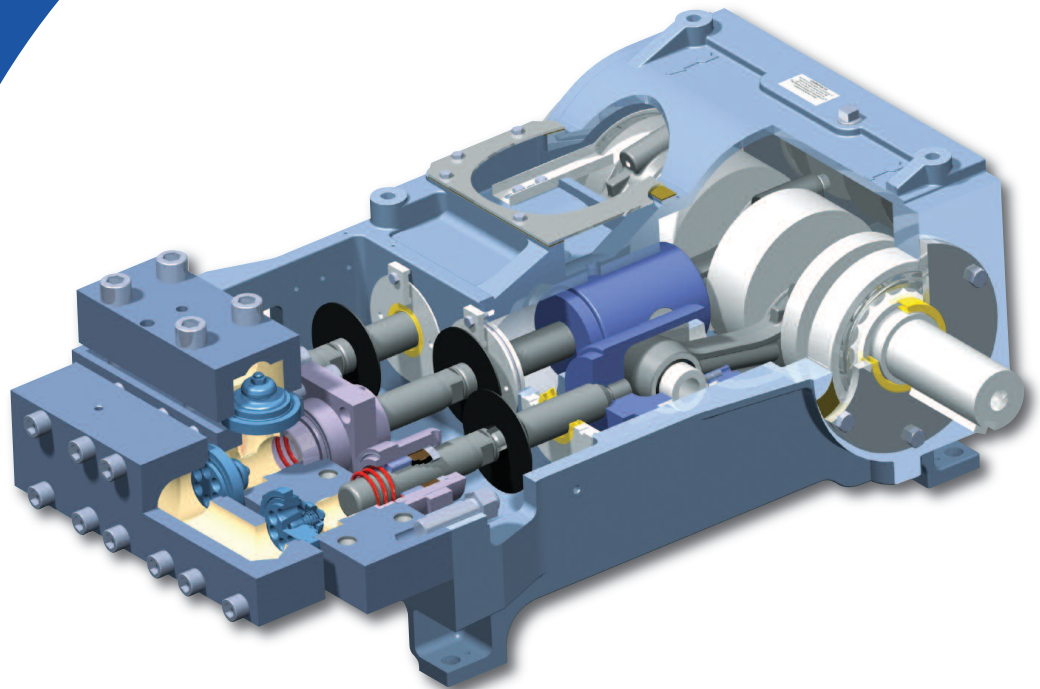


Reciprocating Power Pumps

**Heavy Duty, Horizontal,
Simplex, Duplex, Triplex, Quintuplex**

API 674 Latest Edition



 **CLYDEUNION
PUMPS**

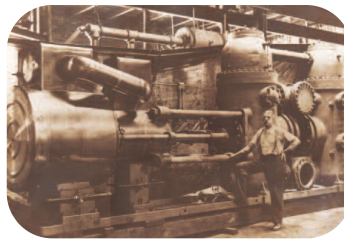
CLYDEUNION Pumps

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.



Production of a UNION Reciprocating Pump in the early 1900s



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.



High Technology Pumps

for the most demanding services

CLYDEUNION Pumps specializes in the design and manufacture of API 674 reciprocating power pumps and pumping packages that exceed customer expectations. 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 optimized reliability in the most severe duty applications.

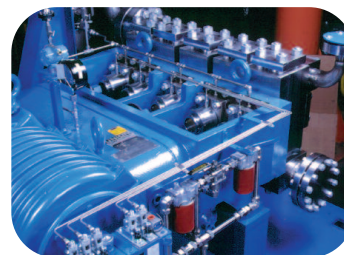
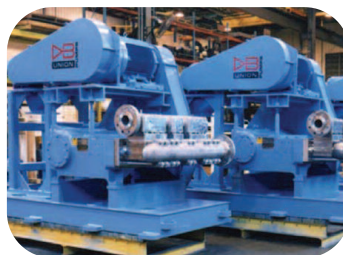
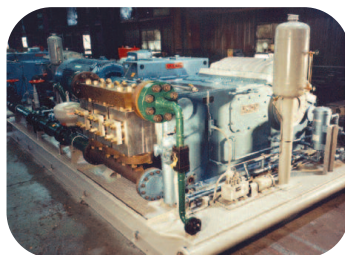
SEAWATER REVERSE OSMOSIS

Worldwide demand for clean water continues to increase. With very high efficiency and reliability, our reciprocating power pumps are ideally suited for Seawater Reverse Osmosis. CLYDEUNION Pumps reciprocating pumps, combined with energy recovery systems, provide the industry's most efficient solution for your high pressure reverse osmosis pumping needs. They also offer the added benefit of delivering filtered seawater at constant flow to the membranes at varying system pressures.



