Technical Addendum

TekStem®

Pumpable Grout for Stemming Seismic Blast Holes

Very Low Permeability to Water

Cured and hardened Tekstem® has a permeability to water (k) of 3.9 x 10^{-9} m/sec as per ASTM D5084 "hydraulic conductivity of soils." k values between 10^{-8}–10^{-11} m/sec are classified as "impervious."**
The unique composition of Tekstem is the reason for It has a very low permeability to water. As a comparison neat Portland cement paste has a permeability of 10^{-7}–10^{-9} m/sec (Baroid) and bentonite chips a permeability of 10^{-10} m/sec according to the same source.
Due to its fluid nature there is no chance of Tekstem bridging over the borehole or hanging up inside the borehole which is a possibility with bentonite chips.
The impervious nature of cured Tekstem provides excellent protection of the water table and its permeability is less in fact then most soils and rocks generally encountered during oil and gas exploration.

Specific Gravity

Tekstem, when mixed with water to form a grout has a specific gravity of 1.195. This ensures that when it is pumped to the bottom of water filled boreholes it cannot rise on its own accord to the surface and instead remains in place.

The "tremie" application technique together with the rheological characteristics of Tekstem result in minimal dilution of Tekstem with residual water in the hole which creates a consistent fill from top to bottom of the hole.

Expansive and Hole Contour Conforming

Tekstem is pumped into seismic boreholes in a fluid state. It contains no sand or other fillers, so it is able to make intimate contact with the hole wall.
Should there be any cracks, crevices or cavities abutting the borehole the fluid nature of Tekstem ensures they are filled fully. During curing Tekstem expands slightly ensuring that excellent contact remains with the hole wall which assists its ability to resist the explosion and ensures an outstanding seal preventing contamination of the water table.

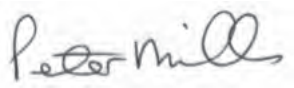
Low Strength

When cured and hardened, Tekstem has a compressive strength of approximately 200 psi. As a comparison concrete has a compressive strength of 5000 psi.
In the unlikely event that a Tekstem filled hole suffers a "blow out" the Tekstem would be expected to break apart unlike a stronger material which could remain intact to form a missile.

The low strength minimizes damage to agricultural implements such as plows should they contact the Tekstem column.

Superior Seismic Formation

Tekstem is a factory manufactured product which undergoes stringent QC testing to ensure consistent performance when stemming holes. Its innovative characteristics result in an extremely high success rate in preventing blow outs. As a result, a cleaner, stronger seismic signal is obtained which facilitates processing of the recorded seismic data.



Peter S. Mills (Bsc Physics)
Technology Leader, Minova USA

* Patented
** Bear J. (1972) Dynamics of fluids in porous media

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Additional information

Started more than 135 years ago, Minova is a global manufacturer and supplier of chemical and mechanical earth control products, adhesives and support equipment. With manufacturing plants on five continents and operations in more than 25 countries, Minova is an industry-leading provider of ground support solutions for the underground mining, construction, tunneling and civil engineering industries.

If further information is required consult Minova Americas.

Manufacturer

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