

## Heating/Cooling System Water Treatment (H/CS)

1. **Biodegrades** organic solids, required for bacterial growth, into CO<sub>2</sub> and water. Bacteria commonly found in heating/cooling systems are IRB (Iron Related Bacteria) and Legionella pneumophila (Legionnaire's Disease). H/CS contains no biocides of any kind.
2. **Does not require change out** for an expected 15 years or more on new and refurbished heating systems.
3. **Dissolves** calcium/magnesium deposits in lines, gauges, valves, reservoirs.
4. **Cleans and Lubricates** lines, sensors, gauges, traps, valves, reservoirs.
5. **All-SAFE** enzymatic action in water/propylene glycol mix from -60°C to 100°C.
6. **Treatment ratio: 25:1 (40 ml/litre).**

Heating/Cooling System Water Treatment (H/CS) quickly catalyzes all organic solids required for bacterial growth such as IRB, without itself being depleted, into a final product breakdown of CO<sub>2</sub>, water, and a miniscule biomass. H/CS has a proven capability of instantly biodegrading the bacterial food supply such as hydrocarbons, sulphates, phosphates, nitrates, and other organic compounds (bacterial food supplies the needed oxygen for promoting IRB, as well as nurturing slime deposits). The SAFE elimination of the bacterial food supply permanently resolves the IRB and the precipitated iron problem which produce large deposits and brown slime in thermal residential and commercial heating water systems.

Heating/Cooling System Water Treatment is All-SAFE in practice and has no adverse effect on humans, animals, or environments, due to its safe self-regenerating biochemistry which is Non-Toxic.

Ecotoxicity Classification: "Absolutely Non-Toxic to Wastewater Treatment Plant bacteria".

IRB (iron related bacteria) are commonly found in circulating water heating/cooling systems that contain aerobic bacteria which need oxygen, and anaerobic bacteria which thrive in an airless environment. Anaerobic bacteria in water produce the stinking gases while the aerobic bacteria break wastes down, but do not generate odour.

Although IRB are considered aerobic organisms requiring oxygen to survive, they can grow in waters with oxygen content as low as 0.01 ppm. For that reason, IRB can thrive and create problems in stagnant, idle, and low flow rate conditions. IRB can grow at temperatures ranging from 0°C to 40°C. The pH range for growth is 5.5 to 8.8. IRB are not affected by light intensity and will grow in complete darkness or in areas fully exposed to light.

Anaerobic bacteria in liquid wastes produce a variety of sulfur monoxides and dioxides, foul-smelling gases. Methane has no odour but is flammable. Carbon dioxide also has no odour but creates the environment in which the aerobic bacteria cannot live and causes the anaerobic bacteria to thrive. Carbon dioxide is motionless and ambient and will suffocate the aerobic bacteria to create the perfect environment for the anaerobic bacteria to take over. The system then becomes septic. Pumping with the H/CS and water/ propylene glycol blend at a 1:25 ratio in the heating/cooling system resolves this issue.

Legionella pneumophila is a bacterium commonly found in heating/cooling water systems causing Legionnaire's Disease, a respiratory system infection with a 10% to 20% fatality rate. LubeCorp's Heating/Cooling System Water Treatment (H/CS) prevents Legionella bacteria by biodegrading its food supply and by preventing the growth of algae and protozoa which act as a biofilm, harboring and providing favorable conditions for Legionella. Commonly, this thin layer microorganism matrix acts as a shield against traditionally used biocides yielding them ineffective.

### **Operation with H/CS**

Heating/Cooling System (H/CS) and water/propylene glycol mixture must be pump-circulated in order to promote the swift biodegradation of aerobic / anaerobic bacteria, organic solids, and IRB at the molecular level.

Existing heating/cooling systems which are heavily loaded with existing clumps of iron precipitate deposits and slime may need to be pretreated with H/CS and water only and pumped to clean out the deposits which cannot be reached at the molecular level for the catalyzing process to take place. The system should then be flushed and re-treated with the final H/CS and water/ propylene glycol blend for permanent operation. Dissolved liquids can be safely sewer disposed and solids can go to landfill disposal.