

A GUIDE TO SPRAY TECHNOLOGY FOR FOOD PROCESSING

SOLUTIONS FOR COATING,
CLEANING, DRYING,
FOOD SAFETY & MORE



Spraying Systems Co.[®]
Experts in Spray Technology





OPTIMIZE SPRAY PERFORMANCE TO BOOST PRODUCTIVITY, REDUCE WASTE & ENSURE FOOD SAFETY

Spray technology is used in dozens of operations in food processing plants including applying coatings, flavorings and other ingredients; applying antimicrobial agents and mold inhibitors; cleaning tanks, equipment and floors; spray drying, air blow-off and more. Optimizing spray performance can have a significant impact on the bottom line. Slashing water use, reducing waste of costly coatings and chemicals, minimizing manual labor and decreasing the risk of product recalls are just a few of the benefits processors can experience by optimizing spray performance.

**WE ARE UNIQUELY QUALIFIED TO HELP YOU IMPROVE QUALITY, INCREASE SAFETY
& LOWER OPERATING COSTS:**

- More than seven decades of experience helping food processors with cleaning, coating, cooling, drying and lubrication operations. Spray technology is our sole focus, resulting in an unmatched level of expertise
- Spray nozzles, spray manifolds and automated systems in food-grade compliant materials
- Research and testing capabilities ensure even the most challenging operations are optimized. Think your coating can't be sprayed? Stubborn residues in vats and tanks taking too long to clean? We'll use advanced modeling and testing to validate our suggested spray solution
- No charge on-site evaluations by our sales engineers can help identify areas for process improvements. Interested in reducing water or compressed air use? Looking for ways to minimize manual labor in cleaning operations? Challenged by excessive maintenance due to overspray? Give us a call, there's a local sales office in your area
- Our global technical sales and manufacturing ensure you can implement the same solution in all of your plants to guarantee product quality and standardized production. We're where you need us to be and ready to deliver

Learn more: **1.800.95.SPRAY** | **1.630.665.5000** | spray.com



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COATING NOZZLES & SPRAY CONTROL

We've got the solution for precision application of ingredients, oils, release agents and other coatings. In addition to a wide range of hydraulic and air atomizing nozzles, we offer automated spray systems to optimize spray performance. No matter what you're spraying, we've got you covered.

For more on turnkey spray systems, see pages 6-11.



PULSAJET® AUTOMATIC SPRAY NOZZLES

PulsaJet electrically-actuated spray nozzles are extremely versatile and ideal for coating with a wide range of non-viscous and viscous coatings. For high viscosity coatings like butter, oil, glaze and chocolate, recirculating and/or temperature controlled versions are available.

BENEFITS

- Automatic flow rate adjustment based on line speed*
- Reduced downtime and lower spray system costs – a single nozzle provides a wide range of flow rates*
- Extra low flow hydraulic atomizing eliminates the need for compressed air in many processes
- Minimal waste and mess due to high transfer efficiency
- Cycle speeds up to 15,000 cycles per minute to keep pace with fast line speeds
- Performance matched to your application – choose from several styles and dozens of spray tips
- **Use with an AutoJet® spray controller for maximum control and performance optimization**

VMAU AUTOMATIC SPRAY NOZZLES

VMAU automatic spray nozzles allow easy adjustment of flow rate, drop size and spray pattern for maximum operating flexibility. Spray performance can be matched to your exact requirements – liquid flow rate, atomizing air and fan air pressure can be fine-tuned to meet application requirements or accommodate batch changes.

BENEFITS

- More uniform, consistent spray patterns than other air atomizing nozzles due to unique design features
- Suitable for viscous coatings – optional heat jacket keeps coatings flowing through nozzles
- Fast and easy maintenance – no tools required
- Suitable for use in a wide range of operations – dozens of standard and anti-bearding spray set-ups, threaded and sanitary connections
- **Use with an AutoJet spray controller for maximum control and performance optimization**

*See more on Precision Spray Control on page 5 and at spray.com/psc

PRECISION SPRAY CONTROL OVERVIEW

AutoJet spray controllers turn electrically-actuated PulsaJet® nozzles on and off very quickly to control flow rate. This cycling is so fast that the flow often appears to be constant.

Precision Spray Control benefits include:

- Flow rate can be automatically adjusted based on line speed to ensure proper coating weight
- A single nozzle can produce a wide range of flow rates. Pressure remains constant, so spray angle and drop size are unaffected by flow rate changes
- Very low flow rates can be achieved without using compressed air to atomize the spray



AUTOMATIC AIR ATOMIZING NOZZLES

Our air-actuated air atomizing nozzles are ideally suited for coating and moistening where precision is important. Choose from dozens of set-ups, body styles and spray patterns.

