

## Raising The Bar on Hygienic Pump Standards for Food Processing

SUCCESSFUL FOOD PRODUCTION REQUIRES ADHERENCE TO A NUMBER OF REGULATORY STANDARDS, SUCH AS EC 1935/2004, AND ECCENTRIC DISC PUMPS HELP PROCESSORS SATISFY THEIR STRICT DEMANDS

By Paul Cardon



Mouvex® SLS Series  
Eccentric Disc Pump

Mouvex® has designed its new SLS Series Eccentric Disc Pumps with a number of operational features that make them ideal for the strict demands of food processing.

In order to successfully get their products onto grocery shelves and restaurant menus, food processors must satisfy the standards of an “alphabet soup” of regulatory agencies, including, but not limited to, bodies with such monikers as FDA, 3A and EHEDG. These regulators have the best interests of both the consumer and the food processor in mind.

There is nothing worse for both parties than a food product that becomes contaminated during production but still makes it to market, leading to a food-borne illness that causes a product recall. The cost to the food processor in these instances can be catastrophic, not only in the reparations that must be made to the injured parties, but in the damage to reputation that can lead to the loss of market share and, in the most severe cases, the processor incurring such a reduction in business that it may be forced to cease operations.

In Europe, one of the more recent food-processing regulations is known as European Commission Regulation No. 1935/2004, or EC 1935/2004. The regulation provides a general framework for materials and articles that are intended to come into contact with food during the

production process. Under the auspices of EC 1935/2004, all materials and articles that are used to package food must comply with the requirements of the regulation. It covers all types of packaging, bottles (glass and plastic), cutlery and even adhesives and inks for printing labels. EC 1935/2004 also introduces specific provisions concerning “active” and “intelligent” packaging, which extends the shelf life of food, or reacts when food has reached its pre-determined expiration date, at which time the packaging may change color, for example.

More specifically, EC 1935/2004 states that the materials and articles that come into contact with food during the production process must not, under any circumstance, transfer substances to the food that can:

- Endanger human health
- Bring about an unacceptable change in the composition of the food
- Bring about a deterioration in the organoleptic characteristics of the food, i.e. cannot affect the appearance, smell or taste of the product



The symbol acknowledging that a pump's operational capabilities meet the standards of EC 1935/2004.

The strictness of the EC 1935/2004 regulation means that food processors must take extreme care that their products are not adversely affected by the equipment that is used to create them. This means that the ideal pumping technology in these circumstances is one that does not allow the food product to come into excessive contact

with various parts of the pump, or allow outside contaminants to enter the production cycle.

## Sanitary Pump Solutions

Invented by French engineer Andre Petit in 1906, the “eccentric movement principle” of pump operation resulted in a new class of pump technology – positive displacement eccentric disc. Over the ensuing years, eccentric disc pumps have established a well-earned reputation for consistently and reliably meeting the edicts of many hygienic regulatory standards, including EC 1935/2004, because they do not need mechanical or dynamic seals in order to operate.

Petit's revolutionary eccentric disc pump technology features a disc that is placed inside a pump cylinder. The disc is driven by an eccentric bearing that is installed on the pump shaft. This creates four distinct pumping chambers that increase and decrease in volume as the disc is rotated by the eccentric bearing, producing both suction and discharge pressures as the chambers move in pairs that are 180 degrees apart. This ingenious method of operation ensures that the fluid passes through the pump at a constant and regular flow rate.

Eccentric disc pumps were an immediate hit in many markets and applications, and prompted Petit to form Mouvex®. Headquartered today in Auxerre, France, Mouvex continues to remain the recognized global leader in manufacturing and supplying pumps for use in applications that require constant flow rates, leak-free operation and the ability to perform in difficult or product-sensitive applications.

Eccentric disc pumps do not need mechanical seals because, even though they are driven by a standard rotating drive, the off-center shaft that rotates the disc allows each point of the disc to move at the same speed. This means that the drive end of the pump's shaft is located on a different plane than the tip end of the shaft that actually drives the pumping mechanism. Attached to the

shaft are bearings that are enclosed in a hermetically sealed metal bellows or rubber boot. So, when the shaft rotates, the bellows or rubber boot does not rotate, but, rather, flexes in an eccentric circle.

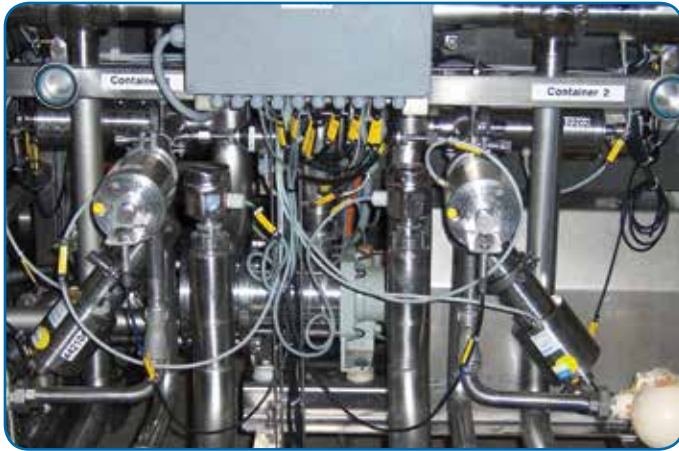
This gives the eccentric disc pump an operation that is similar to that of a peristaltic pump, but without the need for any hoses, which are not recommended for food-processing operations because of their tendency to shed hose material during operation, which creates a contamination risk. During operation, the pump's disc is driven by the eccentric movement of the shaft, allowing product to flow through both the pump's inner and outer chambers.

