SIST

SLOVENSKI STANDARD
SIST EN 1447:2009+A1:2010

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Cevni sistemi iz polimernih materialov - Cevi iz duromernih materialov, ojačenih s steklenimi vlakni (GRP) - Določanje dolgoročne odpornosti proti notranjemu tlaku (vključno z dopolnilom A1)

Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of long-term resistance to internal pressure

Kunststoff-Rohrleitungssysteme für die Renovierung erdverlegter Wasserversorgungsnetze - Teil 1: Allgemeines (ISO 11298-1:2010)

Systèmes de canalisations en plastique - Tubes en plastiques thermodurcissables renforcés de verre (PRV) - Détermination de la résistance à long terme à la pression interne

Ta slovenski standard je istoveten z: EN 1447:2009+A1:2010

ICS:

23.040.20	Cevi iz polimernih materialov	Plastics pipes
83.120	Ojačani polimeri	Reinforced plastics

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

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English Version

Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of long-term resistance to internal pressure

Systèmes de canalisations en plastique - Tubes en plastiques thermodurcissables renforcés de verre (PRV) - Détermination de la résistance à long terme à la pression interne

Kunststoff-Rohrleitungssysteme - Rohre aus glasfaserverstärkten duroplastischen Kunststoffen (GFK) - Bestimmung der Langzeit-Widerstandsfähigkeit gegen Innendruck

This European Standard was approved by CEN on 10 February 2009 and includes Amendment 1 approved by CEN on 14 September 2010.

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Foreword

This document (EN 1447:2009+A1:2010) has been prepared by Technical Committee CEN/TC 155 “Plastics piping systems and ducting systems”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2011 and conflicting national standards shall be withdrawn at the latest by April 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document includes Amendment 1, approved by CEN on 2010-09-14.

This document supersedes [A1] EN 1447:2009 [A1].

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] [A1].

The main modifications are:

– Correction of the valid failure zone limits and the use and reporting of data outside the valid zone.

The material-dependent parameters and/or performance requirements are incorporated in the referring standard.

This standard is one of a series of standards on test methods which support System Standards for plastics piping systems and ducting systems.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This standard describes a method for determining the long-term resistance to internal pressure of glass-reinforced thermosetting plastics (GRP) pipes.

It is a method which uses the following conditions:

— water as the reference liquid inside the test piece;

— water or air as the environment outside the test piece.

The method can be used for tests at different temperatures. It should be noted that, for a given temperature, the results obtained can differ depending on the end loading conditions and whether the external environment is water or air.

The method described in this standard differs from those in some other similar standards, in the following details:

— the failure criteria and the detection of failure;

— the strain in the longitudinal and circumferential directions may be measured during the test;

— the test pressure is maintained constant.

[A1] This method may be used to obtain data to establish internal pressure versus time-to-failure relationships at different temperatures. The procedures for establishing the relationships are not within the scope of this standard. For such purposes attention is drawn to ISO 10928. [A1]

1 Scope

This European Standard specifies a method for determining the time to failure of glass-reinforced thermosetting plastics (GRP) pipes under internal hydrostatic pressure at a specified temperature. The external environment can be air or water.

NOTE For other internal or external environments the referring standard should specify any additional requirement.

2 Normative references

The following referenced documents are indispensable for the application 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.

〚A1〛 ISO 10928, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Methods for regression analysis and their use* 〚A1〛

3 Definitions

For the purposes of this document, the following definitions apply:

3.1
failure
continuous loss of pressure resulting from the passage of the test liquid through the wall of the test piece under test

NOTE See 9.1.

3.2
bursting
failure by rupture of the pipe wall with immediate loss of test liquid and drop of pressure

NOTE See 9.1 and 9.2.2.

3.3
leaking
failure by loss of the pressurizing liquid through the pipe wall to an extent detectable visually and/or by a continuous drop in pressure

NOTE See 9.1, 9.2.1 and 9.2.2.

3.4
weeping
failure by passage of the pressurizing liquid through the pipe wall to an extent detectable visually or electronically

NOTE See 9.1 and 9.2.3.

4 Principle

A cut length of pipe at the required temperature is subjected to a specified internal hydrostatic pressure to cause a state of stress in the pipe wall which depends upon the loading conditions, i.e. with or without the effects of end thrust being carried by the pipe wall. The results of tests at different end loading conditions will be different even for the same pipe. Water or air may be used as the environment outside of the test piece.

The test samples are held at the test pressure until failure occurs. Typically the time to failure is longer at lower pressures (stresses).

