



M I N E R A L S

# WE DIG Responsibly

We have expertise in extracting, shipping, and delivering mineral products with high efficiency.



**MALLI**™  
**MINERALS**  
INTERNATIONAL



# About MMI

Our company stands out as a premier manufacturer and supplier of a wide range of minerals in the USA. With an unwavering commitment to excellence, we take great pride in offering an extensive selection of high-quality minerals, including mica, quartz, feldspar, vermiculite, rutile, garnet, barite, kaolin, and more. Our state-of-the-art facilities and deep expertise enable us to produce premium-grade minerals that cater to the specific requirements of our valued customers.



"DELIVERING EXCELLENCE AND RELIABILITY IN MINERAL SUPPLY FOR INDUSTRIAL AND DIVERSE APPLICATIONS"

Whether you need minerals for industrial applications or various other purposes, we are dedicated to delivering exceptional quality and reliability. Our reliable supply chain ensures prompt and efficient delivery, while our customer service goes above and beyond to ensure your satisfaction. As your trusted partner, we provide seamless collaboration, offering customized solutions and expert guidance.

When you choose us as your mineral supplier, you can expect superior quality, reliability, and a commitment to meeting your unique needs. Experience the difference of working with a top-tier mineral supplier in the USA.



## OUR PRODUCTION SITE

LOCATED IN CHEMIDTHI, AP, INDIA

MMI India mining site is located in Chemidathi, Andhra Pradesh where our primary extraction site is located. We are continuously expanding our footprint by acquiring more land with expanded production offering. Our shipping port is Krishnapatnam which is located about 55 kilometers from the mining site. We also have refining capability working with local refiners to meet the specification of our customers. MMI has state of the art earth moving equipment and we continue to increase our mining capacity by investing in state-of-the-art technology.





# OUR PRODUCTS



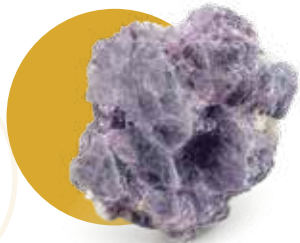
QUARTZ

Quartz is a chemical compound consisting of one part silicon and two parts oxygen (silicon dioxide  $\text{SiO}_2$ ). It is one of the most useful natural material that is resistant to chemicals and heat.



MAGNESIA

It serves as a crucial component in refractories, construction materials, ceramics, and more, thanks to its heat resistance, electrical insulation, and pH-regulating abilities.



MICA

Mica is a mineral name given to a group of minerals that are physically and chemically similar. Micas are fairly light and relatively soft, and the sheets and flakes of mica are flexible. Mica is heat-resistant and does not conduct electricity.



VERMICULITE

Vermiculite comprises a group of hydrated, laminar magnesium-aluminum-iron silicate minerals resembling mica. Vermiculite's water-wicking, lightweight, and thermal-resistant properties make it ideal for a variety of applications and products across an array of industries.



FELDSPAR

Feldspar comprises of different minerals like potassium, aluminum, calcium and silicates. It is one of the most important ingredients in all types of ceramic bodies and glaze. It is used in Glass and ceramic industries.



RUTILE  
SAND

Our in-house manufacturing facility processes synthetic rutile through the upgrading of ilmenite ore to remove impurities and yield a feedstock for production of titanium tetrachloride through the chloride process.



KAOLIN

Our in-house fabrication facility can machine washed china clay into powdered form to suit your specification, print, or requirement. We have abundant product supply for the high-quality Kaolin (china clay) to worldwide market.



GARNET  
SAND

Our in-house manufacturing facility processes of garnet sand in different mesh sizes as per our customer's needs. We have access to abundant natural resources of garnet sand to supply to our customers worldwide.



ALUMINA

Naturally occurring mineral with hardness and heat resistance, derived from bauxite through refining processes, serves as a vital precursor for aluminum production.



BAUXITE

Bauxite is a naturally occurring mineral rich in aluminum oxides and hydroxides. It's the primary source for aluminum production and is prized for its high alumina content.



ANDALUSITE

Pleochroic aluminum silicate mineral valued for refractory applications and occasionally used as a unique gemstone in jewelry.



MULLITE

High-temperature ceramic material prized for its excellent thermal stability, mechanical strength, and resistance to thermal shock in diverse industrial applications.



BARITE

Dense mineral essential in drilling, medical imaging, coatings, and industry for its weight and properties, commonly found in sedimentary deposits worldwide.



SILICA SAND

Naturally occurring granular material used in various industries, including glassmaking, construction, foundry work, and manufacturing of silicon chips.



BALL CLAY

Highly plastic and fine-grained clay used in ceramics for its molding and firing properties, crucial in porcelain and fine china production.



SILLIMANITE

High-temperature aluminum silicate mineral valued for its heat resistance, excellent thermal stability, and versatility in refractory applications and ceramics.



ILMENITE

Titanium iron oxide mineral valued for its titanium content, used in pigments, aerospace, manufacturing, and as a source of titanium dioxide.



ZIRCON SAND

Naturally occurring mineral used in ceramics, refractories, foundries, and electronics for its heat-resistant, high-density characteristics and its role as a source of zirconium.



LIMONITE

Limonite is a naturally occurring, hydrated iron oxidehydroxide mineral. It is typically yellow to brown in color & has an earthy to submetallic luster.



HEMATITE

it is a naturally occurring iron oxide mineral with the chemical formula  $\text{Fe}_2\text{O}_3$ . It is the most important ore of iron & is known for its metallic to earthy luster & reddish-brown to black color.



GOETHITE

Goethite is a naturally occurring iron oxyhydroxide mineral with the chemical formula  $\text{FeO}(\text{OH})$ . It is commonly yellow to brown in color and has an earthy to dull luster.



MAGNETITE

Magnetite is a naturally occurring iron oxide mineral with the chemical formula  $\text{Fe}_3\text{O}_4$ . It is a major source of iron and is known for its strong magnetic properties, making it valuable in industrial, environmental, and technological applications.





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## EFFICIENCY WITH QUALITY

### Quartz Mineral

Quartz, a mineral composed of silicon dioxide (SiO<sub>2</sub>), is highly versatile and finds applications in various industries due to its unique properties.

## MMI Quartz Applications

<b>ELECTRONICS AND SEMICONDUCTORS:</b>	Quartz is a key component in the production of quartz crystals and oscillators used in electronic devices like watches, clocks, radios, and microprocessors. Its piezoelectric properties make it valuable for precise timekeeping and frequency control.
<b>GLASS AND OPTICAL LENSES</b>	High-purity quartz is used in the manufacture of optical lenses, windows, and prisms due to its transparency and ability to transmit ultraviolet (UV) light. It is also a key component in the production of high-quality glass products, including camera lenses and telescope mirrors.
<b>QUARTZ COUNTERTOPS</b>	Engineered quartz countertops, also known as quartzite or quartz surface, are popular in kitchens and bathrooms due to their durability, stain resistance, and attractive appearance.
<b>CONSTRUCTION AND BUILDING MATERIALS</b>	Quartz is used in the production of concrete, mortars, and other construction materials, where its hardness and durability enhance the strength of the final product.
<b>CERAMICS AND PORCELAIN</b>	Quartz is used as a filler and flux in the manufacture of ceramics, including tiles, sanitaryware, and porcelain products.
<b>WATER FILTRATION</b>	Quartz sand is commonly used in water filtration systems to remove impurities and sediments from drinking water and industrial processes.
<b>LABORATORY GLASSWARE</b>	High-purity quartz glass is used to make laboratory equipment like beakers, test tubes, and crucibles due to its resistance to high temperatures and chemical corrosion.
<b>SOLAR PANELS</b>	Solar cells often use quartz as a substrate due to its transparency and durability, enabling the efficient capture of sunlight for electricity generation.

### Product Typical Characteristics

- Chemical Composition
- Hardness
- Transparency
- Color
- Luster
- Crystal Structure
- Transmitting UV Light
- Piezoelectricity
- Heat Resistance
- Electrical Insulation
- Optical Clarity
- Density
- Chemical Inertness
- Environmental Stability

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QUARTZ LUMP



QUARTZ POWDER

MATERIAL	FORM	SIZE
QUARTZ	CRUDE	1 FEET
QUARTZ	LUMPS	4 cm - 12 cm
QUARTZ	POWDER	#200, 240, 300, 325 MESH

#### PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Color:	White
Density:	2.65 to 2.75 g/cm <sup>3</sup>
Melting Point:	1,650° celsius
Mohs hardness:	7

#### CHEMICAL ANALYSIS

PARAMETERS	GRADE A	GRADE B
SiO <sub>2</sub>	99.95%	98.0-99.5%
Al <sub>2</sub> O <sub>3</sub>	0.02%	< 0.5%
Fe <sub>2</sub> O <sub>3</sub>	0.01%	< 0.1%
Na <sub>2</sub> O	0.02%	< 0.2%
K <sub>2</sub> O	0.03%	< 0.2%
CaO	0.04%	< 0.1%
MgO	0.05%	< 0.2%
TiO <sub>2</sub>	0.01%	< 0.02%
LOI	0.02%	0.09%
E.C	3.4	< 13





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## Mica Mineral

Mica is a versatile mineral with several applications across various industries due to its unique properties, including heat resistance, electrical insulation, and flexibility.

