AR 6
January 2025

Approval requirement 6

Plumbing fittings with ends for capillary soldering, capillary brazing and/ or threaded connections

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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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Contents

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 plumbing fittings with ends for capillar soldering and/or thread connections.

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:

- Update in line with new version of EN 1254-1 and 1254-4, 2021.
- These approval requirements have been fully reviewed textually.
- Change of paragraphs.
- Update of referenced documents.

The product requirements have not changed.

1.2 Scope

These approval requirements specify the requirements for copper and copper alloy fittings with ends for capillary soldering or capillary brazing to copper tubes according to the GASTEC QA approval requirements 5 and/or thread connections for the transport of gas.

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 requirements to be met for these fittings, as well as accompanying testing methods, are based on the following standards:

EN 1254-1	Copper and copper alloys - Plumbing fittings - Part 1: Capillary fittings for soldering or brazing to copper tubes	June 2021
EN 1254-4	Copper and copper alloys - Plumbing fittings - Part 4: Threaded fittings	June 2021

Supplementary to that stated in EN 1254-1 and EN 1254-4 the following requirement shall be met:

3.2 Nominal diameter

Contrary to EN 1254-1, table 21 only the following nominal diameters for capillary soldering and thread connections are a part of the scope of this approval requirement:

DN 10 – DN 12 – DN 15 – DN 18 – DN 22 – DN 28 – DN 35 – DN 42 – DN 54

For fittings for thread connections and capillary brazing the following nominal diameters are also applicable in this approval requirement:

DN 64 – DN 76,1 – DN 88,9 – DN 108

3.3 Performance of internal soldering-ends

The inlet of the soldering-end shall be rounded or chamfered in such way that no burrs are visible.

3.4 Across flats

The width of across flats shall be in accordance with ISO 272. If the across flat width is greater than 46 mm the nut may also be octagonal. The height of the across flats shall be at least equal to the values of table 1.

Across flat width (mm)		Height across flat (mm)
Greater than	Less than	
	22	4
22	27	5
27	32	6
32	41	7
41	50	8
50	75	9
75		10

Table 1: across flat height

3.5 Reducer fittings

For reducer fittings and connections, the transition shall be gradually made.

3.6 Corners

In addition to EN 1254-1, clause 4.15, the angle between the axis and branch, ongoing ends of a T-piece and the angle of the axis of a bore in knees and elbows shall be 90°.

It is possible for elbows to produce the angle of the axis of the bores at 45°.

3.7 Connection threads

Fitting threads shall meet the requirements of EN 10226-1.

3.8 Screwed union connections

Screwed union connections shall be in accordance to:

NEN 2550 – male screw union piece
NEN 2551 – female screw union piece
NEN 2542 – flange – thread connection
NEN 2541 – flange - capillary solder connection.
NEN 2545 - gasket ring
NEN 2544 – union nut
NEN 2549 - capillary solder union piece

3.9 Rubber gaskets

Rubber gaskets shall comply with EN 549, and the temperature class shall be at least A2.

4 Performance requirements and test methods

In addition to the requirements from EN 1254-1, the following requirement shall be met.

4.1 Resistance to high temperatures

The fittings connected to the pipe 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.

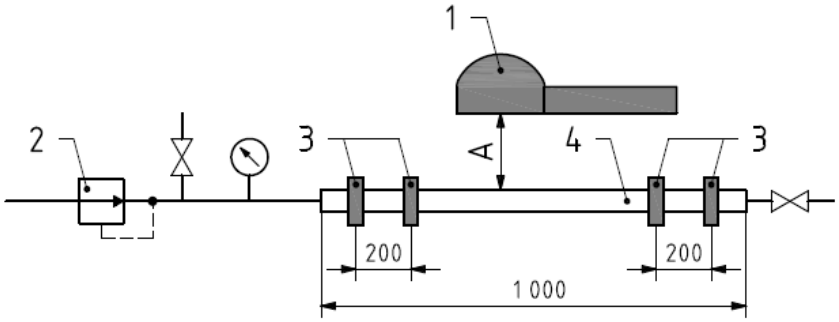

Figure 1

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 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 and documentation

5.1 Marking

In addition to article 7 of EN 1254-1, the fitting shall be permanently marked with:

- GASTEC QA, GASTEC QA logo or punch mark;

5.2 Documentation

Documentation is drawn up according to article 8 of EN 1254-1 in the Dutch language in the language of the country in which the product will be used and at least in English.

