



TABLE I. DASH NUMBERS AND DIMENSIONS

NOMINAL SIZE	CARBON STEEL		PH BRZ OR TIN BRZ	NICKEL COPPER ALLOY	CRESS 300 SERIES	CRES 420	oA (ID)		oB (OD)	WASHER SECTION	
	CAD OR ZINC	PHOS					MIN	MAX		W WIDTH	C THICK ±1/2
	DASH NUMBERS						MIN	MAX	MAX	MIN	MIN 1/2
NO.2 (.086)	39	58	96	115	134	153	.088	.094	.172	.035	.020
NO.4 (.112)	40	59	97	116	135	154	.114	.120	.209	.040	.025
NO.6 (.138)	41	60	98	117	136	155	.141	.148	.250	.047	.031
NO.8 (.164)	42	61	99	118	137	156	.167	.174	.293	.055	.040
NO.10 (.180)	43	62	100	119	138	157	.193	.200	.334	.062	.047
1/4 (.250)	44	63	101	120	139	158	.252	.260	.487	.109	.062
5/16 (.312)	45	64	102	121	140	159	.314	.322	.583	.125	.078
3/8 (.375)	46	65	103	122	141	160	.377	.385	.680	.141	.094
7/16 (.437)	47	66	104	123	142	161	.440	.450	.776	.156	.109
1/2 (.500)	48	67	105	124	143	162	.502	.512	.889	.171	.125
9/16 (.562)	49	68	106	125	144	163	.564	.574	.965	.188	.141
5/8 (.625)	50	69	107	126	145	164	.628	.641	1.073	.203	.156
3/4 (.750)	51	70	108	127	146	165	.753	.766	1.265	.234	.168
7/8 (.875)	52	71	109	128	147	166	.878	.894	1.459	.266	.219
1 (1.000)	53	72	110	129	148	167	1.003	1.024	1.656	.297	.250
1-1/8 (1.125)	54	-	111	130	149	168	1.129	1.153	1.847	.328	.281
1-1/4 (1.250)	55	-	112	131	150	169	1.254	1.280	2.036	.359	.312
1-3/8 (1.375)	56	-	113	132	151	170	1.379	1.408	2.219	.391	.344
1-1/2 (1.500)	57	-	114	133	152	171	1.504	1.534	2.419	.422	.375

1/ SEE REQUIREMENT 4.

(L) DENOTES CHANGE(S)

INCH-POUND

PREPARING ACTIVITY: DLA - IS CUSTODIANS: ARMY- AR NAVY- AS AIR FORCE- 99 DLA- REVIEW: AT, AV, ER, GL, MC, ME, MI, NS, 82 USER: PROJECT NUMBER: 5310-1975	MILITARY SPECIFICATION SHEET TITLE WASHER, LOCK-SPRING, HELICAL, REGULAR (MEDIUM) SERIES	SPECIFICATION SHEET NUMBER MS35338 7 APR 94 REV L SUPERSEDING MS35338K 13 DEC 93 (SEE NOTE 2.) AMSC- N/A FSC 5310
DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.		Page 1 of 3

THE REQUIREMENTS FOR ACQUIRING THE PRODUCT(S) DESCRIBED HEREIN SHALL CONSIST OF THIS SPECIFICATION SHEET AND THE ISSUE OF THE FOLLOWING SPECIFICATION LISTED IN THAT ISSUE OF THE DODDS SPECIFIED IN THE SOLICITATION: ASME B18.2.1.1

THIS SPECIFICATION IS APPROVED FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE.

THE REQUIREMENTS FOR ACQUIRING THE PRODUCT(S) DESCRIBED HEREIN SHALL CONSIST OF THIS SPECIFICATION SHEET AND THE ISSUE OF THE FOLLOWING SPECIFICATION LISTED IN THAT ISSUE OF THE DODISS SPECIFIED IN THE SOLICITATION: ASME B18.21.1

THIS SPECIFICATION IS APPROVED FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE.

