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Interested committees:

Title: prEN4857-1 - Aerospace series- Miniature Connectors, High density, electrical, circular, scoop-proof, triple start threaded coupling, operating temperatures 175 °C continuous or 200°C continuous - Shell sizes : 05 to 07
Part 001: Technical specification

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Introduction

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	(7)
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/ Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

prEN4857 - Aerospace series- Miniature Connectors, High density, electrical, circular, scoop-proof, triple start threaded coupling, operating temperatures 175 °C continuous or 200°C continuous - Shell sizes : 05 to 07
Part 001: Technical specification

prEN4857 - Série aérospatiale Connecteurs miniature électriques circulaires, Haute densité à contacts protégés, à accouplement par filetage, à pas rapide à trois filets, températures d'utilisation 175 °C continu ou 200°C continu Tailles de boîtier : 05 à 07
Partie 001 : Spécification technique

Nota: Update of November July 2017 in green

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Introduction

This family of miniature connectors is derived from EN3645 and MIL-DTL-38999. It is particularly suitable for use in zones of severe environmental conditions on board aircraft, radio telecom and military ground army.

These connectors are derived from EN3645 and preserve requirements such as:

- Triple ACME thread
- Ratcheting system
- Shell to shell bottoming between receptacle and plug
- EMI ring
- Scoop proof.
- Sizes of contacts 22D, according to EN3155-008 and EN3155-003

These connectors are distinguishable from EN3645 by:

- A size and weight reduction.
- Integrated backshells.

1 Scope

This standard specifies the general characteristics, the conditions for qualification, acceptance and quality assurance, as well as the test programs and groups for threaded ring coupling circular connectors, fire-resistant, intended for use in a temperature range from – 65 °C to 175 °C continuous or 200 °C continuous according to the classes.

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.

ISO 68-1	ISO general purpose screw threads – Basic profile – Part 1: Metric screw threads
ISO 261	ISO general-purpose metric screw threads – General plan
ISO 262	ISO general-purpose metric screw threads – Selected sizes for screws, bolts and nuts
ISO 965-2	ISO general purpose metric screw threads – Tolerances – Part 2: Limit sizes for general purpose external and internal screw threads – Medium quality
ISO 4524-1	Metallic coatings – Test methods for electrodeposited gold and gold alloy coatings – Part 1: Determination of coating thickness
EN 2424	Aerospace series – Marking of aerospace products
EN 2591-100	Aerospace series – Elements of electrical and optical connection – Test methods – Part 100: General
EN 9133	Aerospace series – Quality assurance – EN aerospace products – Qualification procedure
EN3909	Aerospace series Test fluids for electric components and sub-assemblies
prEN4857-002	Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C or 200 °C continuous — Part 002: Specification of performance and contact arrangements.
prEN4857-003	Aerospace series - Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C continuous — Part 003: Receptacle square flange mounting - Product standard.

prEN4857-004	Aerospace series - Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C continuous — Part 004: Receptacle, hermetic, square flange mounting - Product standard.
prEN4857-005	Aerospace series - Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C continuous — Part 005: Receptacle, hermetic, round flange, brasage mounting - Product standard.
prEN4857-006	Aerospace series - Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C continuous — Part 006: Protective cover for receptacle - Product standard.
prEN4857-007	Aerospace series - Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C continuous — Part 007: Protective cover for plug - Product standard.
prEN4857-008	Aerospace series - Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C continuous — Part 008: Non release plug with grounding ring - Product standard.
prEN4857-009	Aerospace series - Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C continuous — Part 009: Receptacle, round flange, Jam Nut mounting - Product standard.
prEN4857-010	Aerospace series - Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C continuous — Part 010: Receptacle, hermetic, round flange, Jam Nut mounting - Product standard.
EN 3155-001	Aerospace series - Electrical contacts used in elements of connection - Part 001: Technical specification.
EN 3155-008	Part 008: Contacts, electrical, male, type A, crimp, class S — Product standard
EN 3155-003	Part 003: Contacts, electrical, female, type A, crimp, class S — Product standard
EN 3155-XXX	Contact, Electrical connector, Pin, Crimp Removable, #26 (see Draft μEN3645 - #26 male contacts as EN3155 number is not yet defined)
EN 3155-XXX	Contact, Electrical connector, Socket, Crimp Removable, #26 (see Draft μEN3645 - #26 female contacts as EN3155 number is not yet defined)
EN XXXX	Tools specification for contacts #22 & #26 mounting and un-mounting
EN XXXX	Crimping tools for contacts #22 & #26
ENXXXX	Banding Strap standard (TBC)

