



PART I - DISSOLVING & PURIFYING

A. EQUIPMENT

1. Wash sink provided with hot and cold tap water and distilled or deionized water.
2. Balance to weigh sulfate powder.
3. Timer.
4. 100 ml. graduate.
5. Measuring spoon approximately 1 gm.
6. Mechanical system of five essential parts in series, and an identical system in parallel, inter-connected with stainless steel fittings and rubber hose.
 - a. 2-48 liter stainless steel drums with top head removed, and equipped with motor driven agitators. A water line permits filling from above.
 - b. 2-48 liter stainless steel lower drums, equipped with air vents and compressed air lines, designed to receive liquid from upper drums by gravity flow, and by closing vent and admitting compressed air to blow liquid into a third storage drum.
 - c. 2 stainless steel filter presses, Alsop 7", no. 90 pads in the lines following the lower drums, for removing precipitates from the solution.
 - d. 2 porous stainless steel filters, 35 micron-pores, for removing lint from the filter press.
 - e. 2-48 liter stainless steel drums, equipped with air vents and compressed air lines, to store the purified solution from the lower drums and deliver it by means of compressed air to the dispensers.
7. A compressed air line fitted with a pressure reducing valve, pressure gauge and pipe line filter.

B. MATERIALS

- * 1. P69 Potassium Sulfate, Reagent.
- * 2. Z19 Zinc Sulfide Powder.
- * 3. W7K Distilled, W7J Distilled, or W60B Deionized Water.

C. PROCEDURE

1. Prepare upper drum for mixing by closing drum outlet valve.
2. Fill upper drum with 40 liters distilled or deionized water.
 This quantity is indicated by a mark inside the drum. This water is at about 26°-30° C. (79-86° F.).
3. Start agitator and run for thirty seconds to impart a swirling motion to the water before adding reagents.
4. Weigh out 3486 gms. (71 lbs. 11 oz.) of potassium sulfate. Add this slowly to the drum, with agitator on, taking at least thirty seconds.
5. Add 10 gm. (10 measures) of zinc sulfide powder.
6. Agitate for ten minutes.
7. Empty mixing drum.
 - a. Turn off agitator motor.
 - b. Close outlet valve on lower drum to be used and close inlet valve on second lower drum.
 - c. Shut off air and open vent on lower drum.
 - d. Open inlet valve on lower drum.
 - e. Open outlet valve on upper drum, permitting contents to drain into lower drum.
8. Blow contents of lower drum, when full, into storage drum.
 - a. Close outlet valve and shut off compressed air on storage drum to be used.
 - b. Open vent and inlet valve on storage drum.

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C. PROCEDURE (Cont.)

8. Blow contents of lower drum, when full, into storage drum. (Cont.)
 - c. Close inlet valve and vent on lower drum.
 - d. Turn on compressed air on lower drum and then open outlet valve, blowing contents into storage drum.
9. Deliver solution from storage drum, when full, to settling room.
 - a. Close inlet valve and vent on storage drum.
 - b. Turn on compressed air and open outlet valve.
 - c. Air pressure on system 10 to 13 lbs./sq.in.

This completes the entire cycle of purification.

10. Take sample for copper determination and silicate determination according to Part II below.

PART II - SAMPLING & TESTING

**(Lancaster Process)

A. PURPOSE

Quantitative determination of metals which cause purple and green spots and/or other defects on finished screens.

Test for copper by reduced phenolphthalein method shall be considered indicative of purity of original material for copper or the effectiveness of the purification method for removal of copper.

To detect the presence of silicates in the sulfate solution, which may cause premature gelling.

B. EQUIPMENT

1. Pyrex test tubes, 25 cc. capacity, with 10 cc. level indicated.
2. Test tube rack.

C. SAMPLING PROCEDURE

1. Before each use, all test tubes must be washed with 10% nitric acid.
 2. Rinse test tubes twice with distilled or deionized water.
 3. Rinse test tube twice with 20 cc. of solution to be tested.
 4. Take a sample of 10 cc. of filtered, purified potassium sulfate solution from tap between filter and storage drum for copper test.
 5. Take a sample of about 10 cc. in a test tube of potassium sulfate solution from a dispenser for silicate in sulfate test.
- Place test tubes in rack preparatory to making tests.

