

IAPMO/ANSI Z1002-2014

Rainwater Harvesting Tanks



American National Standard

Approval of an American National Standard requires verification by the American National Standards Institute (ANSI) that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

ANSI does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of ANSI. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this Standard.

This American National Standard may be revised or withdrawn at any time. ANSI procedures require that action be taken periodically to reaffirm, revise, or withdraw this Standard. Purchasers of American National Standards may receive current information on all standards by calling or writing ANSI.

Published by

International Association of Plumbing and Mechanical Officials (IAPMO)

5001 East Philadelphia Street, Ontario, California, 91761, USA

1-800-854-2766 • 1-909-472-4100

Visit the IAPMO Online Store at: www.IAPMOstore.org

Visit the IAPMO Standards website at: www.IAPMOstandards.org

Copyright © 2012-2014 by

International Association of Plumbing and Mechanical Officials (IAPMO)

All rights reserved.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without prior written permission of the publisher.

Printed in the United States of America

Contents

Preface

IAPMO Plumbing Standards Committee

IAPMO Z1002 Technical Subcommittee

- 1** **Scope**
- 2** **Reference Publications**
- 3** **Definitions and Abbreviations**
 - 3.1 Definitions
 - 3.2 Abbreviations
- 4** **General Requirements**
 - 4.1 General
 - 4.2 Drawings and Supporting Documentation
 - 4.3 Ultraviolet (UV) Light Protection
 - 4.4 Openings, Covers, and Risers
 - 4.5 Structural Strength
 - 4.6 Tanks Intended for Potable Water Applications
 - 4.7 Flexible Liners
- 5** **Precast-Concrete Rainwater Harvesting Tanks**
- 6** **Fiber-Reinforced Polyester Rainwater Harvesting Tanks**
 - 6.1 General
 - 6.2 Overlays
- 7** **Thermoplastic Rainwater Harvesting Tanks**
 - 7.1 Blow-Molded and Single-Layer Rotationally-Molded Polyethylene Tanks
 - 7.2 Multi-Layer Rotationally-Molded Polyethylene Rainwater Harvesting Tanks
 - 7.3 Single-Layer Injection-Molded Thermoplastic Rainwater Harvesting Tanks
 - 7.4 Finish
- 8** **Vinyl-Coated Polyester Rainwater Harvesting Tanks**
 - 8.1 General
 - 8.2 Manufacturing
 - 8.3 Materials
 - 8.4 Vents

9 Wood Rainwater Harvesting Tanks

- 9.1 General
- 9.2 Structural Stresses
- 9.3 Staves and Bottom Planks
- 9.4 Joints
- 9.5 Thickness
- 9.6 Finishing
- 9.7 Reinforcing Hoops
- 9.8 Covers
- 9.9 Wood Tank Support System

10 Steel Rainwater Harvesting Tanks

- 10.1 General
- 10.2 Welding

11 Testing Requirements and Performance Criteria

- 11.1 Watertightness Tests
- 11.2 Fiber-Reinforced Polyester Tests
- 11.3 Thermoplastic Rainwater Harvesting Tank Tests

12 Markings and Accompanying Literature

- 12.1 General
- 12.2 Access Markings
- 12.3 Characteristics
- 12.4 Application
- 12.5 Installation Instructions
- 12.6 Maintenance Instructions
- 12.7 Liners

Tables

- 1 Minimum Shell Joint Overlays for Fiber-Reinforced Polyester Rainwater Harvesting Tanks, mm (in)
- 2 Properties of Vinyl-Coated Polyester

Preface

This is the first edition of IAPMO/ANSI 1002, *Rainwater Harvesting Tanks*.

This Standard was developed by the IAPMO Z1002 Technical Subcommittee and approved by the IAPMO Plumbing Standards Committee in accordance with the *ANSI Essential Requirements: Due process requirements for American National Standards* and the *IAPMO Policies and Procedures for Consensus Development of American National Standards*. This Standard was approved as an American National Standard on October 30, 2014.

