



SLOVENSKI STANDARD SIST EN 3475-417:2009

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Aerospace series - Cables, electrical, aircraft use - Test methods - Part 417: Fire resistance of cables confined inside a harness

Luft- und Raumfahrt - Elektrischen Leitungen für Luftfahrt Verwendung - Prüfverfahren - Teil 417: Feuerbeständigkeit von Leitungen eingebunden in Bündeln

Série aérospatiale - Câbles électriques à usage aéronautique - Méthodes d'essais - Partie 417: Tenue au feu des câbles confinés dans un harnais

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49.060 Š^æ\ æš Å^•[|b\ æ Aerospace electric
^|\ dã} æ] !^{ æš Å ã c{ ã equipment and systems

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EUROPEAN STANDARD

EN 3475-417

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March 2009

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Verwendung - Prüfverfahren - Teil 417: Feuerbeständigkeit
von Leitungen eingebunden in Bündeln

This European Standard was approved by CEN on 30 August 2008.

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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 CEN Management Centre has the same status as the official versions.

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Foreword

This document (EN 3475-417:2009) 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 Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, 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of an identical text or by endorsement, at the latest by September 2009, and conflicting national standards shall be withdrawn at the latest by September 2009.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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

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EN 3475-417:2009 (E)**1 Scope**

This standard specifies a method of testing the fire resistance of fire resistance or fire-proof electrical cables inside a harness.

The objective of this test is to **qualify these cables** when they are confined inside harnesses defined hereafter. Described configurations try to be representative of various cables configuration installed in Aircraft.

It shall be used together with EN 3475-100.

2 Normative references

The following referenced documents are indispensable for the application 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 2346-002, *Aerospace series — Cable, electrical, fire resistant — Operating temperatures between – 65 °C and 260 °C — Part 002 : General.*

EN 3475-100, *Aerospace series — Cables, electrical, aircraft use — Test methods — Part 100: General.*

EN 3475-408, *Aerospace series — Cables, electrical, aircraft use — Test methods — Part 408: Fire resistance.*

ISO 2685, *Aircraft — Environmental test procedure for airborne equipment — Resistance to fire in designated fire zones.*

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3 Preparation of specimens

Three specimens per configuration 0,75 m length shall be tested. See Figure 1.

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4 Apparatus

The test equipment shall be as required in EN 3475-408.

Reminder of apparatus requirements:

- a) **Burner:** according with ISO 2685 or any other burner or assembly of burners satisfying the following conditions:
 - The minimum width of the burner shall be 50 mm;
 - Cable length exposed to the flame: 152 mm;
 - Diameter or width of the flame at the base of the burner $\geq 2 D$ (D = diameter of the harness under test);
 - Flame temperature: $(1\ 100 \pm 80)$ °C;
 - Heat flux density received by the calorimeter: (116 ± 10) kW/m².
- b) **Test fixture:** according with ISO 2685:
The frame of the test fixture shall be vibrated with the following characteristics:
 - Direction perpendicular to the axis of the cable;
 - Frequency : (30 ± 5) Hz;
 - Minimum acceleration: 4 g.
- c) **Circuit diagram** (see Annex A, Figures A.1 and A.2)

5 Method

5.1 Preparation of test specimens

Unless otherwise specified in the product standard, 3 types of homogeneous harnesses of respective code 002 (AWG 24), 006 (AWG 20) and 020 (AWG 14) shall be tested.

The cable used to build the harnesses is a three-core cable EN2346-xxxCyyy (see EN 2346-002).

The composition of the harnesses will be 4, 12 and 19 cables connected in series as in example for 4 cables.

These cables shall be twisted with a lay length of 12 to 16 times the outer diameter of the harness.



Figure 1 — Schema

- All first conductors of each three-core together in series (1st equipotential E1)*
All second conductors of each three-core together in series (2nd equipotential E2)
All third conductors of each three-core together in series (3rd equipotential E3)

An external protection [Nickel coated or tin coated copper (85 % minimum coverage) sheath plus a Nomex braid (80 % minimum coverage)] (4th equipotential E4).

Each sample shall be mounted onto a frame as defined in EN 3475-408. The sample shall be loaded with a force defined in Table 1.

Table 1

In daN	Gage 24 (002)	Gage 20 (006)	Gage 14 (020)
n1	1,5	4	8
n2	4	8	8
n3	8	8	8

"n" is the number of three-cores wires EN2346-xxxCyyy.

EN 3475-417:2009 (E)**5.2 Procedure**

The test shall be performed according to EN 3475-408, without fluid immersion.

Each sample shall be simultaneously subjected to the combined flame and vibration test during 5 min, then the flame will be removed and vibration still maintained during the following 10 min.

The insulation resistance measurements must be performed simultaneously between equipotential 1/2 (**E1/E2**) and equipotential 3/4 (**E3/E4**).

6 Requirements/Acceptance criteria

Check the electrical continuity and insulation resistance of the cables during the test.

The minimum insulation resistance shall be 10 000 Ω , unless otherwise specified in the product standard.

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