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October 4, 1976  
SUPERSEDING  
Fed. Spec. FF-W 1825  
August 28, 1973 and  
Mil. Spec. MIL-A-4864A  
February 10, 1960

FEDERAL SPECIFICATION  
WOOL AND GAUZE, METALLIC

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. Metallic wools and gauzes covered by this specification are used as abrasives for cleaning and polishing.

1.2 Classification. Metallic wool and gauze shall be furnished in the following types, classes, and forms, as specified (see 6.2):

Type I - Steel wool, carbon.

Class 0000 - Fine.  
000 - Fine.  
00 - Fine.  
0 - Medium.  
1 - Medium.  
2 - Coarse.  
3 - Coarse.

Form A - Rolls.  
B - Pads.

Type II - Steel wool, ferritic corrosion-resisting.

Class 1 - Medium.  
2 - Coarse.  
3 - Coarse.

Form A - Rolls.  
B - Pads.

Type III - Copper and copper alloy wool.

Class 1 - Medium.  
2 - Coarse.  
4 - Fine.

Form A - Rolls.  
B - Pads.  
C - Bulk.

Type IV - Aluminum wool.

Class 1 - Medium.  
2 - Coarse.  
4 - Fine.

Form A - Rolls.  
B - Pads.  
C - Bulk.

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Type V - Steel gauze, ferritic corrosion-resisting.

Class 1 - Medium.

Form A - Rolls.

B - Pads.

Type VI - Copper gauze.

Class 1 - Medium.

Form A - Rolls.

## 2. APPLICABLE DOCUMENTS

2.1 The following documents, 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 Specification:

PPP-B-636 - Boxes, Shipping, Fiberboard.

### Federal Standards:

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

Fed. Test Method Std. No. 151 - Metals; Test Methods.

(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, U.S. 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 Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, 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 Standards:

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

MIL-STD-129 - Marking for Shipment and Storage.

(Copies of Military Specifications and Standards required by suppliers 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 a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

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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, N.W., Washington, DC 20036.)

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.)

## 3. REQUIREMENTS

3.1 Materials.

3.1.1 Type I. Type I wool shall be produced from plain carbon steel.

3.1.2 Types II and V. Type II wool and type V gauze shall be produced from ferritic corrosion-resisting steel such as AISI 430 or 434.

3.1.3 Types III and VI. Type III wool and type VI gauze shall be any of the 100 or 600 series.

3.1.4 Type IV. Type IV wool shall be of commercial 3003 or 5056 aluminum alloys.

3.2 Dimensions.3.2.1 Types I and II.

3.2.1.1 Rolls. The length of wool prior to forming into rolls shall be 14 to 16 inches (360 to 410 mm).

3.2.1.2 Pads. Steel wool pads shall be formed from ribbon which is a minimum of 3-3/4 inches (95 mm) wide.

3.2.1.3 Fiber thickness. Thickness of individual fiber in types I and II shall be in accordance with table I (see 4.4.1.1).

Class	TABLE I. Types I and II, thickness, individual fibers					
	Not more than 5 percent under		Not more than 5 percent over		No fiber to exceed	
	Inch	mm	Inch	mm	Inch	mm
0000	-----	-----	0.003	0.076	0.006	0.153
000	-----	-----	.004	.122	.008	.203
00	-----	-----	.005	.127	.010	.254
0	0.0003	0.0076	.007	.178	.012	.305
1	.0005	.0127	.010	.254	.015	.387
2	.001	.0254	.014	.356	.025	.635
3	.002	.0508	.018	.457	.040	1.02

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3.2.2 Type III, fiber thickness. Thickness of individual fibers shall be in accordance with table II (see 4.4.1.1).

TABLE II. Type III, thickness, individual fibers

Class	Thickness		Tolerance, plus or minus	
	Inch	mm	Inch	mm
1-Medium	0.005	0.127	0.001	0.025
2-Coarse	.007	.178	.001	.025
4-Fine	.003	.076	.001	.025

3.2.3 Type IV, fiber thickness. Thickness of individual type IV fibers shall be in accordance with table III (see 4.4.1.1).

TABLE III. Type IV, thickness, individual fibers

Class	Maximum		Minimum		Average to fall within	
	Inch	mm	Inch	mm	Inch	mm
1-Medium	0.010	0.254	0.005	0.127	0.009-0.006	0.229-0.152
2-Coarse	0.018	0.457	0.007	0.178	0.016-0.009	0.406-0.229
4-Fine	0.008	0.203	0.002	0.051	0.007-0.003	0.178-0.076

3.2.4 Types V and VI. Size of flattened cylindrical corrosion-resisting steel rolls and pads, and size of flattened cylindrical copper rolls shall be as specified (see 6.2). Thickness of fibers shall be at the manufacturer's options, subject to meeting the other requirements of this specification and being able to perform the stated intended usage in 6.1.4.

