

Australian/New Zealand Standard™

**Performance of electrical appliances—
Air conditioners and heat pumps**

**Part 1.5: Non-ducted portable air-cooled
air conditioners and air-to-air heat
pumps having a single exhaust duct—
Testing and rating for performance**



AS/NZS 3823.1.5:2015

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee EL-056, Room Air Conditioners. It was approved on behalf of the Council of Standards Australia on 24 July 2015 and on behalf of the Council of Standards New Zealand on 24 July 2015.

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-056, Room Air Conditioners.

This Standard follows the testing procedures set out in AS/NZS 3823.1.1:2012, *Performance of electrical appliances—Airconditioners and heat pumps*, Part 1.1: *Non-ducted airconditioners and heat pumps—Testing and rating for performance (ISO 5151:2010, MOD)*, apart from the following fundamental differences:

- (a) This Standard only describes a test setup using calorimeter rooms.
- (b) In the preparation of this Standard, reference was made to EN 14511-2, *Air Conditioners, Liquid Chilling Packages And Heat Pumps With Electrically Driven Compressors For Space Heating And Cooling*, Part 2: *Test Conditions*, for testing non-ducted portable air-cooled air conditioners and air-to-air heat pumps having a single exhaust duct by which both the indoor and outdoor test chambers are kept at the same rating conditions.
- (c) In the preparation of this Standard, reference was also made to EN 15218 *Air conditioners and liquid chilling packages with evaporatively cooled condenser and with electrically driven compressors for space cooling—Terms, definitions, test conditions, test methods and requirements* for testing and rating non-ducted portable air-cooled air conditioners and air-to-air heat pumps having a single exhaust duct that utilise an evaporatively cooled condenser.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

Statements expressed in mandatory terms in footnotes to tables are deemed to be requirements of this Standard.

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard**Performance of electrical appliances—Air conditioners and heat pumps****Part 1.5: Non-ducted portable air-cooled air conditioners and air-to-air heat pumps having a single exhaust duct—Testing and rating for performance****1 SCOPE**

This Standard specifies the standard conditions for capacity and efficiency ratings of non-ducted portable air-cooled air conditioners and air-to-air heat pumps having a single exhaust duct. Such air conditioners and heat pumps may include an evaporatively cooled condenser cooled by air and the evaporation of—

- (a) condensate collected from the evaporator;
- (b) external supplementary water stored in a supplementary water tank; or
- (c) both (a) and (b).

This Standard also specifies the test methods for determining the capacity and efficiency ratings.

The Standard applies to equipment that is factory-made, electrically driven and uses mechanical compression. This Standard is applicable to equipment utilizing one or more refrigeration systems.

This Standard is not applicable to the rating and testing of the following:

- (i) Water-source heat pumps or water-cooled air conditioners.
- (ii) Multi-split-system air conditioners and air-to-air heat pumps (see AS/NZS 3823.1.4 for the testing of such equipment).
- (iii) Individual assemblies not constituting a complete refrigeration system.
- (iv) Equipment using the absorption refrigeration cycle.
- (v) Ducted equipment (see AS/NZS 3823.1.2 for the testing of such equipment).
- (vi) Non-ducted air conditioners and heat pumps, including dual-duct ‘balanced type’ portable air conditioners (see AS/NZS 3823.1.1 for the testing of such equipment).
- (vii) Evaporative coolers or any other cooling systems that are not of the vapour compression type.
- (viii) Dehumidifiers.
- (ix) Spot coolers.

2 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard:

NOTE: Documents that are referenced for informative purposes are listed in the Bibliography.

ISO

817 Refrigerants—Designation and safety classification

3 DEFINITIONS

For the purposes of this document, the following definitions apply.

3.1 Bypassed indoor airflow

Rate of flow of conditioned air directly from the indoor-side outlet to the indoor-side inlet of the equipment.

See Figure 3.1.

3.2 Coefficient of performance (COP)

Ratio of the heating capacity to the effective power input to the device at any given set of rating conditions.

NOTE: Where the COP is stated without an indication of units, it is understood that it is derived from watts/watt.

3.3 Conditioned space

An enclosed space, room or zone to which conditioned air is delivered.

