Test Report

EN 126: 2012 Multifunctional controls for gas burning appliances

Report Reference No. ..... :	SDHL2101001095GA
Checked by (name + signature)..... :	Jun He
Approved by (name + signature) ..... :	Snow Zhang
Date of issue ..... :	2021-04-26

This report is based on a blank test report that was prepared by SGS using information obtained from the TRF originator (see below).

Testing Laboratory ..... :	SGS – CSTC Standards Technical Services Co., Ltd. Shunde Branch Hardlines
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The following information was submitted and identified on behalf of the client as:

Applicant's name ..... :	Foshan Gaochu Electric Co., Ltd
Address ..... :	Floor 3&4, No.5 Wuheng Road, Tianhe Industry Area, Rongbian, Ronggui, Shunde, Foshan, Guangdong
Manufacturing sites ..... :	Same as the applicant
Test item description ..... :	Gas valve
Model and/or type reference ..... :	TL90DXQ & TL90DZAQF-1
Inlet/ outlet connections ..... :	See **Technical Data** in page 3
Gas categories ..... :	See **Technical Data** in page 3
Ratings ..... :	See **Technical Data** in page 3
Operating temperature range ..... :	See **Technical Data** in page 3
Inlet pressure (max.) ..... :	65 mbar
Number of operations ..... :	40 000
Groups of taps ..... :	Group 1
Destination countries ..... :	All EU

Test specification ..... :	
Standard ..... :	EN 126:2012
Test procedure ..... :	Type test
Non-standard test method ..... :	NA

Test Report Form No. ..... :	
TRF Originator ..... :	SGS - CSTC
Master TRF ..... :	Dated 2012-01

Possible test case verdicts ..... :	
Test case does not apply to the test object.....	NA
Test case is not carried out to the test object:	NT
Test object does meet the requirement.....	P(Pass)
Test object does not meet the requirement.....	F(Fail)
Testing ..... :	
Date of receipt of test item ..... :	2021-01-08
Date (s) of performance of tests ..... :	2021-01-08 ~ 2021-04-26

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.
Throughout this report a point is used as the decimal separator.

Summary of the product and the test report:

General description of the appliances

These fittings are manual operated gas control valves fitted with flame supervision device.

These valves have two outlets. There are designed for controlling the multi-ring burner.

For details, see technical data as below.

Technical Data		
Model	TL90DXQ	TL90DZAQF-1
Rating:	0.28 m^3/h	0.25 m^3/h
Maximum working pressure	65mbar	
Operating temperature range	-20~+80°C	
Classification	Group 1	
Number of operations	40000	
Inlet connection	Flange	Saddle-clamp inlet
Outlet connection	M8	M10

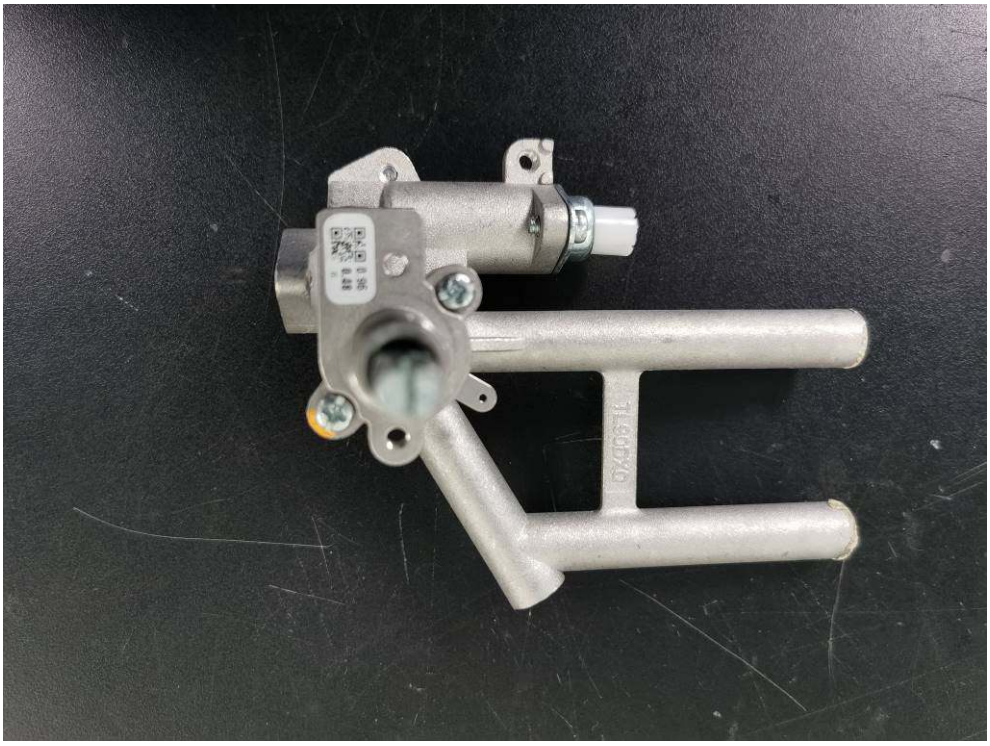
Test Schedule

1. Full tests were conducted on the TL90DXQ & TL90DZAQF-1.
2. As the client's requirement, Clause 9, Marking, installation and operating instructions are not verified since these valves are used in the gas appliance, see test report SDHL2101000957GA.

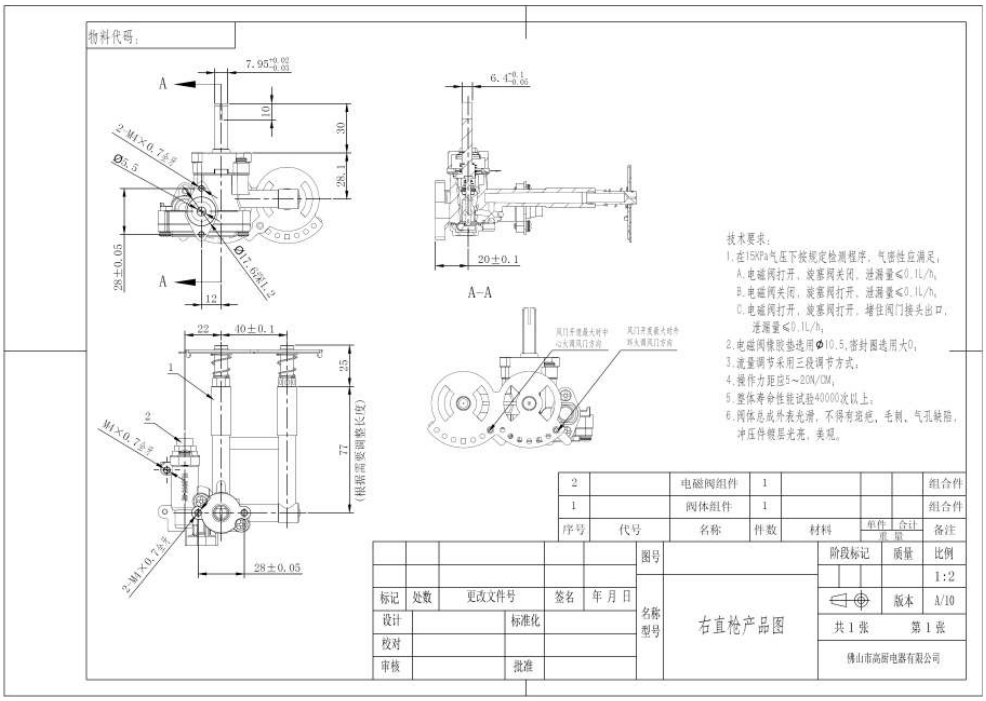
This test report includes following parts:

1. General pictures
2. Test equipment and apparatus
3. Test table
4. Annex test tables
5. Critical component list

General pictures

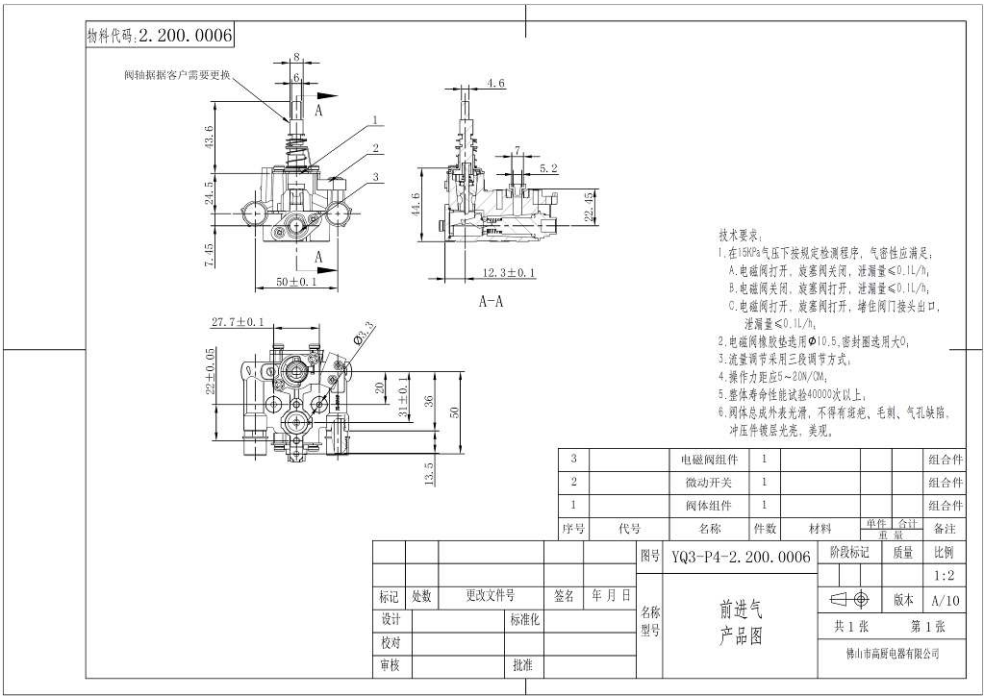


Model TL90DXQ



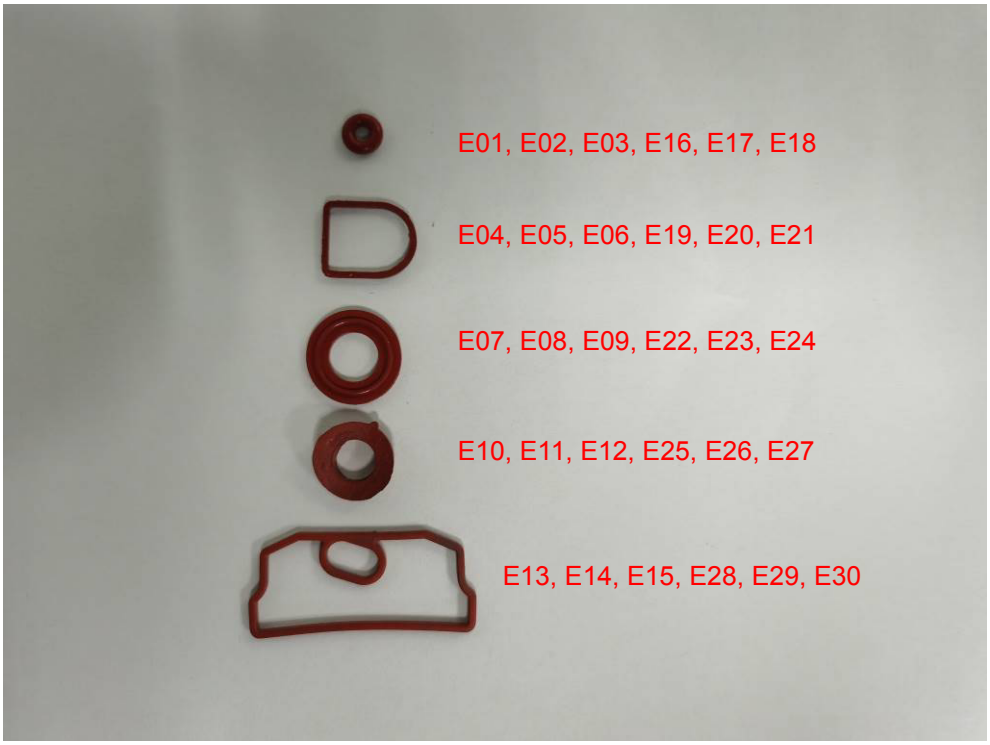
Drawing - TL90DXQ

Model TL90DZAQF-1



Drawing - TL90DZAQF-1

Solenoid valve



Elastomeric material

Test equipment and apparatus			
Instruments Name	**Type/Model**	**Equipment No.**	**Measuring Range**
Universal Ovens	UFE400A0	SD-HG-E213	0~280°C
Universal Ovens	UFE400A0	SD-HG-E214	0~280°C
Constant Temperature and Humidity Tester	KTHA-215TBS	SD-HG-E220	---
Torque Drivers	FTD200CN2-S	SD-HG-E281	---
Wet Gas Flowmeter	W-NK-1A	SD-HG-E226	0.033~10L/min（2~600L/h）
Scientific Ambient Monitor	testo622	SD-HG-E616	300-1200HPA
Electronic Analytical Balance	PL203/00	SD-HG-E260	0.001g~210g
Mercurial Thermometer	---	SD-HG-E255	0~100°C
Stopwatch	PC894	SD-HG-E473	---
Steel Tape	---	SD-HG-E441	5m
Digital caliper	(0～300) mm	SD-HG-E459	(0~300)mm
Digital Pressure Gauge	BG80-212-30N23	SD-HG-E215	(-500~500) Pa
Valve Endurance Testing Chamber	E12.06	SD-HG-E273	---
Air Leakage Tester	FL-295CUL	SD-HG-E266	0.5~10kPa
Electromagnetic Valve Current Tester	E12.12	SD-HG-E274	---

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
4	**Classification**		
4.1	Classes of control		
	Shall be according to EN 13611:2007+A2:2011, 4.1 with the following addition: The MFC is classified according to the classification of the standards as listed in 6.102.1.		Pass
	EN 13611:2007+A2:2011, 4.1 Where appropriate, controls are classified by application (e. g. sealing force, performance characteristics, number of operations during their working life). For classification of controls, see also the specific control standard.		Pass
4.2	Groups of control		
	Shall be according to EN 13611:2007+A2:2011, 4.2.		
	EN 13611:2007+A2:2011, 4.2		
	Controls are grouped according to the bending stresses which they are required to withstand (see Table 4).		
	Group 1 controls		
	Controls for use in an appliance or installation where they are not subjected to bending stresses imposed by installation pipework (e. g. by the use of rigid adjacent supports).		Pass
	Group 2 controls		
	Controls for use in any situation, either internal or external to the appliance, typically without support NOTE Controls which meet the requirements of a group 2 control also meet the requirements of a group 1 control.		NA
4.3	Classes of control functions		
	Shall be according to EN 13611:2007+A2:2011, 4.3 with the following addition: Applicable classifications for MFCs are derived from the classification of the respective controls and/or ACF's, as listed in 6.102.1 and 6.103, that are defined to be part of the MFC.		Pass
	EN 13611:2007+A2:2011, 4.3		
	For the evaluation of protective measures for fault tolerance and avoidance of hazards it is necessary to classify control functions with regard to their fault behaviour.		
	At the classification of control functions their integration into the complete safety concept of the appliance shall be taken into account.		
	For the purpose of evaluating the design of a control function, present requirements recognise three distinct classes:		

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
	Class A: Control functions which are not intended to be relied upon for the safety of the application, NOTE Examples are: room thermostats, temperature control.		NA
	Class B: Control functions which are intended to prevent an unsafe state of the appliance. Failure of the control function will not lead directly to a hazardous situation, NOTE Examples are: thermal limiter, pressure limiter.		NA
	Class C: Control functions which are intended to prevent special hazards such as explosion or whose failure could directly cause a hazard in the appliance. NOTE Examples are: burner control systems, thermal cut-outs for closed water systems (without vent protection).		Pass
5	**Units of measurement and test conditions**		
	Shall be according to EN 13611:2007+A2:2011, Clause 5.		Pass
6	**Construction requirements**		
	EN 13611:2007, Clause 6 is replaced with the following:		
6.101	General		
	MFC consist of:		
	- a combination of controls according to 6.102;		Pass
	- a single ACF (see definition 3.103);		NA
	- a combination of Control(s) and/or Application Control Function(s) according to 6.103.		NA
	Requirements for construction of the controls incorporated in the MFC are covered in the relevant control standards. Where no control standard is available the requirements of EN 13611:2007+A2:2011 and EN 14459:2007 are applicable.		Pass
	In addition, this standard covers in 6.102.2 requirements for the safety related interactions between the different functions of the MFC. Where there are no requirements for these interactions between two or more controls, a risk assessment shall be performed as given in 6.102.2.2 to identify additional requirements. MFCs shall be designed such that access to internal parts requires the use of tools. Blockage of auxiliary canals and orifices shall not lead to an unsafe situation otherwise they shall be protected against blockage by suitable means.		Pass
6.102	MFC based on combination of controls		

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
6.102.1	General		
	MFC are based on a combination of the functionality provided by the controls as given by the following list:		
	automatic shut-off valves according to EN 161;		NA
	pressure regulators according to EN 88-1, including previous requirements from EN 12078 – Zero pressure regulators and EN 12067-1 – Pneumatic gas/air ratio controls;		NA
	manually operated taps according to EN 1106;		Pass
	thermo electric flame supervision devices according to EN 125;		Pass
	mechanical thermostats according to EN 257;		NA
	pressure switches and electronic pressure sensing devices according to EN 1854;		NA
	electronic gas/air ratio control systems according to EN 12067-2;		NA
	automatic burner control system according to EN 298;		NA
	valve proving systems according to EN 1643;		NA
	water operated gas valves according to Annex AA.		NA
6.102.2	Interaction between Controls		
6.102.2.1	Closing mechanism for closure member		
	Each automatic shut-off valve shall consist of a separate, independent closing mechanism controlling only one closure member. A check of internal leak-tightness shall be possible on each of the automatic shut-off valves. If two or more closure members are controlled by one closing mechanism the valve is considered as one automatic shut-off valve.		NA
6.102.2.2	Interactions between functions		
	The MFC shall provide the same overall safety level as the individual functions would have provided for the complete application.		Pass
	This shall be shown by a risk assessment, taking into account the failure modes of each function that interacts with other function(s).		Pass
	Any interference between functions shall be assessed with respect to both, the functional condition and any fault conditions.		Pass
	Mechanical functions shall not affect the safety level of electronic functions and vice versa.		Pass
	The interaction of an electronic control function with other electronic control functions shall be assessed for interference taking into account the amount of faults related to the safety		NA

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	class of that control function. These fault(s) are introduced in the interface of interacting control functions.		
	The result of the assessment shall provide a set of conditions under which the new combination of functions can be used.		Pass
6.102.3	Alternative gas connections		
	Connections of controls according to EN 1106 and EN 125 can alternatively be made according to the following requirements:		
	- the joint can only be removed with tools; - the complete connection including fixing part is tested and; - the joint is inaccessible to the end user.		NA
	For flange or saddle-clamp joints, screws in accordance with ISO 262:1998 shall be used.		Pass
6.103	MFC based on Application Control Functions		
6.103.1	Assessment for ACFs in gas appliances		
	Shall be according to EN 14459:2007, 6.6.6.		NA
6.103.2	Gas shut-off control function		
	Shall be according to EN 14459:2007, Annex L.		NA
6	**Construction requirements (EN1106: 2010)**		
6.1	General (according to EN 13611: 2007, 6.1)		
	Controls shall be designed, manufactured, and assembled so that the various functions operate correctly when installed and used according to the manufacturer's instructions.		Pass
	All pressurized parts of a control shall withstand the mechanical and thermal stresses to which it is subjected without any deformation affecting safety.		Pass
	In general conformity with the requirements given in this standard is verified by the methods of test given in this standard or the specific control standard.		Pass
6.2	Mechanical parts of the control		
6.2.1	Appearance		
	Shall be according to EN 13611:2007, 6.2.1.		
6.2.1	Appearance (EN 13611:2007)		
	Controls shall be free from sharp edges and corners which could cause damage, injury or incorrect operation. All parts shall be clean internally and externally.		Pass
6.2.2	Holes		
	Shall be according to EN 13611:2007, 6.2.2.		

