ANSI/AWWA **E200-23**

(Revision of ANSI/AWWA E200-18)

AWWA Standard

Progressive Cavity Chemical Metering Pumps

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American Water Works Association

Approved American National Standard ANSI

STANDARD Since 1881

AWWA Standard

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Committee Personnel

The AWWA Standards Committee on Progressive Cavity Chemical Metering Pumps, which reviewed and approved this standard, had the following personnel at the time of approval:

Michael Stickley, *Chair*

General Interest Members

C.S. Frizzell, CDM Smith, Maitland, Fla.

J. Hrdlicka (*liaison, nonvoting*), Standards Engineer Liaison, AWWA, Denver, Colo.

E. Lutz, Mott Macdonald, Iselin, N.J.

M. Stickley, Jacobs Engineering, Birmingham, Ala.

B.M. Van Nortwick Jr. (*liaison, nonvoting*), Standards Council Liaison, American Water, Camden, N.J.

Z.R. Yu (*alternate*), Waterloo, Ont., Canada

Producer Members

W. Kimbell, Clearwater Separation Systems Inc., Midlothian, Tex.

User Members

M.G. O'Connell, Suffolk County Water Authority, Bay Shore, N.Y.

P.E. Senesac, P&H Senesac, Inc., Milton, Vt.

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Contents

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

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Foreword

This foreword is for information only and is not a part of ANSI/AWWA E200.*

I. Introduction.

I.A. *Background*. This standard describes the minimum requirements for progressive cavity chemical metering pumps for water and wastewater treatment systems. This standard covers progressive cavity chemical metering pumps for material resistant to aggressive chemicals including sodium hypochlorite (NaOCl), ferric chloride ($FeCl_3$), sulfuric acid (H_2SO_4), hydrochloric acid (HCl), and other strong acids and bases.

A progressive cavity chemical metering pump is a type of positive displacement pump and is also known as a progressing cavity pump, pro-cav pump, eccentric screw pump, or cavity pump. It transfers fluid by means of the progress, through the pump, of a sequence of small, fixed-shape, discrete cavities as its rotor turns. This leads to the volumetric flow being proportional to the rotation rate and to low levels of shear being applied to the pumped fluid. Hence, these pumps have application in fluid metering and pumping of thin-to-viscous or shear-sensitive materials. The cavities taper down toward their ends and overlap with their neighbors, so that, in general, the cross section of fluid moving through the pump never changes, and no flow pulsing is caused by the arrival of cavities at the outlet other than that caused by compression of air or vapor in the fluid or by speed variation in the drive components. These pumps do not pulsate and can be fitted with a variety of highly accurate variable speed drives and reliable mechanical seals.

I.B. *History*. While inventing a compressor for jet engines, aviation pioneer René Moineau discovered in 1930 that this principle could also work as a pumping system. The University of Paris awarded Moineau a doctorate of science for his thesis on "the new capsulism." His pioneering dissertation laid the groundwork for the modern progressive cavity pump.[†]

In 2015, AWWA's Standards Council approved development of a new standard for Progressive Cavity Chemical Metering Pumps. The new standard was assigned to AWWA Standards Committee 273 for Progressive Cavity Chemical Metering Pumps.

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

† Pumps & Systems. The History of Pumps: Through the Years. www.pumpsandsystems.com/topics/pumps/pumps/history-pumps-through-years?page=3 (accessed Sept. 4, 2023).

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I.C. *Acceptance*. In May 1985, the US Environmental Protection Agency (USEPA) entered into a cooperative agreement with a consortium led by NSF International (NSF) to develop voluntary third-party consensus standards and a certification program for direct and indirect drinking water additives. Other members of the original consortium included the Water Research Foundation (formerly AwwaRF) and the Conference of State Health and Environmental Managers (COSHEM). The American Water Works Association (AWWA) and the Association of State Drinking Water Administrators (ASDWA) joined later. In April 1990, USEPA formally withdrew its list of acceptable drinking water additives, and regulatory oversight of direct and indirect drinking water additives passed to the process developed by the consortium under the leadership of NSF.

In the United States, authority to regulate products for use in or in contact with, drinking water rests with individual states.[‡] Local agencies may choose to impose requirements more stringent than those required by the state. To evaluate the health effects of products and drinking water additives from such products, state and local agencies may use various references, including

1. Specific policies of the state or local agency;

2. Four standards developed under the direction of NSF[§]: NSF/ANSI/CAN[¶] 60, Drinking Water Treatment Chemicals—Health Effects; NSF/ANSI/CAN 61, Drinking Water System Components—Health Effects; NSF/ANSI/CAN 372, Drinking Water System Components—Lead Content; and NSF/ANSI/CAN 600, Health Effects Evaluation and Criteria for Chemicals in Drinking Water.

