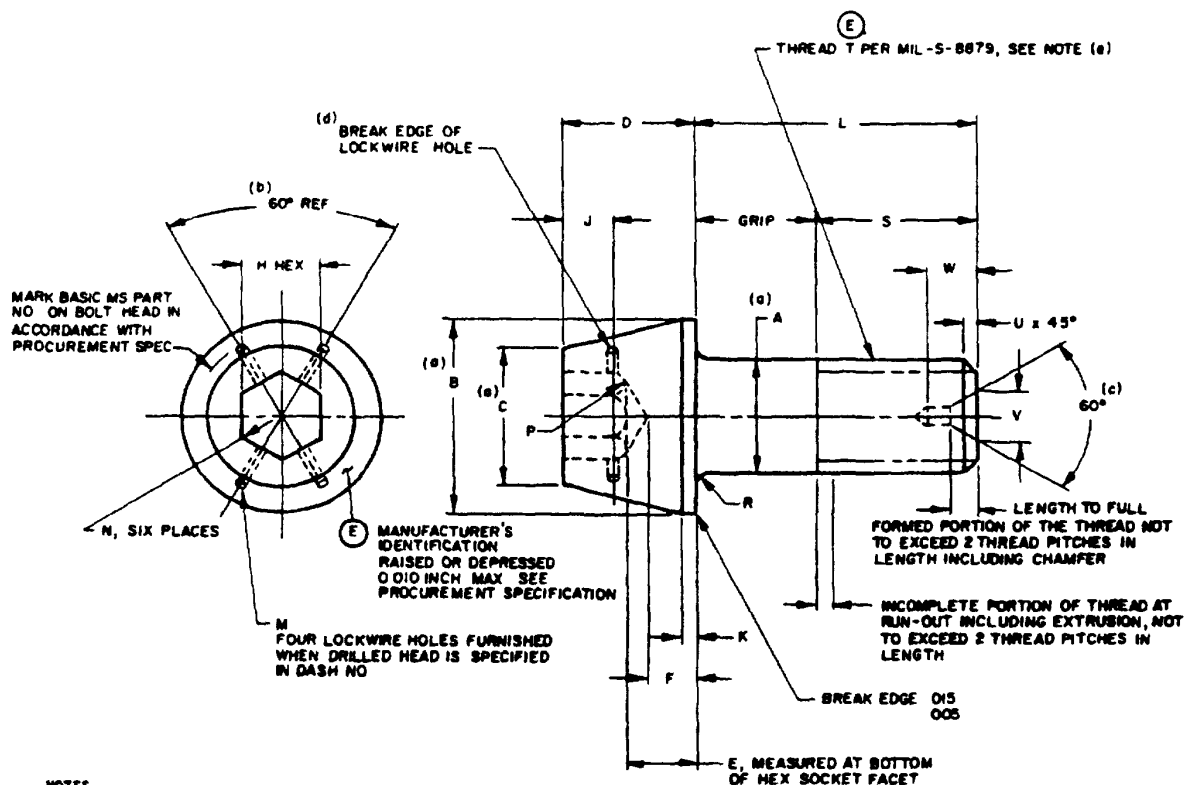


THE REQUIREMENTS FOR ACQUIRING THE PRODUCT(S) DESCRIBED HEREIN SHALL CONSIST OF THIS SPECIFICATION SHEET AND THE ISSUE OF THE FOLLOWING SPECIFICATION LISTED IN THAT ISSUE OF THE DOORS SPECIFIED IN THE SOLICITATION MIL-B-7836



