1. SCOPE

This test method provides a procedure for determining the relative stability (Stabilometer Value) of an asphalt mix by measuring the transmitted horizontal pressure developed in a compacted test specimen under a given vertical pressure. This value indicates the ability of the pavement to resist plastic deformation under the action of traffic.

2. APPARATUS AND MATERIALS

2.1. Equipment Required

2.1.1. Stabilometer

The Hveem stabilometer is a triaxial device consisting essentially of a rubber sleeve within a metal cylinder containing a liquid which registers the horizontal pressure developed by a compacted test specimen as a vertical load is applied.

2.1.2. Testing Machine

The Central Lab uses the California Bearing Ratio (C.B.R.) machine to perform the stabilometer test on Marshall compacted specimens. This machine has a loading capacity of 60,000 lbs compression which loads from the bottom.

2.1.3. Oven

An oven capable of maintaining a temperature of 60 ± 3^{o} C.

2.1.4. Calibration Cylinder

A hollow metal cylinder 102 ± 0.013 mm in outside diameter by 140 mm high (for calibration purposes).

2.1.5. Rubber Bulb

For introducing air into the stabilometer.

2.1.6. Measuring Device

A device for measuring the height of the specimen to the nearest 0.3 mm (0.01 inches).

2.1.7. Follower

One solid wall metal follower 101.2 mm in diameter by 140 mm high.

2.1.8. Miscellaneous Apparatus

Balance of 5 kg capacity and sensitive to 1.0 g, metal pans of various sizes, thermometers, trowels, spatulas, scoops, gloves and beakers.

3. PROCEDURE

3.1. Equipment Preparation

Adjust the bronze nut on the stabilometer stage base (if base is of the adjustment type) so that the top of the stage is 3 1/2 inches below the bottom of the upper tapered ring. Perform all tests at this stage setting.

Adjust the testing machine so that the platen or head moves at a rate of 0.05 inches per minute when no load is being applied. This adjustment is performed with the stabilometer and stage base on the platen if the testing machine applies the load from the lower platen. Hydraulic testing machines must be run several minutes before the oil warms up sufficiently to maintain a constant speed.

Place the standard metal specimen (preheated to 60 $\pm$ 3^{o} C) in place in the stabilometer. Seat it firmly on the stage and by holding it in palce with either the hand or a confing load of 100 pounds in the testing machine, turn the pump to a pressure of exactly 5 psi. Adjust the turns indicator dial to zero. Turn the pump handle at an approximate rate of two turns persecond until the stabilometer dial reads 100 psi. The turns indicator dial shall read 2.00 $\pm$ .05 turns. If it does not, the air in the cell must be adjusted. Remove or add air by means of the valve and the rubber bulb and repeat the displacement measurement after each air change until the proper number of turns is obtained. Release the horizontal pressure and remove the standard metal specimen.

3.2. Sample Preparation

Test specimens at 60 ± 3° C. If desirable to test with moisture present in the mixture, however, test at room temperature.

3.3. Test Procedure

Transfer the test specimen from oven to the stabilometer. Make sure that the specimen goes into the stabilometer straight and is firmly seated level on the base.

Place the follower on top of the specimen and adjust the pump to give a horizontal pressure of 5 psi (the 5 psi pressure should be exact as a deviation of as little as 1 psi has considerable effect on the final value).

Start movement of testing machine platen or head at a speed of 0.05 inches per minute and record the horizontal pressures (stabilometer gauge readings) when the vertical loads are 3000, 5000 (400 psi) and 6000 lbs.

Stop the vertical loading exactly at 6000 lbs and immediately reduce the load to 1000 ± 100 lbs. Turn the displacement pump so that the horizontal pressure is reduced to exactly 5 psi. This will result in a further reduction in the vertical load which is normal and for which no compensation is necessary. Set the turns displacement indicator dial to zero. Turn the pump handle at approximately two turns per second until the stabilometer gauge reads 100 psi. During this operation the vertical load registered on the testing machine will increase and in some cass exceed the initial 1000 lb load. As before, these changes in testing machine loading are characteristic and no adjustment or compensation is required.

4. RESULTS AND CALCULATIONS

4.1. Collection of Test Results

Record the number of turns indicated on the dial as the displacement of a the specimen. The turns indicator dial reads in 0.001 in., and each 0.1 in. is equal to one turn. Thus, a reading of 0.250 in. indicates that 2.50 turns were made with the displacement pump. This measurement is known as turns displacement of the specimen.

4.2. Calculations

Calculate the stabilometer values using the formula as follows:

$S = 22.2/[(P_hD_2/(P_v-P_h))+.222]$

Where: P_v = vertical pressure (typically 400 psi)
P_h = horizontal pressure for corresponding P_v (P_h taken at the instant P_v is 400 psi)
D_2 = displacement of specimen

4.3. Reporting Results

Report the results of the stabilometer test as the numerical value obtained as shown under "Calculations". This value represents the relative resistance to lateral deformation on a scale ranging from 0 to 100.

5. CALIBRATIONS, CORRECTIONS, REPEATABILITY

5.1. Calibrations

Refer to section 3.1

5.2. Corrections

See attached chart for correcting Stabilometer Values to specimen height.

5.3. Precision

The precision of this method has not yet been determined (ASTM).

6. ADDED INFORMATION

6.1. References

STP 204-8, Preparation of Marshall Compaction Specimens.

