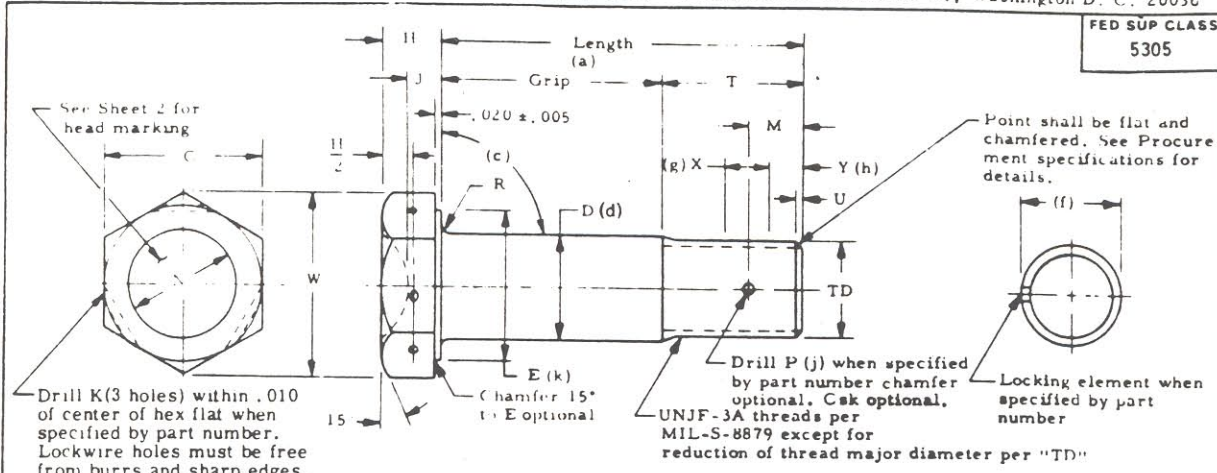


NATIONAL AEROSPACE STANDARD

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC. 1725 De Sales Street, N. W., Washington, D. C. 20036



BASIC NUMBER	Nom Thread Size	C	D Dia				E Dia Min	H	J	K Dia	M	N	P	R Rad	T (Ref) (b)	TD Dia
			Un-plated	Before Chrome Plate	Before Cad Plate or Al Coating	After Plating or Coating										
NAS6303	.1900-32	.376	.1895	.1850	.1887	.1895	.335	.125	.088	.056	.174	.18	.080		.323	.1840
		.367	.1890	.1845	.1881	.1885		.110	.073	.046	.154	.20	.070			.1810
NAS6304	.2500-28	.439	.2495	.2450	.2487	.2495	.398	.140	.098	.056	.180	.24		.020	.370	.2440
		.429	.2490	.2445	.2481	.2485		.125	.083	.046	.160	.26	.086	.010		.2410
NAS6305	.3125-24	.502	.3120	.3075	.3112	.3120	.460	.171	.119		.192	.30	.076		.438	.3060
		.492	.3115	.3070	.3106	.3110		.156	.104		.172	.32				.3020
NAS6306	.3750-24	.564	.3745	.3700	.3737	.3745	.523	.203	.140		.193	.37			.454	.3680
		.554	.3740	.3695	.3731	.3735		.188	.125		.173	.39		.025		.3640
NAS6307	.4375-20	.690	.4370	.4325	.4362	.4370	.648	.234	.161		.209	.43	.116	.015	.528	.4310
		.678	.4365	.4320	.4356	.4360		.219	.146		.189	.45	.106			.4260
NAS6308	.5000-20	.752	.4995	.4950	.4987	.4995	.710	.265	.182		.208	.49		.030	.528	.4930
		.741	.4990	.4945	.4981	.4985		.250	.167		.188	.51		.020		.4880
NAS6309	.5625-18	.877	.5615	.5570	.5607	.5615	.835	.296	.203		.217	.55		.035	.594	.5550
		.865	.5610	.5565	.5601	.5605		.281	.188		.197	.57		.020		.5500
NAS6310	.6250-18	.940	.6240	.6195	.6232	.6240	.898	.327	.223	.080	.217	.61		.040	.626	.6180
		.928	.6235	.6190	.6226	.6230		.312	.208	.070	.197	.63		.025		.6120
NAS6312	.7500-16	1.065	.7490	.7445	.7482	.7490	1.023	.390	.265		.232	.74		.045	.666	.7430
		1.052	.7485	.7440	.7476	.7480		.375	.250		.212	.76		.030		.7370
NAS6314	.8750-14	1.252	.8740	.8695	.8732	.8740	1.210	.453	.307		.251	.87	.151	.050	.759	.8680
		1.239	.8735	.8690	.8726	.8730		.438	.292		.231	.89	.141	.035		.8610
NAS6316	1.0000-12	1.440	.9990	.9945	.9982	.9990	1.398	.515	.348		.274	.99		.060	.895	.9930
		1.427	.9985	.9940	.9976	.9980		.500	.333		.254	1.01		.045		.9860
NAS6318	1.1250-12	1.627	1.1240	1.1195	1.1232	1.1240	1.585	.577	.390		.305	1.11		.070	.989	1.1180
		1.614	1.1230	1.1185	1.1221	1.1225		.562	.375		.285	1.13		.055		1.1110
NAS6320	1.2500-12	1.814	1.2490	1.2445	1.2482	1.2490	1.772	.640	.432		.305	1.24		.075	1.083	1.2430
		1.801	1.2480	1.2435	1.2471	1.2475		.625	.417		.285	1.26		.060		1.2360

