DISCFLO PUMPS

CORPORATE OVERVIEW

COMPANY OVERVIEW

Since 1982 Discflo™ Corporation, a leading U.S. based pump manufacturing company, has been a leader in the hard to pump market. The manufacturing facilities are located in Southern California with distribution outlets worldwide. Discflo™ holds all patents (US and worldwide)on the innovative Disc Technolgy.

Every pump is manufactured to the highest quality standards at our headquarters in San Diego County. The manufacturing plant is equipped with state-of-the-art machinery, engineering and assembling equipment. All pumps undergo thorough quality inpsection and testing before leaving the plant

DISCFLO CORPORATION
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SANTEE, CA 92071
619.596.3181
WWW.DISCFLO.COM

THE TOUGHEST APPLICATIONS DESERVE THE TOUGHEST PUMP.

A SUSTAINABLE SOLUTION FOR GENERAL INDUSTRY

Discflo's disc pumps have been solving the pumping problems of the general industry since 1982. Their unique pumping mechanism is based on the effect of a boundary layer and viscous drag principle, which produces a pulsation-free laminar flow. This technology creates a low-to-no maintenance system by minimizing contact between the pump and the raw material being pumped. The results speak for themselves: wear on the disc pump components is greatly reduced resulting in pump longevity, reducing operational costs and saving hundreds of thousands of dollars in parts, maintenance and product loss. The powerful combination of superior abrasion resistance ,gas-entrained pumping ability and non-emulsifying laminar flow make the disc pump the ideal choice for some of the toughest applications.

With the company's innovative disc technology, Discflo™ is successfully servicing many industries including oil and petrochemical, chemical processing, municipal water/wastewater, food and beverage, pharmaceutical manufacturing, steel manufacturing, pulp and paper, general industrial and specialty applications. The disc pump is not a "one pump fits all" solution; Discflo™ is in the business of providing exceptional solutions to some of industry's toughest pumping problems. to stay competitive in the market, we offer a wide range of pump configurations materials of construction and additional options that we apply when designing the most effective, efficient and highly reliable pump system for your application.

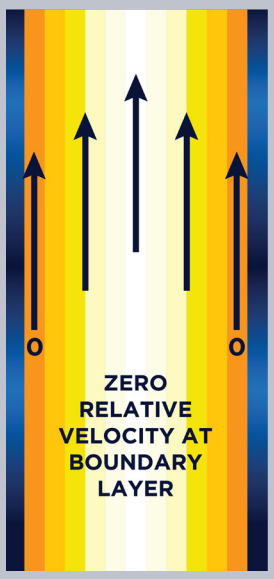
Our unique pumping mechanism is based on the effect of a boundary layer and viscous drag principle, which produces a pulsation-free laminar flow.

APPLICATION

Disc pumps are ideal for pumping the following: multi-phase flows such as liquid-liquid, gas-liquid, liquid-solid, and gas-liquid-solid (for example, misture of gas/oil/water/sand); hundreds of thousands centipoise (cP) of viscous slurries, high-solid fluids to 90 percent solids: abrasive and/or corrosive fluids; large and stringy solids up to 8 inchesin diameter; emulsions and delicate/shear sensitive emulsions. Additionally, Discflo™ pumps are applicable in high-temperature/ pressure systems.

BOUNDARY LAYER AND VISCOUS DRAG PRINCIPLE

Disc pumps operate on 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 enginerring, such as causing friction loss through a piping system. Under laminar flow conditions, streams of liquid travel at different velocities through a pipe with the layer cloesest to the pipe being stationary - known as the Boundary Layer - and successive fluid layers flowing faster toward the center of the pipe.



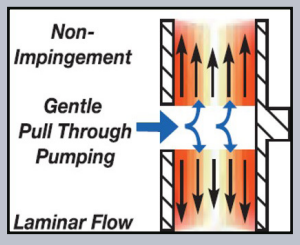
Discflo™ disc pumps employ the principles of Boundary Layer and Viscous Drag, to produce pulsation-free laminar flow. Tupical Pipe flow showing Boundary Layer and Viscous Drag Hydraulic Principles.

Similarily, when a fluid enters the disc pump, a boundary layer is formed on the surfaces of the Discpac, a series of parallel discs which form the pumping mechanism. As the discs rotate, energy is transferred to successive layers of molecules in the fluid between the discs via the Viscous Drag Principle, generating velocity and pressure gradients across the width of the Discpac. This combination of boundary layer and viscous drag results in a powerful force that "pulls" the product through the pump in a smooth, pulsation-free flow.

