

TABLE 1

NOMINAL SIZE			1/4	5/16	3/8	7/16	1/2	9/16	5/8
B	THREAD	UNF-2A	28	24	24	20	20	18	18
D	BODY DIAMETER	MAX MIN	.2500 .2450	.3125 .3065	.3750 .3690	.4375 .4305	.5000 .4930	.5625 .5545	.6250 .6170
F	WIDTH ACROSS FLATS	MAX MIN	.4375 .4280	.5000 .4890	.5625 .5510	.6250 .6120	.7500 .7360	.8125 .7980	.9375 .9220
G	WIDTH ACROSS CORNERS	MAX MIN	.505 .488	.577 .557	.650 .628	.722 .698	.866 .840	.938 .910	1.083 1.051
H	HEAD HEIGHT	MAX MIN	.163 .150	.211 .195	.243 .226	.291 .272	.323 .302	.371 .348	.403 .378
R	RADIUS	MAX MIN	.025 .015	.025 .015	.025 .015	.025 .015	.025 .015	.045 .020	.045 .020
* MIN TENSILE STRENGTH - LBS			6,450	8,700	13,200	17,800	24,000	30,400	38,400
L LENGTH	TOLERANCE	DASH NO.	DASH NO.	DASH NO.	DASH** NO.	DASH NO.	DASH** NO.	DASH NO.	
.375	+0 -.031	1	27	53	79	104	130	155	
.438		2	28	54					
.500		3	29	55					
.562		4	30	56					
.625		5	31	57					
.750		6	32	58					
.875		7	33	59					
1.000		8	34	60					
1.125	+0 -.062	9	35	61	86	110	135	159	
1.250		10	36	62	87	111	136	160	
1.375		11	37	63	88	112	137	161	
1.500		12	38	64	89	113	138	162	
1.750		13	39	65	90	114	139	163	
2.000		14	40	66	91	115	140	164	
2.250		15	41	67	92	116	141	165	
2.500	+0 -.094	16	42	68	93	117	142	166	
2.750		17	43	69	94	118	143	167	
3.000		18	44	70	95	119	144	168	
3.250		19	45	71	96	120	145	169	
3.500		20	46	72	97	121	146	170	
3.750		21	47	73	98	122	147	171	
4.000		22	48	74	99	122	148	172	
4.250		23	49	75	100	124	149	173	
4.500		24	50	76	101	125	150	174	
4.750		25	51	77	102	126	151	175	
5.000		26	52	78	103	127	152	176	
5.500						128	153	177	
6.000						129	154	178	

NOTE: FOR NOTES AND ADDITIONAL SIZES SEE SHEET 2

CROSS REFERENCE OF PART NUMBERS

THE SCREWS COVERED BY DASH NUMBERS GIVEN IN MS35302, MS35304 AND MS35306 ARE CANCELLED AFTER THE DATES INDICATED ON THE CANCELLED DOCUMENTS. USE DASH NUMBERS USED IN THIS STANDARD. THE CANCELLED SCREWS CANNOT ALWAYS REPLACE THE NEW SCREWS AND SHOULD BE USED UNTIL EXISTING STOCKS ARE DEPLETED. USE ONLY THE NEW SCREWS FOR DESIGN AND REPLACEMENT. DASH NUMBERS REPRESENTING OLD AND NEW SCREWS ARE IDENTICAL, MAKING IT UNNECESSARY TO PREPARE AN INTERCHANGEABILITY TABLE.

(F) DENOTES CHANGES

PA	INTERNATIONAL INTEREST	TITLE
AR		SCREW, CAP, HEXAGON HEAD (FINISHED HEXAGON BOLT), ALLOY STEEL, GRADE 8, ZINC COATED, UNF 2A, PLAIN AND SELF LOCKING (F)
99		
FF-S-85	SEE NOTE 12	

