

Micron Diamond Powder

nological schemes of micron powder manufacturing, which allow adjusting granulometric structure, shape factor, field-performance data of powders. This ensures manufacturing of the vast assortment of high quality products.

HARIS DIVISION company offers micron powders with the grain size ranging from 60 to 1 micron, obtained by the method of static or centrifugal sedimentation, and sub-micron powders with the size less than 1 micron, obtained by the method of classification on super centrifuges from the preliminary processed product of 1 micron class.

The main operational characteristics of micron powders quality is their abrasive ability and roughness of the grinded surface. Abrasive ability features a ratio between mass of removed corundum and mass of used powder at the set mode of test. (Tab. 2)

In technology of production an important part play physico-mechanical impact on grains for the purpose of achievement of the necessary granulometric structure and increasing their isometrics. In the HD lab there was worked through new tech-

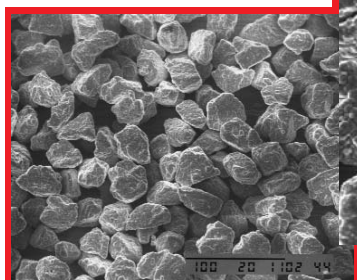
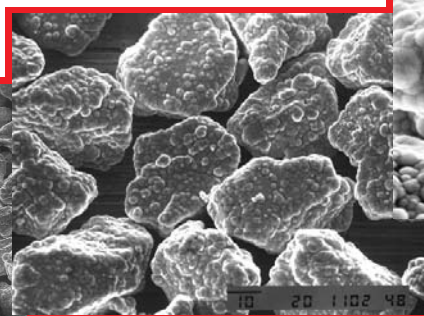
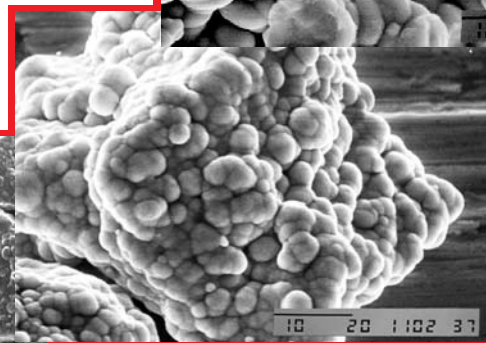
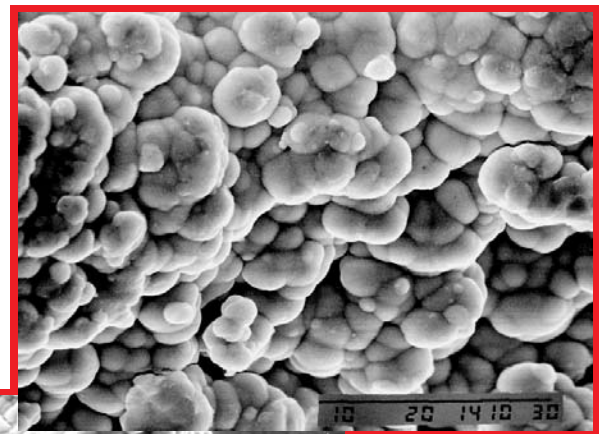
Diamonds with the surface saturated with oxygen, show hydrophilic properties. Their processing with hydroxyl groups increase hydrophilicity of micron powder surface. This characteristics matter while choosing basic substrate to use it in micron powders for emulsions and diamond compounds.

Electroless nickel coating

Durability and efficiency of abrasive tools is significantly dependant on firmness of grain strengthening in bond. That is why high adhesive characteristics of contact - "abrasive-bonding material", increases tool performance effectiveness.

Due to advanced surface of electroless nickel coating, crystals are well knit with bonds, which ensures firm retention of grains before complete deterioration during abrasive tool performance. During the electroless nickel cladding process, the surface of crystal is catalytically activated, thus the optimum adhesion between grains and nickel is reached.

It provides intensive heat deflection, emergent from working surface of grains during grinding process, while the coating of crystal itself aids to distribute temperature farther on the bond, which lowers general temperature of processing. Thus suggested coating significantly betters thermo-physical properties of tool.



