Method to determine viscosity of crude tall oil

Scope

This method covers the determination of viscosity of crude tall oil using a Brookfield viscometer. Viscosity values are useful for sizing pumps in commercial tall oil plants.

NOTE 1: Special adapters for ultra low viscosities or small samples are also available from Brookfield.

Apparatus

1. Brookfield Viscometer - Digital or dial reading models, as listed below, are available from Brookfield Engineering Laboratories, 240 Cushing Street, Stoughton, MA 02072.
2. Beaker, 600-mL.
3. Constant temperature water bath.
4. Thermometer (range as desired).

Reagents

Standard oils, calibrated in absolute viscosity, centipoise - available from Brookfield Engineering Laboratories or Cannon Instrument Company, P. 0. Box 16, State College, PA 16801. The oils have a shelf life of about 1 year.

Procedure

This method assumes the user has the manufacturer's operating instructions and is familiar with the operation of the instrument.

1. Select the proper spindle for the viscosity range expected and attach it to the shaft.
2. Level the viscometer.
3. Fill a 600-mL beaker with the sample to be tested. The sample should be held at the desired temperature in a thermostatted water bath and the viscosity determination should be completed as rapidly as possible if that temperature is above room temperature. Immerse the spindle in the sample to the indentation in the neck of the spindle.
4. Turn on viscometer and select *speed* which will give a reading between 10 and 90.
5. After obtaining three consistent readings about 1 minute apart, take readings and measure the temperature of the material.
6. A viscosity/temperature curve can be made as a hot sample cools. Readings from the viscometer and temperature readings must be recorded at the same time.

Calculation

Viscosity, cP (centipoises) = reading x factor.

NOTE 2: The factor is supplied with the viscometer and is dependent on the spindle used and its speed (rpm).

Report

Report the viscosity as centipoise to nearest 10 cP and the temperature, for example, 3470 cP at 50°C. Also include the spindle number and speed in the report.

Reference

ASTM D2196'Rheological Properties of non-Newtonian Materials, by Rotational (Brookfield), Viscometer"

		Low Viscosity		Medium Viscosity		High Viscosity	
Dial Reading Models	LVF	LVT	RVF	RVT	HAT	HBT	
			LVDV-I		RVDV-I	HADV-4	
Models		LVDV-44		RVDV-11	HADV-44	HBDV-II	
No. of Speeds		4	8	4	8	8	8
No. of Spindles		4	4	7	7	7	7
Min. Viscosity (centipoise)		15	15	100	100	200	800
Max Viscosity (centpoise)		100M	2MM	2MM	8MM	16MM	64MM

(M=1000; MM=1,000,000)