The fluid bein pumped moves parallel to the Discpac, so it does not impinge on the moving parts of the pump. It is this Non-impingement and Gentle Pull-Through pumping action which distinguishes the Discflo™ pumpfrom other pump systems on the market, all of which use some kind of impingement device 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 downtime is rare and in the case of shear sensitive materials, damage to the product by the pump is eliminated. The disc pump's problem-solving ability in hard-to-pump applications is unparalleled in the world of pumps. . . making the Discflo™ truly the future of pump technology.

Boundary Layer/Viscous Drag
Unique Pumping Principle



DISC PUMP NPSH

The blades of an impeller of a centrifulgal pump rotate inside a fluid. As the fluid is accelerated through the blades, low-pressure regions are formed. As the blades move faster, the pressure around them decreases. When the fluid reaches the vapor pressure as a result of the decrease in suction pressure, the fluid begins to vaporize and small steam bubbles form. These steam bubbles collide with the rotating blades, causing waves of pressure and wear on the impeller. What about Discflo™ pumps? Given that the mechanism of energy transfer is not done through contact or impingementof a solid element but through the mechanism of bondary layer and viscous drag (no blades strike the fluid), it is difficult for the fluid particles to reach vapor pressure. In this case, a disc pump only requires a quarter of the net positive suction head (NPSH) of other industry pumps.

EFFICIENCY

LITTLE MAINTENANCE REQUIRED

The pump wears so slowy that spare parts and maintenance requirements are reduced dramatically, over 90% in many applications.

DISC PUMPS NEED FEW (IF ANY) SPARE PARTS

The disc pump comes with no recommended spare parts list, simply becuase it rarely needs them.

NOTHING COMES CLOSE TO A DISC PUMP IN PROTECTING SHEAR-SENSITIVE AND DELICATE SOLIDS

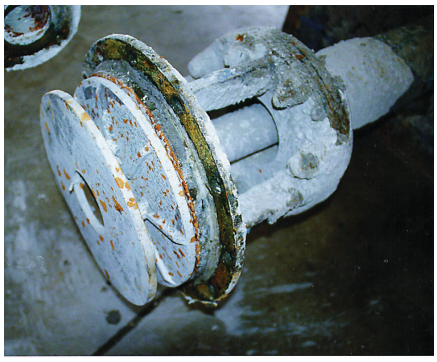
In case after case, end users have reported dramatic yield increases. Discflo™ virtually eliminates product losses in many applications

HEAVY DUTY SHAFT - NEAR ZERO RADIAL AND AXIAL LOADS

There is less than 0.002-inch shaft deflection under the full-load, full-speed pumping. This extends the life of the shafts, seals, sleeves and bearings. The bearings in a disc pump will last in excess of 80,000 hours with proper lubrication.

ENERGY EFFICIENT

In most applications, energy requirements are about the same as most other conentional pumps. However , the disc pump uses less power than other pumps when handling highly viscous material. Because of the viscous drag principle it becomes more efficient as viscosity rises



After seven years continous service handling abrasive fly ash, this Discpac shows no appreciable signs of wear.

The disc pump is so durable that as long as the seal is protected you can run it bone dry and as long as there is seal flusing you can even deadhead the discharge and starve the suction at normal operating speeds without damaging the pump.

UNPARALLELED ECONOMY

The disc pump is competitive in initial capital costs, but in hard-to-pump applications, it has life-cycle cost significantly lower than all other competitors.

The pump is designed to handle viscous, abrasive, air-entrained and shear-sensitive fluids. in these applications, conventional pumps require parts and repairs in their first year of service that exceed their initial purchase price, two or three times over.

