

## Application Note

### BC9 Series Electrodeless Cooling Water Bleed System

Re-circulating cooling water systems, which use the evaporative effect as a method of dissipating heat energy, increase the mineral content of the cooling water due to the concentrating effect of evaporation.

To operate these cooling systems efficiently they require an effective programme of water treatment. The primary objective of the cooling water treatment is to maintain the heat transfer efficiency by the prevention of corrosion and fouling. This is achieved by controlling the concentration of dissolved minerals and chemical dosing of corrosion inhibitors and biocides. The level of dissolved minerals is controlled by bleeding a proportion of the cooling water from the system and replacing it with fresh water. Conductivity measurement is usually employed for automatic bleeding of the cooling water, as there is a direct relationship between conductivity and the dissolved mineral content.

Corrosion inhibitor is added by a dosing pump, either on a timed basis or in proportion to the make up water.

Biocide is dosed on a time basis according to the chemical to be used.

#### Corrosion Inhibitors and their effect on Conductivity Cells

The principal corrosion process in a cooling system is an electrolytic action, which occurs due to the formation of small electrical cells on conducting surfaces. These are formed within a cooling system with many small potential differences between metal parts and the cooling water acting as an electrolyte.

Corrosion inhibitors rely upon their ability to insulate a conducting surface, thereby preventing the electrolytic action, which causes corrosion. This very action causes problems with conventional conductivity cells which have electrodes in direct contact with the solution to be measured. Contacting Conductivity cells requiring frequent cleaning to eliminate the insulating surface that is formed. A conductivity cell with a coated surface will exhibit low conductivity measurements, leading to an increasing concentration of dissolved minerals in the cooling water.



BC92 Electrodeless conductivity meter and  
ECS/24T Electrodeless conductivity sensor

The LTH Electrodeless conductivity measurement system eliminates this problem, as there is no direct electrical connection to the solution. The insulating layer formed by the corrosion inhibitor has no effect on the conductivity measurement.

The LTH BC9 series controller provides an Electrodeless conductivity measurement, which will give an accurate indication of the TDS (total dissolved solids) in the cooling water. A set point can be set over a wide conductivity range which can be used to energise the bleed solenoid valve.

### Corrosion Inhibitor Dosing

Corrosion inhibitor needs to be maintained in the cooling system at a controlled concentration. Several factors will effect the concentration of inhibitor in the cooling water, but principally it is diluted by the addition of fresh water when the conductivity bleed operates.

By monitoring the bleed relay on time, the LTH BC92 Electrodeless conductivity controller, can provide a second feed relay output, whose time is proportional to the bleed time.

This is used to operate a dosing pump to add the required amount of inhibitor.

This control method eliminates the requirement for a water meter, but still provides a proportioning dosing system.

To summarise the BC92 controller and ECS20 series sensor, provide a low maintenance, reliable conductivity measurement system, which is not affected by coating on the sensor, and a proportioning inhibitor dosing controller, in a simple low cost unit.

### Order Codes

Part No.	Description
1173	BC9 IP66 Surface mounting Electrodeless conductivity indicator controller, with single relay output.
1174	BC92 IP66 Surface mounting Electrodeless conductivity indicator controller with current output and proportional feed relay output for Cooling Tower Applications
8481	ECS22T 600 mm PVC dip assembly with ECS20T sensor.
8482	ECS/22T 1200 mm PVC dip assembly with ECS20T sensor.
8489	ECS24T Inline 1.5" Plain PVC tee assembly with ECS20T sensor
8490	ECS24T As 8489 but with 0.5" BSP Galvanised connections
8491	ECS/27T Insertion tank mounting 1.25" BSP assembly with ECS20T Sensor



These products comply with current European Directives



Certificate No. FM 13843

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