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ANSI/AHRI Standard 310/380-2004
(Formerly ARI 310/380-2004)
CSA C744-04

2004 Standard for

Standard for Packaged Terminal Air-Conditioners And Heat Pumps

CANADIAN STANDARDS ASSOCIATION

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CSA C744-04
Standard for Packaged Terminal Air-Conditioners and Heat Pumps

Commitment for Amendments

This Standard is issued jointly by the Air-Conditioning Heating and Refrigeration Institute (AHRI) and the Canadian Standards Association (CSA). Amendments to this Standard will be made only after processing according to the Standards writing procedures of both the Air-Conditioning Heating and Refrigeration Institute and the Canadian Standards Association.

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Preface

This is the second edition of the *Standard for Packaged Terminal Air-Conditioners and Heat Pumps,* jointly published by the Air-Conditioning Heating and Refrigeration Institute (AHRI 310/380-2004) and the Canadian Standards Association (CSA C744-04). It supersedes the previous edition of this joint Standard published in 1993. The previous edition was based on the requirements of AHRI 310-90, *Packaged Terminal Air-Conditioners*, and AHRI 380-90, *Packaged Terminal Heat Pumps*.

This Standard, which applies to factory-manufactured residential, commercial, and industrial packaged terminal air-conditioners and heat pumps, provides requirements for rating, performance, and tests. Separate requirements are provided for Canadian jurisdictions for rating, performance, and tests (see Clause 10). These separate requirements reference CSA Standards.

The publishers of this Standard wish to express their appreciation for the financial support of Natural Resources Canada.

This Standard was jointly prepared by the following Committees in order to harmonize their requirements: the CSA Subcommittee on Performance of Packaged Terminal Air Conditioners and Heat Pumps, under the jurisdiction of the CSA Technical Committee on Heating, Ventilation, Air Conditioning, and Refrigeration (HVAC & R) and the Strategic Steering Committee on Performance, Energy Efficiency and Renewables, and the AHRI Packaged Terminal Engineering Committee under the jurisdiction of the AHRI Packaged Terminal Subsection Committee. This Standard has been formally approved by the CSA Technical Committee and, except for the Canada-only clauses, by the AHRI Committees. This Standard will be submitted to the Standards Council of Canada for approval as a National Standard of Canada.

January 2004

Notes:

(1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*

(2) *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*

(3) *This publication was developed by consensus, which is defined by* CSA Policy governing standardization — Code of good practice for standardization *as "substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity". It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this publication.*

(4) *CSA Standards are subject to periodic review, and suggestions for their improvement will be referred to the appropriate committee.*

(5) *All enquiries regarding this Standard, including requests for interpretation, should be addressed to Canadian Standards Association, 5060 Spectrum Way, Suite 100, Mississauga, Ontario, Canada L4W 5N6, or to the Air-Conditioning Heating and Refrigeration Institute, 2111 Wilson Blvd., Suite 500, Arlington, Virginia 22201, USA.*

Requests for interpretation should

(a) define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;

(b) provide an explanation of circumstances surrounding the actual field condition; and

(c) be phrased where possible to permit a specific "yes" or "no" answer.

Interpretations are published in CSA's periodical Info Update, *which is available on the CSA Web site at www.csa.ca, and by the Air-Conditioning Heating and Refrigeration Institute.*

CSA Foreword

The Canadian Standards Association (CSA) develops standards under the name Canadian Standards Association, and provides certification and testing under the name CSA International. CSA International provides certification services for manufacturers who, under license from CSA, wish to use the appropriate registered CSA Marks on certain products of their manufacture to indicate conformity with CSA Standards.

CSA Certification for a number of products is provided in the interest of maintaining agreed-upon standards of quality, performance, interchangeability and/or safety, as appropriate. Where applicable, certification may form the basis for acceptance by inspection authorities responsible for enforcement of regulations. Where feasible, programs will be developed for additional products for which certification is desired by producers, consumers, or other interests. In performing its functions in accordance with its objectives, CSA does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of the Association represent its professional judgement given with due consideration to the necessary limitations of practical operation and state of the art at the time the Standard is processed.

