

May 2024 - New generation of battery venting systems revolutionize the battery market

The automotive industry is in the midst of a transformation as the sector transitions from combustion engines to electric drives. The increasing demands on electric vehicles and their battery packs, as well as increasingly extreme weather conditions, are confronting the industry with new challenges.

Battery packs are at the heart of many modern technologies. Many different external influences repeatedly cause problems in the battery pack. Our new generation of battery venting is an innovative solution that raises the safety and performance of battery packs to a new level.

The new generation of battery venting is a reversible, metallic quick venting system that is equipped with a valve circuit and includes four different functions:

1. **No ventilation or venting** takes place between -20 mbar and +15 mbar (adjustable).
2. **Ventilation** (through a membrane) with a flow rate of ≥ 400 ml/min @ -50 mbar

Once the release pressure is reached due to an increase in pressure inside the battery housing, the venting piston changes its position and the air can escape. The pressure is equalized for a short time. After venting, the spring returns the piston to its original position.

3. **Venting** (through a membrane) with a flow rate of ≥ 600 ml/min @ +50 mbar

Once the necessary negative pressure is reached due to a pressure drop inside the battery housing, the ventilation piston changes its position and air can flow in. The pressure is equalized for a short time. After venting, the spring returns the piston to its original position.

4. **Emergency venting** with a flow of ≥ 100 l/s @ +200 mbar

Once the trigger pressure for emergency venting is reached, the piston is suddenly pushed upwards. This releases the entire cross-section for emergency venting. After venting, the spring returns the piston to its original position.

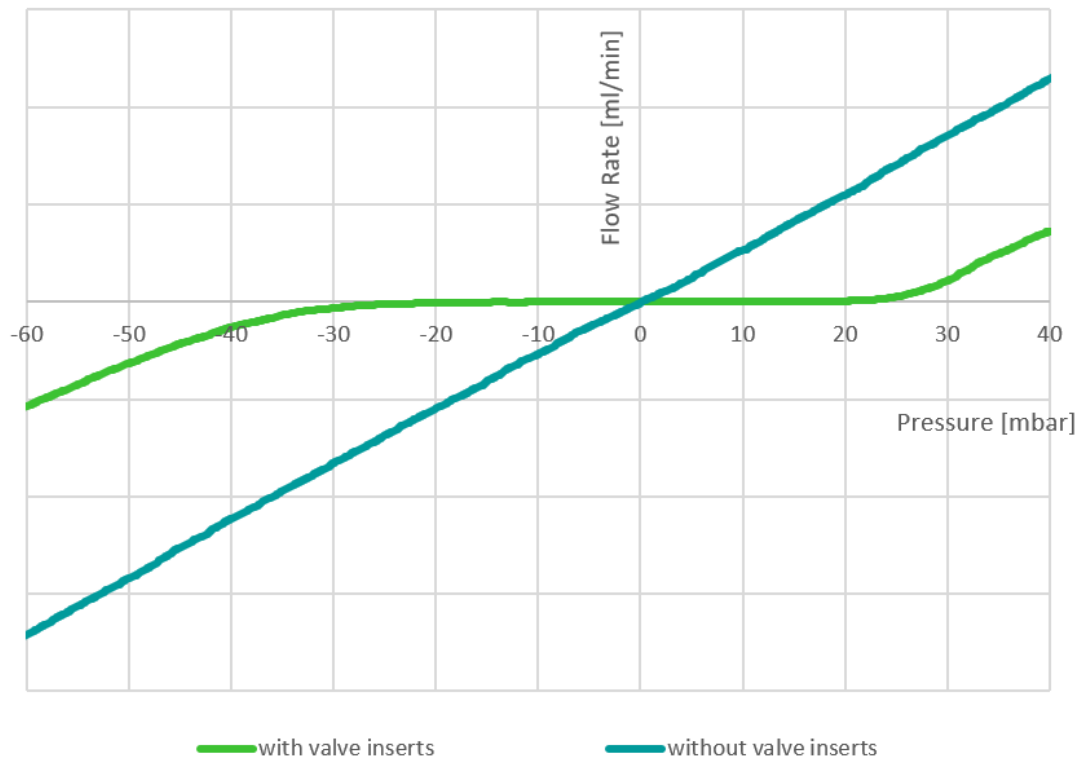


Photo 1: Comparison of quick venting with and without valve inserts



Photo 2: The "New generation of battery venting"

This technology is characterized by its water resistance (RT) of over 250 mbar for 30 minutes, adjustable opening pressure, leakage of ≤ 1 ml/min @ -15 mbar and an operating temperature range of -40 °C to +80 °C.

The flow rate for the breathing function is adjusted by the diameter and material thickness of the membrane, which enables precise control. In addition, the new

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generation of battery venting can be installed from the outside as well as the inside, which further increases its adaptability and flexibility.

With IP 68 and IPX9K protection and a flammability rating of UL94-V0, this technology offers the highest level of safety and reliability. The actuating pressure is adjusted by the force of the spring, allowing easy adaptation to different requirements.

The conditions for ventilation and aeration are clearly defined and ensure reliable operation under all circumstances. Once the release pressure is reached, the new battery venting system enables efficient air exchange, protecting the battery housing from under- or overpressure. The major advantage here is that there is a reduction in moisture in the battery pack as the membrane does not permanently equalize the pressure.

KACO GmbH + Co KG, a subsidiary of the Zhongding Group, is one of the world's leading developers and manufacturers of high-precision, application-oriented sealing solutions for the automotive and mechanical engineering industries. The company, which is based in Germany, is characterized by the highest sealing quality and innovative strength and stands for recognized development and manufacturing expertise. KACO has six plants in Germany, Austria, Hungary, China and the USA and delivers its products all over the world. As a close partner of the automotive industry and its suppliers, the company has been keeping pace with the high demands and technical changes in the industry for decades.

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