



BSI Standards Publication

Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors

Part 3: Test methods

National foreword

This British Standard is the UK implementation of EN 14511-3:2018. It supersedes BS EN 14511-3:2013, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee RHE/17, Testing of air conditioning units.

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

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© The British Standards Institution 2018
Published by BSI Standards Limited 2018

ISBN 978 0 580 91337 2

ICS 91.140.30; 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 2018.

Amendments/corrigenda issued since publication

Date	Text affected
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English Version

**Air conditioners, liquid chilling packages and heat pumps
for space heating and cooling and process chillers, with
electrically driven compressors - Part 3: Test methods**

Climatiseurs, groupes refroidisseurs de liquide
et pompes à chaleur pour le chauffage et le
refroidissement des locaux et refroidisseurs
industriels avec compresseur entraîné par
moteur électrique - Partie 3: Méthodes d'essai

Luftkonditionierer, Flüssigkeitskühlsätze und
Wärmepumpen für die Raumbeheizung und
-kühlung und Prozess-Kühler mit elektrisch
angetriebenen Verdichtern - Teil 3: Prüfverfahren

This European Standard was approved by CEN on 31 December 2017.

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

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

European foreword

This document (EN 14511-3:2018) has been prepared by Technical Committee CEN/TC 113 “Heat pumps and air conditioning units”, the secretariat of which is held by UNE.

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of an identical text or by endorsement, at the latest by September 2018, and conflicting national standards shall be withdrawn at the latest by March 2021.

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

This document supersedes [EN 14511-3:2013](#).

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 Regulation No 206/2012 and EU Regulation No 626/2011.

For relationship with EU Regulation No 206/2012 and EU Regulation No 626/2011, see informative [Annexes ZA](#) and [ZB](#), which are an integral part of this document.

The main changes with respect to the previous edition are listed below:

- a) the revision of [Annexes A](#) and [B](#) on the test methods;
- b) deletion of [Annex C](#);
- c) the revision of [Annex G](#) ([Annex H](#) on the previous version) on liquid pumps corrections;
- d) the inclusion of process chillers into the scope of the EN 14511 series and of this Part 3.

Although this document has been prepared in the frame of the Commission Regulation (EU) No 206/2012 implementing Directive 2009/125/EC with regard to ecodesign requirements for air conditioners and comfort fans, it is also intended to support the Essential Requirements of the European Directive 2010/30/EU.

EN 14511 currently comprises the following parts:

- *Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers with electrically driven compressors — Part 1: Terms and definitions,*
- *Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors — Part 2: Test conditions,*
- *Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors — Part 3: Test methods,*
- *Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors — Part 4: Requirements.*

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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For relationship with EU Regulation No 206/2012 and EU Regulation No 626/2011, see informative [Annexes ZA](#) and [ZB](#), which are an integral part of this document.

The main changes with respect to the previous edition are listed below:

- a) the revision of [Annexes A](#) and [B](#) on the test methods;
- b) deletion of [Annex C](#);
- c) the revision of [Annex G](#) ([Annex H](#) on the previous version) on liquid pumps corrections;
- d) the inclusion of process chillers into the scope of the EN 14511 series and of this Part 3.

Although this document has been prepared in the frame of the Commission Regulation (EU) No 206/2012 implementing Directive 2009/125/EC with regard to ecodesign requirements for air conditioners and comfort fans, it is also intended to support the Essential Requirements of the European Directive 2010/30/EU.

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- *Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors — Part 4: Requirements.*

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1 Scope

1.1 The scope of [EN 14511-1](#) is applicable.

1.2 This European Standard specifies the test methods for the rating and performance of air conditioners, liquid chilling packages and heat pumps using either air, water or brine as heat transfer media, with electrically driven compressors when used for space heating and cooling. These test methods also apply for the rating and performance of process chillers.

It also specifies the method of testing and reporting for heat recovery capacities, system reduced capacities and the capacity of individual indoor units of multisplit systems, where applicable.

This European Standard also makes possible to rate multisplit and modular heat recovery multisplit systems by rating separately the indoor and outdoor units.

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 14511-1:2018, *Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors — Part 1: Terms and definitions*

EN 14511-2:2018, *Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors — Part 2: Test conditions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14511-1:2018 apply.

