Well Armour Technology.

Well Armour is an inorganic compound with exothermic properties that generates thermodynamic isometric characteristics during the setting process (Volume Thermal Expansion). Well Armour is composed of finely divided powders with median particle size down to 7 microns. It is also 100% environmentally safe.

Well Armour is unaffected by chlorides and will physically bond into salt's (this includes Zechstein type formation's). Well Armour is also 100% soluble in 15% HCL with no residue. It has the ability to totally protect a producing formation from damage due to cement, drilling fluids, brines, etc. Well Armour is also able to withstand up to 30% by volume of both organic and inorganic contamination with no adverse effect on the setting characteristics.

Well Armour's components are divided into Low, Medium, and High temperature ranges, each with a different reactivity. Well Armour's natural exothermicity means it generates heat internally; the amount of heat depends on the reactivity of the chosen component. In an application, the reaction is also accelerated rapidly by Well Armour being exposed to formation temperature. Well Armour's natural exothermicity provides the versatility for applications in both hot and cold environments, such as the Arctic.

Unlike Portland type cements, Well Armour components have a flat linear viscosity profile right up to the 'Set Point', where it sets in 120 seconds. This means that Well Armour retains its fluid flow properties right up to the Set Point, with 'critically' Zero gel strength generation. As a consequence, with Well Armour, there isn't a transition phase between the fluid and set states to allow gas, water, or oil, to flow through the Well Armour column. By contrast, a major drawback with Portland type cements is that it does have a transition phase (high gel strength generation), and slow setting times.
Well Armour does not shrink and will physically bond onto corroded or oily casing. It is only time and temperature dependent, hydrostatics have no effect on Well Armour.

Well Armour is the only system that generates extremely fast compressive strength that is approved by major operators to 'pump through the bit', providing huge savings in down time.

Well Armour applications are multi-faceted, and include, but are not limited to:

- Casing vent gas leaks
- Sustained casing pressure issues

- Braidenhead gas issues
- Well abandonments
- Remedial operations (casing leaks, etc.)
- Formation protection
- Formation consolidation
- Lost circulation
- Water shut off
- Gas shut off

This cost-effective technology is not designed to replace the use of oilfield cement, rather, it is designed to do what Portland type cement will not do. The unique characteristics of zero gel strength generation, linear set times, unaffected by hydrostatics, provides absolute predictability under varying downhole conditions.

Please reach out to Tim Sharp to discuss how the Well Armour technology can be a key part of your product offering.
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