



Expert Solutions for the Hygienic Industry

HYGIENIC
Product Recovery Brochure



Where Innovation Flows

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ECCENTRIC DISC PUMPS

Sustainability with Enhanced Product Recovery

Enhance Production Yields and Reduce Manufacturing Costs

Every industry incurs some expenses that are deemed tolerable “costs of doing business.” Manufacturers in the food and beverage, pharmaceutical and cosmetic/personal-care industries, while taking measures to make their operations leaner, have perhaps inadvertently chosen to accept one such “cost of doing business” within their operations: the disposal of raw materials or finished product as waste contained in tubing at the end of production runs or product change overs.

Pump technologies such as lobe, external circumferential piston (ECP), centrifugal, hose and progressive cavity are often chosen to facilitate the transfer of raw and finished fluids during production. However, these pumps are not capable of clearing or stripping the transfer lines of remaining liquids. Product recovery is the process of clearing or stripping lines of valuable product that can be used.

Value: What Can Be Recovered and Used?

The chart below illustrates a conservative example of how much money, in general, a food and beverage, pharmaceutical or cosmetic manufacturer can save through the use of pumping technology that is able to achieve increased product-recovery rates upwards of 70%, with many recoveries typically around 80% and as high as 95%. For a truer gauge of the cost savings, the amount of recovery can be multiplied by the number of changeovers per day, if more than one occurs per day.

The Value of One Pump

The pump technology that can best optimize product recovery is positive displacement eccentric disc pump technology from Mouvex®. Mouvex eccentric disc pumps are able to do this because they can pump air, which creates a vacuum effect on the pump’s suction side and a compressor effect on the discharge side. In other words, once the product runs out in the feed tank, the Mouvex technology continues to pump air in a very constant, non-pulsating manner so that the surface tension on any remaining fluid is not broken. This produces a plug effect, which pushes out the product “plug” as a whole.



Product-Recovery Costs Saved Per Eccentric Disc Pump

Product Discharge Distance	30.5 m (100 ft)
Product Per Meter (Foot) with 63.5 mm (2.5") Line Diameter	0.87 L (0.23 gal)
Specific Gravity	0.99 kg/L (8.3 lb/gal)
Total Weight in Line	86.6 kg (191 lb)
Product Recovered at 70% Recovery Rate	60.8 kg (134 lb)
Price Per kg (lb)	\$2.20 (\$1.00)
Total Cost Savings Per Day (1 Change/Day)	\$134.00
Cost Savings Per Week (x5 days)	\$670.00
Cost Savings Per Month (x4 weeks)	\$2,680.00
Cost Savings Per Year (x12 months)	\$32,160.00

Consumer Perspective



Consumers have come to expect an extremely high level of quality when purchasing food/beverages, cosmetic/personal-care and pharmaceutical/biopharmaceutical products. These consumers are naturally attracted to certain product characteristics and have come to expect them from their yogurts, skin creams, detergents or medicines, such as proper:

- **Texture:** Yogurt should have a good mouth feel
- **Flavor:** Cherry cough syrup should have a pleasant, natural taste
- **Appearance:** Ice cream should look lusciously creamy
- **Color:** Liquid detergent should be attractive
- **Aroma:** Floral-scented shampoo should smell natural
- **Health & Safety:** Without exception, all foods should be safe to eat, and all cosmetics and medicine should be safe to use

With unique and highly efficient product-recovery capabilities, combined with extremely low shear rates, Mouvex eccentric disc pumps help ensure all of these benefits are reflected in the manufacturer's bottom line especially since the ingredients used to produce these functional qualities can also *be some of the most expensive*.

The Costly Implications of Non-Optimized Transfer

Reducing the amount of wasted product is the obvious primary goal of product recovery. Using pump technologies that are unable to strip lines can have a "snowball effect" on the manufacturing operation's total cost of doing business. For example, inadequate line-stripping and inefficient product-recovery require:

- More **water** to clean the lines
- Additional **cleaning chemicals** to clean the lines
- **Sanitizing chemicals** to sanitize the lines
- **Energy** to facilitate the cleaning process
- **Labor** costs to perform longer cleaning operations
- **Disposal** costs of used **water** and chemicals
- **Disposal** of **product** that is no longer usable
- **Water treatment** costs and associated treatment chemicals
- More **time** for cleaning, which means less time for actual production

The Bottom Line

Wasted materials or product means that the manufacturer cannot monetize perfectly good product that would otherwise be washed out of production lines and disposed of.

