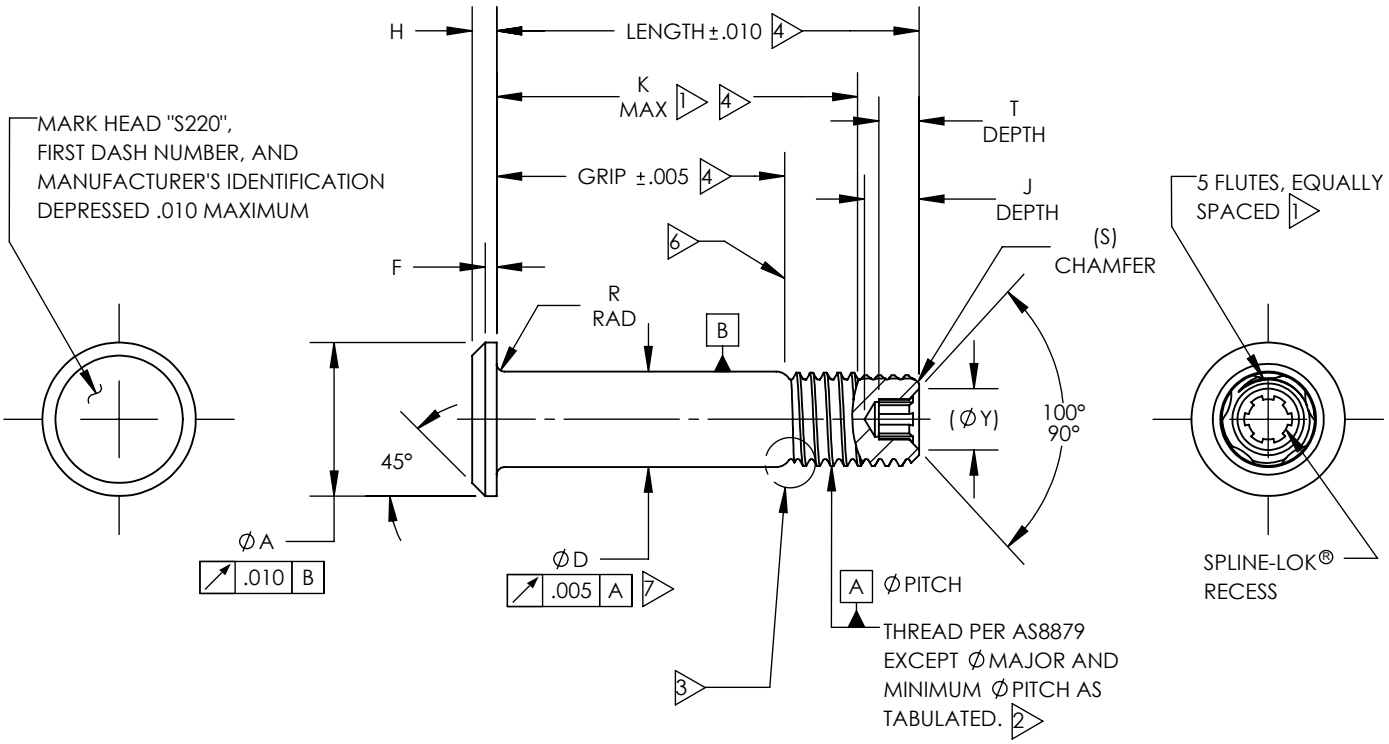


TABLE I - DIMENSIONS & MECHANICAL PROPERTIES

FIRST DASH NO.	ØNOM	THREADS (MODIFIED)		ØA	ØD				(F)	H	R RAD	(S) CHAMFER
					BEFORE FINISH	AFTER FINISH						
		THREAD SIZE	ØMAJOR MOD		ALUM COAT	ALL	ALUM COAT	NONE				
					MIN	MAX	MIN	MIN				
5	5/32	.1640-32 UNJC-3A	.1595 .1565	.262 .242	.1621	.1635	.1625	.1630	.024	.047 .037	.025 .015	1/32" X 45°
6	3/16	.1900-32 UNJF-3A	.1840 .1810	.315 .295	.1881	.1895	.1885	.1890	.025	.055 .045	.025 .015	1/32" X 45°
8	1/4	.2500-28 UNJF-3A	.2440 .2410	.412 .387	.2481	.2495	.2485	.2490	.030	.069 .059	.025 .015	1/32" X 45°
10	5/16	.3125-24 UNJF-3A	.3060 .3020	.505 .475	.3106	.3120	.3110	.3115	.035	.078 .068	.030 .020	3/64" X 45°
12	3/8	.3750-24 UNJF-3A	.3680 .3640	.600 .565	.3731	.3745	.3735	.3740	.040	.088 .078	.030 .020	3/64" X 45°

DIMENSIONS AND TOLERANCE PER ASME Y14.5-2018.
DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.
DIMENSIONS APPLY AFTER FINISH, AND BEFORE SOLID FILM LUBE AND CETYL ALCOHOL LUBE UNLESS OTHERWISE SPECIFIED.
SURFACE TEXTURE PER ASME B46.1. HEAD TO SHANK FILLET, THREAD FLANKS, THREAD ROOT, SHANK ("D" DIAMETER) AND BEARING SURFACE OF HEAD, 32 MICROINCHES RA. OTHER SURFACES, 125 MICROINCHES RA.

PIN, EDDIE-BOLT® 2, PROTRUDING SHEAR HEAD, SPLINE-LOK® SOCKET RECESS, 95 KSI MIN SHEAR, 6AL-4V TITANIUM

HOWMET AEROSPACE

