



Application Note

Enhanced Volume Measurements with the Flotek Controller

Accurate volume measurements play a crucial role in research regulatory and compliance. Electronic scales, which are commonly used for this purpose in biotechnology applications, must frequently be maintained, and calibrated to accurately measure volume. If the scale is moved, accidentally bumped, or incorrectly calibrated, the measurement will be inaccurate. Thus, scales must be handled with the utmost care in bioprocessing.

Application Example

A major US biotechnology company faced significant challenges with their electronic scales used for measuring flow and volume. The application required transferring 350 mL of 30 % glucose (media feed for cells in the bioreactor) into a glass vessel placed on a scale.

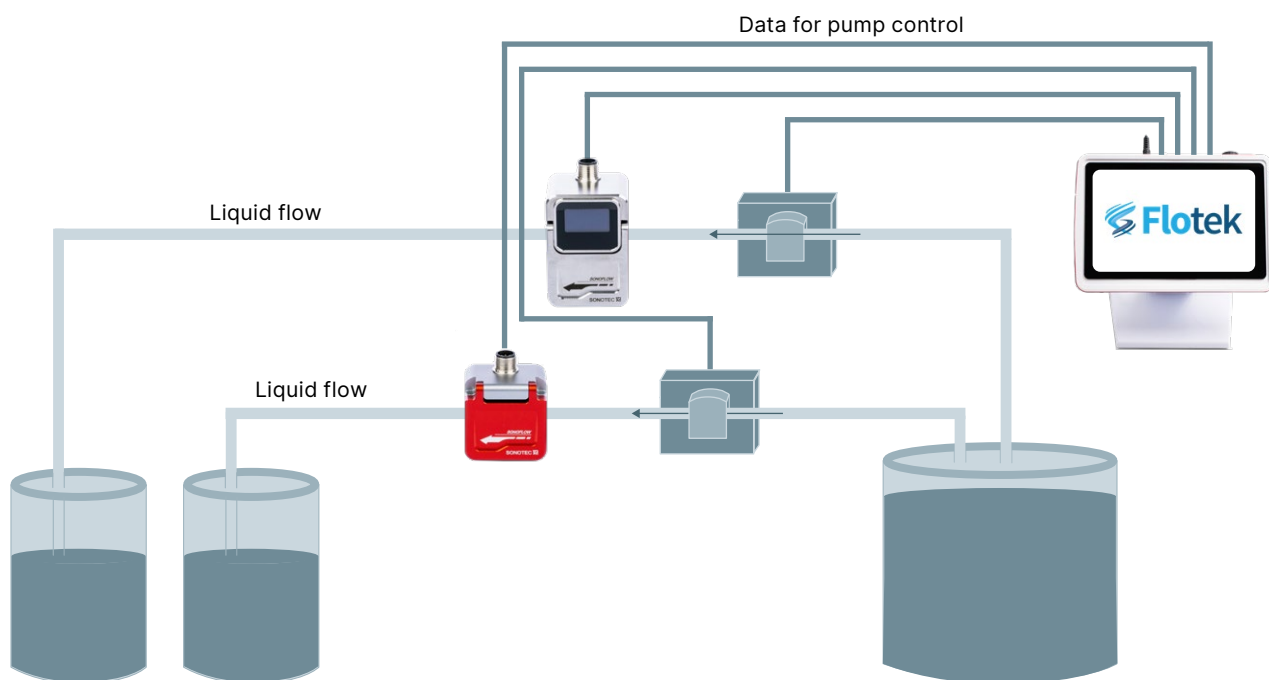
The bioreactor control system feeds the glucose into the bioreactor at a preconfigured flow rate. Inaccurate volume measurements caused by challenges with scales disrupted the supply of glucose to the cells, leading to variations in cell yield.

To address this challenge, **ultrasonic flow meters from SONOTEC can be used as a replacement for the scales.**



Flotek Controller with two SONOFLOW CO.55 V2.0 flow meters, Source: Flotek, SONOTEC GmbH

The compact non-contact **SONOFLOW CO.55 V2.0** flow meters can be easily clamped onto the tubing and measure the flow rate by means of ultrasound through the wall of the tubing without any contact with the medium. The SONOFLOW CO.55 flow meters are known for their high accuracy and reliability.



The final solution included the Flotek Closed Loop Flow Controller System paired with the clamp-on SONOFLOW CO.55 V2.0 flow meter, and the customers existing peristaltic pump.

The Flotek Controller is a dual-channel, closed-loop PID controller engineered to control any pump or sensor. The Flotek Controller is cost-effective and has a user-friendly touchscreen interface. It is designed to control, monitor and log data for a wide range of applications.

The entire measurement and control solution has been implemented as follows.

Calibration and Setup

- The SONOFLOW CO.55 V2.0 flow meter has been calibrated for water.
- By applying a calibration offset factor on the Flotek Flow Controller System, the solution has been tailored for 30 % glucose.
- The calibration setting has been saved on the Flow Controller System for future dispensing cycles.

Integration and Control

- The non-contact SONOFLOW CO.55 V2.0 flow meter provides highly accurate volume and flow measurement data.
- A dispense cycle has been set up utilizing PID (Proportional-Integral-Derivative) control.

Your Benefits

- Compact and flexible system for accurate flow rate and volume measurements based on accuracy of SONOFLOW CO.55 flow sensor
- Plug-and-play set up, no maintenance required
- Non-contact flow measurement with ultrasound
- Closed loop PID controller system
- Optional Watchdog app for offsite process monitoring and alarms

“With our closed-loop flow controller, we combine flexibility and reliability in flow automation. By using non-contact SONOFLOW flow meters in your dosing processes in the media feed, you achieve outstanding accuracy in the liquid feed and thus maximum cell yield.”

Justin Foox

*Founder & Owner
Flotek*

- The Flotek Flow Controller System runs the dispensing cycles based on the readings of the clamp-on flow meter and operates the start / stop functions of the peristaltic pump.

Results

- The Flow Controller setup achieves better than 1 % consistent dispense accuracy.
- The accurate volume and flow outputs from the SONOFLOW CO.55 V2.0 flow meter ensures precise glucose feeds to the cells.
- This improvement leads to more consistent cell yields and overall process efficiency.

This turnkey solution demonstrates the superior performance and reliability of the SONOTEC ultrasonic clamp-on flow meter when paired with the Flotek Flow Controller System, making it an ideal replacement for traditional electronic scales in critical biotechnological applications.

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