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Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Determination of the resistance to chemical attack for the inside of a section in a deflected condition

Tubes et raccords en plastiques thermodurcissables renforcés de verre (PRV) — Détermination de la résistance à une attaque chimique à l'intérieur d'un tronçon de tube soumis à déflexion

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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 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 6, *Reinforced plastics pipes and fittings for all applications.*

This fourth edition cancels and replaces the third edition (ISO 10952:2014), which has been technically revised.

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

— the tolerances for the dimensional measuring devices in 6.2 have been modified;

— the measurement of the mean wall thickness in 8.2 and the mean diameter in 8.3 have been specified.

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.

Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Determination of the resistance to chemical attack for the inside of a section in a deflected condition

1 Scope

This document specifies a method for determining the chemical resistance properties of glass-reinforced thermosetting plastics (GRP) pipes and fittings in a deflected condition for nominal sizes DN 100 and larger.

In conjunction with ISO 10928, this document provides a method for evaluating the effect of a chemical environment on the interior of a pipe or fitting after a specified period of time. Test conditions and requirements are specified in the referring International Standard. ISO 23856 references this document.

NOTE It has been found that the effect of chemical environments can be accelerated by strain induced from deflection; hence, this type of effect is frequently referred to as strain corrosion.

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 10928, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Methods for regression analysis and their use*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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/

3.1
mean diameter
d_m
diameter of the circle corresponding with the middle of the pipe wall cross-section

Note 1 to entry: The mean diameter is given by either of the following formulae:

$$d_m = d_i + e_m$$

$$d_m = d_e - e_m$$

where

d_e is the external diameter of the pipe;

d_i is the internal diameter of the pipe;

e_m is the mean wall thickness of the pipe at the bottom.

Note 2 to entry: The mean diameter and the dimensions used to calculate it are expressed in millimetres.

3.2
leak failure
failure which becomes apparent by the passage of the test liquid through the pipe wall

Note 1 to entry: Failures of the test sample have been observed at the spring-line location without leakage of the test liquid. While leakage is not observed, this can be considered a failure of the test sample as the strain levels in the sample will be altered, invalidating any continuation of the test. The test can be discarded or optionally counted as a failure occurring at the time of spring-line breakage.

4 Principle

The interior of a test piece is exposed to a corrosive test liquid at a specified temperature while being maintained in a fixed diametrically deflected condition. The test is repeated at several deflection levels, using a fresh test piece each time and recording the time to leak failure at each deflection. The results are used to calculate an extrapolated deflection value for a specified period of time.

Alternatively, the extrapolation can be performed using calculated or measured strains. Strain can be measured using strain gauges.

NOTE Use of strain allows testing using test pieces of variable thickness and stiffness classes. Deflection and strain are interrelatable by calculation.

It is assumed that the following test parameters are set by the International Standard making reference to this document:

a) the composition of the test liquid (see Clause 5);

b) the number and length of test pieces (see Clause 7);

c) the preconditioning to be applied (see Clause 9);

d) the test temperature (see 10.1 or 11.1);

e) if failures do not occur (see 10.11 and 11.11), the specified deflection levels and related minimum time intervals;

f) the time to which the data shall be extrapolated (see Clause 12).

5 Test liquid

The test liquid shall be as specified in the referring International Standard. The quantity shall be sufficient to achieve and maintain for the duration of the test the specified depth within the test piece (see 10.7 or 11.7).

6 Apparatus

6.1 Loading frame

The frame comprises two parallel steel sections and threaded rods which can maintain a constant deflection of the test piece (see Figure 1 for typical test set-up). The sections shall be sufficiently stiff such that visible bending or deformation of the sections does not occur during the compression of the

