

TABLE I

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		5,450	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	+0 -.094	15	41	67	92	116	141	165
2.500		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	123	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.

(E) For changes see sheets 1, 2, 3 and 4.

P.A. VC Other Case 82	TITLE SCREW, CAP, HEXAGON HEAD (FINISHED HEXAGON BOLT), ALLOY STEEL, GRADE 8, CADMIUM PLATED, UNF-2A, (E) PLAIN AND SELF LOCKING	MILITARY STANDARD <b>MS90727</b>
PROCUREMENT SPECIFICATION FF-S-85	SUPERSEDES: See note 12	SHEET 1 OF 4

REVIEWER: AT AV MI DA  
 USER: ME MU PA CE UV OS MC MRA

This study 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.

APPROVED 6 MAY 63 REVISED 1 AUG 67 14 OCT 68 1 MAY 1969 22 OCT 1970 21 JUNE 1978

TABLE II							FED. SUP CLASS 5305	
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 #	DASH NO.	DASH NO.	DASH NO.	DASH NO.	DASH NO.
	SIZE .750	SIZE .875 AND OVER							
.750			179						
.875	+0	+0	180	202					
1.000	-.031	-.062	181	203	224				
1.125			182	204	225	245			
1.250			183	205	226	246	265		
1.375	+0	+0	184	206	227	247	266	284	
1.500	-.062	-.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	+0	194	216	237	257	276	294	311
4.000	-.094	-.189	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.
- PROTECTIVE COATING: Cadmium plating 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 2-1/2 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-131. Raised markings are preferred, stampings are acceptable.
- SELF-LOCKING ELEMENT: (a) The self-locking element shall be a patch type or longitudinal strip in accordance with MIL-F-18240.  
(b) For "X" and "Y" dimensions and design and usage limitations, see MS15981.  
(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.
- 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.
- 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.
- Referenced documents shall be of the issue in effect on date of invitations for bid.
- For design feature purposes, this standard takes precedence over procurement documents referenced herein.
- Supersedes: MS35302 in part, MS35304 and MS35306, BCX18, BCX17 in part, BQLI4, BUXI17, 17.1, 18.18.1.19 and 19.1.
- \* 13. INACTIVE FOR NEW DESIGN AFTER 21 JUNE 1976.

P.P. h. Other Code 82	TITLE	MILITARY STANDARD
	SCREW, CAP, HEXAGON HEAD (FINISHED HEXAGON BOLT), ALLOY STEEL, GRADE 8, CADMIUM PLATED, UNF-2A, PLAIN AND SELF LOCKING	MS90727
PROCUREMENT SPECIFICATION FF-S-85	SUPERSEDES: See note 12.	SHEET 2 OF 4

REVIEWER: AE AY AE BA  
UMER: ME NU PA QZ WY CB MC RBA

This 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.

