
EZVI (Emulsified Zero-Valent Iron) aka SourceKill™

TECHNICAL SHEET

EZVI is an emulsion of powdered zero-valent iron, surfactant, oil, and water developed by NASA to reductively dehalogenate halogenated hydrocarbons (e.g., tetrachloroethene (PCE), trichloroethene (TCE), chlorofluorocarbons (CFC), vinyl chloride (VC)). As a water-in-oil emulsion, EZVI is able to mix with dense non-aqueous phase liquids (DNAPLs) present in the subsurface environment. Thus, EZVI is a “source area” remediation technology. Various formulations of EZVI can be customized to different site conditions. This data sheet reflects all of the ranges available.

PRODUCT RANGES

Density: 1.05-1.13 g/mL

Hydrophobicity: Digital image verification

Micellular Structure/Integrity: Micrograph digital image verification

CHEMICAL/PHYSICAL DATA

Appearance: Grey to black viscous liquid

Viscosity: 150-1500cps

Odor: Soybean oil (cooking oil) odor

Solubility in Water: Insoluble

Specific Gravity: 1.05-1.13 g/mL

Percent Solids By Weight: 10-17%

Percent Fermentable Carbon: 40%

SHIPPING CONTAINERS

275-gallon (1040-L) IBC (Intermediate Bulk Container)

Domestic or International-(UN Specification: UN31HA1/Y1.9/100). IBC weighs 139-lbs (65-kg). The net weight is 2300-lbs (1046-kg). The IBC contains 250-gallons (945-L) of product. The IBC dimensions are 45.4 in. high, 48 in. long and 40 in. wide. The IBC has a 2-in. butterfly valve with NPT threads in bottom sump. (Domestic)

Bulk shipping via tanker truck may be available under special circumstances.

SHIPPING

Proper Shipping Name: Emulsified Zero-Valent Iron

Hazard Class: NA

ID Number: NA

Packing Group: None

HANDLING, STORAGE, AND INCOMPATIBILITY

Personal protective equipment during handling should include standard safety equipment, including slip-resistant footwear, and other clothing to minimize dermal contact. Surfaces covered with EZVI are slick. Exercise care in handling or cleanup to avoid injury due to falls.

Do not store near oxidizing or acidic materials. Store away from halogens (chlorines, bromines, iodines). Hydrogen gas may be produced during storage. Keep ignition sources away from material. Refer to SDS for more information.

GENERAL FACTS

- Field-tested by the U.S. Environmental Protection Agency (EPA) under the Superfund Innovative Technology Evaluation (SITE) program
- Primarily used for *in-situ* DNAPL source area destruction
- Typical source area groundwater VOC concentration decrease ~ 90+% within 3 - 6 months
- Surfactant-stabilized water-in-oil emulsion with colloidal and small micron sized zero-valent iron particles (3 – 20 µm)
- Hydrophobic, dense emulsion absorbs DNAPL, delivering contaminant to iron
- Complete *in-situ* chemical reduction (abiotic and biotic) of chlorinated solvent to ethene/ethane
- Applied using injection or soil mixing using conventional technologies
- Dosing typically based upon percentage of available pore space
- Compatible with bioaugmentation cultures
- Applied/used in many states in the US, in Canada, Australia and Japan.
- Developed/patented by NASA

AWARDS

2007 NASA Induction into the Technology Hall of Fame
2006 Federal Laboratory Consortium Excellence in Technology Transfer
2005 NASA Government Invention of the Year
2005 NASA Commercialization Invention of the Year
2022 NASA Spinoff 2022 Magazine Featured Article

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