

## Startup Guide

### ***The Original Single-Feed, Ready-To-Use, Stabilized Liquid Bromine Biocide Based on Bromine Chloride***

Product activity is 11% as BrCl - equivalent to approximately 15% as Br<sub>2</sub> or 7% as Cl<sub>2</sub>.

#### **Applications:**

- STABROM 909 biocide is EPA-registered for use as a fungicide, algicide, slimecidic and microbiocide in commercial and industrial recirculating cooling and process water systems, heat transfer systems (such as hydrostatic sterilizers and retorts, pasteurizers and warmers, and batch and continuous cookers), industrial once-through cooling water systems, pulp and paper mills, wastewater systems, containerized ponds and decorative fountains, and air washers and industrial scrubbing systems.
- This product is a cost-effective alternative to both oxidizing and non-oxidizing biocides for biofilm control. It is EPA-registered to control biofilm deposits from pumps, pipework, heat exchangers and filters associated with industrial water treatment systems.

#### **Expectations:**

- STABROM 909 biocide provides the microbiological control expected of an oxidizing biocide combined with the penetrating ability of a non-oxidizing biocide.
- STABROM 909 biocide controls biofilm and maintains clean cooling tower surfaces.
- STABROM 909 biocide provides reduced scale and corrosion-inhibitor degradation, and decreased system corrosion rates compared with other halogen-based programs.
- Most systems will experience an initial clean-up phase for approximately one month, if the previous biocide program has been ineffective in removing and controlling biofilm. This will result in higher microbiological counts in the bulk water and a higher dose demand for STABROM 909 biocide during that phase, but both will decrease as the system lines out.

#### **Feeding:**

- It is recommended that the product be fed to the tower basin or to a recirculating or make-up water line. STABROM 909 biocide can be target-fed ahead of, or as close as possible to, the microbiologically fouled area. Multiple feed points will provide the best results in complex systems.
- To avoid scaling at the point of injection in systems with high-hardness water, the product should be fed where there is adequate water flow volume and good mixing.
- To avoid interactions in slug-dosed, dual biocide programs, do not feed the two biocides on the same day.
- If a continuous-dosed STABROM 909 biocide is used in a dual biocide program, do not feed the neat STABROM 909 biocide with the neat alternate biocide.
- The neat product should not be fed to a small recirculation line or with neat scale and corrosion inhibitors.

#### **Recommended Feeding Equipment:**

- Conventional feeding equipment such as a diaphragm or a peristaltic pump is suitable for use with this product. Current bleach feed systems can be used if they are thoroughly cleaned and free of contaminants. The use of a degassing pump head or a positive-displacement pump will minimize the potential for pump air-lock resulting from product off-gassing.
- Avoid exposure of the product and delivery system to excessive heat and light, especially direct sunlight. Use opaque tubing or hoses and cover product-delivery areas such as sight glasses and tubing that are exposed to light/sunlight. For best results, minimize the length of the pump suction line, use a degassing pump head, increase the diameter of the suction line, and keep the suction line as cool as possible. A flooded suction line will eliminate the potential for losing prime.

**Compatible Materials of Construction:**

- At use concentration, STABROM 909 biocide is compatible with commonly used materials of construction in cooling towers.
- The neat product is compatible with titanium, Hastelloy® C-276, Monel 400, vinyl tubing, high-density polyethylene, polypropylene, PVC, Viton®, Teflon®, Tygon® tubing, chlorobutyl rubber, Hypalon®, HALAR® ECTFE, Tefzel® ETFE, W.L. Gore GORE-TEX® GR, W.L. Gore UPG Style 800, and Garlock Gylon® Styles 3504, 3500, and 3510.

**Incompatible Materials of Construction for Neat STABROM 909 Biocide:**

- Buna-N rubber, neoprene, silicone rubber, Plasite® 4300 and 3070, nylon, aluminum, brass, carbon steel, copper, stainless steel and other common metals. Use of incompatible materials can promote the exothermic decomposition of the product. In extreme cases, this could result in vigorous gas formation and over-pressurization of storage containers.