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
6.2.2	Holes (EN 13611:2007)		
	Holes for screws, pins, etc., used for the assembly of parts of the control or for mounting, shall not penetrate gas ways. The wall thickness between these holes and gas ways shall be at least 1 mm.		Pass
	Holes necessary for manufacture which connect gas ways to atmosphere but which do not affect the operation of the control shall be permanently sealed by metallic means. Suitable jointing compounds may additionally be used.		Pass
6.2.3	Breather holes		
	EN 13611:2007, 6.2.3 is not applicable.		NA
6.2.4	Test for leakage of breather holes		
	EN 13611:2007, 6.2.4 is not applicable.		NA
6.2.5	Screwed fastenings		
	Shall be according to EN 13611:2007, 6.2.5.		
6.2.5	Screwed fastenings (EN 13611:2007)		
	Screwed fastenings which may be removed for service or adjustment shall have metric threads that conform to ISO 262 unless a different thread is essential for the correct operation or adjustment of the control.		Pass
	Self-tapping screws which cut a thread and produce swarf shall not be used for connecting gas-carrying parts or parts which may be removed for service.		Pass
	Self-tapping screws which form a thread and do not produce swarf may be used provided that they can be replaced by metric machine screws conforming to ISO 262.		NA
6.2.6	Jointing		
	Shall be according to EN 13611:2007, 6.2.6.		
6.2.6	Jointing (EN 13611:2007)		
	Jointing compounds for permanent assemblies shall remain effective under normal operating conditions.		Pass
	Soldering or other processes where the jointing material has a melting point below 450 °C after application shall not be used for connecting gas-carrying parts except for additional sealing.		Pass
6.2.7	Moving parts		
	Shall be according to EN 13611:2007, 6.2.7.		
6.2.7	Moving parts (EN 13611:2007)		

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
	The operation of moving parts (e. g. diaphragms, bellows) shall not be impaired by other parts. There shall be no exposed moving parts which could adversely affect the operation of controls.		NA
6.2.8	Sealing caps		
	Shall be according to EN 13611:2007, 6.2.8.		
6.2.8	Sealing caps (EN 13611:2007)		
	Sealing caps shall be capable of being removed and replaced with commonly available tools and sealed (e. g. by lacquer). A sealing cap shall not hinder adjustment within the whole range declared by the manufacturer.		Pass
6.2.9	Dismantling and reassembly		
	Shall be according to EN 13611:2007, 6.2.9.		
6.2.9	Dismantling and reassembly (EN 13611:2007)		
	Parts which need to be dismantled for service or adjustment shall be capable of being dismantled and reassembled using commonly available tools. They shall be constructed or marked in such a way that incorrect assembly is impossible when following the manufacturer's instructions.		Pass
	Closure parts, including those of measuring and test points, which may be dismantled for service or adjustment shall be constructed such that leak-tightness is achieved by mechanical means (e. g. metal-to-metal joints, O-rings) without using jointing compounds such as liquids, pastes or tapes.		Pass
	Closure parts not intended to be dismantled shall be sealed by means which will show evidence of interference (e. g. lacquer).		Pass
6.2.101	Operating parts of taps		
	Taps operated by rotation shall be opened by turning the operating device anticlockwise and closed by turning it clockwise, except for taps which provide more than one burner with gas.		Pass
	Taps shall be operated manually without the use of tools.		Pass
	It shall not be possible in normal use to apply such forces to the closure member that it is lifted out of its seat or is brought into a position which causes the leakage rates to exceed the values given in 7.2.		Pass
	It shall not be possible to exert direct axial pressure (other than spring pressure) on the closure member when the operating spindle is depressed to clear any knitting arrangement.		Pass
	The taper plug at the large diameter shall be recessed into the body, and the plug shall protrude beyond the taper of the body at the small end. There shall be adequate clearance provided for this protrusion.		Pass

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
6.3	Materials		
6.3.1	Shall be according to EN 13611:2007, 6.3.1.		
6.3.1	General material requirements (EN 13611:2007)		
	The quality of materials, the dimensions used and the method of assembling the various parts shall be such that construction and performance characteristics are safe. Performance characteristics shall not alter significantly during a reasonable life when installed and used according to the manufacturer's instructions. Under these circumstances, all components shall withstand any mechanical, chemical, and thermal conditions to which they may be subjected during service.		Pass
6.3.2	Housing		
	EN 13611:2007, 6.3.2 is replaced with the following:		
	Parts of the housing which directly or indirectly separate a gas-carrying compartment from atmosphere shall be made from metallic materials. O-rings, gaskets and other seals are allowed.		Pass
6.3.3	Test for leakage of housing after removal of non-metallic parts		
	EN 13611:2007, 6.3.3 is not applicable.		NA
6.3.4	Zinc alloys		
	Shall be according to EN 13611:2007, 6.3.4.		
6.3.4	Zinc alloys (EN 13611:2007)		
	Zinc alloys shall only be used for gas-carrying parts of controls up to DN 50 with maximum working pressures up to 20 kP (200 mbar) and of quality ZnAl4 that conforms to ISO 301 where the parts do not exceed a temperature of 80°C. Where the main inlet or outlet threaded connections are made of zinc alloys, threads shall be external and conform to EN ISO 228-1.		NA
6.3.5	Springs providing closing and/or sealing force		
	Shall be according to EN 13611:2007, 6.3.5.		
6.3.5	Springs providing closing and/or sealing force (EN 13611:2007)		
	Closing force and sealing force shall be provided by spring action.		Pass
	Springs providing the sealing and/or closing force for any closure member of the control shall be made of corrosion-resistant materials and shall be designed for static and dynamic loading according to EN 13906-1 or EN 13906-2.		Pass

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
	Springs with wire diameter up to and including 2,5 mm shall be made from corrosion-resistant materials.		Pass
	Springs with wire diameter above 2,5 mm shall either be made from corrosion-resistant materials or shall be protected against corrosion.		NA
6.3.6	Resistance to corrosion and surface protection		
	Shall be according to EN 13611:2007, 6.3.6.		
6.3.6	Resistance to corrosion and surface protection (EN 13611:2007)		
	All parts in contact with gas or atmosphere and springs other than those covered by 6.3.5, shall either be made from corrosion-resistant materials or shall be suitably protected. The corrosion protection for springs and other moving parts shall not be impaired by any movement.		Pass
6.3.7	Impregnation		
	Shall be according to EN 13611:2007, 6.3.7.		
6.3.7	Impregnation (EN 13611:2007)		
	Where impregnation is part of the manufacturing process, it shall be carried out using an appropriate procedure, (e. g. vacuum or internal pressure, using appropriate sealing materials).		NA
6.3.8	Seals for glands for moving parts		
	Shall be according to EN 13611:2007, 6.3.8.		
6.3.8	Seals for glands for moving parts (EN 13611:2007)		
	Seals for moving parts which pass through the body to atmosphere and seals for closure members shall be made only of solid, mechanically stable material of a type which does not deform permanently. Sealing paste shall not be used.		NA
	Manually adjustable packing glands shall not be used for sealing moving parts. NOTE An adjustable gland set by the manufacturer and protected against further adjustment is considered to be non-adjustable.		NA
	Bellows shall not be used as the sole sealing element against atmosphere.		NA
6.3.101	Tap closure member		
	Gas-closing parts shall either have a metallic support to withstand the sealing force or shall be made of metal. This requirement also applies to parts transmitting the closing force.		Pass

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
	For guide elements (see Figures 1 to 5) non-metallic materials are admissible.		
6.4	Gas connections		
	Shall be according to EN 13611:2007, 6.4		
6.4.1	Making connections		
	It shall be possible to make all gas connections using commonly available tools, e. g. by the provision of suitable spanner flats.		Pass
6.4.2	Connection sizes		
	Equivalent connection sizes are given in Table 1.		Pass
6.4.3	Threads		
	Inlet and outlet threads shall be according to ISO 7-1 or to EN ISO 228-1 and shall be chosen from the series given in Table 1.		Pass
6.4.4	Union joints		
	Where connections are made with union joints either the joints shall be included with the control or full details shall be supplied if the threads do not conform to ISO 7-1 or EN ISO 228-1.		NA
6.4.5	Flanges		
	Where flanges are used on controls above DN 50, they shall be suitable for connection to flanges to ISO 7005, PN 6 or PN 16.		NA
	Where flanges are used on controls up to and including DN 50 which are not suitable for connection to flanges to ISO 7005, either suitable adapters shall be supplied to enable connection to standard flanges and threads, or full details of mating parts shall be supplied.		Pass
6.4.6	Compression fittings		
	If compression fittings are used, it shall not be necessary to form the tubes before making connections. Olives shall be appropriate to the tubes for which they are intended. Non-symmetrical olives may be used provided they cannot be fitted incorrectly.		NA
6.4.7	Pressure test nipples		
	Pressure test nipples shall have an external diameter of 9+0/ -0.5 mm and a useful length of at least 10 mm for connection to tubing. The equivalent diameter of the bore shall not exceed 1 mm. Nipples for pressure test conforming to these requirements shall be used only up to and including 500 mbar.		NA
6.4.8	Strainers		

