

**Radio-frequency
connectors —
RF coaxial connectors
with inner diameter of
outer conductor 6,5 mm
(0,256 in) with screw
coupling —
Characteristic
impedance 50 ohms
(Type TNC)**

ICS 33.120.30

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee EPL/46, Cables, wires and waveguides, RF connectors and accessories for communication and signalling, to Subcommittee EPL/46/2, RF connectors and waveguides, upon which the following bodies were represented:

- AEA Technology
- BEAMA Electrical Cable and Conductor Accessory Manufacturers
- British Non-Ferrous Metals Federation
- British Telecommunications plc
- Federation of the Electronics Industry
- Ministry of Defence
- National Supervisory Inspectorate
- Society of Cable Television Engineers

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National foreword

This British Standard has been prepared by Subcommittee EPL/46/2 and is identical with IEC 169-17:1978 *Radio-frequency connectors — Part 17: RF coaxial connectors with inner diameter of outer conductor 6,5 mm (0,256 in) with screw coupling — Characteristic impedance 50 ohms (Type TNC)*, including Amendment 1:1993, published by the International Electrotechnical Commission (IEC). IEC 169-17, also designated QC 222000, is a harmonized specification within the IEC Q system for electronic components of assessed quality.

For ease of reproduction some of the text of the French version of this international standard has been retained. References to IEC page numbers in the text should be ignored.

Cross-references

Publication referred to ^a	Corresponding British Standard
IEC 68	BS EN 60068 <i>Environmental testing</i>
IEC 68-2	BS EN 60068-2 <i>Test methods</i>
IEC 68-2-1:1990	BS EN 60068-2-1:1993 <i>Tests A. Cold</i>
IEC 68-2-2:1974	BS EN 60068-2-2:1993 <i>Test B. Dry heat</i> BS 2011 <i>Environmental testing</i> Part 2.1 <i>Tests</i>
IEC 68-2-3	Part 2.1 Ca: 1977 <i>Test Ca. Damp heat, steady state</i>
IEC 68-2-11	Part 2.1 Ka: 1982 <i>Test Ka. Salt mist</i>
IEC 68-2-13:1983	Part 2.1M: 1984 <i>Test M. Low air pressure</i>
IEC 68-2-14	Part 2.1N: 1985 <i>Test N. Change of temperature</i>
IEC 68-2-20	Part 2.1T: 1981 <i>Test T. Soldering</i> BS 3041 <i>Radio-frequency connectors</i>
IEC 169-1	BS 3041-1:1977 <i>Specification for general requirements and measuring methods</i> BS EN 61169 <i>Radio-frequency connectors</i>
IEC 1169-1 (QC 220000)	BS EN 61169-1:1996 <i>Generic specification. General requirements and measuring methods</i>

^a Undated in text.

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.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 32, an inside back cover 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.

1 Scope

This standard concerns miniature r.f. coaxial connectors for use with r.f. cables both flexible (preferred cables 96-2 IEC 50-3 and 96-2 IEC 50-2) and semi-rigid, where dielectric filled interface is required for severe environmental exposure.

This type is a screw coupled connector known commercially as the TNC connector and was derived from the bayonet coupled connector known as the BNC (IEC Publication 169-8: Radio-frequency Connectors, Part 8: R.F. Coaxial Connectors with Inner Diameter of Outer Conductor 6.5 mm (0.256 in) with Bayonet Lock — Characteristic Impedance 50 ohms (Type BNC).

Patterns and Grade 1 connectors are under consideration.

2 IEC type designation

Connectors conforming to this standard shall be designated by:

- a) the reference to this standard: 169-17 IEC;
- b) the number of the grade:
 - grade 0 = standard test connector = G0;
 - grade 1 = high performance connector = G1;
 - grade 2 = general-purpose connector
 - if grade 2 is required, no grade designation is necessary;
- c) a group of figures specifying the climatic category (see Clause 4).

Example:

169-17 IEC (40/85/21) denotes a general-purpose connector Grade 2 with mating face as indicated in Clause 5 of this standard with a reflection factor less than 0.1 up to 3 GHz for straight connectors and less than 0.13 for right-angle connectors belonging to climatic category 40/85/21.

Type designation for patterns: under consideration.

3 Ratings

The r.f. connectors defined in this standard are designed for use with a variety of cables and semi-rigid coaxial and rigid coaxial lines. Straight connectors grade 2 mounted with 3 mm cable have a reflection factor of less than 0.1 up to 3 GHz and right-angle connectors a reflection factor of less than 0.13. The grade 2 connectors can be used with low reflection up to 11 GHz and grade 1 up to 16 GHz. For grade 1 connectors, reflection factor and frequency range have to be agreed between purchaser and manufacturer.

Voltage:

Application	Sea level	Pressure 44 mbar
Working (d.c. or a.c. peak)	500 V	125 V
Proof	1.5 kV	375 V

Current: 3.5 A d.c. maximum.

NOTE All voltages specified in this standard are r.m.s. values of a.c. voltages. All test voltages are a.c. voltages of 50 Hz to 60 Hz.

4 Preferred climatic categories

Category ^a	Temperature range	Damp heat, steady state
40/85/21	– 40 °C to 85 °C	21 days
40/155/21	– 40 °C to 155 °C	21 days
55/155/56	– 55 °C to 155 °C	56 days
^a To be included in the IEC type designation (see Clause 2).		

5 Dimensions — Connecteurs d'usage général — Niveau 2

Les dimensions en inches sont les dimensions originales. Toutes les représentations non cotées ne sont données qu'à titre d'information.

5.1 Connecteur avec contact central mâle

5 Dimensions — General purpose connectors — Grade 2

Inch dimensions are original dimensions. All undimensioned pictorial configurations are for reference purposes only.

5.1 Connector with pin-centre contact

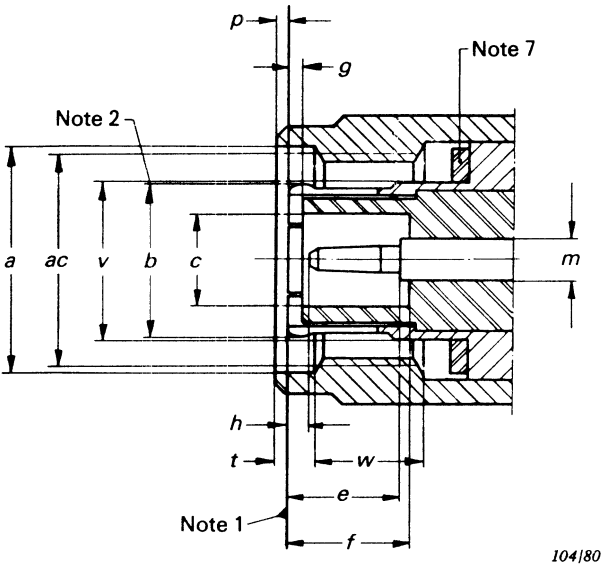


Figure 1A — Connector with pin-centre contact (for dimensions, see table)

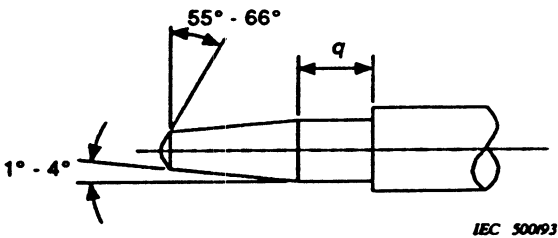
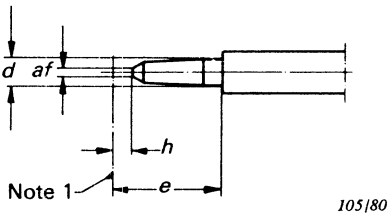


Figure 1B — Details of pin-centre contact

Réf. Ref.	mm		in		Note
	Min.	Max.	Min.	Max.	
a	11,18	—	0,440	—	diam.
b	—	—	—	—	2/diam.
c	4,83	—	0,190	—	diam.
d	1,32	1,37	0,052	0,054	diam.
e	5,33	5,84	0,210	0,230	
f	5,28	5,79	0,208	0,228	
g	0,15	—	0,006	—	
h	0,08	1,02	0,003	0,040	
m	2,06	2,21	0,081	0,087	10/diam.
p	—	1,98	—	0,078	9
q	1,98	—	0,078	—	
t	1,6	—	0,063	—	
v	—	8,18	—	0,322	diam.
w	3,96	—	0,156	—	
ac	—	—	—	—	6
ad	1,96	3,05	0,077	0,120	
af	—	0,64	—	0,025	diam.