MILITARY STANDARD
MS90727

SHEET 5

USER ACTIVITIES
ME MU PA CL WV OB MC NSA

REVIEWER ACTIVITIES
AT AV M IEA

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AMSC N/A

DD 672-1

5305-1747

TABLE 11

NOMINAL SIZE			3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2
B	THREAD	UNF-2A	16	14	12	12	12	12	12
D	BODY DIAMETER	MAX MIN	.7500 .7410	.8750 .8660	1.0000 .9900	1.1250 1.1140	1.2500 1.2390	1.3750 1.3630	1.5000 1.4880
F	WIDTH ACROSS FLATS	MAX MIN	1.1250 1.1000	1.3125 1.2850	1.5000 1.4690	1.6875 1.6310	1.8750 1.8120	2.0625 1.9940	2.2500 2.1750
G	WIDTH ACROSS CORNERS	MAX MIN	1.299 1.254	1.516 1.465	1.732 1.675	1.949 1.859	2.165 2.066	2.382 2.273	2.598 2.480
H	HEAD HEIGHT	MAX MIN	.483 .455	.563 .531	.627 .591	.718 .658	.813 .749	.878 .810	.974 .902
R	RADIUS	MAX MIN	.045 .020	.065 .040	.095 .060	.095 .060	.095 .060	.095 .060	.095 .060
* MIN TENSILE STRENGTH - LBS			56,000	76,400	99,400	128,400	161,000	197,200	237,200

L LENGTH	TOLERANCE		DASH NO.	DASH** NO.	DASH NO.	DASH NO.	DASH NO.	DASH NO.	DASH NO.
	SIZE .750	SIZE .875 AND OVER							
.750			179						
.875			180	202					
1.000	+0 -.031	+0 -.062	181	201	224				
1.125			182	204	225	245			
1.250			183	205	226	246	265		
1.375			184	206	227	247	266	284	
1.500	+0 -.062	+0 -.125	185	207	228	248	267	285	302
1.750			186	208	229	249	268	286	303
2.000			187	209	230	250	269	287	304
2.250			188	210	231	251	270	288	305
2.500			189	211	232	252	271	289	306
2.750			190	212	233	253	272	290	307
3.000			191	213	234	254	273	291	308
3.250			192	214	235	255	274	292	309
3.500			193	215	236	256	275	293	310
3.750	+0 -.094	+0 -.188	194	216	237	257	276	294	311
4.000			195	217	238	258	277	295	312
4.250			196	218	239	259	278	296	313
4.500			197	219	240	260	279	297	314
4.750			198	220	241	261	280	298	315
5.000			199	221	242	262	281	299	316
5.500			200	222	243	263	282	300	317
6.000			201	223	244	264	283	301	318

NOTES:

- MATERIAL: ALLOY STEEL, GRADE 8, IN ACCORDANCE WITH PROCUREMENT SPECIFICATION.
- (F)** PROTECTIVE COATING: ZINC COATING IN ACCORDANCE WITH PROCUREMENT SPECIFICATION.
- THREADS: THE THREADS SHALL BE IN ACCORDANCE WITH SCREW-THREAD STANDARDS FOR FEDERAL SERVICES, HANDBOOK H28.
- THREAD LENGTH: MINIMUM THREAD LENGTH SHALL BE TWICE THE DIAMETER PLUS 1/4 INCH. THE TOLERANCE SHALL BE PLUS 3/16 INCH OR 2-1/2 THREADS, WHICHEVER IS GREATER. ON SCREWS THAT ARE TOO SHORT FOR MINIMUM THREAD LENGTHS, THE DISTANCE FROM THE BEARING SURFACE OF THE HEAD TO THE FIRST COMPLETE THREAD SHALL NOT EXCEED THE LENGTH OF 1-1/2 THREADS FOR SIZES UP TO AND INCLUDING 1 INCH AND 3-1/2 THREADS FOR SIZES LARGER THAN 1 INCH.
- DIMENSIONS: ALL DIMENSIONS ARE IN INCHES, UNLESS OTHERWISE SPECIFIED.
- HEAD MARKING: HEADS SHALL BE MARKED IN ACCORDANCE WITH MIL-HDBK-211. RAISED MARKINGS ARE PREFERRED, STAMPINGS ARE ACCEPTABLE.

