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September 2020

Approval requirement 197

Corrugated stainless steel piping systems for indoor gas installations

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Foreword

This GASTEC QA 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 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 : 1 August 2020

Accepted by Kiwa Nederland B.V. : 23 September 2020

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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
3.2	Appearance	5
3.3	Tensile-resistant fittings	5
3.3.1	Dimensions tensile-resistant fittinges	5
3.4	Connections	5
3.5	Sealing material	6
3.5.1	Rubber sealings	6
3.5.2	Other sealing materials	6
4	**Performance requirements and test methods**	**7**
4.1	General	7
4.2	High temperature test	7
5	**Marking and instructions**	**9**
5.1	Marking	9
5.2	Instructions	9
6	**Quality system requirements**	**10**
7	**Summary of tests**	**11**
7.1	test matrix	11
8	**List of referenced documents and source**	**12**
8.1	Standards / normative documents	12
Parts of the text of this approval requirement are from NEN 1078		12

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 corrugated stainless steel piping systems for indoor gas installations.

This GASTEC QA Approval requirements replace the GASTEC QA Approval Requirements 197 “Corrugated stainless steel piping systems for indoor gas installations” dated February 2019.

List of changes:

- Reference to EN 15266:2007
- Requirement for resistance to high temperatures added

The product requirements have changed.

1.2 Scope

The approval requirements relate to plastic-coated flexible and pliable corrugated stainless steel pipes and matching tensile resistant fittings for gas installations in residences and buildings for the transport of gaseous fuels of the 1st, 2nd and 3rd family of gasses according to EN 437. The nominal internal diameter of the corrugated pipes is 10 through 65 mm. The maximum admissible operating pressure is 0,5 bar. The system is intended for indoor use at operating temperatures ranging from -20 °C to 60 °C.

2 Definitions

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

Board of Experts: The Board of Experts Gastec QA.

Other definitions can be found in EN 15266:2007

3 Product requirements

3.1 General

Corrugated stainless steel piping systems shall meet the requirement of EN 15266:2007. In addition to EN 15266:2007 the requirements below shall be met. Dimensions greater than DN50, with maximum DN65 are part of sizegroup Z according to EN 15266:2007.

3.2 Appearance

The surface of the stainless steel pipe shall be smooth both internally and externally and shall not show any mill scale, pitting, loose oxide layers or acid residues. The pipe ends shall be smooth and flat.

3.3 Tensile-resistant fittings

The surfaces of the tensile-resistant fittings shall be smooth both internally and externally and shall show no blisters, pitting, notches or other defects. Sharp transitions that may have a notching effect shall be avoided. When assembling the tensile-resistant fitting, the stainless steel pipe and in particular the welded seam shall not tear. Fitting tools and aids shall not damage the pipe and tensile-resistant fitting.

3.3.1 Dimensions tensile-resistant fittinges

No requirements are laid down for the dimensions of the connection of the tensile-resistant fitting with the corrugated stainless steel pipe. The dimensions of the tensile-resistant fittings and the admissible tolerances shall be in accordance with the manufacturer's specifications and shall be given on drawings.

If the fitting features any spanner faces, these shall comply with ISO 272. Moreover, the height of the spanner face shall comply with the values given in table 1.

Spanner width (in mm)	Up to 22	24 and 27	30 and 34	36 and 41	46 and 50	55, 60, 65, 70 and 75
Minimum height of spanner face (in mm)	4	5	6	7	8	9

Table 1: heights of spanner faces

3.4 Connections

It is permitted to provide one end of the tensile-resistant fitting with one of the following connections. The connection shall comply with the relevant requirements or standards.

- Gas treads according to ISO 7-1 type R or Rp. The threads shall be smooth and have rounded crests and roots
- Compression fittings for joining copper pipes according to GASTEC QA Approval requirement 35
- Press fittings for joining copper pipes according to GASTEC QA Approval requirement 186
- Plumbing fittings with ends for capillar soldering and/or thread connections according to GASTEC QA Approval requirement 6
- Union couplers according to NEN 2541, 2543, 2544, 2545 and NPR 7028

Other connections are permitted after consultation of the approval authority.

3.5 Sealing material

3.5.1 Rubber sealings

If rubber sealings are used, they shall comply with EN 549. The seals shall be minimally of temperature class A2 according to EN 549.

3.5.2 Other sealing materials

Other sealing materials used shall be in accordance to GASTEC approval requirement 31-1, 31-2 or 31-3 (anaerobic sealing, non-hardening sealing or PTFE tape)

4 Performance requirements and test methods

4.1 General

In addition to EN 15266:2007 the corrugated stainless steel piping system shall meet the below requirements.

4.2 High temperature test

The corrugated stainless steel piping system (including protection/isolation) should be resistant to a radiation heat of 10 kW/m^2 during 30 minutes.
The leakage shall be ≤ 5 l/h after testing

The test shall be performed at a temperature of 20 °C ± 5 °C.
The test samples shall be conditioned at least 24h before testing at a temperature of 20 °C ± 5 °C en humidity of 60 % ± 20 %.

The test is performed in a horizontally test equipment as shown in figure 1. The leakage shall be measured in accordance to Annex A of EN 1775:2007.

The test sample shall be mounted in the test equipment without stress or tension on the test sample, see figure 1.

