

**SECTION 32 12 16**  
**ASPHALT PAVING**

SPEC WRITER NOTE: Use this section only  
for NCA projects. Delete text between  
// \_\_\_\_\_ // not applicable to project.  
Edit remaining text to suit project.

**PART 1 - GENERAL**

**1.1 SUMMARY**

A. Section Includes:

1. Composition, mixing, and construction on prepared subgrade and protection of hot asphalt concrete pavement.
2. // Pavement sealing //.
3. // Cold milling //.
4. // Pervious paving //.
5. // Patching //.

SPEC WRITER NOTE: Determine whether State Highway Spec will be used or new specification will be developed to cover work of this Section. This guide specification is for use when project requirements will conform to State Highway Spec. Highway spec must contain quality standards, percentage of compaction, and tests for quality and field and laboratory compaction. Where Highway Spec calls for "Test", items "Designated", items to be "Established" and other such delegated duties to be performed by a State "Commission", "Engineer", "Laboratory" or other authorized agent, edit this section for these items to be by Contractor.

**1.2 APPLICABLE PUBLICATIONS**

- A. Comply with references to extent specified in this section.
- B. American Association of State Highway and Transportation Officials (AASHTO):
  1. 2016 - Standard Specifications for Transportation Materials and Methods of Sampling and Testing, and AASHTO Provisional Standards.
  2. M320-10 - Performance-Graded Asphalt Binder.
  3. T283-14 - Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage.
- C. Asphalt Institute:

1. Specification SS2.

D. ASTM International (ASTM):

1. C29/C29M-16 - Bulk Density ("Unit Weight") and Voids in Aggregate.
2. C977-10 - Quicklime and Hydrated Lime for Soil Stabilization.
3. D3786/D3786M-13 - Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method.
4. D4355/D4355M-14 - Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.
5. D4632/D4632M-15a - Grab Breaking Load and Elongation of Geotextiles.
6. D6390-11 - Draindown Characteristics in Uncompacted Asphalt Mixtures.

E. National Asphalt Paving Association (NAPA):

1. PS-33 (2009) - Porous Asphalt Pavements.

**1.3 PREINSTALLATION MEETINGS**

- A. Conduct preinstallation meeting at project site minimum 30 days before beginning Work of this section.

SPEC WRITER NOTE: Edit participant list to ensure entities influencing outcome attend.

1. Required Participants:

- a. Contracting Officer's Representative (COR).
- b. // Architect/Engineer. //
- c. // Inspection and Testing Agency. //
- d. Contractor.
- e. Installer.
- f. // Manufacturer's field representative. //
- g. Other installers responsible for adjacent and intersecting work, including // \_\_\_\_\_ //.

SPEC WRITER NOTE: Edit meeting agenda to incorporate project specific topics.

2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.
- a. Installation schedule.
  - b. Installation sequence.
  - c. Preparatory work.

- d. Protection before, during, and after installation.
  - e. Installation.
  - f. Terminations.
  - g. Transitions and connections to other work.
  - h. Inspecting and testing.
  - i. Other items affecting successful completion.
3. Document and distribute meeting minutes to participants to record decisions affecting installation.

#### 1.4 SUBMITTALS

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
  - B. Manufacturer's Literature and Data:
    - 1. Concrete wheel stops.
  - C. Test Reports: Certify products comply with specifications.
    - 1. Aggregate Base Course.
    - 2. Porous Asphalt and Asphalt Base/Surface Course.
    - 3. Job-mix formula.
  - D. Certificates: Certify products comply with specifications.
    - 1. Asphalt prime and tack coat material complying with State Highway Department requirements.
    - 2. Asphalt cement complying with State Highway Department requirements.
- SPEC WRITER NOTE:  
Add required certification to  
Subparagraph 3.
- 3. Job-mix certification that mix equals or exceeds State Highway Specification.
  - E. Qualifications: Substantiate qualifications comply with specifications.
    - 1. Manufacturer // with project experience list //.
    - 2. Land Surveyor.
  - F. One copy of State Highway Department Specifications (Latest Edition).

