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Building and civil engineering sealants — Determination of the degree of cure —

Part 1: Build-up of tensile properties in dumbbell-shaped specimens

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Foreword

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This document was prepared by Technical Committee ISO/TC 59, *Buildings and civil engineering works*, Subcommittee SC 8, *Sealants*.

A list of all parts in the ISO 24068 series can be found on the ISO website.

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.

Building and civil engineering sealants — Determination of the degree of cure —

Part 1:
Build-up of tensile properties in dumbbell-shaped specimens

1 Scope

This document specifies a method for the determination of the degree of cure of one- and multi-component sealants as indicated by the build-up of the tensile properties in dumbbell-shaped specimens during cure.

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 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 5893, *Rubber and plastics test equipment — Tensile, flexural and compression types (constant rate of traverse) — Specification*

ISO 6927, *Building and civil engineering sealants — Vocabulary*

ISO 80000-1:2009, *Quantities and units — Part 1: General*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6927 apply.

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 http://www.electropedia.org/

4 Principle

The degree of cure of a dumbbell-shaped test specimen of a (ambient temperature curing) sealant is determined as the ratio between the value of engineering tensile stress (secant modulus), or maximum tensile strength at any time during cure, and the corresponding value measured after a reference cure period.

5 Apparatus and materials

5.1 Tensile-testing machine with recording device, conforming to ISO 5893 (force class 2 as defined in ISO 7500-1, corresponding to a maximum permissible value of accuracy of ±2 %). The accuracy class

for elongation shall be class D. An appropriate load cell of suitable sensitivity for the sealants to be tested shall be used.

It shall be possible to set the tensile-testing machine at one or more of the following rates of displacement of the driven grip: (100 ± 10) mm/min, (200 ± 20) mm/min and (500 ± 50) mm/min.

The tensile-testing machine shall be equipped with suitable means for measuring strain, such as with a mechanical or non-contacting extensometer (e.g. video-extensometer).

5.2 Template for preparation of sealant sheets, with a thickness of (2 ± 0,2) mm, such as a mould or a plate and frame kit and scraper made from anti-adherent material (e.g. PE, PP, PTFE). The assembly shall allow preparation of sealant sheets of a sufficient size for cutting minimum five test specimens per sheet.

NOTE 1 Test specimens made from sheets of other thickness do not necessarily give comparable results.

NOTE 2 No sealant sheets need to be prepared, if test specimens are directly prepared in suitable moulds (see Clause 7).

5.3 Dies (Type 1, 1A or 2) and cutters, in accordance with ISO 37.

NOTE Dies and cutters are not required, if test specimens are directly prepared in suitable moulds or by other suitable methods (such as water-jetting) (see Clause 7).

6 Conditioning

The equipment used for manufacturing the sealant sheets, the sealant in its unopened package, and the dies shall be conditioned at (23 ± 2) °C and (50 ± 10) % relative humidity for a minimum of 16 h prior to the preparation of sealant sheets and test specimens.

7 Preparation of test specimen

A sufficient number of sealant sheets shall be prepared based on the size of the sealant sheets and the number of cure intervals chosen.

For multi-component sealants, the instructions of the sealant manufacturer regarding the mixing procedure shall be followed. One-component sealants can be applied directly from the original container.

The sealant shall be filled into the cavity and levelled flush with the face of the mould or frame using a suitable scraper, while ensuring that no air pockets are entrapped in the sealant.

The sealant sheet shall then be conditioned (cured) in the mould for a specified period of time (cure interval) at standard conditions of (23 ± 2) °C and (50 ± 10) % relative humidity. One or several arbitrary cure intervals may be selected, as agreed by the parties concerned. Typically, cure intervals are selected from the following: 16 h, 24 h, 48 h, 72 h, 4 d (96 h), 7 d (168 h), 14 d (336 h). Furthermore, a cure interval of 14 d (336 h) or 28 d (672 h) shall be selected as the reference cure, as agreed by the parties concerned.

Other methods of cutting the specimens from the sealant sheets, such as water-jetting, may be applied. However, the type and tolerances of specimen shall correspond to dies (Type 1, 1A or 2) in accordance with ISO 37.

Alternatively, the test specimens may be prepared by casting the sealant directly into suitable moulds (e.g. silicone moulds for organic sealants) with the desired dimensions [sealant thickness of (2 ± 0,2) mm and type and tolerances of specimen corresponding to dies (Type 1, 1A or 2) in accordance with ISO 37].