

RATIONALE

IMPROVED CLAMPS FOR WIRE APPLICATIONS ARE NEEDED TO ADDRESS INSTALLATION AND MAINTENANCE FOR AEROSPACE VEHICLES.

NOTICE

THE REQUIREMENTS FOR PROCURING THE PRODUCT DESCRIBED HEREIN SHALL CONSIST OF THIS SPECIFICATION SHEET AND THE LATEST ISSUE OF: SAE AS23190.

FEDERAL SUPPLY CLASS
5340

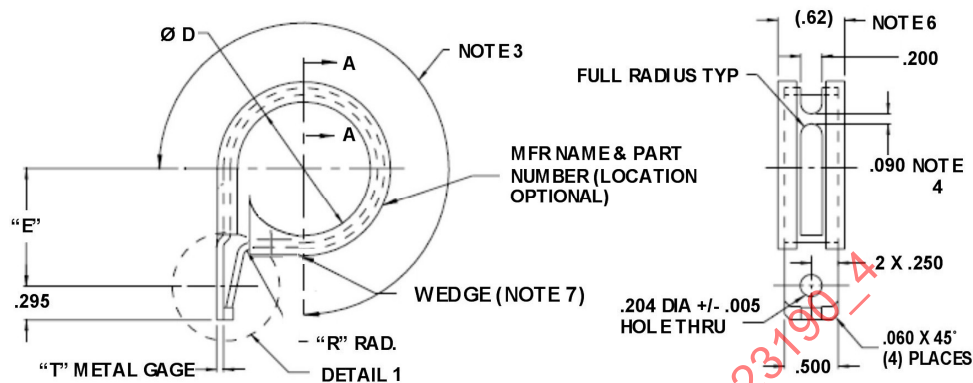
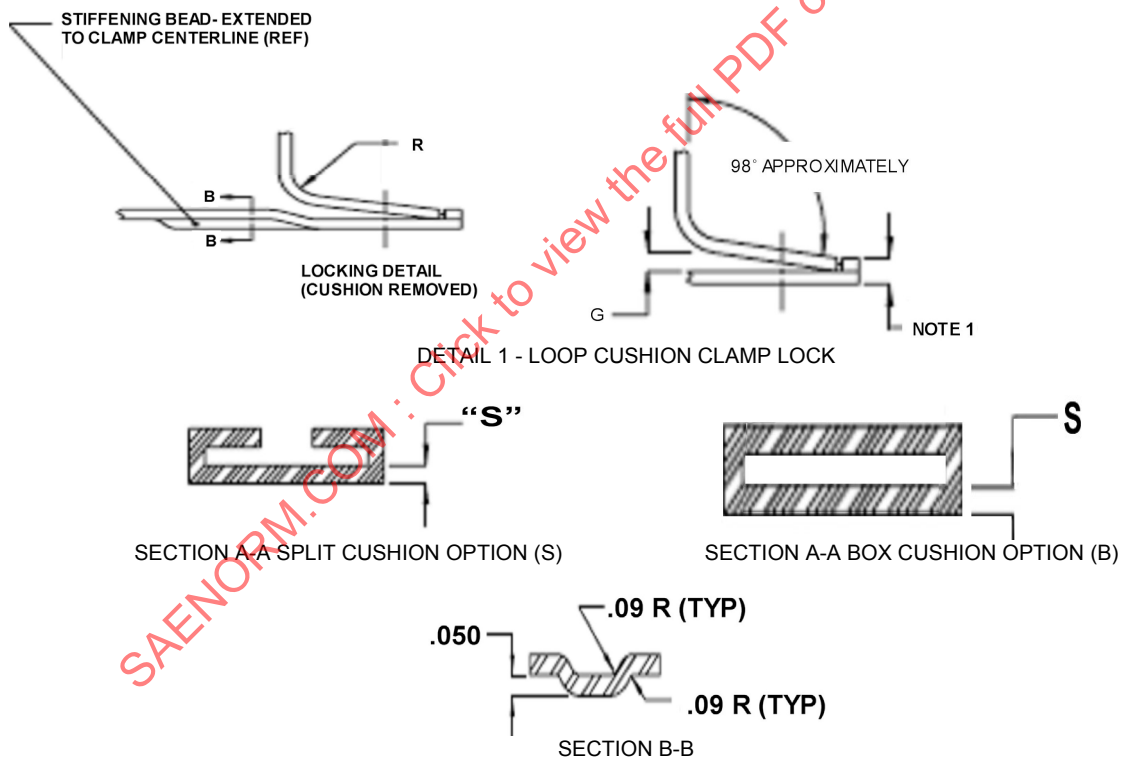
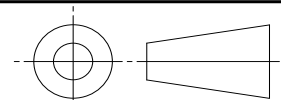


