

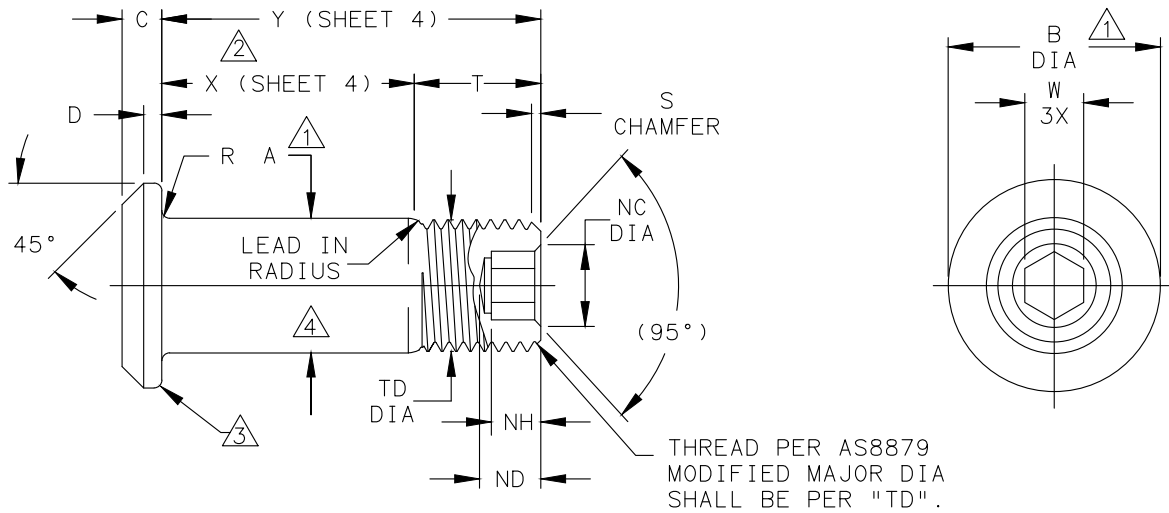


Howmet Fastening Systems
 Carson Operations
 900 E. Watson Center Road
 Carson, California 90745 U.S.A.