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
  - 1. Regularly manufactures specified products.
  - 2. Manufactured specified products with satisfactory service on five similar installations for minimum five years.
    - a. // Project Experience List: Provide contact names and addresses for completed projects. //

- B. COR to have access to all parts of material producing plants to check mixing operations and materials and adequacy of equipment.
- C. Land Surveyor: Professional land surveyor or engineer registered to provide land surveys in jurisdiction where project is located.
- D. Preconstruction Testing:
  - 1. Engage independent testing laboratory to perform tests and submit reports.
  - 2. Asphalt Base Course:
    - a. Test sources, gradation, liquid limit, plasticity index, percentage of wear, and other properties required by State Highway Department.
  - 3. Porous Asphalt and Asphalt Base/Surface Course:
    - a. Test aggregate source, gradation, soundness loss, percentage of wear, and other properties required by State Highway Department.

SPEC WRITER NOTE:  
Add required properties to Subparagraph  
4a.

- 4. Job Mix Formula:
  - a. Test // \_\_\_\_\_ // required by State Highway Department.

**1.6 FIELD CONDITIONS**

- A. Environment:
  - 1. Do not begin asphaltic concrete material placement when atmospheric temperature is below 10 degrees C (50 degrees F), nor during fog, rain, or other unsuitable conditions.

**1.7 WARRANTY**

SPEC WRITER NOTE: Always retain  
construction warranty. FAR includes  
Contractor's one year labor and material  
warranty.

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

**PART 2 - PRODUCTS**

SPEC WRITER NOTE: Add any construction  
requirements not adequately specified in  
State Highway Spec. Edit Sizes and  
Percentages below to comply with State

Highway Specifications and Geotechnical  
Report recommendations.

**2.1 ASPHALT PAVING AGGREGATES**

- A. Aggregates: Crushed stone, gravel, sand, or other sound, durable mineral materials processed and blended, and naturally combined.
- B. // Subbase Aggregate: Maximum 38 mm (1-1/2 inches). //
- C. Base Aggregate Maximum Size:
  - 1. Base course over 152 mm (6 inches) thick: 38 mm (1-1/2 inches).
  - 2. Other base courses: 19 mm (3/4 inch).
- D. Asphaltic Base Course:
  - 1. Maximum Particle Size: 25 mm (1 inch).
  - 2. In conflicts between this specification and requirements in latest version of State Highway Specifications, State Specifications take precedence.
- E. Aggregates for Asphaltic Concrete Paving: Mixture of sand, mineral aggregate, and liquid asphalt in proportions with percentage by weight within the following:

Sieve Sizes	Percentage Passing
19 mm(3/4 inch)	100
9.5 mm(3/8 inch)	67 to 85
6.4 mm(1/4 inch)	50 to 65
2.4 mm(No. 8 mesh)	37 to 50
600 µm(No. 30 mesh)	15 to 25
75 µm(No. 200 mesh)	3 to 8

- 1. Plus 50/60 penetration liquid asphalt at 5 percent to 6-1/2 percent of combined dry aggregates.

**SPEC WRITER NOTES:**

- 1. Pervious pavement is well suited for parking lots, walking paths, sidewalks, plazas, and similar uses. Pervious pavement can be used in driveways if COR is aware of its stormwater functions.
- 2. The following porous paving specifications are provided for informational purposes only. These specifications include information on acceptable materials for typical applications, but are not exclusive or limiting. Architect is responsible for developing detailed specifications for

individual design projects according to project conditions. Working with local asphalt suppliers will provide the best design and material specifications.

3. Include the following Article if pervious paving is in scope of project.

## 2.2 PERVIOUS PAVING AGGREGATES

- A. Aggregate for Infiltration Beds: 50 to 25 mm (2 to 1 inch) uniformly graded coarse aggregate, with wash loss of maximum 0.5 percent, AASHTO size number 3 per AASHTO Standard Specifications, and have 40 percent voids as measured by ASTM C29/C29M. Choker base course aggregate for beds to have 10 to 19 mm (3/8 to 3/4 inch) uniformly graded coarse aggregate AASHTO size number 57 per Table 4, AASTHO Standard Specifications.

## 2.3 NON-WOVEN GEOTEXTILE FABRIC

- A. Fabric: Needled nonwoven polypropylene fibers with the following properties:
1. Grab Tensile Strength (ASTM D4632)  $\geq$  55 kg (120 lbs.).
  2. Mullen Burst Strength (ASTM D3786)  $\geq$  1550 kPa (225 psi).
  3. Flow Rate (ASTM D4491)  $\geq$  360 l/min/0.09 sq. m (95 gal/min/sq. ft.).
  4. UV Resistance after 500 hours (ASTM D4355)  $\geq$  70 percent.
  5. Heat-set or heat-calendared fabrics are not acceptable.

