



Super duplex. Super reliability. Chemical liquid pumps just got smaller, lighter and tougher

The Danfoss range of chemical liquid pumps combines compact axial piston pump technology with precision production in pure super duplex. Pump reliability for the oil and gas industry has never been this good.

90%

reduced space and weight

Ultra-compact axial piston pump design radically reduces footprint compared to traditional pumps

200%

longer service intervals

Full super duplex construction. No oil lubrication, no crankshaft, no pulsation dampeners needed. Simple service compared to traditional pumps



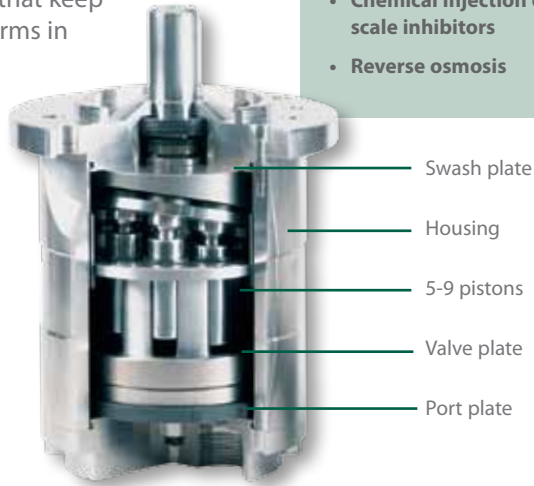
Chemical liquid pumps that punch way above their weight

Maximum reliability. Minimum footprint and maintenance. More than 20 patents. All in one pump.

The Danfoss Group has more than 40 years of experience developing and producing axial piston pumps. Today Danfoss is among the 3 largest manufacturers world-wide of this pump technology.

We listened to the needs of industries that require reliable but lightweight pumps in extreme environments. Then we adapted the axial piston technology used in heavy-duty hydraulic applications to ultra-compact pumps – all made in some of the most corrosion-resistant materials available.

With super duplex inside and out and our patented production technology, we produce chemical liquid pumps that keep process platforms in business.



Where are Danfoss CLP pumps used?

- Condensate transfer
- Methanol or MEG injection
- Dehydration/glycol pumping
- Chemical injection of biocides, oxygen scavengers, scale inhibitors
- Reverse osmosis

Here's how:

We took:

- Our heritage: more than 40 years of experience in axial piston technology for hydraulic applications
- Our field experience: everything we have learned about pumps in extreme environments
- Our dedication to reliability: Danfoss pumps play a mission-critical role across a spectrum of industries

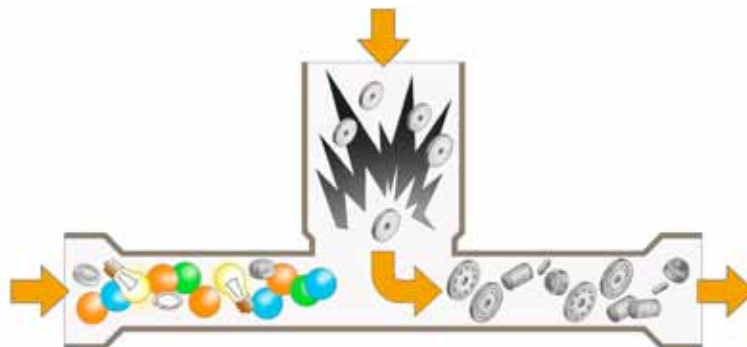
We added:

- Advanced materials technology: super duplex and carbon-reinforced PEEK, from surface to core, for corrosion resistance
- World-class production technology: patented processes and global procurement expertise



You get:

- Ultra-compact: smallest footprint and lowest weight of any comparable pump
- High reliability
- Corrosion resistance
- Unsurpassed energy efficiency
- Low maintenance, with dramatically increased service intervals
- Industry-leading total costs of ownership



Axial piston technology makes it possible.

Super duplex makes it last

Traditional diaphragm or plunger pumps are built with few but relatively large chambers and pistons, and rely on crankshafts to transfer power and check valves to control the flow.

Danfoss CLP pumps use axial piston technology to deliver powerful performance. Crankshafts are not used, multiple pistons run against a swash plate and integrated port and valve plates control flow.

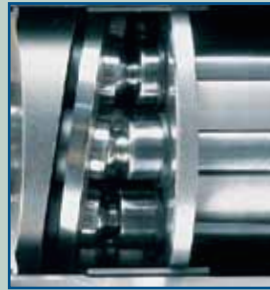
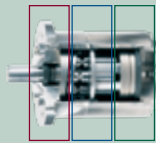
Because Danfoss CLP pumps pack so much power into a compact design, it is now cost-effective to build the entire pump – inside and out – from super duplex and carbon-reinforced PEEK.