3.4 Dehumidifier

Encased assembly designed to remove moisture from its surrounding atmosphere using either an electrically operated refrigeration system or a desiccant type of material. It also includes a means to circulate air and a drain arrangement for collecting and storing and/or disposing of the condensate.

3.5 Effective power input (P_E)

Average electrical power input to the equipment obtained from—

- (a) the power input for operation of the compressor(s);
- (b) the power input to electric heating devices used only for defrosting;
- (c) the power input to all control and safety devices of the equipment; and
- (d) the power input for operation of all fans whether provided with the equipment or not.

NOTE: Effective power input is expressed in units of watts.

3.6 Energy efficiency ratio (EER)

Ratio of the total cooling capacity to the effective power input to the device at any given set of rating conditions.

NOTE: Where the EER is stated without an indication of units, it is understood that it is derived from watts/watt.

3.7 Equalizer opening airflow

Rate of flow of air from the outdoor side through the equalizer opening in the partition wall of a calorimeter to the indoor side.

See Figure 3.1.

3.8 Evaporatively cooled condenser

Heat exchanger that condenses refrigerant vapour by rejecting heat to a water and air mixture causing the water to evaporate and increase the enthalpy of air.

NOTE: Desuperheating and sub-cooling of the refrigerant may also occur.

3.9 Exhaust airflow

Rate of flow of air from the indoor side through the equipment to the outdoor side.

See Figure 3.1.

3.10 Full-load operation

Operation with the equipment and controls configured for the maximum continuous duty refrigeration capacity specified by the manufacturer and allowed by the unit controls.

3.11 Heating capacity

Amount of heat that the equipment can add to the conditioned space (but not including supplementary heat) in a defined interval of time.

NOTE: Heating capacity is expressed in units of watts. Manually selectable supplementary heaters are disabled during capacity tests, but any automatic supplementary heaters are permitted to operate.

3.12 Indoor compartment and indoor-side compartment

Testing room simulating the conditioned space (and containing the tested appliance).

See Figure 3.1.

3.13 Indoor discharge airflow

Rate of flow of air from the outlet of the equipment into the conditioned space.

See Figure 3.1.

3.14 Indoor heat exchanger

Heat exchanger which is designed to remove heat from the indoor part of the building or to transfer heat to it.

NOTE: In the case of an air conditioner or heat pump operating in the cooling mode, this is the evaporator. In the case of an air conditioner or heat pump operating in the heating mode, this is the condenser.

3.15 Indoor intake airflow

Rate of flow of air into the equipment from the conditioned space.

See Figure 3.1.

3.16 Latent cooling capacity

Amount of latent heat that the equipment can remove from the conditioned space in a defined interval of time. Also known as 'room dehumidifying capacity'.

NOTE: Latent cooling capacity is expressed in units of watts.

3.17 Leakage airflow

Rate of flow of air interchanged between the indoor side and outdoor side through the equipment as a result of its construction features and sealing techniques.

See Figure 3.1.

3.18 Non-ducted portable air-cooled air conditioner having a single exhaust duct

Encased assembly, designed primarily to provide free delivery of conditioned air to an enclosed space, room or zone. It takes its source of air for cooling the condenser from the conditioned space, and discharges this air through a duct to the outdoor space.

NOTE: Such air conditioners comprise a primary source of refrigeration for cooling and dehumidification. They can also include means for heating other than a heat pump, as well as means for circulating, cleaning, humidifying, ventilating or exhausting air.

3.19 Non-ducted portable air-cooled heat pump having a single exhaust duct

Encased assembly designed primarily to provide free delivery of conditioned air to an enclosed space, room or zone and includes a prime source of refrigeration for heating. It takes its source of air for the evaporator from the conditioned space, and discharges this air through a duct to the outdoor space.

NOTE: Such heat pumps can be constructed to remove heat from the conditioned space and discharge it to a heat sink if cooling and dehumidification are desired from the same equipment. They can also include means for circulating, cleaning, humidifying, ventilating or exhausting air.

3.20 Outdoor compartment

Compartment where the exhaust air is rejected through the duct of single duct air conditioner.