Products in substantial accord with this Standard but which exhibit a minor difference or a new feature may be deemed to meet the Standard providing the feature or difference is found acceptable utilizing appropriate CSA International Operating Procedures. Products that comply with this Standard shall not be certified if they are found to have additional features which are inconsistent with the intent of this Standard. Products shall not be certifiable if they are discovered to contravene applicable laws or regulations.

Testing techniques, test procedures, and instrumentation frequently must be prescribed by CSA International in addition to the technical requirements contained in Standards of CSA. In addition to markings specified in the Standard, CSA International may require special cautions, markings, and instructions that are not specified by the Standard.

Some tests required by CSA Standards may be inherently hazardous. The Association neither assumes nor accepts any responsibility for any injury or damage that may occur during or as the result of tests, wherever performed, whether performed in whole or in part by the manufacturer or the Association, and whether or not any equipment, facility, or personnel for or in connection with the test is furnished by the manufacturer or the Association.

Manufacturers should note that, in the event of the failure of CSA International to resolve an issue arising from the interpretation of requirements, there is an appeal procedure: the complainant should submit the matter, in writing, to the Secretary of the Canadian Standards Association.

If this Standard is to be used in obtaining CSA Certification please remember, when making application for certification, to request all current Amendments, Bulletins, Notices, and Technical Information Letters that may be applicable and for which there may be a nominal charge. For such information or for further information concerning CSA Certification, please address your inquiry to Applications and Customer Service, CSA International, 178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3.

AHRI Foreword

Important

Safety Disclaimer

AHRI does not set safety standards and does not certify or guarantee the safety of any products, components or systems designed, tested, rated, installed or operated in accordance with this standard/guideline. It is strongly recommended that products be designed, constructed, assembled, installed and operated in accordance with nationally recognized safety standards and code requirements appropriate for products covered by this standard/guideline.

AHRI uses its best efforts to develop standards/guidelines employing state-of-the-art and accepted industry practices. AHRI does not certify or guarantee that any tests conducted under its standards/guidelines will be non-hazardous or free from risk.

AHRI Certification Program Provisions

Scope of the Certification Program

The certification program includes all packaged terminal air-conditioners and heat pumps.

Certified Ratings

The following certification program ratings are verified by test at standard rating conditions (see Clause 4.2):

Packaged Terminal Air-Conditioners

1. Cooling Capacity, W, (Btu/h)
2. Energy Efficiency Ratio, EER, [Btu/(W•h)]
3. Heating Capacity, W, (Btu/h)

Packaged Terminal Heat Pumps

1. Cooling Capacity, W, (Btu/h)
2. Energy Efficiency Ratio, EER, [Btu/(W•h)]
3. High-Temperature Heating Capacity, W, (Btu/h)
4. High-Temperature Coefficient of Performance, COP, W/W
5. Low-Temperature Heating Capacity, W, (Btu/h)
6. Low-Temperature Coefficient of Performance, COP, W/W

Conformance to the requirements of the Maximum High-Temperature Operation Tests, Voltage Tolerance Test, Low-Temperature Operation Test (Cooling), Insulation Effectiveness Test (Cooling), Condensate Disposal Test (Cooling), and Air Infiltration Test are also verified by certification program testing.

Note: *This standard supersedes ARI 310/380-93.*

ANSI/AHRI 310/380-2004
CSA C744-04
Standard for Packaged Terminal Air-Conditioners and Heat Pumps

0 Introduction

0.1
The purpose of this Standard is to establish the following for packaged terminal air-conditioner and heat pump equipment: test requirements, rating requirements, minimum data requirements for published ratings, operating requirements, marking and nameplate data, and conformance conditions.

0.2
This Standard is intended for the guidance of manufacturers, engineers, installers, contractors, and users.

0.3
This Standard is subject to review and amendment as technology advances.

1 Scope

1.1
This Standard applies to factory-manufactured residential, commercial, and industrial packaged terminal air-conditioners and heat pumps as defined in Clause 3.

1.2
This Standard applies to electrically operated vapour-compression refrigeration systems.

1.3
Packaged terminal air-conditioners and heat pumps are intended for unducted installation, but may be employed with ductwork having external static resistance up to 25 Pa (0.1 in H_2O).

