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O-B-41G  
31 May 2005  
 SUPERSEDING  
 O-B-41F  
 31 December 1997

## FEDERAL SPECIFICATION

### BATTERY WATER

The General Services Administration has authorized the use of this federal specification by all federal agencies.

#### 1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers one type of battery water that is used in lead-acid storage batteries.

#### 2. APPLICABLE DOCUMENTS

2.1 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on the date of invitation for bids or request for proposal shall apply.

##### ASTM International

|             |  |
|-------------|--|
| ASTM D 511  | - Standard Test Method for Calcium and Magnesium in Water. |
| ASTM D 512  | - Standard Test Method for Chloride Ion in Water.          |
| ASTM D 1068 | - Standard Test Method for Iron in Water.                  |
| ASTM D 1193 | - Standard Specification for Reagent Water.                |
| ASTM D 1426 | - Standard Test Methods for Ammonia Nitrogen in Water.     |
| ASTM D 1688 | - Standard Test Methods for Copper in Water.               |
| ASTM D 1886 | - Standard Test Methods for Nickel in Water.               |
| ASTM D 3867 | - Standard Test Methods for Nitrite-Nitrate in Water.      |

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| Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data that may improve this document should be sent to: STDZNMGT@dla.mil or Defense Supply Center Richmond, ATTN: DSCR-VEB, 8000 Jefferson Davis Highway, Richmond, VA 23297-5616. |
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AMSC N/A

FSC 6810

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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- ASTM D 6317 - Standard Test Method for Low Level Determination of Total Carbon, Inorganic Carbon And Organic Carbon in Water by Ultraviolet, Persulfate Oxidation, and Membrane Conductivity Detection.

(Private sector and civil agencies may purchase copies of these voluntary standards from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959. Electronic copies may be obtained from <http://www.astm.org/>.)

Waters Corporation

- Anion Analysis Using Hydroxide Eluent and Method Indirect Conductivity Detection and EPA Method B-1011 for Nitrite and Nitrate Using UV Detection.

(Private sector and civil agencies may purchase copies of these voluntary standards from Waters Corporation, 34 Maple Street, Milford, MA 01757. Electronic copies may be obtained from <http://www.waters.com/>.)

### 3. REQUIREMENTS

3.1 Physical characteristics. The battery water shall be clear, colorless, odorless, and free from suspended matter and sediment when tested as specified in 4.3.1.1.

3.2 Impurities. The battery water shall conform to the requirements of table I when tested as specified in the applicable test paragraph cited in table I.

TABLE I. Maximum allowable impurities.

| Impurity                       | Parts per million (ppm) | Test paragraph |
|--------------------------------|-------------------------|----------------|
| Total solids                   | 100                     | 4.3.1.2        |
| Organic and volatile matter    | 50 <sup>1</sup>         | 4.3.1.2        |
| Calcium and magnesium (as CaO) | 40                      | 4.3.1.3        |
| Iron                           | 0.5                     | 4.3.1.4        |
| Copper                         | 2.5                     | 4.3.1.5        |
| Chloride                       | 5                       | 4.3.1.6        |
| Nickel                         | 0.2                     | 4.3.1.7        |
| Ammonia (as NH <sub>4</sub> )  | 8                       | 4.3.1.8        |
| Nitrites (as NO <sub>2</sub> ) | 5                       | 4.3.1.9        |
| Nitrates (as NO <sub>3</sub> ) | 10                      | 4.3.1.10       |

<sup>1</sup>Micrograms per liter (µg/L).

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the acquisition order (see 6.2), the contractor is responsible for the performance of all inspection requirements (examinations and tests) specified herein. Except as otherwise specified in the acquisition order (see 6.2), the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the government. The government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the government for acceptance comply with all requirements of the contract. Sampling inspection, as part of the manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the government to accept defective material.

4.1.2 Contractor assurance of compliance. The contractor's quality program or detailed inspection system shall provide assurance of compliance of all characteristics with the applicable drawing and specification requirements using, as a minimum, the conformance criteria specified herein.

4.1.3 Alternative inspection provisions. When specified in the acquisition order (see 6.2), alternative inspection provisions, methods, or equipment such as statistical process control, tool control, and other types of sampling procedures may be used by the contractor when they provide, as a minimum, the level of quality assurance required by the inspection provisions specified herein. Prior to applying such alternative procedures, methods, or equipment, the contractor shall describe them in a written proposal submitted to the government for evaluation and approval. The contractor shall demonstrate that the effectiveness of each proposed alternative is equal to or better than the quality assurance provisions specified herein. In cases of dispute as to whether the contractor's proposed alternative provides equal quality assurance, the provisions of this specification shall apply. All approved alternative inspection provisions shall be specifically incorporated into the contractor's quality program or detailed inspection system, as applicable.

#### 4.2 Quality conformance inspection.

4.2.1 Lot. A lot shall consist of the battery water produced by one manufacturer at one plant from the same materials and under essentially the same manufacturing conditions, provided the operation is continuous. In the event the process is a batch operation, each batch shall constitute a lot (see 6.3.1).

