Hepure Technologies Inc

Committed to Comprehensive Environmental Solutions

Technical Specification Sheet
Ferox PRB ZVI Reactive Iron Powder

General Description:

Ferox PRB ZVI reactive iron powder represents a breakthrough in terms of performance and efficiency in the granular ZVI marketplace.

- **Certifiable 95+% Pure**
- **Cast iron (reactive alternative to iron filings)**
- **297 micron particle (>95%)**
- **Bulk Density: 2.92 gm/cm^3**

Hepure's Ferox ZVI reactive iron powder line (Fe 92 % to 98 %) is produced by a global producer of high quality cast iron powder to Hepure's exacting requirements. The product line represents a very high purity cast iron powder with different available grades and mesh sizes to US sieve standards. Using high quality feed stock, a proprietary grinding and pulverizing method creates powders suitable for the most demanding remediation environments. From the selection of raw materials, manufacturing, and through to packaging, all processes satisfy demanding product standards. Quality assurance testing is performed at every stage of production so product consistency is maintained. Ferox ZVI reactive iron powder is available in micro-scale or granular particle size distributions suitable for injection, auger placement or permanent wall barriers.

Ferox PRB reactive iron powder offers a greater particle distribution with a larger proportion of fine particles. This greater distribution ensures superior reactivity and generally supports lower ZVI loading requirements in comparison to other ZVI materials.

Product Specifications:

Ferox PRB (-8/+50 mesh)
(Micron-Scale Cast Iron Powder)

Particle Distribution:

Sieve Size (MM)	% Passing
2.380	96-100%
0.297	<4 %

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Chemical Composition:

Element	%Composition
Iron (Fe)	~ 95%
Carbon (C)	~ 2.0%
Oxygen (O)	< 1%
Silicon (Si)	~ 1%
Phosphorous (P)	< 0.1%
Sulfur (S)	~ 0.1%

Product Performance:

Ferox PRB's uniform bulk characteristics provide exceptional cost-effective performance. The substantial number of catalytic sites on the powder surface ensures superior reactivity and generally supports lower ZVI loading requirements in comparison to other ZVI materials Cast Iron Powder (CAS # 7439-89-6). Figure 1 shows a comparison of several ZVI iron powder ability to degrade Trichoroethylene (TCE).

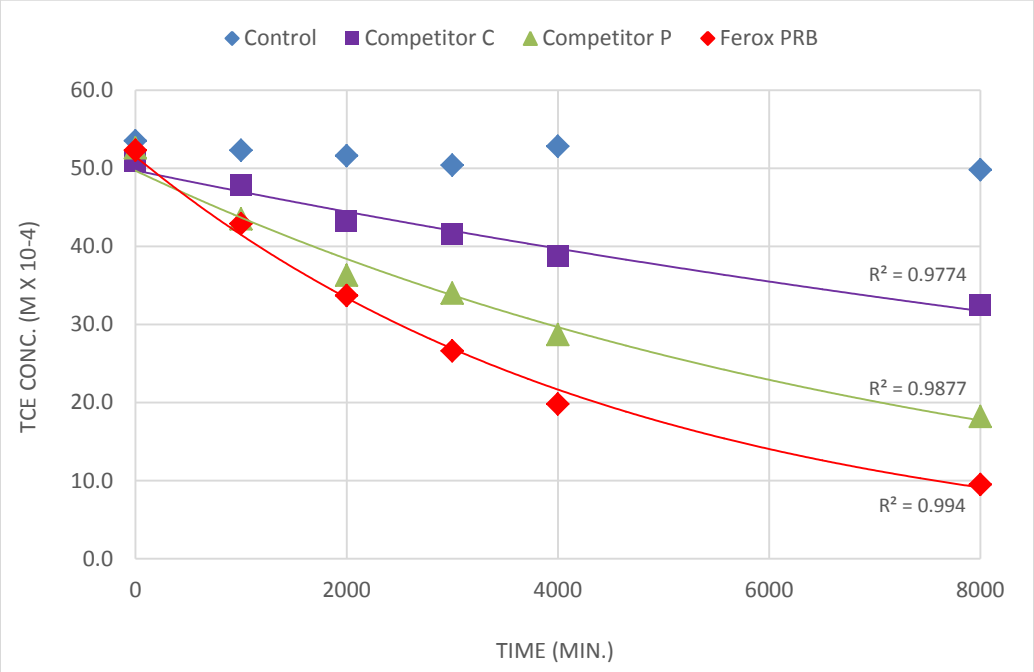

Figure 1. Comparison of ZVI Iron Powders Ability to Degrade TCE

Ferox PRB reduced the TCE by 82% in 5 days. Competitor P and C reduced the TCE by 65% and 36%, respectively.

Materials and Methods:

These batch experiments were carried out in 160 mL serum bottles sealed with Teflon lined septa. The reaction bottles contained 20 g of the following Irons; (1) Connelly Iron Aggregate, (2) Peerless Iron Aggregate, (3), Ferox PRB. In addition, 120 mL of deoxygenated deionized water containing 50 x 10^{-3} M of trichloroethylene (TCE) was added to each. A control was also maintained, dosed with TCE but with no Iron added. The reaction bottles were mixed gently on a Laboratory Rotator at laboratory temperature (~21-22 °C).

At 5 time intervals, ranging from 5 min to approximately 8000 min, 200 µL samples were taken from the reaction bottles using an air-tight glass syringe and injected into a Hewlett-Packard 5890 Series III GC to quantify TCE concentrations over time.

Testing Performed by, **Dr. Dan Cassidy**, *Associate Professor at Western Michigan University,* December 2014.

Table 1 shows the typical trace metals found in the Ferox Flow product. Our products are sampled periodically for quality control and quality assurance.

Table 1: Trace Metals Analysis - Mass Spec – Semi-Quantitative Results.

Element	Result (wt%)	Element	Result (wt%)
Boron	<0.0002	Cobalt	0.0029
Magnesium	0.0042	Nickel	0.0207
Aluminum	0.0249	Copper	0.0575
Titanium	0.0278	Zinc	0.0031
Vanadium	0.0075	Zirconium	0.0004
Chromium	0.0623	Molybdenum	0.0129
Manganese	0.3552		