



Spray Technology for Meat and Poultry Processing

A Guide to Ensuring Food Safety, Increasing Productivity and Reducing Chemical Use

A Division of



Spraying Systems Co.[®]
Experts in Spray Technology



Spray
Nozzles



Spray
Control



Spray
Analysis



Spray
Fabrication

Successful pathogen protection — a three-point approach

Meat and poultry processors have a common fundamental goal —
to ensure the highest level of food safety possible while minimizing production costs.

To meet that goal, you may be facing some of these challenges:

- Reducing microbe counts and extending product shelf life without altering taste
- Minimizing chemical costs without compromising food safety
- Validating safety programs

Overcoming these challenges requires expertise in food production processes, chemistry and application technology. These three disciplines must work in unison to maximize the impact of anti-pathogen strategies.

Process Criteria

Processors develop HACCP plans and SSOPs based on their in-depth knowledge of their processing lines. But, they can benefit from partnering with chemical and application professionals to improve advanced pathogen control and line efficiency.

Chemistry

Food microbiologists and chemical suppliers have developed safe and effective chemicals to destroy pathogens. Experts from chemical companies provide valuable counsel on the many factors that affect the “kill rate” of antimicrobial agents.

Maximum Pathogen Protection

Application Technology

Even the most technically advanced chemicals cannot prevent pathogen “grow out” if they are not applied accurately. Yet determining the most effective method for delivering chemicals to the product is too often overlooked.

Advanced spray technology plays a critical role in applying antimicrobial chemistry

- **Increased product and process quality.** Automated spray control systems adjust chemical application for varying line speeds and product weights quickly and accurately, eliminating human error.
- **Reduced chemical usage.** Automated spray control systems ensure on-target application of coatings every time, reducing overall chemical usage, preventing overspray and eliminating packaging sealing problems.
- **Verified application of antimicrobial agents.** Automated spray control systems confirm spray application of critical coatings and log chemical usage for easier compliance.

For proven spray system solutions that can improve your plant’s food safety and productivity, turn to AutoJet Technologies.

Automated systems consistently and reliably apply food coatings

Optimize the performance of Spraying Systems Co. automatic spray nozzles with AutoJet® Spray Systems

- AutoJet Spray Controllers are equipped with on-board application software for fast production start-up
- Advanced timing control ensures on-target application of chemicals every time
- Multiple levels of password protection reduce operator intervention
- Alarms and warnings notify operators or stop the system should problems occur
- Maintenance and troubleshooting screens are available to quickly isolate problems

Reduce chemical consumption with automatic spray nozzles

PulsaJet® Automatic Spray Nozzles provide accurate spray placement and exceptional spray pattern integrity in high-speed and low capacity meat and poultry processing spray applications.

- High-speed cycling, up to 10,000 times per minute, enables faster line speeds and increased productivity
- Pulse Width Modulation, very fast on-off operation, provides precise control of flow rate by regulating the time that the nozzle sprays
 - Provides lower flow rates with clog-resistant larger spray tips
 - Provides a high turndown ratio — a wide range of flow rates available from a single tip
 - Minimizes overspray and saves chemical consumption
- Compact design with all wear parts easily accessible from the front for minimum maintenance downtime

Spraying Systems Co. offers a broad range of automatic spray nozzles to meet your application requirements.

Validate post-lethality interventions using SprayCheck™ sensors

Here's how AutoJet Spray Systems can verify the application of chemicals to make your food safety process validation easier

- A miniature optical sensor mounted near the nozzle orifice detects a spray pattern
- "Flow" signals sent by the AutoJet Spray Controller are confirmed with "spray present" signals from the SprayCheck sensor to verify spray application
 - Each spray cycle is documented
 - "No-spray present" signals can generate alarms or activate special marking of non-conforming packages



PulsaJet automatic nozzle with SprayCheck sensor

Request more information on our spray solutions for meat and poultry processing. See the back cover for details.

Five examples of AutoJet® spray solutions that ensure safety, increase

RTE meat processor improves kill rate and dramatically reduces chemical consumption

Problem: A ready-to-eat meat processor needed to accurately spray an antimicrobial agent into container cavities prior to filling and vacuum sealing.

Solution: An AutoJet Spray System using multiple PulsaJet® Automatic Spray Nozzles sprays low doses of antimicrobial agents into multiple cavities prior to product insertion. An AutoJet Spray Controller uses a trigger signal from an indexing conveyor to activate the spray during the conveyor's dwell time. The spray controller also monitors pumps and flow sensors to confirm proper flow rates for each spray nozzle. Unacceptable flow conditions trigger fault messages and system shutdown.

