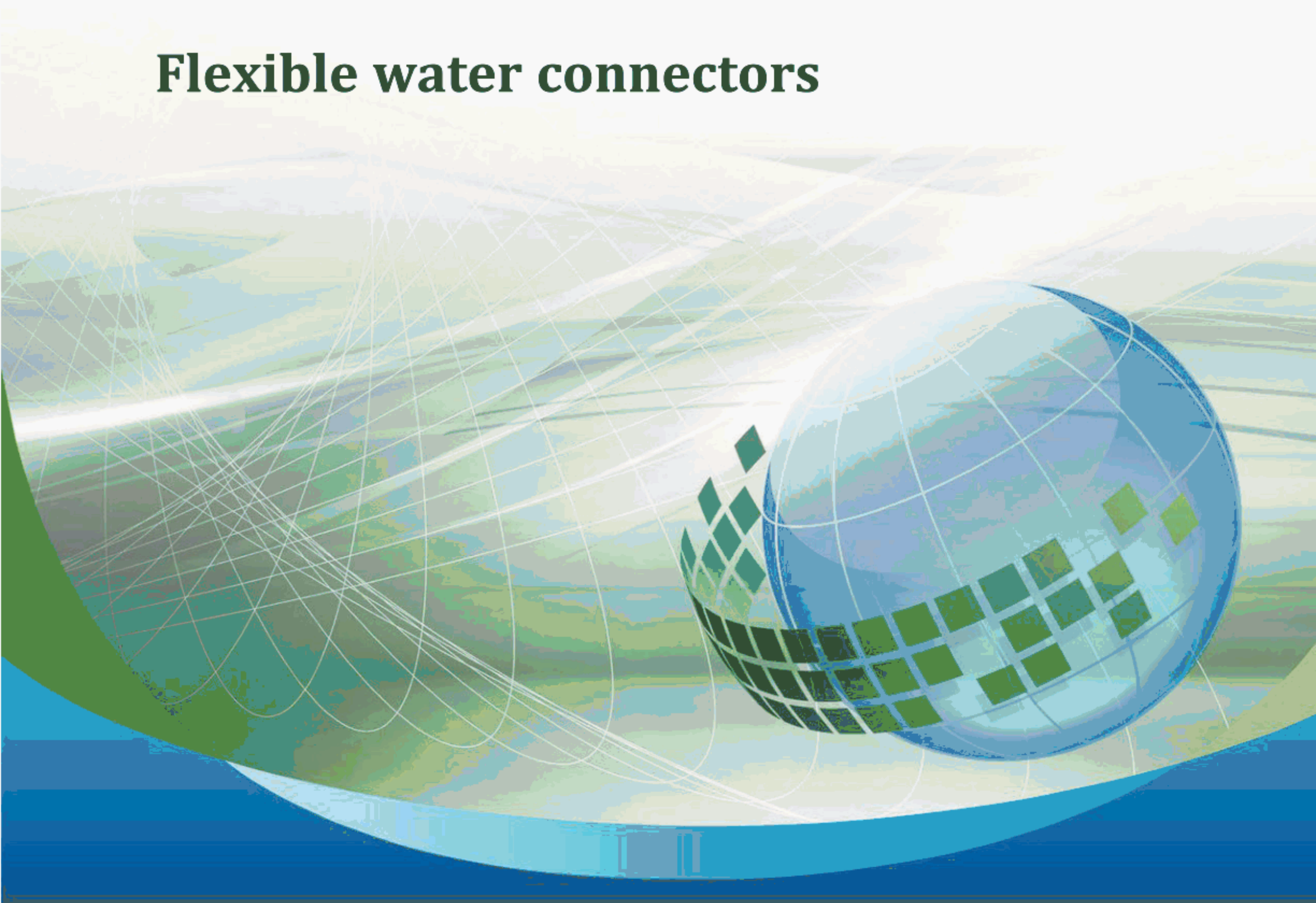




**CSA  
Group**

**ASME A112.18.6-2017/CSA B125.6-17**

# **Flexible water connectors**





# ***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.



# ***Standards Update Service***

## ***ASME A112.18.6-2017/CSA B125.6-17 July 2017***

**Title:** *Flexible water connectors*

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

- go to [shop.csa.ca](http://shop.csa.ca)
- click on **CSA Update Service**

The **List ID** that you will need to register for updates to this publication is **2424680**.

If you require assistance, please e-mail [techsupport@csagroup.org](mailto:techsupport@csagroup.org) or call 416-747-2233.

Visit CSA Group's policy on privacy at [www.csagroup.org/legal](http://www.csagroup.org/legal) to find out how we protect your personal information.