3 Terminology

See EN 2591-100.

For any other definitions, EN 2591-100 will be superseded by this document.

4 Description

4.1 General

Different variants of materials, housings and contact arrangements are provided according to the classes depending on the service conditions.

The pair of connectors is characterized:

- By shell to shell bottoming ;
- By its triple threaded and self-locking coupling system;
- By plugs with shielding ring providing protection against radio electrical interference;
- By the scoop-proof shells.

These connectors use the following contacts:

- Crimped sizes 26, 22.
- Soldered (model Y) sizes 22
- PCB tails contacts #22D and #26 (references and associated standards to be defined).

The receptacles and plugs contain either male contacts or female contacts.

The contacts fitted in the class Y receptacles are exclusively of the male solder type.

The connectors are polarized by means of keyways and keys; polarization shall be obtained before the male contacts enter the insert of the female contacts and before the coupling ring is engaged. The position of the keying arrangement is given in Table 8.

The visual check of coupling is obtained by masking of a red colour band on the receptacle by the plug coupling nut.

4.2 Receptacle

The receptacle housing may be attached:

- Square flange;
- Inline;
- Jamnut, with sealing by O-ring at the attachment;
- Round soldered or brazed flange for class Y connectors.

4.3 Plug

The coupling ring is permanently fitted to the plug and allows coupling and uncoupling of the connectors.

The plug is fitted with a self-locking mechanism and a grounding spring device ensuring electrical continuity between the coupled connector housings.

Moreover, an anti-decoupling device shall be provided to maintain complete coupling.

4.4 Materials and surface treatment

4.4.1 General

When dissimilar metals are in close contact, adequate protection against corrosion shall be used for the electromotive force of the cell not to exceed 0,3 V (see EN 3197).

4.4.2 Housings

The material of the housings for the connectors and fittings may be either aluminium alloy, or passivated stainless steel. Aluminium alloy shall be plated as defined by the class (See prEN4857-002).

Finishes: Cadmium (W), Black Zinc Nickel (Z) &, Nickel (F), (K and Y) Stainless Steel.

4.4.3 Contacts

For non-removable contacts (class Y): they shall be gold-plated on an appropriate undercoat. Selective protection is authorized provided that it is sufficient to ensure that the specified performance is achieved.

Measurement of the thickness of the protective plating shall be effected in accordance with ISO 4524-1.

For removable contacts, see EN3155-003 and EN3155- 008 for #22D , and Draft µEN3645- #26 male contacts & Draft µEN3645 - #26 female contacts for #26.

4.4.4 Non-metallic materials

The materials used for insert, seals and grommets shall have hardness, mechanical and electrical characteristics consistent with the required use.

5 Design

5.1 Housings

The connector housings shall be one-piece. They shall provide the following option: integrated backshell which shall accommodate shield banding / over-molding.

The receptacle shall be fitted with a seal for sealing the coupled housings.

Jam nut receptacles shall contain an O-ring seal.

The coupling ring shall be designed so that the male and female contacts engage when it is turned in a clockwise direction and disengage when turned anticlockwise. The coupling threads may have a lubricant applied during manufacture.

