

SECTION 02230 ASPHALTIC CONCRETE PAVEMENT

PART 1 - GENERAL

1.01 SUMMARY

- A. THIS SECTION INCLUDES:
 - 1. Aggregate materials
 - 2. Aggregate base course
 - 3. Asphaltic concrete pavement
 - 4. Asphaltic concrete overlay pavement

1.02 RELATED DOCUMENTS / SECTIONS

- A. Contract documents and drawings, State of Georgia Department of Transportation Standards and Specifications (GA DOT), current edition. Refer to appropriate related sections as applicable.

1.03 REFERENCES

- A. AASHTO - M147 - Materials for aggregate and soil aggregate.
- B. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb. (4.45 kg) Rammer and an 18-in. (457 mm) drop.
- C. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Course Aggregates.
- D. ANSI/ASTM D698 - Standard Proctor Test - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using a 5.5 lb. (2.49 kg) Rammer and 12 inch (304.8 mm) drop.
- E. ANSI/ASTM D1557 - Modified Proctor Test - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. (4.45 kg) Rammer and 18 inch (457 mm) Drop.
- F. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- G. ASTM D2487 - Classification of Soils for Engineering Purposes.
- H. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- I. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.
- J. ASTM D4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- K. ANSI/ASTM D1556 - Test Method for Density of Soil using the Sand-Cone Method.

1.04 PAYMENT ISSUE

- A. Materials testing to be done at Contractor's expense. Testing firm to be approved by Architect.

PART 2 - PRODUCTS

2.01 AGGREGATE MATERIALS

- A. Coarse Aggregate Type A (Gravel): AASHTO M147, Grade A; passing the No. 40 sieve with a liquid limit of not more than 25; a plasticity index of not more than 5 in accordance with ASTM D4318.
- B. Coarse Aggregate Type 2 (Gravel): Crushed: friable material and debris, graded in accordance with ANSI/ASTM C136, within the following limits:

Sieve Size	Percent Passing
2 inches	100
1 inch	95
3/4 inch	95 to 100
5/8 inch	75 to 100
3/8 inch	55 to 85
No. 4	35 to 60
No. 16	15 to 35
No. 40	10 to 25
No. 200	5 to 10

- C. Aggregate Type A3 (Pea Gravel): Natural Stone; washed, free of shale, clay, organic matter; graded in accordance with ANSI/ASTM C136; to the following limits:

- 1. Minimum Size: 1/4 inch
- 2. Maximum Size: 5/8 inch

- D. Fine Aggregate Type A4 (Sand): Natural river or bank sand; washed, free of silt, clay, loam, friable or soluble materials, and organic matter, graded in accordance with ANSI/ASTM C136; within the following limits:

Sieve Size	Percent Passing
No. 4	100
No. 14	50 to 85
No. 50	10 to 30
No. 100	2 to 10
No. 200	0

2.02 SOURCE QUALITY CONTROL

- A. Tests and analysis of aggregate materials will be performed in accordance with ANSI/ASTM D698.

- B. If tests indicate materials do not meet specified requirements, change material and re-test.

PART 3 - PREPARATION

3.01 STOCKPILING

- A. Stockpile materials in sufficient quantities to meet construction schedules and requirements.
- B. Separate differing materials with dividers or stockpile apart to prevent mixing.
- C. Direct surface water away from stockpile site so as to prevent erosion.

PART 4 - EXECUTION

4.01 AGGREGATE BASE COURSE

- A. Coarse Aggregate Fill Type A: As specified in 2.01.
- B. Fine Aggregate (Sand) Fill Type A4: As specified in 2.01.

4.02 EXAMINATION

- A. Verify substrate has been inspected, gradients and elevations are correct, and dry.

4.03 AGGREGATE PLACEMENT

- A. Spread aggregate over prepared substrate to an equivalent compacted thickness as shown on the plans.
- B. Place aggregate in maximum 6 inch layers and roller compact.
- C. Level and contour aggregate surfaces to elevations and gradients indicated on the approved plans.
- D. Add small quantities of fine aggregate to course aggregate as appropriate to assist compaction.
- E. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

- F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

4.04 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straightedge.
- B. Scheduled compacted thickness: Within 1/4 inch.
- C. Variation from true elevation: Within 1/4 inch.

4.05 FIELD QUALITY CONTROL

- A. Compaction testing, locations, number and frequency of tests shall be as recommended by the GE. Compaction testing shall be in accordance with ANSI/ASTM D1556.
- B. If tests indicate Work does not meet specified requirements, remove Work, replace, and re-test.

4.06 COMPACTION

- A. Under paved areas:
 - 1. Compact placed aggregate materials to achieve minimum 95 percent ASTM D698 compaction or as shown on plans.

