



SLOVENSKI STANDARD
SIST EN 2591-100:2006
01-julij-2006

5 YfcbUj H_UË9`Ya Ybh`YY_hf] b]]b`cdh] b] `dcj YnUj `È`DfYg_i gbY`a YfcXY`È`%\$\$"
XY.`Gd`cýbc

Aerospace series - Elements of electrical and optical connection - Test methods - Part
100: General

Luft- und Raumfahrt - Elektrische und optische Verbindungselemente - Prüfverfahren -
Teil 100: Allgemeines

iTeh STANDARD PREVIEW

Série aérospatiale - Organes de connexion électrique et optique - Méthodes d'essais -
Partie 100 : Généralités

[SIST EN 2591-100:2006](https://standards.iteh.ai/catalog/standards/sist/21b1b196-bcd9-4a4f-baa1-03585316645b/sist-en-2591-100-2006)

<https://standards.iteh.ai/catalog/standards/sist/21b1b196-bcd9-4a4f-baa1-03585316645b/sist-en-2591-100-2006>
Ta slovenski standard je istoveten z: EN 2591-100:2005

ICS:

49.060

SIST EN 2591-100:2006

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 2591-100:2006

<https://standards.iteh.ai/catalog/standards/sist/21b1b196-bcd9-4a4f-baa1-635853f0b45b/sist-en-2591-100-2006>

ICS 49.060

English Version

Aerospace series - Elements of electrical and optical connection
- Test methods - Part 100: General

Série aérospatiale - Organes de connexion électrique et
optique - Méthodes d'essais - Partie 100 : Généralités

Luft- und Raumfahrt - Elektrische und optische
Verbindungselemente - Prüfverfahren - Teil 100:
Allgemeines

This European Standard was approved by CEN on 19 September 2005.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

SIST EN 2591-100:2006

<https://standards.iteh.ai/catalog/standards/sist/21b1b196-bcd9-4a4f-baa1-635853f0b45b/sist-en-2591-100-2006>



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents	Page
Foreword	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	4
4 Standard test conditions	7
5 Others	8
5.1 Fibre end preparation	8
5.2 Termination cleaning	10
5.3 Light Launch System (LLS)	10
5.4 Light Detection System (LDS)	13
6 List of test methods	14
7 Test report	19

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 2591-100:2006](https://standards.iteh.ai/catalog/standards/sist/21b1b196-bcd9-4a4f-baa1-635853f0b45b/sist-en-2591-100-2006)
<https://standards.iteh.ai/catalog/standards/sist/21b1b196-bcd9-4a4f-baa1-635853f0b45b/sist-en-2591-100-2006>

Foreword

This European Standard (EN 2591-100:2005) 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 April 2006, and conflicting national standards shall be withdrawn at the latest by April 2006.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

ITeH STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 2591-100:2006

<https://standards.iteh.ai/catalog/standards/sist/21b1b196-bcd9-4a4f-baa1-635853f0b45b/sist-en-2591-100-2006>

1 Scope

This standard specifies the general requirements for the methods of testing elements of electrical, optical and data transmission system connections used in aerospace applications.

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 2084, *Aerospace series – Cables, electric, single-core, general purpose, with conductors in copper or copper alloy – Technical specification.*

EN 2234, *Aerospace series – Cables, electrical, fire-resistant – Technical specification.*¹⁾

EN 2346, *Aerospace series – Fire resistant electrical cables – Dimensions, conductor resistance and mass.*¹⁾

EN 2591*, *Aerospace series – Elements of electrical and optical connection – Test methods.*

EN 3745-201, *Aerospace series – Fibres and cables, optical, aircraft use – Test methods – Part 201: Visual examination.*

EN 60512-1, *Connectors for electronic equipment – Tests and measurements – Part 1: General (IEC 60512-1:2001)*

TR 4257, *Aerospace series – Elements of electrical and optical connection – Relationship between the numbering systems for parts of EN 2591.*²⁾

IEC 60050-581, *International Electrotechnical Vocabulary – Chapter 581: Electromechanical components for electronic equipment.*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

See IEC 60050-581 and EN 60512-1.

3.1

element of electrical or optical connection³⁾

component such as connector, module, etc., the purpose of which is to ensure the connection of circuits

3.2

flight cover (or protective cover)

accessory designed to ensure, in flight, mechanical protection and sealing of front face of a non coupled connector

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

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

3) In test standards the term "element of connection" shall be used.

