

SmartSet® - Thermo-setting solutions technology

SmartSet® is a U.S. patented formulation of nontoxic inorganic powders that when mixed with water provide a controlled rapid right angle set and rapid compressive strength in downhole conditions. The time to set point is engineered to within minutes as desired.

SmartSet® slurries are engineered for each application based on job placement time and wellbore temperature. Slurry will be a combination of either SmartSet® LT, MT or HT (the low, medium or high-temperature products) in combination with C-Set and I-Set (inhibitor) if required.

APPLICATIONS

Completion / Remedial	Abandonment	Drilling
<ul style="list-style-type: none"> • Gas zone shut off • Water zone shut off • Annular channel repair • Repair of corroded casing and casing leaks • Temporary well kills • Temporary well plugs • Protect formation from heavy polymers and brines during remedial operations 	<ul style="list-style-type: none"> • Surface gas vent shut off • Abandonment plugs • Plugs placed through collapsed casing / tubing • Screen shut off 	<ul style="list-style-type: none"> • Plugs placed through bit • Lost circulation • Formation consolidation • Shoe squeezes • Surface casing top jobs • Alternative lead/tail slurry • Surface casing in permafrost

Typically, small volumes of SmartSet® slurry are required to achieve the desired results – often less than one cubic meter for many remedial jobs. Slurries are mixed at the well site under supervision of a Pluto engineer and pumped downhole using conventional techniques and equipment.

KEY PROPERTIES

- **Zero gel strength generation** – thin fluid until reaches set point and suitable for pumping with coiled tubing, tubing or drill pipe (if viscosity is needed in job use HEC).
- **Right angle set** – thin fluid to immovable solid within 120 seconds always - KEY TO STOPPING GAS INFLUX
- **Withstands 30% contamination** (organic or inorganic) with no effect on set characteristics.
- **Rapid compressive strength development** - average compressive strength is 4,000 psi (can increase to 8,000 psi if desired)
- **100% acid soluble with 15% HCl** – allowing clean-up of producing zones
- **Excellent bond** – to formation, steel, even salt formations.

- **Does not shrink** – possible slight expansion in some cases
- **Thermally stable up to 900 °C** – excellent insulating properties
- **Density of 1.6 SG** (13.5 ppg) – can be weighted or lightened by additives
- **Impermeable when set** – set permeability of 0.012 millidarcies
- **Easy to drill with no cuttings** – approximately 10m/hr using water, coiled tubing and motor
- **Easy to clean up on job** – can be diluted with water
- **Environmentally friendly** – all materials are completely non-toxic (OCNS category D/E)

BENEFITS

SmartSet® is designed to do what Portland cements and resins cannot.

Solutions currently available for down hole temperatures up to 130 °C (266 Fahrenheit).

Zero risk of “after placement” gas flows. A major drawback of Portland cements is the transition between slurry and solid states, where cement gels (up to 30 minutes) and does not transmit hydrostatics, allowing gas to flow and form channels. SmartSet® slurries always set in under 120 seconds.

Can be pumped over producing formation to temporarily isolate during remedial operations. Production can be restored by acidizing or re-perforating after any up hole remedial work is finished.

Can be pumped through the bit and BHA in drilling applications due to the thin low solid properties of the SmartSet® slurry. Through bit plug placement allows time efficient curing of severe drilling fluid losses. A plug can be spotted and then drilling continue 1 to 2 hours later without the need for a trip. It is also possible to set a plug and intentionally sidetrack a well without tripping the drillstring.

Potential to use for arctic permafrost surface casing cement. First, the right-angle set can stop gas influx from shallow zones. Then better insulating properties limit heat transfer during drilling and production.

Set point observed in the field matches lab data within 5 minutes and typically +/- 2 minutes. Repeatability is a key to successful jobs. Set point is adjusted by our laboratory team by means of accelerator or inhibitors to meet job criteria for the planned pumping schedule and wellbore temperatures.

PRODUCT PHYSICALS

- Shipped in 25 kg bags
- Manufactured in Canada

CONTACT

Pluto Ground Technologies Inc.

9168 52 Street SE Calgary, Alberta, Canada

Email: info@plutogt.com | Website: www.plutogt.com