Texan Stone LLC
DBA Texan Minerals and Chemicals
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FRESHWATER VISCOSIFYING FRICTION REDUCER DPAM

The Friction reduction capabilities of TEXAN FR DRY FRESH are illustrated in the Technical Data sheet of Texan Dry Fresh posted on our website.

The proppant transport ability of a Polymer depends on two major factors:

1) Viscosity, 2) Elasticity.

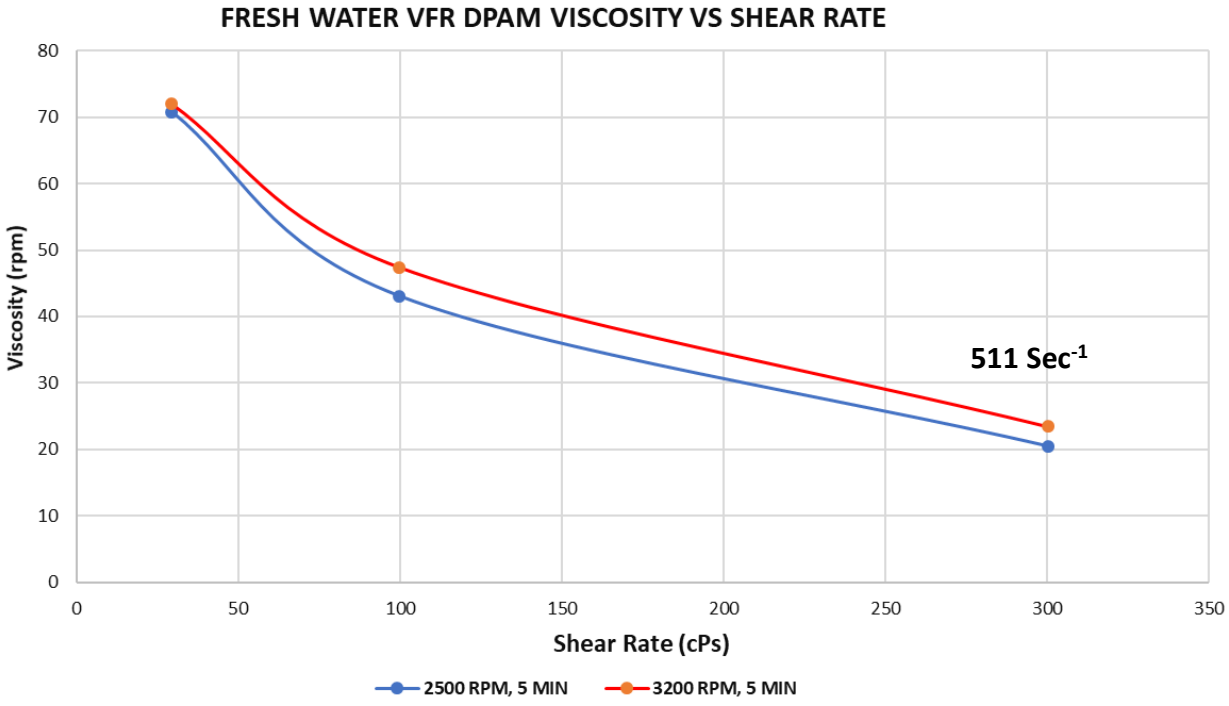
TEST METHODOLOGY

Two tests were carried out to analyze the proppant transport characteristics of Texan Dry Fresh: 1) Viscosity vs Shear Rate using Grace M3600 rheometer 2) Elasticity and Storage Modulus using Anton Paar rheometer in Amplitude sweep and Frequency Sweep

Dosage: 16 lbs. of FR/1000 gallons of Fresh Water (0.192 % solution)

BLENDING RATE: 1) 2500 RPM, 5 MIN; 2) 3200 RPM, 5 MIN

RESULTS AND DISCUSSION:



Shear Rate (cPs)	Viscosity (rpm)	
	2500 RPM, 5 MIN	3200 RPM, 5 MIN
29.37	70.8051	72.0052
99.87	43.0568	47.4095
300.18	20.509	23.4445

The viscosity readings at 300 rpm or 511 sec^{-1} are above 20 cps in both blending parameters suggesting superior sand carrying ability with an increased dosage in Texan Dry Fresh.