HOWMET AEROSPACE PART STANDARD | **ELS220**

HOWMET FASTENING SYSTEMS
CITY OF INDUSTRY OPERATIONS
135 N. UNRUH AVE., CITY OF INDUSTRY, CA 91744

REV: **H**
REV DATE: 02-OCT-2020
SHEET 1 OF 6

DATA CLASSIFICATION: GENERAL | ECCN: EAR99 | CAGE CODE: **1RC86**

TABLE I - DIMENSIONS & MECHANICAL PROPERTIES (CONTINUED)

FIRST DASH NO.	∅NOM	SPLINE-LOK®			DOUBLE SHEAR STRENGTH LBF MIN	TENSILE STRENGTH LBF MIN
		(∅Y)	T MIN DEPTH	J MAX DEPTH		
5	5/32	.100	.075	.140	4,010	2,180
6	3/16	.120	.075	.140	5,380	3,180
8	1/4	.160	.090	.160	9,300	5,820
10	5/16	.189	.125	.210	14,600	9,200
12	3/8	.242	.120	.205	21,000	14,000

PROCUREMENT SPECIFICATION: EBS2202.

MATERIAL: 6AL-4V TITANIUM ALLOY PER AMS4928 OR AMS4967.

HEAT TREAT: 95 KSI SHEAR MINIMUM.

FINISH:

NC = NO FINISH AND CETYL ALCOHOL LUBE PER AS87132.
NF = DRY FILM LUBE PER AS5272, TYPE I (HEAD & SHANK ONLY, OVERSPRAY PERMITTED) AND CETYL ALCOHOL LUBE PER AS87132.
NN = NO FINISH AND NO LUBE.
JC = ALUMINUM COATING PER PS103 ON HEAD AND SHANK ONLY, CETYL ALCOHOL LUBE PER AS87132.

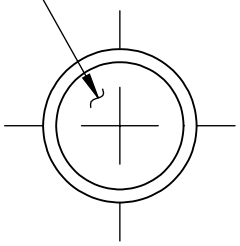
PART CODE & EXAMPLE:

ELS220 NC 8 -8

- -8: 8/16" OR 1/2 " MAXIMUM GRIP LENGTH (1/16" INCREMENTS)
- 8: 8/32" OR 1/4" NOMINAL DIAMETER (1/32" INCREMENTS)
- NC: FINISH: NO FINISH AND CETYL ALCOHOL LUBE PER AS87132.
- ELS220: BASIC PART NUMBER

GENERAL NOTES:

1. FLUTE LOCATION ("K" DIMENSION) AND GEOMETRY ARE INSPECTED PER AFS SPECIFICATION E106.
2. THREADS MUST ACCEPT A AS8879 "GO" RING GAGE TO ASSURE FREE RUNNING NUT CAPABILITY. AS8879 LIMITS DO NOT APPLY TO THREADS IN THE FLUTED PORTION OF THE THREAD, THE ∅MINOR AND ∅PITCH MAY BE UP TO .004 BELOW AS8879 MINIMUM VALUES AND ∅MAJOR MAY BE UP TO .002 BELOW SHEET 1 VALUES FOR A DISTANCE EQUAL TO THE FLUTE LENGTH PLUS 1.5P MAX.
3. BLENDED RADIUS TRANSITION PERMITS USE IN INTERFERENCE FIT APPLICATION.
4. SEE TABLE III.
5. PINS MUST BE PACKAGED OR REPACKAGED IN CLEAR SEALED BAGS. EACH BAG MUST CONTAIN A MAX OF 100 PINS FOR 5 AND 6 DIAMETERS, 50 PINS PER BAG FOR 8 AND 10 DIAMETERS, AND 25 PINS PER BAG FOR 12 DIAMETER. EACH BAG MUST BE MARKED WITH PURCHASER'S AND MANUFACTURER'S COMPLETE PART NUMBER, MANUFACTURER'S LOT NUMBER, MANUFACTURER'S OR DISTRIBUTOR'S NAME, AND THE PACK DATE.
6. ALUMINUM COAT TO BE APPLIED TO HEAD AND SHANK ONLY. OVERSPRAY IS ALLOWED IN THE THREAD RUNOUT AREA FOR A MAXIMUM DISTANCE OF .030 FROM THE END OF THE GRIP.
7. RUNOUT MEASURED WHEN HELD ON THE ∅PITCH OF THE COMPLETE THREADS NEAREST THE SHANK AND CHECKED ON ∅D WITHIN ONE DIAMETER OF THE THREAD RUNOUT.



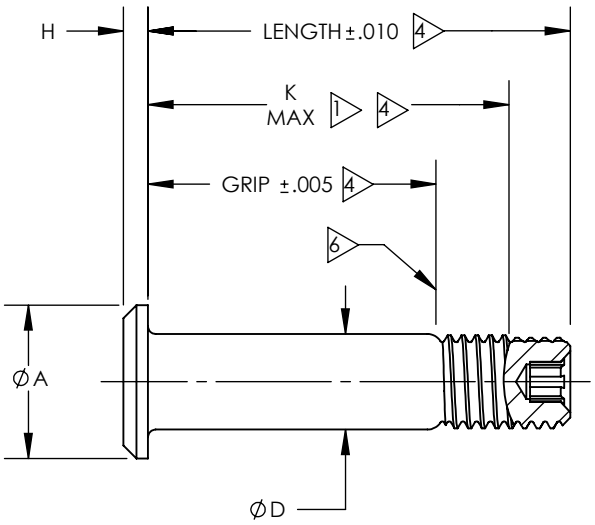


TABLE II (.0156 OVERSIZE) - DIMENSIONS & MECHANICAL PROPERTIES

DASH NUMBER	ØD				DOUBLE SHEAR STRENGTH LBF MIN
	BEFORE FINISH	AFTER FINISH			
	ALUM COAT	ALL	ALUM COAT	NONE	
	MIN	MAX	MIN	MIN	
5-( )X	NO .0156 OVERSIZE AVAILABLE				
6-( )X	.2012	.2026	.2016	.2021	6,130
8-( )X	.2637	.2651	.2641	.2646	10,490
10-( )X	.3262	.3276	.3266	.3271	16,000
12-( )X	.3887	.3901	.3891	.3896	22,700

GENERAL NOTES (CONTINUED):