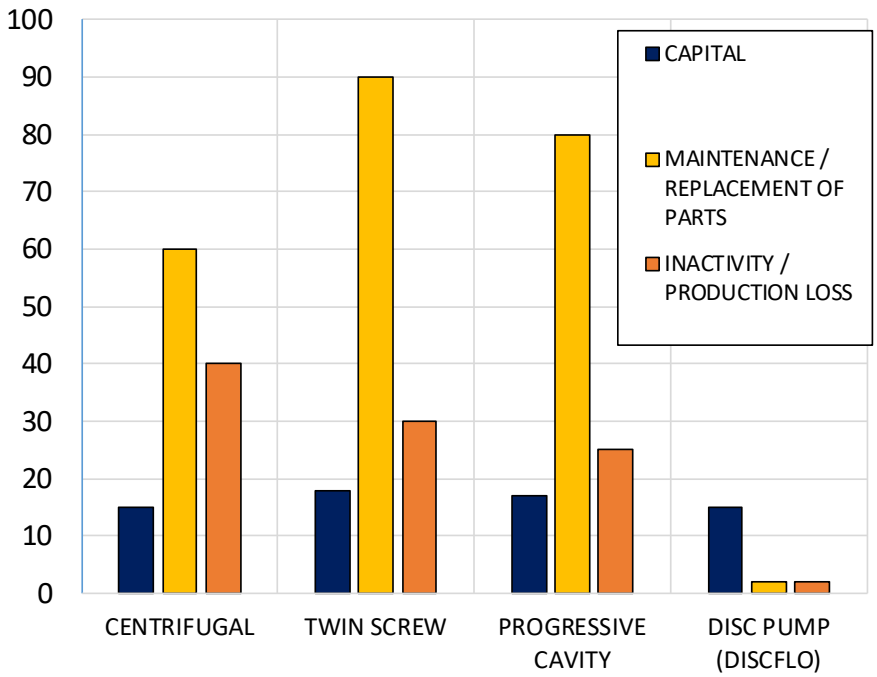
The Discflo™ non-impingement design suffers so little ewear that repair and part requirements are dramatically reduced , often by as much as 90%.

Non-impingement pumping produces higher product yields of better quality, because it doesn't damage or emulsify shear-sensitive solids.

WE SELL PUMPS NOT PARTS

Less than five percent of our revenues fome from purchases of parts for repair. Beacuse of reduced wear the disc pump simply lasts longer.

Discflo™ users worldwide have seen costs decrease as efficiancy with installed Discflo™ pumps increased.



COST COMPARISON

(Thousands of US Dollars)

DISCFLO™ ADVANTAGES

Non-impingement pumping, laminar, pulsation-free flow offers the best protection for shear-sensitive products and ensures pump longevity

No close olerances or loss of performance due to wear

Open design prevents clogging, so pump can handle large or stringy solids content, as well as fluids with varying solids content, size or viscosity

Low NPSHr - about a third to a half less than a comparably sized centrifugal pump

Increasing efficiency as fluid viscosity increases due to the viscous drag pumping principle

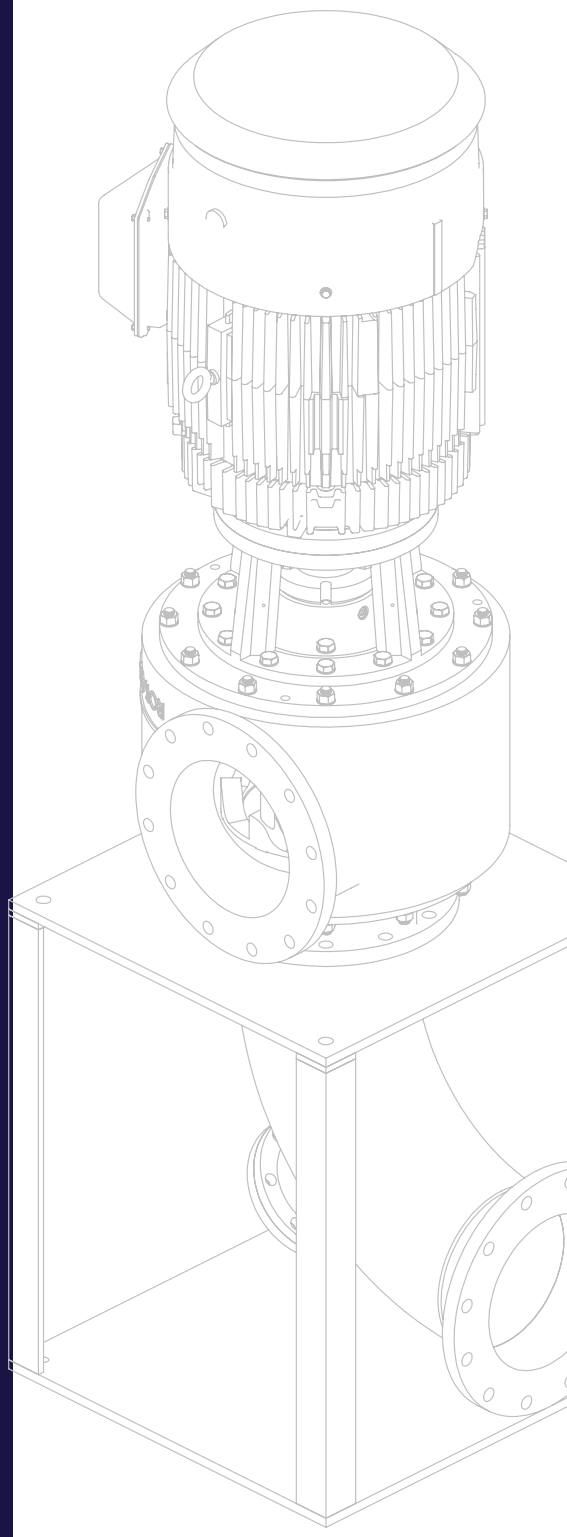
Low wear even in abrasive service due to the laminar flow and non-impingment pumping

