

FISP[®]
Sterile In-Situ
Fermentation/Bioreactor
Sampling Probe



Withdraws Sterile, Cell-Free Samples from
Fermentors, Bioreactors, or Other Vessel Types

Flownamics[®] has developed the FISP[®], which is a sampling probe capable of withdrawing sterile, cell-free samples from fermentors and bioreactors. FISP[®] allows direct on-line sample transfer to a variety of analyzers, such as biochemistry and HPLC systems, as well as collection for off-line analysis. FISP[®] is a small tube-shaped, sterilizable 316 stainless steel carrier which is surrounded by a tubular, micro-porous membrane. They are available for 12, 19, and 25 mm ports for use in laboratory, pilot, or industrial scale vessels. FISP[®] has been and continues to be widely utilized in the fermentation and cell culture fields since its introduction to the market in 1996.



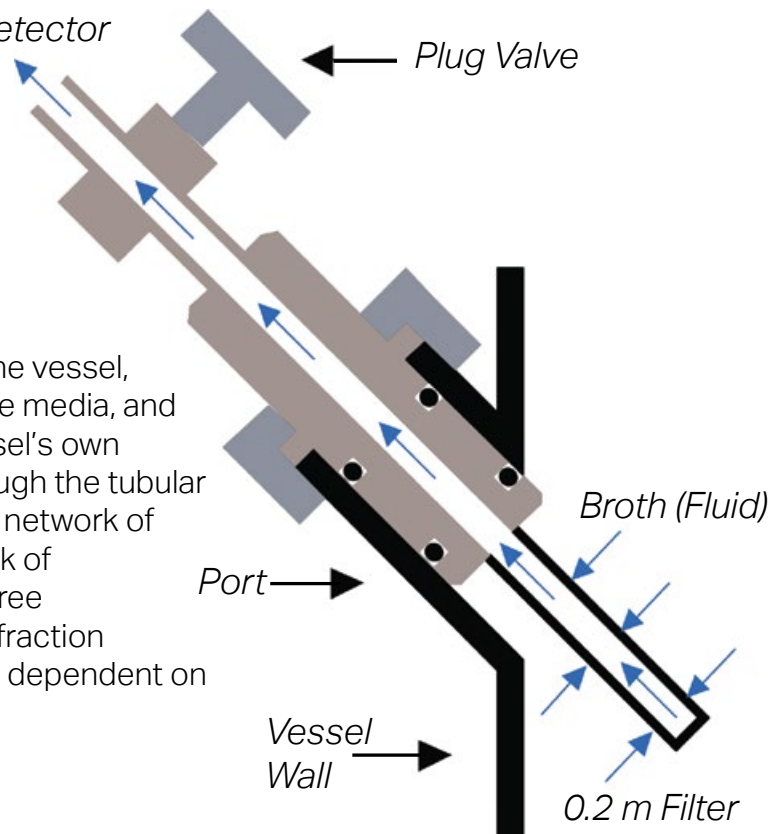
Microbial and Mammalian Sampling

FISP will perform well whether the process is a microbial fermentation requiring multiple samples per hour, or a mammalian cell culture requiring less frequent sampling. Sampling with FISP provides an excellent means of providing on-line nutrient and metabolite monitoring of bacterial, yeast, fungal, and mammalian cell cultures. Data obtained from using the FISP increases process understanding while improving process monitoring and control.

