O-F-506C
February 15, 1972
SUPERSEDING
Fed. Spec. O-F-506B
October 16, 1957

FEDERAL SPECIFICATION

FLUX, SOLDERING; PASTE AND LIQUID

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 two types of flux to be used in soldering copper, copper-base alloys, tin plate, carbon and alloy steels, heat-resistant and high chromium alloys, and corrosion-resistant steels.

1.2 Classification.

1.2.1 Types and forms. Soldering flux shall be of the following types and forms, as specified (see 6.2):

Type I. - For use with tin-lead solders for joining common metals (except aluminum).

Form A - (Paste).

Form B - (Liquid).

Type II. - For use in soldering heat-resistant and high chromium alloys.

Form B - (Liquid).

FSC 3439

2. APPLICABLE DOCUMENTS

2.1 Specifications and standards. The following specifications and standards, of the issues 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:

QQ-S-571	- Solder; Tin Alloy; Lead-Tin Alloy; And Lead Alloy.
PPP-C-96	- Cans, Metal, 28 Gage and Lighter.

Federal Standards:

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

(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, D. C. 20402.

(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., Fort Worth, 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.)

Military Specifications:

MIL-W-45562	- Welding and Soldering Equipment, Supplies and Accessories, Packaging of.

Military Standards:

MIL-STD-130 - Identification Marking of US Military Property.

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

3. REQUIREMENTS

3.1 Materials. Materials used in compounding these fluxes shall be such that the finished product shall meet the requirements of this specification.

3.2 Safety provisions. The soldering flux shall not emit fumes in sufficient volume to become obnoxious when heated to soldering temperatures with ventilation equal to four (4) air changes per hour (see 4.4.3.1 and 4.4.4.1).

3.3 Performance and product characteristics.

3.3.1 Type I, forms A and B. Both paste and liquid type I flux shall form a thin, continuous film capable of protecting surfaces from oxidation, and reducing and dissolving thin films of oxides which may be present.

3.3.1.1 Chemical composition (type I, form A). The type I, form A flux shall conform to the following chemical composition:

Component	Percent
Mineral grease (petrolatum), wax, and resins	72 to 80
Zinc chloride	20 to 25
Ammonium chloride, or other ammonium salts, maximum	3

The form A flux shall be of uniform consistency, shall spread easily, and adhere uniformly.

3.3.2 Type II, form B. Type II flux shall be capable of reducing chromium oxide surface films and shall be suitable for use in soldering heat-resisting steels and high chromium alloys. Form B flux shall wet easily and adhere to clean metal.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier 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 prescribed requirements.

4.2 Quality conformance inspection. Quality conformance inspection shall be applied to production units offered for acceptance under the contract. Quality conformance inspection shall be conducted to the extent necessary to assure that the units offered for acceptance conform to all contractual requirements. As a minimum, quality conformance inspection shall consist of (a) through (c) as follows:

(a) Examination (see 4.3).

(b) Test methods (see 4.4).

(c) Preparation for delivery inspection (see 4.5).

4.2.1 Sampling for quality conformance inspection. When specified (see 6.2), sampling inspection appropriate for the quantity of units being procured shall be as specified by the procuring activity.

4.3 Examination. Filled containers shall be examined to determine compliance with this specification.

4.4 Test methods.

4.4.1 Solder. The soldering fluxes tested herein shall be effective with composition SN 50 tin-lead solder conforming to QQ-S-571.

4.4.2 Type I, form A.

4.4.2.1 Chemical analysis. A specimen of soldering flux shall be subjected to a chemical analysis to determine conformance with 3.4.1.1.