Form Approved
OMB No. 0704-0188

REQUIREMENTS:

1. MATERIAL:

- a. STEEL, CARBON, GRADE 1060 (UNS G10600) THRU 1080 (UNS G10800), IN ACCORDANCE WITH ASTM A29.
- b. CORROSION-RESISTANT STEEL (NON-MAGNETIC) WASHERS SHALL BE TYPE 316 (UNS S31600) THRU 1/4 (.250) AND TYPE 300 SERIES (UNS S30200 TO UNS S31600) FOR ALL OTHER SIZES, AND CORROSION-RESISTANT STEEL (MAGNETIC) WASHERS SHALL BE TYPE 420 (UNS S42000).
- c. PHOSPHOR BRONZE, COPPER ALLOY NO 510 (UNS C51000) IN ACCORDANCE WITH ASTM B159.
- d. TIN-BRASS, COMPOSITION 425 (UNS C42500) IN ACCORDANCE WITH ASTM B591.
- e. NICKEL-COPPER-ALUMINUM ALLOY, FORM 2 (UNS N05500) IN ACCORDANCE WITH QQ-N-286.

2. PROTECTIVE FINISHES:

- a. CARBON STEEL WASHERS:
 - 1. PHOSPHATE COATING SHALL BE IN ACCORDANCE WITH MIL-P-16232 TYPE I, CLASS 2.
 - 2. CADMIUM PLATING SHALL BE IN ACCORDANCE WITH QQ-P-416, TYPE II, CLASS 2, OR MIL-C-81562, TYPE II, CLASS 2.
OR MECHANICALLY DEPOSITED ZINC SHALL BE IN ACCORDANCE WITH MIL-C-81562, TYPE II, CLASS 6.
- b. CORROSION-RESISTANT STEEL WASHERS:
 - 1. PASSIVATION SHALL BE IN ACCORDANCE WITH QQ-P-35.
 - 2. BLACK OXIDE COATING (FOR CRES 300 SERIES ONLY) SHALL BE IN ACCORDANCE WITH MIL-C-13924, CLASS 4. (SEE REQUIREMENT 6).
- c. PHOSPHOR BRONZE AND TIN-BRASS WASHERS SHALL BE CADMIUM PLATED IN ACCORDANCE WITH QQ-P-416, TYPE II, CLASS 3. A MAGNET SHALL BE USED FOR DETECTION VERIFICATION PURPOSES TO DIFFERENTIATE BETWEEN CARBON STEEL WASHERS AND PHOSPHOR BRONZE AND TIN-BRASS WASHERS SPECIFIED HEREIN.
- d. NICKEL-COPPER-ALUMINUM ALLOY WASHERS - UNCOATED.

3. HARDNESS:

- a. CARBON STEEL WASHERS SHALL HAVE A HARDNESS OF 38 TO 46HRC.
- b. CORROSION-RESISTANT STEEL WASHERS TYPE 420 (UNS S42000) SHALL HAVE A HARDNESS OF 45-53HRC, AND TYPE 300 (UNS S3XXX) SERIES WASHERS SHALL HAVE A HARDNESS OF 35-43HRC.
- (L) c. PHOSPHOR BRONZE AND TIN-BRASS WASHERS SHALL HAVE A MINIMUM HARDNESS OF 90HRB.
- d. NICKEL-COPPER-ALUMINUM ALLOY WASHERS SHALL HAVE A HARDNESS OF 33-40HRC.
- 4. MAXIMUM TOLERANCE FOR NOMINAL SERIES .086 THRU .190 SHALL BE +.006, .250 THRU .750 SHALL BE +.010 AND .875 THRU 1.500 SHALL BE +.020 (SEE TABLE I).
- 5. **MAGNETIC PERMEABILITY:** CORROSION-RESISTANT STEEL WASHERS (300 SERIES ONLY) SHALL HAVE A MAGNETIC PERMEABILITY OF 2.0 MAXIMUM (AIR = 1.0) FOR A FIELD STRENGTH OF H = 200 OERSTEDS USING A MAGNETIC INDICATOR IN ACCORDANCE WITH ASTM A342.
- 6. **PART NUMBER:** THE PART NUMBER SHALL CONSIST OF THE BASIC SPECIFICATION SHEET NUMBER FOLLOWED BY A DASH NUMBER TAKEN FROM TABLE I. WHEN BLACK OXIDE COATING IS REQUIRED, THE DASH NUMBER SHALL BE FOLLOWED BY THE LETTER "B".

