



ASME A112.19.3-2022/ CSA B45.4:22

National Standard of Canada
American National Standard



Stainless steel plumbing fixtures

Click to view the full PDF of ASME A112.19.3 CSA B45.4 2022



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.



ASME A112.19.3-2022/CSA B45.4:22
August 2022

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.

More than 10 000 members indicate their support for CSA Group’s standards development by volunteering their time and skills to Committee work.

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 fourteen 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



Cette Norme Nationale du Canada n'est disponible qu'en anglais.

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.

**A trademark of the Canadian Standards Association, operating as “CSA Group”*

CSA Group

The 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.

More than 10 000 members indicate their support for CSA Group's standards development by volunteering their time and skills to Committee work.

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 fourteen 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,
Canada M9W 1R3

American National Standards Institute

The American National Standards Institute (ANSI), Inc. is the nationally recognized coordinator of voluntary standards development in the United States through which voluntary organizations, representing virtually every technical discipline and every facet of trade and commerce, organized labor and consumer interests, establish and improve the some 10 000 national consensus standards currently approved as American National Standards.

ANSI provides that the interests of the public may have appropriate participation and representation in standardization activity, and cooperates with departments and agencies of U.S. Federal, state and local governments in achieving compatibility between government codes and standards and the voluntary standards of industry and commerce.

ANSI represents the interests of the United States in international nontreaty organizations such as the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). The Institute maintains close ties with regional organizations such as the Pacific Area Standards Congress (PASC) and the Pan American Standards Commission (COPANT). As such, ANSI coordinates the activities involved in the U.S. participation in these groups.

ANSI approval of standards is intended to verify that the principles of openness and due process have been followed in the approval procedure and that a consensus of those directly and materially affected by the standards has been achieved. ANSI coordination is intended to assist the voluntary system to ensure that national standards needs are identified and met with a set of standards that are without conflict or unnecessary duplication in their requirements.

Responsibility of approving American standards rests with the
American National Standards Institute, Inc.
25 West 43rd Street, Fourth floor
New York, NY 10036

ASME/CSA Standard

ASME A112.19.3-2022/CSA B45.4:22 Stainless steel plumbing fixtures



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

*Published in August 2022 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 www.csagroup.org/store/

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

ISBN 978-0-7918-7518-6
Copyright © 2022 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 August 2022 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
www.csagroup.org/store/

ISBN 978-1-4883-3847-2
ICS 91.140.60
© 2022 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.

Contents

ASME A112 Standards Committee on Plumbing Materials and Equipment 3

ASME A112.19.3 Project Team on Stainless Steel Plumbing Fixtures 7

CSA Technical Committee on Plumbing Fixtures 9

Preface 15

1 Scope 17

2 Reference publications 18

3 Definitions 18

4 General requirements 20

4.1 General 20

4.1.1 Materials 20

4.1.2 Different materials 20

4.2 Stainless steel thickness 20

4.2.1 Lavatories and sinks 20

4.2.2 Other fixtures 21

4.3 Tolerances 21

4.4 Waste fitting openings, drainage, and overflows 21

4.4.1 Waste fitting openings and drainage 21

4.4.2 Overflows 21

4.5 Additional requirements for water closets 22

4.6 Additional requirements for urinals 22

4.7 Additional requirements for lavatories, sinks, and bidets 22

4.7.1 Openings and mounting surfaces for supply fittings 22

4.7.2 Laundry or utility sink capacity 22

4.8 Additional requirements for bathtubs and shower bases 22

4.8.1 Minimum dimensions for bathtubs 22

4.8.2 Slope to the waste outlet 23

4.8.3 Flanges 23

4.8.4 Supply fittings 23

4.9 Additional requirements for drinking fountains 23

4.10 Accessible design fixtures 23

5 Tests 24

5.1 Surface examination 24

5.1.1 Procedure 24

5.1.2 Performance 24

5.2 Warpage test 24

5.2.1 Procedure 24

5.2.2 Performance 24

5.3 Field-installed flange test 25

5.3.1 Procedure 25

5.3.2	Performance	25
5.4	Overflow test (lavatories, sinks, and bidets)	25
5.4.1	Procedure	25
5.4.2	Performance	25
5.5	Structural integrity tests	25
5.5.1	Water closets	25
5.5.2	Lavatories and sinks	26
5.5.3	Wall-mounted urinals	26
5.5.4	Bathtubs and shower bases	26
6	Markings, packaging, and installation instructions and other literature	28
6.1	General	28
6.2	Non-standard fixtures	28
6.3	Additional markings for water closets and urinals	28
6.4	Field-installed flanges	29
6.5	Packaging and installation instructions and other literature	29
6.5.1	General	29
6.5.2	Packaging	29
6.5.3	Installation instructions	29

Annex A (informative)	— Unit conversion criteria	37
-----------------------	----------------------------	----

ASME A112 Standards Committee on Plumbing Materials and Equipment

W. M. Smith	American Society of Plumbing Engineers (ASPE), Montgomery, Alabama, USA	<i>Chair</i>
S. M. Rawalpindiwala	Kohler Co. Plumbing Division, Kohler, Wisconsin, USA	<i>Vice-Chair</i>
A. L. Guzman Rodriguez	American Society of Mechanical Engineers, New York, New York, USA	<i>Secretary</i>
M. R. Gibeault	Kohler Co. Plumbing Division, Kohler, Wisconsin, USA	<i>Alternate</i>
J. A. Ballanco	JB Engineering and Code Consulting PC, Munster, Indiana, USA	
J. E. Bertrand	Watts Water Technologies, Inc., Avon, Ohio, USA	
C. Haldiman	Watts Water Technologies, North Andover, Massachusetts, USA	<i>Alternate</i>
T. Burger	ASSE International, Mokena, Illinois, USA	
R. Burnham	Zurn Industries LLC, Erie, Pennsylvania, USA	
M. Campos	ICC Evaluation Service, LLC, Brea, California, USA	
S. L. Cavanaugh	Cavanaugh Consulting, Santa Fe, New Mexico, USA	<i>Contributing Member</i>
W. E. Chapin	Professional Code Consulting, LLC, Cullman, Alabama, USA	
P. V. DeMarco	IAPMO Group, Dayton, New Jersey, USA	

