

# MICROMIXER CHIP

## USER INSTRUCTIONS



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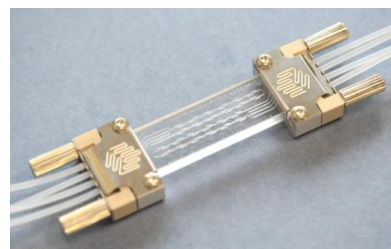
## 1. Getting Started

### 1.1 Installation

The Micromixer Chip (Part No. 3000144) uses two Linear Connectors 4-way (Part No. 3000024). A user guide for the correct set up of Linear Connectors is available. It is particularly important to ensure that all tubes are neatly cut and that they are flush with the edge of the seal. Also, tubes should be fitted in every available slot, regardless of whether they will be used or not. This helps to create a good seal.

A PTFE plug is available for connections that do not require fluid flow (Plug FEP (Part No. 3000056)).

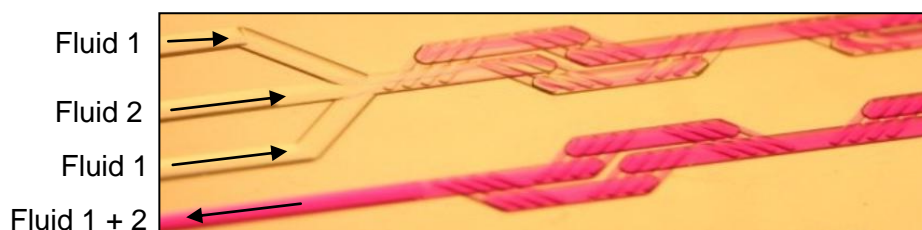
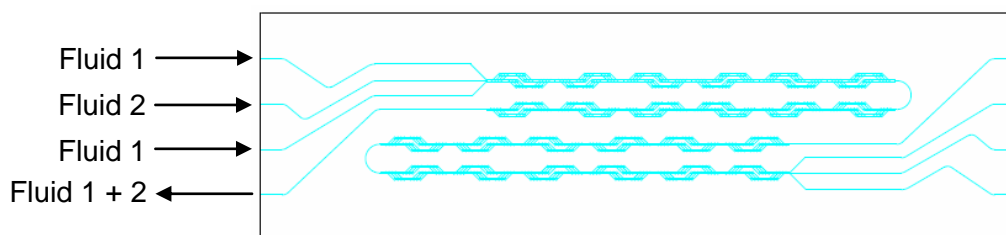
The image (right) shows a Micromixer Chip correctly assembled and ready for use.



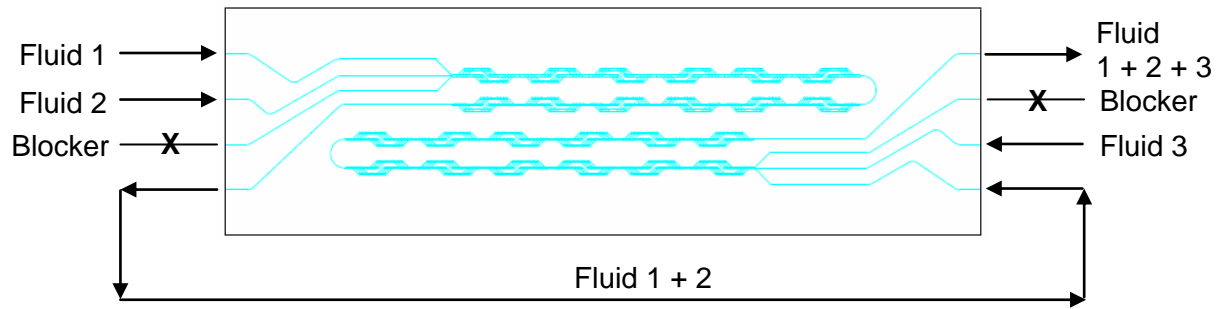
### 1.2 Using the Micromixer

The Micromixer chip contains two separate mixer channels. These can either be used independently, or connected to one another to allow additional fluids to be mixed or to provide extra mixing stages.

**An example of a simple set up:**



**A more complex set up:**



The number of mixing stages required for complete mixing depends on the viscosity of the fluids used and the flow rates they are pumped at. The following table shows the number of mixing stages required for two fluids with viscosities similar to that of water to mix when flowed at equal flow rates and using the simple set up shown above.

Flow rate (microliters/min)	5	10	20	40	80	160	320	640	1200	2000	3000	4000	5000
Number of stages for mixing	1	1	2	4	6	7	7	4	4	3	3	2	2
Mixing time (milliseconds)	4200	2100	2100	2100	1575	919	459	131	70	32	21	11	8



## 2. Troubleshooting

### 2.1 Blockages

The best way to avoid blockages is to filter all fluids before pumping them into the chip. The narrowest junctions are 50 x 125µm and filters should be chosen accordingly.

Despite your best efforts, blockages will occur. There are a number of methods for removing them.

- Flush the system with fluid at a high flow rate >100µl/min
- Flush the system with a chemical that will dissolve the blockage. For example, Dolomite often uses acetone.
- If available, place the chip in a sonication bath for 10 minutes to dislodge the blockage, and then flush the chip with a fluid. Repeat sonication for a longer time period if necessary.
- **BEST OPTION.** Connect the chip to a pressurised gas canister and pump high pressure gas through the chip. Chips are tested up to 30bar, but it is recommended that pressures of 10bar are used.

**REMEMBER:** Whether pumping a chemical to dissolve the blockage or a gas to force it out, exercise all necessary precautions. Also, remember to clean the chip afterwards.



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