

MS16625E  
 8 July 2015  
 SUPERSEDING  
 MS16625D  
 w/AMENDMENT 2  
 5 May 2015

DETAIL SPECIFICATION SHEET

RING, RETAINING, INTERNAL, BASIC  
 (TAPERED SECTION TYPE)

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification sheet and procurement specification MIL-DTL-21248.

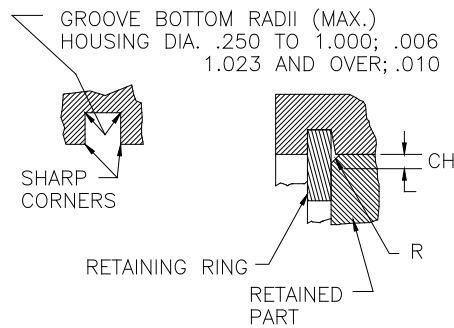
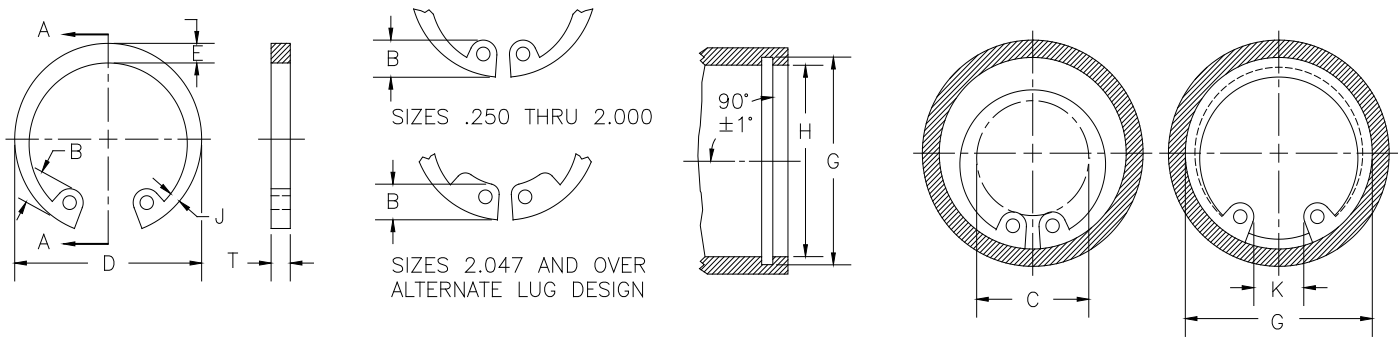


FIGURE 1. RING, RETAINING.

TABLE I DIMENSIONS.

ØH HOUSING		ØD FREE		B		E		J		*T		G		W		*K	*C	*R	*CH
												RECOMMENDED GROOVE				GAP WIDTH		OF RETAINED PART	
INCH	MM	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	MIN.		MAX.	MAX.
.250	6.4	.280		.065		.025	±.002	.015	±.002	.015		.268	±.001	.018	+ .002	.047	.115	.011	.0085
.312	7.9	.346		.066		.033		.018		.015		.330	.0015 TIR	.018	- .000	.055	.173	.016	.013
.375	9.5	.415		.082	±.003	.040		.028		.025		.397		.029		.063	.204	.023	.018
.438	11.1	.482		.098		.049	±.003	.029	±.003	.025		.461	±.002	.029		.063	.23	.027	.021
.453	11.5	.498		.098		.050		.030		.025		.477	.002 TIR	.029		.071	.25	.027	.021
.500	12.7	.548		.114		.053		.035		.035		.530		.039		.090	.26	.027	.021
.512	13.0	.560		.114		.053		.035		.035		.542		.039		.092	.27	.027	.021
.562	14.3	.620	+ .010	.132		.053		.035		.035		.596		.039		.095	.275	.027	.021
.625	15.9	.694	- .005	.132		.060	±.004	.035	±.004	.035		.665	±.002	.039	+ .003	.104	.34	.027	.021
.688	17.5	.763		.132		.063		.036		.035	±.002	.732	.004 TIR	.039	- .000	.118	.40	.027	.021
.750	19.0	.831		.142		.070		.040		.035		.796		.039		.143	.45	.032	.025
.777	19.7	.859		.146		.074		.044		.042		.825		.046		.145	.475	.035	.028
.812	20.6	.901		.155		.077		.044		.042		.862		.046		.153	.49	.035	.028
.866	22.0	.961		.155		.081		.045		.042		.920		.046		.172	.54	.035	.028
.875	22.2	.971		.155	±.005	.084		.045		.042		.931		.046		.179	.545	.035	.028
.901	22.9	1.000	+ .015	.155		.087	±.005	.047	±.005	.042		.959	±.003	.046		.188	.565	.038	.030
.938	23.8	1.041	- .010	.155		.091		.050		.042		1.000	.004 TIR	.046		.200	.61	.038	.030
1.000	25.4	1.111		.155		.104		.052		.042		1.066		.046		.212	.665	.042	.034
1.023	26.0	1.136		.155		.106		.054		.042		1.091		.046		.220	.69	.042	.034
1.062	27.0	1.180		.180		.110		.055		.050		1.130		.056		.213	.685	.044	.035
1.125	28.6	1.249		.180		.116		.057		.050		1.197		.056		.232	.745	.047	.036
1.181	30.0	1.319	- .025	.180		.120	±.006	.058	±.006	.050		1.255	±.004	.056	+ .004	.226	.79	.047	.036
1.188	30.2	1.319	- .020	.180		.120		.058		.050		1.262	.005 TIR	.056	- .000	.245	.80	.047	.036
1.250	31.7	1.388		.180		.124		.062		.050		1.330		.056		.265	.875	.048	.038
1.259	32.0	1.388		.180		.124		.062		.050		1.339		.056		.290	.885	.048	.038
1.312	33.3	1.456		.180		.130		.062		.050		1.396		.056		.284	.93	.048	.038
1.375	34.9	1.526		.180		.130		.063		.050		1.461		.056		.297	.99	.048	.038
1.378	35.0	1.526		.180		.130		.063		.050		1.464		.056		.305	.99	.048	.038
1.438	36.5	1.596		.180		.133		.065		.050		1.528		.056		.313	1.06	.048	.038
1.456	37.0	1.616		.180		.133		.065		.050		1.548		.056		.320	1.08	.048	.038
1.500	38.1	1.660		.180		.133		.066		.050		1.594		.056		.340	1.12	.048	.038

