



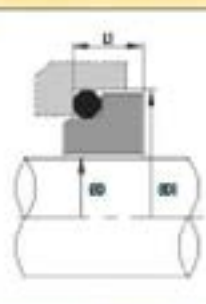
Vulcan Stationary Seat Types, Clamp Rings. Seal Repair, Fitting, Identification And Vulcan



Section

12

COMMON VULCAN 'O'-RING MOUNTED SEATS



Common Vulcan 'O'-Ring Mounted Short Stationary designs to suit DIN and other standard housings. These short 'O'-Ring Mounted Seats are not pinned and rely upon compression on the 'O'-Ring for retention. Consideration should be given to Long Pinned Seats or Boot Mounted Seats where conditions necessitate.

VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	Type 8/19 STD		Type 8B		Type 12		Type 12 DIN		Type 13		Type 13 DIN	
		D1	L1	D1	L1	D1	L1	D1	L1	D1	L1	D1	L1
10	0100	19.2	6.6	19.2	7.1	18.1	5.5	21.0	7.0	18.1	5.5	21.0	7.0
11	0110	-	-	-	-	20.6	5.5	-	-	20.6	5.5	-	-
12	0120	21.6	5.6	21.6	7.6	20.6	5.5	23.0	7.0	20.6	5.5	23.0	7.0
13	0130	-	-	-	-	23.1	6.0	-	-	23.1	6.0	-	-
14	0140	24.6	5.6	24.6	7.6	23.1	6.0	25.0	7.0	23.1	6.0	25.0	7.0
15	0150	24.6	6.6	24.6	8.6	26.9	7.0	-	-	26.9	7.0	-	-
16	0160	28.0	7.5	28.0	9.0	26.9	7.0	27.0	7.0	26.9	7.0	27.0	7.0
17	0170	-	-	-	-	26.9	7.0	-	-	26.9	7.0	-	-
18	0180	30.0	8.0	30.0	10.0	30.9	8.0	33.0	10.0	30.9	8.0	33.0	10.0
19	0190	31.0	7.5	31.0	9.0	30.9	8.0	-	-	30.9	8.0	-	-
20	0200	35.0	7.5	35.0	9.5	30.9	8.0	35.0	10.0	30.9	8.0	35.0	10.0
21	0210	-	-	-	-	35.4	8.0	-	-	35.4	8.0	-	-
22	0220	35.0	7.5	35.0	9.5	35.4	8.0	37.0	10.0	35.4	8.0	37.0	10.0
23	0230	-	-	-	-	35.4	8.0	-	-	35.4	8.0	-	-
24	0240	38.0	7.5	38.0	9.5	35.4	8.0	39.0	10.0	35.4	8.0	39.0	10.0
25	0250	38.0	7.5	38.0	9.5	38.2	8.5	40.0	10.0	38.2	8.5	40.0	10.0
26	0260	40.0	8.0	40.0	10.0	38.2	8.5	-	-	-	-	-	-
28	0280	42.0	9.0	42.0	11.0	43.3	9.0	43.0	10.0	43.3	9.0	43.0	10.0
29	0290	-	-	-	-	43.3	9.0	-	-	43.3	9.0	-	-
30	0300	45.0	10.5	45.0	11.0	43.3	9.0	45.0	10.0	43.3	9.0	45.0	10.0
32	0320	48.0	10.5	48.0	11.0	43.3	9.0	48.0	10.0	43.3	9.0	48.0	10.0
33	0330	-	-	-	-	53.5	11.5	48.0	10.0	53.5	11.5	48.0	10.0
35	0350	52.0	11.0	52.0	11.5	53.5	11.5	50.0	10.0	53.5	11.5	50.0	10.0
38	0380	55.0	10.3	55.0	11.5	60.5	11.5	56.0	13.0	60.5	11.5	56.0	13.0
40	0400	58.0	10.8	58.0	11.5	60.5	11.5	58.0	13.0	60.5	11.5	58.0	13.0
42	0420	62.0	12.0	62.0	14.3	60.5	11.5	-	-	-	-	-	-
43	0430	62.0	12.0	62.0	14.3	60.5	11.5	61.0	13.0	-	-	-	-
44	0440	-	-	-	-	65.5	11.5	-	-	-	-	-	-
45	0450	64.0	11.6	64.0	14.3	65.5	11.5	63.0	13.0	-	-	-	-
48	0480	68.4	11.6	68.4	14.3	65.5	11.5	66.0	13.0	-	-	-	-
50	0500	69.3	11.6	69.3	14.3	72.5	11.5	70.0	14.0	-	-	-	-
53	0530	-	-	-	-	-	-	73.0	14.0	-	-	-	-
55	0550	75.4	13.3	75.4	15.3	72.5	11.5	75.0	14.0	-	-	-	-
58	0580	78.4	13.3	78.4	15.3	-	-	78.0	14.0	-	-	-	-
60	0600	80.4	13.3	80.4	15.3	79.3	11.5	80.0	14.0	-	-	-	-
63	0630	-	-	-	-	-	-	83.0	14.0	-	-	-	-
65	0650	85.4	13.0	85.4	15.3	84.5	11.5	85.0	14.0	-	-	-	-
68	0680	91.5	13.7	91.5	16.0	-	-	90.0	16.0	-	-	-	-
70	0700	92.0	13.0	92.0	15.3	89.5	11.5	92.0	16.0	-	-	-	-
75	0750	99.0	14.0	99.0	15.3	94.5	11.5	97.0	16.0	-	-	-	-
80	0800	104.0	15.0	104.0	16.3	99.5	11.5	105.0	18.0	-	-	-	-
85	0850	109.0	14.8	-	-	105.5	13.5	110.0	18.0	-	-	-	-
90	0900	114.0	14.8	-	-	111.5	13.5	115.0	18.0	-	-	-	-
95	0950	120.3	15.8	-	-	114.5	13.5	120.0	18.0	-	-	-	-
100	1000	123.3	15.8	-	-	119.5	13.5	125.0	18.0	-	-	-	-

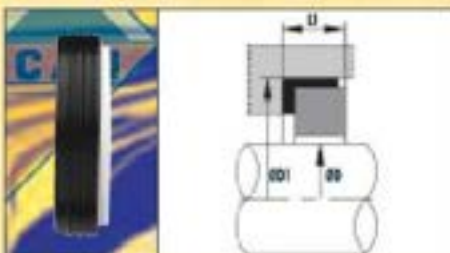
STANDARD STOCK SEAT MATERIALS

Carbon, Ceramic, Silicon Carbide, Tungsten Carbide.

OTHER SEAT MATERIALS TO ORDER



VULCAN BOOT MOUNTED SEATS



Vulcan offer a wide variety of stock Boot Mounted Seats, to suit a variety of different housings and working length standards, as well as different ring I.D.'s to track against all Vulcan Seal faces. Boot Mounted Seats offer optimum cost and performance benefits and are widely utilised. Please specify your shaft size because each seat size shown has a unique I.D.

TYPES 11 & 1511 VULCAN STANDARD SIZES

Shaft Size D0		D1		L1	
Inch	Metric	Metric	Inch	Metric	Inch
0.500	12.13	25.40	1.000	7.93	0.312
0.625	14.15, 16	31.75	1.250	10.28	0.405
0.750	18.19	34.93	1.375	10.28	0.404
0.875	20.22	38.10	1.500	10.28	0.405
1.000	24.25	41.28	1.625	11.10	0.437
1.125	28	44.44	1.750	11.10	0.437
1.250	30.32	47.63	1.875	11.10	0.437
1.375	33.34, 35	50.80	2.000	11.10	0.437
1.500	38	53.98	2.125	11.10	0.437
1.625	40	60.33	2.375	12.70	0.500
1.750	43.44, 45	63.50	2.500	12.70	0.500
1.875	48	69.85	2.750	12.70	0.500
2.000	50	69.85	2.750	12.70	0.500
2.125	53	76.20	3.000	14.28	0.562
2.250	55	79.38	3.125	14.28	0.562
2.375	58.60	82.55	3.250	14.28	0.562
2.500	63	85.73	3.375	14.28	0.562
2.625	65	85.73	3.375	15.90	0.626
2.750	68.70	88.90	3.500	15.90	0.626
2.875	73	95.25	3.750	15.90	0.626
3.000	75	98.43	3.875	15.90	0.626

TYPES 19B/24 VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	Type 19B L1	Type 24 L1
12	0120	23.00	6.60	8.60
14	0140	25.00	6.60	8.60
15	0150	27.00	6.60	8.60
16	0160	27.00	6.60	10.00
18	0180	33.00	7.50	10.00
20	0200	35.00	7.50	10.00
22	0220	37.00	7.50	10.00
24	0240	39.00	7.50	10.00
25	0250	40.00	7.50	10.00
28	0280	43.00	7.50	10.00
30	0300	45.00	7.50	10.00

Metric Shaft Size D	Size Code	D1	Type 19B L1	Type 24 L1
32	0320	48.00	7.50	10.00
35	0350	50.00	7.50	10.00
38	0380	54.00	9.00	11.00
40	0400	58.00	9.00	11.00
43	0430	61.00	9.00	11.00
45	0450	63.00	9.00	11.00
48	0480	66.00	9.00	11.00
50	0500	70.00	9.50	13.00
52	0520	72.00	11.0	13.00
55	0550	75.00	11.0	13.00
58	0580	71.00	11.0	13.00

Metric Shaft Size D	Size Code	D1	Type 19B L1	Type 24 L1
60	0600	80.00	11.0	13.00
65	0650	85.00	11.0	13.00
68	0680	90.00	11.3	13.00
70	0700	92.00	11.3	15.30
75	0750	97.00	11.3	15.30
80	0800	105.0	12.0	15.30
85	0850	110.0	14.0	15.70
90	0900	115.0	14.0	15.70
95	0950	120.0	14.0	15.70
100	1000	125.0	14.0	15.70

STANDARD STOCK SEAT MATERIALS

Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.

