

DIN EN 12309-2:2016-04 (E)

Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW - Part 2: Safety (includes Corrigendum :2015)

Contents

	Page
Foreword	6
1 Scope	8
1.1 Scope of EN 12309 series	8
1.2 Scope of this Part 2 to EN 12309	8
2 Normative references	8
3 Terms and definitions	10
4 Classification	10
4.1 Classification of appliances	10
4.1.1 Classification of gases	10
4.1.2 Classification according to the mode of air supply and evacuation of the combustion products	10
4.1.3 Classification according to the temperatures of the heat transfer media	11
4.1.4 Classification according to denomination	11
5 Construction and design requirements	12
5.1 General	12
5.1.1 Conversion to different gases	12
5.1.2 Materials and method of construction	13
5.1.3 Accessibility for maintenance and use	13
5.1.4 Thermal insulation	13
5.1.5 Gas connection	14
5.1.6 Soundness	14
5.1.7 Air proving	15
5.1.8 Air proving device	15
5.1.9 Gas/air ratio controls	16
5.1.10 Supply of combustion air and evacuation of combustion products	17
5.1.11 Checking the state of operation	19
5.1.12 Electrical equipment	19
5.1.13 Operational safety in the event of fluctuation, interruption and restoration of the auxiliary energy	20
5.1.14 Rotating parts (e.g. motors and fans)	20
5.1.15 Pressurized parts of the appliance	20
5.2 Requirements for adjusting, control and safety devices	21
5.2.1 General	21
5.2.2 Gas rate adjusters and range-rating device	21
5.2.3 Aeration adjusters	21
5.2.4 Automatic gas/air ratio controls	22
5.2.5 Gas pressure regulators	22
5.2.6 Multifunctional controls	22
5.2.7 Automatic shut-off valves	22
5.2.8 Automatic burner control systems	23
5.2.9 Gas strainers	23
5.3 Ignition devices	23
5.3.1 General	23
5.3.2 Ignition device for the main burner	23
5.3.3 Ignition burners	24
5.4 Transportation of combustion air and/or flue gases	24

5.4.1	Combustion air	24
5.4.2	Pre-purge and post-purge	24
5.5	Flame supervision system	24
5.6	Flame ignition and safety time TSA	25
5.7	Main flame establishment	26
5.7.1	Establishment by means of an ignition flame	26
5.7.2	Direct establishment of the main flame	26
5.8	Main burner	26
5.9	Facility for remote control	26
5.10	Thermostats and control of air temperature	27
5.10.1	General requirements	27
5.10.2	Overheat cut-off device	27
5.10.3	Sensors	27
5.11	Gas pressure test points	27
5.12	Pressure relief devices	27
5.13	Additional requirements for appliances designed for outdoor installation	28
5.13.1	General	28
5.13.2	Combustion air inlets	28
5.13.3	Access panels and doors	28
5.13.4	Dimensions of openings	28
5.13.5	Fixing screws	28
5.13.6	Frost protection	28
5.14	Materials in contact with condensate	28
5.15	Condensate	28
5.15.1	Discharge of condensate	28
5.15.2	Control of the combustion products temperature	29
5.15.3	Chemical composition of the condensate	29
5.15.4	Additional requirements for indoor installations	29
5.16	Electrical safety	29
 6	 Operational requirements	30
6.1	Soundness	30
6.1.1	Soundness of the gas circuit	30
6.1.2	Soundness of the combustion circuit and correct evacuation of combustion products	30
6.2	Heat inputs	31
6.2.1	Nominal heat input	31
6.2.2	Ignition heat input	31
6.2.3	Effectiveness of gas rate adjusters	31
6.2.4	Effectiveness of the gas pressure regulator	31
6.2.5	Effectiveness of the range-rating device	31
6.3	Limiting temperatures	32
6.3.1	Temperature of parts of the appliance which have to be touched during normal use	32
6.3.2	Temperatures of the outer case of the appliance	32
6.3.3	Temperature of the floor, walls and worktop/ceiling	32
6.3.4	Component temperatures	32
6.3.5	Motor temperatures (motor windings)	32
6.4	Ignition, cross lighting, flame stability	32
6.4.1	Ignition and cross-lighting	32
6.4.2	Flame stability	33
6.5	Combustion	34
6.5.1	General	34
6.5.2	Limit conditions	34
6.5.3	Special conditions	34
6.5.4	Sooting	34
6.5.5	Supplementary requirement for condensing appliances	34
6.5.6	Supplementary requirements for B12 and B13 appliances	34
6.6	Safety of operation in various temperature environments	34
6.6.1	Temperature operating range	34
6.6.2	Safety in the event of operation outside the temperature operating range	35
6.7	Overheat cut off device	35
6.8	Maximum working pressure of pressurized vessels	35
6.9	Pressure relief devices	35

