

INCH-POUND

MS51890B  
w/AMENDMENT 1  
29 January 2019  
SUPERSEDING  
MS51890B  
25 July 2018

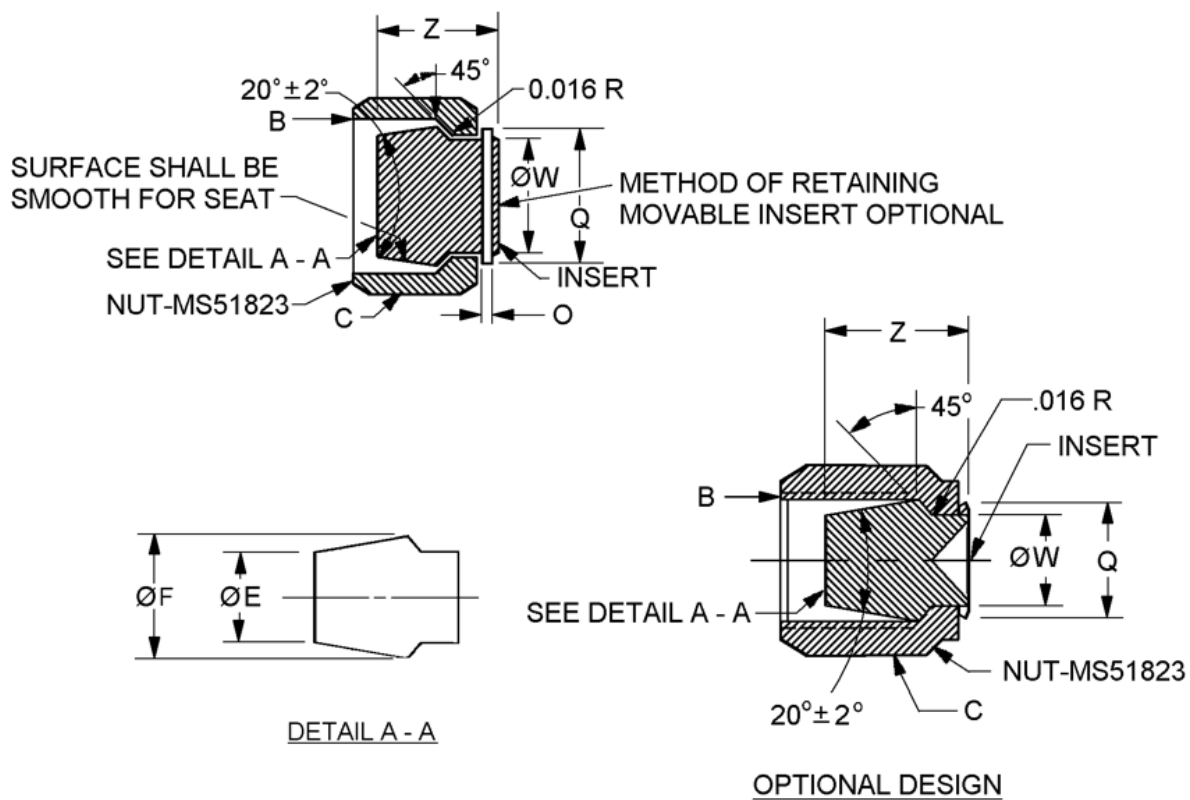
## DETAIL SPECIFICATION SHEET

FITTINGS, HYDRAULIC TUBE, FLARED 37 DEGREES AND FLARELESS,  
STEEL; CAP ASSEMBLY, TUBE, FLARELESS TYPE, HYDRAULIC

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

Reactivated after 25 July 2018 and may be used for new  
and existing designs and acquisitions.

The requirements for acquiring the product described herein shall consist of this specification sheet  
and MIL-DTL-18866.



See notes at end of figure.

FIGURE 1. Cap assembly, tube, flareless, hydraulic.

AMSC N/A

FSC 4730



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Dash number	Tube OD Nom inches (mm)	B Straight thread Class 2B	C Hex flat nominal	E Diameter inches (mm) +.005 (0.13) -.000	F Diameter inches (mm) ±.02 (0.5)
-1	.1250 (3.175)	.3125 - 24UNF	3/8	.126 (3.20)	.22 (5.59)
-2	.1875 (4.763)	.3750 - 24UNF	7/16	.187 (4.75)	.28 (7.11)
-3	.2500 (6.350)	.4375 - 20UNF	9/16	.252 (6.40)	.34 (8.64)
-4	.3125 (7.938)	.5000 - 20UNF	5/8	.315 (8.00)	.41 (10.41)
-5	.3750 (9.525)	.5625 - 18UNF	11/16	.377 (9.58)	.47 (11.94)
-6	.5000 (12.700)	.7500 - 16UNF	7/8	.503 (12.78)	.62 (15.75)
-7	.6250 (15.875)	.8750 - 14UNF	1	.630 (16.00)	.75 (19.05)
-8	.7500 (19.050)	1.0625 - 12UN	1 1/4	.755 (19.18)	.88 (22.35)
-9	.8750 (22.225)	1.1875 - 12UN	1 3/8	.875 (22.23)	1.00 (25.40)
-10	1.0000 (25.400)	1.3125 - 12UN	1 1/2	1.005 (25.53)	1.16 (29.46)
-11	1.2500 (31.750)	1.6250 - 12UN	2	1.257 (31.93)	1.41 (35.81)
-12	1.5000 (38.100)	1.8750 - 12UN	2 1/4	1.507 (38.28)	1.66 (42.16)
-13	2.0000 (50.800)	2.5000 - 12UN	2 7/8	2.000 (50.80)	2.19 (55.63)