N. E. Dickey	Hansgrohe, Inc., Alpharetta, Georgia, USA	
G. S. Duren	Code Compliance, Inc., South Pasadena, Florida, USA	
A. R. Emmerson	Consultant, Arlington Heights, Illinois, USA	
K. Ernst	Oakville Stamping & Bending Limited, Oakville, Ontario, Canada	
R. L. George	Plumb-Tech Design and Consulting Services LLC, Newport, Michigan, USA	
D. Gleiberman	Sloan Valve Co., Los Angeles, California, USA	
J. W. Lauer	Sloan Valve Co., Anaheim, California, USA	<i>Alternate</i>
M. Guard	Regulosity, LLC, Wauwatosa, Wisconsin, USA	
G. W. Harrison	Consultant/Plumbing Instructor, Edmond, Oklahoma, USA	
L. Himmelblau	The Chicago Faucet Company, Des Plaines, Illinois, USA	
J. Kendzel	American Supply Association, Itasca, Illinois, USA	<i>Contributing Member</i>
J. M. Koeller	Koeller and Co., Yorba Linda, California, USA	
C. J. Lagan	American Standard/LIXIL, Piscataway, New Jersey, USA	
W. LeVan	Cast Iron Soil Pipe Institute, Auburn, Alabama, USA	

D. Parney	Cast Iron Soil Pipe Institute, Mundelein, Illinois, USA	<i>Alternate</i>
D. Liang	CSA Group, Toronto, Ontario, Canada	<i>Contributing Member</i>
D. Marbry	Fluidmaster Inc., San Juan Capistrano, California, USA	
R. Mata	American Society of Plumbing Engineers, Mentor, Ohio, USA	
L. A. Mercer	IAPMO Group, Valley City, Ohio, USA	
K. Thompson	Plumbing Manufacturers International, McLean, Virginia, USA	<i>Alternate</i>
A. I. Murra	Abraham Murra Consulting, Santa Margarita, California, USA	
D. Orton	NSF International, Ann Arbor, Michigan, USA	
A. Ciechanowski	NSF International, Ann Arbor, Michigan, USA	<i>Alternate</i>
R. Pickering	Eastern Research Group, Inc. (ERG), Morrisville, North Carolina, USA	<i>Contributing Member</i>
A. Poon	Delta Faucet Company, Indianapolis, Indiana, USA	
B. Ramkarran	Infinity Drain, Ltd., Amityville, New York, USA	<i>Contributing Member</i>
S. A. Remedios	Remedios Consulting, London, Ontario, Canada	
M. Sigler	Plumbing Manufacturers International (PMI), Orlando, Florida, USA	

G. L. Simmons	Charlotte Pipe & Foundry, Charlotte, North Carolina, USA	
W. B. Morris	Charlotte Pipe & Foundry, Charlotte, North Carolina, USA	<i>Alternate</i>
S. Tanner	U.S. Environmental Protection Agency, Washington, District of Columbia, USA	<i>Contributing Member</i>
J. Watson	Elkay Manufacturing, Downers Grove, Illinois, USA	
M. Weiss	Plumbing & Drainage Institute (PDI), Polson, Montana, USA	
W. C. Whitehead	Whitehead Consulting Services, Red Oak, Texas, USA	
S. J. McDanal	Jay R. Smith Manufacturing Co., Montgomery, Alabama	<i>Alternate</i>

ASME A112.19.3 Project Team on Stainless Steel Plumbing Fixtures

S. M. Rawalpindiwala	Kohler Co. Plumbing Division, Kohler, Wisconsin, USA	<i>Chair</i>
J. E. Bertrand	Watts Water Technologies, Inc., Avon, Ohio, USA	
T. Burke	Victoria + Albert Baths, Telford, Shropshire, United Kingdom	
M. Campos	ICC Evaluation Service, LLC, Brea, California, USA	
P. V. DeMarco	IAPMO Group, Dayton, New Jersey, USA	
N. E. Dickey	Hansgrohe, Inc., Alpharetta, Georgia, USA	
L. Gibson	QAI Laboratories, Coquitlam, British Columbia, Canada	<i>Contributing Member</i>
D. Gleiberman	Sloan Valve Co., Los Angeles, California, USA	
E. Ho	IAPMO Group, Markham, Ontario, Canada	
D. E. Holloway	IAPMO R&T Laboratory, Broken Arrow, Oklahoma, USA	
C. J. Lagan	American Standard/LIXIL, Piscataway, New Jersey, USA	
C. W. McDonald	Fortune Brands - Global Plumbing , Group North Olmsted, Ohio, USA	
L. A. Mercer	IAPMO Group, Valley City, Ohio, USA	

K. Thompson	Plumbing Manufacturers International, McLean, Virginia, USA	<i>Alternate</i>
A. I. Murra	Abraham Murra Consulting, Santa Margarita, California, USA	
B. Pines	C&R Plumbing & Heating Inc., Shelby Township, Michigan, USA	
D. Viola	IAPMO, Mokena, Illinois, USA	<i>Contributing Member</i>
J. Watson	Elkay Manufacturing, Downers Grove, Illinois, USA	

