



**GRISWOLD
FILTRATION**

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SBC

SCALE, BACTERIA, & CORROSION CONTROL

Consider the Benefits:

- Non-Chemical
- Controls Corrosion
- Low Power Consumption
- Environmental Friendly
- Controls and Removes Mineral Scale
- Controls and Kills Bacteria and Algae
- Improves Water Solubility
- Safe for all Metals, Plastics, and Rubber
- Significant Water and Energy Savings
- Frequency Display (Standard Feature)
- Modulation Adjustment (Standard Feature)
- pH, Conductivity & Hardness (Optional Features)
- Interface with Existing Plant Equipment & Controls
- Five Year Warranty
- Rapid Return on Investment

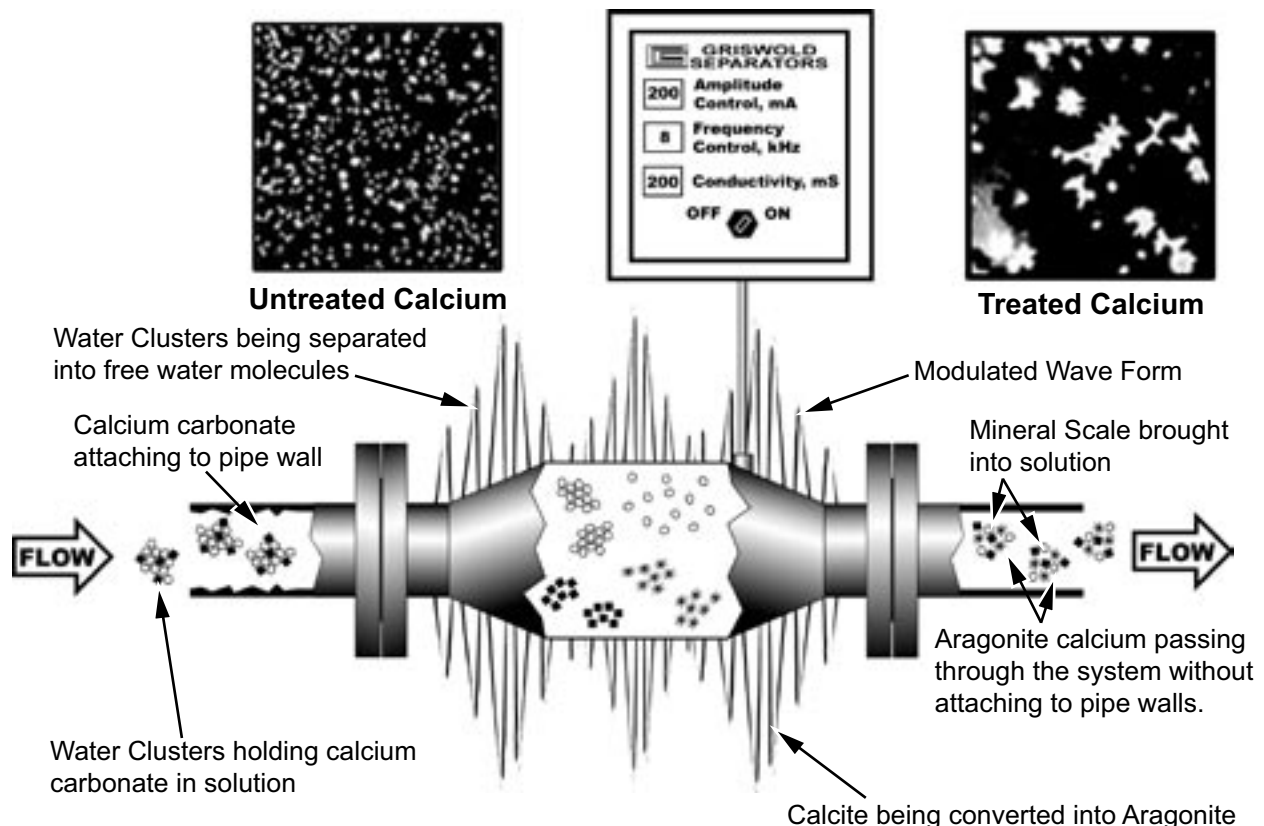
HOW IT WORKS

The Griswold Scale, Bacteria and Corrosion Controller (SBCC) generates a complex electronic signal that is applied to the water via an induction coil housed in a Sch. 80 PVC Reaction Chamber. As the water passes through the chamber, the shape, size and net charge of the dissolved mineral crystals are instantly altered. In this altered state, calcium and other hard water minerals do not precipitate in the normal fashion and adhere to surfaces.

