

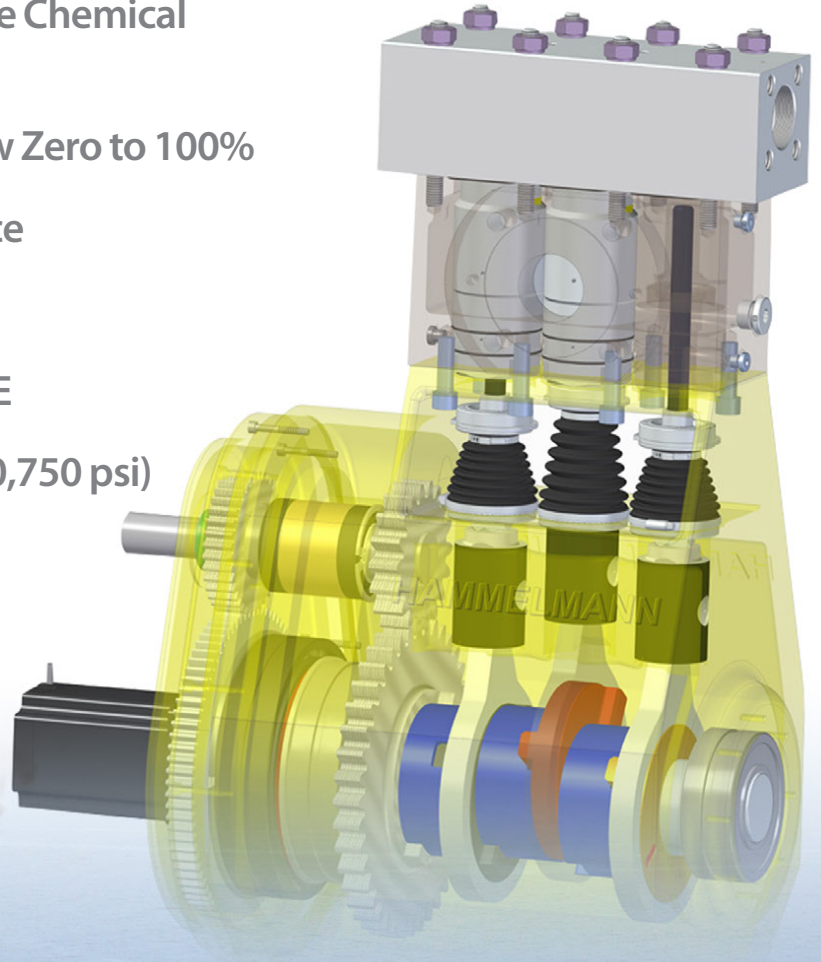
HDP 20V

INNOVATION THROUGH EXPERIENCE

CALDER

CONTROLLED VOLUME INJECTION PUMP

- A Revolution in High Pressure Chemical Injection Pumping
- Variable Stroke/Variable Flow Zero to 100%
- API 674 & API 675 Compliance
- Zero Emissions
- Efficiency: >95%VE & 95%ME
- Pressures up to 3,500 bar (50,750 psi)
- MTBF: 12,000 hrs ++
- Reduced Footprint & Weight
- ATEX Zone I & II Compliant
- Material Options; 316SS, Duplex, Super Duplex



