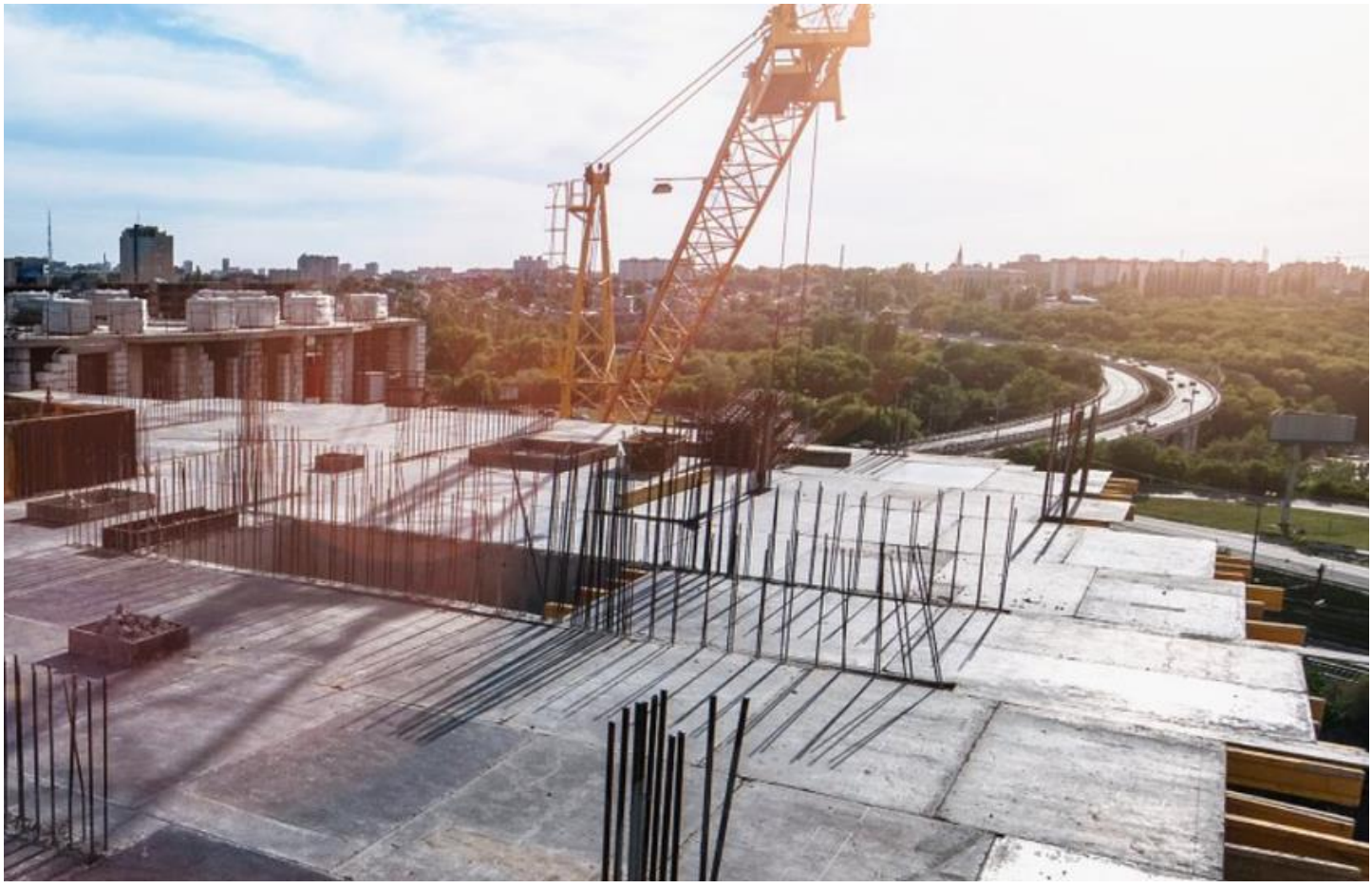
DATA SHEET

Witeklab Stable Reference Electrode (W-S-RE) Datasheet

WITEKLAB
wireless technology labs

The Witeklab Stable Reference Electrode (W-S-RE), protected by patent, is a new type of solid-state reference electrode, classified as metal/metal oxide, based in the stability of the Reduction-Oxidation Potential (ORP) of the REDOX system. This electrode has been embedded in a cement mortar for its application in measuring and/or controlling the electrical potential in the reinforcement of reinforced concrete structures.

