Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings

Effective date June 1, 2015.
This edition approved: Jan. 24, 2015.
AWWA Standard

This document is an American Water Works Association (AWWA) standard. It is not a specification. AWWA standards describe minimum requirements and do not contain all of the engineering and administrative information normally contained in specifications. The AWWA standards usually contain options that must be evaluated by the user of the standard. Until each optional feature is specified by the user, the product or service is not fully defined. AWWA publication of a standard does not constitute endorsement of any product or product type, nor does AWWA test, certify, or approve any product. The use of AWWA standards is entirely voluntary. This standard does not supersede or take precedence over or displace any applicable law, regulation, or code of any governmental authority. AWWA standards are intended to represent a consensus of the water supply industry that the product described will provide satisfactory service. When AWWA revises or withdraws this standard, an official notice of action will be placed in the Official Notice section of Journal - American Water Works Association. The action becomes effective on the first day of the month following the month of Journal - American Water Works Association publication of the official notice.

American National Standard

An American National Standard implies a consensus of those substantially concerned with its scope and provisions. An American National Standard is intended as a guide to aid the manufacturer, the consumer, and the general public. The existence of an American National Standard does not in any respect preclude anyone, whether that person has approved the standard or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standard. American National Standards are subject to periodic review, and users are cautioned to obtain the latest editions. Producers of goods made in conformity with an American National Standard are encouraged to state on their own responsibility in advertising and promotional materials or on tags or labels that the goods are produced in conformity with particular American National Standards.

CAUTION NOTICE: The American National Standards Institute (ANSI) approval date on the front cover of this standard indicates completion of the ANSI approval process. This American National Standard may be revised or withdrawn at any time. ANSI procedures require that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of ANSI approval. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036; 212.642.4900; or emailing info@ansi.org.

eISBN-13, electronic: 978-1-61300-335-0
DOI: http://dx.doi.org/10.12999/AWWA.C213.15

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information or retrieval system, except in the form of brief excerpts or quotations for review purposes, without the written permission of the publisher.

Copyright © 2015 by American Water Works Association
Printed in USA
Committee Personnel

The Steel Water Pipe Manufacturer’s Technical Advisory Committee (SWPMTAC) Task Group for AWWA C213, which revised this standard, had the following personnel at the time:

Larry McKinney, Chair
Richard Norsworthy, Vice-Chair

D. Kathrein, Tapecoat Company, Evanston, Ill. (AWWA)
G. Larsen, Smith-Blair Inc., Texarkana, Texas (AWWA)
L. McKinney, Womble Company Inc., Houston, Texas (AWWA)
R.N. Satyarthi, Baker Coupling Company Inc., Los Angeles, Calif. (AWWA)
C. Smith, Lone Star Specialty Products LLC, Lone Star, Texas (AWWA)
J.A. Wise, Canus International Sales Inc., Surrey, B.C., Canada (AWWA)

The AWWA Standards Committee on Steel Pipe, which reviewed and approved this standard, had the following personnel at the time of approval:

John H. Bambei Jr., Chair
Dennis Dechant, Vice-Chair
John Luka, Secretary

General Interest Members

W.R. Brunzell, Brunzell Associates Ltd., Skokie, Ill. (AWWA)
R.J. Card, Lockwood Andrew & Newnam, Houston, Texas (AWWA)
R.L. Coffey, HDR Engineering Inc., Omaha, Neb. (AWWA)
S.N. Foellmi, Black & Veatch Corporation, Irvine, Calif. (AWWA)
R.L. Gibson, Freese and Nichols Inc., Fort Worth, Texas (AWWA)
M.D. Gossett,* HDR, Denver, Colo. (AWWA)
M.B. Horsley,* Horsley Engineering LLC, Overland Park, Kan. (AWWA)
R.A. Kufaas, Norske Corrosion & Inspection Services Ltd., Surrey B.C., Canada (AWWA)
J.L. Mattson, Corrosion Control Technologies, Sandy, Utah (AWWA)
R. Ortega,* Lockwood, Andrews & Newnam, Houston, Texas (AWWA)
E.S. Ralph,† Standards Engineer Liaison, AWWA, Denver, Colo. (AWWA)

* Alternate
† Liaison, nonvoting
A.E. Romer, AECOM, Orange, Calif.  (AWWA)
J.R. Snow, MWH Americas Inc., Denver, Colo. (AWWA)
H.R. Stoner, Consultant, North Plainfield, N.J. (AWWA)
C.C. Sundberg, CH2M Inc., Issaquah, Wash. (AWWA)
W.R. Whidden, Woolpert, Orlando, Fla. (AWWA)

