English translation

AR 210
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validated Dutch version

Approval requirement 210

Gas stoppers for gas distribution systems

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Foreword

This GASTEC QA (Dutch version) approval requirement 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 (Dutch version) will be used by Kiwa Nederland BV in conjunction with the GASTEC QA general requirements and the KIWA regulations for certification.

This approval requirement is a translation from the Dutch validated version and can only be used as a supporting document.

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

2530 60324

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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 gas stoppers for gas distribution systems.

1.2 Scope

These requirements are applicable to gas stoppers as independent component or as part for installation in another component, for the application in plastic piping systems for the distribution of natural gas according to the “regeling gaskwaliteit” until a MOP of 8 bar and an operating temperature of -20°C up to and including +40°C.

2 Definitions

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

Board of Experts: The Board of Experts GASTEC QA

Closing flow: the flow at which the gas stopper closes

Gas stopper: flow limiter or excess flow valve, component that automatically shuts off the gas flow when the closing flow is exceeded.

Independent component: component that is suitable for installation in the gas distribution network.

Leak tightness: a product is regarded as being leak tight when it complies with the following:
No liquid may visibly leak when using a liquid as the testing medium.
When using gas as a test medium;

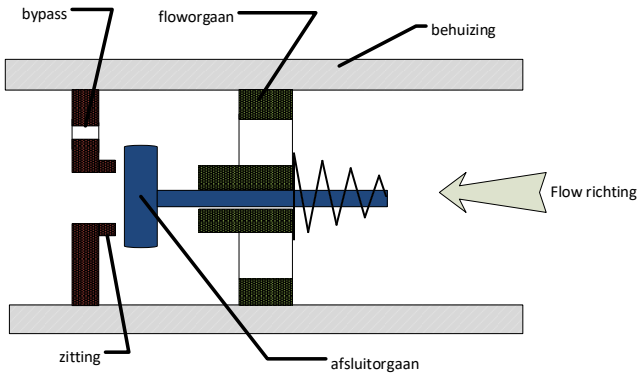
- No air bubbles are permitted when submerged.
- No continuous formation of bubbles is permitted when using leak detection fluid.

MOP: the maximum pressure at which the product can function (maximum operating pressure)

Nominal flow: the flow rate at the specified operating pressure.

Operating temperature: temperature at which the product functions under normal conditions.

Schematic representation gas stopper:



3 Product requirements

3.1 General

The gas stopper shall be internally and externally clean, free of blisters and show no defects. External sharp edges and corners are not allowed.

Drill holes for bolts, pins and other for the connection or assembly shall not form a connection between the gas carrying parts and the surroundings.

The design of the gas stopper shall be such, possibly by means of provisions, that it's not possible to change the settings afterwards.

Glued connections with plastic parts are not allowed

Rubber sealing materials shall comply with EN 682 type GAL or GBL.

Threaded sealings shall comply with GASTEC QA approval requirements 31-1, 31-2 or 31-3.

3.1.1 Gas stopper as independent component

The gas stopper shall be provided on the inlet and outlet side with connections that meet the relevant GASTEC QA approval requirements or when no approval requirements are available with the relevant national or international standards.

3.1.2 Gas stopper for installation in a component

The component in which the gas stopper is placed shall not disturb the operation of the gas stopper. The gas stopper shall be fixed in the component in which it is installed. The component in which the gas stopper can be placed shall comply with the relevant GASTEC QA approval requirements or when no approval requirements are available with the relevant national or international standards.

3.2 Materials

The materials used for making the housing, the flow mechanism, seat and closing element shall comply with paragraph 3.2.1. and/or 3.2.2.

3.2.1 Metals

The metals used shall be demonstrably suitable for the application (including pressure, ambient temperature, corrosion resistance, long-term behaviour).
The suitability of the metal can be demonstrated by:

- reference to relevant product standards of products with similar application in which the material in question is prescribed
- test results using, for example, the EN 12516 series.

The material shall be specified according to the relevant material standard.

