

RATIONALE

COLUMN HEADINGS IN TABLES 1A AND 1B REVISED. INTRODUCE NEW DASH SIZES, -39, -41, -47, AND -49, TO TABLES. INTRODUCE CARBON STEEL WITH ZN-NI PLATING AS A BAND MATERIAL OPTION. CITRIC ACID BATH METHOD 2 ADDED AS AN ALTERNATE TO EXISTING PASSIVATION. OPTIONAL CHEMICAL FILM FINISHED "TYPE II" ADDED WHICH CONTAINS NO HEXAVALENT CHROMIUM. NOTE /17/ UPDATED ACCORDINGLY. NEW NOTE /21/ ADDED, DIRECTING THE USER TO APPROPRIATE DOCUMENTS FOR BAND THICKNESS TOLERANCES. SUPERSESION TABLE 3 ADDED.

REV. C
AS21919™

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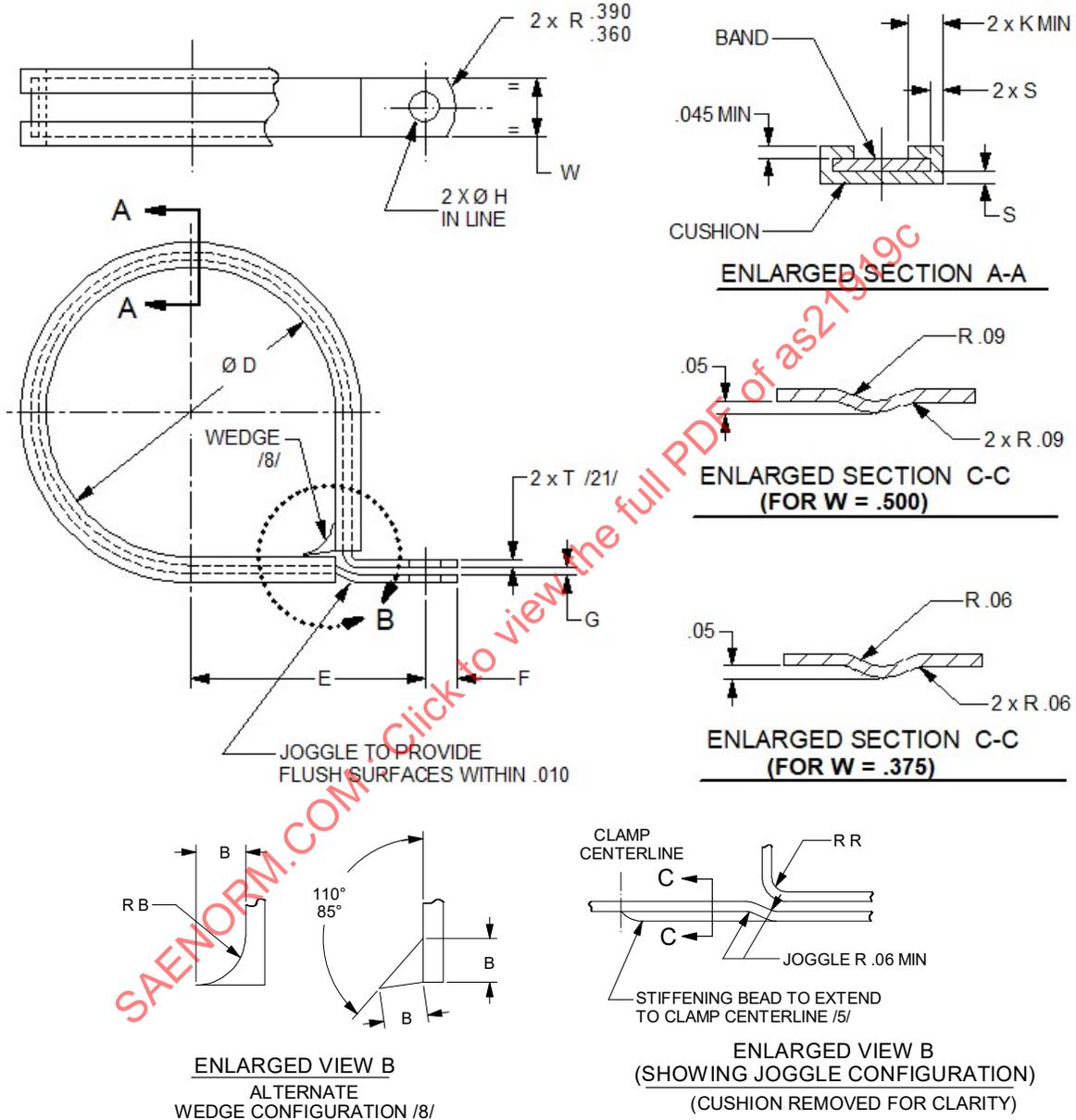
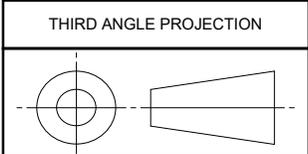


