

AR 194

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version

Approval requirement 194

Equipment for temporarily closing of gas pipes



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Foreword

This GASTEC QA approval requirement (Dutch version) 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 (Dutch version) will be used by Kiwa Nederland BV in conjunction with the GASTEC QA general requirements and the KIWA regulations for certification.

This approval requirement is a translation from the Dutch validated version and can only be used as a supporting document.

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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 equipment for the temporarily closing of gas pipes

This GASTEC QA Approval requirements replace the GASTEC QA Approval Requirements 194 "Apparatuur voor het tijdelijk afsluiten van gasleidingen", dated January 2015.

List of changes:

- Update to the new format for GASTEC QA approval requirements
- These approval requirements have been fully reviewed textually.
- All general requirements have been deleted and included in the GASTEC QA general requirements document
- Change of paragraphs

The product requirements have not changed.

1.2 Scope

This approval requirement applies for equipment for the temporarily closing of gas distribution pipes with a nominal pressure of 100 mbar or 4 bar. Under the first the distribution pipes are included upon which a temporarily or permanent pressure is of maximal 200 mbar.

The specific function recommendations for the application of equipment for temporarily closing of gas distribution pipes is described in the NEN 7244 and the safety instructions natural gas (VIAG) with the accompanying work instructions (VWI).

The below table shows an overview of the under this approval requirement included equipment's with their application and characteristics.

Interrupt gas pipes in the distribution net with a nominal operating pressure of 100 mbar.	Interrupt gas pipes in the distribution net with a nominal operating pressure of 4 bar.	Replacement of main valve in the distribution net with a nominal operating pressure of 100 mbar.	Replacement of tappings in gas distribution pipes with a nominal operating pressure of 100 mbar.
Equipment in combination with inflatable closing element.	Equipment in combination with inflatable closing element.	Valve change sets using inflatable closing element.	Temporarily drill hole closers, using inflatable closing element.
Equipment using a mechanical closing element	Equipment using a mechanical closing element	Valve change sets using mechanical closing element	Temporarily drill hole closers, using mechanical closing element.

2 Definitions

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

Attachment: A component that is screwed into a blowhole saddle and in which the lance can be placed correctly above the gas pipe. This attachment is provided with a rubber cover that allows the gas-free drilling and setting of closing elements.

Board of Experts: The Board of Experts Gastec QA.

Connection element: The part that provides the connection between the pipe to be sealed and the equipment with the sealing element. This part can form an integrated whole with the equipment for the temporary closing of gas pipes. Examples of a connection element are the connection by an adapter on the attachment, on a tap, on a pipe, etc

Connection hose: Hose on the inflatable element that forms the connection between the rod and the inflatable element.

Closing element: The part with which the pipe is sealed (the inflatable or mechanical sealing element).

Bladder: Inflatable element for temporarily closing of gas pipes

Bladder saddle: Special saddle for placing a closer element

Calamity: The circumstance in which the gas velocity in the temporarily to be closed pipeline is more than 20 m / s.

Flow: Flow rate of gas per unit time.

Pressure: Overpressure in relation to atmospheric pressure.

Double bladder: Two inflatable closing elements, with or without a protective cover, which are assembled as one unit

Dynamic seals: These are seals designed to ensure leak-tightness in moving parts. Examples of this are stuffing boxes / seals / o-rings / fitting seats, etc. which are used with components which move relative to each other during use. This can be turning or sliding as is the case with cranes, slides, retracting lances or bars etc.

Flexible element: The flexible part in the inflatable element.

Period of use of equipment: Period that the manufacturer indicates between two inspections.

Consumption period for consumables (including blowing and other closing devices): Term and conditions the manufacturer specifies regarding use and shelf life.

Inserting unit: Part to which the connecting pipe of the sealing element is screwed. The rod is constructed in such a way that the sealing element can be pushed out of and into the lance. The rod also provides for an inflatable sealing element to be inflated and vacuum-sucked.

Insertion element: The part of the device with which the sealing element is inserted into the pipe. Examples of an insertion element are the sliding part of a blowing lance which passes through the adapter to bring the sealing element into the line, the moving parts which bring the sealing elements of the TBA into the line, etc.

Lance: Part for temporary storage of the sealing element that is connected to the insert element or directly to the pipe section to be closed.

MOP: Maximum Operating Pressure.

Mounting equipment: The assembly of parts used to place the sealing element.

Normal use: Normal use is the intended use of the product according to the instructions and condition of the supplier.

Supplier: The party that is responsible for ensuring that products continuously meet the requirements on which the certification is based, being the certificate holder and / or manufacturer.

TBA: Tools with which connection and drilling saddles in gas distribution pipes can be replaced without gas.

