SLOVENSKI STANDARD

SIST EN 1437:2003

01-oktober-2003

Cevni sistemi iz polimernih materialov -Cevni sistemi za odvodnjavanje in kanalizacijo, poloģeni v zemljo ï   Preskusna metoda za doloļ anje odpornosti proti kombinaciji izmeniļ ne temperaturne in soļ asne zunanje obremenitve

Plastics piping systems - Piping systems for underground drainage and sewerage - Test method for resistance to combined temperature cycling and external loading

Kunststoff-Rohrleitungssysteme - Erdverlegte Abwasserkanäle und -leitungen - Prüfverfahren zur Bestimmung der Widerstandsfähigkeit gegen Temperaturwechsel und gleichzeitige äußere Belastung

Systemes de canalisations en plastique - Systemes de canalisations pour assainissement enterré - Méthode d'essai pour la résistance a un cycle de températures et de charge externe combinés

Ta slovenski standard je istoveten z: **EN 1437:2002**

ICS:

23.040.20	Cevi iz polimernih materialov	Plastics pipes
93.030	Zunanji sistemi za odpadno vodo	External sewage systems

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EUROPEAN STANDARD

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English version

Plastics piping systems - Piping systems for underground drainage and sewerage - Test method for resistance to combined temperature cycling and external loading

Systèmes de canalisations en plastique - Systèmes de canalisations pour assainissement enterré - Méthode d'essai pour la résistance à un cycle de températures et de charge externe combinés

Kunststoff-Rohrleitungssysteme - Erdverlegte Abwasserkanäle und -leitungen - Prüfverfahren zur Bestimmung der Widerstandsfähigkeit gegen Temperaturwechsel und gleichzeitige äußere Belastung

This European Standard was approved by CEN on 12 March 2002.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

This document (EN 1437:2002) 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 February 2003, and conflicting national standards shall be withdrawn at the latest by February 2003.

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

This standard is based on clause 12 "Box loading test (BLT)" of section four "Prevailing test methods" of the Technical Report ISO/TR 7074:1986 [1] published by the International Organisation for Standardisation (ISO).

The modifications are:

— test parameters, except those common to all plastics, are omitted;

— editorial changes have been introduced;

— changes in box loading procedure;

— changes in box design.

The material-dependent parameters and/or performance requirements are incorporated in the System Standard(s) concerned.

Annex A, which is informative, gives recommended requirements.

This standard includes a Bibliography.

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

1 Scope

This standard specifies two methods for testing pipes and fittings or joints for plastics piping systems intended for use in underground drainage and sewerage systems for their resistance to deformation and leakage when subjected to sustained external loading in conjunction with the passage of hot water.

Method A involves temperature cycling, by passing hot water and cold water alternately, and is applicable to pipes and associated fittings having a mean outside diameter $d_{em} \leq 190$ mm.

Method B involves passing hot water only, except at intervals specified for measurement of internal deflection, and is applicable to pipes and associated fittings having a mean outside diameter $190 \text{ mm} < d_{em} \leq 510$ mm.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

ISO 48 *Rubber, vulcanized or thermoplastic — Determination of hardness (Hardness between 10 IRHD and 100 IRHD) (including ISO 48:1994/Amd 1:1999)*

3 Principle

A test piece comprising a pipe or an assembly of pipe(s) and fitting(s) is placed on a 100 mm gravel bed and covered with gravel to 600 mm above the crown of the pipe confined by a box of specified dimensions. Depending on the nominal size of the largest pipe or joint under test, a constant vertical load is applied via the gravel and either a specified number of cycles of hot and cold water or just hot water is passed through the test piece. The deformation of the test piece as indicated by vertical deflection or internal diametric compression is measured.

For sizes having a mean outside diameter $d_{em} \leq 190$ mm, hot and cold water is passed through the test piece and air may be blown through the test piece during the intervals between stages (Method A).

For pipes with a mean outside diameter $190 < d_{em} \leq 510$ mm a constant flow of hot water is passed through the test piece (Method B).

Vertical deflection of the test piece is measured. The test piece is checked at the end of the test for cracking, for local deflection in the bottom of the main channel and for leakage at the joints.