## 2.4 ASPHALTS

- A. Comply with Asphalt Institute Specification SS2:
1. Asphalt cement: Penetration grade 50/60.
  2. Prime coat: Cut-back type, grade MC-250.
  3. Tack coat: Uniformly emulsified, grade SS-1H.

SPEC WRITER NOTE: Delete the following three Articles if not required for Project.

## 2.5 POROUS PAVING ASPHALT MIX

- A. Bituminous Surface Course: 64 mm (2-1/2 inches) thick with bituminous mix of 5.75 to 6percent by weight dry aggregate. Maximum binder drain down of 0.3percent according to ASTM D6390. If more absorptive aggregates such as limestone, are used in mix, then base bitumen amount on NAPA P-33 testing procedures or DOT equivalent.
- B. Neat Asphalt Binder: Modified with elastomeric polymer to produce binder meeting AASHTO M320 PG 76-22 requirements. Apply

styrene-butadiene-styrene (SBS) elastomer polymer, or approved equal, at rate of 3percent by weight of total binder. Thoroughly blend composite materials at asphalt refinery or terminal before loading transport vehicle. Polymer modified asphalt binder to be heat and storage stable.

C. Asphalt: Minimum 90 percent crushed material with gradation as follows:

1. U.S. Standard Sieve Size	Percent Passing.
a. 1/2 (12.5mm)	100.
b. 3/8 (9.5 mm)	92-98.
c. 4 (4.75 mm)	34-40.
d. 8 (2.36 mm)	14-20.
e. 16 (1.18 mm)	7-13.
f. 30 (0.60 mm)	0-4.
g. 200 (0.075 mm)	0-2.

D. Hydrated Lime: ASTM C977 Add at dosage rate of 1.0 percent by weight of total dry aggregate to mixes containing granite. Additive must prevent separation of asphalt binder from aggregate and achieve required tensile strength ratio (TSR) of minimum 80percent on asphalt mix when tested according to AASHTO T283. Test asphaltic mix for resistance to stripping by water according to ASTM D-1664. If estimated coating area is not above 95 percent, add anti-stripping agents to asphalt.

E. Do not install pervious pavement on wet surfaces or when ambient air temperature is 10 degrees C (50 degrees F) or lower. Bituminous mix temperature to be between 148 degrees and 177 degrees C (300 degrees F and 350 degrees F), based on asphalt supplier's recommendations.

## 2.6 SEALER

- A. Sealer: Suitable fibrated chemical type asphalt base binders and fillers with container consistency suitable for troweling after thorough stirring, and containing no clay or other deleterious substance.
- B. In conflicts between this specification and requirements in latest version of State Highway Specifications, State Specifications take precedence.

## 2.7 ANCILLARY MATERIALS

- A. Herbicide: Commercial chemical for weed control, registered by EPA. Provide in granular, liquid or wettable powder form.

- B. Wheel Stops: Precast, air entrained concrete, 17.2 MPa (2500 psi) minimum compressive strength, 115 mm (4-1/2 inches) high by 225 mm (9 inches) wide by 1800 mm (72 inches) long // verify-edit dimensions //. Provide chamfered corners, drainage slots and holes for mounting to pavement with galvanized steel dowels 19 mm (3/4 inch) diameter by minimum 254 mm (10 inch) long.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Land Surveyor to establish and control pavement (aggregate or asphalt base course and asphalt surface course) alignments, grades, elevations, and cross sections as shown on Drawings.

#### **3.2 MIXING ASPHALTIC CONCRETE MATERIALS**

- A. Provide hot plant-mixed asphaltic concrete paving materials.
1. Temperature leaving plant: 143 degrees C (290 degrees F) minimum, 160 degrees C (320 degrees F) maximum.
  2. Temperature at time of placing: 138 degrees C (280 degrees F) minimum.

#### **3.3 SUBGRADE**

- A. Shape to line and grade and compact with self-propelled rollers.
- B. Fill depressions developed under rolling with acceptable material and re-roll area.
- C. Remove soft areas, fill with acceptable materials and re-roll area.
- D. If subgrade becomes rutted or displaced before the placing of subbase, rework subgrade to bring to line and grade.
- E. Proof-roll subgrade with maximum 45 tonne (50 ton) gross weight dump truck as directed by COR. If pumping, pushing, or other movement is observed, rework area to provide stable and compacted subgrade.