In general, a series of tests are conducted over various failure times and the results obtained analysed in accordance with [A1] ISO 10928 [A1] to establish a long term value. The number of tests required, the appropriate time intervals and the time at which a value is established (time to failure) are given in the referring standard.

NOTE It is assumed that the following test parameters are set by the standard making reference to this standard:

a) whether or not the test piece is to be loaded by the hydrostatic end thrust while under pressure (see 5.2);

b) free length, L, of the test piece (see 6.2);

c) number of test pieces (see 6.1);

d) test temperature and its tolerance (see 8.1);

e) if and what strain measurements are required (see 8.2);

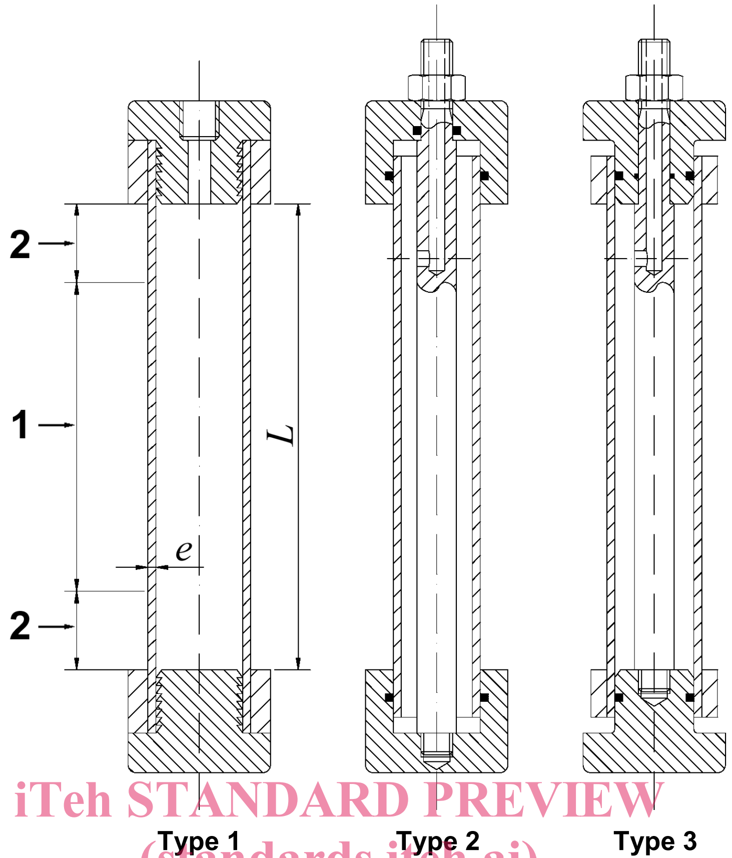
f) external environmental fluid, i.e. water or air (see 8.3) or other environment (see Note to Clause 1);

g) internal environmental fluid, if not water or a test liquid for the purposes of 5.7 and 9.2.3 (see Note to Clause 1).

5 Apparatus

5.1 Dimensional measurement devices, capable of determining the dimensions (length, diameters, wall thickness) to an accuracy of within ± 1,0 %.

5.2 End sealing devices for the test piece, capable of inducing the specified state of stress, i.e. with or without hydrostatic end thrust (see Figure 1).



Key

Type 1 testing with end thrust

Type 2 testing without end thrust, external seals

Type 3 testing without end thrust, internal seals

1 valid failure zone

2 end fixture influence zone, equal to $3{,}3([DN] \times e)^{0{,}5}$

e wall thickness

L free length between end fixtures

Figure 1 — Typical arrangements for pressure testing of pipes

5.3 Test piece support(s), as necessary to minimize deformation of the test piece due to its own weight.

Such support(s) shall not constrain the test piece circumferentially or longitudinally.

5.4 Container for water, if tested with water as the external environment (see 8.3), equipped so that the specified temperature can be maintained uniformly throughout the liquid.

NOTE This can require circulation.

5.5 Pressurizing system, capable of applying the pressure to the liquid in the test piece in such a way as to avoid entrapment of air.

The system shall be capable of maintaining the pressure within the limits detailed in 8.4 for the duration of the test.

NOTE 1 The pressure should, preferably, be applied individually to each test piece. However, the use of equipment enabling the pressure to be applied simultaneously to several test pieces is also permitted if there is no danger of interference when failure occurs.

NOTE 2 If the tests are carried out at a specified stress, the dimensions of the various test pieces should be similar.

NOTE 3 It is recommended that an automatic system be used which adjusts the pressure to keep it within the specified limits.