D. NORMAL SAMPLING FREQUENCY

1. Three times daily.
 - a. First shift - between 7:00 and 8:00 hours.
 - b. Second shift - between 15:00 and 16:00 hours.
 - c. Third shift - between 23:00 and 24:00 hours.
2. Whenever purifying conditions or materials involved change sufficiently to possibly affect the final product.

E. TESTING OF SAMPLES

Test as soon as possible after sampling according to S.N. 34-37-61 and S.N. 34-37-61B.

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PART III - PREPARING SOLUTION
(Marion Process)

A. EQUIPMENT

1. Supply of hot and cold soft tap water and demineralized water.
2. Toledo scale (capacity 500 lb.) to weigh sulfate powder.
3. Electric clock.
4. Mechanical system for mixing and storage of solution.
 - a. One 500-gallon stainless steel mix tank equipped with a "Lightning" 2 H.P. agitator.
 - b. Two Triclover centrifugal stainless steel pumps, Model S-142-S. (One pumps solution from mixing to storage - one to pump from storage through settling room loop line.)
 - c. Two 1000-gallon stainless steel tanks for storage of prepared sulfate solution - high and low level indicators.
 - d. One Alsop filter with #90 pads in line from mix tank to storage tanks to remove solids. Filter Model SD12-WR20.
 - e. Three stainless steel micrometallic filters (35 micron pores). One in line from mix tank to storage tanks, two in parallel in feed line to settling room.
5. Check valves in loop returns and line from mix tank to storage tanks.
6. Calibrated scales to measure volumes in mix tank.
7. Barrel hoist device to empty drums into mix tank.

B. MATERIALS

1. P69 Potassium Sulfate Powder, Reagent Grade.
2. W60C Demineralized Water.

C. PROCEDURE

1. Preparation of Fresh Charge. (Starting with mix tank empty.)
 - a. Prepare tank for mixing by closing valves to drain and to mix tank pump (mix pump #2).
 - b. Fill mix tank with demineralized water to 18" mark on vertical tank wall - 436 gallons at 15.5-32.2°C. (60-90°F.).
 - c. Weigh out 252 lb. of sulfate powder in fiber drum using Toledo scale.
 - d. Transfer drum from scale to barrel hoist device and dump into sulfate tank (mix tank #2).
 - e. Agitate for 5 minutes or until sulfate powder has been completely dissolved.
 - f. Pump to storage tanks.
 - (1) Open valve to mix pump #2.
 - (2) Start pump from control panel switch.
 - (3) Open valves to proper storage tank.
 - (4) Turn off pump and close valves when mix tank level has reached level of outlet pipe.
2. Recharging Tank
 - a. Prepare tank for mixing by closing valve to mix pump #2.
 - b. Fill tank with demineralized water to 18" mark on vertical tank wall (351 gal.).
 - c. Weigh out 203 lb. of sulfate powder in fiber drum using Toledo scale.
 - d. Transfer drum from scale to barrel hoist device and dump into sulfate mix tank.

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- C. PROCEDURE (Cont.)
2. Recharging Tank (Cont.)
 - e. Agitate for 5 minutes or until sulfate powder has been completely dissolved.
 - f. Pump to storage tanks.
 - (1) Open valve to mix pump #2.
 - (2) Start pump
 - (3) Open valves to proper storage tank.
 - (4) Turn off pump and close valves when mix tank level has reached level of outlet pipe.

PART IV - SAMPLING & TESTING
(Marion Process)

A. PURPOSE

Quantitative determination of metals which cause purple and green spots and/or other defects on finished screens.

B. SAMPLING PROCEDURE

1. One 500-cc. sample bottle will be thoroughly rinsed with demineralized water.
2. The sample bottle will be rinsed with 2 500-cc portions of solution to be sampled.
3. The bottle will be filled with solution and submitted immediately to the Chemical and Physical Laboratory for analysis.
4. The sample will be taken from the recirculating line to the mixing tank after 2 - 3 minutes of operation of the pump.

C. SAMPLING FREQUENCY

One sample will be taken from each batch mixed immediately after mixing.

D. TESTING OF SAMPLE

Test as soon as possible after sampling for the following:

1. Copper - Test as per S. N. 34-37-61.
2. Iron - Report results in ppm. Iron content not to exceed 1 ppm.
3. Nickel - Nickel content not to exceed 0.25 ppm.

