SLOVENSKI STANDARD
SIST EN 2591-605:2004

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Aerospace series - Elements of electrical and optical connection - Test methods - Part 605: Optical elements - Return loss

Aerospace series - Elements of electrical and optical connection - Test methods - Part 605: Optical elements - Return loss

Luft- und Raumfahrt - Elektrische und optische Verbindungselemente - Prüfverfahren - Teil 605: Optische Elemente - Rückstreuverluste

Série aérospatiale - Organes de connexion électrique et optique - Méthodes d'essais - Partie 605: Organes optiques - Coefficient de réflexion

Ta slovenski standard je istoveten z: **EN 2591-605:2002**

ICS:

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Aerospace series - Elements of electrical and optical connection - Test methods - Part 605: Optical elements - Return loss

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This European Standard was approved by CEN on 8 February 2002.

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 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 Management Centre has the same status as the official versions.

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

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

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Ref. No. EN 2591-605:2002 E

Foreword

This document (EN 2591-605:2002) 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 return loss of optical connection elements (including permanent connections) and fibre optic couplers.

It shall be used together with EN 2591-100.

2 Normative 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 2591-100 Aerospace series – Elements of electrical and optical connection – Test methods – Part 100: General [1)]

3 Definition

For the purposes of this standard, the following definition apply :

Return loss
Ratio of reflected optical power to incident optical power.

4 Preparation of specimens

4.1 Specimens shall be fitted with normal accessories and terminated as specified in the product standard. Cavities with unterminated contacts shall have filler plugs fitted (where applicable).

If not at standard test conditions, the specimen shall be subjected to standard test conditions and stabilized at these conditions for 24 h as defined in EN 2591-100.

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

- type and length of cable/fibre;
- permitted value (in dB) of the return loss;
- coupler characteristics.

5 Apparatus

It shall comprise :

- a Light Launch System (LLS) as defined in EN 2591-100;
- a Light Detector System (LDS) as defined in EN 2591-100;
- an optical fibre Y coupler with splitting ratio Ki,j (equipped with connectors or not) whose characteristics have been established at wavelength λ_0 under standard temperature.

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

6 Method

6.1 Procedure

The method is called the "Coupler method" because the measuring device is joined around an optical fibre coupler as illustrated in figure 1.

The test sequence is :

a) adjust the launch conditions to 100 % for spot diameter and 110 % for numerical aperture, then connect the coupler to LLS and LDS.

b) measure reflected power *P*o on port 2 of the coupler, its free end 3 immersed in a refractive index matching liquid.

NOTE 1 Power *P*o is the total amount of power reflected by the coupler plus the power backscattered by the fibres.

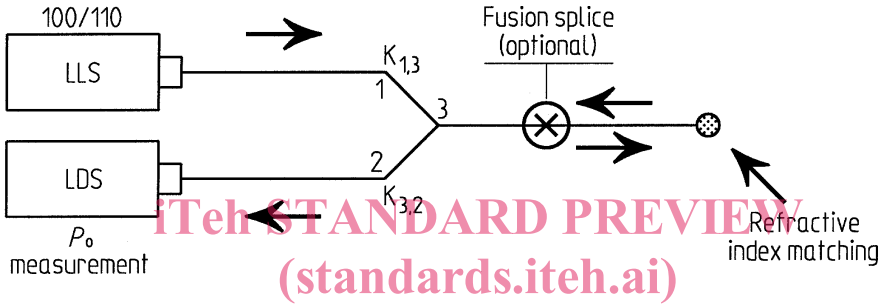

Figure 1

Ki,j is the coupler splitting ratio ($K_{3,2}$ = 0,5 for a 3 dB coupling value)

A fusion splice may be used as appropriate to enable a coupler to be used for a number of cut back termination of different specimens.

c) cut the fibre and insert the specimen Sx as shown in figure 2 and measure *P*1;

NOTE 2 Power *P*1 is the total amount of power reflected by the coupler and the specimen plus the fibre backscattered power.

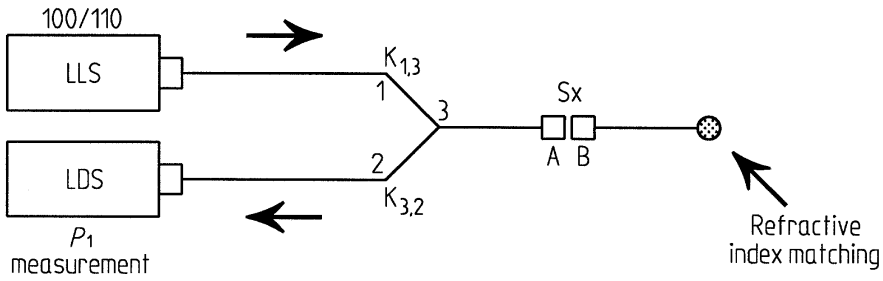

Figure 2

d) disconnect the specimen and remove the part B of the optical cord. Disconnect the LDS of the coupler and connect it in A.

e) immerse the port 2 of the coupler in the index matching liquid and then measure power *P*2 (figure 3);

NOTE 3 Power *P*2 is the total amount of power transmitted through point A of specimen Sx.

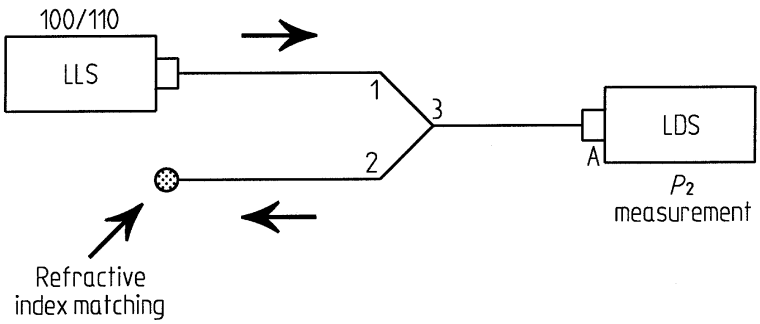

Figure 3

6.2 Final measurements and requirements

Calculation of the return loss (RL) of specimen Sx

Reflection coefficient $R = \dfrac{\text{Total power reflected by Sx}}{\text{Total power incident on Sx}}$

Power reflected by Sx = $P1 - Po$

Total power reflected by Sx = $\dfrac{1}{K_{3,2}}(P1-Po)$

Total power incident on Sx = $P2$

$$R = \frac{1}{K_{3,2}}\left(\frac{P1-Po}{P2}\right)$$

The return loss RL of the specimen is given by :

$$RL = -20 \log\left[\frac{1}{K_{3,2}}\left(\frac{P1-Po}{P2}\right)\right]$$

Particular attention will be paid to :

- value of the refractive index at λ_0 (source wavelength)
- coupler characteristics;
- fibres handling during the test (bend radius).