

3M™ Ceramic Sand Screens for Geothermal Well Applications

Sand control completion methods are used in geothermal projects to prevent the spread of formation solids throughout facilities and pipelines. Many conventional sand control systems are metal based, which when used in hostile environments can be vulnerable to erosion and corrosion, affecting both system performance and lifetime. 3M Ceramic Sand Screens offer a major improvement over traditional sand control methods by utilising the unique properties of 3M Technical Ceramics to provide effective downhole sand control, while resisting erosion and corrosion.



Application challenges

3M™ Ceramic Sand Screen solution

System inflow and injection rates potentially constrained by sand control erosion limits.



Uses silicon carbide, a material nearly as hard as diamond to provide erosion resistance.

Land-based installations should minimise equipment footprint and environmental pollution, for example noise and vibration.



Erosion resistance means they can be deployed as a stand-alone screen only, eliminating the need for gravel packing equipment.

Scale reduces inflow area, increasing erosive forces.



3M™ Ceramic Sand Screen erosion resistant construction mitigates hot spotting risks associated with scale deposition.

Compromised lifetime system integrity caused by solids erosion and corrosive scale removal operations.

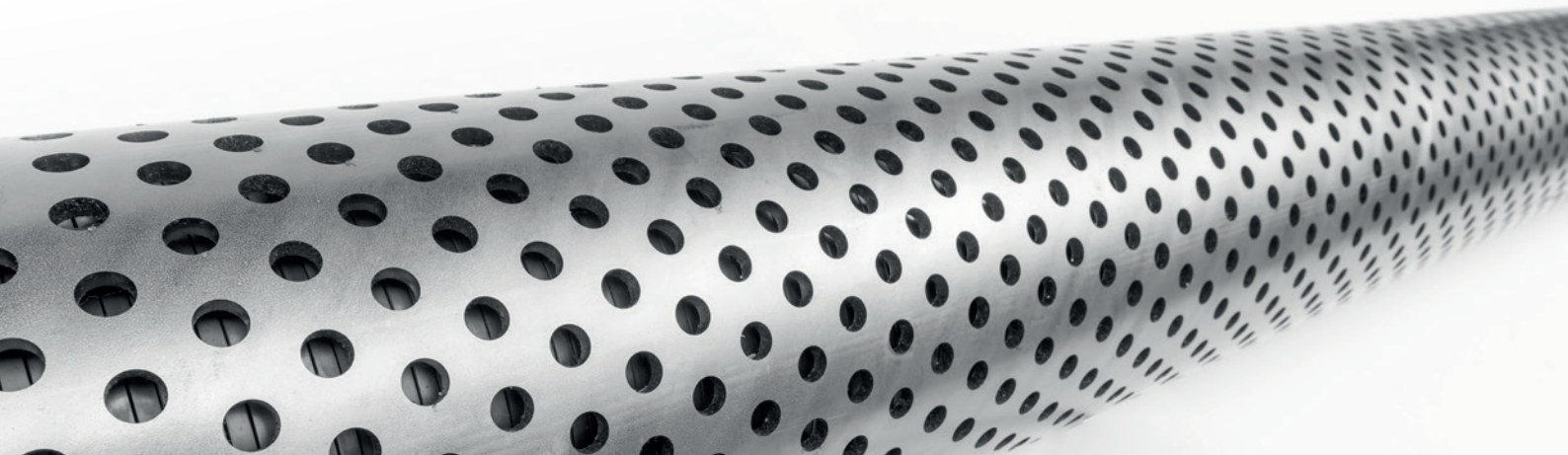


Erosion can be quantified for specific well conditions, enabling due diligence on the life of well expectations.

High rig-time, service costs and operation risks of installation.



Stand-alone screen deployment reduces rig-time, service costs and removes multiple operational stages such as gravel packing.



3M™ Ceramic Sand Screens feature 10 times the hardness of metallic screens, resulting in the following advantages:

- ▶ Proven to resist wear, even under high-velocity flows
- ▶ Reduces workovers
- ▶ Can be used to control produced solids including proppants
- ▶ Helps extend pumping equipment life
- ▶ Can eliminate the need for complex sand control methods
- ▶ Suitable for HPHT applications
- ▶ Can be used in vertical, deviated, and horizontal wells

3M™ Ceramic Sand Screen material description (Not for specification purposes)

Maximum Screen OD	Unit	3.287	3.539	4.287	4.917	5.571 ²	5.496	5.811	7.809	7.809 ²
Base pipe OD ¹	Inch	1.900	2 3/8	2 7/8	3.5	3.5	4	4.5	5.5	5.5
Base pipe weight	lbs/ft	2.75	4.60	6.40	9.20	9.20	9.50	12.60	17.00	17.00
Screen ID	Inch	1.610	1.995	2.441	2.992	2.992	3.548	3.958	4.892	4.892
Connections	API NUE PIN/BOX	1.9	2 3/8	2 7/8						
	VAM/TOP Tubing				3.5	3.5	4	4.5		
	VAM/TOP HC								5.5	5.5
Metallurgy	Base pipe	316/316L	L80Cr-13/L80							
	Metal parts		316/316L/S355J2							
Maximum joint length		R1	R2	R2	R2	R2	R2	R3	R3	R3
Slot opening	Micron	150, 200, 250, 300 and 350 µm								
Average weight of screen	lbs/ft	8.05	9.53	12.94	17.17	23.82	19.68	21.75	37.00	41.49
Diameter perforation	Inch	0.236	0.374	0.433	0.433	0.433	0.492	0.492	0.492	0.492
Perforations base pipe	Avg perfs/ft	88	88	76	76	76	69	69	69	69
Documentation		According to 3M standard STA7_SC-A-600-00 (Based on ISO 17824 2009 E)								
Minimum collapse pressure ³	psi	4500	4500	4500	4500	4500	4500	4500	4500	4500
Minimum burst pressure ³	psi	1500	1500	1500	1500	1500	1500	1500	1500	1500
End ring pushoff ⁴	tons	17	20	23	26	26	30	32	38	38
DLS	°/100 ft	12	12	12	12	12 ⁵	12	12	12	12 ⁵

1 Base pipe Outer Diameter (OD) and Inside Diameter (ID) tolerances according to API Spec 5CT.
 2 Additional shroud compaction strength for open hole stand-alone screen completions.
 3 Collapse and burst values are tested in alignment to ISO17824 and API19SS with no screen failure/no loss of sand control.
 4 Requirements according to Statoil TR2385, Ver. 2.
 5 Calculated.

Standard 3M™ Ceramic Sand Screens rated for temperatures up to 150°C

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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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