



An often neglected problem: air in the oil

[Bleeding at the hydraulic cylinder of HEB \(application example\) - YouTube](#)

There is always air in the oil!

Dissolved air are gas molecules that are in between or attached to oil molecules. This dissolved air has no influence on the properties of the oil. 1l of oil can absorb approx. 20 times the volume of air in compressed form at 250bar.

With undissolved air, the air molecules are in bubble form in the hydraulic oil. While air dissolves only slowly in oil, it escapes abruptly - e.g. when the pressure drops. These changes are typical in a hydraulic system. Since the dissolving capacity of air in the hydraulic medium is pressure-dependent, air is expelled from the oil with each pressure reduction when saturation is reached. Here, the comparison with a bubble bottle helps.

CO₂ is dissolved in the water - just like the air in the oil. Now we increase the pressure by shaking the bottle. If we now open the bottle, the pressure collapses abruptly and the CO₂ flows out in bubbles.

Consequences of undissolved air in the oil

Undissolved air can thus be the cause of a wide variety of damage such as defective seals or even damaged running surfaces. Air bubble erosion, [diesel effect](#) and oil ageing are the causes of this damage, which ultimately leads to cylinder failure and leakage.

What can I do to protect myself from such damage?

Basically, the air content in the medium should be reduced to the saturation level at normal pressure. The vent should always be located at the highest point of the system. Furthermore, it should also be close to the consumer, in our case the cylinder.

With S7, you can [configure](#) the vent directly at HEB and place it in the appropriate position.

Certain series such as the [Z140](#) | [ZNI141](#), [Z160](#) | [ZNI161](#) | [ZMS160](#) and the standard cylinders [NOZ161](#) | [NOZNI161](#) and [NOZ251](#) | [NOZNI251](#) have the vent installed as standard.

If venting directly on the cylinder is not feasible, we also offer venting in elbow fittings. If you have planned a minimes connection on your system, this can also be used for venting.

How to bleed correctly

In order to be able to see the air in the oil and to illustrate the bleeding process, we have created a [video](#) with a transparent cylinder.

What else needs to be considered

- Bleeding the system during commissioning
- Check the system for leaks
- Short, straight pipes with a sufficiently large nominal diameter (lower flow velocities $v_{\text{öl}} < 1 \text{ m/sec}$ => lower pressure loss)