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

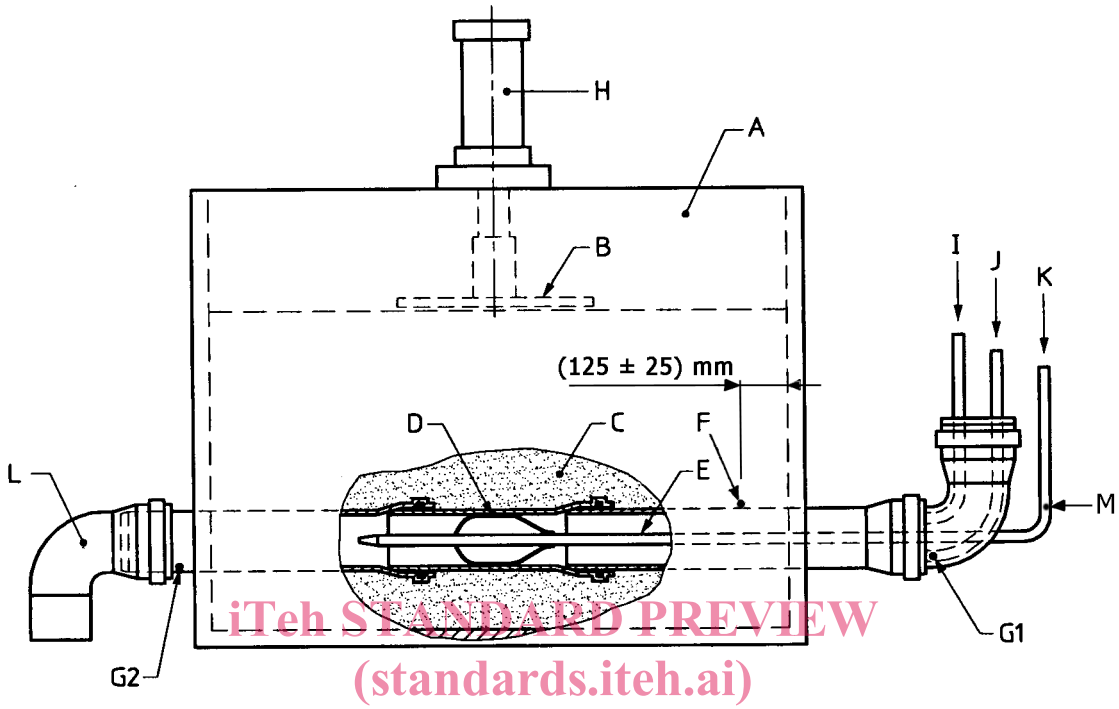
a) if appropriate, the limits of the temperature of the water flowing out (see 7.2.2);

b) if appropriate, the duration of the flow (see 7.2.2);

c) the percentage, x, of d_i for the calculation of the diameter of the hard ball, in accordance with 7.3.3.

4 Apparatus

4.1 Gravel-filled box, to accommodate a test piece as shown in Figures 1, 2 and 3, with dimensions depending upon the size of the test piece as given in Table 1 and with a horizontal base.



Key

A	Box	G2	Outlet hot water sensor (for Method B only)
B	Loading plate	H	Loading device
C	Filling material	I	Air inlet
D	Test sample	J	Hot water inlet
E	Cold water spray (sparge pipe)	K	Cold water inlet
F	Upper surface sensor	L	Water outlet (sealable)
G1	Inlet hot water sensor	M	Cold water sensor

Figure 1 — Typical box loading test (BLT) apparatus

Table 1 — Box dimensions

Dimensions in millimetres

Mean outside diameter pipe/fitting d_{em}	Inside box width l_1	Minimum length of box l_2
Method A:		
≤ 190	700 ± 20	1200
Method B:		
190 < d_{em} ≤ 205	800 ± 20	1300
205 < d_{em} ≤ 255	900 ± 20	1500
255 < d_{em} ≤ 320	1000 ± 20	1500
320 < d_{em} ≤ 410	1300 ± 20	1500
410 < d_{em} ≤ 510	1600 ± 20	1500

The inside walls of the box shall be vertical ± 3 mm and shall have an inside smooth surface e.g. plywood or flat sheet.

The box shall be constructed and reinforced such that, when under load, it shall not deflect more than 3,0 mm at any point.

The pipe line shall pass through the walls of the box via holes sealed in such a way as to impose minimal restraint on the assembly (see clause 5), e.g. by flexible closed cell sponge collars. The test assembly of pipes or pipes and fittings shall be placed with a fall of between 1:100 and 1:75 to the horizontal base so that in the case of Method A conditions alternate discharges of hot and cold water or in the case of Method B, water at a constant temperature can be passed through the assembly while it is subject to a constant force acting through the gravel.

The box shall be constructed such that it can accommodate a total height of gravel of 600 mm above the crown of the pipe.