See Figure 3.1.

3.21 Outdoor exhaust airflow

Discharge rate of flow of air from the equipment through the exhaust duct.

See Figure 3.1.

3.22 Outdoor heat exchanger

Heat exchanger that is designed to transfer heat to the outdoor ambient environment or to remove heat from it.

NOTE: In the case of an air conditioner or heat pump operating in the cooling mode, this is the condenser. In the case of an air conditioner or heat pump operating in the heating mode, this is the evaporator.

3.23 Rated frequency

Frequency shown on the nameplate of the equipment.

3.24 Rated voltage

Voltage shown on the nameplate of the equipment.

3.25 Sensible cooling capacity

Amount of sensible heat that the equipment can remove from the conditioned space in a defined interval of time.

NOTE: Sensible cooling capacity is expressed in units of watts.

3.26 Sensible heat ratio (SHR)

Ratio of the sensible cooling capacity to the total cooling capacity.

3.27 Shall

Indicates that a statement is mandatory.

3.28 Should

Indicates a recommendation.

3.29 Spot cooler

Encased assembly air conditioner that lies wholly within a conditioned space and that draws air for both the evaporator and condenser from the conditioned space and expels both of these back into the conditioned space. Usually portable.

3.30 Standard air

Dry air at 20°C and at a standard barometric pressure of 101.325 kPa, having a mass density of 1.204 kg/m³.

3.31 Supplementary water tank

Tank designed as an integral part of the unit to contain external supplementary water which is fed to the evaporatively cooled condenser.

3.32 Total cooling capacity

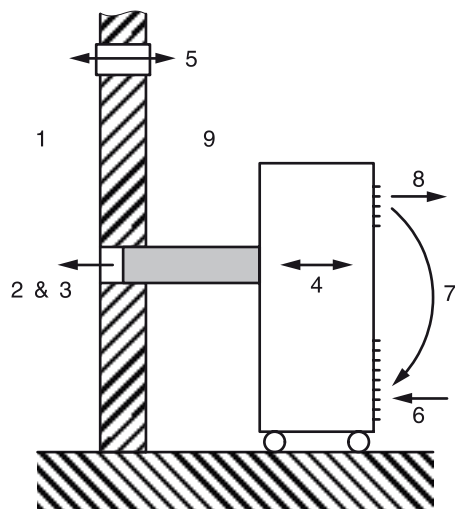
Amount of sensible and latent heat that the equipment can remove from the conditioned space in a defined interval of time.

NOTE: Total cooling capacity is expressed in units of watts.

3.33 Total power input (P_t)

Average electrical power input to the equipment as measured during the test.

NOTE: Total power input is expressed in units of watts.



- LEGEND:
- 1 = Outdoor compartment (Clause 3.20)
 - 2 = Outdoor exhaust airflow (Clause 3.21)
 - 3 = Exhaust airflow (Clause 3.9)
 - 4 = Leakage airflow (Clause 3.17)
 - 5 = Equalizer opening airflow (Clause 3.7)
 - 6 = Indoor intake airflow (Clause 3.15)
 - 7 = Bypassed indoor airflow (Clause 3.1)
 - 8 = Indoor discharge airflow (Clause 3.13)
 - 9 = Indoor compartment (Clause 3.12)

FIGURE 3.1 AIRFLOW DIAGRAM ILLUSTRATING THE AIRFLOW DEFINITIONS

4 NOTATION

The quantity symbols used in this Standard, and their units, are as follows:

Symbol	Description	Unit
A_l	coefficient, heat leakage	J/s °C
A_n	area, nozzle	m ²
C_d	discharge coefficient nozzle	—
c_{pa}	specific heat of air, of moist air	J/kg °C
c_{pw}	specific heat of water	J/kg °C
D_n	nozzle throat diameter	mm
D_t	outside diameter of refrigerant tube	mm
f	factor, dependent on temperature, for Re	—