3.3 Fiber properties, types I through VI. Individual fibers shall have uniform cutting edges which are sharp and smooth. The length of fibers used in wool shall be such that the wool clings together in handling without unraveling.

#### 3.4 Performance.

##### 3.4.1 Type I.

3.4.1.1 Ductility. Individual fibers shall be capable of being bent completely around wire mandrels of the sizes in table IV (see 4.4.1.3).

TABLE IV. Mandrel sizes for type I wool fibers

Class	Diameter of mandrel	
	Inch	mm
0000, 000, 000	0.028	0.711
0, 1	0.036	0.914
2, 3	0.045	1.14

3.4.1.2 Corrosion resistance. Carbon steel wool shall not discolor the blotting paper when tested in accordance with 4.4.2.1.

3.4.1.3 Moisture and oil content. The total of moisture and oil in carbon steel wool shall be 1.5 percent or less by weight when tested in accordance with 4.4.4.

3.4.1.4 Elasticity. Carbon steel wool shall spring back to within 85 percent of the original measured height when tested in accordance with 4.4.5.

##### 3.4.2 Types II and V.

3.4.2.1 Ductility. Individual fibers shall be capable of being bent completely around wire mandrels of the sizes in table V (see 4.4.1.3).

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TABLE V. Mandrel sizes for types II and V fiber

Class	Diameter of mandrel	
	Inch	mm
1	0.036	0.914
2	0.045	1.14
3	0.045	1.14

3.4.2.2 Corrosion resistance. Ferritic corrosion-resisting steel shall not exhibit any evidence of corrosion attack when tested in accordance with 4.4.2.2.

3.4.2.3 Moisture and oil content. The total of moisture and oil in types II and V shall be 1.5 percent or less by weight when tested in accordance with 4.4.4.

3.4.2.4 Elasticity, type II. Corrosion-resisting wool shall spring back to within 85 percent of the original measured height when tested in accordance with 4.4.5.

#### 3.4.3 Types III and VI.

3.4.3.1 Ductility. Individual fibers shall be capable of being bent completely around wire mandrels of the sizes in table VI (see 4.4.1.3).

TABLE VI. Mandrel sizes for types III and VI fibers

Class	Diameter of mandrel	
	Inch	mm
1	0.036	0.914
2	0.045	1.14
4	0.028	0.711

3.4.3.3 Corrosion resistance. Copper wool and gauze shall not exhibit any evidence of corrosion attack when tested in accordance with 4.4.2.3.

3.4.3.4 Moisture and oil content. The total of moisture and oil in types III and VI shall be 1.5 percent or less by weight when tested in accordance with 4.4.4.

3.4.3.5 Elasticity, type III. Copper wool shall spring back to within 85 percent of the original measured height when tested in accordance with 4.4.5.

#### 3.4.4 Type IV.

3.4.4.1 Contour of strands. Contour of the strands shall be substantially uniform and free from raggedness, spirals, and whorls.

3.4.4.2 Brittleness. Aluminum wool shall not show a weight loss greater than 15 percent when tested in accordance with 4.4.3.

3.5 Workmanship. Metal wool and gauze shall be of uniform quality. They shall be clean and free from foreign material, chips, and defects which render the material unsuitable for use. Metal wool shall be free from short ends, and shall not mat or wad easily in use. Carbon steel wool shall be free from rust.

### 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

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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 Sampling.

4.2.1 Sampling for visual examination. Sampling for visual examination of the end product shall be in accordance with level S-4 of MIL-STD-105.

4.2.2 Sampling for tests. Sampling for tests shall be in accordance with level S-1 of MIL-STD-105.

#### 4.3 Examination and tests.

4.3.1 Examination for visual and dimensional defects. Examine wool and gauze in accordance with table VII. The Acceptable Quality Levels (AQL's) for defects in accordance with MIL-STD-105 shall be 2.5 percent defective for major defects and 6.5 percent defective for total defects.

