



**American Water Works
Association**

Dedicated to the World's Most Important Resource™

ANSI/AWWA C214-14
(Revision of ANSI/AWWA C214-07)

AWWA Standard

Tape Coatings for Steel Water Pipe

Effective date March 1, 2014.

First edition approved by AWWA Board of Directors Jan. 30, 1983.

This edition approved: Jan. 19, 2014.

Approved by American National Standards Institute: Nov. 26, 2013.



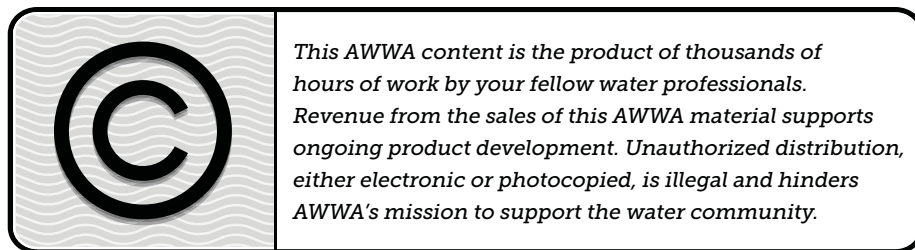
AWWA Standard

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 codes 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 on the first page of 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.



ISBN-13, print: 978-1-58321-991-1

eISBN-13, electronic: 978-1-61300-267-4

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 © 2014 by American Water Works Association
Printed in USA

Committee Personnel

The Steel Water Pipe-Manufacturers Technical Advisory Committee (SWPMTAC) Task Group for AWWA C214, which revised this standard, had the following personnel at the time:

Dan Libby, *Chair*

Larry McKinney, *Vice Chair*

S.A. Arnaout, Hanson Pressure Pipe Inc., Dallas, Texas	(AWWA)
R.M. Buchanan, Canusa CPS, Toronto, Ont.	(AWWA)
D. Dechant, Manufacturing Representative, Aurora, Colo.	(AWWA)
R. Dublin, Canusa CPS, The Woodlands, Texas	(AWWA)
A. Fletcher, Pentair, Melbourne, Australia	(AWWA)
H. Guo, Berry Plastics, Houston, Texas	(AWWA)
B.D. Keil, Northwest Pipe Company, Pleasant Grove, Utah	(AWWA)
D. Libby, Chase Corporation, Westwood, Mass.	(AWWA)
A. Mamish, Berry Plastics, Franklin, Mass.	(AWWA)
L. McKinney, Womble Company Inc., Houston, Texas	(AWWA)
R.D. Mielke, Northwest Pipe Company, Raleigh, N.C.	(AWWA)
M.P. Murphy, Ameron International, Rancho Cucamonga, Calif.	(AWWA)
R. Norsworthy, Polyguard Products Inc., Lancaster, Texas	(AWWA)
F. Rampton, Trenton Corporation, Ann Arbor, Mich.	(AWWA)
B.P. Simpson, American SpiralWeld Pipe Company, Birmingham, Ala.	(AWWA)
C. Smith, Lone Star Specialty Products LLC, Lone Star, Texas	(AWWA)
J.A. Wise, Canus International Sales Inc., Surrey, B.C.	(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)

H.E. Dunham, MWH Inc., Snohomish, Wash.	(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)
J.K. Jeyapalan, Pipeline Consultant, New Milford, Conn.	(AWWA)
R.A. Kufaas, Norske Corrosion & Inspection Services Ltd., Surrey, B.C.	(AWWA)
J.L. Mattson, Corrosion Control Technologies, Sandy, Utah	(AWWA)
E.N. Olson,† Standards Council Liaison, Brown and Caldwell, Gold Hill, Ore.	(AWWA)
R. Ortega,* Lockwood Andrews & Newnam, Houston, Texas	(AWWA)
E.S. Ralph,† Standards Engineer Liaison, AWWA, Denver, Colo.	(AWWA)
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 HILL Inc., Issaquah, Wash.	(AWWA)
W.R. Whidden, Woolpert, Orlando, Fla.	(AWWA)

