



SLOVENSKI STANDARD
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Absorpcijske in adsorpcijske plinske naprave za gretje in/ali hlajenje z grelno močjo do vključno 70 kW - 3. del: Zahteve, preskusni pogoji in preskusne metode

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

Gasbefeuerte Sorptions-Geräte für Heizung und/oder Kühlung mit einer Nennwärmebelastung nicht über 70 kW - Teil 3: Anforderungen und Prüfbedingungen

Appareils à sorption fonctionnant au gaz pour le chauffage et/ou le refroidissement de débit calorifique sur PCI inférieur ou égal à 70 kW - Partie 3 : Exigences, conditions d'essai et méthodes d'essai

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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

Appareils à sorption fonctionnant au gaz pour le chauffage et/ou le refroidissement de débit calorifique sur PCI inférieur ou égal à 70 kW - Partie 3 : Exigences, conditions d'essai et méthodes d'essai

Gasbefeuerte Sorptions-Geräte für Heizung und/oder Kühlung mit einer Nennwärmebelastung nicht über 70 kW - Teil 3: Anforderungen und Prüfbedingungen

This European Standard was approved by CEN on 8 April 2024.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 12309-3:2024) has been prepared by Technical Committee CEN/TC 299 “Gas-fired sorption appliances, indirect fired sorption appliances, gas-fired endothermic engine heat pumps and domestic gas-fired washing and drying appliances”, the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2024, and conflicting national standards shall be withdrawn at the latest by November 2024.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12309-3:2014, EN 12309-4:2014 and EN 12309-5:2014.

In comparison with the previous edition, the following technical modifications have been made:

- the content of previous standards EN 12309-3:2014, EN 12309-4:2014 and EN 12309-5:2014 has been merged;
- nomenclature has been updated to be aligned with Commission Regulation (EU) No 813/2013 of 2 August 2013, Commission Delegated Regulation (EU) No 811/2013 of 18 February 2013, Commission Regulation (EU) No 2016/2281 of 30 November 2016;
- test conditions have been rationalized;
- c_{pump} definition and application has been better detailed;
- test methods have been simplified;
- permissible deviations have been revised;
- informative Annex F (Measurement control criteria for water(brine) to water(brine) appliances) has been deleted.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, ZB or ZC, which is an integral part of this document.

This standard comprises parts under the general title, Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW. A list of all parts in a series can be found on the CEN website.

These documents will be reviewed whenever new mandates could apply.

Any feedback and questions on this document should be directed to the users' national standards body.

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A complete listing of these bodies can be found on the CEN website. According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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1 Scope

1.1 Scope of EN 12309 series

Appliances covered by this document include one or a combination of the following:

- gas-fired sorption chiller;
- gas-fired sorption chiller/heater;
- gas-fired sorption heat pump;
- hybrids based on gas sorption appliances.

This document applies to appliances designed to be used for space heating or cooling or refrigeration with or without heat recovery.

This document applies to appliances having flue gas systems of Type B and Type C (according to EN 1749:2020) and to appliances designed for outdoor installations, including Type A.

EN 12309 does not apply to air conditioners, it only applies to appliances having:

- integral burners under the control of fully automatic burner control systems;
- closed system refrigerant circuits in which the refrigerant does not come into direct contact with the water or air to be cooled or heated;
- mechanical means to assist transportation of the combustion air and/or the flue gas.

The above appliances can have one or more primary or secondary functions (i.e. heat recovery - see definitions in EN 12309-1:2023).

In the case of packaged units (consisting of several parts), this document applies only to those designed and supplied as a complete package.

The appliances having their condenser cooled by air and by the evaporation of external additional water are not covered by EN 12309.

Installations used for heating and/or cooling of industrial processes are not within the scope of EN 12309. All the symbols given in this text are to be used regardless of the language used.

1.2 Scope of this Part 3 of EN 12309

This part of EN 12309 specifies the requirements, test methods and conditions for gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW.

