

# DISCFLO

PUMPS

DISCFLO

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MUNICIPAL & INDUSTRIAL WASTEWATER



# DISCFLO IN THE MUNICIPAL WATER AND WASTEWATER INDUSTRY

**Discflo Pumps** have been successfully employed in Municipal Water and Wastewater plants for over 35 years.

Our pumps offer a superior alternative to centrifugal, progressive cavity, lobe and screw pumps for handling abrasive, viscous and/or high solids slurries, by reducing pump wear and spare parts costs while increasing up-time and reliability.

The open, no-close-tolerance design of the Discflo Pump ensures clog-free operation, even when pumping effluent containing large and stringy solids, such as tumbleweed, plastic strapping and rags. These pumps also handle fluids containing high amounts of entrained air, for example anaerobic sludge or DAF sludge, **without cavitation**. 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.

## CASE STUDY

“It is difficult to find fault in a pump that runs strong, delivers the flow you are expecting and requires little or no maintenance. We anticipate these trends to continue and look forward to these pumps performing well for many years.”

— Sherman Papke, Project Manager, District Central Treatment Plant

The Metro Wastewater Reclamation District in Denver, Colorado, has solved a persistent pumping problem by installing Discflo’s unique Disc pumps. The pumps are handling a viscous anaerobic bio-solids sludge containing high amounts of entrained gas, and have operated trouble-free since start-up in 1995. Based on this initial success, six more pumps were purchase in 1997. Due to the excellent success, the district on 2 subsequent projects, directed the engineers to specify Discflo Pumps.

The sludge, which comes from the primary and secondary treatment of waste-water, is a difficult fluid to pump. It has a solids content of 2-4.5% by weight, a viscosity in the range 1300- 5000 SSU, high temperature, and entrained gas. The entrained gas was a particular problem for the conventional centrifugal style pumps used previously.

The ability to pump viscous sludge with high volumes of entrained air was a major factor in the District’s decision to try the Disc pump. It is a unique (and patented) design of pump that looks like a centrifugal unit but works on a different pumping principle. Rather than using an impeller that “pushes” product through the pump, the Disc pump uses the forces created by boundary layer-viscous drag to “pull” product through the pump.

This makes it ideal for pumping highly viscous flu-ids, fluids with a high solids content (up to 80%), fluids containing large and stringy solids, and of course, fluids containing high volumes of entrained air or gas (up to 80% under certain conditions). Four Discflo Disc pumps, one per anaerobic digester, were installed at the Central Treatment Plant between February and June 1995. The District has experienced no operational or maintenance problems related to these pumps and no downtime, except for routine preventive maintenance, in the two years since installation.

The pumps have run almost continuously and operate at or above the expected performance rating. The savings in repairs, downtime and maintenance using the Disc pump, com-pared to a conventional pump sized for the same application, are as much as 90%—a figure that has been proven in full-scale industrial installations.

### THE CHALLENGE:

- High viscosity sludge
- Reduce high maintenance costs
- Sludge contains high levels of entrained air and gas

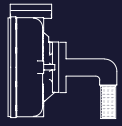
### DISCFLO SOLUTION:

- Discflo pump handles high viscosity fluids with ease
- Pumps handle 80% entrained air/gas

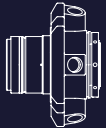
Metro Wastewater Reclamation District, Denver



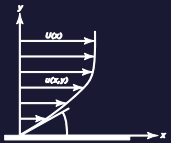
# DISCFLO ADVANTAGES



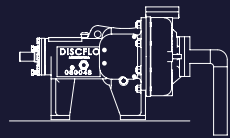
**NO PULSATION**



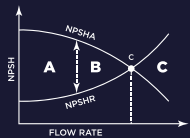
**LONGER SEAL LIFE**



**LAMINAR FLOW**



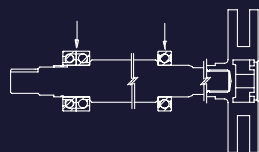
**HIGH SUCTION  
LIFE CAPABILITY**



**VERY LOW NPSH**



**EXCELLENT  
MEAN TIME TO  
REPAIR (MTTR)**



**NO RADIAL LOAD**



**EXCELLENT MEAN  
TIME BETWEEN  
FAILURE (MTBF)**

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

**No close tolerances** or loss of performance due to wear

**Open design** prevents clogging, so pump can handle large or stringy solids, 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

