



**MAKING A MATERIAL DIFFERENCE**

**CARBORUNDUM UNIVERSAL LIMITED  
ELECTRO MINERALS**



## CARBORUNDUM UNIVERSAL LIMITED

**Carborundum Universal Limited (CUMI)**, established as a tripartite joint venture in 1954, is a leading materials sciences engineering solutions provider. CUMI's consolidated revenue is ₹ 3300 crores and PAT of ₹ 333 crores for the financial year 2022. CUMI, part of the 120-year-old Murugappa Group, is listed on the NSE and BSE.

CUMI is a Mines to Market Company whose integrated operations include mining, power generation, fusion, manufacturing, marketing, and distribution. CUMI has over **5,000** employees worldwide who collaborate, innovate and develop high-quality material solutions and world-class services in abrasives, electrominerals, ceramics, refractories and energy storage materials, serving customers in diverse industries including engineering, fabrication, auto and auto components, infrastructure, steel, glass, power generation and distribution, mining and aerospace. CUMI has a wide geographical presence spanning five continents and exports products to over **50 countries**.

### CUMI MINERALS

Electro Minerals Division of CUMI (CUMI Minerals) provides tailor-made solutions in the fused and sintered minerals to various industries such as Abrasives, Refractories, Ceramics, Blasting, Metal Composites etc.

#### CUMI MINERALS' PRODUCT RANGE

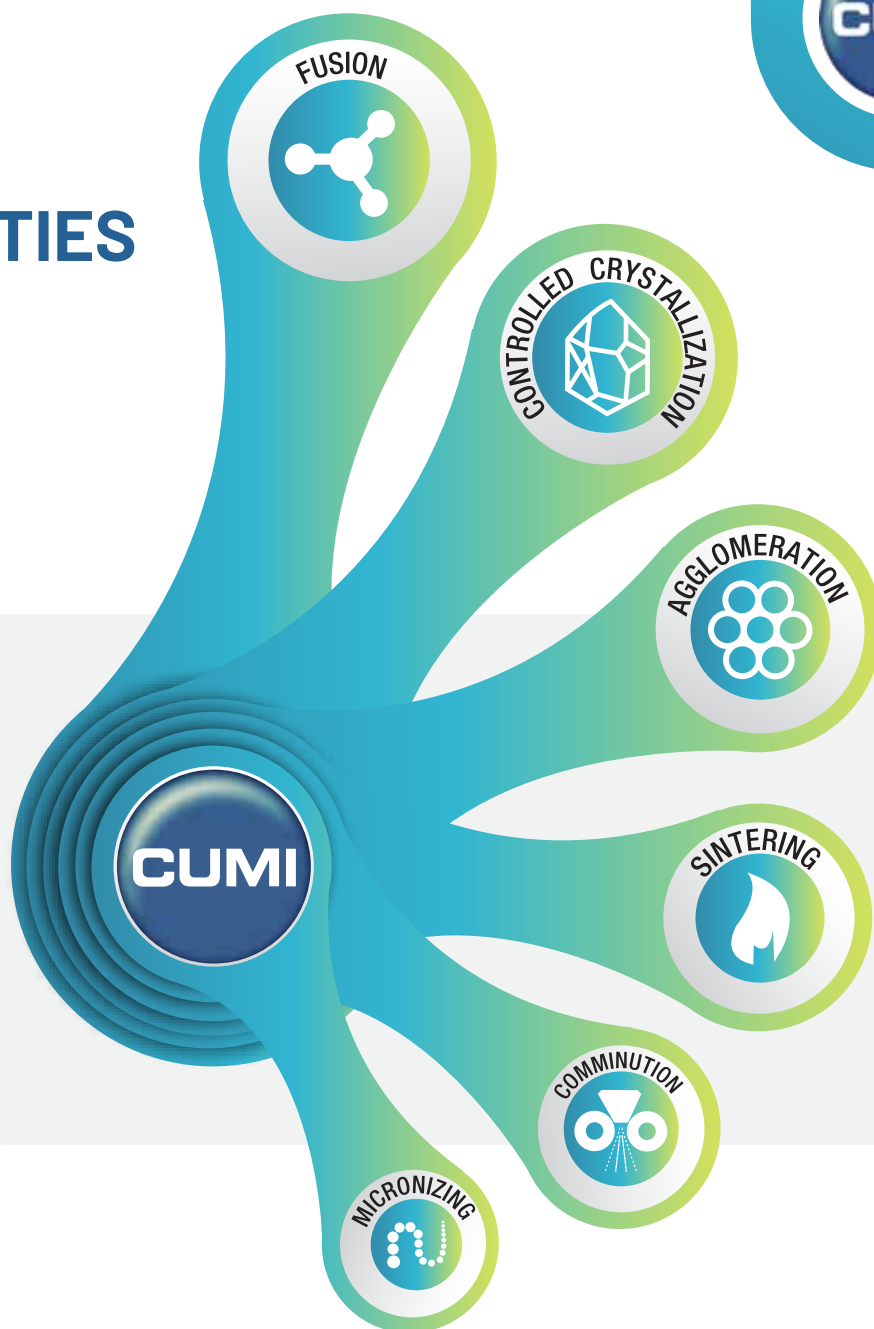
Brown Fused Alumina  
White Fused Alumina  
Silicon Carbide  
Treated Grains  
Graphene

Semi-Friable Alumina  
Monoclinic Zirconia  
Sintered Ceramic Grains  
Alumina Zirconia  
Thermal Spray Powders



**For more details, visit**  
[www.cumi-minerals.com](http://www.cumi-minerals.com)

# OUR CAPABILITIES



# Brown Fused Alumina - MAX

## ABR MAX for Resin Bonded Abrasives

# CUMI **SHARP**

ABR MAX (ABR M) is brown corundum produced by controlled fusion of special high grade raw materials in an electric arc furnace. The process parameters ensure a product of consistent quality and good toughness



### Characteristic

Color	Brown
Phase	$\alpha$ - $\text{Al}_2\text{O}_3$
Knoop Hardness	2100 kg / mm <sup>2</sup>
Shape	Blocky

### Physical properties

#### Typical chemistry, Wt%

Grit Size	F60
$\text{Al}_2\text{O}_3$	95.45 %
$\text{TiO}_2$	2.75 %
$\text{SiO}_2$	0.65 %
$\text{Fe}_2\text{O}_3$	0.22 %
Other Oxides	0.85 %

\*The composition mentioned above is that of the base grain only

### Application

- Brown Fused Alumina ABR MAX Grits (F) is especially designed for manufacturing of bonded organic abrasives products like, Snagging wheels, DC wheels and Cut-off wheels.

