

# **APPENDIX G**

## **Salt Creek Trail Hot Mix Asphalt Specification**

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*EMWD Clarification:  
Standard Specification  
referenced herein is the 2018  
California Department of  
Transportation Standard  
Specifications.*

## **DIVISION V SURFACINGS AND PAVEMENTS**

### **39 ASPHALT CONCRETE**

**Replace section 39-2 HOT MIX ASPHALT with the following:**

#### **39-2.01 Hot Mix Asphalt**

This work includes producing and placing **hot mix asphalt (HMA) Type A**. Comply with the specifications for HMA under Section 39, "Asphalt Concrete" of the Standard Specifications and these Special Provisions. All other requirements of Section 39 shall apply unless otherwise modified or replaced in these Special Provisions.

The type of hot mix asphalt will be shown on the plans or specified in the Special Provisions.

#### **39-2.01(1a) Material**

##### **39-2.01(1a.1) Prime Coat**

Liquid asphalt for prime coat shall be Grade SC-70. Prime coat shall be applied only to those areas designated by the Engineer. The application rate shall be 0.20 gallon per square yard of surface covered. The exact rate and number of applications will be determined by the Engineer.

##### **39-2.01(1a.2) Tack Coat**

Asphaltic emulsion for paint binder (tack coat) shall conform to the provisions in Section 94, "Asphaltic Emulsion" of the Standard Specifications for the rapid-setting or slow-setting type and grade approved by the Engineer. Grade SS1h shall be used if not otherwise specified. Tack coat shall be applied to all vertical surfaces of existing pavement, curbs, gutters, and construction joints in the surfacing against which additional material is to be placed, to a pavement to be surfaced, and to other surfaces designated in the Special Provisions. The application rate shall be from 0.02 to 0.10 gallon per square yard of surface covered. The exact rate and number of applications will be determined by the Engineer. Application of tack coat shall meet the provisions in Section 39-2.01C(3)(f) of the Standard Specifications.

##### **39-2.01(1a.3) Asphalt Binder**

Performance grade (PG) asphalt binder shall conform to the provisions of Section 92, "Asphalt Binders" of the Standard Specifications.

The Contractor shall furnish asphalt in conformance with the State of California Department of Transportation's "Certification Program for Suppliers of Asphalt." The Department maintains the program requirements, procedures, and a list of approved suppliers at the State of California Department of Transportation's METS web site.

The grade for asphalt binder shall be **PG 64-10** and PG 70-10 within the City of Menifee jurisdiction where specified on the plans.

##### **39-2.01(1a.4) Aggregate**

Aggregate shall be clean and free from decomposed materials, organic material, and other deleterious substances. The aggregate gradation of the hot mix asphalt shall conform to the following, unless otherwise specified on the plans:

| HMA Type | Gradation |
|----------|-----------|
| Type A   | 1/2-inch  |

The aggregate gradation for HMA Type A shall be within the target value (TV) limits for the specified sieve size as shown in the table below. The aggregate gradation for HMA Type A, 1-inch shall meet the target value limits under Section 39-2.02B(4)(b), "Aggregate Gradations" of the Standard Specifications.

**Aggregate Gradation  
(Percentage Passing)**

**3/4-inch HMA Type A**

| Sieve sizes | TV limits | Allowable tolerance |
|-------------|-----------|---------------------|
| 1"          | 100       | --                  |
| 3/4"        | 90–100    | TV ± 5              |
| 1/2"        | 70–90     | TV ± 6              |
| No. 4       | 45–55     | TV ± 7              |
| No. 8       | 32–40     | TV ± 5              |
| No. 30      | 12–21     | TV ± 4              |
| No. 200     | 2.0–7.0   | TV ± 2              |

**1/2-inch HMA Type A**

| Sieve sizes | TV limits | Allowable tolerance |
|-------------|-----------|---------------------|
| 3/4"        | 100       | —                   |
| 1/2"        | 95–99     | TV ± 6              |
| 3/8"        | 75–95     | TV ± 6              |
| No. 4       | 55–66     | TV ± 7              |
| No. 8       | 38–49     | TV ± 5              |
| No. 30      | 15–27     | TV ± 4              |
| No. 200     | 2.0–8.0   | TV ± 2              |

**1/2-inch RHMA-G**

| Sieve sizes | TV limits | Allowable tolerance |
|-------------|-----------|---------------------|
| 3/4"        | 100       | --                  |
| 1/2"        | 90–100    | TV ± 6              |
| 3/8"        | 83–87     | TV ± 6              |
| No. 4       | 28–42     | TV ± 7              |
| No. 8       | 14–22     | TV ± 5              |
| No. 200     | 0–6.0     | TV ± 2              |

The aggregate shall conform to the following quality requirements prior to the addition of asphalt binder.