TABLE VII. Classification of defects		
Defects	Major	Minor
Type, class, and form not as specified	X	
Rolls or pads formed from improper dimensioned stock	X	
Edges of fibers not sharp and smooth	X	
Foreign material in wool or gauze		X
Carbon steel wool stained with rust		X
Damage or defects affecting function	X	
Damage or defects not affecting function		X
Contour of type IV strands not as required in 3.4.4.1	X	

4.3.2 Examination of preparation for delivery. An examination shall be made to determine whether the packaging, packing, and marking comply with the requirements in section 5 of this specification. Defects shall be scored in accordance with table VIII. For examination of interior packaging the sample unit shall be one shipping container fully prepared for delivery, selected at random just prior to the closing operations. Sampling shall be in accordance with MIL-STD-105. Defects of closure listed shall be examined on shipping containers fully prepared for delivery. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 with an AQL of 4.0 defects per hundred units.

TABLE VIII. Classification of preparation for delivery defects	
Examine	Defects
Marking (exterior and interior)	Omitted; incorrect; illegible; improper size, location, sequence, or method of application.
Material	Any component missing or damaged.
Workmanship	Inadequate application of components such as incomplete closure of container flaps, loose strapping, inadequate stapling, or distortion of container.
Contents (exterior container)	Number per container is more or less than required. Net weight exceeds box specification requirements.

4.3.3 Test, AQL. The AQL for tests shall be 6.5 percent defective.

#### 4.4 Test methods.

##### 4.4.1 Types I, II, III, and IV, fibers.

4.4.1.1 Thickness. Measure 25 fibers for maximum lateral dimension under a 50X or greater magnification using a microscope with a reticle suitable for measuring the fiber width in thousandths of an inch (see 3.2.1.3, 3.2.2, and 3.2.3).

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4.4.1.2 Edge. Examine fiber edges under 30X or greater magnification (see 3.3 and 4.3.1).

4.4.1.3 Ductility. Wrap a single fiber tightly, once around a taut wire of the appropriate diameter (see 3.4.1.1, 3.4.2.1, and 3.4.3.1). In case of failure, repeat the process using two additional fibers. Failure of either of the additional fibers shall constitute failure of the test.

#### 4.4.2 Corrosion.

4.4.2.1 Type I carbon steel. Compress a tuft of steel wool into a ball or approximately 3/4 inch (19 mm) in diameter. Slightly flatten the ball. Dip a small sheet of white blotting paper in distilled water, remove, shake off excess water, and place it at the bottom of a glass container. Place the wool specimen on top of the blotting paper and cover the container. Maintain the temperature of the contents of the container at  $72^{\circ} \pm 5^{\circ} \text{ F}$  ( $22^{\circ} \pm 3^{\circ}$ ) for a period of 5 hours (see 3.4.1.2).

4.4.2.2 Types II and V, ferritic corrosion-resisting steel. Prepare a nitric acid solution by adding 5 ml concentrated nitric acid (sp. gr. 1.42) to 95 ml distilled water. Separate a small tuft of the wool or gauze and roll it into a compressed ball. Place two drops of the acid onto the ball and examine the ball for signs of corrosion (see 3.4.2.2).

4.4.2.3 Types III and VI, copper and copper alloy. Prepare a specimen of the material, approximately 1 inch square (6.4 square cm). Using a medicine dropper, place 2 drops of 6.5 percent phosphoric acid on the specimen. Examine for evidence of corrosive attack (see 3.4.3.3).

4.4.3 Brittleness, type IV. Select a sample of the material of approximately 10 grams. Weigh the sample accurately. Roll the sample into a ball approximately 2-1/2 inches in diameter, using the palms of the hands. The duration of the rolling action shall be between 40 and 50 seconds. At the end of this time, the ball shall be pulled into an oval shape and the small particles shall be shaken from the pad. The pad shall then be reweighed to determine the percentage of loss (see 3.4.4.2).

4.4.4 Moisture and oil content, types I, II, III, V, and VI. Prepare a 50 gram sample and place it in an oven at  $250^{\circ} \text{ F}$  ( $120^{\circ} \text{ C}$ ) for 1 hour (see 3.4.1.3, 3.4.2.3, and 3.4.3.4).

4.4.5 Elasticity, types I, II, and III. Measure the height of a tuft, 3/4 to 1 inch (19 to 25 mm) high. (Compress the wool to 50 percent of the original height, and then allow the wool to spring back toward its original shape (see 3.4.1.4, 3.4.2.4, and 3.4.3.5).

4.4.6 Contour, type IV. The contour of the strands shall be examined at a magnification of 10 to 35 times, using reflected light (see 3.4.4.1 and 4.3.1). The presence of any of these defects in more than 10 percent of the wool shall be cause for rejection of the lot.

4.5 Rejection and retest. Unless otherwise specified (see 6.2), rejection and retest shall be conducted in accordance with the general section of Fed. Test Method Std. No. 151.

