



Legend[™] Stimulation Fluid Packages

PRODUCT PORTFOLIO



Enhance Production with Multi-Chem's Stimulation Fluids



Multi-Chem's stimulation chemical portfolio includes a comprehensive array of both standard and custom-formulated chemicals, along with integrated fluid systems, for every well stimulation challenge.

Stimulation treatments, such as hydraulic fracturing or acidizing, are a critical step in oil and gas well development and are used to improve or restore hydrocarbon productivity. This enhanced production is needed to improve well economics and provide a return on investment.

Multi-Chem's experienced team provides optimization of stimulation fluids through proper chemical selection and dosage. Application experience and thorough compatibility testing provides chemical and fluid recommendations that ensure the selected chemicals are compatible, effective, and correctly dosed to prevent under or overtreatment. Delivering on these metrics allows for optimized and efficient chemical spend.

Biocides

Biocides are used in stimulation fluids to reduce microbial activity. Bacteria contamination can cause microbiologically-induced corrosion (MIC), biomass accumulation, biogenic sulfide production, oil carryover and polymer degradation. Multi-Chem offers a wide variety of biocide options to keep microbial counts under control.

» B-8510

DBNPA; oxidizing biocide which provides short-term protection and fast speed of kill

protection and slow speed of kill

- » B-8520 Oxazolidine; organic "preservative" biocide which provides long-term
- » B-8614

14% glutaraldehyde – 2.5% ADBAC quat blend; combo biocide which provides long-term protection and medium speed of kill

» B-8625

25% glutaraldehyde; organic biocide which provides medium-term protection and medium speed of kill

» B-8626

25.7% glutaraldehyde – 12.5% ADBAC/DDAC quat blend; combo biocide which provides long-term protection and medium speed of kill

» B-8630

30% glutaraldehyde; organic biocide which provides medium-term protection and medium speed of kill

» B-8642

42.5% glutaraldehyde – 7.5% ADBAC quat blend; combo biocide which provides long-term protection and medium speed of kill » B-8650

50% glutaraldehyde; organic biocide which provides medium-term protection and medium speed of kill

» B-8700

THPS – 20% active; organic biocide which provides medium-term protection and medium speed of kill

» B-8800

THPS – 50% active; organic biocide which provides medium-term protection and medium speed of kill

» B-8802

THPS-A (added surfactant) – 20% active; organic biocide which provides medium-term protection and medium speed of kill

» B-8805

THPS-A (added surfactant) – 50% active; organic biocide which provides medium-term protection and medium speed of kill

» B-8807

THPS-A (added surfactant) – 70% active; organic biocide which provides medium-term protection and medium speed of kill

» B-8850

50% DDAC quaternary amine, winterized; organic "preservative" biocide which provides very long-term protection and slow speed of kill

» B-8875

THPS – 75% active; organic biocide which provides medium-term protection and medium speed of kill

» B-8900

50% DDAC quaternary amine; organic "preservative" biocide which provides very long-term protection and slow speed of kill

» B-8901

Cocodiamine – 35% active winterized; provides long-term protection and slow speed of kill

» B-8904

50% ADBAC quaternary amine; organic "preservative" biocide which provides very long-term protection and slow speed of kill

» B-8905

50% ADBAC quaternary amine; organic "preservative" biocide which provides very long-term protection and slow speed of kill

» B-8910

50% DDAC quaternary amine; organic "preservative" biocide which provides very long-term protection and slow speed of kill

Breakers

Breakers are used in stimulation fluids to decrease viscosity by breaking down polymer chains. This "broken" polymer is more easily returned to surface during flowback to minimize the amount of potentially damaging residue left in the formation.

