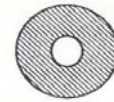


# **LSP Industrial Ceramics, Inc.**

## **Alumina Products Brochure**



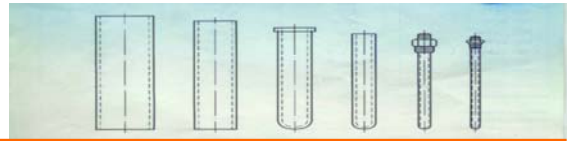
# Alumina Single Bore



Part No.	ID	OD	Part No.	ID	OD
ASB00800	.008	.025	ASB00826-1	.093	.218
ASB00801	.012	.025	ASB00827	.093	.250
ASB00802	.012	.032	ASB00828	.078	.156
ASB00803	.014	.032	ASB00829	.109	.219
ASB00804	.017	.047	ASB00830	.125	.188
ASB00805	.020	.032	ASB00831	.125	.219
ASB00806	.020	.035	ASB00832	.125	.250
ASB00807	.020	.050	ASB00833	.125	.375
ASB00808	.028	.052	ASB00834	.156	.219
ASB00809	.032	.062	ASB00835	.156	.250
ASB00810	.040	.078	ASB00836	.188	.218
ASB00811	.040	.093	ASB00837	.188	.250
ASB00812	.040	.188	ASB00838	.188	.312
ASB00813	.047	.062	ASB00839	.188	.375
ASB00814	.047	.078	ASB00840	.188	.500
ASB00815	.050	.100	ASB00841	.218	.312
ASB00816	.062	.093	ASB00842	.250	.312
ASB00817	.062	.188	ASB00843	.250	.375
ASB00818	.068	.107	ASB00844	.250	.500
ASB00819	.062	.093	ASB00845	.312	.438
ASB00820	.062	.125	ASB00846	.312	.500
ASB00821	.062	.156	ASB00847	.312	.500
ASB00822	.062	.188	ASB00848	.500	.625
ASB00823	.062	.250	ASB00849	.500	.675
ASB00824	.093	.125	ASB00850	.500	.750
ASB00825	.093	.156	ASB00851	.562	.750
ASB00826	.093	.188	ASB00852	.625	.875

*Most sizes listed are also available in Mullite material.  
Please specify COE (closed one end) or OBE (open both ends)  
Please specify length*

# Alumina Tubes



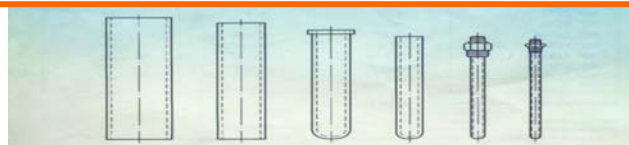
Part No.	OD	ID		Part No.	OD	ID
ASB00601	.125	.062		ASB00627	.750	.562
ASB00602	.156	.078		ASB00628	.812	.562
ASB00603	6mm	4mm		ASB00629	24mm	18mm
ASB00604	.250	.188		ASB00630	.875	.625
ASB00605	8mm	5mm		ASB00631	1.000	.625
ASB00606	.312	.188		ASB00632	.812	.688
ASB00607	9mm	6mm		ASB00633	1.000	.750
ASB00608	10mm	6mm		ASB00634	26mm	20mm
ASB00609	.375	.250		ASB00635	26mm	22mm
ASB00610	.500	.250		ASB00636	28mm	22mm
ASB00611	.438	.312		ASB00637	30mm	23mm
ASB00612	12mm	8mm		ASB00638	1.125	.875
ASB00613	.500	.312		ASB00639	1.250	1.000
ASB00614	.500	.375		ASB00640	35mm	27mm
ASB00615	12,7mm	8,9mm		ASB00641	1.375	1.125
ASB00616	14mm	10mm		ASB00642	1.500	1.125
ASB00617	15mm	10mm		ASB00643	38mm	30mm
ASB00618	.562	.438		ASB00644	1.500	1.250
ASB00619	.688	.438		ASB00645	42mm	34mm
ASB00620	17,5mm	11,1mm		ASB00646	1.625	1.375
ASB00621	17mm	12mm		ASB00647	1.750	1.375
ASB00622	.625	.500		ASB00648	1.750	1.500
ASB00623	.688	.500		ASB00649	2.000	1.500
ASB00624	.750	.500		ASB00650	50mm	40mm
ASB00625	11mm	.500		ASB00651	1.750	1.625
ASB00626	20mm	15mm		ASB00652	1.875	1.625

