



Friction Reducer Selection

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Friction Reducer Selection

Objective:

- Optimize Performance at Lowest Price

Methods:

- Flow Loop
- Oscillatory Rheometer
- Formation Damage
- Location/Climate

Recommended LOS Friction Reducers									
Product	Form	Charge	Viscosifying?	Fresh Water	Brine Tolerance			***Current Availability	Freeze Point
					Low	Mid	High		
					< 50k mg/L TDS	50-100k mg/L TDS	> 100k mg/L TDS		
FRP-20	Emulsion	Anionic	TEST REQ'D	No	No	No	Yes	All Basins	-4 F
FRP-2H			TEST REQ'D	Yes	Yes	TEST REQ'D	No	All Basins	-20 F
FRP-E3-8			Yes	No	No	Yes	No	All Basins	15 F
FRP-4CS			No	Yes	Yes	TEST REQ'D	No	DJ/WTX/BK	-4 F
FRP-4K			No	Yes	Yes	Yes	TEST REQ'D	DJ/WTX/STX	-30 F
FRP-1S			Yes	Yes	Yes	TEST REQ'D	No	All Basins	-5 F
FRP-2S			TEST REQ'D	No	Yes	Yes	TEST REQ'D	All Basins	20 F
FRP-4B			Yes	Yes	Yes	Yes	TEST REQ'D	All Basins	23F
FRP-6CS			No	No	Yes	Yes	No	All Basins	-20 F
FRP-8CS			No	No	No	No	Yes	All Basins	-13 F
FRP-HV9000			Yes	No	Yes	Yes	TEST REQ'D	All Basins	10 F
FRS-1CS			Slurry	Anionic	Yes	Yes	Yes	TEST REQ'D	No
FRS-HV8000	Yes	Yes			Yes	Yes	TEST REQ'D	All Basins	-2 F