OTHER SEAT MATERIALS TO ORDER

TYPES 20 & 1520 VULCAN STANDARD SIZES

Shaft Size D0		D1		L1	
Inch	Metric	Metric	Inch	Metric	Inch
0.375	10	24.60	0.969	8.74	0.341
0.500	12.13	27.79	1.094	8.74	0.341
0.625	14.15, 16	30.95	1.219	10.32	0.406
0.750	18.19	34.15	1.344	10.32	0.406
0.875	20.22	37.30	1.469	10.32	0.406
1.000	24.25	40.50	1.594	10.32	0.406
1.125	28	43.65	1.875	11.99	0.472
1.250	30.32	50.80	2.000	11.99	0.472
1.375	33.34, 35	53.98	2.125	11.99	0.472
1.500	38	57.15	2.250	11.99	0.472
1.625	40	60.35	2.375	11.99	0.472
1.750	43.44, 45	63.50	2.500	11.99	0.472
1.875	48	66.70	2.625	11.99	0.472
2.000	50	69.85	2.750	13.50	0.531
2.125	53	73.05	2.875	13.50	0.531
2.250	55	76.20	3.000	13.50	0.531
2.375	58.60	79.40	3.125	13.50	0.531
2.500	63	82.55	3.250	13.50	0.531
2.625	65	85.70	3.375	15.90	0.626
2.750	68.70	88.90	3.500	15.90	0.626
2.875	73	95.25	3.750	15.90	0.626
3.000	75	101.65	4.002	15.90	0.626
3.125	-	111.15	4.376	20.00	0.787
3.250	80	114.30	4.500	20.00	0.787
3.375	85	117.50	4.626	20.00	0.787
3.500	-	120.65	4.750	20.00	0.787
3.625	90	123.85	4.876	20.00	0.787
3.750	95	127.00	5.000	20.00	0.787
3.875	-	130.20	5.126	20.00	0.787
4.000	100	133.35	5.250	20.00	0.787

VULCAN NON-DIN 'O'-RING MOUNTED SEATS



TYPE 21/31 SEATS

'O'-Ring mounted 'H' configuration stationary seat, to suit both standard European (Type 21) or American (Type 31) housing dimensions. These seats provide the benefit of being able to be pinned through-out the size range.

VULCAN STANDARD SIZES

Shaft Size D0			Shaft Size D0			Type 21				Type 31			
Inch	Metric	Code Size	Metric	Inch	Code Size	D1		L1		D1		L1	
						Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.375	9.53	0450	10	0.394	0190	24.60	0.969	8.70	0.343	22.22	0.875	7.95	0.313
			12	0.472	0120	24.60	0.969	8.70	0.343	22.22	0.875	7.95	0.313
0.500	12.70	0127	13	0.512	0130	27.79	1.094	8.70	0.343	25.40	1.000	7.95	0.313
			14	0.551	0140	27.79	1.094	8.70	0.343	25.40	1.000	7.95	0.313
			15	0.591	0150	30.95	1.219	10.30	0.406	31.75	1.250	10.30	0.406
0.625	15.88	0158	16	0.630	0160	30.95	1.219	10.30	0.406	31.75	1.250	10.30	0.406
			18	0.709	0180	34.15	1.344	10.30	0.406	34.93	1.375	10.30	0.406
0.750	19.05	0191	20	0.787	0290	34.15	1.344	10.30	0.406	34.93	1.375	10.30	0.406
			22	0.864	0220	37.30	1.469	10.30	0.406	38.10	1.500	10.30	0.406
0.875	22.23	0222	24	0.943	0240	37.30	1.469	10.30	0.406	38.10	1.500	10.30	0.406
			25	0.984	0250	40.50	1.594	10.30	0.406	41.28	1.625	11.10	0.437
1.000	25.40	0254	28	1.102	0280	40.50	1.594	10.30	0.406	41.28	1.625	11.10	0.437
			30	1.181	0300	47.63	1.875	11.90	0.469	44.44	1.750	11.10	0.437
1.125	28.58	0286	32	1.260	0320	47.63	1.875	11.90	0.469	44.44	1.750	11.10	0.437
1.250	31.75	0317	33	1.299	0330	50.80	2.000	11.90	0.469	47.63	1.875	11.10	0.437
			35	1.378	0350	50.80	2.000	11.90	0.469	47.63	1.875	11.10	0.437
1.375	34.93	0349	38	1.496	0380	53.98	2.125	11.90	0.469	50.80	2.000	11.10	0.437
			40	1.575	0400	53.98	2.125	11.90	0.469	50.80	2.000	11.10	0.437
1.500	38.10	0381	42	1.654	0420	57.15	2.250	11.90	0.469	53.98	2.125	11.10	0.437
			43	1.693	0430	57.15	2.250	11.90	0.469	53.98	2.125	11.10	0.437
1.625	41.28	0412	45	1.772	0450	60.35	2.376	11.90	0.469	60.35	2.376	12.70	0.500
			47	1.851	0470	60.35	2.376	11.90	0.469	60.35	2.376	12.70	0.500
1.750	44.45	0444	48	1.890	0480	63.50	2.500	11.90	0.469	63.50	2.500	12.70	0.500
			50	1.969	0500	63.50	2.500	11.90	0.469	63.50	2.500	12.70	0.500
1.875	47.63	0475	53	2.087	0530	66.70	2.626	11.90	0.469	66.70	2.626	12.70	0.500
			55	2.165	0550	66.70	2.626	11.90	0.469	66.70	2.626	12.70	0.500
2.000	50.80	0508	58	2.283	0580	69.85	2.750	13.50	0.531	69.85	2.750	12.70	0.500
			60	2.362	0600	69.85	2.750	13.50	0.531	69.85	2.750	12.70	0.500
2.125	53.98	0539	63	2.480	0630	73.05	2.876	13.50	0.531	73.05	2.876	14.30	0.563
			65	2.559	0650	73.05	2.876	13.50	0.531	73.05	2.876	14.30	0.563
2.250	57.15	0571	68	2.683	0680	76.20	3.000	13.50	0.531	76.20	3.000	14.30	0.563
			70	2.754	0700	76.20	3.000	13.50	0.531	76.20	3.000	14.30	0.563
2.375	60.33	0603	75	2.953	0750	79.40	3.126	13.50	0.531	79.40	3.126	14.30	0.563
			77	3.032	0770	79.40	3.126	13.50	0.531	79.40	3.126	14.30	0.563
2.500	63.50	0635	80	3.150	0800	82.55	3.250	13.50	0.531	82.55	3.250	14.30	0.563
			82	3.229	0820	82.55	3.250	13.50	0.531	82.55	3.250	14.30	0.563
2.625	66.68	0666	85	3.347	0850	85.73	3.375	15.90	0.626	85.73	3.375	15.90	0.626
			87	3.426	0870	85.73	3.375	15.90	0.626	85.73	3.375	15.90	0.626
2.750	69.85	0698	90	3.543	0900	88.90	3.500	15.90	0.626	88.90	3.500	15.90	0.626
			92	3.622	0920	88.90	3.500	15.90	0.626	88.90	3.500	15.90	0.626
2.875	73.03	0730	95	3.739	0950	92.10	3.626	15.90	0.626	92.10	3.626	15.90	0.626
			97	3.818	0970	95.25	3.750	15.90	0.626	95.25	3.750	15.90	0.626
3.000	76.20	0762	100	3.937	1000	98.45	3.876	15.90	0.626	98.45	3.876	15.90	0.626
						101.45	4.002	15.90	0.626	101.45	4.002	15.90	0.626
						111.15	4.376	19.90	0.783	111.15	4.376	19.88	0.783
						120.45	4.750	19.90	0.783	120.45	4.750	19.88	0.783
						130.35	5.125	19.90	0.783	130.35	5.125	19.88	0.783

STANDARD STOCK SEAT MATERIALS

Stat Ring: Ceramic, Stainless Steel, Silicon Carbide, Tungsten Carbide, Ni-Resist.

OTHER SEAT MATERIALS TO ORDER



TYPE 8 DIN SHORT



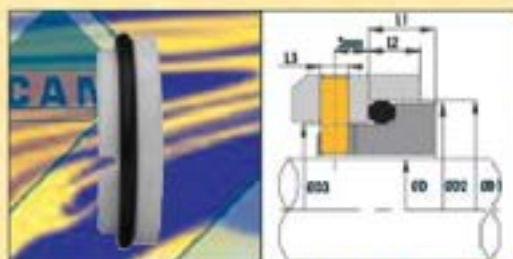
DIN SHORT VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2
10	0100	21.0	20.4	16.4	6.6	5.5
12	0120	23.0	22.6	18.4	6.6	5.5
14	0140	25.0	24.6	20.4	6.6	5.5
15	0150	27.0	26.6	22.4	6.6	5.5
16	0160	27.0	26.6	22.4	6.6	5.5
18	0180	31.0	32.4	26.6	7.5	7.0
20	0200	35.0	34.6	28.6	7.5	7.0
22	0220	37.0	36.6	30.6	7.5	7.0
24	0240	39.0	38.6	32.6	7.5	7.0
25	0250	40.0	39.6	33.6	7.5	7.0
28	0280	43.0	42.6	36.6	7.5	7.0
30	0300	45.0	44.6	38.6	7.5	7.0
32	0320	48.0	47.6	41.6	7.5	7.0
33	0330	48.0	47.6	41.6	7.5	7.0
35	0350	50.0	49.6	43.6	7.5	7.0
38	0380	54.0	53.6	48.6	9.0	8.0
40	0400	58.0	57.4	50.6	9.0	8.0
43	0430	61.0	60.6	53.6	9.0	8.0

Common 'O'-Ring mounted DIN Short seat. DIN Short seats are normally only best recommended for smaller shaft sizes or for non-arduous duties.

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2
45	0450	63.0	62.6	55.6	9.0	8.0
48	0480	66.0	65.6	58.6	9.0	8.0
50	0500	70.0	69.6	61.25	9.5	8.5
53	0530	73.0	72.6	64.25	11.0	8.5
55	0550	75.0	74.4	66.25	11.0	8.5
58	0580	78.0	77.5	69.25	11.0	8.5
60	0600	80.0	79.5	71.25	11.0	8.5
65	0650	85.0	84.5	76.25	11.0	8.5
68	0680	90.0	89.5	80.50	11.3	9.5
70	0700	92.0	91.4	82.60	11.3	9.5
75	0750	97.0	96.4	87.60	11.3	9.5
80	0800	105.0	104.2	94.70	12.0	10.0
85	0850	110.0	109.2	99.70	14.0	10.0
90	0900	115.0	114.2	104.70	14.0	10.0
95	0950	120.0	119.2	109.70	14.0	10.0
100	1000	125.0	124.2	114.70	14.0	10.0

TYPE 8 DIN LONG



DIN LONG VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	21.0	20.6	16.4	10.0	5.5	3.0
12	0120	23.0	22.6	18.4	10.0	5.5	3.0
14	0140	25.0	24.6	20.4	10.0	5.5	3.0
15	0150	27.0	26.6	22.4	10.0	5.5	3.0
16	0160	27.0	26.6	22.4	10.0	5.5	3.0
18	0180	33.0	32.6	26.6	11.5	7.0	3.0
20	0200	35.0	34.6	28.6	11.5	7.0	3.0
22	0220	37.0	36.6	30.6	11.5	7.0	3.0
24	0240	39.0	38.6	32.6	11.5	7.0	3.0
25	0250	40.0	39.6	33.6	11.5	7.0	3.0
28	0280	43.0	42.6	36.6	11.5	7.0	3.0
30	0300	45.0	44.6	38.6	11.5	7.0	3.0
32	0320	48.0	47.6	41.6	11.5	7.0	3.0
33	0330	48.0	47.6	41.6	11.5	7.0	3.0
35	0350	50.0	49.6	43.6	11.5	7.0	3.0
38	0380	54.0	53.6	48.6	14.0	8.0	4.0
40	0400	58.0	57.4	50.6	14.0	8.0	4.0

DIN Long Type seats, with anti-rotation slot, are preferred for higher shaft size/speeds/pressures or sticky, coagulating etc. media.