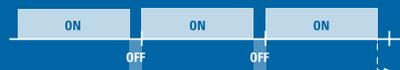
BENEFITS

- Internal air cylinder provides controlled on/off operation up to 180 cycles per minute
- Optional clean-out needles minimize clogging
- Compact versions ideal for use in production area with limited space
- **Use with an AutoJet® spray controller for maximum control and performance optimization**

IDEAL FOR:

- | | |
|-------------------|-------------------------------|
| • Butter | • Release agents on equipment |
| • Flavorings | • Seasonings |
| • Mold inhibitors | • Sugar slurry |
| • Oil | • Water |

NOZZLES SPRAYING 90% OF THE TIME



NOZZLES SPRAYING 50% OF THE TIME



NOZZLES SPRAYING 25% OF THE TIME



AUTOJET® MODEL 1550+ MODULAR SPRAY SYSTEM

For basic control of automatic spray nozzles, this compact, easy-to-use system is ideal. It can be used with electrically- and pneumatically-actuated spray nozzles to control air and liquid.



BENEFITS

- Accurate placement of the sprayed liquid through precise on/off control
- Even application of the sprayed liquid through automated liquid and air control
- Precision spray control when used with PulsaJet® spray nozzles
- Easy set-up, operation and integration
- Available with food contact materials of construction

AUTOJET SPRAY CONTROLLERS

Additional spray controllers are available with more advanced control features such as automatic adjustments to spray system components based on operating conditions, automatic detection of clogged nozzles, operator notification on specified faults and more.

IS YOUR COATING OR MATERIAL SPRAYABLE?

The answer to this question is, almost always, yes. We have a long history of using spray technology to apply just about every coating, ingredient, slurry, flavoring, topping and sealant. The best way to determine if your coating or material 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:

- Cheese
- Chocolate
- Cinnamon
- Egg wash
- Fat barriers
- Gravy
- Marshmallow cream
- Moisture barriers
- Sugar slurry
- Wax

SPRAY MANIFOLDS

Spray manifolds play an important role in many coating operations by optimizing nozzle performance. Manifolds ensure proper fluid and air flow to nozzles as well as proper nozzle placement/positioning to eliminate quality problems. Spray manifolds also can reduce downtime by simplifying changeover between batches. Spray manifolds are available for use with a wide range of nozzles and are configured to meet application requirements.

- **63600 sanitary PulsaJet® spray manifolds** – constructed of 316L stainless steel, this jacketed manifold is designed for use with up to 18 hydraulic PulsaJet automatic spray nozzles. Nozzle spacing is user-specified. The jacket can be used for heating or cooling

- **63600 sanitary air atomizing spray manifolds** – same design as the 63600 sanitary PulsaJet spray manifold, this version is for use with 1/4J or 1/4 VMAU series air atomizing nozzles. A wide range of spray set-ups and versions with shut-off and clean-out needles ensures you get the performance you need

BENEFITS

- Ensures proper delivery of fluid and air to nozzles
- Speeds installation and maintenance

IDEAL FOR:

- Spraying release agents
- Applying coatings to products in pans, drums or on conveyors
- Viscous coatings requiring heating or cooling



ACCUCOAT® SPRAY SYSTEMS

From egg wash to oils, syrups and release agents, AccuCoat Spray Systems eliminate the problems associated with applying viscous coatings. This family of automated systems provides precise temperature control to eliminate waste caused by coatings that are too hot or cold to spray effectively. Processors using AccuCoat Spray Systems report significant increases in production, improvements in product quality and lower operating costs.

BENEFITS

- Reduce waste – clogging, misting and over-application of viscous coatings are eliminated
- Eliminates product loss caused by uneven coating
- Improve food safety – wetted materials are food contact approved and worker contact with product is eliminated
- Minimize downtime – multiple recipes can be pre-programmed for some systems to facilitate batch changes
- Easy to install, easy to operate and easy to clean



BENCHTOP ACCUCOAT HEATED SPRAY SYSTEMS

Benchtop AccuCoat Heated Spray Systems are available for R&D or pilot runs. These systems can be set-up in minutes and provide a cost-effective method to validate coating applications. The compact design includes a heated liquid delivery unit and an AutoJet® spray controller to provide precise spray timing and flow control.



IN-LINE ACCUCOAT HEATED SPRAY SYSTEMS

In-line AccuCoat Heated Spray Systems consist of an AutoJet spray controller and an in-line heater. These units provide heat on demand to warm light oils just prior to spraying to improve coating uniformity and minimize clogging.

