

INTERNATIONAL STANDARD

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**Radio-frequency connectors –
Part 49: Sectional specification for SMAA series R.F connectors**

**Connecteurs pour fréquences radioélectriques –
Partie 49: Spécification intermédiaire relative aux connecteurs RF série SMAA**

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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

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CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	6
3 Mating face and gauge information	7
3.1 Dimensions – High performance connectors – Grade 1	7
3.1.1 Connector with pin-centre contact.....	7
3.1.2 Connector with socket-centre contact	8
3.2 Gauges	9
3.2.1 Gauge pins for socket-centre contact.....	9
3.2.2 Test procedure	9
3.3 Dimensions – standard test connectors – Grade 0	10
3.3.1 Connector with pin-centre contact.....	10
3.3.2 Connector with socket-centre contact	11
4 Quality assessment procedure.....	12
4.1 General.....	12
4.2 Rating and characteristics (see Clause 5 of IEC 61169-1:2013).....	12
4.3 Test schedule and inspection requirements – Periodic tests	15
4.4 Procedures for the quality conformance	17
4.4.1 Quality conformance inspection	17
4.4.2 Quality conformance and its maintenance – General procedure	17
5 Instructions for preparation of detail specifications (DS).....	17
5.1 General.....	17
5.2 Identification of the component	17
5.3 Performance	17
5.4 Marking, ordering information and related matters	18
5.5 Selection of tests, test conditions and severities	18
5.6 Blank detail specification pro-forma for type SMAA connector.....	18
6 Marking	22
6.1 Marking of component.....	22
6.2 Marking and contents of package.....	23
Bibliography.....	24
Figure 1 – Connector with pin-centre contact (for dimensions and notes, see Table 1).....	7
Figure 2 – Connector with socket-centre contact (for dimensions and notes, see Table 2)	8
Figure 3 – Gauge pins for socket-centre contact (for dimensions and notes, see Table 3).....	9
Figure 4 – Connector with pin-centre contact (for dimensions and notes, see Table 4).....	10
Figure 5 – Connector with socket-centre contact (for dimensions and notes, see Table 5) ...	11
Table 1 – Dimensions of connector with pin-centre contact.....	7
Table 2 – Dimensions of connector with socket-centre contact.....	8
Table 3 – Dimensions of gauge pins for socket-centre contact	9
Table 4 – Dimensions of connector with pin-centre contact.....	10
Table 5 – Dimensions of connector with socket-centre contact.....	11

Table 6 – Preferred climatic categories (see IEC 60068-1).....	12
Table 7 – Rating and characteristics	13
Table 8 – Acceptance tests.....	15
Table 9 – Periodic tests	16

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RADIO-FREQUENCY CONNECTORS –

Part 49: Sectional specification for SMAA series R.F connectors

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The text of this standard is based on the following documents:

FDIS	Report on voting
46F/259/FDIS	46F/268/RVD

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

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

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

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

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RADIO-FREQUENCY CONNECTORS –

Part 49: Sectional specification for SMAA series R.F connectors

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 SMAA series thread mated coaxial connectors.

The connectors are normally used for micro wave applications, connecting with 50 Ω RF cables or microstrips in an operating range up to 27 GHz.

These connectors can be intermated with SMA (IEC 60169-15), 3,5 mm (IEEE 287-2007), 2,92 mm (IEC 61169-35) connectors.

It also prescribes mating face dimensions for high performance connectors grade 1, dimensional details of standard test connectors grade 0, for general purpose with gauging information and the mandatory tests selected from IEC 61169-1, applicable to all detail specifications relative to type SMAA connectors.

This specification indicates the recommended performance characteristics to be considered when writing a DS and covers all tests schedules and inspection requirements.

NOTE Metric dimension are original dimensions.