8. FOR DIMENSIONS NOT SHOWN, SEE SHEETS 1 AND 2.

9. FOR MATERIAL, FINISH AND LUBE INFORMATION, SEE SHEETS 1 AND 2.

PART CODE & EXAMPLE: ELS220 NC 8 -8 X

- .0156 OVERSIZE
- 8/16" OR 1/2 " MAXIMUM GRIP LENGTH (1/16" INCREMENTS)
- 8/32" OR 1/4" NOMINAL DIAMETER (1/32" INCREMENTS)
- FINISH: NO FINISH AND CETYL ALCOHOL LUBE PER AS87132.
- BASIC PART NUMBER

TABLE III - FOR STANDARD & 1/64" (.0156) OVERSIZE PINS

SECOND DASH NO.	STRUCTURAL THICKNESS		GRIP ± .005	∅5		∅6		∅8		∅10		∅12	
	MIN.	MAX.		K MAX.	L ± .010	K MAX.	L ± .010	K MAX.	L ± .010	K MAX.	L ± .010	K MAX.	L ± .010
1	.000	.062	.062	----	----	----	----	----	----	----	----	----	----
2	.063	.125	.125	.270	.410	.295	.430	.326	.475	.419	.570	.459	.610
3	.126	.188	.188	.333	.472	.358	.492	.389	.538	.482	.632	.522	.673
4	.189	.250	.250	.395	.535	.420	.555	.451	.600	.544	.695	.584	.735
5	.251	.312	.312	.457	.598	.482	.618	.513	.662	.606	.758	.646	.797
6	.313	.375	.375	.520	.660	.545	.680	.576	.725	.669	.820	.709	.860
7	.376	.438	.438	.583	.722	.608	.742	.639	.788	.732	.882	.772	.923
8	.439	.500	.500	.645	.785	.670	.805	.701	.850	.794	.945	.834	.985
9	.501	.562	.562	.707	.848	.732	.868	.763	.912	.856	1.008	.896	1.047
10	.563	.625	.625	.770	.910	.795	.930	.826	.975	.919	1.070	.959	1.110
11	.626	.688	.688	.833	.972	.858	.992	.889	1.038	.982	1.132	1.022	1.173
12	.689	.750	.750	.895	1.035	.920	1.055	.951	1.100	1.044	1.195	1.084	1.235
13	.751	.812	.812	.957	1.098	.982	1.118	1.013	1.162	1.106	1.258	1.146	1.297
14	.813	.875	.875	1.020	1.160	1.045	1.180	1.076	1.225	1.169	1.320	1.209	1.360
15	.876	.938	.938	1.083	1.222	1.108	1.242	1.139	1.288	1.232	1.382	1.272	1.423
16	.939	1.000	1.000	1.145	1.285	1.170	1.305	1.201	1.350	1.294	1.445	1.334	1.485
17	1.001	1.062	1.062	1.207	1.348	1.232	1.368	1.263	1.412	1.356	1.508	1.396	1.547
18	1.063	1.125	1.125	1.270	1.410	1.295	1.430	1.326	1.475	1.419	1.570	1.459	1.610
19	1.126	1.188	1.188	1.333	1.472	1.358	1.492	1.389	1.538	1.482	1.632	1.522	1.673
20	1.189	1.250	1.250	1.395	1.535	1.420	1.555	1.451	1.600	1.544	1.695	1.584	1.735
21	1.251	1.312	1.312	1.457	1.598	1.482	1.618	1.513	1.662	1.606	1.758	1.646	1.797
22	1.313	1.375	1.375	1.520	1.660	1.545	1.680	1.576	1.725	1.669	1.820	1.709	1.860
23	1.376	1.438	1.438	1.583	1.722	1.608	1.742	1.639	1.788	1.732	1.882	1.772	1.923
24	1.439	1.500	1.500	1.645	1.785	1.670	1.805	1.701	1.850	1.794	1.945	1.834	1.985
25	1.501	1.562	1.562	1.707	1.848	1.732	1.868	1.763	1.912	1.856	2.008	1.896	2.047
26	1.563	1.625	1.625	1.770	1.910	1.795	1.930	1.826	1.975	1.919	2.070	1.959	2.110
27	1.626	1.688	1.688	1.833	1.972	1.858	1.992	1.889	2.038	1.982	2.132	2.022	2.173
28	1.689	1.750	1.750	1.895	2.035	1.920	2.055	1.951	2.100	2.044	2.195	2.084	2.235
29	1.751	1.812	1.812	1.957	2.098	1.982	2.118	2.013	2.162	2.106	2.258	2.146	2.297
30	1.813	1.875	1.875	2.020	2.160	2.045	2.180	2.076	2.225	2.169	2.320	2.209	2.360
31	1.876	1.938	1.938	2.083	2.222	2.108	2.242	2.139	2.288	2.232	2.382	2.272	2.423
32	1.939	2.000	2.000	2.145	2.285	2.170	2.305	2.201	2.350	2.294	2.445	2.334	2.485

