
Aeronavtika - Kabli, optični, zunanji premer obloge 125 µm - 100. del: Kompaktna struktura 62,5/125 µm, zunanji premer vlakna 1,8 mm - Standard za proizvod

erospace series - Cables, optical 125 µm diameter cladding - Part 100: Tight structure 62,5/125 µm core GI fibre 1,8 mm outside diameter - Product standard

Luft- und Raumfahrt - Lichtwellenleiterkabel, Manteldurchmesser 125 µm - Teil 100: Festadaraufbau GI 62,5/125 µm Faser Kabeldurchmesser 1,8 mm - Produktnorm

Série aérospatiale - Câble, optique, diamètre extérieur de la gaine optique 125 µm - Partie 100: Câble à structure serrée fibre à gradient d'indice cœur 62,5/125 µm, diamètre extérieur 1,8 mm - Norme de produit

Ta slovenski standard je istoveten z: EN 4641-100:2015

ICS:

33.180.10	(Optična) vlakna in kabli	Fibres and cables
49.060	Letalska in vesoljska električna oprema in sistemi	Aerospace electric equipment and systems

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English Version

Aerospace series - Cables, optical 125 μm diameter
cladding - Part 100: Tight structure 62,5/125 μm core GI
fibre 1,8 mm outside diameter - Product standard

Série aérospatiale - Câble, optique, diamètre extérieur
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Luft- und Raumfahrt - Lichtwellenleiterkabel,
Manteldurchmesser 125 μm - Teil 100: Festaderaufbau
GI 62,5/125 μm Faser Kabeldurchmesser 1,8 mm -
Produktnorm

This European Standard was approved by CEN on 21 June 2014.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists 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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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents		Page
European foreword		3
1	Scope	4
2	Normative references	4
3	Terms and definitions	5
4	Required characteristics	5
5	Cable construction	5
6	Materials	5
7	Test methods and performances in accordance with EN 3745-100	6
8	Quality assurance	13
9	Designation, marking and colours	13
10	Delivery conditions	14
11	Storage	14
Bibliography		15

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[SIST EN 4641-100:2015](https://standards.iteh.ai/catalog/standards/sist/b6c08d52-d816-419d-974e-2d4f1ccfea91/sist-en-4641-100-2015)

<https://standards.iteh.ai/catalog/standards/sist/b6c08d52-d816-419d-974e-2d4f1ccfea91/sist-en-4641-100-2015>

European foreword

This document (EN 4641-100:2015) 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 European 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.

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 March 2016, and conflicting national standards shall be withdrawn at the latest by March 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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EN 4641-100:2015 (E)**1 Scope**

This European Standard specifies the general characteristics, conditions for qualification, acceptance and quality assurance for fibre optic cable: 4641-100.

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.

EN 2424, *Aerospace series — Marking of aerospace products*

EN 2812, *Aerospace series — Stripping of electric cables*

EN 3745 (all parts), *Aerospace series — Fibres and cables, optical, aircraft use — Test methods*

EN 3838, *Aerospace series — Requirements and tests on user-applied markings on aircraft electrical cables*

EN 3909, *Aerospace series — Test fluids and test methods for electric components and sub-assemblies*

EN 9133, *Aerospace series — Quality management systems — Qualification procedure for aerospace standard parts*

TR 6058, *Aerospace series — Cable code identification list*¹⁾

TIA/EIA-455-30-B, *FOTP-30 Frequency Domain Measurement of Multimode*²⁾

TIA/EIA-455-175-B, *FOTP175 — Chromatic Dispersion Measurement of Single-mode Optical Fibers by the Differential Phase Shift Method*²⁾

ANSI/EIA 4920000-A, *Generic Specification for Optical Waveguide Fibers*²⁾

1) Published as ASD-STAN Technical Report at the date of publication of this European Standard.
<http://www.asd-stan.org/>

2) Published by: National (US) American National Standard Institute. <http://www.ansi.org/>

3 Terms and definitions

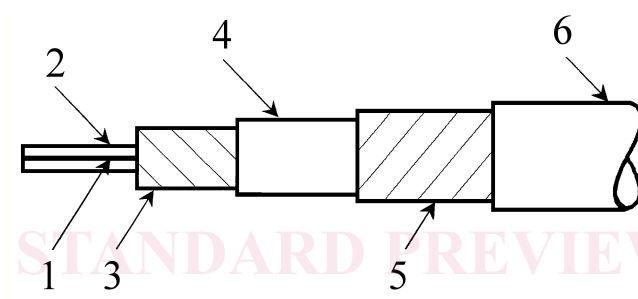
For the purposes of this document, the terms and definitions given in EN 3745-100 apply.

4 Required characteristics

The characteristics of the cables, tested according to the methods described hereafter shall comply with the values defined in this product standard.

5 Cable construction

See Figure 1 and Table 1.



Key

- 1 Core
- 2 Optical cladding
- 3 Primary coating
- 4 Primary jacket
- 5 Mechanical strength braid
- 6 Outer jacket

Figure 1

Table 1

Property	Value
Mass	$\leq 4 \text{ g/m}$
Operating temperature	$-55 \text{ }^\circ\text{C}$ to $125 \text{ }^\circ\text{C}$
Minimum bend radius ($20 \text{ }^\circ\text{C}$)	Installation: 20 mm ($10 \times$ outside diameter) Long term: 20 mm ($10 \times$ outside diameter) Storage: 40 mm ($20 \times$ cable outside diameter)
Tensile strength	$> 200 \text{ N}$

6 Materials

See Table 2.

