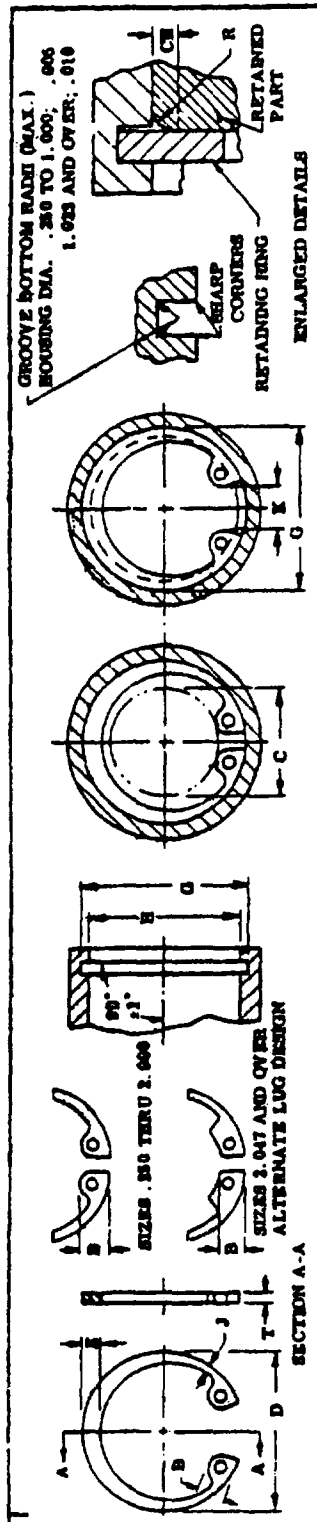


REVERSE SYMBOLS:  
 NAVY - OS  
 ARMY - WC, MI, AV  
 AIR FORCE - 93, 95

USE SYMBOLS:  
 NAVY - MC  
 ARMY - AT, MU, ME

This military standard is approved by the Department of Defense and is mandatory for use by all Departments and Agencies of the Department of Defense. Selection for all new engineering and design applications and for replacement use shall be made from this document.

DD FORM 1327 57 672-1 (Coordinate)



DICE	BOSSING DIAMETER	D FREE DIAMETER		B		E		J		T		G		W	GAP WIDTH	°C	°R	OF RETAINED PART
		BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.	BASIC	TOL.					
.250	6.4	.260	.005	.025	.002	.015	.001	.015	.015	.0015	.018	.002	.018	.018	.047	115	011	.0065
.312	7.9	.346	.006	.035	.003	.018	.002	.018	.018	.0015	.021	.002	.021	.021	.058	173	018	.013
.375	9.5	.415	.007	.040	.003	.025	.003	.025	.025	.002	.028	.003	.028	.028	.063	204	023	.016
.438	11.2	.482	.008	.049	.003	.030	.003	.030	.030	.002	.033	.003	.033	.033	.071	25	027	.021
.500	12.7	.546	.011	.053	.003	.035	.003	.035	.035	.002	.038	.003	.038	.038	.090	26	027	.021
.562	14.3	.620	.016	.063	.003	.040	.004	.040	.040	.002	.044	.004	.044	.044	.092	27	027	.021
.625	15.9	.694	.022	.070	.004	.045	.004	.045	.045	.002	.048	.004	.048	.048	.093	27.5	027	.021
.688	17.5	.763	.028	.074	.004	.048	.004	.048	.048	.002	.051	.004	.051	.051	.104	34	037	.021
.750	19.0	.831	.035	.077	.004	.050	.004	.050	.050	.002	.053	.004	.053	.053	.116	40	037	.021
.777	19.7	.859	.036	.077	.004	.050	.004	.050	.050	.002	.053	.004	.053	.053	.123	45	032	.025
.812	20.6	.901	.038	.077	.004	.050	.004	.050	.050	.002	.053	.004	.053	.053	.148	47.5	035	.028
.866	22.0	.961	.041	.081	.004	.054	.004	.054	.054	.002	.057	.004	.057	.057	.153	49	035	.026
.875	22.3	.971	.042	.081	.004	.054	.004	.054	.054	.002	.057	.004	.057	.057	.173	54	035	.028
.901	22.9	1.000	.045	.087	.004	.055	.004	.055	.055	.002	.058	.004	.058	.058	.179	54.8	035	.026
.938	23.8	1.043	.048	.091	.004	.057	.004	.057	.057	.002	.060	.004	.060	.060	.188	56.5	038	.030
1.000	25.4	1.111	.052	.104	.004	.062	.004	.062	.062	.002	.064	.004	.064	.064	.200	61	038	.030
1.023	26.0	1.136	.053	.108	.004	.063	.004	.063	.063	.002	.065	.004	.065	.065	.212	66.5	042	.034
1.062	27.0	1.180	.055	.110	.004	.065	.004	.065	.065	.002	.067	.004	.067	.067	.230	69	042	.034
1.125	28.6	1.249	.058	.116	.004	.067	.004	.067	.067	.002	.069	.004	.069	.069	.243	74.5	047	.038
1.181	30.0	1.319	.060	.120	.004	.068	.004	.068	.068	.002	.070	.004	.070	.070	.256	79	047	.036
1.188	30.2	1.319	.060	.120	.004	.068	.004	.068	.068	.002	.070	.004	.070	.070	.260	80	047	.036
1.250	31.7	1.386	.062	.124	.004	.070	.004	.070	.070	.002	.072	.004	.072	.072	.280	85	048	.038
1.259	32.0	1.388	.062	.124	.004	.070	.004	.070	.070	.002	.072	.004	.072	.072	.284	85	048	.038
1.312	33.3	1.455	.063	.130	.004	.072	.004	.072	.072	.002	.074	.004	.074	.074	.297	90	048	.036
1.375	34.9	1.526	.063	.130	.004	.072	.004	.072	.072	.002	.074	.004	.074	.074	.305	99	048	.038
1.378	35.0	1.526	.063	.130	.004	.072	.004	.072	.072	.002	.074	.004	.074	.074	.313	106	048	.038
1.438	36.5	1.596	.066	.133	.004	.073	.004	.073	.073	.002	.075	.004	.075	.075	.320	106	048	.038
1.458	37.0	1.616	.066	.133	.004	.073	.004	.073	.073	.002	.075	.004	.075	.075	.340	112	048	.038
1.500	38.1	1.660	.068	.133	.004	.073	.004	.073	.073	.002	.075	.004	.075	.075	.340	112	048	.038