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
	Where an inlet strainer is fitted the maximum strainer hole dimension shall not exceed 1,5 mm and it shall prevent the passage of a 1 mm diameter pin gauge.		NA
	Where an inlet strainer is not fitted, the installation instructions shall include relevant information on the use and installation of a strainer conforming to the above requirements, to prevent the ingress of foreign matter.		NA
	Strainers fitted to controls of DN 25 and above shall be accessible for cleaning or replacement without the need to remove the control body by dismantling threaded or welded pipe work.		NA
6.5	Electronic parts of the control		
	EN 13611:2007, 6.5 is not applicable.		NA
6.6	Protection against internal faults for the purpose of functional safety		
	EN 13611:2007, 6.6 is not applicable.		NA
6.101	Component parts		
6.101.1	General		
	If markings are used for the different positions of the tap, the following symbols according to Table 1 shall be clearly and durably marked or markings shall be used according to the relevant appliance standards (e.g. EN 30-1-1 and EN 14543). Off: Plain disc; Ignition: Star; Full on: Large flame; Reduced flow: Small flame.		NT
	The off-position shall have a non-adjustable stop.		Pass
6.101.2	Turning angles		
6.101.2.1	General		
	The marked reduced flow position, if any, may be placed either after the fully open position or between the open and the close position.		Pass
	The turning angle of the needle valve between the closed and the fully open position shall be between 180° and 360°.		NA
6.101.2.2	Opening at maximum flow		
	If the reduced flow rate position is placed after the fully open position the following requirements shall be met: - in order to change from the closed position to the fully open position the turning angle shall be (90 ± 5)°; - the turning angle between the fully open position and the reduced flow rate position shall be greater than 70°; this requirement is not applicable to multi-outlet taps; - the movement of the tap closure member shall be limited by a fixed stop at the reduced flow rate position.		Pass

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
6.101.2.3	Opening at minimum flow		
	If the reduced flow rate position is placed between the closed and fully open position the following requirements shall be met: - in order to change from the closed position to the fully open position the turning angle shall be greater than 90°; - in order to change from the reduced flow rate position to the fully open position the turning angle shall be greater than 70°; this requirement is not applicable for multi-outlet-taps; - a reduced flow rate position shall be provided by means of a part which locates the tap closure member in this position when the movement is in the direction of closing; - the movement of the tap closure member shall be limited in the fully open position by a stop.		NA
6.101.2.4	Single outlet tap		
	If a single outlet tap does not have a reduced flow position, the turning angle to pass from the closed position to the fully open position shall be (90 ± 5)°.		NA
6.101.3	Lubrication		
	The tap shall be designed so that normal lubrication does not cause blockage of any gas way.		Pass
6.101.4	Stops		
	The extreme positions of the tap travel shall be limited by stops.		Pass
	When operating needle valves it shall not be possible to remove the needle completely from the body by unscrewing. When closing the positive stop is obtained by contact of the needle on its seat.		NA
6.101.5	Safety lock		
	Single outlet taps may be provided with a safety lock preventing any accidental opening which requires two separate actions to operate the tap.		NA
	Taps with two outlets for two separate burners shall be designed so that in order to change from one outlet to the other it is necessary to pass through a locked closed position. It shall only be possible for the user to change from one outlet to the other by a deliberate action. In particular it shall not be possible to change from one outlet to the other by keeping the handle constantly pressed in or by a pure turning movement.		NA
6.101.6	Bearing seal		
	The bearing seal for taps except needle valves shall be≥3 mm (see Figure 1).	TL90DXQ: 3mm TL90DZAQF-1: 3mm	Pass
6.101.7	Taper angle		
	For taper plug taps the closure member included angle shall be at least 9° 25'.	TL90DXQ: 9.51° TL90DZAQF-1:	Pass

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
		11.03°	
6.101.8	Pre-setting devices		
	If present, pre-setting devices shall be easily accessible and not be able to fall into the gas ways of the tap.		NA
	The operation of pre-setting devices shall only be possible with a commercially available type of screwdriver or spanner.		NA
	Pre-setting devices shall be fixed in their set positions.		NA
6.101.9	Open and closed position of a tap		
	Marking of the open and closed position of a tap shall be used unless both the main burner and the ignition burner are supervised and the manually operated tap cannot be incorrectly operated and if the manual actuator, in the open and closed position is so arranged that any marking is not possible (e.g. push-button for on and off).		Pass
6.101.10	Compensation means for taps		
	Manually operated taps shall be designed with compensating means to take up automatically any wear between the closure member and the control body.		Pass
6.101.11	Spring effect in taps		
	The tapered plug shall be held in position in the body by a spring. The construction shall be such that any play between plug and tap body caused by wear which can be expected during normal life shall be taken up automatically.		Pass
6	**Construction requirements (EN125: 2010. Different requirements based on EN1106: 2010)**		
6.1	General		
	Shall be according to EN 13611:2007, 6.1 with the following addition:		
	Controls shall shut off the gas way to the burner automatically with at least the sealing force specified in 7.104 in case of failure in the thermoelectric current. Controls shall also be designed so that during ignition either the gas way to the main burner is open, if there is no pilot burner, or the gas way to the main burner is closed and that to the pilot burner is open.		Pass
6.3.2	Housing		
	Shall be according to EN 13611:2007, 6.3.2.		
	Parts of the housing which directly or indirectly separate a gas-carrying compartment from atmosphere shall either: - be made from metallic materials, or - on removal or fracture of non-metallic parts other than O-rings, gaskets and sealing parts of diaphragms, no more than 30 dm^3/h of air escapes at the maximum inlet pressure.		Pass
	When inside the housing a diaphragm separates the gas-carrying compartment from atmosphere than this is considered to be indirectly separated.		NA

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
6.3.3	Test for leakage of housing after removal of non-metallic parts (EN 13611:2007)		
	Shall be according to EN 13611:2007, 6.3.3 with the following addition: The test shall be performed in accordance with 7.3.2.		NA
7	**Performance**		
	EN 13611:2007+A2:2011, Clause 7 is replaced by the following:		
7.101	General		
	Requirements for performance of MFC are covered in the relevant control standards, see list in 6.102.1. Where no control standard is available the requirements of EN 13611:2007+A2:2011 and EN 14459:2007 are applicable.		Pass
7.102	External leak-tightness of MFC		
	MFC shall be leak-tight in accordance with the leakage rate given in Table 1. The test is performed according to EN 13611:2007+A2:2011, 7.3.2.	See annex test table 1	Pass
7.103	Thermostat function		
	If the MFC incorporates a pressure regulator and an independent mechanical thermostat function, the pressure regulator shall be put out of action for the tests of the thermostatic function.		NA
7.104	Internal leak tightness of MFC		
	The leak-tightness of the closure member(s) of each function shall be tested independently.	See annex test table 1	Pass
7	**Performance requirements (EN1106: 2010)**		
7.1	General performance requirements (EN 13611: 2007, 7.1)		
	Controls shall operate correctly under all combinations of the following:		
	– Full range of inlet pressures;		Pass
	– Ambient temperature range from 0°C to 60°C or wider limits, if declared by the manufacturer;	-20-80°C	Pass
	– In all mounting positions declared by the manufacturer;		Pass
	– Voltage or current range from 85% to 110% of the rated supply value or from 85% of the minimum rated value to 110% of the maximum rated value.		NA
7.2	Leak-tightness		
	Shall be according to EN 13611:2007, 7.2.	See the annex test table 1	Pass