**HOWMET
 AEROSPACE**

Phone (310) 830-8200
 HFS_Carson_Engineering@howmet.com

AERO-LITE®
 ENGINEERING
 STANDARD



AL PIN FAMILY NUMBER	NOM SIZE	THREAD (MODIFIED)	A SHANK DIA BARE ±.0005 - .0000	A SHANK DIA COATED ±.0005	B HEAD DIA	C HEAD HEIGHT	D REF	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
AL12()-5-()	.1640	.1640-32 UNJC-3A	.1630	.1630	.322 .306	.065 .055	.030	.104 .094	.135	.100 .080	.020	1/32"	.280	.1595 .1570	.0806 .0791	4010	2180
AL12()-6-()	.1900	.1900-32 UNJF-3A	.1890	.1890	.377 .357	.074 .064	.035	.119 .104	.135	.100 .080	.020	1/32"	.290	.1840 .1810	.0806 .0791	5380	3180
AL12()-7-()	.2187	.2160-28 UNJF-3A	.2177	.2177	.410 .390	.085 .075	.040	.119 .104	.135	.100 .080	.020	1/32"	.305	.2100 .2070	.0806 .0791	7200	4280
AL12()-8-()	.2500	.2500-28 UNJF-3A	.2490	.2490	.440 .415	.090 .080	.045	.142 .122	.160	.110 .090	.020	1/32"	.320	.2440 .2410	.0967 .0947	9300	5820
AL12()-10-()	.3125	.3125-24 UNJF-3A	.3115	.3115	.505 .475	.112 .102	.055	.180 .160	.200	.130 .110	.025	3/64"	.380	.3060 .3020	.1295 .1270	14600	9200
AL12()-12-()	.3750	.3750-24 UNJF-3A	.3740	.3740	.600 .565	.140 .130	.075	.217 .197	.235	.160 .140	.025	3/64"	.420	.3680 .3640	.1617 .1582	21000	14000
AL12()-14-()	.4375	.4375-20 UNJF-3A	.4365	.4365	.676 .641	.160 .150	.095	.253 .233	.245	.170 .150	.025	3/64"	.500	.4310 .4260	.1930 .1895	28600	18900
AL12()-16-()	.5000	.5000-20 UNJF-3A	.4990	.4990	.770 .735	.188 .178	.095	.289 .269	.275	.190 .170	.025	3/64"	.600	.4930 .4880	.2242 .2207	37300	25600
AL12()-18-()	.5625	.5625-18 UNJF-3A	.5610	.5610	.877 .842	.210 .200	.125	.326 .306	.325	.220 .200	.035	1/16"	.700	.5550 .5500	.2555 .2520	47200	32400
AL12()-20-()	.6250	.6250-18 UNJF-3A	.6235	.6235	.953 .918	.238 .228	.140	.326 .306	.335	.235 .210	.035	1/16"	.780	.6180 .6120	.2555 .2520	58300	41000
AL12()-24-()	.7500	.7500-16 UNJF-3A	.7485	.7485	1.150 1.110	.335 .320	.200	.398 .378	.450	.320 .290	.040	1/16"	1.020	.7430 .7370	.3185 .3150	83900	59500
AL12()-28-()	.8750	.8750-14 UNJF-3A	.8735	.8735	1.330 1.290	.385 .370	.250	.471 .451	.525	.370 .340	.045	5/64"	1.160	.8680 .8610	.3820 .3780	107000	76000
AL12()-32-()	1.0000	1.0000-12 UNJF-3A	.9985	.9985	1.510 1.470	.435 .420	.300	.618 .598	.680	.490 .460	.055	5/64"	1.305	.9930 .9860	.5100 .5040	140000	99000

- ① CONCENTRICITY: "B" HEAD DIAMETER TO "A" SHANK DIAMETER TO BE WITHIN .010 TIR.
- ② GRIP LENGTH IS MEASURED FROM THE UNDERSIDE 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" SHEETS 4 & 5).
- ③ PERMISSIBLE NATURAL FLOW OF MATERIAL. MUST BE FREE FROM SHARP CORNERS.
- ④ MAXIMUM "A" DIAMETER MAY BE INCREASED BY .0002 TO ALLOW FOR DRY FILM LUBE (SUFFIX "RS" AND "UV" FINISH ONLY).

PROCUREMENT SPECIFICATION: C380

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DIMENSIONS IN INCHES AFTER FINISH

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

E	ECR 3040 - ADDED FINISH CODE "GM", ADDED NOTES 5 & 6 TO CLARIFY COVERAGE REQUIREMENTS FOR "GD" AND "GM" FINISHES.
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ISSUED	08/14/95	PIN, AERO-LITE® LIGHTWEIGHT PROTRUDING TENSION HEAD, 6AL-4V TITANIUM	AL12()-()-()
REVISED	03/31/2023		AL104
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THIS DRAWING, THE STRUCTURAL DESIGN DISCLOSED THEREIN AND THE TECHNICAL DATA AND ENGINEERING SERVICE REPRESENTED THEREBY ARE THE EXCLUSIVE PROPERTY OF HUCK INTERNATIONAL INCORPORATED.



