



enventives

AphronICS

2016 - 2017

EVOLVING SOLUTIONS & INDUSTRY PROVEN DRILLING FLUID PRODUCTS

WE INNOVATE OTHERS DUPLICATE

enventives is the wholesale manufacturer and original developer of the AphronICS is a unique drilling fluid system capable of delivering solids free invasion control through severe thief zones enabling the production of previously unexplorable reservoir formations.




MANUFACTURING • GRINDING • BLENDING • SIZING



Aphron ICS Invasion Control System

enventives, LLC offers our patented innovative drilling fluid technology that incorporates uniquely structured micro-bubbles called Aphrons. Aphrons serve as a first line of defense to prevent leak-off during the initial invasion period after a drill bit cuts into rock. Our AphronICS™ technology has highly successful field proven capability in drilling deplet-

ed reservoirs and other low-pressure or permeable formations by solving many issues such as fluid loss control, formation damage, differential sticking and stabilization of multi-pressure sequences with one fluid. The AphronICS™ drilling fluid reduces whole mud loss and minimizes collateral damage to high-permeability porous reservoirs.



The versatile aphron drilling fluid system offers unique mechanical and economic solutions which can produce increased profit for your company while reducing your customers overall well construction cost.

Utilizing the aphron technology will allow your company to engage in an untapped market, providing a unique and cost effective solution to common fluid related exploration dilemmas. Many operators will relate previous field problems that may have benefitted from an aphron technology solution.

AphronICS™ Low-Shear-Rate Viscosity (LSRV), combined with its stable microbubbles, helps you control losses when drilling through depleted reservoirs. In addition, the flexible microbubbles enable operators to economically access reserves where depletion has altered the mechanics of the field, forcing the use of additional casing strings or costly underbalanced-drilling techniques.

There is nothing unusually complicated about building AphronICS™ or maintaining its excellent rheological properties during drilling. The high-LSRV base fluid consists of a High-Yield Stress-

Shear-Thinning (HYSST) polymer coupled with proprietary components that create and stabilize the aphrons within the system. An exclusively formulated aphronizer is incorporated to reach the desired concentration of microbubbles, which typically is 10 to 15% by volume. As the concentration builds, it is not uncommon to see the Brookfield LSRV increase to between 120,000 and 160,000 cP. Once the system is circulating, the rheological properties are easily maintained to provide optimal hole cleaning, cuttings suspension and a high degree of control over the invasion of whole drilling fluid.

In hundreds of wells the world over, operators have seen firsthand the economic advantages of AphronICS™. Many have been high-angle or horizontal wells, where wellbore stability and drilling efficiency have been shown to reduce construction days by as much as 50%. In some situations, intermediate casing strings have been eliminated, resulting in even greater cost savings. The micro-environment bridging has consistently and substantially improved well construction economics by mitigating drilling problems and delivering highly stable boreholes.



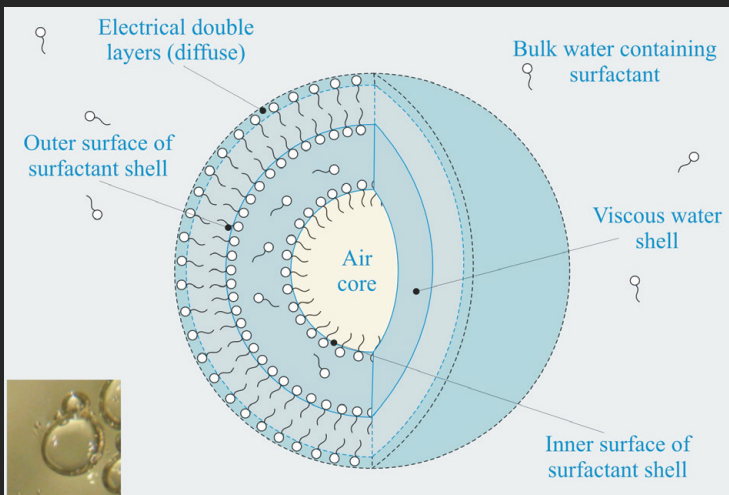
AphronICS™ simplifies completions, too. In fact, cleanup has consistently been reduced to as few as two days in high-porosity sands where 30 days had been the norm. The organic, biodegradable polymers and non-caustic pH materials that make up AphronICS™ provide a healthy balance between operational efficiency and environmental acceptability. The system meets or exceeds regulatory statutes, such as those for the Gulf of Mexico, Canada and the North Sea.