PA	INTERNATIONAL INTEREST	TITLE
AR		SCREW, CAP, HEXAGON HEAD (FINISHED HEXAGON BOLT), ALLOY STEEL, GRADE 8, ZINC COATED, UNF-2A, PLAIN AND SELF-LOCKING
Other Code	99	
PROCUREMENT SPECIFICATION	SUPPLEMENT	
FF-S-85		SEE NOTE 12

MILITARY STANDARD
MS90727

SHEET 2 OF 5

5305-1747

FOR CHANGES SEE SHEETS 1, 2, 3, 4, AND 5
REVISED
A 1 AUG 67 B 14 OCT 68 C 1 MAY 1969 D 22 OCT 1970 E

APPROVED 6 MAY 63

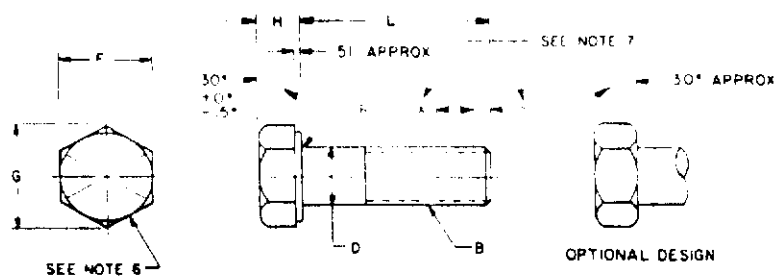
7. SELF-LOCKING ELEMENT:
- (a) THE SELF-LOCKING ELEMENT SHALL BE A LATHE TYPE OR LONGITUDINAL SETUP IN ACCORDANCE WITH MIL-F-18240.
 - (b) FOR "X" AND "Y" DIMENSIONS AND DESIGN AND USAGE LIMITATIONS, SEE MS19981.
 - (c) MAXIMUM RING GAGE DIAMETER THAT LOCKING REGION OF SCREW MUST PASS THRU FREELY OR WITH FINGER PRESSURE SHALL BE THE NOMINAL SIZE PLUS 0.010.
8. PART NUMBER: THE MS PART NUMBER CONSISTS OF THE MS NUMBER, PLUS THE DASH NUMBER. FOR SCREWS WITH SELF-LOCKING ELEMENT ADD THE LETTER "L" AFTER THE DASH NUMBER.
- EXAMPLE: MS90727-1 PLAIN SCREW.
MS90727-1L SELF-LOCKING SCREW.
- *9. BASED ON MINIMUM ULTIMATE TENSILE STRENGTH OF 150,000 P.S.I., TENSILE STRENGTHS ARE CALCULATED BY THE STRESS AREAS INDICATED IN SCREW-THREAD STANDARDS FOR FEDERAL SERVICES, HANDBOOK H28.
 - 10. REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATIONS FOR BID.
 - 11. FOR DESIGN FEATURE PURPOSES, THIS STANDARD TAKES PRECEDENCE OVER PROCUREMENT DOCUMENTS REFERENCED HEREIN.
 - 12. SUPERSEDES: MS35307 IN PART, MS35304 AND MS35306, EXCISE, EXCISE IN PART, BOLX4, SUBX17, 17.1, 18, 18.1, 19 AND 19.1.
 - *13. INACTIVE FOR NEW DESIGN AFTER 21 JUNE 1976.
 - (F) 14. THIS MILITARY STANDARD IS NOT INTENDED FOR USE IN AIRBORNE APPLICATIONS.

RE CHANGES SEE SUPPLIES 2, 3, 4, AND 5

(A) 1 AUG 67 (B) 14 OCT 68 (C) 1 MAY 1969 (D) 29 OCT 1970

APPROVED 6 MAY 63 REVISED

PA	AR	INTERNATIONAL INTEREST	FILE	SCREW, CAP, HEXAGON HEAD (FINISHED HEXAGON BOLT), ALLOY STEEL, GRADE 8, ZINC COATED, UNF-2A, PLAIN AND SELF-LOCKING (F)	MILITARY STANDARD
Other Cost	99				MS90727
PROCUREMENT SPECIFICATION	FF-S-85	SUPERSEDES	SEE NOTE 12	SHEET	OF
				3	5