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TABLE I. DIMENSIONS - Continued

ØH HOUSING		ØD FREE		B		E		J		* T		G RECOMMENDED GROOVE DIAMETER		W WIDTH		* K GAP WIDTH	* C	* R OF RETAINED PART	* CH
INCH	MM	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	MIN.		MAX.	MAX.
1.562	39.7	1.734		.202		.157		.078		.062		1.658		.068		.338	1.14	.064	.050
1.575	40.0	1.734		.202		.157		.078		.062		1.671		.068		.374	1.15	.064	.050
1.625	41.3	1.804		.227		.164		.082		.062		1.725		.068		.339	1.15	.064	.050
1.653	42.0	1.835		.227		.167		.083		.062		1.755	±.005	.068		.348	1.17	.064	.050
1.688	42.9	1.874	+0.035	.227		.170		.085		.062		1.792	.005	.068	+0.004	.357	1.21	.064	.050
1.750	44.4	1.942	-.025	.234		.171		.083		.062		1.858	TIR	.068	-.000	.372	1.26	.064	.050
1.812	46.0	2.012		.234		.170		.084		.062		1.922		.068		.382	1.32	.064	.050
1.850	47.0	2.054		.234		.170		.085		.062		1.962		.068		.392	1.36	.064	.050
1.875	47.6	2.072		.234		.170		.085		.062		1.989		.068		.420	1.39	.064	.050
1.938	49.2	2.141		.234		.170		.085		.062		2.056		.068		.438	1.45	.064	.050
2.000	50.8	2.210		.240		.170		.085		.062		2.122		.068		.453	1.50	.064	.050
2.047	52.0	2.280		.250		.186		.091		.078		2.171		.086		.428	1.52	.076	.061
2.062	52.4	2.280		.250		.186		.091		.078		2.186		.086		.468	1.54	.078	.062
2.125	54.0	2.350		.260		.195		.096		.078		2.251		.086		.460	1.58	.078	.062
2.165	55.0	2.415		.264		.199		.098		.078		2.295		.086		.439	1.61	.078	.062
2.188	55.6	2.415		.264	±.005	.199	±.007	.098	±.007	.078	±.003	2.318		.086		.489	1.64	.078	.062
2.250	57.1	2.490		.270		.203		.099		.078		2.382		.086		.478	1.69	.078	.062
2.312	58.7	2.560		.270		.206		.100		.078		2.450		.086		.486	1.75	.078	.062
2.375	60.3	2.630		.270		.207		.102		.078		2.517		.086		.504	1.81	.078	.062
2.440	62.0	2.702		.280		.209		.103		.078		2.584		.086		.518	1.86	.078	.062
2.500	63.5	2.775		.280		.210		.103		.078		2.648	±.006	.086		.532	1.91	.078	.062
2.531	64.3	2.775	+0.040	.280		.210		.103		.078		2.681	.006	.086	+0.005	.597	1.94	.078	.062
2.562	65.1	2.844	-.030	.290		.222		.109		.093		2.714	TIR	.103	-.000	.540	1.95	.088	.070
2.625	66.7	2.910		.290		.226		.111		.093		2.781		.103		.558	2.02	.088	.070
2.677	68.0	2.980		.300		.230		.113		.093		2.837		.103		.539	2.05	.090	.072
2.688	68.3	2.980		.300		.230		.113		.093		2.848		.103		.568	2.06	.090	.072
2.750	69.8	3.050		.300		.234		.115		.093		2.914		.103		.590	2.12	.092	.074
2.812	71.4	3.121		.300		.230		.115		.093		2.980		.103		.615	2.18	.088	.070
2.835	72.0	3.121		.300		.230		.115		.093		3.006		.103		.676	2.21	.088	.070
2.875	73.0	3.191		.310		.240		.120		.093		3.051		.103		.626	2.22	.092	.074
2.953	75.0	3.325		.310		.250		.122		.093		3.135		.103		.619	2.30	.092	.074
3.000	76.2	3.325		.310		.250		.122		.093		3.182		.103		.738	2.35	.092	.074
3.062	77.8	3.418		.310		.254		.126		.109		3.248		.120		.651	2.41	.097	.078
3.125	79.4	3.488		.310		.259		.129		.109		3.315		.120		.655	2.47	.099	.079
3.149	80.0	3.523		.310		.262		.129		.109		3.341		.120		.650	2.49	.100	.080
3.156	80.2	3.523		.310		.262		.129		.109		3.348		.120		.669	2.50	.100	.080
3.250	82.5	3.623		.342		.269		.135		.109		3.446		.120		.698	2.54	.104	.083
3.346	85.0	3.734		.342		.276		.140		.109		3.546		.120		.705	2.63	.108	.086
3.469	88.1	3.857		.342		.286		.144		.109		3.675		.120		.763	2.76	.108	.086
3.500	88.9	3.890		.342	±.008	.289	±.008	.142	±.008	.109		3.710		.120		.774	2.79	.110	.088
3.543	90.0	3.936		.342		.292		.142		.109		3.755		.120		.788	2.83	.110	.088
3.562	90.5	3.936		.342		.292		.142		.109		3.776		.120		.842	2.85	.110	.088
3.625	92.1	4.024		.342		.299		.150		.109		3.841		.120		.833	2.91	.116	.093

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TABLE I. DIMENSIONS - Continued