Aphron Fluid Technology systems are built with conventional mixing and surface equipment standard to drilling rigs. Once the base fluid has been built to a minimum LSRV of 50,000 cPs the aphron generating package is added through the mud hopper. The air, shear and pressure drop associated with mixing through the hopper will create a 10 - 15% volume of aphrons into the base fluid system.

Aphrons aggregate when forced together and function like one large pressure diverting seal. The Aphron Fluid Technologies are a two phase solution. The technology is focused on improving drilling, workover and completion operations where significant pressure differentials exist.



**APHRONICS™ IS A FIELD PROVEN PRODUCER.
OUR APHRONICS™ IS A PROACTIVE SOLIDS FREE LOST CIRCULATION
SOLUTION. APHRONICS™ IS WHERE YOU NEED IT, WHEN YOU NEED IT
AND MOST OFTEN BEFORE YOU EVER KNEW YOU NEEDED IT.**



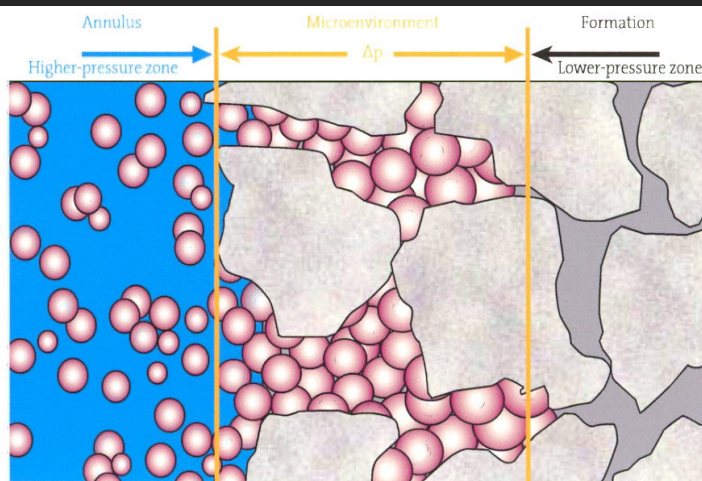
What is AphronICS™?

A variable density fluid system with density variability from >3.0 to 16.0 ppg.

An at balance fluid system with equalized hydraulic pressure between the wellbore and formation.

A solids free system incorporating micro-bubbles under pneumatic pressures for invasion control.

A fine tuned rheology engineered for minimal fluid loss, superior hole cleaning and excellent borehole stability



The water-base APHRONICS invasion-control system uses stable, energized microbubbles of air ("aphrons") to control losses to troublesome formations. When a low-pressure zone is drilled, the aphrons enter the formation where they expand to equalize formation pressure, effectively protecting the formation from fluid invasion. Standard rig equipment and mixing-hopper turbulence are the only requirements for creating the aphrons. This system should not be confused with foam drilling; it requires no external air source.