1.4
This Standard does not apply to the following:

(a) heat-operated air-conditioning/heat pump equipment or room air-conditioners/heat pumps, as defined in CAN/CSA-C368.1;
(b) water-to-air and brine-to-air heat pumps, as defined in CAN/CSA-C13256-1 and ISO 13256-1;
(c) unitary air-conditioners and air-source unitary heat pumps, as defined in CAN/CSA-C273.3 and AHRI 210/240, with capacities less than 19 000 W (65 000 Btu/h);
(d) commercial and industrial unitary air-conditioners and heat pumps, as defined in CAN/CSA-C746 and AHRI 340/360, with capacities of 19 000 W (65 000 Btu/h) or greater;
(e) commercial and industrial single package vertical air-conditioners and heat pumps, as defined in AHRI 390, with capacities of 39 300 W (134 000 Btu/h) or less; and
(f) units with integral gas-fired heating.

1.5
In this Standard, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; “should” is used to express a recommendation or that which is advised but not required; and “may” is used to express an option or that which is permissible within the limits of the standard. Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material. Notes to tables and figures are considered part of the table or figure and may be written as requirements. Legends to equations and figures are considered requirements.

1.6
The values given in SI (metric) units are the standard. The values given in parentheses are for information only.

2 Reference publications
This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below, including all amendments published thereto.

AHRI (Air-Conditioning and Refrigeration Institute)
110-2002
Air-Conditioning Heating and Refrigerating Equipment Nameplate Voltages

210/240-2003
Unitary Air-Conditioning and Air-Source Heat Pump Equipment

340/360-2000
Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment

390-2003
Single Package Vertical Air-Conditioners and Heat Pumps

CSA (Canadian Standards Association)
CAN/CSA-C273.3-M91 (R2001)
Performance Standard for Split-System Central Air-Conditioners and Heat Pumps

CAN/CSA-C368.1-M90 (R2001)
Performance Standard for Room Air Conditioners

CAN/CSA-C746-98
Performance Standard for Rating Large Air Conditioners and Heat Pumps

CAN/CSA-C13256-1-01
Water-source heat pumps — Testing and rating for performance — Part 1: Water-to-air and brine-to-air heat pumps

ANSI/ASHRAE (American National Standards Institute/American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.)
16-1999
Methods of Testing for Rating Room Air Conditioners and Packaged Terminal Air Conditioners

37-1988
Methods of Testing for Rating Unitary Air-Conditioning and Heat Pump Equipment

58-1999

Methods of Testing for Rating Room Air Conditioner and Packaged Terminal Air Conditioner Heating Capacity

IEC (International Electrotechnical Commission)
60038:2002
IEC standard voltages

ISO (International Organization for Standardization)
13256-1:1998
Water-source heat pumps — Testing and rating for performance — Part 1: Water-to-air and brine-to-air heat pumps

Other Publication
ASHRAE Terminology of Heating, Ventilation, Air Conditioning and Refrigeration. 2nd ed. Atlanta: ASHRAE, 1991

3 Definitions

The following definitions apply in this Standard:
Note: *Technical terms used in this Standard but not defined in this clause follow the standard industry definitions in the second edition of* ASHRAE Terminology of Heating, Ventilation, Air Conditioning and Refrigeration.

Coefficient of performance (COP) — a ratio of the heating capacity in watts (W) to the power input values in watts (W) at any given set of rating conditions, expressed in watts/watts (W/W). For heating COP, supplementary resistance heat is excluded.

Cooling capacity — the capacity associated with the decrease in air enthalpy that includes the latent and sensible capacities, W (Btu/h).

Latent capacity — the capacity associated with a decrease in absolute humidity, W (Btu/h).

Sensible capacity — the capacity associated with an increase in the dry-bulb temperature at a constant absolute humidity, W (Btu/h).

Energy efficiency ratio (EER) — a ratio of the cooling capacity in Btu/h to the power input values in watts at any given set of rating conditions, expressed in Btu/(W•h).

