



Demulsifiers

NRG-NE

EMULSION BREAKER

PRODUCT DESCRIPTION

NRG-NE is a block copolymer based on nitrogen-containing compounds in organic solvent. NRG-NE is a high efficiency demulsifier, designed for application in fracturing, acidizing and well clean out operations to prevent hydrocarbon-in-water or acid emulsions.

BENEFITS

- Prevents hydrocarbon-in-water or acid emulsions.
- Compatible with water-based fracturing fluids.
- Not affect rheological properties of fracturing fluid.
- Can be used for acid fracturing, applicable for carbonate and sandstone reservoir.
- Wide range of temperatures up to 302°F (150°C).

PHYSICAL PROPERTIES

Appearance: clean, transparent colorless liquid. Solubility in water: soluble.

RECOMMENDATIONS FOR USE

Typical load of NRG-NE is higher than 1.0 l/m^3 (1.0 gal/1000 gal) and depends on properties of reservoir fluid.

PACKAGING AND STORAGE

NRG-NE is available in 55 gal drums, or 275 gal IBC.

The product should be stored in a dry warehouse away from heating appliances and direct sunlight.

SAFETY REQUIREMENTS



NRG-H2S SORB

HYDROGEN SULFIDE SCAVENGER

PRODUCT DESCRIPTION

Hydrogen sulfide, a natural component of reservoirs or the result of bacterial reduction of sulfurcompounds in produced water, can form insoluble salts with different types of metal ions in produced water, causing fouling, filter blocking, and injection well damage. NRG - H2S SORB product can react selectively with H_2S in the presence of CO_2 to help eliminate the hazards of H_2S .

BENEFITS

- Reacts with H₂S reducing the concentration in the vapor and liquid in hydrocarbon and aqueous liquids.
- Reduces personnel exposure to H₂S.
- Eliminates odor nuisances resulting from stored sour fuels.
- Reduces H₂S levels to required specifications on refinery finished products.
- Effective in sour hydrocarbon treatment applications.

PHYSICAL PROPERTIES

NRG - H2S SORB is a proprietary blend of non-toxic, non-hazardous surface active compounds and proprietary polymeric reactants designed for application in operations where hydrogen sulfide generation is a hazard.

RECOMMENDATIONS FOR USE

NRG - H2S SORB should be added continuously to the hydrocarbon upstream of the storage vessel. Full mixing is necessary to insure sufficient contact time for good H_2S scavenging. The reaction rate of NRG - H2S SORB with H_2S will depend on system parameters; however, a contact time of 30 minutes should be considered minimum.

PACKAGING AND STORAGE

NRG - H2S SORB is available in stainless steel barrels or IBC drums. The product should be stored in a dry warehouse away from heating appliances and direct sunlight.

SAFETY REQUIREMENTS



Corrosion Inhibitors

NRG-COR HT

CORROSION INHIBITOR

PRODUCT DESCRIPTION

NRG-COR HT contains alkyl pyridines quaternary ammonium salt as main component. The product effectively protect metal from corrosion in HCl systemm HCl&HF system, some organic acids system (acetic acid, etc) acidizing and acid cleaning.

BENEFITS

- Effective for combating corrosion of metals in various aggressive environments.
- Reliably protects the equipment and increases the service life.
- No hazars ingredients contains.

PHYSICAL PROPERTIES

Appearance: dark brown liquid. Solubility in water: partially soluble in water, highly soluble in acidic environments. Density at 20° C: 1.08-1.13 g/cm³.

RECOMMENDATIONS FOR USE

To achieve an optimal level of protection, a correct calculation of the concentration of the NRG-COR Acid Corrosion Inhibitor HT used is required based on the degree of aggressiveness of the environment and additional conditions. Temperature application up to 350°F.

PACKAGING AND STORAGE

NRG-COR HT is stable under the conditions of storage and use. The product should be stored in a dry warehouse away from heating appliances and direct sunlight.

