



# Diamond Micron Powders



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## From Start to Finish

Diamond Innovations micron powders are created in a single, continuous manufacturing process. Starting with the highest quality raw materials, Diamond Innovations uses advanced engineering methods to manufacture diamond with specific characteristics of strength and toughness. State-of-the-art micronizing techniques assure the diamond micron powders have precisely defined size, shape and surface properties. The result is unprecedented consistency and uniformity from the initial diamond source to the final product.

## Consistency through Six Sigma Quality Control

Recognizing the need for high quality, Diamond Innovations micron powders offer consistency and repeatability derived from the engineering and understanding invested in our proprietary Six Sigma controlled manufacturing process.

## The Magic Six

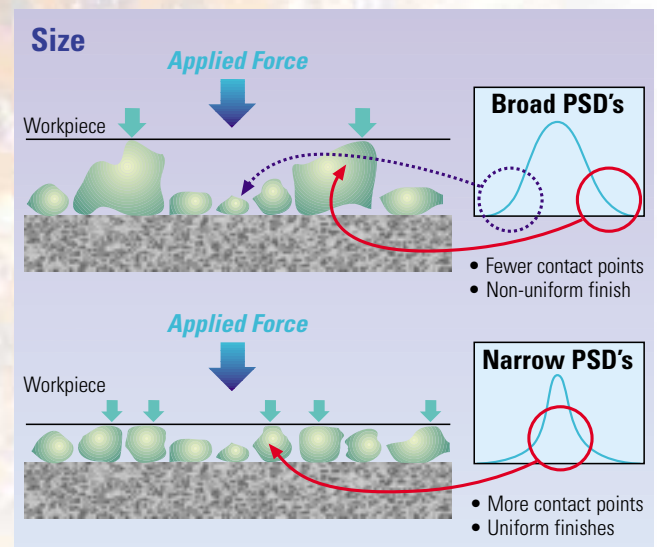
Tightly controlled diamond characteristics enhance the performance of diamond micron powders.

<b>Source</b>	Excellent control of diamond raw materials are key for consistency
<b>Size</b>	Particle size distribution is crucial to achieve performance
<b>Shape</b>	Consistent shape of particles helps achieve desired results
<b>Slurry</b>	Engineered formulation for optimal dispersion and stability
<b>Strength</b>	Controlled microfraction mode for maximum productivity
<b>Surface</b>	Consistent cleanliness for predictable results

## Diamond Innovations Designs for the Exclusion of Oversize and Superfines

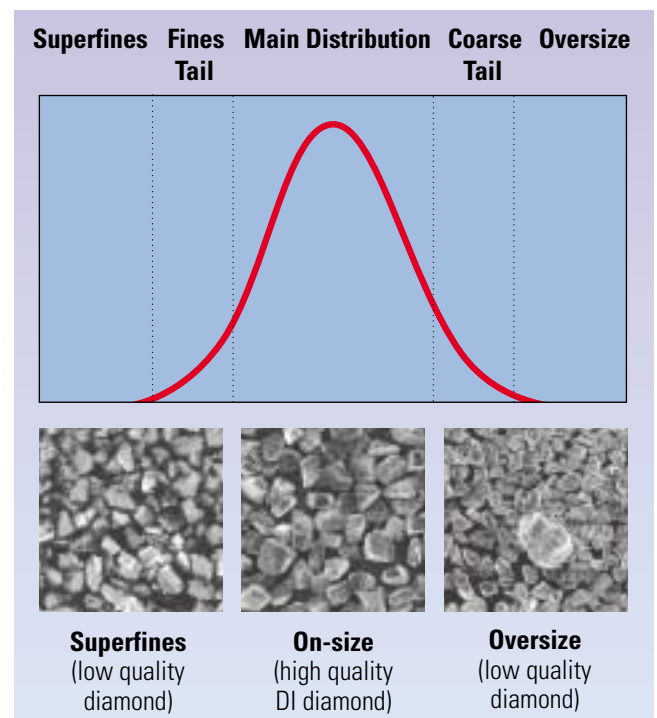
### Particle Size Distribution – PSD

PSD affects workpiece surface finish and material removal rates in free abrasive applications. It also affects the diamond surface characteristics that are critical to chemical and mechanical interactions. This includes surface effects which manifest themselves in wetting and dispersing characteristics, propensity for agglomeration and cohesive strength of these agglomerates. It also affects the amount of moisture or static charge which may impede proper mixing or blending, as well as suspension stability of diamond particles in a slurry.