Heating capacity **—** the capacity associated with the increase in the dry-bulb temperature, W (Btu/h).

Packaged terminal air-conditioner — a wall sleeve and a separate unencased combination of heating and cooling assemblies specified by the manufacturer and intended for mounting through the wall. It includes refrigeration components, separable outdoor louvres, forced ventilation, and heating availability by purchaser's choice of, at least, hot water, steam, or electrical resistance heat.
Note: *Models designated as "cooling only" units need not include heating elements if the physical characteristics and arrangement of the refrigeration system are identical to those of models with heating availability.*

Packaged terminal heat pump — a separate unencased refrigeration system installed in a cabinet having a function and configuration similar to that of a packaged terminal air-conditioner. It uses reverse cycle refrigeration as its prime heat source and should have other supplementary heat source(s) available to purchasers with the choice of, at least, hot water, steam, or electric resistance heat.

Published rating — a statement of the assigned values of those performance characteristics, under stated rating conditions, by which a unit may be chosen to fit its application. These values apply to all units of like nominal size and type (identification) produced by the same manufacturer. The term "published rating" includes the rating of all performance characteristics shown on the unit or published in specifications, advertising, or other literature controlled by the manufacturer, at stated rating conditions.

Application rating — a rating based on tests performed at application rating conditions (other than standard rating conditions).

Standard rating — a rating based on tests performed at standard rating conditions.

Rating conditions — any set of operating conditions under which a single level of performance results and which causes only that level of performance to occur.

Standard rating conditions — rating conditions used as the basis of comparison for performance characteristics.

Standard air — air weighing 1.2 kg/m^3 (0.075 lb/ft^3) that approximates dry air at 21 ºC (70ºF) and at a barometric pressure of 101.3 kPa (29.92 in Hg).

4 Test requirements

4.1 General

Standard ratings shall be established at the standard rating conditions specified in Clause 4.2. Standard ratings shall be verified by tests conducted in accordance with ANSI/ASHRAE 16, 37, or 58, as appropriate.

4.2 Standard rating tests

4.2.1 General

Table 1 indicates the tests and test conditions that are required to determine values of standard capacity ratings and energy efficiency.

Standard cooling ratings shall be verified by tests conducted in accordance with

(a) ANSI/ASHRAE 16; or
(b) ANSI/ASHRAE 37, except that no secondary capacity check shall be used and no ductwork shall be attached to the condenser.

Standard heating ratings, including reverse-cycle heating, shall be verified by tests conducted in accordance with ANSI/ASHRAE 58, except that units with electrical heating elements shall be tested for heating capacity by measurement of room-side electrical component input.

Standard ratings relating to cooling capacity and heating capacity shall be net values, including the effects of circulating fan heat, but not including supplementary heat. Standard input ratings shall be the total power input to the compressor(s) and fans, plus controls and other items included as part of the model number(s).

4.2.2 Electrical conditions

Nameplate voltages are shown in Table 1 of AHRI 110. Standard rating tests shall be performed at the nameplate rated voltage and frequency unless otherwise specified in this Standard.

For all other dual nameplate voltage equipment covered by this Standard, the standard rating tests shall be performed at both voltages or at the lower voltage if only a single standard rating is to be published.

4.3 Equipment

The filter and any air-mixers, air-inlets, grilles, deflecting vanes, and other standard equipment shall be in place during all tests, unless otherwise specified in the manufacturer's instructions to the user.

4.4 Air flow rate

All standard rating tests shall be determined at a single fan speed setting recommended by the manufacturer, with the ventilation dampers closed. All air flow rates shall be expressed in m^3/s (scfm) of standard air.

The standard rating conditions for determining air flow shall be as follows:

(a) The temperature of the air entering the indoor portion of the unit shall be between 21.1 and 26.7 ºC (70 and 80ºF). The unit shall not be operated in either heating or cooling mode during the test.
(b) The static pressure difference between the room air-inlet and the outlet of the unit shall be 0.0 Pa (0.0 in H_2O).
(c) The fan speed shall be set at the maximum setting, and the ventilation dampers shall be closed.

4.5 Part-load rating conditions

The test conditions for part-load ratings shall be as specified in Table 1.