*Most sizes also available in Mullite material*

*Please specify COE (closed one end) or OBE (open both ends)*

*Please specify length*

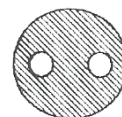
# Alumina Tubes



Part No.	OD	ID	Part No.	OD	ID
ASB00653	2.000	1.750	ASB00680	5.000	4.625
ASB00654	2.250	1.750	ASB00681	140mm	120mm
ASB00655	2.125	1.875	ASB00682	5.500	5.000
ASB00656	2.375	1.875	ASB00683	5.500	5.125
ASB00657	60mm	50mm	ASB00684	150mm	130mm
ASB00658	2.375	2.125	ASB00685	155mm	135mm
ASB00659	2.750	2.250	ASB00686	6.000	5.500
ASB00660	2.750	2.375	ASB00687	160mm	140mm
ASB00661	72mm	62mm	ASB00688	6.000	5.625
ASB00662	2.750	2.500	ASB00689	170mm	150mm
ASB00663	75mm	65mm	ASB00690	6.500	6.000
ASB00664	80mm	70mm	ASB00691	6.750	6.125
ASB00665	3.250	2.875	ASB00692	175mm	155mm
ASB00666	3.250	3.000	ASB00693	6.750	6.250
ASB00667	3.500	3.125	ASB00694	180mm	160mm
ASB00668	90mm	80mm	ASB00695	7.000	6.375
ASB00669	3.500	3.250	ASB00696	7.000	6.500
ASB00670	3.750	3.375	ASB00697	185mm	165mm
ASB00671	105mm	90mm	ASB00698	190mm	170mm
ASB00672	4.000	3.625	ASB00699	7.500	6.875
ASB00673	4.000	3.750	ASB00700	200mm	175mm
ASB00674	4.250	3.875	ASB00701	7.500	7.000
ASB00675	115mm	100mm	ASB00702	220mm	200mm
ASB00676	120mm	100mm	ASB00703	8.500	8.000
ASB00677	4.500	4.125	ASB00704	240mm	220mm
ASB00678	120mm	105mm	ASB00705	9.500	8.875
ASB00679	4.750	4.375	ASB00706	9.500	9.000

*Most sizes listed are also available in Mullite material.  
Please specify COE (closed one end) or OBE (open both ends)  
Please specify length*

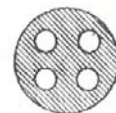
## Alumina Double Bore



Part No.	ID	OD	Part No.	ID	OD
ADB503	.005	.032	ADB514	.040	.188
ADB504	.010	.047	ADB515	.047	.188
ADB505	.016	.062	ADB516	.062	.188
ADB506	.025	.047	ADB517	.050	.200
ADB507	.025	.093	ADB518	.040	.250
ADB508	.020	.125	ADB519	.062	.250
ADB509	.032	.125	ADB520	.078	.250
ADB510	.040	.125	ADB521	.093	.250
ADB511	.032	.156	ADB522	.062	.312
ADB512	.040	.156	ADB523	.078	.312
ADB512-1	.047	.156	ADB524	.125	.375
ADB513	.032	.188	ADB525	.156	.500

*Many sizes also available in Mullite material. Please specify length*

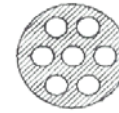
## Alumina Four Bore



Part No.	ID	OD	Part No.	ID	OD
A4B070	.005	.032	A4B081	.040	.188
A4B071	.010	.047	A4B982	.047	.188
A4B072	.016	.062	A4B083	.050	.219
A4B073	.020	.078	A4B084	.040	.250
A4B074	.020	.093	A4B085	.062	.250
A4B075	.020	.109	A4B086	.078	.250
A4B076	.020	.125	A4B087	.062	.312
A4B077	.032	.125	A4B088	.078	.312
A4B078	.032	.156	A4B089	.093	.312
A4B079	.040	.156	A4B090	.125	.375
A4B080	.032	.188			

