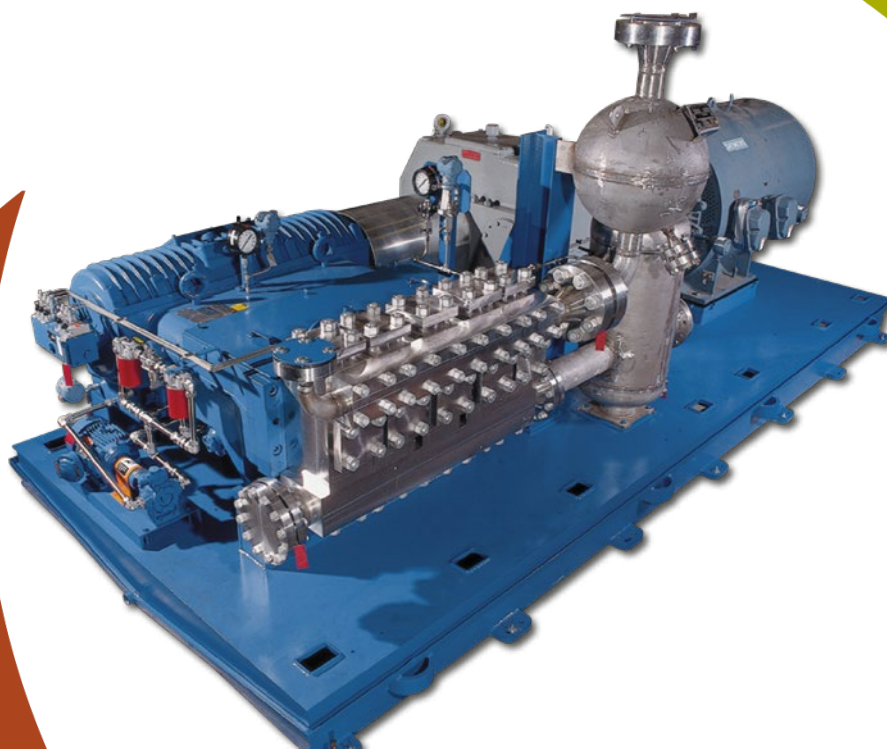


RECIPROCATING PUMPS – PACKAGING

PACKAGING OPTIONS FOR RECIPROCATING PUMPS

CLYDEUNION® PUMPS



CLYDEUNION PUMPS – AN INTRODUCTION

ClydeUnion Pumps is the culmination of a long and eventful engineering legacy, well known for supplying reliable and robust engineered pumping solutions. Through the highly-respected, ground-breaking core companies from which we originate, we are able to claim a 140-year history. Now we are playing an instrumental role in securing the vital energy and water resources that a sustainable society will rely on in the future.

Our engineered-to-order pumping technology is used to carry out all kinds of critical industrial functions. The vast majority of nuclear power plants currently in operation around the world employ our reactor feed pumps. We are also a valued flow control engineering partner to the oil & gas industry – supporting upstream, downstream, transportation and offshore exploration activities. Other key areas we address include seawater desalination, waste water treatment, mining and steel production.

Combining a wealth of pump and system design knowledge with facilities equipped with the latest design, analytical and pump testing equipment, we provide our customers with exceptional products and service – so as to boost efficiency and ensure prolonged operation. In addition to providing aftermarket service on all our current products, we also offer continued support on legacy pumps.

STANDARD RANGE RECIPROCATING PUMPS

The streamlined reciprocating pump portfolio represents:

- Reduced complexity
- Improved parts interchangeability
- Easier product selection
- Faster turnaround

The ClydeUnion Pumps reciprocating power pumps are designed with exceptional versatility to efficiently meet the requirements of a wide variety of pumping applications. These units 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 reduction. 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.

