BRITISH STANDARD

BS EN
3155-069:2009

Aerospace series — Electrical contacts used in elements of connection

Part 069: Contacts, electrical, coaxial, size 16, female, type D, solder, class P — Product standard

ICS 49.060

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British Standards

National foreword

This British Standard is the UK implementation of EN 3155-069:2009.

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A list of organizations represented on this committee can be obtained on request to its secretary.

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Série aérospatiale - Contacts électriques utilisés dans les organes de connexion - Partie 069: Contacts, électriques, coaxiaux, taille 16, femelles, type D, à souder, classe P - Norme de produit

Luft- und Raumfahrt - Elektrische Kontakte zur Verwendung in Verbindungselementen - Teil 069: Elektrische koaxial Bushenkontackte Größe 16, typ D, zum Löten, Klasse P - Produktnorm

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Foreword

This document (EN 3155-069:2009) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

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Introduction

The contact defined by this standard is derived and interchangeable with that of SAE-AS39029/78.

1 Scope

This standard specifies the required characteristics, tests and tooling applicable to size 16, female coaxial electrical contacts, type D, solder, class P, used in elements of connection according to EN 3155-002.

It shall be used together with EN 3155-001.

The associated male contacts are defined in EN 3155-058.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 2591-*, *Aerospace series — Elements of electrical and optical connection — Test methods*

EN 3155-001, *Aerospace series — Electrical contacts used in elements of connection — Part 001: Technical specification* [1]

EN 3155-002, *Aerospace series — Electrical contacts used in elements of connection — Part 002: List and utilization of contacts*

EN 3155-058, *Aerospace series — Electrical contacts used in elements of connection — Part 058: Contacts, electrical, coaxial, size 16, male, type D, solder, class R — Product standard*

QQ-S-571, *Solder, tin alloy: tin-lead alloy and lead alloy* [2]

MIL-I-81969/08, *Installing and removal tools, connector electrical contact, type I and II, class 2, composition A* [2]

MIL-I-81969/14, *Installing and removal tools, connector electrical contact, type III, class 2, composition B* [2]

MIL-PRF-5606, *Hydraulic fluid, petroleum base, aircraft, missile and ordnance* [2]

MIL-PRF-7808, *Lubricating oil, aircraft turbine engine, synthetic base, NATO code number O-148* [2]

MIL-PRF-7870, *Lubricating oil: general purpose, low temperature* [2]

MIL-PRF-23699, *Lubricating oil, aircraft turbine engine, synthetic base, NATO code number O-156* [2]

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* All parts quoted in this document.

1 Published as ASD Prestandard at the date of publication of this standard.

2 Published by: Department of Defence (DOD), the Pentagon, Washington D.C. 20301 USA.

MIL-PRF-87937, *Cleaning compound aerospace equipment* [2]

SAE-AMS1424, *Fluid, deicing/anti-icing, aircraft, SAE type I* [3]

SAE-AS1241, *Fire resistant phosphate ester hydraulic fluid for aircraft* [3]

SAE-AS39029/78, *Contacts, electrical connector, socket, crimp removable, shielded, size 16 (for MIL-C-38999 series II and MIL-C-24308 connectors.* [3]

TR 6058, *Aerospace series — Cable code identification list* [4]

3 Terms and definitions

For the purposes of this standard, the terms and definitions given in EN 3155-001 apply.

4 Required characteristics

4.1 Specific characteristics

Type D contacts are for general application and class P corresponds to an operating temperature range from – 65 °C to 125 °C.

