

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Hot-mix asphalt patching.
2. Hot-mix asphalt paving.
3. Pavement-marking paint.

B. Related Sections:

1. Division 31 Section "Earth Moving" for aggregate subbase and base courses and for aggregate pavement shoulders.

1.02 BUY AMERICAN REQUIREMENTS

A. Provide certificates to show that all products meet the following requirements.

1. American Iron and Steel (AIS)
2. Build America, Buy America Act

B. See Supplementary Conditions for details.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

1. Job-Mix Designs: Fifteen days prior to the production of asphalt concrete, the Contractor shall submit his proposed mix design and a certified laboratory test showing the property curves for the hot mix design data by the Marshall Method.

1.04 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each paving material, from manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the State of Alaska Department of Transportation & Public Facilities (DOT&PF).

B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of DOT&PF for asphalt paving work.

1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
1. Tack Coat: Minimum surface temperature of 40 deg F.
 2. Asphalt Surface Course: Minimum surface temperature of 40 deg F at time of placement.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for oil-based materials, and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.01 AGGREGATES

- A. General: Use materials and gradations that have performed satisfactorily in previous installations.
- B. Coarse Aggregate: Coarse aggregate (that material retained on the No. 4 Sieve) shall be crushed stone or crushed gravel and shall consist of sound, tough, durable rock of uniform quality. All material shall be free from clay balls, vegetative matter or other deleterious matters. Coarse aggregate shall not be coated with dirt or other finely divided mineral matter. In addition, coarse aggregate shall meet the following:
- | | | |
|-----------------------------|----------------------------|---------------------|
| Percent of Wear | AASHTO T 96 | 45 max. |
| Degradation Value | ATM T313 | 30 min. |
| Percent Sodium Sulfate Loss | AASHTO T-104 | 9 max. (5 cycles) |
| Percent Fracture | WAQTC FOP for AASHTO TP 61 | 80 min. single face |
| Thin – Elongated Pieces | ATM 306 | 8% max. |
| Absorption, % max | ATM 308 | 2.0 |
- C. Fine Aggregate: Fine aggregate (passing the No. 4 Sieve) shall meet the quality requirements of AASHTO M 29, including S1.1, Sulfate Soundness Test.
- D. Blended Aggregate: The several aggregate fractions for the mixture shall be sized, graded, and combined in such proportions that the resulting composite blend conforms to the grading requirements shown in the table below. The fraction actually retained between any two consecutive sieves larger than the No. 100 shall be not less than 2 percent of the total. Aggregate gradations shall be determined by WAQTC FOP for AASHTO T 27/T 11. The size of extracted samples for gradation shall be in conformance with AASHTO T-164.

BROAD BAND GRADATIONS FOR
ASPHALT CONCRETE PAVEMENT AGGREGATE
Percent Passing by Weight

<u>Sieve Designation</u>	<u>Gradation Designation</u>
	Type II
3/4-inch	100
1/2-inch	75-90
3/8-inch	60-84
No. 4	33-70
No. 8	19-56
No. 16	10-44
No. 30	7-34
No. 50	5-24
No. 100	4-16
No. 200	4-7

- E. The full tolerances specified below shall be applied to the approved Job Mix Design gradations and shall not be limited to the broad bands listed in paragraph 2.01D. Tolerances shall not be applied to the largest specified screen.

<u>Sieve Size or Item</u>	<u>Tolerance % Passing</u>
3/4-inch	+/-8
1/2-inch	+/-7
3/8-inch	+/-7
No. 4	+/-7
No. 8	+/-6
No. 16	+/-6
No. 30	+/-5
No. 50	+/-4
No. 100	+/-3
No. 200	+/-3
Asphalt %	+/-0.4

- F. Filler: Shall conform to requirements of ASTM M-17.

2.02 ASPHALT MATERIALS

- A. Asphalt Cement: Type and grade shall be PG 52-28 and shall meet applicable requirements of AASHTO M 320.
- B. Tack Coat: CSS-1 cationic emulsified asphalt conforming to applicable requirements of Section 702 of ADOT&PF Standard Specification.
- C. Water: Potable.

2.03 AUXILIARY MATERIALS

- A. Pavement-Marking Paint: MPI #32 Alkyd Traffic Marking Paint.
1. Color: White or Yellow to match existing.

2.04 MIXES

- A. Hot-Mix Asphalt: Provide dense, hot-laid, hot-mix asphalt plant mixes conforming to ADOT&PF Type II, Class B, designed according to procedures in ATM 417; and complying with the following requirements:
 - 1. The Engineer of Record shall approve the job mix design prior to the Contractor placing any asphalt concrete on the job.