This part of EN 12309 deals particularly with test protocols and tools to calculate the capacity, the gas utilization efficiency and the electrical power input of the appliance. This data can be used in particular to calculate the seasonal efficiency of the appliance.

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2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 437:2021, *Test gases — Test pressures — Appliance categories*

EN 1749:2020, *Classification of gas appliances according to the method of supplying combustion air and of evacuation of the combustion products (types)*

EN 12102-1:2022, *Air conditioners, liquid chilling packages, heat pumps, process chillers and dehumidifiers with electrically driven compressors — Determination of the sound power level — Part 1: Air conditioners, liquid chilling packages, heat pumps for space heating and cooling, dehumidifiers and process chillers*

EN 12309-1:2023, *Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW — Part 1: Terms and definitions*

EN 12309-2:2015, *Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW — Part 2: Safety*

FprEN 12309-6:2023,¹ *Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW — Part 6: Calculation of seasonal performances*

EN 12309-7:2014, *Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW — Part 7: Specific provisions for hybrid appliances*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12309-1:2023 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Classification

4.1 Classification of gases

Gases are classified into three families, divided into groups according to the value of the Wobbe index. Families and groups of gas used in this document are in accordance with those of the EN 437:2021.

4.2 Classification of appliances

4.2.1 Classification according to the mode of air supply and evacuation of the combustion products

The types of appliances as defined in EN 1749:2020 apply.

¹ Currently in preparation.

4.2.2 Denomination

Appliances are denominated in such a way that the heat transfer medium for the outdoor heat exchanger is indicated first, followed by the heat transfer medium for the indoor heat exchanger. Examples of such appliances are given in Table 1.

Table 1 — Examples of denomination of appliances

Heat transfer medium		Denomination
Outdoor heat exchanger	Indoor heat exchanger	
Air	Water ^a	Air Cooled Liquid Chiller Air Cooled Liquid Chiller/Heater Air/Water Heat pump
Water ^a	Water ^a	Water Cooled Liquid Chiller Water Cooled Liquid Chiller/Heater Water/Water Heat pump
Brine	Water ^a	Brine Cooled Liquid Chiller Brine Cooled Liquid Chiller/Heater Brine/Water Heat pump
^a This description also applies where the water contains additives to prevent corrosion as specified in the appliances instructions.		

4.2.3 Classification of the operating conditions

The classification according to the temperatures of the heat transfer media is formed in such a way that the heat transfer media are indicated together with their temperatures (in °C). A short classification is formed in such a way that a characteristic letter is used for the heat transfer medium: A for air, W for water and B for brine.

Both for heating and for cooling appliances, the value indicated in the first place refer to the outdoor heat exchanger temperature and the value in the second place to the indoor heat exchanger temperature.

Temperatures for the outdoor heat exchanger are inlet temperatures. Temperatures for the indoor heat exchanger are outlet temperatures.

EXAMPLE 1 In cooling mode, A27W7 means an inlet temperature of air for the outdoor heat exchanger of 27 °C and an outlet temperature of water for the indoor heat exchanger of 7 °C.

EXAMPLE 2 In heating mode, B0W50 means an inlet temperature of brine for the outdoor heat exchanger of 0 °C and an outlet temperature of water for the indoor heat exchanger of 50 °C.

5 Testing conditions

5.1 Environmental conditions and electrical power supply

The tests to check the requirements shall be carried out under the environmental conditions and electrical power supply requirements specified in Tables 2 and 3 depending on the location of the appliance.

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Table 2 — Environmental conditions and electrical power supply requirements for appliances designed for indoor installations

Type	Measured quantities	Test conditions
Water-to-water and brine-to-water appliances ^a	Ambient temperature (Dry bulb temperature)	20 °C ± 5 °C
Air-to-water appliances with duct connection on the air inlet and outlet side	Ambient temperature (Dry bulb temperature)	20 °C ± 5 °C
Air-to-water appliances without duct connection on the air inlet side	Air inlet temperature (Dry/Wet bulb temperature)	According to Tables 4, 5, 8, 9, 10
All appliances	Voltage	Nominal voltage
All appliances	Frequency	Nominal frequency

^a Test conditions for water to water or brine to water appliances can be extended to water to brine and brine to brine appliances respectively (e.g. for reversible applications).