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

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

4 Tests for determination of capacities

4.1 Basic principles, method of calculation for the determination of capacities

4.1.1 Heating capacity

The heating capacity of air conditioners and of air-to-air or water(brine)-to-air heat pumps shall be determined by measurements in a calorimeter room (see [Annex A](#)) or by the air enthalpy method (see [Annex B](#)).

However, the heating capacity of air conditioners and of air-to-air heat pumps having a capacity below or equal to 12 kW for cooling, or heating if the unit has no cooling function, under the standard rating conditions of [EN 14511-2](#) shall be determined by measurements in a calorimeter room.

For heating only units the limit of 12 kW applies to the heating capacity as given under the standard rating conditions of [EN 14511-2](#).

When using the air enthalpy method, in steady-state operation, the heating capacity shall be determined using the following formula:

$$P_H = q \times \rho \times c_p \times \Delta T \quad (1)$$

where

- P_H is the heating capacity, expressed in W;
- q is the air volume flow rate as measured during the test, expressed in m³/s;
- ρ is the air density as measured during the test, expressed in kg/m³;
- c_p is the specific heat at constant pressure, expressed in J/(kg.K);
- ΔT is the difference between outlet and inlet temperatures, expressed in K.

The air density shall be determined for the air conditions at the air flow measuring device.

NOTE 1 The mass flow rate can directly be determined instead of the term ($q \times \rho$).

NOTE 2 The enthalpy change ΔH can directly be used instead of the term ($c_p \times \Delta T$).

For the heating capacity calculation in transient operation, refer to [4.5.3.2](#).

The heating capacity of air-to-water(brine), water(brine)-to-water(brine) heat pumps and liquid chilling packages shall be determined in accordance with the direct method at the water or brine heat exchanger, by determination of the volume flow of the heat transfer medium, and the inlet and outlet temperatures, taking into consideration the specific heat capacity and density of the heat transfer medium.

The measured heating capacity of air-to-air and water(brine)-to-air units shall be corrected for the heat from the indoor fan as specified in [4.1.4.1](#) or [4.1.4.2](#).

The measured heating capacity of water(brine)-to-water(brine) and air-to-water(brine) units shall be corrected for the heat from the indoor liquid pump as specified in [4.1.4.3](#).

4.1.2 Cooling capacity

The cooling capacity of air conditioners and of air-to-air or water(brine)-to-air heat pumps shall be determined by measurements in a calorimeter room (see [Annex A](#)) or by the air enthalpy method (see [Annex B](#)).

However, air conditioners and of air-to-air heat pumps having a cooling capacity below or equal to 12 kW under the standard rating conditions given in [EN 14511-2](#), shall be tested using a calorimeter room.

When using the air enthalpy method, the cooling capacity shall be determined using the following formula:

$$P_c = q \times \rho \times c_p \times \Delta T \quad (2)$$

where

- P_c is the cooling capacity, expressed in W;
- q is the air volume flow rate as measured during the test, expressed in m³/s;
- ρ is the air density as measured during the test, expressed in kg/m³;
- c_p is the specific heat at constant pressure, expressed in J/(kg.K);
- ΔT is the difference between inlet and outlet temperatures, expressed in K.

The air density shall be determined for the air conditions at the air flow measuring device.

NOTE 1 The mass flow rate can directly be determined instead of the term ($q \times \rho$).

NOTE 2 The enthalpy change ΔH can directly be used instead of the term $(c_p \times \Delta T)$.

The cooling capacity of air-to-water(brine), water(brine)-to-water(brine) heat pumps and liquid chilling packages shall be determined in accordance with the direct method at the water or brine heat exchanger, by determination of the volume flow of the heat transfer medium, and the inlet and outlet temperatures, taking into consideration the specific heat capacity and density of the heat transfer medium.

The measured cooling capacity of air-to-air and water(brine)-to-air units shall be corrected for the heat from the indoor fan as specified in [4.1.4.1](#) or [4.1.4.2](#).