All undimensioned pictorial configurations are for reference purpose only.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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*

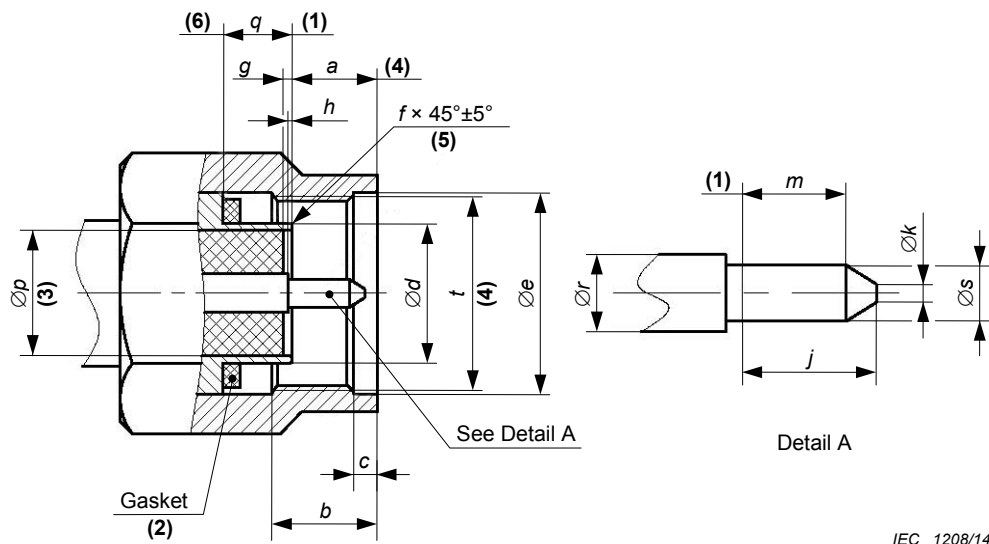
IEC 60068-1, *Environmental testing – Part 1: General and guidance*

IEC 62037 (all parts), *Passive RF and microwave devices, intermodulation level measurement*

3 Mating face and gauge information

3.1 Dimensions – High performance connectors – Grade 1

3.1.1 Connector with pin-centre contact



IEC 1208/14

Figure 1 – Connector with pin-centre contact
(for dimensions and notes, see Table 1)

Table 1 – Dimensions of connector with pin-centre contact

IEC 61169-49:2014

Ref.	mm		Figure footnotes
	Min.	Max.	
a	—	3,35	
b	2,54	—	
c	0,50	1,02	
d	4,52	4,59	
e	6,48	6,73	
f	—	0,08	(5)
g	0,00	0,13	
h	0,00	0,13	
j	—	2,54	
k	—	0,30	
m	1,27	—	(1)
p	—	—	(3)
q	—	—	(6)
r	1,27 (nominal value)		
s	0,902	0,935	
t	1/4-36UNS-2B		(4)

(1) Mechanical and electrical reference plane.

(2) Gasket possible on Grade 1 connectors.

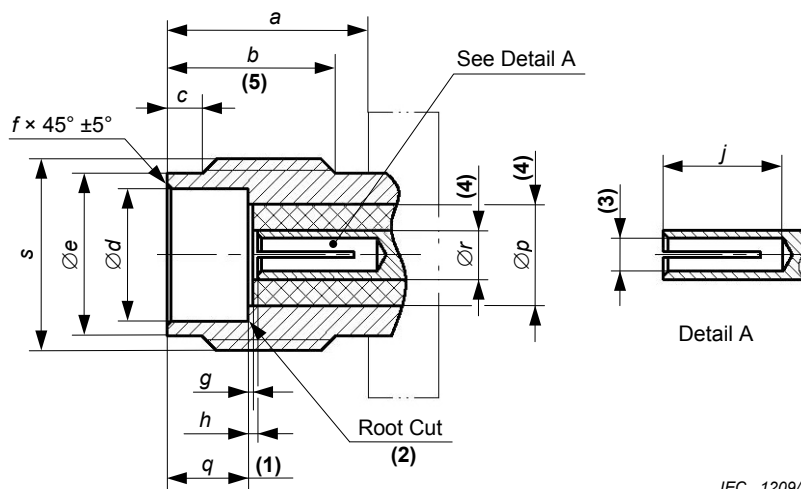
(3) Diameter is chosen to obtain a normal impedance of $50 \Omega \pm 1 \Omega$.

(4) Coupling nut twists position.

(5) 0,08 mm max rounding chamfer, optional.

(6) Dimension q should ensure the reference plane superposition while satisfying the required environmental performance.