## MMI MICA Applications

### ELECTRICAL INSULATION

Mica is used as an insulating material in electrical and electronic equipment, such as capacitors, transformers, and electrical wiring, due to its excellent electrical insulating properties.

### COSMETICS AND PERSONAL CARE

Mica is a common ingredient in cosmetics, where it adds a shimmering or glittery effect to products like eyeshadows, lipsticks, and nail polishes.

### PAINTS AND COATINGS

Mica is used in paints, coatings, and automotive finishes to enhance their durability, texture, and resistance to weathering.

### CONSTRUCTION MATERIALS

Mica is added to construction materials like plaster, stucco, and concrete to improve their workability and resistance to cracking.

### OIL WELL DRILLING

In the oil and gas industry, mica is used as a drilling mud additive to control fluid loss and lubricate drilling equipment.

### PLASTICS AND RUBBER

Mica is used as a filler and reinforcement material in plastics and rubber products to enhance their thermal and mechanical properties.

### HEAT INSULATION

Due to its ability to withstand high temperatures, mica is used as a heat shield and insulation material in appliances, ovens, and furnaces.

### FIREPROOFING

Mica is added to fire-resistant materials to improve their fireproofing properties.

### LUBRICANTS

Mica can be used as a dry lubricant in certain applications where oil-based lubricants are not suitable.

### AGRICULTURE

Mica is sometimes used in agriculture as a soil conditioner to improve aeration and water retention in the soil.

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### Product Typical Characteristics

- Transparency
- Flexibility
- Heat Resistance
- Electrical Insulation
- Chemical Inertness
- Abrasion Resistance
- Lightweight
- Color Range
- Purity
- Texture





**NATUREAL MICA**



**MICA SCRAP**



**MICA FLAKES**



**MICA POWDER**

MATERIAL	FORM	GRADE
NATUREAL MICA	CRUDE	150-200 MM
MICA SCRAP	SCRAP	100 - 150 MM
MICA FLAKES	FLAKES	10 - 100 MM
MICA POWDER	POWDER	#200
MICA SHEETS	SHEET	ALL SIZES

#### PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Color	green, brown, black
Density	2.7 to 3.0 g/cm <sup>3</sup>
Melting Point	1,090 to 1,370° celsius
Mohs hardness	2.5 - 4

#### CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
SiO <sub>2</sub>	48.24%
Al <sub>2</sub> O <sub>3</sub>	32.61%
Na <sub>2</sub> O	0.86%
K <sub>2</sub> O	9.10%
Fe <sub>2</sub> O <sub>3</sub>	2.75%
Moisture	0.20%
Loss on Ignition	4.6%



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## Vermiculite Mineral

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### MMI Vermiculite Applications

#### INSULATION

Vermiculite has excellent insulating properties due to its ability to trap air within its expanded layers. It is commonly used as insulation in construction materials, such as loose-fill insulation, concrete aggregates, and insulation boards.

#### HORTICULTURE & GARDENING

Vermiculite is widely used in gardening and horticulture. It improves soil aeration, moisture retention, and nutrient availability. It can be added to potting mixes or used as a standalone soil amendment to promote healthy plant growth.

#### FIREPROOFING

Expanded vermiculite has high resistance to heat and fire. It is used in fireproofing materials, such as sprays and coatings, to provide a protective barrier against flames and heat transfer.

#### LIGHTWEIGHT CONCRETE

Vermiculite is often used as an aggregate in lightweight concrete, also known as vermiculite concrete. The resulting material is lightweight, insulating, and has good fire resistance, making it suitable for construction applications.

#### PACKAGING

Expanded vermiculite is used as a packaging material for fragile and sensitive goods. Its lightweight and cushioning properties help protect items during transportation.

#### VERMICULITE BOARDS & PANELS

Vermiculite boards are manufactured using vermiculite and other binders. These boards have excellent thermal properties and are used in applications such as wood stoves, fireplaces, and thermal insulation boards.

#### INDUSTRIAL APPLICATIONS

Vermiculite finds various industrial applications, including filtration, absorbents, friction linings, sealants, and coatings.

#### Product Typical Characteristics

- Lightweight
- Fire Resistance
- Thermal Insulation
- Sound Absorption
- Aeration and Water Retention
- Chemical Stability
- Expansion Ability
- Incombustibility
- Non-Asbestos
- Chemical Inertness
- Color and Texture
- Abrasive Properties

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**SUPER FINE GRADE**



**FINE GRADE**



**MEDIUM GRADE**



**LARGE GRADE**



**EXTRA LARGE GRADE**



**RAW VERMICULITE**

MATERIAL	FORM	GRADE
RAW VERMICULITE	CRUDE	RAW
SUPER FINE GRADE	0.5 TO 1 MM	EX-FOLIATED
FINE GRADE	1 TO 2 MM	EX-FOLIATED
MEDIUM GRADE	2 TO 4 MM	EX-FOLIATED
LARGE GRADE	4 TO 8 MM	EX-FOLIATED
EXTRA LARGE GRADE	8 TO 12 MM	EX-FOLIATED

#### PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Moisture content	2 %
Apparent weight	0.25-0.35 g/cc
pH	6 - 9
Sintering temperature	Approx. 1200 °C
Melting point	Approx. 1330 °C

#### CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
SiO <sub>2</sub>	35% - 41%
Al <sub>2</sub> O <sub>3</sub>	6% - 9.5%
Fe <sub>2</sub> O <sub>3</sub>	6% - 9.5%
MgO	21.5 % - 25.5 %
CaO	2% - 6 %
K <sub>2</sub> O	3% - 6 %
TiO <sub>2</sub>	0.6% - 1.4 %
P <sub>2</sub> O <sub>3</sub>	0.2% - 2 %





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## Feldspar Mineral

Feldspar comprises of different minerals like potassium, aluminum, calcium and silicates. It is one of the most important ingredients in all types of ceramic bodies and glaze.

## MMI Feldspar Applications

### CERAMICS AND GLASS

Feldspar is a vital ingredient in the production of ceramics and glass, where it acts as a flux, reducing the melting temperature and improving the overall structure and properties of the materials.

### CONSTRUCTION MATERIALS

It is used in the manufacturing of tiles, plumbing fixtures, and other construction materials to enhance their durability and appearance.

### PAINT AND COATINGS

Feldspar is added to paint and coatings to improve their adhesion, consistency, and resistance to abrasion and weathering.

### FILLERS AND EXTENDERS

It serves as a filler and extender in products like adhesives, sealants, and plastics, improving their strength and workability.

### ABRASIVES

Feldspar's hardness makes it suitable for use in the production of abrasives like grinding wheels and sandpapers.

### CHEMICAL INDUSTRY

It is used in various chemical processes and as a flux in metallurgical applications.

### OIL AND GAS DRILLING

Feldspar is added to drilling fluids to enhance their viscosity and reduce friction during drilling operations.

### CERAMIC GLAZES

In the ceramics industry, it is used in glazes to enhance their color, texture, and durability.

### ELECTRONICS

Some specialized types of feldspar are used in the manufacturing of electronic components such as capacitors and insulators.

