Buckman™
Chemistry, connected.

KEEP COOLING WATER SYSTEMS RUNNING CLEAN

BSC™ 8000

Reduce fouling and corrosion

Buckman System Clean (BSC™) 8000 is a specially designed, concentrated, cleaning dispersant for use in cooling water systems.

BSC 8000 contains a unique combination of active ingredients consisting of an amine, an amide, and a nonionic surfactant. BSC 8000 is especially effective in cleaning organic deposits.

BSC 8000 functions by chemically working into the deposit matrix and loosening the deposit. The chemical action of BSC 8000 results in the dispersal and sloughing off of the matrix. Consistent use of BSC 8000 will help control deposition and underdeposit corrosion. BSC 8000 will also aid in the cleaning of heavily fouled systems.

In addition to reduced organic fouling and plugging, consistent use of BSC 8000 will help reduce inorganic deposits and associated corrosion. The reduction of scale and corrosion results from the cleaning action of BSC 8000. Deposits in a cooling system reduce the ability of corrosion inhibitors to function effectively. These deposits can also provide nucleation sites that allow crystalline growth at the heat transfer surfaces. The deposition greatly increases the potential for the formation of mineral scales, such as calcium carbonate.

The benefits derived from the use of BSC 8000 are an essential part of a total cooling water treatment program. The appropriate use of scale and corrosion control technology, in addition to the proper application of microbicides, is fundamental for overall control.

Methods of application

BSC 8000 can be formulated with water down to a 10% dilution. The actual dilution chosen should be based on the needs of the formulator. The diluted formulation should be stability tested prior to its manufacture. Care should be exercised with high alkalinity and/or high pH dilution water.

The amount of BSC 8000 used will depend on the severity of the deposition. For maintenance of clean surfaces in previously cleaned systems, BSC 8000 should be fed at a rate of 10 to 60 ppm. The product should be applied 1 to 3 days per week in slug doses. For systems that have a greater propensity to foul due to contamination, BSC 8000 should be applied at a rate of 60 to 150 ppm daily until deposits are removed. In addition to feeding BSC 8000, a corrosion inhibitor, an antiscalant, and microbicides need to be fed in order to maintain control of the cooling system. Heavily fouled systems may tend to slough large amounts of deposited material. Therefore, adequate precautions should be taken to prevent plugging screens, small lines, and heat exchangers.

BSC 8000 may cause some foaming when fed at high levels. At normal use levels, the product will generate a small amount of unstable foam that should not be troublesome. BSC 8000 should not be fed in conjunction with glutaraldehyde. Feed BSC 8007 instead.

Results of BSC 8000 treatment are indicated in Figures 1, 2, and 3. In Figure1 the results of a laboratory studies indicate that BSC 8000 was effective against a bacterial biofilm versus a negative (blank) control when tested on glass, stainless steel (SS) and plastic; in Figure 2 against an algal biofilm. Figure 3 provides results from a study using bacteria that were isolated from a cooling tower, grown into a biofilm in SS tubes, and then treated with either BSC 8000 or a competitive biodispersant at 75 ppm (as product). BSC 8000 significantly outperformed the competitive product.

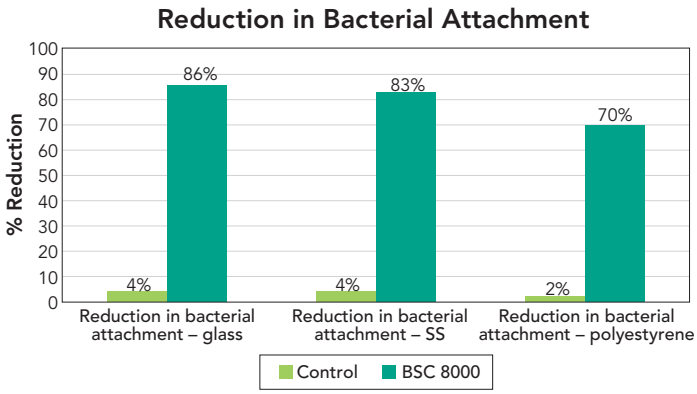

Figure 1. Reduction in bacterial attachment—tests were conducted separately to determine which aspect the dispersant impacts. The medium was dilute nutrient broth which was circulated continuously in a microbial fouling reactor. Bacterial growth (*Pseudomonas*, *Enterobacter*, pigmented bacteria, *Escherichia coli*, *Bacillus subtilis*) was allowed to continue until the biofilm uniformly covered the test surfaces in the reactor. At that point 50 ppm of BSC 8000 was introduced into the reactor. Samples were drawn after 18 h exposure. Removal of biomass was determined gravimetrically (as dry weight).

