



SLOVENSKI STANDARD
SIST EN 50340:2002

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Hidravlične naprave za rezanje kablov - Naprave za uporabo na električnih inštalacijah z nazivno izmenično napetostjo do 30 kV

Hydraulic cable cutting devices - Devices to be used on electrical installations with nominal voltage up to AC 30 kV

Hydraulische Kabelschneidgeräte - Geräte zur Verwendung an elektrischen Anlagen mit Nennwechselspannungen bis 30 kV

Dispositifs coupe câbles hydrauliques - Dispositifs à utiliser sur des installations électriques de tension nominale jusqu'à 30 kV en courant alternatif

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ICS:

13.260 Varstvo pred električnim Protection against electric
udarom. Delo pod napetostjo shock. Live working

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EUROPEAN STANDARD

EN 50340

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English version

**Hydraulic cable cutting devices -
Devices to be used on electrical installations
with nominal voltage up to AC 30 kV**

Dispositifs coupe câbles hydrauliques -
Dispositifs à utiliser sur des installations
électriques de tension nominale jusqu'à
30 kV en courant alternatif

Hydraulische Kabelschneidergeräte -
Geräte zur Verwendung an elektrischen
Anlagen mit Nennwechselspannungen
bis 30 kV

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This European Standard was approved by CENELEC on 2000-08-01. CENELEC 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 Central Secretariat or to any CENELEC 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 CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

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Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 78, Equipment and tools for live working.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50340 on 2000-08-01.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2002-05-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2003-08-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annexes A, B and C are normative and annexes D and E are informative.

The cable cutting devices specified here are designed to protect the user while he is verifying whether the cable is dead.

In some countries, it is necessary where the cable to be cut is live that the first action of the cutting device is to make, on a multi-phases cable, only a single-phase fault to earth so that the protective devices of the network can operate on a single-phase fault.

This standard specifies requirements and tests for these cable cutting devices.

1 Scope

This standard is applicable to cable cutting devices to be used to verify that a cable is dead in accordance with the rules given in EN 50110.

Cable cutting devices specified in this standard are for use on systems with nominal voltage up to 30 kV AC and nominal frequencies up to 60 Hz.

For devices to be used on systems with nominal voltages above 30 kV AC this standard should be used as a guide but additional requirements and tests shall be agreed between manufacturer and customer to provide for an equivalent level of safety.

These devices are not designed to be used on cables with special armour, or with steel wires or steel tapes more than 1 mm in diameter or thickness.

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 12164 + A1	1998 2000	Copper and copper alloys material - Rod for free machining purposes
EN 50110	1996	Operation of electrical installations.
EN 60060-2	1994	Part 2 : Measuring systems (IEC 60060-2:1994)
EN 60156	1995	Insulating liquids - Determination of the breakdown voltage at power frequency - Test method (IEC 60156:1995)
EN 61230	1995	Live working : Portable equipment for earthing or earthing and short-circuiting (IEC 61230:1993, mod.)
HD 437 S1	1984	Standard conditions for use prior and during the testing of solid electrical insulating materials (IEC 60212:1971)
HD 588.1 S1	1991	High-voltage test techniques - Part 1 : General definitions and test requirements (IEC 60060-1:1989)
IEC 60050-151	1978	International Electrotechnical Vocabulary – Chapter 151 : Electrical and magnetic devices.
IEC 60050-604	1987	International Electrotechnical Vocabulary – Chapter 604 : Generation, transmission and distribution of electricity – Operation
IEC 60410	1973	Sampling plans and procedures for inspection by attributes.
IEC 61318	1994	Live working - Guidelines for quality assurance plans.
ISO 1402	1994	Rubber and plastic hoses and hose assemblies - Hydrostatic testing

ISO 6507-1	1997	Metallic materials – Vickers hardness test – Part 1: Test method
ISO 6803	1994	Rubber or plastic hoses and hose assemblies - Hydraulic - pressure impulse test without flexing
ISO 8457-1	1989	Steel wire rod - Part 1 : Dimensions and tolerances
ISO 8457-2	1989	Steel wire rod - Part 2 : Quality requirements for unalloyed steel wire rods for conversion to wire
ISO 9000	series	Quality management systems

3 Definitions

For the purposes of this standard, the following definitions are applicable.