ØH HOUSING		ØD FREE		B		E		J		* T		G RECOMMENDED GROOVE DIAMETER		W WIDTH		* K GAP WIDTH	* C	* R	* CH OF RETAINED PART
INCH	MM	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	MIN.		MAX.	MAX.
3.740	95.0	4.157		.342		.309		.155		.109		3.964		.120		.844	3.02	.120	.096
3.750	95.2	4.157		.342		.309		.155		.109		3.974		.120		.871	3.03	.120	.096
3.875	98.4	4.291		.370		.319	±.008	.160	±.008	.109		4.107		.120		.891	3.11	.123	.098
3.938	100.0	4.358		.370		.324		.161		.109		4.174		.120		.905	3.17	.124	.099
4.000	101.6	4.424		.370		.330		.166		.109		4.240		.120		.918	3.23	.128	.102
4.125	104.8	4.558		.370		.330		.171		.109		4.365		.120		.94	3.36	.130	.104
4.250	108.0	4.691		.370		.335		.180		.109		4.490		.120		.96	3.48	.138	.110
4.331	110.0	4.756		.405		.343		.180		.109		4.571		.120		1.00	3.50	.142	.114
4.500	114.3	4.940		.405		.351		.181		.109		4.740		.120		.98	3.66	.146	.117
4.625	117.5	5.076	±.065	.405	±.008	.360		.183		.109	±.003	4.865	±.006	.120	+ .005	1.00	3.79	.151	.121
4.724	120.0	5.213		.405		.370		.183		.109		4.969	.006	.120	- .000	.96	3.88	.154	.123
4.750	120.6	5.213		.405		.370		.183		.109		4.995	TIR	.120		1.03	3.90	.154	.123
5.000	127.0	5.485		.435		.390	±.009	.186		.109		5.260		.120		.97	4.08	.158	.126
5.250	133.3	5.770		.455		.408		.198		.125		5.520		.139		1.10	4.31	.168	.134
5.375	136.5	5.910		.455		.408		.198	±.009	.125		5.650	±.007	.139		1.12	4.41	.168	.134
5.500	139.7	6.066		.455		.408		.198		.125	±.004	5.770	.006	.139	+ .006	1.09	4.53	.168	.134
5.750	146.0	6.336		.455		.408		.198		.125		6.020	TIR	.139	- .000	1.11	4.78	.168	.134
6.000	152.4	6.620		.455		.408		.196		.125		6.270		.139		1.13	5.03	.168	.134
6.250	158.7	6.895		.485		.423		.211		.156		6.530		.174		1.16	5.24	.177	.142
6.500	165.1	7.170		.485		.438		.219		.156		6.790		.174		1.25	5.49	.181	.145
6.625	168.3	7.308	±.080	.485		.447		.221		.156		6.925		.174		1.28	5.60	.183	.146
6.750	171.4	7.445		.530		.456		.224		.156		7.055		.174		1.21	5.65	.188	.150
7.000	177.8	7.720		.530		.474		.232		.156		7.315		.174		1.26	5.88	.196	.157
7.250	184.1	7.995		.560	±.010	.489		.238		.187		7.575		.209		1.32	6.08	.202	.162
7.500	190.5	8.270		.560		.507		.247		.187		7.840		.209		1.39	6.33	.208	.166
7.750	196.8	8.545		.560		.523		.255		.187		8.100	±.008	.209	+ .008	1.44	6.58	.214	.171
8.000	203.2	8.820		.600		.540		.262		.187	±.005	8.360	.006	.209	- .000	1.50	6.75	.220	.176
8.250	209.5	9.095		.600		.558		.270		.187		8.620	TIR	.209		1.53	7.00	.229	.183
8.500	215.9	9.285		.660		.573	±.010	.277	±.010	.187		8.880		.209		1.71	7.13	.235	.188
8.750	222.2	9.558	±.090	.660		.591		.286		.187		9.145		.209		1.77	7.38	.241	.193
9.000	228.6	9.830		.660		.609		.294		.187		9.405		.209		1.83	7.63	.249	.199
9.250	235.0	10.102		.660		.625		.299		.187		9.668		.209		1.87	7.88	.253	.202
9.500	241.3	10.375		.735		.642		.304		.187		9.930		.209		1.91	7.98	.258	.206
9.750	247.7	10.648		.735		.658		.309		.187		10.190		.209		2.00	8.23	.263	.210
10.000	254.0	10.920		.735		.675		.315		.187		10.450		.209		2.01	8.48	.270	.216

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\* T = DIMENSIONS AND TOLERANCES APPLY TO UNPLATED BERYLLIUM COPPER RINGS ONLY. FOR PLATED AND CORROSION RESISTING STEEL RINGS SIZE 1.023 AND SMALLER, THE MAXIMUM T DIMENSION SHALL NOT EXCEED THE MINIMUM W DIMENSION MINUS .0002 INCH. FOR PLATED AND CORROSION RESISTING RINGS SIZE 1.062 AND LARGER THE MAXIMUM T DIMENSION MAY EXCEED THE LISTED T DIMENSION (T + TOLERANCE) BY A MAXIMUM OF .002 INCH.

\* K = MINIMUM GAP WIDTH WHEN THE RING IS PROPERLY SEATED IN THE GROOVE. (DESIGN REFERENCE DIMENSION.)

\* C = ACTUAL CLEARANCE DIAMETER WHEN THE RING IS SPRUNG INTO THE HOUSING, PRIOR TO INSTALLATION INTO THE GROOVE. (DESIGN REFERENCE DIMENSION.)

\* R AND \* CH = RADII OR CHAMFER ALLOWABLE ON PARTS TO BE RETAINED BY THE RING. THRUST LOADS OF RINGS, RETAINING PARTS WITH CORNER RADII OR CHAMFERS AS LISTED ABOVE ARE TABULATED ON SHEET 11.

TIR = (TOTAL INDICATOR READING) IS THE MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN THE GROOVE AND THE HOUSING.

DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED.

SUPPLEMENTARY MANUFACTURING DIMENSIONS ARE INCLUDED IN PROCUREMENT SPECIFICATION MIL-DTL-21248.

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## REQUIREMENTS:

1. MATERIAL: CARBON STEEL, SAE AIR 4127, STEEL NUMBERS 1060 THRU 1090, STEEL CORROSION RESISTING (SEE PROCUREMENT SPECIFICATION).