### Aggregate Quality Requirements

| Quality Characteristic                                                    | Test Method | HMA Type |        |
|---------------------------------------------------------------------------|-------------|----------|--------|
|                                                                           |             | A        | RHMA-G |
| Percent of crushed particles <sup>a</sup>                                 | CT 205      |          |        |
| Coarse aggregate (% min.)                                                 |             |          |        |
| One fractured face                                                        |             | 90       | --     |
| Two fractured faces                                                       |             | 75       | 90     |
| Fine aggregate (Passing No. 4 sieve and retained on No. 8 sieve.) (% min) |             |          |        |
| One fractured face                                                        |             | 70       | 70     |
| Los Angeles Rattler (% Max.) <sup>a</sup>                                 | CT 211      |          |        |
| Loss at 100 rev.                                                          |             | 12       | 12     |
| Loss at 500 rev.                                                          |             | 45       | 40     |
| Sand equivalent <sup>a, b</sup> (min.)                                    | CT 217      | 47       | 47     |
| Fine aggregate angularity (% min.) <sup>a, c</sup>                        | CT 234      | 45       | 45     |
| Flat and elongated particles (% max. by weight @ 5:1.) <sup>a</sup>       | CT 235      | 10       | 10     |

Note:

<sup>a</sup> Combine aggregate in the JMF proportions.

<sup>b</sup> Reported value must be the average of 3 tests from a single sample.

<sup>c</sup> The Engineer waives this specification if HMA contains less than 10 percent of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.

#### 39-2.01(1a.3) Reclaimed Asphalt Pavement

The use of reclaimed asphalt pavement (RAP) in HMA production may be substituted in a quantity up to 15 percent of the aggregate blend in the base course (bottom layer) only. RAP will not be allowed in the surface course.

#### 39-2.01(1b) Hot Mix Asphalt Mix Design

The HMA mix design shall conform to the provisions of this Section. The mix design process shall consist of performing California Test 367 and laboratory procedures in combinations of aggregate gradations and asphalt binder contents to determine the optimum binder content (OBC) and HMA mixture qualities. The results shall become the proposed job mix formula (JMF).

The Contractor shall submit records of aggregate quality and mix design data. Test data shall be within one year from the last test performed.

The Contractor shall submit the HMA mix design using the "COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT, CONTRACTOR JOB MIX FORMULA PROPOSAL" form to present the JMF. Formats other than the referenced form will not be accepted.

The final JMF shall be signed and stamped by a Civil Engineer registered in the State of California.

If any adjustment is made to the final JMF, a new mix design will be performed and a new JMF will be submitted.

The HMA mix design shall comply with the following requirements:

### HMA Mix Design Requirements

| Quality characteristic                                                                                                                                   | Test method | HMA Type                                                      |                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------|--------------------------------------------------------------------|
|                                                                                                                                                          |             | A                                                             | RHMA-G                                                             |
| Air void content (%)                                                                                                                                     | CT 367      | 4.0<br>5.0 for 1-inch aggregate                               | --                                                                 |
| Voids in mineral aggregate (% min.)<br>No. 4 grading<br>3/8" grading<br>1/2" grading<br>3/4" grading<br>1" grading<br>with NMAS = 1"<br>with NMAS = 3/4" | CT 367      | 17.0<br>15.0<br>14.0<br>13.0<br>13.0<br>14.0                  | --<br>18.0–23.0 <sup>a</sup><br>18.0–23.0 <sup>a</sup><br>--<br>-- |
| Voids filled with asphalt (%)<br>No. 4 grading<br>3/8" grading<br>1/2" grading<br>3/4" grading<br>1" grading                                             | CT 367      | 76.0–80.0<br>73.0–76.0<br>65.0–75.0<br>65.0–75.0<br>60.0–70.0 | Note c                                                             |
| Dust proportion<br>No. 4 and 3/8" gradings<br>1/2" and 3/4" gradings<br>1" grading                                                                       | CT 367      | 0.9–2.0<br>0.6–1.3<br>0.6–1.2                                 | Note c                                                             |
| Stabilometer value (min.) <sup>b</sup><br>No. 4 and 3/8" gradings<br>1/2" and 3/4" gradings<br>1" grading                                                | CT 366      | 30<br>37<br>37 <sup>d</sup><br>(Modified) 35 <sup>e</sup>     | --<br>23<br>--                                                     |

<sup>a</sup> Voids in mineral aggregate for RHMA-G must be within this range.

<sup>b</sup> California Test 304, Part 2.13.

<sup>c</sup> Report this value in the JMF submittal.

<sup>d</sup> Comply with California Test 366: 150 tamps at 500 psi tamping pressure and 230 °F compaction temperature; cool specimens to 140 °F; apply 12,600 lb leveling load; and perform stabilometer test at 140 °F.

<sup>e</sup> Modify California Test 366: 150 tamps at 500 psi tamping pressure and 230 °F compaction temperature; cool specimens to 140 °F; apply additional 500 tamps at 500 psi; apply 12,600 lb leveling load; and perform stabilometer test at 140 °F.

#### 39-2.01(1c) Certifications

Laboratories testing aggregate and HMA qualities used to prepare the mix design and JMF shall be qualified under the State of California Department of Transportation's Independent Assurance Program.

Before production of HMA, the HMA plant must have a current qualification under the State of California Department of Transportation's Materials Plant Quality Program.

#### 39-2.01(1d) Construction

Construction of HMA shall be in conformance with the provisions of Section 39-2.01C, "Construction" of the Standard Specifications and these Special Provisions.