MDR 20-30 56N

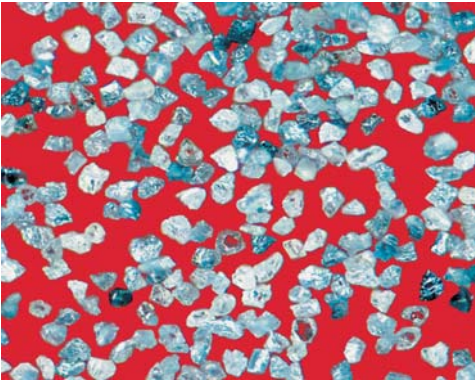
▲ x3500

◀ x2500

◀ x1000

◀ x350

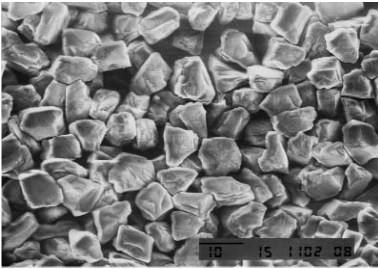
Resin Bond Micron Powder



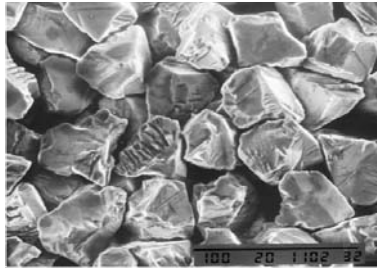
MDR micron powder is a product derived from synthesis of resin bond diamond RBD type, with fractured and slice-like structure. The specific feature of this type is the permanent renewal of cutting edges of crystal thanks to breaking away of small fragments. MDR is more friable and less thermally stable than MDM micron powder.

MDR powder can be used in different resin or vitrified bond systems, as well as in manufacturing of abrasive pastes and slurries.

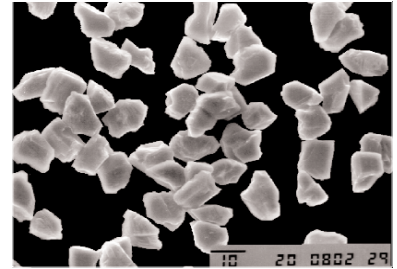
MDR Typical Applications: WC fine-grinding, sapphire and ruby polishing, glass fine-grinding, ceramics lapping, crystal lapping & polishing.



MDR 10-14 (x1000)



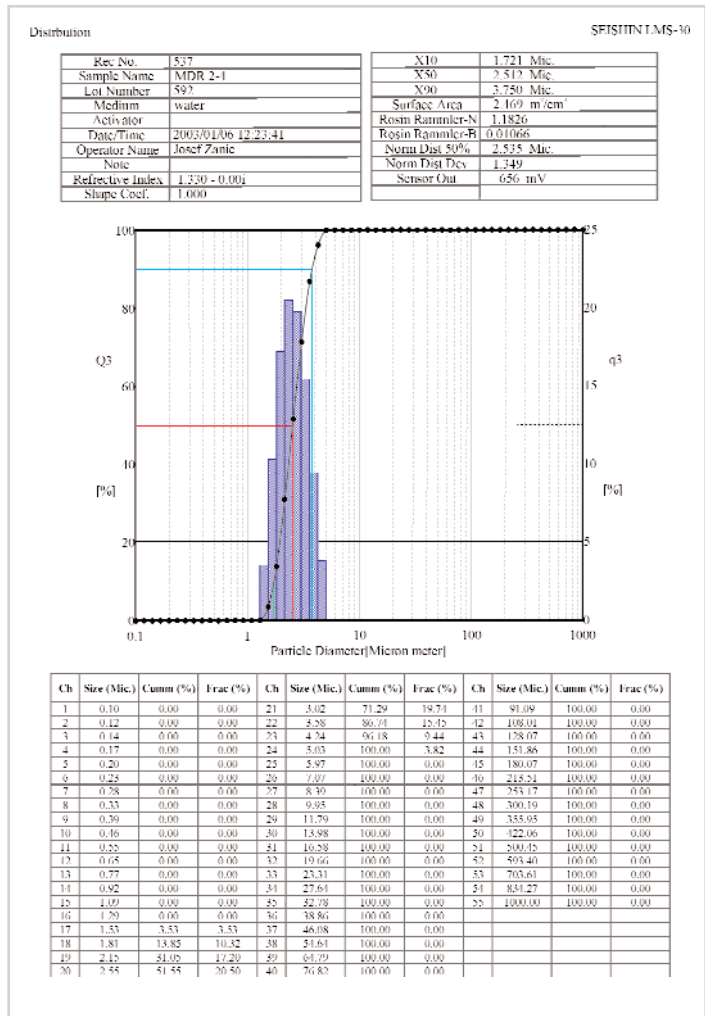
MDR 10-14 (x3500)