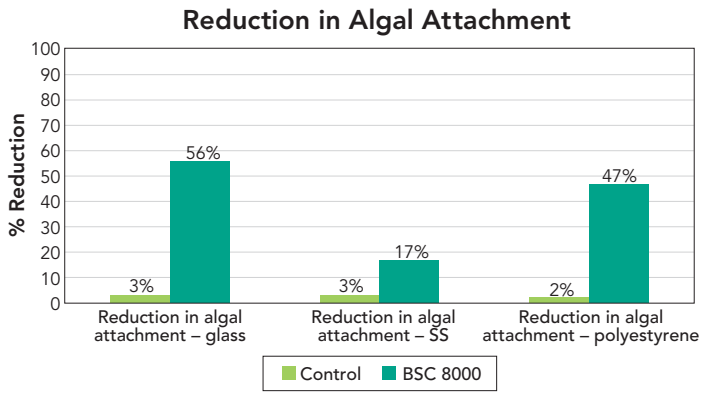

Figure 2. Reduction in algal attachment—tests were conducted separately. Growth salts were used from Allen's medium and allowed to circulate in a continuous flow reactor. The temperature was maintained at 25°C. First, the algae were allowed to grow up under constant lighting until the test surface was coated uniformly and completely. At that point they were treated with 50 ppm BSC 8000. Exposure time was 24 h. The percent differences were determined gravimetrically.

Reduction in a deposit that contained bacteria from a cooling tower.

BSC™ 8000

- 60% concentrate
- Metal-free
- Eco-friendly
- Compatible with chlorine and other oxidizers.

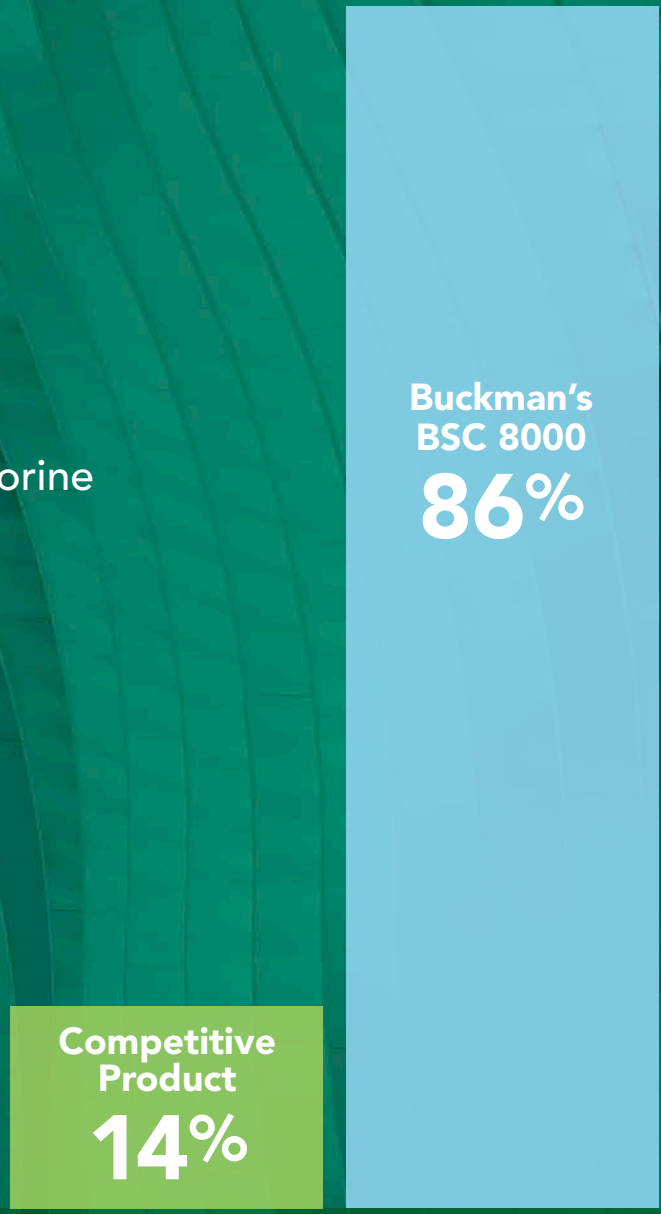

Figure 3. Percent Biomass Reduction—BSC 8000 vs. Competitive Product

Bacteria were isolated from cooling water (pH 8.2, 312 ppm Ca as $CaCO_3$) sampled at a chemical manufacturing plant and subcultured in dilute tryptic soy broth supplemented with D-glucose. After the bacteria were grown to mid-log phase, they were harvested and introduced to synthetic cooling water chemistry similar to the field cooling water. This cooling water was maintained at 35°C and recirculated through 316 stainless steel tubes. The bacteria were allowed to produce and deposit a biofilm which coated the tubes uniformly. At that point either BSC 8000 or a competitive organic dispersant was added at same product concentration (75 ppm as product). The effect was measured the next day. Biomass removal was determined gravimetrically. The results are represented in the bar graph and illustrate a significant difference in performance.

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