Producer Members

S.A. Arnaout, Hanson Pressure Pipe Inc., Dallas, Texas	(AWWA)
H.R. Bardakjian, Consultant, Glendale, Calif.	(AWWA)
R.R. Carpenter, American SpiralWeld Pipe Company, Birmingham, Ala.	(MSS)
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, Rancho Cucamonga, Calif.	(AWWA)
G.F. Ruchti,* Consultant, Punta Gorda, Fla.	(AWWA)
D. Walker, Avid Protective Products LTD/Tnemec Company, Oakville, Ontario	(AWWA)
J.A. Wise, Canus International Sales Inc., Surrey, B.C.	(AWWA)

User Members

G.A. Andersen, New York City Bureau of Water Supply, Little Neck, N.Y.	(AWWA)
--	--------

* Alternate

† Liaison, nonvoting

J.H. Bambei Jr., Denver Water, Denver, Colo.	(AWWA)
Bob Cheng, Metro Vancouver, Burnaby, B.C.	(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 Public Utilities, 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)
N.A. Wigner, Los Angeles Department of Water and Power, Los Angeles, Calif.	(AWWA)
J.V. Young, City of Richmond, Richmond, B.C.	(AWWA)

* Alternate

This page intentionally blank.

Contents

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

SEC.	PAGE	SEC.	PAGE
Foreword		5	Verification
I	Introduction.....ix	5.1	Coating Materials Prequalification 12
I.A	Backgroundix	5.2	Prequalification of Coating Materials Testing..... 12
I.B	History.....ix	5.3	Quality Assurance and Records..... 15
II	Special Issues.....ix	5.4	Inspection and Testing by the Purchaser 15
II.A	Advisory Information on Product Applicationix	5.5	Coated Pipe Tests Quality Control Requirements of Coating Systems 15
III	Use of This Standardx	5.6	Rejection 17
III.A	Purchaser Options and Alternativesx	6	Delivery
III.B	Modification to Standardxi	6.1	Marking..... 17
IV	Major Revisions.....xi	6.2	Packaging and Shipping 17
V	Commentsxii	6.3	Affidavit of Compliance 18
Standard		Tables	
1	General	1	Physical Properties of 100 Percent Solids Liquid Adhesive5
1.1	Scope1	2	Prequalification Requirements of Inner-Layer Tape5
1.2	Purpose2	3	Prequalification Requirements of Outer-Layer Tape6
1.3	Application.....2	4	Prequalification Requirements of Total Coating System6
2	References2	5	Quality Control Properties of the Applied Coating System7
3	Definitions3	6	Dimensions of Inner-Layer and Outer-Layer Tape8
4	Requirements		
4.1	Equipment4		
4.2	Materials and Workmanship4		
4.3	Coating System4		
4.4	Coating Application8		
4.5	Field Procedures 12		

This page intentionally blank.

Foreword

This foreword is for information only and is not part of ANSI/AWWA C214.*

I. Introduction.

I.A. *Background.* This standard describes the minimum material and application requirements for prefabricated plastic tape to be plant applied to the exterior of steel water pipe to protect the pipe against underground corrosion. Currently, the only plastic tape coatings for which significant performance experience in this application has been accumulated are based on polyethylene. However, this standard can also be used to qualify tapes that are based on other polyolefin materials.

