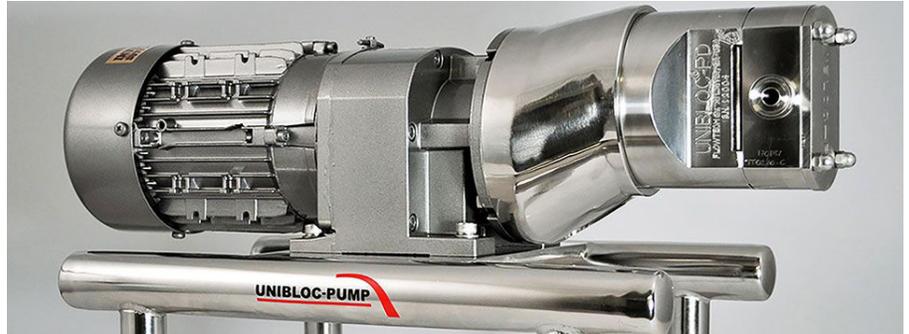


Improve Pump Maintenance & Reliability in Food & Beverage

Pump selection and failure protection will help ensure compliance with strict health and safety regulations.

by: Eric Soderstrom, National Sales Engineer, Unibloc Pump

Sanitary pumps are used in nearly every food and beverage processing plant to transport oils, slurries, additives, flavorings, sugars, meats/poultry, and more from hoppers to grinders, mixers, formers and primary packaging lines. These pumps must be properly maintained and serviced to meet food safety standards and ensure productivity and product integrity.



Food Safety Regulations

The food and beverage industry is a primary target for regulators. As a processor, users must analyze and mitigate potential risks, avoid foreign materials entering the product, follow all sanitation procedures and nurture worker safety. Failure in any one of these areas can lead to severe consequences. Even minor issues can lead to downtime, product waste and lost profits.

U.S. standards

Food processors in the United States must meet the Food & Drug Administration's (FDA) Food Safety Modernization Act (FSMA) requirements. In addition, the U.S. Department of Agriculture (USDA) establishes additional standards for the meat, poultry and egg industries. Equipment used specifically for food processing must comply with 3-A Sanitary Standards. Manufacturers of food-handling machinery must comply with a long list of design criteria to achieve 3-A certification.

EU standards

In the European Union (EU), food processors and importers must meet the food safety requirements of the European Food Safety Authority (EFSA). The European Hygienic Engineering and Design Group (EHEDG) establishes guidelines for processing equipment and machinery to ensure effective clean-in-place (CIP) practices. EU processors must also comply with the European Commission's Food Contact Materials requirements.

Preventing foreign material intrusion

Foreign materials are of utmost concern for food and beverage processors, and rightfully so. To eliminate foreign material contamination, consider the following:

Use corrosion-resistant stainless steel and elastomers in pumps and other food processing equipment with components built to withstand abrasive, acidic or alkalic ingredients, as well as the caustics and high temperatures used for cleaning.

Use a strainer at pump inlets to prevent solids from entering and potentially damaging the pump. Conversely, a strainer at the pump outlet prevents solids from exiting the pump, preserving product integrity and food safety.

Use metal detection and X-ray systems to detect any foreign material, such as metals, plastic, bone material, etc., that has made its way through the pump.

Best materials and surfaces for sanitary food operations

As food processors know, 316L stainless steel is a preferred material for food contact equipment, including sanitary pumps, as it is well known for its resistance to corrosion and abrasion.

Beyond those inherent properties, look for fully machined pumps from a solid block of 316L stainless. These pumps will not contain any welds, seams or crevices that can trap food and bacteria. A stainless-steel pump housing with a smooth, machined exterior provides a nonstick surface that simplifies cleaning. A dome or curved housing keeps standing water from accumulating on the surface of the pump.

When using a positive displacement pump, look for nongalling alloys on the rotors to prevent surface imperfections that are hard to sanitize.

Finally, be sure the seals and elastomers used in the pumps are designed for high-pressure, high-temperature washdowns and caustic cleaning agents, such as fluoroelastomer or ethylene propylene diene monomer (EPDM).

Configuring a Pump for Easy Sanitation

Given the daily cleaning demands required in the food processing industry, placement of a food or beverage processing line is the first consideration for easy sanitation. Have the equipment easily accessible and the surrounding surfaces clutter-free.

In CIP operations, pumps and other equipment do not require disassembly for cleaning. Proper CIP procedures guarantee that the pumps meet the sanitation requirements of the FDA and other regulatory agencies.

Clean out of place (COP) is typically required in the meat and poultry industry. Attempting to perform COP on pumps not built for COP can prove challenging. If reassembled incorrectly or handled roughly, damage can occur. Users should consider choosing a pump specifically engineered for COP operations. They have fewer parts, easy access to food-contact surfaces and easy reassembly.

