AEROSPACE INFORMATION REPORT

AIR1108

Issued 1969-07
Reaffirmed 2013-10

Groove Design - Metal Face Seal

RATIONALE

AIR1108 has been reaffirmed to comply with the SAE five-year review policy.

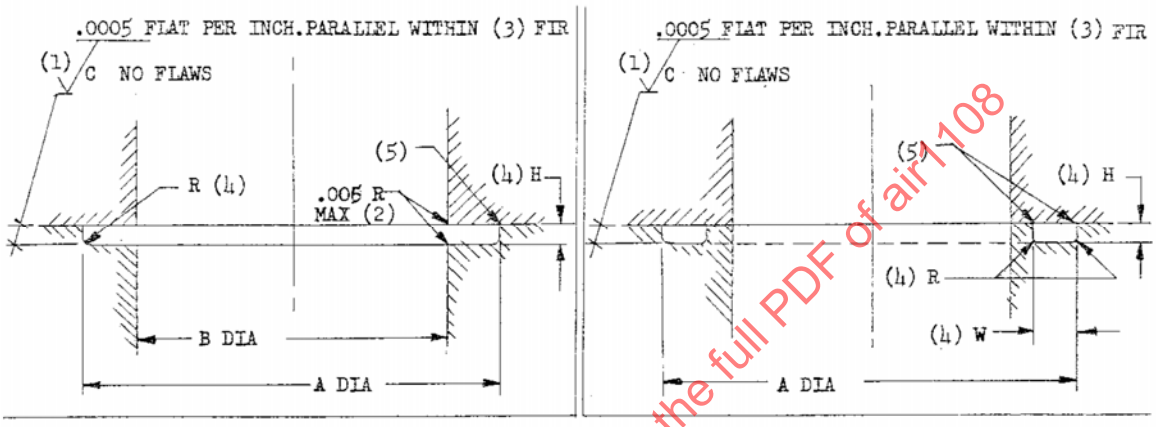


FIGURE 1

FIGURE 2

(1) see paragraph 4.1
(2) see paragraph 5.1
(3) see paragraph 6.2
(4) see paragraph 2.2
(5) non-critical edges, usually controlled by standard edge break note, should not exceed .020 R.

1. SCOPE

1.1 Groove designs presented herein are applicable for use with machined or formed metal seals which are similar in configuration to those shown in figure 3, which operate under internal pressure or in vacuum service and which have been specifically qualified or recommended by the purchaser or the manufacturer for use with this AIR. They are also applicable for use with metal o-rings (e.g., MS9142, MS9202 thru MS9205) where interchangeability with machined or formed metal seals is desired. For metal o-ring groove designs where interchangeability is not a requirement refer to ARP 674.

2. GROOVE DATA

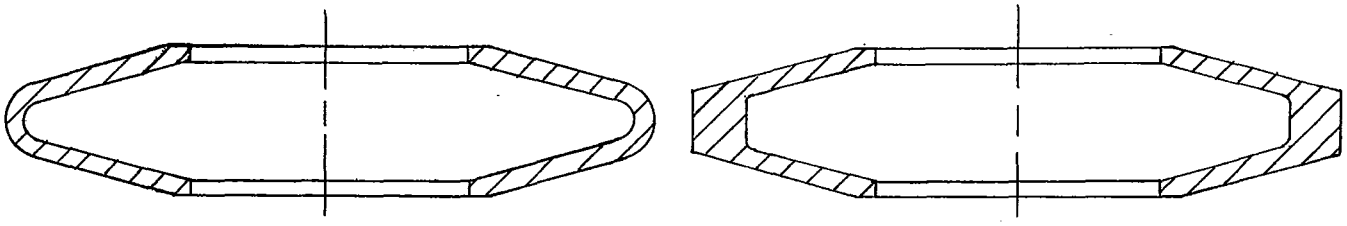
2.1 Counterbore and groove designs as shown in figures 1 and 2 are covered by this document.

