Micro-pump

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Technology Transfer Office

MEMS Micro Pump without chamber nor valves

Keywords

- Micro Pump
- Membrane
- Electromagnetic
- Flow reversibility
- MEMS technology

Intellectual Property

Priority Patent FR3012443 granted
EP3060803 granted (National phases : AT,CH, DE, DK, ES, FR, GB, IT, BE, NL,SE)
US10519945 granted
CA2927425 should be granted soon

Development Status

Proof of Concept in laboratory environment.

Partnership

Licensing

Technology

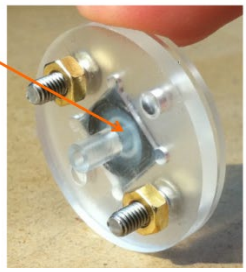
Innovation

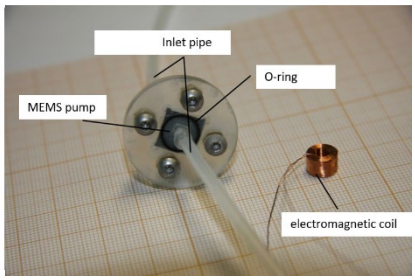
- Membrane micro pump, piloted by electromagnetic control

Results

- The micro device creates a flow without pumping chamber nor valves,
- The flow is created by the oscillations of a flexible polymer membrane
- Oscillations are driven by an electronically controlled micro solenoid.
- The membrane is perforated to force the flow of fluid

MEMS pump
5 x 5 mm²
(Size is easy to adjust)





Benefits

- Compactness and simplicity hence reliability (no chamber, no moving mechanical parts),
- No friction, low vibration level, low noise,
- No wear nor particles generated by mechanical parts friction,
- Throughput and flow direction can be set by electronic direct control
- Low production cost,
- Low consumption
- Network of pumps, easily configured in a complex shape, and individually controlled.
- Building materials adaptable to the fluid chemistry and viscosity.

Performances :

- For typical dimensions (10 x 10 mm) : 15 ml/mn @ 0.75 kPa, power consumption 450 mW,
- Other values : 28 ml/mn @ 0.9 kPa, power consumption 800 mW,
- Pumps can be arranged in series or parallel to increase the pressure and the throughput.

Applications

- **Medical Devices :**
  - Implantable pumps: cardiovascular, diabetology, neurology, hematology, perfusion, nutrition, hearing, ophthalmology, gastroenterology…
  - Artificial Heart
  - Dialysis
  - Lab on a chip
- **Others :**
  - Microfluidics

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