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: high pressure seawater injection and disposal, methanol injection, blowout preventer charge pumps, subsea hydraulic systems; gas processing systems for dehydration and gas sweetening. CLYDEUNION Pumps reciprocating pumps are designed to handle all types of industry related fluids.



GENERAL INDUSTRY

At CLYDEUNION Pumps we have supplied reciprocating power pumps for a wide range of industrial services including high pressure water blasting, cleaning and cutting, metals descale, mine dewatering, hydraulic charge, hydrostatic test, chemical processing, and high pressure mixing. The experience gained in these segments enable us to offer our customers engineered products tailored to their specific requirements.

REFINERIES

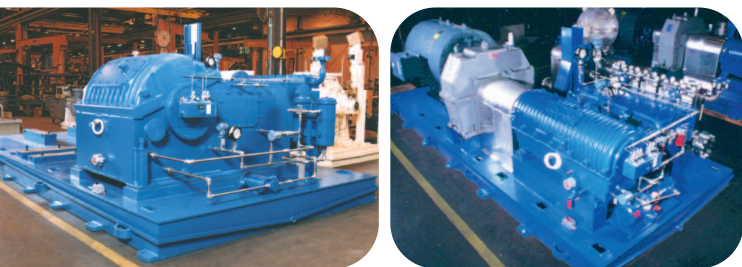
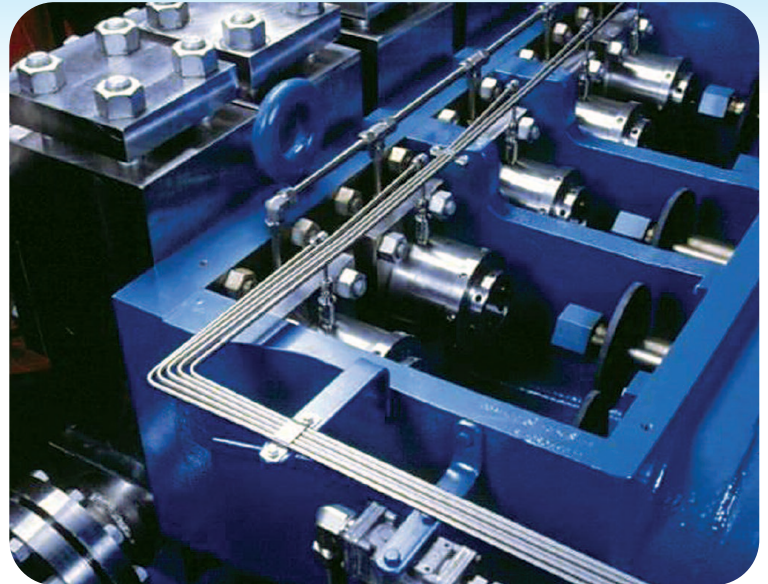
Today's complex refinery processes demand specialized pumping solutions. Extremes of temperature, high-pressure and the ability to handle volatile fluids, calls for highly engineered pumps that can perform reliably in such arduous conditions. CLYDEUNION Pumps has many years of worldwide experience in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

Reciprocating Power

heavy duty horizontal pumps API-674 latest edition

The CLYDEUNION Pumps reciprocating power pumps are designed with exceptional versatility to efficiently meet the requirements of a wide variety of pumping applications. They are ruggedly designed for minimum maintenance and to meet the heavy-duty requirements of continuous duty operation in general industry as well as API 674 services.

These units are driven via electric motors or diesel engines, through V-belt or gear reducers. Stuffing boxes are specifically designed for applications to maximize packing life and minimize maintenance. Equipment can be packaged to meet the most stringent requirements of API 674.