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### Product Typical Characteristics

- Chemical Composition
- Mineral Group
- Color and Varieties
- Hardness
- Particle Size and Grain Distribution
- Density
- Purity and Impurities
- Melting Point
- Thermal Stability
- Chemical Reactivity
- Electrical Properties
- Applications and Uses





SODIUM FELDSPAR LUMPS



POTASium FELDSPAR LUMPS



SODIUM FELDSPAR POWDER



POTASSIUM FELDSPAR POWDER

MATERIAL	FORM	SIZE
SODIUM FELDSPAR	LUMPS	10 - 300 MM
SODIUM FELDSPAR	POWDER	#200, 325 MESH
POTASium FELDSPAR	LUMPS	10 - 300 MM
POTASium FELDSPAR	POWDER	#200, 325 MESH

#### PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Moisture content	2 %
Apparent weight	0.25-0.35 g/cc
pH	6 - 9
Sintering temperature	Approx. 1200 °C
Melting point	Approx. 1330 °C

#### POTASSIUM FELDSPAR CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
K <sub>2</sub> O	11.20%
Na <sub>2</sub> O	2.50%
Fe <sub>2</sub> O <sub>3</sub>	0.10%

#### SODIUM FELDSPAR CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
SiO <sub>2</sub>	67.36%
Al <sub>2</sub> O <sub>3</sub>	19.46%
Fe <sub>2</sub> O <sub>3</sub>	0.40%
MgO	0.50 %
CaO	0.70%
K <sub>2</sub> O	0.31%
TiO <sub>2</sub>	0.05%
Na <sub>2</sub> O	0.05%



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## Rutile Sand Mineral

Rutile sand is a mineral composed primarily of titanium dioxide (TiO<sub>2</sub>) and is valued for its high titanium content. It is used in various applications across industries.

## MMI Rutile Sand Applications

### PIGMENT PRODUCTION

Rutile sand is crucial for producing high-quality paints, coatings, and plastics due to its brightening and opacifying properties.

### WELDING ELECTRODES

It's used as a coating for welding rods, improving the quality and strength of welded joints, especially in high-temperature applications.

### CERAMICS ENHANCEMENT

In ceramics manufacturing, rutile sand enhances firing characteristics, resulting in stronger and more durable products.

### METAL ALLOYS

Rutile sand provides titanium for aerospace and industrial alloys, ensuring high strength and corrosion resistance.

### PLASTICS MODIFICATION

It's used as a filler in plastics to enhance thermal stability, strength, and UV resistance, crucial in many plastic applications.

### ELECTRODES AND ELECTROPLATING

Rutile sand serves as an electrode material and a source of titanium in electrochemical processes.

### REFRACTORY MATERIALS

It improves the thermal shock resistance of refractory materials, making them suitable for high-temperature applications like furnaces and kilns.

### CASTING

Rutile sand is employed as a mold and core material in casting processes due to its ability to withstand high temperatures and maintain mold integrity.

### WATER TREATMENT

Rutile-based products assist in removing impurities from water in various purification processes.

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### Product Typical Characteristics

- Chemical Composition
- Mineral Structure
- Color and Appearance
- Particle Size and Distribution
- Density
- Titanium Dioxide Content
- Impurities
- Melting Point
- Heat Resistance
- Chemical Reactivity
- Applications and Uses
- Environmental Impact

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MATERIAL	FORM	GRADE
RUTILE	SAND	#200, #300, #325
RUTILE	SAND	R87, R90, R92, R95
SYNTHETIC RUTILE	SAND	SR87, SR90, SR92, SR95

#### PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Color:	red, brown, and black
Density:	4.2 to 4.3 g/cm <sup>3</sup>
Melting Point:	1,830 °C
Mohs hardness:	6-6.5

#### CHEMICAL ANALYSIS

PARTICULARS	GRADE I	GRADE II
TiO <sub>2</sub>	92%	90%
Specific Gravity	4.2 - 4.25	4.2 - 4.25
Bulk Density (kg/m <sup>3</sup> )	2630-2650	2630-2650

(Mesh) ASTM	Sieve opening in Microns	%	%
40	425	0.02	0.02
60	250	7.72	8.08
80	180	24.48	24.08
100	150	22.39	21.94
120	125	27.7	27.81
140	106	13.22	13.59
170	90	3.15	3.15
(-) 170	(-) 90	1.26	1.29
Sieve loss	Sieve loss	0.06%	0.04%



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## Kaolin Mineral

Our in-house fabrication facility can machine washed china clay into powdered form to suit your specification, print, or requirement. We have abundant product supply for the high-quality Kaolin (china clay) to worldwide market.

## MMI Kaolin Applications

### PAPER INDUSTRY

Kaolin is used as a filler and coating pigment in the paper industry to improve printability, brightness, and smoothness of paper products.

### CERAMICS AND POTTERY

It is a key ingredient in the production of ceramics and pottery, enhancing their strength, whiteness, and workability.

### PAINTS AND COATINGS

Kaolin is used as a pigment in paints and coatings to control gloss, improve opacity, and provide a smooth finish.

### PLASTICS

In the plastics industry, kaolin is used as a filler and reinforcement agent to enhance mechanical properties and reduce production costs.

### RUBBER INDUSTRY

Kaolin is added to rubber products, such as tires and conveyor belts, to improve their mechanical strength and abrasion resistance.

### COSMETICS

It is used in cosmetics and personal care products, including face masks, as a gentle exfoliant and thickening agent.

### PHARMACEUTICALS

Kaolin is used in pharmaceutical formulations as an excipient, binder, and anti-caking agent in tablets and capsules.

### AGROCHEMICALS

It is used in the formulation of agrochemicals, such as pesticides and herbicides, to improve dispersion and adhesion to plant surfaces.

### FIBER REINFORCEMENT

In the production of fiberglass and reinforced plastics, kaolin is used to enhance the strength and durability of composite materials.

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### Product Typical Characteristics

- Chemical Composition
- Mineral Structure
- Particle Size and Distribution
- Brightness and Whiteness
- Plasticity
- Density
- Moisture Content
- Cation Exchange Capacity (CEC)
- Thermal Properties
- Color and Appearance
- Chemical Reactivity
- Applications and Uses

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KAOLIN LUMPS



KAOLIN POWDER

MATERIAL	FORM	GRADE
KAOLIN	LUMPS	RAW
KAOLIN	POWDER	#200, #300, #325

#### PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Color	slightly off White
Density	2.2 to 2.6 g/cm <sup>3</sup>
Melting Point	1,700 to 1,800 °C
Mohs hardness	2
Grain Size	submicron to several micrometers

#### CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
SiO <sub>2</sub>	45 %
Al <sub>2</sub> O <sub>3</sub>	38 %
Fe <sub>2</sub> O <sub>3</sub>	0.5 %
MgO	0.11 %
CaO	0.61 %
K <sub>2</sub> O	0.50 %
TiO <sub>2</sub>	0.76 %
Na <sub>2</sub> O	0.45 %



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## Garnet Sand Mineral

Our in-house manufacturing facility processes of garnet sand in different mesh sizes as per our customer's needs. We have access to abundant natural resources of garnet sand to supply to our customers worldwide.

## MMI Garnet Sand Applications

<b>ABRASIVE BLASTING</b>	Garnet sand is a widely-used abrasive for surface cleaning and preparation, ideal for removing paint, rust, and contaminants.
<b>WATERJET CUTTING</b>	It plays a vital role in high-precision waterjet cutting machines, effectively slicing through metals, stone, and other materials.
<b>ABRASIVE POWDERS</b>	Garnet is ground into fine powders for use in grinding wheels, sandpaper, and abrasive products, ensuring smooth finishes.
<b>WATER FILTRATION</b>	Garnet sand is used in water treatment to filter out impurities and suspended solids from drinking water and industrial processes.
<b>SANDPAPER</b>	Known for durability, garnet-based sandpaper is favored in woodworking and metalworking, delivering smooth finishes.
<b>OIL AND GAS INDUSTRY</b>	Garnet acts as a proppant in hydraulic fracturing, aiding in fracture maintenance during oil and gas extraction.
<b>MANUFACTURING</b>	Garnet is utilized in manufacturing processes, including glass production, for shaping and finishing products.
<b>PAINT AND COATINGS</b>	Its abrasive qualities enhance paints and coatings for textured or anti-slip surfaces.
<b>CONSTRUCTION MATERIAL</b>	Garnet is added to materials like concrete and asphalt for improved skid resistance and durability.

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## Contact Us

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### Product Typical Characteristics

- Chemical Composition
- Mineral Structure
- Particle Size and Distribution
- Hardness
- Color and Appearance
- Density
- Moisture Content
- Abrasive Properties
- Purity and Impurities
- Melting Point
- Chemical Reactivity
- Applications and Uses



GARNET SAND



MATERIAL	FORM	GRADE
GARNET	SAND	#30,#40,#50,#60, #80 AND ABOVE

PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Bulk Density	2.34T/m3
Specific Gravity	4.1
Hardness	7.4
Melting point	1260°c
Shape of Natural Grain	Sharp Angular

GARNET 20/40 MESH  
CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
SiO <sub>2</sub>	35%
Al <sub>2</sub> O <sub>3</sub>	21%
Fe <sub>2</sub> O <sub>3</sub>	2%
MgO	6 %
CaO	2%
TiO <sub>2</sub>	1%
FeO	30%
MnO	1%

GARNET 30/60 MESH  
CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
SiO <sub>2</sub>	35%
Al <sub>2</sub> O <sub>3</sub>	21%
Fe <sub>2</sub> O <sub>3</sub>	2%
MnO	1%
CaO	2%
TiO <sub>2</sub>	1%
FeO	30%
MnO	1%



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## Andalusite Mineral

Andalusite is a mineral known for its heat-resistant properties and pleochroism, used in refractories, ceramics, abrasives, and gemstone jewelry.