The Griswold signal provides nucleation sites in the water that force the minerals to precipitate in solution, forming larger colloidal particles that can be removed via filtration or blowdown. In addition, natural hydrogen bonds between water molecules are fractured which results in reduced water surface tension and greater solubility. The improved solubility of treated water allows existing mineral encrustations to gradually re-hydrate and soften sufficiently to be removed by the water flow, restoring heat exchange efficiency without harsh chemical treatments.

Bacteria and algae are controlled in two ways:

- First, many of the organisms will bind up in the colloidal mineral particles and be removed via recommended filtration or simple blow-down procedures.
- Second, The Griswold signal has sufficient power to damage bacteria cell walls which renders them unable to multiply. Microbial populations are controlled well below acceptable industry standards and would be further diminished due to the electropurification process of our ultra-strong electro-magnetic signal.



Griswold Scale Bacteria and Corrosion Controller (SBCC)

Griswold Scale Bacteria and Corrosion Controller (SBCC) reduce or eliminate the need for chemical treatment of water in cooling towers, condensers, chillers, heat exchangers and boilers.

Prevents Scale Build-Up

Scale particles in the water receive an enhanced surface charge that causes them to repel from each other and from the walls of the equipment. Electrical charges on particles are reversed to prevent binding to any surface.

Eliminates Toxic Chemicals

1. No recurring chemical expense.
2. No handling and storage of hazardous chemicals on site.
3. No chemical discharge.

Reduces Corrosion

1. Reduces bio-corrosion by preventing the formation of bio-growth on vessel surfaces where bacteria can attack the metal.
2. Increases concentration ratios and TDS, the pH will stabilize from 8-9.5
3. Prolongs life cycle of equipment
4. Increased cycles of concentration in cooling systems = significant water savings.

Controls Algae and Bacteria

1. Bacteria and algae must attach to something before they can feed and reproduce. Griswold SBCC keeps the bacteria, algae, and their food dispersed in the water, off of surfaces, and away from their bio-film breeding ground.
2. Eliminate Bio-Film.
3. Higher frequency generated kills bacteria and other waterborne microorganism.

Short Payback Period

1. The combined reduction of water, chemical and energy costs is enough to pay for the Griswold SBCC (30-36 months with filtration).
2. With Griswold SBCC, the systems can run at higher concentration ratios, meaning the amount of water removed as blowdown and the corresponding sewer charges are greatly reduced.
3. With no chemicals being added, the requirements for pretreatment of blowdown are eliminated.
4. One time cost vs. recurring monthly chemicals = better profit margin.
5. Labor costs for maintaining water filtration & treatment systems will be reduced.
6. Labor costs to clean the vessel surfaces will be reduced.
7. Costs to replace corroded parts like heat exchanger tube bundles, etc. will be reduced.
8. Less downtime for equipment repairs and maintenance = increases production.
9. The Griswold SBCC requires little or no maintenance.
10. There is little electrical current flow through the electromagnetic system.
11. Reduces energy costs use through improved heat transfer efficiency.
12. Increased heat transfer from non-scaled tube surfaces = significant energy savings.
13. Easy interface with facility management hardware and software systems for centralized management.

Other Benefits

The constant battle of monitoring cooling and heating systems will become a thing of the past. Balancing the water chemistry on a daily or weekly basis is not necessary with Griswold SBCC. Cleaning of the systems will be much easier, involving a pressure wash one or two times per year, rather than extensive manual brushing and acid washing. When water systems are clean and free of deposits, heat transfer is at its most efficient. Also scale buildup in pipes creates increased roughness and reduced flow area. Clean pipes mean less energy is needed to drive pumps.

