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Kabelski distribucijski sistemi za televizijsko in zvokovno radiofuzijo - 1. del: Varnostne zahteve

Cabled distribution systems for television and sound signals - Part 1: Safety requirements

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English version

Cabled distribution systems for television and sound signals
Part 1: Safety requirements

Systèmes de distribution par câble destinés aux signaux de radiodiffusion sonore et de télévision
Partie 1: Règles de sécurité

Kabelverteilsysteme für Ton- und Fernsehrundfunk-Signale
Teil 1: Sicherheitsanforderungen

This European Standard was approved by CENELEC on 9 March 1993. 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

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Foreword

The present European Standard was prepared by the CENELEC Technical Committee TC 109, Cabled distribution systems for television and sound signals. It was submitted to the CENELEC formal vote in September 1992 and was approved by CENELEC as EN 50083-1 on 9 March 1993.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1994-03-01
- latest date of withdrawal of conflicting national standards (dow) 1994-03-01

For products which have complied with the relevant national standard before 1994-03-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1999-03-01.

Annexes designated "normative" are part of the body of the standard. Annexes designated "informative" are given only for information. In this standard, annexes A and C are normative and annexes B and D are informative.

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Cabled distribution systems for television and sound signals

Part 1: Safety requirements

1 Scope

This standard deals with the safety requirements applicable to fixed sited systems and equipments primarily intended for the reception, processing and distribution of sound signals, television signals and their associated data signals using all applicable transmission media. It covers all types of systems such as:

- CATV-systems;
- MATV-systems;
- individual receiving systems;

and all types of equipment installed in such systems.

As far as applicable it is also valid for mobile and temporarily installed systems e.g. caravans.

Additional requirements may apply, for example in relation to:

- electricity distribution systems (overhead or underground);
- other telecommunication services distribution systems;
- water distribution systems;
- gas distribution systems;
- lightning protection systems.

This standard is valid for all items from the receiving antennas to the system outlets (subscriber equipment input). This standard does not cover subscriber equipment.

This standard is intended to provide specifically for the safety of the system, personnel working on it, subscribers and subscriber equipment. It deals only with safety aspects and is not intended to define a standard for the protection of equipment used in the system.

2 Terms and definitions

For the purposes of this standard, the following definitions apply:

2.1 cabled distribution system (for television and sound signals)

The general overall term used to define CATV-systems, MATV-systems and individual receiving systems.

2.2 CATV-system or Community Antenna Television system

A system designed to provide sound and television signals to communities.

2.3 MATV-system or Master Antenna Television system

A system designed to provide sound and television signals to households in one or more buildings.

2.4 individual receiving system

A system designed to provide sound and television signals to an individual household.

2.5 headend

Equipment which is connected between receiving antennas or other signal sources and the remainder of the cabled distribution system, to process the signals to be distributed.

2.6 **receiving antenna**

A device with the proper electrical characteristics that intercepts desired signals in the atmosphere and transfers these to the remainder of the cabled distribution system.

2.7 **feeder**

A transmission path forming part of a cabled distribution system. Such a path may consist of a metallic cable, optical fibre, waveguide, or any combination of them. By extension the term is also applied to paths containing one or more radio links.

2.8 **spur feeder**

A feeder to which subscriber taps or looped system outlets are connected.

2.9 **amplifier**

A device to compensate for attenuation.

2.10 **splitter (spur unit)**

A device in which the signal power at the (input) port is divided equally or unequally between two or more (output) ports.

NOTE: Some forms of this device may be used in the reverse direction for combining signal energy.

2.11 **subscriber tap**

A device for connecting a subscriber feeder to a spur feeder.

2.12 **system outlet**

A device for interconnecting a subscriber feeder and a receiver lead.

2.13 **receiver lead**

A lead which connects the system outlet to the subscriber equipment.

NOTE: A receiver lead may include filters and balun transformers in addition to the cable.

2.14 **subscriber feeder**

A feeder connecting a subscriber tap to a system outlet or, where the latter is not used, directly to the subscriber equipment.

2.15 **subscriber equipment**

Equipment at the subscriber premises such as receivers, tuners, decoders, video recorders.

2.16 **transfer point**

An interface between the cabled distribution network and the building's internal network, each of which may be separately owned. The transfer point may contain a voltage dependent device and/or a galvanic isolator.

2.17 **galvanic isolator**

A device providing electrical isolation below a certain frequency range.

2.18 **surge suppressor** [IEC 1024-1]

A device designed to limit the surge voltage between two parts within the space to be protected, such as a spark gap, surge diverter or semiconductor device.

