

BS EN 16905-3:2017



BSI Standards Publication

Gas-fired endothermic engine driven heat pumps

Part 3: Test conditions

bsi.

AVA Documents
Document Sharing Hub

National foreword

This British Standard is the UK implementation of EN 16905-3:2017.

The UK participation in its preparation was entrusted to Technical Committee GSE/37, Gas fired sorption and laundering appliances.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2017.
Published by BSI Standards Limited 2017

ISBN 978 0 580 90766 1

ICS 27.080

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2017.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 16905-3

March 2017

ICS 27.080

English Version

Gas-fired endothermic engine driven heat pumps - Part 3: Test conditions

Pompes à chaleur à moteur endothermique alimenté
au gaz - Partie 3 : Conditions d'essai

Gasbefeuerte endothermische Motor-Wärmepumpen -
Teil 3: Prüfbedingungen

This European Standard was approved by CEN on 9 January 2017.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

© 2017 CEN All rights of exploitation in any form and by any means reserved
worldwide for CEN national Members.

Ref. No. EN 16905-3:2017 E

Contents

Page

European foreword.....	3
1 Scope	4
1.1 Scope of EN 16905 series.....	4
1.2 Scope of EN 16905-3.....	4
2 Normative references	5
3 Terms and definitions	5
4 Test conditions.....	5
4.1 Environmental conditions and electrical power supply requirements.....	5
4.2 Rating conditions in cooling and in heating.....	6
4.3 Rating conditions for engine heat recovery	15
Annex ZA (informative) Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EU) No 813/2013 aimed to be covered.....	16
Annex ZB (informative) Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EU) No 811/2013 aimed to be covered	18
Bibliography.....	20

European foreword

This document (EN 16905-3:2017) 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 September 2017, and conflicting national standards shall be withdrawn at the latest by September 2017.

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 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 endothermic engine driven heat pumps*:

- *Part 1: Terms and definitions*;
- *Part 2: Safety* (WI 00299025; currently in preparation);
- *Part 3: Test conditions*;
- *Part 4: Test methods*;
- *Part 5: Calculation of seasonal performances in heating and cooling mode* (currently being voted).

EN 16905-1, prEN 16905-2, EN 16905-3, EN 16905-4 and EN 16905-5 have been prepared to address the essential requirements of the European Directive 2009/142/EC relating to appliances burning gaseous fuels (see prEN 16905-2:201X, Annex ZA for safety aspects and EN 16905-5:2017, Annex ZA 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/535; (see EN 16905-3:2017, Annex ZA, EN 16905-4:2017, Annex ZA, EN 16905-5:2017, Annex ZA and prEN 16905-2:201X, Annex ZB).

These documents will be reviewed whenever new mandates could apply.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

1.1 Scope of EN 16905 series

This European Standard specifies the requirements, test methods and test conditions for the rating and performance calculation of air conditioners and heat pumps using either air, water or brine as heat transfer media, with gas-fired endothermic engine driven compressors when used for space heating, cooling and refrigeration, hereafter referred to as “GEHP appliance”.

This European Standard only applies to appliances with a maximum heat input (based on net calorific value) not exceeding 70 kW at standard rating conditions.

This European Standard only applies to appliances under categories I_{2H}, I_{2E}, I_{2Er}, I_{2R}, I_{2E(S)B}, I_{2L}, I_{2LL}, I_{2ELL}, I_{2E(R)B}, I_{2ESi}, I_{2E(R)}, I_{3P}, I_{3B}, I_{3B/P}, II_{2H3+}, II_{2Er3+}, II_{2H3B/P}, II_{2L3B/P}, II_{2E3B/P}, II_{2ELL3B/P}, II_{2L3P}, II_{2H3P}, II_{2E3P} and II_{2Er3P} according to EN 437.

This European Standard only applies to appliances having:

- a) gas fired endothermic engines under the control of fully automatic control systems;
- b) closed system refrigerant circuits in which the refrigerant does not come into direct contact with the fluid to be cooled or heated;
- c) where the temperature of the heat transfer fluid of the heating system (heating water circuit) does not exceed 105 °C during normal operation;
- d) where the maximum operating pressure in the
 - 1) heating water circuit (if installed) does not exceed 6 bar;
 - 2) domestic hot water circuit (if installed) does not exceed 10 bar.