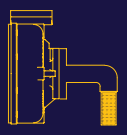
Exceptional reliabiilty due to rugged construction and soids handling capability

Very few spare parts required (less than 5% of company revenue comes from parts sales)

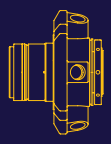
Runs dry indefinitely provided seal must be protected

Hydraulic flow capacities: 1-8000 GPM
Differential pressures: Up to 433 psi
Discpac diameters: 1.75" - 24"
Working Pressure: Up to 2500 psi
Operating Temperatures: Up to 1000° F
Viscosities: Up to 70,000 + cP
Solids size (max): 8"
Pump speeds: 3600 + rpm

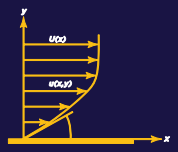




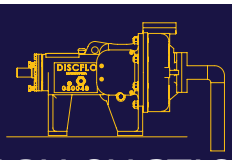
NO PULSATION



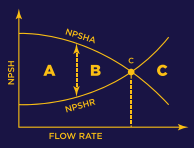
LONGER SEAL LIFE



LAMINAR FLOW

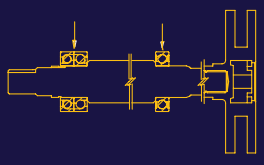


HIGH SUCTION LIFE CAPABILITY



VERY LOW NPSH

MODERN DESIGN



NO RADIAL LOAD

EXCELLENT MEAN TIME BETWEEN FAILURE (MTBF)

CASE STUDIES

DISCFLO™ PUMPS STREAMLINE MULTI-PHASE FLOW

(HEAVY CRUDE OIL – WATER – GAS – SAND) REPLACEMENT OF TWIN-SCREW PUMPS CAMPO QUIFA – COLOMBIA

Due to the presence of heavy crude oils (8-15° API) in the basins of the Eastern Plains from the Colombian Quifa field, the operational conditions of the crude pumping station were a challenge for the traditional applications of positive displacement pumping using Twin-screw Pumps. The presence of solids, sand, water and other pollutants typical of the crude oil in this field, as well as entrained gas and very large viscosity ranges bound together the most undesirable conditions for a traditional screw pump. The continuous wear of the screws and mechanical seals required a halt in production to replace parts which generated high life cycle costs. The result, a high economic impact on the operation and sustainability in this pumping station.

Our Discflo™ pumps have high tolerance to solids, entrained gas, broad ranges of viscosity (water, light crude oil, medium crude oil, heavy crude oil and extra heavy crude oil), and lower requirements of NPSH. Based on our pumps technology, the replacement of the twin-screw pumps by Discflo™ increased pumping capacity and system efficiency while reducing downtime and the overall costs in the life cycle for this application.