Danfoss axial pumps

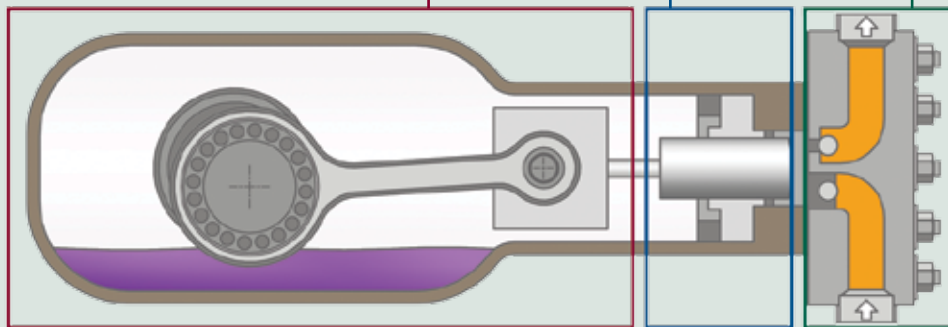
Traditional crankshafts are replaced by a simple fixed swash plate. No need for oil lubrication: the pumped medium provides all necessary lubrication.

5-9 pistons deliver extremely low pulsation rates, which eliminate the use of pulsation dampeners.

Traditional suction/pressure check valves are replaced by a simple port and valve plate – further reducing complexity and maintenance worries.



Traditional diaphragm pumps



Size comparison 1:1





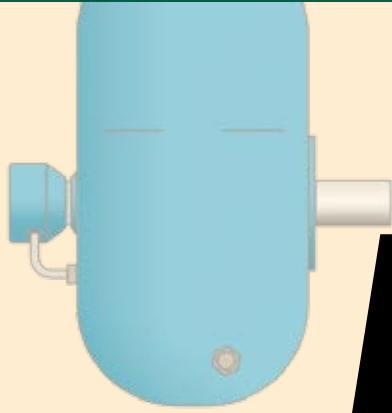
Why risk reliability with traditional diaphragm or plunger pumps?

Traditional diaphragm or plunger pumps

Danfoss CLP positive displacement pumps

1

ULTRA COMPACT: SMALLER FOOTPRINT, LOWER WEIGHT. REDUCE BY FACTOR 5-30 ON AVERAGE



90%
reduced space and weight

2

INCREASED SERVICE INTERVALS: REDUCED MAINTENANCE THROUGH BETTER DESIGN. REDUCE BY FACTOR 2-10 ON AVERAGE

PREVENTATIVE MAINTENANCE CHECKLIST

Check	Daily	Weekly	50 hrs.	500 hrs.	1500 hrs.	3000 hrs.	4000 hrs.	8000 hrs.
Clean Filters	X							
Oil Level Quality	X							
Oil Leaks	X							
Water Leaks	X							
Belts, Pulley		X						
Plumbing		X						
Initial Oil Change			X					
Oil Change				X				
Seal Change					X			
Valve Change						X		
Accessories					X			
Inspection								
Service								

PREVENTATIVE MAINTENANCE CHECKLIST

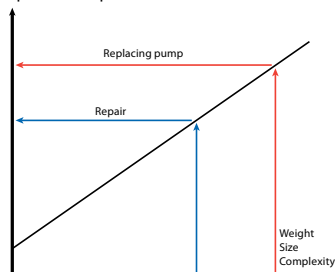
Check	Daily	Weekly	50 hrs.	500 hrs.	1500 hrs.	3000 hrs.	4000 hrs.	8000 hrs.
Clean Filters								
Oil Level Quality								
Oil Leaks								
Water Leaks								
Belts, Pulley								
Plumbing								
Initial Oil Change								
Oil Change								
Seal Change								
Valve Change								
Accessories								
Inspection							X	
Service								X

