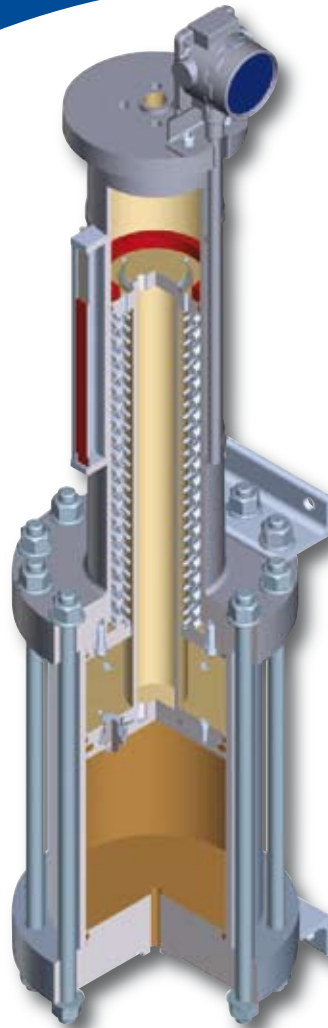


# CP System

**Constant Pressure Barrier Fluid, Sealing Technology**

Complies to and exceeds API 682 plan 53C requirements



**CLYDEUNION**  
**PUMPS**

# CLYDEUNION Pumps

## a leading provider of pumping solutions

### 300 years of pumping experience

CLYDEUNION Pumps is one of the world's leading providers of pumping solutions. We were formed in November 2008 from the joining of Clyde Pumps and Union Pump, which brought together some of the most respected products, people and heritage brands in the business.

The two companies that form CLYDEUNION Pumps have a rich heritage and combined history of over 300 years of pump production and development. Clyde Pumps was formed in May 2007 when the Weir Pumps (Glasgow) business was acquired from The Weir Group plc, but its roots go back to 1871 when brothers, George and James Weir, founded the engineering company of G.&J.Weir. Union Pump has an equally impressive pedigree and had been producing high technology pumps since its formation in 1885 in Michigan, USA.



David Brown employees producing gears in the 1890s



The 'early days' at Union Pump Company, moving a boiler

Today, CLYDEUNION Pumps is structured into six customer focused business units. Our business units are at the heart of everything we do and provide their expertise across the **upstream oil, downstream oil, nuclear power, conventional power** and **water and industrial sectors**. In addition, our truly global **aftermarket** capability ensures our customers are fully supported and receive exceptional care.

\*Weir Pumps  
Mather & Platt  
Drysdale  
WH Allen  
Girdlestone  
Allen Gwynnes  
Harland



Union Pump  
David Brown Pumps  
DB Guinard Pumps  
American Pump  
Pumpline

**UNION** Pump



\* This is a heritage product acquired when the Weir Pumps business transferred to Clyde Pumps in May 2007

# High Technology Pumps for the most demanding services

**CLYDEUNION Pumps specialises in the design and manufacture of API 610 centrifugal pumps and pumping packages. At CLYDEUNION Pumps you will find a commitment to quality throughout the company. Our Quality Management System is fully approved to ISO 9001:2008 and independently verified to comply with the latest quality standards. CLYDEUNION Pumps has a worldwide reputation for providing optimised reliability in the most severe duty applications.**

## **REFINERIES**

Today's complex refinery processes demand specialised pumping solutions. Extremes of temperature, high-pressure and the ability to handle volatile fluids, calls for highly engineered pumps that can perform reliably in such arduous conditions. CLYDEUNION Pumps has many years of experience in the supply of process pumps to the worldwide refinery industry and is committed to providing its customers with solutions to the most complex of pumping requirements.

## **PETROCHEMICAL**

CLYDEUNION Pumps has worldwide experience of engineered pumping systems for petrochemical applications. The process and transferring of petrochemicals demands a high level of pumping reliability. CLYDEUNION Pumps has a reputation for supplying reliable petrochemical pumps which can be found working throughout the world in the most aggressive applications.

## **OIL & GAS PRODUCTION**

Our pumps can be found operating wherever there are oilfields, both onshore and offshore. High efficiency and reliability are major benefits of CLYDEUNION Pumps equipment – both of which are vital considerations in the oil and gas industry. Pumps have been supplied to satisfy a wide range of pumping services including booster pumps for high pressure seawater / produced water injection, crude oil transfer and pumps for handling all types of industry related fluids.



