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**REV. A**  
**AS23190/4**

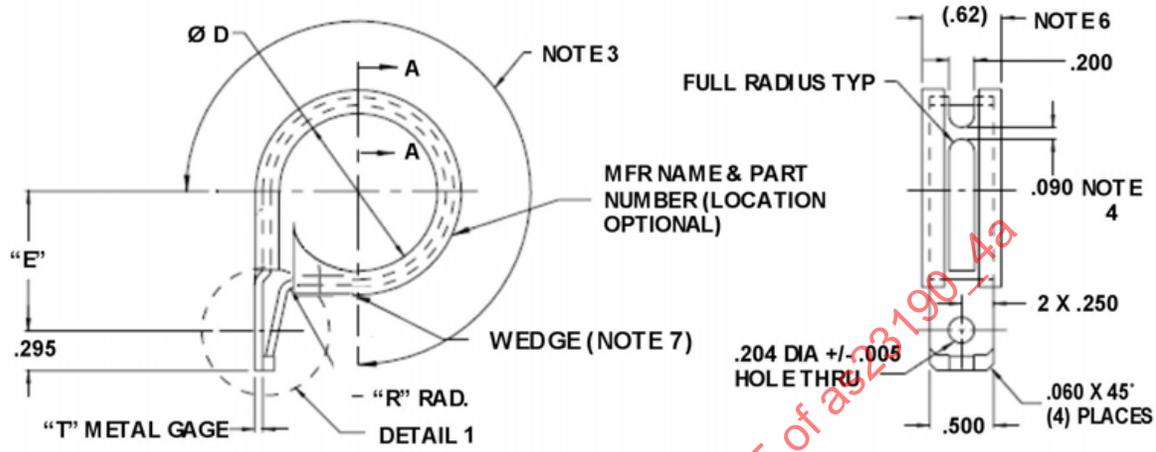
FEDERAL SUPPLY CLASS  
5340

**RATIONALE**

THIS REVISION IS REQUIRED TO REDUCE THE VIBRATION LEVELS, REVISE THE VIBRATION TEST REQUIREMENT, AND DELETE THE INACTIVE FOR NEW DESIGN REQUIREMENTS FOR THE ETHYLENE PROPYLENE AND CHLOROPRENE CUSHION MATERIALS.

**NOTICE**

THE COMPLETE REQUIREMENTS FOR PROCURING THE PRODUCT DESCRIBED HEREIN SHALL CONSIST OF THIS DOCUMENT AND THE LATEST ISSUE OF AS23190.



DETAIL 1 - CLAMP DESIGN

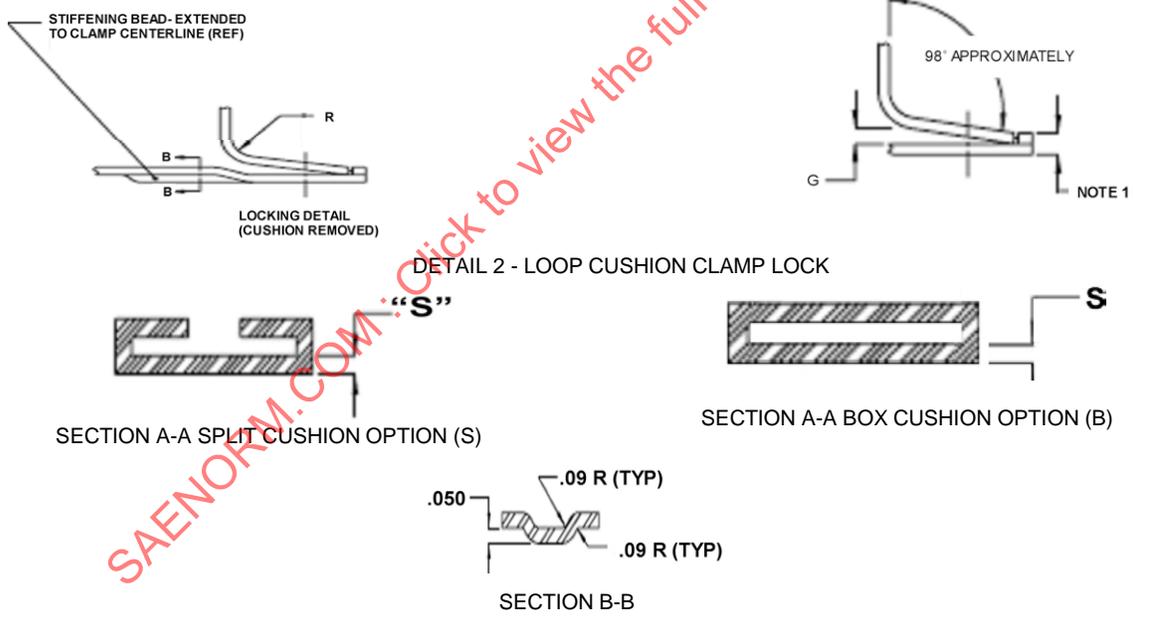
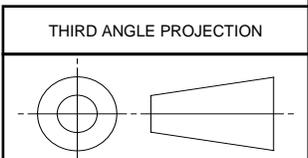


