

SLOVENSKI STANDARD
oSIST prEN 12309-2:2013
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Absorpcijske in adsorpcijske klimatske naprave in/ali toplotne črpalke s plinskim ogrevanjem z grelno močjo do vključno 70 kW - 2. del: Varnost

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

Gasbefeuerte Sorptions-Geräte für Heizung unde/oder Kühlung mit einer Nennwärmebelastung nicht über 70 kW - Teil 2: Sicherheit

Appareils à sorption à chauffage direct au gaz pour chauffage et/ou refroidissement d'un débit calorifique sur PCI inférieur à 70 kW - Partie 2: Sécurité

Ta slovenski standard je istoveten z: prEN 12309-2

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27.080	Toplotne črpalke	Heat pumps

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net heat input not exceeding 70 kW - Part 2: Safety**

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Gasbefeuerte Sorptions-Geräte für Heizung und/oder
Kühlung mit einer Nennwärmebelastung nicht über 70 kW -
Teil 2: Sicherheit

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 299.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Foreword

This document (prEN 12309-2:2013) 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 document is currently submitted to the CEN Enquiry.

This document will supersede EN 12309-1:1999.

EN 12309 comprises the following parts under the general title «*Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW*»:

- Part 1: Terms and definitions;
- Part 2: Safety;
- Part 3: Test conditions;
- Part 4: Test methods;
- Part 5: Requirements;
- Part 6: Calculation of seasonal performances;
- Part 7: Specific provisions for hybrid heating appliances;
- Part 8: Environmental aspects.

Parts 1 and 2 to EN 12309 will supersede EN 12309-1:1999, whereas Part 1 and Parts 3 to 7 of EN 12309 will supersede EN 12309-2:2000. Parts 1 to 7 have been prepared to address the essential requirements of the European Directive 2009/142/EC relating to appliances burning gaseous fuels (see informative Annex ZA of prEN 12309-2:2013 for safety aspects and Annex ZA of prEN 12309-5:2012 for rational use of energy aspects).

These documents are linked to the following European Directives:

- Energy Related Products Directive (2009/125/EC) in terms of tests conditions, tests methods and seasonal performances calculation methods under Mandate M/495 (see Annex ZB of prEN 12309-5:2012);
- Promotion of the Use of Renewable Energy Directive (2009/28/EC – Annex VII) (see Annex A of prEN 12309-5:2012).

For the relationship with EU Directive(s), see informative Annexes ZA and ZB in prEN 12309-2:2013 and in prEN 12309-5:2012, which are an integral part of this document. These documents will be reviewed whenever new mandates could apply.

Part 8 of EN 12309 (“Environmental aspects”) deals with the incorporation of the Resolution BT 27/2008 regarding CEN approach on addressing environmental issues in product and service standards.

This document deals with particularly with the operational safety of the appliance.

1 Scope

Appliances covered by these standards include one or a combination of the following:

- gas fired sorption chiller;
- gas fired sorption chiller/heater;
- gas fired sorption heat pump;

These standards apply to appliances only when used for space heating and cooling with or without heat recovery. Appliances can be monovalent, bivalent or hybrid types.

These standards apply to appliances having flue gas systems of type B and C (according to the CEN/TR 1749) and to appliances designed for outdoor installations. These European Standards apply to appliances that can be single ducted or double ducted.

These standards only apply 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 prEN 12309-1:2012) and this standard applies to all such functions providing that the function concerned is dependent on circulation of fluid (refrigerant and/or solution) within the absorption, adsorption or refrigerant circuit(s).

NOTE 1 Any appliance function that is not dependent on circulation of the fluid within the absorption, adsorption, or refrigerant circuit(s) is assessed separately.

These standards are applicable to appliances that are intended to be type tested. Requirements for appliances that are not type tested would need to be subject to further consideration.

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

These standards do not apply to air conditioners.

