



# SLOVENSKI STANDARD

## SIST EN 6059-502:2015

01-marec-2015

Nadomešča:

SIST EN 6059-502:2009

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**Aeronavtika - Električni kabli, namestitvev - Zaščitne obojke - Preskusne metode - 502. del: Odpornost proti električnim oblokam**

Aerospace series - Electrical cables, installation - Protection sleeves - Test methods - Part 502: Resistance to electrical arcs

Luft- und Raumfahrt - Elektrische Leitungen, Installation - Schutzschläuche - Prüfverfahren - Teil 502: Lichtbogenfestigkeit

Série aérospatiale - Câbles électriques, installation - Gainses de protection - Méthodes d'essais - Partie 502: Résistance aux arcs électriques

**Ta slovenski standard je istoveten z: EN 6059-502:2014**

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**ICS:**

49.060

Letalska in vesoljska  
električna oprema in sistemi

Aerospace electric  
equipment and systems

**SIST EN 6059-502:2015**

**en,fr,de**

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EUROPEAN STANDARD

EN 6059-502

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2014

ICS 49.060

Supersedes EN 6059-502:2009

English Version

## Aerospace series - Electrical cables, installation - Protection sleeves - Test methods - Part 502: Resistance to electrical arcs

Série aérospatiale - Câbles électriques, installation - Gainses de protection - Méthodes d'essais - Partie 502: Résistance aux arcs électriques

Luft- und Raumfahrt - Elektrische Leitungen, Installation - Schutzschläuche - Prüfverfahren - Teil 502: Lichtbogenfestigkeit

This European Standard was approved by CEN on 28 June 2014.

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

CEN members are the national standards bodies of 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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## Foreword

This document (EN 6059-502:2014) 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 June 2015, and conflicting national standards shall be withdrawn at the latest by June 2015.

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.

This document supersedes EN 6059-502:2009.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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**EN 6059-502:2014 (E)****1 Scope**

This European Standard specifies a method of assessing the behaviour of protection sleeves or conduits subject to an external electric arc, either at 115 Vac or 230 Vac 400 Hz.

This Standard shall be used together with EN 6059-100.

The primary aim of this test is to produce, in a controlled fashion, electric arcs at the immediate vicinity of a protection sleeve or conduit and to examine possible consequences on cables inside this protection, which are supposed to be maintained in a safe condition. These electric arcs are representative of those, which may occur in service when a typical cable bundle is severely damaged.

In order to optimize thickness and mass of such protection, it is necessary to associate a current limit  $I_n$  to each sleeves or conduits construction.

Two levels of prospective fault current are specified for all protection sizes.

**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 2267-010, *Aerospace series — Cables, electrical, for general purpose — Operating temperatures between – 55 °C and 260 °C — Part 010: DR family, single UV laser printable — Product standard*

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

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

EN 6059-100, *Aerospace series — Electrical cables, installation — Protection sleeves — Test methods — Part 100: General*

EN 6059-501, *Aerospace series — Electrical cables, installation — Protection sleeves — Test methods — Part 501: Voltage proof test*

A-A-52083, *Specification for tape lacing and tying* <sup>1)</sup>

**3 Specimen requirements**

Protection sleeves or conduits to be tested shall be of traceable origin and, unless otherwise specified, shall have passed the voltage proof test (EN 6059-501) as defined in the concerned product standard.

Unless otherwise specified in the concerned technical product standard, at least one size of protection sleeve per sleeve thickness or construction type (if different from one size to another) shall be assessed.

If possible for each thickness or construction type the test must be performed on a sample having the minimum authorized thickness or minimum authorized mass.

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1) Published by: Customer Service, Defense Printing Service Detachment Office, 700 Robbins Ave, Building 4D, Philadelphia PA 19111-5094 USA.

## 4 Definition and preparation of specimen

### 4.1 Protected bundle (bundle P)

Bundles P are made of arc tracking resistant cables, typically from EN 2267-010 product standard unless otherwise specified in the concerned protection sleeves product standard, with bundle external protection to be tested.

The cable bundle outer diameter shall be as closed as possible to the internal diameter of the protection to be tested. This diameter is obtained:

- with a full assembly of size 24 cables, or
- with a central part in various cable types covered with a full and uniform layer of size 24 cables.

The sleeve shall be fitted in accordance with the manufacturer's declared fitting instructions.

### 4.2 Aggressive bundle (bundle A)

#### 4.2.1 Definition and constitution

Bundles A are made of 7 arc-tracking resistant cables, typically from EN 2267-010 product standard unless otherwise specified in the concerned protection sleeves product standard, without bundle external protection.

The short circuit will be created on these bundles (see 4.3).

The cables gauge is chosen in Table 1, in accordance with the In limit specified for the protection sleeves.

