

TABLE I - DIMENSIONS & MECHANICAL PROPERTIES

FIRST DASH NO.	Ø NOM.	THREAD (MODIFIED)		(Ø A)	Ø A1 MIN	Ø D				F	(H)	M GAGE PROT	R	(S)	Ø V GAGE DIA
		THREAD SIZE	Ø MAJOR MOD			BEFORE FINISH	AFTER FINISH								
						IVD ALUMINUM and ALUMINUM PIGMENTED COATING	ALL	IVD ALUMINUM and ALUMINUM PIGMENTED COATING	NONE						
5	5/32	.1640-32 UNJC-3A	.1595 .1565	.3393	.293	.1621	.1635	.1625	.1630	.004	.040	.0277 .0263	.025 .015	1/32" x 45°	.2218 .2216
6	3/16	.1900-32 UNJF-3A	.1840 .1810	.3911	.324	.1881	.1895	.1885	.1890	.005	.046	.0254 .0234	.030 .020	1/32" x 45°	.2832 .2830
8	1/4	.2500-28 UNJF-3A	.2440 .2410	.5111	.444	.2481	.2495	.2485	.2490	.006	.060	.0424 .0403	.030 .020	1/32" x 45°	.3314 .3312
10	5/16	.3125-24 UNJF-3A	.3060 .3020	.6037	.536	.3106	.3120	.3110	.3115	.007	.067	.0469 .0448	.040 .030	3/64" x 45°	.4047 .4045
12	3/8	.3750-24 UNJF-3A	.3680 .3640	.7090	.642	.3731	.3745	.3735	.3740	.008	.077	.0527 .0506	.040 .030	3/64" x 45°	.4854 .4852

DIMENSIONS AND TOLERANCE PER ASME Y14.5-2018.

DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.

DIMENSIONS APPLY AFTER FINISH AND BEFORE LUBRICATION 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, 130° FLUSH SHEAR HEAD, SPLINE-LOK® RECESS,
95 KSI MIN SHEAR, TITANIUM 6AL-4V



HOWMET AEROSPACE PART STANDARD

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

ELS9020


REV: **M**
REV DATE: 20-JUL-2023
SHEET 1 OF 6

DATA CLASSIFICATION: GENERAL

ECCN: EAR99

CAGE CODE: 1RC86



TABLE I - DIMENSIONS & MECHANICAL PROPERTIES (CONTINUED)

FIRST DASH NO.	ϕ NOM	SPLINE-LOK®			Z MAX 	DOUBLE SHEAR STRENGTH LBF MIN	TENSILE STRENGTH LBF MIN
		(ϕ Y)	T DEPTH MIN	J DEPTH MAX			
5	5/32	.100	.075	.140	.010	4,010	1,500
6	3/16	.120	.075	.140	.015	5,380	2,000
8	1/4	.160	.090	.160	.015	9,300	3,700
10	5/16	.189	.125	.210	.015	14,600	5,500
12	3/8	.242	.120	.205	.015	21,000	7,200

PROCUREMENT SPECIFICATION: EBS2202.

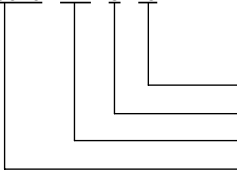
MATERIAL: 6AL-4V TITANIUM ALLOY PER AMS4928 OR AMS4967.

HEAT TREAT: 95,000 PSI SHEAR MINIMUM.

FINISH & LUBE: JC = ALUMINUM PIGMENTED COATING PER PS103 ON HEAD AND SHANK ONLY.
CETYL LUBE PER AS87132. 
VC = IVD ALUMINUM COATING PER MIL-DTL-83448, TYPE II, CLASS 3 ON HEAD AND SHANK ONLY,
AND CETYL LUBE PER AS87132. 
NC = NO FINISH & CETYL ALCOHOL LUBE PER AS87132.
NF = DRY FILM LUBE PER AS5272, TYPE I (HEAD & SHANK ONLY, OVERSPRAY PERMITTED) & CETYL LUBE PER AS87132.
NN = NO FINISH & NO LUBE.

