



EMOS® CELL PERFORMANCE ANALYZER

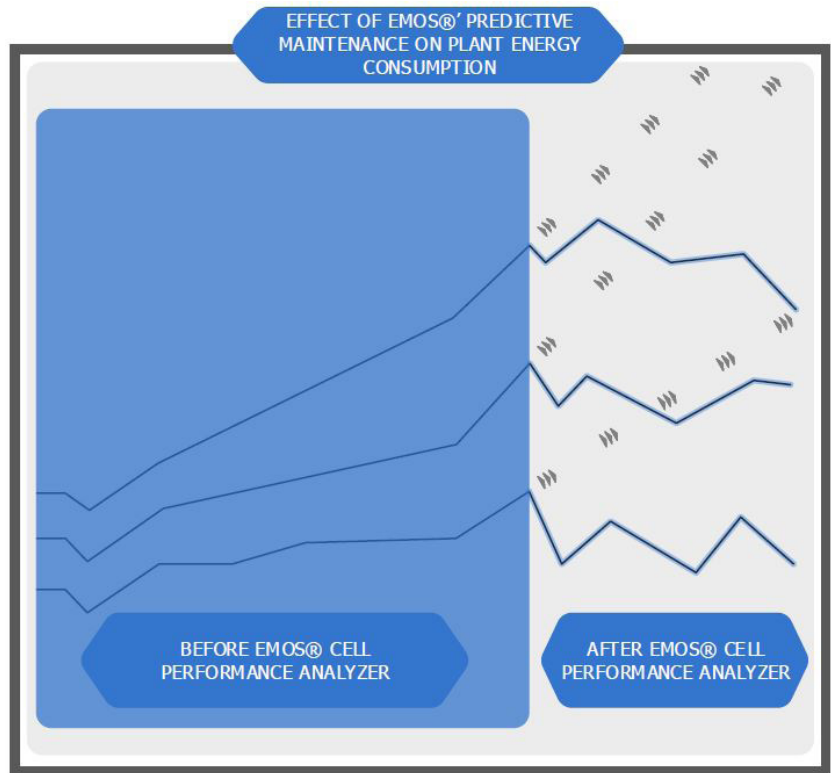
SWITCHING TO PREDICTIVE MAINTENANCE

FEATURES

- Unique patented analysis methods
- KPI's per cell: U_0 , k , U_N , C.E., SPC
- Cell performance forecast
- Identification of underperforming cells
- Simulation of economics of component change

BENEFITS

- Reliable and precise KPI's
- Address aging of individual cell components
- Reduce unplanned shutdowns
- Predictive/preventive maintenance per cell
- Payback calculation (maintenance/upgrades)



OVERVIEW

Presently, most producers are conducting two (2) types of maintenance strategy:

1. Component replacement campaigns based on the life-time warranty of their components or when the overall performance of their electrolyzers has greatly deteriorated. This demands a large amount of capital expenditure and a long shutdown period to conduct the maintenance activity.
2. Breakdown maintenance when operating a cell to failure. This is costly due to sudden and unplanned shutdown, loss of production and costs associated with consequential damages. At the core of the **EMOS® Predictive Maintenance Package**, the **EMOS® Cell Performance Analyzer** consists of the monthly determination of highly precise KPI's for each cell: Current Efficiency (CE), U_0 , k Value and the Specific Power Consumption. This provides the precise performance and operating costs of each single element which is key to be able to switch to a performance-base predictive maintenance strategy.

The decision to replace components can reliably be based on the concept that if a cell is costing more to operate than to replace, it should be replaced during next planned shutdown. Scheduled replacement of degraded components greatly reduces the occurrence of unplanned shutdowns and production loss due to sudden element failure.

On the other hand, keeping over-performing elements in operation, translates in savings in component replacement.

This performance-base Predictive Maintenance Strategy has proven effective in stopping the aging of the plant in terms of Specific Power Consumption, reducing energy costs, increasing throughput, extending the life of components and lowering the number of unplanned shutdown.



