BS ISO 6072:2011

BSI Standards Publication

Rubber — Compatibility between hydraulic fluids and standard elastomeric materials

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National foreword

This British Standard is the UK implementation of ISO 6072:2011. It supersedes BS ISO 6072:2002, which is withdrawn.

The UK committee would like to highlight that Annex C 'Guidelines on elastomer compatibility' in BS ISO 6072:2002 has been removed in BS ISO 6072:2011. They considered that this annex provides useful guidance and have retained it as National Annex NA (informative).

The UK participation in its preparation was entrusted to Technical Committee PRI/54, Vulcanised rubber compounds.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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INTERNATIONAL STANDARD

ISO 6072

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Rubber — Compatibility between hydraulic fluids and standard elastomeric materials

Caoutchouc — Compatibilité des fluides hydrauliques avec les matériaux élastomères de référence

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Full document details: BS ISO 6072:2011

Contents

Page

Foreword ... iv

Introduction ... v

1 Scope ... 1

2 Normative references ... 1

3 Terms and definitions ... 2

4 Test elastomers ... 2
4.1 General ... 2
4.2 Standard acrylonitrile-butadiene rubber with 28 % acrylonitrile content (NBR 1) ... 2
4.3 Standard acrylonitrile-butadiene rubber with 34 % acrylonitrile content (NBR 2) ... 4
4.4 Standard fluorocarbon rubber (FKM 2) ... 5
4.5 Standard peroxide-vulcanized ethylene propylene diene rubber (EPDM 1) ... 7
4.6 Standard hydrogenated acrylonitrile-butadiene rubber with 35 % acrylonitrile content (HNBR 1) ... 8

5 Designation system for the elastomer compatibility index (ECI) ... 10

6 Determination of the ECI ... 10
6.1 Test conditions ... 10
6.2 Determination of change in volume, change in hardness and change in tensile strength and elongation at break ... 12

7 Test report ... 12

8 Identification statement (reference to this International Standard) ... 13

Annex A (informative) **Further information on hydraulic fluids and the types of elastomer used with them** ... 14

Annex B (informative) **Example of test report — Fluid-elastomer compatibility index (ECI)** ... 16

Annex C (informative) **Rapid method for indicating, by measuring the volume change index (VCI), the change in volume of commercial rubbers when treated with mineral-based oils** ... 17

Bibliography ... 19

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 6072 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 4, *Products (other than hoses)*.

This third edition cancels and replaces the second edition (ISO 6072:2002), which has been technically revised.

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Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit. Elastomers are used as seals in fluid power systems. Elastomeric materials are any substances having the ability to return to their original size and shape after deformation. Hydraulic fluids are water, oil or other fluids which are forced through an orifice or round a closed circuit. Elastomeric materials and hydraulic fluids are defined as compatible if they are not significantly altered by chemical reaction or physical swelling.

From the changes in volume, hardness, tensile strength and elongation at break, which standard test specimens of a test elastomer undergo when immersed in a certain fluid under specified test conditions (see Table 11), an elastomer compatibility index (ECI) can be established for this fluid and can be expressed in the format given in Clause 5. The ECI (which should be quoted by oil suppliers) allows selection of suitable combinations of fluids and elastomeric materials without prolonged testing and might provide enough information to eliminate totally unsuitable elastomer/fluid combinations without having to resort to extensive screening tests.

Representative standard compositions of various types of elastomer permit evaluation of the effect of hydraulic fluids on such compositions and comparison with commercial elastomeric materials for actual service. They could also assist producers of additives and hydraulic fluids in the development of hydraulic fluids compatible with different elastomer types.

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INTERNATIONAL STANDARD ISO 6072:2011(E)

Rubber — Compatibility between hydraulic fluids and standard elastomeric materials

1 Scope

This International Standard specifies test methods for evaluating the effect of hydraulic fluids on standard elastomeric materials that have been manufactured in accordance with specified processes. It allows baseline comparisons of fluids with standard elastomers.

This International Standard provides formulations, mixing procedures and vulcanization procedures for five types of elastomeric composition:

a) acrylonitrile-butadiene rubbers (NBR 1 and NBR 2);

b) fluorocarbon rubber (FKM 2);

c) ethylene propylene diene rubber (EPDM 1);

d) hydrogenated acrylonitrile-butadiene rubber (HNBR 1).

These procedures evaluate the effect of mineral-based, fire-resistant and biodegradable hydraulic fluids on such compositions by measurement, under controlled conditions, of physical properties of standard test pieces of the elastomer before and after immersion in the fluids.

This International Standard does not provide formulations of elastomeric materials for actual service, although service elastomers may be tested using these compatibility procedures if required.

NOTE The elastomeric materials used in these formulations are sensitive to fluid variations and have comparatively high swelling characteristics. Stable cure systems can be used to give adequate storage life.

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 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 48, *Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 815-1, *Rubber, vulcanized or thermoplastic — Determination of compression set — Part 1: At ambient or elevated temperatures*

ISO 1629, *Rubber and latices — Nomenclature*

ISO 1817:2011, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 2393, *Rubber test mixes — Preparation, mixing and vulcanization — Equipment and procedures*

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

ISO 5598, *Fluid power systems and components — Vocabulary*

ISO 6743-4, *Lubricants, industrial oils and related products (class L) — Classification — Part 4: Family H (Hydraulic systems)*

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