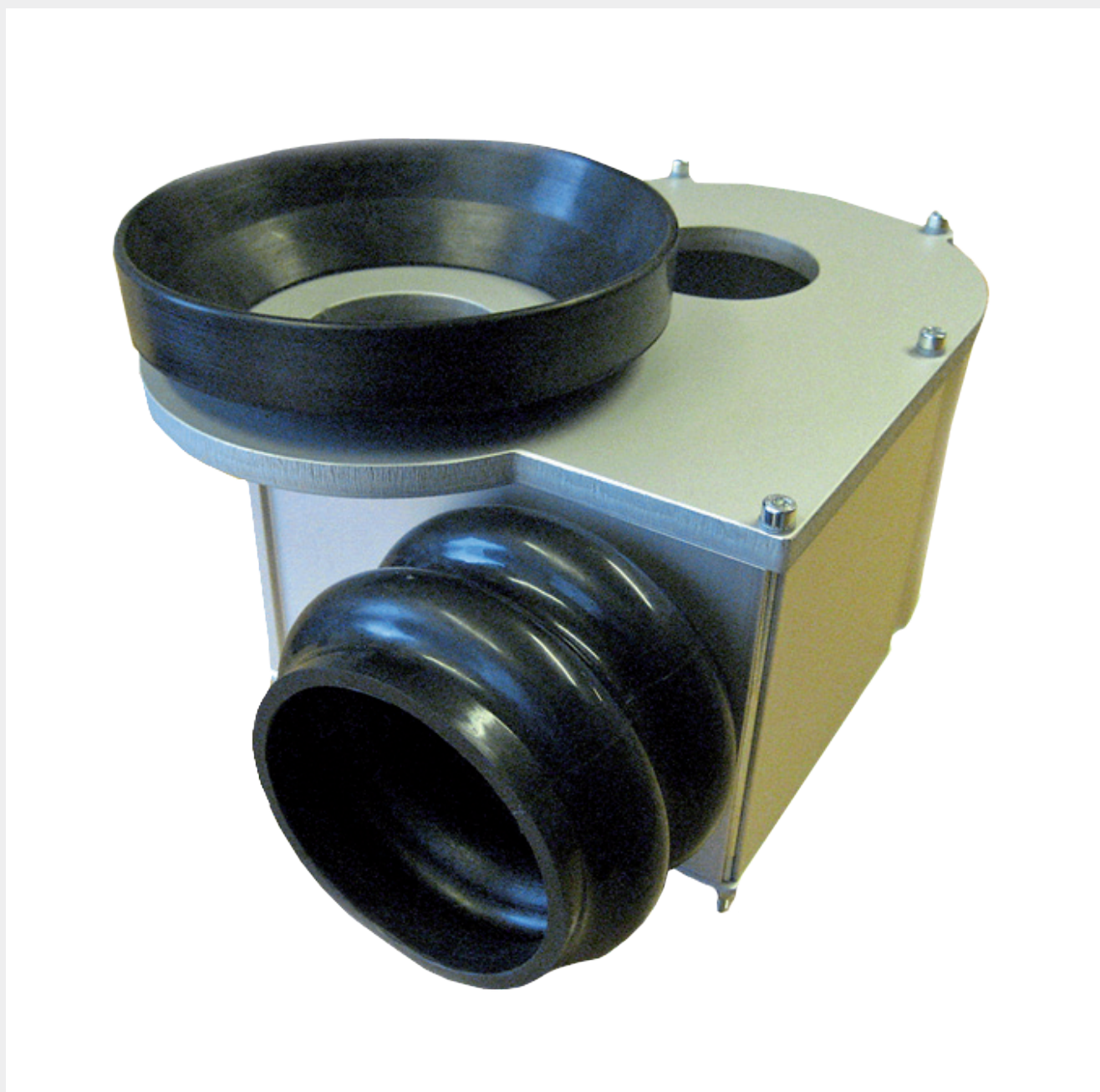


# CYCLONE

SAVING SPACE, MONEY AND THE ENVIRONMENT

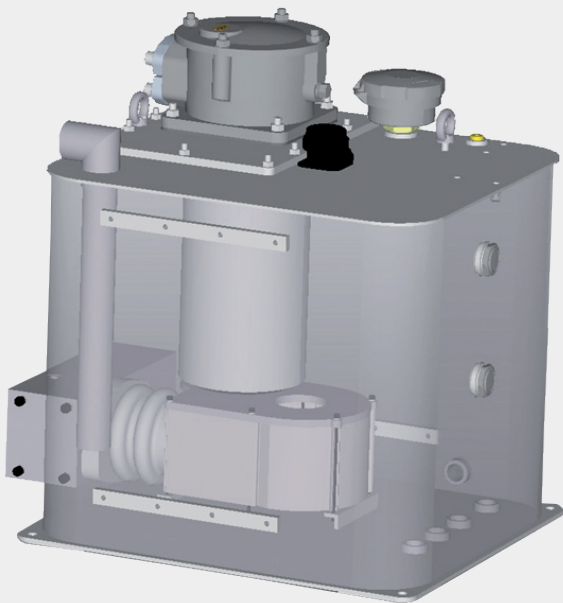


All hydraulic systems include a tank for the hydraulic fluid. According to a simple rule of thumb, the oil volume in the tank should be three times the pump flow in the system. The reason for this is to give air bubbles time to escape before the oil goes back in to the pump. Air and air bubbles in the oil can be devastating to the hydraulic system, compromising functionality and causing breakdowns.

The larger the tank in the hydraulic system, the more oil is used and the whole hydraulic system becomes heavier. Reducing space and weight is critical for many applications. Reducing the volume of oil in a system also has a positive environmental impact.

### The Servi solution

Servi has developed a new type of oil tank based on the cyclone principle. Oil is pumped into the tank where it is rotated. This technology utilises the difference in density between oil