Test pressure: The pressure prescribed by the manufacturer to be applied during the inspection of inflatable sealing elements

Universal lance: Lance that can be used for placing sealing elements in pipes of different material.

Working pressure: The pressure prescribed by the manufacturer that occurs during normal use, for example the pressure in the inflatable element placed in the pipe.

Workload: 90% (\pm 5%) of the maximum stroke to be made in practice.

3 Product requirements

3.1 Dimensions and materials

The used materials, composition, dimensions and tolerances of the parts shall comply with the construction drawings of the manufacturer. These drawings shall be provided by the applicant.

3.2 Parts

3.2.1 General

The parts shall be internally and externally clean, smooth finished, free of burs and shall show no sign of defects. Externally sharp corners shall be avoided. Equipment and parts shall not fail or show more leakage during the normal use period and storage. The functional properties shall not be negatively influenced during the period of use.

Equipment, parts and devices shall not bring any not intended damage to the gas supplying system. Any used lubricant shall be silicone free.

3.2.2 Manometer

When manometers are used, they shall have a deviation of max 5% Rdg and shall be clearly readable.

When analog manometers are used the nominal pressure should be at 2/3 of the max readable value.

3.2.2.1 Manometer inflatable closing element

The manometers shall have the necessary inflation pressure of the closing element clearly marked. If for functioning of the closing element it is necessary to apply vacuum, the required vacuum shall be clearly marked.

3.2.3 Interchange ability of parts

The construction of the equipment shall be such, that parts which get worn during normal use can be changed by not specialized personnel.

3.2.4 Valves

Valves shall be of the quarter turn closing type or (equal) and maintenance free.

3.2.5 Placing of the closing element with use of top piece saddles

The parts which are necessary to place the closing element through the top piece in the pipe system (placing unit) shall be made that no damage or loss of functionality is brought to the valve and seat of the top piece BG.

3.2.6 Double versions of inflatable closing elements

When double versions of the inflatable closing element are used, the elements shall be able to be pressurized and controlled on the pressure separated. The construction of double versions shall be such way that the combination closing element, manometer and valve is clear. When the pressure between the 2 closing elements can be measured, the manometer shall comply with paragraph 3.2.7.

3.2.7 Measurement of the pressure in the gas distribution system

When the closing element has ability to measure the pressure in the gas distribution system, the used manometer shall comply with paragraph 3.2.2

3.2.8 *Un-pressurizing of the pipe part between closing elements*

When the closing element has ability to un-pressurize the pipe part between closing elements, then the valves shall comply with paragraph 3.2.4.

3.3 Materials

3.3.1 *General*

The materials for the equipment for temporarily closing of gas pipes shall be chosen that they can resist the, during normal use, occurring influences.

3.3.2 *Metals*

Metal parts shall be free from corrosion, burs and other imperfections.

3.3.3 *Rubber parts*

Rubber sealings shall fulfil the requirements according to NEN-EN 682, type GAL or GBL.

3.3.4 *Resistance against aging*

The manufacturer shall declare the materials are suitable for normal use.

4 Performance requirements and test method

4.1 General

This chapter contains the performance requirements and test methods that the equipment for the temporary closing of gas pipes shall meet in order to establish that the requirements are met.

The test methods are intended to test the equipment with worst-case situations that may occur in practice. Should this goal not be achieved with the determination methods included here, then a modified / additional test protocol will be drawn up by the manufacturer in consultation with the certifying body. The certifying body and the manufacturer can take the initiative for this.

The tests are carried out at an ambient temperature of 23 °C (± 3 °C) unless otherwise stated.

The work, such as the installation and removal of the closing devices, is carried out in accordance with the method stated in the user manual of the manufacturer.

Unless otherwise stated, the tests on sealing elements are performed on the smallest, middle and largest of the series. The tests on the placing equipment shall be carried out on each type.

Closure element (for pipes) and TBA

Additionally, the tests shall be carried out on each type of lance of the system being presented for inspection.

(Inflatable) closing element

Additionally, the tests to be carried out on a pipe diameter for which the work instructions (VIAG) or manufacturer's instructions prescribe a double sealing element shall also be carried out as such.

4.1.1 Testing equipment

4.1.1.1 Pressure sensor

The for the tests to be used pressure sensor shall have an inaccuracy of $\pm 5\%$ Rdg. If a tolerance is mentioned with the test, this applies to the with the pressure sensor read value.

4.1.1.2 Force sensor

The for the tests to be used force sensor shall have an inaccuracy of $\pm 5\%$ Rdg. If a tolerance is mentioned with the test, this applies to the with the force sensor read value.

4.1.1.3 Flow measurement

Flows shall be established with an $\pm 5\%$ Rdg.