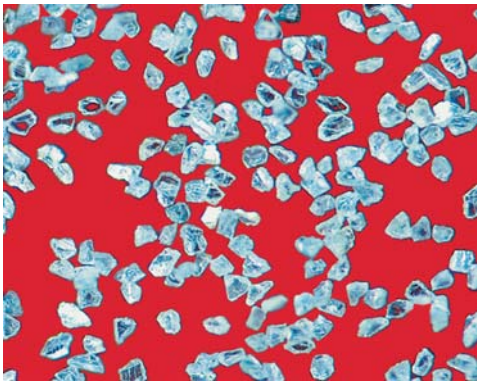
Particle Size Distribution

High-speed control of micron size of powder grain is provided on Laser Particle Size Analyzer. A beam of coherent light from helium-neon laser comes through the sample of analyzed powder, which is being suspended in liquid, and refracted. On the diffraction picture appears a number of concentric rings, with diameter depending on the size of grains. Measuring results are being given as a grain composition graph.

It must be considered that the measurement results received on Laser Particle Size Analyzer need an adjustment with respect to the optical method of measurement declared in most state standards like FEPA, ANSI and GOST.



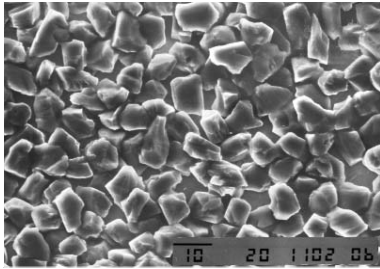
Metal Bond Micron Powder



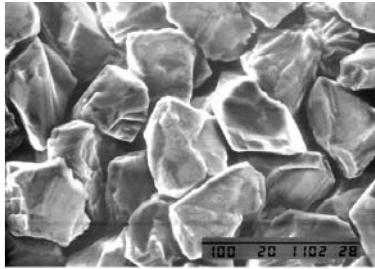
MDM micron powder is a product, received from monocrystalline mesh-size grits MBH diamond series. Grain shape of this micron powder is more regular, than that of MDR type. High degree of chemical homogeneity and minimal inclusion of Metal Bond Diamond dashes, as a basic material, endow MDM with hardness and thermal stability. Optimal shape and high particle strength of grains are used to ensure high material removal rates.

MDM powder can be used for fine-grinding, lapping and polishing applications in metal or vitrified bond systems, as well as in manufacturing of abrasive pastes and slurries.

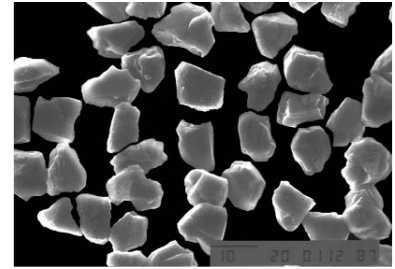
MDM Typical Applications: PCD fine-grinding, stone polishing, glass fine-grinding, ceramics lapping, semiconductor wafer polishing.



MDM 10-15 (x1000)

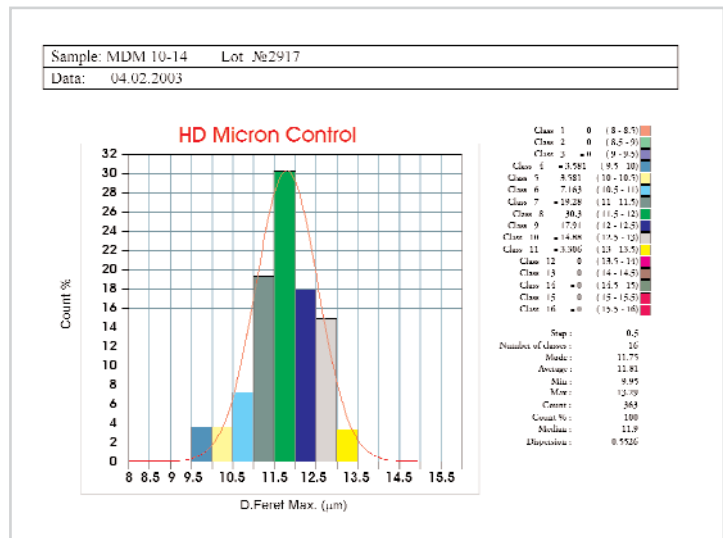


MDM 10-15 (x3500)

