C381.1-17

Energy performance of external ac-dc and ac-ac power supplies

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Preface

This is the second edition of CSA C381.1, *Energy performance of external ac-dc and ac-ac power supplies*. It supersedes the previous edition published in 2008 under the title, *Test method for calculating the energy efficiency of single-voltage external ac-dc and ac-ac power supplies.*

This Standard specifies requirements, definitions, and test methods for measuring the energy performance of external ac-dc and ac-ac power supplies.

The Harmonization Committee intended that this Standard would harmonize with Appendix Z to Subpart B, Part 430 of Title 10 to the United States Code of Federal Regulations, entitled "Uniform Test Method for Measuring the Energy Consumption of External Power Supplies".

CSA Group acknowledges that the development of this Standard was made possible, in part, by the financial support of Natural Resources Canada (NRCan), BC Hydro, Hydro-Québec, and the Ontario Ministry of Energy.

This Standard is considered suitable for use for conformity assessment within the stated scope of the Standard.

This Standard was prepared by the Harmonization Committee on the Performance of External Power Supplies and Battery Charging Systems, under the jurisdiction of the Technical Committee on Residential Equipment and the Strategic Steering Committee on Performance, Energy Efficiency, and Renewables, and has been formally approved by the Technical Committee.

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 Standard 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 Standard.*
4) *To submit a request for interpretation of this Standard, please send the following information to* ***inquiries@csagroup.org*** *and include "Request for interpretation" in the subject line:*
   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) *where possible, phrase the request in such a way that a specific "yes" or "no" answer will address the issue.*

   Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization *and are available on the* Current Standards Activities *page at* ***standardsactivities.csa.ca****.*
5) *This Standard is subject to review within five years from the date of publication. Suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to* ***inquiries@csagroup.org*** *and include "Proposal for change" in the subject line:*
   a) *Standard designation (number);*
   b) *relevant clause, table, and/or figure number;*
   c) *wording of the proposed change; and*
   d) *rationale for the change.*

C381.1-17
Energy performance of external ac-dc and ac-ac power supplies

1 Scope

1.1 General

This Standard specifies a test method for calculating the energy performance of external power supplies (EPS) across a full range of load conditions. It covers single-voltage and multiple-voltage external ac-dc and ac-ac power supplies.

Note: *External power supplies are designed to convert line voltage ac into the low-voltage output (ac or dc) typically required by laptop computers, cordless and cellular phones, portable stereos, etc. EPS are contained in a separate housing from the product they are powering.*

1.2 Purpose

The test method specified in this Standard is intended to complement the methodology contained in CSA C381.2. This Standard and CSA C381.2 define two classifications of products for the purpose of energy-efficiency testing; products within the scope of CSA C381.2 are not intended to be tested by this Standard. Annex B provides information on determining the appropriate test method (this Standard or CSA C381.2) for measuring a product's energy efficiency.

1.3 Exclusions

The following are not covered by this Standard:

a) Dc-dc voltage conversion equipment, such as dc-dc converters, are not included in this Standard, except to the extent that such circuitry is found within a power supply.
b) A "medical device" as defined in Section 1 of the Canadian *Medical Devices Regulations*.
c) A direct operation, ac-dc external power supply with nameplate output voltage less than 3 V and nameplate output current greater than or equal to 1,000 mA that charges the battery of a product that is fully or primarily motor operated are not covered by this Standard.
d) Indirect operation non-Class A external power supplies.

Note: *These products may be covered by CSA C381.2.*

1.4 Terminology

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.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

2 Reference publications

This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below:

CSA Group

C381.2-17
Energy performance of battery-charging systems and uninterruptible power supplies

CAN/CSA-C62301:11 (R2016)
Household electrical appliances — Measurement of standby power

Government of Canada

Medical Devices Regulations, SOR/98-282

Motor Vehicle Safety Act, S.C. 1993, c. 16

IEC (International Electrotechnical Commission)

60050-300:2001
International Electrotechnical Vocabulary — Electrical and electronic measurements and measuring instruments

IEEE (Institute of Electrical and Electronics Engineers)

100-2006
Authoritative Dictionary of IEEE Standards Terms,

1515-2000
Recommended Practice for Electronic Power Subsystems: Parameter Definitions, Test Conditions, and Test Methods

U.S. DOE (U.S. Department of Energy)

Appendix Z to Title 10, Part 430, Subpart B of the United States Code of Federal Regulation—Uniform Test Method for Measuring the Energy Consumption of External Power Supplies

International Efficiency Marking Protocol for External Power Supplies, Version 3.0, September 2013
http://www.nrcan.gc.ca/energy/products/categories/electronics/eps/15515

3 Definitions

In addition to the definitions in the IEEE 100 *Authoritative Dictionary of IEEE Standards Terms* and IEC 60050-300, the following definitions shall apply in this Standard:

Active mode — the mode of operation when the external power supply is connected to the main electricity supply and the output is (or "all outputs are" for a multiple-voltage external power supply) connected to a load (or "loads" for a multiple-voltage external power supply).

