



Use: Hydraulic unit at an Injection molding machine

Specifications:

- Building year: 2002
- Closing force: 31.500 kN
- Oil type: Mobil DTE 25
- Tank volume: 6.000 Liter
- Cycle time: 98 to 120 sec.
- Number of cycles: 720 to 881 per day



To prevent condensation damage in May 2014 GIEBEL adsorber of type DUO-VARIO 560-PA were assembled at several plastic injection molding machines with servo hydraulics. Not only the high acquisition and maintenance costs of the plant, but also the high number of cycles and thus the load of the hydraulic oil with moist air have moved to implement this measure.

The results speak for themselves and demonstrate the added value of a ventilation dryer to hydraulic units. The water content in the oil has fallen steadily after the assembly of the adsorber.

Table 1: Excerpt from lab reports to illustrate the development of the water content.

Inspection date	03.07.2014	24.07.2014	25.08.2014	18.06.2015	16.09.2015	20.10.2015
Oil changed	No	No	No	No	Yes	No
CONTAMINATION						
Silicone (Si [mg/kg])	1	1	1	1	6	5
Water K.F. [ppm]	425	409	376	347	193	167
ADDITIONAL TESTS						
Cleanliness class (ISO 4406)	15/14/10	16/14/12	14/12/10	18/17/13	17/16/12	18/16/13

Adsorber assembled at 20/05/2014



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The reason for the sustainable oil and air drying in the tank based on two effects:

Postflow of dry air

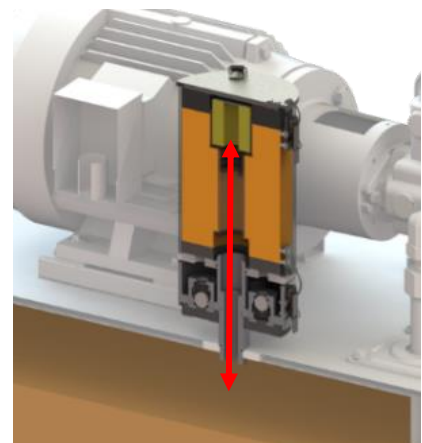
With each inflow of fresh, dry air from the adsorber the water molecules are homogeneously mixed. Thus, the humidity in the tank decreases sustainably. The steady drying air removes the moisture from the oil, but slowly. Regarding the high number of cycles of the injection molding machine the drying of the air in the tank is processed quickly and is clearly visible in the water content of the laboratory reports.

Active drying of the inside air tank

Silica gel has a highly hydrophobic surface and adsorbs polar substances, such water (H₂O) very good. Because of this silica gel dries the air almost during down times of the hydraulic unit.

The adsorber of the VARIO series are used as aerator and deaerator. This means that with each retraction of the cylinder, the air is pressed out through the silica gel in the environment. If this air is dry, the silica gel is partially regenerated and the service life of the adsorber is extended by multiples.

But, if this air is loaded with humidity, then an active drying of the exhaust air is and thus discoloration of the adsorber from above (air flows from the application in the environment). This is good to see at the adsorber at the described injection molding machine.





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Adsorber during assembly
Date: 20.05.2014



Adsorber after 675 working hours

Date: 24.06.2014

Discoloration in the upper area.
Moisture comes from the interior of the tank and is thus dried.

In the lower region of the adsorber is no discoloration to see.

Summary & Added Value:

- Water content in the hydraulic oil is, also after an oil change, constantly low.
- Adsorber protects the hydraulic unit sustained before re-entry of air moisture, thereby reducing the risk of condensation damage.
- Discoloration of the adsorber indicates an active drying of the inside air tank.
- Even existing inside humidity is sustainably absorbed and removed from the tank.

GIEBEL FilTec, 24.11.2015