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# 01 Company Profile

## SHENGGAODA

Shenggaoda Metallurgical Refractory Co., Ltd. is a high-tech enterprise integrating research and development, production and sales. It focuses on high-quality ferroalloys and metallurgical refractory materials.

Since its establishment in 2017, the company has built its own production base and advanced production technology, and is committed to providing stable and efficient products and customized solutions for the global steel, casting and non-ferrous metal industries.



## Why Choose Us?

- ✓ Own modern production base with advanced facilities
- ✓ Strict quality control with ISO 9001 certification
- ✓ Environmentally responsible manufacturing (ISO 14001)
- ✓ Certified occupational health & safety management (ISO 45001)
- ✓ Hazardous Chemical Operation License holder
- ✓ 8+ years of industry expertise

01

# COMPANY PROFILE

## Strategic Location & Our Factory

The company is located in Anyang City, Henan Province - an important heavy industrial base and steel city in China. We fully utilize the abundant local mineral resources and mature industrial chain to ensure a stable supply of raw materials and enjoy a significant cost advantage.

Our factory is situated in Long'an District, Anyang City. It is a modern and specialized ferroalloy smelting base that integrates raw material pretreatment, smelting, processing, and packaging. The factory is adjacent to major transportation arteries, with a well-developed logistics network that enables rapid connection to major export ports such as Tianjin Port and Qingdao Port, providing efficient and punctual delivery guarantees for domestic and international customers.



## 02 Technical Capabilities



### Production Strength

- **Advanced Smelting Equipment:**  
Multiple high-power submerged arc furnaces and refining
- **Complete Processing Lines:**  
Automated crushing, screening, grinding, and packaging systems
- **Customization Service:**  
Various sizes available (lumps, granules, powders)
- **Annual Capacity:**  
80,000MT

## 02 Technical Capabilities

### Quality Assurance

Our ISO 9001 certified quality system ensures:

- **Raw Material Inspection:**

Strict chemical analysis of all incoming materials

- **Process Control:**

Real-time monitoring of smelting parameters

- **Final Product Testing:**

Comprehensive lab testing including spectral analysis

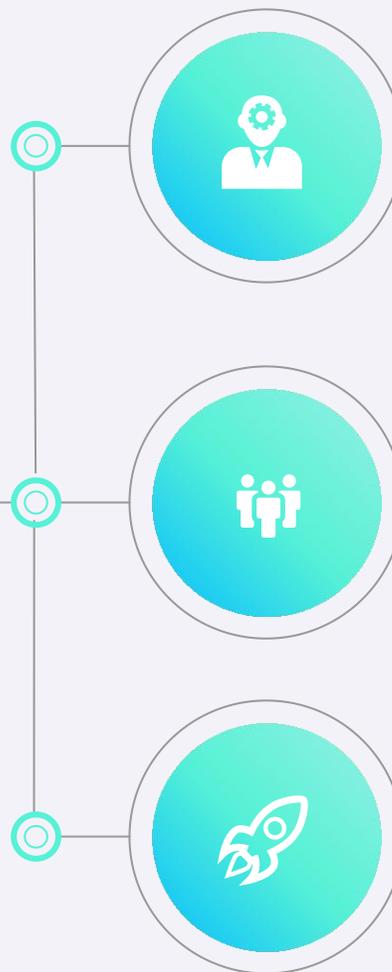
- **Traceability:**

Complete tracking from order to delivery



## Professional Team & Services

Our team is the most valuable asset of the company. Under the framework of the occupational health and safety management system, we regularly provide safety and skills training for our employees to ensure the professional standardization of operation procedures and offer comprehensive professional services to our clients.



### **Experienced management Team**

Core management personnel have been deeply involved in the metallurgical industry for decades and are proficient in both production and marketing

### **Tightly skilled technical engineers Team**

Responsible for process optimization, new product development, and solving technical problems for customers

### **Efficient foreign trade service team**

Proficient in multiple languages and international business, providing a "one-stop" service from inquiry, technical connection to customs clearance and logistics

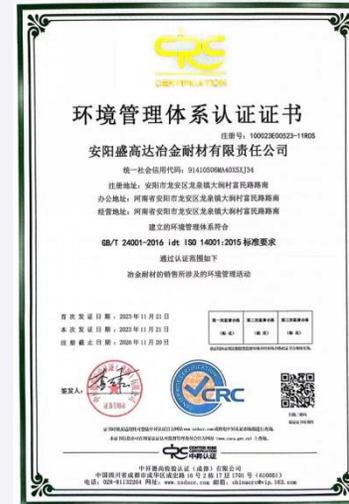
## Our Certifications



**ISO 14001**  
2015 Environmental  
Management System



**ISO 45001**  
2018 Occupational Health &  
Safety Management System



**ISO 9001**  
2015 Quality  
Management System

# 02

# Technical Capabilities

## Our Certifications



**Hazardous Chemical Operation License**



**AAA-rated credit enterprise**

## MAIN PRODUCT

### **Ferrosilicon Alloys**

- Ferrosilicon
- Ferrochrome
- Ferromolybdenum
- Ferrovandium
- Ferrophosphorus

### **Silicon Alloys**

- Silicon Metal
- Calcium Silicon
- Aluminum Silicon
- Barium Silicon
- Ferrosilicon Magnesium

### **High Carbon Alloys**

- Silicon Carbide
- High Carbon Silicon
- Recarburiser
- Silicon Carbon Alloy

### **Manganese Alloys**

- Manganese Metal
- Electrolytic Manganese
- Silicon Manganese
- Ferromanganese

03

## Main Product

# Applications

### Steelmaking

- Deoxidizers: Improve steel purity and quality
- Alloy Additives: Enhance strength, hardness, and toughness of steel products

### Foundry Industry

- Inoculants: Improve metal fluidity and casting performance
- Property Enhancers: Reduce casting defects, improve mechanical properties

### Non-Ferrous Metallurgy

- Alloying Elements: Strengthen aluminum and other non-ferrous alloys
- Performance Optimizers: Enhance corrosion resistance and durability



# 03 Main Product

## Ferrosilicon (FeSi)

**Model Number:** FeSi 65/ 72/ 75/

**Material:** Si, Al, Ca, C, P, S, Fe

**Shape:** Powder, Granule, Lumps, Briquette

**Particle Size:** 10-50mm, 50-100mm, 0-3mm, 3-10mm, Customisation Accepted

**Usage:** Deoxidizer, Alloying agent, Inoculant

**Packing:** 1000kg per bag or as your requirements.



## Product Description

**Ferrosilicon** is an alloy composed of iron and silicon (with a silicon content of 7%-90%). Its core uses are as a deoxidizer and alloy additive in steelmaking, and it is also a key inoculant in the casting industry.

