SLOVENSKI STANDARD
SIST EN 17150:2019

01-oktober-2019

Cevni sistemi iz polimernih materialov, ki delujejo po težnostnem principu in so položeni v zemljo, za transport in shranjevanje vode, ki ni namenjena pitju - Preskusna metoda za ugotavljanje kratkotrajne tlačne odpornosti zabojev

Plastics piping systems for non-pressure underground conveyance and storage of non-potable water - Test method for determination of short-term compression strength of boxes

Kunststoff-Rohrleitungssysteme für die drucklose unterirdische Entwässerung für Nicht-Trinkwasser - Prüfverfahren zur Bestimmung der Kurzzeitdruckfestigkeit von Versickerungsblöcken

Systèmes de canalisations en plastique pour le transport et le stockage souterrains sans pression de l'eau non potable - Méthode d'essai pour la détermination de la résistance à la compression à court terme des structures alvéolaires ultra-légères

Ta slovenski standard je istoveten z: **EN 17150:2019**

ICS:

23.040.03	Cevovodi za zunanje sisteme transporta vode in njihovi deli	Pipeline and its parts for external water conveyance systems

SIST EN 17150:2019 **en,fr,de**

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Plastics piping systems for non-pressure underground conveyance and storage of non-potable water - Test method for determination of short-term compression strength of boxes

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

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European foreword

This document (EN 17150:2019) 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of an identical text or by endorsement, at the latest by March 2020, and conflicting national standards shall be withdrawn at the latest by February 2021.

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1 Scope

This document specifies a method for determining short-term compression strength on boxes made of thermoplastics materials for non-pressure underground conveyance and storage of non-potable water.

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.

EN ISO 3126, *Plastics piping systems - Plastics components - Determination of dimensions (ISO 3126)*

EN ISO 7500-1:2018, *Metallic materials - Calibration and verification of static uniaxial testing machines - Part 1: Tension/compression testing machines - Calibration and verification of the force-measuring system (ISO 7500-1:2018)*

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:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
box
thermoplastic cuboid shaped element, with or without sidewalls, used to create a modular storage system

3.2
integral component
load bearing component contributing to the overall strength of the box

3.3
initial height, length, width
h_i, l_i, b_i
height (test direction), length and width of the sample before testing, respectively, in mm

3.4
initial height after pre-load
h_0
height of the sample after applying a pre-load, but before the load is further increased and recorded, in mm

4 Symbols and units

For the purposes of this document, the following symbols and units apply.

		Units
h_i	initial height (test direction)	mm
l_i	initial length	mm
b_i	initial width	mm
ε	strain	%
ε_{lim}	a predetermined maximum strain	%
h_0	height of the test sample after pre-load	mm
d_c	displacement after correction of offset	mm
F	compression load	kN
F_{max}	maximum compression load	kN
A_0	initial (projected) surface area through which the compression load is applied onto the test sample	m^2
σ_{max}	compression strength	kN/m^2
σ_{maxA}	compression strength method A	kN/m^2
σ_{maxB}	compression strength method B	kN/m^2
X, Y, Z	directions according to orientation in product standard	-

5 Principle

5.1 General

This test is carried out to find the short-term compression strength of boxes. The test sample is compressed in one direction between two parallel stiff plates, either at constant load rate (Method A) or at constant displacement rate (Method B).

NOTE The two methods A and B can lead to different results.

5.2 Method A: Constant load rate

The test sample is submitted to compression in one direction (without lateral support) between two plates moving at constant load rate until the maximum strength or, if applicable, a defined percentage of the initial height of the test sample (measured as a displacement of the test plates) after preload has been reached.

5.3 Method B: Constant displacement rate

The test sample is submitted to compression in one direction (without lateral support) between two plates moving at constant speed until the maximum strength or, if applicable, a defined percentage of the initial height of the test sample (measured as a displacement of the test plates) after preload has been reached.

