

AEROGEL

Density is the key

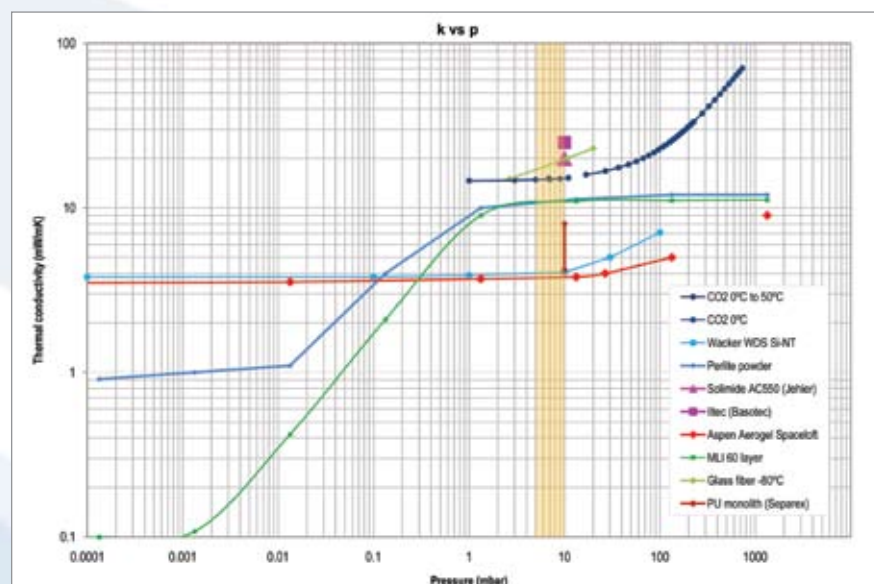
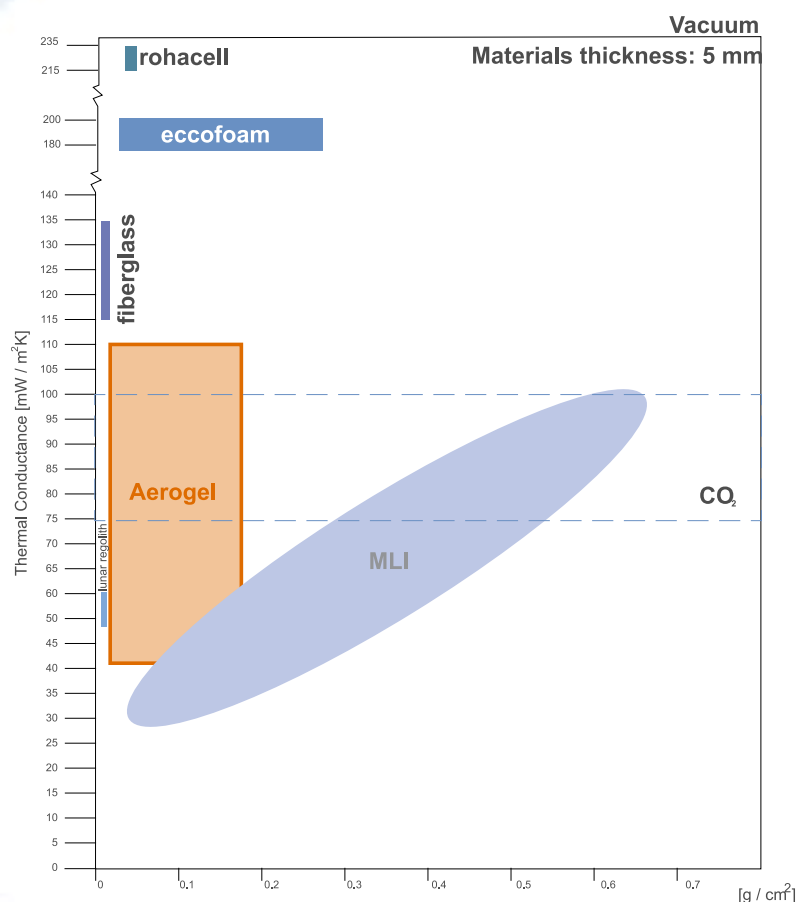
Aerogel is the lightest solid ever known with incredible and tailorable properties that have a range of potential applications in space.

Property*	Value
Density, ρ	0.019-0.060 g/m ³
k (air), TC	8.5 - 22 mW/mK
k (vacuum), TC	1 - 40 mW/mK
Coefficient of thermal expansion	2 - 4 · 10 ⁻⁶ 1/°C
Maximum thickness	10 mm
Surface area, S_{BET}	400-1000 g/m ²
Mean pore diameter, Pd	4-30 nm
Young's modulus	10 ⁴ -10 ⁷ N/m ²
Tensile strength	16 - 88 kPa
Poisson's ratio	0.2
Dielectric constant	1.14 - 2 (18 - 40 GHz)
Electrical resistivity	10 ¹⁵ ohm/cm
Electrical resistivity (carbon doped)	0.1-1 ohm/cm
Refractive index (translucent)	1-1.05

*silica

Aerogel nanoporous structure provides properties such as low density and high thermal insulation, making it extremely competitive for space applications.

Aerogel thermal conductivity, along with a number of other tailorable properties, is a disruptive advantage for applications where the atmosphere starts playing a relevant role in the heat transport, allowing convective heat fluxes (e.g. Mars), such as launchers, re-entry, landers, and rovers.





Integration solutions

Easy installation and integration within complex structures provides flexibility on each application.

- Custom-made Aerogel blankets
- Filter vents for outgassing and to prevent contamination

Space testing

Ability to withstand gamma and electron radiation

Test	Conditions
Outgassing	125 °C, 24 h, 10 ⁻⁵ mbar
Gamma radiation	Co60, 50 Krads, 0.37 Gy/min, 22 h 40 min
Electron radiation	>1332 MeV, >5.0 E + 14 (e-/cm ²), 17 min
Thermal cycling	-100 to 100 °C, 20 cycles, 10 ⁻⁵ mbar
Vibration levels	21-60 Hz (20 g) and 60-100 Hz (6 g)

Compliant with ECSS standards

Potential applications

AST can provide different solutions with Aerogels considering mission-user constrains.

- Re-entry
- Mars rovers and landers
- Cryogenic tanks
- Windows: Translucent Aerogels