

Perfect Pumps for the Process

GLUCOSE PRESENTS SEVERAL CHALLENGES FOR FOOD AND PHARMACEUTICAL PROCESSORS TO OVERCOME, BUT ECCENTRIC DISC PUMPS ARE THE CLEAR SOLUTION

By Christophe Jovani, Marketing Manager



The Challenge

In the world of industrial processing—specifically in the food and pharmaceutical fields—glucose is a highly versatile and key ingredient. It is a compound that can take many forms and successfully fill many roles for the manufacturer. For example:

- Liquid glucose is a perfect substitute for cane sugar in the manufacture of ice cream because it is not susceptible to crystallization, leading to a smoother texture.
- Large amounts of glucose are used in commercial bakeries for pie and cream filling because it keeps the finished products soft, while also providing the required sweetness level.
- Glucose is also a key ingredient in the manufacture of household syrup, honey-like products and various confectionaries.
- In the pharmaceutical field, liquid glucose is mixed with maltose (a sugar produced by the breakdown of starch) and Maltodextrin (a thickening agent made from starch) and used in the manufacture of a variety of syrups, antacid suspensions and other mixtures. It provides body and consistency to the product being made.

But while glucose has rightfully earned its reputation as an indispensable substance in the manufacture of many unique products, it can be difficult to handle and requires transfer equipment, i.e. pumps, that can tackle the challenges it presents. Glucose is very abrasive, which puts pumps under a lot of stress and can lead to premature wearing, breakdown and excessive maintenance costs. Glucose is also a fast-drying substance, which can have an adverse affect on the face of a pump's mechanical seal. The varying viscosity and tackiness of glucose also requires a pump that is nimble enough to handle substances with different thicknesses.



Mouvex Eccentric Disc Pumps are ideal for numerous sanitary applications.

In the past, manufacturers have used progressive cavity pumps and rotary lobe pumps for the transfer of glucose from batch, stock and storage tanks to mixing and process tanks during the production process. These technologies have been proven ineffective for a number of reasons, mainly the leaking mechanical seals that lead to product loss, unsanitary/unsafe working conditions and expensive repair or maintenance costs.

The Solution

The problems inherent in the handling and pumping of glucose have been identified, but the question remains: What's the solution?

For manufacturers of foods and pharmaceuticals that use glucose at some point throughout the process, an emerging technology that continues to prove itself again and again is the Eccentric Disc Pump.

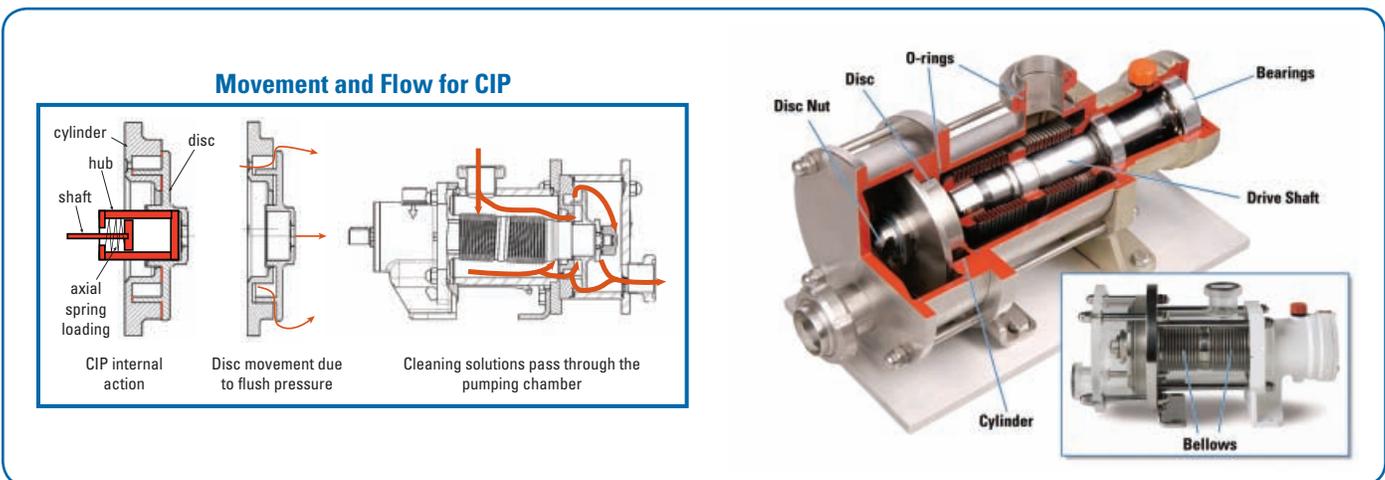
Eccentric disc pumps meet the operational parameters needed in the handling of glucose because they have been designed to efficiently provide consistent and repeatable flow with low shear. Eccentric disc technology consists of a stationary cylinder and disc that are mounted to an eccentric shaft. As the eccentric shaft is rotated, the disc forms

chambers within the cylinder, which increase at the suction port and decrease at the discharge port. During operation, the discharge pressure exerts itself against the eccentric disc, preventing it from slipping. This low slip between the disc and cylinder gives eccentric disc pumps the ability to self-prime and line strip. Taken all together, this pumping principle allows for the gentle transfer of fluids from suction to discharge, with very low agitation and shear, which are prime considerations when handling glucose.

