

American Water Works Association

ANSI/AWWA B200-93

(Revision of ANSI/AWWA B200-88)



AWWA STANDARD
FOR
SODIUM CHLORIDE



Effective date: Mar. 1, 1994.

First edition approved by AWWA Board of Directors July 6, 1949.

This edition approved June 6, 1993.

Approved by American National Standards Institute Dec. 14, 1993.

AMERICAN WATER WORKS ASSOCIATION

6666 West Quincy Avenue, Denver, Colorado 80235

Copyright (C) 1998 American Water Works Association, All Rights Reserved.

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. 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 classified advertising section of *Journal AWWA*. The action becomes effective on the first day of the month following the month of *Journal AWWA* 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 publication. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute, 11 W. 42nd St., New York, NY 10036; (212) 642-4900.

Copyright © 1994 by American Water Works Association
Printed in USA

Committee Personnel

The AWWA Standards Committee on Ion Exchange, which reviewed and approved this standard, had the following personnel at the time of approval.

Steven J. Medlar, *Chair*
Juan J. Menendez, *Vice-Chair*

Consumer Members

L.E. Considine Jr., Hunt Engineers/Architects, Elmira, N.Y.	(AWWA)
W.D. Keene, Burlington Department of Public Works, Burlington, Mass.	(AWWA)
D.M. Macsi, City of Allentown Water Resources, Allentown, Pa.	(AWWA)

General Interest Members

E.E. Baruth,* Staff Liaison Engineer, AWWA, Denver, Colo.	(AWWA)
C.A. Froman Jr.,* Standards Council Liaison, Gary Hobart Water Corporation, Gary, Ind.	(AWWA)
J.J. Gemin, Proctor & Redfern Ltd., Kitchener, Ont.	(AWWA)
A.A. Hottovy, HWS Consulting Group Inc., Omaha, Neb.	(AWWA)
S.J. Medlar, Camp, Dresser & McKee Inc., Edison, N.J.	(AWWA)
J.J. Menendez, Florida Department of Health and Rehabilitative Services, Tallahassee, Fla.	(AWWA)
E.D. Mullen, Elizabethtown Water Company, Bound Brook, N.J.	(AWWA)
G. Pierson, Economic & Engineering Services Inc., Bellevue, Wash.	(AWWA)

Producer Members

B.M. Bertram, Salt Institute, Alexandria, Va.	(AWWA)
R.B. Fackler, Hungerford & Terry Inc., Clayton, N.J.	(AWWA)
K.J. Ficek, Carus Chemical, Ottawa, Ill.	(AWWA)
E.J. Kuhajek, Morton Salt, Woodstock, Ill.	(AWWA)

*Liaison, nonvoting

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		4.2	Chemical Requirements..... 3
I	Introduction..... v	4.3	Impurities..... 3
I.A	Background v	5	Verification
I.B	History..... vi	5.1	Inspection..... 3
I.C	Acceptance..... vi	5.2	Sampling 3
II	Special Issues..... vii	5.3	Test Procedures—General 5
III	Use of This Standard vii	5.4	Moisture 5
III.A	Purchaser Options and Alternatives vii	5.5	Insoluble Matter 5
III.B	Modification to Standard vii	5.6	Calcium 6
IV	Major Revisions viii	5.7	Magnesium..... 7
V	Comments viii	5.8	Sulfate 8
Standard		5.9	Grease, Fat, and Oil..... 9
1	General	5.10	pH Value 9
1.1	Scope..... 1	5.11	Total Impurities..... 9
1.2	Purpose..... 1	5.12	Sodium Chloride Assay..... 10
1.3	Application 1	5.13	Rejection..... 10
2	References 1	6	Delivery
3	Definitions 2	6.1	Marking..... 11
4	Requirements	6.2	Packaging and Shipping 11
4.1	Physical Requirements..... 2	6.3	Affidavit of Compliance..... 12
		Tables	
		1	Maximum Impurity Limits..... 4

Foreword

This foreword is for information only and is not a part of AWWA B200.

I. Introduction

I.A. *Background.* Bedded salt deposits are the remains of ancient seas that have evaporated. Bedded deposits occur in horizontal layers of the mineral halite. These layers range from several feet to hundreds of feet in thickness and are between several feet to several thousand feet below the surface of the earth. Some bedded deposits 25,000 to 50,000 ft below the surface of the earth have been subjected to pressures that have caused the salt to move upward through overlying sedimentary layers toward the earth's surface. Presently, these deposits exist as domes of nearly pure salt that may be as large as 2 mi in diameter and are sometimes found within a few feet of the earth's surface.

Concentrated brine is found in surface lakes or underground pools. Along the coast, the oceans provide a virtually unlimited source of salt.

Rock salt is produced by the conventional room-and-pillar mining method. After sinking a shaft to the salt level, the face, or vertical area, is drilled and may be undercut. The drill holes are loaded with explosives, and the explosives are detonated. The fragmented salt that results is crushed, screened, transported to the shaft, and hoisted to the surface.

Solar salt is produced by the natural evaporation of seawater or more concentrated brine from surface lakes or underground formations in shallow ponds.

Solution-mined brine, from which evaporated salt is produced, is obtained by drilling wells into bedded or domal rock-salt deposits and injecting water into the deposit. The water dissolves the rock salt to produce a saturated brine. Salt deposits can be solution mined through a single set of concentric pipes or through two or more separate pipes within the same deposit. The brine then can be evaporated to produce dry salt by vacuum-pan evaporation or modifications of vacuum-pan evaporation, grainer evaporation, or the Alberger process.

