

Duo-TEC

Duo-TEC* is a dispersible, non-clarified technical grade xanthan gum that provides viscosity, including low-shear-rate viscosity, and weight-material suspension for all water-base mud systems.

Duo-TEC xanthan gum has the unique ability to produce a fluid that is highly shear-thinning and thixotropic.

Typical Physical Properties

Physical appearance	Cream-to-tan powder
Specific gravity	1.5
Bulk density	50 lb/ft ³ (800 kg/m ³)

Applications

The primary function of Duo-TEC xanthan gum is to increase viscosity for cuttings transport and suspension. Duo-TEC xanthan gum performs effectively in all water-base fluids, from highly weighted to low-solids systems. This includes freshwater, seawater, salt and heavy-brine systems.

Duo-TEC xanthan gum works to provide an optimized rheological profile with elevated low-shear-rate viscosity and highly shear-thinning characteristics with low "n" values. These characteristics frequently result in fluids with inverted flow properties, i.e., the yield point being greater than the plastic viscosity. Shear-thinning fluids have low effective viscosities at the high shear rates encountered inside the drillstring and at the bit. This low effective viscosity for minimal pressure losses and standpipe pressures allows optimized hydraulics and maximized rates of penetration. Conversely, at the low shear rates experienced in the annulus, Duo-TEC xanthan gum enables the fluid to have a high effective viscosity for adequately cleaning the well and suspending cuttings.

Duo-TEC xanthan gum should be added slowly through the hopper to prevent lumping and minimize waste. It should be added at the rate of approximately one 25-lb (11.3-kg) sack every seven minutes. The time required for the product to yield its ultimate viscosity depends on salinity, temperature and shear.

The amount of Duo-TEC xanthan gum required depends upon the desired viscosity. Normal concentrations range from 0.50 to 2.5 lb/bbl (1.43 to 7.1 kg/m³) for most mud systems. Special fluids and difficult hole-cleaning conditions can require higher concentrations - up to 4.0 lb/bbl (11.4 kg/m³).

The addition of salt, an antioxidant and thermal stabilizers improves temperature stability in Duo-TEC fluids from 250 to 280°F (121 to 138°C). Specially formulated systems/pills have been used at temperatures up to 400°F (204°C). Duo-TEC xanthan gum is subject to bacterial degradation, and treatments with a biocide are recommended to prevent fermentation.

Advantages

- Highly effective viscosifier
- Shear-thinning rheological profile for improved hydraulics
- Minimum frictional pressure losses for additional hydraulic horsepower at the bit and low, high-shear-rate viscosity for maximum penetration rates
- Viscous laminar flow in the annulus for improved wellbore stability with maximum hole-cleaning and suspension capacity
- Easy to mix

Limitations

- Trivalent ions such as chromium and iron can cause biopolymer precipitation and loss of viscosity or crosslinking
- Not tolerant of high-pH or high-calcium-ion conditions
- Duo-Tec systems should be pretreated with either sodium bicarbonate or SAPP and possibly citric acid prior to drilling cement
- Subject to bacterial degradation, a biocide should be used to prevent fermentation. Slightly anionic nature of Duo-Tec xanthan gum requires special mixing procedures when mixed with cationic materials.

Toxicity and Handling

Bioassay information is available upon request.

Handle as an industrial chemical, wearing protective equipment and observing the precautions described in the Material Safety Data Sheet (MSDS).

Packaging and Storage

Duo-Tec xanthan gum is packaged in 25-lb (11.3-kg) or 55.1-lb (25-kg), plastic-lined, multi-wall, paper sacks.

Store at room temperature in a dry, well-ventilated area. Keep in original container. Keep container closed. Store away from incompatibles.



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