



TESTA BT

ENVIRONMENTAL AND TEMPERATURE
CHAMBERS FOR BATTERY TESTING




aralab





ARALAB is a company specialised in designing, developing, manufacturing and servicing of high quality climatic chambers and controlled environment rooms.

Since 1985 we have been perfecting ways to create and control temperature, humidity, light, air flow and many other environmental conditions.

Only the highest quality components are used to manufacture our chambers so customers can have the best equipment for their research and testing purposes.

Control the environment, Your own climate.



As advances in technology drive the proliferation of portable devices and electric vehicles, the need for high-performing and reliable batteries has never been more crucial.

Our environmental chambers provide a controlled environment, emulating the diverse temperature and humidity conditions that batteries may encounter throughout their lifecycle. As such, Aralab offers an optimized range of battery testing solutions in line with the EUCAR hazard levels, ensuring safe, reliable, and sophisticated testing for energy storage systems.

We provide both standard and tailor-made solutions, putting an emphasis on planning and creating individual systems that adhere to your specific application needs. Each chamber can be equipped with a variety of safety measures based on your internal hazard analysis, complying with the EUCAR Hazard Level classifications.



Certified ISO:9001 for its Quality Management System
Certified ISO:14001 for its Environmental Management System

RECHARGEABLE LITHIUM BATTERIES

AUTOMOTIVE - COMPUTER - TELECOMMUNICATIONS - DEFENSE - CONSUMER - ENERGY



Rechargeable Lithium Batteries became the choice energy storage for portable electronic devices, appliances, electric bicycles, vehicles, military equipment, etc. Reliability and safety become crucial. The batteries must perform well in hot and cold conditions, while not posing a hazard due to leaking or exploding.

Published standards by IEC, SAE, UL, and UN specify environmental tests like temperature cycling, heat resistance, thermal abuse and short circuit while hot.

Because failure during testing can produce hazardous results, these test chambers will require proper safety features and considerations.

THE MOST COMMON TEST STANDARDS FOR LITHIUM ION BATTERY

| | |
|-------------|---------------------------------------|
| IEC 62660-2 | Abuse testing of automotive batteries |
| SAE J2464 | Automotive rechargeable batteries |
| IEC 60086-4 | Safety of lithium batteries |
| UL 1642 | Lithium ion batteries |
| UN/DOT 38.3 | Testing lithium ion batteries |
| IEC 61960 | Portable battery cells |
| UL 2054 | Consumer and commercial batteries |
| IEEE 1625 | Laptop rechargeable batteries |
| IEEE 1725 | Phone rechargeable batteries |

During the thermal tests, battery malfunctions may occur that can lead to the destruction of the batteries. For this reason, safety in the laboratory and protection of the staff during such tests must have the highest priority.

Aralab TESTA chambers for Battery Testing can offer safety systems / devices which comply with the EUCAR Hazard Levels. The Hazard Levels safety equipment can be adapted according to customer specifications. Based on your own testing needs and safety requirements, Aralab can help with the required safety options to create a comprehensive security system.

EUCAR HAZARD LEVELS AND DESCRIPTION

EUCAR assigns the hazard levels shown in Table below to an electrical energy storage systems technology based on that technology's response to abuse conditions. Manufacturers and integrators may find it useful to consider these EUCAR Hazard Levels when evaluating the abuse response.

| HAZARD LEVEL | DESCRIPTION | CLASSIFICATION CRITERIA / EFFECT |
|--------------|------------------------------|---|
| 1 | Passive protection activated | No defect; no leakage; no venting, fire or flame; no rupture; no explosion; no exothermic reaction or thermal runaway. Cell reversibly damaged. Repair of protection device needed. |
| 2 | Defect Damage | No leakage; no venting, fire or flame; no rupture; no explosion; no exothermic reaction or thermal runaway. Cell irreversibly damaged. Repair needed. |
| 3 | Leakage - mass < 50% | No venting, fire or flame; no rupture; no explosion. Weight loss < 50% of electrolyte weight (electrolyte = solvent + salt). |
| 4 | Leakage - mass > 50% | No fire or flame; no rupture; no explosion. Weight loss 50% of electrolyte weight (electrolyte = solvent + salt). |
| 5 | Fire or Flame | No rupture; no explosion (i.e. no flying parts). |
| 6 | Rupture | No explosion, but flying parts of the active mass. |
| 7 | Explosion | Explosion (i.e. disintegration of the cell). |

EXTENSIVE IN BASIC SETUP AND ACCESSORIES. FLEXIBILITY FOR SPECIALIZED MODIFICATIONS.

