



PRIMAWAVE

A superior method for introducing remedial fluids into aquifers for In-Situ Bioremediation and ISCO applications

Terra Systems, Inc. is a licensee of PRIMAWAVE from Wavefront Technologies.

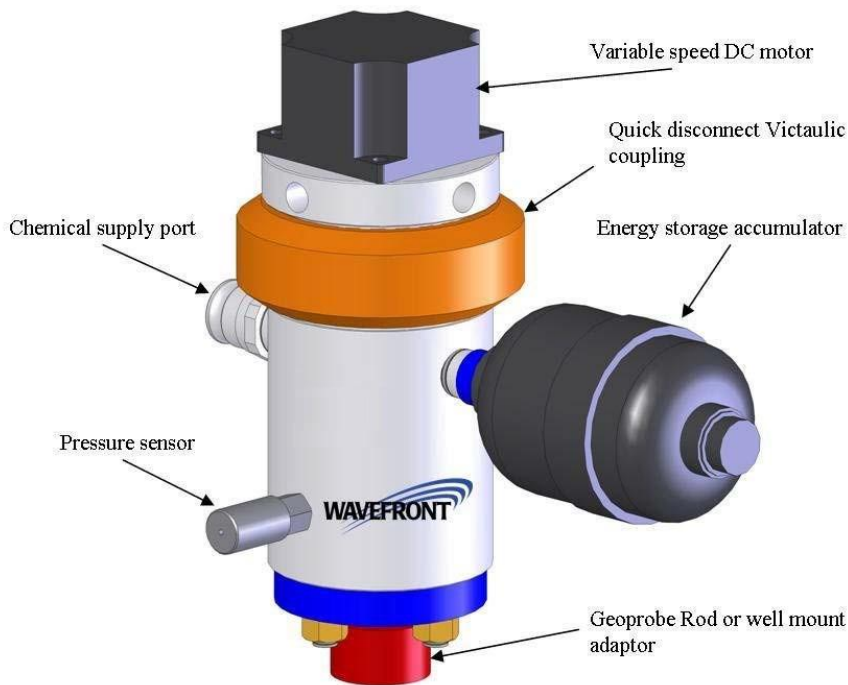
PRIMAWAVE has been verified as an effective environmental remedial strategy by Environment Canada's Environmental Technology Verification Program, Primawave gets results that are unattainable by conventional injection methods. It helps treat sites quickly and at minimal cost by broadly distributing remedial fluids throughout the aquifer compared to conventional injection approaches.

- 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
 - ✓ At flow rates varying from: 0.3 to 30 gpm
 - ✓ At injection pressures ranging from: 25 – 250 psi
 - ✓ At target zone depths from: 5 – 100 ft BGS
 - ✓ To treat formations with permeability ranging from: 1^{E-4} cm/s to 1^{E-7} cm/s
 - ✓ 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, low rental cost
- 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



Primawave Tool Specifications

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|--|----------------------------------|
| ✓ Target Formation Permeability Range: | 1^{E-4} cm/s to 1^{E-7} cm/s |
| ✓ 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 ⁰ C |
| ✓ Construction: | 316 SS with PEEK/Viton Seals |
| ✓ Approximate (Box) Dimensions: | 10in x 10 in x 10 in |
| ✓ Weight: | 45 lbs |

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