4.07 ASPHALTIC CONCRETE PAVING

A. RELATED DOCUMENTS / SECTIONS

- 1. Refer to related sections as applicable.
- 2. Aggregate Base Course and Aggregate Materials.

B. REFERENCES

- 1. MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot Mix Types - The Asphalt Institute (AI).
- 2. MS-3 - Asphalt Plant Manual - The Asphalt Institute (AI).
- 3. MS-8 - Asphalt Paving Manual - The Asphalt Institute (AI).

4. MS-17 - Asphalt Overlays for Highway and Street Rehabilitation - The Asphalt Institute (AI).
5. MS-19 Basic Asphalt Emulsion Manual, The Asphalt Institute (AI).
6. ASTM D946 - Penetration-Graded Asphalt Cement for Use in Pavement Construction.

C. PAYMENT ISSUE

1. Materials testing to be done at the contractor's expense. Testing firm to be approved by architect/engineer.

D. QUALITY ASSURANCE

1. Perform Work in accordance with AI Manual MS-8 unless the GA DOT specifications conflict.
2. Mixing Plant: Conform to AI Manual MS-3.
3. Obtain materials from same source throughout.

E. SUBMITTALS

1. Material Certificates: Provide copies of materials certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds, specified requirements.

F. SITE CONDITIONS

1. Weather Limitations: Apply prime and tack coats when ambient temperature is above 50 deg. F (10 deg.C), and when temperature has not been below 35 deg. F (1 deg. C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture. Construct asphalt concrete surface course when atmospheric temperature is above 40 deg. F (4 deg.C), and when base is dry. Base course may be placed when air temperature is above 30 deg. F (-1 deg. C) and rising.
2. Grade Control: Establish and maintain required lines and elevations.

G. DEFINITIONS

1. Asphalt Wearing Course: The top course of an asphalt pavement.

2. Asphalt Binder Course: The course located between a base course and the wearing course.
3. Base Course: The layer of material immediately beneath the binder course.

H. MATERIALS

1. Asphalt Cement: ASTM D946.
2. Aggregate for Binder Course Mix: (Heavy Duty asphaltic concrete type B) (Light Duty asphaltic concrete type B) in accordance with GA DOT standards.
3. Aggregate for Wearing Course Mix: In accordance with GA DOT standards.
4. Aggregate for Base Course: The base course shall be spread evenly upon the prepared subgrade in sufficient quantity to form a compacted depth as shown on the plans.
5. New topping for existing asphalt pavement as shown on the plans.
6. Fine Aggregate: In accordance with the GA DOT standards.
7. Mineral Filler: Finely ground particles of limestone, hydrated lime or other mineral dust, free of foreign matter.

I. ACCESSORIES

1. Primer: In accordance with the GA DOT standards.
2. Tack Coat: In accordance with the GA DOT standards.

J. ASPHALT PAVING MIX

1. Use dry material to avoid foaming. Mix uniformly.
2. Binder Course: Per GA DOT specifications.
3. Wearing Course: Per GA DOT specifications.
4. The contractor shall submit to the Engineer a design mix for each

course specified a minimum of two weeks prior to commencing work.

K. SUBBASE

1. Aggregate Base Course forms the base construction for work of this Section.

L. PREPARATION - PRIMER

1. Apply primer on base or subbase over subgrade surface at uniform rate of 1/3 gal/sq yd.
2. Apply primer to contact surfaces of curbs, gutters.
3. Use clean sand to blot excess primer.

M. PREPARATION - TACK COAT

1. Apply tack coat on asphalt or concrete surfaces over subgrade at uniform rate of 1/3 gal/sq yd.
2. Apply tack coat to contact surfaces of curbs and gutters.

N. PLACING ASPHALT PAVEMENT

1. Install Work in accordance with GA DOT standards and specifications.
2. All areas where new asphalt adjoins existing asphalt or other pavement shall be sawcut for smooth edges and shall have expansion joints for entire adjoining length. All such areas in right-of-way or other jurisdiction shall comply with the local authority specifications for material, depth, base, pavement thickness, finish, and specifications.

O. RESURFACING

1. Resurfacing and/or overlay topping of existing pavements shall be a minimum 1 1/2" type F asphalt surface course. Spot repairs, cleaning, and sealing of existing pavements shall be in accordance with "Asphalt Overlays for Highway and Street Rehabilitation" (MS-17), Asphalt Institute.

