



**ASSE 1070-2020/
ASME A112.1070-2020/
CSA B125.70:20**
National Standard of Canada



Performance requirements for water temperature limiting devices



Standards Council of Canada
Conseil canadien des normes

Legal Notice for Harmonized Standard

Jointly Developed by ASME, ASSE, and CSA Group

Intellectual property rights and ownership

As between American Society of Mechanical Engineers ("ASME"), ASSE International Chapter of IAPMO, LLC. ("ASSE"), and Canadian Standards Association (Operating as "CSA Group") (collectively "ASME, ASSE, and CSA Group") and the users of this document (whether it be in printed or electronic form), ASME, ASSE, 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, ASSE, and CSA Group and may give rise to a right in ASME, ASSE and CSA Group to seek legal redress for such use, modification, copying, or disclosure. ASME, ASSE, 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, ASSE, and CSA Group do not warrant the accuracy, completeness, or currency of any of the information published in this document. ASME, ASSE, 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, ASSE, 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, ASSE, 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, ASSE, 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, ASSE, 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, ASSE, 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, ASSE, 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, ASSE, 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, ASSE, 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

*ASSE 1070-2020/
ASME A112.1070-2020/
CSA B125.70:20
September 2020*

Title: *Performance requirements for water temperature limiting devices*

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

- go to store.csagroup.org
- click on **Product Updates**

The **List ID** that you will need to register for updates to this publication is **2427761**.

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

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

ASMENORMDOC.COM : Click to view the full PDF of ASSE 1070 ASME A112.1070 CSA B125.70 2020

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.

Individuals, companies, and associations across Canada indicate their support for CSA Group’s standards development by volunteering their time and skills to Committee work and supporting CSA Group’s objectives through sustaining memberships. The more than 7000 committee volunteers and the 2000 sustaining memberships together form CSA Group’s total membership from which its Directors are chosen. Sustaining memberships represent a major source of income for CSA Group’s standards development activities.

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 eight 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



Standards Council of Canada
Conseil canadien des normes

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”*

ASSE/ASME/CSA Standard

**ASSE 1070-2020/ASME A112.1070-2020/
CSA B125.70:20**

Performance requirements for water temperature limiting devices



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

Published in September 2020 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 store.csagroup.org

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

ASSE International (ASSE)

18927 Hickory Creek Dr., Suite 220

Mokena, IL 60448, USA

(708) 995-3019

Visit the ASSE International Webstore at www.assewebstore.com

Commitment for Amendments

This Standard is issued jointly by the American Society of Mechanical Engineers (ASME), ASSE International Chapter of IAPMO, LLC. ("ASSE"), 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, ASSE, 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 978-0-7918-7394-6
Copyright © 2020 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.

ASSE International
18927 Hickory Creek Dr., Suite 220
Mokena, IL 60448
Tel: (708) 995-3019
Fax: (708) 479-6139

E-mail: general.info@asse-plumbing.org

www.asse-plumbing.org

© ASSE International — 2020

Published in September 2020 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
store.csagroup.org

ISBN 978-1-4883-2646-2
ICS 17.120
© 2020 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