FIGURE 1 - LOOP CUSHION CLAMP



SAE values your input. To provide feedback on this Technical Report, please visit <http://www.sae.org/technical/standards/AS23190/4>

THIRD ANGLE PROJECTION



CUSTODIAN: SAE AE-8/AE-8C2

PROCUREMENT SPECIFICATION: AS23190

SAE Aerospace
An SAE International Group

AEROSPACE STANDARD

MOUNTING HARDWARE, CUSHION CLAMP,
METAL FOR CABLE HARNESS TYING AND
SUPPORT, TYPE V, CLASS 1

SAE AS23190/4
SHEET 1 OF 11

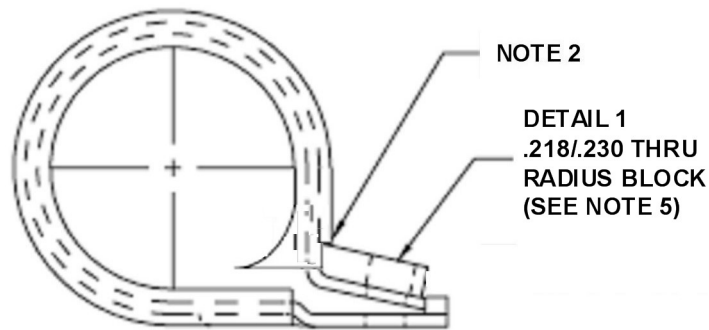
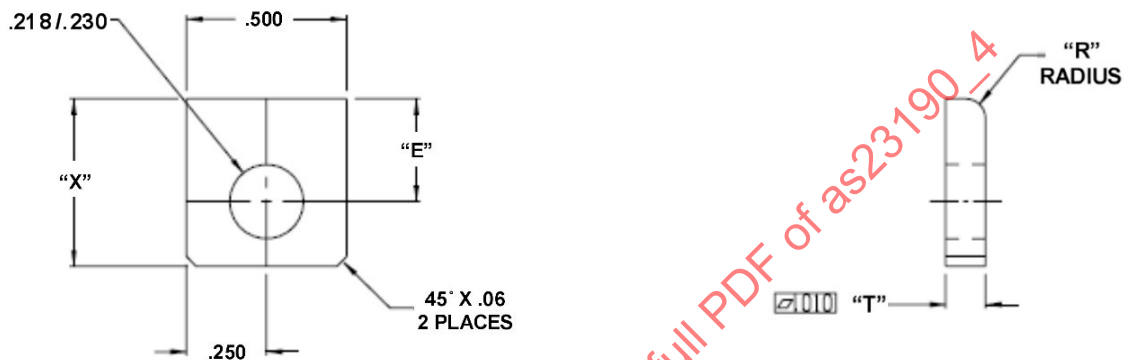


FIGURE 2 - RADIUS BLOCK LOOP CUSHION CLAMP (FIGURE 1 DIMENSIONS APPLICABLE)



DETAIL 1 - CUSHION CLAMP (RADIUS BLOCK)

FIGURES 1 AND 2 NOTES:

1. MAXIMUM HEIGHT OF BRIDGE AS SPECIFIED IN TABLE 4.
2. CUSHION SHALL BE NOTCHED (.125 HIGH) IN AREA SHOWN TO ACCOMMODATE RADIUS BLOCK
3. WEIGHT REDUCING HOLES SHALL BE CENTERED IN THIS AREA. LENGTH OF HOLE PATTERN SHALL BE LIMITED TO 270° AREA SHOWN. A FULL RADIUS HOLE IS PERMITTED. NUMBER OF HOLES PER CLAMP SIZE IS LISTED IN TABLE 4.
4. ADD REINFORCING BRIDGES AS FOLLOW: SIZE 2 THRU 12 (NO BRIDGE), SIZES 13 THRU 27 (1 BRIDGE), SIZES 28 THRU 40 (2 BRIDGES), SIZES 42 THRU 54 (3 BRIDGES), SIZES 56 THRU 66 (4 BRIDGES). SPACING SHALL COMPLY WITH NOTE 3.
5. RADIUS BLOCK SHALL BE ATTACHED TO CLAMP FOOT EITHER BY WELDING (2 PLACES MINIMUM) OR ALTERNATE PERMANENT METHOD OTHER THAN THE USE OF ADHESIVE. ONCE FASTENED, CLAMP HALVES SHALL REST TOGETHER WITH NO GAP PRESENT. ADHESIVE BONDING FOR STAINLESS STEEL MATERIAL IS ACCEPTABLE.
6. REFERENCE DIMENSION .58 FOR ALUMINUM CLAMPS SIZES 5 THRU 17.
7. THE CUSHION IN THE CLAMP'S LOCK POSITION SHALL OVERLAP (SEE REQUIREMENT 8).

REQUIREMENTS:

1. MATERIAL (SEE TABLE 1 AND 2):

TABLE 1 - CLAMP LOOP BASE MATERIALS

CLAMP LOOP MATERIAL DESIGNATION	CLAMP LOOP BASE MATERIAL ^{1/}	HEAT TREATMENT	CLAMP LOOP FINISH
A	2024-T42 ALUMINUM ALLOY PER AMS-QQ-A-250/5	AMS6806 OR AMS2770 CONDITION T42	MIL-DTL-5541 CLASS 1A
P	17-7PH CORROSION RESISTANT STEEL PER AMS5528	AMS-H-6875 OR AMS2759/3 TH1100 AFTER FORMING	AMS-QQ-P-35 PASSIVATED
S	AMS5510 STAINLESS STEEL	N/A	AMS-QQ-P-35 PASSIVATED

^{1/} SEE TABLE 3 FOR BLOCK MATERIAL

TABLE 2 - CLAMP LOOP CUSHION MATERIALS WITH MOLDED WEDGE

CUSHION MATERIAL DESIGNATION	CUSHION COLOR (TEMPERATURE RATING)	CUSHION MATERIAL
EW	PURPLE ^{1/} (275 °F)	M85052/2 ETHYLENE PROPYLENE
FW	BLUE (400 °F)	MIL-R-25988, TYPE II, CLASS 1, GRADE 60 FLUOROSILICONE
GW	BLACK WITH BLUE STRIPES ^{1/} (212 °F)	AMS3209 CHLOROPRENE
HW	LIGHT BLUE (500 °F)	MIL-C-85052/3 SILICONE RUBBER, FABRIC REINFORCED (HIGH TEMPERATURE)
TW	PIGMENTED WHITE (550 °F)	POLY-TETRAFLUOROETHYLENE (PTFE) PER AMS3660