Celeros FT has extensive experience in providing complex pumpsets including electric motors, gearboxes, special auxiliary lube oil systems, steam turbines, diesel engines, control panels and instrumentation. Our Post-installation support further ensures your reciprocating pump will continue to deliver optimum performance and reliability throughout its operational life

APPLICATIONS

Petroleum

- Glycol – Dehydration
- Amine – Sweetening
- Water Injection
- CO₂ Injection
- Methanol Injection
- H₂S Sour Service
- Wash Water
- HVGO Hot Oil
- Hydrocarbon Condensate
- Vaccume Bottoms
- LNG/LPG
- Caustic Charge
- Flare Knockout Drum
- Produced Water
- Blowout Preventions
- Pigging
- SlopTransfer
- Refining –misc.

Nuclear

- Charging Pump
- Standby Liquid Control
- Hydrotest
- Hydrazine Pumps
- Alternate Seal Injection

Conventional Power

- Boiler Feed

Fertilizer

- Carbamate
- Ammonia

Aftermarket

- Upgrades, Repairs and Overhauls

General Industrial

- Hydrostatic Test
- High Pressure Jet Cleaning
- Metals Descaling
- Mine Dewatering
- Seawater RO – HP RO Feed Pump

STANDARD PUMP DESIGN

① BOLT ON FLANGES

- Flexible configuration
- Adaptable to various system connections

② VALVE ASSEMBLY

- Configured to maximise longevity & performance whilst allowing for easy maintenance

③ STUFFING BOX ASSEMBLY

- All API 674 material options
- Standard self-adjusting spring loaded

④ PACKING

- Square and V-ring desing packings available
- Wide assortment of material to accommodate a multitude of applications

⑤ PLUNGER

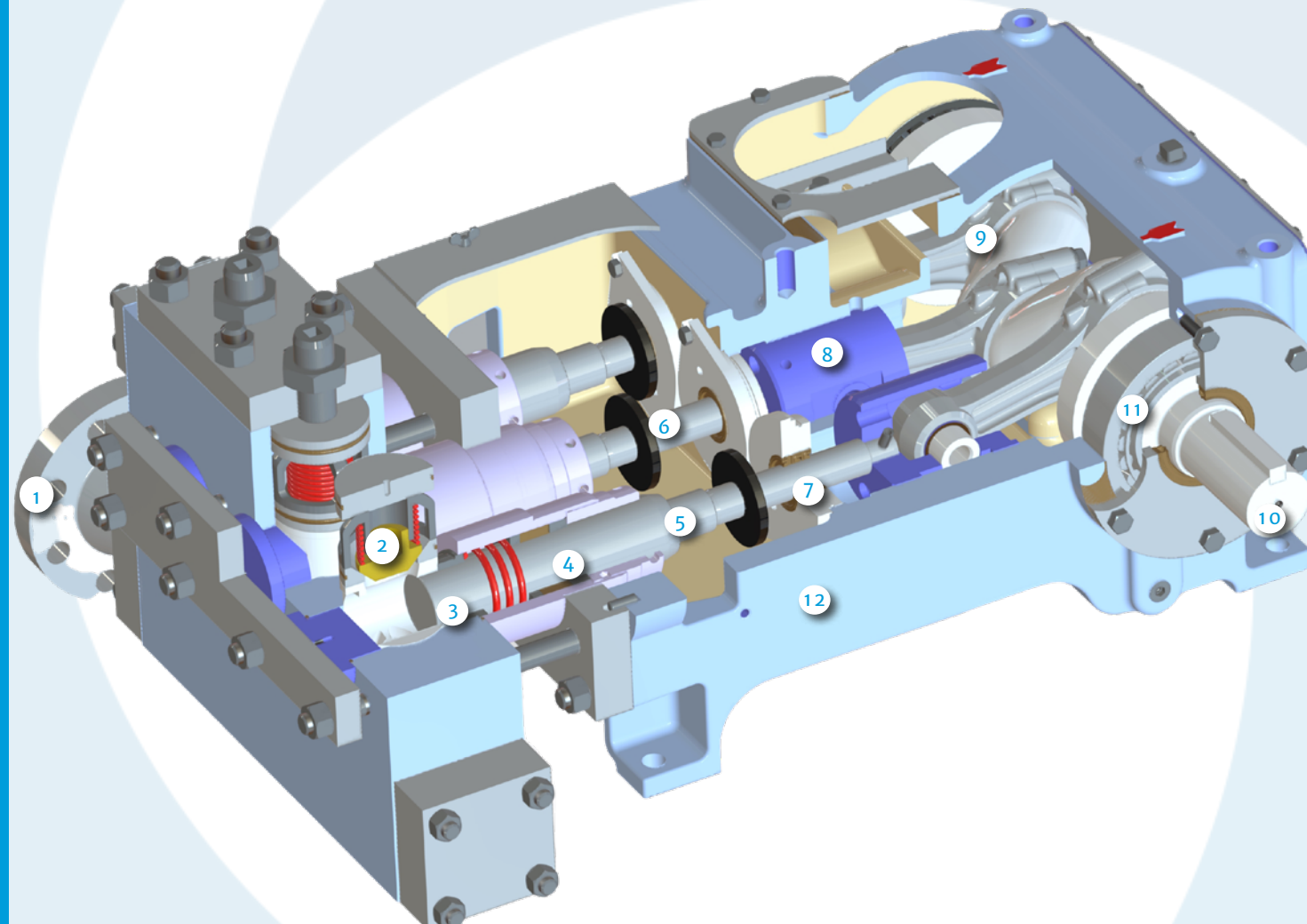
- Standard plungers are hard surfaced for long service life
- Various coatings available to meet various application requirements – thermal spray, rod welding, and other processes available