#### 39-2.01(1d.1) Lift Thickness

Hot mix asphalt shall be spread and compacted in the number of layers of the thicknesses indicated in the following table:

#### Lift Thickness Requirement

| Total Thickness Shown on Plans <sup>a</sup> | Minimum No. of Layers | Top Layer Thickness (ft) |      | Next Lower Layer Thickness (ft) |      | All Other Lower Layer Thickness (ft) |      |
|---------------------------------------------|-----------------------|--------------------------|------|---------------------------------|------|--------------------------------------|------|
|                                             |                       | Min.                     | Max. | Min.                            | Max. | Min.                                 | Max. |
| 0.24-foot or less                           | 1                     | -                        | -    | -                               | -    | -                                    | -    |
| 0.25-foot                                   | 2 <sup>b</sup>        | 0.12                     | 0.13 | 0.12                            | 0.13 | -                                    | -    |
| 0.26 - 0.46 foot                            | 2                     | 0.12                     | 0.21 | 0.14                            | 0.25 | -                                    | -    |
| 0.47-foot or more                           | 3 or more             | 0.15                     | 0.21 | 0.15                            | 0.25 | 0.17                                 | 0.25 |

<sup>a</sup> When pavement reinforcing mat is shown to be placed between layers of hot mix asphalt, the thickness of hot mix asphalt above the pavement reinforcing mat shall be considered to be the "Total Thickness Shown on Plans."

<sup>b</sup> One layer of 0.25 foot thick may be placed as approved by the Engineer.

### **39-2.01(1d.2) Sampling**

The Contractor or the Contractor's representative shall provide a sampling device in the asphalt feed line connecting the plant storage tanks to the asphalt weighing system or spray bar. The sampling device shall be accessible between 24 and 30 inches above the platform. The Contractor shall provide a receptacle for flushing the sampling device.

The sampling device shall include a valve:

1. With a diameter between 1/2 and 3/4 inches;
2. Manufactured in a manner that a one-quart sample may be taken slowly at any time during plant operations;
3. Maintained in good condition.

The Contractor shall replace failed valves.

In the presence of the Engineer, the Contractor shall take 2 one-quart samples per operating day. The Contractor shall provide round friction top containers with one-quart capacity for storing samples.

### **39-2.01(1d.3) Control of Materials**

All proposed materials for use in HMA shall be furnished in conformance with the provisions of Section 6, "Control of Materials" of the Standard Specifications and this Section. All materials to be used in producing the hot mix asphalt shall be supplied from a single source for each material unless approved by the Engineer. Materials to be used in HMA will be subject to inspection and tests by the Engineer. The Contractor shall furnish without charge sample of materials as may be required.

The Contractor shall furnish the Engineer a list of the Contractor's sources of materials and the locations at which those materials will be available for inspection. The Contractor shall assure that the Engineer has free access or entry at all times to the material or production of the material to be inspected, sampled, and tested. It is understood that the inspections and tests made at any point shall, in no way, be considered as a guaranty of acceptance of the material nor continued acceptance of the material presumed to be similar to that upon which inspections and tests have been made, and that inspection and testing performed by the Engineer shall not relieve the Contractor of responsibility for quality control.

All materials which the Engineer has determined defective or do not conform to the requirements of the plans and specifications will be rejected whether in place or not. Under the provisions of this Section, the Engineer will have authority to cause the removal and replacement of rejected material and to deduct the cost thereof from any moneys due or to become due the Contractor.

### **39-2.01(1d.4) Utility Covers**

Except as otherwise provided herein, the Contractor shall adjust to finish grade any valve covers encountered within the project limits, as required, for those utility valves that are provided with slip cans and are adjustable without the replacement of part or the removal of concrete collars. In cases where the owning utility company insists upon upgrades in the standards, or when additional parts or the removal of concrete collars are required for the adjustment, said adjustment will be the responsibility of the owning utility company.

The Contractor shall lower manholes and valves when and as necessary for the protection of the traveling public during construction, and shall coordinate all work on said facilities with the owning utility companies. Final adjustment to grade will be the responsibility of the owning utility company, except as provided herein.

### **39-2.01(1d.5) Placing HMA**

Asphalt paving equipment shall be in conformance with the provisions of Section 39-2.01C(2), "Spreading and Compacting Equipment" of the Standard Specifications. Spreading and Compacting shall be in accordance with this Section and the provisions in Section 39-2.01C, "Construction" of the Standard Specifications.

When placing asphalt concrete to the lines and grades established by the Engineer, the automatic controls shall control the longitudinal grade and transverse slope of the screed. Grade and slope references shall be furnished, installed, and maintained by the Contractor. Should the Contractor elect to use a ski device, the minimum length of the ski device shall be 30 feet. The ski device shall be a rigid one piece unit and the entire length shall be utilized in activating the sensor.

When placing the initial mat of asphalt concrete on existing pavement, the end of the screed nearest the centerline shall be controlled by a sensor activated by a ski device not less than 30 feet. The end of the screed farthest from centerline shall be controlled by an automatic transverse slope device set to reproduce the cross slope designated by the Engineer, by a sensor activated by a similar ski device or as directed by the Engineer.

When paving contiguously with previously placed mats, the end of the screed adjacent to the previously placed mat shall be controlled by a sensor that responds to the grade of the previously placed mat and will reproduce the grade in the new mat within a 0.12 inch tolerance. The end of the screed farthest from the previously placed mat shall be controlled in the same way it was controlled when placing the initial mat.