^{1/} MATERIAL IS INACTIVE FOR NEW DESIGN. EXTRUDED MATERIAL GW SHALL BE IDENTIFIED BY A BLUE STRIPE EXTENDING LENGTHWISE ALONG BOTH EDGES OF THE CUSHION. THE STRIPE WIDTH SHALL BE EQUAL TO THE WIDTH OF THE CUSHION EDGE. MOLDED MATERIAL SHALL BE IDENTIFIED BY A BLUE AREA AT THE WEDGE END. THE BLUE AREA SHALL BE ON ONE OR BOTH EDGES OF THE CUSHION AND MAY INCLUDE THE WEDGE AND SHALL HAVE A MINIMUM LENGTH OF .125 INCH TO A MAXIMUM OF .750 INCH. THE BLUE AREA SHALL BE LOCATED WITHIN AN AREA NOT TO EXCEED 1.50 INCH OR 50% OF THE TOTAL CUSHION LENGTH, WHICHEVER IS SMALLER, WHEN MEASURED FROM THE WEDGE END. IN NO CASE SHALL THE BLUE AREA EXTEND BEYOND 50% OF THE CUSHION LENGTH. THE MATERIAL USED FOR THE BLUE IDENTIFIER SHALL BE THE SAME AS THE CUSHION MATERIAL EXCEPT COLOR BLUE. INKING OR OTHER SURFACE COLORING METHODS SHALL NOT BE USED.

2. CLAMP EXAMINATION (SEE TABLES 3 AND 4 AND FIGURES 1 AND 2):

TABLE 3 - RADIUS BLOCK DIMENSIONS

FOR CLAMP LOOP MATERIAL DESIGNATION (A) <u>1/</u>								
FOR CUSHIONS EW, FW, GW, & HW					FOR CUSHION TW ONLY			
CLAMP DASH NUMBER	E ±.005	X ±.005	T ±.005	R	E ±.005	X ±.005	T ±.005	R
-2	.319	.519	.125	.062	.319	.519	.125	.062
-3 THRU -8	.319	.519	.125	.062	.352	.552	.125	.062
-9 THRU -17	.367	.567	.160	.109	.400	.600	.160	.109
-18 THRU -66	.383	.583	.190	.125	.416	.616	.190	.125
FOR CLAMP LOOP MATERIAL DESIGNATION (P & S) <u>2/</u> , <u>3/</u>								
-2	.319	.519	.125	.062	.319	.519	.125	.062
-3 THRU -8	.319	.519	.125	.062	.352	.552	.125	.062
-9 THRU -12	.383	.583	.160	.109	.416	.616	.160	.109
-13 THRU -17	.367	.567	.160	.109	.400	.600	.160	.109
-18 THRU -66	.383	.583	.190	.125	.416	.616	.190	.125

1/ BLOCK MATERIAL 2024-T851 BARE ALUMINUM

2/ BLOCK MATERIAL 17-7PH STAINLESS STEEL WITH NO FINISH FOR DESIGNATION (P)

3/ BLOCK MATERIAL 321 STAINLESS STEEL WITH NO FINISH FOR DESIGNATION (S)