*Many sizes also available in Mullite material. Please specify length*

# Alumina Multi-Bore Tubes



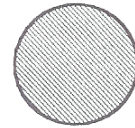
Part No.	No. Bores	OD	ID
AMB050	6	.062	.018
AMB051	6	.082	.062
AMB052	6	.125	.031
AMB053	6	.156	.031
AMB054	6	.218	.040
AMB055	6	.312	.042
AMB056	9	.094	.008
AMB057	12	.175	.018

## Alumina Washers (partial list)

*All tube sizes listed in this catalog can be cut into washer thicknesses per customer specification.*

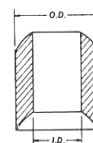
Part No.	OD	ID	Thickness	Part No.	OD	ID	Thickness
ALW00102	1.500	.620	.200	ALW00286	.800	.500	.260
ALW00244	3.550	2.650	.230	ALW00287	1.000	.255	.250
ALW00262	.500	.100	.312	ALW00288	.625	.375	.188
ALW00263	.500	.084	.312	ALW00289	.625	.250	.312
ALW00264	.500	.140	.438	ALW00290	.765	.560	.250
ALW00266	6,4mm	5,2mm	2,54	ALW00291	17mm	7mm	0,88mm
ALW00267	.165	.135	.125	ALW00293	6mm	3mm	4mm
ALW00268	.188	.062	.125	ALW00296	.750	.438	.375
ALW00269	1.000	.438	.250	ALW00297	1.000	.750	.375
ALW00270	.188	.094	.050	ALW00298	.500	.375	.188
ALW00271	.425	.312	.250	ALW00300	1.500	.825	.200
ALW00273	.500	.250	.062	ALW00301	1.200	.270	.250
ALW00274	1.500	.500	.250	ALW00303	.782	.483	.700
ALW00275	1.250	1.000	.500	ALW00304	.984	.330	.200
ALW00279	.370	.175	.100	ALW00307	2.125	1.875	.500
ALW00281	.500	.125	.125	ALW00310	2.000	1.500	.360
ALW00282	.250	.125	.125	ALW00311	2.000	1.500	.500
ALW00283	.375	.250	.125	ALW00315	1.750	1.500	.250
ALW00284	2.500	1.100	.260	ALW00317	1.250	.375	.250
ALW00285	2.500	.500	.260	ALW00320	.750	.250	.250

# Alumina Solid Rods



Part No.	OD	Tolerances	Part No.	OD	Tolerances
ASR020	.020	+/- .002	ASR187	.187	+/- .005
ASR024	.024	+/- .002	ASR197	.197	+/- .006
ASR029	.029	+/- .003	ASR250	.250	+/- .008
ASR032	.032	+/- .004	ASR264	.264	+/- .008
ASR035	.035	+/- .004	ASR312	.312	+/- .009
ASR040	.040	+/- .004	ASR375	.375	+/- .001
ASR048	.048	+/- .005	ASR388	.388	+/- .007
ASR056	.056	+/- .005	ASR400	.400	+/- .012
ASR060	.060	+/- .005	ASR440	.440	+/- .013
ASR062	.062	+/- .005	ASR500	.500	+/- .015
ASR072	.072	+/- .005	ASR518	.518	+/- .007
ASR080	.080	+/- .005	ASR625	.625	+/- .018
ASR096	.096	+/- .005	ASR640	.640	+/- .010
ASR098	.098	+/- .005	ASR750	.750	+/- .022
ASR125	.125	+/- .005	ASR775	.775	+/- .010
ASR137	.137	+/- .005	ASR1000	1.000	+/- .030