## MMI Andalusite Applications

REFRACTORIES	Refractories: Used in furnace linings and high-temperature equipment due to its exceptional heat resistance.
CERAMICS	Ceramics: Enhances the strength and thermal shock resistance of ceramic products.
FOUNDRY	Foundry: Used in casting molds and cores due to its ability to withstand high temperatures.
ABRASIVES	Abrasives: Employed in grinding and cutting tools for its hardness and durability.
JEWELRY	Jewelry: Gem-quality andalusite is cut and used in jewelry for its unique color-changing properties.
HIGH-PERFORMANCE CERAMICS	High-Performance Ceramics: Used in aerospace and electronics industries for its exceptional properties.
OIL AND GAS INDUSTRY	Oil and Gas Industry: Utilized in equipment linings for high-temperature applications.
INSULATION	Insulation: Found in refractory bricks for thermal insulation.
MINERAL COLLECTING	Mineral Collecting: Prized by mineral enthusiasts for its distinctive crystal structure.

### Product Typical Characteristics

- Chemical Composition
- Crystal Structure
- Color Variations
- Hardness and Durability
- Heat Resistance
- Density
- Thermal Shock Resistance
- Refractory Properties
- Ceramic Enhancement
- Gemstone Quality
- Foundry Applications
- Abrasiveness

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ANDALUSITE RAW



ANDALUSITE POWDER

## Chemical Analysis of Andalusite

### Chemical Analysis of CHePA56: 3-5 mm Product

	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	CaO	MgO	Na <sub>2</sub> O	K <sub>2</sub> O	L.O.I
Typical (%)	56.21	38.97	1.11	0.19	0.21	0.18	0.20	0.87	0.97
Guarantee (%)	≥56		≤ 1.2						

### Grain Size Distribution of 3-5 (mm) Product

	<2.8	2.8-4	4-4.7	> 4.7
Typical (%)	4.2	53.7	36.5	5.6
Range (%)	<5	45-55	30-40	5-10

### Chemical Analysis of CHePA57: 1-3, 0-1 mm & Milled Product (Fine size are produce from 1-3 mm)

	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	CaO	MgO	Na <sub>2</sub> O	K <sub>2</sub> O	L.O.I
Typical (%)	58.6	38.65	0.67	0.11	0.06	0.08	0.07	0.34	0.59
Guarantee (%)	≥57		≤ 0.8						

### CHePA57: 1-3 mm

#### Grain Size Distribution (mm)

	0-0.6	0.6-1.4	1.4-2.36	2.36-3.35	> 3.36
Typical (%)	6.5	33.9	43.2	16.4	0.0
Range (%)	5-10	20-35	35-45	10-20	0

### CHePA57: 0-1 mm

#### Grain Size Distribution (mm)

	0-0.15	0.15-0.3	0.3-0.5	0.5-1	> 0.600
Typical (%)	23.0	16.6	22.3	34.7	3.4
Range (%)	20-30	15-25	20-30	30-40	<5

### CHePA 57: Milled Sizing (Mesh)

Sizing (Micron)	200	325
Product Size [D95 (Micron)]	75	45
	75	45

Specific Gravity (g/cm<sup>3</sup>) > 3.1

Moisture (%) ≤0.5



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## Mullite Mineral

It is a refractory material with excellent thermal stability, often used in high-temperature applications such as kiln linings, ceramic production, and aerospace components.

## MMI Mullite Applications

REFRACTORIES	Mullite is a crucial component in refractory materials for lining high-temperature equipment like kilns and furnaces.
CERAMIC PRODUCTION	It enhances ceramics' heat resistance and mechanical strength, crucial for products like kiln furniture and crucibles.
AEROSPACE	Mullite's lightweight and high-temperature resistance make it valuable for aerospace components such as heat shields and rocket nozzles.
ELECTRONICS	Used in electronic substrates and insulators due to its thermal stability and electrical insulating properties.
FOUNDRY INDUSTRY	Mullite serves as a refractory material for casting molds and cores in foundry applications.
METALLURGY	It's used to line furnaces in metallurgical processes for the production of metals and alloys.
GLASS PRODUCTION	Mullite helps maintain high temperatures in glass manufacturing, preventing contamination of the glass melt.
SOLAR PANELS	It serves as a substrate material in solar panels, ensuring efficient energy conversion.
ENVIRONMENTAL FILTERS	Mullite is used in ceramic filters for pollution control due to its resistance to high temperatures and corrosive environments.

### Product Typical Characteristics

- Chemical Composition
- Crystal Structure
- Color and Appearance
- Density
- Thermal Stability
- Heat Resistance
- Mechanical Strength
- Electrical Properties
- Thermal Insulation
- Abrasion Resistance
- Chemical Inertness
- Applications and Uses

## About MMI

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## Contact Us

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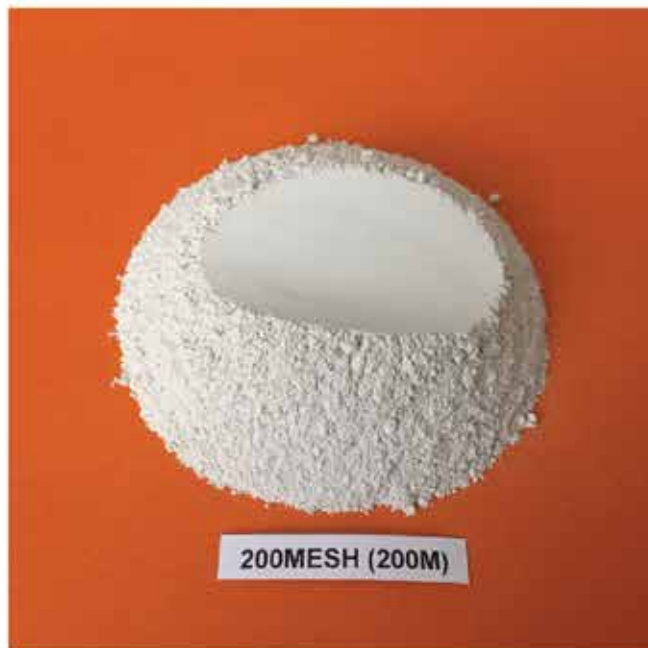
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MULLITE GRITS



MULLITE POWDER

MATERIAL	FORM	GRADE
MULLITE	GRITS	GRITS
MULLITE	POWDER	#200

#### PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Color	white or light gray
Density	2.2 to 2.5 g/cm <sup>3</sup>
Melting Point	1,850 to 1,900° celsius
Mohs hardness	6 - 7
Grain Size	Grits, #200

#### CHEMICAL ANALYSIS

SPECIFICATIONS	For Grits	For Fines	Zirmul
SiO <sub>2</sub>	22-27	20-25	15-18
Al <sub>2</sub> O <sub>3</sub>	73-77	75-80	46-48
Fe <sub>2</sub> O <sub>3</sub>	1.00	1.00	0.15
ZrO <sub>2</sub>	-	-	32-35
CaO	-	-	0.15
Na <sub>2</sub> O	-	-	0.20
TiO <sub>2</sub>	0.50	0.50	0.15
Specific Gravity	2.90-3.15	2.90-3.15	



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## Barite Mineral

Barite, a mineral composed of barium sulfate ( $\text{BaSO}_4$ ), has numerous applications across various industries due to its unique properties.

## MMI Barite Applications

### OIL AND GAS DRILLING

Oil and Gas Drilling: Barite is a crucial component in drilling mud used in oil and gas exploration. It helps control well pressure, lubricates the drilling bit, and prevents blowouts during drilling operations, ensuring safe and efficient extraction of hydrocarbons.

### MEDICAL IMAGING

Medical Imaging: Barium sulfate, derived from barite, is used as a contrast agent in X-ray and CT scans of the gastrointestinal tract. It enhances the visibility of internal structures during medical imaging procedures, aiding in the diagnosis of various health conditions.

