



Texan Shale Chemicals

11806 Wilcrest Drive, Suite 202, Houston, TX 77031
Phone: 281-741-0226 Email: Mani@Texanstone.com



PRODUCT DATA SHEET

FRICITION REDUCER *ANIONIC HIGH BRINE TS-HB EMULSION*

PRODUCT DESCRIPTION

TS-HB is a premium anionic water-soluble polyacrylamide friction reducer (FR). It offers good performance in high salinity brines and can be effective at small dosages. TS-HB has a very high molecular weight and is manufactured as a Liquid-Emulsion. 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. TS-HB 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 STONE TS-HB has been specifically optimized for use as a high brine friction reducer, which can be added as supplied due to its Emulsion form and 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. TS-HB is also designed to handle divalent cations such as calcium, iron and barium. It can achieve optimal performance at low dosages (0.25 – 1.00 gpt), reducing overall treatment costs.

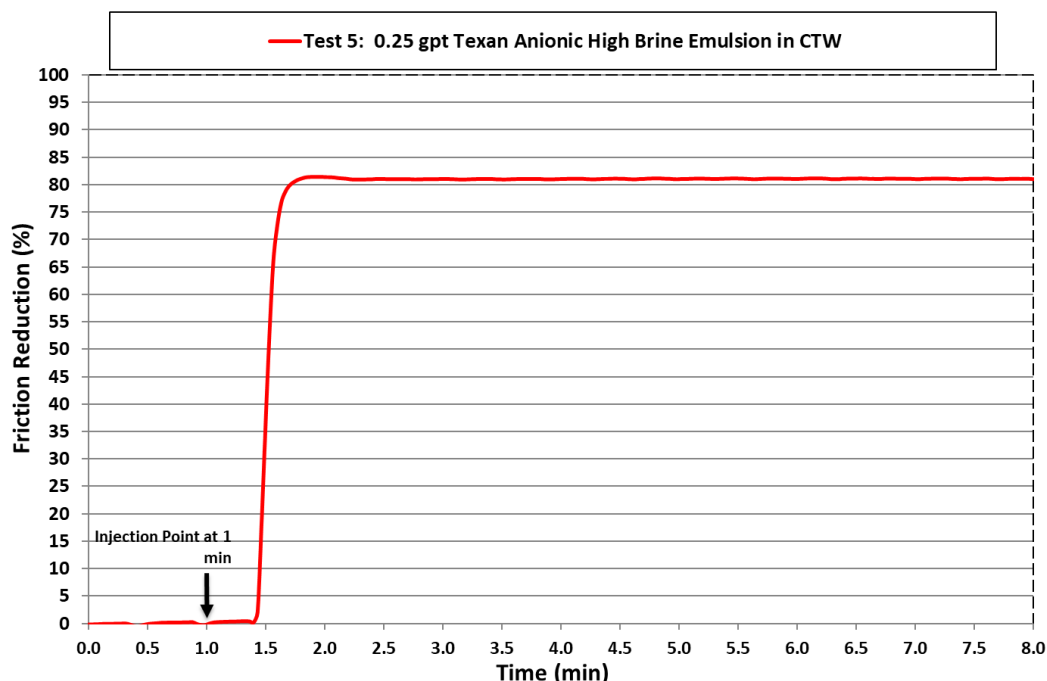
TEST METHODS

Test Method(s): Friction reduction properties of TS-HB 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. Typical dosage of 0.25 gpt was used and the polymer was injected on the fly through the suction header of the mono-pump. Total test time was 20 minutes. TEXAN STONE TS-HB was tested in City Tap Water (CTW), API brine (108K TDS) with composition: NaCl (95.5 g/L), CaCl₂ (28.10 g/L); and Marcellus (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) and 231K Ultra high brine with composition: NaCl (189.123 g/L), KCl (2.511 g/L), MgCl₂ (5.702 g/L), CaCl₂ (25.392 g/L), BaCl₂ (0.003 g/L), SrCl₂ (1.420 g/L), Na₂SO₄ (0.762 g/L), NaHCO₃ (0.945 g/L), LiCl (0.110 g/L), KH₂PO₄ (0.053 g/L), H₃BO₃ (0.172 g/L).

