

GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cold milling of existing asphalt pavement.
2. Minor hot-mix asphalt patching.
3. Minor hot-mix asphalt paving.
4. Minor hot-mix asphalt overlay.
5. Pavement-marking paint.
6. Seal Coating
7. Slurry Coat
8. Crack Sealing

B. Related Sections:

1. Section 31 20 00 "Earth Moving" for subgrade preparation, fill material, unbound-aggregate subbase and base courses and for aggregate pavement shoulders.

1.2 SUBMITTALS

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

1. Job-Mix Designs: For each job mix proposed for the Work.

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

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by the City of Portland or ODOT.

B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of Section 00744 of the 2008 Oregon Standard Specifications for Construction for asphalt paving work.

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

1.4 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 60 deg F.

2. Asphalt Base or Surface Course: Minimum surface temperature varies per nominal compacted thickness of individual lifts and courses to be placed.
 - a. A 2-inch lift or course shall have a minimum surface temperature of 60 deg F and rising at time of placement.
 - b. A 2-inch to 2-1/2-inch lift or course shall have a minimum surface temperature of 60 deg F and rising at time of placement.
 - c. Greater than 2-1/2-inch lift or course shall have a minimum surface temperature of 60 deg F and rising at time of placement.

3. If placing MHMAC between March 15 and September 30, temperature requirement may be lowered 5 deg F.

4. Seal Coating: Material will not be applied when surface temperatures are below 60 deg F, and/or rain is forecast. If sealcoat receives rain before it has cured, Contractor will re-apply material at his own expense, with no reimbursement. Contractor is solely responsible for examining the project. Start and stop points will be clearly marked by owner using white paint.

5. Slurry Coat: Apply slurry coat when the temperature is a minimum 50 deg F and rising, when no rain is expected and as recommended per ASTM D 3910.

B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 55 deg F for water-based materials, and not exceeding 95 deg F.

PART 2 PRODUCTS

2.1 AGGREGATES

A. Conform to requirements of 00744 of the 2008 Oregon Standard Specifications for Construction.

B. Mineral Filler: ASTM D 242, rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: AASHTO M 320 or AASHTO MP 1a, PG 64-22

B. Tack Coat: ASTM D 977 emulsified asphalt.

C. Seal Coating:

1. Emulsion Specifications:

Test	Method	Min	Max
Viscosity, Saybolt Furol @ 25 Deg Cel, SFs	AASHTO T-72	50	150
Storage Stability test, 24 hr, % (a)	AASHTO T-59		1
Particle charge test	AASHTO T-59	Positive	Positive
Sieve test, % (a)	AASHTO T-59		0.1
Residue (% by mass)	California T-331	65	
TESTS ON RESIDUE FROM DISTILLATION:			
Softening Point on Residue, (Deg. Cel)	AASHTO T-53	57	

Penetration @ 25 Deg Cel, 100g, 5 sec, dmm	AASHTO T-49	15	40
--	-------------	----	----

2. Finished Product Specifications:

- a. Weight per gallon – 10.5 lbs/gal. minimum
- b. Solids – 55% Minimum
- c. Residue on Base – 65% Minimum
- d. Penetration of Residue – Less than 30
- e. ISSA-WTA Test – Less than 5% loss
- f. Carboneal™ or approved equal

3. Material Dilution: Material may be diluted up to a maximum of 20% by volume with potable water. There will be no additional added mineral allowed. If conditions warrant (High surface temperatures), misting of the road will be allowed. Standing water will not be allowed. If water puddles form on surface, the application will be halted until standing water has evaporated. Owner has the right to sample diluted material from Contractor's equipment to verify dilution ratios. This will be accomplished by a residue test. If material is found to be over allowable dilution, Contractor will be required to apply additional coat of properly diluted material.

2.3 AUXILIARY MATERIALS

- A. Recycled Materials for Minor Hot-Mix Asphalt Mixes: Reclaimed asphalt pavement; reclaimed and unbound-aggregate base material from sources and gradations that have performed satisfactorily in previous installations, equal to performance of required minor hot-mix 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. Pavement-Marking Paint: MPI #97 Latex Traffic Marking Paint.
 - 1. Color: White, Yellow, Blue or Red where indicated.
- D. Glass Beads: AASHTO M 247, Type 1.
- E. Joint Sealant: ASTM D 6690, Type I, hot-applied, single-component, polymer-modified bituminous sealant.

