BRITISH STANDARD

BS EN
3155-009:2006

Aerospace series — Electrical contacts used in elements of connection —

Part 009: Contacts, electrical, female, type A, crimp, class S — Product standard

The European Standard EN 3155-009:2006 has the status of a British Standard

ICS 49.060

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National foreword

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Série aérospatiale - Contacts électriques utilisés dans les organes de connexion - Partie 009 : Contacts électriques, femelles, type A, à sertir, classe S - Norme de produit

Luft- und Raumfahrt - Elektrische Kontakte zur Verwendung in Verbindungselementen - Teil 009: Elektrische Buchsenkontakte, Typ A, crimpbar, Klasse S - Produktnorm

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Foreword

This European Standard (EN 3155-009:2006) has been prepared by the AeroSpace and Defense 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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0 Introduction

The contacts defined by this standard are derived from those of MIL-C-39029/56 and, intermateable with those of MIL-C-39029/58.

1 Scope

This standard specifies the required characteristics, tests and tooling applicable to female electrical contacts 009, type A, crimp, class S, 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 3155-008.

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 2083, *Aerospace series — Copper or copper alloy conductors for electrical cables — Product standard*

EN 2591 (series), *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*

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

EN 3155-008, *Aerospace series — Electrical contacts used in elements of connection — Part 008: Contacts, electrical, male, type A, crimp, class S — Product standard*

EN 4008-009, *Aerospace series — Elements of electrical and optical connection — Crimping tools and associated accessories — Part 009: Positioner for crimping tool M22520/23 — Product standard*[1)]

EN 4008-010, *Aerospace series — Elements of electrical and optical connection — Crimping tools and associated accessories — Part 010: Head for crimping tool M22520/23 — Product standard*[1)]

ISO 8843, *Aircraft — Crimp-removable contacts for electrical connectors — Identification system*

MIL-DTL-22520, *Crimping tools, terminal, hand or power actuated, wire termination, and tool kits, general specification for*[2]

MIL-C-22520/1, *Crimping tools, terminal, hand, wire termination for wire barrel sizes 12 through 20*[2)]

MIL-C-22520/2, *Crimping tools, terminal, hand, wire termination for wire barrel sizes 20 through 28*[2)]

MIL-C-22520/7, *Crimping tools, terminal, hand, wire termination for wire barrel sizes 16, 20 and 22*[2)]

MIL-C-22520/23, *Crimping tools, terminal, hand or power actuated, wire termination: pneumatic tool for wire barrel sizes 0000 through 8*[2)]

MIL-C-39029, *Contacts, electrical connector, general specification for*[2)]

MIL-C-39029/56, *Contacts, electrical connector, socket, crimp removable (for MIL-C-38999 series I, III and IV connector)*[2)]

MIL-C-39029/58, *Contacts, electrical connector, pin, crimp removable (for MIL-C-24308, MIL-C-38999 series I, II, III and IV, and MIL-C-55302/69 and MIL-C-83733 connectors)* [2)]

MIL-I-81969, *Installing and removal tools, connector electrical contact, general specification for*[2)]

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

MIL-I-81969/18, *Installing and removal tools, connector electrical contact, type I, class 1, composition C*[2)]

MIL-I-81969/30, *Installing and removal tools, connector electrical contact, type II, class 2, composition C for unwired*[2)]

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1) In preparation at the date of this standard.
2) Published by: Department of Defense (DOD), the Pentagon, Washington D.C. 20301 USA.

