

AR 11

June 2024

Dutch version

Approval requirement 11

Gas pressure regulators, gas leak protectors and combination regulators



**Trust
Quality
Progress**

Foreword

This, translated from Dutch, 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, translated from Dutch, 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.

This, translated from Dutch, AR, is used as supporting document. In case of doubt of interpretation of this AR, the Dutch version is leading.

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1 Introduction

1.1 General

These GASTEC QA approval requirements in combination with GASTEC QA general requirements are used by Kiwa as the basis for the issue and maintenance of the GASTEC QA product certificate for gas pressure regulators, gas leak protectors and gas pressure regulators combined with gas leak protectors for domestic 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 version of February 2019.

List of changes:

- The approval requirement is updated in line with the revised version of NEN 7239
- Additional requirement added for stress corrosion in stainless-steel.
- Additional requirement added for uniform corrosion resistance.
- Adjustment in scope
- These approval requirements have been fully reviewed textually.

The product requirements have changed.

1.2 Scope

The products are intended to be used as gas pressure regulators, gas leak protectors and gas pressure regulators combined with gas leak protectors for domestic installations with a capacity up to 10 m³_n/h natural gas and 30 m³_n/h hydrogen and an inlet pressure (MOPu) up to 200 mbar at ambient temperatures comprised between -20°C and 50°C.

When these products are intended to be used with a capacity up to 30 m³_n/h hydrogen, approval requirement 214 shall be followed for approval. Approval requirement 214 defines the additional requirements for the use of the products with hydrogen.

This approval requirement does not apply to gas pressure regulators with built-in safety against excessive outlet pressure.

2 Definitions

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

Austenitic stainless steel: Stainless steel (SS) is an iron alloy and has a high corrosive resistance. The addition of alloying elements provides specific properties. Austenitic stainless steel belongs to 1 of the 4 main groups of stainless steel. Austenitic stainless steel is characterized by nickel and chromium as the main alloying elements.

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

Insulation union coupling: Insulation union couplings are able to make a removable pipe connection which is not electrically conductive.

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

Stress corrosion: Type of corrosion caused by control stresses (via operations) and the simultaneous action of a corrosive medium. Stress corrosion cracking is a consequence of stress corrosion cracking.

Uniform corrosion: Type of corrosion due to a natural interaction between a material and its environment. Oxygen corrosion is the most visible form of corrosion.

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

3 Material and product requirements

This chapter contains the requirements for the properties of the raw materials, materials and semi-products used during the production of the products to be certified under this AR (e.g., support bushes).

3.1 General

Gas pressure regulators, gas leak protector and gas pressure regulators combined with gas leak protectors for domestic installations shall comply with the product requirements described by NEN 7239 “Gas pressure regulators, gas leak protectors and gas pressure regulators combined with gas leak protectors for domestic installations with a capacity up to 10 m³/h natural gas and 30 m³/h hydrogen and an inlet pressure (MOPu) up to 200 mbar”.

In addition, the following requirements shall be met.

3.1.1 *Material characteristics*

Additionally, to article 4.1 of NEN 7239, an insulation union coupling shall meet the requirements of approval requirements 154.

3.1.2 *Corrosion resistance*

The manufacturer shall declare in writing that all parts in contact with ambient air are made of corrosion-resistant material or are duly protected against corrosion.

3.1.3 *Porosity*

The manufacturer shall declare in writing that eventual porosity or cracks in gas-carrying parts of gas pressure regulators, gas leak protector and gas pressure regulators combined with gas leak protectors for domestic installations, may not lead to gas leaks or technical failures.

3.1.4 *Rubber parts*

Rubber parts shall comply with the requirements described in EN 549, minimum class A2 or EN 682, type GBL or GAL. See NPR 7028 for the dimensions of rubber gaskets in gas meters and connections.

Note: The requirement for external density is described in section 6.3 of NEN 7239 and is not seen as a product requirement for rubber material.

3.1.5 *Adjustable packings*

Adjustable gaskets for connections between moving parts are not allowed.

3.1.6 *Requirements for the construction*

The requirements according to NEN 7239, article 5.1.1 up to and including 5.1.5 are met when the products comply with the requirements from articles 6.8 up to and including 6.12 of the NEN 7239.

3.1.7 General connection possibilities

If an insulation union coupling is used to make a non-electric conduction, this insulation union coupling shall meet the requirements of approval requirements 154.

3.1.8 Durability

Contrary to article 8.8.1 of NEN 7239, during testing the number of cycles shall be 40.000 instead of the mentioned 25.000 cycles at the mentioned test temperatures.

3.1.9 Stress corrosion in copper alloys

Contrary to NEN 7239, article 8.10.1, to determine the corrosion resistance of copper alloys, the ammonia test according to ISO 6957 shall be carried out with a pH of 9,5.

3.1.10 Stress corrosion in stainless-steel

Contrary to NEN 7239, article 8.10.2, to determine the corrosion resistance of stainless-steel components, the requirements of paragraph 4.1 shall be met.

4 Performance requirements and test methods

In addition to the requirements from NEN 7239, the following requirements shall be met.

4.1 Resistance against stress corrosion for stainless-steel components

All parts shall be free of stress corrosion.

The magnesium chloride test in accordance with paragraph 4.1.1 shall be used for stainless steel components. After exposure to the magnesium chloride solution, no cracks shall be observed when assessing visually with a 5 times magnification.

4.1.1 Test method (*magnesium chloride*)

The test shall be performed on the components of stainless-steel. The components shall be degreased using acetone and shall be put in a vessel, free from the bottom.