and air. Rotation accelerates the deaeration of oil, so that the tank can be made far smaller. The tank's volume, and thus its weight, can be cut by up to 80% compared to traditional oil tanks in certain applications. Cyclone is patented.



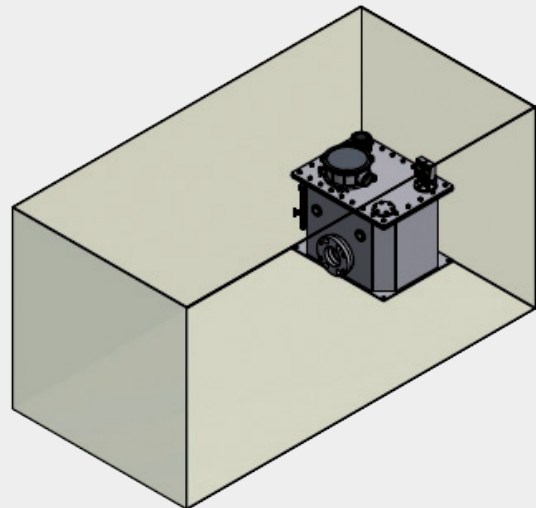
The Cyclone element comes in two different sizes. One dimensioned for returnflow up to 650 l/min (250 x 130 x 185 mm) and another for 350 l/min (250 x 75 x 185 mm). It is a robust design with high reliability.

### Customer benefits

Cyclone offers the following benefits over traditional oil tank:

- A radically downscaled oil tank and thus oil volume
- Lower weight
- More effective deaeration of the oil.
- Extended lifetime of oil
- Less sensitive to movement
- High accessibility
- Reduced environmental impact

Cyclone can be used in most hydraulic applications. It offers the greatest benefit in applications where size and weight are a priority.



The figure indicates the space savings by using the cyclone tank.

