

Quartz Material Characteristics and Quality Evaluation



Chemical Composition

Silicon Dioxide (SiO_2)

Typical:

>90% for high-purity quartz

Main component determining quartz quality



Crystal Structure

Dense crystalline structure

Strong silicon-oxygen bonding

Influences:

- Hardness
- Chemical stability



Hardness

Mohs Hardness
 ≈ 7

High resistance to mechanical breakdown



Associated Minerals

Possible impurities:

- Feldspar
- Mica
- Iron-bearing minerals

Affect purity requirements and final applications



Engineering Relationship



Mineral Composition



Quartz Quality



Application Requirement



Processing Route

Quartz Quality Requirements by Application

Different industries have specific requirements for quartz purity, particle size, and physical properties.



Quartz quality must be controlled according to the intended application.

Key parameters include SiO₂ content, iron level, particle size distribution, whiteness, and impurity control.

Note:

Higher purity and tighter size control increase processing requirements and costs.

Quartz Particle Size and Product Classification

Quartz is crushed and screened into different size fractions to meet the requirements of various industrial applications.



Size Control Factors



Particle Size Distribution

Ensure proper grading for different uses



Fines Content Control

Excess fines affect product quality and performance



Particle Shape Control

Influences packing, strength and workability



Typical Size Classification and Applications

Size Range (mm)	Product Name	Typical Applications
>31.5	Oversize Material	Returned to crusher
20–31.5	Coarse Quartz Aggregate	Construction, road base, concrete
5–20	Fine Aggregate	Concrete, mortar, asphalt
0–5	Quartz Sand	Glass, foundry, filtration, industrial use
<0.075	Quartz Powder (Fines)	Special applications, fillers



Key Point

Controlling particle size and gradation is essential for achieving the required product quality and ensuring consistent performance in the final application.

Note:

Size ranges can be adjusted based on customer requirements and specific industry standards.

Quartz Processing Route Selection Logic

The appropriate processing route is determined by feed characteristics, mineral quality, and the target product requirements.



Key Considerations

- Match processing route with product requirements
- Over-crushing increases operating cost and fines
- Proper screening ensures consistent product quality
- Optional shaping improves particle shape and performance



Summary

Quartz processing is a combination of material characteristics and engineering decisions. Selecting the right route ensures efficient production, consistent quality, and cost-effective operations.