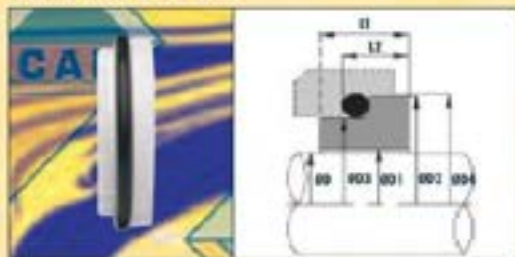
Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
43	0430	61.0	60.6	53.6	14.0	8.0	4.0
45	0450	63.0	62.6	55.6	14.0	8.0	4.0
48	0480	66.0	65.6	58.6	14.0	8.0	4.0
50	0500	70.0	69.6	61.25	15.0	8.5	4.0
53	0530	73.0	72.6	64.25	15.0	8.5	4.0
55	0550	75.0	74.4	66.25	15.0	8.5	4.0
58	0580	78.0	77.5	69.25	15.0	8.5	4.0
60	0600	80.0	79.5	71.25	15.0	8.5	4.0
65	0650	85.0	84.5	76.25	15.0	8.5	4.0
68	0680	90.0	89.5	80.50	18.0	9.5	4.0
70	0700	92.0	91.4	82.60	18.0	9.5	4.0
75	0750	97.0	96.4	87.60	18.0	9.5	4.0
80	0800	105.0	104.2	94.70	18.2	10.0	4.0
85	0850	110.0	109.2	99.70	18.2	10.0	4.0
90	0900	115.0	114.2	104.70	18.2	10.0	4.0
95	0950	120.0	119.2	109.70	17.2	10.0	4.0
100	1000	125.0	124.2	114.70	17.2	10.0	4.0

STANDARD STOCK SEAT MATERIALS

Coramic, Silicon Carbide, Tungsten Carbide, Carbon.

OTHER SEAT MATERIALS TO ORDER

TYPE 24 DIN

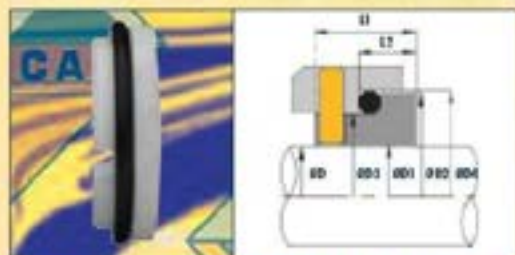


'O'-Ring mounted stationary seat to DIN 24960 (EN12756) Standard with short tail.

The seat offers different axial dimensions to the Type 8 DIN short seat and can be utilised with most seals particularly the Type 24 and 1724 designs.

DIN SHORT VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	D4	L1	L2
10	0100	11.0	20.6	16.4	21.0	10.0	8.6
12	0120	13.0	22.6	18.4	23.0	10.0	8.6
14	0140	15.0	24.6	20.4	25.0	10.0	8.6
16	0160	17.0	26.6	22.4	27.0	10.0	8.6
18	0180	19.0	28.6	24.4	29.0	11.5	10.0
20	0200	21.0	30.6	26.4	31.0	11.5	10.0
22	0220	23.0	32.6	28.4	33.0	11.5	10.0
24	0240	25.0	34.6	30.4	35.0	11.5	10.0
25	0250	26.0	35.6	31.4	36.0	11.5	10.0
28	0280	29.0	38.6	34.4	39.0	11.5	10.0
30	0300	31.0	40.6	36.4	41.0	11.5	10.0
32	0320	33.0	42.6	38.4	43.0	11.5	10.0
33	0330	34.0	43.6	39.4	44.0	11.5	10.0
35	0350	36.0	45.6	41.4	46.0	11.5	10.0
38	0380	39.0	48.6	44.4	49.0	12.5	11.0
40	0400	41.0	50.6	46.4	51.0	12.5	11.0
43	0430	44.0	53.6	49.4	54.0	12.5	11.0



'O'-Ring mounted stationary seat to DIN 24960 (EN12756) Standard with long tail and drive slot.

The seat offers different axial dimensions to the Type 8 DIN long seat and can be utilised with most seals particularly the Type 24 and 1724 designs.

DIN LONG VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	D4	L1	L2	Slot Width	Slot Depth
10	0100	11.2	20.6	16.4	21.0	15.0	8.6	4.0	5.0
12	0120	13.2	22.6	18.4	23.0	15.0	8.6	4.0	5.0
14	0140	15.2	24.6	20.4	25.0	15.0	8.6	4.0	5.0
16	0160	17.2	26.6	22.4	27.0	15.0	8.6	4.0	5.0
18	0180	19.2	28.6	24.4	29.0	17.0	10.0	4.0	5.5
20	0200	21.2	30.6	26.4	31.0	17.0	10.0	4.0	5.5
22	0220	23.2	32.6	28.4	33.0	17.0	10.0	4.0	5.5
24	0240	25.2	34.6	30.4	35.0	17.0	10.0	4.0	5.5
25	0250	26.2	35.6	31.4	36.0	17.0	10.0	4.0	5.5
28	0280	29.2	38.6	34.4	39.0	17.0	10.0	4.0	5.5
30	0300	31.2	40.6	36.4	41.0	17.0	10.0	4.0	5.5
32	0320	33.2	42.6	38.4	43.0	17.0	10.0	4.0	5.5
33	0330	34.2	43.6	39.4	44.0	17.0	10.0	4.0	5.5
35	0350	36.2	45.6	41.4	46.0	17.0	10.0	4.0	5.5
38	0380	39.2	48.6	44.4	49.0	18.0	11.0	5.0	5.5
40	0400	41.2	50.6	46.4	51.0	18.0	11.0	5.0	5.5
43	0430	44.2	53.6	49.4	54.0	18.0	11.0	5.0	5.5

Metric Shaft Size D	Size Code	D1	D2	D3	D4	L1	L2
45	0450	46.0	52.6	55.8	62.0	12.5	11.0
48	0480	49.0	55.6	58.8	65.0	12.5	11.0
50	0500	51.0	57.6	61.3	70.0	14.5	13.0
53	0530	54.0	60.6	64.3	73.0	14.5	13.0
55	0550	56.0	62.6	66.3	75.0	14.5	13.0
58	0580	59.0	65.6	69.3	78.0	14.5	13.0
60	0600	61.0	67.6	71.3	80.0	14.5	13.0
63	0630	64.0	70.6	74.3	83.0	14.5	13.0
65	0650	66.0	72.6	76.3	85.0	14.5	13.0
68	0680	69.0	75.6	79.3	88.0	16.5	15.3
70	0700	71.0	77.6	81.3	90.0	16.5	15.3
75	0750	76.0	82.6	86.3	97.0	16.5	15.3
80	0800	81.0	87.6	91.3	105.0	17.5	15.7
85	0850	86.0	92.6	96.3	109.0	17.5	15.7
90	0900	91.0	97.6	101.3	114.0	17.5	15.7
95	0950	96.0	102.6	106.3	119.0	17.5	15.7
100	1000	101.0	107.6	111.3	124.0	17.5	15.7

Metric Shaft Size D	Size Code	D1	D2	D3	D4	L1	L2	Slot Width	Slot Depth
45	0450	46.2	52.6	55.8	62.0	18.0	11.0	5.0	5.5
48	0480	49.2	55.6	58.8	65.0	18.0	11.0	5.0	5.5
50	0500	51.2	57.6	61.3	70.0	20.0	13.0	5.0	5.5
53	0530	54.2	60.6	64.3	73.0	20.0	13.0	5.0	5.5
55	0550	56.2	62.6	66.3	75.0	20.0	13.0	5.0	5.5
58	0580	59.2	65.6	69.3	78.0	20.0	13.0	5.0	5.5
60	0600	61.2	67.6	71.3	80.0	20.0	13.0	5.0	5.5
63	0630	64.2	70.6	74.3	83.0	20.0	13.0	5.0	5.5
65	0650	66.2	72.6	76.3	85.0	20.0	13.0	5.0	5.5
68	0680	69.2	75.6	79.3	88.0	22.0	15.3	5.0	5.5
70	0700	71.2	77.6	81.3	90.0	22.0	15.3	5.0	5.5
75	0750	76.2	82.6	86.3	97.0	22.0	15.3	5.0	5.5
80	0800	81.2	87.6	91.3	105.0	23.0	15.7	5.0	5.5
85	0850	86.2	92.6	96.3	109.0	23.0	15.7	5.0	5.5
90	0900	91.2	97.6	101.3	114.0	23.0	15.7	5.0	5.5
95	0950	96.2	102.6	106.3	119.0	23.0	15.7	5.0	5.5
100	1000	101.2	107.6	111.3	124.0	23.0	15.7	5.0	5.5

STANDARD STOCK SEAT MATERIALS

Ceramic, Silicon Carbide, Tungsten Carbide, Carbon.

