Minimizing your asset and reliability losses through early corrosion detection with simplified solutions.

WWW.CORROMETER.COM

*Please contact us for*

*More information!*

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## Introduction

Thank you very much for purchasing a **CORROMETER**. The **CORROMETER** is a corrosion sensor that will let you know when environmental conditions are severe enough to cause corrosion, which are usually the "root cause" for many failures in reliability and asset losses. The **CORROMETER** is to corrosion, what the smoke detector is to fire, it will let you know that something needs to be done before your asset or electrical reliability is damaged or lost.

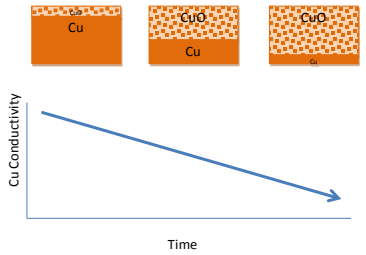
When corrosion occurs we commonly experience it as poor electrical conductivity and it usually means things like weak batteries are even less efficient at starting engines, or it may increase our power consumption and we see higher bills as a result, or it may slow down your communications and internet speeds. So the bottom line is, corrosion costs you your time or your money or both.

## How does the CORROMETER work?

Corrosion is the oxidation process of metals. The **CORROMETER** works on the principle that ALL metal oxides (most all non-electrically conductive) will grow over time. As the oxide thickness increases it decreases the electrically conductive portion of the base metal.

The usual solution to improving conductivity is to replace the part (costly and adds complications), wire brush or polish away the oxide. The bottom line is; if you want to have excellent electrical reliability, you must have an excellent bare metal-to-metal contact.

The **CORROMETER** is able to visually let you see how fast that oxide layer is growing. You will be able to measure how well your protection (or no protection) is working, or if your protection should be increased. Once you know how much protection you need, you will be able to plan and protect your assets from premature depreciation or your electrical connections from premature reliability issues and, avoid those costly repairs and unplanned service calls.




Your metal and the **CORROMETER** corrosion rate will vary depending what the conditions the metal is exposed to, for example deserts are dry and corrosion rates are low, but an island in the ocean has humid air and salt in the air which will cause a significant increase in the corrosion rates.

## What will the CORROMETER do for me?

Simply put the **CORROMETER** lets you know how corrosive the environment you put it in is. Now you can influence how fast it corrodes by protecting it with either poly films or protective coatings or volatile corrosion inhibitors etc. Basically, the **CORROMETER** will let you know how effective those products are for protecting your asset(s), that is, if you protect it like you protected the asset.

The **CORROMETER** allows you to know what the consequences are to your asset due to what **actually** happened during its environmental exposure. Whatever it might be, i.e. rain, snow-salt mixtures, spills, corrosive vapors or chemicals etc. If you apply a protective coating to your asset, then place the same coating across the exposed metal of the **CORROMETER** and it will let you know how effective that protection is, within the environment it is placed in.

The **CORROMETER** goes above and beyond temperature and relative humidity recorders. If a shipment was left out in the rain while going through Customs or sitting on a dock or tarmac, the **CORROMETER** will let you know how the rain impacted your asset.

**The CORROMETER can reduce your costs and save you money by reducing the number of replacement parts, eliminating untimely field service repairs, reducing warranty claims, packaging verification and more.**

The **CORROMETER** is your asset surveillance tool so you will know how to properly protect your assets from premature corrosion failures.

## Placing your CORROMETER

In a sun shielded location, pick an area representative of the environment you want to monitor; for example, an electrical box or in an inconspicuous area. Then secure the **CORROMETER** in place. You may use the two included straps, the double stick tape, or other means to place and secure it.

## Turning the CORROMETER "ON"

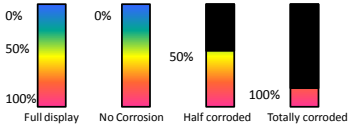
**Note:** For more accurate readings, turn the **CORROMETER** on at room temperature 25° C (77° F). If in very hot or cold locations, it is recommended to cool or warm the **CORROMETER**, whichever is applicable, before testing.

To turn "ON", press the "YELLOW" circle for 1-5 seconds.

Once activated, a colored stripe above the corroding electrode will appear. It will go from **RED** to **GREEN**. If the entire color bar goes to **GREEN**, this means there is little to no (0%) corrosion. If the color bar only shows **RED**, this means the maximum amount of corrosion

(100%) has occurred and the Corrometer has completely corroded.