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

Installations used for heating and/or cooling of industrial processes are not within the scope of these standards.

NOTE 2 All the symbols given in this text are used regardless of the language used.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 88-1, *Pressure regulators and associated safety devices for gas appliances - Part 1: Pressure regulators for inlet pressures up to and including 50 kPa*

EN 88-2, *Pressure regulators and associated safety devices for gas appliances – Part 2: Pressure regulators for inlet pressures above 500 mbar up to and including 5 bar*

EN 126, *Multifunctional controls for gas burning appliances*

EN 161, *Automatic shut-off valves for gas burners and gas appliances*

EN 257, *Mechanical thermostats for gas-burning appliances*

EN 298, *Automatic burner control systems for burners and appliances burning gaseous or liquid fuels*

EN 378-3, *Refrigerating systems and heat pumps – Safety and environmental requirements – Part 3: Installation site and personal protection*

EN 437:2003+A1:2009, *Test gases - Test pressures - Appliance categories*

EN 1057, *Copper and copper alloys – Seamless, round copper tubes for water and gas in sanitary and heating applications*

EN 1092-1, *Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated – Part 1: Steel flanges*

EN 1092-2, *Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated – Part 2: Cast iron flanges*

EN 1092-3, *Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated – Part 3: Copper alloy flanges*

EN 1254-2, *Copper and copper alloys – Plumbing fittings – Part 2: Fittings with compression ends for use with copper tubes*

EN 12067-2, *Gas/air ratio controls for gas burners and gas burning appliances. Electronic types – Part 2: Electronic types*

prEN 12309-1:2012, *Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW - Part 1: Terms and definitions*

prEN 12309-4:2012, *Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW - Part 4: Test methods*

prEN 12309-5:2012, *Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW- Part 5: Requirements*

EN 14459, *Control functions in electronic systems for gas burners and gas burning appliances - Methods for classification and assessment*

EN 60335-1:2012, *Household and similar electrical appliances - Safety - Part 1: General requirements*

EN 60335-2-102, *Household and similar electrical appliances - Safety – Part 2-102: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections*

EN 60529:1991, *Degrees of protection provided by enclosures (IP Code)*

EN 60730-2-9, *Automatic electrical controls for household and similar use – Part 2-9: Particular requirements for temperature sensing controls*

EN ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads – Part 1: Dimensions, tolerances and designation*

EN ISO 3166-1, *Codes for the representation of names of countries and their subdivisions - Part 1: Country codes*

ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads – Part 1: Dimensions, tolerances and designation*

ISO 1182, *Reaction to fire tests for products -- Non-combustibility test*

ISO 3864-2, *Graphical symbols -- Safety colours and safety signs – Part 2: Design principles for product safety labels*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 12309-1:2012 and the following apply.

3.1

automatic recycling

automatic process by which, after loss of flame during operation, the gas supply is interrupted and the full start procedure is re-initiated automatically

4 Classification

Appliances can be classified according to:

- the gases they use;
- the mode of air supply and evacuation of combustion products;
- the temperatures of their heat transfer media;
- their denomination.

4.1 Classification of appliances

4.1.1 Classification of gases

Gases are classified into three families, possibly divided into groups according to the value of the Wobbe index. Families and groups of gas used in this standard are in accordance with those of the EN 437:2003+A1:2009.

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

The types of appliances as defined in CEN/TR 1749 are applicable.

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4.1.3 Classification according to the temperatures of the heat transfer media

4.1.3.1 General

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.

For the purposes of this standard, all references to the term "absorber" shall be taken to mean "adsorber" where the function of the appliance is based on adsorption.

4.1.3.2 Cooling mode

When the appliance is operating in the cooling mode, the temperatures indicated in the first place refer to the condenser/absorber and the temperatures in the second place to the evaporator.