EXAMPLE: MS35338-48

DASH NUMBER

BASIC SPECIFICATION SHEET NUMBER

MS35338-48 INDICATES - WASHER, LOCK-SPRING, HELICAL-SPRING, REGULAR (MEDIUM) SERIES, 1/2 (.500) NOMINAL DIAMETER, CARBON STEEL; CADMIUM OR ZINC PLATED

7. PACKAGING: PACKAGING SHALL BE IN ACCORDANCE WITH ASTM D3951.

NOTES:

- 1. ALL DIMENSIONS ARE IN INCHES.
- 2. MS35338 SUPERSEDES MS16214, MS35337, AN935, NAS1061, BECX1 AND BECX2, SEE TABLE II.
- (L) 3. IN THE EVENT OF A CONFLICT BETWEEN THE TEXT OF THIS DOCUMENT AND THE REFERENCES CITED HEREIN, THE TEXT OF THIS DOCUMENT SHALL TAKE PRECEDENCE.
- (L) 4. UNLESS OTHERWISE SPECIFIED, ISSUES OF REFERENCED DOCUMENTS ARE THOSE IN EFFECT AT THE TIME OF SOLICITATION.

PREPARING ACTIVITY: DLA - IS CUSTODIANS: ARMY- AR NAVY- AS AIR FORCE- 99 DLA- REVIEW: AT, AV, ER, GL, MC, ME, MI, NS, B2 USER: PROJECT NUMBER: 5310-1975	MILITARY SPECIFICATION SHEET TITLE WASHER, LOCK-SPRING, HELICAL, REGULAR (MEDIUM) SERIES	SPECIFICATION SHEET NUMBER MS35338 7 APR 84 REV L SUPERSEDING MS35338K 13 DEC 93 (SEE NOTE 2.) AMSC- N/A FSC 5310
DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.		Page <u>2</u> of <u>3</u>

DD Form 672, MAY 88

PREVIOUS EDITIONS ARE OBSOLETE

THE REQUIREMENTS FOR ACQUIRING THE PRODUCT(S) DESCRIBED HEREIN SHALL CONSIST OF THIS SPECIFICATION SHEET AND THE ISSUE OF THE FOLLOWING SPECIFICATION LISTED IN THAT ISSUE OF THE DODSSS SPECIFIED IN THE SOLICITATION: ASME B1B.21.1

THIS SPECIFICATION IS APPROVED FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE.

TABLE II. INTERCHANGABILITY.

Form Approved
OMB No. 0704-0185

After 21 March 1966, (1) washers given on MS16214, MS35337, NAS1061, and this standard in part, are inactive for design and are canceled, but their existing stocks should be used for maintenance purposes until depleted and (2) washers are given on AN935 are inactivated for new design. Use only the following substitutive washers for new design and replacement.

