AUTOJET® PRECISION SPRAY CONTROL SYSTEMS

FOR FOOD CONTACT APPLICATIONS

Spraying Systems Co.®
Experts in Spray Technology

THE SECRET TO UNIFORM COATING: PRECISION SPRAY CONTROL

Applying ingredients, flavorings, coatings and release agents can be challenging. For years processors have had to tolerate the waste of costly coatings, misting, excessive maintenance downtime and high scrap rates in attempts to achieve uniform coating. Now there is a way to eliminate all those problems and apply the exact amount of coating required directly on the target – even when using high-viscosity coatings. AutoJet® Precision Spray Control Systems provide unmatched accuracy to ensure uniform coating with minimal waste.

In the pages that follow, you will learn more about how AutoJet Precision Spray Control Systems work and see how easy it is to configure a system to fit your exact requirements.

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IS YOUR COATING SPRAYABLE?

The answer to this question is, almost always, yes. We have a proven track record of using spray technology to apply just about every coating, ingredient, slurry, flavoring and topping. The best way to determine if your coating is sprayable is with a proof-of-concept test in our spray laboratories.

Here's a partial list of coatings being successfully applied with spray technology:

- Alcohol (ATEX version only)
- Anti-foaming agents
- Antimicrobials
- Aromas
- Ascorbic acid
- Butter
- Caramel
- De-ionized water
- Eggs/egg wash
- Emulsions
- Enzymes
- Fat
- Food grade dyes and inks
- Gels
- Glazes/syrups
- Lecithin
- Liquid smoke flavor
- Lubricants/release agents/silicone
- Milk
- Oils
- Shortening
- Slurries – starch, sugar, yeast
- Wax

AUTOJET® PRECISION SPRAY CONTROL SYSTEMS OVERVIEW: SUPERIOR PERFORMANCE

AutoJet® Precision Spray Control Systems consist of PulsaJet® automatic spray nozzles and an AutoJet spray controller. Many systems also include a spray manifold. These systems use Precision Spray Control (PSC) to ensure coatings are applied consistently, uniformly and with minimal waste even when conveyor line speed changes.

PSC uses an AutoJet spray controller to turn electrically-actuated PulsaJet nozzles on and off very quickly to control flow rate. The cycling is so fast that the flow often appears to be constant. Flow rate changes are based on line speed and occur almost instantaneously to ensure the proper application rate.

PSC also enables a single PulsaJet nozzle to produce a wide range of flow rates. Electrically-actuated hydraulic versions can achieve very low flow rates – comparable to the flow rates of air atomizing nozzles. Using hydraulic nozzles eliminates the need for costly compressed air and minimizes the misting and overspray problems often associated with air atomizing nozzles.

PSC BENEFITS:

- Reduces product scrap caused by over- or under-application of coatings
- Reduces the use of costly coatings by applying the proper coating volume directly on the target
- Increases production – fast cycling of nozzles (up to 15,000 cycles per minute) keeps pace with high line speeds
- Eliminates maintenance time to clean excess coating from equipment and/or floor due to over-application
- Minimizes the need to change spray set-ups between batches – a single nozzle produces a wide range of flow rates

- Improves worker safety by minimizing misting
- Eliminates the need for compressed air in many coating operations
- Applies uniform coverage and accurate flow rate adjustments based on line speed
- Varies the flow rate without changing spray pressure when used with electrically actuated PulsaJet® spray nozzles
- PulsaJet electrically-actuated spray nozzles improve flexibility while reducing operating costs. Precision Spray Control (PSC) reduces liquid consumption, minimizes clogging and increases the flow rate adjustments based on line speed

SEE THE BENEFITS OF PSC: **spray.com/psc**

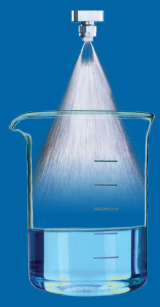
HOW PRECISION SPRAY CONTROL WORKS

Electrically-actuated spray nozzles are turned on and off very quickly to control flow rate. This cycling is so fast that the flow often appears to be constant.

With traditional nozzles, flow rate adjustments require a change in pressure. Changing pressure also changes the nozzle's spray angle/coverage and drop size. With PSC, pressure remains constant enabling flow rate changes without changes in spray performance.

