SLOVENSKI STANDARD
SIST EN 61260:1998

01-avgust-1998

Elektroakustika - Oktavni, poloktavni in terčni filtri (IEC 61260:1995)

Electroacoustics - Octave-band and fractional-octave-band filters

Elektroakustik - Bandfilter für Oktaven und Bruchteile von Oktaven

Electroacoustique - Filtres de bande d'octave et de bande d'une fraction d'octave

Ta slovenski standard je istoveten z: **EN 61260:1995**

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17.140.50	Elektroakustika	Electroacoustics

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EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 61260

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Descriptors: Electroacoustics, bandpass filters, octave band filter, definitions, performance evaluation, attenuation, frequency responses, tests, technical notices, marking

English version

Electroacoustics
Octave-band and fractional-octave-band filters
(IEC 1260:1995)

Electroacoustique
Filtres de bande d'octave et de bande d'une fraction d'octave
(CEI 1260:1995)

Elektroakustik
Bandfilter für Oktaven und Bruchteile von Oktaven
(IEC 1260:1995)

This European Standard was approved by CENELEC on 1995-09-20. 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

Foreword

The text of document 29/292/DIS, future edition 1 of IEC 1260, prepared by IEC TC 29, Electroacoustics, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61260 on 1995-09-20.

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) 1996-07-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1996-07-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annexes A, B and C are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 1260:1995 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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).

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

Publication	Year	Title	EN/HD	Year
IEC 50(801)	1984	International electrotechnical vocabulary (IEV) Chapter 801: Acoustics and electro-acoustics	-	-
IEC 651	1979	Sound level meters	EN 60651	1994
IEC 801-2	1991	Electromagnetic compatibility for industrial-process measurement and control equipment Part 2: Electrostatic discharge requirements	EN 60801-2	1993
IEC 801-3	1984	Part 3: Radiated electromagnetic field requirements	HD 481.3 S1	1987
IEC 804 + A1 A2	1985 1989 1993	Integrating-averaging sound level meters	EN 60804 A2	1994 1994
ISO 266	1975	Acoustics Preferred frequencies for measurements	-	-
OIML	1978	Vocabulary of legal metrology Fundamental terms	-	-

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Electroacoustique –

Filtres de bande d'octave et de bande d'une fraction d'octave

Electroacoustics –

Octave-band and fractional-octave-band filters

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROACOUSTICS –

OCTAVE-BAND AND FRACTIONAL-OCTAVE-BAND FILTERS

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international cooperation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of the IEC on technical matters, prepared by technical committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

3) They have the form of recommendations for international use published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.

4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.

International Standard IEC 1260 has been prepared by IEC technical committee 29: Electroacoustics.

This standard supersedes IEC 225 published in 1966.

The text of this standard is based on the following documents:

DIS	Report on voting
29/292/DIS	29/304/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

Annexes A, B and C are for information only.

ELECTROACOUSTICS –

OCTAVE-BAND AND FRACTIONAL-OCTAVE-BAND FILTERS

1 Scope

1.1 This International Standard provides performance requirements and methods for testing the performance of analogue, sampled-data, and digital implementations of band-pass filters that comprise a filter set or spectrum analyser. The extent of the passband region of a filter's relative attenuation characteristic is a constant percentage of the midband frequency for all filters of a given bandwidth. An instrument complying with the requirements of this International Standard may contain any number of bandpass filters covering any desired frequency range.

1.2 Performance requirements are provided for three filter classes designated class 0, class 1, and class 2. Allowed tolerances increase as the class number increases.

1.3 Bandpass filters complying with the performance requirements of this standard may be part of various measurement systems or may be an integral component of a specific instrument and shall operate in real time. Performance requirements apply to any method that is selected by the manufacturer to implement the design of the filters.

1.4 Instruments complying with the requirements of this standard are capable of providing frequency-band-filtered spectral information for a wide variety of signals, for example, time-varying, intermittent, and steady; broadband and discrete frequency; and long and short durations. For applications involving transient signals, different realizations of filters meeting the requirements of this standard may give different results.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of the IEC and ISO maintain registers of currently valid International Standards.

IEC 50(801): 1994, *International Electrotechnical Vocabulary (IEV) – Chapter 801: Acoustics and electro-acoustics*

IEC 651: 1979, *Sound level meters*
Amendment 1: 1993

IEC 801-2: 1991, *Electromagnetic compatibility for industrial-process measurement and control equipment – Part 2: Electrostatic discharge requirements*

IEC 801-3: 1984, *Electromagnetic compatibility for industrial-process measurement and control equipment – Part 3: Radiated electromagnetic field requirements*

IEC 804: 1985, *Integrating-averaging sound level meters*
Amendment 1, 1989
Amendment 2, 1993

ISO 266: 1975, *Acoustics – Preferred frequencies for measurements*

OIML: 1978, *Vocabulary of legal metrology – Fundamental terms*

3 Definitions

For the purpose of this International Standard, the following definitions apply.

