



// BATTERY TEST CENTER ELECTRICAL TESTS



The mission of the battery test center is to conduct performance, lifetime, endurance, and safety tests on cells, modules, and batteries designed for portable, mobile, and stationary energy storage systems. A great deal of effort is devoted to characterizing batteries under various operating conditions and studying their behavior in response to abuse and crash.

"In the eLaB we investigate, test, and analyze batteries and systems according to standards or by new innovative methods."

Dr. Olaf Böse, Head of Department



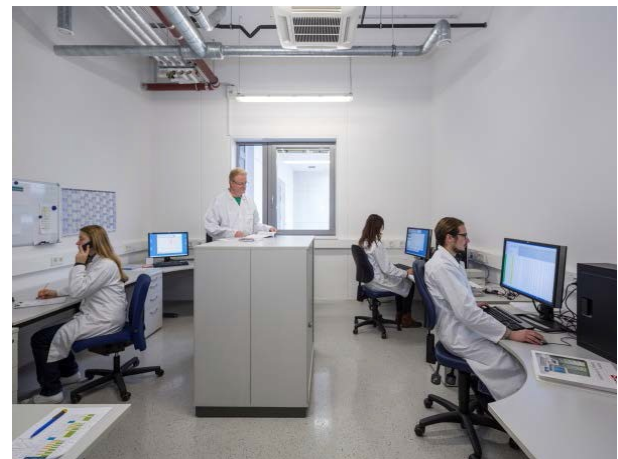
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// ELECTRICAL TESTS

Battery tests can be done under normal conditions and in extreme temperature conditions. We test Hybrid- / Battery vehicles (HEV; BEV), PV-application and stationary applications-



// EQUIPMENT AND INFRASTRUCTURE



Li-Hybrid Module - Single cell measurements - 400V-Li-Hybrid System

Battery Packs - Systems

- **8 test rooms with safety monitoring, 1 external climate chamber**
- **Battery test units**
 - 1x 1000V / 2x600A / 2x180kW with data logging system, parallel operation possible ($I_{max}=1200A$, $P_{max}=360kW$) with new climate chamber (dimensions: 3,5m x 2,5m x 1,5m height)
 - 1x 1000V / 400A / 320kW with data logging system
 - 1x 600V / 3x300A / 3x80kW, 2Q, short time 135kW (30sec), $I_{max}400A$, parallel operation possible (max. 900A, 1200A peak. (30sec.)), data logging system
 - 4x 600V / 2x300A / 2x80kW 2Q, short time 135kW (30sec), $I_{max} 400A$, parallel operation possible (max. 600A, 800A peak. (30sec.)), data logging system
 - 2x 500V / 250A / 50kW, 2xCAN
- **Climate and temperature chambers**
 - Climate chamber with 81m³, climate chamber with 20m³
 - Various climate- or temperature chambers in the size 1500l to 2000l
- **Impedance meter Gamry for use with Battery Tester 1000V / 400A / 320kW tester**
- **Liquid cooler, in various sizes: 2,5 kW to 18,5 kW**

Modules

- **8 test rooms with safety monitoring**
- **Battery test units**
 - 1 test unit 600V / 400A 60kW with data logging system
 - 1 test unit 600V / 300A 60kW with data logging system
 - 1 test unit 600V / 300A 100kW with data logging system
 - 1 test unit 500V / 300A 65kW with data logging system

- **Module test units**
 - 50 test units 100V / 50A (parallel operable max. 250A) with data logging system
 - 2 test units 100V / 500A/42,5kW (parallel operable max 1000A), fast, with data logging
 - 2 test units 100V / 350A (parallel operable max 700A), fast, with data logging
 - 2 test units 60V / 150A
 - 1 test unit 70V / 220A
 - 1 test unit 60V / 250A, Peak 700A 1sec DCH, 15kW DCH
- **Temperature chambers**
 - 5 x 1000 l, -40°C/180°C
 - 1 x 1000 l, -70°C/180°C
 - 1 x 1000 l, -40°C/180°C
 - 2 x 600l, -40°C/100°C
- **1 Impedance meter**
- **1 High accuracy – mΩ-meter**

Cells

- **8 test rooms with safety monitoring**
- **Cell test units**
 - 12 x 6V / 200A, I_{max} 300A for 10s (parallel operable), with data logging system
 - 12 x 6V / 250A, I_{max} 300A for 10s (parallel operable), with data logging system
 - 4 x 20...20V / 100A (parallel operable max. 400A)
 - 40 x 18V / 50A (parallel operable max. 250A) with data logging system
 - 32 x 10V / 150A (parallel operable max. 600A) with data logging system
 - 2 x 10V / 400A (parallel operable max. 800A), fast, with data logging system
 - 4 x -5V...20V / 750A (parallel operable, I_{max}=3000A)
 - 16 x 6V / 80A (parallel operable, I_{max}=400A)
 - >100 x 0.5V-4.5V / 50A
- **Temperature chambers -**
 - 13 x 400 lit. , -40°C/180°C -
 - 12 x 200 lit., -20°C/85°C
- **1 Impedance meter**
- **1 High accuracy mΩ - meter**

EQUIPMENT for LV124, LV123 and LV 148

The battery testing includes also tests according to LV124, LV123 and LV 148.

The realization of the tests occurs with a BOLAB Systems testing device with a huge library of the common tests according to the requirements of the test specifications. In addition, the tests can be carried out with modified or own procedures.

Key parameters for testing with the BOLAB systems:

- -16 V ... +70 V | 228 A | 6.000 W
- Frequency full range: DC...200kHz
- Rise-/fall time: 100V/μs
- DC current 228V (I_{pk}(5ms) +570A
- For pack voltages greater than 70V a serial implementation of HV-DC power supply or battery tester (e.g. 500V DC/500A/100kW) is possible

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