Symbol	Description	Unit
h_{w1}	specific enthalpy of water or steam supplied to indoor-side compartment	J/kg
h_{w2}	specific enthalpy of condensed moisture leaving indoor-side compartment	J/kg
h_{w3}	specific enthalpy of condensate removed by air-treating coil in the outdoor-side compartment reconditioning equipment	J/kg
h_{w4}	specific enthalpy of the water supplied to the outdoor-side compartment	J/kg
h_{w5}	specific enthalpy of the condensed water (in the case of test condition, high) and the frost, respectively (in the case of test conditions low or extra-low) in the test unit	J/kg
K_1	latent heat of vaporization of water (2460.0 J/g at 15°C)	J/g
R_e	Reynolds number	—
p_a	pressure, barometric	kPa
p_c	compartment equalization pressure	Pa
p_n	pressure, at nozzle throat	kPa abs
p_v	velocity pressure at nozzle throat or static pressure difference across nozzle	Pa
ϕ_{ci}	heat removed from indoor-side compartment	W
ϕ_c	heat removed by cooling coil in the outdoor-side compartment	W
ϕ_p	heat leakage into indoor-side compartment through partition separating indoor side from outdoor side	W
ϕ_i	heat leakage into indoor-side compartment through walls, floor and ceiling	W
ϕ_o	heat leakage out of outdoor-side compartment through walls, floor and ceiling	W
ϕ_{ci}	latent cooling capacity (indoor-side data)	W
ϕ_{sc}	sensible cooling capacity	W
ϕ_{sci}	sensible cooling capacity (indoor-side data)	W
ϕ_d	latent cooling capacity (dehumidifying)	W
ϕ_{hi}	heating capacity, indoor-side compartment	W
ϕ_{ho}	heating capacity, outdoor-side compartment	W
ϕ_{tci}	total cooling capacity (indoor-side data)	W
ϕ_{tco}	total cooling capacity (outdoor-side data)	W
ϕ_{thi}	total heating capacity (indoor-side data)	W
ϕ_{tho}	total heating capacity (outdoor-side data)	W
P_i	power input, indoor-side data	W
ΣP_{ic}	other power input to the indoor-side compartment (e.g. W illumination, electrical and thermal power input to the compensating device, heat balance of the humidification device)	W

Symbol	Description	Unit
ΣP_{oc}	sum of all total power input to the outdoor-side compartment, W not including power to the equipment under test	
P_E	power input to the equipment	W
P_t	total power input to equipment	W
q_m	air-mass flow rate	kg/s
q_{mo}	airflow, outdoor, measured	L/s
q_v	air-volume flow rate	L/s
q_{wo}	water mass flow supplied to the outside compartment for maintaining the test conditions	kg/s
q_{wc}	rate at which water vapour is condensed by the equipment	g/s
t_a	temperature, ambient	°C
v_a	velocity of air, at nozzle	m/s
v_n	specific volume of dry air portion of mixture at nozzle	m ³ /kg
v'_n	specific volume of air-water vapour mixture at nozzle	m ³ /kg
μ	kinematic viscosity of air	kg/m.s
W_{i1}	specific humidity of air entering indoor side	kg/kg of dry air
W_{i2}	specific humidity of air leaving indoor side	kg/kg of dry air
W_n	specific humidity at nozzle inlet	kg/kg of dry air
W_r	water vapour (rate) condensed by the equipment	g/s

5 COOLING TESTS

5.1 Cooling capacity test

5.1.1 General conditions

All equipment within the scope of this Standard shall have the cooling capacities and energy efficiency ratios determined in accordance with the provisions of this Standard and rated at the cooling test conditions specified in Table 5.1. All tests shall be carried out in accordance with the requirements of Appendix A and the test methods specified in Clause 7. All tests shall be conducted with the equipment functioning at full-load operation, as defined in Clause 3.10. The electrical input values used for rating purposes shall be measured during the cooling capacity test.

Units that evaporate condensate collected from the evaporator shall be allowed to do so during the capacity test (see Clause 5.1.2). Units that have a supplementary water tank intended to contain supplementary water that is fed to the evaporatively cooled condenser shall have capacity tests performed with and without this feature operating, subject to the requirements of Clause 5.1.3 and Appendix B. If a unit automatically turns off once the supplementary water tank becomes empty, a capacity test with this feature operating is the only capacity test required. See Table B1 in Appendix B for a summary of these requirements.

