Microreactor Chips

<table>
<thead>
<tr>
<th>product datasheet</th>
<th>page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>2</td>
</tr>
<tr>
<td>Benefits</td>
<td>2</td>
</tr>
<tr>
<td>Specifications</td>
<td>3</td>
</tr>
<tr>
<td>Performance and Geometry Information</td>
<td>4</td>
</tr>
<tr>
<td>Channel Layout</td>
<td>5</td>
</tr>
<tr>
<td>Optical transmission</td>
<td>8</td>
</tr>
<tr>
<td>Reactor Chip Header and Accessories</td>
<td>9</td>
</tr>
<tr>
<td>Custom Options</td>
<td>10</td>
</tr>
</tbody>
</table>
The Microreactor Chips are glass microfluidic devices designed for mixing and reaction of two or three liquid reagent streams. The main application is solution phase chemistry experiments including compound synthesis and reaction kinetics studies. The chips are supplied in a chip holder. A chip header is also available (Part No. 3000261) allowing quick connection to 1/16” fluid pipes.

**Table: Microreactor Chip Specifications**

<table>
<thead>
<tr>
<th>Part name</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microreactor Chip 62.5µl, 2 ports</td>
<td>3000278</td>
</tr>
<tr>
<td>Microreactor Chip 62.5µl, 3 ports</td>
<td>3000279</td>
</tr>
<tr>
<td>Microreactor Chip 250µl, 2 ports</td>
<td>3000280</td>
</tr>
<tr>
<td>Microreactor Chip 250µl, 3 ports</td>
<td>3000281</td>
</tr>
<tr>
<td>Quartz Microreactor Chip 250µl, 3 ports</td>
<td>3200122</td>
</tr>
<tr>
<td>Microreactor Chip 1ml, 2 ports</td>
<td>3200046</td>
</tr>
<tr>
<td>Microreactor Chip 1ml, 3 ports</td>
<td>3000077</td>
</tr>
</tbody>
</table>

**Description**

- **Benefits**
  - Rapid mixing across a range of flow rates
  - High visibility (excellent access for optics)
  - 2 or 3 inputs
  - Quick connect/disconnect
  - Wide temperature and pressure range
  - Excellent chemical compatibility
## Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of inputs</td>
<td>2 - 3</td>
</tr>
<tr>
<td>Number of outputs</td>
<td>1</td>
</tr>
<tr>
<td>Reaction volume</td>
<td>62.5µl, 250µl, 1000µl</td>
</tr>
<tr>
<td>Outside diameter of connection tubing</td>
<td>1.6mm (1/16inch)</td>
</tr>
<tr>
<td>Inside diameter of connection tubing</td>
<td>0.25mm, 0.5mm, 0.8mm</td>
</tr>
<tr>
<td>Connection tubing material</td>
<td>PTFE, FEP</td>
</tr>
<tr>
<td>Surface roughness of channels (Rₐ)</td>
<td>5nm</td>
</tr>
<tr>
<td>Chip size</td>
<td>90mm x 28mm and 90mm x 45mm</td>
</tr>
<tr>
<td>Chip thickness</td>
<td>4.5mm</td>
</tr>
<tr>
<td>Max operating temperature</td>
<td>150 °C*</td>
</tr>
<tr>
<td>Material</td>
<td>Glass/Quartz</td>
</tr>
<tr>
<td>Fabrication process</td>
<td>HF etching and thermal bonding</td>
</tr>
</tbody>
</table>

*Contact Dolomite for higher temperature options*
# Performance and Geometry Information