### Deaeriation of oil

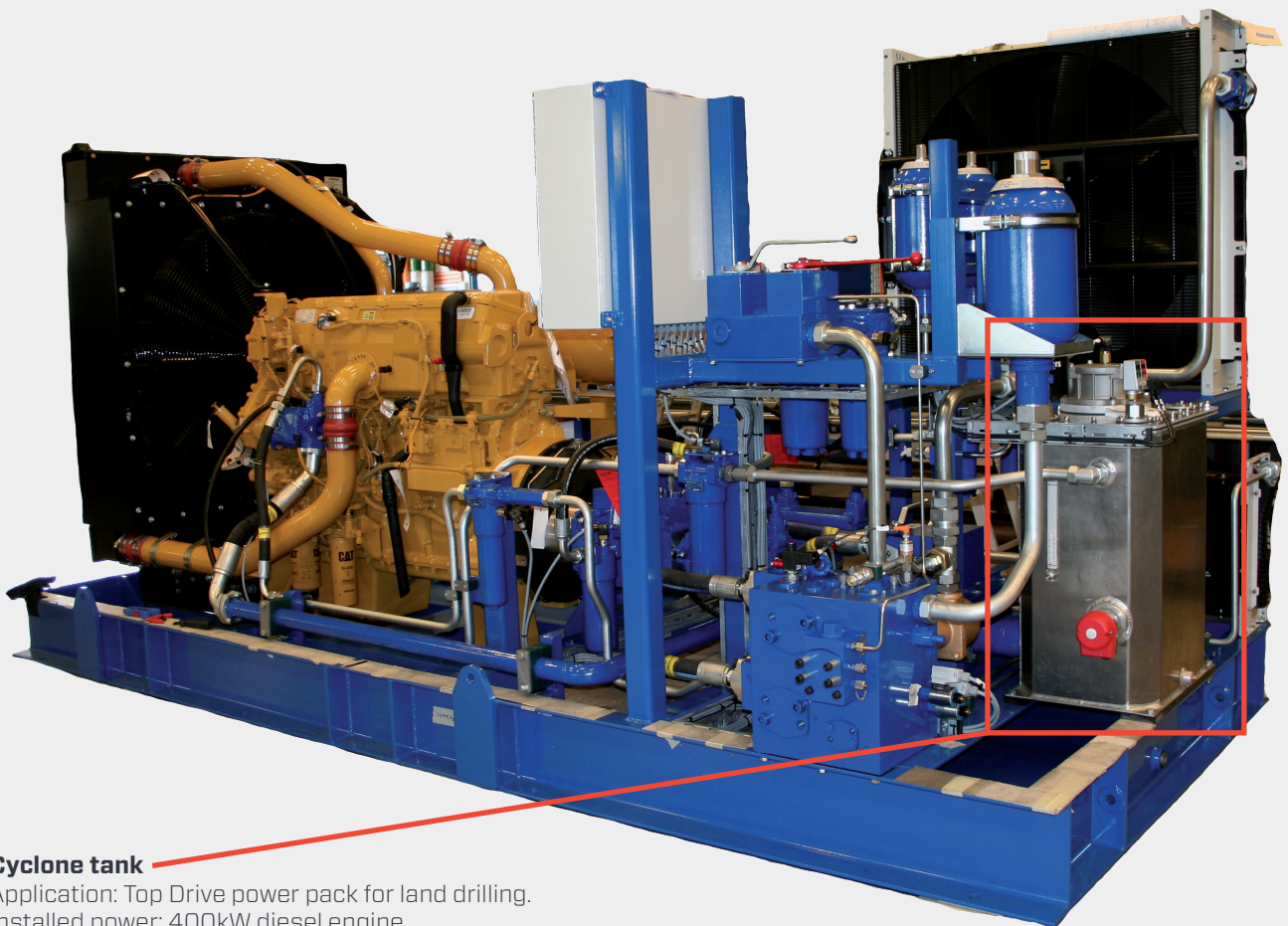
A CFD simulation of a saturated ISO VG46 mineral oil (9% air at 20°C and 1 atm.) shows that the air content in the oil is reduced to 1-1,5% after passing through the cyclone once.

The reduction of air is important for many reasons. Air in oil can result in:

- Rise in oil temperature
- Deterioration of oil quality
- Degradation of lubrication (due to either viscosity loss or sludge and varnish formation)
- Reduced thermal conductivity
- Cavitation and erosion
- Noise generation
- Reduced bulk modulus (due to fluid aeration leading to a spongy fluid and sluggish system control)
- Decreased pump efficiency
- Reduced dielectric properties

### Boost effect

Another benefit of using the cyclone tank is the increased pressure in the suction line to the pump. Both CFD analyses and testing show that the inlet pressure to the pump always is positive and increases with increasing flow through the cyclone element.



### Cyclone tank

Application: Top Drive power pack for land drilling.

Installed power: 400kW diesel engine.

Total pump capacity: 585 cm<sup>3</sup>/rev

Tank volum: 120 Liters