3.2.2 Non-metals

The non-metals used shall be demonstrably suitable for the application (including pressure, ambient temperature, gas resistance, long-term behaviour).

The suitability of the non-metal can be demonstrated by:

- reference to relevant product standards of products with similar application in which the material in question is prescribed
- test results.

For pressurized parts, an EN-ISO 9080 report shall be available which shows that the material is suitable for the intended application.

Non-metal housings may only be produced from virgin material or from a combination of virgin material and own residual material.

The material shall be specified based on the raw material (+ supplier) and additives.

3.3 Closing mechanism

The closing mechanism shall not be provided with a lubricant

3.4 Springs

Springs shall comply with paragraph 3.2.1 be produced from suitable steel. This can be demonstrated when the dynamic load is calculated according to EN 13906-1 or EN 13906-2 and the springs are produced from spring steel with a minimum quality of 1.4310 according to EN 10270-3.

If the springs cannot be calculated in accordance with EN 13906-1 or EN 13906-2, they shall be tested in accordance with paragraph 4.8.

4 Performance requirements

4.1 Strength of the housing

In the case of a gas stopper as an independent component, it shall be able to withstand an internal pressure of 2x MOP with a minimum of 1 bar for 2 minutes without damage or deformation. The test shall be carried out in accordance with paragraph 5.2.

4.2 External gas tigthness

In the case of a gas stopper as an independent component, no external leakage shall be visible at a test pressure of 25 mbar, MOP and 1.5x MOP. The test shall be carried out in accordance with paragraph 5.3.

4.3 Closing flow

The flow at which the gas stopper closes is at most 1.8 times the nominal flow rate specified by the manufacturer. The test shall be carried out in accordance with paragraph 5.4

4.4 Operation with an increase in flow

A gas stopper that is used in a pipe system with a MOP of 200 mbar shall not close in the event of a sudden increase in flow from nominal to 115% nominal flow. The test shall be carried out in accordance with paragraph 5.5.

4.5 Leak flow

At a test pressure of MOP, the leakage current with a completely closed gas stopper may:
Be maximally 3 l/h[1]) for gas stoppers without bypass.
Be maximally the amounts stated by the supplier for gas stoppers with bypass.

The test shall be carried out in accordance with paragraph 5.6.

[1)] Air under standard conditions (1013,25 mbar / 15 ° C)

4.6 Repeated resetting

After repeated (100 times) closing and opening of the gas stopper at a test pressure of MOP, it shall still meet the requirements set out in paragraphs 4.2 and 4.3. The test shall be carried out in accordance with paragraph 5.7.

4.7 Pressure loss

The measured pressure loss, determined with air as medium, over the gas stopper shall correspond to the maximum pressure loss specified by the supplier. The test shall be carried out in accordance with paragraph 5.8.

4.8 Dynamic load springs

If the requirements of paragraph 3.4 are not met, the following requirement applies. The closing flow rate shall not deviate more than 6% after the closing device has completed 10,000 circuits at an ambient temperature of 60 ° C. The test shall be carried out in accordance with paragraph 5.9.

5 Test methods

5.1 General

All tests shall be carried out at an ambient temperature of 23 ° C +/- 5 ° C unless otherwise specified. All tests shall be performed on 3 identical samples unless otherwise specified.

For the purpose of testing, gas stoppers (built-in and independent component) are installed in accordance with the supplier's installation instructions. Gas stoppers for installation in a component are tested built-in in the component. If multiple installation positions are possible, the tests are carried out in the most unfavourable position (to be determined by Kiwa).

5.1.1 Sample selection

Unless otherwise stated, the tests shall be carried out on 3 samples per size group and per MOP class:

Size group	1	2	3	4
Pipe diameter (mm)	16 up to and including 40	50 up to and including 110	125 up to and including 200	225 up to and including 355

Pipe diameter is the diameter of the pipe for which the gas stopper is suitable

5.2 Determination strength of the housing

A pressure of 2x MOP with a minimum of 1 bar is applied to the inlet and outlet sides of the gas stopper. The pressure is applied for 2 minutes. During this period, it is necessary to visually check whether damage and / or deformations occur.