BASIC NUMBER	U Max	W Min	X (g)	Y (h)	AA	BB	CC (d)
NAS6303	.039	.410	.156	.094		.0040	.005
NAS6304	.045	.480	.179	.107	.0045	.0030	.006
NAS6305	.052	.552	.208	.125			.008
NAS6306		.623				.0025	.009
NAS6307	.062	.764	.250	.150			.010
NAS6308		.836					.011
NAS6309	.068	.976	.278	.167	.0060		.012
NAS6310		1.050					.015
NAS6312	.078	1.191	.312	.188		.0020	.018
NAS6314	.089	1.405	.357	.214			.020
NAS6316		1.619			.0090		.022
NAS6318	.104	1.832	.417	.250			.025
NAS6320		2.046					.028

LIST OF CURRENT SHEETS

NO.	REV
1	4
2	3
3	NEW
4	3
5	3

(a), (b) etc. See notes on Sheet 2

CUSTODIAN: National Aerospace Standards Committee		
PROCUREMENT SPECIFICATION	TITLE BOLT, HEX HEAD, CLOSE TOLERANCE, A-286, SELF-LOCKING & NONLOCKING	CLASSIFICATION STANDARD PART
Noted on Sheet 2		NAS6303 thru 6320
Published and distributed by: National Standards Association, Inc. 5161 River Road Washington, D.C. 20016		Sheet 1 of 5

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AIA and its committees will not investigate the applicability of patents to the subject matter of NAS Standards and in respect thereof do not assume any liability to patent owners or to prospective users.

This drawing supersedes all antecedent standard drawing for the same product and shall become effective no later than six months from the last date of approval shown hereon.

APPROVAL DATE December 1968 REVISION ① 16 March 1970 ② 15 Feb. 1972 ③ 30 March 1977 ④ 7 November 1980

NATIONAL AEROSPACE STANDARD

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC., 1725 De Sales Street, N. W., Washington D. C. 20036

MATERIAL: A-286 per AMS 5731 or AMS 5737. Locking element - Plastic per MIL-F-18240 and QPL18240.

HEAT TREAT: 160 KSI minimum ultimate tensile, 95 KSI minimum ultimate shear.

FINISH: Unplated - Passivated to meet requirements of NAS4003.

Cadmium Plated - Cadmium plate per QQ-P-416, Type II, Class 2. Parts plated to Class 3 may be used until stock depleted. Embrittlement test per QQ-P-416 does not apply.

Chromium Plated - Chromium plate per QQ-C-320, Class 2 on shank only. All other surfaces cadmium plated. No chromium within .020 of line of tangency of head-to-shank fillet. Chromium in thread runout permitted. Chromium plated bolts not available with grip dash number 1 or number 2.

Coated - Aluminum coating per NAS4006.

Cadmium plated A-286 CRES bolts shall be identified with green dye or paint on the thread end.

Maximum coverage may include the chamfer plus one incomplete thread.