SPEC WRITER NOTE: Include the following paragraph if herbicide is in scope of project.

- F. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rate and written instructions. Apply to dry subgrade of surface of compacted aggregate base before applying paving materials.



### 3.4 BASE COURSES

SPEC WRITER NOTE: Include the following paragraph if subbase is required.

- A. Subbase:
  - 1. Spread and compact to thickness shown on drawings.
  - 2. Begin rolling at sides, continue toward center, and continue until there is no movement ahead of roller.
  - 3. After completion of subbase rolling, no hauling is permitted over subbase, except top course material delivery.
- B. Base:
  - 1. Spread and compact to thickness shown on Drawings.
  - 2. Begin rolling sides, continue toward center, and continue until there is no movement ahead of roller.
  - 3. After completion of base rolling, no hauling is permitted over base except top course material delivery.
- C. Thickness Tolerance: Compacted thicknesses shown on Drawings within minus 0.0 mm (0.0 inches) to plus 12.7 mm (0.5 inch).
- D. Smoothness Tolerance: Lines and grades shown on Drawings within 5 mm in 3 m (3/16 inch in 10 feet).
- E. Moisture Content: Only amount required to achieve specified compaction.

### 3.5 ASPHALTIC CONCRETE PAVING PLACEMENT

- A. Remove all loose materials from compacted base.
- B. Apply prime coat, and tack coat where required, and allow to dry according to manufacturer's instructions as approved by Architect.
- C. Receipt of Asphaltic Concrete Materials:
  - 1. Do not accept material unless covered with tarpaulin until unloaded, and unless material is minimum 130 degrees C (280 degrees F).
  - 2. Do not begin asphaltic concrete material placement when atmospheric temperature is below 10 degrees C (50 degrees F), nor during fog, rain, or other unsuitable conditions.
- D. Spreading:
  - 1. Spread material with minimal handling.
  - 2. For finished paving 76 mm (3 inches) or less, spread in one layer.
- E. Rolling:
  - 1. After material has been spread to proper depth, roll until surface is hard, smooth, unyielding, and true to thickness and elevations shown on drawings.

2. Roll in minimum two directions until no roller marks are visible.
3. Finished paving smoothness tolerance:
  - a. No depressions which will retain standing water.
  - b. Maximum deviation: 3 mm in 1.8 m (1/8 inch in 6 feet).

SPEC WRITER NOTES:

1. Delete next three Articles if not required for Project.
2. DO NOT SEAL PERVIOUS ASPHALT PAVEMENTS.

### 3.6 SEAL COAT APPLICATION

- A. Prepare surfaces, mix seal coat material, and apply according to manufacturer's instructions as approved by Architect.
- B. Apply one coat of sealer.
- C. Finished surface seal, when dry and thoroughly set, to be smooth, tough, resilient, of uniform black color, and free from coarse textured areas, lap marks, ridges, and other surface irregularities.

### 3.7 COLD MILLING

- A. Clean existing pavement surface of loose or deleterious material immediately before cold milling. Remove existing asphalt pavement to grades and cross sections indicated on Drawings.
  1. Mill to // 38 mm (1-1/2 inches) // 50 mm (2 inches) // 75 mm (3 inches) deep //.

### 3.8 PATCHING

- A. Hot Mix Asphalt Pavement: Sawcut patch perimeter and excavate existing pavement to sound base. Excavate rectangular or trapezoidal patches, extending 300 mm (12 inches) into adjacent sound pavement, unless otherwise indicated on drawings. Cut excavation faces vertically. Remove excavated material. Recompact existing aggregate base course to provide new subgrade.
- B. Tack Coat: Apply uniformly to vertical and horizontal surfaces abutting area to receive new hot mix asphalt paving at rate of 0.2 to 0.7 L/sq. m. (0.05 to 0.15 gal./sq.yd).
  1. Allow tack coat to cure before applying hot mix asphalt paving.
  2. Avoid smearing or staining adjoining surfaces, remove spillage and clean affected surfaces.
- C. Patching: Fill excavated pavement with hot mix asphalt base mix for full thickness of patch; while still hot, compact flush with adjacent pavement surface.

**3.9 CLEANING**

- A. Remove debris, rubbish, and excess material from project site.

**3.10 PROTECTION**

- A. Protect asphaltic concrete paved areas from traffic until sealer is set and cured and does not pick up under foot or wheeled traffic.
- B. Repair damage.

- - - E N D - - -