

WHY

Testing the flight suitability of lithium-ion batteries for electric vehicles in the world's largest test centre for high-voltage batteries.

HOW

Turnkey solution
According to UN 38.3.4.1
Safety device included

WHAT

Vacuum temperature test chamber
Reinforced version

WHY - The challenge.

FEV Group GmbH has built the world's largest development and test centre for high-voltage batteries for electric vehicles in Saxony-Anhalt. A wide variety of tests are carried out on 15,500 square metres and in around 70 facilities.

These include a negative pressure test in accordance with test standard UN 38.3.4.1. This tests whether the lithium-ion batteries are suitable for transport by air under negative pressure conditions. For this purpose, the cells and batteries must be stored for at least six hours at a pressure of 11.6 kPa or less and an ambient temperature of 20 °C (± 5 K).

The turnkey vacuum temperature test chamber shall be provided with safety equipment in accordance with the determined hazard level.



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HOW - The idea.

In order to provide stability and safety suitable for negative pressure, it was necessary to plan a reinforced test chamber. Based on proven standard modules, a reinforced and extremely robust steel construction was developed.

In order to protect the test system from sudden overpressure in the event of a failure of the test specimens, a bursting disc was integrated as a safety device.

The turnkey solution also included the integration of an operating software which, in addition to control, also allows monitoring, evaluation and documentation of the tests and enables networking with other test systems.



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WHAT - The solution.

The vacuum-temperature test chamber has a test chamber with a volume of 16 m³ and is suitable for up to 1,000 kg of test material.

The pressure tests can be carried out at a constant temperature of 20 °C, the temperature deviation over time is ± 5 K. The adjustable pressure range extends from atmospheric pressure to 100 mbar. The pressure reduction from atmospheric pressure to 100 mbar takes place at approx. 25 mbar/min, the pressure increase from 100 mbar to atmospheric pressure at approx. 100 mbar/min.

Selected product: **WT 16'/+20/D LiHL4**

As a special safety device, a bursting disc is installed in the test room ceiling. In an emergency, a large volume of air is abruptly discharged from the test chamber. It responds at a pressure of 0.25 mbar bar g at 22 °C.



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Design features:

- Stainless steel test chamber
- Solid steel reinforcements for increased stability
- Test room door with inspection window and electrical door locking with emergency release inside
- Tension- and pressure-resistant feed-throughs into the test chamber for customer's cables and test equipment
- Emergency stop button, signal column, warning buzzer
- Web panel for touch control, with status and warning display via LED
- Webseason operating software, control and monitoring software SIMPATI