Full locking of the connectors shall occur at about 180°. On completion of tightening of the coupling ring, mechanical contact shall exist between the receptacle and plug housing. A red band shall be located on the receptacle so as to be visible when unmated and fully covered when completely mated.

The receptacle has six keyways which engage with corresponding keys on the plug. The major key is fixed and is wider than the others. Polarization is ensured by the different positions which the minor keys may take. The position of the insert is fixed relative to the major key.

A coloured band indicating the housing polarization shall be marked on the connectors:

- on front diameter of the housing on square flange receptacles;
- on the flange or on front diameter of the housing of jam nut receptacles;
- on the coupling ring of plugs.

Colours:

N: Red

A: Yellow

B: Blue

C: Orange

D: Green

E: Grey

This band shall be positioned so that at least one is visible when the connectors are fitted and when they are mated or unmated.

5.2 Inserts

The inserts for contacts shall be non-removable. Sealing shall be provided between the housing and insert.

The front face of the insert shall be such that sealing is ensured when the connectors are coupled. The interfacial seal of the insert of the male contacts shall be bonded on the hard insert.

The grommet shall permit sealing for all cable diameters indicated in prEN4857-002.

The mechanical contacts retention system shall be integrated in the hard insert.

The design of non-hermetic connectors shall permit individual installation of the contacts without removal of the insert or grommet. Fitting and removal of the contacts shall be from the rear with the tools specified in the contact product standards.

Contact position identification shall be permanent and contrasted on the front face of the insert or the interfacial seal and on the rear face of the grommet as indicated in 6.5.

The marking shall not be recessed or raised on the surfaces providing a seal.

6 Definition drawings and masses

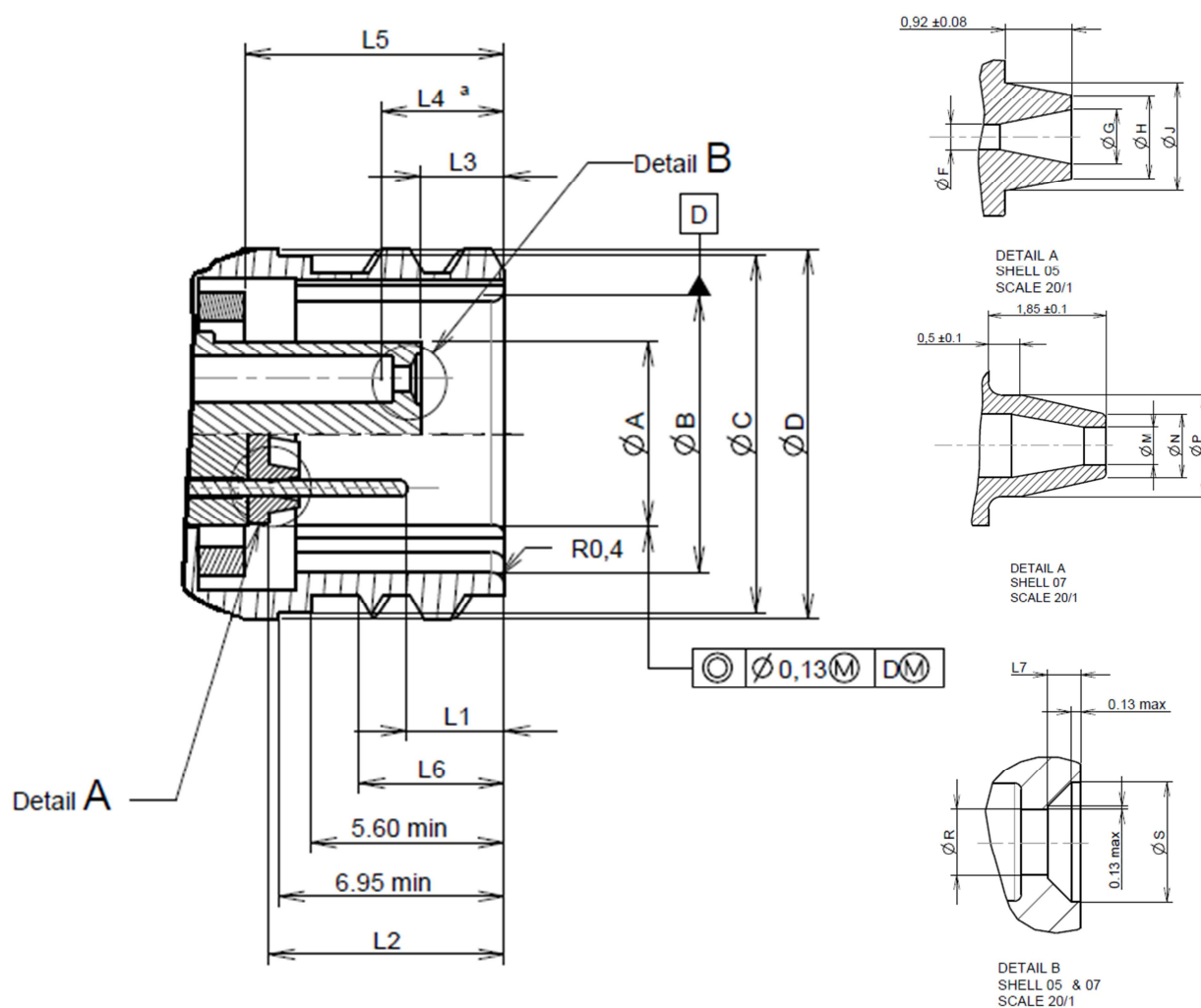
The general dimensions and the masses of receptacles, plugs and protective covers are given in the product standards.

