

INCH-POUND

MIL-DTL-1183K

20 December 2016

SUPERSEDING

MIL-F-1183J

5 May 1987

DETAIL SPECIFICATION

FITTINGS, PIPE, CAST BRONZE, SILVER-BRAZING, GENERAL SPECIFICATION FOR

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers pipe fittings of cast bronze with at least one end for silver-brazing into steam, air, oil, or water piping systems.

1.2 Classification. Fittings are of the following types (see 3.3) and are designated by the applicable specification sheet part number (see 6.2, 6.3, and applicable specification sheet):

- a. Type A – Interior streamlined (with and without groove for brazing ring)
- b. Type B – Interior not streamlined (with and without groove for brazing ring)

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

FEDERAL SPECIFICATIONS

QQ-B-654 - Brazing Alloys, Silver

FEDERAL STANDARDS

FED-STD-H28 - Screw-Thread Standards for Federal Services

FED-STD-H28/7 - Screw-Thread Standards for Federal Services, Section 7 Pipe Threads, General Purpose

Comments, suggestions, or questions on this document should be addressed to Commander, Naval Sea Systems Command, ATTN: SEA 05S, 1333 Isaac Hull Avenue, SE, Stop 5160, Washington Navy Yard DC 20376-5160 or emailed to CommandStandards@navy.mil, with the subject line "Document Comment". Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil>.

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DEPARTMENT OF DEFENSE SPECIFICATIONS

(See supplement 1 for list of specification sheets.)

(Copies of these documents are available online at <http://quicksearch.dla.mil>.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Y14.36M - Surface Texture Symbols

(Copies of this document are available online at <http://webstore.ansi.org/>.)

ASTM INTERNATIONAL

ASTM B61 - Standard Specification for Steam or Valve Bronze Castings

ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications

(Copies of these documents are available online at www.astm.org.)

AMERICAN SOCIETY FOR QUALITY (ASQ)

ASQ Z1.4 - Sampling Procedures and Tables for Inspection by Attributes

(Copies of this document are available online at www.asq.org.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In the event of any conflict between the requirements of this specification and the specification sheet, the latter shall govern.

3.2 Material. Fittings shall be made of material conforming to ASTM B584 (UNS no. C90300 or C92200) or to ASTM B61 (UNS no. C92200) bronze at the manufacturer's option. The Safe Drinking Water Act (SDWA) has stringent lead limitations on surfaces in contact with drinking water, which alloys C90300 or C92200 may not meet. Actual alloys used for fittings and piping used for drinking (potable) water system shall meet the definition of "lead free" in accordance with the requirements of the SDWA. Brass fittings for potable water use may be substituted for non-potable water brass fittings. Non-potable brass fittings shall not be substituted for potable water fittings.

3.2.1 Recycled, recovered, environmentally preferable, or biobased materials. Recycled, recovered, environmentally preferable, or biobased materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.3 Configuration and dimensions. Fitting configuration and dimensions shall be in accordance with figures [1](#) or [2](#) and [table I](#) of this specification and applicable figures and tables of the specified specification sheet (see 6.2). Small ribs or lugs on the body portion of the fitting for use in holding and locating the fitting during the manufacturing process are permitted. Sharp corners shall be rounded or broken.

TABLE I. Socket and wall thickness dimensions, inches.