6.9.1	Pressure activated pressure relief devices	35
6.9.2	Temperature activated pressure relief devices	36
6.10	Effectiveness of the pre-purge	36
6.11	Weather resistance	36
6.12	Formation of condensate	36
6.13	NOx	37
6.14	Combustion products temperature	37
7	Test methods	37
7.1	General	37
7.1.1	Characteristics of test gases: reference and limit gases	37
7.1.2	Conditions for preparation of the test gases	37
7.1.3	Practical application of test gases	38
7.1.4	Test pressures	39
7.1.5	Test procedures - Tests requiring the use of limit gases	39
7.1.6	General test conditions	39
7.1.7	Modulating and high/low operation	42
7.1.8	Tolerances of measurements	42
7.2	Construction and design	43
7.2.1	Manually operated devices (see 5.2.8.2)	43
7.2.2	Extinction safety time (see 5.5)	43
7.2.3	Safety time (see 5.6)	43
7.3	Safety of operation	43
7.3.1	Soundness	43
7.3.2	Heat inputs	46
7.3.3	Limiting temperatures	48
7.3.4	Ignition, Cross-lighting, Flame stability	49
7.3.5	Combustion	56
7.3.6	Safety of operation in various temperature environments	59
7.3.7	Overheat cut-off device	61
7.3.8	Maximum working pressure of pressurized vessels	62
7.3.9	Pressure relief devices	64
7.3.10	Effectiveness of the pre-purge for all appliances	66
7.3.11	Weather resistance	67
7.3.12	NOx Measurement	67
7.3.13	Combustion product temperature	72
7.3.14	Supervision of the combustion air rate or the combustion products rate	72
7.3.15	Leakage of control tubes	73
7.3.16	Adjustment of the gas/air ratio	73
7.3.17	Flame ignition and safety time TSA	73
7.3.18	Discharge of condensate	73
8	Marking and instructions	73
8.1	Appliance marking	73
8.1.1	Data plate	73
8.1.2	Supplementary markings	74
8.1.3	Packaging	75
8.1.4	Warnings on the appliance and the packaging	75
8.1.5	Other information	76
8.2	Instructions	76
8.2.1	Technical instructions	76
8.2.2	User's instructions	78
8.2.3	Conversion instructions	78
8.3	Presentation	79
8.4	Supplementary marking and instructions in the case of appliances to be installed outdoor or in partially protected places	79
8.4.1	General information	79
8.4.2	Warning on the appliance and the packaging	79
8.4.3	Technical instructions	79
9	Figures	80

Annex A (informative) Alternative method for the determination of the nominal heat input or the maximum and minimum heat input for appliances using a pneumatic gas/air ratio control system	91
Annex B (informative) Calculation of conversions of NO	93x
Annex C Example of calculation of weighting factors NO	94x
Annex D Ratio of calorific value Gross to Net and Net to Gross for Gas Families 1, 2 and 3	96
Annex ZA Relationship between this European Standard and the Essential Requirements of EU Directive 2009/142/EC relating to appliances burning gaseous fuels (codified version)	97
Annex ZB Relationship between this European Standard and the requirements of Commission Regulation (EC) No 813/2013	100
Annex ZC Relationship between this European Standard and the requirements of Commission Regulation (EC) N° 811/2013	101
Bibliography	102