English translation

AR 34
September 2018 Dutch version

Approval requirement 34

Flexible hose assemblies

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Foreword Kiwa

This GASTEC QA approval requirement (Dutch version) 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 version and can only be used as supporting document.

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1 Introduction

1.1 General

These GASTEC QA Approval Requirements in combination with the GASTEC QA general requirements are used by Kiwa as the basis for the issue and maintenance of the GASTEC QA product certificate for flexible hose assemblies.

These GASTEC QA Approval Requirements replace GASTEC QA Approval Requirements 34 of March 1996 + amendment A1 of March 2012.

List of changes

- These approval requirements have been fully reviewed textually. All general requirements have been deleted and included in the GASTEC QA general requirements document. Requirements that cannot be verified have been deleted.
- In accordance with NPR 3378-11, lengths of up to 2 meters are permitted with specification on the packaging.
- The mercury nitrate test has been replaced by the ISO 6957 standard.
- The requirement for leak tightness has been amended.
- The tightening resistance requirement has been added.
- Odor permeability no longer applies. This test has already been included in approval requirements 43.
- The packaging requirements have been added.
- The test matrix has been adjusted

1.2 Scope

These GASTEC QA approval requirements describe the requirements with regard to flexible hose assemblies for use in installations for natural gas with a pressure of no more than 200 mbar in accordance with the NPR 3378-11 Code of Practice

2 Definitions

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

Board of Experts: the GASTEC QA Board of Experts

Flexible hose assembly: rubber hose with reinforcement lining (in accordance with GASTEC QA approval requirements 43) with a detachable coupling on one side and with a coupling for connection to the appliance on the other

Natural gas: 2nd family gas in accordance with EN 437

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.

3 Product requirements

3.1 Material

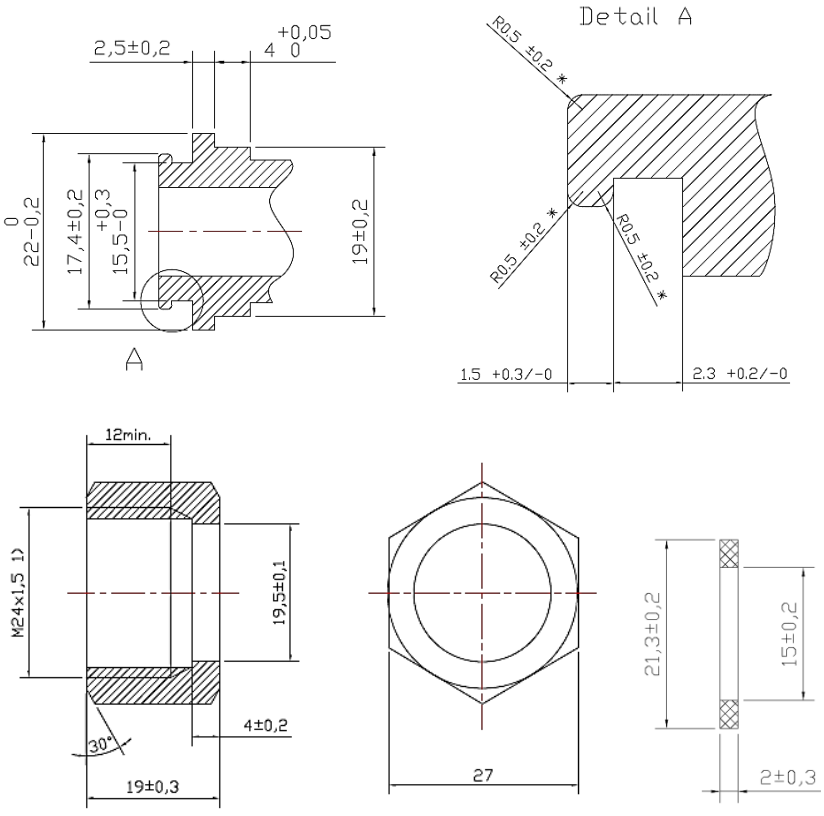
The rubber hose shall consist of a rubber inner layer, one or more reinforcement linings (fabrics or yarn) and a rubber outer layer. The rubber hose may have an intermediate layer. The rubber hose shall comply with GASTEC QA approval requirements 43.

Plastic is not permitted as part of the construction of the hose assembly.

Rubber seals shall comply with the EN 549 standard with a temperature class of at least A2.

3.2 Construction

The hose assembly shall be provided with a detachable coupling on at least one side to connect to the connection valve in accordance with the figure below.