Table 3 — Environmental conditions and electrical power supply requirements for appliances designed for outdoor installation

Type	Measured quantities	Test conditions
Water-to-water and brine-to-water appliances in cooling mode ^a	Ambient temperature (Dry bulb temperature)	25 °C to 35 °C
Water-to-water and brine-to-water appliances in heating mode	Ambient temperature (Dry bulb temperature)	0 °C to 7 °C
Air-to-water appliances	Air inlet temperature (Dry/Wet bulb temperature)	According to Tables 4, 5, 8, 9, 10
All appliances	Voltage	Nominal voltage
All appliances	Frequency	Nominal frequency

^a Test conditions for water to water or brine to water appliances can be extended to water to brine and brine to brine appliances respectively (e.g. for reversible applications).

For all appliances, electrical power voltage and frequency shall be stated in the appliance's technical documentation.

5.2 Test conditions

The appropriate test conditions shall be applied in accordance with:

- Table 4 for water-to-water, water-to-brine, air-to-water and air-to-brine appliances in cooling mode, when the scope of testing is establishing standard GUE, rated cooling capacity and sound power level (L_{WA});
- Table 5 for air-to-water and air-to-brine appliances in cooling mode with heat recovery, when the scope of testing is establishing standard GUE, rated cooling capacity and sound power level (L_{WA});
- Table 6 for water-to-water and brine-to-water appliances in heating mode, when the scope of testing is establishing rated GUE (GUE_{rated}), rated PER (PER_{rated}) and rated heat capacity ($P_{rated,h}$);
- Table 7 for water-to-water and brine-to-water appliances in heating mode, when the scope of testing is establishing establishing sound power level (L_{WA});
- Table 8 for air-to-water appliances in heating mode, when the scope of testing is establishing rated GUE (GUE_{rated}), rated PER (PER_{rated}) and typical heat capacity ($P_{typ(35)}$; $P_{typ(55)}$);
- Table 9 for air-to-water appliances in heating mode, when the scope of testing is establishing rated heat capacity ($P_{rated,h}$);
- Table 10 for air-to-water appliances in heating mode, when the scope of testing is establishing sound power level (L_{WA});

The prescribed test conditions shall be applied at full load of tested appliances, unless differently specified in the above listed tables.

For appliances with brine, the test shall be carried out with the brine specified in the technical documentation, see 7.1.6.

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Table 4 — Standard rating conditions or reference design conditions for establishing standard GUE, rated cooling capacity and sound power level (L_{WA}) for water-to-water, water-to-brine, air-to-water and air-to-brine appliances in cooling mode

Type of appliance / Application	Outdoor heat exchanger		Indoor heat exchanger		NOTES
	Inlet temperature °C	Outlet temperature °C	Inlet temperature °C	Outlet temperature °C	
Water-to-water ^a	30	35 ^d	12	7	W30W7
Water-to-brine ^a	30	35 ^d	0	-5	W30B-5
Air-to-water ^b / Low temperature	35 ^c	/	12	7	A35W7
Air-to-water ^b / Medium temperature	35 ^c	/	23	18	A35W18
Air-to-brine ^b	35 ^c	/	0	-5	A35B-5
NOTE The supplementary heater of a reversible unit (chiller/heater unit) is not operated during the test. In addition, for an appliance with a recovery heat exchanger, no heat recovery medium is circulated during the test.					
^a Test conditions for water-to-water or water-to-brine appliances can be extended to brine-to-water and brine-to-brine appliances respectively (e.g. for reversible applications). ^b The water shall contain any additive specified in technical documentation, but the test conditions remain the same as for water. ^c Dry bulb temperature. ^d Flow rate shall remain inside the range given by the manufacturer; in the opposite case keep the inlet temperature.					