

November 21 - Battery quick deflations and pressure balance units from KACO



Figure 1: Variations of KACO quick deflations

The sealing expert KACO has systematically further developed its quick venting modular system. The product family includes reversible and irreversible solutions with the special feature that a breathing membrane can be optionally configured in all designs. In addition, pure pressure equalization elements without a rapid deaeration function are also offered. This further supplements the portfolio of ventilation and breathing systems for aggregates. KACO thus offers almost all system-relevant sealing products for static and dynamic sealing of oil, cooling media and environmental influences for modern drive trains.

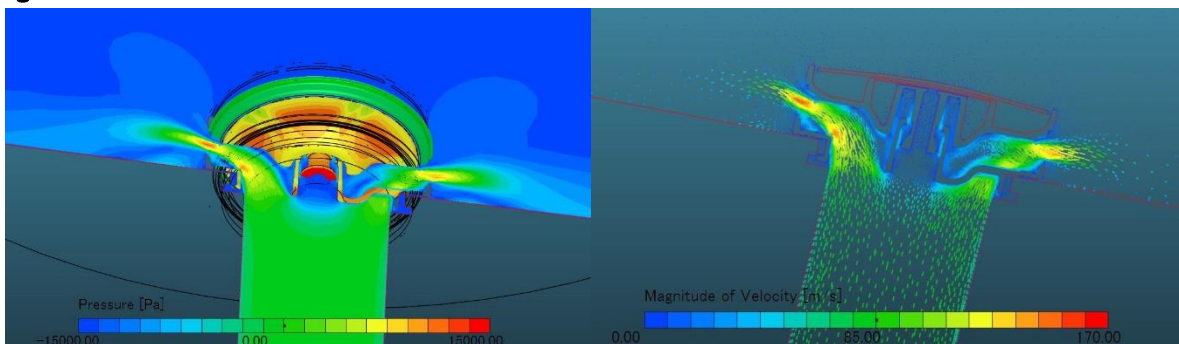


Figure 2: Flow pattern of quick deflation (FEM)

If an unintentional fault should occur in the traction battery of electric or hybridized vehicles, rapid emergency venting must be ensured to reduce the pressure in the affected battery segment. Depending on the customer specification, the emergency venting must either open irreversibly, thus permanently releasing the venting cross-section, or the maximum required venting cross-section must be closed again tightly after the pressure surge (reversible). Irrespective of venting in the event of a fault, it must also be ensured for the battery that continuous pressure equalization can take place during normal operation. For this purpose, so-called pressure balance units (PBU) are used, which are either installed as a separate component or are included in the quick venting system itself as an additional function. KACO offers all solutions for this, i.e. a PBU available separately, a reversible battery quick deflation with or without integrated PBU, or an irreversible battery quick deflation with or without integrated PBU.

As can be seen in Figure 2, KACO battery quick deflation systems are flow-optimized in the smallest possible installation space. Especially in the combination with integrated PBU, no compromises are made for the optimal flow of each sub-function, which offers a great advantage over alternatively available solutions. To improve the EMC properties, a metal grid can be installed as an option which, in addition to improving the shielding effectiveness, also provides additional protection against contact with the inside of the battery when the emergency vent is open.

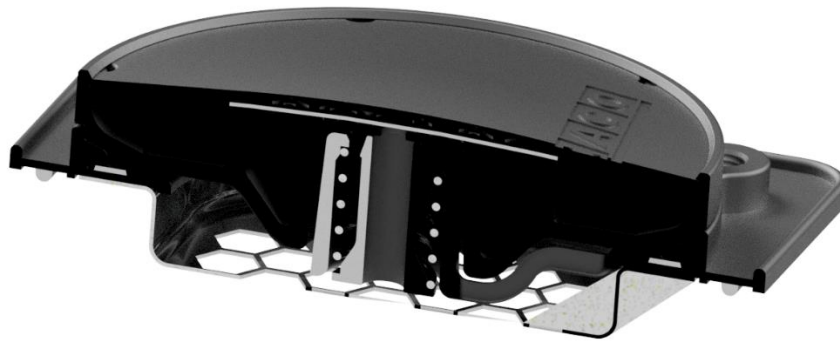


Figure 3: cross section of KACO quick deflation

The modularity and suitable material selection result in very economical customer-specific configurable assemblies, which have been developed to the highest degree of specificity in every sub-function. Figure 4 shows an example of the pressure-dependent outflow behavior of a KACO quick deflation vent with PBU. The KACO quick deflation can be installed in a wide variety of ways using connection housings that can also be configured by the customer. The current modular system includes solutions for snap-in, bayonet or screw-on mounting. Due to their design, all solutions are suitable for end-of-line testing, whereby the reversible design can also be used to test the outflow behavior in the event of a fault.