**Recommended Dosage:**

- Startup dosages are provided only as guides because required dosages depend on system demand and cleanliness. Most systems will experience an initial clean-up phase that will result in initial higher dose demands. It is the user’s responsibility to determine the required dosage to achieve target microbiological control.
- Application of 4 fl oz of STABROM 909 biocide to 1,000 gallons of water yields a maximum of 6.4 ppm as total bromine (approximately 2.8 ppm as total chlorine) but a higher dosage may be required to provide the desired bromine level throughout the system.

**Startup**

- In an intermittent-feed application, apply sufficient STABROM 909 biocide to achieve a total residual bromine level of 4-10 ppm or as needed to maintain control during startup. Repeat as necessary to maintain microbiological control.
- In a continuous-feed application, control halogen residual at 2 ppm as total bromine, or as needed to maintain microbiological control during startup.

**Maintenance**

- Feed rates and residuals may be lowered after startup, depending on system demand and contamination. See Table 1 below for expected halogen residuals and dosages of the biocide per 100,000-gallon blow-down rate in a demand-free system.

Table 1

STABROM 909 Biocide/100,000 Gallon Blow Down	Approximate Total Br <sub>2</sub> Residual
1 gal	2 ppm
2 gal	4 ppm
5 gal	10 ppm

**Monitoring and Control of Residuals:**

- STABROM 909 biocide residuals are measured using the standard DPD colorimetric test for free and total bromine (or chlorine). It may be necessary to dilute the sample with deionized water prior to testing to bring the measurement within the detection range of the instrument. Because this product is stabilized, free-residual color development takes longer than with typical chlorine and bromine biocides; therefore, we recommend a minimum one-minute reaction time of the halogen residual with the free DPD reagent before recording the free halogen residual.
- Continuous analyzers such as the Hach CL 17 can be used.
- Use of ORP analyzers is not recommended. However, it may be possible to monitor STABROM 909 biocide residual using ORP analyzers with the understanding that STABROM 909 biocide’s stabilization technology reduces ORP response, resulting in lower millivolt readings than those typically observed for other oxidizing biocides such as bleach and activated sodium bromide. It is recommended that the residuals be initially tracked using DPD and ORP analyzers to establish the relationship between the two.

**Handling Requirements:**

- This product causes burns to skin and irreversible eye damage. Wear chemical-resistant gloves, eye protection and protective clothing when handling or transferring the product.
- This product is strongly basic and an oxidizing agent. Contact with organic materials such as alcohols and aldehydes, strong reducing agents, strong oxidizers, acids, and ammonia-containing products should be avoided. This product is also incompatible with some materials of construction. Please refer to the second section on this page for details. Use of incompatible materials can promote the

exothermic decomposition of the product. In extreme cases, this could result in vigorous gas formation and over-pressurization of storage containers.

- For specific safety and handling information, refer to the Albemarle Material Safety Data Sheet, which is available on request.

#### **Shelf Life:**

- To maximize product shelf life, store in a cool, dry, well-ventilated area and protect from light. This product retains 95% of its initial activity for at least one year when stored properly, at ambient temperatures (<80 °F) and protected from light.

#### **Storage Containers and Conditions:**

- STABROM 909 biocide should be stored in opaque containers to prevent exposure to light. Exposure to light, especially sunlight, accelerates product decomposition. As the product ages, activity is gradually lost and nitrogen pressure can build up in the headspace; therefore, the product should be stored in vented containers.
- Avoid freezing, excessive heat or exposure to light, especially direct sunlight. Heating of the product above what is needed for freeze protection should be avoided as it can accelerate decomposition. Temperature monitoring is recommended. Precautions should be taken to ensure that the average temperature of the products is maintained below 110 °F.

*For further information, please refer to the technical data sheet and the material safety data sheet, which are available on request.*

The information presented herein is believed to be accurate and reliable, but is presented without guarantee or responsibility on the part of Albemarle Corporation and its subsidiaries. It is the responsibility of the user to comply with all applicable laws and regulations and to provide for a safe workplace. The user should consider any health or safety hazards or information contained herein only as a guide, and should take those precautions which are necessary or prudent to instruct employees and to develop work practice procedures in order to promote a safe work environment. Further, nothing contained herein shall be taken as an inducement or recommendation to manufacture or use any of the herein materials or processes in violation of existing or future patent.



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