# Press release

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Stress test for electrical energy storage systems

**EU standard development for enhanced battery safety and performance**

**Weiss Umwelttechnik has planned and realised a very special test bench for lithium-ion batteries with high energy density at the EU research centre (JRC). For the first time computer tomographic (CT) images are possible during battery operation, thus making the test system the first of its kind.**

Heat, cold and humidity are the major environmental influences on batteries in electric cars, e-bikes or solar power systems. Now, the changes in these batteries under a wide range of different environmental influences – during operation – can be investigated using the test system. The scientists at the JRC expect test results that improve safety, durability and performance of the batteries. Another objective is the development of EU-standards.

The researchers also intend to use CT images to find internal weakspots. Thus chemical processes inside the battery can be followed dynamically under stress conditions, for example. In addition, the entire external test space can be moved on a linear guide in order to focus the CT images. In combination with a rotary table, a 360° view of the DUTs during the tests is also possible. The batteries are subjected to stress beyond the usual load limits under extreme environmental conditions and current load during the computer tomographic recording.

**Safety equipment guarantees safe stress tests**

Safety is top priority: To protect personnel from CT radiation, the external test space was realised in an installation room clad with lead on the outside. During stress tests on the battery, there is a risk of overheating, fire or even explosion. To prevent explosions happening, the external test space is build with protective measures for ATEX Zone 1 classification.

In addition, Weiss Umwelttechnik has equipped the entire system with protective measures which comply with a classification up to EUCAR hazard level 6. The conditioning device is outside the installation room unprotected from the beams. To ensure no openings occur for radiation emission, the supply pipes for climate control and the pipes for gas discharge via a pipe labyrinth must be routed out of the lead-clad room. Permanent oxygen-controlled inerting is realised as a protective measure, for example. Through this, just enough nitrogen (N2) is introduced as is necessary from a safety point of view. Four different gas sensors monitor the test space, two more the lead-clad installation room, in order to detect leaks in the battery DUT.

The Fraunhofer company was commissioned to build the battery test bench in Petten, Holland. This company also researched the suitable material which allowed the CT radiation to penetrate while ensuring the gas tightness of the test space at the same time. Together with partner diondo, specialist for industrial computer tomography, Weiss Umwelttechnik planned and realised the climate-related part of the test system including all safety equipment.

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**Photo material:**



Picture 1: Weiss Umwelttechnik, own image

*Standards for electrical energy storage systems will be developed on the first test system for energised stress tests with CT images in future.*

**The Weiss Technik companies**

With the slogan “Test it. Heat it. Cool it.”, the Weiss Technik companies offer solutions that can be used across the globe in the fields of research and development, as well in the production and quality assurance processes for numerous products. A strong sales and service organisation with 22 companies in 15 countries at 40 locations offers excellent support to customers and a high level of operating reliability for the systems. The **weiss**technik® brand includes customised solutions for environmental simulations, clean rooms, air conditioning, air dehumidifying and containment solutions. With the test systems from the environmental simulation sector, environmental influences across the globe can be simulated in time lapse. The product to be tested is investigated under real loads in terms of its functionality, quality, reliability, material resistance and lifespan. The dimensions of the test equipment range from laboratory test chambers to test chambers for aeroplane components with a volume of several hundred cubic metres. The Weiss Technik companies are part of the Schunk Group, which is based in Heuchelheim near Gießen/Germany.

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