200%
increased service interval

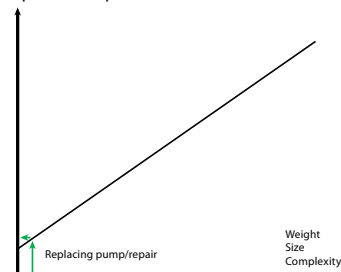
3

LESS DOWNTIME: SIMPLE MAINTENANCE, EASY TRANSPORTATION. REDUCE BY FACTOR 3-30 ON AVERAGE

Transport and replacement time



Transport and replacement time



Danfoss CLP/PD pumps beat them across the board

4

SIMPLE DESIGN: FEWER PARTS, BETTER RELIABILITY

TRADITIONAL PLUNGER/DIAPHRAGM PUMP

Dynamic Seals	From 6 to 18 or more
Dynamic Bearings	At least 8
Chrangshaft	Required
Pulsation Damper	Required
Suction Stabilizer	25-160%
Olie Lubrication System	Required
Gearbox	Required
Pressure Ripples	Required
Super Duplex Casing	No
Mass Acceleration Loss/NPS	Yes (25-160%)

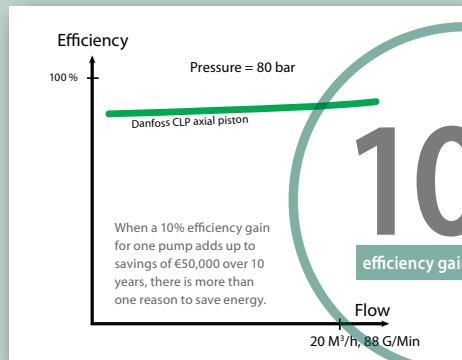
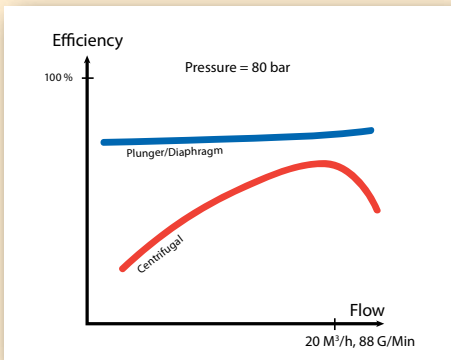
DANFOSS CLP/PD PUMP

Dynamic Seals	0
Dynamic Bearings	2
Chrangshaft	No need
Pulsation Damper	No need
Suction Stabilizer	<1.5%
Olie Lubrication System	No need
Gearbox	No need
Pressure Ripples	No need
Super Duplex Casing	Yes
Mass Acceleration Loss/NPS	0

110%
higher reliability

5

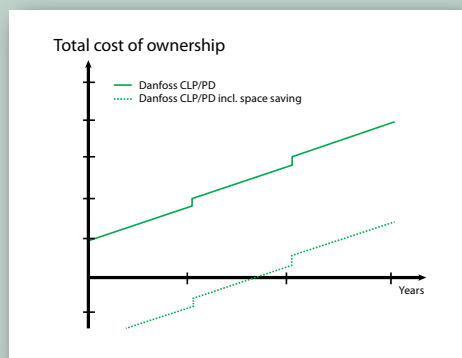
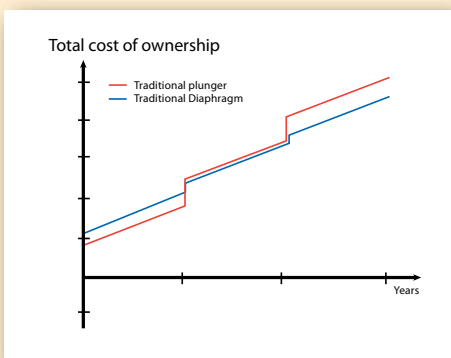
ENERGY EFFICIENT: LOWER OPERATING COSTS, LOWER CO₂ EMISSIONS



10%
efficiency gain

6

SAFE INVESTMENT: BEST-IN-CLASS TOTAL COSTS OF OWNERSHIP



Proven technology at work in some of the world's toughest environments



THE CHALLENGE:
Upgrading the produced water system

Dong Energy took over the Siri oil field in 2002 and has since made it one of the most cost-effective production platforms in the North Sea. Upgrading the produced water system as part of an environmental improvement program required new pumps to inject biocides, scale inhibitors and oxygen scavengers. In addition to pump reliability, Dong Energy wanted to save space and weight – and electricity.

Vendor flexibility was also crucial in case spare parts or replacement pumps were needed.

THE SOLUTION:
Three sets of two pumps

Dong Energy selected a solution that consisted of three sets of two Danfoss pumps to provide complete redundancy. Despite the extra

pumps, the new system was considerably smaller and lighter than the previous one.

“We once thought we had a problem with one of the pumps, and Danfoss flew a replacement to the rig in less than 24 hours. It turned out that there was actually nothing wrong with the pump. Since we depend on 100% uptime, confidence in our suppliers is a must.”