4.1.1.4 Other

The dimensions of the parts which are important for the functioning shall be checked with suitable tools with a measurement inaccuracy of at least 0,1 mm.

4.1.2 Appearance

The appearance and finish shall be visually reviewed. No burrs, corrosion, damage and other imperfections may occur that may adversely affect the operation.

4.2 Leak tightness

4.2.1 Leak tightness static sealing

The seal, other than that referred to in paragraph 4.2.2, shall not show leakage after by 500 times making and removing.

Test method:

1. Assemble and disassemble all types of connections in which the static sealing is located 500 times
2. Apply a test pressure of 1,5 times the working pressure
3. Check the leak tightness with a non-aggressive leak detection product. There shall be no leakage visible.

4.2.2 Leak tightness static sealing between inflatable element and placing unit

The seal shall not show leakage after by 100 times making and removing

Test method:

1. Assemble and disassemble all types of connections in which the static sealing is located 100 times
2. Apply a test pressure of 1,5 times the working pressure
3. Check the leak tightness with a non-aggressive leak detection product. There shall be no leakage visible.

4.2.3 Leak tightness dynamic sealing

The seal shall show no leakage after 500 times over the entire working stroke of the parts to be sealed.

Test method:

1. Move the sealing parts for 500 times over the total working stroke with a speed as expected in practice
2. Apply a test pressure of 1,5 times the working pressure
3. Check the leak tightness with a non-aggressive leak detection product. There shall be no leakage visible.

4.2.4 Leak tightness closing element: pipe systems inside buildings

The maximum leakage between closing element and pipe shall be 5 dm³/h when the closing element is placed in a steel pipe.

With inflatable closing elements the inflatable pressure is equal to the working pressure.

Test method:

1. Place the closing element in a steel pipe (closing element for other pipes). Bring an inflatable closing element to working pressure
2. Apply a test pressure of 30 mbar.
3. Maintain this situation for 30 minutes (\pm 5 minutes). The possible pressure of the closing element shall not be changed during testing
4. Measure the leakage next to the closing element.
5. Repeat the above process with a pressure of 100 and 200 mbar.

4.2.5 Leak tightness closing element: pipe systems outside buildings

The maximum leakage between closing element and pipe shall be 0,3 m³/h when the closing element is placed in a nodular cast iron pipe.

With inflatable closing elements the inflatable pressure is equal to the working pressure.

Test method:

1. Place the closing element in a nodular cast iron (closing element for distribution lines). Bring an inflatable closing element to working pressure
2. Apply a test pressure of 30 mbar or if applicable 4 bar
3. Maintain this situation for 30 minutes (\pm 5 minutes). The possible pressure of the closing element shall not be changed during testing
4. Measure the leakage next to the closing element.
5. Repeat the above process with a pressure of 100 and 200 mbar (not for application till 4 bar)

The maximum of leakage of the closing element – pipe shall be 0,3 m³/h when the closing element is placed in a PE-pipe who at the placement of the closing element is pressed oval for 10%.

With inflatable closing elements the inflatable pressure is equal to the working pressure.

Test method:

1. Place the closing element in a PE-pipe which is at the placement of the closing element oval pressed by 10 % (\pm 1%). Bring an inflatable closing element to working pressure
2. Apply a test pressure of 30 mbar or if applicable 4 bar
3. Maintain this situation for 30 minutes (\pm 5 minutes). The possible pressure of the closing element shall not be changed during testing
4. Measure the leakage next to the closing element.
5. Repeat the above process with a pressure of 100 and 200 mbar (not for application till 4 bar)

4.2.6 Closing element – drill hole

With a placed TBA in a test pipe system with a drill hole as described in figure 1 the leakage shall not exceed 0,3 m³/h.

With inflatable closing elements the inflatable pressure is equal to the working pressure.

The above also applies to a pipe with a drill hole diameter of 40 mm.

Test method:

1. Place the TBA in a pipe according to figure 1.
2. Bring an inflatable element under the working pressure
3. Bring the pipe under a pressure of 30 mbar
4. Maintain the situation for 30 minutes (\pm 5 minutes)
5. Measure the leakage next to the closing element.
6. Repeat the above process with a pressure of 100 and 200 mbar.

Repeat the test steps 1 up to and including 6 with a pipe with a drill hole of 40 mm.

