DIN EN 12309-3:2025-10 (E)

Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW - Part 3: Requirements, test conditions and test methods

Contents

Page

European foreword 5

1 Scope 7
1.1 Scope of EN 12309 series 7
1.2 Scope of this Part 3 of EN 12309 7

2 Normative references 8

3 Terms and definitions 8

4 Classification 8
4.1 Classification of gases 8
4.2 Classification of appliances 8
4.2.1 Classification according to the mode of air supply and evacuation of the combustion products 8
4.2.2 Denomination 9
4.2.3 Classification of the operating conditions 9

5 Testing conditions 9
5.1 Environmental conditions and electrical power supply 9
5.2 Test conditions 11

6 Measurements 18
6.1 Heat Input 18
6.1.1 General conditions for operation of the gas-fired part of the appliance 18
6.1.2 Measurement of heat inputs under test conditions 18
6.2 Electrical power input 19
6.2.1 General conditions for operation of the electrical part of the appliance 19
6.2.2 Effective electrical power input 20
6.2.3 Electrical power input corrections of fans 20
6.2.4 Electrical power input correction of liquid pumps 21
6.3 Cooling mode 22
6.3.1 General 22
6.3.2 Measured cooling capacity 23
6.3.3 Effective cooling capacity 23
6.3.4 Heat recovery capacity in cooling mode 24
6.3.5 Gas utilization efficiency in cooling mode 25
6.4 Heating mode 25
6.4.1 General 25
6.4.2 Measured heating capacity 25
6.4.3 Effective heating capacity 26
6.4.4 Gas utilization efficiency in Heating mode 27
6.5 Auxiliary energy factor 27
6.5.1 Cooling mode 27
6.5.2 Heating mode 27
6.6 Capacity correction 27
6.6.1 General 27
6.6.2 Capacity correction for integrated glandless circulators 28
6.6.3 Capacity correction for integrated dry motor pumps 28
6.6.4 Capacity correction for non-integrated liquid pumps 28

7 Test methods ... 29
7.1 General ... 29
7.1.1 Introduction ... 29
7.1.2 All appliances ... 29
7.1.3 Alternating appliances ... 30
7.1.4 Non ducted appliances ... 30
7.1.5 Ducted appliances ... 30
7.1.6 Air to water(brine) and water(brine) to water(brine) appliances ... 31
7.1.7 Sound measurements ... 31
7.2 Measurement for water(brine) to water(brine) appliances ... 31
7.2.1 Steady-state operation conditions ... 31
7.2.2 Measurement of heating capacity, cooling capacity, heat recovery capacity, gas input and electrical power input ... 31
7.2.3 Measurement of GUE ... 31
7.3 Measurement in cooling mode for air-to-water(brine) appliances ... 32
7.3.1 Steady-state operation conditions ... 32
7.3.2 Measurement of cooling capacity, heat recovery capacity, gas input and electrical power input ... 32
7.3.3 Measurement of GUE ... 32
7.4 Measurement in heating mode for air-to-water appliances ... 32
7.4.1 General ... 32
7.4.2 Preconditioning period ... 33
7.4.3 Equilibrium period ... 33
7.4.4 Data collection period ... 33
7.4.5 Test procedure when a defrost cycle ends the preconditioning period ... 34
7.4.6 Test procedure when a defrost cycle does not end the preconditioning period ... 34
7.5 Reduced capacity tests ... 35
7.5.1 General ... 35
7.5.2 Cycling interval (ON-OFF) tests ... 36
7.6 Permissible deviations ... 37
7.7 Test methods for electric power consumption during thermostat off mode, standby mode and off mode ... 42
7.7.1 Measurement of electrical power consumption during thermostat off mode ... 42
7.7.2 Measurement of the electrical power consumption during standby mode ... 42
7.7.3 Measurement of the electric power consumption during off mode ... 42
7.8 Test results ... 42
7.9 Test apparatus ... 45
7.9.1 Arrangement of the test apparatus ... 45
7.9.2 Installation and connection of the appliance ... 46
7.10 Uncertainties of measurement ... 46

8 Marking and documentation ... 48

Annex A (normative) Determination of the liquid pump efficiency ... 49

A.1 General ... 49
A.2 Hydraulic power of the liquid pump ... 49
A.3 Efficiency of integrated pumps ... 50
A.4 Efficiency of non-integrated pumps ... 53

Annex B (normative) Electrical and capacity corrections to include in the electrical power input and in the measured heating, cooling and heat recovery capacities ... 54

Annex C (informative) Primary energy efficiency - Calculation at a single operating point ... 56

C.1 Primary energy ratio in heating mode ... 56
C.2 Primary energy ratio in cooling mode ... 56

Annex D (informative) Heating capacity tests - Flow chart and examples of different test sequences ... 57

D.1 Flow chart ... 57

D.2 Examples of test profiles 58

Annex E (informative) Direct method for air-to-water (brine) and water (brine) to water (brine) appliances 64

E.1 General 64
E.2 Compensation system air to water appliances 64
E.3 Compensation system for water/brine to water appliances 65

Annex F (normative) Measurement in ON/OFF mode 66

F.1 General 66
F.2 Test procedure for measurement in ON/OFF mode 66

Annex G (informative) Test report 69

G.1 General information 69
G.2 Additional information 69
G.3 Test results 70

Annex ZA (informative) Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EU) No 813/2013 L 239/136 aimed to be covered 71

Annex ZB (informative) Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EU) No 811/2013 L 239/1 aimed to be covered 72

Annex ZC (informative) Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EU) No 2016/2281 L 346/1 aimed to be covered 74

Bibliography 75