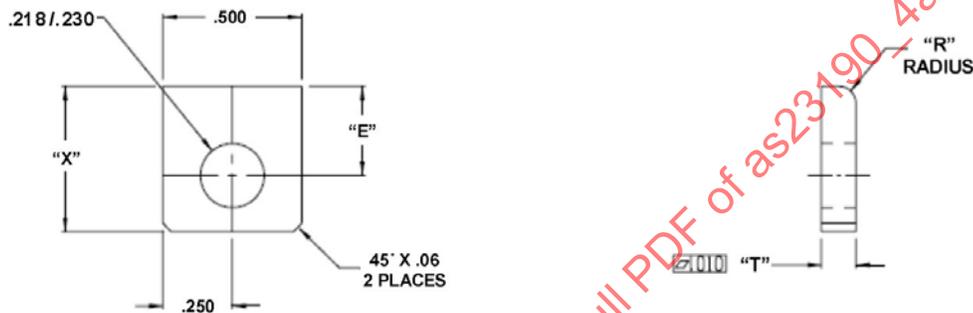
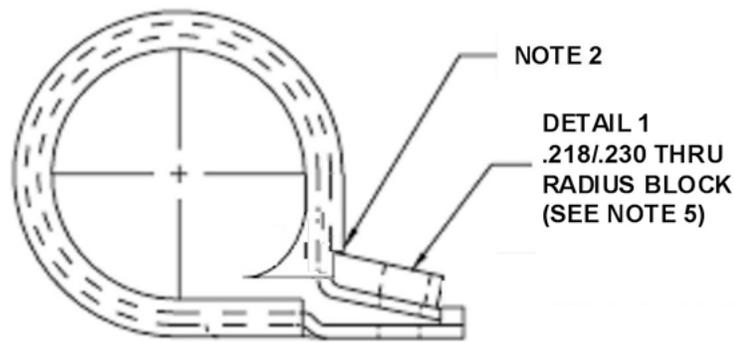
FIGURE 1 - LOOP CUSHION CLAMP (SEE TABLE 4)

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CUSTODIAN:		PROCUREMENT SPECIFICATION:	
	<b>AEROSPACE STANDARD</b>		<b>AS23190/4</b> SHEET 1 OF 14
	(R) MOUNTING HARDWARE, CUSHION CLAMP, METAL FOR CABLE HARNESS TYING AND SUPPORT, TYPE V, CLASS 1		

ISSUED 2008-12 REVISED 2015-07



DETAIL 1 - CUSHION CLAMP (RADIUS BLOCK)

**FIGURE 2 - RADIUS BLOCK LOOP CUSHION CLAMP (SEE TABLE 3, FIGURE 1 DIMENSIONS APPLICABLE)**

FIGURES 1 AND 2 NOTES:

1. MAXIMUM HEIGHT OF LOCKING DEVICE AS SPECIFIED IN NOTE 4/ OF 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. BRIDGES (METAL MATERIAL BETWEEN REDUCING HOLES) 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).

