

Boost N Lock - Titration

The Best Way To Project Boost N Lock Requirements

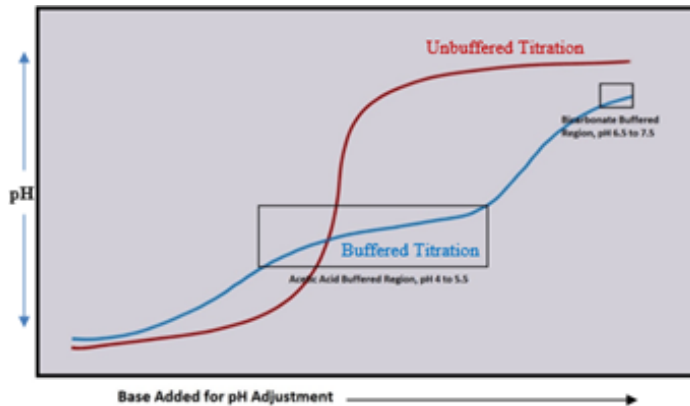


Buffering and pH Stability

TECHNICAL DISCUSSION ON PH ADJUSTMENT

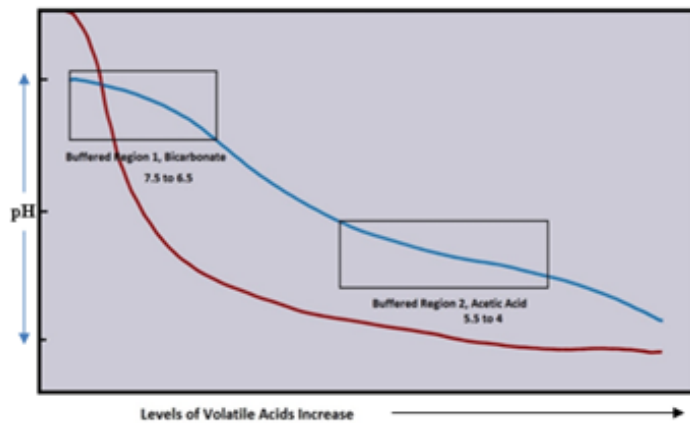
Keep in mind pH and levels of acids are not linearly related due to buffering effects, therefore you cannot know how much base will be needed to increase the pH enough easily without performing a titration, and you cannot know how quickly your pH will drop if volatile acids increase unless you perform a titration. Volatile acid and alkalinity testing will help you guess, but these do not specify what the sources of volatile acids or alkalinity are and therefore will not provide good enough information to be able to guess how much of a base you will need to add to adjust the pH in a digester to desired levels.

We recommend for all customers who order Boost N Lock or other pH adjustment products to perform a titration with a mixed digester (or other areas of concern) sample to get a much more accurate assessment of dose rates. These numbers can vary during transportation and storage so the titration should be run with a fresh sample (less than 1 day old and refrigerated for storage). A method for titration is listed at the bottom of this document for anyone unfamiliar with titrations.



The blue “buffered” graph has much less rapid changes in pH. This is particularly true in the “buffered regions”

The Red unbuffered graph’s pH will drop very quickly if volatile acids increase.



The acetic acid buffered graph (blue) flattens out between pH 4 and 5.5 when you are adjusting the pH. Levels of volatile acids like acetic acid need to be mostly neutralized before the pH will exit the buffered range. This can make it very difficult to guess how much Base you will need to add in a pH titration.



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Titration Method

Boost N Lock



Simple Titration Method for Boost N Lock or Other pH Adjustment Products

If you are unfamiliar with titrations, feel free to contact Aquafix with questions. Be Careful when handling strong bases such as Sodium Hydroxide as they can cause severe chemical burns. Boost N Lock, calcium hydroxide, magnesium hydroxide, sodium bicarbonate, sodium carbonate, and calcium oxide will not cause any problems other than minor skin irritation but ideally you should still not work with these compounds unless you are using a dust mask, and eye protection.

For Safety, we recommend performing this test using a dust mask, safety goggles, and gloves. If compound used gets on your skin, wash with soap and water. If any of these compounds get in your eyes, we recommend immediately using an eye-wash to rinse eyes for at least 15 minutes.

1. Prepare Chemicals- Make a slurry mixture of 50 g of Boost N Lock and 1000 mL of distilled water. Add the slurry to a bottle or container with cover so it can be shaken up regularly.
2. Prepare Sample to Be Tested- Collect 500 mL of well mixed (if possible) anaerobic digester sample in a 1000 mL beaker. Place the beaker on a mixing plate with a magnetic stirrer or put in a 1000 mL contain and shake to mix if necessary.
3. Add Boost-N-Lock Until Desired pH Is Achieved- Test and record the initial pH, then add 5 mL portions of the Boost N Lock Slurry to the continuously mixed beaker of digester sample. After each 5 mL addition, mix the digester sample for 3 minutes and then test and record the pH and add another 5 mL until the pH is at 7. Boost N Lock or any other slurry should be shaken or mixed before each 5 mL addition.
4. Calculate Dose Required for Full Scale Treatment- Once the pH reaches 7, the dose of 5 mL equates to 210# of Boost N Lock (or mag/calcium hydroxide) per 100,000 gallons digester volume. This means you will need to add 210 pounds of Boost N Lock per 100,000 gallons digester volume or other solid pH adjuster for each 5 mL added to the beaker.

Footnotes:

- A. This procedure can also be used for magnesium, or calcium hydroxide. Generally, we recommend increasing the pH to 6 with an inexpensive base like magnesium hydroxide and use Boost N Lock to finish the pH adjustment to improve pH stability.
- B. Dose rate can be further refined by repeating the test but only adding 1 mL at a time of pH adjustment slurry/solution. This equates to 42 pounds per 100,000 gallons.
- C. Procedure can be used for fully soluble compounds such as Sodium Carbonate or liquid pH adjusters. Different calculations may be needed for liquids

Notes:
