

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

iTeh STANDARD

Radio-frequency connectors –  
Part 21: Sectional specification for RF connectors with inner diameter of outer  
conductor 9,5 mm (0,374 in) with screw coupling – Characteristic impedance  
50 ohms (Type SC)

Connecteurs pour fréquences radioélectriques –  
Partie 21: Spécification intermédiaire relatives aux connecteurs RF avec  
conducteur extérieur de 9,5 mm (0,374 in) de diamètre intérieur à verrouillage  
à vis – Impédance caractéristique de 50 ohms (Type SC)



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## RADIO-FREQUENCY CONNECTORS –

**Part 21: Sectional specification for RF connectors with inner diameter of outer conductor 9,5 mm (0,374 in) with screw coupling – Characteristic impedance 50 ohms (Type SC)**

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IEC 61169-21 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. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
46F/601/FDIS	46F/613/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/standardsdev/publications](http://www.iec.ch/standardsdev/publications).

A list of all parts of the IEC 61169 series, under the general title: *Radio-frequency connectors*, can be found on the IEC website.

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## RADIO-FREQUENCY CONNECTORS –

### Part 21: Sectional specification for RF connectors with inner diameter of outer conductor 9,5 mm (0,374 in) with screw coupling – Characteristic impedance 50 ohms (Type SC)

#### 1 Scope

This part of IEC 61169, which is a sectional specification (SS), provides information and rules for the preparation of detail specifications (DS) for type SC threaded RF coaxial connectors with 50  $\Omega$  characteristic impedance. The connectors are used with flexible and semi-rigid cables. They are recommended for use in medium power and low reflection applications up to 11 GHz. The dielectric filled interface is especially beneficial in applications involving severe environmental exposure.

This document specifies mating face dimensions, dimensional details, gauging information for general connectors – grade 2 and standard test connectors – grade 0 as well as test schedules and inspection requirements selected from IEC 61169-1, applicable to all detail specifications relating to type SC RF connectors. Type SC interface specified in this document is equivalent to type SC-B interface in IEC 60169-21:1985.

This document indicates recommended performance characteristics to be considered when writing a detail specification and it covers test schedules and inspection requirements for assessment levels M and H.

NOTE Metric dimension are original dimensions. All undimensioned pictorial configurations are for reference purpose only.

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#### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61169-1:2013, *Radio-frequency connectors – Part 1: Generic specification – General requirements and measuring methods*

IEC 61169-1-6, *Radio-frequency connectors – Part 1-6: Electrical test methods – RF power*

IEC 60169-21:1985, *Radio-frequency connectors – Part 21: Two types of radio-frequency connectors with inner diameter of outer conductor 9,5 mm (0,374 in) with different versions of screw coupling – Characteristic impedance 50 ohms (Types SC-A and SC-B)*

IEC 62153-4-7, *Metallic cables and other passive components test methods – Part 4-7: Electromagnetic compatibility (EMC) – Test method for measuring of transfer impedance  $Z_T$  and screening attenuation  $a_S$  or coupling attenuation  $a_C$  of connectors and assemblies – Triaxial tube in tube method*

#### 3 Terms and definitions

No terms and definitions are listed in this document.



ISO and IEC maintain terminological databases for use in standardization at the following addresses:

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## **4 Mating face and gauge information**