- **Strong Deoxidizing Ability:** At high temperatures, silicon bonds with oxygen to form SiO<sub>2</sub> (melting point: 1723°C), effectively removing oxygen from molten steel and reducing pores/inclusions.
- **Physical Properties:** Melting point (1200-1300°C) is higher than pure iron; hard, brittle, unforgeable/unrollable, usually lumpy or granular.
- **Alloying Effect:** Adds to steel: boosts hardness, wear/corrosion resistance; adds to cast iron: enhances mechanical properties.

## Applications

- **Steelmaking (over 70% usage):** Preferred deoxidizer (3-5 kg/ton of steel); also alloying agent for special steels (e.g., silicon steel, spring steel) to boost magnetic permeability or elasticity.
- **Casting:** Inoculant for cast iron – refines grains, reduces shrinkage cracks, and improves strength/toughness.
- **Others:** Makes silicon-based alloys (e.g., silicomanganese); acts as a reducing agent (e.g., auxiliary for ferrochrome production).

## Specifications

Grades	Chemical Composition(%)				
	Si	Al≤	Ca≤	P≤	C≤
FeSi45	40.0 - 47.0	2.0	0.7	0.04	0.20
FeSi65	65.0 - 72.0	1.5	0.6	0.04	0.20
FeSi72	≥72.0	1.0	1.0	0.04	0.20
FeSi75-A	74.0 - 80.0	0.5	1.0	0.035	0.20
FeSi75Al1.5-A	≥75.0	1.5	1.0	0.035	0.10
FeSi75-B	72.0 - 80.0	1.0	1.0	0.04	0.20
FeSi90Al1.5	87.0 - 95.0	1.5	1.5	0.04	0.20
TFeSi75-A	74.0 - 80.0	0.03	0.03	0.02	0.015

# 03 Main Product

## Silicon Metal (Si)

**Model Number:** Silicon Metal 3303/441/553

**Material:** Si, Fe, Al, Ca, P

**Shape:** Powder, Lumps, Briquette

**Particle Size:** 0-5mm, 10-50mm, 50-100mm,

Customisation Accepted

**Usage:** Aluminum alloys, Chemical, Solar energy,

Steel making

**Packing:** 1000kg per bag or as your requirements.



## Product Description

**Silicon Metal** is a product obtained by reducing quartz sand (mainly composed of  $\text{SiO}_2$ ) with carbon at high temperatures. Its silicon content usually ranges from 98.5% to 99.8%.

- **Physical:** Gray-black solid with metallic luster at room temperature; high melting point (~1410°C), hard and brittle, cannot be forged or stretched like metals.
- **Chemical:** Stable at room temperature (no reaction with air/water); reacts with oxygen/chlorine at high temperatures to form  $\text{SiO}_2$  or  $\text{SiCl}_4$  (critical for further processing).
- **Electrical:** Has semiconductor properties but weak conductivity due to impurities; needs purification (over 99.9999%) for electronics use.

## Applications

- **Metallurgy:** Added to aluminum/magnesium alloys to boost strength, hardness and wear resistance (used in auto parts, aerospace materials).
- **Chemistry:** Converted to organosilicon (silicone rubber, oil) or polysilicon (core material for photovoltaics, semiconductors).
- **Electronics:** High-purity silicon (electronic-grade) is made into wafers for chips, diodes and transistors.

## Specifications

Grades	Chemical Composition(%)				
	Si $\geq$	Fe $\leq$	Al $\leq$	Ca $\leq$	P $\leq$
1101	99.79	0.1	0.1	0.01	0.004
2202	99.58	0.2	0.2	0.02	0.004
3303	99.37	0.3	0.3	0.03	0.005
441	99.1	0.4	0.4	0.1	-
553	98.7	0.5	0.5	0.3	-
poly-Si	99.99	0.15	0.15	0.01	30ppm

# 03 Main Product

## Silicon Carbide (SiC)

**Model Number:** SiC98.5/ 97/ 95/ 90/ 80  
**Material:** SiC, F.C, SiO<sub>2</sub>, Fe<sub>2</sub>O<sub>3</sub>, Al<sub>2</sub>O<sub>3</sub>  
**Shape:** Block, Granule, Powder, Briquette  
**Particle Size:** 0-5mm, 10-50mm, 10-100mm,  
 Customisation Accepted  
**Usage:** Deoxidizer, Additive  
**Packing:** 1000kg per bag or as your requirements.



### Product Description

Silicon Carbide (SiC) is a synthetic compound formed by covalent bonding between silicon and carbon. The mainstream production processes are the Acheson process (low-cost mass production with relatively low purity) and the Physical Vapor Transport (PVT) method (high-purity single crystals for semiconductors).

- **Physical Properties:** Mohs hardness of 9.5 (close to diamond), high temperature resistance (long-term use at 1600°C), and high thermal conductivity (nearly 1/3 that of copper);
- **Chemical Properties:** Resistant to strong acids and alkalis (except hydrofluoric acid), and forms an oxide protective layer on the surface at high temperatures;
- **Electrical Properties:** Wide bandgap (3 times that of silicon) and high breakdown field strength (10 times that of silicon), suitable for high-voltage, low-loss devices.

### Applications

- **Semiconductor/Electronics:** New energy vehicle inverters, photovoltaic inverters (using SiC MOSFETs, featuring small size and low energy consumption);
- **Aerospace:** Turbine blades, spacecraft thermal protection tiles (high temperature resistance and thermal shock resistance);
- **Energy/Environmental Protection:** Nuclear reactor fuel rod cladding, heat exchangers for solar thermal power generation (resistant to extreme environments);
- **Industrial Wear Resistance:** Mine pipeline liners, grinding balls (wear resistance 100 times that of metals).