I.B. *History.* The first edition of this standard was approved by the AWWA Board of Directors on Jan. 30, 1983. The second edition was approved on June 22, 1989, and had an effective date of Jan. 1, 1990. The third edition was approved June 17, 1995, and had an effective date of Dec. 1, 1996. Major revisions in the second edition included deleting references to ANSI/AWWA C209. In the third edition, the references to ANSI/AWWA C209 were reinstated and remain in this fifth edition. The second edition also deleted numerical reference to the maximum operating temperature of steel water pipelines; added a statement of applicability to the “exterior of steel water pipelines in the potable-water supply industry” in Sec. 1.1, Scope; and added item 21, “Maximum internal operating pressure of the pipeline,” to the foreword. Addendum C214a-91, approved on June 23, 1991, added additional physical property requirements, limiting the amount of nonpolyolefinic material in inner-layer tape to a minimum of 1.0 percent and a maximum of 3.5 percent and limiting the amount of nonpolyolefinic material in outer-layer tape to a minimum of 3.0 percent and a maximum of 7.0 percent. The tape manufacturer was also required to certify that the tape met these criteria. Addendum C214a-91 also revised Sec. 5.2.14 (previously Sec. 4.2.11), deleting the phrase “and 140°F (60°C)” from that section. The fourth edition of ANSI/AWWA C214 was approved on Jan. 23, 2000. The fifth edition was approved on Jan. 21, 2007. This sixth edition was approved on Jan. 19, 2014.

II. Special Issues.

II.A. *Advisory Information on Product Application.* This standard defines the performance of prefabricated plastic tape coatings establishing the quality desired for long-term protection and prevention of corrosion. It is intended for the exterior

* American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036.

coating of steel water pipelines for underground or underwater installation under normal conditions. It is based on the best-known experience but is not designed for unqualified use under all conditions. The advisability of its use for any installation must be reviewed by the purchaser. If an extended period of aboveground storage of coated pipe is anticipated, the ability of the outer wrap to resist degradation from ultraviolet light and other atmospheric and environmental conditions should be considered.

Future air emission regulations may restrict the use of liquid adhesives described in this standard. If this occurs, consult the manufacturer for equivalent alternatives.

III. Use of This Standard. It is the responsibility of the user of an AWWA standard to determine that the products described in that standard are suitable for use in the particular application being considered.

III.A. *Purchaser Options and Alternatives.* The following items should be provided by the purchaser:

1. Standard used—that is, ANSI/AWWA C214, Tape Coatings for Steel Water Pipe, of latest revision.
2. Any required exceptions to the standard.
3. Diameter, length, and location of pipeline.
4. Location of coating application with reference to environmental considerations.
5. Operating temperature range (Sec. 1.1.1).
6. Determining nonpolyolefinic material (Tables 2, 3, and 4, Sec. 4.3.1.2 and 4.3.1.3).
7. Outdoor storage (Sec. 4.3.1.3).
8. Coating system thickness (Tables 2, 3, and 5, and Sec. 4.3.1.4).
9. Tape dimensions (Table 6 and Sec. 4.3.2.2.2).
10. Inspecting and testing (Sec. 4.3.3 and Section 5).
11. Visual standards (Sec. 4.4.2.3).
12. Weld seam treatment (Sec. 4.4.2.7).
13. Hard rubber roller use (Sec. 4.4.3.2).
14. Roll temperature (Sec. 4.4.3.2 and 4.4.3.3).
15. Cutback at pipe ends (Sec. 4.4.3.4).
16. Coating repair (Sec. 4.4.4).
17. Welded field-joint coating (Sec. 4.4.5).
18. Conditions not described (Sec. 1.1.2).
19. Coating materials prequalification (Sec. 5.1). NOTE: With reference to Sec. 5.1 (option 2), when submission of samples of proposed materials for testing by the purchaser

is specified, the purchaser should address the assignment of testing costs. According to commonly accepted industry practice, the purchaser pays for the cost of initial testing of coating material samples originally offered by the constructor. If any initial samples fail to conform to the standard, additional samples may be tested. Costs of testing additional samples are borne by the constructor.

