



# G-150 GUAR

G-150 GUAR is a guar-based drilling polymer for water well drilling, core drilling and seismic shot hole drilling. It is a cost effective polymer suitable for a wide range of drilling applications. The ability of G-150 GUAR to dissolve and yield viscosity quickly producing a low solids mud system is advantageous. It gives fast cuttings removal, high penetration rates, and reduces bit and pump wear. Since G-150 GUAR is a natural organic polymer, it is non-toxic and non-polluting. Being biodegradable, however, if the system is to be used over two days, a preservative is recommended.

## PRESERVATION

**CHLORINE ADDITION:** Water found at most locations often contains enzymes and bacterial organisms that will breakdown the G-150 GUAR after 24 to 48 hours exposure. The rate at which this breakdown occurs depends upon the water temperature and is greatly accelerated in warm weather. The first step in any system is to add chlorine to the water in sufficient concentration to kill bacteria but not enough to breakdown the polymer through oxidation. This can be accomplished by adding chlorine to the water and circulating before adding G-150 GUAR. We recommend a level between 10 and 25 ppm active chlorine. Table 2 below shows the amount to add to achieve this level in the fluid.

If there is a need to use the fluid over a multi-day period then the chlorine level in the fluid needs to be maintained at a 5 to 10 ppm level as the chlorine is consumed. A rule of thumb is to add one half to one pint of sodium hypochlorite (bleach) per 1000 gal per day.

**ENZYMES:** Naturally occurring enzymes will also attack G-150 GUAR over a period of time. Adding sodium bicarbonate will bring the system pH to between 7.5 and 8.5 depending on the amount of buffering agents and hardness already occurring in your drilling water. Generally 1/2 pound of sodium bicarbonate per pound of G-150 GUAR will extend the life of the fluid.

The key effect of alkaline pH is that it greatly inhibits the activity of the enzymes that breakdown the polymer chains into elements that are digestible by bacteria. Also enzymes can breakdown the G-150 GUAR solution in the absence of bacteria if the dosage is strong enough. Alkaline pH inhibits this breakdown.

**TABLE 1: RHEOLOGICAL PROPERTIES OF G-150 GUAR FLUIDS**

Concentration (lbs/100 gal)	Marsh Funnel Viscosity	Apparent Viscosity	Plastic Viscosity	Yield Point
1.25	32 Seconds	7.0	4.5	5.0
2.40	37 Seconds	13.5	8.0	11.0
3.5	46 Seconds	21.0	11.0	20.5
4.75	59 Seconds	30.0	13.0	34.0
6.0	90 Seconds	38.5	17.0	43.0

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## BREAKDOWN OF DRILL FLUID

Once drilling is completed, casing is set and the hole is gravel packed, there is no longer any need for the drilling fluid to suspend cuttings or hold the hole open. If mud circulation pumping equipment is still connected, then add sufficient chlorine additive to bring the concentration up to 1000 ppm and circulate the mud to thoroughly distribute the chlorine throughout the mud circuit. Concentrations as low as 200 ppm can be used, but will take a great deal of time to completely breakdown the polymer through oxidation.

If circulation is not possible, then the well can be developed by high velocity horizontal jetting through the well screen opening into the gravel pack or formation. This should be done as soon as possible after casing is set. Chlorine concentrations of 1000 ppm are recommended to both oxidize the G-150 GUAR and destroy any remaining organisms downhole. Use Table 2 to determine proper dosage of either sodium hypochlorite (bleach) or calcium hypochlorite. If calcium levels are high, in either the produced water or your make-up water, use sodium hypochlorite (liquid).

Chlorine treatments are far more effective at an acid pH\*. Using hydrochloric or muriatic acid to bring the system pH down to the 5.0 level before adding the chlorine is recommended. Once the drilling fluid begins to break down, then surging or pumping the well from within the casing is the best way to let the groundwater flush the spent fluid from the formation and packing.

**\*WARNING: Never add acids and chlorine compounds together. Highly poisonous free chlorine gas may result!**

<b>TABLE 2: CHLORINE ADDITIVE REQUIRED TO REACH PPM ACTIVE</b>					
PPM Required	10	25	50	100	1000
Sodium-Hypochlorite (gals /1000 gal Fluid)	0.2	0.5	1.0	2.0	20.0
Calcium-Hypochlorite (lbs/1000 gal Fluid)	0.13	0.3	0.6	1.3	13.0

**G-150 GUAR is available in 30 pound plastic pails.**

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