*Directed to a Detector
or Collector*

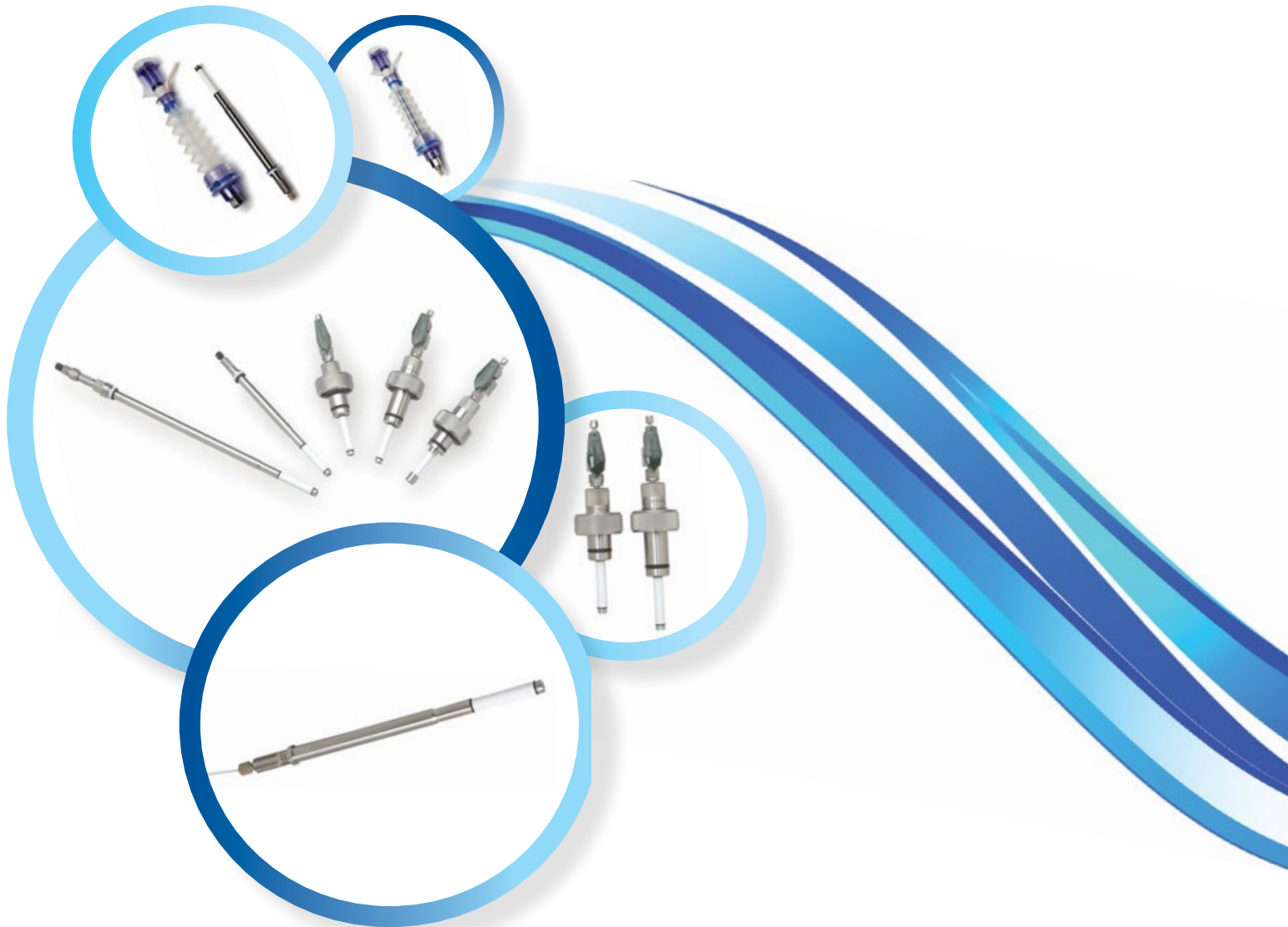
Operation of the FISP[®]

The FISP is inserted into a side or top port of the vessel, immersed into the fermentation broth or culture media, and sterilized in-situ. A peristaltic pump (or the vessel's own hydrostatic pressure) withdraws a sample through the tubular membrane and into the probe's stainless steel network of grooves. The sample flows through the network of grooves into a central channel where the cell-free sample can be directed to an on-line analyzer, fraction collector, or sample container. Fluid flow rate is dependent on the viscosity of the media.



Features of the FISP®

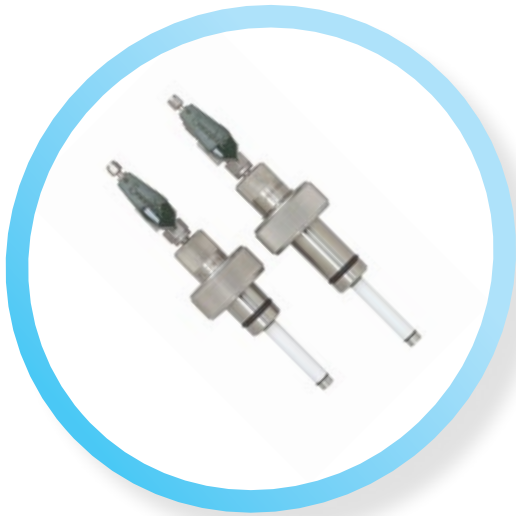
- Sterile, cell-free sampling for on-line or off-line analysis
- Autoclave, SIP, and CIP compatible
- Risk free sampling with 0.2 micron filter (sterile barrier)
- Fits small laboratory to large full-scale production vessels
- Collect and store samples for off-line analysis
- Directly interfaces the fermentor or bioreactor with:
 - Biochemistry analyzers
 - Fraction collectors, autosamplers
 - Flow Injection Analysis (FIA) systems
 - HPLC systems
 - Biosensors
 - Methanol analyzers
- Minimal dead volume for consistent and accurate sampling, which reduces flush time
- Withstands the temperatures, pressures, viscosities, shear forces, and chemicals typical of fermentation environments
- Use with aerobic or anaerobic bacteria, yeast, fungi, algae, insect, and mammalian cell cultures
- Easy to use and maintain; no operator training required
- Can be used for submerged feeding/sterile media addition
- Interfaces with our *Seg-Flow® Sampling System* (additional information available)





F-Series

- Available For 12 and 19 mm Ports
- Fits Into the Fermenter / Bioreactor Top Port
- Dead Volume: Approximately 0.24 to 0.44 ml
- Can Be Used With SUBs
- Compatible With Kleenpak™ Connectors
- Immersion Depths: 120, 200, 310, and 410 mm
- 0.2 μ m Membrane (Custom Pore Sizes Available)



D-Series

- Available For 25 mm Ports: Standard and Safety
- Fits Into the Fermenter / Bioreactor Side Port
- Dead Volume: Approximately 0.24 to 0.44 ml
- Used in PD to Production
- GMP Validated
- Immersion Depths: 90 and 115 mm
- 0.2 μ m Membrane (Custom Pore Sizes Available)

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