



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/
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 <b>MS35338</b> 7 APR 94 REV L SUPERSEDING MS35338K 13 DEC 93 (SEE NOTE 2.) AMSC- N/A FSC 5310
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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 DODSS 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.

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

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, WS35337, 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	WS35338-135	WS35337-37	WS35338-56	WS35337-108	WS35338-108	AN935-2	WS35338-39
MS16214-2	WS35338-136	WS35337-38	WS35338-57	WS35337-109	WS35338-109	AN935-3	WS35338-1/
MS16214-3	WS35338-137	WS35337-39	WS35338-58	WS35337-110	WS35338-110	AN935-4	WS35338-40
MS16214-4	WS35338-138	WS35337-40	WS35338-59	WS35337-111	WS35338-111	AN935-5	WS35338-1/
MS16214-5	WS35338-139	WS35337-41	WS35338-60	WS35337-112	WS35338-112	AN935-6	WS35338-41
MS16214-6	WS35338-140	WS35337-42	WS35338-61	WS35337-113	WS35338-113	AN935-8	WS35338-42
MS16214-7	WS35338-141	WS35337-43	WS35338-62	WS35337-114	WS35338-114	AN935-10	WS35338-43
MS16214-8	WS35338-142	WS35337-44	WS35338-63			AN935-12	WS35338-1/
MS16214-9	WS35338-143	WS35337-45	WS35338-64	WS35338-1	WS35338-39	AN935-416	WS35338-44
MS16214-10	WS35338-145	WS35337-46	WS35338-65	WS35338-2	WS35338-40	AN935-516	WS35338-45
MS16214-11	WS35338-146	WS35337-47	WS35338-66	WS35338-3	WS35338-41	AN935-616	WS35338-46
MS16214-12	WS35338-147	WS35337-48	WS35338-67	WS35338-4	WS35338-42	AN935-716	WS35338-47
MS16214-13	WS35338-148	WS35337-49	WS35338-68	WS35338-5	WS35338-43	AN935-816	WS35338-48
MS16214-14	WS35338-149	WS35337-50	WS35338-69	WS35338-6	WS35338-44	AN935-916	WS35338-49
MS16214-15	WS35338-150	WS35337-51	WS35338-70	WS35338-7	WS35338-45	AN935-1016	WS35338-50
MS16214-16	WS35338-151	WS35337-52	WS35338-71	WS35338-8	WS35338-46	AN935-1216	WS35338-51
MS16214-17	WS35338-152	WS35337-53	WS35338-72	WS35338-9	WS35338-47	AN935-2L	WS35338-52
MS16214-18	WS35338-97	WS35337-54	WS35338-73	WS35338-10	WS35338-48	AN935-3L	WS35338-39
MS16214-19	WS35338-98	WS35337-55	WS35338-74	WS35338-11	WS35338-49	AN935-4L	WS35338-40
MS16214-20	WS35338-99	WS35337-56	WS35338-75	WS35338-12	WS35338-50	AN935-5L	WS35338-1/
MS16214-21	WS35338-100	WS35337-57	WS35338-76	WS35338-13	WS35338-51	AN935-6L	WS35338-41
MS16214-22	WS35338-101	WS35337-58	WS35338-77	WS35338-14	WS35338-52	AN935-8L	WS35338-42
MS16214-23	WS35338-102	WS35337-59	WS35338-78	WS35338-15	WS35338-53	AN935-10L	WS35338-43
MS16214-24	WS35338-103	WS35337-60	WS35338-79	WS35338-16	WS35338-54	AN935-12L	WS35338-1/
MS16214-25	WS35338-104	WS35337-61	WS35338-80	WS35338-17	WS35338-55	AN935-416L	WS35338-44
MS16214-26	WS35338-105	WS35337-62	WS35338-81	WS35338-18	WS35338-56	AN935-516L	WS35338-45
MS16214-27	WS35338-106	WS35337-63	WS35338-82	WS35338-19	WS35338-57	AN935-616L	WS35338-46
MS16214-28	WS35338-107	WS35337-64	WS35338-83	WS35338-20	WS35338-58	AN935-716L	WS35338-47
MS16214-29	WS35338-108	WS35337-65	WS35338-84	WS35338-21	WS35338-59	AN935-816L	WS35338-48
MS16214-30	WS35338-110	WS35337-66	WS35338-85	WS35338-22	WS35338-60	AN935-916L	WS35338-49
MS16214-31	WS35338-111	WS35337-67	WS35338-86	WS35338-23	WS35338-61	AN935-1016L	WS35338-50
MS16214-32	WS35338-112	WS35337-68	WS35338-87	WS35338-24	WS35338-62	AN935-1216L	WS35338-51
MS16214-33	WS35338-113	WS35337-69	WS35338-88	WS35338-25	WS35338-63	AN935-82	WS35338-96
MS16214-34	WS35338-114	WS35337-70	WS35338-89	WS35338-26	WS35338-64	AN935-83	WS35338-1/
		WS35337-71	WS35338-90	WS35338-27	WS35338-65	AN935-84	WS35338-67
WS35337-1	WS35338-39	WS35337-72	WS35338-91	WS35338-28	WS35338-66	AN935-85	WS35338-1/
