SIST

SLOVENSKI STANDARD
SIST EN 6111:2020

01-december-2020

Aeronavtika - Etilen-propilen elastomer (EPM/EPDM) - Trdota 80 IRHD za statične tesnilne elemente v hidravličnih sistemih za dolgotrajno uporabo - Standardi za materiale

Aerospace series - Ethylene-propylene elastomer (EPM/EPDM) - Hardness 80 IRHD for static seal elements in hydraulic systems for long-term application - Material standard

Luft- und Raumfahrt - Ethylen-Propylen-Elastomer (EPM/EPDM) - Härte 80 IRHD für statische Dichtungen in Hydraulik-Systemen für Langzeitanwendung - Werkstoffnorm

Série aérospatiale - Élastomère éthylène propylène (EPM/EPDM) - Dureté 80 IRDH pour joints statiques en systèmes hydrauliques pour application à long terme - Norme de matériau

Ta slovenski standard je istoveten z: **EN 6111:2020**

ICS:

49.025.40	Guma in polimerni materiali	Rubber and plastics
49.080	Letalski in vesoljski hidravlični sistemi in deli	Aerospace fluid systems and components

SIST EN 6111:2020 **en,fr,de**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 6111

September 2020

ICS 49.025.40; 49.080

English Version

Aerospace series - Ethylene-propylene elastomer (EPM/EPDM) - Hardness 80 IRHD for static seal elements in hydraulic systems for long-term application - Material standard

Série aérospatiale - Élastomère éthylène propylène (EPM/EPDM) - Dureté 80 DIDC pour joints statiques dans les systèmes hydrauliques pour application à long terme - Norme de matériau

Luft- und Raumfahrt - Ethylen-Propylen-Elastomer (EPM/EPDM) - Härte 80 IRHD für statische Dichtungen in Hydraulik-Systemen für Langzeitanwendung - Werkstoffnorm

This European Standard was approved by CEN on 22 December 2019.

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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-CENELEC 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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 6111:2020) 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 March 2021, and conflicting national standards shall be withdrawn at the latest by March 2021.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This document defines the requirements of ethylene-propylene elastomer (EPM/EPDM) for seal elements for use as static seals in hydraulic systems using phosphate ester fluids, hardness 80 IRHD (International Rubber Hardness Degree) for long-term application for aerospace application.

Unless otherwise specified in the drawing, order or inspection schedule, this document shall be used in conjunction with the referenced documents.

Applicable temperature range:

— continuous service: −55 °C to 107 °C;

— intermittent service: −55 °C to 120 °C.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 6075, *Aerospace series — Static seal elements O-Ring ethylene-propylene, moulded, phosphate ester resistant (−55 °C to 107 °C) — Inch series*

EN 6076, *Aerospace series — Static seal elements O-Ring straight thread tube fitting boss, ethylene-propylene, moulded, phosphate ester resistant (−55 °C to 107 °C) — Inch series*

EN 6109:2018, *Aerospace series — Static seal elements elastomer, moulded, phosphate ester resistant — Technical specification*

ISO 48-2, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 2: Hardness between 10 IRHD and 100 IRHD*

ISO 188, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

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

ISO 2781, *Rubber, vulcanized or thermoplastic — Determination of density*

ASTM D 1414, *Standard Test Methods for Rubber O-Rings*[1]

ASTM D 3677, *Standard Test Methods for Rubber — Identification by Infrared Spectrophotometry*[1]

ASTM E 1131, *Standard Test Method for Compositional Analysis by Thermogravimetry*[1]

1 Published by: American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, USA.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Requirements

4.1 General

Specification values refer to the arithmetic mean of the corresponding test and, unless otherwise stated, are minimal.

4.2 Specific

4.2.1 Physical and mechanical requirements

In accordance with Table 1.

For the qualification, all tests shall be carried out.

4.2.2 Test specimens

For the minimum number of test specimens, see EN 6109:2018, Table 1 and Table 2.

Test specimens for qualification shall be O-Rings according to EN 6075 or EN 6076.

Unless otherwise specified in EN 6109:2018, Table 1, the cross section of the test specimen shall be between 2,62 mm and 3,53 mm (0.103 inch to 0.139 inch) with an optional diameter.

For acceptance testing of O-Rings and other seal elements the original parts shall be tested.

4.2.3 Hazardous constituents

The relevant local health and safety/environmental protection laws shall be fulfilled.

5 Designation

EXAMPLE

Description block	Identity block
ELASTOMER	EN6111

Number of this standard → EN6111

NOTE If necessary, the code 19005 shall be placed between the description block and the identity block.

6 Technical specification

The general technical requirements and responsibilities corresponding to this material standard are described in the technical specification EN 6109.

Table 1 — Requirements

Line No.	Properties		Test methods	Units	Requirements
1	**Properties in as-delivered condition**				
2	Density		ISO 2781	g/cm^3	[a]
3	Hardness IRHD		ISO 48-2 M	IRHD	80^{+5}_{-4}
4	Tensile strength		ASTM D 1414	MPa	9,7
5	Elongation at break		ASTM D 1414	%	125
6	Stress value (σ_{100})		ASTM D 1414	MPa	5,5
7	Resistance to low temperature	TR 10	ASTM D 1414	°C	−46
8	Resistance to low temperature	TR 70	ASTM D 1414	°C	−28
9	Compression set after 22 h at 120 °C		ASTM D 1414	%	30 max.
10	Infra-red spectroscopic analysis (IR)		ASTM D 3677	—	[b,c]
11	Compositional analysis by thermogravimetry (TGA)		ASTM E 1131	—	[b,d]
12	**Properties after immersion according to ISO 1817 in phosphate ester test fluids as required in EN 6109**				
13	Hardness IRHD[i]	107 °C/334 h	ISO 48-2 M	—	−20 max.
14	Hardness IRHD[i]	107 °C/670 h	ISO 48-2 M	—	−20 max.[b]
15	Hardness IRHD[i]	107 °C/1 000 h	ISO 48-2 M	—	−20 max.[e]
16	Hardness IRHD[i]	107 °C/1 440 h	ISO 48-2 M	—	−20 max.[f]
17	Hardness IRHD[i]	107 °C/1 880 h	ISO 48-2 M	—	−20 max.[f]
18	Hardness IRHD[i]	120 °C/72 h	ISO 48-2 M	—	−20 max.
19	Volume[i]	107 °C/334 h	ISO 1817	%	$^{+20}_{0}$ max.[k]
20	Volume[i]	107 °C/670 h	ISO 1817	%	$^{+20}_{0}$ max.[k]
21	Volume[i]	107 °C/1 000 h	ISO 1817	%	$^{+20}_{0}$ max.[g,k]
22	Volume[i]	107 °C/1 440 h	ISO 1817	%	$^{+20}_{0}$ max.[h,k]
23	Volume[i]	107 °C/1 880 h	ISO 1817	%	$^{+20}_{0}$ max.[h,k]
24	Volume[i]	120 °C/72 h	ISO 1817	%	$^{+20}_{0}$ max.[k]