



EGG PROCESSING PLANT

WASHDOWN AUDIT REPORT



about us

Solutions for Industry

Headquartered in Bethlehem, Pennsylvania, USA, Strahman Group is a worldwide leader in manufacturing high-quality Wash Down Equipment and Industrial Valve products. Since its inception in 1921, the Company has earned a global reputation for reliable products that provide superior performance, innovative solutions to complex problems, and long-term reliability. As a result, Strahman has become the “standard” for numerous industries, including food & beverage processing, chemical, petrochemical, polymer, biotechnology, pharmaceutical, mining, and pulp and paper.

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BACKGROUND

One of southern Arizona's largest value-added eggs processor was recently audited by one of their largest customers.

During that audit, the customer expressed concern about the water pressure used during the sanitation shift. The customer suggested that the pressure was causing translocation of media that could reattach to the surfaces of the previously sanitized equipment.

A conference call with several colleagues was initiated to discuss water pressure. As a result of the call, Strahman Group was invited to tour the plant, review washdown conditions and equipment, and provide an opinion assessment.

Our goal was to explore the washdown environment, validate water pressures, talk about innovations, discuss translocation factors, and understand how nozzle type and water pressure affect translocation, savings solutions, and recommend improvements in efficiency, safety, and sanitary conditions to reduce environmental impact.

Strahman Group's Regional Sales Manager, Chris Gilreath, visited the plant on September 14th and 15th, 2021. In attendance were three Corporate Sanitation Directors and a Microbiologist.

discovery

Day One: Main Objectives

1 Understanding Water Pressure: Water pressure is a force that makes water flow strong or weak. There is no defined measurement of what constitutes low pressure or high pressure. Typical water pressure ranges from 40 psi to 80 psi. Anything over 80 psi is considered high pressure.

IAPMO (International Association of Plumbing and Mechanical Officials) states in their Uniform Plumbing Code: 608.2 Excessive Water Pressure—A limit of 80 psi (551.6 kPa) is the maximum static pressure of any water supply system.

2 Innovation: Strahman is the pioneer in washdown equipment – from our steam/cold water mixing units to our innovative nozzle design. Our design approach is precision and performance. We think about the user and the process. Our nozzles are ergonomically designed, robust, and conscious of water consumption. There is a science in developing a washdown system that delivers enough force and flow to move product without atomizing product or harmful bacteria back onto sanitized surfaces. We do not believe in high-pressure washdown practices. Strahman believes that high pressure significantly increases the risk for recontamination of the just cleaned equipment and environment.

The group also discussed Strahman's EcoPrO3 centralized ozone sanitation systems. Key takeaways were:

- Ozone is considered USDA organic
- Ozone is the strongest approved antimicrobial
- Ozone has a passivation effect on stainless steel
- Ozone destroys biofilms
- Ozone is approved for use in processing

discovery

Day One: Main Objectives

3 Translocation Factors: Translocation of media, bacteria, or pathogens is evident. Significant factors contribute to the rate of translocation:

- **Humidity** is an effective vehicle in carrying organic or inorganic material throughout a room or even into HVAC ductwork. Higher water temperature and pressure increase humidity.
- **Media** in a food processing facility vary greatly. They range from fine powders with low weight to larger masses like meat with higher weight. The lighter the media, the greater travel potential.
- **Air circulation** has an effect as well. Ideally, consider positive, negative, and ambient air pressure differentials to direct undesirable contaminants away from microbially sensitive areas. If unwanted contaminants enter the HVAC, it can harm other parts of the facility.
- **Water pressure.** Higher water pressure will not only add humidity to the air, but it will atomize and propel material into the air. Thus, additional humidity will cause an ideal environment for *Listeria monocytogenes*. While there are no defined pressures for low or high pressure, we can conclude that too much pressure increases the translocation distance of material.

4 Potential Solutions: The goal is to discover a blanket solution to fit all facility environments and applications. With all the varying factors, this can be difficult to find a “one size fits all” solution. The most obvious and easily attainable solution is to ensure water pressures within each facility are within code. Next would be to use a nozzle that has lower shearing and overspray. Another potential solution could be the utilization of a more effective antimicrobial for problematic areas.