CSA Technical Committee on Plumbing Fixtures

C. J. Lagan	American Standard Brands/LWTA, Piscataway, New Jersey, USA <i>Category: Producer Interest</i>	<i>Chair</i>
M. A. Guard	Regulosity LLC, Wauwatosa, Wisconsin, USA <i>Category: General Interest</i>	<i>Vice-Chair</i>
C. Wright	Ontario Pipe Trades, Dundalk, Ontario, Canada <i>Category: User Interest</i>	<i>Vice-Chair</i>
L. Adams	City of Edmonton, Sherwood Park, Alberta, Canada <i>Category: Regulatory Authority</i>	
J. Adili	UL LLC, Northbrook, Illinois, USA	<i>Non-voting</i>
A. Ahuja	Masco Canada Limited, St. Thomas, Ontario, Canada	<i>Non-voting</i>
W. T. Ball	WCM Industries Inc, Colorado Springs, Colorado, USA	<i>Non-voting</i>
J. E. Bertrand	Watts Water Technologies Inc, Avon, Ohio, USA <i>Category: Producer Interest</i>	
A. Brhelle	Masco Canada, St Thomas, Ontario, Canada	<i>Non-voting</i>
J. Briggs	NSF International, Ann Arbor, Michigan, USA	<i>Non-voting</i>
T. Burke	Victoria + Albert Baths Ltd., Telford, Shropshire, United Kingdom	<i>Non-voting</i>

R. Burnham	Zurn Industries LLC, Erie, Pennsylvania, USA <i>Category: Producer Interest</i>	
M. Campos	ICC Evaluation Service, LLC, Brea, California, USA	<i>Non-voting</i>
W. E. Chapin	Professional Code Consulting, LLC, Cullman, Alabama, USA	<i>Non-voting</i>
S. Chen	Masco R&D, Taylor, Michigan, USA	<i>Non-voting</i>
E. Cometa	CSA Group, Toronto, Ontario, Canada	<i>Non-voting</i>
D. J. Compton	Thetford Corporation, Ann Arbor, Michigan, USA	<i>Non-voting</i>
A. De Francesca	City of Toronto, Toronto, Ontario, Canada <i>Category: Regulatory Authority</i>	
P. Despatis	Régie du bâtiment du Québec, Montréal, Québec, Canada <i>Category: Regulatory Authority</i>	
N. Dickey	Hansgrohe, Inc, Alpharetta, Georgia, USA	<i>Non-voting</i>
Y. Duchesne	Régie du bâtiment du Québec, Québec, Québec, Canada	<i>Non-voting</i>
K. Ernst	Oakville Stamping & Bending Limited, Oakville, Ontario, Canada <i>Category: Producer Interest</i>	
F. Fernández	Toto U.S.A. Inc, Ontario, California, USA <i>Category: Producer Interest</i>	
M. E. Fish	Zurn Industries, LLC, Cary, North Carolina, USA	<i>Non-voting</i>

M. R. Gibeault	Kohler Co. Plumbing Division, Kohler, Wisconsin, USA	<i>Non-voting</i>
D. Gleiberman	Sloan, Los Angeles, California, USA	<i>Non-voting</i>
D. Grenier	BainUltra inc., Lévis, Québec, Canada	<i>Non-voting</i>
N. Haynes	Region of Waterloo, Kitchener, Ontario, Canada <i>Category: User Interest</i>	
L. Himmelblau	Chicago Faucets Geberit Manufacturing Division, Des Plaines, Illinois, USA <i>Category: Producer Interest</i>	
E. Ho	IAPMO Group, Markham, Ontario, Canada	<i>Non-voting</i>
E. Hood	H. H. Angus & Associates Limited Consulting Engineers, Toronto, Ontario, Canada <i>Category: User Interest</i>	
K. S. Hui	Ontario Ministry of Municipal Affairs, Toronto, Ontario, Canada <i>Category: Regulatory Authority</i>	
J. Knapton	Southern Alberta Institute of Technology, Calgary, Alberta, Canada <i>Category: General Interest</i>	
T. Knull	Alberta Municipal Affairs, Lethbridge, Alberta, Canada <i>Category: Regulatory Authority</i>	
J. M. Koeller	Koeller and Company, Yorba Linda, California, USA <i>Category: General Interest</i>	
F. Lemieux	Health Canada, Ottawa, Ontario, Canada <i>Category: Regulatory Authority</i>	

D. Liang	CSA Group, Toronto, Ontario, Canada	<i>Non-voting</i>
R. Liao	Xiamen Lota International Co. Ltd., Xiamen, Fujian, China	<i>Non-voting</i>
J. Loera	Fluidmaster Inc., San Juan Capistrano, California, USA	<i>Non-voting</i>
J. MacDonald	BLANCO Canada Inc, Brampton, Ontario, Canada	<i>Non-voting</i>
D. Marbry	Fluidmaster Inc., San Juan Capistrano, California, USA <i>Category: Producer Interest</i>	
R. Mata	American Society of Plumbing Engineers, Mentor, Ohio, USA	<i>Non-voting</i>
T. J. McCann	Department of National Defence, Ottawa, Ontario, Canada <i>Category: User Interest</i>	
C. W. McDonald	Fortune Brands - Global Plumbing Group, North Olmsted, Ohio, USA	<i>Non-voting</i>
K. Moriel	City of Brampton, Brampton, Ontario, Canada	<i>Non-voting</i>
A. I. Murra	Abraham Murra Consulting, Santa Margarita, California, USA <i>Category: General Interest</i>	
R. Neff	Delta Faucet Company, Indianapolis, Indiana, USA <i>Category: Producer Interest</i>	
D. Orton	NSF International, Ann Arbor, Michigan, USA	<i>Non-voting</i>
P. P. Paré	Consumer Representative, Lemoyne, Québec, Canada <i>Category: User Interest</i>	<i>Non-voting</i>