NOTES

- (a) DIMENSIONS A, B AND C SHALL BE CONCENTRIC TO EACH OTHER WITHIN VALUES SPECIFIED FOR X TOTAL INDICATOR READING. DIMENSIONS SHALL BE H AND C SHALL BE CONCENTRIC TO EACH OTHER WITHIN VALUES SPECIFIED FOR Y TOTAL INDICATOR READING. DIMENSION A AND THREAD PITCH DIAMETER SHALL BE CONCENTRIC TO EACH OTHER WITHIN VALUES SPECIFIED FOR Z TOTAL INDICATOR READING.
- (b) REFERENCE DIMENSIONS ARE FOR DESIGN PURPOSES AND TO PROVIDE INFORMATION ONLY. THESE DIMENSIONS ARE NOT INSPECTION OR MANUFACTURING REQUIREMENTS. S MIN REF = (L MIN) - (GRIP MAX).
- (c) ON MS20012 THRU MS20024 CENTER DRILLING OF SHANK IS OPTIONAL FOR BOLT MANUFACTURER.
- (d) COUNTERSINKING OF DRILLED HOLES IS OPTIONAL.
- (e) MS20016 (SEE TABLE 1), 1-14MS-3A IS INACTIVE FOR NEW DESIGN MS20016 THREADS ARE NOTED AS AN EXCEPTION IN MIL-B-7836
- (f) MS20012A IS CANCELLED AFTER 13 JANUARY 1990

REQUIREMENTS

- (1) MATERIAL ALLOY STEEL - UNS G43400, UNS G43406, UNS G41400, UNS G87400, UNS G87350
- (2) FINISH CADMIUM PLATING PER QQ-P-416, TYPE II, CLASS 2 PARTS WITH CLASS 3 PLATING MAY BE FURNISHED FROM SUPPLIER'S STOCK UNTIL 1 JANUARY 1975.
- (3) HARDNESS 34-40 HRC
- (4) DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED, TOLERANCES DECIMALS - 0.10, ANGLES ±1°
- (5) DIMENSIONS TO BE MET AFTER PLATING INTERCHANGEABILITY RELATIONSHIP
- BOLTS WITH TYPE II PLATING CAN BE USED TO REPLACE BOLTS WITH TYPE I PLATING IN ALL APPLICATIONS
- BOLTS WITH TYPE I PLATING CAN BE USED IN PLACE OF BOLTS WITH TYPE II PLATING UNTIL PRESENT STOCKS ARE DEPLETED, BUT BOLTS WITH TYPE I PLATING SHALL NOT BE USED AFTER 1 JANUARY 1964

FOR DESIGN FEATURE PURPOSES, THIS STANDARD TAKES PRECEDENCE OVER PROCUREMENT DOCUMENTS REFERENCED HEREIN REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATIONS FOR BID

(E) DENOTES CHANGES

PREPARING ACTIVITY NAVY - AS CUSTODIANS ARMY-AR NAVY- AIR FORCE-99 DLA- REVIEW ARMY - ER, ME, MI DLA - IS AF-R? USER ARMY - AV PROJECT NUMBER 5306-123E	MILITARY SPECIFICATION SHEET TITLE BOLTS, INTERNAL WRENCHING, 160 KSI FTU AND 50 KSI FSL	SPECIFICATION SHEET NUMBER 30 MAY 1989 MS20004E THRU 20024E SUPERSEDING MS20004D THRU 20024D 10 AUGUST 1981 AMSC- N/A FSC 5306
DISTRIBUTION STATEMENT A Approved for public release distribution is unlimited		Page 1 of 4

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(E)

