



Lubrizol Well Stimulation

Water-Based Fracturing Additives Application Guide

Product Name	Chemical Type	Key Function	Primary Application
Biocides			
BIO-CLEAR™ 1000	Concentrated powder form of DBNPA	Fast acting biocide that degrades quickly. Packaged in 1 lb. (0.45 kg) water soluble bags for safe and easy handling.	Typical concentration range is 1 - 500 ppm. Refer to product label for treatment rates for specific applications.
BIO-CLEAR™ 1430	Glutaraldehyde/quaternary ammonium compound blend (17% active)	Broad spectrum activity. Effective over a wide range of pH and temperature conditions.	Typical concentration range is 60 - 15,000 ppm. Refer to product label for treatment rates for specific applications.
BIO-CLEAR™ 2000	Liquid DBNPA (20% active)	Fast acting biocide that degrades quickly.	Typical concentration range is 1 - 2,000 ppm. Refer to product label for treatment rates for specific applications.
BIO-CLEAR™ 2250	Glutaraldehyde (25% active)	Provides balance between speed of action and length of protection. Highly effective against aerobes, SRB's and APB's.	Typical concentration range is 100 - 10,000 ppm. Refer to product label for treatment rates for specific applications.
BIO-CLEAR™ 2256	Glutaraldehyde/quaternary ammonium compound blend (31% active)	Broad spectrum activity. Effective over a wide range of pH and temperature conditions.	Typical concentration range is 25 - 15,000 ppm. Refer to product label for treatment rates for specific applications.
BIO-CLEAR™ 5000	Liquid DBNPA (5% active)	Fast acting biocide that degrades quickly.	Typical concentration range is 1 - 2,000 ppm. Refer to product label for treatment rates for specific applications.
Scale Inhibitors			
SCALE CLEAR™ 125	Non-winterized phosphonate-based scale inhibitor	Used for controlling the deposition of calcium carbonate, calcium sulfate, strontium sulfate and barium sulfate scales.	Typical concentration range is 0.1 - 0.25 gal/1000 gallons.
SCALE CLEAR™ 125W	Winterized phosphonate-based scale inhibitor	Used for controlling the deposition of calcium carbonate, calcium sulfate, strontium sulfate and barium sulfate scales in colder climates. Freeze point is -29°F (-34°C).	Typical concentration range is 0.1 - 0.25 gal/1000 gallons.
SCALE CLEAR™ 112S	Non-winterized polymer-based scale inhibitor	Prevents calcium carbonate, calcium sulfate, barium sulfate and strontium sulfate scales from precipitating out of solution.	Typical concentration range is 0.1 - 0.25 gal/1000 gallons.
SCALE CLEAR™ 112D	Winterized polymer-based scale inhibitor	Prevents calcium carbonate, calcium sulfate, barium sulfate and strontium sulfate scales from precipitating out of solution. Freeze point is -13°F (-25°C).	Typical concentration range is 0.1 - 0.25 gal/1000 gallons.
Non-Emulsifiers			
NE 006	Nonionic water soluble non-emulsifier	Prevents the formation of emulsions within a broad range of crude oils and condensates.	Typical concentration range is 1-3 gal/1000 gallons.
NE 40	Environmentally friendly nonionic water soluble non-emulsifier	Prevents the formation of emulsions within a broad range of crude oils and condensates. For use in treatments where a low freeze point is not required. Freeze point is 23°F (-5°C).	Typical concentration range is 0.5-1.0 gal/1000 gallons.
NE 201T	Nonyl phenol resin with additional surfactants	Functions as a non-emulsifier and as a surface and interfacial tension reducer.	Typical concentration range is 1-2 gal/1000 gallons.
NE 50	Cationic surfactant	Functions as a non-emulsifier and as a surface tension reducer. Possesses excellent detergent properties to clean fracture and wellbore areas.	Typical concentration range is 1-3 gal/1000 gallons.

