



SLOVENSKI STANDARD
kSIST FprEN 3745-410:2015
01-januar-2015

Aeronavtika - Optična vlakna in kabli za uporabo v zračnih plovilih - Preskusne metode - 410. del: Življenjska doba pod temperaturnim vplivom

Aerospace series - Fibres and cables, optical, aircraft use - Test methods - Part 410: Thermal life

Luft- und Raumfahrt - Faseroptische Leitungen für Luftfahrzeugen - Prüfverfahren - Teil 410: Lebensdauer unter Temperatureinwirkung

Série aérospatiale - Fibre et câbles optiques à usage aéronautique - Méthodes d'essais - Partie 410 : Durée de vie en température

Ta slovenski standard je istoveten z: FprEN 3745-410

ICS:

33.180.10	(Optična) vlakna in kabli	Fibres and cables
49.090	Oprema in instrumenti v zračnih in vesoljskih plovilih	On-board equipment and instruments

kSIST FprEN 3745-410:2015 **en,fr,de**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

FINAL DRAFT
FprEN 3745-410

November 2014

ICS 49.090

Will supersede EN 3745-410:2007

English Version

Aerospace series - Fibres and cables, optical, aircraft use - Test methods - Part 410: Thermal life

Série aérospatiale - Fibre et câbles optiques à usage
aéronautique - Méthodes d'essais - Partie 410 : Durée de
vie en température

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Luftfahrzeuge - Prüfverfahren - Teil 410: Lebensdauer unter
Temperatureinwirkung

This draft European Standard is submitted to CEN members for formal vote. 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.

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

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Foreword

This document (FprEN 3745-410:2014) 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 document is currently submitted to the Formal Vote.

This document will supersede EN 3745-410:2007.

FprEN 3745-410:2014 (E)**1 Scope**

This European Standard specifies a method of measuring the thermal endurance of a finished optical cable. There are two test methods incorporated which estimate the cables thermal life with or without the cable.

- Method A – without mechanical stress (temperature only),
- Method B – combined temperature and mechanical stress.

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 2591-100, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 100: General*

EN 3745-100, *Aerospace series — Fibres and cables, optical, aircraft use — Test methods — Part 100: General*

EN 3745-301, *Aerospace series — Fibres and cables, optical, aircraft use — Test methods — Part 301: Attenuation*

ASTM-D3032, *Standard test methods for hookup wire insulation* ¹⁾

3 Test specimens**3.1 Fibre ends**

The fibre ends shall be prepared in accordance with EN 2591-100.

If not yet at standard test conditions, the specimens shall be subjected to standard test conditions and stabilized at these conditions for 24 h as defined in EN 3745-100.

4 Method A (without mechanical stress applied)**4.1 Preparation of test specimens**

Specimens have to be fixed on an apparatus representative of aircraft installation. Ten specimens are fixed on apparatus and constitute a set for life testing at each temperature. A minimum of four sets of specimens is necessary.

¹⁾ Published by: ASTM National (US) American Society for Testing and Materials (<http://www.astm.org/>).

4.2 Test conditions

The following details shall be specified if not already included in the product standard:

- Type of fibre/cable from which the specimens were taken,
- Type/number/pitch of clamps
- Minimum authorized long term bend radius
- Length of specimens if not 10 m
- Maximum permissible variation in attenuation if not -3 dB
- Temperature values ($\theta_1 > \theta_2 > \theta_3 > \theta_4$)

4.3 Apparatus

The apparatus shall comprise:

- A Light Launch System (LLS) as defined in EN 2591-100,
- A split coupler 1×10 ,
- A Light Detection System (LDS) as defined in EN 2591-100, with 10 channel recorder,
- A fixture to secure the specimens,
- A climatic chamber capable of temperature control of ± 2 °C.

4.4 Procedure

4.4.1 Initial measurements

If the value of the highest temperature value is not specified in the product standard make a quick estimation of the highest test temperature with one specimen during 24 h at 80 °C above the nominal rating temperature.

The variation in attenuation shall not exceed the specified value.

4.4.2 Test

The attenuation shall be monitored throughout the test in accordance with EN 3745-301, method C.

Connect the specimen ends to the coupler, the coupler to LLS and the other specimen ends to LDS.

Place the fixture in the test chamber. The coupler and connectors shall not be into climatic chamber.

Begin the test sequence with the highest test temperature (θ_1) since exposure times will be relatively short.

Record the exposure time to failure for each specimen. A failure is defined when the variation in attenuation is higher than the specified value.

Stop the test sequence when all specimens in group have failed.

Calculate the log average life as defined in ASTM-D3032. If the log average life at this temperature (highest) is found to be less than 100 h, too high a test temperature has been selected and these data should be discarded. Tests should be repeated at lower temperature.

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Repeat this procedure with the group N° 2 of specimens for θ_2 temperature value.

Calculate the log average life as defined in ASTM-D3032.

Repeat this procedure with the group N° 3 of specimens for θ_3 temperature value.

Calculate the log average life as defined in ASTM-D3032.

Repeat this procedure with the last group of specimens for θ_4 temperature value (lowest).

Calculate the log average life as defined in ASTM-D3032. If the average life found at this test temperature is less than 5 000 h, this test will be made at lower temperature.

4.4.3 Final measurements and requirement

The calculation of average life and extrapolation have defined in the ASTM-D3032 — Standard test methods for hookup wire insulation.

4.4.4 Special precautions

Extrapolation to a temperature index expected at the selected end of life (10 000 h, 20 000 h or 40 000 h) should not exceed 25 °C below the lowest aging test temperature.

- The log average life at the highest test temperature (θ_1) shall not be less than 100 h.
- The log average life at the lowest test temperature (θ_4) shall not be less than 5 000 h.

5 Method B (with mechanical stress applied)**5.1 Preparation of test specimens**

One set for life testing shall consist of ten specimens fixed on the apparatus (Figure 1) at each temperature. A minimum of four sets of specimens is necessary. In order to reduce the variation of stress to the fibre the cable shall be attached to the test fixture by trapping it between two padded plates rather than using standard aircraft cable clamps.

5.2 Test conditions

Length of specimens 5 m.

Length of specimens within the test chamber 3 m.

Maximum permissible variation in attenuation if not 3 dB at 20 °C \pm 3 °C and at 850 nm.

Launch conditions to be 85/85.

5.3 Information to be included in the product standard

- Type of fibre/cable from which the specimens were taken,
- Minimum long term bend radius (R),
- wave length if not 850 nm,
- Maximum permissible variation in attenuation if not 3 dB,
- Launch conditions if not 85/85.