	<b>AEROSPACE STANDARD</b>	<b>AS23190/4</b> SHEET 2 OF 14	<b>REV.</b> <b>A</b>
	(R) MOUNTING HARDWARE, CUSHION CLAMP, METAL FOR CABLE HARNESS TYING AND SUPPORT, TYPE V, CLASS 1		

REQUIREMENTS: ALL REQUIREMENTS SHALL CONSIST OF THIS DOCUMENT AND THE LATEST ISSUE OF AS23190.

1. MATERIAL: SEE TABLES 1 AND 2.

**TABLE 1 - CLAMP LOOP BASE MATERIALS**

CLAMP LOOP MATERIAL DESIGNATION	CLAMP LOOP BASE MATERIAL <sup>1/</sup>	HEAT TREATMENT	CLAMP LOOP FINISH
A	2024-T42 ALUMINUM ALLOY PER AMS-QQ-A-250/5	AMS2770, AMS2771, OR AMS 2772 CONDITION T42	MIL-DTL-5541 CLASS 1A
P	17-7PH CORROSION RESISTANT STEEL PER AMS5528	AMS-H-6875 OR AMS2759/3 TH1100 AFTER FORMING	AMS2700 PASSIVATED
S	AMS5510 STAINLESS STEEL	N/A	AMS2700 PASSIVATED

<sup>1/</sup> 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 <sup>1/</sup> (275 °F)	MIL-DTL-85052/2 ETHYLENE PROPYLENE
FW	BLUE (400 °F)	MIL-DTL-25988, TYPE II, CLASS 1, GRADE 60 FLUOROSILICONE
GW	BLACK WITH BLUE STRIPES <sup>1/</sup> (212 °F)	AMS3209 CHLOROPRENE
HW	LIGHT BLUE (500 °F)	MIL-DTL-85052/3 SILICONE RUBBER, FABRIC REINFORCED (HIGH TEMPERATURE)
TW	PIGMENTED WHITE (550 °F)	POLY-TETRAFLUOROETHYLENE (PTFE) PER AMS3660

<sup>1/</sup> MATERIAL IS NOT RECOMMENDED FOR NEW AIRCRAFT DESIGN (SEE APPLICATION NOTES). 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.

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

**TABLE 3 - RADIUS BLOCK DIMENSIONS (SEE DETAIL 1 OF FIGURE 2)**

FOR CLAMP LOOP MATERIAL DESIGNATION (A) 1/								
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 THAU -66	.383	.583	.190	.125	.416	.616	.190	.125
FOR CLAMP LOOP MATERIAL DESIGNATION (P & S) 2/, 3/								
-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).

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	<b>AEROSPACE STANDARD</b>	<b>AS23190/4</b> SHEET 4 OF 14	<b>REV.</b> <b>A</b>
	(R) MOUNTING HARDWARE, CUSHION CLAMP, METAL FOR CABLE HARNESS TYING AND SUPPORT, TYPE V, CLASS 1		

**TABLE 4 - CLAMP DIMENSIONS (SEE FIGURE 1)**

DASH NO.	HARNESS NOMINAL O.D.	D DIA ±.015 1/	E ± .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	.0320 ±.0035	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	.109	.040	.050 ±.004	.0320 ±.0035	1				
-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		.094 +.031 -.000				.040	.050 ±.004	.0320 ±.0035	2
-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	.125	.060	.063 ±.005	.040 ±.004	3				
-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	.125 +.031 -.000	.060	.063 ±.005	.040 ±.004	4				
-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	.125 +.031 -.000	.060	.063 ±.005	.040 ±.004	5				
-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° 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 LOCKING DEVICE 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 FIGURES 1 AND 2 AND 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 AS MANUFACTURED CONDITION IN THE OPEN POSITION AT AN ANGLE APPROACHING 60 TO 90° PRIOR TO INITIAL LOCKING OF THE CLAMP.