R. Pickering	Eastern Research Group, Inc (ERG), Morrisville, North Carolina, USA	<i>Non-voting</i>
S. M. Rawalpindiwala	Kohler Co. Plumbing Division, Kohler, Wisconsin, USA <i>Category: Producer Interest</i>	
S. A. Remedios	Remedios Consulting, London, Ontario, Canada <i>Category: User Interest</i>	
S. Rouleau	Intertek, Ste-Marie, Québec, Canada	<i>Non-voting</i>
S. Shang	China Building Material Test & Cert. Group (Shaanxi) Co. Ltd, Xi'an, Shaanxi, China	<i>Non-voting</i>
M. Sigler	International Code Council, Orlando, Florida, USA	<i>Non-voting</i>
W. Smith	American Society of Plumbing Engineers (ASPE), Montgomery, Alabama, USA <i>Category: General Interest</i>	
S. Tanner	U.S. Environmental Protection Agency, Washington, District of Columbia, USA <i>Category: General Interest</i>	
K. Thompson	Plumbing Manufacturers International, McLean, Virginia, USA	<i>Non-voting</i>
J. C. Watson	IAPMO, Westchester, Illinois, USA	<i>Non-voting</i>
C. White	ASSE International, Mokena, Illinois, USA	<i>Non-voting</i>
C. Wisniewski	Franke Kindred Canada Ltd, Midland, Ontario, Canada	<i>Non-voting</i>
F. Zhang	China Building Material Test & Cert. Group (Shaanxi) Co. Ltd, Xi'an, Shaanxi, China	<i>Non-voting</i>

M. KhalilCSA Group,
Toronto, Ontario, Canada*Project Manager***J. Menard**CSA Group,
Toronto, Ontario, Canada*Project Manager*

ASMENORMDOC.COM : Click to view the full PDF of ASME A112.19.3 CSA B45.4 2022

Preface

This is the third edition of ASME A112.19.3/CSA B45.4, *Stainless steel plumbing fixtures*. It supersedes the previous edition published in 2017.

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

This Standard was prepared by the ASME A112.19.3 Project Team on Stainless Steel Plumbing Fixtures, under the jurisdiction of the ASME A112 Standards Committee on Plumbing Materials and Equipment and the CSA Technical Committee on Plumbing Fixtures. The ASME A112 Standards Committee operates under the jurisdiction of the ASME Board on Standardization and Testing and 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 May 17, 2022.

This Standard has been developed in compliance with the Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

ASME Notes:

- 1) *The next edition of this standard is scheduled for publication in 2025.*
- 2) *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 ensure that individuals from competent and concerned interests had an opportunity to participate. The proposed standard was made available for public review and comment, which provided an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.*
- 3) *ASME does not “approve,” “rate,” or “endorse” any item, construction, proprietary device, or activity. 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 does ASME 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 representatives or persons 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) *Upon request, ASME will issue an interpretation of any requirement of this standard. An interpretation can be issued only in response to a request submitted through the online Interpretation Submittal Form. The form is accessible at <http://go.asme.org/InterpretationRequest>. 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 website under the Committee Pages at <http://cstools.asme.org/> 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 A112.19.3-2022/CSA B45.4:22

Stainless steel plumbing fixtures

1 Scope

1.1

This Standard covers plumbing fixtures made of stainless steel alloys and specifies requirements for materials, construction, performance, testing, and markings.

Note: The term “corrosion-resisting steel” is also applied to stainless steel.

1.2

This Standard covers the following plumbing fixtures:

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

1.4

SI units are the units of record in Canada. In this Standard, the yard/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.

For information on the unit conversion criteria used in this Standard, see Annex [A](#).

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.

ASME (The American Society of Mechanical Engineers)/CSA Group

ASME A112.18.1-2018/CSA B125.1-18

Plumbing supply fittings

ASME A112.18.2-2020/CSA B125.2:20

Plumbing waste fittings

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

Ceramic plumbing fixtures

CSA Group

B125.3-18

Plumbing fittings

B651-18

Accessible design for the built environment

C22.2 No. 0.15-15(R2020)

Adhesive labels

ASTM International (American Society for Testing and Materials)

A240/A240M-20a

Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

ICC/ANSI (International Code Council/American National Standards Institute)

A117.1-2017

Accessible and Usable Buildings and Facilities

UL (Underwriters Laboratories Inc.)

969, Edition 5

Standard for Marking and Labeling Systems

3 Definitions

The following definitions shall apply in this Standard:

Air gap — the unobstructed vertical distance, through the open atmosphere, between the lowest opening of a water supply and the flood level of the fixture.

Bidet — a fixture with a hot and cold water supply intended for genital and perineal hygiene.

Defect —

Blemish — a dent, depression, or raised portion on the visible stainless steel surface of a fixture.

Crack — a fracture in the surface or substrate material of a fixture.

Die mark — a visible scoring of the stainless steel surface of a fixture.

Pinhole — a hole in the stainless steel surface of a fixture whose largest dimension is 1.5 mm (0.06 in) or less.

Wrinkle — a corrugation in the stainless steel surface of a fixture that is visible or can be felt.

Fitting — a device that controls and guides the flow of water.

Note: See ASME A112.18.1/CSA B125.1 and CSA B125.3 for definitions of specific types of fittings.