APPROVED 6 MAY 63 REVISED 1 AUG 67 14 OCT 68 22 OCT 1970 FOR CHANGES SEE SHEETS 1, 2, 3, AND 4

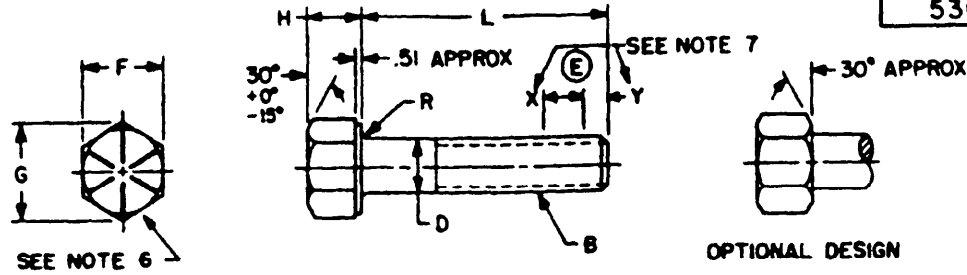


TABLE III  
METRIC TRANSLATION OF TABLE I

NOMINAL SIZE	MM	6.350	7.938	9.525	11.112	12.700	14.288	15.875
B THREAD PITCH	(E)	0.907	1.058	1.058	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 12.421	14.288 13.995	15.875 15.545	19.050 18.694	20.638 20.269	23.812 23.419
G WIDTH ACROSS CORNERS	MAX MIN	12.827 12.395	14.656 14.148	16.510 15.951	18.339 17.729	21.996 21.336	23.825 23.114	27.508 26.695
H HEAD HEIGHT	MAX MIN	4.140 3.810	5.359 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
(R) * 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 11.125 12.700 14.275	+0 -.787	1 2 3 4	27 28 29 30	53 54 55 56	(P) 79 80 81	104 105	(R) 130	
15.875 19.050 22.225 25.400		5 6 7 8	31 32 33 34	57 58 59 60	82 83 84 85	106 107 108 109	131 132 133 134	155 156 157 158
28.575 31.750 34.925 38.100 44.450 50.800	+0 -1.575	9 10 11 12 13 14	35 36 37 38 39 40	61 62 63 64 65 66	86 87 88 89 90 91	110 111 112 113 114 115	135 136 137 138 139 140	159 160 161 162 163 164
57.150 63.500 69.850 76.200 82.550		15 16 17 18 19	41 42 43 44 45	67 68 69 70 71	92 93 94 95 96	116 117 118 119 120	141 142 143 144 145	165 166 167 168 169
88.900 95.250 101.600 107.950 114.300	+0 -2.388	20 21 22 23 24	46 47 48 49 50	72 73 74 75 76	97 98 99 100 101	121 122 123 124 125	146 147 148 149 150	170 171 172 173 174
120.650 127.000 139.700 152.400		25 26	51 52	77 78	102 103	126 127 128 129	151 152 153 154	175 176 177 178

NOTE:

- All dimensions are in millimetres (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.

(E) 003. INACTIVE FOR NEW DESIGN AFTER 21 JUNE 1976.

REVIEWER: AS AV RC ZA  
 UNDER: ME NU PA QZ VT CB RC NHA  
 This 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.

APPROVED 6 MAY 1963 REVISED (A) 1 AUG 1967 (B) 14 OCT 1968 (C) 1 MAY 1969 (D) 22 OCT 1970 (E) FOR CHANGES SEE SHEETS 1, 2, 3, AND 4

P.A. WC Other Case 82	TITLE SCREW, CAP, HEXAGON HEAD (FINISHED HEXAGON BOLT), ALLOY STEEL, GRADE 8, CADMIUM PLATED, UNF-2A, (E) PLAIN AND SELF LOCKING	MILITARY STANDARD <b>MS90727</b>
PROCUREMENT SPECIFICATION 77-S-85	REPLACES: See note 12	SHEET 3 OF 4

TABLE III  
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 (E)		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	33.338 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	43.993 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
(E) MIN TENSILE STRENGTH-KN		252.000	343.800	447.300	577.800	724.500	887.400	1067.400
L LENGTH	TOLERANCE		DASH NO.	DASH NO. (E)	DASH NO.	DASH NO.	DASH NO.	DASH NO.
	SIZE 19.050	SIZE 22.225 AND OVER						
19.050	+0	+0	179	202 203	224	245	265	284
22.225	-.787	-1.575	180					
25.400			181					
28.575	+0 -1.575	+0 -3.175	182	204	225	246	266	285
31.750			183	205	226	247	267	286
34.925			184	206	227	248	268	287
38.100			185	207	228	249	269	288
44.450			186	208	229	250	270	289
50.800			187	209	230	251	271	290
57.150	+0 -2.388	+0 -4.775	188	210	231	252	272	291
63.500			189	211	232	253	273	292
69.850			190	212	233	254	274	293
76.200			191	213	234	255	275	294
82.550			192	214	235	256	276	295
88.900			193	215	236	257	277	296
95.250	194	216	237	258	278	297		
101.600	195	217	238	259	279	298		
107.950	196	218	239	260	280	299		
114.300	197	219	240	261	281	300		
120.650	198	220	241	262	282	301		
127.000	199	221	242	263	283			
139.700	200	222	243	264				
152.400	201	223	244					

NOTE:

- All dimensions are in millimetres (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 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 2-1/2 threads for sizes up to and including 25.400 mm and 3-1/2 threads for sizes larger than 25.400 mm.

(E) (E) 3. INACTIVE FOR NEW DESIGN AFTER 21 JUNE 1976.

U.S. GOVERNMENT PRINTING OFFICE: 1976-803-766/5000

This 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.

P.A. 6C Other Case 82	TITLE SCREW, CAP, HEXAGON HEAD (FINISHED HEXAGON BOLT), ALLOY STEEL, GRADE 8, CADMIUM PLATED, UNF-2A, (E) PLAIN AND SELF LOCKING	MILITARY STANDARD <b>MS 90727</b>
PROCUREMENT SPECIFICATION FF-S-85	SUPERSEDES See note 12	SHEET 4 OF 4

APPROVED 6 MAY 1963 REVISED (A) 1 AUG 1967 (B) 14 OCT 1968 (C) 1 MAY 1969 (D) 22 OCT 1970 (E) FOR CHANGES SEE SHEETS 1, 2, 3, AND 4