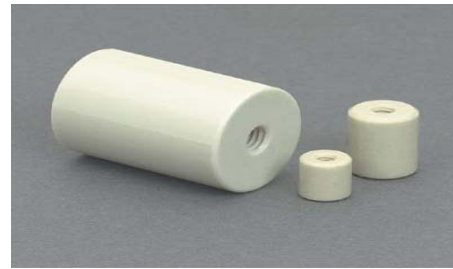
# Alumina Fishspine Beads



Part No.	OD	ID	Length
AFS-1	.090	.040	.125
AFS-2	.094	.040	.094
AFS-3	.125	.040	.125
AFS-4	.158	.040	.158
AFS-5	.170	.060	.188
AFS-6	.188	.062	.188
AFS-7	.200	.094	.200
AFS-8	.330	.040	.158

# Alumina and Steatite Standoff Insulators

*(Glazed or Unglazed)*



Part No.	Diameter (inches)	Thread Size	Length (inches)	Thread Depth (inches)
ASO00100	.375	6-32	.375	.125
ASO00101	.375	6-32	.500	.156
ASO00102	.375	6-32	.625	.188
ASO00103	.375	6-32	.750	.250
ASO00104	.375	6-32	1.000	.375
ASO00105	.375	6-32	1.250	.375
ASO00106	.375	6-32	1.500	.375
ASO00107	.375	6-32	2.000	.375
ASO00108	.500	8-32	.625	.188
ASO00109	.500	8-32	.750	.250
ASO00110	.500	8-32	1.000	.375
ASO00111	.500	8-32	1.250	.375
ASO00112	.500	8-32	1.500	.375
ASO00113	.500	8-32	2.000	.375
ASO00114	.500	8-32	2.500	.375
ASO00115	.500	8-32	3.000	.375
ASO00116	.750	10-32	1.000	.375
ASO00117	.750	10-32	1.250	.375
ASO00118	.750	10-32	1.500	.375
ASO00119	.750	10-32	2.000	.375
ASO00120	.750	10-32	2.500	.375
ASO00121	.750	10-32	3.000	.375
ASO00122	.750	10-32	4.000	.375
cASO00123	1.000	¼-20	1.250	.438
ASO00124	1.000	¼-20	1.500	.500
ASO00125	1.000	¼-20	2.000	.625
ASO00126	1.000	¼-20	2.500	.625
ASO00127	1.000	¼-20	3.000	.625
ASO00128	1.000	¼-20	4.000	.625
ASO00129	1.000	¼-20	5.000	.625
ASO00130	1.000	¼-20	6.000	.625

# Alumina Fasteners



## Fully Threaded Hex Headed Bolts Standard Available Sizes and Lengths

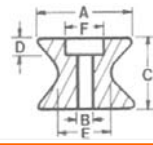
Size	.250"	.500"	.750"	1.00"	1.25"	1.50"	1.75"	2.00"	2.50"	3.00"
0-80	•									
2-56	•	•								
4-40	•	•	•	•						
5-40	•	•	•	•						
6-32	•	•	•	•	•	•				
8-32	•	•	•	•	•	•	•			
10-32	•	•	•	•	•	•	•	•	•	•
1/4-20	•	•	•	•	•	•	•	•	•	•

## Standard Available Metric Sizes and Lengths

Size	5mm	10mm	20mm	25mm	30mm	40mm	50mm
M2	•	•					
M3	•	•	•				
M4	•	•	•	•	•	•	
M5	•	•	•	•	•	•	
M6	•	•	•	•	•	•	•

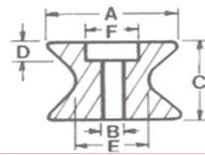
*Corresponding nuts and washers available for the listed sizes.  
All listed parts are 99.8% Alumina*

