

Procedure for Laboratory Makeup of Polymer Flocculants and Coagulants

SNF Polymer flocculants are available in three forms: emulsion, solution and powder. Coagulants are available as solutions. Laboratory makeup procedures vary depending on the form, differing in makeup concentration and manner of polymer introduction. The concentrations specified can normally be used as such in subsequent testing, although additional dilution may be beneficial in some cases. Solutions made up by these procedures should be stable for eight hours for cationic flocculants or two days for anionic flocculants and coagulants.

EMULSION FLOCCULANTS (0.5% product)¹

1. Weigh 398 g of the appropriate water into 600 mL beaker. Use the same water the customer employs for polymer makedown.
2. Shake the sample of emulsion for 5-10 seconds until the product is uniform.
3. After bubbles have dissipated from the emulsion, use a 3.0 mL disposable syringe to withdraw 0.5 mL of emulsion.
4. Empty the syringe, being careful to expel all air bubbles.
5. Wipe the outside of the syringe dry with a tissue.
6. Place the syringe on a balance and tare.
7. Draw approximately 2 mL of emulsion into the syringe and clean the outside of the syringe as before and reweigh.
8. Draw or discard emulsion as needed to reach 2.000 ± 0.05 g.
9. Start mixing the water at 800-1000 rpm, using a motor² equipped with a Jiffy Maker Model LM blade³ centered in the beaker. The motor must be capable of maintaining 800-1000 rpm when the solution viscosity increases.
10. Add the contents of the syringe quickly to the vortex.
11. Reweigh the syringe to determine the exact weight of the polymer added.
12. After mixing for 1 minute, offset the mixer to provide turbulence.
13. Continue mixing for 15 minutes.

The resultant solution should be white, translucent to opaque, and homogeneous. If threads or flecks of polymer are evident, it will be necessary to repeat the entire process.

Alternate Procedure 1: Measure 398 mL of the appropriate water as measured with a 500 mL graduated cylinder into a 600 mL beaker and add, with agitation from Step 9 above, 2.00 mL of well-mixed emulsion from a 3.0 mL disposable syringe.

Alternate Procedure 2: As in either of the above 2 procedures, substituting a Braun Mixer kitchen appliance (or equivalent) to provide agitation. Mix for 10 seconds, then set aside to age for an additional 30 minutes.

SOLUTION FLOCCULANTS (5.0% product):

1. Use a 20mL plastic syringe to withdraw 20.0 mL of solution flocculant from the sample. Wipe excess polymer from the tip of the syringe.
2. Add the contents of the syringe to a 600 mL beaker.
3. Measure 380 mL of polymer makedown water into the beaker.
4. Start mixing at 200-300 rpm, using a motor² equipped with a Jiffy Mixer Model MM blade.³ The motor must be capable of maintaining 200-300 rpm when the solution viscosity increases.
5. After mixing for 1 minute, offset the mixer to provide turbulence.
6. Continue mixing for 10 minutes, gradually increasing the speed of the mixer. Make sure that no concentrated polymer remains on the bottom of the beaker or wound around the shaft.

The resultant solution should be clear and homogeneous. If strings or globs of polymer are evident, continue mixing until homogeneity is achieved.

POWDER FLOCCULANTS (0.2% product):

1. Measure 400 mL of polymer make-up water into a 600 mL beaker.
2. Accurately weigh out 0.800 ± 0.005 g of powder flocculant onto weighing paper.
3. Start mixing at 800-1000 rpm, using a motor² equipped with a Jiffy Mixer Model LM blade³ centered in the beaker. The motor must be capable of maintaining 800-1000 rpm when the solution viscosity increases.
4. Slowly dust the powder flocculant from the weighing paper into the vortex. If clumping occurs, you must restart the procedure from step 1.
5. After polymer addition is complete, offset the mixer to provide turbulence.
6. Continue mixing for 30 minutes.

The resultant solution should be clear and homogeneous. If fisheyes or globs of polymer are evident, continue mixing until homogeneous.

COAGULANTS (5.0% product):

1. Weigh 190 g of appropriate water into a 400 mL beaker. Use the same water the customer employs for polymer makedown.
2. Withdraw from the sample bottle into a 10 mL syringe 0.5 mL of coagulant.
3. Empty the syringe, being careful to expel all air bubbles.
4. Wipe the outside of the syringe dry with a tissue.
5. Place the syringe on a balance and tare.
6. Draw approximately 10 mL of product into the syringe and clean the outside of the syringe as before and reweigh.
7. Draw or discard product as needed to reach 10.00 ± 0.05 g.
8. Start mixing the water with an appropriate mixer.
9. Add the contents of the syringe quickly to the vortex.
10. Reweigh the syringe to determine the exact weight of polymer added.
11. Continue mixing until the solution is homogeneous.

Alternate Procedure: The product may be measured volumetrically if the volume is corrected for the higher density of the coagulant.

¹ For emulsions yielding high makedown viscosity, a concentration of 0.25% can be substituted, with correction to appropriate neat emulsion weights or volumes.

² Fischer Scientific Co. Steadfast Laboratory Stirrer or equivalent, or electric drill.

³ Jiffy Mixer Co., Inc. 4120 Tigris Way, Riverside, CA 92503-4843, 1.800.560.2903