NOTE 1 Mechanical and electrical reference plane.

NOTE 2 Slotted and flared to meet electrical and mechanical requirements.

NOTE 3 Diameters on MMC shall be on, or be capable of, taking up a common axis.

NOTE 6 Screw thread (diameter 11.1125 mm $\times$ 0.907 pitch) in accordance with ISO Standard 263, 7/16—28 UNEF—2B.

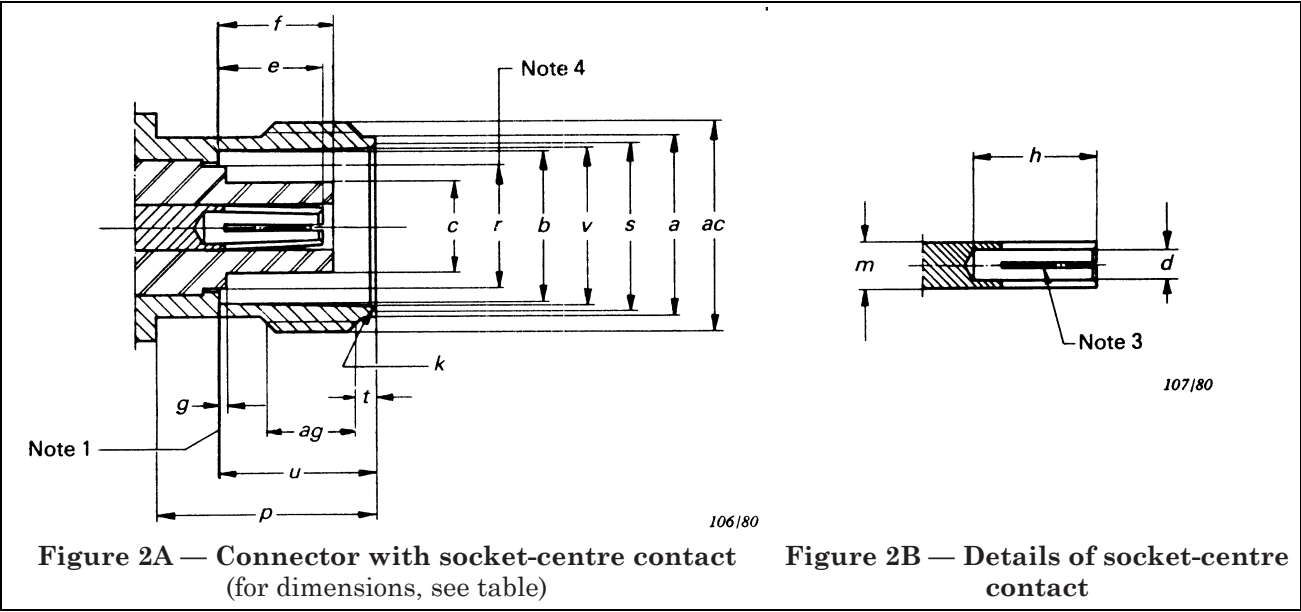
NOTE 7 Sealing gasket to meet required electrical and environmental performance.

NOTE 9 This dimension shows the position with nut biased fully forward.

NOTE 10 Deviation from this dimension is determined by the required reflection factor.

5.2 Connecteur avec contact central femelle

5.2 Connector with socket-centre contact



Réf. Ref.	mm		in		Note
	Min.	Max.	Min.	Max.	
a	9,60	9,68	0,378	0,381	diam.
b	8,10	8,15	0,319	0,321	diam.
c	—	4,72	—	0,186	diam.
d	—	—	—	—	3/diam.
e	4,72	5,23	0,186	0,206	
f	4,78	5,28	0,186	0,208	
g	—	0,15	—	0,006	
h	4,95	—	0,195	—	
k	—	—	—	—	8
m	2,06	2,21	0,081	0,087	10/diam.
p	10,52	—	0,414	—	
r	—	6,50	—	0,256	4/diam.
s	8,79	9,04	0,346	0,356	diam.
t	1,73	2,24	0,068	0,088	
u	8,31	8,51	0,327	0,335	
v	8,31	8,46	0,327	0,333	diam.
ac	—	—	—	—	6
ag	4,75	—	0,187	—	

NOTE 1 Mechanical and electrical reference plane.