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Clay Control Additives			
CC 120	Quaternary chloride compound	Replaces KCl for use as a temporary clay control additive.	Typical concentration range is 1 - 2 gal/1000 gallons.
CC 200	Polymer-based clay control additive	Treats microdarcy formations without plugging the permeability.	Typical concentration range is 1 - 2 gal/1000 gallons.
ClayGuard™ NPH	Blend of amine salts	Clay stabilizer for smectite, illite, shale and mixed layer clay/shale minerals found in many formations. Extends protection beyond that offered by temporary clay stabilizers.	Typical concentration range is 1 - 4 gal/1000 gallons.
ClayGuard™ E	Blend of amine salts	Provides both temporary and permanent clay control protection.	Typical concentration range is 1 - 4 gal/1000 gallons.
XC 197	Complex oligomer benzyl quaternary ammonium chloride	Permanent clay stabilizer.	Typically diluted 2 to 1 in water. Once diluted, typical concentration range is 1 - 2 gal/1000 gallons.

Fluid Recovery Surfactants			
FRS 200	Alcohol ethoxylate-based nonionic surfactant	Used for water and acid treatments in low temperature applications up to 150°F (66°C).	Typical concentration range is 0.5-2 gal/1000 gallons.
KLEENRINSE	Blend of water soluble surfactants	Prevents formation of emulsion within a broad range of crude oils and condensates.	Typical concentration range is 1 - 3 gal/1000 gallons.
SURFMAX 400NE	Unique fluid recovery surfactant	Specifically formulated for oil well stimulation. For use in fracturing and acidizing treatments with freeze protection for cold weather operations. Freeze point is -40°F (-40°C).	Typical concentration range is 0.5 - 2 gal/1000 gallons.

Gel Breakers			
BREAKER AP1	Oxidizing breaker	Returns guar gelled fluid to a water-like consistency. Used on high pH crosslinked gels to reduce viscosity. Effective in temperature range of 120 - 185°F (49 - 85°C).	Use 0.5 - 1.0 lb/1000 gallons as a starting point in break tests.
BREAKER 3L	Oxidizing breaker	Used to reduce viscosity in guar-based crosslinked fluids and slick water systems. Effective in temperature range of 200 - 275°F (93 - 135°C).	Typical concentration range is 1 - 3 gal/1000 gallons for high pH zirconium systems and 0.25 - 2 gal/1000 gallons for borate crosslinked systems.
BREAKER 5L	Oxidizing breaker	Used to reduce viscosity in guar-based crosslinked fluids and slick water systems. Effective in temperature range of 175 - 300°F (79 - 149°C).	Typical concentration range is 1 - 5 gal/1000 gallons.

Crosslinkers			
BXL 101M	Delayed borate crosslinker	Provides extended crosslink times for guar and derivatized guar fracturing fluid systems. Used in wells with bottomhole temperatures up to 300°F (149°C) and in climates with high surface water temperatures.	Typical concentration range is 0.5 - 2 gal/1000 gallons.
BXL 155	Rapid borate crosslinker	Provides rapid crosslink times for guar and derivatized guar fracturing fluid systems. Can be used in conjunction with BXL 101M to enhance overall performance.	Typical concentration range is 0.5 - 2 gal/1000 gallons.

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Oil-Based Fracturing Additives Application Guide

Product Name	Chemical Type	Key Function	Primary Application
Gelling Agent			
HGA 37	Phosphate ester-based	Used for diesel, kerosene or crude. Used with HGA 48 activator.	Typical concentration range is 5-10 gal/1000 gallons of hydrocarbon.
Activator/Crosslinker			
HGA 48	Organo-metallic complex	Used as a crosslinker for hydrocarbon-based fracturing fluids. Used with HGA 37. Temperature range is over 300°F (149°C).	Typical concentration range is 5-10 gal/1000 gallons of hydrocarbon.