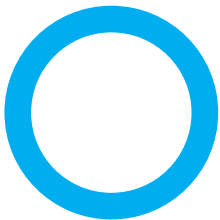




The Willett Pump



Solutions & Technologies



The Willett Pump

The Willett is a vertical, single acting positive displacement ram pump, either hydraulically or mechanically driven. It is designed for long life, low maintenance and optimum energy efficiency. It is the most cost-effective solution available on the market to pump difficult and abrasive sludge and slurries. New and refurbished pumps are available to suit your requirements and budget with revised designs to meet the changing needs of today's market. It also comes with the total backing of a rapid response service available round-the-clock and a highly qualified team of engineers.

Mechanical Willett Pump

A large, industrial-grade mechanical Willett pump is shown in a factory or workshop setting. The pump is painted a vibrant blue and features a prominent red motor at the top. It has a complex structure with various pipes, valves, and a central cylindrical component. The background shows other industrial equipment and a concrete floor.

A new mechanical Willett pump has been developed to enhance and complement an already established range of hydraulic ram pumps.

Features

- Simple to use
- Small footprint
- Easy to install
- Low cost
- Long life

Benefits

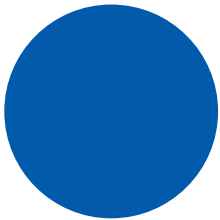
- Will pump viscous and abrasive sludges
- Hydraulic oil not required
- Reduced maintenance

Technical Data for Single Pumps

- Flow rate: 60 to 450 litres per min.
- Maximum pressure: 4 bar
- Installed Power: 4-11kw

Retrofit equipment for the Willett Pump

The latest design improvements to the Willett Pump are available as retrofit packages, which can be fitted to existing pumps. Retrofit can be carried out on site with a minimum of down time. The benefits are easier maintenance, improved control and greater efficiency leading to reduced cost.



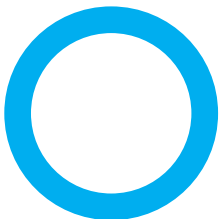
Replacement of mechanical changeover

There are still many pumps in use, which have a mechanical changeover to alter the direction of the ram. Spares for this changeover mechanism are now unobtainable. We offer a simple conversion to electronic changeover, which will enable the pump to keep running for many more years.



Top Hat Conversion

All pumps built before 2000 use a casting, known as a top hat, to support the hydraulic cylinder that drives the ram. This complicates seal replacement on the hydraulic cylinder and is expensive to replace when it becomes worn. All pumps now use a simple beam structure to support the hydraulic cylinder. This system can be fitted to existing pumps, which will substantially reduce the maintenance time and the cost to change seals or renew the cylinder. It also facilitates the fitting of new electronic systems if improvements to stroke control are required.



Coated Rams

We are able to offer a new generation of coatings for metal rams, which match the material properties of the ram more closely to the sludge being pumped. Thus the rams last longer before refurbishment is required. Most types of old metal ram can be refurbished with a new and longer wearing coating.

Electronic control

New electronic control systems are available using linear transducer technology combined with the latest PLC control systems and bespoke software. These systems are fitted where plant automation and accurate process control of the pumping regime is required.

Chemical Dosing Cylinder

The latest version of the dosing cylinder features a vertically mounted hydraulic cylinder. Stroke control is via a linear transducer and PLC, with motive power provided by the pump power pack. The major benefits of the new unit are improved accuracy, longer seal life and reduced maintenance.

MODEL	FLOW				PRESSURE		
	LPM	L/SEC	M3/HR	USGPM	KW	BAR	PSI
6/75/40B	155	2.58	9.2	41	4	5	75
6/150/40B	155	2.58	9.2	41	5.5	10	150
6/300/40B	155	2.58	9.2	41	11	20	300
9/75/40B	375	6.25	22.5	99	7.5	5	75
9/150/40B	375	6.25	22.5	99	11	10	150
9/235/40B	375	6.25	22.5	99	15	16	235
9/300/40B	375	6.25	22.5	99	18.5	20	300
30/35/05	530	8.8	31.8	140	11	5	75
30/35/10	530	8.8	31.8	140	18.5	10	150
30/35/16	530	8.8	31.8	140	30	16	235
30/35/20	530	8.8	31.8	140	37	20	300
35/50/05	800	13.3	48	211	15	5	75
35/50/10	800	13.3	48	211	22	10	150
35/50/16	800	13.3	48	211	37	16	235
35/50/20	800	13.3	48	211	45	20	300
40/75/05	1250	20.8	75	330	22	5	75
40/75/10	1250	20.8	75	330	45	10	150
40/75/16	1250	20.8	75	330	75	16	235
40/75/20	1250	20.8	75	330	90	20	300
50/110/05	1800	30	108	475.5	30	5	75
50/110/10	1800	30	108	475.5	55	10	150
50/110/16	1800	30	108	475.5	90	16	235
50/110/20	1800	30	108	475.5	110	20	300
50/128/12	2100	35	126	555	90	12	176