Nominal pipe size	Outside diameter of pipe	B	D	R	E	M		F		G	P	W
		Shoulder thickness, Type B	Depth of socket	Width of band, Type A	Width of band, Type B	Inside diameter of fittings, Type A		Inside diameter of fittings, Type B		Metal thickness, Type A	Radius	Metal thickness, Type B
	Max	Min ^{1/}	Min ^{1/}	Min ^{1/}	Min ^{1/}		Plus or minus	Min ^{1/}	Max	Min ^{1/}	Min ^{1/}	Min ^{1/}
¼	0.540	½ ₃₂	17 ₆₄	9 ₃₂	0.14	0.398	0.015	0.54	0.58	0.07	5 ₆₄	0.07
⅜	0.675	½ ₃₂	5 ₁₆	21 ₆₄	0.15	0.532	0.015	0.68	0.72	0.08	3 ₃₂	0.08
½	0.840	½ ₃₂	3 ₈	25 ₆₄	0.17	0.697	0.020	0.84	0.90	0.08	3 ₃₂	0.08
¾	1.050	3 ₆₄	3 ₃₂	27 ₆₄	0.21	0.907	0.025	1.05	1.11	0.09	7 ₆₄	0.09
1	1.315	3 ₆₄	7 ₁₆	15 ₃₂	0.24	1.171	0.025	1.32	1.39	0.10	7 ₆₄	0.10
1¼	1.660	3 ₆₄	½	17 ₃₂	0.28	1.502	0.030	1.66	1.73	0.11	1 ₈	0.11
1½	1.900	3 ₆₄	5 ₈	21 ₃₂	0.31	1.742	0.030	1.90	1.97	0.12	1 ₈	0.12
2	2.375	3 ₆₄	21 ₃₂	11 ₁₆	0.38	2.186	0.030	2.38	2.45	0.14	5 ₃₂	0.14
2½	2.875	1 ₁₆	25 ₃₂	13 ₁₆	0.44	2.686	0.030	2.88	2.98	0.15	5 ₃₂	0.15
3	3.500	1 ₁₆	53 ₆₄	55 ₆₄	0.51	3.286	0.035	3.50	3.60	0.17	3 ₁₆	0.17
3½	4.000	1 ₁₆	7 ₈	29 ₃₂	0.56	3.786	0.035	4.00	4.10	0.18	3 ₁₆	0.18
4	4.500	3 ₃₂	29 ₃₂	15 ₁₆	0.62	4.252	0.040	4.50	4.60	0.20	7 ₃₂	0.20
5	5.563	3 ₃₂	1	1½ ₃₂	0.72	5.278	0.040	5.56	5.66	0.28	5 ₁₆	0.28
6	6.625	3 ₃₂	17 ₆₄	19 ₆₄	0.85	6.321	0.040	6.63	6.73	0.32	11 ₃₂	0.32
8	8.625	3 ₃₂	15 ₁₆	123 ₆₄	1.08	8.286	0.040	8.63	8.73	0.38	13 ₃₂	0.38
10	10.750	----	1½	19 ₁₆	----	10.325	0.040	----	----	0.455	½	0.455
12	12.750	----	15 ₈	111 ₁₆	----	12.322	0.040	----	----	0.540	9 ₁₆	0.54

See footnote at end of table.

TABLE I. Socket and wall thickness dimensions, inches – Continued.

Nominal pipe size	Outside diameter of pipe	S	H	J		K		L		N	T	
		Band diameter, Type A	Band diameter, Type B	Diameter of socket		Diameter of shoulder, Type B		Diameter of groove		Face of fitting to groove	Width of groove	
		Min ^{1/}	Min ^{1/}	Min ^{1/}	Max	Min ^{1/}	Max	Min ^{1/}	Max		Min ^{1/}	Max
¼	0.540	0.700	0.81	0.540	0.543	0.413	0.443	0.619	0.639	0.099	0.068	0.078
⅜	0.675	0.855	1.00	0.675	0.678	0.548	0.578	0.764	0.784	0.115	0.083	0.093
½	0.840	1.020	1.17	0.840	0.843	0.714	0.744	0.929	0.949	0.146	0.083	0.093
¾	1.050	1.250	1.42	1.050	1.053	0.923	0.953	1.159	1.179	0.154	0.099	0.109
1	1.315	1.535	1.72	1.315	1.318	1.191	1.221	1.424	1.444	0.154	0.130	0.140
1¼	1.660	1.900	2.10	1.660	1.663	1.534	1.564	1.769	1.789	0.188	0.130	0.140
1½	1.900	2.160	2.38	1.900	1.905	1.778	1.808	2.011	2.031	0.217	0.192	0.202
2	2.375	2.675	2.92	2.375	2.380	2.247	2.277	2.486	2.506	0.232	0.192	0.202
2½	2.875	3.215	3.49	2.875	2.882	2.745	2.775	2.988	3.008	0.295	0.192	0.202
3	3.500	3.880	4.20	3.500	3.507	3.341	3.371	3.613	3.633	0.287	0.255	0.265
3½	4.000	4.400	4.75	4.000	4.007	3.821	3.851	4.113	4.133	0.310	0.255	0.265
4	4.500	4.940	5.31	4.500	4.507	4.298	4.328	4.673	4.693	0.326	0.255	0.265
5	5.563	6.163	6.29	5.563	5.570	5.325	5.355	5.736	5.756	0.373	0.255	0.265
6	6.625	7.305	7.42	6.625	6.632	6.387	6.417	6.798	6.818	0.437	0.255	0.265
8	8.625	9.425	9.56	8.625	8.632	8.387	8.417	8.798	8.818	0.458	0.398	0.408
10	10.750	11.70	----	10.750	10.757	----	----	10.923	10.943	0.551	0.398	0.408
12	12.750	13.84	----	12.750	12.757	----	----	12.963	12.983	0.613	0.398	0.408

