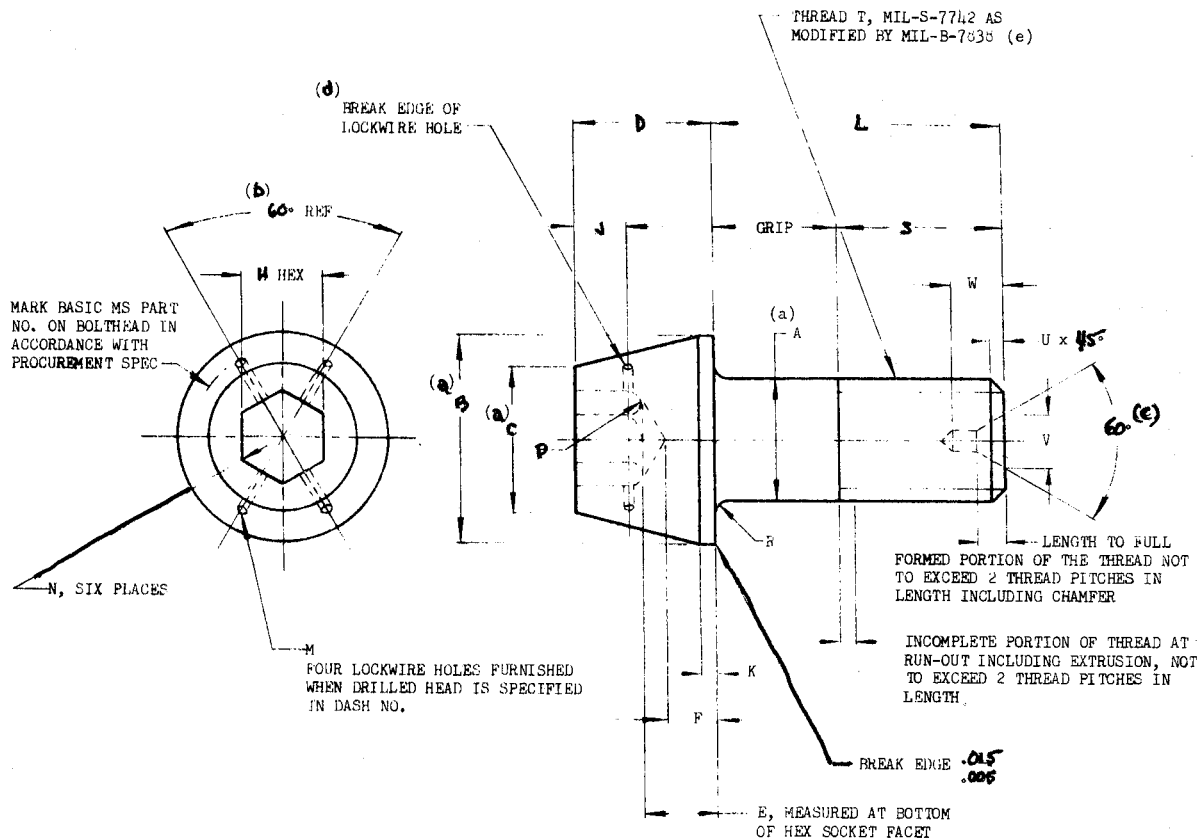


Proj. No. 5306-0747

FED. SUP CLASS
5306USER SYMBOLS:
ARMY - AREVIEWER SYMBOLS:
ARMY - ER ME
DLA - IS

"Review/user information is current as of the date of this document.
For future coordination of changes to this document, draft circulation
should be based on the information in the current DODISS."

This military standard is approved for use by all Departments
& Agencies of the Department of Defense. Selection for all new
engineering and design applications and for repetitive use shall
be made from this document.



- (a) DIMENSIONS A, B, AND C SHALL BE CONCENTRIC TO EACH OTHER WITHIN VALUES SPECIFIED FOR X TOTAL INDICATOR READING.
DIMENSIONS 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) 1-14 NS INACTIVE FOR DESIGN.

