CVMS
CLIMATIC
World-class Climatic Test Chambers and Environmental Test Equipment
www.cvmsclimatic.com

CVMS Climatic

# Introduction

The principal aim of environmental testing is to establish and take steps to improve the quality of manufactured products in terms of performance, robustness, and reliability. It is also used to simulate conditions experienced during the manufacturing process, storage, transport, and operation. A carefully designed environmental test programme carries the ultimate aim of eliminating field failures when a product is brought to market.

A defect or failure can trigger a wide range of actions such as recall, repair or replacement and can result in lost sales, lost time investigating and dealing with the problem, as well as financial cost and reputational damage.

Aerospace, Automotive, Electronics, Defence and Pharmaceuticals are among the many industry sectors that have developed mature environmental test programmes over many years, and the quality and safety of finished goods has never been as high as it is today.

New industries and technologies, for example, renewable energy and storage, bring their own unique test requirements. The environmental test industry has had to rise to meet these new challenges with a range of products that can test and validate, effectively and safely.

# About Us

CVMS Climatic is at the forefront of the design, build and supply of Environmental Test Equipment, from its compact climatic chamber range to large-scale walk-in or drive-in climatic test facilities.  As well as controlling temperature and humidity in defined test spaces, we also offer a wide range of products that simulate other environmental effects, including low pressure (altitude), solar radiation and UV light, rainfall, dust, and corrosive atmospheres.

## World-class Climatic Test Chambers and Environmental Test Equipment

We can lend our expertise in the field of combined testing where more than one environmental effect is required, such as vibration and temperature cycling.

Whether your need is for a simple benchtop temperature chamber or a multi-environment test facility, we can meet your requirements with our world-class and cost-effective range of test systems.

Climatic and Environmental Test Chambers

# Compact Range

Our compact range of test chambers provide an extremely cost-effective entry into the world of climatic testing. These chambers are ideally suited for labs and test rooms where space is at a premium. The chambers are manufactured from high quality materials and components procured from world-class manufacturers so that performance and reliability is built in. The compact series feature a colour touch screen programmable controller for easy operation and close control of temperature and humidity, as well as the functionality and operational range of much larger systems.

**Specifications**

- Internal volume: three chamber sizes: 36, 64 and 100 litres
- Temperature ranges: -20˚C, -40˚C, -50˚C, -70˚C...+180˚C
- Heating rates: up to 5 $Kmin^{-1}$
- Cooling rates: up to 5 $Kmin^{-1}$
- Temperature fluctuation: ±0.5˚C
- Temperature uniformity: ±1.5˚C
- Humidity range: 30%RH ... 98%RH
- Humidity fluctuation: ±3%RH

**Standard Features**

- Colour touch screen controller
- RS232 communications
- Viewing window
- Internal illumination
- 2 x shelf (adjustable)
- 50mm Ø porthole

**Options**

- Trolley / test stand
- Air dryer for low RH applications
- Password controller lock
- Bespoke options for test space, temperature and humidity range
- Additional portholes and shelves
- Ethernet communications

Climatic and Environmental Test Chambers

# Climate +

CVMS Climatic introduce a new standard in high performance temperature and climatic chambers. With a selection of temperature range options and performance capabilities in sizes from 150 to 1000 litres, these chambers will provide solutions for test applications across all industries. Manufactured from high quality materials and components procured from world-class manufacturers, reliability is built in. The climate + series feature a colour touch screen programmable controller for easy operation and close control of temperature and humidity, test data display and logging and remote-control options.

**Specifications**

- Internal volume: six chamber sizes: from 150 to 1000 litres
- Temperature ranges: -20˚C, -40˚C, -50˚C, -70˚C...+180˚C
- Heating rates: up to 5 $Kmin^{-1}$
- Cooling rates: up to 5 $Kmin^{-1}$
- ESS range: 10, 15, 20 $Kmin^{-1}$ (water cooled)
- Temperature fluctuation: ±0.5˚C
- Temperature uniformity: ±2.0˚C
- Humidity range: 20%RH ... 98%RH
- Humidity fluctuation: ±3%RH

**Standard Features**

- 9-inch Colour touch screen controller
- SD card data storage
- RS232 or Ethernet communications
- Viewing window
- Internal illumination
- 2 x shelf (adjustable)
- 50mm or 100mm Ø porthole

**Options**

- Ethernet communications
- Air dryer for low RH applications
- Password controller lock
- Bespoke options for test space, temperature and humidity range
- Water-cooled refrigeration systems
- Additional portholes and shelves

Climatic and Environmental Test Chambers

# Ageing Test Ovens

CVMS Climatic offer a comprehensive range of general purpose industrial and laboratory ovens which are widely used to test materials, devices, or components for their tolerance of heat. The applications cover all industries, including aerospace, automotive, electronics, chemicals, medical, packaging and food. The standard range covers temperatures up to +300˚C and are available in sizes from small benchtop to 1000 litres. We can also offer bespoke products such as 'walk-in' ovens and high temperature furnaces as well as accessories including shelves and special racking systems.

