SLOVENSKI STANDARD
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Aerospace series - Fibres and cables, optical, aircraft use - Test methods - Part 305: Immunity to ambient light coupling

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Luft- und Raumfahrt - Faseroptische Leitungen für Luftfahrzeuge - Prüfverfahren - Teil 305: Fremdlichteinkopplung

Série aérospatiale - Fibres et câbles optiques à usage aéronautique - Méthodes d'essais - Partie 305: Immunité de couplage a la lumiere ambiante

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49.060	Letalska in vesoljska elektriļ na oprema in sistemi	Aerospace electric equipment and systems

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This European Standard was approved by CEN on 1 March 2002.

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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 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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Foreword

This document (EN 3745-305:2002) has been prepared by the European Association of Aerospace Manufacturers (AECMA).

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of an identical text or by endorsement, at the latest by December 2002, and conflicting national standards shall be withdrawn at the latest by December 2002.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This standard specifies a method of measuring the immunity of optical fibre or cable to the coupling of power coming from an external light source.

2 Normatives references

This European Standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 3745-100 Aerospace series – Fibres and cables, optical, aircraft use – Test methods – Part 100: General [1)]

3 Preparation of specimens

3.1 The specimens shall be prepared according to the product standard.

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.

3.2 Unless specified in the technical specification, the following details shall be stated:

- type and length of the specimen in the light proof element;
- spectral characteristics or color temperature of the light source;
- minimum authorized long term bend radius;
- type of apparatus used to guarantee the minimum long term bend radius.

4 Apparatus

The apparatus shall comprise:

C	a modulator set to frequency which is not a multiple of 50 Hz or 60 Hz;
D	a detector;
Di	a diffuser;
IS	an integration sphere;
LA	a locking amplifier to achieve the detection measurement;
LDS	a Light Detector System in accordance with the spectral characteristics of the light source;
Le	a lens;
LS	a Light Source;
T	a terminator to provide a non reflective termination;
–	a removable light proof element allowing shielding the specimen from the light;
–	a glass cylinder or alternative apparatus whose diameter is in accordance with the minimum long term bend radius;

1) In preparation at the date of publication of this standard

A typical arrangement is shown in figure 1.

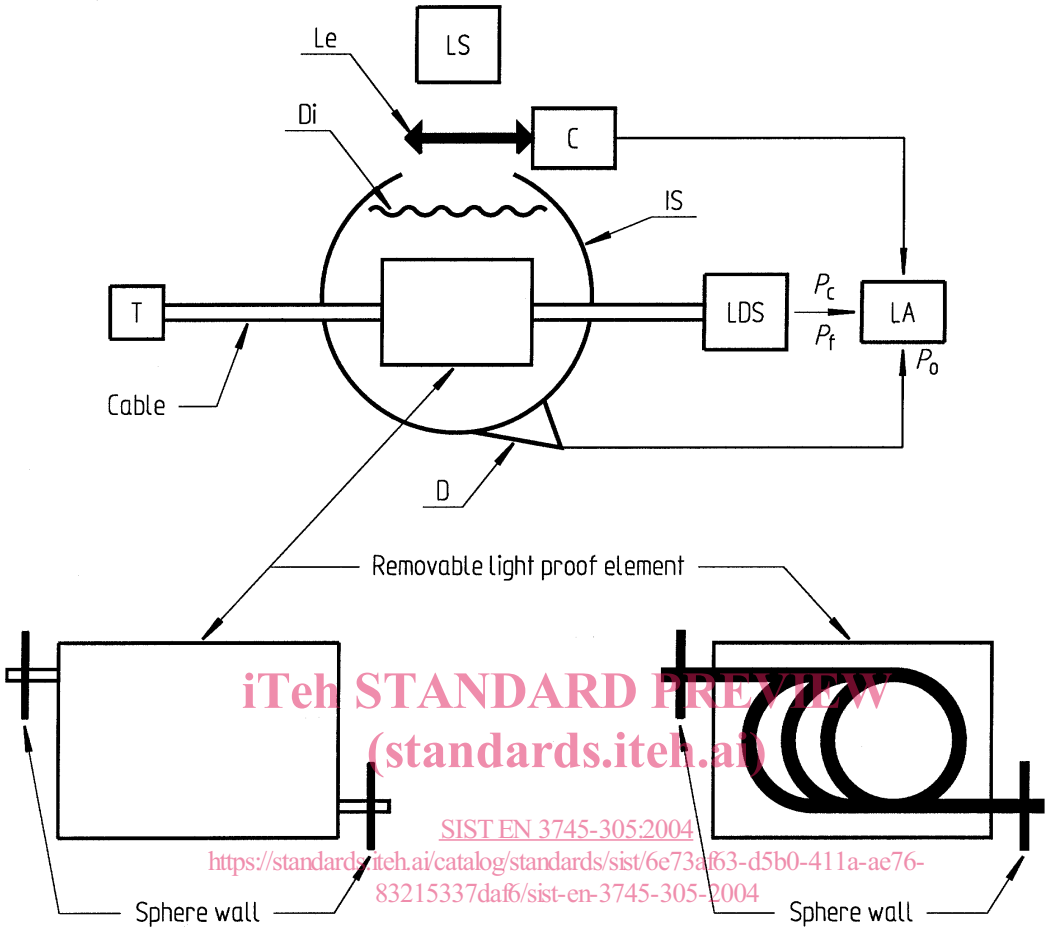

Figure 1

5 Method

The method consists of measuring the ambient light coupled in the specimen by the use of an integrated sphere (see figure 1).

5.1 Procedure

Install the specimen of length *L,* retained at specified bend radius, in the light proof element.

Turn on the LS, C, D, LDS and LA.

Insert the specimen with the removable light proof element in the integrated sphere.

Adjust the power of LS so that the output power is close to the upper detection limits of D and then measure the output powers P_0 and P_f.

Remove the light proof element.

If necessary, adjust the power of LS again so that new *P* value P_1 is equal to P_0.

Measure the new power P_c.

P_0 = level of optical power launched into the integration sphere after insertion of the removable light proof element with the specimen

P_1 = level of optical power launched into the integration sphere after the light proof element has been removed

P_f = ambient light coupled in the specimen in the removable light proof element

P_c = ambient light coupled in the specimen once the light proof element has been removed

5.2 Final measurements and requirements

Calculate the external light coupling coefficient per unit length with the help of the following equation:

$$\text{Coupling coefficient (dB / m)} = -\frac{10}{L}\log\frac{P_c - P_f}{P_0}$$

NOTE This calculation assumes that values P_0 and P_1 are equal.