5.3 Determination external gas tigthness

A pressure equal to the MOP is applied to the inlet and outlet sides of the gas stopper. The pressure is applied for 2 minutes. The gas stopper shall be externally leakproof during this period.

Repeat this test with a pressure of 1.5x MOP and with 25 mbar.

5.4 Determination closing flow

Place the gas stopper in a set up according to figure 1.

- Apply with the help of the pressure regulator (2) and control valve (5) the MOP at nominal flow
- Wait till there is a stable flow through the control valve (5)
- Next, open the control valve (5) slowly and evenly until the gas stopper closes
- Determine the closing flow by means of a flow meter (4)

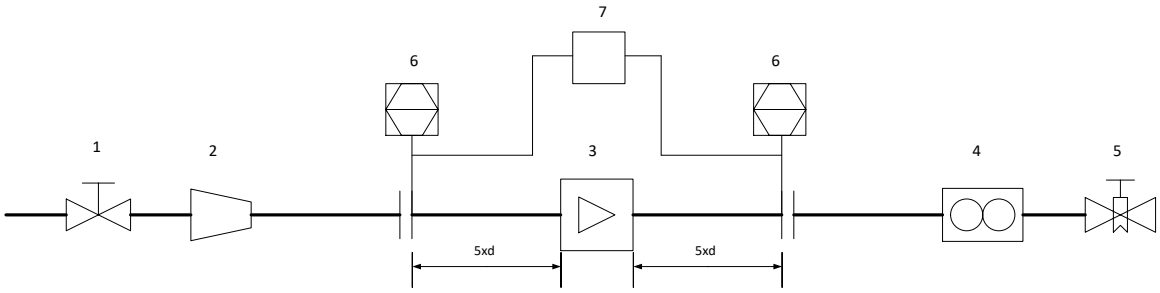


Figure 1

1 Valve
2 Adjustable pressure regulator
3 Gas stopper
4 Flow meter
5 Control valve
6 Pressure meter
7 Pressure difference meter (optional)
d diameter pipe

5.5 Determination operation with an increase in flow

Place the gas stopper in a set up according to figure 2.

- Apply with the help of a pressure regulator (2) and control valve (5) an inlet pressure of 200 mbar at nominal flow
- Next, set, with the valve in the open position (8), the control valve (9) such that 115% nominal flow goes through the gas stopper
- Next, close the valve (8)
- Wait till a stable flow has been created through the control valve (5)
- Then open the valve (8)
- Check with the help of the flow meter (4) if the gas stopper is closed

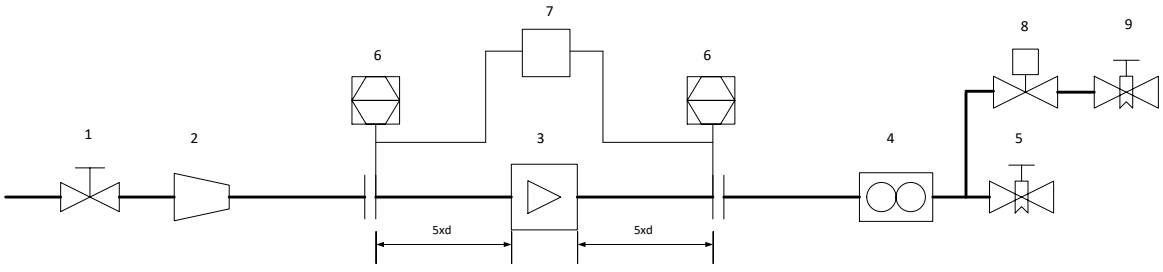


Figure 2

1. Valve
2. Adjustable pressure regulator
3. Gas stopper
4. Flow meter
5. Control valve
6. Pressure meter
7. Pressure difference meter (optional)
8. Electromagnetic valve (opening time 0,2 second)
9. Control valve

d diameter pipe

5.6 Determination leak flow

Place the gas stopper in the set up according to figure 1.