Air and water/brine temperatures for the condenser/absorber are inlet temperatures. Water/brine temperatures for the evaporator are outlet temperatures

For example, A27/W7 means an inlet temperature of air for the condenser/absorber of 27 °C and an outlet temperature of water for the evaporator of 7 °C.

4.1.3.3 Heating mode

When the appliance is operating in the heating mode, the values indicated in the first place refer to the evaporator and the values in the second place to the condenser/absorber.

Air and water/brine temperatures for the evaporator are inlet temperatures. Water/brine temperatures for the condenser/absorber are outlet temperatures.

For example, B0/W50 means an inlet temperature of brine for the evaporator of 0 °C and an outlet temperature of water for the condenser/absorber of 50 °C.

4.1.4 Classification according to denomination

4.1.4.1 Cooling mode

For the purposes of this standard, appliances designed to operate in the cooling mode are denominated in such a way that the heat transfer medium for the condenser/absorber is indicated first, followed by the heat transfer medium for the evaporator. Examples of such appliances are given in Table 1.

Table 1 — Examples of appliances designed to provide cooling

Heat transfer medium		Denomination
Condenser/absorber	Evaporator	
Air	Water ^a	Air Cooled Liquid Chiller Air Cooled Liquid Chiller Heater
Water ^a	Water ^a	Water Cooled Liquid Chiller Water Cooled Liquid Chiller Heater
^a This description also applies where the water contains additives as specified in the appliance's instructions.		

4.1.4.1.1 Heating mode

For the purposes of this standard, appliances designed to operate in the heating mode are denominated in such a way that the heat transfer medium for the evaporator is indicated first, followed by the heat transfer medium for the condenser/absorber. Examples of such appliances are given in Table 2.

Table 2 — Examples of appliances designed to provide heating

Heat transfer medium		Denomination
Evaporator	Condenser/Absorber	
Air	Water ^a	Air/water Heat pump
Water ^a	Water ^a	Water/water Heat Pump
Brine	Water ^a	Brine/Water Heat Pump
^a This description also applies where the water contains additives as specified in the appliance's instructions.		

5 Construction and design requirements

5.1 General

5.1.1 Conversion to different gases

The following operations are allowed in order to convert from a gas of one family or group to a gas of another family or group:

- adjustment of the gas rate of the main burner and ignition burner;
- change of injectors or restrictor;
- change of the ignition burner or its components;
- change of the gas rate modulation system;
- putting out of service and sealing a gas rate adjuster and/or a regulator;
- changes of configuration parameters by data exchange (for requirement see EN 14459).

For each of the operations mentioned above the appliance shall be tested with each of the gases. These operations shall be possible without having to interfere with the connections of the appliance to its pipe-work (gas, water, duct system).

5.1.2 Materials and method of construction

When the appliance is installed in accordance with the appliance's instructions, all components, including the heat exchangers and the refrigerant circuit, shall withstand the mechanical, chemical and thermal conditions to which they may be subjected in the course of normal use.

In addition, the appliance shall be designed in such a way that if condensation takes place, this shall not:

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- affect the operational safety;
- drop outside the appliance.

This requirement does not apply to the flow of condensate which is produced at the outlet of the combustion products evacuation duct or from a purpose made condensate discharge system.

Copper shall not be used for gas carrying parts where its temperature is likely to exceed 100 °C.

Asbestos or materials containing asbestos shall not be used.

Solder with a melting point below 450 °C after application shall not be used for gas carrying parts. Hard solder containing cadmium in its formulation shall not be used in the construction of the appliance.

Where appropriate, materials used on the appliance shall be non-combustible in accordance with the requirements of ISO 1182.

5.1.3 Accessibility for maintenance and use

Parts that are intended to be removable for maintenance or cleaning shall be readily accessible, shall be readily capable of correct assembly and difficult to assemble incorrectly. Such parts shall be impossible to assemble incorrectly where incorrect assembly would create a hazardous condition or result in damage to the appliance and its controls.

