



A safe investment

Food-safe components in washdown applications

STEFANIE BURNS – All consumers have the right to expect safe, good-quality food that has been processed under the best hygienic conditions. This places cleaning, disinfection and sterilization at the top of food processors' priorities. Washdown is the main weapon in the fight for best-practice hygiene standards, especially in meat-processing plants, but washdown is extremely tough on equipment as it uses hot, high-pressure sprays that will eat away at protective coatings. No type of paint can withstand a 1,000 psi washdown for very long. For this reason, ABB has placed great emphasis on three design aspects that are critical for making equipment food-safe: material and housing design, lubricants and sealing technology.

1 Poultry plant with stainless steel motors that can withstand the harshest washdown conditions.



Food producers and handlers are very conscious of food safety and have measures in place to ensure best practice. For example, good hygiene practice (GHP), good manufacturing practice (GMP), and hazard analysis and critical control point (HACCP) are all an integral part of disinfecting premises and equipment, and are considered the most important activities in many food- and meat-processing plants.

Washdown

The main tool used in the quest for hygiene in food-processing facilities is washdown. So important is washdown that large meat-processing companies, such as Tyson, Cargill Meat, JBS, Kraft Foods, etc., though competitors, collaborate through the North American Meat Institute (NAMI) to standardize the basic requirements for washdown equipment. These companies understand that painted or coated units will not withstand continuous caustic washdown and they lead the food industry in the move from traditional corrosion-resistant coatings on

Title picture

Appropriate design is essential if food-safe equipment is to withstand the rigorous washdown regimes employed in food-processing plants and the ingress of foreign materials.

cast iron and aluminum components to a world of all-stainless (and sometimes ventless) mechanical and electrical designs for food-processing equipment → 1.

The location of equipment and the process used to keep the area clean will determine how robust equipment must be. For instance, a packaging area at the end of the line will require very little washdown. The processing section of a food plant, on the other hand, may need a thorough washdown, though the type of washdown will depend on the food processed: Meat and poultry areas can require disinfection; and confectionery chocolate and bakery plants may have processes that get sticky and need special cleaning.

Food-safe design

According to the guidelines being developed by NAMI and the European Hygienic Engineering and Design Group (EHEDG), there are three areas of particular interest regarding the design of food-safe equipment.

Frame design and material

Cast iron and aluminum do not perform well in washdown environments because they corrode. Many suppliers turn to epoxy paints, powder-coating and electro-coating but nothing is more durable than an all-stainless-steel design, making it the preferred housing type.

The main tool used in the quest for hygiene in food-processing facilities is washdown.

Using stainless steel does not, in itself, guarantee a good product – the steel has to be of a high enough grade and, equally importantly, the housing must be designed such that liquids do not collect – they must be able to drain and spill on their own. Likewise, welds must be smooth so as not to trap bacteria.

Further, the cooling fins utilized to cool electric motors can trap contaminants, so the designs ABB chooses for the food and beverage industry are preferentially non-vented and finless. In general, cavities, dead areas, crevices and other irregularities are to be avoided; a smooth frame design will ensure that contaminants are washed off the products properly.

Painted or coated units will not withstand regular caustic washdown – the food industry is moving into a world of all-stainless-steel designs for food-processing equipment.

2 Product unsuitability might be spotted too late.



Lubricants

Food-grade lubricants have properties that make them safe for incidental food contact. However, their performance regarding heat transfer and dissipation, wear, friction, corrosion, etc., is relatively weak compared with traditional lubricants. Nevertheless, with proper monitoring and maintenance they can be used without concern.

To assist the food industry, government organizations such as the FDA (Food and Drug Administration) and the USDA (United States Department of Agriculture) have created food-grade lubricant designations:

- H1 lubricants are used in food-processing environments for incidental food contact.
- H2 lubricants are used in equipment and machine parts in locations where there is no possibility of contact.
- H3 lubricants are typically classified as edible oils and can be used to prevent rust on hooks, trolleys and similar equipment.

Sealing technology

The most common causes of equipment failure relate to issues surrounding lubrication. For this reason, careful attention needs to be given to seals so that the lubricants stay in and contaminants stay out. Harsh washdown poses a special risk to seals as wash jets can force fluids and contaminants through the seals. Good seals are, therefore, a critical fac-

tor. When searching for a well-sealed product, some important questions to ask are:

- How many contact points do the seal lips provide?
- Of what material is the seal made?
- What is the design of lubricant flow through the seals? Is it a labyrinth design? Can the seal purge excess lubrication to avoid pressurized blowout?
- Is there added protection for the seal ie, rubberized flingers, end-covers, etc?

The combination of good housing material and design, H1 food-grade lubricants and a superior sealing design is what makes a product safe for the food-processing environment.

Food safety and violations

There are various types of regulations and standards that help control and regulate food-processing plants and ensure they are in compliance with food safety practices. These are driven by different bodies, for example:

- Governmental: In the United States, the USDA and the FDA have regulatory authority over food-processing practices. The USDA regulates meat, poultry, egg and cheese; the FDA regulates other foods.
- Public health and non-profit organizations: The National Sanitation Foundation International (NSF), 3-A Sanitary Standards, Inc. (an indepen-

dent, not-for-profit corporation dedicated to advancing hygienic equipment design) and the Baking Industry Sanitation Standards Committee (BISSC) are organizations that provide standards and product certifications.

- Food-processing organizations: The NAMI industry trade association is a major player in the United States and is made up of food-processing companies that collaborate to define and write their own sanitary design principles.

Not all areas of the plant require extreme washdown-resistant products. It would be imprudent to select a high-specification product for a standard non-washdown application. On the other hand, skimping on equipment components in harsh washdown environments can turn out to be a very expensive business indeed. Food safety violations are serious and can have a devastating impact not only on the initial perpetrator but on the food-processing business as a whole.

What do food safety violations look like?

Not all violations are easy to spot right away. Sometimes, it can be difficult to tell if a product is stainless steel or just steel coated with zinc, nickel, or TDC (thin dense chrome). The product in → 2 seemed to be a stainless-steel-housed mounted ball-bearing unit until it was pressure washed many times, when the

3 Some products may appear to be stainless steel, but are not, leading to potentially serious violations.



Nothing is more durable than an all-stainless-steel design, making it the preferred housing type.

nickel coating started to chip off. The question then arises – where did the material go?

Another example is found in what appeared to be a polymer-housed unit with stainless steel inserts – except the inserts are not made of stainless steel at all

Food for thought

Food violations arising from harsh wash-down can happen to even the most disciplined of companies. However, with careful selection of frame design and material, lubricants and sealing technology, the likelihood of a potentially very expensive violation can be minimized.

Products need to be selected carefully to match the application environment. Regulations and expectations are increasing in the food safety world and the trend is shifting relentlessly toward a more feature-rich,

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and the unit is now rusting → 3. Because it appears to have some level of corrosion resistance, this product may have been perfectly fine in a less-toxic wash-down environment, but it is not suitable for use in its present location.

all-stainless-steel design for mechanical and electrical components in food-processing facilities. This approach is one that is fully supported by ABB.

Using a standard-grade product in a washdown environment is never a good idea. The housing material and coating type may not be appropriate, the sealing technology may not withstand the high-pressure washdown, fugitive coating materials may contaminate the food and potentially non-food-grade lubricants may spill onto the processing lines.

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