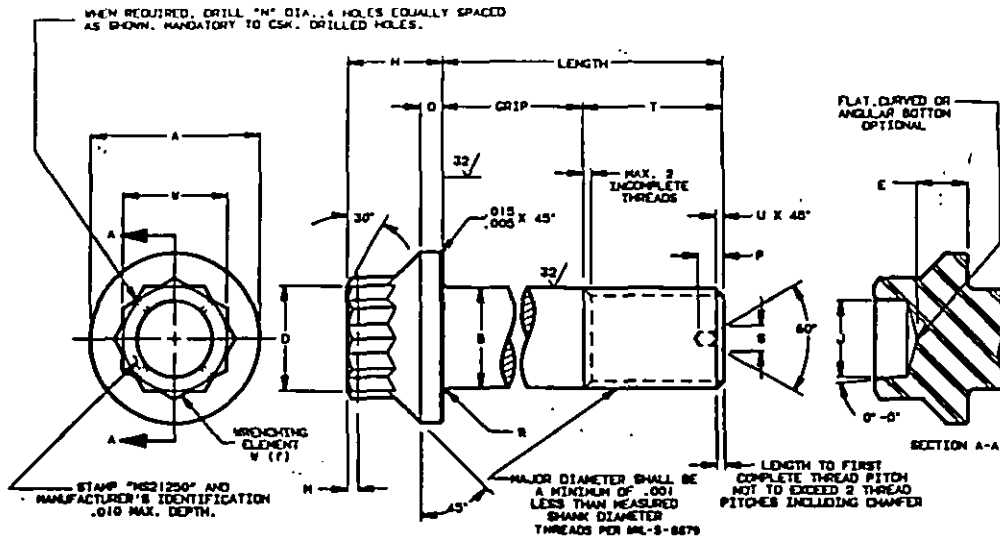


USEN SYMBOL:  
REVERSED SYMBOL:  
O.L.A. - 13  
ARMY - AR  
AIR FORCE - 62



**REQUIREMENTS:**

1. MATERIAL: STEEL ALLOY, MIL-S-5626 (AISI 4140) MIL-S-5000 (AISI 4340) MIL-S-6049 (AISI 8740) MIL-S-8503 (AISI 6150).
2. PLATING: CADMIUM PLATE IN ACCORDANCE WITH QQ-P-416, TYPE II, CLASS 2. CLASS 3 MAY BE USED UNTIL 1 JAN. 1974.
3. SURFACE TEXTURE IN ACCORDANCE WITH ANSI (ASA) B46.1. UNLESS OTHERWISE SPECIFIED, THE SURFACE TEXTURE SHALL NOT EXCEED 125 MICROINCHES.
4. DIMENSIONS ARE IN INCHES, UNLESS OTHERWISE SPECIFIED. TOLERANCES: DECIMALS ±.010, ANGLES ±2°.
5. DIMENSIONS TO BE MET AFTER PLATING.
6. TENSILE STRENGTH TO BE 180,000 TO 200,000 PSI.
7. DIAMETER DASH NO. AT TOP OF TABLE, SHEET 3, PLUS GRIP DASH NO. FIRST COLUMN ON LEFT OF TABLE CONSTITUTE A COMPLETE DASH NO. IDENTIFYING SPECIFIED LENGTHS OF A GIVEN SIZE OF BOLT. GRIP EQUALS LAST THREE DASH NUMBERS TIMES .0625.
8. ADD LETTER H BEFORE DASH NO. TO DESIGNATE DRILLED HEAD. FIRST TWO DASH NUMBERS DESIGNATE DIAMETER IN SIXTEENTHS. LAST THREE DASH NUMBERS DESIGNATE GRIP LENGTH IN SIXTEENTHS. UNASSIGNED INTERMEDIATE OR LONGER GRIP LENGTHS NOT INCLUDED IN TABLE MAY BE SPECIFIED BY THE USE OF WHOLE DASH NUMBERS ONLY.
  - EXAMPLES OF PREFERRED PART NUMBER: MS21250-04608 = BOLT, UNDRILLED HEAD, .2500-28, .500 GRIP LENGTH  
MS21250HD4008 = BOLT, DRILLED HEAD, .2500-28, .500 GRIP LENGTH
  - EXAMPLES OF UNASSIGNED PART NUMBER: MS21250-04009 = BOLT, UNDRILLED HEAD, .2500-28, .562 GRIP LENGTH  
MS21250HD4009 = BOLT, DRILLED HEAD, .2500-28, .562 GRIP LENGTH
9. HARDNESS: 39-43 HRC.

