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Aerospace series - Test fluids and test methods for electric components and subassemblies

Luft- und Raumfahrt - Prüfflüssigkeiten und Prüfverfahren für elektrische Bauelemente und Untergruppen

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Série aérospatiale - Fluides d'essais et méthodes d'essais pour composants et sousensembles électriques

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Aerospace series - Test fluids and test methods for electric components and sub-assemblies

Série aérospatiale - Fluides d'essais et méthodes d'essais pour composants et sous-ensembles électriques Luft- und Raumfahrt - Prüfflüssigkeiten und Prüfverfahren für elektrische Bauelemente und Untergruppen

This European Standard was approved by CEN on 10 May 2006.

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

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Foreword

This document (EN 3909:2007) 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of an identical text or by endorsement, at the latest by June 2008, and conflicting national standards shall be withdrawn at the latest by June 2008.

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 ARD PREVIEW

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1 Scope

This standard specifies tests to demonstrate that components and sub-assemblies will not be adversely affected by contaminating fluids to which they may be exposed. The fluids listed are representative of those commonly used and encountered in airborne and ground operations, and align with the requirements of Section 11 - Fluids susceptibility of ISO 7137. Fluids not listed, and for which a test is required, should be included in the product standards.

These tests are not intended to demonstrate the suitability of components and sub-assemblies to perform in continuous contact with a fluid e.g. on an immersed fuel pump, nor are they tests to demonstrate immunity from electrolytic corrosion.

It shall be used together with TR 4542.

Normative references 2

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.

ISO 1817, Rubber, vulcanized — Determination of the effect of liquids.

ISO 7137, Aircraft — Environmental conditions and test procedures for airborne equipment.

ISO 11075, Aircraft — De-icing/anti-icing fluids — ISO type I.

ISO 11078, Aircraft — De-icing/anti-icing fluids - ISO types II, III and IV.

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AMS 1428, Fluid, aircraft deicing/anti-icing, non-newtonian (pseudoplastic), SAE types II, III, and IV.¹⁾

SIST EN 3909:2008 AMS 1476B, Deodorant, Aircraft Toilet. 1) standards.iteh.ai/catalog/standards/sist/c83875db-83dd-407b-acc5-6861f038a0bf/sist-en-3909-2008

MIL-PRF-680B, Degreasing solvent. 2)

MIL-PRF-6085D, Lubricating oil: Instrument, aircraft, low volatility. 2)

MIL-PRF-7808L, Lubricating oil, aircraft turbine engine, synthetic base (NATO code number O-148).²⁾

MIL-PRF-7870C, Lubricating oil: General purpose, low temperature.²⁾

MIL-PRF-23699F, Lubricating oil, aircraft turbine engine, synthetic base, NATO code number O-156.²⁾

MIL-PRF-87252C, Coolant fluid, hydrolytically stable, dielectric.²⁾

MIL-PRF-87937D, Cleaning compound, aerospace equipment.²⁾

QPL 5606-31, Hydraulic fluid, petroleum base, aircraft, missile and ordnance.²⁾

STANAG 3748, Hydraulic fluid, petroleum (H-515, H-520 and C-635) and polyalphaolefin (H-537, H-538 and H-544). 3)

TR 4542, Aerospace series — Guidance for fluids tests — Technical report. 4)

¹⁾ Published by: Society of Automotive Engineering (SAE), 400 Commonwealth Drive, Warrendale, PA 15096-0001, USA.

²⁾ Published by: Department of Defence (DOD), The Pentagon, Washington D.C. 20301, USA.

³⁾ Published by: NATO Military Agency for Standardization (MAS); B-1110 Brussels, Belgium.

In preparation at the date of publication of this standard. 4)

3 Test fluids

The product standard shall specify the required test fluids which shall, wherever possible, be selected from the list given in Table 1. Each fluid has been specified as being representative of a group of fluids. The product standard shall also specify any additional fluids not listed in Table 1 for which a test is required.

4 Test samples

- 4.1 The test sample shall be either:
- a component; or
- an assembly.

Where size or availability of an assembly shall not permit a full test, a specially selected representation of materials, finishes and components used in an assembly shall be used as a test sample.

The test samples for materials or finishes should have a minimum surface area, where possible, of 20 cm².

