Ultrasonic Spraying Equipment

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ULTRASONIC

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01

Description

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Principle

Ultrasonic spraying equipment use piezoelectric transducer to convert electrical energy into longitudinal high-frequency vibrations, creating standing waves in the liquid at the tip of the nozzle. Once the standing wave amplitude reaches a certain level, the liquid separates into uniformly sized droplets from the nozzle tip, achieving atomization. Ultrasonic spraying equipment uses ultrasonic energy to atomize liquid and spray it onto the substrate surface, achieves highly uniform and precise thin-film coatings. Compared to traditional pneumatic spraying, it increases paint utilization several times and achieves greater coating uniformity.

Advantage1

Uniform spraying:

Using ultrasonic high-frequency vibration technology, spray to uniform particle size onto the substrate, forming a coating of uniform thickness.

Advantage2

High Controllability:

Flow rate precisely controlled, minimum flow rate 0.01 ml/min.

Coating thickness precisely control, 0.1μm~ 40μm

Advantage3

Highly efficient :

Spraying speed precisely controlled, reducing overspray.

Material utilization four times higher than two-fluid spraying, saving materials and reducing environmental emissions.

Advantage4

Reduced Sputtering:

Air source used in minimal quantities, reducing the sputtering contamination caused by pressure spraying.

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Application

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Application

Ultrasonic spraying is widely used in a variety of fields, including electronic components, fuel cells, solar cells, semiconductors, medical devices, and industrial coatings (such as electronics, photovoltaics, glass, and textiles). This technology demonstrates superior performance in various precision coating processes due to its efficient material utilization, low atomization pressure, precise liquid control, and adaptability to complex geometries.

- **Proton exchange membrane（PEM）**
- **Gas diffusion layer（GDL）**
- **Electrolytic hydrogen production**
- **Batteries & Electrodes and Electrolyte Membranes**
- **Transparent conductive film（TCF）**

- **Medical devices**
- **Drug-eluting stents**
- **Blood collection tubes, balloon catheters**
- **Microneedle patches**
- **Biosensors**

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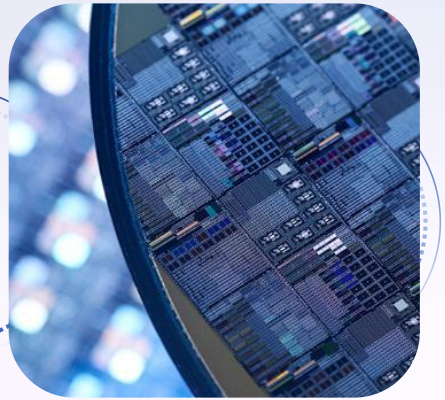
Application

Ultrasonic spraying technology uses the high-frequency resonance of piezoelectric ceramics to effectively break up liquid molecules, forming atomized particles ranging in size from 10 to 40 microns or even smaller. This technology eliminates the need for heating or the addition of chemical reagents, thereby maximizing the original performance and stability of the coating. This makes it more suitable for a wider range of new materials and demanding applications, giving it significant advantages in fields such as medical treatment and new material surface treatment.



