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Composition cork — Gasket material — Classification system, requirements, sampling, packaging and marking

Aggloméré composé de liège — Matériau pour joints pour industries mécaniques — Système de classification, exigences, échantillonnage, emballage et marquage

Reference number
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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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 4709 was prepared by Technical Committee ISO/TC 87, *Cork*.

This second edition cancels and replaces the first edition (ISO 4709:1985), which has been technically revised.

Annex A of this International Standard is for information only.

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Composition cork — Gasket material — Classification system, requirements, sampling, packaging and marking

1 Scope

This International Standard gives a classification system for composition cork intended to be used as gaskets in the mechanical industry. It provides a means for specifying or describing the relevant properties.

Since not all properties that contribute to gasket performance are included, the use of this system is limited to the selection of materials in accordance with specified requirements.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 633, *Cork — Vocabulary*.

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*.

ISO 4708, *Composition cork — Gasket material — Test methods*.

ISO 7322, *Composition cork — Test methods*.

ISO 9392, *Agglomerated cork discs — Sealing behaviour*.

3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 633 apply.

4 Basis of classification

4.1 General

4.1.1 The classification system outlined in this International Standard is intended to encourage uniformity in reporting properties, to provide a common language between suppliers and consumers, and to guide designers and engineers in stipulating specifications based on common test methods for commercially available materials.

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4.1.2 This classification system is versatile enough to also cover new materials and test methods as they are introduced. It is based on the principle that non-metallic gasket materials should be described, as far as possible, in terms of specific physical and mechanical properties and that an infinite number of such descriptions can be formulated by using one or more statements, based on tests.

4.1.3 Users of gasket materials may, by selecting different combinations of different statements, specify different combinations of desired properties. Suppliers may, likewise, report properties available in their respective products.

4.2 Significance of the system

4.2.1 This classification system establishes letter or number symbols or both ("line call-out") for various performance levels of each property or characteristic (see clause 5).

4.2.2 Various levels of specification or description may be established by increasing or decreasing the number of letter-numeral symbols used in the "line call-out".

4.2.3 The specification or description of gasket materials, in this system, shall include a reference to this International Standard followed by six numerals, e.g. ISO 4709 (220340).

4.2.4 Each numeral represents one characteristic (see clause 5).

4.2.5 The numeral "0" is used when the description of any characteristic is not desired.

4.2.6 The numeral "9" is used when the description of any characteristic is specified by some supplement to this classification system, such as engineering drawings.

4.2.7 To specify or describe gasket materials further, each "line call-out" may include one or more suffix letter-numeral symbols (see Table 1).

5 Description of the system

5.1 Basic characteristics

5.1.1 The *first numeral* in the "line call-out" is related to the *type* of raw material that is the base of the gasket material; for cork products the number 2 shall be used.

5.1.2 When the first numeral is 2, the *second numeral* in the "line call-out" may assume the following figures (related to the *type* of agglomerate):

0 not specified

1 composition cork

2 cork and elastomeric

3 cork and cellular rubber

9 as specified

5.1.3 The *third numeral* is related to the *compressibility characteristics* of the agglomerated cork, expressed as a percentage and determined in accordance with ISO 4708:

0 not specified

1 from 0 % to 10 %

2 from 5 % to 7 %

3 from 10 % to 20 %

4 from 15 % to 25 %

5 from 20 % to 30 %

6 from 25 % to 40 %

7 from 30 % to 50 %

8 from 40 % to 60 %

9 as specified

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5.1.4 The *fourth numeral* is related to the *thickness increase* of the agglomerated cork, after immersion in ASTM Oil No. 3, expressed as a percentage and determined in accordance with ISO 4708:

0	not specified	5	from 20 % to 40 %
1	from 0 % to 15 %	6	from 30 % to 50 %
2	from 5 % to 20 %	7	from 40 % to 60 %
3	from 10 % to 25 %	8	from 50 % to 70 %
4	from 15 % to 30 %	9	as specified

5.1.5 The *fifth numeral* is related to the *mass increase* of the agglomerated cork, after immersion in ASTM Oil No. 3, expressed as a percentage and determined in accordance with ISO 4708:

0	not specified	5	maximum 40 %
1	maximum 10 %	6	maximum 60 %
2	maximum 15 %	7	maximum 80 %
3	maximum 20 %	8	maximum 100 %
4	maximum 30 %	9	as specified

5.1.6 The *sixth numeral* is related to the *mass increase* of the agglomerated cork, after immersion in water, expressed as a percentage and determined in accordance with ISO 4708:

0	not specified	5	maximum 40 %
1	maximum 10 %	6	maximum 60 %
2	maximum 15 %	7	maximum 80 %
3	maximum 20 %	8	maximum 100 %
4	maximum 30 %	9	as specified

5.2 Supplementary characteristics

The characteristics given in Table 1 are found to be important for some specific purposes (see 4.2.7).

