



**American Water Works  
Association**

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**ANSI/AWWA B407-18**  
(Revision of ANSI/AWWA B407-12)

**AWWA Standard**

# Liquid Ferric Chloride

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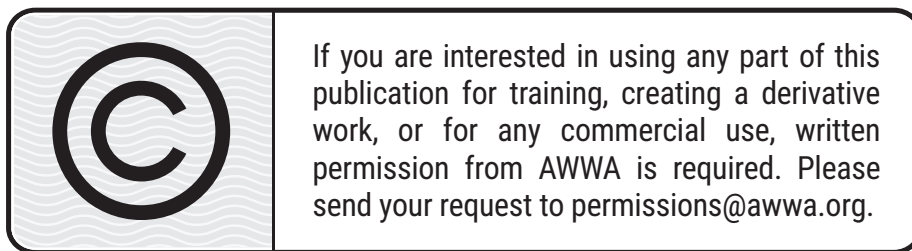
## AWWA Standard

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## Foreword

*This foreword is for information only and is not a part of ANSI/AWWA B407.*

### **I. Introduction.**

I.A. *Background.* Ferric chloride is commercially available in two solid forms, hexahydrate and anhydrous, and in liquid form. This standard describes ferric chloride in aqueous (liquid) form for use in the treatment of municipal and industrial water supplies. Ferric chloride can be produced as a coproduct with titanium dioxide from natural ores containing iron and titanium oxides or by the controlled reaction of spent steel pickling solutions, hydrochloric acid, chlorine, and scrap iron. A high-purity product can be manufactured by reacting chlorine gas with iron, ferrous sulfate, or ferrous chloride. Recognizing that the purity of ferric chloride can vary with the manufacturing process, the purchaser may request that the supplier describe the manufacturing process used. The purchaser also may want to ask the supplier about potential impurities relative to the manufacturing process used.

This standard provides methods for the analysis of specific gravity, insoluble matter, total iron, ferrous iron, ferric chloride, and acidity.

I.B. *History.* In 1977, the AWWA Water Quality Division recommended to the AWWA Standards Council that a standard for ferric chloride be prepared. The Standards Council authorized the development of a ferric chloride standard on May 12, 1977. The first edition of ANSI/AWWA B407 was approved by the AWWA Board of Directors on June 5, 1983. Subsequent revisions were approved in 1988, 1993, 1998, 2005, and 2012. This edition was approved on June 11, 2018.

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<sup>†</sup>) 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). AWWA and the Association of State Drinking Water Administrators (ASDWA) joined later.

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

† NSF International, 789 N. Dixboro Road, Ann Arbor, MI 48105.

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 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 (for noncarcinogens) and risk characterization methodology (for carcinogens). Use of Annex A procedures may not always be identical, depending on the certifier.

ANSI/AWWA B407 addresses additives requirements in Sec. 4.3 of the standard. The transfer of contaminants from chemicals to processed water or the residual solids is becoming a problem of great concern. The language in Sec. 4.3.2 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 also 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. *Storage and Handling Precautions.* Liquid ferric chloride is an orange-brown aqueous solution that is acidic and corrosive to common metals. Suitable materials for construction of storage and handling facilities include titanium, tantalum, synthetic-rubber-lined steel, corrosion-resistant fiberglass-reinforced plastics (FRP),

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



ceramics, tetrafluoroethylene polymer (PTFE), polyvinylidene fluoride (PVDF), and polyvinyl chloride (PVC). Cast iron, carbon steel, stainless steel, aluminum, brass, copper, and polyamides, such as nylon, are not suitable.

Ferric chloride solution may cause burns to the eyes, and acid-resistant goggles should be worn during handling. Contact with skin may cause irritation. This can be avoided by wearing rubber gloves, boots, jacket, and pants.

For additional safety aspects, refer to safety data sheets (SDSs) available from the chemical supplier or manufacturer.