SAVING $1000s IN LIME SLUDGE DISPOSAL

ALMOST ZERO MAINTENANCE OVER THE PAST 30 YEARS OF OWNING DISCFLO PUMPS

The Claude H Dyal Water Plant at the City of Cocoa in Florida is saving $1000s in its lime sludge disposal operations, thanks to Discflo™ pumps. The sludge is highly abrasive and has a solids content up to 80%, making it one of the toughest materials to pump. The first Discflo™ unit, a model 403-2HHD pump with a 28% Norchrome high head Discpac, was installed on a trial basis in the summer of 1993. It was used exclusively to pump lime sludge with a 30-60% solids content. After ten months' operation, the pump was disassembled and inspected by the City's maintenance and engineering personnel and it showed no signs of wear on the casing or the Discpac.

Discflo™ replaced two progressive cavity pumps that required frequent maintenance and a lot of downtime. We checked in with the plant in August of 2000 and Gary reported the following, "We have not only saved thousands of dollars by the use of the Discflo™ pumps, but the downtime has been greatly reduced, therefore improving the overall efficiency of our lime solids removal operation." There has been no wear since they were installed in 1994 and in the first 6 years, replacing the packing was the only maintenance required.

As of this year, 2018 the City of Cocoa Dyal Water Plant has purchased 11 more Discflo™ Pumps for additional Lime Sludge and Lime Slurry applications. Currently the City now has a Discflo™ Pump at every stage of the Lime water softening operations from the initial lime slurry feed pumps, to pumping the settled lime sludge from the bottom of the clarifiers, to pumping the thickened lime sludge to the dewatering building from the holding tanks. There are current plans to purchase two more Lime Slurry feed pumps as part of a 2018 expansion and upgrade. These pumps have all been in service from time periods range from 3–30 years and to date we have yet to replace the wet-end on the pumping units.

PART MAINTENANCE ANNUAL SAVINGS OF $91,000

HIGH TEMPERATURE HOT TALLOW MIXTURE TYSON FOODS BEEF PROCESSING, NEBRASKA & IOWA

The DISCFLO™ Disc Pump is replacing 6 heavy duty low-speed cumferential Gear pumps at Tyson Foods Beef Processing Plants in Nebraska and Iowa.

The new Discflo™ pumps are positioned to deliver a hot Tallow mixture from the cone-shaped bottom of a tall stainless steel tank to the top of a 25' tall second tank. The suction side NPSHa ran as low as 48" and as the tank would occasionally empty, it would often drop to zero causing a momentary dry run vapor lock condition.

The existing pumps and the previous pump attempts were suffering from severe damage caused by the abrasive nature of the product, contributing to a dry run condition and requiring as often as a monthly pump replacement.

Discflo™ provided Model 403-12-2HHD Slurry pump, our industry standard bearing frame pump featuring 316L stainless steel case and proprietary Discpac. Discflo™ augmented this assembly with double-flush mechanical seals to accommodate the dry run periods.

After a 90-day trouble-free trial, the end user purchased 5 additional identical pumps for the same application to install in other plant locations. The pump has continued to process this demanding application for 6 months without issue.

Prior to the Discflo™ pump installation, the customer averaged parts maintenance cost of $45,000 every 6 months. The only cost incurred after installation represented pump inspections, only to determine no part replacements were needed. This maintenence cost

PUMPING MARINE LIFE AND ALGAE

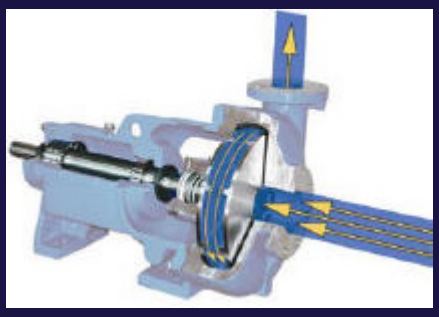
HARBOR BRANCH OCEANOGRAPHIC INST, FLORIDA

The Harbor Branch Oceanographic Institution is using the Discflo™ pump technology to pump live algae. The Disc pump, used as part of the BioFence system from Applied Photosynthetics, is able to pump the live single-celled animals without destroying them. The pump has been operating since mid-October 1998 and says Stephen Gerber of Gerber Pumps, Discflo™ distributor in Florida, "pumps are running well."

Aquatic Ecosystems of Florida purchased a demo unit, a 1510 Disc pump with a smooth plastic Discpac, for testing by Applied Photosynthetics, the UK-based manufacturer of the Bio-Fence system. The Disc pump has a design capacity of 40 GPM at 14-15 ft TDH.