BERYLLIUM COPPER, ASTM B194.

2. HARDNESS

TABLE II. HARDNESS.

HOUSING DIA.	STEEL	HOUSING DIA.	CORROSION RESISTANT STEEL	BERYLLIUM COPPER
.250 AND .312	ROCKWELL 15N-86-88	.250 AND .312	ROCKWELL 15N-82.5-86	ROCKWELL 15N-77-82
.375 TO .512 INCL.	ROCKWELL 30N-69.5-73	.375 TO 1.023	ROCKWELL 30N-63-69.5	ROCKWELL 30N-54-62
.562 TO .777 INCL.	ROCKWELL 30N67.5-72.1	1.062 AND OVER	ROCKWELL C-44-51	ROCKWELL C-34-45
.812 TO 1.025 INCL.	ROCKWELL 30N-66-71			
1.062 TO 3.000 INCL.	ROCKWELL C-47-52			
3.062 AND OVER	ROCKWELL C-45-52			

3. PROTECTIVE FINISH OR TREATMENT:

- (a) CADMIUM PLATE IN ACCORDANCE WITH SAE AMS-QQ-P-416, TYPE II, CLASS 3.
- (b) CORROSION RESISTING STEEL RINGS SHALL BE PASSIVATED, SAE AMS2700.
- (c) PHOSPHATE COAT IN ACCORDANCE WITH MIL-DTL-16232, TYPE Z, CLASS II.
- (d) ZINC COAT IN ACCORDANCE WITH ASTM B633, TYPE II, CLASS Fe/Zn 5 OR ASTM B695, TYPE II, CLASS 5.

4. PART NUMBER: THE BASIC MS PART NUMBER IS FOLLOWED BY A DASH NUMBER TAKEN FROM TABLE III AND IV.

EXAMPLE: MS16625-1100 IS THE PART NUMBER FOR A STEEL, INTERNAL RING FOR USE IN A 1.000 DIAMETER HOUSING.

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TABLE III. DASH NUMBERS.

H HOUSING DIAMETER	1/ STEEL CADMIUM PLATED	1/ STEEL ZINC PLATED	1/ STEEL PHOSPHATE COATED	STEEL CORROSION RESISTING	1/ BERYLLIUM COPPER
	DASH NO.	DASH NO.	DASH NO.	DASH NO.	DASH NO
.250	MS16625-1025	MS1662-2025	MS16625-3025	MS16625-4025	MS16625-5025
.312	↑ -1031	↑ -2031	↑ -3031	↑ -4031	↑ -5031
.375	↑ -1037	↑ -2037	↑ -3037	↑ -4037	↑ -5037
.438	↑ -1043	↑ -2043	↑ -3043	↑ -4043	↑ -5043
.453	↑ -1045	↑ -2045	↑ -3045	↑ -4045	↑ -5045
.500	↑ -1050	↑ -2050	↑ -3050	↑ -4050	↑ -5050
.512	↑ -1051	↑ -2051	↑ -3051	↑ -4051	↑ -5051
.562	↑ -1056	↑ -2056	↑ -3056	↑ -4056	↑ -5056
.625	↑ -1062	↑ -2062	↑ -3062	↑ -4062	↑ -5062
.688	↑ -1068	↑ -2068	↑ -3068	↑ -4068	↑ -5068
.750	↑ -1075	↑ -2075	↑ -3075	↑ -4075	↑ -5075
.777	↑ -1077	↑ -2077	↑ -3077	↑ -4077	↑ -5077
.812	↑ -1081	↑ -2081	↑ -3081	↑ -4081	↑ -5081
.866	↑ -1086	↑ -2086	↑ -3086	↑ -4086	↑ -5086
.875	↑ -1087	↑ -2087	↑ -3087	↑ -4087	↑ -5087
.901	↑ -1090	↑ -2090	↑ -3090	↑ -4090	↑ -5090
.938	↑ -1093	↑ -2093	↑ -3093	↑ -4093	↑ -5093
1.000	↑ -1100	↑ -2100	↑ -3100	↑ -4100	↑ -5100
1.023	↑ -1102	↑ -2102	↑ -3102	↑ -4102	↑ -5102
1.062	↑ -1106	↑ -2106	↑ -3106	↑ -4106	↑ -5106
1.125	↑ -1112	↑ -2112	↑ -3112	↑ -4112	↑ -5112
1.181	↑ -1118*	↑ -2118*	↑ -3118*	↑ -4118*	↑ -5118*
1.188	↑ -1118*	↑ -2118*	↑ -3118*	↑ -4118*	↑ -5118*
1.250	↑ -1125*	↑ -2125*	↑ -3125*	↑ -4125*	↑ -5125*
1.259	↑ -1125*	↑ -2125*	↑ -3125*	↑ -4125*	↑ -5125*
1.312	↑ -1131	↑ -2131	↑ -3131	↑ -4131	↑ -5131
1.375	↑ -1137*	↑ -2137*	↑ -3137*	↑ -4137*	↑ -5137*
1.378	↑ -1137*	↑ -2137*	↑ -3137*	↑ -4137*	↑ -5137*
1.438	↑ -1143	↑ -2143	↑ -3143	↑ -4143	↑ -5143
1.456	↑ -1145	↑ -2145	↑ -3145	↑ -4145	↑ -5145
1.500	↑ -1150	↑ -2150	↑ -3150	↑ -4150	↑ -5150
1.562	↑ -1156*	↑ -2156*	↑ -3156*	↑ -4156*	↑ -5156*
1.575	↑ -1156*	↑ -2156*	↑ -3156*	↑ -4156*	↑ -5156*
1.625	↑ -1162	↑ -2162	↑ -3162	↑ -4162	↑ -5162
1.653	↑ -1165	↑ -2165	↑ -3165	↑ -4165	↑ -5165
1.688	↑ -1168	↑ -2168	↑ -3168	↑ -4168	↑ -5168
1.750	↑ -1175	↑ -2175	↑ -3175	↑ -4175	↑ -5175
1.812	↑ -1181	↑ -2181	↑ -3181	↑ -4181	↑ -5181
1.850	↑ -1185	↑ -2185	↑ -3185	↑ -4185	↑ -5185
1.875	↑ -1187	↑ -2187	↑ -3187	↑ -4187	↑ -5187
1.938	↑ -1193	↑ -2193	↑ -3193	↑ -4193	↑ -5193
2.000	↑ -1200	↑ -2200	↑ -3200	↑ -4200	MS16625-5200
2.047	↑ -1206*	↑ -2206*	↑ -3206*	↑ -4206*	
2.062	↑ -1206*	↑ -2206*	↑ -3206*	↑ -4206*	
2.125	↑ -1212	↑ -2212	↑ -3212	↑ -4212	
2.165	↑ -1218*	↑ -2218*	↑ -3218*	↑ -4218*	
2.188	↑ -1218*	↑ -2218*	↑ -3218*	↑ -4218*	
2.250	↑ -1225	↑ -2225	↑ -3225	↑ -4225	
2.312	↑ -1231	↑ -2231	↑ -3231	↑ -4231	
2.375	↑ -1237	↑ -2237	↑ -3237	↑ -4237	
2.440	↑ -1244	↑ -2244	↑ -3244	↑ -4244	
2.500	↑ -1250*	↑ -2250*	↑ -3250*	↑ -4250*	
2.531	↑ -1250*	↑ -2250*	↑ -3250*	↑ -4250*	
2.562	↑ -1256	↑ -2256	↑ -3256	↑ -4256	
2.625	↑ -1262	↑ -2262	↑ -3262	↑ -4262	
2.677	↑ -1268*	↑ -2268*	↑ -3268*	↑ -4268*	
2.688	MS16625-1268*	MS16625-2268*	MS16625-3268*	MS16625-4268*	