2.05 HAULING EQUIPMENT

- A. Trucks used for hauling asphalt mixtures shall have tight, clean, smooth metal beds that have been thinly coated with a minimum amount of paraffin oil, lime solution or other approved material to prevent the moisture from adhering to the beds. Oil or diesel fuel shall not be used. Each truck shall have a cover of canvas or other suitable material of such size as to protect the mixture from the weather, when necessary, so that the mixture will be delivered on the road at the specified temperature.
- B. Dumping of material in a windrow and then placing the material in the asphalt paver with pickup equipment will be permitted, if the asphalt paver is of such design that the material will fall into a hopper which has movable bottom conveyor(s) to feed the screed and the pickup equipment is constructed so that substantially all of the material deposited on the roadbed is picked up and deposited in the paving machine. Use of the pick-up equipment will be discontinued if its use produces segregation, excessive temperature loss or other lay down problems.
- C. The temperature drop of the asphalt mixture, taken immediately behind the screed, shall not be more than 30 deg F less than the temperature of the material in the hauling unit, taken immediately after loading from the plant or surge bin.

2.06 ASPHALT PAVERS

- A. Asphalt pavers shall be self-contained, power-propelled units, provided with an activated screed or strike-off assembly, heated, if necessary, and capable of spreading and finishing courses of material in lane widths applicable to the specified typical section and thicknesses shown on the plans. Pavers shall be equipped with a paver control system, which shall automatically control the laying of the mixture to specified transverse slope and specified longitudinal grade. The paver control system shall be automatically actuated by the use of a mobile string line, ski, or other approved grade follower. Such mobile string line or ski shall be a minimum of 30 feet in length, shall be attached to the roadway centerline side of the paver by a linkage system that does not in any way bind or prevent the mechanism from truly following the grade, and shall be a product manufactured by a company regularly engaged in the production of equipment for this specific automatic paver control system use. The length of the ski, mobile string line, or other device shall be adjusted to whatever practical maximum is necessary to produce the intended smooth-riding surface. The kind of grade follower used and the type of automatic paver control system used shall be compatible and shall be optional with the Contractor, subject to demonstrated ability thereof to provide complete pavement fully conforming to all specified requirements. Pavers used for shoulders and similar construction shall be capable of spreading and finishing courses of material in widths as shown on the plans. Paver extensions shall include auger, activated screed or strike-off assembly and provisions for heating.

- B. The paver shall be equipped with a receiving hopper having sufficient capacity for a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed.
- C. In order to conform as closely as possible with the specified depth of wearing course, variations in existing cross slopes shall be controlled through the transverse adjusting mechanism on the paver.
- D. The screed or strike-off assembly shall produce a finished surface of required evenness and texture without tearing, shoving or gouging the mixture.
- E. When laying mixtures, the paver shall be operated at forward speeds consistent with plant production.
- F. Pavers shall be kept in full operating condition and in good repair and adjustment at all times.

2.07 ROLLER

- A. Rollers shall be of the steel wheel and/or pneumatic tire type, self-propelled, in good condition, capable of reversing without backlash, and operated at speeds slow enough to avoid displacement of the asphaltic mixture. The number and weight of the rollers shall be sufficient to compact the mixture to the required density and surface smoothness while it is still in a workable condition and capable of maintaining the pace of the paving operation. The use of equipment that results in crushing to the aggregate will not be permitted. All rollers shall have suitable equipment for keeping rollers or tires clean and efficiently dispersing water to the contact surfaces to prevent mixture pick-up. The use of fuel oil on rubber tires or steel rollers will not be permitted. Skirting or other approved devices shall be maintained on pneumatic rollers for heat retention.
- B. The Contractor will be required to furnish a minimum of one pneumatic-tired roller, and one 2-axle tandem steel wheel roller (10-ton minimum weight) for each asphalt paver, with a separate operator for each roller.
- C. A vibratory roller may be used as the finish roller if it meets the requirements for a finish roller, and it is operated with the vibrating unit turned off.
- D. Rollers used for initial breakdown rolling shall be equipped with rolling wheels having a diameter of 40 inches or more.
- E. Pneumatic-tired rollers shall be oscillating type having a width of not less than 4 feet and equipped with pneumatic tires of equal size and diameter, having satisfactory treads. The rear group of tires shall align behind and cover the spaces between the forward groups of tires. Wobble-wheel rollers will not be permitted. Tires shall be inflated to 90 psi or such lower pressure as designated and maintained so that the air pressure will not vary more than 5 psi from the designated pressure. Pneumatic tired rollers shall be so constructed that the total weight of the roller can be varied to produce an operating weight per tire of not less than 2,000 pounds. The total operating weight of the roller shall be varied as directed.
- F. Vibratory rollers with separate controls for energy and propulsion and especially designed for asphaltic pavement compaction may be used in accordance with the limits stated in this subsection. Vibratory rollers will not be allowed for compaction of new pavements unless all phases of construction have been compacted by vibratory means except that they may be used

for compaction of overlays of existing pavements. Vibratory rollers are not to be used when it is determined that such usage may cause a decrease in stability of the pavement structure.

