
Aeronavtika - Kabli, optični, zunanji premer obloge vlakna 125 µm - 201. del:
Polohlapna struktura obloge GI 9/125 µm, zunanji premer vlakna 1,8 mm -
Standard za proizvod

Aerospace series - Cables, optical, 125 µm diameter cladding - Part 201: Semi-loose structure 9/125 µm SM fibre nominal 1,8 mm outside diameter - Product standard

Luft- und Raumfahrt - Lichtwellenleiterkabel, Mantelaußendurchmesser 125 µm - Teil 201: Kompaktader, 9/125 µm SM-Faser, Kabelaußendurchmesser 1,8 mm - Produktnorm

Série aérospatiale - Câbles optiques, diamètre extérieur de la gaine optique 125 µm - Partie 201 :Câble à structure semi-libre fibre à SM 9/125 µm, diamètre extérieur 1,8 mm - Norme de produit

Ta slovenski standard je istoveten z: EN 4641-201:2018

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

SIST EN 4641-201:2019

en,fr,de

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EUROPEAN STANDARD

EN 4641-201

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2018

ICS 49.090

English Version

**Aerospace series - Cables, optical, 125 μm diameter
cladding - Part 201: Semi-loose structure 9/125 μm SM
fibre nominal 1,8 mm outside diameter - Product standard**

Série aérospatiale - Câbles, optiques, diamètre
extérieur de la gaine optique 125 μm - Partie 201
:Câble à structure semi-libre fibre à SM 9/125 μm ,
diamètre extérieur 1,8 mm - Norme de produit

Luft- und Raumfahrt - Lichtwellenleiterkabel,
Mantelaußendurchmesser 125 μm - Teil 201:
Kompaktader, 9/125 μm SM-Faser,
Kabelaußendurchmesser 1,8 mm - Produktnorm

This European Standard was approved by CEN on 8 July 2018.

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.

CEN members are the national standards bodies of 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

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European foreword

This document (EN 4641-201:2018) 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 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 May 2019, and conflicting national standards shall be withdrawn at the latest by May 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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EN 4641-201:2018 (E)**1 Scope**

This European Standard specifies the general characteristics, conditions for qualification, acceptance and quality assurance for a fibre optic cable with a 9/125 µm, SM fibre core, and 1,8 µm outside cable diameter and of semi-loose buffer construction.

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 2424, *Aerospace series — Marking of aerospace products*

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

EN 3475-601, *Aerospace series — Cables, electrical, aircraft use — Test methods — Part 601: Smoke density*

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 electrical and optical components and sub-assemblies*

EN 4641-001, *Aerospace series — Cables, optical, 125 µm diameter cladding — Part 001: Technical specification*

TR 4647, *Aerospace series — Termination procedure for EN 4639 optical contact*¹⁾

IEC 60793-1-45, *Optical fibres — Part 1-45: Measurement methods and test procedures — Mode field diameter*²⁾

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3 Terms and definitions

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

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

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

4 Required characteristics

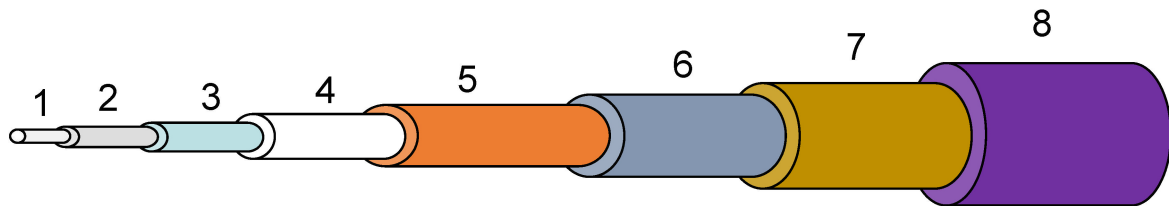
The characteristics of the cables, tested according to the methods described hereafter shall comply with the values defined in this product standard.

1) Published as ASD-STAN Technical Report at the date of publication of this European Standard by Aerospace and Defence Industries Association of Europe-Standardization (ASD-STAN), (www.asd-stan.org).

2) Published by: IEC International Electrotechnical Commission <http://www.iec.ch/>

5 Cable construction

See Figure 1 and Table 1.



