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**OHD L-16  
METHOD OF TEST FOR  
RESISTANCE TO DEFORMATION OF BITUMINOUS MIXTURES  
BY MEANS OF THE HVEEM STABILOMETER**

I. **SCOPE.** This method of test covers the procedure for determining the resistance to deformation of compacted bituminous mixtures by measuring the lateral pressure developed from applying a vertical load by means of the Hveem stabilometer.

II. **APPARATUS.** The apparatus shall consist of the following:

- A. **Oven**, capable of maintaining a temperature of  $140^{\circ} \pm 5^{\circ} \text{ F}$  ( $60^{\circ} \pm 2^{\circ} \text{ C}$ ).
- B. **Hveem Stabilometer**, with adjustable stage.
- C. **Rubber Bulb**, for introducing air into stabilometer.
- D. **Initial Displacement Cylinder.**
- E. **Load Transfer Ram.**
- F. **Measuring Device**, dial indicator assembly for determining the rate of travel of testing machine. Dial indicator graduated in increments of 0.001 inch (0.02 mm) or 0.01 inch (0.2 mm).
- G. **Stopwatch.**
- H. **Testing Machine**, 10,000 pound (4536 Kg) capacity minimum.

III. **TEST SPECIMENS.** Test specimens shall be prepared according to Method of Compacting Bituminous Mixtures for Stabilometer Value (OHD L-8).

Test specimens shall be placed in the  $140^{\circ} \pm 5^{\circ} \text{ F}$  ( $60^{\circ} \pm 2^{\circ} \text{ C}$ ) oven for a minimum of 15 hours prior to testing.

IV. **ADJUSTMENT TO STABILOMETER.**

- A. Refer to Method No. California 902 for details on the mechanics of the Hveem Stabilometer including its operations, calibration and the installation of the Neoprene Diaphragm.
- B. Adjust the bronze nut on the base of the stabilometer so that the top of the stabilometer base is  $3 \frac{1}{2}$  inches (8.89 cm) below the bottom of the metal ring in the top of the stabilometer shell. Secure stabilometer shell to base by tightening the set screw (finger tight).

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- C. Place initial displacement cylinder in the stabilometer. Turn the pump to a pressure of exactly 5 psi (34.5 KPa). Tap the stabilometer dial lightly with the fingers in order to be sure needle is resting on 5 psi (34.5 KPa) pressure. Adjust the turns indicator dial to zero. Turn pump handle at approximately two turns per second until the stabilometer reads 100 psi (689.5 KPa). The turns indicator dial should then read  $2.00 \pm 0.05$  turns. If it does not, the air in the cell must be adjusted by means of the rubber bulb, and the displacement measurement must be repeated after each air change until the proper number of turns is obtained. Release horizontal and vertical pressures and remove brass dummy specimen. The stabilometer is now ready for testing specimens.
- D. Adjust testing machine to give a constant movement of 0.05 inch per minute with no load applied. The hydraulic machines must be run several minutes before oil warms sufficiently to maintain a constant speed.

V. **PROCEDURE.**

- A. Test specimens at  $140^{\circ} \pm 5^{\circ}$  F ( $60^{\circ} \pm 2^{\circ}$  C).
- B. Place the test specimen in the stabilometer. Make sure the specimen is firmly seated level on the base.
- C. Place load transfer ram on top of specimen and adjust pump to give a horizontal pressure of 5 psi (34.5 KPa). (The 5 psi (34.5 KPa) pressure should be exact as a deviation of only 1 pound has considerable effect on the final value.)
- D. Start vertical movement of testing machine base at speed of 0.05 inch (1.27 mm) per minute and record the stabilometer gauge readings when the vertical pressures are 500 lbs (226.8 Kg), 1,000 lbs (453.6 Kg), 2,000 lbs (907.2 Kg), 3,000 lbs (1360.8 Kg), 4,000 lbs (1814.4 Kg), 5,000 lbs (2268 Kg) and 6,000 lbs (2721.6 Kg) total load.
- E. Stop vertical loading exactly at 6,000 lbs (2721.6 Kg) and immediately reduce the load to 1,000 lbs (453.6 Kg).

Turn displacement pump so that the horizontal pressure is reduced to exactly 5 psi (34.5 KPa). This will result in a further reduction in the vertical load reading which is normal and for which no compensation is made. Set the turns displacement indicator dial to zero. Turn pump handle at approximately two turns per second until stabilometer gauge reads 100 psi (689.5 KPa).

During this operation, the vertical load registered on the testing machine will increase and in some cases, exceed the initial 1,000 lbs (453.6 Kg) load. As before, these changes in testing machine loading are characteristic and no adjustment or compensation is required.

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

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- H. After completion of testing, clean the diaphragm of shell with a rag lightly moistened with solvent and heavily powder the diaphragm with talc before storing the stabilometer.