ENTIRE STANDARD REVISED  
 P.A. NAVY - OS  
 Other Code  
 ARMY - WC  
 AIR FORCE - 11  
 TITLE  
 RING, RETAINING, INTERNAL, BASIC (TAPERED SECTION TYPE)  
 MIL-R-21346 TY. I CL. 1  
 SUPERSEDES  
 SHEET 1 OF 10  
 APPROVED 11 DEC 1956 REVISED (A) 21 MAY 1963 (B) 15 JULY 1963 (C) 13 AUG 1968  
 FED. SUP CLASS 5340

MILITARY STANDARD  
 MS16625

PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

REVIEWER SYMBOLS:  
NAVY - OS  
ARMY - WC, MI, AV  
AIR FORCE - 82, 85

USER SYMBOLS:  
NAVY - MC  
ARMY - AT, MU, ME

"Review user information is correct as of the date of this document. For future combination of changes to this document, such combination should be based on the information in the current DDD915."

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H		D		B		E		J		T		G		W		K		°R OF RETAINED PART		°C		°CH	
DIAMETER	INCH	FREE DIAMETER	BASIC TOL.	DIAMETER	BASIC TOL.	BASIC TOL.	BASIC TOL.	BASIC TOL.	BASIC TOL.	BASIC TOL.	BASIC TOL.	DIAMETER	BASIC TOL.	WIDTH	BASIC TOL.	GAP WIDTH	MIN.	MAX.	MAX.	MIN.	MAX.	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		.338	1.15	.064	.050					
1.653	42.0	1.835	.227		.167	.085	.062					1.755	.068	.005	.348	1.17	.064	.050					
1.688	42.9	1.874	.234		.170	.085	.062					1.792	.068	.004	.357	1.21	.064	.050					
1.750	44.4	1.942	.234		.171	.083	.062					1.858	.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					1.982	.068		.392	1.38	.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	.068		.428	1.52	.076	.061					
2.062	52.4	2.280	.250		.186	.091	.078					2.186	.068		.468	1.54	.078	.062					
2.125	54.0	2.350	.260		.195	.096	.078					2.251	.068		.460	1.58	.078	.062					
2.165	55.0	2.415	.264		.199	.098	.078					2.295	.068		.459	1.61	.078	.062					
2.188	55.6	2.415	.264		.199	.098	.078					2.318	.068		.488	1.64	.078	.062					
2.250	57.1	2.490	.270		.203	.099	.078					2.382	.068		.478	1.69	.078	.062					
2.312	58.7	2.560	.270		.206	.100	.078					2.450	.068		.504	1.75	.078	.062					
2.375	60.3	2.630	.270		.207	.102	.078					2.517	.068		.518	1.81	.078	.062					
2.440	62.0	2.702	.280		.209	.103	.078					2.584	.068		.518	1.86	.078	.062					
2.500	63.5	2.775	.280		.210	.103	.078					2.648	.068	.006	.532	1.91	.078	.062					
2.531	64.3	2.775	.280		.210	.103	.078					2.681	.068	.006	.532	1.94	.078	.062					
2.582	65.1	2.844	.290		.222	.109	.093					2.714	.103	.000	.540	1.95	.088	.070					
2.625	66.7	2.910	.290		.226	.111	.093					2.781	.103	.000	.558	2.02	.088	.070					
2.677	68.0	2.980	.300		.230	.113	.093					2.837	.103	.000	.539	2.05	.090	.072					
2.688	68.3	2.980	.300		.230	.113	.093					2.848	.103	.000	.508	2.06	.090	.072					
2.750	69.8	3.050	.300		.234	.115	.093					2.914	.103	.000	.590	2.12	.092	.074					
2.812	71.4	3.121	.300		.230	.115	.093					2.980	.103	.000	.615	2.18	.088	.070					
2.835	72.0	3.121	.300		.230	.115	.093					3.008	.103	.000	.678	2.21	.088	.070					
2.875	73.0	3.191	.310		.240	.120	.093					3.051	.103	.000	.628	2.22	.092	.074					
2.953	75.0	3.325	.310		.250	.122	.093					3.135	.103	.000	.619	2.30	.092	.074					
3.000	76.2	3.325	.310		.250	.122	.093					3.182	.103	.000	.738	2.35	.092	.074					
3.062	77.8	3.418	.310		.254	.126	.093					3.248	.120	.000	.651	2.41	.097	.078					
3.125	79.4	3.488	.310		.259	.129	.093					3.315	.120	.000	.655	2.47	.099	.079					
3.149	80.0	3.523	.310		.262	.129	.093					3.341	.120	.000	.650	2.49	.100	.080					
3.156	80.2	3.523	.310		.262	.129	.093					3.348	.120	.000	.689	2.50	.100	.080					
3.250	82.5	3.623	.342		.269	.135	.093					3.416	.120	.000	.698	2.54	.104	.083					
3.346	85.0	3.734	.342		.276	.140	.093					3.548	.120	.000	.705	2.63	.108	.086					
3.469	88.1	3.857	.342		.286	.144	.093					3.675	.120	.000	.783	2.76	.108	.086					
3.500	88.9	3.890	.342		.286	.144	.093					3.710	.120	.000	.774	2.79	.110	.088					
3.543	90.0	3.936	.342		.292	.142	.093					3.755	.120	.000	.788	2.83	.110	.088					
3.582	90.5	3.936	.342		.292	.142	.093					3.776	.120	.000	.842	2.85	.110	.088					
3.625	92.1	4.024	.342		.298	.150	.093					3.841	.120	.000	.833	2.91	.118	.093					

