

O-H-765C
MARCH 23, 1979
SUPERSEDING
Fed. Spec. O-H-765B
May 22, 1969

FEDERAL SPECIFICATION

HYDROCHLORIC ACID, TECHNICAL

This specification was approved by the Commissioner,
Federal Supply Service, General Services Administration,
for use of all Federal agencies.

1. SCOPE

1.1 This specification covers technical grade hydrochloric acid, also known as muriatic acid.

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:

- L-P-390 - Plastic, Molding and Extrusion Material, Polyethylene and Copolymers (Low, Medium, and High Density).
- HH-I-585 - Insulation, Thermal (Vermiculite).
- PPP-B-585 - Boxes, Wood, Wirebound.
- PPP-B-601 - Boxes, Wood, Cleated-Plywood.
- PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
- PPP-B-636 - Boxes, Shipping, Fiberboard.
- PPP-C-96 - Cans, Metal, 28 Gauge and Lighter.
- PPP-C-186 - Containers, Packaging and Packing for Drugs, Chemicals, and Pharmaceuticals.
- PPP-F-320 - Fiberboard: Corrugated and Solid, Sheet Stock (Container Grade) and Cut Shapes.
- PPP-T-66 - Tape: Pressure-Sensitive Adhesive, Vinyl Plastic Film.

Federal Standard:

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

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(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, US Government Printing Office, Washington, DC 20402.

(Single copies of this specification and other Federal specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Services Centers at the General Services Administration Regional Offices in Boston, New York, Philadelphia, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Houston, Denver, San Francisco, Los Angeles, and Seattle, WA.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specifications:

MIL-D-43703 - Drums, Shipping and Storage, Molded Polyethylene.

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 for 40" by 48" Pallets.
- MIL-STD-1188 - Commercial Packaging of Supplies and Equipment.

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

Code of Federal Regulations (DFR):

49 CFR 171 to 179 - Department of Transportation Hazardous Materials Regulations.

(The Code of Federal Regulations and the Federal Register (FR) are for sale on a subscription basis by the Superintendent of Documents, US Government Printing Office, Washington, DC 20402. When indicated, reprints of certain regulations may be obtained from the Federal agency responsible for issuance thereof.)

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.

American Society for Testing and Materials (ASTM) Standards:

- D1193 - Reagent Water.
- E224 - Analysis of Hydrochloric Acid.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103)

3. REQUIREMENTS

3.1 Physical and chemical characteristics. Hydrochloric acid shall conform to the physical and chemical characteristics of table I when tested as specified therein.

TABLE I. Physical and chemical characteristics

Characteristic	Minimum	Maximum	Test paragraph
Total acidity (as HCl), percent by weight	31.45	-----	4.2.4.1
Specific gravity, 60 deg./60 deg. F (15.6 deg./15.6 deg. C)	1.1600	-----	4.2.4.1
Total sulfur (as H ₂ SO ₄), percent by weight	-----	0.02	4.2.4.1
Iron (Fe), percent by weight	-----	0.0005	4.2.4.1
Arsenic (As), percent by weight	-----	0.0001	4.2.4.2

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 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 that supplies and services conform to the specified requirements.

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4.2 Quality conformance inspection.

4.2.1 Lotting. A lot shall consist of the hydrochloric acid offered for acceptance at one time which has been produced by one manufacturer, at one plant, during one shift, 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 preparation for delivery. Sampling shall be conducted in accordance with MIL-STD-105.

4.2.2.2 For hydrochloric acid tests. Sampling shall be conducted in accordance with table II. A representative specimen of approximately 450 grams (g) 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 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-4 using an AQL of 1.5 percent defective.

4.2.3 Inspection procedure.

4.2.3.1 For examination of preparation for delivery. The sample unit shall be one filled unit container or one fully packed shipping container, as applicable, ready for shipment. Sample containers shall be examined for the following defects using an AQL of 2.5 percent defects per hundred units:

- (a) Contents per container not as specified
- (b) Container not as specified
- (c) Container closure not as specified
- (d) Container damaged or leaking
- (e) Marking incorrect, missing, or illegible
- (f) Tape, vermiculite, or fiberboard pads not as specified

4.2.3.2 For hydrochloric acid tests. Approximately equal portions of all of the specimens taken in 4.2.2.2 shall be thoroughly mixed to form a composited specimen of no less than 450 g. The composited specimen shall be tested as specified in 4.2.4. Each test shall be conducted in duplicate analysis. Failure of either analysis of any test shall be cause for rejection of the lot represented.

4.2.3.3 For container leakage test. The sample unit shall be one filled and closed container. Sample containers selected in 4.2.2.3 shall be tested as specified in 4.2.5.

4.2.4 Hydrochloric acid tests. Water in accordance with type IV of ASTM D1193 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 Total acidity (as HCl), specific gravity, total sulfur (as H_2SO_4), and iron. Determine specific gravity and percent total acidity, total sulfur, and iron in accordance with ASTM E244.