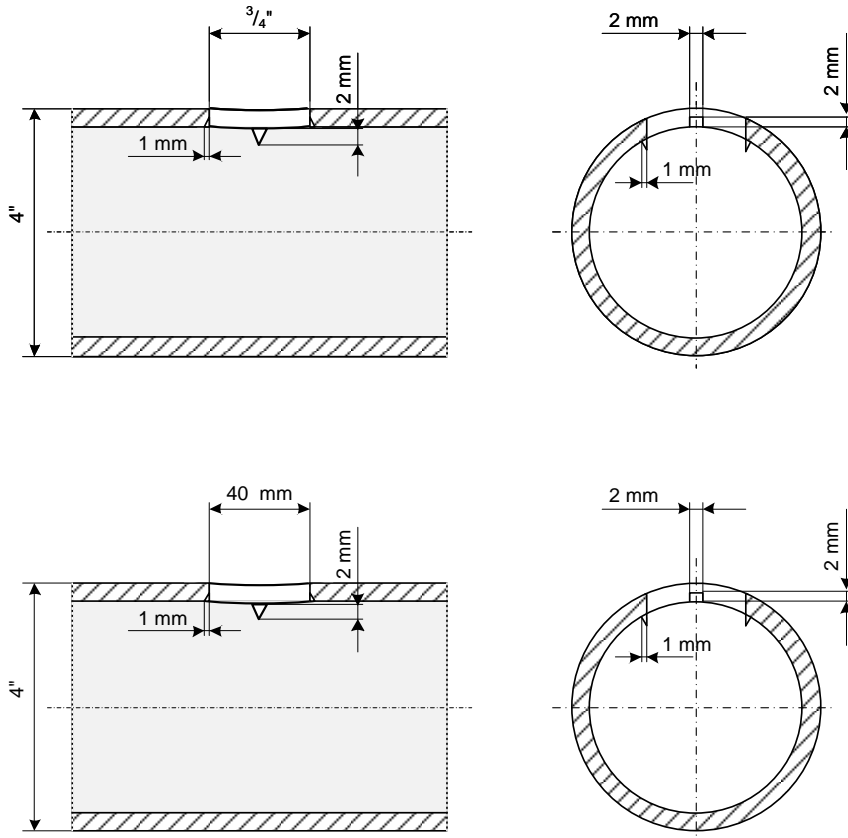


Figure 1

4.2.7 Leak tightness placing unit – top piece

After placing the placing unit 5 times by the valve seat of a top piece the sealing between the placing unit and the top piece shall be leak tight.

During placing or removing the maximal air leakage shall not exceed 1 dm³.

The valve seat and check valve shall not be damaged.

Test method:

1. Bring the part under the non-return valve of the (GASTEC QA marked) top piece up to 300 mbar
2. Check if the non-return valve functions normally
3. Place the lance manually with a normal use speed
4. Measure during the placing and pulling of the lance the amount of air escaping. This should be less than 1 dm³ each operation
5. Test, after placing the lance for the fifth time, the leak tightness of the placing element – top piece with a non-aggressive leak detection product. There shall be no leakage visible
6. Inspect visually the valve seat and check valve. These shall not be damaged and the valve shall close.

4.3 In-use tests

4.3.1 Bending test

After applying a force of 100 N during 5 minutes on the placing element the parts shall not show any damages. The force shall be applied on the point that results in the largest possible bending moment.

Test method:

Below test shall be executed on a PVC-pipe upon which a PVC-Saddle with top piece is mounted for closing elements for distribution lines.

Below test shall be executed on a steel pipe with a to the closing element matched diameter for closing elements for other lines.

1. Place the connection element on the top piece or in the steel pipe. The placing unit is entirely stretched
2. Apply a force of 100 N. The applied force shall result in the maximum bending moment.
3. Maintain this situation for 5 minutes (± 30 seconds)
4. Remove the force and inspect the parts visually. The parts shall not be damaged.

4.3.2 Placing and pulling force

Closing element (for pipes)

The force for placing and pulling of the closing element shall not be higher than 230 N. The placing and pulling of the closing element shall take maximal 5 minutes each.

Test method:

The next test shall be carried out using the biggest allowed closing element for the smallest allowed pipe combination.

1. Place the closing element in the pipe. Measure the applied force.
2. Measure the time needed for placing.
3. Bring an inflatable closing element on working pressure
4. Leave the closing element for 4 hours (± 5 minutes) in the pipe
5. Pull the closing element out of the pipe. Measure the applied force.
6. Measure the time needed for pulling the closing element.

TBA

The force for placing and pulling a TBA shall not be higher than 150 N. The placing and pulling of a TBA shall take maximal 5 minutes each.

Test method:

The placing of a TBA shall be done on a PVC pipe \varnothing 110 mm with a drill hole of 20 mm ± 1 mm upon which a standard saddle and top piece are placed.

