INTERNATIONAL STANDARD 2123

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Sodium and potassium silicates for industrial use — Determination of dynamic viscosity

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FOREWORD

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Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

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Austria	India	Spain
Belgium	Israel	Switzerland
Chile	Italy	Thailand
Czechoslovakia	Netherlands	Turkey
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Germany	Portugal	U.S.S.R.
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INTERNATIONAL STANDARD ISO 2123-1972 (E)

Sodium and potassium silicates for industrial use — Determination of dynamic viscosity

1 SCOPE

This International Standard specifies a method for the determination of the dynamic viscosity of sodium or potassium silicates for industrial use, using a rotary viscometer.

2 FIELD OF APPLICATION

This method is applicable to liquid sodium or potassium silicates, the dynamic viscosity of which lies between 10 and 80 000 mN·s/m^2 *.

3 PRINCIPLE

Determination of the dynamic viscosity at 20 ± 0.2 °C by measuring the couple required to overcome the resistance exercised by the viscous liquid on an immersed element rotating within it at a constant selected speed without causing a vortex.

NOTE — If it is noted that the results obtained at different speeds of the immersed element are in agreement, the fluid is Newtonian and the viscosity determined can be considered as its true dynamic viscosity. If the opposite is noted, the fluid is non-Newtonian and the viscosity determined is an apparent dynamic viscosity.

4 APPARATUS

Ordinary laboratory apparatus and

4.1 Rotary viscometer, consisting of a thermostatically controlled vessel into which an element or rotor, that can be driven by a synchronous electric motor, is immersed up to a certain level in the liquid under examination. This immersed element must be designed so as not to cause the formation of vortices during rotation (generally the immersed element is a perfectly polished cylinder).

A spring makes it possible to measure the couple exercised by the resistance of the fluid on the immersed element.

The degree of winding of the spring is proportional to the viscosity of the fluid for a certain speed and rotor; an integral pointer indicates this degree on a dial.

This viscometer should have several interchangeable rotors and the motor must be capable of driving the rotor at several definite speeds of rotation in order that dynamic viscosities of 10 to 80 000 mN·s/m^2 * may be measured.

4.2 Thermostat capable of maintaining a temperature of 20 ± 0.2 °C in the viscometer (4.1).

4.3 Thermometer, making it possible to read 20 ± 0.2 °C.

5 PROCEDURE

5.1 Test portion

The sample should contain no solid matter in suspension. Take a volume sufficient to fill the vessel of the viscometer, containing the selected rotor, up to the guide mark on the latter.

5.2 Verifying the apparatus

Verify the viscometer periodically with the aid of standard oil of certified viscosity or secondary standard oils, for example, liquid paraffin stored under an atmosphere of nitrogen.

5.3 Determination

First bring the sample to 20 ± 0.2 °C measured by the thermometer (4.3). Switch on the thermostat (4.2) and set it at this temperature.

Pour the test portion (5.1) into the viscometer vessel (4.1), avoiding the formation of air bubbles.

Immerse the rotor, previously selected according to the expected viscosity of the product, taking care to see that the liquid is level with the guide mark on the axis. Follow any particular directions or warnings given by the manufacturer. It is suggested that the liquid be covered with a layer of mineral oil after the rotor has been immersed, to prevent evaporation and skin formation.

Operate the rotor at the selected speed.

Allow the needle to become stable, lock it if necessary and take a reading from the dial of the apparatus.

* i.e. 10 to 80 000 centipoises (cP).
1 N·s/m^2 (SI unit) = 1 Poiseuille (Pl) = 10 poise (P) in the CGS system.

For each sample, carry out two determinations, the results of which should not deviate from their mean value by more than 5 % of that value.

6 EXPRESSION OF RESULTS

Dynamic viscosity, expressed in millinewton seconds per square metre*, is given by the following formula :

$$a \times c$$

where

a is the number of degrees read on the dial of the apparatus (mean value of two measurements deviating by less than 5 % from such mean value);

c is the coefficient by which it is necessary to multiply this number of degrees in order to convert it to millinewton seconds per square metre ($mN \cdot s/m^2$)*.

This coefficient, dependent on the rotor used and the speed selected, is given in a table supplied with the apparatus.

7 TEST REPORT

The test report shall include the following particulars :

a) the reference of the method, the type of apparatus and the procedure used;

b) the results and the method of expression used;

c) any unusual features noted during the determination;

d) any operation not included in this International Standard or regarded as optional.

* See footnote on page 1.