INTERNATIONAL STANDARD

ISO 7143

Second edition
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Paints, varnishes and binders — Methods of test for characterizing water-based coating materials and binders

Peintures, vernis et liants — Méthodes d'essai pour caractériser les produits de peinture et liants à base d'eau

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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 3.

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.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 7143 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 10, *Test methods for binders for paints and varnishes*.

This second edition cancels and replaces the first edition (ISO 7143:1982), which has been technically revised.

The major changes are that the scope has been enlarged to include not only aqueous solutions of polymers and copolymers used as raw materials for water-based coating materials, but also the water-based coating materials themselves. The following properties have been added: gross (large) particle content by sieve analysis, glass transition temperature, residual monomers, particle size distribution and MEQ value. The following properties have been deleted: white-point temperature and freeze-thaw cycle stability.

Readers should note that ISO 12000 gives definitions relative to polymer dispersions and latices 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*.

Paints, varnishes and binders — Methods of test for characterizing water-based coating materials and binders

1 Scope

This International Standard specifies methods of test for characterizing water-based coating materials and 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 whether a drying or curing system is tested.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 976:1996, *Rubber and plastics — Polymer dispersions and rubber latices — Determination of pH.*

ISO 1625:1998, *Plastics — Polymer dispersions — Determination of non-volatile matter (residue) at specified temperatures.*

ISO 2115:1996, *Plastics — Polymer dispersions — Determination of white point temperature and minimum film-forming temperature.*

ISO 2811-1:1997, *Paints and varnishes — Determination of density — Part 1: Pyknometer method.*

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 3251:1993, *Paints and varnishes — Determination of non-volatile matter of paints, varnishes and binders for paints and varnishes.*

ISO 4576:1996, *Plastics — Polymer dispersions — Determination of sieve residue (gross particle and coagulum content).*

ISO 11357-2:1999, *Plastics — Differential scanning calorimetry (DSC) — Part 2: Determination of glass transition temperature.*

ISO 11359-2:1999, *Plastics — Thermomechanical analysis (TMA) — Part 2: Determination of coefficient of linear thermal expansion and glass transition temperature.*

ISO 12000:2000, *Plastics/rubber — Polymer dispersions and rubber latices (natural and synthetic) — Definitions and review of test methods.*

ISO 13741-1:1998, *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 13741-2:1998, *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 15528:2000, *Paints, varnishes and raw materials for paints and varnishes — Sampling.*

ISO 15880:2000, *Paints, varnishes and binders — Determination of MEQ value of water-based coating materials and binders.*

3 Terms and definitions

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

3.1
polymer dispersion (dispersion of natural or synthetic homopolymers and copolymers)
a liquid to semi-liquid material, usually milky-white, 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 or NAD) [Closely based on definition in ISO 12000:2000]

3.2
water-based coating material
a coating material in which the main component of the volatile matter is water

3.3
water-based binder
a 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 water-based coating material or 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 and coating materials, in particular if the binders 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.

Table 1 — Characterizing properties and test methods

Property	Method of test
Viscosity	ISO 3219
Non-volatile matter	ISO 1625 or ISO 3251
pH-value	ISO 976
Sieve residue (gross particle and coagulum content)	ISO 4576
Minimum film-forming temperature	ISO 2115
Glass transition temperature	[a]
Density	ISO 2811-1
Residual monomers	ISO 13741-1 and ISO 13741-2
Particle size distribution	to be agreed between the interested parties [b]
MEQ value	ISO 15880

[a] A method of determining the glass transition temperature of binders will form the subject of a future International Standard. Until this International Standard is published, see ISO 11357-2 and ISO 11359-2.

[b] The results of particle size analysis, for example using 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.

6 Test report

The test report shall contain at least the following information:

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

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.

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