PART NO. EXAMPLE

ELS9020 NN 8 -8



8/16" OR 1/2" MAXIMUM GRIP LENGTH (1/16" INCREMENTS).
8/32" OR 1/4" NOMINAL DIAMETER (1/32" INCREMENTS).
FINISH: NO FINISH & NO LUBE.
PIN PART NUMBER.

GENERAL NOTES:

1. RUNOUT OF " ϕ D" TO " ϕ PITCH" WITHIN .005". WHEN HELD ON THE " ϕ PITCH" OF THE COMPLETE THREADS NEAREST THE SHANK & CHECKED ON THE SHANK WITHIN ONE DIAMETER OF THE THREAD RUNOUT.
2. BLENDED RADIUS TRANSITION PERMITS USE IN INTERFERENCE FIT APPLICATION.
3. CURVED OR FLAT EDGE MANUFACTURER'S OPTION.
4. FLUTE LOCATION ("K" DIMENSION) & GEOMETRY ARE INSPECTED PER E106.
5. THREADS MUST ACCEPT AN 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 ϕ MINOR AND ϕ PITCH MAY BE UP TO .004 BELOW AS8879 MINIMUM VALUES AND ϕ MAJOR MAY BE UP TO .002 BELOW SHEET 1 VALUES FOR A DISTANCE EQUAL TO THE FLUTE LENGTH PLUS 1.5P MAX.
6. SEE TABLE III.
7. ALUMINUM COATING / IVD ALUMINUM COATING TO BE APPLIED ON HEAD AND SHANK ONLY. PARTIAL COATING IS ALLOWED IN THE THREAD RUNOUT AREA FOR A MAXIMUM DISTANCE OF 0.030" FROM THE END OF THE GRIP.
8. PINS SHALL BE PACKAGED OR REPACKAGED IN CLEAR SEALED BAGS. EACH BAG SHALL BE MARKED WITH PURCHASER'S & MANUFACTURER'S COMPLETE PART NUMBER, MANUFACTURER'S LOT NUMBER, MANUFACTURER'S OR DISTRIBUTOR'S NAME & THE PACK DATE.
9. VARIOUS NUT MATERIALS & CONFIGURATION AVAILABLE UPON REQUEST.
10. PARTS WITH A MANUFACTURE DATE ON OR AFTER APRIL 7, 2011; SHALL HAVE THE SPLINE-LOK® RECESS PETALS REMOVED IN ACCORDANCE WITH EBS2202. THE REQUIREMENTS OF EBS2202 ARE NOT APPLICABLE TO PARTS WITH A MANUFACTURE DATE PRIOR TO APRIL 7, 2011; THESE PARTS ARE ACCEPTABLE FOR USE UNTIL INVENTORIES ARE DEPLETED

