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## MILITARY SPECIFICATION

### BRUSH, CLEANING, AIRCRAFT, METAL BRIGHTENING

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, Navy and the Air Force.

#### 1. SCOPE

1.1 Scope - This specification establishes the requirements of brushes used to apply metal cleaners and brightening agents to aircraft metal surfaces.

1.2 Classification - The brushes covered by this specification shall be of the following types and styles:

- Type I - Nylon
- Type II - Tampico
- Type III - 50% Nylon, 50% Tampico
- Type IV - 1/3 Bristle, 1/3 Horsehair, 1/3 Synthetic Filaments
- Type V - Polypropylene (See 6.2)
- Style 1 - Round Block 1 3/4" x 5 3/8" Dia.
- Style 2 - Rectangular Block 1 3/4" x 2 1/2" x 6"
- Style 3 - Rectangular Block 1 3/4" x 3 1/2" x 12"
- Style 4 - Rectangular Block 1 1/4" x 2 3/4" x 10"

#### 2. APPLICABLE DOCUMENTS

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

FSC 7920

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## SPECIFICATIONS

Federal

H-S-951	Synthetic Filaments, General Specification for Brushes
R-N-91	Naphthalene, Technical
QQ-S-781	Steel strapping, Flat
PPP-B-566	Boxes, Folding, Paperboard
PPP-B-601	Boxes, Wood, Cleated-Plywood
PPP-B-621	Boxes, Wood, Nailed and Lock Corner
PPP-B-636	Box, Fiberboard
PPP-B-640	Boxes, Corrugated, Triple Wall
PPP-B-676	Boxes, Set-up, Paperboard
PPP-T-60	Tape, Pressure-Sensitive Adhesive, Water-proof for Packaging and Sealing
PPP-T-97	Tape, Pressure-Sensitive Adhesive, Filament Reinforced

Military

MIL-C-5410	Cleaning Compound, Aluminum Surface, Non-Flame Sustaining
MIL-L-10547	Liners, Case, and Sheet, Overwrap, Water-Vaporproof or Water-proof, Flexible
MIL-C-38334	Corrosion Removing Compound, Prepaint, for Aircraft Aluminum Surfaces

## STANDARDS

Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
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MIL-STD-129

Marking for Shipment and Storage

MIL-STD-130

Identification Marking of U.S. Military Property

(Copies of 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.)

2.2 Other publications - The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated the issue in effect on the date of invitation for bids or request for proposal shall apply.

Official Classifications Committee

Uniform Freight Classification Rules  
(Application for copies of the above publications should be addressed to Official Classification Committee.  
1 Park Avenue at 33rd Street, New York, New York.)

American Trucking Association

National Motor Freight Classification Rules and Container Regulations  
(Application for copies of the above publication should be addressed to the American Trucking Association.  
1424 16th Street, N.W., Washington, D.C.)

3. REQUIREMENTS

3.1 Standard product - The brush delivered under this specification shall be the manufacturer's standard commercial product, except for any design modifications and additional requirements specified herein.

3.2 Preproduction sample - When specified (see 6.3), before production is commenced, a sample of the item covered by this specification shall be submitted or made available to the contracting officer or his authorized representative for approval as specified in 4.2. The approval of the preproduction sample authorizes the commencement of production, but does not relieve the contractor of responsibility for compliance with all applicable provisions of this specification. The preproduction sample shall be manufactured by the contractor in the same facilities to be used for the manufacture of the production items.

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3.3 Design and construction - Unless otherwise specified in the contract or order, the design and construction of the aircraft cleaning brush furnished in accordance with the requirements of this specification shall consist of a brush and handle. Brushes or handles ordered separately shall be interchangeable with each other, by type and style, and the original equipment respectively. (see 6.3)

3.4 Materials - Materials shall conform to the applicable specifications and requirements specified herein. Materials not specifically defined shall be of the quality normally used for this purpose in the manufacturer's standard commercial practice.

3.4.1 Block

3.4.1.1 Style 4 - The block shall be manufactured from close-grained hardwood lumber, free from defects which would impair its serviceability. The moisture content of the block shall not be less than 8 percent nor more than 12 percent when tested as specified in 4.5.2. Defects of the block as indicated in 4.5.1.3 shall not be permitted when the assembled brush is subjected to the immersion tests specified in 4.5.1.1 and 4.5.1.2. The block shall be of the shape and size indicated in 1.2.