4.2.4.2 Arsenic. Weigh 2.000 g of the specimen and to it add 1 millilitre (ml) of concentrated nitric acid and 0.5 ml of concentrated sulfuric acid and evaporate until strong fumes are given off. Cool to room temperature, cautiously add 10 ml of water, and again evaporate to strong fuming. Determine arsenic in the residue by the Gutzeit method (see 6.5). The stain produced shall be no darker than that produce when 0.002 milligram of arsenic (As) is tested by the Gutzeit method.

4.2.5 Container leakage test. Place the sample 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.

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5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be in accordance with Department of Transportation (DOT) regulations and shall be level A or commercial as specified (see 6.2)

5.1.1 Level A, 6-pound (2.72-kilogram) quantity. A quantity of 6 pounds (+1 or -0 ounce avoirdupois) [2.72 (+0.03 or -0) kilograms] of hydrochloric acid shall be packaged in a nominal 5-pint (2.4-liter) bottle conforming to group A, class 2, style <UT>, grade optional of PPP-C-186. The material used for the bottle shall conform to Type I, class M or H, grade 1 or 2 of L-P-390. The minimum thickness of the bottle material shall be 0.030 inch (0.76 millimeter). The bottle shall be designed with a finish adapted to a screw cap conforming to closure A or R of PPP-C-186. The closure of the bottle shall conform to closure A with a separate liner or closure R of PPP-C-186. The tightened screw cap shall be secured to the neck of the bottle by a strip of tape applied circumferentially around, and centered over the juncture between the skirt of the cap and the shoulder of the bottle neck. The tape shall have a nominal width of 2 inches (50.8 millimeters) and a length of at least one and one-third times the circumference of the screw-cap closure. The tape shall conform to type 1, class optional of PPP-T-66. There shall be no evidence of container leakage when the bottle is tested as specified in 4.2.5. Each bottle shall be placed upright and centered in a can with vermiculite cushioning. The can shall conform to type V, class 2 or type VI tin or terneplate of PPP-C-96. The can shall be coated in accordance with plan B with side seam striped of PPP-C-96. At least 1.2 pounds (0.54 kilogram) of vermiculite conforming to type optional, class 1 of HH-I-585 shall be used in each can to assure absorption of the entire contents of the bottle in the event of leakage or breakage. The seams of the slip cover can shall be sealed with the same kind of tape used for the bottle. Alternatively, the hydrochloric acid shall be packaged in a single bottle package conforming to DOT Specification 33A with all of the above screwcap closure and taping requirements applying. There shall be no evidence of container leakage when the bottle is tested as specified in 4.2.5.

5.1.2 Commercial, 6-pound (2.72 kilogram) quantities.

5.1.2.1 Civil agencies. A quantity of 6 pounds (2.72 kilograms) of hydrochloric shall be packaged in a manner to assure that it neither affects nor is affected by the container and its closure.

5.1.2.2 Military activities. A quantity of 6 pounds (2.72 kilograms) of hydrochloric acid shall be packaged in accordance with MIL-STD-1188.

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

5.2.1 Level A.

5.2.1.1 Six-pound (2.72-kilogram) quantity. Four bottles of hydrochloric acid packaged as specified in 5.1.1 shall be packed upright in a closed-fitting wirebound wood, cleated-plywood, or nailed-wood box. The wirebound wood box shall conform to class 3, style optional of PPP-B-585 with wooden components preserved as specified for the grade A box of PPP-B-621. The cleated-plywood box shall conform to type overseas, style A, B, or I, grade A of PPP-B-601. The nailed wood box shall conform to class 2, style 4, grade A of PPP-B-621. Each box shall be designed for a type 2 load. Fiberboard pads formed from material conforming to grade V3c of PPP-F-320 shall line all inside faces of the box and shall be inserted where needed to prevent motion of contents. Each box shall be closed and reinforced as specified in its applicable specification.

5.2.1.2 Five-gallon (18.9-litre) quantity. A quantity of 5 gallons (+6 or -0 fluid ounces) [18.93 (+0.19 or -0) litres] of hydrochloric acid shall be packed in a polyethylene drum conforming to size I of MIL-D-43703 except that a modified cylindrical shape shall be permitted and recessed areas in the top of the drum as well as other features equally efficient as a handle for safe lifting of the drum by hand shall be permitted. The closure of the drum shall be secured using the torque specified by the manufacturer of the drum. There shall be no evidence of container leakage when the drum is tested as specified in 4.2.5.

5.2.1.3 Fifteen-gallon (56.8-litre) quantity. A quantity of 15 gallons (+19 or -0 fluid ounces) [56.8 (+0.5 or -0) litres] of hydrochloric acid shall be packed in a polyethylene drum conforming to size II of MIL-D-43703 except that a modified cylindrical shape shall be permitted and recessed areas in the top of the drum, as well as other handling features as equally or more efficient than the specified handles for safe handling of the drum shall be permitted. The closure of the drum shall be secured using the torque specified by the manufacturer of the drum. There shall be no evidence of container leakage when the drum is tested as specified in 4.2.5.

