Compact, Ceramic Microchannel Heat Exchangers: Design and Fabrication
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Heat exchangers improve efficiency in numerous applications. Ceramic materials allow for high temperature use and higher efficiency.

- Allows higher operating temperatures
- Higher efficiency
- Reduced emissions
- Corrosion resistant
- Low cost

Microchannel designs allow materials with moderate thermal conductivity to be used in compact, high efficiency devices.

- Short heat and mass-transfer distances
- Low pressure drop (laminar)
- Compact
- Efficient
- Reliable
- Low cost
- Scaleable

Modular Design
Balanced Heat Transfer, Pressure Drop, and Mechanical Reliability

Modular Design

Analysis Guides Design Details

Temperature Profile

Fabrication
LAMINATED OBJECT MANUFACTURING FOR PLATE CONSTRUCTION
- Tape casting
- Featuring
- Lamination
- Sintering

Examples of Microchannel Architectures

Performance

Experimental Measurements match CFD Analysis

Typical Specifications

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<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Value</th>
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<tbody>
<tr>
<td>Thermal Duty (kW)</td>
<td>100</td>
<td>4 500</td>
</tr>
<tr>
<td># HX Plates</td>
<td>500</td>
<td>7 500</td>
</tr>
<tr>
<td>T&lt;sub&gt;hot&lt;/sub&gt; − T&lt;sub&gt;cold&lt;/sub&gt; (°C)</td>
<td>170</td>
<td>500</td>
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<tr>
<td>DP (kPa)</td>
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<td>0.11</td>
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<tr>
<td>Volume (m³)</td>
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<td>0.13</td>
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