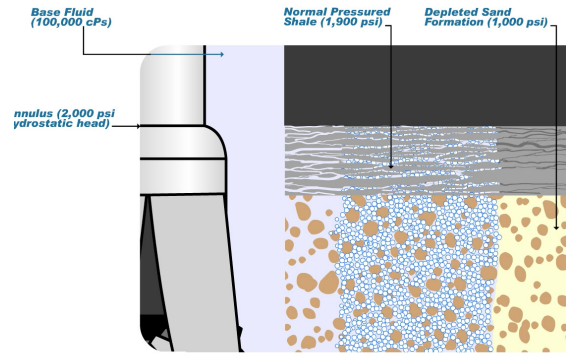
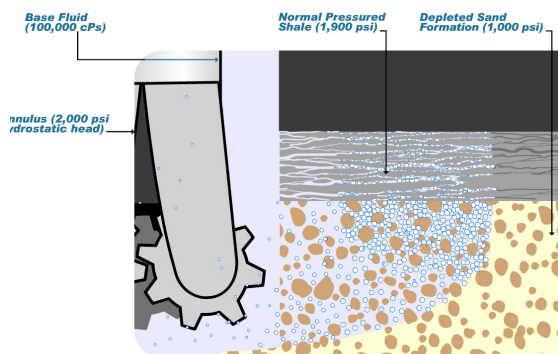
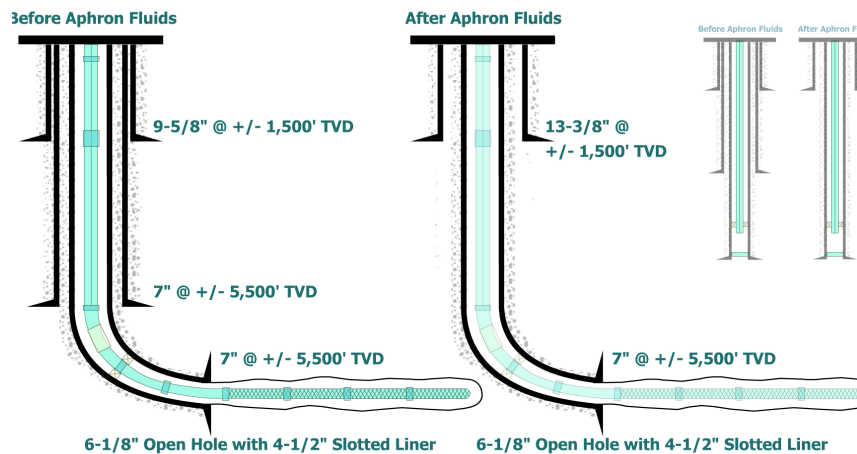
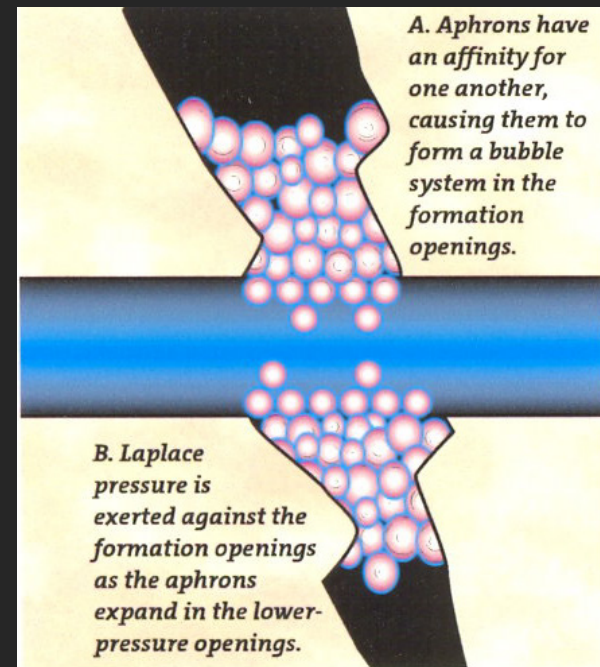
The AphronICS™ (Invasion-Control System) is an engineered drilling-fluid system that controls losses in depleted, high-porosity sands while stabilizing pressured shales. This means you can use conventional drilling equipment to successfully complete many reservoirs that previously would have been candidates only for underbalanced drilling. The system increases shale stability, thereby greatly reducing drilling problems commonly associated with laminated sand/shale sequences.

ENERGIZED APHRONS HAVE AN ATTRACTION FOR EACH OTHER AND LOW-PRESSURE ZONES.

