

Flanges for waveguides - Part 3: Relevant specifications for flat rectangular waveguides

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FLANGES FOR WAVEGUIDES  
PART 3: RELEVANT SPECIFICATIONS FOR FLANGES FOR FLAT  
RECTANGULAR WAVEGUIDES

Brides pour guides d'ondes  
Troisième partie: Spécifications  
particulières de brides pour guides  
d'ondes rectangulaires plats

Flansche für Hohlleiter  
Teil 3: Allgemeine Anforderungen  
für Flansche für flache  
Rechteck-Hohlleiter

BODY OF HD

The Harmonization Document consists of:

- IEC 154-3 (1982) edition 2; IEC/SC 46B, not appended

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This Harmonization Document was approved by CENELEC on 7 September 1983.

The English and French versions of this HD are provided by the text of the IEC publication and the German version is the official translation of the IEC text.

According to the CENELEC Internal Regulations the CENELEC member National Committees are bound:

to announce the existence of this Harmonization Document at national level

by or before 1984-02-01

to publish their new harmonized national standard

by or before 1985-02-01

to withdraw all conflicting national standards

by or before 1985-02-01.

Harmonized national standards are listed on the HD information sheet, which is available from the CENELEC National Committees or from the CENELEC General Secretariat.

The CENELEC National Committees are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

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IEC

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Deuxième édition  
Second edition  
1982-01

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**Brides pour guides d'ondes**

**Troisième partie:  
Spécifications particulières de brides pour  
guides d'ondes rectangulaires plats**

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**Part 3:  
Relevant specifications for flanges  
for flat rectangular waveguides**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FLANGES FOR WAVEGUIDES****Part 3: Relevant specifications for flanges for flat rectangular waveguides**

## FOREWORD

- 1) 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.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
- 3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.
- 4) The IEC has not laid down any procedure concerning marking as an indication of approval and has no responsibility when an item of equipment is declared to comply with one of its recommendations.

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## PREFACE

This standard has been prepared by Sub-Committee 46B: Waveguides and Their Accessories, of IEC Technical Committee No. 46: Cables, Wires and Waveguides for Telecommunication Equipment.

It forms the second edition of Part 3 of IEC Publication 154 dealing with flanges for waveguides, and should be used in conjunction with Part 1: General Requirements and Measuring Methods.

Relevant specifications for other types of flanges have been issued in separate publications.

A draft was discussed at the meeting held in Bucharest in 1974. As a result of this meeting, a draft was circulated to the National Committees under the Accelerated Procedure in October 1975. A draft, Document 46B(Central Office)80, was submitted to the National Committees for approval under the Six Months' Rule in February 1978.

The National Committees of the following countries voted explicitly in favour of publication:

Belgium	Japan
Egypt	Spain
France	Switzerland
Germany	Turkey
Italy	United Kingdom

## DIMENSIONAL DEVIATIONS

The values for the permissible deviations in this standard follow the principles given in ISO Recommendation R286, where:

Deviation is defined as:

algebraical difference between a size (actual, maximum, etc.) and the corresponding basic size.

Upper deviation is defined as:

algebraical difference between the maximum limit of size and the corresponding basic size.

And lower deviation is defined as:

algebraical difference between the minimum limit of size and the corresponding basic size.

It should be noted that the upper and lower deviations may have like signs, unlike signs or either deviation may be zero. This permits the basic sizes of mating shafts and holes to be identical.

The older concept of plus tolerances and minus tolerances has an undesirable limitation, in that the basic sizes of mating shafts and holes cannot be identical for clearance fits.

*Other IEC publications quoted in this standard:*

Publications Nos 153-3: Hollow Metallic Waveguides, Part 3: Relevant Specifications for Flat Rectangular Waveguides.

154-1: Flanges for Waveguides, Part 1: General Requirements and Measuring Methods.

154-6: Part 6: Relevant Specifications for Flanges for Medium Flat Rectangular Waveguides.

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## FLANGES FOR WAVEGUIDES

### Part 3: Relevant specifications for flanges for flat rectangular waveguides

#### EXPLANATIONS

#### Flange designation

To permit a more suitable and systematic arrangement and division of the complete IEC Publication 154 into a general part (Part 1) and subsequent parts (those already issued and those to be issued in the future), the first edition of Part 3 contained two sizes of flanges that had been given a temporary type designation, namely:

154 IEC – PIF(M) 45;  
154 IEC – UGF(M) 100.

This had been done because the ratio between the height and the width of the flange aperture is in the region of 1:4, for these flange ratios, the designation “M” has been allocated.

The technical material for the aforementioned flange types has been deleted from this second edition and appears in IEC Publication 154-6: Part 6: Relevant Specifications for Flanges for Medium Flat Rectangular Waveguides as:

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154 IEC – PNM 45;  
154 IEC – ULM 100,  
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respectively.

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#### Materials

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

#### Information on reflections

The reflections at the flange joint are of three kinds:

- those caused by the allowed deviations on the internal dimensions of the waveguides;
- those caused by lateral displacements of the two flange assemblies;
- those caused by the chokes (in the following, these reflections are not taken into account).

When the deviations on the dimensions of the waveguides (according to IEC Publication 153-3: Hollow Metallic Waveguides, Part 3: Relevant Specifications for Flat Rectangular Waveguides) and of the assemblies (according to this standard) add up to cause maximum lateral displacement and maximum changes of the waveguide internal dimensions, the theoretical maximum reflection may be calculated from:

$$\text{reflection loss} = 10 \log_{10} \frac{1}{\left[ \frac{\lambda_g^2 \Delta a}{4a^3} + \frac{\Delta b}{b} \right]^2 + \left[ \frac{4.9348 \lambda_g (\Delta a'^2)}{a^3} - \frac{7.8957 (\Delta b'^2)}{\lambda_g b} \right]^2} \text{ dB}$$