

# 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
<b>Annex J (normative) Automatic change over device and change over device systems for LPG cylinders to supply appliances installed in seawater boats .....</b>		<b>139</b>
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
<b>Annex ZA (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives .....</b>		<b>141</b>
<b>Bibliography .....</b>		<b>143</b>