SLOVENSKI STANDARD
SIST ISO 1628-2:1996

01-junij-1996

Polimerni materiali - Določanje viskoznostnega števila in mejnega viskoznostnega števila - 2. del: Polivinilklorid

Plastics -- Determination of viscosity number and limiting viscosity number -- Part 2: Poly (vinyl chloride) resins

Plastiques -- Détermination de l'indice de viscosité et de l'indice limite de viscosité -- Partie 2: Résines de poly(chlorure de vinyle)

Ta slovenski standard je istoveten z: **ISO 1628-2:1988**

ICS:

83.080.20 Plastomeri Thermoplastic materials

SIST ISO 1628-2:1996 **en**

INTERNATIONAL STANDARD

ISO 1628-2

First edition
1988-12-15

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
ORGANISATION INTERNATIONALE DE NORMALISATION
МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Plastics — Determination of viscosity number and limiting viscosity number —

Part 2 : Poly(vinyl chloride) resins

Plastiques — Détermination de l'indice de viscosité et de l'indice limite de viscosité —

Partie 2 : Résines de poly(chlorure de vinyle)

Reference number
ISO 1628-2 : 1988 (E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 1628-2 was prepared by Technical Committee ISO/TC 61, *Plastics*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

ISO 1628 consists of the following parts, under the general title *Plastics — Determination of viscosity number and limiting viscosity number* [1]:

- *Part 1: General conditions*
- *Part 2: Poly(vinyl chloride) resins*
- *Part 3: Polyethylenes and polypropylenes*
- *Part 4: Polycarbonate (PC) moulding and extrusion materials*
- *Part 5: Poly(alkylene terephthalates)*
- *Part 6: Methyl methacrylate polymers*

1) The general title of ISO 1628-1 is *Guidelines for the standardization of methods for the determination of viscosity number and limiting viscosity number of polymers in dilute solution*.

Plastics — Determination of viscosity number and limiting viscosity number —

Part 2 : Poly(vinyl chloride) resins

1 Scope and field of application

This part of ISO 1628 defines particular conditions for the determination of the viscosity number of PVC resins. It applies to homopolymers of vinyl chloride and copolymers in which the main constituent is vinyl chloride. Limiting viscosity number is not applied to PVC resins.

2 References

ISO 1628-1, *Plastics — Guidelines for the standardization of methods for the determination of viscosity number and limiting viscosity number of polymers in dilute solution — Part 1: General conditions.*

ISO 3105, *Glass capillary kinematic viscometers — Specification and operating instructions.*

3 Definitions and units

Definitions and units are described in ISO 1628-1, clause 3 and, in particular, sub-clause 3.2.3 for the viscosity number.

4 Measurements

The efflux times of the solvent and solution are measured by means of a capillary tube viscometer. Measurements are described in ISO 1628-1, clause 4.

When the viscometer meets the capillary diameter specifications of sub-clause 5.1, the kinetic energy correction may be neglected.

5 Apparatus

5.1 Viscometer, suspended level Ubbelohde type, with a capillary diameter of 0,58 or 0,73 mm (±2 %). Other dimensions of the viscometer are given in ISO 1628-1, sub-clause 5.1.

NOTES

1 Consideration of the kinematic viscosity of the solvent (6.1) and of table 1 of ISO 1628-1 lead to the choice of a viscometer with a capillary diameter of 0,73 mm. However, capillaries of 0,58 mm are equally acceptable, as tests have shown that this range of capillaries does not significantly influence the viscosity number of PVC.

2 Another viscometer listed in ISO 3105 may be used provided that it gives results equivalent to those of the specified viscometer, which shall be used for reference. If the viscometer used gives efflux times shorter than those of the reference viscometer, it should be calibrated by comparison with the results obtained with the reference viscometer, in order to take into account the correction for kinetic energy. (See annex B of ISO 1628-1.)

5.2 Dilution flask, either a 50 ml graduated flask (one-mark volumetric flask), or a 150 ml flat-bottomed flask and 50 ml pipette for solution preparation (see 6.4).

