

Installation code for decentralized wastewater systems



Legal Notice for Standards

Canadian Standards Association (CSA) standards are developed 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 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 does not warrant the accuracy, completeness, or currency of any of the information published in this document. CSA makes no representations or warranties regarding this document's compliance with any applicable statute, rule, or regulation.

IN NO EVENT SHALL CSA, 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 HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES.

In publishing and making this document available, CSA 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 accepts no responsibility whatsoever arising in any way from any and all use of or reliance on the information contained in this document.

CSA is a private not-for-profit company that publishes voluntary standards and related documents. CSA 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 and the users of this document (whether it be in printed or electronic form), CSA 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's and/or others' intellectual property and may give rise to a right in CSA and/or others to seek legal redress for such use, modification, copying, or disclosure. To the extent permitted by licence or by law, CSA 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 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 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 print or paper form may be distributed only to persons who are authorized by CSA 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; 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.



CANADIAN STANDARDS
ASSOCIATION

CSA Standards Update Service

B65-12

March 2012

Title: *Installation code for decentralized wastewater systems*

Pagination: **89 pages** (x preliminary and 79 text), each dated **March 2012**

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

- go on-line to **shop.csa.ca**
- click on **E-mail Services** under **MY ACCOUNT**
- click on **CSA Standards Update Service**

The **List ID** that you will need to register for updates to this publication is **2421753**.

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

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

Currently in preview, click buy full version

CSA Standard

B65-12

***Installation code for decentralized
wastewater systems***



**CANADIAN STANDARDS
ASSOCIATION**

®Registered trade-mark of Canadian Standards Association

*Published in March 2012 by Canadian Standards Association
A not-for-profit private sector organization
5060 Spectrum Way, Suite 100, Mississauga, Ontario, Canada L4W 5N6
1-800-463-6727 • 416-747-4044*

Visit our Online Store at shop.csa.ca



The Canadian Standards Association (CSA) prints its publications on Rolland Enviro100, which contains 100% recycled post-consumer fibre, is EcoLogo and Processed Chlorine Free certified, and was manufactured using biogas energy.

To purchase CSA Standards and related publications, visit CSA's Online Store at shop.csa.ca or call toll-free 1-800-463-6727 or 416-747-4044.

ISSN 1978-1-55491-688-7

© Canadian Standards Association — 2012

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 Decentralized Wastewater Systems vii

Preface x

0 Introduction 1

- 0.1 General 1
- 0.2 Expectations 1
- 0.3 Intent 1
- 0.4 Major goals 1
- 0.5 Additional goals 2
- 0.6 Innovation 2
- 0.7 Approvals 2

1 Scope 2

2 Reference publications 3

3 Definitions and abbreviations 5

- 3.1 Definitions 5
- 3.2 Abbreviations 9

4 General 9

- 4.1 General 9
- 4.2 Natural and imported soils 9
- 4.3 Site slope 9
- 4.4 Frost protection 9
- 4.5 Personnel 9

5 Design 10

6 Site evaluation 10

- 6.1 General 10
- 6.2 Soil profiles 11
 - 6.2.1 General 11
 - 6.2.2 Horizons 11
 - 6.2.3 Saturated zones 11
 - 6.2.4 Colour 11
 - 6.2.5 Texture and permeability 12
 - 6.2.6 Structure 12
 - 6.2.7 Consistence 12
 - 6.2.8 Salinity 12
 - 6.2.9 Bedrock 12
 - 6.2.10 Limiting layer 12
 - 6.2.10.1 Permafrost 12
- 6.3 Surface elevations and drainage features 12
- 6.4 Area available 13
- 6.5 Site evaluation report 13
 - 6.5.1 Minimum content 13
 - 6.5.2 Additional content 13

