

**CSA B45.13-14/
IAPMO Z1700-2014**

Vacuum waste-collection systems



**CSA
Group**



Legal Notice for Harmonized Standard Jointly Developed by CSA and IAPMO

Intellectual property rights and ownership

As between Canadian Standards Association (operating as "CSA Group") and International Association of Plumbing and Mechanical Officials ("IAPMO") (collectively "CSA Group and IAPMO") and the users of this document (whether it be in printed or electronic form), CSA Group and IAPMO are the joint owners 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. The unauthorized use, modification, copying, or disclosure of this document may violate laws that protect the intellectual property of CSA Group and IAPMO and may give rise to a right in CSA Group and IAPMO to seek legal redress for such use, modification, copying, or disclosure. CSA Group and IAPMO reserve all intellectual property rights in this document.

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 and IAPMO do not warrant the accuracy, completeness, or currency of any of the information published in this document. CSA Group and IAPMO make no representations or warranties regarding this document's compliance with any applicable statute, rule, or regulation.

IN NO EVENT SHALL CSA GROUP AND IAPMO, THEIR RESPECTIVE 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 OF, OR USE OF, THIS DOCUMENT, EVEN IF CSA GROUP OR IAPMO HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES.

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

CSA Group and IAPMO have no power, nor do they undertake, to enforce compliance with the contents of the standards or other documents they jointly publish.

Authorized use of this document

This document is being provided by CSA Group and IAPMO 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 Group and IAPMO 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 and IAPMO; 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

CSA B45.13-14/IAPMO Z1700-2014

May 2014

Title: *Vacuum waste-collection systems*

Pagination: **22 pages** (xii preliminary and 10 text), each dated **May 2014**

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 **2422155**.

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

Visit CSA Group'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/IAPMO Standard

CSA B45.13-14/IAPMO Z1700-2014 Vacuum waste-collection systems



**CSA
Group**

™A trade-mark of the Canadian Standards Association operating as "CSA Group"



Published in May 2014 by CSA Group
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 the CSA Group Online Store at shop.csa.ca

The IAPMO Group
5001 East Philadelphia Street
Ontario, California 91761-2816, USA
1-800-854-2766 • 1-909-472-4100

Visit the IAPMO Online Store at www.IAPMOstore.org

Commitment for Amendments

This Standard is issued jointly by the Canadian Standards Association (operating as “CSA Group”) and the International Association of Plumbing and Mechanical Officials (IAPMO). Amendments to this Standard will be made only after processing according to the Standards writing procedures of both CSA and IAPMO.

Published in May 2014 by
CSA Group
A not-for-profit private sector organization
5060 Spectrum Way, Suite 100
Mississauga, Ontario, Canada
L4W 5N6
1-800-463-6727 • 416-741-4044
Visit the CSA Online Store at shop.csa.ca

ISBN 978-1-77150-054-4

© 2014 CSA Group

All rights reserved. No part of this publication
may be reproduced in any form whatsoever
without the prior permission of the publisher.

The IAPMO Group
5001 East Philadelphia Street
Ontario, California 91761-2816
USA
1-800-854-2766 • 1-909-472-4100
Visit the IAPMO Online Store at
www.IAPMOstore.org

Copyright © 2014 by International Association of
Plumbing and Mechanical Officials

The 2014 edition of this Standard is being issued
with an automatic addenda subscription service.
The use of addenda allows revisions made in
response to public review comments or
committee actions to be published as necessary.