FIGURE 1 - CLAMP

For more information on this standard, visit
<https://www.sae.org/standards/content/AS21919C/>



CUSTODIAN: G-3/G-3E

PROCUREMENT SPECIFICATION: NONE



AEROSPACE STANDARD

CLAMP, LOOP TYPE, CUSHIONED SUPPORT

AS21919™
SHEET 1 OF 7

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TABLE 1A - SIZE CODE AND DIMENSIONS D, E, K, AND T /18/

SIZE CODE /17/	TUBE DIA OD (REF)	D ±.015	E		K STEEL, ALUM WITHOUT CODE "Y" /17/	K ALUM CODE "Y" /17/ /18/	K STEEL CODE "Y" /17/ /18/	T /21/ ALUM ALLOY	T /21/ STEEL
			±.015 ALUM ALLOY	±.015 STEEL					
01	.062	.062	.436	.436	.225	.170	.170	.020	.020
02	.125	.125	.457	.457	.225	.225	.170	.032	.032
03	.188	.188	.498	.498	.225	.225	.170	.032	.032
04	.250	.250	.529	.529	.225	.225	.170	.032	.032
05	.313	.313	.560	.560	.225	.225	.170	.032	.032
06	.375	.375	.592	.592	.225	.225	.170	.032	.032
07	.438	.438	.623	.623	.225	.225	.170	.032	.032
08	.500	.500	.654	.654	.225	.225	.170	.032	.032
09	.563	.563	.752	.749	.225	.225	.225	.050	.032
10	.625	.625	.783	.780	.225	.225	.225	.050	.032
11	.688	.688	.814	.811	.225	.225	.225	.050	.032
12	.750	.750	.845	.842	.225	.225	.225	.050	.032
13	.813	.813	.877	.858	.225	.225	.225	.050	.032
14	.875	.875	.908	.889	.225	.225	.225	.050	.032
15	.938	.938	.939	.920	.225	.225	.225	.050	.032
16	1.000	1.000	.970	.951	.225	.225	.225	.050	.032
17	1.063	1.063	1.002	.983	.225	.225	.225	.050	.032
18	1.125	1.125	1.062	1.030	.225	.225	.225	.062	.032
19	1.188	1.188	1.093	1.061	.225	.225	.225	.062	.032
20	1.250	1.250	1.124	1.092	.225	.225	.225	.062	.032
21	1.313	1.313	1.156	1.124	.225	.225	.225	.062	.032
22	1.375	1.375	1.187	1.155	.225	.225	.225	.062	.032
23	1.438	1.438	1.218	1.186	.225	.225	.225	.062	.032
24	1.500	1.500	1.249	1.217	.225	.225	.225	.062	.032
25	1.563	1.563	1.281	1.259	.225	.225	.225	.062	.032
26	1.625	1.625	1.312	1.280	.225	.225	.225	.062	.032
27	1.688	1.688	1.344	1.312	.225	.225	.225	.062	.032
28	1.750	1.750	1.374	1.342	.225	.225	.225	.062	.032
29	1.813	1.813	1.406	1.374	.225	.225	.225	.062	.032
30	1.875	1.875	1.437	1.405	.225	.225	.225	.062	.032
31	1.938	1.938	1.468	1.444	.225	.225	.225	.062	.040
32	2.000	2.000	1.499	1.475	.225	.225	.225	.062	.040
33	2.062	2.062	1.531	1.507	.225	.225	.225	.062	.040
34	2.125	2.125	1.562	1.538	.225	.225	.225	.062	.040
35	2.188	2.188	1.594	1.570	.225	.225	.225	.062	.040
36	2.250	2.250	1.624	1.600	.225	.225	.225	.062	.040
37	2.312	2.312	1.655	1.631	.225	.225	.225	.062	.040
38	2.375	2.375	1.687	1.663	.225	.225	.225	.062	.040
39	2.437	2.437	1.719	1.695	.225	N/A 1/	N/A 1/	.062	.040
40	2.500	2.500	1.752	1.728	.225	.225	.225	.062	.040
41	2.562	2.562	1.781	1.757	.225	N/A 1/	N/A 1/	.062	.040
42	2.625	2.625	1.812	1.788	.225	.225	.225	.062	.040
43	2.688	2.688	1.844	1.820	.225	.225	.225	.062	.040
44	2.750	2.750	1.875	1.851	.225	.225	.225	.062	.040
45	2.812	2.812	1.906	1.882	.225	.225	.225	.062	.040
46	2.875	2.875	1.937	1.913	.225	.225	.225	.062	.040
47	2.937	2.937	1.969	1.945	.225	N/A 1/	N/A 1/	.062	.040
48	3.000	3.000	2.000	1.976	.225	.225	.225	.062	.040
49	3.062	3.062	2.031	2.007	.225	N/A 1/	N/A 1/	.062	.040
50	3.125	3.125	2.062	2.038	.225	.225	.225	.062	.040
52	3.250	3.250	2.125	2.101	.225	.225	.225	.062	.040
54	3.375	3.375	2.187	2.163	.225	.225	.225	.062	.040
56	3.500	3.500	2.250	2.226	.225	.225	.225	.062	.040
58	3.625	3.625	2.312	2.288	.225	.225	.225	.062	.040
64	4.000	4.000	2.500	2.476	.225	.225	.225	.062	.040
66	4.125	4.125	2.562	2.538	.225	.225	.225	.062	.040

