



Flow Cells

Online pH and Dissolved Oxygen Monitoring in Flow Loops

Continuously monitor pH and dissolved oxygen (DO) using fiber optic sensors for flow loops.

Flow Cells



A flow cell system consists of three components: The flow cell, the fiber optic sensor and the DOTS Software.

Hardware & Software Components

Flow Cells



Single-use flow cells with integrated chemosensors for pH and dissolved oxygen (DO).

Fiber Optic Sensor



Contains an LED, which excites the chemosensor, and a photodiode that detects the emitted luminescence. Collects the data from all connected flow cells.

DOTS Software

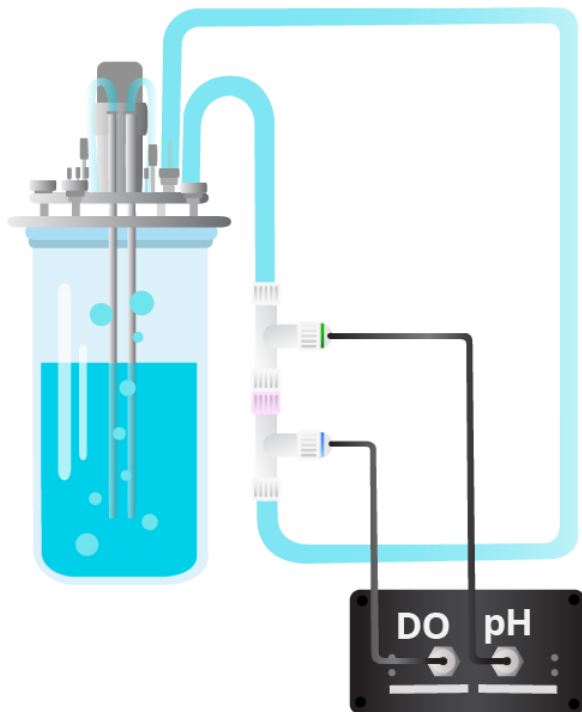


DOTS Software enables a simplified control of sensors and visualizes the received data from all monitored flow loops in real-time.

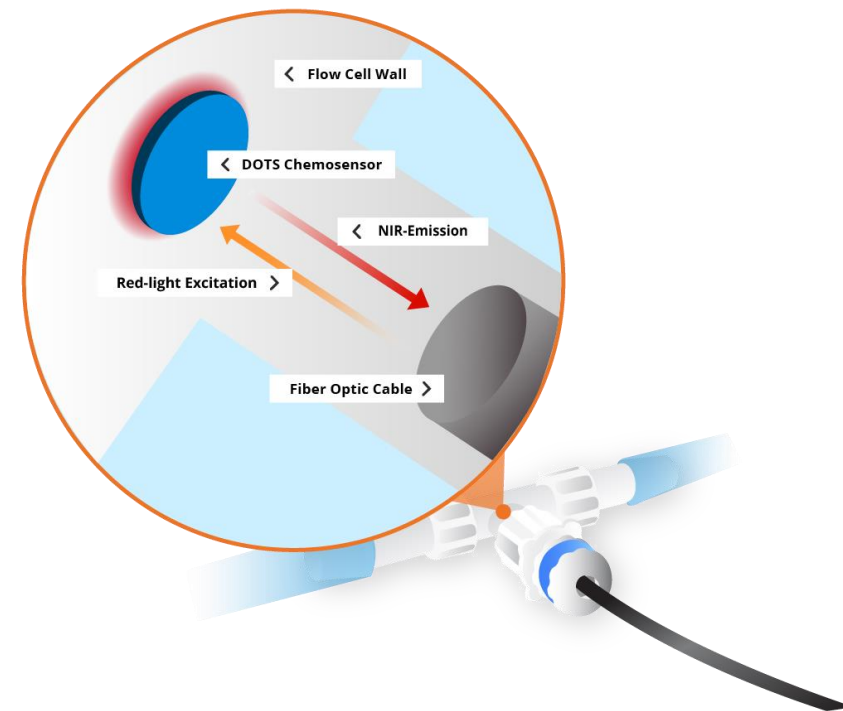
The Flow Cells use the principle of spectroscopy for optical pH and DO monitoring.

