

Anti-Bacterial Coating for Powered Pallet Trucks

How special additive enhances meat processors' washdown process to ensure 99+% elimination of harmful microbes on vehicle's steel surfaces

WHITE PAPER

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Introduction

For facilities preparing beef, pork, veal, poultry or processed meats, sanitization and hygiene are of the utmost importance to minimize the presence of food borne—and potentially harmful—microbial organisms. These include *Listeria monocytogenes*, *Escherichia coli* (*E. coli*), *Campylobacter jejuni*, *Salmonella* and *Shigella*.

Critical to preventing microbial contamination is routine cleaning of powered pallet trucks. These vehicles fall into the Zone 3 classification of sanitization procedures for post-processing areas.¹ Therefore, the U.S. Food and Drug Administration (FDA) requires them to be washed with 180-degree water² and an approved cleaning material, such as chlorine-quaternary ammonium (“quat”)-based cleaner or sanitizer, iodine based cleaner or sanitizer, or chlorine-alkaline detergent.³

However, research has shown that while these methods are effective, trace amounts of bacteria can still remain on surfaces, with potentially dangerous results:

*The presence of organic material and the attachment of microorganisms to surfaces can reduce the efficacy of disinfectants... Bacteria within a biofilm [colony] are generally more resistant to physical and chemical antimicrobial factors than are freely suspended bacteria. On surfaces that are irregular or difficult to reach, survivors might form biofilms, resulting in increased resistance to sanitizers and heat and they could then contaminate foods.*⁵

To combat the potential for microbes to survive on powered pallet trucks, a unique anti-bacterial additive can be included in the clear, powder coat paint finish of the vehicle’s steel components. Adding this extra layer of protection to the forks, undercarriage, platform, handle bar, lifting carriage and bar guard renders these elements of the vehicle microbially neutral by inhibiting the formation of a biofilm colony that could compromise a meat processing facility’s sanitation.

This white paper is intended to help meat processors understand the importance of an anti-bacterial additive to powder coating, and the value it adds to a powered pallet truck.

Get in the Zone

Most meat processors utilize the zone concept⁴ to guide their sanitization procedures:

Zone 1 represents product contact surfaces, which are at the highest level of risk for microbial contamination.

Zone 2 is non-product contact sites close to product contact surfaces, such as controls, equipment frames and guarding, or tools.

Zone 3 encompasses post-processing areas, such as forklifts, pallets, floors, walls, drains, air handling units and floor mats.

Zone 4 areas are outside processing and post-processing areas, but represent areas of potential cross-contamination, such as hallways, bathrooms, locker rooms, coolers and loading docks.

1 http://www.worldwidefoodexpo.com/session_pdf/pdf_20_1.pdf

2 Pages 8 & 9 of <http://www.fsis.usda.gov/oa/topics/transportguide.pdf>

3 Section VII, Figure 4 of <http://www.fda.gov/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/ProduceandPlanProducts/ucm064458.htm#ch7>

4 <http://www.foodsafetymagazine.com/article.asp?id=3815&sub=sub1>

5 The Microbiological Safety and Quality of Food, Volume 1 By Barbara M. Lund, Tony C. Baird-Parker, Grahame Warwick Gould, page 1214, part 44.9.3

Key Feature: The Anti-Bacterial Additive

Potential microbial food safety hazards are eliminated by the presence of a special anti-bacterial additive. This additive prevents the spread of dangerous microorganisms by suppressing their growth. The engineered substance comes in powder form, and is formulated to provide the anti-bacterial protection over an extended period of time—a property that is retained even after repeated washdowns.

The additive's core technology is built from an engineered carrier molecule, known as a zeolite matrix. The three-dimensional zeolite incorporates silver as the active ingredient within its structure, and utilizes an ion exchange release mechanism (Figure A). This means the silver ions exchange with other positive ions (usually sodium) from the ambient moisture in the environment.

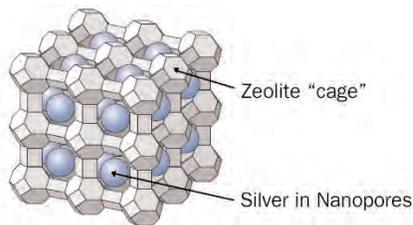


FIGURE A: Anti-bacterial additive's core technology⁶

The silver ions hamper the growth of bacteria into a biofilm colony in three ways:

- Interruption of the cell membrane's transport process,
- Attaching to the cell's DNA, preventing multiplication, and
- Inhibition of enzymes necessary for the cell's metabolism

The additive's key silver-zeolite ingredient is an EPA-registered ionic silver technology and has been Cradle 2 Cradle⁷ certified as using environmentally safe and healthy materials that will not harm the earth or pose any dangers to personnel or consumers. This technology provides built-in protection by naturally and continuously resisting the growth of microbes.

