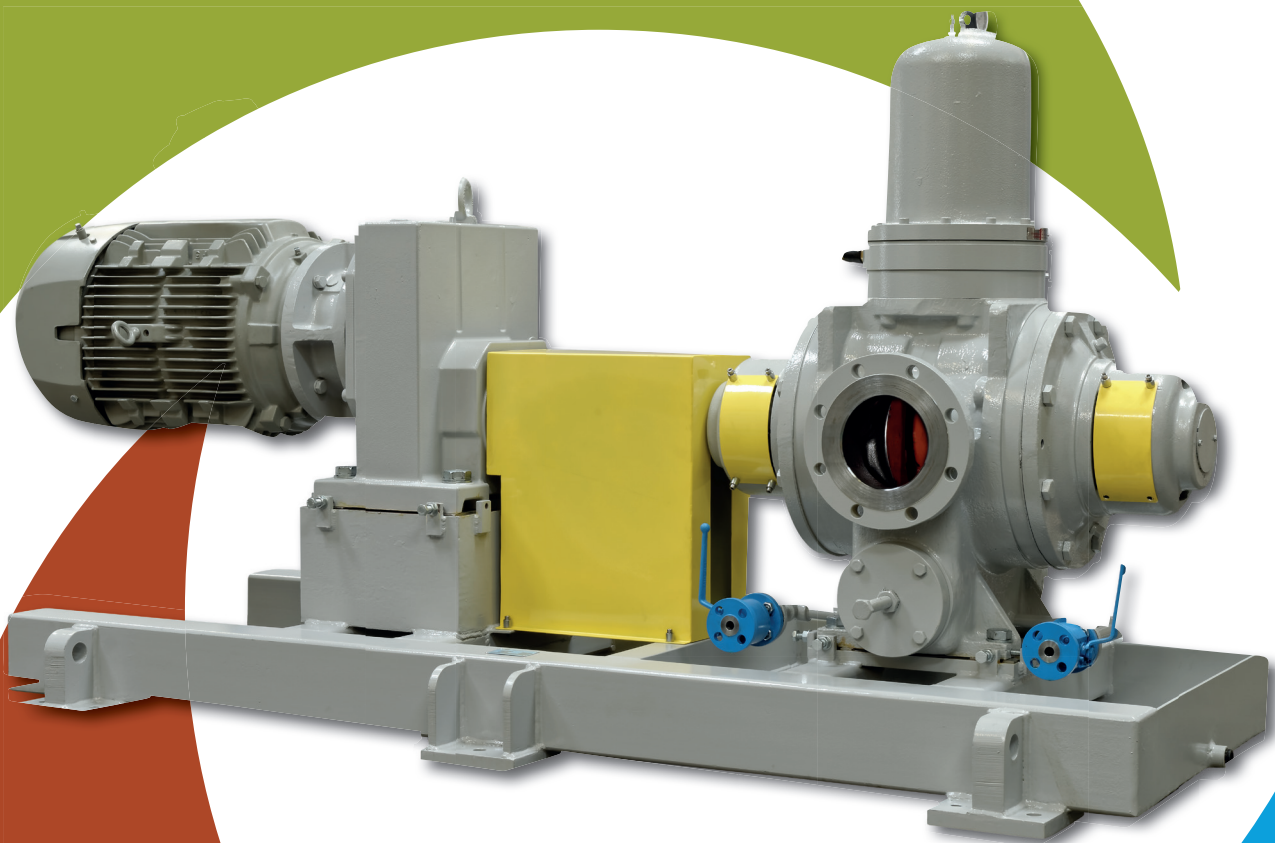


ROTARY VANE PUMPS

2000 SERIES

PLENTY®





PLENTY - AN INTRODUCTION

Plenty is a well established and universally respected brand. The Plenty product range consists of high-quality pumps, filters, separators, and strainers that cover a diverse range of different application scenarios. Our products are all well suited for use in the highly demanding power, chemical, oil/gas, marine, food/beverage, pharmaceutical, pulp/paper processing and water treatment sectors.