1/ DASH SIZES 39, 41, 47, 49 WERE INTRODUCED AT REVISION C. VALUES IN THESE COLUMNS REPRESENT THE DIMENSIONS THAT EXISTED PREVIOUSLY ON MS21919. SINCE THESE DASH SIZES WERE NOT ON MS21919, CODE LETTER "Y" FOR THESE NEW DASH SIZES ARE NOT APPLICABLE.

TABLE 1B - SIZE CODE AND DIMENSIONS W AND F /18/

SIZE CODE	TUBE DIA OD (REF)	W	W	W	F ±.010	F ±.015	F ±.015
		STEEL, ALUM WITHOUT CODE "Y" /17/	ALUM CODE "Y" /17/ /18/	STEEL CODE "Y" /17/ /18/	STEEL, ALUM WITHOUT CODE "Y" /17/	ALUM CODE "Y" /17/ /18/	CRES CODE "Y" /17/ /18/
01	.062	.500	.375	.375	.219	.188	.188
02	.125	.500	.500	.375	.219	.219	.188
03	.188	.500	.500	.375	.219	.219	.188
04	.250	.500	.500	.375	.219	.219	.188
05	.313	.500	.500	.375	.219	.219	.188
06	.375	.500	.500	.375	.219	.219	.188
07	.438	.500	.500	.375	.219	.219	.188
08	.500	.500	.500	.375	.219	.219	.188
09	.563	.500	.500	.500	.219	.219	.219
10	.625	.500	.500	.500	.219	.219	.219
11	.688	.500	.500	.500	.219	.219	.219
12	.750	.500	.500	.500	.219	.219	.219
13	.813	.500	.500	.500	.219	.219	.219
14	.875	.500	.500	.500	.219	.219	.219
15	.938	.500	.500	.500	.219	.219	.219
16	1.000	.500	.500	.500	.219	.219	.219
17	1.063	.500	.500	.500	.219	.219	.219
18	1.125	.500	.500	.500	.219	.219	.219
19	1.188	.500	.500	.500	.219	.219	.219
20	1.250	.500	.500	.500	.219	.219	.219
21	1.313	.500	.500	.500	.219	.219	.219
22	1.375	.500	.500	.500	.219	.219	.219
23	1.438	.500	.500	.500	.219	.219	.219
24	1.500	.500	.500	.500	.219	.219	.219
25	1.563	.500	.500	.500	.219	.219	.219
26	1.625	.500	.500	.500	.219	.219	.219
27	1.688	.500	.500	.500	.219	.219	.219
28	1.750	.500	.500	.500	.219	.219	.219
29	1.813	.500	.500	.500	.219	.219	.219
30	1.875	.500	.500	.500	.219	.219	.219
31	1.938	.500	.500	.500	.219	.219	.219
32	2.000	.500	.500	.500	.219	.219	.219
33	2.062	.500	.500	.500	.219	.219	.219
34	2.125	.500	.500	.500	.219	.219	.219
35	2.188	.500	.500	.500	.219	.219	.219
36	2.250	.500	.500	.500	.219	.219	.219
37	2.312	.500	.500	.500	.219	.219	.219