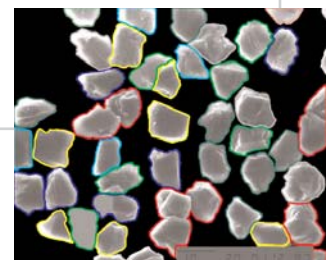


HD Micron Control

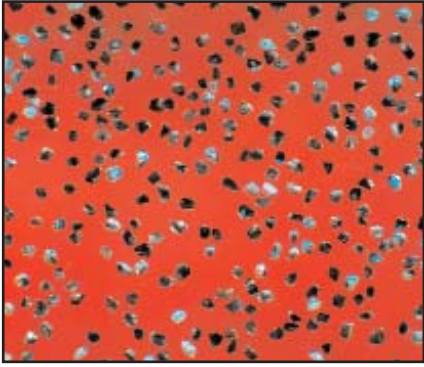
Optical microscope Zeiss equipped with high-resolution CCD Camera and special computer Measurement Software VideoTest allows controlling precise size and shape distribution of grains. This is quite a slow method, featuring high accuracy of measuring and visual monitoring of samples micron powder.



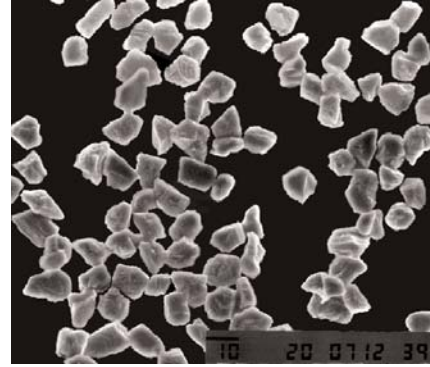
Class Name	Average	Min	Max	Count	Count %	Median
Class 1	0.000	?	?	0	0.000	0.000
Class 2	0.000	?	?	0	0.000	0.000
Class 3	0.000	?	?	0	0.000	0.000
Class 4	9.950	9.950	9.950	13	3.381	9.950
Class 5	10.453	10.453	10.453	13	3.381	10.453
Class 6	10.752	10.698	10.806	26	7.163	10.698
Class 7	11.419	11.228	11.498	70	18.284	11.458
Class 8	11.791	11.520	11.986	110	30.303	11.819
Class 9	12.262	12.052	12.357	65	17.906	12.331
Class 10	12.767	12.558	12.951	54	14.876	12.797
Class 11	13.197	13.107	13.287	12	3.306	13.107
Class 12	0.000	?	?	0	0.000	0.000
Class 13	0.000	?	?	0	0.000	0.000
Class 14	0.000	?	?	0	0.000	0.000
Class 15	0.000	?	?	0	0.000	0.000
Class 16	0.000	?	?	0	0.000	0.000
Total	11.807	9.950	13.287	383	100.000	11.898



CBN Micron Powder

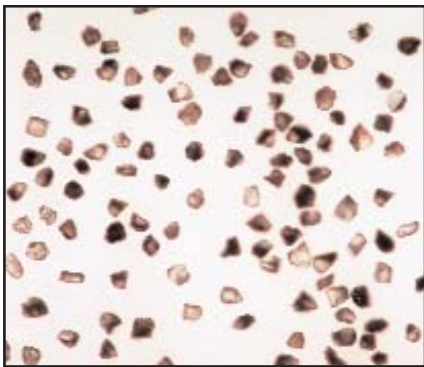


CBN HM1

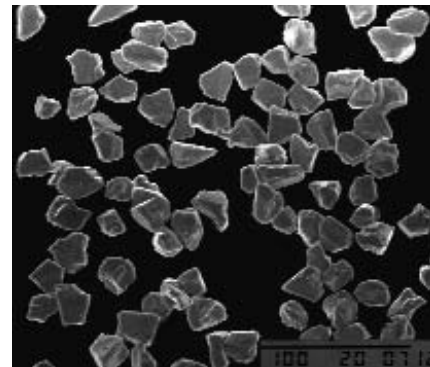


CBN HM1

Haris Division supplies 2 types of CBN micron powder - of black and amber color. CBN HM1 is a derivative product from CBN H200 mesh size. Angular shapes of grains promote high abrasive properties of powder, which is good for high specific removal rates. Variant CBN HM1 60N with Ni 60% coating is offered for resin bond. CBN HM2 is a derivative from CBN H500 with the amber color. Grain shape of this micron-size powder is more regular, than that of CBN HM1. High degree of chemical homogeneity and minimal inclusion of CBN H500 dashes, as a basic material, endow CBN HM2 with hardness and thermal stability. These properties make CBN HM2 popular in using it for sintering plates of PCBN for blade tools. CBN HM1 and HM2 are used for finish grinding and super-finishing applications, as well as for fine-grinding, finishing and polishing of hardened steels, super-alloys and other metal materials and abrasive pastes and emulsions also.



