



Texan Shale Chemicals

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PRODUCT DATA SHEET

TEXAN DRY-BRINE

High Brine Friction Reducer in Powder Form

PRODUCT DESCRIPTION

TEXAN DRY-BRINE is a premium anionic water-soluble polyacrylamide friction reducer (FR) in dry powder form. It offers excellent performance in high salinity brines and can be effective at small dosages. TEXAN DRY-BRINE has a very high molecular weight and is manufactured as dry powder with 100 mesh size for optimal hydration. Addition of small amounts, typically 0.25 – 1.00 gpt (gallons per thousand gallons) to water based high brine frac fluids can deliver friction reduction (pressure loss) of over 70% in a short period of time. Due to its rapid hydration properties, it can be pumped continuously into stimulation fluids as supplied or by batch mixing before treatment. TEXAN DRY-BRINE is APE (alkyl phenol ethoxylates) and NPE (nonyl phenol ethoxylates) free, thus making it environmentally friendly. It is a field tested and proven product in oil field operations.

APPLICATIONS

TEXAN DRY-BRINE has been specifically optimized for use as a high brine friction reducer, which can be used directly as fine dry powder form or dispersed in oil with excellent hydration properties. Due to its anionic nature, it is compatible with conventional non-ionic and anionic stimulation additives, and its' compatibility range is wide ranging.

The dissolution in water should be in a temperature range between 10°C and 40°C; For optimum use of TEXAN DRY-BRINE anionic FR and in order to achieve the best possible results, it is necessary to allow a "maturation" time of 60 minutes. When treating turbid water, the flocculant solution must be added to water at a point of average turbulence, in order to achieve a thorough and homogeneous mixing without impairing the flock formation. Recommended operating concentration is 1 to 2 lbs of powder per thousand gallons.

TEST METHOD BY INDEPENDENT LABORATORY

Friction reduction properties of TEXAN DRY-BRINE were tested on a custom Flow Loop at a flow rate of 6 gpm, generating 80,000 Reynold's number. The test section of the loop consisted of pipe having 3/8" O.D. A dosage of 0.25 gpt (via 2% solution, which is equivalent to 0.65 lbs powder per thousand gallons), was injected on the fly through the suction header of the mono-pump. Total test time was 8 minutes. TEXAN DRY-BRINE was tested in API brine (108K TDS) with composition: NaCl (95.5 g/L), CaCl₂ (28.10 g/L), and Marcellus brine (150K TDS) with composition NaCl (96.47 g/L), KCl (1.54 g/L), CaCl₂ (59.38 g/L), BaCl₂ (7.47 g/L), FeCl₃ (0.55 g/L), NaHCO₃ (0.07 g/L), MgCl₂ (11.43 g/L) and SrCl₂ (17.52 g/L).

PROPERTIES

Form	Free Flowing, White granular powder
Flash Point	Not applicable
Freeze Point	Not determined
Mesh Size	100 Mesh
Molecular Weight (Million)	12-14 (Medium)
Anionic Charge	25-30
Solid Content (%)	≥ 90
Viscosity (cps)@Temp	No data available
Odor	Little odor or odorless
Density (g/cm ³)	0.73g/cm ³
pH	6-8 (0.5% solution)
Solubility	Completely and Rapidly
Insoluble Content (%)	≤0.2
Shelf Life	24 Months (It should be kept in a dry place and the storage temperature is 0 °C to 35 °C, away from direct sunlight and moisture.)