P. FIELD QUALITY CONTROL

1. General: Test in-place asphalt concrete courses for compliance with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable paving as directed by Architect or Engineer.
2. Thickness: In-place compacted thickness will not be acceptable if exceeding following allowable variation from required thickness:
 - A. Base Course: 1/4 inch
 - B. Surface Course: 1/8 inch
 - C. Surface Smoothness: Test finished surface of each asphalt concrete course for smoothness, using 10' straightedge applied parallel with, and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness. All surfaces not acceptable shall be removed and replaced until acceptable.
 1. Base Course Surface: 1/4"
 2. Wearing Course Surface: 1/8"
 3. Crowned Surfaces: Test with crowned template centered at right angle to crown. Maximum allowable variance from template 1/4".
 4. Check surface areas at intervals as directed by Architect or as necessary to insure conformance to the plans and specifications.

4.07 ASPHALTIC CONCRETE OVERLAY PAVING

A. RELATED DOCUMENTS / SECTIONS

1. Refer to related sections as applicable.
2. Aggregate Base Course and Aggregate Materials.

B. REFERENCES

1. MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot Mix Types - The Asphalt Institute (AI).
2. MS-3 - Asphalt Plant Manual - The Asphalt Institute (AI).
3. MS-8 - Asphalt Paving Manual - The Asphalt Institute (AI).
4. MS-17 - Asphalt Overlays for Highway and Street Rehabilitation - The Asphalt Institute (AI).
5. MS-19 Basic Asphalt Emulsion Manual, The Asphalt Institute (AI).

6. ASTM D946 - Penetration-Graded Asphalt Cement for Use in Pavement Construction.

C. PAYMENT ISSUE

1. Materials testing to be done at the contractor's expense. Testing firm to be approved by architect/engineer.

D. QUALITY ASSURANCE

1. Perform Work in accordance with AI Manual MS-8 and the GA DOT specifications. Where conflicts occur, use the more stringent specification.
2. Mixing Plant: Conform to AI Manual MS-3.
3. Obtain materials from same source throughout.

E. SUBMITTALS

1. Material Certificates: Provide copies of materials certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds, specified requirements.

F. SITE CONDITIONS

1. Weather Limitations: Apply prime, seal, and tack coats per manufacturer's specifications, but not less than the following: when ambient temperature is above 50 deg. F (10 deg.C), and when temperature has not been below 35 deg. F (1 deg. C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture. Construct asphalt concrete surface course when atmospheric temperature is above 40 deg. F (4 deg.C), and when base is dry. Base course may be placed when air temperature is above 30 deg. F (-1 deg. C) and rising.
2. Grade Control: Establish and maintain required lines and elevations.

G. DEFINITIONS

1. Asphalt Wearing Course: The top course of an asphalt pavement.
2. Asphalt Binder Course: The course located between a base course and the wearing course.
3. Base Course: The layer of material immediately beneath the binder course.

4. Asphalt Overlay Course: Asphaltic concrete course directly on top of existing asphalt pavement top course. Asphalt overlay is allowed only where specifically shown on plans.

H. MATERIALS

1. Asphalt Cement: ASTM D946.
2. Aggregate for Binder Course Mix: In accordance with GA DOT standards.
3. Aggregate for Wearing Course Mix: In accordance with GA DOT standards.
4. Aggregate for Base Course: The base course shall be spread evenly upon the prepared subgrade in sufficient quantity to form a compacted depth as shown on the plans.
5. Overlay for existing asphalt pavement only as shown and specified on the plans.
6. Fine Aggregate: In accordance with the GA DOT standards.
7. Mineral Filler: Finely ground particles of limestone, hydrated lime or other mineral dust, free of foreign matter.

I. ACCESSORIES

1. Primer: In accordance with the GA DOT standards.
2. Tack Coat: In accordance with the GA DOT standards.

J. ASPHALT PAVING MIX

1. Use dry material to avoid foaming. Mix uniformly.
2. Binder Course: Per GA DOT specifications.
3. Wearing Course: Per GA DOT specifications.
4. Overlay Course: Per GA DOT specifications.
5. The contractor shall submit to the Engineer a design mix for each course specified a minimum of two weeks prior to commencing work.

