CRD-C 652-95

Standard Test Method for Measurement of Reduction in Marshall Stability of Bituminous Mixtures Caused by Immersion in Water*

1. Scope.

1.1 This test method is intended to measure the reduction in Marshall stability resulting from the action of water on compacted bituminous mixtures. A numerical index of retained stability is obtained by comparing the stability of specimens determined in accordance with Marshall procedures (CRD-C 649) with the stability of specimens that have been immersed in water for a period of 24 hours. This method is based in part on ASTM D 1075, "Standard Method of Test for Effect of Water on Cohesion of Compacted Bituminous Mixtures."

2. Apparatus.

2.1 A water bath at least 6 in. deep provided with mechanical water agitator, heating elements, and thermostatic controls capable of maintaining the bath water at temperatures ranging from 100 to 140 °F. The bath shall have a perforated false bottom or be equipped with a shelf for supporting specimens 2 in. (50 mm) above the bottom of the bath.

2.2 Balance and water container with accessory equipment for weighing the test specimens in air and in water.

2.3 Transfer plates, flat, of glass or metal. One of these plates shall be kept under each test specimen during immersion and subsequent handling, except when weighing and testing, in order to prevent breakage or distortion of the specimens.

3. Specimens.

3.1 A minimum of eight standard Marshall test specimens, 4 in. in diameter and 2.5 in. ± 0.125 in. in height, shall be prepared for each test in accordance with the procedures described in method 100. The compaction effort used shall be as specified in CRD-C 649.

4. Procedure.

4.1 Weigh each test specimen in air and in water.

4.2 Calculate the specific gravity of each test specimen as follows:

$$Specific\ gravity = \frac{A}{A - B}$$

where

A = mass of specimen in air, g

B = mass of specimen in water, g

4.3 Sort the test specimens into two groups so that the average specific gravity of the specimens in group 1 is essentially the same as that of group 2.

4.4 Test the specimens in group 1 for Marshall stability and flow as described in CRD-C 649.

4.5 Immerse the group 2 specimens in water for 24 h at the temperatures specified in the following tabulation:

Type bituminous material	Marshall stability test water temperature
Asphalt	140 ± 1 °F
Tar	100 ± 1 °F

4.6 Test group 2 specimens immediately upon removal from the water for stability and flow as described in CRD-C 649.

5. Calculation.

5.1 The numerical index of resistance of bituminous mixtures to the detrimental effect of water shall be expressed as a percentage of the original stability as follows:

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* Formerly MIL-STD-620A, Method 104, 13 January 1966

Index of retained stability $= \dfrac{S_2}{S_1}$ x 100

where

S_1 = Marshall stability of group 1 (average)

S_2 = Marshall stability of group 2 (average)