

O-B-41E

August 29, 1984

SUPERSEDING

O-B-41D

October 31, 1973

FEDERAL SPECIFICATION

BATTERY WATER

This specification was approved by the Assistant Administrator, Office of Federal Supply and Services, General Services Administration, for the use of all Federal agencies.

1. SCOPE

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

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this specification to the extent specified herein:

Federal Specifications:

NN-P-71	-	Pallets, Material Handling, Wood, Stringer Construction, 2-Way and 4-Way (Partial)
PPP-B-585	-	Boxes, Wood, Wirebound
PPP-B-636	-	Boxes, Shipping, Fiberboard
PPP-F-320	-	Fiberboard; Corrugated and Solid, Sheet Stock (Container Grade) and Cut Shapes

Federal Standard:

Fed. Std. No. 123 - Marking for Shipment (Civil Agencies)

(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions as outlined under General Information in the Index of Federal Specifications, Standards and Commercial Item Descriptions. The Index, which includes cumulative bimonthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, US Government Printing Office, Washington, DC 20402.

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(Single copies of this specification, other Federal specifications, and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston, MA; New York, NY; Washington, DC; Philadelphia, PA; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Houston, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; and Seattle, WA.

(Federal Government activities may obtain copies of Federal standardization documents and the Index of Federal Specifications, Standards and Commercial Item Descriptions from established distribution points in their agencies.)

Military Specification:

MIL-B-26701 - Bottles, Screw Cap and Carboys Polyethylene Plastic

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129 - Marking for Shipment and Storage
MIL-STD-147 - Palletized Unit Loads

(Copies of Military specifications and standards required by contractors in connection with specific acquisition functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 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 date of invitation for bids or request for proposal shall apply.

Uniform Classification Committee, Agent:

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

National Motor Freight Traffic Association, Inc., Agent:

National Motor Freight Classification

(Application for copies should be addressed to the American Trucking Associations, Inc., Traffic Department, 1616 P Street, NW, Washington, DC 20036.)

American Society for Testing and Materials (ASTM) Standards:

D 511	-	Calcium and Magnesium in Water
D 512	-	Chloride Ion in Water
D 992	-	Nitrate Ion in Water
D 1068	-	Iron in Water
D 1193	-	Reagent Water
D 1426	-	Ammonia Nitrogen in Water
D 1688	-	Copper in Water
D 1886	-	Nickel in Water
D 1888	-	Particulate and Dissolved Matter, Solids, or Residue in Water
D 3867	-	Nitrite-Nitrate in Water
D 3951	-	Commercial Packaging
E 29	-	Indicating Which Places of Figures are to be Considered Significant in Specified Limiting Values

(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

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 4.2.4.1.

3.2 Impurities. Battery water shall conform to the requirements of table I when tested as specified therein.

TABLE I. Maximum allowable impurities

Impurity	: Parts per million (ppm)	: Test paragraph
Total solids	: 100	: 4.2.4.2
Organic and volatile matter	: 50	: 4.2.4.2
Calcium and magnesium (as CaO)	: 40	: 4.2.4.3
Iron	: 0.5	: 4.2.4.4
Copper	: 2.5	: 4.2.4.5
Chloride	: 5	: 4.2.4.6
Nickel	: 0.2	: 4.2.4.7
Ammonia (as NH ₄)	: 8	: 4.2.4.8
Nitrites (as NO ₂)	: 5	: 4.2.4.9
Nitrates (as NO ₃)	: 10	: 4.2.4.10

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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 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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.