## Size Measurement Expertise

Methods for particle size analysis of sub-sieve size powders include laser light scattering, electrical sensing zone, microscopy, sedimentation and photon correlation spectroscopy. Diamond Innovations micron powders are measured by utilizing the most appropriate sizing technique for each size range. In addition, powders are controlled through the use of a field emission SEM for measuring particles at the extreme ends of a distribution, where levels are too low to be detected by standard measurement techniques.



## Pushing the Technology Barrier

### Shape Characterization

Quantifiable shape characterization results in consistent powders delivering maximum performance. Diamond Innovations utilizes optical imaging for the design and production of uniform, blocky, three dimensional particle shapes that are optimized for higher material removal rates.

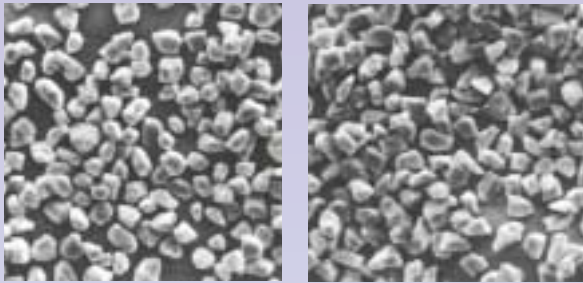
Compared with typical qualitative descriptors, quantitative data is not subject to individual interpretation. For this reason Diamond Innovations uses multiple shape measurement descriptors including aspect ratio.

### Surface Integrity Paramount

Diamond Innovations micron powders are rigorously controlled for utmost purity on the diamond's surface. Surface cleanliness is critical for proper dispersion with slurry vehicles, as well as mixing and retention with bond components.

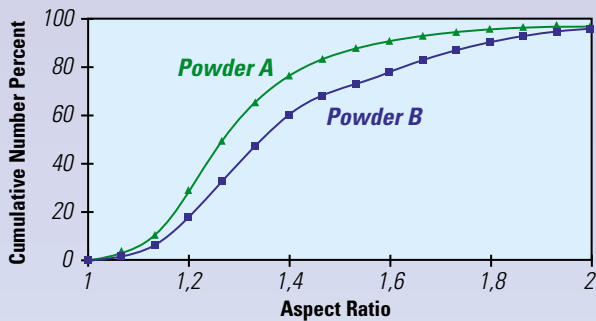
Diamond Innovations processes and tests for the elimination of ionic contaminants down to levels measured at parts per million.

