



SLOVENSKI STANDARD
oSIST prEN 3475-810:2023
01-april-2023

Aeronavtika - Električni kabli za uporabo v zračnih plovilih - Preskusne metode - 810. del: Povratna izguba (SRL)

Aerospace series - Cables, electrical, aircraft use - Test methods - Part 810: Structural return loss

Luft- und Raumfahrt - Elektrische Leitungen für Luftfahrtverwendung - Prüfverfahren - Teil 810: Rückflusdämpfung

Série aérospatiale - Câbles électriques à usage aéronautique - Méthodes d'essais - Partie 810: Affaiblissement de réflexion structurel

Ta slovenski standard je istoveten z: prEN 3475-810

ICS:

29.060.20	Kabli	Cables
49.060	Letalska in vesoljska električna oprema in sistemi	Aerospace electric equipment and systems

oSIST prEN 3475-810:2023

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 3475-810

February 2023

ICS 49.060

Will supersede EN 3475-810:2009

English Version

Aerospace series - Cables, electrical, aircraft use - Test methods - Part 810: Structural return loss

Série aérospatiale - Câbles électriques à usage
aéronautique - Méthodes d'essais - Partie 810:
Affaiblissement de réflexion structurel

Luft- und Raumfahrt - Elektrische Leitungen für
Luftfahrtverwendung - Prüfverfahren - Teil 810:
Rückflussdämpfung

This draft European Standard is submitted to CEN members for enquiry. 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.

This draft European Standard was established by CEN 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 CEN-CENELEC Management Centre has the same status as the official versions.

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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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 3475-810:2023) 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 document has received the approval of the National Associations and the Official Services of the member countries of ASD-STAN, prior to its presentation to CEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 3475-810:2009.

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prEN 3475-810:2023 (E)

1 Scope

This document specifies methods for measuring structural return loss for digital data transmission cable. It is applicable together with EN 3475-100 and EN 50289-1-11. In particular correction procedures detailed in EN 50289-1-11:2016, Annex B are recommended to minimize negative effects of cable preparation in the purpose of high frequency range measurements.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

structural return loss

SRL

used for quantifying the level of the reflected signal and to represent the structural effects of the cable itself relative to its own impedance (Z_c)

Note 1 to entry: The *SRL* result is sensitive to how the characteristic impedance is centred about the load impedance.

4 Preparation of specimens

Test specimen shall be of 100 m minimum length.

The ends of the cable under test shall be prepared in such way that the assembly of the pairs/quads is maintained.

The measurements may be performed on production drums and/or on the final delivery package from one direction.

5 Apparatus

- HF Network Analyser.
- One impedance transformer (balun) with the appropriate frequency range, impedance and balanced at least as well as the pair under test facilitates making measurements on symmetric pairs under balanced conditions.

6 Methods

The *SRL* is a calculated parameter. The *SRL* is obtained from the measured complex impedance open and short circuit, see EN 3475-805 Method C and the calculation of the fitted characteristic impedance.

- Fitted characteristic impedance calculation:

The following formula gives the cable characteristic impedance module in function of the frequency f (Hz).

$$|Zf| = K_0 + \frac{K_1}{f^{1/2}} + \frac{K_2}{f} + \frac{K_3}{f^{3/2}}$$

The K_0 to K_3 coefficients are extracted from the following expression:

$$\begin{bmatrix} \sum_{i=1}^N |Z_{o/s}| \\ \sum_{i=1}^N \frac{|Z_{o/s}|}{\sqrt{f_i}} \\ \sum_{i=1}^N \frac{|Z_{o/s}|}{f_i} \\ \sum_{i=1}^N \frac{|Z_{o/s}|}{f_i^{3/2}} \end{bmatrix} = \begin{bmatrix} N & \sum_{i=1}^N \frac{1}{\sqrt{f_i}} & \sum_{i=1}^N \frac{1}{f_i} & \sum_{i=1}^N \frac{1}{f_i^{3/2}} \\ \sum_{i=1}^N \frac{1}{\sqrt{f_i}} & \sum_{i=1}^N \frac{1}{f_i} & \sum_{i=1}^N \frac{1}{f_i^{3/2}} & \sum_{i=1}^N \frac{1}{f_i^2} \\ \sum_{i=1}^N \frac{1}{f_i} & \sum_{i=1}^N \frac{1}{f_i^{3/2}} & \sum_{i=1}^N \frac{1}{f_i^2} & \sum_{i=1}^N \frac{1}{f_i^{5/2}} \\ \sum_{i=1}^N \frac{1}{f_i^{3/2}} & \sum_{i=1}^N \frac{1}{f_i^2} & \sum_{i=1}^N \frac{1}{f_i^{5/2}} & \sum_{i=1}^N \frac{1}{f_i^3} \end{bmatrix} \times \begin{bmatrix} K_0 \\ K_1 \\ K_2 \\ K_3 \end{bmatrix}$$

where

$Z_{o/s}$ is the measured complex impedance obtained from open and short circuit measurement Zf (Ω);

Zf is the fitted characteristic impedance (Ω);

f is the frequency (Hz);

N is the number of measured points.

— Structural return loss calculation:

The *SRL* for cable pairs is obtained by the formula:

$$SRL = -20 \log \left| \frac{Z_{o/s} - Z_f}{Z_{o/s} + Z_f} \right|$$

where

SRL is expressed in dB.

7 Requirements

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