English translation

AR 69
October 2021
Validated Dutch Version

Approval requirement 69

Metal connection taps and laboratory taps for installations inside buildings

Trust
Quality
Progress

Foreword Kiwa

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 supporting document.

Contents

1 Introduction

1.1 General

This GASTEC QA Approval Requirement in combination with the GASTEC QA general requirements are used by Kiwa as the basis for the issue and maintenance of the GASTEC QA product certificate for metal connection taps and laboratory taps for installations inside buildings.

This GASTEC QA approval requirement replaces GASTEC QA Approval requirement 69 “Metal connection and laboratory gas taps for installations inside buildings”, dated September 1989, and A1, dated March 2012.

List of changes:

- Requirements added for resistance to high temperatures.
- Update to the new format for GASTEC QA approval requirements
- This approval requirement has been fully reviewed textually.
- All general requirements have been deleted and included in the GASTEC QA general requirements document
- The division into chapters has been adjusted.
- The list with reference standards has been adjusted.

The product requirements have not been modified.

1.2 Field of application / scope

This approval requirement is applicable to metal connection taps and laboratory taps for gas installations in buildings and residences (behind the meter) in accordance with the scope of NEN 1078 or NEN 8078, up to a maximum operating pressure of 200 mbar at temperatures between -5ºC and 70ºC for the use of gases from the 2nd and 3rd families according to EN 437 with connection dimensions from DN 10 up to and including DN 50.

2 Definitions

In this approval requirement the following terms and definitions apply:

Operating torque: The greatest torque required to put the obturator from unlocked closed position into open position and inversely, employing the control device.

Board of Experts: Board of Experts GASTEC QA

Rotation: The movement from the closed position of the obturator to the open position and back to the closed position.

Pressure: The overpressure relative to the atmospherical pressure.

Test pressure: The pressure to be applied during the test of the taps.

Differential pressure: The difference between the inlet pressure and the outlet pressure when the obturator is in full open position.

Inlet pressure: The pressure on the inlet side of the valve.

Outlet pressure: The pressure on the outlet side of the valve.

Gas: Natural gas or a comparable gas.

Gas tightness:
Internal gas tightness: The gas tightness between the inlet and outlet of the tap when in closed position.

External gas tightness: The gas tightness of the tap in open position relative to the environment.

Valve: A device that through manual rotation by the user of the obturator will release or shut off the flow.

Connection tap: A tap installed in a connection point to connect the inner pipe with the gas pipe towards an appliance with the purpose to be able to disconnect the appliance from the inner pipe without the necessity to close the main tap (in the gas meter set-up of the network operator).

Plug in tap: A connection tap whose plug can be inserted into the connection hose in closed position of the tap, while the tap cannot be opened without the plug.

Flap tap: A tap in which the obturator identified as “flap” is pressed onto a seat in the body and whose flow is determined by the position of the flap in relation to the seat in the body.

Ball valve: A valve in which the obturator identified as “ball”, that can be rotated around the centerline in the body, and whose flow is determined by the position of openings in the ball in relation to the openings in the body.

Laboratory tap: A faucet equipped with one push-on end according to NEN 1273 or similar.

Plug valve: A valve in which the obturator identified as “plug”, which can be rotated around its centerline in the body, and whose flow is determined by the position of openings in the plug in relation to the openings in the body.

Stop valve: A valve installed before the gas meter, in an indoor pipe or in a connection point for connection to an appliance.

Remarks:

1. In the first case, one refers to the “main valve”.
2. In the latter case. the stop valve is used as connection tap with threaded coupling.

Butterfly valve: A valve in which the obturator identified as “butterfly”, which can be rotated around its centerline in the body, and whose flow is determined by the position of openings in the valve in relation to the openings in the body.

Nominal load: The amount of flowing air specified by the manufacturer when there is a differential pressure of 1 mbar, converted into standard circumstances.

Nominal diameter DN: Numerical value for the connection sizes of all parts in a piping system (the numerical value is a rounded number for referential purposes and only displays a slight relation to the manufacturing dimensions).

Circumstances:

Testing circumstances: Testing circumstances is understood to mean the temperature of gas or air at the inlet of the valve 15 ± 5ºC in an environmental temperature of 23 ± 5ºC.

Standard circumstances: Standard circumstances is understood to mean: 15 °C, 1013 mbar, dry.

Parts of a valve:

Obturator: The part that releases or shuts off the flow.

Control device: The part used to manually move the obturator.

Threaded coupling: The coupling is formed by he valve, the adapter with the sealing ring and the coupling nut.

Lock: The part that locks the obturator in closed position to avoid unintentional opening.

3 Product requirements

3.1 Materials

3.1.1 General

The materials employed in the valves shall be selected in such a way that during ordinary use the occurring mechanical, chemical and thermal influences can be resisted for the life expectancy of the valves.

3.1.2 Material for the body and obturator

The material employed shall be demonstrably adequate to be used within the scope of application. The following materials are deemed to be adequate:

The valve may be made of steel. cast iron, or copper alloys.
When employing copper alloys, one of the following types shall be selected:

- Free cutting brass Cu-Zn39 Pb3 according to DIN 17660
- Free cutting brass Cu-Zn40 Pb3 according to DIN 17660
- Free cutting brass Cu-Zn36 Pb1,5 according to DIN 17660
- Cast brass G Cu-Zn35 according to DIN 1709
- Free cutting brass Cu-Sn Pb5 according to DIN 17660

Brass parts shall be stress-relieved and tested in accordance with section 4.12.

