BRITISH STANDARD

BS EN
3155-028:2006

Aerospace series — Electrical contacts used in elements of connection —

Part 028: Contacts, electrical, coaxial, shielded, size 16, male, type D, crimp, class R — Product standard

ICS 49.060

BSI
British Standards

National foreword

This British Standard is the UK implementation of EN 3155-028:2006.

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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 028 : Contacts électriques coaxiaux, blindés, taille 16, mâles, type D, à sertir, classe R - Norme de produit

Luft- und Raumfahrt - Elektrische Kontakte zur Verwendung in Verbindungselementen - Teil 028: Elektrische koaxiale Stiftkontakte, geschirmt, Größe 16, Typ D, crimpbar, Klasse R - Produktnorm

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Contents

Page

Foreword

This European Standard (EN 3155-028:2006) has been prepared by the European Association of Aerospace Manufacturers - Standardization (AECMA-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 AECMA, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2006, and conflicting national standards shall be withdrawn at the latest by November 2006.

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1 Scope

This standard specifies the required characteristics, tests and tooling applicable to male electrical coaxial contacts, shielded, size 16, type D, crimp, class R, used in elements of connection according to EN 3155-002. It shall be used together with EN 3155-001.

The associated female contacts are defined in EN 3155-029 and EN 3155-039.

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*, *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 3155-029, *Aerospace series — Electrical contacts used in elements of connection — Part 029: Contacts, electrical, coaxial, shielded, size 16, female, type D, crimp, class R — Product standard.*

EN 3155-039, *Aerospace series — Electrical contacts used in elements of connection — Part 039: Contacts, electrical, coaxial, size 16, female, type D, solder, class R — Product standard.*

EN 3682-001, *Aerospace series — Connectors, plug and receptacle, electrical, rectangular, interchangeable insert type, rack to panel, operating temperature 150 °C continuous — Part 001: Technical specification.*

EN 4008-015, *Aerospace series — Elements of electrical and optical connection — Crimping tools and associated accessories — Part 015: Positioner for crimping tool M22520/2-01 — Product standard.* 1)

EN 4008-017, *Aerospace series — Elements of electrical and optical connection — Crimping tools and associated accessories — Part 017: Positioner for crimping tool M22520/4-01 — Product standard.* 1)

MIL-DTL-22520, *Crimping tools, wire termination, general specification for.* 2)

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

TR 6058, *Aerospace series — Cable code identification list*. 3)

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* All parts quoted in this standard.

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

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

3) Published as AECMA Technical Report at the date of publication of this standard.

