

# Roto-Pulse gravel-pack cleaning process

Restore permeability without damage

## Applications

- Sand control operations
- Removal of soluble and insoluble fines, precipitates, and scales
- Removal of filter cake in openhole gravel packs

## Features and benefits

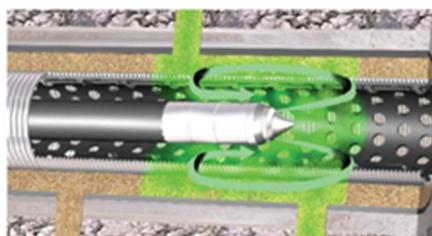
- Safe and economical
  - Uses less acid and reduces environmental impact
  - Does not damage pack or screen
- Improved well performance
  - Creates paths of least resistance to put controlled volumes of treatment fluid into the pack and perforation tunnels
  - Optimizes penetration, pressure, and flow rates
- Special-purpose jetting nozzles
  - Accurately places solvent, acid, or enzyme treatment fluids
- Hydraulic vibration
  - Controls swirling and pulsing pressure
  - Dissolves soluble materials
  - Dislodges insoluble materials
- Placement efficiency
  - Reduces volume of treatment fluid compared to conventional stimulation
- Compatible with **CIRCA™ Complete software** and **TeleCoil™ intelligent coiled tubing system**
  - Integrated pre-job tool setup
  - Real-time surface readout of pressures, casing collar locator (CCL) and gamma depth
  - Monitor tool performance

## Remove gravel-pack damage

The Baker Hughes **Roto-Pulse™ gravel-pack cleaning process** effectively restores permeability without damage. The process uses the Baker Hughes **Roto-Jet™ jetting tool** with its special-purpose nozzles and operational parameters, to uniformly place and fully remove fluid from behind the screen and across the entire interval.

Reduced pore space decreases permeability and production. Scale precipitating from a well's produced fluids and migrating fines reduce and plug the pore space in gravel packs and perforation tunnels. A large amount of this material may be insoluble. The Roto-Pulse process uses pulsating jets to create a hydraulic vibration to mobilize and dislodge these fines.

A momentum exchange between the pulsating fluid and solid matter in the gravel pack causes both the pack sand particles and the plugging solids to vibrate. The vibration mobilizes the plugging fines and allows the currents from the jetting tool to remove the material. Controlling the energy density in the pulsating jets ensures that the gravel pack remains intact and undamaged.



When the plug is soluble, the cleaning action of the gravel pack ensures that fluid moves into the pack where solvent action can occur. Fresh, reactive chemical is delivered, and the spent fluid is displaced as the dissolving action proceeds. A final pass of the Roto-Jet tool flushes residual chemical and reaction products from the pack. Testing indicates when complete flushing is achieved.

## Performance

A typical cleaning sequence is:

Treat the wire-wrap screen with pre-wash fluids to remove internal scale and other deposits.

Treat the gravel pack with the primary treatment chemical in a downward pass of the Roto-Jet tool using a designed, non-damaging, infusion energy.

Displace the treatment or flush the pack clean at the specified rate required by the Roto-Pulse process.