SAFETY REQUIREMENTS



Non-guar Synthetic Fracturing System

NRG-SGA

SYNTHETIC GELLING AGENT «PURE LIQUID» FRACTURING TECHNOLOGY

PRODUCT DESCRIPTION

NRG-SGA is an innovative guar-free synthetic gelling polymer for hydraulic fracturing, «pure liquid» technology. NRG-SGA product is able to completely replace the cross-linked guar system, linear fluid and work as a friction reducer for high-flow frac pumping.

PHYSICAL PROPERTIES

Appearance: white to light yellow powder. Viscosity of 0.5% solution: at least 50 cP. Moisture content in dry form: no more than 12%.

RECCOMENDATIONS FOR USE

NRG-SGA (replacement of the crosslinked guar system) – from 3 to 8 kg/m³. NRG-SGA (for slick water technology) – from 1 to 2 kg/m³. NRG-SGA (replacement of the linear guar system) – from 1 to 4 kg/m³.

BENEFITS

- High residual conductivity.
- Fast hydration rate.
- Working capacity at various sources of water.
- Wide temperature range of application up to 210°C (410°F).
- High load-bearing capacity with low gel viscosity.
- Full compatibility with standard oxidizing breakers.
- Available in dry and liquid forms.

PACKAGING AND STORAGE

The powdered product NRG-SGA is packed in polypropylene bags of 25 kg (55 lb). The liquid product is packed in drums with a capacity of 200 l or in cubic containers (IBC) of 1000 l. The product should be stored in closed undamaged containers, in covered dry storage rooms away from heating devices and sources of moisture.

SAFETY REQUIREMENTS

Anti-Sludge Agents

NRG-MS

ANTI-SLUDGE AGENT

PRODUCT DESCRIPTION

Formation permeability can be compromised by sludge deposits. NRG-MS inhibits the formation of sludge and emulsions that can occur during acidizing operations. During these operations, certain acids such as HCL acid solutions encounter crude oils. It is when the acid reacts to the oil that dense, asphaltene sludge deposits can form. NRG-MS prevents sludge formation, maintain formation permeability, and promotes rapid return of the treating fluid to the wellbore.

BENEFITS

- Works as a colloid stabilizer to prevent the formation of deposits during acid treatments.
- Prevents coagulation of unstable colloidal material present in some crude oils.
- Promotes the use of higher acid concentrations (10–35%) for more effective treatments.
- Performs as a non-emulsifier to prevent some acid-oil emulsions

PHYSICAL PROPERTIES

Appearance: clear, amber brown fluid. Density at 20°C: 0.95-1.20 g/cm³.

RECOMMENDATIONS FOR USE

Can be directly mixed to diluted or concentrated acid, using a concentration of 5-30 l/m³. The product is soluble and stable in hydrochloric acid and other strong mineral acids.

PACKAGING AND STORAGE

NRG-MS is available in 200 I (53 Gallon) poly drums, or 1000 I (263 Gallon) IBC. The product should be stored in a dry warehouse away from heating appliances and direct sunlight.

SAFETY REQUIREMENTS



Iron Stabilizers

NRG-IRON

IRON STABILIZER

PRODUCT DESCRIPTION

NRG-IRON stabilizer is designed for use in technological operations of processing the bottom-hole zone of infection and production wells. The product is used as an additive to the acid composition in order to preserve reservoir properties of the reservoir by preventing the formation of secondary products of the iron hydroxide reaction, eliminating pickling and preventing colmatation of the reservoir with Fe3+ compounds, prevents the formation of tar and heavy resins, improves reservoir permeability, destroys acid-oil emulsions.

BENEFITS

- Keeps iron in solution, restores the trivalent ions of iron (Fe3+) to its bivalent ions (Fe2+).
- Effective when used in hydrochloric acid of various concentration.
- Prevents formation of spontaneous emulsions.
- Helps to avoid damage to the formation.