## **PIPELINES**

CLYDEUNION Pumps has worldwide experience of engineered pumping solutions for pipeline applications. Effective transferring of hydro-carbon products, often in remote locations, demands a high level of pumping reliability. CLYDEUNION Pumps has a reputation for supplying reliable pipeline pumps which can be found working throughout the world in the most hostile environments.



# CP System

# improves safety and eliminates fugitive emissions

The **CLYDEUNION Pumps CP System** is a **Constant Differential Pressure Barrier Fluid Sealing System**. All units comply with and exceed **API 682 Plan 53C** requirements.

There are hundreds of CLYDEUNION Pumps CP Systems operating worldwide providing a simple means of pressurising double, back-to-back and dual pressurised mechanical seals.

- **Designed per ASME Section VIII, Division 1.**
- **Meets requirements of the European Pressure Equipment Directive 97/23/EC.**
- **Available with either ANSI 600 lb or 900 lb flange pressure ratings.**
- **Can be supplied for new pumps or retrofitted to existing pumps from any pump manufacturer.**
- **Offers a proven history in improving seal life, particularly under varying suction pressures.**
- **Provides an excellent mechanical sealing environment in the most demanding process conditions.**

## PROVEN PRODUCT INTEGRITY

The Patented CP System improves safety, reliability and eliminates fugitive emissions. The CP System ensures zero leakage to atmosphere and achieves this without the need for external power or nitrogen gas source. The Unit maintains constant differential pressure across the inboard seal, regardless of fluctuations in suction or discharge pressure.

## EASE OF MAINTENANCE

The CP System has a high usable capacity (10 litres / 2.64 US gal) and can be topped up with the system pressurised and the pump running. The CP System requires only one channel of instrumentation. All instrumentation is magnetic and does not penetrate the pressure envelope wall; facilitating service and replacement whilst the CP system is pressurised. The simple construction of the CP System offers ease of maintenance and reliability.



## UNIT CONFIGURATION

With a CP System per mechanical seal, each system requires its own seal barrier fluid circulation piping. The closed loop is comprised of tubing or pipe with appropriate fittings and incorporates a barrier fluid cooler to remove excess heat generated at mechanical seal faces.



## EC CERTIFICATE OF CONFORMITY

In accordance with the requirements of the Pressure Equipment Directive 97/23/EC and the Pressure Equipment Regulations 1999, UK Statutory Instrument 1999 No. 2001 and 2002 No.1267

# Advantages of the CP System versus Conventional API 682 Seal Systems

**Using a dual pressurised or double, back to back seal :  
CP System versus dual unpressurised seal with API Plan 52 System.**

Design Feature	Benefit	API Plan 52	CP System
Barrier fluid is at a higher pressure than pumpage.	Zero fugitive emissions.	✗	✓
Primary mechanical seal interface film is barrier fluid, not product.	Increased mechanical seal life, especially on light hydrocarbon pumpages	✗	✓
Barrier fluid remains uncontaminated by pumpage throughout its life.	Increased mechanical seal life, especially the secondary seal faces.	✗	✓
No need for the seal system to be connected to plant flare system.	Reduced load on plant vapour recovery system.	✗	✓
Requires only one channel of instrumentation.	Reduced installation and maintenance costs.	✗	✓
Barrier fluid can be refilled with the system pressurised and the pump running.	Reduces pump shutdown time and enables a pump with a leaking seal to continue running.	✗	✓
Barrier fluid reservoir can be mounted off pump baseplate / skid.	Flexibility when retrofitting to existing pump assembly.	✗	✓
Non-penetrating magnetic instrumentation.	Able to service / replace instrumentation with the system full of barrier fluid and pump operating.	✗	✓