6 Requirements

6.1 Basic requirements

The characteristics of gasket materials identified by this classification shall be indicated by the first six numerals of the "line call-out", within the limits shown in 5.1.1 to 5.1.6, and by additional letter-numeral symbols as shown in Table 1.

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Table 1 — Supplementary characteristics

Symbol	Characteristic	Test method	Requirement
A9	Sealing behaviour	ISO 9392	A9 ⩾ as specified
E0 to E9	Thickness increase (%)	ISO 470 and ISO 7322	E0 not specified E1 0 % to 5 % E2 0 % to 10 % E3 0 % to 15 % E4 5 % to 20 % E5 10 % to 25 % E6 15 % to 35 % E7 25 % to 45 % E8 30 % to 60 % E9 as specified
T1 to T9	Tensile strength (kPa)	ISO 4708 and ISO 7322	M1 ⩾ 0,670 MPa M2 ⩾ 1,7 MPa M3 ⩾ 3,4 MPa M4 ⩾ 6,8 MPa M5 ⩾ 10,3 MPa M6 ⩾ 13,8 MPa M7 ⩾ 20,7 MPa M8 ⩾ 27,6 MPa M9 as specified
D	Binder durability	ISO 4708	Shall not disaggregate[a]
F	Flexibility	ISO 4708	Shall be flexible[b]

[a] A test specimen is said to "disaggregate" if it splits open and/or if it shows substantial loss of particles during the test.

[b] A test specimen is said to be flexible if it does not show any crack, break or surface separation after testing.

6.2 Thickness requirements

Gasket materials identified by this classification shall conform to the thickness tolerances specified in Table 2.

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Table 2 — Thickness and tolerances allowed

Type	Thickness mm	Tolerances
Composition cork	from 1,5 to 6	± 0,10 % or ± 0,25 mm (whichever is the greatest)
Cork and elastomeric	< 1,5	± 0,25 mm
	⩾ 1,5	± 0,40 mm
Cork and cellular rubber	⩾ 1,5	± 0,40 mm

7 Sampling

Test specimens shall be selected from sheets of suitable size. They shall be cut squarely. The grain direction shall be noted by an arrow, whenever possible. See ISO 2859-1 for sampling schemes.

8 Packaging

Composition cork shall be kept in moisture-resistant packages or pallets which ensure transportation without damaging the products until arrival at their destination.

9 Marking

Packages shall show the following information:

a) reference to this International Standard, i.e. ISO 4709;

b) product designation in accordance with 4.2;

c) manufacturer identification, even if coded;

d) source.

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Annex A
(informative)

Applicable test methods

Table A.1 indicates the properties, characteristics and test methods that are normally considered applicable to cork gasket materials.

It is not intended to limit the use of the numeral-symbols as provided in this classification system where experience indicates that the related properties, characteristics or test methods or all of these are applicable.

Table A.1 — Types of materials and applicable test methods

Properties, characteristics and methods	Product: Composition cork		
	Type 1 [a]	Type 2 [b]	Type 3 [c]
Compressibility			
Total pressure 700 kPa (∅ of the indentor: 28,7 mm)	X		X
Total pressure 2 750 kPa (∅ of the indentor: 12,8 mm)		X	
Resistance to ASTM Oil No. 3			
Volume increase		X	X
Resistance to ASTM Oil No. 1			
Volume increase, 70 h at 100 °C		X	X
Resistance to ASTM Fuel A			
Volume increase, 22 h at 20 °C to 30 °C		X	X
Resistance to boiling water	X		
Sealing	X	X	X
Flexibility	X	X	X

[a] Composition cork.
[b] Cork and elastomeric.
[c] Cork and cellular rubber.

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