BRENNTAG

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STIMULATION CHEMICALS

Fracturing

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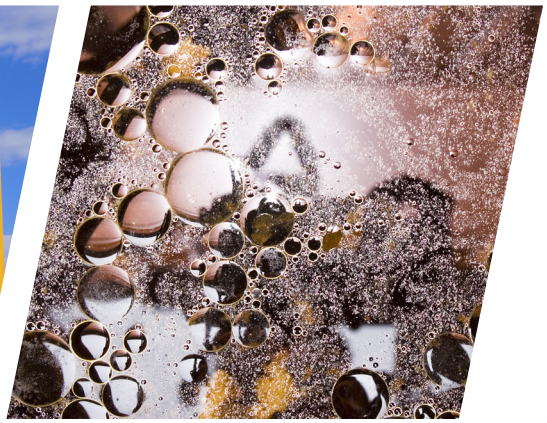
FRACTURING CHEMICALS



SYSTEMS OF CHEMICALS

Borate Crosslinked System

Features:

- up to 150°C
- versions with guar and HPG
- crosslinking under high pH

Key additives:

- TN-GA GGL
- TN-XL 10
- TN-XL 80
- TN XL-100
- TN-BF B

Slickwater Systems

Features:

- liquid friction reducers
- products tolerant for high salinity
- efficient breakdown pressure reducers

Key additives:

- TN-FR 40
- TN-FR 50
- TN-FBK 50

CROSSLINKING AGENTS (TN-XL...)

TN-XL 10

- aqueous borate cross-linker
- contains internal buffers to automatically raise the pH of the gelled fluid to the range of 9.0-11.0
- provides an immediate cross-link and is stable to 120°C
- concentration range: 0.2-2 gpt (0.2-2 L/m³)

TN-XL 80

- aqueous borate cross-linker
- contains internal buffers to automatically raise the pH of the gelled fluid to the range of 8.5-8.7
- provides an immediate cross-link for low temperature applications below 60°C
- concentration range up to 2 gpt (2 L/m³)

TN-XL 100

- delayed borate cross-linker for guar and HPG
- provides extended crosslink times (minimum 3 minutes) at elevated temperatures and gel loadings
- provides stable crosslinked gel in high temperatures
- concentration range from 1.0 to 2.0 gpt (1-2 L/m³)

BUFFERS (TN-BF...)

TN-BF LZ

- low pH buffering agent
- allows adjustment of pH between 3 and 6
- dedicated to decreasepH of treatment water
- concentration range from 0.2 to 2.0 gpt (0.2-2 L/m³)

BUFFERS (TN-BF...)

TN-BF B

- high pH buffering agent
- stable pH value in wide temperature range
- allows adjustment of pH between 9 and 12.5
- dedicated for borate crosslinked fluid systems

GELLING AGENTS (TN-GA...)

TN-GA GG / TN-GA GGL

- fast hydrating guar gelling agent
- self-hydrates through internal dispersants and buffers to enable lump-free continuous mixing
- achieves 80 to 90% viscosity within the first 3 minutes
- used at concentrations from 15 to 50 lb/1000 gal (1.8 to 6.0 kg/m³)
- available in powder and slurry

TN-GA HPG / TN-GA HPGL

- low residue hydroxypropyl guar (HPG)
- achieves 85 to 95% viscosity within the first 4 minutes
- used at concentrations from 20 to 50 lb/1000 gal (2.4 to 6.0 kg/m³)
- available in powder and stable slurry

GEL STABILIZERS (TN-GS...)

TN-GS 163

- amine based
- stabilises viscosity of stimulation fluids in high temperatures
- used above 90°C
- concentration range from 0.5 to 2.0 gpt (0.5-2 L/m³)

FRACTURING CHEMICALS

GEL STABILIZERS (TN-GS...)

TN-GS 165

- inorganic salt based
- prevents premature loss of viscosity during treatment
- used above 90°C
- concentration range from 0.5 to 2.0 gpt (0.5-2 L/m³)

BREAKERS (TN-BK...)

TN-BK 20

- liquid breaker with low viscosity
- highly efficient oxidizing breaker system to reduce viscosity
- product designed for temperatures up to 100°C
- dedicated concentration: 0.5-4.0 gpt (0.5-4.0 L/m³)

TN-BK 30

- extremely efficient breaker for borate systems
- higher concentration of active component compared to TN-BK 20
- used in low temperatures range from 70 to 100°C
- concentration range for borate crosslinked fluid systems: 0.5-4.0 gpt (0.5-4.0 L/m³)

TN-BK AID

- inorganic salt based
- enhancer for breaking mechanism of TN-BK 20 and TN-BK 30
- dedicated for borate crosslinked systems
- typical concentrations range from 0.4 to 4.0 gpt (0.4-4.0 L/m³)

TN-BK 150MT

- enzyme based
- decreases fluid viscosity immediately after dosage
- dedicated for temperatures 30-70°C
- typical concentration: 0.02-1.0 gpt (0.02-1.0 L/m³)

BREAKERS (TN-BK...)

TN-BK HTB

- oxidizing breaker used at temperatures from 60-110°C
- organic peroxide as active component
- high efficient breaker, especially for low temp. under 90°C in conjunction with TN-BK HTB AID
- concentration range: 0.1-1.0 gpt (0.1-1.0 L/m³)

TN-BK 101P

- encapsulated oxidizer for use as a delayed release breaker at temperatures above 90°C
- ammonium persulfate as active component
- allows high breaker concentrations to be used without compromising the fluid viscosity
- typical concentration range from 0.5-10 pound/1000 gal (0.06-1.2 kg/m³)

TN-BK HTB AID

- enhancer for breaking mechanism of TN-BK HTB
- dedicated for borate crosslinked fluid systems
- product concentration regulates fluid breaking time
- typical concentrations range from 0.4-2.0 gpt (0.4-2.0 L/m³)

FRICTION REDUCERS (TN-FRR...)

TN-FRR 50

- cationic emulsion polymer that can reduce friction pressures of water by more than 70%
- adds viscosity to guar and HPG systems to help reduce the required concentration of gelling agent
- typical concentrations range: 0.5-2.0 gpt (0.5-2.0 L/m³)

FRICTION REDUCERS (TN-FRR...)

TN-FRR 40

- high molecular weight, anionic, water-mixable emulsion polymer
- lowers friction pumping pressures in fresh water and brines
- concentration: 0.5 to 2.0 gpt (0.5-2.0 L/m³)

FLUID RECOVERY SURFACTANTS (TN-FBK...)

TN-FBK 50

- micellar additive
- reduces interfacial tension and capillary pressures
- shows anti-emulsifying properties
- leaves the formation “water-wet”
- concentration range: 0.5-2.0 gpt (0.5-2.0 L/m³)
- applicable for acidizing and fracturing

CLAY CONTROL (BRENNTAHIB...)

BRENNTAHIB P30

- permanent clay stabilizer
- high temperature stability
- low formation damage
- compatibility with most drilling, fracturing & workover fluids
- concentration range: 1.0-7.0 gpt (1.0-7.0 L/m³)
- applicable for acidizing and fracturing

BRENNTAHIB CL75

- temporary clay stabilizer
- choline chloride based
- applicable to acidizing and fracturing fluid systems
- concentration range: 1.0-5.0 gpt (1-5 L/m³)

Contact

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