

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Radio-frequency connectors –
Part 61: Sectional specification for RF coaxial connectors with 9,5 mm inner
diameter of outer conductor, quick lock coupling, series Q4.1-9.5**

**Connecteurs pour fréquences radioélectriques –
Partie 61: Spécification intermédiaire relative aux connecteurs coaxiaux pour
fréquences radioélectriques avec diamètre intérieur du conducteur extérieur
de 9,5 mm, verrouillage rapide, série Q4.1-9.5**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

RADIO-FREQUENCY CONNECTORS –

Part 61: Sectional specification for RF coaxial connectors with 9,5 mm inner diameter of outer conductor, quick lock coupling, series Q4.1-9.5

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International Standard IEC 61169-61 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.

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

| FDIS | Report on voting |
|--------------|------------------|
| 46F/492/FDIS | 46F/494/RVD |

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
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RADIO-FREQUENCY CONNECTORS –

Part 61: Sectional specification for RF coaxial connectors with 9,5 mm inner diameter of outer conductor, quick lock coupling, series Q4.1-9.5

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 coaxial connectors with a 9,5 mm inner diameter of the outer conductor and quick lock coupling mechanism, characteristic impedance 50 Ω and an operating frequency of up to 8,5 GHz. Series Q4.1-9.5 connectors with socket centre contact are compatible with threaded 4,1-9,5 series (specified in IEC 60169-11) connectors with pin centre contact. This type of connectors are starting to be applied in telecommunication systems due to their special features which are suitable for outdoor harsh requirements, such as quick and reliable coupling, compatible with threaded connector and being entirely waterproof.

This document specifies mating face dimensions for general purpose connectors – grade 2, dimensional details of standard test connectors – grade 0, gauge information and test requirements, product ratings and characteristics, tests selected from IEC 61169-1, applicable to all detail specifications relating to Q4.1-9.5 series RF coaxial connectors.

Annex A specifies the outline dimensions of connectors and protective sleeves, which could bring interchangeability between pairs of connectors and protective sleeves from different manufacturers.

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

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

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 60529, *Degrees of protection provided by enclosures (IP Code)*

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

IEC 62037-3:2012, *Passive RF and microwave devices, intermodulation level measurement – Part 3: Measurement of passive intermodulation in coaxial connectors*

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:

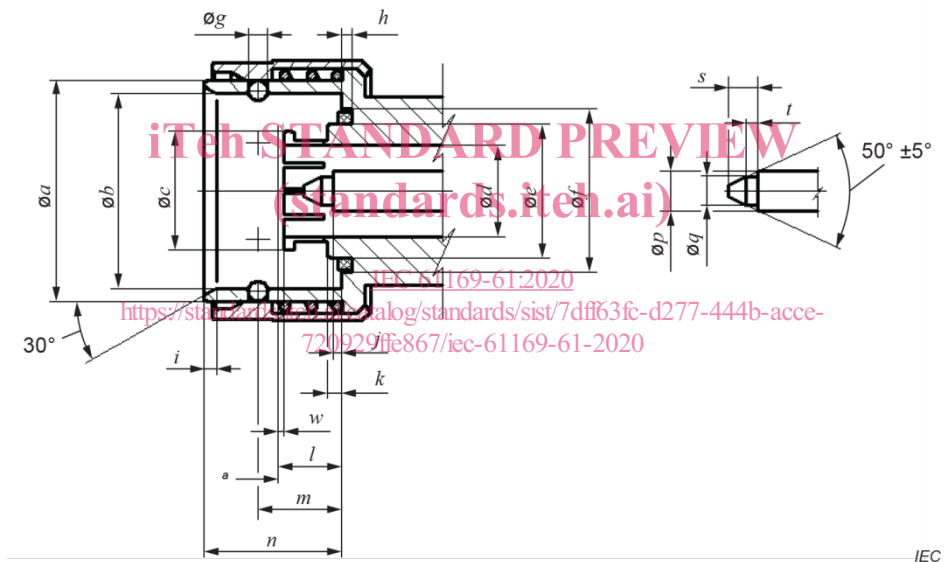
- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Mating face and gauge information

4.1 General connectors – Grade 2

4.1.1 Connector with pin centre contact

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



^a Mechanical and electrical plane.