4.2.2.1 For examination of packaging. Sampling shall be conducted in accordance with MIL-STD-105, inspection level S-3.

4.2.2.2 For battery water test. Sampling shall be conducted in accordance with table II. A representative specimen of approximately 2 liters 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 test

Number of containers in batch or lot	:	Number of sample containers
2 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

4.2.2.3 For container leakage test. Sampling shall be conducted in accordance with MIL-STD-105, inspection level S-2.

4.2.3 Inspection procedure.

4.2.3.1 For examination of packaging. The sample unit shall be one filled unit or shipping container, as applicable, ready for shipment. Sample unit and shipping containers shall be examined for the following defects using an AQL of 2.5 percent defective:

- (a) Contents per container not as specified
- (b) Container not as specified
- (c) Container closure not as specified
- (d) Container damaged or leaking
- (e) Fiberboard pads or liner missing or not as specified
(when required)
- (f) Marking incorrect, missing or illegible
- (g) Unitization not as specified

4.2.3.2 For battery water test. Each sample specimen taken in 4.2.2.2 shall be tested as specified in 4.2.4. Failure of any test by any specimen shall be cause for rejection of the lot represented.

4.2.3.3 For container leakage test. The sample unit shall be one container. The sample containers selected in 4.2.2.3 shall be tested as specified in 4.2.5 using an AQL of 1.5 percent defective.

4.2.3.4 Significant places. For the purpose of determining conformance with this specification, an observed or calculated value shall be rounded-off "to the nearest unit" in the last right hand place of figures used in expressing the limited value, in accordance with the rounding-off method of ASTM E 29.

4.2.4 Battery water tests. Water in accordance with 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. Tests shall be conducted as follows:

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

4.2.4.2 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 1888.

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

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

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

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

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

4.2.4.8 Ammonia (as NH₄). Determine the ammonia content of the specimen in accordance with ASTM D 1426, electrode method.

4.2.4.9 Nitrites (as NO₂). Determine the nitrites content of the specimen in accordance with ASTM D 3867.

4.2.4.10 Nitrates (as NO₃). Determine the nitrates content of the specimen in accordance with ASTM D 992.

4.2.5 Container leakage test. Place the container in each of the following positions, and leave it in each for a period of 15 minutes.

- (a) Upright
- (b) Upside down
- (c) On one side (or one quadrant)
- (d) On one end (or second quadrant)
- (e) On other side (or fourth quadrant)

Examine the container after each period for any evidence of leakage.

5. PACKAGING

5.1 Unit packing. Battery water shall be unit packed level A or commercial as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 One-gallon quantity. A 1 US gallon (gal) quantity [+1.3 or -0 fluid ounces (oz)] of battery water shall be unit packed in a nominal 1-gal capacity polyethylene bottle overpacked in a close-fitting fiberboard box. The polyethylene bottle shall conform to the 1-gallon size as specified in MIL-B-26701 except that minimum capacity shall be 140 fluid ounces (see 6.4), and the required screw-cap shall be furnished with an anti-back-off device. The fiberboard box shall meet minimum requirements of class weather-resistant, grade W6c of PPP-B-636 (see 6.5). The bottle shall be tightly closed and shall not leak when tested in the overpacked configuration as specified in 4.2.5. The box shall be closed as specified for the closure of boxes intended for exterior use in PPP-B-636.

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5.1.1.2 Five-gal quantity. A quantity of 5 US gal (+6 or -0 oz) of battery water shall be unit packed in a polyethylene drum conforming to Uniform Freight Classification Rule 40, section 7-1/4 of National Motor Freight Classification item 257, having a necked-in top for stable staking feature. The closure on the drum shall be fitted with a gasket and an anti-back-off device and shall be closed to a torque within the range specified by the drum manufacturer. There shall be no evidence of leakage of contents when the drum is tested as specified in 4.2.5.

5.1.2 Commercial. A quantity of 1 US gal (+1.3 or -0 oz) or 5 US gal (+6 or -0 oz) as specified (see 6.2) of battery water shall be unit packed commercially in a nominal 1-gal or 5-gal container respectively, in accordance with commercial practice as specified in ASTM D 3951.

5.2 Packing. Battery water shall be packed level A, B or commercial as specified (see 6.2).

5.2.1 Level A.

5.2.1.1 One-gal quantity. Four 1-gal containers of battery water, unit packed as specified in 5.1.1.1, shall be packed upright in a snug-fitting box conforming to class 3, style optional for a type 2 load not exceeding 85 pounds of PPP-B-585. Fiberboard pads conforming to minimum grade W5c of PPP-F-320 shall be used as needed to prevent movement of the 1-gal containers within the box. The box shall be closed as specified in the appendix to PPP-B-585.