**Specifications**

- Internal capacity: 60, 100, 200, 500, 1000 litres
- Standard ovens up to +250˚C or +300˚C
- Heating time: typically, Ambient to +250˚C in 60 minutes.
- PID temperature controllers
- Over temperature alarms
- Applications including ageing, burn-in, temperature testing
- Incubators (including cooled incubators)

**Options**

- Programmable controller
- Interface for operation with vibration system
- Bespoke designs, temperature ranges
- Nitrogen purge system
- SAFE heating for volatile atmospheres

Climatic and Environmental Test Chambers

# Vacuum Drying Ovens

Our range of vacuum drying ovens have many applications, including drying out PCBs, electrical components and small assemblies, other components, and materials and, if required, vacuum storage. It can also be used for testing the above for tolerance to heat and for processes such as curing, annealing and baking.

**Vacuum drying** is an essential 'mass-transfer' operation to remove moisture; it is generally used for the drying of substances that are hygroscopic and heat sensitive and is based on the principle of creating a vacuum that will decrease the pressure below the vapour pressure of the moisture. In other words, it reduces the 'boiling point' of the liquid to a safe level.

It can be a useful tool for solid products that are heat sensitive. Drying is an essential operation in a variety of chemical process industries such as food and pharmaceuticals. Vacuum Ovens work better than conventional ovens because they remove a potential source of contamination. For example, heating components and materials to high temperatures in conventional ovens can cause rapid oxidation which is usually undesirable.

**Specifications**

- Internal capacity: 30, 100, 200 litres
- Temperature range: Ambient +10˚C ... +200˚C
- Temperature fluctuation: ±0.5˚C
- Temperature deviation: ±2˚C
- Heating time to +200˚C
  typically 120 minutes in 200 litre chamber
- Vacuum range: 101 ... 0.1kPa
- PID controller
- Over-temperature protection
- Modular system with integrated vacuum pump
- Shelves
- 0 ... 99hr, 59min timer
- Bespoke designs to suit specific applications

Climatic and Environmental Test Chambers

# Altitude

CVMS Climatic produce bespoke altitude chambers designed to customers' exact requirements. We can offer a wide range of chamber sizes and performance designed for altitude and low-pressure applications across all industries. These chambers are manufactured from high quality materials and components procured from world-class manufacturers and feature a colour touch screen programmable controller, for easy operation and close control of the environmental parameters specified.

**Specifications**

- Internal volume: 1000 litres
- Temperature ranges: -70˚C...+180˚C
- Heating rates: up to 5 $Kmin^{-1}$
- Cooling rates: up to 5 $Kmin^{-1}$
- Temperature fluctuation: ±0.5˚C (at ambient pressure)
- Temperature uniformity: ±2.0˚C (at ambient pressure)
- Humidity range: 20%RH ... 98%RH
- Humidity fluctuation: ±2%RH (at ambient pressure)
- Pressure range: 1000mbar ... 5mbar

**Standard Features**

- Colour touch screen controller
- SD card data storage
- RS232 communications
- Viewing window

**Options**

- Ethernet communications
- Password controller lock

Climatic and Environmental Test Chambers

# Thermal Shock

CVMS Climatic produce a 2-zone and a 3-zone thermal shock chamber. The conventional 2-zone comprises a hot and a cold chamber with the test item moving between the two by way of a mechanical lift. The 3-zone has the test item in a central ambient chamber with the hot and cold air generated and stored in adjacent chambers. At the appropriate time the hot (or cold) air is directed into the ambient zone sequentially according to the programme thus providing the thermal shock.

Bespoke designs are available, tailored to specific test requirements and horizontal and vertical configurations can also be specified.