**Product designed utilizing quantitative data eliminates subjective analysis.**



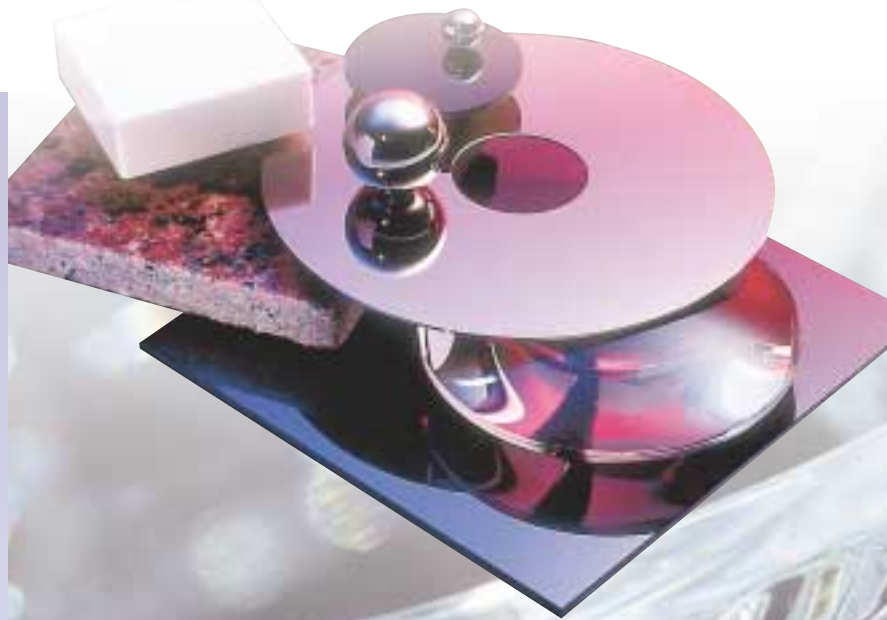
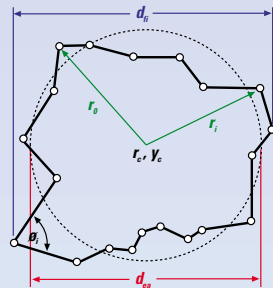
**Powder A**

**Powder B**



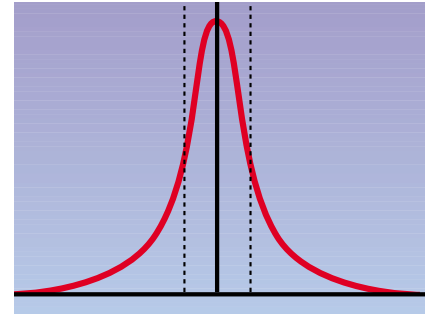
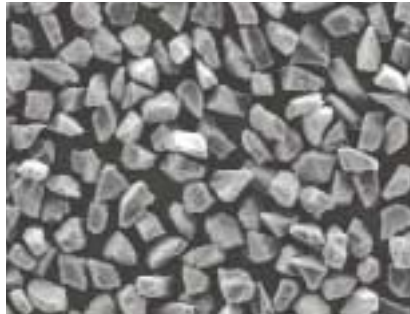
### Quantitative Descriptors

- Aspect Ratio ( $d_{f \max}/d_{f \min}$ )
- Area/Perimeter<sup>2</sup>
- Angularity [ $\sum \theta_i / \theta_i - 1$ ]<sup>2</sup> ( $R_i/R_0 - 1$ )<sup>2</sup>]
- Fractal Dimension
- Fourier Coefficients



# ISO Certified Diamond Innovations Metal Bond Diamond Powder

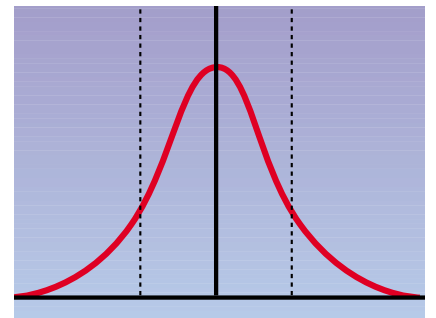
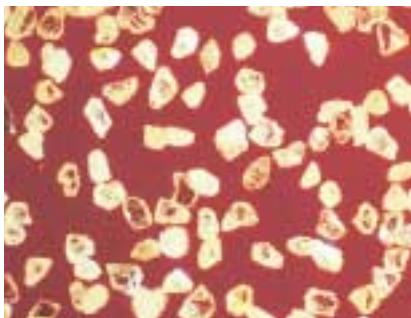
## Premium Grade



**MBM** shows the most tightly controlled size, shape and surface properties. Superior product derived from synthesised monocrystalline diamond. Grown under conditions which create tough, uniform crystals that resist fracturing and have excellent impact resistance. Highly recommended for processing Si wafer, slicing and dicing applications as well as lapping of glass and ceramics.