**Table 1 — Choice of cable gauge**

<b>CB ratings (A)</b>	3	5	7,5	10	10	15	20	25	50
<b>Gauge</b>	26	24	22	20	18	16	14	12	10

Circuit breaker used to protect these cables must be also in accordance with Table 1.

EXAMPLE If the sleeve must provide a 15 A protection, take gauge 16 cables to built the bundle with 15 A CB ratings.

For information the diameter of the bundle will be three times the cable diameter.

#### 4.2.2 Preparation

Cut seven separate lengths of approximately 0,5 m consecutively from one length of cable, and strip one 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.

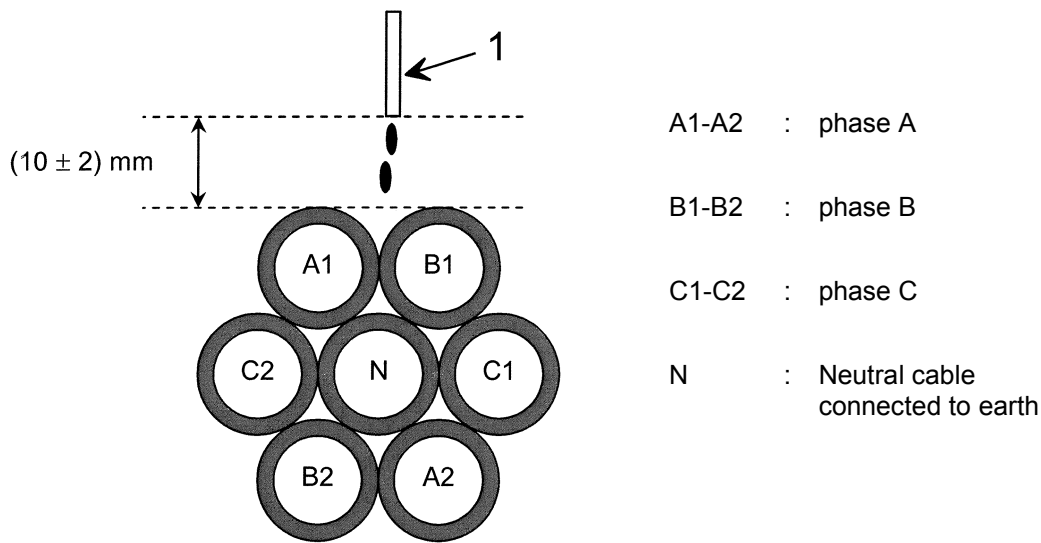
#### 4.2.3 Lay up the seven cables as follows:

- 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 at least within the test zone.

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c) Position the ties at 50 mm spacing toward the end of the specimen as shown in Figure 2.

NOTE The tie material shall be PTFE glass lacing tape conforming to A-A-52083, finish D size 3.

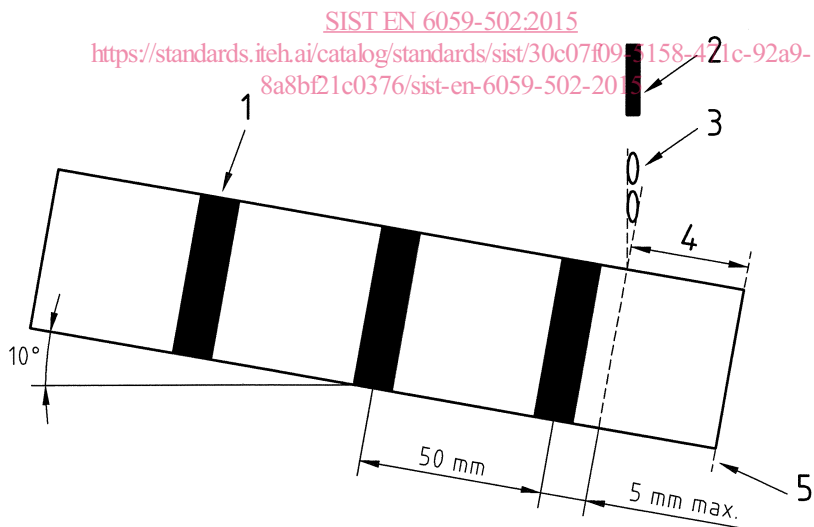


Key

- 1 Drop needle

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Figure 1 — Bundle A – Electrical configuration