5.2.2 Level B, 6-pound (2.72-kilogram) quantity. Four 6-pound (2.72-kilogram) bottles of hydrochloric acid packaged as specified in 5.1 shall be packed upright as specified in 5.2.1.1 except that the container shall be a close-fitting box conforming to grade V3c of PPP-B-636.

5.2.3 Commercial.

5.2.3.1 Civil agencies. Hydrochloric acid shall be packed in containers to assure carrier acceptance and safe arrival at destination. Containers shall comply with applicable carrier regulations.

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5.2.3.2 Military activities. Hydrochloric acid shall be packed in accordance with MIL-STD-1188.

5.3 Marking.

5.3.1 Civil agencies. Containers shall be marked in accordance with Fed. Std. No. 123 and shall show the date of manufacture and the lot or batch number of the hydrochloric acid.

5.3.2 Military activities. Level A and B shipments shall be marked in accordance with MIL-STD-129. Commercial shipments shall be marked in accordance with MIL-STD-1188. Each unit and shipping container shall be marked to show the date of manufacture and lot or batch number of hydrochloric acid.

5.3.3 Precautionary marking. Each unit and shipping container shall be marked to show the following precautionary information:

WARNING! CAUSES BURNS

Avoid contact with skin and eyes.

Avoid breathing vapor.

In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention.

If swallowed, dilute by giving copious doses of water, milk, or raw egg white; get medical attention.

When handling, use protective, splash-proof safety goggles, rubber gloves, and rubber apron.

Spills should be immediately neutralized by sodium carbonate or sodium bicarbonate applied carefully, and then rinsed away.

5.4 Palletization. Shipments of hydrochloric acid shall be palletized in accordance with the applicable requirements of MIL-STD-147.

6. NOTES

6.1 Intended use. Hydrochloric acid is intended for general chemical use in laboratories and for use in the electroplating, galvanizing, and pickling of metals and in the dyeing and bleaching of fabrics.

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) Unit quantity required.
- (c) Level of packaging and packing required (see 5.1 and 5.2).

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 Significant places. For the purpose of determining conformance with this specification, an observed or calculated value should be rounded off "to the nearest unit" in the last right-hand place of figures used in expressing the limiting value, in accordance with the rounding-off method of ASTM E29.

6.5 Gutzeit method of arsenic. The description of the apparatus and procedure for determining arsenic by the Gutzeit method may be found in standard analytical chemistry reference books.

6.6 Commercial concentration. Hydrochloric acid covered by this specification is of a strength known commercially as "20 deg. Baum[']e."

MILITARY INTERESTS:

Preparing activity: Army - EA

Custodians:

Civil Agency Coordinating Activities:

Army - EA

GSA - FSS

Navy - SH

HEW - NIH

Air Force - 68

VA - DMS

Review activities:

Project No. 6810-B034

Army - AR, MD, MI

DLA - GS

User Activities:

Navy - AS, MC

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

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AMENDMENT 2
September 23, 1985
SUPERSEDING
AMENDMENT 1
June 2, 1981

FEDERAL SPECIFICATION

HYDROCHLORIC ACID, TECHNICAL

This amendment, which forms a part of Federal Specification O-H-765C, dated March 23, 1979, is approved by the Assistant Administrator, Office of Federal Supply and Services, General Administration, for the use of all Federal agencies.

PAGE 1

2.1: Under "Federal Specifications" add the following:

"PPP-C-1337 - Container Composite, (Steel Drum with Polyethylene Insert)."

PAGE 3

Add the following new paragraph:

"3.2 Foreign matter. The hydrochloric acid shall contain no foreign matter when tested as specified in 4.2.4.3."

PAGE 5

4.2.3.1: Add the following defects:

- "(g) 55-gallon (208 liter) container interior coating missing or not as specified
- (h) 55-gallon (208 liter) container contamination not neutralized"

Add the following new paragraph:

"4.2.4.3 Foreign matter. Visually examine the specimen for the presence of foreign matter."

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

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AMENDMENT 2

PAGE 7

Add the following new paragraph:

"5.2.1.4 Fifty-five-gallon (208-liter) quantity. A quantity of 55 gallons (+68 or -0 fluid ounces) [208 (+2 or -0) liters] of hydrochloric acid shall be packed in a container conforming to type II, class 4 of PPP-C-1337 except that the interior protective coating shall consist of two coatings of commercially acceptable high-baked-on epoxy-phenolic resin. Immediately after the container has been filled, any hydrochloric acid contamination on the outer surface of the polyethylene insert or the inner and outer surfaces of the steel drum shall be neutralized with 10-percent sodium carbonate solution and rinsed with water, and then the container shall be dried. After any contamination has been neutralized, the insert and steel drum shall be tightly closed in accordance with the container manufacturer's instructions including torque range and any closing procedures."

MILITARY INTERESTS:

Custodians:

Army - EA
Navy - SH
Air Force - 68

Review activities:

Army - AR, MD, ME, MI
DLA - GS

User Activities:

Navy - AS, MC, YD

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA - 7FCE
HHS - NIH
VA - OSS

Preparing activity:

Army - EA

Project No. 6810-B501