SEE TABLE ON SHEET 3 FOR PREFERRED GRIP DASH NUMBERS.  
GRIP LENGTH OF BOLT SHALL BE MEASURED FROM UNDERSIDE OF HEAD TO THE END OF FULL CYLINDRICAL PORTION OF THE SHANK.

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.

INACTIVE FOR NEW DESIGN AFTER 4 DEC 1980.

(L) DENOTES CHANGES

AMSC N/A  
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P.A. NAVY - AS Other Cust USAF - 99 ARMY - AV	TITLE	<b>MILITARY STANDARD</b>  <b>MS21250</b>
	(L) BOLT, TENSION, STEEL, EXTERNAL WRENCHING, FLANGED, 12-POINT, 180 KSI Fcu, 450°F	
PROCUREMENT SPECIFICATION MIL-R-8831	SUPERSEDES: MS21250(ASG)	SHEET OF 1 1

APPROVED 23 NOV 60 REVISED 17 JUNE 1962 30 JAN 69

AMSC N/A

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 For future coordination of changes to this document, draft circulation should be based on the information in the current DDDISS."

REVIEWER SYMBOLS:

DLA - IS  
 ARMY - AR  
 AIR FORCE - AF

USER SYMBOLS:

DD FORM 672-1 (Continued)

NAVY - AS  
 Other Code  
 USAF - 99  
 ARMY - AV

PROCUREMENT SPECIFICATION  
 MIL-B-8831

SUPPLEMENTAL SPECIFICATION  
 MS21250(ASG)

TITLE  
 BOLT, TENSION, STEEL, 180 KSI FTU, 450° F,  
 12 POINT, EXTERNAL WRENCHING FLANGED

MILITARY STANDARD  
 MS21250  
 SHEET 2 OF 3

DIA DASH NO.	THREAD MIL-S-8879	A DIA	B DIA	NOM SIZE W (EX)	D DIA	E MIN	H	J +.010 -.030	M	N DIA ±.005	(e) P MAX	Q	R	(e) S MAX	(d) T MIN REF	U ±.016	DRILL SIZE REF	CONCENTRICITY SEE (a), (b) & (c)			DOUBLE SHEAR LBS MIN	ULT TENSILE LBS MIN
																		X	Y	Z		
02	.1640-32 UNJC-3A	.300 .290	.1635 .1625	.2188	.219 .204	.076	.250	.100							.385		-	.004	.003	.003	4,600	2,950
03	.1900-32 UNJF-3A	.350 .340	.1895 .1885	.2500	.250 .235	.092	.265	.125	.062	.037					.420	.031	-	.005	.004	.0045	6,100	3,910
04	.2500-28 UNJF-3A	.438 .428	.2495 .2485	.3125	.312 .297	.133	.300	.180							.492		-	.006	.005	.0045	10,600	6,980
05	.3125-24 UNJF-3A	.531 .521	.3120 .3110	.3750	.375 .360	.162	.348	.215							.579		-	.008	.006	.0045	16,600	11,100
06	.3750-24 UNJF-3A	.649 .639	.3745 .3735	.4375	.437 .422	.197	.388	.260	.070						.625	.047	-	.009	.006	.0045	23,900	17,100
07	.4375-20 UNJF-3A	.750 .740	.4370 .4360	.5000	.500 .485	.228	.435	.320							.721		-	.010	.008	.0045	32,500	23,200
08	.5000-20 UNJF-3A	.828 .818	.4995 .4985	.5625	.562 .547	.254	.504	.380							.768		-	.011	.009	.006	42,400	30,900
09	.5625-18 UNJF-3A	.938 .928	.5615 .5605	.6250	.625 .610	.287	.557	.440	.094						.852	.062	-	.012	.010	.006	53,700	39,200
10	.6250-18 UNJF-3A	1.050 1.040	.6240 .6230	.6875	.687 .672	.327	.618	.500							.899		-	.015	.010	.006	66,300	49,000
12	.7500-16 UNJF-3A	1.230 1.220	.7490 .7480	.8125	.812 .797	.380	.711	.570	.055	.200	.178				1.036	.078	2	.018	.014	.009	95,400	71,100
14	.8750-14 UNJF-3A	1.438 1.428	.8740 .8730	.9375	.937 .922	.438	.808	.650			.198	.073 .063			1.244		3	.020	.016	.009	129,900	97,100
16	1.0000-12 UNJF-3A	1.625 1.615	.9990 .9980	1.0625	1.062 1.047	.493	.923	.740	.125		.222				1.479		4	.022	.019	.009	169,600	126,000
18	1.1250-12 UNJF-3A	1.875 1.865	1.1240 1.1225	1.2500	1.250 1.235	.556	1.051	.840			.258				1.650		3	.025	.021	.009	214,700	162,000
20	1.2500-12 UNJF-3A	2.125 2.115	1.2490 1.2475	1.3125	1.312 1.297	.636	1.155	.950			.269				1.760	.094	4	.028	.023	.012	265,100	202,000
22	1.3750-12 UNJF-3A	2.313 2.303	1.3740 1.3725	1.4375	1.437 1.422	.698	1.266	1.070	.188		.274	.089 .077		.312	1.885		4	.030	.025	.012	320,700	247,000
24	1.5000-12 UNJF-3A	2.500 2.490	1.4990 1.4975	1.6250	1.625 1.610	.750	1.434	1.200			.335				2.010		4			.012	381,700	296,000