3.1

cable cutting device

a portable device which is used to cut cables in a safe manner. This device is used to verify that a cable is dead at the work site.

It consists of the following components (see Figure 1) :

- a cutting head, this contains the cutting blade(s),
- a hydraulic pump,
- a length of insulating hose with fittings to connect the cutting head and the pump,
- insulating hydraulic fluid,
- an earthing system.

3.2

cutting head

that part (component) of the device which contains the cutting blade(s) and which is applied to the cable to be cut. The blade(s) is(are) operated by means of hydraulic pressure.

3.3

pump

that part of the device which generates pressure in the insulating hydraulic fluid within the hose to operate the cutting head.

3.4

insulating hose

an insulating and pressure resistant hose used to connect the cutting head and the pump.

3.5

insulating hydraulic fluid

fluid with suitable electrical insulating properties used to equalize the pressure between the pump and the cutting head.

3.6

reverse flow valve

a valve for manual operation which is designed and installed for the backflow of fluid from the pressure compartment to the storage compartment after having cut through the cable completely.

3.7

safety valve

a valve designed and installed to release the pressure of fluid in the pressure compartment when the maximum operating pressure of the hydraulic system is reached, so that it protects the system against overpressure.

3.8

hydraulic coupler

a fitting on the pump, the cutting head and at each end of the hose to permit connection of these components. The fitting is made in two mating parts. The coupler can be connected and disconnected only under negligible pressure. The coupler shall be fluid tight and maintain connection under the maximum operating pressure condition of the cable cutting device.

NOTE Some couplers can be separated by hand, others may require the use of a tool.

3.9

maximum operating pressure

the operating pressure specified by the manufacturer which shall not be exceeded during the functioning of the cable cutting device.

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3.10

blade(s)

metallic part(s) with a sharp edge or edges which is designed to penetrate the cable in such a way that the cable will be cut into two separate parts.

3.11

earthing system

all those necessary connections, conductors and fittings used to ensure that the electrical potential of an equipment is as close as practicable to the earth potential (i.e. at or about 0 V to earth) [IEV 604-04-02 Mod].

3.12 Tests

3.12.1

type test

a test performed of one or more devices made to a certain design to show that the design meets certain specifications [IEV 151-04-15].

3.12.2

routine test

a test to which each individual device is subjected during or after manufacture to ascertain whether it complies with certain criteria [IEV 151-04-16].

3.12.3

sampling test

a test performed on a number of devices taken at random from a batch [IEV 151-04-17].

3.12.4

acceptance test

a contractual test to prove to the customer that the device meets certain conditions of its specification [IEV 151-04-20].

4 Requirements

4.1 General

4.1.1 The device shall operate correctly and safely indoor, outdoor, under rain and with a range of ambient temperature between -20°C to +40°C.

4.1.2 The complete cable cutting device shall safely withstand the maximum operating pressure.

4.1.3 For cable cutting devices which can be dismantled, suitable means for the storage and transportation of the separate components shall be provided. These means shall be designed to prevent damage to the component parts in transit and pollution/contamination of all the insulating parts (i.e. hydraulic fluid, hoses). (standards.iteh.ai)

4.2 Cutting head

4.2.1 The design of the cutting head shall be such that it can be transported in a safe manner and is safe and easy to locate on a cable.

4.2.2 The mass of the cutting head shall not exceed 20 kg so that it can be safely and readily operated by one person.

4.2.3 The cutting head shall be designed so that when properly applied, it shall not be displaced during a cutting operation except when a short circuit fault occurs.

4.2.4 The cutting head shall be capable of cutting safely all cables with a diameter up to the maximum diameter specified by the manufacturer.

4.2.5 The blade(s) of the cutting head shall be made of a durable metallic material with a surface hardness ranging between 558 HV5 and 715 HV5 (50 up to 60 HRC) (see ISO 6507-1).

