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| Use on all projects when a job-mix-formula will be developed for the specific project, and statistical acceptance will be used. Use this for **more** than 5000 tons asphalt concrete pavement. |

## Section 401. — ASPHALT CONCRETE PAVEMENT BY GYRATORY MIX DESIGN METHOD

**Description**

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| Enter the pavement roughness type and asphalt binder grade in the highlighted areas below. Materials will provide to the designer the following:  1) Roughness type: Use the following guidelines:  **Type I-A** pavement roughness. (1 opportunity to improve the ride quality **and** driving speed **greater than 35 mph**. ie: 1 lift overlay).  **Type I-B** pavement roughness. (1 opportunity to improve the ride. **and** driving speed **less than or equal to 35 mph** ie: 1 lift overlay).  **Type II-A** pavement roughness. (2 opportunities to improve the ride quality **and** driving speed **greater than 35 mph** ie: Pulverize and 1 lift overlay).  **Type II-B** pavement roughness. (2 opportunities to improve the ride quality **and** driving speed **less than or equal to 35 mph** ie: Pulverize and 1 lift overlay).  **Type III-A** pavement roughness. (3 or more opportunities to improve the ride quality **and** driving speed **greater than 35 mph**. ie: Pulverize and 2 lift overlay).  **Type III-B** pavement roughness. (3 or more opportunities to improve the ride quality **and** driving speed. **less than or equal to 35 mph** ie: Pulverize and 2 lift overlay).  **Type IV** pavement straightedge. (This is the default type that applies to all paved surfaces).  It is possible for a project to have a combination of roughness types and should be identified by station. Type IV will always apply.  2) Asphalt binder grade: Binder grade is project specific.  3) **If this is a desert project change the Pressure Aging Vessel testing temperature to 230°F (110°C) in the highlighted area below.** |

**401.01** Delete the second paragraph and substitute the following:

Asphalt concrete pavement nominal maximum size aggregate is designated according to Tables 401-1 and 703-4. Equivalent single axle loads (ESAL) or number of gyrations at design (NDesign) is designated according to Table 401-1.

Delete the fifth paragraph and substitute the following:

Antistrip additive type is designated according to Subsection 702.05. A minimum of one percent Type 3 (lime) is required in the asphalt concrete mixture.

Add the following:

Pavement roughness is type I-A, I-B, II-A, II-B, III-A, or III-B, and IV as shown in Subsection 401.16.

Asphalt binder grade is PG xx-xx. The Pressure Aging Vessel test temperature shall be 212°F (100°C).

**Construction Requirements**

**401.03 Composition of Mix (Job-Mix Formula).** Add the following after the first paragraph:

Compact specimens with the gyratory effort corresponding to the design ESAL level of 0.3 to <3 million. Use a gyratory compactor which meets the internal angle requirement according to AASHTO T 312.

If more than 1.0 percent hydrated lime is proposed in the JMF, provide AASHTO T 283 test results showing the additional lime is necessary to meet the minimum tensile strength ratio requirements in Table 401-1.

**(c) Submission**

**(1) Aggregate and mineral filler.**

*(a)* Target values: Delete line *(2)* and substitute the following:

*(2)* Designate target values within the gradation band specified for the nominal maximum size aggregate grading shown in Table 703-4. Allowable deviations are shown in Table 703-5:

**(2) Asphalt binder.** Add the following:

*(e)* Laboratory mixing and compaction temperatures and maximum plant mixing temperature

**(3) Antistrip additives.** Add the following:

*(e)* Dosage rate.

**(4) RAP.** Add the following:

*(f)* Optional sheet for RAP on Form FHWA 1641.

**(d) Verification.** Delete the first paragraph and substitute the following:

The verification process starts when all required job mix formula documentation and materials are received.The CO will review the job mix formula and may perform job mix formula verification testing. If verification testing is performed, the information supplied in the Contractor’s job mix formula must agree with the verification test results within the tolerances shown below. Do not begin asphalt concrete mix production for the control strip until the JMF has been approved.

Delete lines (3) and (4) and substitute the following:

**(3) Bulk specific gravity of aggregate (Gsb).** The Contractor’s coarse and fine Gsb is verified if the CO’s results are within 0.038 for AASHTO T 85 and 0.066 for AASHTO T 84.

**(4) Voids in the mineral aggregate (VMA).** The Contractor’s VMA is verified if the CO’s result is within the specification limit in Table 401-1.

Add the following:

**(8) Hveem stabilometer value**. The Contractor’s Hveem stabilometer value is verified if the CO’s result is above the minimum specification of 30.

**Table 401-1 Gyratory Asphalt Concrete Mix Design Requirements, AASHTO R 35.** Add the following note:

(4) For AASHTO T 283, use 4-inch (100-millimeter) diameter specimens. Note that AASHTO T 283 requires a freeze-thaw cycle.

**401.05 Equipment.**

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| Do not include the pay item for a “Material Transfer Vehicle” in that it is considered incidental to construction. If haul distance is anticipated to be short (e.g. less than 30 minutes), Subsection 401.05(b) may be deleted. Verify with pavement & materials group. |

**(b) Materials Transfer Vehicle (MTV).** Delete this Subsection and substitute the following:

**(b) Materials Transfer Vehicle (MTV).** Furnish an MTV with the following:

1. A loading system with the ability to receive mixtures from the hauling equipment;
2. A minimum storage capacity of 13 tons (11.8 metric tons) with a remixing system in the MTV storage bin;
3. A discharge conveyor to deliver the mixture to the paver hopper; and
4. A mass not exceeding the maximum legal loadings on structures.

Pick-up machines, hopper inserts, and material transfer devices are not considered MTVs. Acceptable Material Transfer Vehicles are:

* Weiler E2850 Remixing Transfer Vehicle
* Roadtec SB-1500
* Roadtec SB-2500

In the event the MTV malfunctions during paving operations, the Contractor must suspend paving, however mix in transit and stored in the silo at the time of breakdown may be placed without the use of an MTV. Do not resume mix placement until the MTV is operational.

**401.14 Compacting.** Add the following:

Do not cause cracking, shoving, or undue displacement. Continue rolling until all roller marks are eliminated, all cracks are sealed, and the required density is obtained. For HMA, do not roll the mix after the surface cools below 175 °F (80°C).

**401.15 Joints, Trimming Edges, and Cleanup.** Add the following:

Make the longitudinal joint in the top layer at the centerline of the pavement on two-lane roadways or at the lane lines of roadways with more than two lanes. Establish the centerline of the pavement from recorded data defined in Subsection 152.05(b) or construction staking data if provided by the government. Offset the longitudinal joint in the layer immediately below at least 6-inches (150-millimeters) from the joint.

For curve widening see the plans for locations and details. For two-lane roadways make the longitudinal joint at the centerline of the pavement. Do not vary the shoulder width where curve widening exists.

At connections to existing pavements and previously placed lifts, make the transverse joints vertical to the depth of the new pavement. Form transverse joints by cutting back the previous run to expose the full-depth of the course.

**401.17 Acceptance.** Delete line (b) and substitute the following:

**(b) VMA.** The specification limit shown in Table 401-1. After the JMF has been verified according to Subsection 401.03 and 401.12, use the Contractor’s combined coarse and fine bulk specific gravity of aggregate Gsb values to calculate VMA on field produced asphalt concrete mix samples.