<table>
<tr><th colspan="4">EN 126: 2012</th></tr>
<tr><th>Clause</th><th>Standard Requirement</th><th>Test Result</th><th>Verdict</th></tr>
<tr><td></td><td>Table 2 — Maximum leakage rates
<table>
<tr><th rowspan="2">Nominal inlet size
DN</th><th colspan="2">Maximum leakage rates
cm^3/h of air</th></tr>
<tr><th>Internal leak-tightness</th><th>External leak-tightness</th></tr>
<tr><td>DN < 10</td><td>20</td><td>20</td></tr>
<tr><td>10 ≤ DN ≤ 25</td><td>40</td><td>40</td></tr>
<tr><td>25 < DN ≤ 80</td><td>60</td><td>60</td></tr>
<tr><td>80 < DN ≤ 150</td><td>100</td><td>60</td></tr>
<tr><td>150 < DN <250</td><td>150</td><td>60</td></tr>
</table>
Closure parts shall remain leak-tight after dismantling and reassembly.</td><td></td><td></td></tr>
<tr><td>7.3</td><td>Test for leak-tightness</td><td></td><td></td></tr>
<tr><td></td><td>Shall be according to EN 13611:2007, 7.3.</td><td></td><td>Pass</td></tr>
<tr><td>7.3.1</td><td>General</td><td></td><td></td></tr>
<tr><td></td><td>The limits of error of the apparatus used shall be ± 1 cm^3 and 10 Pa (± 0.1 mbar).</td><td></td><td>Pass</td></tr>
<tr><td></td><td>The uncertainty of measurement of leakage rates shall be within ± 5 cm^3/h.</td><td></td><td>Pass</td></tr>
<tr><td></td><td>For internal leakage of closure members carry out the tests with an initial test pressure of 0,6 kPa (6 mbar) then for both internal and external leakage repeat the tests at 1,5 times the maximum inlet pressure or 15 kPa (150 mbar), whichever is greater.</td><td></td><td>Pass</td></tr>
<tr><td></td><td>Where the control is suitable for use with third family gases with nominal inlet pressures of 11,2 kPa (112 mbar) or 14,8 kPa (148 mbar), use a test pressure of at least 22 kPa (220 mbar).</td><td></td><td>Pass</td></tr>
<tr><td></td><td>Use a method which gives reproducible results. Examples of such methods are shown in:
Annex B (volumetric method) for test pressures up to and including 15 kPa (150 mbar);
Annex C (pressure loss method) for test pressures above 15 kPa (150) mbar.</td><td></td><td>Pass</td></tr>
<tr><td></td><td>The equation for conversion from the pressure loss method to the volumetric method is given in Annex D.</td><td></td><td>Pass</td></tr>
<tr><td>7.3.2</td><td>External leak-tightness</td><td></td><td></td></tr>
<tr><td></td><td>Pressurize the inlet and outlet(s) of the control to the test pressures given in 7.3.1 and measure the leakage rate.</td><td></td><td>Pass</td></tr>
<tr><td></td><td>Dismantle and reassemble closure parts five times according to the manufacturer's instructions and repeat the test.</td><td></td><td>Pass</td></tr>
<tr><td>7.3.3</td><td>Internal leak-tightness</td><td></td><td></td></tr>
<tr><td></td><td>With any closure member in the closed position, pressurize the inlet of the control in the direction of gas flow indicated, to the test pressures given in 7.3.1 and measure the leakage rate.</td><td></td><td>Pass</td></tr>
</table>

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
7.4	Torsion and bending		
	Shall be according to EN 13611:2007, 7.4.	See the annex test table 2	Pass
7.4.1	General		
	Controls shall be constructed in such a way that they have adequate strength to withstand likely mechanical stress to which they may be subjected during installation and service.		Pass
	After testing, there shall be no permanent deformation and any leakage shall not exceed the values specified in Table 2 or in the specific control standard.		Pass
7.4.2	Torsion		
	Controls shall withstand the torque given in Table 4 when tested to 7.5.2 or 7.5.3.		Pass
7.4.3	Bending moment		
	Controls shall withstand the bending moment given in Table 4 when tested to 7.5.4. Group 1 controls shall additionally be tested to 7.5.5.		Pass
7.5	Torsion and bending tests		
	Shall be according to EN 13611:2007, 7.5.		Pass
7.5.1	General		
	Use pipes according to ISO 65, medium series with a length of:		Pass
	– at least 40 × DN for controls up to and including DN 50;		Pass
	– at least 300 mm for controls above DN 50.		NA
	Use only non-hardening sealing paste on connections.		Pass
	Determine the appropriate tightening torque to be applied to flange bolts to ISO 7005 from the values in Table 3.		Pass
	Test the control for external leak-tightness to 7.3.2 and internal leak-tightness to 7.3.3 where applicable, before carrying out torsion and bending tests.		Pass
	If the inlet and outlet connections are not on a common axis, repeat the tests with the connections reversed.		Pass
	If the inlet and outlet connections are not of the same nominal size, clamp the body of the control and apply the torque and bending moment appropriate to each connection in turn.		Pass
	Controls with compression fittings shall be subjected to the bending moment test by means of an adapter on the union threads.		NA
	NOTE 1 Torsion tests are not applicable to controls with flanged		NA

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
	connections if these are the only means of connection.		
	NOTE 2 Bending moment tests are not applicable for controls with flanged or saddle-clamp inlet connections for attachment to cooking appliance manifolds.		Pass
7.5.2	Ten second torsion test – group 1 and group 2 controls with threaded connections		
	Screw pipe 1 into the control with a torque not exceeding the values given in Table 4. Clamp pipe 1 at a distance at least 2d from the control (see Figure 1).		Pass
	Screw pipe 2 into the control with a torque not exceeding the values given in Table 4. Ensure that all joints are leak-tight.		Pass
	Support pipe 2 such that no bending moment is applied to the control.		Pass
	Progressively apply the appropriate torque to pipe 2 for 10 s without exceeding the values given in Table 4. Apply the last 10 % of the torque over a period not exceeding 1 min.		Pass
	Remove the torque and visually inspect the control for any deformation, then test the control for external leak tightness to 7.3.2 and internal leak-tightness to 7.3.3 where applicable.		Pass
7.5.3	Ten second torsion test – group 1 and group 2 controls with compression joints		
7.5.3.1	Olive-type compression joints		
	Use a steel tube with a new brass olive of the appropriate size.		NA
	Clamp the control body rigidly and apply the test torque given in Table 4 to every tubing nut in turn for 10 s.		NA
	Visually inspect the control for deformation, discounting any deformation of the olive seating or mating surfaces consistent with the applied torque. Test the control for external leak-tightness to 7.3.2 and internal leak-tightness to 7.3.3 where applicable.		NA
7.5.3.2	Flared compression joints		
	Use a short length of steel tube with a flared end and follow the method given in 7.5.3.1, discounting any deformation of the cone seating or mating surfaces consistent with the applied torque.		NA
7.5.3.3	Flanged or saddle-clamp inlet connections for attachment to cooking appliance gas manifolds		
	Attach the control to a manifold as recommended by the manufacturer and tighten the fixing screws to the recommended torque. Connect the olive or flared type compression coupling and tighten to the specified torque, given in parentheses in column 2 of Table 4, in accordance with the procedures given in		Pass

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
	7.5.3.1 or 7.5.3.2, as appropriate.		
7.5.4	Ten second bending moment test – group 1 and group 2 controls		
	Use the same control as for the torsion test and the assembly as shown in Figure 2.		Pass
	– Apply the force for the required bending moment for a group 1 or group 2 control given in Table 4 for 10 s, taking the mass of the pipe into consideration. Apply the force:		Pass
	– for controls up to and including DN 50, 40 DN from the centre of the control;		Pass
	for controls above DN 50, at least 300 mm from the control connection.		NA
	Remove the force and visually inspect the control for any deformation, then test the control for external leak tightness to 7.3.2 and internal leak-tightness to 7.3.3 where applicable.		Pass
7.5.5	900 second bending moment test – group 1 controls only		
	Use the same control as for the torsion test and the assembly as shown in Figure 2.		Pass
	Apply the force for the required bending moment for a group 1 control given in Table 4 for 900 s, taking the mass of the pipe into consideration. Apply the force:		Pass
	– for controls up to and including DN 50, 40 × DN from the centre of the control;		Pass
	– for controls above DN 50, at least 300 mm from the control connection.		NA
	With the force still applied, test the control for external leak-tightness to 7.3.2 and for internal leak-tightness to 7.3.3 where applicable.		Pass
7.6	Rated flow rate		
	Shall be according to EN 13611:2007, 7.6 with the following addition: The flow rate shall be measured at the fully open position and if applicable at the reduced flow rate position.	See the annex test table 3	Pass
7.7	Test for rated flow rate		
7.7.1	Apparatus		
	Shall be according to EN 13611:2007, 7.7.1.		Pass
7.7.2	Test procedure		
	Shall be according to EN 13611:2007, 7.7.2 with the following modification: The test shall be performed at 100 Pa (1 mbar) pressure		Pass

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
	difference.		
7.7.3	Conversion of air flow rate		
	Shall be according to EN 13611:2007, 7.7.3.		Pass
7.8	Durability (according to EN 13611:2007, 7.8)		
7.8.1	Elastomers in contact with gas		
	Elastomers in contact with gas (e.g. valve pads, O-rings, diaphragms and lip seals) shall comply with requirements and tests given in EN 549.	See the annex test table 7	Pass
7.8.2	Marking		
	Adhesive labels and all marking shall be resistance to abrasion, humidity and temperature and shall neither lift nor discolor such that the marking become illegible. In specific, marking on knobs shall survive the continual handling and rubbing resulting from manual operation. Marking shall be tested in accordance with the methods given in EN 60730-1:2000, Annex A.		NT
7.8.3	Marking shall be tested in accordance with the methods given in EN 60730-1:2000, Annex A.		NT
7.8.4	Resistance to scratching		
	Surface exclusively protected with paint shall withstand the scratch test before and after the humidity test without the ball penetrating the protective coating to expose bare metal.		NA
7.8.5	Scratch test		
	Draw a 1 mm diameter fixed steel ball across the surface of the control at a speed of 30 mm/s to 40 mm/s with a contact force of 10 N (see Figure 4). Repeat the scratch test after the humidity test of 7.8.7.		NA
7.8.6	Resistance to humidity		
	All parts including those with protected surfaces, (e.g. coated with paint or plating), shall withstand the humidity test without any signs of undue corrosion, lifting or blistering visible with the naked eye. Where evidence of minor corrosion of a control part exists, the part shall be substantial enough to ensure an adequate margin for the safety of the control. Nevertheless, parts of the control, the corrosion of which could adversely affected the continued safe working of the control, shall not show any signs of corrosion.		Pass