ASME International  
Provided by IHS under license with ASME  
No reproduction or networking permitted without license from IHS



# ***ASME/CSA Standard***

## ***ASME A112.18.6-2017/CSA B125.6-17 Flexible water connectors***



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

*Published in July 2017 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](http://shop.csa.ca)***

*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](http://www.asme.org)***

# *ASME A112.18.6-2017/CSA B125.6-17*

## *Flexible water connectors*



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

*Published in July 2017 by CSA Group  
A not-for-profit private sector organization  
178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3*

*To purchase standards and related publications, visit our Online Store at [shop.csa.ca](http://shop.csa.ca)  
or call toll-free 1-800-463-6727 or 416-747-4044.*

*ISBN 978-1-4883-0468-2*

*© 2017 CSA Group*

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

## 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](http://www.asme.org)

Copyright © 2017 by The American Society of Mechanical Engineers (ASME)

The 2017 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.

Published in July 2017 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](http://shop.csa.ca)

ISBN 978-1-4883-0468-2

© CSA Group — 2017

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

CSA Technical Committee on Plumbing Fittings 6

CSA/ASME Harmonization Task Group on Plumbing Fixtures 11

Preface 13

**1 Scope 15**

**2 Reference publications 15**

**3 Definitions and abbreviations 17**

3.1 Definitions 17

3.2 Abbreviations 17

**4 General requirements 17**

4.1 Toxicity and lead content 17

4.2 Materials 17

4.3 Coatings 18

4.4 Connections 18

4.4.1 General 18

4.4.2 Pipe threads 18

4.4.3 Hose end threads 18

4.4.4 Fill valve threads 18

4.4.5 Solder connections 18

4.4.6 Flare connections 18

4.4.7 Compression connections 18

4.4.8 Push-fit fittings 19

4.4.9 Alternate connections 19

4.5 Water heater flexible connectors 19

4.6 Working pressure 19

4.7 Working temperature 19

**5 Performance requirements and test methods 19**

5.1 General 19

5.2 Intermittent impulse pressure test 19

5.2.1 Performance 19

5.2.2 Procedure 20

5.3 Burst pressure test 20

5.3.1 Performance 20

5.3.2 Procedure 20

5.4 Pressure drop test 20

5.4.1 Performance 20

5.4.2 Set-up 20

5.4.3 Procedure 21

5.5 Torque test 21

## 6 Markings 21

---

Annex A (informative) — Exposure to aqueous chloramine 23

Annex B (informative) — Unit conversion and rounding criteria 24



# ASME A112 Standards Committee on Plumbing Materials and Equipment

<b>W.M. Smith</b>	American Society of Plumbing Engineers, Montgomery, Alabama, USA	<i>Chair</i>
<b>S. Rawalpindiwala</b>	Kohler Co., Kohler, Wisconsin, USA	<i>Vice-Chair</i>
<b>T.J. Stessman</b>	Kohler Co., Kohler, Wisconsin, USA	<i>Alternate</i>
<b>R.K. Adler</b>	City of San Jose, San Jose, California, USA	
<b>J.A. Ballanco</b>	JB Engineering & Code Consulting, PC, Munster, Indiana, USA	
<b>J.E. Bertrand</b>	Moen Incorporated, North Olmsted, Ohio, USA	
<b>A. Bonlender</b>	Bradley Corporation, Menomonee Falls, Wisconsin, USA	
<b>R. Burnham</b>	Zurn Industries LLC, Erie, Pennsylvania, USA	
<b>M. Campos</b>	ICC Evaluation Service, LLC, Brea, California, USA	
<b>S.L. Cavanaugh</b>	Cavanaugh Consulting, Santa Fe, New Mexico, USA	
<b>W.E. Chapin</b>	Professional Code Consulting, LLC, Cullman, Alabama, USA	
<b>P.V. DeMarco</b>	IAPMO, Dayton, New Jersey, USA	
<b>C.N. Gross</b>	IAPMO, Ontario, California, USA	<i>Alternate</i>

<b>N.E. Dickey</b>	CSA Group, Cleveland, Ohio, USA	
<b>F. DiFolco</b>	CSA Group, Toronto, Ontario, Canada	<i>Alternate</i>
<b>G.S. Duren</b>	Code Compliance, Inc., S Pasadena, Florida, USA	
<b>R. Emmerson</b>	Consultant, Mundelein, Illinois, USA	
<b>C.L. Jahrling</b>	ASSE International, Chicago, Illinois, USA	<i>Contributing Member</i>
<b>R.L. George</b>	Plumb-Tech Design and Consulting Services L.L.C, Newport, Michigan, USA	
<b>G.W. Harrison</b>	Wayne Harrison Consulting, Edmond, Oklahoma, USA	
<b>L. Himmelblau</b>	Chicago Faucet, Des Plaines, Illinois, USA	
<b>J.M. Koeller</b>	Koeller and Co., Yorba Linda, California, USA	
<b>N.M. Kummerlen</b>	Consultant, Lorain, Ohio, USA	<i>Contributing Member</i>
<b>C.J. Lagan</b>	LIXEL Water Technologies Americas, Piscataway, New Jersey, USA	
<b>J.W. Lauer</b>	Sloan Valve Company, Huntington Beach, California, USA	
<b>D. Gliberman</b>	Sloan Valve Company, Huntington Beach, California, USA	<i>Alternate</i>
<b>W.H. LeVan</b>	Cast Iron Soil Pipe Institute, Panama City Beach, Florida, USA	
<b>D. Marbry</b>	Fluidmaster, Inc., San Juan Capistrano, California, USA	

