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Plastics — Homopolymer and copolymer resins of vinyl chloride —

Part 2:

Preparation of test samples and determination of properties

Plastiques — Résines d'homopolymères et de copolymères de chlorure de vinyle —

Partie 2: Préparation des échantillons pour essai et détermination des propriétés

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 1060-2 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*.

This third edition cancels and replaces the second edition (ISO 1060-2:1985) and includes the following main changes:

- a) the list of test methods in table 1 has been revised;
- b) the preparation of standard pastes has been included.

ISO 1060 consists of the following parts, under the general title *Plastics — Homopolymer and copolymer resins of vinyl chloride*:

- *Part 1: Designation system and basis for specifications*
- *Part 2: Preparation of test samples and determination of properties*

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International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet central@iso.ch
X.400 c=ch; a=400net; p=iso; o=isocs; s=central

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Plastics — Homopolymer and copolymer resins of vinyl chloride —

Part 2:

Preparation of test samples and determination of properties

1 Scope

This part of ISO 1060 specifies the methods of preparation of test samples and the test methods to be used in determining the properties of PVC resins. Requirements for handling test material and for conditioning the material before testing are given here. In addition, properties and test methods which are suitable and necessary to characterize PVC resins are listed.

In order to obtain reproducible and comparable test results, it is necessary to use the methods of sample preparation and conditioning and the test procedures specified herein. Values determined will not necessarily be identical to those obtained using different test samples, or test samples prepared using different procedures.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 1060. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 1060 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 60:1977, *Plastics — Determination of apparent density of material that can be poured from a specified funnel.*

ISO 1068:1975, *Plastics — Homopolymer and copolymer resins of vinyl chloride — Determination of compacted apparent bulk density.*

ISO 1158:—1), *Plastics — Vinyl chloride homopolymers and copolymers — Determination of chlorine content.*

ISO 1159:1978, *Plastics — Vinyl chloride-vinyl acetate copolymers — Determination of vinyl acetate.*

ISO 1264:1980, *Plastics — Homopolymer and copolymer resins of vinyl chloride — Determination of pH of aqueous extract.*

ISO 1265:1979, *Plastics — Polyvinyl chloride resins — Determination of number of impurities and foreign particles.*

ISO 1269:1980, *Plastics — Homopolymer and copolymer resins of vinyl chloride — Determination of volatile matter (including water).*

ISO 1385-1:1977, *Phthalate esters for industrial use — Methods of test — Part 1: General.*

ISO 1624:1978, *Plastics — Vinyl chloride homopolymer and copolymer resins — Sieve analysis in water.*

1) To be published. (Revision of ISO 1158:1984)

ISO 1628-2:—²⁾, *Plastics — Determination of the viscosity of polymers in dilute solution using capillary viscometers — Part 2: Poly(vinyl chloride) resins.*

ISO 2555:1989, *Plastics — Resins in the liquid state or as emulsions or dispersions — Determination of apparent viscosity by the Brookfield Test method.*

ISO 2591-1:1988, *Test sieving — Part 1: Methods using test sieves of woven wire cloth and perforated metal plate.*

ISO 3219:1993, *Plastics — Polymers/resins in the liquid state or as emulsions or dispersions — Determination of viscosity using a rotational viscometer with defined shear rate.*

ISO 3451-5:1989, *Plastics — Determination of ash — Part 5: Poly(vinyl chloride).*

ISO 4574:1978, *Plastics — PVC resins for general use — Determination of hot plasticizer absorption.*

ISO 4575:1985, *Plastics — Polyvinyl chloride pastes — Determination of apparent viscosity using the Severs rheometer.*

ISO 4608:—³⁾, *Plastics — Homopolymer and copolymer resins of vinyl chloride for general use — Determination of plasticizer absorption at room temperature.*

ISO 4610:1977, *Plastics — Vinyl chloride homopolymer and copolymer resins — Sieve analysis using air-jet sieve apparatus.*

ISO 4612:—⁴⁾, *Plastics — Preparation of PVC pastes for test purposes — Planetary-mixer method.*

ISO 6186:—⁵⁾, *Plastics — Determination of pourability.*

ISO 6401:1985, *Plastics — Homopolymer and copolymer resins of vinyl chloride — Determination of residual vinyl chloride monomer — Gas chromatographic method.*

ISO 11468:1997, *Plastics — Preparation of PVC pastes for test purposes — Dissolver method.*

3 Preparation of test samples

3.1 Sampling

The sample of resin taken shall be generally representative of the resin whose properties are to be determined and be sufficiently large to provide the number of test samples required by the test methods concerned.