### CONSTRUCTION AND CONCRETE

Construction and Concrete: Barite is added to concrete and construction materials to enhance their density and improve radiation shielding in nuclear power plants and hospitals, contributing to the safety and durability of infrastructure.

### RADIATION SHIELDING

Radiation Shielding: Barite is used in the construction of radiation shielding materials, such as leaded concrete, to protect against ionizing radiation. This application is critical in medical facilities and nuclear power plants.

### PAINTS AND COATINGS

Paints and Coatings: Barite is used as a filler in paints and coatings to increase their density, opacity, and resistance to chemicals. It also contributes to the quality of the painted surface.

### FOUNDRY CASTING

Foundry Casting: Barite is employed as a mold-release compound in foundry casting processes, helping to separate castings from molds easily and efficiently, which is essential in metal casting operations.

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### Product Typical Characteristics

- Chemical Composition
- Density
- Color
- Crystal Structure
- Hardness
- Transparency
- Heat Resistance
- Electrical Properties
- Chemical Inertness
- Particle Size Distribution
- Impurities
- Fluorescence Properties





**BARITE RAW**



**BARITE POWDER**

MATERIAL	FORM	GRADE
BARITE RAW	LUMPS	RAW
BARITE	POWDER	200 MESH & 325 MESH

DISCIPLINE : CHEMICAL			
Test/Parameter	Result	Unit	
Barium sulphate (as BaSO <sub>4</sub> )	92.08	% (w/w)	
Moisture	0.17	% (w/w)	
Extractable Carbonate (as CO <sub>3</sub> )	1359	mg/kg	
Cadmium (as Cd)	ND(DL: 0.5)	mg/kg	
Mercury (as Hg)	ND(DL: 0.1)	mg/kg	
Arsenic (as As)	5.2	mg/kg	
Lead (as Pb)	5.3	mg/kg	
Magnesium (as MgO)	0.094	% (w/w)	
Zinc (as Zn)	6.9	mg/kg	
Specific gravity	4.233	-	
Cation Exchange Capacity(MB Value)	0.10	meq/100 g	
<b>Remark:</b>	ND: Not detected	DL: Detection limit	1mg/kg = 1 ppm



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## Silica Sand Mineral

Silica sand is a granular material primarily composed of quartz and is widely used in various industries for its unique properties.

## MMI Silica Sand Applications

<b>GLASS PRODUCTION</b>	Essential for clarity, strength, and heat resistance in glass.
<b>FOUNDRY CASTING</b>	Used for molds and cores in metal casting due to its high-temperature resistance.
<b>CONSTRUCTION</b>	Enhances strength and durability in concrete and mortar.
<b>WATER FILTRATION</b>	Removes impurities from drinking water and industrial processes.
<b>SEMICONDUCTOR</b>	Produces single-crystal silicon for computer chips.
<b>PLAY SURFACES</b>	Provides drainage and safety in sports fields and playgrounds.
<b>OIL &amp; GAS FRACKING</b>	Acts as proppants to extract oil and natural gas.
<b>CERAMICS &amp; POTTERY</b>	Withstands high temperatures in firing processes.
<b>SANDBLASTING</b>	Used as an abrasive material to remove surface contaminants.
<b>GOLF COURSE BUNKERS</b>	Fills sand bunkers for golf courses, ensuring a consistent playing surface.
<b>MANUFACTURING GLASS BOTTLES</b>	Silica sand is a critical component in the production of glass bottles and containers for the packaging industry.
<b>HORTICULTURE</b>	Silica sand is used as a component in potting mixtures and soil amendments to improve drainage and aeration in plant growth.

### Product Typical Characteristics

- Chemical Composition
- Particle Size and Grain Distribution
- Color and Appearance
- Density
- Purity and Impurities
- Moisture Content
- Heat Resistance
- Abrasion Resistance
- Chemical Inertness
- Shape and Texture
- Grain Roundness
- Applications and Uses

## About MMI

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SILICA SAND



TS. MESH SIZE		AMOUNT RETAINED		Multiples	PRODUCTS	Specification
MICR	MESH	IN GRAMS	IN %			
1700	12	0	3.08	5	0	MOISTURE
850	20	0		12	0	AFS no. 62.21
600	30	0.34		20	6.8	CLAY
425	40	2.74		30	82.2	FINES
300	50	14.59	96.23	40	583.6	LOT
212	70	34.37		50	1718.5	
150	100	32.83		70	2298.1	
106	140	14.44		100	1444	
75	200	0.58	0.58	140	81.2	
53	270	0		200	0	
				270	0	
TOTAL		99.89			6214.4	

PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Color:	white or colorless
Density:	2.65 to 2.67 g/cm³
Melting Point:	1,710 °C
Mohs hardness:	7
Grain Size:	Fine sand to coarse sand & even granules.

CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
SiO <sub>2</sub>	96.43%
Al <sub>2</sub> O <sub>3</sub>	1.47%
Fe <sub>2</sub> O <sub>3</sub>	0.12%
MgO	0.26 %
CaO	0.04%
K <sub>2</sub> O	0.72%
Na <sub>2</sub> O	0.28%
Cl	0.017%
F	<0.001



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### Ball Clay Mineral

Highly plastic and fine-grained clay used in ceramics for its molding and firing properties, crucial in porcelain and fine china production.

## MMI Ball Clay Applications

CERAMICS	Ball clay is a vital component in ceramics and pottery, offering excellent plasticity for shaping and molding.
SANITARYWARE	It provides impermeability and a smooth finish, making it ideal for manufacturing toilets and sinks.
TILES & PORCELAIN	Enhances the strength, color, and finish of high-quality tiles and porcelain products.
CASTING SLIPS	Crucial in creating intricate ceramic shapes using casting slips.
CERAMIC GLAZES	Improves texture, gloss, and firing characteristics in ceramic glazes.
CEMENT	Acts as a supplementary material, enhancing concrete workability and durability.
DRILLING MUD	Stabilizes boreholes and controls fluid loss in oil and gas drilling.
PAPER INDUSTRY	Enhances paper quality and printability as a filler.
PAINTS & COATINGS	Used for smoothness, texture, and color control in paints and coatings.
FERTILIZERS	Improves consistency and binding in fertilizer formulations.
PESTICIDES	Serves as a carrier for active ingredients in some pesticide formulations.
SEALANTS & ADHESIVES	Acts as a thickening and binding agent in various adhesive products.

### Product Typical Characteristics

- Chemical Composition
- Mineral Structure
- Plasticity
- Color and Appearance
- Particle Size and Distribution
- Firing Temperature
- Moisture Content
- Density
- Binder Properties
- Impurities
- Thermal Expansion
- Applications and Uses

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**BALL CLAY LUMPS**



**BALL CLAY POWDER**

MATERIAL	FORM	GRADE
BALL CLAY	LUMPS	RAW
BALL CLAY	POWDER	#200, #325

#### PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Bulk Density (gm/cc)	1.30 - 1.50
Specific gravity	2 - 2.50
Liquid limit (%)	50 - 65
Plastic limit (%)	34 - 37
Atterberg No	14 - 25
Dry Linear shrinkage (%)	7 - 8.50
Water of Plasticity (%)	12 - 32

#### CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
SiO <sub>2</sub>	32% - 54 %
Al <sub>2</sub> O <sub>3</sub>	32% - 40%
Fe <sub>2</sub> O <sub>3</sub>	0.3 % - 2%
MgO	1.5 % - 3 %
CaO	1% - 3 %
TiO <sub>2</sub>	3% - 6 %



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## Sillimanite Mineral

High-temperature aluminum silicate mineral valued for its heat resistance, excellent thermal stability, and versatility in refractory applications and ceramics.

## MMI Sillimanite Applications

<b>CERAMICS</b>	It is used as a filler and reinforcement material in ceramics and pottery production to enhance the strength and thermal shock resistance of ceramic products.
<b>FOUNDRY INDUSTRY</b>	Sillimanite-based materials are used as mold and core materials in the foundry industry to create intricate and heat-resistant castings.
<b>ABRASIVES</b>	Sillimanite is used in the manufacturing of abrasive products like grinding wheels and sandpapers due to its hardness and abrasive properties.
<b>INSULATION</b>	It is utilized in the production of high-temperature insulation materials for use in furnaces, ovens, and other industrial equipment.
<b>WELDING ELECTRODES</b>	Sillimanite is used as a coating material for welding electrodes, improving the quality and strength of welded joints in high-temperature applications.
<b>ELECTRICAL INSULATION</b>	It finds use as an electrical insulator in high-temperature and high-voltage applications.
<b>OIL AND GAS INDUSTRY</b>	Sillimanite-based materials are used in the oil and gas industry as proppants to keep fractures open in hydraulic fracturing ("fracking") operations.
<b>METALLURGY</b>	Sillimanite is employed in metallurgical processes as a source of aluminum and as a raw material for the production of specialty alloys.