When employing steel or cast iron, one of the following types shall be selected:

- Steel with a 0.2% yield strength of at least 200 N/mm^2, according to DIN 17100
- Cast steel with a 0.2% yield strength of at least 185 N/mm^2, according to DIN 1681
- Nodular cast iron with a 0.2% yield strength of at least 250 N/mm^2, according to with NEN 6002-D
- Malleable cast iron with a 0.5% yield strength of at least 200 N/mm^2, according to NEN 6002-C
- Grey cast iron with a yield strength of at least 200 N/mm^2, determined with a test specimen of Ø 30 mm, according to NEN 6002-A

3.1.3 Materials for springs

Springs shall be made of a stainless type of metal (NEN-EN 10270-C) or off effectively corrosion protected spring steel (EN 10151).

3.1.4 Materials for control devices

The control device shall be made of metal or plastic. Control devices made of plastic shall be tested in accordance with section 4.11.1. The plastic shall be self-extinguishing in 5 seconds.

3.1.5 Materials for seals

Elastic seals in valves shall be made of synthetic materials, such as:

- Polytetrafluorethylene (PTFE), only for sealing at the closing element.
- Rubber of nitrilbutadiene rubber (NBR) which comply with EN 549 Class A2 with regard to sealing towards the environment

The sealing material shall not be able to attach to the movable part of the valve.

3.2 Construction aspects

3.2.1 General

The construction of the valve shall be a design that guarantees a safe and effective operation during operating conditions, without the necessity of performing maintenance.

3.2.2 External

The valve and its parts shall be clean on the inside as well as on the outside, free from burrs and it shall not show any damage. External sharp angles and sides shall not be permitted.

3.2.3 Parts

It shall be possible to install and uninstall detachable parts of the tap with tools that can be obtained in local stores.

3.2.4 Bolts and nuts for threaded connections

Bolts and nuts of (detachable) parts of the tap shall be provided with metrical screw thread according to with ISO 724. Holes for bolts, centering pins, etc. or other openings shall not run into the gas carrying spaces of the body.

3.2.5 Springs for sealing

The end winding of the springs for the seal shall be installed flat. The installation of the springs shall be such that the windings are not on top of each other. The corrosion protection of the springs shall not be damaged as a consequence of operation.

3.2.6 Control device

It shall be possible to operate the valve manually by means of a knob or handle. The open and closed position of the valve shall be indicated clearly visible on the control device. The control device shall indicate the flow direction of the gas when in open position. (In case of a one pipe meter valve by means of an indication). The position of the control device shall not be able to change on its own. The valve shall close by turning the control device to the right. The total rotation angle from closed to open position shall be 90 ± 2º.

The sizing of the control device shall be selected in such a manner that under ordinary operating circumstances there are no hindrances at the time of installation. Fracture of the control device shall never lead to inadmissible leakage of the valve. Furthermore, if a control device is inexistent, it shall be possible to continue operating the valve with auxiliary tools and it shall be possible to clearly put it in closed position.

3.2.7 Scales

The valve shall be provided with permanent, non-adjustable scales for the open and closed positions. Completely turning the control device shall not be possible. It shall not be possible to pull the obturator of the valve upwards so high that the closing positions would disappear.

3.2.8 Wrench flats

The tap shall be provided with wrench flats for installation, preferably executed according to with ISO 272 - presentation m - with a minimum height in accordance with table 1.

Wrench width S in mm		Minimum height in wrench flat in mm
More than	Up to and including	
-	22	4
22	27	5
27	32	6
32	41	7
41	50	8
50	75	9
75	-	10

Table 1: height of wrench flat

3.2.9 Sealing of bushings

Bushings of movable parts between gas carrying spaces and the environment shall not be sealed by means of manually adjustable stuffing boxes. Sealing constructions in the valve shall continue to guarantee adequate sealing, also after the valve has been for a prolonged period in closed or open position. The seal shall not have been permanently reduced after use of the valve in partially opened position.

3.2.10 Configuration of the obturator

The obturator of the valve may have a conical, cylindrical or ball shape. At the lower side of the valve the obturator shall not be able to touch the bottom.

3.3 Construction of stop valves

3.3.1 Inlet side

The inlet side of the stop valve shall be provided with:

- An internal cylindrical pipe thread according to EN 10226-1 from the series Rp 3/8 - ½ - ¾ - 1 - 1¼ - 1½ - 2.
- An external conical pipe thread according to NEN 3258 from the series Rp 3/8 - ½ - ¾ - 1 - 1¼ - 1½ - 2.
- Compression fittings for connections with copper pipes shall be in accordance with GASTEC QA approval requirement 35, from DN 12 up to and including 54.
- Press fittings for connecting copper pipes shall be in accordance with GASTEC QA approval requirement 186.

3.3.2 Outlet side

The outlet side of a stop valve shall be provided with connections according to section 3.3.1 of a threaded coupling according to NEN 2541, NEN 2542, and NEN 2544 (fittings with coupling nuts). Stop valves with a threaded coupling shall be provided with a chamber and pipe thread (ISO 228-1), in which case the sealing ring for sealing shall be in accordance with NEN 2545.

