

Version

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English version

Translation of established Dutch version

Approval requirement 156

Sliding and transition pieces made of PE for
PVC/CPE and copper gas pipes



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Preface Kiwa

This, translated from Dutch, 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, translated from Dutch, AR will be used by Kiwa Nederland BV in conjunction with the GASTEC QA general requirements and the KIWA regulations for certification.

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.

This AR, translated from Dutch, is used as supporting document. In case of doubt of interpretation of this AR, the Dutch version is leading.

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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 sliding and transition pieces made of PE for PVC/CPE and copper pipes.

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 May 2019.

List of changes:

- This approval requirement has been adapted to the new layout of GASTEC QA approval requirements
- The approval requirement is fully textually reviewed
- The chapter division has been adjusted
- The list of reference standards has been adjusted

The product requirements have not changed.

1.2. Scope

This approval requirement is applicable on sliding and transition pieces for making a non-end load connection with PVC/CPE pipes and PVC/CPE and copper pipes used with an operating pressure of up to 200 mbar. The diameter of the PVC/CPE pipe to be connected is ≤ 50 mm and the copper pipe ≤ 42 mm.

2. Definitions

In this approval requirement, the following definitions are applicable:

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

Insertion depth: distance between the place where the end of the pipe can be inserted and the rubber seal

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

Pressure: static overpressure relative to atmospheric pressure

Sliding piece: coupler with its parts with which a non-end load-resistant connection can be made in a PVC / CPE pipe.

Transition sliding piece: a coupler according to the above with a connection option on one side with a copper tube.

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. Compound

The PE material of which the sliding pieces are made shall comply with EN 1555-1. The applied type of compound shall be declared by the manufacturer.

3.2. Re-used material

Re-used material, coming from own production of the manufacturer of sliding pieces, can be processed if the material is not mixed with other materials other than the original compound during processing. The material still shall comply with the material requirements. The manufacturer shall provide notes of the process of re-used material in the production run.

3.3. Construction

3.3.1. General

The manufacturer shall state in the user manual the intended use, applicable medium, maximum operating pressure and suitable materials. In practice, following the user manual, reliable connections shall be able to be made.

The sliding pieces shall be made by means of mechanical processing of PE-pipe. The PE-pipe shall comply with GASTEC QA approval requirement 8 except for the dimensions. The mechanical processing shall be executed such that it has no negative influence on the functioning of the sliding piece.

3.3.2. Design

The insertion part of the sliding piece shall be provided with a rubber sealing (ring or cuff). The construction shall be such that with sliding in the pipe according to the instructions of the manufacturer, the sealing shall not be moved.

Sharp transitions that can cause notching shall be prevented.

3.3.3. Appearance and finish

The sliding pieces shall be internally and externally smooth and shall not show any grooves, pits, blisters or other surface irregularities.

Connection ends shall be flat and square.

3.3.4. Connections

Example of a sliding piece for connecting PVC/CPE pipes with the same nominal outside diameters:

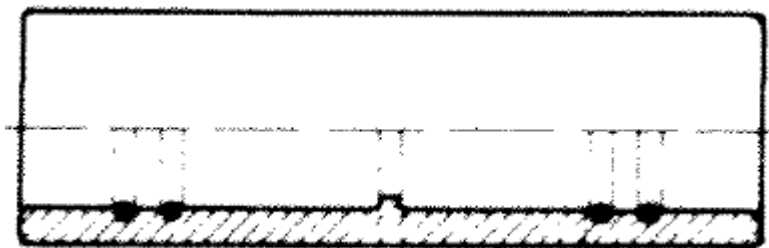


Figure 1

Example of a sliding piece for connecting PVC/CPE pipes with different nominal outside diameters (in case of a transition slide piece PVC/CPE to copper):



Figure 2

Example of a sliding piece for creating a transition connection. With this construction the pipes can slide together (PVC/ CPE to copper):



Figure 3

3.3.5. Dimensions and admissible deviations

The shape of the sliding pieces is not specified, provided that the sliding pieces are suitable for making sliding connections with PVC/CPE and/or copper pipes, taking into account the dimensional tolerances and characteristics specified in GASTEC QA Approval Requirements 5 and 10.

3.3.5.1 Wall thickness

The wall thickness shall meet the values specified in Table 1.

Diameter of the pipe to be connected		Minimum wall thickness in mm
PVC/ CPE	Copper	
20	15	3,5
25	22	3,5
32	28	5,0
40	35	5,5
50	42	5,5

Table 1: minimum wall thickness

3.3.5.2 Insertion depth

The insertion depth shall be at least 80 mm.

3.3.5.3 Internal diameter

The mean internal diameter of the sliding section shall at no cross-section be less than the maximum permissible outside diameter of the pipe to be connected.

