



SLOVENSKI STANDARD

SIST EN 3475-604:2018

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Nadomešča:

SIST EN 3475-604:2010

Aeronavtika - Električni kabli za uporabo v zračnih plovilih - Preskusne metode - 604. del: Odpornost proti električnemu obloku v suhih razmerah

Aerospace series - Cables, electrical, aircraft use - Test methods - Part 604: Resistance to dry arc propagation

Luft- und Raumfahrt - Elektrische Leitungen für Luftfahrtverwendung - Prüfverfahren - Teil 604: Lichtbogenfestigkeit, trocken

Série aérospatiale - Câbles électriques à usage aéronautique - Méthodes d'essais - Partie 604 : Résistance à l'amorçage et à la propagation d'arc électrique, essai à sec

Ta slovenski standard je istoveten z: EN 3475-604:2018

ICS:

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

SIST EN 3475-604:2018

en,fr,de

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EUROPEAN STANDARD

EN 3475-604

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2018

ICS 49.060

Supersedes EN 3475-604:2010

English Version

Aerospace series - Cables, electrical, aircraft use - Test methods - Part 604: Resistance to dry arc propagation

Série aérospatiale - Câbles électriques à usage
aéronautique - Méthodes d'essais - Partie 604 :
Résistance à l'amorçage et à la propagation d'arc
électrique, essai à sec

Luft- und Raumfahrt - Elektrische Leitungen für
Luftfahrtverwendung - Prüfverfahren - Teil 604:
Lichtbogenfestigkeit, trocken

This European Standard was approved by CEN on 28 August 2017.

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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-CENELEC Management Centre has the same status as the official versions.

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

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European foreword

This document (EN 3475-604:2018) 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 July 2018, and conflicting national standards shall be withdrawn at the latest by July 2018.

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

This document supersedes EN 3475-604:2010.

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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EN 3475-604:2018 (E)**1 Scope**

This European standard specifies a method for appraising the behaviour of cable insulation when an electric arc is initiated and maintained by two (2) powered cables rubbing against a blade.

This European standard shall be used together with EN 3475-100.

The primary aim of this test is:

- to produce, in a controlled fashion, continuous failure effects which are representative of those which may occur in service when a typical cable bundle is damaged by abrasion such that electrical arcing occurs, both between cables and between cables and conductive structure, and
- to examine the aptitude of the insulation to track, to propagate electric arc to the electrical origin.

Originally defined for 115 Vac network, this test also proposes conditions for 230 Vac network. Unless otherwise specified in product standard, only 115 Vac conditions shall be satisfied.

Six (6) levels of prospective fault current have been specified for concerned cable sizes (see Clause 7). It is generally agreed that larger sizes need not be assessed since the short-circuit phenomenon becomes dominant at low line impedances.

Unless otherwise specified in the technical/product standard sizes 002, 006 and 020 cable shall be assessed.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 2350, *Aerospace series — Circuit breakers — Technical specification*

EN 2702, *Aerospace series — Aluminium alloy AL-P6061 — T6 or T62 — Drawn or extruded bar and section — a or D ≤ 200 mm*

EN 3197, *Aerospace series — Design and installation of aircraft electrical and optical interconnection systems*

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

EN 3475-302, *Aerospace series — Cables, electrical, aircraft use — Test methods — Part 302: Voltage proof test*

A-A-52083, *Tape, lacing and tying, glass*¹⁾

3 Specimen requirements

Cables to be tested shall be of traceable origin and shall have passed the high voltage dielectric test defined in the product standard.