### Product Typical Characteristics

- Chemical Composition
- Mineral Structure
- Color and Appearance
- Hardness
- Heat Resistance
- Particle Size and Distribution
- Density
- Thermal Expansion
- Moisture Content
- Binder Properties
- Impurities
- Applications and Uses

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SILLIMANITE RAW



SILLIMANITE POWDER

MATERIAL	FORM	GRADE
SILLIMANITE	SAND	200 MESH
SILLIMANITE	SAND	325 MESH

PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Chemical formula	Al <sub>2</sub> SiO <sub>5</sub>
Color	white, gray, brown, green, or bluish-green.
Mohs Hardness	36.5 to 7.5.
Specific Gravity	3.23 to 3.27
Refractive Index:	1.653 to 1.673
Melting Point	1,550 to 1,750° Celsius

CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
SiO <sub>2</sub>	36.1%
Al <sub>2</sub> O <sub>3</sub>	60.3%
Fe <sub>2</sub> O <sub>3</sub>	0.46%
CaO	0.46%
TiO <sub>2</sub>	0.14%



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## Ilmenite Mineral

High-temperature aluminum silicate mineral valued for its heat resistance, excellent thermal stability, and versatility in refractory applications and ceramics.

## MMI ilmenite Applications

<b>TITANIUM DIOXIDE PRODUCTION</b>	Primary source for white pigment used in paints and plastics.
<b>WELDING ELECTRODES</b>	Coating material for high-temperature welding.
<b>CERAMICS</b>	Enhances firing characteristics and product strength.
<b>METALLIC ALLOYS</b>	Provides titanium for aerospace and industrial alloys.
<b>COSMETICS</b>	Adds shimmer to nail polish and makeup.
<b>PLASTICS</b>	Improves thermal stability and strength.
<b>ELECTRODES &amp; ELECTROPLATING</b>	Used in electrochemical applications and electroplating.
<b>REFRACTORIES</b>	Enhances resistance to high temperatures.
<b>CASTING</b>	Mold and core material for casting processes.
<b>WATER TREATMENT</b>	Assists in impurity removal.
<b>GEMSTONES</b>	Inclusions enhance visual appeal.
<b>MINING</b>	Source of titanium for aerospace, medical, and military applications.

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### Product Typical Characteristics

- Chemical Composition
- Mineral Structure
- Color and Appearance
- Particle Size and Distribution
- Titanium Dioxide Content
- Impurities
- Density
- Melting Point
- Heat Resistance
- Hardness
- Chemical Reactivity
- Applications and Uses



ILMENITE SAND



MATERIAL	FORM	GRADE
ILMENITE	SAND	#200, #325

PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Color:	black or dark brown
Density:	4.68 to 4.76 g/cm³
Melting Point:	1,545 °C
Mohs hardness:	5- 6
Grain Size:	Fine to Coarse crystals

Mag purity Test of Ilmenite

MINERALS	ILMENITE
Ilmenite	99.96 %
Garnet	0.03 %
Non-mag	0.01 %
Total	100

CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
TiO <sub>2</sub>	54.278 %
MgO	0.689%
Al <sub>2</sub> O <sub>3</sub>	0.574%
SiO <sub>2</sub>	0.859 %
P2O5	0.031%
SO3	0.00%
CaO	0.299%
V2O5	0.387%
Cr2O3	0.156%
MnO	1.353%
Fe <sub>2</sub> O <sub>3</sub>	37.234%
ZnO	0.034%
As2O3	0.00%
ZrO2	0.066%
Nb2O5	0.036%
SnO2	0.013%
CeO2	0.246%
PbO	0.00%
Th	30 ppm
U	10 ppm



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## Zircon Sand Mineral

Naturally occurring mineral used in ceramics, refractories, foundries, and electronics for its heat-resistant, high-density characteristics and its role as a source of zirconium.

## MMI Zircon Sand Applications

<b>CERAMICS AND REFRACTORIES</b>	Enhances heat resistance in ceramics and refractory products.
<b>FOUNDRY CASTING</b>	Forms precise, heat-resistant molds for metal casting.
<b>ZIRCONIA PRODUCTION</b>	Transformed into high-strength zirconia used in aerospace and medical implants.
<b>CERAMIC GLAZES</b>	Improves appearance and texture in ceramic glazes.
<b>REFRACTORY COATINGS</b>	Used in precision casting processes as a refractory coating.
<b>CHEMICAL INDUSTRY</b>	Provides zirconium compounds for catalysts and coatings.
<b>CASTING CORES</b>	Creates cores for casting intricate metal shapes.
<b>CERAMIC FILTERS</b>	Removes impurities from molten metals in metal casting.
<b>ZIRCONIUM ALLOYS</b>	Used in high-tech applications due to corrosion resistance.
<b>JEWELRY</b>	Gem-quality zircon is used in jewelry for its brilliance.
<b>ELECTRONICS</b>	Zirconium dioxide in electronic ceramics.
<b>OIL AND GAS INDUSTRY</b>	Employed for corrosion resistance and stability.

## About MMI

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## Contact Us

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1451 East 8th Street,  
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### Product Typical Characteristics

- Chemical Composition
- Mineral Structure
- Particle Size and Distribution
- Color and Appearance
- Density
- Heat Resistance
- Purity and Impurities
- Zirconia Content
- Hardness
- Melting Point
- Chemical Reactivity
- Applications and Uses



ZIRCON SAND



MATERIAL	FORM	GRADE
ZIRCON	SAND	#200, #325

PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Color	Reddish brown to white
Density	4.6 to 4.7 g/cm³
Melting Point	2,550 °C
Mohs hardness	7.5
Grain Size	10-300 micrometers

CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
SiO <sub>2</sub>	32.7%
Al <sub>2</sub> O <sub>3</sub>	0.77%
Fe <sub>2</sub> O <sub>3</sub>	0.17%
ZrO <sub>2</sub> +HfO <sub>2</sub>	65.04 %
Th	0.027%
TiO <sub>2</sub>	0.19%
U	0.034%



## Reach Us

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## Alumina Mineral

Naturally occurring mineral with hardness and heat resistance, derived from bauxite through refining processes, serves as a vital precursor for aluminum production.

## MMI Alumina Applications

REFRACTORIES	Alumina's high heat resistance makes it essential for lining furnaces & kilns.
ABRASIVES	Used in grinding wheels and sandpapers for metal and woodworking.
CERAMICS	Forms the backbone of ceramics, providing strength and durability.
ELECTRONICS	Used in semiconductor components and insulators due to its electrical properties.
CATALYSTS	Serves as a catalyst support in chemical processes.
POLISHING COMPOUNDS	Used in lens polishing and glass manufacturing.
FILLER MATERIAL	Enhances the strength and thermal properties of composites.
ARTIFICIAL GEMSTONES	Used to create synthetic gemstones like sapphires.
MEDICAL IMPLANTS	Biocompatible alumina is used in dental and orthopedic implants.
CUTTING TOOLS	Used in cutting inserts and drills for machining applications.
BALLISTIC ARMOR	Provides protection in bulletproof vests and vehicle armor.
HIGH-PURITY ALUMINA (HPA)	High-Purity Alumina (HPA): Used in LED lighting, lithium-ion batteries, and advanced ceramics.

## About MMI

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## Contact Us

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### Product Typical Characteristics

- Chemical Composition
- Crystal Structure
- Color
- Hardness
- Density
- Purity
- Particle Size
- Surface Area
- Grade Classification
- Applications
- Thermal Properties
- Electrical Properties



BROWN FUSED ALUMINA



WHITE FUSED ALUMINA

MATERIAL		FORM	SIZE
ALUMINA		GRITS	0-1 MM
ALUMINA		GRITS	1-3 MM
ALUMINA		GRITS	3-5 MM
ALUMINA		POWDER	#200 MESH

PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Color	Reddish brown to white
Density	4.6 to 4.7 g/cm³
Melting Point	2550 °C
Mohs hardness	7.5
Grain Size	10-300 micrometers

CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
SiO <sub>2</sub>	32.7%
Al <sub>2</sub> O <sub>3</sub>	0.77%
Fe <sub>2</sub> O <sub>3</sub>	0.17%
ZrO <sub>2</sub> +HfO <sub>2</sub>	65.04 %
Th	0.027%
TiO <sub>2</sub>	0.19%
U	0.034%





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## Bauxite Mineral

Bauxite is a naturally occurring mineral rich in aluminum oxides and hydroxides. It's the primary source for aluminum production and is prized for its high alumina content.