3 Terms and definitions

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

4 Required characteristics

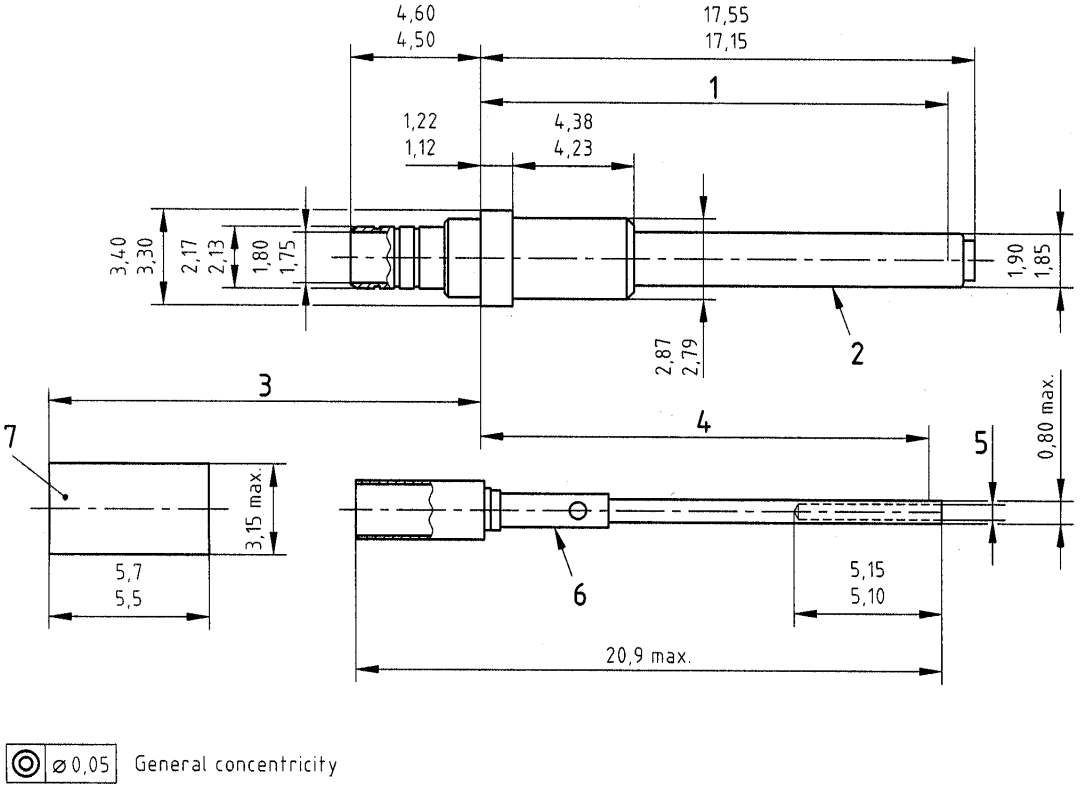
4.1 Specific characteristics

Type D contacts are contacts with screening feature, class R corresponds to an operating temperature range from – 65 °C to 150 °C.

4.2 Dimensions and mass

See Figure 1.

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



Key

1 Electrical point of contact 16,5 min.
2 Outer contact
3 8 max. after crimping
4 Electrical point of contact 15,89 min. See Note 1.
5 See Note 2.
6 Central contact
7 Crimping ferrule

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

NOTE 2 Dimension necessary to obtain the gauge insertion and extraction forces requested in Table 4.

Figure 1

4.3 Marking by colour code

Not applicable

4.4 Material, surface treatment

— Outer body material (male) : copper alloy

— Centre contact (female) : copper alloy

— Crimp ferrule : copper alloy

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

— Dielectric : PTFE or equivalent

4.5 Permissible cables

See Figure 2 and Table 1.

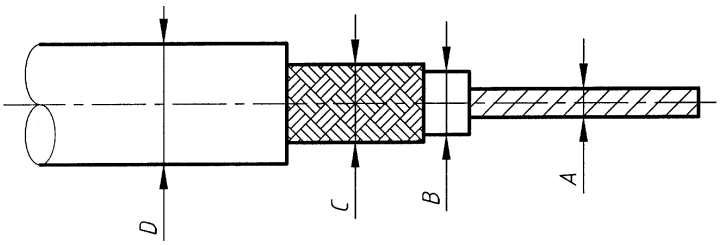


Figure 2

Table 1

Cable group	Cable code according to TR 6058	Dimensions of cable							
		A		*B*		*C*		*D*	
		min.	max.	min.	max.	min.	max.	min.	max.
A	WK and WS	0,48	0,53	1,44	1,60	2,17	2,45	2,33	2,66
B	XY	0,28	0,33	1,52	1,68	–	2,14	2,41	2,67
C	WL	0,28	0,33	1,20	1,30	–	2,00	2,10	2,35
D	WG	0,28	0,33	0,79	0,89	–	1,37	1,70	1,90
NOTE Cables in this table are not a definitive range, but the cable group(s) used for qualification must be stated in the qualification test report.									

4.6 Tooling

4.6.1 Crimping tools

Conform to MIL-DTL-22520G, see Table 2.

The qualification selector numbers used for crimping copper or copper alloy conductors in electrical cables EN 2083 cables are indicated in Table 3.

It is the responsibility of the user if the parameters in Tables 1 and 2 are changed for service use.

Table 2

Cable code	Tooling for crimping of centre contact			Tooling for crimping of contact outer body		
	Crimping tool	Positioner	Selector	Crimping tool	Positioner	Selector
WK, WL and **WS**	M22520/2C-01	EN 4008-015	2	M22520/4A-01	EN 4008-017	–
XY and **WG**	M22520/2C-01		1	M22520/4A-01		–

4.6.2 The contact insertion/extraction tools

Conform to MIL-I-81969: insertion/extraction tool: M81969/1A-03

4.7 Stripping

Cable group codes WK, WS, WL and XY

a) Strip the cable as shown on Figure 3 with:

X = 5 mm to 5,50 mm

Y = 3,75 mm to 4,25 mm

Z = 3 mm max.

b) Slide ferrule over cable sheath.

Fold back the inner braid on cable sheath.

Cut high immunity ribbon on 3 mm strip off length.

Slide centre contact over the centre conductor until it butts against the dielectric.

Crimp centre contact using tools described in Table 2.

c) Push centre contact assembly into contact outer body.

Fold braid over barrel.

Slide ferrule to 0,50 mm min of crimp barrel shoulder.

Crimp the ferrule once by using the tools described in Table 2.

Rotate the contact of about 45°.

Crimp the ferrule a second time by using the tools described in Table 2.