1. Place if applicable the placing unit. Measure the applied force.
2. Measure the time needed for placing.
3. Place the TBA in the pipe. Measure the applied force.
4. Measure the time needed for placing.
5. Pull the TBA out of the pipe. Measure the applied force.
6. Measure the time needed for pulling the TBA.
7. Remove if applicable the placing unit. Measure the applied force.
8. Measure the time needed for pulling the placing unit.

4.3.3 Slide resistance

The closing element (depending on the version in combination with the insertion unit) placed in a high impact PVC pipe or PE pipe shall not slide during 1 hour with a pressure difference of 1,5 times the MOP over the element. The placement is according to the manufacturer's instructions.

For inflatable closing elements the working pressure shall not be adjusted during testing.

Test method:

1. Place the closing element with the placing unit in a High Impact – PVC pipe or PE pipe. With inflatable closing elements the inflation pressure is equal to the working pressure
2. Apply a pressure of 1,5 times MOP on one side of pipe
3. Determine after stabilizing the test set up the position of the closing element
4. Maintain the test pressure during 1 hour (± 10 minutes).
5. Determine the position again of the closing element.

4.3.4 Resistance against damage

The tests in paragraph 4.3.4.2 up to and including 4.3.4.6 shall be carried out in the described sequence and with the same sample.

4.3.4.1 Resistance to inflation pressure

The inflatable closing element shall be able to resist 3 times the working pressure for 30 minutes. The inflatable element shall be supported by the pipe during the test. The closing element shall not succumb as a consequence of testing. The pressure shall not decrease during the test.

Test method:

1. Place the inflatable element in a pipe with the largest diameter for which the closing element is suitable
2. Apply the inflatable element to 3 times the working pressure
3. Wait for 60 seconds (± 5 sec.) and note down the pressure
4. Wait another 30 minutes (± 5 minutes) and note down the pressure again.

Note: the herewith tested sample shall not be used for other tests.

4.3.4.2 Resistance to tightness control before use

The inflatable closing element shall be able to resist 1,25 times the test pressure. The inflatable element is not supported by the pipe during the test, unless otherwise stated by the manufacturer. The closing element shall not show any damages after the test. The pressure shall not decrease during the test.

Test method:

1. Apply the inflatable element to 1,25 times the test pressure (pressure before leak tightness control)
2. Wait for 60 seconds (± 5 sec.) and note down the pressure
3. Wait another 30 minutes (± 5 minutes) and note down the pressure again.

4.3.4.3 Resistance to sharp edges (TBA)

The TBA shall not lose its function after being placed in a test pipe with drill hole (see figure 1 paragraph 4.2.6) for 30 minutes. The pressure shall not decrease during the test. In case an inflatable element is used the inflating pressure shall be 1,5 times the working pressure.

Test method:

For TBA with inflatable element:

1. Place the TBA in a metal test pipe according to figure 1.
2. Inflate the element to 1,5 times the working pressure
3. Wait for 60 seconds (± 5 sec.) and note down the pressure
4. Wait another 30 minutes (± 5 minutes) and note down the pressure again.

For TBA without inflatable element:

1. Place the TBA in a metal test pipe according to figure 1.
2. Pressurize the test pipe to a pressure of 300 mbar
3. Wait 30 minutes (± 5 minutes)
4. Inspect the closing element for functionality. The functionality shall not be lost. See paragraph 4.3.4.6.

4.3.4.4 Resistance to the removal of a nipple

The TBA shall not lose its function as a consequence of removal of the wire-nipple see figure 2. The pressure shall not decrease during the test.

With an inflatable element, the inflating pressure shall be 1,5 times the working pressure.

Test method:

For TBA with inflatable element:

1. Place the TBA in a metal test pipe according to figure 2.
2. Apply the inflatable element to 1,5 times the working pressure
3. Wait for 60 seconds (± 5 sec.) and note down the pressure
4. Unscrew the nipple from the drill hole
5. Wait another 30 minutes (± 5 minutes) and note down the pressure again.

For TBA without inflatable element:

1. Place the TBA in a metal test pipe according to figure 2.
2. Apply a pressure of 300 mbar on the pipe
3. Unscrew the nipple from the drill hole
4. Inspect the closing element visually. The functionality shall not be lost. See paragraph 4.3.4.6

