

INCH-POUND

MS20756G
w/AMENDMENT 1
25 August 2021
SUPERSEDING
MS20756G
28 March 2018

DETAIL SPECIFICATION SHEET

FLANGE, SWIVEL, RETAINING

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

The requirements for acquiring the product described herein shall consist of this specification sheet and SAE-AS4875.

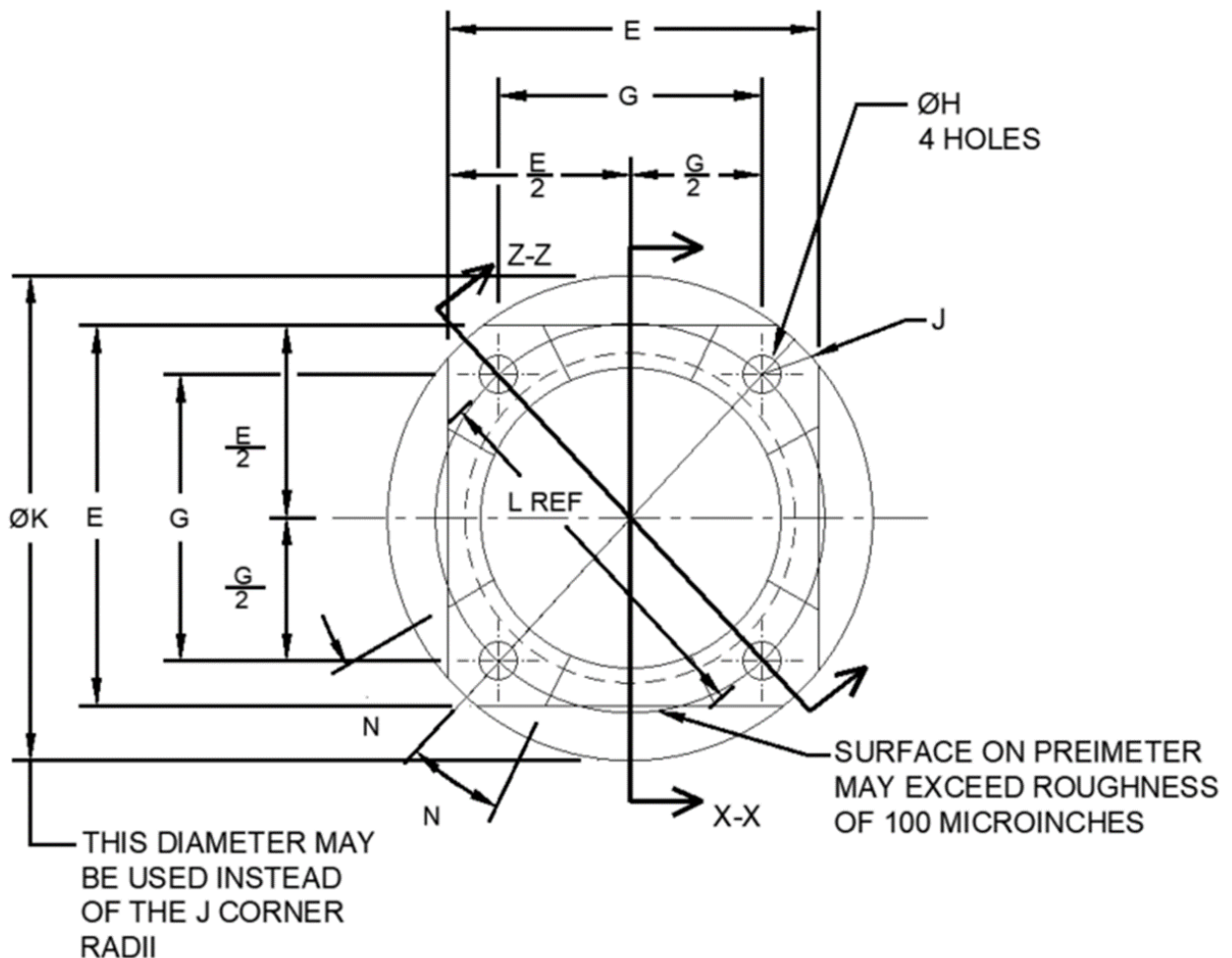
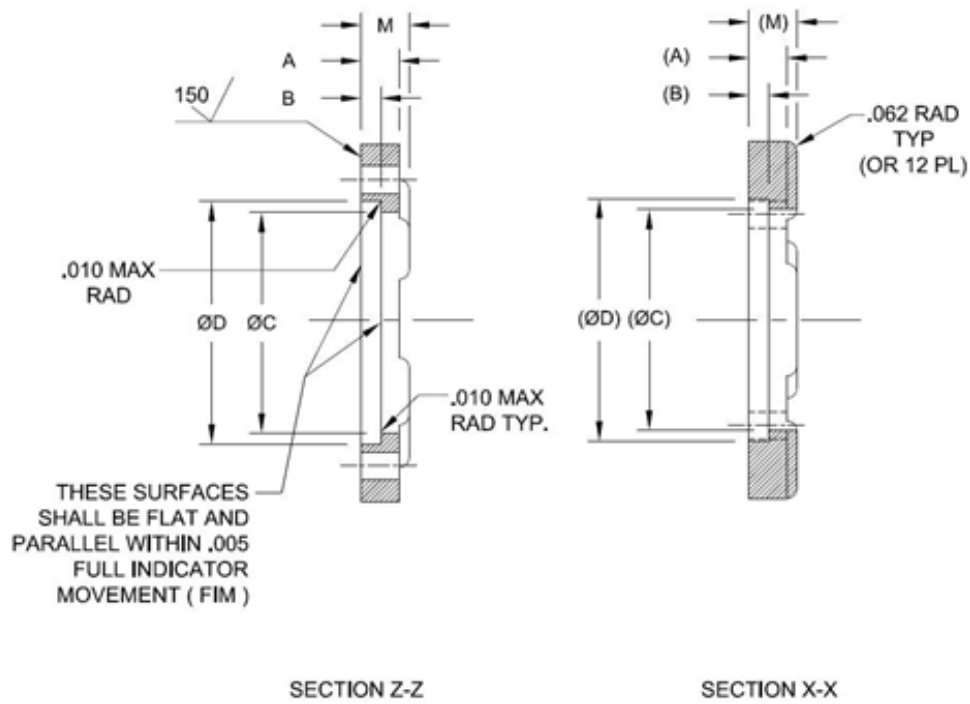