Should the methods and equipment furnished by the Contractor fail to produce a layer of asphalt concrete conforming to the provisions, including straightedge tolerance, of Section 39-2.01C, "Construction" of the Standard Specifications or elsewhere in these Special Provisions, the paving operations shall be discontinued and the Contractor shall modify the equipment or methods, or furnish substitute equipment.

Should the automatic screed controls fail to operate properly during a day's work, the Contractor may manually control the spreading equipment for the remainder of that day. However, the equipment shall be corrected or replaced with alternative automatically controlled equipment conforming to the provisions in this section before starting another day's work.

### **39-2.01(1d.6) Contractor Quality Control**

#### **39-2.01(1d.6a) Quality Control Plan**

The contractor shall submit a quality control plan with the proposed HMA type and HMA mix design in accordance with Section 39-2.01A(3)(c), "Quality Control Plan" of the Standard Specifications.

#### **39-2.01(1d.6b) HMA Production**

The HMA production shall comply with the provisions of Section 39-2.01B(8) of the Standard Specification and the provisions of these Special Provisions.

#### **39-2.01(1d.6c) Quality Control Testing**

The Contractor shall perform quality control sampling and testing at the specified frequency for the quality characteristics shown in the following table:



**Quality Control Testing Requirements**

| Quality Characteristic                                                                                                                                                                                       | Test Method      | Minimum Sampling and Testing Frequency                            | HMA Type                                                      |                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------|
|                                                                                                                                                                                                              |                  |                                                                   | A                                                             | RHMA-G                           |
| Aggregate gradation <sup>a</sup>                                                                                                                                                                             | CT 202           | 1 per 750 tons and any remaining part                             | JMF $\pm$ Tolerance <sup>b</sup>                              | JMF $\pm$ Tolerance <sup>b</sup> |
| Sand equivalent (min) <sup>c</sup>                                                                                                                                                                           | CT 217           |                                                                   | 47                                                            | 47                               |
| Asphalt binder content (%)                                                                                                                                                                                   | CT 379 or CT 382 |                                                                   | JMF $\pm$ 0.45                                                | JMF $\pm$ 0.50                   |
| HMA moisture content (% , max)                                                                                                                                                                               | CT 226 or CT 370 | 1 per 1,500 tons but not less than 1 per paving day               | 1.0                                                           | 1.0                              |
| Percent of maximum theoretical density (%) <sup>d, e</sup>                                                                                                                                                   | QC plan          | 2 per day's production (min.)                                     | 91–97                                                         | 91-97                            |
| Stabilometer value (min) <sup>c, f</sup><br>No. 4 and 3/8" gradings<br>1/2" and 3/4" gradings<br>1" grading                                                                                                  | CT 366           | One per 3,000 tons or 2 per 5 business days, whichever is greater | 30<br>37<br>37                                                | 23<br>--                         |
| Air void content (%) <sup>c, g</sup>                                                                                                                                                                         | CT 367           |                                                                   | 4 $\pm$ 2<br>5 $\pm$ 2 for 1-inch aggregate                   | TV $\pm$ 2                       |
| Aggregate moisture content at continuous mixing plants and RAP moisture content at continuous mixing plants and batch mixing plants <sup>h</sup>                                                             | CT 226 or CT 370 | 2 per day during production                                       | --                                                            | --                               |
| Percent of crushed particles coarse aggregate (% , min)<br>One fractured face<br>Two fractured faces<br>Fine aggregate (% , min)<br>(Passing no. 4 sieve and retained on no. 8 sieve.)<br>One fractured face | CT 205           | As designated in the QC plan. At least once per project.          | 90<br>75 (90 for 1-inch aggregate)                            | --<br>90                         |
| Los Angeles Rattler (% , max)<br>Loss at 100 rev.<br>Loss at 500 rev.                                                                                                                                        | CT 211           |                                                                   | 12<br>45 (40 for 1-inch aggregate)                            | 12<br>40                         |
| Flat and elongated particles (% , max by weight @ 5:1)                                                                                                                                                       | CT 235           |                                                                   | Report only<br>(10 for 1-inch aggregate)                      | Report only                      |
| Fine aggregate angularity (% , min)                                                                                                                                                                          | CT 234           |                                                                   | 45                                                            | 45                               |
| Voids filled with asphalt (%) <sup>i</sup><br>No. 4 grading<br>3/8" grading<br>1/2" grading<br>3/4" grading<br>1" grading                                                                                    | CT 367           |                                                                   | 76.0–80.0<br>73.0–76.0<br>65.0–75.0<br>65.0–75.0<br>60.0–70.0 | Report only                      |

