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## Rubber, vulcanized and thermoplastic — Preformed gaskets used in buildings — Classification, specifications and test methods

*Caoutchouc vulcanisé et thermoplastique — Profils d'étanchéité  
utilisés dans le bâtiment — Classification, spécifications et méthodes  
d'essai*

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 4, *Products (other than hoses)*. [ISO/FDIS 3934](https://standards.iteh.ai/catalog/standards/sist/2059ed24-3480-442d-b4d3-880c311f0101/iso-3934)

This third edition cancels and replaces the second edition (ISO 3934:2002), which has been technically revised.

The main changes to the previous edition are as follows:

- requirements on estimation of lifetime have been added;
- hardness tolerance has increased
- references have been updated.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

Preformed gaskets used in buildings have conditions of use which differ depending on their function and position in the building. When preparing this document, it was felt necessary to take into account the various conditions to which the gaskets are subjected in order to define the material specifications. The tests take into account the static and dynamic stresses to which the gaskets are subjected.

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# Rubber, vulcanized and thermoplastic — Preformed gaskets used in buildings — Classification, specifications and test methods

**WARNING** — Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this document to establish appropriate safety and health practices and to determine the applicability of any national regulatory conditions.

## 1 Scope

This document specifies a system of classification of materials used in preformed gaskets for buildings. It applies to the following products:

- a) gaskets for use round the inside of door or window casings, i.e. weatherstripping (dynamic gaskets);
- b) gaskets for glazing (static gaskets);
- c) gaskets for use round infilling;
- d) gaskets for use between facade parts;
- e) gaskets for use between masonry walls.

In addition to specifying the characteristics required for the constituent materials, some functional tests on the gaskets themselves are specified. The corresponding test procedures are given in [Annexes A to E](#).

This document applies to preformed gaskets made from vulcanized or thermoplastic rubber. It also applies to preformed gaskets made of cellular rubber designed for use at temperatures between  $-20\text{ °C}$  and  $+55\text{ °C}$  (thermal conditions category  $P_1$ ) and between  $-40\text{ °C}$  and  $+70\text{ °C}$  (thermal conditions category  $P_3$ ) (see [Clause 4](#)).

## 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.

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

ISO 48-4, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 4: Indentation hardness by durometer method (Shore hardness)*

ISO 105-A02, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour*

ISO 188:2011, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 812, *Rubber, vulcanized or thermoplastic — Determination of low-temperature brittleness*

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

ISO 815-2, *Rubber, vulcanized or thermoplastic — Determination of compression set — Part 2: At low temperatures*

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ISO 1431-1, *Rubber, vulcanized or thermoplastic — Resistance to ozone cracking — Part 1: Static and dynamic strain testing*

ISO 2285:2019, *Rubber, vulcanized or thermoplastic — Determination of tension set under constant elongation, and of tension set, elongation and creep under constant tensile load*

ISO 3384-1:2019, *Rubber, vulcanized or thermoplastic — Determination of stress relaxation in compression — Part 1: Testing at constant temperature*

ISO 4892-2, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps*

ISO 11346, *Rubber, vulcanized or thermoplastic — Estimation of life-time and maximum temperature of use*

### 3 Terms and definitions

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

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

#### 3.1

##### **compression force**

force needed to compress a test piece through its working range to its *minimum width* (3.3)

#### 3.2

##### **compression recovery**

ability of a gasket to recover its shape after being compressed through its working range

#### 3.3

##### **minimum width**

lower limit of the *working compression range* (3.7)

Note 1 to entry: For a glazing gasket, the minimum width is the sum of the gaps between the glass and the frame on each side of the glass. For weatherstripping, it is the gap between the door or window and the casing, measured at the hinge side.

Note 2 to entry: It is recommended that the minimum width of weatherstripping and the minimum clearance between glazing and frame for a glazing gasket be agreed by consultation between designer, manufacturer and user

#### 3.4

##### **sample**

complete batch of test material (gaskets) as supplied by the manufacturer for test purposes and from which test pieces are cut

#### 3.5

##### **stress relaxation**

time-dependent decrease in stress at a constant deformation

#### 3.6

##### **weathering resistance**

resistance to combined detrimental influences of the outdoor environment (e.g. sunlight, ozone, oxygen, humidity, temperature) on a material



**3.7****working compression range**

range, stated by the manufacturer, through which the gasket performs its function of being compressed or otherwise deformed when used in any particular product

Note 1 to entry: See [Annex A](#).

