CSA GROUP™

CSA B415.1:22
National Standard of Canada

Performance testing of solid-biofuel-burning heating appliances

SCC CCN

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Δ Preface

This is the fourth edition of CSA B415.1, *Performance testing of solid-biofuel-burning heating appliances*. It supersedes the previous editions, published in 2010 and 2000 under the title *Performance testing of solid-fuel-burning heating appliances*, and published in 1992 under the title *Performance Testing of Solid-Fuel-Burning Stoves, Inserts, and Low-Burn-Rate Factory-Built Appliances*.

This Standard can be used as a stand-alone document that can be referenced by the appropriate authority having jurisdiction (AHJ).

The major changes from the previous edition are as follows:

a) this Standard has been restructured to comply with current CSA Group requirements;
b) the general layout has been restructured to make this Standard easier to follow for each type of product covered;
c) the types of products covered by this Standard have been clarified and expanded;
d) site-built heating appliances and hybrid heaters have been added as new product types covered by this Standard;
e) definitions have been added for hybrid hydronic heaters and hybrid forced-air heaters;
f) certain definitions have been clarified and updated (e.g., factory-built fireplace, masonry heater, room heater);
g) reference publications have been updated to the latest editions;
h) informative Annex B, pertaining to the total combustible carbon method for determination of energy efficiency, has been deleted;
i) for many types of appliances, content has been replaced with a referenced standard (e.g., ASTM E2515, ASTM E3053), allowing for less text duplication, better harmonization with the United States Environmental Protection Agency (U.S. EPA), and improved alignment with other International or Regional Standards;
j) this Standard now includes references to and uses definitions from the CSA ISO 17225 series of Standards on graded solid biofuels;
k) emission requirements have been added for hybrid hydronic heaters and hybrid forced-air heaters;
l) emission limits for room heaters have been lowered and harmonized with the U.S. EPA;
m) emission limits for forced-air furnaces and hydronic heaters have been lowered and harmonized with the U.S. EPA, with compliance deadlines of January 1, 2025, and January 1, 2024, respectively;
n) an emission cap applicable to any single test run has been added for forced-air furnaces;
o) the test method for forced-air furnaces (i.e., duct velocity measurement) has been clarified and improved based on lab experience since this Standard was last published;
p) a test method has been developed using portable flue gas analyzers for measuring the gaseous emissions and thermal efficiency of site-built appliances;
q) test fuel characteristics for automatically fuelled appliances have been clarified and expanded;
r) CEN EN 303-5 has been recognized in this Standard for third-party certified automatically fed hydronic heaters with a nominal heat output between 50 and 500 kW;
s) an emission requirement (expressed in mg/Nm^3) and a minimum delivered thermal efficiency requirement have been added for third-party certified automatically fed hydronic heaters tested to CEN EN 303-5; and
t) output and efficiency calculations have been modified to address appliances that generate electricity.

The CSA Technical Committee has endeavoured to make the test methodology of this Standard consistent with the U.S. EPA's regulations, where possible. The interpretation of U.S. EPA regulations is

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periodically updated by the issuance of Applicability Determinations. Anyone using this Standard who also intends to seek U.S. EPA product approval should be fully conversant with all U.S. EPA requirements.

The "Standards of Performance for New Residential Wood Heaters (Subpart AAA)" and "Method 1—Sample and Velocity Traverses for Stationary Sources" were created by the U.S. Environmental Protection Agency (U.S. EPA). They are reproduced in Canada with permission from U.S. EPA.

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CSA acknowledges that the development of this Standard was made possible, in part, by the financial support of the Hearth, Patio & Barbecue Association (HPBA).

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

This Standard was prepared by the Subcommittee on Performance Testing of Solid-Fuel-Burning Appliances, under the jurisdiction of the Technical Committee on Energy Efficiency and Related Performance of Fuel-Burning Appliances and Equipment and the Strategic Steering Committee on Fuels and Appliances, and has been formally approved by the Technical Committee.

This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

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.*
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CSA B415.1:22
Performance testing of solid-biofuel-burning heating appliances

1 Scope

1.1 Product range

This Standard specifies requirements for performance testing of solid-biofuel-burning heating appliances, including maximum emission rates.

1.2 Reporting metrics

This Standard specifies a method for determining

a) heat outputs;
b) appliance efficiencies;
c) emission levels and composition; and
d) electrical energy consumption and production.

1.3 Product types

This Standard applies to

a) Type 1: site-built heating appliances;
b) Type 2: room heaters;
c) Type 3: forced-air furnaces;
d) Type 4: hydronic heating appliances; and
e) Type 5: hybrid heating appliances.

Note: *Typically, units tested under this Standard will have outputs less than 150 kW (500 000 BTU/h).*

For the purposes of this Standard, solid-biofuel-burning appliances include manually and automatically fuelled systems (including add-ons and combinations).

1.4 Fuels

This Standard covers appliances that burn biomass fuels such as

a) cordwood;
b) wood chips;
c) wood pellets;
d) sawdust;
e) firelogs;
f) wood, paper, and other biomass pellets and briquettes; and
g) non-woody solid biofuels from agricultural, herbaceous, and fruit origins such as kernel corn, other grains, cherry pits, and pelletized or briquetted straw, hay, and corn stover.

1.5 Products not covered

This Standard does not apply to

a) factory-built fireplaces intended to be used primarily for aesthetic enjoyment and not as space heaters; and

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