SLOVENSKI STANDARD

SIST EN 12309-2:2001

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Absorpcijske in adsorpcijske klimatske naprave in/ali toplotne ļ rpalke s plinskim ogrevanjem z grelno moļ jo do vkljuļ no 70 kW - 2. del: Smotrna raba energije

Gas-fired absorption and adsorption air-conditioning and/or heat pump appliances with a net heat input not exceeding 70 kW - Part 2: Rational use of energy

Gasbefeuerte Absorptions- und Adsorptions-Klimageräte und/oder Wärmepumpengeräte mit einer Nennwärmebelastung nicht über 70 kW - Teil 2: Rationelle Energieanwendung

Appareils de climatisation et/ou pompes à chaleur à ab- et ad- sorption fonctionnant au gaz de débit calorifique sur PCI n'excédant pas 70 kW - Partie 2: Utilisation rationnelle de l'énergie

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EUROPEAN STANDARD

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English version

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This European Standard was approved by CEN on 14 November 1999.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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FOREWORD

This European Standard has been prepared by Technical Committee CEN/TC 299 "Gas-fired sorption appliances and domestic gas-fired washing and drying appliances", the secretariat of which is held by AENOR.

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 July 2000, and conflicting national standards shall be withdrawn at the latest by July 2000.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

The first part of the standard specifies the requirements and test methods for the construction, safety, marking and testing of the appliances. The second part of the standard specifies the requirements for rational use of energy.

At present, this standard does not specify minimum efficiency values. This is because the standard covers a wide variety of gas-fired absorption and adsorption air conditioning and heat pump appliances, and there are, as yet, not enough examples of any one type of appliance on the European market to establish meaningful values for each of these types.

However, this standard does require manufacturers to declare the gas utilization efficiencies of their appliances and provides the means of verifying these under standardized conditions. This will enable reliable data on appliance efficiencies to be collected with the view to establishing minimum efficiency values for the various appliance types as soon as it is appropriate. It is therefore the intention of CEN/TC 299 to review this standard 2 years after its publication.

1 Scope

This European standard specifies the requirements and methods of test for the rational use of energy of gas-fired absorption and adsorption air conditioning and/or heat pump appliances having a net heat input not exceeding 70 kW, hereafter referred to as "appliances".

This standard applies to appliances having flue systems of Type B_{12}, B_{12BS}, B_{13}, B_{13BS}, B_{14}, B_{22}, B_{23}, C_{12}, C_{13}, C_{32} and C_{33}, and to appliances designed for outdoor installations.

This standard 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 fluid to be cooled or heated;
- mechanical means to assist transportation of the combustion air and/or the flue gases.

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

- gas-fired absorption air conditioner;
- gas-fired adsorption air conditioner;
- gas-fired absorption heat pump;
- gas-fired adsorption heat pump.

The above appliances can have one or more primary or secondary functions (see 3.5 and 3.6) and this standard applies to all such functions providing that the function concerned is dependent on circulation of fluid within the absorption, or adsorption, refrigerant circuit.

NOTE Any appliance function that is not dependent on circulation of the fluid within the absorption, or adsorption, refrigerant circuit should be assessed separately.

This standard does not apply to appliances fitted with more than one flue outlet.

This standard is 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.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 12309-1:1999 Gas-fired absorption and adsorption air-conditioning and/or heat pump appliances with a net heat input not exceeding 70 kW - Part 1: Safety

ISO 5151:1994 Non-ducted air conditioners and heat pumps - Testing and rating for performance

3 Terms and definitions

For the purposes of this standard, the definitions given in EN 12309-1:1999 and the following apply.

3.1
heat recovery
use of available heat from the appliance whose primary control remains in the cooling mode, by means of an additional heat exchanger.

3.2
heat transfer medium
any medium (e.g. air, water) used for the transfer of heat to or from refrigerant containing parts of the appliance; it may be:

- the cooled medium circulating in the evaporator;
- the cooling medium circulating in the condenser or absorber;
- the heat recovery medium circulating in the heat recovery heat exchanger.

3.3
cooling capacity

heat given off by the heat transfer medium to the refrigerant within a defined interval of time.

Symbol: Q_c

Units: kilowatt (kW).

3.4
heating capacity
usable heat given off in the heating mode from the appliance to the heat transfer medium within a defined interval of time.

NOTE If heat is removed from the condenser and/or absorber for defrosting, it is taken into account as appropriate.

Symbol: Q_h

Unit: kilowatt (kW)

3.5
gas utilization efficiency in the cooling mode
ratio of the cooling capacity to the net heat input of the appliance.

Symbol: η_c

3.6
gas utilization efficiency in the heating mode
ratio of the heating capacity to the net heat input of the appliance.

Symbol: η_h

3.7
brine
liquid that has a freezing point depressed relative to water.

3.8
defrost state
state of the appliance when its operation in the heating mode is modified or reversed to defrost a heat exchanger.

3.9
defrost time
time for which the appliance is in the defrost state.

3.10
operating cycle with defrost
operating time of the appliance between two defrosting processes plus the defrost time.

4 Classification

For the purposes of this draft standard, the classifications given in EN 12309-1: 1999 are applicable together with the following additional means of classification.

4.1 Classification of temperatures of heat transfer media

4.1.1 General

The classification relating 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.