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 design 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	Clause EN 1254-1	Test within the scope of		
		Initial product assessment	Product verification	
			Verification	Frequency
Scope	1	X		
Materials	1	X	X	Once a year
Product characteristics				
Internal pressure	4.1	X	X	Once a year
Tightness	4.2	X	X	Once a year
Release of dangerous substances	4.3	X		
Durability of internal pressure	4.4.1	X	X	Once a year
Durability of tightness	4.4.2	X	X	Once a year
Dimensional tolerances	4.5	X	X	Once a year
Wall thickness for ends	4.6	X	X	Once a year
Wall thickness for threaded portions of adaptor fittings	4.7	X	X	Once a year
Dimensions of tail pipe ends for swivel fittings	4.8	X	X	Once a year
Dimensions for gas union connectors	4.9	X	X	Once a year
Threaded end dimensions	4.10	X	X	Once a year
Other adapter ends	4.11	X	X	Once a year
Length of engagement	4.12	X	X	Once a year
Bore dimensions	4.13	X	X	Once a year
Tube abutment	4.14	X	X	Once a year
Alignment of fitting ends	4.15	X	X	Once a year
Shapes for tightening systems	4.16	X	X	Once a year
Surface condition	4.17	X	X	Once a year
Surface cleanliness for medical gases	4.18	X		
Plated or coated surfaces	4.19	X		
Evaluation of conformity	6	X		
Designation	7	X	X	Once a year
Marking, labelling and packaging	8	X	X	Once a year

Description of requirement	Clause EN 1254-1	Test within the scope of		
		Initial product assessment	Product verification	
			Verification	Frequency
	Clause EN 1254-4			
Scope	1	X	X	Once a year
Wall thickness at threaded portions of fittings	4.6	X	X	Once a year
Dimensions of tail pipe ends for swivel fittings	4.7	X	X	Once a year
Dimensions of gas union connectors	4.8	X	X	Once a year
Threaded end dimensions	4.9	X	X	Once a year
Other adapter ends	4.10	X	X	Once a year
Bore dimensions	4.11	X		
Alignment of fitting ends	4.12	X	X	Once a year
Shapes for tightening systems	4.13	X	X	Once a year
Additional GASTEC QA approval requirements				
Nominal diameter	3.2	X	X	Once a year
Performance of internal soldering-end	3.3	X	X	Once a year
Across flats	3.4	X	X	Once a year
Reducer fittings	3.5	X		
Corners	3.6	X		
Connection threads	3.7	X	X	Once a year
Screwed union connections	3.8	X	X	Once a year
Rubber seals	3.9	X	X	Once a year
Resistance to high temperatures	4.1	X	X	Once a year
Marking	5.1	X	X	Once a year
Documentation	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 549: 2019 + A1: 2023	Rubber materials for seals and diaphragms for gas appliances and gas equipment
EN 1254-1: 2021	Copper and copper alloys - Plumbing fittings - Part 1: Capillary fittings for soldering or brazing to copper tubes
EN 1254-4: 2021	Copper and copper alloys - Plumbing fittings - Part 4: Threaded fittings
EN 1775: 2007	Gas supply - Gas pipework for buildings - Maximum operating pressure less than or equal to 5 bar - Functional recommendations
NEN 2541: 1967	Fittings and connections for gas conduits
NEN 2542:1967	Fittings and connections with outside thread for gas conduits
NEN 2544: 1967	Coupling nuts for fittings for gas and water conduits
NEN 2545: 1967	Packing rings for fittings for gas conduits
NEN 2549: 1968	Male screw piece, one side copper tube, for three-piece unions for gas and water conduits
NEN 2550: 1968	Male screw piece, one side outside thread, for three-piece unions for gas- and water conduits
NEN 2551: 1968	Male screw piece, one side inside thread, for three-piece unions for gas conduits

8.2 Source of informative documents

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	