- (a) DIMENSIONS A, B AND J SHALL BE CONCENTRIC TO EACH OTHER WITHIN VALUES SPECIFIED FOR X FIM.
- (b) DIMENSIONS W AND J SHALL BE CONCENTRIC TO EACH OTHER WITHIN VALUES SPECIFIED FOR Y FIM.
- (c) DIMENSIONS B AND THREAD PITCH DIAMETER SHALL BE CONCENTRIC TO EACH OTHER WITHIN VALUES SPECIFIED FOR Z FIM.
- (d) DIMENSIONS B AND THREAD PITCH DIAMETER SHALL BE CONCENTRIC TO EACH OTHER WITHIN VALUES SPECIFIED FOR Z FIM.
- (e) REFERENCE DIMENSIONS ARE FOR DESIGN PURPOSES ONLY AND ARE NOT AN INSPECTION OR MANUFACTURING REQUIREMENT.
- (f) ON BOLTS 3/4 INCH OR LARGER, CENTER DRILLING OF SHANK IS OPTIONAL FOR MANUFACTURER.
- (g) ONLY BOLTS FOR WHICH THERE ARE QUALIFIED PRODUCTS LISTED IN QPL8831 SHALL BE USED FOR DESIGN.
- (h) WRENCHING ELEMENT SHALL BE IN ACCORDANCE WITH AS 870.

