PROCEDURE FOR THE VERIFICATION OF THE ROTATIONAL VISCOSITY TEST APPARATUS AASHTO TP 48

A. PURPOSE

This procedure is intended to give instructions for the checking of the equipment used to perform the Rotational Viscosity Test.

B. APPARATUS REQUIRED

1. Thin wire temperature probe and meter, shall be NIST certified as one complete unit, shall have a range form 60 to 200 °C and readable to 0.1 °C
2. Balance, with a capacity of 2000 grams and readable to 0.1 gram
3. Timer, readable to the nearest 0.1 seconds.
4. Cylindrical spindles, various sizes for measurement of different viscosities.
5. Oven, capable of maintaining any desire temperature setting from room temperature to 260 °C to within ± 3 °C.
6. Proportional temperature controller, capable of maintaining the specimen temperatures ± 0.1 °C for the test temperatures ranging from 60 to 165 °C or greater.
7. Reference fluid (Newtonian fluid), of known viscosity at various temperatures. The reference fluid shall be certified to be Newtonian in behavior over the full range of expected test temperatures and shear rates. The viscosity measured should be within ± 2 percent or the rotary transducer required recalibration.
8. Sample holders, capable of holding required amount of reference fluid.

C. PROCEDURE

1. Assemble the rotational viscometer per the manufacturer's instructions. Rotational viscometer and temperature controller unit shall each be leveled using leveling bubble and adjustable feet.
2. Turn on the rotational viscometer and proportional temperature controller unit.
3. Preheat the sample holders with the sample chamber and selected cylindrical spindle at 135 °C.
4. Set the proportional temperature controller to 135 °C.
5. Heat the reference fluid only until it is fluid enough to pour. Do not overheat fluid.
6. When the proportional temperature controller reads the desired test temperature, remove one sample holder and add the required amount of fluid (based on manufacturer's recommendation) into the sample chamber.
7. Insert the sample chamber into proportional temperature controller unit.
8. Insert a preheated spindle and attach to the viscometer using necessary coupling, Gently lower the spindle into the reference fluid so that asphalt covers the upper conical portion of the spindle.
9. Bring the reference fluid to the desired temperature within approximately thirty minutes and allow it to equilibrate at 135 °C for 10 minutes.
10. Set the viscometer speed at 20 rpm and display the read viscosity in Pascal seconds (Pa•s). If the observed torque is out of range for the selected spindle and speed, change

the spindle and or speed based on the manufacturer's recommendations for the anticipated viscosity. Restart the test with a new sample.

11. After the reference fluid has reached the specified temperature and equilibrated, start the test.
12. Insert the thin wire probe in the sample changer on top of the conical portion of the spindle.
13. Measure the temperature of the sample until the reading stabilize.
14. Record the set temperature, actual temperature and measured temperature.
15. If needed, re-adjust the temperature to achieve a measured temperature of 135 °C.
16. Repeat Steps 13, 14, and 15 until the temperature is achieved.
17. Once the temperature is accurately set, remove the sample holder.
18. Repeat Steps 6-11.
19. Measure and record the viscosity at one minute intervals for a total of three minutes.
20. Average the viscosity readings.
21. Multiply the viscosity in centipoise by 0.001 to obtain the viscosity in Pa•s.
22. The measured viscosity should be within ± 2 percent or the rotary transducer requires recalibration.

D. TOLERANCE

Rotational viscometer shall meet the physical requirements specified in AASHTO TP 48.