Our wide product range consists of positive displacement, fixed and variable flow rotary vane pumps, plus a multitude of triple and twin-screw pumps all under the one brand. Plenty filters, are suitable for both gases and liquids (across a broad spectrum of different pressures), with backflush, self-cleaning and coalescer options available. Filter separators and cyclone separators are also included. Our strong European manufacturing bases are backed up by an extensive range of related support services - covering maintenance, refurbishment, repair and parts replacement.



PLENTY 2000 SERIES ROTARY VANE PUMPS

THE PUMPING PRINCIPLE

The 2000 series pumps are available in to separate designs (G2000 and U2000), both of which utilise the unique Celeros Flow Vane pump concept, with the G2000 range designed as a fixed flow pump whereas the U2000 range is designed to be a variable flow pump without the need for any form of speed variation.

The eccentricity between the shaft and rotor cause the chambers between the rotor and blades to vary in size as the pump rotates. The liquid entering the pump is guided into the ends of the rotor and then back out through the discharge port.

There are eight pumping sectors and the illustration shows how the sector increases and decreases in size during rotation. Each sector in turn acts in the same manner, causing the continuous pumping action.

Unlike a conventional vane pump the blade tip is not rotating at high peripheral speeds against a liner (which could cause a rapid wear to the blade tip). The 2000 Series blades are gently sliding along a flat inside the rotor thus reducing wear and maintaining high volumetric efficiency.

Variable flow is achieved by changing the eccentricity between the shaft and the rotor. As the eccentricity is decreased, the volume of the chambers decreases thus lowering the flow rate. When the shaft and rotor are concentric there is no pumping action, no flow and no hydraulic horsepower absorbed. Reverse flow can also be achieved by increasing the eccentricity over the shaft instead of under the shaft.

This pumping principle has a low shear rate which is important for blending lube oils or pumping shear sensitive fluids such as oily water mixtures to a separator for example.

NON STANDARD PUMPS

The 2000 Series pump design can be factory modified for extremely viscous or arduous refinery applications. Materials of construction are selected according to the fluid nature.

LUBRICANTS BLENDING

Liquid products ranging in viscosities from 2cSt to 75,000 cSt are handled with a 2000 Series vane pump, with mechanical seals used for most applications.

BITUMEN & ASPHALT

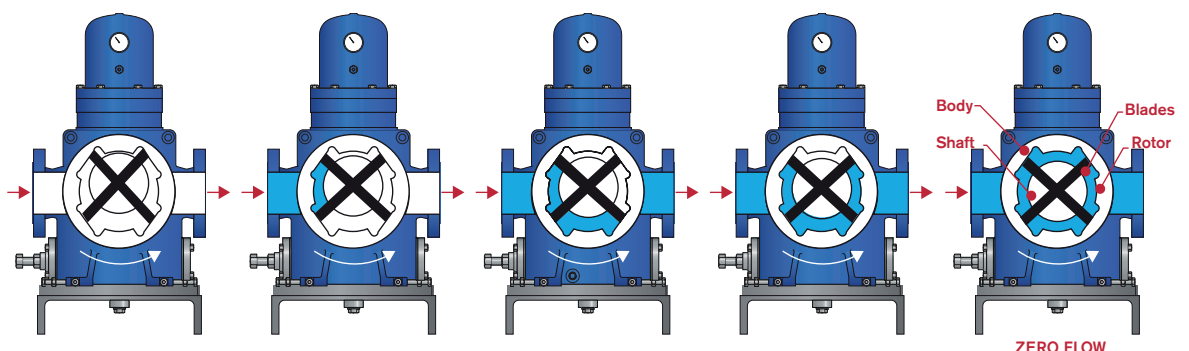
The Plenty rotary vane pump is able to perform continuous pumping during temperature changes where centrifugal pumps normally fail. For applications up to 2000C it is normal to use an internal bearing pump with only 1 mechanical seal (2 seals on higher temperature external bearing designs). Steam or hot oil heating jackets supplied as standard

VISCOUS FLUIDS

Viscous fluids up to 75,000 CST are handled with a standard pump, viscosities up to 500,000 CST with a factory modified pump and seal.

SPECIALIST SEALING

Special sealing options are available including single, double and tandem arrangements in component or cartridge configuration.