CROSS REFERENCE OF PART NUMBERS							
CANCELLED INACTIVATED	SUBSTITUTIVE	CANCELLED INACTIVATED	SUBSTITUTIVE	CANCELLED INACTIVATED	SUBSTITUTIVE	CANCELLED INACTIVATED	SUBSTITUTIVE
MS16214-1	MS35338-135	MS35337-37	MS35338-56	MS35337-108	MS35338-108	AN935-2	MS35338-39
MS16214-2	MS35338-136	MS35337-38	MS35338-57	MS35337-109	MS35338-109	AN935-3	MS35338-10
MS16214-3	MS35338-137	MS35337-39	MS35338-58	MS35337-110	MS35338-110	AN935-4	MS35338-4
MS16214-4	MS35338-138	MS35337-40	MS35338-59	MS35337-111	MS35338-111	AN935-5	MS35338-1
MS16214-5	MS35338-139	MS35337-41	MS35338-60	MS35337-112	MS35338-112	AN935-6	MS35338-41
MS16214-6	MS35338-140	MS35337-42	MS35338-61	MS35337-113	MS35338-113	AN935-8	MS35338-42
MS16214-7	MS35338-141	MS35337-43	MS35338-62	MS35337-114	MS35338-114	AN935-10	MS35338-43
MS16214-8	MS35338-142	MS35337-44	MS35338-63			AN935-12	MS35338-1/
MS16214-9	MS35338-143	MS35337-45	MS35338-64	MS35338-1	MS35338-39	AN935-16	MS35338-44
MS16214-10	MS35338-145	MS35337-46	MS35338-65	MS35338-2	MS35338-40	AN935-516	MS35338-45
MS16214-11	MS35338-146	MS35337-47	MS35338-66	MS35338-3	MS35338-41	AN935-616	MS35338-46
MS16214-12	MS35338-147	MS35337-48	MS35338-67	MS35338-4	MS35338-42	AN935-716	MS35338-47
MS16214-13	MS35338-148	MS35337-49	MS35338-68	MS35338-5	MS35338-43	AN935-816	MS35338-48
MS16214-14	MS35338-149	MS35337-50	MS35338-69	MS35338-6	MS35338-44	AN935-916	MS35338-49
MS16214-15	MS35338-150	MS35337-51	MS35338-70	MS35338-7	MS35338-45	AN935-1016	MS35338-50
MS16214-16	MS35338-151	MS35337-52	MS35338-71	MS35338-8	MS35338-46	AN935-1216	MS35338-51
MS16214-17	MS35338-152	MS35337-53	MS35338-72	MS35338-9	MS35338-47	AN935-2L	MS35338-52
MS16214-18	MS35338-97	MS35337-54	MS35338-73	MS35338-10	MS35338-48	AN935-3L	MS35338-39
MS16214-19	MS35338-98	MS35337-55	MS35338-74	MS35338-11	MS35338-49	AN935-4L	MS35338-40
MS16214-20	MS35338-99	MS35337-56	MS35338-75	MS35338-12	MS35338-50	AN935-5L	MS35338-1/
MS16214-21	MS35338-100	MS35337-57	MS35338-76	MS35338-13	MS35338-51	AN935-6L	MS35338-41
MS16214-22	MS35338-101	MS35337-58	MS35338-77	MS35338-14	MS35338-52	AN935-8L	MS35338-42
MS16214-23	MS35338-102	MS35337-59	MS35338-78	MS35338-15	MS35338-53	AN935-10L	MS35338-43
MS16214-24	MS35338-103	MS35337-60	MS35338-79	MS35338-16	MS35338-54	AN935-12L	MS35338-1/
MS16214-25	MS35338-104	MS35337-61	MS35338-80	MS35338-17	MS35338-55	AN935-416L	MS35338-44
MS16214-26	MS35338-105	MS35337-62	MS35338-81	MS35338-18	MS35338-56	AN935-516L	MS35338-45
MS16214-27	MS35338-106	MS35337-63	MS35338-82	MS35338-19	MS35338-57	AN935-616L	MS35338-46
MS16214-28	MS35338-107	MS35337-64	MS35338-83	MS35338-20	MS35338-58	AN935-716L	MS35338-47
MS16214-29	MS35338-108	MS35337-65	MS35338-84	MS35338-21	MS35338-59	AN935-816L	MS35338-48
MS16214-30	MS35338-110	MS35337-66	MS35338-85	MS35338-22	MS35338-60	AN935-916L	MS35338-49
MS16214-31	MS35338-111	MS35337-67	MS35338-86	MS35338-23	MS35338-61	AN935-1016L	MS35338-50
MS16214-32	MS35338-112	MS35337-68	MS35338-87	MS35338-24	MS35338-62	AN935-1216L	MS35338-51
MS16214-33	MS35338-113	MS35337-69	MS35338-88	MS35338-25	MS35338-63	AN935-8L	MS35338-96
MS16214-34	MS35338-114	MS35337-70	MS35338-89	MS35338-26	MS35338-64	AN935-8L	MS35338-1/
		MS35337-71	MS35338-90	MS35338-27	MS35338-65	AN935-8L	MS35338-67
MS35337-1	MS35338-39	MS35337-72	MS35338-91	MS35338-28	MS35338-66	AN935-85	MS35338-1/
MS35337-2	MS35338-40	MS35337-73	MS35338-92	MS35338-29	MS35338-67	AN935-86	MS35338-98
MS35337-3	MS35338-41	MS35337-74	MS35338-93	MS35338-30	MS35338-68	AN935-88	MS35338-99