If the hose assembly is provided with a detachable coupling on one side, the coupling on the other side shall comply with the relevant GASTEC QA approval requirements or, if no approval requirements are available, the relevant national or international standards.

If the coupling has spanner flats, the spanner width shall be in accordance with the series specified in the ISO 4032.

The attachment of the rubber hose to the construction parts of the hose assembly shall be such that the ends of the rubber hose are fully enclosed.

The attachment of the rubber hose to the construction parts of the bendable hose assembly shall be such that the coupling can only be disassembled in a destructive manner.

The couplings and any clamping bushes shall be smooth, undamaged and without sharp edges.

3.3 Dimensions

3.3.1 Nominal inner diameter

The nominal inner diameter of the hose assembly shall at least be 9 mm.

3.3.2 Length

The length of the hose assembly shall have an overall length of between 200 mm and 600 mm with a tolerance of +20 mm.
Lengths of up to 2 meters are permitted with additional specification on the packaging.

4 Performance requirements and testing methods

4.1 General

All tests shall be performed at an ambient temperature of 23 +/- 5 °C on samples with a length of 600 mm ±30 mm with couplings unless stated otherwise.
1 hose assembly shall be used per test unless specified otherwise.

Leak tightness tests are performed using air.

No deformation or damage shall occur to the product during testing

4.2 Resistance against stress corrosion

All parts shall be free of stress corrosion.

The magnesium chloride test in accordance with 4.2.1 shall be used for stainless steel components. After exposure to the magnesium chloride solution, no cracks shall observed when assessing visually with a 5x magnification.

The ISO 6957 (9.5 pH) standard shall be used for copper alloy components.

4.2.1 Testing method

The parts shall be degreased using acetone.

Dissolve 1000 g of MgCl2.6H2O for every 500 ml of distilled water or proportional parts thereof. There shall be sufficient liquid to submerge the entire part and to suspend it freely from the bottom in the test vessel.

Heat the test vessel up to 130 ± 2 ºC and position the part in the liquid for 100 hours and, next, allow the liquid to cool down to 70 °C ±2 ºC. Keep the sample at this temperature for 60 hours.

Small quantities of magnesium chloride or distilled water may have to be added to achieve this temperature. Ensure that heating takes place uniformly. Prevent shocks and jolts.

Carry out a visual assessment using a 5x magnification.

4.3 Leak thightness

The hose assembly shall be leak tight for 300 seconds when the internal pressure is 300 mbar.

4.3.1 Testing method

The hose assembly shall be sealed on one side and the air pressure shall be increased up to 300 mbar on the other side. No leakage shall be observed during 300 seconds.

4.4 Determination of pressure loss

The loss of pressure over the hose assembly shall not be more than 0,9 mbar with regard to a flow of 1,1 m^3/h (m^3/h standard).

4.4.1 Testing method

A set-up in accordance with figure 1 shall be used to determine the loss of pressure over the hose assembly. The air flow rate shall be set to 1,1 m^3/h (standard) at an inlet pressure of 25 mbar by using a control valve on the outlet side. The loss of pressure measured over the hose assembly may not be more than 0,9 mbar.

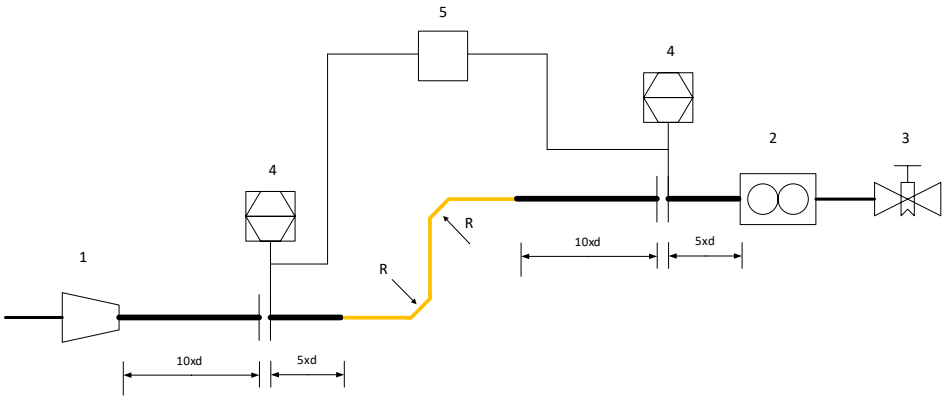


Figure 1

1 = inlet pressure regulator
2 = flow meter
3 = control valve outlet
4 = pressure meter
5 = pressure differential meter

4.5 Resistance to pull out

The hose assembly shall be able to withstand a gradually increasing tensile load from 0 N to 200 N during 60 seconds without presenting leaks.