CODE: Dash number indicates grip in .0625 increments. See Sheet 3 for tabulation of grip and length dimensions.
Add "A" after basic number for aluminum coated bolt. May be used with "D", "L" or "P" code.
Add "D" after dash number for drilled shank.
Add "H" after dash number for drilled head.
Add "L" after basic part number for self-locking bolts, optional configuration.
Add "U" after basic part number for unplated bolts.
Add "P" after basic part number for self-locking bolts, patch type.
Add "C" after basic part number for chrome plated bolts.

EXAMPLE OF PART NUMBER:

NAS6304-10	= Bolt, .2500 thread, .625 grip, nonlocking, plated, undrilled.
NAS6304-10D	= Bolt, .2500 thread, .625 grip, nonlocking, plated, drilled shank.
NAS6304-10DH	= Bolt, .2500 thread, .625 grip, nonlocking, plated, drilled shank and drilled head.
NAS6304-10H	= Bolt, .2500 thread, .625 grip, nonlocking, plated, drilled head.
NAS6304A10	= Bolt, .2500 thread, .625 grip, nonlocking, aluminum coated.
NAS6304L10	= Bolt, .2500 thread, .625 grip, self-locking (optional configuration), plated, undrilled.
NAS6304LU10	= Bolt, .2500 thread, .625 grip, self-locking (optional configuration), unplated, undrilled.
NAS6304PU10	= Bolt, .2500 thread, .625 grip, self-locking (patch type), unplated, undrilled.

HEAD MARKING: Basic number plus grip dash number plus "D", "L", or "P" when applicable, plus manufacturer's symbol raised or depressed .010 max. Arrangement optional.

"D" identifies bolt with drilled shank.

"L" identifies bolt with optional locking element.

"P" identifies bolt with patch type locking element only.

"A", aluminum coated and "U", unplated codes need not appear on head of bolt.

NOTES:

- Grip length of bolts shall be measured from the underside of head to the end of the full cylindrical portion of the shank.
- Reference dimensions are for design purposes only, not an inspection requirement.
- Bearing surface squareness: Within .003 TIR of shank diameter.
- Concentricity: "D" diameter to thread pitch diameter within "AA" values. "D" and "E" diameters within "CC" values TIR.
- Shank straightness: Within "BB" values TIR per inch of length.
- Protrusion of locking element shall be controlled so that it will pass freely, or with finger pressure, through a ring gage with diameter of .010 (+.001, -.000) greater than maximum major diameter of screw thread.
- "X" minimum (5 thread pitches) = region of minimum engagement of female thread required to meet MIL-F-18240 requirements. Locking element within "X" region must develop required torque when tested per MIL-F-18240.
- For ease of starting, locking element shall not be effective in "Y" area (3 thread pitches).
- Cotter pin hole centerline: Within .010 and normal within 2" of bolt centerline.
- Washer face diameter: Max not to exceed actual width across flats; min as tabulated.
- Magnetic permeability shall be less than 2.0 (Air = 1.0) for a field strength of H = 200 oersteds using a magnetic permeability indicator per MIL-I-17214 or equivalent

SURFACE TEXTURE: (AA max per ANSI B46.1) "D" diameter bearing surface of head, thread flanks and thread root 32; other surfaces 125.

Dimensions to be met after plating or coating.

Dimensions in inches.

PROCUREMENT SPECIFICATION: NAS4003, except as noted. Cold work of head to shank fillet is not required for NAS6303 bolt. Locking element for self-locking bolts: Per MS15981 and MIL-F-18240. Any type or configuration of locking element is optional when "L" code is specified. Patch type locking element (with no metal removed) is required when "P" code is specified. Locking element must be supplied by a qualified source listed in QPL18240 or approved for listing in QPL18240. Shipping notice should identify supplier of bolt and locking element separately.

NAS 6303 thru 6320

SH 2

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This drawing supersedes all antecedent standard drawings for the same product and shall become effective no later than six months from the last date of approval shown hereon.

