

Desiccant breathers: A front line defence in the war on lubricant contamination

With contamination a cause of premature machinery failure and diminished lubricant life, cement producers know that maintaining clean oil is one of the best investments they can make. Desiccant breathers can help as a front line defence in the 'war' on lubricant contamination.

There are two primary types of contamination in cement plant lubricants:

Dirt: The atmosphere is dusty, which can compromise lubricant quality and accelerate wear of equipment via abrasion and oxidation;

Water: If the atmosphere is humid or has frequent temperature fluctuations the oil can become laden with moisture.

The solution: a desiccant breather

A desiccant breather is a unique air filter and water vapour removal system. It replaces the standard breather or ventilation system on virtually all types of industrial equipment that contain hydrocarbon and other non-aqueous fluids. It also prevents contamination of products in storage and process tanks.

Desiccant breathers combine a drying media with a combination of filters to prohibit water and microscopic particulates from entering the system, and to remove water from the reservoir to prevent condensation. They come in a large variety of sizes, with different desiccants and other options and represent a significant improvement on commonly-used equipment for this type of application.

Traditional desiccant breathers include both a mechanical filtration system to strip particles from the air down to 3µm or less and a desiccant stage to lower the relative humidity of the air to a level that prevents condensation and even removes water from the oil in many cases.

How do they work?

To remove water, desiccant breathers are generally filled with silica, a hygroscopic (water absorbing) agent that traps and absorbs the moisture contained in the air that enters the

filter. A single grain of silica gel can absorb up to 40% of its weight in water. It also removes moisture from within the reservoir as the unit breathes out. As the reservoir heats up, water contained within the reservoir becomes water vapour. As the vapour is forced out through the breather, it is removed by the drying agent. Water in oil can increase the oxidation rate by more than a factor of 10. By controlling the moisture both outside and inside the reservoir, all of the problems typically caused by water contamination are prevented.

To remove dust, most quality desiccant breathers have a multi-level filtration system to keep dirt out of equipment. As air enters the unit from outside, it contacts a low-density foam filter element. The air then passes through a woven polyester filter element. For added protection, some desiccant breathers also provide a second foam and polyester filter.

Right: A Lubrication Engineers' desiccant breather installed on a lubrication system at an industrial plant.





Left: A desiccant breather may have:

1. Integrated nylon standpipe,
2. Resilient polycarbonate casing,
3. Multi-layer filtration,
4. Oil mist reduction honeycomb,
5. Water vapour adsorbent silica gel,
6. High-quality check valves.

Selecting a quality desiccant breather

A few things to look for when choosing a quality desiccant breather are:

1. Integrated nylon standpipe: This key feature provides excellent vibration resistance and dissipates impact throughout the unit, eliminating weak points. It also allows even airflow distribution throughout the unit, preventing inaccurate readings of desiccant saturation. Many breathers that do not have this key feature will also have oil saturation problems in the desiccant due to splashing or oil mist;

2. Resilient polycarbonate casing: Shock-absorbant, clear casing provides reliable service, easy visual maintenance and UV resistance;

3. Multi-layer filtration: Polyester filters and foam pads protect against migration of desiccant dust and oil mist, providing the maximum efficiency;

4. Water-vapour absorbent silica gel: Absorbs water from incoming air and can hold up to 40% of its weight;

5. Check-valves: Where air flow velocity allows, the breather should have high-quality umbrella check-valves that won't clog or stick to added protection from wash-down environments. Check-valves isolate equipment from ambient conditions, prolong breather life and protect system integrity.

The payoff

Contamination control is the single greatest opportunity for gains in the average lubrication system. Significant gains in machinery reliability can be made

with minimal investment. To date, many industries have treated the symptoms of oil contamination by filtering the lubricant, replacing the oil sooner than necessary and / or rebuilding or replacing failed components at a very high cost. Studies show it costs about 10 times as much to remove contamination as it does to exclude it.

Take action

When it comes to selecting breathers, a 'one size fits all' approach is not ideal. There are many different designs available and there is definitely a best fit for each particular application. Breather selection is an important part of the process of developing a world-class lubrication programme and should not be over-simplified. 

Below: Plant equipment with sight glass and breather.

