



**TECNIC**  
BIOPROCESS EQUIPMENT MANUFACTURING

*Application Note*

## **On-Line Viable Cell Density monitoring using TECNIC's eLAB bioreactors with automated feedback control**

*e*SCADA software uses the best technology in bioprocess control

With specific configurations both for microbial or animal cell cultures and different vessel materials (borosilicate glass, stainless steel or single use), the whole product range is equipped with our own software eSCADA built on Aveva (formerly Wonderware) architecture platform for an easy interconnection to Supervisory Control and Data Acquisition (SCADA) and Manufacturing Execution Systems (MES).

The continuous monitoring of pH and dissolved oxygen does not provide enough information on cell physiology, which is very relevant for cell culture applications. Off-line methods of periodic culture sampling for cell physiology monitoring are time consuming and present a serious risk of contamination.

**Furthermore, Process Analytical Technology (PAT) is primarily focused on reducing process variability integrating online measurement and/or modelling of critical quality attributes with automated feedback control.**

**TECNIC designs and manufactures bioreactors for laboratories, pilot and production applications with the best technology available and high quality standards in its facilities near Barcelona (Spain).**



The Incyte ARC sensor (Hamilton) enables real-time and online measurement of permittivity, which correlates with the viable cell density. The raw signal (pF/cm) is easily converted to cells/ml by introducing from 4 to 8 off-line measurement values performed during the linear growth phase in the eSCADA software. eSCADA software calculates the cell factor. The user has the option to select the

visualization in pF/cm or cells/ml.

Additionally the Incyte ARC sensor provides online data of the media conductivity. Considering that the sensor's principle measurement is based on cell concentration, a possible media dilution or concentration is instantly detected as a consequence of a conductivity decrease or increase, respectively.

CELLS Reactor 2

Process value: 3.75 pF/cm

VCD: 144. \*e3 cells/ml

Conductivity: 17.902 mS/cm

Visualization: cells/ml

Mode: Animal

Mov. Average: High

	pF/cm	*e3 cells/l
t1	3.670	138.00
t2	3.850	144.00
t3	4.220	161.00
t4	4.610	179.00
t5	4.850	193.00
t6	5.230	203.00
t7	0.000	0.00
t8	0.000	0.00

Actions: Zero making, Calculate cells factor

Cells factor: 38.516

eSCADA Software Main Screen

TECNIC HOME REACTOR 2 Machine producing Welcome, Ester 13:14:37 14/5/2021

Manual Datalogs Volume Control

AIR: 3.60 l/min O2: 0.74 l/min CO2: 0.00 l/min I2: 0.00 l/min

ACID: 0.00 ml AFOAM: 25.0 ml BASE: 12.0 ml MEDIA: 0.00 ml

FOAM: [Indicator]

VCD: 144. \*e3 STIR: 200 rpm

TEMP: 36.90 °C pH: 7.09

DO2: 21.4 %sat

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t7	0.000	0.00
t8	0.000	0.00

Actions: Zero making, Calculate cells factor

Cells factor: 38.516

RESET

TEMP: 36.90 °C pH: 7.09 DO2: 21.4 %sat

12:14:37 12:29:37 12:44:37 12:59:37 13:14:37

The Incyte ARC sensor and the eSCADA software allow selecting a microorganism type (animal, bacteria, yeast) to better measure quality. It has got different resolution levels for a better result.

This implementation provides high quality control standards as well as certain flexibility on customization. The complete product range is equipped with industrial software running on the WonderWare (Aveva) platform for a proper interconnectivity between them higher

**All eLAB, ePILOT and ePROD bioreactors are designed and manufactured by TECNIC in its facilities, from 3D drawing to software programming**



Do not hesitate to reach out to us,  
we'll be happy to help you!

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