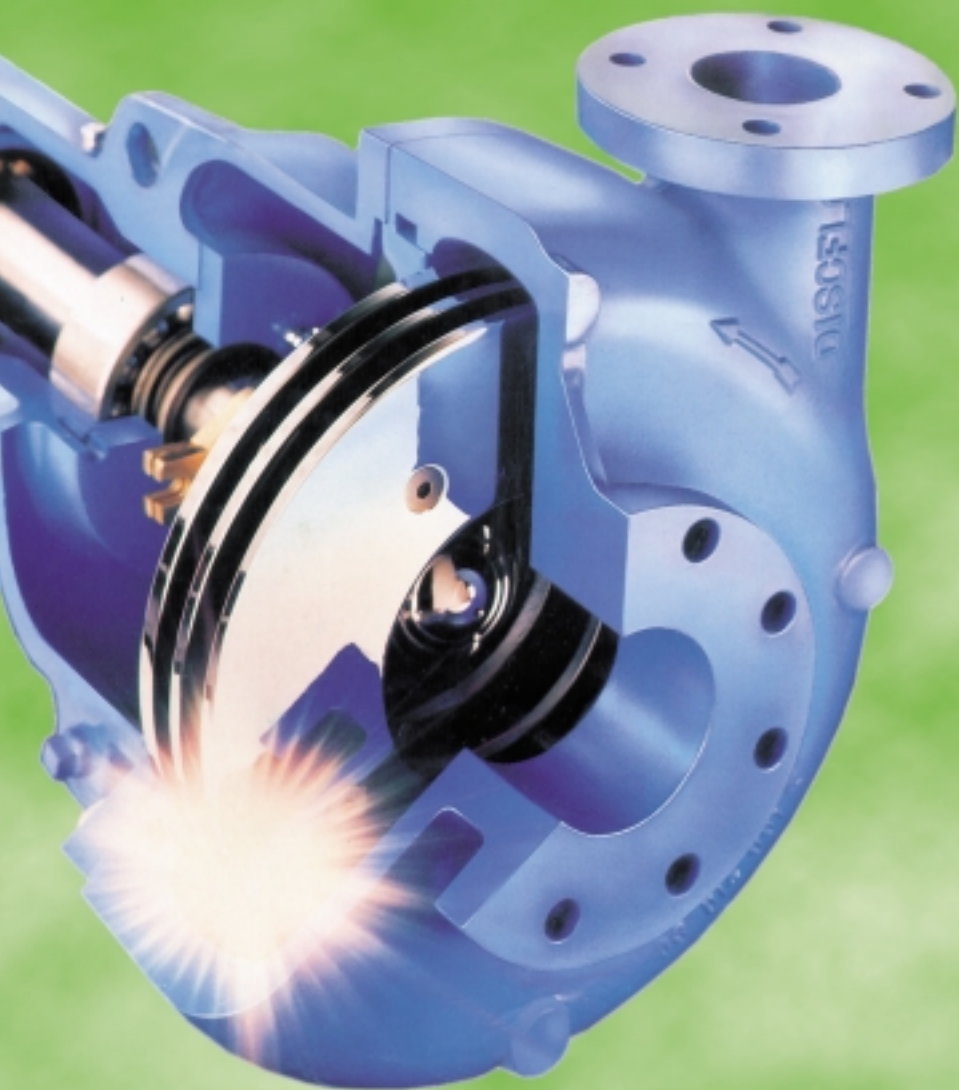


DISCFLO 

DISC PUMPS

*For Municipal and
Industrial Wastewater*

THE FUTURE OF PUMP TECHNOLOGY



PUMPS

highly abrasive, high solids, large or stringy solids and viscous slurries and sludge

DELIVERS

laminar, pulsation-free flow, and a low NPSH requirement

REDUCES

maintenance and downtime in hard-to-pump applications

DISCFLO *and* *the* DISC PUMP



DISCFLO'S DISC PUMP IS A REAL BREAKTHROUGH IN PUMP TECHNOLOGY.

Using a totally unique operating system that differs from other pump designs on the market, it allows you to achieve an unheard-of level of productivity, versatility and exceptionally low Life Cycle Costs in all hard-to-pump municipal and industrial wastewater applications.



- The disc pump has solved some of the toughest problems in these plants. It is able to pump all types of highly viscous, high solids and abrasive slurries, as well as fluids containing large and stringy solids, such as rags, tumbleweed, plastic strapping and anything dumped into the effluent or sewage system. Another benefit of the Discflo pumps is its ability to pump slurries containing high amounts of entrained air and gas, such as anaerobic sludge, without cavitating. The disc pump's superior performance is confirmed by users from both municipal and industrial water and wastewater treatment plants worldwide, all of whom have reaped significant benefits—in reduced pump wear, longer pump life, lower maintenance and operating costs and zero downtime—by switching to the Discflo technology.