Contents

CSA Technical Committee on Plumbing Fixtures (B45) v

IAPMO Plumbing Standards Committee viii

CSA/IAPMO Harmonization Task Group on Plumbing Fixtures x

Preface xi

1 Scope 1

2 Reference publications 1

3 Definitions and abbreviations 3

3.1 Definitions 3

3.2 Abbreviations 4

4 General requirements 4

4.1 Vacuum system components 4

4.1.1 Buffers/accumulators 4

4.1.2 Activators/controllers 4

4.1.3 Interface valve kits/lift kits 4

4.1.4 Isolation valves 4

4.1.5 Check valves 4

4.2 Drainage piping 4

4.2.1 General 4

4.2.2 Copper drainage tubes 5

4.2.3 Plastic drainage piping 5

4.2.4 Stainless steel drainage piping 5

4.3 Vacuum centre 5

4.3.1 Vacuum generation 5

4.3.2 Waste collection 5

4.3.3 Electrical requirements 5

4.4 Other components 6

4.4.1 Tanks 6

4.4.2 Plumbing fixtures 6

4.5 Backflow protection 6

5 Test requirements 6

5.1 Water closet performance tests 6

5.1.1 General 6

5.1.2 Flushing performance test 7

5.1.3 Water consumption test 7

5.2 Vacuum discharge valve/extraction valve test 8

5.2.1 Procedure 8

5.2.2 Performance 8

5.3 Collection tank test 9

5.3.1 Procedure 8

5.3.2 Performance requirements 8

5.4 Activator/controller test 8

5.4.1 Procedure 9

5.4.2 Performance 9

5.5	Buffer/accumulator test for condensate or greywater vacuum systems	9
5.5.1	Procedure	9
5.5.2	Performance	9
5.6	Buffer/accumulator test for grease vacuum systems	9
5.6.1	Procedure	9
5.6.2	Performance	9

6 Markings and additional literature 10

CSA Technical Committee on Plumbing Fixtures (B45)

S. Rawalpindiwala	Kohler Co., Kohler, Wisconsin, USA	<i>Chair</i>
F. Lemieux	Health Canada, Ottawa, Ontario	<i>Vice-Chair</i>
J.E. Bertrand	Moen Incorporated, North Olmsted, Ohio, USA	<i>Associate</i>
R. Burnham	Zurn Industries LLC, Erie, Pennsylvania, USA	
M. Campos	International Code Council, Whittier, California, USA	<i>Associate</i>
S.L. Cavanaugh	Cavanaugh Consulting, Santa Fe, New Mexico, USA	
I.W. Chang	Intertek, Coquitlam, British Columbia	<i>Associate</i>
M. Chojnacka	City of Toronto, Toronto, Ontario	
N. Dickey	CSA Group, Cleveland, Ohio, US	<i>Associate</i>
Y. Duchesne	Régie du bâtiment du Québec, Québec, Québec	
T. Eberhardy	Bradley Corporation, Menomonee Falls, Wisconsin, USA	<i>Associate</i>
T.D. Ellison	Carriford Associates, Rockland, Ontario	
K. Ernst	Oakville Stamping & Bending Limited, Oakville, Ontario	
W. Falcomer	City of Ottawa, Ottawa, Ontario	
F. Fernandez	Toto U.S.A. Inc., Ontario, California, USA	
D. Green	National Research Council Canada, Ottawa, Ontario	<i>Associate</i>
R. Hildebrand	The Regional Municipality of Waterloo, Kitchener, Ontario	

L. Himmelblau	Chicago Faucets Company, Des Plaines, Illinois, USA	
E. Ho	IAPMO Research and Testing Inc., Markham, Ontario	<i>Associate</i>
K.S. Hui	Ontario Ministry of Municipal Affairs and Housing, Toronto, Ontario	
J. Knapton	SAIT Polytechnic, Calgary, Alberta	
J. Koeller	Koeller and Company, Yorba Linda, California, USA	
N.M. Kummerlen	Lorain, Ohio, USA	
C. Lagan	American Standard Brands, Piscataway, New Jersey, USA	
B. Lagueux	Saint-Nicolas, Québec	
J. Manente	Region of Peel, Brampton, Ontario	<i>Associate</i>
D. Marbry	Fluidmaster Inc., San Juan Capistrano, California, USA	<i>Associate</i>
S.E. Martin	International Code Council, Pittsburgh, Pennsylvania, USA	<i>Associate</i>
S. Marxen	American Society of Sanitary Engineering (ASSE), Westlake, Ohio, USA	<i>Associate</i>
W. McCaffrey	Alberta Municipal Affairs, Red Deer, Alberta	
T. McCann	Department of National Defence, Ottawa, Ontario	
D. McNamara	Frank Kindred Canada Limited, Midland, Ontario	
D. Orton	NSF International, Ann Arbor, Michigan, USA	<i>Associate</i>
S.A. Remedios	Remedios Consulting LLC, Noblesville, Indiana, USA	
T. Sessman	Kohler Co., Kohler, Wisconsin, USA	<i>Associate</i>
L. Swatkowski	Plumbint Manufacturers International, Rolling Meadows, Illinois, USA	<i>Associate</i>
C. Trendelman	Delta Faucet Company, Indianapolis, Indiana, USA	<i>Associate</i>