Grip Dash No.	Grip #. 010	LENGTH #. 015 (See Note Below) BASIC NUMBER AND THREAD SIZE													
		NAS6303 1900-12	NAS6304 2500-28	NAS6305 3125-24	NAS6306 3750-24	NAS6307 4375-20	NAS6308 5000-20	NAS6309 5625-18	NAS6310 6250-18	NAS6311 7500-16	NAS6312 8750-14	NAS6313 10000-12	NAS6314 11250-12	NAS6315 12500-12	NAS6316 13500-12
1	.062	.385	.432	.500	.516	.590	.590	.656	.688	.728	.821	.957	1.051	1.145	
2	.125	.768	.864	1.000	1.032	1.180	1.180	1.312	1.376	1.456	1.642	1.914	2.102	2.290	
3	.188	1.151	1.296	1.500	1.548	1.770	1.770	1.968	2.064	2.184	2.524	2.874	3.224	3.574	
4	.250	1.534	1.728	2.000	2.064	2.350	2.350	2.625	2.750	2.900	3.375	3.850	4.325	4.800	
5	.312	1.917	2.176	2.500	2.576	2.950	2.950	3.325	3.500	3.675	4.250	4.825	5.400	5.975	
6	.375	2.299	2.630	3.000	3.084	3.550	3.550	4.025	4.250	4.475	5.150	5.825	6.500	7.175	
7	.438	2.682	3.072	3.500	3.592	4.150	4.150	4.725	4.950	5.175	5.950	6.725	7.500	8.275	
8	.500	3.064	3.504	4.000	4.104	4.750	4.750	5.425	5.700	5.975	6.850	7.725	8.600	9.475	
9	.562	3.447	3.936	4.500	4.616	5.350	5.350	6.125	6.450	6.775	7.750	8.725	9.700	10.675	
10	.625	3.829	4.368	5.000	5.132	5.950	5.950	6.825	7.200	7.575	8.650	9.725	10.800	11.875	
11	.688	4.212	4.800	5.500	5.648	6.550	6.550	7.525	7.950	8.375	9.550	10.725	11.900	13.075	
12	.750	4.594	5.232	6.000	6.160	7.150	7.150	8.225	8.700	9.175	10.450	11.725	13.000	14.275	
13	.812	4.977	5.664	6.500	6.672	7.750	7.750	8.925	9.450	9.975	11.350	12.725	14.100	15.475	
14	.875	5.359	6.096	7.000	7.184	8.350	8.350	9.625	10.200	10.775	12.250	13.725	15.200	16.675	
15	.938	5.742	6.528	7.500	7.696	8.950	8.950	10.325	10.950	11.575	13.150	14.725	16.300	17.875	
16	1.000	6.125	6.960	8.000	8.200	9.650	9.650	11.125	11.800	12.475	14.150	15.825	17.500	19.175	
17	1.062	6.507	7.392	8.500	8.712	10.250	10.250	11.825	12.550	13.275	15.050	16.825	18.600	20.375	
18	1.125	6.890	7.824	9.000	9.224	10.850	10.850	12.525	13.300	14.075	15.950	17.825	19.700	21.575	
19	1.188	7.272	8.256	9.500	9.736	11.450	11.450	13.200	14.025	14.850	16.825	18.700	20.575	22.450	
20	1.250	7.655	8.688	10.000	10.240	12.050	12.050	13.875	14.750	15.625	17.700	19.575	21.450	23.325	
21	1.312	8.037	9.120	10.500	10.752	12.650	12.650	14.550	15.475	16.400	18.575	20.450	22.325	24.200	
22	1.375	8.420	9.552	11.000	11.264	13.250	13.250	15.225	16.200	17.175	19.450	21.325	23.200	25.075	
23	1.438	8.802	10.032	11.500	11.776	13.850	13.850	15.900	16.925	17.950	20.325	22.200	24.075	25.950	
24	1.500	9.185	10.512	12.000	12.288	14.450	14.450	16.575	17.650	18.725	21.000	22.975	24.850	26.825	
25	1.562	9.567	11.000	12.500	12.768	15.050	15.050	17.250	18.375	19.500	21.875	23.850	25.725	27.600	
26	1.625	9.950	11.488	13.000	13.248	15.650	15.650	17.925	19.100	20.275	22.650	24.625	26.500	28.375	
27	1.688	10.332	11.968	13.500	13.728	16.250	16.250	18.600	19.825	21.050	23.425	25.400	27.275	29.150	
28	1.750	10.715	12.448	14.000	14.208	16.850	16.850	19.275	20.550	21.825	24.200	26.175	28.050	29.925	
29	1.812	11.097	12.936	14.500	14.688	17.450	17.450	20.000	21.325	22.650	25.075	27.050	28.925	30.800	
30	1.875	11.480	13.424	15.000	15.168	18.050	18.050	20.675	22.050	23.425	25.950	27.925	29.800	31.675	
31	1.938	11.862	13.904	15.500	15.648	18.650	18.650	21.350	22.775	24.150	26.825	28.800	30.675	32.550	
32	2.000	12.245	14.384	16.000	16.128	19.250	19.250	22.025	23.450	24.875	27.700	29.675	31.550	33.425	
33	2.062	12.627	14.864	16.500	16.608	19.850	19.850	22.700	24.175	25.600	28.575	30.550	32.425	34.300	