3.3.3 Coaxial connection

Connection sizes for coaxial connections shall be in accordance with NEN 2373. (The hardness of the rubber sealing ring shall be 80 +5 -4 IRHD).

3.3.4 Sealing surfaces

For gas tightness, the sealing surfaces of plug valves in closed and open positions shall be at least 3 mm between the obturator and the body.

3.4 Construction of connection taps

3.4.1 Inlet side

The inlet side of the connection tap shall be provided with:

- An internal cylindrical pipe thread Rp $^{3}/_{8}$ or ½ according to EN 10226-1.
- An external conical pipe thread R $^{3}/_{8}$ or ½ according to EN 10226-1.

3.4.2 Outlet side

The outlet side of the connection tap shall be fitted in accordance with the following figure with screw thread M 24 x 1, according to ISO 724.

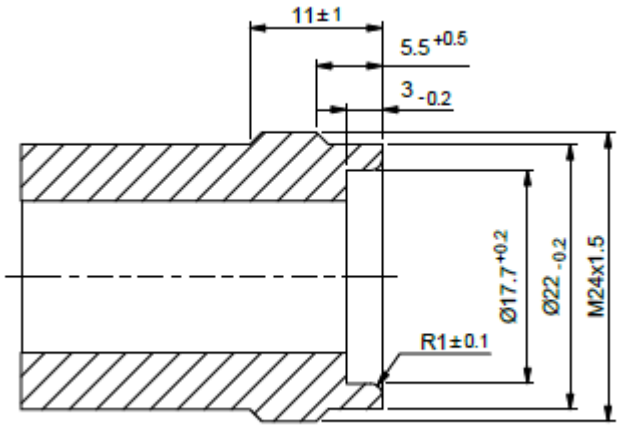


Figure 1: Detailed example of the outlet side of a connection tap.

3.4.3 Lock

A lock shall be fitted in the connection tap, which in closed position of the obturator prevents unintended opening. The lock shall be removed by performing a separate maneuver, which is preceded by turning the valve into open position.

3.4.4 Sealing surfaces

For gas tightness, the sealing surfaces of connection taps in closed and open positions shall be at least 2,5 mm between the obturator and the body.

3.5 Construction of laboratory taps

3.5.1 Inlet side

The inlet side of a laboratory tap shall be provided with:

- An internal cylindrical screw thread Rp $^{3}/_{8}$ or ½ according to EN 10226-1.
- An external conical screw thread R $^{3}/_{8}$ or ½ according to EN 10226-1.
- A capillary solder joint connection for copper pipes DN 10, 12, or 15 shall be in accordance with GASTEC QA approval requirement 6.
- Compression fittings for connections with copper pipes shall be in accordance with GASTEC QA approval requirement 35, from DN 12 up to and including 54.
- Press fittings for connecting copper pipes shall be in accordance with GASTEC QA approval requirement 186.

This requirement applies also to pillars or columns if the manufacturer supplies the laboratory tap mounted in this presentation in such a way that it is permanently gas-tight.

3.5.2 Outlet side

The outlet side of a laboratory tap shall be provided with a push-on end according to NEN 1273, type D= 6.5 mm or a connection according to section 3.5.1.

3.5.3 Lock

A lock shall be fitted in the laboratory tap, which in closed position of the obturator prevents unintended opening. The lock shall be removed by performing a separate maneuver, which is preceded by turning the tap into open position.

3.5.4 Sealing surfaces

For gas tightness, the sealing surfaces of plug valves in closed and open positions shall be at least 2.5 mm between the obturator and the body.

3.6 Construction of plug in taps

3.6.1 Inlet side

The inlet side of the plug in taps shall be provided with:

- An internal cylindrical thread Rp ½ according to EN 10226-1.
- An external conical thread R ½ according to EN 10226-1.

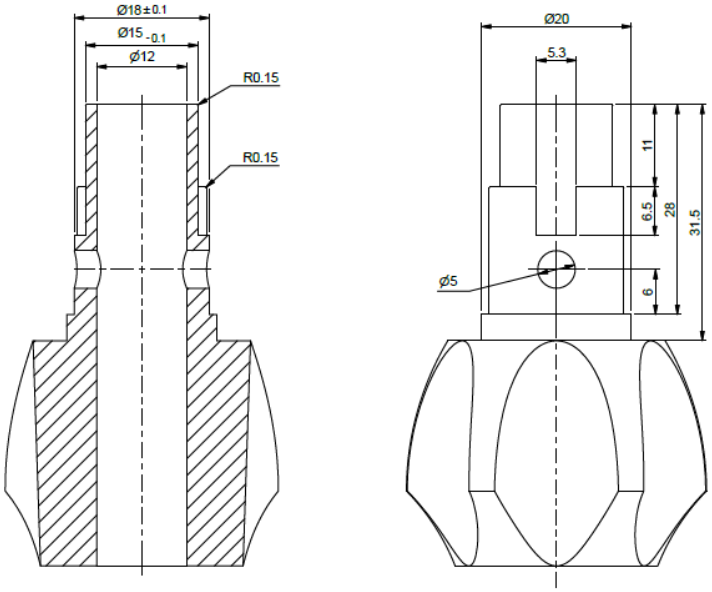


Figure 2: Example of a plug in tap with plug.

