Ceramic plumbing fixtures







Legal Notice for Harmonized Standard Jointly Developed by ASME and CSA Group

Intellectual property rights and ownership

As between American Society of Mechanical Engineers ("ASME") and Canadian Standards Association (Operating as "CSA Group") (collectively "ASME and CSA Group") and the users of this document (whether it be in printed or electronic form), ASME and CSA Group 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 ASME and CSA Group and may give rise to a right in ASME and CSA Group to seek legal redress for such use, modification, copying, or disclosure. ASME and CSA Group 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. ASME and CSA Group do not warrant the accuracy, completeness, or currency of any of the information published in this document. ASME and CSA Group make no representations or warranties regarding this document's compliance with any applicable statute, rule, or regulation.

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

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

ASME and CSA Group 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 ASME and 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 print or paper form may be distributed only to persons who are authorized by ASME and 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 ASME and 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

ASME A112.19.2-2018/CSA B45.1-18, Ceramic plumbing fixtures

Errata — October 2018	Revision symbol (in margin)
Preface Clause 7.9.2.2.3 Figure 3	Δ

Standards Update Service

ASME A112.19.2-2018/CSA B45.1-18 July 2018

Title: Ceramic plumbing fixtures

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

- go to store.csagroup.org
- click on CSA Update Service

The List ID that you will need to register for updates to this publication is 2425956.

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.

ASME/CSA Standard

ASME A112.19.2-2018/CSA B45.1-18 Ceramic plumbing fixtures





*A trademark of the Canadian Standards Association and CSA America Inc., operating as "CSA Group"

Published in July 2018 by CSA Group A not-for-profit private sector organization 178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3 1-800-463-6727 • 416-747-4044

Visit the CSA Group Online Store at shop.csa.ca

The American Society of Mechanical Engineers (ASME)

Three Park Avenue

New York, NY 10016-5990, USA

1-800-843-2763

Visit the ASME Online Store at www.asme.org

Commitment for Amendments

This Standard is issued jointly by the American Society of Mechanical Engineers (ASME) and the Canadian Standards Association (Operating as "CSA Group"). Amendments to this Standard will be made only after processing according to the Standards writing procedures of both ASME and CSA Group.

The American Society of Mechanical Engineers (ASME)
Three Park Avenue
New York, NY 10016-5990
USA
1-800-843-2763
Visit the ASME Online Store at
www.asme.org

Copyright © 2018 by The American Society of Mechanical Engineers (ASME)

This Standard is available for public review on a continuous basis. This provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public at large.

Published in June 2018 by CSA Group A not-for-profit private sector organization 178 Rexdale Boulevard Toronto, Ontario, Canada M9W 1R3 1-800-463-6727 or 416-747-4044 Visit the CSA Group Online Store at shop.csa.ca

ISBN 978-1-4883-1274-8

© 2018 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.

6

Contents

ASME A112 Standards Committee on Plumbing Materials and Equipment	nt
ASME A112.19.2 Project Team on Vitreous China Plumbing Fixtures	10
CSA Technical Committee on Plumbing Fixtures 12	
CSA/ASME Harmonization Task Group on Plumbing Fixtures 17	
Preface 19	
1 Scope 21	
2 Reference publications 22	
3 Definitions and abbreviations 23	
3.1 Definitions 23	
3.2 Abbreviations 27	
4 General requirements 28	
4.1 Dimensions and tolerances 28	
4.1.1 Thickness <i>28</i>	
4.1.2 Tolerances 28	
4.2 Glazing <i>28</i>	
4.3 Waste fitting openings, drainage, and overflows 29	
4.3.1 Openings and drainage 29	
4.3.2 Overflows <i>29</i>	
4.4 Off-the-floor plumbing fixture supports 29	
4.5 Non-vitreous china plumbing fixtures 30	
4.5.1 Glazing <i>30</i>	
4.5.2 Integral traps 30	
4.6 Additional requirements for water closets 30	
4.6.1 Outlet dimensions <i>30</i>	
4.6.2 Non-standard outlets <i>30</i>	
4.6.3 Bolt hole spacing 30	
4.6.4 Roughing-in details <i>30</i>	
4.6.5 Seat-mounting holes <i>30</i>	
4.6.6 Rim profiles 30	
4.6.7 Water surface dimensions <i>30</i>	
4.6.8 Trap diameter 30	
4.6.9 Spuds <i>31</i>	
4.6.10 Rim heights <i>31</i>	
4.7 Additional requirements for urinals 31	
4.7.1 Integral trap diameter 31	
4.7.2 Dimensions 31	
4.7.3 Spuds <i>31</i>	
4.7.4 Materials and construction 31	
4.7.5 Non-water-consuming urinals 31	