The W-S-RE requires no maintenance and is characterized by the stability of its electrical potential and its low coefficient of variation with respect to temperature, as well as its durability over time. Unlike other electrodes, the W-S-RE exhibits great stability in its potential over time, even when its chemical environment undergoes significant variations. This electrode does not require maintenance, as the pH of the concrete pore solution remains very constant over time.



The electrode potential will not change significantly until the concrete carbonation occurs, which will show a significant jump in its electrical potential. The W-S-RE also exhibits excellent stability in its potential over time and less disturbances due to environmental electrical noise. The coefficient of variation of the potential with respect to the temperature of our electrode is negligible (-0.746 mV/ºK). Its electrical stability is mainly due to the potential of the internal reference formed with very stable REDOX pairs. Its low internal resistance, associated with the physical contact surface of our electrode with the surrounding concrete, (ionic current exchange surface of 15.8 cm^2), is much higher compared to other electrodes, making it excellent for maintaining stability in measurements.

MAIN FEATURES

1

Potential Stability:
The W-S-RE is characterized by the stability of its electrical potential over time, providing precise and consistent measurements.

2

Low Coefficient of variation:
It has a low coefficient of variation of the potential concerning temperature (for example: -0.746 mV/ºK), ensuring reliable results regardless of thermal variations.

3

Durability and Low Maintenance:
It doesn't require any maintenance and presents durability over time. Its design is based on a highly stable and long-lasting REDOX pair.

4

Versatile Applications:
Designed to measure corrosion potentials of reinforcements in reinforced concrete. Moreover, it is ideal for being part of sensor systems or multisensors, allowing the monitoring of corrosion-triggering and accelerating agents.

TECHNICAL SPECIFICATIONS

- **Type:** Solid-state Reference Electrode.
- **Material:** Metal/metal oxide system embedded in cement mortar.
- **Exchange Surface Area:** 15.8 cm².
- **Operating** Range: Stable under a wide range of environmental and chemical conditions.

ENVIRONMENTAL STABILITY

Chemical Stability: It responds to a highly stable maintenance-free cell, due to the constancy of the pH in the concrete pore solution over time.
pH Change Resistance: The electrode's potential remains always stable until concrete carbonation occurs, in this case it is capable of detecting a descend in the pH.
Low Sensitivity to Electrical Noise: Shows very low or no sensitivity to disturbances from ambient electrical noise.

INSTALLATION

In New Construction: Electrodes can be attached to the steel reinforcement bars with ties or non-metallic tape. It's advisable to secure the cable as well to prevent detachment.
In Existing Structures: They can be placed by drilling a sufficiently wide hole and filling it with mortar.

RECOMMENDED APPLICATIONS

1 **Reinforced Concrete:**
Measurement of corrosion potentials in embedded reinforcements in reinforced concrete structures.
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2 **Presence of Agents:**
Integration into sensor systems to monitor the presence of corrosive agents..

3 **Sensor Systems for Aggressive Environments:**
They can be incorporated into sensor systems or multisensor setups to monitor the presence of corrosion-triggering and accelerating agents in aggressive environments.