C. Wright

Ontario Pipe Trades,
Dundalk, Ontario

L. Pilla

CSA Group,
Mississauga, Ontario

Project Manager

IAPMO Plumbing Standards Committee

S. Rawalpindiwala	Kohler Co., Kohler, Wisconsin, USA	<i>Chair</i>
S.S. Parkhurst	QAI Laboratories, Tulsa, Oklahoma, USA	<i>Vice-Chair</i>
C. Arnold	National Association of Home Builders Research Center, Washington, D.C., USA	
J.A. Ballanco	JB Engineering and Code Consulting, P.C., Munster, Indiana, USA	
B.G. Brody	North American Composites, Mays Landing, New Jersey, USA	
T. Burke	Victoria and Albert Baths Ltd., Wombourne, West Midlands, United Kingdom	<i>Non-Voting</i>
M.E. Carroll	Underwriters' Laboratories, San Jose, California, USA	
S.L. Cavanaugh	Cavanaugh Consulting, Santa Fe, New Mexico, USA	
I.W. Chang	Intertek, Coquitlam, British Columbia, Canada	
S. Chen	Masco Corporation, Taylor, Michigan, USA	
L. Cox	Structurlite Composites Consultants, Hebron, Ohio, USA	
S.M. Galayda	Product Listing Services, Inc., Litchfield, Ohio, USA	
J. Galvin	Plumbing Manufacturers International, Rolling Meadows, Illinois, USA	
C.R. Graham	Martech Enterprises, Thousand Oaks, California, USA	
A. Granzow	NIBCO, Inc., Elkhart, Indiana, USA	
D.E. Holloway	IAPMO R&T Lab, Broken Arrow, Oklahoma, USA	<i>Non-Voting</i>

R. Hyer	Testing Engineers International, Salt Lake City, Utah, USA	
J.M. Koeller	Koeller and Company, Yorba Linda, California, USA	
C.J. Lagan	American Standard Brands, Piscataway, New Jersey, USA	
R. Mata	CSA Group, Cleveland, Ohio, USA	
L.A. Mercer	Moen Incorporated, North Olmsted, Ohio, USA	
B. Mitchell	Kinro Composites, Waxahachie, Texas, USA	
D. Orton	NSF International, Ann Arbor, Michigan, USA	
S.A. Remedios	Remedios Consulting, LLC, Noblesville, Indiana, USA	
A.L. Scarano	Plastics Piping Consultants, Yardley, Pennsylvania, USA	
W.A. Schneider	Containment Solutions, Inc., Conroe, Texas, USA	
B. Taylor	Taylor Industries, Inc., Parker Ford, Pennsylvania, USA	
W.C. Whitehead	Whitehead Consulting Services, Danvers, Massachusetts, USA	
A.I. Murra	IAPMO, Ontario, California, USA	<i>Secretary</i>
K.C. Thompson	IAPMO, Ontario, California, USA	<i>Staff Liaison</i>

CSA/IAPMO Harmonization Task Group on Plumbing Fixtures

E. Ho	IAPMO Research and Testing, Inc., Ontario, California, USA	<i>Co-Chair</i>
D. McNamara	Franke Kindred Canada Limited, Midland, Ontario, Canada	<i>Co-Chair</i>
M.A. Banks	Dupont Building Innovations, Buffalo, New York, USA	
I.W. Chang	Intertek, Coquitlam, British Columbia, Canada	
N. Dickey	CSA Group, Independence, Ohio, USA	
K. Ernst	Oakville Stamping & Bending Limited, Oakville, Ontario, Canada	
N.M. Kummerlen	Lorain, Ohio, USA	
C.J. Lagan	American Standard Brands, Piscataway, New Jersey, USA	
F. Lemieux	Health Canada, Ottawa, Ontario, Canada	
S. Rawalpindiwala	Kohler Co., Kohler, Wisconsin, USA	
S.A. Remedios	Remedios Consulting LLC, Noblesville, Indiana, USA	
C. Wright	Ontario Pipe Trades, Dundalk, Ontario, Canada	
L. Pilla	CSA Group, Mississauga, Ontario, Canada	<i>Project Manager</i>
A.I. Murra	IAPMO, Ontario, California, USA	<i>Secretary</i>

Preface

This is the first edition of CSA B45.13/IAPMO Z1700, *Vacuum waste-collection systems*.

This Standard supersedes IAPMO IGC 150-2009, *Vacuum Sewage, Grease Waste and/or Condensate Collection Systems*.

