

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Asphalt paving for vehicular and pedestrian use.
2. Asphalt binder courses and surface courses.
3. Preparation of base and subbase for asphalt paving.
4. Joint treatment and edge details.

B. Related Sections

1. Division 31 – Earthwork
2. Division 32 11 23 – Aggregate Base Courses
3. Division 32 13 13 – Concrete Paving
4. Division 32 17 23 – Pavement Markings
5. Division 32 18 23 – Asphalt Millings and Recycled Asphalt
6. Division 32 91 00 – Planting and Ground Cover
7. Division 01 – General Requirements and Coordination

1.2 REFERENCES, CODES, AND STANDARDS

A. American Association of State Highway and Transportation Officials (AASHTO)

1. AASHTO M 292 – Standard Specification for Performance-Graded Asphalt Binder
2. AASHTO T 85 – Specific Gravity of Bituminous Materials
3. AASHTO T 308 – Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method

B. ASTM International

1. ASTM D946 – Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
2. ASTM D1559 – Standard Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
3. ASTM D2041 – Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
4. ASTM D3381 – Standard Test Method for Viscosity of Asphalt Materials
5. ASTM D4867 – Standard Test Method for Effect of Heat and Air on a Moving Film of Asphalt (Rolling Thin-Film Oven Test)
6. ASTM D6926 – Standard Test Method for Asphalt Binder Content of Hot Mix Asphalt by Ignition Method

C. National Asphalt Pavement Association (NAPA)

1. NAPA Quality Control/Quality Assurance Guidelines for Hot Mix Asphalt

D. Asphalt Institute

1. MS-2 – Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types
2. MS-19 – Asphalt Pavement Construction

- E. Federal Highway Administration (FHWA)
 - 1. FHWA-HIF-12-003 – Hot Mix Asphalt Pavement Construction Best Practices
- F. Occupational Safety and Health Administration (OSHA) Standards
- G. Local and State Department of Transportation (DOT) Standards, as applicable

1.3 DEFINITIONS

- A. Asphalt Binder: The bituminous material used to bind aggregate particles in asphalt concrete.
- B. Hot Mix Asphalt (HMA): A mixture of aggregate and asphalt binder heated and mixed at elevated temperatures for paving applications.
- C. Tack Coat: A light application of asphalt emulsion applied between pavement layers to promote bond.
- D. Prime Coat: An application of low viscosity asphalt to an unbound base layer to improve bonding with the asphalt surface.
- E. Lift: A single layer of asphalt paving placed during one operation.

1.4 SUBMITTALS

- A. Action Submittals
 - 1. Product Data: Manufacturer's technical data sheets for asphalt binder, emulsions, additives, and paving materials.
 - 2. Mix Design: Submit proposed hot mix asphalt mix design including gradation, binder content, air voids, and performance properties certified by a qualified laboratory.
 - 3. Quality Control Plan: Detailed plan outlining procedures for mix production, testing frequency, paving operations, and acceptance criteria.
 - 4. Equipment List: Identification and description of paving, compaction, and testing equipment.
 - 5. Construction Schedule: Proposed schedule for paving operations including weather and temperature considerations.
 - 6. Certifications: Asphalt binder certification confirming compliance with specified performance grades and material properties.
- B. Informational Submittals
 - 1. Test Reports: Laboratory test results verifying compliance of materials and mix design with specified requirements.
 - 2. Field Quality Control Reports: Documentation of on-site testing during paving operations.
 - 3. Manufacturer's Installation Instructions.

1.5 QUALITY ASSURANCE

- A. Qualifications:

1. Paving Contractor shall have a minimum of five years' experience in asphalt paving of similar scope and magnitude.
- B. Testing laboratory shall be accredited and experienced in hot mix asphalt testing.
- C. Testing and Inspection:
 1. Materials shall be tested per ASTM and AASHTO standards referenced.
 2. Field density and compaction testing to be performed using nuclear density gauge or core sampling as per project requirements.
 3. Continuous monitoring of temperature during production and placement to meet specification limits.
- D. Mock-Up:
- E. Provide a test strip or mock-up of paving to demonstrate finish, compaction, and joint treatment acceptable to the Architect/Engineer prior to full-scale paving.
- F. Compliance:
 1. All work shall comply with applicable local, state, and federal regulations governing asphalt paving.
- G. Environmental Requirements:
 1. Asphalt paving shall not be performed when ambient temperature is below manufacturer's recommended limits or when weather conditions could impair quality.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery:
 1. Deliver asphalt binder and emulsions in manufacturer's original, unopened containers with labels intact.
 2. Hot mix asphalt shall be delivered promptly to maintain temperature and workability.
- B. Storage:
 1. Store asphalt binder and emulsions in temperature-controlled facilities to prevent degradation.
 2. Aggregate stockpiles shall be maintained free from contamination and segregation.
- C. Handling:
 1. Handle all materials to prevent contamination and damage.
 2. Use approved equipment for loading, transport, and placement of hot mix asphalt.