SAENORM.COM : Click to view the full PDF of AS23190/4

TABLE 4 - CLAMP DIMENSIONS

DASH NO.	HARNESS NOMINAL O.D.	D DIA ±.015 1/	E ± 0.015 2/		G GAP	R RAD ±.016	S +.020 -.000 3/	T - METAL GAGE 4/		WEIGHT REDUCING HOLES
			ALUM	STEEL				ALUM	STEEL	
-2	1/8	.125	.457	.457	.062 +.016 -.000	.062	.040	.0320 ±.0025		NONE
-3	3/16	.188	.498	.498						
-4	1/4	.250	.529	.529						
-5	5/16	.313	.560	.560						
-6	3/8	.375	.592	.592						
-7	7/16	.438	.623	.623						
-8	1/2	.500	.654	.654						
-9	9/16	.563	.752	.749						
-10	5/8	.625	.783	.780						
-11	11/16	.688	.814	.811						
-12	3/4	.750	.845	.842						
-13	13/16	.813	.877	.858						
-14	7/8	.875	.908	.889						
-15	15/16	.938	.939	.920						
-16	1	1.000	.970	.951						
-17	1-1/16	1.063	1.002	.983						
-18	1-1/8	1.125	1.062	1.030						
-19	1-3/16	1.188	1.093	1.061						
-20	1-1/4	1.250	1.124	1.092						
-21	1-5/16	1.313	1.156	1.124						
-22	1-3/8	1.375	1.187	1.155						
-23	1-7/16	1.438	1.218	1.186						
-24	1-1/2	1.500	1.249	1.217						
-25	1-9/16	1.563	1.281	1.259						
-26	1-5/8	1.625	1.31	1.280						
-27	1-11/16	1.688	1.344	1.312						
-28	1-3/4	1.750	1.374	1.342						
-29	1-13/16	1.813	1.406	1.374						
-30	1-7/8	1.875	1.437	1.405						
-31	1-15/16	1.938	1.468	1.444						
-32	2	2.000	1.499	1.475						
-33	2-1/16	2.062	1.531	1.507						
-34	2-1/8	2.125	1.562	1.538						
-35	2-3/16	2.188	1.594	1.570						
-36	2-1/4	2.250	1.624	1.600						
-37	2-5/16	2.312	1.655	1.631						
-38	2-3/8	2.375	1.687	1.663						
-40	2-1/2	2.500	1.752	1.728						
-42	2-5/8	2.625	1.812	1.788						
-43	2-11/16	2.688	1.844	1.820						
-44	2-3/4	2.750	1.875	1.851						
-45	2-13/16	2.812	1.906	1.882						
-46	2-7/8	2.875	1.937	1.913						
-48	3	3.000	2.000	1.976						
-50	3-1/8	3.125	2.062	2.038						
-52	3-1/4	3.250	2.125	2.101						
-54	3-3/8	3.375	2.187	2.163						
-56	3-1/2	3.500	2.250	2.226						
-58	3-5/8	3.625	2.312	2.288						
-64	4	4.000	2.500	2.475						
-66	4-1/8	4.125	2.562	2.538						

1/ DIAMETER "D" MEASURED AT A 45 DEGREE ANGLE FROM VERTICAL AS SHOWN IN FIGURE 1.

2/ DIAMETER "E" MEASURED WITH CLAMP INSTALLED ON A MANDREL OF D DIAMETER WITH A MANUAL TOLERANCE OF ±.001.

3/ MOLDED CUSHION DIMENSION "S" FOR THE TW CUSHION WITH BLOCK IS .030 ± .005.

4/ MAXIMUM HEIGHT OF BRIDGE SHALL BE .076 FOR T=.032, SHALL BE .096 FOR T=.040, SHALL BE .120 FOR T=.050, AND SHALL BE .150 FOR T=.063. TONGUE THICKNESS SHALL BE 1/3 "T" DIMENSION MINIMUM.

3. DIMENSIONS:

DIMENSIONS SHALL BE IN ACCORDANCE WITH TABLES 3 AND 4. DIMENSIONS AND TOLERANCES ARE IN INCHES IN ACCORDANCE WITH AS23190. UNLESS OTHERWISE SPECIFIED, TOLERANCES ARE .XXX $\pm$.010, OR .XX $\pm$.03.

4. BURRS AND SHARP EDGES:

REMOVE ALL BURRS, SCALES, SHARP EDGES AND BREAK ALL SHARP CORNERS ON CLAMP BAND. MOLD MARKS AND FLASH ARE PERMISSIBLE ON CUSHIONS.

5. STIFFENING BEADS:

STIFFENING BEAD SHALL BE REQUIRED ON SIZE 4 AND LARGER. THE BEAD SHALL EXTEND TO THE CENTER LINE OF DIAMETER D FOR SIZE 24 AND SMALLER. LARGER SIZES SHALL BE APPROXIMATELY .75 INCH LONG. ALL RADII ON THE STIFFENING BEAD SHALL BE SMOOTH AND BLENDED. NO SHARP TOOL MARKS ARE ALLOWED.

6. WEDGE:

WEDGE SHALL BE INTEGRALLY MOLDED TO CUSHION. WEDGE SHALL BE CONTOURED TO FIT D DIAMETER UP THRU SIZE 24. LARGER CLAMP SIZES SHALL USE A SIZE 24 WEDGE AS A MINIMUM. THE WEDGE SHALL TOUCH THE CUSHION ON THE LOWER FOOT OF CLAMP WHEN CLAMP IS INSTALLED ON A MANDREL OF D DIAMETER, $\pm$.001 TOLERANCE, WITHOUT SPACERS.

