

## AquaPac Friction Reducer

Chemical solution for alpha/beta gravel pack in low fracture-pressure gradients

### APPLICATIONS

- Openhole completion intervals with low fracture-pressure gradient
- Vertical, deviated, and horizontal wellbores
- Onshore, shelf, and deepwater developments

### BENEFITS

- Reduces risk of early screenout and resulting loss of well when fracture pressure is exceeded
- Simplifies gravel pack process, lowering costs compared with alternatives
- Tool-free insurance for gravel pack efficiency

### FEATURES

- Enables gravel packing of longer intervals
- Functions in both monovalent and divalent brines up to 12.5 lbm/galUS
- Does not affect gravel deposition during alpha wave
- Does not damage gravel pack or formation
- Is compatible with K240 shale stabilizer
- Is supported by SandCADE\* gravel-pack design and evaluation software

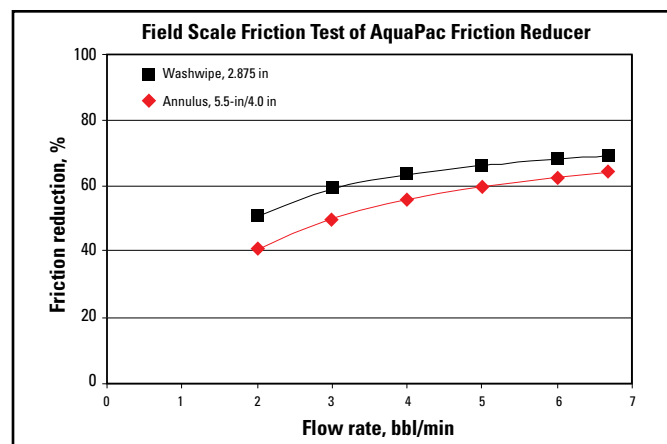
Openhole completions in formations with low fracture-pressure gradients pose unique challenges for gravel packing, including loss of carrier fluid, which leads to premature screenout and incomplete packs.

In AquaPac\* integrated water packing operations in horizontal and highly deviated wells, the gravel is placed in two waves. During the alpha wave, the gravel dune migrates evenly downward along the lower part of the hole. When the toe is filled, pressure increases as the beta wave carries the dune back toward the heel to fill the top part of the hole. The increase in pressure is due to the returning flow of the carrier fluid through the screen-washpipe annulus and in the washpipe.

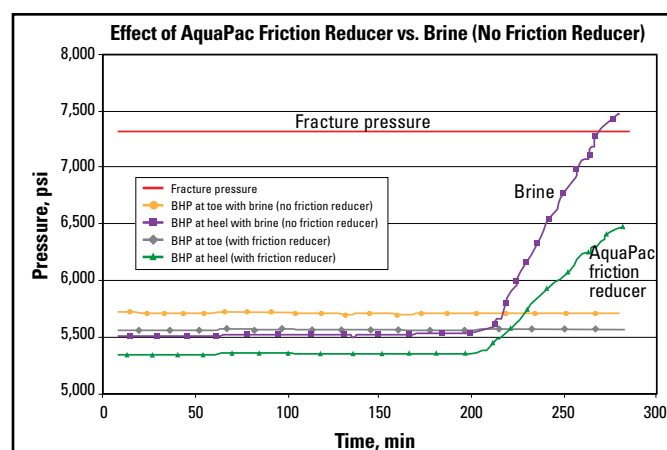
This increased pressure can cause the formation to fracture. The resulting fluid losses can trigger the creation of a gravel bridge that disrupts the beta wave and leaves sections of the screen unpacked.

AquaPac friction reducer solves this problem. The friction reducer is pumped in the carrier fluid, reducing the friction pressure in the screen-washpipe annulus and in the washpipe. The result is lower pressure in the openhole section.

The AquaPac friction reducer treatment is supported by SandCADE gravel-pack design and evaluation software.



Field scale friction test results showed that the AquaPac friction reducer in 9.2 lbm/galUS of sodium chloride carrier brine reduced friction pressure in both the washpipe (black) and screen/washpipe annulus (red) by more than 40%.



The AquaPac integrated water packing operations with brine containing no friction reducer (purple) exceeded the fracture pressure (red) during the beta wave packing stage, resulting in an incomplete pack. With the AquaPac friction reducer (green), however, it did not exceed the fracture pressure, allowing a complete pack to be achieved.