

CONFIRMED
DECEMBER 2007

**Detail specification
for ordinary
rectangular (2 : 1) rigid
waveguide tubing —
Standard wall
thickness —
General application
category**

UDC 621.372.822

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

BSI
Documents

AVA

Document Sharing Hub

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Amendments issued since publication

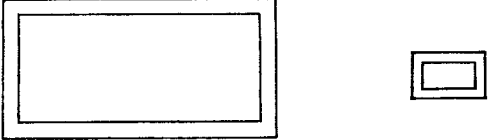
Amd. No.	Date	Comments

© BSI 04-2000

ISBN 0 580 06278 3

Contents

	Page
1 Ratings (including limiting conditions of use) and characteristics	1
2 Marking	2
3 Related documents	2
4 Ordering information	2
5 Certified test records	2
6 Test schedule	3
Table 1A — Dimensions for ordinary rectangular waveguide type R	5
Table 1B — Dimensions for ordinary rectangular waveguide type R	6
Table 2 — Surface roughness in micrometres and micro-inches	7
Table 3 — Weight data for ordinary rectangular waveguide — type R	8

ELECTRONIC PARTS OF ASSESSED QUALITY: DETAIL SPECIFICATION	
OUTLINE DRAWING  Type R70 Type R320 Examples of cross section For dimensions see tables	RIGID WAVEGUIDE TUBING ORDINARY RECTANGULAR (2 : 1) STANDARD WALL THICKNESS
	GENERAL APPLICATION CATEGORY
	R5 TO R1200 MATERIALS: CLASSES 1 TO 4

1 Ratings (including limiting conditions of use) and characteristics

1.1 Nominal internal width and operating frequency range. Alternate sizes in the tables have been chosen from two staggered series, each covering the frequency range in steps with a frequency ratio of approximately 1.5. The nominal frequency range is approximately from $1.25f_c$ to $1.9f_c$ (f_c = cut-off frequency of dominant mode). For any particular type of application the effective frequency range may be smaller or greater than the nominal frequency range.

The actual frequency range required in a specific case may not fall into the effective working frequency range of a waveguide size in one series. The other series will then generally be found suitable. In the table the two series are combined.

1.2 Theoretical power rating. The values quoted are the theoretical breakdown values at a frequency 1.5 times the cut-off frequency (assuming breakdown in air at N.T.P. to occur at 30 000 V/cm). The figures quoted include a power safety factor of two as well as allowance for a voltage standing wave ratio of 0.5 (33 % voltage reflection coefficient).

For other frequencies the values quoted should be multiplied by:

$$1.34 (1 - (f_c/f)^2)^{1/4}$$

1.3 Ratio between inside width and height. The standard ratio of inside width to inside height is in principle 2 : 1. For some types of waveguides given in this specification this ratio has not been observed because a different value of the ratio was already in extensive use.

1.4 Deviation on inside width and height. Deviations for the inside width and heights are in principle $\pm 1/750$ of the internal width.

For the smallest sizes the normal deviation is ± 0.020 mm (± 0.0008 in), which represents a departure from the principle mentioned above.

1.5 Theoretical attenuation. The values given in the tables are based on a figure for the resistivity of copper $1.7241 \times 10^{-8} \Omega \text{ m}$ and apply to a frequency equal to $1.5f_c$. For the general case attenuation is given by the following formula:

$$2.3273 \left(\frac{\rho}{\rho_0} \right)^{1/2} \times \frac{1}{b(a)^{1/2}} \times \frac{\left(\frac{f}{f_c} \right)^2 + \frac{2b}{a}}{\left(\frac{f}{f_c} \right)^{1/2} \times \left[\left(\frac{f}{f_c} \right)^2 - 1 \right]^{1/2}} \text{ dB/m}$$

where ρ = resistivity of inside non-magnetic wall metal,

ρ_0 = resistivity of copper = $1.7241 \times 10^{-8} \Omega \text{ m}$,

a = inside width in millimetres,

b = inside height in millimetres,

f_c = cut-off frequency for H_{01} (TE_{01}) mode = $\frac{149.9}{a}$ GHz,

f = frequency at which the attenuation is to be calculated.