

WHY

Luft-Eiswasserschok-Prüfung
von Lithium-Ionen-Batterien für Elek-
tro-Fahrzeuge

HOW

Turnkey-Lösung
Tests gemäß VW 80000:2017 LV124
K-13

WHAT

Corrosion-resistant test chamber with
ice water basin
Lifting device
Water circulation device
Safety according to Hazard Level 5

WHY - The challenge.

High-voltage batteries for electric vehicles must be tested for their functionality during sudden immersion in water in accordance with test standard VW 80000:2017 LV124 K-13.

In the demanding tests, the test material is first heated to 60 to 90 °C and then shock-cooled by rapid immersion in 0 °C cold water. A test series consists of 20 cycles with five minutes of immersion time each. Since the ice water must have a salt content of 5%, the test system must be designed to be corrosion-resistant.

The system shall be suitable for entire battery packs weighing up to 800 kg. The lifting-lowering mechanism shall lower the test material 1.5 metres into the water basin within 5 seconds. Since outgassing can occur when lithium-ion batteries come into contact with salt water, appropriate protective measures are required.

HOW - The idea.

The test chamber consists of an air temperature control area with a fan unit and an ice water basin below. The test material is fixed on a test material carrier and lowered into the ice water basin via a spindle lifting device.

The lifting device is equipped with a powerful lifting spindle drive. Parts that require maintenance and are susceptible to corrosion are mounted outside the test chamber and are held there by a steel construction frame.

The ice water basin filled with 5% salt water is cooled down to the specified temperature by a refrigeration unit and a permanently operating circulation pump and kept there. The basin is dimensioned so that test specimens up to a height of < 850 mm can be tested.



WHAT - The solution.

The test system has an approx. 10 m³ test chamber in the air temperature control area and an approx. 11.7 m³ ice water basin. It is suitable for test items weighing up to 800 kg. The test material can be conveniently brought in via the double-wing test chamber door.

Because of the risk of corrosion from the salt water, the entire test chamber, including pumps and circulation unit, is corrosion-resistant.

Selected Product: TS 22'/+60 AS/Li

In order to minimise the risk of explosion due to possible reaction gases that can arise when lithium-ion batteries come into contact with salt water, the test room must be permanently purged with fresh air. This is done via an external supply air temperature control unit. A sufficiently large external heating coil ensures that the air test chamber reliably maintains the required temperature despite the constant supply of fresh air.

Design features:

- Safety devices according to Hazard Level 5:
 - Electric door locking with emergency release
 - Particle barrier in door
 - Status display with signal lamp and horn
 - Supply air temperature control unit for reducing the gas concentration
 - Draught- and pressure-resistant feed-throughs (with sealing plugs and plug protection on the outside)
 - 3 feed-throughs for nozzles of a high-pressure fog system
 - Reversible pressure relief flap on the roof of the test chamber to compensation of pressure fluctuations in the test room
- Cable drag for fast tracking of the of the test material supply lines during lifting/lowering
- Regulation and control via digital control system SIMPAC[®], WEBS[®] software and web panel on the test system