Dash number	O Thickness inches (mm) ±.06 (1.52)	Q Maximum inches (mm)	W Diameter inches (mm) +.004 (0.10) -.000	Z Length inches (mm) ±.09 (2.3)
-1	.05 (1.3)	.25 (6.4)	.125 (3.18)	.49 (12.5)
-2	.05 (1.3)	.25 (6.4)	.181 (4.60)	.57 (14.5)
-3	.05 (1.3)	.38 (9.7)	.246 (6.25)	.64 (16.3)
-4	.05 (1.3)	.50 (12.7)	.310 (7.87)	.66 (16.8)
-5	.05 (1.3)	.50 (12.7)	.372 (9.45)	.68 (17.3)
-6	.06 (1.5)	.62 (15.8)	.498 (12.65)	.84 (21.3)
-7	.06 (1.5)	.75 (19.1)	.625 (15.88)	.85 (21.6)
-8	.06 (1.5)	.88 (22.4)	.750 (19.05)	.84 (21.3)
-9	.06 (1.5)	1.00 (25.4)	.875 (22.23)	.87 (22.1)
-10	.09 (2.3)	1.25 (31.8)	1.000 (25.40)	.99 (25.15)
-11	.12 (3.1)	1.50 (38.1)	1.250 (31.75)	1.10 (27.9)
-12	.16 (4.1)	1.75 (44.5)	1.500 (38.10)	1.21 (30.7)
-13	.16 (4.1)	2.25 (57.2)	2.000 (50.80)	1.18 (30.0)

## NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Remove all burrs and slivers.
4. Dimensions and tolerances not shown shall be in accordance with SAE-J514.
5. Threads shall be in accordance with ASME B1.1.
6. The drawing is for identification purposes only and is not intended to restrict designs and shapes not dimensioned.

FIGURE 1. Cap assembly, tube, flareless, hydraulic - Continued.

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REQUIREMENTS:

Cap assembly shall be as specified on figure 1 and in table I.

Materials shall be in accordance with MIL-DTL-18866.

Insert shall be movable and permanently secured to the nut to prevent assembly from coming apart. A physical and permanent retention method shall be present.

Finish. Finishes shall be as specified in table I.

All plating's shall be capable of meeting a minimum of 96 hours salt spray test in accordance with ASTM B117. The fittings shall show no evidence of red corrosion after 96 hours of salt spray. Fluid passages, other openings and internal threads shall not be subject to the plating thickness requirement and may have bare areas provided they are protected with a light film of oil.

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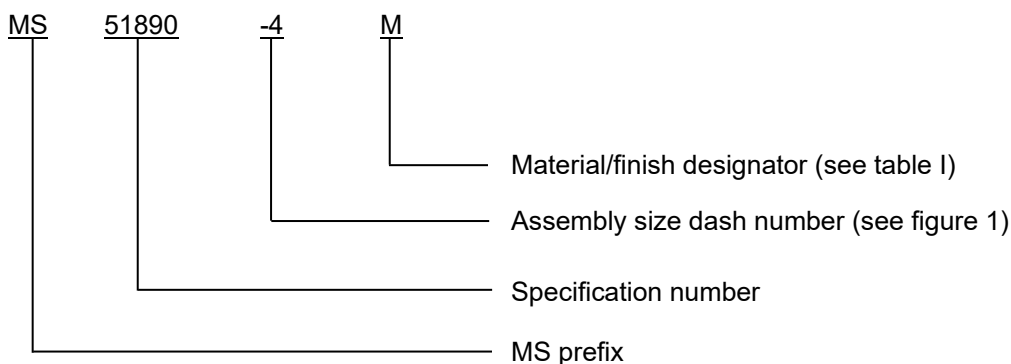
TABLE I. Material and finish identification codes.