» LD-4075

Solid oxidizing breaker effective at temperatures from 120-180°F; may also be dissolved in water and pumped as a liquid; may be used with an activator at temperatures below 120°F

» LD-4175

Liquid oxidizing breaker effective at temperatures above 120°F; may be used with an activator at temperatures below 120°F

» LD-4375

Liquid oxidizing breaker recommended for polysaccharide-based, crosslinked gel systems at fluid temperatures from 75-200°F

» LD-4475 Solid encapsulated oxidizing breaker designed for fluid temperatures of



120-140°F; slightly permeable coating allows delayed release of breaker into fluid

» LD-4550

Solid oxidizing breaker specifically formulated to break friction reducer (FR) polymer; may also be dissolved in water and pumped as a liquid

» LD-4575

Solid encapsulated oxidizing breaker designed for fluid temperatures of 140-200°F; slightly permeable coating allows delayed release of breaker into fluid

» LD-4900

Liquid catalyst to activate oxidizing breakers lower than typical temperature limit

» LD-4925 Liquid enzyme breaker for 80-140°F and pH up to 9.5

» LD-4975 Solid enzyme breaker for 80-140°F and pH less than 8.5

Clay Control

Clay control chemicals are used in stimulation fluids to minimize damage caused by the interaction of the treatment fluid and formation clay particles which may be prone to swelling, dispersing and/or migrating. Multi-Chem offers both temporary and permanent clay control measures.

» LD-6120

Liquid inorganic potassium salt solution; temporary clay swelling control through ion exchange

» LD-6240

Liquid inorganic salt solution; temporary clay swelling control through ion exchange

» LD-6250

Medium charge density cationic polymer that permanently adsorbs onto the anionic clay face to prevent swelling and sloughing; highly effective and efficient

» LD-6360

Organic cation used to prevent clay destabilization and swelling; contains 27% choline chloride, blocking the migration and adsorption of water; contains 27% choline chloride

» LD-6370

Organic cation used to prevent clay destabilization and swelling; contains 75% choline chloride

» LD-6380

Water-soluble cationic polymer which preferentially adsorbs onto clay and silica surfaces to prevent swelling and migration; incompatible with most anionic surfactants

Crosslinkers

Crosslinkers are used in stimulation fluids to interconnect polymer chains, thus increasing the molecular weight and fluid viscosity to allow better proppant transport and fracture geometry.

» LD-3125

Water-based suspension of borate mineral used to provide delayed crosslinking of guar-based polymer in Legend[™] G2000 and H2000 fracturing fluids

» LD-3225

Concentrated solution of borate crosslinking agent used to provide non-delayed crosslinking of guarbased polymer in various Legend fracturing fluids

» LD-3425

Concentrated solution of borate crosslinking agent with incorporated pH component to provide instant crosslinking of guar-based polymer in Legend G3000 fracturing fluids

» LD-3525

Concentrated solution of borate crosslinking agent with incorporated pH component to provide delayed crosslinking of guar-based polymer in Legend G4000 fracturing fluids





» LD-3625

Delayed zirconate-based crosslinker activated by temperature and used in the Legend G5000 fracturing fluids

Friction Reducers

Friction reducers (FR) are used in stimulation fluids to reduce pipe friction pressure generated during hydraulic fracturing treatments. Multi-Chem's line of FR products exhibits excellent storage stability, is tolerant to wide temperature fluctuations, can be viscosified to improve proppant transport, and is effective in fresh water to produced water up to 300,000 ppmTDS.

» LD-2000

Concentrated anionic FR for fresh

water and produced water up to 60,000 ppm TDS

- » LD-2100 Anionic FR for fresh water and produced water up to 60,000 ppm TDS
- » LD-2125 Cost-effective anionic FR for fresh water and produced water up to 15,000 ppm TDS
- » LD-2150 Cationic FR for fresh water and produced water up to 70,000 ppm TDS
- » LD-2250 Dual-component cationic FR for produced water from 50,000 to 100,000 ppm TDS
- » LD-2350 Dual-component cationic FR for

produced water from 100,000 to 200,000 ppm TDS

» LD-2450 Dual-component cationic FR for produced water from 200,000 to 300,000 ppm TDS

