

Tech Track (12-14-2010)

ALTERNATE SYSTEM MONITORING OF HYPOBROMOUS ACID

Background:

Hypobromous acid is produced by a process approved by the FDA and FSIS for use in meat and poultry processing. It is patent-pending, and has received FCN #944. In most applications it is critical to assure that the product is being produced continuously, and various methods have been suggested to monitor the solution concentration. A simple and reliable method of indirectly monitoring the concentration of hypobromous acid is suggested in this Tech Bulletin.

Chemistry:

Hydrogen bromide is diluted in a water stream and is activated by a hypochlorite source: typically sodium or potassium hypochlorite. The result is hypobromous acid with a dilute salt solution of sodium or potassium chloride. These compounds are strong electrolytes and can be measured easily by the electrical conductivity of the solution. Conductivity is measured in units called micro-seimens. TDS is a similar measurement, but the units of measure are parts per million (ppm). Typically, a TDS reading is about 60% of a micro-seimen unit. For purposes of convenience, a meter reading in TDS (ppm) units is preferred, but a Conductivity meter can be used if the meter readings are multiplied by 0.6.

Measurement of Process Water:

The conductivity or TDS of each potable water source is different at each location. The untreated potable water source should be measured and recorded at each location. This will be the background (or raw water) TDS [ppm] reading.

- a. Blend the hydrogen bromide with water and bleach according to the desired ppm required. Test the solution using the recommended test kit to assure all the solution is bromine-based with no free or excess chlorine bleach. Typically the resultant pH will be about 6.9-7.2.
- b. The TDS reading of a 200 ppm available bromine solution in distilled water will be about 200 ppm. Likewise, a 3000 ppm solution of hypobromous acid in distilled water will yield a TDS of approximately 3,000 ppm. Therefore, the simple system calculation becomes:

$$\text{Available bromine} = \text{Total TDS reading} - \text{raw water reading}$$

This simple monitoring method is not designed to validate the actual concentration of the hypobromous acid, but it is a very reliable way to monitor the efficiency and operation of the system on a routine basis. Most modern TDS monitors/controllers are supplied with carbon electrodes, which will give long and reliable service life. Additional high or low alarms can be added to alert the operation to a failure in the system. By incorporating a flow switch or flow sensing device, a good robust system will result that will alert the operator quickly of any system operational failure.