There are thousands of CLYDEUNION Pumps reciprocating power pumps operating worldwide on services as diverse as:

- **HVGO high temperature charge at 800°F (426°C) and at 4500 psig (310 barg) discharge pressure complex engineered system.**
- **High pressure pumps for Hydro-demolition: 20,000 psig (1380 barg)**
- **High pressure Carbamate and Ammonia pumps for Fertilizer service**
- **High Pressure Salt Water or produced injection – high salinity, high pressure with sand, oil, H₂S.**

PROVEN PRODUCT INTEGRITY

The CLYDEUNION Pumps reciprocating power pumps encompass proven design history for excellence in reliability. The CLYDEUNION Pumps Simplex, Duplex, Triplex, and Quintuplex pumps all have an enviable history of sound engineering, designed to exceed the rigorous requirements of API 674 and customer satisfaction.

EASE OF MAINTENANCE

The simple modular construction of the reciprocating power pump offers ease of maintenance and reliability. A complete fluid end change-out can be completed in under eight hours. Routine packing, plunger and valve assembly changes are made easily by the user without the need for factory assistance.

PUMP SETS & PACKAGES

CLYDEUNION Pumps has extensive experience in providing complex pump sets including electric motors, gearboxes, special auxiliary lube oil systems, steam turbines, diesel engines, control panels and instrumentation.

Reciprocating Pump

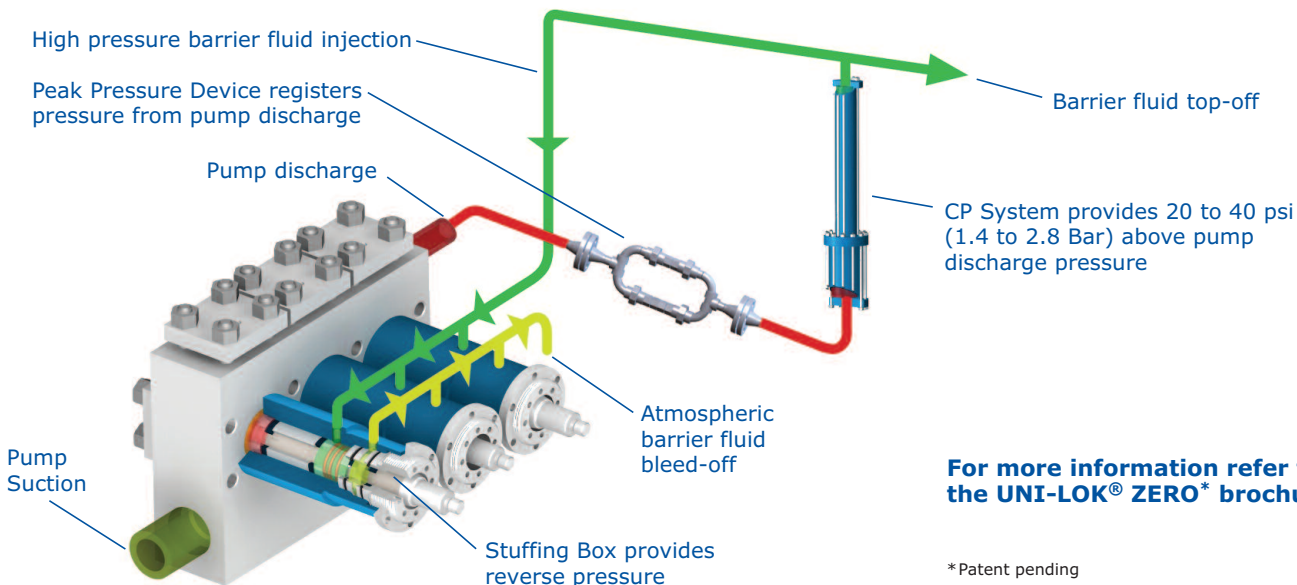
Sealing Technology for the 21st Century

UNI-LOK® ZERO* SEALING SYSTEM

Developed to control leakage of VOCs to the atmosphere, the UNI-LOK® ZERO* provides a simple means of pressurizing 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.