4.2.6 The cutting head shall be designed to ensure that cutting is done continuously until the cable is cut through completely.

4.2.7 If the hydraulic pressure disappears for any reason the blade(s) shall return to the starting position.

4.2.8 The cutting head shall be connected to the insulating hose by a coupler which requires the use of a tool to separate it.

4.2.9 The cutting head(s) shall be compatible with the pump as specified by the manufacturer of the pump.

4.3 Insulating hose

4.3.1 These hoses shall provide the required electric insulation between the operator and the cable even when the cutting head blade(s) reach(es) the highest nominal voltage at power frequency and also under condition of pollution of the outer surface.

4.3.2 The complete length of the insulating hose shall be made of insulating material. It shall be flexible.

4.3.3 The insulating hose shall be a single piece and be not less than 5 m long. Moreover, the effective length shall be in accordance with the recommendations for use as mentioned in annex A.

The elongation of the hose when measured at the maximum operating pressure shall be less than 5% of the original length.

4.3.4 The insulating hose and couplings shall withstand the following pressure tests :

- an overpressure test of 2 times the maximum operating pressure,
- a burst-pressure test of 4 times the maximum operating pressure,
- 60 000 pulses at the maximum pulse pressure of 1,33 times the maximum operating pressure and with hydraulic fluid temperature of 100°C.

4.4 Insulating hydraulic fluid

The insulating hydraulic fluid shall withstand a test voltage of at least 10 kV.

4.5 Pump

4.5.1 The pump shall be fitted with a safety valve, a reverse flow valve and a pressure gauge to indicate the operating pressure.

4.5.2 To ensure that the pump does not move during pumping, the part of the pump in contact with the ground shall be designed to provide sufficient slip resistance during operation.

4.5.3 The pump shall be suitable for operation by foot, by hand or by power driven operation.

4.5.4 Any means provided to adjust the maximum operating pressure shall only be accessible via a cover/plate, or enclosure which needs a special tool for removal.

4.5.5 The pressure level at which the safety valve shall function shall be reached with no more than 50 strokes of the pump operating mechanism and no more than one minute in the case of power driven pumps.

4.6 Safety valve

4.6.1 The safety valve shall release pressure in excess of the operating pressure by diverting the flow of the insulating fluid back into the storage compartment.

4.6.2 The safety valve shall close automatically when the pressure in the system decreases below the maximum operating pressure.

4.7 Reverse flow valve

The reverse flow valve shall be readily operated from the operating position.

4.8 Pressure gauge

4.8.1 The pressure indicated by the pressure gauge shall be clear and unambiguous when viewed from the operating position.

4.8.2 The pressure gauge shall either be protected against mechanical damage or be sufficiently robust in construction.

4.8.3 The range of pressure shown by the pressure gauge shall extend from « No pressure » to a value not less than 1,2 times the maximum operating pressure. The «maximum operating pressure» shall be clearly indicated by a marking in red. The indication shall be clear and unambiguous when viewed from the operating position.

4.9 Hydraulic coupler

4.9.1 The mating parts of the coupler shall be capable of being easily connected by hand on the pump and by a tool on the head.

4.9.2 The mating parts of the coupler, once properly connected, shall neither separate under pressure nor leak.

4.9.3 To protect against the ingress of foreign bodies and pollutants, each part of any coupler shall be provided with a readily removable cover or cap.

NOTE These covers and caps should be made captive to their individual parts of the couplers, so they are not lost.

4.10 Equipotential bonding and earthing system

The cable cutting device shall be usable according to the two following methods (4-10-1 and 4-10-2). So the cable cutting device shall be equipped with identified fittings where the earthing links will be connected (see ANNEX A).

4.10.1 Bonding shall be made between the pump and the earth (ground) by means of an earthing cable having a minimum cross section area of not less than 16 mm² and a length no greater than 1 m.

4.10.2 The cutting head shall be earthed. The earthing cable shall meet the requirements of EN 61230.