

INCH-POUND

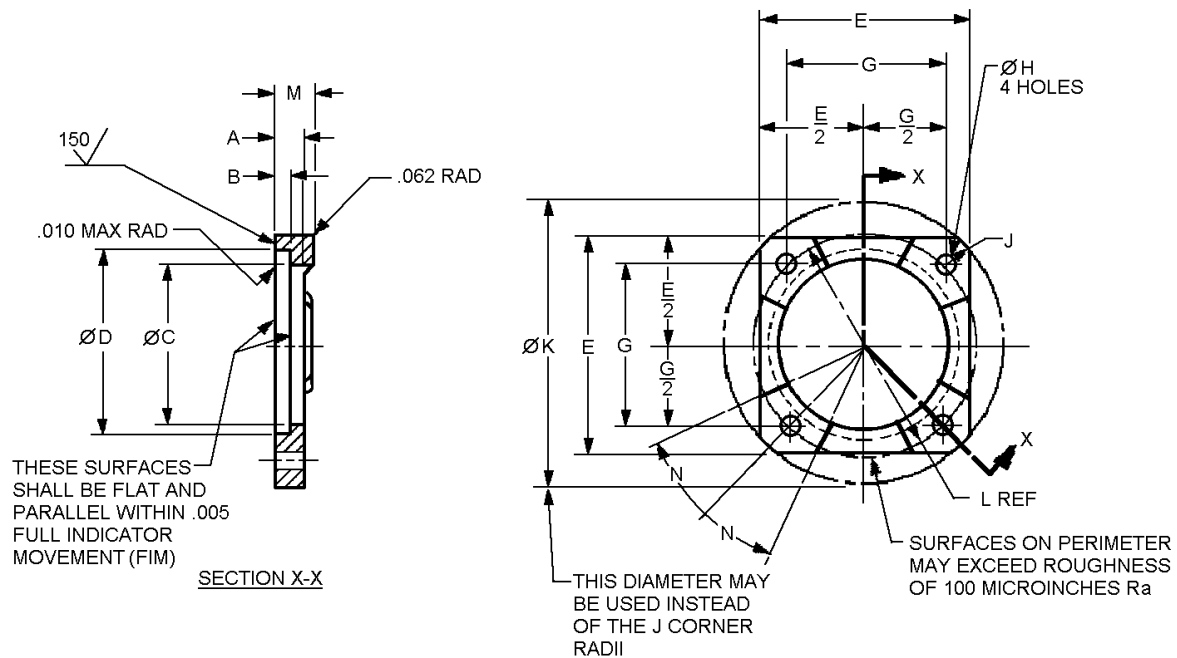
MS20756F  
 24 May 2011  
 SUPERSEDING  
 MS27056E  
 17 November 2009