7 Wastewater flows and strength	14
7.1 Residential flows	14
7.2 Non-residential flows	14
7.3 Daily flow variances	15
7.4 Wastewater strength	15
7.4.1 Residential	15
7.4.2 Non-residential	15
8 Upstream components	15
8.1 Primary treatment components	15
8.1.1 General	15
8.1.2 Effluent quality	15
8.1.3 Exceptions	15
8.2 Additional treatment	16
8.3 Septic tanks	16
8.3.1 Working capacity	16
8.3.2 Access	16
8.3.3 Water tightness	17
8.3.4 Insulation	17
8.3.5 Horizontal setback distances	17
8.3.6 Venting	17
8.3.7 Effluent filtration	17
8.3.8 Installation	18
8.3.9 Compliance	18
8.4 Effluent tanks and effluent chambers	18
8.4.1 General	18
8.4.2 Capacity	18
8.4.3 Access openings	18
8.4.4 Water tightness	18
8.4.5 Insulation	18
8.4.6 Location	18
8.4.7 Installation	18
8.4.8 Venting	19
8.4.9 Compliance	19
8.5 Advanced treatment devices	19
8.5.1 Performance	19
8.5.2 Installation	19
8.5.3 Setback distances	19
8.6 Effluent pumps	19
8.6.1 General	19
8.6.2 Plumbing criteria	19
8.6.3 Liquid level sensor	20
8.6.4 High-liquid level alarm	20
8.6.5 Electrical criteria	20
8.7 Grease interceptors	20
8.7.1 General	20
8.7.2 Compliance	20
8.7.3 Sizing, selection, location, installation, and maintenance	20
8.7.4 Horizontal setback distances	20
8.8 Sampling ports	20
8.9 Piping	20
8.9.1 General	20
8.9.2 Non-pressurized piping	21
8.9.3 Pressurized piping	21

- 8.9.4 Joints 21
- 8.9.5 Flow monitoring 21
- 8.10 Alarms 21
- 8.10.1 Alarm types 21
- 8.10.2 Location and functionality 21

9 Soil absorption systems 22

- 9.1 General 22
- 9.2 Vertical separation 22
- 9.3 Horizontal setback distances 22
- 9.4 Loading rates 22
 - 9.4.1 Hydraulic loading rates 22
 - 9.4.2 Linear loading rate 23
 - 9.4.3 Imported fills 25
- 9.5 Materials and dimensioning 25
 - 9.5.1 Gravel-based systems 25
 - 9.5.2 Materials 25
 - 9.5.3 Trenches 26
 - 9.5.4 Gravel-less and gravel substitute systems 27
 - 9.5.5 Inspection ports 27
- 9.6 Nutrient loading 27
- 9.7 Pressure-distribution systems 27
 - 9.7.1 General 27
 - 9.7.2 Design 27
 - 9.7.3 Distribution piping 27
 - 9.7.4 Orifices 28
 - 9.7.5 Dosing 28
- 9.8 Other soil absorption systems 28
 - 9.8.1 Seepage beds 28
 - 9.8.2 Sand filters 29
 - 9.8.3 Subsurface drip dispersal 29
 - 9.8.4 Contour systems 29

10 Holding tanks 29

- 10.1 Capacity 29
- 10.2 Access openings 29
- 10.3 Water tightness 29
- 10.4 Insulation 29
- 10.5 Setback distances and locations 30
- 10.6 Installation 30
- 10.7 Compliance 30

11 Installation 30

Annexes

- A** (informative) — Operation and maintenance of decentralized wastewater systems 49
- B** (informative) — Installation guideline for septic tanks 53
- C** (informative) — Soil categories and classification 54
- D** (informative) — Sludge and scum accumulation rates 60
- E** (informative) — Constant head well (pask) permeameter for in-situ measurement of field saturated hydraulic conductivity of soils 65
- F** (informative) — Northern considerations 76

Tables

- 1** — Minimum vertical separation distances 31
 - 2** — Material specifications and loading rates for imported fills 31
 - 3** — Suitability of soil for effluent loading 33
 - 4** — Minimum horizontal setback distances for soil absorption systems, m 33
 - 5** — Average and peak daily flows per occupant residential occupancies 34
 - 6** — Fixture units 34
 - 7** — Maximum area of dwellings based on the number of bedrooms 35
 - 8** — Non-residential peak daily flows 35
 - 9** — Levels of treatment 37
 - 10** — Minimum working capacity of septic tanks 37
 - 11** — Types of treatment 38
 - 12** — Maximum hydraulic loading rates 39
 - 13** — Maximum linear loading rates, L/(m•d) 41
 - 14** — Requirements for geotextiles (non-woven filter fabrics) 44
-

Figures

- 1** — Vertical separation for a trench system 44
- 2** — Vertical separation for imported fill 45
- 3** — Illustration of the concept of the linear loading rate 45
- 4** — Slope of groundwater and mounded water flowing from disposal area 45
- 5** — Example of a system designed to control effluent flow direction 47
- 6** — Mounding in native soil and fill 48