NOTES:

1. MATERIAL: ALLOY STEEL. SEE PROCUREMENT SPECIFICATION.
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: ROCKWELL C34 TO C40.
4. DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCES: DECIMALS $\pm .010$, ANGLES $\pm 1^\circ$.
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.

(D) DENOTES CHANGE

P.A. Navy - AS Other Cust ARMY - AR USAF - 99	TITLE BOLTS, INTERNAL WRENCHING, 160 KSI FTU AND 96 KSI FS.	MILITARY STANDARD MS 20004 THRU 20024
PROCUREMENT SPECIFICATION MTL-B-7835	SUPERSEDES:	SHEET 1 OF 4

DD FORM 672-1 (Coordinated)

PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

APPROVED 28 Jan 52
REVISED 20 Apr 62
29 DEC 72
10 August 1981

USER SYMBOLS:
ARMY - AV
NAVY - AS

REVIEWER SYMBOLS:
ARMY - ER, ME
DIA - IS

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FED. SUP CLASS
5306

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 UNF-3A	.2492	.2477	.438	.428	.342	.250	.112	.063	.1900	.1880	.078		.037	
MS20005	5/16-24 UNF-3A	.3117	.3102	.531	.521	.394	.312	.144	.094	.2210	.2190	.094			.010
MS20006	3/8 -24 UNF-3A	.3742	.3727	.649	.639	.520	.375	.03	.116		.2210	.2190	.094		
MS20007	7/16-20 UNF-3A	.4367	.4347	.750	.740	.534	.438	.208	.141	.3150	.3130	.125	.063		
MS20008	1/2 -20 UNF-3A	.4991	.4971	.828	.818	.625	.500	.208	.169	.3785	.3755	.172			.011
MS20009	9/16-18 UNF-3A	.5616	.5596	.938	.928	.723	.562	.279	.190	.4410	.4380	.203			
MS20010	5/8 -18 UNF-3A	.6240	.6220	1.050	1.040	.826	.625	.317	.216	.5035	.5005	.234			.019
MS20012	3/4 -16 UNF-3A	.7488	.7468	1.230	1.220	.921	.750	.385	.273	.5660	.5630	.281			
MS20014	7/8 -14 UNF-3A	.8737	.8707	1.438	1.428	1.083	.875	.450	.327	.6295	.6257	.344	.094	.055	
MS20016(e)	1 -14 NS -3A														
MS20017	1 -12 UNF-3A	.9985	.9955	1.625	1.615	1.249	1.000	.527	.381		.7507	.7507	.391		.022
MS20018	1-1/8 -12 UNF-3A	1.124	1.121	1.875	1.865	1.275	1.125	.589	.443			.453			
MS20020	1-1/4 -12 UNF-3A	1.249	1.246	2.125	2.115	1.598	1.250	.667	.475	1.005	1.001	.500			
MS20022	1-3/8 -12 UNF-3A	1.374	1.370	2.313	2.303	1.768	1.375	.746	.531	1.131	1.126	.547	.125		
MS20024	1-1/2 -12 UNF-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 UNF-3A	.7488	.7468	1.230	1.220	.921	.750	.385	.273	.5660	.5630	.281	.094		

TABLE I (CONT'D)

BASIC MS PART NO.	P RAD		R 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					.475	.031				6,190	.005	.007	
MS20005			.041	.031	.537					9,820	.006	.008	.0045
MS20006					.662					15,200	.008	.010	
MS20007	.020	.010				.047				20,600	.009	.011	
MS20008			.051	.047	.737					27,400	.010	.012	
MS20009					.850					34,800	.011	.014	.006
MS20010					.932	.062				43,600	.012	.016	
MS20012					1.037					63,200	.015	.018	
MS20014					1.162		.187	.200	2	86,100	.018	.022	
MS20016(e)			.073	.063		.078				112,000			
MS20017	.030	.015			1.287		.250	.260	3	144,000	.020	.025	.009
MS20018					1.475					144,000	.022	.026	
MS20020					1.600					180,000	.025	.032	
MS20022			.089	.077	1.725	.094	.312	.320	4	219,000	.028	.035	.012
MS20024					1.850					263,000	.030	.039	
MS20012A			.073	.063	.730	.062	.187	.200	2	63,200	.015	.018	.006