2.19 **attenuation**

The attenuation of any system or equipment is the decibel ratio of the input power to the output power.

2.20 **earthing terminal**

The connection point by means of which the earthing or grounding of a conducting part of an equipment is accomplished.

2.21 **earth electrode** [IEV 826-04-02]

A conductive part or a group of conductive parts in intimate contact with and providing an electrical connection with earth.

2.22 **protective conductor** (symbol PE) [IEV 826-04-05]

A conductor required by some measures for protection against electric shock for electrically connecting any of the following parts:

- exposed conductive parts;
- extraneous conductive parts;
- main earthing terminal;
- earth electrode;
- earthed point of the source or artificial neutral.

2.23 **earthing conductor** [IEV 826-04-07]

A protective conductor connecting the main earthing terminal or bar to the earth electrode.

2.24 **neutral conductor** (symbol N) [IEV 826-01-03]

A conductor connected to the neutral point of a system and capable of contributing to the transmission of electrical energy.

2.25 **equipotential bonding conductor** [IEV 826-04-10]

A protective conductor for ensuring equipotential bonding.

2.26 **equipotential bonding** [IEV 826-04-09]

Electrical connection putting various exposed conductive parts and extraneous conductive parts at a substantially equal potential.

2.27 **equipotential bonding bar**

A bar to which e.g. extraneous-conductive-parts (see IEV 826-03-03), metal-sheath of electrical power and telecommunication cables and other cables can be bonded.

2.28 **lightning protection system (LPS)** [IEC 1024-1]

The complete system used to protect a space against the effects of lightning. It consists of both external and internal lightning protection systems.

NOTE: In particular cases, an LPS may consist of an external LPS or an internal LPS only.

2.29 **"natural" component of an LPS** [IEC 1024-1]

A component which performs a lightning protection function but is not installed specifically for that purpose.

NOTE: Some examples of the use of this term are as follows:
- "natural" air-termination;
- "natural" down-conductor;
- "natural" earth electrode.

2.30 **earth-termination system** [IEC 1024-1, modified]

That part of an external earthing system which is intended to conduct and disperse current in the earth.

2.31 **metal installation** [IEC 1024-1]

Extended metal items in the space to be protected which may form a path for lightning current such as pipe-work, staircases, elevator guide rails, ventilation, heating and air conditioning ducts and interconnected reinforcing steel.

2.32 **safety distance** [IEC 1024-1]

The minimum distance between two conductive parts within the space to be protected between which no dangerous sparking can occur.

2.33 **main earthing terminal; main earthing bar** [IEV 826-04-08]

A terminal or bar provided for the connection of protective conductors, including equipotential bonding conductors and conductors for functional earthing if any, to the means of earthing.

3 General requirements

The cabled distribution system shall be so designed, constructed and installed as to present no danger, either in normal use or under any single fault condition, to subscribers, personnel working on or externally inspecting the system, or to any other person, providing particularly:

- personal protection against electric shock;
- personal protection against physical injury;
- protection against fire.

For further details see HD 384 series.

NOTE: For service and operation conditions the above does not apply to trained, authorized personnel working on the equipment, who may be exposed to live parts of the equipment by the removal of protective covers.

3.1 *Mechanical*

All parts of the system shall be so constructed that there is no danger of physical injury from contact with sharp edges or corners.

3.2 *Access*

A standard test finger shall not make contact with any live part or parts of the system which are accessible to the general public without first removing a protective cover by the use of a tool. The standard test finger is defined in HD 195.

3.3 *Laser radiation*

If equipment embodying laser products is used, special attention has to be paid to radiation safety. Specific requirements and recommendations are under consideration. Refer to EN 60825.

4 Weather protection

All equipment and cables exposed to weather, especially corrosive atmosphere, adverse temperature or other adverse conditions shall be so constructed or protected as may be necessary to prevent danger arising from such exposure.

If, in conditions of sunshine falling on parabolic antennas, solar radiation is focused near the feed end of the network of the parabolic reflector such that burning may occur, the equipment shall be fitted with a warning notice in a clearly visible position.

5 Equipotential bonding and earthing

5.1 *General requirements*

The cabled distribution system shall be designed and constructed in accordance with the requirements of the HD 384 series so that no hazardous voltages can be present on the outer conductors of any cable or accessible metalwork of any equipment, including passive items. The requirements for the system outlet are specified in clause 9, the requirements for bonding and for lightning protection of antenna systems in clause 10.