3.3**connector with built-in protection of contacts**

connector with characteristics such that male or female contacts, mounted in a plug or receptacle, cannot come into contact with the front of the connector to which it is coupled (scoop-proof) and in which, in the event of accidental coupling of two parts or the connector equipped with male contacts, no electrical contact can take place

3.4**contact pressure point**

point at which a square ended gauge pin of the same basic diameter as the mating contact first engages the female contact spring member

3.5**initial measurement**

examination or measurement of characteristics carried out to determine the magnitude of the variations produced by the stress or stresses applied

This examination or measurement is carried out at the end of pre-conditioning and under normal atmospheric conditions for measuring.

3.6**final measurement**

examination or measurement of characteristics carried out at the end of the recovery to assess the condition of the specimen after testing and to determine the magnitude of the variations in characteristics in relation to the values recorded at initial measuring

3.7**flammability**

a product is considered to be "non-flammable" when combustion due to exposure for a given duration to a standard external flame remains localized and stops spontaneously after withdrawal of the flame

3.8**fire resistance**

a product is considered to be "fire-resistant" when, subjected to a standard flame:

- it retains its electrical role for six minutes;
- the flame does not propagate to the other side of the support in the first twenty minutes.

3.9**values of alternating voltage and current**

unless otherwise indicated, alternating voltage and current are indicated in root mean square values

3.10**line data bus**

pair of twisted wires, shielded, having a specified impedance, a matched impedance at its two ends and used for data transport

3.11**branch line**

section of twisted wires, shielded, with a specified impedance, which connects equipment to a bus line

3.12**line coupler**

element of electrical or optical connection the purpose of which is to shunt the transmission signals from a bus line to equipment

3.13**line coupler, single**

coupler consisting of one line and one branch

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 2591-100:2006](https://standards.iteh.ai/catalog/standards/sist/21b1b196-bcd9-4a4f-baa1-635853f0b45b/sist-en-2591-100-2006)

[https://standards.iteh.ai/catalog/standards/sist/21b1b196-bcd9-4a4f-baa1-](https://standards.iteh.ai/catalog/standards/sist/21b1b196-bcd9-4a4f-baa1-635853f0b45b/sist-en-2591-100-2006)

[635853f0b45b/sist-en-2591-100-2006](https://standards.iteh.ai/catalog/standards/sist/21b1b196-bcd9-4a4f-baa1-635853f0b45b/sist-en-2591-100-2006)

3.14

line coupler, double

coupler consisting of one line and two branches

3.15

in-line splice

permanent element of electrical or optical connection for two-wire cables

3.16

line termination

end line component the purpose of which is to match the bus line to its characteristic impedance

3.17

branch termination

end branch termination the purpose of which is to eventually replace equipment

3.18

recovery

treatment of a specimen, after conditioning, so that the properties of the specimen may be stabilized before measuring

3.19

optical fibre cable

a certain number of optical fibres or bundles, coated separately and joined inside a common sheath

3.20

beam splitter

device for dividing an optical beam into two separate beams

3.21

insertion loss (of an optical element)

extra optical attenuation caused by the insertion of an extra optical element into an optical system

3.22

launch angle

the launch angle is the angle between the wave propagation vector of the incoming light and the normal vector of an optic fibre end face

3.23

multimode fibre

a multimode fibre is an optical fibre having a large core diameter dimension in relation to the wavelength of the light, and in which a large number of modes can propagate

3.24

optical port

the port which radiates or accepts optical power at the interface

3.25

fibre optic branching device

a device possessing three or more optical ports which shares optical power among its ports in a predetermined fashion

3.26

patchcord

an assembly where the cable or fibre is terminated at each end with either a plug or socket connector

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 2591-100:2006

<https://standards.iteh.ai/catalog/standards/sist/21b1b19c-bcd9-4a4f-baaf-635853f0b45b/sist-en-2591-100-2006>

3.27**pigtail**

a pigtail is a short length of fibre between a component and a transmission fibre, often permanently secured to the component (LED, coupler, connection elements, ...)

