

WW-P-471C
December 29, 1981
SUPERSEDING
WW-P-471B
21 May 1970
MS49005, MS51884,
MS51885, MS51886,
and MS51887
28 September 1973

FEDERAL SPECIFICATION

PIPE-FITTINGS: BUSHINGS, LOCKNUTS, AND PLUGS;
IRON, STEEL, AND ALUMINUM; (THREADED); 125-150 POUNDS

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 the requirements for bushings, locknuts, and plugs made of aluminum, iron, or steel.

1.2 Classification.

1.2.1 Types, classes, styles, materials, finishes, and sizes. Plugs, bushings, and locknuts shall be of the following types, classes, styles, materials, finishes, and sizes as specified (see 1.2.2):

Type A - Plug.

Class A - Square head.

Style C - Cored (size 1/2 - 3-1/2).

Style S - Solid (size 1/8 - 3-1/2).

Class B - Bar or slotted head (size 4 - 8).

Class C - Countersunk or headless.

Style A - Hexagon socket (size 1/8 - 1).

Style B - Square socket (size 1/2 - 4).

Type B - Bushing.

Class D - Outside head.

Class E - Inside head.

Class F - Face bushing.

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Type C - Locknut (material B only).

Material A - Aluminum.

Finish A - Anodized.

Finish N - Nonanodized.

Material B - Iron or steel.

Finish C - Zinc plated.

Finish U - Uncoated.

Size A -	1/8 inch.	G - 1-1/4 inch.	M - 3-1/2 inch.
Size B -	1/4 inch.	H - 1-1/2 inch.	N - 4 inch.
Size C -	3/8 inch.	J - 2 inch.	P - 5 inch.
Size D -	1/2 inch.	K - 2-1/2 inch.	R - 6 inch.
Size E -	3/4 inch.	L - 3 inch.	T - 8 inch.
Size F -	1 inch.		

1.2.2 Definitive part number (DPN). Plugs, bushings, and locknuts covered by this specification shall be identified by a DPN. This part number is intended for cataloging and ordering purpose only. The DPN shall consist of the Federal Specification symbol plus the specification part number (see 1.2.1). The DPN shall be written as follows (see 6.2):

DPN	WW-P-471	X	XX	X
Type				
Class				
Style				
Material				
Finish				
Size				

NOTE: Use Q where class and style is not applicable.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation, form a part of this specification to the extent specified herein.

Federal Standards:

FED STD H28 - Screw-Thread Standards for Federal Services.
 Fed. Std. No. 123 - Marking for Shipment (Civil Agencies).

(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions 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 bi-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 and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston; New York; Philadelphia; Washington, DC; Atlanta; Chicago; Kansas City, MO; Fort Worth; Houston; Denver; San Francisco; Los Angeles; and Seattle, WA.

(Federal activities may obtain copies of Federal specifications, standards, and commercial item descriptions, and the Index of Federal Specifications, Standards, and Commercial Item Descriptions from established distribution points in their agencies.)

Military Specification:

MIL-V-3 - Valves, Fittings, and Flanges (Except for Systems Indicated Herein); Packaging of.

Military Standards:

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

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

(Copies of specifications, standards, handbooks, drawings, and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. The following document(s) form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

American National Standards Institute (ANSI):

B2.1 - Pipe Threads (Except Dryseal).

B16.14 - Ferrous pipe Plugs, Bushings, and Locknuts with Pipe Threads.

(Application for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018.)

American Society for Testing and Materials (ASTM) Standards:

A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.

A216 - Carbon Steel Castings Suitable for Fusion Welding for High Temperature Service.

B211 - Aluminum-Alloy Bars, Rod and Wires.

B580 - Anodic Oxide Coatings on Aluminum.

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

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3. REQUIREMENTS

3.1 Materials. Materials shall be as specified herein and in referenced documents. Materials not specified shall be selected by the contractor and shall be subject to all provisions of the specification.

3.1.1 Iron and steel. Iron shall conform to ANSI B16.14. Steel shall conform to ASTM A216.

3.1.2 Aluminum. Aluminum shall conform to ASTM B211, alloy 1100, 2011, or 2024.

3.2 Standard commercial product. The fittings shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this specification but which are a part of the manufacturer's standard commercial product, shall be included in the unit being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs, or brochures, and represents the latest production model.