Performance data +

Simplex pumps will give flow rates up to 2100 ltr/min. Larger flow rates are achieved by multiple units operating in electronic sequence, giving controlled, constant-flow output. These multiple pumps operate with a single hydraulic power pack and may include an integrated stand-by facility for economy.

All data based upon water at 20°C. Pumps for higher pressures and flow rates, details available on request. As part of our policy for continual development we reserve the right to amend the specification without notice. Pumps fitted with chemical dosing cylinders require larger motors. For intermediate pump sizes, please contact our sales office.



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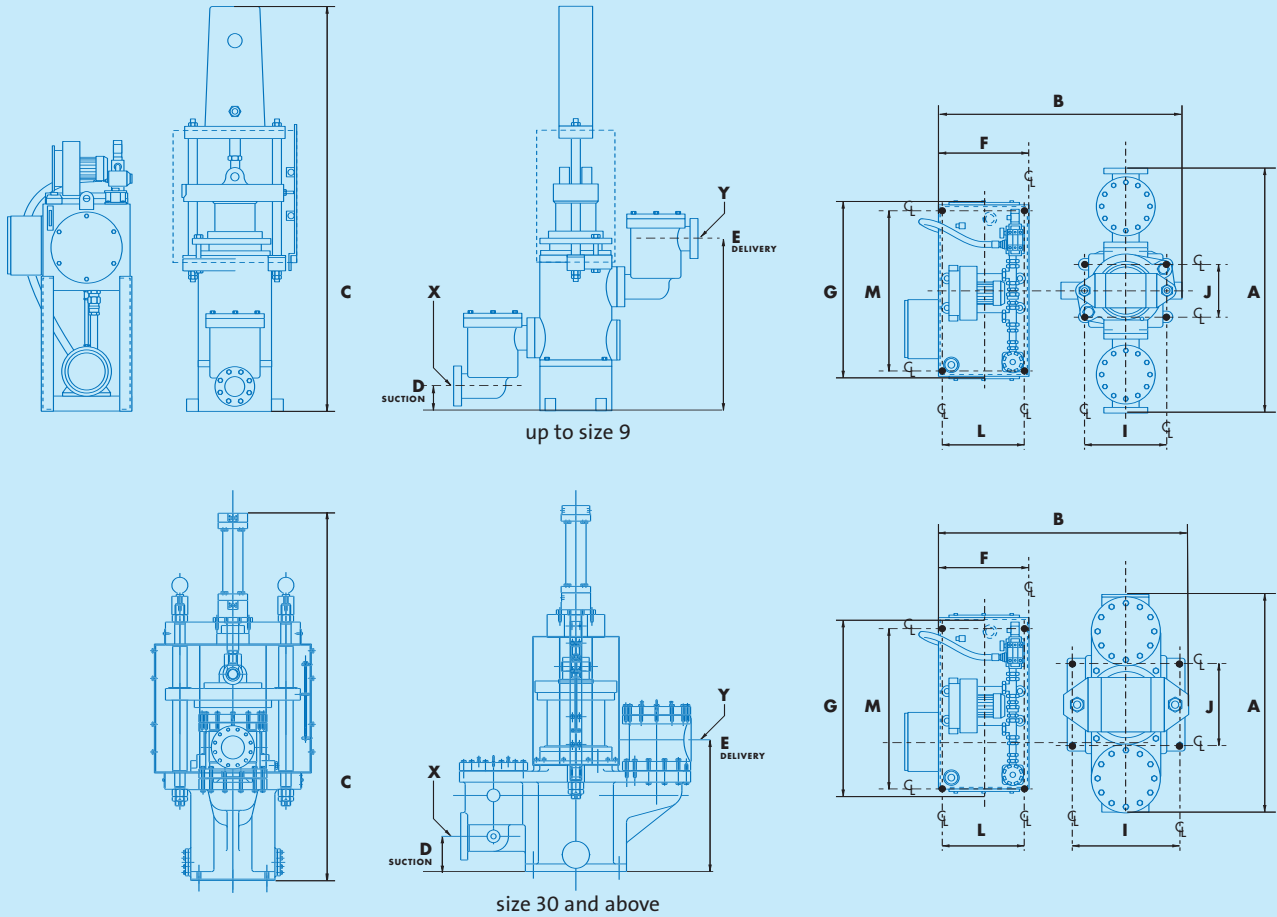
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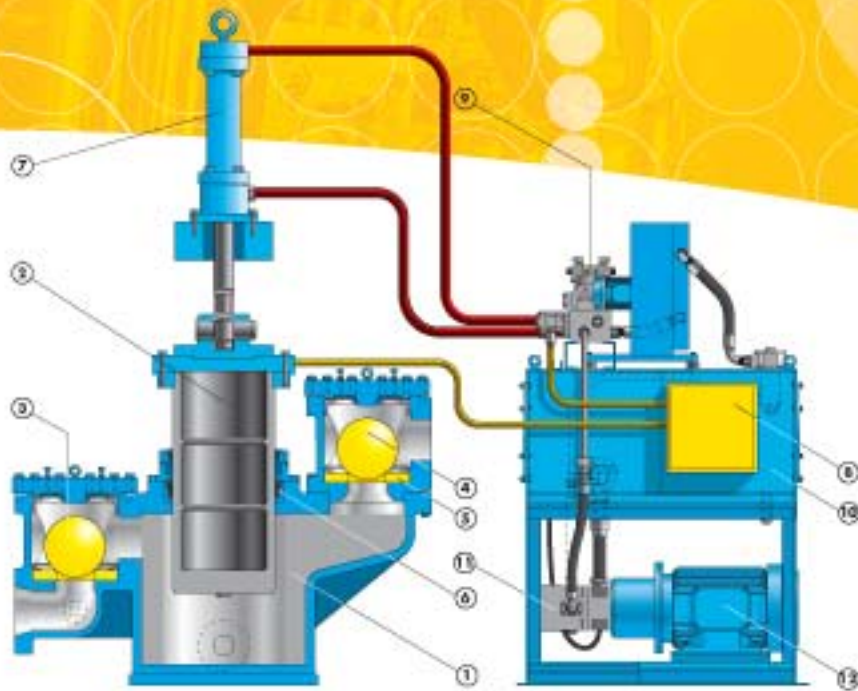
Dimensions



