Plastics warning devices for underground cables and pipelines with visual characteristics

The European Standard EN 12613:2001 has the status of a Swedish Standard. This document contains the official English version of EN 12613:2001. Swedish Standards corresponding to documents referred to in this Standard are listed in "Catalogue of Swedish Standards", issued by SIS. The Catalogue lists, with reference number and year of Swedish approval, International and European Standards approved as Swedish Standards as well as other Swedish Standards.

Plast – Varningsanordningar av plast för markförlagda kablar och rörledningar med visuella egenskaper

Plastics warning devices for underground cables and pipelines with visual characteristics

English version

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 European Standard was approved by CEN on 1 March 2001.

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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.
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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 249 "Plastics", the secretariat of which is held by IBN.

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of an identical text or by endorsement, at the latest by October 2001, and conflicting national standards shall be withdrawn at the latest by October 2001.

This standard includes two normative annexes A and B, specifying test methods.

This standard specifies the requirements of warning devices for the manual or mechanized laying of cables and piping in the ground such as electric cables, pipelines for pressurized or unpressurized fluids. These warning devices have a triple aim, warning of the presence of a pipeline, or a cable, when opening a trench, indicating its orientation and identifying the equipment protected.

The life expectancy of the warning devices should be at least equal to that of the equipment with which it is associated.

The test methods and the corresponding requirements relate to the constituent material and to the functional characteristics (fitness for purpose) of the warning device.

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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.
1 Scope

This standard specifies the requirements for warning devices with visual characteristics manufactured from plastic materials, intended to indicate the presence of cables and pipelines laid in the ground when opening trenches and more generally during digging work.

The warning device may have the form of a tape (type 1) or a mesh (type 2).

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).

EN ISO 175 Plastics - Methods of test for the determination of the effects of immersion in liquid chemicals (ISO 175:1994)
IEC 60898:1995 Electrical accessories - Circuit-breakers for over current protection for household and similar installations

3 Terms and definitions

For the purposes of this standard the following terms and definitions apply.

3.1 warning device (visual), type 1
a strip formed from plastic material to warn of the presence of underground cables or pipes during excavation

3.2 warning device (visual), type 2
a net formed from plastic material to warn of the presence of underground cables or pipes during excavation

4 Material

The material shall be any thermoplastics material, e.g. polyethylene (PE) or polypropylene (PP), which enables the warning device (visual) to conform to the requirements of this part of this standard.

The use of reworked, reprocessed or recycled materials is permitted.

The material and, if used, colours for printing shall have no detrimental effects on the environment.

5 Requirements

5.1 Appearance and colouring
The appearance, colouring and marking shall not exhibit any change after testing in accordance with 6.1.1.

The colours are to be as agreed between manufacturer and purchaser.
5.2 Dimensions

5.2.1 Warning device (visual), type 1

The width of the warning device (visual), type 1, shall be as agreed between manufacturer and purchaser, but not less than 50 mm. The sides shall be straight and parallel, with permissible deviations of ± 2 mm.

5.2.2 Warning device (visual), type 2

The nominal width of the warning device (visual), type 2, shall be declared by the manufacturer. The permissible deviations from the manufacturer’s declared width shall be ± 10 % or ± 10 mm, whichever is the smaller, provided that the minimum width of the device is not less than 50 mm.

The recommended minimum length of a warning device (visual), type 2 on a reel is 100 m or as agreed with the purchaser.

The maximum internal perimeter for an opening in the warning device (visual), type 2 shall be 360 mm.

The minimum width of the strands forming a warning device (visual), type 2 shall be as follows:
- 2 mm for an internal perimeter equal to or greater than 160 mm;
- 1 mm for an internal perimeter less than 160 mm.

5.3 Tensile withstand strength

Testing shall be in accordance with 6.1.2.

Using a test piece conforming to Figure 1 in 6.1.2, the minimum tensile withstand load for the warning device (visual), type 1 in the longitudinal direction shall be not less than 200 N.

For a warning device (visual), type 2, the tensile withstand load in the longitudinal direction shall be not less than 300 N.

The test piece shall withstand without starting to separate at the weak points (if any) for not less than 5 min.

The test piece shall not exhibit a reduction of more than 20 % of its width after removal of the specified load.

5.4 Laying characteristics

For ease of use, the warning device (visual) requires sufficient transverse rigidity, sufficient flatness and sufficient longitudinal mechanical strength to maintain the shape.

They shall be tested in accordance with 6.1.7.

The outside edges of a warning device of length L and width w, when supported by an axial strip of width w/4 along the whole length L (see Figure 2) for 1 min at (23 ± 2) °C, shall not exceed a deflection greater than w/4 (see Figure 2).

The flatness shall be such that when a length of 10 m is laid on a flat surface for 5 min at (23 ± 2) °C, the warning device shall not exhibit, at any point, any separation with respect to the reference surface greater than w/4.
5.5 Visual warning characteristics

When tested in accordance with 6.1.3, the warning device (visual) shall exhibit at least one minimum single length of 200 mm outside the simulated bucket and at least one minimum length of 200 mm in the simulated trench. The minimum width shall be 2 mm.

5.6 Resistance to microorganisms

This test is to be performed on materials other than PE or PP.
After testing in accordance with 6.1.4, the warning device (visual) shall not exhibit any change.

5.7 Resistance to UV-light

If required, the warning device (visual) shall be resistant to UV-light: the test conditions shall be specified by the purchaser, when tested in accordance with 6.1.5.

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

5.8 Temperature stability

The temperature stability should be agreed between purchaser and supplier.

5.9 Marking

The warning device (visual) shall be marked at intervals not exceeding 1 m. The marking shall be legible, durable and shall include at least the following information:
- a) name or trademark of the manufacturer;
- b) year of manufacture in uncoded form
- c) reference to this European Standard
Information other than the above shall be in accordance with the purchaser’s specification.

6 Testing

6.1 Type tests

Type tests shall be conducted on 4 samples. When one of the samples does not conform to the test requirements that test shall be repeated on further four samples.
All type tests shall be conducted at (23 ±2) °C unless otherwise specified.

6.1.1 Colouring

Three separate tests shall be carried out in accordance with :
- normative annex B, using 20% ammonium sulfide;
- EN ISO 175, using 10 % nitric acid and 20 % sodium carbonate solution.
These tests shall be repeated for each colour.

No discolouration or change of the initial colour is permitted. Only a change in surface finish (e.g. gloss/matt) is permitted.

6.1.2 Tensile withstand strength

For the determination of the longitudinal tensile withstand strength, the length of the test piece (L in Figure 1) shall be such that it includes, when there are weak points distributed repeatedly, at least one set of points affecting the whole width.