OTHER SEAT MATERIALS TO ORDER



TYPE 25

VULCAN STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		D2		L1		L2		Gasket Thickness	
Inch	Metric	Code Size	Metric	Inch	Code Size	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
1.500	12.70	0127	13	0.512	0130	13.70	0.539	29.45	1.164	17.40	0.685	7.90	0.311	0.00	0.00
1.425	15.88	0158	16	0.630	0160	14.90	0.586	33.94	1.301	17.40	0.685	7.90	0.311	0.00	0.00
1.750	19.35	0191	19	0.748	0190	20.00	0.787	36.21	1.424	17.40	0.685	7.90	0.311	0.00	0.00
-	-	0200	20	0.787	0200	21.00	0.827	36.90	1.451	17.40	0.685	7.90	0.311	0.00	0.00
1.875	22.23	0221	22	0.866	0220	23.20	0.913	39.29	1.551	17.40	0.685	7.90	0.311	0.00	0.00
-	-	0250	25	0.984	0250	24.00	1.029	41.90	1.654	17.40	0.685	7.90	0.311	0.00	0.00
1.000	15.88	0254	-	-	-	24.00	1.029	42.54	1.674	17.40	0.685	7.90	0.311	0.00	0.00
1.125	18.58	0286	-	-	-	29.60	1.165	45.74	1.801	26.90	1.059	11.10	0.437	1.60	0.063
-	-	0300	30	1.181	0300	31.00	1.220	48.29	1.917	26.90	1.059	11.10	0.437	1.60	0.063
1.250	11.75	0317	32	1.260	0320	32.70	1.287	50.20	1.984	26.90	1.059	11.10	0.437	1.60	0.063
1.375	14.93	0349	35	1.378	0350	34.00	1.407	53.48	2.112	26.90	1.059	11.10	0.437	1.60	0.063
1.500	18.10	0381	38	1.494	0380	39.70	1.559	56.35	2.259	26.90	1.059	11.10	0.437	1.60	0.063
1.625	11.28	0412	-	-	-	42.20	1.661	62.20	2.454	26.90	1.059	11.10	0.437	1.60	0.063
1.750	44.45	0444	45	1.772	0450	45.40	1.787	66.30	2.617	26.90	1.059	11.00	0.433	1.60	0.063
1.875	47.63	0476	48	1.890	0480	49.00	1.929	69.25	2.758	26.90	1.059	11.10	0.437	1.60	0.063
-	-	0500	50	1.969	0500	51.00	2.008	71.90	2.831	26.90	1.059	11.10	0.437	1.60	0.063
2.000	10.00	0500	-	-	-	51.00	2.009	72.73	2.867	26.90	1.059	11.10	0.437	1.60	0.063
2.125	13.18	0539	-	-	-	54.90	2.161	79.00	3.112	33.30	1.311	14.30	0.563	1.60	0.063
2.250	17.15	0571	-	-	-	58.70	2.309	82.25	3.254	33.30	1.311	14.30	0.563	1.60	0.063
2.375	40.33	0603	60	2.382	0600	61.30	2.413	85.43	3.363	33.30	1.311	14.30	0.563	1.60	0.063
2.500	43.50	0635	-	-	-	64.50	2.539	88.40	3.484	33.30	1.311	14.30	0.563	1.60	0.063
2.625	46.38	0666	-	-	-	67.60	2.661	91.78	3.612	33.30	1.311	14.30	0.563	1.60	0.063
2.750	49.35	0699	70	2.754	0700	71.00	2.796	94.90	3.754	33.30	1.311	14.30	0.563	1.60	0.063
2.875	73.03	0730	-	-	-	74.00	2.913	98.13	3.863	33.30	1.311	14.30	0.563	1.60	0.063
3.000	76.20	0762	-	-	-	77.20	3.039	99.71	3.954	33.30	1.311	14.30	0.563	1.60	0.063
3.125	79.38	0794	-	-	-	80.40	3.161	102.89	4.051	33.30	1.311	14.30	0.563	1.60	0.063
3.500	101.90	0867	-	-	-	99.90	3.933	114.00	4.484	34.30	1.350	14.30	0.563	1.60	0.063
3.750	151.25	0953	-	-	-	143.30	5.679	120.25	4.754	34.30	1.350	14.30	0.563	1.60	0.063
4.000	101.60	1016	-	-	-	102.60	4.039	124.70	4.904	34.30	1.350	14.30	0.563	1.60	0.063
4.125	104.78	1053	105	4.134	1050	104.00	4.113	129.90	5.104	34.30	1.417	14.00	0.600	1.60	0.063
4.500	114.30	1143	-	-	-	115.30	4.539	139.40	5.484	34.30	1.350	14.30	0.563	1.60	0.063
5.500	139.71	1397	-	-	-	140.70	5.539	177.50	6.984	36.30	1.417	14.00	0.600	1.60	0.063

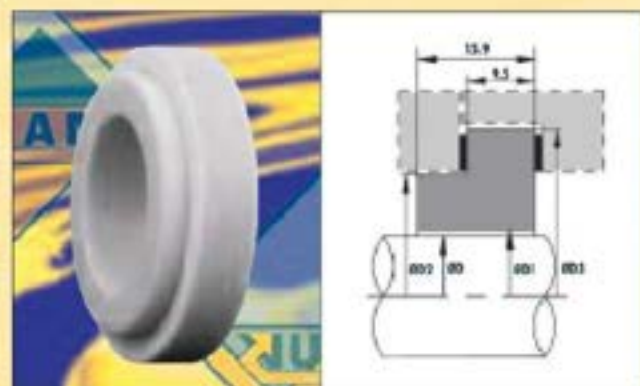
The Type 25 seat is an industry standard stationary design with 'V' shape profile, supplied complete with 2 off PTFE gaskets. Commonly used with a wide variety of seals, particularly the multi-spring Type 16XX series.



TYPE 27

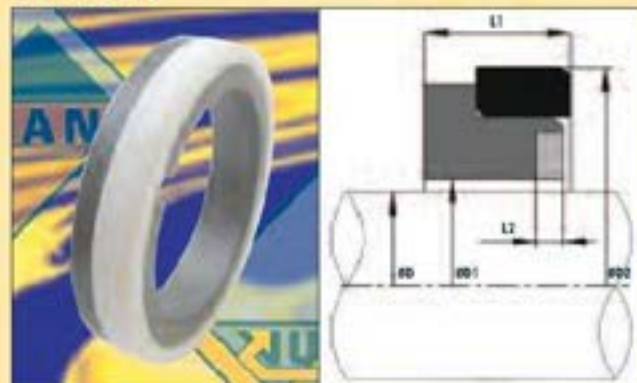
VULCAN STANDARD SIZES

Inch Shaft Size D	Size Code	D1	D2	D3	Gasket Thick
0.750	0191	21.60	34.80	44.45	1.60
0.875	0222	24.75	37.95	47.65	1.60
1.000	0254	27.95	41.15	50.80	1.60
1.125	0286	31.10	44.30	53.95	1.60
1.187	0300	32.70	45.90	55.55	1.60
1.250	0317	34.30	47.50	57.15	1.60
1.375	0349	37.45	50.65	60.30	1.60
1.500	0381	40.65	57.00	66.65	1.60
1.625	0412	43.80	60.15	69.85	1.60
1.750	0444	47.00	63.35	76.20	1.60
1.875	0476	50.15	66.50	79.35	1.60
2.000	0508	53.35	69.70	82.55	1.60
2.125	0539	56.50	72.85	88.90	1.60
2.250	0571	59.70	76.05	92.05	1.60
2.375	0603	62.85	79.20	95.25	1.60
2.500	0635	66.00	82.40	101.50	1.60
2.625	0666	69.20	85.60	104.75	1.60
3.000	0762	78.00	93.50	121.00	1.60



The Type 27 seat is an industry standard stationary design with 'L' shape profile, supplied complete with two off PTFE gaskets. Commonly used with multiple-spring balanced seals.

TYPE 23



'L'-shaped seat that seals to the housing by the P.T.F.E ring supplied. The design provides for use of an anti-rotation pin (recommended).

The P.T.F.E ring allows easy installation and helps the seat align, whilst providing exceptional chemical resistance.

VULCAN TYPE 23

Shaft Size ØD		D1		D2		L1		L2	
Inch	Metric	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
2.375	60.33	61.93	2.438	62.55	3.250	14.30	0.563	3.50	0.138
2.500	63.50	65.00	2.559	65.73	3.375	14.30	0.563	3.50	0.138
2.625	66.68	68.18	2.684	68.73	3.375	15.90	0.626	3.50	0.138
2.750	69.85	71.35	2.809	71.90	3.500	15.90	0.626	3.50	0.138
2.875	73.02	74.53	2.934	75.25	3.750	15.90	0.626	3.50	0.138
3.000	76.20	77.70	3.059	78.43	3.875	15.90	0.626	3.50	0.138
3.125	79.38	81.92	3.225	82.60	4.000	19.80	0.780	4.00	0.157
3.250	82.55	85.09	3.350	85.78	4.125	19.80	0.780	4.00	0.157
3.375	85.73	88.27	3.475	88.95	4.250	19.80	0.780	4.00	0.157
3.500	88.90	91.44	3.600	92.13	4.375	19.80	0.780	4.00	0.157
3.625	92.08	94.64	3.726	95.30	4.500	19.80	0.780	4.00	0.157
3.750	95.25	97.79	3.850	98.48	4.625	19.80	0.780	4.00	0.157
3.875	98.43	100.97	3.975	101.65	4.750	19.80	0.780	4.00	0.157
4.000	101.60	104.14	4.100	104.83	4.875	19.80	0.780	4.00	0.157

Shaft Size ØD		D1		D2		L1		L2	
Inch	Metric	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
2.375	60.33	61.93	2.438	62.55	3.250	14.30	0.563	3.50	0.138
2.500	63.50	65.00	2.559	65.73	3.375	14.30	0.563	3.50	0.138
2.625	66.68	68.18	2.684	68.73	3.375	15.90	0.626	3.50	0.138
2.750	69.85	71.35	2.809	71.90	3.500	15.90	0.626	3.50	0.138
2.875	73.02	74.53	2.934	75.25	3.750	15.90	0.626	3.50	0.138
3.000	76.20	77.70	3.059	78.43	3.875	15.90	0.626	3.50	0.138
3.125	79.38	81.92	3.225	82.60	4.000	19.80	0.780	4.00	0.157
3.250	82.55	85.09	3.350	85.78	4.125	19.80	0.780	4.00	0.157
3.375	85.73	88.27	3.475	88.95	4.250	19.80	0.780	4.00	0.157
3.500	88.90	91.44	3.600	92.13	4.375	19.80	0.780	4.00	0.157
3.625	92.08	94.64	3.726	95.30	4.500	19.80	0.780	4.00	0.157
3.750	95.25	97.79	3.850	98.48	4.625	19.80	0.780	4.00	0.157
3.875	98.43	100.97	3.975	101.65	4.750	19.80	0.780	4.00	0.157
4.000	101.60	104.14	4.100	104.83	4.875	19.80	0.780	4.00	0.157

TYPE 24



TYPE 24 BEZL

DIN 24960 pinned seat designed to readily push fit, with a rectangular section seat ring in P.T.F.E. Pin diameter recommended is 3mm up to size 35mm and 4mm from 38mm to 100mm. Face profiled to accept a restraining bezel plate.

Dimension table overleaf



TYPE 24 BEZS

DIN 24960 non-pinned short seat, designed to readily push fit. Seat is fitted with an elastomer 'O'-Ring, and the face is profiled to accept a restraining bezel plate.

Dimension table overleaf



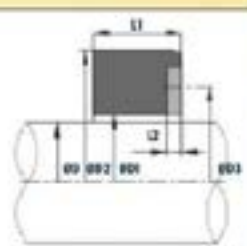
TYPE 24 BEZL / BEZS

Metric Shaft Size D	Size Code	D1	L1
20	0200	35.00	13.50
22	0220	37.00	13.50
24	0240	39.00	13.50
25	0250	40.00	13.00
28	0280	43.00	12.50
30	0300	45.00	12.00
32	0320	48.00	12.00
33	0330	48.00	12.00
35	0350	50.00	12.00
38	0380	56.00	13.00
40	0400	58.00	13.00
43	0430	61.00	13.00
45	0450	63.00	13.00
48	0480	65.00	13.00
50	0500	70.00	13.50

Metric Shaft Size D	Size Code	D1	L1
53	0530	73.00	13.50
55	0550	75.00	13.50
58	0580	78.00	13.50
60	0600	80.00	13.50
63	0630	83.00	13.50
65	0650	85.00	13.50
68	0680	90.00	13.50
70	0700	92.00	14.50
75	0750	97.00	14.50
80	0800	105.00	15.00
85	0850	110.00	15.00
90	0900	115.00	15.00
95	0950	120.00	15.00
100	1000	125.00	15.00

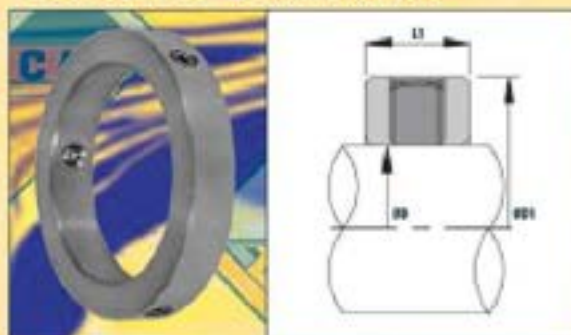
TYPE 32

The Type 32 seat is an 'O'-Ring mounted seat suited for higher pressure applications. Easy fitting and good heat transfer, leading to enhanced performance are features of this design.



