

FED. SUPPLY CLASS

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AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.
1000 WILSON BLVD.
ARLINGTON, VA 22209

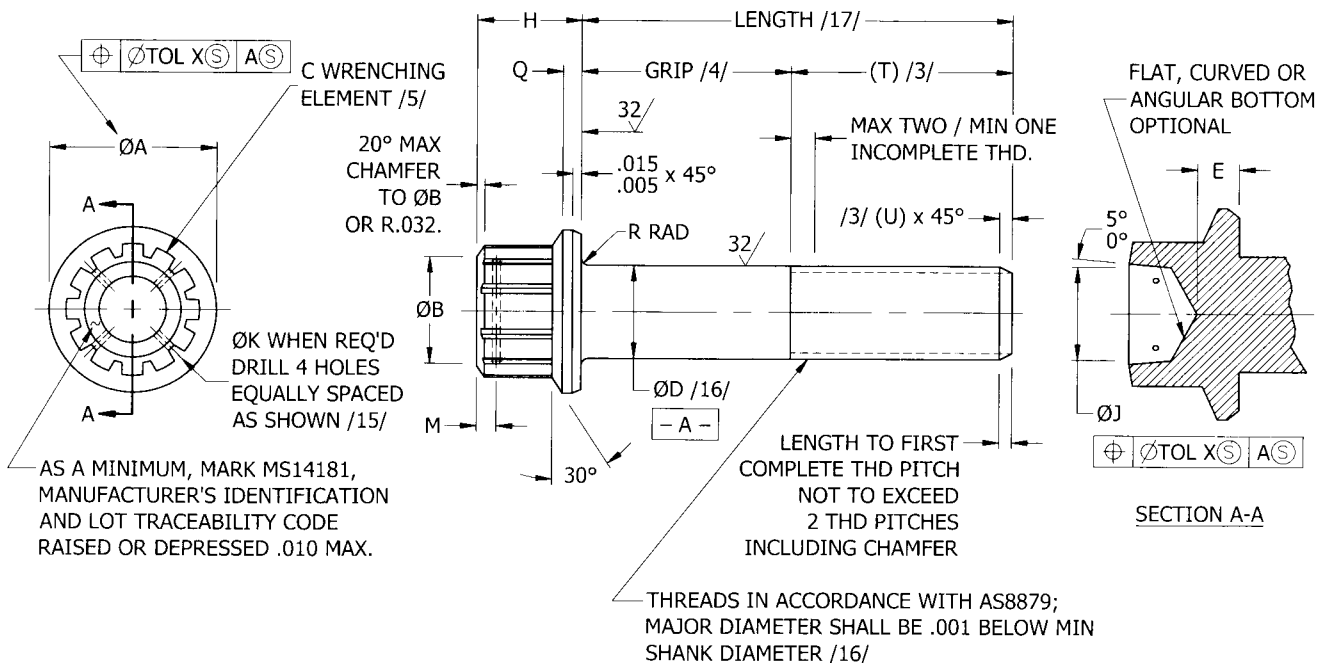


TABLE I - DIMENSIONS AND STRENGTH VALUES

DIA DASH NO.	NOMINAL SIZE	THREAD UNJF-3A /16/	ØA		ØB		C WRENCHING ELEMENT /3/	ØD /16/	
			MAX	MIN	MAX	MIN		MAX	MIN
03	NO. 10	.1900-32	.359	.349	.188	.173	8	.1895	.1885
04	1/4	.2500-28	.470	.460	.250	.235	10	.2495	.2485
05	5/16	.3125-24	.585	.575	.375	.360	12	.3120	.3110
06	3/8	.3750-24	.701	.691	.438	.423	14	.3745	.3735
07	7/16	.4375-20	.817	.807	.500	.485	16	.4370	.4360
08	1/2	.5000-20	.932	.922	.562	.547	20	.4995	.4985
09	9/16	.5625-18	1.047	1.037	.625	.610	22	.5615	.5605
10	5/8	.6250-18	1.163	1.153	.688	.673	24	.6240	.6230
12	3/4	.7500-16	1.394	1.384	.812	.797	28	.7490	.7480
14	7/8	.8750-14	1.625	1.615	.938	.923	32	.8740	.8730
16	1.0	1.0000-12	1.856	1.846	1.062	1.047	38	.9990	.9980