4. Performance requirements and test methods

This chapter contains the performance requirements and associated test methods that the products shall meet. This chapter also specifies the limit values, if applicable.

4.1. General

Samples needed for testing shall be at least 15h old. The tests shall be carried out in triplicate unless otherwise specified, with a representative choice of different sizes from the range of sliding pieces to be made.

The tests shall be carried out with approved pipe types in accordance with GASTEC QA approval requirement 5 or 10.

In the case of a sliding piece according to figure 3, the copper pipe shall be inserted at least 80 mm during the test.

The dimensions of the sliding pieces shall be checked with suitable measuring tools with a measuring inaccuracy of at most 0.1 mm. The values shall meet those of paragraph 3.3.5 and the values specified by the manufacturer.

The sliding pieces shall be visually assessed for appearance. The marking applied to the sliding pieces shall be checked.

4.2. Test samples

The test samples shall be prepared without the use of lubricants or similar substances.

4.3. Leak tightness at internal air pressure

The connections of the sliding pieces with pipes of PVC/CPE or copper (in case of a transition sliding piece at on side copper) shall be able to resist, at a temperature of 23 ± 2 °C, an internal air pressure of 25 ± 2 mbar and consecutively an internal air pressure of 500 ± 10 mbar without showing leakage.

4.3.1. Test method

The sample shall consist of a sliding piece connected to the corresponding PVC/CPE pipe or copper pipe. The free length of the PVC/CPE pipe shall be at least 250 mm.

During the test, the test sample shall be checked for leakage by immersing the test sample at 100 ± 10 mm in a water bath. Subject the sample at a temperature of 23 ± 2 °C during 15 ± 1 minutes at an internal air pressure of 25 ± 2 mbar. Next, increase the pressure to 500 ± 10 mbar and maintain this pressure for 15 ± 1 minutes.

4.4. Leak tightness with deformation of the PVC/CPE pipe

The connections of sliding pieces with pipes of PVC/CPE or copper (in case of a transition sliding piece at on side copper) shall be able to resist, at a temperature of 23 ± 2 °C and a diametrical deformation of the PVC/CPE pipe of 10 % on a distance of $0,5 d_e$ (diameter pipe) from the sliding end, an internal air pressure of 25 ± 2 mbar and consecutively an internal air pressure of 500 ± 10 mbar without showing leakage.

4.4.1. Test method

Assemble the test pieces as described in paragraph 4.3.1.

Apply on $0,5 \pm 0,1 d_e$ from the sliding end a diametrical deformation of the PVC/CPE pipe(s). Maintain this deformation during the test. With a transition sliding piece the copper pipe does not need to be deformed.

Perform the test according to paragraph 4.3.1.

4.5. Leak tightness during bending

The connections of sliding pieces with pipes of PVC/CPE or copper (in case of a transition sliding piece at on side copper) shall be able to resist, at a temperature of $23 \pm 2^\circ\text{C}$ during and after applying a force F according to table 2 on a distance of $10 \pm 0,5 d_e$ from the sliding end, an internal air pressure of 25 ± 2 mbar and consecutively an internal air pressure of 500 ± 10 mbar without showing leakage.

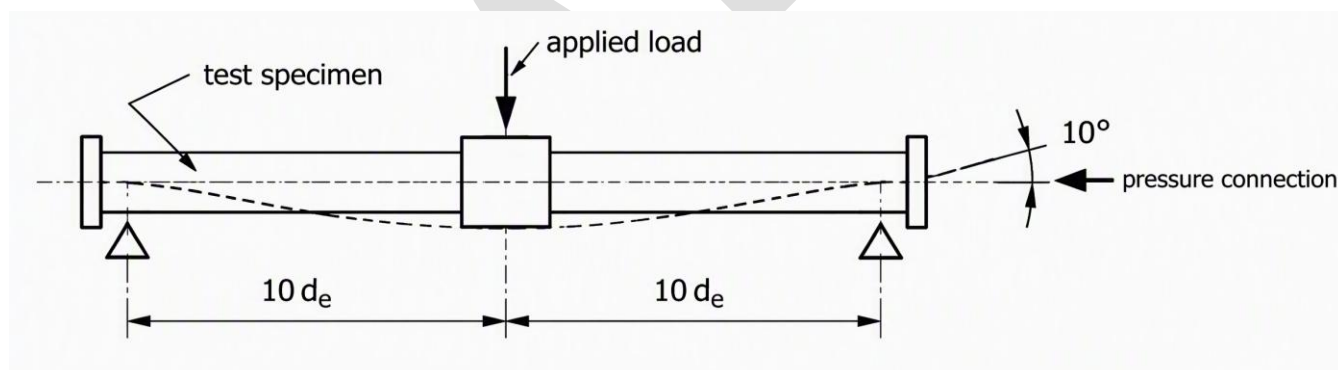
d_e		Force "F" in N
PVC/ CPE	Copper	
20	15	85
25	22	120
32	28	150
40	35	190
50	42	220

Table 2: Force on distance $10 d_e$

4.5.1. Test method

The sample shall exist from a sliding piece connected with the corresponding PVC/CPE pipe or copper pipe. The free length of the pipes shall be at least $10 d_e$ for both PVC/CPE as copper pipe.