2.2 Variations in the H, W and R dimensions are provided to accommodate small, medium and large seal cross-sections.

Dash Numbers per paragraph 7	H	W Min	R
-1006 thru -1080	.043-.045	.100	.010-.020
-2016 thru -2224	.075-.077	.150	.015-.030
-3032 thru -3800	.106-.109	.190	.020-.035

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AIR1108



Formed Metal Seal

Machined Metal Seal

EXAMPLES OF METAL SEALS

FIGURE 3

3. DIAMETRAL TOLERANCES

3.1 Two classes of tolerances are provided for diameter A dimensions.

3.1.1 Class I reflects tolerances suitable for general applications.

3.1.2 Class II reflects very close tolerances. This class is intended for machined or formed metal seals in applications with high pressure pulsations where diametral expansion of seals must be minimized.

4. SURFACE TEXTURE

4.1 The maximum permissible roughness of groove surfaces is usually specified by the seal manufacturers as follows:

32 AA for liquids.
16 AA for vacuum or gases other than hydrogen or helium.
8 AA for hydrogen or helium.

5. OUTSIDE CORNER BREAKS

5.1 Sharp edges shall be broken or rounded as shown in figures 1 and 2. Radii or chamfers greater than .005 R are permitted on diameter B corners (figure 1) if diameter B is reduced accordingly.

6. FLATNESS AND PARALLELISM

6.1 Flatness of groove sealing surfaces shall be as shown in figures 1 and 2.

6.2 The sealing surfaces shall be held parallel within .001 FIR for each inch of groove diameter (diameter A) except that this limit shall never exceed the groove depth tolerance (tolerance on dimension H).