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
	Place the control in a chamber at an ambient temperature of (40±2) °C with a relative humidity exceeding 95% for 48 h. Remove the control from the chamber and examine it with the naked eye for signs of corrosion, lifting or blistering of the coated surface. Leave the control for a further 24 h at (20 ± 5) °C and carry out another examination.		Pass
7.8.7	Humidity test		
	Place the control in a chamber at an ambient temperature of (40±2) °C with a relative humidity exceeding 95% for 48 h. Remove the control from the chamber and examine it with the naked eye for signs of corrosion, lifting or blistering of the coated surface. Leave the control for a further 24 h at (20 ± 5) °C and carry out another examination.		Pass
7.9	Performance tests for electronic controls		
	EN 13611:2007, 7.9 is not applicable.		NA
7.10	Long-term performance for electronic controls		
	EN 13611:2007, 7.10 is not applicable.		NA
7.101	Operating torque and force		
7.101.1	Requirements for operating torque		
	The operating torque shall not exceed the values given in Table 2 when tested in accordance with 7.101.2. The operating torque of a tap knob shall not exceed 0,017 N·m per millimetre of the knob diameter.	See the annex test table 4	Pass
7.101.2	Test for operating torque		
	The operating torque is measured with a suitable torque-meter having accuracy within ± 10 % of the maximum value of operating torque specified in Table 2 for the relevant size of the tap to check for conformity with 7.101.1. The opening and closing movements are carried out at a constant angular velocity of approximately 1.5 rad/s.		Pass
7.101.3	Requirements for operating force		
	For taps which are operated by a push-button, the force required for the manual operation of the push-button shall not exceed the values given in Table 3 when tested in accordance with 7.101.4. Where an actuating knob is supplied the operating force shall not exceed 0.5 N.	See the annex test table 4	Pass
7.101.4	Test for operating force		
	The operating force is measured with a suitable dynamometer		Pass

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
	having accuracy within ± 10 % of the maximum value of operating force specified in Table 3 for the relevant size of the tap to check for conformity with 7.101.3.		
7.101.5	Requirements for operating torque for safety lock		
	If the tap is designed to lock in the OFF position, it shall not unlock when a torque of 1 N·m is applied when tested in accordance with 7.101.6. The performance of the tap shall not be permanently impaired by this torque.	See the annex test table 4	Pass
7.101.6	Test for operating torque for safety lock		
	In the off-position the safety lock is subjected ten times to an applied torque of 1 N·m for 10 s to check for conformity with 7.101.5.		Pass
7.102	Endurance		
7.102.1	Requirement		
	The tap shall withstand the number of operations corresponding to the classification given in 4.1. This does not apply to pre-setting devices. After endurance testing there shall be no visible damage or visible change to the marked positions. The leakage shall conform to the values specified in EN 13611:2007, Table 2. The force necessary for operation shall not exceed the values specified in 7.101.1 or 7.101.3.	See the annex test table 1, 4, 5, 6	Pass
7.102.2	Endurance test		
7.102.2.1	Static endurance test		
	Two taps (one in the open position, the other in the closed position) are subjected successively to temperature resistance tests under the following conditions: 48 h at 0 °C or at the minimum operating temperature as stated in the operating instructions, whichever is the lower. 48 h at 60 °C or at the maximum operating temperature as stated in the operating instructions, whichever is the higher. After this test without any preliminary operation of the tap the operating torque is checked.		Pass
7.102.2.2	Dynamic endurance test		
	Taps shall be tested according to the number of operations: – 5 000 operations; – 10 000 operations; or – 40 000 operations under the following conditions:		Pass

<table>
<tr><th colspan="4">EN 126: 2012</th></tr>
<tr><th>Clause</th><th>Standard Requirement</th><th>Test Result</th><th>Verdict</th></tr>
<tr><td></td><td>– 50 % of the operations shall be performed at the maximum operating temperature as stated in the operating instructions;
– 50 % of the operations shall be performed at a temperature of (20 ± 5) °C.</td><td></td><td></td></tr>
<tr><td>7</td><td colspan="3">Performance (EN125:2010. Different requirements based on EN1106: 2010)</td></tr>
<tr><td>7.1</td><td colspan="3">General</td></tr>
<tr><td></td><td colspan="3">Shall be according to EN 13611:2007, 7.1 with the following addition:</td></tr>
<tr><td></td><td colspan="3">Tests shall be conducted in the sequence shown in Table 1</td></tr>
<tr><td></td><td>Table 1 — Sequence of testing
<table><tr><th>Clauses no.</th><th>Type of test</th></tr><tr><td>7.3</td><td>Test for leak-tightness</td></tr><tr><td>7.7</td><td>Test for rated flow rate</td></tr><tr><td>7.101.2</td><td>Test for operating torque and force</td></tr><tr><td>7.102.2</td><td>Test for interlocks</td></tr><tr><td>7.104.2</td><td>Test for sealing force</td></tr><tr><td>7.103.2</td><td>Test for closing current</td></tr><tr><td>7.5</td><td>Torsion and bending tests</td></tr><tr><td>7.105.2.1</td><td>Static endurance test</td></tr><tr><td>7.105.2.2</td><td>Dynamic endurance test</td></tr><tr><td>7.8</td><td>Durability</td></tr><tr><td>6.3.3</td><td>Test for leakage of housing after removal of non-metallic parts</td></tr></table></td><td></td><td>Pass</td></tr>
<tr><td>7.2</td><td colspan="3">Leak-tightness</td></tr>
<tr><td></td><td colspan="3">EN 13611:2007, 7.2 is replaced by the following:</td></tr>
<tr><td></td><td>Controls shall be leak tight, in accordance with the leakage rates given in Table 2</td><td>See annex test table 1</td><td>Pass</td></tr>
<tr><td></td><td>Table 2 — Maximum leakage rates
<table><tr><th rowspan="3">Gas connection nominal inlet size DN</th><th colspan="4">Maximum leakage rates
cm³/h of air</th></tr><tr><th colspan="2">Internal leak tightness</th><th colspan="2">External leak tightness</th></tr><tr><th>Closed (de-energized) position</th><th>Ignition position</th><th>Operating and closed (de-energized) position</th><th>Ignition position</th></tr><tr><td>DN < 10</td><td>20</td><td rowspan="3">5 000</td><td>20</td><td>170</td></tr><tr><td>10 ≤ DN ≤ 25</td><td>40</td><td>40</td><td>190</td></tr><tr><td>25 < DN ≤ 50</td><td>60</td><td>60</td><td>210</td></tr></table>
Closure parts shall remain leak-tight after dismantling and reassembly.</td><td></td><td>Pass</td></tr>
<tr><td>7.3</td><td colspan="3">Test for leak-tightness</td></tr>
<tr><td>7.3.1</td><td colspan="3">General</td></tr>
<tr><td></td><td colspan="3">Shall be according to EN 13611:2007, 7.3.1.</td></tr>
<tr><td>7.3.2</td><td colspan="3">External leak-tightness</td></tr>
<tr><td></td><td colspan="3">Shall be according to EN 13611:2007, 7.3.2 with the following addition:
Pressurize the inlet and outlet(s) of the control to the test pressures given in 7.3.1.
Before the test, closure parts which may be dismantled in accordance with 6.2.9 shall be dismantled and reassembled five times to the manufacturer's instructions and the leakage rate for each of the mentioned conditions below is measured.</td></tr>
</table>

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
	a) The Control shall be operated such that all closure members in the control are in the open position. Any suitable electrical source may be used during the test. The inlet and outlet(s) of the control shall then be pressurized to the test pressure according to 7.3.1. b) The test of a) shall then be carried out with the electrical source removed so that the main and pilot gas ways (for protected pilots) in the control are closed. c) The test of a) shall then be repeated with any spindle moved during ignition and held in the ignition position.		
7.3.3	Internal leak-tightness		
	EN 13611:2007, 7.3.3 is replaced by the following: Closed position Test in the closed position the leakage of the de-energized control in the direction of gas flow, at the test pressures given in 7.3.1 and measure the leakage rate. If there is more than one closure member in the control, the test shall be repeated with each closure member in turn in the closed position, all the other closure members being fully open. Ignition position For controls equipped with a pilot burner outlet, this outlet shall be blocked. Test in the ignition position the leakage of the de-energized control in the direction of gas flow at the test pressures given in 7.3.1 and measure the leakage rate.		
7.6	Rated flow rate		
	EN 13611:2007, 7.6 is replaced by the following:		
	The flow rate when measured according to 7.7 shall be between 0.95 times and 1.40 times the rated flow rate as declared by the manufacturer.	See annex test table 3	Pass
7.101.1	Operating torque and force		
7.101.1.1	Requirement		
	If applicable the torque required to operate the control shall not exceed the values given in Table 3.	See annex test table 4	Pass
	If the manufacturer supplies a knob together with the control, the operating torque shall not exceed 0,017 Nm per millimetre of knob diameter.		NA
	The force or pressure required to operate a push-button directly by hand shall not exceed 30 N for nominal size of controls up to and including DN 10, and 45 N for nominal size of controls exceeding DN 10, or 0,5 N/mm², whichever is smaller.	See annex test table 4	Pass
7.101.2	Test for operating torque and force		
	The operating torque is measured with a suitable torque meter having an accuracy within ± 10 % of the maximum torque specified in Table 3 the relevant size of control to check for compliance with 7.101.1. Carryout the opening and closing movement with a constant angular velocity of approximately 1,5 rad/s.		

