

AR 31-3

August 2024

Approval requirement 31-3

Sealing materials for metallic threaded joints
Part 3: Unsintered PTFE tapes and PTFE strings



Trust
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Progress

Foreword

This 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 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.

Approved by the Board of Experts: 16/08/2024

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

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1 Introduction

1.1 General

This GASTEC QA approval requirement (AR) in combination with the GASTEC QA general requirements, is applied by Kiwa as the basis for the issuing and maintaining the GASTEC QA product certificate for sealing materials for metallic threaded joints – part 3: Unsintered PTFE tapes and PTFE strings.

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 September 2019.

List of changes:

- These approval requirements have been fully reviewed textually.
- The scope has been revised
- Change of paragraphs
- Update of list of referenced documents

The product requirements have not changed.

1.2 Scope

This approval requirement is applicable on unsintered PTFE sealing tapes and strings for metallic threaded joints according to EN 10226-1.

The sealing material is suitable for use in gas installations for gases from the 2nd and 3rd family gases according to EN 437.

Note: The sealing material for metal threaded connections according to EN 10226-1 is also suitable for hot water heating systems, but this application is not covered by the GASTEC QA quality mark.

2 Definitions

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

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

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

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

3 Material and product requirements

This chapter contains the material and product requirements that the raw materials, materials and products used shall meet.

3.1 General

The product shall comply with the requirements described in EN 751-3.

Supplementary to that stated in EN 751-3 the product shall comply with the following product requirements.

3.2 Classification of sealing materials

Sealing materials shall be suitable for both fine (F) and course (G) threads. The materials shall meet the requirements for both classes F and G.

Contrary to EN 751-3, chapter 4 following classification shall be used:

- “Klasse 0.2” materials shall meet the requirements for Class B of EN 751-2.
- “Klasse 8” materials shall meet the requirements for Class AR_p of EN 751-2.
- “Klasse 20” materials shall meet the requirements for Class C of EN 751-2.

3.3 Thickness

Contrary to EN 751-3, paragraph 5.1.2.3 the PTFE tape shall have a minimum thickness of 0,10 mm. Determine the dimensions of the tape in accordance with clause 4.4 of this approval requirement.

3.4 Density

Contrary to EN 751-3, paragraph 5.1.3 the minimum relative density of the PTFE tape shall be 1,0 g/cm³ at 20 °C. The density of twines shall comply with the specification of the manufacturer. Determine the density of the tape in accordance with paragraph 4.4 of this approval requirement.

4 Performance requirements and thest methods

This chapter contains the additional and different performance requirements and associated test methods that the products shall meet in combination with the requirements of EN 751-3. This chapter also specifies the limit values, if applicable.

4.1 Leak tightness

Contrary to EN 751-3, the test pressures for the leak tightness tests shall be according to table 1 of this AR.

4.1.1 Test method

The test samples shall be tested during 15 minutes at a test pressure in accordance with table 1. Leakage shall be determined over the last 5 min of the prescribed test time, in line with EN 751-3.

Class	Test pressure in bar during 15 ± 1 min.
Klasse 0.2 bar	0.3 ± 0.015
Klasse 8 bar	12 ± 0.3
Klasse 20 bar	30 ± 1.5

Table 1

4.2 Resistance to a pressure blast

Additionally, the test assemblies in accordance with EN 751-2, paragraph 7.3, shall be leak tight after being subjected to a pressure blast.

4.2.1 Test method

The test assemblies shall be subjected to a pressure blast with air or nitrogen in accordance with table 2 for 10 -1/+5 seconds. After being subjected to the pressure blast the test assemblies are tested according to paragraph 4.1.

Class	Pressure blast in bar during 10 -0/+5 sec.
Klasse 0.2 bar	1 ± 0.01
Klasse 8 bar	16 ± 0.5
Klasse 20 bar	N.A.

Table 2

4.3 Resistance to high temperatures

In addition to EN 751-3, the sealed metallic threaded joint shall be resistant to a radiation heat of 10 kW/m² for 30 minutes. The leakage shall be ≤ 5 liters per hour after testing.

4.3.1 Test method

The test shall be performed at a temperature of 20 ± 5 °C. The test samples shall be assembled in accordance with EN 751-3, clause 7.2. The test samples shall be conditioned at least 24h before testing at a temperature of 20 ± 5 °C and a 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 with Annex A of EN 1775.