5 Rating requirements

5.1 General

Standard ratings shall be expressed in cooling capacity or heating capacity. Power input ratings shall be expressed in increments or multiples of 5 W. Air flow rates shall be expressed in increments of 5 L/s (10 scfm).

5.2 Values of standard capacity ratings

Standard capacity ratings shall be expressed only in terms of watts, W (Btu/h), in increments or multiples of 30 W (100 Btu/h).

5.3 Values of energy efficiency ratio (EER) and coefficient of performance (COP)

Standard measures of EER, whenever published, shall be expressed in multiples of the nearest 0.1 Btu/(W•h). COP for heating or cooling, whenever published, shall be expressed in multiples of the nearest 0.1 W/W.

5.4 Part-load rating

Systems that are capable of capacity reduction shall be rated at each step of capacity reduction provided by the refrigeration system(s) as published by the manufacturer.

5.5 Application ratings

Ratings at conditions other than those specified in Clauses 4.2 and 4.5 may be published as application ratings and shall be based on data determined by methods prescribed in Clause 4.1.

5.6 Tolerances

To comply with this Standard, measured test results shall not be less than 95% of the published rating for performance ratios and capacity.

6 Minimum data requirements for published ratings

6.1 General

As a minimum, published ratings shall include all standard ratings. All claims to ratings within the scope of this Standard shall include the statement “Rated in accordance with AHRI 310/380 and CSA C744”*. All claims to ratings outside the scope of this Standard shall include the statement “Outside the scope of AHRI 310/380 and CSA C744”†. Wherever application ratings are published or printed, they shall include a statement of the conditions at which the ratings apply.

**The equivalent French wording is «Évalué selon l’AHRI 310/380 et la CSA C744».*
†*The equivalent French wording is «Non visé par l’AHRI 310/380 et la CSA C744».*

6.2 Capacity designations

As a minimum, capacities used in published specifications, literature, or advertising controlled by the manufacturer for equipment rated under this Standard shall be expressed in W (Btu/h) at the standard rating conditions specified in Clause 4.2 and at the part-load rating conditions specified in Clauses 4.5, 5.2, and 5.3.

7 Operating requirements

7.1 General

To comply with this Standard, any production units shall meet the requirements detailed in Clause 7.

7.2 Maximum high-temperature operation tests

7.2.1 General

Packaged terminal air-conditioner and heat pump equipment shall pass the appropriate high-temperature operation tests with an air flow rate determined in accordance with Clause 4.4.

7.2.2 Temperature conditions

Temperature conditions shall be maintained as specified in Table 1.

7.2.3 Voltages

Tests shall be run at the Range A minimum utilization voltage from Table 1 of ARI 110, based on the unit's nameplate rated published voltage(s). This voltage shall be supplied at the unit's service connection.

7.2.4 Procedure

The unit shall be operated for 1 h at the temperature conditions and voltage specified.

7.2.5 Requirements

The unit shall operate without interruption for any reason for 1 h.

7.3 Voltage tolerance test

7.3.1 General

Packaged terminal air-conditioners and heat pumps shall pass the voltage tolerance test described in Clause 7.3 with an air flow rate determined in accordance with Clause 4.4.

7.3.2 Temperature conditions

Temperature conditions shall be maintained at the standard cooling and/or standard heating steady state conditions as specified in Table 1.

7.3.3 Voltages

7.3.3.1

Tests shall be run at the Range B minimum and maximum utilization voltages from Table 1 of AHRI 110, based on the unit's nameplate rated published voltage(s). These voltages shall be supplied at the unit's service connection and at rated frequency. A lower minimum or a higher maximum voltage shall be used, if listed, on the nameplate.

7.3.3.2

The power supplied to single-phase equipment shall be adjusted just prior to the shutdown period (see Clause 7.3.4.2) so that the resulting voltage at the unit's service connection is 86% of the nameplate rated voltage when the compressor motor is on locked-rotor. (For 200 V or 208 V nameplate rated

equipment, the restart voltage shall be set at 180 V when the compressor motor is on locked-rotor.) Open circuit voltage for three-phase equipment shall not be greater than 90% of nameplate rated voltage.

