



Texan Stone LLC DBA Texan Minerals and Chemicals

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PRODUCT DATA SHEET

TEXAN DRY-FRESH

Fresh Water / Light Brine Friction Reducer in Powder Form

PRODUCT DESCRIPTION

TEXAN DRY-FRESH is a premium anionic water-soluble polyacrylamide based friction reducer (FR) that is highly effective in fresh water and light brine conditions. It has high molecular weight and is manufactured as dry powder with 100 mesh size per optimal hydration. Addition of small amounts, typically 0.25 – 1.00 gpt (gallons per thousand gallons), to water based frac fluids can deliver friction reduction (pressure loss) of over 70% in a short period of time. Due to its rapid hydration properties, TEXAN DRY-FRESH can be pumped continuously into the stimulation fluids as supplied or by batch mixing before treatments. TEXAN DRY-FRESH 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-FRESH has been specifically optimized for use as a fresh water-to-light brine friction reducer, which can be used directly as fine dry powder form with excellent hydration properties. It is compatible with common non-ionic and anionic stimulation additives such as surfactants, scale inhibitors, biocides, etc., and can be used with low to moderate salt concentrations. TEXAN DRY-FRESH can achieve optimal performance at low dosages (0.25 – 1.00 gpt), reducing overall treatment costs.

Recommended operating concentration is 1 to 2 lbs per thousand gallons.

TEST METHOD BY INDEPENDENT LABORATORY

Test Method(s): Friction reduction properties of TEXAN DRY-FRESH 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-FRESH was tested in city tap water (fresh water), API brine (108K TDS) with composition: NaCl (95.5 g/L), CaCl₂ (28.10 g/L) with a FR dosage of 0.5 gpt, 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), NaHCO₃ (0.07 g/L), MgCl₂ (11.43 g/L) and SrCl₂ (17.52 g/L) with a FR dosage of 0.5 gpt. (1.3 lbs powder per thousand gallons).

PROPERTIES

Form	White Fine Dry Powder
Flash Point	Not applicable
Freeze Point	Not determined
Mesh Size	100 Mesh
Molecular Weight (Million)	18-20 (Very High)
Anionic Charge	28-33
Solid Content (%)	≥ 90
Viscosity (cps)@Temp	315 cPs (0.1% solution)
Odor	Little odor or odorless
Density (g/cm ³)	0.82g/cm ³
pH	6-8 (5 % solution)
Solubility	Water Soluble
Insoluble Content (%)	≤0.2
Shelf Life	24 Months (It should be stored in a dry place and the storage temperature is 0 °C to 35 °C, away from direct sunlight and moisture.)

PACKED IN JUMBO BAGS WEIGHING 1650 LBS.



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PERFORMANCE & RESULTS

The following figures represent test results in three different brines. Texan DRY-FRESH is delivers excellent performance in all brine conditions, with increase in dosage (from 0.65 lbs powder to 1.3 lbs powder per thousand gallons) for higher brine such as produced water.

Figure 1. FR performance of TEXAN DRY-FRESH in city tap water at room temperature