FED. SUP CLASS  
5340

D.A. NAVY - OS Other Com ARMY - WC AIR FORCE - 11	TITLE RING, RETAINING, INTERNAL, BASIC (TAPERED SECTION TYPE)	MILITARY STANDARD <b>MS16625</b>
PROCUREMENT SPECIFICATION MIL-R-21248 TY. I CL. 1	SUPERSEDES	SHEET 2

REVISION SYMBOLS:  
 NAVY - 08  
 ARMY - WC, MI, AV  
 AIR FORCE - 02, 85

REVISION SYMBOLS:  
 NAVY - 08  
 ARMY - WC, MI, AV  
 AIR FORCE - 02, 85

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K HOUSING DIAMETER INCH	D FREE DIAMETER	B TOL.	E BASIC TOL.	J BASIC TOL.	T BASIC TOL.	G RECOMMENDED GROOVE		W WIDTH	K GAP WIDTH MIN.	°C	°R °CH OF RETAINED PART	
						DIA. BASIC TOL.	TIR				MAX.	MIN.
3.740	95.0	0.157	.309	.155	.109	3.944	.120	.844	3.02	120	.096	
3.750	95.2	0.157	.309	.155	.109	3.974	.120	.871	3.03	120	.096	
3.875	98.4	0.291	.319	.160	.109	4.107	.120	.891	3.11	123	.098	
3.938	100.0	0.358	.334	.161	.109	4.174	.120	.905	3.17	124	.099	
4.000	101.6	0.424	.330	.166	.109	4.240	.120	.918	3.23	128	.102	
4.125	104.8	0.558	.330	.171	.109	4.385	.120	.94	3.36	130	.104	
4.250	108.0	0.691	.335	.180	.109	4.490	.120	.96	3.48	138	.110	
4.331	110.0	0.756	.343	.180	.109	4.571	.120	1.00	3.50	142	.114	
4.500	114.3	0.940	.351	.181	.109	4.740	.120	.98	3.66	148	.117	
4.625	117.5	0.978	.360	.183	.109	4.885	.006	1.00	3.78	151	.121	
4.724	120.0	0.5.213	.370	.183	.109	4.989	.006	1.00	3.88	154	.123	
4.750	120.6	0.5.213	.370	.183	.109	4.993	TIR	1.03	3.90	154	.123	
5.000	127.0	0.5.485	.390	.186	.109	5.260	.120	.97	4.08	158	.126	
5.250	133.3	0.5.770	.408	.196	.125	5.520	.139	1.10	4.31	168	.134	
5.375	136.5	0.5.910	.408	.198	.125	5.650	.037	1.12	4.41	168	.134	
5.500	139.7	0.6.066	.408	.198	.125	5.770	.006	1.09	4.53	168	.134	
5.750	146.0	0.6.336	.408	.198	.125	6.020	TIR	1.11	4.78	168	.134	
6.000	152.4	0.6.620	.408	.196	.125	6.279	.139	1.13	5.03	168	.134	
6.250	158.7	0.6.895	.423	.211	.156	6.530	.174	1.16	5.24	177	.141	
6.500	165.1	0.7.170	.438	.219	.156	6.783	.174	1.25	5.49	181	.146	
6.625	168.3	0.7.308	.447	.221	.156	6.825	.174	1.28	5.60	183	.145	
6.750	171.4	0.7.445	.456	.234	.156	7.055	.174	1.21	5.65	188	.150	
7.000	177.8	0.7.720	.474	.232	.156	7.315	.174	1.28	5.88	196	.157	
7.250	184.1	0.7.995	.489	.236	.187	7.575	.209	1.32	6.08	202	.162	
7.500	190.5	0.8.270	.507	.247	.187	7.840	.209	1.39	6.33	208	.168	
7.750	196.8	0.8.545	.523	.253	.187	8.100	.008	1.44	6.58	214	.171	
8.000	203.2	0.8.820	.540	.262	.187	8.360	.006	1.50	6.75	220	.176	
8.250	209.5	0.9.095	.558	.270	.187	8.620	TIR	1.53	7.00	229	.183	
8.500	215.9	0.9.285	.573	.277	.187	8.880	.209	1.71	7.13	235	.188	
8.750	222.2	0.9.558	.591	.286	.187	9.145	.209	1.77	7.38	241	.193	
9.000	228.6	0.9.830	.609	.294	.187	9.405	.209	1.83	7.63	248	.199	
9.250	235.0	0.10.102	.625	.289	.187	9.668	.209	1.87	7.88	253	.202	
9.500	241.3	0.10.375	.642	.304	.187	9.930	.209	1.91	7.98	258	.208	
9.750	247.7	0.10.648	.658	.309	.187	10.190	.209	2.00	8.23	263	.210	
10.000	254.0	0.10.920	.675	.315	.187	10.450	.209	2.01	8.48	270	.216	

