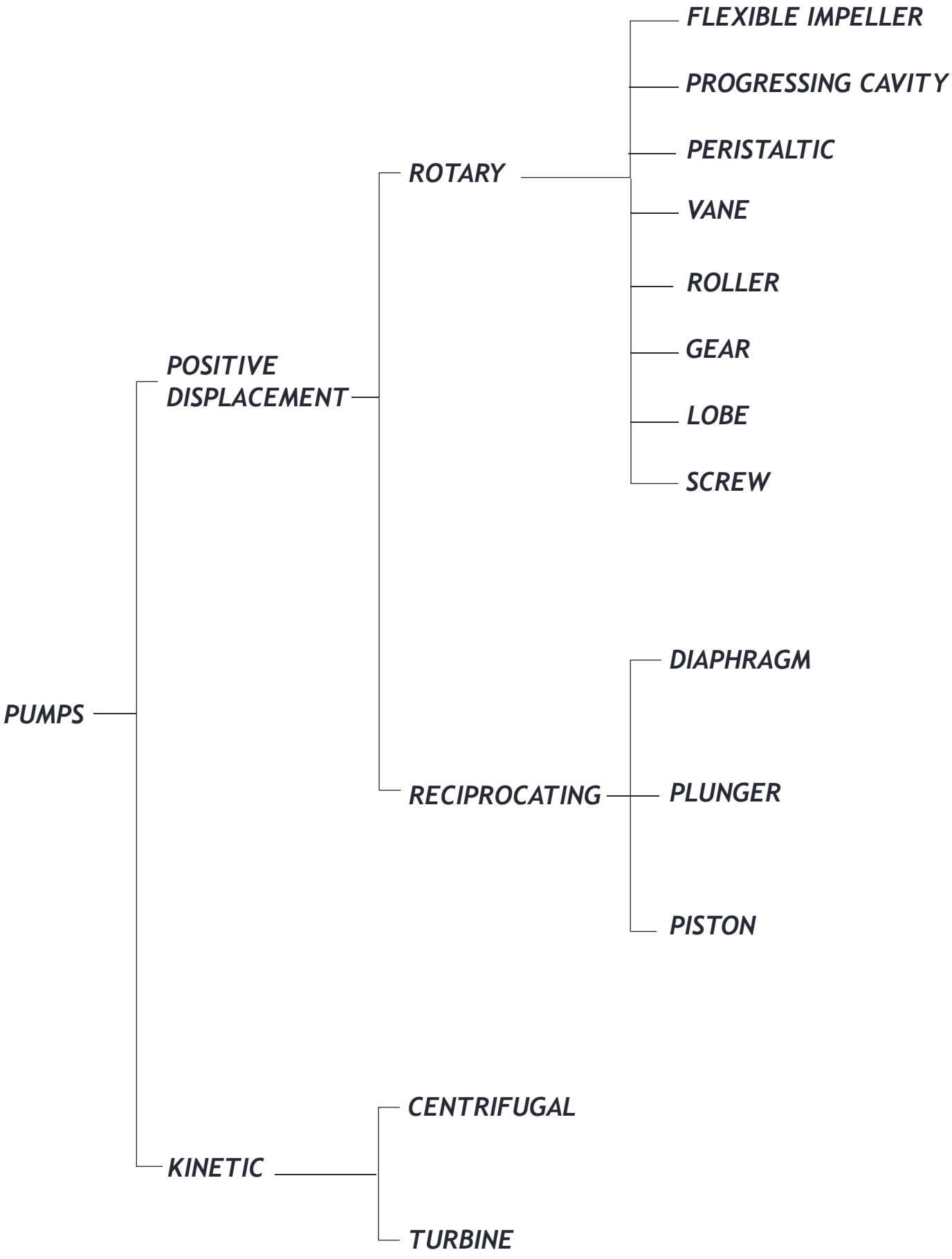
HOME

COMMON PUMPING PRINCIPLES



COMMON PUMPING PRINCIPLES

CENTRIFUGAL

HOW IT WORKS:

a.) Liquid enters the inlet port of the pump through gravity or priming and is directed towards the center of the impeller.

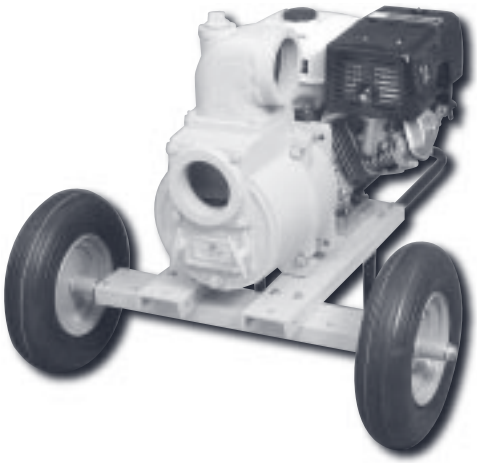
b.) The rotating impeller uses centrifugal force to add velocity to the liquid as it is slung off the edges of the blades into the volute casing.

c.) The volute configuration converts the velocity energy into static pressure or available pump head as the liquid leaves the discharge port.