CALIBRATIONS

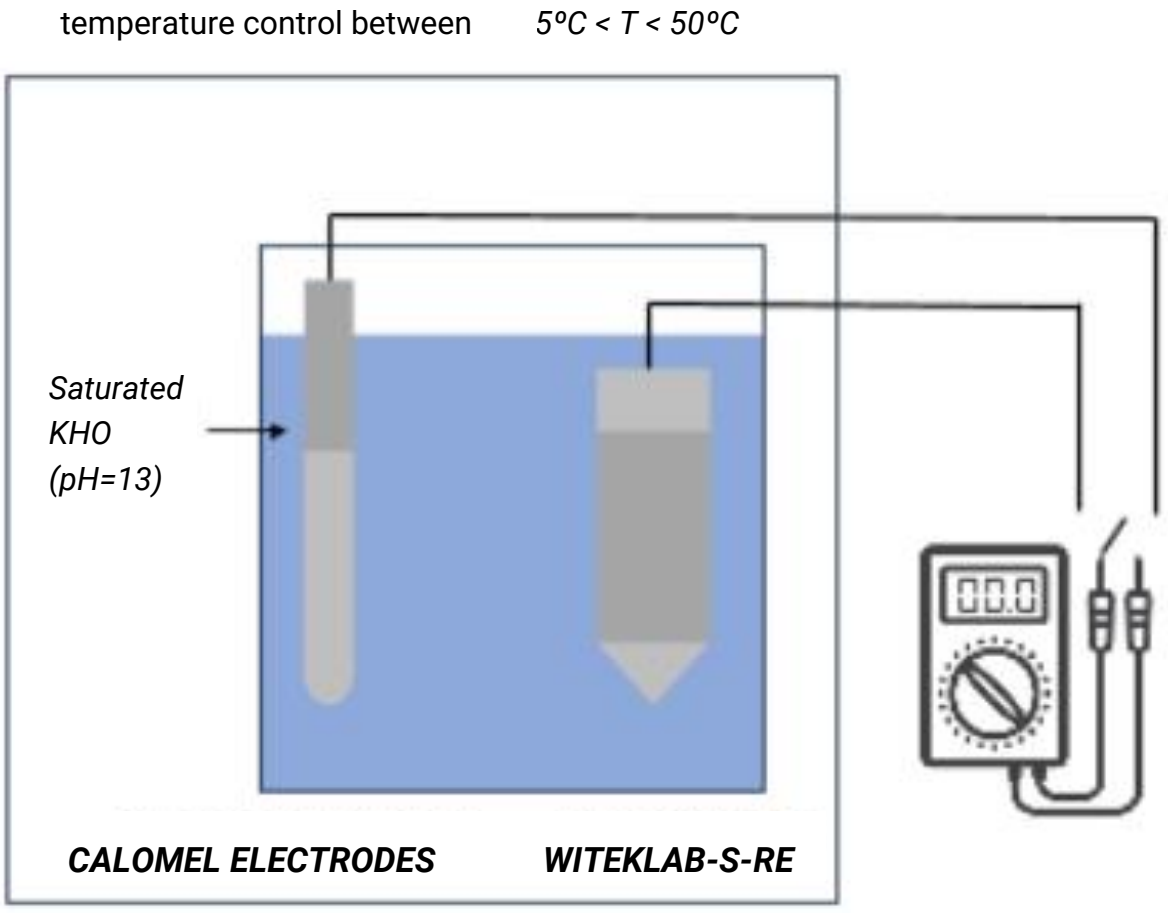
Each W-S-RE is calibrated with respect to a primary reference electrode. It can be made of hydrogen, calomel, silver/silver chloride, or copper/copper sulfate, with the calomel electrode being the most reliable.

The reference electrodes are characterized when immersed in a 0.1 M KOH solution (pH≈13) thermostated at 25°C for 15 days. The dissolution pH conditions simulate the dissolution conditions in the pores of non-carbonated concrete.

Subsequently, the electrodes undergo cycles of cooling and heating in a temperature range between 5°C and 50°C, inclusive. An average variation of the potential with temperature is obtained.

Example of measuring potential variation with temperature.

average variation of potential with temperature: -0.746 mV/K.



MODELS

W-S-RExx

W-S-RE03 (3m de cable)

W-S-RE05 (5m de cable)

PATENT PROTECTION

MANUFACTURER INFORMATION

WITEKLAB
wireless technology labs

www.witeklab.com

witeklab@witeklab.ad