

MMM Atomizing Technology

Liquid Atomizing Applications

Main Web Site: <http://www.mpi-ultrasonics.com>

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Applications

- **Ultrasound is an excellent method of atomizing fluids into very small particles, thereby greatly increasing the liquid material surface area and allowing an efficient air/gas mixing process. While this is known technology we are specializing in development of ultrasonic systems that allow this technology to move from the lab bench or small systems to high volume industrial applications. Based on our proprietary MMM ultrasonic generator technology we have the capability to make large arbitrary shaped (un-tuned) mechanical elements vibrate at ultrasonic frequencies. Normal ultrasonic generator systems cannot make the transition because they rely on carefully tuned mechanical elements of fixed size and shape that limit the scope of their use large scale applications.**
- **Our MMM systems allow us to make a wide range of atomizing elements. Some of our developments have included Solder Powder manufacturing and Ceramic-composites Bead manufacturing. In our lab we have experimented with a number of sonotrodes, vibrating elements, and different liquids, operating from very low temperatures until temperatures significantly higher than 1000° C.**
- **Industrial fluids atomizers & gas mixing (air conditioning, semiconductor technologies...)**
- **Water & fuel atomizers**
- **Liquid alloys atomizers & solder atomizers**
- **Incineration of waste and dangerous liquids by atomizing**
- **Large volume humidifiers & dust removal**
- **Air and water filtering, purification, decontamination & sterilization (nuclear, included)**
- **Micro-encapsulation, coating, surface impregnation**
- **Food and Pharmaceutical applications (surface decontamination)**
- **Electrochemistry & Sonochemistry process integration (nano technologies)**

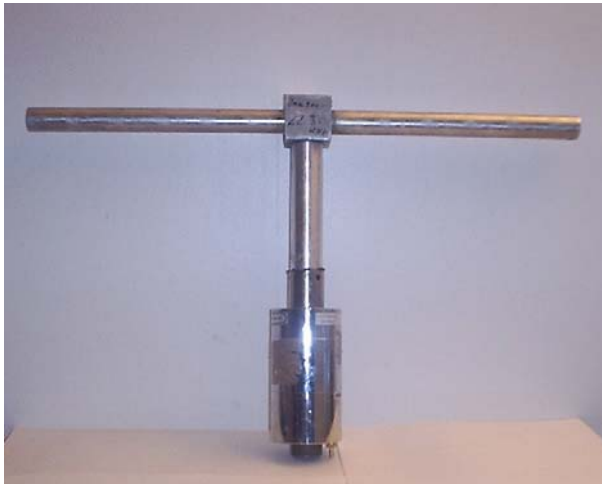
Clamp-On Tubular Atomizers in Action

(movie files)



T-Tube Atomizers in Action

(movie files)



Vibrating Wire & Plates in Action

(movie files)



Piston Sonotrode Atomizer in Action

(movie files)