\*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 .0003 INCH. FOR PLATED AND CORROSION RESISTING STEEL 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 SPRUNG INTO THE HOUSING, PRIOR TO INSTALLATION INTO THE GROOVE. (DESIGN REFERENCE DIMENSION.)  
 \*W\* 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 CHAMFER RADIUS OR CHAMFERS AS LISTED ABOVE ARE TABULATED ON SHEET 9.  
 \*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-R-21248.

PROBING CLASS  
 5540

P.A. NAVY - 08  
 ORG. CODE: ARMY - WC  
 AIR FORCE - 11

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

PROCUREMENT SPECIFICATION  
 MIL-R-21248 TY. I CL 1

SUPERSEDES

MILITARY STANDARD  
 MS16625  
 SHEET 3

APPROVED 11 DEC 1958 REVISED (C) FOR CHANGES SEE SHEETS 1 THROUGH 10

USER SYMBOLS:  
NAVY - MC  
ARMY - AT, MU, MS

REVISER SYMBOLS:  
NAVY - CB  
ARMY - WC, MI, AV  
AIR FORCE - 82, 86

"Revision/issue information is current as of the date of this document. For future conditions of change to this document, each circulation should be based on the information in the current DODDIS."

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H HOUSING DIAMETER	STEEL CADMIUM PLATED	STEEL PHOSPHATE COATED	STEEL CORROSION RESISTING	BERYLLIUM COPPER	FED. SUP CLASS 5340
	DASH NO.	DASH NO.	DASH NO.	DASH NO.	
.250	MS16625-1025	MS16625-3025	MS16625-4025	MS16625-5025	
.312	-1031	-3031	-4031	-5031	
.375	-1037	-3037	-4037	-5037	
.438	-1043	-3043	-4043	-5043	
.453	-1045	-3045	-4045	-5045	
.500	-1060	-3050	-4050	-5050	
.512	-1051	-3051	-4051	-5051	
.562	-1056	-3056	-4056	-5056	
.625	-1062	-3062	-4062	-5062	
.688	-1068	-3068	-4068	-5068	
.760	-1075	-3075	-4075	-5075	
.777	-1077	-3077	-4077	-5077	
.812	-1081	-3081	-4081	-5081	
.866	-1086	-3086	-4086	-5086	
.875	-1087	-3087	-4087	-5087	
.901	-1090	-3090	-4090	-5090	
.938	-1093	-3093	-4093	-5093	
1.000	-1100	-3100	-4100	-5100	
1.025	-1102	-3102	-4102	-5102	
1.062	-1106	-3106	-4106	-5106	
1.125	-1112	-3112	-4112	-5112	
1.181	-1118*	-3118*	-4118*	-5118*	
1.188	-1118*	-3118*	-4118*	-5118*	
1.250	-1125*	-3125*	-4125*	-5125*	
1.259	-1125*	-3125*	-4125*	-5125*	
1.312	-1131	-3131	-4131	-5131	
1.378	-1137*	-3137*	-4137*	-5137*	
1.378	-1137*	-3137*	-4137*	-5137*	
1.438	-1143	-3143	-4143	-5143	
1.466	-1145	-3145	-4145	-5145	
1.500	-1150	-3150	-4150	-5150	
1.562	-1156*	-3156*	-4156*	-5156*	
1.575	-1156*	-3156*	-4156*	-5156*	
1.625	-1162	-3162	-4162	-5162	
1.653	-1166	-3166	-4166	-5166	
1.688	-1168	-3168	-4168	-5168	
1.750	-1175	-3175	-4175	-5175	
1.812	-1181	-3181	-4181	-5181	
1.850	-1185	-3185	-4185	-5185	
1.875	-1187	-3187	-4187	-5187	
1.938	-1193	-3193	-4193	-5193	
2.000	-1200	-3200	-4200	-5200	MS16625-8200
2.047	-1206*	-3206*	-4206*	-5206*	
2.062	-1206*	-3206*	-4206*	-5206*	
2.125	-1212	-3212	-4212	-5212	
2.165	-1216*	-3216*	-4216*	-5216*	
2.188	-1218*	-3218*	-4218*	-5218*	
2.250	-1225	-3225	-4225	-5225	
2.312	-1231	-3231	-4231	-5231	
2.378	-1237	-3237	-4237	-5237	
2.440	-1244	-3244	-4244	-5244	
2.500	-1250*	-3250*	-4250*	-5250*	
2.531	-1250*	-3250*	-4250*	-5250*	
2.562	-1256	-3256	-4256	-5256	
2.625	-1262	-3262	-4262	-5262	
2.677	-1268*	-3268*	-4268*	-5268*	
2.688	MS16625-1268*	MS16625-3268*	MS16625-4268*		