**Runs Dry Indefinitely** Provided seal must be protected because there is no direct metal-to-metal contact in the pump. The seal must be protected under these conditions

**Low maintenance/minimal spare parts** 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 part purchases

**Exceptional reliability and high uptime** due to rugged construction and solids handling capability, Discflo pumps are the most reliable pump on the market for hard-to-pump applications

**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

**Deadheading Discharge or 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. Seal flushing must continue under these conditions

**Hydraulic flow capacities:** 1-8000 GPM

**Differential pressures:** Up to 433 psi

**Discpac diameters:** 1.75" - 24"

**Working pressures:** Up to 2500 psi

**Operating temperatures:** Up to 1000°F

**Viscosities:** Up to 700,000 + cP

**Solids size (max):** 8"

**Pump speeds:** 3600 + rpm

## WHAT OUR CUSTOMERS ARE SAYING

### 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%.

**DiscFlo Solution:** Installed 6 new DiscFlo Pumps and decreased transfer time from 60 to 7 minutes an increased solids content to 35%!

### 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

### PRIMARY SLUDGE

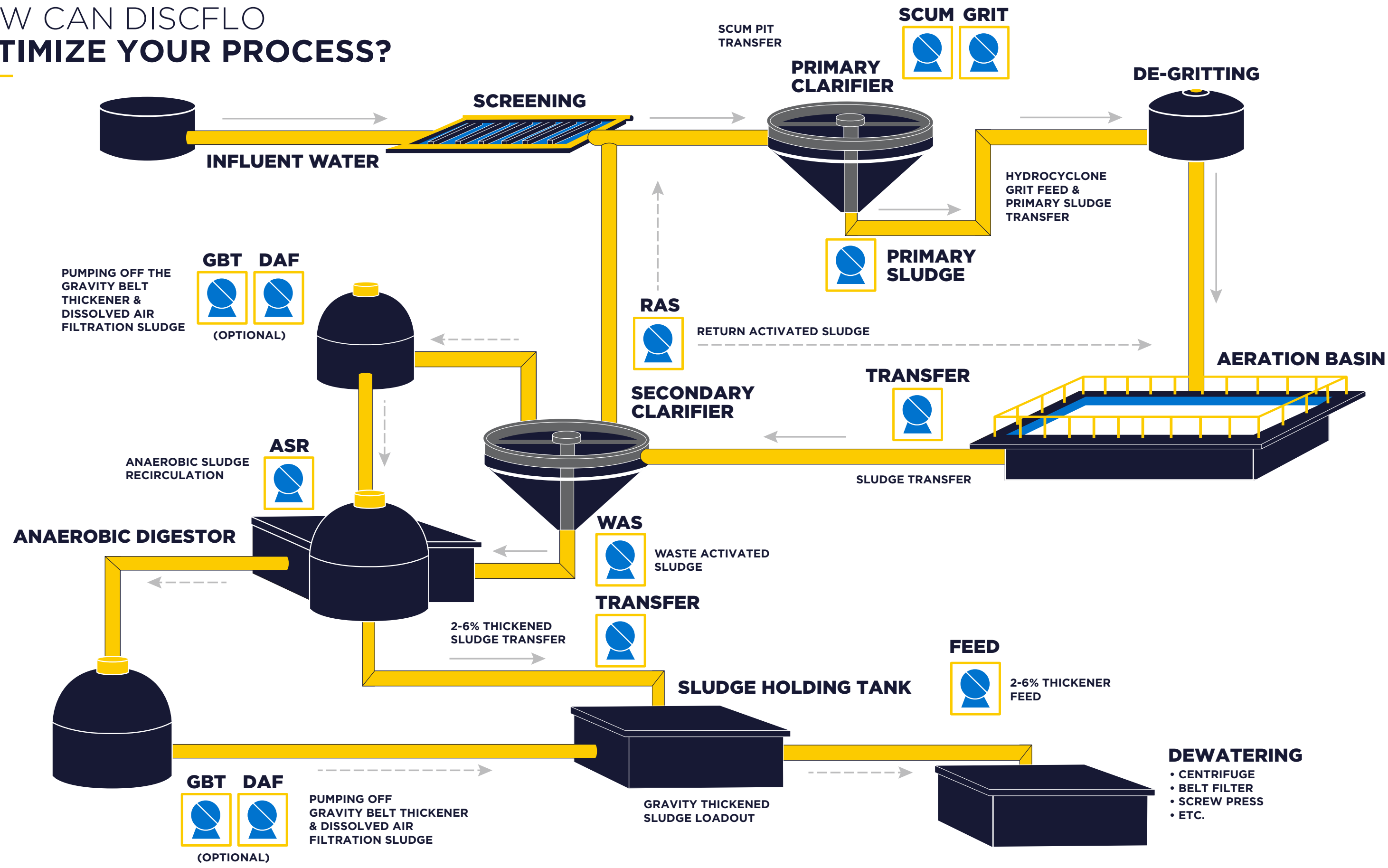
WWTP, Morganstown, WV

"We love these pumps because they are virtually maintenance free!"  
— Ernie Utter, Maintenance Supervisor

**Discflo 604-12-1HHD:** 250 GPM @ 44' TDH @ 4% solids w/long stringy materials



# HOW CAN DISCFLO OPTIMIZE YOUR PROCESS?





# APPLICATIONS WE SUCCESSFULLY PUMPS

## MUNICIPAL APPLICATIONS

- GRIT
- SCUM
- DAF SLUDGE
- R.A.S. / W.A.S.
- DIGESTOR LOAD OUT
- LIME SLURRY / LIME SLUDGE
