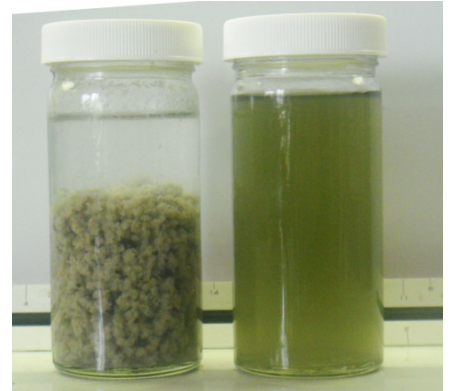


Cleaning Chemicals for Process Equipment

Integrated Engineers provided treatability services for a company that chemically cleans process equipment. They had 7 waste streams from the process onsite. The samples each contained various contaminants of alkaline solutions such as phosphates, potassium hydroxide, sodium hydroxide and sodium carbonate with trace amounts of grease, metals, nitrates, citrates, and ammonium. The treatment was conducted using Floccin™ 1106 and Floccin™ HP.

Sample #1

This sample's pH was at 10.6 and contained ammonium bi-carbonate, ammonium hydroxide, and sodium bromate and had a dark blue tint before treatment, 100 mL was treated with 5 grams of 1106 and flocculated very well leaving the water clear. The jar test with Floccin™ 1106 showed good encapsulation of the solids in the water and the pH was at 7.



Sample #2

This sample's pH was at 9.8 and contained acids, inhibitors, surfactants, ammonium hydroxide, sodium carbonate and nitrite and had a deep red color. Similarly, a 100 mL jar test using Floccin™ HP showed a good removal of the solids and the color was reduced in the water and pH was at 9.8 without adjustment.



Sample #3

This sample's pH was at 10.8 and contained tri-sodium phosphate, di-sodium phosphate, and surfactants. Treatment with the Floccin™ 1106 showed an easy separation of solids a strong flock after only 2 minutes. The dosage of the Floccin™ 1106 was 2 grams with no pH adjustment and water clarity was excellent, pH was at 7.



Sample #4

This sample's pH was at 10.5 and contained sodium carbonate and surfactants, the water was cloudy with solids floating in it. Once again treatment was done with 2 grams of Floccin™ 1106 without pH adjustment and the jar test showed good encapsulation of solids and water clarity was very good, pH was at 7.



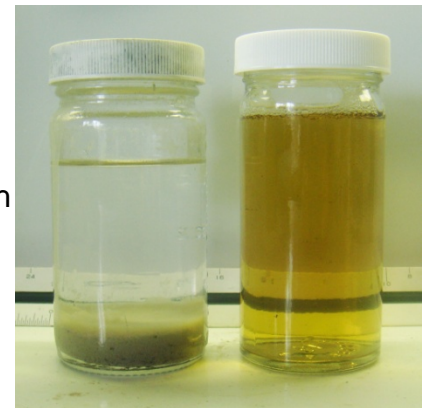
Sample #5

This sample's pH was at 12.6 and contained surfactants, sodium hydroxide and metasilicate. Treatment with 2 grams of 1106 showed excellent flock and clear water quality and the pH was at 7.



Sample #6

This sample's pH was at 0 which needed adjusting to neutral adding caustic this sample contained hydrochloric acid, ammonium bi fluoride, inhibitor, and surfactants, once they sample was set to neutral we added 4 grams of Floccin™ HP for treatment, water color cleared very well with good solids separation.

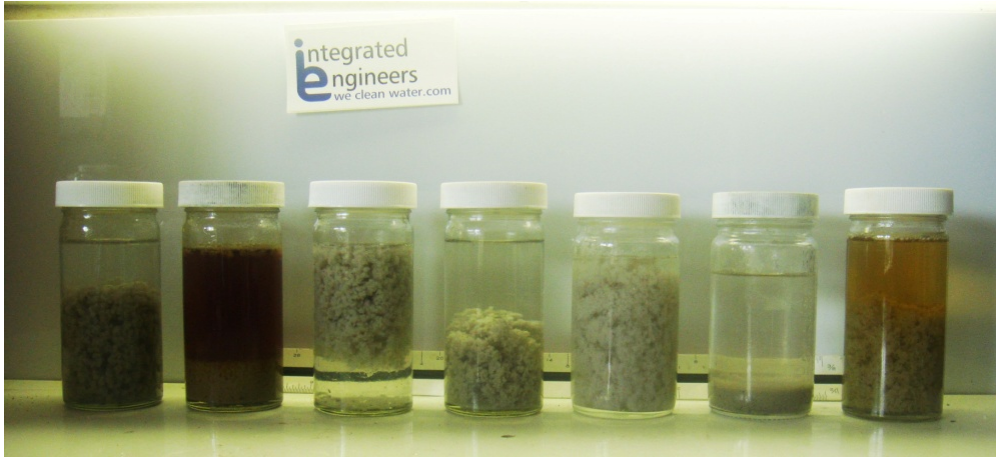


Sample #7

This sample's pH was at 12 and contained tetra ammonium-edta, hidracine, and ammonium hydroxide, the color was dark red. Treatment started by adjusting pH to 7 and added 2 grams of Floccin™ HP and flocked very well with significant reduction in color depth.



All 7 samples after individual treatment using Floccin™ 1106 or Floccin™ HP



Equalization Tank Simulation

Since the samples vary in pH range, rather than treating separately we combined all 7 into a 1000 mL test jar, in amounts of 130 mL each. The pH after mixing was at 0 due to high amount of acids, we pH adjusted to bring the water to neutral.



Conclusion: Final Treatability

We then filled a 100 mL jar and treated with 2 grams of HP. The treatment went very well with significant solids reduction, settling time was in a matter of seconds.

In conclusion the waste water can be combined in an equalization tank, pH adjusted to neutral and treated with the Floccin™ HP. In the final treatment 2 grams of Floccin™ HP to 100mL will quantify to 167 lbs/1,000 gallons.