<b>R. Mata</b>	CSA Group, Cleveland, Ohio, USA	
<b>D. Liang</b>	CSA Group, Guangzhou, China	<i>Alternate</i>
<b>D. Orton</b>	NSF International, Ann Arbor, Michigan, USA	
<b>S. Aridi</b>	NSF International, Ann Arbor, Michigan, USA	<i>Alternate</i>
<b>S.A. Remedios</b>	Remedios Consulting LLC, London, Ontario, Canada	
<b>M. Sigler</b>	Plumbing Manufacturers International, Rolling Meadows, Illinois, USA	
<b>G.L. Simmons</b>	Charlotte Pipe & Foundry, Charlotte, North Carolina, USA	
<b>D.G. Waggoner</b>	Charlotte Pipe & Foundry, Charlotte, North Carolina, USA	<i>Alternate</i>
<b>D. Viola</b>	IAPMO, Mokena, Illinois, USA	
<b>L.A. Mercer</b>	IAPMO, Mokena, Illinois, USA	<i>Alternate</i>
<b>J.C. Watson</b>	Elkay Manufacturing, Oak Brook, Illinois, USA	
<b>M. Weiss</b>	Plumbing and Drainage Institute, Polson, Montana, USA	
<b>W.C. Whitehead</b>	Whitehead Consulting Services, Peabody, Massachusetts, USA	
<b>A.L. Guzman</b>	American Society of Mechanical Engineers, New York, New York, USA	<i>Staff Secretary</i>



# CSA Technical Committee on Plumbing Fittings

<b>K. Ernst</b>	Oakville Stamping & Bending Limited, Oakville, Ontario, Canada <i>Category: Producer Interest</i>	<i>Chair</i>
<b>W. Ball</b>	Woodford Manufacturing Company, Colorado Springs, Colorado, USA	<i>Associate</i>
<b>J.E. Bertrand</b>	Moen Incorporated, North Olmsted, Ohio, USA <i>Category: Producer Interest</i>	
<b>A. Bonlender</b>	Bradley Corporation, Menomonee Falls, Wisconsin, USA	<i>Associate</i>
<b>S. Breda</b>	Omni Brass Inc., North York, Ontario, Canada <i>Category: User Interest</i>	
<b>T. Burke</b>	Victoria + Albert Baths Ltd., Telford, , United Kingdom	<i>Associate</i>
<b>R. Burnham</b>	Zurn Industries LLC, Erie, Pennsylvania, USA	<i>Associate</i>
<b>M. Campos</b>	International Code Council, Brea, California, USA	<i>Associate</i>
<b>W.E. Chapin</b>	Professional Code Consulting, LLC, Cullman, Alabama, USA	<i>Associate</i>
<b>Y. Duchesne</b>	Régie du bâtiment du Québec, Québec, Québec <i>Category: Regulatory Authority</i>	
<b>C. Erickson</b>	Underwriters Laboratories Inc., Northbrook, Illinois, USA	<i>Associate</i>
<b>W. Falcomer</b>	The Corporation of the City of Ottawa, Ottawa, Ontario, Canada <i>Category: Regulatory Authority</i>	

<b>F. Fernández</b>	Toto U.S.A. Inc, Ontario, California, USA	<i>Associate</i>
<b>M. Fish</b>	Zurn Industries, LLC, Cary, North Carolina, USA	<i>Associate</i>
<b>D. Gleiberman</b>	Sloan, Los Angeles, California, USA	<i>Associate</i>
<b>D. Green</b>	National Research Council Canada, Canadian Codes Centre, Ottawa, Ontario, Canada	<i>Associate</i>
<b>M. Guard</b>	International Code Council (ICC), Washington, DC, USA	<i>Associate</i>
<b>R. Guinn</b>	Oro-Medonte, Ontario, Canada <i>Category: User Interest</i>	
<b>L. Himmelblau</b>	Chicago Faucets Geberit Manufacturing Division, Des Plaines, Illinois, USA <i>Category: Producer Interest</i>	
<b>E. Ho</b>	IAPMO Research & Testing Inc, Markham, Ontario, Canada	<i>Associate</i>
<b>E. Hood</b>	H. H. Angus & Associates Ltd., Toronto, Ontario, Canada <i>Category: User Interest</i>	
<b>K.S. Hui</b>	Ontario Ministry of Municipal Affairs, Toronto, Ontario, Canada <i>Category: Regulatory Authority</i>	
<b>C. Jahrling</b>	ASSE International, Mokena, Illinois, USA	<i>Associate</i>
<b>A. Knapp</b>	A. Knapp & Associates, Toronto, Ontario, Canada <i>Category: General Interest</i>	
<b>J. Knapton</b>	SAIT Polytechnic, Calgary, Alberta, Canada <i>Category: General Interest</i>	

