

**CORROSION PROTECTION OF STEEL PIPELINES
IN BRINE SERVICE BY INTERNAL CONCRETE LINERS**

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ABSTRACT

The performance of concrete materials for internal pipeline protection against the erosive and corrosive effects of flowing brine was evaluated for seventeen different liner formulations. Corrosion rates were measured by linear polarization on samples exposed in a test manifold to flowing brine. Samples were also exposed to static site-generated brine as a function of time. These samples were returned to the laboratory for visual analysis of damage, and examination of brine penetration through the concrete by electron probe microchemical analysis. The study focused on the performance of two liners applied by centrifugal casting: an oil-field-standard calcium silicate-based concrete, and a high-sulfate-resistance calcium-aluminate cement. The study also focused on a calcium-aluminate concrete liner applied by hand. Results showed that standard calcium silicate concrete (API RP10E) and a rotary calcium aluminate concrete provided excellent protection. Pipewall corrosion rates were reduced from 10 to 15 mils per year to 1 mil per year or less. The hand-applied liners also reduced the pipewall corrosion rate, but not to the same degree as the cast liners.

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