SPS TECHNOLOGIES

DRAWING NUMBER SPS-B-94702
ISSUE DATE 11/18/96
REVISION (9) 10/13/04

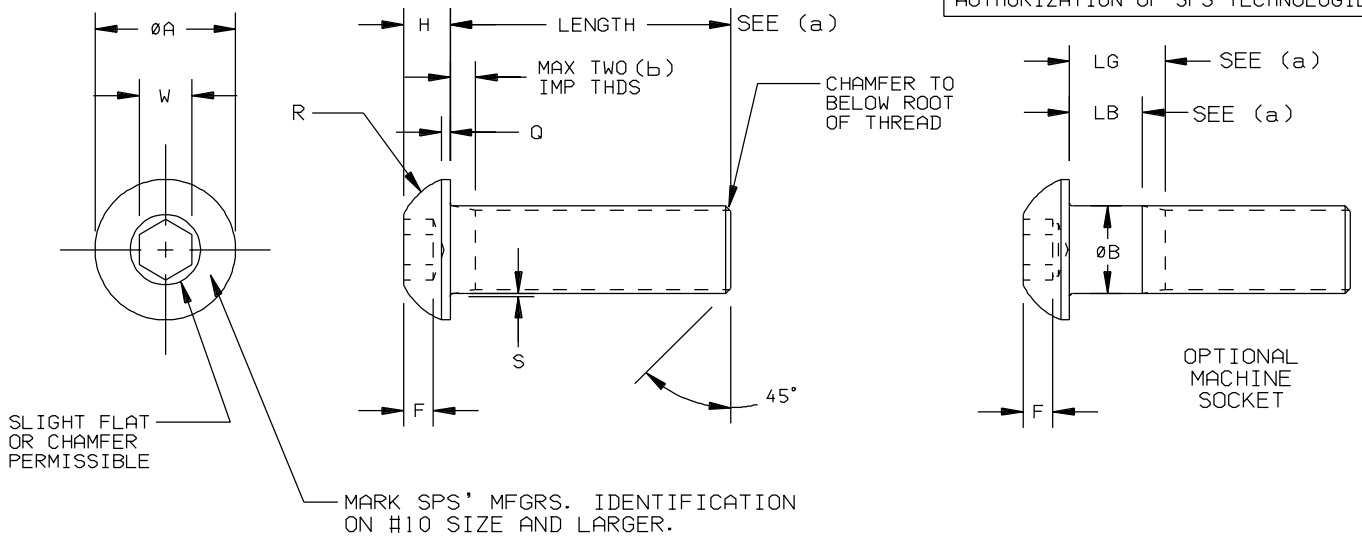

TABLE I

DASH NO	SIZE	THREAD DESIGNATION				ØA		ØB		F	H		L	Q	R	S	
		UNRF	CLASS	UNRC	CLASS	MAX	MIN	MAX	MIN	MIN	MAX	MIN	(a)	REF	REF	MAX	MIN
90	#0	.060-80	3A			.114	.104	.060	.0568	.020	.032	.026	.500	.010	.070	.010	.005
91	#1	.073-72	3A	.073-64	3A	.139	.129	.073	.0695	.028	.039	.033	.500	.010	.080	.010	.005
92	#2	.086-64	3A	.086-56	3A	.164	.154	.086	.0822	.028	.046	.038	.500	.010	.099	.010	.005
93	#3	.099-56	3A	.099-48	3A	.188	.176	.099	.0949	.035	.052	.044	.500	.010	.110	.010	.005
94	#4	.112-48	3A	.112-40	3A	.213	.201	.112	.1075	.035	.059	.051	.500	.015	.135	.010	.005
95	#5	.125-44	3A	.125-40	3A	.238	.226	.125	.1202	.044	.066	.058	.500	.015	.141	.010	.005
96	#6	.138-40	3A	.138-32	3A	.262	.250	.138	.1329	.044	.073	.063	.625	.015	.158	.010	.005
98	#8	.164-36	3A	.164-32	3A	.312	.298	.164	.1585	.052	.087	.077	.750	.015	.185	.015	.010
3	#10	.190-32	3A	.190-24	3A	.361	.347	.190	.1840	.070	.101	.091	1.000	.020	.213	.015	.010
4	1/4"	.250-28	3A	.250-20	3A	.437	.419	.250	.2435	.087	.132	.122	1.000	.031	.249	.020	.015
5	5/16"	.312-24	3A	.312-18	3A	.547	.527	.3125	.3053	.105	.166	.152	1.000	.031	.309	.020	.015
6	3/8"	.375-24	3A	.375-16	3A	.656	.636	.375	.3678	.122	.199	.185	1.250	.031	.368	.020	.015
8	1/2"	.500-20	3A	.500-13	3A	.875	.851	.500	.4919	.175	.265	.245	2.000	.046	.481	.030	.020
10	5/8"	.625-18	3A	.625-11	3A	1.000	.970	.625	.6163	.210	.331	.311	2.000	.062	.523	.030	.020