EXAMPLE For a gasket of *free height* ([3.8](#)) 7,5 mm, the manufacturer states a working range of 3 mm to 6 mm.

**3.8****free height**

height of a gasket measured without causing any significant deformation

Note 1 to entry: See [Figure 1](#).

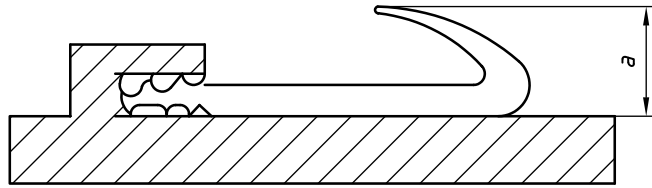


Figure 1 — Example of measurement of free height

**4 Environmental conditions**

The conditions to which gaskets may be subjected in the working environment are divided into the following categories:

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- a) Thermal conditions (depending on the climate and the position in the construction)
    - P<sub>1</sub>: temperature of preformed gasket -20 °C to +55 °C
    - P<sub>2</sub>: temperature of preformed gasket -20 °C to +85 °C
    - P<sub>3</sub>: temperature of preformed gasket -40 °C to +70 °C
    - P<sub>4</sub>: temperature of preformed gasket -40 °C to +100 °C
  - b) Mechanical conditions
    - X: static uses (see [Table 1](#)), i.e. between fixed elements
    - Y: dynamic uses (see [Table 1](#)), i.e. between moving elements
  - c) Weathering
    - R<sub>1</sub>: protected from solar radiation
    - R<sub>2</sub>: exposed to solar radiation

**5 Classification and specification****5.1 Classification**

From the results of the tests carried out in accordance with this document, the classification of a particular type of gasket shall be determined using [Table 1](#). The numbers from [Table 1](#), taken in the order given, form the classification code for that gasket, viz:

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|

- A: type of gasket
- B: working compression range
- C: compression force
- D: working temperature range
- E: compression recovery
- F: stress relaxation
- G: weathering resistance

Figure 2 gives a typical example of a classification code.

### 5.2 Specifications

The characteristics for the different classification criteria shall meet the requirements specified in Tables 2 to 9.

### 6 Test pieces

Test pieces shall be prepared in accordance with the relevant standard test method or the relevant annex of this document and, whenever possible, shall be cut from the gasket to be tested.

Failing this, they shall be taken from extruded ribbon (2 mm thick, 30 mm in width) or from appropriately dimensioned test slabs prepared from the same batch of material used to produce the gaskets being assessed and obtained under conditions that have been shown by experience to give comparable results.

If measurements are made on test pieces not conforming to the standard referenced in Tables 2 to 9 (e.g. part of a gasket), the results can be different and the requirements to be met shall be subject to agreement between the interested parties.

Table 1 — Classification of gaskets

| Code-letter | Characteristic  | Class                           |                                       |                                       |                                       |  |                       |                       |                       |                         |         |
|-------------|---|---------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|--|-----------------------|-----------------------|-----------------------|-------------------------|---------|
|             |   | 0                               | 1                                     | 2                                     | 3                                     | 4                                      | 5                     | 6                     | 7                     | 8                       | 9       |
| A           | Type of gasket  | X: static use<br>Y: dynamic use |                                       |                                       |                                       |  |                       |                       |                       |                         |         |
| B           | Working compression range (mm)<br>Measured in accordance with Annex A |                                 | u 1                                   | > 1<br>but<br>u 2                     | > 2<br>but<br>u 4                     | > 4<br>but<br>u 6                      | > 6<br>but<br>u 8     | > 8<br>but<br>u 10    | > 10<br>but<br>u 15   | > 15<br>but<br>u 30     | > 30    |
| C           | Compression force (N/m)<br>Measured in accordance with Annex B        |                                 | u 10                                  | > 10<br>but<br>u 20                   | > 20<br>but<br>u 50                   | > 50<br>but<br>u 100                   | > 100<br>but<br>u 200 | > 200<br>but<br>u 500 | > 500<br>but<br>u 700 | > 700<br>but<br>u 1 000 | > 1 000 |
| D           | Working temperature range (°C)  |                                 | -20<br>to<br>+55<br>(P <sub>1</sub> ) | -20<br>to<br>+85<br>(P <sub>2</sub> ) | -40<br>to<br>+70<br>(P <sub>3</sub> ) | -40<br>to<br>+100<br>(P <sub>4</sub> ) |                       |                       |                       |                         |         |