NOZZLES SPRAYING
90% OF THE TIME

NOZZLES SPRAYING
50% OF THE TIME



NOZZLES SPRAYING
25% OF THE TIME

UNMATCHED COATING SYSTEM VERSATILITY

PulsaJet® nozzles and an AutoJet® spray controller are required to achieve PSC. Many systems include a spray manifold to ensure proper fluid delivery to the nozzle. A wide range of nozzle, controller and manifold options are available so performance can be tailored to the specifics of the coating viscosity and desired level of automation.

Contact your local sales engineer for system selection assistance and a no-obligation demonstration.

PULSAJET NOZZLES:

- Threaded or sanitary connections
- Standard, recirculating and temperature control designs
- Hydraulic and air atomizing versions

SPRAY MANIFOLDS:

- **98250 spray manifold** for use with hydraulic PulsaJet spray nozzles
- **63600 heated and non-heated manifolds** for use with hydraulic and air atomizing PulsaJet nozzles

SEE DETAILED SPECIFICATIONS ON PAGES 10-15

AUTOJET® SPRAY CONTROLLERS:

- **AutoJet Model 1750+ Spray Control Panel** provides Precision Spray Control for up to ten PulsaJet nozzles
- **AutoJet Model 2150+ Spray Control Panel** for advanced Precision Spray Control for up to 16 PulsaJet nozzles
- **AutoJet Model 2850+ Spray Control Panel** for advanced Precision Spray Control for up to 32 PulsaJet nozzles.

AUTOJET PRECISION SPRAY CONTROL SYSTEMS: IDEAL FOR A WIDE RANGE OF COATING, MOISTENING AND LUBRICATING APPLICATIONS

Here are just a few examples of how food processors are using our systems:

- Spraying oil, butter and flavorings on dough prior to baking to improve taste and appearance
- Applying release agents to pans and conveyors to prevent products from sticking
- Adding viscous coatings like glazes, sugar slurries and cinnamon to breakfast foods, snacks and desserts
- Applying antimicrobial agents to ensure food safety
- Coating products with preservatives and mold inhibitors to extend shelf life
- Applying moisture to products to help ingredient adhesion
- Adding water to foods to balance moisture loss from freezing
- Misting fruits and vegetables to ensure product stickers remain affixed after application
- Applying corn syrup to cake plates on packaging lines to minimize product movement once placed
- Applying a precise coating of oil to maintain a consistent calorie count
- Scoring bread
- Spraying yeast slurry on baked goods before packaging to extend shelf life

ACHIEVING RESULTS WITH AUTOJET® PRECISION SPRAY CONTROL SYSTEMS

BAKERY INCREASES PRODUCTION SPEED FIVE-FOLD

Problem: Geary's Bakeries, one of Britain's best known craft bakeries, needed to ensure that seed toppings would consistently adhere to rolls. Applying too much water caused the seeds to sprout and too little water resulted in seeds falling off. Geary's was having workers dip each dough ball in water and then pressing it into seeds – a slow and tedious process.

Solution: PulsaJet® spray nozzles now apply a precise volume of water to the rolls. An AutoJet® Model 1750+ Spray Control System automatically adjusts the flow rate for variations in line speed. Operators can easily set the duration of the spray cycle based on the type of baked good and the delay time between the detection of the baking tray and beginning of the spray cycle.

RESULTS:

System payback: less than three months

Seed application: time reduced from 5 seconds per roll to 1 second per roll

Improved product quality: seed adhesion problems eliminated

REDUCED SOYBEAN OIL WASTE SAVES PIZZA PRODUCER MORE THAN US$50,000

Problem: Inconsistent application of soybean oil to pizza crust dough made it impossible to validate the calorie count of the finished pizza. In addition, over application of the oil was costly and the excess increased conveyor belt wear.

Solution: The soybean oil is sprayed on the dough by PulsaJet nozzles. Operators simply select the oil application rate based on the type of pizza being produced and activate specific nozzles to match spray coverage to the width of the dough. PSC is used to apply the proper volume of oil based on line speed.

RESULTS:

System payback: less than 10 months

Calorie count: now easily validated

Eliminated soybean oil waste: savings of US$38,000 annually

Extended conveyor belt wear life: savings of US$13,000 annually

SEE MORE DETAILS ON THESE &
DOZENS MORE RESULTS STORIES AT
spray.com/results

AUTOMATED SPRAY SYSTEM ELIMINATES COSTLY QC PROBLEM FOR BAKERY

Problem: Damaged cakes and customer complaints prompted this bakery to find a way to ensure cakes remain firmly affixed to cardboard plates during shipping. Coating the cake plate with heated corn syrup proved to be the solution. However, the syrup was often overheated and had to be discarded. In addition, workers were routinely over-applying the syrup creating costly waste and a messy work environment.

