

## Mixing Guidelines for ELS™ Microemulsion

### Introduction

ELS™ Microemulsion is composed of cold-water soluble of complex food-grade carbon and nutrients which support the reductive treatment of a wide range of groundwater contaminants. ELS creates reducing conditions and promotes enhanced reductive dehalogenation reactions. ELS is designed for easy on-site handling and addition to the subsurface via existing wells, hydraulic injection networks, or direct push technology.

This document provides recommendations for the preparation of diluted ELS for injection.

### Packaging

ELS is a 25% emulsion delivered in 55-USG drums, filled to 50 USG / 420 lbs per drum (190 L / 190 kg)

### ELS Injection Volumes and Dilutions

Depending on the application method, between 10% and 100% of the effective porosity is generally targeted during ELS injection, with a higher percent pore fill 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 the effective porosity is targeted. To facilitate the desired injection volume, the ELS components are diluted in the field. Table 1 shows examples of mixing recipes for a 55-USG drum of ELS, in United States customary units (USC) and metric units.

**Table 1: ELS Dilutions and Corresponding Concentration**

Dilution (USC)	3-fold	5-fold	10-fold	25-fold
Volume ELS emulsion per drum (USG)	50	50	50	50
% active component in ELS as delivered	25%	25%	25%	25%
Volume water (USG)	100	200	450	1200
Resulting total volume (USG)	150	500	5	1250
Resulting ELS concentration (wt %)	8.33%	5%	2.50%	1%
Dilution (Metric)	3-fold	5-fold	10-fold	25-fold
Volume ELS emulsion per drum (L)	190	190	190	190
% active component in ELS as delivered	25%	25%	25%	25%
Volume water (L)	380	760	1710	4560
Resulting total volume (L)	570	950	1900	4750
Resulting ELS concentration (wt %)	8.33%	5%	2.50%	1%



### **General Mixing Procedures**

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 ELS to mixing tank. Note that this material is pre-emulsified, has a viscosity of about 3,000 – 4,000 cps 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. If other additives are used (e.g., pH buffers), they may be added at this time.
4. Mixing time depends on equipment used (typically 5-10 min). Material is to be mixed until uniform.

### **Health and Safety**

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

Please contact PeroxyChem for additional guidance.

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