While some algae have a hard shell and can therefore be pumped with centrifugal pumps without destruction, other algae species have flagellae - soft protruding parts - that would be destroyed by regular centrifugal impellers.

The trial tested the Disc pump on 15 sensitive species of algae and found that it did not damage any of them. The BioFence system previously used an airoperated diaphragm pump which was high in maintenance, larger than a Disc pump and required a compressor.



WHAT OUR CUSTOMERS ARE SAYING

ZERO DOWNTIME FOR OIL SLUDGE PUMP

"Sometimes, it is viscous as water and at other times as much as 1000cP. The disc pump's ability to handle variations in viscosity without breaking down was one of the key factors for choosing the Discflo design."

Challenge: 400GPM/465TD/10-20%/ solids/Viscous/Abrasive/Frequent Pump Failure

"GODSEND" FOR DREDGING

"Our company selected Discflo because of it's ability to handle highly viscous product and provide the volume needed, together with its durability and lack of maintenance."

Challenge:
Viscosity 20,000_cPs/Solids 2-40%/Filter press cycle time 90 minutes

SOLVING OIL EMULSION PUMP PROBLEMS

For 40 years moving slop oil has become "a reliability nightmare" with over 30 maintenance work orders in a year.

Challenge:
Emulsifying oil in transfer. Changes in fluid conditions causing pump breakdowns.
Loss of performance due to abrasive wear.

LIME SLUDGE PUMPS

Water Reclamation Plant, Cocoa, FL

"With the Discflo Pump, transfer time has decreased by over 70%!
The suspended solids pumped increased 14%, an amount that the existing Vortex style pump could not handle effectively."
— Joseph DeGiovine, Asst. Superintendent

The Challenge: Original recessed vortex pumps took 1 hour to transfer Lime sludge; limited to a maximum solids content of 15%.

RESIN SLURRY PUMP

Water Treatment Plant, St. Cloud, FL

"We love these pumps! We have not had to do anything to the since we installed them!"
— James Reus, Lead Maintenance Mechanic, MWP

Discflo Resin Slurry Pump: 55-60 GPM @ 40-60'TDH

The Challenge: The product being pumped is very shear sensitive and has some abrasives.

DiscFlo Solution: Installed 2 Model# 2015-8-2HHD

SLUDGE/SLURRY PUMP

Pinellas County WWTP, South Cross Bayou, LA

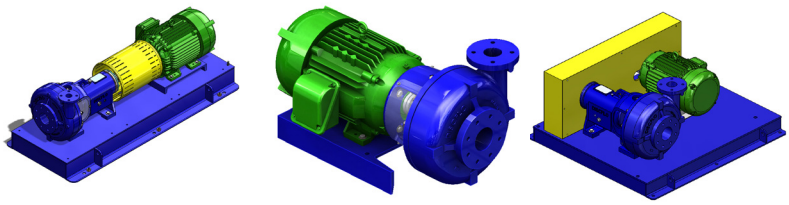
"5% Sludge created a maintenance nightmare for their Lobe pumps. Discflo eliminated the problem!"
— Stephen Gerber, Field Services Manager, Gerber Pumps

Discflo Sludge/Slurry Pump: 5-6% Thickened Sludge

DISCFLO™ DISC PUMPS

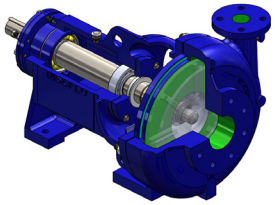
API PUMPS

Offer exceptional productivity and cost-savings benefits. Using the innovative Discpac technology, these pumps offer a superior alternative to centrifugal, progressive cavity, lobe and gear pumps for viscous, abrasive, high solids and gas entrained fluids as well as handling shear sensitive and delicate chemicals and emulsions. Tests have proven that Disc Pumps can pump oil/water fluids without emulsifying them. Built to API Standards for the Oil & Natural Gas industry.



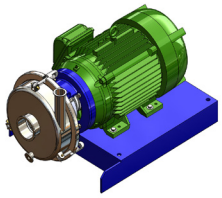
HORIZONTAL PUMPS

Handles a wide variety of difficult fluids efficiently and effectively, without breaking down in service. The same pump model can handle fluctuations in temperature, pressure, solids content and even product without breakdown. Horizontal pump line includes: in-line, close-coupled, side-by-side, over-under and self-priming configurations for hard-to-pump applications



GLASS LINED PUMPS

A specialty line of pumps offering superior abrasion and corrosion resistance available on all standard Disc Pump models. Extends the wear life of a pump over any other type of pump in the industry.