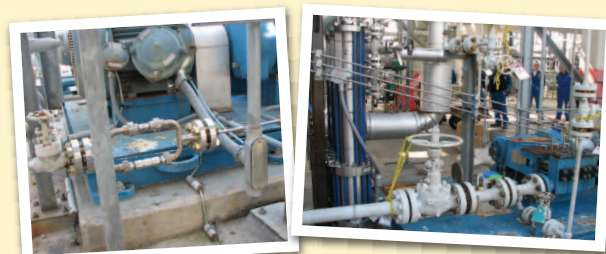
Following installation of:

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

CLYDEUNION Pumps

features of the Reciprocating Power Pump

1 Fluid Cylinder

- All API 674 material options
- Pressure integrity designed to ASME Section VIII and API 674 Latest Edition

2 Discharge Manifold

- Reversible end-to-end
- All API 674 material options
- ANSI B16.5 Flanges Standard
- NPT & Grayloc connections available

3 Liquid End Bolting

- High Strength Alloy Steel standard
- Stainless Steel options available

4 Suction Manifold

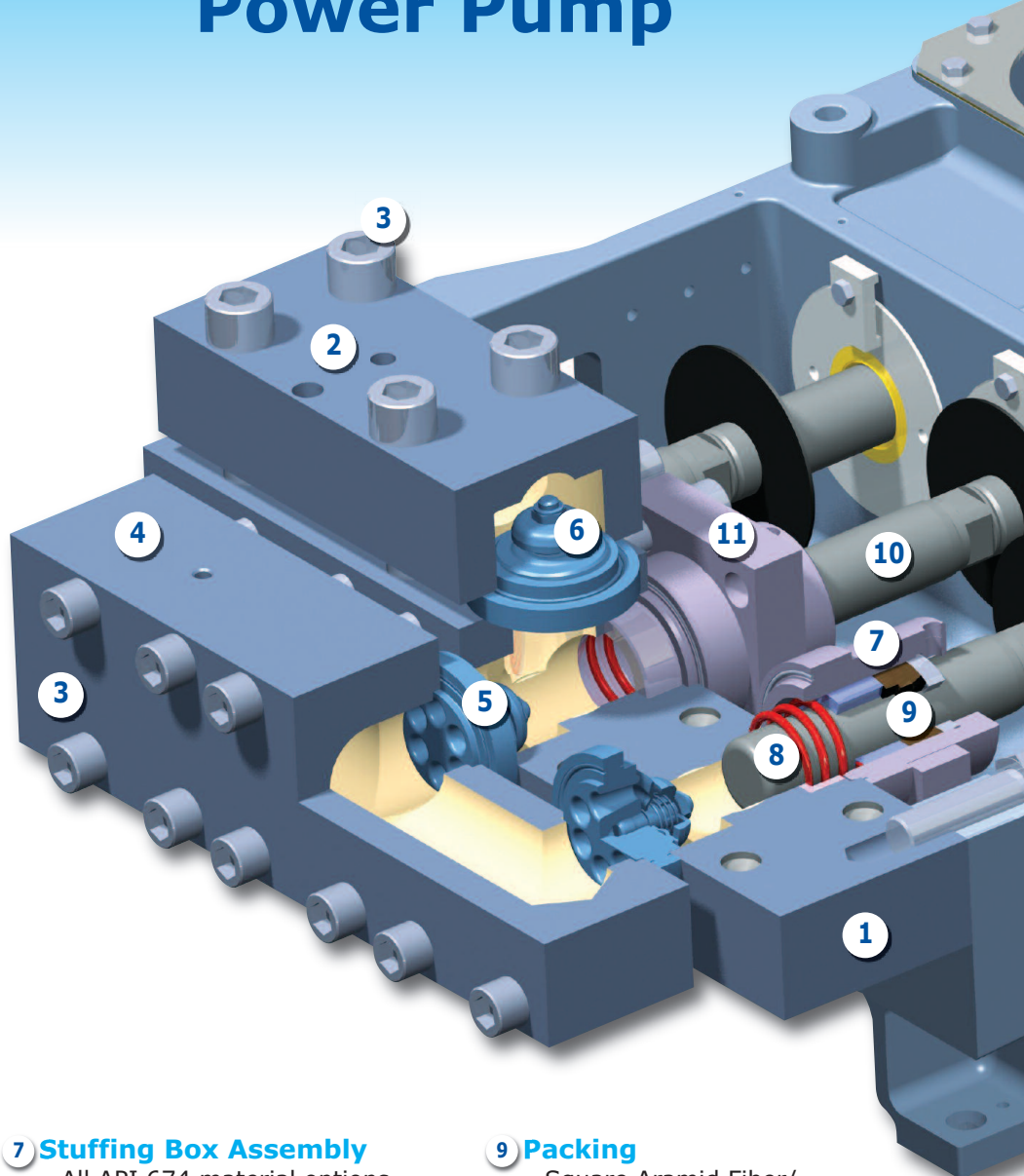
- Reversible end-to-end
- All API 674 material options
- ANSI B16.5 Flanges Standard
- NPT & Grayloc connections available

