Preparing Tersus Surfactants (TASK)

Tersus provides specialty formulated surfactants to accommodate site specific geochemistry and off-the-shelf surfactants for gasoline, diesel and heating oil remediation. Tersus supports surfactant enhanced aquifer remediation (SEAR) with design and engineering services. The Tersus technical team includes University Oklahoma professors who lead the country in SEAR research, system integrators and experienced field implementers.

TASK Mixing Instructions

Tersus recommends using gloves, goggles and site-appropriate personal protective equipment (PPE) when handling TASK. Please use the mixing table guideline immediately below, when preparing a desired injection batch.

Batch Volume	TASK-DRO		Salt (NaCl)	Water
Gallons	Gallons	Pounds	Pounds	Gallons
500	8.6	76.4	50	491
1,000	17.2	153	100	983
1,500	25.9	229	150	1,474
2,500	43	382	250	2,457
5,000	86	764	500	4,914
10,000	172	1,529	1,000	9,828

Example:

To prepare 5,000 gallons of surfactant solution for a diesel application, slowly add 86 gallons of TASK-DRO to 4,914 gallons of water. Mixing times will vary depending on pumping rates and mixing method. After the solution is well mixed, add 500 pounds of sodium chloride into the batch and continue mixing until all salt is completely dissolved.

Mixing QA/QC:

Tersus suggests conducting a surfactant solution quality test on site before full batch mixing. To maximize the potential of the TASK solution to mobilize the diesel NAPL, the electrolyte concentration must be just right; that is, the resulting TASK solution should have an equal affinity to the groundwater and NAPL.

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Required materials:

- Site NAPL and injection make-up water
- TASK-DRO
- Salt
- Tall narrow glass vials: 50 mL vials are OK; 500 ml glass jars are easier to handle
- Scale or volume measuring device
- Permanent marker with a fine point

Instructions:

1. Prepare a small batch of site-specific surfactant solution with 80% of the estimated salt. Below is a table with example mixing ratios.

Batch Volume	TASK-DRO	Salt at 80%	Make-up Water
100 parts (wt)	*1.8 parts (wt)*	*1.0 part (wt)*	*97.2 parts (wt)*
1 liter	17.2 ml (18.3 grams)	10 grams	Enough to complete 1 liter
10 liters (2.6 gallons)	172 ml (183 grams)	100 grams	Enough to complete 10 liters
200 liters (53 gallons)	3.4 liters (3.7 kilograms)	2 kilograms	Enough to complete 200 liters

2. Fill 1/3 of the vial with the prepared surfactant solution.
3. Slowly pour into the vial roughly 1/3 of its volume with NAPL. Allow it to run down the side of the vial before contacting the surfactant solution.
4. Use a permanent marker to indicate on the vial the aqueous-oil interphase level (i.e., where surfactant solution ends and NAPL starts).
5. Without shaking, swirl and rock back and forth the surfactant-oil-water mixture and set aside to allow the liquids to settle.
6. Compare the new interphase with the mark on the vial.

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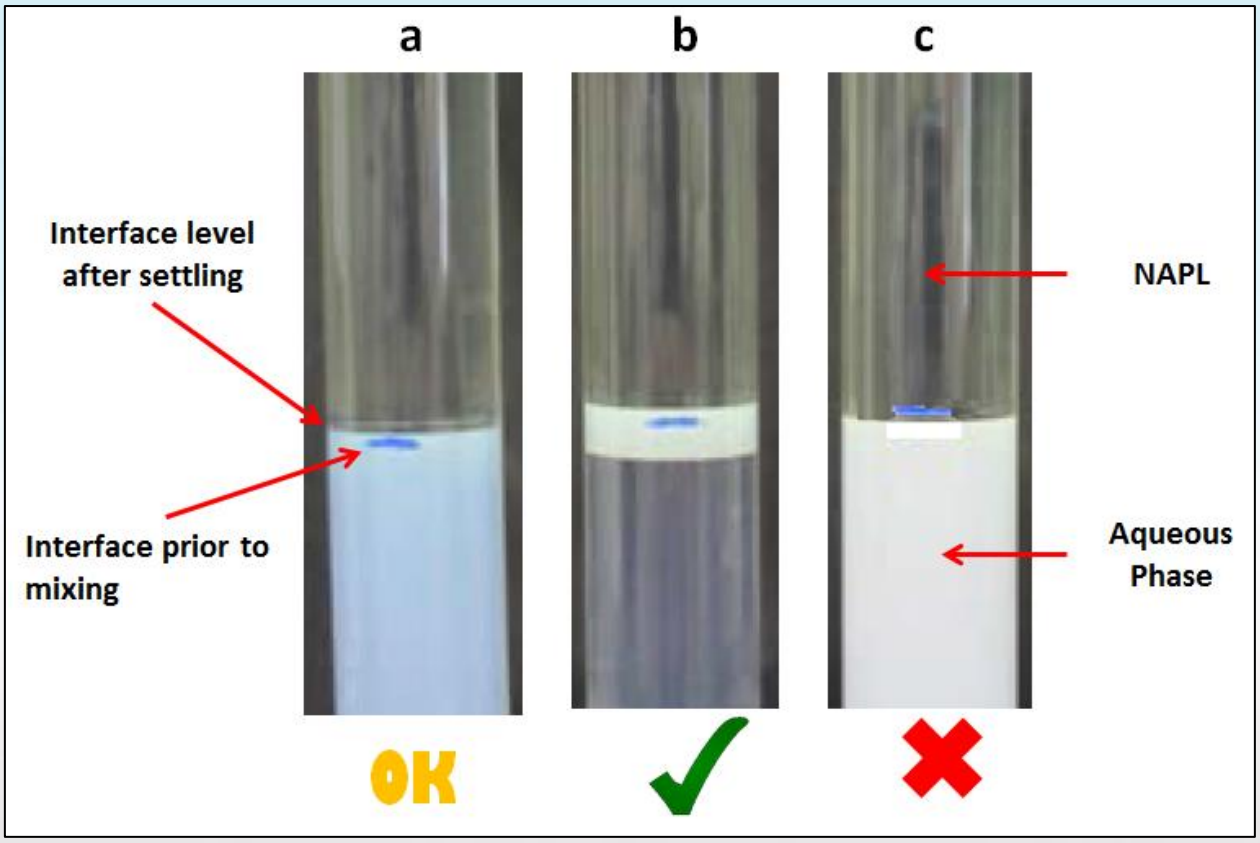
Results:

a) If the aqueous level is above the mark, the salt concentration is too low and not ideal.
b) If a third phase appears, the surfactant solution is just right.
c) If the aqueous level is below the mark, the salt concentration is too high.



Recycling

Due to cost and liability considerations, the vast majority of our clients do not ship empty containers back to Tersus. Fortunately, you can find local recycling services located throughout the United States. Their business is to collect, prepare and resell used drums.

Questions

If you need any assistance whatsoever, please call 919-453-5577.

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