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TABLE III. DASH NUMBERS. CONTINUED

H HOUSING DIAMETER	1/ STEEL CADMIUM PLATED	1/ STEEL ZINC PLATED	1/ STEEL PHOSPHATE COATED	STEEL CORROSION RESISTING
	DASH NO.	DASH NO.	DASH NO.	DASH NO.
2.750	MS16625-1275	MS16625-2275	MS16625-3275	MS16625-4275
2.813	↑ -1281*	↑ -2281*	↑ -3281*	↑ -4281*
2.834	↑ -1281*	↑ -2281*	↑ -3281*	↑ -4281*
2.875	↑ -1287	↑ -2287	↑ -3287	↑ -4287
2.953	↑ -1300*	↑ -2300*	↑ -3300*	↑ -4300*
3.000	↑ -1300*	↑ -2300*	↑ -3300*	↑ -4300*
3.062	↑ -1306	↑ -2306	↑ -3306	↑ -4306
3.125	↑ -1312	↑ -2312	↑ -3312	↑ -4312
3.149	↑ -1315*	↑ -2315*	↑ -3315*	↑ -4315*
3.156	↑ -1315*	↑ -2315*	↑ -3315*	↑ -4315*
3.250	↑ -1325	↑ -2325	↑ -3325	↑ -4325
3.346	↑ -1334	↑ -2334	↑ -3334	↑ -4334
3.469	↑ -1346	↑ -2346	↑ -3346	↑ -4346
3.500	↑ -1350	↑ -2350	↑ -3350	↑ -4350
3.543	↑ -1354*	↑ -2354*	↑ -3354*	↑ -4354*
3.562	↑ -1354*	↑ -2354*	↑ -3354*	↑ -4354*
3.625	↑ -1362	↑ -2362	↑ -3362	↑ -4362
3.740	↑ -1375*	↑ -2375*	↑ -3375*	↑ -4375*
3.750	↑ -1375*	↑ -2375*	↑ -3375*	↑ -4375*
3.875	↑ -1387	↑ -2387	↑ -3387	↑ -4387
3.938	↑ -1393	↑ -2393	↑ -3393	↑ -4393
4.000	↑ -1400	↑ -2400	↑ -3400	↑ -4400
4.125	↑ -1412	↑ -2412	↑ -3412	↑ -4412
4.250	↑ -1425	↑ -2425	↑ -3425	↑ -4425
4.330	↑ -1433	↑ -2433	↑ -3433	↑ -4433
4.500	↑ -1450	↑ -2450	↑ -3450	↑ -4450
4.625	↑ -1462	↑ -2462	↑ -3462	↑ -4462
4.724	↑ -1475*	↑ -2475*	↑ -3475*	↑ -4475*
4.750	↑ -1475*	↑ -2475*	↑ -3475*	↑ -4475*
5.000	↑ -1500	↑ -2500	↑ -3500	↑ -4500
5.250	↑ -1525	↑ -2525	↑ -3525	↑ -4525
5.375	↑ -1537	↑ -2537	↑ -3537	↑ -4537
5.500	↑ -1550	↑ -2550	↑ -3550	↑ -4550
5.750	↑ -1575	↑ -2575	↑ -3575	↑ -4575
6.000	↑ -1600	↑ -2600	↑ -3600	↑ -4600
6.250	↑ -1625	↑ -2625	↑ -3625	↑ -4625
6.500	↑ -1650	↑ -2650	↑ -3650	↑ -4650
6.625	↑ -1662	↑ -2662	↑ -3662	↑ -4662
6.750	↑ -1675	↑ -2675	↑ -3675	↑ -4675
7.000	↑ -1700	↑ -2700	↑ -3700	↑ -4700
7.250	↑ -1725	↑ -2725	↑ -3725	↑ -4725
7.500	↑ -1750	↑ -2750	↑ -3750	↑ -4750
8.000	↑ -1800	↑ -2800	↑ -3800	↑ -4800
8.250	↑ -1825	↑ -2825	↑ -3825	↑ -4825
8.500	↑ -1850	↑ -2850	↑ -3850	↑ -4850
8.750	↑ -1875	↑ -2875	↑ -3875	↑ -4875
9.000	↑ -1900	↑ -2900	↑ -3900	↑ -4900
9.250	↓ -1925	↓ -2925	↓ -3925	↓ -4925
9.500	↓ -1950	↓ -2950	↓ -3950	↓ -4950
9.750	↓ -1975	↓ -2975	↓ -3975	↓ -4975
10.000	MS16625-2000	MS16625-3000	MS16625-4000	MS16625-5000

\* SAME DASH NUMBERS SUITABLE FOR EITHER HOUSING DIAMETER (INCHES OR MM)  
 1/ SUBSTITUTE CORROSION RESISTANT STEEL WHEN USED IN FOOD PROCESSING MACHINERY, OR IN FUEL OR LUBRICATION SYSTEMS, OR WHEN USED AT TEMPERATURES OVER 450°F (233°C).