1.7 WARRANTY

- A. Provide a warranty for the asphalt paving materials and workmanship for a period of not less than one year from date of substantial completion.
- B. Warranty shall cover defects such as cracking, rutting, delamination, and premature failure not due to normal wear or structural deficiencies in underlying base.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Asphalt Binder:
 - 1. Performance Grade (PG) binder shall comply with AASHTO M 292 and ASTM D946. Typical grade: PG 64-22 or as specified.
 - 2. Binder shall be free of contaminants and meet viscosity and penetration requirements.
- B. Aggregates:
 - 1. Aggregates shall comply with ASTM C33 or local DOT gradation requirements.
 - 2. Aggregates shall be clean, hard, durable, and free of deleterious materials.
- C. Hot Mix Asphalt (HMA):
 - 1. Mix design shall conform to Asphalt Institute MS-2 mix design methods.
 - 2. Mixture gradation and binder content shall comply with project-specific requirements.
 - 3. Air void content shall be between 3% and 5% after compaction.
- D. Tack Coat:
 - 1. Use SS-1h or CSS-1h asphalt emulsions conforming to ASTM D2397.
- E. Prime Coat:
 - 1. Use low viscosity asphalt materials conforming to ASTM D2027 or local DOT standards.
- F. Additives and Modifiers:
 - 1. Additives such as anti-stripping agents may be used as approved.
- G. Joint Sealants:
 - 1. Use hot-pour rubberized asphalt sealants or as specified for longitudinal and transverse joints.

2.2 MANUFACTURERS

- A. Asphalt Binder Suppliers:
 - 1. Valero Energy Corporation
 - 2. NuStar Energy L.P.
 - 3. Marathon Petroleum Corporation
- B. Hot Mix Asphalt Producers:
 - 1. Granite Construction Inc.
 - 2. Vulcan Materials Company
 - 3. Martin Marietta Materials
- C. Asphalt Emulsion Suppliers:
 - 1. Ergon Asphalt & Emulsions, Inc.
 - 2. McAsphalt Industries Limited
- D. Additive Suppliers:
 - 1. BASF Corporation

2. Evonik Industries AG
- E. Joint Sealant Manufacturers:
 1. Crafc0, Inc.
 2. Sonneborn, a BASF company

2.3 EQUIPMENT

- A. Paving Equipment:
 1. Self-propelled asphalt pavers capable of placing uniform lifts at specified widths and thicknesses.
- B. Compaction Equipment:
 1. Steel-wheeled rollers and pneumatic-tired rollers suitable for effective compaction of HMA.
- C. Temperature Measuring Devices:
 1. Infrared or contact thermometers for verifying mix and pavement temperatures.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that base and subbase courses have been installed and compacted to required tolerances and densities.
- B. Confirm that drainage and grading are complete and conform to project drawings.
- C. Notify Architect/Engineer of unsatisfactory conditions before proceeding.

3.2 PREPARATION

- A. Clean base surfaces of dust, dirt, loose materials, and debris.
- B. Apply prime coat to unbound base if specified, and allow curing as recommended.
- C. Apply tack coat to existing asphalt surfaces or between lifts as specified.

3.3 INSTALLATION

- A. Hot Mix Asphalt Production:
 1. Produce HMA at temperatures recommended by manufacturer, typically between 275°F and 325°F.
 2. Maintain uniform mixing and delivery to paving site.
- B. Paving:
 1. Place asphalt mix in layers not exceeding specified lift thickness (typically 2 to 3 inches).
 2. Spread and strike off mix uniformly to required grade and slope.
- C. Compaction:
 1. Begin compaction immediately after paving while mix is still hot.

2. Achieve density not less than 92% of maximum theoretical density determined by ASTM D2041.
 3. Use multiple roller passes with steel and pneumatic rollers to achieve uniform compaction.
- D. Joints:
1. Construct longitudinal and transverse joints to provide a smooth, continuous surface.
 2. Treat joints with tack coat prior to adjoining lift placement.
 3. Seal joints with specified joint sealant after compaction.
- E. Surface Finish:
1. Surface shall be smooth, free of segregation, and compacted uniformly.
 2. Correct irregularities exceeding 1/4 inch in 10 feet.

3.4 FIELD QUALITY CONTROL

- A. Testing Frequency:
1. Perform gradation and binder content tests on mix samples at a minimum frequency of one test per 500 tons or as specified.
 2. Conduct density tests on paved lifts at intervals not less than one test per 1,000 square yards.
- B. Temperature Monitoring:
1. Record mix and pavement temperature at start, during, and at completion of paving.
- C. Acceptance Criteria:
1. Mix properties and compaction must comply with specified tolerances.
 2. Reject and remove paving not conforming to requirements.

3.5 PROTECTION AND CLEANUP

- A. Protect newly placed asphalt from traffic and adverse weather for minimum curing period specified by manufacturer.
- B. Remove excess materials, debris, and equipment from site upon completion.
- C. Repair any damage to adjacent surfaces or structures caused by paving operations.

3.6 MAINTENANCE

- A. Maintain asphalt pavement in good condition for duration of warranty period.
- B. Perform crack sealing, patching, and surface treatments as required to preserve pavement integrity.

END OF SECTION