DASH NUMBER INDICATES MAX GRIP LENGTH IN .0625 INCREMENTS; LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE DASH NUMBERS ONLY.

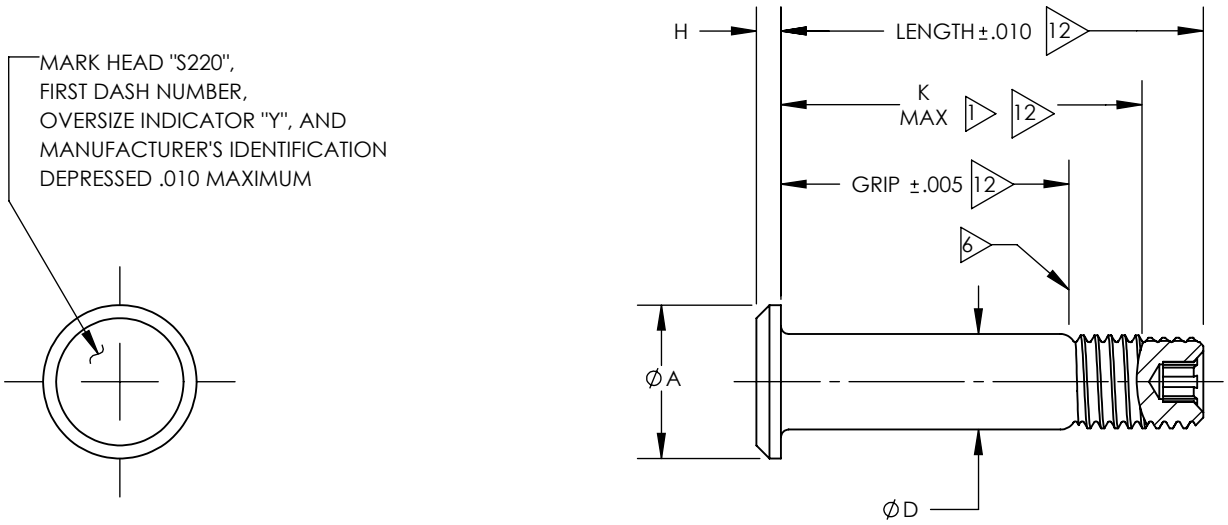


TABLE IV (.0312 OVERSIZE) - DIMENSIONS & MECHANICAL PROPERTIES

DASH NUMBER	ØD				DOUBLE SHEAR STRENGTH LBF MIN
	BEFORE FINISH	AFTER FINISH			
	ALUM COAT	ALL	ALUM COAT	NONE	
	MIN	MAX	MIN	MIN	
5-( )Y	USE STANDARD DIAMETER ELS220( )6-( )				
6-( )Y	.2168	.2182	.2172	.2177	7,100
8-( )Y	.2793	.2807	.2797	.2802	11,800
10-( )Y	.3418	.3432	.3422	.3427	17,600
12-( )Y	.4043	.4057	.4047	.4052	24,600

GENERAL NOTES (CONTINUED):

10. FOR DIMENSIONS NOT SHOWN, SEE SHEETS 1 AND 2.

11. FOR MATERIAL, FINISH AND LUBE INFORMATION, SEE SHEETS 1 AND 2.

12 SEE TABLE V.

PART CODE & EXAMPLE: ELS220 NC 8 -8 Y

- .0312 OVERSIZE
- 8/16" OR 1/2 " MAXIMUM GRIP LENGTH (1/16" INCREMENTS)
- 8/32" OR 1/4" NOMINAL DIAMETER (1/32" INCREMENTS)
- FINISH: NO FINISH AND CETYL ALCOHOL LUBE PER AS87132.
- BASIC PART NUMBER