3 Definitions

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

4 Required characteristics

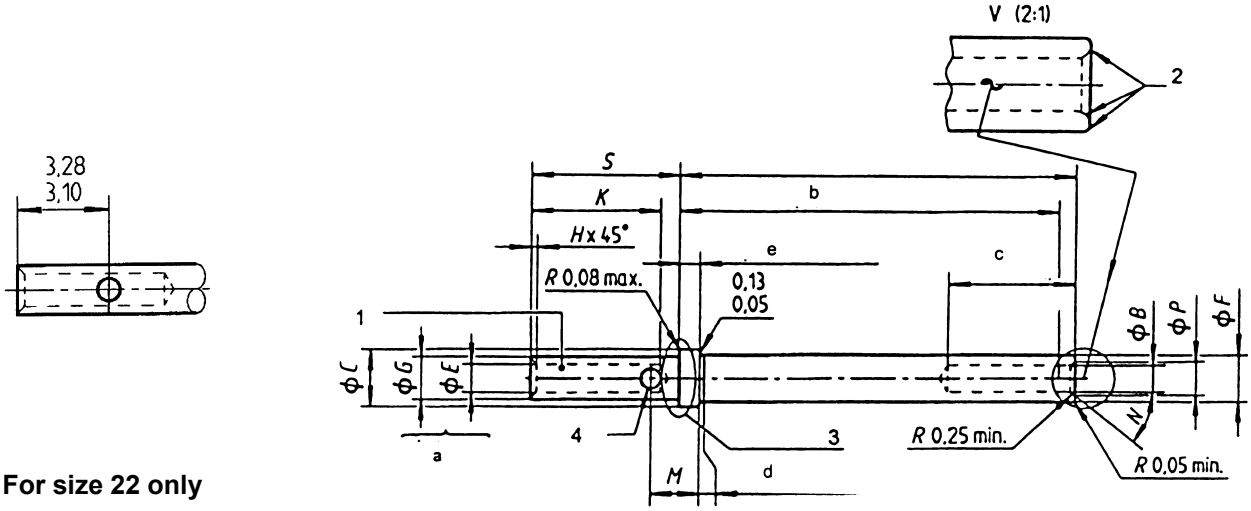
4.1 Specific characteristics

Type A contacts are for general application and class S corresponds to an operating temperature range from – 65 °C to 200 °C.

4.2 Dimensions and mass

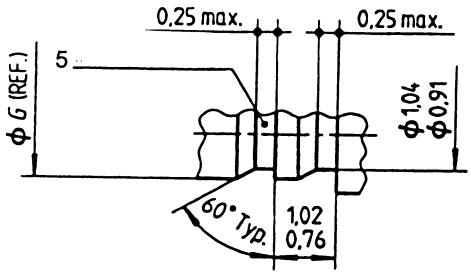
See Figure 1 and Table 1.

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

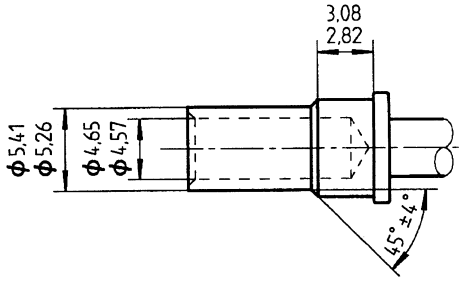


For size 22 only

W (10:1) Size 22 only



X (3:1 Size 10 only



Key

1 Colour bands see Table 2
2 One full radius permissible
3 W, X and Y
4 ∅ G and ∅ E[a]
5 Identification groove optional

a for size 22 ⌀ ϕ 0,08 ϕE ϕG ; for all other sizes ⌀ ϕ0,025 ϕE Ⓜ ϕG Ⓜ

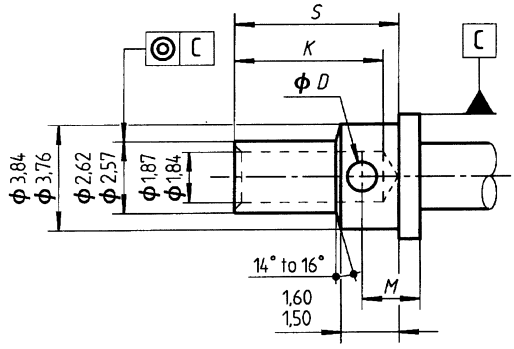
b 14,86 min., point at which a square ended gauge pin of the same basic diameter as the mating contact first engages the female contact spring member.

c 4,22 min., this dimension represents both the length of the bore ∅ *B* which includes the active zone of protection (see EN 3155--001, 5.3.2).