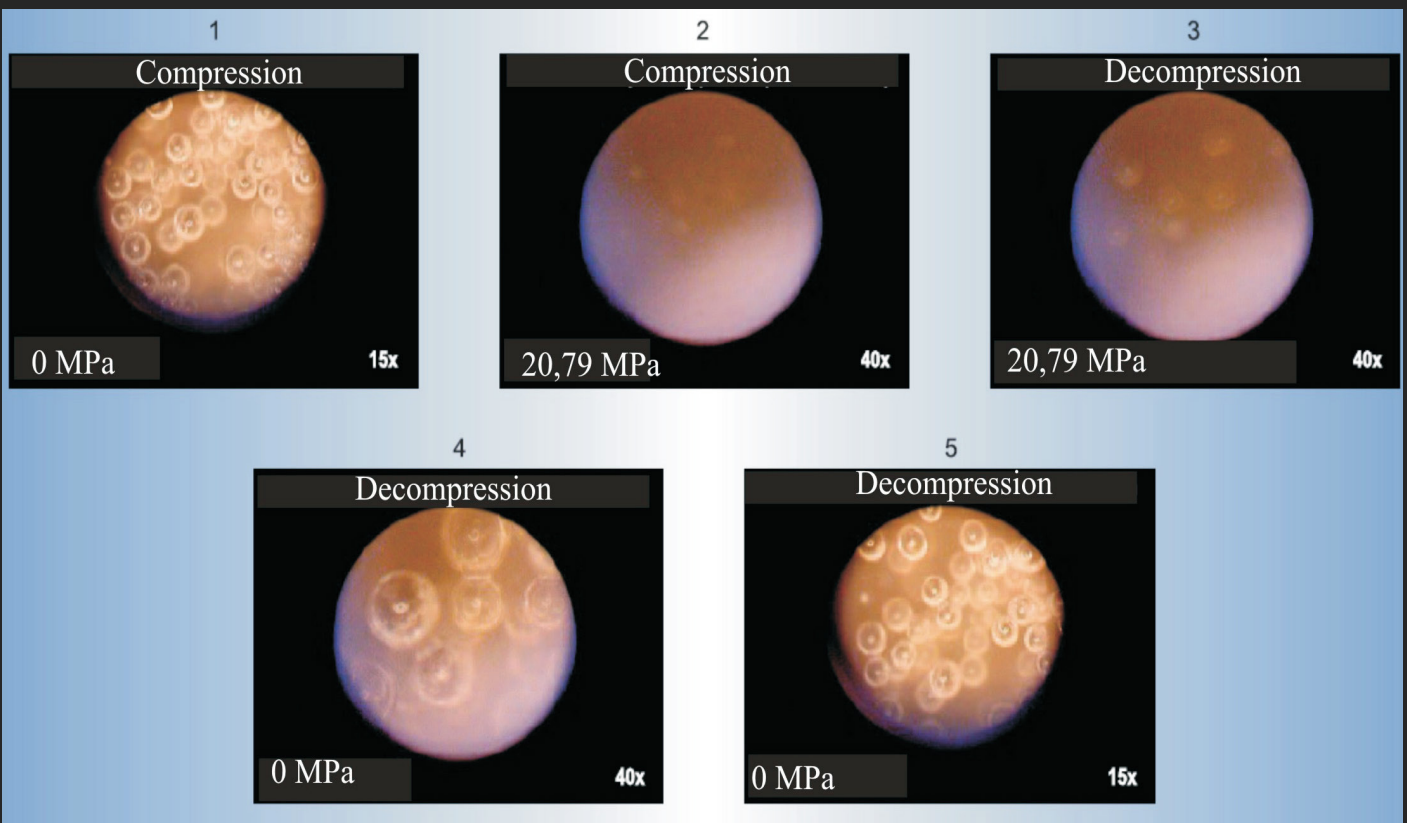
Each aphon contains a gas nucleus of encapsulated air, and this enclosed air compresses when the microbubbles circulate down the hole. The internal pressure of these microbubbles increases at a rate proportional to the external pressure being applied. The combination of increasing pressure and temperature serve to energize the individual aphones.