Apply, at $23 \pm 2^\circ\text{C}$, a force F according to table 2 on the sample at a distance of $10 \pm 0,5 d_e$ from the end of the sliding piece. The force shall be applied evenly. Maintain this situation during the test.



Perform the test according to paragraph 4.3.1, however the sample will not be placed in a bath and leakage shall be determined with a soap solution.

4.6. Leak tightness under negative pressure

The connections of sliding pieces with pipes of PVC/CPE or copper (in case of a transition sliding piece at on side copper) shall be able to resist, at a temperature of $23 \pm 2^\circ\text{C}$ during 2 hours, an external water pressure of 10 ± 1 kPa without water leakage occurring.

4.6.1. Test method

Apply the test pieces as described in paragraph 4.3.1.

Subject the test pieces, at a temperature of $23 \pm 2^\circ\text{C}$ for at least 2 hours, to an external water pressure of 10 ± 1 kPa. Then increase the water pressure to 80 ± 5 kPa and maintain this pressure for at least 2 hours. After the test, check wheter water ingress has occurred.

4.7. Strength of the sliding piece

The sliding piece shall be able to resist, at a temperature of 23 ± 2 °C, during 15 minutes a hydraulic pressure of 30 ± 1 bar without showing deformations or leakage.

4.7.1. Test method

Mount the sliding piece in an installation that can at least resist a pressure of 30 bar.

Apply an internal pressure of 30 ± 1 bar to the sample and maintain this for 15 ± 1 minutes. Measure the water pressure with a precision manometer according to EN 837-2. During the test, maintain the manometer reading within $\pm 2\%$. Check if the sliding piece shows deformations or leakages.

4.8. Influence of heating on the sliding pieces

Sliding pieces shall not show, after exposure for 60 ± 5 minutes to air or glycerine at a temperature of 110 ± 2 °C and the following cool down to a temperature of 23 ± 2 °C, a change in length of more than 3%.

4.8.1. Test method

Determine the length of the, for this test used, sliding piece with an accuracy of 0,1 mm. The sample shall be placed in an oven or bath with glycerine for 60 ± 5 minutes at a temperature of 110 ± 2 °C. The placement of the sample shall be such that the change in length is impeded as little as possible. After being cooled down to a temperature of 23 ± 2 °C, the length will be measured again.

5. Marking and instructions

5.1. Marking

On the sliding pieces shall be durably and clearly marked with the following information:

- GASTEC QA, GASTEC QA logo or punchmark
- Name or trademark of manufacturer
- Compound in code
- Nominal connection size and type of the to be connected pipes
- Production period, eventually in code which is accessible for the customer

The to be applied marking cannot have any negative influence on the characteristics of the sliding piece.

5.2. Instructions

The supplier shall provide a user manual in the Dutch language and in the language of the country in which the product will be used. The user manual shall contain at least the information that with a sliding piece according to figure 3, the copper pipe shall be inserted at least 80 mm.

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.

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7. Summary of evaluation

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

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

7.1. Evaluation matrix

Description of requirement	Clause	Investigation within the scope of		
		Initial product assessment	Product verification	
			Inspection	Frequency
Material and product requirements	3			
Compound	3.1	X	X	Annually
Re-used material	3.2	X		
Construction	3.3	X		
General	3.3.1	X		
Fulfilment	3.3.2	X		
Finish and appearance	3.3.3	X		
Connection possibilities	3.3.4	X		
Dimensions	3.3.5	X	X	Annually
Performance requirements	4			
Leak tightness at internal air pressure	4.3	X	X	Annually
Leak tightness with deformation of the PVC/CPE pipe	4.4	X	X	Annually
Leak tightness during bending	4.5	X		
Leak tightness at under pressure	4.6	X	X	Annually
Strength of the sliding pieces	4.7	X	X	Annually
Influence of heating on the sliding pieces	4.8	X		
Marking	5.1	X	X	Annually
Instructions	5.2	X		

8. List of referenced documents and source

8.1. Standards/ normative documents

All references in this GASTEC QA Approval Requirement refer to the version of the relevant document specified in the list below

Number	Title	Version *
EN 837-2		1997
EN 1555-1	Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) - Part 1: General	2025
Approval requirement 5		
Approval requirement 10		

*) If no date of issuance is specified in this column, the current version of the document applies.

8.2. Source of informative documents

Number	Title	Version *
General requirements GASTEC QA		

*) If no date of issuance is specified in this column, the current version of the document applies.