

# CellRetention-3™ SUBmerged ATF

World's most efficient Perfusion-SUB

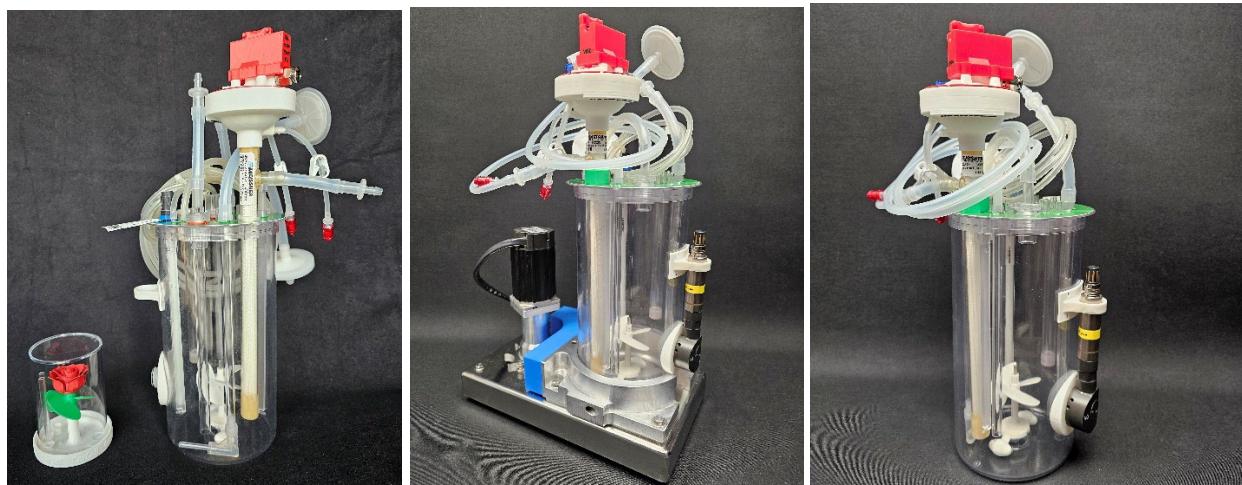
This unique setup SUBmerge the Hollow-Fiber-Filter inside the Single-Use-Bioreactor with the integrated inverted diaphragm Single-Use-Pump on top of the HFF. Extra ordinary benefits are:

**Avoid fouling – avoid dead volume – avoid cell death – reduce shear force stress**

Perfusion-SUBmerged in ATF perfusion cultivation by cell retention including also necessary Single-Use-Sensors. By variable, selectable broth velocity ranging 0 – 10 m/s fouling is regularly flushed out of the HFF and back into the SUB by the Thalia pump. SUBmerged HFF eliminate any need for hoses and connectors thus no dead volume. The inverted pump by nature cannot retain cells. SUBmerged has no fluid path restrictions and shear force stress is thus also eliminated.

General features of CellRetention-3 SUBmerged P-SUB:

- The Thalia diaphragm pump is directly integrated with the Meissner SepraPor HFF
- Working Volume range from 0.4 to 2.5 liter for >100 mio/CHO/cell/ml cell density
- Pumped volume and velocity accurately measured – no guessing.
- The complete and pre-assembled unit packed in dual film bags and precision irradiated – forget the autoclave.



*Photos show from different angles. LASER sensor mounted in the red bracket above the dome of the Thalia TM80 pump. The P-SUB is driven by Magnetic-Stirrer-Table (MST) easy to integrate for thermal control with the Heating-Support-Foot. Or driven by servo motor from head-plate.*

The SUBmerged-3 is from birth a P-SUB by integrating both the SUB, HFF, SUP, SUS in one package. Shown version features pre-installed DO, pH, level, and mounted with InCyte bio-mass Single-Use-Sensor patch. The Thalia TM80 is driven by the Clotho Drive Unit and offers 1-50 ml/stroke capacity, 18 strokes/min and measure conveyed volume and velocity with 1 % accuracy.

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