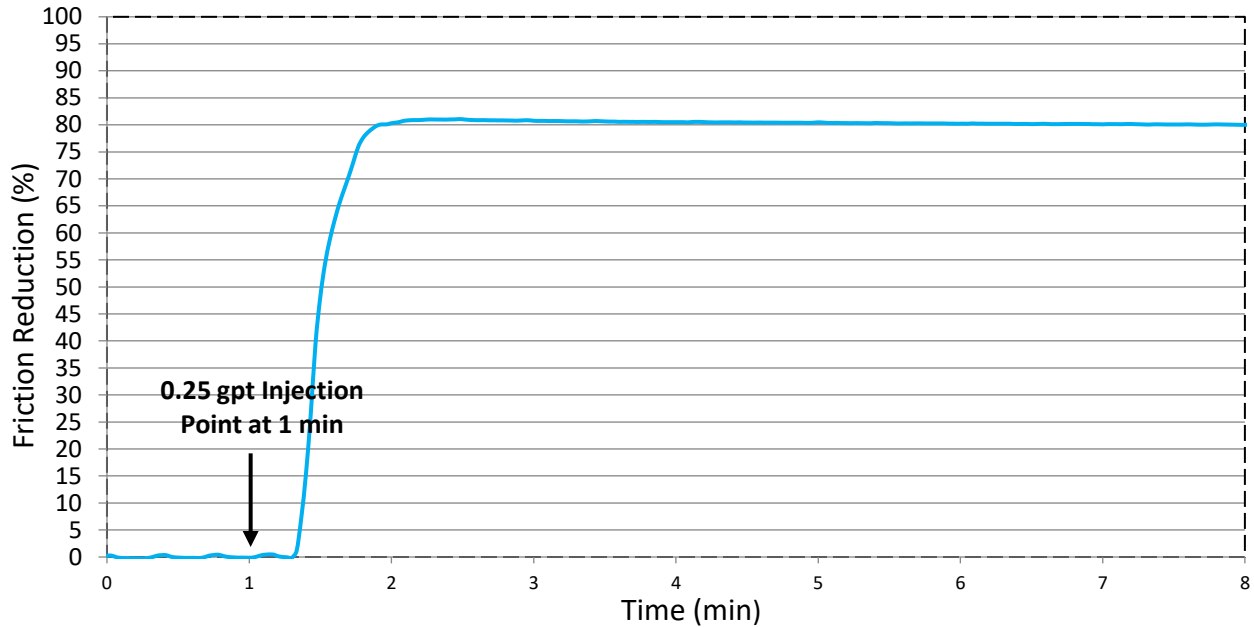
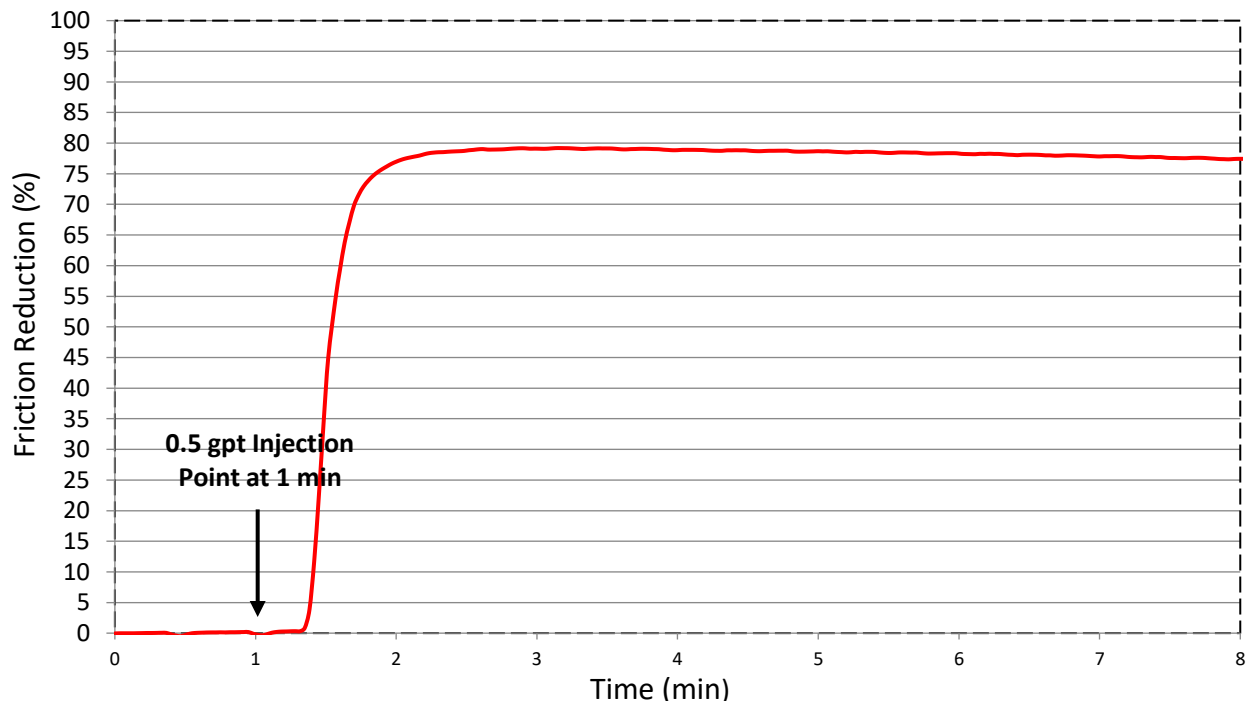