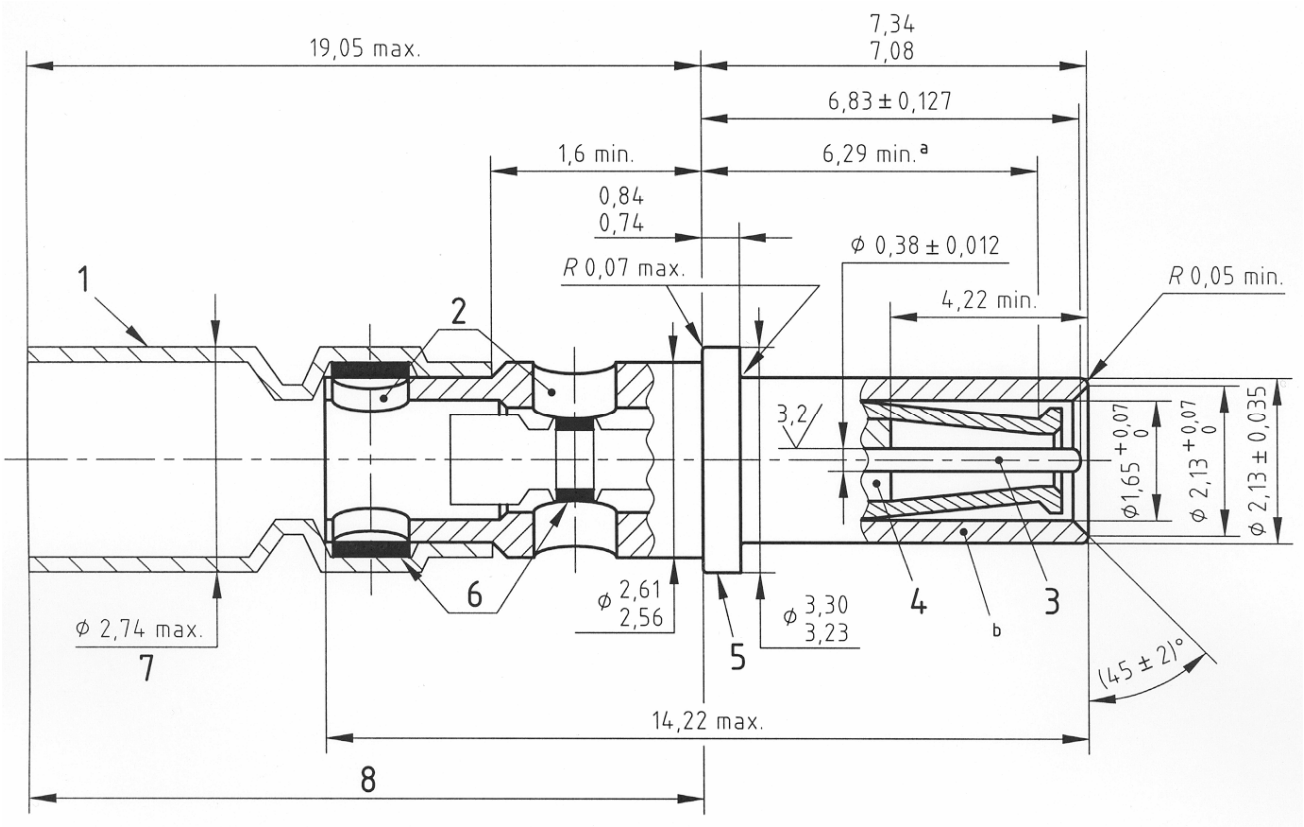
4.2 Dimensions and mass

See Figure 1.

Dimensions and tolerances are given in millimetres and apply after surface treatment.

3 Published by: Society of Automotive Engineering (SAE), 400 Commonwealth Drive, Warrendale, PA 15096, USA.

4 Published as ASD Technical Report at the date of publication of this standard.



Key

1 Heat shrinkable tubing
2 Inspection windows
3 Male central contact body
4 Dielectric
5 Female external contact body
6 Weld rings
7 Diameter after use
8 Heating zone

a See Note 1

b See Note 2

Figure 1

NOTE 1 Point at which a square ended gauge pin of the same basic diameter as the mating contact first engages the female contact spring member.

NOTE 2 Outer contact mates with 1,61/1,57 male contact diameter.

Mass: 0,60 g.

4.3 Marking by colour code

Not applicable.

4.4 Material, surface treatment

4.4.1 Material

Contact body: copper alloy.

4.4.2 Protective coating

Gold on appropriate undercoat for copper alloy parts (except silver).

Thickness not specified.

4.4.3 Dielectric

ETFE Fluoropolymer.

4.4.4 Heat shrinkable tubing.

Radiation cross linked polyvinylidene fluoride.

4.4.5 Weld rings

Sn63 as per QQ-S-571.

4.5 Permissible cables

The cables should have dimensions within the values specified in Table 1.