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THE INITIAL RELEASE OF THIS DOCUMENT SUPERSEDES MS14181, REVISION C, AMENDMENT 1. PART NUMBERS REMAIN MS14181



CUSTODIAN
NATIONAL AEROSPACE STANDARDS COMMITTEE

REVISION
4

PROCUREMENT
SPECIFICATION
NAS4008 ③

TITLE
**BOLT, TENSION, NICKEL ALLOY 718, 220 KSI Ft_u,
EXTERNAL WRENCHING, SPLINE DRIVE, FLANGED HEAD**

CLASSIFICATION
PART STANDARD

NASM14181

SHEET 1 OF 5

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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 REVISION DATE.

FORM 09-01

REVISION DATE: JANUARY 31, 2014

ISSUE DATE: NOVEMBER 1999

TABLE I – DIMENSIONS AND STRENGTH VALUES (CONTINUED)

DIA DASH NO.	E MIN	H ± .010	ØJ +.010 -.030	ØK ± .005	M	Q		R RAD		(T) MIN
						MAX	MIN	MAX	MIN	
03	.113	.205	.100	.037	.062	.037	.017	.022	.016	.408
04	.149	.250	.125			.046	.026	.028	.022	.495
05	.187	.312	.215	.065	.070	.055	.035	.035	.029	.589
06	.224	.337	.260			.064	.044	.043	.033	.659
07	.262	.393	.320			.073	.053	.049	.039	.763
08	.299	.450	.380		.094	.082	.062	.055	.045	.838
09	.336	.505	.440			.091	.071	.061	.051	.935
10	.374	.562	.500			.100	.080	.068	.058	1.005
12	.449	.600	.570			.118	.098	.080	.070	1.173
14	.523	.700	.650		.125	.136	.116	.093	.083	1.348
16	.599	.800	.740			.154	.134	.105	.095	1.546

TABLE I – DIMENSIONS AND STRENGTH VALUES (CONTINUED)

DIA DASH NO.	(U)	BEARING AREA (MEAN DIA) SQ. IN.	TENSILE STRENGTH (LBF)			DOUBLE SHEAR STRENGTH LBF MIN.	STRESS RUPTURE AT 800 °F (LBF) /13/	TOLERANCE	
			ROOM TEMPERATURE		AT 800 °F MIN. /13/			X	Z /16/
			MAX.	MIN.					
03	.039	.0517	5,640	4,770	3,810	7,100	2,670	.004	.004
04	.045	.0914	10,080	8,540	6,830	12,300	4,780	.005	
05	.052	.1442	15,960	13,500	10,800	19,200	7,560	.006	
06		.2106	24,700	20,900	16,720	27,650	11,700	.008	
07	.063	.2896	33,480	28,300	22,640	37,600	15,840	.009	.006
08		.3786	44,640	37,800	30,240	49,100	21,160	.010	
09	.089	.4808	56,570	47,900	38,320	62,150	26,820	.011	
10		.5945	70,820	59,900	47,920	76,700	33,540	.012	
12		.7512	100,800	86,900	69,500	109,857	48,700	.015	
14		1.1673	137,000	119,000	95,000	149,640	66,600	.018	
16	.100	1.5465	179,000	155,000	124,000	195,565	86,800	.020	.009

MATERIAL: NICKEL ALLOY 718 WITH CHEMISTRY OF AMS5662 (UNS N07718), AMS5663 (UNS N07718) OR AMS5962 (UNS N07718).

HEAT TREAT: MATERIAL MUST BE PROCESSED TO YIELD 220 KSI MINIMUM ULTIMATE TENSILE STRENGTH WITH THE PYROMETRY REQUIREMENTS OF AMS2750.