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observations

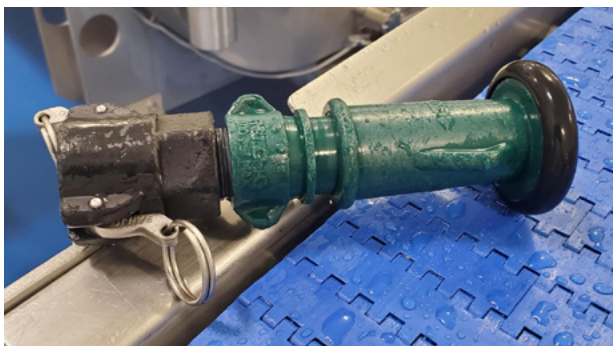
Day Two: Potential Solutions

1 Water Pressure: Verified testing on cold and hot water using an inline Watts water pressure meter confirmed the pressure was well within IAPMO Uniform Plumbing Code: 608.2.

WATER	BURST	MEAN
Hot	85 psi	60 psi
Cold	85 psi	62 psi

2 Flow Pattern and Overspray Comparison:
Current Nozzle: A fire hose-style nozzle.

The nozzle sprays a variable cone pattern to a solid stream. The user twists the tip of the nozzle to achieve the desired spray pattern and flow. There is no shut-off feature if the user drops the nozzle while spraying.



Tested Nozzle: Strahman's Hydro-Pro 150® Spray Nozzle. Our nozzle sprays a variable cone pattern to a solid stream and features a locking trigger mechanism to help reduce fatigue and safety shut-off. The user engages the lever to activate the spray and achieves the desired pattern and flow once the lever is locked. If dropped, the safety shut-off is activated, and the water flow immediately stops.



△ Strahman Hydro-Pro 150®

HYRO-PRO 150® FLOW TEST		
PSI	FLOW (GPM)	
	STANDARD	LOW FLOW
20	3 ¼	2 ¼
30	4 ¼	2 ¾
40	5 ½	3 ¼
50	5 7/8	3 ¾
60	6 ¾	4 1/8
70	7 ½	4 ½
80	7 ¾	4 7/8
90	8 ¼	5
100	9	5 1/8




◁ Fire-Hose Style Spray Nozzle



observations

5 Gallon Challenge

We conducted a water test to gauge how quickly the water would fill a 5-gallon bucket and then calculated the estimated annual cost based on the plant's 3.5 hours/day of usage x 27 nozzles/hoses.

FIRE-HOSE STYLE NOZZLE 	SANI-LAV NOZZLE 	HYDRO-PRO 150® NOZZLE* 
10.43 sec to fill bucket	33.3 sec to fill bucket	Did Not Test
28.76 GPM	9.01 GPM	6.75 GPM
56,258,874 gallons annual consumption of water	17,624,912 gallons annual consumption of water	13,204,013 gallons annual consumption of water
\$204,564 (\$2.72 per HCF (748.05 gallons)) annual sewer cost ¹	\$64,086 (\$2.72 per HCF (748.05 gallons)) annual sewer cost ¹	\$48,011 (\$2.72 per HCF (748.05 gallons)) annual sewer cost ¹
\$131,613 (\$1.75 per HCF (748.05 gallons)) annual water cost ¹	\$41,232 (\$1.75 per HCF (748.05 gallons)) annual water cost ¹	\$30,890 (\$1.75 per HCF (748.05 gallons)) annual water cost ¹
\$336,177 total annual cost	\$105,418 total annual cost	\$78,901 total annual cost