(a) FOR SCREWS OF NOMINAL LENGTHS EQUAL TO OR SHORTER THAN STANDARD MAXIMUM LENGTH "L" LISTED IN TABLE I, THE COMPLETE (FULL-FORM) THREADS, MEASURED WITH A THREAD RING GAGE HAVING THE THREAD CHAMFER AND/OR COUNTERBORE REMOVED, SHALL EXTEND TO WITHIN TWO PITCHES (THREADS) OF THE BEARING SURFACE OF THE HEAD. FOR LONGER SCREWS, THE LENGTH OF THE COMPLETE THREAD SHALL, AT THE OPTION OF THE MANUFACTURER, BE BETWEEN THE MINIMUM LIMIT OF TWICE THE BASIC SCREW DIAMETER PLUS 0.50 INCH AND THE MAXIMUM LIMIT WITHIN TWO PITCHES (THREADS) OF THE HEAD. THE UNTHREADED PORTION OF THE SCREWS SHALL BE AT NOMINAL DIAMETER.

(b) IMPERFECT THREADS NOT TO ENTER INTO FILLET AREA.

TABLE II

LENGTH TOLERANCE TABLE		
UP TO 1" INCL.	OVER 1" TO 2" INCL.	OVER 2"
-.03	-.04	-.06

TABLE III

SIZE	TENSILE STRENGTH IN POUNDS (c)		RECOMMENDED SEATING TORQUE IN INCH POUNDS PLAIN (d)		DOUBLE SHEAR STRENGTH OF BODY LBS. (REF ONLY)	W NOM	X (e)
	UNRC	UNRF	UNRC	UNRF			
#0	---	270	---	1.5	540	.035	.005
#1	390	390	2.5	2.5	800	.050	.005
#2	560	560	4.5	4.5	1,110	.050	.005
#3	730	730	7.0	7.0	1,480	.0625	.005
#4	970	1,060	8.0	8.0	1,890	.0625	.005
#5	1,270	1,330	12.0	13.0	2,360	.0781	.005
#6	1,450	1,620	15.0	17.0	2,880	.0781	.005
#8	2,240	2,360	30.0	31.0	4,060	.0937	.006
#10	2,800	3,200	40.0	45.0	5,440	.1250	.007
1/4"	5,090	5,820	100.0	110.0	9,420	.1562	.009
5/16"	8,380	9,280	200.0	220.0	14,720	.1875	.011
3/8"	12,400	14,000	350.0	400.0	21,200	.2187	.013
1/2"	22,700	25,600	850.0	1,000.0	37,700	.3125	.018
5/8"	36,200	41,000	1,700.0	1,900.0	58,900	.3750	.021

THE RECOMMENDED SEATING TORQUES LISTED SERVE AS GUIDELINES ONLY. EVEN WHEN USING THE RECOMMENDED SEATING TORQUES, THE INDUCED LOADS OBTAINED MAY VARY AS MUCH AS ±25% DEPENDING UPON THE UNCONTROLLED VARIABLES SUCH AS MATING MATERIAL, PLATING, LUBRICATION, SURFACE FINISH, HARDNESS, BOLT/JOINT COMPLIANCE, METHOD OF TIGHTENING, ETC.

HOWEVER, THE BEST WAY TO DETERMINE THE CORRECT TORQUE IS TO RUN TESTS ON THE PARTICULAR JOINT BY TIGHTENING SAMPLE BOLTS UNTIL THEY JUST BEGIN TO YIELD. THE OPTIMUM TORQUE IS 80% OF THIS VALUE.

(c) THE TENSILE STRENGTH IS BASED ON 160 KSI STRESS LEVEL AND THE AREA PER ASME B1.1
(d) TORQUE VALUES LISTED ARE FOR PLAIN SCREWS. FOR CADMIUM PLATED SCREWS, MULTIPLY RECOMMENDED SEATING TORQUE BY .75; FOR ZINC PLATED SCREWS MULTIPLY BY 1.40
(e) RUNOUT - SOCKET TO BODY WITHIN "X" T.I.R.

