SLOVENSKI STANDARD
SIST EN 12613:2021

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Nadomešča:
SIST EN 12613:2009

Polimerne opozorilne priprave za podzemne kable in cevovode z vidnimi značilnostmi

Plastics warning devices for underground cables and pipelines with visual characteristics

Warneinrichtungen aus Kunststoff mit visuellen Eigenschaften für erdverlegte Kabel und Rohrleitungen

Dispositifs avertisseurs à caractéristiques visuelles, en matière plastique, pour câbles et canalisations enterrés

Ta slovenski standard je istoveten z: **EN 12613:2021**

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13.320	Alarmni in opozorilni sistemi	Alarm and warning systems
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Plastics warning devices for underground cables and pipelines with visual characteristics

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Warneinrichtungen aus Kunststoff mit visuellen Eigenschaften für erdverlegte Kabel und Rohrleitungen

This European Standard was approved by CEN on 13 December 2020.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 12613:2021) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by July 2021, and conflicting national standards shall be withdrawn at the latest by July 2021.

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

This document supersedes EN 12613:2009.

The major modifications compared to the previous edition are:

— Addition of a reference to Regulation (EC) No 1907/2006 (REACH) (Clause 4);

— Addition of the apparatus for measurement of dimensional characteristics (5.3.1);

— Review of the tolerances for nominal widths greater than 1 000 mm (5.3.3);

— Deletion of the transversal rigidity (5.4.3 in EN 12613:2009), since it is not a discriminating characteristic for products with width ≤ 500 mm;

— Addition of a sentence to specify that the case of absence of rupture of the test specimen is considered as successful (5.5);

— The method according EN 60898-1, for the resistance of printing, is now recommended only (instead of being mandatory) and other methods are allowed (5.9);

— Review of the number of test pieces reduced from four to one. In addition, when the test is not successful, an acceptance criteria is defined for retesting (6.1);

— Extension of the tolerances on the test temperature for the products submitted to testing (6.1);

— Deletion of 6.4 of EN 12613:2009 (transversal rigidity);

— Deletion of Clause 7 of EN 12613:2009 as factory production control tests do not necessarily appear in a product standard;

— In A.2, deletion of the paragraph beginning with “IMPORTANT” (no added value);

— Review of Figure A.4 and expressing of minimum gaps between the plates and the transversal walls of the central compartment;

— Addition of Table A.2 giving the characteristics of an alternative quality of EPDM sheets (A.2.4);

— Review of tolerances for EPDM sheets (Table A.3);

— Total load values were changed to minimum values (Table A.4);

— Review of the number of test pieces (A.3);

— Review of the number of test pieces to be tested from six to three (A.5);

— Addition of a new paragraph for the acceptance criteria (A.6);

— Change of the duration of the test from 15 days to 28 days (B.3);

— Addition of a Bibliography.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Visual warning devices are used for the manual or mechanized laying of cables and piping buried in ground such as electrical power cables, communication cables, pressure and non-pressure piping systems.

The purpose of warning devices is to warn of the presence of a pipe or a cable, when opening a trench, to indicate its orientation and to identify the equipment protected.

The warning devices are expected to last at least the lifetime of the equipment with which they are associated.

1 Scope

This document specifies the material, mechanical and functional (fitness for purpose) requirements for warning devices with visual characteristics manufactured from plastics, intended to indicate the presence of cables and piping systems buried in ground when opening trenches and more generally during digging work.

This document also specifies test methods.

This document is applicable to two types of visual warning devices: tapes (type 1) and meshes (type 2).

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 60898-1:2019, *Electrical accessories — Circuit-breakers for overcurrent protection for household and similar installations — Part 1: Circuit-breakers for a.c. operation (IEC 60898-1:2015, modified)*

EN ISO 175, *Plastics — Methods of test for the determination of the effects of immersion in liquid chemicals (ISO 175)*

EN ISO 846, *Plastics — Evaluation of the action of microorganisms (ISO 846)*

EN ISO 4892-1, *Plastics — Methods of exposure to laboratory light sources — Part 1: General guidance (ISO 4892-1)*

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 https://www.iso.org/obp

3.1
Type 1 warning device
strip manufactured from plastics to warn of the presence of underground cables or pipes during excavation

3.2
Type 2 warning device
mesh/net manufactured from plastics to warn of the presence of underground cables or pipes during excavation

3.3
nominal width of a warning device
W_0
overall width of the warning device, as declared by the manufacturer, in millimetres

3.4
longitudinal direction
direction corresponding to the extrusion direction, parallel to the length of the reel

4 Material

The material shall be made of any thermoplastic material, e.g. polyethylene (PE) or polypropylene (PP), to which are added those additives necessary for manufacturing warning devices conforming to the requirements of this document.

The use of own or external reprocessed materials or recycled materials shall be permitted for manufacturing warning devices conforming to the requirements of this document.

The material, additives, colour masterbatches and inks for printing, if added, shall have no detrimental effect on the environment.

Environmental, health and safety aspects, as well as the use of regulated substances [1] are to be taken into account for the design process of the products.

5 Requirements

5.1 Colour

The colour of the warning device shall be as agreed between the manufacturer and the purchaser.

5.2 Appearance and colour fastness

The appearance, colouring and marking of the warning device shall not exhibit any change when tested in accordance with 6.2. No discoloration or change of the initial colour shall be permitted. Only a change in surface appearance (e.g. gloss/matt) shall be permitted.