- THICKENER FEED:  
GBT / BFP / CENTRIFUGE FEED
- DEWATERING TANK TRANSFER
- THICKENED SLUDGE TRANSFER
- PRIMARY & SECONDARY SLUDGE
- NEAT POLYMER SOLUTIONS AND  
OTHER PROCESSING CHEMICALS
- ANAEROBIC SLUDGE RECIRCULATION

## INDUSTRIAL APPLICATIONS

- SUGAR MILLS
- AGRICULTURE
- MINING OPERATIONS
- ENVIRONMENTAL WASTE CLEAN-UP,  
INCLUDING NUCLEAR WASTE
- METAL FABRICATION AND FINISHING
- PAINT, INK AND PLASTICS PRODUCTION
- UTILITY AND POWER GENERATION PLANTS
- BREWERIES, BEVERAGE PLANTS AND DAIRIES

# THE DISCFLO PRINCIPLE

DISCFLO USES A LAMINAR FLOW AND VISCOUS  
DRAG PUMPING PRINCIPLE WITH UNIQUE AND  
TECHNICAL BENEFITS.

# FLUIDS PUMPED

## SEVERELY ABRASIVE FLUIDS

Pumps the most severely abrasive fluids with no problems and minimal wear.

## HIGHLY VISCOUS & ABRASIVE FLUIDS

Because the disc pump works using friction, the higher the viscosity, the more efficiently it pumps. It can handle the same viscosities as progressive cavity and lobe pumps.

## FLUIDS CONTAINING LARGE AND/OR STRINGY SOLIDS

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.

## 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.

## FLUIDS WITH HIGH VOLUMES OF ENTRAINED AIR/GAS

Handles fluids containing high levels of air/gas without vapor-locking or causing pump cavitation.

## 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.

## 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.

A WIDE RANGE OF STANDARD DISCFLO PUMP MODELS AND SIZES ARE AVAILABLE, INCLUDING OVER-UNDER, SIDE-BY-SIDE, SUBMERSIBLE, DRY PIT, CANTILEVER AND SUMP PUMP CONFIGURATIONS. A NEW PRODUCT, A VERTICAL TURBINE PUMP WAS INTRODUCED THIS YEAR TO HANDLE SOLIDS UP TO 4”, A FLOW RATE UP TO 600 LITERS PER SECOND AND RUNS WITH UP TO 80% EFFICIENCY.