NOTE – For definitions of additional terms in this standard, reference should be made to IEC 50(801) and the OIML Vocabulary of legal metrology.

3.1 **bandpass filter:** Filter with a single transmission band (or passband with small relative attenuation) extending from a lower bandedge frequency greater than zero to a finite upper bandedge frequency.

3.2 **octave ratio:** Nominal frequency ratio of 2:1; general symbol G.

NOTES

1 This standard permits two options, designated base-ten and base-two, for determining an octave-band, or fractional-octave-band, frequency ratio.

2 For base-ten systems,

$$G_{10} = 10^{3/10} \tag{1}$$

3 For base-two systems,

$$G_2 = 2 \tag{2}$$

4 The base-ten system is preferred.

3.3 **bandwidth designator:** Reciprocal of a positive integer, including 1, to designate the fraction of an octave band; symbol $1/b$.

3.4 **reference frequency:** Frequency of 1 000 Hz, exactly; symbol f_r.

3.5 **exact midband frequency:** In hertz, a frequency that has a specified relationship to the reference frequency such that the ratio of the exact midband frequencies of any two contiguous bandpass filters is the same for all filters in a filter set of a specified bandwidth; symbol f_m. When the denominator of the bandwidth designator is an odd number, exact midband frequencies of any filter in a set of filters are determined from:

$$f_m = (G^{x/b})(f_r) \tag{3}$$

and when the denominator of the bandwidth designator is an even number, exact midband frequencies of any filter in a set of filters are determined from:

$$f_m = (G^{(2x+1)/(2b)})(f_r) \tag{4}$$

where x is any integer, positive, negative, or zero.

NOTES

1 Exact midband frequencies determined from equation (3) or (4) permit the output of narrow-fractional-octave-band filters to be combined to yield the band level of a filter of wider-bandwidth with a corresponding exact midband frequency and corresponding bandedge frequencies.

2 With the base-ten system, midband frequencies included within any 10:1 frequency range are the same as within any other 10:1 frequency range except for the position of the decimal sign. With the base-two system, midband frequencies are unique and do not repeat.

3 As examples, for one-third-octave-band filters, the exact midband frequency for the band with a nominal midband frequency of 5 000 Hz is 5 011,872 Hz to three decimal places by the base-ten system and 5 039,684 Hz by the base-two system, or a difference of approximately 0,6 %. At a nominal midband frequency of 50 000 Hz, the exact midband frequency is 50 118,723 Hz by the base-ten system and 50 796,834 Hz by the base-two system, or an approximate difference of 1,4 %.

4 When the denominator of the bandwidth designator is an odd number, one of the filters in a complete filter set may have a midband frequency of 1 000 Hz. When the denominator of the bandwidth designator is an even number, the bandedge frequency of one adjacent pair of filters in a complete filter set may be at 1 000 Hz and therefore none of the filters will have a midband frequency of 1 000 Hz.

5 Exact midband frequencies for octave-band and one-third-octave-band filters are given in table A.1 for the usual range of audio frequencies.

3.6 **nominal midband frequencies:** In hertz, rounded midband frequencies for the designation of bandpass filters.

3.7 **bandedge frequencies:** In hertz, frequencies of the lower and upper edges of the passband of a bandpass filter such that the exact midband frequency is the geometric mean of the lower and upper bandedge frequencies; symbols f_1 and f_2, respectively. Bandedge frequencies are determined from:

$$f_1 = (G^{-1/(2b)})(f_m) \quad (5)$$

and

$$f_2 = (G^{+1/(2b)})(f_m) \quad (6)$$

where

G represents an octave frequency ratio calculated according to equation (1) for base-ten systems or (2) for base-two systems;

f_m is an exact midband frequency determined from equation (3) or (4).

3.8 **normalized frequency:** For a bandpass filter, ratio of frequency to the exact midband frequency; symbol f/f_m.

3.9 **filter bandwidth:** In hertz, for a given filter, upper bandedge frequency f_2 minus the corresponding lower bandedge frequency f_1 calculated from equations (5) and (6).

3.10 **octave-band filter:** Bandpass filter for which the nominal ratio of upper bandedge frequency to lower bandedge frequency is two.