TOLERANCES ±.010 AND ±2° SURFACE ROUGHNESS 125 UNLESS OTHERWISE NOTED	FSCM NO. 56878 CUSTODIAN: JENKINTOWN, PA.	TITLE: SCREW, BUTTON HEAD HEXAGON RECESS ALLOY STEEL, 160 KSI U.T.S.	STANDARDS AND SPECIFICATIONS FF-S-86 EXCEPT AS NOTED
DRAFTED IN ACCORDANCE WITH ANSI Y14.5M-1982			PART NUMBER: 94702( )-( )( )-( )( )
DRAWN BY: STEVE FOSTER	DATE: 11/18/96		
APPROVED: S FOSTER	DATE: 10/14/04		SHEET 1 OF 2
APPROVED: F CICCARONE			

SPS TECHNOLOGIES

DRAWING NUMBER SPS-B-94702

ISSUE DATE 11/18/96

REVISION
1 4/08/97
2 6/14/97
3 9/16/97
4 3/23/98
5 11/12/99
6 1/12/2001
7 3/26/2001
8 3/07/03
9 10/13/04

TABLE IV

FOR LENGTHS SHORTER THAN LISTED, (LENGTHS ABOVE HEAVY LINE) SCREWS WILL BE THREADED TO WITHIN 3 THREAD PITCHES OF THE HEAD.

BODY AND GRIP LENGTHS FOR FLAT HEAD SOCKET SCREWS

SIZE	#0		#1		#2		#3		#4		#5		#6		#8		#10	
NOM. LENGTH	L_G	L_B	L_G	L_B	L_G	L_B	L_G	L_B	L_G	L_B	L_G	L_B	L_G	L_B	L_G	L_B	L_G	L_B
3/4	0.250	0.190																
7/8	0.250	0.190	0.250	0.170	0.250	0.160	0.250	0.150										
1	0.500	0.440	0.250	0.170	0.250	0.160	0.250	0.150										
1-1/4	0.750	0.690	0.620	0.550	0.620	0.540	0.620	0.520	0.500	0.380	0.500	0.380	0.500	0.340	0.380	0.220		
1-1/2			0.880	0.800	0.880	0.790	0.880	0.770	0.500	0.380	0.500	0.380	0.500	0.340	0.380	0.220	0.620	0.420
1-3/4					1.120	1.040	1.120	1.020	1.000	0.880	1.000	0.880	1.000	0.840	0.880	0.720	0.620	0.420
2							1.380	1.270	1.000	0.880	1.000	0.880	1.000	0.840	0.880	0.720	1.120	0.920
2-1/4									1.500	1.380	1.500	1.380	1.500	1.340	1.380	1.220	1.120	0.920
2-1/2													1.500	1.340	1.380	1.220	1.620	1.420
2-3/4													2.000	1.840	1.880	1.720	1.620	1.420
3															1.880	1.720	2.120	1.920
3-1/4															2.380	2.222	2.120	1.920
3-1/2																	2.620	2.420
3-3/4																	2.620	2.420
4																	3.120	2.920

