

Newman Zone HRO™

A Self-Emulsifying Electron Donor

Newman Zone HRO™ is a neat-oil blend used for anaerobic bioremediation of chlorinated solvents, nitrated explosives (RDX, HMX, TNT), selected toxic metals (chrome VI), perchlorate and nitrate. Newman Zone HRO™ is easily emulsified in water on-site with gentle mixing and then injected into the subsurface. This larger droplet field emulsion improves oil retention in sand and gravel soils and fractured bedrock. Once injected the soybean oil and soybean oil esters slowly ferment to hydrogen and volatile fatty acids which support anaerobic biodegradation for as long as five years after injection.

Application

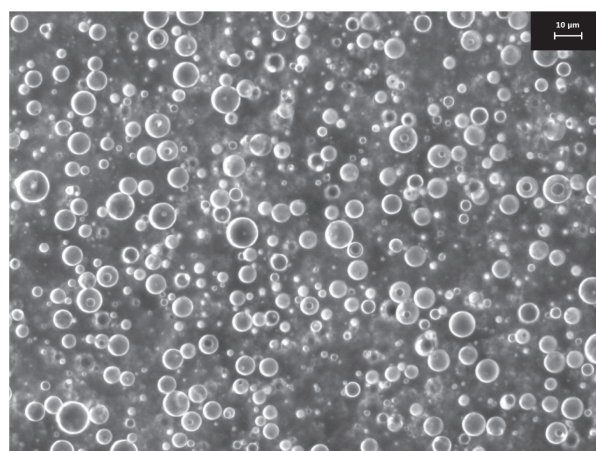
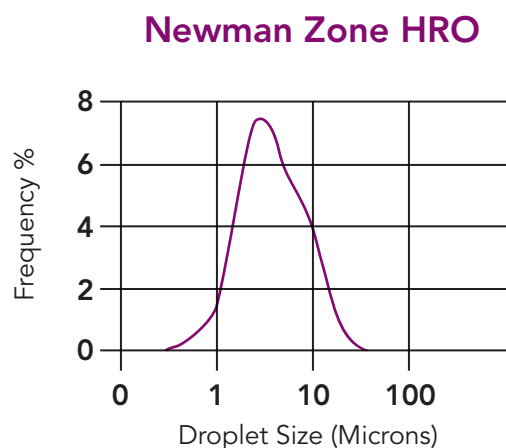
The low viscosity Newman Zone HRO™ blend can be injected into the subsurface neat and then emulsified with chase water or emulsified with low shear mixing in a tank prior to injection. After dilution in a batch mode or dilution by chase water, oil concentrations of 1% to 5% oil by volume are normally applied to each injection location. After dilution the emulsified Newman Zone HRO™ remains stable and pumps as easily as water.

Benefits – Easily Creates a Field Emulsion

When added to water Newman Zone HRO™ will immediately bloom into an oil-in-water emulsion. Low shear mixing such as hand shaking in a vial or recirculating in a tank with a centrifugal pump will produce an emulsion with a median droplet size of about 3 microns. 90% of the droplets by volume are under 10 microns.

Benefits – Droplet Sizes that Enhance Retention in Coarse or Fractured Materials

When emulsified in the field Newman Zone HRO™ produces oil droplets that are larger than those in our factory emulsified Newman Zone™. The larger droplets are more readily retained in coarse soils and bedrock fractures and on sites with very high ground water pore velocity. Newman Zone HRO™ should not be used in soils with low permeability such as silts and clays. The small droplet Newman Zone® products provide better mobility in low permeability soils.



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Product Content

Chemical Name	CAS Number	Composition
Blend of Soybean Oil and Soybean Oil Esters	8001-22-7	90%
Food Grade Surfactant Blend	Proprietary	<10%

Product Characteristics

Parameter	Unit	Specification
Density	g/cm ³	0.92
Flash Point	°F	>235
Appearance		Pale Amber liquid

Packaging

Newman Zone HRO™ is available in 5-gallon pails (38 pounds net) and 275-gallon totes (2,000 pounds net).

Storage

Newman Zone HRO™ may be stored on site for up to a year without refrigeration. Below freezing temperatures will not harm Newman Zone HRO™, but cold winter temperatures may cause the product to gel. Store at 40 degrees Fahrenheit or higher to maintain a low viscosity.

Safety

All components are food grade or on the Generally Recognized as Safe (GRAS) list. No protective equipment is necessary under normal use conditions.