### Specifications

Grades	Chemical Composition(%)					
	SiC≥	F.C≤	Fe <sub>2</sub> O <sub>3</sub> ≤	SiO <sub>2</sub> ≤	Al <sub>2</sub> O <sub>3</sub> ≤	Other≤
SiC98.5	98.5	0.2	0.1	0.3	0.1	0.5
SiC97	97.0	0.5	0.4	0.5	0.3	1.0
SiC95	95.0	0.5	0.7	1.0	0.5	1.5
SiC90	90.0	1.0	1.0	1.5	1.0	2.0
SiC80	80	2.5	2.0	8.0	1.5	3.0
SiC70	75	3.5	2.0	12.0	1.5	3.0

# 03 Main Product

## Manganese Metal (Mn)

**Model Number:** Mn 95,Mn97,Mn 997

**Material:** Mn, Si, C, P, S, Fe

**Shape:** Block, Granular, Faky, Powder

**Particle Size:** 10-100mmmm, 1-5mm, 3-10mm, 80-325 mesh, Customisation Accepted

**Usage:** Deoxidizer, Desulfurizer, Alloying

**Packing:** 1000kg per bag or as your requirements.



## Product Description

**Manganese Metal** typically has a purity of  $\geq 95\%$ , produced via electrolysis (for high-purity Mn,  $\geq 99.7\%$ ) or silicothermic reduction (for industrial-grade Mn, 95%-98%), and is mainly used as a high-end alloy additive, battery material, and precision industrial feedstock.

- **Physical:** Silvery-gray, forms oxide film; melting point 1244°C; hard/brittle at room temp, ductile at 800-1000°C.
- **Chemical:** Reacts slowly with water/dilute acids; oxidizes in air (protective MnO<sub>2</sub> film); high-purity Mn resists weak acids.
- **Metallurgical:** Enhances alloy strength/toughness; better than alloys at removing O/S from molten steel.

## Applications

- **Steel Industry (60% of industrial-grade Mn usage):** Adds to high-end/low-alloy steel (boosts toughness by 20-30%); replaces nickel in stainless steel.
- **Non-Ferrous Alloy Sector (25% usage):** 1-3% in Al/Mg alloys (corrosion resistance); in Cu alloys (precision parts).
- **Battery & Electronics Industry (10% usage, fastest-growing sector):** Ultra-high-purity Mn for Li-ion battery cathodes (EVs, storage); magnetic materials.

## Specifications

Grades	Chemical Composition(%)					
	Mn $\geq$	C $\leq$	Si $\leq$	Fe $\leq$	P $\leq$	S $\leq$
JMnA98	98	0.05	0.3	1.5	0.03	0.02
JMnA97-A	97	0.05	0.4	2	0.03	0.02
JMnA96-A	96.5	0.05	0.5	2.3	0.03	0.02
JCMn98	98	0.04	0.3	1.5	0.02	0.04
JCMn97	97	0.05	0.4	2	0.03	0.04

# 03 Main Product

## Ferrochrome (FeCr)

**Model Number:** HCFeCr , MCFeCr, LCFeCr,

Micro FeCr, Ultra-LC-FeCr

**Material:** Cr, Fe, C, Si, P, S

**Shape:** Lumps

**Particle Size:** 50-100mm, Customisation Accepted

**Usage:** Aluminum alloys, Chemical

**Packing:** 1000kg per bag or as your requirements.



## Product Description

**Ferrochrome** is an iron-chromium alloy made by carbothermally reducing chromite ore with coke (reducing agent) and iron ore in ore-smelting furnaces (1,800–2,000°C).

- **Alloying Power:** Forms stable Fe-Cr solid solutions, boosting steel's corrosion resistance (e.g., Cr≥12% in stainless steel creates passive film), high-temp strength, and hardness—critical for stainless/tool steels.
- **Physical:** High melting point (1,600–1,800°C, rises with Cr); hard/brittle (lump/granular, non-forgable); density ~7.1–7.5g/cm<sup>3</sup> (mixes well with molten steel).
- **Chemical Stability:** Resists oxidation at room temp; high-temp forms Cr<sub>2</sub>O<sub>3</sub> (2,435°C) to aid deoxidation. Resists weak acids/alkalis—suitable for humid/corrosive conditions.
- **Carbon Impact:** High-carbon: low-cost, strong deoxidation + alloying. Low-carbon/ultra-low-carbon: ultra-low C (≤0.1%), for premium low-impurity steels (e.g., food/aerospace grades).

## Applications

- **Steelmaking Industry:** Used as a deoxidizer to remove excess oxygen in molten steel, preventing the formation of oxide inclusions and improving steel quality. It also acts as an inoculant in cast iron production to refine the grain structure.
- **Alloy Additive:** Added to special steels (e.g., high-speed steel, stainless steel) to adjust the content of calcium and silicon, enhancing the steel's toughness and wear resistance.
- **Other Fields:** Used in the production of calcium silicide ceramics and as a reducing agent in the extraction of certain rare metals.

## Specifications

Grades	Chemical Composition(%)				
	Cr	C	Si	P	S
HC-FeCr	4.0-10.0	45.0-52.0	5.00	0.04	0.06
MC-FeCr	0.5-4.0	50.0-60.0	3.00	0.03	0.05
LC-FeCr	0.15-0.5	60.0-70.0	2.00	0.03	0.04
Micro-C-FeCr	≤0.15	63.0-75.0	1.50	0.03	0.03
Ultra-LC-FeCr	≤0.03	65.0-72.0	1.00	0.02	0.02

# 03 Main Product

## Calcium Silicon (CaSi)

**Model Number:** Ca30Si60, Ca30Si55, Ca28Si60, Ca28Si55

**Material:** Ca, Si, Fe, Al, C, Ti, P

**Shape:** Lumps, Granule, Powder

**Particle Size:** 1-5mm, 1-10mm, 10-50mm,

Customisation Accepted

**Usage:** Deoxidizer, Incubator



### Product Description

**Calcium Silicon**, often abbreviated as CaSi, is a ferroalloy composed primarily of calcium (Ca) and silicon (Si), with trace amounts of iron (Fe) and other impurities. Its chemical formula is typically expressed as CaSi<sub>2</sub>, but the actual calcium content can range from 28% to 35%.

**Alloying Power:** Forms stable Fe-Cr solid solutions, boosting steel's corrosion resistance (e.g., Cr≥12% in stainless steel creates passive film), high-temp strength, and hardness—critical for stainless/tool steels.

