

GECOR8 CORROSION RATE METER WITH MODULATED GUARD RING CONFINEMENT

A corrosion rate meter for steel in concrete to be used in large structures, which include 4 different techniques in only one equipment.

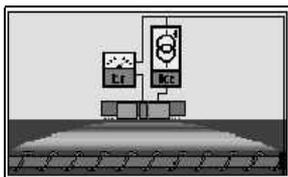
- **Mapping** is a quick method having E_{corr} and ρ .
- **Advanced Modulated Confinement Technique (MCT)** for aerial structures with guard electrical-field controllers.
- **Attenuation of Potential Technique (APT)** for measuring submerged or very wet structures.
- **Passivity Verification Technique (PVT)** for measuring the efficiency of Cathodic Protection (CP) without switching-off the current.

The equipment in addition has:

- The possibility of selection of $Cu/CuSO_4$ or $Ag/AgCl$ reference electrodes.
- Illustrative screen which helps the operator to visually follow measurements.
- Inspection management and reports editing tool.



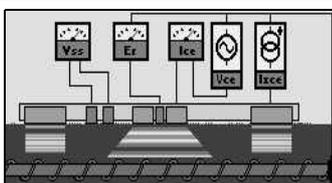
FIELD TECHNIQUES FOR CORROSION MEASUREMENT OF CONCRETE REINFORCEMENTS



Sensor B

Mapping

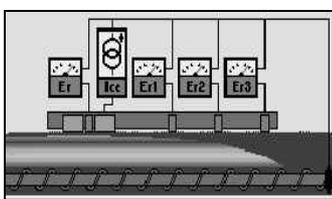
GECOR8 combines the classical mapping of E_{corr} , with a measurement of the Resistivity, ρ (unconfined galvanostatic pulse) registered in the time range of 1-2 seconds. The technique is applied through a very small sensor (sensor B), which enables mapping of each electrochemical parameter individually as well as the combination of the two parameters. The operator can change the colour code in case of single parameters but not of the combination of parameters that is part of the interpretation know-how of GECOR8.



Sensor A

Measurements in aerial structures

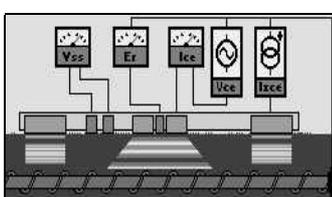
GECOR8 offers an advanced **Modulated Confinement Technique (MCT)** provided by the two reference electrodes controlling the guard ring in order to accurately delimit the area to be polarised. It measures the Polarisation Resistance (R_p , true) through a galvanostatic pulse which lasts from 30 to 100 seconds in order to reach a quasisteady-state condition. The corrosion current I_{corr} obtained is referred to the area of reinforcement below a circle delimited by the two reference electrodes which control the guard ring (guard controllers). MCT having the Guard Electrical-Field Controllers (GEFC) is the only technique able to give accurate values of I_{corr} and to minimise measurement errors in very localised corrosion.



Sensor C

Measurement in submerged or very wet structures

When the concrete is very wet, the resistivity is so low that the current may reach long distances and the area polarised is very large. In this condition an accurate confinement is only feasible using very large counter and guard ring electrodes. In order to overcome the difficulty and to avoid the use of large electrodes, **Attenuation of Potential Technique (APT)**, which is based in the monitoring of the potential attenuation with the distance has been implemented in GECOR8. The technique is applied through a longitudinal sensor (sensor C) of around 18 cm long. It has a small counter and three aligned electrical field (reference electrodes) followers, which measure the critical length, L_{crit} , and enables an accurate measurement of the R_p , true through Feliu's formula.



Sensor A

Measurement in structures with cathodic protection

The checking of the efficiency of Cathodic Protection without switching-off the current is made through the **Passivity Verification Technique (PVT)**. The technique is based in the analysis of the impedance obtained from an alternated current applied with modulated confinement (sensor A). GECOR8 gives indication on the efficiency of the CP in percentage. The structure is considered well protected when the CP shows efficiency equal or higher than 90 %.

GECOR8 CORROSION RATE METER WITH MODULATED GUARD RING CONFINEMENT

GECOR8 has four major components:

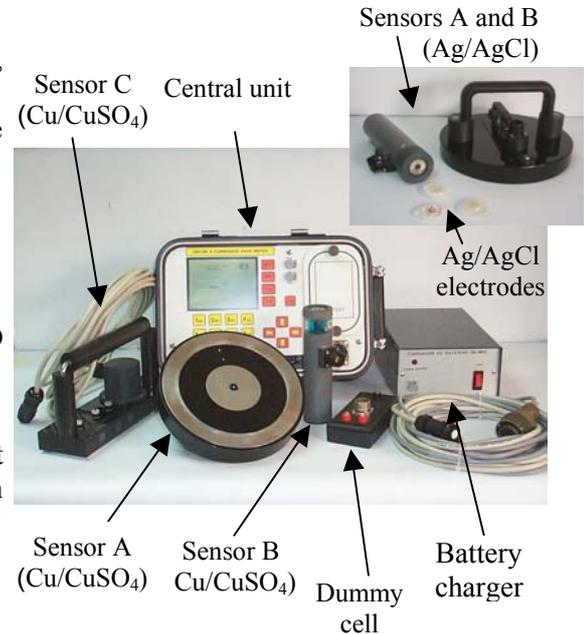
- The **Corrosion Rate Meter** is based on a potentiostat/galvanostat, controlled by a computer and powered by batteries.
- Sensor A** for measurements in aerial structures and checking the efficiency of cathodic protection.
- Sensor B** for mapping.
- Sensor C** for measurements in submerged or very wet structures.

Corrosion Rate Meter:

The G8-CRM uses $4 \cdot 10^4$ MΩ input impedance voltmeters. The LCD screen has a 320*240 points display.
 Weight: 4,5 kg; dimension: 21x31x22 cm.

Dummy cell: GECOR8 provides an additional dummy cell that verifies the correct equipment operation. Inside this cell, exists an electrical circuit that simulates the structure behaviour.

Battery: Is composed by a pack that provides on complete charge th tension of 13.7 volts with a capacity of 5 Ah.



Sensor	Method	Measurements
A	Aerial structures	Corrosion rate Corrosion potential Concrete electrical resistance
	Cathodic Protection	Corrosion potential Efficiency of protection
B	Mapping	Corrosion potential Resistivity Risk level
C	Submerged or very wet structures	Corrosion rate Corrosion potential Resistivity

Sensor A:

The G8-A-Cu or G8-A-Ag sensor contains three Cu/CuSO₄ or Ag/AgCl reference electrodes and two concentric stainless steel counter electrodes.
 Weight: 1Kg; dimension: 18cm (diameter) x 2.5 cm (tall).

Sensor B:

The G8-A-Cu or G8-A-Ag sensor contains a Cu/CuSO₄ or Ag/AgCl reference electrode and a stainless steel counter electrode with sponge pad.
 Weight: 0.160Kg; dimension: 4cm (diameter) x 14 cm (tall).

Sensor C:

The G8-A-Cu sensor contains four Cu/CuSO₄ reference electrodes and a stainless steel counter electrode.
 Weight: 1Kg; dimension: 7x23x2.5 cm.

Pre-post processing software:

It is designed for the preparation of predefined task and for an easily stored and process of all results.