Cable code WG

a) Strip the cable as shown on Figure 3 with:

X = 5 mm to 5,50 mm

Y = Z = 3,75 mm to 4,25 mm

b) Slide ferrule over cable sheath.

Flare the braid.

Slide centre contact over centre conductor until it butts against the dielectric.

Crimp centre contact using tools described in Table 2.

c) Push centre contact assembly into the contact outer body.

Fold back braid over barrel.

Slide ferrule to 0,50 mm min of crimp barrel shoulder.

Crimp the ferrule once by using the tools described in Table 2.

Rotate the contact of about 45°.

Crimp the ferrule a second time by using the tools described in Table 2.

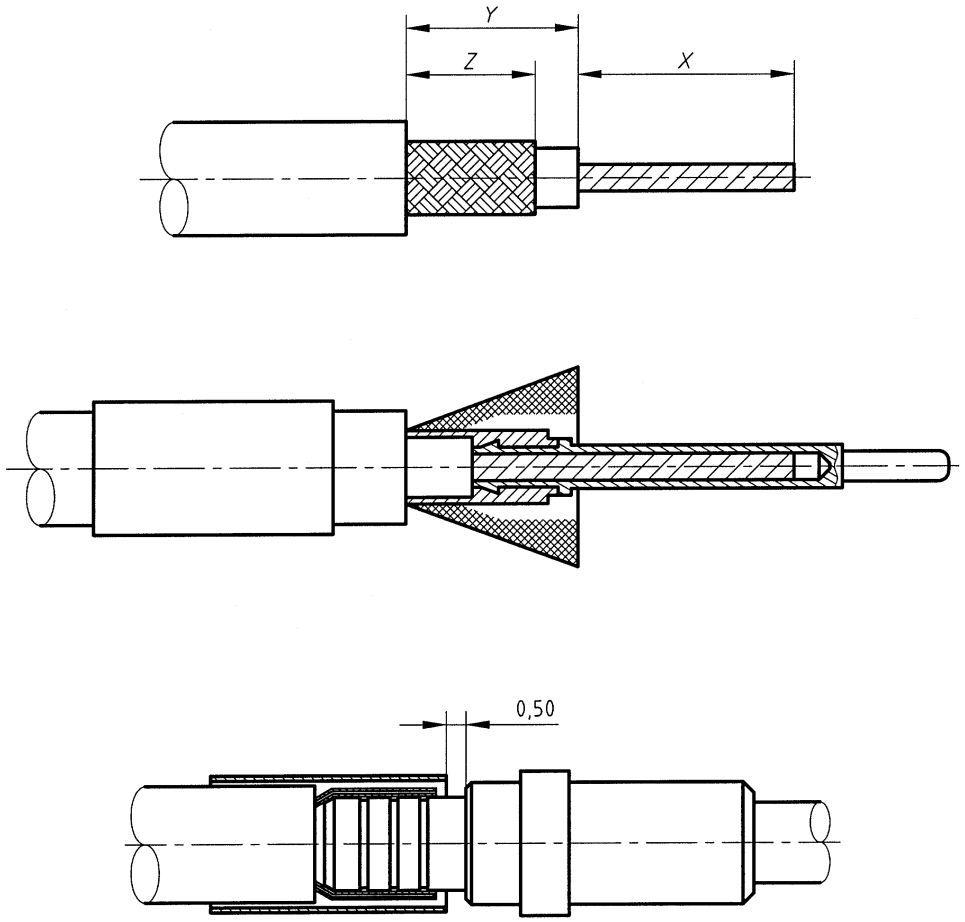


Figure 3

4.8 Tests

See Table 3.

Table 3

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	Test temperature: ambient. Contact resistance whatever the cable code is: Initial / After test Centre: 10 mΩ / 15 mΩ Outer: Not applicable
202	Contact resistance at rated current		X	Test current: Central contact: 1 A Outer contact: 12 A Contact resistance at ambient temperature whatever the cable code is: Initial / After test Centre: 10 mΩ / 15 mΩ Outer: 1,5 mΩ / 2 mΩ Contact resistance at $(150\ ^{+5}_{0})$ °C whatever the cable code is: Initial / After test Centre: 10 mΩ / 20 mΩ Outer: 1,5 mΩ / 3 mΩ
203	Electrical continuity at microvolt level	X		
204	Discontinuity of contacts in the microsecond range		X	Duration of discontinuity ≤ 0,1 µs – Refer to tests EN 2591-402 and EN 2591-403
206	Measurement of insulation resistance		X	Method C – Contacts mated – 5 000 MΩ at ambient temperature – 2 000 MΩ at $(150\ ^{+5}_{0})$ °C
207	Voltage proof test		X	Method C – Contacts mated 750 Va.c. at sea level. Maximum leakage current: 5 mA maximum