FEATURES:

High Volume Flow: centrifugal pumps deliver a high volume of flow with smooth, non-pulsating delivery
Low Maintenance: wear due to operation is minimal, they are easily disassembled and have few moving parts
Low Power Consumption: most efficient pump for moving large volumes of liquid

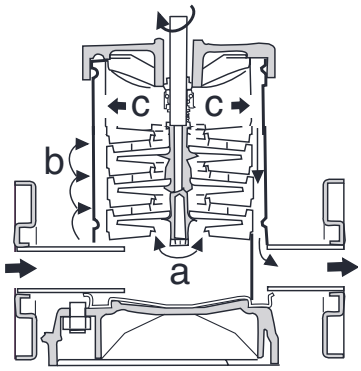
F.E. MYERS	*MARCH*
FLOTEC	*IWAKI*
JABSCO	*CARVER*
LANCASTER	*BURKS*
WEBSTER	*ABS*
GRUNDFOS	*ANSIMAG*
SCOT	*GOULDS*
STA-RITE	*BANJO*
TRI-CLOVER	*BERKELEY*
VANTON	*BJM*
PURITI	*CAL*
PRICE	*CH & E*
FISHER	*CORCORAN*
WAUKESHA	*TEEL*
LIQUIFLO	*AMT*
LITTLE GIANT	*INGERSOLL-RAND*
FINISH THOMPSON	*VERTIFLO*
FRISTAM	*WIEMEN*
GRISWOLD	*BARNES*
HYPRO	*BUFFALO*
OBERDORFER	*CHESTERTON*
CRANE	*WEIR*
DURIRON	*LOWARA*
ENDURA	*WEMCO*
PACO	*PEERLESS*
CASTER	*PACER*
GORMAN RUPP	*SERFILCO*
TRACO	*SHERWOOD*
EBARA	*EASTERN*
AMPCO	



COMMON PUMPING PRINCIPLES

MULTI-STAGE CENTRIFUGAL

HOW IT WORKS:



a.) Liquid flows by gravity into the suction port and enters the center of the first impeller/stage (a).

b.) Each successive centrifugal impeller/stage (b) directs its flow into the suction of the next impeller/stage, which adds to the accumulated discharge head/pressure of the liquid.

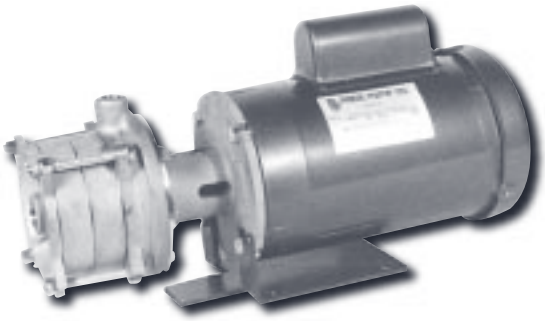
c.) As the liquid leaves the last impeller/stage (3) it is directed toward the discharge port through the area between the inner and outer casings.

FEATURES:

High Head/Pressure: Produces significantly higher head/pressure than single stage centrifugals

Continuous Duty: Designed to run 24 hours a day, 7 days a week

GOULDS
EBARA
GRUNDFOS
AURORA
TONKA-FLO
TNT
PRICE
EASTERN



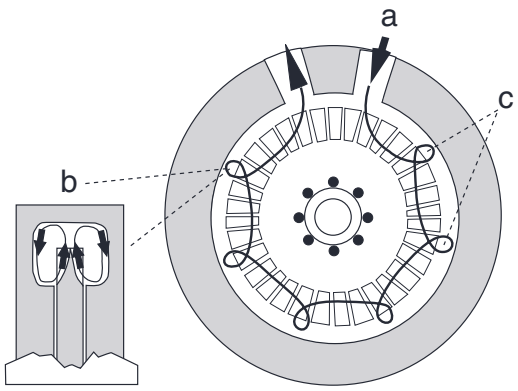
COMMON PUMPING PRINCIPLES

REGENERATIVE TURBINE

HOW IT WORKS:

a.) Liquid enters the suction port (a) and is pushed forward by the blades of the impeller (b) in an orderly circular flow around the periphery of the housing.

b.) The circular liquid flow in the side channels (c) occur many times during one revolution resulting in 10 times or more discharge pressure than from a similar diameter impeller turning the same speed in a centrifugal pump.



FEATURES:

High Head/Low Flow: Produces high head at low flow without damaging pump components
Continuous Duty: Designed to run 24 hours a day, 7 days a week
Compact: More compact than multistage centrifugals that deliver the same flow and head
Enrained Air Handling: up to 20%

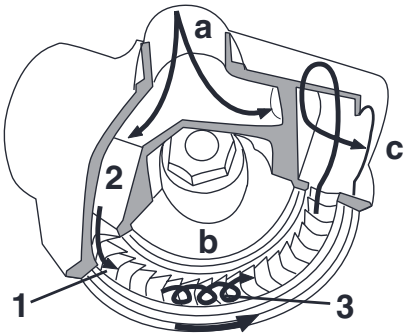
"BURKS" TURBINE

HOW IT WORKS:

a.) As the liquid is removed by the impeller (1) from the inlet raceway (2), additional liquid is drawn in.

b.) The blades of the impeller (1) capture liquid from the inlet raceway (2) adding energy to the liquid (3) as the liquid is propelled toward the outlet.

