



CORROSIVE CONTAMINANT	ISA CLASSIFICATION			
	G1 MILD	G2 MODERATE	G3 HARSH	GX SEVERE
	0-300 Angstroms	300-1000 Angstroms	1000-2000 Angstroms	2000 + Angstroms
H <sub>2</sub> S Hydrogen Sulphide	3 ppb	10 ppb	50 ppb	50 ppb
SO <sub>2</sub> Sulfur Dioxide	10 ppb	100 ppb	300 ppb	300 ppb
CL <sub>2</sub> Chlorine	1 ppb	2 ppb	10 ppb	10 ppb
NO <sub>x</sub> Nitrogen	50 ppb	125 ppb	1250 ppb	1250 ppb
NH <sub>3</sub> Ammonia	500 ppb	10,000 ppb	25,000 ppb	25,000 ppb
O <sub>3</sub> Ozone	2 ppb	25 ppb	100 ppb	100 ppb

Note: Shaded figures indicate maximum allowable gas concentration for each ISA classification

#### **CLASSIFICATIONS:**

- MILD (G1)** An environment sufficiently well-controlled that corrosion is not a factor in determining equipment reliability.
- MODERATE (G2)** An environment in which the effects of corrosion are measurable and may be a factor in determining equipment reliability.
- HARSH (G3)** An environment in which there is a high probability that corrosive attack will occur. These harsh levels should prompt further evaluation resulting in environmental controls or specially designed and packaged equipment.
- SEVERE (GX)** An environment in which only specially designed and packaged equipment would be expected to survive. Specifications for equipment in this class are a matter of negotiation between user and supplier.

#### **METHOD OF MEASUREMENT:**

The above corrosion rates were determined from coupon tests in which silver and copper strips were exposed to the contaminant gases for 30 days

(ISA - S71.04) Environmental conditions for Process Measurement and Control Systems: Airborne Contaminants.

Specialists in Air & Gas Purification, Corrosion & Odor Control

12944 – 148 STREET, EDMONTON, ALBERTA T5L 2H8 PHONE: (780) 447-1141 FAX: (780) 447-1833



The Unisorb Canada CORROSION COUPON SERVICE is offered by Unisorb Canada to help our customers determine the degree of contamination and corrosiveness of an indoor environment. In conjunction with Unisorb Canada media testing system monitoring programs, this information is invaluable for identification and specification of corrosive conditions which may exist in sensitive electrical equipment environments.

Causes and effects of corrosion on various metals, especially silver and copper, have been studied extensively by Battelle Memorial Institute and Bell Telephone Labs. Unisorb Canada and several computer manufacturers have jointly sponsored Battelle Columbus Laboratories to carry out an in-depth environmental study on the kinetics of corrosion processes on various metals. The results of this on-going project have also helped to correlate the contaminant concentration and corrosion rates.

### **TESTING AND APPARATUS DESCRIPTION:**

The objective of the test is to expose silver and copper strips to the contaminated air in an environment of interest. After a given period of time, normally 30, 60 or 90 days, the coupons are removed and analyzed to determine the thickness of the corrosion films that have formed on the coupon surfaces. The thickness of the film is subsequently correlated with various contaminant concentrations as classified by the Instrument Society of America (ISA).

The silver and copper coupons are typically mounted on a test panel which in turn is protected by a flexiglass frame. The entire assembly is shipped in an airtight plastic bag.

### **TESTING PROCEDURE:**

Due to the sensitivity of the coupons, extreme care is required in handling the coupons to avoid contamination and to ensure test accuracy. The following procedures are recommended:

- Remove corrosion coupon assembly from the shipping material.
- Fill in the information requested on the label, especially the time and date of installation. Company name, plant and building location are also necessary for identification purposes.
- The coupon assembly should be placed vertically as close to the delicate electronic equipment as possible or in an airspace that is representative of the environment of interest. Placing coupons in direct and strong movement of air current is not recommended.
- Save the packing material, plastic bags and shipping carton for return mailing at the end of the exposure period.
- After 30, 60 or 90 days, retrieve the entire coupon assembly. Note the date and time of retrieval on the label.



### **TESTING LOCATION:**

Corrosion coupons are not designed for an outdoor area. The outside concentration is typically determined with analytical instruments such as analyzers. For an indoor application, it is necessary to choose an area that reflects the actual air quality of the environment being surveyed. Direct and strong air currents should be avoided but areas of stagnant air would also give false analysis. Generally, Unisorb recommends the coupons be placed as close as possible to the computer or electronic equipment requiring protection.