This style of operation eliminates any possibility of pulsation – which is another critical consideration in food production – within the pumped liquid, and since the pump does not depend on clearances to facilitate product flow, any slip is negligible. Additionally, with the pump needing no mechanical seals, there are no surfaces present where products that are difficult to seal and prone to crystallization can adhere and cause damage, which eliminates a maintenance concern.

Speaking of maintenance, eccentric disc pumps also feature simple, efficient clean-in-place/sanitize-in-place (CIP/SIP) operation that does not require the vertical drain porting that robs lobe pumps of a good portion of their efficiency. In most cases, the CIP process begins with a water flush with concentrations of different cleaning solutions, such as a mild caustic, and perhaps a reheating of solutions that are circulated through the pump, piping and valves, concluding with a final rinse. In some cases, steam is used in place of water or other cleaning solutions.



Successfully handling thick, solid-laden products like strawberries is one of the many areas where Mouvex® SLS Series Eccentric Disc Pumps excel in food processing.



Food processors require pumps that meet the tenets of regulatory standards like EC 1935/2004, which have been designed to protect both the processor and consumer from the undo risks that can be brought on by product contamination during production.



It is also important to minimize the amount of residual product, especially if the pump is used to handle different types of foodstuffs, that remains in the pump and piping prior to starting the CIP cycle. For optimum cleaning of sticky or viscous products, the flow rate through the pump is generally between 76 and 757 L/min (20- 200 gpm) and less for thinner, easier-to-handle products.

In CIP applications, the pumps can be arranged in a series to take advantage of their unique “disc/cylinder” design. Because the pressure at the pump inlet is higher than at the outlet, the disc lifts from the pump cylinder, permitting passage of the water or cleaning solutions to flow through the pump, thoroughly cleaning the pump chambers. This unique feature eases the cleaning process and reduces cycle times so the pump can be put back into operation as quickly as possible.

## New Mouvex® SLS Series Eccentric Disc Pumps Meet the Regulatory Needs of Food Processors

Recognizing that food processors require the best, most reliable pump technology in order to satisfy the EC 1935/2004 regulation, as well as other food-processing regulatory standards, Mouvex® has created the SLS Series Seal-less Drive Eccentric Disc Pump. These pumps have been designed for use in the food, cosmetic and pharmaceutical industries, all of which require extremely hygienic operations.

What sets the SLS Series pumps apart is an innovative new design that incorporates a double-wall bellows into the pump’s construction, along with monitoring that is done via pressure switch. By mounting the pressure switch on the bellows flange, the bellows becomes an independent sub-assembly within the pump, resulting in easier and safer operation. The design has helped the SLS pumps earn approval from EC 1935/2004, along with 3A, FDA and EHEDG, for use in food-processing applications.

Other improvements in the SLS Series pumps include the ability to handle differential pressures up to 10 bar (145 psi) and high-quality machined parts for optimum surface finish, which are also compatible with SMS, DIN11851, DIN11864 and ASME-BPE clamp flanges.



Mouvex® SLS Series Eccentric Disc Pump

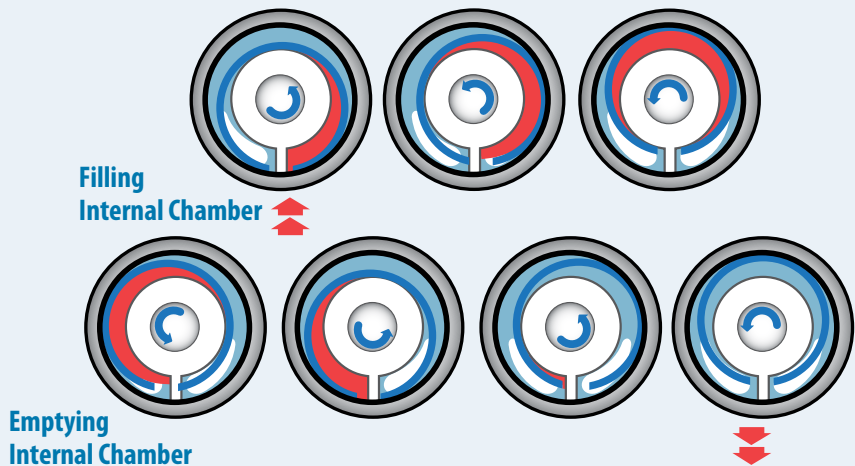
Along with these advancements, the SLS Series pumps offer the features that Mouvex eccentric disc pumps have become known for, including:

- Completely seal-less design
- Low shear rate
- Self-priming and dry-run capabilities
- Exceptional volumetric consistency
- Strong vacuum and compression effect for line stripping
- Only two wear parts
- Maintenance that can be performed while the pump is online
- Optional heating jacket

Mouvex is currently offering the SLS Series pumps – which replace the landmark C Series pumps that were introduced in 1996 – in SLS1, SLS2, SLS3, SLS4 and SLS8 sizes, with the SLS12, SLS18, SLS24 and SLS36 models expected to be released to the market in 2014.

# Mouvex Principle

Eccentric disc pumps consist of a cylinder and pumping element mounted on an eccentric shaft. As the eccentric shaft is rotated, the pumping element forms chambers within the cylinder, which increase in size at the intake port, drawing fluid into the pumping chamber. The fluid is transported to the discharge port where the pumping chamber size is decreased. This action squeezes the fluid out into the discharge piping.



## Conclusion

There are many potential pitfalls in food processing. Leaks lead to an unrecoverable loss of product and create unexpected cleanup costs. As mentioned, contamination during production brings with it a whole slew of far-reaching problems for the processor. Because of the ironclad need to produce food of the highest quality in every batch, strict regulations have been put into place to help ensure that both the producer and consumer are protected. Thanks to an innovative design that has stood the test of time for more than a century, eccentric disc pump technology stands ready to help food processors confidently overcome every challenge they may face.

## About the Author:

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