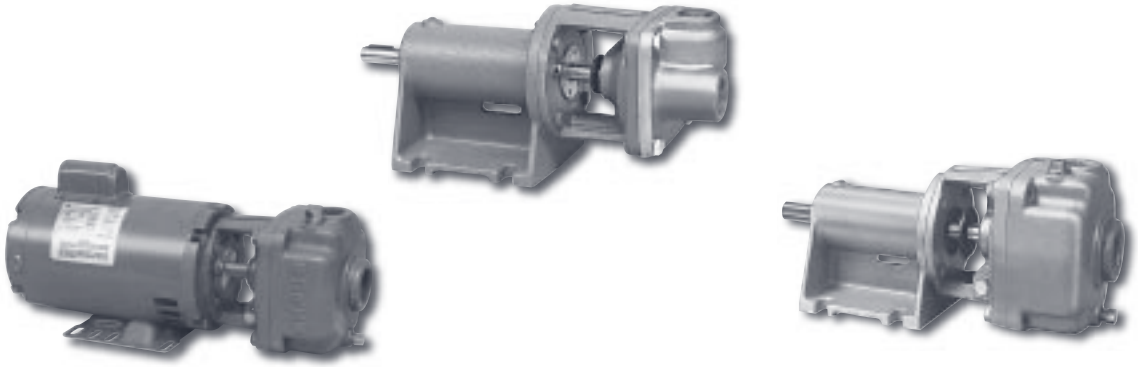
c.) Liquid is forced out through the outlet port as additional liquid is deposited by the impeller.



FEATURES:

High Pressure: turbine pumps will deliver non-abrasive, low viscosity liquids in applications requiring high pressure and low flow
Low Maintenance: with its seal being the only contacting part, little maintenance is required, even in continuous duty applications
Self-priming Option: configurations are available that include a liquid chamber that enables self-priming
Enrained Air Handling: up to 20%

BURKS
MTH
CORKEN
ROTH
CASTER



COMMON PUMPING PRINCIPLES

FLEXIBLE IMPELLER

HOW IT WORKS:

a.) As the flexible impeller blades leave the cam, the cavities between them increase in size and create a vacuum which draws in the liquid.

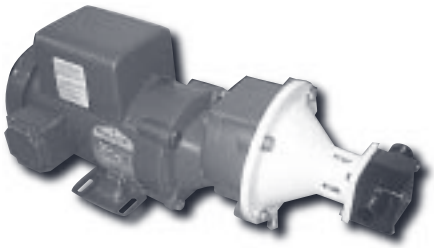
b.) Once the blades clear the inlet port, the liquid is captured in the cavity between the blades and the housing.

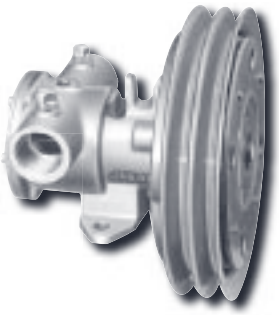
c.) As the blades contact the cam and bend, the cavity between them is reduced in size and the liquid is forced out the discharge.

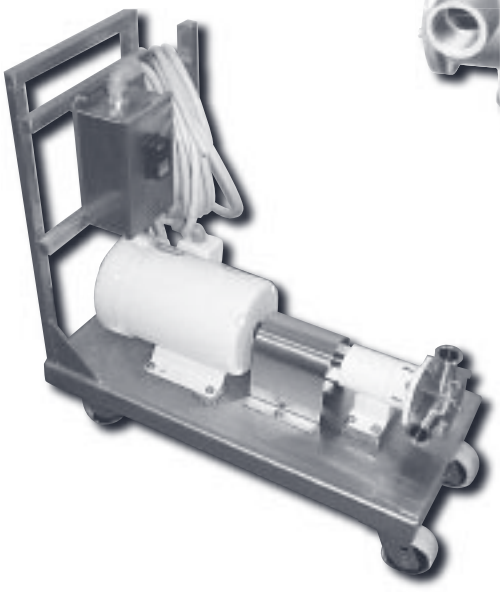
FEATURES:

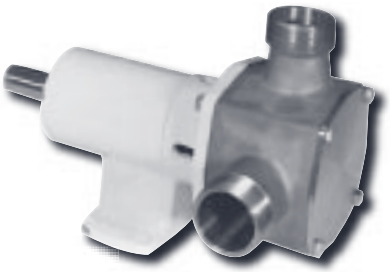
Self-priming: primes quickly from a dry or wet start / will lift up to 15 feet when wet
Low Shear: smooth gentle pumping action for liquids of low to high viscosity
Batching: smooth repeatable flow of low to high viscosity liquids