38	2.375	.500	.500	.500	.219	.219	.219
39	2.437	.500	N/A 1/	N/A 1/	.219	N/A 1/	N/A 1/
40	2.500	.500	.500	.500	.219	.219	.219
41	2.562	.500	N/A 1/	N/A 1/	.219	N/A 1/	N/A 1/
42	2.625	.500	.500	.500	.219	.219	.219
43	2.688	.500	.500	.500	.219	.219	.219
44	2.750	.500	.500	.500	.219	.219	.219
45	2.812	.500	.500	.500	.219	.219	.219
46	2.875	.500	.500	.500	.219	.219	.219
47	2.937	.500	N/A 1/	N/A 1/	.219	N/A 1/	N/A 1/
48	3.000	.500	.500	.500	.219	.219	.219
49	3.062	.500	N/A 1/	N/A 1/	.219	N/A 1/	N/A 1/
50	3.125	.500	.500	.500	.219	.219	.219
52	3.250	.500	.500	.500	.219	.219	.219
54	3.375	.500	.500	.500	.219	.219	.219
56	3.500	.500	.500	.500	.219	.219	.219
58	3.625	.500	.500	.500	.219	.219	.219
64	4.000	.500	.500	.500	.219	.219	.219
66	4.125	.500	.500	.500	.219	.219	.219

1/ DASH SIZES 39, 41, 47, 49 WERE INTRODUCED AT REVISION C. VALUES IN THESE COLUMNS REPRESENT THE DIMENSIONS THAT EXISTED PREVIOUSLY ON MS21919. SINCE THESE DASH SIZES WERE NOT ON MS21919, CODE LETTER "Y" FOR THESE NEW DASH SIZES ARE NOT APPLICABLE.

TABLE 1C - DIMENSIONS B, G, H, R, AND S /18/

SIZE CODE RANGE	B	G	H ±.005	H ±.005	R	S	S
			WITHOUT	CODE "Y"		WITHOUT	WITHOUT
/17/			CODE "Y"	CODE "Y"	±.016	CODE "Y"	CODE "Y"
			/17/	/17/ /18/		/17/	/17/ /18/
01	/8/	.062-.078	.223	.204	.062	.040	.040
02-03	.046-.110	.062-.078	.223	.204	.062	.040	.040
04-08	.093-.125	.062-.078	.223	.204	.062	.040	.040
09-10	.093-.125	.062-.078	.223	.204	.109	.040	.040
11-17	.155-.312	.062-.078	.223	.204	.109	.060	.040
18-30	.155-.312	.094-.125	.223	.204	.125	.060	.060
31-49	.155-.312	.125-.156	.223	.204	.125	.060	.060
50-66	/8/	.125-.156	.223	.204	.125	.060	.060

NOTES:

1/ MATERIAL:

BAND: /4/

- a. CODE LETTER K: LOW CARBON STEEL 1010 PER AMS5040 WITH ASTM A109 COLD ROLLED TEMPER NO. 4 TENSILE PROPERTIES OR 1020 PER AMS5046 TYPE 1.
- b. CODE LETTER C: TYPE 321 CORROSION RESISTANT STEEL PER AMS5510.
- c. CODE LETTER D: 2024-0 ALUMINUM ALLOY PER AMS-QQ-A-250/5 OR AMS4461.