Principle of Measurement

Flow Cell Architecture

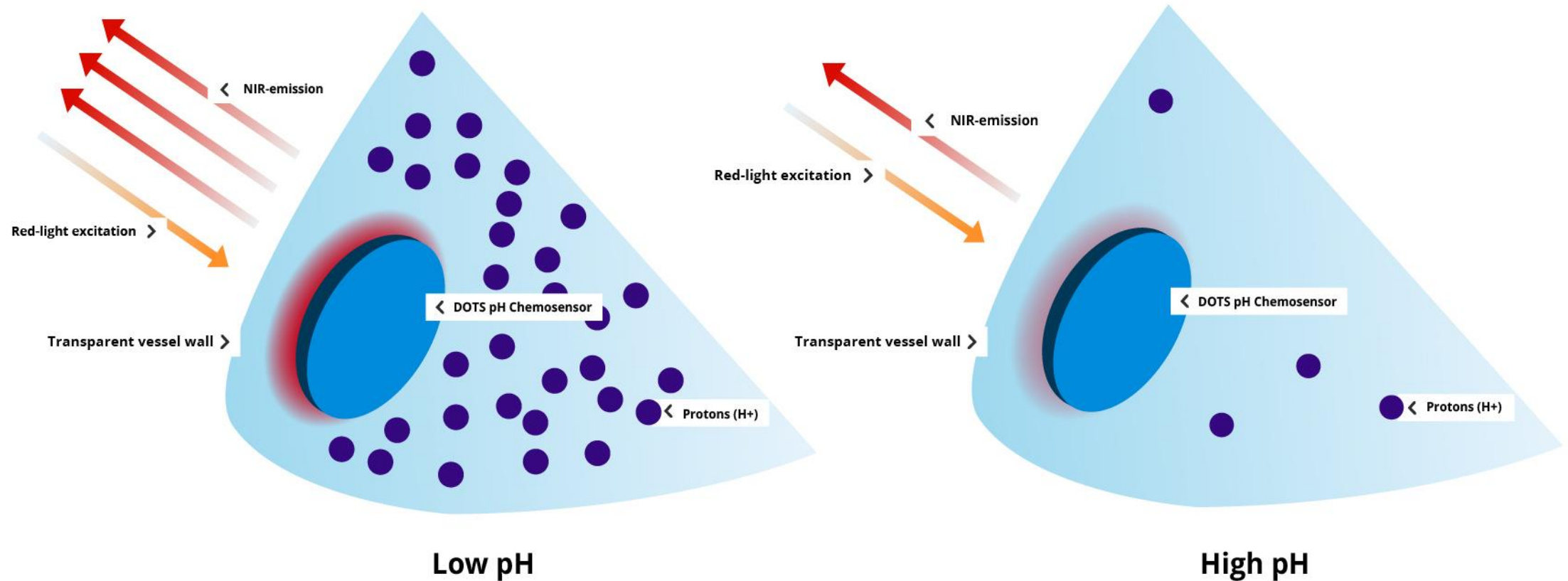


Sensing Principle



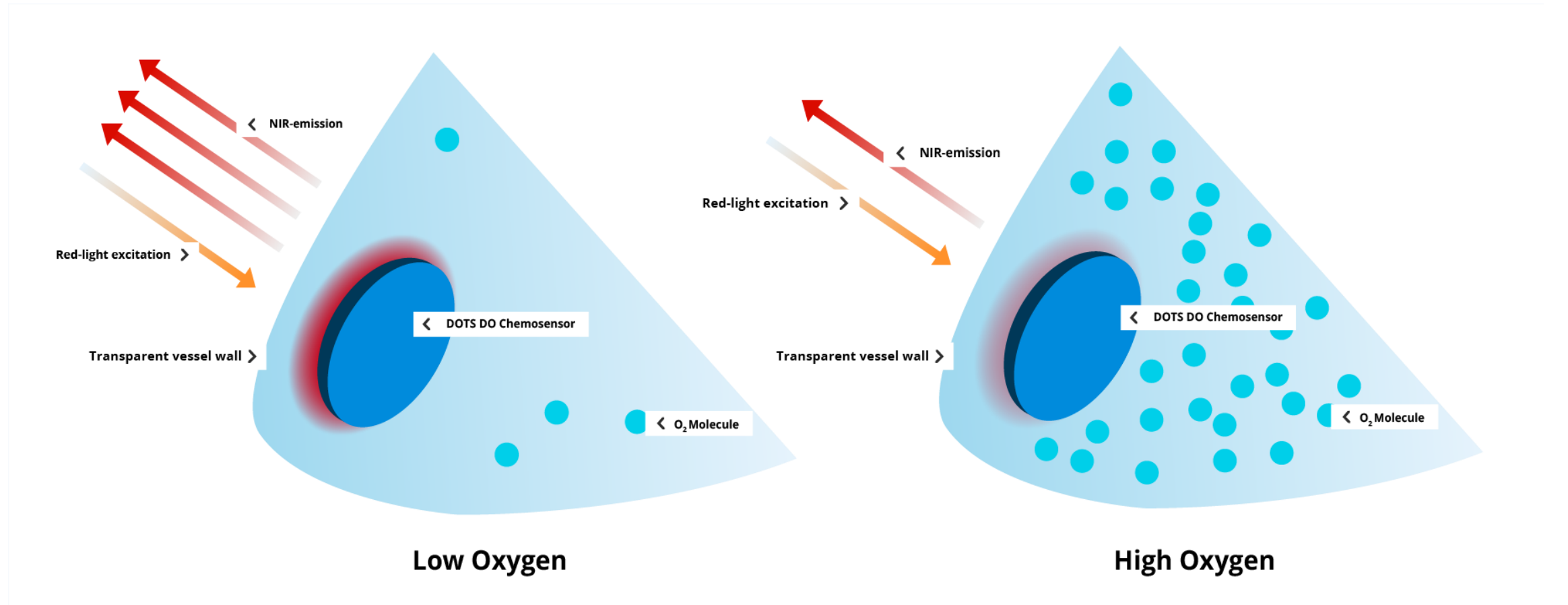
The chemosensors contain indicator dyes which are excitable with red light (610-630 nm) and show luminescence in the near infrared region (NIR, 760-790 nm).

Principle of Measurement - pH



Depending on the molecules present in the solution, the amount of luminescence changes. The fiber optic sensor measures this phase shift which is then calculated into the relevant parameter.

Principle of Measurement – Dissolved Oxygen (DO)



Flow Cells enable scientists to continuously monitor cell culture conditions, removing the need for manual sampling.

Flow Cell Key Facts



Key Facts

Ranges for a variety of applications

pH ranges: 5-7, 6-8, 7-9

Dissolved Oxygen (DO) range: 0-50% O₂ (gas) / 0-100% O₂ (liquid) (mbar)

Single or dual Channel

Combine pH and DO flow cells with a luer-luer adapter and measure both parameters in the same flow loop simultaneously

Easy to install and use

Standard luer-lock connectors allow for easy installation into flow loops with different tubing sizes