7. TABULATED GROOVE DIAMETERS

7.1 Dimensions for the A and B diameters are established as in the following tables:

DASH NUMBER	NOM SEAL OD	A DIAMETER CLASS I	A DIAMETER CLASS II	B DIA MAX
1006	.3750	.380- .385	.3750- .3760	.208
1007	.4375	.442- .447	.4375- .4385	.271
1008	.5000	.505- .510	.5000- .5010	.333
1009	.5625	.567- .572	.5625- .5635	.395
1010	.6250	.630- .635	.6250- .6260	.458
1011	.6875	.692- .697	.6875- .6885	.524
1012	.7500	.755- .760	.7500- .7510	.586
1013	.8125	.817- .822	.8125- .8135	.649
1014	.8750	.880- .885	.8750- .8770	.711
1015	.9375	.942- .947	.9375- .9395	.776
1016	1.0000	1.005- 1.010	1.0000-1.0020	.838
1017	1.0625	1.067- 1.072	1.0625-1.0645	.901
1018	1.1250	1.130- 1.135	1.1250-1.1270	.963
1019	1.1875	1.192- 1.197	1.1875-1.1895	1.028
1020	1.2500	1.255- 1.260	1.2500-1.2520	1.090
1021	1.3125	1.317- 1.322	1.3125-1.3145	1.153
1022	1.3750	1.380- 1.385	1.3750-1.3770	1.215
1023	1.4375	1.442- 1.447	1.4375-1.4395	1.278
1024	1.5000	1.505- 1.510	1.5000-1.5020	1.340
1025	1.5625	1.567- 1.572	1.5625-1.5645	1.403
1026	1.6250	1.630- 1.635	1.6250-1.6270	1.465
1027	1.6875	1.692- 1.697	1.6875-1.6895	1.528
1028	1.7500	1.755- 1.760	1.7500-1.7520	1.590
1029	1.8125	1.817- 1.822	1.8125-1.8145	1.653
1030	1.8750	1.880- 1.885	1.8750-1.8770	1.715
1031	1.9375	1.942- 1.947	1.9375-1.9395	1.778
1032	2.0000	2.005- 2.010	2.0000-2.0020	1.840
1033	2.0625	2.067- 2.072		1.903
1034	2.1250	2.130- 2.135		1.965
1035	2.1875	2.192- 2.197		2.028
1036	2.2500	2.255- 2.260		2.090
1037	2.3125	2.317- 2.322		2.145
1038	2.3750	2.380- 2.385		2.207
1039	2.4375	2.442- 2.447		2.270
1040	2.5000	2.505- 2.510		2.332
1041	2.5625	2.567- 2.572		2.395
1042	2.6250	2.630- 2.635		2.457
1043	2.6875	2.692- 2.697		2.520
1044	2.7500	2.755- 2.760		2.582
1045	2.8125	2.817- 2.822		2.645
1046	2.8750	2.880- 2.885		2.707
1047	2.9375	2.942- 2.947		2.770
1048	3.0000	3.005- 3.010		2.832
1050	3.1250	3.130- 3.135		2.957
1052	3.2500	3.255- 3.260		3.082
1054	3.3750	3.380- 3.385		3.207
1056	3.5000	3.505- 3.510		3.332
1058	3.6250	3.630- 3.635		3.457
1060	3.7500	3.755- 3.760		3.582
1062	3.8750	3.880- 3.885		3.707
1064	4.0000	4.005- 4.010		3.832
1066	4.1250	4.130- 4.135		3.957
1068	4.2500	4.255- 4.260		4.082
1070	4.3750	4.380- 4.385		4.207
1072	4.5000	4.505- 4.510		4.332
1074	4.6250	4.630- 4.635		4.457
1076	4.7500	4.755- 4.760		4.582
1078	4.8750	4.880- 4.885		4.707
1080	5.0000	5.005- 5.010		4.832
2016	1.0000	1.005- 1.010	1.0000-1.0020	.760
2017	1.0625	1.067- 1.072	1.0625-1.0645	.822
2018	1.1250	1.130- 1.135	1.1250-1.1270	.885
2019	1.1875	1.192- 1.197	1.1875-1.1895	.947
2020	1.2500	1.255- 1.260	1.2500-1.2520	1.012
2021	1.3125	1.317- 1.322	1.3125-1.3145	1.074
2022	1.3750	1.380- 1.385	1.3750-1.3770	1.137
2023	1.4375	1.442- 1.447	1.4375-1.4395	1.199
2024	1.5000	1.505- 1.510	1.5000-1.5020	1.262
2025	1.5625	1.567- 1.572	1.5625-1.5645	1.324
2026	1.6250	1.630- 1.635	1.6250-1.6270	1.387
2027	1.6875	1.692- 1.697	1.6875-1.6895	1.449
2028	1.7500	1.755- 1.760	1.7500-1.7520	1.512
2029	1.8125	1.817- 1.822	1.8125-1.8145	1.574
2030	1.8750	1.880- 1.885	1.8750-1.8770	1.637
2031	1.9375	1.942- 1.947	1.9375-1.9395	1.699
2032	2.0000	2.005- 2.010	2.0000-2.0020	1.762
2033	2.0625	2.067- 2.072	2.0625-2.0655	1.824
2034	2.1250	2.130- 2.135	2.1250-2.1280	1.887
2035	2.1875	2.192- 2.197	2.1875-2.1905	1.949
2036	2.2500	2.255- 2.260	2.2500-2.2530	2.012
2037	2.3125	2.317- 2.322	2.3125-2.3155	2.074