» LD-2600 Cost-effective anionic FR for fresh water applications

- » LD-2725 Anionic FR for fresh water and produced water up to 100,000 ppm TDS
- » LD-2775 Anionic, viscosifying FR for fresh water and produced water up to 100,000 ppm TDS
- » LD-2800 Cationic FR for fresh and produced water up to 100,000 ppm TDS
- » LD-2850 Cationic FR for fresh water and produced water up to 200,000 ppm TDS
- » LD-2875 Cationic FR for fresh water and produced water up to 200,000 ppm TDS
- » LD-2900 Premium anionic FR for fresh water and produced water up to 30,000 ppm TDS; excellent proppant transport

at elevated concentrations

» LD-2950 Premium cationic FR for fresh water and produced water up to 250,000 ppm TDS; excellent proppant transport at elevated concentrations

» LD-2975 Anionic FR for fresh water and produced water up to 150,000 ppm TDS

Gel Stabilizers

Gel stabilizers are used in stimulation fluids to allow crosslinked fluid systems to remain stable at high temperatures and extended pump times.

» LD-6500

Liquid gel stabilizer which increases

temperature stability of gelled, aqueous-based fluids above 230°F

Gelling Agents

Gelling agents are used in stimulation fluids to add viscosity in order to lower friction pressure by changing fluid from turbulent to laminar flow regime, lower fluid loss, create fracture width, and/or transport proppant.

» LD-1300 Liquid gel concentrate of high yield guar polymer developed for rapid onthe-fly hydration

» LD-1800

Liquid gel concentrate of doublederivatized guar polymer, carbomethylhydroxypropyl guar (CMHPG) developed for rapid on-the-fly hydration; derivatization reduces the amount of residue associated with the polymer

pH Control

pH control chemicals are used in stimulation fluids to adjust the hydration rate, crosslinking rate, gel stability, and gel break time.

- » LD-5100
 Buffering agent used to lower pH of fluids to aid in hydration
- » LD-5200 pH control agent used to raise pH quickly and temporarily
- » LD-6620 Buffering agent used to raise pH of fluids to aid in crosslinking

Scale Inhibitors

Scale inhibitors are used in stimulation fluids to minimize scale precipitation that may occur when stimulation fluids come in contact with reservoir fluids. Multi-Chem has vast application experience and technical expertise to select the best solution based on the treatment and reservoir fluid characteristics. The scale inhibitors are thermally stable to a minimum of 350°F with tagged, non-tagged, neutralized, non-neutralized, polymeric and phosphonate-based options available.

» LD-7715

Non-tagged polymeric scale inhibitor; inhibits broad spectrum of scales including CaCO₃, BaSO₄, CaSO₄, FeCO₃, and FeS

» LD-7720

Neutralized phosphonate scale inhibitor; inhibits a broad spectrum of scales with particularly excellent inhibition of BaSO₄ and CaSO₄ scales

» LD-7725

Water-based blend of polymers designed to prevent mineral scale deposits (such as calcium carbonate, calcium sulfate and barium sulfate) and is traceable with a simple field test

» LD-7730

Non-neutralized phosphonate scale inhibitor effective on calcium, magnesium, strontium, barium or iron scales designed for squeezes due to solubility characteristics

» LD-7735

Water-based phosphonate scale inhibitor designed to provide multifunctional scale inhibition over a wide temperature range; has excellent calcium and iron tolerance designed for continuous or batch treatment

» LD-7740

Tagged polymeric scale inhibitor designed for use for more environmentally sensitive regions; inhibits broad spectrum of scales including CaCO₃, BaSO₄, CaSO₄, FeCO₃, and FeS

» LD-7745

Tagged polymeric scale inhibits broad spectrum of scales including $CaCO_3$, $BaSO_4$, $CaSO_4$, $FeCO_3$, and FeS

» LD-7755 Non-tagged polymeric scale inhibitor; high calcium tolerance; inhibits broad spectrum of scales including $CaCO_3$, $BaSO_4$, $CaSO_4$, $FeCO_3$, and FeS

» LD-7765

Water-based phosphonate scale inhibitor designed to provide multifunctional scale inhibition over a wide temperature range

» LD-7785

Fully neutralized water-based phosphonate scale inhibitor designed to provide multifunctional scale inhibition over a wide temperature range

» LD-7790

Phosphonate scale inhibitor neutralized with non-metal cation; inhibits broad spectrum of scales

» LD-7795 Solid phosphonate scale inhibitor placed during proppant stages for slow, prolonged release; effective up

Surfactants

to 400°F

Surfactants are used in stimulation fluids to lower the surface tension and capillary pressure to minimize trapping of the aqueous phase in the matrix and enable more liquids to be returned to surface. Multi-Chem has vast application experience and technical expertise to select the best solution based on the reservoir and produced fluid characteristics.