7.3.3.3
Within one minute after the equipment has resumed continuous operation (see Clause 7.3.5.3), the voltage shall be restored to the values specified in Clause 7.3.3.1.

7.3.4 Procedure

7.3.4.1
The equipment shall be operated for 1 h at the temperature conditions and voltage(s) specified.

7.3.4.2
All power to the equipment shall be interrupted for a period sufficient to cause the compressor to stop (not to exceed 5 s) and then be restored.

7.3.5 Requirements

7.3.5.1
During the test, the equipment shall operate continuously without failure of any of its parts.

7.3.5.2
The equipment shall operate continuously without interruption for the 1 h period preceding the power interruption.

7.3.5.3
The unit shall resume continuous operation within 2 h of the restoration of power and shall then operate continuously for 30 min. Operation and resetting of safety devices prior to establishment of continuous operation shall be permitted.

7.4 Low-temperature operation test (cooling)

7.4.1 General
Packaged terminal air-conditioner and heat pump equipment shall pass the low-temperature operation test described in Clause 7.4 when operating with an initial air flow rate determined in accordance with Clause 4.4 and with controls, dampers, and grilles set to produce the maximum tendency to frost or ice the evaporator, provided that such settings are not contrary to the manufacturer's instructions to the user.

7.4.2 Temperature conditions
Temperature conditions shall be maintained as specified in Table 1.

7.4.3 Procedure
The test shall run continuously for not less than 4 h after establishment of the specified temperature conditions. During that time the equipment shall be in the cooling cycle. The unit shall be permitted to start and stop under control of an automatic limit device, if provided.

7.4.4 Requirements

7.4.4.1
During the entire test, the equipment shall operate without damage or failure of any of its parts.

7.4.4.2
During the entire test, frost or ice shall not obstruct more than 50% of the cooling coil face area.

7.4.4.3
During the test, and during the defrosting period after completion of the test, all ice or runoff shall be caught and removed by the drain provisions.

7.5 Insulation effectiveness test (cooling)

7.5.1 General
Packaged terminal air-conditioner and heat pump equipment shall pass the insulation effectiveness test described in Clause 7.5 when operating with an air flow rate determined in accordance with Clause 4.4 and with controls, dampers, and grilles set to produce the maximum tendency to sweat, provided that such settings are not contrary to the manufacturer's instructions to the user.

7.5.2 Temperature conditions
Temperature conditions shall be maintained as specified in Table 1.

7.5.3 Procedure
After establishment of the specified temperature conditions, the unit shall be operated continuously for 4 h.

7.5.4 Requirements
During the test, no condensed water shall drip, run, or blow off from the equipment's casing.

7.6 Condensate disposal test (cooling)

7.6.1 General
Packaged terminal air-conditioner and heat pump equipment shall pass the condensate disposal test described in Clause 7.6 when operating with an air flow rate determined in accordance with Clause 4.4. Controls, dampers, and grilles shall be set to produce condensate at the maximum rate, provided that such settings are not contrary to the manufacturer's instructions to the user.

7.6.2 Temperature conditions
Temperature conditions shall be maintained as specified in Table 1.

7.6.3 Procedure
After establishment of the specified temperature conditions, the equipment shall be started with its condensate collection pan filled to the overflowing point and shall be operated continuously for 4 h after the condensate level has reached equilibrium.

7.6.4 Requirements
During the test and after the unit is turned off, no condensed water shall drip, run, or blow off from the unit.

7.7 Air infiltration test

7.7.1 General
Packaged terminal air-conditioner and heat pump equipment shall pass the air infiltration test described in Clause 7.7 with ventilation dampers closed.

7.7.2 Temperature conditions
Temperature conditions shall be maintained as specified in Table 1.

7.7.3 Procedure

7.7.3.1
The equipment shall be installed in a facility suitable for determining the air infiltration quantity, such as a facility for leakage air flow measurements described in ANSI/ASHRAE 16 and 58.

7.7.3.2
The indoor static pressure shall be maintained at 25 Pa (0.1 in H_2O) below the outdoor static pressure. The unit shall not be operating in the cooling, heating, or fan-only modes.