**Using a dual pressurised or double, back to back seal:  
CP System versus various API Plan 53 Systems.**

Design Feature	API Plan 53A	API Plan 53B	API Plan 53C	CP System
Inter-seal barrier fluid pressure automatically changes with varying pumpage pressure.	✗ Fixed pressure seal	✗ Fixed pressure seal	✓	✓
Differential pressure between seal barrier fluid and pumpage fixed.	✗	✗	Partial <sup>(1)</sup>	✓ <sup>(2)</sup>
Suitable for use with low suction pressures.	✓	✓	✗	✓
Nitrogen gas free operation.	✗	✗	✓	✓
No nitrogen absorption into barrier fluid.	✗	✓	✓	✓
Requires only one channel of instrumentation.	✗	✗	✗	✓
No external relief valves.	✓	✓	✗	✓
Large volume of useable seal barrier fluid.	✓	✗	✗	✓
System can be refilled while pressurised.	Not Usual	✓	✓	✓
Non-penetrating magnetic instrumentation.	✗	✗	Partial	✓

<sup>(1)</sup> Differential pressure between seal barrier fluid and pumpage varies within range of pre-fixed pressure multiplier device.

<sup>(2)</sup> CP System is a pressure addition device maintaining barrier fluid pressure 15 to 30 psi (1 to 2 Bar) above pumpage pressure.

**Complies to and exceeds API 682 Plan 53C requirements.**

# CLYDEUNION Pumps

## features of the CP System

### 1 Stroke Limiting Valve

- Prevents accidental overfilling of barrier fluid avoiding over pressurising of the mechanical seals.
- Provides a thermal pressure relief facility.

### 2 Bottom Cylinder

- 10 litres / 2.64 US gal working capacity maximises period between refills.

### 3 Double Coil Spring

- Differential pressure is generated entirely by spring action.
- No need for any external supply of instrument air or nitrogen.
- No need for any circulating pumps.

### 4 Piston Position Indicator

- Magnetically coupled sight gauge provides local visual indicator of barrier fluid level.

### 5 Piston Position Switch / Transmitter

- Magnetically coupled switch or transmitter provides an alarm and/or trip signal when barrier fluid is low.

### 6 Barrier Fluid Cooler

- Options if required:
- Naturally air cooled single, double or triple length of finned pipe – standard.
  - Shell/tube water cooled – optional.
  - Fin/fan cooled – optional.