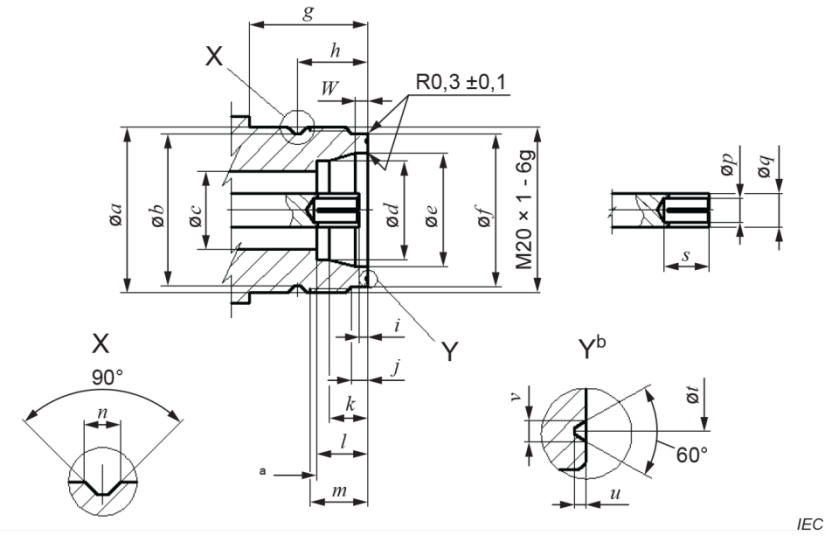
Figure 1 – Connector with pin centre contact

Table 1 – Dimensions of connector with pin centre contact

| Ref. | mm | |
|-----------------------|---|-------|
| | Min. | Max. |
| <i>a</i> | 22,32 | 22,52 |
| <i>b</i> | 19,78 | 19,90 |
| <i>c</i> ^a | — | — |
| <i>d</i> | 9,45 | 9,55 |
| <i>e</i> | 13,70 | 13,75 |
| <i>f</i> | 16,80 | 16,90 |
| <i>g</i> ^b | 1,99 | 2,01 |
| <i>h</i> ^c | — | — |
| <i>i</i> | 1,20 | 1,40 |
| <i>j</i> | 0,57 | 0,97 |
| <i>k</i> | 1,20 | 1,42 |
| <i>l</i> | 6,15 | 6,25 |
| <i>m</i> | 8,49 | 8,59 |
| <i>n</i> | 13,58 | 14,08 |
| <i>p</i> ^d | 4,13 (nominal) | |
| <i>q</i> | 2,855 | 2,945 |
| <i>s</i> | 4,00 | 5,00 |
| <i>t</i> | 2,50 | 3,00 |
| <i>w</i> | 0,20 | 0,50 |
| ^a | Resilient electrical contact, slot design meets 4.3.3 requirements. | |
| ^b | Stainless steel or ceramic beads, not less than 5pcs, radially and uniformly distributed. | |
| ^c | Sealing ring design optional and should meet sealing performance. | |
| ^d | The tolerance on this dimension is determined by the tolerance of characteristic impedance. | |

4.1.2 Connector with socket centre contact

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



- ^a Mechanical and electrical plane.
- ^b Ring identification tank and painted with red mark.

Figure 2 – Connector with socket centre contact

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Table 2 – Dimensions of connector with socket centre contact