### Packing and brands

25 kg / 50 kg bags &  
1 MT jumbo bags (big-bags)  
Custom packing can be offered on request.

Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>
F12	1.86 - 2.00
F14	1.87 - 2.00
F16	1.87 - 2.00
F20	1.84 - 1.96
F24	1.84 - 1.94
F30	1.80 - 1.90
F36	1.79 - 1.89
F40	1.79 - 1.89
F46	1.77 - 1.87
F54	1.74 - 1.84
F60	1.70 - 1.80
F80	1.65 - 1.75
F90	1.63 - 1.73
F100	1.60 - 1.70
F120	1.57 - 1.67
F150	1.54 - 1.62
F180	1.50 - 1.58
F220	1.48 - 1.56



● Loose bulk density tested as per FEPA standard 44-2:2006

● Particle size distribution tested as per FEPA standard 42-2:2006

Typical specification only for illustrative purposes. Specifications vary with specific application requirements  
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# Brown Fused Alumina - MAX

## ABV MAX for Vitrified Bonded Abrasives

# CUMI **SHARP**

ABV MAX (ABV M) is brown corundum produced by controlled fusion of special high grade raw materials in an electric arc furnace. The process parameters ensure a product of consistent quality and good toughness. The grains are magnetic separated for extremely low free iron content making it suitable for vitrified abrasive applications.



### Characteristic

Color	Brown
Phase	$\alpha$ - $\text{Al}_2\text{O}_3$
Knoop Hardness	2100 kg / $\text{mm}^2$
Shape	Blocky

### Physical properties

#### Typical chemistry, Wt%

Grit Size	F60
$\text{Al}_2\text{O}_3$	96.2 %
$\text{TiO}_2$	2.70 %
$\text{SiO}_2$	0.60 %
$\text{Fe}_2\text{O}_3$	0.12 %
Other Oxides	0.35 %

\*The composition mentioned above is that of the base grain only

### Application

- Low iron content of ABV MAX makes it more suitable for vitrified bonded abrasives like, Centerless wheels, crankshaft grinding wheels and ball grinding wheels.

### Packing and brands

25 kg / 50 kg bags &

1 MT jumbo bags (big-bags)

Custom packing can be offered on request.

#### Grit sizes

Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>
F12	1.88-2.06
F14	1.88-2.06
F16	1.86-2.04
F20	1.84-2.02
F24	1.82-2.00
F30	1.82-1.96
F36	1.80-1.93
F40	1.78-1.92
F46	1.78-1.90
F54	1.78-1.88
F60	1.70-1.82
F80	1.65-1.75
F90	1.63-1.73
F100	1.60-1.70
F120	1.57-1.67
F150	1.54-1.62
F180	1.50-1.58
F220	1.48-1.55



- Loose bulk density tested as per FEPA standard 44-2:2006  
Particle size distribution tested as per FEPA standard 42-2:2006

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# Brown Fused Alumina - MAX

## AC MAX for Coated Abrasives

# CUMI **SHARP**

AC MAX is a brown corundum produced by controlled fusion of special high grade raw materials in an electric arc furnace. The process parameters ensure a product of consistent quality and good toughness.



### Characteristic

Color	Brown
Phase	$\alpha$ - $\text{Al}_2\text{O}_3$
Knoop Hardness	2100 kg / $\text{mm}^2$
Shape	Angular

### Physical properties

#### Typical chemistry, Wt%

Grit Size	P 60
$\text{Al}_2\text{O}_3$	95.53 %
$\text{TiO}_2$	2.75 %
$\text{SiO}_2$	0.65 %
$\text{Fe}_2\text{O}_3$	0.22 %
Other Oxides	0.85 %

\*The composition mentioned above is that of the base grain only

#### Application

- Brown Fused Alumina AC MAX Grits (P) is especially designed for manufacturing of coated abrasive products like belts, discs and sheets.

Grit sizes	Loose Bulk Density, $\text{g}/\text{cm}^3$
P12	1.85 - 1.93
P16	1.85 - 1.93
P20	1.83 - 1.91
P24	1.79 - 1.87
P30	1.77 - 1.85
P36	1.72 - 1.80
P40	1.68 - 1.76
P50	1.68 - 1.76
P60	1.65 - 1.75
P80	1.65 - 1.75
P100	1.62 - 1.70
P120	1.52 - 1.60
P150	1.52 - 1.60
P180	1.48 - 1.56
P220	1.40 - 1.50



#### Packing and brands

25 kg / 50 kg bags &  
1 MT jumbo bags (big-bags)  
Custom packing can be offered on request.

- Loose bulk density tested as per FEPA standard 44-2:2006

- Particle size distribution tested as per FEPA standard 43-2:2006

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# Semifriable Alumina

## SFB for Bonded Abrasives

# CUMI SHARP

Semi friable alumina is brown corundum produced by controlled fusion of special grade alumina with other raw materials in an electric arc furnace. The process parameters ensure a product of consistent quality and intermediate toughness between that of white and brown corundum.



### Characteristic

Color	Brown
Phase	$\alpha$ - $\text{Al}_2\text{O}_3$
Knoop Hardness	2100 kg / $\text{mm}^2$
Shape	Blocky
Melting Point	2050°C

### Physical properties

#### Typical chemistry, Wt%

Grit Size	F 60
$\text{Al}_2\text{O}_3$	98.30 %
$\text{TiO}_2$	1.58 %
$\text{SiO}_2$	0.04 %
$\text{Fe}_2\text{O}_3$	0.04 %
CaO	0.02 %

\*The composition mentioned above is that of the base grain only

### Application

- Semi friable F grit is a fast cool cutting grain which is particularly suitable for grinding and cutting tough, heat-sensitive steels and non-ferrous metals. It is a preferred grain for gear grinding wheels and ID wheels.

### Packing and brands

25 kg / 50 kg bags &  
1 MT jumbo bags (big-bags)  
Custom packing can be offered on request.

Grit sizes	Loose Bulk Density, $\text{g/cm}^3$
F12	1.86-2.00
F14	1.85-1.95
F16	1.85-1.95
F20	1.82-1.92
F24	1.81-1.91
F30	1.80-1.90
F36	1.78-1.88
F40	1.77-1.87
F46	1.77-1.87
F54	1.76-1.86
F60	1.73-1.83
F80	1.67-1.77
F100	1.59-1.69
F120	1.57-1.67
F150	1.58-1.68
F180	1.53-1.63
F220	1.50-1.60



- Loose bulk density tested as per FEPA standard 44-2:2006

- Particle size distribution tested as per FEPA standard 42-2:2006

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# Semi Friable Alumina

## SFC for Coated Abrasives

# CUMI SHARP

Semi friable alumina is brown corundum produced by controlled fusion of special grade calcined alumina with other raw materials in an electric arc furnace. The process parameters ensure a product of consistent quality and intermediate toughness between that of white and brown corundum.

