



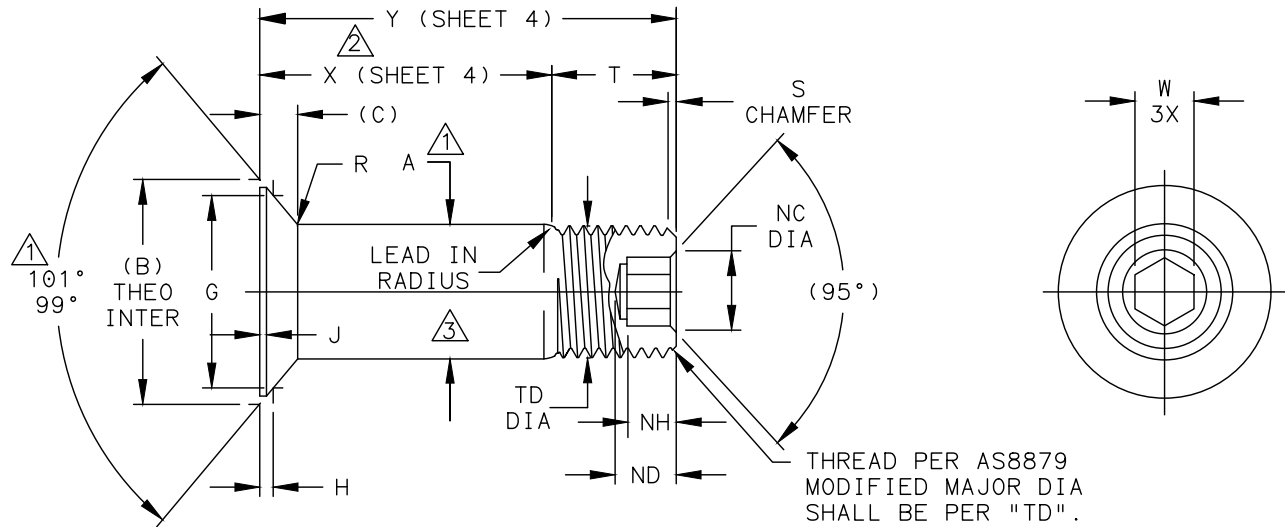
Howmet Fastening Systems
 Carson Operations
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**HOWMET
 AEROSPACE**

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**AERO-LITE®
 ENGINEERING
 STANDARD**

THIS DRAWING, THE STRUCTURAL DESIGN DISCLOSED THEREIN AND THE TECHNICAL DATA AND ENGINEERING SERVICE REPRESENTED THEREBY ARE THE EXCLUSIVE PROPERTY OF HUCK INTERNATIONAL INCORPORATED.