Technical Committee on Decentralized Wastewater Systems

D. Joy	University of Guelph, Guelph, Ontario	<i>Chair</i>
A. Durnie	Alberta Municipal Affairs, Edmonton, Alberta	<i>Vice-Chair</i>
J. Aitkin	Rankin's Septic Tank Pumping & Environmental Services, Waterdown, Ontario <i>Representing Ontario Association of Sewage Industry Services</i>	<i>Associate</i>
W. Alsip	Terrex Construction Ltd., Okotoks, Alberta	
D. Bachelder	Advanced Drainage Systems Inc., York, Maine, USA	
M.C. Bélanger	Premier Tech Aqua, Rivière-du-Loup, Québec	<i>Associate</i>
B. Berard	Infiltrator Systems Inc., Lac du Bonnet, Manitoba	
B. Bohn	Watertech Engineering Research and Health Inc., Calgary, Alberta	
J.H. Doner	Waterloo Biofilter Systems Inc., Rockwood, Ontario	<i>Associate</i>
C. Ferneyhough	Advanced Drainage Systems Inc., Caledon, Ontario	<i>Associate</i>
J.P. Ferrero	Bureau de normalisation du Québec, Québec, Québec	<i>Associate</i>
K. Galloway	Engineering Technologies Canada Ltd., Stratford, Prince Edward Island	
B. Gorczyca	University of Manitoba, Winnipeg, Manitoba <i>Consumer Representative</i>	<i>Associate</i>
K. Gould	New Brunswick Department of Health, Fredericton, New Brunswick	
R. Guinn	Hawkestone, Ontario <i>Consumer Representative</i>	

F. Hay	Pinnacle Environmental Technologies Inc., Langley, British Columbia	<i>Associate</i>
D. Johnson	Newfoundland and Labrador Department of Health and Community Services, St. John's, Newfoundland and Labrador	<i>Associate</i>
C.D. Jowett	Waterloo Biofilter Systems Inc., Rockwood, Ontario	
D. Krauss	Infiltrator Systems Inc., North Bay, Ontario	<i>Associate</i>
R. Lacasse	Premier Tech Aqua, Rivière-du-Loup, Québec	
L. Laidman	L-Zone Environmental Inc., Binbrook, Ontario	
R. Lay	Enermodal Engineering Limited, Kitchener, Ontario	
I. Leblanc	Assembly of First Nations, Ottawa, Ontario	<i>Associate</i>
L. Leskiw	Paragon Soil and Environmental Consulting Inc., Edmonton, Alberta	
M. MacCormack	Stantec Consulting Ltd., Kitchener, Ontario	<i>Associate</i>
D.G. Martin	Golder Associates Ltd., Kanata, Ontario	
T. Pinkess	Yukon Department of Health and Social Services, Whitehorse, Yukon	
J. Rowse	British Columbia Onsite Sewage Association, Victoria, British Columbia	
A. Sharaf	Ontario Ministry of Municipal Affairs and Housing, Toronto, Ontario	<i>Associate</i>
M. Schmalz	Alberta Wilbert Sales Ltd., Edmonton, Alberta	
C. Seeley	Saskatchewan Ministry of Health, Regina, Saskatchewan	
P. Seto	Environment Canada, Burlington, Ontario	
D. Smiley	Manitoba Conservation, Winnipeg, Manitoba	

C. Soroczan	Canada Mortgage and Housing Corporation, Ottawa, Ontario	<i>Associate</i>
J. Steeves	Aboriginal Affairs and Northern Development Canada, Gatineau, Québec	
G.K. Taracha	Health Canada, Ottawa, Ontario	
M. Wilkinson	Wilkinson Heavy Precast Ltd., Dundas, Ontario	<i>Associate</i>
T. Wilson	Langley, British Columbia	
M. Bernardi	Canadian Standards Association, Mississauga, Ontario	<i>Project Manager</i>

In addition to the members of the Committee, valuable contributions to the development of this Standard were made by Abraham Murra and Dwayne Torrey.

Preface

This is the first edition of CSA B65, *Installation code for decentralized wastewater systems*.

The development of this Code was made possible, in part, by the financial support of Advanced Drainage Systems Inc., Alberta Municipal Affairs, Alberta Onsite Wastewater Management Association, Alberta Wilbert Sales Ltd., Canada Mortgage and Housing Corporation, Health Canada, Infiltrator Systems Inc., Manitoba Conservation, Ontario Onsite Wastewater Association, Pinnacle Environmental Technologies Inc., Premier Tech Aqua, and Waterloo Biofilter Systems Inc. Such support does not indicate endorsement of the contents of this Code.