FIGURE 1. Swivel fitting flange type I rectangle size 8 through 32 - Continued





Inches	mm
.005	0.13
.010	0.25
.062	1.57

FIGURE 1. Swivel fitting flange type I rectangle size 8 through 32 - Continued

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Size designator	Tubing OD and hose ID inches (mm)	A +.015 -.005 (+0.38 -0.13) inches (mm)	B +.005/-0.000 (+0.13/-0.00) inches (mm)	C dia (see note 4) +.010/-0.000 (+0.25/-0.00) inches (mm)	D dia (see note 4) +.005/-0.000 (+0.13/-0.00) inches (mm)	E (see note 9) inches (mm)	
8	.500 (12.70)	.234 (5.94)	.136 (3.45)	.750 (19.05)	.885 (22.48)	1.390 (35.31)	±.016 (0.41)
10	.625 (15.88)			.880 (22.35)	1.010 (25.65)	1.468 (37.29)	
12	.750 (19.05)			1.125 (28.58)	1.260 (32.00)	1.594 (40.49)	
16	1.000 (25.40)			1.375 (34.93)	1.510 (38.35)	1.750 (44.45)	
20	1.250 (31.75)	.297 (7.54)	.168 (4.27)	1.688 (42.88)	1.854 (47.09)	2.188 (55.58)	±.020 (0.51)
24	1.500 (38.10)			1.938 (49.23)	2.135 (54.23)	2.375 (60.33)	
32	2.000 (50.80)			2.562 (65.07)	2.760 (70.10)	3.000 (76.20)	