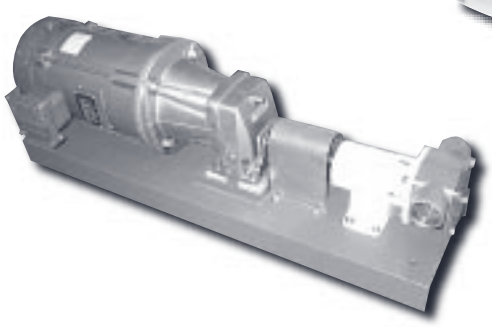
JABSCO
JOHNSON
OBERDORFER
SHERWOOD
PROVEN
LITTLE GIANT
FLOTEC (STA-RITE)
SIMER







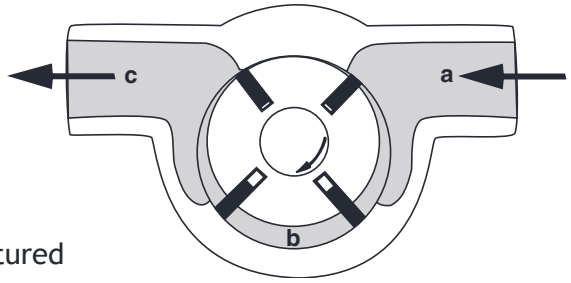




COMMON PUMPING PRINCIPLES

VANE

HOW IT WORKS:



a.) Centrifugal force (and/or springs) keeps the blades in contact with the housing as each blade leaves the upper eccentric area. Liquid is drawn in as the size of the cavity between the blades and housing increases during this rotary motion.

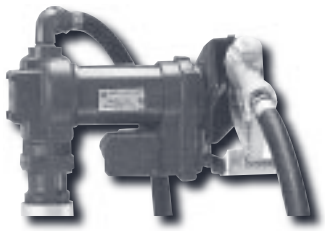
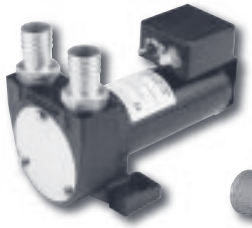
b.) Once the blades clear the inlet port, the liquid is captured in the cavity between the blades and the housing.

c.) As the blades contact the eccentric portion of the housing and are pushed back into their slot, the cavity between the blades is reduced in size which forces the liquid out the discharge.

FEATURES:

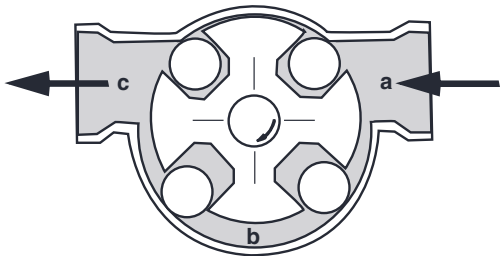
Self-Priming: lift liquids up to 3 feet / higher lifts are possible with some models
Low to Medium Viscosity: thin to medium viscosities are easily handled
Simplicity: few moving parts to fail or replace

CORKEN
BLACKMER
PROCON
FLUID-O-TEC
GROCO
JABSCO


ROLLER

HOW IT WORKS:



a.) Centrifugal force slings each roller out against the housing as each roller leaves the upper eccentric area. Liquid is drawn in as the size of the cavity between the rollers and housing increases during this rotary motion.

b.) Once the rollers clear the inlet port the liquid is captured in the cavity between the rollers.

c.) As the rollers contact the eccentric portion of the housing and are pushed back into their slot, the cavity between the rollers is reduced in size which forces the liquid out the discharge.

FEATURES:

Abrasive Handling: the roller design allows the handling of powders in suspension
High Pressure: up to 300 psi can be achieved
Simplicity: few moving parts to fail or replace

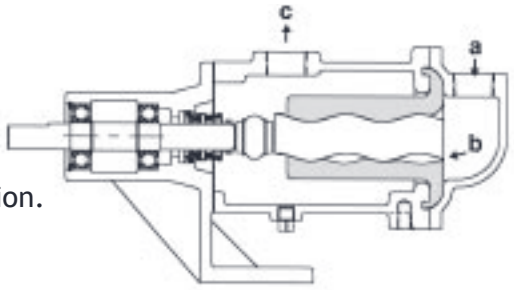
HYPRO
ACE



COMMON PUMPING PRINCIPLES

PROGRESSING CAVITY

HOW IT WORKS:



a.) Liquid is drawn into the suction of the pump as the corkscrew shaped rotor revolves within the rubber stator.

b.) Liquid is captured in the cavity between the rotor and stator. This cavity travels toward the discharge during rotation.

