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Product name: **CLAYCAP  
LIQUID**

Product description: CLAYCAP LIQUID is a high activity, synthetic, anionic polyacrylamide of high molecular weight, with 50% of the active ingredient dispersed in a light mineral oil. It is a viscous, off-white, oily liquid having a density of approximately 1.1kg/l. It is pourable at temperatures as low as -10°C and is easily mixed with fresh or salt water with some agitation.

- Principal uses:
- CLAYCAP LIQUID is used as a clay or shale encapsulator and as a friction reducer. It is used in forward and reverse circulation slim hole and large diameter drilling, slurry shield tunnelling, earth pressure balance tunnelling, micro tunnelling, pipejacking, bentonite piling, diaphragm walling and horizontal directional drilling.
  - As a clay or shale encapsulator it is normally used at concentrations of 2 to 6kg/m<sup>3</sup> of water in low solids mud systems. CLAYCAP LIQUID forms a thin layer on the surface of the cuttings and the walls of the hole. This layer helps to inhibit the passage of free water from the mud to the clays and shales thereby reducing their wetting and limiting the swelling that would otherwise take place. The cuttings may then be removed from the hole with less dispersion and degradation, which allows better control of the rheological properties of the mud and there is less bit balling and agglomeration of the cuttings into larger bits or balls. Less wetting and disturbance of the shales or clays in the hole, because of encapsulation, results in the walls being more stable and sloughing is reduced. Pipe sticking and the need for reaming is reduced and lower pumping pressures are required with a cleaner hole being formed. The protection supplied to the walls of the hole allows for faster rates of penetration to be achieved and for a more stable hole to be maintained for longer periods. CLAYCAP LIQUID is tolerant of high concentrations of salt and is suitable for use with Potassium Chloride inhibited muds.
  - CLAYCAP LIQUID can be used for fluid loss control in low solids mud systems. It may be used at concentrations of 2 to 5kg/m<sup>3</sup> with cellulose based products such as CMC to provide a low solids mud with good fluid loss control, shale stabilisation and clay encapsulation.
  - CLAYCAP LIQUID is an excellent friction reducer. When added to water in concentrations of 3 to 8kg/m<sup>3</sup> of water it forms a slippery liquid that is suitable for injection into the annulus of pipejacks, micro-tunnels or caissons. In these applications the combination of extreme slippiness, good fluid loss control, reduction of the swelling of clays and hole stabilisation provided by the CLAYCAP LIQUID is extremely beneficial and can result in significant reductions in the jacking forces, often allowing longer length of pipes to be installed or the use of less inter-jacks.
  - When CLAYCAP LIQUID is mixed at concentrations of 1 to 3kg/m<sup>3</sup> of water it can be used to lubricate the face of EPB tunnelling machines and can also be injected into the screw conveyor system as a lubricant. The encapsulating properties of the mud help to limit the balling of the cuttings while the slippiness of the mud helps to reduce friction in the conveyor or transport system.
  - The product may be used at concentrations of 1 to 3kg/m<sup>3</sup> of water to form a circulation fluid for use with slurry shield tunnelling machines working in cohesive soils. The fluid works to encapsulate the cuttings thereby helping with their transport through the pumping system. In addition a film of the fluid is deposited on the walls of the excavation thereby providing lubrication to the shield and to the pipes being jacked.

- CLAYCAP LIQUID can be used at strong concentrations of 20kg/m<sup>3</sup> of water to form a friction reducing paste or "paint" that is applied to the outside surface of pipes used in pipejacking or caissons. This strong concentration of CLAYCAP LIQUID may be mixed in a small barrel or drum and then brushed onto the surface of the pipe just prior to the pipe being placed into the tunnelling machine. The CLAYCAP LIQUID "paint" will tend to dry out on concrete surfaces but upon contact with ground water or the annulus injection fluid, it will form a very slippery film on the surface of the pipe and this will reduce the friction between the pipe or caisson and the ground. The "paint" may also be used with steel or plastic pipes. A weaker solution of CLAYCAP LIQUID, as detailed above could be used as the annulus injection fluid so as to minimise and maintain low friction and jacking loads.

**Characteristics:** CLAYCAP LIQUID is suitable for addition to fresh or salt-water low solids mud systems. It is completely compatible with KCl and when used together they form an excellent mud for drilling unstable clays and sloughing shale formations. It is resistant to Calcium and Magnesium ions. CLAYCAP LIQUID should not be used in conjunction with Bentonite as this may lead to dramatic changes in viscosity.

**Mixing:** CLAYCAP LIQUID can easily be mixed with fresh or salt water with agitation in a mixing barrel. The dosage of CLAYCAP LIQUID will depend upon the application, ground conditions and mud system.

**Packaging, Storage & Handling:** CLAYCAP LIQUID is normally packaged in 25kg plastic drums but other packaging is available to order. It has a long shelf life if stored in a cool dry place, avoiding extreme temperatures. The product is classified as an irritant to the eyes and skin. It is recommended that gloves, goggles and protective clothing be worn. Spillages should be contained with an inert material and removed for disposal. The product is very slippery when wet. Further information on handling and use can be found in the relevant Safety Data Sheet.

**Customs tariff code:** 390690.90

**Properties:**

Chemical type:	Anionic polyacrylamide dispersed in a light mineral oil.
Appearance:	Liquid
Colour:	White
Odour:	Oily
Active content:	50%
pH 1% solution:	7.5
Solubility in water:	Soluble
Boiling point:	>100°C
Freeze/thaw stability:	Good
Specific gravity:	1.1g/cm <sup>3</sup>
Pour point:	<-10°C
Flash point:	>120°C
Other:	Irritant. Slippery when wet.