PLENTY PUMPS IN THE FIELD

STANDARD PUMPS - HEAVY DUTY INDUSTRIAL

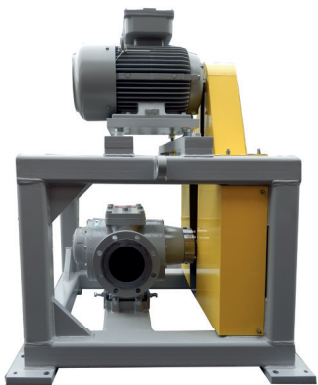
The 2000 Series standard pumps are manufactured with S.G. iron (ductile iron) or steel casings according to client's preference and can be fitted with integral relief valve and heating jackets as necessary for the application.

API 676 & OTHER SPECIFICATIONS

The 2000 Series pumps can be supplied in accordance with the requirements of API 676. Other international pump standards or client specific requirements can be accommodated.

UNITISATION

Pumps can be supplied as bare shaft or fully assembled with driver on a baseplate (API or industrial design) with spacer or non-spacer coupling and non-spark guard.



TYPICAL PRODUCTS

- Lubricating Oil
- Viscous Chemical Additives
- Shear Sensitive Additives
- Bitumen Asphalt
- Fuel Oils
- Crude Oil
- Molasses
- Bitumen Emulsion
- Grease
- Polymers
- Resins
- Polyols

TYPICAL PRODUCT APPLICATIONS

- Base / Lube Oil Transfer
- Lubricant Blending
- In Line Blending
- Drum Filling
- Bottle / Can Filling Machines
- Truck / Barge Loading & Unloading
- Blended Oil Transfer
- Tank Recirculation
- Tank to Tank Transfer
- Bitumen Production & Loading

STANDARD PUMP ASSEMBLY OPTIONS INCLUDE:

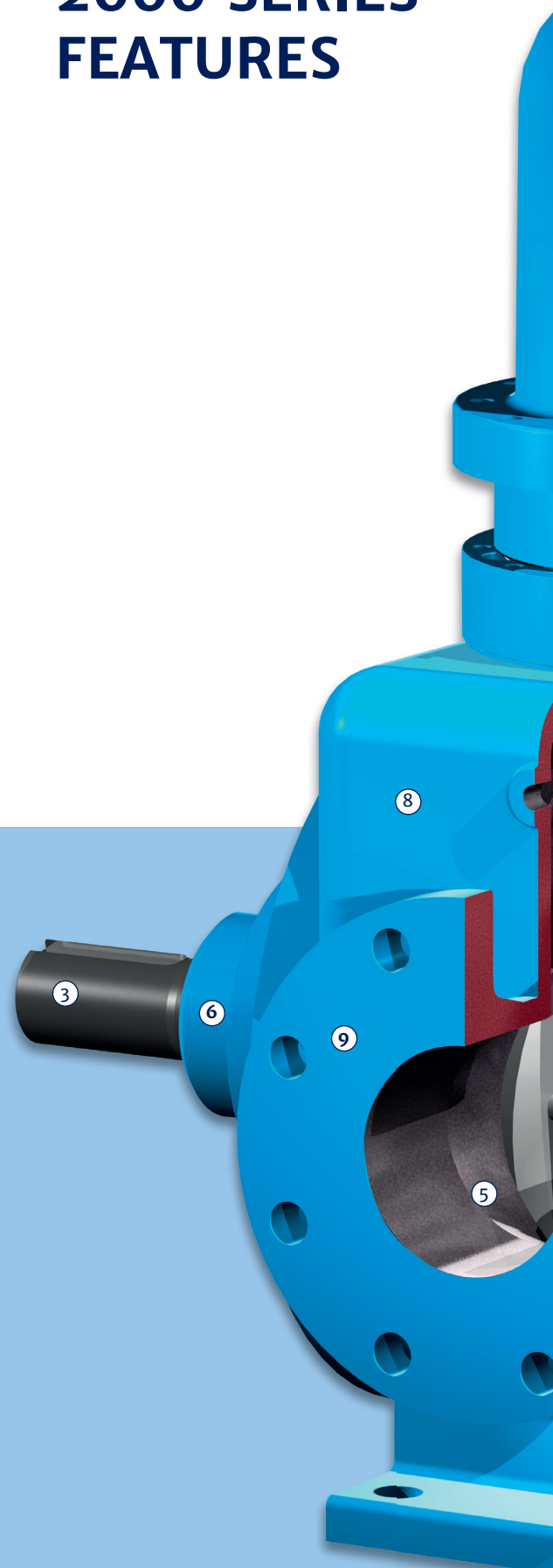
- Internal or external roller bearings
- Mechanical seal or gland packing
- Seal flush and / or quench
- Single or double mechanical seals.
- API682 Cartridge seals
- Fabricated baseplates with drip rim and drain facility
- Internal pressure relief valve (excluded / blanked off, for API676 service)
- Jacketed casings (Steam / Hot Oil) for high temperature duties
- Hardened rotating assembly (nitriding) for arduous services