3.4.1.2 Style 1, 2 and 3 - The blocks shall be thoroughly seasoned close-grained ash, beech, cherry, hickory, hard maple, white oak, or pecan, free from defects which would impair their serviceability. The blocks shall not crack or warp unduly upon drying when tested in hot water as specified in 4.5.1. The blocks shall be of the shape and size indicated in 1.2, and figures 1 and 2.

3.4.1.3 Brush holes - The brush side of the blocks shall contain the following size and number of brush holes:

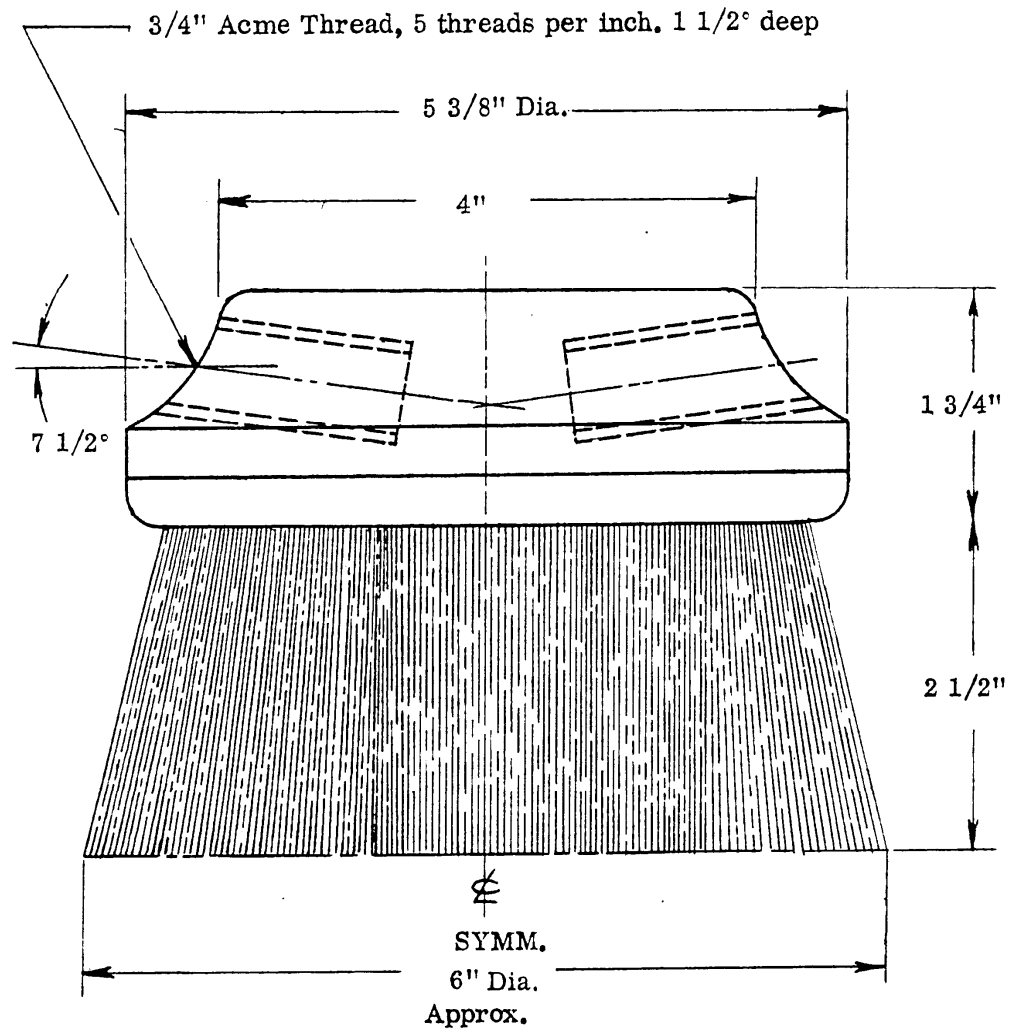
3.4.1.3.1 Style 4 - 96 holes, 9/32 inch in diameter, and not less than 1/2 inch deep evenly staggered in 5 rows.