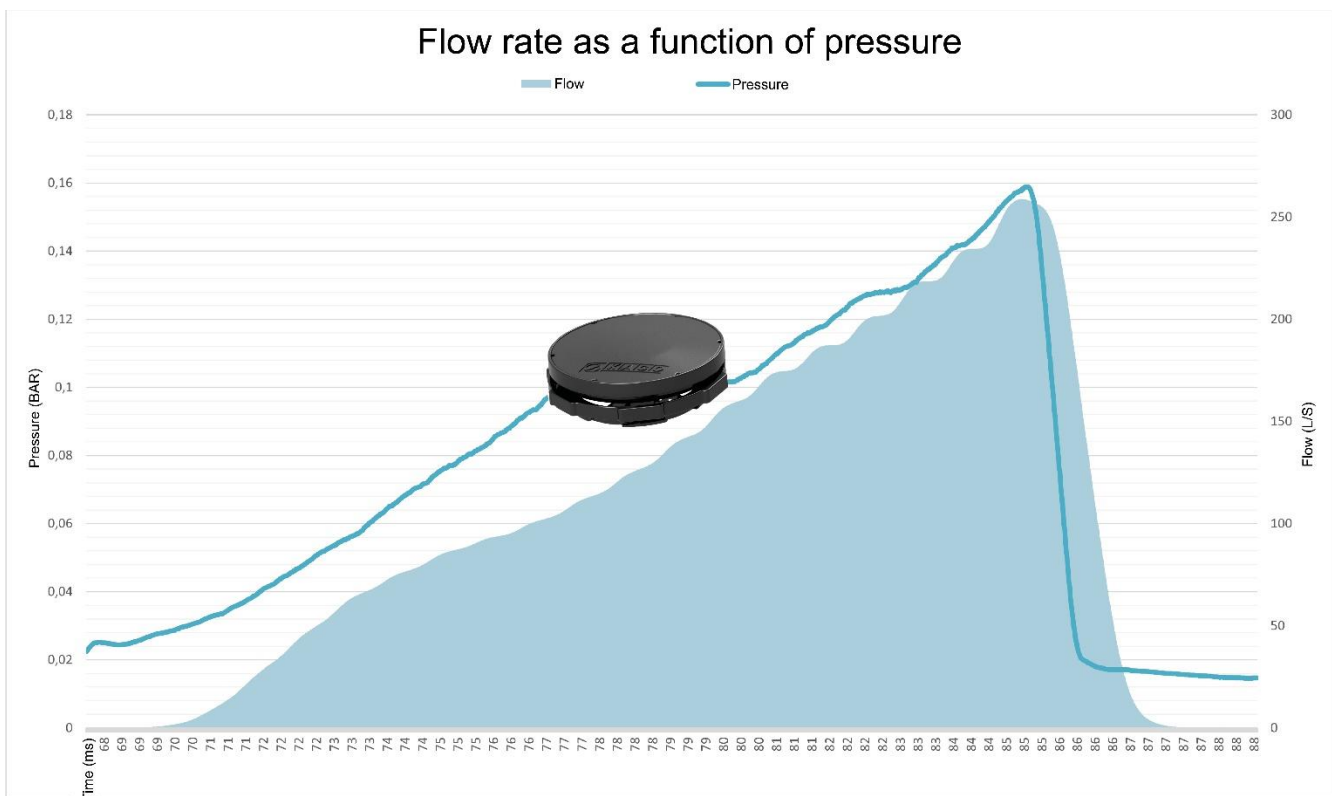


Figure 4: Outflow behavior of the quick deflation with PBU

Component testing

For years, the expansion of KACO's product range has gone hand in hand with the expansion of its global testing capabilities. The test facilities built for rapid venting enable rapid validation of the properties simulated in advance using the digital twin. All sub-functions of the rapid venting with PBU can be tested with test setups developed specifically for this purpose. Thus, as usual, customers of the sealing expert can rely on KACO responding to their wishes and standing by them as a competent

partner, from design and simulation to the creation of prototypes and the validation tests to be carried out with them, right through to the start of series production.

Vice President Research & Development Andreas Genesisius expresses his enthusiasm for the further development: "With the further development of quick deflations for battery systems, KACO offers the full range of solutions required to ensure continuous pressure equalization as well as quick emergency venting of traction batteries. The high level of materials expertise and the use of state-of-the-art fluid simulations make a valuable contribution as part of the transformation of the automotive industry. In addition to all the topics we have been involved in for decades in the field of oil and coolant seals, it is remarkable how quickly we have been able to expand our new product family around the subject of ventilation and deaeration. The high level of innovation from our company guarantees our customers a strong partner at their side now and in the future, which is certainly an advantage given the current pace of technological change."

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 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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