



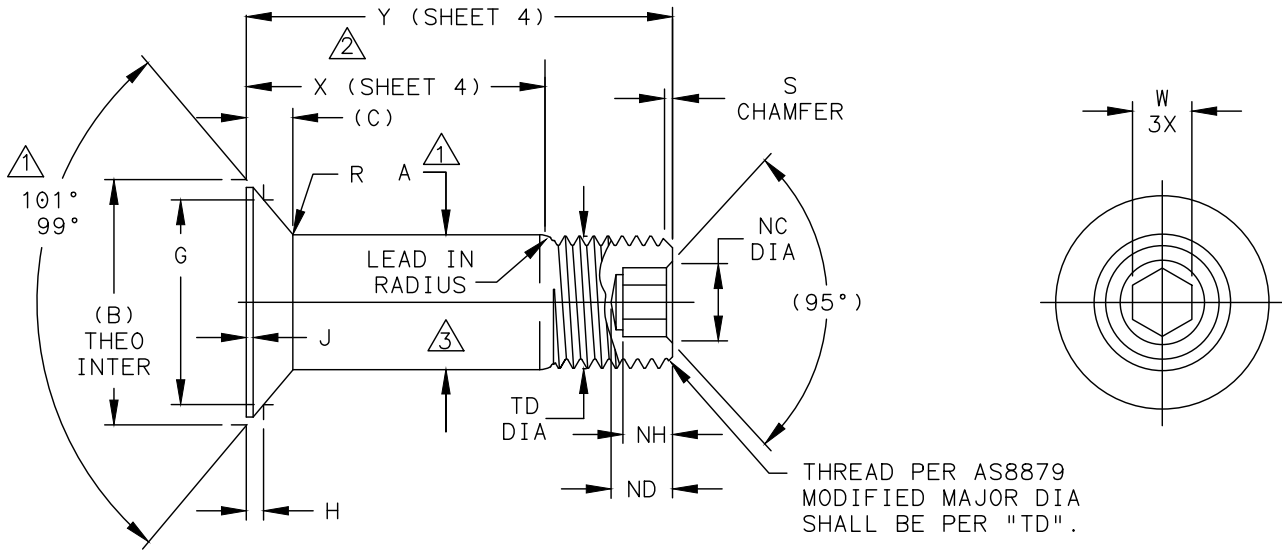
Howmet Fastening Systems  
 Carson Operations  
 900 E. Watson Center Road  
 Carson, California 90745 U.S.A.

**HOWMET  
 AEROSPACE**

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**AERO-LITE®**  
**ENGINEERING  
 STANDARD**

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THREAD PER AS8879  
 MODIFIED MAJOR DIA  
 SHALL BE PER "TD".

AL PIN FAMILY NUMBER	NOM SIZE	THREAD (MODIFIED)	A SHANK DIA BARE +.0005 - .0000	A SHANK DIA COATED ±.0005	(B) THEO INTER NOM	(C) HEAD HEIGHT NOM	G GAGE DIA ±.0001	H GAGE HEIGHT	J MAX	NC CHAMFER DIA	ND DRILL DEPTH MAX	NH HEX DEPTH	R RAD ±.005	S CHAMFER	T REF	TD DIA	W HEX 3X	DOUBLE SHEAR LBS MIN	TENSION LBS MIN
AL13()-5-()	.1640	.1640-32 UNJC-3A	.1630	.1630	.3279	.0692	.2831	.0202 .0174	.012	.104 .094	.135	.100 .080	.020	1/32"	.280	.1595 .1570	.0806 .0791	4010	2180
AL13()-6-()	.1900	.1900-32 UNJF-3A	.1890	.1890	.3788	.0796	.3271	.0233 .0201	.015	.119 .104	.135	.100 .080	.025	1/32"	.290	.1840 .1810	.0806 .0791	5380	3180
AL13()-8-()	.2500	.2500-28 UNJF-3A	.2490	.2490	.5041	.1070	.4319	.0321 .0285	.015	.142 .122	.160	.110 .090	.025	1/32"	.320	.2440 .2410	.0967 .0947	9300	5820
AL13()-10-()	.3125	.3125-24 UNJF-3A	.3115	.3115	.6310	.1341	.5450	.0381 .0341	.015	.180 .160	.200	.130 .110	.035	3/64"	.380	.3060 .3020	.1295 .1270	14600	9200
AL13()-12-()	.3750	.3750-24 UNJF-3A	.3740	.3740	.7580	.1611	.6581	.0441 .0397	.015	.217 .197	.235	.160 .140	.035	3/64"	.420	.3680 .3640	.1617 .1582	21000	14000
AL13()-14-()	.4375	.4375-20 UNJF-3A	.4365	.4365	.8848	.1881	.7783	.0471 .0423	.022	.253 .233	.245	.170 .150	.045	3/64"	.500	.4310 .4260	.1930 .1895	28600	18900
AL13()-16-()	.5000	.5000-20 UNJF-3A	.4990	.4990	1.0105	.2146	.8901	.0531 .0479	.022	.289 .269	.275	.190 .170	.045	3/64"	.600	.4930 .4880	.2242 .2207	37300	25600
AL13()-18-()	.5625	.5625-18 UNJF-3A	.5610	.5610	1.1374	.2417	1.0027	.0593 .0537	.025	.326 .306	.325	.220 .200	.045	1/16"	.700	.5550 .5500	.2555 .2520	47200	32400
AL13()-20-()	.6250	.6250-18 UNJF-3A	.6235	.6235	1.2687	.2706	1.1123	.0686 .0626	.025	.326 .306	.335	.235 .210	.045	1/16"	.780	.6180 .6120	.2555 .2520	58300	41000
AL13()-24-()	.7500	.7500-16 UNJF-3A	.7485	.7485	1.5272	.3266	1.3439	.0801 .0737	.025	.398 .378	.450	.320 .290	.045	1/16"	1.020	.7430 .7370	.3185 .3150	83900	59500
AL13()-28-()	.8750	.8750-14 UNJF-3A	.8735	.8735	1.7810	.3806	1.5541	.0986 .0918	.025	.471 .451	.525	.370 .340	.045	5/64"	1.160	.8680 .8610	.3820 .3780	107000	76000
AL13()-32-()	1.0000	1.0000-12 UNJF-3A	.9985	.9985	2.0358	.4351	1.7765	.1124 .1052	.025	.618 .598	.680	.490 .460	.045	5/64"	1.305	.9930 .9860	.5100 .5040	140000	99000