Notes:

- (1) *The use of the singular does not exclude the plural (and vice versa) when the sense allows.*
- (2) *This standard was developed in accordance with the IAPMO procedures accredited as meeting the criteria for American National Standards and it is an American National Standard. The IAPMO Standards Committee that approved this Standard was balanced to assure that individuals from competent and concerned interests had an opportunity to participate. During its development, this Standard was made available for public review, thus providing an opportunity for additional input from industry, academia, regulatory agencies, and the public at large.*
- (3) *This Standard was developed by consensus, which is defined as substantial agreement; consensus implies much more than a simple majority, but not necessarily unanimity. It is consistent with this definition that a member of the relevant IAPMO Standards Committee can be included in the committee roster and yet not be in full agreement with all sections of this Standard.*
- (4) *Although the intended primary application of this Standard is stated in its scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*
- (5) *IAPMO Standards are subject to periodic review and suggestions for their improvement will be referred to the relevant IAPMO Standards Committee. To submit a proposal for change to this Standard, you may send the following information to the International Association of Plumbing and Mechanical Officials, Attention Standards Department, at standards@IAPMOstandards.org or, alternatively, at 5001 East Philadelphia Street, Ontario, California, 91761, and include "Proposal for change" in the subject line:*
 - (a) *standard designation (number);*
 - (b) *relevant section, table, or figure number, as applicable;*
 - (c) *wording of the proposed change, tracking the changes between the original and the proposed wording; and*
 - (d) *rationale for the change.*
- (6) *Requests for interpretation should be clear and unambiguous. To submit a request for interpretation of this Standard, you may send the following information to the International Association of Plumbing and Mechanical Officials, Attention Standards Department, at standards@IAPMOstandards.org or, alternatively, at 5001 East Philadelphia Street, Ontario, California, 91761, and include "Request for interpretation" in the subject line:*
 - (a) *the edition of the standard for which the interpretation is being requested;*
 - (b) *the definition of the problem, making reference to the specific section and, when appropriate, an illustrative sketch explaining the question;*
 - (c) *an explanation of circumstances surrounding the actual field conditions; and*
 - (d) *the request for interpretation phrased in such a way that a "yes" or "no" answer will address the issue.*
- (7) *Interpretations are processed in accordance with IAPMO's accredited standards development procedures. IAPMO issues written replies to inquiries concerning interpretation of technical aspects of this Standard.*
- (8) *IAPMO accepts responsibility only for those interpretations of this Standard issued in accordance with the accredited IAPMO policies and procedures, which precludes the issuance of interpretations by individuals.*
- (9) *IAPMO does not "approve," "rate," or "endorse" any item, construction, proprietary device, or activity.*

- (10) Attention is drawn to the possibility that some of the elements of this Standard may be the subject of patent rights. IAPMO is not to be held responsible for identifying any or all such patent rights. Users of this Standard are expressly advised that determination of the validity of any such patent rights is entirely their responsibility.*
- (11) IAPMO does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this Standard, and does not undertake to insure anyone utilizing this Standard against liability for infringement of any applicable patents, nor assumes any such liability. Users of this Standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their responsibility.*
- (12) Participation by federal or state agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this Standard.*

IAPMO Plumbing Standards Committee

S. Rawalpindiwala	Kohler Co. Kohler, Wisconsin, USA	<i>Chair</i>
S.S. Parkhurst	QAI Laboratories Tulsa, Oklahoma, USA	<i>Vice-Chair</i>
C. Arnold	Home Innovation Research Labs Upper Marlboro, MD, USA	
J.A. Ballanco	JB Engineering and Code Consulting, P.C. Munster, Indiana, USA	
J. Bertrand	Moen Incorporated North Olmsted, Ohio, USA	
B.G. Brody	North American Composites Mays Landing, New Jersey, USA	
T. Burke	Victoria + Albert Baths Ltd. Wombourne, West Midlands, United Kingdom	
S.L. Cavanaugh	Cavanaugh Consulting Santa Fe, New Mexico, USA	
I.W. Chang	Intertek Coquitlam, British Columbia, Canada	
S. Chen	Masco Corporation Taylor, Michigan, USA	
L. Cox	Structurlite Composites Consultants Hebron, Ohio, USA	
K. Ernst	Oakville Stamping & Bending Limited Oakville, Ontario, Canada	
D. Frederick	Underwriters Laboratories Northbrook, Illinois, USA	
S.M. Galayda	Product Listing Services, Inc. Litchfield, Ohio, USA	
J. Galvin	Plumbing Manufacturers International Rolling Meadows, Illinois, USA	