FINISH: PASSIVATE PER AMS2700, METHOD 1, TYPE 2 OR TYPE 8, CLASS 4 EXCEPT CADMIUM PLATED PARTS. CADMIUM PLATED PARTS PER AMS-QQ-P-416, TYPE II, CLASS 2, UP TO 450 °F APPLICATION ENVIRONMENT.

LUBRICANT: SOLID FILM LUBRICANT PER AS5272, TYPE I.

PERFORMANCE: PER NAS4008 ~~NASM85604~~, WITH THE ADDITION OF THE FOLLOWING QUALIFICATION TESTS:

- STRESS RUPTURE PER NASM1312-10 WITH VALUES AS TABULATED IN TABLE I. (QUALIFICATION TEST ONLY.)
- ELEVATED TEMPERATURE TENSILE STRENGTH PER NASM1312-18 WITH VALUES AS TABULATED IN TABLE I. (QUALIFICATION TEST ONLY.)
- AFTER AGING, MATERIAL DUCTILITY SHALL BE NOT LESS THAN 8% ELONGATION AND 15% REDUCTION OF AREA WHEN TESTED PER ASTM E 8. (QUALIFICATION AND CONFORMANCE TEST.)

REVISION

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NASM14181

SHEET 2

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CODE:

DIAMETER DASH NUMBER AT TOP OF TABLE II, SHEETS 4 AND 5, PLUS GRIP DASH NUMBER ON FIRST COLUMN ON LEFT OF TABLE II CONSTITUTE A COMPLETE DASH NUMBER, IDENTIFYING SPECIFIED LENGTHS OF A GIVEN DIAMETER OF BOLT. GRIP EQUALS LAST THREE DASH NUMBERS TIMES .0625. UNASSIGNED INTERMEDIATE OR LONGER GRIP LENGTHS NOT INCLUDED IN TABLE MAY BE SPECIFIED BY THE USE OF WHOLE DASH NUMBERS ONLY.

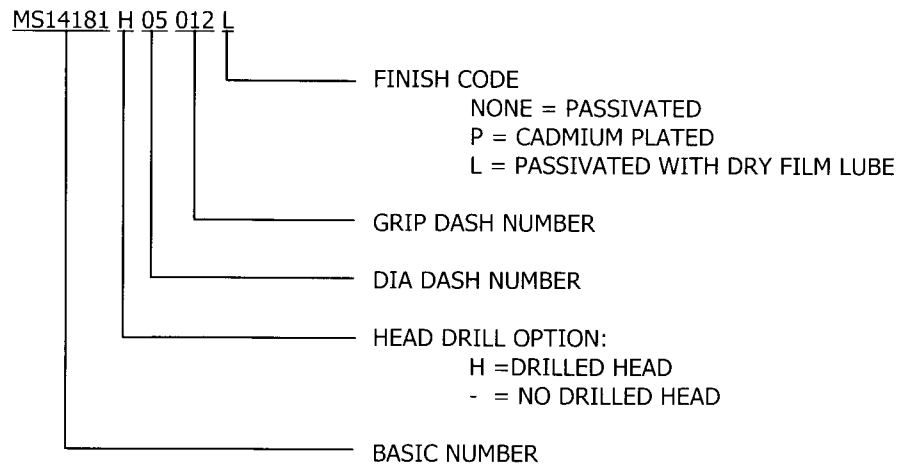
ADD "H" BEFORE DASH NUMBERS TO DESIGNATE DRILLED HEAD.

ADD "L" AFTER GRIP LENGTH DASH NUMBERS TO DESIGNATE PASSIVATION WITH SOLID FILM LUBRICANT.

ADD "P" AFTER GRIP LENGTH DASH NUMBERS TO DESIGNATE CADMIUM PLATING.

NO CODE AFTER GRIP LENGTH DASH NUMBERS INDICATES PASSIVATION ONLY.