Size number	G ±.005 (±0.13) inches (mm)	H dia +.010/- .000 (+0.25 -0.00) inches (mm)	J radius (see note 9) ±.016 (±0.41) inches (mm)	K dia (see note 9) ±.015 (±0.38) inches (mm)	L dia ±.005 (0.25mm) inches (mm)	M ±.016 (±0.41) inches (mm)	N
8	.950 (24.13)	.205 (5.21)	.219 (5.56)	1.782 (45.26)	1.344 (34.14)	.296 (7.52)	20°
10	1.038 (26.37)			1.906 (48.41)	1.468 (37.29)		
12	1.156 (29.36)			2.094 (53.19)	1.635 (41.53)		
16	1.312 (33.32)			2.312 (58.72)	1.855 (47.12)		
20	1.656 (42.06)	.266 (6.76)	.266 (6.76)	2.875 (73.03)	2.342 (59.49)	.359 (9.12)	16°
24	1.812 (46.02)		.281 (7.14)	3.094 (78.59)	2.562 (65.07)		
32	2.375 (60.33)	.328 (8.33)	.312 (7.92)	3.953 (100.41)	3.359 (85.32)		12°

FIGURE 1. Swivel fitting flange type I rectangle size 8 through 32 - Continued.

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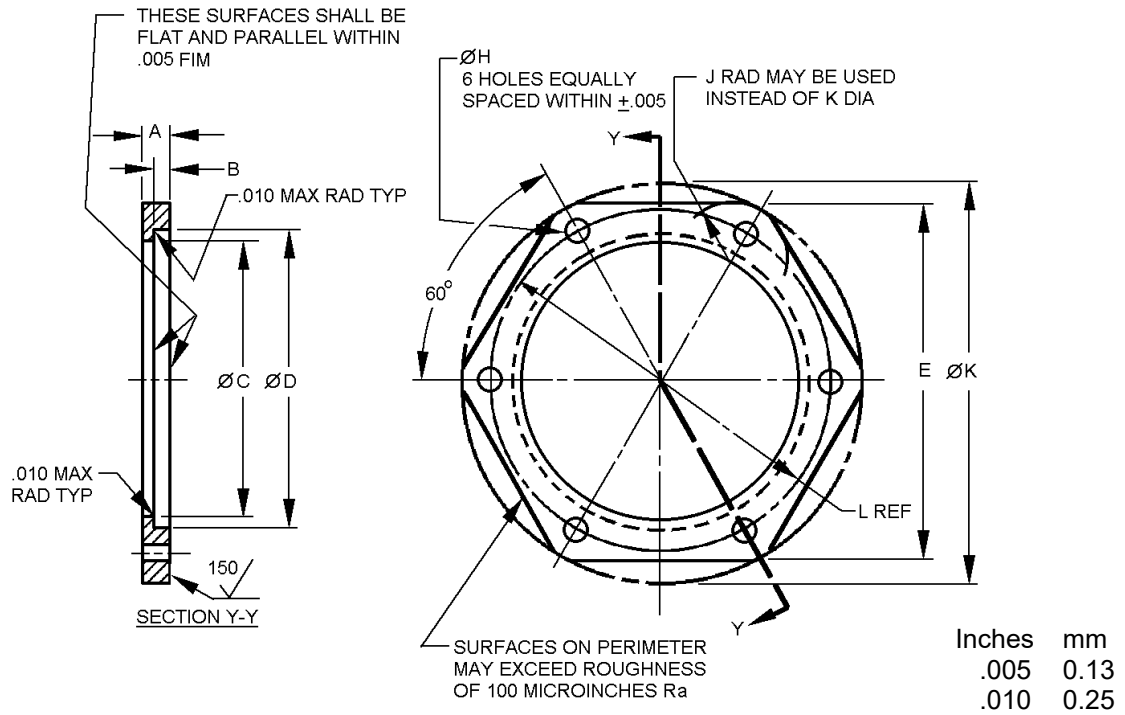
Size number	Weight max (estimated) lbs (gram)		
	Steel	Al alloy	Titanium
8	.03 (14)	.01 (5)	.02 (9)
10	.05 (23)	.02 (9)	.03 (14)
12	.08 (36)	.03 (14)	.04 (18)
16			
20	.14 (64)	.05 (23)	.07 (32)
24	.17 (77)	.06 (27)	.09 (41)
32	.25 (113)	.09 (41)	.13 (59)