NOTE:
^{1/} Minimum dimensions, as specified, are acceptable only when they are sufficient to permit the material to meet the requirements specified herein.

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3.4 **Wall thickness.** The wall thickness shall be as required by figures 1 or 2 and table I for the applicable nominal pipe size (see 6.2). On reducing fittings, the minimum wall thickness of each connection end shall be that wall thickness specified for each nominal pipe size as given in table I. The wall thickness of the body (waterway) on reducing fittings in the area where the body meets the connection end shall be not less than the minimum required for the pipe size of the respective ends. The body wall thickness between the different pipe size ends shall make a gradual transition from larger wall thickness to the smaller wall thickness and shall be not less than the minimum wall thickness required of the smaller pipe size.

3.5 **End connections.** The band at the socket ends of the fittings, except female reducers, union tailpieces, and union threadpieces, shall be rectangular in cross-section with or without rounded corners. Unions, union fitting tailpieces, and union threadpieces shall have rounded ends knurled, ribbed, lugged for wrenching, or have octagonal ends. End connections shall be grooved in accordance with 3.5.1, face fed in accordance with 3.5.1.2, or threaded in accordance with 3.5.2, as specified (see 6.2).

3.5.1 **Socket ends.** Silver-brazed socket ends shall be either grooved for a brazing ring or internally smooth for face fed brazing, as specified (see 6.2).

3.5.1.1 **Grooved ends.** Fitting ends requiring a groove for brazing ring shall be as shown on figures 1 and 2 with dimensions in table I, and when specified (see 6.2), shall be provided with QQ-B-654, BCuP-5 silver-brazing rings. The brazing ring dimensions shall be as shown on figure 3 and in table II.

TABLE II. Dimensions of silver-brazing ring, inches.

Nominal pipe size	Q (±0.003)	K (±0.003)	H	F	
				Min	Max
¼	0.035	0.063	0.639	0.073	0.130
⅜	0.040	0.078	0.784	0.073	0.130
½	0.040	0.078	0.949	0.073	0.130
¾	0.050	0.094	1.179	0.073	0.130
1	0.050	0.125	1.444	0.073	0.135
1¼	0.050	0.125	1.789	0.073	0.135
1½	0.050	0.188	2.031	0.073	0.135
2	0.050	0.188	2.506	0.073	0.135
2½	0.050	0.188	3.008	0.073	0.135
3	0.050	0.250	3.633	0.073	0.167
3½	0.050	0.250	4.133	0.073	0.167
4	0.080	0.250	4.693	0.073	0.229
5	0.080	0.250	5.756	0.073	0.229
6	0.080	0.250	6.818	0.073	0.261
8	0.080	0.391	8.818	0.073	0.261
10	0.080	0.391	10.943	0.073	0.261
12	0.096	0.391	12.983	0.073	0.261

3.5.1.2 **Face fed ends.** Face fed ends shall be as shown on figures 1 and 2 with dimensions in table I and shall have a 45-degree by 1/32-inch (approximately) chamfer at the face of the fitting (see figures 1 and 2). The chamfer shall be included in the depth of socket dimension.

3.5.2 **Threaded ends.** Fittings with one or more threaded ends shall be Type B (nonstreamlined). The threads shall be in accordance with FED-STD-H28 and FED-STD-H28/7, American National Taper pipe threads (NPT) for the nominal pipe size specified (see 6.2).

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3.6 Working pressure and temperature. The maximum allowable working pressures and temperatures for fittings shall be as specified in [table III](#).

TABLE III. Maximum working pressure and temperature.