E. REPORTING OF RESULTS

1. In case of a rejectable batch, results are to be returned to the Mixing Room Foreman or Engineer immediately. This should not be more than 4 hours after sampling to prevent use of improper settling solutions
2. Routine results are to be returned to the Mixing Room Foreman by company mail.

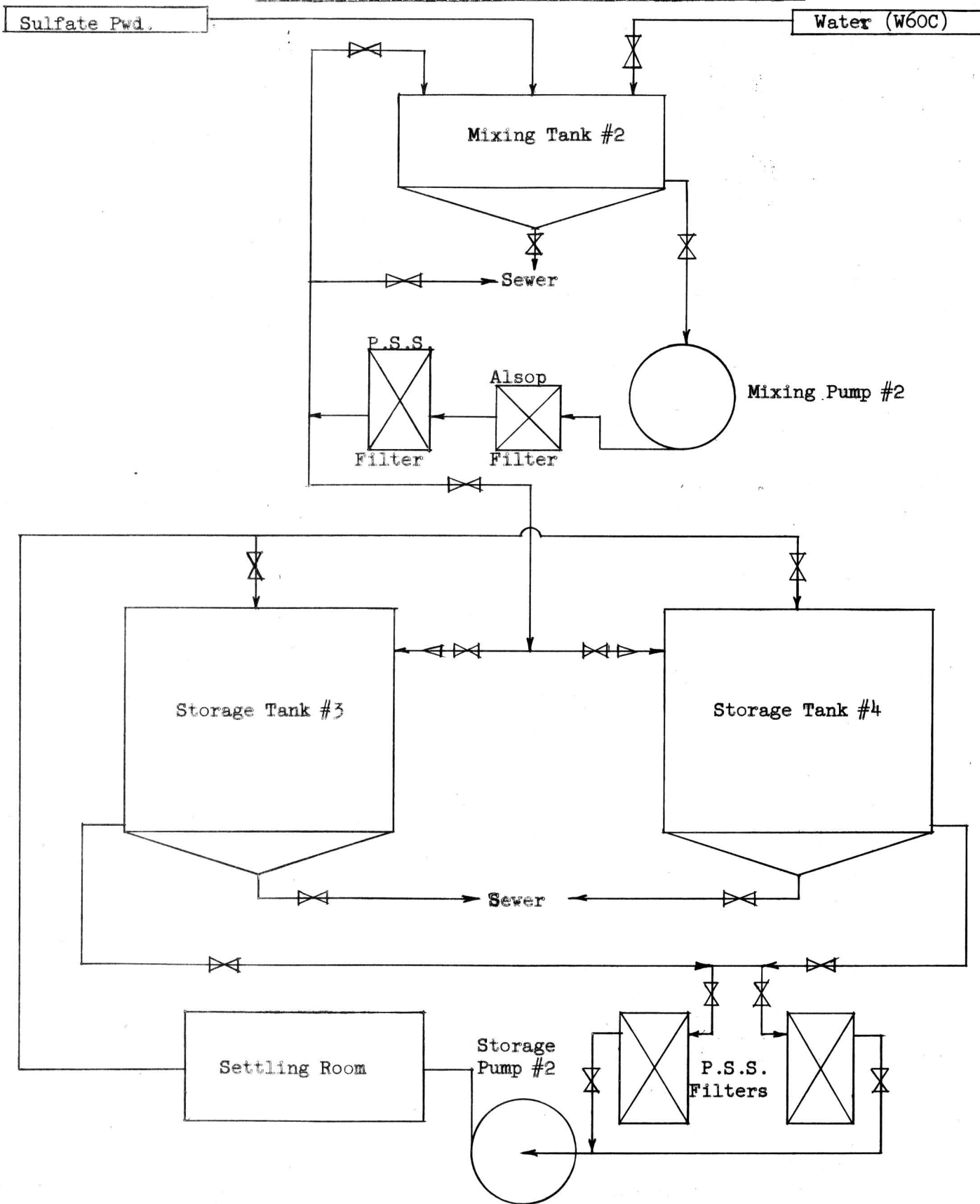
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DIAGRAM OF SULFATE MIXING SYSTEM (Marion Process)



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