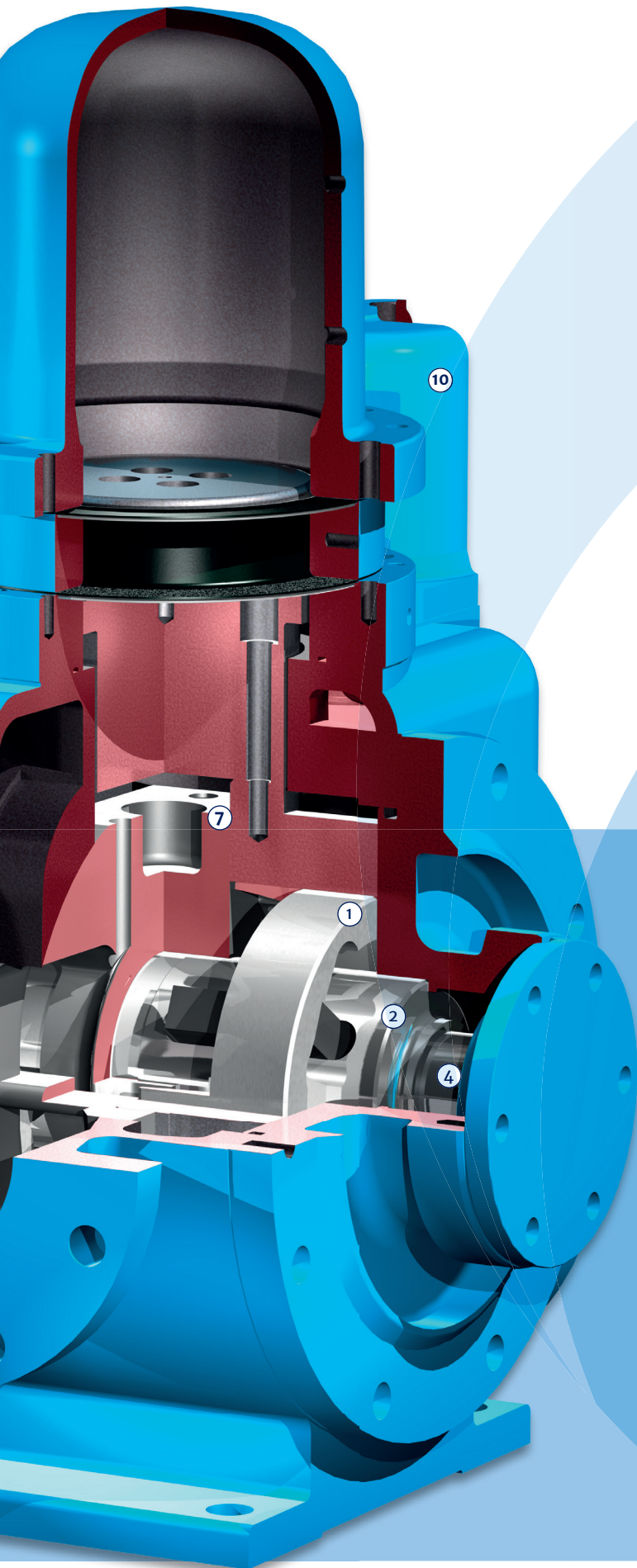
CELEROS PLENTY ROTARY PUMP IS GLOBALLY UTILISED IN A WIDE RANGE OF REFINERY SERVICES, WITH OPERATING PARAMETERS IN THE RANGE OF:

