



**CSA
Group**

Z317.1-16

Special requirements for plumbing installations in health care facilities

Currently in preview, click buy full version

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.



Standards Update Service

Z317.1-16

October 2016

Title: *Special requirements for plumbing installations in health care facilities*

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

- go to shop.csa.ca
- click on **CSA Update Service**

The **List ID** that you will need to register for updates to this publication is **24245.0**

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.

Z317.1-16
***Special requirements for plumbing
installations in health care facilities***



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

*Published in October 2016 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 shop.csa.ca
or call toll-free 1-800-463-6727 or 416-747-4044.*

ISBN 978-1-4883-0386-9

*© 2016 CSA Group
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 Health Care Facilities	3
Subcommittee on Plumbing in Health Care Facilities	5
Preface	7
1 Scope	8
2 Reference publications	9
3 Definitions	13
4 General	17
4.1 System planning and design	17
4.2 Construction	18
4.3 Commissioning	18
4.4 Operation and maintenance	18
4.4.1 General	18
4.4.2 Infection prevention and control measures	19
4.4.3 Evaluation, testing, and treatment of potable water systems	21
4.5 Sustainability	23
4.6 Application	23
4.7 Catastrophic event management	24
4.8 Alarms	24
5 Hydraulic fire protection systems	24
6 Water systems	25
6.1 General	25
6.2 Potable water supply	25
6.3 Potable water distribution systems	26
6.3.1 Design and construction	26
6.3.2 System elements	27
6.3.3 Hot water systems	29
6.3.4 Water storage tanks	33
6.3.5 Initial system treatment	34
6.4 Specialized water systems	35
6.4.1 General	35
6.4.2 Deionization	37
6.4.3 Distillation	37
6.4.4 Reverse osmosis	37
6.4.5 Membrane and filter technology	38
6.5 Steam and condensate	38
7 Drainage systems	38
7.1 General	38
7.2 Foreign objects	38

7.3	Insulation	38
7.4	Storm drainage systems	39
7.4.1	Discharge	39
7.4.2	Sump pumps	39
7.5	Sanitary drainage systems	39
7.5.1	Sewage pumps	39
7.5.2	Design	40
7.5.3	Hazardous waste	41
8	Plumbing fixtures and fittings	42
8.1	General	42
8.2	Water closets	44
8.3	Other human waste disposal provisions	45
8.4	Sinks and lavatories	45
8.4.1	General	45
8.4.2	Hand hygiene sinks	46
8.4.3	Barrier free sinks	49
8.4.4	Scrub sinks	49
8.4.5	Hoppers	50
8.4.6	Utility sinks	50
8.5	Bathtubs and showers	51
8.5.1	General	51
8.5.2	Bathtubs	51
8.5.3	Showers	52
8.6	Floor drains	52
8.7	Decontamination showers	53
8.8	Eye wash stations	53
9	Catastrophic event management	54
9.1	General	54
9.2	Alternative water supply	55
<hr/>		
Annex A (informative)	— Health care facility examples according to class	59
Annex B (informative)	— Measures to prevent legionella growth and spread in hot water systems	61
Annex C (informative)	— Legionella testing	66
Annex D (informative)	— Antimicrobial remediation measures for hot water systems	68

Technical Committee on Health Care Facilities

G.D. Burrill	Teegor Consulting Inc., Fredericton, New Brunswick <i>Category: Engineering Consultant</i> <i>Representing Canadian Healthcare Engineering Society (CHES)</i>	<i>Chair</i>
R. Snell	Parkin Architects Limited, Toronto, Ontario <i>Category: General Interest</i>	<i>Vice-Chair</i>
S. Bagworth	Agnew Peckham and Associates, Toronto, Ontario <i>Category: General Interest</i>	
R.J. Belanger	Wasaga Beach, Ontario <i>Category: Engineering Consultant</i>	
S. Bogdan	St. Joseph's Health Centre, Toronto, Ontario <i>Category: User Interest</i>	
W.D. Carson	W.D. Carson and Associates, Whitby, Ontario <i>Category: Engineering Consultant</i> <i>Representing the Mitchell Partnership</i>	
R. Dixon	R&C Dixon Consulting Ltd., Nanaimo, British Columbia <i>Category: General Interest</i>	
C. Drolet	Ministère de la Santé et des Services Sociaux (MSSS), Québec, Québec <i>Category: Government and/or Regulatory Authority</i>	
L. Elias	R Tec Consulting Ltd., Toronto, Ontario <i>Category: Engineering Consultant</i>	
M. Fontaine	Lower Mainland Facilities Management, Surrey, British Columbia <i>Category: User Interest</i>	

C. Harvey	North York General Hospital, Toronto, Ontario <i>Category: User Interest</i>	
M. Keen	St. Michael's Hospital, Toronto, Ontario <i>Category: General Interest</i> <i>Representing ASHRAE</i>	
G. Kuzmenko	G K Enterprise Services Inc., Brantford, Ontario <i>Category: Engineering Consultant</i>	
D. MacKay	Ministry of Health & Long-Term Care, Toronto, Ontario <i>Category: Government and/or Regulatory Authority</i>	
L.M. Shea	Manitoba Health, Healthy Living, and Seniors, Winnipeg, Manitoba <i>Category: Government and/or Regulatory Authority</i>	
N. Stark	H. H. Angus & Associates Ltd., Toronto, Ontario <i>Category: Engineering Consultant</i>	
K. Stockton	The Ottawa Hospital - General Campus, Ottawa, Ontario <i>Category: User Interest</i>	
M. Weimer	Lower Mainland Facilities Management, New Westminster, British Columbia <i>Category: Government and/or Regulatory Authority</i> <i>Representing British Columbia Ministry of Health</i>	
S.M. Wilson	Alberta Health Services, Edmonton, Alberta <i>Category: User Interest</i> <i>Representing Infection Prevention and Control Canada (IPAC)</i>	
J. Kraebel	CSA Group, Toronto, Ontario	<i>Project Manager</i>