TABLE V - FOR 1/32" (.0312) OVERSIZE PINS

SECOND DASH NO.	STRUCTURAL THICKNESS		GRIP ± .005	∅6		∅8		∅10		∅12	
	MIN.	MAX.		K MAX.	L ± .010	K MAX.	L ± .010	K MAX.	L ± .010	K MAX.	L ± .010
1	.000	.062	.062	----	----	----	----	----	----	----	----
2	.063	.125	.125	.315	.450	.361	.510	.454	.615	.504	.655
3	.126	.188	.188	.378	.512	.424	.573	.517	.677	.567	.718
4	.189	.250	.250	.440	.575	.486	.635	.579	.740	.629	.780
5	.251	.312	.312	.502	.638	.548	.697	.641	.803	.691	.842
6	.313	.375	.375	.565	.700	.611	.760	.704	.865	.754	.905
7	.376	.438	.438	.628	.762	.674	.823	.767	.927	.817	.968
8	.439	.500	.500	.690	.825	.736	.885	.829	.990	.879	1.030
9	.501	.562	.562	.752	.888	.798	.947	.891	1.053	.941	1.092
10	.563	.625	.625	.815	.950	.861	1.010	.954	1.115	1.004	1.155
11	.626	.688	.688	.878	1.012	.924	1.073	1.017	1.177	1.067	1.218
12	.689	.750	.750	.940	1.075	.986	1.135	1.079	1.240	1.129	1.280
13	.751	.812	.812	1.002	1.138	1.048	1.197	1.141	1.303	1.191	1.342
14	.813	.875	.875	1.065	1.200	1.111	1.260	1.204	1.365	1.254	1.405
15	.876	.938	.938	1.128	1.262	1.174	1.323	1.267	1.427	1.317	1.468
16	.939	1.000	1.000	1.190	1.325	1.236	1.385	1.329	1.490	1.379	1.530
17	1.001	1.062	1.062	1.252	1.388	1.298	1.447	1.391	1.553	1.441	1.592
18	1.063	1.125	1.125	1.315	1.450	1.361	1.510	1.454	1.615	1.504	1.655
19	1.126	1.188	1.188	1.378	1.512	1.424	1.573	1.517	1.677	1.567	1.718
20	1.189	1.250	1.250	1.440	1.575	1.486	1.635	1.579	1.740	1.629	1.780
21	1.251	1.312	1.312	1.502	1.638	1.548	1.697	1.641	1.803	1.691	1.842
22	1.313	1.375	1.375	1.565	1.700	1.611	1.760	1.704	1.865	1.754	1.905
23	1.376	1.438	1.438	1.628	1.762	1.674	1.823	1.767	1.927	1.817	1.968
24	1.439	1.500	1.500	1.690	1.825	1.736	1.885	1.829	1.990	1.879	2.030
25	1.501	1.562	1.562	1.752	1.888	1.798	1.947	1.891	2.053	1.941	2.092
26	1.563	1.625	1.625	1.815	1.950	1.861	2.010	1.954	2.115	2.004	2.155
27	1.626	1.688	1.688	1.878	2.012	1.924	2.073	2.017	2.177	2.067	2.218
28	1.689	1.750	1.750	1.940	2.075	1.986	2.135	2.079	2.240	2.129	2.280
29	1.751	1.812	1.812	2.002	2.138	2.048	2.197	2.141	2.303	2.191	2.342
30	1.813	1.875	1.875	2.065	2.200	2.111	2.260	2.204	2.365	2.254	2.405
31	1.876	1.938	1.938	2.128	2.262	2.174	2.323	2.267	2.427	2.317	2.468
32	1.939	2.000	2.000	2.190	2.325	2.236	2.385	2.329	2.490	2.379	2.530

DASH NUMBER INDICATES MAX GRIP LENGTH IN .0625 INCREMENTS; LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE DASH NUMBERS ONLY.