

Water Clarification

The purpose of this test is to determine which ECA Water Demulsifier can remove impurities in wastewater which render is "hazardous". These include such contaminants as emulsified oil, heavy metals and suspended solids.

The chemicals used can be categorized by their mode of action as reverse demulsifiers, coagulants or flocculants. The objectives of the treatment are to assure rapid recovery of oil-free water from which solids and other contaminants have been removed, producing a minimal sludge volume, or the recovery of free oil for recycling.

I. CONCENTRATION (ppm)

Generally speaking, a chemical concentration of 500-3000 ppm would be sufficient to treat most aqueous emulsions. However, the exact amount will depend on the stability of the emulsion. To determine the amount of chemical to use in sample sizes of 500-100 ml, use the following formula:

$$\text{ppm} = \frac{\text{ml chemical}}{\text{ml sample}} \times 10^6$$

Example: To get 1500 ppm in a 50 ml sample:

$$\frac{(1500 \text{ ppm})(50 \text{ ml sample})}{10^6} = 0.075 \text{ ml chemical}$$

As a general rule, a dropper may be used; 4 drops of ECA added to 100 ml will give a concentration of 1000 ppm.

II. MATERIALS

1-2 doz. 100 ml bottles
pH paper
syringe or pipette
beaker for rinsing
sulfuric acid (25 - 50%)
sodium hydroxide (25 - 50%)
ECA Water Demulsifiers
test sheets

III. PROCEDURE

- q **Fill test bottle with 100 ml of sample.**
- q **Record color, pH, odor, turbidity, etc.**
- q **Adjust pH below 8.5 - 9 if necessary.**
- q **Add ECA product at various concentrations and mix well (20 shakes).**
- q **Record pH and note any change in color, floc formation, etc.**
- q **Adjust pH to 8.5 - 9 if necessary and record observations. When adjusting pH, shake bottles gently.**
- q **Monitor rate of floc growth, separation, etc. (See test sheets). Determine particle size by filtering through known micron size filters.**
- q **Repeat steps as necessary at different concentrations and pH. Try to obtain the best results as the lowest concentration.**

IV. OBSERVATIONS

The following is a list of qualitative terms used in describing test results:

- q **COLOR:** describes in terms of color and degree of darkness (dark, pale, faint, colorless).
- q **FLOCK GROWTH/OIL SEP:** describe in time (rapid, moderate, slow). Floc growth is seen as particles coagulating out of solution. Oil separations seen as a free layer of oil that rises to the surface.
- q **FLOC SIZE:** refers to the particle size and is described as large, medium, small.
- q **FLOC SETTLING:** describes whether the floc settles to the bottom, floats to the top, or splits between the two. The rate at which this occurs is also included and is referred to as rapid (immed. - 60 sec.), moderate (1 min. - 5 min.), slow (5 min. - 2 hrs.).
- q **SLUDGE VOL:** is described as the % of the total volume after appropriate settling.
- q **SUPERNATANT CLARITY:** ranges from very good to poor.
 - Very good (clear or water white)*
 - Good (clear, but slightly turbid)*
 - Fair (turbid, but more transparent than untreated).*
 - Poor (no change)*