EXAMPLE OF PART NUMBER:



EXAMPLES OF ASSIGNED PART NUMBER:

MS14181-04016P = 0.2500-28 BOLT, 1.520 LONG, 1.000 GRIP, UNDRILLED HEAD, CADMIUM PLATED.
MS14181H04016L = 0.2500-28 BOLT, 1.520 LONG, 1.000 GRIP, DRILLED HEAD, PASSIVATED COAT WITH DRY FILM LUBE PER AS5272, TYPE I.
MS14181-04016 = 0.2500-28 BOLT, 1.520 LONG, 1.000 GRIP, UNDRILLED HEAD, PASSIVATED.
MS14181H04016 = 0.2500-28 BOLT, 1.520 LONG, 1.000 GRIP, DRILLED HEAD, PASSIVATED.

EXAMPLES OF UNASSIGNED INTERMEDIATE OR LONGER GRIP LENGTH PART NUMBER: /17/

MS14181-04017 = .2500-28 BOLT, 1.583 LONG, 1.0625 GRIP, UNDRILLED HEAD, PASSIVATED
MS14181-040114 = .2500-28 BOLT, 7.645 LONG, 7.125 GRIP, UNDRILLED HEAD, PASSIVATED

NOTES:

- (1) DIMENSIONS IN INCHES. TOLERANCES UNLESS OTHERWISE SPECIFIED: DECIMAL $\pm .010$, ANGLES $\pm 2^\circ$.
- (2) DESIGN AND USAGE INFORMATION: THESE BOLTS ARE DESIGNED TO BE USED WITH MS14182 NUTS AND MS14183 WASHERS.
- /3/ REFERENCE DIMENSIONS ARE FOR DESIGN PURPOSES ONLY AND ARE NOT INSPECTION OR MANUFACTURING REQUIREMENTS.

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SHEET 3

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- /4/ GRIP LENGTH OF BOLT SHALL BE MEASURED FROM UNDERSIDE OF HEAD TO THE END OF FULL CYLINDRICAL PORTION OF SHANK.
- /5/ WRENCHING ELEMENT PER MS33787. WRENCHES PER MIL-W-8982.
- (6) DIMENSIONS APPLY AFTER FINISH AND PRIOR TO THE APPLICATION OF LUBRICATION UNLESS OTHERWISE SPECIFIED.
- (7) DIMENSIONS AND TOLERANCING PER ANSI Y14.5M-1982.
- (8) REMOVE ALL BURRS AND SHARP EDGES.
- (9) THIS STANDARD TAKES PRECEDENCE OVER DOCUMENTS REFERENCED HEREIN.
- (10) UNLESS OTHERWISE SPECIFIED HEREIN, REFERENCED DOCUMENTS SHALL BE THE ISSUE IN EFFECT ON DATE OF MANUFACTURE. HOWEVER, EXISTING MATERIAL INVENTORY CERTIFIED TO A PREVIOUS REVISION OF THE APPLICABLE MATERIAL SPECIFICATION(S) IS ACCEPTABLE FOR USE UNTIL DEPLETION.
- (11) SURFACE TEXTURE SHALL BE IN ACCORDANCE WITH ASME B46.1 AND SURFACE TEXTURE SYMBOLS SHALL BE IN ACCORDANCE WITH ASME Y14.36M.
- (12) SURFACE ROUGHNESS: BEARING SURFACE OF HEAD, HEAD TO SHANK FILLET, SHANK, AND FLANKS AND ROOT OF THREADS: 32 MICROINCHES R_a , ALL OTHER SURFACES 125 MICROINCHES R_a PER ASME B46.1.
- /13/ FOR CADMIUM PLATED PARTS OR SOLID FILM LUBRICATED PARTS, ELEVATED TEMPERATURE TENSILE STRENGTH AND STRESS RUPTURE QUALIFICATION TESTS NOT REQUIRED.
- (14) UNLESS OTHERWISE SPECIFIED, PART INVENTORY MANUFACTURED TO PREVIOUS REVISIONS OF THE APPLICABLE DRAWING OR SPECIFICATION MAY BE PROCURED AND USED UNTIL STOCK IS DEPLETED.
- /15/ PARTS WITH DRILLED HEADS MANUFACTURED AFTER NOVEMBER 1, 2013 MUST HAVE THE DRILLED HOLES COUNTERSUNK.
- /16/ DIMENSIONS $\varnothing D$ AND THREAD PITCH DIAMETER SHALL BE CONCENTRIC TO EACH OTHER WITHIN VALUES SPECIFIED FOR Z FIM.
- /17/ UNTABULATED NOMINAL LENGTHS ASSOCIATED WITH INTERMEDIATE OR LONGER NOMINAL GRIP LENGTHS NOT INCLUDED IN TABLE II SHALL BE CALCULATED BY GRIP LENGTH + (T) MIN. + .025