34	2.125	13.010	15.344	17.000	17.088	20.450	20.450	23.375	24.850	26.325	29.450	31.425	33.300	35.175	
35	2.188	13.392	15.824	17.500	17.568	21.050	21.050	24.050	25.575	27.050	30.325	32.300	34.200	36.050	
36	2.250	13.775	16.304	18.000	18.048	21.650	21.650	24.725	26.300	27.775	31.200	33.175	35.075	36.925	
37	2.312	14.157	16.784	18.500	18.528	22.250	22.250	25.400	27.025	28.500	32.075	34.050	35.950	37.800	
38	2.375	14.540	17.264	19.000	19.008	22.850	22.850	26.075	27.750	29.225	32.950	34.925	36.825	38.675	
39	2.438	14.922	17.744	19.500	19.488	23.450	23.450	26.750	28.475	30.000	33.825	35.800	37.700	39.550	
40	2.500	15.305	18.224	20.000	19.968	24.050	24.050	27.425	29.200	30.775	34.700	36.675	38.575	40.425	
41	2.562	15.687	18.704	20.500	20.448	24.650	24.650	28.100	30.025	31.550	35.575	37.550	39.450	41.300	
42	2.625	16.070	19.184	21.000	20.928	25.250	25.250	28.775	30.775	32.325	36.450	38.425	40.325	42.175	
43	2.688	16.452	19.664	21.500	21.408	25.850	25.850	29.450	31.525	33.100	37.325	39.300	41.250	43.050	
44	2.750	16.835	20.144	22.000	21.888	26.450	26.450	30.125	32.275	33.875	38.200	40.175	42.125	43.925	
45	2.812	17.217	20.624	22.500	22.368	27.050	27.050	30.800	33.025	34.650	39.075	41.050	43.000	44.800	
46	2.875	17.600	21.104	23.000	22.848	27.650	27.650	31.475	33.775	35.425	40.000	41.925	44.075	45.675	
47	2.938	17.982	21.584	23.500	23.328	28.250	28.250	32.150	34.525	36.200	40.875	42.800	45.150	46.550	
48	3.000	18.365	22.064	24.000	23.808	28.850	28.850	32.825	35.275	36.975	41.750	43.675	46.025	47.425	
49	3.062	18.747	22.544	24.500	24.288	29.450	29.450	33.500	36.025	37.750	42.625	44.550	47.000	48.300	
50	3.125	19.130	23.024	25.000	24.768	30.050	30.050	34.175	36.775	38.525	43.500	45.425	47.875	49.175	
51	3.188	19.512	23.504	25.500	25.248	30.650	30.650	34.850	37.525	39.300	44.375	46.300	48.750	50.050	
52	3.250	19.895	23.984	26.000	25.728	31.250	31.250	35.525	38.275	40.075	45.250	47.175	49.625	50.925	
53	3.312	20.277	24.464	26.500	26.208	31.850	31.850	36.200	39.025	40.850	46.125	48.050	50.500	51.800	
54	3.375	20.660	24.944	27.000	26.688	32.450	32.450	36.875	39.775	41.625	47.000	48.925	51.375	52.675	
55	3.438	21.042	25.424	27.500	27.168	33.050	33.050	37.550	40.525	42.400	47.875	49.800	52.250	53.550	
56	3.500	21.425	25.904	28.000	27.648	33.650	33.650	38.225	41.275	43.175	48.750	50.675	53.125	54.425	
57	3.562	21.807	26.384	28.500	28.128	34.250	34.250	38.900	42.025	43.950	49.625	51.550	54.000	55.300	
58	3.625	22.190	26.864	29.000	28.608	34.850	34.850	39.575	42.775	44.725	50.500	52.425	54.875	56.175	
59	3.688	22.572	27.344	29.500	29.088	35.450	35.450	40.250	43.525	45.500	51.375	53.300	55.750	57.050	
60	3.750	22.955	27.824	30.000	29.568	36.050	36.050	40.925	44.275	46.275	52.250	54.175	56.625	57.925	
61	3.812	23.337	28.304	30.500	30.048	36.650	36.650	41.600	45.025	47.050	53.125	55.050	57.500	58.800	
62	3.875	23.720	28.784	31.000	30.528	37.250	37.250	42.275	45.775	47.825	54.000	55.925	58.375	59.675	
63	3.938	24.102	29.264	31.500	31.008	37.850	37.850	42.950	46.525	48.600	54.875	56.800	59.250	60.550	
64	4.000	24.485	29.744	32.000	31.488	38.450	38.450	43.625	47.275	49.375	55.750	57.675	60.125	61.425	
65	4.062	24.867	30.224	32.500	31.968	39.050	39.050	44.300	48.025	50.150	56.625	58.550	61.000	62.300	
66	4.125	25.250	30.704	33.000	32.448	39.650	39.650	44.975	48.775	50.925	57.500	59.425	61.875	63.175	
67	4.188	25.632	31.184	33.500	32.928	40.250	40.250	45.650	49.525	51.700	58.375	60.300	62.750		