MS35337-4	MS35338-42	MS35337-75	MS35338-94	MS35338-31	MS35338-69	AN935-810	MS35338-100
MS35337-5	MS35338-43	MS35337-76	MS35338-95	MS35338-32	MS35338-70	AN935-812	MS35338-1/
MS35337-6	MS35338-44	MS35337-77	MS35338-134 OR 153	MS35338-33	MS35338-71	AN935-8416	MS35338-101
MS35337-7	MS35338-45	MS35337-78	MS35338-135 OR 154	MS35338-34	MS35338-72	AN935-8516	MS35338-102
MS35337-8	MS35338-46	MS35337-79	MS35338-136 OR 155	MS35338-35	MS35338-73	AN935-8616	MS35338-103
MS35337-9	MS35338-47	MS35337-80	MS35338-137 OR 156	MS35338-36	MS35338-74	AN935-8716	MS35338-104
MS35337-10	MS35338-48	MS35337-81	MS35338-138 OR 157	MS35338-37	MS35338-75	AN935-8816	MS35338-105
MS35337-11	MS35338-49	MS35337-82	MS35338-139 OR 158	MS35338-38	MS35338-76	AN935-8916	MS35338-106
MS35337-12	MS35338-50	MS35337-83	MS35338-140 OR 159	MS35338-39	MS35338-77	AN935-81016	MS35338-107
MS35337-13	MS35338-51	MS35337-84	MS35338-141 OR 160	MS35338-40	MS35338-78	AN935-81216	MS35338-108
MS35337-14	MS35338-52	MS35337-85	MS35338-142 OR 161	MS35338-41	MS35338-79	AN935-82L	MS35338-96
MS35337-15	MS35338-53	MS35337-86	MS35338-143 OR 162	MS35338-42	MS35338-80	AN935-83L	MS35338-1/
MS35337-16	MS35338-54	MS35337-87	MS35338-144 OR 163	MS35338-43	MS35338-81	AN935-84L	MS35338-87
MS35337-17	MS35338-55	MS35337-88	MS35338-145 OR 164	MS35338-44	MS35338-82	AN935-85L	MS35338-1/
MS35337-18	MS35338-56	MS35337-89	MS35338-146 OR 165	MS35338-45	MS35338-83	AN935-86L	MS35338-88
MS35337-19	MS35338-57	MS35337-90	MS35338-147 OR 166	MS35338-46	MS35338-84	AN935-88L	MS35338-89
MS35337-20	MS35338-59	MS35337-91	MS35338-148 OR 167	MS35338-47	MS35338-85	AN935-810L	MS35338-100
MS35337-21	MS35338-40	MS35337-92	MS35338-149 OR 168	MS35338-48	MS35338-86	AN935-812L	MS35338-1/
MS35337-22	MS35338-41	MS35337-93	MS35338-150 OR 169	MS35338-49	MS35338-87	AN935-8416L	MS35338-101
MS35337-23	MS35338-42	MS35337-94	MS35338-151 OR 170	MS35338-50	MS35338-88	AN935-8516L	MS35338-102
MS35337-24	MS35338-43	MS35337-95	MS35338-152 OR 171	MS35338-51	MS35338-89	AN935-8616L	MS35338-103
MS35337-25	MS35338-44	MS35337-96	MS35338-96	MS35338-52	MS35338-90	AN935-8716L	MS35338-104
MS35337-26	MS35338-45	MS35337-97	MS35338-97	MS35338-53	MS35338-91	AN935-8816L	MS35338-105
MS35337-27	MS35338-46	MS35337-98	MS35338-98	MS35338-54	MS35338-92	AN935-8916L	MS35338-106
MS35337-28	MS35338-47	MS35337-99	MS35338-99	MS35338-55	MS35338-93	AN935-81016L	MS35338-107
MS35337-29	MS35338-48	MS35337-100	MS35338-100	MS35338-56	MS35338-94	AN935-81216L	MS35338-108
MS35337-30	MS35338-49	MS35337-101	MS35338-101	MS35338-57	MS35338-95		
MS35337-31	MS35338-50	MS35337-102	MS35338-102	MS35338-58	MS35338-149 OR 168	NAS1061-6	MS35338-136
MS35337-32	MS35338-51	MS35337-103	MS35338-103	MS35338-59	MS35338-150 OR 169	NAS1061-10	MS35338-138
MS35337-33	MS35338-52	MS35337-104	MS35338-104	MS35338-60	MS35338-151 OR 170	NAS1061-416	MS35338-139
MS35337-34	MS35338-53	MS35337-105	MS35338-105	MS35338-61	MS35338-152 OR 171	NAS1061-516	MS35338-140
MS35337-35	MS35338-54	MS35337-106	MS35338-106	MS35338-62		NAS1061-616	MS35338-141
MS35337-36	MS35338-55	MS35337-107	MS35338-107	MS35338-63			

1/ No replacement.

PREPARING ACTIVITY: DLA - IS	MILITARY SPECIFICATION SHEET	SPECIFICATION SHEET NUMBER
CUSTODIANS: ARMY- AR NAVY- AS	TITLE	MS35338 7 APR 94
AIR FORCE- 99 DLA-	WASHER, LOCK-SPRING, HELICAL,	REV L
REVIEW: AT, AV, ER, GL, MC, ME, MI, NS, B2	REGULAR (MEDIUM) SERIES	SUPERSEDING
USER:		MS35338K 13 DEC 93 (SEE NOTE 2.)
PROJECT NUMBER: 5310-1975		AMSC- N/A FSC 5310
DISTRIBUTION STATEMENT	A. Approved for public release; distribution is unlimited.	Page 3 of 3