TABLE II – GRIP AND LENGTH DIMENSIONS

GRIP DASH NO. /4/	GRIP $\pm .010$	DIAMETER DASH NUMBERS										
		03	04	05	06	07	08	09	10	12	14	16
		LENGTH $\pm .015$ /17/										
004	.250	0.683	0.770	0.864	0.934	1.038	1.113	1.210	1.280	1.448	1.623	1.821
006	.375	0.808	0.895	0.989	1.059	1.163	1.238	1.335	1.405	1.573	1.748	1.946
008	.500	0.933	1.020	1.114	1.184	1.288	1.363	1.460	1.530	1.698	1.873	2.071
010	.625	1.058	1.145	1.239	1.309	1.413	1.488	1.585	1.655	1.823	1.998	2.196
012	.750	1.183	1.270	1.364	1.434	1.538	1.613	1.710	1.780	1.948	2.123	2.321
014	.875	1.308	1.395	1.489	1.559	1.663	1.738	1.835	1.905	2.073	2.248	2.446
016	1.000	1.433	1.520	1.614	1.684	1.778	1.863	1.960	2.030	2.198	2.373	2.571
018	1.125	1.558	1.645	1.739	1.809	1.913	1.988	2.085	2.155	2.323	2.498	2.696
020	1.250	1.683	1.770	1.864	1.934	2.038	2.113	2.210	2.280	2.448	2.623	2.821

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SHEET 4

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TABLE II – GRIP AND LENGTH DIMENSIONS (CONTINUED)

