

3M™ Ceramics for Oil and Gas Applications

The new 3M™ Ceramic Sand Screens offer a breakthrough sand control technology delivering unparalleled abrasion resistance in demanding oil and gas well applications.

With the unique characteristics of advanced ceramics, such as outstanding hardness, exceptional resistance to wear and corrosion as well as to extreme temperatures, 3M™ Ceramic Sand Control Screen Systems offer impressive advantages for the oil and gas industry.

3M Technical Ceramics (formerly ESK) is a pioneer in the field of non-oxide ceramics and has more than 85 years of experience in designing and manufacturing cutting edge ceramic solutions.

All of our knowledge and experience is reflected in the performance of 3M™ Ceramic Sand Control Screen Systems which deliver higher efficiency and longer service life.



Material

Material properties	Units	Stainless steel	Hard metal	Silicon nitride	Silicon carbide
Knoop hardness	HK 0.1GPa	< 0.5 (Rc 30–40)	16	14.5	21–25
Compressive strength	MPa	2200	5000	> 2500	2200–2500
Thermal conductivity at 20°C	W/(mK)	35–45	95	25–40	75–125
Density	g/cm ³	7.8	14.9	3.2	3.1–3.2
Flexural strength [4 point bending]	MPa	N/A	1550	700–800	400–650
Young's modulus	GPa	200	520–620	310	410
Fracture toughness K _{Ic}	MPa m ^{0.5}	N/A	10–20	6	4–6

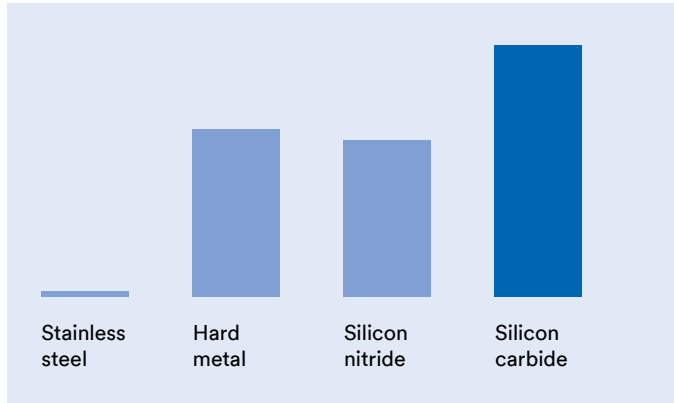
3M™ Ceramic Sand Control Screen Systems contain one of the hardest and most abrasion resistant materials made by mankind: technical ceramics.

One of the most prominent of these materials is silicon carbide, mostly known and used for machining and grinding the hardest steels. This synthetic material shows extreme hardness, abrasion resistance, high temperature strength and chemical inertness which is unparalleled – the ideal material when severe abrasion and heavy chemical attack threatens parts and functionality in the oil and gas industry.

Knoop Hardness

The higher the hardness, the lower the abrasion

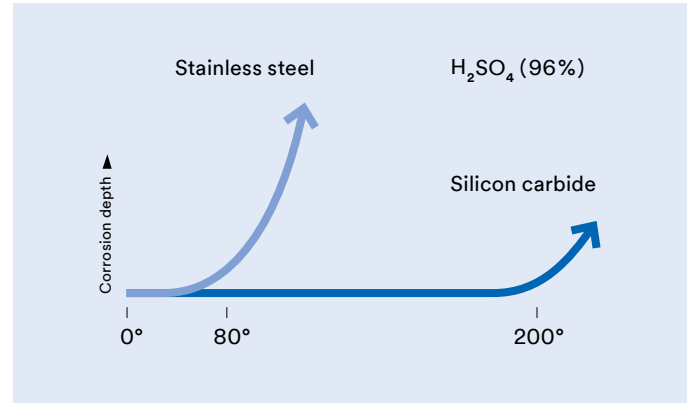
- Almost as hard as diamond and 20 times harder than metals
- Exceptional wear resistance even when exposed to sand



Temperature vs. Corrosion

Silicon carbide easily survives acids and bases even at higher temperatures

- Corrosion resistant against chlorides, hydrogen sulfide or hot sulfuric acid
- Proven a millionfold as ceramic seals and bearings in chemical industry



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The management system has been certified according to DIN EN ISO 9001, DIN EN ISO 50001, DIN EN ISO 14001.

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