nearest ton)

2. Measurement. "Ultrathin Bonded Asphalt Surface" shall be measured by the ton of material at the time of delivery to the road. Provide a weigh ticket for each load. Due to possible variations in the specific gravity or weight per cubic foot of the aggregates, the tonnage used may vary from the proposal quantities and no adjustment in contract unit price will be made because of such variances.

Payment for "Ultrathin Bonded Asphalt Surface" at the contract unit price per ton is full compensation for the specified work. Tack oil and quality control testing and certification is subsidiary to " Ultrathin Bonded Asphalt Surface".

7.12 STREET SWEEPING

A. General. When indicated in the Project Documents, street sweeping shall be furnished as specified herein.

B. Construction Requirements. The Contractor will be required to sweep the street prior to surfacing operations if directed by the Project Engineer or Inspector. Prior to application of surfacing, micro-surfacing, or ultrathin bonded asphalt surface, the surface of the roadway shall be thoroughly cleaned and flushed of all vegetation, loose aggregate, dirt, mud and other debris. This must be accomplished by use of a vacuum or regenerative air type sweeper. The Contractor will be responsible for proper disposal of all material collected during the sweeping process. This bid item is intended to clean the street of excessive pre-existing debris and not to be used to sweep up excess construction materials left by the street repair Contractor or replace the normal sweeping required to clean the street prior to the surfacing operations.

C. Bid Item, Measurement and Payment.

(1) Bid Item:

STREET SWEEPING Unit: Square Yard (nearest 1 Square Yard)

(2) Measurement. “Street Sweeping” shall be measured by the square yard. The unit price bid for Street Sweeping shall be full compensation for all mobilization, clean-up, any hauling, or disposal; and for all labor, equipment, materials, tools, and incidentals necessary to complete the work as specified for Street Sweeping. Actual square yardage for payment will be measured in the field.

END OF SECTION