6.1 Receptacle mating dimensions

The mating dimensions of receptacles are shown in figure 1 and details. Dimensions are indicated in tables 1, 2, 3 and 4.

Dimensions and tolerances are in millimetres.

Figure 1 – Receptacle - Coupling dimensions



Nota : refe to table 4 for ACME thread dimensions.

Keys:

a : The distance between the front face of the shell and the point where the right end of a gauge with a diameter equal to the nominal diameter of a male contact comes into contact with the flexible part of the female contact.

Table 1

Housing size	<i>A</i> +0.2 -0	<i>B</i> +0.1 -0.07	<i>C</i> ± 0.1	<i>D</i> ± 0.1
05	5.60	8.60	11.1	11.50
07	6.65	9.32	12.00	12.70

Table 2

Housing size	Contact size	L1	L2	L3	L4	L5	L6 min max	L7 +0.04 -0.02
05	#22	3.71 3.00	7.34 7.08	2.67 2.49	4.69 3.74	8.17 7.92	4.00 / 5.10	0.46
	#26	3.70 2.78	7.32 7.04		5.08 4.67			0.31
07	#22	3.77 3.00	7.43 7.12	2.72 2.52	4.74 3.72	8.33 8.02		0.46
	#26	3.73 3.03			5.08 3.90			

Table 3

Contact size	Housing size	<i>F</i> max	<i>G</i> ± 0.05	<i>H</i> ± 0.05	<i>J</i> ± 0.05	<i>K</i> +0.05 -0	<i>M</i> max	<i>N</i> ± 0.05	<i>P</i> ± 0.1	<i>R</i>	<i>S</i>
22	05	0.65	1.00	1.41	1.85	/	/	/	/	0.91 ^{+0.04} _{-0.02}	1.65 ^{+0.04} _{-0.02}
	07	/	/	/	/	1.00	0.65	1.00	1.60		1.85 ^{+0.04} _{-0.02}
26	05	0.40	0.75	1.16	1.50	/	/	/	/	0.75 ± 0.025	1.5 ± 0.025
	07	/	/	/	/	0.90	0.40	0.80	1.35		1.4 ± 0.025

Table 4

BB – Thread – 60° STUB ACME TRIPLE START										
Housing Size	Designation Class 2A thread			See note	External threading Class 2A					
	Thread size inch	Apparent pitch inch	Actual pitch inch		External diameter		Diameter on side		Diameter at thread end	
					max.	min.	max.	min.	max.	min.
05	0.454 0	0.1	0.3		11.50	11.35	10.74	10.59	10.23	10.08
07	0.500 0	0.1	0.3		12.70	12.55	11.98	11.83	11.18	11.03

6.2 Plug mating dimensions

Mating dimensions of plugs are shown in figure 2 and details of figure 1. Dimensions are indicated in tables 5, 6 and 7.

