

# New Injection/Atomization System for SPRAY PYROLYSIS

## ATOKIT

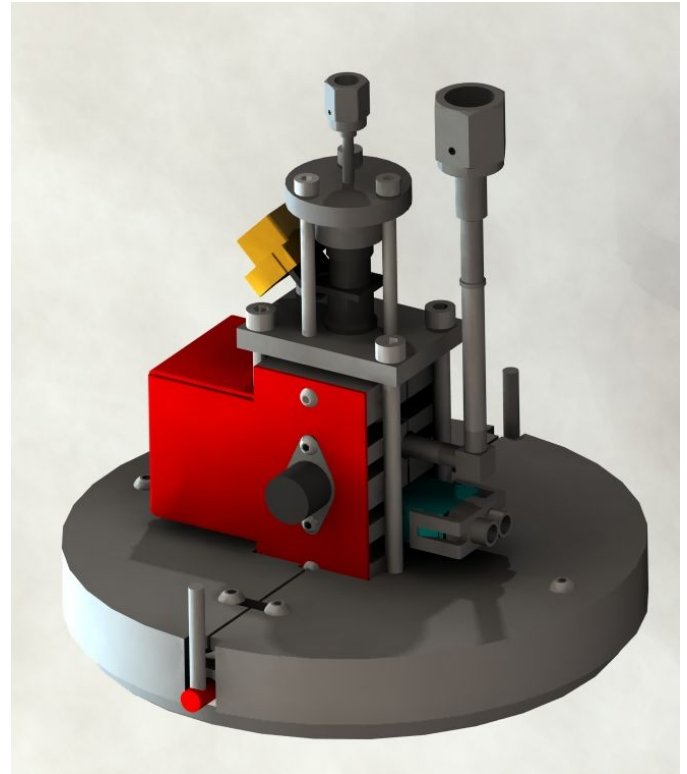
High Performance, Precise, Innovative liquid and solid precursors **Injection/Atomization System** for pure **liquid** compounds and **solid ones dissolved in a carrier liquid** (organic solvent).

The **ATOKIT** is able to handle and **atomize most of liquid compounds and solutions** from **low viscosity to high viscosity** ones.

The **ATOKIT** achieves a very fine atomization of a pulsed liquid mixed with a carrier gas prior to injection.

The generated aerosol can be used for **Spray Pyrolysis** processes. It can also be easily vaporized to produce reactive gases for the synthesis by ALD and CVD of thin films, nanoparticles and nanoobjects of numerous functional materials such as for instance : dielectrics (**low-k and high-k**), barrier layers (**Ta, Ti and Nb nitrides**), ferroelectrics, piezoelectrics, metals (**Cu, Pt, Ru, Ir, Rh, Ag, Pd,...**), III-V, II-V, chalcogenides, transparent conductive oxides, photovoltaics, low friction coatings, hard coatings and superconductors.

Because of its unique proprietary way to deliver and atomize the liquid the **ATOKIT** is the ideal tool to build a **real non-contact flash vaporizer** therefore generating **particle free vapors**.



Indeed, the blasting of the carrier gas/liquid mixture allows generating an aerosol of around 10 microns diameter droplets. Such very small droplets can be easily flash vaporized.

The **ATOKIT** operates from vacuum to atmospheric pressure.