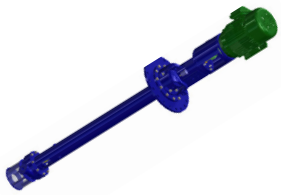


SANITARY PUMPS

Offers unique productivity and cost-savings benefits for users in specialized application areas where sanitary pumps are required. Compliant to 3A standards, BS EN 1672-2 Standards.

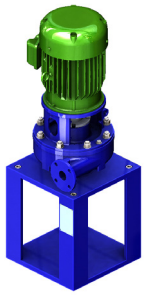
SUBMERSIBLE PUMPS

Ideal for municipal wastewater, Oil & Petrochemical industries and especially efficient in high viscous, high solids sludge and slurry applications. No close tolerances, pulsation-free flow and is based on a non-contact pumping action.



CANTILEVER DISC PUMPS

Utilized in tank or sump environments. Fluctuations in temperature, pressure and solids content are handled efficiently without breakdown. Ideal solutions for reliable, low maintenance operation in the harshest applications.



SUMP & DRY PIT PUMPS

Combines heavy duty construction with clog-free operation for hard-to-pump industrial applications.

SPECIFICS

	STANDARD MATERIALS OF CONSTRUCTION						
Part Description	Ductile Iron	316 SS	CD4MCu	Alloy 20	Monel	Hastelloy	Titanium
						C, C276, B & 22	
Casing	Ductile Iron	316 SS	CD4MCu	Alloy 20	Monel	Hastelloy	Titanium
Discpac	Ductile Iron	316 SS	CD4MCu	Alloy 20	Monel	Hastelloy	Titanium
Lantern Ring	316 SS	316 SS	CD4MCU	Alloy 20	Monel	Hastelloy	Titanium
Stuffing Box Packing	Graphite	PTFE Impregnated Fiber					
	Back to Back Angular contact						
Shaft, Less Sleeve	316 SS	316 SS	Alloy 20	Alloy 20	Monel	Hastelloy	Titanium
Shaft, With Sleeve	SAE 4140				Monel	Hastelloy	Titanium
Shaft Sleeve	316 SS	316 SS	F255	Alloy 20	Monel	Hastelloy	Titanium
Bearing Locknut	Steel						
Bearing Lockwasher	Steel						
Radial Bearing	8", 10" & 12" Single, Deep Groove Ball ***14" & 20" Cylindrical Roller						
Stuffing Box (packed)	Ductile Iron	316 SS	F255	Alloy 20	Monel	Hastelloy	Titanium
Seal Box	Ductile Iron			Monel	Hastelloy		Titanium
Bearing Frame	Ductile Iron						
Gland	316 SS	316 SS	F255	Alloy 20	Monel	Hastelloy	Titanium
Oil Sight Gauge	Glass/Steel						
Bearing Isolator Outboard	Stablized Teflon						
Bearing Isolator Inboard	Stabalized Teflon						
Casing Gasket	Fiber			PTFE			
Casing Drain Plug (optional)	Steel	316 SS	F255	Alloy 20	Monel	Hastelloy	Titanium
O Ring, Bearing Housing	Viton						
O Ring, Discpac	Viton			PTFE			

CONTACT US FOR SPECIFICS ON MATERIALS OF CONSTRUCTION ADVICE ON SELECTION, AND DATA ON PRE SSURE-TEMERAPTURE RATINGS.

The discpac can be designed for the gentlest possible pumping of shear-sensitive and gaseous froth and at the same time handle aggressive slurries with heavy viscosities and high abrasive and solid content.