| Ref. | mm | |
|-----------------------|----------------|-------|
| | Min. | Max. |
| <i>a</i> | 19,69 | 19,74 |
| <i>b</i> | 18,09 | 18,15 |
| <i>c</i> | 9,45 | 9,55 |
| <i>d</i> | 12,03 | 12,13 |
| <i>e</i> | 13,80 | 13,85 |
| <i>f</i> | 18,28 | 18,32 |
| <i>g</i> | 14,40 | — |
| <i>h</i> | 8,49 | 8,59 |
| <i>i</i> | 1,17 | 1,47 |
| <i>j</i> | 1,60 | 1,90 |
| <i>k</i> | 4,65 | 4,75 |
| <i>l</i> | 6,15 | 6,25 |
| <i>m</i> | 6,70 | — |
| <i>n</i> | 2,18 | 2,24 |
| <i>p</i> ^a | — | — |
| <i>q</i> ^b | 4,13 (nominal) | |
| <i>s</i> | 5,00 | — |
| <i>t</i> | 16,50 | 16,70 |
| <i>u</i> | 0,40 | 0,50 |
| <i>v</i> | 0,45 | 0,65 |
| <i>w</i> | 1,60 | 1,80 |

^a The resilient electrical contact, slot design optional, should meet 4.2.1 requirements.

^b The tolerance on this dimension is determined by the tolerance of characteristic impedance.

4.2 Gauges

4.2.1 Gauge pin for socket centre contact

4.2.1.1 General

The gauge pin for socket centre contact is shown as Figure 3 and its dimensions are shown as Table 3.

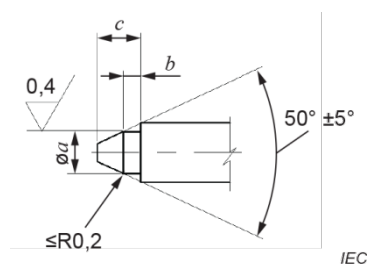


Figure 3 – Gauge pin for socket centre contact

Table 3 – Dimensions of gauge pin for socket centre contact

| Ref. | Gauge A (For sizing purpose) | | Gauge B (For insertion purpose) | | Gauge C (For retention purpose) Mass of gauge : 150 ⁺⁵ ₀ g | |
|----------|---------------------------------|-------|------------------------------------|-------|--|-------|
| | Min. | Max. | Min. | Max. | Min. | Max. |
| <i>a</i> | 2,945 | 2,950 | 2,940 | 2,945 | 2,850 | 2,855 |
| <i>b</i> | 2,0 | 2,2 | 2,0 | 2,2 | 2,0 | 2,2 |
| <i>c</i> | 3,3 | 3,5 | 3,3 | 3,5 | 3,3 | 3,5 |

Material: steel, polished.

4.2.1.2 Test procedure

Test procedure is as follows.

a) Sizing test

The gauge A should be inserted in the socket centre contact three times, this is a sizing operation.

b) Insertion test

Following the sizing operation, if specified in the detail specification, the force necessary to insert Gauge B fully into the socket centre contact shall be measured. When this test is required, the insertion force shall not exceed 15 N.

c) Retention test

After sizing or insertion test, the gauge C shall be inserted into the socket centre contact. The contact shall retain the mass of the gauge C in a vertical downward position. When this test is required, the retention force shall be not less than 1,5 N.

4.2.2 Gauge rings for plug outer contact

4.2.2.1 General

The gauge rings for plug outer contact is shown as Figure 4 and its dimensions are shown as Table 4.

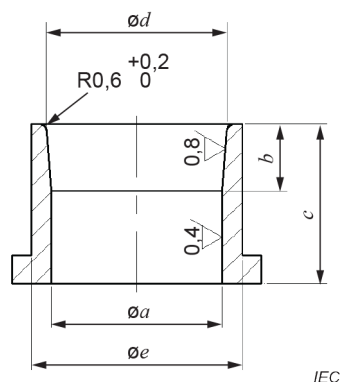


Figure 4 – Gauge ring for plug outer contact

Table 4 – Dimensions of gauge rings for plug outer contact

| Ref. | Gauge A (For sizing purpose) | | Gauge B (For insertion purpose) | | Gauge C (For retention purpose) Mass of gauge: 400 ⁺⁵ ₀ g | |
|----------|---------------------------------|--------|------------------------------------|-------|---|--------|
| | Min. | Max. | Min. | Max. | Min. | Max. |
| <i>a</i> | 12,13 | 12,135 | 12,125 | 12,13 | 12,03 | 12,035 |
| <i>b</i> | 4,65 | 4,75 | 4,65 | 4,75 | 4,65 | 4,75 |
| <i>c</i> | 6,65 | — | 6,65 | — | 6,65 | — |
| <i>d</i> | 12,69 | 12,80 | 12,69 | 12,80 | 12,69 | 12,80 |
| <i>e</i> | 15,00 | — | 15,00 | — | 15,00 | — |

Material steel, polished.