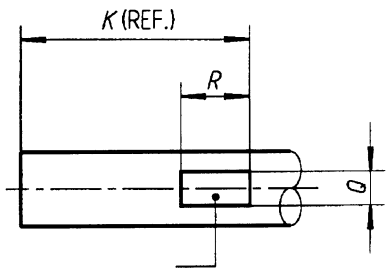
d 0,15 max., clearance between sleeve and body of the contact.

e $^{0,84}_{0,74}$, not applicable for contact size 22

Y (5:1) **Size 12-14 only**



Z (5:1) **Optional design**



Key

1 14° to 16°

Figure 1

Table 1

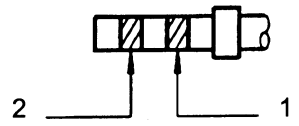
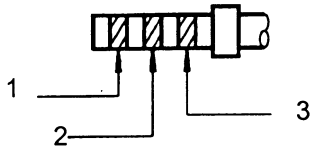
Size		*B*	*C*	*D*	*E*	*F*	*G*	*H*	*J*
Contact	**Barrel**	min.				max.			
22	22	0,78	1,57 1,52	0,56 0,46	0,902 0,851	1,57	1,22 1,17	0,13 0,08	15,90 15,65
20	20	1,05	2,39 2,31	0,81 0,66	1,22 1,17	1,98	1,78 1,73	0,25 0,13	15,90 15,65
20	18	1,05	2,39 2,31	0,81 0,66	1,35 1,30	1,98	1,78 1,73	0,25 0,13	15,90 15,65
16	16	1,63	3,30 3,23	1,07 0,91	1,73 1,68	2,87	2,62 2,57	0,25 0,13	15,90 15,65
16	14	1,63	3,30 3,23	1,07 0,91	1,87 1,84	2,87	2,62 2,57	0,25 0,13	15,90 15,65
12	12	2,43	4,62 4,55	1,07 0,91	2,59 2,49	4,09	3,84 3,76	0,41 0,13	15,90 15,65
12	14	2,43	4,62 4,55	0,80 0,70	1,87 1,84	4,09	3,84 3,76	0,41 0,13	15,90 15,65
10	10	3,21	6,15 6,05	1,32 1,17	3,56 3,40	5,46	5,41 5,26	0,41 0,13	15,90 15,65

Size		*K*	*M*	*N°*	*P*	*Q*	*R*	*T*	**Mass** g
Contact	**Barrel**								max.
22	22	3,58 min.	—	50 44	1,20	0,56 0,46	1,17 0,46	6,02 5,87	0,20
20	20	5,31 min.	1,98 1,83	47 40	1,35	0,81 0,66	1,60 0,66	6,02 5,87	0.30
20	18	5,31 min.	1,98 1,83	47 40	1,35	0,81 0,66	1,60 0,66	6,02 5,87	0.30
16	16	5,31 min.	2,24 2,08	47 40	2,14	1,07 0,76	1,85 0,91	6,02 5,87	0,70
16	14	5,31 min.	2,24 2,08	47 40	2,14	1,07 0,76	1,85 0,91	6,02 5,87	0,70
12	12	5,31 min.	2,24 2,08	47 40	3,00	1,07 0,76	1,85 0,91	6,02 5,87	1,30
12	14	5,31 min.	1,74 1,64	47 40	3,00	1,07 0,76	1,85 0,91	6,02 5,87	1,30
10	10	9,78 9,02	2,24 2,08	See Figure 1	See Figure 1	Not applicable	Not applicable	10,29 10,03	1,38

4.3 Marking by colour code

See Table 2.

Table 2

Size		Two bands according to ISO 8843 		Two bands according to MIL-C-39029/56[a] 		
Contact	**Barrel**	**Band 1**	**Band 2**	**Band 2**	**Band 2**	**Band 2**
22	22	Green	Green	Orange	Yellow	Grey
20	20	Red	Red	Orange	Green	Brown
20	18	Red	Brown[b]	—	—	—
16	16	Blue	Blue	Orange	Green	Red
16	14	Blue	White[c]	—	—	—
12	12	Yellow	Yellow	Orange	Green	Orange
12	14	Yellow	White[c]	—	—	—
10	10	White	Brown	Green	Red	Violet

[a] Contacts supplied with three colour bands must conform to this EN standard.

[b] Violet Colour band not to be used for new manufacture.

[c] Orange colour band not to be used for new manufacture.

Key

1 Band 1
2 Band 2
3 Band 3

4.4 Material, surface treatment

— Body material: copper alloy.