Ready-to-use

Factory-calibrated and pre-sterilized for immediate use

Flexible flow rates

From 5 mL/min to 500 mL/min

Powerful DOTS Software

Simplified sensor control and data visualization for improved comparability

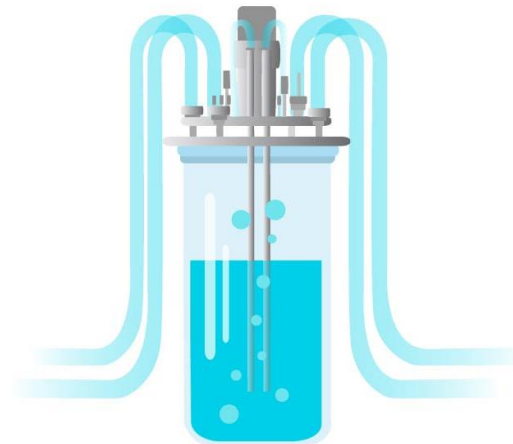
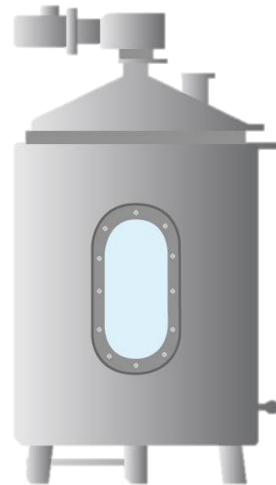
Flow Cells are compatible with a variety of lab infrastructure.

Compatible Laboratory Infrastructure

Perfusion bioreactors, custom benchtop bioreactors, and small-scale fermenters

Flow Cell

Harvest lines, sampling lines, media in/out flow lines, waste removal lines



The DOTS Software enables easy sensor handling and real-time data visualization.

DOTS Software Modules

Create an experiment with pre-defined application templates or via the custom template generator

The screenshot shows the 'Create new thingie' wizard in the DOTS software. It is divided into two main sections: 'Basic Settings' and 'Thingie Structure'. The 'Basic Settings' section includes fields for 'Name', 'Number of things', and 'Project', along with a 'Relations' section for adding new relations. The 'Thingie Structure' section prompts the user to 'Select a template in order to see thingie structure.' The interface is clean and modern, with a dark header and a light main area.