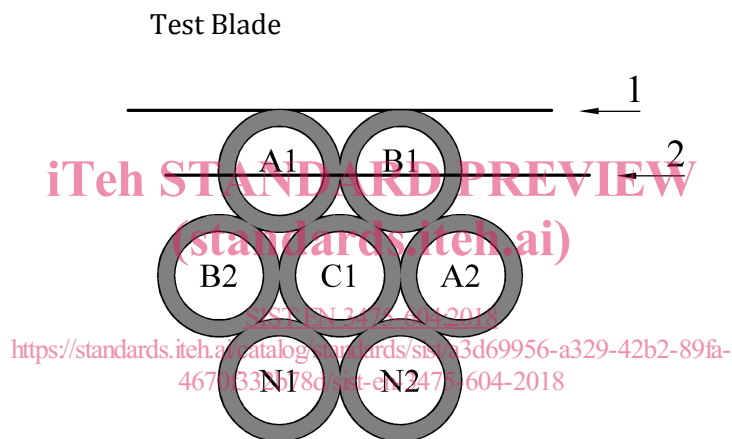
¹⁾ Published by: Department of Defense Industrial Supply Center, ATTN: DISC-BBEE, 700 Robbins Avenue, Philadelphia, PA 19111-5096 - USA.

4 Preparation of specimen

4.1 Cut seven (7) separate lengths of approximately 0,5 m consecutively from one length of cable, and strip each of the ends of insulation to permit electrical connection. Clean each length of cable with a clean cloth moistened with propan-2-ol (isopropyl alcohol) fluid.

4.2 Lay up the seven (7) cables as follows:

- a) Form the cables in a six around one configuration as shown in Figure 1.
- b) Ensure that all cables are straight and geometrically parallel, and restrained by lacing tapes such that they are in continuous contact for at least a 75 mm continuous length around the mid point of the loom length. This is called the test zone.
- c) Position the lacing tapes at 15 mm to 20 mm spacing within the test zone. The tie material shall be PTFE glass lacing tape conforming to A-A-52083 type IV, finish D, size 3.
- d) Number the cables as shown in Figure 1 such that the cables in contact with the blade are numbers A1 and B1.



Key

1 Original position

2 Final position

A1-A2 : Phase A

B1-B2 : Phase B

C1-C2 : Phase C

N1-N2: Inactive cables connected to earth

Figure 1 — Specimen configuration

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5 Apparatus

5.1 Electrical equipment

Connect the seven (7) cables of the test sample within a circuit as shown in Figure 2. This circuit shall have the following requirements:

- a) The provision of adjustable levels of prospective fault currents for the five A, B and C cables and an electrical return path for the two N cables.
- b) A three phase 115/200 V 400 Hz (115 Vac network) or 230/400 V 400 Hz (230 Vac network) star (Y) connected supply shall be derived from a dedicated rotary machine capable of sustaining the maximum prospective fault current given in Table 1 (115 Vac network) or Table 2 (230 Vac network) for at least sufficient time for circuit protection to operate. In any case the generator shall have a sufficient rating to provide these prospective fault currents.
- c) 115 Vac or 230 Vac circuit breakers (D2) shall be single pole units rated at the values specified in Table 3.

They shall have trip characteristics in accordance with EN 2350 or as required in the product specification.

NOTE 1 Reference of circuit breakers used shall be recorded.

NOTE 2 In particular case, others ratings of thermal breaker protection could be employed in accordance with aircraft manufacturer rules.

- d) The electrical power source shall be appropriately protected and it shall be established that no combination of test circuit events would activate this protection.

