

$$\frac{d(\rho_r \vec{V})}{dt} + \nabla \cdot (\rho_r \vec{V} \vec{V}) = -\vec{\nabla} p + \nabla \cdot (\mu_r \nabla \vec{V}) + \vec{F}_r$$

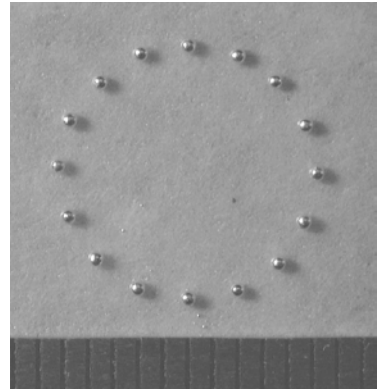


PneumaDrop

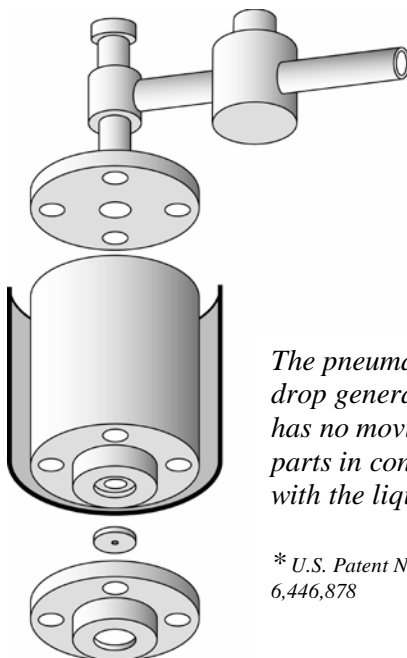
The pneumatic droplet generator, Pneumadrop can produce small, uniform droplets from a wide range of liquids and molten materials. It is simple to use, robust and particularly well suited for high-temperature applications requiring accurate dispensing or production of individual droplets on demand.

Applications

- Precise dispensing of liquids in pharmaceutical and biomedical devices
- Research in droplet dynamics, spray coating, droplet combustion
- Calibration of particle size measuring devices
- Solder deposition on circuit boards
- Precise deposition of adhesives and other materials
- Manufacturing uniform size metallic particles
- Specialized ink-jet printing.



Two samples of tin droplets deposited on steel surfaces which show the repeatability of the process. (Scale in mm)



The pneumatic drop generator has no moving parts in contact with the liquid.*

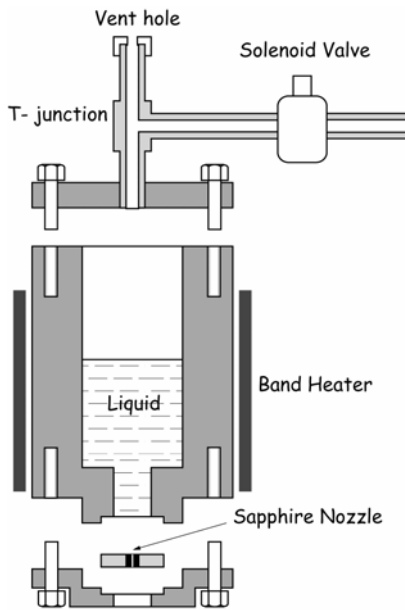
* U.S. Patent No. 6,446,878

Technology Advantages:

- Controlled ejection of individual droplets on demand
- Wide range of drop sizes
- No moving parts in contact with liquid;
- Easily cleaned
- Multiple nozzle capability
- No theoretical temperature limitations allows for:
 - High melting point materials
 - Sterilization procedures

203 College Street
Suite 302
Toronto, Ontario
M5T 1P9 Canada

Tel: (416) 979.5544
Fax: (416) 979.5519
Web: www.simulent.com

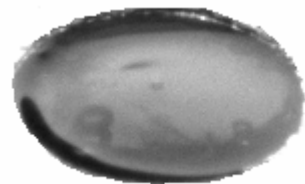
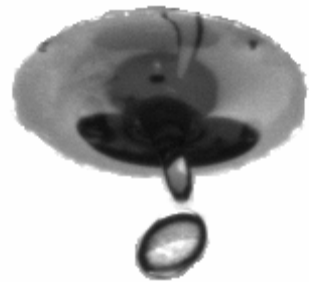
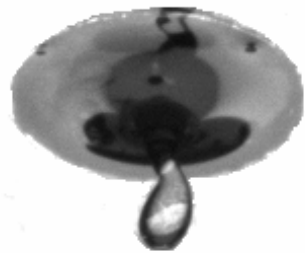
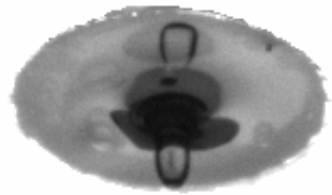


The schematic diagram of the droplet generator.

Specifications

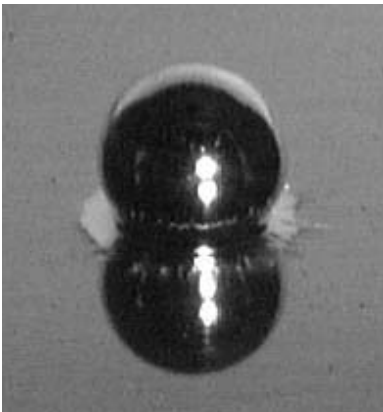
The generator has been tested for the following working conditions:

- Droplet sizes: 0.15 to 3.0 mm
- Temperature range: 10°– 800°C
- Viscosity ranges: 10⁻³– 4 Ns/m²
- Surface tension: 0.02 – 0.8 N/m.
- Drop frequency: up to 40 Hz



Benefits:

- PneumaDrop is robust and easy to operate.
- Insensitive to liquid properties.
- Operates accurately with a small amount of liquid.
- Withstands high temperatures.
- A single droplet can be produced with no satellite drops.
- Tested for a wide variety of liquids and molten metals such Water, hydrocarbons fuels, molten solder, tin, bismuth, indium, zinc, and aluminum.
- Wide range of droplet sizes can be obtained by replacing the nozzle.
- Easy to refill.



Impacting molten zinc droplet

Formation of water droplet from the drop generator