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**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

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13.320	Alarmni in opozorilni sistemi	Alarm and warning systems
83.140.99	Drugi izdelki iz gume in polimernih materialov	Other rubber and plastics products

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## Plastics warning devices for underground cables and pipelines with visual characteristics

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

Warneinrichtungen aus Kunststoff mit visuellen Eigenschaften für erdverlegte Kabel und Rohrleitungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 249.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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## European foreword

This document (prEN 12613:2020) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by NBN.

This document is currently submitted to the CEN Enquiry.

This document will supersede 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  $\leq 500$  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 60868-1, 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 clause for the acceptance criteria (A.6);

- Review of numbering of A.6 of EN 12613:2009 to A.7;
- Change of the duration of the test from 15 days to 28 days (B.3);
- Addition of a Bibliography.

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## 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.

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## 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 the test methods referred to in this document.

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 60898-1:2017, modified)*

EN ISO 175, *Plastics — Method of test for 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 <http://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

**prEN 12613:2020 (E)****3.5****transversal direction**

direction parallel to the width (at right angle to the length)

**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  $\leq 360$  mm.

The minimum width of the strands shall be:

—  $\geq 1$  mm when the internal perimeter of the opening is  $< 160$  mm;

—  $\geq 2$  mm when the internal perimeter of the opening is  $\geq 160$  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