INTERNATIONAL STANDARD

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Structural adhesives — Determination of the pot life (working life) of multi-component adhesives

Adhésifs structuraux — Détermination de la durée de vie en pot (délai d'utilisation) d'adhésifs multicomposants

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Foreword

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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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information.

The committee responsible for this document is ISO/TC 61, *Plastics*, Subcommittee SC 11, *Products*.

This third edition cancels and replaces the second edition (ISO 10364:2007), which has been technically revised.

Structural adhesives — Determination of the pot life (working life) of multi-component adhesives

SAFETY STATEMENT — Persons using this International Standard should be familiar with normal laboratory practice, if applicable. This International Standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any regulatory requirements.

1 Scope

This International Standard specifies methods for determining the pot life of multi-part adhesives in order to be able to determine whether the pot life conforms to the minimum specified working life required of an adhesive.

For the purposes of simplification, the term "pot life" is deemed to have the same meaning as "working life" and will be used to represent both throughout this International Standard. Methods described to measure the property provide different answers. So the results shall be specified with respect to the method used.

The test methods described are suitable for assessing all multi–part adhesives, and especially epoxy based and polyurethane based adhesives, but they are not suitable for some acrylic-based adhesives.

NOTE 1 Some of the methods described in this International Standard can also be suitable for determination of working life of one-part adhesives that react to humidity (e.g. PUR prepolymers).

NOTE 2 This International Standard can also be used for assessing non-structural adhesives.

2 Normative references

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

ISO 472, *Plastics — Vocabulary*

ISO 2555, *Plastics — Resins in the liquid state or as emulsions or dispersions — Determination of apparent viscosity by the Brookfield Test 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 15605, *Adhesives — Sampling*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 472 and the following apply.

3.1
pot life
working life
maximum period of time during which a multi-part adhesive can be used after mixing the components

4 Principle

This International Standard specifies four methods for the determination of the pot life of multi-part adhesives.

In method 1, the pot life is determined from the increase in viscosity of the adhesive as it reacts. This method is not suitable for the determination of pot lives that are shorter than 5 min.

In method 2, the pot life is determined from the decrease in the mass of mixed adhesive which is extruded in unit time under standard conditions. This method is not suitable for the determination of pot lives that are shorter than 5 min.

In method 3, the pot life is determined as the time taken by the mixed adhesive to reach a defined temperature, the so-called critical temperature. This method is applicable to all multi-part systems.

In method 4, the working live of low viscose, self-levelling two part adhesives, or one-part moisture curing adhesives is determined by means of the film formation point and the drying point. A thin weight-loaded pin ("needle") is drawn at a constant speed through a thin layer of the respective adhesive. The time at which the trace, generated by the needle, is no longer levelled out by the still flowing adhesive is defined as film formation time while the point at which the needle lifts out of the adhesive and continues gliding on the film surface without leaving any marks is defined as film drying time.

5 Apparatus

5.1 Balance, capable of weighing up to (500 ± 0,1) g for methods 1 and 2 and up to (100 ± 0,1) g for methods 3, and 4.

5.2 Beaker, squat shape, plain bottom of appropriate seize, made of a material which does not react with the adhesive under test, with a wall thickness which does not exceed 1 mm.

5.3 Spatula, made of a material which does not react with the adhesive under test.

5.4 Rotational viscometer, as specified in ISO 2555 or ISO 3219.

5.5 Water bath, capable of being maintained at constant temperature to within ±0,1 °C for methods 2 and 3 and within ±0,2 °C for method 4 throughout the temperature range 15 °C to 30 °C.

5.6 Stopwatch, accurate to ±1 s.

5.7 Test enclosure, capable of being maintained at the test temperature and, if necessary, at a relative humidity of (50 ± 5) %.

5.8 Disposable plastic cartridges, internal diameter 47 mm, length 210 mm, and fitted with a threaded end fitting and a piston, both cartridge, and piston being made of a material which does not react with the adhesive under test.

5.9 Stirrer, with a rigid, helical stirrer blade made of a material which does not react with the adhesive under test.

5.10 Stirrer motor, electrically or pneumatically powered, whose speed can be regulated between 0 min^{-1} and 1 000 min^{-1}.

5.11 Extrusion nozzle, made of material which does not react with the adhesive under test, capable of being screwed onto the end fitting of the cartridge (5.8). The diameter of the nozzle's extrusion orifice shall be suitable for dispensing the mixed adhesive. An orifice diameter of 3 mm shall be used.