PHYSICAL PROPERTIES

Appearance: dark brown liquid. Solubility in water: soluble.

RECOMMENDATIONS FOR USE

The required concentration of the NRG-IRON stabilizer: 0.8-1.0% (5000 ppm Fe3+) or 0.5-0.7% (2500 ppm Fe3+).

PACKAGING AND STORAGE

NRG-IRON is available in 200 I (53 Gallon) poly drums, or 1000 I (263 Gallon) IBC. The product should be stored in a dry warehouse away from heating appliances and direct sunlight.

SAFETY REQUIREMENTS



Surfactants

NRG-VES HT

VISCOELASTIC SURFACTANT FOR HIGH TEMPERATURE

PRODUCT DESCRIPTION

NRG-VES HT is a viscoelastic surfactant for high temperature matrix acidizing (350°F) based on different zwitterionic compounds and special additives in alcohol solvent. NRG-Vashti highly effective product designed to produce different smart self-diverting acid compositions for high-temperature conditions.

BENEFITS

- Effectively increases the viscosity of the acid when interacting with carbonate rock.
- Increased zonal coverage at high tempearatures.
- Retards the rate of reaction for deeper penetration of live acid into the formation.

CHEMICAL NATURE

Complex composition of alkylamines in alcohol solvent.

PHYSICAL PROPERTIES

Appearance: liquid from colorless to dark brown, opalescence is allowed.

Density at 20°C: 0.80-1.00 g/cm³.

Solubility in water: soluble.

Flammability: flammable liquid and vapour.

RECOMMENDATIONS FOR USE

Viscoelastic surfactant helps create non damaging solutions for acid diversion through viscoelastic diverting agents NRG-VES HT and surfactant based acid gelling agents. In acidizing or hydraulic fracturing applications, the products self-divert, with depletion creating optimized wormhole networks at high temperatures up to 350°F. NRG-VES HT can be used as non-damaging viscosifiers for hydraulic fracturing operations at elevated temperatures.

PACKAGING AND STORAGE

NRG-VES HT is supplied in polyethylene drums of 227 liters or IBC containers of 1000 liters. The product should be stored in a dry warehouse away from heating appliances and direct sunlight.

SAFETY REQUIREMENTS



NRG-H2S SORB U

HYDROGEN SULFIDE SCAVENGER

PRODUCT DESCRIPTION

Hydrogen sulfide scavenger NRG-H2S SORB U is an eefctive scavenger for applications in the oil and gas industry to remove (neutralize) free hydrogen sulfide and mercaptans in oils, any liquid hydrocarbons and residual fuels. Does not contain formaldehyde and triazines and has a number of unique advantages. It is completely safe for oil refining processes, since it does not cause the formation of insoluble organosulfur deposits inside the Crude Distillation Unit's equipment. Does not affect the alkalinity of petroleum products after treatment (does not increase the pH of the water extract).

BENEFITS

- Reacts with H₂S reducing the concentration in the vapor and liquid in hydrocarbon and aqueous liquids.
- Reduces personnel exposure to H₂S.
- Completely safe for oil refining processes.
- Reduces H_aS levels to required specifications on refinery finished products.
- Effective in sour hydrocarbon treatment applications.

CHEMICAL NATURE

A mixture of active imino-containing components in organic solvents.

PHYSICAL PROPERTIES

Appearance: liquid from amber to dark brown.

Density at 20°C: 0.83-0.88 g/cm³. Viscosity at 20°C: 20,0 mm2/s (cSt).

RECOMMENDATIONS FOR USE

For oil treatment, the effective dosage of NRG - H2S SORB U is from 0.9 to 1.5 ppm per each 1.0 ppm of hydrogen sulfide, which should be scaved to. For dosing of the NRG - H2S SORB U, it is recommended to use block dosing units. When transferring scavenger from supply containers, it is recommended to use oil- and petrol resistant hoses.

PACKAGING AND STORAGE

NRG - H2S SORB U is available in stainless steel drums.

