

Wireless Sensor Solution for Monitoring Cathode Collector Bars in Aluminium Electrolysis Cells

Aluminium electrolysis is a fundamental process that occurs within specialized cells. These cells facilitate the transformation of aluminium oxide into pure aluminium metal through the application of electric current. Within each cell, a molten cryolite solution serves as the medium through which the electrolysis process takes place. The key components of these cells are the anodes and cathodes, both constructed from carbon materials due to their exceptional electrical conductivity.

To enable the flow of electricity into and out of the electrolysis cell, metal bars, namely anode rods and cathode collector bars, are utilized. These bars establish the crucial electrical connections required for the successful operation of the cell. By maintaining a continuous flow of electric current, this process drives the conversion of aluminium oxide into valuable aluminium metal.

Challenge

- Monitoring the integrity of cathode collector bars poses significant challenges in aluminium electrolysis cells. Over time, the carbon thickness of cathodes gradually decreases, increasing the risk of contamination and downstream production difficulties. Traditional monitoring methods, such as metal sample analysis and infrequent manual



Photo: Hydro/Manus Motroen

measurements, not only lack real-time information but also expose personnel to hazardous conditions.

- Manual measurements conducted in potline basements, characterized by high temperatures, cramped spaces, and high currents, present serious safety risks to personnel. The potential for metal runout and injury further exacerbates the dangers associated with these operations. Due to these hazards, manual measurements are often considered one of the most dangerous tasks performed in potline environments.
- Moreover, relying solely on manual measurements and metal sample analysis can lead to delayed detection of issues and subsequent production losses. The absence of real-time information on parameters such as temperature, metal content, and current hampers proactive maintenance and decision-making processes.

Solution

- Our innovative solution addresses these challenges by utilizing wireless sensor technology for cathode collector bar monitoring. With robust wireless sensors, continuous data collection becomes effortless and precise.
- Designed to withstand the extreme conditions of aluminium electrolysis cells, including high temperatures, magnetic fields, and currents, our wireless sensors ensure reliable and accurate measurements.

- By deploying our wireless sensors at critical points on the cathode collector bars, you gain real-time visibility into temperature variations and current distribution.
- Continuous temperature measurements provide early warnings of changes occurring inside the cell, enabling proactive interventions. Simultaneously, separate current measurements for each cathode collector bar offer insights into the uniformity of current distribution, facilitating the detection of potential cathode degradation.

What you get

Implementing our wireless sensor solution for cathode collector bar monitoring offers several benefits:

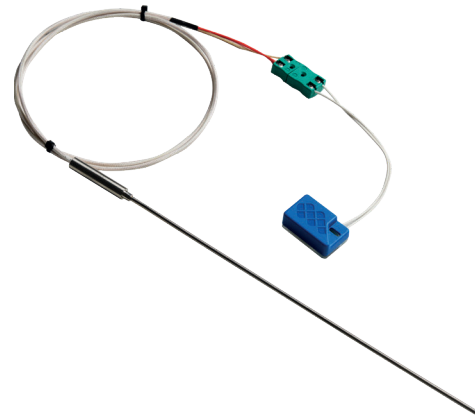
1. Continuous measurement of temperature on each cathode collector bar.
2. Continuous measurement of current passing through each cathode collector bar.
3. Detailed measurements available for up to one year in the Neuron Cloud.
4. Operator alerts for temperature deviations and current discrepancies, delivered via email, SMS, or push notifications.
5. Reduction in the time spent by operators in hazardous areas beneath electrolysis cells.
6. Extended cathode lifespan through improved understanding of cathode integrity.

Our comprehensive wireless sensor solution provides technical personnel in maintenance and metallurgy fields with an efficient and reliable approach to monitor cathode collector bars in aluminium electrolysis cells. By continuously collecting data through our robust wireless sensors, you can proactively address potential issues, minimize production losses, and ensure the safety and optimal performance of your aluminium electrolysis process.

Discover the benefits of our IoT solution and unlock the full potential of your cathodes.

Products in use

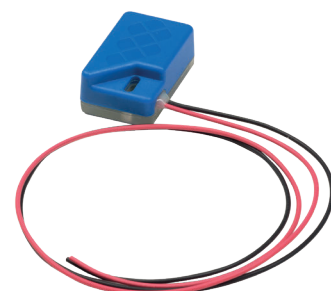
- Neuron PT100HT 25cm Probe
- Neuron PT100HT Bolt M6
- Neuron mV Digitizer Precision



Neuron PT100HT 25cm Probe



Neuron PT100HT Bolt M6



Neuron mV Digitizer Precision