### Characteristics

Product Characteristics	CUMISHARP SFC
Color	Brown
Phase	$\alpha$ - $Al_2O_3$
Shape	Angular with sharp edges
Hardness (Knoop)-Typical	2100 kg/mm <sup>2</sup> @ 100 gm



### Physical properties

Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>
P12	1.87-2.02
P14	1.85-2.00
P16	1.83-1.98
P20	1.80-1.95
P24	1.80-1.88
P30	1.78-1.86
P36	1.79-1.87
P40	1.78-1.86
P50	1.75-1.83

Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>
P60	1.73-1.81
P80	1.67-1.75
P100	1.63-1.73
P120	1.59-1.67
P150	1.56-1.64
P180	1.54-1.62
P220	1.52-1.58



- Loose bulk density tested as per FEPA standard 44-1|2006
- Particle size distribution tested as per FEPA standard 43-1|2006

### Typical chemistry, wt%

Grit Size	$Al_2O_3$	$TiO_2$	$Fe_2O_3$	$SiO_2$	CaO
P60	98.3%	1.58%	0.04%	0.04%	0.02%

### Packing and brands

25 kg / 50 kg bags & 1MT jumbo bags (big-bags),  
Custom packing can be offered on request

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# Blue Fired Semi Friable Alumina

## BSFB for Bonded Abrasives

# CUMISHARP

Blue Fired Semi Friable Alumina is a specially heat treated grain manufactured by a close control process. The heat treatment process brings a structural blue phase, imparting maximum toughness and durability.

The product is more suitable for aggressive cool-cutting applications and is ideal for heat-sensitive steels, metals, and alloys.

### Characteristics



Product Characteristics	CUMISHARP BSFB
Color	Blue
Phase	$\alpha$ - $Al_2O_3$
Shape	Blocky
Hardness (Knoop)-Typical	2150 kg/mm <sup>2</sup> @50 gm

### Physical properties

Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>
F12	1.82 -2.02
F14	1.8 5-1.97
F16	1.85 -1.95
F20	1.82 -1.92
F24	1.81 -1.91
F30	1.80 -1.90
F36	1.78 -1.88
F40	1.77 -1.87
F46	1.77 -1.87

- Loose bulk density tested as per FEPA standard 44 1:2006

Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>
F54	1.76 -1.86
F60	1.73 -1.83
F80	1.67 -1.77
F90	1.66 -1.76
F100	1.59 -1.69
F120	1.58 -1.68
F150	1.58 -1.68
F180	1.53 -1.63
F220	1.50 -1.58

- Particle size distribution tested as per FEPA standard 42-1:2006



### Typical chemistry, wt%

Grit Size	$Al_2O_3$	$TiO_2$	$Fe_2O_3$	$SiO_2$	CaO
F60	98.2%	1.52%	0.10%	0.08%	0.03%

### Packing and brands

25 kg / 50 kg bags & 1 MT jumbo bags (big-bags).  
Custom packing can be offered on request

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# Blue Fired Semi Friable Alumina

## BSFC for Coated Abrasives

# CUMISHARP

Blue Fired Semi Friable Alumina is a specially heat treated grain manufactured by a close control process. The heat treatment process brings a structural blue phase, imparting maximum toughness and durability. The product is more suitable for aggressive cool-cutting applications.

### Characteristics

Product Characteristics	CUMISHARP BSFC
Color	Blue
Phase	$\alpha$ - $\text{Al}_2\text{O}_3$
Shape	Angular with sharp edges
Hardness (Knoop)-Typical	2150 kg/mm <sup>2</sup> @100 gm



### Physical properties

Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>
P12	1.87-2.02
P14	1.86-2.01
P16	1.85-2.00
P20	1.83-1.98
P24	1.80-1.90
P30	1.78-1.88
P36	1.78-1.88
P40	1.78-1.88
P50	1.87-2.02

Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>
P60	1.73-1.83
P80	1.68-1.78
P100	1.62-1.72
P120	1.57-1.67
P150	1.54-1.64
P180	1.53-1.63
P220	1.51-1.61



- Loose bulk density tested as per FEPA standard 44-1:2006
- Particle size distribution tested as per FEPA standard 43-1:2006

### Typical chemistry, wt%

Grit Size	$\text{Al}_2\text{O}_3$	$\text{TiO}_2$	$\text{Fe}_2\text{O}_3$	$\text{SiO}_2$	CaO
P60	98.2%	1.52%	0.10%	0.08%	0.03%

### Packing and brands

25 kg / 50 kg bags & 1 MT jumbo bags (big-bags).  
Custom packing can be offered on request

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# White Fused Alumina

## WB for Bonded Abrasives

# CUMI **SHARP**

White Fused Alumina oxide (WB) is obtained by the fusion of high purity Alumina in an electric arc furnace. WB is characterized with high purity, large crystal size and high hardness yet friable. It provides faster cutting action and a cool cut.



### Characteristic

Color	White
Phase	$\alpha$ - $\text{Al}_2\text{O}_3$
Shape	Blocky with sharp edges
Hardness (Knoop) - Typical	2150 kg/mm <sup>2</sup>
Phase	$\alpha$ - $\text{Al}_2\text{O}_3$

### Physical properties

#### Typical chemistry, Wt%

Grit Size	F 60
$\text{Al}_2\text{O}_3$	99.50 % Min.
$\text{TiO}_2$	0.01 %
$\text{SiO}_2$	0.02 %
$\text{Fe}_2\text{O}_3$	0.03 %
$\text{Na}_2\text{O}$	0.32 %

\*The composition mentioned above is that of the base grain only

### Application

- White fused alumina F grits are mainly used in bonded applications like, Crankshaft grinding, ID grinding, Track grinding and gear grinding & Thin wheels.

### Packing and brands

25 kg / 50 kg bags &  
1 MT jumbo bags (big-bags)  
Custom packing can be offered on request.

Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>
F12	1.68-1.78
F14	1.70-1.80
F16	1.67-1.77
F20	1.68-1.78
F22	1.70-1.80
F24	1.70-1.80
F30	1.70-1.80
F36	1.69-1.79
F40	1.69-1.79
F46	1.71-1.81
F54	1.69-1.79
F60	1.67-1.77
F80	1.63-1.73
F90	1.59-1.69
F100	1.55-1.65
F120	1.53-1.63
F150	1.49-1.59
F180	1.46-1.56
F220	1.45-1.55



● Loose bulk density tested as per FEPA standard 44-2:2006

● Particle size distribution tested as per FEPA standard 42-2:2006

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# White Fused Alumina WC for Coated Abrasives

## CUMI SHARP

White Fused Alumina oxide (WC) is obtained by the fusion of high purity Bayer alumina in an electric arc furnace. WC is characterized with high purity, large crystal size and high hardness yet friable. It provides faster cutting action and a cool cut, due to its friable nature making WC a preferred grain for coated applications.