Dissolve 1000 g $MgCl_2 \cdot 6H_2O$ per 500 ml distilled water, or proportional amounts thereof. There shall be sufficient fluid to completely immerse the assembly.

Heat a vessel to 130 ± 2 °C and place the tube in the fluid for 108 hours let the fluid cool down to $70^\circ C \pm 2$ °C and leave the tube for 60 hours.

It can be necessary that a small amount of magnesium chloride or distilled water must be added in order to reach the 130°C. Make sure that the heating takes place uniformly (avoid bumps and jolts).

The visual assessment of sample takes place with the aid of a 5 times magnifying glass.

4.2 Uniform corrosion resistance

The housing of the regulator shall be resistant against uniform corrosion. Housing made by a type of Austenitic RVS 300 series are exempt of this requirement due to the material characteristics related to the requirement of uniform corrosion.

All other metals used for the housing shall be assess according to paragraph 4.2.1.

4.2.1 Test method

The uniform corrosion shall be assessed by performing the salt spray test according to ISO 9227, with a liquid according to paragraph 5.2.2 and a test duration of 168h.

An assembled regulator (capped at both inlet and outlet side) shall be exposed to the salt spray test.

After completion of the salt spray test, the regulator will be mounted according to the manufacturer's instructions, and the leak tightness will be assessed according to article 8.3 of NEN 7239. The sample will pass if the regulator is mountable, and when the leakage does not exceed $10 \text{ cm}^3/\text{h}$.

5 Marking

5.1 Marking

Additionally, to the marking as described in NEN 7239, article 7.1, the gas pressure regulators, gas leak protectors and combination regulators shall be marked with:

- GASTEC QA, the GASTEC QA logo or punch mark

6 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 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.

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	Article NEN 7239	Test within the scope of		
		Initial product assessment	Product verification Verification	Frequency
Material				
Material characteristics	4.1	X		
Durability	4.2	X		
Corrosion resistance	4.3	X		
Porosity	4.4	X		
Rubber parts	4.5	X	X	1x / year
Requirements for the construction				
Implementation	5.1	X		
Connection options	5.2			
General	5.2.1	X		
Threaded connection	5.2.2	X	X	1x / year
Gas meter coupling	5.2.3	X	X	1x / year
Flange connection	5.2.4	X	X	1x / year
Functional operation				
Mounting position	6.2	X	X	1x / year
Gas tightness	6.3	X	X	1x / year
External gas tightness	6.3.1	X	X	1x / year
Internal gas tightness	6.3.2	X	X	1x / year
Pressure control	6.4			
Control behavior with evenly changing flow rate	6.4.1	X	X	1x / year
Control behavior with suddenly changing flow rate	6.4.2	X	X	1x / year
Closing pressure	6.4.2.1	X	X	1x / year
Increasing flow	6.4.2.2	X	X	1x / year
Gas leak protection	6.5			
Addressing pressure	6.5.1	X	X	1x / year
Closed position	6.5.2	X	X	1x / year
Breakdown pressure	6.5.3	X	X	1x / year
Gas pressure loss	6.5.4	X	X	1x / year
Silence and vibration	6.6	X	X	1x / year
Mechanical strength	6.7			
Resistance against bending and torsion	6.7.1	X	X	1x / year
Resistance against high pressure	6.7.2	X	X	1x / year

Description of requirement (continued)	Article NEN 7239	Test within the scope of		
		Initial product assessment	Product verification	
			Verification	Frequency
Durability	6.8			
Domestic gas pressure regulators and combined regulators	6.8.1	X		
Gas leak protection	6.8.2	X		
Resistance against the effects of gas	6.9	X		
Resistance against chemical influences	6.10	X		
Sustainability of marks	6.11	X		
Resistance to moisture	6.12	X		
Recognizability, assembly and operating instructions	7			
Marking	7.1	X	X	1x / year
Assembly and installation instructions	7.2	X		
Paragraph AR 11				
Material characteristics	3.1.1	X		
Corrosion resistance	3.1.2	X		
Porosity	3.1.3	X		
Rubber parts	3.1.4	X	X	1x/ year
Adjustable packings	3.1.5	X		
Requirements for the construction	3.1.6	X		
General connection possibilities	3.1.7	X		
Durability	3.1.8	X		
Stress corrosion in copper alloys	3.1.9	X		
Stress corrosion in stainless-steel	3.1.10 / 4.1	X		
Uniform corrosion resistance	4.2	X		
Marking	5.1	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.

NEN 7239: 2023	Gas pressure regulators, gas leak protectors and gas pressure regulators combined with gas leak protectors for domestic installations with a capacity up to 10 m ³ _n /h natural gas and 30 m ³ _n /h hydrogen and an inlet pressure (MOPu) up to 200 mbar
ISO 6957: 1988	Copper alloys – Ammonia test for stress corrosion resistance
ISO 9227: 2022	Corrosion tests in artificial atmospheres – Salt spray tests
EN 549: 2019 + A1: 2023	Rubber materials for seals and diaphragms for gas appliances and gas equipment
EN 682: 2002+A1: 2005	Elastomeric seals – materials requirements for seals in pipes and fittings carrying gas and hydrocarbon fluids

8.2 Source of informative documents

EN 437: 2021	Test gases- test pressure – appliance categories
NPR 7028: 2022	Gas meters, swivel nuts and fittings – Dimensions
General Requirements GASTEC QA	