### **4.1 Dimensions – General connectors – Grade 2**

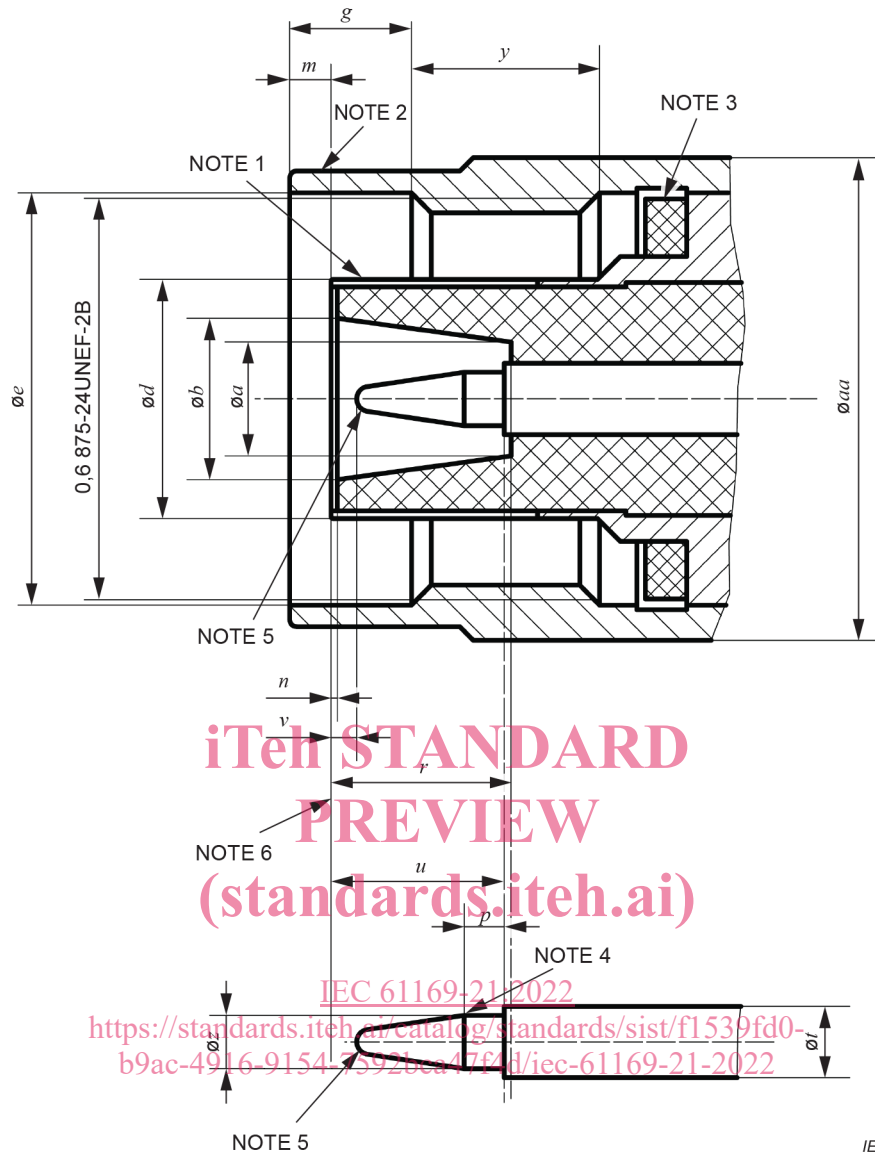
#### **4.1.1 Connector with pin-centre contact**

The mating face of a connector with pin-centre contact is shown in Figure 1 and its dimensions are shown in Table 1.

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NOTE 1 Slot design is optional.

NOTE 2 Three holes with diameter of 0,69 mm (0,027 in) minimum equally spaced for safety wiring. Location on coupling nut is optional.

NOTE 3 Sealing gasket to give required environmental performance.

NOTE 4 Taper of pin contact starts here.

NOTE 5 Spherical or chamfered.

NOTE 6 Mechanical and electrical reference plane.

**Figure 1 – Connector with pin-centre contact**

**Table 1 – Dimensions of connector with pin-centre contact**

Ref.	mm		in	
	Min.	Max.	Min.	Max.
<i>a</i>	4,93	—	0,194	—
<i>b</i>	7,01	—	0,276	—
<i>d</i> <sup>a</sup>	—	—	—	—
<i>e</i>	17,53	—	0,690	—
<i>g</i> <sup>b</sup>	5,41	5,66	0,213	0,223
<i>m</i> <sup>b</sup>	0,64	2,16	0,025	0,085
<i>n</i>	0,18	—	0,007	—
<i>p</i>	2,36	—	0,093	—
<i>r</i>	7,85	—	0,309	—
<i>t</i>	3,02	3,15	0,119	0,124
<i>u</i>	7,80	8,56	0,307	0,337
<i>v</i>	0,08	1,02	0,003	0,040
<i>y</i> <sup>b</sup>	6,35	—	0,250	—
<i>z</i>	2,29	2,34	0,090	0,092
<i>aa</i>	—	21,03	—	0,828

<sup>a</sup> Dimensions shall meet requirements of mating characteristics.

