

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.

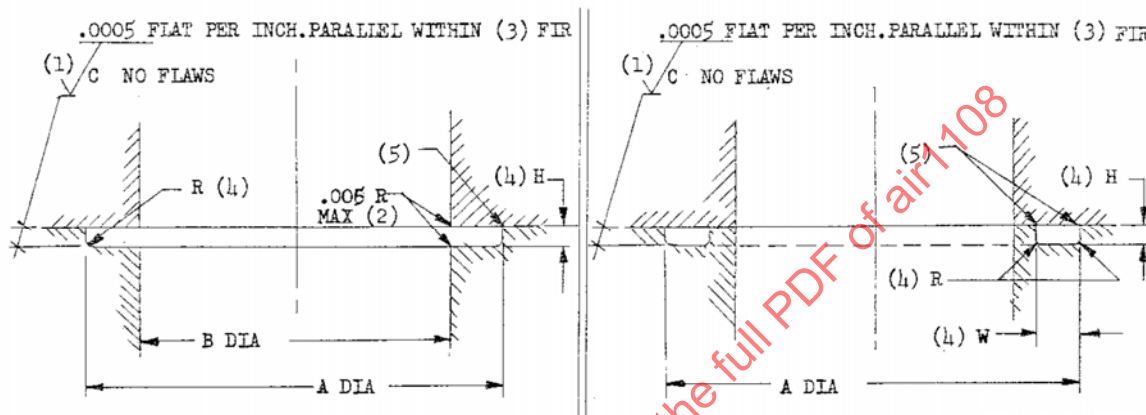


FIGURE 1

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., MS91h2, 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

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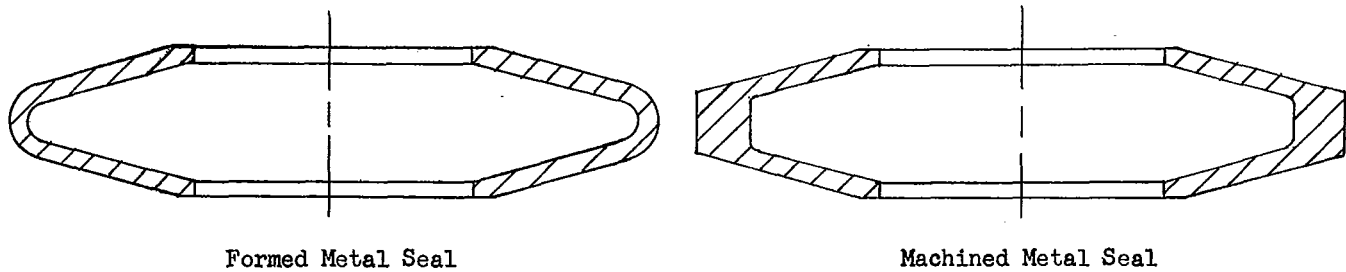
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EXAMPLES OF METAL SEALS