SIZE	1/4		5/16		3/8		7/16		1/2		5/8	
NOM. LENGTH	L_G	L_B	L_G	L_B	L_G	L_B	L_G	L_B	L_G	L_B	L_G	L_B
1-3/4	0.750	0.500										
2	0.750	0.500	0.880	0.600								
2-1/4	1.250	1.000	0.880	0.600	1.000	0.690						
2-1/2	1.250	1.000	1.380	1.100	1.000	0.690	1.120	0.770	1.000	0.620		
2-3/4	1.750	1.500	1.380	1.100	1.500	1.190	1.120	0.770	1.000	0.620		
3	1.750	1.500	1.880	1.600	1.500	1.190	1.620	1.270	1.000	0.620		
3-1/4	2.250	2.000	1.880	1.600	2.000	1.690	1.620	1.270	1.750	1.360	1.500	1.040
3-1/2	2.250	2.000	2.380	2.100	2.000	1.690	2.120	1.770	1.750	1.360	1.500	1.040
3-3/4	2.750	2.500	2.380	2.100	2.500	2.190	2.120	1.770	1.750	1.360	1.500	1.040
4	2.750	2.500	2.880	2.600	2.500	2.190	2.620	2.270	2.500	2.120	2.250	1.800
4-1/4	3.250	3.000	2.880	2.600	3.000	2.690	2.620	2.270	2.500	2.120	2.250	1.800
4-1/2	3.250	3.000	3.380	3.100	3.000	2.690	3.120	2.770	2.500	2.120	2.250	1.800
4-3/4	3.750	3.500	3.380	3.100	3.500	3.190	3.120	2.770	3.250	2.860	3.000	2.540
5	3.750	3.500	3.880	3.600	3.500	3.190	3.620	3.270	3.250	2.860	3.000	2.540
5-1/4	4.250	4.000	3.880	3.600	4.000	3.690	3.620	3.270	3.250	2.860	3.000	2.540
5-1/2			4.380	4.100	4.000	3.690	4.120	3.770	4.000	3.620	3.750	3.300
5-3/4			4.380	4.100	4.500	4.190	4.120	3.770	4.000	3.620	3.750	3.300
6			4.880	4.600	4.500	4.190	4.620	4.270	4.000	3.620	3.750	3.300
6-1/4			4.880	4.600	5.000	4.690	4.620	4.270	4.750	4.360	4.500	4.040
6-1/2			5.380	5.100	5.000	4.690	5.120	4.770	4.750	4.360	4.500	4.040
6-3/4					5.500	5.190	5.120	4.770	4.750	4.360	4.500	4.040
7					5.500	5.190	5.620	5.270	5.500	5.120	5.250	4.800
7-1/4					6.000	5.690	5.620	5.270	5.500	5.120	5.250	4.800
7-1/2					6.000	5.690	6.120	5.770	5.500	5.120	5.250	4.800
7-3/4					6.500	6.190	6.120	5.770	6.250	5.860	6.000	5.540
8							6.620	6.270	6.250	5.860	6.000	5.540
8-1/2							7.120	6.770	7.000	6.620	6.750	6.300
9							7.620	7.270	7.000	6.620	6.750	6.300
9-1/2							8.120	7.770	8.000	7.620	7.750	7.300
10									8.000	7.620	7.750	7.300
11											9.250	8.800
12											10.250	9.800

1. MATERIAL: ALLOY STEEL PER CHEMISTRY OF ASTM A574.
2. HEAT TREATMENT: PER THE REQUIREMENTS OF ASTM A574.
3. FINISH: SEE NOTE 5.
4. DIMENSIONS, GEOMETRIC TOLERANCE PER ASME B18.3 - INCLUDING MANUFACTURING NOTES NOT LISTED IN THIS DRAWING.
5. PART NUMBERING: 94702 ( ) - ( ) ( ) - ( ) ( )

- FINISH = B-CHEMICAL BLACK OXIDE PER MIL-DTL-13924.
  C-CADMIUM PLATE PER AMS-QQ-P-416, TYPE I, CLASS 3.
  D-CADMIUM PLATE PER AMS-QQ-P-416, TYPE II, CLASS 3.
  H-CADMIUM PLATE PER AMS-QQ-P-416, TYPE I, CLASS 2.
  J-CADMIUM PLATE PER AMS-QQ-P-416, TYPE II, CLASS 2. (YELLOW CHROMATE)
  M-CADMIUM PLATE PER AMS-QQ-P-416, TYPE II, CLASS 2 (OLIVE DRAB)
  S-SILVER PLATE PER AMS2410.
  U-ZINC PLATE PER ASTM B633 TYPE III SCI.
  Z-ZINC PLATE PER ASTM B633 TYPE II SCI.
  NO LETTER-THERMAL OXIDE (BLACK) PLUS RUST PREVENTATIVE OIL.
- = LENGTH IN SIXTEENTHS
- THREAD = C-COARSE, F-FINE
- = DASH NUMBER (BASIC DIAMETER)
- LOCKING FEATURE = NO LETTER-NO LOCKING FEATURE, E-TYPE P (PATCH) PER MIL-DTL-18240, K-TYPE N (PELLET) PER MIL-DTL-18240, TF-TRU-FLEX
- BASIC PART NUMBER

TOLERANCES ±.010 AND ±2° SURFACE ROUGHNESS 125 UNLESS OTHERWISE NOTED	DRAFTED IN ACCORDANCE WITH ANSI Y14.5M 1982	SPS TECHNOLOGIES	PART NUMBER: 94702( )-( )( )-( )( ) SHEET 2 OF 2