## MMI Bauxite Applications

ALUMINUM PRODUCTION	Primary source for extracting aluminum metal.
REFRACTORIES	Used in high-temperature environments, like furnaces.
ABRASIVES	Provides abrasive grit for sandpapers and grinding wheels.
CEMENT	Adds alumina to enhance cement's strength and durability.
PROPPANTS	Used in hydraulic fracturing (fracking) for oil and gas extraction.
CHEMICAL INDUSTRY	Source of aluminum chemicals for various applications.
CERAMICS	Used in the production of ceramic products, like tiles and dinnerware.
MANUFACTURING	Used in the creation of automotive parts and aircraft components.
NON-FERROUS ALLOYS	Used in the production of non-iron alloys.
ENVIRONMENTAL APPLICATIONS	Utilized in water purification and soil remediation.

### Product Typical Characteristics

- Chemical Composition
- Mineral Structure
- Color and Appearance
- Hardness
- Density
- Alumina Content
- Impurities
- Particle Size & Distribution
- Moisture Content
- Refractory Properties
- Cementitious Properties
- Applications and Uses

## About MMI

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## Contact Us

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MATERIAL	FORM	SIZE
BAUXITE	GRITS	0-1 MM
BAUXITE	GRITS	1-3 MM
BAUXITE	GRITS	3-5 MM
BAUXITE	POWDER	#200 MESH

CHEMICAL ANALYSIS

PARAMETERS	MMIB89	MMIB87	MMIB85	MMIB80	MMIB78
Al <sub>2</sub> O <sub>3</sub>	89.5	87.8	85.9	80.15	79.1
Fe <sub>2</sub> O <sub>3</sub>	1.5	1.6	1.7	1.6	1.6
Cao	0.3	0.5	0.4	0.5	0.4
TiO <sub>2</sub>	3.5	3.5	3.56	3.5	3.5
AP	4	6	6	6	7
BD (gm/css)	3.3	3.28	3.25	3.17	3.0

PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Color	white and gray to reddish-brown
Density	2.2 to 2.6 g/cm³
Melting Point	2,072 °C
Mohs hardness	1-3
Grain Size	500 µm to 2,000 µm





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## Magnesia Mineral

It serves as a crucial component in refractories, construction materials, ceramics, and more, thanks to its heat resistance, electrical insulation, and pH-regulating abilities.

## MMI Magnesia Applications

### REFRACTORIES

Essential for furnace linings in steel, cement, and glass production. Improves heat resistance and prolongs equipment life.

### CEMENT AND CONSTRUCTION

Enhances cement formulations for better durability and resistance to harsh conditions. Used in specialty concrete mixes for construction projects.

### METALLURGY

Crucial refractory material in metal smelting and casting operations. Withstands extreme temperatures and chemical reactions.

### CHEMICAL INDUSTRY

Utilized in chemical processes, like magnesium salts production and catalysts. Facilitates chemical reactions and acts as a pH regulator.

### ELECTRICAL INDUSTRY

An excellent electrical insulator, it's used in electrical components like heating elements and insulating materials. Ensures safety in electrical applications.

### AGRICULTURE

Adjusts soil pH to improve nutrient uptake for crops. Corrects acidic soils and enhances agricultural productivity.

### HEALTHCARE

An ingredient in antacids and laxatives to alleviate digestive discomfort. Balances stomach acidity and aids in bowel movements.

### ENVIRONMENTAL REMEDICATION

Used in water treatment to neutralize acidity and remove heavy metals. Helps clean contaminated water sources and mitigate environmental damage.

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### Product Typical Characteristics

- Chemical Composition
- Crystal Structure
- Color and Appearance
- Density
- Hardness
- Melting Point
- Purity and Impurities
- Particle Size & Distribution
- Refractory Properties
- Thermal Conductivity
- Electrical Conductivity
- Applications and Uses

## Contact Us

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FUSED MAGNESIA



DEAD BURNT MAGNESITE

MATERIAL	FORM	SIZE
MAGNESIA	GRITS	0-1 MM
MAGNESIA	GRITS	1-3 MM
MAGNESIA	GRITS	3-6 MM
MAGNESIA	POWDER	#200 MESH

#### CHEMICAL ANALYSIS

PARAMETERS	FUSED MAGNESIA	DEAD BURNT MAGNESIT	DEAD BURNT MAGNESITE
Grade	(2:1) RATIO WITH HIGH CRYSTAL	GRADE 95	GRADE 90
MGO	97%	95%	90%
SIO	0.6%	2%	4.5%
Cao	1.2%	1.5%	2%
Fe <sub>2</sub> O <sub>3</sub>	0.6%	1.2%	1.2%
LOI	0.2%	0.3%	0.33%
BD (gm/css)	3.49	3.20	3.15

#### PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Color	gray, yellow, or brown
Density	2.2 to 3.0 g/cm <sup>3</sup>
Melting Point	2,800 °C
Mohs hardness	5.5 to 6.5
Grain Size	100 μm to 1,000 μm





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## Limonite Mineral

Limonite is a naturally occurring, hydrated iron oxide-hydroxide mineral. It is typically yellow to brown in color & has an earthy to submetallic luster.

## MMI Limonite Applications

### IRON AND STEEL PRODUCTION

**Pig Iron and Steel Manufacturing:** Limonite is used as a source of iron in the production of pig iron and steel. It is smelted in blast furnaces to extract iron, which is then further processed into steel.

### PIGMENTS

**Ochre Pigments:** Limonite is a primary source of natural ochre pigments, which are used in paints, coatings, and dyes. These pigments are valued for their earthy tones and stability.

### CONSTRUCTION MATERIALS

**Concrete and Cement:** Limonite can be used as an additive in concrete and cement to improve certain properties like strength and durability.  
**Road Construction:** It is sometimes used in road construction as a base material or as an aggregate.

### ENVIRONMENTAL APPLICATIONS

**Water Treatment:** Limonite is used in water treatment processes to remove impurities and heavy metals due to its adsorption properties.  
**Soil Amendment:** It can be used to improve soil quality by adding essential nutrients and improving soil structure.

### CATALYSTS

**Chemical Industry:** Limonite is used as a catalyst in various chemical reactions, including the synthesis of ammonia & other industrial chemicals.

### JEWELRY AND ORNAMENTAL USES

**Gemstones:** Although not a traditional gemstone, limonite can be polished and used in jewelry and ornamental items for its unique appearance.

## About MMI

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**Chemical Propertise**  $\text{FeO}(\text{OH}) \cdot n\text{H}_2\text{O}$  (hydrated iron(III) oxide-hydroxide)

Hydration	Contains water of hydration
Solubility	Insoluble in water; soluble in HCl
Reactivity	Reacts with acids; decomposes upon heating
Decomposition	Forms hematite ( $\text{Fe}_2\text{O}_3$ ) and releases water upon heating
Adsorption Capacity	High adsorption for heavy metals and impurities
Thermal Stability	Decomposes at high temperatures

## Contact Us

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LIMONITE POWDER



LIMONITE LUMP

MATERIAL	FORM	SIZE
LIMONITE	SUPER FINE AGGREGATE	4.75 MM - 200 MESH
LIMONITE	FINE COARSE AGGREGATE	4.75 - 10 MM
LIMONITE	MEDIUM COARSE AGGREGATE	10 - 20 MM
LIMONITE	STANDARD COARSE AGGREGATE	20 - 40 MM
LIMONITE LUMP	OVERSIZE AGGREGATE	40 - 63 MM

#### PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Color	Yellow, brown, dark brown
Streak	Yellow to brown
Luster	Earthy to submetallic
Hardness (Mohs)	4 to 5.5
Specific Gravity	2.7 to 4.3
Texture	porous, powdery, granular
Fracture	Uneven or conchoidal
Crystal System	Amorphous
Transparency	Opaque
Magnetism	Weakly magnetic
Porosity	High
Form/Habit	Botryoidal, reniform, stalactitic, earthy masses, or coatings

#### CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
Iron (Fe)	40-60%
Oxygen (O)	25-35%
Water (H <sub>2</sub> O)	10-15%
Silica (SiO <sub>2</sub> )	1-10%
Alumina (Al <sub>2</sub> O <sub>3</sub> )	1-5%
Manganese (Mn)	0.1-2%
Phosphorus (P)	0.01-0.5%
Sulfur (S)	0.01-0.5%
Titanium (Ti)	0.1-1%
Calcium (Ca)	0.1-1%
Magnesium (Mg)	0.1-1%
Other Trace Elements	<1% (combined)





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## Hematite Mineral

It is a naturally occurring iron oxide mineral with the chemical formula  $Fe_2O_3$ . It is the most important ore of iron & is known for its metallic to earthy luster & reddish-brown to black color.

