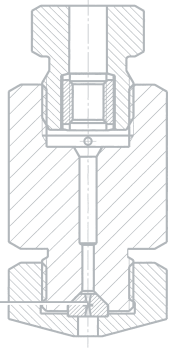
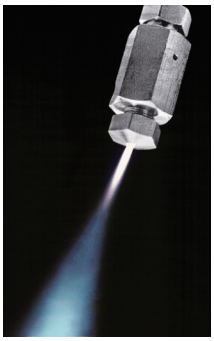
Multi-Purpose Pilot Units for Micronization and Spray Drying (RESS/GAS)

Standard Design		Options
Max. operating pressure	300 bar	500 bar
Max. operating temperature	80°C	120, 150, 200°C
CO_2 flow	18 l/h	10, 30, 50, 100 l/h
Column interior diameter	Ø 90 mm	Ø 60, 110, 160 mm
Column internal length	1 m	0.4, 2 m



Diamond nozzle

Nozzle holder with diamond nozzle. Diamond nozzles are easily exchangeable. Orifice range 15–300 µm.



Spray generated by diamond nozzle (picture courtesy of Fraunhofer Institute, Germany)

RESS
Rapid **E**xpansion of **S**upercritical **S**olutions: An active agent is dissolved in a supercritical solvent and expanded through a spray nozzle. Solvent power is lost rapidly and solid particles fall out.

GAS
Gas **A**nti-**S**olvent Recrystallization: An active agent is dissolved using a conventional liquid solvent and sprayed through a spray nozzle together with a high-pressure gas. The gas decreases the solvent power and extracts the solvent during the expansion. Small particles are generated.

High-pressure micronization (RESS/GAS) is used to generate very fine and uniform powders or well defined geometries of solid particles by expansion of a high-pressure fluid.

Advantages
- Production of fine powders (nano-/microscale)
- Production of uniform powders
- Shape and size of crystals changeable in a wide range by modifying the process parameters
- Fine-tuning of particle-size distribution

Features
- For rapid expansion of supercritical solutions and gas anti-solvent recrystallization
- Closed CO_2 cycle
- Contaminant-free recirculation of supercritical solvent
- High-performance separation step

Options
- Semi-continuous discharging of solid products
- Diamond nozzle sets with different nozzle geometries
- Data acquisition system
- Process control and batch documentation with programmable logic controller (PLC)

Applications
- Formulation of pharmaceutical products
- Enrobing of active agents
- Production of colour pigments

Multi-purpose unit for micronization using RESS or GAS techniques as well as for supercritical fluid extraction (France). Unit is equipped with a diamond nozzle and a motor-driven pump for pulsation-free spraying.