WS35337-2	WS35338-40	WS35337-73	WS35338-92	WS35338-29	WS35338-67	AN935-86	WS35338-98
WS35337-3	WS35338-41	WS35337-74	WS35338-93	WS35338-30	WS35338-68	AN935-88	WS35338-99
WS35337-4	WS35338-42	WS35337-75	WS35338-94	WS35338-31	WS35338-69	AN935-810	WS35338-100
WS35337-5	WS35338-43	WS35337-76	WS35338-95	WS35338-32	WS35338-70	AN935-812	WS35338-1/
WS35337-6	WS35338-44	WS35337-77	WS35338-134 OR 153	WS35338-33	WS35338-71	AN935-8416	WS35338-101
WS35337-7	WS35338-45	WS35337-78	WS35338-135 OR 154	WS35338-34	WS35338-72	AN935-8516	WS35338-102
WS35337-8	WS35338-46	WS35337-79	WS35338-136 OR 155	WS35338-35	WS35338-73	AN935-8616	WS35338-103
WS35337-9	WS35338-47	WS35337-80	WS35338-137 OR 156	WS35338-36	WS35338-74	AN935-8716	WS35338-104
WS35337-10	WS35338-48	WS35337-81	WS35338-138 OR 157	WS35338-37	WS35338-75	AN935-8816	WS35338-105
WS35337-11	WS35338-49	WS35337-82	WS35338-139 OR 158	WS35338-38	WS35338-76	AN935-8916	WS35338-106
WS35337-12	WS35338-50	WS35337-83	WS35338-140 OR 159	WS35338-39	WS35338-77	AN935-81016	WS35338-107
WS35337-13	WS35338-51	WS35337-84	WS35338-141 OR 160	WS35338-40	WS35338-78	AN935-81216	WS35338-108
WS35337-14	WS35338-52	WS35337-85	WS35338-142 OR 161	WS35338-41	WS35338-79	AN935-82L	WS35338-96
WS35337-15	WS35338-53	WS35337-86	WS35338-143 OR 162	WS35338-42	WS35338-80	AN935-83L	WS35338-1/
WS35337-16	WS35338-54	WS35337-87	WS35338-144 OR 163	WS35338-43	WS35338-81	AN935-84L	WS35338-87
WS35337-17	WS35338-55	WS35337-88	WS35338-145 OR 164	WS35338-44	WS35338-82	AN935-85L	WS35338-1/
WS35337-18	WS35338-56	WS35337-89	WS35338-146 OR 165	WS35338-45	WS35338-83	AN935-86L	WS35338-68
WS35337-19	WS35338-57	WS35337-90	WS35338-147 OR 166	WS35338-46	WS35338-84	AN935-88L	WS35338-69
WS35337-20	WS35338-59	WS35337-91	WS35338-148 OR 167	WS35338-47	WS35338-85	AN935-810L	WS35338-100
WS35337-21	WS35338-40	WS35337-92	WS35338-149 OR 168	WS35338-48	WS35338-86	AN935-812L	WS35338-1/
WS35337-22	WS35338-41	WS35337-93	WS35338-150 OR 169	WS35338-49	WS35338-87	AN935-8416L	WS35338-101
WS35337-23	WS35338-42	WS35337-94	WS35338-151 OR 170	WS35338-50	WS35338-88	AN935-8516L	WS35338-102
WS35337-24	WS35338-43	WS35337-95	WS35338-152 OR 171	WS35338-51	WS35338-89	AN935-8616L	WS35338-103
WS35337-25	WS35338-44	WS35337-96	WS35338-96	WS35338-52	WS35338-90	AN935-8716L	WS35338-104
WS35337-26	WS35338-45	WS35337-97	WS35338-97	WS35338-53	WS35338-91	AN935-8816L	WS35338-105
WS35337-27	WS35338-46	WS35337-98	WS35338-98	WS35338-54	WS35338-92	AN935-8916L	WS35338-106
WS35337-28	WS35338-47	WS35337-99	WS35338-99	WS35338-55	WS35338-93	AN935-81016L	WS35338-107
WS35337-29	WS35338-48	WS35337-100	WS35338-100	WS35338-56	WS35338-94	AN935-81216L	WS35338-108
WS35337-30	WS35338-49	WS35337-101	WS35338-101	WS35338-57	WS35338-95		
WS35337-31	WS35338-50	WS35337-102	WS35338-102	WS35338-58	WS35338-149 OR 168	NAS1061-8	WS35338-136
WS35337-32	WS35338-51	WS35337-103	WS35338-103	WS35338-59	WS35338-150 OR 169	NAS1061-10	WS35338-138
WS35337-33	WS35338-52	WS35337-104	WS35338-104	WS35338-60	WS35338-151 OR 170	NAS1061-416	WS35338-139
WS35337-34	WS35338-53	WS35337-105	WS35338-105	WS35338-61	WS35338-152 OR 171	NAS1061-516	WS35338-140
WS35337-35	WS35338-54	WS35337-106	WS35338-106	WS35338-62		NAS1061-616	WS35338-141
WS35337-36	WS35338-55	WS35337-107	WS35338-107	WS35338-63			

1/ No replacement.

PREPARING ACTIVITY: DLA - IS	MILITARY SPECIFICATION SHEET	SPECIFICATION SHEET NUMBER
CUSTODIANS: ARMY- AR NAVY- AS	TITLE	MS35338
AIR FORCE- 99 DLA-	WASHER, LOCK-SPRING, HELICAL, REGULAR (MEDIUM) SERIES	7 APR 94 REV L
REVIEW: AT, AV, ER, GL, MC, ME, MI, NS, B2		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