The measured cooling capacity of water(brine)-to-water(brine) and air-to-water(brine) units shall be corrected for the heat from the indoor liquid pump as specified in [4.1.4.3](#)

4.1.3 Heat recovery capacity

The heat recovery capacity of air-to-water(brine), water(brine)-to-water(brine) heat pumps and liquid chilling packages shall be determined in accordance with the direct method at the water or brine heat recovery heat exchanger, by determination of the volume flow of the heat transfer medium, and the inlet and outlet temperatures, taking into consideration the specific heat capacity and density of the heat transfer medium.

The heat recovery capacity shall be determined using the following formula:

$$P_{HR} = q \times \rho \times c_p \times \Delta T \quad (3)$$

where

- P_{HR} is the heat recovery capacity, expressed in W;
- q is the volume flow rate, expressed in m^3/s ;
- ρ is the density, expressed in kg/m^3 ;
- c_p is the specific heat at constant pressure, expressed in $\text{J}/(\text{kg}\cdot\text{K})$;
- ΔT is the difference between outlet and inlet temperatures expressed in K.

NOTE 1 The mass flow rate can directly be determined instead of the term $(q \times \rho)$.

NOTE 2 The enthalpy change ΔH can directly be used instead of the term $(c_p \times \Delta T)$.

The measured heat recovery capacity of units shall be corrected for the heat from the liquid pump as specified in [4.1.4.3](#).

4.1.4 Capacity correction

4.1.4.1 General

The capacity shall include the correction due to the heat output of indoor and/or outdoor fans and/or pumps, integrated into the unit or not as follows.

4.1.4.2 Capacity correction of fans for units without duct connection

In the case of units which are not designed for duct connection, i.e. which do not permit any external pressure difference, and which are equipped with an integral fan, no capacity correction due to heat provide by the fan shall apply.

4.1.4.3 Capacity correction due to indoor fan for ducted units

4.1.4.3.1 Units with integrated indoor fan

If the fan at the indoor heat exchanger is an integral part of the unit, the power input correction of the fan, as calculated with [Formula \(8\)](#) (see [4.1.5.3.1](#)) shall be:

- subtracted from the measured heating capacity
- added to the measured cooling capacity

4.1.4.3.2 Units with non-integrated indoor fan

If the fan at the indoor heat exchanger is not an integral part of the unit, the power input correction as calculated with [Formula \(9\)](#) (see [4.1.5.3.2](#)) shall be:

- added to the measured heating capacity
- subtracted from the measured cooling capacity

4.1.4.4 Capacity correction due to indoor liquid pump

4.1.4.4.1 Units with integrated liquid pump

If the liquid pump is an integrated part of the unit, the capacity correction as defined in [4.1.4.4.3](#) or [4.1.4.4.4](#) shall be:

- subtracted from the measured heating capacity.
- added to the measured cooling capacity
- subtracted from the measured heat recovery capacity

4.1.4.4.2 Units with non-integrated liquid pump

If the liquid pump is not an integral part of the unit, the capacity correction as defined in [4.1.4.4.5](#) shall be:

- added to the measured heating capacity.
- subtracted from the measured cooling capacity
- added to the measured heat recovery capacity

4.1.4.4.3 Capacity correction for integrated glandless circulators

If the unit is equipped with a glandless circulator, the capacity correction is calculated using formula (4)

$$(q \times \Delta p_e) \times [(1-\eta)/\eta] \quad (4)$$

where

- q is the measured liquid flow rate, expressed in m³/s.
- Δp_e is the measured available external static pressure difference, expressed in Pa, as defined in EN 14511-1:2018, 3.58;
- η is the global efficiency of the pump calculated according to [Annex G](#).

4.1.4.4.4 Capacity correction for integrated dry motor pumps

If the unit is equipped with a dry-motor pump, the capacity correction shall be calculated using [Formula \(5\)](#).

$$(q \times \Delta p_e) \times [(IE - \eta)/\eta] \quad (5)$$

where

- q is the measured liquid volume flow rate, expressed in m³/s;
- Δp_e is the measured available external static pressure difference, expressed in Pa, as defined in EN 14511-1:2018, 3.58;
- IE is the motor efficiency level as defined in the EC No 640/2009 regulation;
- η is the global efficiency of the pump calculated according to [Annex G](#).