- Apply with the help of a pressure regulator (2) and control valve (5) the MOP at nominal flow
- Wait till there is a stable flow through the control valve (5)
- Open the control valve (5) evenly and slowly till the gas stopper closes
- After closing of the gas stopper, the leak flow will be determined using the flow meter (4).

5.7 Determination repeated resetting

Place the gas stopper in the set up according to figure 1.

- Apply with the help of a pressure regulator (2) and control valve (5) the MOP at nominal flow
- Wait till there is a stable flow through the control valve (5)
- Open the control valve (5) quickly and as such the gas stopper closes
- Close the control valve (5) slowly until the gas stopper opens via the bypass or reset the gas stopper according to the instructions of the manufacturer.

Repeat these steps until the gas stopper has been closed 90 times. Then repeat the tests as described in paragraphs 5.3, 5.4, 5.5 and 5.6.

5.8 Determination pressure loss

Place the gas stopper in the set up according to figure 1.

Apply with the help of the pressure regulator (2) a constant inlet pressure. Measure the flow and the pressure difference over the gas stopper. Depending on the method of specification of the pressure loss by the manufacturer, this measurement shall be repeated at different set ups.

5.9 Dynamical load springs

Measure the closing flow of the gas stopper according to paragraph 5.4. Next place the gas stopper in an ambient temperature of 60°C. Have the gas stopper make 10.000 switches and re-determine the closing flow according to paragraph 5.4.

6 Marking, instructions and packaging

6.1 Marking

The gas stopper shall be marked with the following information:

- GASTEC QA or GASTEC QA logo (can be marked on the smallest packaging)
- Name or identification mark of the supplier
- Type notification
- Production date or code
- MOP
- Nominal connection size of the inlet and outlet side (in case of an independent component)
- Direction of flow

6.2 Instructions

The supplier shall provide instructions and deliver it with the product. These instructions shall be in the Dutch language with included that it's a GASTEC QA approved product. Next the following information shall be included in the instructions:

- The use, installation and in case applicable, de-installation of the product
- The maximum length of the connection pipe for which the gas stopper is suitable
- The conditions under which the product can be used
- The way it can be controlled that the product is correctly installed
- The way the product should be stored
- Maximum shelf-life when stored
- A graph which the pressure loss is plotted against flow

6.3 Packaging

The product shall be packaged such that contamination and damage is not possible from the outside.

7 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.

8 Summary of tests

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

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

8.1 Test matrix

Description of requirement	Clause	Test within the scope of		
		Initial product assessment	Product verification	
			Verification	Frequency
General	3.1	X		
Gas stopper as independent component	3.1.1	X		
Gas stopper for installation in a component	3.1.2	X		
Materials	3.2	X		
Metals	3.2.1	X		
Non-metals	3.2.2	X		
Closing mechanism	3.3	X		
Strength of the housing	4.1	X		
External gas tightness	4.2	X	X	Once a year
Closing flow	4.3	X	X	Once a year
Operation with increasing flow	4.4	X		
Bypass flow	4.5	X		
Repeated resetting	4.6	X	X	Once a year
Pressure loss	4.7	X		
Dynamical load springs	4.8	X		
Marking, instructions and packaging	6	X	X	Once a year

9 List of referenced documents and source

9.1 Standards / normative documents

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

EN 682: 2002+A1: 2005	Elastomeric seals - Materials requirements for seals used in pipes and fittings carrying gas and hydrocarbon fluids
EN 12516 series	Industrial valves - Shell design strength - Part 1: Tabulation method for steel valves shells
EN-ISO 9080: 2012	Plastics piping and ducting systems — Determination of the long-term hydrostatic strength of thermoplastics materials in pipe form by extrapolation
EN 13906-1: 2013	Cylindrical helical springs made from round wire or bar - Calculation and design - Part 1: Compression springs
EN 13906-2: 2013	Cylindrical helical springs made from round wire or bar - Calculation and design - Part 2 tension springs
EN 10270-3: 2011	Steel wire for mechanical springs - Part 3: Stainless spring steel wire

9.2 Source

Parts of the text of this approval requirement is based on DVGW G5305-2.