Key

- 1 Core
- 2 Cladding
- 3 Primary buffer
- 4 Primary buffer
- 5 Bondable layer
- 6 Barrier
- 7 Strength member
- 8 Cable jacket

Figure 1

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Table 1

Property	Value
Mode field diameter	1 310 nm: $(9,0 \pm 0,5) \mu\text{m}$ 1 550 nm: $(10,1 \pm 0,6) \mu\text{m}$
Cladding	$(125 \pm 1,0) \mu\text{m}$
Primary Coating	$(245 \pm 10) \mu\text{m}$
Secondary buffer diameter	$(0,9 \pm 0,06) \text{mm}$
Finished cable diameter	$(1,8 \pm 0,12) \text{mm}$
Cable mass	$\leq 4,65 \text{ g/m}$
Finished cable diameter	$(0,9 \pm 0,06) \text{mm}$
Cable mass	$1,0 \pm 0,2 \text{ g/m}$
Operating temperature	$- 65 \text{ }^\circ\text{C}$ to $150 \text{ }^\circ\text{C}$
Fibre cut-off wavelength	$\leq 1,260 \text{ nm}$
Minimum bend radius (+ 20 °C)	Installation: 10 mm (5 x outside diameter) Long term: 20 mm (10 x outside diameter) Storage: 40 mm (20 x cable outside diameter)
Tensile strength	$> 200 \text{ N}$

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6 Materials

See Table 2.

Table 2

Element		Material
Fibre	Core	Silica
	Cladding	
Primary buffer		Polyacrylate
Primary buffer		PTFE
Bondable layer		Polyimide
Barrier layer		PTFE (Non-sealed)
Strength member		Aramid/fibre glass woven braid
Outer jacket		Extruded fluoropolymer

7 Test methods and performances

7.1 Tests in accordance with EN 3745-100

7.1.1 Optical fibre

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See Table 3.

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Table 3 — Optical fibre performance requirements

Test method EN 3745-	Designation of test	Test conditions and results
201	Visual examination	Pass
IEC 60793-1-45	Fibre Mode Field Diameter (MFD)	MFD: $(9,0 \pm 0,5) \mu\text{m}$
501	Optical fibre proof test	$> 1 \%$
301 Method D	Fibre attenuation	Maximum attenuation $\leq 0,7 \text{ dB/km}$ at 1 310 nm, $\leq 0,5 \text{ dB/km}$ at 1 550 nm at 20 °C Minimum sample length: $\geq 100 \text{ m}$

7.1.2 Fibre optic cable

See Table 4.

Table 4 — Fibre optic cable performance requirements (1 of 5)

Test method EN 3745-	Designation of test	Test conditions and results
201	Visual inspection	The outer jacket shall have the correct identification as specified in this standard. The coating shall be continuous and free of visible defects such as lumps, abrasions, cracks, splits or blisters. Number of samples: 1 Sample length: 3 m
203	Primary coating outside diameter	$(245 \pm 10) \mu\text{m}$
203	Buffer diameter	$(915 \pm 60) \mu\text{m}$
203	Outer jacket outside diameter	$(1,8 \pm 0,12) \text{ mm}$
205 Method A	Longitudinal stability	Change in longitudinal dimensions between A and B: $\leq 5 \text{ mm}$. Number of samples: 3 Sample length: $(3,5 \pm 0,03) \text{ m}$ Perform temperature cycling – Test method EN 3745-402: 25 cycles
301 Method D	Cable attenuation	Maximum attenuation $\leq 0,70 \text{ dB/km}$ at 1 310 nm, $\leq 0,50 \text{ dB/km}$ at 1 550 nm at 20 °C. Minimum sample length: $\geq 100 \text{ m}$
305	Cable immunity to ambient light	Level of optical power $\leq - 50 \text{ dB m}$ Sample length exposed to light source: $(10 \pm 0,1) \text{ m}$
306/402	Attenuation during temperature cycling	Visual examination in accordance with EN 3745-201 Maximum variation of attenuation: $\Delta\alpha \leq 0,30 \text{ dB}$ at 1 310 nm Test method EN 3745-402: 25 cycles High temperature: 150 °C Low temperature: – 65 °C Duration at extreme temperatures: 30 min Rate of change: 5 °C per min Number of samples: 3 – Sample length: $\geq 10 \text{ m}$
401	Cable accelerated aging	Visual examination in accordance with EN 3745-201 Maximum variation in attenuation: $\Delta\alpha \leq 0,30 \text{ dB}$ Variation in attenuation after 24 h: $\leq 0,10 \text{ dB}$ at 1 310 nm Residual variation in attenuation: $\leq \Delta\alpha 0,10 \text{ dB}$ at 1 310 nm Mandrel diameter: 250 mm Test temperature: 150 °C – Number of temperature cycles: 1 Number of samples: 1 – Sample length: $(100 \pm 0,05) \text{ m}$
404	Thermal shock	Visual examination in accordance with EN 3745-201 Maximum permissible variation in attenuation during test sequence and after 24 h: $\Delta\alpha \leq 0,30 \text{ dB}$ at 1 310 nm. High temperature: 150 °C Low temperature: – 65 °C Duration at extreme temperatures: 30 min Number of samples: 3 Sample length: $\geq 10 \text{ m}$ Number of temperature cycles: 25