It shall be possible to clean the combustion chamber and the parts in contact with combustion products in accordance with the appliance's instructions without using special tools unless these are supplied as necessary accessories with the appliance.

Access shall be possible to all handles, buttons etc. required during normal use of the appliance, without having to remove any part of the case. For this purpose, the opening of a door or access panel is permitted.

Constructional parts accessible during use and maintenance shall be free from sharp edges and corners that might cause damage or personal injury during use or maintenance.

5.1.4 Thermal insulation

Any thermal insulation shall retain its insulating properties under the influences of temperature and ageing. The insulation shall withstand the normally expected thermal and mechanical stresses. The insulation of parts associated with the combustion products circuit shall be non combustible. All insulation shall be securely located and shall be protected against mechanical damage, condensate and vermin.

5.1.5 Gas connection

The appliance gas inlet connection shall be accessible.

The clearance around the inlet connection, after removing the case if necessary, shall be adequate to allow the use of tools required to make the connection. It shall be possible to make all the connections without special tools.

It shall be possible to connect the appliance by rigid or flexible metallic means to the gas supply.

A compression fitting suitable for copper tube shall comply with EN 1254-2 and EN 1057.

If the appliance has a threaded connection, this thread shall comply with EN ISO 228-1 or ISO 7-1. In the first case (EN ISO 228-1), the end of the appliance inlet connection shall be sufficiently flat to allow the use of a sealing washer.

If flanges are used, they shall comply with EN 1092-1, EN 1092-2 or EN 1092-3 as appropriate and the counterflanges and sealing gaskets shall be provided.

5.1.6 Soundness

5.1.6.1 Soundness of the gas circuit

The gas circuit shall consist of metallic parts.

Holes for screws, studs, etc., intended for the assembly of parts shall not open into gasways. The wall thickness between drillings and gasways shall be at least 1 mm. This does not apply to orifices for measurement purposes.

The soundness of parts and assemblies making up the gas circuit and likely to be dismantled for routine maintenance in situ shall be achieved by means of mechanical joints, e.g. metal-to-metal joints, packing, or O-ring joints, i.e. excluding the use of all sealing materials such as tape, paste or liquid. However, the sealing materials mentioned above may be used for permanent assemblies. These sealing materials shall remain effective under all conditions of appliance use. It shall not be possible for water to penetrate into the gas circuit.

5.1.6.2 Soundness of the combustion circuit

The combustion circuit shall be constructed so as to prevent any leakage of combustion products.

Any means used to achieve soundness of the combustion circuit shall be such that it remains effective under normal conditions of use and servicing.

Parts, which have to be removed during routine service and affect the soundness of the appliance and/or its ducts, shall be sealed by mechanical means, excluding pastes, liquids and tapes. The need for replacement of the seal(s), following a cleaning or servicing operation as stated in the technical instructions, is permitted.

Where the appliance case forms part of the combustion circuit and it can be removed without the use of tools, either the appliance shall not operate, or there shall be no leakage of combustion products into the room where the appliance is installed when the case is replaced incorrectly.

However, parts of the assembly that are not intended to be dismantled for maintenance may be joined in such a way, that permanent soundness is assured during continuous service under normal conditions of use.

The ducts, bends, if any, and the terminal or fitting piece shall fit together correctly and shall form a stable assembly.

Parts intended to be dismantled for periodic servicing shall be designed and arranged so that soundness is assured after reassembly.

Any fitting piece shall allow a sound connection to be made to the system intended for the evacuation of combustion products and supply of air.

5.1.7 Air proving

Appliances with fans shall be fitted with a system for air proving.

Except for appliances with gas/air ratio controls, before each fan starts it shall be checked that there is no simulation of air flow in the absence of air flow.

The system for supervision of the combustion air rate or combustion products rate shall be activated directly by the flow of combustion air or combustion products. This is also valid for appliances with more than one fan speed in which the flows associated with each fan speed are monitored.