### **EXPOSURE DURATION:**

Unisorb Canada Corrosion Coupons can be exposed for 30, 60 or 90 days. Exposure time of 30 days is generally recommended for computer or control rooms without air filtration systems. For building with adequate protection, longer exposure time should be considered. Unisorb Canada is available for consulting on the exposure time of our corrosion coupons.

Return the complete coupon assembly in the original packing material to Unisorb for analysis at the following address:

Unisorb Canada  
12944 148 St  
Edmonton, Alberta  
T5L 2H8

ATTN: LABORATORY MANAGER



CLIENT: XXXX

DATE:

CONTACT:

COUPON #: 9721



SITE:

LOCATION: RC5A3F

DATE INSTALLED:

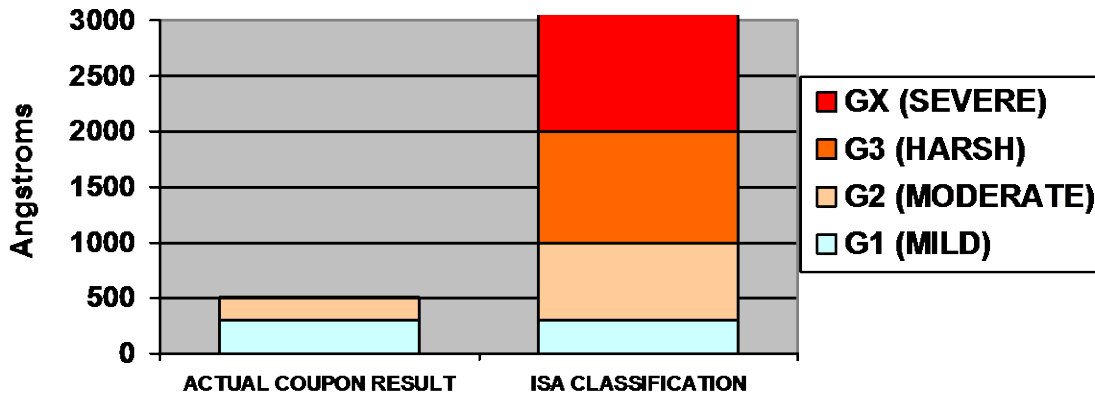
DATE REMOVED:

No. of DAYS: 30

COUPON STRIP	CHLORIDE	OXIDE	SULFIDE	UNKNOWN	TOTAL	ISA CLASS
Cu		202	302	0	504	G2
Ag	0		204	0	204	

Note: Cu = Copper Ag = Silver

### ISA Classification Coupon Graph



COMMENTS:



# Unisorb

## PRODUCT CATALOG

### CORROSION COUPON MONITORING ANALYSIS

<b>CUSTOMER :</b> XXXX	<b>DATE :</b> June 15, 200X
<b>PLANT SITE :</b> XXXX	<b>TEST DATE :</b> June 14, 200X

### CORROSION COUPON ANALYSIS REPORT ACTUAL FILM THICKNESS, ANGSTROMS

Location	Coupon #	Date Installed	Date Removed	Chloride	Oxide	Sulfide	Unknown	Total	30 day Equiv	ISA Rating	
<b>MAIN CONTROL</b>											
Control Rm.	Cu	S535	Nov 18/98	Dec 20/98		191	887	0	1078	1060	<b>G3</b>
	Ag				3731		409	0	4140	3881	
<b>DMACS Cabinet</b>											
DMACS Cabinet	Cu	S534	Nov 18/98	Dec 20/98		95	55	0	150	148	<b>G1</b>
	Ag				2238		273	39	2550	2391	
<b>GLYCOL</b>											
Glycol Heater	Cu	S533	Nov 18/98	Dec 20/98		167	776	97	1040	1023	<b>G3</b>
	Ag				1066		136	0	1202	1127	

<b>ISA CLASSIFICATION</b>			
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MILD	MODERATE	HARSH	SEVERE
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Classification based on 30 day period			

Lab Technician:

Note: Cu = Copper Ag = Silver

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## Electronic Corrosivity Monitor



### **Features:**

- **Corrosion Rate, Relative Humidity, Monitors Temperature, and Differential Pressure**
- **High-Sensitivity Corrosion Rate Measurement**
- **Corrosion Rate of Copper and Silver Sensors Corresponds to ISA Classification of Environments**
- **Digital and Analog Outputs**
- **Optional Datalogging**

The ECM™ is a multiparameter monitoring system providing constant surveillance of the environment and rapid detection of any deterioration that could result in damage to expensive equipment and valuable assets.

Early detection of humid, high temperature, or corrosive conditions will permit corrective action to be taken before substantial damage occurs to sensitive computer and instrumentation systems or electrical equipment.