5.2.1.2 Five-gal quantity. The 5-gal quantity of battery water, unit packed as specified in 5.1.1.2, shall require no further protection for shipment other than unitization.

5.2.2 Level B, 1-gal quantity. Four 1-gal unit packs of battery water shall be packed level B in the same manner as is specified for level A in 5.2.1.1, except that the box shall conform to class weather-resistant, grade V3c of PPP-B-636. Motion of contents shall be prevented by inserting fiberboard pads where needed. The box shall be furnished with a fiberboard liner having flutes parallel to the vertical dimension of the box. Also, a fiberboard pad shall be placed on top of and below the unit packs. The fiberboard liner and pads shall conform to class weather-resistant, grade V3c of PPP-F-320. The box shall be closed and reinforced as specified for the closure of exterior boxes in the appendix to PPP-B-636.

5.2.3 Commercial. A 1- or 5-gal quantity of battery water as specified (see 6.2) shall be packed commercially in accordance with ASTM D 3951.

5.2.4 Unitization. Level A and B packs of the 1-gal quantity shall be palletized on a pallet conforming to type IV, softwood of NN-P-71 and in accordance with the requirements for load type I of MIL-STD-147, while those of the level A 5-gal quantity shall be palletized in accordance with the requirements for load type XVII (framed load). Bonding means shall be "H, K" and "L" of

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MIL-STD-147. Commercial packs shall be unitized in a manner to assure carrier acceptance, safe delivery from supply source to initial destination, and stability in storage for a minimum duration of six months.

5.3 Marking. Each container shall be marked "For Lead Acid Batteries Only".

5.3.1 Civil agencies. For civil agencies, level A, B and commercial unit packs, packs and unitized loads shall be marked in accordance with Fed. Std. No 123.

5.3.2 Military activities. For military activities, level A and B unit packs, packs and unitized loads shall be marked in accordance with MIL-STD-129. Commercial unit packs and packs shall be marked in accordance with ASTM D 3951. Commercial unitized loads shall be marked to assure, as a minimum, proper identification of contents at origin and destination.

6. NOTES

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

6.2 Ordering data. Purchasers should select the preferred options permitted herein, and include the following information in procurement documents:

- (a) Title, number, and date of this specification,
- (b) Level of unit packing and packing required (see 5.1 and 5.2), and
- (c) Quantity to be unit packed and packed commercially (see 5.1.2 and 5.2.3).

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.

6.4 The 140 fluid ounce minimum capacity in 5.1.1.1 is a firm requirement to minimize burst bottles causable by expansion of water when freezing.

6.5 The wather resistant unit pack is specified in 5.1.1.1 because it, as the unit of issue, is subject to shipment by itself as the exterior pack.

MILITARY INTERESTS:

Custodians:

Army - EA
Air Force - 68

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA-7FCE
DOT-ACO

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Review activity:

DLA - GS

User activities:

Army - ME, SM
Navy - MC, YD

Preparing activity:

Army - EA

Project No. 6810-B434

Orders for this publication are to be placed with the General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain copies and other documents referenced herein.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER O-B-41E		2. DOCUMENT TITLE BATTERY WATER	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION <i>(Mark one)</i>	
b. ADDRESS <i>(Street, City, State, ZIP Code)</i>		<input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER <i>(Specify):</i> _____	
5. PROBLEM AREAS			
a. Paragraph Number and Wording:			
b. Recommended Wording:			
c. Reason/Rationale for Recommendation:			
6. REMARKS			
7a. NAME OF SUBMITTER <i>(Last, First, MI) - Optional</i>		b. WORK TELEPHONE NUMBER <i>(Include Area Code) - Optional</i>	
c. MAILING ADDRESS <i>(Street, City, State, ZIP Code) - Optional</i>		8. DATE OF SUBMISSION <i>(YYMMDD)</i>	

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