Producer Members

D.W. Angell,* Standards Council Liaison, American Flow Control, Birmingham, Ala. (AWWA)
S.A. Arnaout, Hanson Pressure Pipe Inc., Dallas, Texas (AWWA)
H.R. Bardakjian, Consultant, Glendale, Calif. (AWWA)
D. Dechant, Dechant Infrastructure Service, Aurora, Colo. (AWWA)
W.B. Geyer, Steel Plate Fabricators Associates, Lake Zurich, Ill. (AWWA)
B.D. Keil, Northwest Pipe Company, Draper, Utah (AWWA)
J.L. Luka, American SpiralWeld Pipe Company, Columbia, S.C. (AWWA)
R. Mielke,† Northwest Pipe Company, Raleigh, N.C. (AWWA)
J. Olmos, Ameron Water Transmission Group, Ranch Cucamonga, Calif. (AWWA)
G.F. Ruchti,† Consultant, Punta Gorda, Fla. (AWWA)
B.P. Simpson,† American SpiralWeld Pipe Company, Birmingham, Ala. (AWWA)
D. Walker, Avid Protective Products LTD/Tnemec Company, Oakville, Ont., Canada (AWWA)
J.A. Wise, Canus International Sales Inc., Surrey, B.C., Canada (AWWA)

User Members

G.A. Andersen, New York City Bureau of Water Supply, Little Neck, N.Y. (AWWA)
J.H. Bambei Jr., Denver Water, Denver, Colo. (AWWA)
B. Cheng, Metro Vancouver, Burnaby, B.C., Canada (AWWA)
M.E. Conner, San Diego County Water Authority, San Diego, Calif. (AWWA)
R.V. Frisz, US Bureau of Reclamation, Denver, Colo. (USBR)
G. George, Tacoma Water, Tacoma, Wash. (AWWA)
T.J. Jordan, Metropolitan Water District of Southern California, La Verne, Calif. (AWWA)
M. McReynolds, Metropolitan Water District of Southern California, Los Angeles, Calif. (AWWA)
G. Oljaca,† Metro Vancouver, Burnaby, B.C., Canada (AWWA)
N.A. Wigner, Los Angeles Department of Water and Power, Los Angeles, Calif. (AWWA)

* Liaison, nonvoting
† Alternate
## Contents

All AWWA standards follow the general format indicated subsequently. Some variations from this format may be found in a particular standard.

<table>
<thead>
<tr>
<th>SEC.</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreword</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Introduction</td>
</tr>
<tr>
<td>I.A</td>
<td>Background</td>
</tr>
<tr>
<td>I.B</td>
<td>History</td>
</tr>
<tr>
<td>I.C</td>
<td>Acceptance</td>
</tr>
<tr>
<td>II</td>
<td>Special Issues</td>
</tr>
<tr>
<td>II.A</td>
<td>Advisory Information on Material Application</td>
</tr>
<tr>
<td>III</td>
<td>Use of This Standard</td>
</tr>
<tr>
<td>III.A</td>
<td>Purchaser Options and Alternatives</td>
</tr>
<tr>
<td>III.B</td>
<td>Modification to Standard</td>
</tr>
<tr>
<td>IV</td>
<td>Major Revisions</td>
</tr>
<tr>
<td>V</td>
<td>Comments</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SEC.</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Requirements</td>
</tr>
<tr>
<td>4.1</td>
<td>Equipment</td>
</tr>
<tr>
<td>4.2</td>
<td>Materials and Workmanship</td>
</tr>
<tr>
<td>4.3</td>
<td>Epoxy System</td>
</tr>
<tr>
<td>4.4</td>
<td>Epoxy Application</td>
</tr>
<tr>
<td>4.5</td>
<td>Special Pipe Connections and Appurtenances</td>
</tr>
<tr>
<td>4.6</td>
<td>Field Procedures</td>
</tr>
<tr>
<td>5</td>
<td>Verification</td>
</tr>
<tr>
<td>5.1</td>
<td>Epoxy Materials Prequalification</td>
</tr>
<tr>
<td>5.2</td>
<td>Requirements of Epoxy System</td>
</tr>
<tr>
<td>5.3</td>
<td>Quality Assurance and Records</td>
</tr>
<tr>
<td>5.4</td>
<td>Inspection and Testing by the Purchaser</td>
</tr>
<tr>
<td>5.5</td>
<td>Quality Control Requirements of Applied Epoxy System</td>
</tr>
<tr>
<td>5.6</td>
<td>Rejection</td>
</tr>
<tr>
<td>6</td>
<td>Delivery</td>
</tr>
<tr>
<td>6.1</td>
<td>Marking</td>
</tr>
<tr>
<td>6.2</td>
<td>Packaging and Shipping</td>
</tr>
<tr>
<td>6.3</td>
<td>Affidavit of Compliance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tables</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Physical Properties of Epoxy Powder Materials</td>
</tr>
<tr>
<td>2</td>
<td>Prequalification Requirements of Epoxy System</td>
</tr>
<tr>
<td>3</td>
<td>Quality Control Requirements of Applied Epoxy System</td>
</tr>
<tr>
<td>4</td>
<td>Adhesion Rating Criteria for Epoxy System Tests</td>
</tr>
</tbody>
</table>