TABLE IV. SUBSTITUTION TABLE.

CROSS REFERENCE OF PART NUMBERS				
H HOUSING DIAMETER	INACTIVE	SUBSTITUTE	SUBSTITUTE	SUBSTITUTE
	STEEL	1/ STEEL CADMIUM PLATED	1/ STEEL ZINC PLATED	1/ STEEL PHOSPHATE COATED
	DASH NO.	DASH NO	DASH NO.	DASH NO.
.250	MS16625-25	MS16625-1025	MS16625-2025	MS16625-3025
.312	↑ -31	↑ -1031	↑ -2031	↑ -3031
.375	-37	-1037	-2037	-3037
.438	-43	-1043	-2043	-3043
.453	-45	-1045	-2045	-3045
.500	-50	-1050	-2050	-3050
.512	-51	-1051	-2051	-3051
.562	-56	-1056	-2056	-3056
.625	-62	-1062	-2062	-3062
.688	-68	-1066	-2066	-3068
.750	-75	-1075	-2075	-3075
.777	-77	-1077	-2077	-3077
.812	-81	-1081	-2081	-3081
.866	-86	-1086	-2086	-3086
.875	-87	-1087	-2087	-3087
.901	-90	-1090	-2090	-3090
.936	-93	-1093	-2093	-3093
1.000	-100	-1100	-2100	-3100
1.023	-102	-1102	-2102	-3102
1.062	-106	-1106	-2106	-3106
1.125	-112	-1112	-2112	-3112
1.181	-118	-1118	-2118	-3118
1.188	-118	-1118	-2118	-3118
1.250	-125	-1125	-2125	-3125
1.259	-125	-1125	-2125	-3125
1.312	-131	-1131	-2131	-3131
1.375	-137	-1137	-2137	-3137
1.378	-137	-1137	-2137	-3137
1.438	-143	-1143	-2143	-3143
1.456	-145	-1145	-2145	-3145
1.500	-150	-1150	-2150	-3150
1.562	-156	-1156	-2156	-3156
1.575	-156	-1156	-2156	-3156
1.625	-162	-1162	-2162	-3162
1.653	-165	-1165	-2165	-3165
1.688	-168	-1168	-2168	-3168
1.750	-175	-1175	-2175	-3175
1.812	-181	-1161	-2161	-3181
1.850	-185	-1165	-2165	-3185
1.875	-187	-1167	-2167	-3187
1.938	-193	-1193	-2193	-3193
2.000	-200	-1200	-2200	-3200
2.047	-206	-1206	-2206	-3206
2.062	-206	-1206	-2206	-3206
2.125	-212	-1212	-2212	-3212
2.165	-218	-1218	-2218	-3218
2.186	-218	-1218	-2218	-3218
2.250	-225	-1225	-2225	-3225
2.312	-231	-1231	-2231	-3231
2.375	-237	-1237	-2237	-3237
2.440	-244	-1244	-2244	-3244
2.500	-250	-1250	-2250	-3250
2.531	-250	-1250	2250	-3250
2.562	-256	-1256	-2256	-3256
2.625	-262	-1262	-2262	-3262
2.677	-268	-1268	-2268	-3268
2.688	-268	-1268	-2268	-3268
2.750	-275	-1275	-2275	-3275
2.813	↓ -281	↓ -1281	↓ -2281	↓ -3281
2.834	-281	-1281	-2281	-3281
2.875	MS16625-287	MS16625-1287	MS16625-2287	MS16625-3287



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TABLE IV. SUBSTITUTION TABLE. CONTINUED

CROSS REFERENCE OF PART NUMBERS				
H HOUSING DIAMETER	INACTIVE	SUBSTITUTE	SUBSTITUTE	SUBSTITUTE
	STEEL	1/ STEEL CADMIUM PLATED	1/ STEEL ZINC PLATED	1/ STEEL PHOSPHATE COATED
	DASH NO.	DASH NO.	DASH NO.	DASH NO.
2.953	MS16625-300	MS16625-1300	MS16625-2300	MS16625-3300
3.000	-300	-1300	-2300	-3300
3.062	↑ -306	↑ -1306	↑ -2306	↑ -3306
3.125	-312	-1312	-2312	-3312
3.149	-315	-1315	-2315	-3315
3.156	-315	-1315	-2315	-3315
3.250	-325	-1325	-2325	-3325
3.346	-334	-1334	-2334	-3334
3.469	-346	-1346	-2346	-3346
3.500	-350	-1350	-2350	-3350
3.543	-354	-1354	-2354	-3354
3.562	-354	-1354	-2354	-3354
3.625	-362	-1362	-2362	-3362
3.740	-375	-1375	-2375	-3375
3.750	-375	-1375	-2375	-3375
3.875	-387	-1387	-2387	-3387
3.938	-393	-1393	-2393	-3393
4.000	-400	-1400	-2400	-3400
4.125	-412	-1412	-2412	-3412
4.250	-425	-1425	-2425	-3425
4.330	-433	-1433	-2433	-3433
4.500	-450	-1450	-2450	-3450
4.625	-462	-1462	-2462	-3462
4.724	-475	-1475	-2475	-3475
4.750	-475	-1475	-2475	-3475
5.000	-500	-1500	-2500	-3500
5.250	-525	-1525	-2525	-3525
5.375	-537	-1537	-2537	-3537
5.500	-550	-1550	-2550	-3550
5.570	-575	-1575	-2575	-3575
6.000	-600	-1600	-2600	-3600
6.250	-625	-1625	-2625	-3625
6.500	-650	-1650	-2650	-3650
6.625	-662	-1662	-2662	-3662
6.750	-675	-1675	-2675	-3675
7.000	-700	-1700	-2700	-3700
7.250	-725	-1725	-2725	-3725
7.500	-750	-1750	-2750	-3750
8.000	-800	-1800	-2800	-3800
8.250	-825	-1825	-2825	-3825
8.500	-850	-1850	-2850	-3850
8.750	-875	-1875	-2875	-3875
9.000	-900	-1900	-2900	-3900
9.250	-925	-1925	-2925	-3925
9.500	↓ -950	↓ -1950	↓ -2950	↓ -3950
9.750	-975	-1975	-2975	-3975
10.000	MS16625-1000	MS16625-2000	MS16625-3000	MS16625-4000