VI. **CALCULATIONS.** Calculation of Stabilometer values:

$$S = \frac{22.2}{[(Ph \times D)/(Pv - Ph)] + 0.222}$$

Where:

S	=	Hveem Stability Value
Pv	=	Vertical Pressure (typically 400 psi (2758 KPa))
Ph	=	Horizontal Pressure (stabilometer reading in psi) (Ph taken at the instant Pv is 400 psi (2758 KPa))
D	=	Displacement on Specimen.

**NOTE:** The Hveem Stability Value must be corrected for specimen height. Use Chart A to correct the Hveem Stability Value for all mixes except Bituminous Base Fine Aggregate Type. Use Chart B to correct the Hveem Stability Value for Bituminous Base Fine Aggregate Type.

- VII. **REPORTING.** Report the results of the stabilometer test as the numerical value obtained as shown under Section VI, Calculations. This value represents the relative resistance to lateral deformation on a scale ranging from 0 for liquids to 100 for a solid.

**NOTE:** Bring the specimen to room temperature in the case where it is desired to test with whatever moisture may be present in the mixture. The report should indicate that the test was performed at room temperature.

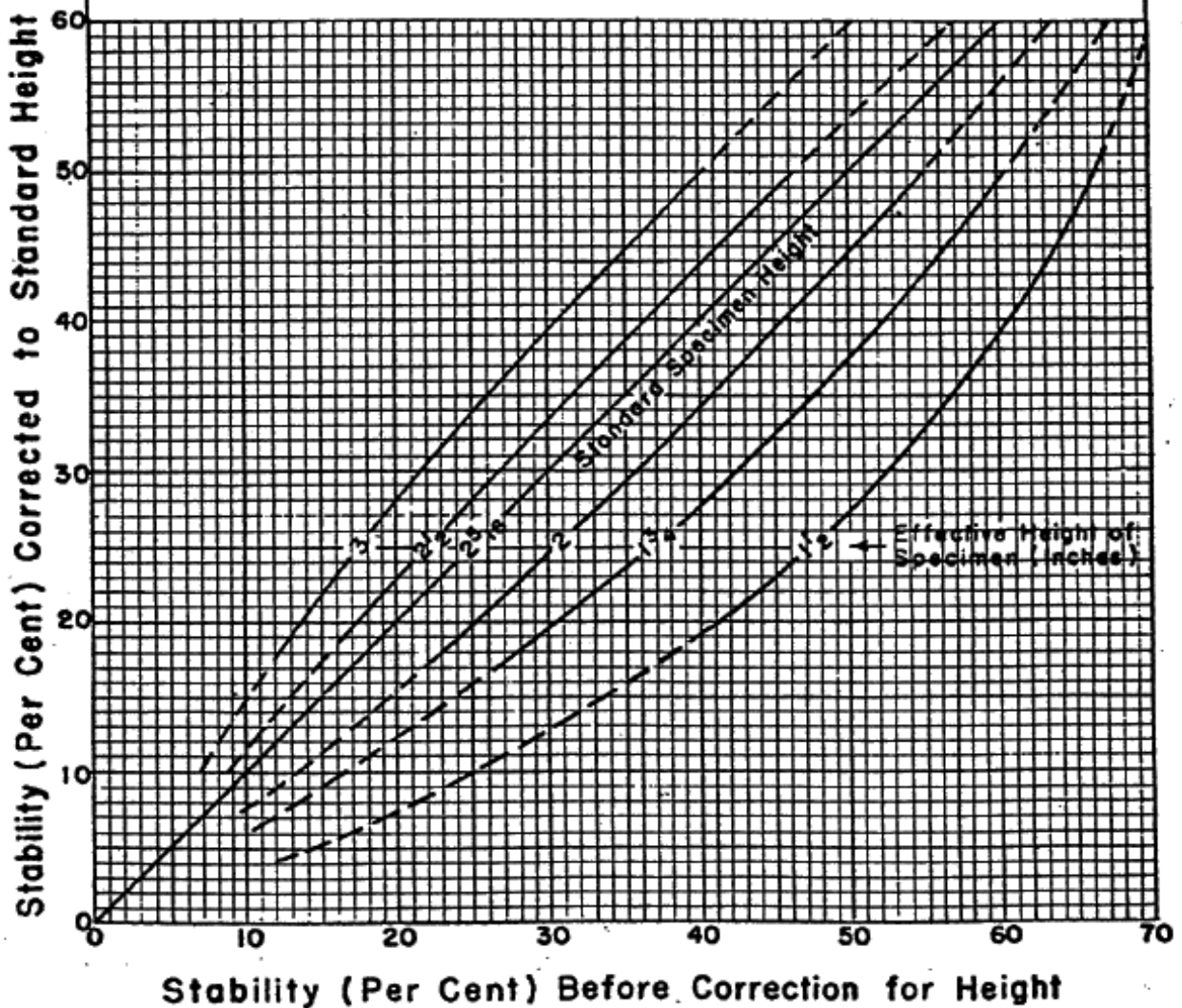
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CHART A

CHART FOR CORRECTING HVEEM STABILOMETER VALUES TO STANDARD SPECIMEN HEIGHT OF 2 5/16 "

To Use Chart

1. Determine per cent stability and locate on lower margin of this chart.
2. Follow line upward to curve representing actual height of specimen used.
3. On left margin read the " Per Cent Stability " corrected to the equivalent of a standard height specimen.