#### 5. PREPARATION FOR DELIVERY

5.1 Packaging. Quantities of the wools and gauzes as specified in the contract or order shall be packaged in accordance with the manufacturer's commercial practice to insure protection against damage during shipment and safe delivery at destination, while complying with the common carrier rules as a minimum.



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

5.2.1 Level A. Wool or gauze of like description, packaged as specified in 5.1, shall be packed in quantities as specified in the contract or order in a close-fitting box conforming to PPP-B-636, class weather resistant. Closure, waterproofing sealing, and strapping of the boxes shall be in accordance with the appendix to PPP-B-636.

5.2.2 Level B. Wool or gauze of like description, packaged as specified in 5.1, shall be packed in quantities as specified in the contract or order in a close-fitting box conforming to PPP-B-636, class domestic. Closure of the boxes shall be in accordance with method II of the appendix to PPP-B-636.

5.2.3 Level C. Wool or gauze of like description, packaged as specified in 5.1, shall be packed in containers that comply with the National Motor Freight Classification rules or the Uniform Freight Classification rules.

5.3 Marking. Marking shall be in accordance with 5.3.1 or 5.3.2 as specified (see 6.2).

5.3.1 Civil agencies. Marking of interior packages and shipping containers shall be in accordance with Fed. Std. No. 123.

5.3.2 Military agencies. Marking of interior packages and shipping containers shall be in accordance with MIL-STD-129.

## 6. NOTES

### 6.1 Intended use.

6.1.1 Steel wool. Steel wool is used as an abrasive material. Corrosion-resisting steel wool is for filtering liquids as well as for cleaning or smoothing steels, nonferrous metals, or other corrosive media where use of carbon steel wool might result in rust staining due to particles left on the surface. Some typical uses of steel wool are as follows:

6.1.1.1 Class 0000. Finishing and polishing fine furniture; rubbing down final varnish, lacquer, and shellac finishes.

6.1.1.2 Class 000. Rubbing down final coat, dulling varnish, and antique finishing.

6.1.1.3 Class 00. Smoothing automobile bodies for spray painting.

6.1.1.4 Class 0. Polishing and cleaning metal, finishing and reviving old painted surfaces, and removing discoloration stains.

6.1.1.5 Class 1. Preparation of surfaces for first coats, polishing sheet metals and machinery parts, and smoothing woodwork.

6.1.1.6 Class 2. Floor maintenance, cleaning linoleum, cleaning machinery and tools, removing rust, preparing surfaces before painting or varnishing first coats.

6.1.2 Copper wool. Copper wool is intended for cleaning and removing corrosion products from copper and copper alloy surfaces. It is also for use in filtering gases and liquids.

6.1.3 Aluminum wool. Aluminum wool is intended for cleaning and removing corrosion products from aluminum and alloy surfaces. It is also used for filtering various liquids and gases.

6.1.4 Corrosion-resisting steel and copper gauze. Gauze is intended for cleaning machine parts such as threaded shafts and plastic extruders, and as an abrasive material. Corrosion-resisting steel gauze is also intended for cleaning food processing equipment.



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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) Type, class, and form (see 1.2).
- (c) Size of gauze required (see 3.2.4).
- (d) Rejection and retest not in accordance with 4.5.
- (e) Level of packing required (see 5.2).
- (f) Whether civil or military marking is required (see 5.3).

6.3 Copper wool. Detailed information on the 100 and 600 series of copper and copper alloys is contained in Standards Handbook, Copper, Brass, Bronze, Wrought Mill Products, Alloy Data 12 available from the Copper Development Association, Inc., 405 Lexington Avenue, New York, NY 10017.

6.4 Aluminum wool, cleaning anodized aluminum surfaces. When cleaning anodized aluminum surfaces with aluminum wool, wet the surface and soap it with a mild neutral soap. Clean the soaped surface with aluminum wool applied with a light rubbing pressure. Failure to observe these precautions can result in the scratching or cutting of the anodizing.

6.5 Metric equivalents. The metric equivalents listed herein are for information only, and are not intended to be used for determining acceptance or rejection of items otherwise conforming to the requirements of this specification.

Military Coordinating Activity:

Army - MR

User activities:

Army - ME  
Navy - SH  
Air Force - 84

PREPARING ACTIVITY: GSA - FSS

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Orders for this publication are to be placed with General Services Administration, acting as an agent or the Superintendent of Documents. See Section 2 of this specification to obtain extra copies and other documents referenced herein. Price 35 cents each.