3.1.2 Connector with socket-centre contact



IEC 1209/14

Figure 2 – Connector with socket-centre contact
(for dimensions and notes, see Table 2)

Table 2 – Dimensions of connector with socket-centre contact

Ref.	mm		Figure footnotes
	Min.	Max.	
a	5,54	—	
b	4,32	—	(5)
c	0,50	1,02	
d	4,605	4,673	(2)
e	5,28	5,49	
f	0,00	0,13	
g	0,00	0,10	
h	0,00	0,10	
j	2,92	—	
p	—	—	
q	1,88	1,98	(1)
r	1,27 (nominal value)		(4)
s	1/4-36UNS-2A		
Detail A			(3)

(1) Mechanical and electrical reference plane.
 (2) Design for root cut to be allowed.
 (3) Design for slotting is optional. It is chosen to meet electrical and mechanical requirements, when mated with a Ø 0,902 mm to Ø 0,935 mm gauge pin.
 (4) Diameter shall be chosen to obtain a normal impedance of 50 Ω ± 1 Ω.
 (5) The shortest full thread length.

3.2 Gauges

3.2.1 Gauge pins for socket-centre contact

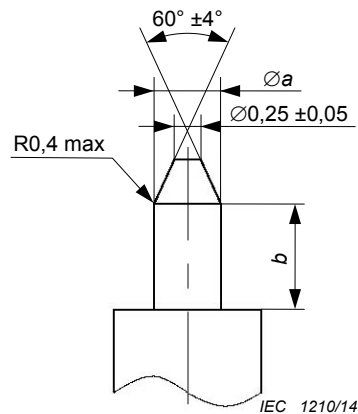


Figure 3 – Gauge pins for socket-centre contact
(for dimensions and notes, see Table 3)

Table 3 – Dimensions of gauge pins for socket-centre contact

Ref.	Gauge A Maximum material for sizing purposes		Gauge B Minimum material for measurement of retention force Mass of gauge: 28 g +2 g	
	mm		mm	
	Min.	Max.	Min.	Max.
a	0,950	0,955	0,899	0,902
b	0,76	1,14	1,27	1,90
Material: steel, polished, surface roughness: Ra=0,4 µm maximum.				

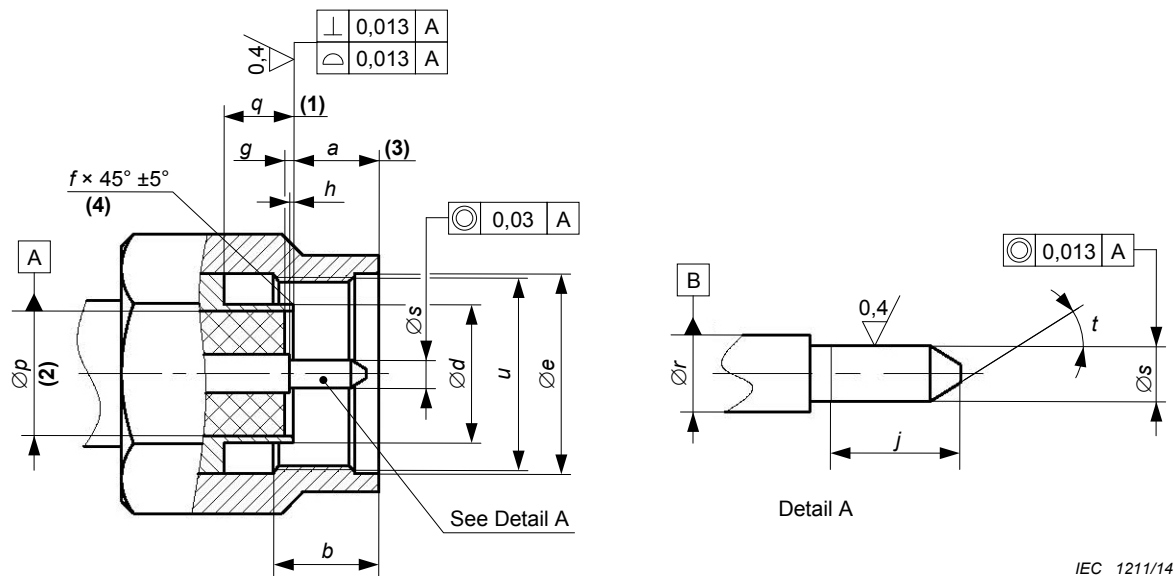
3.2.2 Test procedure

The gauge A shall be inserted into the socket-centre contact three times with a minimum depth of 0,76 mm. This is a sizing operation and should only be carried out when the socket-centre contact is removed from the connector.

