IMPINGING-JET MICRO MIXER

IJMM

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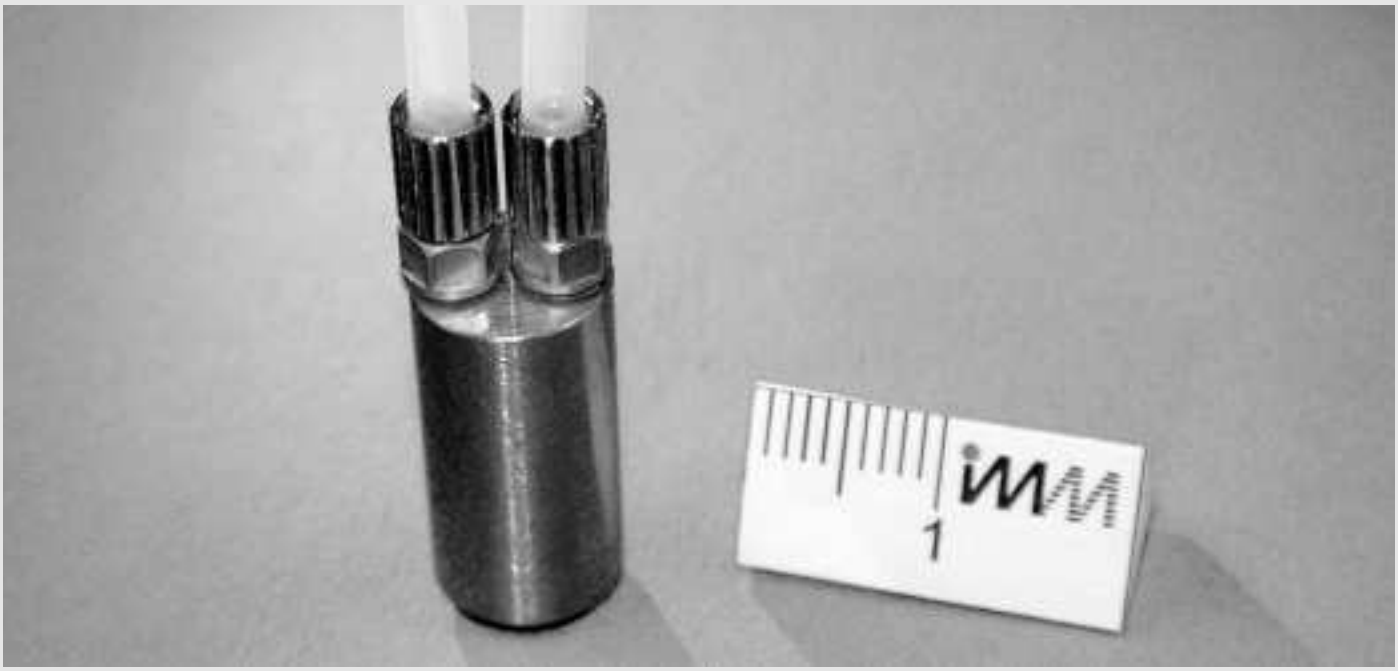


Impinging-Jet Micro Mixer

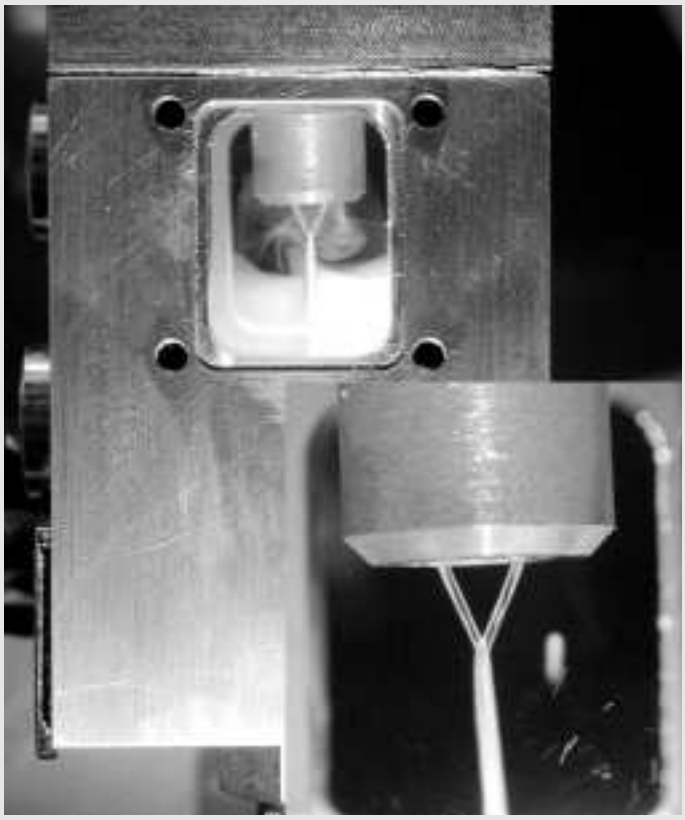
Principle

Deliberately slow mixing is an issue when fast mixing would have deleterious effects on processing, e.g. by plugging the whole system. As a matter of fact, most organic processes are associated with more or less precipitation during the course of reactions. Particle generation is simply not possible in the vast majority of today's micro devices.

For this reason, a specialty mixer was developed that performs mixing in a "wall-free" environment, i.e. by two pump-driven, falling jets merging into one in a Y-shaped configuration. It was shown that the smaller the jet diameter, the better the mixing quality. Intense knowledge on jet configuration as a function of flow rate and jet diameter has been documented, in addition to mixing quality judgement.

As a result, the nozzles of the jet mixer have tiny, only 350 µm wide nozzles. The mixer has been tested for inorganic reaction processing such as calcium carbonate precipitation and organic reaction that are associated by strong fouling. The aminolysis of acetyl chloride with n-triethylamine in THF leads to instantaneous heavy precipitation. This reaction hardly can be handled in any other micro device. It is an extreme representative of many other organic reactions that suffer more or less from fouling, e.g. like quaternizations.

3 different flow patterns:
- *Y-type jet of IJMM (top)*
- *Fan-shaped jet (middle)*
- *Fanned-out jet (down)*



IJMM in a special funnel-like housing for particle production

Geometric parameters determine the mixing performance, beside flow parameters

Technical Data

Name	Impinging-Jet Micro Mixer
Order number	IJMM
Mixing principles	Jet collision
Size (L x B x H)	10 x 35 x 10
Connectors (Inlet/Outlet)	1/8″ / 1/8″ Clamp screw
Standard boring-/noozle diameter d (µm)	350, 500, 1000
Orientation angles (d)	45°, 60°, 90°
Standard material	1.4571
Options	Other materials like Hastelloy, Monell or Titan on request

Operating Conditions

Temperature (°C)	-40 – 220
Pressure stability (bar)	10
Flowrate (l/h)	0.5 – 3
Residence time (ms)	0
Inner volume (µl)	0
Max Viscosity (mPas)	100
Leakage Class	< $L_{0.001}$