APPROVED 11 DEC 1968 REVISED C FOR CHANGES SEE SHEETS 1 THROUGH 10

P.A. NAVY - 08 Other Code ARMY - WC AIR FORCE - 11	TITLE RING, RETAINING, INTERNAL, BASIC (TAPERED SECTION TYPE)	MILITARY STANDARD MS16625
PROCUREMENT SPECIFICATION MIL-R-21248 TY. I CL. 1	SUPERSEDES	SHEET 4

USER SYMBOLS:  
 NAVY - MC  
 ARMY - AT, MU, ME

REVISOR SYMBOLS:  
 NAVY - OS  
 ARMY - WC, ML, AV  
 AIR FORCE - 82, 86

"Review User Information to correct as of the date of this document. For future modifications of changes to this document, such corrections should be based on the information in the current BODHIS."

This inquiry standard is approved by the Department of Defense and is mandatory 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.

H HOUSING DIAMETER	STEEL CADMIUM PLATED	STEEL PHOSPHATE COATED	STEEL CORROSION RESISTING	FED. SUP CLASS 5340
	DASH NO.	DASH NO.	DASH NO.	
	2.750	MS16625-1275	MS16625-3275	
2.813	-1281*	-3281*	-4281*	
2.834	-1281*	-3281*	-4281*	
2.875	-1287	-3287	-4287	
2.983	-1300*	-3300*	-4300*	
3.000	-1300*	-3300*	-4300*	
3.062	-1306	-3306	-4306	
3.125	-1312	-3312	-4312	
3.149	-1315*	-3315*	-4315*	
3.156	-1315*	-3315*	-4315*	
3.250	-1325	-3325	-4325	
3.348	-1334	-3334	-4334	
3.468	-1348	-3348	-4348	
3.500	-1350	-3350	-4350	
3.648	-1354*	-3354*	-4354*	
3.662	-1354*	-3354*	-4354*	
3.625	-1362	-3362	-4362	
3.740	-1375*	-3375*	-4375*	
3.750	-1375*	-3375*	-4375*	
3.875	-1387	-3387	-4387	
3.938	-1393	-3393	-4393	
4.000	-1400	-3400	-4400	
4.125	-1412	-3412	-4412	
4.250	-1425	-3425	-4425	
4.330	-1438	-3438	-4438	
4.500	-1450	-3450	-4450	
4.625	-1462	-3462	-4462	
4.724	-1475*	-3475*	-4475*	
4.750	-1475*	-3475*	-4475*	
5.000	-1500	-3500	-4500	
5.250	-1525	-3525	-4525	
5.375	-1537	-3537	-4537	
5.500	-1550	-3550	-4550	
5.750	-1575	-3575	-4575	
6.000	-1600	-3600	-4600	
6.250	-1625	-3625	-4625	
6.500	-1650	-3650	-4650	
6.625	-1662	-3662	-4662	
6.750	-1675	-3675	-4675	
7.000	-1700	-3700	-4700	
7.250	-1725	-3725	-4725	
7.500	-1750	-3750	-4750	
8.000	-1800	-3800	-4800	
8.250	-1825	-3825	-4825	
8.500	-1850	-3850	-4850	
8.750	-1875	-3875	-4875	
9.000	-1900	-3900	-4900	
9.250	-1925	-3925	-4925	
9.500	-1950	-3950	-4950	
9.750	-1975	-3975	-4975	
10.000	MS16625-2000	MS16625-4000	MS16625-6000	

\* SAME DASH NUMBERS SUITABLE FOR EITHER HOUSING DIAMETER (INCHES OR MM.)

