

**SECTION 32 12 16  
ASPHALT PAVING**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. The specifications sections "General Conditions to the Construction Contract", "Special Conditions" and "Division 01 - General Requirements" form a part of this Section by this reference thereto, and shall have the same force and effect as if printed herewith in full.

**1.2 RELATED DOCUMENTS**

- A. Commonwealth of Pennsylvania Department of Transportation Specifications, Publication 408/2020.

**1.3 SUMMARY**

- A. Section Includes:
  - 1. Cold milling of existing asphalt pavement.
  - 2. Asphalt paving.
- B. Related Requirements:
  - 1. Section 31 20 00 "Earth Moving" for subgrade preparation, fill material, and separation geotextiles.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include technical data and tested physical and performance properties.
  - 2. Job-Mix Designs: For each job mix proposed for the Work.

**1.5 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For manufacturer and testing agency.
- B. Material Certificates: For each paving material.
- C. Material Test Reports: For each paving material, by a qualified testing agency.
- D. Field quality-control reports.

## **1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the Pennsylvania Department of Transportation (PennDOT).
- B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.
- C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of PennDOT for asphalt paving work.
  - 1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

## **1.7 FIELD 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. Prime Coat: Minimum surface temperature of 40 deg F.
  - 2. Tack Coat: Minimum surface temperature of 40 deg F.
  - 3. Slurry Coat: Comply with weather limitations in ASTM D 3910.
  - 4. Asphalt Base Course: Minimum surface temperature of 35 deg F and rising at time of placement.
  - 5. Asphalt Surface Course: Minimum surface temperature of 40 deg F at time of placement.

## **PART 2 - PRODUCTS**

### **2.1 AGGREGATES**

- A. General: Use materials and gradations that have performed satisfactorily in previous installations.
- B. Coarse Aggregate: ASTM D 692/D 692M, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.
- C. Fine Aggregate: ASTM D 1073, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.
  - 1. For asphalt pavement, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.
- D. Mineral Filler: ASTM D 242/D 242M or AASHTO M 17, rock or slag dust, hydraulic cement, or other inert material.

### **2.2 ASPHALT MATERIALS**

- A. Asphalt Binder: AASHTO M 320, PG 64-22.
- B. Asphalt Cement: ASTM D 3381/D 3381M for viscosity-graded material.

- C. Tack Coat: ASTM D 977 or AASHTO M 140 emulsified asphalt, or ASTM D 2397 or AASHTO M 208 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.
- D. Water: Potable.
- E. Undersealing Asphalt: ASTM D 3141/D 3141M; pumping consistency.

## **2.3 AUXILIARY MATERIALS**

- A. Recycled Materials for Asphalt Pavement Mixes: Reclaimed asphalt pavement; reclaimed, unbound-aggregate base material; and recycled asphalt shingles from sources and gradations that have performed satisfactorily in previous installations, equal to performance of required asphalt paving produced from all new materials.
- B. Herbicide: Commercial chemical for weed control, registered by the EPA, and not classified as "restricted use" for locations and conditions of application. Provide in granular, liquid, or wettable powder form.
- C. Sand: ASTM D 1073 or AASHTO M 29, Grade No. 2 or No. 3.
- D. Paving Geotextile: AASHTO M 288 paving fabric; nonwoven polypropylene; resistant to chemical attack, rot, and mildew; and specifically designed for paving applications.
- E. Joint Sealant: ASTM D 6690 or AASHTO M 324, Type I or Type II, hot-applied, single-component, polymer-modified bituminous sealant.

## **2.4 MIXES**

- A. Asphalt Pavement: Dense-graded, hot-laid, asphalt plant mixes approved by authorities having jurisdiction and complying with the following requirements:
  - 1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
  - 2. Base Course: PG 64S-22, < 0.3 Million EASLS, 25.0MM Mix.
  - 3. Surface Course: PG 64S-22. < 0.3 Million EASLS, 9.5MM Mix.
- B. Emulsified-Asphalt Slurry: ASTM D 3910, Type 2.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. 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.
  - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.

2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 10 tons.
  3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by on-site Geotechnical Engineer, and replace with compacted backfill or fill as directed.
- C. Proceed with paving only after unsatisfactory conditions have been corrected.

### **3.2 COLD MILLING**

- A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.
1. Mill to a depth of 1-1/2 inches.
  2. Mill to a uniform finished surface free of excessive gouges, grooves, and ridges.
  3. Control rate of milling to prevent tearing of existing asphalt course.
  4. Repair or replace curbs, manholes, and other construction damaged during cold milling.
  5. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled asphalt.
  6. Patch surface depressions deeper than 1 inch after milling, before wearing course is laid.
  7. Handle milled asphalt material in accordance with State requirements.
  8. Keep milled pavement surface free of loose material and dust.
  9. Do not allow milled materials to accumulate on-site.

### **3.3 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. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.
1. Mix herbicide with prime coat if formulated by manufacturer for that purpose.
- C. 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 asphalt paving.
  2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

### **3.4 PLACING ASPHALT PAVEMENT**

- A. Machine place asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in 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 asphalt base course in number of lifts and thicknesses indicated.
  2. Place asphalt surface course in single lift.
  3. Spread mix at a minimum temperature of 250 deg F.

4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
  5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- B. 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. Overlap mix placement about 1 to 1-1/2 inches from strip to strip to ensure proper compaction of mix along longitudinal joints.
  2. Complete a section of asphalt base course before placing asphalt surface course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

### **3.5 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 asphalt course.
1. Clean contact surfaces and apply tack coat to joints.
  2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
  3. Offset transverse joints, in successive courses, a minimum of 24 inches.
  4. 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."
  5. Compact joints as soon as asphalt will bear roller weight without excessive displacement.
  6. Compact asphalt at joints to a density within 2 percent of specified course density.

### **3.6 COMPACTION**

- A. General: Begin compaction as soon as placed asphalt paving will bear roller weight without excessive displacement. Compact paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
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 asphalt is still hot enough to achieve specified density. Continue rolling until asphalt course has been uniformly compacted to the following density:
1. Average Density: 96 percent of reference laboratory density according to ASTM D 6927 or AASHTO T 245, but not less than 94 percent or greater than 100 percent.
  2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent or greater than 96 percent.

- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while 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 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.

### **3.7 INSTALLATION TOLERANCES**

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
  - 1. Base Course: Plus or minus 1/2 inch.
  - 2. Surface Course: Plus 1/4 inch, no minus.
- B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
  - 1. Base Course: 1/4 inch.
  - 2. Surface Course: 1/8 inch.
  - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

### **3.8 FIELD QUALITY CONTROL**

- A. Testing Agency: Client Agency will engage a qualified testing agency to perform tests and inspections.
- B. Thickness: In-place compacted thickness of asphalt courses will be determined according to ASTM D 3549.
- C. Surface Smoothness: Finished surface of each asphalt course will be tested for compliance with smoothness tolerances.
- D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979 or AASHTO T 168.
  - 1. Reference maximum theoretical density will be determined by averaging results from four samples of asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
  - 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
    - a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than three cores taken.

- b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.
- E. Replace and compact asphalt where core tests were taken.
- F. Remove and replace or install additional asphalt where test results or measurements indicate that it does not comply with specified requirements.

**END OF SECTION**