

Performance testing of solid-fuel-burning heating appliances



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Standards Update Service

B415.1-10

March 2010

Title: *Performance testing of solid-fuel-burning heating appliances*

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B415.1-10
***Performance testing of solid-fuel-
burning heating appliances***



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*Published in March 2010 by CSA Group
A not-for-profit private sector organization
178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3*

*To purchase standards and related publications, visit our Online Store at store.csagroup.org
or call toll-free 1-800-463-6727 or 416-747-4044.*

ISBN 978-1-55491-356-5

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Preface

This is the third edition of CSA B415.1, *Performance testing of solid-fuel-burning heating appliances*. It supersedes the previous editions, published in 2000 under the same title, 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.

The major changes from the previous edition are as follows:

- (a) this Standard has been restructured to comply with current CSA requirements;
- (b) this Standard is now written in yard/pound (imperial) units as well as SI (metric) units;
- (c) the types of appliances covered by this Standard have been clarified;
- (d) the percentage of maximum burn rate has been revised for appliances that are equipped with a means of controlling burn rate;
- (e) this Standard now describes test procedures for measuring the emissions, heat output, and efficiency of thermostatically controlled central warm air furnaces and hydronic heaters;
- (f) the primary units for reporting emissions for large appliances such as central warm air furnaces and hydronic heaters are now g/MJ of heat output;
- (g) new emission requirements have been added for indoor and outdoor central heating appliances;
- (h) emission limits for space heaters have been lowered;
- (i) the equations for determining the heat content of the fuel used for testing are now based on the specific heat of the species in the flue products rather than the enthalpies; and
- (j) a Microsoft Excel® spreadsheet has been linked to the Standard as a non-mandatory annex (see Annex F) for calculating the energy efficiency and heat output of solid-fuel-burning heating appliances.

The Technical Committee has made every effort to make the test methodology of this Standard consistent with the United States Environmental Protection Agency's regulations, where possible. The test procedures described in this Standard are based on EPA Test Method 5G and ASTM E2515. The interpretation of the EPA regulations is periodically updated by the issuance of Applicability Determinations. Anyone using this Standard who also intends to seek EPA product approval should be fully conversant with all EPA requirements.

Emission limits are expressed in both g/h and g/MJ (output) at the option of the manufacturer, except that central and outdoor system limits are expressed in g/MJ (output) only.

CSA acknowledges that the development of this Standard was made possible, in part, by the financial support of Environment Canada.

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

This Standard was prepared by the Technical Committee on Performance Testing and Rating of Solid-Fuel-Burning Appliances, under the jurisdiction of the Strategic Steering Committee on Fuel Burning Equipment, and has been formally approved by the Technical Committee. This Standard will be submitted to the Standards Council of Canada for approval as a National Standard of Canada.

March 2010

Notes:

- (1) The 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.*

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.*

Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization and are published in CSA's periodical Info Update, which is available on the CSA Web site at www.csa.ca.

B415.1-10

Performance testing of solid-fuel-burning heating appliances

1 Scope

1.1

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

1.2

This Standard specifies a method for determining

- (a) heat outputs;
- (b) appliance efficiencies;
- (c) emission levels and composition; and
- (d) flue gas flow rates.

1.3

This Standard applies to

- (a) manually and automatically fuelled stoves and fireplace inserts;
- (b) factory-built fireplaces with a minimum burn rate less than 5 kg/h (11 lb/h), as determined in accordance with [Clause 7](#); and
- (c) furnaces and hydronic heaters designed to have the useful heat produced by the appliance conveyed to areas remote from the appliance by ducting or plumbing.

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-fuel-burning appliances include manually and automatically fuelled systems (including add-ons and combinations).

1.4

This Standard covers appliances that burn biomass fuels such as

- (a) cordwood;
- (b) wood chips;
- (c) sawdust;
- (d) firelogs;
- (e) wood, paper, and other biomass pellets and briquettes; and
- (f) kernel corn and other grains.

This Standard does not cover coal-fired appliances.

1.5

This Standard does not apply to

- (a) site-built masonry fireplaces;
- (b) site-built masonry heaters; or
- (c) factory-built fireplaces with a minimum burn rate greater than or equal to 5 kg/h (11 lb/h).