## MMI Hematite Applications

IRON AND STEEL	Primary ore for iron and steel production
PIGMENTS	Red ochre pigment in paints, coatings, and cosmetics
JEWELRY	Polished hematite is used in jewelry and ornamental items
CONSTRUCTION	Heavyweight concrete aggregate for radiation shielding
ENVIRONMENTAL	Water purification and heavy metal removal
ELECTRONICS	Used in magnetic recording media and sensors
MEDICAL	Research into biomedical applications, such as drug delivery
CATALYSTS	Catalyst in chemical reactions, including ammonia production
ENERGY	Research into iron-based batteries and energy storage systems

## About MMI

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**Chemical Propertise**  $Fe_2O_3$  (iron(III) oxide)

Iron Content	69.9% Fe by weight
Solubility	Insoluble in water; soluble in concentrated acids
Reactivity	Stable in air; reduces to magnetite ( $Fe_3O_4$ ) in reducing environments
Thermal Stability	Stable at high temperatures; melts at $-1585^{\circ}C$ ( $2,849^{\circ}F$ )
Electrical Conductivity	Poor conductor of electricity

## Contact Us

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HEMATITE GRANULES



HEMATITE POWDER

MATERIAL	FORM	SIZE
HEMATITE	SUPER FINE AGGREGATE	4.75 MM – 200 MESH
HEMATITE	FINE COARSE AGGREGATE	4.75 – 10 MM
HEMATITE	MEDIUM COARSE AGGREGATE	10 – 20 MM
HEMATITE	STANDARD COARSE AGGREGATE	20 – 40 MM
HEMATITE LUMP	OVERSIZE AGGREGATE	40 – 63 MM

#### PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Color	Reddish-brown to black
Streak	Reddish-brown
Luster	Metallic to earthy
Hardness (Mohs)	5.5 to 6.5
Specific Gravity	4.9 to 5.3
Crystal System	Trigonal (hexagonal)
Transparency	Opaque
Magnetism	Weakly magnetic
Fracture	Uneven to subconchoidal
Cleavage	None

#### CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
Iron (Fe)	69.9%
Oxygen (O)	30.1%
Silica (SiO <sub>2</sub> )	0.1-2%
Alumina (Al <sub>2</sub> O <sub>3</sub> )	0.1-1%
Manganese (Mn)	0.1-1%
Titanium (Ti)	0.1-1%
Magnesium (Mg)	0.1-1%
Calcium (Ca)	0.1-1%
Other Trace Elements	<1% (combined)





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## Goethite Mineral

Goethite is a naturally occurring iron oxyhydroxide mineral with the chemical formula  $\text{FeO}(\text{OH})$ . It is commonly yellow to brown in color and has an earthy to dull luster.

## MMI Goethite Applications

IRON AND STEEL	Secondary iron ore for iron and steel production
PIGMENTS	Yellow ochre pigment in paints, coatings, and dyes
ENVIRONMENTAL	Water treatment for heavy metal removal and soil remediation
CONSTRUCTION	Used as a filler or additive in cement and concrete
AGRICULTURE	Soil amendment to improve iron content and soil structure
JEWELRY	Polished goethite is used in jewelry and ornamental items
CATALYSTS	Catalyst in chemical reactions and industrial processes
GEOLOGICAL STUDIES	Indicator mineral for locating iron ore deposits

## About MMI

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**Chemical Propertise**  $\text{FeO}(\text{OH})$  (iron oxyhydroxide)

Iron Content	82.9% Fe by weight
Solubility	Insoluble in water; soluble in acids
Reactivity	Decomposes to hematite ( $\text{Fe}_2\text{O}_3$ ) upon heating
Thermal Stability	Decomposes at $\sim 200^\circ\text{C}$ ( $392^\circ\text{F}$ ) to release water and form hematite
Adsorption Capacity	High adsorption capacity for heavy metals & impurities

## Contact Us

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GOETHITE



GOETHITE POWDER

MATERIAL	FORM	SIZE
GOETHITE	SUPER FINE AGGREGATE	4.75 MM - 200 MESH
GOETHITE	FINE COARSE AGGREGATE	4.75 - 10 MM
GOETHITE	MEDIUM COARSE AGGREGATE	10 - 20 MM
GOETHITE	STANDARD COARSE AGGREGATE	20 - 40 MM
GOETHITE LUMP	OVERSIZE AGGREGATE	40 - 63 MM

#### PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Color	Yellow, brown, or reddish-brown
Streak	Yellowish-brown
Luster	Earthy to dull
Hardness (Mohs)	5.0 to 5.5
Specific Gravity	3.3 to 4.3
Crystal System	Orthorhombic
Transparency	Opaque
Magnetism	Weakly magnetic
Fracture	Uneven to fibrous
Cleavage	Perfect in one direction

#### CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
Iron (Fe)	62.9%
Oxygen (O)	27.0%
Hydrogen (H)	1.0%
Silica (SiO <sub>2</sub> )	0.1-5%
Alumina (Al <sub>2</sub> O <sub>3</sub> )	0.1-2%
Manganese (Mn)	0.1-1%
Phosphorus (P)	0.01-0.5%
Sulfur (S)	0.01-0.5%
Other Trace Elements	<1% (combined)





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## Magnetite Mineral

Magnetite is a naturally occurring iron oxide mineral with the chemical formula  $Fe_3O_4$ . It is a major source of iron and is known for its strong magnetic properties, making it valuable in industrial, environmental, and technological applications.

## MMI Magnetite Applications

IRON AND STEEL	Primary ore for iron and steel production
HEAVY MEDIA SEPARATION	Used in dense media separation processes for coal and mineral processing
CATALYSTS	Catalyst in ammonia production and Fischer-Tropsch synthesis
ENVIRONMENTAL	Water purification, heavy metal removal, and wastewater treatment
ELECTRONICS	Used in magnetic recording media, sensors, and data storage devices
MEDICAL	Magnetic nanoparticles for drug delivery, hyperthermia, and MRI contrast agents
CONSTRUCTION	Heavyweight concrete aggregate for radiation shielding
PIGMENTS	Black pigment in paints, coatings, and cosmetics
ENERGY	Research into iron-based batteries and energy storage systems

## About MMI

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**Chemical Propertise**  $Fe_3O_4$  (iron(II,III) oxide)

Iron Content	72.4% Fe by weight
Solubility	Insoluble in water; soluble in concentrated acids
Reactivity	Oxidizes to hematite ( $Fe_2O_3$ ) in the presence of oxygen
Thermal Stability	Stable at high temperatures; melts at $-1,597^{\circ}C$ ( $2,907^{\circ}F$ )
Electrical Conductivity	Good conductor of electricity

## Contact Us

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Jacksonville, FL 32206



**MAGNETITE GRANULES**



**MAGNETITE POWDER**

MATERIAL	FORM	SIZE
MAGNETITE	SUPER FINE AGGREGATE	4.75 MM - 200 MESH
MAGNETITE	FINE COARSE AGGREGATE	4.75 - 10 MM
MAGNETITE	MEDIUM COARSE AGGREGATE	10 - 20 MM
MAGNETITE	STANDARD COARSE AGGREGATE	20 - 40 MM
MAGNETITE LUMP	OVERSIZE AGGREGATE	40 - 63 MM

#### PHYSICAL PROPERTIES RESULT

PROPERTIES	RESULT
Color	Black or dark brown
Streak	Black
Luster	Metallic to submetallic
Hardness (Mohs)	5.5 to 6.5
Specific Gravity	5.1 to 5.2
Crystal System	Cubic (isometric)
Transparency	Opaque
Magnetism	Strongly magnetic(ferrimagnetic)
Fracture	Uneven to subconchoidal
Cleavage	None

#### CHEMICAL ANALYSIS

PARAMETERS	PERCENTAGE VALUE
Iron (Fe)	72.4%
Oxygen (O)	27.6%
Silica (SiO <sub>2</sub> )	0.1-2%
Alumina (Al <sub>2</sub> O <sub>3</sub> )	0.1-1%
Manganese (Mn)	0.1-1%
Titanium (Ti)	0.1-1%
Magnesium (Mg)	0.1-1%
Calcium (Ca)	0.1-1%
Other Trace Elements	<1% (combined)