# Alumina Pulleys



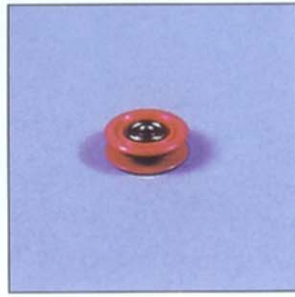
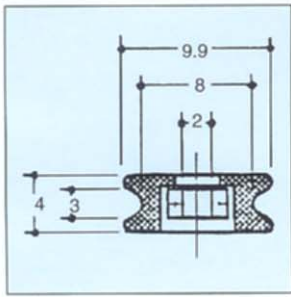
Part No.	A	B	C	D	E
PUL50-2	.275	.010	.120	.078	.125
PUL50-3	.395	.040	.156	.080	.162
PUL50-4	.395	.050	.120	.093	.120
PUL50-5	.500	.100	.312	.288	.165
PUL50-48	.500	.325	.250	.140	.140
PUL50-54	.500	.140	.450	.225	.110
PUL50-6	.530	.078	.235	.156	.125
PUL50-7	.530	.078	.235	.156	.190
PUL50-60	.535	.455	.225	.135	.340
PUL50-8	.565	.125	.235	.100	.280
PUL50-9	.625	.125	.250	.187	.125
PUL50-10	.650	.135	.355	.260	.175
PUL50-11	.660	.080	.235	.156	.250
PUL50-12	.670	.175	.275	.225	.145
PUL50-13	.670	.175	.275	.225	.180
PUL50-14	.670	.175	.275	.225	.210
PUL50-15	.670	.175	.275	.225	.240
PUL50-57	.670	.060	.280	.180	.370
PUL50-43	.685	.140	.375	.250	.125
PUL50-52	.700	.335	.270	.175	.175
PUL50-53	.732	.120	.380	.260	.260
PUL50-16	.750	.156	.440	.312	.205
PUL50-42	.750	.125	.355	.250	.250
PUL50-56	.750	.156	.555	.380	.312
PUL50-41	.775	.125	.355	.240	.250
PUL50-51A	.800	.400	.630	.500	.140
PUL50-61	.800	.375	.780	.625	.295
PUL50-17	.870	.120	.495	.178	.315
PUL50-18	.875	.125	.312	.288	.375

# Alumina Pulleys

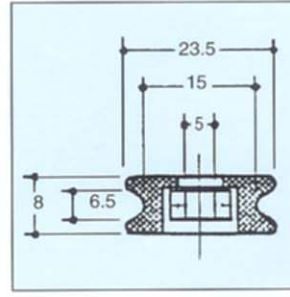


Part No.	A	B	C	D	E
PUL50-19	.875	.156	.220	.093	.375
PUL50-20	.875	.156	.845	.660	.250
PUL50-40	.875	.152	.350	.250	.250
PUL50-45	.875	.740	.300	.210	.545
PUL50-21	.885	.150	.550	.312	.270
PUL50-22	.910	.080	.235	.156	.250
PUL50-23	.950	.190	.685	.490	.250
PUL50-24	1.000	.156	.312	.288	.312
PUL50-25	1.000	.156	.500	.312	.312
PUL50-26	1.000	.187	.375	.250	.125
PUL50-27	1.045	.085	.235	.156	.250
PUL50-28	1.050	.187	.440	.312	.250
PUL50-29	1.062	.218	.750	.560	.140
PUL50-30	1.062	.218	.750	.560	.280
PUL50-31	1.093	.218	.500	.312	.375
PUL50-32	1.125	.218	.470	.340	.312
PUL50-33	1.185	.200	.395	.205	.355
PUL50-55	1.250	.060	.312	.140	.825
PUL50-34	1.280	.218	.750	.560	.312
PUL50-35	1.280	.218	.812	.625	.375
PUL50-44	1.305	.110	.310	.290	.790
PUL50-47	1.356	.875	.630	.500	.408
PUL50-36	1.375	.187	.343	.225	.156
PUL50-37	1.375	.218	.565	.312	.375
PUL50-50	1.375	1.102	.320	.295	.687
PUL50-49	1.390	.300	.550	.330	.620
PUL50-46	1.398	.250	.550	.500	.640
PUL50-38	1.450	.160	.235	.156	.250
PUL50-58	1.500	.315	.785	.665	.354

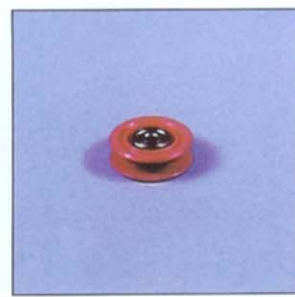
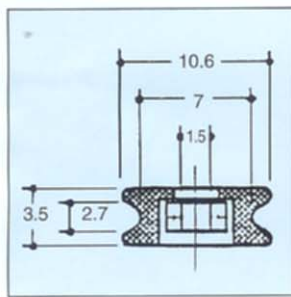
# Ceramic Pulleys With Bearings



