

401-R-701 QC/QA HMA PAVEMENT

(Revised 12-19-19)

The Standard Specifications are revised as follows:

SECTION 401, BEGIN LINE 68, DELETE AND INSERT AS FOLLOWS:

The single percentage of aggregate passing each required sieve shall be within the limits of the following gradation tables:

Sieve Size	Dense Graded, Mixture Designation – Control Point (Percent Passing)				
	25.0 mm	19.0 mm	12.5 mm	9.5 mm	4.75 mm**
50.0 mm					
37.5 mm	100.0				
25.0 mm	90.0 - 100.0	100.0			
19.0 mm	< 90.0	90.0 - 100.0	100.0		
12.5 mm		< 90.0	90.0 - 100.0	100.0	100.0
9.5 mm			< 90.0	90.0 - 100.0	95.0 - 100.0
4.75 mm				< 90.0	90.0 - 100.0
2.36 mm	19.0 - 45.0	23.0 - 49.0	28.0 - 58.0	32.0 - 67.0*	
1.18 mm					30.0 - 55.0
600 µm					
300 µm					
75 µm	1.0 - 7.0	2.0 - 8.0	2.0 - 10.0	2.0 - 10.0	3.0 - 8.0

\* The mix design gradation shall be less than or equal to the PCS control point 58.0% passing the 2.36 mm sieve for all 9.5 mm surface mixtures. The mix design gradation can be greater than the PCS control point 58.0% passing the 2.36 mm sieve when used on non-Department maintained facilities.

\*\* The total blended aggregate gradation for the 4.75 mm mixture shall have a fineness modulus greater than or equal to 3.30 as determined in accordance with AASHTO T 27.

PCS Control Point for Mixture Designation (Percent Passing)					
Mixture Designation	25.0 mm	19.0 mm	12.5 mm	9.5 mm	4.75 mm
Primary Control Sieve	4.75 mm	4.75 mm	2.36 mm	2.36 mm	n/a
PCS Control Point	40	47	39	47	n/a

Sieve Size	Open Graded, Mixture Designation – Control Point (Percent Passing)		
	OG9.5 mm	OG19.0 mm	OG25.0 mm
37.5 mm			100.0
25.0 mm		100.0	70.0 – 98.0
19.0 mm		70.0 – 98.0	50.0 – 85.0
12.5 mm	100.0	40.0 – 68.0	28.0 – 62.0
9.5 mm	75.0 – 100.0	20.0 – 52.0	15.0 – 50.0
4.75 mm	10.0 – 35.0	10.0 – 30.0	6.0 – 30.0
2.36 mm	0.0 – 15.0	7.0 – 23.0	7.0 – 23.0
1.18 mm		2.0 – 18.0	2.0 – 18.0
600 µm		1.0 – 13.0	1.0 – 13.0
300 µm		0.0 – 10.0	0.0 – 10.0

150 $\mu$ m		0.0 – 9.0	0.0 – 9.0
75 $\mu$ m	0 – 6.0	0.0 – 8.0	0.0 – 8.0
% of Binder	> 3.0	> 3.0	> 3.0

Dust/Calculated Effective Binder Ratio shall be 0.6 to 1.4. The Dust/Calculated Effective Binder Ratio for 4.75 mm mixtures shall be 1.0 to 2.0.

The optimum binder content shall produce a  $\Delta P_b \leq 0.20$  as determined in accordance with ITM 591 and the following air voids at  $N_{des}$ :

Air Voids at Optimum Binder Content								
	Dense Graded					Open Graded		
Mixture Designation	25.0 mm	19.0 mm	12.5 mm	9.5 mm	4.75 mm	25.0 mm	19.0 mm	9.5 mm
Air Voids	5.0%	5.0%	5.0%	5.0%	5.0%	15.0% - 20.0%	<del>10.0</del> 12.0%	<del>15.0</del> 17.0%

SECTION 401, BEGIN LINE 132, DELETE AND INSERT AS FOLLOWS:

VOIDS FILLED WITH ASPHALT, VFA, CRITERIA @ $N_{des}$	
ESAL	VFA, %
< 3,000,000	60 – 73
3,000,000 to < 10,000,000	60 – 70
$\geq$ 10,000,000	60 – 70

Notes:

1. For 4.75 mm mixtures, the specified VFA range shall be 67% to 79%.
2. For 9.5 mm mixtures, the specified VFA range shall be ~~68~~69% to ~~71~~72% for design traffic levels  $\geq$  3,000,000 ESALs.
3. For 25.0 mm mixtures, the specified lower limit of the VFA shall be 62% for design traffic levels < 300,000 ESALs.
4. For OG mixtures, VFA is not applicable.

SECTION 401, BEGIN LINE 360, DELETE AND INSERT AS FOLLOWS:

Rubblized concrete pavements shall be primed in accordance with 405. PCCP, milled asphalt surfaces, and ~~asphalt surfaces~~ *new and existing asphalt surfaces* shall be tacked in accordance with 406. Contact surfaces of curbing, gutters, manholes, and other structures shall be tacked in accordance with 406.

SECTION 401, BEGIN LINE 381, INSERT AS FOLLOWS:

#### **401.14 Spreading and Finishing**

The mixture shall be placed upon an approved surface by means of laydown equipment in accordance with 409.03(c). Prior to paving, both the planned quantity and lay rate shall be adjusted by multiplying by the MAF. When mixture is produced from more than one DMF for a given pay item, the MAF will be applied to the applicable portion of the mixture for each. The temperature of each mixture at the time of spreading shall be less than 315°F whenever PG 64-22 or PG 70-22 binders are used or not more than 325°F whenever PG 76-22 binder is used. *No mixture shall be placed on a previously paved course that has not cooled to below 175°F. For mixtures compacted in accordance with 402.15, the temperature of each mixture at the time of spreading shall not be less than 245°F.*

SECTION 401, BEGIN LINE 412, DELETE AND INSERT AS FOLLOWS:

The finished thickness of any course shall be at least two times but not more than ~~four~~ five times the maximum particle size as shown on the DMF, except 4.75 mm mixtures shall be at least 1.5 times but not more than 3 times the maximum particle size shown on the DMF.

SECTION 401, BEGIN LINE 737, INSERT AS FOLLOWS:

If the SCPF for an *open graded* subplot is less than 0.85 or the volume of effective binder is greater than 3.0% above design minimums, the subplot will be referred to the Office of Materials Management for adjudication as a failed material in accordance with 105.03.

SECTION 401, BEGIN LINE 749, DELETE AND INSERT AS FOLLOWS:

Air Voids		
Dense Graded	Open Graded	Pay Factor
Deviation from Spec ( $\pm\%$ )	Deviation** ( $\pm\%$ )	
$\leq 0.5$	$\leq 3.0$	1.05
$> 0.5$ and $\leq 1.7$	$> 3.0$ and $\leq 4.0$	1.00
	4.1	0.98
1.8	4.2	0.96
	4.3	0.94
	4.4	0.92
1.9	4.5	0.90
2.0	4.6	0.84
	4.7	0.78
	4.8	0.72
	4.9	0.66
	5.0	0.60
$> 2.0$	$> 5.0$	Submitted to the Office of Materials Management*

\* Test results will be considered and adjudicated as a failed material in accordance with normal Department practice as listed in 105.03.  
 \*\* Deviation shall be from 17.5% for OG25.0 mm and OG19.0 mm mixtures and shall be from ~~12.5~~14.5% for OG9.5 mm mixtures.