INTERNATIONAL STANDARD

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Binders for paints and varnishes — Methods of test for characterizing water-based binders

Liants pour peintures et vernis — Méthodes d'essai pour caractériser les liants à base d'eau

Reference number
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

ISO 7143 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 10, *Test methods for binders for paints and varnishes*, in collaboration with CEN Technical Committee CEN/TC 139, *Paints and varnishes*.

This third edition cancels and replaces the second edition (ISO 7143:2000), which has been technically revised.

The major changes are as follows:

a) water-based coating materials have been excluded from the scope because these products are not specified in accordance with this standard;

b) the determination of molecular mass has been added to Table 1;

c) the normative references have been updated and the text has been editorially revised.

Readers should note that ISO 12000 gives definitions relative to polymer dispersions and lattices, and identifies the test methods applicable to the determination of their properties. ISO 12000 covers both aqueous and non-aqueous polymer dispersions, and products of synthetic and natural origin, including synthetic rubber latices. It was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*, in close collaboration with ISO/TC 45, *Rubber and rubber products*.

In this corrected version of ISO 7143:2007, the reference number of the standard in the fourth paragraph of the foreword has been corrected to read ISO 7143.

Binders for paints and varnishes — Methods of test for characterizing water-based binders

1 Scope

This International Standard specifies methods of test for characterizing binders, i.e. aqueous dispersions and solutions of polymers and copolymers, in particular those used as raw materials for water-based coating materials. The properties determined will depend on whether a drying or curing system is tested.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 976, *Rubber and plastics — Polymer dispersions and rubber latices — Determination of pH*

ISO 2115, *Plastics — Polymer dispersions — Determination of white point temperature and minimum film-forming temperature*

ISO 2811-1, *Paints and varnishes — Determination of density — Part 1: Pyknometer method*

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

ISO 3251, *Paints, varnishes and plastics — Determination of non-volatile-matter content*

ISO 4576, *Plastics — Polymer dispersions — Determination of sieve residue (gross particle and coagulum content)*

ISO 11357-2, *Plastics — Differential scanning calorimetry (DSC) — Part 2: Determination of glass transition temperature*

ISO 11359-2, *Plastics — Thermomechanical analysis (TMA) — Part 2: Determination of coefficient of linear thermal expansion and glass transition temperature*

ISO 13741-1, *Plastics/rubber — Polymer dispersions and rubber latices (natural and synthetic) — Determination of residual monomers and other organic components by capillary-column gas chromatography — Part 1: Direct liquid injection method*

ISO 13741-2, *Plastics/rubber — Polymer dispersions and rubber latices (natural and synthetic) — Determination of residual monomers and other organic components by capillary-column gas chromatography — Part 2: Headspace method*

ISO 13885-1, *Binders for paints and varnishes — Gel permeation chromatography (GPC) — Part 1: Tetrahydrofuran (THF) as eluent*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

ISO 15880, *Paints, varnishes and binders — Determination of MEQ value of water-based coating materials and binders*

ISO 16805, *Binders for paints and varnishes — Determination of glass transition temperature*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
polymer dispersion
liquid or semi-liquid material, usually milkwhite, containing the polymeric material in a stable condition, finely dispersed in a continuous liquid phase, normally water (aqueous dispersion) or an organic liquid (non-aqueous dispersion, NAD)

[ISO 4618:2006]

3.2
water-based binder
binder in which the main component of the volatile matter is water

4 Sampling

Take a representative sample of the product to be tested, as described in ISO 15528.

5 Methods of test

The test methods used for a particular binder shall be the subject of agreement between the interested parties, if not otherwise specified.

The properties given in Table 1 are considered as characterizing properties of water-based binders, in particular if they are used as raw materials for paints and varnishes.

If reactive groups, e.g. hydroxyl groups, are to be determined, the test shall be carried out as for organic binders, before diluting with water.

6 Test report

The test report shall contain at least the following information:

a) a reference to this International Standard (ISO 7143:2007);

b) all details necessary for complete identification of the product tested (manufacturer, trade name, batch number, etc.);

c) the results of the tests and the test methods used;

d) any deviations from the procedures specified;

e) the dates of the tests.

Table 1 — Characterizing properties and test methods

Property	Method of test
Viscosity	ISO 3219
Non-volatile matter	ISO 3251
pH-value	ISO 976
Sieve residue (gross particle and coagulum content)	ISO 4576
Minimum film-forming temperature	ISO 2115
Glass transition temperature	ISO 16805
Density	ISO 2811-1
Residual monomers	ISO 13741-1 and ISO 13741-2
Particle size distribution	To be agreed between the interested parties [a]
MEQ value	ISO 15880
Molecular mass	ISO 13885-1 [b]

[a] The results of particle size analysis, for example with PCS (photon correlation spectroscopy), strongly depend on the details of the method. The results obtained by different laboratories can therefore be compared only if common reference samples are used.

[b] The results of GPC (gel permeation chromatography) analysis are relative values and depend on the separation factor, column material, detector, etc. The data obtained by different laboratories can therefore be compared only if common reference samples are used.

Bibliography

[1] ISO 4618:2006, *Paints and varnishes — Terms and definitions*

[2] ISO 12000, *Plastics/rubber — Polymer dispersions and rubber latices (natural and synthetic) — Definitions and review of test methods*