Does an open system need chemical treatment?

Cooling Towers and condenser systems are particularly vulnerable to corrosion and fouling. Read on to find out why and what to do about it.

Cooling systems for comfort air conditioning and industrial processes usually have a cooling tower. The purpose of the cooling tower is to remove heat from a circulating stream of water, sometimes referred to as condenser water. By causing some of the water to evaporate, the rate of cooling is greatly increased. This is accomplished by making the water fall in a stream of fine droplets and drawing air through the stream using a fan mounted at the top of the tower.

Loss of heat-transfer efficiency translates directly into increased cooling costs. Corrosion of condenser system components such as chillers, circulating pumps, and cooling towers can be very costly in terms of production loss, increased maintenance and equipment replacement.

Since towers contain warm water, are open to sunlight and trap a variety of life forms and nutrient sources, they are perfect breeding grounds for algae, fungi and bacteria. Some of these forms circulate throughout the condenser system, while others attach themselves to convenient surfaces. Corrosion is frequently found beneath these deposits as a result of under-deposit corrosion or direct attack from species that consume iron in order to propagate.

Cooling towers have been found to provide ideal breeding conditions for pathogenic bacteria such as Legionella pneumophila. Legionnaires' Disease is a potentially fatal form of pneumonia thought to be transmitted to humans via airborne water droplets. The forced air design of cooling towers creates droplets of the correct size to be easily drawn into heating and cooling ducts and transported to working and living areas.

What is the simplest way to prevent these kinds of problems?

- Implement a properly designed chemical treatment program to prevent metal corrosion and scale deposits, eliminate algae and bacteria growth, reduce water usage and discharge, and permit running at higher cycles of concentration
- Install and maintain a filter for the condenser water in order to assist in controlling the build up of solids in the circulating water and on internal surfaces
- Regularly test the system to ensure adequate performance of the treatment program