

Alkaline cleaners are powerful tools in aqueous parts-cleaning processes. These cleaners are chemical blends consisting of alkaline salts, wetting agents, and sequestrant (chelating) agents. Alkaline cleaners, with the proper mechanical action, are very effective at removing contamination from parts, however they must be monitored. If they are not monitored, then higher levels of alkalinity in fluids can damage or discolor certain material, such as aluminum which turns dark when the concentration ratio is too strong.

Each day, the operators and maintenance engineers in manufacturing plants must determine if the correct ratio of alkaline cleaning product is evident in the wash bath. In order to assure the proper level exists, a consistent procedure must be followed to assure the washing process remains repeatable. If the same procedure is not followed, then the washing process is not consistently repeatable and part rejection becomes a real possibility.

In order to properly perform such a test, the manufacturer should have a titration chart available to consult after performing the actual titration. If a chart is not readily available, there is a procedure for creating one.

How to Create a Titration Chart

Take a 10ml sample of the solution that will be tested, and then add 90ml of de-ionized water to the graduated flask with the solution. This gives the tester a 10% concentration of compound.

Using a 10-cc syringe, take exactly 10cc of the solution. Then transfer this 10cc of sample solution to the 125-ml graduated glass flask. Add de-ionized water to the 50ml mark, and swirl to mix.

Add 5 drops of methyl orange indicator to the glass flask. Swirl the flask to mix all components. The solution should turn orange. If an orange color does not appear, then there is no significant amount of cleaner.

Fill one of the 5-cc disposable syringes, to 5cc with 0.1 N Hydrochloric Acid (HCl). Slowly add the HCl to the glass flask in small increments (between 0.2 and 1.0cc). Swirl to mix after each increment. Continue adding until the pH reaches an endpoint of 4.0 and a red-pink color appears.

After determining the amount of ml of HCl it takes to turn this sample to a red-pink color, plot the points on a graph. This provides a titration chart to reference in the next step, where the alkalinity of the solution will be tested.

Hurricane Alkalinity Titration Kit

To safely follow these directions and use the Alkalinity Titration Kit, the tester will require a pair of rubber gloves and safety goggles.

First, use a clear plastic container to remove approximately 250mL of solution from the washer-cleaning tank. Make sure that the washer tank has been well agitated. Then use the 10cc-graduated syringe to transfer exactly 10cc of cleaning solution into the 125mL graduated glass flask.

Next, add deionized water to the solution. Pour to the 50ml mark on the flask, and then swirl to mix. Add 5 drops of methyl orange indicator to the flask and continue to mix. The indicator will tell if there is enough cleaner present in the solution for testing. If it turns orange, proceed on. If it does not, then there is not a significant amount of cleaner present. Now, fill one of the 5-cc disposable syringes with 0.1 N Hydrochloric Acid (HCl).

Slowly add HCl to the solution in increments of 0.2 to 1.0cc, as smaller increments yield better test results. Continue adding the HCl to the solution until a red-pink color appears in the flask. If the tester has access to a pH-testing device, the endpoint of the pH should be 4.0 when they stop adding HCl. Depending on what type of cleaning product is being used, there may be a need to refill the syringe with HCl during this process.

Once the pH endpoint has been reached and the red-pink color appears, record the total volume of HCl (1cc = 1ml) used to produce red-pink color. Now it is time to refer to the Alkalinity Calibration Curve for the product being used. Use the calibration curve to determine volume percent cleaner (horizontal axis) by plotting total volume of HCl used (vertical axis) on the calibration curve. Add more cleaning product to reach the desired level on concentration, if necessary.

The testing is now finished. Dispose of the equipment in the proper manner and rinse the flask.

By following these simple steps, repeatable chemical concentration levels will exist in each washer solution tank. That will enable consistent cleaning to take place and diminish the potential danger of part rejection.