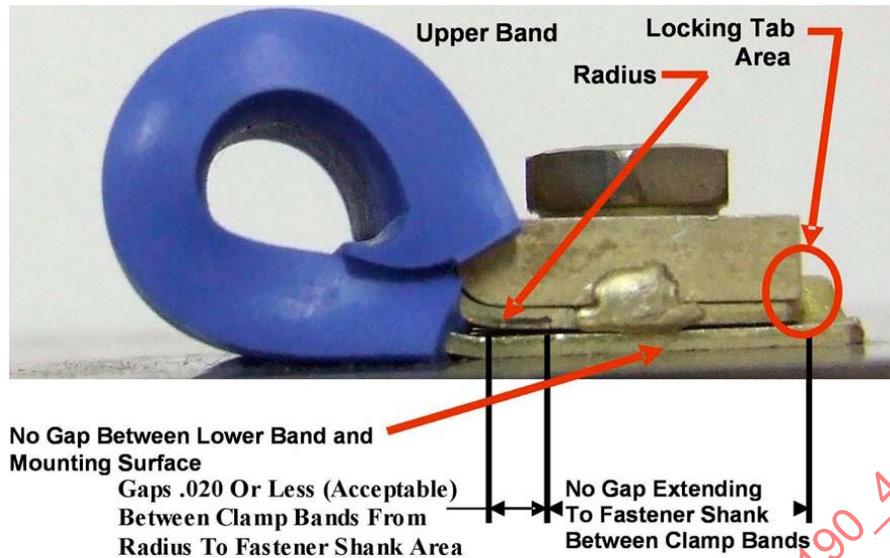
LOOP ALIGNMENT TEST: THE LOCKING MECHANISM SHALL CLOSE AND LOCK WHEN MOUNTED WITHOUT MOUNTING HARDWARE OVER A MANDREL WITH A DIAMETER "D" WITHIN  $\pm .001$  INCH SPECIFIED IN TABLE 4. THE MOUNTING HOLES SHALL BE IN ALIGNMENT WITHIN .010 INCH. THE BAND WIDTH STRAIGHTNESS (PARALLEL TO THE BAR AXIS) SHALL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

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	<b>AEROSPACE STANDARD</b>	<b>AS23190/4</b> SHEET 6 OF 14	<b>REV.</b> <b>A</b>
	(R) 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:
  - a. VIBRATION:

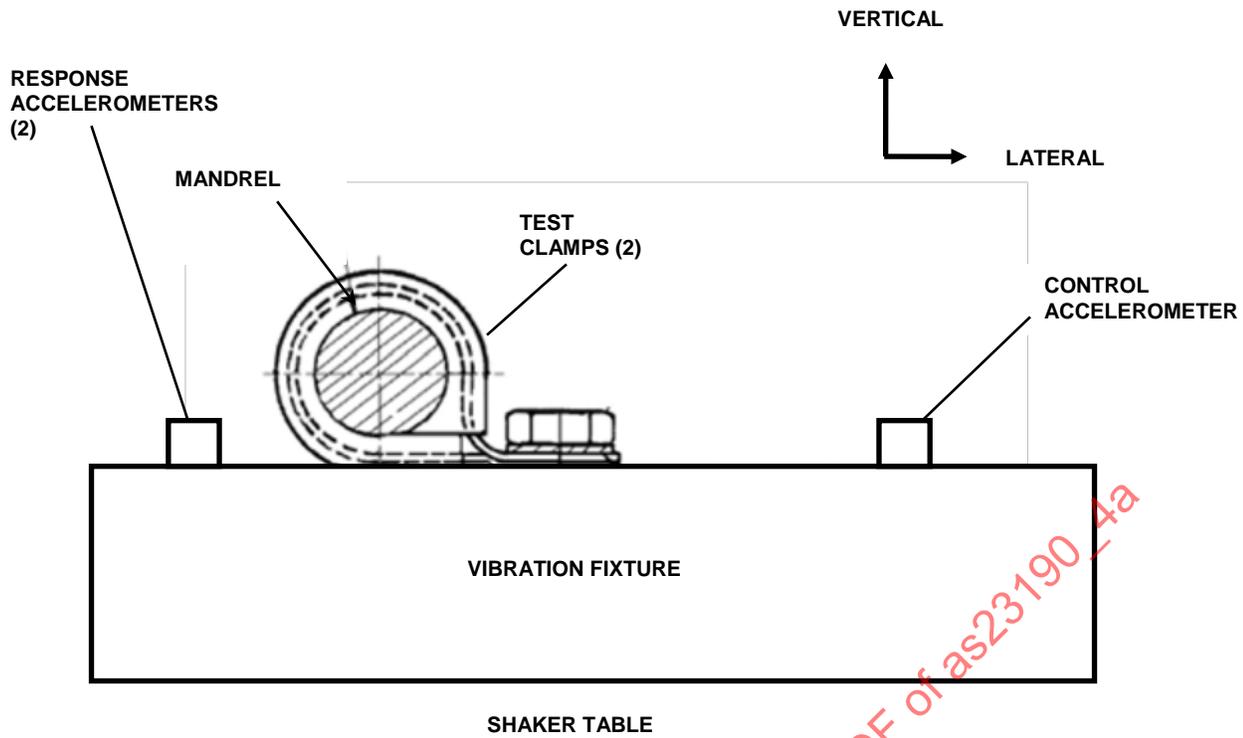
THE VIBRATION TEST SHALL BE CONDUCTED USING THE VIBRATION ACCELERATION LIMITS AND BREAK POINTS DEFINED IN TABLES 6 AND 7. SIMULTANEOUS TESTING OF MULTIPLE SIZE CLAMPS AND MULTIPLE SAMPLES IS PERMISSIBLE. THE CONFIGURATION OF USING METAL MANDRELS, MOUNTING METHOD AND CLAMP SPACING (FIGURE 5) SHOWN WAS DONE TO FACILITATE MULTIPLE CONFIGURATIONS TESTING AT THE SAME TIME. IT WAS ALSO USED AS A METHOD TO ESTABLISH A STANDARD FOR TESTING MANUFACTURERS CLAMP CAPABILITY WITHIN A DEFINED PARAMETER. THIS MAY OR MAY NOT REPRESENT AN AIRCRAFT INSTALLATION AND THE USERS MUST VERIFY THEIR APPLICATION (SEE INTENDED USE FOR ADDITIONAL INFORMATION).

THE ASSEMBLY SHALL BE INSTALLED FLAT ON A VIBRATION FIXTURE AND SHAKER TABLE AS SHOWN IN FIGURE 4. CLAMPS SHALL BE MOUNTED FLAT ON THE VIBRATION FIXTURE WITH 10-32 UNF-3A BOLTS (160 KSI OR HIGHER STRENGTH) AND TORQUED TO 30 INCH POUNDS  $\pm$  3 INCH POUNDS. A FLAT WASHER SHALL BE USED BENEATH THE HEAD OF THE MOUNTING BOLT WITH THE SMOOTH EDGE AGAINST THE CLAMP FOOT. A TORQUE STRIPE (INDICATOR) SHALL BE APPLIED TO THE FASTENERS TO ENSURE NO ROTATION OCCURS. A CONTROL ACCELEROMETER SHALL BE MOUNTED ON THE VIBRATION FIXTURE. RESPONSE ACCELEROMETERS SHALL BE MOUNTED ON BOTH CLAMPS AS SHOWN IN FIGURE 5.

CLAMP SIZES -16, -24, AND -32 SHALL BE TESTED FOR CLAMP LOOP MATERIAL DESIGNATORS A AND S WITH ALL CUSHION DESIGNATORS. TWO SAMPLES OF THE SAME SIZE AND LOOP AND CUSHION MATERIAL SHALL BE MOUNTED ON TEST MANDRELS WITH SPACING AND DIMENSIONS AS SPECIFIED IN FIGURE 5 AND TABLE 5. MULTIPLE MANDRELS WITH DIFFERING TYPES OF CLAMPS MAY BE OPERATED ON A TEST FIXTURE AT THE SAME TIME PROVIDED THEY ARE WITHIN THE FIXTURE AND TEST EQUIPMENT CAPACITY, AND MANDRELS DO NOT DYNAMICALLY INTERACT. IF MULTIPLE MANDRELS ARE TESTED AT ONE TIME, AT LEAST ONE MANDREL OF EACH TYPE SHALL HAVE THE RESPONSE ACCELEROMETER CONFIGURATION SHOWN IN FIGURE 4.