3.6.2 Outlet side

The outlet side of a plug in tap shall be fitted in such a way that with the help of the plug shown in the figure a good connection can be established.

3.6.3 Control device

The plug in tap shall be easily operable with the help of the handle of the tap or the handle made as a plug. These handles shall be fitted in such a way that they can only be operated in accordance with the construction of the plug in tap. The plug in tap shall be fitted in such a way that when turning the handle of the tap or the handle attached to the plug, no other forces are exerted on the obturator than those possibly required to moving it. By doing so, the obturator shall not be damaged.

3.6.4 Sealing surfaces

For gas tightness, the sealing surfaces of plug in taps in closed and open positions shall be at least 2.5 mm between the obturator and the body.

3.6.5 Tap positions

The plug in taps opens by turning to the left and closes turning to the right. The total rotation angle shall be limited by fixed non-adjustable closing positions. The positions “plug in” - “closed” - “open” of the obturator shall be easily recognizable from the outside. If colors are used for marking the open and closed positions; “red” has been determined for the closed position and “green” for the open position.

A closed position shall exist in which the gas passage is closed but the plug cannot be removed from the plug in tap. This position shall be provided with a manual detachable lock or a clearly detectable intermediate position. The rotation angle from the open position to the closed position shall be approximately 90º; beyond this rotation angle a coupling position shall have been implemented in the final closed position, in which the plug can we removed from the plug in tap. Between this coupling position and the closed position the gas passage shall be closed in all intermediate positions.

When there is no plug inserted in the valve, it shall be impossible to open the plug in tap using commercially available tools. The plug in tap shall only be able to be opened, if the plug is connected in a gastight manner with the plug in tap.

If for gas tightness between the plug and the plug in tap a special sealing is applied, this sealing must be installed in such a way that it cannot be removed from the plug in tap.

4 Performance requirements and test methods

4.1 General

The valve shall function well in all assembly positions specified by the manufacturer. The test, unless indicated otherwise, shall be carried out with air at an environmental temperature of 23 ºC ± 5 ºC. The values measured shall be converted to 15 ºC and 1013 mbar. The test shall be carried out in the assembly position specified by the manufacturer. If no position has been indicated, the valve shall be examined in the least favorable position.

4.2 External and internal gas tightness

The valve shall be gastight under the test circumstances of paragraph 4.2.1 and 4.2.2 with pressures of 20-300 mbar. This is deemed to have been met if the leakage amount is not more than 20 cm^3/h.

4.2.1 Test method: External gas tightness

Connect the inlet of the valve, and if applicable, the outlet as well, separately, to a leakage measuring system that has an accuracy of 5 cm^3/h. Measure the external gas tightness of the valve with the obturator in closed, open and semi open positions with a pressure of 20 mbar, resp. 300 mbar.

4.2.2 Test method: Internal gas tightness

Connect the inlet of the valve, and is applicable, the outlet as well, separately, to a leakage measuring system that has an accuracy of 5 cm^3/h.

Measure the external gas tightness of the valve with the obturator in closed position with a pressure of 20 mbar, resp. 300 mbar.

4.3 Nominal load:

The valve under the test circumstances of paragraph 4.3.1 shall comply with the values indicated in table 2 when a predetermined amount of pressurized air is passed at 25 mbar and with an adjusted pressure difference of 1 mbar converted to standard circumstances.

DN	Minimum flow rate in m^3/h							
	Stop valve		Connection tap		Laboratory tap		Plug in valve	
	Right	Angled	Right	Angled	Right	Angled	Right	Angled
10 (3/8)	3	2	2	1.7	0.75	0.50		
15 (½)	4	3	2	1.7	1	0.75	3.3	3.0
20 (¾)	10	8						
25 (1)	16	12						
32 (1 ¼)	26	20						
40 (1 ½)	36	28						
50 (2)	60	46						

Table 2: Minimum flow rate of passing air

Remark: A coaxial valve with a 2 inch coupling nut is equal to the perpendicular valve DN 25, and a coaxial valve with a 2 ¾ inch coupling nut is equal to a perpendicular valve DN 40.