⑥ CROSSHEAD EXTENSION

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

⑦ CROSSHEAD STUB SEAL

- Most models use spring loaded lip type elastomer seals. Others use square packing
- High Horsepower models use replaceable wear shoes for refurbishment



⑧ CROSSHEAD

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

⑨ CONNECTING ROD & BEARING ASSEMBLY

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

⑩ 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

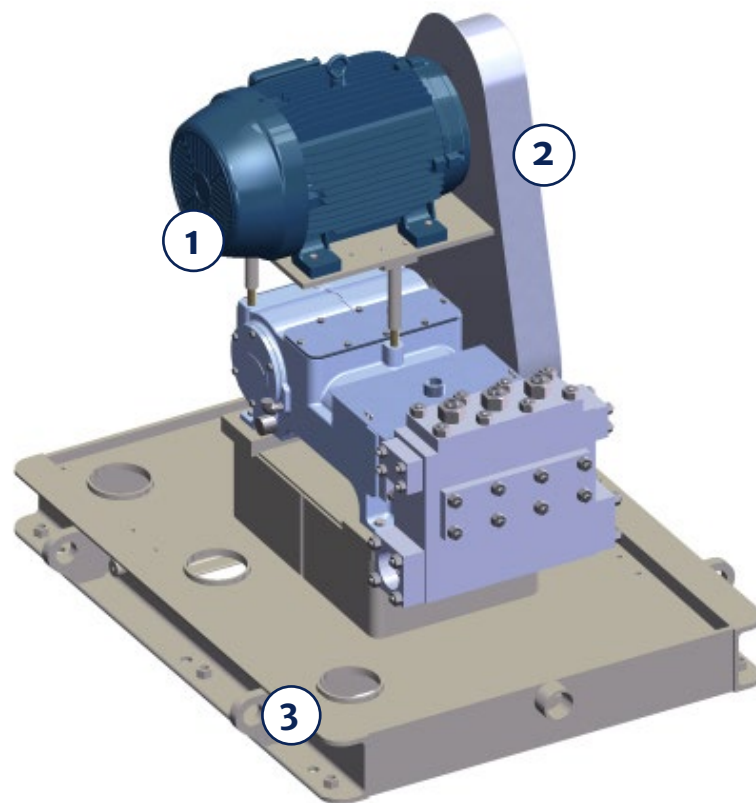
⑪ CRANKSHAFT MAIN BEARINGS

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

⑫ POWER FRAME

- A48 Class 30 cast iron rugged construction and easy full maintenance
- Full cylindrical crosshead bores – can be fitted with liners when required
- Available with gear packs with several ratios for most models
- Additional drive methods include self standing gears and V-belts