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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: Ra 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
 (AL12) 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 (12).
 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: AL12()-10-6

GRIP LENGTH IN .0625 INCH INCREMENTS.
 SHANK DIA IN .03125 INCH INCREMENTS.
 FINISH SUFFIX (SEE FINISH CODE).
 TITANIUM PROTRUDING HEAD FOR TENSION
 APPLICATIONS.
 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 (HI-KOTE 1 ONLY) PER NAS4006 PLUS CETYL ALCOHOL LUBE PER AS87132.
- SUFFIX "AT" = ALUMINUM COATING PER NAS4006.
- 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 "CF" = ION VAPOR DEPOSITED ALUMINUM COATING PER MIL-C-83488, TYPE II, CLASS 3 WITH BLACK COLOR ON THREAD END.
- SUFFIX "GD" = ALUMINUM COATING PER NAS4006 ON THREADS ONLY PLUS CETYL ALCOHOL LUBE PER AS87132. ⁵
- SUFFIX "GM" = ALUMINUM COATING PER NAS4006 ON THREADS AND TOP OF HEAD ONLY WITH WHITE COLOR ON THREAD END PLUS CETYL LUBE PER AS87132. ⁵₆
- SUFFIX "KM" = ALUMINUM COATING (HI-KOTE 1 ONLY) PER NAS4006 WITH WHITE COLOR ON THREAD END PLUS CETYL ALCOHOL LUBE PER AS87132.
- SUFFIX "KN" = ALUMINUM COATING PER NAS4006 WITH WHITE COLOR ON THREAD END.
- 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 "UV" = SULFURIC ACID ANODIZE (BLUE) PER ISO 8080 AND DRY FILM LUBE PER AS5272 PLUS CETYL ALCOHOL LUBE PER AS87132.
- SUFFIX "VF" = SULFURIC ACID ANODIZE (BLUE) PER ISO 8080 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.

⁵ NO OVERSPRAY ON SHANK DIAMETER "A". INCOMPLETE COVERAGE ON THREADS PERMITTED UP TO .030 MAX INTO THREADS FROM "X".

⁶ OVERSPRAY ON BEARING SURFACE OF HEAD PERMITTED UP TO .005 MAXIMUM.

E	ECR 3040 - ADDED FINISH CODE "GM", ADDED NOTES 5 & 6 TO CLARIFY COVERAGE REQUIREMENTS FOR "GD" AND "GM" FINISHES.	
ISSUED	08/14/95	PIN, AERO-LITE® LIGHTWEIGHT PROTRUDING TENSION HEAD, 6AL-4V TITANIUM
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GRIP NUMBER TABULATION																
GRIP DASH NO.	DESIGN GRIP RANGE		X ± .005	05	06	07	08	10	12	14	16	18	20	24	28	32
	MIN.	MAX.		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
△ 2	△ 2			± .010	± .010	± .010	± .010	± .010	± .010	± .010	± .010	± .010	± .010	± .010	± .010	± .010
2	.063	.125	.125	.405	.415	-	-	-	-	-	-	-	-	-	-	-
3	.126	.188	.188	.468	.478	.493	.508	.568	-	-	-	-	-	-	-	-
4	.189	.250	.250	.530	.540	.555	.570	.630	.670	.750	-	-	-	-	-	-
5	.251	.312	.312	.592	.602	.617	.632	.692	.732	.812	.912	1.012	-	-	-	-
6	.313	.375	.375	.655	.665	.680	.695	.755	.795	.875	.975	1.075	1.155	1.395	-	-
7	.376	.438	.438	.718	.728	.743	.758	.818	.858	.938	1.038	1.138	1.218	1.458	1.598	1.743
8	.439	.500	.500	.780	.790	.805	.820	.880	.920	1.000	1.100	1.200	1.280	1.520	1.660	1.805
9	.501	.562	.562	.842	.852	.867	.882	.942	.982	1.062	1.162	1.262	1.342	1.582	1.722	1.867
10	.563	.625	.625	.905	.915	.930	.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	.993	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	1.055	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	1.117	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	1.180	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	1.243	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	1.305	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	1.367	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	1.430	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	1.493	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	1.555	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	1.617	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	1.680	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	1.743	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	1.805	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	1.867	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	1.930	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	1.993	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	2.055	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	2.117	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	2.180	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	2.243	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	2.305	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

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