5.3 Filter funnel, with fritted glass filter disc of medium porosity (pore size 40 to 50 µm).

5.4 Mechanical agitator, equipped with a heating device to keep the flask (5.2) and its contents at a temperature between 80 and 85 °C. As an alternative, a rotary agitator or shaker may be placed in an oven at a temperature between 80 and 85 °C.

5.5 Other apparatus

Analytical balance, accurate to 0,1 mg.

Other necessary apparatus is described in ISO 1628-1, clause 5: viscometer holders (5.2), thermostated bath (5.3) but with a tolerance of ±0,1 °C, temperature measuring device (5.4) with 0,05 °C sensitivity, and timing device (5.5).

6 Solvent and solution

6.1 Solvent

Cyclohexanone, distilled less than two weeks before use and having a kinematic viscosity between 2,06 and 2,14 mm^2/s at 25 °C. Distill the solvent at atmospheric pressure, collecting only the fraction distilling between 155 and 156 °C. Store the solvent in the dark in a dark-coloured bottle fitted with a ground-glass stopper. Check the kinematic viscosity before use.

6.2 Resin sample

The sample shall be representative of the material to be tested. Pretreat the sample (by drying, washing, etc.) as agreed between the interested parties.

6.3 Solution concentration

The concentration shall be about 5 g of resin per litre of solution at 25 ± 1 °C. The exact concentration is calculated from 6.4.

6.4 Preparation of solution

Weigh, to the nearest 0,2 mg, 0,250 ± 0,005 g of resin and transfer it quantitatively to the 50 ml or 150 ml flask (5.2) (see note 1). Add about 40 ml of cyclohexanone (6.1) to the 50 ml flask (or exactly 50 ml if a 150 ml flask is used), while swirling the flask by hand to prevent coagulation or the formation of lumps. If a 150 ml flask is used, note the total weight in order to compensate for solvent evaporation after cooling to 25 ± 1 °C. Continue dissolution by agitating for 1 h between 80 and 85 °C using the agitator (5.4). Check visually that dissolution is complete. If gelatinized particles are still visible, start again with a new portion of the resin. Cool the solution to 25 ± 1 °C and dilute to the mark of the 50 ml flask with cyclohexanone at the same temperature (see note 2). Mix the solution thoroughly by shaking. If a 150 ml flask is used, compensate for the evaporation of solvent by adding cyclohexanone to restore to the original mass.

NOTES

1 The sample can be weighed directly into the flask.

2 Minor errors in the concentration of the solution are introduced by the use of flasks that are calibrated at 20 °C instead of 25 °C and by the two different methods of preparation of the solution. These errors can be ignored for the purposes of this part of ISO 1628.

7 Temperature of measurement

The temperature shall be 25 ± 0,1 °C.

8 Procedure

The procedure is described in ISO 1628-1, clause 8.
When filling the viscometer (5.1), filter the solvent and solution using the filter funnel (5.3).

Particular care shall be given to viscometer cleaning, which shall be based on the procedure described in annex A of ISO 1628-1. Efflux times with the control solvent cyclohexanone (6.1) shall remain constant to within 0,2 s for a given viscometer. With the solution, the measurement of efflux times shall be repeated until two succesive measurements differ by less than 0,25 %. Always discard the first efflux time reading.

NOTE — The procedure described applies only to a Ubbelohde viscometer. It will be necessary to modify it if another viscometer is used.

9 Expression of results

Calculate the viscosity number V.N. as specified in ISO 1628-1, clause 9, using the equation

$$\text{V.N.} = \frac{t - t_0}{t_0\, c}$$

where

t and t_0 are the efflux times, in seconds, of the solution and solvent, respectively;

c is the concentration of the solution, in grams per millilitre.

Express the viscosity number in millilitres per gram rounded to the nearest whole number.

10 Test report

The test report shall include the following information:

a) a reference to this part of ISO 1628

b) a full identification of the material under test;

c) the characteristics of the viscometer;

d) the test results, as expressed by the efflux times of the solvent and solution and the resulting viscosity number.

UDC 678.743.22 : 532.13

Descriptors : plastics, polymers, polyvinyl chloride, resins, dilution, tests, determination, viscosity.

Price based on 2 pages