## CASE STUDY

### SAVING \$1000s IN LIME SLUDGE DISPOSAL ALMOST ZERO MAINTENANCE OVER THE PAST 30 YEARS OF OWNING DISCFLO PUMPS

*Claude H Dyal Water Treatment Plant, City of Cocoa, Florida*

#### THE CHALLENGE:

“During the course of normal operation, the rotor/stator assembly in the progressive cavity pumps would start wearing out after 2-3 months.”

— Gary L Heller, City of Cocoa Superintendent

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.

## HARNESSING THE POWER OF BOUNDARY LAYER VISCOUS DRAG

The **non-impingement** and **laminar flow** pumping of the Disc pump is similar to flow through an ordinary pipe. The layers of fluid at the walls are stationary (relative to the rotating discs), creating a protective boundary layer. Viscous drag pulls layers into flows of smooth laminar streams.

#### NO CLOSE TOLERANCES

The Disc pump is not a centrifugal pump, positive displacement, gear or lobe pump. Unique in design, the Disc pump bridges the performance gaps of conventional pumps and is capable of out-performing all of them in many applications.

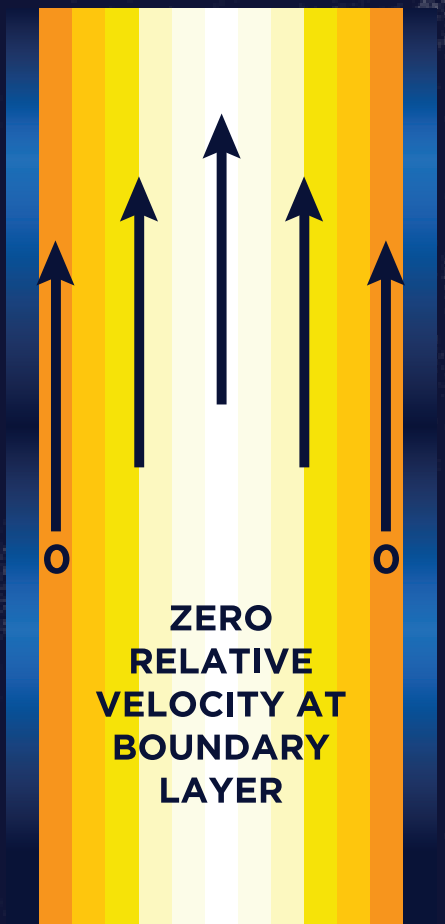
#### Non Pulsating, Laminar Flow

#### NO RADIAL LOADS

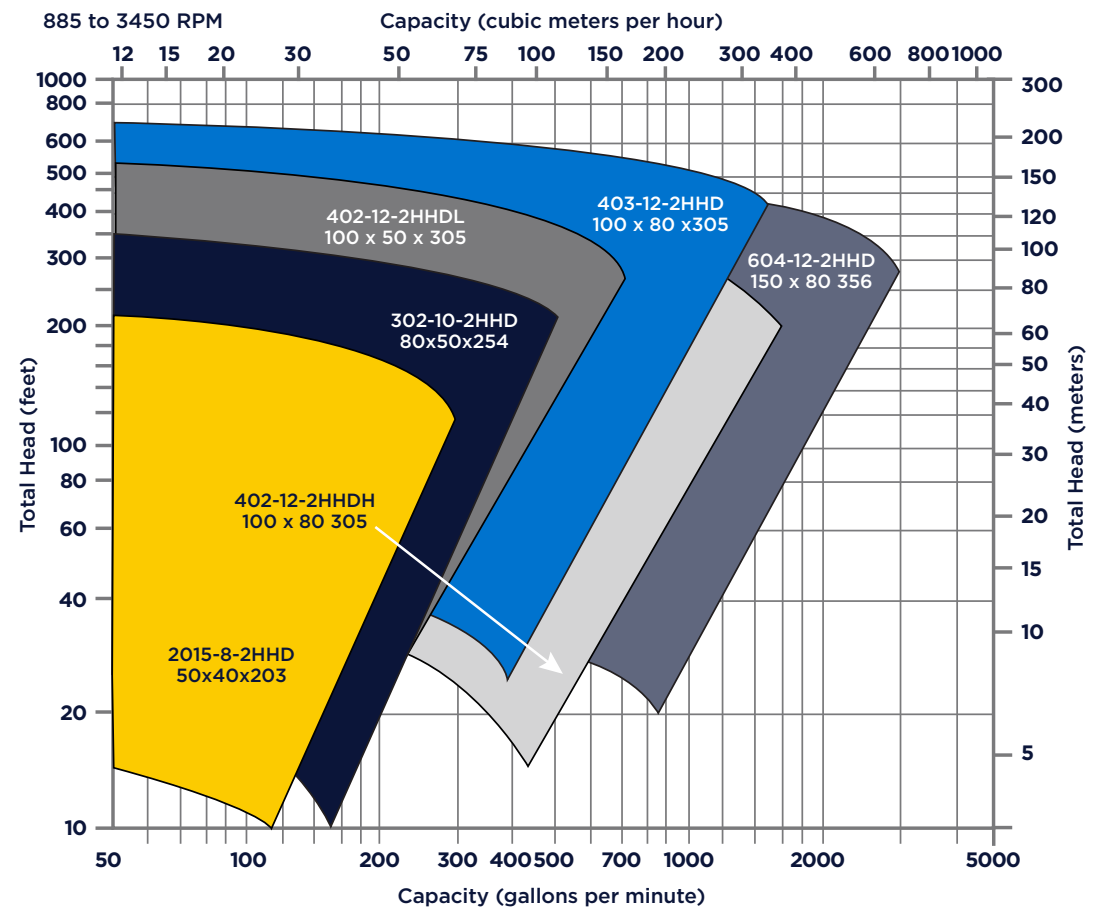
The Disc pump uses a new and patented technology that isn’t available in any other pump. The technology of the Disc pump harnesses the natural power of the boundary layer and viscous drag.

#### NON PULSATING, LAMINAR FLOW

Through viscous drag, the fluid is pulled through the pump without impingement. The boundary layer attracts and drags successive layers of fluid molecules into layered flows of parallel streams. This is the simple principle of viscous drag and in the Disc pump it is a powerful dynamic force that “pulls” the fluid through the pump in a smooth laminar, non-turbulent flow.