TABLE I BOLT DIMENSIONS AND TENSILE STRENGTH

BASIC MS PART NO	(a) THREAD T	(a) A DIA		(a) B DIA		(a) C DIA	D	E	F MIN	(a) H HEX		J	K	M +.005 -.000 DIA	N MAX RAD
		MAX	MIN	MAX	MIN					MAX	MIN				
MS20004	1/4-28 UNJF-3A	.2492	.2477	.438	.428	.342	.250	.112	.068	.1900	.1880	.078		.037	.010
MS20005	5/16-24 UNJF-3A	.3117	.3102	.531	.521	.394	.312	.144	.094	.2210	.2190	.094			
MS20006	3/8-24 UNJF-3A	.3742	.3727	.649	.639	.520	.375	.183	.116	.3150	.3130	.125			.011
MS20007	7/16-20 UNJF-3A	.4367	.4347	.750	.740	.534	.438	.208	.141			.156			
MS20008	1/2-20 UNJF-3A	.4991	.4971	.828	.818	.625	.500	.247	.169	.3785	.3755	.172			
MS20009	9/16-18 UNJF-3A	.5616	.5596	.938	.928	.723	.562	.279	.190	.4410	.4380	.203			.019
MS20010	5/8-18 UNJF-3A	.6240	.6220	1.050	1.040	.826	.625	.317	.216	.5035	.5005	.234			
MS20012	3/4-16 UNJF-3A	.7488	.7468	1.230	1.220	.921	.750	.385	.273	.5660	.5630	.281			
MS20014	7/8-14 UNJF-3A	.8737	.8707	1.438	1.428	1.083	.875	.450	.327	.6295	.6257	.344			
MS20016 *	1 -14 NS -3A											.391			
MS20017	1 -12 UNJF-3A	.9985	.9955	1.625	1.615	1.249	1.000	.527	.381	.7547	.7507	.453			.022
MS20018	1-1/8-12 UNJF-3A	1.124	1.121	1.875	1.865	1.275	1.125	.589	.443						
MS20020	1-1/4-12 UNJF-3A	1.249	1.246	2.125	2.115	1.598	1.250	.667	.475	1.005	1.001	.500	.125		
MS20022	1-3/8-12 UNJF-3A	1.374	1.370	2.313	2.303	1.768	1.375	.746	.531	1.131	1.126	.547			
MS20024	1-1/2-12 UNJF-3A	1.499	1.495	2.500	2.490	1.931	1.500	.823	.586	1.256	1.251	.594	.156		
MS20012A	3/4-16 UNJF-3A	.7488	.7468	1.230	1.220	.921	.750	.385	.273	.5660	.5630	.281	.094		

(E) SEE NOTE (f)

TABLE I (CONTINUED)

BASIC MS PART NO	P RAD		P RAD		(b) S MIN REF	U ±.016	(c) V MAX	(c) W MAX	(b) (c) CENTER DRILL SIZE REF	TENSILE STRENGTH LB MIN	(a) CONCENTRICITY		
	MAX	MIN	MAX	MIN							X	Y	Z
MS20004			.041	.031	.475	.031				6,190	.005	.007	
MS20005					.537					9,820	.006	.008	0045
MS20006					.662	.047				15,200	.008	.010	
MS20007	020	010	.057	.047	.787					20,400	.009	.011	
MS20008					.850					27,400	.010	.012	
MS20009					.912	.062				34,800	.011	.014	.006
MS20010					1.037					43,600	.012	.016	
MS20012					1.162		187	200	2	63,200	.015	.018	
MS20014					1.287	.078				86,100	.018	.022	
MS20016 *					1.475		250	260	3	112,000	.020	.025	.009
MS20017	030	015			1.600					144,000	.022	.026	
MS20018					1.725	.094	.312	320	4	180,000	.025	.032	
MS20020			.089	.077	1.850					219,000	.028	.035	
MS20022					2.030	.062				283,000	.030	.039	.012
MS20024					2.150					348,000	.035	.040	
MS20012A			.073	.063	0.730	.062	187	200	2	63,200	.015	.018	.006

(E) SEE NOTE (f)

* SEE NOTE (a)

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PREPARING ACTIVITY NAVY - AS
CUSTODIANS ARMY - AP NAVY -
AIR FORCE - 99 DLA -
REVIEW ARMY - EP, ME, MI DLA - IS AF - HC
USER ARMY - AV
PROJECT NUMBER 5306-1233

MILITARY SPECIFICATION SHEET
TITLE BOLTS, INTERNAL WRENCHING, 160 KSI FTU
AND 96 KSI FSL

SPECIFICATION SHEET NUMBER 30 MAY 1989
MS20004E THRU 20024E
SUPERSEDING
MS20004D THRU 20024D 10 AUGUST 1981
AMSC - N/A FSC 5306