4.1.4.4.5 Capacity correction for non-integrated liquid pumps

If the measured hydraulic power according to [Annex G](#) is ≤ 300 W, the liquid pump is considered as a glandless circulator. The capacity correction is calculated using [Formula \(6\)](#).

$$(q \times (-\Delta p_i)) \times [(1-\eta)/\eta] \quad (6)$$

where

- q is the measured liquid flow rate, expressed in m³/s;
- Δp_i is the measured internal static pressure difference, expressed in Pa, as defined in EN 14511-1:2018, 3.59;
- η is the global efficiency of the pump calculated according to [Annex G](#).

If the measured hydraulic power according to [Annex G](#) is > 300 W, the liquid pump is considered as a dry-motor pump. The capacity correction is calculated using [Formula \(7\)](#).

$$[q \times (-\Delta p_i)] \times [(IE - \eta) / \eta] \quad (7)$$

where

- q is the liquid volume flow rate, expressed in m³/s;
- Δp_i is the measured internal static pressure difference, expressed in Pascal, as defined in 3.59 of EN 14511-1:2018;
- IE is equal to 0,88 (the average the motor efficiency level defined in the EC No 640/2009 regulation for IE3 efficiency level);
- η is the global efficiency of the pump calculated according to [Annex G](#).

4.1.5 Effective power input

4.1.5.1 General

The effective power input shall include the correction due to power input of indoor and/or outdoor fans and/or pumps, integrated or no to the unit as follows.

4.1.5.2 Power input correction of fans for units without duct connection

In the case of units which are not designed for duct connection, i.e. which do not permit any external pressure differences, and which are equipped with an integral fan, the power absorbed by the fan shall be included in the effective power absorbed by the unit.

4.1.5.3 Power input correction of fans for units with duct connection

4.1.5.3.1 Power input correction for integrated fans

If a fan is an integral part of the unit, only a fraction of the power input of the fan motor shall be included in the effective power absorbed by the unit. The fraction that is to be excluded from the total power absorbed by the unit shall be calculated using [Formula \(8\)](#):

$$\frac{q \times \Delta p_{e(\text{corr})}}{\eta} \quad (8)$$

where

- q is the air volume flow rate, expressed in m³/s and set according to [4.4.1.3](#) or [4.4.1.4](#);
- $\Delta p_{e(\text{corr})}$ is the available external static pressure difference, expressed in Pa, as defined in EN 14511-1:2018, 3.58 and set according to [4.4.1.3](#) or [4.4.1.4](#);
- η is equal to η_{target} as declared by the fan manufacturer according to the ecodesign regulation n°327/2011 for fans driven by motors between 125 W and 500 kW; otherwise is equal to 0,3 by convention.

4.1.5.3.2 Power input correction for non-integrated fans

If no fan is provided with the unit, the proportional power input which is to be included in the effective power absorbed by the unit shall be calculated using the [Formula \(9\)](#):

$$\frac{q \times (-\Delta p_i)}{\eta} \quad (9)$$

where

- q is the air volume flow rate, expressed in m³/s and set according to [4.4.1.3](#) or [4.4.1.4](#);
- Δp_i is the measured internal static pressure difference, expressed in Pa, as defined in EN 14511-1:2018, 3.59;
- η is 0,3 by convention.

4.1.5.4 Power input correction of liquid pumps

4.1.5.4.1 Power input correction for integrated liquid pumps

When the liquid pump is integrated into the unit, it shall be connected for operation. When the liquid pump is delivered by the manufacturer apart from the unit, it shall be connected for operation according to the manufacturer's instructions and be then considered as an integral part of the unit.

For an integrated liquid pump, only a fraction of the input to the pump motor shall be included in the effective power absorbed by the unit. The fraction which is to be excluded from the total power absorbed by the unit shall be calculated using [Formula \(10\)](#):

$$\frac{q \times \Delta p_e}{\eta} \quad (10)$$

where

- q is the measured liquid flow rate, expressed in m³/s;
- Δp_e is the measured available external static pressure difference, expressed in Pa, as defined in EN 14511-1:2018, 3.58;
- η is the efficiency of the pump calculated according to [Annex G](#).

In case the liquid pump is not able to provide any external static pressure difference, then this correction does not apply but the correction shall be made according to [4.1.5.4.2](#).