- ① CONCENTRICITY: CONICAL SURFACE OF COUNTERSUNK HEAD TO "A" SHANK DIAMETER TO BE WITHIN .005 TIR.
- ② GRIP LENGTH IS MEASURED FROM THE TOP OF THE HEAD TO THE MAXIMUM GRIP PLANE. TRANSITION AREA AND THREAD FORM WILL ALLOW MATING COLLAR TO ACHIEVE MINIMUM GRIP CONDITION WITHOUT INTERFERENCE. (SEE DESIGN GRIP RANGE AND DIMENSION "X" SHEET 3).
- ③ MAXIMUM "A" DIAMETER MAY BE INCREASED BY .0002 TO ALLOW FOR DRY FILM LUBE (SUFFIX "RS" FINISH ONLY).

DIMENSIONS IN INCHES AFTER FINISH

PROCUREMENT SPECIFICATION: C380

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AERO-LITE IS A TRADEMARK OF HOWMET AEROSPACE INC. AND ITS SUBSIDIARIES.

DRAWN BY	DH	FSCM (Cage Code) 17446 - Carson
CHECKED BY	MM	

C5	REMOVE HI-KOTE I AND KAL-GARD 2242 FROM PAGE 3. (REF. ECR 2906)	
ISSUED	08/14/95	PIN, AERO-LITE® LIGHTWEIGHT 100° COUNTERSUNK TENSION HEAD, 6AL-4V TITANIUM
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		AL13()-()-()
		AL105



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MATERIAL: 6AL-4V TITANIUM ALLOY PER AMS4967 OR AMS4928.  
MINIMUM SHEAR STRENGTH: 95 KSI (Ø5Ø THRU 24Ø)  
89 KSI (28Ø THRU 32Ø).  
SURFACE TEXTURE: R<sub>a</sub> MAX PER ANSI-B46.1 BEFORE COATING. BEARING SURFACE OF HEAD,  
HEAD TO SHANK FILLET RADIUS, SHANK AND LEAD-IN RADIUS, -32,  
OTHER SURFACES -125.

HEAD MARKING: HEADS SHALL BE MARKED WITH THE MANUFACTURER'S SYMBOL, THE BASIC NUMBER (AL13) AND DASH NUMBER DESIGNATING DIAMETER, DEPRESSED .006 MAX DEPTH DEPTH ARRANGEMENT OPTIONAL.