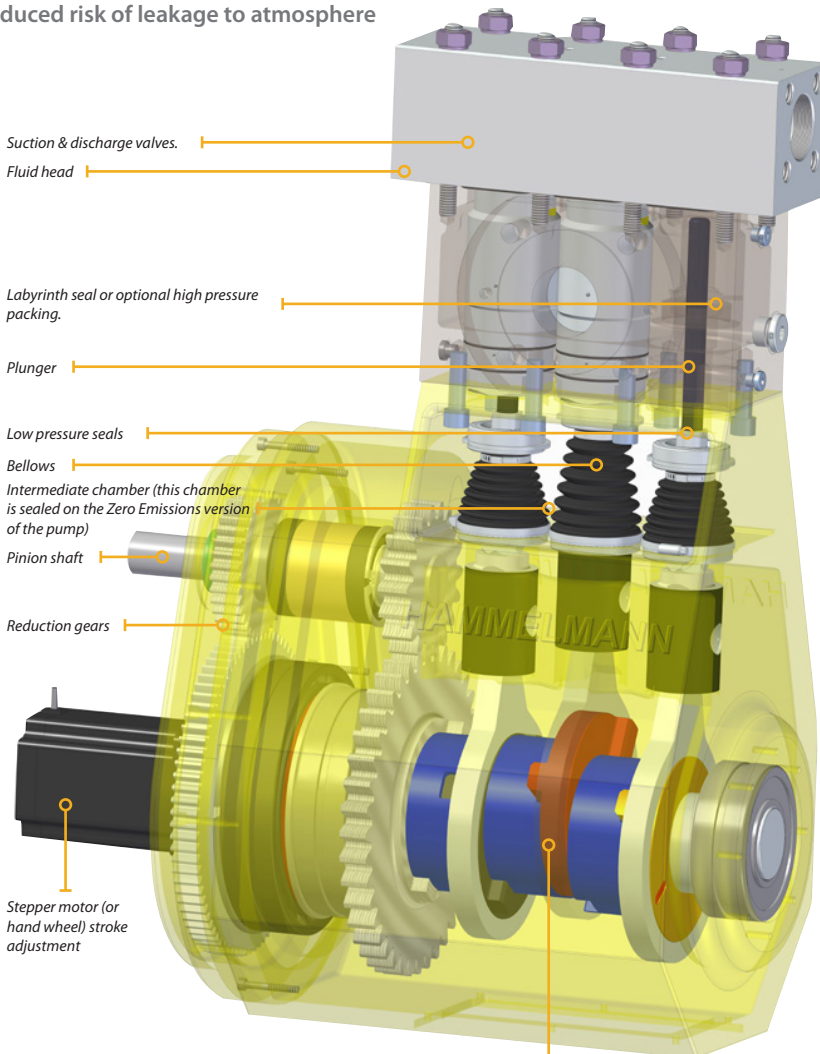
HDP 20V CONTROLLED VOLUME INJECTION PUMP

The Hammelmann High Pressure Pump revolution started in 1948 when engineer Paul Hammelmann built his first high pressure pump. Of his many patents the most significant is the 'labyrinth seal' technology and encapsulation of the HP components within the suction manifold, eliminating the risk of a high pressure leak to atmosphere and extending the life of high pressure seals to 12000 hours ++.

For almost 20 of our 32 years in business, Calder has worked together with Hammelmann, combining their pumps and Calder packaging experience to deliver Calder process packages to the Oil & Gas industry. Calder-designed-and-built packages operate under the most hostile environmental conditions, delivering industry compliant, lightweight, small footprint, environmentally friendly High Pressure Injection technology which leads the world in safety, efficiency and reliability.

The HDP 20V Variable Stroke Pump represents another chapter in the progress of this remarkable pump manufacturer. The HDP 20V pump delivers all of the advantages of the conventional API 675 Double Diaphragm type pump:

- Variable flow rate via stroke control from 0% to 100%
- Seamless, automatic or manual flow adjustment
- Flow repeatability
- Linearity
- Remote operation
- High turndown ratio
- Reduced risk of leakage to atmosphere



Suction & discharge valves.
Fluid head

Labyrinth seal or optional high pressure packing.