### 7 System Drain Valve

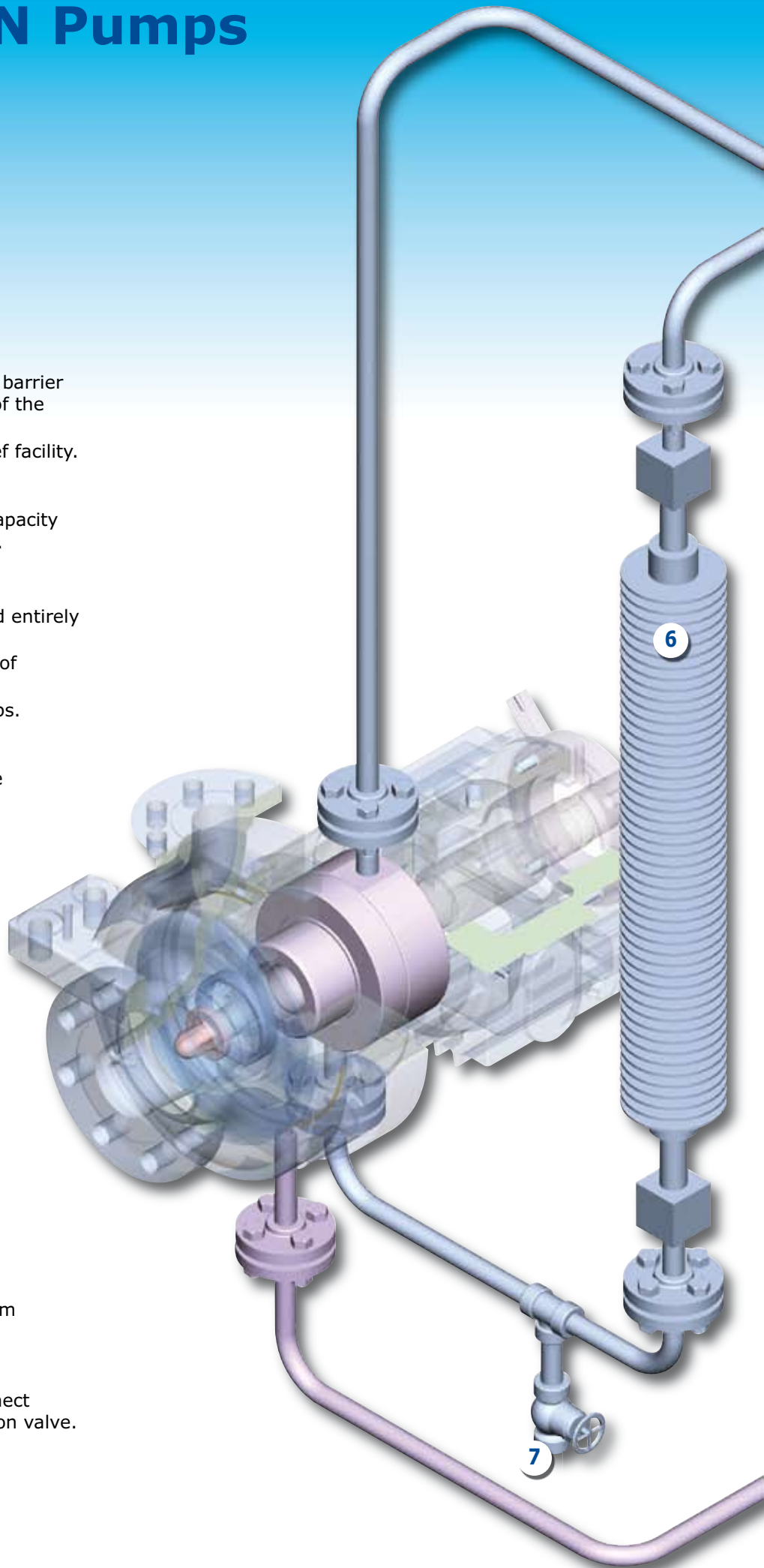
### 8 Universal Mount

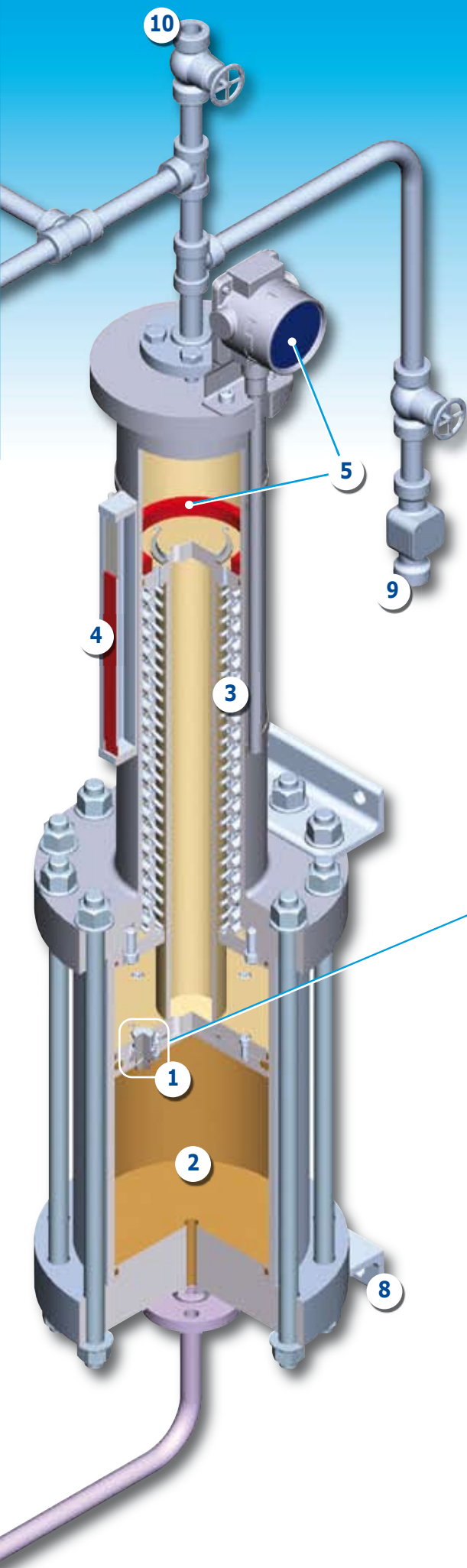
- Flexibility to mount the CP System remotely from the pump.

### 9 Fill Connection

- A separate line with a quick connect coupling, check valve and isolation valve.