3.28**single mode fibre**

a single mode fibre is an optical fibre in which only one mode can propagate

3.29**passive coupler**

a passive coupler is a passive branching device in which power from one or more incoming optical ports is distributed to one or more outgoing optical ports

3.30**tee coupler**

an optical fibre tee coupler is a passive coupler or combiner with three optical ports

3.31**return loss**

light energy reflected back from discontinuities in a fibre optic link

3.32**light launch system****LLS**

device designed to create defined and repeatable light coupling conditions in a test setup

3.33**light detection system****LDS**

device designed to take repeatable measurements of light transmitted by a test setup

3.34**temporary joint**

non permanent optical fibre connecting devices for use on equipment

3.35**terminator**

a non-reflective termination of an optical fibre

3.36 For the following terms, see EN 3745-201.

Optical fibre - Core - Cladding - Primary coating - Refractive index profile - Step index fibre - Graded index fibre - Quasi-step index fibre - Core diameter - Cladding diameter - Concentricity error core/cladding - Non circularity of core - Non circularity of cladding - Attenuation - Numerical aperture - Bandwidth

4 Standard test conditions

4.1 The test methods are written so that the test may be carried out either individually or included in a test sequence. When the test is carried out individually, the measurements are applicable so that the effect of the test on the performances of the specimen can be evaluated.

This is why "if applicable" has been added to the titles "Initial measurements" and "Final measurements".

4.2 Unless otherwise indicated in the test method, technical specification or product standard, the test conditions shall be as follows:

- temperature: (23 ± 5) °C;
- atmospheric pressure: 86 kPa to 106 kPa (860 mbar to 1 060 mbar);
- relative humidity: 45 % to 75 %.

The temperature and humidity shall remain constant throughout a series of measurements.

Unless otherwise indicated in the technical specification, the cables used for tests shall be in accordance with EN 2083 and EN 2084 or EN 2234 and EN 2346.

5 Others

5.1 Fibre end preparation

5.1.1 General

The aim of this paragraph is to give recommendations on preparing the ends of fibres, whether terminated or not. It is not intended to describe a precise method for fibre end preparation; instead it gives the information necessary to describe and quantify fibre and quality.

This paragraph is applicable therefore to all tests which require the use of at least one optical interface of this type. It applies to all types of fibre, silica, plastic or a combination of these and other materials, irrespective of their diameter.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

5.1.2 Parameters

The following parameters define the quality of a fibre end:

- surface condition; <https://standards.iteh.ai/catalog/standards/sist/21b1b196-bcd9-4a4f-baa1-635853f0b45b/sist-en-2591-100-2006>
- perpendicularity of the optical face relative to the axis of symmetry of the fibre;
- surface flatness.

Surface condition (see Figure 1)

The face of the optical fibre shall not exhibit any nicking or lips and internal defects such as cracks⁴⁾. Surface defects (hackle and mist zone) of the fibre core area shall not exceed 0,5 µm in size.



$R = 0,5 \mu\text{m max.}$

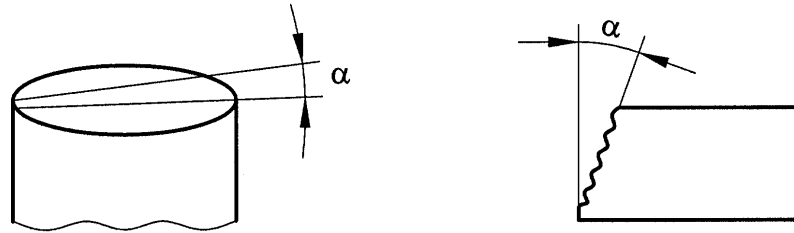
Figure 1

4) Cracks made by a cleaving tool are acceptable if they don't reach the core area.

Perpendicularity (see Figure 2)

The surface of the prepared fibre shall be perpendicular to the axis of symmetry of the fibre unless otherwise specified in the product standard.

The permitted defect shall be represented by a maximum permitted angle α .



$$\alpha \leq 1 \text{ degree}$$

Figure 2**Surface flatness** (see Figure 3)

The surface of the prepared fibre shall be as flat as possible unless otherwise specified in the product standard. Concavity and convexity shall be such that the maximum deviation between the highest and lowest points of the fibre surface envelope shall not exceed 3 μm .



$$X = 3 \mu\text{m max.}$$

Figure 3**5.1.3 Methods**

Any method of fibre end preparation is acceptable provided that the parameters defined in 5.1.2 are within the range specified.

NOTE Depending on the recommendations of the fibre/cable/connector manufacturers, any of the following techniques may be used: cleaving, polishing.

5.1.4 Specimen examination and acceptance

Any method, optical or otherwise, which enables defects of the size quoted in 5.1.2 to be assessed, shall be acceptable.

The methods may use systems which are as simple as a microscope with appropriate magnification for the measurement or as sophisticated as an interferometry test bench.

A specimen shall be accepted when all the above parameters comply with the values defined in 5.1.2.