3.4.1.3.2 Style 1 - 113 holes, 1/4 inch in diameter, and not less than 5/16 inch deep.

3.4.1.3.3 Style 2 - 98 holes, 1/4 inch in diameter, and not less than 5/16 inch deep.

3.4.1.3.4 Style 3 - 140 holes, 1/4 inch in diameter, and not less than 5/16 inch deep.

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DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCES:  
FRACTIONS PLUS OR MINUS  $\frac{1}{8}$ , ANGLES PLUS OR MINUS  $1/2^\circ$ .

FIGURE 1

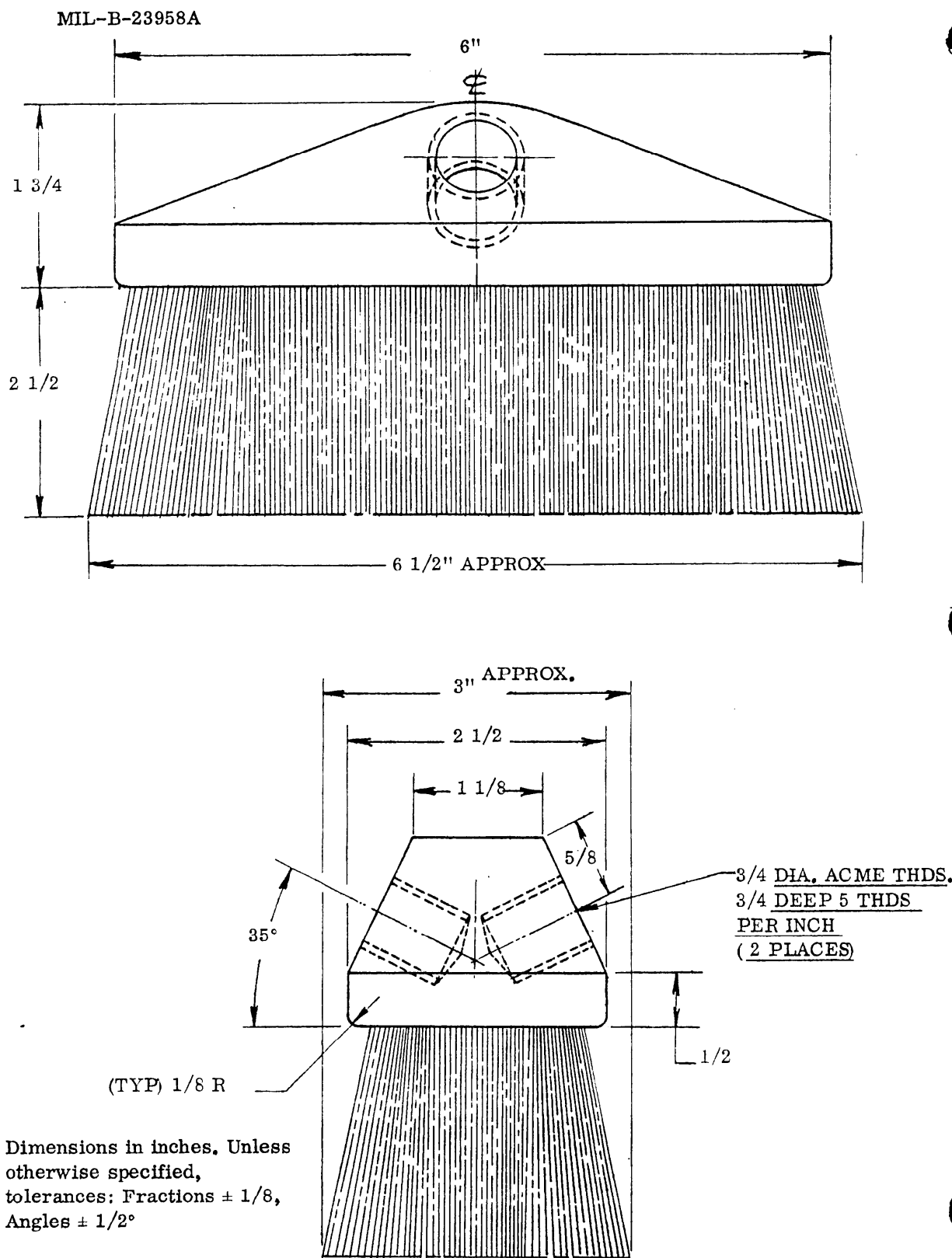


FIGURE 2

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3.4.1.4 Handle holes - The block shall contain the following size and number of handle holes:

3.4.1.4.1 Style 4 - Two tapered holes; one on an angle of 45° and one on an angle of 30°. Holes shall be located at the corner of the longitudinal center of the block and shall not penetrate through the block. Hole angles shall be measured from the vertical plane with an angle tolerance of  $\pm 2^\circ$ . The holes shall be of sufficient size to hold the handle securely in the block by friction (see 3.4.3).

3.4.1.4.2 Style 1, 2, 3 - The number and size of handle holes shall be as indicated in figures 1 and 2.

3.4.2 Brush Stock

3.4.2.1 Type V - Type V shall be "X" shaped (not round). Fibers shall be 0.015 inch thick.

3.4.2.1.1 Type IV - The brush stock shall be an appropriate mixture of 1/3 bristle, 1/3 horsehair, and 1/3 synthetic filaments. Bristles shall be light or dark brown sterilized hog bristles; horsehair shall be extra stiff, dark brown or gray and sterilized. Synthetic filaments may be any synthetic composition and shall meet the test requirements of Class N, Type II of Federal Specification H-S-951. Synthetic filaments shall be black, level, having a diameter of 0.009 to 0.015 inch. The total minimum weight of the preceding materials comprising the brush stock shall not be less than 7.2 ounces when tested as specified in 4.3 and 4.5.3. Brush stock shall be formed by evenly proportioned tufts of the preceding materials. Each tuft shall have a minimum of 4 wraps of a suitable thread or filament. The trim length of the brush stock shall be  $2 \frac{3}{4} \pm \frac{1}{4}$  inches. (Trim length is measured from the face of the block to the working end of the brush.)

3.4.2.1.2 Setting compound - The end of each tuft shall be securely set into each brush hole by means of an epoxy or any durable setting compound. The setting compound used shall be water, acid, and oil resistant. The brush stock and the security of the attachment shall be capable of withstanding the immersion tests specified in 4.5.1.

3.4.2.2 Type I, II, III and V - The brush stock for type I, II, III and V shall be as follows:

- a) Type I - Good grade white Nylon Fiber
- b) Type II - Good grade white Tampico Fiber
- c) Type III - 50-50 mixture of Type I and Type II
- d) Type V Polypropylene

Type V - Type V shall conform to class P Type II of Federal Specification H-S-951. The color shall be black or natural as specified (6.3)

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The brush stock shall solidly fill the holes and be evenly trimmed. The stock shall remain stiff and firmly secured after being immersed in hot water as specified in para 4.5.1.

3.4.3 Handle

3.4.3.1 Style 4 (For use with block Style 4) - Unless otherwise specified, the length of the handle shall be 51 inches (see 6.3). The diameter of the handle shall be 1 1/8 inches. One end shall be rounded and the other end shall be tapered to a 3/4 inch diameter within a length of 3 inches. Tolerances for the preceding dimensions shall be  $\pm 1/16$  inch. The handle shall be manufactured from straight grained hardwood lumber and shall have a moisture content not less than 8 percent nor more than 12 percent when tested as specified in 4.5.2. Examination for defects in material construction, appearance and workmanship of the handle shall be as specified in 4.4.2.

3.4.3.2 Style 1 (For use with block Styles 1, 2, 3) - Unless otherwise specified, each brush shall be furnished with a close-grain hardwood handle 15/16 inch in diameter. One end shall be threaded for 1 1/16 inches with an Acme thread 3/4 inch in diameter, 5 threads per inch, to fit the holes in the block. A tolerance of  $\pm 1/32$  inch in diameter and  $\pm 1$  inch in length will be allowed. The handles shall be 4 1/2, 5, or 6 feet in length, as specified. (see 6.3)

3.5 Finish - The blocks and handles shall be smoothly sanded and shall have a natural polish, smooth shellac or lacquer finish,

3.6 Identification marking - Each brush shall be permanently and legibly marked in accordance with MIL-STD-130 with the following information:

Manufacturer's Name or Trademark  
Stock Number  
U.S. Property  
Contract Number

3.7 Workmanship - The finished brush shall conform to the quality of product established by this specification, and the occurrence of defects shall not exceed the applicable acceptable quality levels.