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Unless otherwise specified, tolerances linear dimensions ± 0.005 inch (0.13 mm) angles $\pm 5^\circ$.
4. Diameters C and D shall be concentric within .010 inch (0.25 mm) full indicator movement.
5. Unless otherwise specified, the surface roughness shall not exceed 100 microinches (25.4 μm) Ra in accordance with ASME B46.1.
6. Break all sharp edges; remove all loose or hanging burrs and slivers that may become dislodged.
7. For tube sizes -8 through -16, maximum operating temperature 275°F (135°C), maximum pressure 1500 psi (10 MPa).
8. For tube sizes -20 through -32, maximum operating temperature 275°F (135°C), maximum pressure 500 psi (3.4 MPa).
9. Reduction by forging draft angle of 7° maximum is permissible if forged.

FIGURE 1. Swivel fitting flange type I rectangle size 8 through 32 - Continued.

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Size designator	Tubing OD and hose ID inches (mm)	A +.015 -.005 (+0.38 -0.13) inches (mm)	B +.005/-0.000 (+0.13/-0.00) inches (mm)	C dia (see note 4) +.010/-0.000 (+0.25/-0.00) inches (mm)	D dia (see note 4) +.005/-0.000 (+0.13/-0.00) inches (mm)	E (see note 9) inches (mm)	
8	.500 (12.70)	.234 (5.94)	.136 (3.45)	.750 (19.05)	.885 (22.48)	1.538 (39.07)	±.016 (0.41)
10	.625 (15.88)			.880 (22.35)	1.010 (25.65)	1.644 (41.76)	
12	.750 (19.05)			1.125 (28.58)	1.260 (32.00)	1.813 (46.05)	
16	1.000 (25.40)			1.375 (34.93)	1.510 (38.35)	2.000 (50.80)	
20	1.250 (31.75)			1.688 (42.88)	1.854 (47.09)	2.460 (62.48)	
24	1.500 (38.10)	.297 (7.54)	.168 (4.27)	1.938 (49.23)	2.135 (54.23)	2.680 (68.07)	±.020 (0.51)
32	2.000 (50.80)			2.562 (65.07)	2.760 (70.10)	3.359 (85.32)	
40	2.500 (63.50)			3.062 (77.77)	3.291 (83.59)	4.000 (101.60)	
48	3.000 (76.20)			3.562 (90.47)	3.791 (96.29)	4.500 (114.30)	

FIGURE 2. Swivel fitting flange type II hexagon size 8 through 48.

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Size number	H dia +.010/-0.000 (+0.25/-0.00) inches (mm)	J radius (see note 9) ±.016 (±0.41) inches (mm)	K dia (see note 9) ±.015 (±0.38) inches (mm)	L dia ±.005 (0.25mm) inches (mm)
8	.205 (5.21)	.219 (5.56)	1.782 (45.26)	1.344 (34.14)
10			1.906 (48.41)	1.468 (37.29)
12			2.094 (53.19)	1.635 (41.53)
16			2.312 (58.72)	1.855 (47.12)
20	.266 (6.76)	.266 (6.76)	2.875 (73.03)	2.342 (59.49)
24		.281 (7.14)	3.094 (78.59)	2.562 (65.07)
32	.328 (8.33)	.312 (7.92)	3.953 (100.41)	3.359 (85.32)
40		.375 (9.53)	4.500 (114.30)	3.812 (96.82)
48		.625 (15.88)	5.000 (127.00)	4.312 (109.52)