APPROVED 23 NOV 60 REVISED (L) FOR CHANGES SEE SHEET 1 AND 2

REQ. SUP CLASS 5306

TABLE 1

TABLE 11

FED. SUP CLASS  
5306

GRIP DASH NO.	GRIP $\pm$ .010	DIAMETER DASH NUMBERS															
		02	03	04	05	06	07	08	09	10	12	14	16	18	20	22	24
LENGTH																	
004	.250	.655	.690	.762	.849	.895	.991	1.038									
006	.375	.780	.815	.887	.974	1.020	1.116	1.163	1.247	1.294	1.431						
008	.500	.905	.940	1.012	1.099	1.145	1.241	1.288	1.372	1.419	1.556	1.764	1.999	2.170			
010	.625	1.030	1.065	1.137	1.224	1.270	1.366	1.413	1.497	1.544	1.681	1.889	2.124	2.295	2.405	2.530	2.655
012	.750	1.155	1.190	1.262	1.349	1.395	1.491	1.538	1.622	1.669	1.806	2.014	2.249	2.420	2.530	2.655	2.780
014	.875	1.280	1.315	1.387	1.474	1.520	1.616	1.663	1.747	1.794	1.931	2.139	2.374	2.545	2.655	2.780	2.905
016	1.000	1.405	1.440	1.512	1.599	1.645	1.741	1.788	1.872	1.919	2.056	2.264	2.499	2.670	2.780	2.905	3.030
018	1.125	1.530	1.565	1.637	1.724	1.770	1.866	1.913	1.997	2.044	2.181	2.389	2.624	2.795	2.905	3.030	3.155
020	1.250	1.655	1.690	1.762	1.849	1.895	1.991	2.038	2.122	2.169	2.306	2.514	2.749	2.920	3.030	3.155	3.280
022	1.375	1.780	1.815	1.887	1.974	2.020	2.116	2.163	2.247	2.294	2.431	2.639	2.874	3.045	3.155	3.280	3.405
024	1.500	1.905	1.940	2.012	2.099	2.145	2.241	2.288	2.372	2.419	2.556	2.764	2.999	3.170	3.280	3.405	3.530
026	1.625	2.030	2.065	2.137	2.224	2.270	2.366	2.413	2.497	2.544	2.681	2.889	3.124	3.295	3.405	3.530	3.655
028	1.750	2.155	2.190	2.262	2.349	2.395	2.491	2.538	2.622	2.669	2.806	3.014	3.249	3.420	3.530	3.655	3.780
030	1.875	2.280	2.315	2.387	2.474	2.520	2.616	2.663	2.747	2.794	2.931	3.139	3.374	3.545	3.655	3.780	3.905
032	2.000	2.405	2.440	2.512	2.599	2.645	2.741	2.788	2.872	2.919	3.056	3.264	3.499	3.670	3.780	3.905	4.030
034	2.125	2.530	2.565	2.637	2.724	2.770	2.866	2.913	2.997	3.044	3.181	3.389	3.624	3.795	3.905	4.030	4.155
035	2.187					2.833											
036	2.250	2.655	2.690	2.762	2.849	2.895	2.991	3.038	3.122	3.169	3.306	3.514	3.749	3.920	4.030	4.155	4.280
038	2.375	2.780	2.815	2.887	2.974	3.020	3.116	3.163	3.247	3.294	3.431	3.639	3.874	4.045	4.155	4.280	4.405
039	2.437						3.225										
040	2.500	2.905	2.940	3.012	3.099	3.145	3.241	3.288	3.372	3.419	3.556	3.764	3.999	4.170	4.280	4.405	4.530
042	2.625	3.030	3.065	3.137	3.224	3.270	3.366	3.413	3.497	3.544	3.681	3.889	4.124	4.295	4.405	4.530	4.655
044	2.750	3.155	3.190	3.262	3.349	3.395	3.491	3.538	3.622	3.669	3.806	4.014	4.249	4.420	4.530	4.655	4.780
046	2.875	3.280	3.315	3.387	3.474	3.520	3.616	3.663	3.747	3.794	3.931	4.139	4.374	4.545	4.655	4.780	4.905
048	3.000	3.405	3.440	3.512	3.599	3.645	3.741	3.788	3.872	3.919	4.056	4.264	4.499	4.670	4.780	4.905	5.030
050	3.125	3.530	3.565	3.637	3.724	3.770	3.866	3.913	3.997	4.044	4.181	4.389	4.624	4.795	4.905	5.030	5.155
052	3.250	3.655	3.690	3.762	3.849	3.895	3.991	4.038	4.122	4.169	4.306	4.514	4.749	4.920	5.030	5.155	5.280
054	3.375	3.780	3.815	3.887	3.974	4.020	4.116	4.163	4.247	4.294	4.431	4.639	4.874	5.045	5.155	5.280	5.405
056	3.500	3.905	3.940	4.012	4.099	4.145	4.241	4.288	4.372	4.419	4.556	4.764	4.999	5.170	5.280	5.405	5.530
058	3.625	4.030	4.065	4.137	4.224	4.270	4.366	4.413	4.497	4.544	4.681	4.889	5.124	5.295	5.405	5.530	5.655
060	3.750	4.155	4.190	4.262	4.349	4.395	4.491	4.538	4.622	4.669	4.806	5.014	5.249	5.420	5.530	5.655	5.780
