

Version  
1 March 2025

English version

# Approval requirement 192

Elastomeric seals in gas appliances and gas  
installations



creating  
trust  
***driving  
progress***



**kiwa**

## Preface Kiwa

This approval requirement (AR) is approved by the Board of Experts (BoE) GASTEC QA, in which relevant parties in the field of gas related products are represented. This Board of Experts supervises the certification activities and where necessary require the GASTEC QA approval requirement to be revised. All references to Board of Experts in this GASTEC QA approval requirement pertain to the above-mentioned Board of Experts.

This AR will be used by Kiwa Nederland BV in conjunction with the GASTEC QA general requirements and the KIWA regulations for certification.

In this AR is established which requirements a product and the requestor/ certificate holder of the GASTEC QA product certificate should meet and the matter to which Kiwa evaluates this.

Kiwa has a method which is established in the certification procedure for the execution of:

- The investigation for provisioning and maintaining a GASTEC QA product certificate based on this AR.
- The periodic evaluations of the certified products for the purpose of maintaining a provided GASTEC QA product certificate based on this AR.

Approved by the Board of Experts: Month date, year

Accepted by Kiwa Nederland B.V.: Month date, year

**Kiwa Nederland B.V.**

Wilmersdorf 50  
P.O. Box 137  
7300 AC Apeldoorn  
The Netherlands

Telephone: +31 88 998 44 00

[nl.kiwa.info@kiwa.com](mailto:nl.kiwa.info@kiwa.com)

[www.kiwa.com](http://www.kiwa.com)

# Contents

Preface Kiwa .....	2
Contents .....	3
1 Introduction .....	4
1.1 General .....	4
1.2 Scope.....	4
2 Definitions.....	5
3 Material and product requirements.....	6
3.1 General .....	6
4 Marking .....	7
4.1 Marking .....	7
5 Quality system requirements.....	8
6 Summary of evaluation .....	9
6.1 Evaluation matrix .....	9
7 List of referenced documents and source .....	10
7.1 Standards/ normative documents .....	10
7.2 Source of informative documents .....	10
Annex A - Additional requirements for materials in contact with (renewable) di-methyl-ether .....	11
Scope.....	11
Classification.....	11
Additional requirements .....	11
Using liquids.....	11
Using liquified gasses .....	11
Test methods .....	12
1.Using liquids.....	12
2. Using liquified gasses.....	12

# 1 Introduction

## 1.1 General

This GASTEC QA approval requirement (AR) in combination with the GASTEC QA general requirements, is applied by Kiwa as the basis for the issuing and maintaining the GASTEC QA product certificate for elastomeric seals in gas appliances and gas installations.

With this product certificate, the certificate holder can demonstrate to his or her customers that an expert independent organization monitors the production process of the certificate holder, the quality of the product and the related quality assurance.

Next to the requirements established in this AR and the general requirements, Kiwa has additional requirements in the sense of general procedural requirements for certification, as laid down in the internal certification procedures.

This GASTEC QA approval requirement replaces the version of May 2022.

List of changes:

- The approval requirement is fully textually reviewed.
- Annex added to the AR for additional requirements for materials in contact with di-methyl-ether.
- The list of reference standards has been adjusted.

The product requirements have not changed

## 1.2 Scope

This approval requirement is based on EN 549. This European Standard specifies the requirements for rubber materials used for gas appliances and gas indoor installations in contact with 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> family gases according to EN 437 with operating temperatures between -40 °C to +150 °C.

Annex A describes the additional requirements for materials in contact with (renewable) di-methyl-ether.

## 2 Definitions

In this approval requirement, the following definitions are applicable:

**Board of Experts (BoE):** The Board of Experts GASTEC QA.

**Maximum operating pressure (MOP):** Maximum pressure that a component is capable of withstanding continuously in service under normal operating conditions.

See also the definitions mentioned in the GASTEC QA general requirements.

CONCEPT

## 3 Product requirements

This chapter contains the material and product requirements that the raw materials, materials and products used shall meet.

### 3.1 General

The product shall meet the requirements of EN 549: Rubber materials for seals and diaphragms for gas appliances and gas equipment.

CONCEPT

## 4 Marking

### 4.1 Marking

Additional to the marking as described in EN 549, the rubber seals or sealing package upon which the marking cannot be applied, shall be clearly and durably marked with the GASTEC QA word mark or logo.

CONCEPT



## 5 Quality system requirements

The requirements for the quality system are described in the GASTEC QA general requirements. An important part of this are the requirements for drawing up a risk analysis (e.g., an FMEA) of the product design and the production process in accordance with chapters 3.1.1.1 and 3.1.2.1. This risk analysis shall be available for inspection by Kiwa.

CONCEPT



## 6 Summary of evaluation

This chapter contains a summary of the evaluation to be carried out during:

- The initial product assessment;
- The periodic product verification;