In vacuum-pan evaporation, cubic "vacuum-granulated" salt crystals form in the brine during evaporation and are removed as a slurry, which is then dewatered and dried.

In the grainer process, small hoppers of salt form on the surface of a concentrated brine solution. These drop to the bottom of the grainer pan once they become large enough to overcome forces that hold them to the surface. The resultant flake salt is removed from the grainer by rakes and dried in a rotary dryer.

The Alberger process is a part vacuum-pan, part grainer operation in which cubic crystals are formed in a flash chamber and fed to the grainer pans. The seed crystals in the grainer pan produce a product that is a mixture of grainer-type flakes and flakes grown on seed crystals. The salt is centrifuged from the brine and dried as in the grainer process. Screens are used to separate the salt into specific grades.

Any of the three types of salt (rock, solar, or vacuum granulated and their compressed forms) can be used for regeneration of ion-exchange resins. The greater quantity of insoluble matter in some rock salt may require clarification of the brine. The accumulation of insolubles in the brine tank is a disadvantage, because periodic removal is necessary. Vacuum-granulated salt has the highest purity and leaves no insoluble residue.

Salt for regeneration of ion-exchange units should be selected on the basis of the brine purity required. Cation-exchange processes usually require that the saturated brine contain less than 2000 mg/L of calcium sulfate (CaSO_4). Anion-exchange processes require low calcium and magnesium content of the brine to produce a consistent quality of effluent water. When caustic soda or soda ash is added to the brine makeup, brine with a calcium level of 0–10 mg/L (as Ca) should be used. The magnesium level should be 0–2 mg/L (as Mg).

I.B. History. The first edition of the AWWA standard for sodium chloride was approved as tentative by the AWWA Board of Directors on July 6, 1949. AWWA B200 was made a standard on May 15, 1953. Revisions approved on June 5, 1964, provided new sections on information to be supplied by the purchaser and on an affidavit of compliance. The revisions also provided for the use of the ethylenediaminetetraacetic acid (EDTA) titrimetric method for the determination of calcium and magnesium, the permanganate titrimetric method for calcium, and the gravimetric method for magnesium.

The 1969 revisions of the standard provided for two types of salt that were not included in earlier standards—evaporated and compressed evaporated salt. At that time, the impurity limits for certain constituents were revised, the definitions section was revised and enlarged, the physical characteristics were modified in regard to fineness requirements, and minor changes were made in the test methods.

The 1978 edition combined evaporated salt and compressed evaporated salt and added a specification for compressed solar salt. The 1988 edition included an acceptance clause in the foreword, and revised definitions, limits, and test procedures.

Revisions to this 1993 edition (sixth edition) of the standard are listed in Sec. IV of this foreword.

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 all direct and indirect drinking water additives. Other members of the consortium included the American Water Works Association Research Foundation (AWWARF), the Conference of State Health and Environmental Managers (COSHEM), the American Water Works Association (AWWA), and the Association of State Drinking Water Administrators (ASDWA). The consortium is responsible for the cooperative effort of manufacturers, regulators, product users, and other interested parties that develop and maintain the NSF standards. 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. An advisory program formerly administered by USEPA, Office of Drinking Water, discontinued on Apr. 7, 1990.
2. Specific policies of the state or local agency.

*Sodium chloride is not included in the scope of ANSI/NSF 60 or ANSI/NSF 61.

†Persons in Canada, Mexico, and non-North American countries should contact the appropriate authority having jurisdiction.

3. Two standards developed under the direction of NSF, ANSI*/NSF† 60, Drinking Water Treatment Chemicals—Health Effects, and ANSI/NSF 61, Drinking Water System Components—Health Effects.

4. 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 ANSI/NSF 60. 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.

Appendix A, “Toxicology Review and Evaluation Procedures,” to ANSI/NSF 60 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 Appendix A procedures may not always be identical, depending on the certifier.

AWWA B200-93 does not address additives requirements. Thus, 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 all parties offering to certify products for contact with, or treatment of, drinking water.
3. Determine current information on product certification.

II. Special Issues. This standard has no applicable information for this section.

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. When purchasing sodium chloride, the purchaser should provide specific information in specifications regarding the following:

1. Standard used—that is, AWWA B200-93, Standard for Sodium Chloride.
2. If an affidavit of compliance (Sec. 6.3) is required.
3. Quantity of sodium chloride required and method of packaging and shipping (Sec. 6.2).
4. If bulk shipments of sodium chloride are to be accompanied by weight certificates issued by certified weighers (Sec. 6.2.4).
5. When rock salt is readily available with values for moisture, calcium, magnesium, sulfates, or water-insoluble impurities lower than those shown in Table 1, purchasers may prefer to modify the limits set in the table for these substances.

III.B. Modification to Standard. Any modification of the provisions, definitions, or terminology in this standard must be provided in the purchaser’s specifications.

*American National Standards Institute, 11 W. 42nd St., New York, NY 10036.

†NSF International, 3475 Plymouth Rd., Ann Arbor, MI 48106.

‡Both publications available from National Academy of Sciences, 2102 Constitution Ave. N.W., Washington, DC 20418.

IV. Major Revisions. Major changes to the 1988 standard included in this edition are as follows:

1. Revision of Sec. I.C, Acceptance, in foreword.
2. Revision of definitions.
3. Style and format changes.

V. Comments. If you have any comments or questions about this standard, please call the AWWA Standards Department, (303) 794-7711 ext. 2201, FAX (303) 795-1440, or write to the department at 6666 W. Quincy Ave., Denver, CO 80235.