Energy costs may be reduced by up to 30%. Many municipal sewer agencies penalize and charge fees to users, because their blowdown contains hazardous chemicals and high-suspended solids, which the agencies must treat. Without chemicals in the blowdown, those fees can be avoided.

- **Unpolluted discharge from blowdown and bleed = environmental compliance.**

The workplace is safer, because the staff is not handling toxic chemicals. Cooling and heating systems are large investments that need to be protected. Griswold SBCC reduces corrosion, deposits, and harmful chemicals, all of which allow the equipment to meet or exceed life cycle expectations. Recent studies by manufactures of cooling systems indicate that systems that should last 20 years or more are lasting an average of 8 to 12 years.

Energy Savings Mechanism

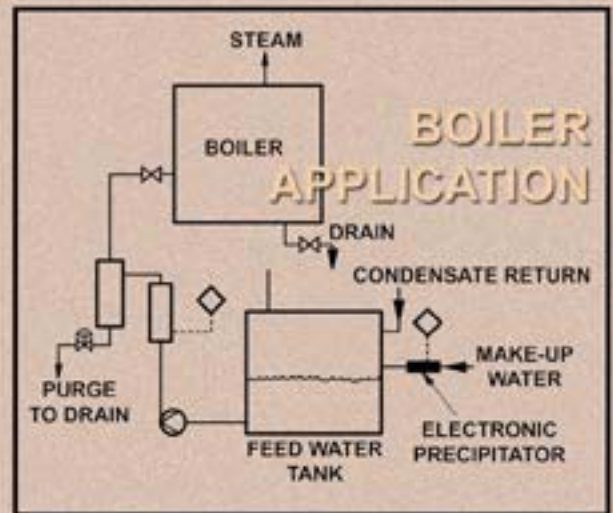
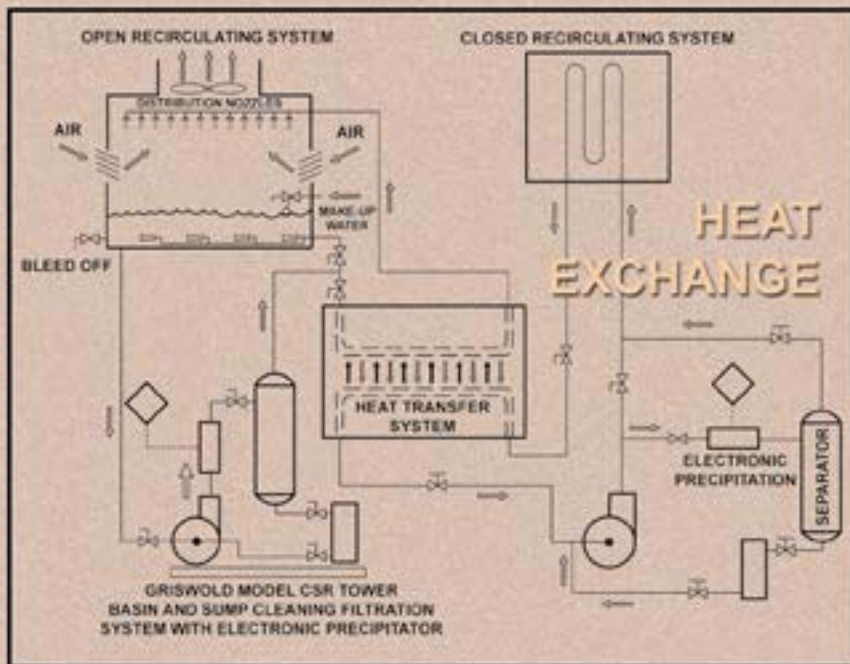
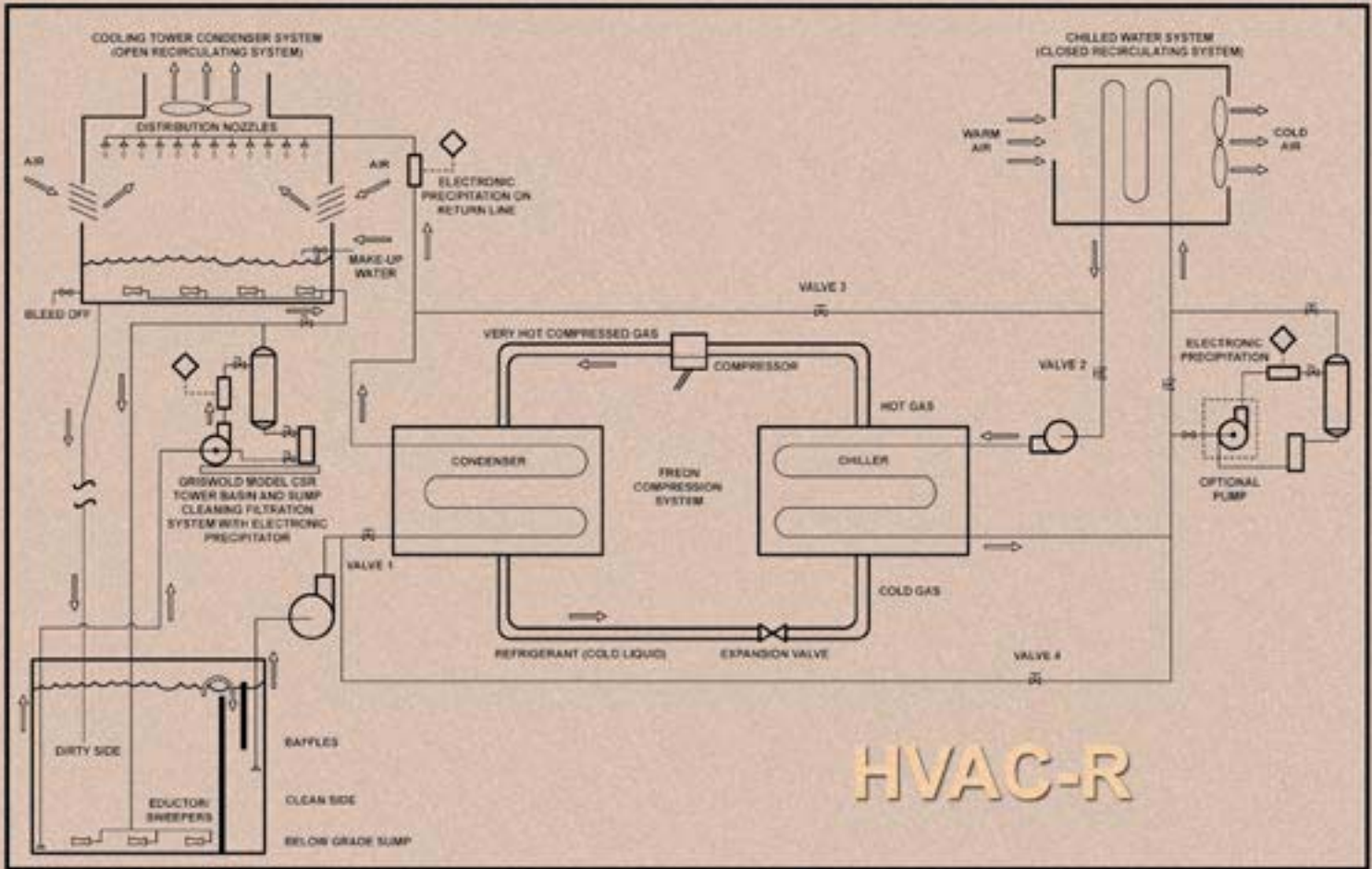
The primary energy savings result from a decrease in energy consumption in heating or cooling applications. This savings is associated with the prevention or removal of scale build-up on a heat exchange surface where even a thin film (1/32" or 8mm) can increase energy consumption by nearly 10%. Examples of savings resulting from removal of calcium-magnesium scales are shown in **table below**. A secondary energy savings can be attributed to reducing the pump load, or systems pressure, required to move the water through scale-free, unrestricted piping.

Scale Thickness (inches)	Increased Energy Consumption (%)
1/32	8.5
1/16	12.4
1/8	25
1/4	40

Example Increase in Energy Consumption as a Function of Scale Thickness*

*See Federal Technology Alerts/Non-Chemical Technologies for Scale and Hardness Control (http://www.pnl.gov/fta/11_non.htm)

INSTALLATIONS/APPLICATIONS



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