

**OKLAHOMA DEPARTMENT OF TRANSPORTATION  
SPECIAL PROVISION  
FOR  
PLANT MIX BITUMINOUS BASES AND SURFACES (SUPERPAVE)**

These special provisions revise, amend, and where in conflict, supersede applicable sections of the 2009 Standard Specifications for Highway Construction, English and Metric.

**708.02 MINERAL AGGREGATE** (Replace Table 708:1 with the following:)

<b>Table 708:1 Physical Properties of Aggregates</b>								
<b>Test</b>	<b>Aggregates to be used in:</b>							
	<b>Superpave</b>			<b>Stone Matrix Asphalt</b>	<b>Permeable Friction Course</b>	<b>Rich Bottom Layer</b>	<b>Open Graded Friction Surface Course</b>	<b>Open Graded Bituminous Base</b>
	<b>PG64</b>	<b>PG70</b>	<b>PG76</b>	<b>PG76</b>	<b>PG76</b>	<b>PG64</b>	<b>PG76</b>	<b>PG64</b>
L.A. Abrasion <sup>a</sup> , % wear	≤ 40	≤ 40	≤ 40	≤ 30	≤ 30	≤ 40	≤ 30	≤ 40
Micro-Deval <sup>a</sup> , % wear	—	—	≤ 25	≤ 25	≤ 25	—	≤ 25	—
Sand equivalent <sup>b</sup>	≥ 40	≥ 45	≥ 50	—	—	≥ 40	—	—
Mechanically Fractured Faces <sup>b, c, h</sup> , %	≥ 85/80	≥ 95/90	≥ 98/95	≥ 98/95	≥ 98/95	≥ 85/80	≥ 98/95	≥ 85/80
Aggregate Durability Index <sup>a</sup>	≥ 40	≥ 40	≥ 40	≥ 40	≥ 40	≥ 40	≥ 40	≥ 40
Insoluble Residue <sup>d, e</sup> , %	≥ 30	≥ 40	≥ 40	≥ 40	≥ 40	—	≥ 40	—
Flat and Elongated <sup>b, c, f</sup> , %	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10
Natural Sand and Gravel <sup>b</sup> , %	≤ 15	≤ 15	≤ 15	0	0	≤ 15	0	0
Clay Balls and Friable Particles <sup>g</sup> , %	≤ 1.0	≤ 1.0	≤ 1.0	0	0	≤ 1.0	0	0
Soft Particles <sup>a</sup> , %	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5
Sticks or Roots <sup>a</sup> , %	≤ 0.5	≤ 0.5	≤ 0.5	0	0	≤ 0.5	0	0

<b>Table 708:1</b> <b>Physical Properties of Aggregates</b>
Note: For this table: PG64, PG70, and PG76 refer to the high temperature grade of the binder. Unless otherwise noted, specifications for PG binder grades higher than PG76 will use PG76 specifications.
<sup>a</sup> Applies to each source.
<sup>b</sup> Applies to the combined aggregate.
<sup>c</sup> Applies to the aggregate retained on the No. 4 [4.75 mm] sieve.
<sup>d</sup> Applies to the combined coarse aggregate.
<sup>e</sup> Applies to the coarse aggregate in the surface course. Does not apply to shoulders, driveways, and temporary detours.
<sup>f</sup> A flat and elongated piece has a length greater than five times the thickness.
<sup>g</sup> Applies to combined aggregate. If the maximum for the combined aggregate is not exceeded, the Department will allow 1.5% for one source.
<sup>h</sup> In the mechanically fractured faces requirement format “xx/yy,” “xx” is the minimum percentage of coarse aggregate requiring one fractured face, and “yy” is the percentage requiring two fractured faces.

#### **708.04 COMPOSITION OF MIXTURES**

##### **A. Asphalt Mix Design and Initial Job-Mix Formula** *(Replace the 3<sup>rd</sup> paragraph with the following:)*

Ensure the initial JMF is in accordance with Tables 708:6, 708:8, and 708:9, or Tables 708:7, 708:8, and 708:9 for the type of mix required by the Contract. Prepare a trial mixture in accordance with Subsection 411.04.C. Propose changes to the JMF if the trial, prepared at the initial JMF proportions, fails to meet the requirements of Tables 708:6, 708:10, 708:11, and 708:12, or Tables 708:7, 708:10, 708:11, and 708:12. If the changes do not produce a mix design in accordance with these tables, the Resident Engineer will require a new mix design. If the changes do produce a mix design in accordance with these tables, the Department’s Materials Engineer will approve the changes for adjustment of the JMF.

##### **B. Plant Produced Mixtures** *(Replace the 1<sup>st</sup> and 2<sup>nd</sup> paragraphs with the following:)*

Provide a uniform, plant produced mixture of the combined aggregate and asphalt in accordance with Tables 708:6, 708:10, and 708:11, or Tables 708:7, 708:10, and 708:11 within the specification limits established by the JMF with allowable tolerances.