4.1.2 Cooling mode

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

All air temperatures are inlet temperatures. Water and brine temperatures for the evaporator are outlet temperatures. Water temperatures for the condenser/absorber are inlet 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 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.

All air temperatures are inlet temperatures. Water temperatures for the condenser/absorber are outlet temperatures. Water and brine temperatures for the evaporator are inlet 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.

4.2 Denomination of appliances

4.2.1 Cooling mode

For the purposes of this european 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
Air	Air	Air cooled air conditioner
Water [a)]	Water [a)]	Water cooled liquid chiller Water cooled liquid chiller/heater
Water [a)]	Air	Water cooled air conditioner

[a)] This description also applies where the water contains additives as specified in the manufacturer's instructions

4.2.2 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	Air	Air/air heat pump or air conditioner
Water [a)]	Air	Water/air heat pump or air conditioner
Brine	Air	Brine/air heat pump
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 manufacturer's instructions

5 Requirements

5.1 Cooling mode

5.1.1 Water and air cooled chillers and chiller/heaters

5.1.1.1 Cooling capacity rating and gas utilization efficiency

The manufacturer shall declare the cooling capacity corresponding to test condition (T1) given in table 5, together with the gas utilization efficiency under the same conditions. When measured under the appropriate test conditions given in 6.2.1.1.2, and in accordance with the methods of test in clause 6, it shall be verified that the cooling capacity and the gas utilization efficiency are not less than those declared by the manufacturer.

If the manufacturer declares cooling capacities or gas utilization efficiencies corresponding to test conditions (T2) or (T3) given in table 5, these shall also be verified. When measured under the appropriate test conditions given in 6.2.1.1.2, and in accordance with the methods of test in clause 6, it shall be verified that the corresponding cooling capacity and, if applicable, the gas utilization efficiency are not less than those declared by the manufacturer.

If, in addition, the manufacturer declares a cooling capacity or gas utilization efficiency for the primary function which relates to conditions other than those given in this standard, the claim(s) shall be verified under the conditions specified in the manufacturer's instructions for installation and adjustment.

5.1.1.2 Secondary functions

No specific requirements or methods of test are included in this standard for secondary functions. However, if the manufacturer claims a heating capacity or gas utilization efficiency (η_h) for the secondary function, the manufacturer shall specify the conditions under which the claim(s) are made. It shall be verified under these conditions that these claims are valid.

If the secondary function is heat recovery, the heat recovery capacity claimed by the manufacturer shall correspond to the appropriate test conditions given in table 6. When measured under the appropriate test conditions given in 6.2.1.1.2, and in accordance with the methods of test in clause 6., it shall be verified that the heat recovery capacity is not less than that declared by the manufacturer.

5.1.2 Air and water cooled air conditioners

5.1.2.1 Cooling capacity rating and gas utilization efficiency

The manufacturer shall declare the cooling capacity corresponding to test conditions:

- (T1) for water cooled air conditioners, and
- (T1) and (T2) for air cooled air conditioners

given in table 9, together with the gas utilization efficiencies under the same conditions. When measured under the appropriate test conditions given in 6.2.2.1.2, and in accordance with the methods of test in clause 6, it shall be verified that the cooling capacity and the gas utilization efficiency are not less than those declared by the manufacturer.

If the manufacturer declares cooling capacities or gas utilization efficiencies under the optional test conditions (T2) and/or (T3) given in table 9, these shall also be verified. When measured under the appropriate test conditions given in 6.2.1.1.2, and in accordance with the methods of test in clause 6, it shall be verified that the corresponding cooling capacity and, if applicable, the gas utilization efficiency are not less than those declared by the manufacturer.

If, in addition, the manufacturer declares a cooling capacity or gas utilization efficiency for the primary function which relates to conditions other than those given in this standard, the claim(s) shall be verified under the conditions specified in the manufacturer's instructions for installation and adjustment.

5.1.2.2 Secondary functions

No specific requirements or methods of test are included in this standard for secondary functions. However, if the manufacturer claims a heating capacity or gas utilization efficiency (η_h) for the secondary function, the manufacturer shall specify the conditions under which the claim(s) are made. It shall be verified under these conditions that these claims are valid.

5.2 Heating mode

5.2.1 Heating capacity rating and gas utilization efficiency

The manufacturer shall declare the heating capacity corresponding to test condition (T1) given in table 12, together with the gas utilization efficiency under the same conditions. When measured under the appropriate test conditions given in 6.3.1.2, and in accordance with the method of test in clause 6, it shall be verified that the heating capacity and the gas utilization efficiency are not less than those declared by the manufacturer.

If the manufacturer declares heating capacities or gas utilization efficiencies corresponding to test conditions (T2), (T3) or (T4) given in table 12, these shall also be verified. When measured under the appropriate test conditions given in 6.3.1.2, and in accordance with the methods of test in clause 6, it shall be verified that the corresponding heating capacity and, if applicable, the gas utilization efficiency are not less than those declared by the manufacturer.

If, in addition, the manufacturer declares a heating capacity or gas utilization efficiency for the primary function which relates to conditions other than those given in this standard, the claim(s) shall be verified under the conditions specified in the manufacturer's instructions for installation and adjustment.