1/ SUBSTITUTE CORROSION RESISTANT STEEL WHEN USED IN FOOD PROCESSING MACHINERY, OR IN FUEL OR LUBRICATION SYSTEMS, OR WHEN USED AT TEMPERATURES OVER 450°F (233°C).

NOTES:

1. DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED. DIMENSIONING AND TOLERANCING SHALL BE IN ACCORDANCE WITH ASME Y14.5M.
2. INACTIVE FOR NEW DESIGN, UNCOATED STEEL (SEE SUBSTITUTION TABLE IV).
3. RECOMMENDED DESIGN LIMITATIONS AND USAGE:

(a) INTENDED USE- TO PROVIDE SHOULDERS FOR POSITIONING AND RETAINING MACHINE COMPONENTS IN HOUSINGS (BORES). TAPERED DESIGN PRINCIPLE PERMITS RINGS TO MAINTAIN CONSTANT CIRCULARITY AND PRESSURE AGAINST BOTTOM OF GROOVE. THE USE OF THE FOLLOWING FORMULAS IS BASED ON THE FACT THAT THE RING WILL NOT FAIL IN COMPRESSION.

(b) ALLOWABLE THRUST LOAD CAPACITY OF THE RINGS. ABUTTING COMPONENTS TO HAVE SHARP CORNERS.

$$P = \frac{\pi H T X}{F}$$

WHERE:

P = ALLOWABLE THRUST LOAD (POUNDS)  
 H = HOUSING DIAMETER (INCHES)  
 T = RING, THICKNESS (INCHES)  
 X = ULTIMATE SHEAR STRENGTH OF THE RING MATERIAL (P.S.I.)\* .  
 F = FACTOR OF SAFETY, F=4, IS RECOMMENDED, SINCE THE RING UNDER LOAD IS SUBJECTED NOT ONLY TO PURE SHEAR STRESSED BUT ALSO TO BENDING STRESSES.

(c) ALLOWABLE LOAD CAPACITY OF GROOVE WALL =

$$P = \frac{\pi H d Y}{F}$$

WHERE:

P = ALLOWABLE COMPRESSION LOAD (POUNDS)  
 H = HOUSING DIAMETER (INCHES)  
 d = GROOVE DEPTH (INCHES)  
 Y = YIELD STRENGTH IN COMPRESSION OF THE GROOVE MATERIAL (P.S.I.).  
 F = FACTOR OF SAFETY- TO INSURE A SAFE WORKING LOAD  
 A SAFETY FACTOR, F = 2, IS RECOMMENDED

(d) MINIMUM DISTANCE BETWEEN OUTER GROOVE WALL AND END OF HOUSING =

$$Z = 3d$$

WHERE:

Z = MINIMUM DISTANCE BETWEEN OUTER GROOVE WALL AND END OF HOUSING (INCHES).  
 d = GROOVE DEPTH (INCHES).

(e) ALLOWABLE HOUSING DIAMETER =

$$H = \sqrt{\frac{G^2 - 4FP}{Y \pi}}$$

WHERE:

H = ALLOWABLE HOUSING DIAMETER  
 G = GROOVE DIAMETER.  
 F = FACTOR OF SAFETY (SEE FORMULA (c) ABOVE).  
 P = DESIGN LOAD.  
 Y = YIELD STRENGTH IN COMPRESSION OF GROOVE MATERIAL (P.S.I.).

(f) DIFFERENTIAL ROTATION:

THE CONDITIONS UNDER WHICH A RETAINING RING MAY BE USED WHEN ADJACENT PARTS ROTATE RELATIVE TO IT, FALL INTO TWO CATEGORIES:

- (1) WHERE NO THRUST IS EXERTED BY ADJACENT PART: IN THIS CASE, DIFFERENTIAL ROTATION OF RING AND ADJACENT PART CREATES NO ELEMENT OF RISK IN THE APPLICATION OF THE RINGS BECAUSE NO FRICTIONAL TORQUE IS EXERTED BY THE MACHINE PART ON THE RING.
- (2) CONSIDERATION MUST BE GIVEN TO THE MAGNITUDE OF THE THRUST INVOLVED. THE FRICTION MOMENT MAY NOT EXCEED THE BENDING MOMENT, WHICH THE RING CAN TOLERATE WITHOUT RELEASING ITS PRESSURE AGAINST THE BOTTOM OF THE GROOVE, FORMULATED AS FOLLOWS;

$$fPN \leq \frac{sTE^2}{18} \quad \text{OR}$$

$$P \leq \frac{StE}{f18N}$$

WHERE:

P = ALLOWABLE THRUST LOAD EXERTED BY ADJACENT PART (POUNDS).

f = COEFFICIENT OF FRICTION.

s = WORKING STRESS OF RING UNDER MAXIMUM CONTRACTION (P.S.I.) •.

T = RING THICKNESS (INCHES).

E = GREATEST WIDTH SECTION OF RING (INCHES).

N = NEUTRAL RING DIAMETER (INCHES) = FREE DIAMETER MINUS 3/4 E DIMENSION.

