

O-H-795  
O-H-795  
20 MAY 1953  
SUPERSEDING  
Int. Fed. Spec. O-A-87 (Navy Ships)  
17 March 1952

FEDERAL SPECIFICATION

HYDROFLUORIC ACID, TECHNICAL

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

1. SCOPE AND CLASSIFICATION

1.1 Scope.--This specification covers technical grade hydrofluoric acid for use in removing sand particles from metallic castings and for etching glass.

1.2 Classification.--The material covered by this specification shall be furnished in one type and one grade.

2. APPLICABLE SPECIFICATIONS, STANDARDS, AND OTHER PUBLICATIONS

2.1 The following specifications and standards of the issues in effect on date of invitation for bids, form a part of this specification:

Federal Specifications:

NN-B-601--Boxes: Wood-Cleated-Plywood, for Domestic Shipment.  
NN-B-621--Boxes: Wood, Nailed and Lock-Corner.

Military Specifications:

JAN-P-105--Packaging and Packing for Overseas Shipment--Boxes, Wood, Cleated, Plywood.  
JAN-P-106--Packaging and Packing for Overseas Shipment--Boxes, Wood, Nailed.

Navy Department Specification:

General Specifications for Inspection of Material.

Military Standard:

MIL-STD-129--Marking of Shipments.

(Copies of Federal specifications and the Federal Specifications Index may be obtained upon application, accompanied by check, money order, cash, or Government Printing Office coupons to the General Services Administration, Business Service Center, Region 3, Seventh and D Streets, S.W., Washington 25, D.C. This office will also honor deposit account numbers issued by the Government Printing Office. Single copies of produce specification required for bidding purposes are available without charge at the GSA Regional Offices in Boston, New York, Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, Seattle, and Washington, D.C. Prices of additional copies may be obtained from the GSA Regional Office.

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

2.2 Other publication.--The following publication, of the issue in

effect on date of invitation for bids, forms a part of this specification:

Interstate Commerce Commission:

Code of Federal Regulations; Title 49, Transportation

(Copies of the above publication are obtainable from the Superintendent of Documents, Government Printing Office, Washington 25 D.C. Price may be obtained from the Superintendent of Documents.)

### 3. REQUIREMENTS

3.1 Material.--Hydrofluoric acid, technical, shall contain not less than 60 percent of

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hydrogen fluoride (HF), by weight, in water solution, when tested as specified in 4.4.1.

3.2 Labeling.--Each container shall be durably and legibly labeled with the following:

"HAZARDOUS LIQUID AND VAPOR CAUSES SEVERE BURNS WHICH MAY NOT BE IMMEDIATELY PAINFUL OR VISIBLE. Do not get in eyes, on skin, on clothing. Do not breathe vapor. Store out of sun and away from direct heat. First aid in case of contact or suspicion of contact: Always have on hand a supply of magnesia paste (magnesium oxide and glycerine). Immediately flush skin (until whiteness disappears) and eyes (for at least 15 minutes) with plenty of water paying particular attention to skin under nails. Apply magnesia paste. Get medical attention. Remove and wash clothing before re-use."

#### 4. SAMPLING, INSPECTION, AND TEST PROCEDURES

4.1 Lot.--For purposes of sampling a lot shall consist of not more than 16,000 pounds of hydrofluoric acid offered for delivery at one time. Material in a lot shall be identified by order of production until ultimate action is taken by the Government inspector as to the acceptance or rejection of the lot.

4.1.1 Sampling procedure for lot acceptance tests.--From each lot the Government inspector shall take three separate 1-quart samples. The samples shall be taken so as to represent respectively, the first, middle, and last part of the run which produced the lot. Samples shall be taken only in containers made of steel, lead, or polyethylene, since the acid covered by this specification is highly corrosive and attacks other metals and glass. Each sample shall be thoroughly mixed and divided into three equal portions. The portions shall be placed in clean, dry containers which shall be sealed and carefully marked. The three portions of the sample shall be used a follows:

- (a) One for inspection tests.
- (b) One for the contractor.
- (c) One to be held by the Government inspector for 90 days to be used for retests in case of dispute.