Key

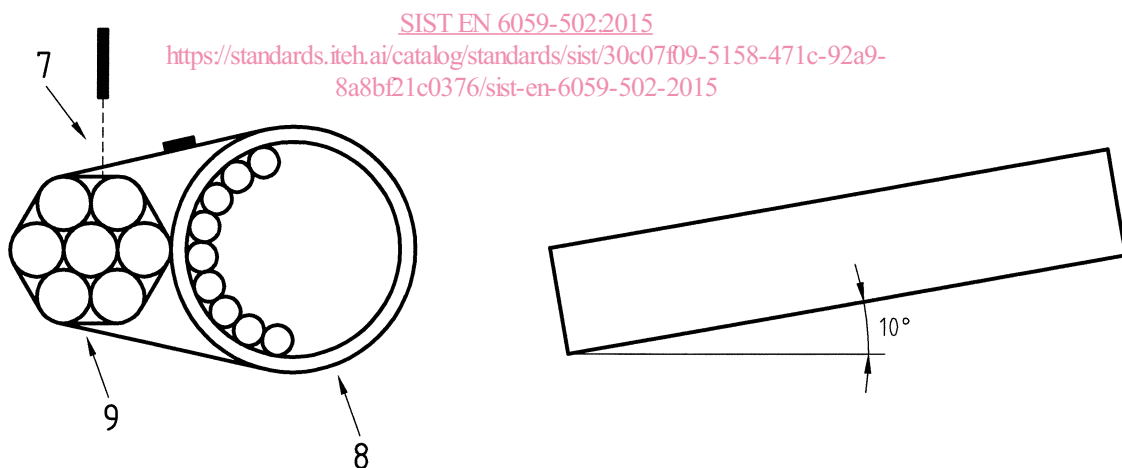
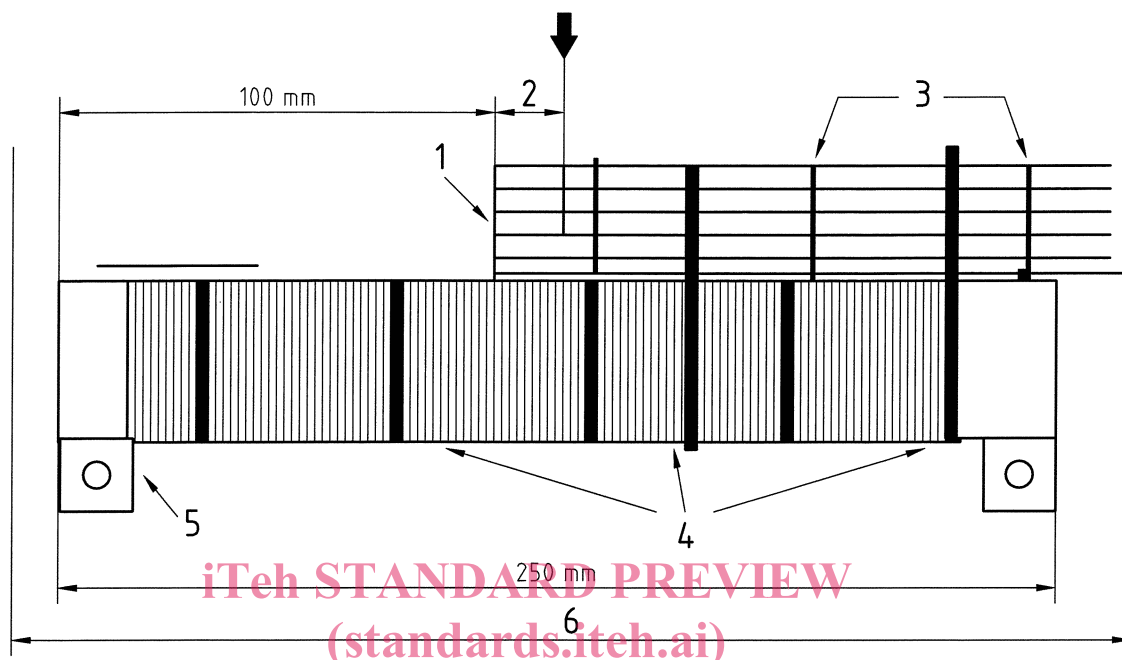
- 1 Glass lacing ties
- 2 Drop needle
- 3 Drops
- 4 10 mm to 20 mm
- 5 Ends of the 7 cables in the same plane

Figure 2 — Configuration of bundle A



### 4.3 Test configuration

The bundle A shall be attached on bundle P by qualified tyraps, according to the following Figures 3 and 4. For protective materials with a join or overlap the bundle A shall be so positioned that the energy from any arc is applied to the minimum material thickness part of the protective material



#### Key

- |   |  |   |   |
|---|--|---|---|
| 1 | Ends of the 7 cables in the same plane | 6 | Length and end of bundle sample to be define with mechanical test setup |
| 2 | 10 mm to 20 mm                         | 7 | Drops   |
| 3 | Cable ties                             | 8 | Bundle P  |
| 4 | Tyraps                                 | 9 | Bundle A  |
| 5 | Two attachment points                  |   |   |

Figure 3 — Test bundles configuration