APPROVED 11 DEC 1956 REVISED (C) FOR CHANGES SEE SHEETS 1 THROUGH 10

P.A. NAVY - OS Other Code ARMY - WC AIR FORCE - 11	TITLE RING, RETAINING, INTERNAL BASIC (TAPERED SECTION TYPE)	MILITARY STANDARD MS16625
PROCUREMENT SPECIFICATION MIL-R-21348 TY. I CL. 1	SUPERSEDES	SHEET 5

REVISOR SYMBOLS:  
 NAVY - OS  
 ARMY - WC, MI, AV  
 AIR FORCE - 82, 85

USER SYMBOLS:  
 NAVY - MC  
 ARMY - AT, MU, ME

"Revisions/changes information is current as of the date of this document. For future coordination of changes to this document, such circulation should be based on the information in the current DODDIS."

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SUBSTITUTION TABLE				FED. SUP CLASS 5340
CROSS REFERENCE OF PART NUMBERS				
H HOUSING DIAMETER	INACTIVE	INACTIVE	SUBSTITUTE	
	STEEL $\Delta$	STEEL ZINC PLATED	STEEL CADMIUM PLATED	
	DASH NO.	DASH NO.	DASH NO.	
.250	MS16625 -25	MS16625 -2025	MS16625 -1025	
.312	-31	-2031	-1031	
.375	-37	-2037	-1037	
.438	-43	-2043	-1043	
.453	-45	-2045	-1045	
.500	-50	-2050	-1050	
.512	-51	-2051	-1051	
.562	-56	-2056	-1056	
.625	-62	-2062	-1062	
.688	-68	-2068	-1068	
.750	-75	-2075	-1075	
.777	-77	-2077	-1077	
.812	-81	-2081	-1081	
.866	-86	-2086	-1086	
.875	-87	-2087	-1087	
.901	-90	-2090	-1090	
.938	-93	-2093	-1093	
1.000	-100	-2100	-1100	
1.023	-102	-2102	-1102	
1.062	-106	-2106	-1106	
1.125	-112	-2112	-1112	
1.181	-118	-2118	-1118	
1.188	-118	-2118	-1118	
1.250	-125	-2125	-1125	
1.259	-125	-2125	-1125	
1.312	-131	-2131	-1131	
1.375	-137	-2137	-1137	
1.378	-137	-2137	-1137	
1.438	-143	-2143	-1143	
1.458	-145	-2145	-1145	
1.500	-150	-2150	-1150	
1.582	-156	-2156	-1156	
1.575	-156	-2156	-1156	
1.625	-162	-2162	-1162	
1.653	-165	-2165	-1165	
1.688	-168	-2168	-1168	
1.750	-175	-2175	-1175	
1.812	-181	-2181	-1181	
1.850	-185	-2185	-1185	
1.875	-187	-2187	-1187	
1.938	-193	-2193	-1193	
2.000	-200	-2200	-1200	
2.047	-206	-2206	-1206	
2.062	-206	-2206	-1206	
2.125	-212	-2212	-1212	
2.165	-218	-2218	-1218	
2.188	-218	-2218	-1218	
2.250	-225	-2225	-1225	
2.312	-231	-2231	-1231	
2.375	-237	-2237	-1237	
2.440	-244	-2244	-1244	
2.500	-250	-2250	-1250	
2.531	-250	-2250	-1250	
2.562	-256	-2256	-1256	
2.625	-262	-2262	-1262	
2.677	-268	-2268	-1268	
2.688	-268	-2268	-1268	
2.750	-275	-2275	-1275	
2.813	-281	-2281	-1281	
2.834	-281	-2281	-1281	
2.875	MS16625 -287	MS16625 -2287	MS16625 -1287	

APPROVED 11 DEC 1958 REVISED (C) FOR CHANGES SEE SHEETS 1 THROUGH 10

P.A. NAVY-08	TITLE	MILITARY STANDARD
Other Code	ARMY - WC AIR FORCE - 11	MS16625
PROCUREMENT SPECIFICATION MIL-R-21248 TY. I CL. 1	SUPSEDES	SHEET

USER SYMBOLS:  
 NAVY - MC  
 ARMY - AT, MU, ME

REVIEWER SYMBOLS:  
 NAVY - OS  
 ARMY - WC, MI, AV  
 AIR FORCE - 82, 85

"Review" user information is current as of the date of this document. For future confirmation of changes to this document, such circulation should be based on the information in the current DODDIS."

