

Cost-effective production improvements in erosion-prone environments

3M™ Ceramic Sand Screens enable efficient sand control

Customer challenge

- ▶ Customer had wells in an area where erosion was a common cause of production slowdowns and performance issues
- ▶ A full rework of the well is too expensive in the current oil and gas market, so a cost effective rig-less deployment was pursued
- ▶ Hot spotting was a key concern when the screen was placed across the new perforation zone
- ▶ Required a sand screen to optimize productivity throughout the well design life
- ▶ Highly deviated well was at 85° with Dogleg of 5.8°/100ft, where rig-less deployment was challenging

Why ceramic sand screens?

- ▶ Increased production envelope enables higher production rates
- ▶ Unlocks wells where sand failure has occurred
- ▶ Rig-less operation places the screens directly across the perforations
- ▶ Simplicity of deployment
- ▶ Proven outstanding erosion resistance

Results

Two wells equipped with 3M™ Ceramic Sand Screens Systems in 2017:

- ▶ Production rates: 2500BBD compared to 100BBD before ceramic sand screen installation
- ▶ Easy rig-less deployment on E-Line with tractor
- ▶ Screens straddled in 5 runs

Customer key decision drivers

Decision matrix included:

- ▶ Ease of deployment
- ▶ Longevity of the screen in terms of its erosion resistance and ceramic properties
- ▶ Proven suitability of ceramic sand screens for deployment in highly deviated or horizontal wells
- ▶ Ability to maximize productivity with robust downhole sand control

Economic comparison with other options includes:

- ▶ Maintaining low production rates through the wellhead for manageable sand production
- ▶ Gravel pack at higher CAPEX
- ▶ Higher accepted workover risk by redeploying previous sand control system in the field



Photos courtesy of Exxon Mobil Corporation and Helix ESG

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 Solution for Old and Challenging Cased Holes – BG Group

MOC-Egypt- April 2016: Ceramic Sand Screen Systems - A Unique Down-Hole Solution for Sand Control

Sand Control with Ceramic Screens in Unconsolidated Reservoirs Demonstrated in the Mature Gaiselberg Oilfield. OIL GAS European Magazine, 2/2012, p. 74–78

SPE-182278-MS: Sand Control in Corrosive and Erosive Downhole Conditions at High Temperatures – 3M Technical Ceramics

Warranty, Limited Remedy, and Disclaimer: Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. User is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application. User is solely responsible for evaluating third party intellectual property rights and for ensuring that user's use of 3M product does not violate any third party intellectual property rights. Unless a different warranty is specifically stated in the applicable product literature or packaging insert, 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OF NON-INFRINGEMENT OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. If the 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.

Limitation of Liability: Except where prohibited by law, 3M will not be liable for any loss or damages arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.

Technical Information: Technical information, recommendations, and other statements contained in this document or provided by 3M personnel are based on tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed. Such information is intended for persons with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. No license under any 3M or third party intellectual property rights is granted or implied with this information.



3M Technical Ceramics

Zweigniederlassung der 3M Deutschland GmbH
Max-Schaidhauf-Str. 25, 87437 Kempten, Germany

Phone +49 (0)831 5618-0
Web 3M.com/ceramicsandscreens

3M Advanced Materials Division

3M Center
St. Paul, MN 55144 USA

Phone 1-800-367-8905
Web www.3M.com/advancedmaterials

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

3M is a trademark of 3M Company. Used under license by 3M subsidiaries and affiliates.

Please recycle. Printed in USA © 3M 2017. All rights reserved. Issued: 9/17 12615HB 98-0212-4273-4