5 Suction Valve Assembly

- Valve Assemblies clamped between manifold and fluid cylinder. Some models have pressed valve seats
- Disc valves standard - low to medium pressure
- Wing guided bevel valves - high pressure
- Abrasion resistant and ball valves for slurry
- Light and heavy rate springs available for special requirements (NPSH)

6 Discharge Valve Assembly

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7 Stuffing Box Assembly

- All API 674 material options
- Standard self-adjusting spring loaded
- Adjustable stuffing box for more critical services
- Special leakage control (UNI-LOK®) with detection system
- UNI-LOK® ZERO* for volatile and toxic liquids

8 Stuffing Box Spring

- To provide automatic adjustment as packing wears

9 Packing

- Square Aramid Fiber/ Teflon standard
- Special V-ring design for high pressure applications in various materials

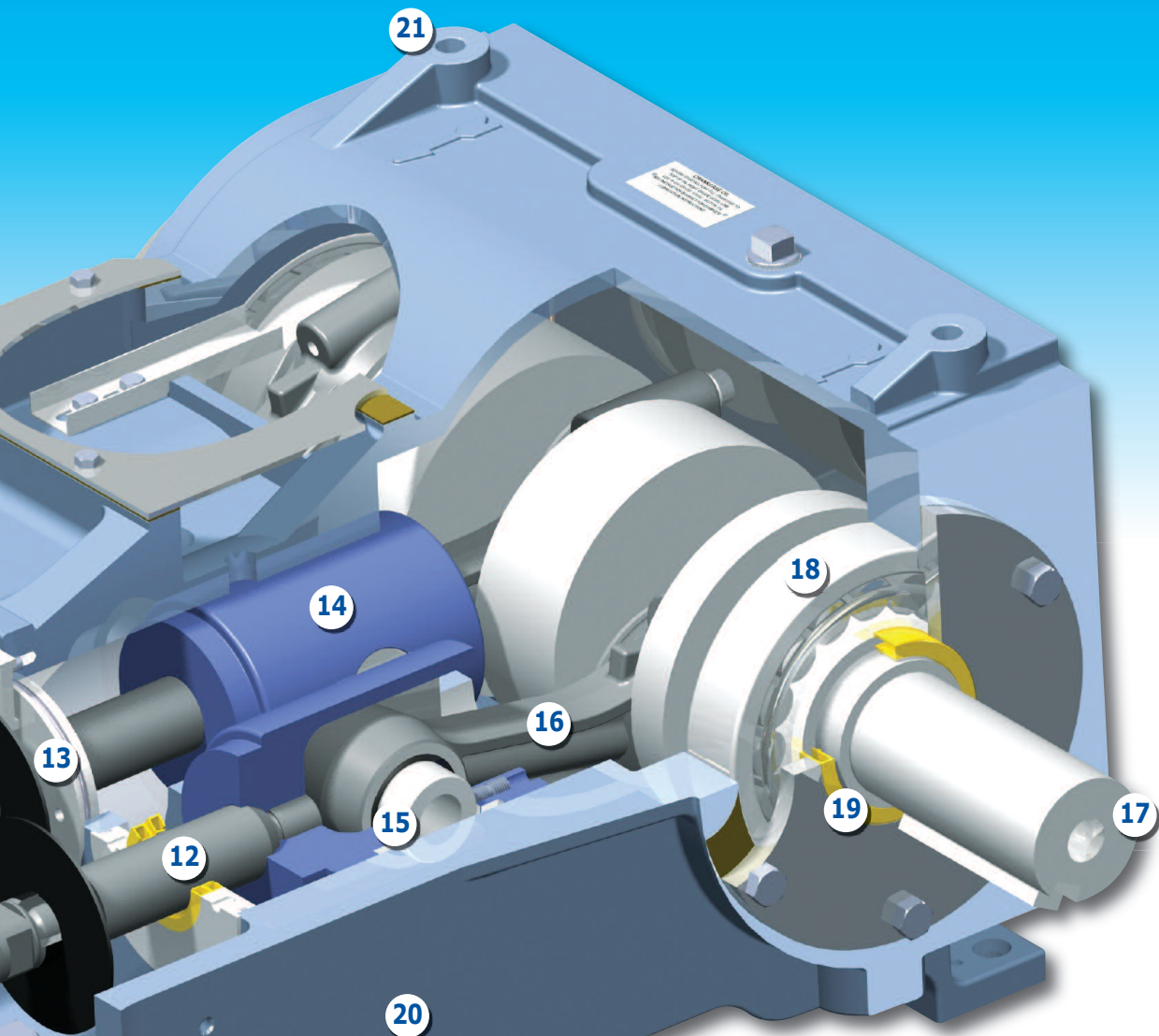
10 Plunger

- Various coatings available – Thermal Spray and Rod Welding processes
- Severe duties require special plunger hardness for optimum reliability

11

Stuffing Box Flange

- Designed to maintain the position of the stuffing box



12 Crosshead Extension

- Provide accurate alignment between plunger and crosshead
- Provided in 12%–13% chrome for corrosion and wear resistance

Crosshead Stub Seal

- 13 • Most models use spring loaded lip type elastomer seals. Others use square packing

14 Crosshead

- Large diameter, full piston type for optimum support
- Cast iron operating against cast iron bores for excellent bearing surface

15 Wrist Pins and Bearing

- Hardened steel pin operating against a sintered bronze bushing

16 Connecting Rod and Bearing Assembly

- Heavy duty ductile iron or steel rods with separate bolted caps
- Connecting rod bearings are split, replaceable, precision type babbitt lined steel

17 Crankshaft

- One-piece SAE 4140 steel for toughness and high endurance limit
- Reversible in Power Frame for drive input from either side of pump for most models

18 Crankshaft Main Bearings

- Two anti-friction taper roller bearings designed for 3 year L₁₀ life
- Several of our larger models use spherical roller bearing

