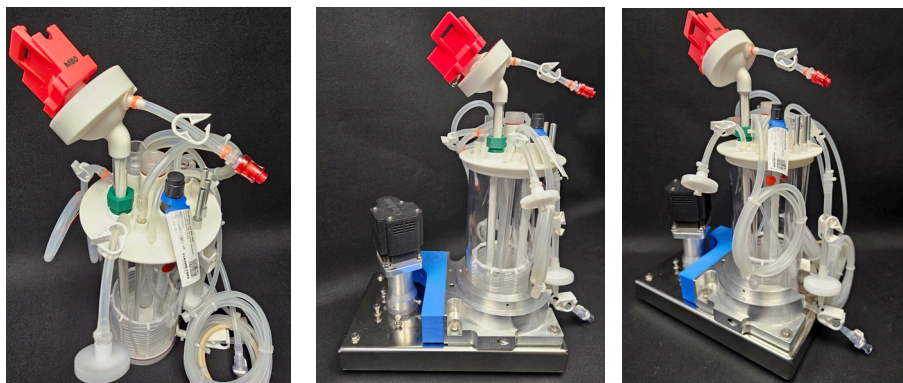


TOP text 0.5 – 1.5 liter Working Volume ATF Perfusion-SUB
2nd line text **SUBmerged™ P-SUB clear HFF from fouling**
Date. 2026-07-01
Author: Per Stobbe

- Revolutionizing **CellRetention-2-MBD** SUBmerge SeptraPor® HFF (Hollow-Fiber-Filter) directly into the SUB broth eliminating dead volume
- Direct coupled HFF with inverted innovative Thalia TM80A diaphragm Single-Use-Pump reduces shear stress, eliminates cell accumulation and clear well known HFF fouling



All three photos shows the 2 liter P-SUB with OD 4 mm thin wall silicone hose Membrane-Diffusion-Cage for better KLa values compared to traditional spargers. Centre and right photo shows the P-SUB mounted in the Heating-Support-Foot (HSF) bolted on the Magnetic-Stirrer-Table (MST) separating the black servo motor from the P-SUB headplate. The HSF is a perfect thermal control with sufficient contact to the P-SUB surface for accurate temperature regulation. Red LASER sensor mounts in a Re-Usable-Bracket above the dome of the inverted Thalia A-SUP.

Inside the P-SUB

- Agitation by OD 40 mm pitch blade impeller via Magnetic-Bottom-Drive
- Super-efficient pico-pore silicone *Membrane-Diffusion-Cage* for high cell density, deep-tubes, addition, harvest, baffles, etc – see doc under download
- SeptraPor CZ12-xx1x HFF (Hollow-Fibre-Filter) with 186 cm² surface and HFF inlet **SUBmerged** directly inside the broth
- Single-Use-Sensors (SUS) for DO, pH, bio-mass, temp, level as needed

Outside the P-SUB

- 3 small diameter weldable M-Flex hoses length 900 mm for addition
- 1 gas inlet small short hose with sterile filter for aeration
- 900 mm weldable M-Flex hose - permeate for rinsing and permeate
- 1 small short hose with swabable valve for sampling
- Optional exhaust gas cooler
- Single-Use-Sensors (SUS) for DO, pH, temp, level - optional biomass when with HSF
- 1 exhaust hose with 26 cm² sterile filter - see [Sterile-Filter-Heater](#)
- LASER guided Thalia SUP exchanged broth volume fully programmable by [Clotho Drive Unit](#) mastering accurately velocity, volume, number of variable strokes – no guessing

The kit / the package consists of:

- Industry leading architecture P-SUB pre-assembled and ready to install
- 0.5 – 1.5 liter Working Volume (WV) from 2 liter Vessel Volume (VV) OD 110 mm

- SeptraPor [PG13 kit](#) based on OD12 x 300 mm HFF with 186 cm², 0.2 µm pore, ID 1 mm lumen, inverted direct coupled ground-breaking LASER guided Thalia TM80A (no Luer-Lok or TRI-clamps) for reduced shear stress
- [Single-Use-Sensors \(SUS\)](#) VisiWell for DO, OneFerm pH (K8 or VP), temp well, level as needed (optional InCyte bio-mass on SUB wall with MBD drive)

Designed for **Magnetic-Bottom-Drive** (MBD):

- Headplate with 4 x PG13.5 circumference port, center PG13 port for DO sensor well, 6 ports for In&Out with small diameter hoses, exhaust, temp well

Designed for **Head-Plate-Drive** (HPD):

- Headplate with 4 x PG13.5 circumference ports, centre PG13 for drive axle, 6 ports for In&Out with small diameter hoses, exhaust, temp well

Benefits of this P-SUBmerged are:

- **avoid HFF fouling** – freedom to select broth velocities for gentle harvest and sequential pulses flushing out debris from inside the HFF
- **eliminate dead volume** – skip all the hoses, traditional plastic connectors and **SUBmerge** the HFF
- **avoid cell death** - inverted Thalia pump arranged on top of the HFF = hereby the diaphragm pump cannot accumulate cells
- **reduce shear force** – protect cells by eliminating hoses, fittings - **SUBmerged** HFF inside the P-SUB and the inverted Thalia on top of HFF
- **increased K_{la} values** - aeration via membrane for gas diffusion - 30% better via large surface area tubular pico-sparger

Installation

Designed for **Magnetic-Bottom-Drive** (MBD):

- the P-SUB mounts in PerfuseCell Heating-Support-Foot (HSF - for electrical thermal control) which is bolted onto the PerfuseCell Magnetic-Stirrer-Table (MST) for agitation by any servo motor

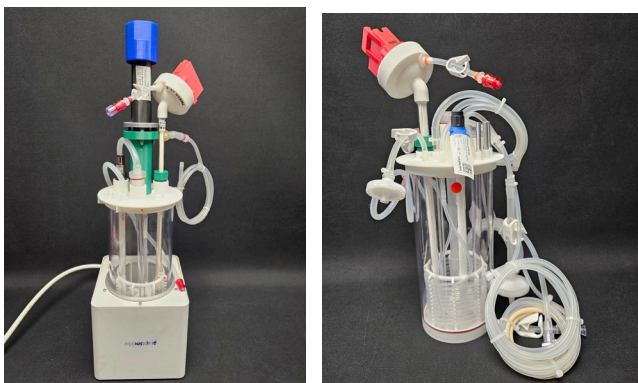
Designed for **Head-Plate-Drive** (HPD):

- Headplate with 4 x PG13.5 circumference ports and 6 ports for In&Out with small diameter hoses, exhaust, temp well
- Centre PG13.5 occupied by HPD bearing assembly for agitation by any servo motor

Thermal control by:

- PerfuseCell Heating-Support-Foot (HSF) and Harmonia
- Eppendorf SciVario and ThermoWell
- Conventional Electrical-Heating-Blanket (EHB) and general PCS

Don't forget to pre-wet HFF as usual – info found here – [Tips&Tricks](#)



Thalia TM80A SUP unified with the SeptraPor 186 cm² HFF and mounted in PG13 headplate port. P-SUB inserted in ID110 mm ThermoWell for thermal control with Maxon RE30 for

Find Tips & Tricks here - <https://perfusecell.com/perfusion-support/tips-tricks-in-details/tips-tricks-3-liter/>

Download documentation - for 3D PDF checkout conditions here - <https://perfusecell.com/download-product-info>