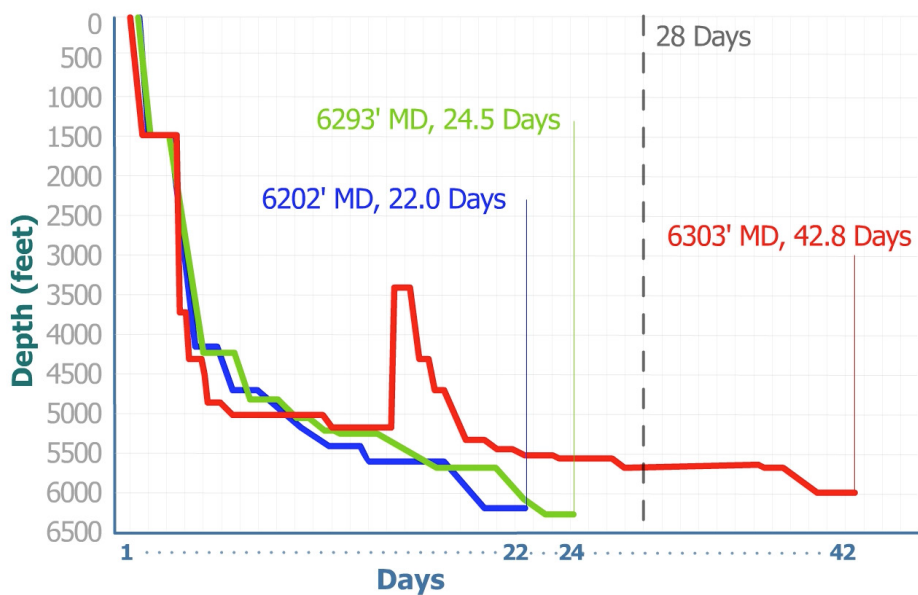
Once the bit exposes a depleted formation, the aphones immediately aggregate within the openings of low-pressure zones. There, a portion of the energy stored within each aphon is released, causing it to expand. The expansion continues until the internal and external pressures on the wall of the aphon are in balance.

As the energized microbubbles enter formation openings, they carry energy equal to that of the annulus. As they crowd into an opening, external Laplace forces increase dramatically, causing aggregation and an increase in the internal LSRV. The microenvironment created by this phenomenon assists in reducing fluid invasion.



THE RESILIENT MICOBUBBLES CALLED APHRONS ARE CAPABLE OF COMPRESSION AND DECOMPRESSION AT PRESSURES GREATER THAN 4000 PSI . THIS ENABLES THE APHRON-ICS™ TO CREATE THE MICRO ENVIRONMENTS NECESSARY TO BALANCE PRESSURE BETWEEN THE ANNULUS AND THE FORMATION AND TO MAINTAIN THE BRIDGE AND SEAL ACROSS THE PORE THROATS OF A THIEF ZONE.

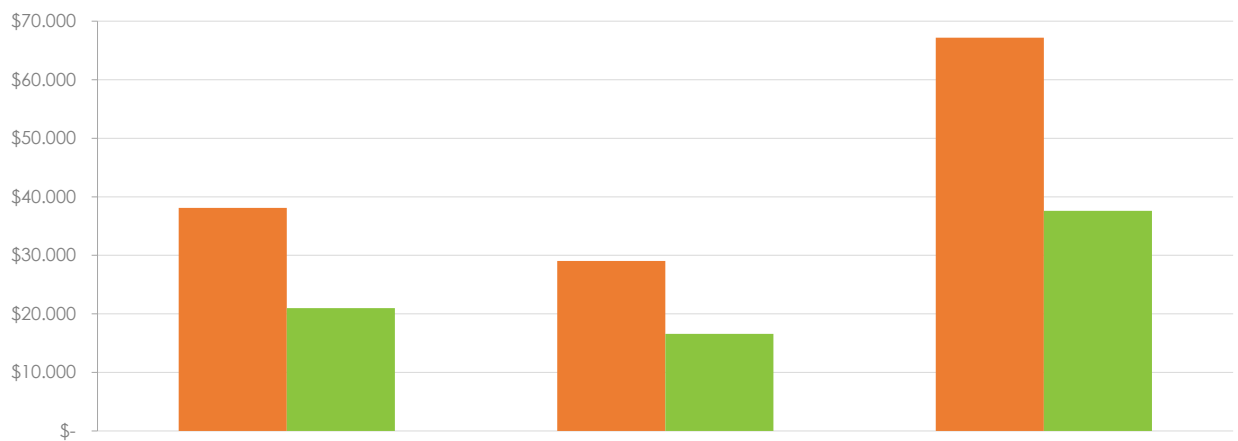




Accelerated Drilling

The red drilling curve reflects typical well construction time with conventional waterbase fluids in this field due to issues associated with high annular vs. low reservoir pressure differentials sticking.