CODING: THE FIRST SET OF LETTERS DESIGNATE THE FAMILY OF LIGHTWEIGHT AERO-LITE® PINS FOR AEROSPACE APPLICATIONS.  
THE NEXT SET OF NUMBERS DESIGNATE HEAD SIZE, STYLE, MATERIAL AND LOAD APPLICATION (13).  
THE NEXT SET OF LETTERS DESIGNATE FINISH (SEE FINISH CODE FOR SUFFIX INFORMATION).  
THE FOLLOWING NUMBERS DESIGNATE THE NOMINAL PIN SHANK DIAMETER IN .03125 INCH INCREMENTS.  
THE FINAL NUMBERS DESIGNATE THE GRIP LENGTH NUMBER OR THE NOMINAL PIN SHANK LENGTH IN .0625 INCH INCREMENTS.

EXAMPLE: AL13()-10-6  
GRIP LENGTH IN .0625 INCH INCREMENTS.  
SHANK DIA IN .03125 INCH INCREMENTS.  
FINISH SUFFIX (SEE FINISH CODE).  
TITANIUM 100° COUNTERSUNK HEAD FOR TENSION APPLICATIONS.  
AL FAMILY OF AERO-LITE® LIGHTWEIGHT PINS FOR AEROSPACE APPLICATIONS.

C5		REMOVE HI-KOTE I AND KAL-GARD 2242 FROM PAGE 3. (REF. ECR 2906)		
ISSUED	08/14/95	PIN, AERO-LITE® LIGHTWEIGHT 100° COUNTERSUNK TENSION HEAD, 6AL-4V TITANIUM	AL13()-()-()	
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C<sub>5</sub>

- FINISH: SUFFIX "AG" = ALUMINUM COATING PER NAS4006 WITH ORANGE COLOR ON THREAD END PLUS CETYL ALCOHOL LUBE PER AS87132.
- SUFFIX "AP" = ALUMINUM COATING PER NAS4006 PLUS CETYL ALCOHOL LUBE PER AS87132.
- SUFFIX "BJ" = ION VAPOR DEPOSITED ALUMINUM COATING PER MIL-C-83488, TYPE II, CLASS 3 PLUS CETYL ALCOHOL LUBE PER AS87132.
- SUFFIX "BL" = ION VAPOR DEPOSITED ALUMINUM COATING PER MIL-C-83488 TYPE II CLASS 3 WITH BLACK COLOR ON THREAD END PLUS CETYL ALCOHOL LUBE PER AS87132.
- SUFFIX "GM" = ALUMINUM COATING PER NAS4006 ON THREADS (NO OVERSPRAY ON SHANK) AND TOP OF HEAD (.005 MAX OVERSPRAY ON BEARING SURFACE) ONLY WITH WHITE COLOR ON THREAD END PLUS CETYL ALCOHOL LUBE PER AS87132.
- SUFFIX "HY" = ALUMINUM COATING PER NAS4006 WITH ORANGE COLOR ON THREAD END PLUS APPLY SEALANT UNDER HEAD PER BMS 5-95 AND CETYL ALCOHOL LUBE PER AS87132.
- SUFFIX "RP" = PHOSPHATE FLUORIDE TREAT PER AMS2486 WITH ORANGE COLOR ON THREAD END PLUS CETYL ALCOHOL LUBE PER AS87132.
- SUFFIX "RS" = PHOSPHATE FLUORIDE TREAT PER AMS2486 AND DRY FILM LUBE PER AS5272 WITH ORANGE COLOR ON THREAD END.
- SUFFIX "SU" = ALUMINUM COATING PER NAS4006 WITH LIGHT BLUE COLOR ON THREAD END PLUS CETYL ALCOHOL LUBE PER AS87132.
- SUFFIX "WF" = SULFURIC ACID ANODIZE (BLUE) PER ISO 8080 WITH BLACK COLOR ON THREAD END PLUS CETYL ALCOHOL LUBE PER AS87132.
- NO LETTER = UNCOATED PIN PLUS CETYL ALCOHOL LUBE PER AS87132.

