

ElectroBromtm the **Green Bio Control** for **Hydrofracture Water**

Toxic chemicals, biocides, are used to control the growth of formation plugging microorganisms during Marcellus hydrofracture procedures. These products can contaminate aquifers and surface waters and are a toxic spill danger during transport, storage, and use.

ElectroBrom technology is the only effective microorganism control technology that **eliminates use of all toxic chemicals.**



The patent pending ElectroBrom was developed as a safe, cost effective means for making aqueous electrolytic bromine solution at the point of use from a harmless aqueous mixed salt solution. The produced solution is used to control growth of microorganisms. Shown in the picture is an **ElectroBrom** Model EB-60 rated at 60 pounds per day of electrolytic bromine.

Green Advantages

- Electrolytic bromine degrades back to harmless bromide ion, **no toxic chemical residue in the flowback water.**
- Electrolytic bromine is produced from a harmless solution of sodium bromide and chloride, toxicity is less than table salt, no risk of accidental spills of any chemicals during transport, in inventory, or during use.
- USEPA registered, **ElectroBrom** units are produced in USEPA registered facilities, USEPA #58616-PA-1 and 58616-AZ-1.
- **Electrolytic bromine** chemistry is effective against all microorganisms.
- **No toxic chemical feeds required!**
- Cost effective against all other biological control technologies.
- Local support, Brockway, PA, is located in the “middle” of the Marcellus gas field

ElectroBrom Equipment and Economics

For a typical hydrofracture job where 1.2 mg is injected on a daily basis at flow rates to 4,200 gpm, an ElectroBrom Model EB 60 would be supplied with a 1000 gallon accumulation tank and a dosing pump rated from 0 to 10 gpm so as to be able to provide a bromine dose of 5 mg/l at up to 4,200 gpm of flow. Electrically, the ElectroBrom unit requires 3/480 – 25 amps while the dosing pump requires 1/110 – 5 amps. The only other utility required is a flow of 1-2 gpm of water at 30 psi, the salt solution will be provided in either 55 gallon drums or totes, premixed. The entire system will be mounted on an enclosed trailer for weather protection and easy movement from site to site.

Unit operation consists of setting up the unit and filling the accumulation tank prior to start of hydrofracture job. Electrolytic bromine solution would be drawn from the accumulation tank as required using the supplied metering pump. As the accumulation tank level drops from use, the ElectroBrom unit will automatically activate from a level control in the tank and produce new electrolytic bromine solution to maintain the tank at an acceptable working level. We currently have two EB-60 units which will be available for rental service in the configuration described above at a rate of \$1500 per day, which includes the delivered cost of the mixed salt solution.

Economics

We have looked at the cost to use two commercial biocides, 20% DBNPA and 50% glutaraldehyde, over the course of a four day hydrofracture job using 1.2 million gallons of water per day. With reported use levels of 55 mg/l for the DBNPA and 125 mg/l for the glutaraldehyde, and prices of \$3.50/lb and \$2.75/lb respectively, we have calculated the following biocide costs for this job as compared to the ElectroBrom unit:

20% DBNPA	\$7,700
50% Glutaraldehyde	\$13,772
ElectroBrom EB 60	\$6,000

Give us a call to reserve a system for your next environmentally sensitive hydrofracture job.

ProChemTech International, Inc.
“Innovation in Water Management”
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