Henrik Nysted
 Project Manager,
 Dong Energy



THE CHALLENGE:
More condensate through existing infrastructure

Maersk Oil and Gas was the first company to establish a cross-border infrastructure agreement in the North Sea, sending condensate from the Norwegian Trym field for processing at Maersk's Harald platform in Danish waters. Maersk needed new pumps to send more condensate through Harald's existing infrastructure – without taking up more room or adding costly new structures.

THE SOLUTION:
Danfoss ultra-compact CLP pumps

After a careful review of its options Maersk chose two Danfoss axial piston pumps. Both

have been helping to move condensate to the Danish mainland since the upgrade.

“Reliability was a given, but we were especially looking for high-capacity pumps that don't take up much room. Danfoss CLP pumps deliver on both counts. We are often pioneers in new technology, so the idea of trying something new is not foreign to us.”

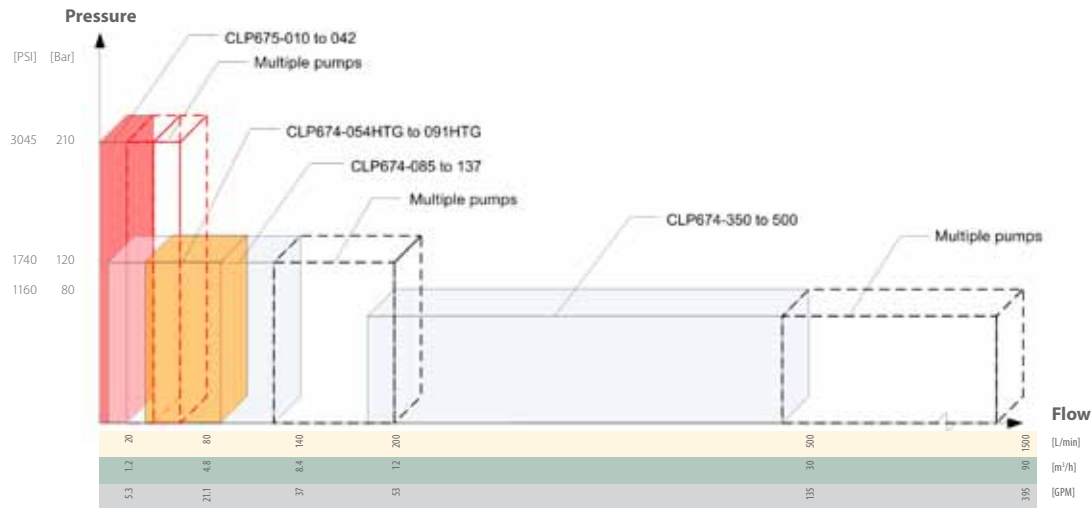
Finn Schweitz Christensen,
 Assistant Purchasing Manager,
 Maersk Oil and Gas

WE HAVE SUPPLIED POSITIVE DISPLACEMENT PUMPS TO:

BP, Shell, Statoil, Talisman Energy, BR Petrobras, WG Wood Group, Maersk Oil and Gas, Petronas, Qatar Petroleum



A complete program of high-performance chemical liquid pumps for the oil and gas industry



Multi-purpose pumps – CLP674-Transferring

Pump selection	CLP674-025	CLP674-042	CLP674-085	CLP674-137	CLP674-350	CLP674-400	CLP674-500	
Capacity range	[L/min] @ 80 bar [GPM @ 1160 PSI]	6 - 26.2 1.8 - 8	10 - 44 2.7 - 12	32 - 82 14 - 36	53 - 137 14 - 36	203 - 348 54 - 92	240 - 412 64 - 109	293 - 502 77 - 133
Speed range	[RPM]	700 - 3000	700 - 3000	700 - 1800	700 - 1800	700 - 1200	700 - 1200	700 - 1200
Pressure range	[Bar] [PSI]	20 - 120 290 - 1740	20 - 120 290 - 1740	20 - 120 290 - 1740	20 - 120 290 - 1740	20 - 80 290 - 1160	20 - 80 290 - 1160	20 - 80 290 - 1160
Weight	[Kg] / [Lb]	8.6 / 17	8.6 / 17	32 / 70.5	32 / 70.5	105 / 231.5	105 / 231.5	105 / 231.5
Size	A [mm] / [In]	166 / 6.54		255 / 8.86		367 / 14.45		
	B [mm] / [In]	105 / 4.13		169 / 6.65		275 / 10.83		
	C [mm] / [In]	120 / 4.75		209 / 8.23		275 / 10.83		