C <sub>5</sub>		REMOVE HI-KOTE I AND KAL-GARD 2242 FROM PAGE 3. (REF. ECR 2906)	
ISSUED	08/14/95	PIN, AERO-LITE® LIGHTWEIGHT 100° COUNTERSUNK TENSION HEAD, 6AL-4V TITANIUM	AL 13 ( ) - ( ) - ( )
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GRIP NUMBER TABULATION															
GRIP DASH NO.	DESIGN GRIP RANGE		X ±.005	05	06	08	10	12	14	16	18	20	24	28	32
	MIN.	MAX.		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
				±.010	±.010	±.010	±.010	±.010	±.010	±.010	±.010	±.010	±.010	±.010	±.010
2	.063	.125	.125	.405	.415	-	-	-	-	-	-	-	-	-	-
3	.126	.188	.188	.468	.478	.508	.568	-	-	-	-	-	-	-	-
4	.189	.250	.250	.530	.540	.570	.630	.670	.750	-	-	-	-	-	-
5	.251	.312	.312	.592	.602	.632	.692	.732	.812	.912	1.012	-	-	-	-
6	.313	.375	.375	.655	.665	.695	.755	.795	.875	.975	1.075	1.155	-	-	-
7	.376	.438	.438	.718	.728	.758	.818	.858	.938	1.038	1.138	1.218	1.458	-	-
8	.439	.500	.500	.780	.790	.820	.880	.920	1.000	1.100	1.200	1.280	1.520	1.660	-
9	.501	.562	.562	.842	.852	.882	.942	.982	1.062	1.162	1.262	1.342	1.582	1.722	1.867
10	.563	.625	.625	.905	.915	.945	1.005	1.045	1.125	1.225	1.325	1.405	1.645	1.785	1.930
11	.626	.688	.688	.968	.978	1.008	1.068	1.108	1.188	1.288	1.388	1.468	1.708	1.848	1.993
12	.689	.750	.750	1.030	1.040	1.070	1.130	1.170	1.250	1.350	1.450	1.530	1.770	1.910	2.055
13	.751	.812	.812	1.092	1.102	1.132	1.192	1.232	1.312	1.412	1.512	1.592	1.832	1.972	2.117
14	.813	.875	.875	1.155	1.165	1.195	1.255	1.295	1.375	1.475	1.575	1.655	1.895	2.035	2.180
15	.876	.938	.938	1.218	1.228	1.258	1.318	1.358	1.438	1.538	1.638	1.718	1.958	2.098	2.243
16	.939	1.000	1.000	1.280	1.290	1.320	1.380	1.420	1.500	1.600	1.700	1.780	2.020	2.160	2.305
17	1.001	1.062	1.062	1.342	1.352	1.382	1.442	1.482	1.562	1.662	1.762	1.842	2.082	2.222	2.367
18	1.063	1.125	1.125	1.405	1.415	1.445	1.505	1.545	1.625	1.725	1.825	1.905	2.145	2.285	2.430
19	1.126	1.188	1.188	1.468	1.478	1.508	1.568	1.608	1.688	1.788	1.888	1.968	2.208	2.348	2.493
20	1.189	1.250	1.250	1.530	1.540	1.570	1.630	1.670	1.750	1.850	1.950	2.030	2.270	2.410	2.555
21	1.251	1.312	1.312	1.592	1.602	1.632	1.692	1.732	1.812	1.912	2.012	2.092	2.332	2.472	2.617
22	1.313	1.375	1.375	1.655	1.665	1.695	1.755	1.795	1.875	1.975	2.075	2.155	2.395	2.535	2.680
23	1.376	1.438	1.438	1.718	1.728	1.758	1.818	1.858	1.938	2.038	2.138	2.218	2.458	2.598	2.743
24	1.439	1.500	1.500	1.780	1.790	1.820	1.880	1.920	2.000	2.100	2.200	2.280	2.520	2.660	2.805
25	1.501	1.562	1.562	1.842	1.852	1.882	1.942	1.982	2.062	2.162	2.262	2.342	2.582	2.722	2.867
26	1.563	1.625	1.625	1.905	1.915	1.945	2.005	2.045	2.125	2.225	2.325	2.405	2.645	2.785	2.930
27	1.626	1.688	1.688	1.968	1.978	2.008	2.068	2.108	2.188	2.288	2.388	2.468	2.708	2.848	2.993
28	1.689	1.750	1.750	2.030	2.040	2.070	2.130	2.170	2.250	2.350	2.450	2.530	2.770	2.910	3.055
29	1.751	1.812	1.812	2.092	2.102	2.132	2.192	2.232	2.312	2.412	2.512	2.592	2.832	2.972	3.117
30	1.813	1.875	1.875	2.155	2.165	2.195	2.255	2.295	2.375	2.475	2.575	2.655	2.895	3.035	3.180
31	1.876	1.938	1.938	2.218	2.228	2.258	2.318	2.358	2.438	2.538	2.638	2.718	2.958	3.098	3.243
32	1.939	2.000	2.000	2.280	2.290	2.320	2.380	2.420	2.500	2.600	2.700	2.780	3.020	3.160	3.305

DIMENSIONS IN INCHES  
AFTER FINISH

C5 REMOVE HI-KOTE I AND KAL-GARD 2242 FROM PAGE 3. (REF. ECR 2906)

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PIN, AERO-LITE® LIGHTWEIGHT  
100° COUNTERSUNK TENSION HEAD,  
6AL-4V TITANIUM

AL 13 ( ) - ( ) - ( )  
AL 105