4.2 Unless otherwise indicated in the technical specification, the following details shall be specified in the product standard:

— the number and type of sample to be tested.

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5.1 Initial cleaning

Cleaning

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Unless otherwise specified in the product standard, the test sample shall be thoroughly cleaned to remove unrepresentative coatings i.e. preservatives, grease or contaminants.

When a separate sample is specified for each fluid, only initial cleaning applies.

5.2 Intermediate cleaning

If sequential testing is required, the product standard shall specify any necessary cleaning method.

When more than one fluid is to be applied to a test sample, the following should be considered:

- The need to assess the effect of individual fluids;
- The possibility of synergistic effects from applying successive fluids;
- If the order of exposure to fluids in service life is known, or if the exposure to fluids recognized as having synergistic effects is known and is possible in service life, then this order should be specified;
- Whether the test sample should be cleaned between or after the test.

NOTE Choice of cleaning fluid shall clearly not result in further contamination. Some of the specified fluids may be used as a cleaning fluid (e.g. aviation fuel, solvents, cleaning fluids) otherwise a fluid known to be used in normal cleaning procedures should be used.

5.3 Final cleaning

The product standard shall specify any necessary cleaning method prior to final examination.

6 Initial examination

6.1 The test sample shall be visually examined and its condition recorded.

6.2 The product standard shall specify any measurements or tests required.

7 Test methods

7.1 Two test methods are given in Clause 8 and Clause 9. The product standard shall specify the test or tests to be used and the order of application of the test fluids if sequential testing is required. For information on the selection of the appropriate method, see TR 4542.

7.2 The product standard shall specify whether the test sample is to be connected electrically or mechanically and, if it is required to operate before, during or after the procedure, the operating parameters shall also be defined.

NOTE This document may involve the use of hazardous substances and/or processes. All relevant healthy and safety procedures currently in force should be observed.

8 Method 1

8.1 Mount the test sample in its normal operating configuration and maintain at room temperature, or as specified in the product standard. Teh STANDARD PREVIEW

8.2 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.

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8.3 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 ± 2) °C for $(160 \frac{+8}{0})$ h.

8.4 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.

8.5 Repeat this procedure, if specified by the product standard.

9 Method 2

9.1 Immerse the test sample fully in the specified test fluid which shall be maintained at the temperature and for the time stated in the product standard. If the temperature and/or duration are not specified the temperature shall be as given in Table 1 and the duration shall be a minimum of (24 ± 1) h.

9.2 Transfer the test sample to a test chamber and maintain at the test temperature and for the time specified in the product standard. If not specified, the parameters shall be (65 ± 2) °C for $(160 \frac{+8}{0})$ h.

9.3 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.

NOTE This procedure is not intended to demonstrate the operation of equipment which is normally immersed in a fluid.

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Table 1 — List of fluids

Fluids family	Test fluid No	Туре	Fluids to be used for the test		Test	Flash-point	Observations or corresponding symbols	
			Base	Alternative	°C ± 2 °C	°C	Ref.	Standard
Fuels	1	Gasoline Toluene 30 % Isooctane 70 % v/v	ISO 1817 Liquid B	_	40	4	_	AVGAS
	2	Kerosene	ISO 1817 Liquid F	_	70	40	a F44 F34 F35 F40	AVCAT/FS11 AVTUR/FS11 AVTUR AVTAG
Hydraulic fluid	3	Phosphate base	ISO 1817 Liquid 103	_	70	160	Synthetic fluid H 580 NSA 307110 Type IV	SYDROL 500B4 SKYDROL 5 MOBIL EXXON
	4	Silicone base	NATO-S-1714	_	80	140	NATO-S-1714	ZX-42
	5	Mineral base	Stanag 3748 (NATO-H-520) (QPL 5606-31)	_	80	80	NATO-H-515	OM-15
Oils	6	Mineral base	EIO-0-1176	-	125	200	NATO-O-1176	OMD-90
	7	Mineral base	NATO-0-142 (MILPRF-7870C)	_	70	120	NATO-O-142	OM-12
	8	Synthetic oil DIESTER	22008 Liquid 401	_	150	260	NATO-O-147 (MIL-PRF-6085D) NATO-O-149	OX-14 OX-38
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