- **Physical:** Grayish-white or silver luster; brittle at room temperature; melts at around 1030-1050°C.
- **Chemical :** Reacts easily with oxygen, sulfur, and nitrogen in molten steel; has strong deoxidation and desulfurization capabilities.
- **Mechanical :** Low mechanical strength; easily crushed into small particles for adding into molten steel.

### Applications

- **Steelmaking Industry (>90% Share)**
- **Stainless steel:** Critical for rust/acid resistance (e.g., 304/316 grades).
- **Tool/die steel:** Enhances hardness/wear resistance (HRC 55–60).
- **Structural steel:** Improves low-temp toughness/weldability (bridges/machinery).
- **Foundry:** Directly makes wear-resistant castings (e.g., crusher liners, HRC≥50, 3–5× longer life than cast iron).
- **Others:** Produces Cr-based alloys (Ni-Cr heating elements, Cr-Mo high-temp pipes); acts as reducing agent in non-ferrous smelting (e.g., titanium alloys).

### Specifications

Grades	Chemical Composition(%)						
	Si	Ca≥	Fe≥	Al<	C≤	Ti≤	P≤
Ca31Si60	50-65	31	4	2.5	1	0.3	0.07
Ca28Si60	50-65	28	4	2.5	1	0.3	0.07
Ca24Si60	55-65	24	4	2.5	1	0.3	0.04
Ca20Si55	50-60	20	4	2.5	1	0.3	0.04
Ca16Si55	50-60	16	4	2.5	1	0.3	0.04

# 03 Main Product

## High Carbon Silicon

**Model Number:** DJMn-G, DJMn-D, DJMn-P

**Material:** Mn, Si, C, P, S, Se, Fe

**Shape:** Block, Granule, Powder, Bid Package

**Particle Size:** 1-3mm, 10-50mm, 10-100mm, 10-60mm, Customisation Accepted

**Usage:** Deoxidation, Alloying, Nodulizer

Desulfurization, Nurturing, Reduction

**Packing:** 1000kg per bag or as your requirements.



## Product Description

**High Carbon Silicon**, Also called silicon-carbon alloy, a ferroalloy mainly composed of Si (50%-70%) and C (10%-30%), with small amounts of S, P impurities.

- **Dual functions of deoxidation + carburization:** removes oxygen from molten steel and supplements C at high temp;
- **Physical properties:** High melting point: approximately 1680°C, High density and hardness: It is usually supplied in block or granular form., Thermal stability: not prone to deformation at high temperatures.;
- **Chemical stability:** usually  $S \leq 0.05\%$ ,  $P \leq 0.05\%$ , to prevent pollution of molten steel and ensure stable deoxidation effect.

## Applications

- **Steelmaking industry** (accounting for over 70%):
  - Deoxidizer: replaces traditional deoxidizers, cuts costs and increase recovery rate .
  - Alloying: Enhance the hardness, wear resistance and magnetic permeability of steel.
  - Desulfurization aid: can reduce the sulfur content in steel water .
- **Foundry industry:** Refines cast iron grains, reduces casting cracks;
- **Silicon-based alloy production:** It is used as raw material to prepare silicon-manganese alloy, silicon-aluminum alloy, etc.
- **Reducing agent:** It is used as an auxiliary reducing agent in the smelting process of ferrochrome, ferromanganese, etc.

## Specifications

Grades	Chemical Composition(%)						
	Mn≥	C≤	S≤	P≤	Si≤	Se≤	Fe≤
<b>DJMn-G</b>	99.95	0.01	0.03	0.001	0.002	0.0003	0.006
<b>DJMn-D</b>	99.9	0.02	0.04	0.002	0.004	0.001	0.01
<b>DJMn-P</b>	99.8	0.03	0.04	0.002	0.01	0.08	0.03

# 03 Main Product

## Electrolytic Manganese (Mn)

**Model Number:** JMnA98, JMnA97-A, JMnA96-A  
JCMn98, JCMn97

**Material:** Mn, Si, C, P, S, Fe

**Shape:** Block, Granular, Faky, Powder

**Particle Size:** Thickness: 0.5-2mm,

**Length:** 50-150mm, Width: 30-100mm

**Usage:** Deoxidizer, Desulfurizer, Alloying

**Packing:** 1000kg per bag or as your requirements.



### Product Description

**Electrolytic Manganese Flakes** is high-purity metallic manganese in flake form, produced via electrolysis—using manganese ore as raw material, leaching with acid to get manganese sulfate solution, then depositing manganese on the cathode, followed by washing, drying and stripping. Manganese content is usually  $\geq 99.5\%$ .

- **High Purity:** Mn content  $\geq 99.5\%$  (up to 99.95% for premium grades); ultra-low impurities ( $S \leq 0.04\%$ ,  $P \leq 0.002\%$ ,  $Fe \leq 0.03\%$ ).
- **Physical Traits:** Silvery-gray, flat flakes (0.5-2mm thick); brittle (easily crushed to powder), with a protective oxide film resisting oxidation.
- **Chemical Stability:** Resists weak acids/bases at room temperature; reacts with strong oxidizers; effective for deoxidation/alloying at high temperatures.

### Applications

- **Batteries:** Core material for Li-ion battery cathodes ( $LiMn_2O_4$ , NCM); high-purity grades boost cycle life and safety.
- **High-End Alloys:** Added to Al/Mg alloys (e.g., 5052) for corrosion resistance; used in Mn-Cu precision resistors and aerospace titanium alloys.
- **Electronics:** Produces Mn-Zn ferrites (low magnetic loss) for transformers; used in semiconductor packaging (minimizes signal interference).
- **Chemicals/Env Protection:** Catalyst for organic synthesis; adsorbent for heavy metal removal in wastewater.