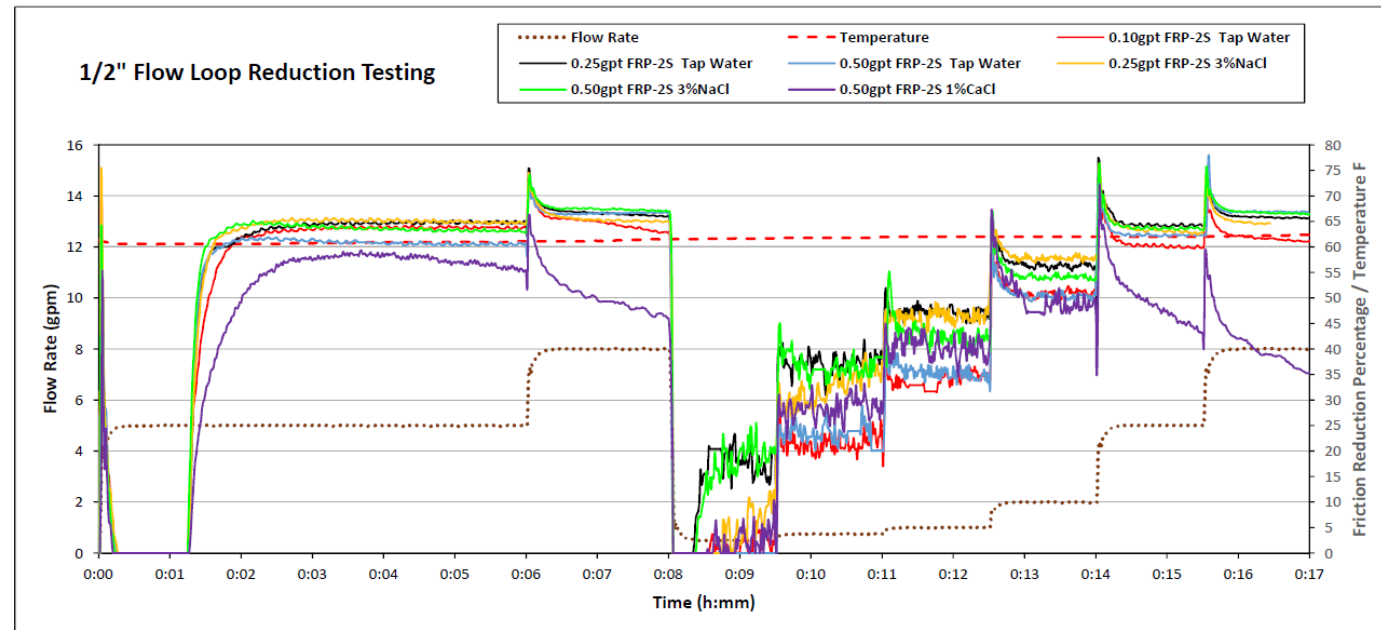
Friction Reduction

- 1/2" Diameter Flow Loop
 - Multiple Setpoints
 - Tap, CaCl, NaCl



Chandler Model 6500

1/2" Flow Loop Reduction:

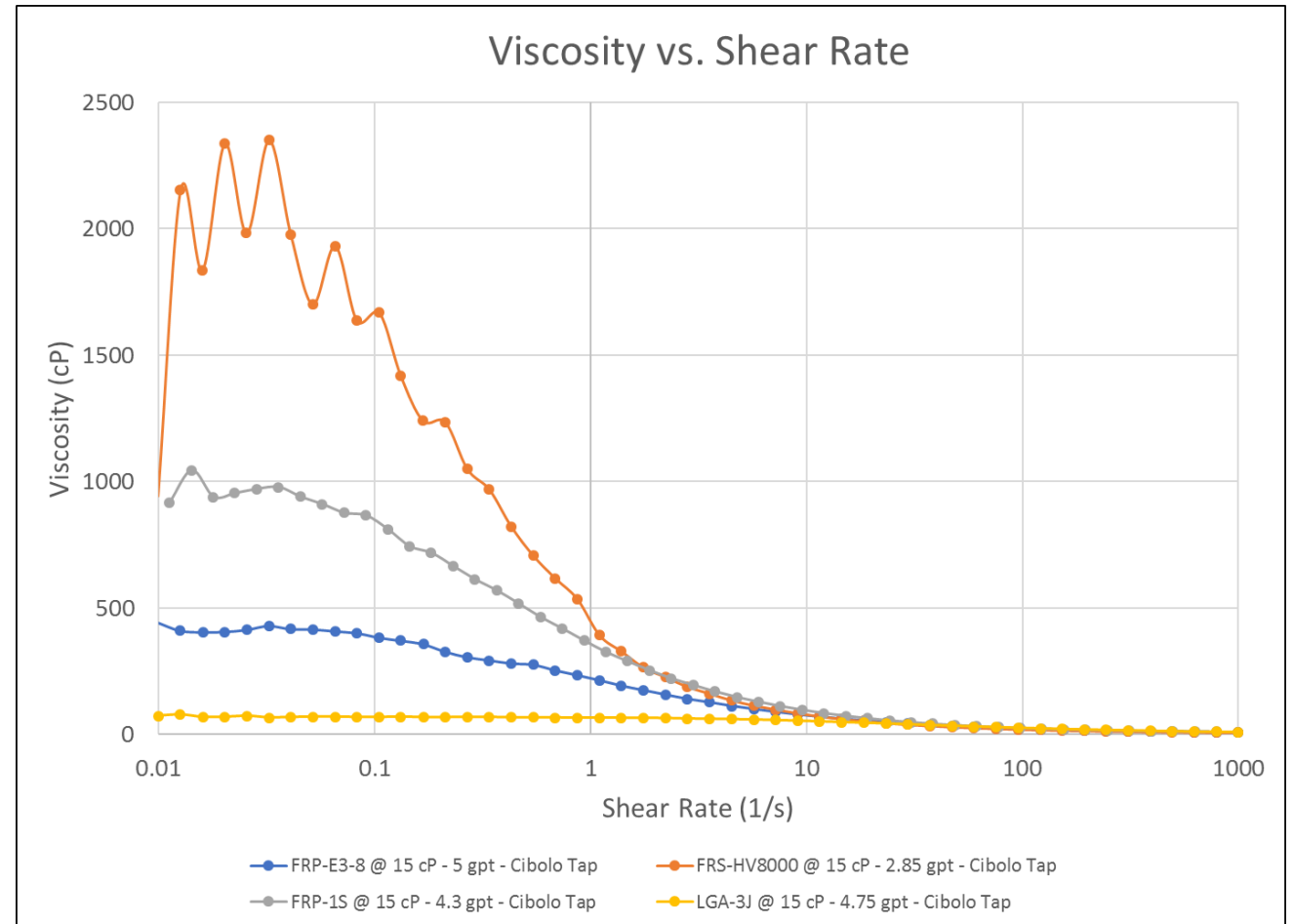


Viscoelastic Properties

- Proppant Transport
 - Rate
 - Viscosity
 - Elasticity



Anton Paar MCR-102

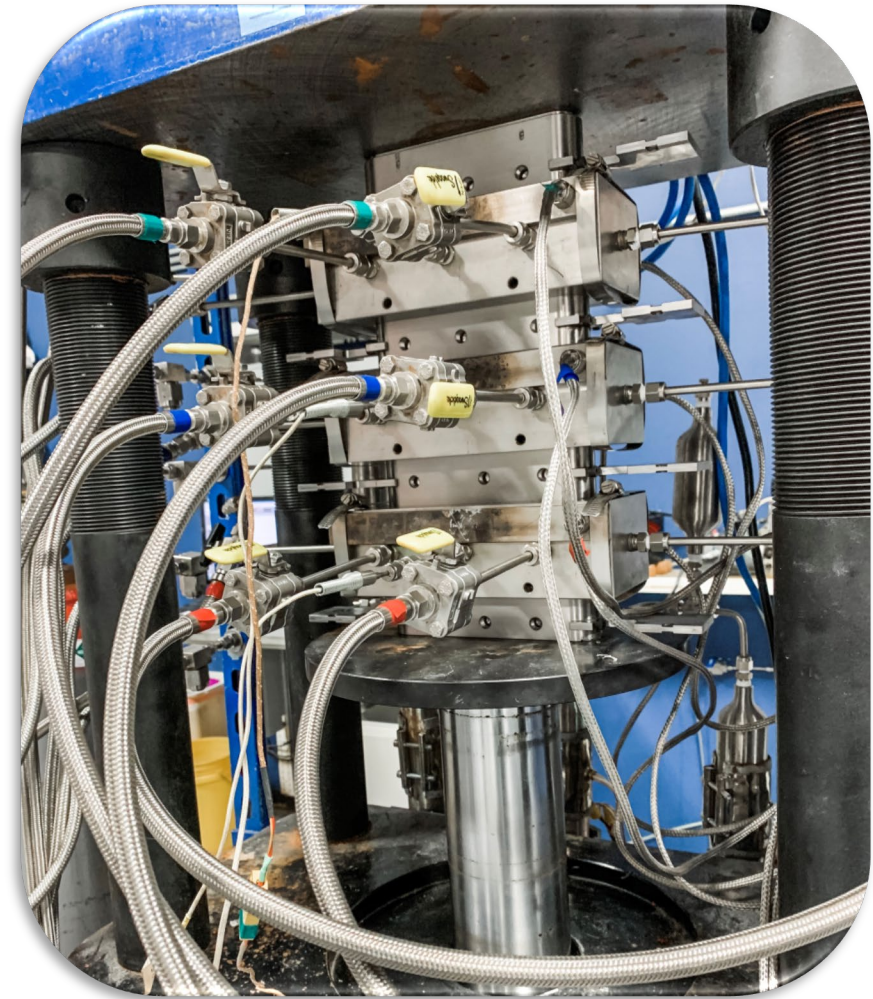


Formation Damage

- Conductivity Cells
 - Whole Fluid Testing
 - Multiple Temperatures
 - 160F, 200F, 260F
 - Multiple Pressures
 - 6,000psi, 9,000psi



40/70 White With FR Between Two Steel Cores



Courtesy of PropTester

Summary

- Test friction reduction in a variety of water qualities on a flow loop
- Evaluate viscoelastic properties for proppant transport
- Ensure that the fluid will not increase damage



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