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 stream expands the ultrasonically-produced spray to a wide rectangular pattern
  - Adjustable air flow through the air directors determines the density of the spray

**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

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**TABLE**

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Blade 100mm to 250mm

- Fuel cell inks and slurries
- Conductive inks
- Solar and conformal coatings containing nano-particles
- Fluxes
- Photoresists

Available in 35kH and 45kH frequencies

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**Equipment**

CAT ILDS Head

CAT ILDS Head

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**Precision Coating Technology**

**Solar**

**Semiconductor**

**Fuel Cell**

**PV-440 for Thin-Film Solar Production**

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www.ultraspray.com
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About our PV-480 for Thin Film Solar Production

CAT IIDS Head

- Fuel cell inks and slurries
- Conductive inks
- Organic inks containing nano-particles
- Fluxes
- Photovoltaics
- Other low viscosity solutions and suspensions

- Fuel cell inks and slurries
- Conductive inks
- Organic inks containing nano-particles
- Fluxes
- Photovoltaics
- Other low viscosity solutions and suspensions

- Photoresists
- Conformal coatings - acrylic and urethane
- Other low viscosity solutions and suspensions

- Photoresists
- Conformal coatings - acrylic and urethane
- Other low viscosity solutions and suspensions

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Electronics Assembly

USI isthe leaderinelectronicsassembly 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 line-masks, fuel cell, solar panel, display, and microtechnology.

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.

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**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, photoimageable soldermasks, conductive inks, and liquids containing nano-particles
- Batch or in-line configurations available
- Optional heated vacuum chuck

**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 modules production processes:
  - Anti-reflective coatings
  - Cadmium chloride and other salt solutions
- Processes glass plates up to 1.219 dm (48”) wide at speeds of up to 1.8 meters (6 ft) per minute

**Precision Coating for Your Application**

PV-360 for Crystalline Cell Production

PV-480 for Thin-Film Cell Production

Prism for Fuel Cell 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 successful customer references 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

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• 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 fine-line, flat panel display, and microtechnology.

Precision Coating for Your Application

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.

PV-360 System for Silicon Wafers

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- Ideal for catalyst inks, electrolyte materials, slurries, and other proprietary materials critical to PEM, DMFC, and SOFC fuel cell production
- Optional heated vacuum chuck

PV-360 for Crystalline Cell Production

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Prism System for Semiconductor

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  - Glass panels
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  - Batch or in-line configurations available
  - HEPA filtration kit and heated vacuum chuck optional

PV-360 for Crystalline Cell Production

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PV-360 for Crystalline Cell Production

www.ultraspray.com
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 provides a precise, uniform application of various conformal coating to printed circuit boards.

**Electronics Assembly**

**Prism System for Electronics Assembly**
- Virtually eliminates labor-intensive masking
- Multiple spray and dispense head 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 fine-line, fast, panel display, and medical technology.*

**Prism EH for Semiconductor Production**
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- Solutions and suspensions containing nano-particles  
- Fluxes  
- Photoresists  
- Additives  
- Conformal coatings - acrylic and urethane  
- Other low viscosity solutions and suspensions |
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- **Additives**
- **Conformal coatings - acrylic and urethane**
- **Other low viscosity solutions and suspensions**

Available in 35 kHz and 60 kHz frequencies

**Blade**

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- **Solutions and suspensions containing nano-particles**
- **Fluxes**
- **Photoresists**
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- **Conformal coatings - acrylic and urethane**
- **Other low viscosity solutions and suspensions**

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**PV-480 for Thin-Film Solar Production**

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- **Typical Liquids**
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  - **Conformal coatings**
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**USI Headquarters**

Ultrasonic Systems, Inc.  
Worldwide Headquarters  
135 Ward Hill Avenue  
Haverhill, MA USA 01835  
Tel: +1 (978) 523-0095  
Fax: +1 (978) 523-0096  
www.ultraspray.com

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**Precision Coating Technology**

**Solar**

**Semiconductor**

**Fuel Cell**

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