



CSA C652:00
National Standard of Canada
(reaffirmed 2020)



Installation of Electric Storage Tank and Heat Pump Water Heaters for Residential Use



Standards Council of Canada
Conseil canadien des normes

Legal Notice for Standards

Canadian Standards Association (operating as “CSA Group”) develops standards through a consensus standards development process approved by the Standards Council of Canada. This process brings together volunteers representing varied viewpoints and interests to achieve consensus and develop a standard. Although CSA Group administers the process and establishes rules to promote fairness in achieving consensus, it does not independently test, evaluate, or verify the content of standards.

Disclaimer and exclusion of liability

This document is provided without any representations, warranties, or conditions of any kind, express or implied, including, without limitation, implied warranties or conditions concerning this document’s fitness for a particular purpose or use, its merchantability, or its non-infringement of any third party’s intellectual property rights. CSA Group does not warrant the accuracy, completeness, or currency of any of the information published in this document. CSA Group makes no representations or warranties regarding this document’s compliance with any applicable statute, rule, or regulation.

IN NO EVENT SHALL CSA GROUP, ITS VOLUNTEERS, MEMBERS, SUBSIDIARIES, OR AFFILIATED COMPANIES, OR THEIR EMPLOYEES, DIRECTORS, OR OFFICERS, BE LIABLE FOR ANY DIRECT, INDIRECT, OR INCIDENTAL DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES, HOWSOEVER CAUSED, INCLUDING BUT NOT LIMITED TO SPECIAL OR CONSEQUENTIAL DAMAGES, LOST REVENUE, BUSINESS INTERRUPTION, LOST OR DAMAGED DATA, OR ANY OTHER COMMERCIAL OR ECONOMIC LOSS, WHETHER BASED IN CONTRACT, TORT (INCLUDING NEGLIGENCE), OR ANY OTHER THEORY OF LIABILITY, ARISING OUT OF OR RESULTING FROM ACCESS TO OR POSSESSION OR USE OF THIS DOCUMENT, EVEN IF CSA GROUP HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES.

In publishing and making this document available, CSA Group is not undertaking to render professional or other services for or on behalf of any person or entity or to perform any duty owed by any person or entity to another person or entity. The information in this document is directed to those who have the appropriate degree of experience to use and apply its contents, and CSA Group accepts no responsibility whatsoever arising in any way from any and all use of or reliance on the information contained in this document.

CSA Group is a private not-for-profit company that publishes voluntary standards and related documents. CSA Group has no power, nor does it undertake, to enforce compliance with the contents of the standards or other documents it publishes.

Intellectual property rights and ownership

As between CSA Group and the users of this document (whether it be in printed or electronic form), CSA Group is the owner, or the authorized licensee, of all works contained herein that are protected by copyright, all trade-marks (except as otherwise noted to the contrary), and all inventions and trade secrets that may be contained in this document, whether or not such inventions and trade secrets are protected by patents and applications for patents. Without limitation, the unauthorized use, modification, copying, or disclosure of this document may violate laws that protect CSA Group’s and/or others’ intellectual property and may give rise to a right in CSA Group and/or others to seek legal redress for such use, modification, copying, or disclosure. To the extent permitted by treaty or by law, CSA Group reserves all intellectual property rights in this document.

Patent rights

Attention is drawn to the possibility that some of the elements of this standard may be the subject of patent rights. CSA Group shall not be held responsible for identifying any or all such patent rights. Users of this standard are expressly advised that determination of the validity of any such patent rights is entirely their own responsibility.

Authorized use of this document

This document is being provided by CSA Group for informational and non-commercial use only. The user of this document is authorized to do only the following:

If this document is in electronic form:

- load this document onto a computer for the sole purpose of reviewing it;
- search and browse this document; and
- print this document if it is in PDF form.

Limited copies of this document in print or paper form may be distributed only to persons who are authorized by CSA Group to have such copies, and only if this Legal Notice appears on each such copy.

In addition, users may not and may not permit others to

- alter this document in any way, or remove this Legal Notice from the attached standard;
- sell this document without authorization from CSA Group; or
- make an electronic copy of this document.

If you do not agree with any of the terms and conditions contained in this Legal Notice, you may not load or use this document or make any copies of the contents hereof, and if you do make such copies, you are required to destroy them immediately. Use of this document constitutes your acceptance of the terms and conditions of this Legal Notice.