ASSE Product Standards Committee 7

CSA Technical Committee on Plumbing Fittings 9

Preface 15

Section I 18

1 Scope 18

Section II 19

2 Reference publications and definitions 19

2.1 Reference publications 19

2.2 Definitions 19

Section III 20

3 Design and general requirements 20

3.1 Rated pressure, flow rate, and temperature range 20

3.1.1 Rated pressure 20

3.1.2 Flow rate 20

3.1.3 Temperature range 20

3.2 End connections 20

3.3 Function 20

3.4 Cross-flow 21

3.5 Toxicity and lead content 21

3.6 Devices incorporating electrical features 21

3.7 Servicing 22

Section IV 22

4 Performance requirements and test methods 22

4.1 General 22

4.1.1 Preconditioning 22

4.1.2 Installation for testing 22

4.1.3 Test sequence 22

4.2 High-temperature conditioning test 22

4.2.1 Purpose 22

4.2.2 Procedure 22

4.2.3 Failure criteria 23

4.3 Working pressure and temperature test 23

4.3.1 General 23

4.3.2 Purpose 23

4.3.3 Procedure with the valve closed 23

4.3.4 Procedure with the valve opened and the outlet(s) blocked 23

4.3.5	Test temperatures and pressures	23
4.3.6	Failure criteria	23
4.4	Cross-flow test	24
4.4.1	Purpose	24
4.4.2	Procedures	24
4.4.3	Failure criteria	24
4.5	Life cycle test	24
4.5.1	Purpose	24
4.5.2	Procedure	24
4.5.3	Failure criteria	24
4.6	Pressure and temperature variation test	25
4.6.1	Data gathering (see Figure 1)	25
4.6.2	Procedure (see Figure 1)	25
4.6.3	Failure criteria	26
4.7	Cold water supply failure test	26
4.7.1	Purpose	26
4.7.2	Procedure	26
4.7.3	Failure criteria	27
4.8	Hydrostatic pressure test	27
4.8.1	Purpose	27
4.8.2	Procedure	27
4.8.3	Failure criteria	27

Section V 27

5	Markings, packaging, instructions, and literature	27
5.1	Product markings	27
5.2	Temperature control setting identification	27
5.3	Packaging	28
5.4	Installation and maintenance instructions	28
5.5	Rated flow	28
5.6	Water temperature	28

Annex A (informative) — Unit conversion and rounding criteria 30

Annex B (informative) — Verifying the time constant of the temperature-measuring equipment 31

ASME A112 Standards Committee on Plumbing Materials and Equipment

W. M. Smith	American Society of Plumbing Engineers, Montgomery, Alabama, USA	<i>Chair</i>
S. M. Rawalpindiwala	Kohler Co. Plumbing Division, Kohler, Wisconsin, USA	<i>Vice-Chair</i>
M. R. Gibeault	Kohler Co. Plumbing Division, Kohler, Wisconsin, USA	<i>Alternate</i>
R. K. Adler	City of San Jose, San Jose, California, USA	
J. A. Ballanco	JB Engineering & Code Consulting PC, Munster, Indiana, USA	
J. E. Bertrand	Fortune Brands — Global Plumbing Group, North Olmsted, Ohio, USA	
T. Burger	NSF International, South Euclid, Ohio, 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	
A. Ciechanowski	NSF International, Ann Arbor, Michigan, USA	<i>Alternate</i>
P. V. DeMarco	IAPMO, 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	
C. Haldiman	Watts Water Technologies, Springfield, Missouri, 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	
N. M. Kummerlen	Consultant, Lorain, Ohio, USA	<i>Contributing Member</i>

C. J. Lagan	American Standard/LIXIL, Piscataway, New Jersey, USA	
M. Malatesta	American Standard/LIXIL, Piscataway, New Jersey, USA	<i>Alternate</i>
W. LeVan	Cast Iron Soil Pipe Institute, Watersound, Florida, USA	
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	
C. W. McDonald	Fortune Brands — Global Plumbing Group, North Olmsted, Ohio, USA	<i>Alternate</i>
L. A. Mercer	IAPMO, Valley City, Ohio, USA	
K. Thompson	IAPMO, Ontario, California, USA	<i>Alternate</i>
W. B. Morris	Charlotte Pipe & Foundry, Charlotte, North Carolina, USA	<i>Alternate</i>
A. I. Murra	Abraham Murra Consulting, Oakville, Ontario, Canada	
D. Orton	NSF International, Ann Arbor, Michigan, USA	
R. Pickering	Eastern Research Group, Inc., 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, Orlando, Florida, USA	
G. L. Simmons	Charlotte Pipe & Foundry, Charlotte, North Carolina, USA	
S. Tanner	U.S. Environmental Protection Agency, Washington, District of Columbia, USA	<i>Contributing Member</i>
J. Watson	Elkay Manufacturing, Oak Brook, Illinois, USA	
M. Weiss	Plumbing & Drainage Institute, Polson, Montana, USA	
W. C. Whitehead	Whitehead Consulting Services, Peabody, Massachusetts, USA	
A. L. Guzman Rodriguez	American Society of Mechanical Engineers, New York, New York, USA	<i>Secretary</i>

