SLOVENSKI STANDARD
SIST EN 3475-604:2004

01-maj-2004

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

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 a usage aéronautique - Méthodes d'essais - Partie 604: Résistance a l'amorçage et a la propagation d'arc électrique, essai a sec

Ta slovenski standard je istoveten z: **EN 3475-604:2002**

ICS:

49.060	Letalska in vesoljska elektriļ na oprema in sistemi	Aerospace electric equipment and systems

SIST EN 3475-604:2004 **en**

EUROPEAN STANDARD

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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

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This European Standard was approved by CEN on 22 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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 3475-604:2002 E

Foreword

This document (EN 3475-604:2002) 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 a method for appraising the behaviour of cable insulation when an electric arc is initiated by two powered cables rubbing against a blade.

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

The primary aim of this test is to produce, in a controlled fashion, 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.

Six levels of prospective fault current have been specified for cable sizes 26 to 10.

Individual product standards shall require at least sizes 24, 20, 14 cable to be assessed.

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
EN 3475-302	Aerospace series – Cables, electrical, aircraft use – Test methods – Part 302: Voltage proof test
EN 2702	Aerospace series – Aluminium alloy AL-P6061-T6 or T62 – Drawn or extruded bar and section – a or $D \leq 150$ mm [1)]
EN 2350	Aerospace series – Circuit breakers – Technical specification
MIL-T-43435-B	Specification for tape lacing and tying [2)]

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.

4 Preparation of specimen

4.1 Cut seven 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 fluid.

1) Published as AECMA Prestandard at the date of publication of this standard
2) Published by: Department of Defense (DOD), The Pentagon, Washington D.C. 20301 USA.

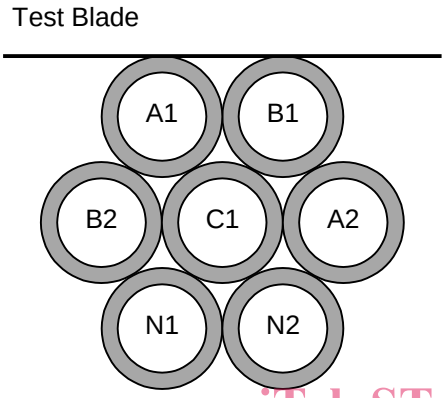
4.2 Lay up the seven cables as follows:

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 ties 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 ties at 15 mm to 20 mm spacing within the test zone.

NOTE The tie material shall be PTFE glass lacing tape conforming to MIL-T-43435-B type IV, finish D size 3.



A1-A2 : phase A

B1-B2 : phase B

C1 : phase C

N1 - N2 : Inactive cables connected to earth

Figure 1 – Specimen configuration

5 Apparatus

5.1 Electrical equipment

Connect the seven 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 208/115 V 400 Hz star (Y) connected supply shall be derived from a dedicated rotary machine capable of sustaining the maximum prospective fault current given in table 1 for at least sufficient time for circuit protection to operate. In any case the generator shall have a 1 min rating of not less than 15 kVA.

c) Circuit breakers shall be rated as given in table 2 and shall be single pole units. They shall have trip characteristics in accordance with EN 2350 or as required in the product specification.

NOTE 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 shut down 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 In the case of the automatic shut down 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.