Revision History

CSA C652:00, Installation of Electric Storage Tank and Heat Pump Water Heaters for Residential Use — originally published November 2000

National Standard of Canada — October 2002
Outside front cover, National Standard of Canada text, title page.
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.

Currently in preview, click buy full version

Standards Update Service

CSA C652:00

November 2000

Title: *Installation of Electric Storage Tank and Heat Pump Water Heaters for Residential Use*

To register for e-mail notification about any updates to this publication

- go to www.csagroup.org/store/
- click on **Product Updates**

The **List ID** that you will need to register for updates to this publication is **20115**.

If you require assistance, please e-mail techsupport@csagroup.org or call 416-747-2233.

Visit CSA Group's policy on privacy at www.csagroup.org/legal to find out how we protect your personal information.

Canadian Standards Association (operating as “CSA Group”), under whose auspices this National Standard has been produced, was chartered in 1919 and accredited by the Standards Council of Canada to the National Standards system in 1973. It is a not-for-profit, nonstatutory, voluntary membership association engaged in standards development and certification activities.

CSA Group standards reflect a national consensus of producers and users — including manufacturers, consumers, retailers, unions and professional organizations, and governmental agencies. The standards are used widely by industry and commerce and often adopted by municipal, provincial, and federal governments in their regulations, particularly in the fields of health, safety, building and construction, and the environment.

Individuals, companies, and associations across Canada indicate their support for CSA Group’s standards development by volunteering their time and skills to Committee work and supporting CSA Group’s objectives through sustaining memberships. The more than 7000 committee volunteers and the 2000 sustaining memberships together form CSA Group’s total membership from which its Directors are chosen. Sustaining memberships represent a major source of income for CSA Group’s standards development activities.

CSA Group offers certification and testing services in support of and as an extension to its standards development activities. To ensure the integrity of its certification process, CSA Group regularly and continually audits and inspects products that bear the CSA Group Mark.

In addition to its head office and laboratory complex in Toronto, CSA Group has regional branch offices in major centres across Canada and inspection and testing agencies in eight countries. Since 1919, CSA Group has developed the necessary expertise to meet its corporate mission: CSA Group is an independent service organization whose mission is to provide an open and effective forum for activities facilitating the exchange of goods and services through the use of standards, certification and related services to meet national and international needs.

For further information on CSA Group services, write to
CSA Group
178 Rexdale Boulevard
Toronto, Ontario, M9W 1R3
Canada

A National Standard of Canada is a standard developed by a Standards Council of Canada (SCC) accredited Standards Development Organization, in compliance with requirements and guidance set out by SCC. More information on National Standards of Canada can be found at www.scc.ca.

SCC is a Crown corporation within the portfolio of Innovation, Science and Economic Development (ISED) Canada. With the goal of enhancing Canada’s economic competitiveness and social well-being, SCC leads and facilitates the development and use of national and international standards. SCC also coordinates Canadian participation in standards development, and identifies strategies to advance Canadian standardization efforts.

Accreditation services are provided by SCC to various customers, including product certifiers, testing laboratories, and standards development organizations. A list of SCC programs and accredited bodies is publicly available at www.scc.ca.

Standards Council of Canada
600-55 Metcalfe Street
Ottawa, Ontario, K1P 6L5
Canada



Standards Council of Canada
Conseil canadien des normes

Cette Norme Nationale du Canada est disponible en versions française et anglaise.

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 to judge its suitability for their particular purpose.

**A trademark of the Canadian Standards Association, operating as “CSA Group”*

National Standard of Canada

CSA C652:00

***Installation of Electric Storage Tank
and Heat Pump Water Heaters for
Residential Use***



*®A trademark of the Canadian Standards Association,
operating as "CSA Group."*



*Published in November 2000 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 www.csagroup.org/store/
or call toll-free 1-800-463-6727 or 416-747-4044.*

*ICS 91.140.65; 23.020.10
ISBN 1-55324-231-9*

*© 2000 Canadian Standards Association
All rights reserved. No part of this publication may be reproduced in any form whatsoever
without the prior permission of the publisher.*

