

Softening point test of bitumen- Step by Step Procedure and Significance

What is Softening point of bitumen?

The softening point is the temperature at which the bitumen attains a particular degree of softening under specified conditions of the test. The Softening point test of bitumen sample is carried out in the Ring and Ball test apparatus.

Apparatus required

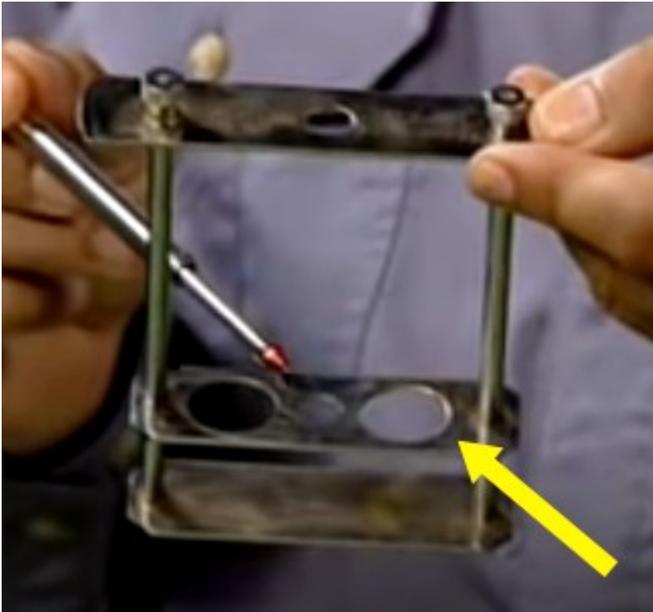
1) Brass ring & Steel ball

It consist of a metal frame having three plate and hole at the top of the plate for insertion of thermometer to measure temperature.

The middle plate has two large hole for placing of ring ball and a small hole at the middle of plate.

The lower plate of metal frame doesn't have any hole.

The distance between top surface of bottom plate and lower surface of middle plate is 25 millimeter.



2) A cylindrical ring is tapered in shape. The diameter of the top ring is 17.5 millimeter and its height is 6.4 millimeters.



Cylindrical ring

3) The centering guide has three pins such that they form an imaginary circle if diameter slightly larger than 7.5 millimeters to enable movement of steel ball.

The centering guide and the ring re fit with each other and place on the metal frame.



Centering guide

4) The steel ball has diameter 7.5 millimetre and its weight is 3.5 gram.



Steel Ball

5) Heat resistance beaker of capacity 600 ml.

6) A thermometer having a range of more than 120 degrees centigrade and accuracy not less than 0.5 centigrade.

6) Heat regulator

Procedure Softening point test of bitumen

At first the sample of bitumen is heated above 70 degree centigrade to 100 degree centigrade above the softening point.

Now take glass plate and prepare a mix of glycerin and Dexedrine.

Apply this mixture to the surface of glass to prevent bitumen from sticking.

Now, put the both ring on the glass surface and pour full of bitumen into it.

Allow it to cool for 30 minute in air.

The excess bitumen from ring should be removed from upper portion of the ring.

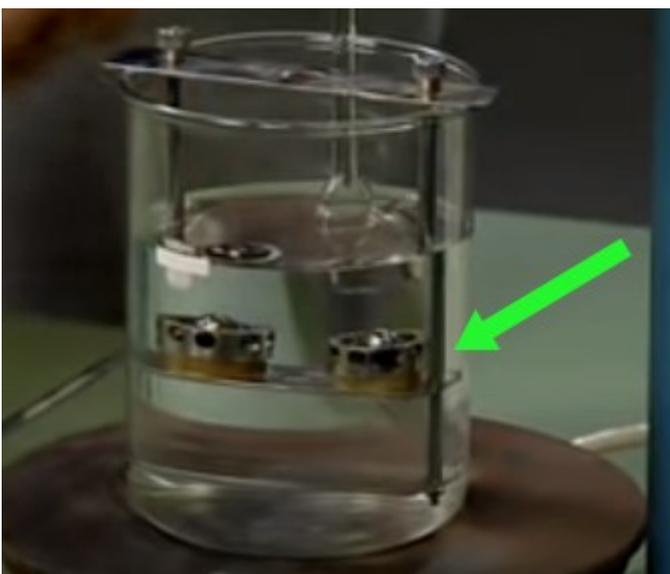
After that put distilled water in the beaker at a temperature of 5 degree centigrade. The beaker is filled in beaker such that the surface is about 50 millimetre above the specimen.

Now assemble the ring and ball guide and place it on the middle plate of metallic frame.

Now, place the frame in water and leave it for 15 minutes.

After 15 minutes take steel ball which are previously cooled at the tempreture at 5 degree centigrade and placed on the top of the ball guide.

Again place the whole assembly on the heating plate.



After that it is again heated at a rate of 50 C per minute till the bitumen softens & touches the bottom of the metal plate placed at a specified distance below the ring.

Note down the temperature when the ball along with bitumen just touches the lower plate.

Take individual data of temperature for both ball individually.

The difference between centigrade the two readings should not exceed 1-degree centigrade for temperature ranges 40 degrees centigrade to 60 degrees centigrade.

and 1.5 degrees centigrade for temperature ranges 60 degrees centigrade to 80 degrees centigrade. otherwise tests should be repeated.

Hence, The average value of the two temperatures of both balls is the softening point of bitumen.

So, in this way Softening point test of bitumen is performed.

IS 73 has specified different criteria so, code should be followed before application of bitumen for specified load.

Report of test

Temperature for ball (A) = 46 degree centigrade.

Temperature for ball (B) = 47 degree centigrade.

Softening point of bitumen = $(A + B)/2 = (46 + 47)/2 = 46.5$ degree centigrade.

Significance of Softening point test of bitumen

The softening point of bitumen used in the pavement construction varies between 35° to 70°. It indicates how susceptible the bitumen with respect to the variation of temperature.

Bitumen of the same penetration value with a higher softening point is less susceptible to temperature than of that same grade bitumen having less softening point.

Read Also,

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