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
AL109()-5-()	.1640	.1640-32 UNJC-3A	.1630	.1630	.2587	.0402	.2027	.0250 .0222	.012	.104 .094	.135	.100 .080	.020	1/32"	.280	.1595 .1570	.0806 .0791	4010	1650
AL11()-5-()	.1640	.1640-32 UNJC-3A	.1630	.1630	.2587	.0402	.2027	.0250 .0222	.012	.090 .075	.170	.135 .115	.020	1/32"	.280	.1595 .1570	.0645 .0635	4010	1650
AL11()-6-()	.1900	.1900-32 UNJF-3A	.1890	.1890	.2991	.0462	.2440	.0246 .0216	.015	.119 .104	.135	.100 .080	.025	1/32"	.290	.1840 .1810	.0806 .0791	5380	2000
AL11()-8-()	.2500	.2500-28 UNJF-3A	.2490	.2490	.3924	.0602	.3314	.0271 .0241	.015	.142 .122	.160	.110 .090	.025	1/32"	.320	.2440 .2410	.0967 .0947	9300	3700
AL11()-10-()	.3125	.3125-24 UNJF-3A	.3115	.3115	.4713	.0671	.4046	.0295 .0265	.015	.180 .160	.200	.130 .110	.035	3/64"	.380	.3060 .3020	.1295 .1270	14600	5000
AL11()-12-()	.3750	.3750-24 UNJF-3A	.3740	.3740	.5580	.0772	.4853	.0320 .0290	.015	.217 .197	.235	.160 .140	.035	3/64"	.420	.3680 .3640	.1617 .1582	21000	7200
AL11()-14-()	.4375	.4375-20 UNJF-3A	.4365	.4365	.6650	.0959	.5697	.0420 .0380	.020	.253 .233	.245	.170 .150	.045	3/64"	.485	.4310 .4260	.1930 .1895	28600	10000
AL11()-16-()	.5000	.5000-20 UNJF-3A	.4990	.4990	.7510	.1057	.6499	.0444 .0404	.020	.289 .269	.275	.190 .170	.045	3/64"	.525	.4930 .4880	.2242 .2207	37300	13500
AL11()-18-()	.5625	.5625-18 UNJF-3A	.5610	.5610	.8345	.1147	.7199	.0509 .0453	.025	.326 .306	.325	.220 .200	.045	1/16"	.600	.5550 .5500	.2555 .2520	47200	17000
AL11()-20-()	.6250	.6250-18 UNJF-3A	.6235	.6235	.9215	.1249	.8011	.0535 .0475	.025	.326 .306	.335	.235 .210	.045	1/16"	.660	.6180 .6120	.2555 .2520	58300	21000
AL11()-24-()	.7500	.7500-16 UNJF-3A	.7485	.7485	1.0909	.1436	.9701	.0539 .0475	.025	.398 .378	.450	.320 .290	.045	1/16"	.895	.7430 .7370	.3185 .3150	83900	30700
AL11()-28-()	.8750	.8750-14 UNJF-3A	.8735	.8735	1.3112	.1836	1.1363	.0768 .0700	.025	.471 .451	.525	.370 .340	.045	5/64"	1.000	.8680 .8610	.3820 .3780	107000	41000
AL11()-32-()	1.0000	1.0000-12 UNJF-3A	.9985	.9985	1.5092	.2141	1.3049	.0893 .0821	.025	.618 .598	.680	.490 .460	.045	5/64"	1.160	.9930 .9860	.5100 .5040	140000	54500

- 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	ML	FSCM (Cage Code) 17446 - Carson
CHECKED BY	MM	

D ₆	REMOVE HI-KOTE I AND KAL-GARD 2242 REFERENCES FROM PAGE 3. (REF. ECR 2906)
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ISSUED	08/07/95	PIN, AERO-LITE® LIGHTWEIGHT 100° COUNTERSUNK SHEAR HEAD, 6AL-4V TITANIUM (CLOSE TOLERANCE GAGE PROTRUSION)	AL11/109()-()-()
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MATERIAL: 6AL-4V TITANIUM ALLOY PER AMS4967 OR AMS4928.
 MINIMUM SHEAR STRENGTH: 95 KSI (05Ø THRU 24Ø)
 89 KSI (28Ø THRU 32Ø).
 SURFACE TEXTURE: R_a 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 (AL11 OR AL109) AND DASH NUMBER DESIGNATING DIAMETER,
 DEPRESSED .006 MAX DEPTH ARRANGEMENT OPTIONAL.

CODING: THE FIRST SET OF LETTERS DESIGNATE THE FAMILY OF LIGHTWEIGHT
 AERO-LITE® PINS FOR AEROSPACE APPLICATIONS (AL).
 THE NEXT SET OF NUMBERS DESIGNATE HEAD SIZE, STYLE, MATERIAL AND LOAD
 APPLICATION. THE NUMBERS (109) DESIGNATES OVERSIZE HEX
 SOCKET (ONLY VALID FOR 5/32 DIAMETER).
 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: AL109()-10-6

- GRIP LENGTH IN .0625 INCH INCREMENTS.
- SHANK DIA IN .03125 INCH INCREMENTS.
- FINISH SUFFIX (SEE FINISH CODE).
- TITANIUM 100° COUNTERSUNK HEAD FOR SHEAR APPLICATIONS WITH OVERSIZE HEX SOCKET.
- AL FAMILY OF AERO-LITE® LIGHTWEIGHT PINS FOR AEROSPACE APPLICATIONS.

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- 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 "GD" = ALUMINUM COATING PER NAS4006 ON THREADS ONLY 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.