Dimensions in millimetres and prior to load being applied

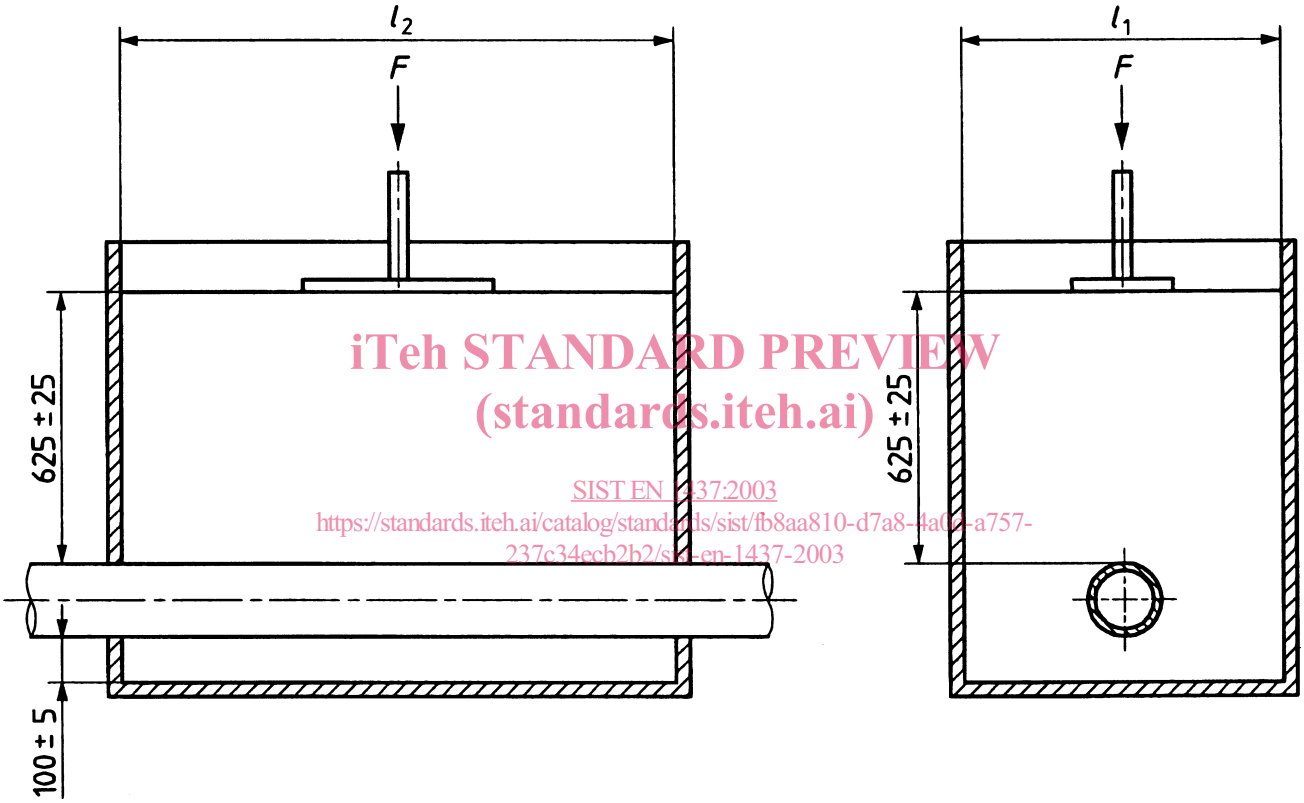
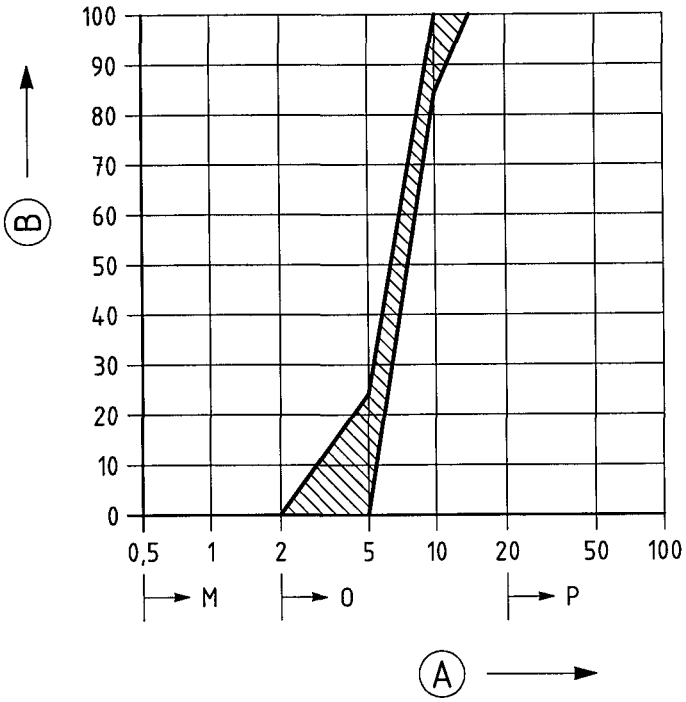


Figure 2 — Main dimensions of the box

The gravel shall be classified in accordance with Table 2, shall have a surface texture in accordance with Table 3, with granular composition within the range shown in Figure 3 and shall conform to the requirements of Table 4.



Key

A Particle size, in millimetres
B Cumulative percentage passing
M Sand
O Gravel
P Stone

Figure 3 — Gradation range of the gravel for box loading test

The gravel shall be washed natural material comprising hard, durable and clean particles.

It shall be dry during the preparation and completion of the test.

Table 2 — Particle shape

Classification	Description
Rounded	Fully water-worn or completely shaped by attrition
Irregular	Naturally irregular or partly shaped by attrition and having rounded edges
Angular	Possessing well-defined edges formed at the intersection of roughly planar faces
Flaky	Material of which the thickness is small relative to the other two dimensions
Elongated	Material, usually angular, in which the length is considerably larger than the other two dimensions
Flaky and elongated	Material having the length considerably larger than the width and the width considerably larger than the thickness