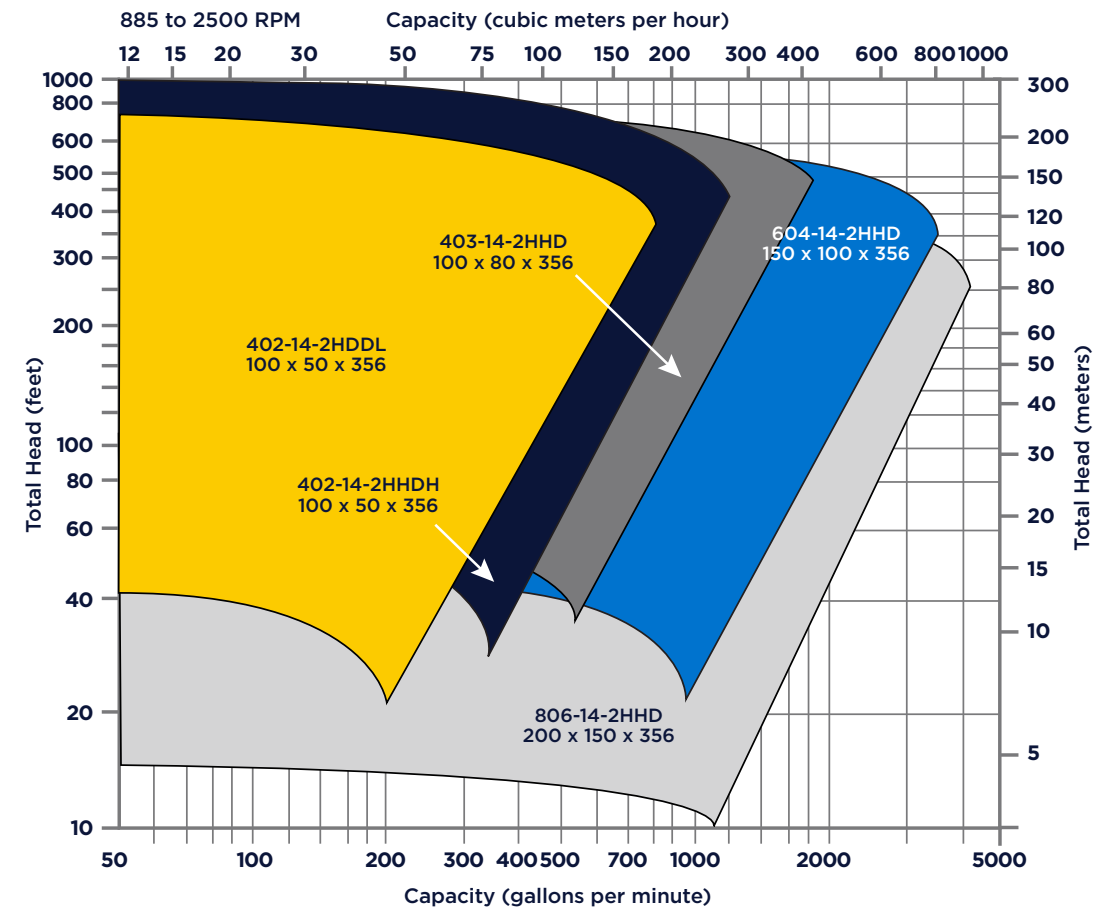


With no impingement device to damage your product and a boundary layer of protection for the pump, the Disc pump effectively eliminates the root cause of clogging, cavitation, excessive wear and product damage that plague the performance of conventional pumps. Discflo is more reliable and efficient in handling tough application and a lot more cost effective. It simply last longer, requires fewer (if any) repairs and doesn’t damage your product.