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

This Standard was prepared by the CSA/IAPMO Harmonization Task Group on Plumbing Fixtures, under the jurisdiction of the CSA Technical Committee on Plumbing Fixtures and the IAPMO Plumbing Standards Committee. The CSA Technical Committee operates under the jurisdiction of the CSA Strategic Steering Committee on Construction and Civil Infrastructure. This Standard has been formally approved by the CSA Technical Committee and the IAPMO Standards Committee. This Standard was approved as an American National Standard by the American National Standards Institute on February 20, 2014.

CSA 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.
- (6) Attention is drawn to the possibility that some of the elements of this Standard may be the subject of patent rights. CSA is not to 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.

IAPMO Notes:

- (1) The use of the singular does not exclude the plural (and vice versa) when the sense allows.
- (2) This standard was developed in accordance with the IAPMO procedures accredited as meeting the criteria for American National Standards and it is an American National Standard. The IAPMO Standards Committee that approved this Standard was balanced to assure that individuals from competent and concerned interests had an opportunity to participate. During its development, this Standard was made available for public review, thus providing an opportunity for additional input from industry, academia, regulatory agencies, and the public at large.
- (3) This Standard was developed by consensus, which is defined as substantial agreement; consensus implies much more than a simple majority, but not necessarily unanimity. It is consistent with this definition that a member of the relevant IAPMO Standards Committee can be included in the committee roster and yet not be in full agreement with all sections of this Standard.
- (4) 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.

- (5) IAPMO Standards are subject to periodic review and suggestions for their improvement will be referred to the relevant IAPMO Standards Committee. To submit a proposal for change to this Standard, you may send the following information to the International Association of Plumbing and Mechanical Officials, Attention Standards Department, at **standards@IAPMOstandards.org** or, alternatively, at 5001 East Philadelphia Street, Ontario, California, 91761, and include "Proposal for change" in the subject line:
- (a) standard designation (number);
 - (b) relevant section, table, or figure number, as applicable;
 - (c) wording of the proposed change, tracking the changes between the original and the proposed wording; and
 - (d) rationale for the change.
- (6) Requests for interpretation should be clear and unambiguous. To submit a request for interpretation of this Standard, you may send the following information to the International Association of Plumbing and Mechanical Officials, Attention Standards Department, at **standards@IAPMOstandards.org** or, alternatively, at 5001 East Philadelphia Street, Ontario, California, 91761, and include "Request for interpretation" in the subject line:
- (a) the edition of the standard for which the interpretation is being requested;
 - (b) the definition of the problem, making reference to the specific section and, when appropriate, an illustrative sketch explaining the question;
 - (c) an explanation of circumstances surrounding the actual field conditions; and
 - (d) the request for interpretation phrased in such a way that a "yes" or "no" answer will address the issue.
- (7) Interpretations are processed in accordance with IAPMO's accredited standards development procedures. IAPMO issues written replies to inquiries concerning interpretation of technical aspects of this Standard.
- (8) IAPMO accepts responsibility only for those interpretations of this Standard issued in accordance with the accredited IAPMO policies and procedures, which precludes the issuance of interpretations by individuals.
- (9) IAPMO does not "approve," "rate," or "endorse" any item, construction, proprietary device, or activity.
- (10) Attention is drawn to the possibility that some of the elements of this Standard may be the subject of patent rights. IAPMO is not to 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 responsibility.
- (11) IAPMO does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this Standard, and does not undertake to insure anyone utilizing this Standard against liability for infringement of any applicable patents, nor assumes any such liability. Users of this Standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their responsibility.
- (12) Participation by federal or state agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this Standard.

CSA B45.13-14/IAPMO Z1700-2014

Vacuum waste-collection systems

1 Scope

1.1

This Standard covers vacuum waste-collection systems intended to extract and transport water, condensate from refrigerators, sanitary waste, greywater, or grease and specifies requirements for materials, construction, performance testing, and markings.

1.2

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; “may” is used to express an option or that which is permissible within the limits of the standard; and “can” is used to express possibility or capability.

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.

1.3

The values stated in either SI (metric) or inch/pound units are to be regarded as the standard. SI units are the units of record in Canada.

In this Standard, the inch/pound units are shown in parentheses. The values stated in each measurement system are equivalent in application; however, each system is to be used independently. Combining values from the two measurement systems can result in non-conformance with this Standard.

All references to gallons are to U.S. gallons.

2 Reference publications

ASTM International

A312/A312M-12

Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes

A403/A403M-12

Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings

B88-09

Standard Specification for Seamless Copper Water Tube

D1527-99 (2005)

Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedule 40, 80 and 120

D1785-12

Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedule 40, 80, and 120