Pump Size	DIMENSIONS															WEIGHT KG	
	A	B	C	D	E	F	G	H ¹	H ²	I	J	L	M	X (NB)	Y (NB)	PUMP	POWERPACK
6	1146	1300	1925	203	876	482	920	M22	M10	350	303	350	610	100	80	635	350
9	1289	1440	2130	127	902	624	1194	M22	M20	438	267	440	864	100	100	1135	528
12	1433	1640	2460	178	953	624	1194	M20	M20	520	380	440	864	150	150	1700	1500
14	1490	2300	2900	220	1114	750	1300	M22	M20	635	445	820	1080	200	150	2500	1850
40	1550	1950	2770	305	985	750	1300	M22	M20	660	540	820	1080	200	150	3000	1850
50	2000	2500	3390	305	1143	800	2000	M30	M20	738	590	940	1840	250	200	5000	2900

Notes:

H1 and H2 refer to pump and powerpack foundation bolts respectively. Powerpack weights include oil. All dimensions are for guidelines only. For certified dimensions, please refer to our design office. We reserve the right to update, change and improve our product without prior notice. Powerpack dimensions refer to overhead powerpacks only.



1. Pump Body 2. Ram 3. Suction Ball Valve 4. Delivery Ball Valve 5. Valve Seat 6. Ram Seals 7. Hydraulic Drive Cylinder
8. Electronic Control Plc 9. Hydraulic Valve Manifold 10. Oil Reservoir 11. Hydraulic Oil Pump 12. Electric Motor



Access to the ball valve is quick and simple



Biased flow in the ball valve housing balances out the wear on the ball thereby prolonging valve life

Power Packs

Three types are available, compact and overhead for small pumps or where a small footprint is required, L shape for total accessibility and ease of maintenance.



Overhead Powerpack

Standard Features include:

- Steel tanks with internal baffle, removable tops, inspection covers and drip tray
- Oil filtration and level control system
- Cooling system designed for specific application
- Directional control via specially developed Ceetop standard solenoid actuated valves with over pressure relief valve and pressure gauge fitted as standard
- High efficiency motors and axial piston variable displacement pump with pressure compensator to give maximum versatility and energy efficiency

Pump Body

The pump body is a strong one-piece casting manufactured from close grained cast iron. It can also be made from cast stainless steel or coated internally with a suitable material, typically rubber, nylon, or polyurethane.



