SLOVENSKI STANDARD
SIST EN 3475-806:2004

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Aerospace series - Cables, electrical, aircraft use - Test methods - Part 806: Attenuation

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Luft- und Raumfahrt - Elektrische Leitungen für Luftfahrtverwendung - Prüfverfahren - Teil 806: Dämpfung

Série aérospatiale - Câbles électriques à usage aéronautique - Méthodes d'essais - Partie 806: Affaiblissement

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49.060	Letalska in vesoljska elektriļna oprema in sistemi	Aerospace electric equipment and systems

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This European Standard was approved by CEN on 20 January 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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Foreword

This document (EN 3475-806:2002) 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of an identical text or by endorsement, at the latest by December 2002, and conflicting national standards shall be withdrawn at the latest by December 2002.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 methods for measuring the attenuation of a cable.

It shall be used together with EN 3475-100.

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 3475-100 Aerospace series – Cables, electrical, aircraft use – Test methods – Part 100: General

3 Preparation of specimens

Connectors shall be fitted on each end of the test specimens (coaxial cables) or the test specimens shall be stripped (balanced cables) and connected to the measuring device.

4 Methods

4.1 Insertion method

Measurement of attenuation is carried out by transmission in harmonic mode at the frequencies indicated in the product standard, inserting a cable sample in a suitable circuit and by compensating the attenuation caused by this cable by means of a calibrated attenuator.

The sample shall be of a length *L* such that it produces, unless otherwise stipulated in the product standard, an attenuation equivalent to at least 3 dB.

Figure 1 shows a basic arrangement.

The generator is adjusted to the measuring frequency F and its output level is held constant throughout measurement.

The indicator consists either of a measurement receiver or a detector followed by a d.c. or low frequency voltmeter if the generator is modulated.

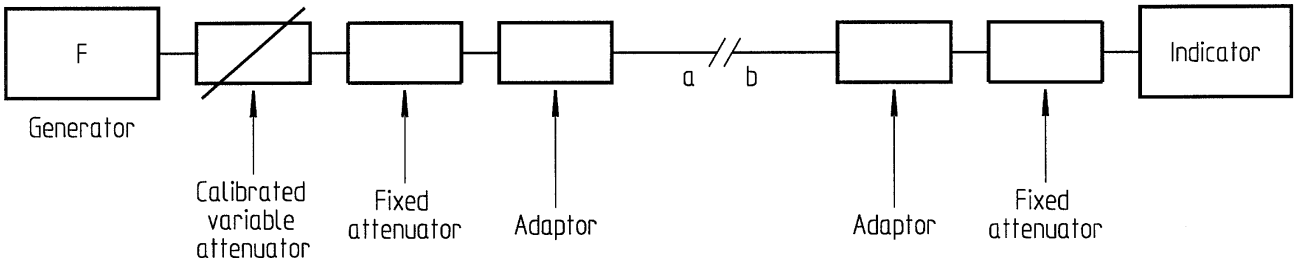

Figure 1

The adaptor devices shown in figure 1 are intended to ensure correct connection between the measuring line and the cable to be tested.

Since the measuring line is a coaxial cable, these devices shall not be used if the cable to be tested has a coaxial structure of the same rated characteristic impedance as the line: these are impedance transformers in the case of coaxial cables with different rated characteristic impedance: these are balanced transformers in the case of symmetrical cables (pairs).

First note the output level on the indicator which corresponds to a value N_1 on the calibrated variable attenuator.

Then connect the test sample between a and b and readjust the variable attenuator so as to obtain the same indicator level as in the previous operation; if N_2 is the new value shown on the variable attenuator, attenuation is:

$$\alpha = \frac{N_1 - N_2}{L[1 + 0{,}002\,(t - 20)]}$$, in decibels per metre at 20 °C

where t is the temperature, in degrees Celsius, of the test specimens.

4.2 Comparison of input and output voltage or power (insertion loss ≥ 3 db)

The attenuation constant shall be determined from the ratio of the input and output voltage or power. Both quantities may be measured in turn by a single measuring receiver or simultaneously with a network analyser or two channel powermeters.

In the case of a balanced cable, the measurement shall be carried out in a balanced condition. If the measuring test equipment is an unbalanced one, both ends of the pair shall be connected to the test equipment by means of baluns. The baluns shall be selected to match the test equipment to the cable nominal impedance at the test frequency.