- Standard sizes : 8, 10, 12, 14, 17, and 20-inch diameters
- Holds from two to twenty discs
- Custom configurations - the spacing, size and number of discs in the discpac can be configured according to fluid conditions and head and flow rate requirements
- Smooth surfaces for maximum shear reduction or ribbed High Head discs for higher flow rates and efficiency in some applications

OPERATING AND DESIGN RANGE

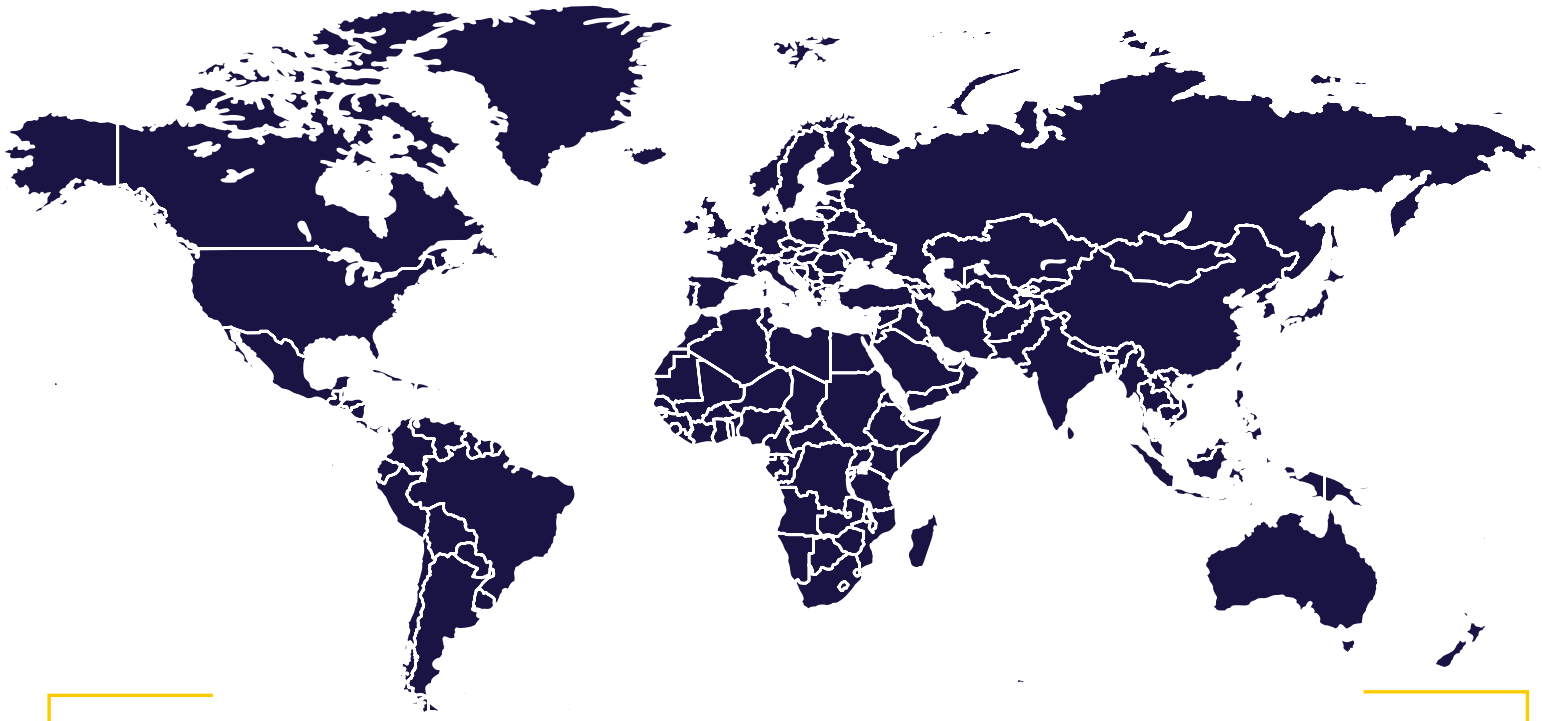
- Hydraulic flow capacities: 2-10,000 GPM [0.5-2250 m^3/h
- Discharge pressures: up to 1000+ft TDH [300+m]
- Discpac diameters from 8-inch [203mm] to 20-inch [508mm]
- Suction pressures: low NPSHr
- Working pressures: up to 1400 psi [95 atm]
- Operating temperatures: to 1000° F [523° C]
- Viscosities: up to 300,000 cPs
- Pump speeds: up to 3600 rpm
- Drivers: electric, diesel, hydraulic, air

SEALS

- The Discflo™ disc pump is designed to accommodate almost all makes and models of single and double mechanical seals and cartridge seals in both US and metric sizes.

DISCFLO™ DISC PUMPS AROUND THE WORLD

WE HAVE SUCCESSFULLY SERVED MANY OF THE TOP COMPANIES THROUGHT THE WORLD



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