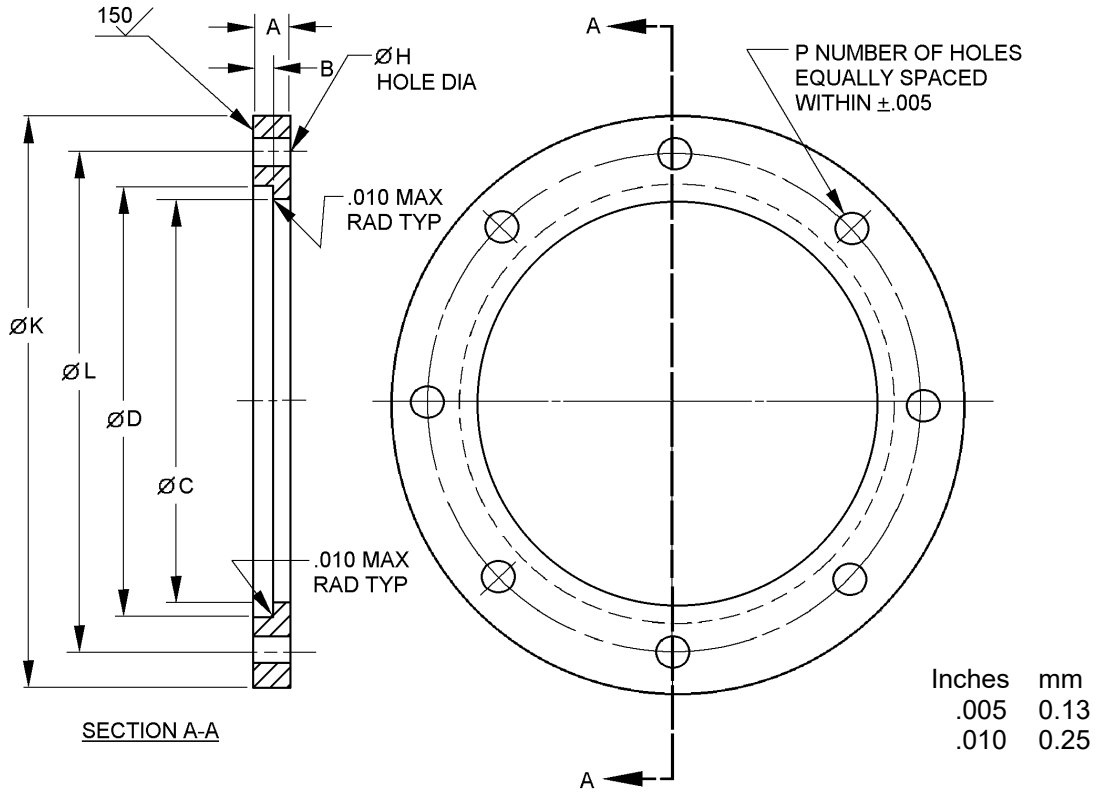
Size number	Weight max (estimated) lbs (gram)		
	Steel	Al alloy	Titanium
8	.03 (14)	.01 (5)	.02 (9)
10	.05 (23)	.02 (9)	.03 (14)
12	.08 (36)	.03 (14)	.04 (18)
16			
20	.14 (64)	.05 (23)	.07 (32)
24	.17 (77)	.06 (27)	.09 (41)
32	.25 (113)	.09 (41)	.13 (59)
40	.45 (204)	.16 (73)	.21 (95)
48	.53 (240)	.19 (86)	.24 (109)

