

FRICTION REDUCER

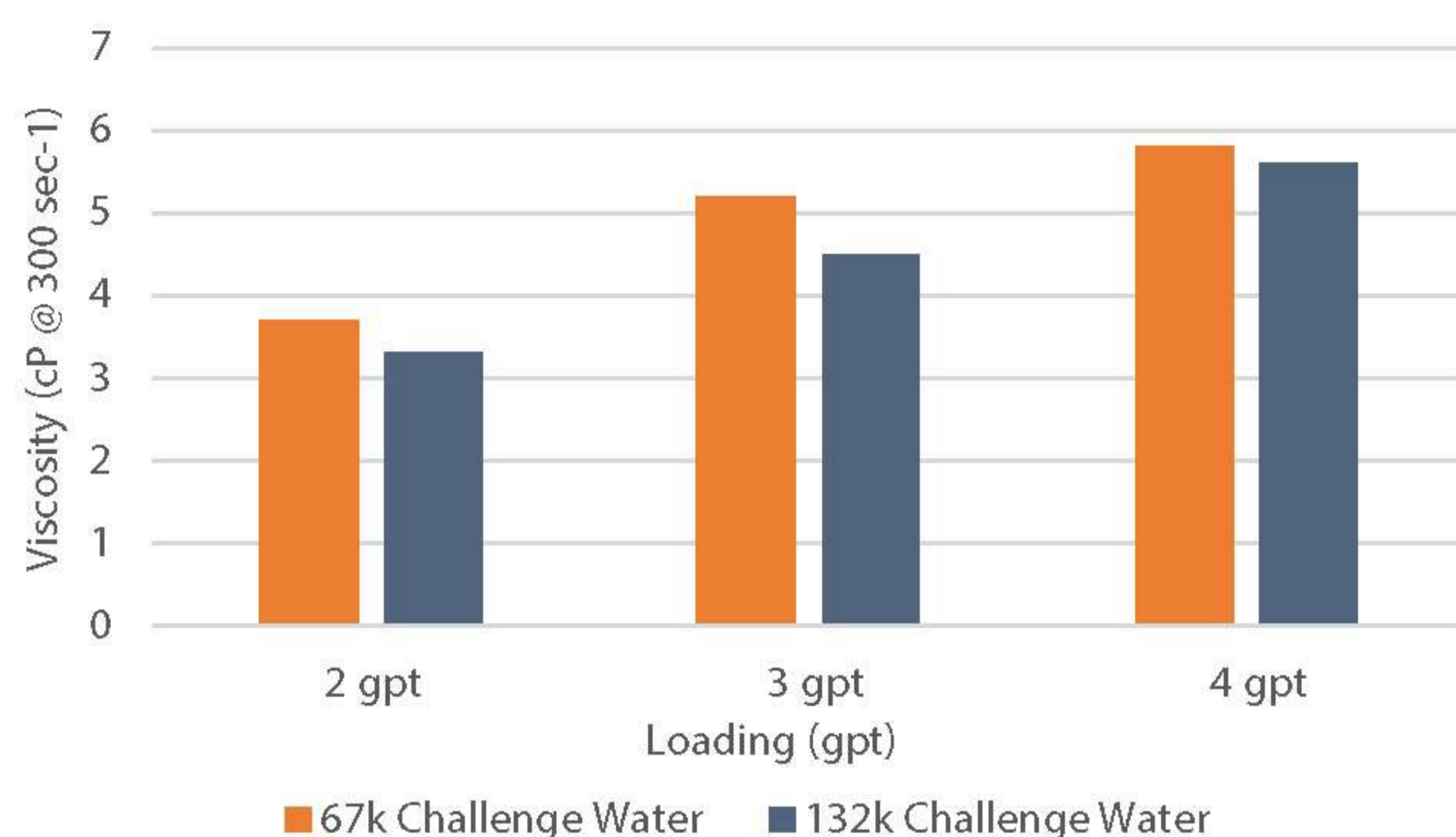


ALPHA-4

Description

Alpha Friction Reducer™ 4 is a high viscosity brine-tolerant anionic copolymer designed for use in hydraulic fracturing. More aggressive sand concentrations are able to reduce stage completion times, and improve efficiency. The brine tolerance of Alpha 4 Friction Reducer allows for reuse of produced and brackish water during the job, allowing operators to prevent costly disposal costs and allowing for less purified water sources.