If the manufacturer of equipment having a variable-speed compressor does not provide information on the full-load frequency and how to achieve it during the cooling capacity test, the equipment shall be operated with its thermostat or controller set to its minimum allowable temperature setting.

5.1.2 Condensate containers

The duration of the cooling capacity test shall not be interrupted by a full condensate container triggering a cut-off switch. If necessary, condensate containers shall be modified to drain away excess condensate into a larger container in the test chamber before the volume that activates the cut-off switch is reached.

NOTE: Many units have an in-built drain hose to facilitate this.

5.1.3 Tests using supplementary water evaporation feature

Performance and cooling capacity tests shall be performed using the supplementary water evaporation feature as per the manufacturer's instructions, if applicable. Water added to a unit's supplementary water tank shall be $35^{\circ}\text{C} \pm 1^{\circ}\text{C}$. All performance parameters for the standard rating test shall also be recorded for any cooling capacity tests that use the supplementary water evaporation feature. The test procedure includes determining the duration of time that the supplementary water tank can operate at standard cooling rating conditions. These procedures are specified in Appendix B.

NOTE: Some units are fitted with a supplementary water evaporation feature designed to provide additional water for the evaporatively cooled condenser and/or compressor. They generally require the user to fill a supplementary water tank and manually select an operational mode via the unit's control panel or remote control that turns this supplementary water evaporation feature on. This operational mode may override other thermostat and fan settings and is designed to achieve higher cooling capacities and greater energy efficiency while this feature is active. When these units deactivate their supplementary water evaporation feature (for instance, when they detect that there is insufficient water in the supplementary water tank), they may automatically revert to cooling without the aid of the supplementary water evaporation feature, or they may switch themselves off.

5.1.4 Temperature conditions

The temperature conditions stated in Table 5.1 shall be considered standard rating conditions for the determination of cooling capacity.

If the unit is rated for operation at two frequencies or, in some cases, if the equipment has a dual-rated voltage, then the cooling capacity test shall be conducted at each frequency and voltage in accordance with the conditions of Tables 5.1 and 5.2.

TABLE 5.1
COOLING CAPACITY RATING CONDITIONS

Parameter	Standard rating conditions
Temperature of air entering indoor-side: —dry-bulb —wet-bulb	35°C 24°C
Temperature of air entering outdoor-side: —dry-bulb —wet-bulb	35°C 24°C
Test frequency*	Rated frequency
Test voltage	See Table 5.2

* Equipment with dual-rated frequencies shall be tested at each frequency.

NOTE: The measured performance of single duct, portable air conditioners and heat pumps is sensitive to even a small difference in the enthalpy of the air entering the indoor chamber from the outdoor chamber. Therefore, it is desirable to have the indoor and outdoor chamber temperatures as close as possible during the tests.

TABLE 5.2
VOLTAGES FOR CAPACITY
AND PERFORMANCE TESTS

Rated (nameplate) voltages*	Test voltage
V	V
90 to 109	100
110 to 127	115
180 to 207	200
208 to 253	230
254 to 341	265
342 to 420	400
421 to 506	460
507 to 633	575

* For equipment with dual-rated voltages such as 115/230 and 220/440, the test voltages would be 115 and 230 V in the first example, and 230 and 460 V in the second example. For equipment with an extended voltage range, such as 110–120 V or 220–240 V, the test voltage would be 115 V or 230 V, respectively. Where the extended voltage range spans two or more of the rated voltage ranges, the mean of the rated voltages shall be used to determine the test voltage from the table.

EXAMPLE: For equipment with an extended voltage range of 200–220 V, the test voltage would be 230 V, based on the mean voltage of 210 V.

5.1.5 *Airflow conditions—air quantity*

Tests shall be conducted at standard rating conditions (see Table 5.1) with 0 Pa static pressure maintained at the air discharge of the equipment and with the refrigeration means in operation if required. All air quantities shall be expressed as litres per second (L/s) of standard air, as defined in Clause 3.30.

Airflow measurements should be made in accordance with the provisions specified in Appendix C, as appropriate, as well as the provisions established in other appropriate appendices of this Standard.