Nominal pipe size (inches)	Steam service		Air, oil, water service	
	Max working pressure (lb/in ²)	Max temperature (°F)	Max working pressure (lb/in ²)	Max temperature (°F)
¼ through 6	200	425	400	150
Above 6	150	425	250	150

3.7 Surface finish. Machined surfaces shall have a surface roughness average finish of 125 R_a or better. The surface finish of union seats and retainer rings shall be 63 R_a or better. O-ring contacting surfaces of unions, union tees, and union elbows shall have a surface finish of 32 R_a. The finish symbols used in this specification are in accordance with ANSI Y14.36M.

3.8 Dimensional tolerances. Dimensional tolerances shall be as shown in tables [IV](#) and [V](#). Tolerances are not imposed on dimensions given as minimum or maximum.

TABLE IV. Tolerance on center-to-end or center-to-center dimension, inches.

Nominal pipe size of fitting	Tolerance ±	Nominal pipe size of fitting	Tolerance ±
¼	0.04	2½	0.10
⅜	0.05	3	0.10
½	0.06	3½	0.10
¾	0.06	4	0.12
1	0.07	5	0.12
1¼	0.07	6	0.12
1½	0.08	8	0.15
2	0.08	10 and over	0.18

TABLE V. Dimensional tolerances (other than center-to-end and center-to-center).

Dimension ^{1/}	Machined			Casting	
	Decimals		Fractions	Dimensions	Tolerance
	2 Place	3 Place			
6 and under	±0.01	±0.005	±¼ ₆₄	2 and under	+¼ ₁₆ , -¼ ₁₆
Over 6 through 24	±0.02	±0.010	±¼ ₃₂	Over 2 through 5	+¾ ₃₂ , -¼ ₁₆
Over 24	±0.03	±0.015	±¼ ₁₆	Over 5 through 8	+¼ ₈ , -¾ ₃₂
Angular - ±0 degrees 30 minutes				Over 8 through 12	+¾ ₁₆ , -¼ ₈
				Over 12 through 15	+7 ₃₂ , -5 ₃₂
				Over 15	+¼ ₄ , -¾ ₁₆
NOTE:					
^{1/} All dimensions in inches except angular.					

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3.9 Identification. Rough castings of fittings shall be identified with the name or trademark of the manufacturer (NOTE: On unions and union sub-assemblies, usually only the nut has the manufacturer's identification). Type A (streamlined) castings shall also be marked with the letter "A" or "S" and the maximum pressure for air, oil, and water. The marking shall be cast or stamped (low stress stamps) in raised or depressed letters upon the outside of the body of all rough castings. Depressed markings shall be applied so as not to reduce the fitting wall thickness below the minimum requirement.

3.10 Workmanship. Fittings shall be sound, smoothly cored, true to form, uniform in texture, and free from cold shuts. The fittings shall be thoroughly cleaned inside and outside. Fins and rough areas that are not well rounded shall be blended. Machining chips and burrs shall be removed.

4. VERIFICATION

4.1 Sampling for conformance. Sampling for conformance shall be in accordance with 4.1.2 through 4.1.3.

4.1.1 Lot. An inspection lot shall consist of all fittings of the same name, type, and size produced under essentially the same conditions and offered for delivery at one time.

4.1.2 Sampling for visual and dimensional examination. Sample fittings shall be selected at random from each lot in accordance with ASQ Z1.4 at inspection level II for the examination specified in 4.2.2.1.

4.1.3 Sampling for hydrostatic pressure leakage test. Sample fittings shall be selected from each lot in accordance with ASQ Z1.4 at inspection level II for the hydrostatic pressure leakage test specified in 4.2.2.2.

4.2 Conformance. Conformance inspection and tests shall consist of the following:

- a. Individual fitting for test (see 4.2.1).
- b. Sampled fittings for tests (see 4.2.2).

4.2.1 Individual fitting for test.

4.2.1.1 Air pressure leakage test. In order to verify conformance with 3.6, each fitting shall be tested under water or with soapsuds at 100 pounds per square inch (lb/in²) (nominal) air pressure for 5 to 10 seconds. No leakage is allowed.

4.2.2 Sampled fittings for tests.

4.2.2.1 Visual and dimensional examination. Each of the sample fittings selected in accordance with 4.1.2 shall be examined to verify conformance to all requirements of this specification not involving tests. Examination shall be conducted as specified in [table VI](#). Any fitting in the sample containing one or more defects shall be rejected, and if the number of defective fittings in any sample exceeds the acceptable number for that sample, the lot represented by the sample shall be rejected.

