iPAC
INJECTABLE POWDER ACTIVATED CARBON

Injectable Powder Activated Carbon
Designed for Environmental Remediation of soil and groundwater

Benefits Include

High surface area powder Activated carbon with particle size less than 45 microns

Economical solution compared to other available products

Complements other remediation approaches and reagents

Applications

Soil Mixing: Excavation and treatment of impacted soils for backfill or off-site use

In-Situ: Direct push injection in groundwater and by hydraulic fracturing

Soil bio piles and land farming

Effective to support natural attenuation and bioremediation applications

May be combined with other reagents and remediation approaches to meet site specific remediation objectives

Target Contaminants

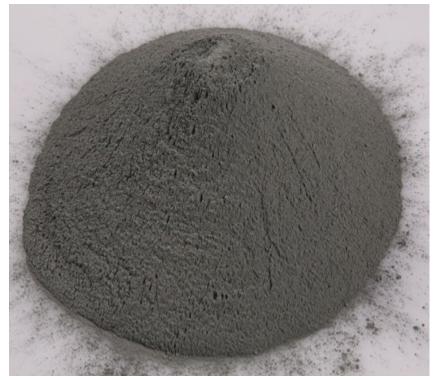
PFAS- perfluoroalkyl substances
- **PFOS/PFOA**

Chlorinated Solvents
- **PCE, TCE, DCE, VC**

Petroleum Hydrocarbons:
- BTEX- Benzene, toluene, ethylbenzene, xylenes
- MTBE- Methyl tert-butyl-ether
- Gasoline, Diesel and Oil Range Organics

Polycyclic Aromatic Hydrocarbons (PAHs)

Mercury (Hg)



High quality and high surface area (eg. 1,000 m2/g) injectable powder activated carbon (iPAC) for soil and groundwater remediation by adsorption of organic contaminants, PFOS /PFOA (iPAC-PF), and heavy metals (e.g. Hg) or in combination with other REDOX and biotic reduction reagents. Adsorption can significantly retard contaminant migration and decrease dissolved phase concentrations in groundwater.

iPAC™ is very effective in low permeability formations and injected into silts and clays (Winner and Fox, 2016) or combined with sand to improve hydraulic conductivity and preferential pathways for more rapid diffusion and effective capture of VOCs. Increasing adsorptive media, like **iPAC™**, allows for natural adsorptive accumulation of contaminants and bacteria over time to facilitate the formation of active biofilm and enhanced biodegradation processes (Voice et al, 1992). The combined effects often result in synergistic processes that significantly reduce the time to reach remedial objectives. The coupling of adsorption and degradation reduces the potential for contaminant rebound that is frequently observed with conventional remediation technologies such as chemical oxidation or mechanical processes (e.g. pump and treat and dual phase extraction).

Changing the diffusive gradient: The addition of sufficient **iPAC™** into the target treatment zone of the aquifer, allows for rapid adsorption/sequestration of the contaminants of concern. This allows for reduced dissolved phase concentrations in the aquifer, verified by reducing trends in groundwater monitoring wells. The reduction in dissolved phase compounds, increases rates of diffusion of adsorbed phase contaminants into the aquifer, thereby reducing the overall time of remediation. It is imperative that a biotic or abiotic process is employed to complement **iPAC™** to ensure destruction of target COCs occurs over time. **iPAC™** decreases the high concentrations in soluble phases that may aid in reducing the lag time for biodegradation to escalate (Aktas, et al, 2012).

Injection: iPAC™ is ready to inject with guar or crosslink gels for hydraulic fracturing methods. It is commonly employed to support barrier applications to reduce or eliminate off-site transport of VOCs, to stabilize hot spots not otherwise economically addressed by other methods, and to complement plume remediation strategies.

iPAC™ is non-corrosive to underground structures or piping systems and non-toxic.

Technical design support, references, papers, and reliable customer services available to all customers.

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