Solution: An AutoJet® Precision Spray Control System with temperature control now applies a precise volume of corn syrup to each plate. As the plates move down the conveyor, a heated PulsaJet® nozzle applies a light coating of corn syrup. An AutoJet spray controller makes automatic adjustments to flow rate based on line speed and spray pressure to ensure optimal performance.

RESULTS:

System payback: less than four months

Lower scrap rate: cake damage dropped dramatically

Reduced use of corn syrup: 0.5 grams per plate compared to 7 grams per plate

Lower operating costs: workers have been deployed to other tasks

REVENUE BOOST OF US$60,000 FOR BEEF PROCESSOR WITH NEW AUTOMATED SPRAY SYSTEM

Problem: Unable to find a way to uniformly add water to its products prior to freezing and stay in compliance with government regulations, this beef processor was forced to forego adding moisture. Since beef patties are sold based on weight, this was a significant revenue loss for the processor since product weight decreases during freezing.

Solution: An AutoJet Precision Spray Control System provides the necessary precision for moisture addition. The AutoJet Model 2850+ Spray Controller adjusts the duty cycle of the PulsaJet nozzles based on line speed information from a sensor on the conveyor.

RESULTS:

System payback: less than six months

Improved product control: moisture addition to patties to offset loss during freezing now verifiable and product weight is maintained

Revenue gain: US$5,000 per month

AUTOJET® SPRAY CONTROLLERS

System control options range from simple to sophisticated and offer Precision Spray Control. Choose the level of automation best suited to your operation.

AUTOJET MODEL 1750+ SPRAY CONTROL PANEL

- Superior control of automatic nozzles compared to manual operation and solenoid valves
- Faster changeover between batches using optional pre-stored recipes
- Uniform spray coverage on the target with automated control of air and liquid
- Remote control feature for enhanced worker productivity. WiFi connectivity enables control from tablets, phones and computers. Workers can adjust system settings, troubleshoot problems and review system alerts even while deployed on other tasks
- Operates a wide variety of electrically- and pneumatically-actuated spray nozzles
- Quick set-up. The compact, self-contained system can be set up in minutes and the small footprint makes integration into existing operations easy
- A modular design that is available with a pump, without a pump, with a pressure pot or as a standalone spray controller

- Flexibility to match application needs. Every system provides on/off control of electrically- and pneumatically-actuated spray nozzles. Then choose liquid pressure control, liquid and atomizing air control, or liquid, atomizing and fan air control

AUTOJET® MODEL 2150+ SPRAY CONTROL PANEL

- Single and dual channel versions available
- Timing control of up to 16 air- or electrically-actuated hydraulic or air atomizing nozzles per channel
- Fixed or variable spray time and fixed or variable spray distance; repeat function for all modes
- Liquid pressure control for spray nozzles
- HMI Wi-Fi access to adjust settings, view alarms and schedule/review maintenance
- Line speed: 5 to 400 ft./min. (1.5 to 121.9 m/min.)
- Optional zone control to turn groups of PulsaJet® nozzles on or off with either a digital signal or a manual switch
- Other Options: Storage of up to 20 recipes, real-time monitoring or flow rate and pressure, and line speed encoding

AUTOJET MODEL 2850+ SPRAY CONTROL PANEL

- Touchscreen HMI with diagnostic screens
- Closed and open loop flow control for automatic adjustment of flow rate based on operating conditions
- System integrity checking maintains a consistent flow rate from a nozzle header spraying continuously or from a single nozzle applying intermittent “shots”. If out of range flows are detected, operators are notified with an alarm. This flow rate validation ensures product quality - especially important when applying expensive coatings or adding critical ingredients like antimicrobial agents
- Storage of up to 16 recipes reduces set-up time/changeover between batches
- Integrated zone control – easily create and store 12 different spray zones per recipe
- Helpful maintenance reminders on the HMI ensure proper system performance
- Automatic air, liquid pressure and atomizing air adjustments based on input from sensors
- Choice of one- or two-channel control

APPLICATION-SPECIFIC AUTOJET SYSTEMS

Standard AutoJet Systems are also available for specific coating applications. **Ask your sales engineer for additional information.**

- AutoJet Antimicrobial Spray Systems
- AutoJet Mold Inhibitor Spray Systems
- AccuCoat® Heated Spray Systems

PULSAJET® AUTOMATIC SPRAY NOZZLES

All food grade PulsaJet® automatic spray nozzles are constructed entirely of materials approved for food processing applications. Wetted materials meet FDA and EC 1935/2005 requirements for food contact. Stainless steel, PPS, PEEK™ and Viton® are used for maximum chemical resistance.

