

PureFlow: Versatile Platform for Bubble-Free Fluid Systems

An advanced bubble trap for fluid systems, ensuring that only pure liquid flows efficiently removing gas bubbles.

Case ID:

ID2023-004

IP Position:

Patent Pending

Development Status:

TRL 6: Representative model or prototype system, which is tested in a relevant environment.

Opportunity

Partners sought for development and prototype testing.

Category(s):

Electronics Cooling Systems, Biotechnology, Microfluidics, Fluid Dynamics, Flow Control, Medical Devices, Lab-on-a-Chip

Keywords:

Bubble Trap, Gas Bubble Removal, Fluidic System, Buoyancy, Coalescence, Fluid Circuit, Cell Culture

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2.0

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Technology Overview

- A novel inline bubble trap for fluidic circuits, designed to effectively remove gas bubbles from a liquid flow. It employs a unique configuration to separate gas bubbles, preventing their re-entry into the system, and offers advantages over existing traps by ensuring continuous operation without clogging or orientation constraints.
- This innovation addresses the challenge of gas bubbles in fluidic systems, crucial in applications such as microfluidics and medical devices. By utilizing buoyancy and coalescence, the trap provides a reliable and robust solution for industries where bubble-free liquid flow is imperative.

Key Features & Benefits

Features:

- Trap effectively separates gas bubbles from liquids in a fluidic system.
- Unique configuration to guide bubbles away from the liquid flow, ensuring only liquid passes through.
- Robust against a wide range of flow rates and bubble sizes.
- Works reliably regardless of orientation and can operate continuously for extended periods without maintenance.

Benefits:

- Prevents potential harm to cells and ensures experiments are conducted without interference.
- Eliminates the risk of spills even regardless of device orientation.
- Superior performance compared to existing bubble traps.

Potential Applications

- **Biotechnology:** Ensures healthy cell cultures by removing harmful gas bubbles.
- **Pharmaceuticals:** Maintains purity in drug manufacturing processes.
- **Medical Devices:** Guards against gas embolisms in devices like dialysis machines.
- **Microfluidics:** Facilitates precise fluid control in lab-on-a-chip systems.
- **Electronics Cooling:** Aids in efficient liquid cooling of electronic components.
- **Academic Research:** Supports various experiments involving liquid flow.
- **Spaceflight Technology:** Enables reliable fluid management in zero gravity.
- **Automotive Industry:** Helps in fluid handling systems for vehicles.

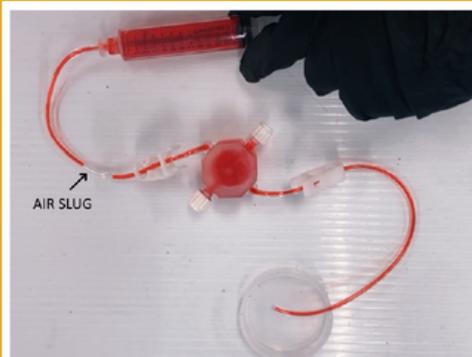


Fig 1. Air slug enters the bubble trap but does not exit.

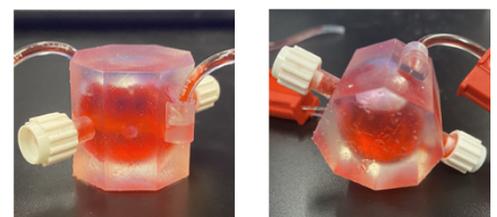


Fig 2. Liquid filled bubble trap in two distinct orientations, showing how the centroid remains fully immersed in liquid with the air gap at the top.