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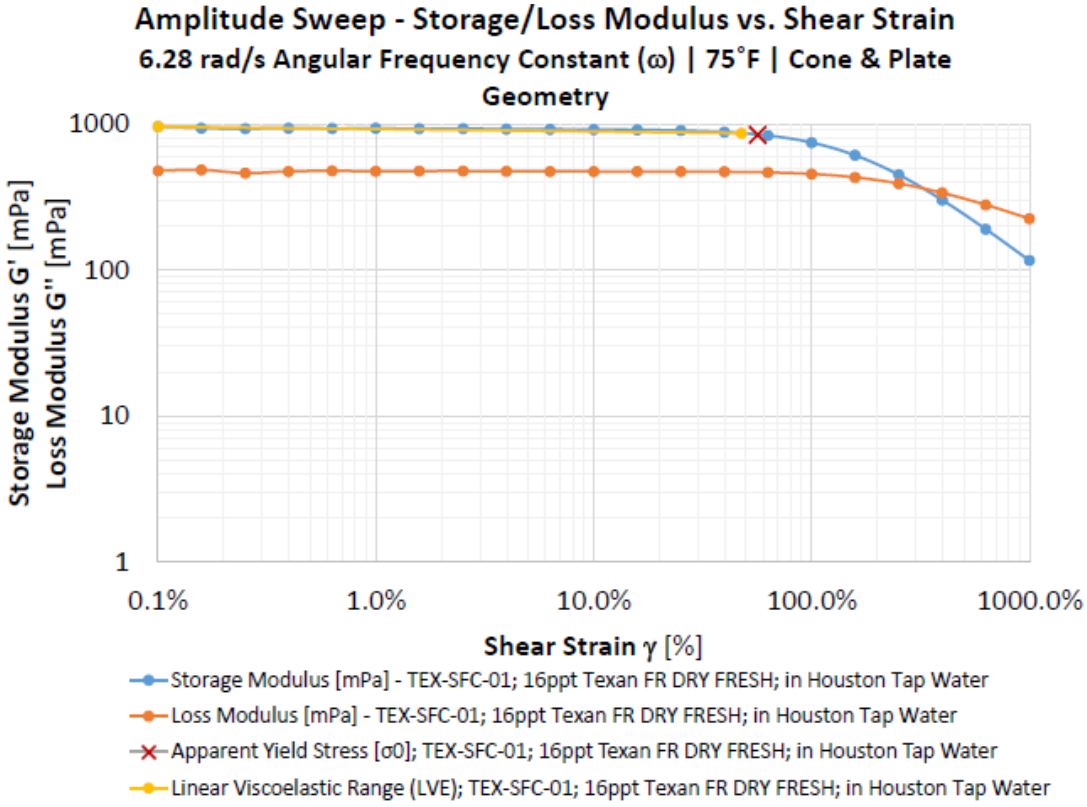
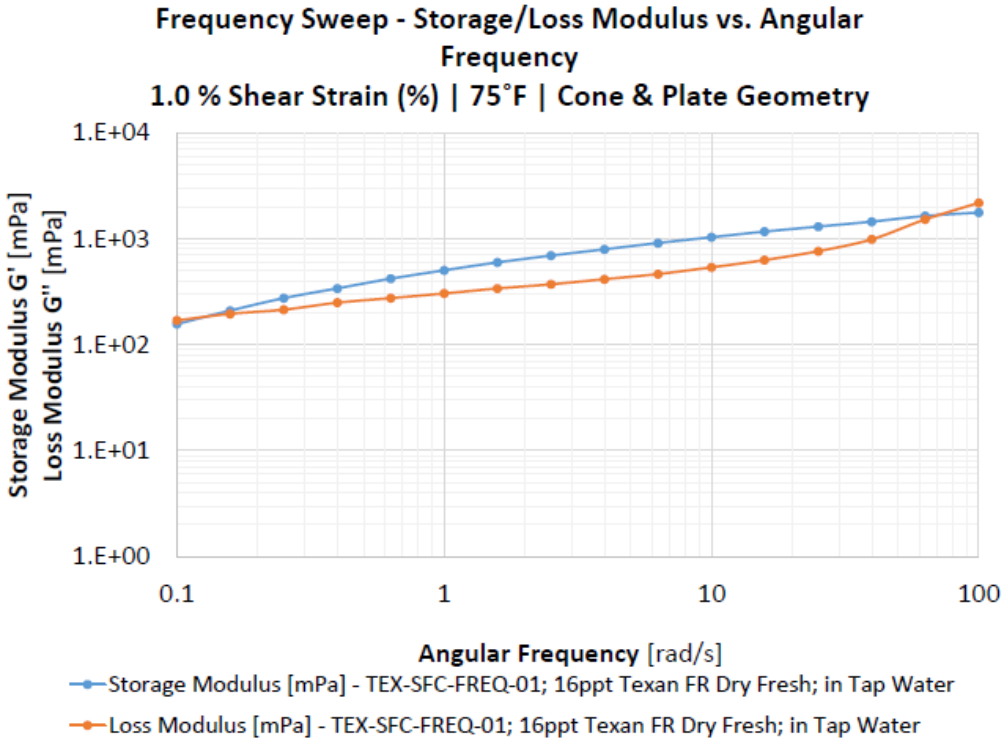
G' AND G'' ANALYSIS





The amplitude and frequency sweep curves suggest that Texan Dry Fresh exhibits high elastic behavior or gel-like behavior over a wide range of Strain rate. Also, the high G' in the Linear Viscoelastic range suggests that the fluid exhibits strong viscoelastic behavior.