3.3 Design. Fittings shall be furnished in the types, classes, styles, materials, finishes, and sizes specified and shall be in accordance with ANSI B16.14.

3.4 Dimensions. Dimensions for all plugs, bushings, and locknuts shall be in accordance with ANSI B16.14.

3.5 Finish.

3.5.1 Zinc-coated. When specified (see 6.2), iron and steel fittings shall be zinc-coated in accordance with ASTM A153. The zinc-coating shall be applied prior to all threading.

3.5.2 Anodized. When specified (see 6.2), aluminum fittings shall be anodized in accordance with ASTM B580.

3.6 Threads. Unless otherwise specified (see 6.2), all threads shall be right-hand and shall be smooth, clean, and true to form. Threads shall be in accordance with FED STD H28 or ANSI B2.1.

3.6.1 Bushings. When specified (see 6.2), class D bushings shall have the external threads oversize in accordance with ANSI B16.14.

3.6.2 Locknuts. All locknuts shall have internal threads with American National Standard straight pipe threads for locknut connections (NPSL) in accordance with FED STD H28 or ANSI B2.1.

3.7 Identification marking. The name, initial, the manufacturer, or other mark by which he can be readily identified, shall be legibly cast or die-stamped on each fitting, unless the size or shape does not permit such marking to be applied.

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3.8 Workmanship. Fittings shall be thoroughly cleaned, made free of sand and scale, be sound, smoothly cored, true to form, and free of cold shuts, blowholes, porosity, or any other defect that may affect serviceability.

3.9 Pressure test. Plugs and bushings shall pass the pressure test specified in 4.5.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, 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 supplies and services conform to prescribed requirements.

4.1.1 Inspection of materials and components. The contractor is responsible for insuring that materials and components are inspected for compliance with referenced documents.

4.2 Quality conformance inspection. The quality conformance inspection shall consist of the examination of 4.3, the tests of 4.4, and the inspection of preparation for delivery of 4.5. Sampling shall be in conformance with MIL-STD-105.

4.3 Examination: Fittings selected from the sample shall be examined for defects in table I. The inspection level shall be I and the Acceptable Quality Level (AQL) shall be 1.5 percent defective.

TABLE I. Classification of defects.

Defect	Reference paragraph(s)
Material not as specified	3.1, 3.1.1, 3.1.2
Fittings not standard commercial product.	3.2
Fittings not latest product model.	3.2
Design not as specified.	3.3
Dimensions not as required.	3.4
Finish as specified.	3.5, 2.5.2, 3.5.3
Threads not as specified.	3.6, 3.6.1, 3.6.2
Identification markings omitted, illegible, incorrect, or incomplete.	3.7
Workmanship not as required.	3.8

4.4 Tests. Fittings selected from the sample shall be tested as required herein. The inspection level shall be S-3 and the AQL shall be 4.0 percent defective.

4.4.1 Air pressure test. Each of the sample fittings selected in accordance with 4.4.1 shall be subjected to an air pressure test of not less than 60 pounds per square inch (psi), while the samples are under water or another suitable medium. Fittings shall not leak air at any part of the surface.

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4.4.2 Hydrostatic-pressure test. When specified (see 6.2), sample fittings selected in accordance with 4.4.1 shall be subjected to the following hydrostatic test pressure for 1 minute:

- (a) For 125 pound (lb) fittings - 250 psi (ANSI B16.14 material).
- (b) For 150 lb fittings - 300 psi (ASTM A216 material).

The fittings shall not leak or sweat at any part of the surface.

4.5 Inspection of preparation for delivery. The preservation, packing, and marking of the fittings shall be examined in accordance with section 4 of MIL-V-3.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packing. Preservation and packing shall be in accordance with MIL-V-3 with the level of preservation and level of packing as specified (see 6.2).

5.2 Marking.

5.2.1 Civil agencies. Marking shall be in accordance with Fed. Std. No. 123.

5.2.2 Military agencies. Marking shall be in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. Bushings, locknuts, and plugs are intended for use with threaded piping at working pressures between 125 and 150 lb.