TEST MANDRELS SHALL BE 6061-T6 ALUMINUM ALLOY RODS IN ACCORDANCE WITH ASTM B211. ALL DIMENSIONS SHALL BE IN ACCORDANCE WITH TABLE 5 WITH SURFACE ROUGHNESS OF 32 MICRINCHES Ra MAXIMUM. THE MANDRELS MAY HAVE SHOULDERS TO PREVENT SLIPPAGE DURING VIBRATION. THE SHOULDERS SHALL MAINTAIN A POSITIVE CLEARANCE FROM THE VIBRATION FIXTURE AND CLAMP UNDER TEST. SHOULDER DIMENSION SHALL NOT EXCEED .25 INCHES.

	<b>AEROSPACE STANDARD</b>	<b>AS23190/4</b> SHEET 7 OF 14	<b>REV.</b> <b>A</b>
	(R) MOUNTING HARDWARE, CUSHION CLAMP, METAL FOR CABLE HARNESS TYING AND SUPPORT, TYPE V, CLASS 1		



**FIGURE 4 - AXIS DEFINITION**

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	<b>AEROSPACE STANDARD</b>	<b>AS23190/4</b> SHEET 8 OF 14	<b>REV.</b> <b>A</b>
	(R) MOUNTING HARDWARE, CUSHION CLAMP, METAL FOR CABLE HARNESS TYING AND SUPPORT, TYPE V, CLASS 1		