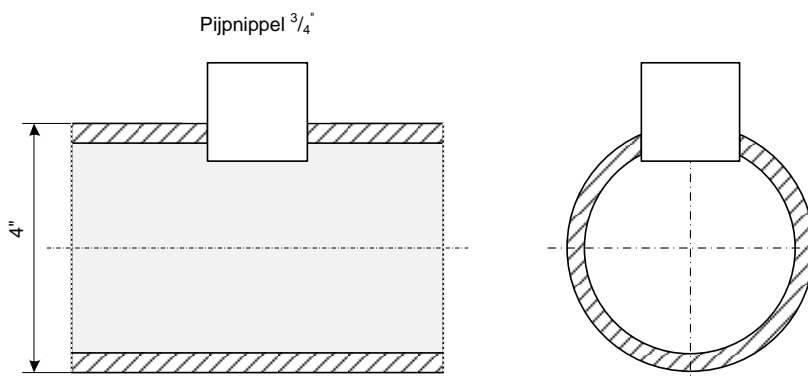


Figure 2

4.3.4.5 Resistance against sliding (TBA)

The functionality of a TBA shall not be lost due to an angular rotation over an angle of 30 °C (figure 3) when the TBA is placed in a test pipe with a drill hole (as in figure 1, paragraph 4.2.6). For inflatable closing elements the applied inflating pressure is equal to the working pressure and this cannot be changed during testing.

Test method:

1. Place the TBA in a test pipe according to figure 1.
2. Apply a pressure which is equal to the working pressure on an inflatable element
3. Place the TBA 30°C out of the lead. See figure 3.
4. Inspect the TBA. The functionality of the TBA shall not be lost. See paragraph 4.3.4.6.

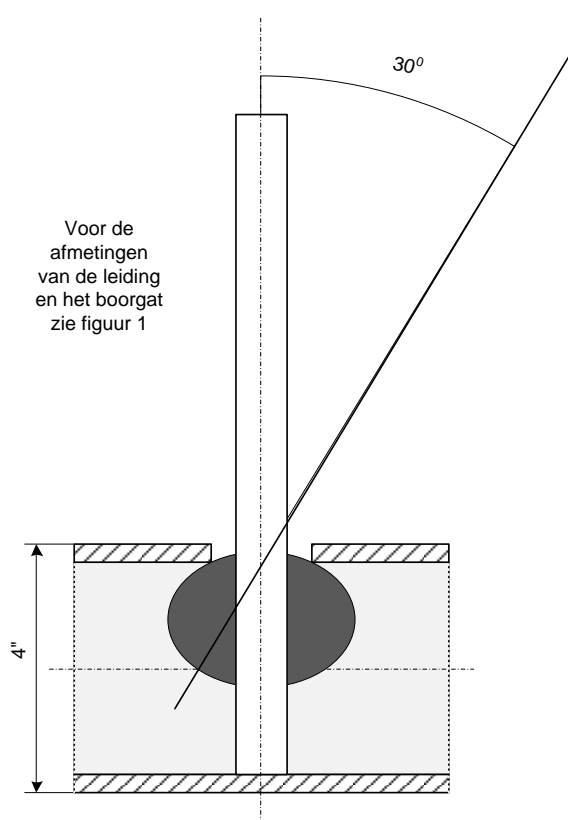


Figure 3

4.3.4.6 Closing TBA after “resistance against damage”

After the tests in paragraphs 4.3.4.1 up to and including 4.3.4.5 a TBA shall still be able to function properly. This shall be proven by a test according to paragraph 4.2.6.

4.3.4.7 Resistance against static tensile force

The connection between placing unit and closing element for distribution pipe lines shall resist a tensile force of 800 N during a period of 5 minutes without any damage.

The placing unit and closing element for non-distribution pipe lines and drill holes shall resist a tensile force of 230 N during a period of 5 minutes, without any damage.

Test method:

1. Apply a force to the connection placing unit/closing element of 800 N (main line) or 230 N (other lines and drill hole) following figure 4. Apply working pressure first on an inflatable closing element
2. Maintain this situation for 5 minutes (± 30 seconds)
3. Remove the load and inspect the element visually.
4. If applicable, repeat the test for a double inflatable element

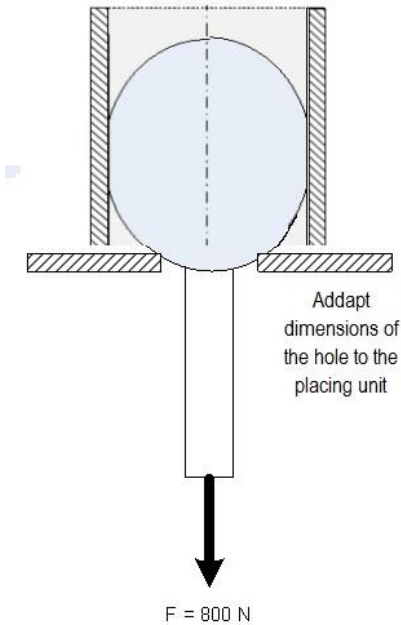


Figure 4

4.3.4.8 Resistance against repeated use

TBA

The part for gas tight closing of the TBA shall still be functional after 50 times being placed in the test pipe of figure 1 (paragraph 4.2.6). parts with restricted life time shall be replaced according to the manufacturer's instructions. With inflatable closing elements the inflation pressure is equal to the working pressure. After the test the TBA shall fulfil the requirements of 4.2.6.