— Surface treatment: gold on appropriate undercoat, thickness of protection not specified selective protection permitted.

4.5 Permissible cables

See Table 3.

Table 3

Size		Size of conductors			Rated test current A
Contact	Barrel	AECMA code	Section mm²	AWG[a]	
22	22	004 002 001	0,40 0,25 0,15	22 24 26	5 3 2
20	20	006 004 002	0,60 0,40 0,25	20 22 24	7,5 5 3
20	18	010 006 004 002	1,00 0,60 0,40 0,25	18 20 22 24	7,5 7,5 5 3
16	16	012 010 006	1,20 1,00 0,60	16 18 20	13 10 7,5
16	14	020 012 010 006	2,00 1,20 1,00 0,60	14 16 18 20	13 13 10 7,5
12	12	030 020	3,00 2,00	12 14	23 17
12	14	020 012 010 006	2,00 1,20 1,00 0,60	14 16 18 20	17 13 10 7,5
10	10	050 030	5,00 3,00	10 12	33 23

[a] AWG = Closest American Wire Gage

4.6 Tooling

4.6.1 Crimping tools

Conform to MIL-DTL-22520, see Tables 4 and 5.

The qualification selector numbers used for crimping copper and copper alloy conductors in cables EN 2083 are indicated in Table 4.

It is the responsibility of the user if the parameters in Tables 4 and 5 are changed for service use.

Table 4

Contact		Cable size		Tools M22520/1-01		Tools M22520/2-01		Tools M22520/7-01	
Contact size	Barrel size	AECMA code	AWG[a]	Positioner	Selector number	Positioner	Selector number	Positioner	Selector number
22	22	001	26	Not applicable	—	M22520/2-07	2	M22520/7-05	1
		002	24		—		3		2
		004	22		—		4		3
		—	—		—		—		—
20	20	002	24	M22520/1-04 Red	1	M22520/2-10	4	M22520/7-08	4
		004	22		2		5		5
		006	20		3		6		6
		—	—		—		—		—
20	18	002	24	M22520/1-04 Red	1	M22520/2-10	4	M22520/7-08	4
		004	22		2		5		5
		006	20		3		6		6
		010	18		4		7		7
16	16	006	20	M22520/1-04 Blue	4	Not applicable	—	M22520/7-04	7
		010	18		5		—		8
		012	16		6		—		8
		—	—		—		—		—
16	14	006	20	M22520/1-04 Blue	4	Not applicable	—	M22520/7-04	7
		010	18		5		—		8
		012	16		6		—		8
		020	14		6		—		8
12	12	020	14	M22520/1-04 Yellow	7	Not applicable	—	Not applicable	—
		030	12		8		—		—
		—	—		—		—		—
		—	—		—		—		—
12	14	006	20	M22520/1-04 Yellow	4	Not applicable	—	Not applicable	—
		010	18		5		—		—
		012	16		6		—		—
		020	14		6		—		—

[a] AWG = Closest American Wire Gage

Table 5

Contact		Cable size		Tools M22520/23-01
Contact size	Barrel size	AECMA code	AWG[a]	Positioner
10	10	030	12	EN 4008-009 and head EN 4008-010
		050	10	
		—	—	
		—	—	

[a] AWG = Closest American Wire Gage

4.6.2 Insertion/extraction tools

Conform to MIL-I-81969.

See Table 6.

Table 6

Size		Insertion tools	Extraction tools	
Contact	Barrel		Wired Contact	Unwired Contact
22	22	M81969/14-01 M81969/8-01	M81969/14-01 M81969/8-02	M81969/30-08
20	20	M81969/14-10 M81969/8-05	M81969/14-10 M81969/8-06	M81969/30-11
20	18	M81969/14-10 M81969/8-05	M81969/14-10 M81969/8-06	M81969/30-11
16	16	M81969/14-03 M81969/8-07	M81969/14-03 M81969/8-08	M81969/30-12
16	14	M81969/14-03 M81969/8-07	M81969/14-03 M81969/8-08	M81969/30-12
12	12	M81969/14-04 M81969/8-09	M81969/14-04 M81969/8-10	M81969/30-13
12	14	M81969/14-04 M81969/8-09	M81969/14-04 M81969/8-10	M81969/30-13
10	10	M81969/14-05 M81969/8-11	M81969/14-05 M81969/8-12	Not applicable

4.7 Cable stripping

See Table 7.

