

AGS VACUUM SEAL GUIDE

J. R. Jahelka

December 1979

Collider Accelerator Department
Brookhaven National Laboratory

U.S. Department of Energy

USDOE Office of Science (SC)

Notice: This technical note has been authored by employees of Brookhaven Science Associates, LLC under Contract No.DE-AC02-76CH00016 with the U.S. Department of Energy. The publisher by accepting the technical note for publication acknowledges that the United States Government retains a non-exclusive, paid-up, irrevocable, world-wide license to publish or reproduce the published form of this technical note, or allow others to do so, for United States Government purposes.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

Accelerator Department
BROOKHAVEN NATIONAL LABORATORY
Associated Universities, Inc.
Upton, New York 11973

AGS DIVISION TECHNICAL NOTE

No. 157

AGS VACUUM SEAL GUIDE

J.R. Jahelka
December 12, 1979

Table of Contents

	<u>Page</u>
I. General Notes	1
II. Groove Dimensions	2
III. Part Numbering Scheme	3
IV. Seal Sizes	4

Accelerator Department
BROOKHAVEN NATIONAL LABORATORY
Associated Universities, Inc.
Upton, New York 11973

AGS DIVISION TECHNICAL NOTE

No. 157

AGS VACUUM SEAL GUIDE

J.R. Jahelka
December 12, 1979

I. General Notes

- A. This note is intended to be used as a guide when designing grooves for metal C-ring vacuum seals. The sizes listed herein are available and currently in stock in the AGS Vacuum Lab, with notations as to preferred sizes. It is hoped that one day a small inventory of only the preferred sizes could be maintained. However, just about any size or configuration is available and the manufacturers should be consulted on special sizes or configurations. The list denotes several of the preferred sizes that are not currently available and an additional tooling charge will be charged for these seals.
- B. All seals within an 18-inch radius of the beam line should be metal C-rings, others may be elastomer. However, in high radiation areas it is desirable to use all metal seals.
- C. Electrical insulation between flanges sealed with a metal gasket can be accomplished by inserting a ceramic coated flange between the parts to be insulated and using bolt insulators. Drawing D05-M-791-3 shows a typical ceramic coated flange and drawing C-D05-M-823-1 shows a typical bolt insulator.
- D. When listing gaskets in the material list use the following:
 - For elastomer seal - O-ring #2-331, Viton "A"
 - For metal seal - C-ring 2.290/187/20/P/180 In.

E. Approved sources for metal C-rings are as follows:

Pressure Science, Incorporated
 11642 Old Baltimore Pike
 Beltsville, Maryland 20705
 Telephone: (301) 937-4010
 FTS 8-(202)-937-4010

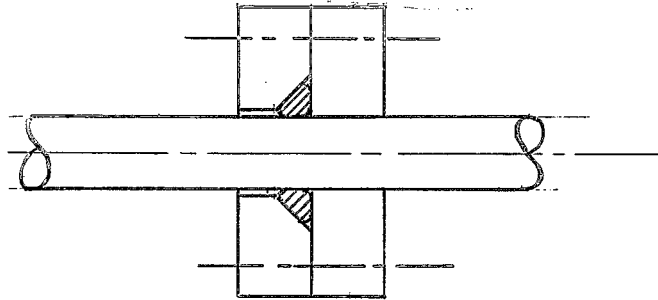
Advanced Products Company
 33 Defco Park Road
 North Haven, Connecticut 06473
 Telephone: (203) 239-3341

And currently being evaluated is:

UAP Components, Incorporated
 2620 The Boulevard
 Columbia, South Carolina 29290
 Telephone: (803) 783-1880

F. When circular stock O-ring is used on a square or rectangular opening, use a ring with an outer circumference equal to the developed inner periphery of the square or rectangular groove.

