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**Aeronavtika - Razširjeni optični zaključki, nefizični stik optičnih vlaken v standardnih votlinah po standardu EN 3645 - 102. del: Večrodovni ženski zaključki velikosti 16 - Tehnična specifikacija**

Aerospace series - Expanded beam termini, fibre optic non-physical contact in EN 3645 standard cavities - Part 102: Multimode female termini size 16 - Technical specification

Luft- und Raumfahrt - Strahlaufweitender Anschluss, berührungsloser Lichtwellenleiterkontakt in EN 3645-Standardkontaktkammer - Teil 102: Multimode-Buchsenanschluss, Größe 16 - Technische Lieferbedingungen

Série aérospatiale - Contact à faisceau expansé, fibre optique sans contact physique, dans alvéoles standards EN 3645 - Partie 102 : Contact femelle multimode taille 16 - Spécification technique

**Ta slovenski standard je istoveten z: prEN 4869-102**

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**ICS:**

49.090	Oprema in instrumenti v zračnih in vesoljskih plovilih	On-board equipment and instruments
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**oSIST prEN 4869-102:2023**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 4869-102**

March 2023

ICS 49.090

English Version

**Aerospace series - Expanded beam termini, fibre optic  
non-physical contact in EN 3645 standard cavities - Part  
102: Multimode female termini size 16 - Technical  
specification**

Série aérospatiale - Contact à faisceau élargi, fibre  
optique sans contact physique, dans alvéoles standards  
EN 3645 - Partie 102 : Contact femelle multimode taille  
16 - Spécification technique

Luft- und Raumfahrt - Strahlauweitender Anschluss,  
berührungsloser Lichtwellenleiterkontakt in EN 3645-  
Standardkontaktkammer - Teil 102: Multimode-  
Buchsenanschluss, Größe 16 - Technische  
Lieferbedingungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee ASD-STAN.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## European foreword

This document (prEN 4869-102:2023) 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 document has received the approval of the National Associations and the Official Services of the member countries of ASD-STAN, prior to its presentation to CEN.

This document is currently submitted to the CEN Enquiry.

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## 1 Scope

This document details the dimensions and performance requirements of a multimode female size 16, non-physical contact expanded beam terminus. This terminus is suitable for use with connectors which have standard size 16 socket crimp contact cavities (series I and III): connectors with cavities for contact of type EN 3155-009F16.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 2591-100, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 100: General*

EN 2591-304, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 304: Damp heat steady state*

EN 2591-312, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 312: Air leakage*

EN 2591-407, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 407: Durability of contact retention system and seals*

EN 2591-601, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 601: Optical elements — Insertion loss*

EN 2591-602, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 602: Optical elements — Variation of attenuation and optical discontinuity*

EN 2591-604, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 604: Optical elements — Cleaning capability of optical face*

EN 2591-605, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 605: Optical elements — Return loss*

EN 2591-609, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 609: Optical elements — Effectiveness of cable attachment — Cable cyclic flexing*

EN 2591-610, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 610: Optical elements — Effectiveness of cable attachment — Cable pulling*

EN 2591-611, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 611: Optical elements — Effectiveness of cable attachment — Cable torsion*

EN 2591-612, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 612: Optical elements — Effectiveness of cable attachment — Cable axial compression*

EN 2591-613, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 613: Optical elements — Impact test*

EN 2591-617, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 617: Optical elements — Temperature cycling*

EN 2591-6301, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 6301: Optical elements — Endurance at temperature*

EN 2591-6303, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 6303: Optical elements — Cold/low pressure and damp heat*

EN 2591-6305, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 6305: Optical elements — Rapid change of temperature*

EN 2591-6307, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 6307: Optical elements — Salt mist*

EN 2591-6314, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 6314: Optical elements — Immersion at low air pressure*

EN 2591-6405, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 6405: Optical elements — Axial load*

EN 2591-6406, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 6406: Optical elements — Mechanical endurance*

EN 4869-001, *Aerospace series — Expanded beam termini, fibre optic non-physical contact in EN 3645 standard cavities — Part 001: Technical specification*

EN 4641-100, *Aerospace series — Cables, optical 125  $\mu\text{m}$  diameter cladding — Part 100: Tight structure 62,5/125  $\mu\text{m}$  core GI fibre 1,8 mm outside diameter — Product standard*

EN 4641-102, *Aerospace series — Cables, optical, 125  $\mu\text{m}$  outside diameter cladding — Part 102: Semi-loose 62,5/125  $\mu\text{m}$  GI fibre nominal 1,8 mm outside diameter — Product standard*

EN 4641-301, *Aerospace series — Cables, optical 125  $\mu\text{m}$  diameter cladding — Part 301: Tight structure 50/125  $\mu\text{m}$  GI, fibre nominal 1,8 mm, outside diameter — Product standard*

MIL-I-81969/14,<sup>1)</sup> *Installing and removal tools, connector electrical contact, type III, class 2, composition B*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 2591-100 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/>
- IEC Electropedia: available at <https://www.electropedia.org/>

<sup>1)</sup> Published by: DoD National (US) Mil. Department of Defense <https://www.defense.gov/>.

## 4 Fibre optic contact designation and dimensions

### 4.1 Contact designation

See Table 1.