<b>J. Koeller</b>	Koeller and Company, Yorba Linda, California, USA <i>Category: General Interest</i>	
<b>F. Lemieux</b>	Health Canada, Ottawa, Ontario, Canada <i>Category: Regulatory Authority</i>	
<b>D. Liang</b>	CSA Group, Guangzhou, , China	<i>Associate</i>
<b>R. Liao</b>	Xiamen Lota International Co. Ltd., Xiamen, , China	<i>Associate</i>
<b>J. MacDonald</b>	BLANCO Canada Inc., Brampton, Ontario, Canada	<i>Associate</i>
<b>M. Malatesta</b>	American Standard Brands/LWTA, Piscataway, New Jersey, USA	<i>Associate</i>
<b>D. Marbry</b>	Fluidmaster Inc., San Juan Capistrano, California, USA	<i>Associate</i>
<b>C. McLeod</b>	Kohler Co., Kohler, Wisconsin, USA <i>Category: Producer Interest</i>	<i>Associate</i>
<b>D. McNamara</b>	Franke Kindred Canada Limited, Midland, Ontario <i>Category: Producer Interest</i>	
<b>M. Mohammed</b>	Reliance Worldwide Corp. (Canada) Inc., Vaughan, Ontario, Canada	<i>Associate</i>
<b>A. Murra</b>	Abraham Murra Consulting, Oakville, Ontario, Canada	<i>Associate</i>
<b>S.R. O'Neill</b>	Mohawk College of Applied Arts and Technology, Stoney Creek, Ontario, Canada	<i>Associate</i>
<b>D. Orton</b>	NSF International, Ann Arbor, Michigan, USA	<i>Associate</i>



<b>P. Paré</b>	Masco Canada Limited, St. Thomas, Ontario, Canada <i>Category: Producer Interest</i>	
<b>R. Pickering</b>	Eastern Research Group, Inc. (ERG), Morrisville, North Carolina, USA	<i>Associate</i>
<b>S.M. Rawalpindiwala</b>	Kohler Co. Plumbing Division, Kohler, Wisconsin, USA <i>Category: Producer Interest</i>	
<b>S.A. Remedios</b>	Remedios Consulting LLC, London, Ontario, Canada <i>Category: User Interest</i>	
<b>P. Saeed</b>	Powers, A Watts Brand, Mt. Prospect, Illinois, USA <i>Category: Producer Interest</i>	
<b>R. Sharma</b>	U.S. Environmental Protection Agency, Washington, DC, USA	<i>Associate</i>
<b>M. Sigler</b>	Plumbing Manufacturers Int'l, Rolling Meadows, Illinois, USA	<i>Associate</i>
<b>W.M. Smith</b>	American Society of Plumbing Engineers (ASPE), Montgomery, Alabama, USA <i>Category: General Interest</i>	
<b>S. Sparling</b>	Giffin Koerth Forensic Engineering, Toronto, Ontario, Canada <i>Category: General Interest</i>	
<b>J. St-Denis</b>	Intertek Testing Services NA Ltd. Services d'essais Intertek AN Ltee., Lachine, Québec, Canada	<i>Associate</i>
<b>S. Tanner</b>	U.S. Environmental Protection Agency, Washington, DC, USA <i>Category: General Interest</i>	
<b>C.W. Trendelman</b>	Bargersville, Indiana, USA	<i>Associate</i>
<b>C. Tripodi</b>	Moen Incorporated, Oakville, Ontario, Canada	<i>Associate</i>

<b>D. Tyner</b>	Delta Faucet Company, Indianapolis, Indiana, USA	<i>Associate</i>
<b>J.C. Watson</b>	Elkay, Oak Brook, Illinois, USA	<i>Associate</i>
<b>S. Williams</b>	Watts Water Technologies (Canada) Inc., Burlington, Ontario, Canada	<i>Associate</i>
<b>C. Wright</b>	Ontario Pipe Trades, Dundalk, Ontario, Canada	<i>Associate</i>
<b>L. Pilla</b>	CSA Group, Toronto, Ontario	<i>Project Manager</i>