After this, the gauge B shall be inserted into socket-centre contact. The contact shall retain the mass of the gauge in a vertical downward position.

3.3 Dimensions – standard test connectors – Grade 0

3.3.1 Connector with pin-centre contact



IEC 1211/14

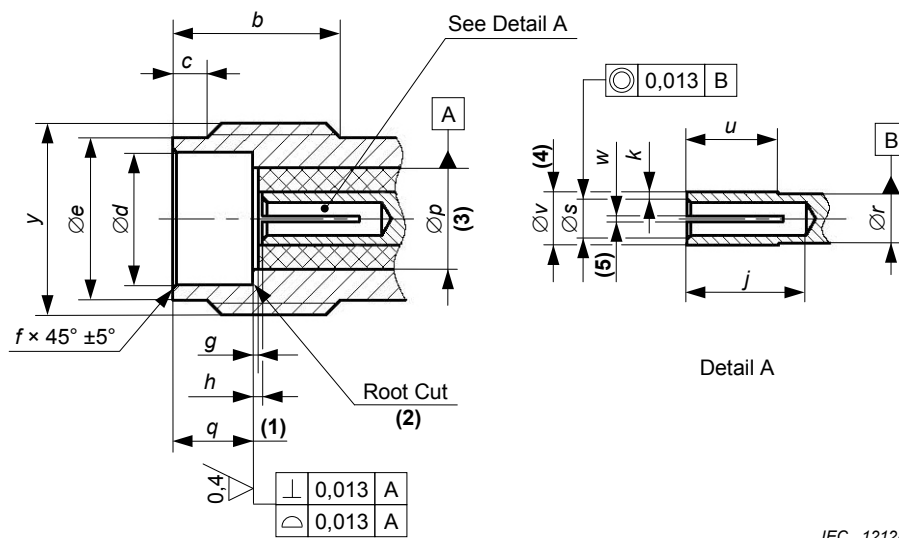
Figure 4 – Connector with pin-centre contact
(for dimensions and notes, see Table 4)

Table 4 – Dimensions of connector with pin-centre contact

Ref.	mm		Figure footnotes
	Min.	Max.	
a	2,590	3,350	
b	2,540	4,320	
d	4,521	4,592	
e	6,480	6,730	
f	—	0,080	(4)
g	0,000	0,050	
h	0,000	0,076	
j	2,030	2,290	
p	—	—	
q	2,030	—	(1)
r	1,270 (nominal value)		(2)
s	0,902	0,927	
t	42°	48°	
u	1/4-36UNS-2B		(3)

(1) Mechanical and electrical reference plane.
 (2) Diameter shall be chosen to obtain a normal impedance of $50 \Omega \pm 0,25 \Omega$.
 (3) Coupling nut twists position.
 (4) 0,08 mm max. rounding chamfer, optional.

3.3.2 Connector with socket-centre contact



IEC 1212/14

**Figure 5 – Connector with socket-centre contact
(for dimensions and notes, see Table 5)**

Table 5 – Dimensions of connector with socket-centre contact

Ref.	mm		Figure footnotes
	Min.	Max.	
<i>b</i>	4,320	—	
<i>c</i>	0,510	1,020	
<i>d</i>	4,597	4,666	(2)
<i>e</i>	5,283	5,490	
<i>f</i>	—	0,150	
<i>g</i>	0,000	0,050	
<i>h</i>	0,000	0,076	
<i>j</i>	3,050	3,300	
<i>k</i>	0,080	—	
<i>p</i>	3,925	3,945	
<i>q</i>	1,880	1,980	(1)
<i>r</i>	1,260	1,270	(3)
<i>s</i>	0,965	0,990	
<i>t</i>	42°	48°	
<i>u</i>	1,650	1,800	
<i>v</i>	1,285	1,300	(4)
<i>w</i>	0,150	0,200	
<i>y</i>	1/4-36UNS-2A		

(1) Mechanical and electrical reference plane.
(2) Design for root cut to be allowed.
(3) Diameter shall be chosen to obtain a normal impedance of $50 \Omega \pm 0,25 \Omega$.
(4) Diameter *v* is for the unslotted dimensions.
(5) The slot width and the slot depth should be chosen to satisfy the requirement of mechanical and the electrical specification.