PIN code material/plating finish	Material	Plating finish
Blank	Steel	Cadmium plating in accordance with SAE-AMS-C-81562, type II, class 3 or SAE-AMS-QQ-P-416, type II, class 2. <u>1/</u>
H	Steel	Zinc-aluminum in accordance with ASTM F1136/F1136M, grade 3, NC. <u>2/</u>
J	Steel	Zinc-nickel in accordance with SAE-AMS2417, type 2, grade B. <u>2/ 3/</u>
M	Nickel-copper alloy UNS N04400	No additional finish.
N	High-chromium nickel alloy UNS N06690	No additional finish.
P	Steel	Zinc phosphate finish in accordance MIL-DTL-16232 type Z, class 1. <u>4/</u>
R	Steel	Zinc plating in accordance with ASTM B633; type III or V, Fe/Zn 8. <u>4/ 5/</u>
SS	Corrosion resistant steel	No additional finish. Passivation in accordance with SAE-AMS2700, method 1, type 6 or 7, free machining alloy UNS S30300 method 1, type 2 or 4.
T	Titanium	Anodize in accordance with SAE-AMS2488 type 2. <u>6/</u>
TF	Titanium	Fluoride phosphate in accordance with SAE-AMS2486. <u>6/</u>
Z	Steel	Zinc plating in accordance with ASTM B695, type II, class 8. <u>4/</u>
ZC	Steel	Zinc may be any zinc plating from PIN codes J, R, and Z with a colored chromate coating. <u>4/ 5/</u>

- 1/ Embrittlement test need not be run. Cadmium shall not be used in oxygen or potable water systems. Cadmium is prohibited from use in NAVSEA owned shipboard systems.
- 2/ Hexavalent chromium free. Finish shall be RoHS compliant.
- 3/ The zinc-nickel alloy plate shall contain 12% to 16% nickel. The coating thickness shall be 315µ inches (8µm) minimum.
- 4/ Not for use in aircraft. Requires approval from the Program Office for all applications. Zinc-plated materials should be avoided in hydraulic systems with water-glycol fluids. Reference ASTM MNL37 - Fuels and Lubricants Handbook, "water glycol fluids are highly alkaline due to the presence of amine based corrosion inhibitors. As a result, these fluids can attack zinc, cadmium, magnesium, and non-anodized aluminum, forming sticky or gummy residues". Consequently, these metals should be avoided when selecting system components.
- 5/ ASTM B633 type III finishes have a chromate conversion coating or chromic acid rinse which includes hexavalent chromium and is not recommended.
- 6/ A pretreatment, a modification of the fluoride treatment, or a post treatment shall be applied so the final color of the fittings shall be similar to SAE-AMS-STD-595 colors 36076 through 36293. Titanium shall not be used in oxygen or potable water systems.

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PIN: The PIN consists of the letters "MS", the specification number, a dash number for the cap assembly size, and a letter for material finish designator.



PIN example: MS51890-4M indicates a cap assembly, .3125 inch (7.938 mm), nickel-copper alloy.

Cadmium is not recommended. To the users of this document, it is recommended that the use of carbon steel material with cadmium plating be used only when other materials and finishes specified in this document cannot meet performance requirements.

Cadmium is prohibited from use in NAVSEA owned shipboard systems in accordance with the requirements of T9070-AL-DPC-020/077-2.

Class I and II ozone depleting substances (ODS) shall not be used in MS51890 or any referenced procedures.

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, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

Referenced documents shall be of the issue in effect on date of invitations for bid.

Amendment notations. The margins of this specification are marked with vertical lines to indicate modifications generated by this amendment. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations.

Referenced documents. In addition to MIL-DTL-18866, this document references the following:

MIL-DTL-16232	SAE-AMS-STD-595/36076	SAE-AMS-STD-595/36251
MS51823	SAE-AMS-STD-595/36081	SAE-AMS-STD-595/36270
ASME B1.1	SAE-AMS-STD-595/36099	SAE-AMS-STD-595/36280
ASTM B117	SAE-AMS-STD-595/36118	SAE-AMS-STD-595/36293
ASTM B633	SAE-AMS-STD-595/36134	SAE-AMS2417
ASTM B695	SAE-AMS-STD-595/36152	SAE-AMS2486
ASTM F1136/F1136M	SAE-AMS-STD-595/36170	SAE-AMS2488
ASTM MNL37	SAE-AMS-STD-595/36173	SAE-AMS2700
SAE-AMS-C-81562	SAE-AMS-STD-595/36176	SAE-J514
SAE-AMS-QQ-P-416	SAE-AMS-STD-595/36231	T9070-AL-DPC-020/077-2

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CONCLUDING MATERIAL

Custodians:

Army - AR  
Navy - SH  
Air Force - 99  
DLA - CC

Preparing activity:

DLA - CC

(Project 4730-2018-121)

Review activities:

Army - AT  
Navy - AS, OS  
Air Force - 71

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>.