Table 2

Element		Material
Fibre	Core	Silica
	Cladding	
Primary coating		Silicone
Primary jacket		Halogen free high temperature copolymer
Mechanical strength reinforcement		Polymer aromatic braid
Outer jacket		High temperature copolymer

7 Test methods and performances in accordance with EN 3745-100

7.1 Optical fibre tests

See Table 3.

Table 3 — Optical fibre test methods

Test method EN 3745-	Designation of the test	Test conditions and results
201	Fibre visual examination	The coating shall be continuous and free of visible defects such as lumps, abrasions, cracks, splits or blisters.
202	Fibre core dimensions	Core diameter: $(62,5 \pm 3) \mu\text{m}$
202	Fibre dimension cladding diameter	Cladding diameter: $(125 \pm 2) \mu\text{m}$ Method A or B Sample should be in accordance with test methods Number of sample: 1
202	Fibre dimension core non circularity	Core non circularity: $\leq 5\%$ ($3 \mu\text{m}$) Number of sample: 1
202	Fibre dimension cladding non circularity	Cladding non circularity: $\leq 2\%$ ($2,5 \mu\text{m}$) Number of sample: 1
202	Fibre dimension concentricity error	Concentricity error: $\leq 3 \mu\text{m}$ Number of sample: 1
301 Method A	Fibre attenuation	$\leq 4 \text{ dB/km}$ at 850 nm (20 °C) $\leq 2 \text{ dB/km}$ at 1 300 nm (20 °C)
302	Numerical aperture	$0,275 \pm 0,015$
303	Bandwidth	Bandwidth $\geq 160 \text{ MHz.km}$ at 850 nm Bandwidth $\geq 500 \text{ MHz.km}$ at 1 300 nm Number of sample: 1 Minimal length of the sample: 1 km Central wavelengths: 850 nm / 1 300 nm $\pm 10 \text{ nm}$ Spectral width (-3 dB): $\leq 10 \text{ nm}$ for 850 nm and 1 300 nm
501	Optical fibre proof test	$> 1\%$

7.2 Fibre optic cable

See Table 4.

Table 4 — Fibre optic cable test methods (1 of 6)

Test method EN 3745-	Designation of the test	Test conditions and results
201	Visual Inspection	The outer jacket shall have the correct identification as specified in this European Standard. The coating shall be continuous and free of visible defects such as lumps, abrasions, cracks, splits or blisters. Sample length: (100 ± 0,05) m
203	Primary coating outside diameter	(400 ± 25) µm
203	Buffer diameter	(900 ± 25) µm
203	Outer jacket outside diameter	(1,8 ± 0,1) mm
203	Outer jacket wall thickness	(0,35 ± 0,07) mm
205	Cable longitudinal dimensional stability	The change in longitudinal dimensions between core/cladding and primary jacket and core/cladding and outer jacket shall not exceed the maximum value of 200 µm. Number of samples: 4 in total, 2 for each length Length of the samples: 2 m, (20 ± 0,01) m
301 Method C	Cable attenuation	Visual examination in accordance with EN 3745-201 Maximum attenuation at -55 °C and 125 °C $\alpha \leq 0,7$ dB at 850 nm and 1 300 nm Number of sample: 1 Length of the sample: (20 ± 0,01) m Central wavelengths: 850 nm and 1 300 nm Rate of change to reach test temperature: 10 °C per minute 1 h stabilization at -55 °C/125 °C before performing test
301 Method A	Cable optical discontinuity	Signal discontinuity $\leq 0,2$ dB/point Number of sample: 1
301 Method A	Attenuation	Maximum attenuation at 20 °C $\alpha \leq 4$ dB/km at 850 nm, $\alpha \leq 2$ dB/km at 1 300 nm Central wavelengths: 850 nm and 1 300 nm Number of sample: 1 Length of the sample: 250 m minimum

Table 4 — Fibre optic cable test methods (2 of 6)

Test method EN 3745-	Designation of the test	Test conditions and results
305	Immunity to ambient light coupling	Level of optical power ≤ -50 dBm Diameter of the sphere integration: $(10 \pm 0,1)$ cm Length of the sample in the light proof element: $(1 \pm 0,01)$ m Spectral characteristics or colour temperature of the light source: solar spectrum Continuous spectrum between 250 nm and 1 600 nm Light temperature: 6 000 K Light intensity: 86 400 lx Minimum authorized long term bend radius: $(20 \pm 0,1)$ mm
306	Variation of attenuation during temperature cycling	Visual examination in accordance with EN 3745-201 Maximum permitted variation of attenuation: $\alpha \leq 0,7$ dB at 850 nm and 1 300 nm Number of samples: 3 Length of the sample: $(20 \pm 0,01)$ m Temperature cycling (see EN 3745-402) Number of cycles: 5
401	Cable accelerated ageing	Visual examination in accordance with EN 3745-201 – Maximum variation in attenuation: $\leq 0,5$ dB – Maximum variation in attenuation after 24 h: $\leq 0,3$ dB Residual maximum variation in attenuation: $\leq 0,2$ dB Number of samples: 3 Length of the sample: $(100 \pm 0,05)$ m Diameter of the mandrel: 250 mm Number of temperature cycles: 1 Test is carried out at the temperature of 125 °C
402	Temperature cycling	High temperature: 125 °C Low temperature: -55 °C Duration at extreme temperatures: 30 min Number of cycles: 5 Rate of change: 5 °C/min
404	Thermal shock	Visual examination in accordance with EN 3745-201 Maximum permissible variation in attenuation during test sequence and after 24 h - $\Delta\alpha \leq 0,7$ dB The maximum displacement of the fibre value shall be ≤ 200 μ m relative to the outer jacket Number of samples: 3 Length of the sample: $(20 \pm 0,01)$ m Number of temperature cycles: 4 Test is carried out at -55 °C and 125 °C