For a given type of warning device (design, width), the colour fastness shall be tested for each colour.

5.3 Dimensional characteristics

5.3.1 General

The nominal width, W_0, of the warning device shall be as agreed between the manufacturer and the purchaser.

The dimensional characteristics of the warning device shall be measured by means of:

a) a measuring tape/metal ruler, capable of measuring to an accuracy of 1,0 mm for the width of the warning device;

b) a metal ruler, capable of measuring to an accuracy of 0,5 mm for the internal perimeter of the openings, if relevant;

c) a calliper gauge, capable of measuring to an accuracy of 0,1 mm, for measuring the minimum width of the strands, if relevant.

5.3.2 Type 1 warning devices

Each individual value of the width shall be equal or greater than 50 mm and the outside edges of the warning device shall be straight and parallel.

The deviation of each outside edge, towards outside or inside relatively to the mean line, shall be less or equal to 2 mm.

5.3.3 Type 2 warning devices

The width of the Type 2 warning device shall conform to Table 1.

Table 1 — Requirements for the width

Nominal width mm	Minimum and maximum width mm
$50 \leq W_0 < 100$	$W_0 - 0{,}1\ W_0 \leq W \leq W_0 + 0{,}1\ W_0$ and $W \geq 50$
$100 \leq W_0 \leq 500$	$W_0 - 10 \leq W \leq W_0 + 10$
$500 < W_0 \leq 1\ 000$	$W_0 - 20 \leq W \leq W_0 + 20$
$W_0 > 1\ 000$	$W_0 - 30 \leq W \leq W_0 + 30$

The internal perimeter of an opening shall be ≤ 360 mm.

The minimum width of the strands shall be:

— ≥ 1 mm when the internal perimeter of the opening is < 160 mm;

— ≥ 2 mm when the internal perimeter of the opening is ≥ 160 mm.

It is recommended that the minimum reel length is equal or greater than 100 m or as agreed between the manufacturer and the purchaser.

5.4 Laying characteristics

5.4.1 General

For ease of use, the warning devices need sufficient flatness and longitudinal mechanical strength to maintain their shape.

5.4.2 Tensile withstand strength

When tested in accordance with 6.3, the type 1 warning device shall withstand a load of 200 N during 1 min in longitudinal direction, without starting of the separation of the weak points, if any, and shall not exhibit a reduction of more than 20 % of its width after removal of the load.

When tested in accordance with 6.3, the type 2 warning device shall withstand a load of 300 N during 1 min in longitudinal direction, without starting of the separation of the weak points, if any, and shall not exhibit a reduction of more than 20 % of its width after removal of the load.

5.4.3 Flatness

When tested in accordance with 6.4, the warning device shall not exhibit a gap between any point of the warning device and the reference surface greater than W_0 /4.

5.5 Visual warning characteristics

The visual characteristics of the warning devices are assessed by means of a test which simulates the opening of a trench with the bucket of an excavator (see A.1).

When tested in accordance with Annex A, the warning device shall exhibit at least one single part of a minimum length of 200 mm outside of the movable plate (which simulates the bucket) and at least one single part of a minimum length of 200 mm in the frame (which simulate the trench). In the case of absence of rupture between the movable plate and at least one side of the frame, the warning device is deemed to satisfy the requirement of this subclause. The width of the visible parts of warning device shall be greater or equal to 2 mm.

5.6 Resistance against microorganisms

The resistance against microorganisms shall be determined only for the warning devices made from materials other than polyethylene (PE) or polypropylene (PP).

When tested in accordance with EN ISO 846 and the test conditions as specified by the purchaser, the warning device shall not exhibit any change.

5.7 Resistance to UV-light

If required, the warning device shall be resistant to UV-light. When tested in accordance with the guidance provided by EN ISO 4892-1 and its subsequent parts, and the test method and conditions as specified by the purchaser, the warning device shall conform to the requirement as specified by the purchaser.

If the warning device is not resistant to UV-light, it shall be protected by suitable packaging, as agreed between manufacturer and purchaser.

5.8 Temperature stability

If required, the temperature stability of the warning device shall conform to the requirement, as agreed between the manufacturer and the purchaser.

5.9 Resistance of printing

If required, the permanence of print (or printing) on the warning device should be determined in accordance with EN 60898-1:2019, 9.3. If so, it shall fulfil the requirements specified in EN 60898-1:2019, 9.3. Other test methods to assess the resistance of printing may be used by agreement between the manufacturer and the purchaser.

5.10 Marking

The visual warning devices shall be marked at intervals (i.e. the free space between two consecutive marks) not exceeding 1 m.

The marking shall be legible when viewed without magnification, durable and shall include at least the following information:

a) reference to EN 12613;

b) name or trademark of the manufacturer;

c) year of manufacture in figure or in code.

Information other than the above shall be in accordance with the purchaser's specification.

6 Test methods

6.1 Test pieces and test conditions

One test piece shall be tested for each test, i.e. the determination of the colour fastness (6.2), the determination of the tensile withstand strength (6.3) and the determination of the flatness (6.4).

When the test piece does not satisfy the relevant requirement, then the test shall be repeated by using two other test pieces. In this case, these two test pieces shall satisfy the relevant requirement, in order to declare the test successful.

Unless otherwise specified, conditioning and testing shall be performed at (23 ± 5) °C.