|                                                                                                                                |                                         |                             |                                                        |                                                        |
|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-----------------------------|--------------------------------------------------------|--------------------------------------------------------|
| Voids in mineral aggregate (% min) <sup>i</sup><br>No. 4 grading<br>3/8" grading<br>1/2" grading<br>3/4" grading<br>1" grading | CT 367                                  |                             | 17.0<br>15.0<br>14.0<br>13.0<br>13.0                   | 18.0-23.0 <sup>j</sup><br>18.0-23.0 <sup>j</sup>       |
| Dust proportion <sup>i</sup><br>No. 4 and 3/8" gradings<br>1/2" and 3/4" gradings<br>1" grading                                | CT 367                                  |                             | 0.9–2.0<br>0.6–1.3<br>0.6–1.3                          | Report only                                            |
| Smoothness                                                                                                                     | Special Provision<br>39-2.01<br>(1c.10) | --                          | 12-foot straight-edge, must grind, and Pl <sub>0</sub> | 12-foot straight-edge, must grind, and Pl <sub>0</sub> |
| Asphalt rubber binder viscosity @ 350 °F, centipoises                                                                          | Section 39-2.03B(3)                     | Section 39-2.03A (4)(C)(ii) | --                                                     | 1,500-4,000                                            |
| Asphalt modifier                                                                                                               | Section 39-2.03B(3)                     | Section 39-2.03A (4)(C)(ii) | --                                                     | Section 39-2.03B(3)                                    |
| CRM                                                                                                                            | Section 39-2.03B(3)                     | Section 39-2.03A (4)(C)(ii) | --                                                     | Section 39-2.03B(3)                                    |

<sup>a</sup> Determine combined aggregate gradation containing RAP under California Test 367.

<sup>b</sup> The tolerances must comply with the allowable tolerances in section 39-2.02B(4)(b) for HMA and section 39-2.03B(4)(b) for RHMA.

<sup>c</sup> Report the average of 3 tests from a single split sample.

<sup>d</sup> Required for HMA Type A and RHMA-G if the specified paved thickness is at least 0.15 foot.

<sup>e</sup> Determine maximum theoretical density (California Test 309) at the frequency specified for Test Maximum Density under California Test 375, Part 5.D.

<sup>f</sup> California Test 304, Part 2.13.

<sup>g</sup> Determine the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.

<sup>h</sup> For adjusting the plant controller at the HMA plant.

<sup>i</sup> Report only if the adjustment for the asphalt binder content TV is less than or equal to ±0.3 percent from OBC value.

<sup>j</sup> Voids in mineral aggregate for RHMA-G must be within this range.

For any single quality characteristic except smoothness, if 2 consecutive quality control test results do not comply with the action limits or specifications:

1. Stop production.
2. Notify the Engineer.
3. Take corrective action.
4. Demonstrate compliance with the specifications before resuming production and placement.

### 39-2.01(1d.6d) Density Cores

The Engineer shall test density cores to determine the percent of maximum theoretical density of the paved HMA. The Contractor shall take 4- or 6-inch diameter density cores from each 500 tons of HMA produced.

The Engineer shall determine the percent of maximum theoretical density from the average density of 3 density cores taken by the Contractor from every 500 tons of production or part thereof divided by the maximum theoretical density. The location of the density cores shall be randomly selected by the Engineer and shall be performed in the Engineer's presence. Density holes shall be backfilled and compacted with material approved by the Engineer. Density cores shall be marked with the density core's location and layer number and shall be placed in a protective container. If a density core is damaged, it shall be replaced and re-cored within 1 foot longitudinally from the original density core.

**39-2.01(1d.6e) Compaction**

Contractor shall determine the in-place density and relative compaction of HMA pavement in accordance with the procedures of California Test 375. The Contractor shall use California Test 308, Method A, in determining in-place density of each density core instead of using the nuclear gauge in Part 4, "Determining In-Place Density by the Nuclear Density Device." The Contractor shall use California Test 309 to determine the maximum theoretical density instead of calculating test maximum density in Part 5, "Determining Test Maximum Density" and shall be at the frequency specified for Test Maximum Density under California Test 375, Part 5D. Relative compaction is required for HMA, and shall be reported at various pave thicknesses as listed in the following table:

**HMA Relative Compaction Requirements**

| HMA Type           | Minimum Pave Thickness (ft) | Relative Compaction (%) |
|--------------------|-----------------------------|-------------------------|
| Type A, (3/4-inch) | 0.15                        | 91-97                   |

**39-2.01(1d.7) Acceptance Criteria**

The Engineer shall accept HMA based on compliance with the in place HMA quality requirements shown in the following table:

### HMA Acceptance In Place

| Quality characteristic                                                        |                |      |      | Test method   | HMA Type                           |                                                  |  |
|-------------------------------------------------------------------------------|----------------|------|------|---------------|------------------------------------|--------------------------------------------------|--|
|                                                                               |                |      |      |               | A                                  | RHMA-G                                           |  |
| Aggregate gradation <sup>a</sup>                                              |                |      |      | CT 202        | JMF ± tolerance <sup>c</sup>       | JMF ± tolerance <sup>c</sup>                     |  |
| Sieve                                                                         | 3/4"           | 1/2" | 3/8" |               |                                    |                                                  |  |
| 1/2"                                                                          | X <sup>b</sup> |      |      |               |                                    |                                                  |  |
| 3/8"                                                                          |                | X    |      |               |                                    |                                                  |  |
| No. 4                                                                         |                |      | X    |               |                                    |                                                  |  |
| No. 8                                                                         | X              | X    | X    |               |                                    |                                                  |  |
| No. 200                                                                       | X              | X    | X    |               |                                    |                                                  |  |
| Sand equivalent (min) <sup>d</sup>                                            |                |      |      | CT 217        | 47                                 | 47                                               |  |
| Asphalt binder content (%)                                                    |                |      |      | CT 379 or 382 | JMF ± 0.45                         | JMF ± 0.50                                       |  |
| HMA moisture content<br>(%, max)                                              |                |      |      | CT 226 or 370 | 1.0                                | 1.0                                              |  |
| Percent of maximum<br>theoretical density (%) <sup>e, f</sup>                 |                |      |      | CT 375        | 91–97                              | 91–97                                            |  |
| Stabilometer value (min) <sup>d, g</sup>                                      |                |      |      | CT 366        |                                    |                                                  |  |
| No. 4 and 3/8" gradings                                                       |                |      |      |               | 30                                 | --                                               |  |
| 1/2" and 3/4" gradings                                                        |                |      |      |               | 37                                 | 23                                               |  |
| 1" grading                                                                    |                |      |      |               | 37                                 | --                                               |  |
| Air void content (%) <sup>d, h</sup>                                          |                |      |      | CT 367        | 4 ± 2                              | TV ± 2                                           |  |
| Percent of crushed particles                                                  |                |      |      | CT 205        |                                    |                                                  |  |
| Coarse aggregate (%, min)                                                     |                |      |      |               |                                    |                                                  |  |
| One fractured face                                                            |                |      |      |               | 90                                 | --                                               |  |
| Two fractured faces                                                           |                |      |      |               | 75 (90 for 1-inch aggregate)       | 90                                               |  |
| Fine aggregate (%, min)<br>(Passing no. 4 sieve and retained on no. 8 sieve.) |                |      |      |               |                                    |                                                  |  |
| One fractured face                                                            |                |      |      |               | 70 (90 for 1-inch aggregate)       | 70                                               |  |
| Los Angeles Rattler (%, max)<br>Loss at 100 rev.<br>Loss at 500 rev.          |                |      |      | CT 211        | 12<br>45 (40 for 1-inch aggregate) | 12<br>40                                         |  |
| Fine aggregate angularity (%, min)                                            |                |      |      | CT 234        | 45                                 | 45                                               |  |
| Flat and elongated particles<br>(%, max by weight @ 5:1)                      |                |      |      | CT 235        | Report only                        | Report only                                      |  |
| Voids filled with asphalt (%) <sup>i</sup>                                    |                |      |      | CT 367        |                                    | Report only                                      |  |
| No. 4 grading                                                                 |                |      |      |               | 76.0–80.0                          |                                                  |  |
| 3/8" grading                                                                  |                |      |      |               | 73.0–76.0                          |                                                  |  |
| 1/2" grading                                                                  |                |      |      |               | 65.0–75.0                          |                                                  |  |
| 3/4" grading                                                                  |                |      |      |               | 65.0–75.0                          |                                                  |  |
| 1" grading                                                                    |                |      |      |               | 60.0–70.0                          |                                                  |  |
| Voids in mineral aggregate<br>(% min) <sup>i</sup>                            |                |      |      | CT 367        |                                    | 18.0–23.0 <sup>j</sup><br>18.0–23.0 <sup>j</sup> |  |
| No. 4 grading                                                                 |                |      |      |               | 17.0                               |                                                  |  |
| 3/8" grading                                                                  |                |      |      |               | 15.0                               |                                                  |  |
| 1/2" grading                                                                  |                |      |      |               | 14.0                               |                                                  |  |
| 3/4" grading                                                                  |                |      |      |               | 13.0                               |                                                  |  |
| 1" grading                                                                    |                |      |      |               | 13.0                               |                                                  |  |
| Dust proportion <sup>i</sup>                                                  |                |      |      | CT 367        |                                    | Report only                                      |  |
| No. 4 and 3/8" gradings                                                       |                |      |      |               | 0.9–2.0                            |                                                  |  |
| 1/2" and 3/4" gradings                                                        |                |      |      |               | 0.6–1.3                            |                                                  |  |
| 1" grading                                                                    |                |      |      |               | 0.6–1.3                            |                                                  |  |

| Smoothness            | Special Provision<br>39-2.01 (1c.10) | 12-foot straight-edge, must grind, and $PI_0$ | 12-foot straight-edge, must grind, and $PI_0$ |
|-----------------------|--------------------------------------|-----------------------------------------------|-----------------------------------------------|
| Asphalt binder        | Various                              | Section 92                                    | Section 92                                    |
| Asphalt rubber binder | Various                              | --                                            | Section 92-1.01D(2) and Section 39-2.03B(3)   |
| Asphalt modifier      | Various                              | --                                            | Section 39-2.03B(3)                           |
| CRM                   | Various                              | --                                            | Section 39-2.03B(3)                           |

<sup>a</sup> The Engineer determines combined aggregate gradations containing RAP under California Test 367.

<sup>b</sup> "X" denotes the sieves the Engineer tests for the specified aggregate gradation.

<sup>c</sup> The tolerances must comply with the allowable tolerances in section 39-2.02B(4)(b) for HMA Type A and section 39-2.03B(4)(b) for RHMA-G.

<sup>d</sup> The Engineer reports the average of 3 tests from a single split sample.