NATIONAL AEROSPACE STANDARD

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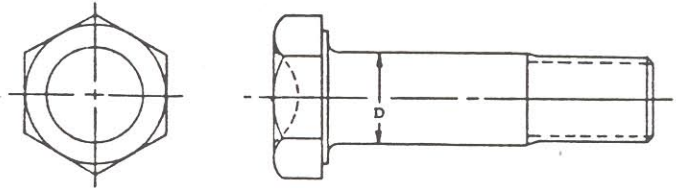
RESTRICTED USAGE: FOR REPAIR WORK ONLY

.0156 and .0312 Oversize Shank for Replacement of Bolts Shown on Sheet 1

Head Marking: Same as on Sheet 1 plus identification for oversize, as applicable, to be included in second sector.

Identify .0156 oversize by "X"
Identify .0312 oversize by "Y"

See Sheet 1 for dimensions not shown.



PART NUMBER (NONLOCKING, PLATED ** UNDRILLED SHANK) .0156 Oversize		Nominal Thread Size	D Diameter .0156 Oversize Shank		
			Unplated Bolts	Plated or Coated Bolts	
				Before Cad Plate or Al Coating	After Plating or Coating
Undrilled Head	Drilled Head				
NAS6303-*X	NAS6303-*HX	.1900-32	.2026 .2021	.2018 .2012	.2026 .2016
6304-*X	6304-*HX	.2500-28	.2651 .2646	.2643 .2637	.2651 .2641
6305-*X	6305-*HX	.3125-24	.3276 .3271	.3268 .3262	.3276 .3266
6306-*X	6306-*HX	.3750-24	.3901 .3896	.3893 .3887	.3901 .3891
6307-*X	6307-*HX	.4375-20	.4526 .4521	.4518 .4512 ③	.4526 .4516
6308-*X	6308-*HX	.5000-20	.5151 .5146	.5143 .5137	.5151 .5141
6309-*X	6309-*HX	.5625-18	.5771 .5766	.5763 .5757	.5771 .5761
6310-*X	6310-*HX	.6250-18	.6396 .6391	.6388 .6382	.6396 .6386
6312-*X	6312-*HX	.7500-16	.7646 .7641	.7638 .7632	.7646 .7636
6314-*X	6314-*HX	.8750-14	.8896 .8891	.8888 .8882	.8896 .8886
6316-*X	6316-*HX	1.0000-12	1.0146 1.0141	1.0138 1.0132	1.0146 1.0136
6318-*X	6318-*HX	1.1250-12	1.1396 1.1386	1.1388 1.1377	1.1396 1.1381
6320-*X	6320-*HX	1.2500-12	1.2646 1.2636	1.2638 1.2627	1.2646 1.2631

* Grip dash number in .0625 increments. See sheet 3 for grip and length dimensions.
For material, finish and procurement information, see sheet 2.

** For unplated bolt, add "U" after basic number.

Example: NAS6304U*HX = Drilled head, unplated, .0156 oversize bolt.

NAS 6303 THRU 6320
SH 4

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