There accelerated drilling curves reflects your gateway to the potential benefits of aphron fluids technologies.



		Fluid Cost \$USD	Rig Cost \$USD	Cum. Cost \$USD
	Low Density Fluid	\$38,115	\$29,056	\$67,171
	Aphron Fluid	\$21,000	\$16,603	\$37,603

Workover Cost Breakdown

PRODUCTS GUIDE

Aphron ICS™

Our Aphron Invasion Control System™ is an at balance fluid system that is solids free, incorporating microbubbles under pneumatic pressure for invasion control. Our Aphron ICS™ has a finely tuned rheology engineered for minimal fluid loss, superior hole cleaning and excellent borehole stability.

ActiGuard™

ActiGuard™ is a proprietary blend of surfactants and vegetable based oils utilised for the control of swelling and sloughing shales. ActiGuard™ is a key component of our Aphron ICS™ fluid technology.

BlueStreak™

BlueStreak™ Mud Conditioner is a multi-component blend of anionic and nonionic surfactants and co-surfactants in an aqueous solution. BlueStreak™ works well in all types of water base drilling fluids and is a key component of our Aphron ICS™ fluid technology.

GoDevil II™

GoDevil II™ is a blend of non-ionic polymers which provide low shear rate viscosity (LSVR) in drilling fluid systems. GoDevil II™ works well in all types of water base drilling fluids and is a key component of our Aphron ICS™ fluid technology.

ActiVator I™

ActiVator I™ is a unique additive designed to be added to certain types of biopolymer-containing fluids to enhance their thermal stability. ActiVator I™ is particularly effective in the thermal enhancement of low-shear-rate-viscosity fluids.

ActiVator II™

ActiVator II™ is a thermal stabilizer for drilling fluids viscosified with polysaccharide polymers such as natural gums, cellulose derivatives, and biopolymers.

Aphronizer A™

Aphronizer A™ is a concentrated surfactant that enhances the shell strength of aphron micro-bubbles.

Aphronizer B™

Aphronizer B™ is a specially design polyvinyl alcohol additive for enhanced AphronICS™ fluids to yield enhanced aphron shell malleability.

TriCon HT™

TriCon HT™ is a proprietary blend of synthetic and natural polymers coupled with stabilizers that are designed to enhance the thermal stability and high temperature fluid loss control of water based fluid systems.

Plasticizer™

Plasticizer™ is a polymeric additive to the enhanced AphronICS™ drilling fluids. Plasticizer™ provides a plaster like coating to aphron micro-bubbles that have been treated with Aphronizer B™.

PassiVator I™

PassiVator I™ is a water base mud defoamer. It has been specifically designed for use in a new concept for treating potential foaming problems in aphron containing water-base fluids.

PolyPhron ICS™

PolyPhronICS™ is used under numerous field conditions to reduce or completely eliminate the need for conventional lost circulation materials. This feature is thought to result from several mechanisms. One is the significant increase in low-shear rate viscosity that occurs. The second mechanism is the expansion of the bubbles to a size that effectively air-lock fluids in a porous formation. A third mechanism is the potential, instantaneous lowering of fluid density on a micro-environmental basis as bubble expansion takes place during the loss to the formation.

PolyMul™

PolyMul™ is a novel, non-aqueous emulsifier. It has been specifically designed for use in PolyPhronICS™. PolyMul™ works well in most oils, synthetics, oil base muds (OBM), and synthetic base muds (SBM).

PolyQ™

PolyQ™ is a specialized Mud Conditioner designed as an LSRV Booster and Aphron bubble enhancer for the PolyphronICS™. PolyQ™ is specifically designed to enhance viscosity and stabilize the aphrons in the PolyphronICS™.

PolyVis™

PolyVis™ is a primary rheology additive that provides low shear rate viscosity (LSVR) in non-aqueous drilling, workover, and completion fluid systems. When mixed with oils or oil base muds, it provides hole cleaning, solids suspension, and formation invasion control.