Fixture — a device that receives water, waste matter, or both and directs these substances into a drainage system.

Note: See ASME A112.19.2/CSA B45.1 for definitions of specific types of fixtures.

Flange —

- a) the flat area on the front or sides of a compartment in a sink or lavatory; or
- b) the raised vertical section for retaining water in a tub or shower base.

Flat-rim sink (rim-back sink) — a single- or double-compartment sink with flanges on all sides but no back ledge (ledge-back).

Flood level — the level at which water will overflow a fixture.

Flushometer valve — a flushing device attached to a pressurized water supply pipe that, when actuated, opens the pipe for direct flow into the fixture at a rate and in a quantity that enables proper operation of the fixture. The valve then gradually closes to provide trap reseal in the fixture and avoid water hammer.

Note: The pipe to which the flushometer valve is connected should be large enough to enable it to deliver water at a sufficient rate of flow for flushing.

Horizontal surface — a surface forming an angle with the horizontal of less than 45°.

Integral rim — a mounting rim that is an integrally formed part of a sink flange and has clamp-down devices for attaching the sink to the countertop.

Lavatory — a washbowl or basin.

Ledge — the flat area of a sink or lavatory on which supply fittings are normally mounted.

Ledge-back sink — a single- or double-compartment sink with a ledge along the back that has openings for mounting supply fittings.

Overflow — a conduit that is integral or attached to a fixture and whose function is to remove liquid from a fixture after the fixture has been filled past the desired level.

Mirror finish — a highly reflective finish with no visible polishing lines.

Rim — the unobstructed open edge of a fixture.

Satin finish — a surface with a soft sheen consisting of fine, regular polish lines in a uniform pattern.

Urinal — a fixture that receives only liquid body waste and conveys the waste through a trap into a drainage system.

Vertical surface — a surface forming an angle with the horizontal of 45 to 90°.

Water closet — a fixture with a water-containing receptor that receives liquid and solid body waste and on actuation conveys the waste through an exposed integral trap into a drainage system.

4 General requirements

4.1 General

4.1.1 Materials

With the exception of laboratory sinks, which shall be made of type 316 stainless steel alloy, stainless steel plumbing fixtures shall be made of type 201, 202, 301, 302, 304, 316, or 430 stainless steel alloys.

Note: These stainless steel alloy types are specified in ASTM A240/A240M.

4.1.2 Different materials

When a fixture is made of a combination of stainless steel and other materials covered under ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1, or CSA B45.5 / IAPMO Z124, the other materials shall comply with the applicable requirements of those same standards.

4.2 Stainless steel thickness

4.2.1 Lavatories and sinks

4.2.1.1 General

The thickness of stainless steel sheet for lavatories and kitchen, bar, laboratory, laundry, and utility sinks shall comply with Clause [4.2.1.2](#) (before drawing) or [4.2.1.3](#) (after drawing).

4.2.1.2 Before drawing

The minimum thickness shall be based on bowl depth as specified in Table [1](#).

4.2.1.3 After drawing

The minimum thickness after fabrication shall be as follows:

- a) vertical surfaces: 0.559 mm (0.022 in);
- b) corners: 0.508 mm (0.020 in); and
- c) horizontal surfaces: 0.635 mm (0.025 in).

For Items a) and b), the thickness shall be determined by taking the average of six measurements of surface or corner thickness. For Item c), thickness shall be determined by taking the average of three measurements from the bottom of the fixture and three from the flat surfaces of the flange.

4.2.2 Other fixtures

The thickness of stainless steel sheet for fixtures not specified in Clause [4.2.1.1](#) shall be determined in accordance with Clause [4.2.1.3](#).

4.3 Tolerances

Unless otherwise specified in this Standard, the tolerance on dimensions of 200 mm (8 in) and greater shall be $\pm 3\%$. The tolerance on dimensions less than 200 mm (8 in) shall be $\pm 5\%$.

In this Standard, dimensions specified as “minimum” or “maximum” shall not be reduced below the specified minimum or increased above the specified maximum by application of a tolerance. If a dimensional range is specified and the word “minimum” or “maximum” does not appear, the upper and lower limits shall not be considered critical, and the appropriate tolerance shall apply.

4.4 Waste fitting openings, drainage, and overflows

4.4.1 Waste fitting openings and drainage

4.4.1.1

Fixtures shall

- a) have a waste fitting opening (outlet), the centre of which shall be located at the lowest point of the fixture; and
- b) drain to the waste outlet.

4.4.1.2

Except when proprietary (i.e., non-standard) waste fittings are provided by the manufacturer, the dimensions of waste outlets shall be as shown in Figures [1a](#) to [1f](#).

4.4.1.3

Factory-supplied waste fittings shall comply with ASME A112.18.2/CSA B125.2.

4.4.2 Overflows

4.4.2.1 Lavatories, sinks, and bidets

4.4.2.1.1

Overflows may be provided at the option of the manufacturer. When overflows are provided, the manner in which they are positioned shall be at the option of the manufacturer.

4.4.2.1.2

When provided, overflows in sinks intended for dishwashing and food preparation (e.g., kitchen and bar sinks) shall not be concealed and shall be accessible for disassembly and cleaning after installation.

4.4.2.1.3 Performance

Overflows shall comply with Clause [5.4](#).

4.4.2.2 Bathtubs

Overflows in bathtubs may be provided at the option of the manufacturer. When overflows are provided, their dimension, location, and position in relation to the waste outlet in the fixture shall be as shown in Figure 7.

Variations in location, geometry, diameter, and angle of orientation of the overflow opening shall be acceptable when factory-provided waste and overflow fittings are used.

Note: Some plumbing codes require bathtub overflows.