P.A. Navy - AS	TITLE	MILITARY STANDARD
Other Cust Army - AR USAF - 99	BOLTS, INTERNAL WRENCHING, 160 KSI FTU AND 96 KSI FSU	MS 20004 THRU 20024
PROCUREMENT SPECIFICATION MIL-B-7838	SUPERSEDES:	SHEET 2 OF 4

DD FORM 672-1 (Coordinated)

PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

APPROVED 28 Feb 52 REVISED (D) FOR CHANGES SEE SHEETS 2 AND 4

TABLE II DASH NOS. GRIP LENGTHS AND BOLT LENGTH																	FED. SUP CLASS 5306
DASH NO.	GRIP ±.010	L, LENGTH ±.015															
		MS20004	MS20005	MS20006	MS20007	MS20008	MS20009	MS20010	MS20012	MS20014	MS20015	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	.938	1.062													
8	.500	1.000	1.062	1.188	1.312	1.312											
10	.625	1.125	1.188	1.312	1.438	1.438	1.500	1.562									
12	.750	1.250	1.312	1.438	1.562	1.562	1.625	1.688	1.812								
14	.875	1.375	1.438	1.562	1.688	1.688	1.750	1.812	1.938	2.062							
16	1.000	1.500	1.562	1.688	1.812	1.812	1.875	1.938	2.062	2.188	2.312	2.312					
18	1.125	1.625	1.688	1.812	1.938	1.938	2.000	2.062	2.188	2.312	2.438	2.438	2.625				
20	1.250	1.750	1.812	1.938	2.062	2.062	2.125	2.188	2.312	2.438	2.562	2.562	2.750	2.875	3.000		
22	1.375	1.875	1.938	2.062	2.188	2.188	2.250	2.312	2.438	2.562	2.688	2.688	2.875	3.000	3.125	3.250	3.375
24	1.500	2.000	2.062	2.188	2.312	2.312	2.375	2.438	2.562	2.688	2.812	2.812	3.000	3.125	3.250	3.375	3.500
26	1.625	2.125	2.188	2.312	2.438	2.438	2.500	2.562	2.688	2.812	2.938	2.938	3.125	3.250	3.375	3.500	3.625
28	1.750	2.250	2.312	2.438	2.562	2.562	2.625	2.688	2.812	2.938	3.062	3.062	3.250	3.375	3.500	3.625	3.750
30	1.875	2.375	2.438	2.562	2.688	2.688	2.750	2.812	2.938	3.062	3.188	3.188	3.375	3.500	3.625	3.750	3.875
32	2.000	2.500	2.562	2.688	2.812	2.812	2.875	2.938	3.062	3.188	3.312	3.312	3.500	3.625	3.750	3.875	4.000
34	2.125	2.625	2.688	2.812	2.938	2.938	3.000	3.062	3.188	3.312	3.438	3.438	3.625	3.750	3.875	4.000	
36	2.250	2.750	2.812	2.938	3.062	3.062	3.125	3.188	3.312	3.438	3.562	3.562	3.750	3.875	4.000	4.125	
38	2.375	2.875	2.938	3.062	3.188	3.188	3.250	3.312	3.438	3.562	3.688	3.688	3.875	4.000	4.125	4.250	
40	2.500	3.000	3.062	3.188	3.312	3.312	3.375	3.438	3.562	3.688	3.812	3.812	4.000	4.125	4.250	4.375	
42	2.625	3.125	3.188	3.312	3.438	3.438	3.500	3.562	3.688	3.812	3.938	3.938	4.125	4.250	4.375	4.500	
44	2.750	3.250	3.312	3.438	3.562	3.562	3.625	3.688	3.812	3.938	4.062	4.062	4.250	4.375	4.500	4.625	
46	2.875	3.375	3.438	3.562	3.688	3.688	3.750	3.812	3.938	4.062	4.188	4.188	4.375	4.500	4.625	4.750	
48	3.000	3.500	3.562	3.688	3.812	3.812	3.875	3.938	4.062	4.188	4.312	4.312	4.500	4.625	4.750	4.875	
50	3.125	3.625	3.688	3.812	3.938	3.938	4.000	4.062	4.188	4.312	4.438	4.438	4.625	4.750	4.875	5.000	
52	3.250	3.750	3.812	3.938	4.062	4.062	4.125	4.188	4.312	4.438	4.562	4.562	4.750	4.875	5.000	5.125	
54	3.375	3.875	3.938	4.062	4.188	4.188	4.250	4.312	4.438	4.562	4.688	4.688	4.875	5.000	5.125	5.250	
56	3.500	4.000	4.062	4.188	4.312	4.312	4.375	4.438	4.562	4.688	4.812	4.812	5.000	5.125	5.250	5.375	