continued

Table 3 *(continued)*

EN 2591-	Test	Not applicable	Applicable	
			According to EN 3155-001	Remarks
210	Electrical overload	X		
211	Capacitance	X		
212	Surface transfer impedance	X		
220	Contact/conductor joint ageing by current and temperature cycling	X		
301	Endurance at temperature		X	$T = (150\ ^{+5}_{0})$ °C Duration: 1 000 h
305	Rapid change of temperature		X	$T_A = (150\ ^{+5}_{0})$ °C $T_B = (-65\ ^{+5}_{0})$ °C
306	Mould growth	X		
307	Salt mist		X	
315	Fluid resistance		X	According to EN 3682-001
316	Ozone resistance	X		
402	Shock		X	Method A, severity 30, see EN 3682-001.
403	Sinusoidal and random vibration		X	According to EN 3682-001.
406	Mechanical endurance		X	
417	Tensile strength (crimped connection)		X	Cable code XY and WL: centre: > 15 N outer: > 65 N Cable code WG: centre: > 15 N outer: > 45 N Cable code WS and WK: centre: > 35 N outer: > 80 N
418	Gauge insertion/extraction forces (female contacts)		X	Gauge as described in Figure 4 and Table 4 Insertion Initial = 3,33 N max. After test = 3,89 N max. Extraction Initial = 0,14 N max. After test = 0,11 N max.
501	Soft solderability	X		

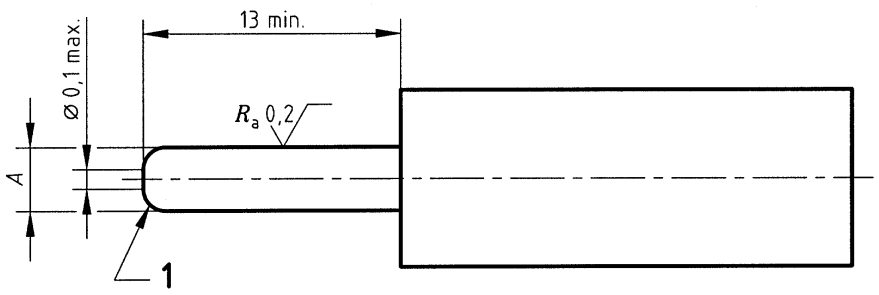
continued

Table 3 *(concluded)*

EN 2591-	Test	Not applicable	Applicable	
			According to EN 3155-001	Remarks
503	Contact deformation after crimping		X	Cable size in accordance with Table 2 – Centre contact concentricity tolerance shall not exceed 0,28 mm. Centre contact and outer body crimping zone shall not exceed 0,15 mm expansion.
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		
NOTE Tests EN 2591-201, EN 2591-202, EN 2591-417 and EN 2591-503 must be performed for each cable group; other tests are performed for the worst case.				

4.9 Gauge

See Figure 4 and Table 4.



Key

1 Blend radius

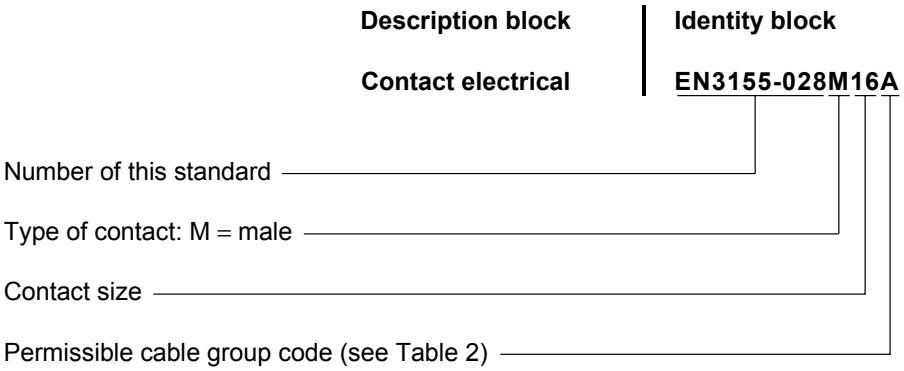
Figure 4

Table 4

Gauge	*A*
max.	0,399 0,394
min.	0,368 0,363

5 Designation

EXAMPLE



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

6 Marking

See EN 3155-001.

7 Delivery conditions

The contacts are packaged and identified individually. Conditioning shall provide protection of the contacts against any eventual damage.

Packaging shall include:

— the manufacturer's name;

— the designation defined in Clause 5;

— the manufacturer's reference;

— the manufacturing date code (year-week).

8 Technical specification

See EN 3155-001.

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