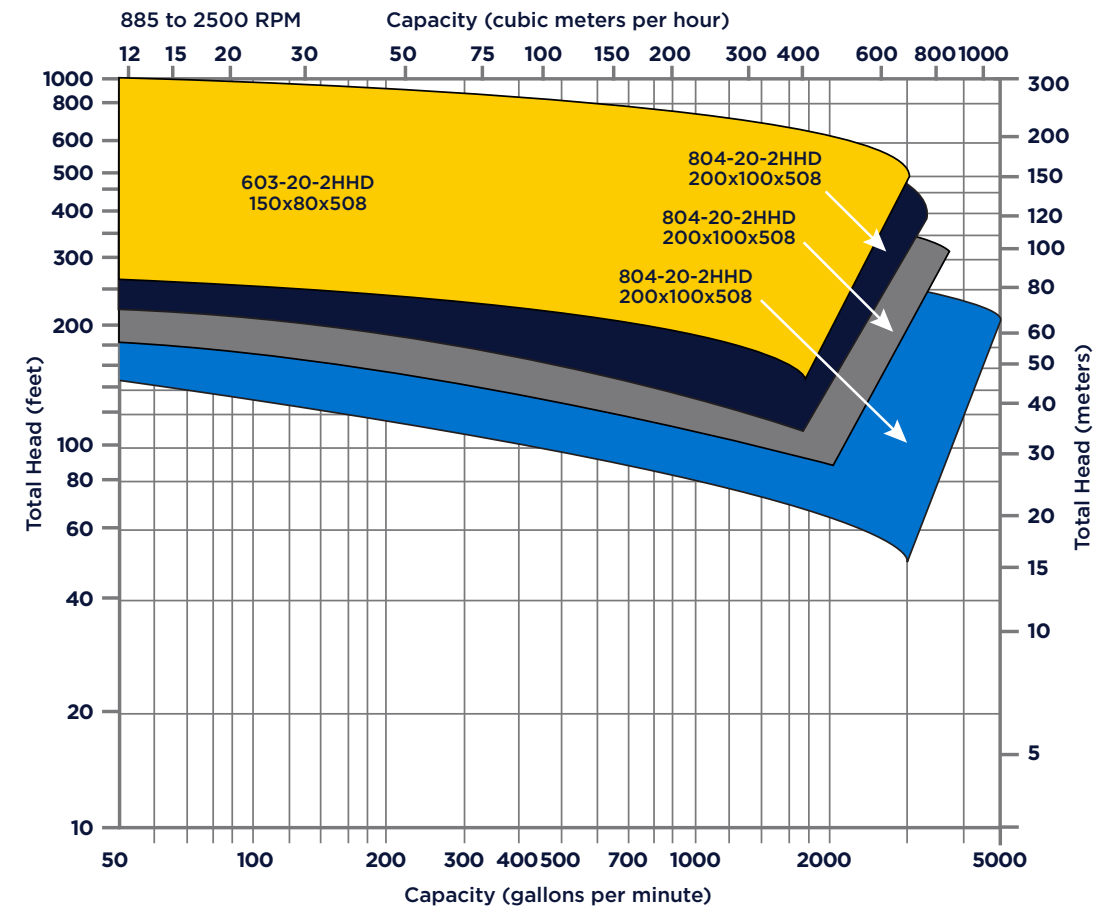
**US Models**

- 2015-8-2HHD
- 302-10-2HHD
- 402-12-2HHDL
- 402-12-2HHDH
- 403-12-2HHD
- 604-12-2HHD



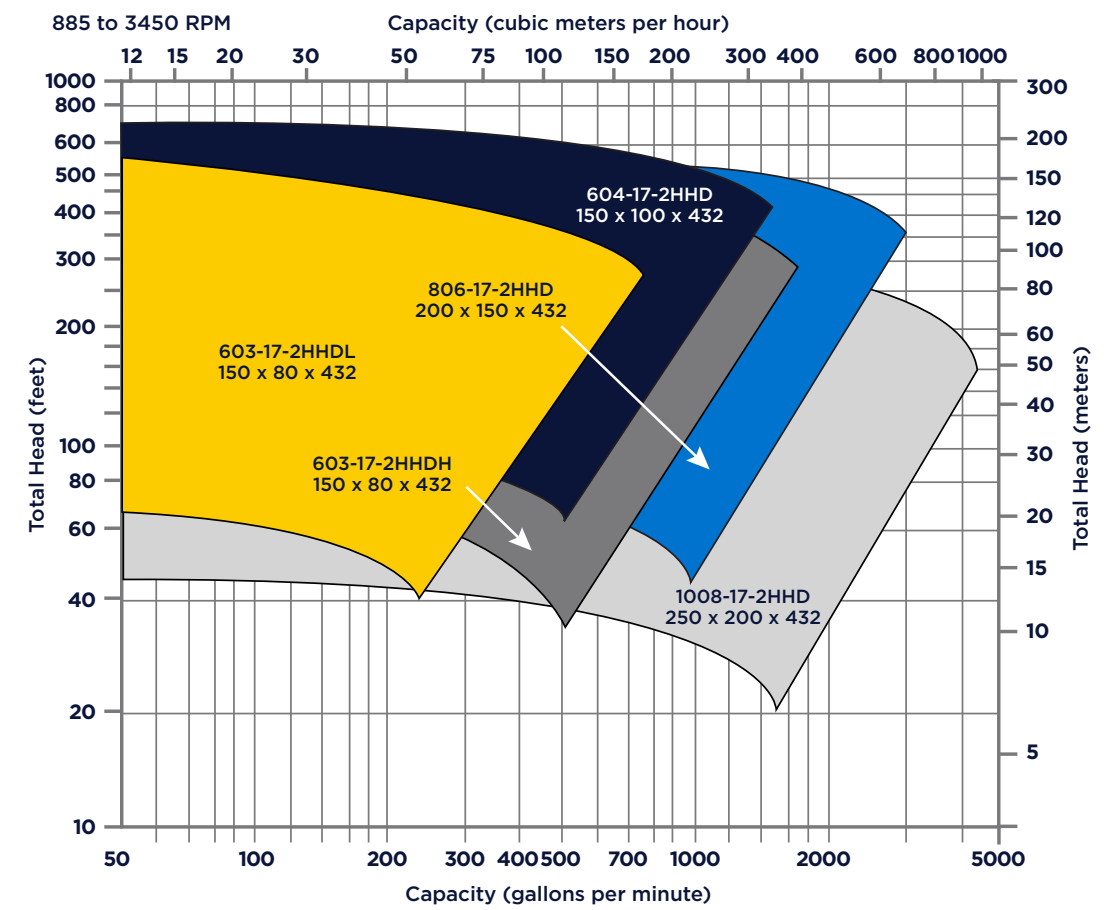
**US Models**

- 402-14-2HDDL
- 402-14-2HDDH
- 403-14-2HHD
- 604-14-2HHD
- 806-14-2HHD



**US Models**

- 603-20-2HHD
- 804-20-2HHD
- 806-20-2HHD
- 1006-20-2HHD
- 1008-20-2HHD

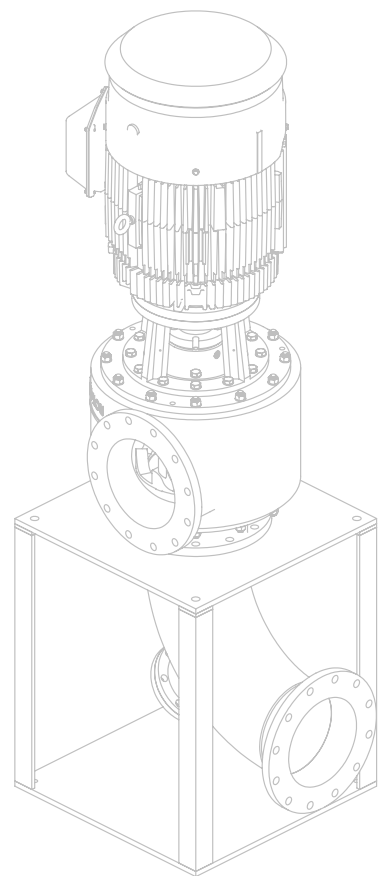


**US Models**

- 603-17-2HDDL
- 604-17-2HHD
- 804-17-2HDDH
- 806-17-2HHD
- 1008-17-2HHD



WE HAVE  
SUCCESSFULLY  
SERVED MANY  
OF THE TOP  
**MUNICIPAL WATER  
& WASTEWATER**  
COMPANIES IN  
THE WORLD



AMALGAMATED SUGAR CO.  
ANCHORAGE WATER & WASTEWATER UTILITY U.S.  
STEEL CORPORATION  
BP CHEMICAL  
CITY & COUNTY OF HONOLULU, KAILUA WWTP  
CITY OF BOCA RATON  
CITY OF BRITT, WWTP  
CITY OF COCOA, WWTP  
CITY OF HONOLULU, WWTP  
CITY OF LOS ANGELES, WWTP  
CITY OF OMAHA, WWTP  
DENVER METRO WW RECLAMATION DISTRICT  
STOCKHOLM SEWAGE PLANT  
DUPONT CHAMBERS WORKS  
EXXON MOBIL CHEMICAL CO.  
FRITO-LAY INC.  
GENENCOR INTERNATIONAL  
GEORGIA PACIFIC  
GREAT LAKES CHEMICAL  
INTERNATIONAL PAPER  
METROPOLITAN WATER RECLAMATION  
PACKAGING CORP OF AMERICA  
SAND ISLAND, WWTP  
TYSON FOODS  
U.S. STEEL CORPORATION

**THE  
TOUGHEST  
APPLICATIONS  
DESERVE THE  
TOUGHEST  
PUMP.**



Discflo specializes in servicing many industries, including Oil and Petrochemical, Chemical Processing, Municipal Water/Wastewater, Food & Beverage, Pharmaceutical Manufacturing, Pulp and Paper, Steel Manufacturing, General Industrial and Specialty Applications. **Discflo** leads the world in slurry pumps, abrasives pumps, cantilever pumps and waste-water pumps.

**DISC**FLO