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chip type</strong></td>
<td>62.5µl Reaction chip</td>
</tr>
<tr>
<td></td>
<td>250µl Reaction chip</td>
</tr>
<tr>
<td>Part number</td>
<td>250µl Reaction chip</td>
</tr>
<tr>
<td></td>
<td>1000µl Reaction chip</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>Glass</td>
</tr>
<tr>
<td></td>
<td>Glass</td>
</tr>
<tr>
<td></td>
<td>Quartz</td>
</tr>
<tr>
<td></td>
<td>Glass</td>
</tr>
<tr>
<td><strong>Operating pressure</strong></td>
<td>30Bar</td>
</tr>
<tr>
<td></td>
<td>30Bar</td>
</tr>
<tr>
<td>Back pressure with 100µl/min flow (water)</td>
<td>30Bar</td>
</tr>
<tr>
<td><strong>Mixing time</strong></td>
<td>6 seconds</td>
</tr>
<tr>
<td></td>
<td>10 seconds</td>
</tr>
<tr>
<td></td>
<td>10 seconds</td>
</tr>
<tr>
<td></td>
<td>10 seconds</td>
</tr>
<tr>
<td>Preheating of reagents prior to mixing</td>
<td>No</td>
</tr>
<tr>
<td><strong>Channel Cross-section</strong></td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Mixing channel depth</strong></td>
<td>85µm</td>
</tr>
<tr>
<td></td>
<td>250µm</td>
</tr>
<tr>
<td></td>
<td>250µm</td>
</tr>
<tr>
<td></td>
<td>1240µm</td>
</tr>
<tr>
<td><strong>Mixing channel width</strong></td>
<td>220µm</td>
</tr>
<tr>
<td></td>
<td>300µm</td>
</tr>
<tr>
<td></td>
<td>300µm</td>
</tr>
<tr>
<td></td>
<td>161µm</td>
</tr>
<tr>
<td><strong>Mixing channel length</strong></td>
<td>532mm</td>
</tr>
<tr>
<td></td>
<td>532mm</td>
</tr>
<tr>
<td></td>
<td>532mm</td>
</tr>
<tr>
<td></td>
<td>536mm</td>
</tr>
<tr>
<td><strong>Reaction channel depth</strong></td>
<td>85µm</td>
</tr>
<tr>
<td></td>
<td>250µm</td>
</tr>
<tr>
<td></td>
<td>250µm</td>
</tr>
<tr>
<td></td>
<td>1240µm</td>
</tr>
<tr>
<td><strong>Reaction channel width</strong></td>
<td>370µm</td>
</tr>
<tr>
<td></td>
<td>400µm</td>
</tr>
<tr>
<td></td>
<td>400µm</td>
</tr>
<tr>
<td></td>
<td>391µm</td>
</tr>
<tr>
<td><strong>Reaction channel length</strong></td>
<td>1912mm</td>
</tr>
<tr>
<td></td>
<td>2509mm</td>
</tr>
<tr>
<td></td>
<td>2509mm</td>
</tr>
<tr>
<td></td>
<td>1844mm</td>
</tr>
</tbody>
</table>
Channel Layout for 62.5µl and 250µl 2 port Microreactor Chips

Mixing channel

Reaction channel

Fluid input 1

Fluid input 2

Double-T mixing junction

Fluid output

Double-T mixing junction
Channel Layout for 62.5µl and 250µl 3 port Microreactor Chips

Double-T mixing junction

Mixing channel
Reaction channel
Channel Layout for Microreactor Chip 1ml, 2 ports

Channel Layout for Microreactor Chip 1ml, 3 ports
Figure 1 Mixing of 0.1 M NaOH with pH indicator in water

Optical Transmission

Optical Transmission of Glass (3000278, 3000279, 3200280, 3000281, 3200046 and 3000077)
Reactor Chip Header (Part No. 3000261) and other accessories

**Reactor Chip Header (Part No. 3000261):** Enables the alignment and connection of all the input and output pipes to the Microreactor in seconds. The header is secured to the chip and holder by the two knurled thumb screws.

**Chip Header Seal (Part No. 3000262):** Make the seal between the Microreactor and the input/output pipes held in the Mitos Chip Header. They are made of extremely chemically resistant fluoroelastomer (FFKM) and create a “zero” dead volume seal rated to 20bar (300psi).

**Chip Header Blanking Plug (Part No.3000263):** Used to seal off inputs to the chip. This enables a 3 input chip to be used with 1 or 2 inputs and a 2 input chip to be used with just 1 input. The blanking plug inserts into the Chip Header in place of an input pipe and should be used with a Chip Header Seal.

Optical Transmission of Synthetic Quartz – Viosil-SQ (3200122)
The reactor chip may be mounted on the Mitos Volcano Heating Module (Part No. 3000284) as shown below. This is shown on a hotplate with temperature probe (Part No. 3000222 (US)), (Part No. 3000223 (UK)). The operating temperature range is room temperature to +300°C.

Custom Options

The microreactor chips may be customised in the following ways:

- Channel depth may be increased or decreased
- The chips can be made in quartz to improve UV light transmission
- Hydrophobic surface coatings can be applied to the inside surface of the channels
- Metals layers may be deposited on the inside surface of the channels, examples include platinum and gold layers