- The disc pump technology was developed in the late 1970s. The pumps are manufactured exclusively by Discflo Corporation, founded in 1982, at its international headquarters in southern California, USA.

**The Discflo pump allows
you to achieve an unheard-of
level of productivity, versatility
and low Life Cycle Costs.**

DISCFLO'S MISSION

*is to become the number one
manufacturer of pumps for
the hard-to-pump
marketplace worldwide.*

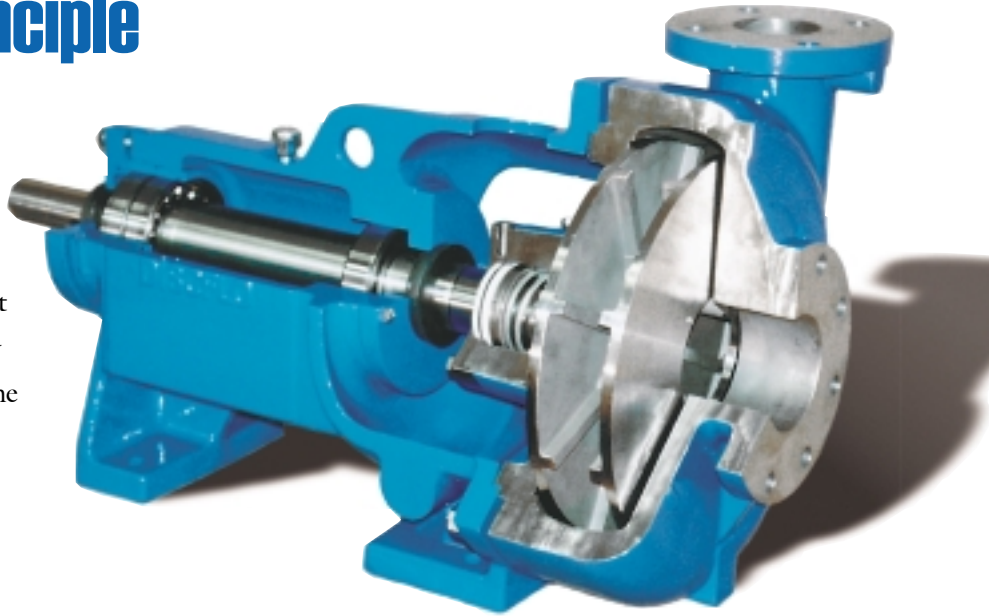
*We plan to achieve this through
continuous innovation in pump
design and technology, attention
to quality in our manufacturing
process and dedication to
excellent customer service.*

*In reaching our goal, we can help
you reach yours—to solve your pump
operating and maintenance problems
and produce a superior end-product.*

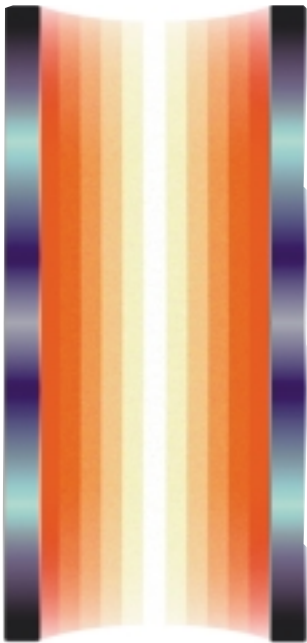
The Disc Pump Principle

THE DISC PUMP IS A HIGHLY INNOVATIVE PUMP.

From the outside, it has the appearance of a centrifugal unit, but it performs the work not only of centrifugals, but also progressive cavity pumps, lobe and gear type pumps, and in some cases has replaced chopper pumps. The disc pump achieves flow rates from 2 to 10,000 GPM [2250 m³/h] and heads up to 1000 ft [300m].



- Disc pumps use the principles of boundary layer and viscous drag. The application of these principles is new in the world of pumps but widely used in other areas of fluid engineering, such as causing friction loss through a piping system. Under laminar flow conditions, streams of liquid travel at different velocities through a pipe. Fluid in the layer closest to the pipe is stationary, forming a boundary layer between the pipe and the rest of the fluid. successive fluid layers flow faster towards the center of the pipe.



Disc pumps employ the principles of boundary-layer adhesion and viscous drag, to produce pulsation-free, laminar flow.