DISTRIBUTION STATEMENT A Approved for public release, distribution is unlimited

Page 2 of 4

DD FORM 672 MAY 1988

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TABLE 11 DASH NOS., GRIP LENGTHS AND BOLT LENGTH

DASH NO.	GRIP = 010	LENGTH = 015														
		MS20004	MS20005	MS20006	MS20007	MS20008	MS20009	MS20010	MS20012	MS20014	MS20016	MS20017	MS20018	MS20020	MS20022	MS20024
		1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1	1-1/8	1-1/4	1-3/8	1-1/2
4	.250	.750														
6	.375	.875														
8	.500	1.000	1.062	1.188	1.312	1.312	1.312	1.312	1.312	1.312	1.312	1.312	1.312	1.312	1.312	1.312
10	.625	1.125	1.188	1.312	1.438	1.438	1.438	1.438	1.438	1.438	1.438	1.438	1.438	1.438	1.438	1.438
12	.750	1.250	1.312	1.438	1.562	1.562	1.562	1.562	1.562	1.562	1.562	1.562	1.562	1.562	1.562	1.562
14	.875	1.375	1.438	1.562	1.688	1.688	1.688	1.688	1.688	1.688	1.688	1.688	1.688	1.688	1.688	1.688
16	1.000	1.500	1.562	1.688	1.812	1.812	1.812	1.812	1.812	1.812	1.812	1.812	1.812	1.812	1.812	1.812
18	1.125	1.625	1.688	1.812	1.938	1.938	1.938	1.938	1.938	1.938	1.938	1.938	1.938	1.938	1.938	1.938
20	1.250	1.750	1.812	1.938	2.062	2.062	2.062	2.062	2.062	2.062	2.062	2.062	2.062	2.062	2.062	2.062
22	1.375	1.875	1.938	2.062	2.188	2.188	2.188	2.188	2.188	2.188	2.188	2.188	2.188	2.188	2.188	2.188
24	1.500	2.000	2.062	2.188	2.312	2.312	2.312	2.312	2.312	2.312	2.312	2.312	2.312	2.312	2.312	2.312
26	1.625	2.125	2.188	2.312	2.438	2.438	2.438	2.438	2.438	2.438	2.438	2.438	2.438	2.438	2.438	2.438
28	1.750	2.250	2.312	2.438	2.562	2.562	2.562	2.562	2.562	2.562	2.562	2.562	2.562	2.562	2.562	2.562
30	1.875	2.375	2.438	2.562	2.688	2.688	2.688	2.688	2.688	2.688	2.688	2.688	2.688	2.688	2.688	2.688
32	2.000	2.500	2.562	2.688	2.812	2.812	2.812	2.812	2.812	2.812	2.812	2.812	2.812	2.812	2.812	2.812
34	2.125	2.625	2.688	2.812	2.938	2.938	2.938	2.938	2.938	2.938	2.938	2.938	2.938	2.938	2.938	2.938
36	2.250	2.750	2.812	2.938	3.062	3.062	3.062	3.062	3.062	3.062	3.062	3.062	3.062	3.062	3.062	3.062
38	2.375	2.875	2.938	3.062	3.188	3.188	3.188	3.188	3.188	3.188	3.188	3.188	3.188	3.188	3.188	3.188
40	2.500	3.000	3.062	3.188	3.312	3.312	3.312	3.312	3.312	3.312	3.312	3.312	3.312	3.312	3.312	3.312
42	2.625	3.125	3.188	3.312	3.438	3.438	3.438	3.438	3.438	3.438	3.438	3.438	3.438	3.438	3.438	3.438
44	2.750	3.250	3.312	3.438	3.562	3.562	3.562	3.562	3.562	3.562	3.562	3.562	3.562	3.562	3.562	3.562
46	2.875	3.375	3.438	3.562	3.688	3.688	3.688	3.688	3.688	3.688	3.688	3.688	3.688	3.688	3.688	3.688
48	3.000	3.500	3.562	3.688	3.812	3.812	3.812	3.812	3.812	3.812	3.812	3.812	3.812	3.812	3.812	3.812
50	3.125	3.625	3.688	3.812	3.938	3.938	3.938	3.938	3.938	3.938	3.938	3.938	3.938	3.938	3.938	3.938