Contents

Technical Committee on Residential Equipment v

Subcommittee on Water Heaters vii

Preface ix

1. Scope 1

2. Definitions and Reference Publications 1

2.1 Definitions 1

2.2 Reference Publications 2

3. Installation — General 2

3.1 Codes 2

3.2 Requirements 2

3.3 Qualifications 2

3.4 Energy Efficiency 2

4. Placement 3

4.1 Electric Storage Tank Water Heaters 3

4.1.1 Placement 3

4.1.2 Drainage 3

4.1.3 Location 3

4.1.4 Ambient Temperature 3

4.1.5 Clearance and Access 3

4.1.6 Thermal Break 3

4.1.7 Drain Pan 3

4.2 Heat Pump Water Heaters 3

4.2.1 General 3

4.2.2 Thermal Environment 3

4.2.3 Drainage 4

5. Plumbing 4

5.1 Connections 4

5.2 Solders and Fluxes 4

5.3 Heat Exchangers 4

6. Cold-Water Connection 4

6.1 Pressure Relief 4

6.2 Shutoff Valve 4

6.3 Check Valves 4

6.4 Top-Entry Water Heaters 4

6.5 Side-Entry Water Heaters 5

6.6 Thermal Insulation 5

7. Hot-Water Connection 5

7.1 Electric Storage Tank Water Heaters 5

7.1.1 Heat Trap 5

- 7.1.2 Thermal Insulation 5
- 7.2 Add-on Heat Pump Water Heaters 5
 - 7.2.1 Piping Connections and Drainage Valve 5
 - 7.2.2 Thermal Insulation 5

8. Startup Procedures and Precautions 5

- 8.1 Electric Power to Electric Storage Tank Water Heaters and Integral Heat Pump Water Heaters 5
 - 8.1.1 Startup 5
 - 8.1.2 Maintenance 5
- 8.2 Electric Power to Add-on Heat Pump Water Heaters 6
 - 8.2.1 Number of Supplies 6
 - 8.2.2 Startup 6
 - 8.2.3 Interconnections 6
 - 8.2.4 Maintenance 6
- 8.3 Temperature- and Pressure-Relief Valve 6
 - 8.3.1 Test 6
 - 8.3.2 Replacement 6
- 8.4 Leaks 6
 - 8.4.1 Plumbing 6
 - 8.4.2 Thermal Insulation 6
- 8.5 Thermal Bridging 6
- 8.6 Confirmation of Operation 6
 - 8.6.1 Storage Tank Water Heaters 6
 - 8.6.2 Integral Heat Pump Water Heaters 7
 - 8.6.3 Add-on Water Heaters 7

Figures 8

Preface

This is the second edition of CSA Standard C652, *Installation of Electric Storage Tank and Heat Pump Water Heaters for Residential Use*. It supersedes the previous edition, published in 1992 under the title *Installation of Electric Storage Tank Water Heaters for Residential Use*. This edition adds the requirements for the installation of heat pump water heaters.

This Standard provides guidance for the installation of electric storage tank and heat pump water heaters. It complements both the safety and the performance Standards and includes requirements for the installation of thermal insulation on water pipes, the use of heat traps, the use of a thermal break at the bottom of the water tank, and other items related to good installation practice.

This Standard was prepared by the Subcommittee on Water Heaters 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. It will be submitted to the Standards Council of Canada for approval as a National Standard of Canada.

November 2000

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 CSA International, Standards Division, 178 Rexdale Boulevard, Toronto, Ontario M9W 1R3.
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. For subscription details, write to CSA Sales Promotion, Info Update, at the address given above.

C652-00

Installation of Electric Storage Tank and Heat Pump Water Heaters for Residential Use

1. Scope

1.1

This Standard specifies requirements for the installation of electric storage tank and heat pump water heaters intended for use in residential premises.

1.2

This Standard applies to

- (a) electric storage tank water heaters with
 - (i) volumes of 50–454 L (13–120 US gal); and
 - (ii) electrical heaters with power inputs up to 12 kW; and
- (b) heat pump water heaters that have
 - (i) a maximum current rating of 24 A;
 - (ii) a single-phase maximum voltage of 250 V; and
 - (iii) ancillary equipment necessary for the device to function.

1.3

This Standard is not intended to provide guidance in selecting the tank capacity for any given installation.

1.4

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

2. Definitions and Reference Publications

2.1 Definitions

The following definitions apply in this Standard:

Add-on heat pump — a supplementary heating device for connection to a storage tank water heater, consisting of an air-to-water heat pump, air-circulating fan, water pump, and controls.

Authority having jurisdiction — the governmental body responsible for the enforcement of any part of this Standard or the official or agency designated by that body to exercise such a function.

Electric storage tank water heater — an automatically controlled, thermally insulated, electrically heated water storage tank having a rated storage capacity of 50–454 L (13–120 US gal).