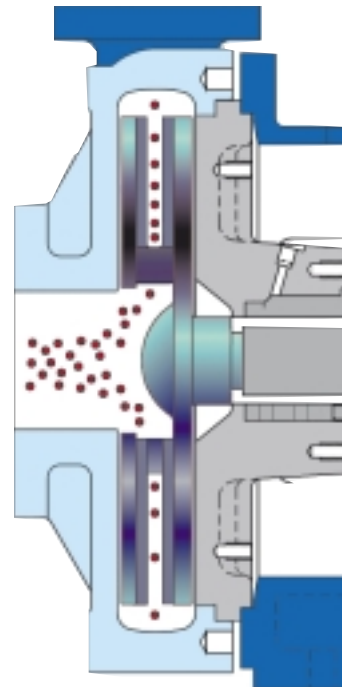
- Similarly, when a fluid enters the disc pump, its molecules adhere to the surfaces of the Discpac, a series of parallel discs which are the heart of the disc pump. This creates a boundary layer. As the discs rotate, energy is transferred to successive layers of molecules in the fluid between the discs through viscous drag, generating velocity and pressure gradients across the width of the Discpac.

This combination of boundary layer and viscous drag causes a powerful dynamic force field that “pulls” the product through the pump in a smooth, pulsation-free flow.

- The fluid being pumped moves parallel to the discs, and the boundary layer creates a molecular buffer between the disc surfaces and the fluid. Consequently there is no impingement of the fluid on the moving parts of the pump. It is this which distinguishes the Discflo pump from other pump systems on the market, all of which use some kind of impingement device—such as a vane, impeller, lobe, hose or screw—to “push” product through the pump.

- By minimizing contact between the pump and the material being pumped, wear on the disc pump components is greatly reduced, pump breakdown is almost unknown and, in the case of delicate and shear sensitive materials, damage to the product by the pumping system is virtually eliminated. The disc pump’s problem-solving ability in hard-to-pump applications is unparalleled in the

Disc pumps have a non-impingement pumping action, with minimal contact between pump and fluid.



APPLICATIONS

EXAMPLES OF MUNICIPAL INSTALLATIONS

- Primary and secondary clarifier sludge
 - Recirculating anaerobic sludge to the digester
 - Digested sludge
- Wastewater slurry containing high volumes of pigments
- Dewatering tank transfer
 - Lime slurry containing up to 80% solids
- Raw sewage containing rags, grit and tumbleweed
- Sand and water slurries
- Neat polymer solutions and other processing chemicals

EXAMPLES OF INDUSTRIAL INSTALLATIONS

- The Discflo disc pump can pump all types of industrial effluent and has experience in the following industries in particular:
- Chemical, oil and petrochemical processing plants
 - Paint, ink and plastics production
 - Pulp, paper and textile mills
 - Mining operations
 - Metal fabrication and finishing
 - Food manufacturing plants and agriculture
 - Breweries, beverage plants and dairies
 - Sugar mills
 - Utility and power generation plants
 - Environmental waste clean-up, including nuclear waste

Features of the Disc Pump

OPERATING BENEFITS

● Pulsation-free Laminar Flow

Pulsation-free laminar flow ensures no degradation of delicate products or damage to shear sensitive fluids, no dampening required later in the process, and less wear on the surrounding pipework.

● No Close Tolerances

Allows the disc pump to handle large and stringy solids, as well as fluctuations in solids size and volume, without clogging.

● Low NPSH Requirement

The disc pump's NPSH requirement is about one half to a third that of a standard centrifugal pump in the same service conditions due to the smooth laminar flow within the disc pump.

● Ability to Run Bone Dry

The disc pump is able to run dry indefinitely because there is no direct metal-to-metal contact in the pump. *Note: the mechanical seal must still be protected under these conditions.*

● Deadheading Discharge/Starving the Suction

It is possible to deadhead the discharge and/or starve the suction for extended periods of time at normal operating speeds, without damaging the pump. *Note: seal flushing must be continued under these conditions.*

● No Radial Loads

In-house testing at Discflo proves that there are no radial loads on the disc pump shaft during operation, ensuring longer seal, bearing and shaft life.

● Ease of Operation and Installation

The disc pump is one of the most straightforward pumps to install and operate. The back pull-out design allows the user to remove the bearing frame and rotating assembly without disturbing surrounding pipe connections.

● Long Life for Pump Components

Very few spare parts needed for the Discflo pump over its lifetime. The pump uses a heavy duty shaft which has close-to-zero axial loading and no radial loads, increasing bearing and seal life.

● Low Maintenance/Spare Parts Requirements

Disc pumps suffer little-to-no wear even in severely abrasive service due to their non-impingement operation and laminar flow. Less than 5% of Discflo's business comes from spare parts purchased for repair.

