



Atomizing Nozzles and Spray Systems ECCN 2B352.i

ECCN 2B352.i controls complete spraying or fogging systems, spray booms, and aerosol generating units (including atomizers and nozzles) that are “specially designed” or modified for fitting to aircraft, UAVs, or lighter-than-air vehicles. To be controlled, these units must also be capable of delivering an initial droplet volume median diameter (VMD) of less than 50 microns at a flow rate exceeding **2 liters per minute**.

Vendors and manufacturers that produce high-precision air-atomizing nozzles and spray systems, which may fall under ECCN 2B352.i (specifically designed for generating aerosols with a volume median diameter of less than 50 microns at high flow rates), include major industrial spray technology providers.

Key Vendors and Manufacturers

The following companies are identified as manufacturers or suppliers of atomizing nozzles and spray systems:

- **Lechler Inc. (Lechler US):** Manufactures pneumatic atomizing spray nozzles for fine droplets used in pollution control, cooling, and coating.
- **Spraying Systems Co. (TeeJet):** Offers a wide range of air-atomizing nozzles (“two-fluid” nozzles) designed for creating very fine sprays or mists.
- **BETE Fog Nozzle, Inc.:** Produces the XA nozzle system for air atomizing, including specialized nozzles for chemical processing and high-precision spraying.
- **Delavan Spray Technologies:** Specializes in air-atomizing nozzles for viscous liquids, often used for combustion and spraying applications.
- **Nex Flow Air Products Corp.:** Manufacturer of air nozzles and spray atomizing nozzles for industrial applications.
- **Siansonic Technology:** Manufactures ultrasonic atomizers, including the “Focumist” nozzle, which provides precise spray control.
- **SyringePump.com (Inc. ultrasonic atomizers):** Offers various, specialized industrial atomizing nozzles, including for high-temperature applications.
- **Nozzle Network Co., Ltd.:** A global search system providing products from numerous manufacturers for industrial spraying.
- **Monarch Nozzles:** Manufactures a full line of spray nozzles, including air-atomizing, fog, and oil burners.
- **Project Enterprises, Inc. (Wagner):** Distributes various spray nozzle types, including air atomizing and specialty nozzles.

While many industrial vendors manufacture atomizing nozzles, only those producing equipment “specially designed” for aircraft integration and meeting these specific technical thresholds are subject to ECCN 2B352.i controls.

Industrial Atomizing Nozzle Manufacturers

The following manufacturers produce high-performance atomizing nozzles. While many of their standard products are for industrial use (and may not be “specially designed” for aircraft), they offer the technical capabilities (droplet size <50 microns) that require evaluation against ECCN 2B352.i.

- **Spraying Systems Co.:** Offers a catalog of over 90,000 products, including Air Atomizing Nozzles specifically for operations requiring finely atomized mist or fog. Their Hydraulic Atomizing Nozzles can achieve droplet sizes in the 10-100 μm range.
- **BETE Spray Technology:** Manufactures Air Atomizing Spray Nozzles and MicroWhirl (MW) Misting & Fogging Nozzles designed for applications requiring very fine droplets. They provide custom-engineered solutions for precision coating and chemical processing.
- **Lechler US:** Provides a range of over 25,000 nozzles, including pneumatic atomizing nozzles and industry-specific engineered solutions for the chemical and pharmaceutical markets.
- **Nex Flow Air Products Corp.:** A supplier of various atomizing and air nozzles used in industrial cooling and coating that require fine droplet control.

Key Technical Considerations for 2B352.i

- **Aircraft Modification:** Standard industrial nozzles typically do not fall under this ECCN unless they are modified for or “specially designed” for aircraft or UAV mounting.
- **Exclusions:** Systems demonstrated *not* to be capable of delivering biological agents in the form of infectious aerosols are specifically excluded from 2B352.i controls.
- **Measurement Methods:** Compliance with the 50-micron threshold is typically measured using the Doppler laser method **or** Forward laser diffraction method.

Technical Specification Comparison

Specific Vendor Models Against the Technical Criteria of ECCN 2B352.i.

Vendor / Model	Droplet Size (VMD)	Flow Rate	Aircraft / UAV Design	Potential 2B352.i Control
CH Technologies [BANG]	0.7 – 2.5 μm	2 – 16 L/min	Lab/Research Focus	Controlled (if modified for flight)
CH Technologies [Collision]	~2.5 μm (MMAD)	2 – 32 L/min	Lab/Research Focus	Controlled (if modified for flight)
BETE [MicroWhirl MW]	“Mist” to “Fog”	0.032 – 1.413 L/min	Industrial/ Commercial	Low (Flow rate < 2 L/min)
Spraying Systems [Air Atomizing]	10 – 100 μm	Variable (Model Dep.)	Industrial/ Commercial	Medium (Depends on model)
Ikeuchi [SCBIMV]	“Fine Fog”	“Smallest flow rate”	Industrial/ Commercial	Low (Flow rate below 2 L/min)

Detailed Model Analysis

CH Technologies BioAerosol Nebulizing Generator (BANG)

- **Performance:** This unit is specifically designed for biological agent delivery in research. It meets the droplet size threshold (0.7–2.5 μm) and the flow rate threshold (up to 16 L/min).
- **Control Note:** While primarily for laboratory use, any version modified for fitting to a UAV or aircraft would trigger ECCN 2B352.i.

CH Technologies Collison Nebulizer

- **Performance:** Models with multiple jets (e.g., 24-jet) can reach flow rates up to 50 L/min while maintaining small droplet sizes.
- **Control Note:** Like the BANG, it is controlled if integrated into an aerial delivery system.

BETE MicroWhirl (MW) Series

- **Performance:** According to BETE's metric technical data, the flow rate range is 0.032 to 1.413 L/min.
- **Control Note:** Because the maximum flow rate listed (1.413 L/min) is below the **2 L/min** threshold specified in 2B352.i, these specific nozzles generally do not meet the technical criteria of ECCN 2B352.i, even if they produce droplets < 50 microns.

Spraying Systems Co. Air Atomizing Nozzles

- **Performance:** These two-fluid nozzles use compressed air to achieve very fine atomization (10–100 microns).
- **Control Note:** Larger industrial versions can exceed the 2 L/min flow rate, but they are typically sold for factory coating or cooling. They only become controlled under 2B352.i if “specially designed” or modified for aircraft use.

Summary of Threshold Compliance

- To be controlled, a system must meet **all** thresholds.
- Most industrial misting nozzles (like BETE or Ikeuchi) achieve the droplet size, but fail the **2 L/min flow rate** or **aircraft design** requirement.
- Specialized biodefense generators (like CH Technologies) easily meet the droplet and flow requirements, making their **physical modification for aircraft** the deciding factor for control.



CH Technologies (USA)
Bio-Aerosol Nebulizing Generator (BANG)



CH Technologies (USA)
Collision Nebulizer