ASSE Product Standards Committee

T. Su	Stevens Institute of Technology, Hoboken, New Jersey, USA	<i>Chair</i>
W. Briggs	JB&B, New York, New York, USA	
T. Burger	NSF International, South Euclid, Ohio, USA	
W. Chapin	Professional Code Consulting, LLC, Cullman, Alabama, USA	
M. E. Fish	Zurn Industries, LLC, Cary, North Carolina, USA	
R. L. George	Plumb-Tech Design and Consulting Services LLC, Newport, Michigan, USA	
D. Gleiberman	Sloan Valve Co., Los Angeles, California, USA	
B. Gunnell	Precision Plumbing Products, Portland, Oregon, USA	
C. Haldiman	Watts Water Technologies, Springfield, Missouri, USA	
J. F. Higdon	Supply Source Products, Matthews, North Carolina, USA	
J. Kendzel	American Supply Association, Itasca, Illinois, USA	
R. Mata	American Society of Plumbing Engineers, Mentor, Ohio, USA	
T. Pitcherello	State of New Jersey, Bordentown, New Jersey, USA	

D. Rademacher	Plumbing Code and Design Consulting, Butte, MT, USA
S. M. Rawalpindiwala	Kohler Co. Plumbing Division, Kohler, Wisconsin, USA
B. Smith	ASPE, Montgomery, Alabama, USA
C. Jahrling	ASSE International, Chicago, Illinois, USA

CSA Technical Committee on Plumbing Fittings

K. Ernst	Oakville Stamping & Bending Limited, Oakville, Ontario, Canada <i>Category: Producer Interest</i>	<i>Chair</i>
J. E. Bertrand	Fortune Brands — Global Plumbing Group, North Olmsted, Ohio, USA <i>Category: Producer Interest</i>	<i>Vice-Chair</i>
D. McNamara	Franke Kindred Canada Limited, Midland, Ontario, Canada <i>Category: Producer Interest</i>	<i>Vice-Chair</i>
J. Adili	UL LLC, Northbrook, Illinois, USA	<i>Non-voting</i>
W. T. Ball	WCM Industries Inc., Colorado Springs, Colorado, USA	<i>Non-voting</i>
S. Breda	Omni Brass Inc., Vaughan, Ontario, Canada <i>Category: User Interest</i>	
J. Briggs	NSF International, Ann Arbor, Michigan, USA	<i>Non-voting</i>
T. Burger	NSF International, South Euclid, Ohio, 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>Non-voting</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>

L. Clifton	International Code Council, Brea, California, USA	
A. DeFrancesca	City of Toronto, Toronto, Ontario, Canada	<i>Non-voting</i>
N. E. Dickey	Hansgrohe, Inc., Alpharetta, Georgia, USA	<i>Non-voting</i>
Y. Duchesne	Régie du bâtiment du Québec, Québec, Québec, Canada <i>Category: Regulatory Authority</i>	
A. R. Emmerson	Consultant, Mundelein, Illinois, USA	
W. Falcomer	The Corporation of the City of Ottawa, Ottawa, Ontario, Canada <i>Category: Producer Interest</i>	
F. Fernández	Toto U.S.A. Inc., Ontario, California, USA	<i>Non-voting</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>
F. Grable	International Code Council (ICC), Country Club Hills, Illinois, USA	<i>Non-voting</i>
D. Grenier	BainUltra inc., Lévis, Québec, Canada	<i>Non-voting</i>
M. Guard	Regulosity, LLC, Wauwatosa, Wisconsin, USA	<i>Non-voting</i>
R. Guinn	Consumer Representative, Oro-Medonte, Ontario, Canada <i>Category: User Interest</i>	

R. Hernandez	CSA Group, Independence, Ohio, USA	
L. Himmelblau	The Chicago Faucet Company, 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>	
J. M. Koeller	Koeller and Co., Yorba Linda, California, USA <i>Category: General Interest</i>	
A. Lathia	CSA Group, Independence, Ohio, USA <i>Category: Regulatory Authority</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>
D. Lundy	Watts Water Technologies (Canada) Inc., Burlington, Ontario, Canada	<i>Non-voting</i>