2.4 MIXES

- A. Recycled Content of Minor Hot-Mix Asphalt: Postconsumer recycled content plus one-half of preconsumer recycled content not more than 30 percent by weight.
- B. Minor Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and complying with the following requirements:
 - 1. Provide mixes conforming to section 00744 of the 2008 Oregon Standard Specifications for Construction.
 - 2. Base Course: Level 2, ½-inch dense, MHMAC.
 - 3. Surface Course: Level 2, ½-inch dense, MHMAC.

C. Emulsified-Asphalt Slurry: ASTM D 3910, Type 1.

PART 3 EXECUTION

3.1 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.

3.2 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 as indicated on plans.
 - 2. Patch surface depressions deeper than 1 inch (25 mm) after milling, before wearing course is laid.
- B. If the cold-milled pavement surface will be exposed to traffic, sweep and clean prior to allowing traffic to use the roadway.

3.3 PATCHING

- A. Minor Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseal concrete pieces firmly.
 - 1. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.
- C. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, minor hot-mix asphalt paving 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.
- D. Patching: Fill excavated pavements with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

3.4 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. Asphalt Overlay: Clean and prepare existing exposed asphalt surface to receive asphalt overlay.
1. Remove loose and deleterious material and existing pavement markings.
 2. The pavement surface shall be dry prior to the preparation work and paving.
 3. Protect all existing structures from the overlay operation and check and clean as necessary after the overlay.
 - a. Adjust utility castings to finish grade within areas of overlay as required.
 4. Apply tack coat to existing asphalt surfaces to receive an asphalt overlay.
 5. Level and compact depressed areas of minor hot mix asphalt concrete as directed. Perform the leveling work as a separate operation from the overlay.
- 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 minor hot-mix asphalt paving.
 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.5 MINOR HOT-MIX ASPHALT PLACING

- A. 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. Spread mix at minimum temperature of 250 deg F.
 2. 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.
- C. 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.

3.6 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.
 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."

3.7 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.
 - 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: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 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. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- G. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.8 ASPHALT CURBS

- A. Construct hot-mix asphalt curbs over compacted pavement surfaces. Apply a light tack coat unless pavement surface is still tacky and free from dust. Spread mix at a minimum temperature of 250 deg F (121 deg C).
 - 1. Asphalt Mix: Same as pavement surface-course mix.
- B. Place hot-mix asphalt to curb cross section indicated or, if not indicated, to local standard shapes, by machine or by hand in wood or metal forms. Tamp hand-placed materials and screed to smooth finish. Remove forms after hot-mix asphalt has cooled.

3.9 INSTALLATION TOLERANCES

- A. Cold Milling: Test with a 12 foot straightedge furnished and operated by the Contractor, as directed. The variation from the top of the ridges from the testing edge of the straightedge, between any two ridge contact points, shall not exceed 1/4 inch.
- B. 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.
- C. 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.

3.10 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Owner.
- B. Allow paving to age for 30 days before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
 1. Broadcast glass beads uniformly into wet pavement markings at a rate of 6 lb/gal..

3.11 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Replace and compact minor hot-mix asphalt where core tests were taken.
- C. Remove and replace or install additional minor hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.12 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.

3.13 REPAIRS

- A. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch (6 mm).
 1. Clean cracks and joints in existing hot-mix asphalt pavement.
 2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch (6 mm) wide. Fill flush with surface of existing pavement and remove excess.
 3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch (6 mm) wide. Fill flush with surface of existing pavement and remove excess.

3.14 SURFACE TREATMENTS

- A. Seal Coating: The Contractor shall clean the surface of the asphalt not more than 24 hours prior to applying sealer. Contractor may use backpack blowers, walk-behind blowers, compressors, wire brooms or any method that will completely remove any dust, dirt, vegetation, or deleterious material. Oil spots will be treated with oil spot primer specifically designed for this purpose. It is Contractor's responsibility to remove debris from parking areas and dispose of said debris at Contractor's expense. No additional payment will be made for this item.
1. Application shall be by purpose built seal coating equipment with rubber squeegees. Brooms, rollers and spray application will not be allowed, except that small hand brooms may be used for detail work in small, tight areas.
 2. Rate is to be (2) two coats of properly diluted material. The second coat is not to be applied until the first coat has completely dried.
 3. Material will be applied uniformly over the entire surface in such a manner that there are no ridges or uncoated areas. Material will be applied in such a manner that no material will be splashed or run onto concrete curbs, pole bases or other property. Cutoff lines at the ends of the work areas will be straight lines, unless abutting curbs.
- B. Slurry Coat: Apply slurry coat in a uniform thickness between 1/8" and 1/4" according to ASTM D 3910 and allow to cure.
1. Roll slurry seal to remove ridges and provide a uniform, smooth surface.
 2. Avoid traffic on newly sealed surface until material has completely cured.

END OF SECTION