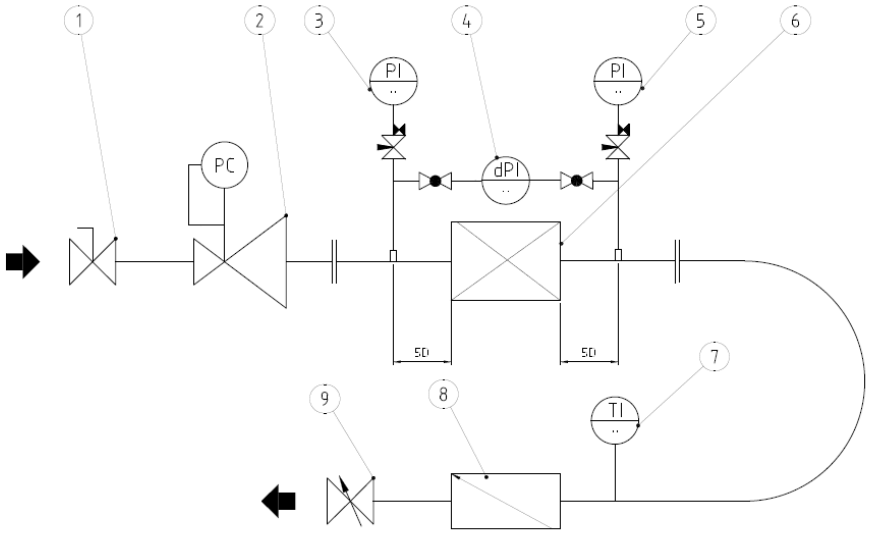
4.3.1 Test method

Connect the tap (6) in completely open position to the measuring instrument according to the figure shown. Using the pressure regulator, (2) establish an outlet pressure of 25 mbar. Adjust the stop (9) in such a manner that the differential pressure gauge (4) shows a pressure difference of 1 mbar. Convert the air flow rate indicated by the volumetric flow meter (8) to standard circumstances according to:

$$Vst = V \frac{Pa + p}{1013} \times \frac{288}{273 + t}$$

Where

Vst	is the air flow rate under standard circumstances, in m^3/h^2
V	is the air flow rate during measurement, in m^3/h
Pa	is the atmospheric pressure (absolute pressure), in mbar
P	is the test pressure (overpressure), in mbar
t	is the air temperature, in ºC



Legend:

1	Valve
2	Regulator inlet pressure
3	Pressure gauge inlet pressure
4	Differential pressure pressure gauge
5	Pressure gauge outlet pressure
6	Tap to be tested
7	Thermometer
8	Flow meter
9	Control valve

Figure 3: test installation

4.4 Operating torque and torque strength

4.4.1 Operating torque

The tap under the test circumstances of section 4.4.1.1 shall comply with values specified in table 3 for the operating torque.

DN	Torque in Nm							
	Stop valve		Connection tap		Laboratory tap		Plug in tap	
	Max. oper.	Max. strength	Max. oper.	Max. strength	Max. oper.	Max. strength	Max. oper.	Max. strength
10 (3/8)	0.6	3	0.6	3	0.6	3		
15 (½)	0.6	3	0.6	3	0.6	3	0.6	3
20 (¾)	1	5						
25 (1)	1.8	9						
32 (1 ¼)	4	2						
40 (1 ½)	7	35						
50 (2)	10	50						

Table 3: Operating torque and torque strength

4.4.1.1 Test method

Set up the tap in a fixed position. Put the obturator in completely open position. Establish the operating torque, after a resting period of a least 24 hours. During the test, no pressure shall be exerted on the obturator. Perform the measurement from the completely open up to the closed position. The measurement is performed with a uniform speed of approximately 5 revolutions per minute (approx. ¼ turns per 3 seconds).

4.4.2 Torque strength

The tap under the test circumstances of paragraph 4.4.2.1 shall comply with values specified in table 3 for the strength of the control device, and no damage shall occur.

4.4.2.1 Test method

Set up the tap in a fixed position. Open and close the tap with the prescribed torque strength of section 4.4.1, whereby the torque is applied on the control device. Afterwards, assess the tap, checking for damage and/or deformations.

4.5 Resistance to torsion of stop valves, connection taps and laboratory taps

The valve shall not show permanent deformation and/or damage after and during a torsion load under the circumstances of paragraph 4.5.1 and it shall remain operable and gastight.

4.5.1 Test method for stop valves with 2 inner threads

Provide a valve with two inner threads at the inlet and outlet sides with connecting pieces (pipe sections of steel, of medium heavy quality according to EN 10241, provided with unused screw thread) as follows:

1. Screw a connection piece manually, provided with sealing packing (tape) at the inlet side.
2. Screw a connection piece at the outlet side as per point 1.
3. Clamp the connection piece at the inlet side at a distance of ≥ 2 DN (see figure 4).

Figure 4

Connection pieces when applying torsion

Apply a torque to the outlet side of the connection piece according to table 4, 2nd column and maintain this torque for 10 seconds. Remove the torque and measure the gas tightness according to section 4.2 and the operating torque according to section 4.4.1,excluding the waiting time of 24 hours. Repeat the test with a torque according to table 4, 4th column and maintain this torque for 900 seconds. Next, measure the external gas tightness according to section 4.2.1 (without waiting time) and the operating torque according to section 4.4.1, while the torque is maintained.

DN	Torsion in Nm		
	Conical-cylindrical thread connection 10s - test	Coupling nut connection 10s- test	900 s test
1	2	3	4
10 (3/8)	40	25	20
15 (½)	50	35	30
20 (¾)	85	40	40
25 (1)	125	50	55
32 (1 ¼)	160	60	80
40 (1 ½)	200	70	100
50 (2)	250	80	120

Table 4: Torsion

4.5.2 Test method for stop valve with screw thread and threaded coupling

Provide a valve with screw thread at the inlet side of a connection piece according to section 4.5.1.1. Hold on to the connection piece and apply torque to the threaded socket in accordance with table 4, 2nd column. maintain this torque for 10 seconds.

Mount a steel threaded pipe on the fitting with a length of at least 300 mm and the corresponding diameter. Clamp the connection piece at the inlet side at a distance of ≥ 2 DN (see figure). Mount the threaded coupling at the outlet side by means of the coupling nut with a torque according to table 4, 3rd column. Sustain this torque for 10 seconds. Remove the torque and measure the gas tightness according to section 4.2 and the operating torque according to section 4.4.1 (without waiting time).

