

[METRIC]  
O-B-41F  
31 December 1997  
SUPERSEDING  
O-B-41E  
29 August 1984

## FEDERAL SPECIFICATION

### BATTERY WATER

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

#### 1. SCOPE

1.1 Scope. This federal 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 of the date of invitation for bids or request for proposal shall apply.

American Society for Testing and Materials (ASTM) Standards:

ASTM D511 - Standard Test Method for Calcium and Magnesium in Water  
ASTM D512 - Standard Test Method for Chloride Ion in Water  
ASTM D1068 -Standard Test Method for Iron in Water  
ASTM D1193 -Standard Specification for Reagent Water  
ASTM D1426 -Standard Test Method for Ammonia Nitrogen in Water  
ASTM D1688 -Standard Test Method for Copper in Water  
ASTM D1886 -Standard Test Method for Nickel in Water  
ASTM D3867 -Standard Test Method for Nitrite-Nitrate in Water  
ASTM D4779 -Standard Test Method for Total, Organic and Inorganic Carbon in High Purity Water by Ultraviolet (UV) or Persulfate Oxidation, or Both, and Infrared Detection

Beneficial comments, recommendations, additions, deletions, clarifications, etc., and any data which may improve this document should be sent by letter to: Defense Supply Center Richmond (DSCR), ATTN: DSCR-VBD, 8000 Jefferson Davis Highway, Richmond, VA 23297-5610.
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AMSC N/A

FSC 6810

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(Application for copies should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

Millipore Corporation, Waters Chromatography Division:

Method B-1011 - Waters Test Method for Determination of Nitrite/Nitrate in Water  
Using Single Column Ion Chromatography

(Application for copies should be addressed to Millipore Corporation, Waters Chromatography Division, 34 Maple Street, Minford, MA 01757.)

(DoD activities may obtain copies of those adopted voluntary standards listed in the DoD Index of Specifications and Standards free of charge from the Standardization Document Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 Physical characteristics. 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. Battery water shall conform to the requirements of Table I when tested as specified in the applicable test methods cited in Table I.

### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, 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.

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> micro grams per liter (µg/L)

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. Alternate inspection procedures, 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. When required, 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.

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## 4.2 Quality conformance inspection.

4.2.1 Lotting. 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).

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 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 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 4.2.2 shall be tested as specified in 4.3.1. Failure of any test, by any specimen, shall be cause for rejection of the lot represented.

## 4.3 Test methods.

4.3.1 Battery water tests. Water, in accordance with ASTM D1193, 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, acid and base reagents shall be concentrated acids and bases. Tests shall be conducted as follows:

4.3.1.1 Physical characteristics. Pour approximately 50 mL of the well mixed specimen into a clean, dry, 25 by 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 D4779.

4.3.1.3 Calcium and magnesium (as CaO). Determine the calcium and magnesium content of the specimen in accordance with ASTM D511, complexometric titration method.

4.3.1.4 Iron. Determine the iron content of the specimen in accordance with ASTM D1068, direct atomic absorption method.

4.3.1.5 Copper. Determine the copper content of the specimen in accordance with ASTM D1688, direct atomic absorption method.

4.3.1.6 Chloride. Determine the chloride content of the specimen in accordance with ASTM D512.

4.3.1.7 Nickel. Determine the nickel content of the specimen in accordance with ASTM D1886, direct atomic absorption method.

4.3.1.8 Ammonia (as NH<sub>4</sub>). Determine the ammonia content of the specimen in accordance with ASTM D1426, electrode method.

4.3.1.9 Nitrites (as NO<sub>2</sub>). Determine the nitrites content of the specimen in accordance with ASTM D3867 or Millipore Corporation Method B-1011.

4.3.1.10 Nitrates (as NO<sub>3</sub>). Determine the nitrates content of the specimen in accordance with Millipore Corporation Method B-1011.

## 5. PACKAGING

5.1 General requirements. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2).

## 6. NOTES

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

6.1 Intended use. Battery water covered by this specification is intended for use in lead-acid storage batteries only.

6.2 Acquisition requirements. Acquisition documents shall specify the following:

- a. Title, number, and date of this specification.
- b. Unit quantity required.
- c. Level of packing required (see 5.1).

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

MILITARY INTERESTS:

Custodians

Army - EA  
Air Force - 68  
Navy - YD1

Reviewers

Army - AT  
Navy - MC

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - 10FTE

Preparing Activity:

DLA - GS

(Project 6810-1406)