

Explanation of the 12.5% Sodium Hypochlorite Specification

That the excess alkalinity be between 0.15% and 0.4%. Lower excess alkalinity causes stability problems and salts to precipitate and higher excess alkalinity raises the pH too much and makes the product more corrosive to both operators and equipment in addition to causing the product to be more unstable. With a Specification, the water/wastewater plant is trying to guarantee the following:

1. That delivery is made within three (3) days from time of order.
2. That the delivery vehicle does not make a mess or contaminate the product.
3. That the Supplier has a demonstrated track record of reliability and safety.
4. That the product contains a minimum of 12.0 trade percent chlorine at the time of delivery (inclusive of any titration or analysis errors since 12.5 Trade Percent is specified). Lower strengths would save money for the Supplier but increase the expenses for the utility. Too much higher strength bleach (much over 12.5 Trade Percent) is not suitable for storage at normal Florida temperatures.
5. That the excess alkalinity be between 0.1% and 0.5%. Lower excess alkalinity causes stability problems and salts to precipitate and higher excess alkalinity raises the pH too much and makes the product more corrosive to both operators and equipment. Continuous process bleach can easily meet this Specification. A batch process plant that cannot meet the Specification for excess alkalinity will have difficulty meeting the chlorate limit and the product will lose strength too quickly because of localized overheating during the batch operation.
6. That the Supplier carefully chooses its raw materials to minimize EPA disinfection byproducts that are known or suspected carcinogens such as perchlorate, chlorate and bromate and to comply with EPA regulations as well.
7. That some effort has been made by the supplier to remove harmful metals like iron, nickel, cobalt, and copper. Metals cause decomposition, loss of strength, creation of chlorate, and creation of oxygen. Oxygen bubbles cause even more rapid decomposition and interfere with calibration and feeder equipment operation. There have even been instances of pipes bursting and sample jars exploding for very high metal bleach. The Supplier has the option to use more expensive sodium hydroxide, softened water, and/or filtering of the finished product to meet these specifications. The cost to the Supplier is small and the benefit to the water plant is significant.
8. That the same effort has been made by the Supplier to remove suspended solids (sludge). The sludge can clog up the feeders. When the sludge builds up in the tank, the tank has to be washed which creates a disposal problem. Sludge also causes the product to lose strength more quickly in addition to significantly shortening the life of the storage tank.

Most utilities have eliminated a number of operating problems by including the Suspended Solids Test in their Specification. This is a relatively quick (less than 3 minutes) and

inexpensive test that can determine the "quality" of the sodium hypochlorite (e.g., sludge and metals content). There is also a Hach Test Kit (Cat. No. 26871-00 w/TenSette Pipet Model 19700-01) that can analyze the sodium hypochlorite strength to ± 3 gpl in about five to ten minutes (e.g., to ± 0.3 Trade Percent). The kit can be purchased for about \$300 to \$400 from any Hach distributor. Call (800) 227-4224 to find the location of the nearest Hach distributor or to order the kit.

Samples that are sent to the certified lab in Ohio (a.k.a., NovaChem) should be put in the freezer overnight before being shipped via Federal Express. The samples (1000 ml and 500 ml bottles) should then be packed in a small ice chest with blue ice to ensure that the sample stays cold. This will ensure that the analytical results are accurate. Since the Supplier pays for the laboratory analysis, it will only cost the utility about \$15 for the bottles, a small ice chest, and piece of blue ice to verify whether or not the Supplier is meeting all of their specifications. Many of the analyses can be run locally and do not require an outside laboratory (e.g., Filter Test, Excess Caustic and Strength). Additional information is available from Odyssey Manufacturing and the AWWA.