# CSA/ASME Harmonization Task Group on Plumbing Fixtures

<b>P. Paré</b>	Masco Canada Ltd., St. Thomas, Ontario, Canada	<i>Co-Chair</i>
<b>S. Remedios</b>	Remedios Consulting LLC, London, Ontario, Canada	<i>Co-Chair</i>
<b>M. Campos</b>	International Code Council, Whittier, California, USA	
<b>I. Chang</b>	Intertek Testing Services NA Ltd., Coquitlam, British Columbia, Canada	
<b>N.E. Dickey</b>	CSA Group, Cleveland, Ohio, USA	
<b>K. Ernst</b>	Oakville Stamping & Bending Limited, Oakville, Ontario, Canada	
<b>R. Guinn</b>	Oro-Medonte, Ontario, Canada	
<b>L. Himmelblau</b>	Chicago Faucets Geberit Manufacturing Division, Des Plaines, Illinois, USA	
<b>E. Ho</b>	IAPMO Research & Testing Inc., Markham, Ontario, Canada	
<b>A. Knapp</b>	A. Knapp & Associates, Toronto, Ontario, Canada	
<b>N. M. Kummerlen</b>	Consultant, Lorain, Ohio, USA	
<b>F. Lemieux</b>	Health Canada, Ottawa, Ontario, Canada	
<b>D. Liang</b>	CSA Group, Guangzhou, China	<i>Associate</i>



<b>M. Malatesta</b>	American Standard Brands/LWTA, Piscataway, New Jersey, USA	
<b>D. McNamara</b>	Franke Kindred Canada Limited, Midland, Ontario, Canada	
<b>D. Orton</b>	NSF International, Ann Arbor, Michigan, USA	
<b>S. Rawalpindiwala</b>	Kohler Co. Plumbing Division, Kohler, Wisconsin, USA	
<b>P. Saeed</b>	Powers, A Division of Watts Water Technologies, Inc., Buffalo Grove, Illinois, USA	
<b>W.M. Smith</b>	American Society of Plumbing Engineers (ASPE), Montgomery, Alabama, USA	
<b>C. Wright</b>	Ontario Pipe Trades, Dundalk, Ontario, Canada	
<b>L. Pilla</b>	CSA Group, Toronto, Ontario, Canada	<i>Project Manager</i>

# Preface

This is the second edition of ASME A112.18.6/CSA B125.6, *Flexible water connectors*. It supersedes the previous edition published in 2009.

The following changes appear in this edition:

- a) updated reference to the latest edition of NSF 61;
- b) revised working temperatures;
- c) new low lead requirements;
- d) updated fill valve thread requirements; and
- e) updated ice maker pressure drop requirements.

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 Fittings, under the jurisdiction of ASME Standards Committee on Plumbing Materials and Equipment and the CSA Technical Committee on Plumbing Fittings. The CSA Technical Committee operates under the jurisdiction of the CSA Strategic Steering Committee on Water Management Products, Materials, and Systems. 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 19, 2017.

## ASME Notes:

- 1) *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) *To submit a request for interpretation of CSA Standards, please send the following information to [inquiries@csa.ca](mailto:inquiries@csa.ca) and include “Request for interpretation” in the subject line:*
  - a) *define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;*
  - b) *provide an explanation of circumstances surrounding the actual field condition; and*
  - c) *where possible, phrase the request in such a way that a specific “yes” or “no” answer will address the issue.*

*Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization and are published in CSA’s periodical Info Update, which is available on the CSA website at <http://standardsactivities.csa.ca>.*
- 5) *CSA Standards are subject to periodic review, and suggestions for their improvement will be referred to the appropriate committee. To submit a proposal for change to CSA Standards, please send the following information to [inquiries@csa.ca](mailto:inquiries@csa.ca) and include “Proposal for change” in the subject line:*
  - a) *Standard designation (number);*
  - b) *relevant clause, table, and/or figure number;*
  - c) *wording of the proposed change; and*
  - d) *rationale for the change.*
- 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.*



# ***ASME A112.18.6-2017/CSA B125.6-17***

## ***Flexible water connectors***

### **1 Scope**

#### **1.1**

This Standard covers flexible water connectors for use in water supply systems under

- a) continuous pressure in accessible locations; and
- b) intermittent pressure in recreational vehicles only.

#### **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; 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.

#### **1.3**

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 conversion criteria used in this Standard, see Annex [B](#).

### **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)**

A112.19.5-2005

*Trim for Water-Closet Bowls, Tanks, and Urinals*

B1.1-2003 (R2008)

*Unified Inch Screw Threads (UN and UNR Thread Form)*

B1.20.1-1983 (R2006)

*Pipe Threads, General Purpose, Inch*

B1.20.3-1976 (R2003)

*Dryseal Pipe Threads, Inch*

B1.20.7-1991 (R2003)

*Hose Coupling Screw Threads, Inch*

B16.18-2001 (R2005)

*Cast Copper Alloy Solder Joint Pressure Fittings*

B16.22-2001 (R2005)

*Wrought Copper and Copper Alloy Solder Joint Pressure Fittings*

B16.26-2006

*Cast Copper Alloy Fittings for Flared Copper Tubes*

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

ASME A112.18.1-2012/CSA B125.1-12

*Plumbing supply fittings*

**ASSE (American Society of Sanitary Engineering)/ASME (The American Society of Mechanical Engineers)/CSA Group**

ASSE 1002-2015/ASME A112.1002-2015/CSA B125.12-15

*Anti-siphon fill valves for water closet tanks*

**ASSE (American Society of Sanitary Engineering)**

1061-2006

*Performance Requirements for Removable and Non-Removable Push-Fit Fittings*

**ASTM International (American Society for Testing and Materials)**

D6284-09

*Standard Test Method for Rubber Property — Effect of Aqueous Solutions with Available Chlorine and Chloramine*

**ANSI (American National Standards Institute)/ISA (Instrumentation, Systems, and Automation Society)**

75.02-1996

*Control Valve Capacity Test Procedures*

**NSF International/ANSI (American National Standards Institute)**

61-2015

*Drinking Water System Components — Health Effects*

NSF/ANSI 372-2016

*Drinking Water System Components — Lead content*

**SAE International (Society of Automotive Engineers)**

J512 (1997)

*Automotive Tube Fittings*

## 3 Definitions and abbreviations

### 3.1 Definitions

The following definitions shall apply in this Standard:

**Accessible** — readily serviceable or readily replaceable.

**Flexible water connector (flexible connector)** — a non-rigid tube or hose with end connections used for connecting a water supply to a fixture, fitting, or appliance.

**Push-fit fitting** — a mechanical fitting that joins pipes or tubes and achieves a seal by pushing the mating pipe or tube into the fitting by hand. The fitting can be removable or non-removable.

### 3.2 Abbreviations

The following abbreviations shall apply in this Standard:

NPT — National Pipe Taper

NPTF — National Pipe Taper Fuel and Oil

UNS — Unified National Special

## 4 General requirements

**Note:** *The provisions of this Standard are not intended to prevent the use of alternative materials or manufacturing methods for products that meet the intent of this Standard.*

### 4.1 Toxicity and lead content

#### 4.1.1

Flexible connectors used for delivery of drinking water shall comply with the applicable requirements of NSF/ANSI 61.

#### 4.1.2

Solder and fluxes shall not exceed 0.2% lead content by mass. Metal alloys shall not exceed 3.7% lead content by mass.

#### 4.1.3

Flexible connectors intended to convey or dispense water for human consumption through drinking or cooking shall not contain a weighted average lead content in excess of 0.25% when evaluated in accordance with the test method specified in NSF/ANSI 372.

### 4.2 Materials

**Note:** *Annex A provides information on the effects of aqueous chloramine on elastomers.*



#### 4.2.1

Copper alloy components shall contain at least 56% copper.

#### 4.2.2

Stainless steel components in contact with water shall be made from 300 or 400 series stainless steel. Ferrous steel parts not in contact with water shall be protected by a coating that complies with Clause 4.3.

### 4.3 Coatings

Coatings shall be tested in accordance with and meet the requirements of Clause 5.2 of ASME A112.18.1/CSA B125.1.

### 4.4 Connections

#### 4.4.1 General

Connections shall comply with the performance requirements of this Standard (see Clause 5) and, as applicable, Clauses 4.4.2 to 4.4.7.

#### 4.4.2 Pipe threads

NPT or NPTF threads shall comply with the L1 gauge requirements of ASME B1.20.1 or ASME B1.20.3 using a tolerance of  $\pm 1$  turn. Other pipe threads shall comply with ASME B1.20.1.

#### 4.4.3 Hose end threads

Hose end threads shall

- a) be compatible with hose end threads that comply with ASME B1.20.7; and
- b) comply with the requirements of this Standard.

#### 4.4.4 Fill valve threads

Fill valve threads shall comply with ASSE 1002/ASME A112.1002/CSA B125.12, except that fill valve threads may be Class 2B.

#### 4.4.5 Solder connections

The length and diameter of the joint section of a solder joint end for connection to copper tube or copper tube fittings shall be as specified in ASME B16.18 or ASME B16.22. Flexible connectors for soldering to the water distribution system shall not contain soldered assemblies.

#### 4.4.6 Flare connections

Flare connections shall

- a) be compatible with flare connections that comply with ASME B16.26; and
- b) comply with the requirements of this Standard.

#### 4.4.7 Compression connections

Compression connections shall

- a) be compatible with compression connections that comply with SAE J512; and
- b) comply with the requirements of this Standard.



#### 4.4.8 Push-fit fittings

Connections achieved by push-fit fittings shall comply with ASSE 1061 and the applicable requirements of this Standard.

#### 4.4.9 Alternate connections

Alternate connections shall meet the performance requirements of this Standard.

#### 4.5 Water heater flexible connectors

Metallic water heater flexible connectors shall be made of

- a) 300 series stainless steel with a minimum wall thickness of 0.25 mm (0.010 in); or
- b) copper with a minimum wall thickness of 0.7 mm (0.026 in).