Typical Transfer or Fill Line Where Product Losses Occur

Don't Leave
Your Profits In The

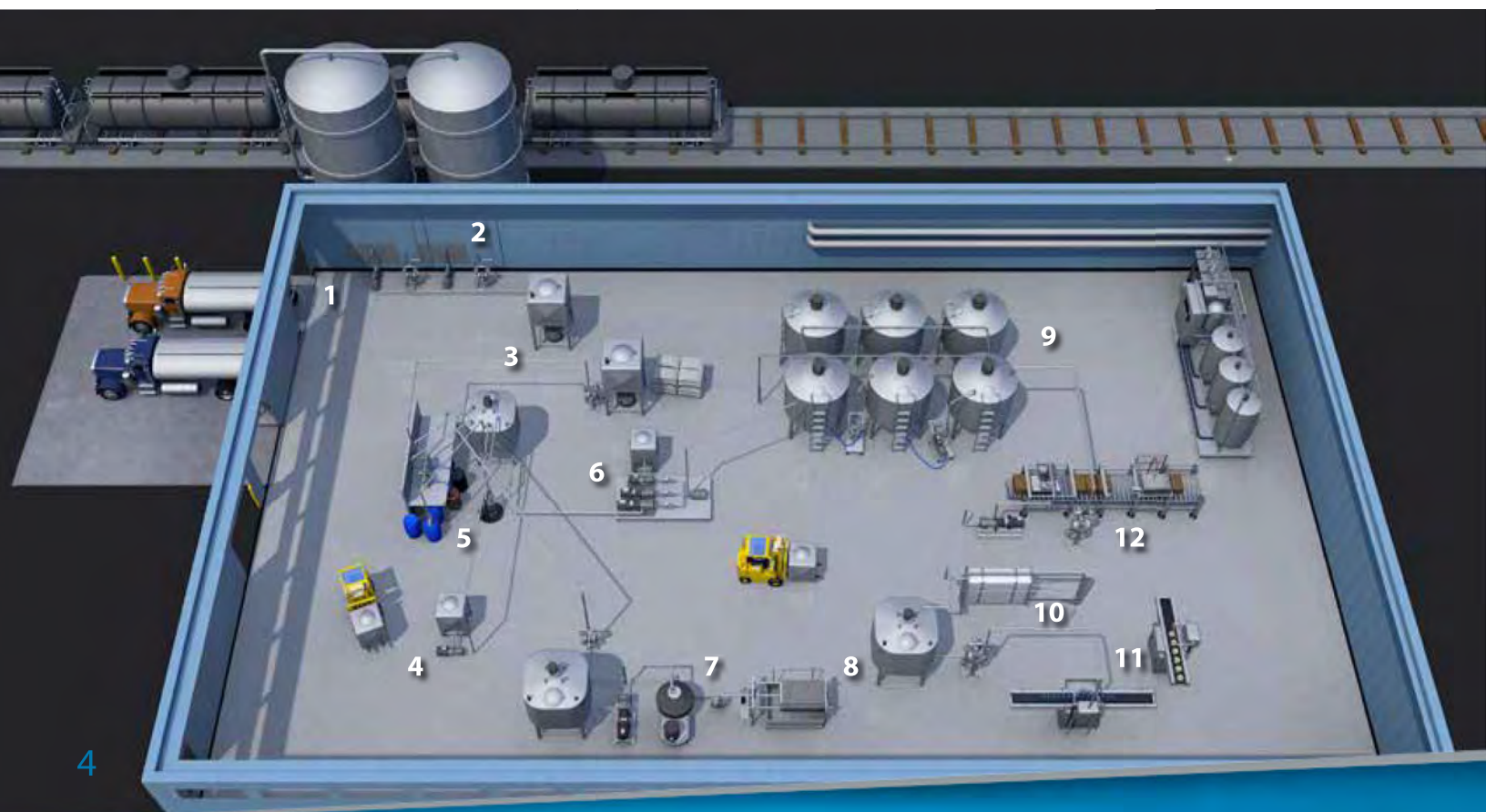
Pipeline



Typical Process Plant

Locations Where Product Recovery is Desirable:

1. **Receiving Lines**
 - Sweeteners, concentrates
 - Seal-less pumps
2. **Bulk Ingredient Area**
 - Sweeteners, concentrates
 - Seal-less pumps
3. **Powder Blend Area**
 - Starch, powdered milk, flavors
 - Seal challenges, high abrasiveness
4. **Portable Tank Unload**
 - Purees, sauces, ingredients
 - Seal challenges, high abrasiveness
 - Dry run, dry prime
5. **Drum Unload Station**
 - Seal challenges, high abrasiveness
 - Dry run, dry prime
6. **Batch or In-line Blend Station**
 - Flow control with Movex
7. **Separation Area**
 - No pulse feed of centrifuge with Movex
8. **Filtering Process**
 - Filtering media packaging
9. **Intermediate Storage Area**
 - Buffer to store batch-production products
 - Storage for different formulators
 - Storage to provide residence time
10. **Heat Exchange Process**
 - Heat, cool, pasteurize, sterilize, crystallize
 - Constant/controlled flow provided by Movex
11. **Filling System**
 - Feed tank, feed pump and filler
 - Pump selection based on filler requirements
 - Movex for constant flow feed
12. **Rework System**
 - Reprocessing of filler overflow
 - Product recovery on filler downtime
 - Self-priming, dry-running ability





Typical Pump Technologies Used in Hygienic Applications

While many pump technologies play prominent and effective roles in the manufacture of food and beverages, pharmaceuticals and cosmetics, they generally fall short when asked to optimize product recovery. A number of design or operating characteristics help spell out where they fall short in product recovery, and other critical application needs, as evidenced by the following chart:

Rotary Pump Type	Product Recovery Capability	Slip When New	Slip With Change Viscosity*	Slip With Change Pressure*	Slip With Some Wear**	Dry Priming	Wet Priming Low Viscosity	Uses Dynamic Seal	Hygienic Design
Eccentric Movement	yes	very low	very low	very low	very low	very good	very good	no	yes
Progressive Cavity	no dry run	low	medium	medium	medium	no	good	yes	some
Gear Pump	no	medium	excessive	medium	high	poor**	medium**	yes	no
Lobe Pump	no	high	excessive	poor	high	no	poor**	yes	yes
Circumferential Piston	no	medium	excessive	medium	high	poor	medium**	yes	yes
Sine Style	no	medium	excessive	medium	high	medium**	medium**	yes	yes
Vane Pump	yes	low	low	low	low	good	good	yes	no

* Effect on slip assuming the pump has been in service a few weeks/months and is at 50% of life of parts.

** Typically will need to accelerate the pump to prime compared to product flow rate.

Mouvex® Eccentric Disc Pumps, on the other hand, offer a number of positive characteristics when it comes to optimizing product recovery, as noted in the following chart:

Eccentric Disc Attributes	
No Mechanical Seals	✓
Volume Efficiency (Even with Air)	✓
High Cleanability	✓
Low-Pulsing/Constant Flow	✓
Low Slip with Viscosity, Pressure, Wear Changes	✓
Dry Self-Priming	✓
High Turn Up/Turndown	✓
Low Maintenance Cost (Parts)	✓
Low Maintenance Cost (Labor)	✓
Low Shear with Low Viscosity	✓



Mouvex® Eccentric Disc Pumps for Product Recovery

Mouvex® has several pump models that includes product-recovery capability in food and beverage, pharmaceutical, and cosmetic/ personal-care product manufacturing:

Seal-less Design

Designed without mechanical seals, packing, or magnetic drive, Mouvex Eccentric Disc pumps feature a unique seal-less design with superior volumetric performance, resulting in high efficiency level over the time and optimized productivity gain and energy savings. The Mouvex principle pumps also provide very high suction and discharge pressure that allow the capability to self-prime and fully strip lines, maximizing product recovery.