Plunger

Low pressure seals

Bellows
Intermediate chamber (this chamber is sealed on the Zero Emissions version of the pump)

Pinion shaft

Reduction gears

Stepper motor (or hand wheel) stroke adjustment

Variable stroke crankshaft – Zero to 30mm stroke adjustment

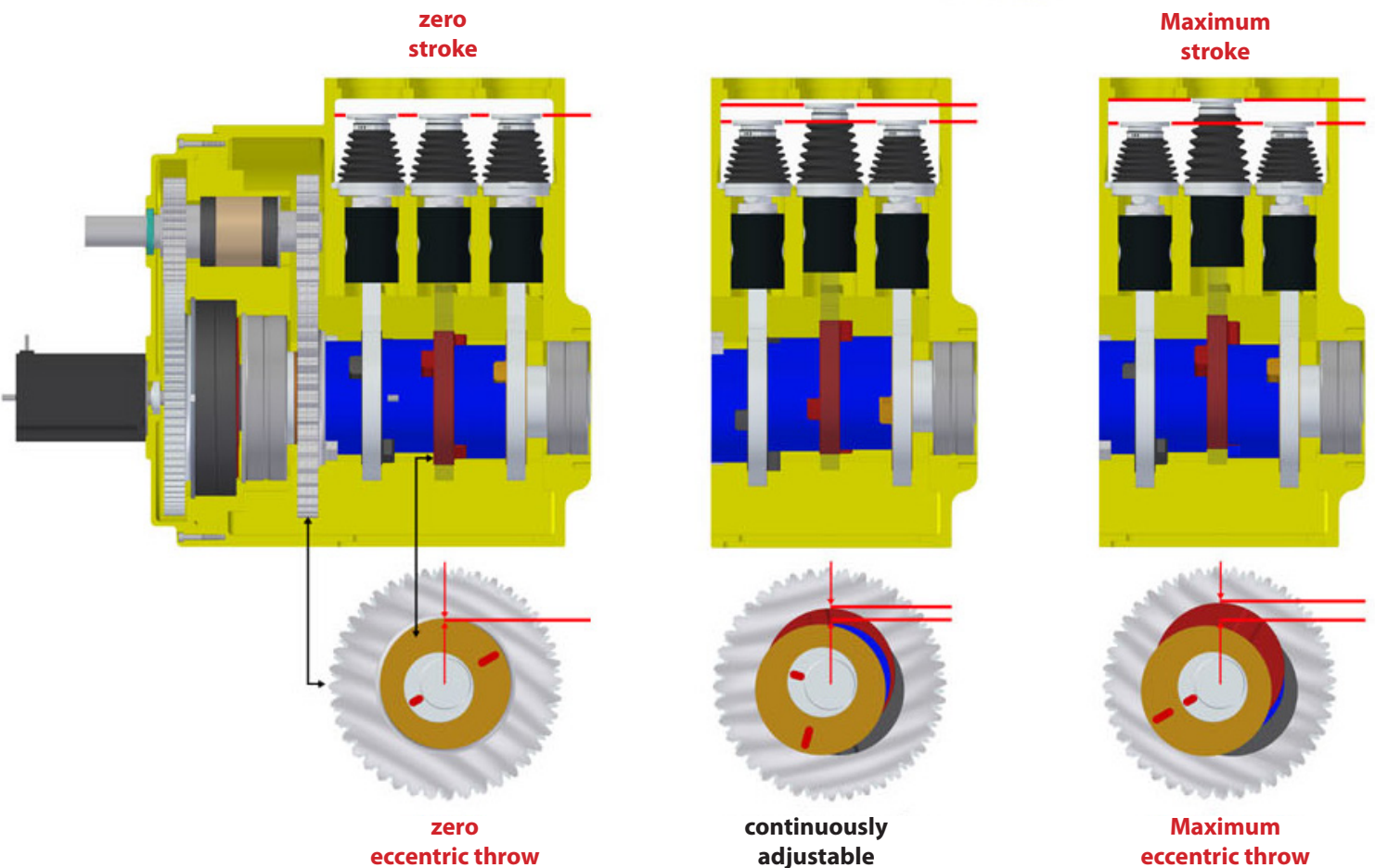
Calder 20V Pump Package:

Additional advantages particularly at higher volumes and pressures ≥ 200 bar:

- Significantly smaller footprint
- Significant package weight savings
- Energy efficient pump, converting 93% to 98% of the shaft power to hydraulic energy
- High reliability delivering extended Mean-Time -Between-Failures (MTBF)
- Capacity to handle dirtier fluids at higher pressures
- Reduced levels of vibration/pulsation.
- Lower noise levels
- Zero risk of high pressure process fluid leakage to atmosphere with zero emissions option
- Reliable control and containment of low pressure leakage
- Eliminates the risk of contaminating hydraulic fluid
- Pressurised power end oil lubrication & filtration system
- Power end cooling is not required due to the high mechanical efficiency of the pump



Variable Stroke Operation



Description of Operation, Variable Stroke:

- The pinion shaft is driven by a constant speed electric motor
- The pinion gear wheel drives the crankshaft through the 2.2:1 reduction gear which is incorporated into the HP pump power end
- The stroke length is altered by turning the variator shaft
- The stepper motor maintains the pre-set position of the variator shaft
- The stepper motor (or hand wheel) mounted to the crankshaft orientates the crankshaft double eccentric journals to achieve the desired stroke length range from zero to 30mm
- Stroke length adjustment can be made while the pump is on or off load

Materials

Wetted part materials selection is dictated by customer preference and the process liquid to be pumped.

Available liquid end materials include: 316L Stainless Steel, Duplex SS, Super Duplex SS, Bronze, Hastelloy and Inconel.

Plungers: Solid Ceramic or Tungsten Carbide.

Fluid Head Assembly

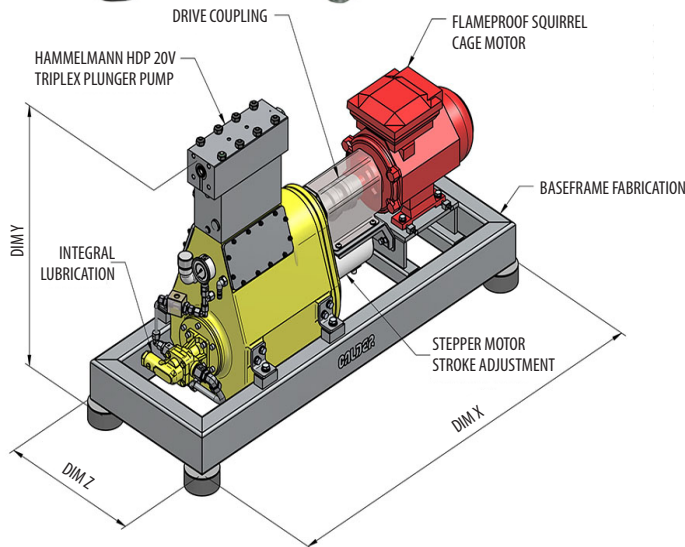
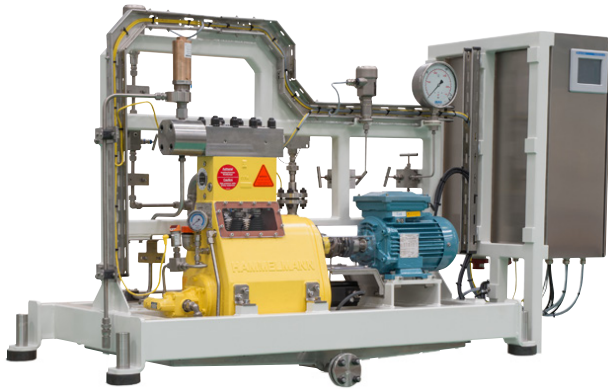
- The Hammelmann HDP 20V pump fluid head assembly is the industry-proven fluid end fitted to the full range of Hammelmann process pumps.