58	3.625	4.125	4.188	4.312	4.438	4.438	4.500	4.562	4.688	4.812	4.938	4.938	5.125	5.250	5.375	5.500	
60	3.750	4.250	4.312	4.438	4.562	4.562	4.625	4.688	4.812	4.938	5.062	5.062	5.250	5.375	5.500	5.625	
62	3.875	4.375	4.438	4.562	4.688	4.688	4.750	4.812	4.938	5.062	5.188	5.188	5.375	5.500	5.625	5.750	
64	4.000	4.500	4.562	4.688	4.812	4.812	4.875	4.938	5.062	5.188	5.312	5.312	5.500	5.625	5.750	5.875	
66	4.125	4.625	4.688	4.812	4.938	4.938	5.000	5.062	5.188	5.312	5.438	5.438	5.625	5.750	5.875	6.000	
68	4.250	4.750	4.812	4.938	5.062	5.062	5.125	5.188	5.312	5.438	5.562	5.562	5.750	5.875	6.000	6.125	
70	4.375	4.875	4.938	5.062	5.188	5.188	5.250	5.312	5.438	5.562	5.688	5.688	5.875	6.000	6.125	6.250	
72	4.500	5.000	5.062	5.188	5.312	5.312	5.375	5.438	5.562	5.688	5.812	5.812	6.000	6.125	6.250	6.375	
74	4.625	5.125	5.188	5.312	5.438	5.438	5.500	5.562	5.688	5.812	5.938	5.938	6.125	6.250	6.375	6.500	
76	4.750	5.250	5.312	5.438	5.562	5.562	5.625	5.688	5.812	5.938	6.062	6.062	6.250	6.375	6.500	6.625	
78	4.875	5.375	5.438	5.562	5.688	5.688	5.750	5.812	5.938	6.062	6.188	6.188	6.375	6.500	6.625	6.750	
80	5.000	5.500	5.562	5.688	5.812	5.812	5.875	5.938	6.062	6.188	6.312	6.312	6.500	6.625	6.750	6.875	
82	5.125	5.625	5.688	5.812	5.938	5.938	6.000	6.062	6.188	6.312	6.438	6.438	6.625	6.750	6.875	7.000	
84	5.250	5.750	5.812	5.938	6.062	6.062	6.125	6.188	6.312	6.438	6.562	6.562	6.750	6.875	7.000	7.125	
86	5.375	5.875	5.938	6.062	6.188	6.188	6.250	6.312	6.438	6.562	6.688	6.688	6.875	7.000	7.125	7.250	
88	5.500	6.000	6.062	6.188	6.312	6.312	6.375	6.438	6.562	6.688	6.812	6.812	7.000	7.125	7.250	7.375	
90	5.625	6.125	6.188	6.312	6.438	6.438	6.500	6.562	6.688	6.812	6.938	6.938	7.125	7.250	7.375	7.500	
92	5.750	6.250	6.312	6.438	6.562	6.562	6.625	6.688	6.812	6.938	7.062	7.062	7.250	7.375	7.500	7.625	
94	5.875	6.375	6.438	6.562	6.688	6.688	6.750	6.812	6.938	7.062	7.188	7.188	7.375	7.500	7.625	7.750	
96	6.000	6.500	6.562	6.688	6.812	6.812	6.875	6.938	7.062	7.188	7.312	7.312	7.500	7.625	7.750	7.875	
98	6.125						7.000	7.062	7.188	7.312	7.438	7.438	7.625	7.750	7.875	8.000	
100	6.250						7.125	7.188	7.312	7.438	7.562	7.562	7.750	7.875	8.000	8.125	
102	6.375						7.250	7.312	7.438	7.562	7.688	7.688	7.875	8.000	8.125	8.250	
104	6.500						7.375	7.438	7.562	7.688	7.812	7.812	8.000	8.125	8.250	8.375	
106	6.625						7.500	7.562	7.688	7.812	7.938	7.938	8.125	8.250	8.375	8.500	
108	6.750						7.625	7.688	7.812	7.938	8.062	8.062	8.250	8.375	8.500	8.625	
110	6.875						7.750	7.812	7.938	8.062	8.188	8.188	8.375	8.500	8.625	8.750	
112	7.000						7.875	7.938	8.062	8.188	8.312	8.312	8.500	8.625	8.750	8.875	
114	7.125												8.625	8.750	8.875	9.000	
116	7.250												8.750	8.875	9.000	9.125	
118	7.375												8.875	9.000	9.125	9.250	
120	7.500												9.000	9.125	9.250	9.375	
122	7.625												9.125	9.250	9.375	9.500	
124	7.750												9.250	9.375	9.500	9.625	
126	7.875												9.375	9.500	9.625	9.750	
128	8.000												9.500	9.625	9.750	9.875	