7. IDENTIFICATION:

IDENTIFICATION SHALL INCLUDE PART NUMBER AND MANUFACTURER'S NAME OR TRADEMARK. TRADEMARK SHALL BE REGISTERED IN AIR1351. DO NOT MARK IN RADIUS. PART NUMBER SHALL BE PERMANENTLY MARKED ON THE CUSHION (LOCATION OPTIONAL). MANUFACTURER NAME OR TRADEMARK SHALL BE STAMPED ON THE CLAMP LOOP. NAME OR TRADEMARK MAY BE LOCATED ON THE TOP OR BOTTOM (EAR OR JOGGLE) WHEN WEIGHT REDUCING HOLE DOES NOT PERMIT MARKING LOCATION SHOWN IN FIGURE 1.

8. LOCKING MECHANISM:

CLAMP LOOP SHALL HAVE A SPRING BACK CONDITION IN THE OPEN POSITION AT AN ANGLE APPROACHING 60 TO 90 DEGREES.

LOOP ALIGNMENT TEST: THE LOCKING MECHANISM SHALL CLOSE AND LOCK WHEN MOUNTED WITHOUT MOUNTING HARDWARE OVER A MANDREL WITH A DIAMETER "D" WITHIN $\pm$.001 INCH SPECIFIED IN TABLE 4. THE MOUNTING HOLES SHALL BE IN ALIGNMENT WITHIN .010 INCH. THE BAND WIDTH STRAIGHTNESS (PARALLEL TO THE BAR AXIS) SHALL BE WITHIN .010 INCH EXCEPT IN THE AREA OF THE STIFFENING BEAD.

CUSHION ALIGNMENT TEST: POSITION THE CUSHION TO $+.020$ -.045, $-.000$ INCH OVERLAP OF THE EAR-TAB PORTION OF THE CLAMP. CLOSE THE CLAMP INTO THE LOCKED POSITION. THE WEDGE SHALL HAVE MAXIMUM CUSHION OVERLAP OF .052.

FULL LOCKED VERIFICATION (WITHOUT MANDREL): POSITION THE CUSHION IN ACCORDANCE WITH THE CUSHION ALIGNMENT TEST. WHEN THE CLAMP IS IN A FULLY LOCKED POSITION SHOWN IN FIGURE 3 USING MOUNTING HARDWARE ON A FLAT PLATE, THERE SHALL BE NO GAP BETWEEN THE FLAT PORTION OF THE BAND AND THE MOUNTING SURFACE. THERE SHALL BE NO VISIBLE GAP BETWEEN METAL BANDS EXTENDING FROM THE LOCKING AREA TO THE FAR SIDE OF THE FASTENER. A GAP BEYOND THE RADIUS NOT EXTENDING TO THE FASTENER SHALL BE LIMITED TO .020 INCH MAXIMUM. CUSHION PINCHING WHICH CAUSES A GAP AT THE RADIUS IS UNACCEPTABLE. THE CUSHION WEDGE SHALL MAKE FIRM RUBBER TO RUBBER CONTACT SUFFICIENT TO PREVENT HARNESS/WIRE FROM CONTACTING METAL BANDS.

 An SAE International Group	AEROSPACE STANDARD	SAE AS23190/4 SHEET 6 OF 11	
	MOUNTING HARDWARE, CUSHION CLAMP, METAL FOR CABLE HARNESS TYING AND SUPPORT, TYPE V, CLASS 1		