4.1.2 Inspection tests.--Unless otherwise specified in the contract or order, the contractor shall furnish all samples and shall be responsible for accomplishing the required tests. When inspection is conducted at the contractor's plant, all inspection and testing shall be under the supervision of the Government inspector. Contractors not having laboratory testing facilities satisfactory to the Government shall engage the services of a commercial testing laboratory acceptable to the inspector. Acceptance or approval of material during course of manufacture shall in no case be construed as guaranty of the acceptance of the finished product.

4.1.2.1 When Government inspection tests are required, samples shall be forwarded to the Government laboratory designated by the procuring agency together with copy of the contractor's data.

4.2 Retests and rejections.--Failure of the material to conform to any one of the requirements of this specification during inspection shall be cause for rejection of the lot represented. If, in the opinion of the contractor, the failure was due to faulty test methods, the tests may be repeated on the contractor's retained sample. In case of a controversy, the test shall be repeated on the Government retained sample. Failure of any two of the three samples to meet the requirements shall be cause for final rejection of the lot represented. Material which has been rejected may be reworked to correct the defects and resubmitted for acceptance. Before resubmitting, full particulars concerning previous rejection and the action taken to correct the defects found in the original shall be furnished the inspector.

#### 4.3 Inspection procedures.

4.3.1 Navy.--For Naval purchases, the general inspection procedures shall be in accordance with General Specifications for Inspection of Material.

4.3.2 Air Force.--For Air Force purchases the contractor shall furnish all samples and shall be responsible for accomplishing the inspection tests. When inspection is conducted at the contractors plant, all inspection and testing shall be under the supervision of the Government inspector. Contractors not having laboratory testing facilities satisfactory to the Government shall engage the services of a commercial testing laboratory acceptable to the procuring service. The contractor shall furnish test reports in duplicate showing quantitative results for all tests required by this specification, and signed by an authorized representative of the contractor or laboratory as applicable. Acceptance or approval of the material during course of manufacture shall in no case be construed as a guaranty of the acceptance of the finished product.

#### 4.4 Test procedures.

##### 4.4.1 Hydrogen fluoride.

4.4.1.1 Apparatus.--The apparatus shall consist of a 100-ml. burette; a platinum weighting tube of about 10-ml. capacity, fitted with a platinum cap; two platinum dishes of approximately 125-ml. capacity; hot plate; steam bath; and gravimetric balance.

4.4.1.2 Reagents.--Reagents shall consist of standardized 1 normal NaOH solution, which shall be kept in a ceresin-lined container to prevent contamination with silica; standardized 1/10 normal iodine solution; a saturated solution of  $\text{KNO}_3$ ; phenolphthalein indicator; and starch indicator.

4.4.1.3 Procedure for determining total acidity and hydrofluosilicic acid.--A portion of approximately 3 grams of the sample shall be accurately weighed out in a platinum weighing tube. Approximately 10 ml. of a saturated solution of  $\text{KNO}_3$  shall be poured into a platinum dish of approximately 125-ml. capacity and chopped ice added. Approximately 50 ml. of standard 1 normal NaOH shall be run in from a burette and 3 drops of phenolphthalein indicator added. The weighing tube containing the weighed sample shall be immersed beneath the surface of the caustic and the cover slowly removed with a platinum wire to allow the sample to mix slowly with the caustic. The solution shall be kept cold and titrated with the standard NaOH in the burette to the first permanent pink color. The total milliliters used shall be noted as (A). The dish shall be put on a hot plate and the solution warmed to approximately 176 deg. F. Additional standard NaOH shall be added to obtain the second end point and the additional milliliters noted as (B).

4.4.1.4 Procedure for determining sulfuric acid in hydrofluoric acid.--A portion of approximately 10 grams of the sample shall be accurately weighed out in a platinum weighing tube and transferred to a platinum dish. The weighing tube shall be rinsed into the dish with distilled water. The solution shall be evaporated to constant volume (near dryness) on a steam bath. A few drops of water shall be added and the evaporation repeated. Lack of odor during the second evaporation indicates that all acids other than sulfuric have been expelled. The residue shall be cooled, dissolved in 100 ml. of  $\text{CO}_2$  free water, and titrated with the standard 1 normal NaOH solution, using phenolphthalein indicator. The milliliters needed shall be noted as (C).

4.4.1.5 Procedure for determining sulfurous acid in hydrofluoric acid.--A portion of approximately 10 grams of the sample shall be accurately weighed in a platinum weighing tube and transferred to a platinum dish with approximately 75 ml. of water. This solution shall be titrated with standard 1/10

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normal iodine using starch indicator. The milliliters used shall be noted as (D).