Table 1

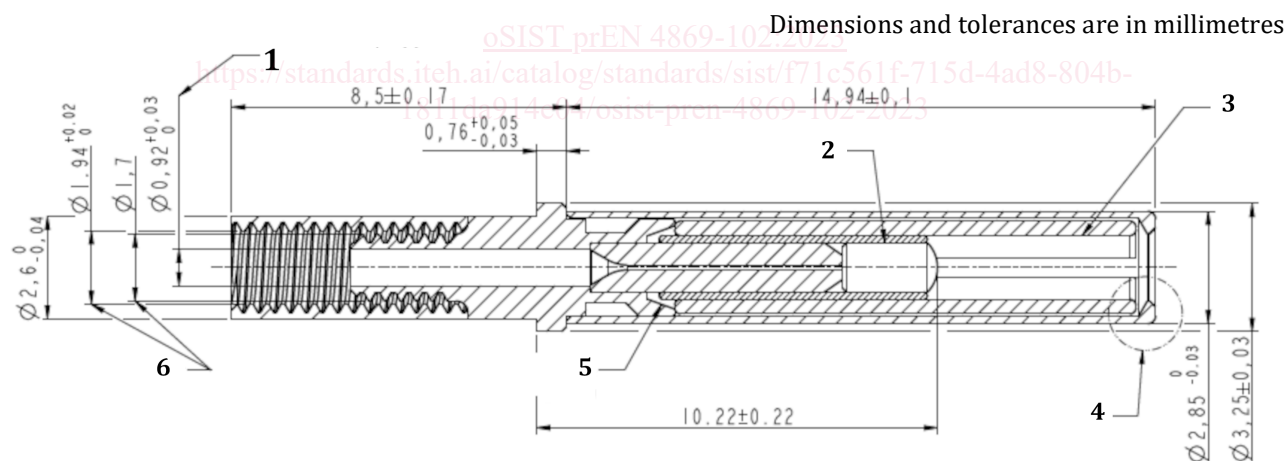
Contact designation	Wavelength of AR coating <sup>a</sup>	Identity letter for the wavelength of AR coating
Size 16 expanded beam fibre optic pin contact for a wavelength of 850 nm	850 nm	A
Size 16 expanded beam fibre optic pin contact for a wavelength of 1 300 nm	1 300 nm	B
Size 16 expanded beam fibre optic pin contact for a dual wavelength of 850 nm and 1 300 nm	850 – 1 300 nm	C

<sup>a</sup> AR coating:

- coating on two active sides of the C-lens (flat and convex sides);
- transmittance:  $T > 99,5\%$  (or  $R < 0,25\%$  per face) at the selected wavelength;
- AR coating area should be free from stains.

### 4.2 Contact dimensions

See Figure 1: (with rear contact dimensions for selected cables for qualification tests).



#### Key

- For 900  $\mu$  buffer
- C lens
- Pin gauge  $\varnothing 1,62 \text{ mm} \pm 0,0002 \text{ mm}$   
at depth: 5,8 mm  
Withdrawal force: 0,2 – 0,6 kg
- See detail A
- Contact groove (epoxy glue injection area)
- For jacket diameter of 1,8 mm

Figure 1



### 4.3 Optical interface

**Table 2 — Interface requirements for fibre with diameter 62,5 µm/125 µm**

Parameter	Value	Units
Beam size diameter (at power level: 1/e <sup>2</sup> ) Tolerance: ±3 %		
At 850 nm and distance of:		
- 1 mm:	0,700	mm
- 2,12 mm:	0,700	
- 10 mm:	0,690	
- 20 mm:	0,850	
- 50 mm:	1,930	
- 100 mm:	3,740	
At 1 300 nm and distance of:		
- 1 mm:	0,700	mm
- 2,12 mm:	0,700	
- 10 mm:	0,710	
- 20 mm:	0,890	
- 50 mm:	1,910	
- 100 mm:	3,810	
Angle of beam divergence between:		
- 1 mm and 1,56 mm	0,00 ± 0,1	degrees
- 10 mm and 20 mm	0,50 ± 0,1	
Beam circularity	> 96	%
Air gap distance between the lenses of the 2 termini	2,12 ± 0,20	mm

Measurement method: the beam analysis is based on a micro-positioning optical bench. An optical fibre is aligned in front of the contact lens. The fibre is moved backward following the optical axis at the measurement distance. Also, at this distance the fibre is moved in the plane. The origin of measurement distance is fixed from the extremity of the optical contact lens.

Launch conditions: overfilled launch conditions.

**Table 3 — Interface requirements for fibre with diameter 50 µm/125 µm**

Parameter	Value	Units
Beam size diameter (at power level: 1/e <sup>2</sup> ) Tolerance: ±3 %		
At 850 nm and distance of:		
– 1 mm:	0,540	mm
– 2,12 mm:	0,540	
– 10 mm:	0,570	
– 20 mm:	0,730	
– 50 mm:	1,625	
– 100 mm:	3,030	
At 1 300 nm and distance of:		
– 1 mm:	0,540	mm
– 2,12 mm:	0,540	
– 10 mm:	0,530	
– 20 mm:	0,680	
– 50 mm:	1,590	
– 100 mm:	3,090	
Angle of beam divergence between:		
– 1 mm and 1,56 mm	0,00 ± 0,1	degrees
– 10 mm and 20 mm	0,50 ± 0,1	
Beam circularity	> 98	%
Air gap distance between the lenses of the 2 termini	2,12 ± 0,20	mm

Measurement method: the beam analysis is based on a micro-positioning optical bench. An optical fibre is aligned in front of the contact lens. The fibre is moved backward following the optical axis at the measurement distance. Also, at this distance the fibre is moved in the plane. The origin of measurement distance is fixed from the extremity of the optical contact lens.

Launch conditions: overfilled launch conditions.

#### 4.4 Cable designation

Selected cables for qualification test (jacket diameter = 1,8 mm/buffer = 900 µm): specified in EN 4641-100 (tight structure, 62,5 µm/125 µm), EN 4641-102 (loose structure, 62,5 µm/125 µm) and EN 4641-301 (tight structure, 50 µm/125 µm).