

More functionality, lower costs, better usability with the Arc system

GEA Diessel GmbH uses intelligent Hamilton Arc sensors for pH-, DO and conductivity measurement in a process fermentation plant

Industry: Plant engineering for liquid processing

Application: Biotechnology, pharmaceutical technology

Hamilton product: Arc System for pH, DO and conductivity measurement

When planning a modern 750 liter fermentation plant including cross flow unit, the GEA Diessel company was looking for the best available measurement technology suited for the customer requirements. Attention turned to the new intelligent Arc sensors. After testing the Arc system, the plant engineer and GEA's customer were convinced of the advantages of the new technology, deciding to use the Arc system in the fermentation plant. GEA Diessel and Hamilton were able to supply an accurate and innovative solution to the customer.

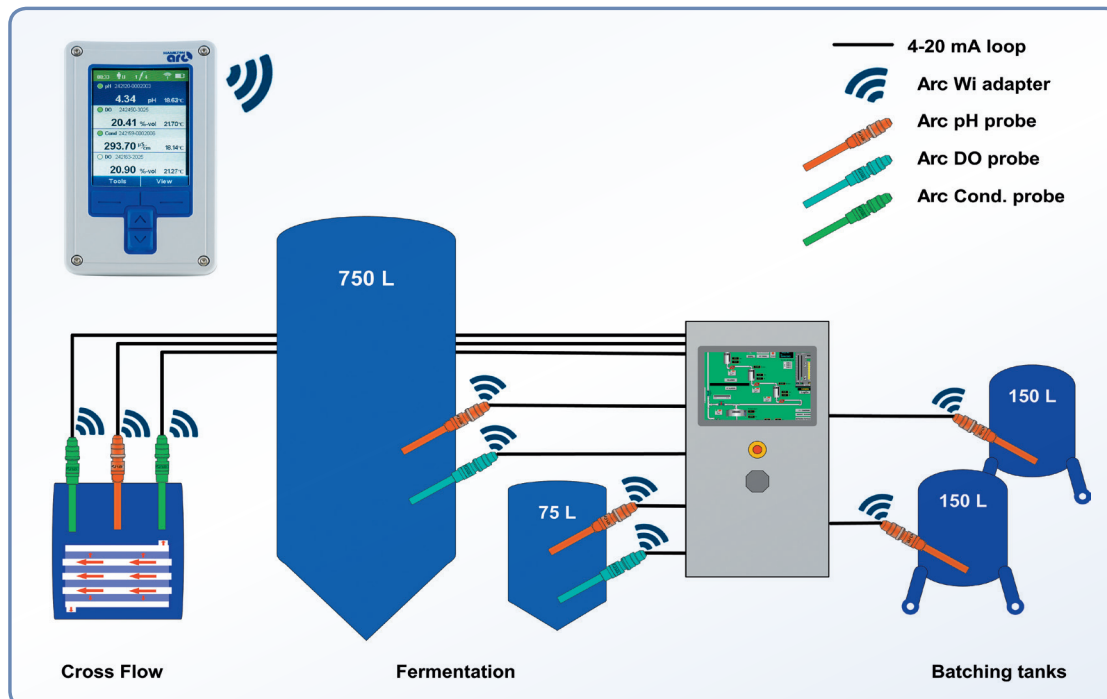
Requirements

Efficiency, compact construction, reliability and precise process controls - these are the requirements for the new GEA

Diessel company fermentation plant. Process stability and the necessary measurement equipment for the entire plant were especially important for the customer. In using the modern Hamilton Arc Sensors a suitable solution is established. Intelligent measurement data processing and robust, quality signals directly from the sensor head are advantages of the Arc system in the fermentation process.

Measurement points

The newly constructed fermentation plant contains nine measurement points for pH, DO and conductivity. The intelligent Arc sensors contain an integrated transmitter and deliver data such as measurement value, sensor quality, operating time,



Hamilton products:

- 5x EasyFerm Plus Arc 120
- 2x Conducell 4USF Arc 120
- 2x VisiFerm DO Arc 120
- 1x Arc View H-Package
- 9x Arc Wi Sensor Adapter
- 9x FlexiFit BIO
- 9x Sensor Cable VP 8 DC

Figure 1: Small scale layout of GEA fermentation plant.

CIP/SIP count, product numbers, calibration data, and much more. Measurement points for pH and DO are placed at both the pre-fermenter and main fermenter. The optical sensor, VisiFerm DO, is used for dissolved oxygen measurement. Its maintenance costs are low, because it does not contain any electrolyte and has a membrane that is very resistant to pressure. Furthermore, polarization of the sensor is not necessary. VisiFerm DO Arc does not require any extensions to the sensor, thus the design is very compact and the price/performance ratio is unbeatable.

The batching tanks are both equipped with the pH Arc sensor, EasyFerm Plus Arc. The classical version of this sensor is successfully established in fermentation processes. The formulation tank sensor is run by its own control box, connected to the PCS of the production plant when the tank is used. The last stage of the production is the cross flow device, equipped with two conductivity sensors Conducell 4USF Arc and a pH sensor, the EasyFerm Plus. The compact design and broad measurement range of 1 $\mu\text{S}/\text{cm}$ up to 500 000 $\mu\text{S}/\text{cm}$, make the sensor ideal in the downstream area.

Layout and new operational concept

The Hamilton Arc System achieves stable and interference-free 4-20 mA signals from the sensor to the PCS. The cost and required space for transmitters does not have to be considered when planning the plant. Arc View Handheld receives its data

User benefits of Arc sensors

- ▶ Simple operation and maintenance with Handheld
- ▶ Little maintenance required
- ▶ No transmitter needed
- ▶ Robust 4-20 mA signal
- ▶ Stable optical oxygen measurement
- ▶ High quality product
- ▶ High measurement accuracy
- ▶ Wireless sensor management
- ▶ Sensor quality monitoring
- ▶ Space savings in the control box

by wireless data transmission from every sensor and offers an elegant way to acquire the digital information from Arc sensors. Sensor quality and operational status can be monitored centrally and conveniently with one Arc View Handheld for multiple sensors.

Calibration on site is not necessary because of the integrated transmitter. All sensors can be calibrated conveniently in the laboratory with the Arc View Handheld before the process starts. The calibration data is then stored in the sensor for further use.



Figure 2: Arc sensor while transmitting data



Figure 3: Arc sensor operation with Arc View Handheld at main fermenter

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