- Capacities - up to 250 m³/hr / 1,100 USgpm
- Pressure - up to 20 Bar 290 Psi
- Viscosity (Standard Product) - up to 75,000 cSt (347,250 ssu)
- Viscosity (Special Product) - up to 500,000 cSt (2,315,000 ssu)
- Temperature - -40° to +300° C -40° to 570° F

2000 SERIES FEATURES

- ① **SOLID SG IRON OR STEEL ROTOR**
 - Replaceable rotor for easy maintenance
 - Groove in rotor prevents build-up of contaminants
 - Rotor driven by blades, no external transmission required
- ② **ROTATING ASSEMBLY COMPRISING ROTOR / BLADES**
 - Robust design
 - Thick cross section
 - Solid one piece blade construction
 - No thin push rods or springs
 - Large surface contact area, maximising efficiency
- ③ **SHAFT**
 - Standard Solid 1 piece shaft defined for high torque loading
 - Hardening options for aggressive liquids
- ④ **BEARINGS**
 - Internal design for lubricating products
 - External design for aggressive liquids.
 - Roller / Taper bearing options based on process
- ⑤ **OPTIMUM NPSH PERFORMANCE**
 - Double entry as standard for reduction in NPSH especially at high viscosity
- ⑥ **SEALING OPTIONS**
 - Standard component
 - Gland Packing
 - Standard Cartridge (single / double)
 - API682 Carrdige (single / double)
- ⑦ **FLOW CONTROL DEVICE (U2000 SERIES ONLY)**
 - Unique flow control features for the U2000 series
- ⑧ **CASING**
 - SG Iron
 - Carbon Steel
 - Stainless Steel
- ⑨ **CONNECTIONS OPTIONS**
 - ANSI Flanges as standard
 - DIN available on request
 - Other international standard upon request
- ⑩ **INTEGRAL RELIEF**
 - Fitted as standard
 - Removed for API 676 compliance

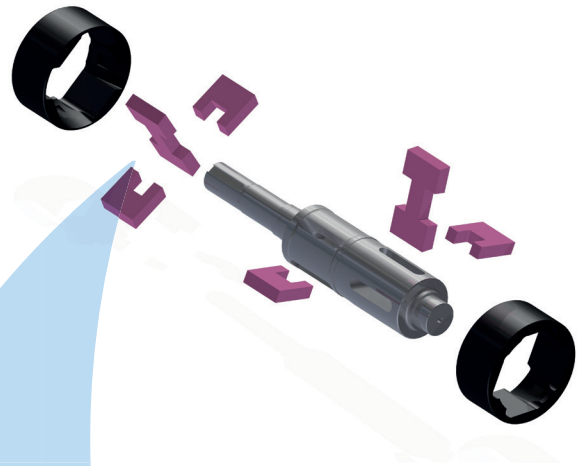




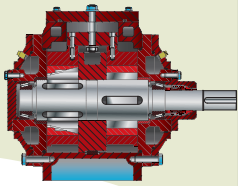
2 THE ROTATING ASSEMBLY

- The unique rotating assembly consists of eight working blades made up as two sections set 45° apart, each section consisting of two half blades and one 'H' blade.

The diagram shows only one rotor and the roller bearings used on an inboard pump.

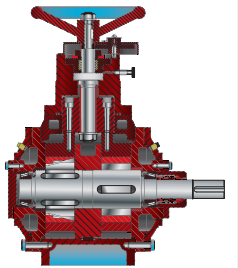


U2000 FLOW CONTROL OPTIONS



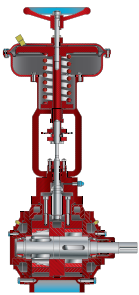
FIXED CAPACITY PUMPS - STANDARD FIXED TRANSFER WITH NO FLOW CONTROL

Pumps can be supplied in a fixed flow form with the addition of the fixed flow cover. The bridge block is secured to the body centre piece, which in turn locks the inner bodies in the full flow position.. As the pump is basically the same as the variable flow pump, a fixed capacity pump can be installed to begin with and then converted to variable flow at a later date if it is found necessary.