2038	2.3750	2.380- 2.385	2.3750-2.3780	2.140
2039	2.4375	2.442- 2.447	2.4375-2.4405	2.202
2040	2.5000	2.505- 2.510	2.5000-2.5030	2.265
2041	2.5625	2.567- 2.572	2.5625-2.5655	2.327
2042	2.6250	2.630- 2.635	2.6250-2.6280	2.390
2043	2.6875	2.692- 2.697	2.6875-2.6905	2.452
2044	2.7500	2.755- 2.760	2.7500-2.7530	2.515
2045	2.8125	2.817- 2.822	2.8125-2.8155	2.577
2046	2.8750	2.880- 2.885	2.8750-2.8780	2.640
2047	2.9375	2.942- 2.947	2.9375-2.9405	2.702
2048	3.0000	3.005- 3.010	3.0000-3.0030	2.765
2049	3.0625	3.067- 3.072	3.0625-3.0655	2.827
2050	3.1250	3.130- 3.135	3.1250-3.1280	2.890
2051	3.1875	3.192- 3.197	3.1875-3.1905	2.952
2052	3.2500	3.255- 3.260	3.2500-3.2530	3.015
2053	3.3125	3.317- 3.322	3.3125-3.3155	3.077
2054	3.3750	3.380- 3.385	3.3750-3.3780	3.140
2055	3.4375	3.442- 3.447	3.4375-3.4405	3.202
2056	3.5000	3.505- 3.510	3.5000-3.5030	3.265
2057	3.5625	3.567- 3.572	3.5625-3.5655	3.327
2058	3.6250	3.630- 3.635	3.6250-3.6280	3.390
2059	3.6875	3.692- 3.697	3.6875-3.6905	3.452
2060	3.7500	3.755- 3.760	3.7500-3.7530	3.515
2061	3.8125	3.817- 3.822	3.8125-3.8155	3.577
2062	3.8750	3.880- 3.885	3.8750-3.8780	3.640
2063	3.9375	3.942- 3.947	3.9375-3.9405	3.702
2064	4.0000	4.005- 4.010	4.0000-4.0030	3.765
2066	4.1250	4.130- 4.135		3.890
2068	4.2500	4.255- 4.260		4.015
2070	4.3750	4.380- 4.385		4.140
2072	4.5000	4.505- 4.510		4.265
2074	4.6250	4.630- 4.635		4.390
2076	4.7500	4.755- 4.760		4.515
2078	4.8750	4.880- 4.885		4.640
2080	5.0000	5.005- 5.012		4.765
2082	5.1250	5.130- 5.137		4.890
2084	5.2500	5.255- 5.262		5.015
2086	5.3750	5.380- 5.387		5.140
2088	5.5000	5.505- 5.512		5.265
2090	5.6250	5.630- 5.637		5.390
2092	5.7500	5.755- 5.762		5.515
2094	5.8750	5.880- 5.887		5.640
2096	6.0000	6.005- 6.012		5.765
2100	6.2500	6.255- 6.262		6.015
2104	6.5000	6.505- 6.512		6.265
2108	6.7500	6.755- 6.762		6.515
2112	7.0000	7.005- 7.012		6.765
2116	7.2500	7.255- 7.262		7.015
2120	7.5000	7.505- 7.512		7.265
2124	7.7500	7.755- 7.762		7.515
2128	8.0000	8.005- 8.012		7.765
2132	8.2500	8.255- 8.262		8.015
2136	8.5000	8.505- 8.512		8.265
2140	8.7500	8.755- 8.762		8.515
2144	9.0000	9.005- 9.012		8.765
2148	9.2500	9.255- 9.262		9.015
2152	9.5000	9.505- 9.512		9.265
2156	9.7500	9.755- 9.762		9.515
2160	10.0000	10.005-10.015		9.765
2164	10.2500	10.255-10.265		10.015
2168	10.5000	10.505-10.515		10.265
2172	10.7500	10.755-10.765		10.515
2176	11.0000	11.005-11.015		10.765
2180	11.2500	11.255-11.265		11.015
2184	11.5000	11.505-11.515		11.265
2188	11.7500	11.755-11.765		11.515
2192	12.0000	12.005-12.015		11.765
2200	12.5000	12.505-12.515		12.265
2208	13.0000	13.005-13.015		12.765
2216	13.5000	13.505-13.515		13.265
2224	14.0000	14.005-14.015		13.765
3032	2.0000	2.005- 2.010	2.0000-2.0030	1.702
3033	2.0625	2.067- 2.072	2.0625-2.0655	1.765
3034	2.1250	2.130- 2.135	2.1250-2.1280	1.827
3035	2.1875	2.192- 2.197	2.1875-2.1905	1.890
3036	2.2500	2.255- 2.260	2.2500-2.2530	1.952
3037	2.3125	2.317- 2.322	2.3125-2.3155	2.015
3038	2.3750	2.380- 2.385	2.3750-2.3780	2.077
3039	2.4375	2.442- 2.447	2.4375-2.4405	2.140
3040	2.5000	2.505- 2.510	2.5000-2.5030	2.202
3041	2.5625	2.567- 2.572	2.5625-2.5655	2.265
3042	2.6250	2.630- 2.635	2.6250-2.6280	2.327
3043	2.6875	2.692- 2.697	2.6875-2.6905	2.390
3044	2.7500	2.755- 2.760	2.7500-2.7530	2.452
3045	2.8125	2.817- 2.822	2.8125-2.8155	2.515
3046	2.8750	2.880- 2.885	2.8750-2.8780	2.577
3047	2.9375	2.942- 2.947	2.9375-2.9405	2.640