This European Standard applies to appliances only when used for space heating or space cooling or for refrigeration, with or without heat recovery.

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

Packaged units, single split and multisplit systems are covered by this European Standard. Single duct and double duct units are covered by this European Standard.

The above appliances can have one or more primary or secondary functions.

This European 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.

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

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

1.2 Scope of EN 16905-3

This part of the EN 16905 series specifies the test conditions for the rating of energy parameters of gas-fired endothermic engine driven heat pumps for heating and/or cooling mode including the engine heat recovery.

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 16905-1, *Gas-fired endothermic engine driven heat pumps — Part 1: Terms and definitions*

EN 16905-4:2017, *Gas-fired endothermic engine driven heat pumps — Part 4: Test methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16905-1 apply.

4 Test conditions

4.1 Environmental conditions and electrical power supply requirements

The tests shall be carried out under the environmental conditions specified in Table 1 or Table 2 depending on the location of the unit.

For all units, electrical power voltage and frequency shall be stated in the instructions.

Table 1 — Environmental conditions and electrical power supply requirements for units designed for installation indoors

Type	Measured quantities	Rating test
Water-to-water and brine-to-water units ^a	Dry bulb temperature	15 °C to 30 °C
Water-to-air and brine-to-air units with duct connection on the air inlet and outlet side	Dry bulb temperature	15 °C to 30 °C
Water-to-air and brine-to-air units without duct connection on the air inlet side	Dry bulb temperature Wet bulb temperature	Inlet temperature (see Table 6 and Table 7)
Air-to-water units with duct connection on the air inlet and outlet side	Dry bulb temperature	15 °C to 30 °C
Air-to-water units without duct connection on the air inlet side	Dry bulb temperature Wet bulb temperature	Inlet temperature (see Tables 12 to 15)
Air-to-air units with duct connection on the outdoor air inlet and outlet side	Dry bulb temperature	15 °C to 30 °C
Air-to-air units without duct connection on the outdoor air inlet and outlet side	Dry bulb temperature Wet bulb temperature	As inlet temperature see Table 3 and Table 4
All appliances	Voltage	Rated voltage
All appliances	Frequency	Rated frequency
^a Rating 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).		

Table 2 — Environmental conditions and electrical power supply requirements for units designed for installation outdoors

Type	Measured quantities	Rating test
Air-to-water units	Dry bulb temperature Wet bulb temperature	Inlet temperature (see Tables 12 to 14 and Table 15)
Water-to-air units	Dry bulb temperature Wet bulb temperature	Inlet temperature (see Table 6 and Table 7)
Water-to-water and brine-to-water operating in cooling mode ^a	Dry bulb temperature	15 °C to 30 °C
Water-to-water and brine-to-water operating in heating mode	Dry bulb temperature	0 °C to 7 °C
Air-to-air units with duct connection on the indoor air inlet and outlet side	Dry bulb temperature Wet bulb temperature	Inlet temperature (see Table 3 and Table 4)
All appliances	Voltage	Rated voltage
All appliances	Frequency	Rated frequency
^a Rating 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).		

4.2 Rating conditions in cooling and in heating

For the rating tests, the appropriate test conditions shall be applied in accordance with:

- Table 3 for air-to-air units and air-cooled multisplit systems in heating mode;
- Table 4 for air-to-air units and air-cooled multisplit systems in cooling mode;
- Table 5 for air-to-air simultaneous heating and cooling mode multisplit systems;
- Table 6 for water-to-air, brine-to-air units and water-cooled multisplit systems in heating mode;
- Table 7 for water-to-air, brine-to-air units and water-cooled multisplit systems in cooling mode;
- Tables 8 to 10 for water-to-water and brine-to-water units in heating mode, depending on the temperature applications;
- Table 11 for water-to-water, brine-to-water, water-to-brine and brine-to-brine units in cooling mode;
- Tables 12 to 14 for air-to-water units in heating mode, depending on the temperature applications;
- Table 15 for air-to-water and air-to-brine units in cooling mode.

For units with brine, the test shall be carried out with the brine specified in the instruction, see EN 16905-4:2017, 4.5.1.6.

NOTE 1 For air-to-water, brine-to-water and water-to-water units, the instructions declare the water temperatures levels (lower, medium, high) applicable to the heating mode.