- Also available with 56% and 30% Ni-coating/Ti-coating
- Blocky shape
- Tightest mean
- Narrowest deviation
- Excellent oversize control
- Very clean diamond surfaces

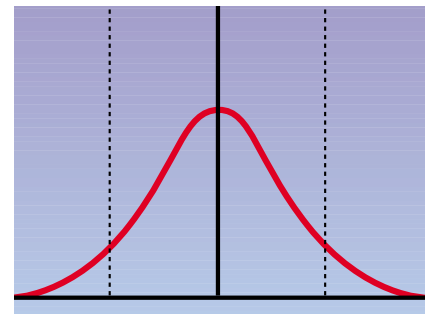
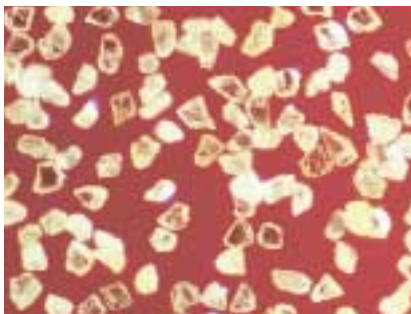
## Standard Grade



**SJK-5** has well controlled size, shape and surface properties, utilizing tough, blocky diamond, with high impact resistance. SJK-5 achieves excellent results in glass, wafer and polycrystalline diamond (PCD) lapping and polishing applications.

- Blocky shape
- Tight mean
- Controlled standard deviation
- Very good oversize control
- Clean diamond surfaces

## Economy Grade

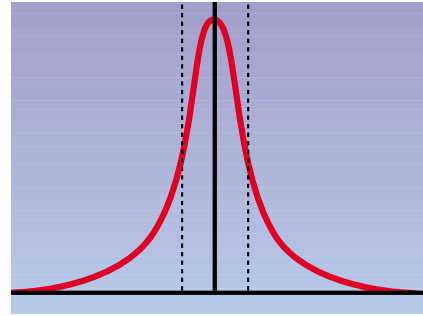
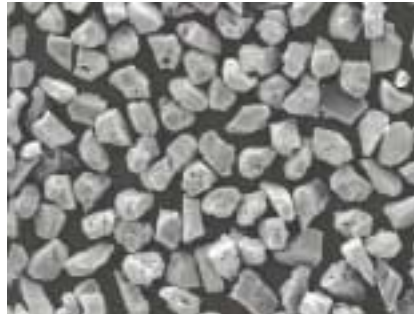
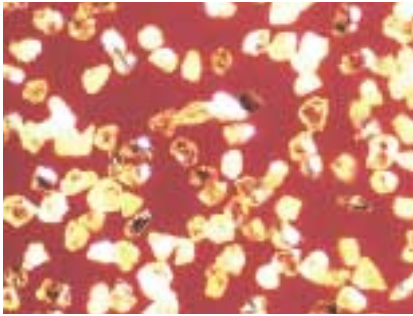


**GMM** meets most size, shape and surface requirements. Good general purpose product designed to provide acceptable surface finish and material removal results in all applications where tight tolerance is not required.

- No coatings available
- Blocky shape
- Well controlled mean
- Standard deviation and oversize control

# ISO Certified Diamond Innovations Resin Bond Diamond Powder

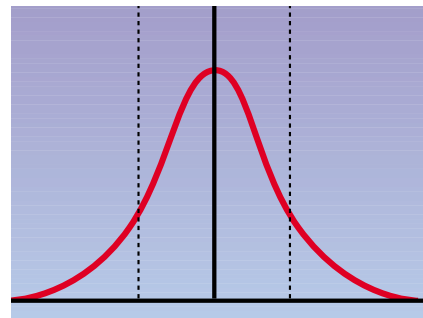
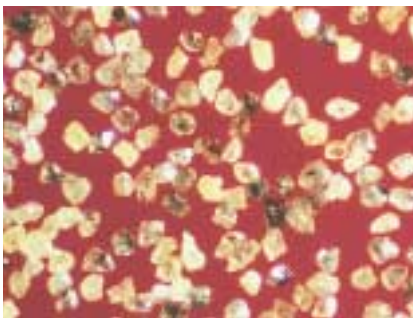
## Premium Grade