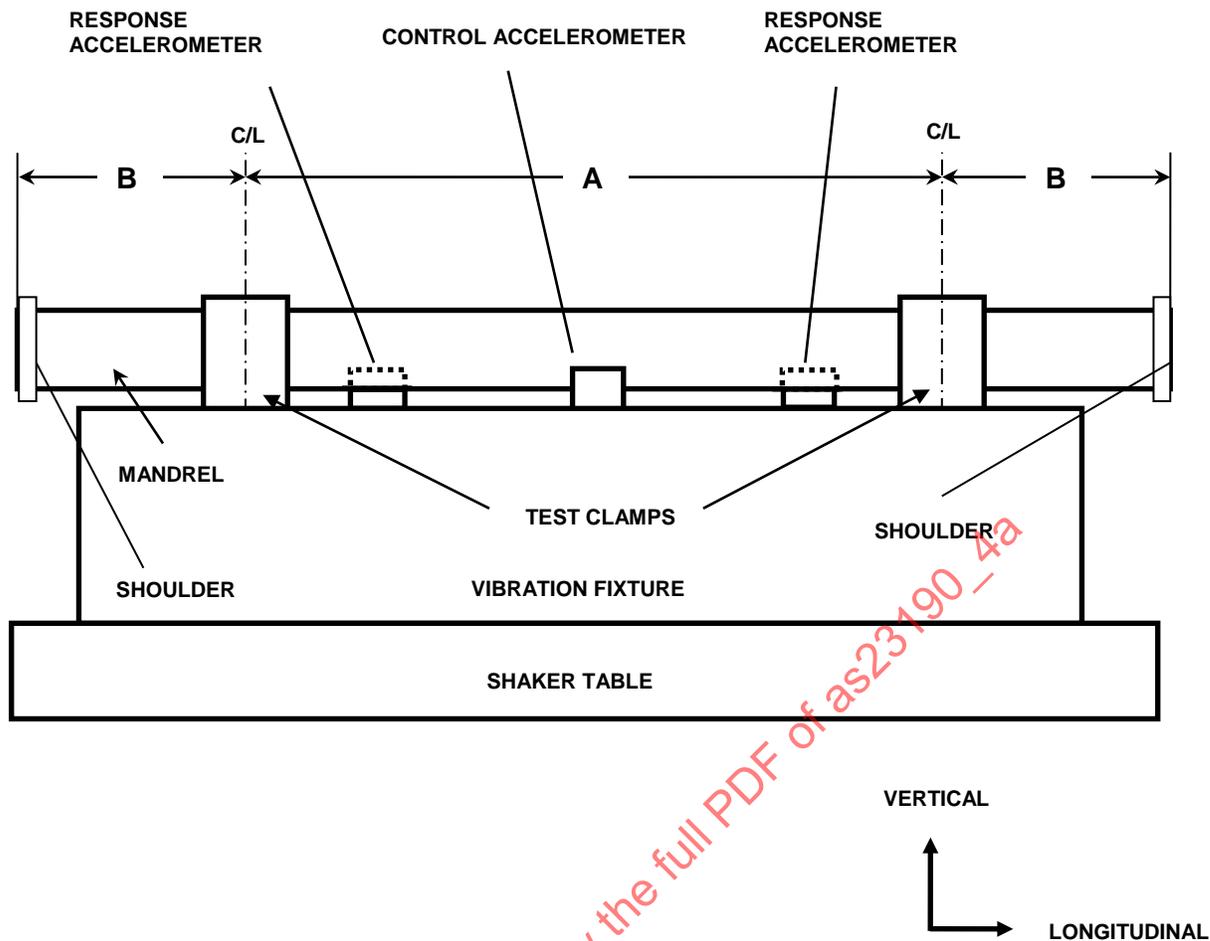


FIGURE 5 - CLAMP MOUNTING AND SPACING

TABLE 5 - MANDREL AND CLAMP PARAMETERS

CLAMP SIZE	MANDREL		CLAMP SPACING (SEE FIGURE 5)	
	DIA $\pm$ .001 [INCH]	LENGTH $\pm$ .015 [INCH]	A [INCH]	B [INCH]
-16	1.000	7.50	6.0	1.0
-24	1.500	7.50	6.0	1.0
-32	2.000	7.50	6.0	1.0

**TABLE 6 - BREAK POINTS FOR RANDOM VIBRATION (CLAMP WITHOUT RADIUS BLOCK)**

CLAMP SIZE	OVERALL ACCELERATION [G <sub>rms</sub> ]	20 HZ BREAKPOINT [G <sup>2</sup> /HZ]	500 HZ BREAKPOINT [G <sup>2</sup> /HZ]	800 HZ BREAKPOINT [G <sup>2</sup> /HZ]	DURATION [MINUTES]
RANDOM VIBRATION VERTICAL					
-16	18	0.604	0.604	0.0074	17
-24	8	0.119	0.119	0.0014	45
-32	7	0.091	0.091	0.0011	24
RANDOM VIBRATION LATERAL					
-16	18	0.604	0.604	0.0074	28
-24	12	0.266	0.266	0.0030	20
-32	8	0.119	0.119	0.0014	28

CLAMP FAILURE OCCURS WHEN VISIBLE DAMAGE IS OBSERVED. THIS INCLUDES CRACKS, DISTORTIONS, BREAKS, OR RELEASING OF THE LOCKING DEVICE. CUSHION FAILURE OCCURS WHEN VISIBLE DAMAGE IS OBSERVED INCLUDING: TEARING, EXCESSIVE WEAR, DETERIORATION, EXPOSURE OF LOOP METAL, OR SEPARATION FROM THE CLAMP.