20. Quality assurance and records (Sec. 5.3).
21. Inspection and testing by the purchaser (Sec. 5.4).
22. Holiday detector use (Sec. 5.5.2).
23. Adhesion requirement and test frequency (Sec. 5.5.3).
24. Coating-system thickness test frequency (Sec. 5.5.4).
25. Nonconforming pipe (Sec. 5.5).
26. Delivery (Section 6).
27. Packaging (Sec. 6.2.1).
28. Affidavit of compliance, if required (Sec. 6.3).

III.B. *Modification to Standard.* Any modification to the provisions, definitions, or terminology in this standard must be provided by the purchaser.

IV. Major Revisions. The major revisions made to the standard in this edition include the following:

1. The title of the standard was changed to be consistent with other AWWA steel pipe coating standards.
2. Sec. 2, References, was updated.
3. Table 1, Physical properties of liquid adhesive, was deleted.
4. Requirements were divided into prequalification requirements for inner- and outer-layer tapes and total-coating system, and quality control properties of the applied coating system. Related changes were made to the content and titles of Tables 2–5.
5. Removed minimum value for nonpolyolefinic material in Tables 2 and 3.
6. Increased dielectric strength in Tables 2 and 3 to 450V/mil (was 6kV/20 mil and 12kV/50 mil).
7. Removed maximum thickness requirements in Tables 2, 3, and 5.
8. Added cathodic disbondment requirement to Table 4. The maximum radius is 12 mm when tested per ASTM G8.
9. Table 5 was created to list quality control properties for the coated pipe. Test Method 5.5.3 was created to detail the peel adhesion test method of a coated pipe.
10. Sec. 4.4.4, Coating repair in plant and field, was revised.
11. Sec. 4.4.5, Coating of welded and mechanical field joints, was revised.

12. All existing wording in Sec. 4.5, Field Procedures, of the previous revision of C214 was removed. The section now references AWWA C604.

13. Section 5, Verification, was updated to match the new language being used in all coating standards.

14. A new Sec. 5.2.15 on cathodic disbondment was added.

15. A new Sec. 5.3, Quality Assurance and Records, was added.

16. A new Sec. 5.4, Inspection and Testing by the Purchaser, was added.

17. A new Sec. 5.5, Coated Pipe Test-Quality Requirements of Coating Systems, was added, including a new section on adhesion testing (Sec. 5.5.3).

18. The title of old Sec. 5.5, Nonconformance (previous revision), was changed to Sec. 5.6, Rejection, and the section was expanded to include coating work and coated pipe.

19. Sec. 6.2.2, Shipping, handling, and storage, was revised. The sections on stacking, shipping, loading, and trench side storage were deleted.

V. Comments. If you have any comments or questions about this standard, please call AWWA Engineering and Technical Services at 303.794.7711, FAX at 303.795.7603, write to the department at 6666 West Quincy Avenue, Denver, CO 80235-3098, or email at standards@awwa.org.



**American Water Works
Association**

Dedicated to the World's Most Important Resource™

ANSI/AWWA C214-14
(Revision of ANSI/AWWA C214-07)

AWWA Standard

Tape Coatings for Steel Water Pipe

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes the materials and application of tape coating systems in coating plants at fixed sites using coating techniques and equipment as recommended by the tape coating manufacturer. For normal construction considerations, prefabricated polyolefin tapes are applied as a three-layer system consisting of (1) liquid adhesive, (2) corrosion-preventive tape (inner layer), and (3) mechanical-protective tape (outer layer). This standard establishes the minimum requirements for tape coating systems used on the exterior of steel water pipe in the potable-water supply industry. Continuous monitoring of all application procedures for the tape coating systems shall be performed by the constructor.

1.1.1 *Maximum temperatures.* AWWA pipe coating standards are written for and based on the service temperature of potable water. These coating systems have performed at higher temperatures. Consult the coating manufacturer for conditions and limitations.

1.1.2 *Conditions not described in this standard.* This standard does not describe the additional materials and procedures that may be required for difficult conditions, such as those encountered in rocky areas or where soil conditions are known to be severe and in construction of underwater lines, casing pipe, and river