

**KUNI 70 kW KASULIKU SOOJUSKOORMUSEGA
ABSORPTSIOONPRINTSIIBIL GAASISEADMED KÜTTE-
JA/VÕI JAHUTUSE TARBEKS. OSA 6: SESOONSE
JÕUDLUSE ARVUTUS**

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 12309-6:2015 sisaldab Euroopa standardi EN 12309-6:2014 ingliskeelset teksti.	This Estonian standard EVS-EN 12309-6:2015 consists of the English text of the European standard EN 12309-6:2014.
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English Version

Gas-fired sorption appliances for heating and/or cooling with a
net heat input not exceeding 70 kW - Part 6: Calculation of
seasonal performances

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 6 : Calcul des performances
saisonnnières

Gasbefeuerte Sorptions-Geräte für Heizung und/oder
Kühlung mit einer Nennwärmebelastung nicht über 70 kW -
Teil 6: Berechnung der saisonalen Effizienzkennzahlen

This European Standard was approved by CEN on 18 October 2014.

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Foreword

This document (EN 12309-6:2014) 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of an identical text or by endorsement, at the latest by June 2015, and conflicting national standards shall be withdrawn at the latest by June 2015.

This document supersedes EN 12309-2:2000.

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

This document 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 and Annex ZB, which are integral parts of this document.

This standard 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 appliances;*
- *Part 8: Environmental aspects.*

EN 12309-1 and EN 12309-2 supersede EN 12309-1:1999, whereas EN 12309-1, EN 12309-3, EN 12309-4, EN 12309-5, EN 12309-6, and EN 12309-7 supersede EN 12309-2:2000.

EN 12309-1, EN 12309-2, EN 12309-3, EN 12309-4, EN 12309-5, EN 12309-6, and EN 12309-7 have been prepared to address the essential requirements of the European Directive 2009/142/EC relating to appliances burning gaseous fuels (see Annex ZA of prEN 12309-2:2013 for safety aspects and Annex ZA of EN 12309-5:2014 for rational use of energy aspects).

These documents are linked to the Energy Related Products Directive (2009/125/EC) in terms of tests conditions, tests methods and seasonal performances calculation methods under Mandate M/495 (see EN 12309-3:2014, Annex ZA; EN 12309-4:2014, Annex ZA; EN 12309-6:2014, Annex ZA and EN 12309-7:2014, Annex ZA and prEN 12309-2:2013, Annex ZB and EN 12309-5:2014, Annex ZB).

These documents will be reviewed whenever new mandates could apply.

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

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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1 Scope

1.1 Scope of EN 12309

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

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

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

This European Standard applies to appliances having flue gas systems of type B and type C (according to CEN/TR 1749) and to appliances designed for outdoor installations. 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 12309-1:2014).

In the case of packaged units (consisting of several parts), this European Standard 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 should be used regardless of the language used.

1.2 Scope of this Part 6 to EN 12309

This part of EN 12309 specifies the calculation methods of seasonal performances for gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW. It deals in particular with the calculation methods of reference seasonal performances in cooling and heating mode for monovalent and bivalent appliances.

NOTE This European Standard serves as an input for the calculation of the system energy efficiency in heating mode of specific heat pump systems in buildings, as stipulated in EN 15316-4-2.

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 12309-1:2014, *Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW — Part 1: Terms and definitions*

EN 12309-4:2014, *Gas-fired sorption appliances for heating and/or cooling with a net heat input not exceeding 70 kW — Part 4: Test methods*

EN 15502-1, *Gas-fired heating boilers — Part 1: General requirements and tests*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12309-1:2014 apply.

4 Calculation methods for reference *SGUE* and *SAEF* in cooling mode

4.1 General

The calculation of the reference Seasonal Gas Utilization Efficiency ratio in cooling mode (*SGUE_c*) and reference Seasonal Auxiliary Energy factor in cooling mode (*SAEF_c*) follows from the application of the bin method, where the part load Gas Utilization Efficiency ratio in cooling mode (*GUE_c*) and Auxiliary Energy Factor in cooling mode (*AEF_c*) at each bin temperature is determined via linear interpolation of the respective part load values at the reference part load conditions A, B, C and D.

The part load conditions A, B, C, D provide the part load ratios and the temperature test conditions at four reference outdoor air dry bulb temperatures: 35 °C, 30 °C, 25 °C and 20 °C.

The part load ratio corresponding to a given outdoor temperature T_j is defined according to Formula (1):

$$PLR_c(T_j) = (T_j - 16) / (35 - 16) \quad (1)$$

At part load condition A, the declared capacity of the appliance is assumed equal to the building load (i.e. capacity ratio = 100 %).

At part load conditions B, C and D, the declared capacity of the appliance is higher than the building load. The capacity ratio (CR), i.e. the ratio of the cooling load (P_c) over the declared capacity (DC) of the appliance at the same temperature conditions, is lower than one. In such conditions, the *GUE_c* and *AEF_c* are affected by both temperature test conditions and capacity ratio. The methods for the determination of *GUE_c* and *AEF_c* are defined in EN 12309-4:2014.

4.2 Part load conditions

4.2.1 General

For the indoor heat exchanger both fan coil and floor cooling applications are considered.

For the fan coil application, appliances which do, and do not, allow variations of the outlet water temperature with the outdoor temperature are considered. Variable outlet temperatures shall only be applied when the programming unit provides an outdoor air temperature dependant modification of the outlet temperature.