Layout

The test equipment shall be assembled generally in accordance with one of the two circuit arrangements shown in figure 2 or figure 3.

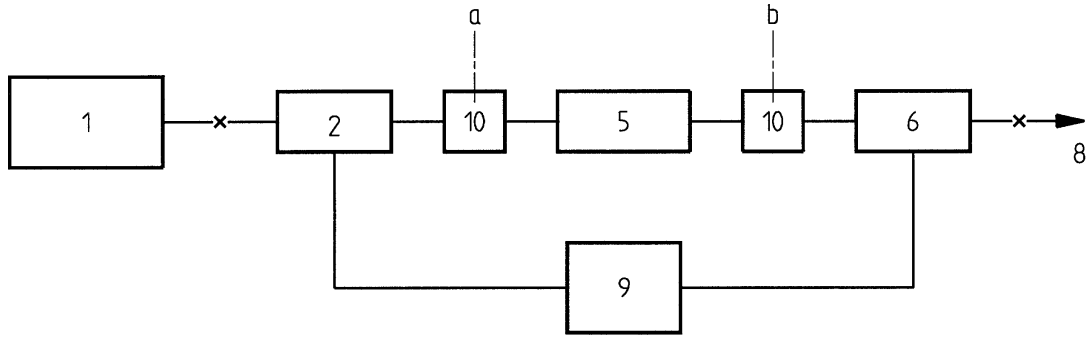

Figure 2 – Layout of test circuit for comparison – Test set up A

Where:
1 : generator
2 : attenuator 6 dB
5 : test specimen
6 : insertion unit
8 : terminating load
9 : network analyser
10 : matching baluns (measurement on a balanced cable with an unbalanced measuring test equipment)

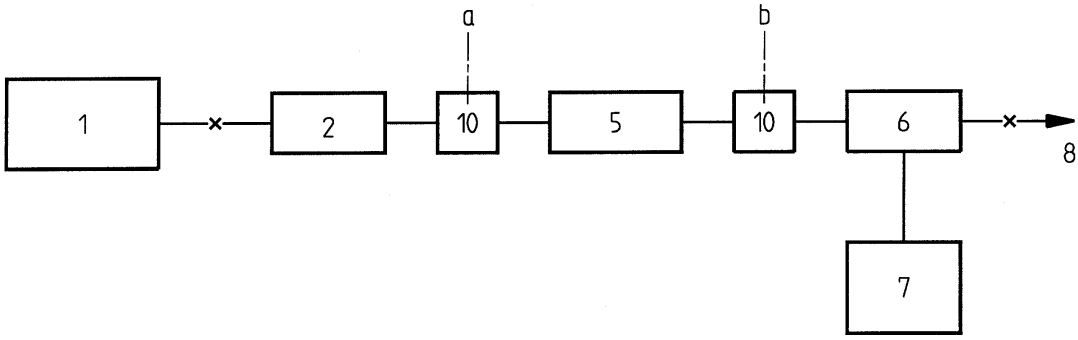

Figure 3 – Layout of test circuit for comparison – Test set up B

Where:
1 : generator
2 : attenuator 6 dB
5 : test specimen
6 : insertion unit
7 : measuring receiver
8 : terminating load
9 : network analyser
10 : matching baluns (measurement on a balanced cable with an unbalanced measuring test equipment)

Procedure

For test set up A, the test circuit shall be calibrated at the test frequency with the test ports connected together. The test specimen shall then be inserted into the circuit and the ratio of the input and output voltage or power shall be recorded, reading a in decibels.

Expression of results

The attenuation constant shall be determined as follows:

Test set up A $\alpha = \dfrac{a}{L\left[1 + 0{,}002\,(t - 20)\right]}$, in decibels per metre at 20 °C

Test set up B $\alpha = \dfrac{a_1 - a_2}{L\left[1 + 0{,}002\,(t - 20)\right]}$, in decibels per metre at 20 °C

Where:
a is the test circuit A reading in decibels
a_1 is the circuit B reading without the test specimen in decibels
a_2 is the circuit B reading with the test specimen in decibels
L is the length of the test specimen in metres
t is the temperature of the test specimen in degrees Celsius

5 Requirement

The values obtained shall not exceed the values specified in the product standard.