



# SLOVENSKI STANDARD

## SIST EN 3475-411:2015

01-februar-2015

Nadomešča:

SIST EN 3475-411:2006

---

**Aeronavtika - Električni kabli za uporabo v zračnih plovilih - Preskusne metode - 411. del: Odpornost proti tekočinam**

Aerospace series - Cables, electrical, aircraft use - Test methods - Part 411: Resistance to fluids

Luft- und Raumfahrt - Elektrische Leitungen für Luftfahrtverwendung - Prüfverfahren - Teil 411: Beständigkeit gegen Flüssigkeiten

Série aérospatiale - Câbles électriques à usage aéronautique - Méthodes d'essais - Partie 411: Résistance aux fluides

<https://standards.iteh.ai/catalog/standards/sist/c632b709-26ee-4d28-9bee-18c1ab4fbb82/sist-en-3475-411-2015>

**Ta slovenski standard je istoveten z: EN 3475-411:2014**

---

**ICS:**

49.060

Letalska in vesoljska  
električna oprema in sistemi

Aerospace electric  
equipment and systems

**SIST EN 3475-411:2015**

**en,fr,de**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 3475-411:2015

<https://standards.iteh.ai/catalog/standards/sist/c632b709-26ee-4d28-9bee-18c1ab4fbb82/sist-en-3475-411-2015>

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 3475-411**

November 2014

ICS 49.060

Supersedes EN 3475-411:2005

English Version

**Aerospace series - Cables, electrical, aircraft use - Test methods  
- Part 411: Resistance to fluids**

Série aérospatiale - Câbles électriques à usage  
aéronautique - Méthodes d'essais - Partie 411: Résistance  
aux fluides

Luft- und Raumfahrt - Elektrische Leitungen für  
Luftfahrtverwendung - Prüfverfahren - Teil 411:  
Beständigkeit gegen Flüssigkeiten

This European Standard was approved by CEN on 11 October 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.

[SIST EN 3475-411:2015](https://standards.iteh.ai/catalog/standards/sist/c632b709-26ee-4d28-9bee-18c1ab4fbb82/sist-en-3475-411-2015)

<https://standards.iteh.ai/catalog/standards/sist/c632b709-26ee-4d28-9bee-18c1ab4fbb82/sist-en-3475-411-2015>



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

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

<b>Contents</b>		<b>Page</b>
Foreword.....		<b>3</b>
<b>1</b>	<b>Scope .....</b>	<b>3</b>
<b>2</b>	<b>Normative references .....</b>	<b>3</b>
<b>3</b>	<b>Test fluids .....</b>	<b>4</b>
<b>4</b>	<b>Procedures .....</b>	<b>4</b>
<b>5</b>	<b>Requirements .....</b>	<b>7</b>

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 3475-411:2015](#)

<https://standards.iteh.ai/catalog/standards/sist/c632b709-26ee-4d28-9bee-18c1ab4fbb82/sist-en-3475-411-2015>

## Foreword

This document (EN 3475-411:2014) 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 May 2015, and conflicting national standards shall be withdrawn at the latest by May 2015.

This document supersedes EN 3475-411:2005.

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, 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.

## 1 Scope

(standards.iteh.ai)

This European Standard specifies two methods of determining the fluid resistance of a finished cable.

Method 1: occasional contamination.

<https://standards.iteh.ai/catalog/standards/sist/c632b709-26ee-4d28-9bee-18c1ab4fbb82/sist-en-3475-411-2015>

Method 2: contamination test.

It shall be used together with EN 3475-100 and EN 3909.

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

EN 3475-201, *Aerospace series - Cables, electrical, aircraft use - Test methods - Part 201: Visual examination*

EN 3475-203, *Aerospace series - Cables, electrical, aircraft use - Test methods - Part 203: Dimensions*

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

EN 3475-405, *Aerospace series - Cables, electrical, aircraft use - Test methods - Part 405: Bending at ambient temperature*

EN 3475-503, *Aerospace series - Cables, electrical, aircraft use - Test methods - Part 503: Scrape abrasion*

EN 3909, *Aerospace series - Test fluids and test methods for electric components and sub-assemblies*

**EN 3475-411:2014 (E)**

ISO 1817, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

MIL-PRF-87937D, *Performance specification: cleaning compound, aerospace equipment* <sup>1)</sup>

ASTM D740, *Standard Specification for Methyl Ethyl Ketone* <sup>2)</sup>

AMS 1476B, *Aircraft toilet flush fluid* <sup>2)</sup>

**3 Test fluids**

Unless otherwise specified in the product standard, all fluids listed in EN 3909 are mandatory.

**4 Procedures****4.1 General**

**4.1.1** Unless specified in the product specification method 2 shall be used.

**4.1.2** For each fluid to be tested, take two clean specimens at least off 1m in length from a finished cable. Where large cables are being tested a single specimen may be divided into two after fluid exposure if the resulting pieces are of sufficient length to allow the post tests to be correctly carried out.