Common Causes of Pump Failure

There is no single cause of pump failure. Fortunately, failures are avoidable with the right pump design and maintenance. Here are some common causes of pump failure.

Running the pump dry: Most pump seals require lubrication from the product to distribute heat, generated by friction. Among other issues, running the pump dry causes cracking and warping of the seals.

Overly gritty or abrasive product: Unless an appropriate seal design is chosen, gritty or abrasive product will wear down a seal faster than normal.

Chemical or physical incompatibilities: Severe chemical or physical loading can reduce the life of a pump seal. The harsher the chemicals or forces acting upon the pump, the faster a seal will fail.

Pump galling: Caused by a combination of friction and adhesion, galling leads to the slipping and tearing of the crystalline structure beneath the surface of the seal material.

Excessive shock and vibration: Excessive shock and vibration can cause significant axial and radial play of the shaft, which will lead to misalignment and leakage.

Installation and maintenance errors: If a pump is installed incorrectly, the shaft can become misaligned, causing pump seal failure. Other errors include over-tightening fasteners, a dirty seal face and incorrectly mounted seals.

Harsh environments: Uncontrolled heat, drastic temperature shifts and caustic cleaning detergents can increase seal wear. Adjusting seal chamber pressure, speed, the pumped medium and the temperature around the pump can all cause damage.

Incorrect pump design or seal choice: Choosing the wrong pump design or material is a major cause of pump seal failure; however, this is avoidable if time is spent upfront selecting the appropriate pump and seal combination.

Preventing Pump Seal Failures

There are multiple steps to eliminate the common risk factors presented above:

Size the pump properly: Knowing a product's viscosity and flow rate are key when sizing any pump.

Reduce installation errors: Once the right pump and seal combination are selected, they must be installed correctly using the right tools and in alignment.

Use the pump correctly: Proper day-to-day pump operation is one of the biggest factors in the life of a seal. Operate the pump according to the manufacturer's specs and guidelines, and do not operate the pump without product in the rotor housing.

Perform regular maintenance and upkeep: Do not neglect pump maintenance; fix any issues, including leaks, as soon as possible to avoid turning a simple repair into a major shutdown, resulting in lost productivity, safety risks and lost revenue.

The most important components to monitor for maintenance and repair:

Seals: The most common cause of pump downtime is seal failure. Establish a regular schedule for inspecting and replacing damaged or worn pump seals and elastomers.

Mounting points: Regularly check the mounting points of the pump to the process line to verify they are secure.

Oil: Check the bearing housing and gearbox oil for degradation, fill levels and leaks.

Pump accessories: Inspect and observe check valves, pressure relief valves, strainers and sight glasses.

Pump Lubrication

Like any machinery, sanitary pumps contain lubricated parts. Oil should be changed after 2,000 hours of operation or once per year, whichever comes first. Do not underfill or overfill. Follow the manufacturer's guidelines on the volume and types of lubricants to use. Failure to carefully plan by choosing the right sanitary pump for food and beverage processes—and maintaining the pumps on the production line—can result in costly downtime, repairs, regulatory fines, product loss, safety hazards and lower total cost of ownership (TCO).

As with any machinery, it is vital to conduct routine maintenance to prolong pump life and replace everyday wear items. Proper care keeps pumps running at peak efficiency, helping meet productivity and throughput goals far into the future.

8 Tips on Performing Pump Maintenance Safely

1. Turn off the equipment before performing any maintenance or system checks.
2. Unplug the pump from its power source and use lockout/tagout procedures to prevent restarts during service. Use shaft guards and coupling guards to prevent fingers, hands and clothing from catching on equipment.
3. Deenergize any safety/relief valves before dismantling.
4. Avoid contact with hot surfaces and keep appendages and foreign objects away from moving parts.
5. Be sure the sanitation crew understands the ingress protection (IP) ratings (protection levels) of the pumps they are servicing or cleaning.
6. Return the pump to its operating clearances after maintenance.
7. Never attempt to operate a pump with the covers off.
8. Ensure the suction and pressure sides of the pump are free from blockages.

This is not an all-inclusive list of potential safety risks involved with pump maintenance. Always train workers to know and comply with health and safety regulations.

About Unibloc Pump

Headquartered in Kennesaw, Georgia, Unibloc Pump designs and manufactures positive displacement pumps for critical industries, including food and beverage, meat and poultry, pharmaceutical, bakery and confection, transportation, and many others. Unibloc Pump brings Tier 1 performance to the world's most demanding pump processing applications. In the daily battle against downtime and sanitary compliance, Team Unibloc stands shoulder-to-shoulder alongside its customers to solve every problem, meet every deadline, and drive Total Cost of Ownership performance better than any other vendor. uniblocpump.com



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