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Unless otherwise specified, tolerances linear dimensions ± 0.005 inch (0.13 mm) angles $\pm 5^\circ$.
4. Diameters C and D shall be concentric within .010 inch (0.25 mm) full indicator movement.
5. Unless otherwise specified, the surface roughness shall not exceed 100 microinches (25.4 μm) Ra in accordance with ASME B46.1.
6. Break all sharp edges; remove all loose or hanging burrs and slivers that may become dislodged.
7. For tube sizes -8 through -16, maximum operating temperature 275°F (135°C), maximum pressure 1500 psi (10 MPa).
8. For tube sizes -20 through -48, maximum operating temperature 275°F (135°C), maximum pressure 500 psi (3.4 MPa).
9. Reduction by forging draft angle of 7° maximum is permissible if forged.

FIGURE 2. Swivel fitting flange type II hexagon size 8 through 48 - Continued.

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Size number	Tubing OD and hose ID inches (mm)	A +.015/ -.005 (+0.38/ -(0.13) inches (mm)	B +.005/ -.000 (+0.13/ -.000) inches (mm)	C dia (see note 4) ±.031 (0.79) inches (mm)	D dia (see note 4) inches (mm)		H dia +.010/ -.000 (+0.25/ -0.00) inches (mm)
56	3.500 (88.90)	.312 (7.92)	.168 (4.27)	3.968 (100.79)	4.234 (107.54)	+.010/ -.000 (+0.25/ -0.000)	.328 (8.33)
64	4.000 (101.60)			4.531 (115.09)	4.797 (121.84)		
80	5.000 (127.00)	.375 (9.53)	.188 (4.78)	5.531 (140.49)	5.797 (147.24)		
96	6.000 (152.40)			6.531 (165.89)	6.797 (172.64)	+.020/ -.000 (0.51/ -.000)	
112	7.000 (177.80)	.437 (11.10)	.200 (5.08)	7.594 (192.89)	7.860 (199.64)		

FIGURE 3. Swivel fitting flange type III round size 56 through 112.

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Size number	K dia (see note 8) ±.015 (±0.38) inches (mm)	L dia Ref inches (mm)	P number of holes
56	5.562 (141.27)	4.875 (123.83)	8
64	6.125 (155.58)	5.438 (138.13)	
80	7.125 (180.98)	6.438 (163.53)	10
96	8.125 (206.38)	7.438 (188.93)	12
112	9.188 (233.38)	8.500 (215.90)	14

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Unless otherwise specified, tolerances linear dimensions ± 0.005 inch (0.13 mm) angles $\pm 5^\circ$.
4. Diameters C and D shall be concentric within .010 inch (0.25 mm) full indicator movement.
5. Unless otherwise specified, the surface roughness shall not exceed 100 microinches (2.54 μm) Ra in accordance with ASME B46.1.
6. Break all sharp edges; remove all loose or hanging burrs and slivers that may become dislodged.
7. Maximum operating temperature 275°F (135°C), maximum pressure 500 psi (3.4 MPa).
8. Reduction by forging draft angle of 7° maximum is permissible if forged.

FIGURE 3. Swivel fitting flange type III round size 56 through 112 - Continued.

REQUIREMENTS:

Design and construction:

Dimensions and configuration: See figures 1, 2, and 3.

For nominal use on fuel and oil systems.

Materials: Materials shall be in accordance with SAE-AS4875.

Material designators (see table I): Designators for material types shall be in accordance with SAE-AS4875.

Material and size designators shall be in accordance with table I.

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TABLE I. Material and size designators. 1/

Size number	Size number with letter material designator			
	Steel (Blank)	Aluminum alloy	CRES	Titanium <u>2/</u>
8	-8	-W8	-R8	-T8
10	-10	-W10	-R10	-T10
12	-12	-W12	-R12	-T12
16	-16	-W16	-R16	-T16
20	-20	-W20	-R20	-T20
24	-24	-W24	-R24	-T24
32	-32	-W32	-R32	-T32
40	-40	-W40	-R40	-T40
48	-48	-W48	-R48	-T48
56	-56	-W56	-R56	-T56
64	-64	-W64	-R64	-T64
80	-80	-W80	-R80	-T80
96	-96	-W96	-R96	-T96
112	-112	-W112	-R112	-T112

1/ Materials and designators blank/none, "W", "R", and "T" are in accordance with SAE-AS4875.