K. ASPHALT OVERLAY PREPARATION - EXISTING PAVEMENT

1. The Contractor must perform a thorough inspection of all existing pavement areas designated for asphalt pavement overlay. Existing pavement areas which exhibit excessive wear, rutting, cracking, settling, or other defects must be repaired prior to installation of asphalt overlay. Areas with defects shall be marked for inspection by the Architect.
2. **CLEANING:**
Existing asphalt pavement shall be cleaned thoroughly. Saw cut pavement edges where pavement is to be removed. Clean all loose and objectionable material. Surface must be dry prior to asphalt overlay pavement. Primer, sealer, reinforcement fabric, and tack coat are required prior to placement of overlay pavement.
3. **STRUCTURAL PATCHING:**
Structural patching will be required where the following conditions occur: excessive wear of surface course, rutting, excessive cracking, local depressed areas, potholes, and similar defects in the existing pavement. All such areas in the existing pavement with defects shall be removed and repaired. Areas to be patched shall be cut out, trimmed to vertical sides, with all loose material or debris removed. Remove and replace subgrade and existing aggregate base material as required to provide a minimum pavement section equal to or greater than the pavement section specified for the project.
4. **LEVELING:**
Leveling consists of asphalt wedges used to level existing pavement surfaces prior to asphalt overlay pavement installation. Leveling may be done ONLY in those areas where the existing base course and underlying subgrade meet the minimum pavement specifications for the project. Leveling shall be done in at least two layers, maximum depth of 2 inches per layer, for up to 6 inches total depth. All layers shall be level with smooth transitions to existing pavement. Crowned areas shall be leveled all the way to the top of the crown, depressed areas shall be leveled to meet the existing edge of pavement adjacent to the depression. Leveling construction and materials shall conform to GA DOT specifications.
5. **CRACK SEALING:**
All cracks in the existing pavement greater than 0.375 inches (3/8") shall be sealed with an appropriate crack filler prior to asphalt overlay pavement installation. After proper installation of crack filler material, all cracks in existing pavement shall be reinforced with Type II pavement reinforcement fabric per GA DOT standards and specifications. Crack filler and sealer material and construction shall conform to GA DOT specifications.
6. **TAPERING:**

Asphalt pavement overlay adjacent to curbs, gutters, raised pavement edges, structures, drainage grates, manhole covers, or similar areas shall be constructed to provide a finished asphalt surface at the joint where the asphalt meets the existing structure no higher than the existing elevation. The asphalt overlay minimum thickness as specified shall be maintained. Existing pavement shall be removed as required to provide a finished surface at the edge of pavement adjacent to existing structures equal to the existing asphalt surface elevation. Do not feather or taper the asphalt overlay. Maintain the minimum pavement thickness throughout.

7. STRUCTURE ADJUSTMENTS:

All structures in the pavement shall be adjusted, relocated, repaired, raised or lowered, and set into new pavement to ensure proper function for the structure. All joints and edges with existing pavement, curb, gutters, drainage structures, manholes, cleanouts, valves, and all other structures in the pavement overlay area, shall be even with the finished pavement surface and uniform for the proper function of the structure. Do not raise with the asphalt overlay any finished grades adjacent to buildings or structures which may be damaged by water intrusion. Maximum finished pavement grade adjacent to buildings or structures which may be damaged by water intrusion is 0.50 feet lower than the finished floor level of the building or structure. Existing grades adjacent to buildings which are less than 0.50 feet lower than the finished floor may be maintained at the existing elevation with Owner's approval under the following conditions: 1.) no water intrusion is present, with no history of water intrusion (Contractor must verify); 2.) Positive slope and drainage away from the building or structure must be maintained.

L. ASPHALT OVERLAY PREPARATION - PRIMER

1. Apply primer on base or subbase over surface at uniform rate per GA DOT specifications.
2. Apply primer to contact surfaces of curbs, gutters.
3. Use clean sand to blot excess primer.

M. ASPHALT OVERLAY PREPARATION - TACK COAT

1. Apply tack coat on asphalt or concrete surfaces over subgrade at uniform rate per GA DOT specifications.
2. Apply tack coat to contact surfaces of curbs and gutters. Install Type II pavement reinforcement fabric per GA DOT standards and specifications.

N. PLACING ASPHALT OVERLAY PAVEMENT

1. Install all Work in accordance with asphaltic concrete pavement specifications, and GA DOT standards and specifications.
- O. RESERVED
- P. FIELD QUALITY CONTROL
1. General: Test in-place asphalt concrete courses for compliance with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable paving as directed by Architect.
 2. Thickness: In-place compacted thickness will not be acceptable if exceeding following allowable variation from required thickness:
 - A. Base Course: $\frac{1}{2}$ ", plus or minus
 - B. Surface Course: $\frac{1}{4}$ ", plus or minus
 - C. Overlay Course: $\frac{1}{4}$ ", plus or minus
 - D. Surface Smoothness: Test finished surface of each asphalt concrete course for smoothness, using 10' straightedge applied parallel with, and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness. All surfaces not acceptable shall be removed and replaced until acceptable.
 1. Base Course Surface: $\frac{1}{4}$ "
 2. Wearing Course Surface: $\frac{1}{8}$ "
 3. Crowned Surfaces: Test with crowned template centered at right angle to crown. Maximum allowable variance from template, $\frac{1}{4}$ ".
 4. Check surface areas at intervals as directed by Architect or as necessary to insure conformance to the plans and specifications.

END OF SECTION 02230