- Glass industry
- Float glass
- Functional coating vacuum chamber

- Photoresist coating
- Flux spraying
- Compound nanoparticle coating

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Product Introduce

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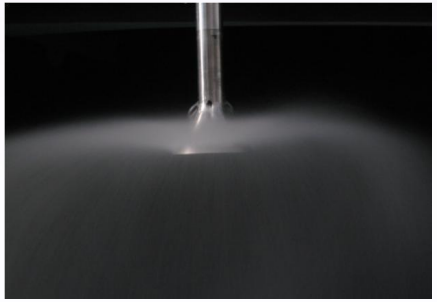
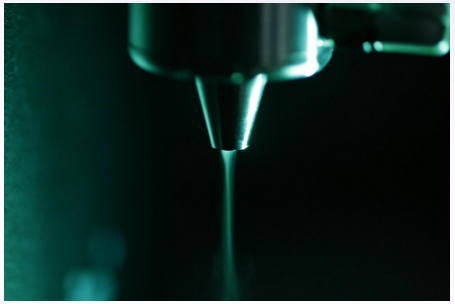
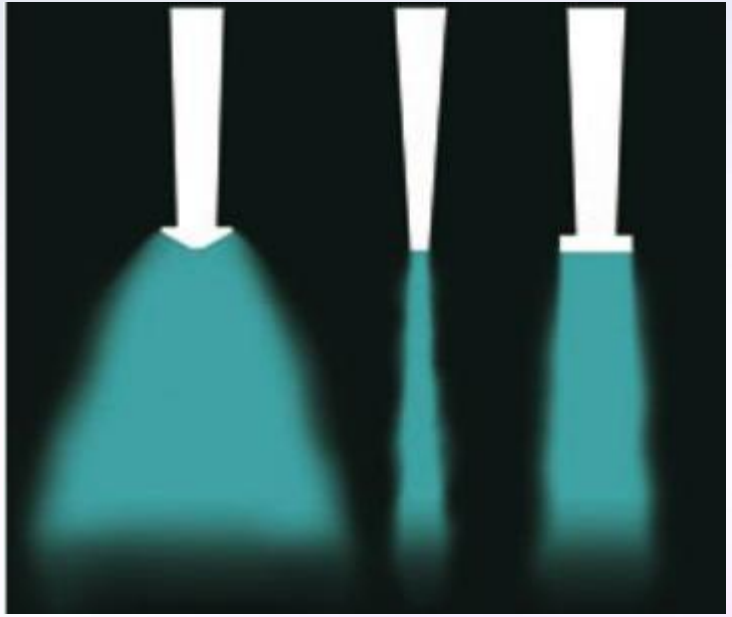
Type of ultrasonic nozzle



Ring Parabolic shape



Gathered Shape



•Diffusion •Micro spray •Straight Spray

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Parameter

Frequency	40Khz	60Khz	100Khz	120Khz
Generator Model	RPS-HF010			
Input Voltage	220V/50Hz			
Nozzle Material	Titanium alloy			
Shell Material	SS304			
Communication	RS485			
Spray Width	10~50mm	10~35mm	2~10mm	2~8mm
Spray Particle	10~40μm	10~20μm	5~15μm	1~10μm
Material Viscosity	< 100cps	<80cps	<50cps	<50cps
Solid Content	<10%			
Ultrasonic Power	100W,10~90% adjustable			
Flow Rate	<40ml/min	<15ml/min	<7ml/min	<5ml/min
Hole diameter	0.3~1.5mm	0.3~1mm	0.3~0.8mm	0.3~0.5mm

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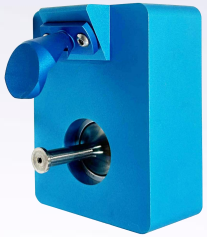
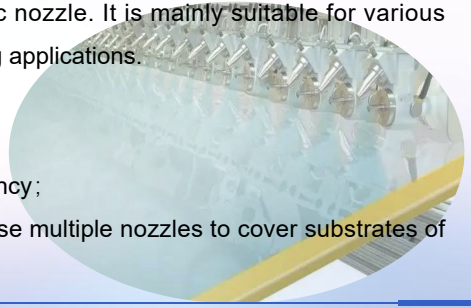
Product Overview

Parallel type



Wide spray nozzle

Wide-spray nozzle is an ultrasonic nozzle with a wider spraying area. It adopts ultrasonic spraying technology, disperses and redirects the carrier gas through a special flow channel design, so that the liquid mist after ultrasonic atomization is sprayed in a fan shape, thereby widening the spraying width of the ultrasonic nozzle. It is mainly suitable for various medium and large area spraying applications.