2/ Titanium shall not be used in oxygen systems.

Finishes. Finish and finish designators shall be as specified in table II. 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.

TABLE II. Flange finish code.

PIN code dash letter	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>
	Aluminum <u>2/</u>	Anodize in accordance with MIL-PRF-8625, type II.
	CRES	No additional finish. Passivation in accordance with SAE-AMS2700, type 6 or 7.
	Titanium <u>3/</u>	Fluoride phosphate in accordance with SAE-AMS2486. <u>4/</u>
-A	Steel	Aluminum-nickel in accordance with ASTM F1136/F1136M, grade 3, NC
-D	Aluminum <u>2/</u>	Anodize in accordance with MIL-PRF-8625, type II then apply NAVAIR trivalent chromium pretreatment (TCP) in accordance with MIL-DTL-81706, type II, class 1A.
-DA	Aluminum <u>2/</u>	Chemical conversion coating in accordance with, MIL-DTL-5541, type II, class 3
-G	Steel	Zinc plating with colorless passivate in accordance with ASTM B633, type V, Fe/Zn 25. <u>6/</u>
-H	Steel	Zinc phosphate finish in accordance MIL-DTL-16232 type Z, class 1. <u>6/</u>
-J	Steel	Zinc plating in accordance with ASTM B633; type II or III, Fe/Zn 5, or ASTM B695, type II, class 5. <u>6/</u>
KA	Steel	Zinc Nickel Electroplate, MIL-PRF-32647, Type K20 torque/tension modifier. <u>6/ 7/</u>
KB	Steel	Zinc Nickel Electroplate, MIL-PRF-32647, Type K16 torque/tension modifier. <u>6/ 7/</u>
-R	Steel	Zinc plating in accordance with ASTM B633; type III or V, Fe/Zn 8. <u>6/</u>
-T	Titanium <u>4/</u>	Anodized in accordance with SAE-AMS2488, type 2
-V	Steel	Zinc-nickel in accordance with SAE-AMS2417, type 1. <u>5/ 6/</u>
-Z	Steel	Zinc plating in accordance with ASTM B695, type II, class 8. <u>3/ 6/</u>
-ZF	Steel	Zinc plating in accordance with ASTM B633, type VI, Fe/Zn 8. <u>6/</u>
-ZN	Steel	Zinc may be any zinc plating's from PIN codes R, V, Z. <u>6/ 7/</u>

1/ Cadmium shall not be used in oxygen or potable water systems. Cadmium is prohibited from use in NAVSEA owned shipboard systems and Army and Marine ground vehicles.

2/ Aluminum alloy 7075 shall be dyed brown.

3/ Titanium shall not be used in oxygen systems.

4/ 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.

5/ The zinc-nickel alloy plate shall contain 12% to 16% nickel. The coating thickness shall be 315µ inches (8µm) minimum. Hexavalent chromium free. Finish shall be ROHS compliant.

6/ 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.

