

**Penadrill™**  
and Other Outstanding  
Drilling/Workover Technologies



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Penadrill™



What is Chemlogic's drilling compound known as Penadrill? The technical explanation is both wordy and boring to most readers, but here is what our engineer wrote for the technical data sheet:

- Chemlogic "Penadrill" is a highly complex lubricant designed specifically to speed drilling in high compressive strength cement plugs. The lubricant is built to lubricate the point of drill bit to cement contact. It does so by lowering surface tension at the interfacial point of force developed between the drill bit and the specialty cement. Capillary forces are controlled for optimum penetration by allowing lubrication surface active agents and lubricant oils to concur on the substrate. Unlike other highly acclaimed Chemlogic lubricants, LubriFree and LubriGlide, that utilize the capillary forces of repulsion to lower the entropic repulsion forces that enable the establishment of a long range attractive lubrication regime across the complete project, Penadrill's unique surfactant molecules diffuse through the oil in water emulsion to become adsorbed by the substrate to lower the surface potential. At these shorter interaction times, of relevance to tribology, oil capillary junctions and islands of the adsorbed surfactants coexist on the substrate. Penadrill will work well in any drilling operation and improve penetration speeds and reduce bit wear. Unlike standard drilling operations, drilling out modern, high compressive strength cement plugs is extremely difficult and requires unique lubrication qualities. And, the product will help penetrate even when poor quality cement plugs begin rotating around with the bit by penetrating the substrate pores and fissures allowing bit success at the most critical time.



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Penadrill™



### Laymen's explanation of Penadrill:

- ① Penadrill is an outstanding lubricant that works within the drilling system to help penetrate the formation substrate or cement pore space and adsorb a lubricating film so the bit has lubrication preceding its point of penetration.
- ① The combination chemistry containing colloidal wettings agents encapsulate the drilled particles into finely divided solids that remain dispersed due to their small size and electrical charge. These particles have negligible settling velocity because their small mass has a low gravitational force, thereby allowing fast removal of solids which keeps the bit clean and speeds the drilling process.
- ① The particles of the colloidal encapsulation absorb ions and acquire an electric charge. The colloidal dispersion "islands" take on the same charge and thus are repelled by one another keeping the mass moving away from the bit. Think about it like taking two magnets and trying to force the like charged ends together...its physically difficult and they certainly don't stay together.
- ① If you want to picture in your mind what the lubricating side of the Penadrill is doing...think about digging a post hole in hard ground. When you 'lubricate' the ground with water so the shovel has penetration ahead of the point of force...you get faster penetration. Now picture the shovel without any soil attached because it remains clean...it speeds the digging and soil removal even faster!



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## Specialty Product Development



Chemlogic is first & foremost an oilfield specialty chemical company that supplies outstanding products and services.

- ① We have developed a complete product line for the drilling and workover segment of the oilfield. Unlike the other companies simply supplying relabeled chemicals; Chemlogic developed numerous of the top selling chemistries in the industry – both in the wholesale and retail markets in a relatively short period of time. Why? How?
- ① Chemlogic set itself apart from the others by thinking and doing things ‘outside the box’. The others already had gels, polymers, and lubricants, but had unfortunately relented to a ‘commoditized or me-too’ way of thinking...they sell commodities. Chemlogic markets ‘unique’ specialty compounds that are in a league of their own. Let’s face it...in order to grow a new business...we have to deliver results. In fact, we have to deliver better results than our competitors every day in order to keep growing.
- ① While other companies market fewer product offerings because larger manufacturing batch loads equates to less cost and higher profitability. That trend needs changing. We will remain a specialty company that develops a compound based on one location or one well at a time in order to achieve the results that specializing individual applications brings.
- ① We continually prove that profits and success follow results-oriented product development, not sales & profit-oriented product lines. What happened to the industry is that companies have force-fed one technology into every possible application...so larger batches can be produced and inventory costs can be spread into fewer compounds netting greater profits at the expense of performance.
- ① Now is the time to redevelop and revitalize the specialty chemicals industries ‘old-fashioned’ approach to solving problems: one well – one application at a time.



