



SELECTING THE RIGHT PNEUMATIC SOLUTIONS FOR FOOD APPLICATIONS

Andy MacPherson, Product Manager for Food & Beverage at Festo, shares a five-step process to guide the selection of the correct pneumatic solutions for food applications.

Machine builders and specifiers face unique challenges in food environments. Ensuring the proper specification of pneumatic controls supports hygiene and safety protocols, minimizes downtime, and keeps operational costs in check.

Consider the following key points when selecting pneumatic components for food applications:



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Determine the Food Zone:

When choosing pneumatic automation, it is crucial to consider the working environment of the equipment to maintain food quality, safety, and machinery longevity. The selection depends on the specific zone in which the equipment will operate. The European standard EN 1672-2 defines three production zones: the food zone, splash zone, and non-food zone.

Pneumatic components for food and splash zones must be easy to clean and disinfect, corrosion-resistant, non-toxic, and non-absorbent. They should also have smooth, continuous, or sealed surfaces to minimize contamination risks. Pneumatic components for the non-food zone, where machine parts do not come into contact with the product, do not require such stringent toxicity and contamination requirements. However, they should still be made from corrosion-resistant materials and be easy to clean and disinfect.

Assess Air Quality Requirements:

It is essential to assess whether compressed air could come into contact with the food product or packaging. Direct and indirect contact points include bagging, mixing, drying, air knives (blow-off), and the exhaust of pneumatic cylinders.

Compressed air can be a significant source of contaminants, including moisture, particulates, and bacteria. It has been estimated that a 75-hp compressor with a capacity of 300 scfm intakes 100,000 to 1 million bacteria per hour. To maintain hygiene and safety, it is crucial to ensure that the air is filtered to the appropriate standard. The required level of filtration varies for wet and dry foods.

Evaluate the Cleaning Regime:

Cleaning processes and chemicals used on the production line can impact the performance of pneumatic components. Determine the type of cleaning process (foam, power wash, etc.) and the duration of exposure to cleaning agents. Then, select materials and hygienically designed components that ensure food safety and the required component lifespan.

Machine parts must be resistant to reactions with cleaning agents and antimicrobial chemicals (disinfectants). Therefore, they need to be corrosion-resistant and mechanically stable. If the cleaning regime changes, pneumatic components should be reassessed to ensure continued performance as expected.

Choose the Appropriate Material Specification:

The material specification of pneumatic components plays a critical role in meeting stringent hygiene requirements in food applications. Consider not only the materials used for the drive unit but also those for interface components like connections, seals, and lubricants (e.g., food-grade grease). All materials must be compatible with the plant's cleaning processes.

High-alloy stainless steel is commonly chosen for the food industry. However, aluminum can serve as a more affordable alternative when made resistant to cleaning agents through additional coatings or anodized oxide layers. Plastics can also be used as long as they do not release or absorb hazardous substances.

Consider Seals and Lubricants:

Using the correct seal material is essential to prevent premature failure of pneumatic products. Intensive cleaning processes can wash out lubricating grease and hinder the operation of pneumatic components.

For instance, selecting the right wiper seal for a cylinder ensures long-lasting performance. Using dry-running seals guarantees reliable functioning even after machine components have been washed out. Lubricating greases and oils must comply with FDA regulations or ISO 21469. When in contact with food or its packaging, NSF-H1 greases are required.