7.7.4 Requirements
During the entire test, the measured air flow rate, L/s (ft^3/min), leaking into the indoor portion shall be considered to be the infiltration rate through the equipment and shall not exceed 3.1 L/(s•m) (2 ft^3/(min•ft)) at the perimeter of the wall sleeve where it normally projects through the wall.

7.8 Test tolerances
The conditions for the tests specified in Clause 7 shall be average values, subject to tolerances of ± 0.6 ºC (± 1.0ºF) for dry-bulb and wet-bulb temperatures, ± 1.0% of the reading for voltages, and ± 5 Pa (± 0.02 in H_2O) for static pressure.

8 Marking and nameplate data
As a minimum, the nameplate shall display the manufacturer's name, the model designation, and the equipment's electrical characteristics.

Nameplate voltages for 60 Hz systems shall include one or more of the equipment nameplate voltage ratings shown in Table 1 of AHRI 110. Nameplate voltages for 50 Hz systems shall include one or more of the utilization voltages shown in Table 1 of IEC 60038.

9 Conformance conditions
While conformance with this Standard is voluntary, conformance shall not be claimed or implied for products or equipment covered by the "Introduction" (Clause 0) and "Scope" (Clause 1) unless such claims meet all the requirements of the Standard.

10 Clauses applicable to Canada only

Note: *The requirements of these clauses modify the requirements of Clauses 1 to 9 where noted.*

10.1 Reference publications
Clause 10 refers to the following publications, and where such reference is made, it shall be to the edition listed below, including all amendments published thereto.

CSA (Canadian Standards Association)
C22.1-02
Canadian Electrical Code, Part I

B52-99
Mechanical Refrigeration Code

10.2 Definition

The following additional definition applies in Clause 10.4:

Replacement units — units with wall sleeves less than 0.41 m (16 in) high or less than 1.07 m (42 in) wide unless they meet the new construction minimum efficiency requirements.

10.3 General requirements

Packaged terminal air-conditioners and heat pumps covered by this Standard shall be designed, constructed, and assembled to meet the applicable electrical and refrigeration safety requirements of the *Canadian Electrical Code, Part I*, and CSA B52.

10.4 Marking and nameplate data — Replacement units

Replacement units shall be factory labelled as follows:

MANUFACTURED FOR REPLACEMENT APPLICATIONS ONLY. NOT TO BE INSTALLED IN NEW CONSTRUCTION PROJECTS

PIÈCE DE REMPLACEMENT UNIQUEMENT. NE PAS INSTALLER DANS DES APPAREILS NEUFS

10.5 Values of minimum standard EER and COP

Packaged terminal air-conditioners and heat pumps shall have an EER and COP at standard rating conditions of not less than the values shown in Table 2 when tested under the standard rating conditions specified in Table 1.

10.6 Values of high efficiency standard EER and COP

The values of high efficiency standard EER and COP are under development (see Table 3).

Table 1
Operating conditions for standard rating and performance tests
(See Clauses 4.2.1, 4.5, 7.2.2, 7.3.2, 7.4.2, 7.5.2, 7.6.2, 7.7.2, and 10.5.)