19 Crankshaft Oil Seal

- Spring loaded lip type elastomer seals

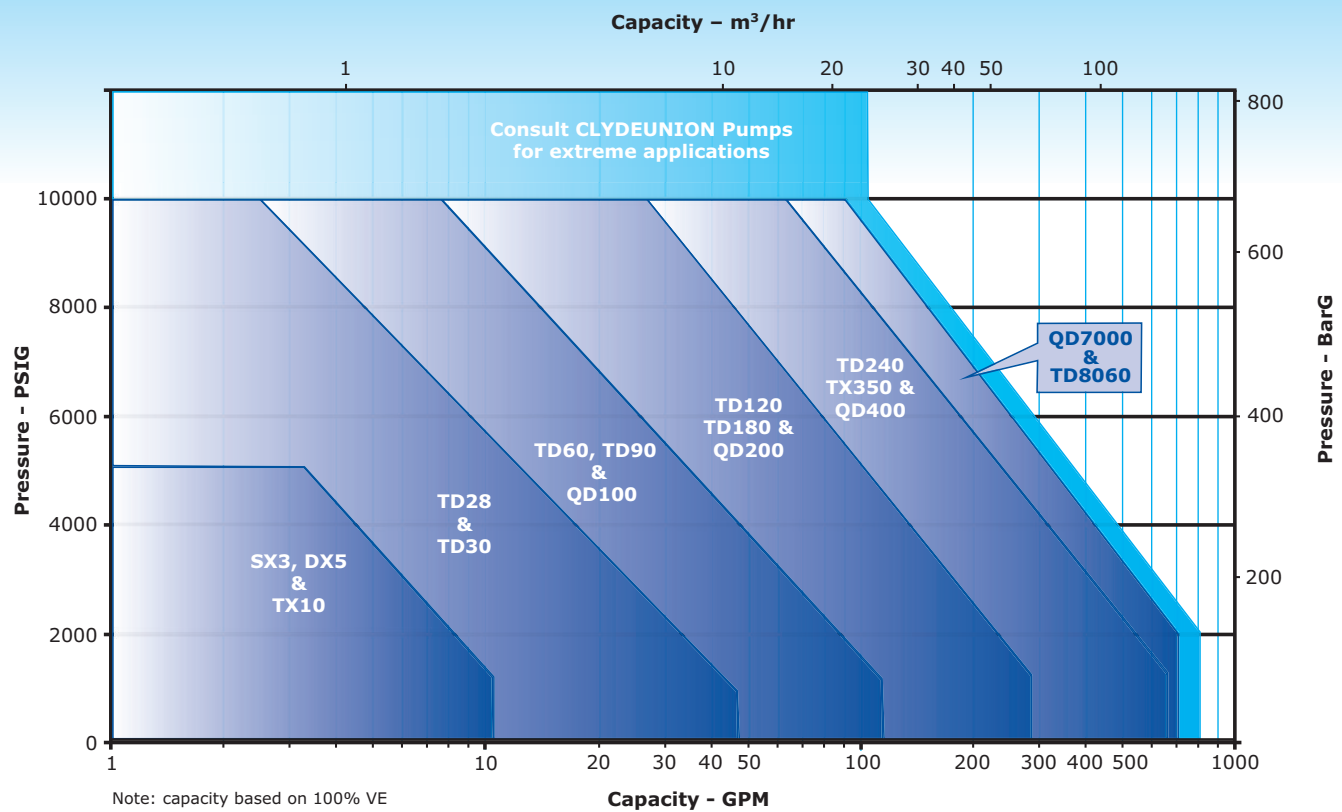
20 Power Frame

- A48 Class 30 Cast Iron rugged construction and ease of maintenance
- Full cylindrical crosshead bores - can be fitted with liners when required
- Available with CUP Gear Pairs with several ratios for most models
- Additional drive methods include self standing gears and V-belts

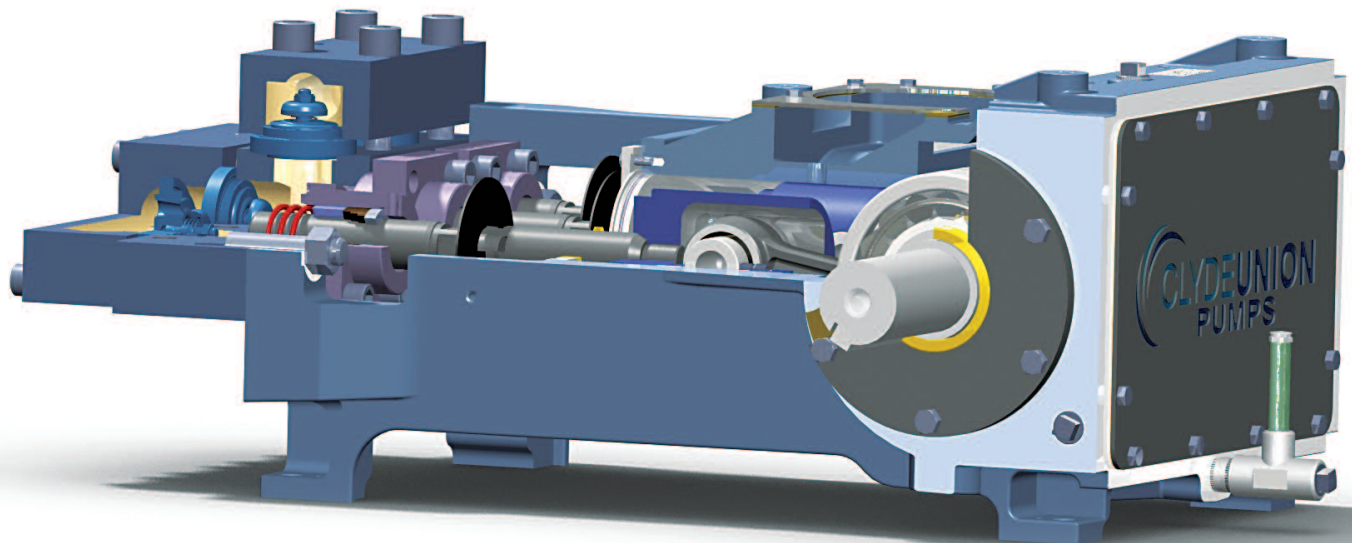
21 Top Mount Motor Mount

- For most models the power frames suitable for top mounting motor for V-belt drive

Standard Hydraulic Range coverage charts



This chart covers the standard Reciprocating Power Pump range. Other engineering designs exist for extreme applications.



Global Aftermarket Capability

best in service and response

Our customer focused aftermarket organization 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.