Liquid Metal Atomizing in Action

**Very High
Atomizing
Temperature**



Movie file

**Sonotrode
water-cooled
internally**



Rotating Sonotrode Atomizers in Action

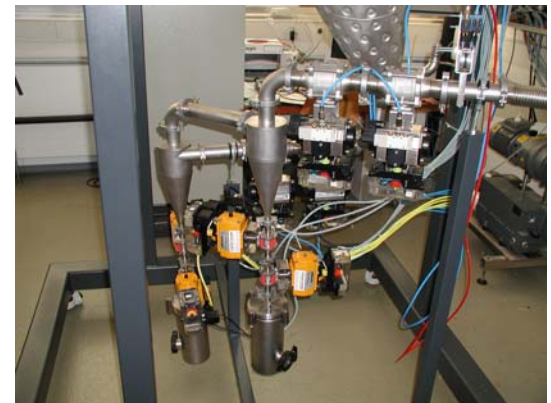
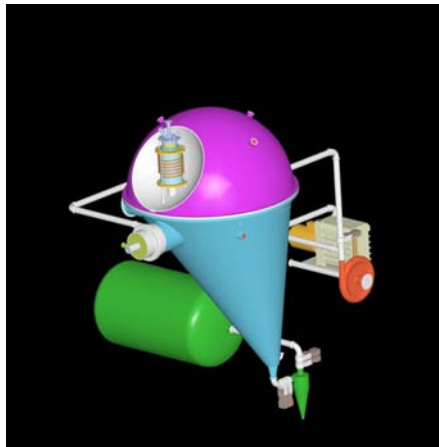
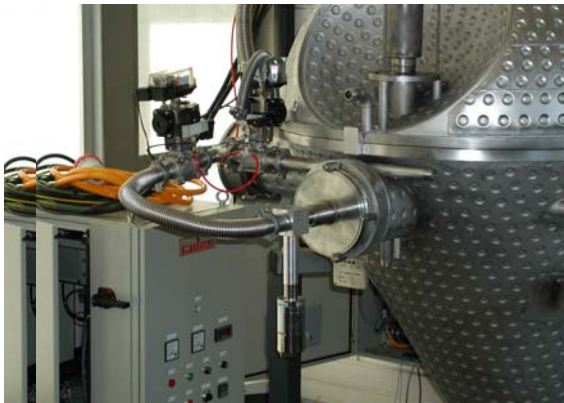
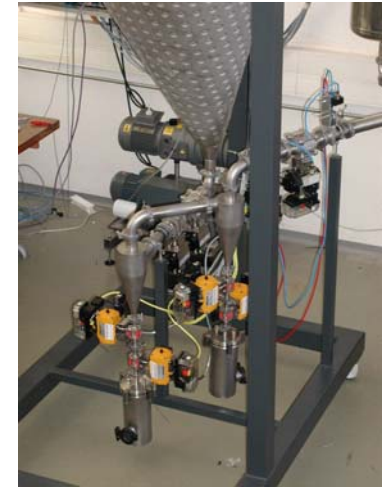
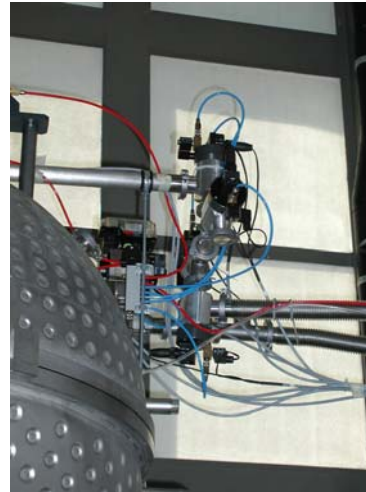
(movie files)



High and Low temperature applications

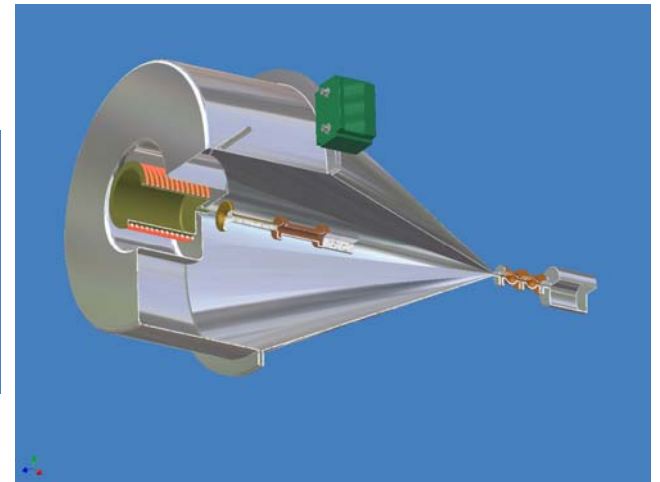
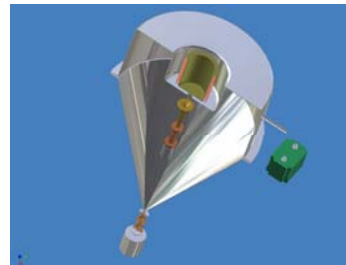
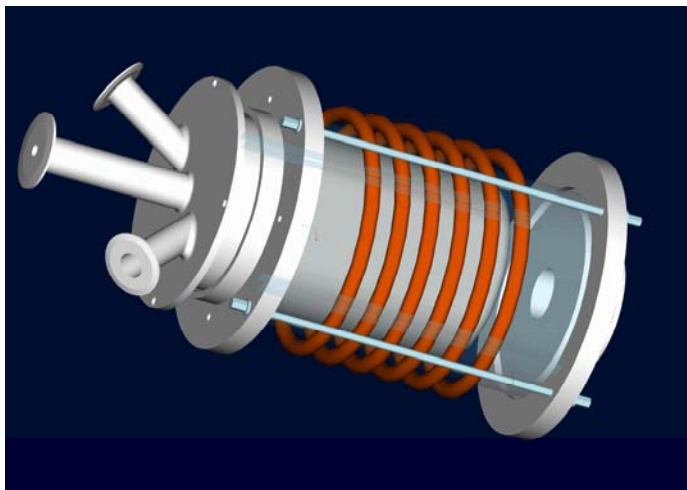
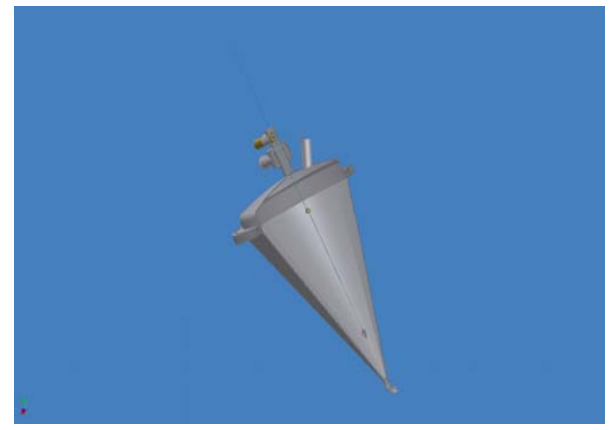
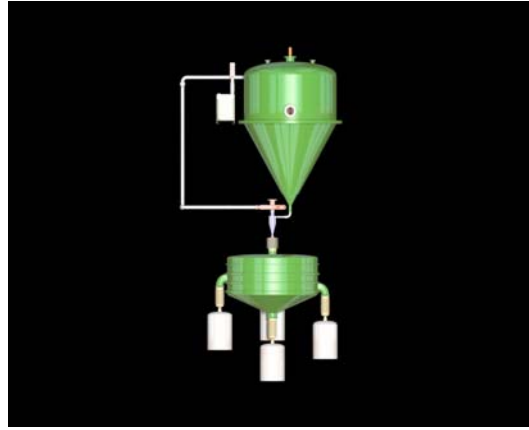
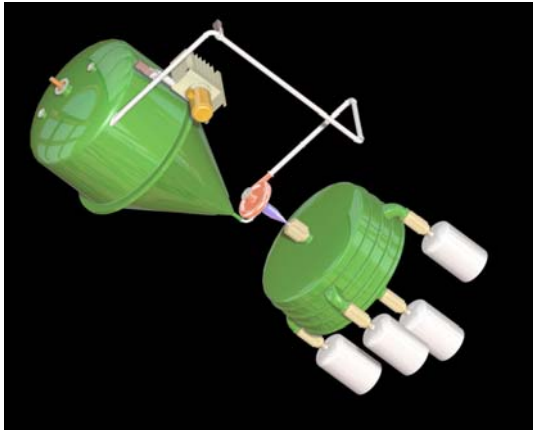


