

KE 81

November 2023

Approval requirement 81

Elastomeric seals



**Trust
Quality
Progress**

Foreword

This GASTEC QA approval requirement (AR) has been approved by the Board of Experts product certification 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 GASTEC QA approval requirement will be used by Kiwa Nederland BV in conjunction with the GASTEC QA general requirements and the KIWA regulations for certification.

Approved by Board of Experts: 24th of November 2023

Accepted by Kiwa Nederland B.V.: 30th of November 2023

Kiwa Nederland B.V.

Wilmersdorf 50
Postbus 137
7300 AC Apeldoorn

Tel. 088 998 33 93
Fax 088 998 34 94
info@kiwa.nl
www.kiwa.nl

© 2023 Kiwa Nederland B.V.

All rights reserved. No part of this book may be reproduced, stored in a database or retrieval system, or published, in any form or in any way, electronically, mechanically, by print, photoprint, microfilm or any other means without prior written permission from the publisher.

The use of this approval requirement by third parties, for any purpose whatsoever, is only allowed after a written agreement is made with Kiwa Nederland B.V. to this end

Contents

	Foreword	1
	Contents	2
1	Introduction	3
1.1	General	3
1.2	Scope	3
2	Definitions	4
3	Product requirements	5
3.1	General	5
4	Testing methods	6
4.1	Test pieces from products	6
5	Marking	7
5.1	Marking	7
6	Quality system requirements	8
7	Summary of tests	9
7.1	Test matrix	9
8	List of referenced documents and source	10
8.1	Standards / normative documents	10
	Annex A: test pieces from products	11

1 Introduction

1.1 General

This GASTEC QA approval requirement in combination with the GASTEC QA general requirements include all relevant requirements, which are adhered by Kiwa as the basis for the issue and maintenance of a GASTEC QA certificate for elastomeric seals.

This GASTEC QA Approval requirements replace the GASTEC QA Approval Requirements 81 dated September 2018.

List of changes:

- Textual review

The product requirements have not been changed.

1.2 Scope

This approval requirement specifies the requirements for elastomeric materials used in seals for supply pipes and fittings, ancillaries and valves for the supply of gaseous fuels of the 2nd and 3rd family according to EN 437 with operating temperatures in general from - 5 °C up to 50 °C and in special cases from - 15 °C up to 50 °C.

2 Definitions

In this approval requirement, the following terms and definitions are applicable:

Board of Experts: The Board of Experts Gastec QA.

3 Product requirements

3.1 General

The product shall comply with the requirements as specified in EN 682: “Elastomeric seals – Materials requirements for seals used in pipes and fittings carrying gas and hydrocarbon fluids”, type GAL or GBL.

4 Testing methods

4.1 Test pieces from products

If the dimensions of the rubber end products are such that it is possible to take out the test pieces from them, the tests shall be carried out on such test pieces.

Depending on the dimensions of the end products it is allowed and can be necessary to take test pieces with other (smaller) dimensions than those prescribed in the standards. A guideline for this preparation is given in annex A.

5 Marking

5.1 Marking

Supplementary to the required marking stated in EN 682, clause 10, the elastomeric seals or parcel of seals where the marking is not practicable, shall be marked clearly and durably with the GASTEC QA word mark or logo. This can be applied on the smallest packaging.

6 Quality system requirements

The supplier shall make a risk assessment of the product and production process according to chapter 3.1.1.1 and 3.1.2.1 of the GASTEC QA general requirements. The risk assessments shall be available to Kiwa for review.

7 Summary of tests

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

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

7.1 Test matrix

Description of requirement	Clause (EN 682)	Test within the scope of		
		Initial product assessment	Product verification	
			Verification	Frequency
Classification	3	X	X	1x/ year
Material	4.1	X	X	1x/ year
Finished seal requirements	4.2			
Dimensional tolerances	4.2.1	X	X	1x/ year
Imperfections and defects	4.2.2	X	X	1x/ year
Hardness	4.2.3	X	X	1x/ year
Tensile strength and elongation at break	4.2.4	X	X	1x/ year
Compression set in air	4.2.5	X		
Accelerated ageing in air	4.2.6	X		
Stress relaxation in compression	4.2.7	X		
Volume change in liquid B	4.2.8	X		
Volume change in oil	4.2.9	X		
Ozone resistance	4.2.10	X		
Compression set at -15 °C	4.2.11	X		
Designation	9	X	X	1x/ year
Marking	10	X	X	1x/ year
Additional marking GASTEC QA	AR 81: 4.1	X	X	1x/ year

8 List of referenced documents and source

8.1 Standards / normative documents

All normative references in this approval requirement refer to the editions of the standards as mentioned in the list below.

EN 437: 2021

Test gases- test pressure – appliance categories

EN 682: 2002+ A1: 2005

Elastomeric seals - Materials requirements for seals used in pipes and fittings carrying gas and hydrocarbon fluids

Annex A: test pieces from products

When preparing the test pieces, it is often impossible to meet all the dimensions prescribed in the relevant standard applicable to the test. Therefore it is decided for this GASTEC QA approval requirement that some deviations with respect to the dimensions are to be allowed.

Most end products are (o-)rings. Use a knife to separate the rubber part from other materials, if needed. Preparation of the test pieces shall be done using the techniques given in ISO 23529: 2016. By selecting the appropriate shape and part of the product for preparing the test pieces the following should be kept in mind:

- For hardness also small pieces may be used by taking the micro method of ISO 48
- For tensile strength and elongation, ISO 37 gives also smaller test pieces (type 3 and 4) and ring test pieces, but using type 2 is preferred. A constant cross section of the parallel section is the most important. Using thinner test pieces or missing a few parts of the clamping sections will hardly influence the results as long as the break of the test piece is within the parallel section. This combined with the possible smaller test pieces makes that almost every end product can be tested.
- Compression set is a material property which is not very sensitive to dimensions of the test pieces. Taking rectangular test pieces leads to the same results. Combined with the possibility of stacking up to three layers almost every product can be tested. In case of too thin material available the test pieces can be scaled down to a smaller thickness. In that case other spacers have to be applied to get a compression of about 25 %. More important than having a compression of exact 25 % is knowing the compressed height exactly. It is known that a compression between 20 and 30 % will lead to the same results.
- For the change in volume the thickness is more important than length or width. It is not really necessary to have complete flat test pieces. Often parts of the full products may be used without having different results.
- For stress relaxation more or less the same applies as with compression set, although, knowing the exact deformation is of no importance at all.
- For ozone resistance it is important to have none machined surfaces. Here, for small products, taking full sections of the products is often better and giving more realistic results than trying to get the test pieces as mentioned in the standard.

After preparation the test pieces the test pieces shall be conditioned at least 16 hours before testing.