<sup>e</sup> The Engineer determines percent of maximum theoretical density if the specified paved thickness is at least 0.15 foot under California Test 375, except the Engineer uses:

1. California Test 308, Method A, to determine in-place density of each density core instead of using the nuclear gauge in Part 4, "Determining In-Place Density By The Nuclear Density Device."
2. California Test 309 to determine maximum theoretical density instead of calculating test maximum density in Part 5, "Determining Test Maximum Density."

<sup>f</sup> The Engineer determines maximum theoretical density (California Test 309) at the frequency specified for Test Maximum Density under California Test 375, Part 5.D.

<sup>g</sup> California Test 304, Part 2.13.

<sup>h</sup> The Engineer determines the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.

<sup>i</sup> Report only if the adjustment for the asphalt binder content TV is less than or equal to  $\pm 0.3$  percent from the OBC value submitted on a *Contractor Hot Mix Asphalt Design Data* form.

<sup>j</sup> Voids in mineral aggregate for RHMA-G must be within this range.

No single test result may represent more than 750 tons or 1 day's production, whichever is less.

For any single quality characteristic except smoothness, if 2 consecutive acceptance test results do not comply with the specifications:

1. Stop production.
2. Take corrective action.
3. Take samples and split each sample into 4 parts in the Engineer's presence. Test 1 part for compliance with the specifications and submit 3 parts to the Engineer. The Engineer tests 1 part for compliance with the specifications and reserves and stores 2 parts.
4. Demonstrate compliance with the specifications before resuming production and placement.

### **39-2.01(1d.8) HMA Acceptance and Payment Factor**

The Engineer shall sample for acceptance testing and test for quality characteristics as specified in these Special Provisions. Acceptance of placed HMA shall be based on a single defined lot of HMA. A lot is defined as having 1,000 tons of paved HMA, except if a quantity of HMA paved at day's end is greater than 500 tons, this quantity of paved HMA shall be considered a lot. If a quantity of HMA paved at day's end is less than 500 tons, this quantity of HMA shall be included in the previous lot's test result for payment evaluation.

For percent of maximum theoretical density, the Engineer shall determine a deduction for each lot's test result outside the specifications using the following reduced payment factors:

**Reduced Payment Factors for Percent of Maximum Theoretical Density**

| HMA Type A and<br>RHMA-G<br>percent of maximum<br>theoretical density | Reduced payment<br>factor | HMA Type A and<br>RHMA-G<br>percent of<br>maximum<br>theoretical density | Reduced<br>payment factor |
|-----------------------------------------------------------------------|---------------------------|--------------------------------------------------------------------------|---------------------------|
| 91.0                                                                  | 0.0000                    | 97.0                                                                     | 0.0000                    |
| 90.9                                                                  | 0.0125                    | 97.1                                                                     | 0.0125                    |
| 90.8                                                                  | 0.0250                    | 97.2                                                                     | 0.0250                    |
| 90.7                                                                  | 0.0375                    | 97.3                                                                     | 0.0375                    |
| 90.6                                                                  | 0.0500                    | 97.4                                                                     | 0.0500                    |
| 90.5                                                                  | 0.0625                    | 97.5                                                                     | 0.0625                    |
| 90.4                                                                  | 0.0750                    | 97.6                                                                     | 0.0750                    |
| 90.3                                                                  | 0.0875                    | 97.7                                                                     | 0.0875                    |
| 90.2                                                                  | 0.1000                    | 97.8                                                                     | 0.1000                    |
| 90.1                                                                  | 0.1125                    | 97.9                                                                     | 0.1125                    |
| 90.0                                                                  | 0.1250                    | 98.0                                                                     | 0.1250                    |
| 89.9                                                                  | 0.1375                    | 98.1                                                                     | 0.1375                    |
| 89.8                                                                  | 0.1500                    | 98.2                                                                     | 0.1500                    |
| 89.7                                                                  | 0.1625                    | 98.3                                                                     | 0.1625                    |
| 89.6                                                                  | 0.1750                    | 98.4                                                                     | 0.1750                    |
| 89.5                                                                  | 0.1875                    | 98.5                                                                     | 0.1875                    |
| 89.4                                                                  | 0.2000                    | 98.6                                                                     | 0.2000                    |
| 89.3                                                                  | 0.2125                    | 98.7                                                                     | 0.2125                    |
| 89.2                                                                  | 0.2250                    | 98.8                                                                     | 0.2250                    |
| 89.1                                                                  | 0.2375                    | 98.9                                                                     | 0.2375                    |
| 89.0                                                                  | 0.2500                    | 99.0                                                                     | 0.2500                    |
| < 89.0                                                                | Remove and<br>replace     | > 99.0                                                                   | Remove and<br>replace     |

### **39-2.01(1d.9) Smoothness**

#### **39-2.01(1d.9a) Straightedge**

The straightedge for smoothness determination on the top layer of HMA pavement shall conform to the tolerance specified in Section 36-3, "Pavement Smoothness" of the Standard Specifications.

#### **39-2.01(1d.9b) Profilograph**

In addition to the straightedge provisions in Section 36-3, "Pavement Smoothness" of the Standard Specifications, HMA concrete pavement shall conform to the surface tolerances specified in this Section, "Profilograph."