Dimensions and tolerances are in millimetres.

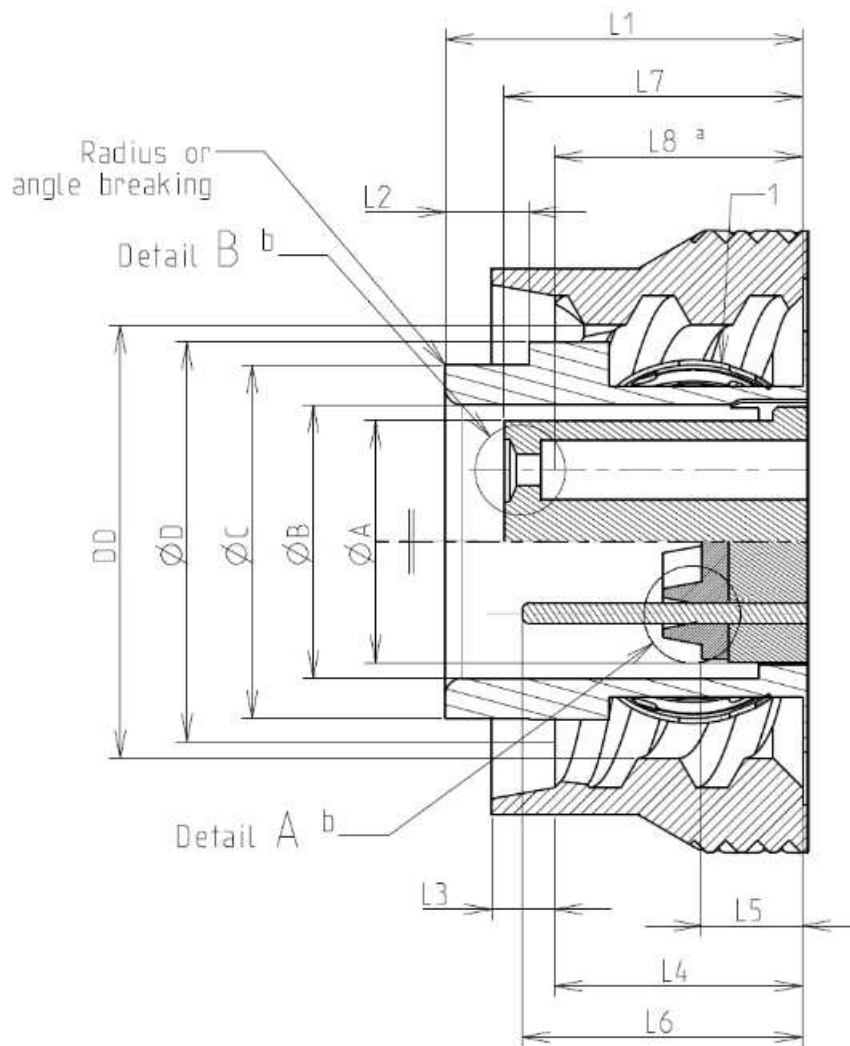


Figure 2 – Plug – Coupling dimensions

Key :

1 : spring finger

a : The distance between the shell shoulder and the point where the right end of a gauge with a diameter equal to the nominal diameter of a male contact comes into contact with the flexible part of the female contact.

b : Detail A & B : see Figure 1 and Table 3