PERFORMANCE & RESULTS

The following figures represent the test results in various Brines.

Figure 1. Performance of TS-HB 3 # CTW in 3/8" OD





Texan Shale Chemicals

11806 Wilcrest Drive, Suite 202, Houston, TX 77031
Phone: 281-741-0226 Email: Mani@Texanstone.com



Figure 2. Performance of TS-HB 3 # 108K Brine in 3/8" OD

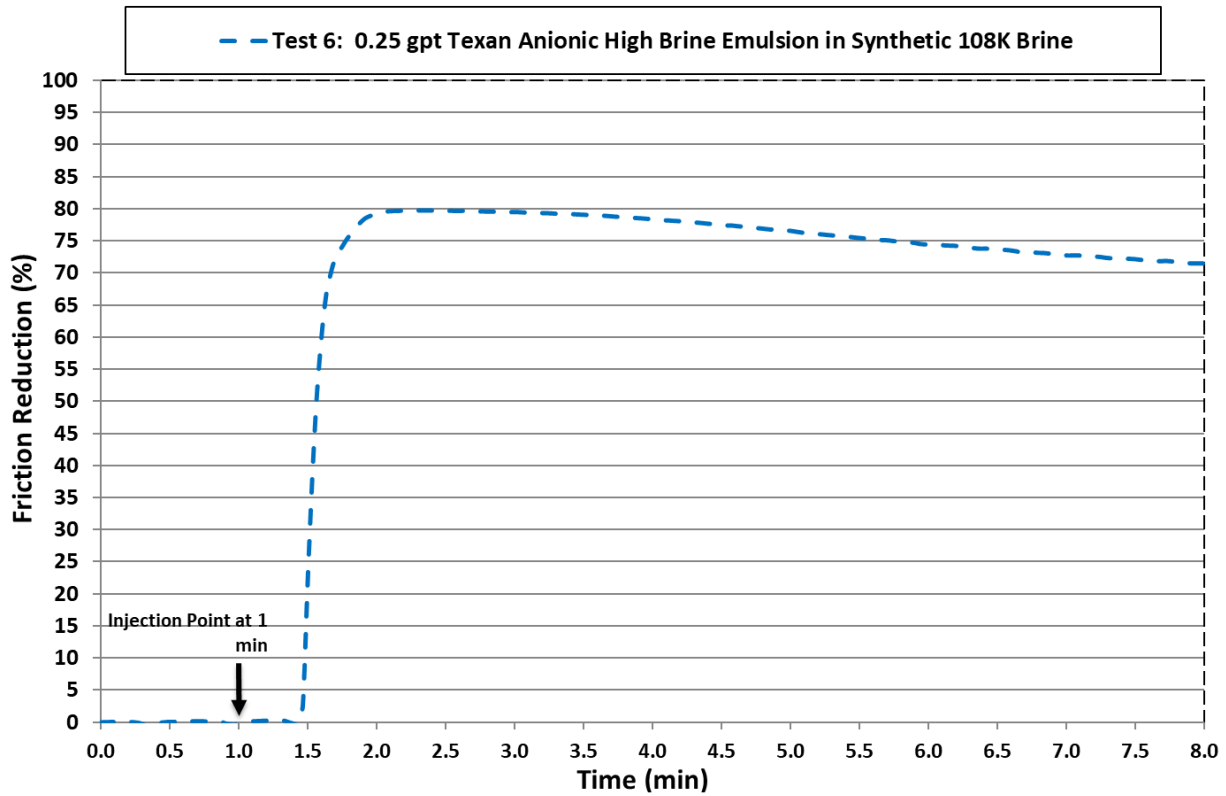
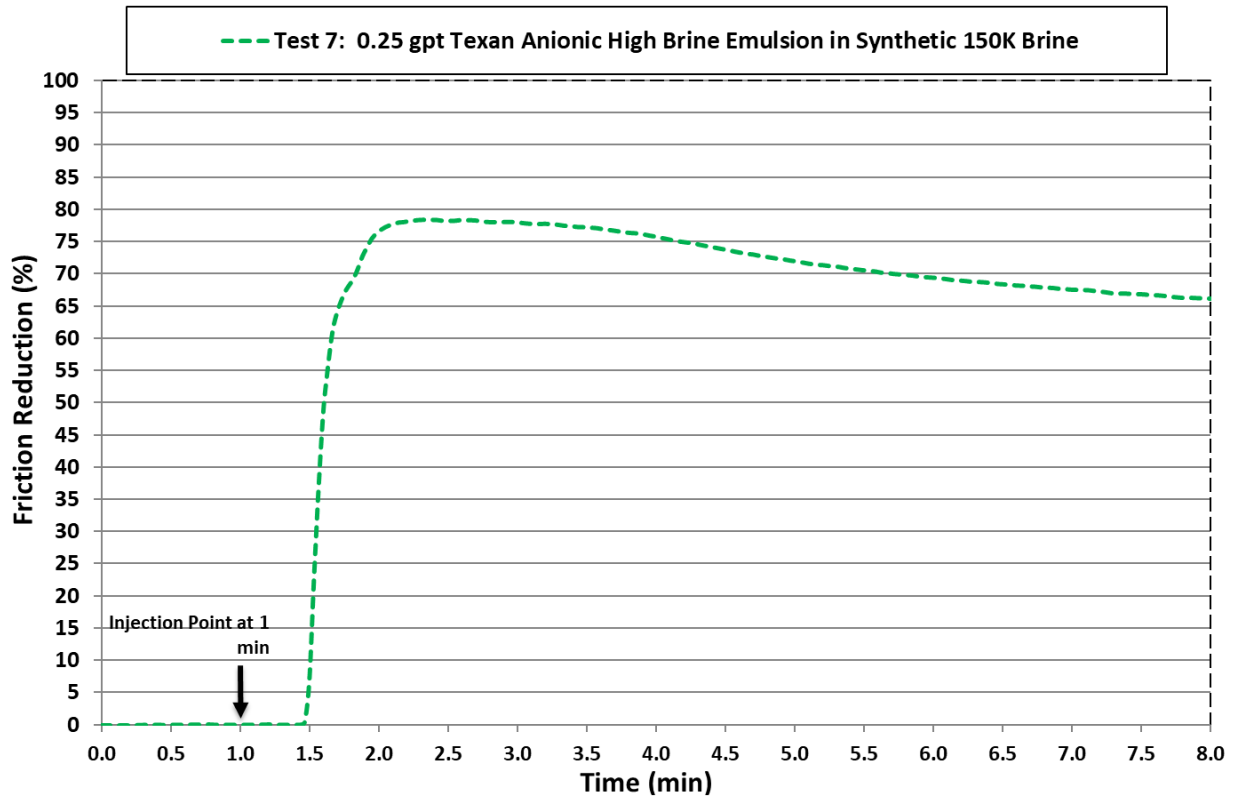