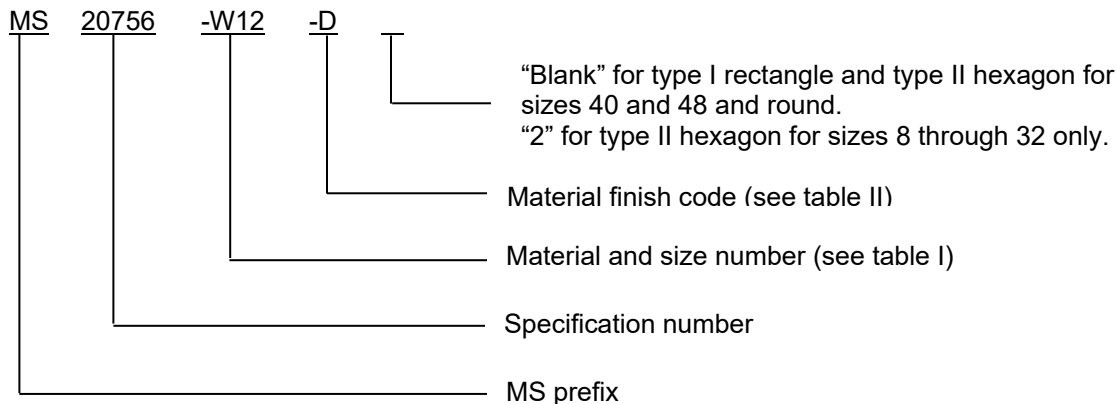
7/ Salt spray requirements shall be in accordance with MIL-PRF-32647

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Trivalent wrenchability. Applies to aluminum fittings that receive the NAVAIR TCP coating in accordance with MIL-DTL-81706, type II. When the finish has been damaged due to poor wrenchability, the surface of the flange shall be touched up using the brush plating process below. The term "trivalent wrenchability" is used to evaluate the ability of the finish to withstand abrasion from an excessive amount of wrenching.

Brush plating of NAVAIR TCP shall be in accordance with MIL-DTL-81706, type 2, class 1A, material form 1 through 6, application method B. Example of a PIN: M817062A6B.

PIN example:



MS20756-W12-D indicates: Flange, .750 inch (19.05 mm) tube ID, aluminum anodized then NAVAIR TCP applied, type I rectangle.

MS20756-W12-D2 indicates: Flange, .750 inch (19.05 mm) tube ID, aluminum anodized with NAVAIR TCP, type II hexagon.

MS20756-56 indicates: Flange, 3.500 inch (88.90 mm) tube ID, steel, cadmium plating in accordance with SAE-AMS-C-81562, type II, class 3 or SAE-AMS-QQ-P-416, type II, class 2, type III round.

Marking. The complete PIN shall be permanently marked on an unfinished surface.

Guidance on use of alternative parts with less hazardous or nonhazardous materials. This specification provides for a number of alternative plating materials via the PIN. Users should select the PIN with the least hazardous material that meets the form, fit and function requirements of their application.

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

Army and Marine ground vehicles cadmium restriction. The use of cadmium plating for Army and Marine ground vehicles is prohibited unless otherwise explicitly stated in the contract as a requirement.

Class I and II ozone depleting substances (ODS) shall not be used in MS20756 or any referenced procedures.

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

This standard takes precedence over documents referenced herein.

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Supersession data:

Aluminum alloys 2014 and 2024 "D" designator is cancelled. For new and existing designs, use aluminum alloy 7075 "W" designator.

CRES alloy 304 "J" designator is cancelled. For new and existing designs, use CRES alloy 321 "R" designator.

For nominal use on fuel and oil systems.

Amendment Notations. The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. 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 and relationship to the previous issue.

Referenced documents. In addition to SAE-AS4875, this document references the following:

MIL-DTL-5541	ASTM F1136/F1136M
MIL-DTL-16232	ASTM MNL37
MIL-DTL-81706	SAE-AMS-C-81562
MIL-PRF-8625	SAE-AMS-STD-595
MIL-PRF-32647	SAE-AMS2417
ASME B46.1	SAE-AMS2486
ASTM B117	SAE-AMS2488
ASTM B633	SAE-AMS2700
ASTM B695	SAE-AMS-QQ-P-416
	T9070-AL-DPC-020/077-2

CONCLUDING MATERIAL

Custodians:

Army - AT
Navy - AS
Air Force – 71
DLA - CC

Preparing activity:

DLA - CC

(Project 4730-2021-036)

Review activities:

Navy - SA

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>.