Conductivity (TDS) Comparison of Several Stabilized Bromine Products

Background:
In recent years there has been a trend to utilize several alternative biocide programs in order to achieve a lower total dissolved solids (TDS) profile for recirculating cooling water irrespective of matrix pH. Several of the classic oxidizing biocides, such as bromine tablets (BCDMH) and activated sodium bromide (activated with sodium hypochlorite) have proven to be very effective microbiocides, but they exhibit very short half-lives in cooling water and contribute a significant amount of inert by-product salts to the water matrix due to the frequency of addition or the inefficiency of adding sodium hypochlorite in any amount. In systems that operate with high cycles of concentrations, or are restricted by the amount of dissolved solids in the blow-down water, it is imperative to the operator to reduce the extraneous amount of dissolved solids added to the cooling water.

One of the advantages of stabilized bromine is: the chemistry has been described as a "time release" product that requires less frequent additions than other bromine-based biocides. Stabilized bromine products have half-lives of 3-8 times longer (in a typical water matrix) than BCDMH or activated sodium bromide. Therefore, identifying the relative amount of dissolved solids contributed by stabilized bromine products is a valuable tool for the water technologist in determining which chemistry is best suited to their specific application. Additionally, there are significant differences in the total amount of inert by-products contributed by each type of stabilized bromine product. The results of a lab evaluation of Enviro Tech's BromMax® and Albemarle's Stabrom® and Maxxis® are presented herein.

Methods:
Freshly analyzed samples of BromMax 10.2, Maxxis and Stabrom were diluted in distilled water to yield a 40 ppm solution, reported as active chlorine (Cl2). A higher activity target level was chosen to compensate for low-dilution errors, for testing methodology purposes.

Results:

Sample	Stock Solution (ppm Cl2)	Conductivity (uS)	TDS (ppm)	% Diff
BromMax 10.2	40.0	302	196	--
Maxxis	40.0	359	233	15.88%
Stabrom 909	40.0	373	242	19.03%

Conclusion:
Based on the analytical results presented above, a representative 600 lb drum of Albemarle's Maxxis will yield 190 lbs of solids, Stabrom would yield 155 lbs of solids, and BromMax will yield 184 lbs of solids. However, when adjusted for activity differences each equivalent 600 lb drum becomes (1) Maxxis @ 216 lbs salts, (2) Stabrom @ 233 lbs salts, and BromMax @ 184 lbs. Maxxis would result in 32 lbs more salt (solids) and Stabrom 49 lbs more salt than BromMax. This additional salt contribution is quite significant for operations concerned about total TDS blow-down, especially those under strict discharge requirement limitations.

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April 9, 2008