After the plant is in operation, propose any necessary adjustments to the JMF in accordance with Table 708:6 or Table 708:7. If test results indicate the adjustments are in accordance with Tables 708:10 and 708:11, adjust the JMF accordingly.

**C. Reclaimed Asphalt Pavement** (*Replace the 2<sup>nd</sup> paragraph with the following:*)

Regardless of the layer or binder type, the Department’s Materials Engineer will accept superpave mixtures with no greater than 25 percent RAP for shoulders, driveways, and layers serving as a bond breaker under PCC pavements if the mixture meets the Contract requirements for the type or grade. Superpave mixtures containing up to 35 percent RAP will be accepted in temporary detours if the mixture meets the Contract requirements for the type or grade, and if the mixture can be produced meeting air quality standards set forth by the Oklahoma Department of Environmental Quality. Temporary is defined as any material that will not become part of any permanent pavement. Temporary material must be removed before the end of the project.

(*Replace Table 708:6 with the following:*)

<b>Table 708:6</b>					
<b>Mixtures for Superpave</b>					
<b>Sieve Size <sup>a</sup></b>	<b>Percent Passing per Superpave Mixture Type</b>				
	<b>S2</b>	<b>S3</b>	<b>S4</b>	<b>S5</b>	<b>S6</b>
1½ in [37.5 mm]	100	—	—	—	—
1 in [25.0 mm]	90 – 100	100	—	—	—
¾ in [19.0 mm]	≤ 90	90 – 100	100	—	—
½ in [12.5 mm]	—	≤ 90	90 – 100	100	—
⅜ in [9.5 mm]	—	—	≤ 90	90 – 100	100
No. 4 [4.75 mm]	≥ 40	—	—	≤ 90	80 – 100
No. 8 [2.36 mm]	29 – 45	31 – 49	34 – 58	37 – 67	54 – 90
No. 16 [1.18 mm]	—	—	—	—	—
No. 30 [0.600 mm]	—	—	—	—	—
No. 50 [0.300 mm]	—	—	—	—	—
No. 100 [0.150 mm]	—	—	—	—	—
No. 200 [0.075 mm]	1.0 – 7.0 <sup>b</sup>	2.0 – 8.0 <sup>b</sup>	2.0 – 10.0 <sup>b</sup>	2.0 – 10.0 <sup>b</sup>	5.0 – 15.0
<b>Other Mixture Requirements</b>					
NMS <sup>c</sup>	1 in [25 mm]	¾ in [19 mm]	½ in [12.5 mm]	⅜ in [9.5 mm]	No. 4 [4.75 mm]
Asphalt Cement <sup>d</sup> , % of mix mass	≥ 3.9	≥ 4.3	≥ 4.8	≥ 5.3	≥ 5.8
Performance grade asphalt cement	e	e	e	e	e
<sup>a</sup> Table 708:6 reflects the sieve size boundaries for design and JMF purposes. After the design is established, the JMF will designate combined aggregate sieve requirements with tolerances in Table 708:12.					
<sup>b</sup> Ensure the ratio of the percent passing the No. 200 [75 µm] sieve to the percent effective asphalt cement is from 0.6 to 1.6.					
<sup>c</sup> Nominal Maximum Size (NMS) is defined as one size larger than the first sieve to retain more than 10 percent.					
<sup>d</sup> The Department’s Materials Engineer may adjust the lower limit if the effective specific gravity of the combined aggregates is greater than 2.65. The Department’s Materials Engineer may allow adjustments if a theoretical lab molded specimen at the JMF asphalt content meets the VMA requirement at 4% air voids.					
<sup>e</sup> The Contractor may substitute a higher grade of asphalt than that shown on the Plans at no additional cost to the Department.					

(Replace Table 708:8 with the following:)

<b>Table 708:8</b>						
<b>Mix Design Properties of Laboratory Molded Specimens</b>						
<b>Property</b>	<b>Superpave</b>			<b>SMA</b>	<b>PFC</b>	<b>RBL</b>
	<b>PG64</b>	<b>PG70</b>	<b>PG76</b>	<b>PG76</b>	<b>PG76</b>	<b>PG64</b>
Number of SGC Gyration						
$N_{ini}$	6	7	8	—	—	—
$N_{des}$	50	65	80	50	50	50
Required Density, % of $G_{mm}$						
$N_{ini}$	85.5 – 91.5	85.5 – 90.5	85.5 – 89.0	—	—	—
$N_{des}$	96.0	96.0	96.0	96.0	≤ 82.0	98.0
VMA, %	See Table 708:9					
VFA, %	See Table 708:9					
Lab Permeability, $cm/s \times 10^{-5}$	≤ 12.5	≤ 12.5	≤ 12.5	≤ 12.5	—	≤ 12.5
TSR, Min.	0.80	0.80	0.80	0.80	—	0.80
ITS <sup>a</sup> , psi	—	—	≥ 75	—	—	—
Draindown, %	—	—	—	≤ 0.20	≤ 0.20	—
Hamburg Rut Test, Min. No. of Cycles to 12.50 mm, 122 °F	10,000	15,000	20,000	20,000	—	5,000
Note: For this table: PG64, PG70, and PG76 refer to the high temperature grade of the binder. Unless otherwise noted, specifications for PG binder grades higher than PG76 will use PG76 specifications.						
<sup>a</sup> Indirect Tensile Strength from AASHTO T 283, preconditioned specimen average, in psi.						