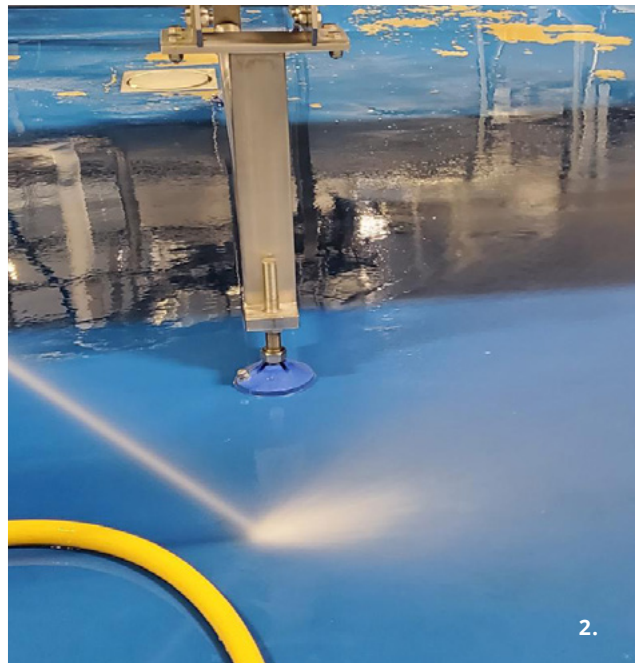
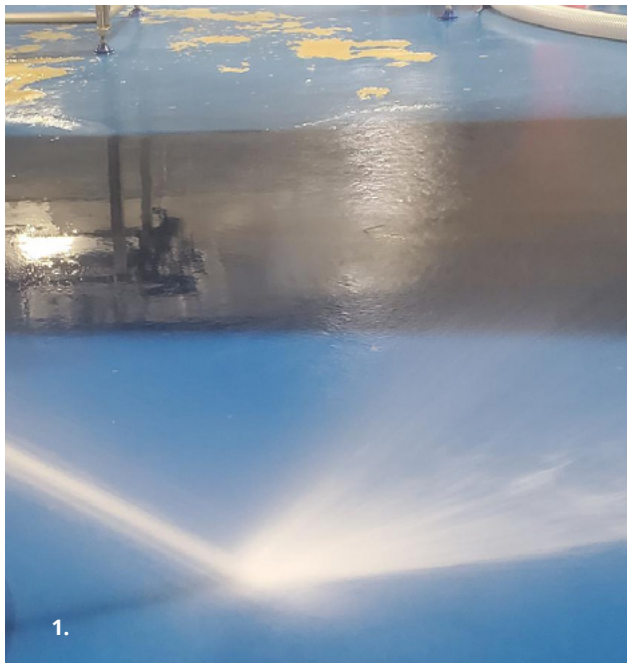
Sources

¹<https://www.yumaaz.gov/home/showpublisheddocument/16/637305859802300000>

²<https://www.yumaaz.gov/home/showpublisheddocument/18/637305859805100000>

observations

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These images illustrate the water shear and distance traveled by overspray. 1. The fire-hose style spray nozzle demonstrates a strong force of water spray that will likely cause contaminants on the floor to become airborne that could potentially reattach to previously cleaned surfaces. 2. The Strahman Hydro-Pro 150® demonstrates a controlled spray having less shear and overspray. 3. The two sprays side by side in comparison.

observations

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These style hose clamps can be a catch-all for all kinds of contaminants and a safety hazard. If a clamp loosens, the threat of hot water will spray everywhere, potentially harming the user. Strahman hoses have smooth surface Stainless Steel clamps, so they are sanitary, easy to keep clean, and hydraulically clamped, providing a strong connection to the nozzle.



The above images from another food facility show what can happen to improperly handled hoses by splicing and clamping to connections.

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recommendations

Day Two: Solutions

3 Product Recommendations: Strahman Hydro-Pro 150® Nozzle with our Pivot Pro and extruded hose. The ergonomic design of the nozzle coupled with our Pivot Pro fully articulating swivel will reduce user fatigue. Less fatigue ensures an attentive user will complete sanitation to standards. The HP-150 nozzle is lightweight and features a locking trigger mechanism that disengages and stops water flow if the nozzle drops. The extruded hose is smooth and easy to clean. It also features FDA internal tube that provides greater strength.

\$257,276
total annual cost savings



▷ Strahman Ergonomic Hose Assembly



recommendations

Day Two: Solutions

4 Product Recommendations: Strahman EcoPrO3 centralized or mobile ozone sanitation. This system is fully stainless-steel skid-mounted, comprised of the ozone generator, oxygen concentrator, ozone injection system, ozone balance tank, dissolved ozone monitor/controller, and safety destruct system. The EcoPrO3-20S will supply ozonated water at up to 20 GPM at 2.0 PPM ozone concentration (higher concentrations at lower flow rates). The system operation is via a Raspberry Pi controller and touchscreen. All historical treatment data, in addition to system diagnostic data, will be stored in the controller and is accessible remotely.

Advantages and Benefits:

- Proven Disinfection Technology
- Improved Product Quality and Safety
- FDA, USDA, and USDA Organic Program Direct Food Contact Approved
- Ozone-On-Demand Controls: integrated process controls allow for fully automated, constant set-point operation based on real-time ozone demand. Dissolved ozone levels are automatically controlled to provide a stable, consistent level to the process.





CONTACT US

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