Strip approximately 25 mm of both ends of each specimen.

Measure the cable diameter EN 3475-203.

**4.2 Method 1: occasional contamination test**

**4.2.1** Mount the test samples in their normal operating configuration and maintain at room temperature or as specified in the product standard.

**4.2.2** Dip, brush or spray the test sample with the specified fluid which shall be maintained at the test temperature given in Table 1, or as specified in the product standard. Ensure that the entire surface of the sample is thoroughly wetted. Allow the sample to drain naturally for 5 min to 10 min; shaking or wiping is not permitted.

Transfer the test sample to a test chamber and maintain at the test temperature for the time specified in the product standard. If not specified, the parameters shall be  $(65 \pm 2) ^\circ\text{C}$  for  $\left(160 \begin{smallmatrix} +8 \\ 0 \end{smallmatrix}\right)$  h.

**4.2.3** At the end of the period allow the test sample to return to room temperature, and remain at room temperature for between 1 h and 2 h, before being subjected to final examination.

**4.2.4** Repeat this procedure, if specified by the product standard.

**4.3 Method 2: contamination test for aircraft applications (to be conducted unless otherwise specified in the product specifications)**

**4.3.1** For each fluid to be tested, take two clean specimens at least off 1 m in length from a finished cable. Where large cables are being tested a single specimen may be divided into two after fluid exposure if the resulting pieces are of sufficient length to allow the post tests to be correctly carried out.

<sup>1)</sup> Published by: DoD National (US) Mil. Department of Defense. <http://www.defenselink.mil/>

<sup>2)</sup> Published by: ASTM National (US) American Society for Testing and Materials. <http://www.astm.org/>

**4.3.2** Unless otherwise stated in the product standard, each specimen shall be wound seven complete turns onto a mandrel of diameter 12 times the maximum specified outer cable diameter without torsion, but with sufficient tension to ensure the specimen remains fully in contact with the mandrel.

Remove the mandrel (if necessary the specimen may be tied using lacing cord so as to retain the coils).

**4.3.3** Immerse the test two specimens fully in one of the specified test fluid with the ends 150 mm above the surface of the fluid which shall be maintained at the temperature specified in Table 1 for each of fluids listed in EN 3909 or the cable maximum rated temperature whichever is the lowest for  $(24 \pm 1)$  h.

**4.3.4** Remove the specimens from the fluid and transfer them to a chamber at  $(65 \pm 2)$  °C for  $\left(160 \begin{smallmatrix} +8 \\ -0 \end{smallmatrix}\right)$  h.

**4.3.5** At the end of the period allow the test sample to cool to room temperature, and remain at room temperature for between 1 h and 2 h, before being subjected to final examination.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 3475-411:2015](https://standards.iteh.ai/catalog/standards/sist/c632b709-26ee-4d28-9bee-18c1ab4fbb82/sist-en-3475-411-2015)

<https://standards.iteh.ai/catalog/standards/sist/c632b709-26ee-4d28-9bee-18c1ab4fbb82/sist-en-3475-411-2015>

Table 1

Fluid No.	Fluid type see EN 3909	Test fluid	Flash point	Test temperature	
1	Fuels	Gasoline	ISO 1817 Liquid B	4	40
		Kerosene	ISO 1817 Liquid F	40	70
2	Hydraulic fluid	Phosphate	ISO 1817 Liquid 103	160	70
		Silicone	NATO-S-1714	140	80
		Mineral	NATO-H-520 OM-18	80	80
3	Oils	Mineral	NATO-O-1176, OMD-90	200	125
		Mineral	NATO-O-142, OM-12	120	70
		Synthetic Diester	ISO 1817 Liquid 101	260	150
		Synthetic Polyol ester	NATO-160 OX-26	15	150
4	Cleaning fluids	Solvent	Isopropanol Propanol 25 %	12	50
		Solvent	White spirit 75 % v/v	–	25
		Solvent	Methylethylketone ASTM-D740	4	25
		Detergent	MIL-PRF-87937D Type IV	–	25
		Sullage	AMS 1476B 5 % solution in water v/v	–	25
5	De-icing	Runway	50 % Inhibited Potassium Acetate in Water v/v	–	25
		Ground	Ethylene Glycol 80 % + Water 20 % v/v	–	25
		Flight	NATO-S-745 AL-5	–	25
6	Fire Extinguishants	–	See Note	–	–
7	Cooling	–	ISO 1817 Liquid 103	177	25

NOTE Because of the nature of these products in their normal condition in service i.e. gaseous, it is impossible to perform Fluid immersion tests in a liquid state under standard Laboratory conditions. Therefore no testing will be performed; research into alternative fluids and or test methods is being undertaken at the time of writing of this standard. Due to restrictions applicable by local laws, fire extinguishants shall not be discharged in non-critical situations.