Hot glycol pumps – CLP674HTG

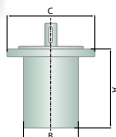
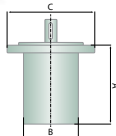
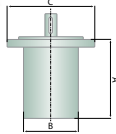
Pump selection	CLP674-054	CLP674-068	CLP674-077	CLP674-091	
Capacity range	[L/min] @ 80 bar [GPM @ 1160 PSI]	32 - 54 8 - 14	40 - 68 11 - 18	44 - 77 12 - 20	53 - 91 14 - 24
Speed range	[RPM]	700 - 1200	700 - 1200	700 - 1200	700 - 1200
Pressure range	[Bar] [PSI]	20 - 120 290 - 1740	20 - 120 290 - 1740	20 - 120 290 - 1740	20 - 120 290 - 1740
Weight	[Kg] / [Lb]	32 / 70.5	32 / 70.5	32 / 70.5	32 / 70.5
Size	A [mm] / [In]	225 / 8.86			
	B [mm] / [In]	169 / 6.65			
	C [mm] / [In]	209 / 8.23			

Metering pumps – CLP675-Metering

Pump selection	CLP675-010	CLP675-017	CLP675-025	CLP675-042	
Capacity range	[L/min] @ 80 bar [GPM @ 1160 PSI]	2.5 - 10.8 0.66 - 2.85	4.1 - 17.4 1.1 - 4.6	6.1 - 26.2 1.6 - 6.9	10.2 - 43.6 2.7 - 11.5
Speed range	[RPM]	700 - 3000	700 - 3000	700 - 3000	700 - 3000
Pressure range	[Bar] [PSI]	20 - 210 290 - 3045	20 - 210 290 - 3045	20 - 210 290 - 3045	20 - 210 290 - 3045
Weight	[Kg] / [Lb]	5.2 / 9.7	5.2 / 9.7	5.2 / 9.7	5.2 / 9.7
Size	A [mm] / [In]	131 / 5.16		166 / 6.54	
	B [mm] / [In]	94 / 3.70		113 / 4.45	
	C [mm] / [In]	120 / 4.72		120 / 4.72	

Other key specifications – all pumps

ATEX/EX	EX2 G T3-6	Pulsation	±1.5% @ 9 piston
Max inlet pressure	< 6 bar	Installation	Both vertical and horizontal
Typical NPSHr	5 m	Filtration	10µ Beta 5000 filters
Noise (60 bar, 1500 RPM)	Typical < 74 dB(A)	Wetted parts	Duplex/Super Duplex and PEEK
Temperature	95 C (125 C)	Outer casing material	Duplex/Super Duplex



A world leader in pump and energy technology



The Danfoss Group is one of the largest industrial companies in Denmark, with more than 25,000 employees worldwide, production on four continents and sales in almost every country on the planet. Danfoss plays a leading role in research, development and production in a wide spectrum of industries.

Danfoss is among the world's top three manufacturers in all of its key divisions. Similarly, we are among the top three producers in all pump business areas in which we are active.

Our work is based on our core values: Trust, Passion for Technology, Reliability, Global Perspective with Local Commitment, and Environmental and Social Responsibility.

Reducing our own CO₂ footprint – and helping our customers do the same

Before one of our CLP pumps even starts saving energy in a customer installation, Danfoss has already carefully considered the pump's entire CO₂ life cycle. From compact designs that use less material, to highly efficient manufacturing processes

and simple maintenance routines, we take our environmental responsibility seriously, and think it into everything we do.

The Danfoss High-Pressure Pump Division

The Danfoss High-Pressure Pump Division brings decades of hydraulic experience to the design and manufacture of energy-saving pumps. The division designs and markets a broad range of high-performance pumps, including the groundbreaking APP pumps for the reverse osmosis market and specially developed CLP pumps for the oil and gas industry.

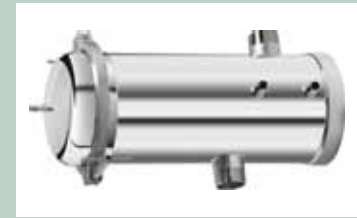
Learn more at www.danfoss.com



Danfoss also produces a line of rugged pumps for the reverse osmosis market: APP pumps from Danfoss RO Solutions.



Danfoss accessories



Filtration: A wide range of filter housings and cartridges covers all filtration needs.



Magnetic coupling: Zero emissions required? Seal-free pumps with magnetic couplings are available.



Skid systems: Daisy-chain pumps for increased capacity, or design one-skid arrays for chemical injection, condensate transfer, etc.



Motor & pump unit: Combine pump and motor on the same skid.

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