This Standard was prepared by Technical Committee on Decentralized Wastewater Systems, under the jurisdiction of the Strategic Steering Committee on Water Management Products, Materials, and Systems, and has been formally approved by the Technical Committee.

March 2012

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) To submit a request for interpretation of CSA Standards, please send the following information to inquiries@csa.ca 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 published in CSA’s Current Standard Activities, which is available on the CSA website at <http://standardsactivities.csa.ca>.
- (5) CSA Standards are subject to periodic review, and suggestions for their improvement will be referred to the appropriate committee. To submit a proposal for change to CSA Standards, please send the following information to inquiries@csa.ca 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.

B65-12

Installation code for decentralized wastewater systems

0 Introduction

0.1 General

This Code was developed in response to a request from provincial/territorial regulators, who saw the need for a national installation code for decentralized wastewater systems that would

- (a) provide a national basis for training and qualification of installers, inspectors, operators, and users;
- (b) enhance the protection of public health and safety;
- (c) enhance the protection of the environment;
- (d) create potential savings in resources by the sharing of knowledge among provincial/territorial and federal ministries;
- (e) standardize practices and requirements across Canada to support the inter-provincial/territorial movement of labour, goods, and services;
- (f) consider the economic impact of compliance; and
- (g) provide a framework for consistent compliance throughout Canada.

Experts from across North America had the opportunity to participate in the development of this Code, and provinces, territories, and other stakeholders were able to provide their input on the technical content.

0.2 Expectations

It is expected that this Code will

- (a) be adopted by provinces and territories across Canada and by federal ministries;
- (b) increase opportunities for sharing technical resources and training materials and therefore make closing the gaps between provincial, territorial, and federal regulations much easier and faster;
- (c) encourage research and innovation on a national scale and allow the results of research to have greater and more widespread application and benefit; and
- (d) be reviewed and updated to reflect the current state of knowledge in the decentralized wastewater industry.

0.3 Intent

The intent of this Code is to specify requirements for the design and installation of decentralized wastewater systems and to provide guidance on recommended practices for the operation and maintenance of the systems.

0.4 Major goals

The major goals of this Code are to

- (a) specify requirements that result in decentralized wastewater systems that are sustainable long-term solutions for wastewater management;
- (b) enhance the protection of surface water and groundwater;
- (c) enhance the protection of the environment; and
- (d) enhance the protection of public health and safety.

0.5 Additional goals

In addition to the goals listed in [Clause 0.4](#), this Code

- (a) facilitates the operation and maintenance of decentralized wastewater systems by specifying requirements for their design;
- (b) recognizes various climates, soils, and geographic factors across Canada;
- (c) encourages development and allows for new technologies and facilitates their acceptance by authorities having jurisdiction; and
- (d) facilitates regulation by jurisdictions.

0.6 Innovation

It is not the intent of this Code to stifle innovation. If a system is not covered in this Code non-coverage should not be construed as precluding its use.

0.7 Approvals

The authorities having jurisdiction approve designs of sewerage works not covered in this Code. Legislation takes precedence over this Code.

1 Scope

1.1

1.1.1

This Code covers decentralized wastewater systems that use soil absorption systems for infiltration, dispersal, and final treatment of wastewater and serve residential, institutional, and commercial establishments.

Note: In this Code, the term “system” refers to a decentralized wastewater system.

1.1.2

This Code also covers sewage holding tanks.

Note: Holding tanks are not a self-sustaining method of on-site wastewater management because they rely on the availability of an adequate off-site wastewater treatment facility, which generally creates a load on municipal infrastructure. Owners of holding tanks also incur ongoing costs for the removal and hauling of wastewater to approved treatment facilities. The use of a holding tank system as the wastewater management solution for a property is subject to the requirements of the local authority having jurisdiction.

1.2

1.2.1

This Code does not cover

- (a) lagoons or surface discharge of effluent; and
- (b) wastewater generated by industrial processes.

1.2.2

This Code does not specify requirements for, or provide direction on, the selection of the type of system and required effluent quality that might be needed to manage cumulative impacts

- (a) on a multi-lot, subdivision, or watershed scale caused by multiple decentralized wastewater systems; or
- (b) where systems are located in a sensitive receiving environment.

Note: The determination of treatment objectives, effluent quality, and system types required for a multi-lot subdivision should consider cumulative impact or loading limits. Loading limits required to prevent unacceptable impacts on groundwater or surface water, caused by the total wastewater generated from multi-lot subdivisions or where needed to protect a sensitive receiving environment, should be considered in the selection and use of decentralized wastewater treatment systems.