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
	The operating force is measured with a suitable dynamo meter having an accuracy within ± 10 % of the measured value to check for compliance with 7.101.1.		
7.102	Interlocks		
7.102.1	Requirement		
	If present, an ignition interlock shall prevent ignition as long as the closure member to the main burner is open.		NA
	If present, a re-start interlock shall prevent the re-opening of the closure member controlling the main burner or the main burner and the pilot burner until the armature plate has separated from the magnetic element.		NA
7.102.2	Test for interlocks		
	The applicable test shall be carried out five times. Using ignition interlock, verify that ignition can only take place when the pilot gas way is open and the closure member of the main gas way is closed. Thereafter, with the closure member of the main gas way opened, it shall not be possible to operate the ignition device under all conditions. To check a re-start interlock, energize the control with suitable electrical means and bring the control in the normal operating position with closure member opened. Verify under these conditions that a re-start attempt is not possible as long as the closure member is in the open position.		
7.103	Closing current		
7.103.1	Requirement		
	The initial closing current shall not exceed 200 mA and shall not be less than 40 mA unless otherwise declared by the manufacturer.	See annex test table 5	Pass
	If the initial closing current is less than 100 mA, the closing current determined after the endurance test according to 7.105 shall be between 60 % and 400 % of the initial value.		Pass
	If the initial closing current is 100 mA or greater, the closing current determined after the endurance test according to 7.105 shall be between 50 % and 300 % of the initial value.		NA
7.103.2	Test for closing current		
	Connect a DC source (voltage approximately 2 V) with a variable resistor in series to the control to simulate a thermocouple. If mains voltage is used rather than a battery, the direct current shall be smoothed to a ripple of less than 2 % of the mean value of the direct current. Proceed as follows: a) in the ignition position of the control the closure member of the control is held open by pressure or torque on the push-button or knob as applicable (the armature plate being held in contact with the magnetic element);		

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Clause	**Standard Requirement**	**Test Result**	**Verdict**
	b) excite the magnetic element by a current which is uniformly and continuously increased at a rate less than 30 mA/s until it is approximately three times the maximum closing current declared by the manufacturer; c) release the push-button or knob with the control left in the fully open position, the armature plate being held by the magnetic element; d) increase the current at any rate up to 1500 mA, and sustain the current for at least 60 s; e) reduce the current at a constant rate down to approximately 300 % of the maximum closing current declared by the manufacturer; f) reduce the current further at a constant rate not exceeding 10 mA/s until the control closes (the armature plate drops off the magnetic element); g) measure the current at this point; h) repeat the sequence ten times and from the values measured obtain the mean, which shall be taken as the closing current.		
7.104	Sealing force		
7.104.1	Requirement		
	In the closed position the control shall have a minimum sealing force of 1 kPa (10 mbar) over the closure member orifice area. The internal leak-tightness of the control according to the test method in 7.104.2 shall not exceed 100 cm^3/h.	See annex test table 6	Pass
7.104.2	Test for sealing force		
	Connect an air supply through a flow meter to the outlet of the control such that the air pressure opposes the closing direction of the closure member. Energize and de-energize the control twice. Pressurize the control with an increasing rate less than 100 Pa/s (1 mbar/s) to a pressure of 1 kPa (10 mbar) and measure the leakage rate after the test system has stabilized.		
7.105	Endurance		
7.105.1	Requirement		
	After each of the endurance tests described in 7.105.2 the control shall conform to the requirements of 7.2, 7.3, 7.101, 7.102, 7.103 and 7.104.	See the annex test table 1, 4, 5, 6	Pass
7.105.2	Endurance test		
7.105.2.1	Static endurance test		
	Subject the control in closed (de-energized) position to temperature resistance tests under the following conditions: - 48 h at 0 °C or at the minimum operating temperature declared by the manufacturer, whichever is lower; - 48 h at 60 °C or at the maximum operating temperature declared by the manufacturer, whichever is higher. Verify after these tests with the control at ambient temperature the requirements of 7.105.1, the		

EN 126: 2012			
Clause	**Standard Requirement**	**Test Result**	**Verdict**
	operating torque or force being determined by a single measurement without any preliminary operation of the control.		
7.105.2.2	Dynamic endurance test		
	Install the control according to the manufacturer's instructions. Supply the gas inlet of the control with air at the maximum inlet pressure declared by the manufacturer at rated flow rate. Use an activating force during the endurance test between 30 % and 50 % greater than the operating force indicated by the manufacturer. The activating force shall act axially in the operating direction for controls with a push-button, at a speed of 100 mm/s. Keep the force constant during the endurance test (e.g. by using a spring). Where a knob is used in place of a push-button, apply the above requirements with not more than 20 operations per minute carried out. Supply the control during the test with a current corresponding to at least three times the closing current stated by the manufacturer. Arrange each cycle so that the current is not applied before the armature is in contact with the magnetic element of the control. Perform the number of cycles in accordance with Table 4, depending on the Class of the control. Check the operation of the control throughout the endurance test.		
8	**EMC/Electrical requirements**		
	EN 13611:2007+A2:2011, Clause 8 is replaced by the following:		
	EMC/Electrical requirements of MFC are covered in the relevant control standards. Where no control standard is available the requirements of EN 13611:2007+A2:2011 and EN 14459:2007 are applicable.		NA
9	**Marking, installation and operating instructions**		NT

Annex test table 1-1: Leak-tightness (Test model:TL90DXQ)

Standard Requirements					Test Result		Verdict
					T1	T2	
The leakage rate≤20(cm^3/h)	Before endurance	External leakage		6mbar	3.14	2.75	Pass
				150mbar	11.84	11.42	
		Internal leakage		6mbar	2.53	2.37	
				150mbar	10.42	10.65	
		Internal leakage in de-energized position at room temperature	Flame supervision device	6mbar	2.65	2.63	
				150mbar	10.53	10.72	
		Internal leakage in de-energized position at 80°C		6mbar	2.65	2.73	
				150mbar	10.53	10.84	
		Internal leakage in de-energized position at -20°C		6mbar	2.60	2.68	
				150mbar	10.59	10.96	
The leakage rate≤20(cm^3/h)	After endurance	External leakage		6mbar	3.32	2.87	
				150mbar	12.43	11.68	
		Internal leakage		6mbar	2.83	2.58	
				150mbar	10.53	10.75	
		Internal leakage in de-energized position at room temperature	Flame supervision device	6mbar	2.88	2.68	
				150mbar	10.73	10.81	
		Internal leakage in de-energized position at 80°C		6mbar	2.94	2.73	
				150mbar	10.77	10.84	
		Internal leakage in de-energized position at -20°C		6mbar	2.85	2.68	
				150mbar	10.94	11.02	

Annex test table 1-2: Leak-tightness (Test model: TL90DZAQF-1)

Standard Requirements					Test Result		Verdict
					T1	T2	
The leakage rate≤20(cm^3/h)	Before endurance	External leakage		6mbar	2.76	2.54	Pass
				150mbar	9.75	9.02	
		Internal leakage		6mbar	2.43	2.32	
				150mbar	8.75	8.26	
		Internal leakage in de-energized position at room temperature	Flame supervision device	6mbar	2.40	2.36	
				150mbar	8.79	8.31	
		Internal leakage in de-energized position at 80°C		6mbar	2.49	2.40	
				150mbar	8.84	8.36	
		Internal leakage in de-energized position at -20°C		6mbar	2.51	2.44	
				150mbar	8.90	8.42	
The leakage rate≤20(cm^3/h)	After endurance	External leakage		6mbar	2.80	2.62	
				150mbar	9.92	9.21	
		Internal leakage		6mbar	2.53	2.38	
				150mbar	8.94	8.52	
		Internal leakage in de-energized position at room temperature	Flame supervision device	6mbar	2.44	2.40	
				150mbar	9.05	9.43	
		Internal leakage in de-energized position at 80°C		6mbar	2.62	2.59	
				150mbar	9.10	9.51	
		Internal leakage in de-energized position at -20°C		6mbar	2.69	2.63	
				150mbar	9.17	9.55	

Annex test table 2-1: Torsion and bending (Test model:TL90DXQ)

10s Torsion		**Test result**		**Verdict**
Standard Requirements		**T3**	**T4**	
Internal leakage≤20(cm^3/h)	6mbar	2.62	2.41	Pass
	150mbar	9.14	9.87	
External leakage≤20 (cm^3/h)	6mbar	2.98	2.74	
	150mbar	9.62	10.24	
After testing, there shall be no permanent deformation		Pass		

Note: Torsion was on inlet connection.

Annex test table 2-2: Torsion and bending (Test model:TL90DXQ)

10s Torsion		**Test result**		**Verdict**
Standard Requirements		**T3**	**T4**	
Internal leakage≤20(cm^3/h)	6mbar	2.65	2.44	Pass
	150mbar	9.20	9.92	
External leakage≤20 (cm^3/h)	6mbar	3.06	2.82	
	150mbar	9.78	10.30	
After testing, there shall be no permanent deformation		Pass		

Note: Torsion was on outlet connection.

Annex test table 2-3: Torsion and bending (Test model:TL90DXQ)

10s Bending		**Test result**		**Verdict**
Standard Requirements		**T3**	**T4**	
Internal leakage≤20(cm^3/h)	6mbar	2.67	2.46	Pass
	150mbar	9.17	9.95	
External leakage≤20 (cm^3/h)	6mbar	2.98	2.87	
	150mbar	9.84	10.23	
After testing, there shall be no permanent deformation		Pass		

Note: 10s bending was on outlet connection.

Annex test table 2-4: Torsion and bending (Test model:TL90DXQ)

900s Bending		**Test result**		**Verdict**
Standard Requirements		**T3**	**T4**	
Internal leakage≤20(cm^3/h)	6mbar	2.69	2.50	Pass
	150mbar	9.23	9.98	
External leakage≤20 (cm^3/h)	6mbar	3.04	2.92	
	150mbar	9.88	10.27	
After testing, there shall be no permanent deformation		Pass		

Note: 900s bending was on outlet connection.