### Specifications

Grades	Chemical Composition(%)					
	Mn $\geq$	C $\leq$	Si $\leq$	Fe $\leq$	P $\leq$	S $\leq$
JMnA98	98	0.05	0.3	1.5	0.03	0.02
JMnA97-A	97	0.05	0.4	2	0.03	0.02
JMnA96-A	96.5	0.05	0.5	2.3	0.03	0.02
JCMn98	98	0.04	0.3	1.5	0.02	0.04
JCMn97	97	0.05	0.4	2	0.03	0.04

# 03 Main Product

## Ferromolybdenum (FeMo)

**Model Number:** FeSi 65/ 72/ 75/

**Material:** Mo, Si, C, P, S, Cu, Fe

**Shape:** Powder, Granule, Lumps

**Particle Size:** 0-1mm , 1-10mm, 10-100mm,

Customisation Accepted

**Usage:** A critical additive in casting

**Packing:** 1000kg per bag or as your requirements



### Product Description

**Ferromolybdenum** is an iron-molybdenum alloy primarily composed of molybdenum (Mo: 50%-75%) and iron, with trace impurities like carbon, silicon, sulfur, and phosphorus. It is produced by reducing molybdenum ores (e.g., molybdenite) with iron and carbon in submerged arc furnaces, serving as a key additive in steelmaking to introduce molybdenum into alloys efficiently.

- High melting point (~1800°C), for high-temperature steelmaking.
- Boosts steel’s hardness, strength, and creep resistance via stable carbide formation.
- Enhances corrosion/oxidation resistance; balances strength and toughness in alloys.
- Low impurities (S, P ≤0.05%) to protect steel quality.

### Applications

- **Steelmaking:**
  - HSLA steels (bridges, pipelines) for added strength.
  - Heat-resistant steels (boilers, turbines) for high-temperature stability.
  - Stainless steels (316/317 grades) for corrosion resistance.
  - Tool steels for improved wear resistance.
- **Cast irons:** Refines structure for stronger automotive parts (e.g., crankshafts).
- **Superalloys:** Used in aerospace (jet engines) for high-temperature performance.

### Specifications

Grades	Chemical Composition(%)					
	Mo	Si≤	S≤	P≤	C≤	Cu≤
FeMo70	65.0 - 75.0	1.5	0.1	0.05	0.1	0.5
FeMo70Cu1	65.0 - 75.0	2	0.1	0.05	0.1	1
FeMo70Cu1.5	65.0 - 75.0	2.5	0.2	0.1	0.1	1.5
FeMo60 - A	55.0 - 65.0	1	0.1	0.04	0.1	0.5
FeMo60 - B	55.0 - 65.0	1.5	0.1	0.05	0.1	0.5
FeMo60 - C	55.0 - 65.0	2	0.15	0.05	0.2	1
FeMo60	≥60.0	2	0.1	0.05	0.15	0.5
FeMo55 - A	≥55.0	1	0.1	0.08	0.2	0.5
FeMo55 - B	≥55.0	1.5	0.15	0.1	0.25	1

# 03

## Main Product

### Aluminum Silicon (Al-Si Alloys)

**Model Number:** FeAl52Si5, FeAl42Si15, FeAl32Si25

**Material:** Si, Al, Mn, C, P, S

**Shape:** Plates, Strips, Powders, Ingots

**Particle Size:** Ingots  $\phi$ 6.35mm,  $\phi$ 12.7mm, Powders 45 $\mu$ m-106, 14 $\mu$ m-45 $\mu$ m, Customisation Accepted

**Usage:** Alloy, Casting industry

**Packing:** 1000kg per bag or as your requirements



### Product Description

**Aluminum Silicon (Al-Si alloys)** are a class of aluminum-based alloys where silicon (Si) is the primary alloying element, typically containing 5%-25% silicon, along with minor additions of copper (Cu), magnesium (Mg), or nickel (Ni) to tailor properties. They are produced via casting (most common) or powder metallurgy, leveraging silicon's ability to improve castability and wear resistance of aluminum.

- **High castability:** Low melting point, minimal shrinkage—ideal for complex shapes.
- **Good wear resistance:** Hard Si particles resist abrasion.
- **Lightweight:** Density  $\sim$ 2.6-2.8 g/cm<sup>3</sup> (30% lighter than steel).
- **Decent corrosion resistance:** Natural oxide layer protects against mild environments.
- **Good thermal conductivity:** Suitable for heat-dissipation parts.
- **Cost-effective:** Lower cost than high-strength Al alloys.

### Applications

- **Automotive:** Engine parts (cylinder heads, pistons), transmission housings (castability, heat resistance).
- **Electronics:** Heat sinks (LEDs, CPUs) and device casings (thermal conductivity, corrosion resistance).
- **Industrial:** Pump housings, bearing sleeves (wear resistance).
- **Aerospace:** Secondary structures (brackets, heat shields) for weight/strength balance.

### Specifications

Grades	Chemical Composition(%)					
	Si $\geq$	Al $\geq$	Mn $\leq$	C $\leq$	P $\leq$	S $\leq$
FeAl52Si5	5	52	0.2	0.2	0.02	0.02
FeAl47Si10	10	47	0.2	0.2	0.02	0.02
FeAl42Si15	15	42	0.2	0.2	0.02	0.02
FeAl37Si20	20	37	0.2	0.2	0.02	0.02
FeAl32Si25	25	32	0.2	0.2	0.02	0.02
FeAl27Si30	30	27	0.4	0.4	0.03	0.03
FeAl22Si35	35	22	0.4	0.4	0.03	0.03
FeAl17Si40	40	17	0.4	0.4	0.03	0.03

# 03 Main Product

## Recarburiser

**Model Number:** Graphitized Recarburiser, Calcined Petroleum Coke Recarburiser, Calcined Coal Recarburiser, Natural Graphite Recarburiser

**Material:** FC, S, Ash, N, Volatiles,

**Shape:** Powder, Granule, Lumps

**Particle Size:** 1-5mm and 3-8mm, 0.5-3mm, 10-30mm

**Usage:** Casting, Steelmaking, Special needs

**Packing:** 25kg woven bags, 1000kg per bag



## Product Description

**Recarburiser** is an additive used in steel smelting and casting processes to supplement carbon content in molten metal. Its primary role is to adjust the carbon content in metals to a target range, optimizing their mechanical properties (e.g., hardness, strength) and processability. It is primarily composed of carbon (C), typically produced via graphitization, calcination, or similar processes, with low levels of impurities (ash, sulfur, nitrogen, etc.). High fixed carbon ( $\geq 85\%$ , up to 98% for premium grades).

- **High fixed carbon** ( $\geq 85\%$ , up to 98% for premium grades).
- **Low impurities** ( $S \leq 0.05\%$ ,  $ash \leq 5\%$ ) to avoid contamination.
- **Good reactivity**, with carbon absorption rates of 60%-95% (varies by type).
- **Stable**, non-hygroscopic, and available in various particle sizes.

