AR 5
November 2024

Approval requirement 5

Copper tubes

Trust
Quality
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: Month date, year

Accepted by Kiwa Nederland B.V.: Month date, year

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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 copper tubes.

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 the version of September 2019.

List of changes:

- These approval requirements have been fully reviewed textually.
- Change of several paragraph numbers
- Update of list of referenced documents

1.2 Scope

This approval requirement specifies the requirements for copper tubes. The intended use is transport for 2nd and 3rd family gases in accordance with EN 437 with a maximum operating pressure of 1 bar.

The copper tube can be supplied with or without an external covering for protection of the tube surface and/or as thermal insulation finish coat.

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 copper tubes shall comply with the requirements specified in EN 1057: 2006 + A1: 2010.

3.2 Wall thickness

Contrary to EN 1057: 2006+ A1: 2010, the nominal wall thickness of the copper tube shall be according to table 1.

Nominal outside diameter d (mm)	**Nominal wall thickness e (mm)**					
	1,0	**1,1**	**1,2**	**1,5**	**2**	**2,5**
10	X					
12	X					
15	X					
18	X					
22	X	X	X	X		
28			X	X		
35			X	X		
42			X	X		
54			X	X	X	
64					X	
76,1					X	
88,9					X	
108						X

Table 1

3.3 Requirements for copper tubes with external covering

The copper tubes with external covering shall comply with the requirements specified in KIWA BRL K761.

4 Performance requirements and test methods

In addition to the requirements of EN 1057, the products shall also comply with the following requirement.

4.1 Resistance to high temperatures

The copper pipes (including protection/isolation) shall be resistant to a radiation heat of 10 kW/m^2 for 30 minutes. The leakage shall be ≤ 5 liters per hour after testing.

4.1.1 Test method

The test shall be performed at a temperature of 20 ° ± 5 °C. The test samples shall be conditioned at least 24h before testing at a temperature of 20 ± 5 °C and a relative 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 1775:2007.

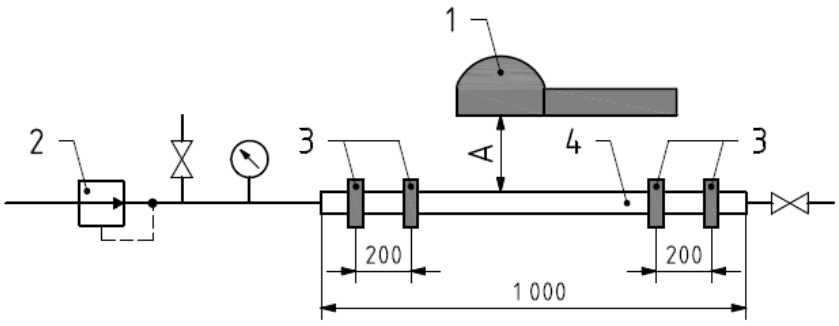

Figure 1

Legend:
1 heat cup
2 measuring system as described in appendix A of 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)

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 for 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 minutes at 200 mbar. Record the value (l/h).

5 Marking

5.1 Marking

In addition to article 12 of EN 1057 the copper tube shall be permanently marked with:

- GASTEC QA, GASTEC QA punch mark or logo;
- Type of covering (if applicable)

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 copper tubes

Description of requirement	Clause EN 1057	Test within the scope of		
		Initial product assessment	Product verification	
			Verification	Frequency
Composition	7.1	X	X	1x/ year
Mechanical properties	7.2	X	X	1x/ year
Dimensions and tolerances	7.3	X	X	1x/ year
Freedom from defects	7.4	X	X	1x/ year
Surface quality	7.5	X	X	1x/ year
Bending	7.6	X	X	1x/ year
Drift expanding	7.7	X	X	1x/ year
Flanging	7.8	X	X	1x/ year
Additional GASTEC QA requirements				
Wall thickness	3.2	X	X	1x/ year
Resistance to high temperatures	4.1	X		
Marking	5.1	X	X	1x/ year

7.2 Test matrix for external covering of copper tubes

Description of requirement	Clause BRL K761	Test within the scope of		
		Initial product assessment	Product verification	
			Verification	Frequency
Material	2.3.2.1	X	X	once a year
Appearance	2.3.2.2	X	X	once a year
Fit	2.3.2.3	X	X	once a year
Thickness	2.3.2.4	X	X	once a year
Vulnerability	2.3.2.5	X		
Processability	2.3.2.6	X		
Thermal insulation	2.3.2.7	Optional		
Marking	2.3.3	X	X	once a year
Additional requirements for PVC Covering				
Aging	3.2.1	X		
Loss of plasticizer	3.2.2	X	X	once a year
Cold bend test	3.2.3	X	X	once a year
Additional requirements for PE Covering				
Melt flow index after ageing	4.2.1	X	X	once a year
Elongation at break	4.2.2	X	X	once a year
Cold bend test	4.2.3	X	X	once a year
Additional requirements for covering made from hard polyurethane foam surrounded by another cover of non-plasticized PVC				
Dimensional stability of the PU-foam	5.2.1	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 1057: 2006 + A1: 2010	Copper and copper alloys – seamless, round copper tubes for water and gas in sanitary and heating application
EN 1775: 2007	Gas supply - Gas pipework for buildings - Maximum operating pressure less than or equal to 5 bar - Functional recommendations
BRL K761	Copper tubes provided with an external covering

8.2 Source of informative documents

EN 437: 2021	Test gases- test pressure – appliance categories
NEN 1078: 2024	Supply for gas with an operating pressure up to and including 500 mbar - Performance requirements - New estate
General requirements GASTEC QA	