This method has proven more effective and economical than chemical baths or direct spraying, with pathogen reductions of greater than 6 log₁₀ and chemical savings estimated at more than US\$1,000,000 per year.



SAFETY



PRODUCTIVITY

Case-ready poultry processor eliminates packaging problems and verifies antimicrobial application

Problem: A poultry processor needed to spray an antimicrobial agent in packages without wetting the lip of the product tray. The volume of solution had to be precisely adjusted based on portion size and the processor required verification that the antimicrobial was applied to each package.

Solution: An AutoJet Spray System prevents overspray by using the packaging machine's encoder signal and a proximity sensor to precisely control the timing of a PulsaJet Automatic Spray Nozzle. The system allows operators to quickly select the proper spray volume from a menu based on portion size and verifies that chemicals are applied to each package using SprayCheck™ sensors for validation purposes.

productivity and reduce chemical use



CHEMICAL REDUCTION



Ready meal processor minimizes overspray on oval targets with advanced spray shaping

Problem: A processor of ready meals and processed meats needed to spray a viscous water and caramel coating onto oval-shaped molds filled with pâté. The previous system produced a flat fan pattern which sprayed a great deal of coating on the outside of the mold.

Solution: An AutoJet Spray Controller quickly adjusts the atomizing air pressure to a flat spray nozzle from 3 psi to 15 psi and then back to 3 psi, varying the spray pattern's fan width. By carefully timing the pressure adjustments with the motion of the molds, an intermittent oval coverage is created, minimizing the waste produced by other spray systems. The external mix spray setups used with the PulsaJet Automatic Spray Nozzles handle the viscous coating without clogging.

Packaged foods producer extends shelf life of frozen meatballs

Problem: A major meat processor was experiencing product quality problems due to their chemical application process. The manual process resulted in chemical waste, inconsistent coverage and mold on their frozen meatballs.

Solution: An AutoJet Modular Spray System using PulsaJet Automatic Spray Nozzles evenly coats the meatballs with lactic acid after cooking and prior to freezing. The spray controller can automatically adjust flow rate for variations in line speed, so a constant application rate is maintained. Uniform coverage with lactic acid extends the product's shelf life. The automated system also greatly reduces overspray and chemical usage.

Case-ready meat processor improves product quality of ground beef chubs

Problem: Responding to customer demands, a major case-ready meat processor needed to improve the consistency of their seasoning of ground beef chubs prior to packaging.

Solution: An AutoJet Spray Flavoring System maintains a constant application rate of .25% rosemary seasoning by weight, regardless of line speed changes. Photoeye sensors detect the presence of ground beef chubs and trigger intermittent sprays from PulsaJet Automatic Spray Nozzles, eliminating over-application of the seasoning mix. Stainless steel flow meters confirm the flow rate to the AutoJet Spray Controller and alarms are programmed to notify operators if the system does not maintain the desired flow rate.

In addition to satisfying their customer's product quality demands, the AutoJet Spray System provided the processor with a payback estimated at one year based solely on reduced chemical usage.

Other helpful resources:

A Guide to Spray Technology for Food Processing

Bulletin No. 524B

Informative guide summarizes the latest spray technologies for coating, spray drying, cooling, humidifying and packaging.



AutoJet® Modular Spray System *Bulletin No. AT104B*

Details the features, specifications and options of our most cost-effective spray system to incorporate advanced spray control.



PulsaJet® 10,000 **Automatic Spray Nozzle** *Bulletin No. 551*

Includes features, benefits and specifications of our new automatic spray nozzle. PulsaJet nozzles use extremely fast on-off operation, up to 10,000 cycles per minute, to precisely control flow rate and reduce overspray.



Optimizing System Performance with Precision Spray Control *Bulletin No. AT103B*

Provides an overview of the benefits of automated spray systems. Included are application examples that show how to reduce overspray, improve product quality, increase throughput and improve regulatory compliance.



A Guide to Safe and Effective Sanitation *Catalog 40*

Features innovative spray products for food processors. Topics include CIP solutions, automated tank washing, manual cleaning, equipment cleaning and blow off.



Advancing Spray Technology Through Consulting, Prototyping and Testing *Bulletin No. 520C*

Discusses the role of spray analysis and research methodologies in process improvement. Case studies demonstrate how spray analysis has saved manufacturers thousands of dollars.



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