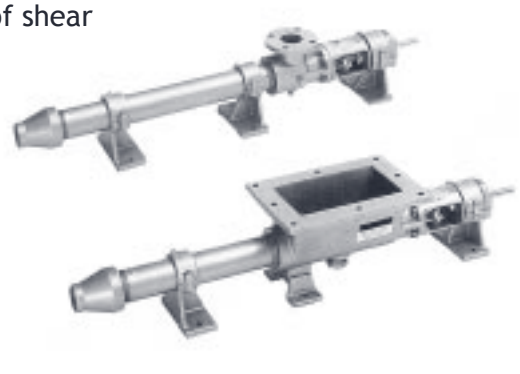
c.) The cavity opens into the discharge chamber and delivers its contents as it reduces in size. Liquid is forced out the discharge as more liquid is delivered by continued rotation.

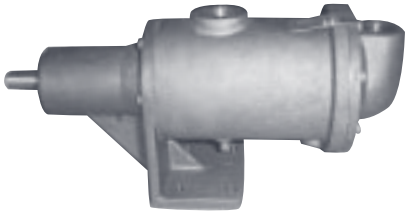
FEATURES:

Abrasive Handling: the rotor/stator design allows the handling of abrasive and/or viscous liquids

Low Shear: smooth gentle pumping action enables the pumping of shear sensitive and solid entrained liquids

High Pressure: up to 600 psi can be achieved with low to high viscosity liquids

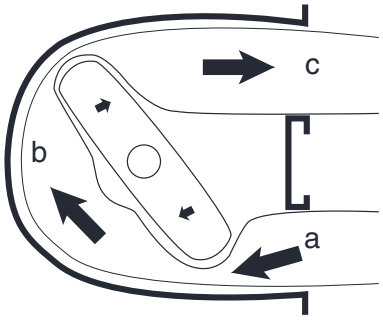




ALFA-LAVAL
MOYNO
SEEPEX
ALLWEILER
TARBY
ROPER
LIBERTY
NETSCH
NEMO
MENOFLO

PERISTALTIC

HOW IT WORKS:



a.) As the rollers compress the hose and move away from the inlet a vacuum is created drawing in liquid.

b.) The rollers work together to capture liquid between the pinched areas of the tube and move the liquid toward the discharge.

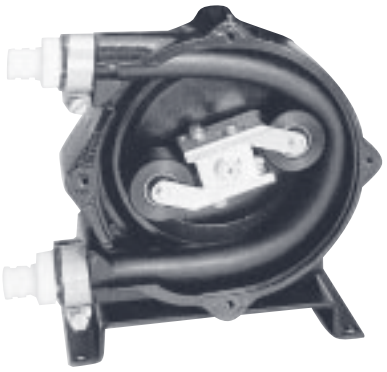
c.) The front roller leaves the hose, opening the captured area while the back roller pushes the liquid out the discharge.

FEATURES:

No Liquid Contact: liquid comes in contact only with the hose utilized within the pump

Self-priming: can lift up to 25 feet

Viscous and Abrasive Liquids: designed to handle viscous, corrosive, abrasive and high purity solutions

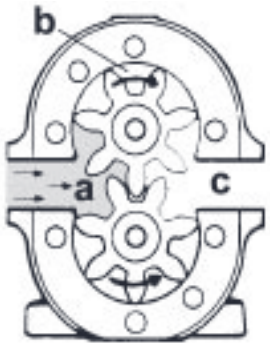


ANKO
BREDEL
TAT
GREYLOR
GRI
ALFA-LAVAL
WATSON-MARLOW
BARNANT
BLUE WHITE
VECTOR
TATE
WESTFLO
VERTAFLO

COMMON PUMPING PRINCIPLES

EXTERNAL GEAR

HOW IT WORKS:

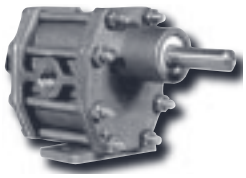


a.) As the gears separate on the inlet side of the pump, cavities are created between the gear teeth which create a vacuum that draws in the liquid.

b.) Once the teeth clear the inlet port, the liquid is captured between the gear teeth and the housing.

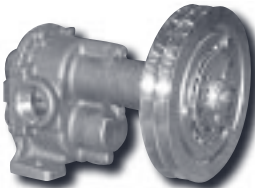
c.) As the teeth mesh, the liquid is squeezed out of the cavity and forced out the discharge port.

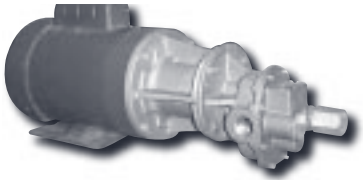
FEATURES:



Metering: thin to viscous liquids can be dispensed in a smooth repeatable flow
High Pressure: up to 500 psi can be achieved with low to high viscosity liquids
Clean Liquids: close fitting gears require clean non-abrasive liquids

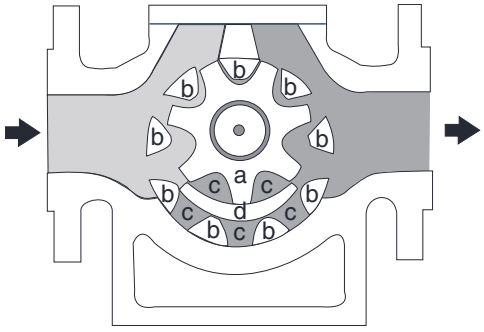
VIKING
OBERDORFER
ECO
LIQUIFLO
RANGER
BOWIE
ROPER
MICROPUMP
BROWN & SHARP





INTERNAL GEAR

HOW IT WORKS:



a.) The inner gear (a) rotates in unison with the outer gear (b) opening gaps between their teeth on the suction side drawing in liquid.

b.) Liquid is trapped in the gaps (c) between the teeth and the stationary crescent (d) as the gears travel toward the discharge side.

c.) As the inner (a) and outer (b) gears mesh together liquid is forced out the discharge side.

