



# **Electroacoustics — Octave-band and fractional-octave-band filters**

## **Part 1: Specifications**

STANDARDS  
Australia



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AS IEC 61260.1:2019

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- Association of Australian Acoustical Consultants
- Australian Acoustical Society
- AUSTROADS
- Bureau of Steel Manufacturers of Australia
- Department of Defence (Australian Government)
- Engineers Australia
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# Electroacoustics — Octave-band and fractional-octave-band filters

## Part 1: Specifications

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Originated in New Zealand as NZS 1499:1965.  
AS Z41—1969 and NZS 1499:1965 jointly revised, amalgamated and redesignated  
as NZS 4476:1997.  
This edition revised in part and redesignated as AS IEC 61260.1:2019.

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## Preface

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee EV-010, Acoustics Community Noise, to supersede AS/NZS 4476:1997, *Acoustics—Octave-band and fractional-octave-band-filters*.

The objective of this Standard is to specify performance requirements for analogue, sampled-data, and digital implementations of band-pass filters. The extent of the pass-band region of a filter's relative attenuation characteristic is a constant percentage of the exact mid-band frequency for all filters of a given bandwidth. An instrument conforming to the requirements of this standard may contain any number of contiguous band-pass filters covering any desired frequency range.

Performance requirements are provided for two filter classes: class 1 and class 2. In general, specifications for class 1 and class 2 filters have the same design goals and differ mainly in the acceptance limits and the range of operational temperature.

Band-pass filters conforming to the performance requirements of this Standard may be part of various measurement systems or may be an integral component of a specific instrument such as a spectrum analyser.

This Standard is identical with, and has been reproduced from, IEC 61260-1:2011 *Electroacoustics — Octave-band and fractional-octave-band filters — Part 1: Specifications*.

As this document has been reproduced from an International Standard, a full point substitutes for a comma when referring to a decimal marker.

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The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTROACOUSTICS –  
OCTAVE-BAND AND FRACTIONAL-OCTAVE-BAND FILTERS –**

**Part 1: Specifications**

**FOREWORD**

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International Standard IEC 61260-1 has been prepared by IEC technical committee 29: Electroacoustics.

This first edition of IEC 61260-1, future IEC 61260-2 and future IEC 61260-3, cancel and replace the first edition of IEC 61260 published in 1995, and Amendment 1:2001. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the IEC 61260:

- a) the single document in the first edition of IEC 61260:1995 is in IEC 61260 series separated into the three parts covering: specifications, pattern evaluation tests and periodic tests;
- b) the IEC 61260:1995 specified three performance categories: classes 0, 1 and 2. The IEC 61260 series specifies requirements for class 1 and 2;
- c) in the IEC 61260:1995, the design goals for the specification can be based on base-2 or base 10 design. In IEC 61260 series only base-10 is specified;

- d) the reference environmental conditions have been changed from 20 °C / 65 % RH to 23 °C / 50 % RH;
- e) IEC 61260:1995 specified tolerance limits without considering the uncertainty of measurement for verification of the specifications. IEC 61260 series specifies acceptance limits for the observed values and maximum-permitted uncertainty of measurements for laboratories testing conformance to specifications in the standard.

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

FDIS	Report on voting
29/835/FDIS	29/839/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.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all the parts in the IEC 61260 series, published under the general title *Electroacoustics – Octave-band and fractional-octave-band filters* can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://www.techstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

## INTRODUCTION

IEC 61260:1995 and its Amendment 1:2001 are now separated into the following three parts of IEC 61260 series:

- Part 1: Specifications
- Part 2: Pattern evaluation tests (under consideration)
- Part 3: Periodic tests (under consideration)

For assessments of conformance to performance specifications, IEC 61260-1 uses different criteria than were used for the IEC 61260:1995 edition.

IEC 61260:1995 did not provide any requirements or recommendations to account for the uncertainty of measurement in assessments of conformance to specifications. This absence of requirements or recommendations to account for uncertainty of measurement created ambiguity in determinations of conformance to specifications for situations where a measured deviation from a design goal was close to a limit of the allowed deviation. If conformance was determined based on whether a measured deviation did or did not exceed the limits, the end-user of the octave-band and fractional-octave-band filters incurred the risk that the true deviation from a design goal exceeded the limits.

To remove this ambiguity, IEC Technical Committee 29, at its meeting in 1996, adopted a policy to account for measurement uncertainty in assessments of conformance in International Standards that it prepares.

This first edition of IEC 61260-1 uses an amended criterion for assessing conformance to a specification. Conformance is demonstrated when (a) measured deviations from design goals do not exceed the applicable *acceptance limits* and (b) the uncertainty of measurement does not exceed the corresponding maximum-permitted uncertainty. Acceptance limits are analogous to the tolerance limits allowances for design and manufacturing implied in the IEC 61260:1995.

Actual and maximum-permitted uncertainties of measurement are determined for a coverage probability of 95 %. Unless more specific information is available, the evaluation of the contribution of a specific filter or filter set to a total measurement uncertainty can be based on the acceptance limits and maximum-permitted uncertainties specified in this standard.

# ELECTROACOUSTICS – OCTAVE-BAND AND FRACTIONAL-OCTAVE-BAND FILTERS –

## Part 1: Specifications

### 1 Scope

**1.1** This part of the IEC 61260 series specifies performance requirements for analogue, sampled-data, and digital implementations of band-pass filters. The extent of the pass-band region of a filter's relative attenuation characteristic is a constant percentage of the exact mid-band frequency for all filters of a given bandwidth. An instrument conforming to the requirements of this standard may contain any number of contiguous band-pass filters covering any desired frequency range.

**1.2** Performance requirements are provided for two filter classes: class 1 and class 2. In general, specifications for class 1 and class 2 filters have the same design goals and differ mainly in the acceptance limits and the range of operational temperature. Acceptance limits for class 2 are greater than, or equal to, those for class 1. Maximum-permitted expanded uncertainties of measurement are also specified.

**1.3** Performance requirements are given for designs where the octave frequency ratio and the mid-band frequencies are powers of ten.

**1.4** Band-pass filters conforming to the performance requirements of this standard may be part of various measurement systems or may be an integral component of a specific instrument such as a spectrum analyser.

**1.5** This standard specifies the ranges of environmental conditions for operation of the filters. The required range depends on whether the instrument containing the filters is designed to be operated in a controlled environment or more generally in the field.

**1.6** Band-pass filters conforming to 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 or steady; broadband or discrete frequency; and long or short durations.

### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2006, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-6-1:2005, *Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity for residential, commercial and light-industrial environments*