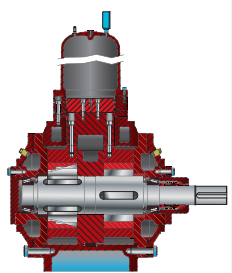
MANUAL CONTROL PUMPS - INTERMITTENT / IRREGULAR FLOW CONTROL REQUIRMENT

Manual control pumps have their inner bodies connected to a hand wheel via the control spindle. Flow control between zero and maximum is achieved by rotating the hand wheel which changes the position of the inner bodies altering the eccentricity of the rotors to the shaft, thereby changing the flow rate. The hand wheel is equipped with an indicator calibrated in % eccentricity to facilitate easy setting within 1% accuracy. Flow can also be reversed and controlled between zero and maximum in the reverse direction.



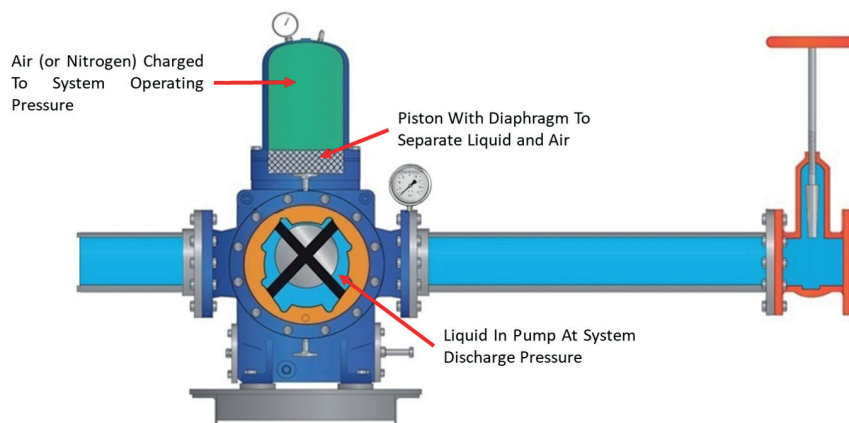
REMOTE CONTROL PUMPS - HIGH ACCURACY BLENDING APPLICATIONS

Remote control pumps have their inner bodies connected to an actuator. The actuator can be electro-mechanical, electro-pneumatic or pneumatic type. Flow control between zero and maximum, and reverse between maximum and zero is achieved by the actuator receiving a signal from an external source and moving accordingly. Movement of the actuator changes the position of the inner bodies, altering the eccentricity of the rotors to the shaft, thereby changing the flow rate.



CONSTANT PRESSURE CONTROL PUMPS - AUTOMATIC FLOW CONTROL FOR DRUM / TANKER FILLING

CPC is a patentated mechanism which automatically alters the eccentricity of the rotors to the shaft., to match the flow rate of the pump to that possible in the system to maintain set pressure. CPC pumps have their inner bodies connected to the control piston via the bridge, the control piston is enclosed in a cylinder. Gas pressure is applied to the top of the control piston and the delivery pressure of the pump is fed to the underside of the control piston.



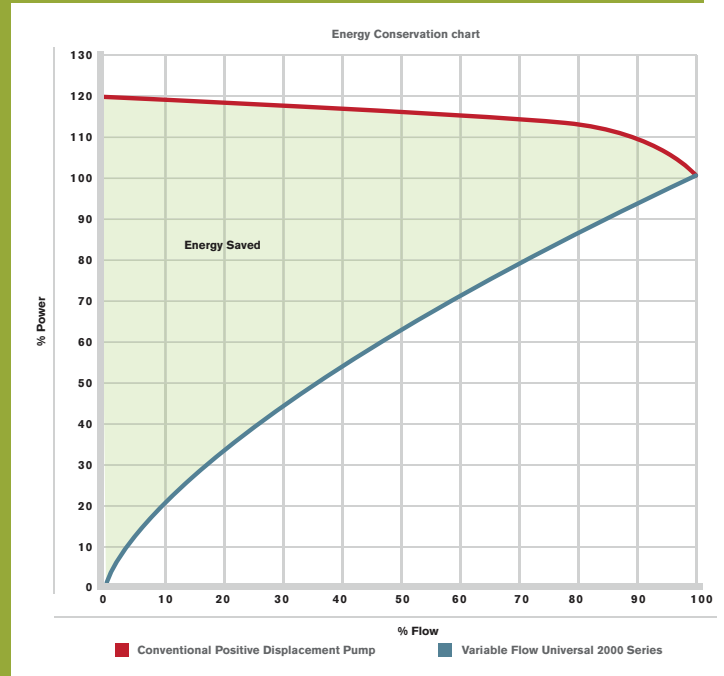
ENERGY & COST SAVING

Energy costs are increasing and will become an even greater burden to the profitability of your company.

