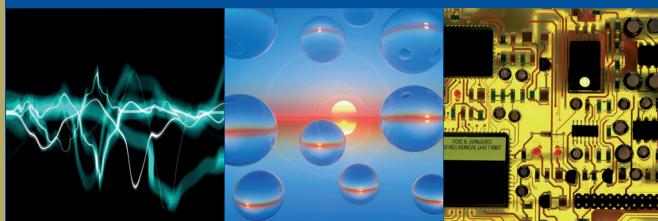


# BATTERY TEST CHAMBERS

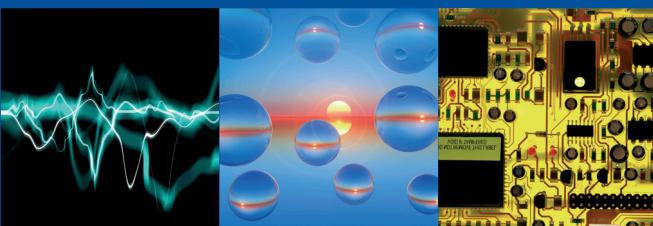


ATT provides a range of standard chambers for battery tests in different sizes of housing from the small LV start battery up to an electric vehicle multicell traction battery.

Temperature and humidity are precisely controlled in a wide range of conditions.



# BATTERY TEST CHAMBERS



## ACCESSORIES

As well as climatic simulation, the battery chamber features a kit of accessories that makes the testing procedure easier and safer; gas, flame and smoke detection; fire extinguisher; and overpressure valve.

The proposed devices have been optimized in accordance with the EUCAR Hazard Levels in order to create a standard for safety analyses (Table 1).

HAZARD LEVEL	DESCRIPTION	CRITERIA FOR SEVERITY CLASSIFICATION & EFFECTS
0	No effect	No effect, no loss of functionality.
1	Reversible Loss of Function	No defect; no leakage; no venting, fire, or flame; no rupture; no explosion; no exothermic reaction or thermal runaway.
2	Irreversible defect/damage	Temporary loss of battery functionality. Resetting of protective device needed.
3	Leakage mass < 50%	No leakage; no venting, fire, or flame; no rupture; no explosion; no exothermic reaction or thermal runaway. RESS irreversibly damage. Repair needed.
4	Leakage mass ≥ 50%	No venting, fire, or flame; no rupture; no explosion. Weight loss ≥ 50% of electrolyte weight.
5	Fire or Flame	Heavy smoke (electrolyte=solvent+salt).
6	Rupture	No rupture; no explosion (i.e. no flying parts).
7	Explosion	No explosion. RESS could disintegrate but slowly without flying parts of high thermal or kinetic energy.

Table 1: Severity Levels (Adopted and modified by EUCAR)

Our list of accessories has been optimized in accordance with the hazard levels defined by the EUCAR, with each hazard level associated with a series of accessories.

HAZARD LEVEL	DESCRIPTION
0 ... 2	<b>OPTICAL/ACOUSTIC ALARM AND 4 SUPPLEMENTARY PT100 SENSORS</b> The luminous cylinder has 3 signal levels (white, green, and red) and serves to attract the operator's attention in the event of anomalous functioning of the equipment. The 4 supplementary sensors may be used to monitor the temperature of the specimen in the chamber.
3 ... 4	<b>FLUSHING SYSTEM WITH GN2 OR COMPRESSED AIR</b> In the case of connection to a nitrogen gas system, the system makes it possible to create inert conditions in the test chamber and, in this case, it may be coupled with the oxygen sensor to increase the degree of reliability of the device. <b>OXYGEN SENSOR, H2 SENSOR, CO SENSOR</b> Monitoring of the above-said gases in the chamber in all functioning conditions envisaged in the technical specifications. <b>OVERPRESSURE VALVE</b> The system is positioned in the upper part and has been conceived to protect the chamber from any gradual releases of gas by the specimen. The system is not designed to compensate for internal overpressures of an explosive nature. The device must be appropriately connected to the outside in order to avoid contamination of the test area.
5 ... 6	<b>C02 FIRE EXTINGUISHING SYSTEM</b> The system is equipped with a fire extinguishing control unit, a smoke sensor for the analysis of the test volume, and a system with a C02 cylinder for automatically extinguishing any fire in the chamber. The whole system is supplied from the outside.