

DIN EN 16678:2016-02 (E)

Safety and control devices for gas burners and gas burning appliances - Automatic shut-off valves for operating pressure of above 500 kPa up to and including 6 300 kPa

Contents		Page
European foreword		6
1	Scope	7
2	Normative references	7
3	Terms and definitions	8
4	Classification	9
4.1	Classes of control	9
4.2	Groups of control	10
4.3	Classes of control functions	10
5	Units of measurement and test conditions	10
6	Construction requirements	10
6.1	General	10
6.2	Mechanical parts of the control	10
6.2.1	Appearance	10
6.2.2	Holes	10
6.2.3	Breather holes	10
6.2.4	Test for leakage of breather holes	10
6.2.5	Screwed fastenings	10
6.2.6	Jointing	11
6.2.7	Moving parts	11
6.2.8	Sealing caps	11
6.2.9	Dismantling and reassembly	11
6.2.101	Closed position indicator switch	11
6.2.102	Valve with modulating control	11
6.2.103	Other controls assembled to a valve	11
6.2.104	Balanced valves	11
6.2.105	Additional requirements for shut-off function	11
6.3	Materials	12
6.3.1	General material requirements	12
6.3.2	Housing	12
6.3.3	Test for leakage of housing after removal of non-metallic parts	12
6.3.4	Zinc alloys	12
6.3.5	Springs providing closing and/or sealing force	12
6.3.6	Resistance to corrosion and surface protection	12
6.3.7	Impregnation	12
6.3.8	Seals for glands for moving parts	12
6.3.101	Closure members	12
6.3.102	Parts transmitting the closing force	12
6.3.103	Balanced valves	12
6.3.104	Bellows	12
6.3.105	Resistance to pressure	13
6.4	Gas connections	13
6.4.1	Making connections	13
6.4.2	Connection sizes	14

6.4.3	Threads	14
6.4.4	Union joints	14
6.4.5	Flanges	14
6.4.6	Compression fittings	14
6.4.7	Nipples for pressure test	14
6.4.8	Strainers	14
6.4.101	Welded connections	14
6.5	Electrical parts of the control	14
6.5.1	General	14
6.5.2	Switching elements	14
6.5.3	Electrical components	14
6.6	Protection against internal faults for the purpose of functional safety	15
6.6.1	Design and construction requirements	15
6.6.2	Class A	15
6.6.3	Class B	15
6.6.4	Class C	15
6.6.5	Circuit and construction evaluation	15
6.101	Pneumatic and hydraulic actuating mechanisms	15
7	Performance	15
7.1	General	15
7.2	Leak-tightness	15
7.3	Test for leak-tightness	15
7.4	Torsion and bending	16
7.5	Torsion and bending tests	16
7.6	Rated flow rate	16
7.7	Test for rated flow rate	16
7.8	Durability	16
7.8.1	Elastomers in contact with gas	16
7.8.2	Marking	17
7.8.3	Tests for marking	18
7.8.4	Resistance to scratching	18
7.8.5	Scratch test	18
7.8.6	Resistance to humidity	18
7.8.7	Humidity test	18
7.9	Performance test for electronic controls	18
7.10	Long-term performance for electronic controls	18
7.101	Closing function concerning remanence	18
7.101.1	Requirement	18
7.101.2	Test of closing function	18
7.102	Closing force	19
7.102.1	Requirement	19
7.102.2	Test of closing force	19
7.103	Delay time and opening time	19
7.103.1	Requirement	19
7.103.2	Test of delay time and opening time	19
7.104	Closing time	19
7.104.1	Requirement	19
7.104.2	Test of closing time	19
7.105	Sealing force	20
7.105.1	Requirement	20
7.105.2	Test of sealing force	20
7.106	Closed position indicator switch	20
7.106.1	Requirement	20
7.106.2	Test of closed position indicator switch	21
7.107	Endurance	21
7.107.1	Requirement	21
7.107.2	Endurance test	21
8	EMC/Electrical requirements	22
8.1	Protection against environmental influences	22
8.2	Supply voltage variations below 85 % of rated voltage	22

8.3	Short term voltage interruptions and decreases	22
8.4	Supply frequency variations	22
8.5	Surge immunity test	22
8.6	Electrical fast transient/burst	22
8.7	Immunity to conducted disturbances	22
8.8	Immunity to radiated fields	22
8.9	Electrostatic discharge immunity test	22
8.10	Power frequency magnetic field immunity test	22
8.11	Electrical requirements	23
8.11.101	General	23
8.11.102	Electrical equipment	23
9	Marking, installation and operating instructions	24
9.1	Marking	24
9.2	Installation and operating instructions	24
9.3	Warning notice	25
Annex A (informative) Gas connections in common use in the various countries		26
Annex B (informative) Leak-tightness test - volumetric method		27
Annex C (informative) Leak-tightness test - pressure loss method		28
Annex D (normative) Conversion of pressure loss into leakage rate		29
Annex E (normative) Electrical/electronic component fault modes		30
Annex F (normative) Additional requirements for safety accessories and pressure accessories as defined in EU Directive 97/23/EC		31
Annex G (informative) Materials for pressurized parts		32
Annex H (informative) Additional materials for pressurized parts		33
Annex I (normative) Requirements for controls used in DC supplied gas burners and gas burning appliances		34
Annex J (normative) Method for the determination of a Safety Integrity Level (SIL)		35
Annex K (normative) Method for the determination of a Performance Level (PL)		36
Annex L (informative) Relationship between Safety Integrity Level (SIL) and Performance Level (PL)		37
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2009/142/EC relating to appliances burning gaseous fuels		38
Annex ZB (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 97/23/EC relating to pressure equipment		41
Bibliography		43
Table 1 -- Minimum value of safety factor F		13
Table 2 -- Test method and acceptance criteria referred to the properties of elastomeric materials ..		17
Table 3 -- Sealing force requirements		20
Table 4 -- Operating cycles		22
Table ZA.1 -- Correspondence between this European Standard and Directive 2009/142/EC relating to appliances burning gaseous fuels		38

Table ZB.1 -- Correspondence between this European Standard and Directive 97/23/EC relating to pressure equipment	41
Figures Figure 1 -- Typical pilot and release valve application	9