C.R. Graham	Martech Enterprises Thousand Oaks, California, USA	
A. Granzow	NIBCO, INC. Elkhart, Indiana, USA	
D.E. Holloway	IAPMO R&T Lab Broken Arrow, Oklahoma, USA	<i>Non-voting</i>
R. Hyer	Testing Engineers International Salt Lake City, Utah, USA	
J.M. Koeller	Koeller and Company Yorba Linda, California, USA	
C.J. Lagan	American Standard Brands Piscataway, New Jersey, USA	
R. Mata	CSA Group Cleveland, Ohio, USA	
B. Mitchell	Kinro Composites Waxahachie, Texas, USA	
D. Orton	NSF International Ann Arbor, Michigan, USA	
S.A. Remedios	Remedios Consulting, LLC Noblesville, Indiana, USA	
A.L. Scarano	Plastics Piping Consultants Yardley, Pennsylvania, USA	
W.A. Schneider	Containment Solutions, Inc. Conroe, Texas, USA	
W.M. Smith	American Society of Plumbing Engineers Montgomery, Alabama, USA	
B. Taylor	Taylor Industries, Inc. Parker Ford, Pennsylvania, USA	
W.C. Whitehead	Whitehead Consulting Services Danvers, Massachusetts, USA	
C. Wright	Ontario Pipe Trades Dundalk, Ontario, Canada	

A.I. Murra

IAPMO
Ontario, California, USA

Secretary

K.C. Thompson

IAPMO
Ontario, California, USA

Staff Liaison

IAPMO Z1002 Technical Subcommittee

J. Kendzel	American Society of Plumbing Engineers Rosemont, Illinois, USA	<i>Chair</i>
L. Grainawi	Steel Tank Institute Lake Zurich, Illinois, USA	<i>Vice-Chair</i>
C. Babbert	E.C. Babbert, Inc. Canal Winchester, Ohio, USA	
E.W. Boulware	Design-Aire Engineering, Inc. Indianapolis, Indiana, USA	
P.B. Cutler	National Precast Concrete Association Carmel, Indiana, USA	
R. Gates	Davey Water Products Pty. Ltd. Scoresby, Victoria, Australia	
J. Harrington	Rainwater Collection Solutions Alpharetta, Georgia, USA	
J. Hillman	Hall-Woolford Tank Co., Inc. Philadelphia, Pennsylvania, USA	
D. Lentz	Infiltrator Systems, Inc. Old Saybrook, Connecticut, USA	
J. Lexvold	Xerxes Corporation Bloomington, Minnesota, USA	
J. Majerowicz	Plumbers' Joint Apprenticeship Committee L.U. 130, U.A. Chicago, Illinois, USA	
T. Quinn	Natural Resources Defense Council Santa Monica, California, USA	
W.A. Schneider	Containment Solutions, Inc. Conroe, Texas, USA	
O. Stevens	Fiber Technology Corporation Lorton, Virginia, USA	
R. Stever	Jensen Precast Sparks, Nevada, USA	

B.A. Stowe	Roth North America Syracuse, New York, USA	
R. Vander Veen	Mid State Concrete Products Santa Maria, California, USA	
A.I. Murra	IAPMO Ontario, California, USA	<i>Secretary</i>
K.C. Thompson	IAPMO Ontario, California, USA	<i>Staff Liaison</i>

IAPMO Z1002-20yy

Rainwater Harvesting Tanks

1 Scope

1.1

This Standard covers rainwater harvesting tanks and specifies requirements for design, materials, manufacture, performance, testing, and markings.

1.2

Rainwater harvesting tanks covered by this Standard are

- (a) made of concrete, fiber-reinforced polyester, steel, thermoplastics, wood, or vinyl-coated polyester;
- (b) prefabricated or assembled at the site of final installation;
- (c) intended for above-ground or buried installations;
- (d) intended for stationary (i.e., fixed) installations only;
- (e) intended for indoor and outdoor applications; and
- (f) intended for atmospheric pressure (i.e., non-pressurized) applications only.

1.3

The requirements of this Standard are not intended to prevent the use of alternative materials or methods of construction, provided such alternatives meet the intent and requirements of this Standard.

1.4

In this Standard,

- (a) “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy to comply with the standard;
- (b) “should” is used to express a recommendation but not a requirement;
- (c) “may” is used to express an option or something permissible within the scope of the standard; and
- (d) “can” is used to express either a possibility or a capability.

Notes accompanying sections of the Standard do not specify requirements or alternative requirements; their purpose is to separate explanatory or informative material from the text. Notes to tables and figures are considered part of the table or figure and can be written as requirements.

1.5

SI units are the primary units of record in global commerce. In this Standard, the inch/pound units are shown in parentheses. The values stated in each measurement system are equivalent in application but each unit 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.