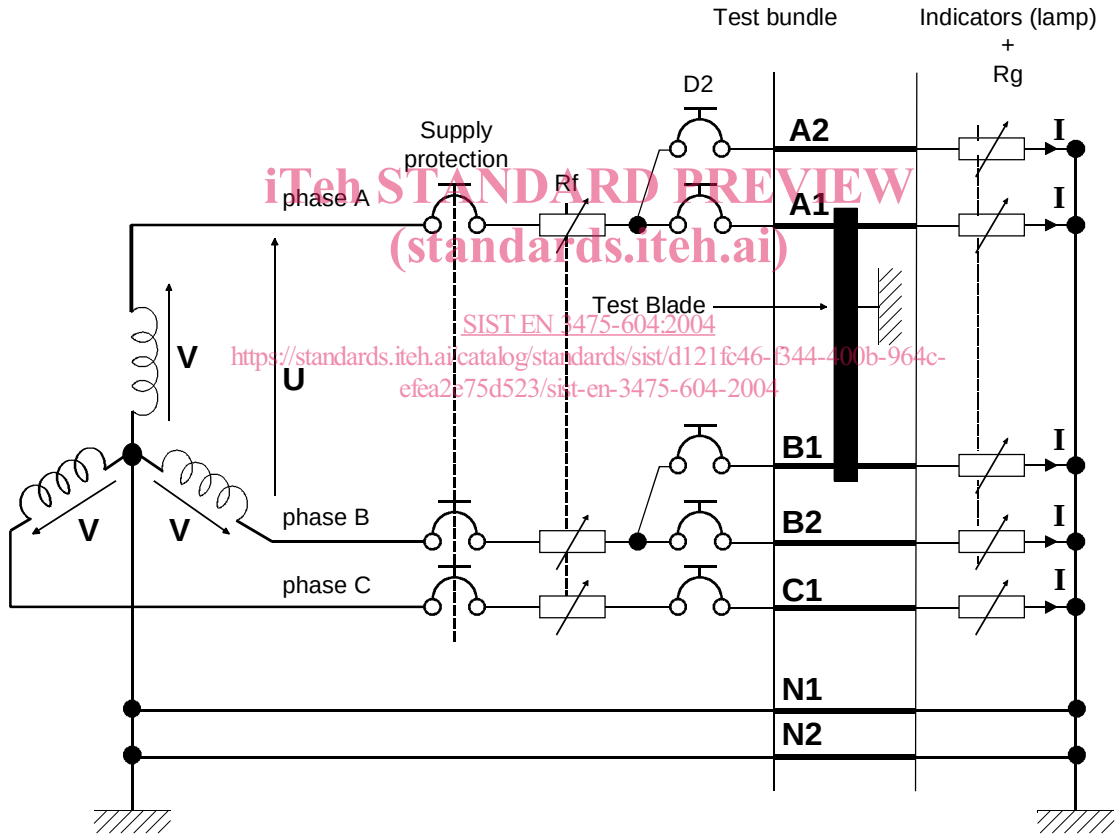


Figure 2 – Test schematic circuit

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 ± 0,1) N.

f) A mechanical stop to limit the fall of the oscillating blade to within an accuracy of 0,2 mm measured at the point of contact.

g) Means of separating the blade from the specimen, both manually and automatically if used.

h) An electrical connection of the aluminium blade to the neutral of the test power supply (see 5.1 h).

i) A transparent enclosure to protect personnel from ejected molten metal and short wavelength ultra violet light.