Shaft Size D0		D1		D2		D3 (slot PCD)		L1		L2		O-Ring
Inch	Metric	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Size
0.500	12.70	13.80	0.543	25.30	0.996	19.80	0.780	7.90	0.311	2.50	0.098	BS214
0.625	15.88	16.98	0.669	31.65	1.246	24.20	0.953	10.30	0.406	2.50	0.098	BS215
0.750	19.05	20.15	0.793	34.82	1.371	27.75	1.093	10.30	0.406	2.50	0.098	BS216
0.875	22.23	23.33	0.919	38.00	1.496	31.00	1.220	10.30	0.406	2.50	0.098	BS217
1.000	25.40	26.50	1.043	41.18	1.621	34.10	1.343	11.15	0.439	2.50	0.098	BS218
1.125	28.58	30.08	1.184	44.35	1.746	37.30	1.469	11.15	0.439	2.50	0.098	BS219
1.250	31.75	33.25	1.309	47.53	1.871	40.50	1.594	11.15	0.439	2.50	0.098	BS220
1.375	34.93	36.43	1.434	50.70	1.996	43.60	1.717	11.15	0.439	2.50	0.098	BS221
1.500	38.10	39.60	1.559	53.88	2.121	46.80	1.843	11.15	0.439	2.50	0.098	BS222
1.625	41.28	42.78	1.684	60.23	2.371	51.60	2.031	12.75	0.502	3.00	0.118	BS223
1.750	44.45	45.95	1.809	63.40	2.496	54.80	2.157	12.75	0.502	3.00	0.118	BS224
1.875	47.63	49.13	1.934	66.58	2.621	57.90	2.280	12.75	0.502	3.00	0.118	BS225
2.000	50.80	52.30	2.059	69.75	2.746	61.10	2.406	12.75	0.502	3.00	0.118	BS226
2.125	53.98	55.48	2.184	76.10	2.996	65.90	2.594	14.33	0.564	3.50	0.138	BS227
2.250	57.15	58.65	2.309	79.28	3.121	69.00	2.717	14.33	0.564	3.50	0.138	BS228
2.375	60.33	61.83	2.434	82.45	3.246	72.20	2.843	14.33	0.564	3.50	0.138	BS229
2.500	63.50	65.00	2.559	85.63	3.371	75.40	2.969	14.33	0.564	3.50	0.138	BS230
2.625	66.68	68.18	2.684	85.63	3.371	77.00	3.031	15.93	0.627	3.50	0.138	BS231
2.750	69.85	71.35	2.809	88.80	3.496	80.20	3.157	15.93	0.627	3.50	0.138	BS232
2.875	73.03	74.53	2.934	95.15	3.746	84.90	3.343	15.93	0.627	3.50	0.138	BS233
3.000	76.20	77.70	3.059	98.33	3.871	88.10	3.469	15.93	0.627	3.50	0.138	BS234
3.125	79.38	81.92	3.225	101.50	3.996	91.30	3.594	19.84	0.781	3.50	0.138	BS235
3.250	82.55	85.09	3.350	104.68	4.121	94.40	3.717	19.84	0.781	3.50	0.138	BS236
3.375	85.73	88.27	3.475	107.85	4.246	97.60	3.843	19.84	0.781	3.50	0.138	BS237
3.500	88.90	91.44	3.600	111.03	4.371	100.80	3.969	19.84	0.781	3.50	0.138	BS238
3.625	92.08	94.62	3.725	114.20	4.496	104.00	4.094	19.84	0.781	3.50	0.138	BS239
3.750	95.25	97.79	3.850	117.38	4.621	107.10	4.217	19.84	0.781	3.50	0.138	BS240
3.875	98.43	100.97	3.975	120.55	4.746	110.30	4.343	19.84	0.781	3.50	0.138	BS241
4.000	101.60	104.14	4.100	123.73	4.871	113.50	4.469	19.84	0.781	3.50	0.138	BS242

VULCAN CLAMP RINGS



Stainless Steel, working length setting, Clamp Rings, available in all common imperial and metric shaft sizes. Standard thickness as shown, but other sizes and widths available to order. All fitted with three grub screws at 120° apart.

The Clamp Rings have a variety of uses, most particularly to set or amend seal housing depth to suit the preferred seal's working length.

VULCAN STANDARD SIZES

Shaft Size D0			Shaft Size D0			D1		L1	
Inch	Metric	Code Size	Metric	Inch	Code Size	Metric	Inch	Metric	Inch
0.375	9.53	0095	10	0.394	0100	19.00	0.748	7.50	0.295
0.500	12.70	0127	12	0.472	0120	21.00	0.827	7.50	0.295
			14	0.551	0140	23.00	0.906	7.50	0.295
			15	0.591	0150	24.00	0.945	7.50	0.295
0.625	15.88	0158	16	0.630	0160	25.00	0.984	7.50	0.295
0.750	19.05	0191	18	0.709	0180	31.00	1.220	7.50	0.295
			20	0.787	0200	33.00	1.299	7.50	0.295
0.875	22.23	0222	22	0.866	0220	35.00	1.378	7.50	0.295
			24	0.945	0240	37.00	1.457	7.50	0.295
1.000	25.40	0254	25	0.984	0250	38.00	1.496	7.50	0.295
1.125	28.58	0286	28	1.102	0280	41.00	1.614	7.50	0.295
			30	1.181	0300	43.00	1.693	7.50	0.295
1.250	31.75	0317	32	1.260	0320	45.00	1.772	10.00	0.394
			33	1.299	0330	46.00	1.811	10.00	0.394
1.375	34.93	0349	35	1.378	0350	48.00	1.890	10.00	0.394
1.500	38.10	0381	38	1.496	0380	53.00	2.087	10.00	0.394
1.625	41.28	0412	40	1.575	0400	55.00	2.165	10.00	0.394
			43	1.693	0430	58.00	2.283	10.00	0.394
1.750	44.45	0444	45	1.772	0450	60.00	2.362	10.00	0.394
1.875	47.63	0476	48	1.890	0480	63.00	2.480	10.00	0.394
2.000	50.80	0508	50	1.969	0500	65.00	2.559	10.00	0.394
2.125	53.98	0539	53	2.087	0530	68.00	2.677	10.00	0.394
2.250	57.15	0571	55	2.165	0550	70.00	2.756	10.00	0.394
			58	2.283	0580	70.00	2.756	10.00	0.394
2.375	60.33	0603	60	2.362	0600	79.00	3.110	10.00	0.394
2.500	63.50	0635	63	2.480	0630	87.00	3.378	10.00	0.394
2.625	66.68	0666	65	2.559	0650	84.00	3.307	12.00	0.472
			68	2.677	0680	87.00	3.425	12.00	0.472
2.750	69.85	0698	70	2.756	0700	89.00	3.504	12.00	0.472
2.875	73.03	0730	73	2.874	0730	95.00	3.740	12.00	0.472
3.000	76.20	0762	75	2.953	0750	98.00	3.858	12.00	0.472
3.125	79.38	0794	80	3.150	0800	103.00	4.055	12.00	0.472
3.250	82.55	0826	-	-	-	103.00	4.055	12.00	0.472
3.375	85.73	0857	85	3.346	0850	108.00	4.252	12.00	0.472
3.500	88.90	0889	90	3.543	0900	113.00	4.449	12.00	0.472
3.625	92.08	0921	-	-	-	113.00	4.449	12.00	0.472
3.750	95.25	0953	95	3.740	0950	118.00	4.646	12.00	0.472
3.875	98.43	0984	-	-	-	121.00	4.764	12.00	0.472
4.000	101.60	1016	100	3.937	1000	123.00	4.843	12.00	0.472

STANDARD STOCK SEAT MATERIALS

304 Stainless Steel as standard

316 Stainless Steel and other metals available to order.



FITTING INSTRUCTIONS

FITTING INSTRUCTIONS FOR STANDARD ROTARY MECHANICAL SEALS; PLEASE OBSERVE THE FOLLOWING;

EQUIPMENT CONDITION

- ◆ Check the condition of the equipment shaft and bearings for the following:
 - ◆ Shaft diameter is within tolerance $\pm 0.05\text{mm}$ ($\pm 0.002''$).
 - ◆ Shaft run out is less than 0.1mm ($0.004''$) for shaft speeds up to and including 1800rev/min and less than 0.05mm ($0.002''$) for shaft speeds greater than 1800rev/min .
 - ◆ Shaft max. ovality (concentricity) $\pm 0.025\text{mm}$.
 - ◆ Shaft bearing clearances should not permit lateral axial movements exceeding 0.12mm i.e. Shaft End Float should be less than 0.12mm .
 - ◆ Shaft surface finish, should be a maximum of $0.3/0.6\mu\text{m}$.
 - ◆ Seal housing diameter tolerance should be within $\pm 0.05\text{mm}$. Make sure the seal housing surfaces are free from damage or corrosion.

PREPARATION

- ◆ There are no sharp edges, burrs, scratches or corrosion where the seal must pass over. It is recommended that the shaft is chamfered at the end to aid assembly. A typical lead in of $2.5 \times$ ten degree angle for seal sizes up to 63.5mm and $4 \times$ ten degree angle for seal sizes over 63.5mm is satisfactory.
- ◆ Do not place foot(s) down on any surface unless protected by clean cloth or paper.

Ensure that equipment operating conditions do not exceed the seal design parameters.

INSTALLATION OF SEAL AND SEAT

- ◆ Extreme cleanliness and care is essential during installation. When ready to use, lay parts onto a clean flat surface and remove protective wrapping. Take care not to cut or damage any seal parts, as these can easily be damaged if mishandled.
- ◆ SEAT: Lightly lubricate the seat bore and housing with clean water, alcohol or other elastomer compatible liquid. Press fit the stationary seat into the gland plate and check the face is square to the gland plate face, utilizing a small hand press or pillar of a drilling machine if necessary. Protect the seat face first with a plastic material. Place into the shaft the assembled gland plate and stationary seat.
- ◆ SEAL: Lightly lubricate the sleeve and the neck of the seal bellows with clean water or soft soap. Light oil may be used with elastomers, other than Ethylene Propylene (EP). Fitting with grease may prevent a bellows or diaphragm seal from gripping the shaft. Use grease, if you prefer, solely on 'O' Rings.
- ◆ Slide onto the shaft the rotary seal and set to the correct working length. If necessary, gently turning the seal as it slides (in a direction opposite to the direction of the rot, if the seal is a Conical Spring Seal). If the seal is fitted with grub-screws, tighten uniformly and lock with thread sealant, if considered desirable. Carefully clean both seal faces to remove all traces of grease.
- ◆ Assemble the equipment in the normal manner. Finally bolt the gland plate to the stuffing box in an even manner, to the correct necessary torque. Turn the shaft by hand to check that it will turn freely with no obstructions.