Refer to the graph and see how the U2000 pump with its variable flow capability can reduce your energy costs.

The U2000 Series can vary its flow infinitely between zero and 100% flow. As power absorbed is pro-rata to flow, it can be seen that reducing flow will reduce the hydraulic horsepower.

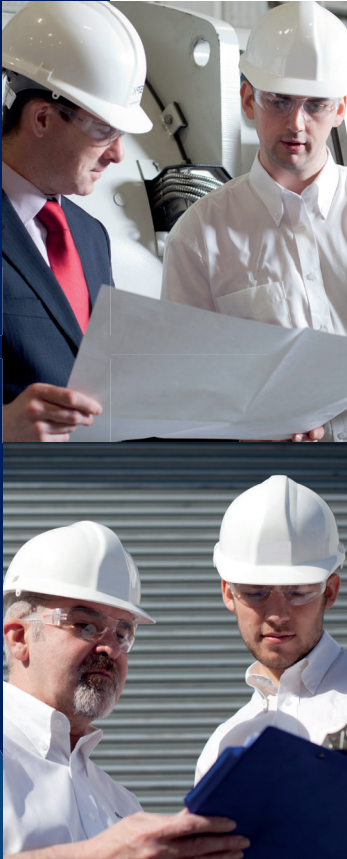
Pumps that have a regular intermittent demand can actually pay back their initial capital cost and return a profit from energy savings.



PUMP FEATURE	USER BENEFITS
VARIABLE CONTROL FLOW RATE FROM ZERO TO MAXIMUM ON THE U2000	Considerable energy cost savings at reduced flow rates. External pressure and flow control systems not required. Versatile pump utilisation matching pump flow against system demand
FIXED SPEED DRIVE	Expensive variable speed drives system not required.
COMPREHENSIVE FLOW CONTROL AVAILABILITY	Manual, Remote Control and Automatic flow controls are available to suit almost any application
VERSATILE DESIGN CONCEPT	Standard pump arrangements suitable for viscosity applications from 2 cst to 75,000 cst (for higher viscosities contact Celeros)
ROBUST CONSTRUCTION	Heavy duty bearing arrangements designed for long operational periods between routine maintenance
SLOW RUNNING	Slow running increases service life. The low shear effect on product reduces or eliminates emulsification of the pumped liquid
LOW NOISE	Environmentally acceptable for site operators
VISCOUS PUMPING	The robust vane and blade assembly allows the pump to operate at high viscosities whilst maintaining high efficiency
MECHANICAL SEALS	Seal housing is designed to accommodate standard L1K mechanical seals, with the options of fitting non-standard seals available.
HEATING JACKETS	The pump can be fitted with jacketed covers to allow heating by hot oil or steam. (Electric heat tracing can be used on non jacketed pumps)

GLOBAL AFTERMARKET CAPABILITY BEST IN SERVICE & RESPONSE

Our customer focused aftermarket organisation is positioned to provide comprehensive care for our varied and diverse product lines. Heritage and obsolete products benefit from the same level of attention and expertise ensuring that reliability and availability is maximized irrespective of a pump's length of service.



GENUINE HIGH QUALITY

Original or upgraded specification spare parts, coupled with full engineering design capability, enables longevity of reliable operation. Highly skilled and experienced service engineers ensure accuracy in build and optimised performance. The worldwide presence of ClydeUnion Pumps offers local service facilities in over 40 countries.



SERVICE SOLUTIONS

ClydeUnion Pumps is committed to supporting our installed base wherever it may be. Depending on your location we will provide either direct service support or support via our local authorised service partners. Whichever option is provided, you can be assured of the best attention from fully qualified and experienced engineers.

- Upgrades & re-rates
- Service & overhaul
- Installation & commissioning
- Technical support
- Inventory management
- 3rd party equipment



Parts & maintenance:
Any brand, any material, anytime.
Heritage products, upgrades &
improvements





ROTARY VANE PUMP

- | SPEED
- | EXCELLENCE
- | PARTNERSHIP

 PLENTY®