D₆

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GRIP NUMBER TABULATION															
GRIP DASH NO.	DESIGN GRIP RANGE		X	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
			±.005	±.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	.735	-	-	-	-	-	-
5	.251	.312	.312	.592	.602	.632	.692	.732	.797	.837	.912	-	-	-	-
6	.313	.375	.375	.655	.665	.695	.755	.795	.860	.900	.975	1.035	1.270	-	-
7	.376	.438	.438	.718	.728	.758	.818	.858	.923	.963	1.038	1.098	1.333	1.438	1.598
8	.439	.500	.500	.780	.790	.820	.880	.920	.985	1.025	1.100	1.160	1.395	1.500	1.660
9	.501	.562	.562	.842	.852	.882	.942	.982	1.047	1.087	1.162	1.222	1.457	1.562	1.722
10	.563	.625	.625	.905	.915	.945	1.005	1.045	1.110	1.150	1.225	1.285	1.520	1.625	1.785
11	.626	.688	.688	.968	.978	1.008	1.068	1.108	1.173	1.213	1.288	1.348	1.583	1.688	1.848
12	.689	.750	.750	1.030	1.040	1.070	1.130	1.170	1.235	1.275	1.350	1.410	1.645	1.750	1.910
13	.751	.812	.812	1.092	1.102	1.132	1.192	1.232	1.297	1.337	1.412	1.472	1.707	1.812	1.972
14	.813	.875	.875	1.155	1.165	1.195	1.255	1.295	1.360	1.400	1.475	1.535	1.770	1.875	2.035
15	.876	.938	.938	1.218	1.228	1.258	1.318	1.358	1.423	1.463	1.538	1.598	1.833	1.938	2.098
16	.939	1.000	1.000	1.280	1.290	1.320	1.380	1.420	1.485	1.525	1.600	1.660	1.895	2.000	2.160
17	1.001	1.062	1.062	1.342	1.352	1.382	1.442	1.482	1.547	1.587	1.662	1.722	1.957	2.062	2.222
18	1.063	1.125	1.125	1.405	1.415	1.445	1.505	1.545	1.610	1.650	1.725	1.785	2.020	2.125	2.285
19	1.126	1.188	1.188	1.468	1.478	1.508	1.568	1.608	1.673	1.713	1.788	1.848	2.083	2.188	2.348
20	1.189	1.250	1.250	1.530	1.540	1.570	1.630	1.670	1.735	1.775	1.850	1.910	2.145	2.250	2.410
21	1.251	1.312	1.312	1.592	1.602	1.632	1.692	1.732	1.797	1.837	1.912	1.972	2.207	2.312	2.472
22	1.313	1.375	1.375	1.655	1.665	1.695	1.755	1.795	1.860	1.900	1.975	2.035	2.270	2.375	2.535
23	1.376	1.438	1.438	1.718	1.728	1.758	1.818	1.858	1.923	1.963	2.038	2.098	2.333	2.438	2.598
24	1.439	1.500	1.500	1.780	1.790	1.820	1.880	1.920	1.985	2.025	2.100	2.160	2.395	2.500	2.660
25	1.501	1.562	1.562	1.842	1.852	1.882	1.942	1.982	2.047	2.087	2.162	2.222	2.457	2.562	2.722
26	1.563	1.625	1.625	1.905	1.915	1.945	2.005	2.045	2.110	2.150	2.225	2.285	2.520	2.625	2.785
27	1.626	1.688	1.688	1.968	1.978	2.008	2.068	2.108	2.173	2.213	2.288	2.348	2.583	2.688	2.848
28	1.689	1.750	1.750	2.030	2.040	2.070	2.130	2.170	2.235	2.275	2.350	2.410	2.645	2.750	2.910
29	1.751	1.812	1.812	2.092	2.102	2.132	2.192	2.232	2.297	2.337	2.412	2.472	2.707	2.812	2.972
30	1.813	1.875	1.875	2.155	2.165	2.195	2.255	2.295	2.360	2.400	2.475	2.535	2.770	2.875	3.035
31	1.876	1.938	1.938	2.218	2.228	2.258	2.318	2.358	2.423	2.463	2.538	2.598	2.833	2.938	3.098
32	1.939	2.000	2.000	2.280	2.290	2.320	2.380	2.420	2.485	2.525	2.600	2.660	2.895	3.000	3.160

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