Test method:

For a TBA with inflatable element:

1. Place the TBA in a metal test pipe according to figure 1.
2. Apply a pressure to the closing element equal to the working pressure
3. Maintain the pressure during a period of 60 seconds (± 5 seconds)
4. Remove the TBA
5. Repeat the steps 1 up to and including 4, 50 times
6. Subject the TBA to the test as described in paragraph 4.2.6.

For a TBA without inflatable element:

1. Place the TBA in a metal test pipe according to figure 1.
2. Apply a pressure of 300 mbar on the pipe
3. Remove the TBA
4. Repeat the steps 1 up to and including 3, 50 times
5. Subject the TBA to the test as described in paragraph 4.2.6.

Closing element (for pipes)

The part of the closing element which closes off the pipe shall still be functional after 50 times being placed in a nodular cast iron pipe. Parts with restricted life time shall be replaced according to the manufacturer's instructions. After the test the closing element shall fulfil the requirements of 4.2.5 (only nodular cast iron pipe).

Any flexible elements that may be present shall not be damaged and the radius with which the sealing element and the flexible components are placed must correspond to those which are created at the smallest diameter.

The diameter of the pipe shall correspond to the smallest possible pipe diameter to be sealed for which the relevant closing element is suitable.

The setting direction of the closing element shall correspond with the desired direction after insertion.

Test method:

1. Place the closing element in a nodular cast iron pipe with a for the applicable closing element smallest possible internal pipe diameter
2. Apply a working pressure on the inflatable closing element
3. Repeat the in the first part mentioned step 5, 50 times
4. Check if needed the placement direction twice, after the first time placing and after the last time placing. This shall correspond with the predetermined direction.
5. Subject the closing element to the test as described in paragraph 4.2.5.

4.3.4.9 Resistance against rupture

Inflatable closing elements

If in a closing element, which has a working pressure, a hole of 1 mm is made, this hole shall not grow with a constant pressure.

Test method:

1. Apply a working pressure on the closing element in a pipe
2. Make a hole of 1 mm in the closing element on the place as mentioned in figure 5.
3. Apply the working pressure for 1 minute (± 10 seconds) on the closing element
4. Inspect the closing element visually.

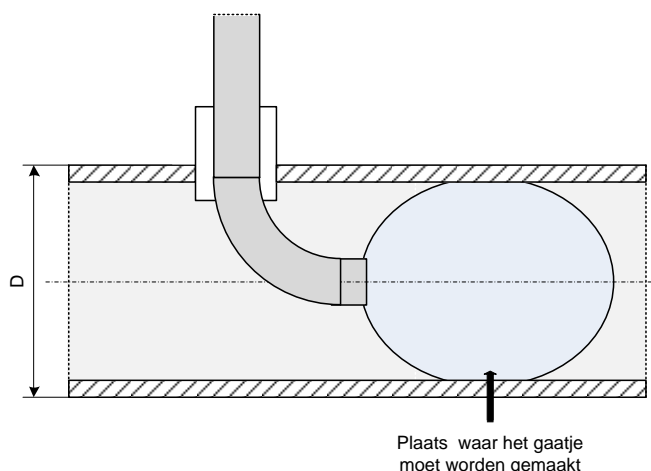


Figure 5

4.3.4.10 Resistance against gas flow during placing

Closing element for distribution lines

The connection between placing unit and closing element shall resist the force occurring during placing of the closing element in a gas flow of 20 m/s. This test is repeated 5 times.

When the closing element is also used for calamity's (in which the gas can flow freely out of the pipe due to e.g. breaking of the pipeline), the connection between placing unit and closing element shall resist the force occurring during placing of the closing element in a gas flow of 80 m/s. This test is repeated 5 times.

After the test the closing element shall fulfil the requirements of 4.2.5 (only nodular cast iron pipe).

Test method:

Below test shall be carried out on a PVC pipe with the largest diameter for which the closing element is suitable and upon which a PVC saddle with top piece is mounted for closing elements for main lines.

1. Create an air speed (or gas speed) of 20 m/s in the pipe or 80 m/s in case of a closing element used for placement during calamity's
2. Place the closing element according to the manufacturer's instructions in the pipe
3. Check, if applicable, the placement direction after the first time placing and after the last time placing. This should comply with the predetermined direction
4. Repeat this 5 times
5. Subject the closing element finally to paragraph 4.2.5.