G. Triangular area to be equal to 110% of the O-ring cross sectional area.



II. Groove Dimensions

"O" Ring Groove Widths and Depths For Vacuum Use

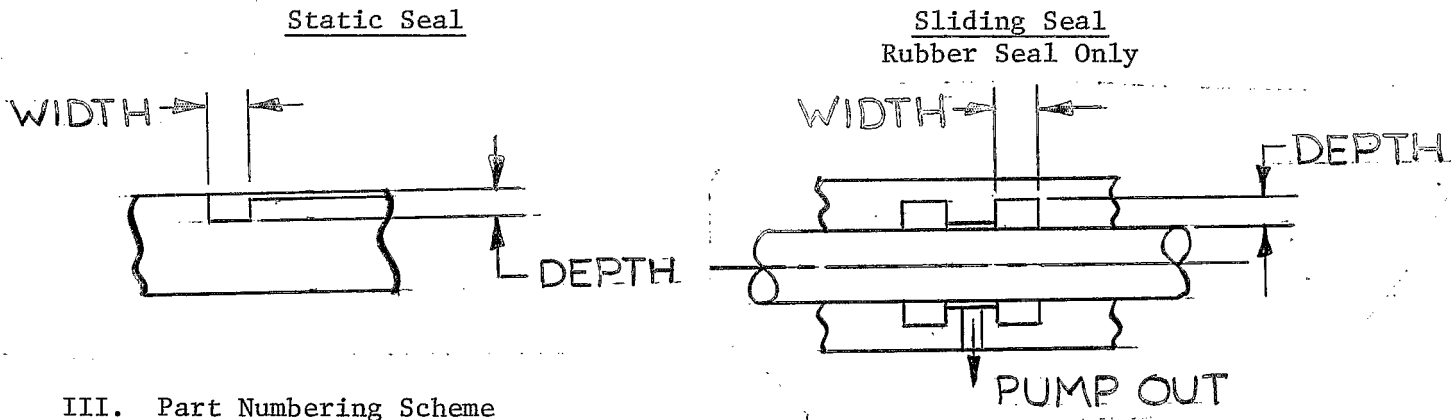
Static Seals				Sliding Seals	
Nom. Dia.	Cross Section Dia. (D)	Groove(.75D) Depth	Groove(1.2D) Width	Groove(.8D) Depth	Groove(1.15D) Width
	.040	.030	.048 1/16*	.032	.046
	.050	.038	.060 3/32*	.040	.058
	.060	.045	.072 3/32*	.048	.069
1/16	.070	.053	.084 3/32*	.056	.081
3/32	.103	.077	.124 5/32*	.082	.118
1/8	.139	.104	.167 3/16*	.111	.160
3/16	.210	.156	9/32	.168	.242
1/4	.275	.206	11/32	.220	.316

*Make groove width to fractional dimensions where space permits.

The same groove dimensions (above, except for sliding seals) are used for both the rubber O-rings and the metal C-rings.

NOTE 1 - Groove I.D. should be the nominal seal I.D. given as a fraction.

NOTE 2 - For rotating and sliding seals 1-1/2 O.D. and larger, use .85 D for groove depth (rubber seals only).



III. Part Numbering Scheme

Part numbers for standard C-rings are assigned as follows:

P/N - ID/h/t/P/180 or 0 In:

- ID - Groove I.D. (in decimal equivalent-inches) + .040*
- h - C-ring height, 250 for 1/4 inch nominal** (in thousands of an inch)

225	"	1/4	"	"
187	"	3/16	"	"
145	"	.145	"	"
125	"	1/8	"	"
093	"	3/32	"	"
- t - C-ring material thickness in thousandths of an inch

25	for	1/4	inch	nominal
20	"	3/16	"	"
20	"	.145	"	"
15	"	1/8	"	"
15	"	3/32	"	"
- P - Inconel X-750, C-ring material
- 180 - External pressure type ring
- 0 - Internal pressure type ring
- In - Indium plated

e.g., an 8-1/2" x 1/4" C-ring would be 8.540/250/25/P/180 In

*Was .030. Pressure Science tooling currently available uses this dimension--all new seals to be manufactured either by P.S.I. or other vendor must be in accordance with Spec. AGS-800.

**250 is preferred free height.

IV. Seal Sizes (P = Preferred Size)

Nominal I.D.	Part Number	PSI P/N	O-Ring Equivalent	Remarks
.460		613A54-0007-2	2-111	Free height-.093
.533		633A54-1732-2	2-112	Free height-.093
3/4	.790/125/15/P/180 In		2-210	P New size--no tooling available
1	1.030/125/15/P/180 In	A-3854	2-214	P
1-1/8	1.155/125/15/P/180 In	A-3856	2-216	
1-1/4	1.280/093/15/P/180 In	A-3858	2-124	
	1.280/125/15/P/180 In	A-3859	2-218	P
1-1/2	1.530/125/15/P/180 In	A-3860	2-222	P
1-3/4	1.780/125/15/P/180 In	A-3863	2-224	P
2	2.030/125/15/P/180 In	A-3864	2-226	P
2-1/4	2.280/125/15/P/180 In	A-3866	2-228	P
	2.280/187/20/P/180 In	A-3867	2-331	
2-3/8	2.405/187/20/P/180 In	A-3868	2-332	
2-1/2	2.530/125/15/P/180 In	A-3869	2-230	P
2-5/8	2.655/125/15/P/180 In	A-3872	2-231	
2-3/4	2.790/125/15/P/180 In		2-232	P New size--no tooling available
2-7/8	2.905/125/15/P/180 In	A-3873	2-233	
3	3.040/125/15/P/180 In		2-234	P New size--no tooling available
3-1/4	3.280/125/15/P/180 In	A-3876	2-236	
	3.280/187/20/P/180 In	A-3877	2-339	P
3-1/2	3.530/125/15/P/180 In	A-3879	2-238	
	3.530/187/20/P/180 In	A-3880	2-341	P
3-5/8	3.655/125/15/P/180 In	A-3881	2-239	
3-3/4	3.780/187/20/P/180 In	A-3882	2-343	P
4	4.030/125/15/P/180 In	A-3884	2-242	
	4.030/145/20/P/180 In	A-4032	2-242	4" Marmon joint seal
	4/040/187/20/P/180 In		2-345	P New size--no tooling available
4-1/8	4.150/187/20/P/180 In	A-3956	2-346	
4-1/4	4.280/187/20/P/180 In	A-3887	2-347	P
4-1/2	4.530/145/20/P/180 In	A-3888	2-246	
	4.530/187/20/P/180 In	A-3889	2-349	P