3.2 Preparation of standard pastes

In order to carry out certain tests on paste resins, it is necessary to prepare standard pastes from the test sample concerned.

For designation purposes, one of two standard paste formulations, A and B, shall be used, but formulation A should be used in preference. Formulation B should be used when the resin to be designated does not form a paste with formulation A or if the temperature exceeds 35 °C during the preparation of the paste. Formulation B should also be used when it is not possible to measure the viscosities of the paste at both shear rates with formulation A.

2) To be published. (Revision of ISO 1628-2:1988)

3) To be published. (Revision of ISO 4608:1984)

4) To be published. (Revision of ISO 4612:1979)

5) To be published. (Revision of ISO 6186:1980)

Formulation A: 100 parts by mass of resin
 60 parts by mass of bis-(2-ethylhexyl) phthalate (DOP)

Formulation B: 100 parts by mass of resin
 100 parts by mass of bis-(2-ethylhexyl) phthalate (DOP)

The pastes shall be prepared in accordance with ISO 4612 (method B) or ISO 11468 except in cases of dispute when they shall be prepared by method B of ISO 4612.

When measured at 20 °C by the methods described in ISO 1385-1, the density, refractive index and dynamic viscosity of the DOP plasticizer used shall have the following values:

density	0,982 g/cm ³ to 0,984 g/cm ³
refractive index	1,486 to 1,487
dynamic viscosity	77 mPa·s to 83 mPa·s

4 Conditioning of test samples

Condition test samples prior to testing wherever specified in the test method or product specification.

5 Determination of properties

In the determination of properties and the presentation of results, the standards, methods and special conditions listed in table 1 shall apply.

For the designation of general-purpose resins, retention on a 63 µm mesh sieve shall be determined in accordance with ISO 4610 while, for paste resins and filler resins, it shall be determined in accordance with ISO 1624.

Table 1 — Properties and test procedures

Property	Standard	Units
Properties of powder		
Apparent density ¹⁾	ISO 60	g/ml
Compacted apparent bulk density	ISO 1068	g/ml
Impurities and foreign particles	ISO 1265	number of specks per 100 squares of grid
Sieve analysis in water ¹⁾	ISO 1624	%
Methods using test sieves of woven wire cloth	ISO 2591-1	% or other appropriate unit
Plasticizer absorption at room temperature ¹⁾	ISO 4608	parts per 100 parts of resin by mass
Sieve analysis using air-jet sieve apparatus ¹⁾	ISO 4610	%
Hot plasticizer absorption	ISO 4574	parts per 100 parts of resin by mass
Pourability	ISO 6186	s
Chemical properties		
Chlorine content	ISO 1158	%
Vinyl acetate content	ISO 1159	%
pH of aqueous extract	ISO 1264	—
Volatile matter (including water)	ISO 1269	%
Reduced viscosity ¹⁾	} ISO 1628-2	ml/g
K value		—
Ash	ISO 3451-5	%
Residual vinyl chloride monomer	ISO 6401	mg/kg
Viscosity of pastes		
The pastes used for all viscosity determinations shall be prepared in accordance with ISO 4612 or ISO 11468		
Apparent viscosity by the Brookfield test method	ISO 2555	Pa·s
Viscosity with a rotational viscometer working at defined shear rate ¹⁾ ²⁾	ISO 3219	Pa·s
Apparent viscosity using the Severs rheometer	ISO 4575	Pa·s
¹⁾ Designatory property. ²⁾ In cases of dispute, method B of ISO 4612 shall be used for paste preparation.		

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Descriptors: plastics, thermoplastic resins, vinyl resins, homopolymers, copolymers, vinyl chloride, tests, determination, properties, test specimens, specimen preparation.

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