

# Think CIP for Optimum ROI

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**This unique clean-in-place pump technology gets your process up and running faster between batches to improve uptime and reduce maintenance time and costs.**

**T**hough eccentric disc pump technology was invented in France and introduced to the market more than 100 years ago, it has only reached the global stage in recent years.

These pumps are now used in industrial and sanitary applications that include food processing, pharmaceuticals, chemicals, soaps, healthcare and cosmetics, agrochemicals, paper coatings, solvents, polymers and petrochemicals.

## The Eccentric Disc Principle

Eccentric disc technology employs an oscillating eccentric disc to produce the pumping performance of a positive displacement pump, creating a more consistent flow even with changes in pressure and viscosity.

The oscillating motion of the pump disc on the cylinder causes very low internal velocity, resulting in gentle low shear pumping action and lower energy consumption.

Eccentric disc pumps can uniquely meet those competitive pressures and environmental protection regulations that force companies to improve operating efficiencies, reduce product losses and improve sanitary standards.

Eccentric disc pumps are seal-less, which helps to eliminate high-value product losses. But perhaps most beneficial is their true clean-in-place (CIP) capability – a significant economic advantage over other pumps that require time-consuming disassembly between batches in order to properly clean and sanitize them.

Eccentric disc pumps can be completely drained, flushed and cleaned in place without disassembly. No removal of piping, pump housing covers, or disassembly of any kind is required. And since the pump does not require disassembly, maintenance time and costs are reduced, and



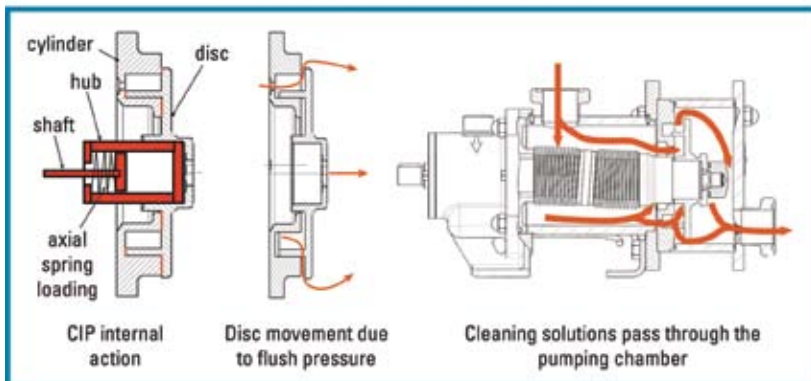
A lucite/clear C-Series eccentric disc pump.

the process can be back on line quickly.

## CIP for Sanitary & Food Applications

There are stainless steel eccentric disc pumps that hold 3A Approval Certification and are EHEDG (European Hygienic Equipment Design Group) approved, designed specifically to be flushed and cleaned in place.

### Movement and Flow for CIP



This drawing shows the flow of cleaning solution through the pump chamber.

Other accepted technologies, such as lobe pumps, may experience a 15 to 20 percent loss of volumetric efficiency when designed for CIP drain ability with vertical porting. A stainless steel eccentric disc pump experiences no loss of performance due to porting, and does not need to be by-passed to clean-in-place, provided the pressure does not exceed 45-psi (30-psi for certain models).

In most cases, the CIP process begins with a water flush, concentrations of different cleaning solutions such as a mild caustic, and perhaps 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. It is important to minimize the amount of residual product, especially if it is expensive or hazardous, remaining in the pump and piping prior to starting the CIP cycle. Eccentric disc pumps, thanks to their excellent suction lift and line stripping capabilities, enable reducing the quantities of residual products. This minimizes loss of products, eases cleaning and reduces cycle time. For optimum cleaning of sticky or viscous products, the flow through the pump is between 20-gpm to 200-gpm depending on pump model, and less for thinner, easier to handle products.

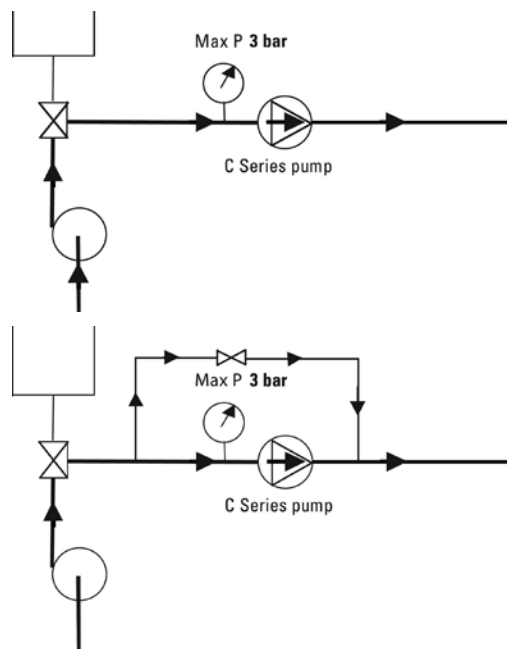
In CIP applications, eccentric disc pumps are arranged in series to take advantage of the pumps' unique "disc/cylinder" design. Because the pressure at the pump inlet is higher than at the outlet, the disc lifts from the pump cylinder, permitting passage of the water or cleaning solutions to flow through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

Typically, a centrifugal pump, installed in series, is used for CIP cycles, placed upstream of the eccentric disc pump. Unlike other technologies, the eccentric disc pump does not need to operate during the CIP cycle.

Generally, the most efficient CIPs include five stages:

- 1) Pre-wash with clean water at room temperature to evacuate remaining residues.
- 2) Washing with an alkaline detergent, typically a soda at 2.5 percent at a temperature of 80-deg C, to enable dissolving and evacuating grease and proteins.
- 3) Rinsing with clean water at room temperature to avoid mixing of two different cleaning solutions.
- 4) Washing with acid solution, typically nitric acid at 2.5 percent at room temperature, to dissolve and evacuate proteins and inorganic salts.
- 5) Rinsing with clean water at room temperature to evacuate any trace of acid solution.

CIP technology improves operating economics because it is fast, efficient and effective. In a sanitary process that requires routine cleaning between process batches, CIP technology can dramatically improve the uptime performance and reduce maintenance costs. By design, eccentric disc technology is highly reliable and low-maintenance because the pump consists of very few parts: a single drive shaft; a single or double



These diagrams show the pumps arranged in series.

set of bellows that also act as a pressure retaining element; four bearings (separated from the liquid); one disc; one cylinder; one gear case; one disc nut; seven o-rings; and two lip seals.

## Diverse Applications

Eccentric disc CIP pumps are capable of handling up to 10,000-Cst (46,000-SSU) liquids and working pressures of 72.5-psi to 130-psi, depending on the model. Speed range is 50-rpm to 1000-rpm, with capacities of .03-gpm to 158-gpm. Rated up to 300-deg F, these pumps have a particle size range of 1-mm to 3-mm and are effective at handling suspended solids with mild abrasives.

From high-value fine chemical applications to sanitary and food applications, CIP eccentric disc technology makes the pump extremely flexible, capable of pumping low viscosity, high viscosity and abrasive materials within a single process, all with the same pump, demonstrating that output is not affected by viscosity variations.

Even at low speeds, the suction capability of the pump allows for perfect priming and draining of mobile tanks and stationary pipes. Its seal-less design makes it particularly suitable for a broad range of mediums, from sticky and highly viscous liquid sugars to toxic chemicals and extremely thin products, such as solvents.

Gentle handling, high volumetric capability, seal-less design and ROI-optimizing CIP technology – all wrapped into one pump.

**P&S**

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