FEATURES:

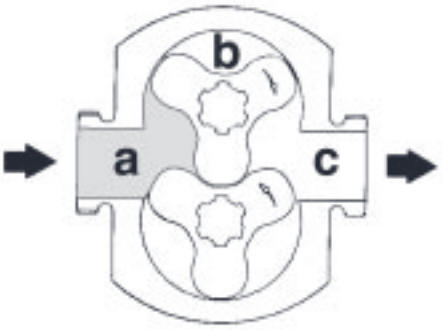
High Viscosities at Standard Motor Speeds: internal gear pump models that drive the inner gear are capable of pumping viscosities of up to 10,000 ssu at the standard motor speed of 1800 rpm's
High Pressure: up to 650 psi can be achieved with low to high viscosity liquids
Clean Liquids: close fitting gears require clean non-abrasive liquids

VIKING
TUTHILL
HAIGHT
ROTAN
VICAN

COMMON PUMPING PRINCIPLES

LOBE

HOW IT WORKS:



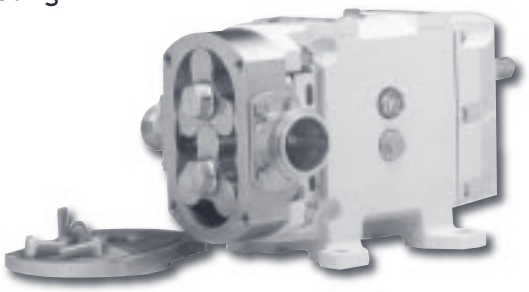
a.) The motion of the counter rotating tri-lobe rotors create a partial vacuum which draws the liquid smoothly into the pump chamber.

b.) As the rotors revolve, liquid is captured between the rotor cavities and the outer housing.

c.) The liquid is forced out the discharge as the rotors mesh and eliminate the cavities the liquid occupies.

FEATURES:

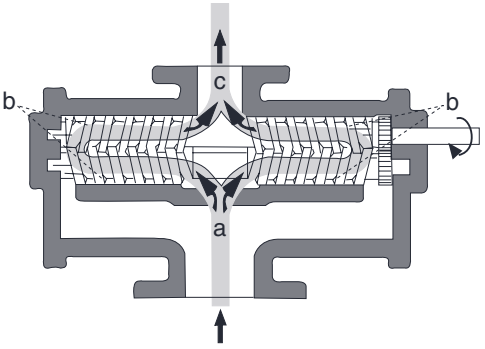
Efficient: Improved efficiency and sterilizability over the traditional lobe pump design. Longer sealing surfaces ensure high volumetric efficiencies with thin liquids.
Solids Handling: gentle low shear solids and abrasive handling
Wide Viscosity Range: from 1 to 1,000,000 centipoise



ALBIN
ALFA-LAVAL
VIKING
WAUKESHA
TRI-CLOVER
TUTHILL
JABSCO
BORGER
G & H

SCREW

HOW IT WORKS:



a.) As the "threads" of the screws rotate a vacuum is formed and liquid is drawn into the suction port.

b.) Liquid is captured between the screw "threads" and the outer housing (a).

c.) These cavities (b) move along the lower screw and continue back along the top screw as their rotation continues. The flow is divided and travels in opposite directions through the pump in order to obtain axial thrust balancing

d.) The liquid is forced out of the discharge as the cavities open along the top screw at the end (c) of the meshing screw "threads".

FEATURES:

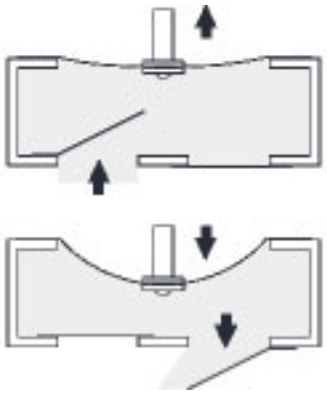
High Pressure: Pressures of up to 5000 psi
Smooth Flow: Smooth continuous flow with practical no noise or vibration
Continuous Duty: Designed to run 24 hours a day, 7 days a week
Dry Running: Because of non-contacting rotor screws, timed twin screw designs can run dry intermittently in order to scavenge tank bottoms

ALLWEILER
BORNEMANN
IMO
LEISTRITZ
PLENTY
SEIRBATH

COMMON PUMPING PRINCIPLES

DIAPHRAGM

HOW IT WORKS:



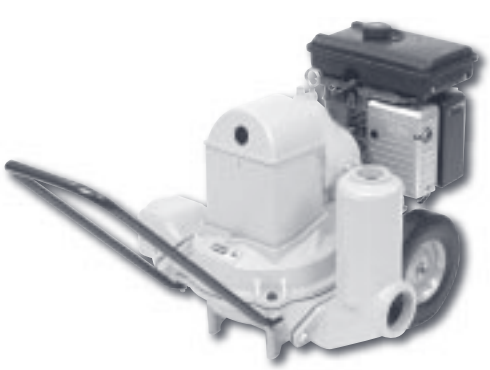
a.) As the piston diaphragm is pulled away from the housing, the cavity increases in size. This creates a vacuum that draws in the liquid through the one way inlet valve.

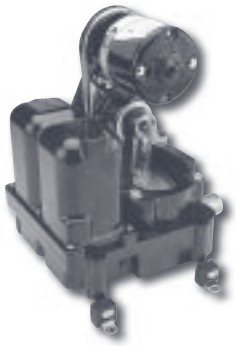
b.) As the diaphragm is pushed toward the housing, the cavity decreases in size which forces the liquid out through the one way outlet valve.

FEATURES:

Dry Running: can run dry indefinitely without damage
Self-priming: can lift up to 15 feet under ideal conditions
Self-adjusting: "air operated" diaphragm pumps automatically adjust their speed as viscosity fluctuates

MARLOW
BOSWORTH
WHALE
CH & E
JABSCO
METERING: PULSAFEEDER
BLUE-WHITE
NEPTUNE
PROMINENT
LMI

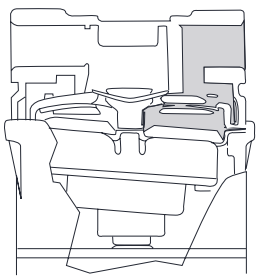




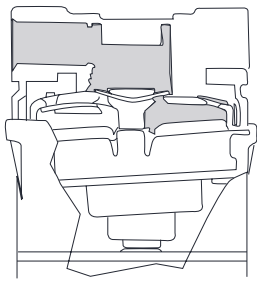
CAM DRIVEN DIAPHRAGM

HOW IT WORKS:

A multiple diaphragm pump utilizes an offset cam attached to the diaphragm by pistons to alternately enlarge and decrease the size of each chamber.



A



B

a.) As the piston moves away from the housing, the cavity increases and draws in liquid through the one way inlet check valve.

b.) As the piston moves toward the housing the cavity decreases in size and forces the liquid out through the one way outlet check valve.

c.) Each diaphragm cavity works independently as their piston alternately decreases and increases the diaphragm cavity.

FEATURES:

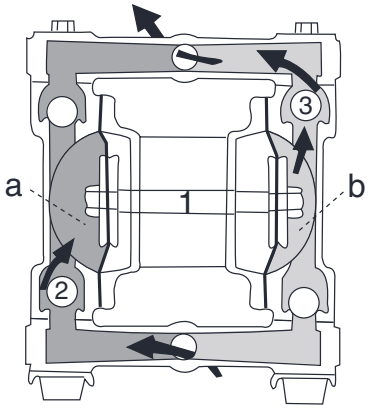
Same as the single diaphragm except cannot handle solid because of their small valve openings.
High Pressure: up to 150 psi is possible; 2500 psi for Hydracell
Smooth Flow: multiple diaphragms smooth out the pulsation of the single diaphragm design

FLOJET
SHURFLO
AQUATEC
HYDRACELL (Hydraulic Actuated)

COMMON PUMPING PRINCIPLES

AOD

HOW IT WORKS:



a.) Compressed air powers the piston (1) moving it to the right enlarging cavity "a". This action creates a vacuum drawing in liquid through the chamber's inlet check valve (2).

b.) While the piston (1) enlarges cavity "a" it compresses cavity "b" forcing liquid out the one way check valve (3) toward the discharge.

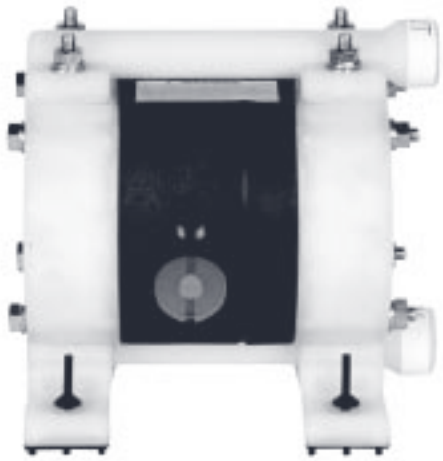
c.) Once the piston (1) has fully extended to the right, it is redirected (by compressed air) to the left compressing chamber "a" (forcing liquid out the discharge) and enlarging chamber "b" (drawing in liquid through the suction).