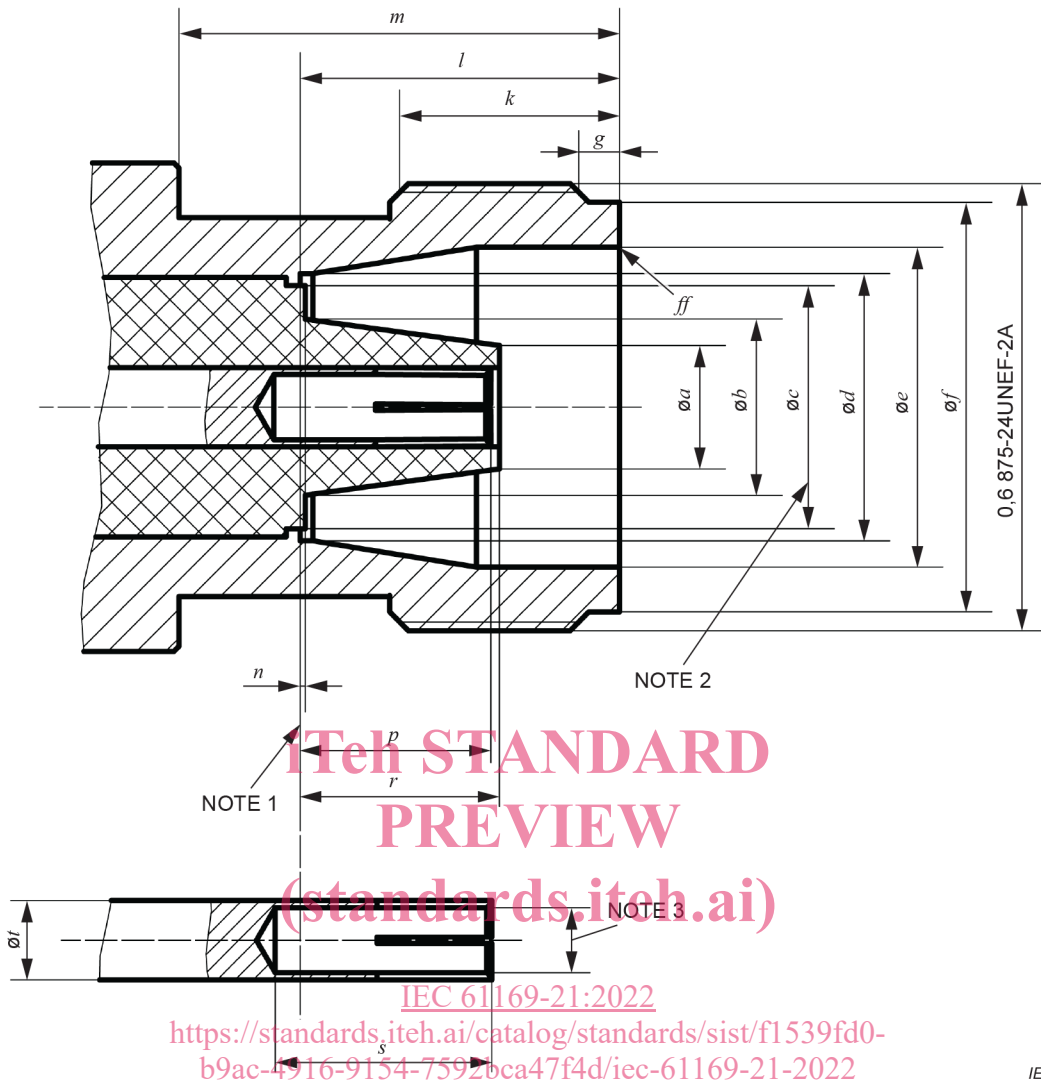
<sup>b</sup> Applicable when coupling nut is urged forward.

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#### 4.1.2 Connector with socket-centre contact

The mating face of a connector with socket-centre contact is shown in Figure 2 and its dimensions are shown in Table 2.

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NOTE 1 Mechanical and electrical reference plane.

NOTE 2 Applies to dielectric extending beyond reference plane.

NOTE 3 Slot design optional. Contact is closed.

Figure 2 – Connector with socket-centre contact

**Table 2 – Dimensions of connector with socket-centre contact**

Ref.	mm		in	
	Min.	Max.	Min.	Max.
<i>a</i>	—	4,83	—	0,190
<i>b</i>	—	6,91	—	0,272
<i>c</i>	—	9,50	—	0,374
<i>d</i>	10,44	10,54	0,411	0,415
<i>e</i>	12,24	12,65	0,482	0,498
<i>f</i>	—	16,00	—	0,630
<i>g</i>	1,19	1,96	0,047	0,077
<i>k</i>	7,54	—	0,297	—
<i>l</i>	12,47	12,57	0,491	0,495
<i>m</i>	16,03	—	0,631	—
<i>n</i>	—	0,18	—	0,007
<i>p</i>	6,93	7,70	0,273	0,303
<i>r</i>	—	7,85	—	0,309
<i>s</i>	7,62	—	0,300	—
<i>t</i> <sup>a</sup>	3,02	3,15	0,119	0,124
<i>ff</i> <sup>b</sup>	0,25	—	0,010	—

<sup>a</sup> Tolerance to be chosen so that the reflection factor requirement is met.

<sup>b</sup> Fillet.