### Characteristics

Product Characteristics	CUMISHARP WC
Color	White
Phase	$\alpha$ - $Al_2O_3$
Shape	Angular with sharp edges
Hardness (Knoop)-Typical	2150 kg/mm <sup>2</sup> @ 100 gm



### Physical properties

Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>
P12	1.65-1.80
P20	1.65-1.80
P24	1.65-1.80
P30	1.60-1.80
P36	1.60-1.80
P40	1.60-1.80
P50	1.60-1.80
P60	1.60-1.80
P80	1.58-1.73

Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>
P100	1.50-1.65
P120	1.48-1.63
P150	1.45-1.60
P180	1.42-1.60
P220	1.40-1.58



- Loose bulk density tested as per FEPA standard 44-1|2006
- Particle size distribution tested as per FEPA standard 43-1|2006

### Typical chemistry, wt%

Grit Size	$Al_2O_3$	$TiO_2$	$Fe_2O_3$	$SiO_2$	$Na_2O$
P60	99.35%	0.004%	0.02%	0.025%	0.02%

### Packing and brands

25 kg / 50 kg bags & 1MT jumbo bags (big-bags),  
Custom packing can be offered on request

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## Great White Fused Alumina GWB for Bonded Abrasives

Great White, a superior variant of White Fused Alumina (WFA), is a high pure fused material manufactured in electric arc fusion furnace, using selective grade of Bayer alumina. Pore free microstructure of this variant imparts better grain properties suitable for abrasive applications such as Thin Wheels and Coated Abrasives.

### Characteristics

Parameter	CUMI GREAT WHITE
Color	White
Phase	$\alpha$ - $\text{Al}_2\text{O}_3$
Shape	Blocky for Bonded application
Hardness (Knoop) - Typical	2150 kg/mm <sup>2</sup> @ 100gm



### Physical properties

For Bonded Application - F Grits

Grit sizes	Loose Bulk Density (g/cm <sup>3</sup> )
F14	1.78 - 1.95
F16	1.78 - 1.95
F20	1.78 - 1.95
F24	1.80 - 1.90
F30	1.78 - 1.90
F36	1.79 - 1.89
F46	1.77 - 1.87
F54	1.74 - 1.84
F60	1.70 - 1.80
F80	1.71 - 1.81

Loose bulk density tested as per FEPA standard 44-1:2006.

Particle size distribution tested as per FEPA standard 42-1:2006



### Typical chemistry, wt%

Grit Size	$\text{Al}_2\text{O}_3$	$\text{TiO}_2$	$\text{SiO}_2$	$\text{Fe}_2\text{O}_3$	$\text{Na}_2\text{O}$
F60	99.56%	0.01%	0.04%	0.036%	0.33%

### Packing and brands

25 kg / 50 kg bags & 1 MT jumbo bags (big-bags). Custom packing can be offered on request.

# Black Silicon Carbide

## SBB for Bonded Abrasives

# CUMI **SHARP**

Black Silicon Carbide is manufactured from high purity quartz and coke, and fused in a resistance furnace under controlled conditions for purity and crystalline structure.



### Characteristic

Color	Black
Phase	$\alpha$ - SiC
Knoop Hardness	2480 kg / mm <sup>2</sup>
Thermal conductivity	100 Wm <sup>-1</sup> K <sup>-1</sup> @ 25°C
Modulus of Elasticity	410 GPa

### Typical chemistry

Grit Size	F 24
SiC	98.36 %
f-Si	0.32 %
f-SiO <sub>2</sub>	0.50 %
Fe <sub>2</sub> O <sub>3</sub>	0.22 %
f-C	0.31 %
Al <sub>2</sub> O <sub>3</sub>	0.20 %

\*The composition mentioned above is that of the base grain only

### Application

- Black Silicon Carbide Bonded grains is suitable for grinding hard or brittle materials like cast iron, ceramics and glass. It is also used for grinding low tensile strength, ductile non-ferrous materials.

### Packing and brands

25 kg / 50 kg bags &

1 MT jumbo bags (big-bags)

Custom packing can be offered on request.

### Physical properties

Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>
F12	1.46-1.56
F14	1.48-1.58
F16	1.48-1.58
F20	1.48-1.58
F24	1.49-1.59
F30	1.49-1.59
F36	1.49-1.59
F46	1.49-1.59
F54	1.49-1.59
F60	1.49-1.59
F70	1.48-1.58
F80	1.47-1.57
F90	1.41-1.51
F100	1.45-1.55
F120	1.42-1.52
F150	1.40-1.50
F180	1.37-1.47
F220	1.37-1.47



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# Black Silicon Carbide

## SBC for Coated Abrasives

# CUMI **SHARP**

Black Silicon Carbide is manufactured from high purity quartz and coke, and fused in a resistance furnace under controlled conditions for purity and crystalline structure. They are also used on paper, fiber, or cloth backing and with a glue or resin adhesive. The grain shape is designed to impart high projectability when electrostatically coated.



### Characteristic

Color	Black
Phase	$\alpha$ - SiC
Knoop Hardness	2480 kg / mm <sup>2</sup>
Thermal conductivity	100 Wm <sup>-1</sup> K <sup>-1</sup> @ 25°C
Modulus of Elasticity	410 GPa

### Physical properties

### Typical chemistry

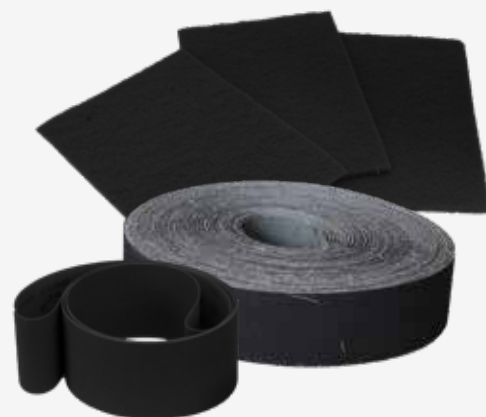
Grit Size	P 50
SiC	98.20 %
f-Si	0.40 %
f-SiO <sub>2</sub>	0.51 %
Fe <sub>2</sub> O <sub>3</sub>	0.26 %
f-C	0.26 %
Al <sub>2</sub> O <sub>3</sub>	0.20 %

\*The composition mentioned above is that of the base grain only

### Application

- Black Silicon Carbide coated grains is used in the manufacture of coated abrasives for high speed, high tensile strength, and heavy duty automated applications in the metals industry.

Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>
P12	1.38 - 1.53
P14	1.39 - 1.53
P16	1.40 - 1.53
P20	1.42 - 1.53
P24	1.43 - 1.53
P30	1.44 - 1.54
P36	1.45 - 1.55
P40	1.45 - 1.55
P50	1.45 - 1.55
P60	1.45 - 1.55
P80	1.44 - 1.54
P100	1.43 - 1.53
P120	1.40 - 1.50
P150	1.36 - 1.46
P180	1.31 - 1.41
P220	1.26 - 1.36



### Packing and brands

25 kg / 50 kg bags & 1 MT jumbo bags (big-bags)  
Custom packing can be offered on request.

Typical specification only for illustrative purposes. Specifications vary with specific application requirements  
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# **SPECIALITY MINERALS**





## Alumina Zirconia 40% AZ40 for Bonded Abrasives

Alumina Zirconia 40% (Marlin AZ40) manufactured by a highly controlled solidification route using electric arc furnace. This process creates regular eutectic microstructures containing alternate alumina and zirconia, and novel "cube shaped" eutectic crystals. This novel microstructures are introduced for the first time in the abrasive industry to improve the overall abrasive performance of the grain.



### Characteristics

Color	Grey
Phase	Lamellar layers of toughened zirconia in alpha alumina matrix
Vickers Hardness (Typical)	19.0 GPa @ 50 g load
True density (Typical)	4.75 g / cc

### Physical properties

#### Typical chemistry, wt%

Grit Size	F 24
Al <sub>2</sub> O <sub>3</sub>	55.20 %
ZrO <sub>2</sub>	41.30 %
SiO <sub>2</sub>	0.30 %
Fe <sub>2</sub> O <sub>3</sub>	0.08 %
Others	< 3 %

\*The composition mentioned above is that of the base grain only

Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>	Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>
F20	1.98 -2.22	F80	1.80 -2.08
F24	1.96 -2.20	F100	1.80 -2.08
F30	1.95 -2.19	F120	1.80 -2.08
F36	1.95 -2.19	F150	1.80 -2.08
F46	1.90 -2.14	F180	1.80 -2.08
F54	1.86 -2.10	F220	1.80 -2.08
F60	1.84 -2.08		

• Loose bulk density tested as per FEPA standard 44-2:2006

• Particle size distribution tested as per FEPA standard 42-2:2006

### Application

MARLIN is extensively used in resin bonded grinding and cut off wheels for superior performance. It is highly preferred for grinding of chromium alloys.

**A special surface coating available for superior performance of Marlin grains**

### Packing

25 kg / 50 kg bags &

1 MT jumbo bags (big-bags)

Custom packing can be offered on request

### Alumina Zirconia 25% (AZ25) for Bonded Abrasives

Characteristics	AZ25
Colour & Shape	Greyish Brown & Blocky
Phase	Uniform distribution of tetragonal Zirconia in alumina matrix
Vickers Hardness (Typical)	20.5 GPa @ 50 g load
True Density	4.30 g/cc

#### Typical chemistry, wt%

Product	Al <sub>2</sub> O <sub>3</sub>	ZrO <sub>2</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	Others
AZ25	75.10%	23.50%	0.30%	0.08%	<3%

Typical specification only for illustrative purposes. Specifications vary with specific application requirements. The data presented in this specification sheet are confidential and must not be disclosed to any other parties without the written consent of Carborundum Universal Limited (CUMI).  
US Patent no. 5782940, 5858037 & 6104015;

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## Alumina Zirconia 40% AZ40 for Coated Abrasives

Alumina Zirconia 40% (Marlin) manufactured by a highly controlled solidification route using electric arc furnace. This process creates regular eutectic microstructures containing alternate alumina and zirconia, and novel "cube shaped" eutectic crystals. This novel microstructures are introduced for the first time in the abrasive industry to improve the overall abrasive performance of the grain



### Characteristics

Color	Grey
Phase	Lamellar layers of toughened zirconia in alpha alumina matrix
Vickers Hardness (Typical)	19.0 GPa @ 50 g load
True density (Typical)	4.75 g / cc

### Physical properties

Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>
P20	1.94 -2.22
P24	1.92 -2.20
P30	1.91 -2.19
P36	1.91 -2.19
P40	1.84 -2.12
P50	1.82 -2.10
P60	1.82 -2.10
P80	1.80 -2.08
P100	1.80 -2.08
P120	1.80 -2.08
P150	1.80 -2.08
P180	1.80 -2.08
P220	1.80 -2.08



### Typical chemistry, wt%

Grit Size	P 24
Al <sub>2</sub> O <sub>3</sub>	55.20 %
ZrO <sub>2</sub>	41.30 %
SiO <sub>2</sub>	0.30 %
Fe <sub>2</sub> O <sub>3</sub>	0.08 %
Others	< 3 %

\*The composition mentioned above is that of the base grain only

### Application

MARLIN P grits are extensively used in coated abrasives for high-end applications.

**A special surface coating available for superior performance of Marlin grains**

• Loose bulk density tested as per FEPA standard 44-2:2006

• Particle size distribution tested as per FEPA standard 42-2:2006

### Packing

25 kg / 50 kg bags &  
1 MT jumbo bags (big-bags)  
Custom packing can be offered on request

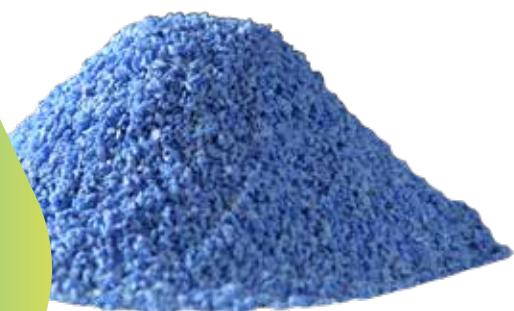
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US Patent no. 5782940, 5858037 & 6104015;

# AZURE S IIA

## for Bonded and Coated Abrasives



Azure-S II / IIA is a sintered alumina abrasive. It is manufactured by our patented state-of-the-art sol-gel technology. Sintered alumina abrasive is a well known for its high performance and unique fracture characteristic. It performs better in high pressure application and also withstands severe application condition. It also provides cooler cutting and longer life. All these parameters make it as a unique choice for abrasive manufacturers.