- » Ascend[™] Surfactant Solution Revolutionary, dual-component surfactant solution that incorporates a sacrificial agent to allow surfactant to penetrate further into the rock matrix
- » LD-7200 Nonionic, non-emulsifying surfactant formulated for both dry and liquidsrich formations.
- » LD-7205 Anionic surfactant formulated for liquidsrich formations which can be used in hydraulic fracturing and matrix acidizing
- » LD-7250
 Amphoteric surfactant with low CSI score; very good for oils with asphaltenes
- » LD-7275 Anionic and nonionic blended surfactant formulated for liquids-rich formations
- » LD-7285 Nonionic surfactant formulated for dry gas formations

» LD-7310

Anionic and nonionic blended surfactant formulated for liquids-rich formations

» LD-7330

Winterized anionic and nonionic blended surfactant formulated for liquids-rich formations

» LD-7415

Anionic surfactant formulated for liquids-rich formations; winterized version usable to -40°F

» LD-7535

Anionic and nonionic blended surfactant formulated for liquids-rich formations

» LD-7625

Nonionic, non-emulsifying nonwinterized surfactant formulated for dry and liquids-rich formations; good for applications at 35°F and above

» LD-7635

Nonionic, non-emulsifying surfactant formulated for dry and liquids-rich formations with low CSI scores and relatively high flash point compared to similar products

» LD-7645

Nonionic, non-emulsifying surfactant formulated for dry and liquids-rich formations with low CSI scores and



relatively high flash point compared to similar products

» LD-7645W

Nonionic, non-emulsifying winterized surfactant to extend lower temperature tolerance; low CSI score and formulated for dry and liquids-rich formations

» LD-7655

Nonionic, non-emulsifying surfactant formulated for dry and liquids-rich formations with low CSI scores and relatively high flash point compared to similar products

» LD-7665

Nonionic, non-emulsifying surfactant formulated for dry and liquids-rich formations with low CSI scores and relatively high flash point compared to similar products

» LD-7665W

Nonionic, non-emulsifying winterized surfactant to extend lower temperature tolerance; low CSI score and formulated for dry and liquids-rich formations





BREAKTHROUGH FRACTURING FLUID SYSTEMS PERFORM IN ALL TYPES OF RESERVOIRS AND TEMPERATURES FROM 100°F TO 400°F

Crosslinked Fluid Systems

Crosslinked fluid systems are combinations of chemicals that create a highly viscous, stable fluid in order to transport proppant into the created fracture geometry. Through specialized gel manufacturing methods and chemical mixtures that include unique combinations of crosslinker and breaker technologies, these breakthrough fracturing fluids perform in all types of reservoirs and in temperatures ranging from 100°F to 400°F

» Legend G2000 System

Cost-effective delayed borate crosslinked fluid utilizing guar polymer; stable up to 200°F; good shear stability and adjustable crosslinked time; compatible with a wide range of water sources

» Legend G3000 System

Instant borate crosslinked fluid utilizing guar polymer; stable up to 150°F; efficient fluid system with crosslinked viscosities achieved at relatively lower gel loadings; excellent proppant transport

» Legend G4000 System

Delayed borate crosslinked fluid utilizing guar polymer; stable up to 200°F; efficient fluid system with crosslinked viscosities achieved at relatively lower gel loadings; excellent proppant transport

» Legend G5000 System

Delayed zirconate crosslinked fluid utilizing double-derivatized CMHPG polymer; excellent clean up and performance at high temperature; stable up to 400° F

Sales of Halliburton products and services will be in accord solely with the terms and conditions contained in the contract between Halliburton and the customer that is applicable to the sale.

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