**RVM** is derived from synthesised diamond, which is grown under conditions that create thousands of tightly bonded crystals within each diamond grain, also known as “multicrystallinity“. These crystals are designed to microchip and present new, sharp edges in abrasive applications. RVM shows excellent results in glass-, tungsten carbide- and ceramic grinding.

- Also available with 56% and 30% Ni-coating
- Blocky shape
- Tightest mean
- Narrowest deviation
- Excellent oversize control
- Very clean diamond surfaces

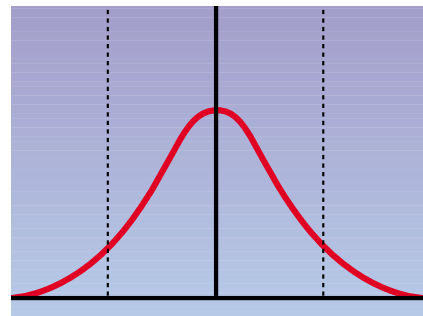
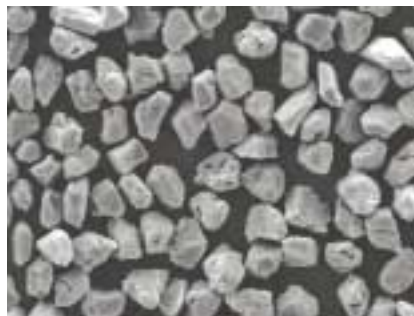
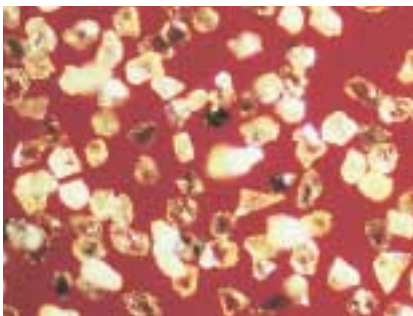
## Standard Grade



**RJK-1** is characterized by its friable, irregular, semi-blocky particle shape. Designed for applications in resin bonded wheels, where a soft polishing and lapping action is required. Highly recommended for crystal lapping, PCD and glass grinding.

- Also available with 56% and 30% Ni-coating/  
Cu-coating
- Blocky shape
- Tight mean
- Controlled standard deviation
- Very good oversize control
- Clean diamond surfaces

## Economy Grade



**GRM** meets most size, shape and surface requirements. Economical multi purpose product. Provides satisfactory surface finish and material removal rates in all applications where tight tolerances are not mandatory. Very good results in wire die polishing, stone/gem polishing as well as precision wire sawing.

- No coatings available
- Blocky shape
- Well controlled mean
- Standard deviation and oversize control