Figure 2. FR performance of TEXAN DRY-FRESH in API 108 K brine at room temperature



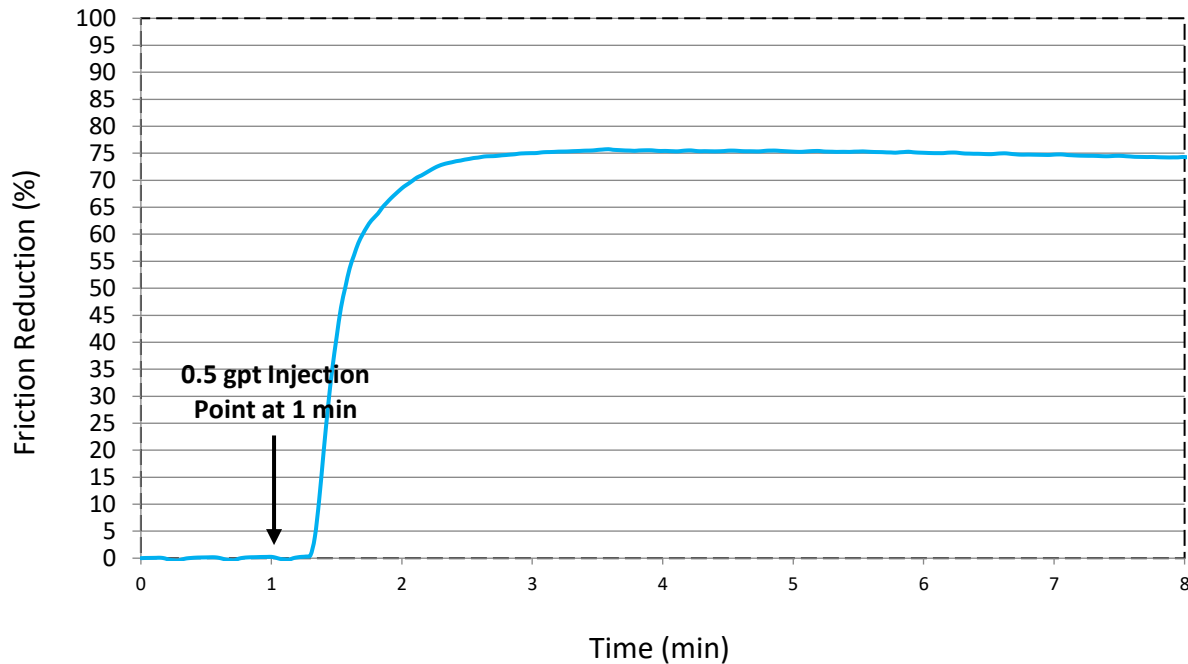


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Figure 3. FR performance of TEXAN DRY-FRESH in Marcellus 150K brine at room temperature



Notes:

1. From the above results, it is clearly demonstrated that TEXAN DRY-FRESH powder is a superior and versatile product, which achieves FR value of 81.07 % in city tap water, 79.20% in API 108 K brine and 75.76 % in Marcellus 150K brine with only slight increase in dosage.
2. Therefore, the TEXAN DRY-FRESH offers a tremendous advantage compared to competitors. It can be applied easily under varying brine conditions, from fresh to produced water.

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