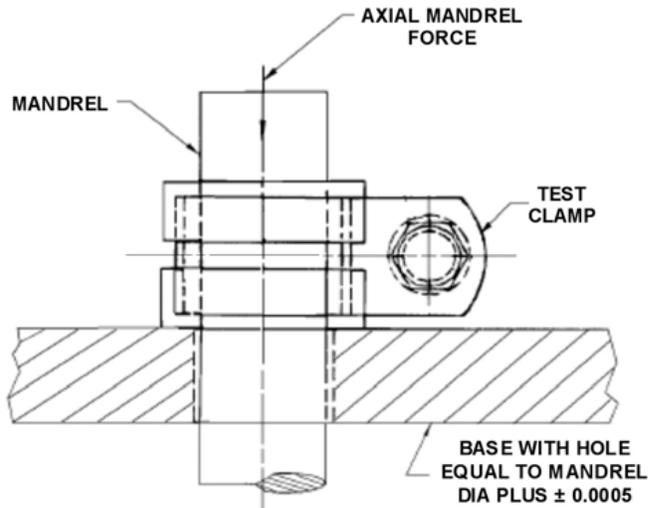
**TABLE 7 - BREAK POINTS FOR RANDOM VIBRATION (CLAMP WITH RADIUS BLOCK)**

CLAMP SIZE	OVERALL ACCELERATION [G <sub>rms</sub> ]	20 HZ BREAKPOINT [G <sup>2</sup> /HZ]	500 HZ BREAKPOINT [G <sup>2</sup> /HZ]	800 HZ BREAKPOINT [G <sup>2</sup> /HZ]	DURATION [MINUTES]
RANDOM VIBRATION VERTICAL					
-16	20	0.745	0.745	0.0091	17
-24	9	0.151	0.151	0.0018	45
-32	8	0.119	0.119	0.0014	24
RANDOM VIBRATION LATERAL					
-16	19	0.671	0.671	0.0082	28
-24	13	0.315	0.315	0.0035	20
-32	9	0.151	0.151	0.0018	28

b. DIAMETRAL RETENTION TEST:

FOLLOWING THE VIBRATION TEST, THE CLAMP SHALL BE SUBJECTED TO THE DIAMETRAL RETENTION TEST SHOWN IN FIGURE 6. A MANDREL MADE OF STEEL DRILL ROD IN ACCORDANCE WITH ASTM A582 SHALL BE SECURED BY THE CLAMP. THE MANDREL SURFACE TEXTURE SHALL BE 32 MICRONS ± 2 MICRONS. THE MANDREL SIZE SHALL BE DIAMETER E ± 0.001 INCH (SEE DIMENSIONS). SECURE THE CLAMP TO THE FIXTURE WITH MOUNTING BOLT AND TORQUE TO 30 INCH-POUNDS. THE MANDREL SHALL BE SLOWLY FORCED TO SLIDE LONGITUDINALLY THROUGH THE CLAMP FOR DISTANCE OF ONE INCH AT A RATE OF 1 INCH PER MINUTE. THE CUSHION SHALL NOT ROLL OR SLIP OFF THE BAND.

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**FIGURE 6 - DIAMETRAL TEST FIXTURE**

12. QUALITY CONFORMANCE: AS23190 GROUP A INSPECTION. GROUP B INSPECTION NOT REQUIRED.
13. RETENTION OF QUALIFICATION: AS23190 GROUP C INSPECTION (GROUP I ONLY) AND HEREIN. RETENTION OF QUALIFICATION SHALL BE PERFORMED AT 3 YEAR INTERVALS AFTER THE INITIAL QUALIFICATION APPROVAL DATE, UNLESS OTHERWISE NOTIFIED BY THE QUALIFYING ACTIVITY.  
  
VIBRATION TESTING SHALL BE CONDUCTED EVERY THREE RETENTION OF QUALIFICATION CYCLES (NINE YEARS).
14. CLAMP RESTRICTIONS AND APPLICATIONS ARE SHOWN IN TABLE 8.
15. WIRES MUST BE FIRMLY INSTALLED IN THE CLAMP (SEE ASS0881 PRIMARY SUPPORT).
16. APPROXIMATE MAXIMUM WEIGHTS ARE SHOWN IN TABLE 9. WEIGHT VARY SIGNIFICANTLY FROM MATERIAL TYPES, AND CLAMP SIZE,
17. AS21919 CLAMPS MAY BE USED AS AN ALTERNATIVE WHEN DIRECTED BY AN AUTHORIZED MAINTENANCE MANUAL OR COGNIZANT ENGINEERING AUTHORITY.

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	<b>AEROSPACE STANDARD</b>	<b>AS23190/4</b> SHEET 11 OF 14	<b>REV.</b> <b>A</b>
	(R) MOUNTING HARDWARE, CUSHION CLAMP, METAL FOR CABLE HARNESS TYING AND SUPPORT, TYPE V, CLASS 1		