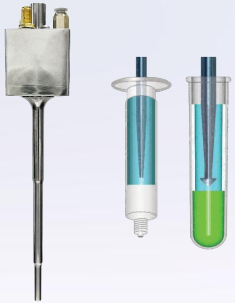


•Spray width: 40-100mm;

•Particle size: 15-40μm;

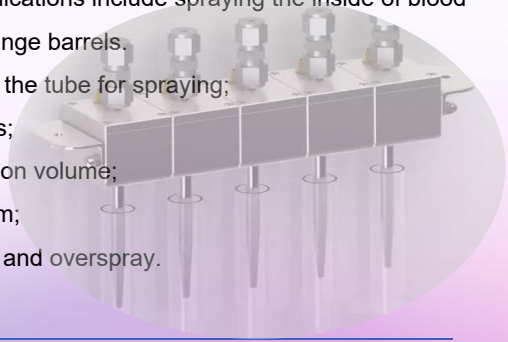
•Adjustable width, high consistency;

•Cover 24" with one nozzle or use multiple nozzles to cover substrates of any width



Probe-type nozzle

The probe-type ultrasonic nozzle is an extended-type ultrasonic nozzle. Utilizing ultrasonic nozzle technology, the extended nozzle tip allows the nozzle to penetrate into narrow spaces for spraying. It is primarily used for spraying into pipes. Typical applications include spraying the inside of blood collection tubes (BCTs) and syringe barrels.



•Can penetrate the inner wall of the tube for spraying;

•Uniform, fine atomized particles;

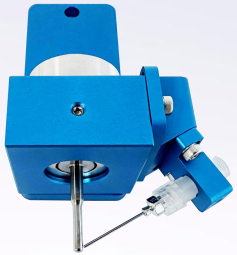
•Precisely controllable atomization volume;

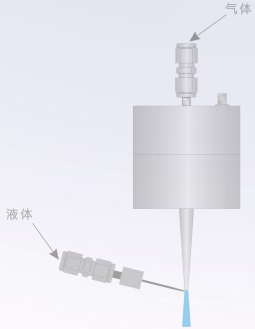
•Maximum spray diameter 20mm;

•Soft spraying, reducing spatter and overspray.

Product Overview

External type





External liquid supply type nozzle

Unlike traditional nozzles, the atomization process of the this type does’t pass through the inside of the ultrasonic nozzle, but is directly transported to the ultrasonic nozzle from the outside. This external liquid inlet method helps to improve liquid supply accuracy and atomization stability.

- •High coating uniformity
- •High raw material utilization rate
- •No clogging of nozzles
- •Little impact on liquid
- •Coating thickness is highly controllable

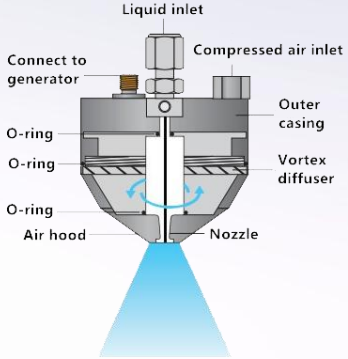
External type micro nozzle

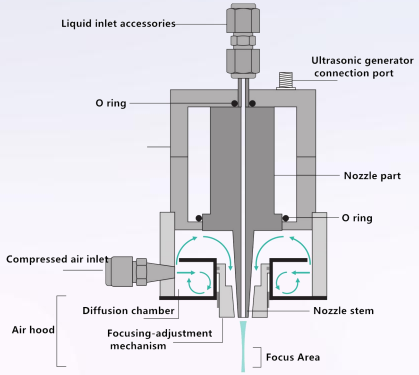
The micro-ultrasonic atomizing nozzle is designed for extremely small spray areas and flow rates. It utilizes ultrasonic atomization technology and a unique liquid and air supply method to achieve a smaller spray area and more precise flow rates. It is primarily suitable for a variety of small-area spraying applications.

- •Ultra-fine spray width: 2-8mm
- •Ultra-high frequency: 120kHz
- •Microscopic atomized particle size: approximately 10 microns
- •Multi-channel configuration allows simultaneous atomization of up to two liquids
- •Uniform atomization, with over 95% spray uniformity
- •Clog-resistant printhead reduces maintenance costs
- •Soft spray minimizes splashing and overspray

Product Overview

Vortex type





Vortex type nozzle

The vortex type ultrasonic atomizing nozzle is an atomizing nozzle with a built-in air chamber. The air chamber design changes the airflow and atomizing area during atomization, making the atomizing area adjustable.