The product should be stored in a dry warehouse away from heating appliances and direct sunlight.

SAFETY REQUIREMENTS



Corrosion Inhibitors

NRG-SURFO COR

SURFACTANTS FOR CORROSION INHIBITOR

PRODUCT DESCRIPTION

NRG-SURFO COR is a series of additives specially developed surfactant for use as active components of corrosion inhibitors in the oil industry. The main component for the synthesis of NRG-SURFO PRO surfactants is 1-hydroxyethyl-2-alkylimidazoline. Corrosion inhibitors based on NRG-SURFO COR grades B, D, E have proven themselves both in protection against carbon dioxide and hydrogen sulfide corrosion.

BENEFITS

- High inhibitory ability.
- Several variations of the product increase the waorkability and selection of the optimal formulation.
- Compatible with all types of surfactants used in the oil industry.

CHEMICAL COMPOSITION

NRG-SURFO COR (grades B/D/E) is a surfactant of an amphoteric nature, it is an imidazoline based on aminoethylethanolamine (AEEA) and acids of vegetative origin.

PHYSICAL PROPERTIES

Appearance: homogeneous liquid. Solubility in water: soluble. Density at 20°C: no less 0.90 g/cm³. Dry content in final form: no less 70%.

RECOMMENDATIONS FOR USE

To achieve an optimal level of protection, a correct calculation of the concentration of the NRG-SURFO COR surfactants used is required based on the degree of aggressiveness of the environment and temperatures. Reccomendations for application:

NRG-SURFO PRO grade B can be used at both low and high temperatures. Modified imidazoline surfactant NRG-SURFO PRO grade B is compatible with salt deposition inhibitors, which makes it possible to create complex action inhibitors based on it to protect equipment from corrosion and salt deposition. It is compatible with all types of waters with different mineralization and different pH values.

For the blending of corrosion inhibitors based on imidazoline surfactant NRG-SURFO PRO grade E is recommended to add monoethanolamine (MEA). The recommended content of imidazoline surfactant NRG-SURFO PRO grade E in a corrosion inhibitor is from 14%.

NRG-SURFO PRO grade D contains two imidazoline rings in one molecule, which significantly increases the ability of grade D to adsorb on a metal surface. The recommended content of dimeric imidazoline surfactant NRG-SURFO PRO grade D in a corrosion inhibitor is from 10%.

PACKAGING AND STORAGE

NRG-SURFO COR is packed in plastic drums or plastic cans depends on client's requirements. The product should be stored in a dry warehouse away from heating appliances and direct sunlight.

SAFETY REQUIREMENTS



Crosslinkers

NRG-CROSS LXL

LIQUID DELAYED CROSSLINKER FRACTURING FLUIDS

PRODUCT DESCRIPTION

Series of liquid delayed crosslinkers NRG-CROSS LXL (grades A, B, V) – is a hydrocarbon-based slurry of borate mineral. The product provides delayed cross links forming of water-based fracturing fluids. Delay time in depend on grade of crosslinker NRG-CROSS LXL and concentration. NRG-CROSS LXL grade V is a special modification for water-based fluid systems using liquid breakers NRG-BREAK LHT or NRG-BREAK DUO. Breaker catalyst is not required.

BENEFITS

- Adjustable crosslink time.
- Temperature range application from 104 up to 248°F (40 to 120°C).
- pH of crosslinked gel is above 9.0;
- Low freezing temperature for severe regions.
- High predicted concentration of crosslink agent.

CHEMICAL COMPOSITION

NRG-CROSS LXL is a hydrocarbon-based slurry of borate mineral.

PHYSICAL PROPERTIES

Appearence: viscous liquid, gray or brown suspension. Density at 20°C (68 °F): 1,15 – 1,25 g/cm³ (9.6 – 10.43 lb/gal). pH of crosslinked gel: 9.0 – 10.5.

Vortex time: grade A – less 60 sec / grade B – less 90 sec / grade V – less 90 sec.

