
**Aeronavtika - Električni in optični spojni elementi - Preskusne metode - 228. del:
Izvlečna sila tulke**

Aerospace series - Elements of electrical and optical connection - Test methods - Part
228: Ferrule withdrawal force

Luft- und Raumfahrt - Elektrische und optische Verbindungselemente - Prüfverfahren -
Teil 228: Auszugskraft der Ferrule

Série aérospatiale - Organes de connexion électrique et optique - Méthodes d'essais -
Partie 228 : Force d'extraction de la ferrule

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Ta slovenski standard je istoveten z: EN 2591-228:2018

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49.060

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EUROPEAN STANDARD
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EN 2591-228

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English Version

**Aerospace series - Elements of electrical and optical
connection - Test methods - Part 228: Ferrule withdrawal
force**

Série aérospatiale - Organes de connexion électrique et
optique - Méthodes d'essais - Partie 228 : Force
d'extraction de la fêrûle

Luft- und Raumfahrt - Elektrische und optische
Verbindungselemente - Prüfverfahren - Teil 228:
Auszugskraft der Ferrule

This European Standard was approved by CEN on 2 March 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.

iTeh STANDARD PREVIEW

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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 2591-228:2018) 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 April 2019, and conflicting national standards shall be withdrawn at the latest by April 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 United Kingdom.

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EN 2591-228:2018 (E)**1 Scope**

This European Standard describes the procedure to measure the withdrawal force between the ferrule of an optical contact and the resilient alignment sleeve located inside the connector.

This method is suitable for use for resilient alignment sleeve qualification.

It shall be used together with EN 2591-100.

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*

3 Terms and definitions

No terms and definitions are listed in this document.

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 General description

The contact force between the mating ferrules in a fibre optic connector is the difference between the breakaway frictional force and the spring force of the connector. To maintain contact, the breakaway friction force shall remain below the spring force.

The ferrule withdrawal force is a breakaway frictional force between the ferrule and the sleeve. This force is small and can be affected by numerous parameters like the climatic conditions, the design of the apparatus, the pin gauges, the cleanliness of the specimens, the Van Der Waals forces, and the roughness of specimens.

The criteria to be applied to the results of these measurements account for the spread that is inherent in the preparation of specimens.

5 Preparation of specimens

Unless otherwise indicated in the product standard, specimens shall be prepared as below:

- The specimens and apparatus shall be subjected to standard test conditions as defined in EN 2591-100;
- The specimens and gauge pins shall be perfectly clean and dry;
- Prior to testing, each sleeve and gauge pin shall be cleaned by wiping, using for example lint-free wipes.

The cleaning action shall consist of thorough rubbing or scrubbing. Moistening wipes should be avoided. If moistening is necessary no alcohol shall be used, and following cleaning, adapters and gauge pins are preconditioned at 40 °C for 30 minutes and then returned to room temperature for at least 30 minutes.

- It is strongly recommended to wear gloves to avoid any risk of grease deposit on the specimens and gauge pins.

Unless otherwise indicated in the technical specification, the following details shall be specified in the product standard:

- Min. and max. value of the sleeve withdrawal force in Newton;
- Gauge pin material and dimensions (not required for Zirconia sleeves for ferrule 1,25 mm or 2,5 mm);
- Value and tolerance of the external diameter;
- Length of the chamfer;
- Roughness;
- Roundness;
- Material.

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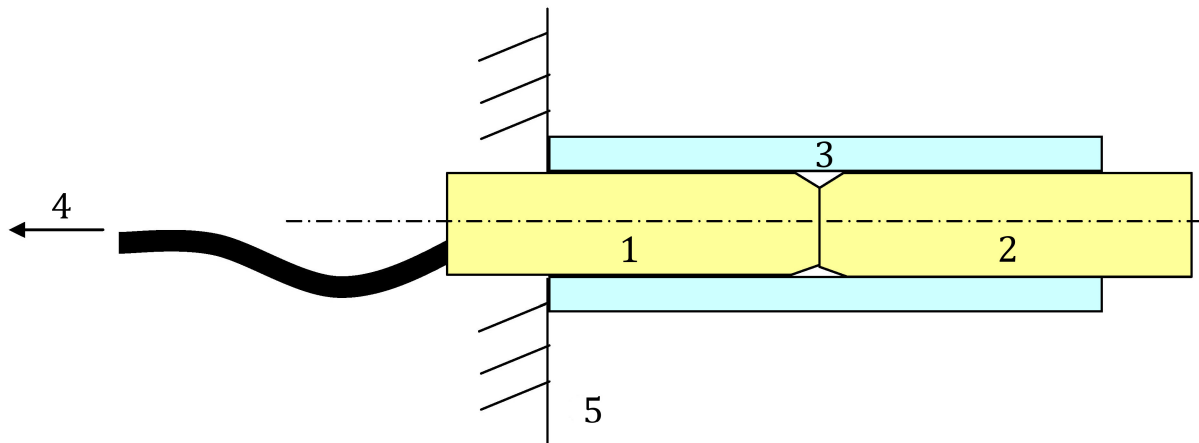
6 Apparatus

6.1 General

The specimen is a connector alignment sleeve. The measurement is made with two gauge pins inserted so they meet at the centre of the sleeve. Force is applied between one of the gauge pins and the sleeve as shown in Figure 1.