PulsaJet nozzles are also available for spraying alcohol in zone 1 hazardous locations. Certified by FM approvals, the nozzles feature stainless steel, PEEK and PPS wetted parts for maximum chemical resistance.

PulsaJet nozzles are available in a wide variety of configurations, including:

- Hydraulic or air atomized sprays
- Threaded or sanitary inlet connections
- Auto-alignment of flat spray tips
- Recirculation of sprayed liquid
- Temperature control to enable spraying of heated viscous liquids
- Special coatings for improved corrosion resistance
- Special construction for enhanced moisture protection

Precise liquid distribution for all PulsaJet automatic spray nozzles is provided using UniJet® spray tips. Standard UniJet tips are available in 303 or 316 stainless steel and offer a wide range of flow rates and spray angles.

Premium UniJet PWMD spray tips offer improved coating uniformity for critical food processing applications. The tapered edges ensure even coverage when overlapping sprays are required and the low volume behind the spray orifice results in improved spray distribution. UniJet PWMD tips are available in 303 stainless steel and offer a wide range of flow rates.

MODELS
AA10000AUH-104208
AA10000AUH-104210-FC

Liquid inlet connection	1/8" NPT or BSPT
Minimum flow rate at 40 psi (2.8 bar) and 10% duty cycle	.0017 gpm (0.006 lpm)
Maximum flow rate at 100 psi (7 bar) and 100% duty cycle	0.47 gpm (1.8 lpm)
Maximum rated pressure	100 psi (7 bar) (250 psi [17 bar] with 2150+ controller)
Maximum liquid temperature	200°F (93°C)
Power	24VDC, 0.36 amp
Maximum operating speed	10,000 cpm (15,000 cpm with 2150+ controller)

104208 accepts UniJet® TPU spray tips*.
104210-FC accepts Premium UniJet PWMD spray tips with 5° offset for auto spray pattern alignment**.

Construction: Stainless steel, Viton® or EPDM seals, PPS and PEEK™.

MODEL
AA10000AUH-114270-FC

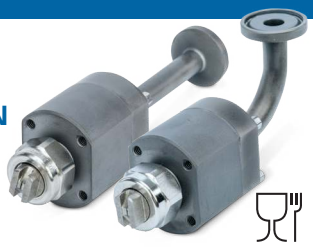
Liquid inlet connection	1/2" sanitary flange
Minimum flow rate at 40 psi (2.8 bar) and 10% duty cycle	.0017 gpm (0.006 lpm)
Maximum flow rate at 100 psi (7 bar) and 100% duty cycle	0.47 gpm (1.8 lpm)
Maximum rated pressure	100 psi (7 bar)
Maximum liquid temperature	200°F (93°C)
Power	24VDC, 0.36 amp
Maximum operating speed	6,000 cpm

Accepts UniJet TPU spray tips* using a threadless tip connection.

Construction: Stainless steel, Viton® or EPDM seals, PPS and PEEK.

*More information: *Industrial Spray Products Catalog* 75-HYD, pages C24-C31.
**More information: Data Sheet, PWMD UniJet® Tips.

MODELS
AA10000AUH-03-3/8SF-CRN
AA10000AUH-55417

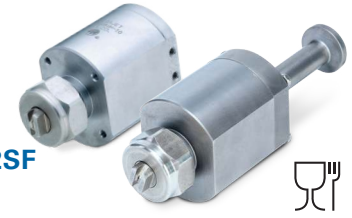


Liquid inlet connection	1/2" sanitary flange
Minimum flow rate at 40 psi (2.8 bar) and 10% duty cycle	.0017 gpm (0.006 lpm)
Maximum flow rate at 100 psi (7 bar) and 100% duty cycle	0.47 gpm (1.8 lpm)
Maximum rated pressure	100 psi (7 bar) (250 psi [17 bar] with 2150+ controller)
Maximum liquid temperature	200°F (93°C)
Power	24VDC, 0.36 amp
Maximum operating speed	10,000 cpm (15,000 cpm with 2150+ controller)

Both nozzles accept UniJet TPU spray tips*.