Next, apply torque to the outlet side of the threaded pipe according to table 4, 4th column and sustain this torque for 900 seconds. Next, measure the external gas tightness according to section 4.2.1 (without waiting time) and the operating torque according to section 4.4.1, while the torque is maintained.

If before reaching the torque specified in table 4, 4th column, the coupling slips in the coupling nut, the torque shall be reduced just to the point where slipping does not occur anymore.

Remark: Taps provided with other connections than screw thread according to EN 10226-1, for example with compression fittings, shall be tested for bending in an appropriate manner. The quality of other connection techniques shall be tested in accordance with the standardized requirements.

4.5.3 Test method stop valve with coaxial connection

Mount the valve with a coaxial connection on the corresponding accessory. Load a 2 inch coupling nut for 20 seconds with a torque of 12 Nm and a 2 ¾ inch coupling nut with a torque of 150 Nm. Remove the torque and measure the gas tightness according to section 4.2.

4.5.4 Test method connection tap and laboratory tap

Screw the connection thread of a valve with external thread in a malleable cast iron socket of ½ inch according to NEN-EN 10242. Apply a torque of 40 Nm to the wrench flats. Sustain this torque for 10 seconds. After disassembly, assess the valve for damage. Next, measure the gas tightness according to section 4.2 and the operating torque according to section 4.4.1 (without waiting time).

Screw the connection thread of a valve with inner thread to a steel threaded pin with corresponding screw thread of nominal size and apply a torque of 40 Nm to the wrench flats. Sustain this torque for 10 seconds. After disassembly, assess the valve for damage. Next, measure the gas tightness according to section 4.2 and the operating torque according to section 4.4.1(without waiting time).

4.6 Bending resistance of stop valves

The stop valve shall not show any permanent deformation and/or damage after a bending load applied under the test circumstances according to paragraph 4.6.1., and it shall still be operable and gastight.

4.6.1 Test method

Take a stop valve, tested as per paragraph 4.5 and, if necessary, extend the assembled connection pieces with equivalent pipe to a length of at least 300 mm. Clamp the pipe at the inlet side at a distance equal to at least twice the DN number (in mm) to the inlet of the valve. The center line of the valve shall be in vertical position (see figure). Apply torque to the outlet side of the pipe, in the center of the valve, according to table 5, 2nd column and sustain it for 10 seconds.

DN	Torque for 10 seconds Nm	Torque for 900 seconds Nm
1	2	3
10 (3/8)	65	20
15 (½)	80	30
20 (¾)	100	40
25 (1)	160	60
32 (1 ¼)	250	70
40 (1 ½)	340	80
50 (2)	510	100

Table 5: Bending torque

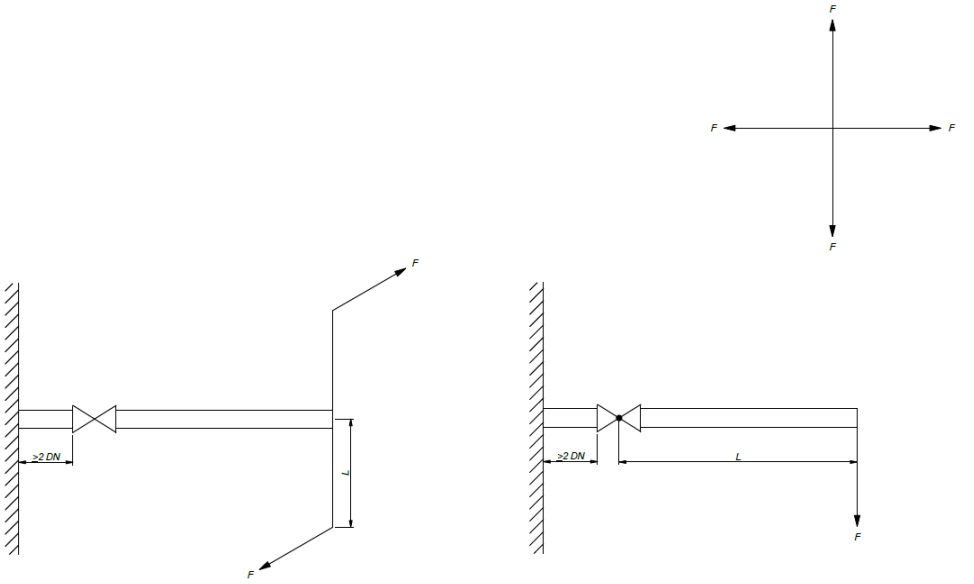


Figure 5

Connection pieces when bending

Next, reduce the torque to the value according to table 5, 3rd column. Maintain this torque for 900 seconds. Next, measure the external gas tightness according to 4.2.1 and the operating torque according to section 4.4.1 (without waiting time), while the torque is maintained. Repeat the same test in 3 directions that differ 90º, 180º and 270º from the first selected position.

Remark: Valves provided with other connections than screw thread according to EN 10226-1, for example with compression fittings, shall be tested for bending in an appropriate manner. The quality of other connection techniques shall be tested in accordance with the standardized requirements.