The apparatus comprises:

- A force generator with a mechanism that generates a continuously increasing force and is equipped with a force gauge to record continuously the force and the movement of the mobile gauge pin. Loading rates of approximately 100 mm/min are generally considered acceptable for mechanically driven instruments.
- A test assembly with a flexible member to apply the force on the mobile gauge and insure that the force generated will not induce a bending load on the specimen.
- A pair of gauge pins.



Key

- 1 Mobile gauge pin
- 2 Fixed gauge pin
- 3 Sleeve
- 4 Applied force
- 5 Stop

Figure 1 — Test unit with applied force

6.2 Gauge pin dimensions

The following material and dimensions of gauge pins are defined for Zirconia sleeve dedicated to 1,25 mm or 2,5 mm ferrules. For other sleeves, the dimensions of the gauge pins shall be as specified in the product standard.

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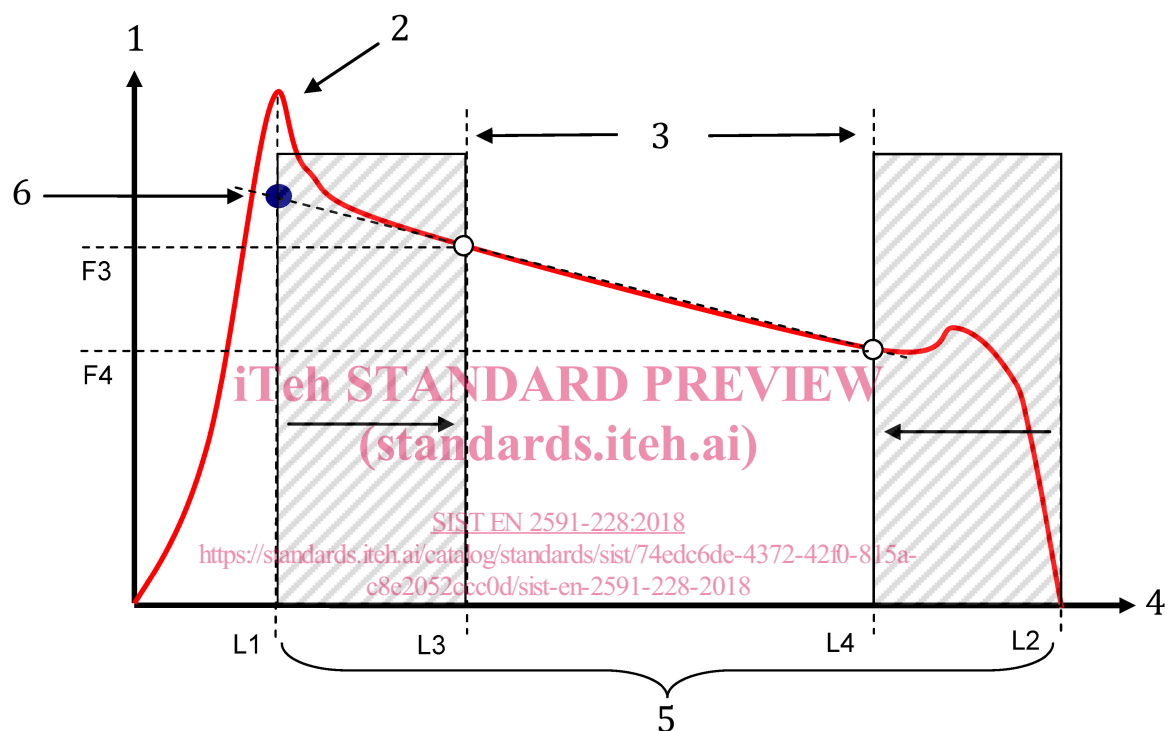
- The length of the gauge pin shall be sufficient to allow it to extend half-way into the sleeve and have enough left protruding out of the sleeve to allow for the attachment of a fixture or force generator;
- The chamfer of the gauge pin shall be on the end that is inserted in the sleeve, and is measured in the radial direction;
- Material of the gauge pin: Zirconia;
- Surface finish (Ra): 0,2 μm max.;
- Roundness: 0,2 μm max.;
- Diameter: 1,249 μm or $(2,499 \pm 0,2) \mu\text{m}$;
- Chamfer: 0,05 mm to 0,15 mm without burrs in the transition area with the cylindrical surface;
- When pin gauges are reversed, the difference between measurements shall not be more than 10 %.

6.4 Position of the specimen

- The specimen is a sleeve with two gauge pins inserted so as to touch at the centre of the specimen;
- The interface between the two gauge pins shall be located within 10 % of the length of the specimen from the centre of the specimen itself.

7 Testing

To compensate for the weight of the test assembly, the indicator on the force gauge shall be adjusted to zero. Force is to be applied at a continuously increasing rate.



Key

- 1 Force (N)
- 2 Random Peak
- 3 Linear area = 'X' % of measured range
- 4 Displacement (mm)
- 5 Measured range
- 6 Withdrawal force (WF)

Figure 2 — Traction curve obtained from force generator