



## **Field and Operational Benefits of using Wavefront's Primawave™ Process (Hornet Tool) for ISCO Applications**

### **Field-proven enhanced placement efficiency resulting in lower cleanup costs**

- Improved contact of target (contaminated) zone by injected chemical
- Greater treatment efficiency
- Reduced chemical fingering and improved chemical distribution

### **Field proven pinpoint placement of treatment chemicals without zonal isolation**

- Specific permeability zones can be targeted within a subsurface formation
- Enables the treatment of low permeability zones within a higher permeability environment

### **Field proven enhanced injection rates**

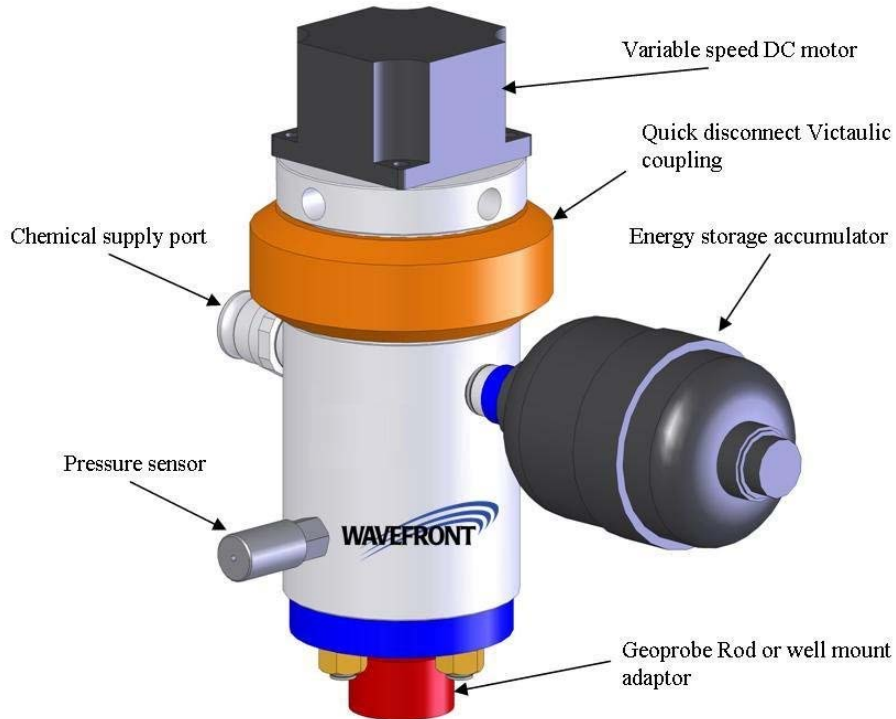
- Increased injection rates; 3 to 5 times, when compared to static injection methods
- Reduced on-site time consequently lowers project staff and equipment costs
- Reduced closure costs as a result of shorter injection duration

### **Reduced equipment inventory costs**

- Large range of operational flexibility. Equipment can be used effectively
  - o At flow rates varying from 1 to 30 gpm
  - o At injection pressures ranging from 25 – 250 psi
  - o At target zone depths from 5 – 100 ft BGS
  - o To treat formations with permeability ranging from  $1^{E-2}$  cm/s to  $1^{E-7}$  cm/s
  - o With most known treatment chemicals
- Compatible with all types of direct push equipment
- Compatible with all types of injection well
- Compatible with all injection methods (e.g. top down, bottom up)

### **Equipment Advantages**

- Small, robust, relatively low capital cost equipment
- Compatibility with wide range of injection chemicals and pH environments (316 stainless steel construction with Viton seals)
- Simple install and operating procedure (minimum training required for install/operation). Can be installed and operated by one person
- All weather construction



### Hornet Tool Specifications

Target Formation Permeability Range	1 millidarcy to 1 Darcy
Target Formation Depth Range	10 ft to 100 ft
Operating Pressure Range	0 – 250 psi (FS of 2)
Injection Flow Range	0.3 gpm – 30 gpm
Injection Fluid Capability	Liquids, gases and suspensions
Maximum Operating Temperature	60 °C
Construction	316 SS with PEEK/Viton Seals
Approximate (Box) Dimensions	10in x 10 in x 10 in
Weight	45 lbs

### Information and Quotations

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