

DIN EN 13785:2010-05 (E)

Regulators with a capacity of up to and including 100 kg/h, having a maximum nominal outlet pressure of up to and including 4 bar, other than those covered by EN 12864 and their associated safety devices for butane, propane or their mixtures (includes Amendment A1:2008)

Contents		Page
Foreword		5
1	Scope	6
2	Normative references	6
3	Terms and definitions	7
3.1	General terms and definitions	7
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 regulators	11
4.1	Introduction	11
4.2	Regulators for installations where the final regulator supplies a pressure specified in EN 437	12
4.3	Other regulators	12
5	Constructional characteristics	12
5.1	General	12
5.2	Materials	13
5.3	Special requirements	16
5.3.1	Pressure sensing subassembly	16
5.3.2	Regulation subassembly	16
5.3.3	Back pressure subassembly	16
5.3.4	Connection subassembly	17
5.4	Mechanical strength	19
5.4.1	Resistance to impact	19
5.4.2	Resistance to pressure	19
5.4.3	Strength of connections	20
5.5	Soundness	21
5.6	Mechanical endurance	22
5.6.1	General requirements	22
5.6.2	Special requirements	22
5.7	Resistance to humidity changes	22
5.8	Resistance to corrosion	22
6	Performance characteristics	23
6.1	General	23
6.1.1	Introduction	23
6.1.2	Supply pressure	23
6.1.3	Regulated pressure	23
6.2	Supply pressure and regulated pressure according to 4.2	24
6.2.1	Single stage fixed regulator for EN 437 pressures	24
6.2.2	Two stages fixed or adjustable regulators for EN 437 pressures	24
6.2.3	Three stages fixed or adjustable regulators for EN 437 pressures	25
6.3	Variable regulators	27
6.4	Regulators out of the pressures of EN 437	27

7	Test methods	28
7.1	General conditions	28
7.1.1	Type of test gas	28
7.1.2	Test conditions	28
7.1.3	Equivalence formulas	28
7.1.4	Test samples	29
7.2	Verification of constructional characteristics	29
7.2.1	Resistance to impact	29
7.2.2	Resistance to pressure	29
7.2.3	Mechanical strength of connections	30
7.2.4	Regulation subassembly	34
7.2.5	Soundness	34
7.2.6	Mechanical endurance	35
7.2.7	Resistance to humidity changes	36
7.2.8	Resistance to corrosion	37
7.3	Verification of performance characteristics	37
7.3.1	General	37
7.3.2	Plotting of the performance curves	40
8	Marking, packaging, instructions	40
8.1	General	40
8.2	Marking of the regulator	40
8.3	Packaging	41
8.4	Instructions for installation, use and maintenance	41
Annex A (normative) Special requirements for regulators fitted with pressure or rate operated safety devices		42
A.1	Regulators fitted with an over-pressure relief	42
A.1.1	Definition	42
A.1.2	Constructional characteristics	42
A.1.3	Performance characteristics	42
A.1.4	Test methods	43
A.1.5	Regulator marking	43
A.2	Regulators fitted with an over-pressure shut off safety valve	43
A.2.1	Definition	43
A.2.2	Constructional characteristics	43
A.2.3	Performance characteristics	44
A.2.4	Test methods	44
A.3	Regulators fitted with an under-pressure shut off safety device	45
A.3.1	Definition	45
A.3.2	Constructional and performance characteristics	45
A.3.3	Test methods	46
A.4	Regulators fitted with an excess flow valve	46
A.4.1	Definition	46
A.4.2	Performance characteristics	46
A.4.3	Test methods	46
A.4.4	User and maintenance instructions	47
A.5	Regulators fitted with a regulated pressure limiter	47
A.5.1	Definition	47
A.5.2	Constructional and performance characteristics	47
A.5.3	Test methods	48
A.5.4	User and maintenance instructions	48
Annex B (normative) Special requirements for regulators fitted with a thermal cut out		49
B.1	Definition	49
B.2	Constructional characteristics	49
B.3	Performance characteristics	49
B.4	Test methods	49

Annex C (normative) Special requirements for low pressure regulators under extreme temperature conditions (temperatures below -20 °C)	51
Annex D (normative) Method for measuring leaks at test pressures less than or equal to 16 bar	52
D.1	Scope 52
D.2	Diagram of the test bench 52
D.3	Coefficient K 53
D.3.1	Method 53
D.3.2	Calculations 53
D.4	Measurement of the leak 53
D.4.1	Method 53
D.4.2	Calculations 53
D.5	Checks 54
Annex E (normative) Complementary test requirements for non metallic thermoplastic or thermal setting materials used in the construction of regulators	55
E.1	Scope 55
E.2	Materials 55
E.3	Special conditions for carrying out the tests mentioned in the body of the document 55
E.3.1	Resistance to impact (see 5.4.1 and 7.2.1) 55
E.3.2	Mechanical resistance of connections (see 5.4.3 and 7.2.3) 55
E.3.3	Soundness (see 5.5 and 7.2.5) 56
E.4	Special requirements 56
E.4.1	Resistance to hydrocarbons 56
E.4.2	Resistance to cracking under stress and when chemical agents are present 56
E.4.3	Characteristics relating to fire resistance 56
E.4.4	Accelerated ageing 57
E.5	Sampling and order of tests 57
Annex F (normative) Requirements for elastomeric reinforced diaphragms	58
Annex G (normative) Inlet connections	59
Annex H (normative) Outlet connections	106
Annex I (informative) Test method for resistance to corrosion	136
I.1	Principle 136
I.2	Reagents 136
I.2.1	Saline solution 136
I.2.2	Compressed air 136
I.2.3	Salt mist 137
I.3	Apparatus 137
I.3.1	Spraying chamber 137
I.3.2	Sprayers 137
I.3.3	Heating device 138
I.3.4	Salt solution supply device 138
I.3.5	Compressed air supply device 138
I.3.6	Mist collectors 138
I.4	Test method 139
I.4.1	Method of exposure of regulators 139
I.4.2	Duration of tests 139
I.4.3	Checks 139
I.4.4	Cleaning of regulators 139
I.5	Results 139
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 90/396/EEC	142
Bibliography	144