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4.2.2 Sampling for battery water tests. Sampling shall be conducted in accordance with table II. A representative specimen of approximately 0.9 liter (L) shall be removed from each sample container and placed in a suitable clean dry container labeled to identify the lot and container from which it was taken.

TABLE II. Sampling for battery water tests.

| Number of containers in a batch or lot | Number of samples |
|--|-------------------|
| 1 to 2                                 | Sample 100%       |
| 3 to 25                                | 2                 |
| 26 to 150                              | 3                 |
| 151 to 1,200                           | 5                 |
| 1,201 to 7,000                         | 8                 |
| 7,001 to 20,000                        | 10                |
| over 20,000                            | 20                |

4.2.3 Inspection procedures for battery water tests. Each sample specimen taken in accordance with 4.2.2 shall be tested as specified in 4.3.1. Failure of any test by any inspection shall be cause for rejection of the lot represented.

4.3 Test methods.

4.3.1 Battery water tests. Reagent-grade water meeting the requirements of ASTM D 1193 and reagent-grade chemicals shall be used throughout the tests. Where applicable, blank determinations shall be run and corrections applied where significant. Unless otherwise specified (see 6.2), acid and base reagents shall be concentrated acids and bases. Tests shall be conducted as specified in 4.3.1.1 through 4.3.1.10.

4.3.1.1 Physical characteristics test. Pour approximately 50 milliliters (mL) of the well mixed specimen into a clean, dry, 25 X 150-mL test tube. Immediately examine for odor and then allow to stand for no less than 10 minutes. Examine by transmittance light for clarity, color, suspended matter, and sediment.

4.3.1.2 Total solids and organic and volatile matter. Determine the total solids and organic and volatile matter content of the specimen in accordance with ASTM D 6317.

4.3.1.3 Calcium and magnesium (as CaO). Determine the calcium and magnesium content of the specimen in accordance with the complexometric titration method of ASTM D 511.

4.3.1.4 Iron. Determine the iron content of the specimen in accordance with the direct atomic absorption method of ASTM D 1068.

4.3.1.5 Copper. Determine the copper content of the specimen in accordance with the direct atomic absorption method of ASTM D 1688.

4.3.1.6 Chloride. Determine the chloride content of the specimen in accordance with ASTM D 512.

4.3.1.7 Nickel. Determine the nickel content of the specimen in accordance with the direct atomic absorption method of ASTM D 1886.

4.3.1.8 Ammonia (as NH<sub>4</sub>). Determine the ammonia content of the specimen in accordance with the electrode method of ASTM D 1426.

4.3.1.9 Nitrites (as NO<sub>2</sub>). Determine the nitrites content of the specimen in accordance with ASTM D 3867 or EPA Method B-1011 of "Anion Analysis Using Hydroxide Eluent and Indirect Conductivity Detection and EPA Method B-1011 for Nitrite and Nitrate using UV Detection".

4.3.1.10 Nitrates (as NO<sub>3</sub>). Determine the nitrates content of the specimen in accordance with EPA Method B-1011 of "Anion Analysis Using Hydroxide Eluent and Indirect Conductivity Detection and EPA Method B-1011 for Nitrite and Nitrate using UV Detection".

## 5. PACKAGING

5.1 Packaging. The requirements for packaging shall be as specified in the acquisition order (see 6.2).

5.2 Unit quantity. The battery water shall be provided in either 1-gallon, 5-gallon, or bulk quantity as specified in the acquisition order (see 6.2).

## 6. NOTES

INFORMATION FOR GUIDANCE ONLY. (This section contains information of a general or explanatory nature that is helpful, but is not mandatory.)

6.1 Intended use. The battery water is intended for use in lead-acid storage batteries only.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, revision, and date of this standard.
- b. Responsibility for inspection, if different (see 4.1).
- c. Inspection facility, if different (see 4.1).
- d. Alternative inspection, if required (see 4.1.3).
- e. Acid and base reagents, if other than specified (see 4.3.1).
- f. Packaging requirements (see 5.1).
- g. Unit quantity required (see 5.2).

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6.3 Definitions.

6.3.1 Batch. A batch is a specific quantity of material that has been manufactured by some unit chemical process or subjected to some physical mixing operation intended to make the final product substantially uniform.

6.4 Subject term (key word) listing.

lead-acid  
storage

6.5 National stock numbers (NSNs). The following NSNs correspond with this federal specification. This list may not be indicative of all NSNs used to procure battery water covered under this specification.

| <u>NSN</u>       | <u>Size</u>         |
|------------------|---------------------|
| 6810-00-286-3783 | 1-gallon containers |
| 6810-00-297-9540 | 5-gallon containers |
| 6810-00-297-9541 | Bulk liquid         |

6.6 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

## MILITARY INTERESTS:

Custodians:

Army - EA

Navy - MC

Air Force - 68

Review Activity:

Army - AT

CIVIL AGENCY  
COORDINATING ACTIVITY:

GSA - FSS

Preparing Activity:

DLA - GS3

(Project 6810-1720)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST database at <http://assist.daps.dla.mil>.