



SLOVENSKI STANDARD
oSIST prEN 3475-513:2023

01-november-2023

Aeronavtika - Električni kabli za uporabo v zračnih plovilih - Preskusne metode - 513. del: Odpornost proti deformaciji (namestitvev s plastičnimi vezicami)

Aerospace series - Cables, electrical, aircraft use - Test methods - Part 513: Deformation resistance (installation with plastic cable ties)

Luft- und Raumfahrt - Elektrische Leitungen für Luftfahrtverwendung - Prüfverfahren - Teil 513: Verformungsbeständigkeit (Installation mit Kunststoff-Kabelbindern)

Série aérospatiale - Câbles électriques à usage aéronautique - Méthodes d'essais - Partie 513 : Résistance à la déformation (installation avec frettes de câblage en plastique)

Ta slovenski standard je istoveten z: prEN 3475-513

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

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ICS 49.060

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English Version

Aerospace series - Cables, electrical, aircraft use - Test methods - Part 513: Deformation resistance (installation with plastic cable ties)

Série aérospatiale - Câbles électriques à usage
aéronautique - Méthodes d'essais - Partie 513 :
Résistance à la déformation (installation avec frettes
de câblage en plastique)

Luft- und Raumfahrt - Elektrische Leitungen für
Luftfahrtverwendung - Prüfverfahren - Teil 513:
Verformungsbeständigkeit (Installation mit Kunststoff-
Kabelbindern)

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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prEN 3475-513:2023 (E)**European foreword**

This document (prEN 3475-513:2023) 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 3475-513:2020.

The main changes with respect to the previous edition EN 3475-513:2020 are as follows:

- EN 3475-513 (P2), 02/2020 — Editorial improvements, correction of the force of the cable tie gun setting in 5.2.3 (75^{+5}_0 N instead of 115^{+5}_0 N) and update of Figure 1.

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1 Scope

This document defines the test methods to evaluate the performance of coaxial, quadrax and databus cables after the installation of plastic cable ties.

It is expected to be used together with EN 3475-100.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 3475-805, *Aerospace series — Cables, electrical, aircraft use — Test methods — Part 805: Characteristic impedance*

EN 3475-806, *Aerospace series — Cables, electrical, aircraft use — Test methods — Part 806: Attenuation*

EN 3475-808, *Aerospace series — Cables, electrical, aircraft use — Test methods — Part 808: Cross-talk*

EN 3475-812, *Aerospace series — Cables, electrical, aircraft use — Test methods — Part 812: Return loss (VSWR)*

EN 4056-003, *Aerospace series — Cable ties for harnesses — Part 003: Plastic cable ties — Operating temperatures -65 °C to 105 °C and -65 °C to 150 °C — Product standard*

3 Terms and definitions

No terms and definitions are listed in this document.

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/>

4 Coaxial cable — Method A

4.1 Preparation of specimens

4.1.1 Required parts/samples

12 plastic cable ties, type EN 4056-003 Type 1, size code S or equivalent.

Cut 8 (eight) pieces of the test cable to a length of $(2\,000 \pm 20)$ mm.

Test is to be performed on 4 (four) specimens made up of 2 (two) cable pieces.

4.1.2 Initial measurement

Measure the impedance of each specimen (on both pieces of cable) in accordance with EN 3475-805, method B, plot the results.

4.1.3 Preparation of samples

Use 3 (three) plastic cable ties per specimen to bundle 2 (two) cable pieces.

Place the first cable tie approximately 1 000 mm from the end which was connected to the TDR (to measure the initial impedance).

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Place the second cable tie at a distance of (100 ± 5) mm to the first, the third cable tie in a distance of 100 mm to the second.

The cable tie gun setting must be set and calibrated to a force of 75_0^{+5} N.

4.2 Test method**4.2.1 First test**

To be performed on 2 (two) out of 4 (four) specimens.

Measure the impedance of each cable again in accordance with EN 3475-805, method B, plot the results.

Compare the impedance before and after the cable ties have been applied to cable bundle.

4.2.2 Second test

To be performed on 2 (two) out of 4 (four) specimens.

Store the cable bundle for 8 (eight) h in an air convection oven at a temperature of (130 ± 5) °C.

Cool the cable bundle for 4 (four) h to 6 (six) h to ambient temperature.

Measure the impedance of each cable again in accordance with EN 3475-805, method B, plot the results.

Compare the impedance before and after the cable ties have been applied to cable bundle.

4.3 Requirement

The impedance shall not deviate more than 5 % from the originally recorded values.

5 Coaxial cable — Method B**5.1 Preparation of specimens****5.1.1 Required parts/samples**

14 plastic cable ties, type EN 4056-003 Type 1, size code V (4,4 mm width) or equivalent.

2 (two) pieces of cable each 2 (two) m long.

5.1.2 Preparation of samples

Cut 2 (two) pieces of 2 (two) m long of cable under test.

Mount necessary connectors on each specimen to allow their connection to measurement device, for example with adapted connectors type N or TNC.

5.2 Test method**5.2.1 General**

Specimens shall be prepared as defined in 5.1.2.

5.2.2 Initial measurement

On each of the 2 (two) samples, measure the VSWR in accordance with EN 3475-812 within the frequency range specified in the cable product standard.

Save the curve for further comparison.

5.2.3 Sample conditioning

Roll up each sample in order to obtain 4 (four) turns minimum to form a loop with an internal diameter of about 160 mm each.

Place 7 (seven) cable ties all around the loop uniformly. See Figure 1.

The cable tie gun setting shall be set and calibrated to a force of 75_0^{+5} N.