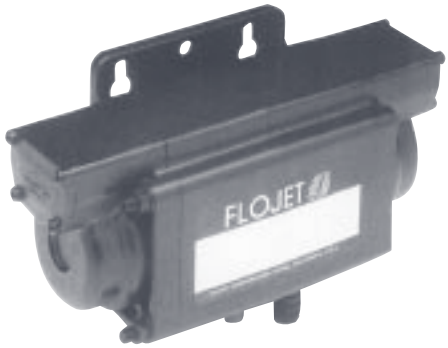
d.) Once the piston (1) has fully extended to the left the cycle repeats as compressed air redirects the piston (1) back to the right.

FEATURES:

Dry Running: can run dry indefinitely without damage
Dead Head: will simply stall and will not be damaged when the discharge is blocked
Self-priming: can lift up to 20 feet under ideal conditions
Sealless: Does not utilize a seal
Forgiving: Self compensating design limits damage by misuse

FLOJET
YAMADA
ALL-FLO
GRANZOW
WARREN-RUPP
WILDEN
AMERICAN
VERSA-MATIC
ARO
GRACO

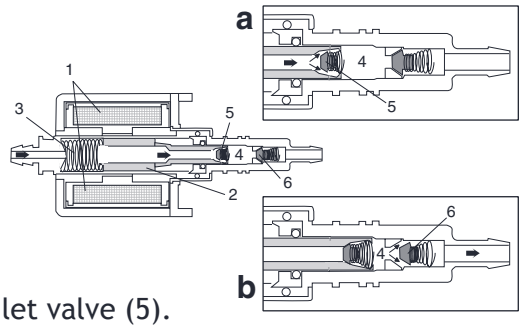




COMMON PUMPING PRINCIPLES

OSCILLATING

HOW IT WORKS:



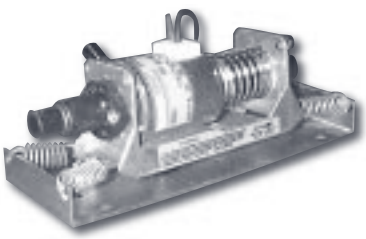
a.) The AC input power is rectified by a single diode connected to the solenoid coil (1). When the positive half wave of current passes through the diode to energize the coil, an electromagnetic field pulls the piston (2) and compresses the piston spring (3). The piston's movement enlarges the inlet chamber (4) creating a vacuum and drawing liquid in through the inlet valve (5).

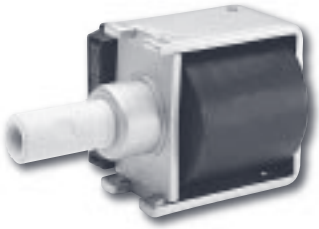
b.) The diode blocks the negative half wave of the input current causing the electromagnetic field to die. The piston spring (3) then pushes the piston (2) toward the inlet chamber (4) forcing the liquid through the outlet valve (6).

FEATURES:

Low Flow: oscillating pumps deliver low flow at low to high pressures
Self-priming: some models can lift up to 22 feet
Motorless: this design does not require a rotating motor which reduces cost and required maintenance

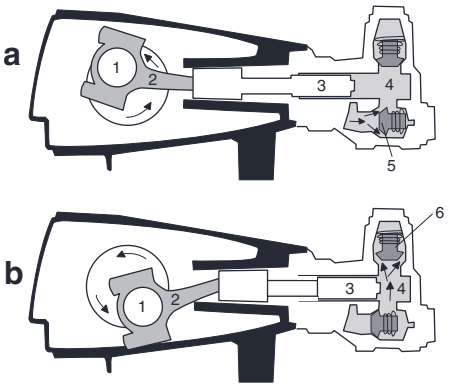
GORMAN RUPP
FLOJET
FLUID-O-TEC





PLUNGER

HOW IT WORKS:

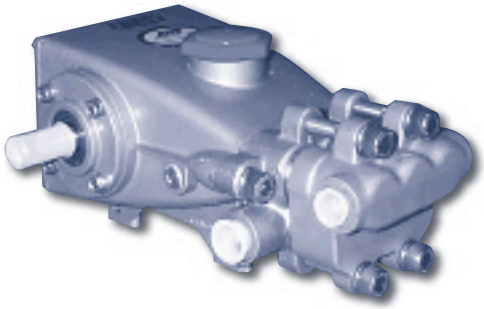


a.) As the crankshaft (1) rotates the connecting rod (2) pulls back the plunger (3) from the liquid chamber (4) within the manifold which increases the chamber's size. This creates a vacuum that draws in liquid through the inlet valve (5).

b.) As the crankshafts rotation continues, the connecting rod (2) pushes the plunger (3) toward the liquid chamber (4) reducing the chamber's size. This forces the liquid out the discharge valve (6).

FEATURES:

High Pressure: pressures of up to 15,000 PSI can be achieved
Clean Liquids: closed fitting components require clean non-abrasive liquids
Durable: ceramic plungers and an oil filled crankcase ensures a long operating life



FMC	***GENERAL***	***WHEATLEY***
CAT	***GIANT***	***NATIONAL***
HYPRO	***PUMPTEC***	***GASO***