

Direct Injection Method Using Dual Dosatron Pumps

For low flow applications (< 15 gpm) such as the spraying of meat products on conveyor belts, an On-Line Reprocessing (OLR) spray cabinet or for a < 1000 head per day carcass wash, the direct injection method may be the most economical approach.

This method involves the use of two Dosatron pumps in series. One pump for the HB2 and the other for the sodium hypochlorite (NaOCl) bleach. The entire flow of water can be injected with the correct amount of HB2 and the right amount of NaOCl.

A Dosatron model D14MZ3000 (for up to 14 gpm) with polypropylene body/bell is recommended for both the HB2 and NaOCl solutions. Click on the following link for more information: <http://www.dosatronusa.com/products/product-catalogue/d14mz3000-14-gpm.aspx>

The dilution ratio is calculated as follows:

For 250 ppm as Br₂, 125 ppm Br⁻ ion is injected.

HB2 is 23.7 % Br⁻ ion.

Therefore: $237,000 / 125 = 1896:1$ (or nearest integer) is the dilution ratio for HB2/HB3

The volume of 12.5 % NaOCl is 1.8 times the volume of HB2/HB3.

Therefore: $1896 / 1.8 = 1053:1$ (or nearest integer) is the dilution ratio for 12.5 % NaOCl

The Dosatron pumps are preferentially used in series for two reasons:

- (1) If the pumps were in parallel, the presence of tees, and 90o elbows in the pipework of either circuit (HB2 or NaOCl) means there are more frictional forces than on pipework which is free of such restrictions. This induces an increased head-loss in the circuit and causes a flow imbalance as water is preferentially diverted through the circuit with the lowest head-loss.
- (2) If the source water is high in calcium hardness, introducing the HB2 first provides a depressed pH flow to the bleach pump to eliminate the possibility of problematic CaCO₃ (lime) scale formation in the bleach pump.
- (3) The system will be nearly balanced after both chemical injections and subsequent mixing/blending when the pH is in the range of 7.0-7.4. Then perform the SOP chemical analysis to assure the target bromine is reached, with no excess bleach.

(4) Although not depicted here, an efficient mixing device, such as a large filter housing (with no filter), should be used to assure accurate testing and pH measurements.

Delivery pumps must meter HB2 and NaOCl simultaneously. Pulsed flow of either reactant will result in excess (unreacted) HB2 or NaOCl, resulting in variable pH and upon testing analysis. When pulsed flow is unavoidable, a surge tank of up to 1/2 to 50 gallons capacity should be used that allows the HB2 and NaOCl to be properly mixed for 100 % activation of HB2.

Schematic of Using Two Dosatron Pumps in Series for Direct Injection of 220-300 ppm HOBr (as Br₂)