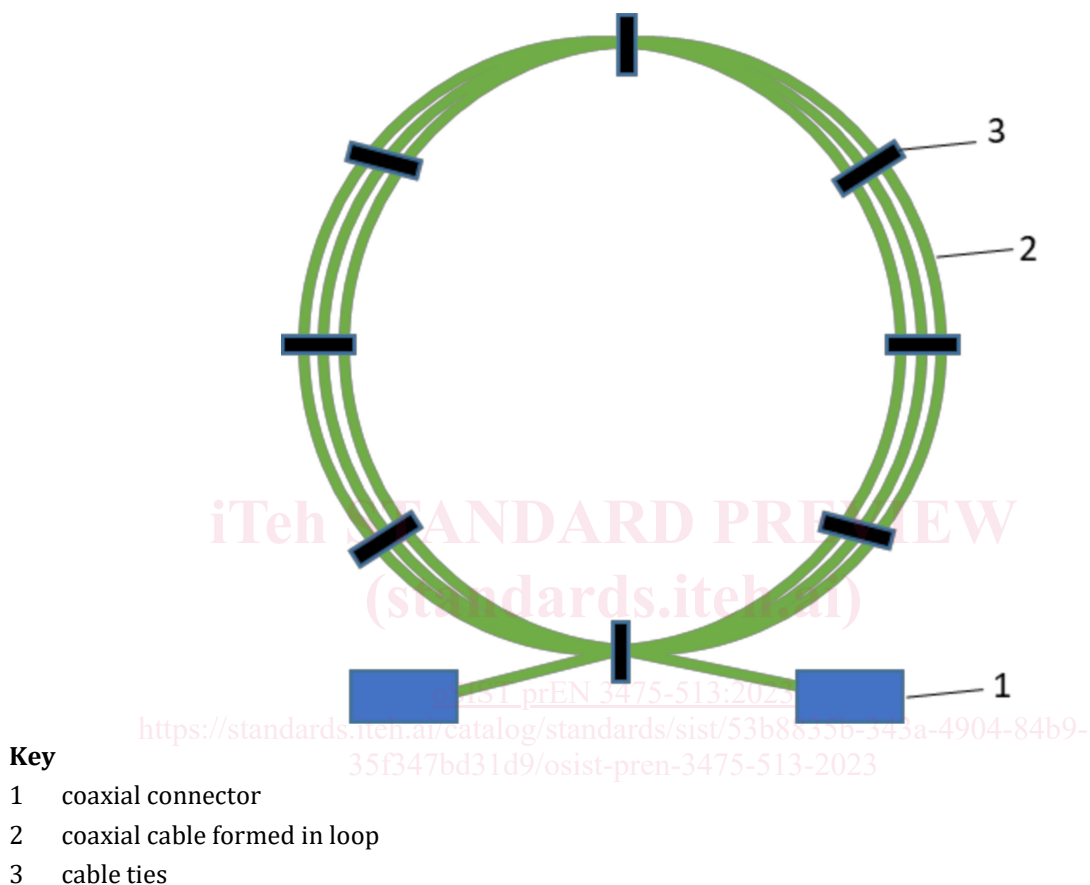


Figure 1 — Coaxial cable with cable ties and specified diameter loop

5.2.4 Intermediate measurements

Measure the attenuation in accordance with EN 3475-806 and VSWR in accordance with EN 3475-812 in the frequency range of the cable under test.

Compare the curves before and after the cable ties have been applied onto the cable.

5.2.5 Sample conditioning after tying

Store the cable bundle for 8 (eight) h in an air convection oven at a temperature of (130 ± 5) °C.

Cool the cable bundle for 4 (four) h to 6 (six) h to ambient temperature.

5.2.6 Final measurements

Measure the attenuation in accordance with EN 3475-806 and VSWR in accordance with EN 3475-812 within the frequency range specified in the cable product standard.

Compare the curves before and after sample conditioning.

prEN 3475-513:2023 (E)**5.3 Requirement**

Values for attenuation and VSWR shall be conform to the values specified in the product standard.
The comparison of results before and after tests shall be recorded and joined to the report.

6 Quadrax cable**6.1 Preparation of specimens****6.1.1 Required parts/samples**

90 plastic cable ties, type EN 4056-003 Type 1, size code S or equivalent.

1 (one) piece of cable, length: 20 m.

6.1.2 Preparation of samples

Take the 20 m cable to connect on measurement device with adapted connectors.

6.2 Test method**6.2.1 General**

Specimens shall be prepared as defined in 6.1.2.

6.2.2 Initial measurement

Before tying the cable with the cable ties, perform:

- crosstalk in accordance with EN 3475-808.

6.2.3 Sample conditioning

Make a loop with the cable and align the 2 (two) ends in order to have 10 m length. Put a mandrel inside the loop in order to have a minimum bend radius equal to 5 (five) times the outer cable diameter.

Use plastic cable ties to bundle the two cable lengths. Place the first cable tie just after the loop.

Distance between each cable tie shall be 100 mm. See Figure 2.

The cable tie gun setting must be set and calibrated to a force of 75_0^{+5} N.

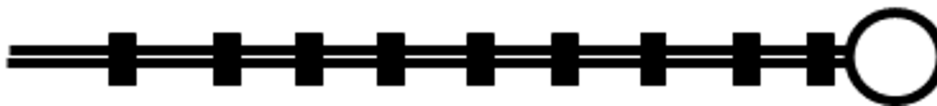


Figure 2 — Quadrax cable with cable ties and specified mandrel

6.2.4 Final measurement

The following measurements shall be performed:

- crosstalk in accordance with EN 3475-808.

Compare the measure before and after the cable ties have been applied onto the cable.