

© Copyright SEK. Reproduction in any form without permission is prohibited.

Metalliska rörvågledare – Del 1: Allmänna bestämmelser och mätmetoder

Hollow metallic waveguides –

Part 1: General requirements and measuring methods

Som svensk standard gäller europastandarden EN 60153-1:2016. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60153-1:2016.

Nationellt förord

Europastandarden EN 60153-1:2016

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 60153-1, Second edition, 2016 - Hollow metallic waveguides - Part 1: General requirements and measuring methods**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SEN 43 02 01, utgåva 2, 1968, gäller ej fr o m 2019-06-22.

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a mätning, säkerhet och provning och för utförande, skötsel och dokumentation av elprodukter och elanläggningar.

Genom att utforma sådana standarder blir säkerhetsfordringar tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard

Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

English Version

**Hollow metallic waveguides -
Part 1: General requirements and measuring methods
(IEC 60153-1:2016)**

Guides d'ondes métalliques creux -
Partie 1: Exigences générales et méthodes de mesure
(IEC 60153-1:2016)

Metallische Hohlleiter -
Teil 1: Allgemeine Anforderungen und Messverfahren
(IEC 60153-1:2016)

This European Standard was approved by CENELEC on 2016-06-22. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of document 46F/302/CDV, future edition 2 of IEC 60153-1, prepared by SC 46F "RF and microwave passive components", of IEC/TC 46 "Cables, wires, waveguides, RF connectors, RF and microwave passive components and accessories" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60153-1:2016.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2017-03-22
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2019-06-22

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 60153-1:2016 was approved by CENELEC as a European Standard without any modification.

Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

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.

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

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050	series	International Electrotechnical Vocabulary (IEV)	-	-
IEC 60068	series	Environmental testing	EN 60068	series
IEC 60154	series	Flanges for waveguides	EN 60154	series
IEC 60261	-	Sealing test for pressurized waveguide tubing and assemblies	HD 138 S2	-

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	6
4 Type designation	7
4.1 Type	7
4.2 Designation.....	7
5 Standard atmospheric conditions for testing	8
6 Visual inspection	8
7 Mechanical requirements	8
7.1 Dimensions	8
7.1.1 General	8
7.1.2 Ordinary rectangular waveguides	9
7.1.3 Rectangularity of cross-section.....	10
7.1.4 Flat rectangular waveguides.....	10
7.1.5 Circular waveguides.....	11
7.2 Other mechanical requirements	11
7.2.1 Bow	11
7.2.2 Twist.....	12
7.2.3 Surface roughness.....	12
7.2.4 Internal stress.....	12
8 Electrical tests.....	12
8.1 Attenuation	12
8.2 Internal reflections from irregularity of internal dimensions	13
9 Additional tests – Gas tightness	14

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOLLOW METALLIC WAVEGUIDES –

Part 1: General requirements and measuring methods

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). 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. 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 IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60153-1 has been prepared by subcommittee 46F: RF and microwave passive components, of IEC technical committee 46: Cables, wires, waveguides, RF connectors, RF and microwave passive components and accessories.

This second edition cancels and replaces the first edition published in 1964. This edition constitutes a technical revision.

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

- a) expand the operation frequency range;
- b) revise the equation of attenuation.

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

CDV	Report on voting
46F/302/CDV	46F/316/RVC

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.

It is to be read in conjunction with IEC 60154: Flanges for waveguides.

A list of all parts in the IEC 60153 series, published under the general title *Hollow metallic waveguides*, 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 website under "<http://webstore.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

This International Standard relates to straight hollow metallic tubing for use as waveguides in electronic equipment. In recent years, the operation frequency of waveguide components and systems has been extended to 1 THz and above. However, the first edition of the IEC 60153 series of standards only specified the aperture dimensions for ordinary rectangular waveguide for frequencies up to 325 GHz. In addition, the first edition of the IEC 60153 series of standards, dating from the 1960's, does not meet the needs of the current applications. This new edition of IEC 60153-1 addresses these two issues by extending the frequency coverage to 3 300 GHz and by addressing current applications for this type of waveguide.

This standard takes into account IEC 60068 when necessary.

When there is a difference between the general requirements and the relevant specification sheet, the latter prevails.

HOLLOW METALLIC WAVEGUIDES –

Part 1: General requirements and measuring methods

1 Scope

This part of IEC 60153 specifies straight hollow metallic tubing for use as waveguides in electronic equipment.

It covers:

- a) the details necessary to ensure compatibility and, as far as essential, interchangeability;
- b) test methods;
- c) uniform requirements for the electrical and mechanical properties.

It should be noted that no recommendations are made for the materials to be used for waveguides. The choice of material is agreed between customer and manufacturer.

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 60050 (all parts), *International Electrotechnical Vocabulary* (available at <http://www.electropedia.org/>)

IEC 60068 (all parts), *Environmental testing*

IEC 60154, *Flanges for waveguides*

IEC 60261, *Sealing test for pressurized waveguide tubing and assemblies*