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## 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, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specifications where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Preproduction sample inspection - The preproduction inspection shall consist of all the tests of this specification as described under 4.5 except brush stock weight 4.5.3, and all the examinations for defects of the end items as described under 4.4. The responsibility for the performance of the preproduction inspection shall be as specified in the contract or order (see 6.3).

4.3 Quality conformance inspection - For purposes of lot acceptance, quality conformance inspection shall consist of all the tests of this specification as described under 4.5, and all process and end item examinations of 4.3 and 4.4.

4.3.1 Sampling - Unless otherwise indicated, sampling for inspection and acceptance shall be in accordance with MIL-STD-105.

4.3.1.1 Lot - An inspection lot for examination and tests shall consist of all material submitted for acceptance and delivery at one time.

4.3.2 Inspection of materials and components - In accordance with 4.1, the supplier is responsible for insuring that materials and components used are manufactured, tested, and inspected in accordance with the requirements of this specification and referenced subsidiary specifications and standards to the extent specified or, if none, in accordance with this specification. In the event of conflict, this specification shall govern.

4.3.3 Process examination - Examination shall be made to determine compliance with those fabrication features and characteristics which cannot be observed or determined in the examination of the end product. This examination shall include inspection of the surface of the block for checks, splits, decay, or other defects affecting the serviceability of the block; number, depth, width, and

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uniformity of distribution of holes for brush stock; and where applicable the percentage of bristles, horsehair and synthetic filaments, the diameter of the synthetic filament used, weight of brush stock (4.3.3.1) and compound setting of tufts into brush block holes. Failure to meet the requirements of this examination shall be cause for rejection of affected end item lots.

4.3.3.1 Type IV intermediate testing - Prior to the application of the setting compound, the weight of the brush stock shall be determined in accordance with 4.5.3 for conformance to 3.4.2.1.1. The sample unit shall be the amount of bristle, horsehair, and synthetic filament to be used in one brush and the lot size shall be expressed in units of brushes. The requirements shall be applicable to the individual unit and the results shall be reported as pass or fail. The inspection level shall be S-2 and the acceptable quality level (AQL) shall be 6.5 defects per 100 units.

#### 4.4 Examination of end item

4.4.1 Examination of the end item shall be made in accordance with the classification of defects, inspection levels and acceptable quality levels (AQL's) set forth in the following paragraphs. Lot size, for determination of sample size in accordance with MIL-STD-105, shall be expressed in units of brushes for examinations in 4.4.2 and 4.4.3. For examinations in 4.4.4, lot size shall be expressed in units of shipping containers.

4.4.2 Examination of end items for defects in material, construction, appearance and workmanship - The sample unit for this examination shall be one brush and one handle as applicable. Not more than five brushes or handles shall be selected from any one shipping container. The inspection level shall be S-2 and the acceptable quality level (AQL) shall be 6.5 defects per 100 units. (See Table I)

4.4.3 Examination of end item for dimensional defects - The sample unit for this examination shall be one brush. The inspection level shall be S-2 and the acceptable quality level (AQL) shall be 6.5 defects per 100 units. (See Table II)

4.4.4 Examination of preparation for delivery - An examination shall be made to determine that packaging, packing, and marking comply with the requirements of section 5 of this specification. The sample unit shall be one fully packed shipping container selected just prior to the closing operation. Shipping containers fully prepared for delivery shall be examined for closure defects. The inspection level shall be S-4 and the acceptable quality level (AQL) shall be 4.0 defects per 100 units. (see Table III)