## 4.2 Gauges

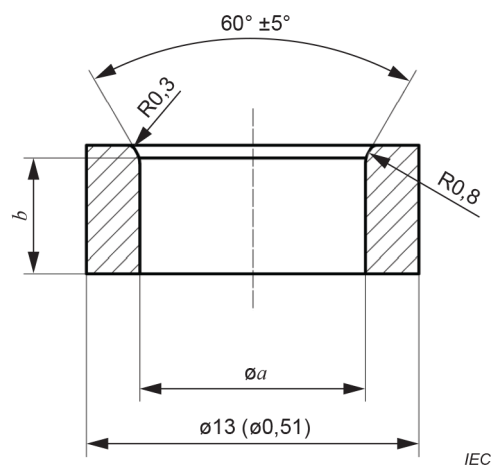
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### 4.2.1 Pin connectors – outer contact

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The gauge for outer contact of pin connector is shown in Figure 3 and its dimensions are shown in Table 3.

Dimensions in millimetres (inches)



**Figure 3 – Gauge for outer contact of pin connector**

**Table 3 – Dimensions of gauge for outer contact of pin connector**

Ref.	Gauge A (For outer contacts)				Gauge B (For slotted outer contacts) Mass of gauge: 200 <sup>+5</sup> g			
	mm		in		mm		in	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
<i>a</i>	10,426	10,439	0,410 5	0,411 0	10,643	10,656	0,419 0	0,419 5
<i>b</i>	3,180	—	0,125 0	—	0,790	—	0,031 0	—

Material: polished steel with a 0,4 µm (16 µin) finish.

Test procedures are as follows:

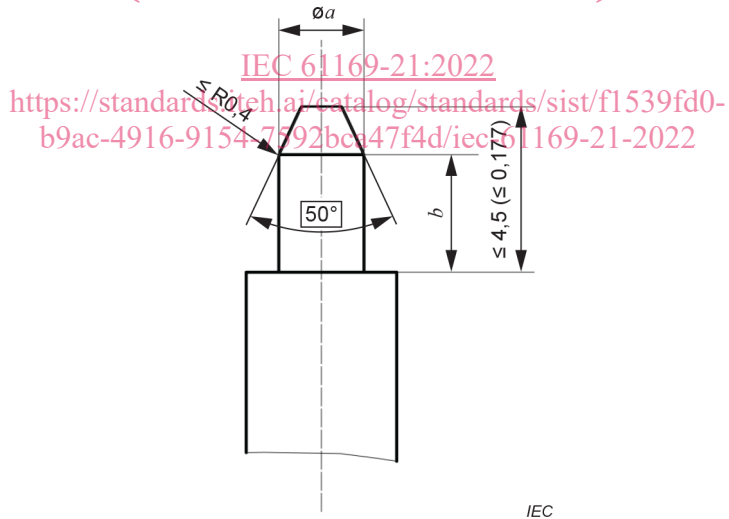
- a) For outer contacts, a steel test ring A (Figure 3) with inner diameter "*a*" shall be pushed over the outer electrical contact of the connector. The insertion force shall not exceed 66 N when the outer contact inserts into the gauge A at a minimum distance of "*b*".
- b) For slotted outer contacts, a steel test ring B (Figure 3) with an inner diameter "*a*" shall be placed over the outer electrical contact of the connector. The test ring shall uniformly meet the outer electrical contact when pushed no more than 0,79 mm (0,031 in) over this contact.

**4.2.2 Socket connectors – centre contact**

The gauge for centre contact of a socket connector is shown in Figure 4 and its dimensions are shown in Table 4.

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Dimensions in millimetres (inches)



**Figure 4 – Gauge for centre contact of socket connector**

**Table 4 – Dimensions of gauge for centre contact of socket connector**

Ref.	Gauges A (For sizing purpose)				Gauges B (For retention test) Mass of gauge: 56 g			
	mm		in		mm		in	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
<i>a</i>	2,337	2,342	0,092 0	0,092 2	2,276	2,286	0,089 6	0,090 0
<i>b</i>	3,180	—	0,125 0	—	—	—	—	—

Material: polished steel with a 0,4 µm (16 µin) finish.

Test procedures are as follows:

- a) A steel test pin A (Figure 4) with a diameter "*a*" shall be inserted into the centre contact at a minimum distance of 3,18 mm (0,125 in). This is a sizing operation.
- b) After completion of item a), a second steel test pin B (Figure 4) with a diameter "*a*" shall have a minimum withdrawal force of 0,56 N after insertion into the centre electrical contact.

### 4.3 Standard test connectors – Grade 0

#### 4.3.1 General

These dimensions are for standard test connector adapters for reflection factor testing.

#### 4.3.2 Standard test connector with pin-centre contact

The mating face of a standard test connector with pin-centre contact is shown in Figure 5 and its dimensions are shown in Table 5.

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