52	3.250	3.750	3.812	3.938	4.062	4.062	4.062	4.062	4.062	4.062	4.062	4.062	4.062	4.062	4.062	4.062
54	3.375	3.875	3.938	4.062	4.188	4.188	4.188	4.188	4.188	4.188	4.188	4.188	4.188	4.188	4.188	4.188
56	3.500	4.000	4.062	4.188	4.312	4.312	4.312	4.312	4.312	4.312	4.312	4.312	4.312	4.312	4.312	4.312
58	3.625	4.125	4.188	4.312	4.438	4.438	4.438	4.438	4.438	4.438	4.438	4.438	4.438	4.438	4.438	4.438
60	3.750	4.250	4.312	4.438	4.562	4.562	4.562	4.562	4.562	4.562	4.562	4.562	4.562	4.562	4.562	4.562
62	3.875	4.375	4.438	4.562	4.688	4.688	4.688	4.688	4.688	4.688	4.688	4.688	4.688	4.688	4.688	4.688
64	4.000	4.500	4.562	4.688	4.812	4.812	4.812	4.812	4.812	4.812	4.812	4.812	4.812	4.812	4.812	4.812
66	4.125	4.625	4.688	4.812	4.938	4.938	4.938	4.938	4.938	4.938	4.938	4.938	4.938	4.938	4.938	4.938
68	4.250	4.750	4.812	4.938	5.062	5.062	5.062	5.062	5.062	5.062	5.062	5.062	5.062	5.062	5.062	5.062
70	4.375	4.875	4.938	5.062	5.188	5.188	5.188	5.188	5.188	5.188	5.188	5.188	5.188	5.188	5.188	5.188
72	4.500	5.000	5.062	5.188	5.312	5.312	5.312	5.312	5.312	5.312	5.312	5.312	5.312	5.312	5.312	5.312
74	4.625	5.125	5.188	5.312	5.438	5.438	5.438	5.438	5.438	5.438	5.438	5.438	5.438	5.438	5.438	5.438
76	4.750	5.250	5.312	5.438	5.562	5.562	5.562	5.562	5.562	5.562	5.562	5.562	5.562	5.562	5.562	5.562
78	4.875	5.375	5.438	5.562	5.688	5.688	5.688	5.688	5.688	5.688	5.688	5.688	5.688	5.688	5.688	5.688
80	5.000	5.500	5.562	5.688	5.812	5.812	5.812	5.812	5.812	5.812	5.812	5.812	5.812	5.812	5.812	5.812
82	5.125	5.625	5.688	5.812	5.938	5.938	5.938	5.938	5.938	5.938	5.938	5.938	5.938	5.938	5.938	5.938
84	5.250	5.750	5.812	5.938	6.062	6.062	6.062	6.062	6.062	6.062	6.062	6.062	6.062	6.062	6.062	6.062
86	5.375	5.875	5.938	6.062	6.188	6.188	6.188	6.188	6.188	6.188	6.188	6.188	6.188	6.188	6.188	6.188
88	5.500	6.000	6.062	6.188	6.312	6.312	6.312	6.312	6.312	6.312	6.312	6.312	6.312	6.312	6.312	6.312
90	5.625	6.125	6.188	6.312	6.438	6.438	6.438	6.438	6.438	6.438	6.438	6.438	6.438	6.438	6.438	6.438
92	5.750	6.250	6.312	6.438	6.562	6.562	6.562	6.562	6.562	6.562	6.562	6.562	6.562	6.562	6.562	6.562
94	5.875	6.375	6.438	6.562	6.688	6.688	6.688	6.688	6.688	6.688	6.688	6.688	6.688	6.688	6.688	6.688
96	6.000	6.500	6.562	6.688	6.812	6.812	6.812	6.812	6.812	6.812	6.812	6.812	6.812	6.812	6.812	6.812
98	6.125															
100	6.250															
102	6.375															
104	6.500															
106	6.625															
108	6.750															
110	6.875															
112	7.000															
114	7.125															
116	7.250															
118	7.375															
120	7.500															
122	7.625															
124	7.750															
126	7.875															
128	8.000															

(E) *APPLIES TO MS20012A ONLY.