Table 1

Dimensions in millimetres

Cable diameter ∅		min.	max.
Jacket	*A*	2,59	2,79
Shield	*B*	1,67	2,13
Dielectric	*C*	0,91	1,72
Conductor	*D*	0,22	0,58
Permissible cable code according to TR 6058		XE, XY , WL	

4.6 Stripping of cables and wiring method

4.6.1 Assembly instructions

Strip cable as shown in Figure 2, 3 or 4.

Pretin central conductor with SN63.

Insert cable into contact until it is fully seated.

Heat contact with appropriate tools as shown on Figure 5 until solder melts and flows and strain relief tubing conforms to cable.

4.6.2 Preparation of coaxial cable:

Depending upon dielectric diameter value there are three possibilities:

a) Cable preparation for straight shield

When all ∅ conform to Table 1.

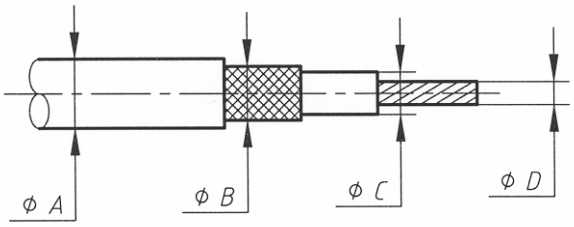
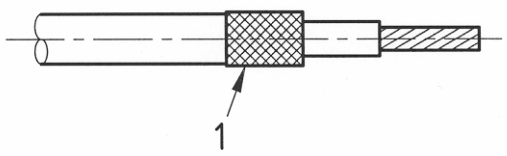


Figure 2

b) Cable preparation for fold back shield

When shield diameter is smaller than ∅ B min. of Table 1.

Restriction: if ∅ of shield become ≥ ∅ B max. (2,13 mm).



Key

1 Fold shield back over cable jacket

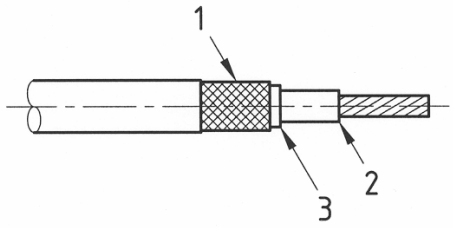
Figure 3

c) Preparation for coaxial cable with small dielectric diameter:

When dielectric diameter is ≤ ∅ C min. Table 1 (0,91 mm):

— strip the cable as shown on Figure 4,

— slip a dielectric barrier between the shield braid and the cable dielectric to bring the diameter within the value specified in Table 1.



Key

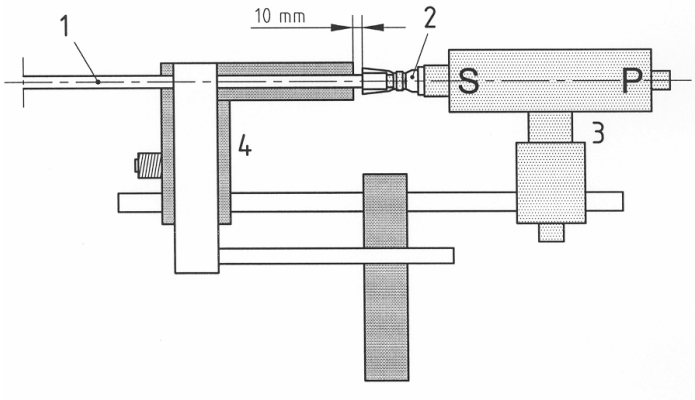
1 Shield braid
2 Cable dielectric
3 Dielectric barrier

Figure 4

4.7 Tooling

4.7.1 Contact termination tooling

The hot air generator is of a minimum usable capacity of 800 W and the temperature in the heating zone shall be (420 ± 20) °C. The drawing of the tool is given for information purposes: the positioner has an interface for the male contact on side P and the female contact on side S (see Figure 5); the function of the cable clamp is to hold the parts in place during the heating and cooling phases.



Key

1 Coaxial cable
2 Contact
3 Positioning device
4 Cable clamp

Figure 5

4.7.2 Insertion/extraction tooling

Insertion: M81969/14-03 or M81969/08-07 (see MIL-I-81969/14 or MIL-I-81969/08).

Extraction: M81969/14-03 or M81969/08-08.