NOTE: Additional guidance for making airflow measurements can be found in ISO 3966 and ISO 5167-1.

5.1.6 *Test conditions*

5.1.6.1 *General*

Tests shall be conducted under the rating conditions with no changes made in fan speed or system resistance to correct for variations from the standard barometric pressure (see Clause 3.30).

5.1.6.2 *Preconditions*

The test room reconditioning apparatus and the equipment under test shall be operated until equilibrium conditions, as required by Clause 7.3, are attained. Equilibrium conditions shall be maintained for not less than 1 h before capacity test data are recorded.

5.1.6.3 Testing requirements

The test shall provide for the determination of the sensible, latent and total cooling capacities as determined in the indoor-side compartment. See Clauses 5.1.1, 5.1.3 and Appendix B for additional requirements associated with units that have a supplementary water tank.

5.1.6.4 Duration of test

The data shall be recorded at equal intervals as required by Clause 7.3.3. The recording of the data shall continue for at least a 30min period during which the tolerances specified in Clause 7.3 shall be met. Many units exhibit pronounced cyclic behaviour in cooling mode. If a unit exhibits this type of cyclic behaviour, data shall be recorded and averaged over at least 120 min.

5.2 Maximum cooling performance test

5.2.1 General conditions

The test shall be conducted with the equipment functioning at full-load operation, as defined in Clause 3.10. If the unit includes an inbuilt condensate collection and evaporation process, it shall be allowed to function (see Clause 5.1.2). Units with a supplementary water tank may require two tests, subject to the requirements of Appendix B. This feature shall be operated in accordance with manufacturer's instructions, if applicable.

The test voltages in Table 5.2 shall be maintained at the specified percentages under running conditions. In addition, the test voltage shall be adjusted so that it is not less than 86% of the rated voltage at the moment of restarting the equipment after the shutdown required by Clause 5.2.4.2. The determination of cooling capacity and electrical power input is not required for this performance test. The unit shall be set up as specified in Appendix A.

5.2.2 Temperature conditions

The conditions, which shall be used during the maximum cooling test, are given in Table 5.3. If applicable, water added to a supplementary water tank shall be at $35^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

NOTE: The Committee is considering adding voltage fluctuation in the future.

TABLE 5.3
MAXIMUM COOLING
PERFORMANCE TEST CONDITIONS

Parameter	Standard rating conditions
Temperature of air entering indoor-side: —dry-bulb —wet-bulb	43°C 26°C
Temperature of air entering outdoor-side: —dry-bulb —wet-bulb	43°C 26°C
Test frequency*	Rated frequency
Test voltage	See Table 5.2

* Equipment with dual-rated frequencies shall be tested at each frequency.

5.2.3 *Test conditions*

5.2.3.1 *Preconditions*

The controls of the equipment shall be set for maximum cooling. Inbuilt condensate containers shall be emptied at the commencement of this test (see Clause 5.1.2).

5.2.3.2 *Duration of test*

The equipment shall be operated continuously for 1 h after the specified air temperatures in Table 5.3 have been established in accordance with the tolerances in Table 7.3. Thereafter, all power to the equipment shall be cut off for 3 min and then restored. The operation of the equipment may be restarted either automatically or through the use of a remote controller or similar device. The test shall continue for 60 min after the equipment restarts.

5.2.4 *Performance requirements*

5.2.4.1 *General*

Air conditioners and heat pumps shall meet the following requirements when operating at the conditions specified in Table 5.3:

- (a) During one entire test, the equipment shall operate without any indication of damage.
- (b) The motors of the equipment shall operate continuously for the first hour of the test without tripping any protective device.
- (c) After the interruption of power, the equipment shall resume operation within 30 min and run continuously for 1 h, except as specified in Clauses 5.2.4.2 and 5.2.4.3.

5.2.4.2 *Protective device*

A protective device may trip only during the first 5 min of operation after the shutdown period of 3 min. During the remainder of that 1 h test period, no protective device shall trip.

5.2.4.3 *Exception*

For those models so designed that resumption of operation does not occur after the initial trip within the first 5 min, the equipment may remain out of operation for not longer than 30 min. It shall then operate continuously for 1 h.