Before the start of the high temperature test, the sample is tested on leakage at 200 mbar during 5 minutes. Record the leakage value (l/h)

Expose the test sample during 30 minutes to a heat radiation of 10 kW/m^2. The distance between the heating cup and the sample shall be calculated with the data on the calibration file of the heating cup.

Determine the leakage after the high temperature test during 5 munites at 200 mbar. Record the value (l/h)

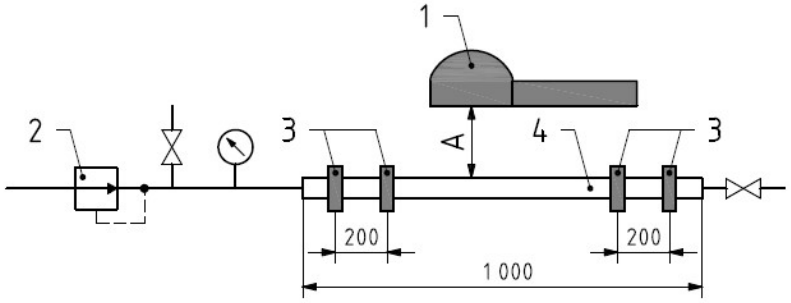

Figure 1: test equipment for high temperature test

1 heat cup
2 measuring system as described in appendix A of NEN-EN 1775:2007
3 mounting brackets
4 test sample
A distance between heat cup and surface of the assembled component (for example the outside of a casing)

In case of fittings the test shall be performed with the use of a pipe which fit the fitting according to the installation manual of the manufacturer. The pipe is mounted on both ends of the fitting.

5 Marking and instructions

5.1 Marking

The pipe shall be marked according to EN 15266:2007 and in addition also with:

- The GASTEC QA mark

The fittings shall be marked according to EN 15266:2007 and in addition also with:

- The GASTEC QA mark

5.2 Instructions

The instruction manual of the corrugated stainless steel piping system shall be available in Dutch and shall meet the requirements of EN 15266:2007 and in addition also:

- A confirmation stating which combination of coated corrugated stainless steel pipe and tensile-resistant fitting can be used
- The fitness for repeated assembly of the fitting
- The minimum bending radius
- A curve describing the relation between airflow and pressure loss per meter pipe
- A curve describing the relation between airflow and pressure loss of a pipe system containing a straight fitting, one meter pipe and an elbow 90° fitting

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 15266	Test within the scope of		
		Initial product assessment	Product verification	
			Verification	Frequency
Product requirements	**4**			
General	4.1	X	X	Once a year
Materials	4.2	X	X	Once a year
Nominal size DN and pressure drop	4.3	X	X	Once a year
Threads	4.4	X	X	Once a year
PLT fittings	4.5			
General	4.5.1	X	X	Once a year
Stress corrosion	4.5.2	X		
Dezincification	4.5.3	X		
Seals and sealing agents	4.6	X	X	Once a year
Environment	4.7	X		
Supports	4.8	X	X	Once a year
Electrical conductivity requirements	4.9	X	X	
Cover	4.10	X	X	Once a year
Performance requirements	**5**			
Tightness test	5.2	X	X	Once a year
Dimensional check	5.3	X	X	Once a year
Bending performance	5.4	X	X	Once a year
Crushing resistance	5.5	X	X	Once a year
Stability under pressure	5.6	X		
Wear resistance of the outer cover	5.7	X		
Structural strength	5.8	X	X	Once a year
Impact resistance	5.9	X		
Penetration resistance	5.10	X		
Resistance to pull out	5.11	X	X	Once a year
Chemical resistance	5.12	X		
Low temperature resistance	5.13	X		
Ageing	5.14	X		
Tightness in case of fire	5.15	X		
Reaction to fire	5.16	X		
Electrical conductivity	5.17	X	X	Once a year
Pressure drop	5.18	X		
Maximum load for admissible deformation	5.19	X		
Marking and instructions	**6**			
Marking	6.5	X	X	Once a year
Instructions	6.4	X	X	Once a year
Additional GASTEC QA requirements				
General	3.1	X	X	Once a year
Appearance	3.2	X	X	Once a year
Tensile resistant fittings	3.3	X	X	Once a year
Connections	3.4	X	X	Once a year
Sealing material	3.5	X	X	Once a year
Resistance to high temperatures	4.2	X		
Marking	5.1	X	X	Once a year
Instructions	5.2	X	X	Once a 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 15266:2007	Stainless steel pliable corrugated tubing kits in buildings for gas with an operating pressure up to 0,5 bar
NEN 2541:1967	Fittings and connections for gas conduits
NEN 2543:1967	Fittings for soldering gas conduits
NEN 2544:1967	Coupling nuts for fittings for gas and water conduits
NEN 2545:1967	Packing rings for fittings with gas conduits
NPR 7028:2008	Gasmeters – Dimensions and connections
EN 549:2019	Rubber materials for seals and diaphragms for gas appliances and gas equipment
ISO 7-1:1994/Corr 2007 en	Pipe threads where pressure-tight joints are made on the threads, dimensions, tolerances and designation
ISO 272:1982	Fasteners: widths across flats for hexagon products
GASTEC QA Approval requirement 6:2019	Plumbing fittings with ends for capillar soldering and/or thread connections
GASTEC QA Approval requirement 35:2019	Compression fittings for joining copper pipes
GASTEC QA Approval requirement 186:2019	Press fittings for joining copper pipes

Parts of the text of this approval requirement are from NEN 1078