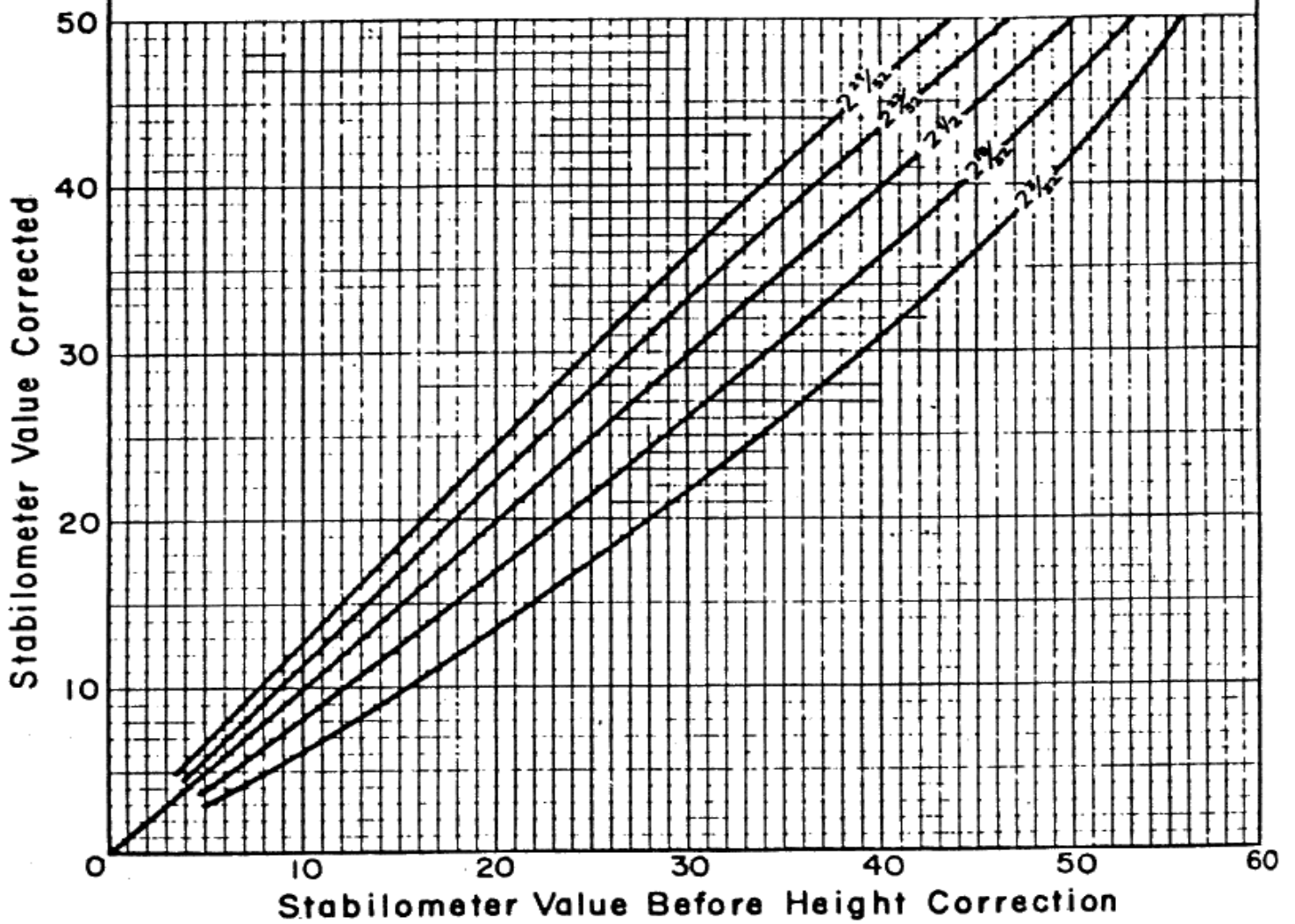
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**CHART B**

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

Height correction should be made using  
the table and chart below.



**Chart for Correcting Stabilometer Values to Specimen Height of 2.5 in. (64 mm).**