J. MacDonald	BLANCO Canada Inc., Brampton, Ontario, Canada	<i>Non-voting</i>
M. Malatesta	American Standard/LIXIL, Piscataway, New Jersey, USA	<i>Non-voting</i>
D. Marbry	Fluidmaster Inc., San Juan Capistrano, California, USA	<i>Non-voting</i>
M. Martinez	Delta Faucet Company, Indianapolis, Indiana, USA	
R. Mata	American Society of Plumbing Engineers, Mentor, Ohio, USA	<i>Non-voting</i>
C. McDonald	Fortune Brands — Global Plumbing Group, North Olmsted, Ohio, USA	<i>Non-voting</i>
L. A. Mercer	IAPMO, Valley City, Ohio, USA	<i>Non-voting</i>
M. Mohammed	Reliance Worldwide Corp. (Canada) Inc., Vaughan, Ontario, Canada	<i>Non-voting</i>
A. I. Murra	Abraham Murra Consulting, Oakville, Ontario, Canada <i>Category: General Interest</i>	
R. Neff	Delta Faucet Company, Indianapolis, Indiana, USA	<i>Non-voting</i>
S. R. O'Neill	Mohawk College of Applied Arts and Technology, Stoney Creek, Ontario, Canada	<i>Non-voting</i>
D. Orton	NSF International, Ann Arbor, Michigan, USA	<i>Non-voting</i>
P. Paré	Masco Canada Limited, St. Thomas, Ontario, Canada <i>Category: Producer Interest</i>	
M. Pfeiffer	International Code Council (ICC), Country Club Hills, Illinois, USA <i>Category: Producer Interest</i>	

R. Pickering	Eastern Research Group Inc., Morrisville, North Carolina, USA	<i>Non-voting</i>
A. Poon	Delta Faucet Company, Indianapolis, Indiana, USA	
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>
P. Saeed	Powers, A Watts Brand, Mt. Prospect, Illinois, USA <i>Category: Producer Interest</i>	
S. Shang	China Building Material Test & Cert. Group (Shaanxi) Co. Ltd., Shaanxi, Shanxi, China	<i>Non-voting</i>
M. Sigler	Plumbing Manufacturers Int'l, Orlando, Florida, USA	<i>Non-voting</i>
W. Smith	American Society of Plumbing Engineers (ASPE), Montgomery, Alabama, USA <i>Category: General Interest</i>	
R. Sparling	-30- Forensic Engineering, Toronto, Ontario, Canada <i>Category: General Interest</i>	
S. Tanner	U.S. Environmental Protection Agency, Washington, District of Columbia, USA <i>Category: General Interest</i>	
K. Thompson	IAPMO, Ontario, California, USA	<i>Non-voting</i>
J. C. Watson	Elkay Manufacturing, Oak Brook, Illinois, USA	<i>Non-voting</i>

S. Weinman	American Society of Mechanical Engineers (ASME), New York, New York, USA	
S. P. Williams	Sioux Chief Manufacturing Company Inc., Brantford, Ontario, Canada	<i>Non-voting</i>
E. L. Wirtschoreck	International Code Council (ICC), Country Club Hills, Illinois, USA	<i>Associate</i>
K. Wong	Uponor, Apple Valley, Minnesota, USA	<i>Non-voting</i>
C. Wright	Ontario Pipe Trades, Dundalk, Ontario, Canada <i>Category: User Interest</i>	
R. Zanola	CSA Group, Lombardia, Milan, Italy	
F. Zhang	China Building Material Test & Cert. Group (Shaanxi) Co. Ltd., Shaanxi, Shanxi, China	<i>Non-voting</i>
J. Menard	CSA Group, Toronto, Ontario, Canada	<i>Project Manager</i>

Preface

This is the second edition of ASSE 1070/ASME A112.1070/CSA B125.70, *Performance requirements for water temperature limiting devices*. It supersedes the previous edition published in 2015.

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

This Standard was prepared by the ASSE/ASME/CSA Harmonization Task Group on Plumbing Fittings, under the jurisdiction of the ASME A112 Standards Committee on Plumbing Materials and Equipment, the ASSE Product Standards Committee, and the CSA Technical Committee on Plumbing Fittings. 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 on Plumbing Materials and Equipment, the ASSE Product Standards Committee, and the CSA Technical Committee on Plumbing Fittings.