When conducting tests on electrical storage devices, the optimal choice for superior protection of individuals, test specimens, test equipment, and the laboratory environment is Aralab's range of trusted climatic and temperature chambers. These chambers are easy to operate and available in a range of test space volumes from 40 to 2,000 litres, with a broad selection of standard accessories to choose from.

HAZARD LEVELS SAFETY EQUIPMENT

| LEVELS | COMPONENTS |
|-----------|---|
| LEVEL 0-3 | Status Indicator |
| | Security Door Lock |
| | Emergency Stop |
| LEVEL 4 | Mechanical Door Lock |
| | Reversible Pressure Relief |
| LEVEL 5 | Fire Detection/Extinguisher (Activated by Temperature or Manually) (could be activated by CO, check accessories list) |
| | Gas Measurement (3 gases - As standard CO, H2, H2S) (more available as accessories) |
| LEVEL 6 | Explosion Pressure Relief Window |
| | Inertization with N2 including O2 sensor (Cylinder not included) |

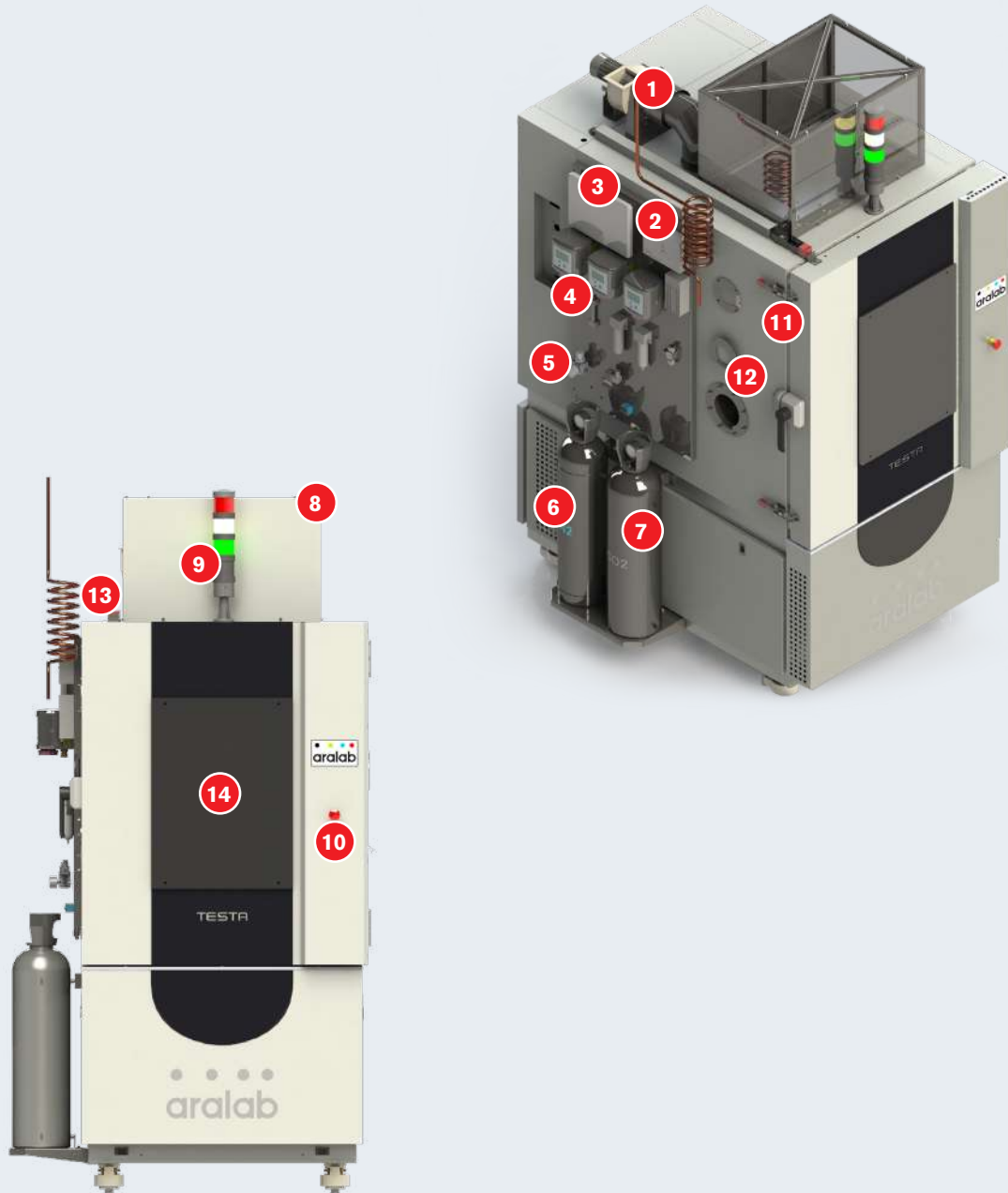


EUCAR HAZARD LEVEL PROTECTIONS

| HAZARD LEVEL 0-3 | HAZARD LEVEL 4 | HAZARD LEVEL 5 | HAZARD LEVEL 6 |
|---|---|--|---|
|  |  |  |  |
| Status indicator | Mechanical Door Lock | Fire extinguishing | Permanent gas inertization with nitrogen or argon. O ₂ measurement |
|  |  |  |  |
| Emergency Stop | Reversible pressure release | Fire detection w/ CO Sensor | Gas Measurement CO, H ₂ , H ₂ S) (more available) |
|  |  |  |  |
| Security Door lock | Special entry-ports | ATEX Extration / renovation | Explosion Pressure relief |
| | |  | |
| | | Gas Measurement CO, H ₂ , H ₂ S) (more available) | |



SAFETY DEVICES. EXAMPLE IN TESTA 500 EC-45 BT



- | | | | |
|----|--|-----|--|