IN SUCH CASES WHERE DIFFERENTIAL ROTATION OCCURS THE CALCULATION SHOULD BE BASED ON THE MAXIMUM POSSIBLE VALUE OF THE COEFFICIENT OF FRICTION.

(g) IMPACT CAPACITY OF RING OR GROOVE WALL:

$$I_R = \frac{PT}{2} \quad \text{FOR THE RING (INCH POUNDS) ABUTTING COMPONENTS TO HAVE SHARP CORNERS}$$

$$I_G = \frac{Pd}{2} \quad \text{FOR THE GROOVE (INCH POUNDS).}$$

WHERE:

P = ALLOWABLE THRUST LOAD OF RING OR GROOVE (POUNDS).

T = RING THICKNESS (INCHES).

I<sub>G</sub> = IMPACT CAPACITY OF GROOVE WALL (INCH POUNDS).

d = GROOVE DEPTH (INCHES).

I<sub>R</sub> = IMPACT CAPACITY OF RING (INCH POUNDS) .

\* FOR RINGS OF STEEL X = 120,000 P.S.I. ULTIMATE SHEAR STRENGTH FOR RING SIZES UP TO 3/4 INCH.  
X = 150,000 P.S.I. ULTIMATE SHEAR STRENGTH FOR RING SIZES 3/4 INCH AND OVER.  
S = 250,000 P.S.I. WORKING STRESS.

\* FOR RINGS OF BERYLLIUM COPPER X = 110,000 P.S.I. ULTIMATE SHEAR STRENGTH FOR ALL SIZES.  
S = 180,000 P.S.I. WORKING STRESS.

(h) LOAD CAPACITY, WITH THE RETAINED PART RADIUS OR CHAMFERED:

WHEN THE RADIUS OR CHAMFER OF THE RETAINED PART DOES NOT EXCEED THE MAXIMUM RADIUS ALLOWED FOR THE BOTIOM OF THE RING GROOVE, THE LESSER LOAD CAPACITY COMPUTED FROM THE FORMULAS ON SHEET 10 WILL APPLY. THE CORNER RADII AND CHAMFERS LISTED ON TABLE I WERE CHOSEN AS LARGE AS POSSIBLE FOR THE RING SIZES INVOLVED AND ARE RELATED TO THE MAXIMUM THRUST LOADS LISTED IN TABLE V.

IF THE CORNER RADII OR CHAMFERS ARE SMALLER THAN THOSE LISTED, THEN THE THRUST LOADS INCREASE PROPORTIONALLY, IN ACCORDANCE WITH THE FOLLOWING FORMULAS:

$$P^1 = \frac{PCH}{CH^1} \quad \text{OR}$$

WHERE:

P<sup>1</sup> = NEW ALLOWABLE THRUST LOAD.

P = LISTED ALLOWABLE THRUST LOAD.

CH<sup>1</sup> = NEW (SMALLER) CHAMFER.

CH = LISTED CHAMFER.

R<sup>1</sup> = NEW (SMALLER) CORNER RADIUS.

R = LISTED CORNER RADIUS.

$$P^1 = \frac{PR}{R^1}$$

LIMIT LOADS LISTED IN TABLE V ARE BASED ON RINGS OF STEEL OR STAINLESS STEEL (WORKING STRESS = 250,000 P.S.I. - TABLE I) AND OF BERYLLIUM COPPER (WORKING STRESS = 180,000 P.S.I. - TABLE II), IF THE ALLOWABLE GROOVE CAPACITY LOADS, AS CALCULATED BY USING THE FORMULA ON SHEET 10 ARE LESS THAN THEY SHOULD BE USED.

TABLE V. LIMIT LOADS.

NOMINAL RING SIZE		ALLOWABLE THRUST LOAD FOR RING ASSEMBLIES WITH PARTS HAVING MAXIMUM CORNER RADII OR CHAMFERS.	
FROM	TO	TABLE I STEEL OR STAINLESS STEEL	TABLE II BERYLLIUM COPPER
.250	.312	190 LB	140 LB
.375	.453	530 LB	380 LB
.500	.750	1100 LB	800 LB
.777	.938	1650 LB	1200 LB
1.000	1.500	2400 LB	1700 LB
1.562	2.000	3900 LB	2800 LB
2.062	2.531	6200 LB	
2.652	3.000	9000 LB	
3.062	5.000	12000 LB	
5.250	6.000	15000 LB	
6.250	7.000	23000 LB	
7.250	10.000	34000 LB	

NOTE: THE ABOVE FORMULAS ARE TO BE USED FOR BRITTLE MATERIALS SUCH AS CAST IRON, ETC.

WARNING: RINGS SHOULD NOT BE EXCESSIVELY CONTRACTED DURING INSTALLATION SINCE THIS WILL LEAD TO RING FAILURE. IF THE RING HAS PLAY BETWEEN THE GROOVE DIAMETER AND THE OUTSIDE RING DIAMETER THIS INDICATES THAT THE RING HAS BEEN EXCESSIVELY CONTRACTED, (PROVIDING GROOVE DIAMETER HAS BEEN MACHINED TO RECOMMENDED DIMENSIONS).

4. CHANGES FROM PREVIOUS ISSUE.. THE MARGINS OF THIS SPECIFICATION ARE MARKED WITH VERTICAL LINES TO INDICATE MODIFICATIONS GENERATED BY THIS REVISION. THIS WAS DONE AS A CONVENIENCE ONLY AND THE GOVERNMENT ASSUMES NO LIABILITY WHATSOEVER FOR ANY INACCURACIES IN THESE NOTATIONS. BIDDERS AND CONTRACTORS ARE CAUTIONED TO EVALUATE THE REQUIREMENTS OF THIS DOCUMENT BASED ON THE ENTIRE CONTENT IRRESPECTIVE OF THE MARGINAL NOTATIONS.

MILITARY INTEREST

Custodians:  
 Army - AR  
 Navy - OS  
 Air Force - 99  
 Review activities:  
 Army – AV, MI

Preparing activity:  
 DLA - IS  
  
 (Project 5325-2015-008)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.