#### 4.6 Working pressure

Flexible connectors shall function at

- a) supply pressures between 140 and 860 kPa (20 and 125 psi); and
- b) intermittent impulse pressures not exceeding 1240 kPa (180 psi).

#### 4.7 Working temperature

Flexible connectors

- a) intended for hot and cold water applications shall function at supply temperatures between 4 and 71°C (40 and 160°F) and shall withstand water at 85 °C (185°F) for 0.5 h without failure of the pressure envelope; or
- b) intended only for cold water applications shall function at supply temperatures between 4 and 43 °C (40 and 110 °F) and shall withstand water at 52 °C (125°F) for 0.5 h without failure of the pressure envelope.

### 5 Performance requirements and test methods

#### 5.1 General

##### 5.1.1

A specimen representing each combination of nominal diameter, connection type, and material shall be tested.

##### 5.1.2

Separate specimens shall be used for each test specified in this Standard.

#### 5.2 Intermittent impulse pressure test

##### 5.2.1 Performance

Flexible connectors shall withstand intermittent impulse pressures not exceeding 1280 kPa (185 psi) when tested in accordance with Clause 5.2.2. In addition, on completion of such testing, the flexible connectors shall not leak when tested in accordance with the blocked outlet procedure specified in Clause 5.3.1.3 of ASME A112.18.1/CSA B125.1.

## 5.2.2 Procedure

The intermittent impulse pressure test shall be conducted as follows:

- a) Supply water to the specimen in such a manner that the flowing pressure upstream of the specimen does not exceed 517 kPa (75 psi) and the flow rate is  $7.6 \pm 1.9$  L/min ( $2.0 \pm 0.5$  gpm), at the following temperatures:
  - i)  $82 \pm 3$  °C ( $180 \pm 5$  °F) for flexible connectors intended for hot and cold water applications; and
  - ii)  $49 \pm 3$  °C ( $120 \pm 5$  °F) for flexible connectors intended only for cold water applications.
- b) For each cycle, stop the flow and increase the pressure from 517 kPa (75 psi) to  $1240 \pm 35$  kPa ( $180 \pm 5$  psi).
- c) Cycle the specimen for 100 000 cycles at a minimum of 7 cycles/min at the following rates:
  - i)  $3 \pm 1$  s at 517 kPa (75 psi) maximum; and
  - ii)  $3 \pm 1$  s at  $1240 \pm 35$  kPa ( $180 \pm 5$  psi) maximum.

## 5.3 Burst pressure test

### 5.3.1 Performance

Flexible connectors shall not leak when subjected to the hydrostatic burst pressure test specified in Clause 5.3.2.

### 5.3.2 Procedure

The burst pressure test shall be conducted as follows:

- a) Fill the specimen with water.
- b) For flexible connectors intended
  - i) for hot and cold water applications, submerge the specimen in water at  $82 \pm 3$  °C ( $180 \pm 5$  °F) for 30 min. Alternatively, if the medium is air, condition the specimen for 60 min at ambient laboratory conditions while flowing water at  $82 \pm 3$  °C ( $180 \pm 5$  °F) through it; or
  - ii) only for cold water applications, submerge the specimen in water at  $49 \pm 3$  °C ( $120 \pm 5$  °F) for 30 min. Alternatively, if the medium is air, condition the specimen for 60 min at ambient laboratory conditions while flowing water at  $49 \pm 3$  °C ( $120 \pm 5$  °F) through it.
- c) Pressurize the specimen at  $1724 \pm 35$  kPa ( $250 \pm 5$  psi).
- d) Hold the specimen at the temperature and pressure specified in Items b) and c) for 30 min.
- e) Remove the specimen from the water, if applicable.
- f) Inspect the specimen for leaks while it is still being subjected to the test pressure.

## 5.4 Pressure drop test

### 5.4.1 Performance

The pressure drop across the specimen shall not exceed the applicable value specified in Table 1 when it is tested in accordance with Clause 5.4.3. This requirement shall not apply to flexible connectors that are an integral part of a faucet that complies with ASME A112.8.1/CSA B125.1.

### 5.4.2 Set-up

The test assembly shall be set up in accordance with Part 4 of ANSI/ISA-75.02. The test specimen shall consist of a flexible water connector bent 180° around a mandrel of the applicable size specified in Table 1.



### 5.4.3 Procedure

The pressure drop test shall be conducted as follows:

- a) Supply water at the applicable flow rate specified in Table 1 for at least 30 s.
- b) At the end of the 30 s, measure the pressure drop across the specimen.

### 5.5 Torque test

Flexible connectors shall not leak or otherwise fail when tested in accordance with Clause 5.3.4.2 of ASME A112.18.1/CSA B125.1.