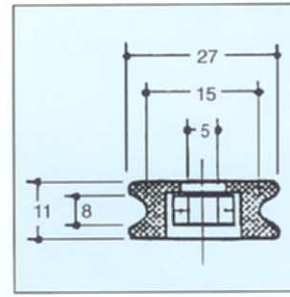
B101



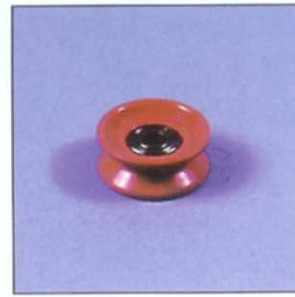
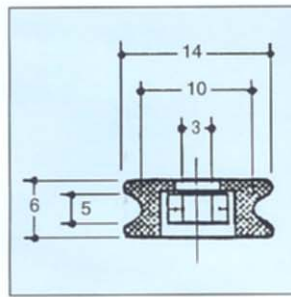
B110-2



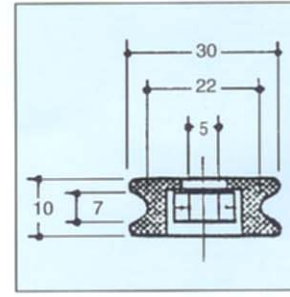
B102



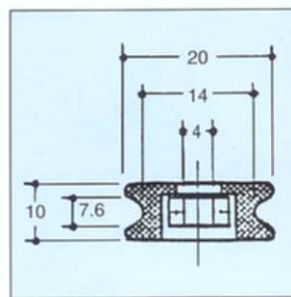
B111



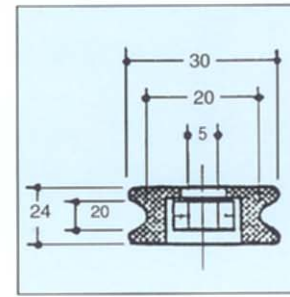
B104



B112



B110



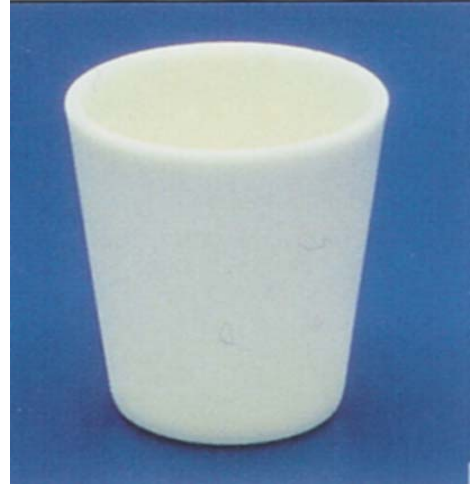
B114A

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## Alumina Cylindrical Crucibles

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Part No.	Diam. (mm)	Height (mm)	Capacity (ml)
CYC002	13	25	2
CYC005	18	26	5
CYC006	24	19	6
CYC010	22	33	10
CYC020	28	40	20
CYC040	25	100	40
CYC050	35	64	50
CYC060	25	152	60
CYC100	39	91	100
CYC170	40	165	170
CYC180	54	91	180
CYC250	59	104	250
CYC500	69	148	500
CYC750	83	160	750
CYC1000	93	167	1000
CYC1500	105	194	1500
CYC2400	127	228	2400
CYC4750	178	228	4750



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## Alumina Combustion Boats

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Part No.	Length (mm)	Width (mm)	Height (mm)	Capacity (ml)
CB01	30	6	7	1
CB015	40	10	8	1.5
CB03	50	12	9	3
CB05	70	14	10	5
CB10	90	17	11,5	10
CB15	100	20	13	15
CB20	105	22	14,5	20
CB50	137	27	21	50



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## High Form Alumina Crucibles