FEPS SHEET CLASS
5305

TABLE 1
METRIC TRANSFORMATION OF TABLE 1

NOMINAL SIZE	MM	6.350	7.938	9.525	11.112	12.700	14.288	15.875
B THREAD PITCH		0.907	1.056	1.056	1.270	1.270	1.411	1.411
D BODY DIAMETER	MAX MIN	6.350 6.223	7.938 7.785	9.525 9.373	11.112 10.935	12.700 12.522	14.288 14.084	15.875 15.672
F WIDTH ACROSS FLATS	MAX MIN	11.112 10.871	12.700 12.427	14.288 13.995	15.875 15.545	17.463 17.094	19.050 18.694	20.638 20.269
G WIDTH ACROSS CORNERS	MAX MIN	12.627 12.395	14.196 13.948	15.750 15.495	17.304 16.929	18.858 18.436	20.412 20.014	21.966 21.595
H HEAD HEIGHT	MAX MIN	4.140 3.810	5.059 4.953	6.172 5.740	7.391 6.909	8.204 7.671	9.423 8.839	10.236 9.601
R RADIUS	MAX MIN	.635 .381	.635 .381	.635 .381	.635 .381	.635 .381	1.143 .508	1.143 .508
* MIN TENSILE STRENGTH-KN		24.525	39.150	59.400	80.100	108.000	136.800	172.800
L LENGTH	TOLERANCE	DASH NO.	DASH NO.	DASH NO.	DASH NO.**	DASH NO.	DASH NO.**	DASH NO.
9.525		1	27	53				
11.125		2	28	54	79			
12.700		3	29	55	80	104		
14.275	+0 -1.787	4	30	56	81	105	130	
15.875		5	31	57	82	106	131	155
19.050		6	32	58	83	107	132	156
22.225		7	33	59	84	108	133	157
25.400		8	34	60	85	109	134	158
28.575		9	35	61	86	110	135	159
31.750	+0 -1.575	10	36	62	87	111	136	160
34.925		11	37	63	88	112	137	161
38.100		12	38	64	89	113	138	162
44.450		13	39	65	90	114	139	163
50.800		14	40	66	91	115	140	164
57.150		15	41	67	92	116	141	165
63.500		16	42	68	93	117	142	166
69.850		17	43	69	94	118	143	167
76.200		18	44	70	95	119	144	168
82.550		19	45	71	96	120	145	169
88.900	+0 -2.388	20	46	72	97	121	146	170
95.250		21	47	73	98	122	147	171
101.600		22	48	74	99	123	148	172
107.950		23	49	75	100	124	149	173
114.300		24	50	76	101	125	150	174
120.650		25	51	77	102	126	151	175
127.000		26	52	78	103	127	152	176
139.700						128	153	177
152.400						129	154	178

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS (mm), UNLESS OTHERWISE SPECIFIED AND ARE BASED ON AN APPROXIMATE CONVERSION FACTOR OF 25.4 mm EQUAL ONE INCH.
- FOR ADDITIONAL SIZES SEE SHEET 4.
- INACTIVE FOR NEW DESIGN AFTER 21 JUNE 1976.

PA AR INTERNATIONAL INTEREST
99

SCREW, CAP, HEXAGON HEAD (FINISHED HEXAGON BOLT), ALLOY STEEL, GRADE 8, ZINC COATED, UNF-2A, PLAIN AND SELF-LOCKING (F)