More specifically, the seal-free construction of certain leading eccentric disc pump technology eliminates the presence of mechanical seals, which are standard features on lobe and cavity pumps, making them susceptible to dangerous and ongoing product leaks. This seal-free technology ensures a consistently clean and safe working environment, zero product loss and no need for drip trays.

Another major benefit offered by eccentric disc pumps in the handling of glucose is their clean-in-place/sanitize-in-place capabilities. As mentioned, the viscosity of glucose can vary quite a bit, while its stickiness can make it hard to remove from pump surfaces, meaning that the pumps need to be maintained on a regular schedule. That's where CIP/SIP comes in.

Eccentric disc's CIP/SIP technology allows the pump to be completely drained, flushed and cleaned without disassembly. Since the pump does not need to be bypassed during the CIP/SIP process, it experiences no loss of performance due to vertical drain porting. When cleaning, pressure is introduced to the back of the eccentric disc through the pump chamber. When the flush pressure overcomes the spring, the disc moves away from the cylinder, allowing the cleaning solution to pass through the pumping chamber. This type of pump can then be self-cleaned or cleaned by an external circulation pump.



Application Example: *Candy Bars*

A plant that manufactures candy bars required the transfer of glucose from a stocking tank to mixing tank. The lobe pumps that were being used in the process would constantly leak at the mechanical seals, and since the pumps were only being used eight hours at a time, glucose was drying on the seal faces between uses, which was harming the mechanical seals. Ultimately, the failure-related production stops and high maintenance costs were becoming prohibitive for the manufacturer.

The solution to the problem was the installation of two Mouvex C-Series C18i eccentric disc pumps. In the 3-plus years since the pumps have been installed, they

have required no maintenance. Because of their seal-less design, there has also been no product leakage and the wear on the piston-cylinder has been negligible, despite the abrasive properties of the glucose.



Mouvex C-Series C18i Eccentric Disc Pump.

For more information on specific applications, go to www.mouvex.com.

Leaders in Eccentric Disc Technology

Some of the leading designs for eccentric disc pumps that are widely used in various industries today were developed by Auxerre, France-based Mouvex®. Incorporated in 1906, Mouvex is a leading manufacturer of positive-displacement eccentric disc pumps for use in the transfer of liquids or dry-bulk products. In April 2008, Mouvex became a member of the Pump Solutions Group (PSG™), Redlands, CA, a conglomeration of six of the world's leading pump manufacturers and an operating company within the Dover Corporation, New York, NY.

An example of an eccentric disc pump that has had a wealth of experience is the Mouvex C-Series. Where maintenance is concerned, C-Series pumps set the standard because they consist of very few parts. In total, they contain:

- A single drive shaft that has been machined on four different planes
- A single or double set of bellows that also acts as a pressure-retaining element
- Four bearings that are separated from the liquid
- One disc made of Acteon®, which is a special metallic compound that has been used in its construction to ensure high corrosion resistance
- One cylinder
- One gear case
- One disc nut
- Seven O-rings
- Two lip seals

This CIP/SIP capability has helped Mouvex's C-Series Eccentric Disc Pumps earn certification from a wide range of governing bodies, including:

- **European Hygienic Engineering & Design Group:** EHEDG was formed in 1989 and is a consortium of equipment manufacturers, food industries, research institutes and public health authorities with the aim of promoting hygiene during processing and packaging of food products.
- **CE:** The CE marking certifies that a product has met European Union consumer health, safety or environmental requirements.
- **Ex:** The Ex mark shows that equipment, protective systems or components comply with European standards for explosive protection equipment.
- **3A:** 3A certification enhances product safety and ensures that all product surfaces can be mechanically cleaned or easily dismantled for manual cleaning.



The eccentric disc is at the heart of C-Series and SLC-Series technology.

- **TUV:** TUV certification involves rigorous testing for the applications for which the component is designed. It includes verification that the device satisfies the strictest European regulations for the industry and ensures that component specifications are stated correctly.

Conclusion

When looking for the pumping technology that offers the best in operation, reliability and efficiency when handling glucose, look no further than eccentric disc technology from Mouvex. C-Series pumps are ideal for glucose-handling in food and pharmaceutical applications because:

- Seal-free design means leak-free design
- Ability to pump low- and high-viscosity products means output is not affected by viscosity variations, while volumetric efficiency is maintained
- Low linear speed means low pulsation affect
- Self-priming capability means the ability to completely clear pipes and lines and the ability to run dry

In addition, Mouvex recently introduced a new SLC-Series line of eccentric disc pumps. The SLC-Series pumps have been designed to self-compensate for mechanical wear, giving them the ability to maintain consistent flow over time. This results in high-volume efficiency combined with

a gentle fluid-handling nature. Other design features of the SLC-Series are similar to those found in the C-Series: seal-less construction; self-priming, dry-run and line-stripping capabilities; and CIP/SIP operation. All of this makes the SLC-Series the next generation of eccentric disc pumps that are ideal for glucose-transfer applications.

Leading food and pharmaceutical manufacturers know that the versatility of glucose makes it a pivotal component in the production of a wide number of products. And with the challenges the handling of glucose can present, more and more of these manufacturers are doing the wise thing and turning to eccentric disc pump technology from Mouvex to conquer these challenges.



SLC-Series is the newest addition to the Mouvex line of eccentric disc pumps.

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PSG is comprised of six leading pump companies — Wilden®, Blackmer®, Griswold™, Neptune®, Almatec® and Mouvex®.

You can find more information on Mouvex at www.mouvex.com and PSG at www.pumpspsg.com.