PRODUCT DATA SHEET

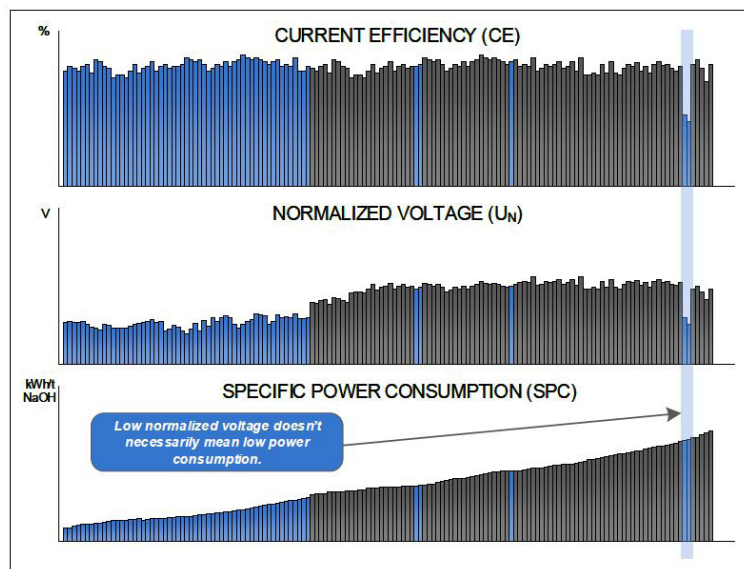
MKD0031 2V0 - EMOS Cell Performance

World Trade Center, 380 St-Antoine W., Suite 2000, Montreal, Quebec, Canada H2Y 3X7

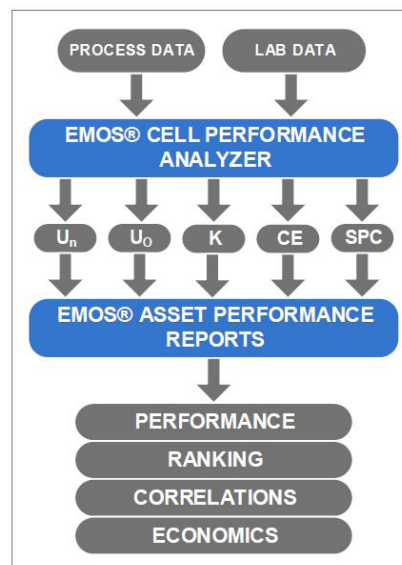
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EMOS® CELL PERFORMANCE ANALYZER



EMOS® Asset Performance Report



EMOS® Cell Performance Analyser Inputs/Outputs

TECHNICAL SPECIFICATIONS

Accuracy of the Analysis	
Individual Cell U_o	$\pm 2.5\text{mV}$
Individual Cell U_n	$\pm 2.5\text{mV}$
Individual K-Factor	$\pm 0.001 \text{ Vm}^2/\text{kA}$
Current Efficiency (CE) of each membrane	$\pm 0.25\%$
Specific Power Consumption (SPC) of each membrane	$\pm 0.5\%$

REQUIREMENTS

Process Data	Laboratory Data	Recommended Prerequisites
Historical process data is required for building the EMOS® Cell Performance Analyzer Engine. Contact us for the complete list.	A list of lab analysis must be supplied for our specialists to complete the EMOS® Cell Performance Analysis.	SW310 EMOS® Asset Management Database

ORDERING INFORMATION

Part Number	Description
EN505	EMOS® Cell Performance Analyser Initial Setup, Test and Validation
EN506	EMOS® Cell Performance Analyzer Annual Service

RELATED PRODUCTS

Part Number	Description
SWPER	EMOS® Asset Performance Reports
SW310	EMOS® Asset Management Database

ADDITIONAL INFORMATION

EMOS® Cell Performance Analyzer is part of R2's **Electrolyzer Maintenance, Optimization and Safety System**. Contact us for more information.



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