# Diamond Micron Powders – Availability

Product Name	Mean Target	~ Equivalent Mesh Size	MBM	SJK-5	GMM	MBM-N MBN-N30	MBM-Ti	MBM-LC	Natural	RVM	RJK-1	GRM	RVM-N RVM-N30	RJK-1N	RJK-1Cu
0 - 1/5	0.1										✓				
0 - 1/4	0.15		✓	✓	•				•	•	✓	•			
0 - 1/2	0.25	60.000	✓	✓	•				•	•	✓	•			
0 - 1	0.5	28.000	✓	✓	✓			•	•	•	✓	•			
1/2 - 1	0.75		•	•	•				•	•	✓	•			
1/2 - 1 1/2			•	•	•				•	•	✓	•			
0 - 2	1	14.000	✓	✓	✓			•	•	•	✓	•			
1 - 2	1.5	13.000	✓	✓	✓			•	•	✓	✓	✓			
1/2 - 3			•	•	•				•	•	✓	•			
1 - 3	2	12.000	✓	✓	✓			•	•	✓	✓	•			
1 1/2 - 3			•	•	•				•	•	✓	•			
2 - 3	2.5		•	•	•				•	•	•	•			
2 - 4	3	8.000	✓	✓	✓			•	•	✓	✓	✓			
2 - 5	3.5		✓	✓	✓				•	•	✓	•			
3 - 5	4		✓	✓	✓				•	•	•	•			
2 - 6	4	6.000	✓	•	•				•	•	✓	•			
3 - 6	4.5	5.000	✓	✓	✓				•	•	✓	•			
4 - 6	5		✓	✓	✓				•	•	•	•			
5 - 7	6									•	•	•			
5 - 8	6.25									•	•	•			
4 - 8	6	3.000	✓	✓	✓			✓	•	✓	✓	✓			
6 - 8	7		•	•	•				•	•	•	•			
5 - 9	7									•	•	•			
5 - 10	7.5	2.200	✓	✓	•					•	✓	•			
6 - 10	8									•	✓	•			
6 - 12	9	1.800	✓	✓	✓			•	•	✓	✓	✓			
8 - 12	10		•	•	•				•	•	✓	•			
8 - 15	11.5	1.500	•	•	•				•	•	✓	•			
8 - 16	12		✓	✓	✓				•	•	✓	✓			
10 - 15	12.5	1.400	✓	•	✓				•	•	✓	•	•	•	•
10 - 16	13								•	•	•	•			
12 - 17				✓					•	•	•	•			
10 - 20	15	1.200	✓	✓	✓	•		✓	•	✓	✓	✓	•	✓	•
12 - 20	16								•	•	•	•			
12 - 22	17	1.100	✓	✓	✓	•		•	•	✓	✓	•	✓	•	•
15 - 20	17.5	1.100	✓	✓		•			•	•	✓	•	•	•	•
15 - 25	20	1.000	✓	✓	✓	•		✓	•	•	✓	•	✓	•	•
15 - 30	21.5					•			•	•	•	•	•	•	•
20 - 25	22.5		•	✓		•		•	•	•	✓	•	•	•	•
20 - 30	25	800	✓	✓	✓	•		✓	•	•	✓	•	✓	✓	•
25 - 30	27.5		✓	•		•			•	•	•	•	•	•	•
22 - 36	29	700	✓	✓	✓	•		✓	•	•	✓	•	✓	•	•
20 - 40	30		✓	✓	✓	•			•	•	✓	•	✓	•	•
30 - 40	35	600	✓	✓	✓	•		✓	•	•	✓	•	✓	✓	•
35 - 45	40		•	•	•	•			•	•	•	•	•	•	•
30 - 50			•	•	•	•			•	•	•	•	•	•	•
40 - 50	45	500	✓	✓	•	•		•	•	✓	✓	•	•	•	•
36 - 54	45	500	✓	✓	•	•		•	•	✓	✓	•	✓	•	•
30 - 60	45		✓	✓	✓	•			•	•	✓	•	•	•	•
40 - 60	50	400/500	✓	✓	✓	•			•	•	✓	✓	✓	•	•
50 - 60			•	•	•	•			•	•	•	•	•	•	•
50 - 70	60		•	•	•	•			•	•	•	•	•	•	•
40 - 80	60		•	•	•	•			•	•	•	•	•	•	•
54 - 80	67	325/400	✓	✓	✓	•			•	•	•	✓	✓	•	•
60 - 80	70		•	•	•	•			•	•	•	•	•	•	•
60 - 100	80	270/325	•	•	•	•			•	•	•	•	•	•	•

✓ = Standard Product    • = Made to Order

When ordering please specify crystal type (MBM, RVM, SJK-5 etc.), size and coating if desired.  
Example: RVM - N30 22-36

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