KARNEST
TECHNOLOGY PRIVATE LIMITED
Aerogel Insulation Solutions

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Factory: D-2-CH-151-1-6, Dahej-II
Dist. Bharuch, Gujarat – 392135

TECHNICAL DATA SHEET

Silica Aerogel Powder — Hydrophobic Grade

Code: KNS-SA-HP01
Grade: Hydrophobic
Status: Commercial | Rev. 1.0 | 2026

Silica Aerogel Powder — Hydrophobic Grade (KNS-SA-2601) is a nano-porous amorphous SiO_2 functional filler manufactured by Karnest Technology Pvt. Ltd. at its Dahej-II facility. Its three-dimensional nanoporous network, with average pore sizes of ~14 nm well below the mean free path of air, delivers ultra-low thermal conductivity. The hydrophobic surface treatment ensures very low moisture absorption, excellent flowability, and long-term performance stability in humid environments.

1. Physical Properties

Parameter	Typical Value / Range	Test Method / Notes
Appearance	White, lightweight free-flowing powder	
Bulk Density	~0.075 – 0.1 g/cc	*Tap density*
True Density	~2 g/cm³	*He pycnometry*
Porosity	≥90%	*Often 90–98%*
Particle Size D50	~55 µm	*Malvern Mastersizer 3000 (dry); reducible via ball milling*
Average Pore Size	~14 nm	*Quantachrome TouchWin*
BET Surface Area	~730 m²/g	*Quantachrome TouchWin*
Color	White	

2. Thermal Properties

Parameter	Typical Value / Range	Test Method / Notes
Thermal Conductivity (@25°C)	~22-24 mW/(m·K)	*ISO 8302 / EN 12667 (Guarded Hot Plate); ASTM D-7984 (MTPS)*
Service Temperature	Up to 350–400°C (continuous)	*Hydrophobicity loss onset ~520°C (DSC exothermic peak), TA instrument SDT Q600*
Heat Resistance / Pore Stability	SiO_2 sintering onset >600°C; exothermic peaks at 670°C & 709°C	*As seen from DSC peaks, TA instrument SDT Q600*

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Parameter	Typical Value / Range	Test Method / Notes
Fire Performance	Inorganic, non-combustible material	

3. Chemical Properties

Parameter	Typical Value / Range	Test Method / Notes
Chemical Composition	Amorphous SiO_2	
CAS Number	7631-86-9	*Pure SiO_2 (differs for mixed oxide grades)*
EC Number	231-545-4	
SiO_2 Purity	>99.5%	*Measured by XRF*
Solubility in Water	Insoluble	
pH (aqueous suspension)	Neutral (6.5–8.0)	

4. Surface Characteristics

Parameter	Typical Value / Range	Test Method / Notes
Surface Treatment	Hydrophobic	*Hydrophilic grade available on request*
Hydrophobic Groups	~12–13% by weight	*SDT Q600 TG measurement*
Water Contact Angle	Available on request	*Direct measurement not standardised for low-density powders; sessile drop requires compaction; Washburn method limited to contact angles <90°*
Moisture Absorption	Very low	
Hydrophobicity Retention	Retained up to ~520°C	*Loss onset determined by DSC*

5. Typical Applications

Sector	Applications
Construction & Building	Thermal insulation plasters, renders, mortars, insulating boards, lightweight screeds
Coatings & Paint Industry	Thermal insulation coatings; matte / flat paint additive (reduces gloss, improves scrub resistance); anti-scald and anti-condensation coatings; PU, acrylic & epoxy coating systems; matting agent for industrial and decorative paints; texture additive for specialty architectural finishes

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Sector	Applications
Energy & Industrial	Battery thermal barriers, pipe insulation, industrial furnace linings, subsea pipe fill
Packaging	Insulated packaging liners for temperature-sensitive goods (pharma, food, biologics); void-fill and lightweight cushioning composites; fire-retardant packaging boards
Other	Acoustic / lightweight composites, catalyst support, adsorption media, cryogenic insulation

6. Safety & Handling

Item	Details
Material Classification	Synthetic amorphous silica (not crystalline silica) — IARC: Not classified as carcinogen
Hazard	Mechanical irritant to eyes, skin, and respiratory tract (dust)
Carcinogenicity	Not classified
Recommended PPE	Dust mask (FFP2 or equivalent), safety goggles, chemical-resistant gloves
Storage Conditions	Store in sealed containers under dry conditions; avoid humidity. Keep away from strong acids and strong bases.

7. Packaging

Type	Format	Notes
Standard	Moisture-proof PE-lined bags: 10 kg / 20 kg / 25 kg	*Suitable for construction, coatings, paint*
Bulk — Drums	Fiber drums	*Industrial / export quantities*
Bulk — FIBC	Flexible Intermediate Bulk Container (jumbo bag)	*Large volume; custom capacity on request*
Custom	Available on request	*Sector-specific formats (paint, pharma, packaging)*

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