4.4.3 Type I, forms A and B.

4.4.3.1 Soldering test. Test pieces, 3 inches by 1/2 inch, shall be prepared from sheet steel, copper, tinned plate, and brass. A surface of each of the metals shall be cleaned to a bright finish with abrasive cloth and coated with a thin film of the flux. A pool of solder (see 4.4.1) shall then be melted on the fluxed surfaces by means of a well tinned and clean soldering iron heated well above the melting point of the solder. No disagreeable fumes shall be evolved. The fluxed area shall be covered with a bright, continuous, tightly adhering coat of solder without porosity. A clean, soft copper wire (0.0508 inch in diameter) shall be soldered to the center of each piece of metal. The wire shall be parallel to the long dimension of the test piece, and 1/2 inch of the wire shall be in contact with the test piece. Pieces so prepared shall be pulled to destruction in a tension-testing machine. Failure of the wire outside the soldered joint shall be indicative of an acceptable flux, while failure of the soldered joint shall be cause for rejection of the flux.

4.4.4 Type II, form B.

4.4.4.1 Soldering test. Using a sheet of heat-resistant steel or a high-chromium alloy, three 2-inch square pieces of sheet shall be prepared by cleaning the surface to a bright finish on which the test will be made. The cleaned surface shall be coated with a thin film of flux. A pool of solder approximately 0.4 gram in weight shall be melted on the surface by means of a soldering iron applied to the reverse side of the sheet. The pool shall spread over the fluxed area to form a bright, nonporous, firmly adhering coat of solder which shall be very thin at

the edges. A clean, soft copper wire (0.0508 inch in diameter) shall be soldered to the center of each piece of metal. The wire shall be parallel to the long dimension of the test piece, and 1/2 inch of the wire shall be in contact with the test piece. Pieces so prepared shall be pulled to destruction in a tension-testing machine. Failure of the wire outside the soldered joint shall be indicative of an acceptable flux, while failure of the soldered joint shall be cause for rejection of the flux.

4.5 Preparation for delivery inspection. The preservation, packaging, packing, and marking of the containers of flux shall be inspected to determine compliance with the requirements of section 5.

5. PREPARATION FOR DELIVERY

5.1 Military agencies.

5.1.1 Preservation, packaging, packing, and marking. Unless otherwise specified (see 6.2), preservation, packaging, packing, and marking shall be in accordance with MIL-W-45562. The level of preservation, packaging, and packing shall be as specified (see 6.2).

5.2 Civil agencies.

5.2.1 Unit packaging. Soldering flux, in the quantity specified (see 6.2), shall be packaged in a can conforming to PPP-C-96, type V, class 2.

5.2.1.1 Intermediate packaging. Cans of one pint capacity and smaller shall be intermediate packaged in accordance with the level B packaging requirements of PPP-C-96. Cans larger than one pint capacity do not require intermediate packaging.

5.2.2 Packing. Packing shall be in accordance with the level B requirements of PPP-C-96.

5.2.3 Marking. Marking shall be in accordance with Fed. Std. No. 123. Each can shall be permanently marked or labeled as to instructions for use and safety precautions to be exercised in its usage.

6. NOTES

6.1 Intended use. This specification is intended to cover several types of fluxes of various forms for use with tin-lead solders in joining all common metals, except aluminum, and for other special soft soldering applications.

6.1.1 Type I fluxes in either liquid or paste form are intended for general soft soldering applications of joining all common metals except aluminum.

6.1.2 Type II flux is intended for use in joining heat-resistant and high chromium alloys.

6.1.3 After soldering with either type I or type II flux, the joint area can be cleaned in accordance with the flux removal schedule specified in MIL-S-6872, when corrosion prevention is desired.

6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number, and date of this specification.

(b) Type and form required (see 1.2.1).

(c) Sampling, when specified (see 4.2.1).

(d) Preservation, packaging, packing, and marking if different (see 5.1.1).

(e) Selection of applicable level of packaging and packing (see 5.1.1).

(f) Quantity to the unit package (see 5.2.1).

MILITARY CUSTODIANS:

Army - WC
Navy - None
Air Force - 84

Review activities:

Army - None
Navy - None
Air Force - 84

User activities:

Army - ME, AT, EL
Navy - YD, AS, MC
Air Force - None

Preparing activity:

Army - WC

CIVIL AGENCY INTEREST:

GSA-FSS

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	☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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