4.5.1 Testing method

The couplings of the hose assembly shall be connected to a traction device. The tensile load shall be increased to 200 N at a speed of 50 mm per minute. This 200 N load shall be maintained for 60 seconds. Next, the hose assembly shall be disassembled and checked for leak tightness in accordance with 4.3.

4.6 Resistance against shock loads

The hose assembly shall be able to withstand a shock load of 200 N without leakage.

4.6.1 Testing method

The hose assembly shall be clamped on the top side and linked to a 20 kg weight on the bottom side. The weight shall be lifted 500 mm and, released so that it can fall freely. Subsequent, the test shall be repeated.
Then the hose assembly shall be disassembled and checked for leak tightness in accordance with 4.3.

4.7 Resistance against torsional loads

The hose assembly shall be able to withstand a torsional load as a result of a 180° rotation at temperatures ranging from 20 °C to 80 °C without leakage, becoming loose from the couplings or suffering damage that may have an impact on functionality.
After determining the resistance against the tensile load, the resistance against the torsional load shall be determined.

4.7.1 Testing method

The hose assembly shall be connected with two parallel fastening points with a 180 mm center-to-center distance. The ends of the hose assembly shall be turned 180° relative to each other.

This set-up shall be maintained fully for seven days for 24 hours in an air oven. The temperature in the oven must be 80 ±3°C for 2 hours followed by 20 ±3°C for 2 hours, alternating.

The set-up shall be cooled down after seven days until ambient temperature is achieved. The swivel nuts may not have been loosened and the hose assembly shall not be damaged. The leak tightness shall be determined in accordance with 4.3. Next, the resistance against the tensile load shall be determined in accordance with 4.5

4.8 Resistance against changing loads

The hose assembly shall be able to withstand an alternating load ranging from 0 N to 30 N 1000 times without being damaged or leakage.

4.8.1 Testing method

The hose assembly shall be connected to a horizontal fastening point using the loose or fixed connecting fitting. The free end shall be connecting with the 3 kg mass by using the hexagonal swivel nut. This mass shall be moved upwards 1000 times with a constant speed of approximately 10 times per minute until the hose assembly is free from loads and then moved downwards until the mass is suspended from the hose assembly. Next, the leak tightness shall be checked in accordance with 4.5.

4.9 Strenght of fittings

Couplings with a flat gasket shall be able to resist torsion with a moment of 3,5 Nm per mm of inner diameter of the hose assembly without presenting leaks.

4.9.1 Testing method

The coupling of the hose assembly shall be installed on a suitable counterpart component. The coupling shall, next, be tightened with a moment that matches 3,5 Nm per mm of the inner diameter of the hose assembly.
Leak tightness shall be checked in the installed state in accordance with 4.5

5 Marking and packaging

5.1 Marking

The product shall include a non-removable ring that includes the following information:

- Name or identification marking of the supplier.
- GASTEC QA or the GASTEC QA logo

5.2 Packaging

Every rubber hose assembly shall be protected against possible damage during storage and transport through packaging.

If the length of the product is longer than 60 centimeters, the following text shall be specified on the packaging:

Rubber hose assemblies longer than 60 centimeters may only be used in relation to:

- Movable appliances in the open air
- Integrated appliances
- Radiation appliances

6 Summary of tests

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

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

6.1 Test matrix

Description of requirement	Clause	Test within the scope of		
		Initial product assessment	Product verification	
			Verification	Frequency
Material	3.1	X		
Construction	3.2	X	X	1x/year
Dimensions	3.3	X	X	1x/year
Nominal inner diameter	3.3.1	X		
Length	3.3.2	X		
Resistance against stress corrosion	4.2	X	X	1x/year
Leak tightness	4.3	X	X	1x/year
Determination of pressure loss	4.4	X		
Resistance to pull out	4.5	X		
Resistance against shock loads	4.6	X		
Resistance against torsional loads	4.7	X	X	1x/year
Resistance against changing loads	4.8	X	X	1x/year
Strength of fittings	4.9	X		
Marking	5.1	X	X	1x/year
Packaging	5.3	x		

7 List of referenced documents

7.1 Standards / normative documents

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

EN 549: 1995	Rubber materials for seals and diaphragms for gas appliances and gas equipment
ISO 4032: 2013	Hexagon regular nuts (style 1) – product grades A and B
ISO 6957: 1988	Copper alloys – ammonia tests for stress corrosion resistance