



**American Water Works  
Association**

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**ANSI/AWWA B452-14**  
(Revision of ANSI/AWWA B452-06)

**AWWA Standard**

# EPI-DMA Polyamines

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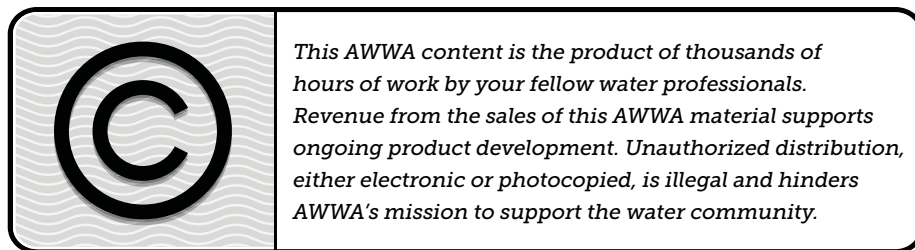
## AWWA Standard

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# Foreword

*This foreword is for information only and is not a part of ANSI\*/AWWA B452.*

## **I. Introduction.**

I.A. *Background.* Chemical clarification methods have been used to improve the quality of drinking water supplies since the late 1880s in the United States. In 1967, the first completely synthetic organic polyelectrolyte was accepted by the US Public Health Service for use in treating potable water. The responsibility for accepting additives for drinking water treatment was subsequently assumed by the US Environmental Protection Agency (USEPA) and administered by the Office of Drinking Water as an advisory program. USEPA's acceptance was made by the specific name of the suppliers' product and not by generic type. Epichlorohydrin dimethylamine (EPI-DMA) polyamines (CAS<sup>†</sup> Nos. 25988-97-0 and 42751-79-1) are one of several types of synthetic organic polyelectrolytes that were accepted for use in potable water treatment under this program, which was discontinued in 1990.

EPI-DMA polyamines belong to a family of synthetic organic polyelectrolytes (also called polymers or coagulants) used in water and wastewater treatment to improve the performance of some unit operations in the treatment process, most often by increasing the extent or rate of liquid–solids separation. Frequent applications are clarification (the separation of solid particles) and demulsification (removal of liquid organic particles). EPI-DMA polyamines are principally made from two monomers, epichlorohydrin (EPI) and dimethylamine (DMA). EPI-DMA polyamines have a cationic charge, a high relative charge density, and a low relative molecular weight, and they are manufactured and sold in aqueous solution form. EPI-DMA polyamines are also called polyamines, polyquaternary amines, and quaternized polyamines.

The important concepts to remember regarding EPI-DMA polyamines include the following:

1. EPI-DMA polyamines are similar to polyDADMAC polymers in their solution form (ANSI/AWWA B451, Poly [Diallyldimethylammonium Chloride]) in their use, handling, storage, and solution preparation.

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

† Chemical Abstracts Service, 2540 Olentangy River Road, P.O. Box 3012, Columbus, OH 43210.

2. EPI-DMA polyamines are different from polyacrylamide (PAM) polymers (ANSI/AWWA B453, Polyacrylamide) in their use, handling, storage, and solution preparation.

3. EPI-DMA polyamines are supplied in an aqueous solution form that may be referred to as liquids or aqueous solutions.

4. EPI-DMA polyamines are a family of polymers with a relatively constant charge type and charge density but with different molecular weights and degrees of branching.

5. The physical properties of EPI-DMA polyamines cannot be used to judge product performance; only laboratory testing, pilot plant studies, or full plant trials can discern product efficacy.

6. EPI-DMA polyamines may contain inactive ingredients, such as salts, depending on the manufacturing method and formulation.

The user should consult the material safety data sheet (SDS) and product technical data sheet for product composition information regarding any specific EPI-DMA polyamine product.

I.B. *History.* The AWWA Standards Council authorized development of this standard in 1979. The standard was developed by the AWWA Standards Committee on Polyelectrolytes and was approved by the AWWA Board of Directors on June 17, 1990. The second edition of this standard was approved on June 21, 1998. The third edition of ANSI/AWWA B452 was approved on Feb. 12, 2006. This edition was approved on Jan. 19, 2014.

I.C. *Acceptance (water supply service applications).* 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 American Water Works Association Research Foundation (AwwaRF, now Water Research Foundation\*) 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 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

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\* Water Research Foundation, 6666 W. Quincy Avenue, Denver, CO 80235.

† Persons outside the United States should contact the appropriate authority having jurisdiction.



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

Various certification organizations may be involved in certifying products in accordance with NSF/ANSI 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.

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

ANSI/AWWA B452 addresses additives requirements in Sec. 4.6 of the standard. The transfer of contaminants from chemicals to processed water or to residual solids is becoming a problem of greater concern. The language in Sec. 4.6 is a recommendation only for direct additives used in the treatment of potable water to be certified by an accredited certification organization in accordance with NSF/ANSI 60 Drinking Water Treatment Chemicals—Health Effects. However, users of the standard may opt to make this certification a requirement for the product. 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.

I.D. *Acceptance (wastewater service applications).* This is the first revision of ANSI/AWWA B452 that addresses wastewater service applications and standards.

## **II. Special Issues.**

II.A. *Safety.* EPI-DMA polyamines are not considered to be toxic as household products nor primary skin irritants by the Consumer Product Safety Commission (US Federal Hazardous Substances Act). Good housekeeping procedures and personal cleanliness are recommended when handling EPI-DMA polyamine.

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\* NSF International, 789 N. Dixboro Road, Ann Arbor, MI 48113.