### Characteristics

Color	Blue
Specific gravity	3.96
Hardness	2200-2500 kg / mm <sup>2</sup>
Fracture Toughness	3.9 – 4.5 MPa*m <sup>1/2</sup>
Melting point	2050°C

### Physical properties

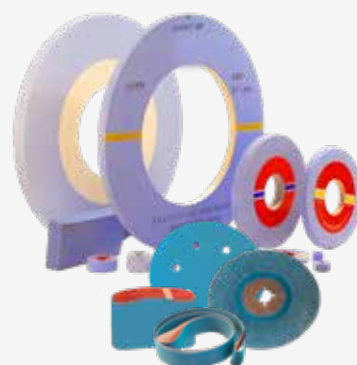
#### Typical chemistry, wt%

Grit Size	F 60
Al <sub>2</sub> O <sub>3</sub>	96 – 99 %
MgO	0.5 – 1.5 %
Others (special additives)	0.5 – 2.5 %

- ✓ Uniform microstructure
- ✓ Submicron crystal in the matrix
- ✓ High hardness
- ✓ Moderate toughness
- ✓ Self-sharpening property
- ✓ Cooler cutting
- ✓ Consistent performance
- ✓ Longer life

This product is used in a wide variety of grinding application, including high pressure grinding of metal forging, precision grinding of bearing surfaces, sanding of painted surfaces and wooden surfaces, precision polishing of camshafts etc

Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>	Grit sizes	Loose Bulk Density, g/cm <sup>3</sup>
F16	1.81 - 1.93	P16	1.81 - 1.93
F20	1.80 - 1.92	P20	1.80 - 1.92
F24	1.78 - 1.90	P24	1.78 - 1.90
F30	1.77 - 1.89	P30	1.77 - 1.89
F36	1.77 - 1.89	P36	1.77 - 1.89
F40	1.75 - 1.87	P40	1.75 - 1.87
F46	1.75 - 1.87	P50	1.72 - 1.84
F54	1.72 - 1.84	P60	1.70 - 1.82
F60	1.70 - 1.82	P80	1.68 - 1.80
F80	1.67 - 1.79	P100	1.66 - 1.78
F100	1.65 - 1.77	P120	1.65 - 1.77
F120	1.63 - 1.75	P150	1.65 - 1.77
F150	1.63 - 1.75	P180	1.65 - 1.77
F180	1.63 - 1.75	P220	1.65 - 1.77
F220	1.63 - 1.75		



● Loose bulk density tested as per FEPA standard 44-2:2006

● Particle size distribution tested as per FEPA standard 42-2:2006

### Packing and brands

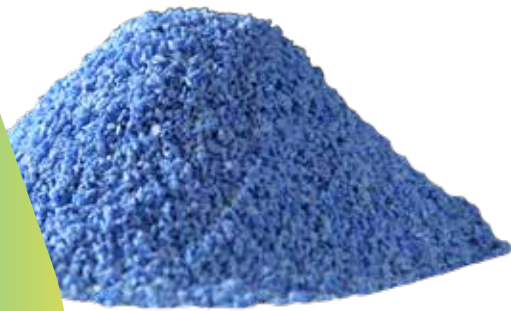
25 kg / 50 kg box  
Custom packing can be offered on request

Typical specification only for illustrative purposes. Specifications vary with specific application requirements. The data presented in this specification sheet are confidential and must not be disclosed to any other parties without the written consent of Carborundum Universal Limited (CUMI).  
US Patent no. 5782940, 5858037 & 6104015;

# AZURE S NEO for Bonded and Coated Abrasives



AzureS Neo is a Sintered Ceramic Alumina abrasives grain. Our patented state-of-the-art process manufactures it through sol-gel technology. This grade of sintered alumina abrasive grain is well known for its high performance and unique fracture characteristic. It performs better in high-pressure applications and withstands other severe application conditions. It also provides cooler cutting and longer life. All of these make this grain a unique choice for bonded and coated abrasives manufacturers.

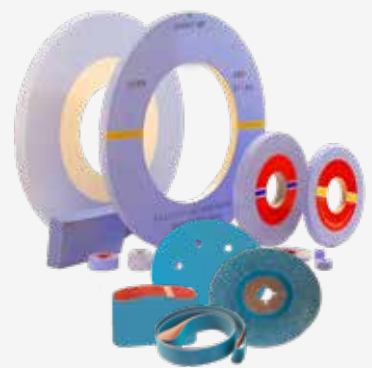


## Characteristics

Color	Blue
Specific gravity	3.90-3.91
Hardness	2000-2100 kg / mm <sup>2</sup>
Fracture Toughness	4.3 – 4.7 MPa*m <sup>1/2</sup>
Melting point	2050°C

## Physical properties

Grit sizes	Loose Bulk Density (g/cc)	Grit sizes	Loose Bulk Density (g/cc)
F16	1.81 - 1.93	P16	1.81 - 1.93
F20	1.80 - 1.92	P20	1.80 - 1.92
F24	1.78 - 1.90	P24	1.78 - 1.90
F30	1.77 - 1.89	P30	1.77 - 1.89
F36	1.77 - 1.89	P36	1.77 - 1.89
F40	1.75 - 1.87	P40	1.75 - 1.87
F46	1.75 - 1.87	P50	1.72 - 1.84
F54	1.72 - 1.84	P60	1.70 - 1.82
F60	1.70 - 1.82	P80	1.68 - 1.80
F80	1.67 - 1.79	P100	1.66 - 1.78
F100	1.65 - 1.77	P120	1.65 - 1.77
F120	1.63 - 1.75	P150	1.65 - 1.77
F150	1.63 - 1.75	P180	1.65 - 1.77
F180	1.63 - 1.75	P220	1.65 - 1.77
F220	1.63 - 1.75		



## Typical chemistry, wt%

Grit Size	F 60 / P 60
Al <sub>2</sub> O <sub>3</sub>	96 – 99 %
MgO	0.5 – 1.5 %
Others (special additives)	0.5 – 2.5 %

## Packing and brands

25 kg / 50 kg box

Custom packing can be offered on request

- Loose bulk density tested as per FEPA standard 44-2:2006
- Particle size distribution tested as per FEPA standard 42-2:2006
- Micro ranges (# 230 to # 2000) are also available.

Typical specification only for illustrative purposes. Specifications vary with specific application requirements. The data presented in this specification sheet are confidential and must not be disclosed to any other parties without the written consent of Carborundum Universal Limited (CUMI).  
US Patent no. 5782940, 5858037 & 6104015;



# Krystalox-D for Bonded and Coated Abrasives

## Krystalox-D

Krystalox-D is a sintered alumina abrasive manufactured by our state-of-the-art sol-gel technology. The grain is engineered with properties that make it more aggressive than the earlier generation of ceramic grains. The design helps it to prolong the grain sharpness by the intrinsic ability to generate newer and sharper edges within the grain as the grinding proceeds. The extensive application studies have established Krystalox-D's superior nature over other ceramic grains.