Advantages:

- Eccentric Disc design allows for consistent flow and improved energy savings
- Extremely gentle, pulse-free flow to protect shear-sensitive products
- Reduced maintenance with no mechanical seals or timing gears
- Easy to install

Features and Benefits:

- Seal-less design eliminates leakage
- Ability to strip and drain transfer piping/tubing
- Line-stripping capabilities
- Self-priming with strong suction
- Shear-sensitive handling
- Consistent flow rate independent of pressure
- Low linear speed
- Precise dosing

- Accurate volume metering with high turn down
- Dry-run capable
- Maintains performance over time
- Effective with both high- and low-viscosity fluids
- Full drainability
- Clean-In-Place (CIP)/ Sanitize-In-Place (SIP)
- Easy integration

C Series and SLS Series:

- Feature a unique seal-less design with double stainless steel bellows to ensure long life and product safety
- For higher capacity applications
- Efficient and modular design for process applications
- Your solution for air and shear sensitive products and requiring a high sanitary standard



SLS Series: 1/2/3
Eccentric Disc Pump



C Series
Eccentric Disc Pump



SLS Series: 4/8
Eccentric Disc Pump





Model	Size	Maximum Speed*	Maximum Flow Rate*	Maximum Pressure	Maximum Temperature	Materials of Construction
Micro C Series	MC125	1000 rpm	125 L/hr (0.55 gpm)	15 bar (217 psi)	121°C (250°F)	Bellows: 316Ti Stainless steel Disc: CY5SnBiM (anti-galling alloy) Cylinder: 316L Stainless Steel Body Casing: 316L Stainless Steel
	MC250	1000 rpm	250 L/hr (1.1 gpm)	10 bar (145 psi)		
	MC500	1000 rpm	500 L/hr (2.2 gpm)	5 bar (72 psi)		
	MC800	1000 rpm	760 L/hr (3.3 gpm)	3 bar (44 psi)		
SLS Series	SLS 1	1000 rpm	1 m³/hr (4.4 gpm)	16 bar (232 psi)	121°C (250°F)	Bellows: 316Ti Stainless Steel Disc: CY5SnBiM (anti-galling alloy) Cylinder: 316L Stainless Steel Body Casing: 316L Stainless Steel
	SLS 2	1000 rpm	2 m³/hr (8.8 gpm)	10 bar (145 psi)		
	SLS 3	1000 rpm	3 m³/hr (13.2 gpm)	6 bar (87 psi)		
	SLS 4	750 rpm	4 m³/hr (17.6 gpm)	10 bar (145 psi)		
	SLS 8	750 rpm	8 m³/hr (35.2 gpm)	6 bar (87 psi)		
C Series	C12i	500 rpm	12 m³/hr (52 gpm)	9 bar (130 psi)	121°C (250°F)	Bellows: 316Ti Stainless Steel Disc: CY5SnBiM (anti-galling alloy) Cylinder: 316L Stainless Steel Body Casing: 316L Stainless Steel
	C18i	500 rpm	18 m³/hr (79 gpm)	6 bar (86 psi)		
	C24i	450 rpm	24 m³/hr (105 gpm)	9 bar (130 psi)		
	C36i	450 rpm	36 m³/hr (158 gpm)	6 bar (87 psi)		
S Series	S2	900rpm	1,500 L/hr (6.6 gpm)	6 bar (87 psi)	80°C (176°F)	Bellows: FKM Disc: CY5SnBiM (anti-galling alloy) Cylinder: 316L Stainless Steel Body Casing: 316L Stainless Steel
	S4	750 rpm	4,000 L/hr (17.6 gpm)	6 bar (87 psi)	SIP 120°C	
	S6	500 rpm	12,000 L/hr (52 gpm)	6 bar (87 psi)	(20 minutes)	

* Actual maximum speed and flow for application dependent on proper application sizing.

Fittings: SMS, DIN 11851, DIN 11864 BF-A Aseptik fl, Tri-Clamp ® Equivalent available.

S Series:

- Features a unique seal-less design with rubber bellow
- Simplest positive displacement pump to clean out of place in the industry, including sanitary applications requiring quick and easy dismantling (Up to 12 m³/hr / 52 gpm)



S Series: S6 Unit
Eccentric Disc Pump

S Series: S6
Eccentric Disc Pump



Micro C Series:

- Features a unique seal-less design with a single bellow
- Highly controlled flow rates below most other positive displacement pumps can handle
- Your solution for continuous dosing with low flow rate (Below 800 L/hr / 3.5 gpm)



Micro C Series: C125
Eccentric Disc Pump



(* In Process)





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