ENSURE THAT THE EQUIPMENT IS PRIMED BEFORE START-UP

SEAL IDENTIFICATION

VULCAN WEB PORTAL

Vulcan have created and collated a vast array of seal identification information, all of which is contained on our Web Portal, which we establish for each of our partner customers.

The first half of the portal contains an online on-line product enquiry, order and supply processing site. This sleek, easy to use, facility enables you to check stock and production due dates, on all Vulcan products, immediately see your next quantity-related prices, contact us with enquiries and place orders. Orders are received electronically, automatically into Vulcan's system and this initiates an integrated, automated, electronic supply chain, of bar-coded product, moving through all of our processes to dispatch. Customers can monitor their account and track all orders live on screen.

The second half of the Portal has been designed as a complete Technical and Commercial Data-base of all information on Vulcan, and its products. Our aim, in building this over many years, has been to provide our customers with instant answers or detail, on all common, possible commercial or technical questions.

The principal sections are:

- ◆ Commercial and Vulcan Information Section
- ◆ Mechanical Seal Product Section
- ◆ Encapsulated 'O' Rings Product Section
- ◆ Gland Packing Product Section
- ◆ Teflon Expanded PTFE Product Section
- ◆ New and Up-Dated Advice Section
- ◆ Help and Instructions Section

The Mechanical Seal Section has been developed to provide comprehensive information and support on all aspects of our seals and contains the following sections:-

- ◆ Introduction to Vulcan Seals
- ◆ Vulcan Seal Electronic Presentations
- ◆ Mechanical Seal Technical Suite
- ◆ Seal Material Compatibility Charts
- ◆ Seal and Seal Identification Data-Bases

Rapid seal identification is vital for our customers and recognising this, Vulcan have focused heavily on creating the best suite of tools available, to exist. This Data-base section then contains:

- ◆ In depth, seal/seal cross-reference charts to other manufacturers
- ◆ Comprehensive code cracker information on our main competitors
- ◆ A Vast Pump Model/Seal Search Engine
- ◆ A Unique Seal Identification Suite

This seal identification suite facility has been designed to enable rapid identification and specification of any common Standard Mechanical Seal. The process allows you to visually recognise any common seal/seal and then prompts you with advice, to check/validate what are the main critical dimensions or application details.

The suite is simply and logically laid out, in sections by seal design type, with photographs for easy recognition. Behind each photograph, there is extensive clear advice showing:

- | | |
|----------------------------------|--|
| ◆ What are the Main Types | ◆ Seal Material Recommendations |
| ◆ Tables of Dimension | ◆ Most Common Applications |
| ◆ What Dimensions are Crucial | ◆ Features/Benefits of Vulcan's Design |
| ◆ Our Codes and Competitor Codes | ◆ Vulcan Stock Enquiry Link |
| ◆ Product Pump/Media Information | |

EQUIVALENTS LISTING TO OTHER SEAL SUPPLIERS

BURGMANN®	VULCAN	AES®	VULCAN	JOHN CRANE®	VULCAN	M.T.L.®	VULCAN
BT-AR, BT-AR3	Type 18	N-801	Type 18	1 (USA)	Type A5	Europa 1	Type 12 DIN
BT-FH	Type 13	N-8012	Type 192	1A (UK)	Type A1	Europa 2	Type 12
H7N	Type 1678	N-8013	Type 193	2 (UK)	Type A2	Europa 4	Type 88
H12N or H17GN	Type 82	N-802	Type 19	2 (USA)	Type A4	FA	Type 18
HJ92	Type 405	N-803	Type 20	4 (UK)	Type 1644	FG 1	Type 19
H2	Type 9	N-803U	Type 25	6A (USA)	Type 25	FG 2	Type 192
H2N	Type 9L	N-804	Type 60	6A (UK)	Type 70	FG 3	Type 193
H2N4	Type 95	N-804U	Type 65	6D / 6J	Type 66	FP/D	Type 24
H3	Type 88	N-805	Type 1400N	8-1	Type 1609S	FP/E35	Type 11
H3N	Type 8 DIN	N-8052	Type 1420DIN	8-1T	Type 1645S	SIMPLEX	Type 13
H3N4	Type 85	N-8053	Type 1430DIN	881	Type 1609BS	SIMPLEX DIN	Type 13 DIN
H22	Type 8	N-807	Type 1724	88TT	Type 1645BS	TPO 1 Seat	Type 198
H32N	Type 8 DIN	N-8P02	Type 1520	9	Type 1609	TPO 2 Seat	Type 8 DIN5
H32N4	Type 85	N-8P04	Type 1511	9T	Type 1645		
H37	Type 8	N-8P05	Type 1522	9BT	Type 1645B		
H37N	Type 8 DIN	N-C01	Type CLAM	21	Type 11		
H37N4	Type 85	N-M01	Type 1609	588	Type 1659BS		
H37G	Type 8	N-M01S	Type 1609S	58U	Type 1659S	Roten® 2	Type 12
H37GN	Type 8 DIN	N-M02	Type 1609B	59B	Type 1659B	Roten® 3	Type 13
H37GN4	Type 85	N-M02S	Type 1609BS	59U	Type 1659	Roten® 4	Type 12 with FEPs lined
H37756	Type 8W	N-M03	Type 1659	80	Type 1688		Type 7 with FEPs lined
H7N	Type 1677	N-M03S	Type 1659S	87	Type 1682	Roten® 45	
H74 or H74	Consult Vulcan	N-M04	Type 1659B	106 (USA)	Type 65		
HG1	Type 19	N-M04S	Type 1659BS	106 (UK)	Type 60	Roten® 5	Type 7
HG12	Type 192	N-M05	Type 1645	109	Type 1609	Roten® SH2	Type 78
HG13	Type 193	N-M05S	Type 1645S	109B	Type 1609B	Roten® 7K	Type 1688U
HG15/20	Type 1520	N-M06	Type 1645B	502	Type 1724	Roten® EHS	Type 40U
HG15	Consult Vulcan	N-M06S	Type 1645BS	521	Type 24	Uniken® 2	Type 12 DIN
HG901	Type 22	N-M07	Type 50	2100 K	Type 142	Uniken® 3	Type 13 DIN
HG910	Type 10	N-P01	Type 10	2100 M	Type 143	Uniken® 4	Type 12 DIN
HG912	Type 24	N-P01U	Type A1	2100 S	Type 14		FEPs lined
HG913	Type 143	N-P02	Type 20	502	Type 1724	Uniken® 45	Type 70 with FEPs lined
HG920	Type 20	N-P02U	Type A2	521	Type 24		
HG921	Type 11	N-P03	Type 24			Uniken® 5	Type 70
		N-P04	Type 11			Uniken® SK	Type 135
		N-P04U	Type A4			Uniken® 7K	Type 1688L
		N-P05	Type 22			Uniken® EHS	Type 40L
		N-P05U	Type A5				
G1 or G2	Consult Vulcan	N-P06	Type 26				
G4	Type 8 STD	N-P07	Consult Vulcan				
G6	Type 8 DIN5	N-P08	Type 55				
G7 & G8	Type 8 BEZ	N-P08U	Type 98				
G9	Type 8 DINL	N-P09	Type 94				
G13	Type 88 seat	N-S01	Type 8 STD				
G15 or G115	Consult Vulcan	N-S02	Type 8 DINL				
G16	Consult Vulcan	N-S03	Type 8 DIN5				
G30	Consult Vulcan	N-S04	Type 24 STAT				
G46	Type 24 DINL	N-S04U	Type 198 STAT				
G50	Type 20 seat	N-S05	Type 24 DINL				
G55	Type 11 seat	N-S06	Type 24 DIN5				
G60	Type 198	N-S07	Type 21 STAT				
G61	Type 24 seat	N-S07U	Type 21 STAT				
		N-S08	Type 25 STAT				
		N-S09	Type 23				
		N-T01	Type 8				
		N-T01 DIN	Type 8 DIN				
		N-T02	Type 8B				
		N-T03	Type 12				
		N-T03 DIN	Type 12 DIN				
		N-T04	Type 13				
		N-T04 DIN	Type 13 DIN				
		N-T05	Type 06 Range				
		N-W01	Type 1688				
		N-W02	Type 1688L				
		N-W03	Type 1688W				
		N-W04	Type 1688Y				
		N-W07D	Type 1627				

For a more comprehensive and up-to-date listings please see the comparison sheet on your customer web portal.
All information contained in this table is supplied in good faith and was considered correct at the time of going to press. However, VEL cannot guarantee that using this information will always result in an entirely suitable replacement, especially as specifications can change.