PolyWet™

PolyWet™ is a oil wetting agent specifically designed for use in the PolyPhronICS™ oil-based Drilling Fluids. When mixed with diesel, Mo or IO base fluids, PolyWet™ is completely soluble and acts to coat oil wet surfaces. PolyWet™ also serves as a general dispersant for non-oil wet solids, LCM and additives that require oil wetting for use in oil-based fluids.

Tri-Vis cP+™

Tri-Vis cP+™ is a rheological modifier which enhances low shear rate viscosity (LSVR) in drilling, workover, and completion fluid systems. Tri-Vis cP+™ is normally used as an adjunct to PolyVis™. When mixed with oils or oil base muds, it functions to stabilize Polyphrons.

MicroDyne L™

MicroDyne L™ is a novel, non-aqueous fluid conditioner. It has been specifically designed for enhancing the formation of the Polyphrons (Aphrons) in non-aqueous fluids. It is used in a new concept for treating various losses of fluids from non-aqueous fluid systems. MicroDyne L™ works well in most oils, synthetics, oil base muds (OBM), and synthetic base muds (SBM).



Innovative Drilling Fluid Additives

Proven in the Field for 30+ Years

Premium & Low Cost Loss Circulation Materials

Field Proven Proprietary Formulations

Organophilic & Modified Lignite Products

HTHP Fluid Loss Additives for Oil, Water & Synthetics

AphronICS™

Patented micro-bubble Invasion Control System

Ven-BHC™

Low-Cost & Superior Replacement for MMO/MMH Drilling Systems

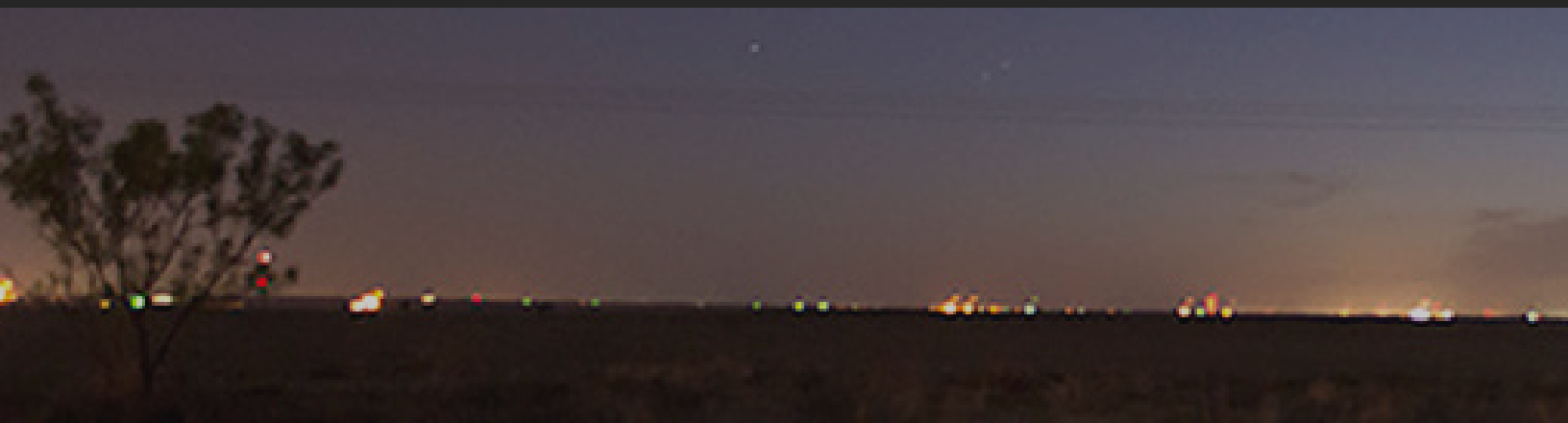
Private Label & Real Custom Blends

Lubricant Technologies

Research & Development Services

Full Lab Capabilities

Permian Basin Logistics (Rail, Warehousing, Storage & Yard)





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PRICE QUOTES

Please contact enventives, LLC or your local enventives distributor for current availability and to obtain current price quotes.

PRODUCT DATA INFORMATION

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