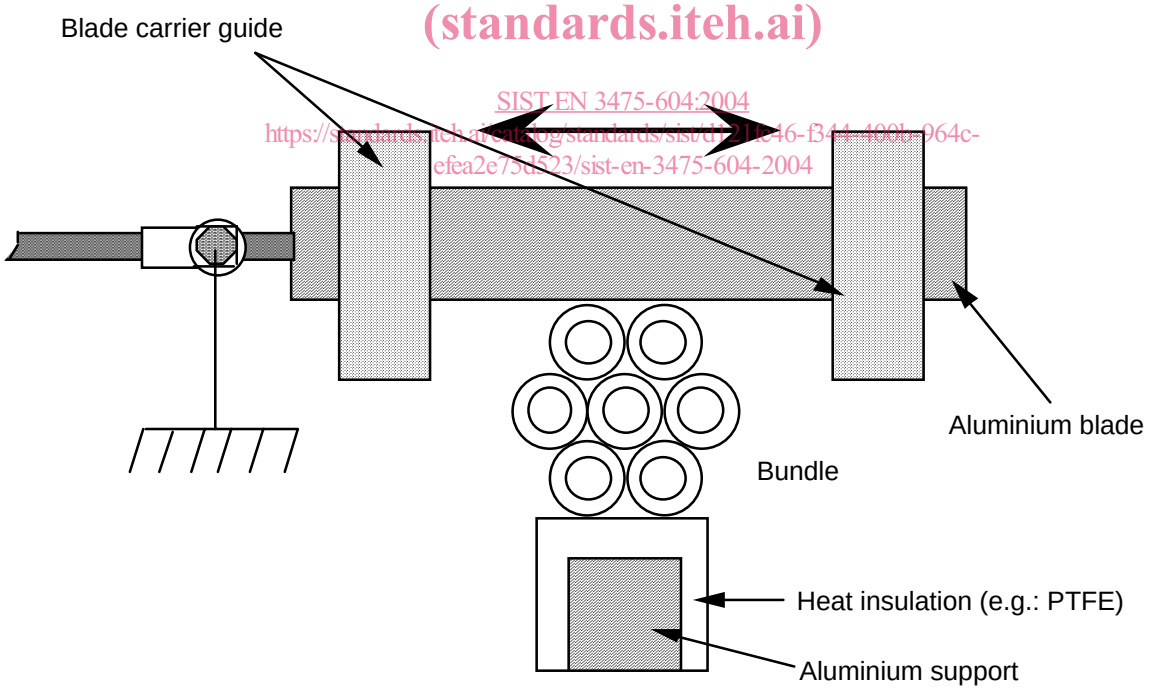


Figure 3a

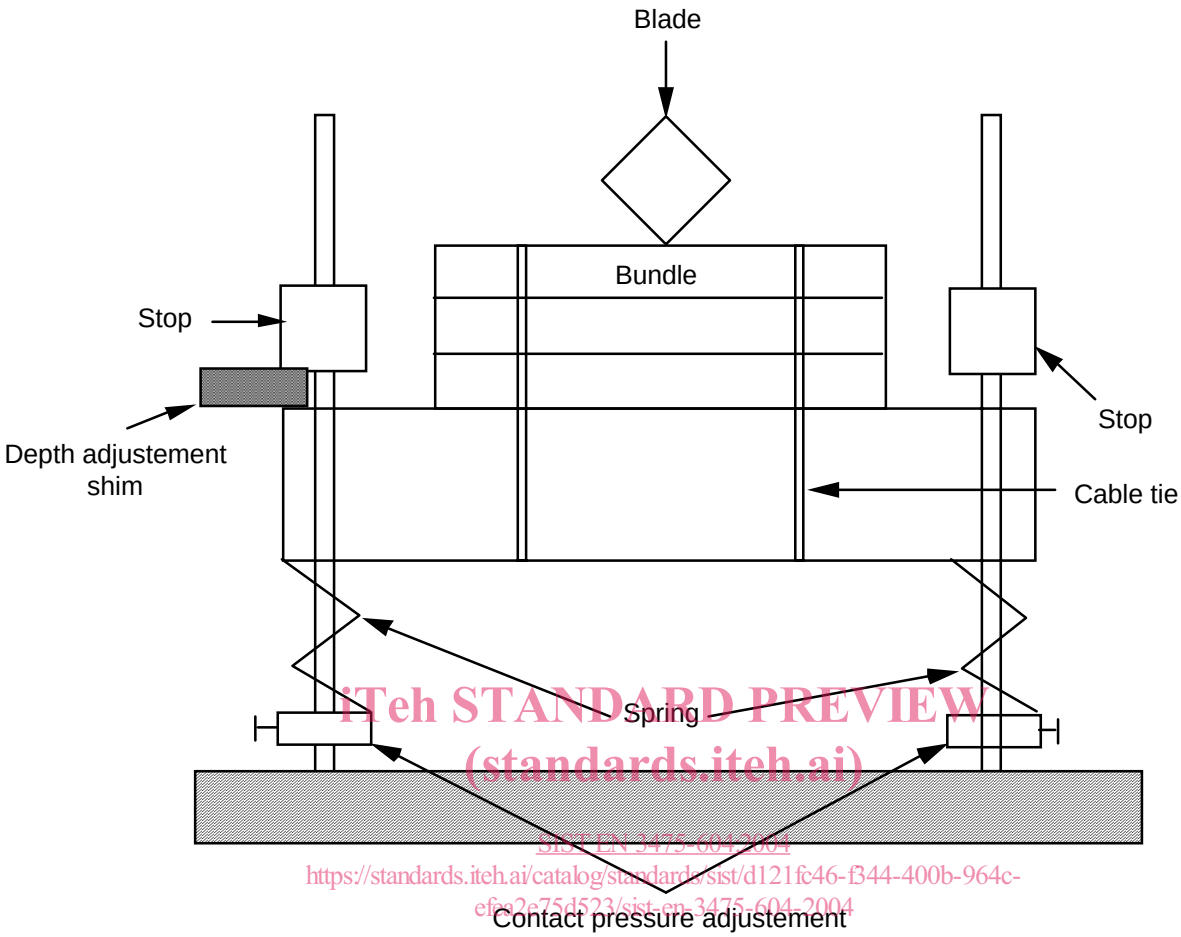


Figure 3b

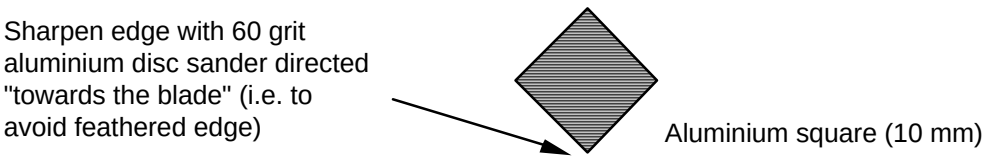


Figure 3c