II.B. *Basis for Payment.* The basis for payment shall be the dry weight equivalent of ferric chloride supplied.

II.C. *General Guide to the User.* Some liquid chemical products can amass minor or sometimes critical amounts of solid materials throughout user product handling systems while adhering to those general product requirements set forth in Sec. 4. These materials can be in the nature of:

1. Crystallization, precipitation, and accumulation of product primary components;
2. Crystallization, precipitation, and accumulation of product derivatives; and
3. Precipitation and/or accumulation of product inclusions.

These materials may not be compatible with existing product storage and feed systems. Typical management measures available to the user include: site-specific specifications, inline filtering or screening, storage and feed system cleaning schedules, storage and handling system design, and inventory management. Therefore, it is recommended that the user discuss with the supplier and fully understand

1. Typical product characteristics;
2. Specific application protocols or requirements for product efficacy;
3. Environmental factors that can impact product efficacy;
4. Product storage and handling system requirements; and
5. Logistics and material receipt requirements

**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 standard for liquid ferric chloride permits a wide range of ferric chloride concentration. The purchaser should be aware of the wide range of water weight relative to the shipping cost.

The following information should be provided by the purchaser:

1. Standard used—that is, ANSI/AWWA B407, Liquid Ferric Chloride, of latest revision.
2. Net weight to be supplied (Sec. II.B).
3. Whether compliance with NSF/ANSI 60, Drinking Water Treatment Chemicals—Health Effects, is required.
4. Whether specific gravity of the solution is stipulated (Sec. 4.1).
5. Details of federal, state, and local requirements (Sec. 4).
6. Percentage of ferrous iron permitted. If ferrous iron in excess of 2.5 percent is permitted, the purchaser should state the maximum allowable ferrous iron concentration (Sec. 4.2).
7. Whether the purchaser will reject product from containers or packaging with missing or damaged seals. The purchaser may reject product from bulk containers or packages with missing or damaged seals unless the purchaser's tests of representative samples, conducted in accordance with Sec. 5.2–Sec. 5.11, demonstrate that the product meets the standard. Failure to meet the standard or the absence of, or irregularities in, seals may be sufficient cause to reject the shipment.
8. Size and type of container to be used (Sec. 6.2.1).
9. If weight certificates are required (Sec. 6.2.2).
10. Whether an affidavit of compliance, certified analysis, or both, is required (Sec. 6.3).
11. Whether alternative security measures have been adopted to replace or augment the security measures set out in Sec. 6.2.3 and Sec. 6.2.4.

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

**IV. Major Revisions.** Major revisions to the standard in this edition include the following:

1. Minor text changes in the following sections:
  - Product Certifications (Sec. 4.3.2)
  - Affidavit of Compliance or Certified Analysis (Sec. 6.3)
2. Updated language in Notice of Nonconformance (Sec. 5.12)

**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](mailto:standards@awwa.org).



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(Revision of ANSI/AWWA B407-12)

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# Liquid Ferric Chloride

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## SECTION 1: GENERAL

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### **Sec. 1.1 Scope**

This standard describes ferric chloride in aqueous (liquid) form for use in the treatment of potable water, wastewater, and reclaimed water. Applications of the chemical include (1) water softening with lime or a combination of lime and soda ash to improve hardness reduction and coagulation, and (2) water clarification, as a coagulant, followed by settling or filtration.

### **Sec. 1.2 Purpose**

The purpose of this standard is to provide the minimum requirements for liquid ferric chloride, including physical, chemical, sampling, packaging, shipping, and testing requirements.

### **Sec. 1.3 Application**

This standard can be referenced in documents for purchasing and receiving liquid ferric chloride and can be used as a guide for testing the physical and chemical properties of liquid ferric chloride samples. The stipulations of this standard apply when this document has been referenced and then only to liquid ferric chloride used in the treatment of potable water, wastewater, and reclaimed water.