● High Uptime and Reliability

The most reliable pump on the market for hard-to-pump applications. The disc pump has no close tolerances, pulsation-free flow and is based on a non-contact pumping action. All these factors contribute to high uptime by preventing solids from clogging.

● Higher Yields and Improved Quality

When pumping delicate and shear sensitive (e.g. dilatant or thixotropic) products, disc pumps can increase productivity and reduce product losses due to the non-contact pumping mechanism and laminar flow.

FLUIDS PUMPED



- **Highly Viscous Fluids**

Because the disc pump uses friction, the higher the viscosity, the *more* efficiently it pumps. Fluids – including clarifier sludge, tar, tank bottoms and asphalt – up to several 100,000 cPs can be pumped.

- **Slurries with a High Solids Content**

Handles slurries containing up to 80%+ solids without clogging, wearing excessively or coming to a standstill. Examples include pumping sewage, oil and sand slurries, and all types of effluent.

- **Severely Abrasive Fluids**

Pumps the most severely abrasive fluids with no problems and minimal wear, including lime slurries, borax, sand and grit, and fly ash from utility plants.

- **Fluids Containing Large and/or Stringy Solids**

Discs in the Discflo pump can be spaced several inches apart to handle large solids, because solids entering the pump move to the area of highest velocity – the midway point between the discs – and pass through without clogging. It can also pump stringy solids - such as rags and plastic strapping – without clogging.

- **Fluids with High Volumes of Entrained Air/Gas**

Handles fluids containing high levels of air/gas without vapor-locking or causing pump cavitation, including DAF sludge, anaerobic sludge and froths.

- **Corrosive Fluids and Hazardous Materials**

Pumps are available in a wide range of metallic and non-metallic materials to handle all types of corrosive/hazardous fluids, including toxic slurries, nuclear waste and hot acids/alkalis.

- **Fluids with Varying Conditions**

The Discflo pump is the most versatile industrial pump on the market today. The same model can handle fluctuations in temperature, pressure, solids content and even product, without breakdown.

- **Delicate and/or Shear Sensitive Products**

Virtually eliminates product damage during pumping. Proven success in handling shear damaging, shear thickening (dilatant) and shear thinning (thixotropic) products, such as latexes, emulsions, and large, delicate solids.



Sump Pumps

PUMP CONFIGURATIONS



Discflo's disc pumps are an engineered product, configured to meet the user's needs by varying the number, size and spacing of discs in the Discpac. Disc pumps are available in direct-coupled, frame-mounted, close-coupled, sump, submersible, vertical sump, dry pit and cantilever models, with Discpac diameters from 8-inch [203mm] to 20-inch [508mm].

Models		Models	
US (in)	Metric (mm)	US (in)	Metric (mm)
2015-8	50 × 40 × 203	603-17	150 × 80 × 432
302-10	80 × 50 × 254	604-17	150 × 100 × 432
402-12	100 × 50 × 305	806-17	200 × 150 × 432
403-12	100 × 80 × 305	1008-17	250 × 200 × 432
604-12	150 × 100 × 305	603-20	150 × 80 × 508
402-14	100 × 50 × 305	804-20	200 × 100 × 508
403-14	100 × 80 × 305	806-20	200 × 150 × 508
604-14	150 × 100 × 305	1006-20	250 × 150 × 508
806-14	200 × 100 × 432	1008-20	250 × 200 × 508

PUMP MATERIALS



METALLURGIES: stainless steel, ductile iron, CD4, hastalloy, maxalloy, carbon steel, titanium

NON-METALLIC MATERIALS: PVDF, Teflon, ceramic-lined, rubber-lined

Other specialist materials available on request.

OPERATING RANGE



Operating range for standard disc pumps:

- **Hydraulic flow capacities:** 2–10,000 GPM [0.5–2250 m³/h]
- **Discharge pressures:** up to 1000+ ft TDH [300+ m]
- **Suction pressures:** low NPSHr
- **Working pressures:** up to 1400 psi [95 atm].
- **Operating temperatures:** to 1000°F [523°C]
- **Viscosities:** up to 300,000 cPs
- **Pump speeds:** up to 3600 rpm
- **Solids size (max):** 10 inches [250 mm]
- **Drivers:** electric, diesel, hydraulic, air