5.3 Condensate control and enclosure sweat performance test

5.3.1 *General conditions*

Any modifications to the condensate collection system made in accordance with Clause 5.1.2 shall be removed. The conditions which shall be used during the condensate control and enclosure sweat performance test are given in Table 5.4. The test shall be conducted with the equipment functioning at full-load operation, as defined in Clause 3.10, except as required in Clause 5.3.3. The determination of cooling capacity and electrical power input is not required for this performance test.

5.3.2 *Temperature conditions*

The temperature conditions that shall be used during this test are given in Table 5.4.

TABLE 5.4
CONDENSATE CONTROL AND ENCLOSURE
SWEAT PERFORMANCE TEST CONDITIONS

Parameter	Standard rating conditions
Temperature of air entering indoor-side: —dry-bulb —wet-bulb	27°C 24°C
Temperature of air entering outdoor-side: —dry-bulb —wet-bulb	27°C 24°C
Test frequency*	Rated frequency
Test voltage	See Table 5.2

* Equipment with dual-rated frequencies shall be tested at each frequency.

5.3.3 *Airflow conditions*

The controls, fans, dampers and grilles of the equipment shall be set to produce the maximum tendency to sweat, provided such settings are not contrary to the manufacturer's operating instructions.

5.3.4 *Test conditions*

5.3.4.1 *Preconditions*

After establishment of the specified temperature conditions, the equipment shall be run until the condensate flow has become uniform.

5.3.4.2 *Duration of test*

The equipment shall be operated for a period of 4 h. If the equipment has a condensate drain container that becomes full and triggers a cut-off switch, the container shall be emptied and the equipment restarted as required until the 4 h test period is complete.

5.3.5 *Performance requirements*

5.3.5.1 *Condensate water*

When operating under the test conditions specified in Table 5.4, no condensed water shall drip, run or blow from the equipment.

5.3.5.2 *Condenser air*

Equipment which rejects condensate to the evaporatively cooled condenser shall dispose of all condensate rejected by this means and there shall be no dripping or blowing-off of water from the equipment such that the building or surroundings become wet.

6 HEATING TESTS

6.1 Heating capacity tests

6.1.1 General conditions

6.1.1.1 General

For all heating capacity tests, the requirements specified in Appendix A shall apply. Testing shall be conducted using the method(s) and instrumentation that meet the requirements of Clauses 7.1 and 7.2. Standard rating conditions for heating capacity tests are specified in Table 6.1. All Clause 6 heating capacity tests shall be conducted with the heat pump at full-load operation, as defined in Clause 3.10. The electrical input values used for rating purposes shall be measured during the heating capacity test.

If the manufacturer of the equipment having a variable-speed compressor does not provide information on the full-load frequency and how to achieve it during the heating capacity test, the equipment shall be operated with its thermostat or controller set to its maximum allowable temperature setting.

6.1.1.2 Selectable resistive elements

Selectable resistive elements used for heating indoor air shall be prevented from operating during all heating capacity tests.

6.1.1.3 Condensate containers

The duration of the heating capacity test shall not be interrupted by a full condensate container triggering a cut-off switch. If necessary, condensate containers shall be modified to drain away excess condensate into a larger container in the test chamber before the volume that activates the cut-off switch is reached.

NOTE: Many units have an in-built drain hose to facilitate this.

If the unit's operating instructions recommend using continuous drain during heating mode these instructions shall be followed for the heating test.

TABLE 6.1
HEATING CAPACITY RATING CONDITIONS

Parameter	Standard rating conditions
Temperature of air entering indoor-side: —dry-bulb —wet-bulb	20°C 15°C
Temperature of air entering outdoor-side: —dry-bulb —wet-bulb	20°C 15°C
Test frequency*	Rated frequency
Test voltage	See Table 5.2

* Equipment with dual-rated frequencies shall be tested at each frequency.

NOTE: The measured performance of single duct, portable air conditioners and heat pumps is sensitive to even a small difference in the enthalpy of the air entering the indoor chamber from the outdoor chamber. Therefore, it is desirable to have the indoor and outdoor chamber temperatures as close as possible during the tests.