Assign sensors to objects via drag and drop

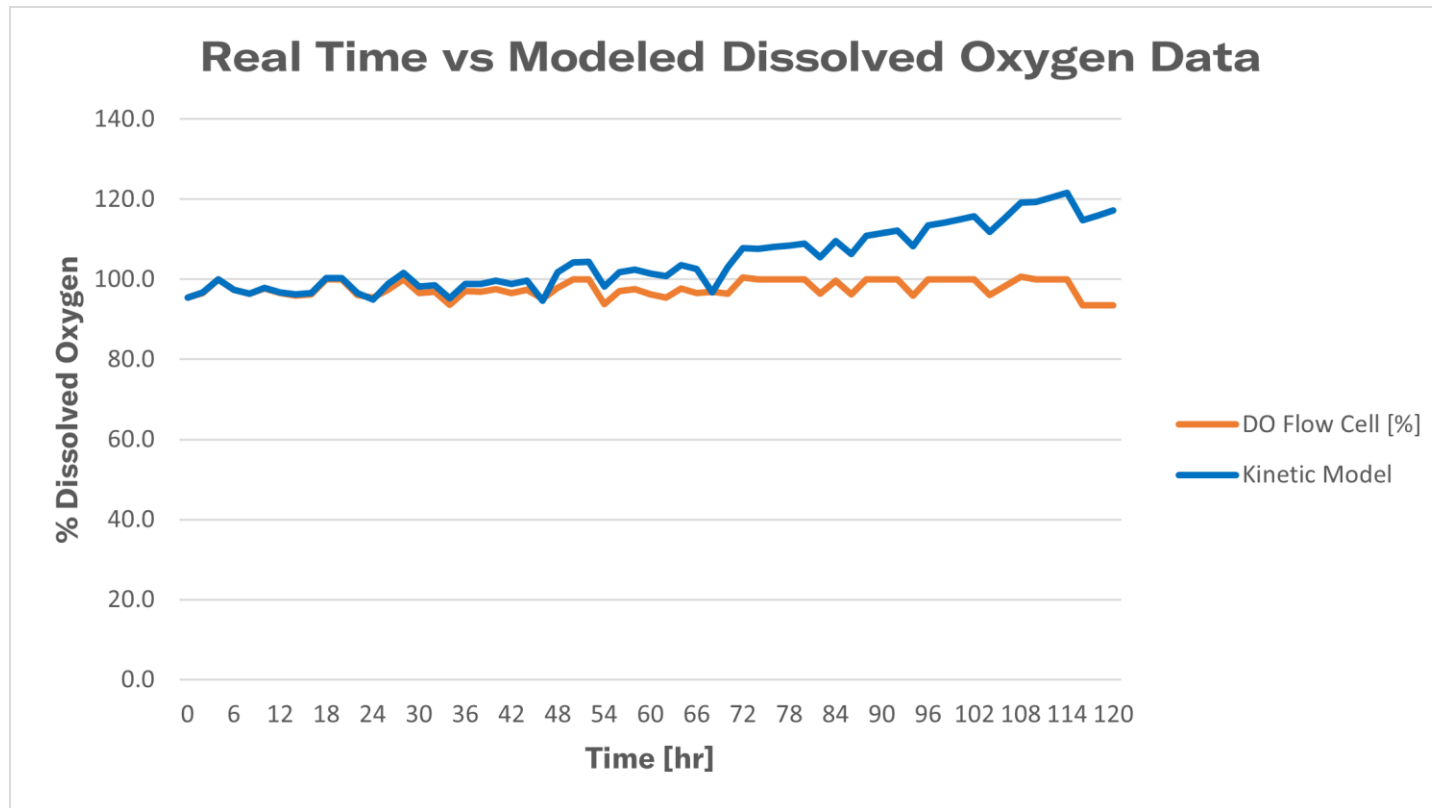
The screenshot displays the 'Device Assignment' step of the DOTS software. It shows a list of available sensors on the left, including various CO2 and pH sensors, and a central workspace where these sensors are being assigned to 'E. coli GFP Expression' tasks. The interface uses a drag-and-drop mechanism to link sensors to specific tasks, with a 'Task name' field for each assignment.

Start your experiment and visualize your data in real-time

The screenshot shows the 'Thingie Detail Page' in the DOTS software. It features a large real-time data graph on the left, showing a fluctuating signal over time (Jan 20 to Jan 22). On the right, there is a 'Basic information' panel with details about the 'E. coli GFP Expression' thingie, including its name, project, and creator. Below the graph, there is a 'Control' panel with various operational buttons like 'Inoculation', 'Induction', and 'Maturation', along with status indicators for different components.

Customer Success Story – Washington State University

Integrated Dissolved Oxygen Flow Cells Optimize Centrifugal Bioreactor (CBR) Designed To Maximize Cytotoxic T Lymphocyte (CTL) Production



Fiber optic sensors reported approximately 5% higher, on average, than the values predicted by the kinetic model (based on OCR from static culture studies) highlighting that the cells are not consuming oxygen as fast as originally thought.

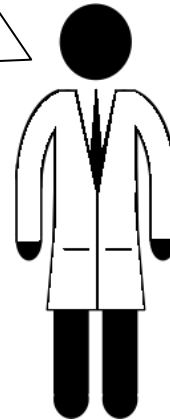


Our flow cells are built around the sensing needs of our customers.

Customer Feedback

“Incorporating SBI’s pH and DO flow cells into our system removed the need for manual sampling, saving us time, reducing the risk of contamination, and providing information on how the CAR T-cells are growing even when we are not in the lab. With availability of this more detailed view of our culture, we can make informed improvements to our cell expansion process.”

-Kitana Manivone Kaiphanliam
(Washington State University)



“Having an integrated oxygen flow cell made all the difference in getting our cell expansion culture to work. The consistent real-time data showed us we needed to provide a better oxygenation system for successful cellular growth.”

-Dr. Bernard J. Van Wie
(Washington State University)



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