4.8	Additional requirements for lavatories, sinks, and bidets 31
4.8.1	Openings and mounting surfaces for supply fittings 31
4.8.2	Wall-mounted commercial lavatories and sinks 32
4.8.3	Spuds for clinic sinks 32
4.9	Additional requirements for bathtubs and shower bases 32
4.9.1	Minimum dimensions for bathtubs 32
4.9.2	Slope to the waste outlet 32
4.9.3	Flanges 32
4.10	Additional requirements for drinking fountains 33
4.11	Accessible design fixtures 33
5 Flus	shing devices used with fixtures 33
5.1	General 33
5.2	Gravity flush tanks 33
5.2.1	General 33
5.2.2	Fill valve opening diameter and location 33
5.2.3	Critical level 33
5.2.4	Low-profile gravity tanks 34
5.2.5	Water closet fill valve 34
5.2.6	Water closet tank capacity 34
5.3	Pressurized flushing devices 34
5.3.1	General 34
5.3.2	Low-profile tanks with pressurized flushing devices 34
5.4	Plastic water closet tanks 34
5.5	Electrical components of electro-hydraulic water closets 34
5.5.1	Pump motor and impeller 34
5.5.2	Jet hose 34
5.5.3	Electrical supply cords 35
5.5.4	Wiring harnesses and electrical controls 35
5.6	Dual-flush water closets 35
6 Test	ts — Materials, finishes, structural integrity, and seals 35
6.1	Water absorption test 35
6.1.1	Test specimen 35
6.1.2	Specimen preparation 35
6.1.3	Procedure 35
6.1.4	Report 35
6.1.5	Performance 36
6.2	Crazing test 36
6.2.1	Test specimen 36
6.2.2	Procedure 36
6.2.3	Performance 36
6.3	Surface examination 36
6.3.1	Procedure 36
6.3.2	Evaluation 36
6.3.3	Performance 37
6.3.4	Other fixtures 37
6.4	Warpage test 37
6.4.1	Procedure 37

6.4.2	Performance 37
6.5	Field-installed tiling-flange seal test 37
6.5.1	Procedure 37
6.5.2	Performance 38
6.6	Overflow test (lavatories, sinks, and bidets) 38
6.6.1	Procedure 38
6.6.2	Performance 38
6.7	Structural integrity tests for all wall-mounted plumbing fixtures and thin-wall lavatories 38
6.7.1	All wall-mounted fixtures and thin-wall lavatories 38
6.7.2	Wall-mounted water closets 39
6.7.3	Wall-mounted and thin-wall lavatories 39
6.7.4	Wall-mounted urinals 39
6.8	Structural integrity test for bathtubs, shower bases, and non-vitreous service sinks 39
6.8.1	Apparatus 39
6.8.2	Procedure 40
6.8.3	Performance 40
6.9	Joint seal test 40
6.10	Auger test 40
6.10.1	Procedure 40
6.10.2	Performance 40
6.11	Condensation-free (insulated) tank test 40
6.11.1	
6.11.2	Performance 41
7 Wat	er closet tests 41
7.1	General 41
7.1.1	All tests 41
7.1.2	Gravity flush tank water closets 41
7.1.3	Flushometer tank, electro-hydraulic, or other pressurized flushing device water closets 42
7.1.4	Flushometer valve water closets 42
7.1.5	Procedures for standardizing the water supply system 42
7.1.6	Test medium 43
7.1.7	Reports 43
7.2	Trap seal depth determination test 43
7.2.1	Apparatus 43
7.2.2	Procedure 43
7.2.3	Report 43
7.2.4	Performance 43
7.3	Water consumption test 43
7.3.1	General 43
7.3.2	Apparatus 44
7.3.3	Procedure 44
7.3.4	Report 44
7.3.5	Performance 44
7.4	Trap seal restoration test 44
7.4.1	Apparatus 44
7.4.2	Procedure 44
7.4.3	Report 45
7.4.4	Performance 45

7.5 Granule and ball test 45 7.5.1 Test media 45 7.5.2 Procedure 45 7.5.3 Report 45 7.5.4 Performance 7.6 Surface wash test 46 7.6.1 Test medium 7.6.2 Procedure 46 7.6.3 Report 46 7.6.4 Performance 46 Drain line transport characterization test 7.7 46 7.7.1 Test medium 46 7.7.2 **Apparatus** 46 7.7.3 Procedure 47 7.7.4 Report 47 7.7.5 Performance 47 7.8 Overflow test for gravity flush tanks 7.8.1 48 **Apparatus** 7.8.2 Procedure 48 7.8.3 Report 48 7.8.4 Performance 48 7.9 Waste extraction test 48 7.9.1 **Apparatus** 48 7.9.2 48 Test media 7.9.3 Procedure 50 7.9.4 Performance and report 50 7.9.5 Performance 50 Consistent water level test 51 7.10 7.10.1 Procedure 7.10.2 Performance 51 Fill valve shutoff integrity test with increased water pressure 7.11 51 7.11.1 Procedure 51 7.11.2 Performance 51 7.12 Adjustability test for tank-type gravity water closets with original equipment 51 7.12.1 Procedure 51 7.12.2 Report 52 7.12.3 Performance 52 7.13 Adjustability test for tank-type gravity water closets with aftermarket closure seals 52 7.13.1 Procedure 52 7.13.2 Report 53 Performance 7.13.3 53 8 Urinal tests 53 8.1 General 53 8.2 Test apparatus and general instructions 54 8.3 Trap seal depth determination test 8.3.1 **Apparatus** 54 8.3.2 Procedure 54 8.3.3 Report 55

