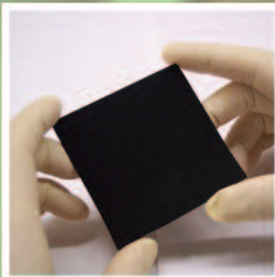
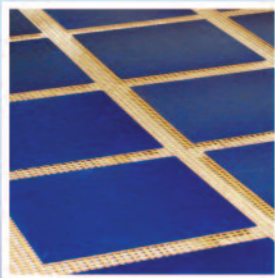


# *Precision Coating Technology*



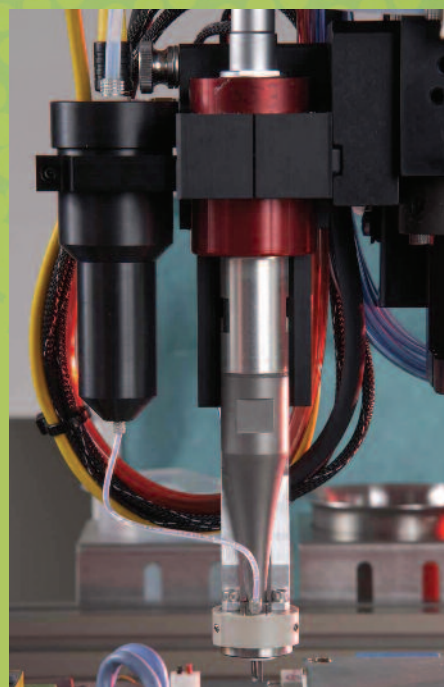
Solar  
Semiconductor  
Fuel Cell



## USI's Nozzle-Less Ultrasonic Spray Head Technology

USI's core technology consists of proprietary nozzle-less ultrasonic spray head technology for the thin, uniform application of a variety of low viscosity materials. The spray head consists of an ultrasonic transducer with a spray forming tip, an ultrasonic generator, an external liquid applicator, a precision liquid delivery system, and air directors.

- Principle of operation
  - Spray is produced with ultrasonic energy
  - Spray is shaped with low pressure air
- Nozzle-less ultrasonic spray head
  - Coating applied by an external liquid applicator directly to a rectangular spray forming tip on the ultrasonic head
  - Ultrasonic energy “atomizes” the coating liquid
  - Flat, sheet-like spray pattern is formed
- Integrated spray shaping – air directors
  - Independent air streams expand the ultrasonically-produced spray to a wide rectangular pattern
  - Adjustable air flow through the air directors determines the velocity of the spray



CAT ILDS Head

### USI Ultrasonic Spray Heads

Model	Coating Pattern Range	Typical Liquids	
CAT ILDS	3mm to 25mm	<ul style="list-style-type: none"><li>• Fuel cell inks and slurries</li><li>• Conductive inks</li><li>• Solutions and suspensions containing nano-particles</li><li>• Fluxes</li><li>• Photoresists</li></ul>	<ul style="list-style-type: none"><li>• Dopants</li><li>• Conformal coatings - acrylic and urethane</li><li>• Other low viscosity solutions and suspensions</li></ul>
Available in 35 kHz and 60 kHz frequencies			
Blade	100mm to 210mm	<ul style="list-style-type: none"><li>• Fuel cell inks and slurries</li><li>• Conductive inks</li><li>• Solutions and suspensions containing nano-particles</li><li>• Fluxes</li></ul>	<ul style="list-style-type: none"><li>• Photoresists</li><li>• Dopants</li><li>• Conformal coatings</li><li>• Other low viscosity solutions and suspensions</li></ul>
Available in 35 kHz and 45 kHz frequencies			



# Precision Coating for Your Application



PV-360  
for Crystalline  
Cell Production

USI's coating systems deliver a superior alternative to conventional air-atomizing spray nozzle, roll coating, fog coating, or ultrasonic spray nozzle coating techniques. The difference is in our core technology – a unique, proprietary nozzle-less ultrasonic spray head. We have developed coating systems that utilize this technology for a variety of markets and applications to deliver:

- Thin, uniform coating deposition for a wide range of materials;
- Up to 99% coating transfer efficiency;
- Coating system platforms developed to meet the needs of specific market requirements.

## Solar

The solar market requires high performance, reliable manufacturing technologies capable of uninterrupted production. USI's coating systems deliver unsurpassed manufacturing quality, efficiency, reliability, and throughput for the rapidly expanding global solar market.

