INTERNATIONAL STANDARD 1233

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Plastics — Determination of viscosity number of methyl methacrylate polymers and copolymers in dilute solution

Matières plastiques — Détermination de l'indice de viscosité des polymères et copolymères du méthacrylate de méthyle en solution diluée

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

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.

International Standard ISO 1233 (originally draft International Standard ISO/DIS 824) was drawn up by Technical Committee ISO/TC 61, *Plastics*, and circulated to the Member Bodies in August 1969.

It has been approved by the Member Bodies of the following countries :

Belgium	Italy	Sweden
Canada	Japan	Switzerland
France	Netherlands	Turkey
Germany	New Zealand	United Kingdom
Greece	Poland	U.S.A.
Hungary	Romania	U.S.S.R.
Israel	South Africa, Rep. of	

No Member Body expressed disapproval of the document.

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Plastics — Determination of viscosity number of methyl methacrylate polymers and copolymers in dilute solution

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for determining the viscosity number of poly(methyl methacrylate), or copolymers in which the principal ingredient is methyl methacrylate, in dilute solution in chloroform.

NOTE — For the definition of viscosity number, and for other terms, definitions and formulae, see ISO/R 1628, *Plastics — Directives for the standardization of methods for the determination of the dilute solution viscosity of polymers.*

2 PRINCIPLE

The times of flow of the solvent and a solution of resin are measured at 25 °C by conventional methods. The concentration of resin has to be chosen such that the ratio of the time of flow of the solution to the time of flow of the solvent is at least 1,2 and less than 1,4. The viscosity number is calculated from these measurements and from the known concentration of the solution. Density difference and kinetic energy errors are small in this method and corrections are not applied.

3 SOLVENT

Redistilled chloroform, the fraction distilling between 60,5 and 61,5 °C at a pressure of 1 013 mbar (760 mmHg) collected in a brown bottle and stored in the dark.

4 APPARATUS

4.1 Volumetric flask, 100 ml with ground glass stopper.

4.2 Sintered glass filter funnel, with 40 μm maximum pore diameter.

4.3 Thermostatic bath, maintained at 25 ± 0,05 °C.

4.4 Viscometer, suspended level Ubbelohde type, of which the essential dimensions are as shown in the figure.[1)]

4.5 Analytical balance, to weigh to an accuracy of 0,000 1 g.

4.6 Stop-watch, reading to the nearest 0,1 s.

5 PROCEDURE

5.1 Clean the viscometer (4.4) before it is used, and after discordant readings and at intervals during regular use. Use a mixture of equal volumes of concentrated sulphuric acid and a saturated solution of potassium dichromate in water.

Rinse it with water followed by acetone and dry it by drawing through it a stream of air free from dust. Between successive satisfactory determinations, wash the viscometer with acetone and dry as described.

5.2 Weigh a quantity of resin between 0,2 and 0,3 g to the nearest 0,000 1 g and transfer it quantitatively to the volumetric flask (4.1). Add approximately 60 ml of solvent, taking care to avoid the formation of lumps, and insert the stopper.

For routine determinations and for the estimation of the proper concentration, shake the mixture gently until the resin has dissolved completely. The mixture may be warmed slightly to hasten solution. For reference determinations, shake the mixture gently until the resin has dissolved completely, then allow the solution to stand 16 ± 0,5 h. By means of thermostatic control, maintain the temperature of the solution at 25 ± 0,05 °C and add solvent at 25 ± 0,05 °C until the volume of the solution is exactly 100 ml.

The viscometric measurement should yield a flow time of the solution 20 to 40 % higher than the flow time of the solvent. If this requirement is not met at the initially chosen concentration of resin, the concentration has to be changed accordingly.

1) In some cases, viscometer dimensions other than those given in the figure would be required to avoid shear rate effects. These dimensions shall then be stated explicitly in the test report. These dimensions shall permit the operating conditions prescribed in ISO/R 1628 to be respected.