Construction: Magnetic stainless steel with chromium nitride coating for improved corrosion resistance, Viton® or EPDM seals, PPS and PEEK.

MODELS
AA10000AUH-10-FC
AA10000AUH-63910-1/2SF



Liquid inlet connection	10-FC: 1/8" NPT or BSPT 63910-1/2SF: 1/2" sanitary flange
Minimum Flow rate at 40 psi (2.8 bar) and 20% duty cycle	.02 gpm (0.075 lpm)
Maximum flow rate at 100 psi (7 bar) and 100% duty cycle	1.6 gpm (1.8 lpm)
Maximum rated pressure	100 psi (7 bar)
Maximum liquid temperature	150°F (65°C)
Power	24VDC, 0.36 amp
Maximum operating speed	5,000 cpm

Both nozzles accept UniJet TPU spray tips*.

Construction: Stainless steel, Viton® or EPDM seals, PPS and PEEK. 63910-1/2SF version magnetic stainless steel with chromium nitride coating for improved corrosion resistance.

MODEL AA10000AUH-104215-FC

Liquid inlet connections	1/8" NPT or BSPT
Minimum flow rate at 40 psi (2.8 bar) and 10% duty cycle	.0017 gpm (0.006 lpm)
Maximum flow rate at 100 psi (7 bar) and 100% duty cycle	0.47 gpm (1.8 lpm)
Maximum rated pressure	100 psi (7 bar) (250 psi [17 bar] with 2150+ controller)
Maximum liquid temperature	200°F (93°C)
Power	24VDC, 0.36 amp
Maximum operating speed	10,000 cpm (15,000 cpm with 2150+ controller)

Accepts Premium UniJet® PWMD spray tips with 5° offset for auto spray pattern alignment. Port at front allows recirculation of sprayed fluid**.

Construction: Stainless steel, Viton® or EPDM seals, PPS and PEEK™.

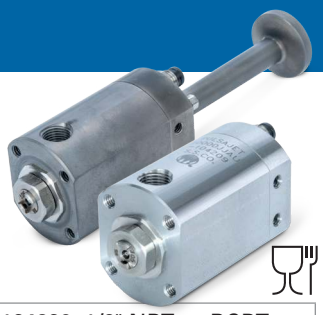
MODEL AA10000AUH-72440

Liquid inlet connections	72440-SF: 1/2" sanitary flange 72440-T: 1/4" NPT or BSPT
Minimum flow rate at 40 psi (2.8 bar) and 10% duty cycle	.0017 gpm (0.006 lpm)
Maximum flow rate at 100 psi (7 bar) and 100% duty cycle	0.47 gpm (1.8 lpm)
Maximum rated pressure	100 psi (7 bar)(250 psi [17 bar] with 2150+ controller)
Maximum liquid temperature	150°F (65°C)
Power	24VDC, 0.36 amp
Maximum operating speed	10,000 cpm (15,000 cpm with 2150+ controller)

Accepts UniJet TPU spray tips* using a threadless tip connection.

Construction: Stainless steel, Viton® or EPDM seals, PPS and PEEK. Magnetic stainless steel available with chromium nitride coating for improved corrosion resistance or electropolish finish.

MODELS AA10000JJAU-104209 AA10000JJAU-3/8SF-CRN



Liquid inlet connections	104209: 1/8" NPT or BSPT 3/8SF-CRN: 1/2" sanitary flange
Minimum flow rate at 40 psi (2.8 bar) and 10% duty cycle	0.0043 gpm (0.016 lpm)
Maximum flow rate at 100 psi (7 bar) and 100% duty cycle	0.18 gpm (0.68 lpm)
Maximum rated pressure	100 psi (7 bar) (250 psi [17 bar] with 2150+ controller)
Maximum liquid temperature	200°F (93°C)
Power	24VDC, 0.36 amp
Maximum operating speed	10,000 cpm (15,000 cpm with 2150+ controller)

Both units accept JJ setups***.
Specify appropriate retainer cap when ordering

Construction: Stainless steel, Viton or EPDM seals, PPS and PEEK. AA10000JJAU-3/8SF-CRN has magnetic stainless steel with chromium nitride coating for improved corrosion resistance.