6.2 Ordering data. Acquisition documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Definitive part number (see 1.2.2).
- (c) Finish (see 3.5.1 and 3.5.2).
- (d) When left-hand threads are required (see 3.6).
- (e) The dimensions of the oversize thread on outside head bushings (type B, class D) (see 3.6.1).
- (f) When hydrostatic testing shall be performed (see 4.4.2).
- (g) Level of preservation and packaging and level of packing required (see 5.1).

6.3 Contract data requirements. When this specification is used in an acquisition which incorporates a DD Form 1423 and invokes the provisions of paragraph 7-104.9(n) of the Defense Acquisition Regulations (DAR), the data requirements will be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the Contract Data Requirements List (DD Form 1423) incorporated into the contract. When the provisions of DAR 7-104.9(n) are not invoked, the data shall be delivered in accordance with the contract requirements.

6.4 Cross reference of classification. A cross reference of old to new classifications is not used in this revision because of the general nature of the types in the previous issue.

6.5 Supersession data. Table II lists the fittings in this specification by type and class, the MS standards superseded by this specification, and the current industry documents as applicable.

TABLE II. Supersession data.

Type and class	MS	Industry reference
Type A, class A	MS51884	ANSI B16.14, table 1
Type A, class B	MS51885	ANSI B16.14, table 2
Type A, class C	MS49005	ANSI B16.14, table 3
Type B,	MS51887	ANSI B16.14, table 4
Type C	MS51886	ANSI B16.14, table 5

6.6 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

MILITARY CUSTODIANS:

Army - ME
Navy - YD
Air Force - 99

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA - FSS
VA
AGR - AFS

Review activities:

Army - EA
Navy - MC
DLA - CS

Preparing activity:

Navy - YD
Project No. 4730-0495

User activity:

Army - AR

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

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 AMENDMENT 1
 6 March 1987

FEDERAL SPECIFICATION

PIPE-FITTINGS: BUSHINGS, LOCKNUTS, AND PLUGS;
 IRON, STEEL, AND ALUMINUM: (THREADED); 125-150 POUNDS

This amendment forms a part of Federal Specification WW-P-471C, dated December 29, 1981, is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal Agencies.

Page 2

Paragraph 1.2.1 - Under Material B

DELETE: Finish C - Zinc plated

ADD: Finish C - Electrodeposited Zinc
 Finish D - Electrodeposited Cadmium

Paragraph 1.2.2

DELETE: In its entirety.

ADD: 1.2.2 Definitive part number (DPN). Plugs, bushings, and locknuts covered by this specification shall be identified by a DPS. This part number is intended for cataloging and ordering purpose only. The DPN shall consist of the Federal Specification symbol plus the specification part number (see 1.2.1). The DPS shall be written as follows (see 6.2):

DPN	WW P 471	X	XX	XX	XX
Type					
Class					
Style					
Material					
Finish					
Size					

NOTE: Use Q where class and style is not applicable.

AMSC N/A

FSC 4730

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

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Amendment 1

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Paragraph 2.3

- DELETE: ASTM A153 - Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 ASTM A216 - Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service
- ADD: ASTM B633 - Specification for Electrodeposited Coatings of Zinc on Iron and Steel
 ASTM B766 - Specification for Electrodeposited Coatings of Cadmium

Page 4

Paragraph 3.1.1

- DELETE: In its entirety.
- ADD: 3.1.1 Iron and steel. Iron and steel shall conform to ANSI B16.14.

Paragraph 3.5.1

- DELETE : In its entirety.
- ADD: 3.5.1 Ferrous pipe fittings. When specified (see 6.2), iron or steel fittings shall be either zinc coated in accordance with ASTM B633 or cadmium coated in accordance with ASTM B766. Coating shall be applied prior to all threading.

Paragraph 3.5.2

- DELETE: In its entirety.
- ADD: 3.5.2 Aluminum pipe fittings. When specified (see 6.2), aluminum fittings shall be anodized in accordance with ASTM B580.

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Paragraph 4.4.2

- DELETE: (ANSI B16.14 material)
 (ASTM A216 material)

Preparing Activity:
Navy - YD

(Project 4730-0947)