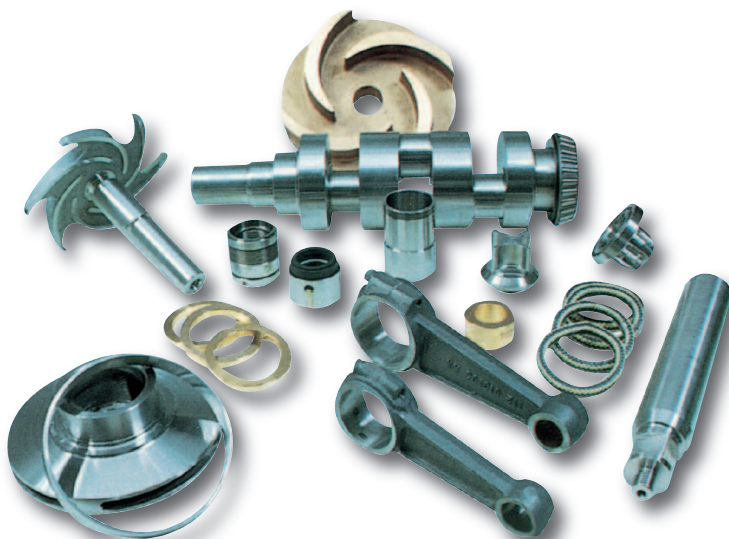
GENUINE HIGH QUALITY

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 optimized 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 authorized 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:	Aftermarket:	Manufacturing:				
✓	✓	✓	Europe			
✓	✓	✓	Annecey:	Tel: + (33) 45 005 5600	Fax: + (33) 45 005 5880	Email: anncey@clydeunion.com
✓	✓	✓	Penistone, UK:	Tel: + (44) 122 676 3311	Fax: + (44) 122 676 6535	Email: penistone@clydeunion.com
✓	✓	✓	Glasgow, UK:	Tel: + (44) 141 637 7141	Fax: + (44) 141 637 7358	Email: glasgow@clydeunion.com
✓	✓	✓	Nordic countries:	Tel: + (47) 815 310 02	Fax: + (47) 815 310 03	Email: nordic@clydeunion.com
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✓	✓	✓	Americas			
✓	✓	✓	Baton Rouge, LA:	Tel: + (1) 225 775 2660	Fax: + (1) 225 778 0212	Email: batonrouge@clydeunion.com
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✓	✓	✓	Burlington, ON:	Tel: + (1) 905 315 3800	Fax: + (1) 905 335 8262	Email: burlington@clydeunion.com
✓	✓	✓	Calgary, AB:	Tel: + (1) 403 236 8725	Fax: + (1) 403 236 7224	Email: calgary@clydeunion.com
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✓	✓	✓	Houston, TX:	Tel: + (1) 281 372 5040	Fax: + (1) 281 372 5042	Email: houston@clydeunion.com
✓	✓	✓	Itapira, SP:	Tel: + (55) 19 3843 2520	Fax: + (55) 19 3843 2531	Email: brasil@clydeunion.com
✓	✓	✓	Salt Lake City, UT:	Tel: + (1) 801 292 7882	Fax: + (1) 801 292 7885	Email: saltlake@clydeunion.com
✓	✓	✓	Asia			
✓	✓	✓	Beijing:	Tel: + (86) 106 598 9500	Fax: + (86) 106 598 9505	Email: beijing@clydeunion.com
✓	✓	✓	New Delhi:	Tel: + (91) 120 4640 400	Fax: + (91) 120 4640 401	Email: newdelhi@clydeunion.com
✓	✓	✓	Shanghai:	Tel: + (86) 216 160 6969	Fax: + (86) 216 160 6968	Email: shanghai@clydeunion.com
✓	✓	✓	Singapore:	Tel: + (65) 62 76 7117	Fax: + (65) 62 78 7117	Email: singapore@clydeunion.com
✓	✓	✓	Middle East / Africa			
✓	✓	✓	UAE:	Tel: + (97) 12 631 1959	Fax: + (97) 12 635 1242	Email: uae@clydeunion.com
✓	✓	✓	Algeria:	Tel: + (213) 21 69 2319	Fax: + (213) 21 69 3046	Email: algeria@clydeunion.com

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

UNION Pump

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