### 10 System Vent Valve





### MECHANICAL SEAL REQUIREMENT

Mechanical seals selected for use with a CP System should be either dual pressurised or double "back to back" seals and should be fitted with a pumping ring or scroll to circulate barrier fluid through the barrier fluid cooler.

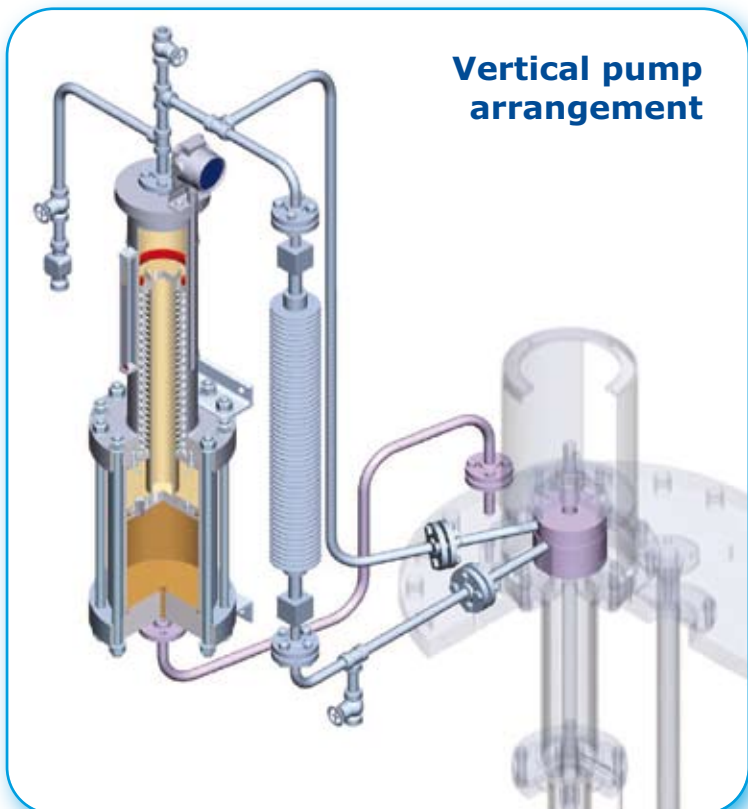
### HAZARDOUS PUMPAGES

The inner or primary seal should have a reverse pressure capability for hazard pumpages as follows:

- Capable of operating at normal sealing pressure and zero barrier fluid pressure for a period of 15 seconds with the pump running at full speed.
- Capable of sealing at pump case design pressure with zero barrier fluid pressure for an indefinite period with the pump stationary.



*Stroke Limiting Valve*



**Vertical pump arrangement**

# Reciprocating Pump

The CP Advantage is now available in Reciprocating Pumps

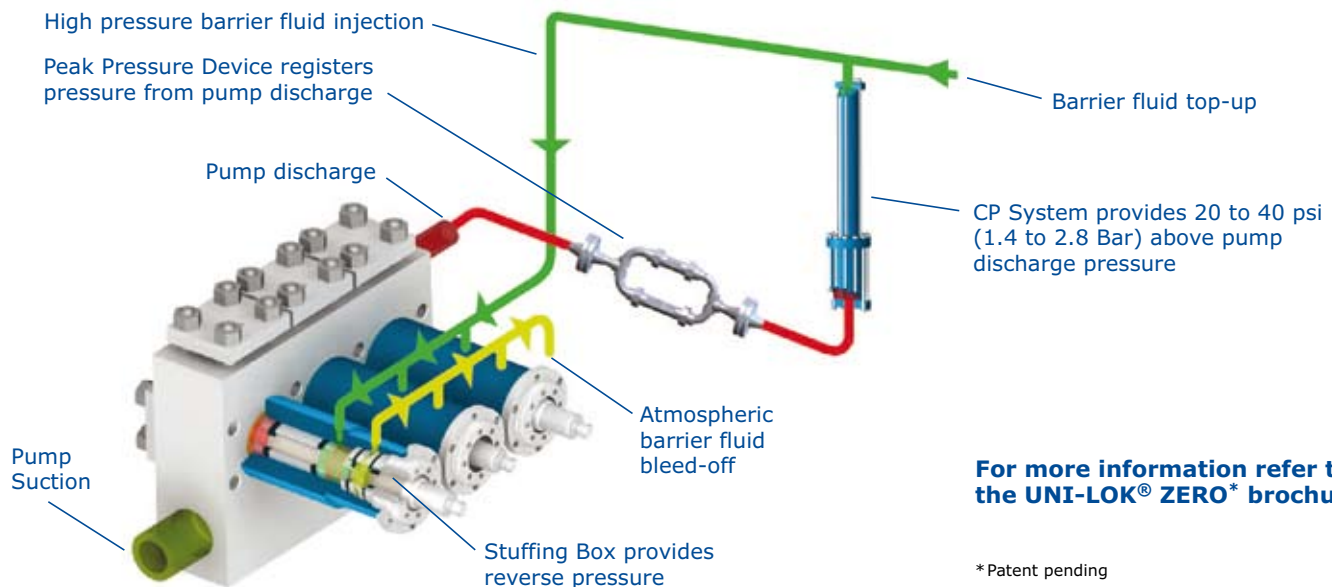
# Sealing Technology for the 21st Century