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TABLE I

EXAMINATION	DEFECTS
Material	<p>Block not close grained hardwood.</p> <p>Handle not straight grained hardwood.</p> <p>Slope of grain exceeds 1 inch in any 10 inch length of handle.</p> <p>Brush tufts not uniform; not made up of approximately equal quantities of horsehair, hog bristles, and synthetic filaments.</p> <p>(Type IV)</p>
Construction and Appearance	<p>Any split, check wane, rot or other defect in block or handle which would impair its serviceability. Any crook, bow or twist more than 3/8 inch at the greatest point parallel with the full length of the handle.</p> <p>Spiral or cross grain in the handle.</p> <p>Block not chamfered or rounded on all top edges.</p> <p>Top of handle not rounded.</p>
Workmanship	<p>Hole for handle penetrates through base of block.</p> <p>Handle does not fit securely into holes in block; hole of insufficient depth to firmly engage the handle. (Style 4). Thread on handle and in the block not properly engaged. (Style 1, 2 and 3). Tufts not uniform in density, distribution and location; tufts not trimmed evenly and uniformly.</p> <p>Tufts not securely set in block, can easily be removed by hand.</p> <p>Block and handle not smoothly finished.</p> <p>Block or handle not finished with a natural polish, smooth shellac or lacquer finish.</p>
Identification Marking	<p>Omitted, incomplete, illegible; not of a permanent nature (see 5.3).</p>

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TABLE II

EXAMINATION	DEFECTS
Block dimensions, Length, Width, height and holes	Dimensions not in accordance with Style requirements.
Brush Stock; Trim length (measured from face of the block)	Not in accordance with Style requirements.
Handle length, diameter, taper or thread	Not in accordance with Style requirements.

TABLE III

EXAMINATION	DEFECTS
Material	Any packaging or packing component or material not as specified. Any component missing or malformed.
Packaging	Brushes not packaged separately in intermediate container. Handles not uniformly and securely banded together.
Packing	Less than the specified quantity of brushes and handles per shipping container.
Workmanship	Not uniformly and compactly packed in a manner which will prevent shifting of contents in handling and shipping. Inadequate application of components, such as incomplete or insecure sealing of container flaps; loose or crooked strapping or tape banding; bulge or distortion of shipping container. Shipping container broken, bruised, crushed or otherwise damaged in a manner which may result in loss or damage to contents.
Marking (intermediate container and shipping container).	Omitted, incomplete, incorrect, illegible; of improper size, location, sequence or method of application.

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#### 4.5 Test Methods

4.5.1 Immersion test - The brushes, selected at random shall be subjected to the following tests.

4.5.1.1 Immersion in hot water - The sample brushes shall be immersed in water having a temperature of 180°F for a period of 90 minutes. After immersion period, the brushes shall be thoroughly air dried.

4.5.1.2 Immersion in cleaning and brightening solution - Following the hot water immersion the brushes shall be immersed in an undiluted solution of cleaning and brightening compound conforming to MIL-C-38344 or MIL-C-5410. Type II, undiluted, for a period of 24 hours, air dried for 24 hours, re-immersed for 24 hours, air dried for 72 hours, re-immersed for 24 hours, air dried for 72 hours, reimmersed for 24 hours and finally oven-dried at 120°F for 24 hours. No rinsing operation shall be performed.

4.5.1.3 Cause for rejection - At the conclusion of the above tests, the sample brushes shall be inspected for defects. There shall be no evidence of cracks or wrapping of the block in excess of 1/4 inch for 10 inches in any direction; no loosening of tufts, softening, embrittlement, or shedding of individual fibers. Sample brushes used for the immersion tests shall not be delivered to the Government as part of the lot to be furnished under procurement.

4.5.2 Moisture content - The brushes and handles shall be tested for moisture content for conformance to 3.4.1.1, 3.4.1.2 and 3.4.3.1 as applicable.

4.5.3 Brush stock weight (Type IV) - Brush stock sampled in accordance with 4.3.3.1 shall be conditioned for not less than 16 hours in air at a relative humidity of  $50 \pm 4$  percent and at a temperature of  $23.0^\circ \pm 1.1^\circ\text{C}$  ( $73.5 \pm 2^\circ\text{F}$ ) and weight under the same atmospheric conditions to the nearest 1/32 ounce for conformance to 3.4.2.1.1.

#### 5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging - Preservation and packaging shall be level A or C as specified (see 6.3)

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5.1.1 Level A - Each brush shall be individually packaged in a folding or set-up fiberboard box conforming to PPP-B-566 or PPP-B-676. Each brush shall be protected with a minimum of one ball of naphthalene or an equal amount of flakes conforming to R-N-91.