GRIP DASH NO. /4/	GRIP ± .010	DIAMETER DASH NUMBERS										
		03	04	05	06	07	08	09	10	12	14	16
		LENGTH ± .015 /17/										
022	1.375	1.808	1.895	1.989	2.059	2.163	2.238	2.335	2.405	2.573	2.748	2.946
024	1.500	1.933	2.020	2.114	2.184	2.288	2.363	2.460	2.530	2.698	2.873	3.071
026	1.625	2.058	2.145	2.239	2.309	2.413	2.488	2.585	2.655	2.823	2.998	3.196
028	1.750	2.183	2.270	2.364	2.434	2.538	2.613	2.710	2.780	2.948	3.123	3.321
030	1.875	2.308	2.395	2.489	2.559	2.663	2.738	2.835	2.905	3.073	3.248	3.446
032	2.000	2.433	2.520	2.614	2.684	2.788	2.863	2.960	3.030	3.198	3.373	3.571
034	2.125	2.558	2.645	2.739	2.809	2.913	2.988	3.085	3.155	3.323	3.498	3.696
036	2.250	2.683	2.770	2.864	2.934	3.038	3.113	3.210	3.280	3.448	3.623	3.821
038	2.375	2.808	2.895	2.989	3.059	3.163	3.238	3.335	3.405	3.573	3.748	3.946
040	2.500	2.933	3.020	3.114	3.184	3.288	3.363	3.460	3.530	3.698	3.873	4.071
042	2.625	3.058	3.145	3.239	3.309	3.413	3.488	3.585	3.655	3.823	3.998	4.196
044	2.750	3.183	3.270	3.364	3.434	3.538	3.613	3.710	3.780	3.948	4.123	4.321
046	2.875	3.308	3.395	3.489	3.559	3.663	3.738	3.835	3.905	4.073	4.248	4.446
048	3.000	3.433	3.520	3.614	3.684	3.788	3.863	3.960	4.030	4.198	4.373	4.571
050	3.125	3.558	3.645	3.739	3.809	3.913	3.988	4.085	4.155	4.323	4.498	4.696
052	3.250	3.683	3.770	3.864	3.934	4.038	4.113	4.210	4.280	4.448	4.623	4.821
054	3.375	3.808	3.895	3.989	4.059	4.163	4.238	4.335	4.405	4.573	4.748	4.946
056	3.500	3.933	4.020	4.114	4.184	4.288	4.363	4.460	4.530	4.698	4.873	5.071
058	3.625	4.058	4.125	4.239	4.309	4.413	4.488	4.585	4.655	4.823	4.998	5.196
060	3.750	4.183	4.270	4.364	4.434	4.538	4.613	4.710	4.780	4.948	5.123	5.321
062	3.875	4.308	4.395	4.489	4.559	4.663	4.738	4.835	4.905	5.073	5.248	5.446
064	4.000	4.433	4.520	4.614	4.684	4.788	4.863	4.960	5.030	5.198	5.373	5.571
066	4.125	4.558	4.645	4.739	4.809	4.913	4.988	5.085	5.155	5.323	5.498	5.696
068	4.250	4.683	4.770	4.864	4.934	5.038	5.113	5.210	5.280	5.448	5.623	5.821
070	4.375	4.808	4.895	4.989	5.059	5.163	5.238	5.335	5.405	5.573	5.748	5.946
072	4.500	4.933	5.020	5.114	5.184	5.288	5.363	5.460	5.530	5.698	5.873	6.071
074	4.625	5.058	5.145	5.239	5.309	5.413	5.488	5.585	5.655	5.823	5.998	6.196
076	4.750	5.183	5.270	5.364	5.434	5.538	5.613	5.710	5.780	5.948	6.123	6.321
078	4.875	5.308	5.395	5.489	5.559	5.663	5.738	5.835	5.905	6.073	6.248	6.446
080	5.000	5.433	5.520	5.614	5.684	5.788	5.863	5.960	6.030	6.198	6.373	6.571
082	5.125	5.558	5.645	5.739	5.809	5.913	5.988	6.085	6.155	6.323	6.498	6.696
084	5.250	5.683	5.770	5.864	5.934	6.038	6.113	6.210	6.280	6.448	6.623	6.821
086	5.375	5.808	5.895	5.989	6.059	6.163	6.238	6.335	6.405	6.573	6.748	6.946
088	5.500	5.933	6.020	6.114	6.184	6.288	6.363	6.460	6.530	6.698	6.873	7.071
090	5.625	6.058	6.145	6.239	6.309	6.413	6.488	6.585	6.655	6.823	6.998	7.196
092	5.750	6.183	6.270	6.364	6.434	6.538	6.613	6.710	6.780	6.948	7.123	7.321
094	5.875	6.308	6.395	6.489	6.559	6.663	6.738	6.835	6.905	7.073	7.248	7.446
096	6.000	6.433	6.520	6.614	6.684	6.788	6.863	6.960	7.030	7.198	7.373	7.571
098	6.125	6.558	6.645	6.739	6.809	6.913	6.988	7.085	7.155	7.323	7.498	7.696
100	6.250	6.683	6.770	6.864	6.934	7.038	7.113	7.210	7.280	7.448	7.623	7.821
102	6.375	6.808	6.895	6.989	7.059	7.163	7.238	7.335	7.405	7.573	7.748	7.946
104	6.500	6.933	7.020	7.114	7.184	7.288	7.363	7.460	7.530	7.698	7.873	8.071
106	6.625	7.058	7.145	7.239	7.309	7.413	7.488	7.585	7.655	7.823	7.998	8.196
108	6.750	7.183	7.270	7.364	7.434	7.538	7.613	7.710	7.780	7.948	8.123	8.321
110	6.875	7.308	7.395	7.489	7.559	7.663	7.738	7.835	7.905	8.073	8.248	8.446
112	7.000	7.433	7.520	7.614	7.684	7.788	7.863	7.960	8.030	8.198	8.373	8.571

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