## Applications

- **Steelmaking:** Adjusts carbon levels in electric/converter furnaces to enhance hardenability and wear resistance.
- **Casting:** Boosts carbon in gray/ductile iron to improve machinability and graphite formation.
- **Other:** Used in powder metallurgy (as carbon source) and welding materials (to optimize welds).

## Specifications

Type	Raw Material	Fixed Carbon	Main Impurities
Graphitized Recarburiser	Petroleum coke, pitch coke	$\geq 98\%$	$S \leq 0.05\%$ , $Ash \leq 1\%$ , $N \leq 0.02\%$
Calcined Petroleum Coke Recarburiser	Petroleum coke (calcined)	90%-95%	$S \leq 0.5\%$ , $Ash \leq 3\%$ , $N \leq 0.3\%$
Calcined Coal Recarburiser	Anthracite (high-temperature calcined)	85%-90%	$S \leq 0.3\%$ , $Ash \leq 8\%$ , $Volatiles \leq 1\%$
Natural Graphite Recarburiser	Natural flake graphite	90%-95%	$S \leq 0.1\%$ , $Ash \leq 5\%$ , $Moisture \leq 0.5\%$

# 03 Main Product

## Silicon Manganese

**Model Number:** FeMn65Si20, FeMn60Si25, FeMn60Si20, FeMn55Si25, FeMn55Si18

**Material:** Mn, Si, C, P, S, Fe

**Shape:** Granule, Lumps

**Particle Size:** 10-100mm, 5-50mm, custom sizes

**Usage:** key deoxidizer, desulfurizer, alloying agent

**Packing:** 25kg woven bags, 1000kg per bag



### Product Description

Silicon manganese (Si-Mn alloy) is a ferroalloy composed primarily of silicon (Si), manganese (Mn), and iron (Fe), produced by smelting manganese ore, silica, and coke in submerged arc furnaces. It serves as a key deoxidizer, desulfurizer, and alloying agent in steelmaking, efficiently introducing both silicon and manganese into molten steel to enhance performance.

- **Dual Alloying Effect:** Combines silicon and manganese for dual alloying effects, enhancing steel strength and toughness.
- **Strong deoxidation/desulfurization** capabilities, reducing impurities in molten metal.
- **High melting point** (~1200-1350°C) suitable for high-temperature steelmaking.
- **Cost-effective** alternative to using pure silicon and manganese separately.

### Applications

- **Steelmaking:Alloying:** Added to carbon steel, low-alloy steel, and stainless steel to boost strength, hardness, and wear resistance (e.g., construction steel, automotive gears).  
Deoxidation/Desulfurization: Removes oxygen and sulfur to prevent brittleness in finished steel.
- **Casting Industry:** Adjusts manganese levels in cast irons (gray iron, ductile iron) to refine graphite structure and improve mechanical properties (e.g., engine blocks, machine tool parts).
- **Other Fields:** Used in welding electrodes to stabilize arcs and improve weld toughness. As a reducing agent in metallurgical processes for certain non-ferrous metals.

### Specifications

Grades	Chemical Composition(%)					
	Mn	Si	C≤	P≤	S≤	Fe
FeMn65Si20	60.0-70.0	18.0-22.0	0.5	0.15	0.04	Balance
FeMn60Si25	55.0-65.0	23.0-27.0	0.5	0.15	0.04	Balance
FeMn60Si20	55.0-65.0	18.0-22.0	0.5	0.15	0.04	Balance
FeMn55Si25	50.0-60.0	23.0-27.0	0.5	0.2	0.05	Balance
FeMn55Si18	50.0-60.0	17.0-20.0	0.5	0.2	0.05	Balance

# 03 Main Product

## Ferrovanadium

**Model Number:** FeV80, FeV50, FeV40

**Material:** V, C, Si, P, S, Fe

**Shape:** Granule, Lumps

**Particle Size:** 10-50mm , 5-25mm , and custom sizes

**Usage:** Deoxidation, Desulfurization, Alloying

**Packing:** 25kg woven bags, 1000kg per bag or as your requirements



## Product Description

**Ferrovanadium** is a ferroalloy primarily composed of vanadium (V) and iron (Fe), produced by reducing vanadium ore (e.g., vanadinite) with iron in electric furnaces. It serves as a key vanadium source in steelmaking and alloy production, used to introduce vanadium into metals for enhanced mechanical properties.

- **High vanadium content** (35%-85%), enabling efficient alloying.
- **Strong Grain Refinement:** Refines metal grain structure via vanadium carbides (VC), boosting strength and toughness.
- **Enhances hardenability** and wear resistance in steels.
- **Heat Resistance:** Improves high-temperature stability of alloys.
- **Low impurities** (C, Si, S, P) to preserve base metal quality.

## Applications

- **Steelmaking:** Strengthens structural steel (bridges, buildings), automotive parts (axles, gears), and tool steels (cutting tools); enhances stainless steel corrosion resistance.
- **Aerospace/Defense:** Used in high-performance alloys for aircraft engine components, missile parts, and armor plating (balances strength and weight).
- **Special Alloys:** Added to titanium alloys to improve creep resistance (e.g., for jet engine turbine blades). Used in superconducting alloys and magnetic materials for specialized industrial applications.

## Specifications

Grade	Chemical Composition(%)					
	V	C≤	Si≤	P≤	S≤	Fe
FeV80-A	75.0-85.0	0.06	2	0.05	0.05	Balance
FeV80-B	75.0-85.0	0.1	2.5	0.06	0.05	Balance
FeV50-A	45.0-55.0	0.1	3	0.08	0.05	Balance
FeV50-B	45.0-55.0	0.2	4	0.1	0.05	Balance
FeV40	35.0-45.0	0.3	5	0.1	0.05	Balance

# 03 Main Product

## Ferromanganese

**Model Number:** FeMn90C7.5, FeMn80C8.0, FeMn80C2.0, FeMn75C1.5, FeMn85C0.7

**Material:** Si, Mn, C, P, S, Fe

**Shape:** Granule, Lumps

**Particle Size:** 10-60mm , 5-30mm , and custom sizes

**Usage:** Deoxidation, Desulfurization, Alloying

**Packing:** 25kg woven bags, 1000kg per bag or as your requirements



## Product Description

**Ferromanganese** is a ferroalloy primarily composed of manganese (Mn) and iron (Fe), produced by smelting manganese ore with iron ore and coke in electric furnaces. It serves as a critical manganese source in steelmaking and casting, used for deoxidation, desulfurization, and alloying to enhance metal performance.