6 Apparatus

6.1 Compression testing machine, which shall be capable of applying loads or displacements via stiff plates. The load may be applied either directly or indirectly, e.g. by use of a lever arm arrangement. The load shall be applied (90±1)° to the bottom plate.

For method A, the test machine shall have a maximum displacement rate capability in excess of 1 mm/s.

6.2 A pair of parallel plates.

Where the compression load can be applied to the test sample, the plates shall be flat, smooth and clean and shall not deform during the test to an extent that would affect the results. The deformation of the plates has to be lower than 1,0 mm during the whole test. The upper plate shall be fixed (plate type 1) or shall have the capability to rotate around one or both horizontal axes (plate type 2). If a test sample has integral protrusions, it is allowed to use an additional loose flat plate with recesses as a load distribution layer to secure acceptable contact between the surface of the test sample and the plate of the testing machine or remove the integral protrusions.

The length and the width of each plate shall be greater than the length and width of the test sample.

6.3 Timer, which shall be capable of continuously measuring and recording the time with an accuracy of 0,1 s.

6.4 Dimensional measuring devices, which shall be compliant with EN ISO 3126, and capable of determining the test piece dimensions with an accuracy of 1 mm.

6.5 Displacement measuring device, which shall be capable of continuously measuring and recording the displacements between the two plates of the compression machine with an accuracy of 0,1 mm.

6.6 Weighing devices, which shall be capable of measuring the weight of the test sample, with an accuracy better than 0,1 % of the sample weight. They shall be capable of measuring the weight of the plate(s), if applicable, with an accuracy better than 0,5 % of the weight of the plates.

6.7 Load measuring device, which shall be capable of continuously measuring and recording the magnitude of the compression load being applied onto the sample according to EN ISO 7500-1:2018 class 2 or better.

7 Test sample

7.1 General

The test sample shall consist of a box with integral components which represent the weakest entity of the final construction.

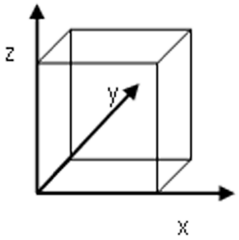

Figure 1 — Identification of the test direction of the box

In Figure 1, the Z-direction is the preferred vertical direction of installation.

Those which are homogeneous extruded boxes shall be cut to obtain a test sample representative of the structure of the box and shall furthermore be cut with a minimum length of 0,5 m in the Z-direction. The ratio between the X-direction and Z-direction, and Y-direction and the Z-direction shall be less than 1,0. Identification of the test direction can be found in Figure 1.

7.2 Age

At the start of testing in accordance with Clause 8, the age of the test samples shall be at least 24 h.

For type testing, and in case of dispute, the age of the test samples shall be at least 21 days.

7.3 Conditioning

The test samples shall be conditioned in air at test temperature for at least 24 h immediately prior to testing in accordance with Clause 8.

8 Procedure

Choose the compression method A or B.

Method A with a constant load rate of (0,50 ± 0,05) kN/m²/s.

Method B with a constant displacement rate of (1,0 ± 0,1) mm/min.

When performing the test, safety precautions should be taken to prevent from harm.

Carry out the following procedure at a temperature of (23 ± 2) °C.

Measure the dimensions of the test sample (initial height h_i, initial length l_i and initial width b_i) after conditioning, with an accuracy of 1 mm. Measure and record the weight of the test sample. Record the weight of the movable plate and the additional plate (if applicable).

The initial surface area through which the compression load is applied onto the box can be calculated using the initial dimension measurements.

Place the test sample between the two plates of the compression testing machine. The test sample should be centred on the axis of the applied load.

When the test is carried out in X- or Y- direction, fixing of components may be needed compared with tests carried out in Z-Direction. The type of fixture used shall be reported.

At the beginning of the test, the test sample shall be compressed with a nominal pre-load of 5 kN/m² to 10 kN/m². This pre-load shall be applied within 1 min and kept constant for 5 min.

Record the sample height h_0 after applying pre-load.