Safety glasses should be worn when handling EPI-DMA polyamines. Appropriate first-aid practices should be followed in all cases of exposure. In case of eye contact, flush with plenty of water for at least 15 min. If irritation develops, call a physician. Consult the SDS for the specific product for safety procedures before handling any EPI-DMA polyamines product or solution.

II.B. *Spill Control.* EPI-DMA polyamines should be disposed of according to federal, state or provincial, and local regulations. A dike should be formed around any spill area to contain as much material as possible, and the contained material should be shoveled, scooped, or pumped, as appropriate, into suitable disposal containers. Any remaining material should be removed by absorbing it on vermiculite or other suitable absorbing material and placed in a sealed container for disposal. The spill area should be thoroughly hosed with water after all possible polymer has been scooped up, absorbed, or wiped up because liquid product can make floors very slippery. Use of warm water is beneficial.

**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.* This AWWA standard can be used to prepare a purchase specification, but is not itself a specification because it cannot address requirements unique to the purchaser's specific situation and does not establish business relationships. In addition, this EPI-DMA polyamines standard does not establish physical and chemical property specifications for any one EPI-DMA polyamine product, because the physical and chemical properties of EPI-DMA polyamines do not always relate to their performance in specific applications.

Below are requirements that the user might consider when developing an EPI-DMA polyamines product purchase specification. This standard requires the supplier to provide a product technical data sheet in addition to an SDS for each product and requires specific information to be included in the product technical data sheet. The information in a product technical data sheet may be used to establish or comply with purchase specifications.

1. Compliance with the requirements of the latest revision of ANSI/AWWA Standard B452, EPI-DMA Polyamines, for potable water supply service applications (water) or wastewater service applications (wastewater), as applicable.
2. For potable water applications, compliance with NSF/ANSI 60, Drinking Water Treatment Chemicals—Health Effects.

3. For potable water applications, compliance with USEPA Phase II Rule National Primary Drinking Water Regulations, epichlorohydrin treatment technique requirements (40 CFR 141.111).

4. Compliance with, approval by, or certification as meeting any other applicable federal, state or provincial, and local requirements.

5. Description of the application the product will be used for.

6. Estimation of annual purchase requirements (pounds/kilograms).

7. Typical order quantity (number of containers and pounds/kilograms product).

8. Shipping address (destination).

9. Special delivery requirements (need for truck with a lift gate; length and coupling sizes of hoses needed for bulk delivery; transfer pump; allowed times of delivery; limitations on truck size or weight; other). Note any product physical property limitations such as a maximum viscosity that cannot be handled by the storage or feed equipment.

10. Order lead time (the number of days between order placement and delivery necessary if typical lead times are insufficient).

11. Billing address.

12. Financial terms.

13. Insurance/performance bond requirements.

14. Active polymer concentration in the product expressed as a weight percent (Section 3, 4.9).

15. Specific physical and chemical properties for quality control. Minimum specifications should include visual appearance, total solids, Brookfield viscosity range, and pH range of the product's solution (from product technical data sheet). Verification of physical and chemical properties should be by the methods specified in Section 5 or by other methods acceptable to both purchaser and supplier.

16. Affidavit of compliance or certified analysis, or both, if required (Sec. 4.1.3).

17. Sampling requirements and protocol (Sec. 5.2).

18. Requirement for supplier to provide product's manufacturing location contact information for quality control inquiries (Sec. 5.7).

19. Marking requirements (Sec. 6.1).

20. Packaging and shipping requirements (Sec. 6.2). State any alternative security measures adopted to replace or augment the security measures set out in Sec. 6.2.

21. State whether the purchaser may reject product from tank trucks (bulk), containers or packaging with missing or damaged seals. State whether the purchaser

may reject product if it fails to meet specifications determined by testing from bulk containers or packages with missing or damaged seals unless the purchaser's tests of representative samples, conducted in accordance with Section 5, demonstrate that the product meets the standard. Failure to meet standard or the absence of, or irregularities in, seals may be sufficient cause to reject the shipment. State whether a chain of custody is desired (Sec. 6.2.2.2).

III.B. *Product Performance.* Performance evaluation via a laboratory test or pilot plant or plant trial or other performance test is essential for confirming EPI-DMA polyamine activity (Sec. 5.6).

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

**IV. Major Revisions.** Major changes made to the standard in this revision include the following:

1. Requirement that suppliers provide product technical data sheets along with SDSs (aka MSDSs).
2. Requirement that product technical data sheets contain specific information.
3. Improved guidance on establishing purchasing specifications.
4. Inclusion of a requirement for tamper-evident packaging. (Sec. 6.2)

**V. Comments.** If you have any comments or questions about this standard, please call the 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](mailto:standards@awwa.org).



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## EPI-DMA Polyamines

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### SECTION 1: GENERAL

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#### **Sec. 1.1 Scope**

This standard describes epichlorohydrin dimethylamine (EPI-DMA) polyamines for use in the treatment of potable water, wastewater, and reclaimed water.

#### **Sec. 1.2 Purpose**

The purpose of this standard is to provide the minimum general requirements for EPI-DMA polyamine products, including physical, chemical, sampling, packaging, shipping, and testing requirements, and to provide the means of developing requirements for specific EPI-DMA polyamine products.

#### **Sec. 1.3 Application**

This standard can be referenced in documents for purchasing and receiving EPI-DMA polyamine products and can be used as a guide for testing the physical and chemical properties of EPI-DMA polyamine product samples. The stipulations of this standard apply when this document has been referenced and only to EPI-DMA polyamines used in the treatment of potable water, wastewater, and reclaimed water. Each section or subsection of this standard shall apply to both water supply service applications and wastewater service applications unless the section or subsection states that it applies only to water supply service applications or the word *water* is stated in the title, or the section or subsection states that it applies only to wastewater service applications or the word *wastewater* is stated