

Optimizing well production

Resolving proppant flowback issues with 3M™ Ceramic Sand Screens

Customer challenge

Procure a sand control method to preserve the integrity and productivity of the well.

Limit investment at top surface.

North Sea application

Wells stimulated without possibility to cope with proppant flow back at surface

Need for simple sand control solution

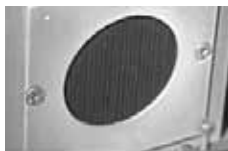
High-erosion environment (100 ft/s)

Why ceramics?

Wire-wrap screens failed every erosion test (lower photo). The ceramic screens did not show any visible wear or material loss.

Made of abrasion-resistant silicon carbide, 3M™ Ceramic Sand Screens mitigate wash-out erosion compared to all steels and hard coated steels tested.

Erosion test results



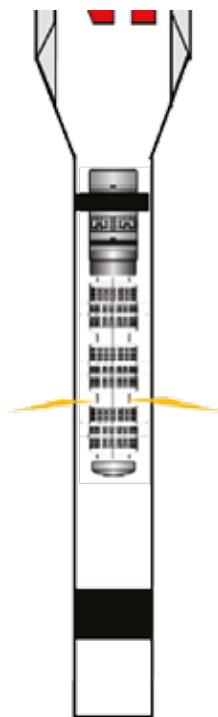
3M™ Ceramic Sand Screen. After 240 min.



Wire-wrap sand screen. After 60 min.

Results

- ▶ The 2 wells equipped with 3M ceramic sand screen technology have been online and producing since late 2014
- ▶ Hang on packer and set across the upper perforation zone
- ▶ Ca. 25 and 35MMSCFD
- ▶ Still producing, no proppant flowback seen at surface
- ▶ Next wells to be completed in the same way



Customer key decision drivers

Should not be decided by initial cost but decided by value creation on capital spend

Decision matrix included:

- ▶ Overall intervention cost
- ▶ Increased longevity potential
- ▶ Optimized production utilizing ceramic properties
- ▶ Simplified logistics and operation

Economic comparison with other options includes:

- ▶ Standalone metallic screen
- ▶ Frac pack
- ▶ Top surface investment (de-sander)

Technical references

SPE 176225-MS: cased hole ceramic screen cutting completion cost for marginal reservoir: application in Tunu Field

OTC 25106-MS: an innovative approach of revival for damaged wells in high erosive environment using ceramic sand screens – BG Group

SPE 146721: An innovative milestone in sand control – Maersk Oil & Gas

SPE 160327: ceramic sand screens for sand control in unconsolidated reservoirs (with fines content) – RAG

SPE 166092-MS: ceramic sand screen: ceramic sand screen – an innovative downhole sand control solutions for old & challenging cased holes – BG Group

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