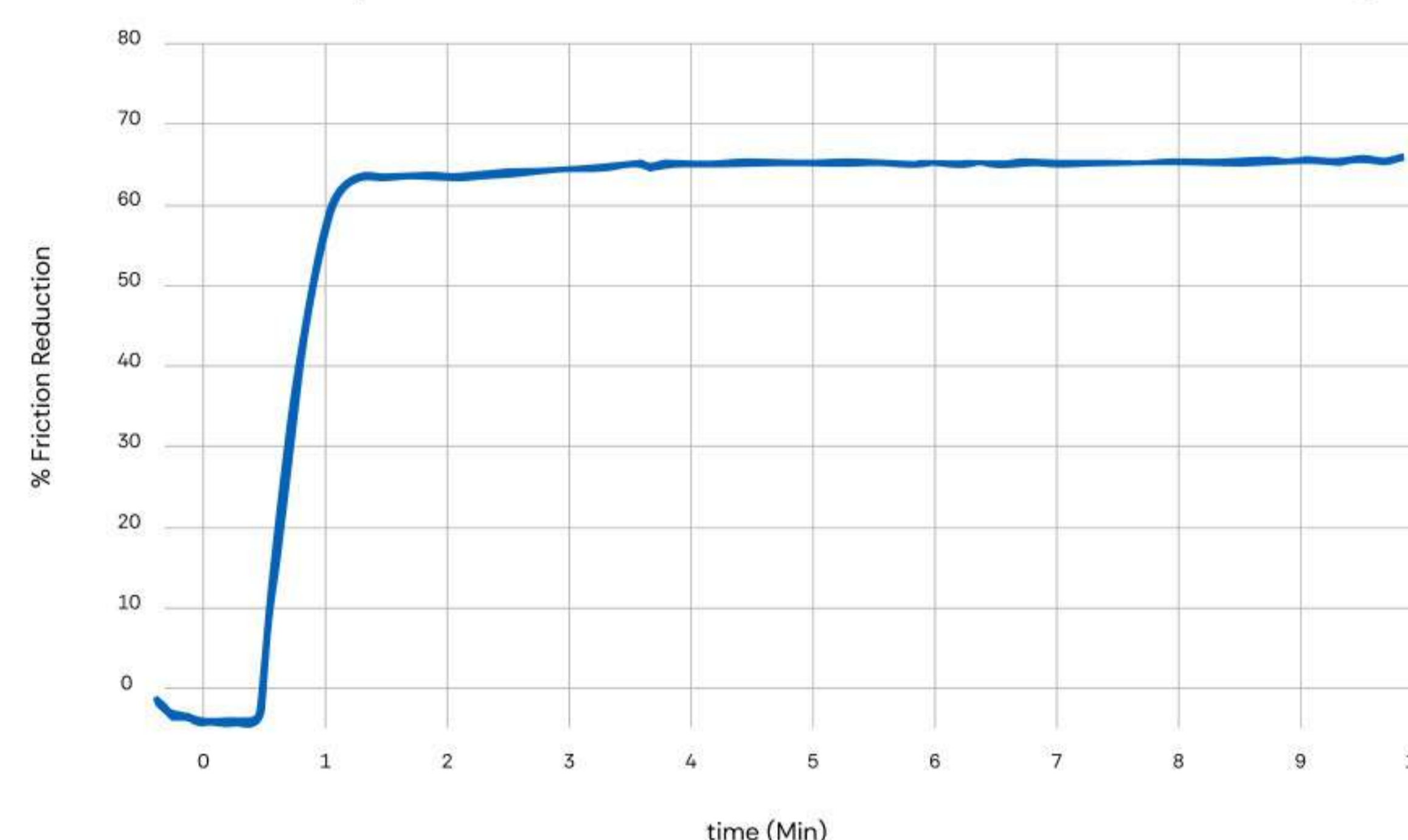
Spikes in pressure during hydraulic fracturing is a costly issue. This can cause: 1. Screenouts and necessary flushing out proppant from the well to continue 2. Failure to place proppant according to design reducing increased designed reservoir stimulation 3. Safety retesting on surface and downhole equipment for pressure resilience 4. Increased wear on surface pumping equipment Alpha Friction Reducer 4 has improved performance compared to other slurry- and emulsion-based friction reducers. Alpha 4 will give equivalent or better performance at dosages 10-30% below most emulsion-based FR products. A reduction of pumping time between 10 and-40% can be achieved if sand concentrations are increased. Alpha Friction Reducer 4 enables getting to pumping rates faster as well.



Application

Alpha Friction Reducer™ 4 has been tested in and provides higher viscosity profiles in water sources to 200,000 ppm TDS, but has higher salt tolerance than this depending on the salt composition. High concentrations of calcium and other divalent ions will reduce performance for all friction reducers Alpha Friction Reducer 4 has shown higher viscosity and friction reduction performance relative to other controls run in parallel at equivalent cost dosage. Alpha 4 is particularly effective when high variation in brine water occurs on location.

0.75 GPT Alpha Friction Reducer™ 4 132K Challenge Water



Friction reduction results for Alpha Friction Reducer™ 4 in 132,000 ppm TDS water, including 5,000 ppm of calcium, 3 ppm iron at 0.75 gpt dosage.

Alpha Friction Reducer™ 4 is a stabilized slurry friction reducer, which requires certain precautions before executing a frac job on location. Progressive cavity (PC) style pumps are recommended instead of gear pumps. Care must be taken to not expose Alpha 4 to water before being pumped for the fracturing job, which includes the recommendation of one-way valves. Alpha 4 can be delivered to location via bulk ISO containers or totes. AET also can be delivered via VAC trucks directly into ISO containers on location.

Properties

Color	Tan/Off-white
Form	Slurry/Suspension
Density	8.84±0.23 lbs/gal
Viscosity (72 °F, 300 sec-1)	150-250
Suspension Stability	At least to 135°F1
Pour Point	As low as 32°F
Flash Point	>200°F
Ionic Charge	Anionic
Water Range	Fresh – 200K TDS2
Pour Point	<40°F

¹Suspension stability tested at 135°F for 1 week with no apparent separation. In the case of any visible separation, circulating through the container will remove this effect. It is recommended that product is circulated once every two weeks if not used at all.

²Up to 200K TDS compatibility has been tested for Alpha 4. A flow loop test using source waters and normally used additives is recommended prior to operations to ensure performance.

Additional Information

Reach out to your AET account manager today for more information, samples, and other high-performance products.



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