Features:

- Moderate plunger speeds result in low plunger and sealing element wear.
- Flow rate adjustment options:
 - Hand wheel manual adjustment
 - Stepper motor with amplifier
- Communication interface:
 - Analogue Interface
 - CANopen
 - Modbus
- High pressure sealing assemblies:
 - Dynamic labyrinth seal technology for exceptional long life reliability and high efficiency from 10% to 100% flow rate.
 - Kevlar/PTFE seal assembly for high volumetric efficiency from Zero to 100% flow rate.
- Stainless steel pump head free of alternating stress.
- Suction & discharge wing guided conical valves.
- The high pressure components are enclosed within the suction chamber of the high pressure pump, thereby eliminating any risk of a high pressure leak to atmosphere.

HDP 20V Controlled Volume Injection Pump

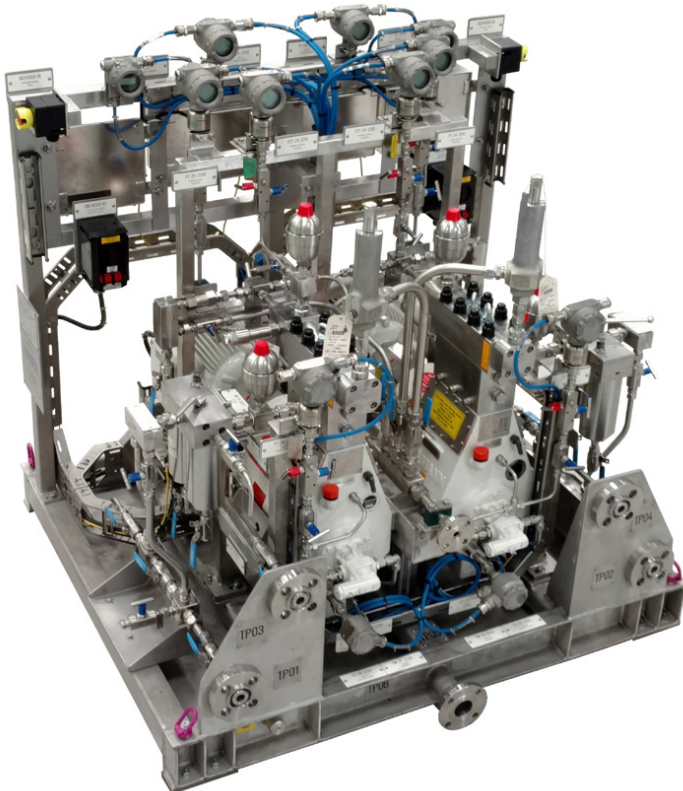
INNOVATION THROUGH EXPERIENCE



Technical Information

- Vertical 3 plunger pump
- Rod force : ≤ 17.6 kN
- Stroke length : ≤ 30 mm
- Power rating: ≤ 18.5 kW
- API 674 & API 675 Compliant
- Pinion shaft speed 1500, 1800, 2150 rpm
- Maximum plunger speed:
 - At 2,100 rpm motor speed = 57m/min
 - At 1,800 rpm motor speed = 49m/min
 - At 1,500 rpm motor speed = 41m/min
- Power end lubrication: Pinion shaft driven lube pump

Motor Frame Size	kW	X (mm)	Y (mm)	Z (mm)
90	1.1 - 1.5	1205	750	440
100	2.2 - 3	1280	750	440
112	4	1280	750	440
132	5.5 - 7.5	1360	800	500
160	11 - 15	1510	850	525
180	18.5 - 22	1510	850	525



HDP 20V Pump Performance Chart:

Plunger Diameter - mm	Flow - lpm	Flow - m ³ /hr	Operating Pressure - bar
	up to	up to	up to
8	2.9	0.17	3270
10	4.8	0.29	2200
12	7.5	0.45	1550
15	11.9	0.71	990
17.5	16.2	0.97	730
20	21.6	1.30	560
25	33.5	2.01	350
30	48.6	2.92	240
35	67.0	4.02	180
40	88.6	5.32	140
45	111.2	6.67	110



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