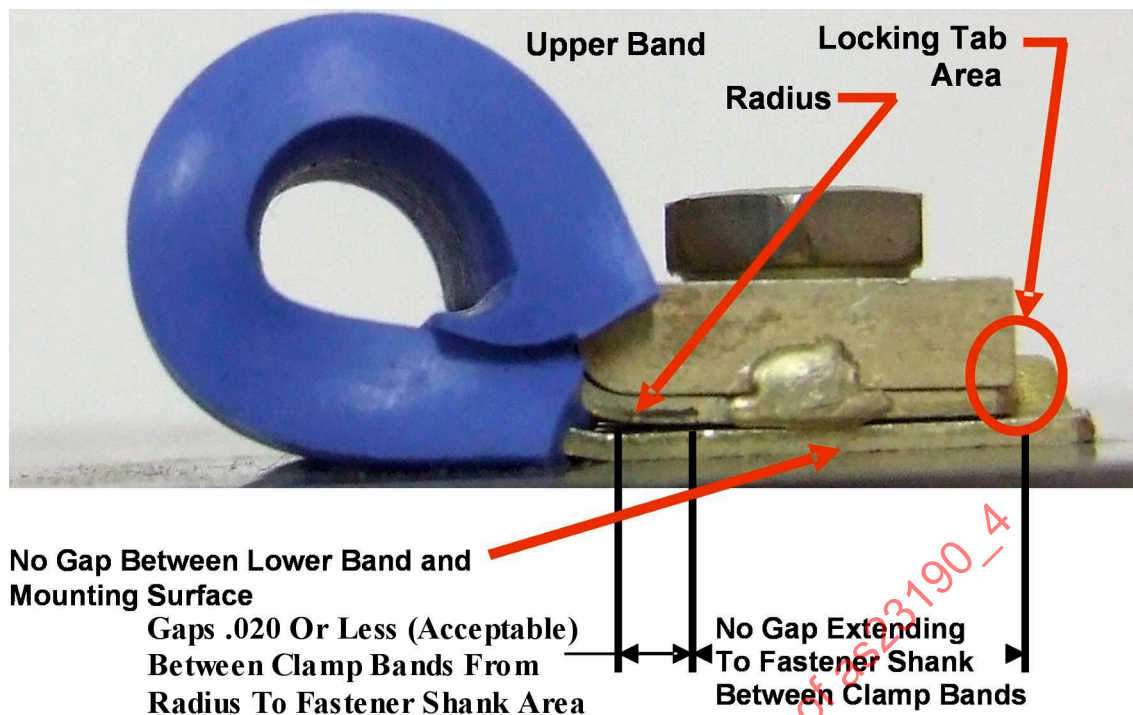


FIGURE 3 - MOUNTED CLAMP GAP REQUIREMENTS

9. INITIAL QUALIFICATION (SEE APPLICATION RESTRICTIONS - REQUIREMENT 14): INITIAL QUALIFICATION REQUIREMENTS CONSIST OF ALL REQUIREMENTS SPECIFIED HEREIN. INITIAL QUALIFICATION SHALL ONLY BE PERFORMED BY THE QUALIFYING ACTIVITY LISTED IN AS23190. THE QUALIFYING ACTIVITY SHALL PROVIDE A DATA PACKAGE TO THE SUPPLIER.
10. IDENTIFICATION TRADEMARK: IF A TRADEMARK IS USED, MANUFACTURER SHALL DEMONSTRATE APPLICATION FOR INCLUSION IN AIR1351 HAS BEEN SUBMITTED.
11. ALL CLAMP LOOP MATERIALS WITH ALL WEDGE CUSHION MATERIALS AND WITH AND WITHOUT RADIUS BLOCK R SHALL BE QUALIFIED IN ACCORDANCE AS23190 TABLE 1-GROUP 1, AND THE FOLLOWING TESTS:

SAENORM.COM : Click to view the full PDF of AS23190-4

A. VIBRATION (INITIAL QUALIFICATION ONLY):

VIBRATION WIRE BUNDLE SAMPLES: CLAMP SIZES -12, -24, -32, AND -48 SHALL BE TESTED FOR CLAMP LOOP DESIGNATORS A AND S WITH ALL CUSHION DESIGNATORS. TWO SAMPLES OF EACH SIZE SHALL BE MOUNTED TO THE MOTION PORTION OF THE VIBRATION TABLE 24 INCHES APART IN ACCORDANCE WITH FIGURE 4. TWO SAMPLES SHALL BE MOUNTED ON BOTH ENDS OF THE WIRE BUNDLE ON A STATIONARY PLATFORM. EACH STATIONARY SAMPLE SHALL BE 24 INCHES FROM THE VIBRATING SAMPLE. THE WIRE BUNDLE SHALL HAVE A 6 INCHES OVERHANG ON EACH END OF THE STATIONARY CLAMPS. THE WIRE BUNDLE SHALL CONSIST OF AS22759/92 WIRES CONSISTING OF 60% SIZE 26, 20% SIZE 22, AND 20% SIZE 16 ON THE OUTER LAYER OF THE BUNDLE ADJACENT TO THE CUSHION INTER SURFACE. CLAMP SHALL BE FULLY LOADED WITH WIRE AND TAPE BUILD-UP IS NOT PERMITTED.

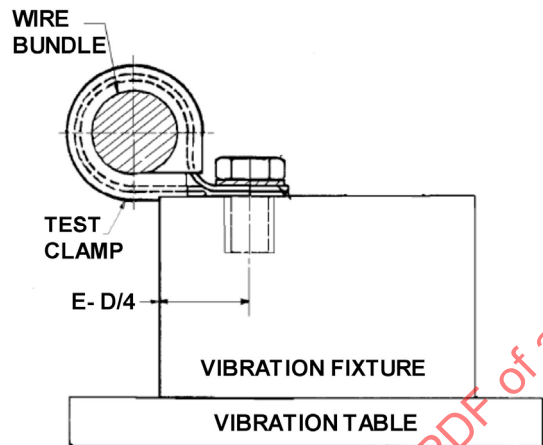


FIGURE 4 - VIBRATION FIXTURE

SIMPLE HARMONIC VIBRATION (CLAMPS WITHOUT RADIUS BLOCK): THE WIRE BUNDLE SHALL BE SUBJECTED TO A SIMPLE HARMONIC MOTION FROM 10 TO 2000 HZ IN EACH OF THREE MUTUALLY PERPENDICULAR AXES. THE LEVEL OF VIBRATION SHALL BE A VELOCITY OF 254 MM/S FROM 10-50 HZ; 1.5 MM DOUBLE AMPLITUDE FROM 50-140 HZ, AND 60 G FROM 140-2000 HZ. THE ENTIRE FREQUENCY RANGE FROM 10-2,000 HZ AND BACK SHALL BE TRAVERSED IN 20 MINUTES. THE VIBRATION SHALL BE APPLIED FOR A 12 HOUR DURATION IN EACH OF THE THREE MUTUALLY PERPENDICULAR AXES FOR A TOTAL OF 36 HOURS. EACH AXIS OF VIBRATION SHALL BE ACCOMPLISHED BY VIBRATING FOR 4 HOURS AT AMBIENT ROOM TEMPERATURE, 4 HOURS AT - 67 °F ± 11° F, AND 4 HOURS 275 °F (±11° F).

RANDOM VIBRATION (CLAMPS WITH AND WITHOUT RADIUS BLOCK): EIA 364-28, TEST CONDITION VI, LETTER J. DURATION SHALL BE 8 HOURS IN THE LONGITUDINAL DIRECTION AND 8 HOURS IN A PERPENDICULAR DIRECTION FOR A TOTAL OF 16 HOURS AT AMBIENT ROOM TEMPERATURE.

HIGH RANDOM VIBRATION (CLAMPS WITH RADIUS BLOCK ONLY): EIA 364-28, TEST CONDITION V EXCEPT VIBRATION ENVELOPE SHALL BE IN ACCORDANCE WITH FIGURE 5. DURATION SHALL BE 8 HOURS IN THE LONGITUDINAL DIRECTION AND 8 HOURS IN A PERPENDICULAR DIRECTION FOR A TOTAL OF 16 HOURS AT AMBIENT ROOM TEMPERATURE.