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		B DIA MAX	DASH NUMBER	NOM SEAL OD	A DIAMETER		B DIA MAX	DASH NUMBER	NOM SEAL OD	A DIAMETER		B DIA MAX	
		CLASS I	CLASS II				CLASS I	CLASS II				CLASS I	CLASS II		
1006	3.750	3.80-	3.85	3.750-	3.760	2.08	1076	4.7500	4.755-	4.760	4.582	2074	4.6250	4.635	4.390
1007	3.735	4.42-	4.47	4.375-	4.385	2.31	1078	4.8750	4.880-	4.885	4.707	2076	4.7500	4.760	4.515
1008	5.000	5.05-	5.10	5.000-	5.010	2.77	1080	5.0000	5.005-	5.010	4.832	2078	4.8750	4.885	4.640
1009	5.625	5.67-	5.72	5.625-	5.635	3.35	2016	1.0000	1.005-	1.010	.760	2080	5.0000	5.005-	4.765
1010	6.250	6.30-	6.35	6.250-	6.260	4.58	2017	1.0625	1.067-	1.072	.822	2082	5.1250	5.137	4.890
1011	6.875	6.92-	6.97	6.875-	6.885	5.24	2018	1.1250	1.130-	1.135	.885	2084	5.2500	5.262	5.015
1012	7.500	7.55-	7.60	7.500-	7.510	5.86	2019	1.1875	1.192-	1.197	.947	2086	5.3750	5.387	5.140
1013	8.125	8.17-	8.22	8.125-	8.135	6.49	2020	1.2500	1.255-	1.260	1.012	2088	5.5000	5.512	5.295
1014	8.750	8.80-	8.85	8.750-	8.770	7.11	2021	1.3125	1.317-	1.322	1.074	2090	5.6250	5.637	5.360
1015	9.375	9.42-	9.47	9.375-	9.395	7.76	2022	1.3750	1.380-	1.385	1.137	2092	5.7500	5.762	5.515
1016	1.0000	1.005-	1.010	1.0000-	1.0020	8.38	2023	1.4375	1.442-	1.447	1.199	2094	5.8750	5.887	5.640
1017	1.0625	1.067-	1.072	1.0625-	1.0645	9.01	2024	1.5000	1.505-	1.510	1.262	2096	6.0000	6.005-	5.765
1018	1.1250	1.130-	1.135	1.1250-	1.1270	9.63	2025	1.5625	1.567-	1.572	1.324	2100	6.2500	6.255-	6.015
1019	1.1875	1.192-	1.197	1.1875-	1.1895	1.028	2026	1.6250	1.630-	1.635	1.387	2104	6.5000	6.505-	6.265
1020	1.2500	1.255-	1.260	1.2500-	1.2520	1.090	2027	1.6875	1.692-	1.697	1.449	2108	6.7500	6.755-	6.515
1021	1.3125	1.317-	1.322	1.3125-	1.3145	1.153	2028	1.7500	1.755-	1.760	1.512	2112	7.0000	7.005-	6.765
1022	1.3750	1.380-	1.385	1.3750-	1.3770	1.215	2029	1.8125	1.817-	1.822	1.574	2116	7.2500	7.255-	7.015
1023	1.4375	1.442-	1.447	1.4375-	1.4395	1.278	2030	1.8750	1.880-	1.885	1.637	2120	7.5000	7.505-	7.265
1024	1.5000	1.505-	1.510	1.5000-	1.5020	1.340	2031	1.9375	1.942-	1.947	1.699	2124	7.7500	7.755-	7.515
1025	1.5625	1.567-	1.572	1.5625-	1.5645	1.403	2032	2.0000	2.005-	2.010	1.762	2128	8.0000	8.005-	7.765
1026	1.6250	1.630-	1.635	1.6250-	1.6270	1.465	2033	2.0625	2.067-	2.072	1.824	2132	8.2500	8.255-	8.015
1027	1.6875	1.692-	1.697	1.6875-	1.6895	1.528	2034	2.1250	2.130-	2.135	1.887	2136	8.5000	8.505-	8.265
1028	1.7500	1.755-	1.760	1.7500-	1.7520	1.590	2035	2.1875	2.192-	2.197	1.949	2140	8.7500	8.755-	8.515
1029	1.8125	1.817-	1.822	1.8125-	1.8145	1.653	2036	2.2500	2.255-	2.260	2.012	2144	9.0000	9.005-	8.765
1030	1.8750	1.880-	1.885	1.8750-	1.8770	1.715	2037	2.3125	2.317-	2.322	2.074	2148	9.2500	9.255-	9.015
1031	1.9375	1.942-	1.947	1.9375-	1.9395	1.778	2038	2.3750	2.380-	2.385	2.140	2152	9.5000	9.505-	9.265
1032	2.0000	2.005-	2.010	2.0000-	2.0020	1.840	2039	2.4375	2.442-	2.447	2.202	2156	9.7500	9.755-	9.515