## UNI-LOK® ZERO\* SEALING SYSTEM

Developed to control leakage of VOCs to the atmosphere, the UNI-LOK® ZERO\* provides a simple means of pressurising the stuffing box to 20 to 40 psi (1.4 to 2.8 Bar) above the peak discharge pressure of the pump, thus eliminating any migration of the pumpage past the primary seal of the stuffing box and into the atmosphere. (Similar to and API 682 Plan 53C)

The system comprises 3 main components:

- A device\* that references only the peak discharge pressure from the discharge line of the pump.
- A patented CP barrier fluid reservoir that takes peak discharge reference pressure and adds 20 to 40 psi (1.4 to 2.8 Bar) to the barrier fluid that is injected into the stuffing box. This is accomplished without the need for external nitrogen gas supplies, external pumps, power supplies or bladder accumulators.
- A unique stuffing box\* designed to accommodate reverse pressure sealing. The barrier fluid injected behind the primary packing is always 20 to 40 psi (1.4 to 2.8 Bar) above the product pressure. Therefore, any leakage is barrier fluid into the pump effectively sealing the pumpage from the atmosphere.



## FIELD TRIAL SUCCESS

### Enterprise Products

Port Allen Facility, Louisiana, USA



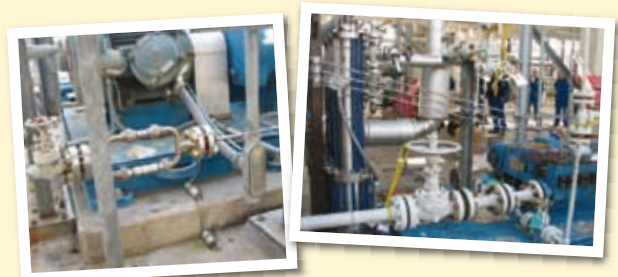
The challenge was to combat short packing life and high VOC emissions on a Butane Service, CUP-TD60 Reciprocating Pump.

Following installation of:

### UNI-LOK® ZERO\* SEALING SYSTEM

Emissions are 33% of EPA allowable limits and packing life was extended by 4 times.

*"Enterprise Products is very pleased with the sealing arrangement CLYDEUNION Pumps has developed. It has virtually resolved a recurring fugitive emissions issue that has always plagued positive displacement pumps in light hydrocarbon service."*



The UNI-LOK® ZERO\* system is available for both new equipment and as an aftermarket retrofit to provide unparalleled protection from VOC emissions to comply with current and future environmental controls.

For more information refer to the UNI-LOK® ZERO\* brochure.

\* Patent pending

# Global Aftermarket Capability

## best in service and 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 maximised 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**





SALES SERVICE FACILITY MANUFACTURING

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**OUR EXTENSIVE BRAND HERITAGE :**

\*Weir Pumps, Mather & Platt, Drysdale, WH Allen, Girdlestone, Allen Gwynnes, Harland



Union Pump, David Brown Pumps, DB Guinard Pumps, American Pump, Pumpline



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\*This is a heritage product acquired when the Weir Pumps business transferred to Clyde Pumps in May 2007.

We are constantly endeavouring to improve the performance of our equipment and as a result, we reserve the right to make alterations from time to time, and equipment may differ from that detailed in this brochure.