RECOMMENDATIONS FOR USE

Typical loading of NRG-CROSS LXL are between of 1.5 - 5.5 l/m 3 (1.5 - 5.5 gal/1000gal) and depends on reservoir conditions.

PACKAGING AND STORAGE

NRG-CROSS LXL is available in 200 liters (53 Gallon) poly drums, or 1000 liletrs (263 Gallon) Intermediate Bulk Container. The product should be stored in a dry warehouse away from heating appliances and direct sunlight. Keep product in a tightly closed container. Storage life – 12 months.

SAFETY REQUIREMENTS

Crosslinkers

NRG-CROSS FXL

LIQUID INSTANT CROSSLINKER FRACTURING FLUIDS

PRODUCT DESCRIPTION

Series of liquid instant crosslinkers NRG-CROSS FXL (grades A, B, V) - is a water- and alcohol-based solution of borates. NRG-CROSS FXL grade A is used as additional crosslinker (gel activator). It reduces crosslink time and improve share sensitivity. NRG-CROSS FXL grade B is used as a single crosslinker. NRG-CROSS FXL grade V - special modification for water-based fluid systems using liquid breakers NRG-BREAK LHT or NRG-BREAK DUO. Breaker catalyst is not required.

BENEFITS

- Improved share sensitivity.
- High predicted concentration of crosslink agent.
- Low loadings.
- Sedimentation less while storage.
- Using in common with liquid breakers without breaker catalysts for temperature above 104°F (40°C).

CHEMICAL COMPOSITION

NRG-CROSS FXL product is a water and alcohol based solutions of borates.

PHYSICAL PROPERTIES

Appearence: transparent liquid, yellowish or brown. Density at 20°C (68°F): 0.95 – 1.25 g/cm³ (7.93 – 10.43 lb/gal).

RECOMMENDATIONS FOR USE

Typical concentraction range

NRG-CROSS FXL grade A 1.5 – 2.0 I/m³ (1.5 - 2.0 gal/1000 gal), used as additional crosslinker (gel activator)

NRG-CROSS FXL grade B 1.5 - 3.0 l/m3 (1.5 - 3.0 gal/1000 gal)

NRG-CROSS FXL grade V 1.5 – 4.0 l/m³ (1.5 - 4.0 gal/1000 gal)

PACKAGING AND STORAGE

NRG-CROSS FXL is available in 200 liters (53 Gallon) poly drums, or 1000 liletrs (263 Gallon) Intermediate Bulk Container. The product should be stored in a dry warehouse away from heating appliances and direct sunlight. Keep pproduct in a tightly closed container. Storage life -12 months.

SAFETY REQUIREMENTS



NRG-BREAK LT/MT/HT

ENCAPSULATED BREAKER FRACTURING FLUIDS

PRODUCT DESCRIPTION

An encapsulated breaker NRG-BREAK (grades LT, MT, HT) is chemical composition used in a fracturing process in the protection of an oil&gas stimulation operation which comprises: a breaker chemical; and a pinhole free coating of a neutralized sulfonated elastomeric polymer of about 2 to about 80 microns thick deposited onto the surface of the breaker chemical, wherein said neutralized sulfonated polymer encapsulates the breaker chemical, wherein the neutralized sulfonated polymer is permeable to the breaker chemical and the neutralized sulfonated polymer is non-reactive to the breaker chemical.

BENEFITS

- Effective controlled release breaker chemical composition.
- Encapsulation of the breaker greatly reduces fracturing fluid exposure to the breaker and enables the use of high concentrations of breaker that, without coating, would rapidly reduce the fluid viscosity.
- Improves the conductivity of the crack, increasing its purity.
- Non-toxic.

CHEMICAL COMPOSITION

NRG-BREAK LT/MT/HT is a coated inorganic oxidizing material.

PHYSICAL PROPERTIES

Appearence: white to beige granules. Solubility in water: partially soluble.