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## Extensive Product Line



- ⦿ **ProGel HT** – top selling compound - High temperature & pressure stable, cross-linked polysaccharide gelling agent based on proprietary biopolymers & xanthan gums.
- ⦿ **ClayChlor-X** – top preforming KCl substitute used at half the rates of competitive compounds. Based on complex polyquats that prevent formation damage during downhole operations.
- ⦿ **Penadrill** – specialty lubricants for cement drill out and tough drilling conditions; now becoming a standard in cement drill-outs throughout the industry.
- ⦿ **LubriFree** – many state LubriFree is simply the best drilling lubricant to be utilized in the Eagle Ford & Barnett Shale as it has repeatedly reduced friction induced pressures and increased ROP by 50 – 500%.
- ⦿ **LubriGlide** – developed to outperform present “pipe on pipe” lubricants – used to reduce helical force friction; now being setup as a standard throughout the Eagle Ford & Barnett Shale.
- ⦿ **ProBeads GX & PX** – outstanding biopolymeric lubricant with glass or plastic beads used for helical bends and prevention of buckling – combine chemical lubrication with mechanical (minute small ball-bearing spheres).
- ⦿ **ProPoly FR-821 – 823** – proprietary cross-linked acrylamide friction reduction polymer compounds. “Slick Water” polymers for use in coiled tubing and well bore applications involving mixed chloride & higher brines.
- ⦿ **ProPoly PA** – cross-linked PHPA (partially hydrolyzed polyacrylamide) emulsion polymer and prilled poly beads for multiple drilling and completion gelling operations.
- ⦿ **ProScav HS 40 Series** – Hydrogen Sulfide (Sour/Poisonous Gas) scavenger developed for drilling systems – protonated molecule reacts 2X faster and works in both hydrophilic and lipotropic systems.



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## Extensive Product Line



### Excellence Continued

- 🌀 **ProFoam XT 70 Series** – low use rate foamer for coiled tubing, air drilling, and completion work. Designed for iron and calcium stability coupled with a long foam half-life with outstanding water retention that rivals no other compound.
- 🌀 **ProPacker** – packer fluid inhibitor based on oxygen scavengers, corrosion inhibitor, and polyquats that prevent sessile biological growth in the annular space. One 55 gallon drum treats 100 – 200 barrels of water depending on water source and conditions.
- 🌀 **ProBreak DF 80 Series** – low use rate defoaming agent designed for drilling and workover systems.
- 🌀 **GulfPure HD 1000 Series** – cleaners designed for multiple uses throughout the drilling and production well site. Specialty compounds built to clean frac tanks, break oil based muds, clean cuttings, remove pipe dope, and numerous applications within the GulfPure HD, ProClean, ProSolve series.
- 🌀 **ProTas pH** – pH and alkalinity booster for polymer yielding or system corrections.
- 🌀 **ProCet pH** – carboxylic acid-based pH adjustment compound for drilling & wastewater.
- 🌀 **ProSurf 2000 Series** – ligand and surfactant packages for SWD maintenance via injectivity improvement, pressure reduction, scale chelation/sequestration, and continuous cleaning of the bore face and perforations.
- 🌀 **ParaSperser 3000 Series** – outstanding paraffin & asphaltene dispersant clean-up for well bore, surface, gathering, & pipeline systems.



## Extensive Product Line

### Water Reuse Technologies Being Developed for Future Projects:



Specialty treatment equipment is being developed for water reuse. Currently cleaning pipeline pigging and frac tank waste in Louisiana with great success. The protocol for water reuse will be coming out in 2014.





Ongoing Mixing Technologies Being Developed for Future Projects:



Specialty turbine agitators for biopolymeric gel development, emulsion polymer yield for water reuse – the flocculation of oil and solids ending in downstream filtration or belt pressing. There are multiple applications of these turbine tanks for drilling, workover, and completion operations.



Steam & hot water traced systems for use primarily in the Bakken Shale or water reuse areas that require heating the fluid with chemicals for the break or increased polymer yield and gel strength.