

A Guide to **TEST PROCEDURES FOR LARGE AGGREGATE ASPHALT MIXES BY MODIFIED MARSHALL TEST**

While increased traffic loadings make it all the more essential that larger stone mixes are available for their inherent strengths, standard Marshall type test apparatus does not provide for the testing of 28mm and above nominal size asphalt mixes. The following procedures using modified Marshall apparatus, with a larger sample mould and mechanical compaction, are being adopted overseas and will shortly be published as an American Standard Test Method (ASTM). The test is appropriate for mixes with aggregate sizes from 26.5mm to 53.6mm.

Equipment

Specimen mould assembly shall have an inside diameter of 152.4 ± 0.2 mm by 114.3mm in height with base plates and extension collars to suit.

Mechanical compactor shall have a motor with a minimum size of 250W with a chain lift frame and automatic sliding weight release with the hammer having a flat face of 149.4mm in diameter weighing 10.21 ± 0.01 kg with a free fall of 457.2 ± 2.5 mm.

Specimen extractor, compaction pedestal, specimen mould holder, breaking head, loading jack, ring dynamometer assembly and flowmeter of the appropriate size are detailed in the draft ASTM.

Sample Preparation

Approximately 4.050kg of mix is placed in the mould in two approximately equal increments, with spading after each increment.

The number of blows required to reach the equivalent compaction levels for the approximately 150mm diameter by 95mm high specimen size is $1\frac{1}{2}$ times the number of blows needed for the standard Marshall specimen (100mm x 63.5mm).

Test Procedure

Loading is applied to the test specimen at the rate used in a standard Marshall test (51mm/min.) with a maximum loading time of 30 seconds after removal

of the specimen from the hot bath.

For specimens with a thickness that varies from 95.2mm the load to be applied is varied by a table in the draft ASTM.

Interpretation of Results

Data has been obtained on the relationship of stability and flow value of 150mm and 100mm specimens from various agencies and these results analysed to determine average stability and flow ratios.

It is recommended that the minimum stability requirements for 150mm specimens should be 2.25 times the requirements for 100mm specimens and that the range of flow values of 150mm specimens be adjusted to $1\frac{1}{2}$ times the values required for 100mm specimens.

Further Information

Complete details of the test method and a comprehensive specification of the test equipment are available if required. Requests should be directed to the AAPA Federal Technical Committee or to AAPA's Head Office (see below).

Reference

1. Kandhal, P, "Large Stone Asphalt Mixes: Design and Construction". Paper presented to the Association of Asphalt Paving Technologists, February 1990.