4.8 Tests

See Table 2.

Table 2

<table>
<tr><th rowspan="2">EN 2591-</th><th rowspan="2">Test</th><th rowspan="2">Not applicable</th><th colspan="2">Applicable</th></tr>
<tr><th>According to EN 3155-001</th><th>Remarks</th></tr>
<tr><td>101</td><td>Visual examination</td><td></td><td>X</td><td></td></tr>
<tr><td>102</td><td>Examination of dimensions and mass</td><td></td><td>X</td><td>See 4.2.</td></tr>
<tr><td>201</td><td>Contact resistance - low level</td><td></td><td>X</td><td>Test temperature: ambient
<table><tr><th rowspan="2">Contact</th><th colspan="2">Maximum contact resistance*
mΩ</th></tr><tr><th>Initial</th><th>After tests</th></tr><tr><td>Centre</td><td>10</td><td>15</td></tr><tr><td>Outer</td><td colspan="2">Not applicable</td></tr></table>* Whatever cable type</td></tr>
<tr><td>202</td><td>Contact resistance at rated current</td><td></td><td>X</td><td>Test temperature: ambient
<table><tr><th rowspan="3">Contact</th><th colspan="3">Maximum contact resistance*
mΩ</th><th rowspan="3">Rated current
A</th></tr><tr><th colspan="2">(25^{+3}_{0}) °C</th><th>(125^{+3}_{0}) °C</th></tr><tr><th>Initial</th><th>After tests</th><th>After tests</th></tr><tr><td>Centre</td><td>10</td><td>15</td><td>20</td><td>1</td></tr><tr><td>Outer</td><td>1,5</td><td>2</td><td>3</td><td>7,5</td></tr></table>* Whatever cable type</td></tr>
<tr><td>204</td><td>Discontinuity of contacts in the microsecond range</td><td></td><td>X</td><td>Method B
Duration of discontinuity: ≤ 100 ns.
Test duration: throughout the duration of tests EN 2591-402 and EN 2591-403.</td></tr>
<tr><td>206</td><td>Measurement of insulation resistance</td><td></td><td>X</td><td>Method C
Mated contacts
At ambient > 5 GΩ
At 125 °C > 2 GΩ</td></tr>
<tr><td>207</td><td>Voltage proof test</td><td></td><td>X</td><td>Method C
Proof test voltage at sea level:
1 300 VAC r.m.s. Between centre contact and outer contact.
Proof test voltage at altitude:
125 VAC r.m.s. at 1,1 kPa pressure (33 000 m).
Leakage current: 2 mA</td></tr>
<tr><td>210</td><td>Electrical overload</td><td>X</td><td></td><td></td></tr>
<tr><td>211</td><td>Capacitance</td><td>X</td><td></td><td></td></tr>
<tr><td>212</td><td>Surface transfer impedance</td><td>X</td><td></td><td></td></tr>
<tr><td>213</td><td>Shielding effectiveness from 100 MHz to 1 GHz</td><td>X</td><td></td><td></td></tr>
</table>

continued

Table 2 *(concluded)*

EN 2591-	Test	Not applicable	Applicable	
			According to EN 3155-001	Remarks
301	Endurance at temperature		X	Method B – 125 °C Duration: 1 000 h
305	Rapid change of temperature		X	T_A = (125 ± 2) °C T_B = (– 65 ± 2) °C
306	Mould growth	X		
307	Salt mist		X	
315	Fluid resistance		X	See Table 3.
402	Shock		X	Method A, severity 300. The contacts shall be connected with a cable as per Table 1 and then fitted in connectors. The connectors fitted with appropriate cable clamps shall be mated and mounted on the shock apparatus using appropriate mounting systems. Discontinuity: ≤ 100 ns
403	Sinusoidal and random vibration		X	The contacts shall be connected to a cable as per Table 1 then fitted in the connectors. The connectors fitted with appropriate cable clamps shall be mated and mounted on the vibration apparatus using appropriate mounting systems. The cables are clamped a minimum of 200 mm from the rear of the contacts at a fixed point of the assembly. Discontinuity: ≤ 100 ns Test at (23 ± 5) °C
406	Mechanical endurance		X	
415	Test probe damage (female contacts)	X		
416	Contact bending strength	X		
417	Tensile strength (crimped connection)	X		
501	Soft solderability	X		
502	Restricted entry	X		
503	Contact deformation after crimping	X		
508	Measurement of thickness of coating on contacts		X	The measured thickness shall be recorded.
509	Adhesion of coating on contacts		X	
513	Magnetic permeability		X	
514	Solderability of contacts with self-contained solder and flux		X	