These bonding requirements are intended to protect only the cabled system and shall not be considered to provide protection against electric shock from electrical installations.

Earthing points or earthing and bonding systems shall be designed and constructed in accordance with the requirements of HD 384.5.54.

Where cabled distribution systems are installed outdoor on the same poles as those of the electric supply, a common earthing may be used.

5.2 *Equipotential bonding mechanisms*

5.2.1 Metallic enclosures for mains supplied equipment, except on subscriber premises, shall be bonded. An example from bonding units within the enclosure is shown in figure 1. Metallic enclosures on subscriber premises shall be bonded in accordance with HD 384.5.54.

5.2.2 Where direct connection to an earthing system is not suitable because balancing currents are expected to flow in the outer conductor, for example in extensive horizontally cabled distribution systems, special protection shall be provided.

This protection shall be achieved, as shown in figure 2 either by:

- mounting the equipment within a non-metallic enclosure;

or

- fitting a voltage dependent device to the system between the metallic enclosure and the local earth such that hazardous voltages shall be removed from the outer conductor and accessible metalwork of the system.

A suitable warning notice shall be provided inside the enclosure.

If the balancing currents in the conductors exceed the maximum current allowed by the manufacturer of the cable and/or the manufacturer of the cable connectors used in the system, galvanic isolation shall be introduced as described hereafter.

5.2.3 Where galvanic isolation is provided between sections of the network, to eliminate balancing currents due to local potential differences, the outer conductors of each isolated section shall be connected to an earthing system.

NOTE: The galvanic isolator may be liable to radiate or pick-up high frequency energy, and can be damaged by overvoltages.

5.2.4 The outer conductors of coaxial cables entering and/or leaving a building, shall be bonded directly to a common equipotential bonding bar, either at the equipment or separately. The subscriber feeder cables need not to be bonded if a galvanic isolator or fully isolated outlets (see clause 9) or transfer points are used. Examples are shown in figures 3, 4 and 5.

5.2.5 Where bonding is not possible and to avoid balancing currents between the cabled distribution system and the building installation a galvanic isolator shall be used. An example is shown in figure 5.

NOTE: The galvanic isolator may be liable to radiate or pick-up high frequency energy and can be damaged by overvoltages.

5.2.6 Provision shall be made to maintain continuity of the outer conductor system while units are changed or removed. An example is shown in figure 6.

5.2.7 The equipotential bonding conductor connected to the main earthing terminal shall be mechanically stable, comply with HD 384.5.54 and shall have a minimum cross-sectional area of 4 mm^2 Cu.

5.2.8 Every connection of a protective conductor or an earthing conductor to an earthing terminal shall be readily accessible and soundly made by the use of crimps, clamps, weld or hard soldered joints.

5.2.9 All metallic enclosures, housings, mounting bays, racks and mains supplied equipment of metallic construction, shall be provided with an external earthing terminal as shown in figures 7 and 8 complying with the relevant clauses of HD 195.

NOTE: Line powered amplifiers, taps, splitters and transfer points may also be fitted with earthing terminals.

6 Mains supplied equipment

6.1 *Equipment*

6.1.1 The devices used in a cabled distribution system shall meet the requirements of HD 195, Class II equipment. Exceptionally Class I equipment can be used.

6.1.2 Devices installed outdoors and operated from the mains supply shall be so constructed that the harmful effects of moisture, water, dust etc. are prevented. Alternatively they shall be installed in an appropriate drip-proof, splash-proof or watertight enclosure so as to provide the appropriate degree of protection.

6.2 *Connection to the mains supply*

6.2.1 The connection to the mains supply shall conform to the requirements of HD 384.

6.2.2 The connection of a Class II equipment to the mains supply shall be only bipolar. The protective conductor, if any, of Class II equipment shall not be connected to the mains protective conductor.

6.2.3 If the Class II equipment is provided with a flexible power cable then either it shall be fitted with a bipolar plug, i.e., without a contact to the protective conductor or, where the power system requires the presence on the plug of a third (protective conductor) pin to gain access to the supply, no connection shall be made to that third pin. An example is shown in figure 8.

NOTE: If different potentials build up between the protective conductor and the equipotential bonding terminal, e.g. in older buildings, no balancing currents shall flow and produce excessive heat.

7 Network powering of the cabled distribution system

7.1 *Line powering*

The line powering voltage between inner and outer conductors of the feeder cable shall not exceed 65 V r.m.s. The following conditions shall be met:

- Line powering shall be confined to feeders only and shall not extend to the subscriber feeder.
- The line powering voltage shall be completely inaccessible to the public.