CUSHION: /4/ /7/

- a. CODE LETTER E: ETHYLENE PROPYLENE PER MIL-DTL-85052/2 OR AMS3253.
- b. CODE LETTER F: NITRILE PER MIL-DTL-85052/1 OR AMS3224 /12/
- c. CODE LETTER G: CHLOROPRENE PER AMS3209 AND OZONE RESISTANCE REQUIREMENTS PER NOTE /11/.
- d. CODE LETTER H: SILICONE PER AMS3310.
- e. CODE LETTER J: FLUOROSILICONE PER MIL-DTL-25988, TYPE II, CLASS 1, GRADE 60.

2. HEAT TREATMENT:

- a. MATERIAL CODE LETTER D: HEAT TREAT TO T42 TEMPER IN ACCORDANCE WITH AMS2770 OR AMS2772.

3. FINISH:

- a. BAND MATERIAL CODE LETTER K: LOW HYDROGEN EMBRITTLEMENT ZINC NICKEL PLATING PER AMS2461, TYPE II, CLASS 2, COLOR BLACK.
- b. BAND MATERIAL CODE LETTER C: PASSIVATE PER AMS2700, METHOD 1, TYPE 6 OR TYPE 7, OR METHOD 2
- c. BAND MATERIAL CODE LETTER D:
 - NO ADDITIONAL CODE LETTER: CHEMICAL CONVERSION COATING PER MIL-DTL-5541, TYPE I, CLASS 1A.
 - CODE LETTER N: CHEMICAL CONVERSION COATING PER MIL-DTL-5541, TYPE II, CLASS 1A. /17/