IDEAL FOR:

- Butter
- Chocolate
- Egg wash
- Fat barriers
- Oil
- Sugar slurry
- Coating candies, nuts, cereals and other confectioneries with viscous coatings in pans





FULLY-JACKETED ACCUCOAT® HEATED SPRAY SYSTEMS

Fully-jacketed AccuCoat Heated Spray Systems maintain precise temperature control all the way from the liquid supply tank to the target. AutoJet® spray controllers are available for basic spray control and for real-time monitoring and closed-loop control. Optional features include auto tank refill and tank agitation.

ACCUCOAT PANNING SYSTEMS

AccuCoat Panning Systems provide flexible performance and control for candy and confectionery panning operations. Systems are available for individual pans and also for operations with centralized fluid delivery. AccuCoat Panning Systems are fully jacketed to ensure the proper temperature control from tank to target. The system's AutoJet spray controller maintains the desired coating weight and ensures uniform coating on the target – without manual intervention.



AUTOJET® FOOD SAFETY SYSTEMS FOR MEAT & POULTRY PROCESSORS

AutoJet Food Safety Spray Systems ensure that sanitizers are applied uniformly on conveyors and antimicrobial agents are precisely applied into packages or directly onto meat and poultry products each and every time. These systems have been proven to enhance food safety and extend shelf life for bagged whole muscle products, roll stock products, fresh meats, ground meats and sliced products.



SYSTEM MODULES

Application requirements determine the actual configuration of an AutoJet Food Safety Spray System. Systems typically include:

- **Fluid Delivery** – PulsaJet® automatic spray nozzles with UniJet® spray tips or UniJet bodies and spray tips in FDA-compliant materials. Nozzles are typically mounted on spray headers. Other mounting options are available
- **Spray Control** – AutoJet spray controller or PLC for automated systems. Manual and timer-based control valves are available for conveyor sanitizing systems
- **Fluid Supply** – Stainless steel pressure pot with liquid level sensor and pressure relief valve

IDEAL FOR:

- Bagged whole muscle products
- Hot dogs, links and formed products
- Fresh meats – subprimals and trim
- Packaged poultry products
- Sliced meat and poultry products



BENEFITS

- Precise application of sanitizers or antimicrobials ensures consistent performance and minimal waste
- Added intervention steps enhance food safety and can extend shelf life, meeting the demanding requirements for both processors and retailers
- Allows multiple antimicrobials and volumes to be used on a single line
- Provides the freedom to utilize high quality, natural antimicrobials efficiently
- Easily integrated into existing product lines

AUTOJET® FOOD SAFETY SYSTEMS FOR BAKED GOODS & SNACK FOODS

AutoJet Food Safety Spray Systems apply mold inhibitors and antimicrobials to baked goods, snack foods and other food products. The system applies the mold inhibitor uniformly and provides complete coverage of the product to help extend shelf life.



SYSTEM COMPONENTS

- An AutoJet spray controller ensures accurate, intermittent spraying even if line speed varies
- Hydraulic PulsaJet® automatic spray nozzles

BENEFITS

- Precise, accurate coating ensures product quality and extends shelf life
- Controls use of costly mold inhibitors

IDEAL FOR:

- Loaf bread
- Tortillas
- English muffins
- Flat bread



TANKJET® TANK CLEANING EQUIPMENT

There's a TankJet product solution for nearly every tote, tank, vat or vessel. Options include tank cleaning nozzles, spray balls and high-impact tank cleaning machines. A few of the more-widely used products in food plants are featured here, but there are dozens more.

Visit tankjet.com for more information.

- **TankJet 360 for tanks up to 100' (30 m) in diameter** – this powerful fluid-driven machine offers the most consistent impact over the entire pressure range. High-impact cleaning removes even the most stubborn residues efficiently and effectively so tanks can be returned to service quickly
- **TankJet AA190 for tanks up to 34' (10 m) in diameter** – motorized unit operates at pressures up to 1000 psi (69 bar) and provides high-impact cleaning with 360° coverage. Motors are positioned outside of the tank for long, dependable wear life. Units can be permanently installed or moved from tank to tank
- **TankJet 63225-3A spray balls for tanks up to 13' (4 m) in diameter** – stationary spray balls designed for sanitary rinsing are threadless, self-draining and have a polished 32Ra interior and exterior surface finish
- **TankJet lances** for efficient fluid delivery to tank cleaners – connections, lengths and materials are user-specified

BENEFITS

- Thorough, consistent, quick cleaning of tanks
- Improves worker safety – eliminates need to enter tanks and minimizes exposure to hazardous chemicals
- Reduces use of costly cleaning chemicals and water

IDEAL FOR:

- Rinsing, cleaning and sanitizing tanks of all sizes
- Clean-in-place (CIP) and sanitary applications



GUNJET® SPRAY GUNS & CONVEYOR CLEANING NOZZLES

Improve cleaning efficiency without compromising quality. We have a wide range of solutions to help shorten cleaning time, sanitize hard-to-reach areas, reduce use of costly chemicals and more.