When directed by the Engineer, the uppermost layer of asphalt concrete surfacing shall be profiled in the presence of the Engineer using a California Profilograph or equivalent in conformance with California Test 526, Section 36-3, "Pavement Smoothness" of the Standard Specifications, and as specified in these Special Provisions.

The California Profilograph or equivalent will not be required for the following areas of the pavement surface but shall conform to the straightedge requirements in Section 36-3, "Pavement Smoothness" of the Standard Specifications:

1. Pavement with a total thickness less than 0.24 foot;
2. Pavement on horizontal curves with a centerline curve radius of less than 1,000 feet and the pavement within the superelevation transition on those curves;
3. Pavement placed in a single lift when required by the Special Provisions;

4. Pavement with extensive grade or cross slope correction which does not receive advance leveling operations in conformance with the provisions in Section 39-2.01C(8), "Leveling" of the Standard Specifications;
5. Pavement for ramps and connectors with steep grades and high rates of superelevation, as determined by the Engineer;
6. Shoulders and miscellaneous areas.

The Contractor shall conform to California Test 526, except a zero (null) blanking band shall be used for determining the Profile Index. Prior to beginning profiles, the profilograph shall be calibrated in the presence of the Engineer. Two profiles shall be obtained within each traffic lane, 3 feet from and parallel with the edges of the lane.

Pavements profiled shall conform to the following Profile Index requirements:

1. Pavement on tangent alignment and pavement on horizontal curves having a centerline curve radius of 2,000 feet or more shall have a Profile Index of 0.16 foot or less for each 330 feet section profiled;
2. Pavement on horizontal curves having a centerline curve radius of 1,000 feet or more but less than 2,000 feet, including the pavement within the superelevation transition of these curves, shall have a Profile Index of 0.32 foot or less for each 330 feet section profile;
3. Pavement within any 330 feet section, containing high point areas with deviations in excess of 0.025 foot in a length of 25 feet or less, when tested in conformance with the requirements in California Test 526, shall be corrected by the Contractor regardless of the Profile Index.

The Contractor shall complete initial runs of the profilograph prior to opening the pavement to public traffic. If initial profiles cannot be made prior to opening the pavement to public traffic, the initial runs of the profilograph shall be made the next day that traffic control is permitted for the area to be profiled.

Areas of the top surface of the uppermost layer of asphalt concrete pavement that do not meet the specified surface tolerances shall be brought within tolerance by abrasive grinding.

Abrasive grinding shall be performed to reduce individual deviations in excess of 0.025 foot, and to reduce the Profile Index of the pavement to be within the specified tolerance. Areas which have been subjected to abrasive grinding shall receive a seal coat. Deviations in excess of 0.025 foot which cannot be brought into specified tolerance by abrasive grinding shall be corrected by either (1) removal and replacement or (2) placing an overlay of asphalt concrete. The corrective method for each area shall be selected by the Contractor and shall be approved by the Engineer prior to beginning the corrective work. Replacement or overlay pavement not meeting the specified tolerances shall be corrected by the methods specified above. Corrective work shall be at the Contractor's expense. The Contractor shall run profilograms on the areas that have received abrasive grinding or corrective work until the final profilograms indicate the Profile Index of the area is within the specified tolerance.

When abrasive grinding is used to bring the top surface of the uppermost layer of asphalt concrete surfacing within the specified surface tolerances, additional abrasive grinding shall be performed as necessary to extend the area ground in each lateral direction so that the lateral limits of grinding are at a constant offset from, and parallel with, the nearest lane line or pavement edge, and in each longitudinal direction so that the grinding begins and ends at lines normal to the pavement centerline, within a ground area. Ground areas shall be neat rectangular areas of uniform surface appearance.

The original of the final profilograms that indicate the pavement surface is within the Profile Index specified shall become the property of the County and shall be delivered to the Engineer prior to acceptance of the contract.

The contract bid price paid per ton for Hot Mix Asphalt (HMA) for the type shown in bid proposal shall include full compensation for furnishing all labor, tools, materials, equipment, and incidentals, and for doing all the work involved including the sampling and testing of HMA quality characteristics, sampling and testing of density cores, and furnishing and applying asphaltic emulsion (paint binder/tack coat).

Full compensation for furnishing and applying asphaltic emulsion (paint binder/tack coat) shall be considered as included in the contract price paid for Asphalt Concrete.

The adjustment of frames, valve covers, grates, manholes, including initial lowering of valves and manholes when required, shall be considered as included in the contract price paid for hot mix asphalt.

**Add following to Section 39-2.01B(11)**

Construction of asphalt concrete dike shall conform to the applicable provisions in Section 39 of the Standard Specifications, in accordance to the applicable Standards Plans and details shown in the plans, these Special Provisions, and as directed by the Engineer.

Asphalt binder to be mixed with the aggregate for AC Dike and miscellaneous areas shall be PG 70-10.

Hot mix asphalt dike placed, of the different types specified on the bid items list, is measured along the completed length.

The contract unit bid price paid per linear foot for Place Hot Mix Asphalt Concrete Dike of the different types shown on the bid items list and shall include full compensation for furnishing all labor, material (other than Hot mix Asphalt Concrete), tools, and equipment and doing all the work involved in placing and compacting and no additional compensation will be allowed therefor.

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