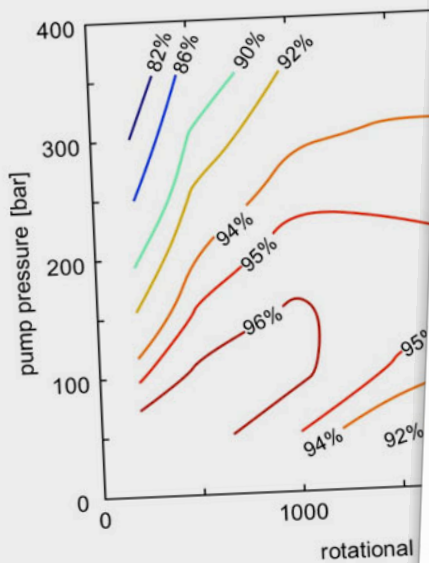
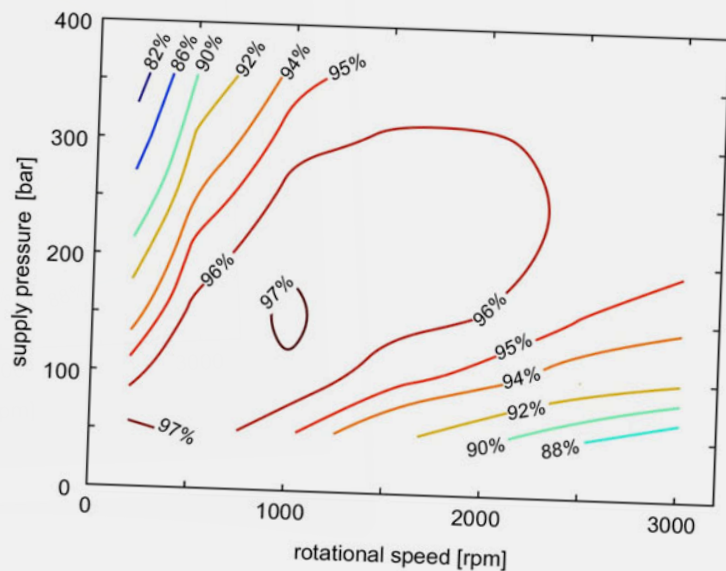


THE EFFICIENT FLOATING CUP

overall efficiency 24 cc pump @ $T_{oil} = 55^{\circ}\text{C}$



overall efficiency 24 cc motor @ $T_{oil} = 55^{\circ}\text{C}$



Floating cup pumps and motors have a high efficiency. The floating cup principle itself is very efficient, having almost no friction between the cups and the cylinders. In addition, a new, low friction hydrostatic bearing has been designed and applied. The new bearing reduces the losses of the barrels running on the port plates. Finally, a new control has been

developed for variable displacement pumps and motors, which strongly reduces the losses compared to conventional controls. The diagrams above show some results of tests performed at Eindhoven University of Technology. The results are for a small 24 cc/rev pump/motor. Peak efficiencies of 97% and higher (for larger machines) can be achieved.

EFFICIENT INNOVATIONS

BALL SHAPED PISTON CROWN

The pistons in the floating cup principle have a ball shaped piston crown. The cup slides and pivots around this ball shape. The sealing line between the cup and the cylinder is always standing perpendicular to the cup axis. As a result the cup is hydrostatically balanced in all radial directions.

LOW PISTON FRICTION

Because of the perpendicular sealing line, the hydraulic pressure forces acting on the cup are balanced in all radial directions and they can not create a side force on the piston. Hence the friction losses and wear are extremely low.

PRESS FITTED PISTONS

In the floating cup design the pistons can not move: they are press fitted into the rotor. Unlike other axial piston designs, there are no ball joints or slippers and therefore no additional friction losses, leakage or wear.

LOW LEAKAGE

The pistons have a cavity in the piston crown. This makes the piston crown expand when being pressurized. The cavity is made as such that the piston expansion matches the cup expansion, thereby always closing the gap between the piston crown and the cup, even at very high pressures.

NEW HYDROSTATIC BEARING

A new hydrostatic bearing is developed for the sealing area surrounding the barrel ports. The new design strongly reduces the friction and the wear of the interface between barrels and port plates.

NEW PUMP AND MOTOR CONTROL

Variable displacement pumps and motors need actuators and control valves to make them variable. Although the losses of these actuators and valves are normally not included in efficiency measurements, they cause high losses. A new pump control has been designed which strongly reduces these losses.

More information about Innas and the floating cup technology can be found at www.innas.com



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