1033	2.0625	2.067-	2.072	2.0625-	2.0645	1.903	2040	2.5000	2.505-	2.510	2.265	2160	10.0000	10.005-	9.765
1034	2.1250	2.130-	2.135	2.1250-	2.1270	1.965	2041	2.5625	2.567-	2.572	2.327	2164	10.2500	10.255-	10.015
1035	2.1875	2.192-	2.197	2.1875-	2.1895	2.028	2042	2.6250	2.630-	2.635	2.390	2168	10.5000	10.505-	10.265
1036	2.2500	2.255-	2.260	2.2500-	2.2520	2.090	2043	2.6875	2.692-	2.697	2.452	2172	10.7500	10.755-	10.515
1037	2.3125	2.317-	2.322	2.3125-	2.3145	2.155	2044	2.7500	2.755-	2.760	2.515	2176	11.0000	11.005-	10.765
1038	2.3750	2.380-	2.385	2.3750-	2.3770	2.207	2045	2.8125	2.817-	2.822	2.577	2180	11.2500	11.255-	11.015
1039	2.4375	2.442-	2.447	2.4375-	2.4395	2.270	2046	2.8750	2.880-	2.885	2.640	2184	11.5000	11.505-	11.265
1040	2.5000	2.505-	2.510	2.5000-	2.5020	2.332	2047	2.9375	2.942-	2.947	2.702	2188	11.7500	11.755-	11.515
1041	2.5625	2.567-	2.572	2.5625-	2.5645	2.395	2048	3.0000	3.005-	3.010	2.765	2192	12.0000	12.005-	11.765
1042	2.6250	2.630-	2.635	2.6250-	2.6270	2.457	2049	3.0625	3.067-	3.072	2.827	2200	12.5000	12.505-	12.265
1043	2.6875	2.692-	2.697	2.6875-	2.6895	2.520	2050	3.1250	3.130-	3.135	2.890	2208	13.0000	13.005-	12.765
1044	2.7500	2.755-	2.760	2.7500-	2.7520	2.582	2051	3.1875	3.192-	3.197	2.952	2216	13.5000	13.505-	13.265
1045	2.8125	2.817-	2.822	2.8125-	2.8145	2.645	2052	3.2500	3.255-	3.260	3.015	2224	14.0000	14.005-	13.765
1046	2.8750	2.880-	2.885	2.8750-	2.8770	2.707	2053	3.3125	3.317-	3.322	3.077	3032	2.0000	2.005-	1.702
1047	2.9375	2.942-	2.947	2.9375-	2.9395	2.770	2054	3.3750	3.380-	3.385	3.140	3033	2.0625	2.067-	1.765
1048	3.0000	3.005-	3.010	3.0000-	3.0020	2.832	2055	3.4375	3.442-	3.447	3.202	3034	2.1250	2.130-	1.827
1050	3.1250	3.130-	3.135	3.1250-	3.1270	2.957	2056	3.5000	3.505-	3.510	3.265	3035	2.1875	2.192-	1.890
1052	3.2500	3.255-	3.260	3.2500-	3.2520	3.082	2057	3.5625	3.567-	3.572	3.327	3036	2.2500	2.255-	1.952
1054	3.3750	3.380-	3.385	3.3750-	3.3770	3.207	2058	3.6250	3.630-	3.635	3.390	3037	2.3125	2.317-	2.015
1056	3.5000	3.505-	3.510	3.5000-	3.5020	3.332	2059	3.6875	3.692-	3.697	3.452	3038	2.3750	2.380-	2.077
1058	3.6250	3.630-	3.635	3.6250-	3.6270	3.457	2060	3.7500	3.755-	3.760	3.515	3039	2.4375	2.442-	2.140
1060	3.7500	3.755-	3.760	3.7500-	3.7520	3.582	2061	3.8125	3.817-	3.822	3.577	3040	2.5000	2.505-	2.202
1062	3.8750	3.880-	3.885	3.8750-	3.8770	3.707	2062	3.8750	3.880-	3.885	3.640	3041	2.5625	2.567-	2.265
1064	4.0000	4.005-	4.010	4.0000-	4.0020	3.832	2063	3.9375	3.942-	3.947	3.702	3042	2.6250	2.630-	2.327
1066	4.1250	4.130-	4.135	4.1250-	4.1270	3.957	2064	4.0000	4.005-	4.010	3.765	3043	2.6875	2.692-	2.390
1068	4.2500	4.255-	4.260	4.2500-	4.2520	4.082	2066	4.1250	4.130-	4.135	3.890	3044	2.7500	2.755-	2.452
1070	4.3750	4.380-	4.385	4.3750-	4.3770	4.207	2068	4.2500	4.255-	4.260	4.015	3045	2.8125	2.817-	2.515
1072	4.5000	4.505-	4.510	4.5000-	4.5020	4.332	2070	4.3750	4.380-	4.385	4.140	3046	2.8750	2.880-	2.577
1074	4.6250	4.630-	4.635	4.6250-	4.6270	4.457	2072	4.5000	4.505-	4.510	4.265	3047	2.9375	2.942-	2.640