

DIN EN 13786:2010-07 (E)

Automatic change-over valves having a maximum outlet pressure of up to and including 4 bar with a capacity of up to and including 100 kg/h, and their associated safety devices for butane, propane or their mixtures (includes Amendment A1:2008)

Contents

Page

Foreword	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	9
3.1 General terms and definitions	9
3.2 Terms and definitions concerning gas	10
3.3 Terms and definitions concerning pressures	10
3.4 Terms and definitions concerning rates	11
4 Types of automatic change over devices	12
4.1 Introduction	12
4.2 Automatic change over devices for installations where the final regulator supplies a pressure specified in EN 437	12
4.3 Other automatic change over devices installation	13
5 Constructional characteristics	13
5.1 General	13
5.2 Materials	13
5.3 Special requirements	14
5.3.1 Pressure sensing subassembly	14
5.3.2 Regulation subassembly	14
5.3.3 Back pressure subassembly	15
5.3.4 Connection subassembly	15
5.3.5 Supply-reserve indicator	17
5.3.6 Knob for selection of the operational cylinder	17
5.3.7 Fixing onto a wall	17
5.3.8 Non return valves	17
5.4 Mechanical strength	18
5.4.1 Resistance to pressure	18
5.4.2 Strength of connections	18
5.5 Soundness	20
5.6 Mechanical endurance	20
5.7 Resistance to humidity changes	20
5.8 Resistance to corrosion	20
6 Performance characteristics	20
6.1 General	20
6.1.1 Introduction	20
6.1.2 Supply pressure	21
6.2 Operational limit characteristics (regulation function)	21
6.3 Operational limit characteristics (Change over function)	22
6.3.1 Change over pressure	22
6.3.2 Selection of the operating cylinder	22
7 Test methods	22
7.1 General conditions	22

7.1.1	Type of test gas	22
7.1.2	Test conditions	23
7.1.3	Equivalence formulae	23
7.1.4	Test samples	23
7.2	Verification of constructional characteristics	24
7.2.1	Resistance to pressure	24
7.2.2	Mechanical strength of connections	25
P	7.2.3 Regulation subassembly	25
7.2.4	Soundness	26
7.2.5	Endurance	26
7.2.6	Resistance to humidity changes	27
7.2.7	Resistance to corrosion	27
7.3	Verification of performance characteristics	27
7.3.1	General	27
7.3.2	Plotting of regulation curves	31
8	Marking, packaging, instructions	31
8.1	General	31
8.2	Marking of the device	31
8.3	Packaging	31
8.4	Instructions for use and maintenance	32
Annex A	(normative) Special requirements for automatic change over devices fitted with pressure or rate operated safety valves	33
A.1	Change over devices fitted with an over-pressure relief	33
A.1.1	Definition	33
A.1.2	Constructional characteristics	33
A.1.3	Performance characteristics	33
A.1.3.1	Automatic change over devices having a maximum regulated pressure of up to and including 150 mbar	33
A.1.3.2	Automatic change over devices having a maximum regulated pressure exceeding 150 mbar	33
A.1.4	Test methods	34
A.1.4.1	Automatic change over devices having a maximum regulated pressure of up to and including 150 mbar	34
A.1.4.2	Automatic change over devices having a maximum regulated pressure exceeding 150 mbar	34
A.1.5	Automatic change over device marking	34
A.2	Automatic change over device fitted with an over-pressure shut off safety valve	34
A.2.1	Definition	34
A.2.2	Constructional characteristics	35
A.2.2.1	General	35
A.2.2.2	Closing force	35
A.2.2.3	Diaphragm strength	35
A.2.3	Performance characteristics	35
A.2.3.1	Automatic change over devices with a maximum regulated pressure of up to and including 150 mbar	35
A.2.3.2	Automatic change over devices with a maximum regulated exceeding 150 mbar	35
A.2.4	Test methods	35
A.2.4.1	Test for the components transmitting the closing forces	35
A.2.4.2	Test for diaphragm strength	36
A.2.4.3	Performance test	36
A.3	Automatic change over device fitted with an under-pressure shut off safety device	36
A.3.1	Definition	36
A.3.2	Constructional and performance characteristics	36
A.3.3	Test methods	37
A.4	Automatic change over devices fitted with an excess flow valve	37
A.4.1	Definition	37
A.4.2	Performance characteristics	37

