

## PHPA POLYMER CONCENTRATION KIT

### OFI Part No. 290-00

The Polyacrylamide (PHPA) polymer used for drill solids encapsulation for the oil and gas industry has a high molecular weight (Long Chain) and is anionic (negative) in charge. To obtain the concentration of Polyacrylamide in the fluid one must first precipitate the Acrylamide molecule as a complex tin. Once the Acrylamide molecule is precipitated, a centrifuge is used to compress the precipitate into a measurable mass which is then converted into oilfield units, lb/bbl, kg/m<sup>3</sup>, etc.

#### Components:

- #153-16 Cylinder, Graduated, 25 ml x 2/10 ml, glass
- #153-19 Centrifuge Tube, 15 ml, Pyrex
- #153-25-15 Centrifuge, Portable, 2-place, 115 Volt, 6 amp
- #153-34 Pipette, 1 ml x 1/10 ml, glass
- #153-36 Pipette, 2 ml x 1/10 ml, glass
- #153-38 Pipette, 5 ml x 1/10 ml, glass
- #153-51-4 Beaker, 100 ml, glass
- #153-41 Safety Bulb, Pipette
- #168-04 Stirring Rod, 6" length, glass

#### Reagents:

- #260-08 Sodium Hydroxide sol'n, 0.2N, 8 oz
- #275-06 Hydrochloric Acid, 0.2N, 8 oz
- #290-02 Cresol Red Indicator sol'n, 2 oz
- #290-03 Stannic Chloride, 10% sol'n. 16 oz (UN3265)

#### Procedure:

1. Pour 10 ml of filtrate into a 100 ml glass beaker.
2. Add 4 drops of Cresol Red Indicator solution. The solution should turn purple.

**Note:** *Due to the potential harmful effects of swallowing chemicals, we recommend that a Pipette Safety Bulb be used with any pipette to withdraw reagents from the bottle.*

3. Titrate carefully with 0.2N Hydrochloric acid, one drop at a time while gently swirling the 100 ml glass beaker. The end point is reached when the solution turns from a red to a yellow color. If the end point is overshot, back titrate with 0.2N Sodium Hydroxide.

4. Using the 5.0 ml pipette and safety bulb, add 2.0 ml of Stannic Chloride Depolymerizer and an additional 0.5 ml for every estimated 0.5 lb/bbl of polymer in the drilling fluid. Swirl the solution by rotating the 100 ml beaker with a rapid clockwise motion for approximately 3 to 5 minutes. This swirling motion allows the 100 ml glass beaker to form a colloidal web or "Mopping up effect."
5. Pour the precipitate and the fluid from the 100 ml beaker into the 15 ml centrifuge tube. Use the glass stirring rod as a guide and dislodge any residual precipitate that might adhere to the beaker walls. Fill the opposing centrifuge tube with water or another sample as a counterbalance during high speed rotation of the centrifuge.

***Note:** It is recommended the operator wear safety glasses and stand at a safe distance during the start up and operation of the centrifuge. Allow sufficient space for the tubes to swing out and remove any objects from the perimeter of the centrifuge. Stay clear of the centrifuge during operation, but do not leave it unattended while in motion.*

6. Allow the centrifuge to run for approximately ten minutes. It is essential to operate the centrifuge the same amount of time during each test for optimal consistency.
7. After the time period is up, wait for the centrifuge to come to a complete stop. Remove the tube containing the precipitate and report the precipitate amount in ml. The glass stirring rod may be used to level off and press down the precipitate for a more accurate reading.

### **Calculation:**

$$\text{Polyacrylamide Conc., lb./bbl} = (\text{Precipitate, ml} \times 8.34) \times 42$$

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