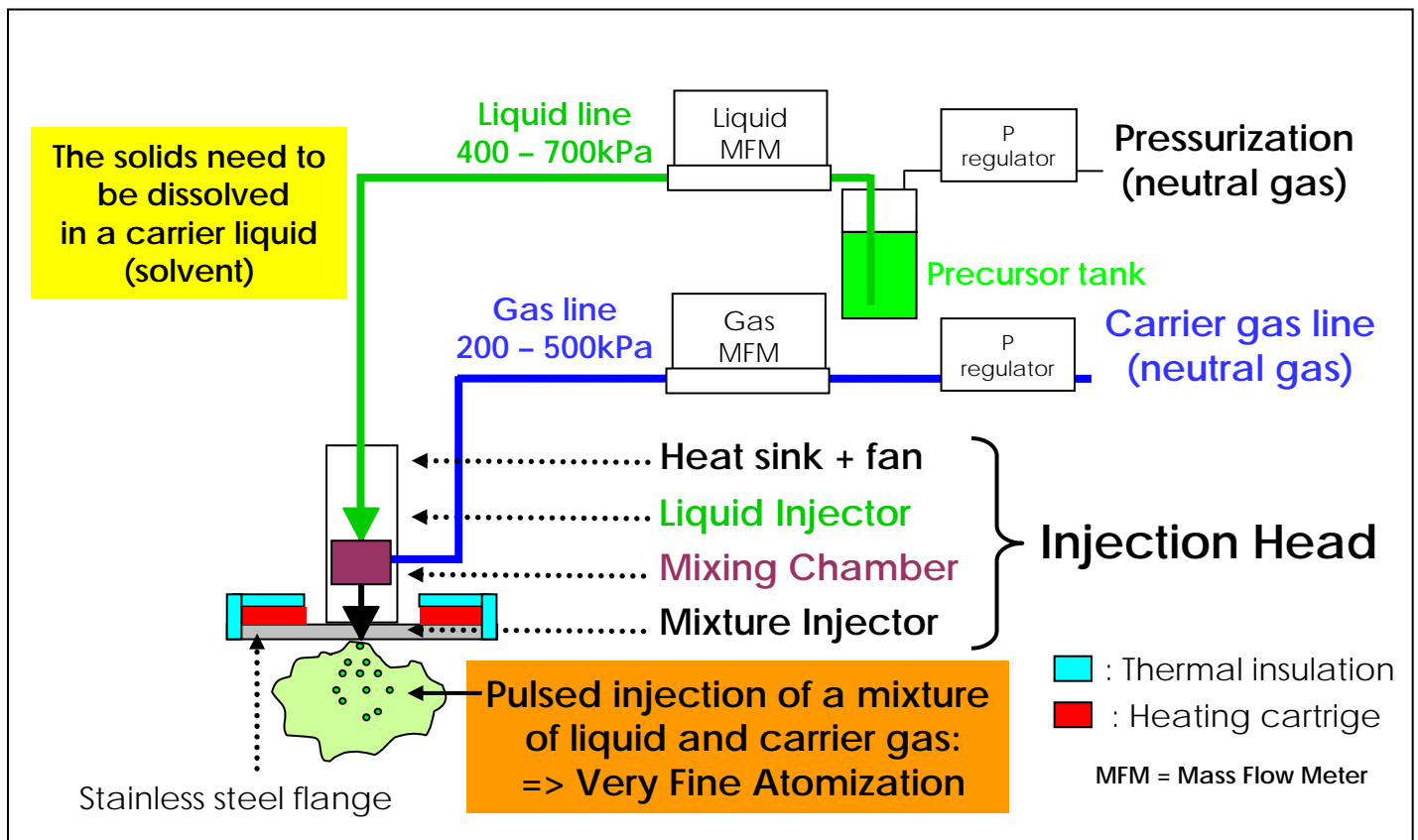
Thanks to delivering of accurate and stable liquid flows, the **ATOKIT** delivers accurate and stable aerosol flows.

*US patent pending and patents pending in other countries*

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## ATOKIT Operating Principle



The **Injection Head** consists of multiple components which are one **liquid injector**, one **mixing chamber** (maintained under constant carrier gas pressure) and one **mixture injector**. These three components are surrounded by a heat sink on which is attached a fan. It allows maintaining by air cooling the liquid or solution to atomize at room temperature as long as it is not injected. Premature undesired precursors decomposition is thus avoided.

The **liquid injector** pulses the cool fluid into the **mixing chamber**. The **mixing chamber** blends this fluid with the carrier gas. Finally, the **mixture injector** injects the liquid and gas mixture in a pulsed regime. This pulsed flow atomizes the fluid into an aerosol of extremely small droplets.

The aerosol delivered can be used for **SPRAY PYROLYSIS** processes or it can be vaporized to generate a gas phase for **CVD and ALD processes**.

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## ATOKIT Technical Specifications

- **Flange**
  - CF100mm
- **Heating:**
  - Temperature range: up to 280°C
  - Heating zone: 1,
  - Thermocouple: 1, K type
  - Power: 400 W (220 VAC or 110 VAC)
- **System control:**
  - Stand alone 19" 2U rackable ICU (Injector Control Unit)
  - ICU controlled from a PC interfaced to the unit by a software (RS485)
  - "dll" help files provided to allow for easy interfacing of the **ATOKIT** on the PC
  - ICU controlled from a PLC Via a RS485 port (MODBUS com° protocol), the MODBUS "memory map" is provided to help the customer to interface the **ATOKIT** on his PLC
  - One SubD 37 F to connect the **ATOKIT** to a PLC (triggers and injectors status)
- **Fittings:**
  - Liquid inlet: 1/8" compression type or 1/8" F VCR
  - Carrier gas inlet: 1/4" Female VCR
- **Injector Control Unit ( ICU ) facilities:**
  - 19" rackable 2U unit
  - All the necessary cables for the injectors are provided
  - RS 485 MODBUS
  - The ICU must be power supplied by 24 V DC and, depending on the options selected, the ICU must also be power supplied by +15V/-15 V DC
  - Power: 24 V DC: 3 A ; +15 VDC: 500 mA ; -15 V DC: 500 mA
- **ATOKIT Control Software:**
  - Compatible with Windows XP Pro SP2,
  - A demonstration version is provided on request
- **ATOKIT Options:**
  - Devicenet interface ICU
  - Second injection head on a bigger flange (not CF type), 600 W

