CSA GROUP™

CSA Z317.2:19
National Standard of Canada

Special requirements for heating, ventilation, and air-conditioning (HVAC) systems in health care facilities

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 licence 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 format.

Limited copies of this document in printed 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 thereof, 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.

Standards Update Service

CSA Z317.2:19
December 2019

Title: *Special requirements for heating, ventilation, and air-conditioning (HVAC) systems in health care facilities*

To register for e-mail notification about any updates to this publication
- go to **store.csagroup.org**
- click on **Product Updates**

The **List ID** that you will need to register for updates to this publication is **2427847**.

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.

National Standard of Canada

CSA Z317.2:19

Special requirements for heating, ventilation, and air-conditioning (HVAC) systems in health care facilities

Published in December 2019 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.*

ICS 97.040.10
ISBN 978-1-4883-2588-5

Contents

Preface

This is the fifth edition of CSA Z317.2, *Special requirements for heating, ventilation, and air-conditioning (HVAC) systems in health care facilities*, one of a series of Standards on the design, construction, and maintenance of health care facilities and systems. It supersedes the previous editions, published in 2015, 2010, 2001, and 1991.

This Standard is intended for use by architects, engineers, planners, consultants, and health care facility staff to ensure the efficient planning, design, construction, and maintenance of HVAC systems. In addition to design and construction requirements, this Standard includes commissioning, operational, maintenance, and monitoring requirements for HVAC systems that will reduce the risk of transmission of infection among building occupants, including patients, staff, and visitors. Significant changes in this edition include the following:

a) clarification of HVAC requirements for rooms and areas used for similar or different functions, including more stringent requirements for areas in a facility used for more than one function;
b) additional guidance on HCFs providing services when outdoor conditions are extreme and when indoor conditions are outside of the HVAC design ranges;
c) information on areas with increased activity level potentially requiring a higher air exchange rate to maintain air quality;
d) enhanced electrical system requirements for control systems during loss of power to ensure continuity of systems;
e) revisions for HVAC system upgrades associated with renovations or additions;
f) expansion of requirements for chemical treatment of steam and condensate piping systems;
g) expansion of requirements for heating and cooling source redundancy;
h) additional considerations for the placement of outdoor intakes;
i) clarification for the location of duct-mounted humidifiers;
j) new provisions for flex ducting;
k) expanded requirements for audible and visual alarms for AIRs;
l) clarification on the use of non-aspirating diffusers in Type I areas;
m) alignment of inhaled anaesthetic and analgesic gas scavenging requirements with CSA Z7396.1;
n) a new clause on ventilation of normally unoccupied service areas;
o) clarification on placement of local heating or cooling units and water removal requirements;
p) guidance on catastrophic HVAC equipment failure in alignment with catastrophic event management in CSA Z8000;
q) new requirements for HEPA filter testing and performance verification;
r) clarification that HVAC system operation may be modified or operated in certain situations beyond the ranges specified in Table 1, in consultation with the MDT;
s) new HVAC design criteria for Whole body storage and Morgue viewing in Table 1;
t) expansion of HVAC design criteria for Scope reprocessing areas in Table 1;
u) expansion of HVAC design criteria for Treatment and procedure rooms for patients requiring airborne precautions in Table 1;
v) updated airflow direction requirements for the Operating room and Sterile core in Table 1;
w) updated examples of health care facilities according to class in Annex B; and
x) revised formulas and calculations in Annex C.

CSA Group acknowledges that the development of this Standard was made possible, in part, by the financial support of the governments of Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland and Labrador, Northwest Territories, Nova Scotia, Nunavut, Ontario, Prince Edward

Island, Québec, Saskatchewan, and Yukon, as administered by the Canadian Association for Drugs and Technology in Health (CADTH).

This Standard was prepared by the Subcommittee on Special Requirements for HVAC Systems in Health Care Facilities, under the jurisdiction of the Technical Committee on Health Care Facilities and the Strategic Steering Committee on Health and Well-being, 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.*
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.*

CSA Z317.2:19
Special requirements for heating, ventilation, and air-conditioning (HVAC) systems in health care facilities

0 Introduction

Indoor air quality is an important health and wellness consideration, and is especially critical to the health of patients, visitors, staff, and occupants of health care facilities (HCFs). Inadequate indoor air quality can complicate patient care and recovery and negatively affect health and wellness. The proper design, installation, commissioning, operation, and maintenance of HVAC systems can decrease the risk of airborne transmission of organisms inside buildings and therefore the risk of healthcare acquired infections. Optimization of indoor air quality protects the health and safety of patients, staff, and visitors and supports positive clinical outcomes.

In addition, a well-designed HVAC system can help HCFs to meet their conservation objectives and promote the judicious use of renewable and non-renewable resources while delivering required comfort and safety for all building occupants.

1 Scope

1.1

This Standard provides requirements for the planning, design, construction, commissioning, operation, and maintenance of HVAC systems in HCFs. In general, these requirements are more stringent than those applied to non-health care facilities.

Note: *See Annex A for general guidelines on HVAC system design. Table 1 provides specific design parameters for HVAC systems.*

1.2

This Standard

a) specifies minimum values for certain parameters;
b) establishes the suitability of different design options;
c) establishes recommendations for zoning, controls, and monitoring; and
d) outlines best practice for energy conservation.

1.3

This Standard is not intended to preclude the use of design concepts and the adoption of installation, operations, and maintenance procedures more stringent than those specified in this Standard. In cases where clinical evidence supports additional measures to improve the safety and efficacy of HCFs, such additional measures should be considered in the design, installation commissioning, operation, and maintenance of the HVAC system.