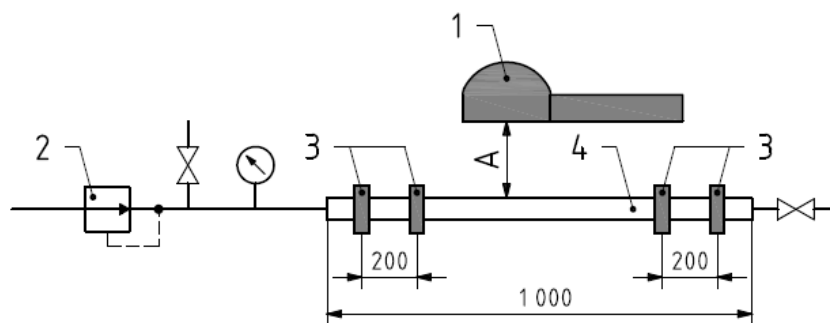


Figure 1

Legend:

1 heat cup

2 measuring system as described in appendix A of EN 1775

3 mounting brackets

4 to be tested sample

A distance between heat cup and surface of the assembled component (for example the outside of a casing)

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 for 5 minutes. Record the leakage value (l/h).

Expose the test sample during 30 minutes to a heat radiation of 10 kW/m². 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 minutes at 200 mbar. Record the value (l/h).

4.4 Determination of dimensions

Test method

1. Perform the measurement at 20 ± 5 °C.
2. Measure the thickness of the PTFE tape in accordance with EN 751-3, paragraph 7.2.2.3, with an accuracy of ± 0.0025 mm on 60 points spread over the length of the tape. Disregard the first and last 500 mm of the PTFE length.
3. Calculate the average of the 60 measurements (result A, in cm).
4. Measure the width of the PTFE tape with the help of a measure microscope with an accuracy ± 0.01 mm on the beginning, middle and end of the tape. Disregard the first and last 500 mm of the PTFE length.
5. Calculate the average of the 3 measurements (result B, in cm).
6. Measure the length PTFE over a length of 1000 ± 10 cm, with an accuracy of ± 5 mm (result C, in cm).
7. Measure the weight of this 10 m tape with an accuracy of $\pm 0,1$ mg (result D in g).
8. Calculate the relative density in g/cm^3 as following; $D / (A \times B \times C)$.

5 Marking and instructions

5.1 Marking

In addition to that stated in EN 751-3, chapter 8, each spool carrying PTFE tape or twine shall be marked to with the following information:

- GASTEC QA, GASTEC QA logo or word mark.
- Pressure class “Klasse 0.2”, “Klasse 8” or “Klasse 20”.

5.2 Instructions

As stated in EN 751-3, article 8, the installation instructions shall be provided in a language which can be easily understood and additionally also in the Dutch language.

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 evaluation

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

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

7.1 Evaluation matrix

Description of requirement	Clause EN 751-3	Test within the scope of		
		Initial product assessment	Product verification Verification	Frequency
Differentiation and classification of PTFE tapes and PTFE strings	4			
Differentiation	4.1	X		
Classification	4.2	X	X	Once a year
Requirements to be met by the PTFE tape and PTFE strings as received	5.1			
General	5.1.1	X		Once a year
Tape and string dimensions	5.1.2			
Length	5.1.2.1	X	X	Once a year
Width	5.1.2.2	X	X	Once a year
Thickness	5.1.2.3	X		
Mass	5.1.3	X		
Mass per area for PTFE tapes	5.1.3.1	X	X	Once a year
Mass per length for PTFE stings	5.1.3.2	X	X	Once a year
Residual lubricant content	5.1.4	X		
PTFE structure and material	5.1.5	X		
Wrapping properties	5.1.6	X		
Requirements to be met by the PTFE tape and PTFE string after assembly	5.2			
Sealing properties	5.2.1	X		
Tightness	5.2.1.2	X		
Resistance to temperature cycling	5.2.1.3	X	X	Once a year
Dismantling	5.2.2	X		
Test documentation	6.2	X		
Marking on packages	8.1	X	X	Once a year
Instructions	8.2	X	X	Once a year
Additional GASTEC QA approval requirements	Clause AR			
Classification of sealing materials	3.2	X		
Thickness	3.3	X	X	Once a year
Density	3.4	X	X	Once a year
Resistance to pressure blast	4.2	X	X	Once a year
Leak tightness	4.3	X	X	Once a year
Resistance to high temperatures	4.4	X		
Marking	5.1	X	X	Once a year
Instructions	5.2	X	X	Once a year

8 List of referenced documents

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 751-3: 2022 + A1: 2024

Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water -part 3: unsintered PTFE tapes

EN 1775: 2007

Gas supply - Gas pipework for buildings - Maximum operating pressure less than or equal to 5 bar - Functional recommendations

8.2 Source of informative documents

EN 437: 2021

Test gases- test pressure – appliance categories

EN 10226-1: 2004

Pipe threads where pressure tight joints are male on the treads – Part 1 taper external threads and parallel internal threads

NEN 1078: 2024

Supply for gas with an operating pressure up to and including 500 mbar - Performance requirements - New estate

General requirements GASTEC QA