### ***PV-360 System for Silicon Wafers***

- Conveyorized system for the application of phosphoric and boric acid for the following cell production processes:
  - Laser doped selective emitter (LDSE)
  - In-line thermal diffusion
- Precision metering pump liquid delivery system
- Processes up to 4,300 wafers per hour

### ***PV-480 System for Thin-Film***

- Conveyorized system for coating glass panel substrates for the following thin-film module production processes:
  - Anti-reflective coatings
  - Cadmium chloride and other salt solutions
- Processes glass plates up to 1,219mm (48") wide at speeds of up to 1.8 meters (6 ft) per minute



*Prism for Fuel  
Cell Production*

## Fuel Cell

The coating process in fuel cell manufacture presents a major challenge. Materials are often very expensive and require specialized liquid handling and delivery systems. These materials contain suspended particles and generally clog nozzle-based spray systems. USI's nozzle-less spray head technology delivers efficient, precision coatings where traditional systems cannot.

### *Prism System for Fuel Cell*

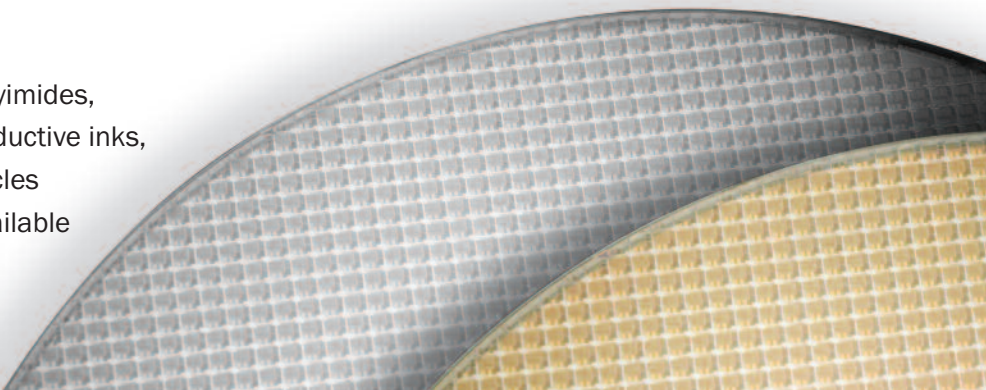
- Most advanced fuel cell coating system available
- Batch or in-line configurations for R&D or full-scale production
- Precision metering pump liquid delivery system with integrated fluid stirring
- Ideal for catalyst inks, electrolyte materials, slurries, and other proprietary materials critical to PEM, DMFC, and SOFC fuel cell production
- Optional heated vacuum chuck

## Semiconductor

USI's nozzle-less ultrasonic coating technology provides a thin, uniform coating of photoresist, polyimides, and solutions where conventional spin coating is ineffective. These applications include non-circular substrates, or substrates requiring uniform coverage on three-dimensional surface features, such as sidewalls of trenches.

### *Prism System for Semiconductor*

- Applications include:
  - Wafers
  - MEMS devices
  - Glass panels
- Compatible with photoresists, polyimides, photoimagable soldermasks, conductive inks, and liquids containing nano-particles
- Batch or in-line configurations available
- HEPA filtration kit and heated vacuum chuck optional







*Prism EH for  
Semiconductor  
Production*

## Electronics Assembly

USI is the leader in electronics assembly coating applications with more than 20 years of experience in this market and thousands of satisfied customers worldwide. USI's nozzle-less ultrasonic spray head technology and Microline Digital Dispense Head technology provide a precise, uniform application of various conformal coatings to printed circuit boards.

### *Prism System for Electronics Assembly*

- Virtually eliminates labor intensive masking
- Multiple spray and dispense technologies available
- Choice of three- or four-axis of motion
- Batch or in-line configurations available
- User-friendly Windows XP based GUI

## Other Markets Served

USI's coating technology extends to other applications. Contact us to learn more about our capabilities in the medical, flat panel display, and nanotechnology.



[www.ultraspray.com](http://www.ultraspray.com)



*USI Headquarters*



*PV-480 for Thin-Film  
Solar Production*

## About USI

Ultrasonic Systems, Inc. (USI) manufactures high-performance spray coating equipment based on proprietary, nozzle-less ultrasonic spray head technology. Our commitment to reliability and performance extends to multiple applications in the markets we serve.

### USI at a glance:

- 20 years of manufacturing precision spray coating systems
- Proprietary nozzle-less ultrasonic spray head technology
- Applications expertise in solar, fuel cell, semiconductor, and others
- All products developed, engineered, and manufactured by USI
- Comprehensive technical sales and service
- Worldwide distribution and support

With thousands of installations worldwide, our team of technical experts provides the best technical, product, and application support available. USI is committed to ensuring that you receive the ultimate performance possible from our systems. For more information on any of our products and their use in your application, or for a live demonstration of our products, contact: [sales@ultraspray.com](mailto:sales@ultraspray.com)



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