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

This Standard was approved as an American National Standard by the American National Standards Institute on July 17, 2020.

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 <https://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 Standard.
- 4) To submit a request for interpretation of this Standard, please send the following information to inquiries@csagroup.org and include “Request for interpretation” in the subject line:
 - a) define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;
 - b) provide an explanation of circumstances surrounding the actual field condition; and
 - c) where possible, phrase the request in such a way that a specific “yes” or “no” answer will address the issue.

Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization and are available on the Current Standards Activities page at standardsactivities.csa.ca.

- 5) This Standard is subject to review five years from the date of publication. Suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include “Proposal for change” in the subject line:
 - a) Standard designation (number);
 - b) relevant clause, table, and/or figure number;
 - c) wording of the proposed change; and
 - d) rationale for the change.

ASSE Notes:

Notes:

- 1) **Requests for interpretation**

Requests for interpretation may be sent to any of the (3) standards organizations. All interpretations are reviewed and agreed upon by the ASSE International, ASME, and CSA prior to response. Requests for interpretations may be sent to:

Staff Engineering Group

ASSE International

18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448-8399

Requests must include:

- Name and contact information of the individual requesting the interpretation;
- Name of organization the individual represents (if any);
- Appropriate references to the standard's clauses that have a bearing on the issue cited in the request;
- A concise explanation of the issue requiring a technical interpretation;
- Any supporting documentation that will assist in understanding or describing the issue;
- Any recommendations the requestor would like to make concerning a possible technical interpretation, along with appropriate justification or comments.

Forms for requests or general guidance can be obtained by emailing staffengineer@asse-plumbing.org.

2) **Endorsement vs. Listing**

ASSE International does not endorse any product, but rather lists products that have successfully been applied for and meet the given standard. In exchange the manufacturer is allowed to place the ASSE Seal with the given standard number on their product for public recognition.

In order to apply for listing, visit www.asse-plumbing.org/seal/listing_instructions.html.

3) **Patent rights**

ASSE International complies with Section 3.1 of ANSI Essential Requirements – Inclusion of Patents in American National Standards. To understand what is and is not covered, visit www.ansi.org/essentialrequirements.

4) **Committee or Working Group Membership**

Each standard is developed by a working group and then approved by the Product Standards Committee and Board of Directors of ASSE International. In order to apply for membership on a working group or any committee, the applications are available at www.asse-plumbing.org/standards/WorkingGroupApp.pdf.

ASSE 1070-2020/ ASME A112.1070-2020/ CSA B125.70:20

Performance requirements for water temperature limiting devices

Section I

1 Scope

1.1

This Standard covers water temperature limiting devices intended to limit the hot or tempered water temperature supplied to fittings for fixtures such as sinks, bidets, lavatories, and bathtubs to reduce the risk of scalding. These devices are not designed to address thermal shock.

Note: Unless otherwise specified in this Standard, water temperature limiting devices are referred to as “devices”.

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 inch/pound units are shown in parentheses.

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

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

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

Section II

2 Reference publications and definitions

2.1 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/CSA Group

ASME A112.18.1-2018/CSA B125.1-18
Plumbing supply fittings

ASSE International

Plumbing Dictionary Sixth Edition — 2007

ASTM International

ASTM F877-19
Standard Specification for Crosslinked Polyethylene (PEX) Hot and Cold Water Distribution Systems

ASTM D2846/D2846M-19a
Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot and Cold Water Distribution Systems

CSA Group

CSA B137-17
Thermoplastic pressure piping compendium

NSF International

NSF/ANSI 61-2019
Drinking Water System Components — Health Effects

NSF/ANSI 372-2016
Drinking Water System Components — Lead Content

2.2 Definitions

In addition to the definitions in ASME A112.18.1/CSA B125.1 and in the ASSE Plumbing Dictionary, the following definitions shall apply in this Standard:

Temperature setting — an adjustable means to limit the maximum setting of the device towards the hot position limiting the maximum discharge temperature.

Thermal shock — a rapid change in the outlet water temperature that is felt by the user and is sufficient to produce a potentially hazardous reaction.