4.1.5.4.2 Power input correction for non-integrated liquid pumps

If no liquid pump is provided with the unit, the proportional power input which is to be included in the effective power absorbed by the unit shall be calculated using [Formula \(11\)](#):

$$\frac{q \times (-\Delta p_i)}{\eta} \quad (11)$$

where

- q is the measured liquid flow rate, expressed in m³/s;
 Δp_i is the measured internal static pressure difference, expressed in Pa, as defined in EN 14511-1:2018, 3.59;
 η is the efficiency of the pump calculated according to [Annex G](#).

4.1.6 Units on a distribution network of pressurized water

In the case of appliances designed especially to operate on a distributing network of pressurized water without water-pump, no correction shall be applied to the power input.

4.1.7 Units for use with remote condenser

The power from the auxiliary liquid pump of the remote condenser shall not be taken into account in the effective power input.

4.2 Test apparatus

4.2.1 Arrangement of the test apparatus

4.2.1.1 General requirements

The test apparatus shall be designed in such a way that all requirements on adjustment of set values, stability criteria and uncertainties of measurement according to this European Standard can be fulfilled.

4.2.1.2 Test room for the air side

The size of the test room shall be selected such that any resistance to air flow at the air inlet and air outlet orifices of the test object is avoided. The air flow through the room shall not be capable of initiating any short circuit between these two orifices, and therefore the velocity of the air flows through the room at these two locations shall not exceed 1,5 m/s when the test object is switched off. The air velocity in the room shall also not be greater than the mean velocity through the unit inlet. Unless otherwise stated by the manufacturer, the air inlet or air outlet orifices shall be not less than 1 m distant from the surfaces of the test room.

Any direct heat radiation by heating units in the test room onto the unit or onto the temperature measuring points shall be avoided.

4.2.1.3 Appliances with duct connection

The connections of a ducted air unit to the test facility shall be sufficiently air tight to ensure that the measured results are not significantly influenced by exchange of air with the surroundings.

4.2.1.4 Appliances with integrated pumps

For appliances with integrated and adjustable water or brine pumps, the pump speed shall be set at the same time as the temperature difference.

In case of a liquid pump with several fixed speeds or with variable speed, the manufacturer shall provide information on the settings of pump (speed or external static pressure to achieve).

4.2.1.5 Liquid chilling package for use with remote condenser

Units for use with remote condenser are tested by using a water (brine)-cooled condenser, the characteristics of which shall enable the intended operating conditions to be achieved.

4.2.2 Installation and connection of the test object

4.2.2.1 General

The test object shall be installed and connected for the test as recommended by the manufacturer in the installation and operation manual. The accessories provided by option are not included in the test. If a back-up heater is provided in option or not, it shall be switched off or disconnected to be excluded from the testing.

For single ducts, regardless of the manufacturer's instructions, the discharge duct shall be as short and straight as possible compatibly with minimum distance between the unit and the wall for correct air inlet but not less than 50 cm. No accessory shall be connected to the discharge end of the duct.

For double duct units, the same requirements apply to both suction and discharge ducts, unless the appliance is designed to be installed directly on the wall.

For multisplit systems, the test shall be performed with the system operating at a capacity ratio of 1, or as close as possible.

When performing measures in heating mode, set the highest room temperature on the unit/system control device; when performing measures in cooling mode, set the lowest room temperature on the unit/system control device. If in the instructions, the manufacturer indicates a value for the temperature set on the control device for a given rating condition, then this value shall be used.

For unit with open-type compressor the electric motor shall be supplied or specified by the manufacturer. The compressor shall be operated at the rotational speed specified by the manufacturer.

For inverter type control units, the setting of the frequency shall be done for each rating condition. The manufacturer shall provide in the documentation information about how to obtain the necessary data to set the required frequencies.

If skilled personnel with knowledge of control software is required for the start of the system, the manufacturer or the nominated agent should be in attendance when the system is being installed and prepared for tests.

4.2.2.2 Installation of unit consisting of several parts

In the case of a unit consisting of several parts, the following installation conditions shall be complied for the test.

- a) The refrigerant lines shall be installed in accordance with the manufacturer's instructions. The length of the lines shall be 5 m except if the constraints of the test installation make 5 m not possible, in which case a greater length may be used, with a maximum of 7,5 m.
- b) The lines shall be installed so that the difference in elevation does not exceed 2,5 m.

