

EFFECT OF WATER ON COHESION OF COMPACTED ASPHALT MIXTURES

1. SCOPE: This method covers the measurement of the change in resistance to plastic flow (Marshall stability) resulting from the action of water on compacted asphalt mixtures. Obtain a numerical index of retained resistance to plastic flow by comparing the resistance to plastic flow of specimens determined by the Marshall procedure, AASHTO T 245, Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus, with that of specimens that have been immersed in water under prescribed conditions.
2. APPARATUS:
 - 2.1. Provide a water bath conforming to AASHTO T 245.
 - 2.2. Flat, glass transfer plates: Provide one plate to keep under each test specimen during the immersion period, and during handling except when testing, in order to prevent breakage or distortion of the specimens.
 - 2.3. Provide a Marshall recording-test press conforming to AASHTO T 245.
 - 2.4. Provide calipers capable of measuring up to 6 in. to the nearest 0.01 in.
3. SPECIMENS:
 - 3.1. Prepare specimens 4 inches in diameter according to AASHTO T 245, except that the number of blows shall be such to provide specimens with 7.0 ± 1.0 percent voids in the compacted mix.
 - 3.2. For open-graded friction course (OGFC), use a mix temperature as determined by Kentucky Method (KM) 64-424, Method for Designing Open-Graded Friction Course Mixtures, for that mixture and a compactive effort of 35 blows on one side only.
 - 3.3. Control specimens: For each test, prepare three control specimens.
 - 3.4. Test specimens: For each combination to be tested, prepare three specimens.
4. PROCEDURE:
 - 4.1. Measure, and record, the height of all specimens to the nearest 0.01 in.
 - 4.2. Immerse the specimens in a water bath maintained at the temperature indicated in the following table, and allow the specimens to remain for the indicated duration.

MIXTURE TYPE	TEMPERATURE OF WATER BATH (°F)	DURATION OF IMMERSION
(TEST SPECIMENS)		
Sand Asphalt	140	24 hours
OGFC	120	96 hours
(CONTROL SPECIMENS)		
Sand Asphalt	140	30 minutes
OGFC	120	30 minutes

4.3. Remove the specimens from the bath at the end of the specified immersion period, and test them for resistance to plastic flow according to AASHTO T 245.

4.4. Correct the stability of each specimen by applying the correlation ratios, for the applicable specimen height, in Table 1 of AASHTO T 245.

5. CALCULATION: Calculate the numerical index of the resistance, R_r , of the asphalt mixture to the effect of water as the percentage of the original resistance to plastic flow that is retained after the immersion period as follows:

$$R_r = 100 (S_2/S_1),$$

where: S_2 = average of the maximum load in lb_f of the three test specimens; and
 S_1 = average of the maximum load in lb_f of the three control specimens.

6. REPORT: Report R_r to the nearest percent. Consider values less than 70 percent unsatisfactory.

APPROVED

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DATE

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