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TABLE VI. Classification of defects.

Categories	Defects
Critical:	None defined.
Major:	
101	Type, name, and size not as specified.
102	Material not as specified.
103	Fitting not sound, smoothly cored, true to form, uniform in texture; not free from cold shuts.
104	Fitting surface (internal and external) not thoroughly cleaned; fins, machining chips, burrs, and roughness not removed or blended.
105	Fitting welded where strength, serviceability, or machining will be affected; unauthorized repairs, plugged, welded, or impregnated.
106	Brazing ring (if specified) missing or not as specified.
107	Thread (if required) missing, torn, stripped, broken, not concentric, or not within gauging limits.
108	Thread (if required) size not as specified.
109	Socket not smooth.
110	Socket dimensions not as specified.
111	Bottom of socket not streamlined (Type A fittings only).
112	Bottom of socket not square with axis of fittings.
113	Fitting dimensions not within tolerances specified.
114	Bands damaged or not as specified.
115	Tail pieces or threaded pieces of unions not octagonal, knurled, ribbed, or lugged.
116	Reducing fitting wall thickness not as specified.
117	O-ring and back-up ring missing or not as specified (if specified).
Minor:	
201	Ends (other than brazing ring type) not chamfered as specified.
202	Marking, manufacturer's name, or trademark type-designating letter missing, not cast, stamped incorrectly, or illegible.

4.2.2.2 Hydrostatic pressure leakage test. In order to verify conformance with 3.6, each sample fitting (except union assemblies) selected in accordance with 4.1.3 shall be subjected to a hydrostatic pressure $1\frac{1}{2}$ times the working pressure for 1 minute. Under the hydrostatic pressure, the fitting shall not leak water or sweat at any part of the surface.

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5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Fittings herein are intended for steam, air, oil, or water piping service aboard naval vessels, providing for silver-brazing installation, which civilian vessel fittings generally lack. Commercial specifications for brazed fittings do not have a pre-inserted ring recess in the socket bore design. Type A fittings are intended for general service and specifically for seawater service. Fittings that are provided as Type B only (caps, reducing crosses, 45-degree reducing laterals, plugs, threaded reducers, long turn single sweep reducing tees, fittings with integral flanges and certain reducing tee sizes, bend sizes, and one lateral and one socket-to-socket reducer size) should be used for the same general services as Type A fittings but should not be used for seawater service. Caps and plugs that are provided as Type B should only be used for "no flow" seawater service. Type A or Type B fittings are used with MIL-T-16420 copper-nickel pipe, MIL-T-24107 copper pipe, or their equivalent commercial pipe standards, and ASTM B43 brass pipe. Type A or Type B fittings are attached to the pipe by the silver-brazing process without exceeding a temperature of 1,500 degrees Fahrenheit (°F). Existing stock of fittings manufactured to MIL-F-1183J dated 5 May 1987 are acceptable for use until depleted.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Specification sheet part number required (see 1.2, 3.3, 3.5, 3.5.1, 3.5.1.1, 3.5.2, 6.3, and applicable specification sheet).
- c. Wall thickness (see 3.4).
- d. Nominal pipe size (see 3.4).
- e. End connection requirements (see 3.5 and applicable specification sheet).
- f. Socket end grooved or internally smooth (see 3.5.1).
- g. Inclusion of QQ-B-654 silver-brazing rings (see 3.5.1.1).
- h. Packaging requirements (see 5.1).

6.3 Specification sheet part number. The specification sheet part number is a definitive part number that corresponds to the fittings covered by this specification and defines the requirements of the options presented in this specification (see 6.2). The exact format of the military specification sheet part number for a particular fitting is presented on its specification sheet.

6.4 Union O-ring seal (Navy applications). Unions, union elbows, and union tees should have an O-ring and a retainer ring outboard of the ground joint installed before being placed in service in a pipeline. The installation of the O-ring and retainer ring forms an effective seal with back-up to provide a leakproof joint.