4 Quality assessment procedure

4.1 General

The following Subclauses 4.2 to 4.4 provide recommended rating, performance and test conditions to be considered when writing a detail specification. They also provide an appropriate schedule of tests with minimum levels of conformance inspection sampling, together with the pro-forma blank detail specification (BDS) and instructions for the preparation of a detail specification.

4.2 Rating and characteristics (see Clause 5 of IEC 61169-1:2013)

The values indicated below are recommended for SMAA series RF connectors and are given for the writer of the detail specification. They are applicable for the condition when the connectors are fully mated.

Certain tests are listed without any recommended values being given. These tests will usually not be required. When these tests are required, appropriate values shall be entered in the detail specification at the discretion of the specification writer.

Preferred climatic categories are given in Table 6.

Table 6 – Preferred climatic categories (see IEC 60068-1)

Category designation	Letter*	Temperature range °C	Steady damp heat
40/85/21	A	–40 to +85	21 days
55/155/56	B	–55 to +155	56 days

* To be included in the IEC type designation.

Rating and characteristics are given in Table 7.

Table 7 – Rating and characteristics

Rating and characteristics	IEC 61169-1:2013 Subclause	Values	Remarks, deviations from standard test method
Electrical			
Nominal impedance		50 Ω	
Frequency range Grade1 connectors		DC to 27 GHz	Or upper frequency limit of cable
Reflection factor ^a Grade 1 connectors – straight styles – right-angle styles ^h – component mounting styles – solder bucket and PCB mounting styles	9.2.1	DC to 27 GHz $\leq 0,030 + 0,005f$ (GHz) See DS See DS See DS	
Centre contact resistance ^b – initial – after conditioning	9.2.3	$\leq 3,0$ m Ω $\leq 5,0$ m Ω	
Outer conductor continuity ^b – initial – after conditioning	9.2.3	$\leq 2,5$ m Ω $\leq 5,0$ m Ω	
Insulation resistance ^b – initial – after conditioning	9.2.5	$\geq 5\ 000$ M Ω ≥ 200 M Ω	
Proof voltage at sea level ^{c,d} – uncabled styles – semi-rigid and semi-flexible 2,16 mm (0,086 in) diameter – semi-rigid and semi-flexible 1,19 mm (0,047 in) diameter	9.2.6	750 V 750 V 500 V	86 kPa to 106 kPa
Proof voltage at 4,4 kPa ^{c,d} – uncabled styles – semi-rigid and semi-flexible 2,16 mm (0,086 in) diameter – semi-rigid and semi-flexible 1,19 mm (0,047 in) diameter	9.2.6	150 V 150 V 100 V	4,4 kPa approximately equivalent to 20 km
Environmental test voltage at sea level ^{c,d} – uncabled styles – semi-rigid and semi-flexible 2,16 mm (0,086 in) diameter – semi-rigid and semi-flexible 1,19 mm (0,047 in) diameter	9.2.6	250 V 250 V 175 V	86 kPa to 106 kPa
Environmental test voltage at 4,4 kPa ^{c,d} – uncabled styles – semi-rigid and semi-flexible 2,16 mm (0,086 in) diameter – semi-rigid and semi-flexible 1,19 mm (0,047 in) diameter	9.2.6	65 V 65 V 45 V	4,4 kPa approximately equivalent to 20 km
Screening effectiveness (straight cables only) ^g	9.2.7	≥ 100 dB at 1 GHz	$Z_t \leq 1$ m Ω ,
Discharge test (corona effect)	9.2.8	See DS	Extinction voltage