### Characteristics

Color	Blue
Specific gravity	3.89-3.90
Hardness	2000-2100
Fracture Toughness	4.8 – 5.2 MPa*m <sup>1/2</sup>
Melting point	2050°C

### Physical properties

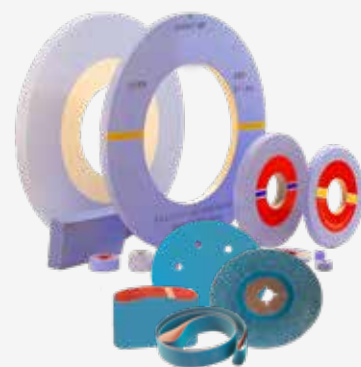
#### Typical chemistry, wt%

Grit Size	F 60
Al <sub>2</sub> O <sub>3</sub>	>90 %
MgO	1.5 – 2.5 %
Y <sub>2</sub> O <sub>3</sub>	1 – 1.5 %
La <sub>2</sub> O <sub>3</sub> + Nd <sub>2</sub> O <sub>3</sub>	3.0 – 6.0 %
Traces of CoO, TiO <sub>2</sub> & SiO <sub>2</sub>	

- ✓ Uniform microstructure
- ✓ Submicron crystal in the matrix
- ✓ High hardness
- ✓ Moderate toughness
- ✓ Self-sharpening property
- ✓ Cooler cutting
- ✓ Consistent performance
- ✓ Longer life

This product is used in a wide variety of grinding application, including high pressure grinding of metal forging, precision grinding of bearing surfaces, sanding of painted surfaces and wooden surfaces, precision polishing of camshafts etc

Grit sizes	Loose Bulk Density (g/cc)	Grit sizes	Loose Bulk Density (g/cc)
F16	1.81 - 1.93	P16	1.81 - 1.93
F20	1.80 - 1.92	P20	1.80 - 1.92
F24	1.78 - 1.90	P24	1.78 - 1.90
F30	1.77 - 1.89	P30	1.77 - 1.89
F36	1.77 - 1.89	P36	1.77 - 1.89
F40	1.75 - 1.87	P40	1.75 - 1.87
F46	1.75 - 1.87	P50	1.72 - 1.84
F54	1.72 - 1.84	P60	1.70 - 1.82
F60	1.70 - 1.82	P80	1.68 - 1.80
F80	1.67 - 1.79	P100	1.66 - 1.78
F100	1.65 - 1.77	P120	1.65 - 1.77
F120	1.63 - 1.75	P150	1.65 - 1.77
F150	1.63 - 1.75	P180	1.65 - 1.77
F180	1.63 - 1.75	P220	1.65 - 1.77
F220	1.63 - 1.75		



● Loose bulk density tested as per FEPA standard 44-2:2006

● Particle size distribution tested as per FEPA standard 42-2:2006

● Micro ranges (# 230 to # 2000) are also available.

### Packing and brands

25 kg / 50 kg box

Custom packing can be offered on request

Typical specification only for illustrative purposes. Specifications vary with specific application requirements. The data presented in this specification sheet are confidential and must not be disclosed to any other parties without the written consent of Carborundum Universal Limited (CUMI).  
US Patent no. 5782940, 5858037 & 6104015;

# Krystalox DX for Bonded Abrasives

## Krystalox-DX

Krystalox-DX is a shaped sintered alumina abrasive developed by the unique manufacturing process, indigenously developed by CUMI. The porosity imparted by the shape and the sintered alumina properties delivers multi-fold performances to the grinding wheels in which they are used. The benefits are found most in high speed precision applications.



### CHARACTERISTICS

#### Physical Properties

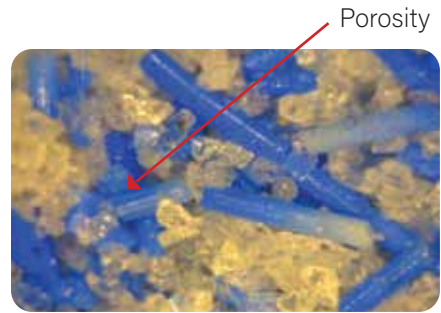
Product Characteristics	Krystalox - DX
Size	G
Specific gravity	3.90
Colour	Blue
Hardness HV (kgf/mm <sup>2</sup> )	2000-2400
Fracture Toughness MPa·m <sup>1/2</sup>	3.9-4.5
Melting point (°C)	2050

#### Mechanical properties:

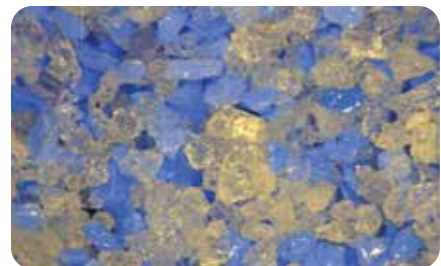
- Increased plowing action.
- Better form holding.
- Able to withstand higher in-feed rates.
- Reduced vibration while grinding.
- Lower Power requirement.

#### Typical Chemistry

Ingredients	Krystalox - DX (wt. %)
Al <sub>2</sub> O <sub>3</sub>	96-99
MgO	0.5-1.5
Additives	0.5-2.5



- Extremely High Aspect ratio(L/D) of more than 4.
- Open grit placement and hence induced porosity.
- Open structure.



- Regular aspect ratio(L/D) of less than 2.
- Regular/closed grit placement.
- Closed structure.

### APPLICATIONS

This product is specially designed for high contact precision applications such as Gear grinding, Internal grinding, Track grinding, Creep-feed grinding, Flute grinding etc.