- **High manganese content** (60%-90%), enabling efficient alloying.
- **Strong deoxidation/desulfurization:** Reduces oxygen and sulfur in molten metal to avoid brittleness.
- **Enhances steel toughness** and workability by refining grain structure.
- **High melting point** (~1200-1400°C) for high-temperature smelting.
- **Cost-effective** vs. pure manganese.

## Applications

- **Automotive:** Engine parts (cylinder heads, pistons), transmission housings (castability, heat resistance).
- **Electronics:** Heat sinks (LEDs, CPUs) and device casings (thermal conductivity, corrosion resistance).
- **Industrial:** Pump housings, bearing sleeves (wear resistance).
- **Aerospace:** Secondary structures (brackets, heat shields) for weight/strength balance.

## Specifications

Type	Chemical Composition(%)					
	Mn	C≤	Si≤	P≤	S≤	Fe
High-carbon FeMn90C7.5	85.0-95.0	7.5	2.5	0.35	0.05	Balance
High-carbon FeMn80C8.0	75.0-85.0	8	2.5	0.35	0.05	Balance
Medium-carbon FeMn80C2.0	75.0-85.0	2	2	0.3	0.05	Balance
Medium-carbon FeMn75C1.5	70.0-80.0	1.5	2	0.3	0.05	Balance
Low-carbon FeMn85C0.7	80.0-90.0	0.7	1	0.25	0.03	Balance

# 03 Main Product

## Ferrosilicon magnesium

**Model Number:** FeSiMgSRE3, FeSiMg8RE2, FeSiMg7

**Material:** Mg, Si, Ca, C, P, S, Fe

**Shape:** Granule, Lumps

**Particle Size:** 5-30mm , 3-15mm , and custom sizes

**Usage:** Deoxidation, Desulfurization, Alloying

**Packing:** 1000kg per bag or as your requirements



## Product Description

**Ferrosilicon magnesium (Fe-Si-Mg alloy)** is a ferroalloy composed mainly of iron (Fe), silicon (Si), and magnesium (Mg), with trace elements like calcium (Ca) and rare earths (RE) sometimes added. It is primarily used as a nodulizer in ductile iron production, transforming flake graphite in cast iron into spherical (nodular) graphite, thereby significantly improving mechanical properties (toughness, strength) of castings.

- **Core Nodulizing Ability:** Magnesium (Mg) is the key element, capable of transforming flake graphite in cast iron into spherical form, ensuring high nodularity.
- **Purification Effect:** Silicon (Si) assists in deoxidation, while magnesium and calcium (Ca) effectively desulfurize (sulfur <0.02%), preventing nodulization failure.
- **Controllable Reactivity:** Balanced magnesium content reduces gas evolution (to prevent porosity) while ensuring sufficient nodulizing effect.
- **Stable Composition Strong Adaptability:** Low impurities (e.g., P<0.05%)

## Applications

- **Ductile Iron Casting (Core Application):**
- **Automotive Industry:** Produces crankshafts, camshafts, and differential cases (requires high toughness and fatigue resistance).
- **Engineering Machinery:** Manufactures hydraulic cylinder blocks, excavator arms, and gearboxes (withstands heavy loads and impact).
- **Pipe Fittings:** Used for high-pressure water/gas pipes (needs pressure resistance and ductility).
- **Other Cast Irons:** Improves structure of malleable cast iron, reducing brittleness in thick-walled castings.

## Specifications

Grade	Chemical Composition(%)							
	Mg	Si	Ca	RE	C≤	P≤	S≤	Fe
FeSiMg8RE3	7.0-9.0	40.0-47.0	2.0-4.0	2.0-4.0	1	0.05	0.02	Balance
FeSiMg8RE2	7.0-9.0	40.0-47.0	2.0-4.0	1.0-3.0	1	0.05	0.02	Balance
FeSiMg7	6.0-8.0	42.0-48.0	≤1	≤0.5	1	0.05	0.02	Balance
FeSiMg6RE2	5.0-7.0	40.0-47.0	1.5-3.5	1.0-3.0	1	0.05	0.02	Balance

# 03 Main Product

## Barium Silicon

**Model Number:** FeSiMgSRE3, FeSiMg8RE2, FeSiMg7

**Material:** Ba, Si, C, P, S, Fe

**Shape:** Granule, Lumps

**Particle Size:** 10-100mm , and custom sizes

**Usage:** Deoxidation, Desulfurization

**Packing:** 1000kg per bag or as your requirements



## Product Description

**Barium-silicon alloy** is an inorganic compound, usually with the chemical formula  $BaSi_2$ . Composed of barium (Ba) and silicon (Si), it belongs to the metal silicide family and usually contains a certain amount of iron and other impurities.

- Physical Properties:** Generally, it is a bulk metallurgical material, presenting as a gray-black crystalline solid. Its density is approximately  $4.3 \text{ g/cm}^3$ , and its melting point is around  $1200^\circ\text{C}$ .
- Chemical Properties:** It has strong deoxidation and desulfurization capabilities. During the steelmaking process, it can react with oxygen and sulfur in the molten steel. When reacting with water and acids, it produces silane ( $SiH_4$ ) and barium compounds.
- Metallurgical Properties:** Barium in the barium-silicon alloy can improve the deoxidation efficiency of silicon, reduce the oxygen content in the molten steel, prevent the formation of harmful nodules, promote the formation of spherical inclusions, and improve the fluidity and quality of the steel.

## Applications

- Steelmaking Field:** Used as a deoxidizer to remove oxygen from the molten steel, thereby improving the strength and durability of the steel. It also serves as a desulfurizer to reduce the sulfur content in the steel, preventing brittleness and crack formation of the steel. Additionally, it can be used for inclusion modification to enhance the toughness and workability of the steel.
- Foundry Industry:** Applied in the production of cast iron, it can improve the fluidity of the molten iron, reduce shrinkage, and enhance the mechanical properties of the castings.
- Special Steel Production:** It is a crucial additive for manufacturing high-quality alloys used in industries such as automotive, aerospace, and construction.