Annex test table 2-5: Torsion and bending (Test model: TL90DZAQF-1)

10s Torsion		**Test result**		**Verdict**
Standard Requirements		**T3**	**T4**	
Internal leakage≤20(cm^3/h)	6mbar	2.41	2.66	Pass
	150mbar	9.74	8.86	
External leakage≤20 (cm^3/h)	6mbar	2.73	2.82	
	150mbar	10.35	9.28	
After testing, there shall be no permanent deformation		Pass		

Note: Torsion was on inlet connection.

Annex test table 2-6: Torsion and bending (Test model: TL90DZAQF-1)

10s Torsion		**Test result**		**Verdict**
Standard Requirements		**T3**	**T4**	
Internal leakage≤20(cm^3/h)	6mbar	2.45	2.70	Pass
	150mbar	9.77	8.75	
External leakage≤20 (cm^3/h)	6mbar	2.80	2.87	
	150mbar	10.48	9.36	
After testing, there shall be no permanent deformation		Pass		

Note: Torsion was on outlet connection.

Annex test table 2-7: Torsion and bending (Test model: TL90DZAQF-1)

10s Bending		**Test result**		**Verdict**
Standard Requirements		**T3**	**T4**	
Internal leakage≤20(cm^3/h)	6mbar	2.50	2.77	Pass
	150mbar	9.79	8.72	
External leakage≤20 (cm^3/h)	6mbar	2.85	2.89	
	150mbar	10.44	9.41	
After testing, there shall be no permanent deformation		Pass		

Note: 10s bending was on outlet connection.

Annex test table 2-8: Torsion and bending (Test model: TL90DZAQF-1)

900s Bending		**Test result**		**Verdict**
Standard Requirements		**T3**	**T4**	
Internal leakage≤20(cm^3/h)	6mbar	2.53	2.84	Pass
	150mbar	9.85	8.76	
External leakage≤20 (cm^3/h)	6mbar	2.88	2.84	
	150mbar	10.40	9.36	
After testing, there shall be no permanent deformation		Pass		

Note: 900s bending was on outlet connection.

Annex test table 3-1: Flow rate (Test model:TL90DXQ)

Test Requirements		Test Result	
		T1	T2
The maximum flow rate when measured according to 7.7 shall be at least 0.95 times the rated flow rate.	Tap	Fully open	Fully open
	Pa (mbar)	1018.2	
	P (mbar)	29.0	
	t (°C)	22.5	
	q_n (m^3/h)	0.28	0.28
	q_a(m^3/h)	0.2788	0.2772
	△ $q= q_a / q_n$	99.57%	99.00%
Verdict		Pass	

Annex test table 3-2: Flow rate (Test model: TL90DZAQF-1)

Test Requirements		Test Result	
		T1	T2
The maximum flow rate when measured according to 7.7 shall be at least 0.95 times the rated flow rate.	Tap	Fully open	Fully open
	Pa (mbar)	1018.2	
	P (mbar)	29.0	
	t (°C)	22.5	
	q_n (m^3/h)	0.25	0.25
	q_a(m^3/h)	0.2527	0.2541
	△ q= q_a / q_n	101.08%	101.64%
Verdict		Pass	

Annex test table 4-1: Operating torque and operating force (Test model:TL90DXQ)

Before endurance

Standard Requirements	**Test Result**		**Verdict**
	T1	**T2**	
Operating torque≤0.2(N·m)	0.09	0.11	Pass
Operating force≤30(N)	22.6	21.2	
The tap shall withstand with operating torque (1 N·m) for safety lock.	Pass	Pass	

After static endurance

Standard Requirements	**Test Result**		**Verdict**
	T1	**T2**	
Operating torque≤0.2(N·m)	0.13	0.10	Pass
Operating force≤30(N)	19.8	19.6	
The tap shall withstand with operating torque (1 N·m) for safety lock.	Pass	Pass	

After dynamic endurance

Standard Requirements	**Test Result**		**Verdict**
	T1	**T2**	
Operating torque≤0.2(N·m)	0.10	0.13	Pass
Operating force≤30(N)	21.6	20.8	
The tap shall withstand with operating torque (1 N·m) for safety lock.	Pass	Pass	

Annex test table 4-2: Operating torque and operating force (Test model: TL90DZAQF-1)

Before endurance

Standard Requirements	Test Result		Verdict
	T1	T2	
Operating torque≤0.2(N·m)	0.08	0.12	Pass
Operating force≤30(N)	19.8	21.6	
The tap shall withstand with operating torque (1 N·m) for safety lock.	Pass	Pass	

After static endurance

Standard Requirements	Test Result		Verdict
	T1	T2	
Operating torque≤0.2(N·m)	0.12	0.14	Pass
Operating force≤30(N)	18.4	20.5	
The tap shall withstand with operating torque (1 N·m) for safety lock.	Pass	Pass	

After dynamic endurance

Standard Requirements	Test Result		Verdict
	T1	T2	
Operating torque≤0.2(N·m)	0.11	0.13	Pass
Operating force≤30(N)	21.4	20.2	
The tap shall withstand with operating torque (1 N·m) for safety lock.	Pass	Pass	

Annex test table 5-1: Closing current (Test model:TL90DXQ)

Standard Requirements		Test result		Verdict
		T1	T2	
The initial closing current shall not exceed 200 mA and shall not be less than 40 mA unless otherwise declared by the manufacturer.	Before endurance (mA)	108.6	105.4	Pass
If the initial closing current is less than 100 mA, the closing current determined after the endurance test according to 7.105 shall be between 60 % and 400 % of the initial value. If the initial closing current is 100 mA or greater, the closing current determined after the endurance test according to 7.105 shall be between 50 % and 300 % of the initial value.	After endurance (mA)	114.2	109.8	
	Percentage of initial closing current (%)	105.16%	104.17%	

Annex test table 5-2: Closing current (Test model: TL90DZAQF-1)

Standard Requirements		Test result		Verdict
		T1	T2	
The initial closing current shall not exceed 200 mA and shall not be less than 40 mA unless otherwise declared by the manufacturer.	Before endurance (mA)	25.8	33.8	Pass
If the initial closing current is less than 100 mA, the closing current determined after the endurance test according to 7.105 shall be between 60 % and 400 % of the initial value. If the initial closing current is 100 mA or greater, the closing current determined after the endurance test according to 7.105 shall be between 50 % and 300 % of the initial value.	After endurance (mA)	29.2	32.6	
	Percentage of initial closing current (%)	113.18%	96.45%	

Annex test table 6-1: Sealing force (Test model:TL90DXQ)

Standard Requirements		Test result		Verdict
		T1	T2	
In the closed position the control shall have a minimum sealing force of 1 kPa (10 mbar) over the closure member orifice area. The internal leak-tightness of the control according to the test method in 7.104.2 shall not exceed 100 cm³/h. (cm³/h)	Before endurance	3.68	3.92	Pass
	After endurance	3.72	3.98	

Annex test table 6-2: Sealing force (Test model: TL90DZAQF-1)

Standard Requirements		Test result		Verdict
		T1	T2	
In the closed position the control shall have a minimum sealing force of 1 kPa (10 mbar) over the closure member orifice area. The internal leak-tightness of the control according to the test method in 7.104.2 shall not exceed 100 cm³/h. (cm³/h)	Before endurance	5.29	5.84	Pass
	After endurance	5.33	5.92	

Annex test table 7: Elastomers in contact with gas

Resistance to gas

Standard Requirement		Test Result					Verdict
		m_1(g)	m_3(g)	m_5(g)	△ m_1(%)	△ m_2(%)	
The change in mass after immersion (Δm_1) shall be between -5% to + 10%, the change in mass after drying (Δm_2) shall be between -8 % to +5%.	E01	0.700	0.700	0.694	0	-0.86%	Pass
	E02	0.700	0.700	0.695	0	-0.71%	
	E03	0.690	0.690	0.688	0	-0.29%	
	E04	0.840	0.840	0.839	0	-0.12%	
	E05	0.820	0.820	0.820	0	0	
	E06	0.840	0.840	0.839	0	-0.12%	
	E07	0.530	0.530	0.529	0	-0.19%	
	E08	0.500	0.500	0.500	0	0	
	E09	0.500	0.500	0.500	0	0	
	E10	0.320	0.320	0.317	0	-0.94%	
	E11	0.320	0.320	0.316	0	-1.25%	
	E12	0.321	0.321	0.318	0	-0.93%	
	E13	0.560	0.560	0.559	0	-0.18%	
	E14	0.560	0.560	0.557	0	-0.54%	
	E15	0.560	0.560	0.558	0	-0.36%	

Resistance to lubricants

Standard Requirement		Test Result			Verdict
		m_1(g)	m_7(g)	△ m_3(%)	
The sample after immersion the change in mass shall be between -10% to +15%.	E16	0.700	0.710	+1.43%	Pass
	E17	0.700	0.708	+1.14%	
	E18	0.690	0.700	+1.45%	
	E19	0.810	0.836	+3.21%	
	E20	0.830	0.835	+0.60%	
	E21	0.830	0.839	+1.08%	
	E22	0.520	0.525	+0.96%	
	E23	0.520	0.528	+1.54%	
	E24	0.520	0.511	-1.73%	
	E26	0.310	0.319	+2.90%	
	E26	0.310	0.317	+2.26%	
	E27	0.310	0.318	+2.58%	
	E28	0.550	0.564	+2.55%	
	E29	0.560	0.561	+0.18%	
	E30	0.560	0.564	+0.71%	

Critical components list

Object/part	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity
Elastomeric material	Foshan Gaochu Electric Co., Ltd	---	-20~80°C	EN 549:2019	Tested with valves
Solenoid valve	Foshan Gaochu Electric Co., Ltd	2011C/KD-10	---	---	Tested with valves

--- End of Report ---