~ ~ 4	
8.3.4	Performance 55
8.4	Surface wash test 55
8.4.1	Test medium 55
8.4.2	Procedure 55
8.4.3	Report 55
8.4.4	Performance 55
8.5	Dye test 56
8.5.1	Test medium and apparatus 56
8.5.2	Procedure 56
8.5.3	Report 56
8.5.4	Performance 56
8.6	Water consumption test 56
8.6.1	Apparatus 56
8.6.2	Procedure 56
8.6.3	Report 57
8.6.4	Performance 57
8.7	Tests for non-water-consuming urinals 57
9 Ma	rkings, packaging, and installation instructions and other literature 57
9.1	General 57
9.2	Non-standard fixtures 57
9.3	Additional markings for water closets and urinals 58
9.3.1	Close-coupled water closets 58
9.3.2	Water consumption 58
9.3.3	Water level mark in gravity flush tank water closets 58
9.3.4	Water closet tank repair parts 58
9.4	Field-installed flanges 58
9.5	Packaging 58
9.5.1	General 58
0 5 3	Water closets and urinals 59
9.5.2	
9.5.2 9.6	Installation instructions and other literature 59
	Installation instructions and other literature 59 General 59
9.6	
9.6 9.6.1	General 59

Annex A (informative) — Suggested formats for reporting test results 80

Annex B (informative) — Unit conversion criteria 86

△ Preface

This is the third edition of ASME A112.19.2/CSA B45.1, Ceramic plumbing fixtures.

It supersedes the previous edition published in 2013.

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

This Standard was prepared by the ASME/CSA Joint Harmonization Task Group on Plumbing Fixtures, under the jurisdiction of the ASME Standards Committee on Plumbing Materials and Equipment and the CSA Technical Committee on Plumbing Fixtures. 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 ASME Standards Committee and the CSA Technical Committee. This Standard was approved as an American National Standard by the American National Standards Institute on June 15, 2018.

ASME Notes:

- This standard was developed under procedures accredited as meeting the criteria for American National Standards and it is an American National Standard. The Standards Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed Standard was made available for public review and comment that provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.
- 2) ASME does not "approve," "rate," or "endorse" any item, construction, proprietary device, or activity.
- 3) ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor assume any such liability. Users of a standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.
- 4) Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this standard.
- 5) ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.
- 6) ASME issues written replies to inquiries concerning interpretation of technical aspects of this Standard. All inquiries regarding this Standard, including requests for interpretations, should be addressed to:

Secretary, A112 Standards Committee The American Society of Mechanical Engineers Two Park Avenue New York, NY 10016-5990

A request for interpretation should be clear and unambiguous. The request should

- cite the applicable edition of the Standard for which the interpretation is being requested.
- phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or

situation. The inquirer may also include any plans or drawings, which are necessary to explain the question; however, they should not contain proprietary names or information.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee.

Interpretations are published on the ASME Web site under the Committee Pages at http://www.asme.org/codes/ as they are issued.

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 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) 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.
- 5) 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.

6) Attention is drawn to the possibility that some of the elements of this Standard may be the subject of patent rights. CSA Group 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.

ASME A112.19.2-2018/CSA B45.1-18 Ceramic plumbing fixtures

1 Scope

1.1

This Standard covers vitreous and non-vitreous china plumbing fixtures and specifies requirements for materials, construction, performance, testing, and markings. This Standard's performance requirements and test procedures apply to all types of water closets and urinals that discharge into gravity drainage systems in permanent buildings and structures, independent of occupancy.

1.2

This Standard covers the following plumbing fixtures:

- a) bathtubs;
- b) bidets;
- c) drinking fountains;
- d) fixtures for institutional applications;
- e) lavatories;
- f) shower bases;
- g) sinks:
 - i) bar sinks;
 - ii) clinic sinks;
 - iii) kitchen sinks;
 - iv) laboratory sinks;
 - v) laundry sinks;
 - vi) service sinks; and
 - vii) utility sinks;
- h) urinals; and
- i) water closets.

1.3

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.