

WHY

Corrosion resistance tests of lithium-ion batteries for electric vehicles with temperature cycling in the world's largest test centre for high-voltage batteries

HOW

Turnkey solution
According to GS 95024-3-1 section K06 and K07 and other standards
Including safety device (HL4)

WHAT

Walk-in special construction test chamber
Central cooling supply
Stainless steel design (V5A)
Including temperature control

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 sqm and in around 70 facilities.

These include salt spray tests to test corrosion resistance in accordance with GS 95024-3-1 sections K06 and K07 and other standards. In the tests, lithium-ion batteries are brought to temperatures of -40 °C to +80 °C and exposed to a spray of 5% NaCl water solution at varying temperatures for a specified time.

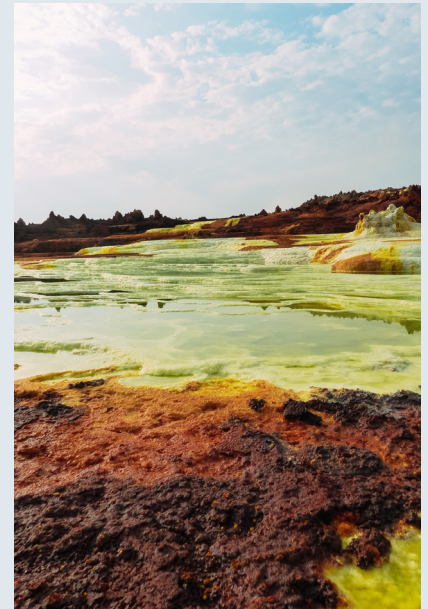
The cold is supplied via the central refrigeration system. The turnkey salt spray test chamber shall be provided with safety equipment according to the determined hazard level.

HOW - The idea.

To withstand the temperature changes, the test chamber and all components installed in it must be made of high-quality stainless steel (V5A).

The salt solution in the test chamber is nebulised via 2-substance nozzles arranged in special spray channels on the side walls. The salt solution is nebulised in the test chamber with humidified, heated compressed air according to the injector principle. This ensures a uniform salt mist distribution over the entire test chamber area of 1.5 +/-0.5 ml /80 cm² h.

The test chamber is heated by electric heaters. For heating, cooling, humidifying and dehumidifying, a recirculation system is provided on the rear wall. Due to the poor thermal conductivity of stainless steel, the stainless steel heat exchangers integrated in this system must be dimensioned larger in order to achieve the required temperature change rates.



**weisstechnik Salt spray test chamber (stainless steel)
for lithium-ion batteries with test piece temperature contro**

WHAT - The solution.

The salt spray test chamber has a 16 m³ test chamber for testing lithium-ion batteries (packs) at varying temperatures in a saline atmosphere. The test chamber and the fixtures are made of corrosion-resistant V5A stainless steel. For installation in the pit provided by the customer, the chamber is compactly built on a base frame and allows floor-level access.

For ventilation of the test chamber after a test, a fan is integrated for blowing out with air from the installation room. The salty exhaust air must be led outside on site.

Selected product: WT S/KWT 16/40-80/LiHL4

The required safety devices for tests on lithium-ion batteries have been taken into account to a certain extent. The test chamber was set up in a separate area, additional safety equipment was provided by the customer.



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Design features:

- Brine storage tank 500 l
- Safety devices according to Hazard Level 4:
 - Electric door locking with emergency unlocking
 - Status display with signal lamp and horn
 - Reversible pressure relief flap in the sloping roof to compensate pressure fluctuations in the test chamber
 - 2 draught- and pressure-resistant feed-throughs (200 mm with sealing plugs and plug protection on the outside)
- 2-leaf test room door with viewing window and rising hinges for installation in on-site pit with floor-level access
- Siphon for condensate drain
- Emergency stop button in the test room
- Ventilation fan and shut-off damper with status monitoring
- Fault signal on potential-free switch contact