Activity of the main component: from 65% to 85%.

RECOMMENDATIONS FOR USE

Product NRG-BREAK grades LT/MT/HT are used in concentrations from 0.1 to 1.0 kg/m³, depending on the temperature and the required time of destruction of the hydraulic fracturing fluid.

PACKAGING AND STORAGE

NRG-BREAK LT/MT/HT is available in 25 kg plastic drums. The product should be stored in a dry warehouse away from heating appliances and direct sunlight. Keep product in a tightly closed container.

SAFETY REQUIREMENTS



NRG-BREAK LHT

FRACTURING FLUIDS

PRODUCT DESCRIPTION

NRG-BREAK LHT is a liquid delayed breaker. The product does not affect to rheology of fracturing fluid and releases only in reservoir, to prevent sedimentation of proppant.

BENEFITS

- Low loadings.
- Not affect to rheology of fracturing fluid.
- Repeatability of laboratory tests.
- Good alternative to solid encapsulated breakers, where is technological needed.

CHEMICAL COMPOSITION

NRG-BREAK LHT is a proprietary formulation based on solution of oxidizing agent.

PHYSICAL PROPERTIES

Appearence: transparent colorless liquid. Density at 20° C (68 °F): $1,00 - 1,10 \text{ g/cm}^3$ (8.35 - 9.18 lb/gal). Activity of the main component: from 65% to 85%.

RECOMMENDATIONS FOR USE

Typical loading of NRG-BREAK LHT product is above 0.5 I/m³ (0.5 gal/1000gal) and depends on reservoir condition and treatment design. Reccomended reservoir temperature range of application:

Grade A between 40 - 90°C (104 - 194°F) Grade B between 80 - 110°C (176 - 230°F) Grade V between 105 - 120°C (221 - 248°F)

PACKAGING AND STORAGE

NRG-BREAK LHT is available in 200 liters (53 Gallon) poly drums, or 1000 liletrs (263 Gallon) Intermediate Bulk Container. The product should be stored in a dry warehouse away from heating appliances and direct sunlight. Keep product in a tightly closed container.

SAFETY REQUIREMENTS



NRG-BREAK DUO

LIQUID DELAYED DUO BREAKER FRACTURING FLUIDS

PRODUCT DESCRIPTION

NRG-BREAK DUO (grades A and B) is a special created liquid delayed double-acting breaker. Its not affect to rheology of fracturing fluid and release only in reservoir, to prevent sedimentation of proppant. The efficiency and ability to break bonds in hydraulic fracturing fluid is higher and faster comparison to standard breakers.

BENEFITS

- Low loadings of the product and high efficiency.
- Improved retained conductivity of proppant pack compared standard breakers.
- Not affect to rheology of fracturing fluid.
- Smooth and complete destruction of the polymer chain by duo-destruction act.
- Low freezing temperature for severe climate and repeatability of laboratory tests.

CHEMICAL COMPOSITION

NRG-BREAK DUO (grades A and B) is a proprietary formulation based on specialty chemical mixture.

PHYSICAL PROPERTIES

Appearence: transparent colorless or yellowish liquid. Density at 20° C (68°F): 1,00-1,10 g/cm³ (8.35 – 9.18 lb/gal). Activity of the main component: from 65% to 85%.

RECOMMENDATIONS FOR USE

Typical loading of NRG-BREAK DUO is above 0.5 l/m^3 (0.5 gal/1000gal) and depends on reservoir condition and treatment design. Reccomended reservoir temperature range of application:

Grade A between 40 - 75°C (104 - 167°F) Grade B between 60 - 95°C (140 - 203°F).

PACKAGING AND STORAGE

NRG-BREAK DUO is available in 200 liters (53 Gallon) poly drums, or 1000 liletrs (263 Gallon) Intermediate Bulk Container. The product should be stored in a dry warehouse away from heating appliances and direct sunlight. Keep product in a tightly closed container.

SAFETY REQUIREMENTS