Submersible Pump

Case Studies: MUNICIPAL & INDUSTRIAL WASTEWATER



CASE HISTORY Nº 1

• At a wastewater treatment plant in Toronto, Canada, Discflo pumps are being used for two different sludge handling processes. They are installed in the disposal area pumping a 3% solids sludge from the digesters to the centrifuges, and on the dissolved air flotation tanks. In the first process, the disc pumps replaced rotary lobe pumps, which required complete overhaul after 3000 running hours at the cost of CAN \$10,000 each. Because this process runs 24 hours a day, 365 days a year, “the lobe pumps were costing us too much to maintain”, reports the chief works supervisor (mechanical) at the plant. It was the same problem in the sludge thickening area, only in this application, the plant used progressive cavity type pumps. These pumps cost from CAN \$15,000 – CAN \$20,000 to overhaul. The first Discflo pumps were installed in the sludge disposal area in 1995, and in the sludge thickening facility in 1996. Since start-up, they have all run trouble-free, with no repairs and no breakdown in service.

CASE HISTORY Nº 2

• Disc pumps have solved a pumping problem in sludge recirculation for a wastewater treatment facility in Denver, Colorado. The previous centrifugal type pumps experienced air-locking when the plant installed gas mixing equipment as part of the anaerobic digestion process. The disc pumps’ ability to handle entrained gas in this viscous sludge was a major factor in their selection, according to the project manager for the Central Treatment Plant. The pumps have operated with no downtime or repairs, other than routine preventative maintenance, since start-up in 1995.



CASE HISTORY Nº 3

• Discflo pumps were installed at a California-based utility company to handle the highly abrasive material, fly ash. These pumps were finally replace in 1995, after seven years’ service. In that time, there were no major problems during operation and no appreciable wear on the Discpac. “They’ve been very good pumps for us” comments the company’s operating and maintenance manager “and have carried on pumping this highly abrasive material without breaking down.”

Increasing productivity, reducing operating costs.



CASE HISTORY N° 4

● Four disc pumps were installed at a municipal sewage treatment plant in Gothenburg, Sweden, to pump a thickened wastewater sludge. The sludge has a 3 – 7% dry content with a solid size of 1–2 mm [0.04 – 0.08-in] and a fluid density of 1000 kg/m³ [62 lb/ft³]. The Discflo units replaced progressive cavity pumps which were experiencing wear problems in this 24 hour/day operation. Since start up, the disc pumps have run perfectly without any problems and the plant personnel are very pleased with its performance. The savings amount to around \$36,000 per pump per year.

**“The only maintenance
required in five years ... has
been packing replacement.”**

— City Superintendent of a Florida wastewater treatment plant.



CASE HISTORY N° 5

● Disc pumps' lack of radial loads are saving a WWTP in North Carolina a small fortune in mechanical seals. Elsewhere in the plant, where centrifugal pumps are being used to pump a viscous, high solids fluid, the maintenance department is spending as much as \$14,000 per year on seal replacements due to the radial loading problem. They have been using disc pumps since 1989 to pump primary scum from the clarifier. The scum is thick, abrasive and contains some solids. As well as saving on mechanical seals, the plant has greatly reduced its pump maintenance and spare parts bills. Says the maintenance supervisor at the plant: “My staff have not had to look at the maintenance manual once since the pumps were installed in 1989. The only thing they have done in the past eight years is add some extra packing as needed.”

CASE HISTORY N° 6

● A Florida water treatment plant is using disc pumps to pump lime sludge. It is a severely abrasive, viscous (2000 cPs) and high solids content fluid, with a specific gravity of 1.5. Prior to installing the first Discflo units, the plant operated two progressive cavity pumps to move lime sludge with a 30–60% solids content. “During the course of normal operation, the rotor/stator assembly in these pumps would start wearing out after 2–3 months” reports the superintendent at the plant. The disc pump system was then installed in 1993. The City Superintendent comments: “It has not shown any signs of wear to date... The only maintenance required in five years of operation has been packing replacement and the solids being pumped now range from 60–80% on a daily basis.” The pumps have reduced the City's maintenance bill by tens of thousands of dollars in maintenance costs, as well as cut downtime and improved the overall efficiency of the lime solids removal operation.



DISC PUMPS... The Future of Pump Technology

Disc pumps are available both from Discflo Corporation direct and through your local disc pump distributors. For information about your nearest distributor or the use of this innovative pump technology in municipal and industrial wastewater applications, contact Discflo Corporation direct at the address below, or visit our web-site www.discflo.com.



Disc pump have been successfully installed in a wide range of industries, including the following:

- Pulp and paper manufacture
- Oil refining and drilling operations
- Metal, mining and mine de-watering industries
- Chemical and petrochemical processing
- Food, beverage and agricultural industries
- Pharmaceutical and bio-medical processing

Disc pumps and the Discpac technology are covered by United States and foreign patents.

Find out what Discflo can do for you today!

DISCFL 

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