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Structural adhesives — Standard database of properties

Adhésifs structuraux — Base de données des caractéristiques

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 11, *Products*.

This second edition cancels and replaces the first edition (ISO 17194:2007), of which it constitutes a minor revision.

The main changes compared to the previous edition are as follows:

— the normative references updated;

— Table 2 has been updated;

— description of the simple stress analysis and Table 3 have been updated.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Over recent years, there has been an increase in the use of computer methods for the selection and evaluation of structural adhesives and for assistance with the manufacture and design of joints with these materials. The data sheets from materials suppliers generally do not supply all the property data that are needed to support the application of these methods.

This document specifies a set of basic properties for adhesives commonly required for the use of these materials in a wide range of applications. Test methods and test conditions are recommended for the measurement of the data to enable traceability of presented values. For each property, a single (preferred) test method and specific test conditions are identified in order to improve the comparability of data on different materials generated by different data suppliers.

In selecting the contents for this database, attempts have been made to find a balance in the quantity of data specified. Too much and data suppliers will be reluctant to produce the data, too little and the database has limited value. The aim is, therefore, not to present a comprehensive list of properties for adhesives but to be selective in identifying the most important properties that are needed for the use of adhesives for different applications. It should be noted that many adhesives have been developed with special properties for a particular application. It is possible that these properties will not be specified in the list associated with this document. However, scope has been included within this document for the presentation of additional data under test conditions identified by the data supplier. In this way, the special properties of the adhesive can be presented with the basic data.

Structural adhesives — Standard database of properties

1 Scope

This document specifies a set of basic properties commonly required for the selection and use of structural adhesives in different applications. ISO standard test methods and test conditions are also reviewed for the measurement of these data to facilitate traceability of recorded values (see Introduction).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 62, *Plastics — Determination of water absorption*

ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles*

ISO 527-2, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics*

ISO 868, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness)*

ISO 1183 (all parts), *Plastics — Methods for determining the density of non-cellular plastics*

ISO 1817, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 2555, *Plastics — Resins in the liquid state or as emulsions or dispersions — Determination of apparent viscosity using a single cylinder type rotational viscometer method*

ISO 2577, *Plastics — Thermosetting moulding materials — Determination of shrinkage*

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

ISO 11339, *Adhesives - T-peel test for flexible-to-flexible bonded assemblies*

ISO 4587, *Adhesives — Determination of tensile lap-shear strength of rigid-to-rigid bonded assemblies*

ISO 6721-4, *Plastics — Determination of dynamic mechanical properties — Part 4: Tensile vibration — Non-resonance method*

ISO 6721-5, *Plastics — Determination of dynamic mechanical properties — Part 5: Flexural vibration — Non-resonance method*

ISO 9142, *Adhesives — Guide to the selection of standard laboratory ageing conditions for testing bonded joints*

ISO 10364, *Adhesives — Determination of pot life (working life) of multi-component adhesives*

ISO 11343, *Adhesives — Determination of dynamic resistance to cleavage of high-strength adhesive bonds under impact wedge conditions — Wedge impact method*

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

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

ISO 15166-1, *Adhesives — Methods of preparing bulk specimens — Part 1: Two-part systems*

ISO 15166-2, *Adhesives — Methods of preparing bulk specimens — Part 2: Elevated-temperature-curing one-part systems*

ISO 17212, *Structural adhesives — Guidelines for the surface preparation of metals and plastics prior to adhesive bonding*

ISO 25217, *Adhesives — Determination of the mode 1 adhesive fracture energy of structural adhesive joints using double cantilever beam and tapered double cantilever beam specimens*

IEC 62631-3-1, *Dielectric and resistive properties of solid insulating materials - Part 3-1: Determination of resistive properties (DC methods) - Volume resistance and volume resistivity - General method*

IEC 60243-1, *Electrical strength of insulating materials — Test methods — Part 1: Tests at power frequencies*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Principle

A list is presented of properties that are generally useful for the selection and application of structural adhesives. Recommended test methods and test conditions are given for each property to help in the determination of values and to promote the presentation of traceable and comparable data.

5 Test specimens

Where possible, use the test specimens recommended in the test method standards employed to measure the properties given in Tables 1, 2 and 3. If alternative test methods are used, the test method reference shall be recorded with the results. The preparation of test specimens shall be as specified in ISO 17212 for joint specimens and ISO 15166-1 or ISO 15166-2 for bulk specimens. Since the properties of adhesives generally depend on the concentration of absorbed water, specimens shall be stored dry or in an atmosphere of (50 ± 10) % RH at (23 ± 2) °C prior to testing, for a sufficient time to reach zero or equilibrium water content as indicated by no significant further changes in the mass of the specimen with storage time.

6 Test conditions

Where possible, use the test conditions specified for each property in Tables 1, 2 and 3. If alternative test conditions are used, these shall be recorded with the results.