The system measures humidity, temperature, and the corrosive attack on two replaceable thin-film sensors. The corrosion rate is shown by indicator lights that correspond to the ISA classification of environments (G1 through GX) for copper and silver.

Analog and/or digital outputs of corrosion, humidity and temperature information provides remote alarming, display and recording. The information may also be stored in the on-board datalogger, and accessed via PC software.

The system can also be used as a high-sensitivity corrosion monitor for special applications. The ECM™ is particularly useful for environmental monitoring in refineries, chemical plants, pulp and paper plants, control rooms, computer rooms, museums, and clean rooms.

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# Electronic Corrosivity Monitor

## Specifications:

### Measured Parameters

Corrosion: Two independent channels  
Corrosion Rate: Rate time period user selectable: 1-99 hrs.  
ISA Classification: G1 through GX  
Temperature: +32°F to +122°F or 0°C to +50°C  
Humidity: 10% to 95% RH  
Differential Pressure: Optional differential pressure transmitter, 0-2 inches or 0-50 mm (H<sub>2</sub>O) standard

### Sensors

2,500 D nominal span (life). One copper and one silver provided with instrument. Other materials available by special order.

### Displays

LCD display of corrosion and corrosion rate for each channel, humidity, temperature, and room loss differential pressure. LED indicators corresponding to ISA environmental classifications.

### Alarms

Corrosion rate (2 channels), low temperature, high temperature, low RH, high RH, differential pressure, ISA environmental classification (2 channels).

### Outputs

Analog: Five 4-20 mA outputs (current sinking or current sourcing) user assignable to desired parameters.  
Digital: RS-232 or RS-485 serial output of all nine measured and calculated parameters. Multiple units can be connected on RS485 multidrop (daisy chain). Contact factory for information concerning real time monitoring software.

### Data logging

Internal data logger accessed by software direct from PC.

### Power Requirements

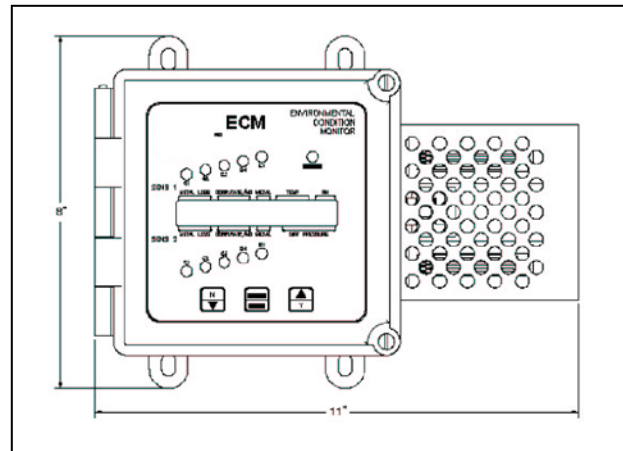
24 VDC, 115 or 220 VAC, 0.4 amps.

### Operating Temperature Range

+32°F to +122°F or 0°C to +50°C

### Weight

5 lbs. (2.3 kg)





## Unisorb Corrosion Monitoring Probes



These highly sensitive probes are used to monitor and measure corrosivity of the air for sensitive electronic and electrical equipment environments. They are designed to provide quick and accurate corrosion rates with accuracy of less than 10 angstroms. The total corrosive capacity of these probes is 2,500 angstroms, and based on normal ISA G-1 rated environments these probes will provide continuous monitoring for up to one year. Even 24 hour corrosion rates can be monitored with these probes. This allows a very economical alternative to one time throwaway type sacrificial coupons.

Either copper or silver probes are available. These probes can be used individually or in combination with each other. The copper probe is used for specific determination of ISA classification, but for situations where multiple contaminants may be present, or where there may be concern as to corrosive effects on both copper and silver contacts within the instrumentation equipment itself, it would be best to utilize both probes. For example, the silver probe will provide more specific information where chlorides are present than the copper probe will on it's own.

The probes ship in a vapor tight plastic canister, which must NOT be misplaced. The probe is to be removed, being careful not to touch the metal surfaces, and placed within the controlled environment for a minimum initial exposure of 30 days. The date of the initial installation must be recorded on the data sheet included in the canister. The corrosive effects of these probes is determined by retrieving them, noting the date and time that they are retrieved, and replacing them along with the data sheet into the canister and couriering them back for immediate analysis to:

**Unisorb Canada**  
**12944 148 St**  
**Edmonton, Alberta**  
**T5L 2H8**  
**Attention: Laboratory Manager**

Complete results and recommendation will be provided as quickly as possible and the probe will be returned for ongoing use. In some circumstances the information can be down loaded on the site.

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