Subcommittee on Plumbing in Health Care Facilities

W.D. Carson	W.D. Carson and Associates, Whitby, Ontario <i>Representing The Mitchell Partnership</i>	<i>Chair</i>
M. Lee	H. H. Angus & Associates Ltd, Toronto, Ontario	<i>Vice-Chair</i>
R.J. Belanger	Wasaga Beach, Ontario	
G.D. Burrill	Teegor Consulting Inc, Fredericton, New Brunswick <i>Representing Canadian Healthcare Engineering Society (CHES)</i>	
R. Dixon	R&C Dixon Consulting Ltd, Vancouver, British Columbia	
K. Ernst	Oakville Stamping & Bending Limited, Oakville, Ontario	
G. Kuzmenko	G K Enterprise Services Inc, Brantford, Ontario	
L. Lampron	Centre de santé et de service sociaux de Rimouski- Neigetsu Rimouski, Québec	
R. Marchand	Université de Montréal, Montréal, Québec	
A. Matte	Ministère de la Santé et des Services Sociaux (MSSS), Québec, Québec	
M. Prentost	École Polytechnique de Montréal, Montréal, Québec	
T. Runka	Chem-Aqua Environmental Services, Brampton, Ontario	

K. Sharples

Smith + Andersen,
Toronto, Ontario

S.M. Wilson

Alberta Health Services,
Edmonton, Alberta
*Representing Infection Prevention and Control
Canada (IPAC)*

J. Kraegel

CSA Group,
Toronto, Ontario

Project Manager

Preface

This is the fifth edition of CSA Z317.1, *Special requirements for plumbing installations in health care facilities*, one of a series of Standards related to health care facility engineering. It supersedes the previous editions, published in 2009, 1999, 1988, and 1978.

This Standard is intended to assist health care facilities to manage the potential risks associated with plumbing installation and maintenance.

The following have been updated for this edition:

- a) scope and definitions (Clauses 1 and 3);
- b) requirements and recommendations on infection prevention and control (Clause 4);
- c) requirements on system design, initial system treatment, and ongoing measures to limit the occurrence of legionella and other infectious micro-organisms (Clause 6);
- d) requirements on plumbing fixtures and fittings, including hand hygiene sinks (Clause 8); and
- e) a new clause on catastrophic event management (Clause 9).

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 CADTH.

This Standard was prepared by the Subcommittee on Plumbing in Health Care Facilities, under the jurisdiction of the Technical Committee on Health Care Facilities and the Strategic Steering Committee on Health Care Technology and Systems, 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 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.*

Z317.1-16

Special requirements for plumbing installations in health care facilities

1 Scope

1.1

This Standard addresses the special requirements of plumbing systems pertinent to the design, construction, operation, and maintenance of health care facilities (HCFs). This Standard specifies requirements for the following in HCFs:

- a) water supply systems, including domestic cold water systems and hot water systems;
- b) plumbing fixtures and fittings;
- c) drainage systems;
- d) monitoring and maintenance of water systems;
- e) infection control;
- f) catastrophic event planning;
- g) specialized water systems (e.g., reverse-osmosis, deionized, distilled); and
- h) hydraulic fire protection systems.

Note: *Special requirements for plumbing systems apply in HCFs because of the need to protect occupants of the facility and the adjacent surroundings from*

- a) *infectious diseases;*
- b) *hazards created by improper temperatures, leaks, and inadequate drainage; and*
- c) *adverse conditions created by the failure or improper operation of plumbing systems.*

1.2

This Standard supplements the relevant standards and other applicable requirements for plumbing systems, fixtures, and fittings in general building applications.

Notes:

- 1) *Relevant plumbing standards for plumbing systems, fixtures, and fittings in general building applications include*
 - a) *ASME A112.19.2/CSA B45.1;*
 - b) *ASME A112.19.1/CSA B45.2;*
 - c) *ASME A112.19.3/CSA B45.4;*
 - d) *CSA B45.5/IAPMO Z124;*
 - e) *CAN/CSA-B64 Series;*
 - f) *ASME A112.18.1/CSA-B125.1;*
 - g) *ASME A112.18.2/CSA-B125.2; and*
 - h) *CSA B125.3.*
- 2) *Applicable requirements for plumbing systems are also contained in the National Building Code of Canada and the National Plumbing Code of Canada.*

1.3

This Standard does not apply to medical gas systems.

Note: *See CAN/CSA-Z7396.1 for design, installation, certification, and maintenance requirements for non-flammable medical gas piping systems.*

1.4

This Standard is not intended to preclude the use of design concepts and the adoption of construction, installation, operations, and maintenance procedures more stringent than those specified in this Standard and in the documents listed in Clause 1.2.

1.5

This Standard applies to all classes of HCF.

Note: *Some requirements may be waived for smaller Class C-2 HCFs as determined by the application of engineering principles and in consultation with the administrator and the authority having jurisdiction.*

1.6

The requirements of this Standard apply to the retrofitting of existing systems when

- a) an existing HCF is
 - i) extended; or
 - ii) undergoing material alteration or repair; and
- b) the plumbing in existing facilities is adversely affected.

1.7

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.

1.8

The values given in SI units are the units of record for the purposes of this Standard. The values given in parentheses are for information and comparison only.

2 Reference publications

This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below, including all amendments published thereto.

CSA Group

CAN/CSA-ISO 13959-11

Water for haemodialysis and related therapies

CAN/CSA-ISO 26722-16

Water treatment equipment for haemodialysis applications and related therapies