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Part No.	Diam. (mm)	Height (mm)	Capacity (ml)
HFC005	22	28	5
HFC010	29	31	10
HFC020	38	35	20
HFC050	48	47	50
HFC100	58	61	100
HFC250	76	93	250
HFC500	90	118	500
HFC750	99	136	750
HFC1000	118	148	1000
HFC1500	124	161	1500
HFC2000	150	175	2000



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## Conical Alumina

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Part No.	Diam. (mm)	Height (mm)	Capacity (ml)
CNC005	22	32	5
CNC010	27	35	10
CNC020	33	44	20
CNC050	43	53	50
CNC100	55	68	100
CNC250	73	95	250
CNC500	90	128	500
CNC750	104	150	750



## Alumina Discs

Part No.	Diam. (mm)	Diam. (inches)	Thickness (mm)	Thickness (inches)
DIS001	25	1.000	1,5	.062
DIS002	32	1.250	2	.078
DIS003	38	1.500	2	.078
DIS004	51	2.000	2	.078
DIS005	64	2.500	3	.125
DIS006	76	3.000	3	.125
DIS007	89	3.500	4	.156
DIS008	102	4.000	4	.156
DIS009	127	5.000	5	.188
DIS010	152	6.000	5	.188



## Alumina Rectangular Trays

Part No.	Length (mm)	Width (mm)	Height (mm)	Capacity (ml)
RT01.5	25	15	5	1.5
RT05	40	30	6	5
RT13	60	40	8	13
RT32	75	50	11	32
RT64	100	45	19	64
RT140	150	65	19	140
RT340	200	90	25	340
RT750	188	140	42	750



## Material Properties Comparison Chart

Property	Units	Mullite	96 Alumina	998 Alumina
Color		Buff	White	Cream
Bulk Density	(g/cm <sup>3</sup> (#/ft <sup>3</sup> ))	2.8 (175)	3.72 (232)	3.91 (244)
Crystal Size (Range)	Microns	5-35	2-35	5-30
Permeability	%	0	0	0
Flexural Strength (MOR) 20° C 1000° C	MPa (ksi) MPa (ksi)	180 (26) --	345 (50) 205 (30)	380 (55) 165 (24)
Compressive Strength 20° C	MPa (ksi)	1310 (190)	2100 (305)	3650 (530)
Tensile Strength 20° C	MPa (ksi)	124 (18)	241 (35)	295 (43)
Elastic Modulus 20° C	GPa (ksi X 10 <sup>3</sup> )	151 (22)	275 (40)	344 (50)
Hardness (H 1kg) 20° C	GPa (ksi X 10 <sup>3</sup> )	10.5	13	15.2
Fracture Toughness 20° C	MPa. m <sup>-5</sup>	2	3.5	4
Maximum Use Temperature (no load conditions)	°C (° F)	1680 (3056)	1700 (3092)	1800 (3272)
Thermal Conductivity 20° C 800° C	W/m° K (BTU.in/ft <sup>2</sup> .hr. F) W/m° K (BTU .in/ft <sup>2</sup> .hr F)	6 (42) 3.6 (25)	25 (174) 5.7 (40)	36 (250) 8.2 (57)
Expansion Coefficient 20-1000° C	10 <sup>-6</sup> /°C (10 <sup>-6</sup> /°F)	5.4 (3)	8.2 (4.6)	8.4 (4.7)
Dielectric Constant @1KhZ @1MhZ @1GhZ	-- -- --	-- 5.8 --	9.0 9.0 9.0	-- -- --
Dielectric Strength @6.35mm @1.27mm @0.25mm	kV/mm(ac) kV/mm(ac) kV/mm(ac)	9.8 -- --	11.8 14.6 22.8	12.6 18.1 31.5
Volume Resistivity @ 25° C @ 300° C @ 500° C @ 700° C @ 1000 C	Ohm, cm Ohm, cm Ohm, cm Ohm, cm Ohm, cm	>10 -- -- -- --	>10 3.1 x 10 4.0 x 10 1 x 10 1x 10	>10 -- -- -- --
Te Value	°C (°F)	450 (842)	1000 (1832)	--