



SLOVENSKI STANDARD

SIST EN 1447:2009

01-junij-2009

Nadomešča:

SIST EN 1447:1997

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

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

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

Systemes de canalisations en plastiques - 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

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

EN 1447

March 2009

ICS 23.040.20

Supersedes EN 1447:1996

English Version

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

Systèmes de canalisations en plastiques - 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.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, 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 United Kingdom.



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[77cc519972ac/sist-en-1447-2009](#)

Foreword

This document (EN 1447:2009) 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 September 2009, and conflicting national standards shall be withdrawn at the latest by September 2009.

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 supersedes EN 1447:1996.

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, 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.

EN 1447:2009 (E)

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.

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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 EN 705.

1 Scope

This 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.

EN 705, *Plastics piping systems – Glass-reinforced thermosetting plastics (GRP) pipes and fittings – Methods for regression analyses and their use*

3 Definitions

For the purposes of this standard, 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

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NOTE See 9.1. <https://standards.iteh.ai/catalog/standards/sist/bf7790d0-4dba-48ab-8ac6-77cc519972ae/sist-en-1447-2009>

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.

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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 EN 705 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:

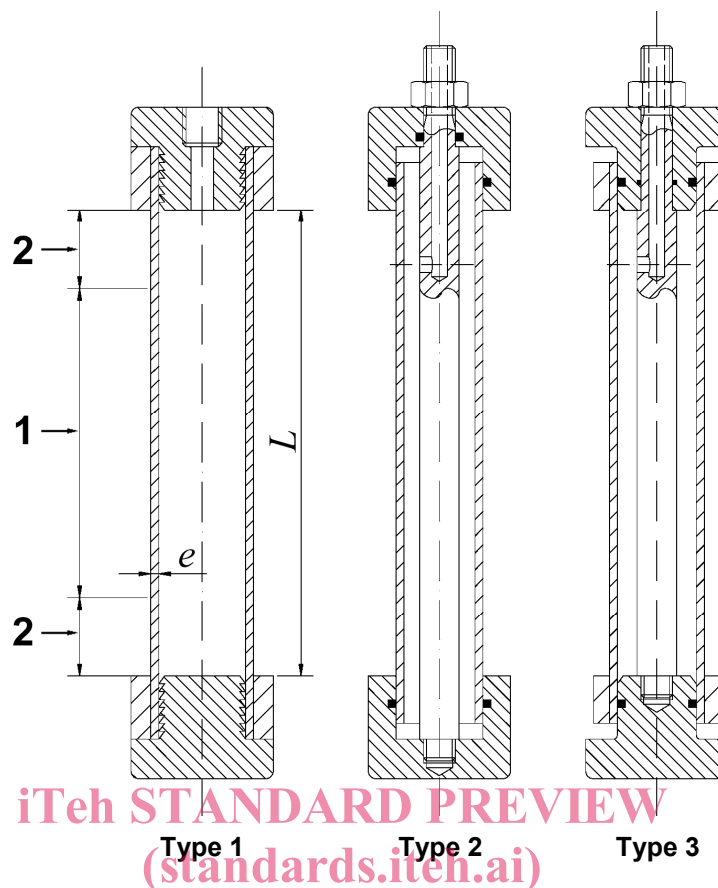
- a) whether or not the test piece is to be loaded by the hydrostatic end thrust while under pressure (see 5.2);
- b) free length, L , of the test piece (see 6.2);
- c) number of test pieces (see 6.1);
- d) test temperature and its tolerance (see 8.1);
- e) if and what strain measurements are required (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).

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5 Apparatus

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

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	1	valid failure zone
Type 2	testing without end thrust, external seals	2	end fixture influence zone, equal to $3,3([DN] \times e)^{0,5}$
Type 3	testing without end thrust, internal seals	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.