- G. Poorly performing rollers may be rejected and replaced with suitable equipment or supplemented as may be necessary to accomplish the desired results.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
- B. Proceed with paving only after unsatisfactory conditions have been corrected.

3.02 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
- B. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd.
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.03 HOT-MIX ASPHALT PLACING

- A. All concrete curb and gutter must be in place and have cured for at least 72 hours before placing asphalt.
- B. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
 - 1. Place hot-mix asphalt surface course in single lift.
 - 2. The mixture shall leave the plant at a temperature between 290 deg F and 325 deg F and shall be spread at a temperature of not less than 280 deg F. Any batch of mixture that has been heated to a temperature greater than 325 deg F shall be dumped and removed from the plant. Such overheated material shall not be used in the pavement.
 - 3. Begin applying mix along the low side of the street and progress to the high side.
 - 4. Placing of the asphalt paving shall be as continuous as possible.
 - 5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- C. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
 - 1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete asphalt base course for a section before placing asphalt surface course.

- D. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.04 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
 - 1. Clean contact surfaces and apply tack coat to joints. The application shall be uniformly and thinly sprayed on. Care and protection shall be provided to avoid accumulation or overspray.
 - 2. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."

3.05 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers. Plan rolling pattern such that steel wheel rollers do not roll over areas of portland cement concrete pavement.
 - 1. Complete compaction before mix temperature cools to 185 deg F.
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 - 1. Average Density: 94 percent of reference laboratory density according to ATM 409 (Alaska Test Method), but not less than 92 percent nor greater than 100 percent.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.06 INSTALLATION TOLERANCES

- A. Thickness: Compact each course to produce the thickness indicated within the following tolerances:
 - 1. Asphalt thickness shall be accepted when 75 percent of the cores are within 0.15 inch of the specified thickness and no core shows a deficient thickness more than 0.25 inch below design thickness.
- B. Surface Smoothness: Compact to produce a surface smoothness within the following tolerances as determined by using a 16-foot straightedge applied transversely or longitudinally to paved areas:
 - 1. The variation of the surface from the testing edge of the straightedge between any two contacts with the surface shall not exceed 3/16 inch.
- C. Cracking: Ensure that method of compaction does not produce cracking or “checking” in the asphalt concrete mat. Any area with transverse cracking, spaced 2 inches apart or closer, and extending at least 1/2 inch in depth, will not be accepted.

3.07 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent testing agency to perform field inspections and tests and to prepare test reports.
 - 1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.
- B. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.
- C. Developer may, at his sole option, core asphalt to test for thickness and density.
- D. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- E. In-Place Density: Field density of in-place compacted pavement shall be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726. Two tests shall be taken of the paved surface.
- F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.
- G. Contractor to provide asphalt pavement patches at all core sample locations.

3.08 DISPOSAL

- A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

- A. Hot Asphalt Pavement: Shall be measured based on the number of tons placed as determined from delivery weight tickets.
- B. Driveway Asphalt: Shall be measured based on the square yardage of the asphalt placed. Generally the thickness shall be 2-inches.

4.02 BASIS OF PAYMENT

- A. Payment for hot-mix asphalt paving pay items shall include furnishing all necessary material, personnel, equipment, transportation and supplies to perform the work as shown and specified. This shall include roadways and approaches. Pavement markings shall be subsidiary.
- B. Payment for hot-mix asphalt will not be paid until after the installation of hot-mix asphalt.
- C. Payment for driveway asphalt shall include furnishing all necessary material, personnel, equipment, transportation and supplies to perform the work needed to repair driveways.
- D. Removal and reinstallation of existing signs shall be subsidiary to the water main pay items.

<u>Pay Item Number</u>	<u>Pay Item</u>	<u>Pay Unit</u>
321216-1	3" Hot-Mix Asphalt	Ton
321216-2	Driveway Asphalt	Square Yard

END OF SECTION

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