4.5 Additional requirements for water closets

Water closets and their flushing devices shall comply with the applicable requirements of ASME A112.19.2/CSA B45.1, except that the

- a) structural integrity test shall be conducted in accordance with Clause 5.5.1; and
- b) minimum thickness requirements for vitreous china shall not apply.

4.6 Additional requirements for urinals

Urinals and their flushing devices shall comply with the applicable requirements of ASME A112.19.2/CSA B45.1, except that the

- a) structural integrity test shall be conducted in accordance with Clause 5.5.3; and
- b) minimum thickness requirements for vitreous china shall not apply.

4.7 Additional requirements for lavatories, sinks, and bidets

4.7.1 Openings and mounting surfaces for supply fittings

4.7.1.1

When provided, openings and mounting surfaces for lavatory, sink, and bidet supply fittings shall be as shown in Figures 2 to 6, except when proprietary (i.e., non-standard) supply fittings are provided by the manufacturer.

4.7.1.2

Factory-supplied lavatory, sink, and bidet supply fittings shall comply with ASME A112.18.1/CSA B125.1.

4.7.1.3

Mounting surfaces for supply fittings that rely on an air gap for backflow protection shall be not more than 13 mm (0.5 in) below the flood level rim.

Note: Care should be taken to ensure that the minimum air gap specified in ASME A112.18.1/CSA B125.1 or in the applicable plumbing code is not compromised when supply fittings are installed on fixtures with mounting surfaces below the flood level rim.

4.7.2 Laundry or utility sink capacity

The minimum capacity of at least one compartment of a laundry or utility sink shall be 60 L (15.9 gal).

4.8 Additional requirements for bathtubs and shower bases

4.8.1 Minimum dimensions for bathtubs

The minimum dimensions for bathtubs shall be as shown in Figure 7.

4.8.2 Slope to the waste outlet

Bathtubs and shower bases shall have a maximum slope of 4% to the waste outlet.

Note: There should be a minimum slope of 1% to the waste outlet.

4.8.3 Flanges

4.8.3.1

Bathtubs and shower bases intended for installation against a wall shall incorporate a flange raised at least 8 mm (0.3 in) above the rim or threshold and comply with Clauses [4.8.3.3](#) to [4.8.3.5](#).

4.8.3.2

Shower bases intended for installation against and securing to a wall shall incorporate a continuously raised flange at least 25 mm (1.0 in) above the threshold and comply with Clauses [4.8.3.3](#) to [4.8.3.5](#).

4.8.3.3

The flange shall be

- a) integral with the bathtub or shower base;
- b) added to an island tub or shower base in the factory; or
- c) field-installed using a flange kit that complies with Clause [5.3](#) and includes all necessary parts and fasteners.

4.8.3.4

Bathtubs and shower bases using field-installed flanges shall be marked in accordance with Clause [6.4](#).

4.8.3.5

The bottom of any hole in the flange or corner treatment shall be not less than 8 mm (0.3 in) above the rim or threshold.

4.8.4 Supply fittings

Factory-supplied supply fittings shall comply with ASME A112.18.1/CSA B125.1.

4.9 Additional requirements for drinking fountains

4.9.1

Drinking fountains shall

- a) include a supply fitting, which shall be at least 25 mm (1.0 in) above the flood level rim; and
- b) comply with the dimensions shown in Figure [8](#).

Note: Drinking fountain supply fittings are also known as drinking fountain bubblers.

4.9.2

Factory-supplied drinking fountain supply fittings shall comply with ASME A112.18.1/CSA B125.1, including the toxicity requirements.

4.10 Accessible design fixtures

Fixtures designed to be accessible shall comply with the dimensional requirements specified in CSA B651 or ICC/ANSI A117.1.

5 Tests

5.1 Surface examination

5.1.1 Procedure

Visible surfaces shall be examined for defects by the unaided eye under ordinary light at a distance of approximately 610 mm (2 ft).

Note: *Unaided eye includes vision assisted by corrective lenses normally worn by the person inspecting the specimen.*

5.1.2 Performance

Visible surfaces shall be free of blemishes, cracks, die marks, pinholes, and wrinkles. Surface details that are part of the design shall not be cause for rejection.

5.2 Warpage test

5.2.1 Procedure

The specimen shall be placed on a flat and level surface to ascertain the amount of deviation from the horizontal plane that exists at its edges.

A feeler gauge of a thickness equal to the total warpage allowed in Clause [5.2.2](#) shall not slide under the specimen unless forced.

If the specimen rocks on two opposite corners, the horizontal plane shall be determined by placing one feeler gauge, as thick as the total warpage allowed, under a corner that does not touch the flat and level surface and inserting it not more than 1/16 in. Forcing the specimen down on the feeler gauge, a second feeler gauge of the same thickness shall not slide under the specimen at any other point.

5.2.2 Performance

5.2.2.1 Warpage requirements

When measured in accordance with Clause [5.2.1](#), the

- warpage at edges of the fixture that are set against the wall or floor, or into cabinets or countertops, shall not exceed 5 mm/m (0.06 in/ft);
- warpage at all other edges of the fixture shall not exceed 7.5 mm/m (0.09 in/ft); and
- total warpage of any linear dimension shall not exceed 16 mm (0.63 in).

5.2.2.2 Curves part of the design

Curves that are part of the design shall not be considered warpage.

5.2.2.3 Warpage that is eliminated

Warpage that is eliminated when the fixture is installed in accordance with the manufacturer's instructions shall not be considered a cause for failure.

5.3 Field-installed flange test

5.3.1 Procedure

The flange fixture seal test shall be conducted as follows:

- Install the flange in accordance with the manufacturer's instructions.
- Expose the flange seal at the joint with the fixture to a continuous water spray for 15 to 20 min. Use a shower spray with a flow rate of 9.0 ± 0.5 L/min (2.38 ± 0.13 gpm) and a water temperature of 38 ± 3 °C (100 ± 5 °F).
- Inspect the specimen for water leakage through the joint to the back of the flange.

5.3.2 Performance

There shall be no leakage through the flange and fixture joint.

5.4 Overflow test (lavatories, sinks, and bidets)

5.4.1 Procedure

The overflow test shall be conducted as follows:

- Install the specimen using a waste fitting that complies with ASME A112.18.2/CSA B125.2 and keep the specimen levelled in a stand.
- Supply water to the specimen at the maximum flow rate specified in ASME A112.18.1/CSA B125.1 for flow rate testing of a supply fitting appropriate for the specimen. If the specimen is a laundry or utility sink, the rate of water supply to the major compartment shall be at least 15 L/min (4 gpm) and to the minor compartment (if any) at least 9 L/min (2.4 gpm).
- Close the waste outlet.
- Measure the elapsed time from the onset of water flowing into the overflow opening until the water begins to overflow the flood level rim of the specimen.

5.4.2 Performance

The specimen shall drain for at least 5 min from the onset of water flowing into the overflow opening, without overflowing its flood level rim.

5.5 Structural integrity tests

5.5.1 Water closets

5.5.1.1 Procedure

The structural integrity test for water closets shall be conducted as follows:

- Install the specimen in accordance with the manufacturer's instructions.
- Cover the bowl with a loose piece of plywood 19 mm (0.75 in) thick.
- Apply a static load centred over the bowl and gradually increase the load to 2.2 kN (500 lbf).
- Maintain the load for at least 2 min.
- Remove the load.
- Visually inspect the specimen 5 min after removal of the load.

5.5.1.2 Performance

There shall be no structural damage or other forms of failure, e.g., tearing of the stainless steel or separation of weld joints.

5.5.2 Lavatories and sinks

5.5.2.1 Apparatus

The apparatus for the structural integrity test for lavatories and sinks shall consist of a

- a) loading device capable of applying a 1.3 kN (292 lbf) load without shock to the centre of the bottom of the specimen; and

Note: *Calibrated weights or a suitable mechanical or hydraulic load applicator may be used.*

- b) 76 mm (3.0 in) diameter load-distribution disc that is covered by 13 mm (0.5 in) thick sponge rubber or another suitable soft material between the disc and the surface being loaded and is capable of applying and removing a 1.3 kN (292 lbf) load at the centre of the fixture bottom.

5.5.2.2 Procedure

The structural integrity test for lavatories and sinks shall be conducted as follows:

- a) Mount the specimen (including a waste fitting) in a wood frame in accordance with the manufacturer's instructions.
- b) Apply a 1.3 kN (292 lbf) load to the bottom of the specimen at the centre of the maximum span, hold for 2 min, and then remove the load. If the waste outlet is located at the centre of the bottom of the specimen, apply the load over the centre of the waste outlet.
- c) Ten minutes after removal of the load, apply a 1.3 kN (292 lbf) load for 1 min to the centre of the bottom of the specimen. If the waste outlet is at the centre of the bottom of the specimen, apply the load halfway between the centre of the waste outlet and the wall or threshold. Do not apply the load over a rib or other support on the underside of the specimen.
- d) Inspect the specimen for damage.

5.5.2.3 Performance

There shall be no structural damage or other forms of failure, e.g., tearing of the stainless steel or separation of weld joints.

5.5.3 Wall-mounted urinals

5.5.3.1 Procedure

The structural integrity test for wall-mounted urinals shall be conducted as follows:

- a) Install the specimen in accordance with the manufacturer's instructions.
- b) Apply a 0.22 kN (50 lbf) vertical load on the top surface at the front of the rim.
- c) Maintain the load for at least 2 min.
- d) Remove the load.
- e) Visually inspect the specimen 5 min after removal of the load.

5.5.3.2 Performance

There shall be no structural damage or other forms of failure, e.g., tearing of the stainless steel or separation of welds or joints.

5.5.4 Bathtubs and shower bases

5.5.4.1 Apparatus

The apparatus for testing the structural integrity of bathtubs and shower bases shall be as follows:

- a) three micrometer dial gauges graduated to 0.03 mm (0.001 in);

- b) a loading device capable of applying a 1.3 kN (292 lbf) load without shock to the centre of the specimen bottom; and
Note: *Calibrated weights or a suitable mechanical or hydraulic load applicator may be used.*
- c) a 130 × 250 mm (5 × 10 in) pad to distribute the load over a 32 500 mm² (50.0 in²) area. The pad shall consist of a sheet of sponge rubber 19 mm (0.75 in) thick (Shore A durometer of 8 to 14), topped with a plate of plywood or stiffer material having a minimum thickness of 19 mm (0.75 in). The thickness of this plate shall be such that there is not more than 0.25 mm (0.01 in) deflection of the ends when the load is applied.

5.5.4.2 Set-up

The specimen shall be mounted in a wood frame simulating normal installation, as follows:

- a) The frame shall allow for clearance under the specimen for the dial gauges.
- b) The manufacturer's installation instructions shall be used for spacing the 2 × 4 dimensional lumber of the frame and for fastening the specimen to the frame. If such instructions are not available, the specimen shall be fastened along the flange to each stud of the frame by 38 mm (1.5 in) long No. 6 steel wood screws using 10 mm (0.38 in) steel washers. The spacing of the studs in the frame shall be not greater than 406 mm (16 in) between centres.
- c) The top of the frame shall be at least 305 mm (12 in) higher than the top of the installed specimen.
- d) If legs or other component parts of the specimen are within 3 mm (0.13 in) of the floor line after installation, rigid vertical support shall be provided.
- e) If the front apron of the specimen is not touching the test frame, the apron shall be supported in a continuous bed of plaster of Paris.