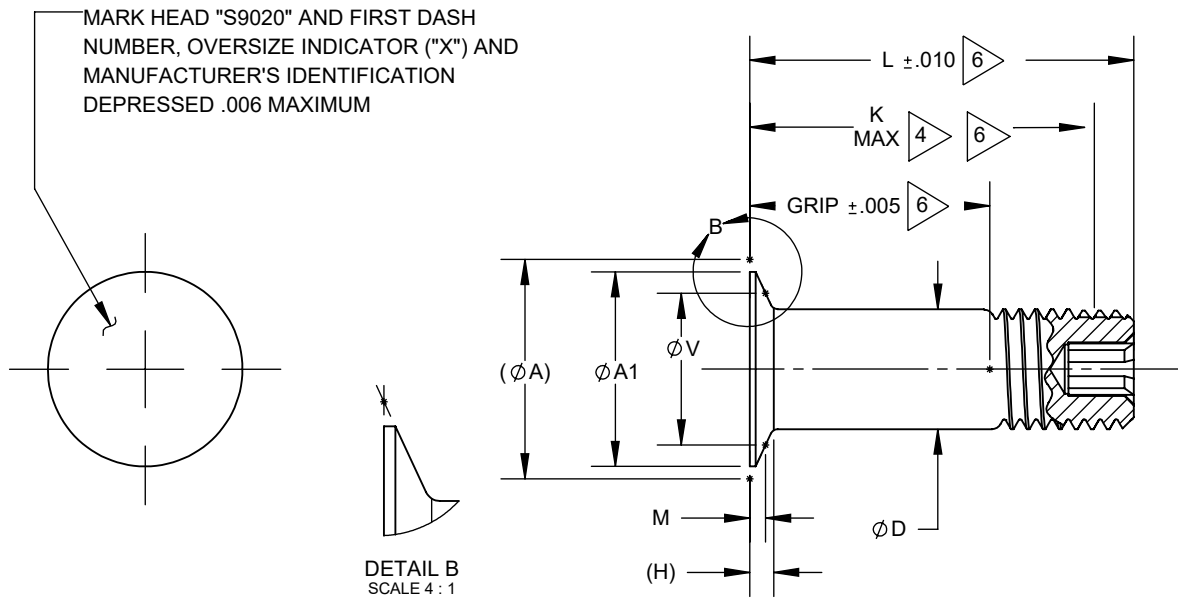


TABLE II - .0156 OVERSIZE ("X") DIMENSIONS & MECHANICAL PROPERTIES

FIRST DASH NO.	(Ø A)	Ø A1 MIN	Ø D				(H)	M GAGE PROT	Ø V GAGE DIA	DOUBLE SHEAR STRENGTH LFB MIN
			BEFORE FINISH	AFTER FINISH						
			IVD ALUMINUM and ALUMINUM PIGMENTED COATING	ALL	IVD ALUMINUM and ALUMINUM PIGMENTED COATING	NONE				
			MIN	MAX	MIN	MIN				
5	NO .0156 OVERSIZE AVAILABLE									
6	.4042	.337	.2012	.2026	.2016	.2021	.046	.0378 .0350	.2440 .2438	6,130
8	.5267	.460	.2637	.2651	.2641	.2646	.060	.0461 .0431	.3314 .3312	10,490
10	.6193	.552	.3262	.3276	.3266	.3271	.067	.0506 .0476	.4047 .4045	16,000
12	.7246	.657	.3887	.3901	.3891	.3896	.077	.0564 .0533	.4854 .4852	22,700

11. FOR DIMENSION NOT SHOWN, SEE SHEETS 1 AND 2.

12. FOR MATERIAL, FINISH AND LUBE INFORMATION, SEE SHEET 1 AND 2.

HOW TO ORDER EXAMPLE:

ELS9020 NN 8 -8 X

X = .0156 OVERSIZE.
8/16" OR 1/2" MAXIMUM GRIP LENGTH (1/16" INCREMENTS).
NOMINAL DIAMETER IN 32NDS OF PIN BEING REPLACED.
FINISH: NO FINISH & NO LUBE.
BASIC PART NUMBER.

TABLE III - FOR STANDARD AND .0156 ("X") OVERSIZE PINS

SECOND DASH NO.	STRUCTURAL THICKNESS		GRIP ± .005	Ø5		Ø6		Ø8		Ø10		Ø12	
	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	----	----	----	----	----	----	----	----
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 INCHES; LONGER LENGTHS MAY BE SPECIFIED BY USE OF WHOLE DASH NUMBER ONLY.