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6.5 Supersession data. Fitting names that have been changed or deleted are as follows:

In MIL-F-1183J term	In MIL-DTL-1183K term
Reducer (male pipe thread to socket)	Bushing
Reducer (male pipe to socket)	Adapter
Reducer (socket to socket)	Reducing coupling
Lateral	Y-branch

6.6 Subject term (key word) listing.

Adapter

Caps

Coupling

Plugs

Reducers

Reducing crosses

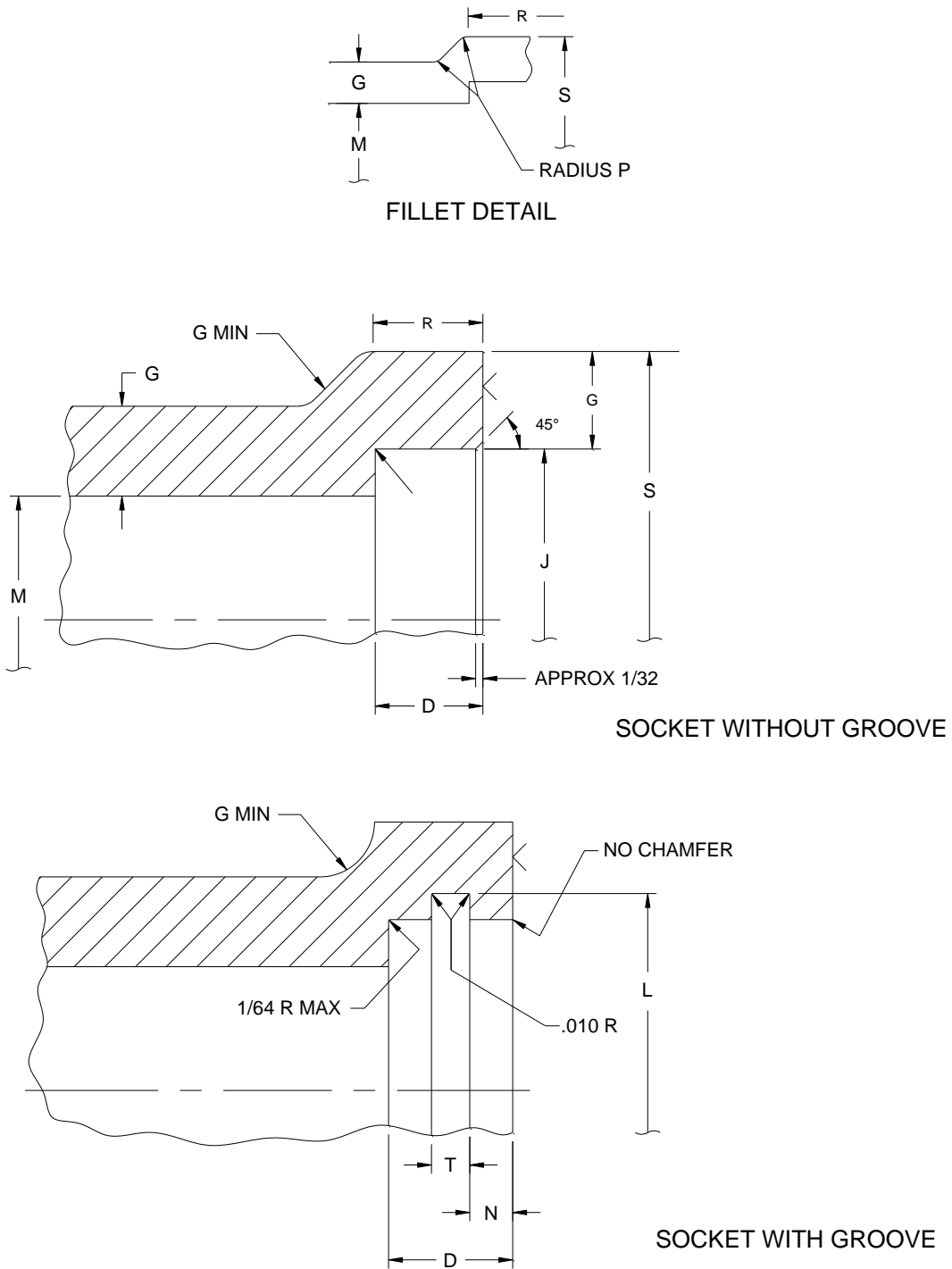
Reducing laterals

Tees

Y-branch

6.7 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

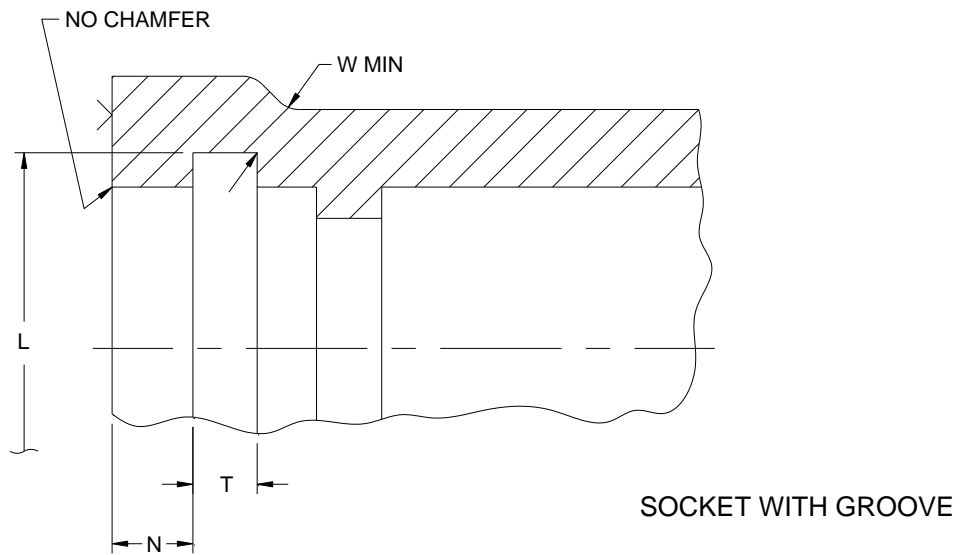
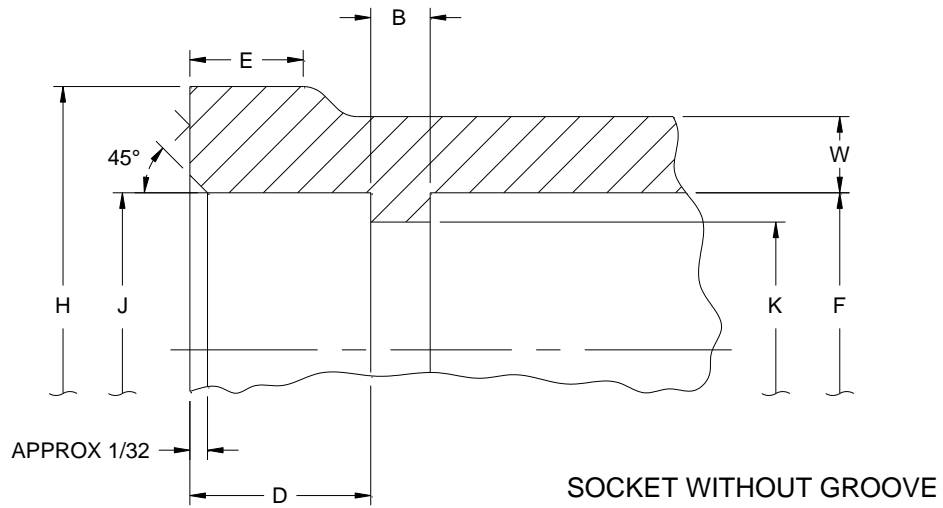
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See table I for dimensions.

FIGURE 1. Type A, streamlined interior (see 1.2).

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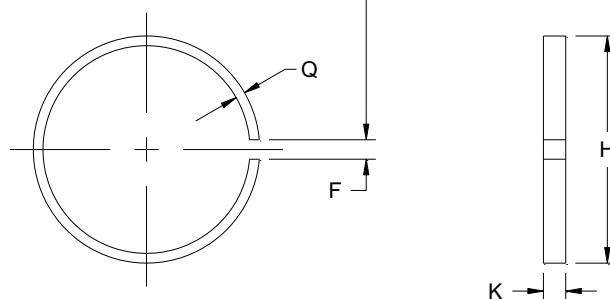


See table I for dimensions.

FIGURE 2. Type B, nonstreamlined interior (see 1.2).

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VERIFY GAP WHILE BRAZING RING
IS RESTRAINED IN RING GAUGE OF
DIAMETER EQUAL TO N



See table II for dimensions.

FIGURE 3. Silver-brazing ring.

Custodians:

Army – CR4
Navy – SH
Air Force – 99

Preparing activity:

Navy – SH
(Project 4730-2016-088)

Review activity:

DLA – CC

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.