Figure 3. Performance of TS-HB 3 # 150K Brine in 3/8" OD



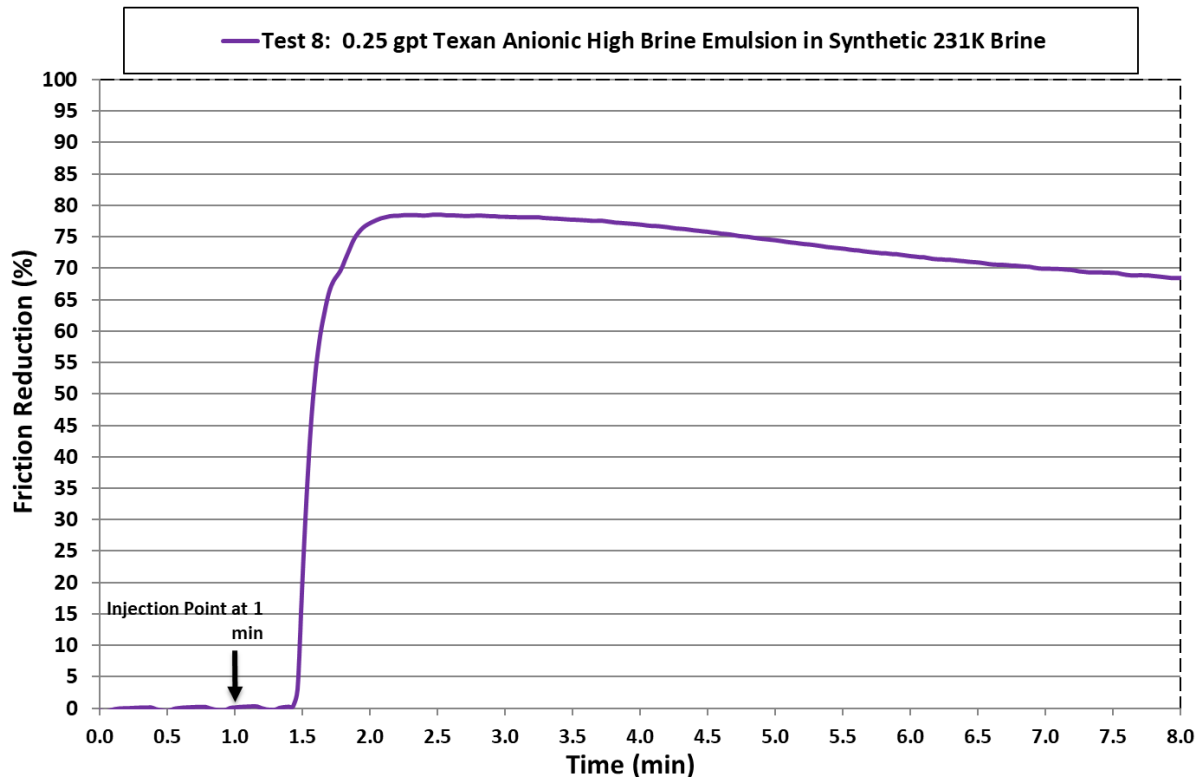


Texan Shale Chemicals

11806 Wilcrest Drive, Suite 202, Houston, TX 77031
Phone: 281-741-0226 Email: Mani@Texanstone.com



Figure 4. Performance of TS-HB 3 # 231K Brine in 3/8" OD



The test results show that TS-HBS achieves a FR value of 81.38% in CTW, 79.72% in Synthetic 108K Brine, 78.40 in Synthetic 150k Brine and 78.47% in Synthetic 231k Brine.

PROPERTIES

Form	Opaque Liquid
Flash Point	> 200 F (93.0 C). Method Used: Pensky-Marten Closed Cup
Freeze Point	- 30 C (-22 F)
Viscosity (cps)@Temp	No data available
Color	White / Off-White
Odor	Slight petroleum oil
Density	9.02 lbs/gal
pH	5-8 (1% solution)
Solubility	Water Soluble
Shelf Life	6 Months (recommended to store indoors between 5 – 30 C.)

PACKAGING (customized packaging available upon request.)

Size	Packaging	Weight
55 gal.	Drum	475 lbs
275 gal.	Tote	2,300 lbs
330 gal.	Tote	2,800 lbs
5000 gal.	Bulk/ISO	45,500 lbs

Disclaimer: The information provided in this document is for general purpose only and is believed to be accurate to the best of our knowledge. Texan and its affiliates do not make any guarantee or warranty regarding the accuracy of the data, merchant ability, fitness for a particular purpose or use, title, non-infringement, etc. The user agrees to assume all liabilities related to the use of or reliance on such information. Texan and its affiliates shall not be liable for any direct, indirect, special, punitive, exemplary or consequential damages from any cause whatsoever including but not limited to its negligence.