062	3.875	4.280	4.315	4.387	4.474	4.520	4.616	4.663	4.747	4.794	4.931	5.139	5.374	5.545	5.655	5.780	5.905
064	4.000	4.405	4.440	4.512	4.599	4.645	4.741	4.788	4.872	4.919	5.056	5.264	5.499	5.670	5.780	5.905	6.030
066	4.125	4.530	4.565	4.637	4.724	4.770	4.866	4.913	4.997	5.044	5.181	5.389	5.624	5.795	5.905	6.030	6.155
068	4.250	4.655	4.690	4.762	4.849	4.895	4.991	5.038	5.122	5.169	5.306	5.514	5.749	5.920	6.030	6.155	6.280
070	4.375	4.780	4.815	4.887	4.974	5.020	5.116	5.163	5.247	5.294	5.431	5.639	5.874	6.045	6.155	6.280	6.405
072	4.500	4.905	4.940	5.012	5.099	5.145	5.241	5.288	5.372	5.419	5.556	5.764	5.999	6.170	6.280	6.405	6.530
074	4.625	5.030	5.065	5.137	5.224	5.270	5.366	5.413	5.497	5.544	5.681	5.889	6.124	6.295	6.405	6.530	6.655
076	4.750	5.155	5.190	5.262	5.349	5.395	5.491	5.538	5.622	5.669	5.806	6.014	6.249	6.420	6.530	6.655	6.780
078	4.875	5.280	5.315	5.387	5.474	5.520	5.616	5.663	5.747	5.794	5.931	6.139	6.374	6.545	6.655	6.780	6.905
080	5.000	5.405	5.440	5.512	5.599	5.645	5.741	5.788	5.872	5.919	6.056	6.264	6.499	6.670	6.780	6.905	7.030
082	5.125	5.530	5.565	5.637	5.724	5.770	5.866	5.913	5.997	6.044	6.181	6.389	6.624	6.795	6.905	7.030	7.155
084	5.250	5.655	5.690	5.762	5.849	5.895	5.991	6.038	6.122	6.169	6.306	6.514	6.749	6.920	7.030	7.155	7.280
086	5.375	5.780	5.815	5.887	5.974	6.020	6.116	6.163	6.247	6.294	6.431	6.639	6.874	7.045	7.155	7.280	7.405
088	5.500	5.905	5.940	6.012	6.099	6.145	6.241	6.288	6.372	6.419	6.556	6.764	6.999	7.170	7.280	7.405	7.530
090	5.625	6.030	6.065	6.137	6.224	6.270	6.366	6.413	6.497	6.544	6.681	6.889	7.124	7.295	7.405	7.530	7.655
092	5.750	6.155	6.190	6.262	6.349	6.395	6.491	6.538	6.622	6.669	6.806	7.014	7.249	7.420	7.530	7.655	7.780
094	5.875	6.280	6.315	6.387	6.474	6.520	6.616	6.663	6.747	6.794	6.931	7.139	7.374	7.545	7.655	7.780	7.905
096	6.000	6.405	6.440	6.512	6.599	6.645	6.741	6.788	6.872	6.919	7.056	7.264	7.499	7.670	7.780	7.905	8.030
098	6.125								6.997	7.044	7.181	7.389	7.624	7.795	7.905	8.030	8.155
100	6.250								7.122	7.169	7.306	7.514	7.749	7.920	8.030	8.155	8.280
102	6.375								7.247	7.294	7.431	7.639	7.874	8.045	8.155	8.280	8.405
104	6.500								7.372	7.419	7.556	7.764	7.999	8.170	8.280	8.405	8.530
106	6.625								7.497	7.544	7.681	7.889	8.124	8.295	8.405	8.530	8.655
108	6.750								7.622	7.669	7.806	8.014	8.249	8.420	8.530	8.655	8.780
110	6.875								7.747	7.794	7.931	8.139	8.374	8.545	8.655	8.780	8.905
112	7.000								7.872	7.919	8.056	8.264	8.499	8.670	8.780	8.905	9.030
114	7.125													8.795	8.905	9.030	9.155
116	7.250													8.920	9.030	9.155	9.280
118	7.375													9.045	9.155	9.280	9.405
120	7.500													9.170	9.280	9.405	9.530
122	7.625													9.295	9.405	9.530	9.655
124	7.750													9.420	9.530	9.655	9.780
126	7.875													9.545	9.655	9.780	9.905
128	8.000													9.670	9.780	9.905	10.030

USER SYMBOLS:  
REVIEWER SYMBOLS:  
DLA-18  
ARMY - AR  
AIR FORCE - 82

Revisions/changes information is entered on the date of the document.  
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P.A. NAVY - AS Other Cust	TITLE BOLT, TENSION, STEEL, 180 KSI FTU, 450°F, 12 POINT, EXTERNAL WRENCHING FLANGED	MILITARY STANDARD <b>MS21250</b>
USAF - 99 ARMY - AV	SUPERSEDES: MS21250(ASC)	SHEET 3 OF 3
PROCUREMENT SPECIFICATION MIL-B-8831		