NOTE 2 Diameters on MMC shall be on, or be capable of taking up a common axis.

NOTE 3 Slotted and flared to meet electrical and mechanical requirements.

NOTE 4 Applies only when dielectric extends beyond reference plane.

NOTE 6 Screw thread (diameter 11.1125 mm × 0.907 pitch) in accordance with ISO Standard 263, 7/16—28 UNEF—2A.

NOTE 8 Chamfer or radius.

NOTE 10 Deviation from this dimension is determined by the required reflection factor.

6 Calibres et connecteurs d'essai de référence — Niveau 0

6.1 Calibres mécaniques

6.1.1 Connecteurs avec contact central mâle

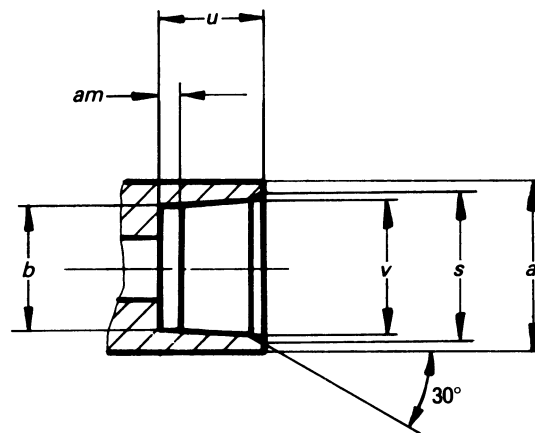
6.1.1.1 Calibre pour contact extérieur du connecteur mâle

6 Gauges and standard test connectors — Grade 0

6.1 Mechanical gauges

6.1.1 Connectors with pin-centre contact

6.1.1.1 Gauge for outer contact of pin connector



108/80

Figure 3 — Gauge for outer contact of pin connector

Calibre A (pour opérations de calibrage) Gauge A (for sizing purposes)					Calibre B (pour mesure de la force de rétention du calibre pour le conducteur extérieur) Masse (poids) du calibre: 225 ± 5 g Gauge B (for measurement of gauge retention force for outer conductor) Mass (weight) of gauge: 225 ± 5 g			
Réf. Ref.	mm		in		mm		in	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
a	9,63	9,68	0,379	0,381	9,63	9,68	0,379	0,381
b	8,08	8,10	0,318	0,319	8,15	8,18	0,321	0,322
u	8,41	8,46	0,331	0,333	8,36	8,41	0,329	0,331
v	8,31	8,36	0,327	0,329	8,41	8,46	0,331	0,333
s	8,79 nom.		0,346 nom.		8,79 nom.		0,346 nom.	
am	4,00	—	0,157	—	4,00	—	0,157	—
Matériau: acier poli; état de surface: Ra = 0,4 µm (16 µin) max. Material: steel, polished; surface roughness: Ra = 0.4 µm (16 µin) max.								

6.1.1.2 Séquence d'essai

Le calibre A doit être placé une fois sur le contact électrique extérieur. Cela est une opération de calibrage qu'il convient d'effectuer seulement lorsque l'isolant est retiré du connecteur.

Le calibre B doit ensuite être placé sur le contact extérieur en position verticale. Le calibre doit être retenu.

Cet essai peut aussi être effectué sur connecteurs dont l'isolant n'est pas retiré.

6.1.2 Connecteurs avec contact central femelle

6.1.2.1 Calibre mâle pour contact central femelle

6.1.1.2 Test sequence

Gauge A shall be placed over the outer electrical contact of the connector once. This is a sizing operation and should only be carried out when the insulator is removed from the connector.

After this, gauge B shall be placed over the outer contact in a vertical position. The gauge shall be retained.

This test can also be carried out on connectors when the insulator is not removed.