Standard seal

Rams and Seals

Pump rams are manufactured from ceramic, alumina or from steel coated with a high temperature ceramic. These materials are resistant to abrasion and are hard wearing. The ram is sealed by low maintenance, auto-adjusting chevron seals. Other arrangements include traditional packed glands, high specification and flushed seals.



With gland flush

Ball Valves

Attached to the body casting are the suction and discharge non-return ball valves. They have generous clearances to allow the passage of rag and large solids. Biased flow in the valve chamber rotates the ball, which ensures that the ball and seat wear evenly and helps to prevent blockage. Access into the ball valve is via an easily removable cover.

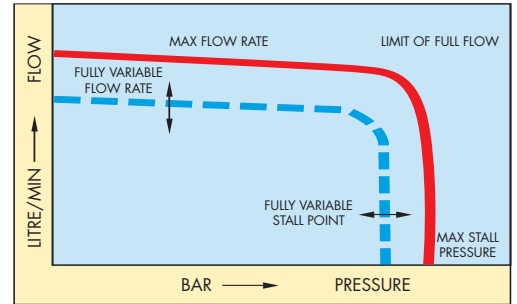
Variable Speed Control

The standard Willett pump is designed to maintain full flow over a range of operating pressures. However the pump can be equipped for variable flow. Turndown ratio varies with the pumped fluid. Control is via PLC keypad or remote MCC.

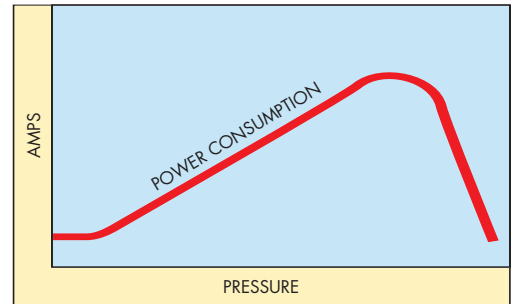
Pumping Characteristics

The system design allows for full flow characteristics up to 80% of the maximum operating (stall) pressure, at this point the hydraulic drive system automatically compensates and reduces the volume of oil produced. The pump then progressively reduces its stroke rate until eventual stall. The system ensures that a constant output is maintained irrespective of changes in delivery pressure. Should a blockage occur or a valve is closed in the delivery line the pump will automatically stall at the pre-set pressure without causing damage to the pump or pipework.

The variable displacement hydraulic pump ensures that power consumption is low when line pressure is at its maximum. This feature is particularly useful on applications where high pressures are maintained for long periods i.e. Filter Press Feed or Line Clearing applications. Both maximum pressure and flow are adjustable to meet varying requirements where necessary.



Constant output at increasing delivery heads



High efficiency gives low power consumption



Sludge density monitoring unit



Proximity switches sense the position of the pump ram and relay this to the PLC

Electronic Control System

Reciprocation of the Willett pump ram is controlled by a PLC interacting with proximity switches and a solenoid operated hydraulic directional control valve. Where more complex control is required, a linear transducer can be fitted.

Volume Totaliser / Flow Meter

The Willett pump displaces a fixed volume of fluid for every stroke of the pump ram. By counting the number of strokes of the pump a running total of pumped media can be given.

Blocked Pipe Detection

Should a blockage occur in the delivery pipework then the Willett pump automatically stalls via the hydraulic system. This is detected by the PLC and a volt free contact is opened which can be used to raise an alarm and/or initiate shutdown.

Sludge Density Monitoring

This patented PLC system monitors pressure differences in the delivery pipeline caused by variations in sludge density and viscosity. The pump hydraulic pressure equal to the minimum sludge density required is used as a set point. The Willett is then controlled so that it only pumps against a delivery line pressure, which is at or above the set point.

In-Line Chemical Dosing

A separate chemical injection cylinder actuated and controlled by the pump hydraulic system is used to inject polyelectrolyte or other chemical directly into the pump suction ball valve chamber. This ensures good mixing and accurate control of the chemical dose.

Industries	Applications
Wastewater - Primary settled	Filter Press Feed, Digester Feed, Auto Desludge, Long Distance Transfer
Potable Water - Alum and / or Ferric settled sludges	Filter Press Feed
Effluent Treatment - Hazardous & non-hazardous process by-products	Filter Press Feed, Transfer
Chemical Processing - Handling of abrasive and crystalline substances	Filter Press Feed, Transfer
Ceramic Industry - Ring main, transfer and filter press feed of ceramic slip	Filter Press Feed, Transfer
Coal Mining - Pumping of tailings and fines	Filter Press Feed

Both maximum pressure and flow are adjustable to meet varying requirements where necessary