(Replace Table 708:9 with the following:)

<b>Table 708:9</b>								
<b>Mix Design Properties of Laboratory Molded Specimens</b>								
<b>Property</b>	<b>Superpave</b>					<b>SMA</b>	<b>PFC</b>	<b>RBL</b>
	<b>S2</b>	<b>S3</b>	<b>S4</b>	<b>S5</b>	<b>S6</b>			
VMA <sup>a</sup> , %	≥ 12.5	≥ 13.5	≥ 14.5	≥ 15.5	≥ 16.5	≥ 17.0	—	≥ 14.0
VFA <sup>b</sup> , %	67 - 73	70 - 75	72 - 77	73 - 78	75 - 79	—	—	—
<sup>a</sup> VMA is based on the bulk specific gravity of the aggregates.								
<sup>b</sup> VFA is defined as the percentage of VMA containing asphalt binder.								

(Replace Table 708:10 with the following:)

<b>Table 708:10</b>						
<b>Field Properties of Laboratory Molded Specimens</b>						
<b>Property</b>	<b>Superpave</b>			<b>SMA</b>	<b>PFC</b>	<b>RBL</b>
	<b>PG64</b>	<b>PG70</b>	<b>PG76</b>	<b>PG76</b>	<b>PG76</b>	<b>PG64</b>
Number of SGC Gyration						
$N_{ini}$	6	7	8	—	—	—
$N_{des}$	50	65	80	50	50	50
Required Density, % of $G_{mm}$						
$N_{ini}$	85.5 – 91.5	85.5 – 90.5	85.5 – 89.0	—	—	—
$N_{des}$	94.5 - 97.4	94.5 - 97.4	94.5 - 97.4	94.5 - 97.4	≤ 82.0	96.5 - 99.4
VMA, %	See Table 708:11					
VFA, %	See Table 708:11					
Lab Permeability, $cm/s \times 10^{-5}$	—	—	—	—	—	—
TSR, Min.	0.75	0.75	0.75	0.75	—	0.75
ITS <sup>a</sup> , psi	—	—	—	—	—	—
Draindown, %	—	—	—	—	—	—
Hamburg Rut Test, Min. No. of Cycles to 12.50 mm, 122 °F	—	—	—	—	—	—
Note: For this table: PG64, PG70, and PG76 refer to the high temperature grade of the binder. Unless otherwise noted, specifications for PG binder grades higher than PG76 will use PG76 specifications.						
<sup>a</sup> Indirect Tensile Strength from AASHTO T 283, preconditioned specimen average, in psi.						

(Add the following:)

<b>Table 708:11</b>								
<b>Field Properties of Laboratory Molded Specimens</b>								
<b>Property</b>	<b>Superpave</b>					<b>SMA</b>	<b>PFC</b>	<b>RBL</b>
	<b>S2</b>	<b>S3</b>	<b>S4</b>	<b>S5</b>	<b>S6</b>			
VMA <sup>a</sup> , %	≥ 12.0	≥ 13.0	≥ 14.0	≥ 15.0	≥ 16.0	≥ 16.5	—	≥ 13.5
VFA <sup>b</sup> , %	—	—	—	—	—	—	—	—
<sup>a</sup> VMA is based on the bulk specific gravity of the aggregates. Compute a new bulk specific gravity from each AASHTO T 209 test. Calculate the value by multiplying the aggregate Effective Specific Gravity ( $G_{se}$ ) calculated from the latest AASHTO T 209 test by the aggregate Bulk Specific Gravity ( $G_{sb}$ ) from the design. Afterwards, divide the product by the aggregate $G_{se}$ from the design.								
<sup>b</sup> VFA is defined as the percentage of VMA containing asphalt binder.								

**708.06 SAMPLING AND TESTING**

*(Delete the following row from Table 708:13 under the “Aggregates” section:)*

Uncompacted void content of fine aggregate	AASHTO T 304, Method A
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*(Delete the following row to Table 708:13 under the “Bituminous Mixtures” section :)*

Rutting susceptibility using the asphalt pavement analyzer	OHD L-43
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*(Add the following row to Table 708:13 under the “Bituminous Mixtures” section :)*

Rutting susceptibility using the Hamburg Rut Tester	OHD L-55
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