3. Other references including AWWA standards, *Food Chemicals Codex*, *Water Chemicals Codex*,[**] and other standards considered appropriate by the state or local agency.

Various certification organizations may be involved in certifying products in accordance with NSF/ANSI/CAN 61. Individual states or local agencies have authority to accept or accredit certification organizations within their jurisdiction. Accreditation of certification organizations may vary from jurisdiction to jurisdiction.

[‡] Persons outside the United States should contact the appropriate authority having jurisdiction.

[§] NSF International, 789 N. Dixboro Road, Ann Arbor, MI 48105.

[¶] Standards Council of Canada, 55 Metcalfe Street, Suite 600, Ottawa, ON K1P 6L5 Canada.

[**] Both publications available from National Academy of Sciences, 500 Fifth Street, NW, Washington, DC 20001.

NSF/ANSI/CAN 600 (which formerly appeared in NSF/ANSI/CAN 60 & 61 as Annex A, "Toxicology Review and Evaluation Procedures") does not stipulate a maximum allowable level (MAL) of a contaminant for substances not regulated by a USEPA final maximum contaminant level (MCL). The MALs of an unspecified list of "unregulated contaminants" are based on toxicity testing guidelines (noncarcinogens) and risk characterization methodology (carcinogens). Use of NSF/ANSI/CAN 600 procedures may not always be identical, depending on the certifier.

ANSI/AWWA E200 does not address additives requirements. Users of this standard should consult the appropriate state or local agency having jurisdiction in order to

1. Determine additives requirements, including applicable standards.
2. Determine the status of certifications by parties offering to certify products for contact with, or treatment of, drinking water.
3. Determine current information on product certification.

II. Special Issues.

II.A. *Chlorine and Chloramine Degradation of Elastomers.* The selection of materials is critical for water service and distribution piping in locations where there is a possibility that elastomers will be in contact with chlorine or chloramines. Documented research has shown that elastomers such as gaskets, seals, valve seats, and encapsulations may be degraded when exposed to chlorine or chloramines. The impact of degradation is a function of the type of elastomeric material, chemical concentration, contact surface area, elastomer cross section, and environmental conditions including temperature. Careful selection of and specifications for elastomeric materials and the specifics of their application for each water system component should be considered to provide long-term usefulness and minimum degradation (swelling, loss of elasticity, or softening) of the elastomer specified.

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 information shall be provided by the purchaser:

1. Standard used—that is, ANSI/AWWA E200, Progressive Cavity Chemical Metering Pumps, of latest revision.
2. Whether compliance with NSF/ANSI/CAN 61, Drinking Water System Components—Health Effects, is required or not.
3. Details of federal, state, provincial, territorial, and local requirements (Sec. 4.1.1).

4. Request for elastomer test coupons (Sec. 4.1.2.2).
5. Request for stator dimensions (Sec. 4.1.4.2).
6. Request for quality measurement certificates (Sec. 4.1.4.2.2).
7. Apparent viscosity test requirements (Sec. 4.2.2.1.1).
8. Drive accuracy (Sec. 4.2.5.1).
9. Required turn down (Sec. 4.2.5.1.1).
10. Minimum dry film thickness other than 3 mils (Sec. 4.2.10.1).
11. Field top-coating (Sec. 4.2.10.2).
12. Required holiday testing (Sec. 4.2.11).
13. Required run-dry protection (Sec. 4.2.14).
14. Written instructions for storage requirements (Sec. 6.3.2).
15. Request for Affidavit of Compliance from manufacturer (Sec. 6.5).

IV. Major Revisions.

1. Addition of language to be consistent with AWWA Standards Council guidelines.

2. Removal of vibration testing requirements as not applicable to Hydraulic Institute (HI) technical directive 14.6 (Sec. 4.2).

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

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American Water Works Association
Dedicated to the World's Most Vital Resource®

AWWA Standard

Progressive Cavity Chemical Metering Pumps

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard provides minimum requirements for progressive cavity chemical metering pumps used with polymers and aggressive chemicals including sodium hypochlorite (NaOCl), ferric chloride ($FeCl_3$), sulfuric acid (H_2SO_4), hydrochloric acid (HCl), and other strong acids and bases. This standard includes design, materials, application, testing, and delivery of these metering pumps.

Sec. 1.2 Purpose

The purpose of this standard is to provide minimum requirements for progressive cavity chemical metering pumps suitable for water and wastewater service, including design, materials, application, testing, and delivery.

Sec. 1.3 Application

This standard can be referenced by the purchaser for pumps described in Sec. 1.1.