UNASSIGNED DASH NOS. SHALL NOT BE USED, EXCEPT THOSE DASH NOS. 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 BOLT 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 SHEET 2 ARE INACTIVE FOR DESIGN.

ADD H BEFORE DASH NO. FOR BOLT WITH DRILLED HEAD.

EXAMPLES OF PART NOS.: 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.

P.A. Navy - AS

Other Cust

Army - AR
 USAF - 99

TITLE

BOLT - INTERNAL WRENCHING, 160 KSI FTU AND 96 KSI FSU

MILITARY STANDARD

MS20004 THRU
 MS20024

PROCUREMENT SPECIFICATION
 MIL-B-7838

SUPERSEDES:

SHEET 3 OF 4

DD FORM 672-1 (Coordinated)

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APPROVED 28 Jan '72 REVISED FOR CHANGES SEE SHEETS 2 AND 4

USER SYMBOLS:

ARMY - AV

REVIEWER SYMBOLS:

ARMY-ER ME
 DIA-IS

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TABLE II (CONT'D)

DASH NO	GRIP ±.010	L. LENGTH, I.015 MS20012A
8	.500	1.230

(D)

FED. SUP CLASS
530

P.A.
NAVY - AS
Other Cust
Army - AR
USAF - 99

TITLE

BOLTS, INTERNAL WRENCHING, 160 KSI FTU AND 96 KSI FSU

MILITARY STANDARD

MS 20004 THRU
20024

PROCUREMENT SPECIFICATION
MIL-B-7838

SUPERSEDES:

SHEET OF

4 4

APPROVED 28 Feb. 1952 REVISED FOR CHANGES SEE SHEETS 2 AND 4

DD FORM 1 SEP 71 672-1 (Coordinated)

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PLATE NO. 17709

U.S. GOVERNMENT PRINTING OFFICE: 1981 O 703 023/6235

4