A.4.3	Complementary tests for the automatic change over devices - Test methods	38
A.4.4	User and maintenance instructions	38
A.5	Automatic change over devices fitted with a regulated pressure limiter	38
A.5.1	Definition	38
A.5.2	Constructional and performance characteristics	38
A.5.3	Test methods	39
A.5.3.1	Test conditions	39
A.5.3.2	Measurement of the maximum regulated pressure	39
A.5.3.3	Measurement of the pressure drop	39
A.5.4	Users and maintenance instructions	39
Annex B (normative) !Special requirements for automatic change over devices and automatic change over device systems for caravans, motor caravans or fresh water boats		40
Annex C (normative) Special requirements for low pressure automatic change over devices under extreme temperature conditions (temperatures below - 20 °C)		42
Annex D (normative) Method for measuring leaks at test pressures less than or equal to 16 bar		43
D.1	Scope	43
D.2	Diagram of the test bench	43
D.3	Coefficient K	44
D.3.1	Method	44
D.3.2	Calculations	44
D.4	Measurement of the leak	44
D.4.1	Method	44
D.4.2	Calculations	44
D.5	Checks	45
Annex E (normative) Complementary test requirements for non metallic thermoplastic or thermal setting materials used in the construction of automatic change over devices		46
E.1	Scope	46
E.2	Materials	46
E.3	Special conditions for carrying out the test mentioned in the body of the standard	46
E.3.1	Resistance to impact (see 5.4.1 and 7.2.1)	46
E.3.2	Mechanical resistance of connections (see 5.4.2 and 7.2.2)	46
E.3.3	Soundness (see 5.5 - 7.2.4)	47
E.4	Special requirements	47
E.4.1	Resistance to hydrocarbons	47
E.4.2	Resistance to cracking under stress and when chemical agents are present	47
E.4.3	Characteristics relating to fire resistance	47
E.4.4	Accelerated ageing	48
E.5	Sampling and order of tests	48
Annex F (normative) Requirements for elastomeric reinforced diaphragms		49
Annex G (normative) Inlet connections		50
Annex H (normative) Outlet connections		99
Annex I (normative) Test method for resistance to corrosion		133
I.1	Principle	133
I.2	Reagents	133
I.2.1	Saline solution	133
I.2.2	Compressed air	133
I.2.3	Salt mist	134
I.3	Apparatus	134
I.3.1	Spraying chamber	134
I.3.2	Sprayers	134
I.3.3	Heating device	135

I.3.4	Salt solution supply device	135
I.3.5	Compressed air supply device	135
I.3.6	Mist collectors	135
I.4	Test method	136
I.4.1	Method of exposure of automatic change over device	136
I.4.2	Duration of tests	136
I.4.3	Checks	136
I.4.4	Cleaning of automatic change over device	136
I.5	Results	136
Annex J (normative) Automatic change over device and change over device systems for LPG cylinders to supply appliances installed in seawater boats		139
J.1	Scope	139
J.2	General	139
J.3	Maximum guaranteed rate	139
J.4	Change over device and change over device systems fitted with a pressure relief valve	139
J.5	Vent	139
J.6	Connections	139
J.7	Material	139
J.8	Resistance to corrosion	140
J.8.1	General	140
J.8.2	Requirement	140
J.8.3	Test method	140
J.9	Marking	140
J.10	Instructions for use and maintenance	140
Annex ZA (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives		141
Bibliography		143