# Televisioonisignaalide, helisignaalide ja interaktiivsete teenuste kaablivõrgud Osa 4: Passiivsed lairiba seadmed koaksiaalkaabelvõrkudele

Cable networks for television signals, sound signals and interactive services -- Part 4: Passive wideband equipment for coaxial cable networks

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

| | |
|---|---|
| Käesolev Eesti standard EVS-EN 60728-4:2008 sisaldab Euroopa standardi EN 60728-4:2008 ingliskeelset teksti. | This Estonian standard EVS-EN 60728-4:2008 consists of the English text of the European standard EN 60728-4:2008. |
| Standard on kinnitatud Eesti Standardikeskuse 24.07.2008 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas. | This standard is ratified with the order of Estonian Centre for Standardisation dated 24.07.2008 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation. |
| Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 16.05.2008. | Date of Availability of the European standard text 16.05.2008. |
| Standard on kättesaadav Eesti standardiorganisatsioonist. | The standard is available from Estonian standardisation organisation. |



**ICS** 33.060.40, 33.170

**Võtmesõnad:** cable television, coaxial cables, components, measuring techniques specifications, sound broadcasting, telecasting, television broadcasting community aerial systems

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 60728-4

May 2008

ICS 33.060.40; 33.170

Supersedes EN 50083-4:1998

English version

# Cable networks for television signals, sound signals and interactive services - Part 4: Passive wideband equipment for coaxial cable networks

(IEC 60728-4:2007)

Réseaux de distribution par câbles pour signaux de télévision, signaux de radiodiffusion sonore et services interactifs - Partie 4: Equipements large bande passifs relatifs aux réseaux câblés coaxiaux (CEI 60728-4:2007)

Kabelnetze für Fernsehsignale, Tonsignale und interaktive Dienste - Teil 4: Passive Breitbandgeräte für koaxiale Kabelnetze (IEC 60728-4:2007)



CENELEC

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

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Ref. No. EN 60728-4:2008 E

## Foreword

The text of document 100/1243/FDIS, future edition 3 of IEC 60728-4, prepared by technical area 5, Cable networks for television signals, sound signals and interactive services, of IEC TC 100, Audio, video and multimedia systems and equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60728-4 on 2008-04-01.

This European Standard supersedes EN 50083-4:1998 + corrigendum January 1999.

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) | 2009-01-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2011-04-01 |

For this European Standard the informative Annex B of IEC 60728-4:2007 shall be disregarded and has been replaced by the normative Annex ZB, *Special national conditions;* and the informative Annex ZC, *A-deviations*.

Annexes ZA, ZB and ZC have been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 60728-4:2007 was approved by CENELEC as a European Standard without any modification.

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# Annex ZA
(normative)

## Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

NOTE 1 When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Where a standard cited below belongs to the EN 50000 series, the European Standard applies instead of the relevant International Standard.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 60068 | Series | Environmental testing | EN 60068 | Series |
| IEC 60417 | Data-base | Graphical symbols for use on equipment | - | - |
| IEC 60529 | -[1)] | Degrees of protection provided by enclosures (IP Code) | EN 60529<br>+ corr. May | 1991[2)]<br>1993 |
| IEC 60617 | Data-base | Graphical symbols for diagrams | - | - |
| IEC 60728 | Series | Cable networks for television signals, sound signals and interactive services | EN 60728<br>EN 50083 | Series<br>Series |
| IEC 60966-1 | -[1)] | Radio frequency and coaxial cable assemblies -<br>Part 1: Generic specification - General requirements and test methods | EN 60966-1 | 1999[2)] |
| IEC 60966-2-4 | -[1)] | Radio frequency and coaxial cables assemblies -<br>Part 2-4: Detail specification for cable assemblies for radio and TV receivers - Frequency range 0 to 3 000 MHz, IEC 61169-2 connectors | EN 60966-2-4 | 2003[2)] |
| IEC 60966-2-5 | -[1)] | Radio frequency and coaxial cable assemblies -<br>Part 2-5: Detail specification for cable assemblies for radio and TV receivers - Frequency range 0 to 1 000 MHz, IEC 61169-2 connectors | EN 60966-2-5 | 2003[2)] |
| IEC 60966-2-6 | -[1)] | Radio frequency and coaxial cable assemblies -<br>Part 2-6: Detail specification for cable assemblies for radio and TV receivers - Frequency range 0 to 3 000 MHz, IEC 61169-24 connectors | EN 60966-2-6 | 2003[2)] |
| IEC 61000-4-5 | -[1)] | Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test | EN 61000-4-5 | 2006[2)] |

[1)] Undated reference.
[2)] Valid edition at date of issue.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 61000-6-1 | -[1)] | Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments | EN 61000-6-1 | 2007[2)] |
| IEC 61169-1 | -[1)] | Radio-frequency connectors - Part 1: Generic specification - General requirements and measuring methods | EN 61169-1 | 1994[2)] |
| IEC 61169-2 | -[1)] | Radio-frequency connectors - Part 2: Sectional specification - Radio frequency coaxial connectors of type 9,52 | EN 61169-2 | 2007[2)] |
| IEC 61169-24 | -[1)] | Radio-frequency connectors - Part 24: Sectional specification - Radio frequency coaxial connectors with screw coupling, typically for use in 75 ohm cable distribution systems (type F) | EN 61169-24 | 2001[2)] |

# Annex ZB
(normative)

## Special national conditions

**Special national condition**: National characteristic or practice that cannot be changed even over a long period, e.g. climatic conditions, electrical earthing conditions.