	Test	Indoor unit		Outdoor unit		Water	
		Air entering		Air entering			
		Dry-bulb °C (°F)	Wet-bulb °C (°F)	Dry-bulb °C (°F)	Wet-bulb °C (°F)	In °C (°F)	Out °C (°F)
Cooling	Standard rating conditions*	26.7 (80.0)	19.4 (67.0)	35.0 (95.0)	23.9† (75.0)	—	—
	Standard rating conditions (low temperature)‡	26.7 (80.0)	19.4 (67.0)	27.8 (82.0)	18.3† (65.0)	—	—
	Low-temperature operation	19.4 (67.0)	13.9 (57.0)	19.4 (67.0)	13.9† (57.0)	—	—
	Maximum high-temperature operation	26.7 (80.0)	19.4 (67.0)	46.1 (115.0)	23.9† (75.0)	—	—
	Insulation effectiveness	26.7 (80.0)	23.9 (75.0)	26.7 (80.0)	23.9† (75.0)	—	—
	Condensate disposal	26.7 (80.0)	23.9 (75.0)	26.7 (80.0)	23.9† (75.0)	—	—
	Air infiltration	21.1–26.7 (70.0–80.0)	—	21.1–26.7 (70.0–80.0)	—	—	—
	Part-load conditions	26.7 (80.0)	19.4 (67.0)	27.8 (82.0)	18.3† (65.0)	—	—
Heating	Standard rating (other than heat pump)§	21.1 (70.0)	—	—	—	93.3 (200.0)	82.2 (180.0)
	Standard rating conditions high-temperature heat pump heating	21.1 (70.0)	15.6 (60.0) max.	8.3 (47.0)	6.1 (43.0)	—	—
	Standard rating conditions low-temperature heat pump heating‡	21.1 (70.0)	15.6 (60.0) max.	–8.3 (17.0)	–9.4 (15.0)	—	—
	Maximum high-temperature operation	26.7 (80.0)	—	23.9 (75.0)	18.3 (65.0)	—	—
	Part-load conditions	21.1 (70.0)	—	16.7 (62.0)	13.6 (56.5)	—	—

**Not required for heating-only units.*
†Required when condensate is rejected to the condenser air stream.
‡Only required if the manufacturer's published rating includes low-temperature specifications.
§Where steam is the heating medium, the steam pressure shall be 13.8 kPa *(2 psig).*
Note: *For all tests except air infiltration, the static pressure difference between the room air-inlet and the outlet of the unit shall be* 0.0 Pa *(0.0 in H_2O). For the air infiltration test, the indoor static pressure shall be* 24.9 Pa *(0.1 in H_2O) below outdoor static pressure.*

Table 2
Minimum standard EER and COP
(See Clause 10.5.)

Equipment type	Minimum efficiency SI units (inch/pound units)
PTAC* EER new construction	= 12.5 – (0.213 × Cap_c/293.1) [12.5 – (0.213 × Cap_c/1000)]
PTAC EER replacements	= 10.9 – (0.213 × Cap_c/293.1) [10.9 – (0.213 × Cap_c/1000)]
PTHP† EER new construction	= 12.3 – (0.213 × Cap_c/293.1) [12.3 – (0.213 × Cap_c/1000)]
PTHP EER replacements	= 10.8 – (0.213 × Cap_c/293.1) [10.8 – (0.213 × Cap_c/1000)]
PTHP COP new construction	= 3.2 – (0.026 × Cap_c /293.1) [3.2 – (0.026 × Cap_c /1000)]
PTHP COP replacements	= 2.9 – (0.026 × Cap_c /293.1) [2.9 – (0.026 × Cap_c /1000)]

**Packaged terminal air-conditioner.*
†*Packaged terminal heat pump.*
Notes:
(1) *"Cap_c" means the rated cooling capacity of the product in* W *(Btu/h). If the unit's capacity is less than* 2030 W *(7000 Btu/h), use* 2030 W *(7000 Btu/h) in the calculation. If the unit's capacity is greater than* 4390 W *(15 000 Btu/h), use* 4390 W *(15 000 Btu/h) in the calculation.*
(2) *The factor Cap_c shall be the cooling capacity (sensible and latent) in* W *(Btu/h).*
(3) *EER and COP are not determined at the low-temperature standard rating conditions.*

Table 3
High efficiency standard EER and COP
(See Clause 10.6.)

Equipment type	High efficiency SI units (inch/pound units)
PTAC EER new construction	*
PTHP EER new construction	*
PTHP COP new construction	*

**The values of high efficiency standard EER and COP are under development.*
Note: *No high efficiency level has been defined for replacement units.*

Proposition de modification

N'hésitez pas à nous faire part de vos suggestions et de vos commentaires. Au moment de soumettre des propositions de modification aux normes CSA et autres publications CSA prière de fournir les renseignements demandés ci-dessous et de formuler les propositions sur une feuille volante. Il est recommandé d'inclure

- le numéro de la norme/publication
- le numéro de l'article, du tableau ou de la figure visé
- la formulation proposée
- la raison de cette modification.

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