| 1. | Flushing ATEX System | 8. | Explosion Pressure Relief System |
| 2. | Fire detection and extinguishing system | 9. | Status Indicator |
| 3. | PLC - Safety Control Systems | 10. | Emergency Stop command |
| 4. | Gas Sensors – CO, H ₂ , HF, HC, O ₂ , others | 11. | Mechanical Door Lock w/ retaining clamps |
| 5. | Permanent Gas Inertization Inlet | 12. | Security Entry Ports |
| 6. | N ₂ - Gas Cylinder or N2 Inlet | 13. | Security Door Lock |
| 7. | CO ₂ - Gas Cylinder | 14. | Polycarbonate window protection |



TESTA BATTERY TESTING CHAMBER



TESTA ATEX CHAMBER



GAS SENSORS, FIRE DETECTORS



POLYCARBONATE WINDOW PROTECTION



SAFETY CONTROL SYSTEMS PLC



MAGNETIC DOOR LOCK AND MANUAL LATCHES



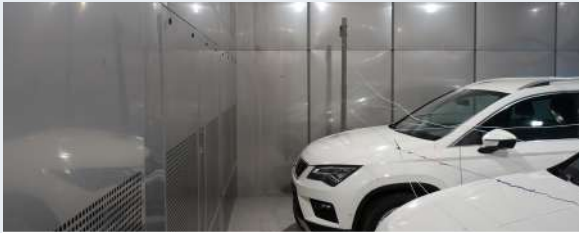
INERTIZATION SYSTEMS



FLUSHING / PRESSURE RELIEF SAFETY

BIGGER TESTING SPACE OR OTHER SPECIFIC REQUIREMENTS?

If you find that standard test chambers don't meet your size needs, or your testing requirements demand a custom solution, Aralab provides you with an extensive range of options. As a comprehensive solution provider, we engineer and build testing chambers and rooms from walk-in test chambers to vehicle-sized test rooms, allowing for expansive testing space. Furthermore, our portfolio expands to include test systems for solar radiation, temperature shock, ATEX protection chambers, vibration tests, and multi-axial shaker tables (MAST).

**DRIVE-IN AUTOMOTIVE TESTING****WALK-IN CLIMATIC TESTING****VIBRATION TESTING****SOLAR AND UV RADIATION CHAMBER****EUCAR ATEX WALK-IN CHAMBERS****TEMPERATURE SHOCK CHAMBERS****SUN SIMULATOR DRIVE-IN**

Let's meet!

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Control the environment

Your own climate