PREPARING ACTIVITY NAVY - AS

CUSTODIANS ARMY-AP

NAVY-

AIR FORCE-99

DLA-

REVIEW ARMY - EP, ME, M J DLA - IS AF-R?

USER APPY - AV

PROJECT NUMBER 5306-123E

MILITARY SPECIFICATION SHEET

TITLE BOLTS, INTERNAL WRENCHING, 160 KSI FTU
AND 96 KSI FSL

SPECIFICATION SHEET NUMBER 30 MAY 1989

MS20004E THRU 20024E

SUPERSEDING

MS20004D THRU 20024D

1C AUGUST 1981

AMSC- N/A

FSC 5306

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GPO: 1989-0-250-000-000-0

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THE REQUIREMENTS FOR ACQUIRING THE PRODUCT(S) DESCRIBED HEREIN SHALL CONSIST OF THIS SPECIFICATION SHEET AND THE ISSUE OF THE FOLLOWING SPECIFICATION LISTED IN THAT ISSUE OF THE DDIRS SPECIFIED IN THE SOLICITATION MIL-B-7838

THIS SPECIFICATION IS APPROVED FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE

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UNASSIGNED DASH NUMBERS SHALL NOT BE USED, EXCEPT THOSE DASH NUMBERS COVERED BY THE FOLLOWING CODING NOTE

DASH NUMBERS INDICATE PREFERRED GRIP LENGTHS IN .125 INCREMENTS. INTERMEDIATE GRIP LENGTHS BETWEEN THOSE LENGTHS LISTED, MAY BE SPECIFIED IN .062 INCREMENTS BY INTERMEDIATE DASH NUMBERS. LENGTH AND GRIP OF A BOLT WITH AN ODD NUMBER FOR THE DASH NUMBER WILL BE .062 GREATER THAN SHOWN FOR THE BOLTS WITH THE PRECEDING EVEN DASH NUMBER. ONLY BOLT DIAMETER FOR WHICH THERE ARE QUALIFIED PRODUCTS LISTED ON QPL-7838 SHALL BE USED FOR DESIGN.

FOR EACH BOLT DIAMETER GRIP LENGTHS GREATER OR LESS THAN THOSE DESIGNATED BY ASSIGNED DASH NUMBERS ON TABLE II ARE INACTIVE FOR DESIGN.

ADD "H" BEFORE DASH NUMBER FOR BOLT WITH DRILLED HEAD

EXAMPLES OF PART NUMBERS MS20017-18 = 1-12 BOLT, 2.438 INCH LONG, 1.125 INCH GRIP, UNDRILLED HEAD
MS20017H18 = 1-12 BOLT, 2.438 INCH LONG, 1.125 INCH GRIP, DRILLED HEAD.

PREPARING ACTIVITY NAVY - AS
CUSTODIANS ARMY - AR NAVY -
AIR FORCE - 99 DLA -
REVIEW ARMY - ER, ME, MI DLA - JS AF - 62
USER ARMY - AV
PROJECT NUMBER 5306-1234

MILITARY SPECIFICATION SHEET

TITLE BOLT - INTERNAL WRENCHING, 160 KS; FTU
AND 96 KS; FSL

SPECIFICATION SHEET NUMBER 30 MAY 1989

MS20004E THRU 20024E

SUPERSEDING
MS20004D THRU 20024D 10 AUGUST 1981

AWSC- N/A FSC 5306

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