NOTE If it affects harmonization, it forms part of the European Standard / Harmonization Document.

For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.

| Clause | Special national condition |
|---|---|
| **5.1.3** | **Finland**<br>All equipment installed in locations that are not temperature controlled shall meet their requirements within the temperature range -40 °C to +55 °C. |

# Annex ZC
(informative)

## A-deviations

**A-deviation**: National deviation due to regulations, the alteration of which is for the time being outside the competence of the CENELEC national member.

This European Standard does not fall under any Directive of the EC.

In the relevant CENELEC countries these A-deviations are valid instead of the provisions of the European Standard until they have been removed.

| Clause | Deviation |
|---|---|
| **5.3** | **Netherlands** |
| **Table 2** | (Dutch Technical Regulations for CATV networks (Technische Voorschriften voor Centrale Antenne Inrichtingen, 3e uitgave), 21 December 1977, which are valid for CATV networks in accordance with Article 21 of the Dutch Telecommunications law (Stb. 1988, 520)). |
| | The use of looped system outlets is not allowed. |

# CONTENTS

# INTRODUCTION

Standards of the IEC 60728 series deal with cable networks including equipment and associated methods of measurement for headend reception, processing and distribution of television signals, sound signals and their associated data signals and for processing, interfacing and transmitting all kinds of signals for interactive services using all applicable transmission media.

This includes

- CATV[1]-networks;
- MATV-networks and SMATV-networks;
- individual receiving networks;

and all kinds of equipment, systems and installations installed in such networks.

The extent of this standardization work is from the antennas and/or special signal source inputs to the headend or other interface points to the network up to the terminal input.

The standardization of any user terminals (i.e., tuners, receivers, decoders, multimedia terminals, etc.) as well as of any coaxial, balanced and optical cables and accessories thereof is excluded.



[1] This word encompasses the HFC networks used nowadays to provide telecommunications services, voice, data, audio and video both broadcast and narrowcast.

# CABLE NETWORKS FOR TELEVISION SIGNALS, SOUND SIGNALS AND INTERACTIVE SERVICES –

## Part 4: Passive wideband equipment for coaxial cable networks



## 1 Scope

This part of IEC 60728 applies to system outlets, splitters and taps, passive single or multiple port equipment comprising filters, attenuators, equalizers, galvanic isolators, power injectors, cable splices, terminating resistors and transfer points, but excluding coaxial cables and receiver leads (see 5.2).

This standard

- covers the frequency range 5 MHz to 3 000 MHz;
- identifies performance requirements for certain parameters;
- lays down data publication requirements for certain parameters;
- stipulates methods of measurements;
- introduces minimum requirements defining quality grades.

There are three grades for all passive equipment except system outlets where there is only one.

Different networks require the same performance and, when integrating networks, upgrading will be avoided.

Practical experience has shown that these three grades meet most of the technical requirements necessary for supplying a minimum signal quality to the subscribers. This classification should not be considered as a requirement but as information for users and manufacturers on the minimum quality criteria of the material required to install networks of different sizes. The system operator should select appropriate material to meet the minimum signal quality at the subscriber's outlet and to optimize cost/performance, taking into account the size of the network and local circumstances.

All requirements and published data should be understood as guaranteed values within the specified frequency range and in well-matched conditions.

## 2 Normative references

The following referenced documents are indispensable for the application 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.

IEC 60068 (all parts), *Environmental testing*

IEC 60417, *Graphical symbols for use on equipment*

NOTE IEC 60417 can be consulted on the IEC website.

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60617, *Graphical symbols for diagrams*

IEC 60728 (all parts), *Cable networks for television signals, sound signals and interactive services*

NOTE The title of some of the parts of the IEC 60728 series will be changed when a new edition is published.

IEC 60966-1, *Radio frequency and coaxial cable assemblies – Part 1: Generic specification – General requirements and test methods*

IEC 60966-2-4, *Radio frequency and coaxial cable assemblies – Part 2-4: Detail specification for cable assemblies for radio and TV receivers – Frequency range 0 to 3 000 MHz, IEC 61169-2 connectors*

IEC 60966-2-5, *Radio frequency and coaxial cable assemblies – Part 2-5: Detail specification for cable assemblies for radio and TV receivers – Frequency range 0 to 1 000 MHz, IEC 61169-2 connectors*

IEC 60966-2-6, *Radio frequency and coaxial cable assemblies – Part 2-6: Detail specification for cable assemblies for radio and TV receivers – Frequency range 0 to 3 000 MHz, IEC 61169-24 connectors*

IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-6-1, *Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity for residential, commercial and light-industrial environments*

IEC 61169-1, *Radio-frequency connectors – Part 1: Generic specification – General requirements and measuring methods*

IEC 61169-2, *Radio-frequency connectors – Part 2: Sectional specification – Radio-frequency coaxial connectors of type 9,52*

IEC 61169-24, *Radio-frequency connectors – Part 24: Sectional specification – Radio-frequency coaxial connectors with screw coupling, typically for use in 75 ohm cable distribution systems (type F)*

## 3 Terms, definitions, symbols and abbreviations

### 3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE Some terms have been taken from IEC 60050-723.

**3.1.1**
**active equipment**
equipment (for example, amplifiers, converters, etc), performing signal processing by means of external or internal power supply in a certain frequency range

**3.1.2**
**amplitude frequency response**
gain or loss of an equipment or system plotted against frequency