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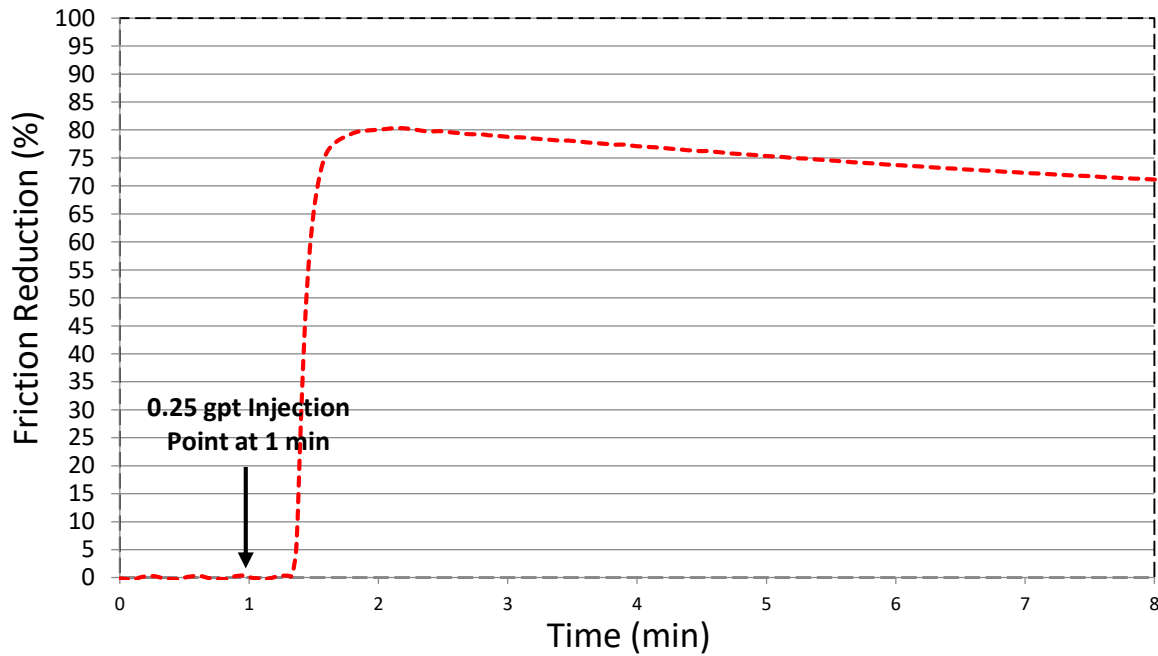


PACKED IN JUMBO BAGS WEIGHING 1650 LBS.

PERFORMANCE & RESULTS

The following figures represent the test results in the two brines, 0.25 gpt via 2% solution, which is equivalent to 0.65 lbs powder per thousand gallons.

Figure 1. FR performance of TEXAN DRY-BRINE in 108K TDS API Brine.



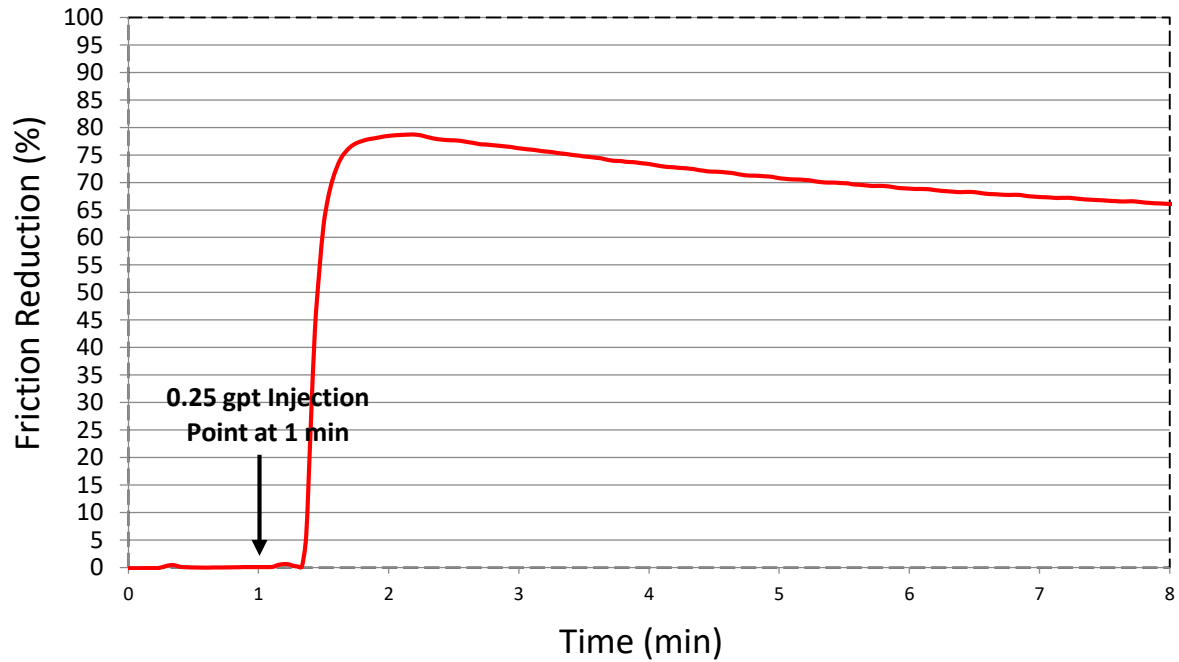


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Figure 2. FR performance of TEXAN DRY-BRINE in 150K TDS Marcellus Brine.



The test results show that TEXAN DRY-BRINE achieves a FR value of 80.33% in API brine and 78.74% in Marcellus brine.