5.1.2 Level C - The brushes shall be preserved and packaged to afford the minimum degree of protection necessary to prevent deterioration or damage during shipment under normal environmental conditions and commercial modes of transportation.

5.2 Packing - Packing shall be level A, B, or C as specified (see 6.3).

5.2.1 Level A

5.2.1.1 Brushes and handles packed together - Brushes packaged in accordance with 5.1.1 shall be packed together with handles in snug-fitting overseas exterior type boxes conforming to PPP-B-636 or PPP-B-640. Boxes shall be provided with case liners conforming to MIL-L-10547, sealed in accordance with the Appendix thereto, or liners may be omitted provided that all joints and seams, including manufacturer's joint, are sealed with at least 2 inch wide tape conforming to PPP-T-60, Type II, Class 1. The gross weight limitations of PPP-B-636 boxes shall not exceed 110 pounds except for Navy procurement whereby the maximum gross weight shall be limited to 70 pounds. When weight in excess of these limitations is required, boxes conforming to PPP-B-640 shall be used. The quantity of brushes and handles packed together shall be as specified by the procuring activity (see 6.3). The boxes shall be closed and sealed in accordance with the appendix of the respective specification.

5.2.1.2 Brushes and handles packed separately - Brushes shall be packed in accordance with 5.2.1.1. Unless otherwise specified, strapping of the exterior box shall not be required. Handles shall be strapped in bundles with the ends of the handles protected against damage with fiberboard or other suitable overwraps securely fastened in place. Flat steel strapping conforming to QQ-S-871, or pressure-sensitive filament tape conforming to PPP-T-97, Type IV, shall be used for securing bundles. Strapping shall be applied in a manner which will not damage the handles. Filament tape shall be applied in accordance with the appendix to the tape specification. Gross weight limitations of boxes shall be as specified in 5.2.1.1.

5.2.2 Level B

5.2.2.1 Brushes and handles - The brushes and handles shall be packed as specified for level A, except that boxes shall be the domestic type or class as applicable. Case liners or waterproof sealing will not be required and boxes will not require strapping.

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5.2.3 Level C - Unless otherwise specified by the procuring activity brushes and handles shall be packaged in a manner to insure safe transportation at the lowest rate to the point of delivery, and shall meet as a minimum the requirements of the rules and regulations applicable to the mode of transportation selected.

5.3 Marking - In addition to any special marking required by the contract, interior packages and exterior shipping containers shall be marked in accordance with MIL-STD-129.

## 6. NOTES

6.1 Intended use - The brush covered by this specification is intended for use in cleaning and brightening aircraft metal surfaces.

6.2 Type V is intended for use as an alternate to Type II

6.3 Ordering Data - Procurement Documents should specify the following:

- a) Title, number, and date of this specification
- b) Type of brush required.
- c) Style of brush required.
- d) Color of bristle, when required (3.4.2.2)
- e) Style and length of handle (3.4.3)
- f) Preproduction sample when required (3.2)
- g) Number of brushes and handles required.
- h) Applicable levels of packaging and packing (5.1 and 5.2).

Custodians:

Army - GL  
Navy - AS  
Air Force - 84

Preparing activity:

Navy - AS  
(Proj. No. 7920-0140)

Review/user information is current as of the date of this document. For future coordination of changes to this document, draft circulation should be based on the information in the current DODISS.

SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 119-R004
<p align="center"><u>INSTRUCTIONS</u></p> <p>This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity (as indicated on reverse hereof).</p>		
SPECIFICATION		
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ORGANIZATION (Of submitter)		CITY AND STATE
CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT
		\$
MATERIAL PROCURED UNDER A		
<input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> SUBCONTRACT		
1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? A. GIVE PARAGRAPH NUMBER AND WORDING.		
B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.		
2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID		
3. IS THE SPECIFICATION RESTRICTIVE? <input type="checkbox"/> YES <input type="checkbox"/> NO IF "YES", IN WHAT WAY?		
4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)		
SUBMITTED BY (Printed or typed name and activity)		DATE

DD FORM 1426  
1 APR 63

REPLACES NAVSHIPS FORM 4863, WHICH IS OBSOLETE

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