Nominal I.D.	Part Number	PSI P/N	O-Ring Equivalent	Remarks
4-3/4	4.780/125/15/P/180 In	A-3892	2-248	
	4.780/187/20/P/180 In	A-3893	2-351	P
5	5.030/187/20/P/180 In	A-3894	2-353	P
5-1/4	5.280/187/20/P/180 In	A-8615	2-355	P
5-1/2	5.530/187/20/P/180 In	A-3895	2-357	P
	5.530/225/25/P/180 In	A-4092	2-433	P
5-3/4	5.780/125/15/P/180 In	A-3896	2-256	
	5.780/187/20/P/180 In	A-2893	2-359	P
6	6.030/125/15/P/180 In	A-3898	2-258	
	6.030/187/20/P/180 In	A-5481	2-361	P
	6.030/225/25/P/180 In	A-3899	2-437	
6-1/4	6.280/187/20/P/180 In	A-3901	2-362	P
	6.280/225/25/P/180 In	A-3902	2-438	
6-1/2	6.530/145/20/P/180 In	A-3906	2-260	6" Marmon joint seal
	6.530/187/20/P/180 In	A-3818	2-363	P
	6.530/225/25/P/180 In	A-3909	2-439	
6-3/4	6.790/187/20/P/180 In		2-440	P New size--no tooling available
7	7.030/187/20/P/180 In	A-4195	2-365	
	7.030/225/25/P/180 In	A-3910	2-441	P
7-1/4	7.280/225/25/P/180 In	A-3914	2-442	P
7-1/2	7.530/225/25/P/180 In	A-3916	2-443	P
7-3/4	7.780/225/25/P/180 In	A-3918	A-444	P
8	8.030/225/25/P/180 In	A-3819	2-445	P
8-1/4	8.289/225/25/P/180 In	A-3920	2-445	P
8-1/2	8.530/145/20/P/180 In	A-3923	2-268	8" Marmon joint seal
	8.530/225/25/P/180 In	A-3925	2-446	P
9	9.030/187/20/P/180 In	A-3927	2-373	
	9.030/225/25/P/180 In	A-3928	2-447	P
9-1/2	9.530/225/25/P/180 In	A-3931	2-448	P
10	10.030/225/25/P/180 In	A-3932	2-449	P
10-1/2	10.530/145/20/P/180 In	A-5480	2-275	10" Marmon joint seal
	10.530/225/25/P/180 In	A-3936	2-450	P
11	11.040/250/25/P/180 In		2-451	P New size--no tooling available
11-1/2	11.530/225/25/P/180 In	A-3938	2-452	P
12	12.030/225/25/P/180 In	A-4041	2-453	P
12-1/2	12.530/125/15/P/180 In	A-3941	2-278	
	12.540/145/20/P/180 In		2-278	12" Marmon joint seal, new size--no tooling available

Nominal I.D.	Part Number	PSI P/N	O-Ring Equivalent	Remarks
13	13.030/225/25/P/180 In	A-3943	2-455	P
14	14.040/250/25/P/180 In		2-457	P New size--no tooling available
15	15.030/225/25/P/180 In	A-3945	2-459	P
16	16.030/225/25/P/180 In	A-3946	2-461	P
17	17.030/187/20/P/180 In	A-8174	2-386	
	17.040/250/25/P/180 In		2-463	P New size--no tooling available
20	20.030/225/25/P/180 In	A-3949	2-469	P
22-1/4	22.280/225/25/P/180 In	A-3951	2-471	P
26	26.030/225/25/P/180 In	A-3953	2-475	P
26-1/2	26.530/225/25/P/180 In	A-3954	2-475	P
28	28.030/225/25/P/180 In	A-3955		P

Special Sizes

7- $\frac{1}{4}$ x 4- $\frac{1}{8}$ Oval Seal	7.250x4.126/187/20/P/180 IN	A-3903		P Ring chamber oval seal
8- $\frac{5}{8}$ OD	8.622/187/20/P/0 In	A-3926		P Ring chamber Marmon seal
	C-D05-M-1172-3A	D-2476		P 4" valve seal and retainer
	C-D05-M-1143-3A	D-2440		P 12" ring Marmon seal and retainer
	C-D05-M-1144-3A			P 14" ring Marmon seal and retainer
	C-D05-M-1170-3A	B-2471		P 5' straight section port box oval seal
4- $\frac{1}{4}$ x 4- $\frac{1}{4}$	D05-M-2058-3A	C-7657		P F5 & F10 special chamber pump-out seal

mn

Distribution: Dept. Adm.
 AD Mech. Designers
 AD Mech. Engineers
 R. diGirolamo
 W. Jacobs
 R. Monaghan
 F. Schneider