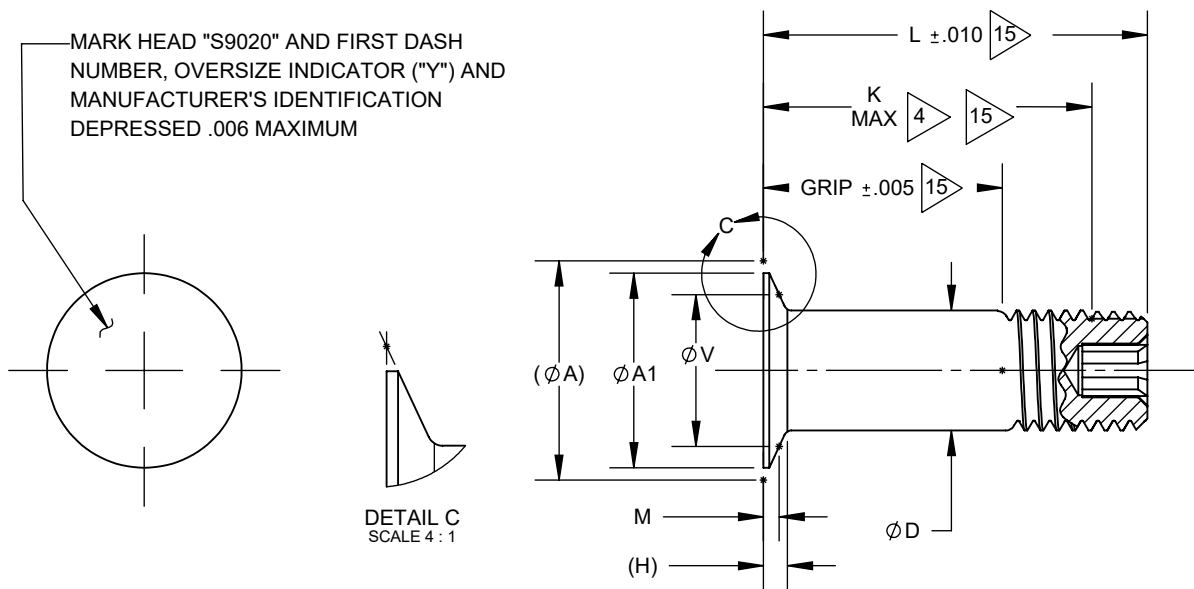


TABLE IV - .0312 OVERSIZE ("Y") DIMENSIONS & MECHANICAL PROPERTIES

FIRST DASH NO.	(Ø A)	Ø A1 MIN	Ø D				(H)	M GAGE PROT	Ø V GAGE DIA	DOUBLE SHEAR STRENGTH LBF MIN	
			BEFORE FINISH	AFTER FINISH							
				IVD ALUMINUM and ALUMINUM PIGMENTED COATING	ALL	IVD ALUMINUM and ALUMINUM PIGMENTED COATING					NONE
5	USE STANDARD DIAMETER ELS9020NN6-()										
6	.4198	.353	.2168	.2182	.2172	.2177	.046	.0360 .0333	.2671 .2669	7,100	
8	.5423	.475	.2793	.2807	.2797	.2802	.060	.0497 .0467	.3314 .3312	11,800	
10	.6349	.568	.3418	.3432	.3422	.3427	.067	.0478 .0449	.4320 .4318	17,600	
12	.7402	.673	.4043	.4057	.4047	.4052	.077	.0601 .0569	.4854 .4852	24,600	

13. FOR DIMENSIONS NOT SHOWN, SEE SHEET 1 AND 2.
14. FOR MATERIAL AND FINISH AND LUBE INFORMATION, SEE SHEET 1 AND 2.

15 SEE TABLE V.

HOW TO ORDER EXAMPLE:

ELS9020 NN 8 -8 Y

- Y = .0312 OVERSIZE.
- 8/16" OR 1/2" MAXIMUM GRIP LENGTH (1/16" INCREMENTS).
- NOMINAL DIAMETER IN 32NDS OF PIN BEING REPLACED.
- FINISH: NO FINISH & NO LUBE.
- BASIC PART NUMBER.

TABLE V - FOR .0312 ("Y") OVERSIZE PINS ONLY

SECOND DASH NO.	STRUCTURAL THICKNESS		GRIP ± .005	Ø6		Ø8		Ø10		Ø12	
	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	----	----	----	----	----	----	----	----
3	.126	.188	.188	.378	.512	.424	.577	.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.