6.1.2 Connectors with socket-centre contact

6.1.2.1 Gauge pin for socket-centre contact

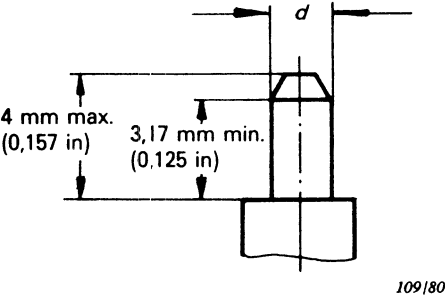


Figure 4 — Gauge pin for socket-centre contact

Calibre C (pour opérations de calibrage) Gauge C (for sizing purposes)					Calibre D (pour mesure de la force de rétention du calibre pour le conducteur intérieur) Masse (poids) du calibre: 57 ± 1 g Gauge D (for measurement of gauge retention force for inner conductor) Mass (weight) of gauge: 57 ± 1 g			
Réf. Ref.	mm		in		mm		in	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
d Ø	1,372	1,377	0,0540	0,0542	1,308	1,321	0,0515	0,0520

6.1.2.2 Séquence d'essai

Le calibre mâle d'essai C doit être introduit une fois dans le contact central sur une distance minimale de 3,17 mm (0,125 in). Cela est une opération de calibrage qu'il convient d'effectuer seulement lorsque le contact central femelle est retiré du connecteur.

Le calibre D doit ensuite être introduit et maintenu en position verticale. Le calibre doit être retenu.

Cet essai peut aussi être effectué sur connecteurs dont le contact central femelle n'est pas retiré.

6.1.2.2 Test sequence

Test pin gauge C shall be inserted into the centre contact a minimum distance of 3.17 mm (0.125 in) once. This is a sizing operation and should only be carried out when the socket-centre contact is removed from the connector.

After this, gauge D shall be inserted and held in the vertical position. The gauge shall be retained.

This test can also be carried out on connectors when the socket-centre contact is not removed.

6.2 Connecteur d'essai de référence — Niveau 0

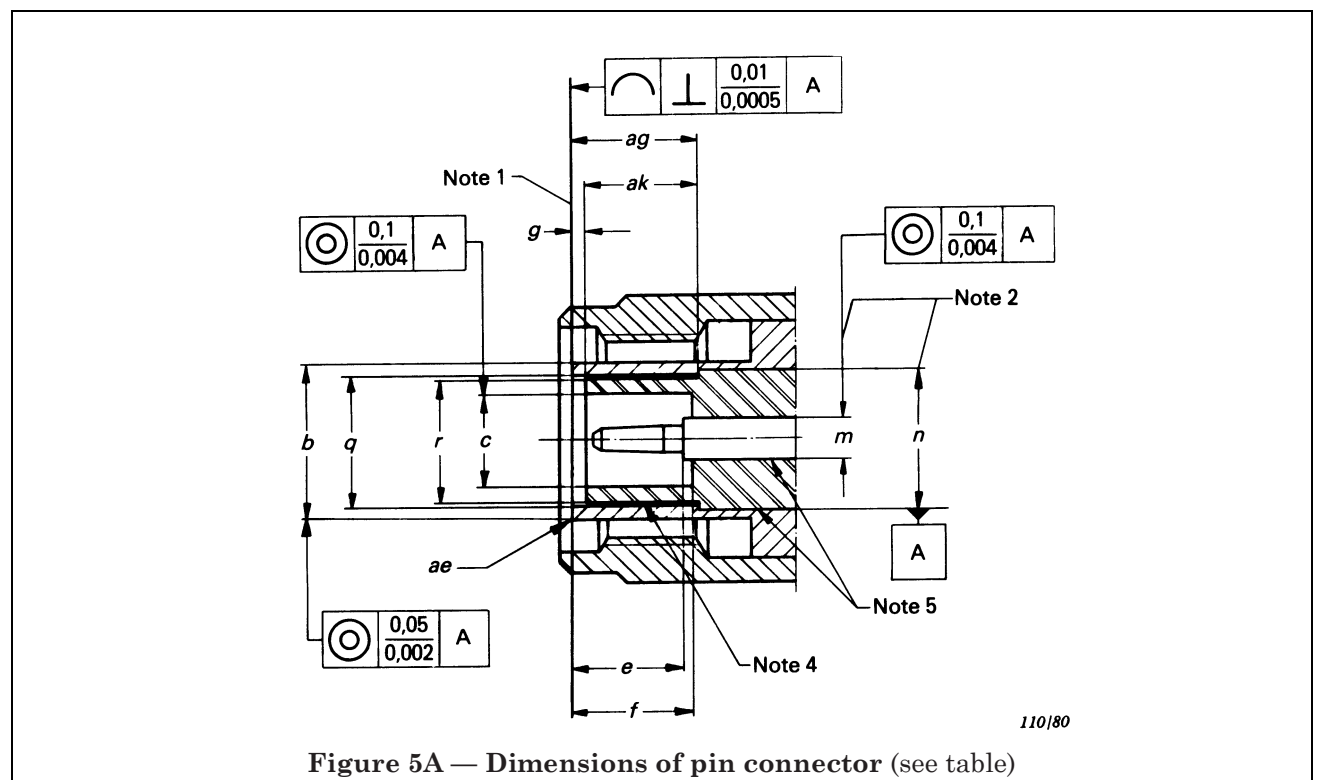
Les connecteurs d'essai de référence sont essentiellement utilisés comme étant une partie du raccordement à l'équipement de mesure afin de mesurer le facteur de réflexion conformément au paragraphe 14.1 de la Publication 169-1 de la CEI: Connecteurs pour fréquences radioélectriques, Première partie: Règles générales et méthodes de mesure.