•Adjustable spray range

•Controllable spray pattern

Product Overview

Customization

Vacuum flange type nozzle

The nozzle is connected to the vacuum chamber through a flange to ensure the sealing of the vacuum environment.

- Strong vacuum adaptability
- Customizable atomizer heads with different frequencies based on your needs

High temperature type nozzle

Customizable water-cooled or air-cooled nozzles are available based on customer application requirements. Reduce heat transfer within the furnace, ensuring proper operation. Typically suitable for applications such as high-temperature pulverizing, high-temperature cracking, real-time drying, and high-temperature coating.

- Suitable for high temperature environments
- Optional frequency

Precision liquid supply system

Constinfuse-constant flow syringe pump

Flow Rate	0.1μl-30ml /min
Syringe Size	5ml, 10ml, 25ml
Accuracy	≤+0.05%
Communication	RS485
Display Size	7inch LCD screen
Valve Material	Valve body: PCTFE, Valve element: PTFE
Tube Connection Interface	1/4-28UNF(Optional)
Environment Temperature	15-40℃
Syringe Material	Barrel material: Borosilicate glass
	Plunger rod material: Stainless steel
	Plunger seal material:PTFE
Power Supply	85~132/170~264VAC
Working Mode	Continuous work

Precision liquid supply system

Single tube liquid supply syringe pump

Flow Rate	0.1μl-30ml/min
Syringe Size	25ml
Accuracy	≤+0.05%
Communication	RS485
Display Size	7inch LCD screen
Tube Connection Interface	1/4-28UNF(Optional)
Environment Temperature	15-40℃
Syringe Material	Borosilicate glass
Power Supply	85~132/170~264VAC
Working Mode	Manual pumping

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04

Ultrasonic coating Machine

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P300 Simple Ultrasonic coating machine

Simple frame, horizontal and vertical movement, X,Y axis movement.

Semi-automated, suitable for experiments and small scale tests.

DIMENSIONS：W400mm×H450mm×D510mm；

WORK AREA：300 × 300 × 100mm；

NOTE: Work area may be reduced depending upon system configuration

POWER REQUIREMENTS：120V， 220V, +/-10%, 50-60Hz

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P400 Ultrasonic coating machine

Automated, programmable benchtop coating system with coordinated XYZ motion control

using Windows-based software and user-friendly

teach pendant with trackball.

Versatile R&D to mid-volume production thin film coatings.

DIMENSIONS：W944mm×H831mm×D794mm；

WORK AREA：400 × 400 × 100mm；

NOTE: Work area may be reduced depending upon system configuration

POWER REQUIREMENTS：120V， 220V, +/-10%, 50-60Hz；

Common options:

Wire/rod coater, sheet heating, ultra-static ESC, nozzle rotation or tilt, cleanroom upgrade, and corrosive material upgrade.

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P490 Ultrasonic coating machine

A standalone programmable three-axis robot ultrasonic full coating solution. This system employs robust ball-screw slides driven by servo motors. Spray pattern widths can be easily shaped depending on which nozzle is used. Custom Windows-based software makes it easy to program and store a variety of spray patterns for automated processes.

ENCLOSURE DIMENSIONS：W1021mm ×H163mm ×D997mm；

WORK AREA：420mmx 490mmx 85mm；

Configurable bottom plate heating function and vacuum adsorption function

Note: Work area may be reduced depending upon system configuration

POWER REQUIREMENTS：100-240 VAC， 50/60 Hz， 4.5A maximum base system, 17A maximum with standard heating plate;

Common options: Wire/Rod Coater, Sheet Heating, Ultra-Static ESC, Nozzle Rotation or Tilt, Cleanroom Upgrade, Corrosive Material Upgrade.

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THANK YOU!

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