

## DIAMOND POWDER

With a 10 on the Mohs scale, diamonds are the hardest material known to man. Our Metal Bond Diamond powders are synthetically manufactured to exacting specifications. These high-density powders are milled to achieve a blocky (rounded) shape morphology. Our high strength powders are ideal for polishing, grinding, and lapping of hard materials such as cements, ceramics, granite, and marble.

High-density diamond powders are also suitable for thermally conductive applications.

Panadyne offers sizes ranging from 0.5  $\mu\text{m}$  to 8 mesh, as well as custom graded sizes.



## TYPICAL APPLICATIONS

Polishing

Grinding

Lapping

Thermal Conductivity

Ceramic Parts

## TYPICAL PROPERTIES

Abrasive

High Hardness

High Strength

High Density

Wear Resistance

High Thermal Conductivity



## ZIRCONIA POWDER TECHNICAL DATA

PROPERTIES	UNITS	TEST	VALUE
<b>Physical</b>			
Chemical Formula	-	-	ZrO <sub>2</sub>
Density, $\rho$	g/cm <sup>3</sup>	ASTM C20	6.04
Color	-	-	white
Crystal Structure	-	-	tetragonal
Water Absorption	% @R.T.	ASTM C373	0.0
Hardness	Mohs	-	6.5
Hardness	knoop (kg/mm <sup>2</sup> )	Knoop 100g	1600
<b>Mechanical</b>			
Compressive Strength	MPa @ R.T.	ASTM C773	2500
Tensile Strength	MPa @ R.T.	ACMA Test #4	248
Modulus of Elasticity (Young's Modulus)	GPa	ASTM C848	207
Flexural Strength (MOR)	MPa @ R.T.	ASTM F417	900
Poisson's Ratio, $\nu$		ASTM C818	0.32
Fracture Toughness, $K_{IC}$	MPa x m <sup>1/2</sup>	Notched Beam Test	13.0
<b>Thermal</b>			
Max. Use Temperature (* denotes inert atm.)	°C	No load cond.	500
Thermal Shock Resistance	$\Delta T$ (°C)	Quenching	280-360
Thermal Conductivity	W/m-K @ R.T.	ASTM C408	2.7
Coefficient of Linear Thermal Expansion, $\alpha_l$	$\mu\text{m}/\text{m}\cdot\text{°C}$ (~-25°C through $\pm 1000\text{°C}$ )	ASTM C372	11.0
Specific Heat, $c_p$	cal/g-°C @ R.T.	ASTM C351	0.10
<b>Electrical</b>			
Dielectric Constant	1MHz @ R.T.	ASTM D150	26@100kHz
Dielectric Strength	kV/mm	ASTM D116	9.0
Electrical Resistivity	$\Omega\text{cm}$ @ R.T.	ASTM D1829	$>10^4$

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Mesh Size	IMicron Range	Bureau of Standard Equivalent	Micro Finish	Ra/RHS Finish
400/500	40-60	50	12-22	.35
520	40-50	45	-	-
530	39-45	40	-	-
550	30-40	35	-	-
600	20-40	30	10-19	.3
700	22-36	29	-	-
800	20-30	25	8-12	.25
900	20-25	23	-	-
1,00	15-25	20	7-9	.2
1,100	12-22	17	-	-
1,200	10-20	15	4-6	.15
1,300	10-18	14	-	-
1,500	8-16	12	3-5	.1
1,600	8-12	10	-	-
1,800	6-12	9	-	-
2,000	6-10	8	-	-
2,200	5-10	7.50	-	-
3,000	4-8	6	-	-
4,000	4-6	5	2-3	.6
5,000	2-6	4	-	-
7,000	2-5	3.50	-	-
8,000	2-4	3	1-2	.05
10,000	2-3	2.50	-	-
12,000	1-3	2	-	-
12,500	.5-3	1.75	-	-
13,000	1-2	1.50	0-1	.025
14,000	.5-2	1.25	-	-
15,000	0-2	1.00	-	-
60,000	.25-1	0.625	0-1/	.012
100,000	0-.5	0.250	-	-
200,000	0-.25	0.125	-	-
250,000	0-.20	0.100	-	-