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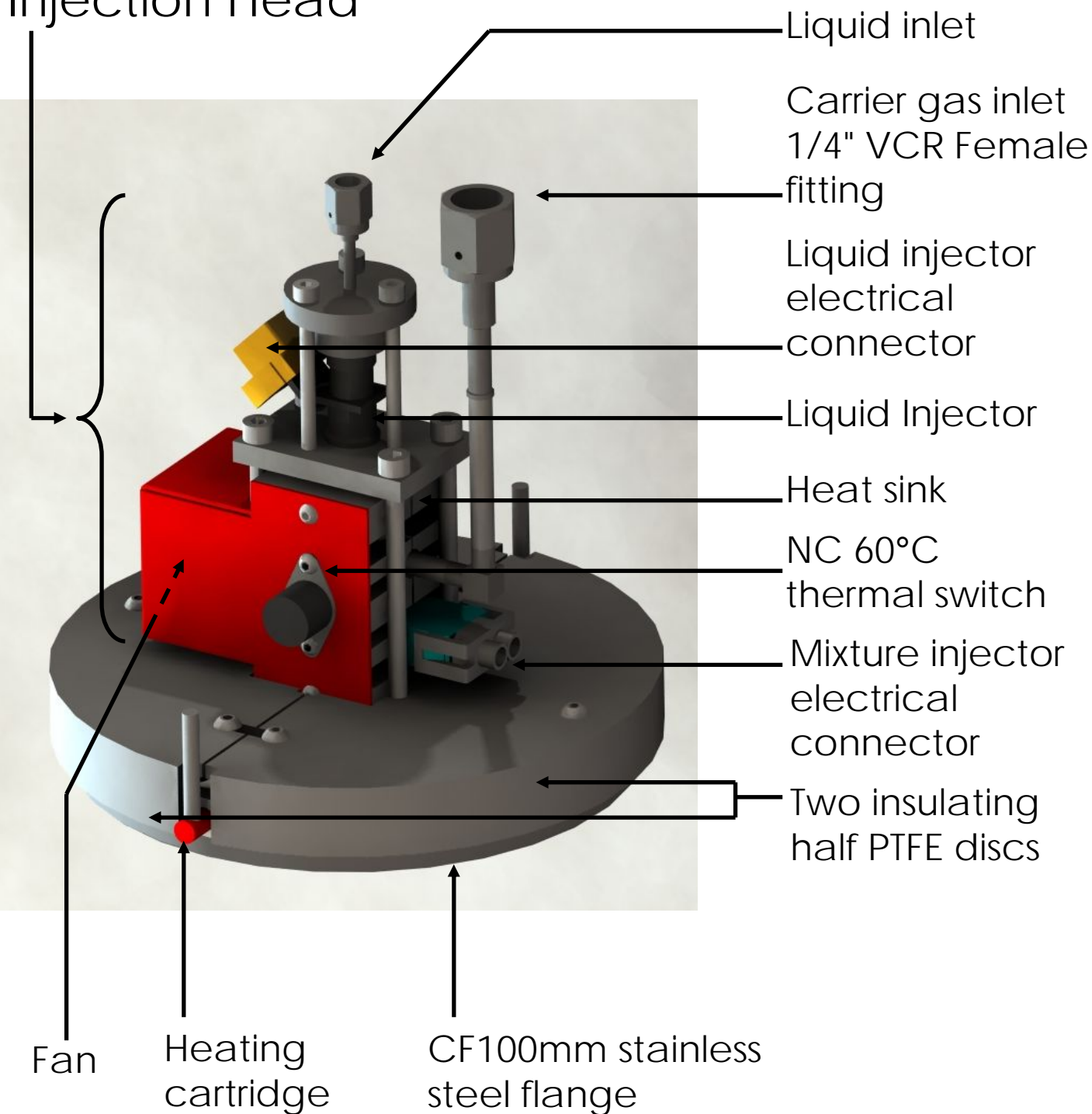
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## ATOKIT

### Injection Head



www.kemstream.com

Specifications are subject to change without notice

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