COMMON USA SEAL CODES TO VULCAN X REFERENCE LIST

USA	VULCAN CODE	USA	VULCAN CODE	USA	VULCAN CODE	USA	VULCAN CODE
130	055015	264	0317 ASJ.N.E	370V	0301.11.N.C	525	0444 ASJ.N.E
131	0191.0650.N.C	265	0191.11.N.E	380	0254.M11.N.C	527	0529 ASJ.N.C
132	0158.11.N.C	267	0508.11.N.C	380V	0254.M11.V.C	528	0476.MAS.N.C
132V	0158.11.N.C	267V	0508.11.N.C	381	0317.11.N.C	529	0254.22.N.C
136	0127.11.N.C	268	0603.11.N.E	381V	0317.11.N.C	542	0666 ASJ.N.E
138N	0317.0603.N.C	269	0603.11.N.E	382	0301.11.N.C	542.21	0666.22.N.E
139	0158.11.N.C SEAL	270	0730.11.N.E	383	0317.11.N.C	543	0529.11.N.C
142	0191.118.N.C	274	0158 ASJ.N.C	383V	0317.11.N.C	543V	0529.11.N.C
142V	0191.118.N.C	275	0191 ASJ.N.C	384	0296 ASJ.N.C	544	0477.11.N.E
144	0191.118.N.C	278	0603 ASJ.N.E	384V	0296 ASJ.N.C	547	0317 ASJ.N.E
147	0264.11.N.C	278.21	0603.22.N.E	384	0317 ASJ.N.E	547	0349 ASJ.N.E
147V	0264.11.N.C	279	0603 ASJ.N.E	385	0301 ASJ.N.E	548	0254.11.N.C
148	0191.0611.N.C	279.21	0603.22.N.E	387	0254.11.N.C SEAL	550	0444.11.N.E
149	0317 ASJ.N.C	282	0296.22.N.E	387V	0254.11.N.C SEAL	552	0158.11.N.E
149V	0317 ASJ.N.C	282.21	0296.22.N.E	388	0254.M11.V.C	553	0301.11.N.E
149	0222.118.N.E	283	0301.11.N.C	389	0191.11.N.C SEAL	554	0476.MAS.N.E
149	0444.11.N.C SEAL	288	0444.11.N.C	400	0127.M11.N.C SEAL	555	0444.MAS.N.C
150	0127.20.N.C SEAL	288V	0444.11.N.C	401	0127.11.N.C SEAL	557	0254 ASJ.N.E
153	0158.0650.N.C	290	0158.11.N.C	401A	0127.118.N.C	564	0191 ASJ.N.C SEAL
153V	0158.0650.N.C	290V	0158.11.N.C	402	0317.118.N.C	578	0222.11.N.C SEAL
154	0317.11.N.C SEAL	292	0301.M118.N.C	409	0158.0731.N.C	584	0296 ASJ.N.E
157	0191.118.N.C SEAL	298	0127 ASJ.N.C SEAL	416	0317.11.N.C SEAL	586	0476 ASJ.N.E
158N	0254.0601.O.F	299	0158 ASJ.N.C SEAL	425	0158.MAS.N.C	588	0296.11.N.E
162	0127 ASJ.N.C	300	0158 ASJ.N.C	436	0444.11.N.E	583	0476.11.N.C
163	0127.20.N.C	300V	0158 ASJ.N.C	436V	0444.11.N.E	583V	0476.11.N.C
164	0127.0731.N.C	303	0222.11.N.C	440	0191.0731.N.C	584	0603.11.N.E
165	0127.0731.N.C	303V	0222.11.N.C	445	0508.11.N.C	595	0476 ASJ.N.E
168	0127.M11.N.C	305	0301 ASJ.N.C	445V	0508.11.N.C	597	0317.118.N.C
172	0349.11.N.C SEAL	305V	0301 ASJ.N.C	446	0444.11.N.C	598	0317.118.N.C
172.52	0349 ASJ.N.C SEAL	309	0222.11.N.C	446V	0444.11.N.C	601	0191.75.N.C
177	0349.11.N.C	309V	0222.11.N.C	447	0158.73.N.C	601S	W-0011.75.N.C
177V	0349.11.N.C	312	0476.11.N.C	447V	0158.73.N.C	601V	0191.75.N.C
185	0317.11.N.C	314	0301 ASJ.N.C	448	0444.11.N.C	604	0296.11.N.E
185V	0317.11.N.C	316	0301 ASJ.N.C	453	0158.73.N.C	605	0296.11.N.C
186	0349.11.N.C	317	0444 ASJ.N.C	458	0476.MAS.N.C	605V	0296.11.N.C
186V	0349.11.N.C	319	0508 ASJ.N.C	460	0254.M11.N.C	606	0191.75.N.C
188	0222 ASJ.N.C	320	0301.11.N.C	460V	0254.M11.V.C	607	0296 ASJ.N.E
188V	0222 ASJ.N.C	321	0476.22.N.E	461	0476.11.N.C	608	0296 ASJ.N.E
192	0349.0611.O.F	323	0571 ASJ.N.C	461V	0476.11.N.C	609	0476 ASJ.N.E
193N	0508.11.N.C	324	0731.22.N.E	462	0508.11.N.C	609V	0476 ASJ.N.E
194	0508.11.N.C SEAL	326	0317.M11.N.C	462V	0508.11.N.C	610	0476 ASJ.N.E
200	0158 ASJ.N.C	327	0571 ASJ.N.C	463	0635.11.N.E	610V	0476 ASJ.N.E
200A	0158.254.N.C	328	0666 ASJ.N.E	463V	0635.11.N.E	617	0222.11.N.E
200V	0158 ASJ.N.C	328.21	0666.22.N.E	464	0698.11.N.E	618	0317.11.N.E
201	0191 ASJ.N.C	329	0730.22.N.E	465	0762.11.N.E	628	0158.65.N.C
201V	0191 ASJ.N.C	332	0568.11.N.E	466	0317.11.N.C	631	0127.11.N.C
204	0296 ASJ.N.C	334	0365.11.N.C	466V	0317.11.N.C	632	0127.11.N.C
204V	0296 ASJ.N.C	336	0519.11.N.C	468	0635.118.N.E	633	0158.118.N.C
225	0444 ASJ.N.C	338	0519.11.N.E	469	0635.118.N.E	633V	0158.118.N.C
225V	0444 ASJ.N.C	340	0476.11.N.C	471	0158.11.N.C	637	0158 ASJ.N.E
227	0191.118.N.C	342N	0508 ASJ.N.C	472	0317.11.N.C	647	0529.11.N.C
228	0222.11.N.C SEAL	344	0296.11.N.C	474	0158.118.N.C	647	0191.75.N.C SEAL
230	0349.11.N.C	346	0476 ASJ.N.C	475	0762.22.N.E	659	0301.11.N.C
230V	0349.11.N.C	347	0301.11.N.C	477	0476 ASJ.N.E	659V	0301.11.N.C
238	0158 ASJ.N.C SEAL	347V	0301.11.N.C	477V	0476 ASJ.N.E	666	0127.M11.N.C
239	0476.11.N.C SEAL	348	0296.11.N.C SEAL	478	0508.MAS.N.E	677	0349.22.N.C
244	0301 ASJ.N.E	349	0635 ASJ.N.E	479	0508 ASJ.N.E	677V	0349.22.N.C
247	0254.M118.N.C	349.21	0635.22.N.E	483	0698.11.N.E	682	0301.11.N.C
247V	0254.M118.N.C	349V	0635 ASJ.N.E	484	0476 ASJ.N.E	687	0222.11.N.C
248	0254.11.N.C	350	0603 ASJ.N.E	485	0158 ASJ.N.C	687V	0222.11.N.C
248V	0254.11.N.C	350.21	0603.22.N.E	486	0158 ASJ.N.C	688	0254 ASJ.N.E
249	0317.11.N.C	351	0571 ASJ.N.C	487	0158 ASJ.N.C	703	0222.11.N.C
249V	0317.11.N.C	351V	0571 ASJ.N.C	491	0349.11.N.C	703V	0222.11.N.C
250	0222.11.N.C	353	0571 ASJ.N.E	491V	0349.11.N.C	717	0158.750.N.C
251	0254.M11.N.C	354	0349.22.N.C	492	0603.11.N.E	714	0158.750.N.C
251V	0254.M11.N.C	354V	0349.22.N.C	499	0254.11.N.C	715	0158.750.N.C
252	0412.11.N.C	355	0296.11.N.C	501	0158.MAS.N.C	722	0158.118.N.C
252V	0412.11.N.C	355V	0296.11.N.C	501V	0158.MAS.N.C	724	0158.118.N.C
253	0412.11.N.C	356	0296.11.N.C	506	0127.65.N.C	725	0158.11.N.C
253V	0412.11.N.C	356V	0296.11.N.C	507	0158.65.N.C	728	0158 ASJ.N.E
245	0254.11.N.C	357	0254.11.N.C	507V	0158.65.N.C	729	0158 ASJ.N.E
245V	0254.11.N.C	357V	0254.11.N.C	508	0158.11.N.C	744	0476 ASJ.N.E
246	0317.11.N.C	358	0191.11.N.C	508V	0158.11.N.C	744V	0476 ASJ.N.E
246V	0317.11.N.C	358V	0191.11.N.C	510	0317.118.N.C	745	0476 ASJ.N.E
247	0301.118.N.C	359	0158.11.N.C	513	0476 ASJ.N.E	745V	0476 ASJ.N.E
248	0254.11.N.C	359V	0158.11.N.C	513V	0476 ASJ.N.E	746	0476 ASJ.N.E
248V	0254.11.N.C	360	0254.65.N.C	514	0476.11.N.C	747	0476 ASJ.N.E
249	0317.11.N.C	360V	0254.65.N.C	514V	0476.11.N.C	750	0191.11.N.C
249V	0317.11.N.C	361	0307 ASJ.N.E	515	0301 ASJ.N.E	750V	0191.11.N.C
250	0222.11.N.C	361V	0307 ASJ.N.E	516	0158.65.N.C	752	0191.750.N.C
251	0254.M11.N.C	364	0444 ASJ.N.C	517	0317.118.N.C	752V	0191.750.N.C
252	0254.M118.N.C	364V	0444 ASJ.N.C	518	0158.650.N.C	754	0254 ASJ.N.C
253	0296.11.N.C	370	0254.65.N.C	519	0444.MAS.N.E	754V	0254 ASJ.N.C
254	0296.11.N.C	371	0301.11.N.C	523	0476 ASJ.N.C	756	0317.11.N.C
257	0349 ASJ.N.C	371V	0301.11.N.C	524	0158.650.N.C	756V	0317.11.N.C
258	0301 ASJ.N.E	373	0191 ASJ.N.C	525	0317.118.N.C	758	0301.11.N.C
258.21	0301.22.N.E	374	0301 ASJ.N.C	529	0296.118.N.C	758V	0301.11.N.C
259	0301.118.N.C	374V	0301 ASJ.N.C	530	0508 ASJ.N.E	760	0191.MAS.N.E
260	0444 ASJ.N.E	376	0349.11.N.C SEAL	532	0508.118.N.C	761	0476.118.N.C
		378	0301.11.N.C	534	0301.118.N.C	762	0191.1451.N.E