## 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.



Inches	mm
.010	0.25
.062	1.57

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

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Size designator	Tubing OD and hose ID inches (mm)	A +.015 -.005 (+0.38 -0.13) inches (mm)	B +.005/- .000 (+0.13/-0.00) inches (mm)	C dia (see note 4) +.010/- .000 (+0.25/-0.00) inches (mm)	D dia (see note 4) +.005 (+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)			1.688 (42.88)	1.854 (47.09)	2.188 (55.58)	
24	1.500 (38.10)	.297 (7.54)	.168 (4.27)	1.938 (49.23)	2.135 (54.23)	2.375 (60.33)	±.020 (0.51)
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 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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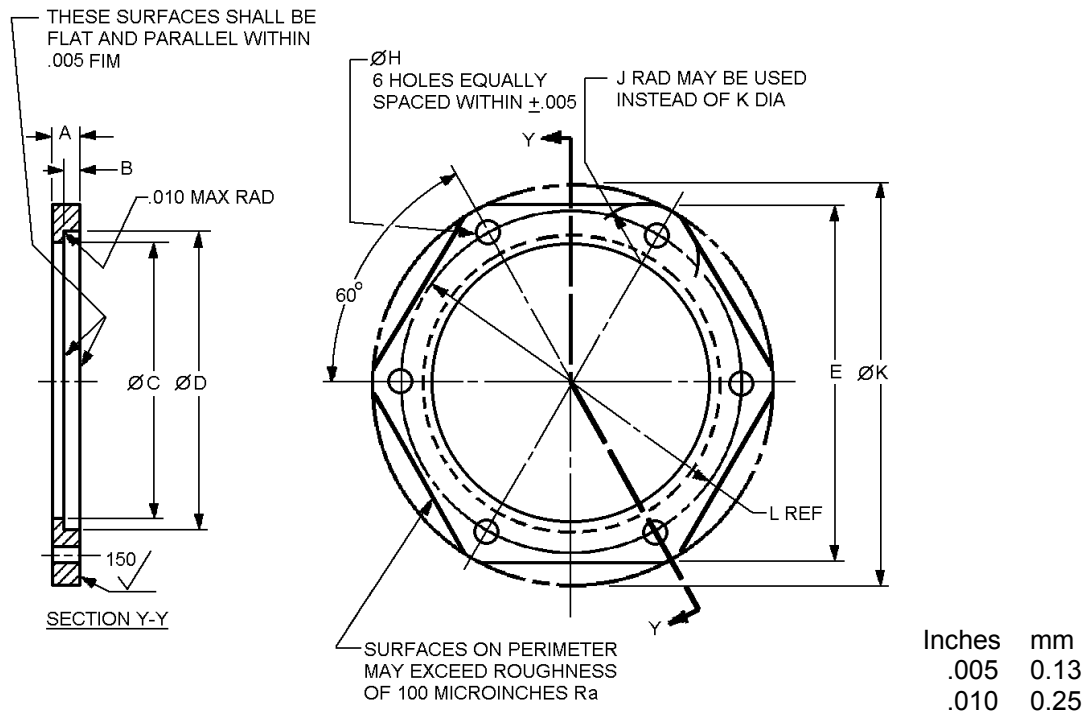
Size number	Weight max (estimated) lbs (gram)		
	Steel	Al alloy	Titanium
8	.03 (14)	.01 (5)	.02 (9)
10	.05 (23)	.02 (9)	.03 (14)
12	.08 (36)	.03 (14)	.04 (18)
16			
20	.14 (64)	.05 (23)	.07 (32)
24	.17 (77)	.06 (27)	.09 (41)
32	.25 (113)	.09 (41)	.13 (59)

## NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Unless otherwise, tolerances,  $\pm .005$  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  $\mu\text{m}$ ) 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 (+0.13/-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 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)

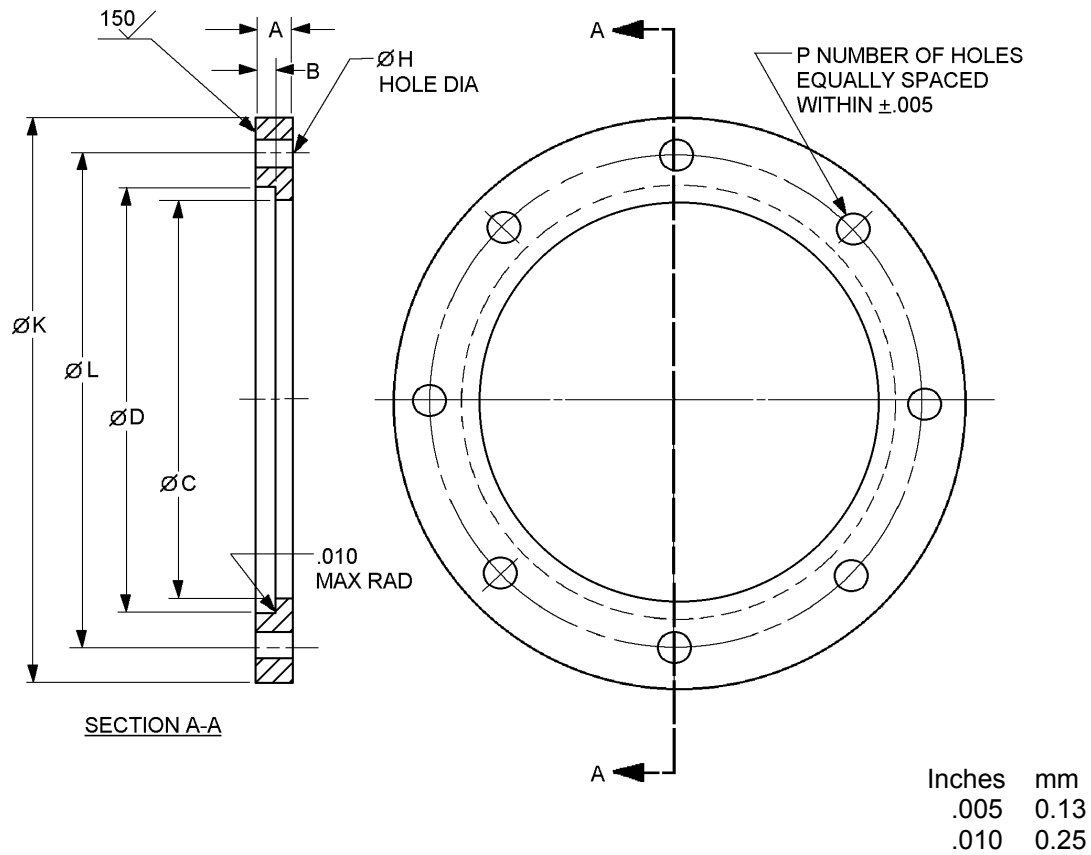
Size number	Weight max (estimated) lbs (gram)		
	Steel	Al alloy	Titanium
8	.03 (14)	.01 (5)	.02 (9)
10	.05 (23)	.02 (9)	.03 (14)
12	.08 (36)	.03 (14)	.04 (18)
16			
20	.14 (64)	.05 (23)	.07 (32)
24	.17 (77)	.06 (27)	.09 (41)
32	.25 (113)	.09 (41)	.13 (59)
40	.45 (204)	.16 (73)	.21 (95)
48	.53 (240)	.19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

## NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Unless otherwise, tolerances, ±.005 inch (0.13 mm) angles ±.5°.
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 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, tolerances, ±.005 inch (0.13 mm), angles ±.5°.
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 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 and designators 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	Aluminum alloy	CRES <u>2/</u>	CRES <u>3/</u>	Titanium <u>4/</u>
8	-8	-D8	-W8	-J8	-R8	-T8
10	-10	-D10	-W10	-J10	-R10	-T10
12	-12	-D12	-W12	-J12	-R12	-T12
16	-16	-D16	-W16	-J16	-R16	-T16
20	-20	-D20	-W20	-J20	-R20	-T20
24	-24	-D24	-W24	-J24	-R24	-T24
32	-32	-D32	-W32	-J32	-R32	-T32
40	-40	-D40	-W40	-J40	-R40	-T40
48	-48	-D48	-W48	-J48	-R48	-T48
56	-56	-D56	-W56	-J56	-R56	-T56
64	-64	-D64	-W64	-J64	-R64	-T64
80	-80	-D80	-W80	-J80	-R80	-T80
96	-96	-D96	-W96	-J96	-R96	-T96
112	-112	-D112	-W112	-J112	-R112	-T112

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

2/ Inactive material code: PINs with material code letter J are inactive for new design as of 2009-02. Use PINs with material code letter R for new design.

3/ Corrosion resistant steel (CRES).

4/ Titanium shall not be used in potable water or oxygen systems.

Finishes. Finishes for the flange shall be in accordance with SAE-AS4875.

Finish designators shall be as specified in table II.



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TABLE II. Flange finish code. 1/

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.
	Aluminum	Anodize in accordance with MIL-A-8625, type II. <u>2/</u>
	CRES	No additional finish. Passivation in accordance with SAE-AMS2700, type 6 or 7.
	Titanium <u>3/</u>	Fluoride phosphated in accordance with SAE-AMS2486.
-A	Steel	Aluminum-nickel in accordance with ASTM F1136, grade 3, NC
-D	Aluminum	Anodize above with NAVAIR trivalent chromium pretreatment (TCP) in accordance with MIL-DTL-81706, type II, class 1A. <u>2/</u>
-CN	Steel	Cadmium plating in accordance with SAE-AMS-C-81562, type II, class 3 or SAE-AMS-QQ-P-416, type II, class 2 with NAVAIR TCP in accordance with MIL-DTL-81706, type II, class 1A.
-F	Steel	NAVAIR TCP in accordance with MIL-DTL-81706, type II, class 1A. <u>2/</u>
-G	Steel	Zinc plating with colorless passivate in accordance with ASTM B633, type V, Fe/Zn 25.
-H	Steel	Zinc phosphate finish in accordance MIL-DTL-16232 type Z, class1. <u>5/</u>
-J	Steel	Zinc plating in accordance with ASTM B633; type II or III, Fe/Zn 5, or ASTM B695, type II, class 5.
-N	Steel	NAVAIR TCP in accordance with MIL-DTL-81706, type II, class 1A.
-R	Steel	Zinc plating in accordance with ASTM B633; type VI, Fe/Zn 5.
-T	Titanium <u>3/ 4/</u>	Anodized in accordance with SAE-AMS2488, type 2
-V	Steel	Zinc-nickel in accordance with SAE-AMS2417, type 1.
-Z	Steel	Zinc may be any zinc plating's from PIN codes H, J, R, V.
-ZN	Steel	Zinc may be any zinc plating's from PIN codes H, J, R, V with NAVAIR TCP in accordance with MIL-DTL-81706, type II, class 1A.