PACKAGED DESIGN



ALTERNATIVE QUICK SHIP PUMP OPTION INCLUDE:

Power End

- Right or Left Hand drive
- Cast Iron Power Frame
- Splash or Gravity Lubrication

Fluid Cylinder

- NPT or Flanged Connections
- ASME B16.5 Flanges
- Fluid End Carbon Steel
- Material Selection Options – S2 & S3

Stuffing Box

- Spring Loaded Self Adjusting
- Packing available in a variety of different styles
- Plungers in various material and coating options
- Non-lubricated design

1 Driver

- Motor Driven (NEMA)
- VFD Compatible
- Top Mounted

2 Speed Reduction

- Belt (V-Belt)

3 Base Plate

- No Baseplate – Bare Shaft Pump
- C Channel Design
- Standard Slope Deck Baseplate

Contact Celeros FT for information regarding timeframe.

Additional – On Demand Packaging Options

Packaged pumps can also be configured to suit specific order specifications

Power End

- Ductile Iron Power Frame – Suitable for low temperature applications.
- Additional Lubrication and Cooling options are available.

Fluid Cylinder

- Various fluid end materials available
- ASME Sect III, NACE, and Customer Specific Compliance.

Stuffing Box

- A Variety of packaging arrangements are available, including, Primary, Secondary and Tertiary packing sets.
- Manually adjusted designs available.
- Can be Lubricated or Non-lubricated, or alternatively have an external flush.
- Unilok style Stuffing Box for reduced emissions, with sealed distance piece
- Crankshaft or Motor Driven Lubricator
- Oil tank to provide 30 day supply of lubricant
- Leakage Detection System
- Barrier Fluid Collection Tank for Volatile Liquid and Vapours

Motor Driven (NEMA, IEC)

- Variable Speed Drives
- Steam Turbine
- Hydraulic
- Steam/Gas/Air (Direct acting designs available)

Speed Reduction

- Belt (V-Belt or Cog Belt)
- Driver can be top mounted for reduced footprint or alternatively back mounted
- Gears (AGMA, DIN, API)
 - Bolt-on “Gear-pac”
 - Internal Gears
 - Geared Motor
 - Stand alone Gear Unit (Horizontal or Vertical motor orientation)

Packaging Options

- Pulsation and Vibration Control per API-674, Analysis approach 1 or 2
- Noise Control
- Containerized solutions
- Mobile Packages / Trailer Mounted
- ATEX Compliance

Package

- Suitable for mounting on customer foundations, or baseplate mounted from the facility
- Incorporates various piping arrangements
- Instrumentation, Condition Monitoring, Control Panels, Lubrication Modules, Cooling Systems, Variable Speed Drives
- Designed to comply with Customer Project Specific Requirements
- Onshore and Offshore installations

Accessories

Power End

- Oil Immersion Heater
- Condition Monitoring, Vibration and Temperature
- Purge Connection

Pumps

- Simplex, Duplex, Triplex and Quintuplex designs available
- Stock Power Ends available for incorporation into OEM designs, Clyde Union power ends proven track record in Water Blast/Jetting applications
- High temperature Designs currently working up to 850F (454C)
- Safely Related, ASME N Stamp Reciprocating Pumps, in numerous USA Nuclear Plants, as well as other worldwide installations.

| **SPEED**
| **EXCELLENCE**
| **PARTNERSHIP**

CLYDE UNION®
PUMP

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