Mixing Guidelines for EHC® Liquid Reagent

EHC® Liquid reagent is a cold-water soluble formulation specially designed to be emplaced via existing wells and/or hydraulic injection networks for the treatment of a wide range of groundwater contaminants. EHC Liquid is delivered as two components that are mixed together on site. The first component, ELS™ Microemulsion is a 25% liquid emulsion of food-grade lecithin, provided in 55-USG drums containing 50 USG. The second component, EHC Liquid Mix is a food-grade powdered organo-iron compound. The two components are proportioned such that one bag of the EHC Liquid Mix is required for every 50 USG of ELS Microemulsion.

This document provides guidelines for the preparation of diluted EHC Liquid for injection.

Packaging

Part 1: ELS Microemulsion delivered in 55-USG drums, filled with 50 USG / 420 lbs per drum (190 L / 190 Kg)

Part 2: EHC Liquid Mix, water soluble powder with the organo-iron compound in 24.5 lb bags (11.1 Kg)

EHC Liquid Injection Volumes and Dilutions

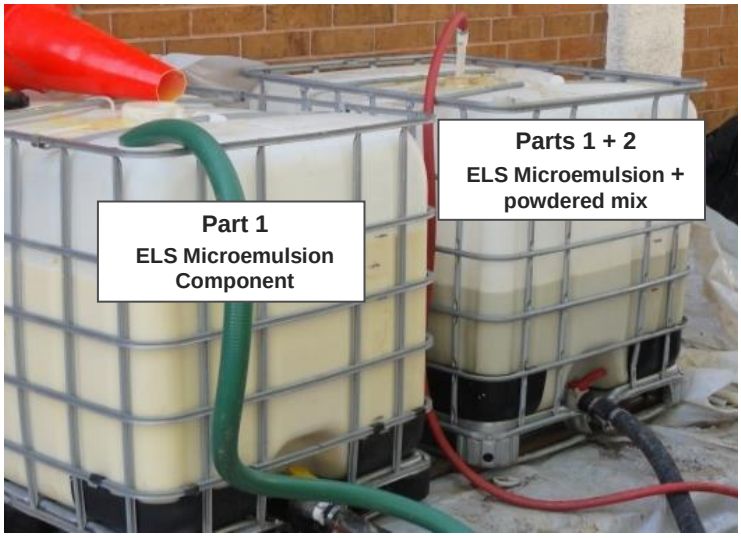
Depending on the application method, between 10% and 100% of the effective porosity is normally targeted during EHC Liquid injection, with a higher percent pore fill normally targeted during low-flow injections into wells and injection networks. This is in contrast to applications via direct push technology where normally around 10 to 15% of effective porosity is targeted. To facilitate the desired injection volume, the components are diluted in the field. The table below shows examples of mixing ratios for a 55-USG drum of ELS Microemulsion in United States customary units (USC) and metric units.

Dilution (USC):	**3-fold**	**5-fold**	**10-fold**	**25-fold**
Volume of Part 1 - ELS Microemulsion per drum (USG)	50			
Mass of Part 2 - EHC Liquid Mix component (lbs)	24.5			
Volume water (USG)	100	200	450	1200
Resulting total volume (USG)	150	250	500	1250
Resulting EHC Liquid concentration (wt%)	10.5%	6.3%	3.2%	1.3%
Dilution (Metric):	**3-fold**	**5-fold**	**10-fold**	**25-fold**
Volume of Part 1 - ELS Microemulsion per drum (L)	190			
Mass of Part 2 - EHC Liquid Mix component (Kg)	11.1			
Volume water (L)	380	760	1710	4560
Resulting total volume (L)	570	950	1900	4750
Resulting EHC Liquid concentration (wt%)	10.5%	6.3%	3.2%	1.3%

General Mixing Procedure

Proportioning can be varied to accommodate mixing tank size. The general mixing procedure is:

1. Fill mixing tank with required amount of dilution water per the treatment design.
2. Transfer Part 1 – ELS Microemulsion to mixing tank. Note that this material is pre-emulsified, has a viscosity of about 3,000 – 4,000 centipoise and will require an appropriate pump for transfer from the drum. Alternatively, the emulsion may be transferred in pails by hand. A paddle mixer and/or recirculation pump is sufficient for mixing.
3. Add Part 2 – EHC Liquid Mix organo-iron powder and continue mixing. Ensure no solids remain on bottom of tank.
4. If other additives are used (e.g., pH buffers), they may be added at this time.
5. Mixing time depends on equipment used (typically 5-10 min). Continue to mix until uniform.



Health and Safety

EHC Liquid is safe when handled properly in accordance with instructions for use and the SDS's. The SDS's are posted on our web site at: http://www.peroxychem.com/markets/environment. When working with EHC Liquid the use of standard personal protective equipment, including safety glasses, protective clothing and gloves are recommended. Additional safety equipment may be required for mechanical and site operations.

Please contact PeroxyChem for additional guidance.