Table 3 — List of fluids

Fluid			Immersion		Temp. in oven	Number of cycles
Category	References		Duration min.	Temp. °C		
Fuel	JP5	NATO F44	5^{+2}_{0}	25	85	7
Mineral hydraulic fluid	MIL-PRF-5606	NATO F515	15^{+5}_{0}	85	100	5
Synthetic hydraulic fluid	SAE-AS1241	Skydrol 500 B4 Skydrol LD 4	15^{+5}_{0}	85	100	5
Mineral lubricant	MIL-PRF-7870	NATO O142	15^{+5}_{0}	120	125	5
Synthetic lubricant	MIL-PRF-23699	NATO O156	15^{+5}_{0}	150	125	5
	MIL-PRF-7808	NATO O148				
Cleaning products	Diluted MIL-PRF-87937	–	15^{+5}_{0}	25	25	5
	25 % Propanol + 75 % White spirit					
	Azeotrope R113AzM (R113 + methanol)		5^{+2}_{0}			2
Deicing fluid	SAE-AMS1424	NATO S742	15^{+5}_{0}	50	100	5
Extinguishing fluid	Chlorobromethane (less than 0,1 MPa of overpressure)	–	15^{+5}_{0}	– 15	25	5
Cooling liquid	Coolanol	–	15^{+5}_{0}	50	25	5

4.9 Gauge

Figure 6 and Table 4 define the gauge used for test EN 2591-418.

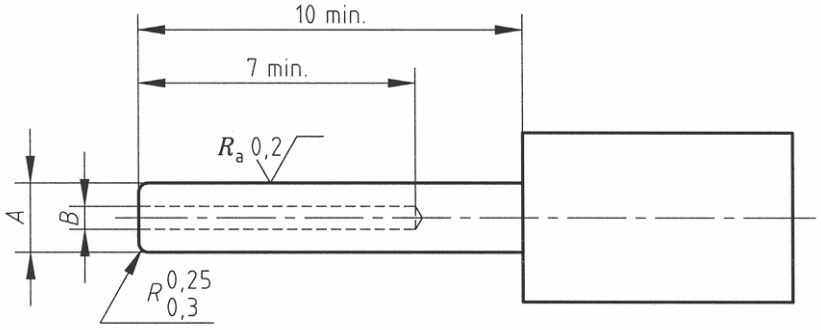


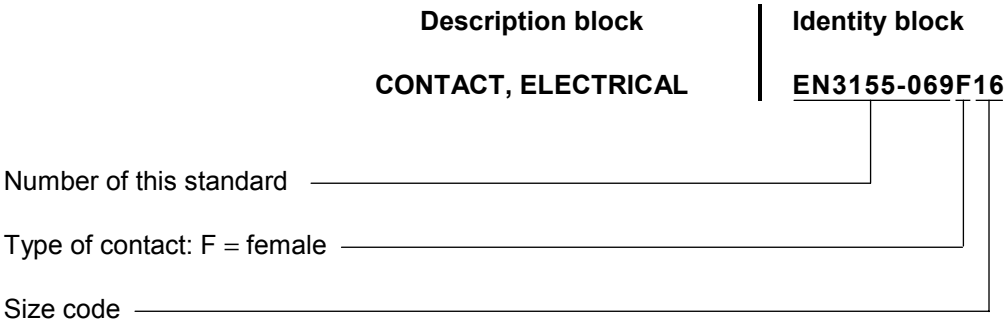
Figure 6

Table 4

A		*B*
Gauge min. $^{0}_{-0,005}$	Gauge max. $^{+0,005}_{0}$	
1,57	1,61	0,5 min.

5 Designation

EXAMPLE



NOTE If necessary, the code I9005 may be placed between the description block and the identity block.

6 Marking

See EN 3155-001.

7 Technical specification

See EN 3155-001.

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