4.7 Endurance

Under the test circumstances according to 4.7.1, the valve shall be able to resist at least the number of rotations specified in table 6, without noticeable deterioration of quality. The first fifty percent of the number of mandatory rotations, shall be carried out at a temperature of 23.5ºC. The remaining number of rotations shall be done at a temperature of 70,5ºC.

DN	Number of rotations approx. 10 per minute			
	Stop valve	Connection tap	Laboratory tap	Plug in tap
10 (3/8)	10 000	-	10 000	-
15 (½)	10 000	10 000	10 000	10 000
20 (¾)	5 000	-	-	-
25 (1)	5 000	-	-	-
32 (1 ¼)	2 000	-	-	-
40 (1 ½)	2 000	-	-	-
50 (2)	2 000	-	-	-

Table 6: number of rotations

4.7.1 Test method

The valve shall be installed stress-relieved in the testing installation, while the forces on the scales of the valve are not larger than the maximum torque. The frequency for opening and closing is approximately ten times per minute. Gas shall flow through the valve while testing. Carry out the first half of the number of rotations specified in 4.7 at environmental temperature; the second half at a temperature of 70 ºC ± 5 ºC. Measure the gas tightness after testing at different temperatures according to section 4.2 and the operating torque according to section 4.4.1 (without waiting time).

4.8 Resistance to flowing gas

Non-metal parts of the valve that enter into contact with gas, shall be resistant to the components gas is normally composed of as described in section 4.8.1.
This section is particularly applicable to plastics.

4.8.1 Test method

Silicone rubbers

Determine the mass of the rubber parts with an accuracy of up to 0.1%. Next, store the parts, respectively testing pieces, for 3 x 24 hours in liquid pentane of commercial quality (n-pentane).

The volume of pentane shall be at least 25 times the volume of the part or the testing piece. To be able to measure on a scale model, it is permitted as well to take testing pieces of approx. 2 g and a thickness of approx. 2 mm. Remove the parts or testing pieces from the liquid pentane and dry them for 168 ± 2 hours, at a temperature of 40ºC ± 2ºC.

Determine the mass again with an accuracy of up to 0.1% and compare the changes with the mass from before the testing. The change in mass shall be between +5% and -5%.

Other rubbers or plastics
Determine the mass of the rubber/plastics parts with an accuracy of up to 0,1%. Next, store the parts, respectively testing pieces, for 3 x 24 hours in liquid pentane of commercial quality (n-pentane).

The volume of pentane shall be at least 25 times the volume of the part or the testing piece. To be able to measure on a scale model, it is permitted as well to take testing pieces of approx. 2 g and a thickness of approx. 2 mm. Remove the parts or testing pieces from the liquid pentane and if necessary dry them with filter paper and determine the mass with an accuracy of up to 0,1%.

Next, store the parts or testing pieces, for 24 hours at room temperature and determine the mass again with an accuracy of up to 0,1%. Compare the change of mass of the parts or the testing pieces from before the test, immediately after the tests after the drying time. The change in mass shall be between -10% and 15%.

4.9 Resistance to varying temperatures

The valve shall remain gastight and operable during testing circumstances according to section 4.9.1. at temperatures of -5º up to and including 70°C.

4.9.1 Test method

After testing according to section 4.7, store the valve, provided with a fitting and the obturator in completely open position for 48 hours at a temperature of -5ºC, while subjecting the valve to a testing pressure of 300 mbar. At this temperature, measure the gas tightness according to section 4.2 and the operating torque according to section 4.4.1.

4.10 Resistance to stress corrosion

All parts shall be resistant to stress corrosion.

For stainless steel parts the magnesium chloride test shall be carried out according to section 4.10.1. After exposure, there shall be no visual signs of cracks at 5 times magnification.

Parts of copper alloys shall be tested on stress corrosion by means of an ammonium chloride test according to ISO 6957 (Ph 9.5). There shall be no visual signs of cracks at 10 to 15 times magnification.

4.10.1 Test method

The test will be performed on valves without a protective layer.

Stainless steel parts shall be completely immersed for a maximum of 30 seconds in a 15% sulphuric acid solution or in a 40% nitric acid solution until all oxides are removed from the surface or from imperfections. After this, the parts are immediately rinsed in running water.

After drying, the parts shall be completely immersed in an aqueous solution containing approximately 1000 g of $MgCL_2$- 6 H_2O per 500 ml of distilled water and kept under these conditions firstly for 100 hours at a temperature of 130 ± 5°C and subsequently for 60 hours at 70 ± 2° C by means of a closed thermostatic bath with a reflux condenser.

After the test, the parts are visually assessed for the presence of cracks or fissures, if necessary using a magnifying glass with 10 or 20 times magnification.

Corrosive attack by the test liquid does not constitute grounds for non-conformance. The components comply with the requirement if no cracks or tears are visible.

4.11 Resistance to high temperatures

The valve shall be resistant to a radiation heat of 10 kW/m^2 for 30 minutes. The leakage shall be ≤ 5 l/h after testing.

4.11.1 Test method

The test shall be performed at a temperature of 20ºC ± 5ºC. The test samples shall be assembled according to paragraph 5.2 of this approval requirement. The test samples shall be conditioned at least 24h before testing at a temperature of 20 ºC ± 5 ºC and a humidity of 60% ± 20%.

The test is performed in a horizontally test equipment as shown in figure 6. The leakage shall be measured in accordance to Annex A of EN 1775:2007.