Table 7

Size		Stripped length of cable mm ± 0,5
Contact	Barrel	
22	22	4
20	20	6
20	18	
16	16	
16	14	
12	12	
12	14	
10	10	9

4.8 Tests

See Table 8.

Table 8

EN 2591-	Test	Not applicable	Applicable	
			According to EN 3155-001	Remarks
101	Visual examination		X	
102	Examination of dimensions and mass		X	See 4.2
201	Contact resistance — low level		X	
202	Contact resistance at rated current		X	
204	Discontinuity of contacts in the microsecond range		X	
210	Electrical overload		X	
220	Contact/conductor joint ageing by current and temperature cycling	X		
301	Endurance at temperature		X	T = (200 ± 2) °C Duration: 1 000 h
305	Rapid change of temperature		X	T_A = (– 65 ± 2) °C T_B (200 ± 2) °C
307	Salt mist		X	
315	Fluid resistance	X		
319	Gas-tightness of solderless wrapped connections	X		
402	Shock		X	
403	Sinusoidal and random vibrations		X	Method B, using the vibration envelope shown in Figure 2 Ambient temperature
406	Mechanical endurance		X	
415	Test probe damage (female contact)	X		
416	Contact bending strength		X	
417	Tensile strength (crimped connection)		X	
418	Gauge insertion and extraction forces in and out of a female contact	X		
424	Stripping force, solderless wrapped connections	X		
425	Unwrapping, solderless wrapped connections	X		
501	Soft soldering	X		
502	Restricted entry		X	
503	Contact deformation after crimping		X	
507	Plating porosity		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		

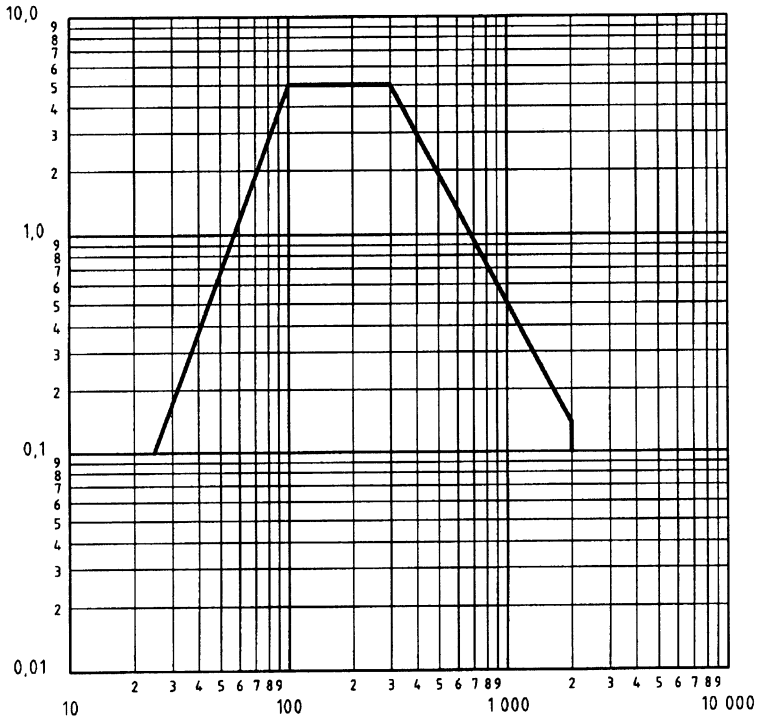


Figure 2

4.9 Gauges

See EN 3155-001.

5 Designation

EXAMPLE

Description block	Identity block
CONTACT, ELECTRICAL	**EN3155-009 F 20 20**

Number of this standard

Type of contact and identification code:

- F: female with two colour bands according to ISO 8843 or three colour bands according to MIL-C-39029
- S: female with three colour bands according to MIL-C-39029
- X: female with two colour bands according to ISO 8843

Contact size (see Table 1)

Barrel size (see Table 1)

NOTE If necessary, the code I9005 shall 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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