### SIZE AND BULK DENSITY

Grits	Diameter (mm)	Bulk density (g/cc)
G30	0.54-0.72	1.74-1.94
G36	0.45-0.60	1.72-1.92
G46	0.33-0.46	1.70-1.90
G60	0.24-0.31	1.65-1.85
G80	0.18-0.25	1.64-1.84
G100	0.14-0.21	1.63-1.83
G120	0.10-0.17	1.62-1.82

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US Patent no. 5782940, 5858037 & 6104015;

# Grain Treatments

## HEAT TREATED/ROASTED

- Grains are heated to high temperature followed by furnace annealing
- Release the internal stresses and heal micro cracks
- ✓ Dustless grain surface
- ✓ Tougher grain and better wear resistance

### Applications:

Coated belts, fiber and flap discs, Thin wheels, Snagging and DC wheels

## BLUE FIRING

- Grains are superheated and soaked at very high temperature followed by furnace annealing
- ✓ Bluish in color after the treatment
- ✓ Dustless grain surface
- ✓ Toughest grain and best wear resistance

### Applications:

Heavy duty coated and bonded applications. Cut-off applications

## CUMIJET

- ✓ Reduces agglomeration and improves flowability
- ✓ Improved electro-stat performance
- ✓ Uniform grain coating on the backing

## CERAMIC COATING | SUPER CERAMIC COATING

- Ceramic Coating consists of pure red oxide and high quality frit, which offers better grain adhesion with the bond.
- Super Ceramic Coating is an advanced grain surface treatment, which enhances the overall abrasive performance of the grains.
- ✓ Enables clean and dust-free surface
- ✓ Ensures better resin adhesion on the grain surface
- ✓ Suitable for all type of grains (BFA, WFA, SF, AZ)

### Applications:

DC Wheels, Snagging, Cut-off, Coated belts and discs

## SILANE TREATMENT

- Grain surface is uniformly coated with high quality silane
- ✓ Improves the coupling between grain and organic resin
- ✓ Dust-free grain surface
- ✓ Protects from atmospheric and operational degradation

### Applications:

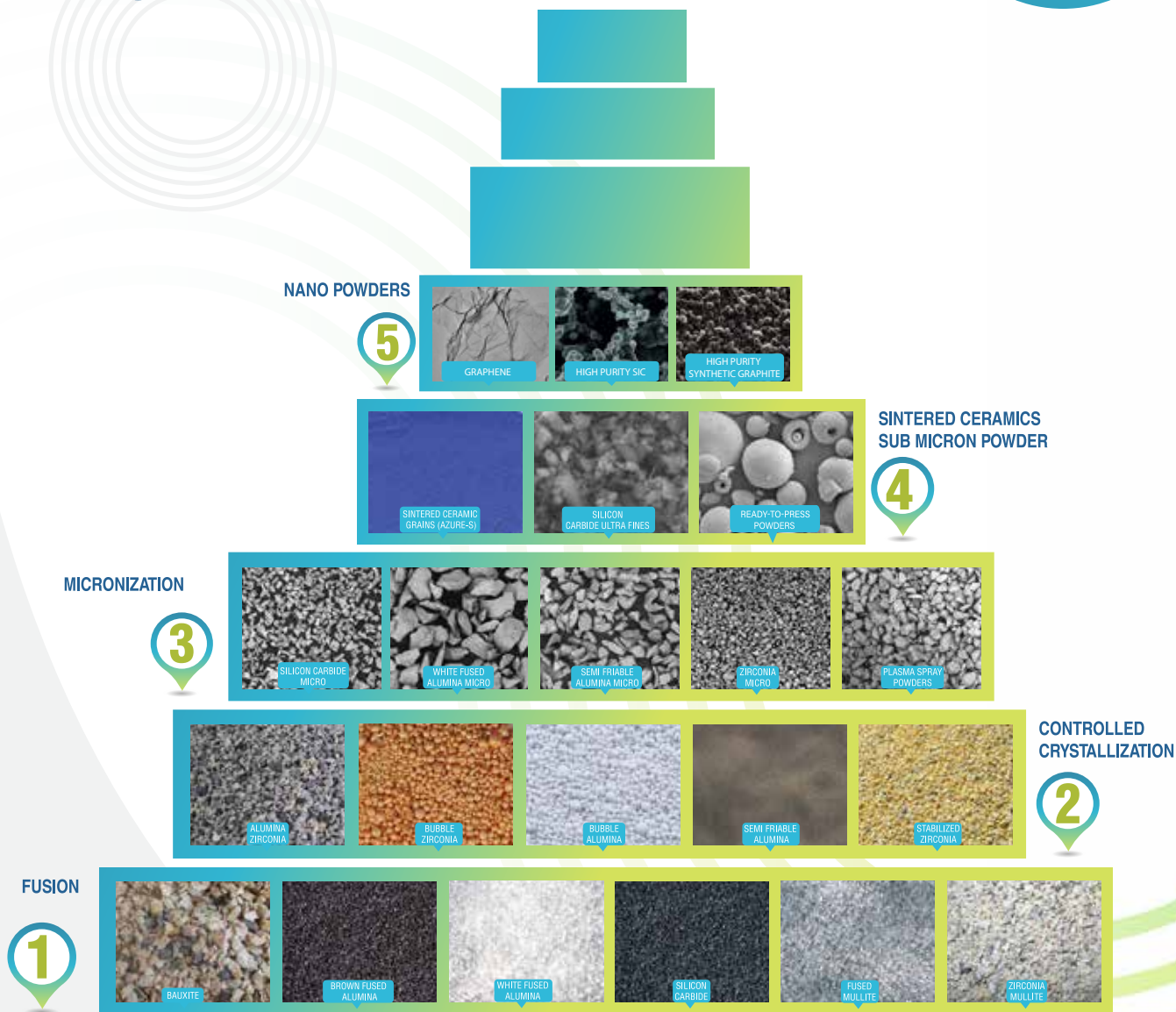
All organic abrasive applications

## CUMIJET+

- ✓ Improves flow and imparts charge on the grain surface
- ✓ Best electro-stat performance
- ✓ Uniform grain coating on the backing
- ✓ Improved productivity

	Product Code	WFA	BFA	SF	BSF	SIC	AZ40   AZ25	AVAILABILITY
Ceramic Coating, Super Ceramic Coating	CC, SCC, ALLCOT	Color: Red Grit Sizes: 16-220	Color: Red Grit Sizes: 16-220	Color: Red Grit Sizes: 16-220	Color: Red Grit Sizes: 16-220		Colour: Reddish-Grey Grit Sizes: 8 – 220	F & P
Silane Treatment	ST		Color: Grayish Grit Sizes: 24-180	Color: Light Brown Grit Sizes: 24-180	Color: Blue Grit Sizes: 24-180	Color: Black Grit Sizes: 24-1200	Colour: Reddish-Grey Grit Sizes: 12 – 220	F & P
Heat Treatment	HT		Color: Grayish Grit Sizes: 24-220					F & P
Blue Heat Treatment	BHT		Color: Blue Grit Sizes: 16-80					F & P
Micro Treatments	CUMIJET & CUMIJET+	Color: White Grit Sizes: 240-1200	Color: Brown Grit Sizes: 240-1200	Color: Light Brown Grit Sizes: 240-1200	Color: Light Blue Grit Sizes: 240-1200	Color: Black Grit Sizes: 240-1200		P
Heat Treated Ceramic Coating	HTCC		Color: Red Grit Sizes: 16-220					F & P

# OUR INNOVATION VALUE PYRAMID



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