MODEL AA10000AUH-03-Z1

Liquid inlet connection	1/8" NPT or BSPT
Minimum Flow rate at 40 psi (2.8 bar) and 10% duty cycle	.0017 gpm (0.006 lpm)
Maximum flow rate at 100 psi (7 bar) and 100% duty cycle	0.47 gpm (1.8 lpm)
Maximum rated pressure	100 psi (7 bar)
Maximum liquid temperature	104°F (40°C)
Power	Max. 27VDC, 0.36 amp
Maximum operating speed	10,000 cpm

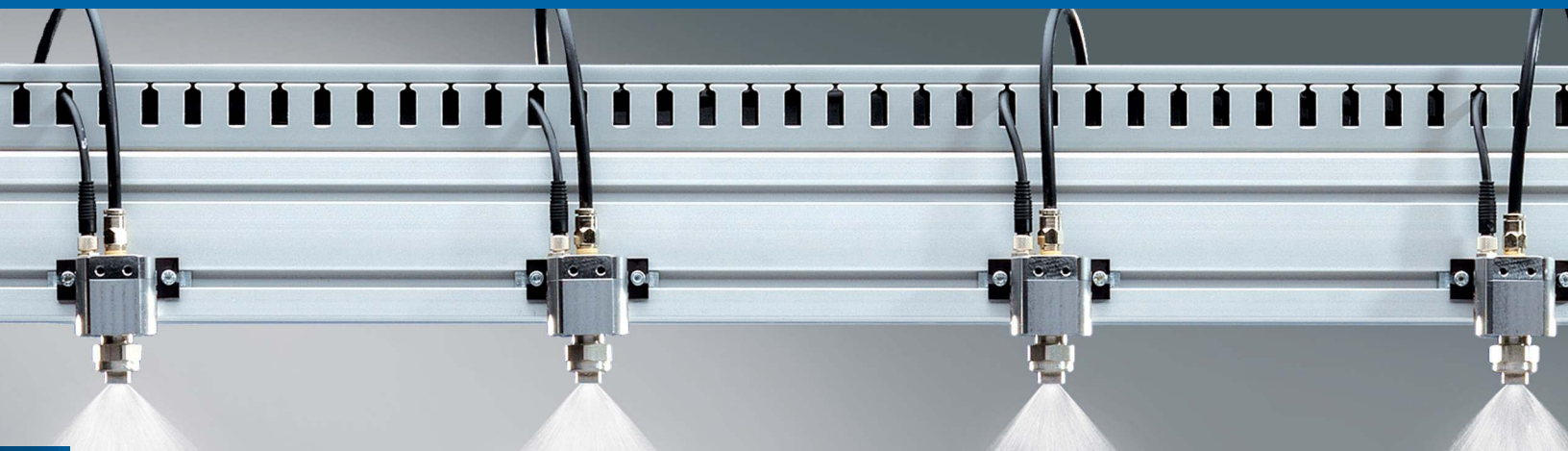
Accepts UniJet TPU spray tips*. Used in Zone 1 hazardous areas.

Construction: Stainless steel, FFKM seals, PPS and PEEK.

*More information: *Industrial Spray Products Catalog* 75-HYD, pages C24-C31.

**More information: Data Sheet, PWMD UniJet® Tips.

***More information: *Air Atomizing and Automatic Spray Nozzles Catalog* 75AA-AUTO, pages B24-B31.



SPRAY MANIFOLDS

98250 HYDRAULIC PULSAJET® SPRAY MANIFOLD

- Use with PulsaJet hydraulic spray nozzles
- User specified lengths, number of nozzles and nozzle spacing
- User-adjustable nozzle spacing
- Dual inlet ports for liquid recirculation
- Aluminum construction
- IP64 wiring configuration available for single channel or independent banking of nozzles

63600 HYDRAULIC SANITARY JACKETED PULSAJET MANIFOLD

- Heated or non-heated operation
- Hot water jacket can be used as a cooling jacket
- Housing and all internal liquid and conduit lines are 316L stainless steel construction

63600 AIR ATOMIZING SANITARY JACKETED PULSAJET MANIFOLD

- Heated or non-heated operation
- Hot water jacket can be used as a cooling jacket
- Housing and all internal liquid and conduit lines are 316L stainless steel construction

The following trademarks are registered to other entities in the US and may be registered in other countries as well: Peek™, Viton®

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