SLOVENSKI STANDARD
SIST EN 4054:2005

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Aerospace series - Pipe couplings, loose flanges and seals - Seals in fluorocarbon rubber and armature in aluminium alloy - Technical specification

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Luft- und Raumfahrt - Rohrverbindungen mit losen Flanschen und Flachdichtungen - Dichtungen aus Fluorcarbon-Elastomer mit Aluminiumarmierung - Technische Lieferbedingungen

Série aérospatiale - Raccords, brides amovibles et joints - Joints en élastomere fluorocarbone et armature en alliage d'aluminium - Spécification technique

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This European Standard was approved by CEN on 11 September 2003.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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Foreword

This document (EN 4054:2004) has been prepared by the European Association of Aerospace Manufacturers - Standardization (AECMA-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 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of an identical text or by endorsement, at the latest by May 2005, and conflicting national standards shall be withdrawn at the latest by May 2005.

This document supersedes EN 4054:2003.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This standard specifies the characteristics, qualification and acceptance requirements for seals for flanged pipe couplings in fluorocarbon rubber with an armature in aluminium alloy, for aerospace applications.

It is applicable whenever referenced.

2 Normative references

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 2859-1, *Sampling procedures and tables for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

EN 2751, *Aerospace series – Storage conditions for rubber products – Requirements for storage, cleaning and maintenance* [1)]

EN 2798, *Aerospace series – Fluorocarbon rubber (FPM) – Low compression set – Hardness 80 IRHD* [2)]

EN 3376, *Aerospace series – Limits of surface imperfections of elastomeric toroidal sealing rings (o-rings)* [2)]

EN 9133, *Aerospace series – Quality management systems – Qualification Procedure for Aerospace Standard Parts* [2)]

3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply.

3.1
production batch
quantity of finished seals manufactured from the same batch of compound moulded onto the armature. The product standard of the material defining the armature shall be the same for the compound batch.

3.2
compound
a homogeneous mixture of polymers or polymers with all ingredients required for the finished product

1) In preparation at the date of publication of this standard
2) Published as AECMA Prestandard at the date of publication of this standard

3.3 Surface discontinuites

3.3.1
crack
rupture in the material which may extend in any direction and which may be intercrystalline or transcrystalline in character

3.3.2
seam
open surface defect

3.4
simple random sampling
the taking of *n* items from a population of *N* items in such a way that all possible combinations of *n* items have the same probability of being chosen

3.5
sampling plan
a plan according to which one or more samples are taken in order to obtain information and possibly to reach a decision

3.6
limiting quality (LQ_{10})
in a sampling plan, the quality limit which corresponds to a specified 10 % probability of acceptance

3.7
acceptance quality limit (AQL)
a quality limit which in a sampling plan corresponds to a specified but relatively high probability of acceptance

It is the maximum per cent defective (or the maximum number of defects per hundred units) that, for purposes of sampling inspection can be considered satisfactory as a process average.

3.8
definition document
document specifying all the requirements for finished parts

4 Quality assurance

4.1 Qualification

EN 9133

Qualification, inspections and tests shall be carried out on five seals of each size, except for opposed indication specified in Table 1.

The test programme may possibly be reduced. Any such decision shall be based on the results obtained on similar types of seals provided that the design and manufacturing conditions are identical.

4.2 Acceptance

4.2.1 Purpose

The purpose of acceptance inspections and tests is to check, as simply as possible, by a method representative of actual use conditions, that the seals constituting the production batch satisfy the requirements of this standard.

4.2.2 Conditions

Acceptance inspections and tests are specified in Table 1. They shall be carried out on each production batch. Table 1 specifies the test method and the sampling plan applicable to each test. Seals from the production batch to be tested shall be selected by simple random sampling.

Each seal may be submitted to several tests.

The seals to be subjected to destructive tests may be those on which non-destructive tests have been carried out.

4.2.3 Responsibility

Acceptance inspections and tests shall be carried out by the manufacturer, or under his responsibility.

4.2.4 Inspection and test report

The manufacturer must ensure conformity of products according to the results obtained in relation to the requirements and carry out an inspections and test report giving the observed values. This report shall be provided to the purchaser.

5 Requirements

See Table 1.

Table 1 — Technical requirements and test methods

Clause	Characteristic	Requirement	Inspection and test method	Q/A [a]	Sample size
5.1	**Materials** (armature and rubber parts)	In accordance with the product standard or definition document	As stated in the material specification	Q	
				A	
5.2	**Dimensions and tolerances**	In accordance with the product standard or definition document	Standard gauging at a temperature of (20 ± 5) °C	Q	See 4.1.
				A	Table 2
5.3	**Surface condition**				
5.3.1	**Armature**	The armature shall be exempt of surface defects as: burrs, deep seams, cracks or other imperfections detrimental to good functioning. Special attention shall be made (before rubber moulding) to the area in contact with the rubber to obtain perfect rubber adhesion during moulding.	Visual inspection Examination at a maximum magnification of × 6	Q	See 4.1.
				A	100 %
5.3.2	**Rubber parts**	In accordance with the inspection document	EN 3376	Q	See 4.1.
				A	100 %
5.3.3	**Finished product**	Moulding of the rubber part on the metallic part without any detrimental defect to good functioning	Cut out the item along a diametral plan and verify that the fastening of the rubber part on the metallic part is satisfactory.	Q	One sample of each diameter
5.4	**Assembly**	Seating strength required to achieve a metal / metal contact	Record the seating strength required to achieve a metal / metal contact. The torque to be applied to achieve a metal / metal contact shall be compatible with a bolt and a standard seating torque for the seal assembly in the use condition.	Q	One sample of each diameter
				A	Table 3
5.5	**Performance**	Resistance to ageing and pressurizing	See annex A (normative).	Q	One sample of each diameter
		Swelling by oil and fuel	See annex B (normative).	Q	One sample of each diameter
5.6	**Packaging**	See clause 6.	Visual inspection	A	100 %
5.7	**Marking**	See clause 7.	Visual inspection	A	100 %
5.8	**Storage**	See clause 8.	Means adapted to the requirement		

[a] Q: Qualification, A: Acceptance