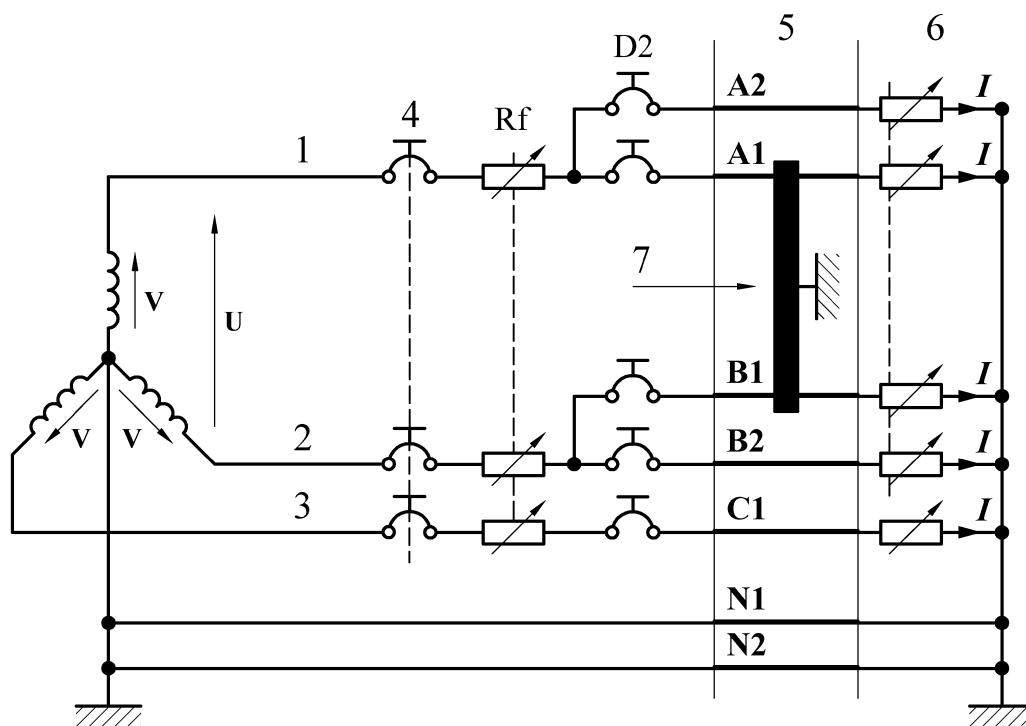
- e) The ballast resistors shall be non-inductive and of appropriate power rating. Care shall be taken to position all laboratory wiring such that inductive effects are reduced to a practical minimum. Supply cables shall be as short as possible.

- f) Cables A, B and C shall be connected to indication and open circuit detectors at entry into the grounded star point. These components shall limit the standing current to no more than 10 % of the circuit breaker rating.

- g) The automatic shutdown facility shall provide, upon the detection of any open circuit during test and after a 10 s delay, removal of the blade from the specimen and for electrical power to be removed. Open circuit in this case means either a physical break in the specimen or a thermal breaker trip.

NOTE 3 In the case of the automatic shutdown facility is not used, the physical break in the specimen are detected by lamps in series with the rheostat Rg.

- h) A heavy duty electrical bonding strap shall be connected between the blade of the test rig and the electrical star point of the generator.
- i) Appropriate instrumentation, recording and switching control shall be installed in accordance with good laboratory practice.
- j) A rheostat Rg adjusting current (I) in the circuit to a value equal to 10 % of the circuit breaker current.

**Key**

- 1 Phase A
- 2 Phase B
- 3 Phase C
- 4 Supply protection
- 5 Test bundle
- 6 Indicators (lamp) + Rg
- 7 Test blade

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Figure 2 — Test schematic circuit

5.2 Test equipment

Construct an apparatus as shown diagrammatically in Figures 3a, 3b and 3c which includes the following minimum provisions:

- a) A lightweight, freely pivoting test fixture to hold the blade at a 90° angle to the specimen and to exert a controlled force on the specimen.

NOTE Generally a mounting on 50 mm centres shall hold the individual cables of the specimen in close proximity.

- b) Electrical terminations to provide a ready means of connecting test specimens into the circuit as shown in Figure 2.
- c) An aluminium blade complying with material specification T6061-T6 (EN 2702) and Figure 3c.
- d) A mechanism to provide a minimum oscillating stroke of 15 mm excursion at a frequency of (8 ± 2) Hz.
- e) A blade carrier to give a downward force at the blade of $(2,5 \pm 0,1)$ N.