4.2.2.2 Test procedure

Test procedure is as follows.

a) Sizing test

The gauge A should be inserted in the outer contact three times, this is a sizing operation.

b) Insertion test

Following the sizing operation, if specified in the detail specification, the force necessary to insert Gauge B fully into the outer contact shall be measured. When this test is required, the insertion force shall not exceed 35 N.

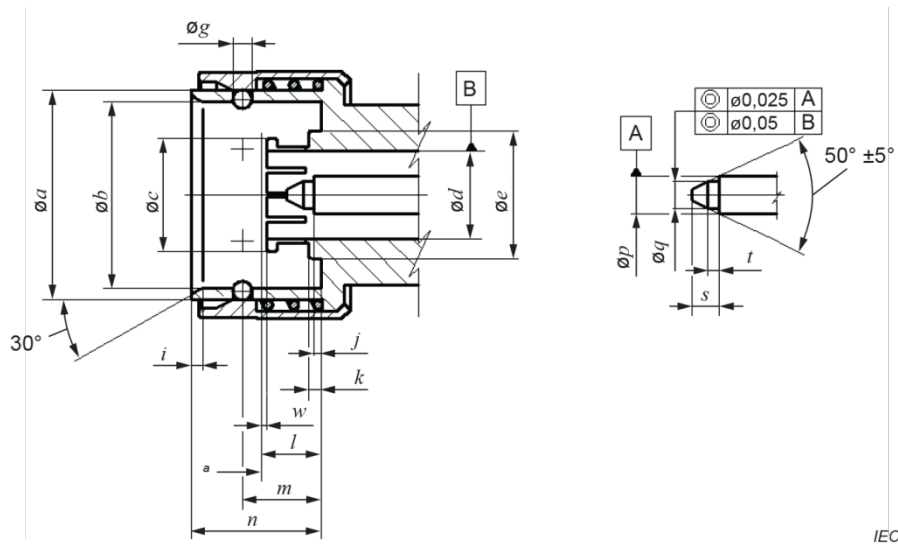
c) Retention test

After sizing or insertion test, the gauge C shall be inserted into the outer contact. The contact shall retain the mass of the gauge C in a vertical downward position. When this test is required, the retention force shall be not less than 4 N.

4.3 Standard test connectors – Grade 0

4.3.1 Standard test connector with pin centre contact

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



^a Mechanical and electrical plane.

Figure 5 – Standard test connector with pin-centre contact

Table 5 – Dimensions of standard test connector with pin-centre contact

| Ref. | mm | |
|-----------------------|-------|-------|
| | Min. | Max. |
| <i>a</i> | 22,32 | 22,52 |
| <i>b</i> | 19,78 | 19,90 |
| <i>c</i> ^a | — | — |
| <i>d</i> | 9,500 | 9,510 |
| <i>e</i> | 13,70 | 13,75 |
| <i>g</i> ^b | 1,99 | 2,01 |
| <i>i</i> | 1,20 | 1,40 |
| <i>j</i> | 0,57 | 0,97 |
| <i>k</i> | 1,20 | 1,42 |
| <i>l</i> | 6,15 | 6,25 |
| <i>m</i> | 8,49 | 8,59 |
| <i>n</i> | 13,58 | 14,08 |
| <i>p</i> | 4,126 | 4,130 |
| <i>q</i> | 2,898 | 2,902 |
| <i>s</i> | 4,00 | 5,00 |
| <i>t</i> | 2,50 | 3,00 |
| <i>w</i> | 0,20 | 0,50 |

^a Resilient electrical contact, slot design optional and meet 4.2.2 requirements.

^b Stainless steel or ceramic beads, not less than 5pcs, radially and uniformly distributed.