5.5.4.3 Procedure

The structural integrity test for bathtubs and shower bases shall be conducted as follows:

- a) Maintain the temperature of the test area and specimen at 24 ± 6 °C (75 ± 10 °F).
- b) Inspect the finished surface of the specimen for cracks and other defects. Note all defects and damage.
- c) Centre the distribution pad over the horizontal centrelines of the specimen waste outlet with the 254 mm (10 in) dimension along the length of the waste outlet. Determine the waste outlet centrelines by using the average length and width of the waste outlet.
- d) Place the three micrometer dial gauges on a rigid base beneath the longitudinal centreline of the waste outlet, with one gauge directly beneath the centre of the distribution pad and the other two within 51 mm (2.0 in) of each end of the bottom of the waste outlet.
- e) Ensure that the areas where the tips of the gauges bear on the specimen are sufficiently flat and smooth that a small lateral movement of the specimen will not change the gauge reading by more than 0.03 mm (0.001 in).
- f) Prepare the bearing areas by grinding the undersurface or by rigidly fastening a small, flat, level plate to the specimen.
- g) If the waste outlet of the specimen interferes with the placement of the gauges, insert a standard spud into the waste outlet and use the flat surface on the spud for gauge bearing.
- h) Preload the specimen by applying a load of 1.3 kN (292 lbf) on the centre of the distribution pad for 5 min. Remove the load and take the initial dial gauge readings.
- i) Reload the specimen using the 1.3 kN (292 lbf) load and take gauge readings immediately following the load application and again 5 min later.
- j) Remove the load and take gauge readings immediately following removal and again 10 min later.
- k) Calculate the average deflection of the specimen and supports by averaging the deflections measured by the two end gauges.

- l) Calculate the centre deflection (at the waste outlet) by subtracting the average deflection calculated in Item k) from the deflection measured by the centre gauge.
- m) After removal of the load, inspect the surface of the specimen for cracks in accordance with Clause [5.1](#). Note any other damage resulting from the testing.

5.5.4.4 Performance

5.5.4.4.1

Bathtubs shall show no damage to inner or outer surfaces as a result of testing. Cracking shall be considered damage to the inner surface. Cracking or separation of reinforcing members shall be considered damage to the outer surface.

5.5.4.4.2

Centre deflection 5 min after the load specified in Clause [5.5.4.3](#) is applied shall be not greater than 3.18 mm (0.125 in). The residual centre deflection 10 min after the load is removed shall be not greater than 0.08 mm (0.003 in).

6 Markings, packaging, and installation instructions and other literature

6.1 General

6.1.1

Stainless steel plumbing fixtures shall be marked with the manufacturer's name or registered trademark or, in the case of private labelling, the name of the customer for whom the fixture was manufactured. Additional markings shall be in accordance with Clauses [6.2](#) and [6.3](#), as applicable.

6.1.2

Markings shall be permanent, legible, and visible after installation.

6.1.3

Acceptable means of applying permanent markings shall include firing on, etching, sand blasting, mechanical stamping, stamping with a permanent (non-water soluble) ink, and casting in.

Adhesive labels that comply with CAN/CSA-C22.2 No. 0.15 or UL 969 shall also be considered permanent when placed on a surface that is not normally submerged in water. The exposure conditions specified in Clause 7.1 of UL 969 shall apply.

6.2 Non-standard fixtures

Fixtures that require proprietary (i.e., non-standard) components, e.g., supply fittings, waste fittings, or water closet seats, shall indicate, in the packaging or the accompanying literature, that such components are provided by the manufacturer and shall identify the proper replacement parts.

6.3 Additional markings for water closets and urinals

Additional markings for water closets and urinals shall be in accordance with Clause 9.3 of ASME A112.19.2/CSA B45.1.

6.4 Field-installed flanges

Bathtub and shower bases that use field-installed flanges shall have a non-permanent label stating “Do not install this fixture against a wall unless the appropriate flange is first installed”.*

* The equivalent French wording is « Ne pas fixer cet appareil au mur à moins que la bride appropriée n’ait été préalablement installée ».

6.5 Packaging and installation instructions and other literature

6.5.1 General

The manufacturer’s packaging and literature, including installation instructions for recommended minimum operating pressures for water closets and urinals, shall comply with Clauses 9.5 and 9.6 of ASME A112.19.2/CSA B45.1.

6.5.2 Packaging

6.5.2.1

Packaging for stainless steel fixtures shall be marked with the

- a) manufacturer’s name or registered trademark or, in the case of private labelling, the name of the customer for whom the fixture was manufactured; and
- b) model number.

6.5.2.2

Packaging for water closets and urinals shall be marked with the average water consumption in accordance with Clause 9.3.2 of ASME A112.19.2/CSA B45.1.

6.5.3 Installation instructions

6.5.3.1 General

6.5.3.1.1 Water closets

The manufacturer shall provide installation instructions with water closets (except for flushometer valve water closets).

6.5.3.1.2 Close-coupled water closets

For close-coupled water closets, installation instructions shall be provided with the bowl or tank.

6.5.3.1.3 Wall-mounted fixtures

Wall-mounted fixtures shall include instructions for proper installation of the fixtures and minimum structural support requirements.

6.5.3.2

Flange kits for installation in the field shall include installation instructions.