## 6 Markings

### 6.1

Except as specified in Clause 6.2, flexible connectors shall be permanently marked with the manufacturer's recognized name, trademark, or other mark.

### 6.2

Flexible connectors that are not permanently marked with the manufacturer's recognized name, trademark, or other mark shall be permanently marked with the recognized name, trademark, or other mark of the customer for whom the connector was manufactured.

### 6.3

Flexible connectors marked in accordance with Clause 6.1 may also be marked with the name, trademark, or other mark of the customer for whom the connector was manufactured, by placing a permanent mark or non-permanent label or tag on the connector.

### 6.4

#### 6.4.1

In addition to meeting the requirements of Clause 6.1 or 6.2, flexible connectors shall be marked "For use with water in accessible locations only".\* This requirement shall be met by placing a permanent mark or non-permanent label or tag on the connector.

\* The equivalent French wording is "Pour utilisation avec de l'eau dans les endroits accessibles seulement".

#### 6.4.2

The requirement in Clause 6.4.1 shall not apply to flexible connectors that are an integral part of a faucet that complies with ASME A112.8.1/CSA B125.1.

#### 6.4.3

In addition to meeting the requirements of Clause 6.1 or 6.2, flexible connectors intended only for cold water applications shall be permanently marked "Only for use with cold water".\*

\* The equivalent French wording is "Pour utilisation avec eau froide seulement".

#### 6.4.4

The requirement specified in Clause 6.4.3 shall not apply to flexible connectors that are an integral part of a fixture fitting that complies with ASME A112.8.1/CSA B125.1.

**Table 1**  
**Maximum pressure drop for flexible connectors**  
 (See Clause 5.4.)

Application	Typical nominal sizes	Mandrel size, mm (in)	Flow rate, L/m (gpm)	Maximum pressure drop, kPa (psi)
Clothes washer	3/4 in hose thread	127.0 (5.0)	15.1 (4.0)	172.4 (25.0)
Faucet or dishwasher	3/8 to 1/2 in OD tube	127.0 (5.0)	7.6 (2.0)	103.4 (15.0)
Fill valve	3/8 to 1/2 in OD tube	127.0 (5.0)	7.6 (2.0)	69.0 (10.0)
General connector	NPS-1	304.8 (12.0)	94.6 (25.0)	13.8 (2.0)
	NPS-1-1/4	381.0 (15.0)	113.6 (30.0)	13.8 (2.0)
	NPS-1-1/2	457.2 (18.0)	113.6 (30.0)	13.8 (2.0)
	NPS-2	609.6 (24.0)	151.4 (40.0)	13.8 (2.0)
Icemaker	1/4 in OD tube	127.0 (5.0)	1.9 (0.5)	110.3 (16.0)
Water heater	5/8 to 7/8 in OD tube or NPS-3/4 pipe	127.0 (5.0)	37.9 (10.0)	27.6 (4.0)

**Notes:**

- 1) Tolerances on mandrel sizes shall be  $\pm 5\%$ .
- 2) Tolerances for flow rates shall be  $-0\%$ ,  $+5\%$ .



## *Annex A (informative)*

# ***Exposure to aqueous chloramine***

**Note:** *This Annex is not a mandatory part of this Standard.*

### **A.1 General**

Accelerated life-cycle testing and anecdotal evidence have shown that exposure to aqueous chloramine can have deleterious effects on some elastomers used for flexible connectors. ASTM D6284 can be useful in evaluating the chloramine resistance of elastomers.

## *Annex B (informative)*

### ***Unit conversion and rounding criteria***

**Note:** *This Annex is not a mandatory part of this Standard.*

#### **B.1**

The following conversion rules are used in this Standard:

- a) Zeros to the left of the first non-zero digit are not significant.
- b) If the number is greater than 1, all zeros to the right of the decimal point are significant.
- c) In multiplication and division, the original number with the smallest number of significant digits determines the number of significant digits in the product or quotient.
- d) If an exact constant is used (e.g., 3 ft = 1 yd), it does not affect the number of significant digits in the calculated value.
- e) If inexact constants are used (e.g.,  $\pi = 3.1416$ ), the constant with at least one more significant digit than the smallest number of significant digits in the original data is used.

#### **B.2**

The following rounding rules are used in this Standard:

- a) The digits that follow the last significant digit are dropped if the first digit is less than 5.
- b) If the first digit dropped is greater than 5, the preceding digit is increased by 1.
- c) If the first digit dropped is 5 and there are non-zero digits following the 5, the preceding digit is increased by 1.
- d) If the first digit dropped is 5 and there are only zeros following the 5, the digit is rounded to the even number (e.g., for three significant digits, 1.655000 becomes 1.66, 1.625000 becomes 1.62).
- e) For maximums and minimums, rounding is performed within the range of the maximum and minimum values in a way that does not violate the original limits.



I S B N 978-0-7918-7184-3