4.4.1.6 Calculations of the percentage of hydrogen fluoride.--The percentage of hydrogen fluoride may be calculated by the following formula, in which symbols A, B, C, and D are as indicated in 4.4.1.3, 4.4.1.4, 4.4.1.5;  $S_{r1}$ ,  $S_{r2}$ , and  $S_{r3}$  are the samples taken in following the procedure described in the respective paragraphs; and  $N_s$  and  $N_{I_2}$  are the normalities of the sodium hydroxide and iodine solutions, respectively:

$$\text{Percent HF} = \left[ \frac{2A-B}{S_{r1}} - \frac{2C}{S_{r2}} \right] N_s \frac{2DN_{r1}}{S_{r3}}$$

## 5. PREPARATION FOR DELIVERY

5.1 Packaging.--Unless otherwise specified, hydrofluoric acid shall be furnished in steel drums of 20 gallons rated capacity (231 cubic inches per gallon) containing 165 pounds net weight of acid or in 1-pound hard rubber, ceresin, or polyethylene bottles, as specified (see 6.1). All threaded closure and vent plugs shall be well lubricated after filling of the drums to facilitate removal and prevent seizure of threads.

5.1.1 Unless otherwise specified, steel drums shall conform to section 78.51, Hydrofluoric Acid, Specification 5A of the Code of Federal Regulations.

### 5.2 Packing.

5.2.1 Domestic shipment and storage.--Unless otherwise specified, no overpacking will be required for 20-gallon steel drums. When 1-pound containers are specified (see 6.1), they shall be packed in nailed wood or cleated plywood boxes conforming to Federal Specification NN-B-601 or NN-B-621. The gross weight of the packed shipping container shall not exceed 200 pounds.

5.2.2 Overseas shipment.--The 1-pound containers specified in 5.1, shall be padded in shipping containers conforming to Military Specification JAN-P-105 or JAN-P-106. The gross weight of the packed shipping container shall not exceed 70 pounds.

### 5.3 Marking.

5.3.1 One-pound bottles.--Unless otherwise specified, in addition to the labeling specified in 3.2, 1-pound bottles, packed as specified in 5.2, shall be legibly and durably marked in accordance with the Code of Federal Regulations.

5.3.2 Twenty-gallon steel drums.--Unless otherwise specified, in addition to the labeling specified in 3.2, 20-gallon steel drums shall be legibly and durably marked in accordance with the Code of Federal Regulations.

5.4 Marking (Military only).--In addition to the marking specified in 5.3 and any special markings required by the procuring documents, the 1-pound containers, the 20-gallon drums, and the exterior shipping containers shall be marked in accordance with Military Standard MIL-STD-129.

6.3 Hydrofluoric acid should be purchased by volume, the unit being a U.S. gallon, 231 cubic inches at 25 deg. C. (77 deg. F.).

Patent notice.--When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise, as in any manner licensing the holder or any other person or corporation or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

MILITARY INTERESTS:

Army--C M O Q T

Navy--Sh A Or S

Air Force.

The specification is a part of Section IV, Part 5, of the Federal Standard Stock Catalog.

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Copies of this specification can be purchased for 5 cents each from the General Services Administration, Business Service Center, Region 3, Seventh and D Streets, S. W., Washington 25, D. C. Single copies required for bidding purposes are available without charge at the nearest GSA Regional Office.

O-H-795  
AMENDMENT-2  
JULY 3, 1957  
SUPERSEDING  
AMENDMENT-1  
August 10, 1953

FEDERAL SPECIFICATION

HYDROFLUORIC ACID, TECHNICAL

This amendment, which forms a part of Federal Specification O-H-795, dated 20 May 1958, was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

Page 1, paragraph 2.1: Delete reference to Federal Specifications NN-B-601 and NN-B-621, and Military Specifications JAN-P-105 and JAN-P-106, and substitute the following:

"Federal Specifications:

NN-P-515--Plywood, Container Grade.

PPP-B-585--Boxes; Wood, Wirebound.

PPP-B-601--Boxes, Wood, Cleated-Plywood.

PPP-B-621--Boxes, Wood, Nailed and Lock-Corner.