1/ Shall be capable of withstanding minimum of 96 hours salt spray.

2/ Die light blue.

3/ Titanium shall not be used in oxygen systems.

4/ Color equivalent to numbers /36076, /36081, /36099, /36118, /36134, /36152, /36170, /36173, and /36176 in accordance with FED-STD-595.

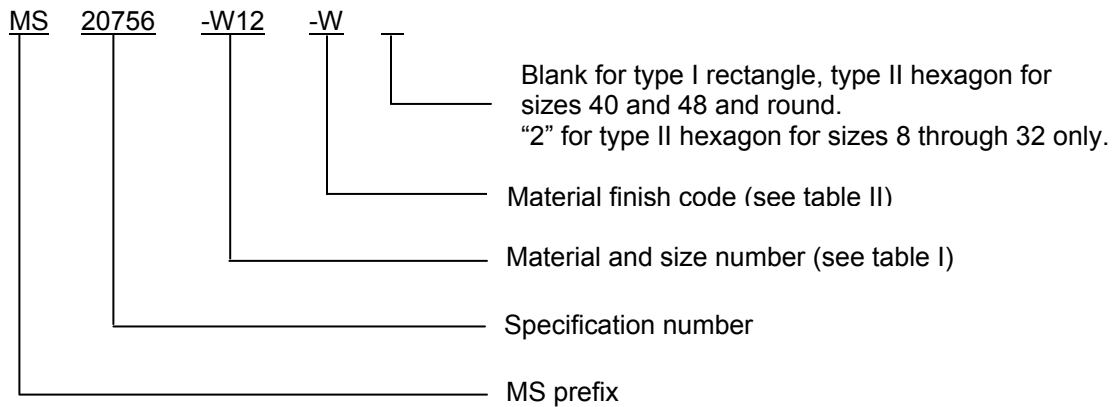
5/ Hexavalent chromium free.

Trivalent wrenchability. When the finish has been damaged due to poor wrenchability, the surface of the connector 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 hard chromium by electrodeposition shall be in accordance with SAE-AMS-2451/5.
- Brush plating of medium-hardness, low stress nickel by electrodeposition shall be in accordance with SAE-AMS-2451/9.
- Brush plating of NAVAIR TCP shall be in accordance with MIL-DTL-81706, type II, class 1A, material form 1 through 6, application method B. Example of a PIN: M817062A6B.

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PIN example:



MS20756-W12W indicates: Flange, .750 inch (19.05 mm) tube ID, aluminum anodized with NAVAIR TCP, type I rectangle.

MS20756-W12-W2 indicates: Flange, .750 inch (19.05 mm) tube ID, aluminum anodized with NAVAIR TCP, type II hexagon.

MS20756-56-CN 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 with NAVAIR TCP in accordance with MIL-DTL-81706, type II, class 1A 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.

Supersession data: Due to stress corrosion cracking aluminum alloys 2014 and 2024 "D" designator have been replaced by aluminum alloy 7075 "W" designator.

For nominal use on fuel and oil systems.

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.

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

MIL-A-8625	FED-STD-595/36152	SAE-AMS-C-81562
MIL-DTL-16232	FED-STD-595/36170	SAE-AMS-QQ-P-416
MIL-DTL-81706	FED-STD-595/36173	SAE-AMS2700
FED-STD-595/36076	FED-STD-595/36176	SAE-AMS2417
FED-STD-595/36081	ASME B46.1	SAE-AMS-2451/5
FED-STD-595/36099	ASTM B633	SAE-AMS-2451/9
FED-STD-595/36118	ASTM B695	SAE-AMS2486
FED-STD-595/36134	ASTM F1136	SAE-AMS2488

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CONCLUDING MATERIAL

Custodians:

Army - AV  
Navy - AS  
Air Force - 99  
DLA - CC

Preparing activity:  
DLA - CC

(Project 4730-2011-037)

Review activities:

Army - AT  
Navy - SA  
Air Force - 85

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.daps.dla.mil>.