6.2.1 Connecteur d'essai de référence avec contact central mâle

6.2 Standard test connectors — Grade 0

Standard test connectors are mainly used as part of the adaptor to the measuring equipment to carry out reflection factor measurement according to Clause 14.1 of IEC Publication 169-1: Radio-frequency Connectors, Part 1: General Requirements and Measuring Methods.

6.2.1 Standard test connector with pin-centre contact



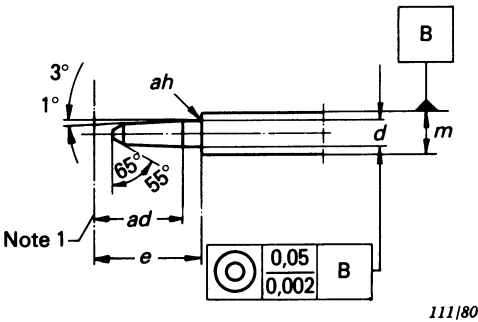


Figure 5B — Dimensions of centre contact
(see table)

Réf. Ref.	mm		in		Note
	Min.	Max.	Min.	Max.	
b	8,06	8,09	0,3175	0,3185	diam.
c	4,88	4,93	0,192	0,194	diam.
d	1,35	1,37	0,0530	0,0541	diam.
e	5,31	5,38	0,209	0,212	
f	5,38	5,54	0,212	0,218	
g	0,15	0,30	0,006	0,012	
m	2,14 nom.		0,0842 nom.		2/diam.
n	6,99	7,01	0,2752	0,2760	2/diam.
q	6,72	6,74	0,2645	0,2655	diam.
r	6,60	6,65	0,260	0,262	diam.
ad	3,66	3,98	0,144	0,157	
ae	0,1	0,3	0,004	0,012	rad.
ag	5,31	5,36	0,209	0,211	
ah	—	0,13	—	0,005	rad.
ak	5,16 nom.		0,203 nom.		

Pour les dimensions non indiquées dans ce tableau, voir le paragraphe 5.1.
For dimensions not indicated in this table, see Sub-clause 5.1.

NOTE 1 Plan de référence mécanique et électrique. Perpendiculaire à l'axe 0,01 mm (0,0005 in).
NOTE 1 Mechanical and electrical reference plane. Normal to the axis 0.01 mm (0.0005 in).

NOTE 2 Ces diamètres sont donnés pour isolant polytétrafluoréthylène (PTFE) avec constante diélectrique 2,02. L'impédance caractéristique de la ligne de transmission déterminée par les diamètres *m* et *n* doit être $50 \pm 0,2 \Omega$.
NOTE 2 These diameters are for polytetrafluorethylene (PTFE) insulation with dielectric constant 2.02. Characteristic impedance of transmission line determined by diameters *m* and *n* shall be $50 \pm 0.2 \Omega$.

NOTE 4 Si jeu concentrique radial 0,05 mm (0,002 in) nom.
NOTE 4 If concentric, radial air gap 0.05 mm (0.002 in) nom.

NOTE 5 Pas de jeu.
NOTE 5 Zero air gap.