Table 1 (continued)

| Code-letter | Characteristic  | Class |   |   |                     |                     |                     |                     |                     |                     |      |
|-------------|---|-------|---|---|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|------|
|             |   | 0     | 1   | 2   | 3                   | 4                   | 5                   | 6                   | 7                   | 8                   | 9    |
| E           | Compression recovery (%)<br>Measured in accordance with Annex C |       | u 20                                      | > 20<br>but<br>u 30                       | > 30<br>but<br>u 40 | > 40<br>but<br>u 50 | > 50<br>but<br>u 60 | > 60<br>but<br>u 70 | > 70<br>but<br>u 80 | > 80<br>but<br>u 90 | > 90 |
| F           | Stress relaxation (%)<br>Measured in accordance with Annex D    |       | u 20                                      | > 20<br>but<br>u 30                       | > 30<br>but<br>u 40 | > 40<br>but<br>u 50 | > 50<br>but<br>u 60 | > 60<br>but<br>u 70 | > 70<br>but<br>u 80 | > 80<br>but<br>u 90 | > 90 |
| G           | Weathering resistance   |       | R <sub>1</sub><br><a href="#">Table 8</a> | R <sub>2</sub><br><a href="#">Table 9</a> |                     |                     |                     |                     |                     |                     |      |

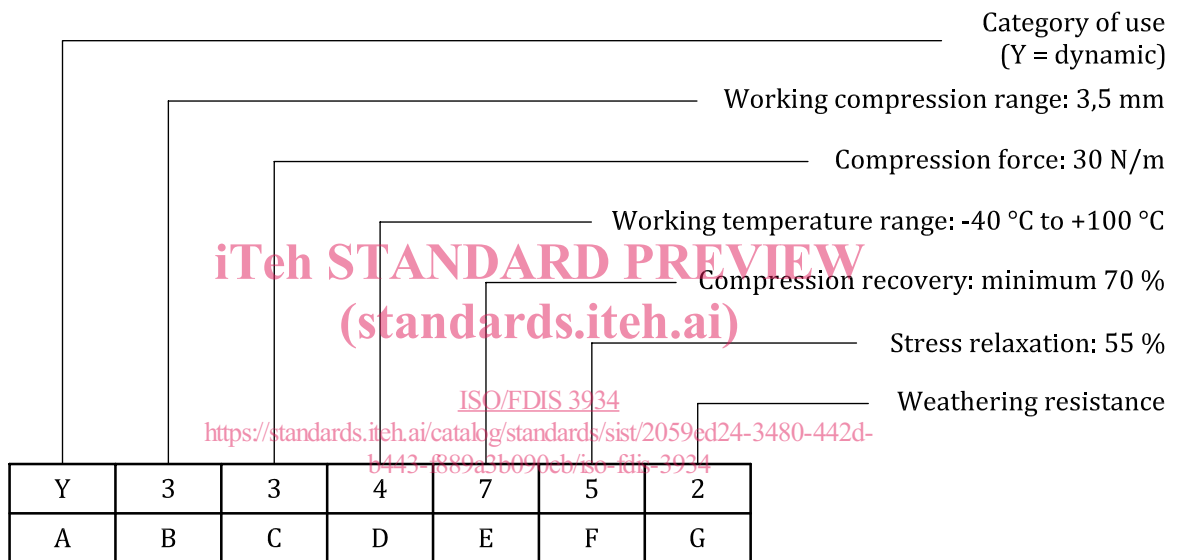


Figure 2 — Typical example of classification code

Table 2 — Requirements for thermal conditions category P<sub>1</sub>

| Characteristic                                   | Unit    | Specification |    | Test method  |
|--|---------|---------------|----|--|
| Tolerance on nominal hardness                    | Shore A | +5            | -5 | ISO 48-4<br>For thermoplastic rubber read after 15 s |
| Brittleness temperature limit                    | °C      | -35           |    | ISO 812  |
| <b>Deformation tests</b>                         |         | X             | Y  | ISO 815-1  |
| <b>Compression set</b>                           |         |               |    |  |
| Type B test piece                                |         |               |    |  |
| 25 % compression                                 |         |               |    |  |
| 22 h in air at 55 °C                             |         |               |    |  |
| 22 h recovery at standard laboratory temperature |         |               |    |  |
| — Vulcanized rubber max.                         | %       | 30            | 30 |  |
| — Thermoplastic rubber max.                      | %       | 50            | 50 |  |
| — Cellular rubber max.                           | %       | 50            | 50 |  |