PROUREMENT SPECIFICATION SUPERSIDES
FF-S-85 SEE NOTE 12

MILITARY STANDARD
MS90727

SHEET 4 5

REVISOR (A) 1 AUG 1967 (B) 14 OCT 1968 (C) 1 MAY 1969 (D) 22 OCT 1970 (E) FOR CHANGES SEE SHEETS 1,2,3,4, AND 5

APPROVED 6 MAY 63

TABLE IV
METRIC TRANSLATION OF TABLE II

NOMINAL SIZE		MM	19.050	22.225	25.400	28.575	31.750	34.925	38.100
B	THREAD PITCH		1.588	1.814	2.117	2.117	2.117	2.117	2.117
D	BODY DIAMETER	MAX MIN	19.050 18.821	22.225 21.996	25.400 25.146	28.575 28.296	31.750 31.471	34.925 34.620	38.100 37.795
F	WIDTH ACROSS FLATS	MAX MIN	28.575 27.940	33.336 32.639	38.100 37.313	42.862 41.427	47.625 46.025	52.388 50.648	57.150 55.245
G	WIDTH ACROSS CORNERS	MAX MIN	32.995 31.852	38.506 37.211	43.994 42.545	49.505 47.219	54.991 52.476	60.503 57.734	65.989 62.992
H	HEAD HEIGHT	MAX MIN	12.268 11.557	14.300 13.487	15.926 15.011	18.237 16.713	20.650 19.025	22.301 20.574	24.740 22.911
R	RADIUS	MAX MIN	1.143 .508	1.651 1.016	2.413 1.524	2.413 1.524	2.413 1.524	2.413 1.524	2.413 1.524
**MIN TENSILE STRENGTH-KN			252.500	343.800	447.300	572.800	724.500	867.400	1067.400
L LENGTH	TOLERANCE		DASH NO.	DASH** NO.	DASH NO.	DASH NO.	DASH NO.	DASH NO.	DASH NO.
	SIZE 19.050	SIZE 22.225 AND OVER							
19.050 22.225 25.400	+0 -1.787	+0 -1.575	179 180 181	202 203	224				
28.575 31.750 34.925 38.100 44.450 50.800	+0 -1.575	+0 -3.175	182 183 184 185 186 187	204 205 206 207 208 209	225 226 227 228 229 230	245 246 247 248 249 250	265 266 267 268 269	284 285 286 287	302 303 304
57.150 63.500 69.850 76.200 82.550			188 189 190 191 192	210 211 212 213 214	231 232 233 234 235	251 252 253 254 255	270 271 272 273 274	288 289 290 291 292	305 306 307 308 309
88.900 95.250 101.600 107.950 114.300	+0 -2.386	+0 -4.775	193 194 195 196 197	215 216 217 218 219	236 237 238 239 240	256 257 258 259 260	275 276 277 278 279	293 294 295 296 297	310 311 312 313 314
120.650 127.000 139.700 152.400			198 199 200 201	220 221 222 223	241 242 243 244	261 262 263 264	280 281 282 283	298 299 300 301	315 316 317 318

NOTE:

- ALL DIMENSIONS ARE IN MILLIMETERS (mm), UNLESS OTHERWISE SPECIFIED AND ARE BASED ON AN APPROXIMATE CONVERSION FACTOR OF 25.4 mm EQUAL ONE INCH.
- THREAD LENGTH: MINIMUM THREAD LENGTH SHALL BE TWICE THE DIAMETER PLUS 6.350 mm. THE TOLERANCE SHALL BE PLUS 4.775 mm ON 2-1/2 THREADS, WHICHEVER IS GREATER. ON SCREWS THAT ARE TOO SHORT FOR MINIMUM THREAD LENGTH, THE DISTANCE FROM THE BEARING SURFACE OF THE HEAD TO THE FIRST COMPLETE THREAD SHALL NOT EXCEED THE LENGTH OF 2-1/2 THREADS FOR SIZES UP TO AND INCLUDING 25.400 mm. (1 INCH). FOR SIZES EXCEEDING 25.400 mm.

*** INACTIVE FOR NEW DESIGN AFTER 21 JUNE 1976.

PA	AR	INTERNATIONAL INTEREST	TITLE	MILITARY STANDARD
Other Cust	99		SCREW, CAP, HEXAGON HEAD (FINISHED HEXAGON BOLT), ALLOY STEEL, GRADE 8, ZINC COATED, UNF 2A, PLAIN AND SELF-LOCKING (F)	MS90727
PROCUREMENT SPECIFICATION	SUPERSEDES	FF-S-85	SEE NOTE 12	SHEET 5 OF 5

USER ACTIVITIES:
ME MU PA CL WV OB MC NSAREVIEWER ACTIVITIES:
AT AV MI EAThis military standard is approved for use by all Departments and Agencies of the Department of Defense
Selection for all new engineering and design applications and for repetitive use shall be made from this
document when applicable