

## Detergent Residue Testing Using a pH Meter, pH indicator, or Test Kit

The following test procedures are suitable for detecting detergent residues resulting from improper rinsing and can be used to meet laboratory accreditation guidelines and questionnaires such as the College of American Pathologist program of State water lab accreditation programs.

This also establishes compliance with:

- National Environmental Laboratory Accreditation Conference (NELAC) in 2003,
- The NELAC Institute (NLI) 2009/2016 Laboratory Standards
- National Environmental Laboratory Accreditation Program (NELAP)

### **A. pH Meter Method**

1. Rinse a small clean beaker by filling and emptying 3 times with source water.
2. Fill a 4th time and measure pH using a pH meter. Record the pH as source water pH.
3. Using a piece of cleaned glassware you wish to test, fill about 10% full with source water (10ml into 100ml beaker). Use more water if necessary to get enough water to be able to sufficiently immerse the pH meter electrode in your measuring beaker.
4. Swish water in glassware to extract residues from all possible surfaces.
5. Take pH reading with pH meter and record as glassware pH.
6. Any significant increase in pH indicates possible alkaline detergent residue. A significant change is 0.2 or more pH units on a pH meter measuring to 0.1 pH units of sensitivity. A result of less than 0.2-pH units change indicates properly rinsed glassware.

Note: If deionized water is used as the sample water, a slight amount (10-20 mg/L) of reagent grade, non-buffering salt (NaCl, CaCl<sub>2</sub>) should be added to the sample water to allow pH meter to function properly. If you want to avoid contaminating clean glassware, dump the glassware testing solution into a triple rinsed beaker and then add the non-buffering salt prior to measuring the pH with a meter.

Note regarding pH paper: detergents and surface active agents can interfere with some pH paper by causing a decrease of several pH units in reading. Please test any pH paper you

intend to use with these detergents to determine if there is any interference before adapting this procedure for use with pH paper.

You should test approximately 1% of large frequently washed quantities of glassware and 5% of smaller quantities of less frequently washed glassware, and you should rotate the types of glassware tested. Particularly try to test narrow necked volumetric flasks more frequently. Keep records of the test date, types of glassware tested and test results.

The above procedure A is effective for the following Alconox, Inc. detergent brands: ALCONOX, LIQUI-NOX, TERG-A-ZYME, ALCOJET, DET-O-JET and DETERGENT 8.

If you are testing for CITRANOX or CITRAJET detergent, please adapt the procedure to test for an acid residue and therefore determine if there is a significant lowering of 0.2 pH units as in step 6 an acid shift would indicate an acid residue.

### **B. pH Indicator Method for Alkaline Detergents**

#### 1. Materials

a. Use 0.04% Bromothymol Blue Solution (Aldrich 31,875-2), or prepare 250 mL of solution in a 400 mL beaker by dissolving 0.1 g of Bromothymol Blue (Aldrich cat no 11,441-3) in 16 mL of 0.01 N NaOH, fill with reagent grade water to 250 mL.

- 1 Select glassware to be evaluated for alkaline detergent residue, fill ½ full with reagent grade water
- 2 Swish water around the glassware to extract any residues off the sides
- 3 add 2-3 drops of 0.04% Bromthymol Blue and observe the color
- 4 A pale blue color is a failing reading indicative of an alkaline residue
- 5 A blue/green color is indicative of a passing neutral pH
- 6 A yellow color can also be passing if you water is in the pH 5.5-6.5 range

The above procedure B is effective for the following Alconox, Inc. detergent brands: ALCONOX, LIQUI-NOX, TERG-A-ZYME, ALCOJET, DET-O-JET and DETERGENT 8.

### **C. Detergent Test Kit Method for Neutral pH Anionic Detergents**

If you are testing for ALCOTABS detergent, extract a pipet or other equipment cleaned using

a minimum of 15 mL of high purity water in to a clean beaker. Test the extract using this test kit in a clean beaker. A finding of none detected confirms that there are no Alcotab residues. These kits are available from:

- 1 Chemetrics Inc. water testing kit K-9400 or I-2017 for anionic detergents, which is sensitive to 1/4 ppm. Contact Chemetrics, Inc. at 1-800-356-3072.
- 2 LaMotte Chemical water testing kit 4507-01 for anionic detergents, which is sensitive to 1 ppm. Contact LaMotte Chemical at 301-778-3100.
3. Hach Company water testing kit 143203 for anionic detergents, which is sensitive to 1 ppm. Contact Hach Company at 1-800-227-4224 or 303-669-3050.

#### **D. Conductivity test for neutral pH ionic and nonionic detergents**

If you are testing for ALCOTABS or LUMINOX detergent, please adapt the procedure to use a conductivity meter and deionized water that is sensitive to ionic detergent residue.

1. Rinse two clean beakers or containers thoroughly with deionized water which has a conductivity of below 1 uS/cm at 25 deg C.
2. Fill one container sufficiently full of water to measure the conductivity
3. Measure and record the conductivity with calibrated conductivity meter that reads in the range of at least 0.1 uS/cm to 100 uS/cm at 25 deg C.
4. Pipette with a selection of washed pipets or extract with deionized water from glassware from the clean container in to the second container to test for extracted detergent residues in to the water.
5. Measure and record the conductivity of the extracted container
6. An increase of 0.5 uS/cm or less is indicative of no significant detergent residue.

Use the kits or conductivity to test for detergent in rinse water that has passed through a Pipette or been extracted from glassware. If no detergent is detected with the kit, you can conclude that there is no interfering residue from the ALCOTABS or LUMINOX.

Thank you for your interest in *Alconox, Inc.* detergents.