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SUBSTITUTION TABLE				FED. SUP CLASS 5340
CROSS REFERENCE OF PART NUMBERS				
B HOUSING DIAMETER	INACTIVE STEEL /1	INACTIVE STEEL ZINC PLATED	SUBSTITUTE STEEL CADMIUM PLATED	
	DASH NO.	DASH NO.	DASH NO.	
2.953	MS16625-300	MS16625-2300	MS16625-1300	
3.000	-300	-2300	-1300	
3.062	-306	-2306	-1306	
3.125	-312	-2312	-1312	
3.149	-316	-2316	-1316	
3.156	-315	-2315	-1315	
3.250	-325	-2325	-1325	
3.346	-334	-2334	-1334	
3.469	-346	-2346	-1346	
3.500	-350	-2350	-1350	
3.543	-354	-2354	-1354	
3.562	-354	-2354	-1354	
3.625	-362	-2362	-1362	
3.740	-376	-2376	-1376	
3.750	-375	-2375	-1375	
3.875	-387	-2387	-1387	
3.938	-393	-2393	-1393	
4.000	-400	-2400	-1400	
4.125	-412	-2412	-1412	
4.250	-425	-2425	-1425	
4.330	-433	-2433	-1433	
4.500	-450	-2450	-1450	
4.625	-462	-2462	-1462	
4.724	-475	-2475	-1475	
4.750	-476	-2476	-1475	
5.000	-500	-2500	-1500	
5.250	-525	-2525	-1525	
5.375	-537	-2537	-1537	
5.500	-550	-2550	-1550	
5.570	-575	-2575	-1575	
6.000	-600	-2600	-1600	
6.250	-625	-2625	-1625	
6.500	-650	-2650	-1650	
6.625	-662	-2662	-1662	
6.750	-675	-2675	-1675	
7.000	-700	-2700	-1700	
7.250	-725	-2725	-1725	
7.500	-750	-2750	-1750	
8.000	-800	-2800	-1800	
8.250	-825	-2825	-1825	
8.500	-850	-2850	-1850	
8.750	-875	-2875	-1875	
9.000	-900	-2900	-1900	
9.250	-925	-2925	-1925	
9.500	-950	-2950	-1950	
9.750	-975	-2975	-1975	
10.000	MS16625-1000	MS16625-3000	MS16625-2000	

△ SUBSTITUTE CORROSION RESISTING STEEL WHEN USED IN TEMPERATURES OVER 450° F AND FOR FOOD MACHINERY.

PA NAVY - OS Other Case ARMY - WC AIR ORCE - 11	TITLE RING, RETAINING, INTERNAL, BASIC (TAPERED SECTION TYPE)	MILITARY STANDARD MS16625
PROCUREMENT SPECIFICATION MIL-R-21248 TY. 1 CL. 1	SUPERSEDES	SHEET 7

APPROVED 11 DEC 1958 REVISED (C) FOR CHANGES SEE SHEETS 1 THROUGH 10

USER SYMBOLS:  
NAVY - MC  
ARMY AT, MU, ME

REVIEWER SYMBOLS:  
NAVY - OB  
ARMY - WC, MI, AV  
AIR FORCE - 82, 85

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FED. SUP CLASS  
5340

**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.

$P = \frac{FHTX}{Y}$  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.)<sup>2</sup>.  
F = FACTOR OF SAFETY, F = 4, IS RECOMMENDED, SINCE THE RING UNDER LOAD IS SUBJECTED NOT ONLY TO PURE SHEAR STRESSES BUT ALSO TO BENDING STRESSES.

(c) ALLOWABLE LOAD CAPACITY OF GROOVE WALL =

$P = \frac{FHY}{F}$  WHERE:  
P = ALLOWABLE COMPRESSION LOAD (POUNDS).  
H = HOUSING DIAMETER (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 = MINIMUM DISTANCE BETWEEN OUTER GROOVE WALL AND END OF HOUSING (INCHES).  
Z = 3d WHERE: d = GROOVE DEPTH (INCHES).

(e) ALLOWABLE HOUSING DIAMETER =

$H = \sqrt{\frac{G^2 - 4PF}{Y}}$  WHERE:  
H = ALLOWABLE HOUSING DIAMETER.  
G = GROOVE DIAMETER.  
P = FACTOR OF SAFETY (SEE FORMULA (c) ABOVE).  
F = 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:

$IPN \leq \frac{sTE^2}{18}$  OR  $P = \frac{sTE^2}{18N}$  WHERE:  
IPN = ALLOWABLE THRUST LOAD EXERTED BY ADJACENT PART (POUNDS).  
f = COEFFICIENT OF FRICTION.  
s = WORKING STRESS OF RING UNDER MAXIMUM CONTRACTION (P.S.I.)<sup>2</sup>.  
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:

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

$I_G = \frac{Pd}{2}$  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.

APPROVED 11 DEC 1958 REVISED (C) FOR CHANGES SEE SHEETS 1 THROUGH 10

P.A. NAVY - OS Other Case	TITLE	MILITARY STANDARD
ARMY - WC AIR FORCE - 11	RING, RETAINING, INTERNAL, BASIC (TAPERED SECTION TYPE)	MS16625
PROCUREMENT SPECIFICATION MIL-R-21248 TY. 1 CL. 1	SUPERSEDES	SHEET 8



USEE SYMBOLS:  
NAVY - MC  
ARMY - AT, MU, ME

REVIEWER SYMBOLS:  
NAVY - OB  
ARMY - WC, MI, AV  
AIR FORCE - 92, 95

(N) LOAD CAPACITY, WITH THE RETAINED PART RADIUSED OR CHAMFERED:  
WHEN THE RADIUS OR CHAMFER OF THE RETAINED PART DOES NOT EXCEED THE MAXIMUM RADIUS ALLOWED FOR THE BOTTOM OF THE RING GROOVE THE LESSER LOAD CAPACITY COMPUTED FROM THE FORMULAS ON SHEET 8 WILL APPLY. THE CORNER RADI AND CHAMFERS LISTED ON SHEETS 1 THRU 3 WERE CHOSEN AS LARGE AS POSSIBLE FOR THE RING SIZES INVOLVED AND ARE RELATED TO THE MAXIMUM THRUST LOADS LISTED IN THE TABLE BELOW.  
IF THE CORNER RADI OR CHAMFERS ARE SMALLER THAN THOSE LISTED, THEN THE THRUST LOADS INCREASE PROPORTIONALLY, IN ACCORDANCE WITH THE FOLLOWING FORMULAS:

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

WHERE:

- $P^1$  = NEW ALLOWABLE THRUST LOAD.
- $P$  = LISTED ALLOWABLE THRUST LOAD.
- $CH^1$  = NEW (SMALLER) CHAMFER.
- $CH$  = LISTED CHAMFER.
- $R^1$  = NEW (SMALLER) CORNER RADIUS.
- $R$  = LISTED CORNER RADIUS.

LIMIT LOADS LISTED BELOW 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 8 ARE LESS THAN THEY SHOULD BE USED.

NOMINAL RING SIZE		ALLOWABLE THRUST LOAD FOR RING ASSEMBLIES WITH PARTS HAVING MAXIMUM CORNER RADI 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	1850 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	
2.852	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	

"Earlier/ago information is correct as of the date of this document. For future consideration of changes to this document, draft circulation should be based on the information in the current DODSIS."

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NOTE: THE ABOVE FORMULAS ARE NOT 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 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 RECOMMEND DIMENSIONS).

APPROVED 11 DEC 1956 REVISED (C) FOR CHANGES SEE SHEETS 1 THROUGH 10

P.A. NAVY-OS Other Cust	TYPE	MILITARY STANDARD
ARMY - WC AIR FORCE - 11	RING, RETAINING, INTERNAL WASH (TAPERED SECTION TYPE)	MS16625
PROCUREMENT SPECIFICATION SUPERSEDES MIL-R-21248 TY I.C.L. 1		SHEET 3

USER SYMBOLS:  
NAVY - MC  
ARMY - AT, MU, ME

REVISER SYMBOLS:  
NAVY - OB  
ARMY - WC, ML, AV  
AIR FORCE - B2, B5

"Editor/rev information is correct as of the date of this document. For future coordination of changes to this document, date circulation should be based on the information in the current DODDIS."

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**NOTES:**

- 1 - MATERIAL:
  - (a) STEEL, CARBON, FEDERAL STANDARD 66, STEEL NOS. 1066 THRU 1090, STEEL, CORROSION RESISTING, (SEE PROCUREMENT SPECIFICATION).
  - (b) BERYLLIUM COPPER, FEDERAL SPECIFICATION QQ-C-533.
- 2 - HARDNESS:
 

HOUSING DIA.	STEEL	HOUSING DIA.	CORROSION RESISTING 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 30N-67.5-72	1.062 AND OVER	ROCKWELL C-44-51	ROCKWELL C-34-43
.812 TO 1.023 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 COATINGS AND TREATMENTS:
  - (a) CADMIUM PLATING, QQ-P-416, TYPE II, CLASS 3.
  - (b) CORROSION RESISTING STEEL RINGS SHALL BE PASSIVATED, QQ-P-35.
  - (c) PHOSPHATE COATING, MIL-G-16232, TYPE II.
- 4 - PART NUMBER - (MS NUMBER) - (RING DASH NUMBER).  
EXAMPLE - MS16625-1100 IS THE PART NUMBER FOR A STEEL, INTERNAL RETAINING RING FOR USE IN A 1.000 DIAMETER HOUSING.
- 5 - DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED. DIMENSIONING AND TOLERANCING SHALL BE IN ACCORDANCE WITH UNAS Y14.5.
- 6 - INACTIVATE FOR NEW DESIGN, UNCOATED STEEL AND ZINC PLATED STEEL, (SEE SUBSTITUTION SHEET 6 AND 7).
- 7 - THE GOVERNMENT HAS A ROYALTY FREE LICENSE UNDER WALDES KOHNOOR INC. COPYRIGHTS PERTINENT TO PORTIONS OF THE INFORMATION CONTAINED HEREIN AND UNDER THE FOLLOWING LISTED PATENT FOR THE BENEFIT OF MANUFACTURERS OF THE ITEM FOR THE GOVERNMENT OR FOR USE IN EQUIPMENT TO BE DELIVERED TO THE GOVERNMENT. (U. S. PATENT NO. 2,861,824).

FOR DESIGN FEATURE PURPOSES, THIS STANDARD TAKES PRECEDENCE OVER PROCUREMENT DOCUMENTS REFERENCED HEREIN. REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATIONS FOR BID.

PA NAVY - OB Other Case ARMY - WC AIR FORCE - 11	TITLE RING, RETAINING, INTERNAL, BASIC (TAPERED SECTION TYPE)	MILITARY STANDARD <b>MS16625</b>
PROCUREMENT SPECIFICATION MIL-R-21248 TY. I CL. 1	SUPERSEDES	SHEET 10

APPROVED 11 DEC 1958 REVISED (C) FOR CHANGES SEE SHEETS 1 THROUGH 10