California Department of Transportation Standards, Test 366, Method of Test for Stabilometer Value

6.2. Precautions

Every effort should be made to fabricate test specimens having an over all height between 6.1 cm and 6.6 cm, however, if for some reason this is not possible, the stabilometer value should be corrected as indicated on the attached chart.

Adhere strictly to the temperature control requirements.

Frequent calibration of the stabilometer should be made during the day as temperature change has considerable effect upon the pressure exerted within the hydraulic system.

Close adherence to the 5 psi initial horizontal pressure is necessary for accurate test results.

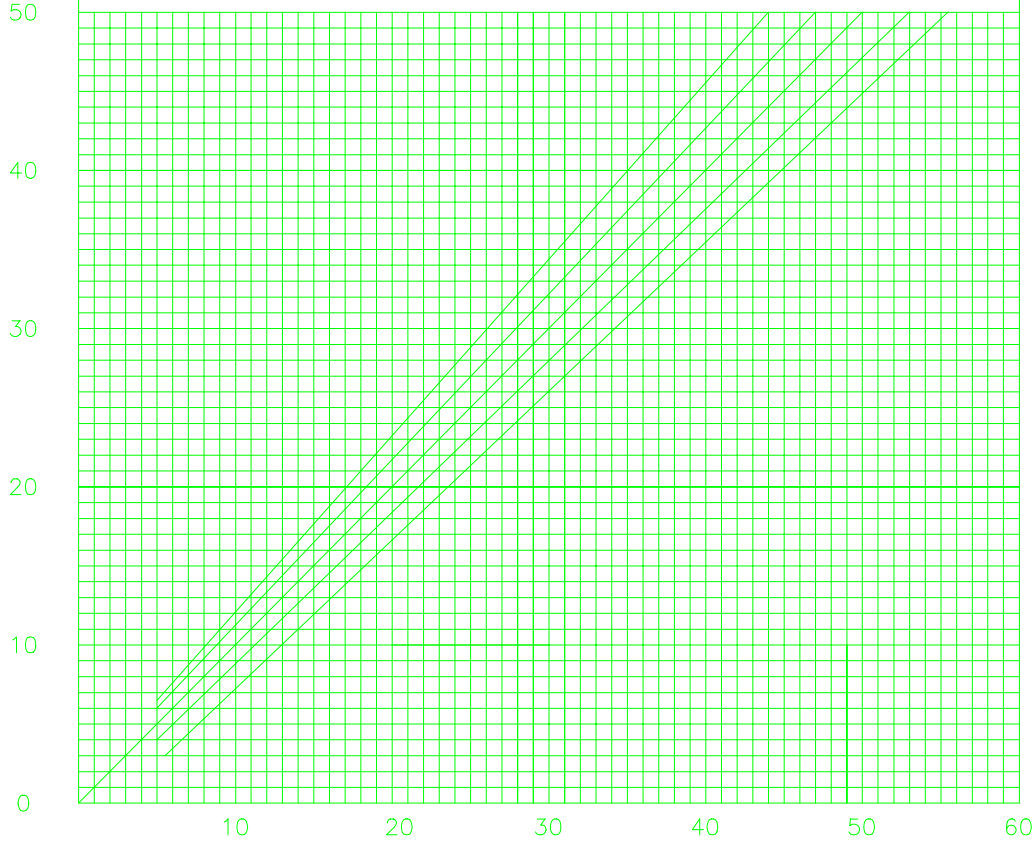
When setting the 5 psi horizontal pressure, always drop below 5 psi and then bring the pressure back up to 5 psi and gently tap the dial to remove any slack in the dial indicator gear.

CHART FOR CORRECTING STABILOMETRE VALUES
TO SPECIMEN HEIGHT OF 2.50" (64mm)

Height correction should be made using the table and below chart

Example: Overall height of 2.74" (69mm) select correction curve "B". Stabilometre value uncorrected = 35
Stabilometre value corrected = 38

Overall Specimen Ht.	Correction curve
2.80" to 3.00" (71mm to 76mm)	A
2.60" to 2.79" (66mm to 70mm)	B
2.40" to 2.59" (61mm to 65mm)	C
2.20" to 2.39" (56mm to 60mm)	D
2.00" to 2.19" (51mm to 55mm)	E



Stabilometre Value Before Height Correction

Fig.9 Chart Correcting Stabilometre Values to Specimen Height of 2.5 (64mm)

APPROVAL SHEET

New __ Revision X Date of Previous Document 90-05-10

Effective Date: 92-04-11

Description of Revision (Reason for Revision):

- Removal of reference to California Kneading compactor from test procedure. Specifications are for Marshall compacted briquettes.

Review/Implementation Process:
Lab Supervisors Committee

Other Manuals/Policies Affected:
Nil

Follow Up/Training Required:
Nil

Comments/Concerns/Implications (Budget/Environment/Stakeholders):

Prepared and Recommended by D. MacLeod — 92-04-07 Date

Approval Recommended by R.A. Widger — 92-04-08 Date

Approval Recommended by A.R. Gerbrandt — 92-04-09 Date
Dir., Technical Standards & Policies Br.

Approved by D.G. Metz — 92-04-11 Date
Assistant Deputy Minister, Infrastructure

Electronic File Updated 92-04-30
Update Mailed - -