Section III

3 Design and general requirements

3.1 Rated pressure, flow rate, and temperature range

3.1.1 Rated pressure

Water temperature limiting devices shall be designed to function at any supply pressure between 140 kPa and 860 kPa (20 psi and 125 psi).

3.1.2 Flow rate

The manufacturer shall designate the minimum rated flow rate of devices other than those integral to plumbing supply fittings that have a maximum flow rate. The flow rates for devices designed into fixture fittings shall be in accordance with ASME A112.18.1/CSA B125.1.

3.1.3 Temperature range

Water temperature limiting devices shall

- a) be designed with an adjustable outlet temperature that includes the range of 41 °C to 43 °C (105 °F to 110 °F);
- b) operate with inlet
 - i) cold water temperatures between 4 °C and 27 °C (39 °F and 80 °F); and
 - ii) hot water temperatures between 49 °C and 82 °C (120 °F and 180 °F); and
- c) be set to deliver a maximum water temperature of 49 °C (120 °F) or less.

For non-adjustable water temperature limiting devices, the outlet temperature shall be a maximum of 43 °C (110 °F).

3.2 End connections

End connections for temperature limiting devices shall comply with a nationally or internationally recognized standard.

3.3 Function

3.3.1

Water temperature limiting devices are

- a) intended to supply tempered water to plumbing supply fittings, or to be integral with plumbing supply fittings supplying tempered water;
- b) intended to reduce the risk of scalding; and
- c) not intended to protect against thermal shock.

3.3.2

Water temperature limiting devices shall have a

- a) fixed (non-adjustable) temperature setting; or
- b) temperature setting that can be
 - i) adjusted and locked in position; or
 - ii) adjusted with the use of a tool to protect against ready adjustment by the user.

3.3.3

Supply fittings with an integral water temperature limiting device and user control shall allow the outlet temperature to be adjusted by the user up to a maximum temperature of 49 °C (120 °F).

3.3.4

In addition to complying with this Standard, water temperature limiting devices integral to plumbing supply fittings shall comply with the applicable requirements of ASME A112.18.1/CSA B125.1.

3.4 Cross-flow

Water temperature limiting devices shall have check valves or other means of preventing cross-flow that comply with Clause [4.4](#).

3.5 Toxicity and lead content

3.5.1

Devices covered by this Standard and that are in contact with drinking water intended for human ingestion shall comply with the applicable requirements of NSF/ANSI 61.

3.5.2

Solders and fluxes in contact with potable water shall not exceed, by mass, 0.2% lead content. Metal alloys in contact with potable water shall not exceed 8% lead content.

3.5.3

Fittings 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 NSF/ANSI 372.

3.6 Devices incorporating electrical features

3.6.1

Electrical power to low-voltage circuits involving a peak open-circuit potential of not more than 42.2 V shall be supplied by a

- a) primary battery supply;
- b) suitable Class 2 low-voltage transformer complying with the applicable CSA or UL electrical Standards; or
- c) combination of a transformer and fixed impedance that, as a unit, complies with the requirements for a Class 2 transformer specified in Item b).

3.6.2

Devices incorporating electrical features other than low-voltage circuits shall comply with the applicable CSA or UL electrical Standards.

3.6.3

Electrical plumbing controls, including solenoid valves, shall

- a) be considered components of the device;
- b) be tested with the device; and
- c) comply with Clause [4.5](#).

Replacement of a battery during the life cycle testing specified in Clause [4.5](#) shall not be considered a failure.

3.7 Servicing

Internal parts of water temperature limiting devices shall be repairable without removal of the device from the plumbing system, except for devices with union connections.

Section IV

4 Performance requirements and test methods

4.1 General

4.1.1 Preconditioning

Before testing, specimens shall be conditioned at ambient laboratory conditions for at least 12 h.

4.1.2 Installation for testing

For test purposes, specimens shall be installed in accordance with the manufacturer's instructions.

4.1.3 Test sequence

Tests shall be conducted on the same specimen, in the order listed in this Standard.

4.2 High-temperature conditioning test

4.2.1 Purpose

The purpose of this test is to determine if the materials can withstand the maximum temperatures specified in Clause [3.1.3](#).