### 6.1 Evaluation matrix

Description of requirement	Clause EN 549	Investigation within the scope of		
		Initial product assessment	Product verification	
			Inspection	Frequency
Product information	4	X	X	1 x per year
Classification (min. class A2)	5	X	X	1 x per year
General	6.1	X	X	1 x per year
<b>Requirements for rubber material used to manufacturer seals</b>				
Hardness	6.2	X	X	1 x per year
Tensile strength	6.2	X	X	1 x per year
Elongation at break	6.2	X	X	1 x per year
Compression set	6.2	X		
Resistance to aging	6.2	X		
Resistance to gas	6.2	X		
Resistance to condensate/liquid phase of combustible gases	6.2	X		
Resistance to lubricants	6.2	X		
Resistance to ozone	6.2	X		
Resistance to gas – Change in volume	6.2	X		
Resistance to condensate/liquid phase of combustible gases – change in volume	6.2	X		
Stress relaxation in compression	6.2	X		
<b>Requirements for rubber material uses to manufacturer diaphragms</b>				
Hardness	6.3	X	X	1 x per year
Tensile strength	6.3	X	X	1 x per year
Elongation at break	6.3	X	X	1 x per year
Compression set	6.3	X		
Resistance to aging	6.3	X		
Resistance to gas	6.3	X		
Resistance to condensate/liquid phase of combustible gases	6.3	X		
Resistance to lubricants	6.3	X		
Resistance to ozone	6.3	X		
Evaluation of life-time for material used to manufacture seals	8	X		
Infrared spectra of the material	9	X		
<b>Additional GASTEC QA requirement</b>				
Marking	4	X	X	1 x per year
Requirements for materials in contact with di-methyl-ether	Annex A	X		

## 7 List of referenced documents and source

### 7.1 Standards/ normative documents

Number	Title	Version *
EN 549 + A2	Rubber materials for seals and diaphragms for gas appliances and gas equipment	2024

\*) If no date of issuance is specified in this column, the current version of the document applies.

### 7.2 Source of informative documents

Number	Title	Version *
EN 437	Test gases- test pressure – appliance categories	2021
General requirements GASTEC QA		

\*) If no date of issuance is specified in this column, the current version of the document applies.

# Annex A - Additional requirements for materials in contact with (renewable) di-methyl-ether

## Scope

This annex specifies additional requirements and associated test methods for rubber materials used in gas installations, gas equipment and gas appliances that are intended to be used in contact with (renewable) di-methyl-ether (r)DME pure as well as blended with LPG.

## Classification

For application in contact with (r)DME, blended or pure the letter D (for pure) or DBxx (DME-blended) for blended is added to the classification given in clause 5 of EN 549. Where xx is the maximum percentage DME allowed.

*Example: The classification of a rubber material applicable over the temperature range of  $-20\text{ }^{\circ}\text{C}$  to  $+80\text{ }^{\circ}\text{C}$  with a declared nominal hardness of 70 IRHD-M which is allowed for use with a DME content up to 20 % would be B2/H3/DB20.*

## Additional requirements

### Using liquids

When tested in accordance with the methods detailed under test method 1 in this annex, circular test pieces having a diameter between 30 mm and 40 mm and a thickness of  $(2 \pm 0.2)$  mm shall be used. The material shall comply with the requirements given in table 1.

Property	Unit	Requirement
-change in volume after immersion	%	$\leq 40$
-change in mass after drying <sup>a</sup>	%	+5 -8
<sup>a</sup> It is recommended to determine the change in volume as well, to get a better understanding what is really happening with the material.		

Table 1: additional requirements for use in contact with (r)DME.

In case the change in volume is larger than 40 % the test in the next paragraph can be used for further examination whether the material still can be accepted or not.

### Using liquified gasses

When tested in accordance with the methods detailed under test method 2 in this annex, circular test pieces having a diameter between 30 mm and 40 mm and a thickness of  $(2 \pm 0.2)$  mm shall be used. The material shall comply with the requirements given in table 2.

Property	Unit	Requirement
-change in volume after immersion	%	$\leq 35$
-change in mass after drying <sup>a</sup>	%	+5 -8
<sup>a</sup> It is recommended to determine the change in volume as well, to get a better understanding what is really happening with the material.		

Table 2: Additional requirements for use in contact with (r)DME.

## Test methods

### 1. Using liquids

Three test pieces shall be tested in accordance with ISO 1817, using the following conditions:

- Immerse for  $72^{0}_{-2}$  h at  $(23 \pm 2)$  °C in n-butyl-acetate and pentane having a composition as given in table 3.
- After removal from the liquid, wipe dry rapidly and weigh immediately in air and in water.
- Determine the change in volume with reference to the initial volume of the specimen.
- Dry the test specimens for a period of  $96^{0}_{-2}$  h in a normal air oven at  $(70 \pm 2)$  °C.
- Determine the change in mass with reference to the initial mass of the specimen.

Calculate the arithmetic mean values of the three results both after immersion and after drying.

Intended use [ % (r)DME in LPG]	Test liquid [ % n-butyl-acetate in pentane]
0	n.a.
$\leq 20$	20
$\leq 40$	40
$\leq 60$	60
$\leq 80$	80
$\leq 100$	100 (so only n-butyl-acetate)

Table 3: Composition of test liquid.

### 2. Using liquified gasses

Three test pieces shall be tested in accordance with ISO 1817, using the following conditions:

- Immerse for  $72^{0}_{-2}$  h at  $(23 \pm 2)$  °C in blend of (r)DME and propane under pressure, such that it is assured the test pieces are in liquid. The gas mixture should have a composition as given in table 4.
- After removal from the liquid, directly determine the change in volume using the photographic method.

Note: Photographic method required to deal with the fact changes because of evaporation of gasses.

- Determine the change in volume with reference to the initial volume of the specimen.
- Dry the test specimens for a period of  $96 - 02$  h in a normal air oven at  $(40 \pm 2)$  °C.
- Determine the change in mass with reference to the initial mass of the specimen.

Calculate the arithmetic mean values of the three results both after immersion and after drying.

Intended use [ % (r)DME in LPG]	Test liquid [ % (r)DME in propane]
0	n.a.
$\leq 20$	20
$\leq 40$	40
$\leq 60$	60
$\leq 80$	80
$\leq 100$	100 (so only (r)DME)

Table 4: Composition of test gas.