CBN HM2



CBN HM2

Comparative spectrographic analysis of basic chemical content of samples of two types of CBN Micron. Spectral foldover of CBN HM1 and CBN HM2 is made on roentgen fluorescent spectrometer BAIRD EX-6500.

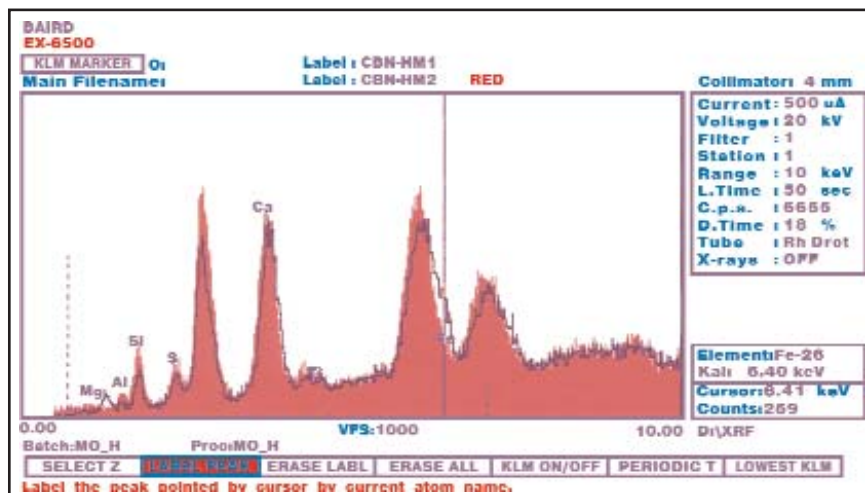


Table of size availability.

	MICRON SIZE, μm *	MEDIAN SIZE, μm	MDN natural diamond	MDR	MDR 56N	MDM	CBN HM1	CBN HM1 60N	CBN HM2	MDP polycrystalline detonation	
Fine-Grinding	40 - 60	50.00	•	•	•	•	•	•	•		
	36 - 54	45.00				•			•		
	30 - 40	35.00				•	•	•	•		
	20 - 40	30.00	•	•	•	•	•	•	•		
	22 - 36	29.00				•					
Lapping	20 - 30	25.00	•	•	•	•	•	•	•		
	15 - 30	22.00	•	•	•		•	•			
	12 - 22	17.00	•	•	•	•					
	10 - 20	15.00	•	•	•	•			•		
	10 - 15	12.50				•					
	8 - 15	11.50	•	•	•	•			•		
	6 - 12	8.50	•	•		•	•		•		
	5 - 10	7.00				•	•		•		
	4 - 8	6.00	•	•		•	•		•		
	4 - 6	5.00	•	•		•					
Polishing	3 - 6	4.50	•	•		•					
	3 - 5	4.00				•					
	2 - 6	4.00	•	•					•		
	2 - 5	3.50				•					
	2 - 4	3.00	•	•		•	•		•		
	1.5 - 3	2.40	•	•		•					
	0.5 - 3	1.75	•	•			•		•		
	0 - 2	1.00	•	•		•	•		•	•	
	SUBMICRON SIZE, μm										
	0.5 - 1.5	1.00	•	•		•					•
	0.75 - 1.25	1.00		•							•
	0.5 - 1	0.75	•	•		•	•		•		•
	0.5 - 0.75	0.65	•	•							•
	0 - 1	0.50	•	•		•					•
	0.25 - 0.75	0.50		•							•
	0.25 - 0.5	0.35		•							•
	0 - 0.5	0.25	•	•		•					•
	0 - 0.25	0.13	•	•		•					•

* other sizes are made on customers request

Operational characteristics of micron powder.

Micron Size Range	Abrasive ability, not less than	Surface roughness parameter R_a , μm	
		before processing	after processing
0-0.5	-	0.019	0.013
0-1	-	0.025	0.020
1-2	-	0.032	0.023
2-3	1.8	0.040	0.030
3-5	2.0	0.050	0.038
5-7	2.8	0.063	0.045
7-10	3.3	0.080	0.060
10-14	3.8	0.100	0.075
14-20	4.2	0.125	0.095
20-30	4.3	0.160	0.120
30-40	4.3	0.200	0.155
40-60	4.4	0.400	0.195

Tab 2.



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