## Specifications

Grades	Chemical Composition(%)					
	Ba $\geq$	Si $\geq$	Al $\leq$	Mn $\leq$	C $\leq$	P $\leq$
FeBa30Si35	30	35	3	0.4	0.3	0.04
FeBa25Si40	25	40	3	0.4	0.3	0.04
FeBa20Si45	20	45	3	0.4	0.3	0.04
FeBa15Si50	15	50	3	0.4	0.3	0.04
FeBa10Si55	10	55	3	0.4	0.2	0.04
FeBa5Si60	5	60	3	0.4	0.2	0.04
FeBa2Si65	2	65	3	0.4	0.2	0.04

# 03 Main Product

## Silicon Carbon Alloy

**Model Number:** Si70C3, Si65C3, Si60C3, Si55C10

**Material:** Si, C, Al, Ca, P, S, Fe

**Shape:** Granule, Lumps

**Particle Size:** 10-60mm, 5-60mm, 3-8mm, 1-10mm

**Usage:** Deoxidizer, Additive

**Packing:** 1000kg per bag or as your requirements



## Product Description

Silicon carbon alloy is a new type alloy apply to revolving furnace. It can replace deoxidizing alloy such as Ferrosilicon, Silicon Carbide as well as reduce the dosage of deoxidizers. With less dosage, also lower the cost of steelmaking. It can make the steel better chemical component, better mechanical property than traditional deoxidizers. Its effect is very stable and obviously the low price made its excellent cost performance.

- Main Active Ingredients of Silicon-Carbon Alloy: Silicon and carbon.
- The reactions involved are:  $Si + 2FeO = 2Fe + SiO_2$      $C + FeO = Fe + CO$
- The deoxidation products easily float, improving the quality of the molten steel. Additionally, adding 1.5kg/t of a special foaming slag agent designed for use with silicon-carbon alloy not only increases the recovery rate of the silicon-carbon alloy but also quickly forms slag, creating favorable conditions for refining.

## Applications

- **Functional Applications in the Metallurgical Field**
  - **Deoxidation:** It can reduce the usage of deoxidizers and silicon carbide, and even replace silicon ferroalloy. This effectively lowers the steelmaking cost.
  - **Desulfurization:** Use its own basic oxides to react with sulfur dioxide to form sulfates, which are applied in flue gas desulfurization.
  - **Auxiliary Smelting:** In the processes of molten iron recovery from steel slag and electric furnace smelting of stainless steel, it acts as a reducing agent or flux. It increases furnace temperature, improves molten iron fluidity, and simultaneously enhances output, as well as the toughness and machinability of castings.
- **Auxiliary in Casting Production:** Applied in ordinary casting to optimize the fluidity of molten iron, reduce casting defects, and help improve the grade and quality of castings.

## Specifications

Grades	Chemical Composition(%)						
	≥Si	C	Al≤	Ca	Fe	S≤	P≤
Si70C3	70	≤3	2	7	1.5	0.05	0.04
Si65C3	65	≤3	2.5	9	2	0.05	0.04
Si60C3	60	≤3	3	11	3	0.05	0.04
Si55C10	55	≥10	3.5	13	4	0.06	0.05
Si50C13	50	≥13	4	15	5	0.06	0.05
Si45C15	45	≥15	4.5	17	6	0.06	0.05

# 03 Main Product

## Ferrophosphorus

**Model Number:** FeP28, FeP24, FeP20, FeP18

**Material:** P, Fe, Si, Mn, C, P, S,

**Shape:** Granule, Lumps

**Particle Size:** 10-50 mm , 20-80 mm, 1-5 mm, 5-10 mm

**Usage:** Deoxidizer, Additive

**Packing:** 1000kg per bag or as your requirements



## Product Description

**Ferrophosphorus** is a ferroalloy mainly composed of phosphorus (P) and iron (Fe). Its core use is as a phosphorus additive in metallurgy to adjust the properties of steel or cast iron, and it can also be used as a deoxidizer or alloying agent.

- **Composition:** Core elements are phosphorus (15%-30%) and iron ( $\geq 60\%$ -80%), with impurities like silicon ( $\leq 4\%$ ), manganese ( $\leq 2\%$ ), and carbon ( $\leq 1\%$ ). Higher phosphorus strengthens its ability to adjust metal properties, but excess causes steel cold brittleness.
- **Physical:** Silver-gray to dark gray solid at room temperature; brittle, easy to break. Melting point:  $\sim 1100\text{-}1250^\circ\text{C}$ ; density:  $\sim 6.8\text{-}7.2\text{ g/cm}^3$ . Insoluble in water, stable at room temperature, but reacts with oxygen/sulfur at high temperatures.
- **Metallurgical:** Proper addition boosts steel's hardness, wear resistance, and corrosion resistance. It also has mild deoxidation capacity. Note: Phosphorus reduces steel's low-temperature toughness, so dosage must be precisely controlled.

## Applications

- **Steel & Cast Iron:**
  - Adds to low-alloy structural steel/spring steel to enhance hardness and wear resistance.
  - Improves molten iron fluidity, reduces casting shrinkage, and enhances surface finish in gray cast iron.
  - Controls phosphorus ( $\leq 0.15\%$ ) in railway rails/wear-resistant parts to balance hardness and avoid cold brittleness.
- **Special Alloys:** Used in phosphor bronze/brass production—acts as a deoxidizer for molten copper and improves alloy machinability/corrosion resistance .
- **Others:** Serves as a phosphorus source for lithium iron phosphate (lithium battery cathode); used in fireworks/signal flares for specific flame effects via phosphorus combustion.

## Specifications

Grades	Chemical Composition(%)						
	P	$\geq\text{Fe}$	$\text{Si}\leq$	$\text{Mn}\leq$	$\text{C}\leq$	$\text{S}\leq$	$\text{P}\leq$
FeP28	25-30	65	3.5	2	0.8	0.15	30
FeP24	22-26	68	3.5	2	0.8	0.15	26
FeP20	18-22	72	4	2.5	1	0.2	22
FeP18	16-20	75	4	2.5	1	0.2	20

## 04 Contact Information

Shenggaoda Metallurgical Refractory

# We Welcome

- **Factory visits and inspections**
- **Product customization requests**
- **Technical consultations**
- **Long-term cooperation discussions**



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