Ultimately, the presence of the anti-bacterial additive in the clear, powder coat paint finish of the

powered pallet truck's steel components does not "clean" those surfaces. Rather, it prevents any residual bacteria that evaded the washdown process from growing into a harmful colony of potential microbial contaminants. Should any bacteria remain on the surface, they will encounter silver ions released by the additive, and will subsequently die (Figure B).

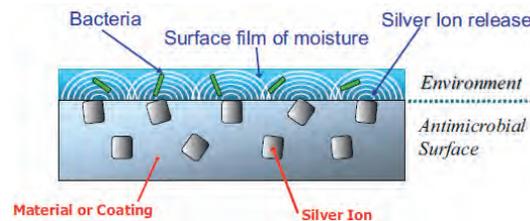


FIGURE B: How the anti-bacterial additive works⁸

The efficacy of the additive and other silver-zeolite based coatings against microbes such as *Listeria monocytogenes* and *Escherichia coli* (*E. coli*), is supported by numerous research reports (Figure C).

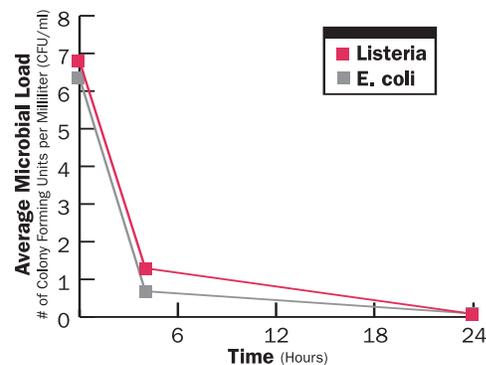


FIGURE C: Bactericidal activity of silver-zeolite powder-coated steel on *Listeria monocytogenes*⁹ and *Escherichia coli* (*E. coli*)¹⁰

Further, because the silver-zeolite particles are an integral component of the additive used in the clear, powder coat paint finish, they cannot be washed away. The integral robustness of the finish itself ensures that the anti-bacterial properties of the solution remain unaffected by the cleaning processes recommended by the FDA, including 180-degree water, quat- or iodine-based cleaners or sanitizers, or chlorine-alkaline detergent.

6 <http://medicaldesign.com/materials/cycle-infections-broken-multifaces-strategy-201012/>

7 <http://www.mbd.com/detail.aspx?linkid=2&sublink=8>

8 <http://medicaldesign.com/materials/cycle-infections-broken-multifaces-strategy-201012/>

9 Antimicrobial Efficacy of a Silver-Zeolite Matrix Coating on Stainless Steel, by MM Cowan, KZ Abshire, SL Houk, SN Evans. Department of Microbiology, Miami University, Oxford, OH 45056. Prepared for Carrier Corp., Syracuse, NY. April 2003.

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Other Key Features Enhance Operation

In addition to including an anti-bacterial coating as a standard feature, the ideal AC-powered walkie/rider pallet truck for transporting pallets and vats filled with ham, meats, bacon, sausage or chicken includes a wide range of standard features integrated into its design. These attributes directly address the numerous concerns shared throughout the meat processing industry, and include:

Sanitization/wash down features to prevent component damage and rust

- Sealed components and electrical connections
- Sealed enclosures and bearings
- Powder coating
- Stainless-steel linkage pin connects the drive to the carriage and forks
- Stainless-steel load wheel axle
- Oversized floorboard with non-slip or cushioned surface
- Sealed switches

Ease of maintenance features to ensure lower total cost of ownership

- Easily accessible grease points
- Heavy-duty, one-piece forks
- Heavy-duty tie rods forged of hardened, rolled steel
- Roller-free, tapered steel fork slides
- String guards

Ease of operation features to protect loads, operators and pedestrians

- Treaded drive tire for maximum grip on slick floors
- Auto-lift forks to prevent floor damage
- Electronic brake provides anti-rollback feature on slopes
- Heavy-duty, spring-loaded casters

Cold storage use features to accommodate trips to and from freezers and coolers

- Sealed components, electrical connections and switches are protected against condensation
- Dual Hall Effect speed and directional control eliminates high maintenance components, such as thermostats and heaters
- Oversized, soft-touch switches for hand-in-glove operation

Conclusion

Now available, all these standard features—including the anti-bacterial coating—on one truck: Nissan Forklift's "Manager's Special."

This custom, powered walkie/rider pallet truck is specifically engineered to withstand the harsh requirements of the meat processing industry. Go to tinyurl.com/meatindustry to learn more about this unique truck and determine if a demonstration is right for you.



About Nissan Forklift

Nissan Forklift Corporation, a wholly owned subsidiary of Nissan Motor Company Ltd., designs, manufactures and supports a complete line of material handling equipment that delivers features resulting in greater dependability, higher productivity and lower operational costs. Headquartered in Marengo, Ill., Nissan Forklift has a network of more than 100 authorized dealerships with over 225 locations across North, South and Latin America, as well as additional worldwide locations.

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