The test sample shall be mounted in the test equipment without stress or tension on the test sample, as shown in figure 6.

Before the start of the high temperature test, the sample is tested on leakage at 200 mbar during 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).

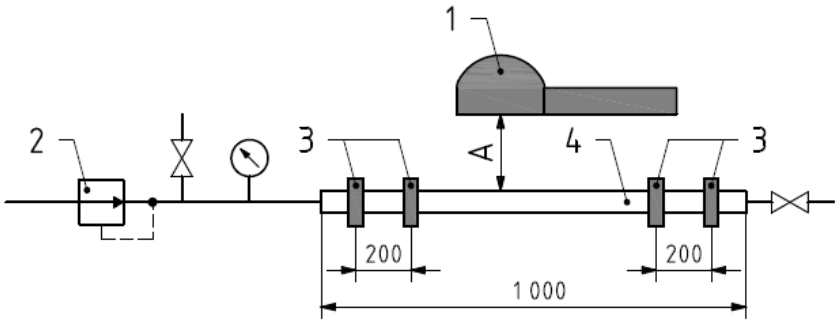


Figure 6: test set up

Legend:
1 heat cup
2 measuring system as described in appendix A of NEN-EN 1775:2007
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)

5 Marking, instructions and packaging

5.1 Marking

On the body and the connection pieces of the valve the following shall be clearly and durably indicated:

- The GASTEC QA, logo or punch mark
- The name of the manufacturer or their trademark;
- The nominal pass DN;
- If necessary, the flow direction by means of an arrow.

5.2 Instructions

The instructions shall be delivered with the product in the Dutch language, and shall include clear instructions on how the product shall be installed, connected, and operated. The instruction shall include the marking requirements of 5.1 and information on safety, defects, pressure loss, and mounting position.

5.3 Packaging

The products shall be packed individually in a packaging that protects against damage due to transport of the product.

6 Quality management system requirements

The supplier shall make a risk analysis of the product and the 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 for Kiwa for review.

7 Summary of tests

This chapter includes a summary of the tests carried out during:

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

7.1 Text matrix

Description of requirement	Article	Test within the scope of		
		Initial product assessment	Product verification	
			Verification	Frequency
Product requirements				
Materials	3.1			
General	3.1.1	X	X	Once a year
Material for the body and obturator	3.1.2	X	X	Once a year
Material for springs	3.1.3	X	X	Once a year
Materials for control devices	3.1.4	X	X	Once a year
Materials for seals	3.1.5	X	X	Once a year
Construction aspects	3.2			
General	3.2.1	X	X	Once a year
External	3.2.2	X	X	Once a year
Parts	3.2.3	X	X	Once a year
Bolts and nuts for threaded connections	3.2.4	X	X	Once a year
Springs for sealing	3.2.5	X	X	Once a year
Control device	3.2.6	X	X	Once a year
Scales	3.2.7	X	X	Once a year
Wrench flats	3.2.8	X	X	Once a year
Sealing of transit pipes	3.2.9	X	X	Once a year
Configuration of the obturator	3.2.10	X	X	Once a year
Construction of stop valves	3.3	X	X	Once a year
Construction of connection taps	3.4	X	X	Once a year
Construction of laboratory taps	3.5	X	X	Once a year
Construction of plug in taps	3.6	X	X	Once a year
Performance requirements				
General	4.1			
External and internal gas tightness	4.2	X	X	Once a year
Nominal load	4.3	X		
Operating torque and torque strength	4.4	x	x	Once a year
Resistance to torsion	4.5	X		
Bending resistance of stop valves	4.6	X		
Endurance	4.7	X		
Resistance to flowing gas	4.8	X	X	Once a year
Resistance to varying temperatures	4.9	X		
Resistance to stress corrosion	4.10	x		
Resistance to high temperatures	4.11	X		
Marking, instructions and packaging	5.1	X	x	Once a year
Instructions	5.2	x		
Packaging	5.3	x	x	Once a year

8 Titles of standards and sources

8.1 Standards / Normative documents:

All references in this GASTEC QA approval requirement remit to the version of the relative document in accordance with the following list.

EN 437: 2021	Test gases- test pressure – appliance categories
EN 751-2: 1997	Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water -part 2: non-hardening jointing compounds
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: 2018	Supply for gas with an operating pressure up to and including 500 mbar - Performance requirements - New estate
NEN-EN 10270-3: 2011	Steel wire for mechanical springs - Part 3: Stainless spring steel wire
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
ISO 228-1 2003	Pipe threads where pressure-tight joints are not made on the threads – Part 1: Dimensions, tolerances and designation
ISO 724; 1999	ISO General-purpose metric screw threads - Basic dimensions
NEN 1273: 1967	Push-on ends and hose adapters for gas
GASTEC QA approval requirement 6: 2019	Plumbing fittings with ends for capillary soldering, capillary brazing and/ or threaded connections
GASTEC QA approval requirement 35: 2019	Compression fittings for joining copper pipes
GASTEC QA approval requirement 186: 2019	Press fittings for joining copper pipes
NEN-EN 10242: 1995 + A1 1999 + A1/C1 1999 +A2 2003	Threaded pipe fittings in malleable cast iron
EN 549: 2019	Rubber materials for seals and diaphragms for gas appliances and gas equipment