PPP-P--31 -- Preservation, Packaging, Packing, and Marking of Material; and Shipping Instructions (Domestic Shipment and Storage).

Federal Standard:

No. 102--Preservation, Packaging, and Packing levels."

Page 1, Paragraph 2.1: Delete parenthetical "Copies" paragraph and substitute:

(Activities outside the Federal Government may obtain copies of Federal Specifications and Standards 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, U. S. Government Printing Office, Washington 25, D. C.

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, Seattle, and Washington, D. C.

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

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

Page 1, paragraph 2.2: Delete and substitute:

2.2 Other publications.--The following documents form a part of this specification. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply.

Governmental:

Code of Federal Regulations:

49 CFR 71.1--Interstate Commerce Commission Rules and Regulations for Transportation of Explosives and Other Dangerous Articles. Specification 5A.

(The Code of Federal Regulations is available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Orders should

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cite the title and code numbers as listed above. Prices may be obtained from the Superintendent of Documents.)

Nongovernmental:

Consolidated Freight Classification Ratings, Rules, and Regulations.

(Copies may be obtained from the Official Classification Committee, 1 Park Avenue at 33rd Street, New York 16, New York.)

Page 2, paragraph 4.1.1, line 8: Following "lead" insert "hard rubber, ceresin."

Page 4, section 5: Delete and substitute:

#### 5. PREPARATION FOR DELIVERY

The definitions and applications of the levels of packaging and packing shall be in accordance with Federal Standard No. 102.

##### 5.1 Packaging.

5.1.1 All Levels.--Hydrofluoric acid shall be furnished in one-pint or one-gallon hard rubber, ceresin, or polyethylene bottles, or 20-gallon rated capacity steel drums as specified (see 6.1). All thread closure and vent plugs shall be well lubricated after filling of the drum to facilitate removal and prevent seizure of threads.

5.1.1.1 Twenty-gallon steel drums.--Steel drums shall conform to section 73.264, Hydrofluoric Acid, Specification 5A of the Interstate Commerce Commission Rules and Regulations for Transportation of Explosives and Other Dangerous Articles by Freight.

##### 5.2 Packing.

5.2.1 Level A.--Hydrofluoric acid packaged in one-pint or one gallon containers in accordance with 5.1.1 shall be packed in overseas type wood cleated plywood, nailed wood, or wirebound wood boxes conforming to Federal Specification PPP-B-601, PPP-B-621, or PPP-B-585, respectively. Plywood shall conform to type II, class I of Federal Specification NN-P-515. Box closures shall be as specified in the applicable box specification or appendix thereto. The gross weight shall not exceed 70 pounds. Additional packing for the 20-gallon steel drum will not be required.

5.2.2 Level B.--Hydrofluoric acid packaged in one-pint or one-gallon containers in accordance with 5.1.1 shall be packed in domestic type wood cleated plywood, nailed wood, or wirebound boxes conforming to Federal Specification PPP-B-601, PPP-B-621, or PPP-B-585, respectively. Closures shall be as specified in the applicable box specification or appendix thereto. The gross weight shall not exceed 200 pounds. Additional packing for the 20-gallon steel drum will not be required.

5.2.3 Level C.--Hydrofluoric acid packaged in accordance with 5.1.1 shall be packed in containers of the type, size and kind used for the purpose, in a manner which will insure acceptance and safe delivery at destination. Shipping containers shall comply with the Consolidated Freight Classification Rules, or other regulations as applicable to the mode of transportation.

##### 5.3 Marking.

5.3.1 Military agencies.--In addition to the marking specified in 3.2 and any special marking required by the contract or order, each unit and shipping container shall be marked in accordance with the Interstate Commerce Commission Regulations and Military Standard MLL-STD-129.

5.3.2 Civilian agencies.--In addition to the marking specified in 3.2, each bottle, shipping container, and drum shall be legibly and durably marked in accordance with the Interstate Commerce Commission Regulations and Federal Specification PPP-P31.

Page 4, paragraph 6.1: Add:

"(c) Level of packing required (see 5.2)."

Page 5, bottom of page: Delete "Copies" paragraph and substitute:

"Copies of this specification may be purchased for 5 cents."

MILITARY INTEREST:

Army--C M

Navy--Sh A Or S

Air Force.

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Copies of this specification may be purchased for 10 cents each.