4.2.2 Procedure

Specimens shall be conditioned as follows:

- a) Set up the specimen in accordance with Figure [1](#), with shut-off valves V1 and V2 in the full open position:
 - i) For water temperature limiting devices not integral to plumbing supply fittings, set valve V3 in the full open position.
 - ii) For water temperature limiting devices integral to plumbing supply fittings and with maximum flow requirements in accordance with ASME A112.18.1/CSA B125.1, a flow control device shall be installed.
- b) Establish and maintain an equal pressure of 310 ± 14 kPa (45 ± 2 psi) on both the hot and cold water supplies.
- c) Set the hot water temperature to $82 \pm 0, -6$ °C ($180 \pm 0, -10$ °F).
- d) Set the cold water temperature to 10 ± 3 °C (50 ± 5 °F).
- e) Adjust the outlet temperature to the maximum outlet temperature of the device, or 49 °C (120 °F), whichever is lower.
- f) For water temperature limiting devices not integral to plumbing supply fittings or where the integral devices are not required to comply with a maximum flow rate, adjust valve V3 to the

manufacturer's minimum rated flow +10%, –0% and maintain the conditions established in Items b) to e).

- g) Allow the water to flow through the specimen for 5 min.

4.2.3 Failure criteria

Seals of water temperature limiting devices shall not leak.

4.3 Working pressure and temperature test

4.3.1 General

On water temperature limiting devices integral to plumbing supply fittings, the working pressure and temperature test shall be conducted in accordance with ASME A112.18.1/CSA B125.1.

4.3.2 Purpose

The purpose of this test is to determine if the device can withstand pressures of 140 and 860 kPa (20 and 125 psi). See Figure 1 for set-up of the test.

4.3.3 Procedure with the valve closed

Water temperature limiting devices with integral closure mechanisms shall be tested in accordance with Clause 4.3.5. During the test, the pressures and temperatures specified in Clause 4.3.5.2 shall be maintained for 5 to 6 min each, with the valve closed.

4.3.4 Procedure with the valve opened and the outlet(s) blocked

Specimens shall be tested in accordance with Clause 4.3.5. During the test, the pressures and temperatures specified in Clause 4.3.5.2 shall be maintained for 5 to 6 min each, with the outlet(s) blocked.

Where the outlet(s) is difficult to block, the flowing pressure shall be increased to the pressures and temperatures specified in Clause 4.3.5.2 for 5 to 6 min each.

4.3.5 Test temperatures and pressures

4.3.5.1

The test shall be conducted in an ambient environment of 20 ± 5 °C (68 ± 9 °F). The specimen shall be brought to equilibrium test temperatures by running water through it.

4.3.5.2

The test pressures and temperatures shall be as follows:

- a) 140 ± 14 kPa and 10 ± 6 °C (20 ± 2 psi and 50 ± 10 °F);
- b) 860 ± 14 kPa and 10 ± 6 °C (125 ± 2 psi and 50 ± 10 °F);
- c) 140 ± 14 kPa and 66 ± 6 °C (20 ± 2 psi and 150 ± 10 °F); and
- d) 860 ± 14 kPa and 66 ± 6 °C (125 ± 2 psi and 150 ± 10 °F).

4.3.6 Failure criteria

Seals of water temperature limiting devices shall not leak.

4.4 Cross-flow test

4.4.1 Purpose

The purpose of this test is to determine if cross-flow leakage occurs when the outlet(s) is blocked.

Note: When a water temperature limiting device is integral to a plumbing supply fitting, the test is conducted in accordance with the requirement of ASME A112.18.1/CSA B125.1.

4.4.2 Procedures

The cross flow test shall be conducted as follows:

- a) Install the device in the open position with the mixed water outlet blocked.
- b) Pressurize the cold water inlet(s) to 35 ± 7 kPa (5 ± 1 psi) water.
- c) Maintain for 1 min.
- d) Examine for leakage at the hot inlet(s).
- e) Pressurize the hot water inlet(s) to 35 ± 7 kPa (5 ± 1 psi) water.
- f) Maintain for 1 min.
- g) Examine for leakage at the cold inlet(s).

4.4.3 Failure criteria

The rate of leakage shall not exceed 50 mL/min (0.01 gpm).