Alternative

Closing element for distribution lines

Alternatively, the connection between placing unit and closing element shall resist 1.5 times the calculated force occurring during placing of the closing element in a gas flow of 20 m/s with a minimum of 800 N. This test is repeated 5 times. (see paragraph 4.5.4.7)

When the closing element is also used for calamity's (in which the gas can flow freely out of the pipe due to e.g. breaking of the pipeline), the connection between placing unit and closing element shall resist 1,5 x the calculated force occurring during placing of the closing element in a gas flow of 80 m/s with a minimum of 800 N. This test is repeated 5 x.

5 Marking and instructions

5.1 Marking

On the equipment (and loose parts) the following shall be durable affixed:

- Name of the manufacturer
- Production date eventually in code.
- The GASTEC QA logo, word or trademark.
- At inflatable closing elements the working pressure.

Additional for TBA, if applicable:

- The outside diameter of the pipe system and/or the diameter of the drilling hole, for which the TBA is suitable.

Additional for closing elements for pipe systems:

- The pipe system diameter or diameter range for which the closing element is suitable.

5.2 Instructions

The applicant of the approval shall provide a user manual. In this manual minimal following shall be laid down:

- The right use of the equipment.
- The right way of control, preparation placing and removing of the closing element.
- The right combination of parts with their dimension range shall be indicated clearly.
- Point of particular interest shall be the avoiding of problems. It shall be clearly indicated whether the closing element is suitable for the use during calamities.
- The maximum allowable working pressure in the pipe for which the equipment is intended.
- The most important points of particular interest shall be mounted non-erasable in the box or case.
- The way of storage and handling of the equipment.
- The period of use of the equipment.
- If applicable the number of applications of (parts) of the closing element.
- The maintenance and control on the equipment necessary to ensure safe working. Among what a summary of parts and the way how these shall be inspected.
- The user's manual shall be provided with (revision) date and document number.

The manual shall be in Dutch language in clearly expressions eventually with pictures.

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	Test within the scope of		
		Initial product assessment	Product verification	
			Verification	Frequency
Product requirements				
Dimensions and materials	3.1	X	X	Each year
Parts	3.2			
General	3.2.1	X		
Manometer	3.2.2	X		
Interchangeability of parts	3.2.3	X		
Valves	3.2.4	X	X	Each year
Placing of closing elements with use of top piece saddles	3.2.5	X		
Double versions of inflatable closing elements	3.2.6	X		
Measurement of the pressure in the gas distribution system	3.2.7	X		
Un-pressurizing the pipe parts between closing elements	3.2.8	X		
Materials	3.3			
General	3.3.1	X		
Metals	3.3.2	X	X	Each year
Rubber parts	3.3.3	X	X	Each year
Resistance against aging	3.3.4	X		
Performance requirements	4			
General	4.1			
Leak tightness	4.2	X		
Leak tightness static sealing	4.2.1	X	X	Each year
Leak tightness static sealing between inflatable element and placing unit	4.2.2	X	X	Each year
Leak tightness dynamic sealing	4.2.3	X	X	Each year
Leak tightness closing element – pipe systems inside buildings	4.2.4	X		
Leak tightness closing element – pipe systems outside buildings	4.2.5	X		
Closing element – drill hole	4.2.6	X		
Leak tightness placing unit – top piece	4.2.7	X	X	Each year

Description of requirement	Clause	Test within the scope of		
		Initial product assessment	Product verification	
			Verification	Frequency
In-use test	4.3			
Bending test	4.3.1	X		
Placing and pulling force	4.3.2	X		
Slide resistance	4.3.3	X	X	Each year
Resistance against damage	4.3.4	X		
Resistance against inflation pressure	4.3.4.1	X	X	Each year
Resistance to tightness before use	4.3.4.2		X	Each year
Resistance against sharp edges	4.3.4.3	X	X	Each year
Resistance to the removal of a nipple	4.3.4.4	X	X	Each year
Resistance against sliding	4.3.4.5	X		
Closing TBA after "resistance against damage)	4.3.4.6	X		
Resistance against static tensile force	4.3.4.7	X	X	Each year
Resistance against repeated use	4.3.4.8	X		
Resistance against rupture	4.3.4.9	X	X	Each year
Resistance against gas flow during placing	4.3.4.10	X		
Marking	6.1	X	X	Each year
Instructions	6.2	X		

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.

NEN 7244	Nederlandse editie op basis van NEN-EN 12007-1 - Gasvoorzieningsystemen - Leidingen voor maximale bedrijfsdruk tot en met 16 bar
NEN-EN 682	Afdichtingen van elastomeer - Materiaaleisen voor afdichtingen van verbindingen in buizen en hulpstukken voor gas en vloeibare koolwaterstoffen