## Reading the CORROMETER




## Determining Corrosion Rate

When the color goes from **GREEN** (0% or no corrosion) to **RED** (100% or totally corroded), take the number of days it took to corrode and divide by 365.25 days. This gives you the time it took for the CORROMETER to corrode in terms of a fraction of a year. Once this calculation is made, take that number and divide it into 0.15 µm (0.00000015 meters) or 5.9 µ" (0.0000059") and this will give you the corrosion rate in µm or µ"/year. **Note this is NOT mils/yr (1 mil = 0.001")**

So, for example, say it took 200 days for the CORROMETER to go from **GREEN** to **RED**; to calculate the corrosion rate, we first take:

200 ÷ 365.25 = 0.547

Next, you divide time into the thickness. When this is calculated, this will be a **NOMINAL** corrosion rate per year:

.15 µm ÷ 0.547 yr = **0.274 µm/yr**

**or**

5.9 µ" ÷ 0.547 yr = **10.78 µ"/yr**

If you use the table provided, divide the respective number that correlates to the color by the number of "DAYS EXPOSED" to determine your corrosion rate.

| | | | | |
|---|---|---|---|---|
| Metric | Take the CORROSION # | 18.25 | 36.5 | 54.75 |
| | Divide by the DAYS EXPOSED | | | |
| | Answer is: Corrosion Rate **(µ/yr)** | | | |
| English | Take the CORROSION # | 0.7185 | 1.437 | 2.155 |
| | Divide by the DAYS EXPOSED | | | |
| | Answer is: Corrosion Rate **(mils/yr)** | | | |

## Recording the Corrosion Rate

To begin record the installation and inspection dates somewhere, i.e. on the side of the **CORROMETER** and in a more permanent place like a log book.

In addition, if you have a smart phone with a 2D bar code scanning app and an inventory app, you can scan the bar code and log the days using the apps.

## DO NOT Do's

Although the **CORROMETER** has been tested to be compatible with many protective coatings, liquids and vapors, it may not be compatible with strong oxidizers or alkaline substances. It would be best to test for compatibility before using. It is the users responsibility to qualify the use and placement of the **CORROMETER**.

IMPORTANT NOTES:

- It has not been tested in areas with explosion potentials, remove device from area before testing.
- It is not intended to be used in areas where temperatures exceed 50° C (122° F) for extended periods of time (+ 4 weeks).
- For determining the most accurate corrosion rate, testing should be done at 25° C (77° F).
- It is not meant to be tested with direct salt spray, unless you are evaluating protective barrier films.
- It is not intended to be in continuous direct sunlight or flames.

## TROUBLESHOOTING

- I do not see the color indication, or I only see red, or it takes too long for the colors to appear. Check the install date, maybe it's been there a very long time, check the temperature you're testing at, it should be 25° C, or look to see if the metal patch has totally corroded away.

## FREQUENTLY ASKED QUESTIONS (FAQ)

- Does the temperature (cold and hot) affect the reading? Yes, for best results you should test as close to room temperature as possible.
- Is it water proof? It can withstand being submersed in water for short periods of time.

## RECOMMENDED PLACES TO USE

- Electrical boxes
- Aircraft, Ships & Boats
- Traffic - telecom control housings
- Wastewater - chemical treatment
- Refineries
- Motor vehicles - impacts from exposure to water
- Transoceanic shipping
- Mothballing
- Refineries
- Pipelines
- Railroad industry
- Storage
- Ocean environments
- Snow-salt wake zones
- Power generation
- Swimming pool areas
- Wherever volatile corrosion inhibitors (VCI's) are used
- HVAC
- Petroleum drill operations
- Mining

## WARRANTY

Conditions MM&D LLC. warrants this product to be free from materials and manufacturing defects under normal use for as long as you own this product. This warranty covers all of the working component parts. This warranty does not cover corrosion detection beyond what the sensor is capable of detecting, once the corroded element is gone or fully corroded a new **CORROMETER** is needed to continue monitoring. This warranty does not cover damage due to misuse, alteration, negligence, accidents or tampering with the device. Conditions Inc will replace product which are defective in workmanship or materials.

## Return Policy

Please work with an authorized distributor or contact us at www.corrometer.com to schedule a return.