Atomizing Technology



Atomizing Chamber

with integrated induction-heating oven



Liquids Incineration

- The most interesting for liquid incineration is our tubular clamp technology. In its simplest form we are using specially designed clamps to fit over standard stainless steel or titanium pipes. In a more complex form we would machine a tubular shaped sonotrode from a solid block to give greater durability to the system. In either case these pipes either internally or externally become the radiating elements that make contact with the material under treatment. In an incineration application we have envisioned that the liquid material would be feed through the interior of the pipe where it is atomized and mixed with pressurized air. Attached are video files of two systems that demonstrate atomizing using our flexible Pipe-Clamp Technology.
- One concept is to use these ultrasonic components to help incinerate waste motor oils, industrial oils, organic and mineral oils. Very dirty and used lubricants, oils and greasy materials, charged with different solid particles can be ultrasonically transformed (atomized) into a spray phase, mixed at the same time with other liquids and gasses and very efficiently incinerated. The burning process in a spray phase is extremely efficient.
- The benefit is to eliminate liquid waste materials while producing heat energy for electricity or hot water applications in an environmentally-clean way. In the case of atomizing waste oils we propose to infuse the oil with water (and if necessary with certain amount of other, easy flammable fluid) and atomize the oil/water mixture. Such a mixture would offer much better burning efficiency since presence of water, between 10% and 20%, in many cases is stimulating oil and other fuels incineration and increasing flame temperature. If liquids to be incinerated are charged with foreign particles and have uncontrollable density traditional methods of using nozzles and pumps for spray production will not work well because nozzles would become blocked by the presence of hard particles. When using ultrasonic atomizers, such problems are completely irrelevant, meaning that almost any dirty and charged liquid can be atomized (or firstly reconditioned, mixed ultrasonically with other liquids, in order to get optimal viscosity, density and flammability, and then atomized and incinerated).
- A second concept is to efficiently incinerate non-flammable waste and dangerous liquids with ultrasonic stimulation. By transforming any dangerous liquid into spray phase, ultrasonically, and mixing it at the same time with a convenient flammable gas or flammable liquid spray the result should be a very efficient incineration.
- Our expertise is ultrasonic system components and we look to our industrial partners to bring the required expertise to make complete systems. Although we clearly understand the conceptual system elements it is important for you to understand that many of these new projects require a development phase where we can test and optimize our ultrasonic equipment and our clients can test and optimize the other system elements.