COMMON USA SEAL CODES TO VULCAN X REFERENCE LIST

USA	VULCAN CODE	USA	VULCAN CODE	USA	VULCAN CODE	USA	VULCAN CODE
264	0191.165.N.C.	942	0571.11.N.C.SEAL	1183	0307.A51.N.C.	2045	0309.11.N.C.
265	0191.75.N.C.	944	0476.NAS1.N.F.	1184	0307.A51.N.C.	2046	0309.11.N.C.
266	0191.75.N.C.	946	0301.NAS1.N.F.	1185	0307.NAS1.N.C.	2047	0309.11.N.C.
267	0191.111.N.C.	949	0476.NAS1.N.F.	1186	0307.A51.N.C.	2048	0309.11.N.C.
268	0191.111.N.C.	950	0301.NAS1.N.F.	1189	0301.111.N.C.	2049	0309.22.N.C.
269	0191.111.N.C.	952	0158.NAS1.N.C.	1190	0301.A51.N.C.	2050	0309.22.N.C.
271	0191.A51.N.C.	954	0158.NAS1.N.C.	1191	0301.A51.N.C.	2051	0301.AA.N.C.
272	0191.A51.N.C.	961	0158.75.N.C.	1192	0301.A51.N.C.	2052	0301.AA.N.C.
274	0227.11.N.C.	964	0158.75.N.C.	1194	0444.A51.N.C.	2053	0301.AA1.N.F.
275	0227.11.N.C.	973	0191.A51.N.C.	1199	0444.A51.N.C.	2054	0301.AA1.N.F.
276	0227.A51.N.C.	974	0191.A51.N.C.SEAL	1210	0191.111.N.C.	2055	0412.AA.N.C.
277	0254.A51.N.C.	975	0254.A51.N.C.SEAL	1214	0191.111.N.C.	2056	0412.AA.N.C.
278	0254.A51.N.C.	976	0317.200.N.C.	1222	0191.A51.N.C.SEAL	2057	0412.A51.N.C.
279	0254.A51.N.C.	977	0317.200.N.C.	1408	0476.11.N.C.	2058	0412.A51.N.C.
284	0217.11.N.C.	978	0317.200.N.C.	1409	0508.111.N.C.	2059	0444.11.N.C.
288	0127.75.N.C.	979	0317.200.N.C.	1417	0509.A51.N.C.	2060	0444.11.N.C.
289	0254.A51.N.C.	980	0158.11.N.C.	1420	0476.111.N.C.	2061	0444.111.N.F.
291	0254.A51.N.C.	981	0317.AA1.N.F.	1436	0286.A51.N.F.	2062	0444.111.N.F.
801	0286.111.N.C.	982	0254.22.N.C.	1438	0286.A51.N.F.	2063	0476.11.N.C.
802	0286.111.N.C.	983	0286.A51.N.C.	1437	0286.A51.N.F.	2064	0476.11.N.C.
804	0217.111.N.C.	1000	0158.75.N.C.	1437	0286.A51.N.F.	2067	0476.111.N.F.
805	0249.111.N.C.	1000P	0158.75.N.C.	1438	0286.A51.N.F.	2068	0476.111.N.F.
806	0249.111.N.C.	1002	0127.11.N.C.	1438	0286.A51.N.F.	2069	0476.111.N.F.
807	0249.A51.N.C.	1002P	0127.11.N.C.	1439	0286.A51.N.F.	2070	0476.111.N.F.
808	0249.221.N.C.	1013	SP11.1	1439	0286.A51.N.F.	2071	0476.111.N.F.
809	0249.221.N.C.	1014	0254.A51.N.C.	1441	0301.A51.N.F.	2072	0476.A51.N.F.
814	0301.111.N.C.	1015	0317.A51.N.C.SEAL	1445	0301.A51.N.F.	2073	0508.11.N.C.
817	0301.111.N.C.	1017	0508.22.N.C.	1454	0476.A51.N.F.	2074	0508.11.N.C.
818	0412.111.N.C.	1018	0317.111.N.C.	1454	0476.A51.N.F.	2075	0508.111.N.F.
819	0412.111.N.C.	1021	0158.73.N.C.	1457	0476.A51.N.F.	2076	0508.111.N.F.
821	0412.111.N.C.	1023	0254.A51.N.C.	1459	0476.A51.N.F.	2077	0508.A51.N.C.
822	0412.A51.N.C.	1024	0191.70.N.C.SEAL	1460	0476.A51.N.F.	2078	0508.A51.N.C.
825	0444.111.N.C.	1030	0254.A51.N.F.	1466	0509.A51.N.F.	2079	0508.A51.N.F.
826	0444.111.N.C.	1031	0444.A51.N.F.	1467	0309.22.N.C.	2084	0509.A51.N.F.
827	0476.111.N.C.	1031P	0444.A51.N.F.	1474	0444.22.N.C.	2085	0509.A51.N.F.
828	0476.111.N.C.	1031P	0444.22.N.F.	1476	0571.111.N.F.	2086	0509.A51.N.F.
829	0476.A51.N.F.	1032	0444.A51.N.F.	1478	0571.111.N.F.	2087	0509.11.N.C.
831	0476.A51.N.F.	1033	0444.A51.N.F.	1479	0571.11.N.C.	2087	0571.11.N.C.
832	0508.111.N.C.	1042	0444.A51.N.C.	1480	0571.11.N.C.	2088	0571.11.N.C.
833	0508.111.N.C.	1042	0444.22.N.C.	1483	0412.A51.N.F.	2089	0509.111.N.F.
834	0402.111.N.C.	1046	0254.A51.N.C.	1484	0444.A51.N.F.	2089	0571.111.N.F.
835	0435.111.N.C.	1047	0317.AA.V.C.	1485	0508.A51.N.F.	2090	0509.111.N.F.
836	0490.111.N.C.	1050	0127.11.N.C.SEAL	1486	0509.111.N.F.	2090	0571.111.N.F.
837	0490.AA1.N.C.	1053P	0317.111.N.C.	1487	0509.111.N.F.	2091	0571.A51.N.C.
838	0490.221.N.C.	1057	0539.111.N.F.	1488	0571.A51.N.F.	2092	0571.A51.N.C.
839	0539.111.N.C.	1057P	0539.111.N.F.	1488	0571.A51.N.F.	2093	0509.111.N.F.
841	0539.221.N.C.	1058	0635.111.N.C.SEAL	1497	0412.AA1.N.C.	2094	0571.A51.N.F.
842	0508.11.N.C.	1058P	0635.111.N.F.	1498	0412.AA1.N.C.	2097	0635.A51.N.F.
843	0508.A51.N.C.	1059	0462.221.N.F.	1499	0412.A51.N.F.	2099	0635.A51.N.F.
844	0539.111.N.C.	1059P	0462.221.N.F.	2000	0158.AA1.N.C.	2099P	0635.A51.N.F.
846	0571.111.N.F.	1060	0367.NAS1.N.C.	2001	0158.AA1.N.C.	2100	0635.A51.N.F.
847	0571.111.N.C.	1060P	0367.NAS1.N.C.	2002	0158.AA1.N.C.	2100V	0635.A51.N.F.
848	0571.A51.N.C.	1064	0158.111.N.C.	2003	0158.AA1.N.C.	2102	0509.111.N.F.
849	0571.A51.N.C.	1067	0286.A51.N.C.	2004	0158.AA1.N.C.	2103	0286.A51.N.C.SEAL
850	0127.111.N.C.	1079	0158.111.N.C.	2005	0158.AA1.N.C.	2104	0309.22.N.C.SEAL
851	0191.A51.N.C.	1080	0158.111.N.C.	2006	0158.AA1.N.C.	2105	0301.11.N.C.SEAL
852	0435.111.N.C.	1081	0317.111.N.C.	2007	0158.AA1.N.C.	2106	0301.A51.N.C.SEAL
854	0539.111.N.C.	1082	0317.111.N.C.	2008	0191.AA1.N.C.	2107	0412.11.N.C.SEAL
855	0539.111.N.C.	1083	0317.22.N.C.	2009	0191.AA1.N.C.	2108	0444.11.N.C.SEAL
856	0539.A51.N.C.	1084	0317.22.N.C.	2010	0191.AA1.N.C.	2109	0444.A51.N.C.SEAL
857	0539.A51.N.C.	1085	0158.AA1.N.C.	2011	0191.AA1.N.C.	2113	0476.A51.N.C.SEAL
858	0444.AA1.N.F.	1085P	0158.AA1.N.C.	2012	0191.A51.N.C.	2111	0508.11.N.C.SEAL
859	0444.AA1.N.F.	1097	0476.11.N.C.	2013	0191.A51.N.C.	2112	0508.A51.N.C.SEAL
864	0349.AA1.N.F.	1109	0317.221.N.F.	2014	0191.A51.N.C.	2113	0571.A51.N.C.SEAL
865	0349.AA1.N.F.	1110	0301.221.N.F.	2015	0191.A51.N.C.	2114	0476.111.N.F.
866	0286.AA1.N.F.	1125	0191.P11.N.C.	2016	0158.A51.N.C.	2115	0362.111.N.F.
867	0286.AA1.N.F.	1128	0317.AA1.N.F.	2017	0158.A51.N.C.	2116	0362.111.N.F.
874	0571.11.N.C.	1130	0191.AA1.N.C.	2018	0158.A51.N.F.	2117	0301.111.N.C.
876	0508.111.N.C.	1131	0286.AA1.N.C.	2019	0158.A51.N.F.	2120	0435.11.N.C.
877	0191.011.N.C.	1132	0349.AA1.N.C.	2020	0158.A51.N.C.	2122	0367.AA.N.C.
877V	0191.011.N.C.	1136	0317.AA1.N.C.	2021	0158.A51.N.C.	2123	0367.AA.N.C.
882	0158.AA1.N.C.SEAL	1140	0365.89.N.C.	2022	0158.A51.N.F.	2124	0408.111.N.C.
883	0286.A51.N.C.	1145	0508.111.N.F.	2023	0158.A51.N.C.	2127	0301.AA1.N.F.
898	0476.AA1.N.F.	1149	0127.111.N.C.	2024	0227.AA.N.C.	2130	0158.A51.N.C.SEAL
899	0301.AA1.N.F.	1152	0158.75.N.C.	2025	0227.AA.N.C.	2131	0508.22.N.C.
905	0191.111.N.C.	1156	0158.111.N.C.	2026	0227.AA1.N.C.	2134	0309.22.N.C.
908	0191.011.N.C.	1160	0191.111.N.C.	2027	0227.AA1.N.C.	2135	0444.22.N.C.
917	0254.A51.N.C.	1164	0254.A51.N.C.	2028	0227.A51.N.C.	2137	0301.111.N.C.
916	0435.A51.N.F.	1165	0254.A51.N.C.	2029	0227.A51.N.C.	2140	0444.22.N.C.
921	0191.AA1.N.C.	1166	0254.A51.N.C.	2030	0227.A51.N.C.	2145	0254.111.N.F.
926	0301.111.N.C.	1168	0286.A51.N.C.	2031	0227.A51.N.C.	2150	0444.221.N.F.
930	0127.11.N.C.SEAL	1169	0286.A51.N.C.	2032	0254.AA1.N.C.	2154	0444.221.N.F.
932	0158.11.N.C.SEAL	1170	0286.A51.N.C.	2033	0254.AA1.N.F.	2154V	0444.221.N.F.
935	0227.A51.N.C.	1171	0286.A51.N.C.	2034	0254.AA1.N.F.	2152	0408.111.N.C.
935V	0227.A51.N.C.	1172	0286.A51.N.F.	2035	0254.A51.N.C.	2160	0158.011.N.C.
936	0227.A51.N.C.	1173	0286.A51.N.F.	2036	0254.A51.N.C.	2161	0158.751.N.C.
937	0254.A51.N.C.SEAL	1174	0286.A51.N.C.	2041	0307.AA1.N.C.	1258V	0635.A51.N.C.SEAL
939	0301.11.N.C.SEAL	1175	0286.A51.N.C.	2042	0307.AA1.N.C.	1258	0635.A51.N.F.
941	0571.11.N.C.	1181	0317.A51.N.C.	2043	0307.AA1.N.C.	3754V	0635.A51.N.F.
941V	0571.11.N.C.	1182	0317.A51.N.C.	2044	0307.AA1.N.F.	80702	0191.75.N.C.SEAL