

# ECM™

Online Environmental Monitoring System



The pulp and paper industry generates sales of over 165 billion dollars in the United States alone, with more than 300 pulp mills and 550 paper mills in operation. According to the Corrosion Costs and Preventive Strategies in the United States report by CC Technologies Laboratories, Inc. corrosion costs the industry on average 5.92 billion dollars annually, approximately 3.6% of total U.S. sales.

In the pulp and paper industry corrosion is prevalent in every step of the production process. Acidic chemicals used at varying temperatures and pressures in the production process create ideal conditions for the formation of corrosive gases. These gases are often able to diffuse into other areas of the plant wreaking havoc with vulnerable equipment such as electronics. Tough competition in the pulp and paper industry has forced operators to reduce maintenance and equipment replacement costs through tighter control of atmospheric corrosion. One of the leading producers of paper products in the United States adopted Rohrbach Cosasco Systems Online Environmental Monitoring System (ECM) for one of their largest paper plants.

systems that incorporate proper ventilation and filtration equipment. There must also be a monitoring and control system to make sure that the air filtration systems are working properly. This proactive approach will reduce maintenance costs and reduce plant downtime. Air filtration systems are effective, but there needs to be a way to monitor the effectiveness of the system. If an air filtration system is not working properly or the filtration media needs to be replaced an online environmental monitoring system will take the guess work out of it.

Many corrosion monitoring techniques have been developed over the years but most have been designed to address corrosion in liquid media such as water and oil. For various reasons these methods are not effective ways of monitoring environmental corrosion. The competitive nature of the pulp industry demanded a product that tracked multiple variables and provided historical data that could be correlated with other process parameters to improve overall control.



ECM™ Environmental Condition Monitor with Copper and Silver Corrosion Sensors



Sulphites and sulphates are used extensively in the pulping process to reduce the raw material. Chlorine, peroxide, sulphites, and other compounds are used to bleach the pulp to attain print quality color. These highly corrosive chemicals create a by-product of acidic gases when combined with varying temperatures and pressures inherent to the production process. In gaseous form they are able to permeate control rooms and other areas where sensitive equipment is used. Even in small amounts acidic gases such as sulphur dioxide, can corrode electronic control equipment in a relatively short time, ultimately causing failure of electronic equipment.

Reducing or eliminating corrosive atmosphere relies on maintaining a stable environment through the use of air

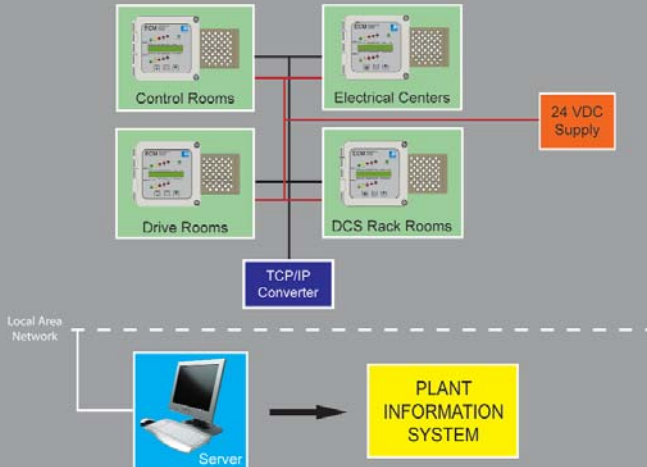
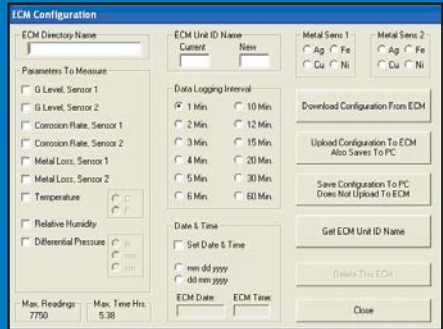
**GAIN BETTER  
CONTROL OF AIR  
FILTRATION SYSTEMS  
AND REDUCE  
REPLACEMENT  
FILTER COSTS**

Rohrback Cosasco Systems developed the ECM specifically to answer this need. The ECM is a multi-parameter environmental corrosion monitor that provides continual surveillance of the surrounding atmosphere. It uses one silver and one copper sensor to detect the severity of atmospheric corrosion while simultaneously detecting relative humidity, temperature, and differential pressure.

The ECM was originally developed as a stand alone unit, but in this case a comprehensive online system of multiple monitors equipped with data logging capability was required for integration into their Plant Information System. The ECM offered a strategic and cost effective solution that could be easily joined with the paper company's Plant Information System.

Over forty ECM's were placed in critical locations containing highly sensitive equipment such as control rooms, DCS rack rooms, drive rooms, and electric centers. They were connected to the existing LAN network via an RS232 communication cable/TCP/IP converter (see diagram below). The measured parameters on the multiple ECM units were remotely configured using RCS's ECM Data logger Software. Data was then fed into the Plant Information system for immediate analysis. Online access to this information now allows the operator to mitigate the causes of atmospheric corrosion before deterioration of process equipment can occur.

# Easily Configure Measured Parameters Through ECM Data Logging Software



Critical plant locations are continuously monitored alerting the operator of any immediate changes in the environment

In addition to pulp and paper plants, the ECM online system or a stand-alone unit can be highly effective in refineries, chemical plant, museums, and clean rooms. It conveniently displays corrosion (metal loss), corrosion rate, relative humidity, temperature, and differential pressure loss on an LCD display. The user is able to make selections and change settings through a front panel interface. In addition, the panel displays LED indicator lights corresponding to the severity levels defined by the Instrument Society of America's (ISA) standard S71.04 titled "Environmental Equipment Conditions for Process Management and Control Systems, Airborne Contaminants". The ISA has defined four severity levels for corrosive gas contaminants in computer control rooms. These severity levels

are defined as G1, G2, G3, GX (see table below). The ECM employs an audible alarm to alert the user when severe conditions arise. The alarm can be set for any of the measured parameters.

### Severity levels for corrosive gas contaminants in computer control rooms

| Severity Level                                 | G1<br>Mild | G2<br>Moderate | G3<br>Harsh | GX<br>Severe |
|--|------------|----------------|-------------|--------------|
| Copper Reactivity Level (Angstroms per month)* | <300       | <1000          | <2000       | ≥2000        |

\*Measured in angstroms after one month's exposure.

### The ECM System used as a comprehensive online system or stand alone offers the following benefits:

- Rapid detection of deterioration of the environment
- Measures nine different parameters including, corrosion rate, metal loss, relative humidity, temperature, and differential pressure
- Continuously monitors the environment and provides immediate alerts to corrosive upsets
- High sensitivity corrosion rate measurement
- Corresponds to ISA classification of environments
- LED indicators display ISA classification of environments G1-GX
- Digital and analog outputs
- Data-logging configurations
- Audible alarm alerts user of immediate process upsets

With the increasing demand of a global market, leading paper manufacturers rely on the consistent operation of their processing systems and equipment throughout their pulp and paper plants. The cost of a full or partial plant shutdown can be damaging to their overall production and distribution channel. The ECM Online Environmental Monitoring System offers a comprehensive, effective, and economical solution to atmospheric effects of corrosion and related parameters.

Rohrbach Cosasco Systems has been providing corrosion monitoring solutions for over 50 years. RCS stays the world leader in corrosion monitoring by providing the latest technology in CM systems and equipment and maintaining our commitment to excellence and quality throughout our design and manufacturing process.

### Please contact us for more information about our systems and services:



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