CU150A GUNJET SPRAY GUNS

High-impact, low-pressure CU150A GunJet spray guns offer versatile performance. Guns feature an adjustable spray pattern – from hollow cone to solid stream – and interchangeable orifice caps for quick and easy change of spray capacity.

BENEFITS

- Clean without spreading contaminants
- Conserve water and chemicals
- Durable and reliable – all stainless steel with white corrosion-resistant outer cover designed for food plants
- Ergonomic design reduces operator fatigue

IDEAL FOR:

- General plant and equipment clean-up and sanitation
- Conveyor cleaning
- Equipment cleaning



CONVEYOR & EQUIPMENT CLEANING NOZZLES

VeeJet® flat spray nozzles are typically used for rinsing, cleaning and sanitizing conveyors because of the uniform coverage provided by overlapping spray patterns. Conventional and QuickJet® quick-connect styles are available in a wide range of spray angles, capacities and materials.

BENEFITS

- Eliminate manual cleaning and ensure cleaning consistency
- Clean conveyors thoroughly – high-impact flat spray nozzles with narrow angle sprays remove tough residues
- Reduce downtime with quick-connect nozzles which allow spray tips to be changed by hand

For conveyor sanitizing systems, see page 10.

SPRAYDRY® NOZZLES

You will find the perfect match to your performance requirements in our product line – it's the most extensive in the industry. You'll find different nozzle styles – swirlchamber, core and whirlchamber designs. Each style has multiple configuration options and hundreds of interchangeable components.

- **SV SprayDry nozzles with swirlchamber design** – these nozzles are direct replacements for competitive nozzles but that's where the similarity ends. SV SprayDry nozzles provide longer wear life, higher standard rated pressures and competitive pricing and are readily available – shipping in days, not weeks

- **SK and SB SprayDry nozzles with core design** – these nozzles feature a very narrow, uniform drop size distribution to ensure particle size consistency. In addition, drop size can be fine-tuned by adjusting capacity and pressure. Maximum free passage and anti-bearding styles are available to reduce clogging and minimize build-up on the nozzle face

- **WhirlJet® SprayDry nozzles** – for use in high volume operations. WhirlJet SprayDry nozzles produce larger particles and provide uniform drop size distribution with minimal product waste at pressures up to 5000 psi (340 bar). Choose from two body styles and two types of whirlchambers



BENEFITS

- Extend production runs due to use of superior materials of construction
- Reduce maintenance time – hand-tight design on most models eliminates the need for special tools and simplifies disassembly and reassembly
- Versatile – hundreds of interchangeable swirlchambers, insert/core combinations and insert/whirlchamber combinations ensure you'll get the performance you need

IDEAL FOR:

- Coffee
- Flavorings
- Food color
- Infant formula
- Ingredients
- Milk
- Nutraceuticals
- Powdered foods and drinks
- Tea
- Whey
- Yeast



WINDJET® AIR PRODUCTS FOR DRYING/BLOW-OFF

For superior drying or blow-off, you'll find what you need in our WindJet line. Some products use compressed air and others use clean heated air from a regenerative blower. All of our WindJet solutions will help you dry parts more thoroughly and quickly, improve precision in blow-off operations and reduce compressed air use or eliminate it completely.

- **WindJet air knife packages** – air knives powered by use of an energy-efficient air source – a dependable, low maintenance regenerative blower – are ideal where air velocity is needed for drying. A uniform, high volume air stream along the entire length of the knife is produced to eliminate spotting and blotching problems. Air cannons can be used instead of or in conjunction with air knives and provide a targeted air stream that can be directed into holes and indentations for complete drying
- **WindJet air nozzles** – convert a low volume of compressed air into a targeted, high-impact air stream for complete drying. Available in a wide range of styles, spray patterns and capacities, WindJet nozzles are also widely used for cooling, blow-off and moving products on/off conveyors

BENEFITS

- Reduce operating costs up to 95% – WindJet air knife packages eliminate the need for compressed air; WindJet air nozzles use up to 92% less compressed air than open pipe
- Low operating noise
- Improve worker safety

IDEAL FOR:

- Drying cans and bottles
- Drying conveyors
- Blowing rejected product from conveyor lines
- Cooling baked goods
- Dust blow-off
- Moving product from conveyor to conveyor





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