4.5 Life cycle test

4.5.1 Purpose

The purpose of this test is to determine if there is any deterioration in performance upon completion of the cycles of operation noted in Clause [4.5.2](#).

4.5.2 Procedure

The life cycle test shall be conducted as follows:

- a) Supply water to the specimen at a flowing pressure of 345 ± 35 kPa (50 ± 5 psi) and a supply pressure of 550 kPa (80 psi) maximum (valve closed) shall be supplied to the specimen throughout the test, and at
 - i) 10 ± 3 °C (50 ± 5 °F) to the cold-water inlet; and
 - ii) 60 ± 3 °C (140 ± 5 °F) to the hot-water inlet.
- b) Set the discharge flow rate at the manufacturer's minimum rated flow, or in the case of integrated fittings with outlet flow control, the flow shall be set at maximum.
- c) Open the hot- and cold-water valves.
- d) Set the specimen to discharge water at 40 ± 3 °C (105 ± 5 °F).
- e) Cycle the specimen for 100,000 cycles at a rate of 3 to 5 cycles per minute. Each cycle shall be as follows:
 - i) Flow water for at least 6 s.
 - ii) Reduce the hot water temperature to ambient temperature for at least 6 s.
 - iii) Increase the hot water temperature to 60 ± 3 °C (140 ± 5 °F).

4.5.3 Failure criteria

There shall be no leakage.

4.6 Pressure and temperature variation test

4.6.1 Data gathering (see Figure 1)

Data shall be gathered as follows:

- a) The temperature-recording device shall be started 10 s before the step changes.
- b) Temperature measurements shall be taken at temperature sensors T1, T2, and T3 with measuring equipment capable of detecting a 63.2% step change within 0.3 s with a frequency rate of 20 Hz (one value every 0.05 s) for 25 ± 5 s unless otherwise specified in this Standard. See Annex B.
- c) The outlet temperature measurements at sensor T3 shall be averaged every 0.25 s.
- d) Temperature sensors T1, T2, and T3 shall be located as follows:
 - i) temperature sensors T1, T2, and T3, within the flow stream in Type K or Type L copper water tube;
 - ii) temperature sensors T1 and T2, within 914 mm (36 in) of the device; and
 - iii) for devices integral to a plumbing supply fitting, temperature sensor T3 shall be within 25 mm (1.0 in) of the discharge outlet to the fixture in the flow stream. For specimens with multiple discharges, the test shall be conducted for each discharge outlet except for the rim flush mode of bidet fittings. For all other devices, the maximum distance shall be 457 mm (18 in) from the outlet of the specimen.

The outlet tube shall be the same size as the outlet connection size of the device.

Note: For verifying the time constant of the temperature-measuring equipment, see Annex B.

4.6.2 Procedure (see Figure 1)

4.6.2.1

Controllers with pressure feedback loops shall not be active during the tests, but may be used to set the test parameters.

Note: Controllers with pressure feedback loops interact with the specimen and result in inaccurate test results.

4.6.2.2

The pressure and temperature variation test shall be conducted as follows:

- a) Set the valves as follows:
 - i) For specimens integral to plumbing supply fittings that comply with the maximum flow rate requirements of ASME A112.18.1/CSA B125.1,
 - 1) set up the specimen as shown in Figure 1, with valves V1, V2, and the specimen in the fully open position; and
 - 2) fully open valve V3 or remove valve V3 so that the specimen is tested with its intended flow-control device(s) attached.
 - ii) For all other specimens, adjust valve V3 so that the specimen delivers the manufacturer's minimum rated flow +10%, -0% at which the specimen complies with the temperature limiting requirements of Clauses 4.6 and 4.7.
- b) Adjust and maintain the hot and cold water supply pressures directly upstream of the inlet connections to a flowing pressure of 310 ± 14 kPa (45 ± 2 psi), as measured by gauges G1 and G2.
- c) Adjust the temperatures at temperature sensors T1 and T2 so that there is a temperature differential of 44 °C to 56 °C (80 °F to 100 °F) between the hot water temperature [minimum of 60 °C (140 °F)] and the cold water temperature [maximum of 21 °C (70 °F)].
- d) After the hot water and cold water inlet temperatures are established, maintain the inlet temperatures at ± 1.0 °C (± 2.0 °F).