- c) The thermal insulation of the lines shall be applied in accordance with the manufacturer's instructions.
- d) Unless constrained by the design, at least half of the connecting lines shall be exposed to the outside conditions, with the rest of the lines exposed to the inside conditions.

4.2.2.3 Indoor units of multisplit systems

When testing a multisplit system in a calorimeter room, the air flow rate and the external static pressure shall be adjusted separately for each one of the ducted indoor units.

When testing a multisplit system using the air enthalpy method, the air flow rate and the external static pressure shall be adjusted separately for each indoor unit, ducted or not.

In case of equipment with non-ducted indoor units tested using the air enthalpy method, the above requirement on ducted indoor units shall apply.

4.2.2.4 Measuring points

Temperature and pressure measuring points shall be arranged in order to obtain mean significant values.

For free air intake temperature measurements, it is required:

- either to have at least one sensor per square meter, with not less than four measuring points and by restricting to 20 the number of sensors equally distributed on the free air surface;
- or to use a sampling device. It shall be completed by four sensors for checking uniformity if the surface area is greater than 1 m².

Air temperature sensors shall be placed at a maximum distance of 0,25 m from the free air surface.

For control cabinet air conditioners, the inlet temperature at the evaporator is measured instead of the temperature inside the control cabinet.

For units consisting of a heat pump and a storage tank as a factory made unit, water inlet and outlet temperature measurements shall be taken at the inlet and outlet of this unit.

For water and brine, the density in [Formulae \(1\), \(2\) and \(3\)](#) shall be determined in the temperature conditions measured near the volume flow measuring device.

4.3 Uncertainties of measurement

The uncertainties of measurement shall not exceed the values specified in [Table 1](#).

Table 1 — Uncertainties of measurement for indicated values

Measured quantity	Unit	Uncertainty of measurement
Liquid		
- temperature inlet/outlet		
- temperature difference	K	$\pm 0,15$ K
- temperature inlet/outlet	$^{\circ}\text{C}$	$\pm 0,15$ K
- volume flow	m^3/s	± 1 %
- static pressure difference	kPa	± 1 kPa ($\Delta p \leq 20$ kPa) or ± 5 % ($\Delta p > 20$ kPa)
Air		
- dry bulb temperature	$^{\circ}\text{C}$	$\pm 0,2$ K
- wet bulb temperature	$^{\circ}\text{C}$	$\pm 0,4$ K
- volume flow	m^3/s	± 5 %
- static pressure difference	Pa	± 5 Pa ($\Delta p \leq 100$ Pa) or ± 5 % ($\Delta p > 100$ Pa) ± 5 % ($\Delta P > 100$ Pa)
Refrigerant		
- pressure at compressor outlet	kPa	± 1 %
- temperature	$^{\circ}\text{C}$	$\pm 0,5$ K
Concentration (in volume)		
- Heat transfer medium	%	± 2
Electrical quantities		
- electric power	W	± 1 %
- voltage	V	$\pm 0,5$ %
- current	A	$\pm 0,5$ %
- electrical energy	kWh	± 1 %
Compressor rotational speed	min^{-1}	$\pm 0,5$ %

The heating or cooling capacities measured on the liquid side shall be determined within a maximum uncertainty of 5 % independent of the individual uncertainties of measurement including the uncertainties on the properties of fluids.

The steady-state heating or cooling capacities determined using the calorimeter method shall be determined with a maximum uncertainty of 5 %, independent of the individual uncertainties of measurement including the uncertainties on the properties of fluids; this maximum uncertainty is extended to 10 % for single duct units due to the air exchange between the two compartments of the calorimeter room.

Heating capacity determined during transient operation (defrost cycles) using the calorimeter method shall be determined with a maximum uncertainty of 10 %, independent of the individual uncertainties of measurement including the uncertainties on the properties of fluids.

The heating and cooling capacities measured on the air side using the air enthalpy method shall be determined with a maximum uncertainty of 10 %, independent of the individual uncertainties of measurement including the uncertainties on the properties of fluids.

NOTE CEN ISO/TS 16491 provides guidelines for the evaluation of uncertainty of measurement in air conditioner and heat pump cooling and heating capacity tests.