- /4/ MATERIAL COMBINATION CODES: LETTER (S) INDICATE BAND AND CUSHION MATERIAL CODES. DO NOT SPECIFY BAND/CUSHION COMBINATIONS NOT LISTED. MAXIMUM RECOMMENDED TEMPERATURE IS INDICATED IN PARENTHESES. SEE NOTE /7/ FOR MAXIMUM RECOMMENDED TEMPERATURE RANGE AND OTHER USAGE INFORMATION.
- a. DE = ALUMINUM ALLOY BAND WITH ETHYLENE PROPYLENE CUSHION (275 °F).
 - b. DF = ALUMINUM ALLOY BAND WITH NITRILE CUSHION (275 °F).
 - c. DG = ALUMINUM ALLOY BAND WITH CHLOROPRENE CUSHION (212 °F).
 - d. CE = CRES BAND WITH ETHYLENE PROPYLENE CUSHION (275 °F).
 - e. CF = CRES BAND WITH NITRILE CUSHION (275 °F).
 - f. CG = CRES BAND WITH CHLOROPRENE CUSHION (212 °F).
 - g. CH = CRES BAND WITH SILICONE CUSHION (392 °F).
 - h. CJ = CRES BAND WITH FLUOROSILICONE CUSHION (392 °F).
 - i. KF = LOW CARBON STEEL WITH NITRILE CUSHION (275 °F).
 - j. KG = LOW CARBON STEEL WITH CHLOROPRENE CUSHION (212 °F).
 - k. KH = LOW CARBON STEEL WITH SILICONE CUSHION (392 °F).
- /5/ STIFFENING BEAD SHALL BE REQUIRED ON SIZE -04 THRU -24. ALL RADII ON THE STIFFENING BEAD SHALL BE SMOOTH AND BLENDED. NO SHARP TOOL MARKS ARE ALLOWED.
6. IDENTIFICATION: MARK PART NUMBER AND MANUFACTURER'S NAME, TRADEMARK, OR CAGE CODE PER AS478-2A1. DO NOT MARK ON INTERNAL RADIUS.
- /7/ CUSHION APPLICATION AND COLOR INFORMATION: /1/ /4/
- a. CUSHION CODE LETTER E: FOR USE IN AREAS EXPOSED TO PHOSPHATE ESTER HYDRAULIC FLUID AND OTHER SYNTHETIC FLUIDS. EXCELLENT OZONE RESISTANCE. NOT RESISTANT TO PETROLEUM BASED FLUIDS. COLOR SHALL BE PURPLE. (MAXIMUM RECOMMENDED TEMPERATURE 275 °F.)
 - b. CUSHION CODE LETTER F: FOR USE PRIMARILY IN FUEL IMMERSION AND FUEL VAPORS. GOOD OZONE RESISTANCE. NOT RESISTANT TO PHOSPHATE ESTER BASED FLUIDS. COLOR SHALL BE SOLID YELLOW. (MAXIMUM RECOMMENDED TEMPERATURE 275 °F.)
 - c. CUSHION CODE LETTER G: FOR GENERAL PURPOSE USE IN AREAS EXPOSED TO PETROLEUM BASED HYDRAULIC FLUIDS AND OCCASIONAL FUEL SPLASH. EXCELLENT OZONE RESISTANCE. NOT RESISTANT TO PHOSPHATE ESTER BASED FLUIDS. NOT FOR USE ON TITANIUM TUBING. COLOR SHALL BE BLACK WITH A BLUE IDENTIFIER. SEE NOTE /10/. (MAXIMUM RECOMMENDED TEMPERATURE 212 °F.)
 - d. CUSHION CODE LETTER H: FOR ELEVATED TEMPERATURE USAGE IN AREAS EXPOSED TO PHOSPHATE ESTER BASED FLUID AND OTHER SYNTHETIC FLUIDS. UNAFFECTED BY OZONE. NOT RESISTANT TO PETROLEUM BASED FLUIDS. COLOR SHALL BE NATURAL WHITE. (MAXIMUM RECOMMENDED TEMPERATURE 392 °F.)
 - e. CUSHION CODE LETTER J: FOR ELEVATED TEMPERATURE USAGE IN AREAS EXPOSED TO PETROLEUM BASED FLUIDS. UNAFFECTED BY OZONE. NOT RESISTANT TO PHOSPHATE ESTER BASED FLUIDS. COLOR SHALL BE SOLID BLUE. (MAXIMUM RECOMMENDED TEMPERATURE 392 °F.)
- /8/ CODE LETTER W INDICATES WEDGE TYPE CUSHION. WEDGE IS MANDATORY FOR -02 THRU -48 SIZE CLAMPS. WEDGE IS PROHIBITED ON -01 AND -50 THRU -66 SIZE CLAMPS. WEDGE SHALL BE INTEGRALLY MOLDED TO CUSHION OR VULCANIZED USING PRESSURE AND HEAT TO ACCOMPLISH A BOND BETWEEN CUSHION AND WEDGE. THE COMPLETE BASE OF THE WEDGE SHALL OVERLAP AND SEAT ATOP THE OPPOSITE END OF THE CUSHION FOR DIM B MIN WHEN CLAMP MOUNTING HOLES ARE ALIGNED AND DIMENSION G IS ZERO (CLAMP COMPLETELY CLOSED). ADDITIONALLY, WHEN DIMENSION G IS ZERO, NEITHER WEDGE END OF CUSHION NOR THE OPPOSITE END SHALL EXTEND INTO THE GAP BETWEEN CLAMP'S FEET.
9. CLOSURE TEST: THE CLAMP SHALL BE INSTALLED ON A BAR HAVING A DIAMETER EQUAL TO THE NOMINAL D DIMENSION WITHIN ±.001 INCH. DIMENSION G (GAP) SHALL BE RESTRAINED WITHIN THE SPECIFIED TOLERANCE LIMITS AND THE HOLES SHALL BE IN ALIGNMENT WITHIN .010 INCH. THE BAND WIDTH STRAIGHTNESS (PARALLEL TO THE BAR AXIS) SHALL BE WITHIN .010 EXCEPT IN THE AREA OF THE STIFFENING BEAD.

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	CLAMP, LOOP TYPE, CUSHIONED SUPPORT		