**2-zone specifications**

- Internal volume:
  four chamber sizes up to 1000 litres
- Thermal shock range: -65°C ... +180°C
- Conversion time: ≤5 sec
- Recovery time: ≤5 min

**3-zone specifications**

- Internal volume:
  five chamber sizes up to 1000 litres
- Thermal shock range: -65°C ... +180°C
- Pre-heat range: +70°C ... +200°C
- Pre-cool range: -10°C ... -75°C
- Recovery time: ≤5 min

**Standard features**

- Colour touch screen controller
- RS232 communications

Climatic and Environmental Test Chambers

# Air Treatment Unit

The air treatment unit (ATU) is designed to provide a solution to the problem faced when the test item cannot easily be accommodated inside a standard test chamber or even a walk-in facility. It may be that the dimensions will not fit or perhaps there is a test rig or apparatus that also needs to be installed either inside or outside the conditioned test area. A simple insulated enclosure is constructed around the test item, keeping any mechanical rigs or electronic test equipment safely outside. The ATU will condition air to the correct temperature prior to delivery to the test item via insulated hoses. Long-term conditioning or temperature cycling can be applied, and our standard ATU model will comply with many of the test standards in aerospace, automotive and electronics industries.

ATUs can be designed and built to meet specific requirements and bespoke enclosures, hoses or insulated ducting can also be supplied.

**Specifications (standard model)**
For a typical 1m$^3$ enclosure with 100kg steel load

- External dimensions: D1400 x H2400 x W1280 mm (approx.)
- Temperature range: -60˚C...+120˚C
- Heating rate: 3 Kmin$^{-1}$
- Cooling rate: 3 Kmin$^{-1}$
- Temperature fluctuation: ±0.5˚C
- Temperature uniformity: ±2.0˚C

**Standard Features**

- Colour touch screen controller
- SD card data storage
- RS232 communications

**Options**

- Ethernet communications
- Password controller lock
- Air drying system for low RH applications
- Bespoke enclosures and hose sets
- Humidity control: 30% ...80% RH

Climatic and Environmental Test Chambers

# Walk-in / Drive-in

The size of your test item is not a limiting factor with CVMS Climatic. We can produce test rooms that will fit a whole vehicle, aircraft part, space satellites or many racks of smaller items that need to be tested or conditioned in bulk.

As these chambers are built to order, all the necessary climate and performance specifications, as well as options and features can be incorporated into the design. Demands for testing in the field of renewable energy and storage bring their own challenges, and all the safety and monitoring requirements that are now needed are built into the designs and incorporated where required. CVMS Climatic are well positioned to deal with the test demands of new technologies as well as traditional industries such as aerospace, automotive, defence, electronics pharmaceutical and scientific research.

**Specifications (standard model)**

- Internal volume: typically, from 8m$^3$ upwards as required
- Temperature ranges: typically, from -70˚C...+150˚C or as required
- Humidity range: typically, 10%RH ... 95%RH or as required

**Combined Environments**

- Solar radiation
- Rainfall
- Low pressure
- Vibration

**Options**

- Water-cooled refrigeration systems
- SAFE heating systems
- Bespoke configurations / sizes of portholes
- Bespoke test racks or shelving systems
- Bespoke loading / unloading systems
- Remote control options

# UV light

CVMS Climatic produce a range of UV test cabinets, designed to imitate the effects of ultraviolet light, rainwater and dew. UVA and UVB light tubes simulate the ultraviolet light and condensed water spray simulates the rainfall and dew that can cause fading, colour change, fracturing and brittleness etc. in materials or coatings.

These tests can uncover the effects of outside exposure in a few days or weeks, instead of months or years in the natural environment. The results, subsequent investigations and further testing can help to improve the durability and appearance of materials or material combinations, and where desirable, effective coatings and treatments can be determined.

**Specifications**

- Internal volume: two standard chamber sizes of 130 and 260 litres
- UV wavelength: 313nm, 340nm
- Temperature range:
  Ambient +10°C ... +70°C
- Humidity: ≥95%RH

Climatic and Environmental Test Chambers

# Corrosion Testing

CVMS Climatic produce six standard sizes of salt fog test cabinets. They have been designed to accelerate the effects of corrosion on sample materials and devices. The results and subsequent investigations and further tests can improve the resistance of materials and devices as well as their coatings or treatments to corrosion.  This improves product robustness, reliability, and on-going safety.

**Specifications**

- Internal volume: six standard chamber sizes from 100 to 1600 litres
- Salt fog settlement: 1 ... 2ml/80 ($cm^2h$)
- Temperature range: +35˚C...+65˚C
- Temperature uniformity: ≤2.0˚C / ≤0.5°C

**Options**

- Damp heat 85%RH ... 95%RH
- Bespoke chambers and salt fog, spray apparatus according to customers' requirements.

Climatic and Environmental Test Chambers

# Ingress Protection

CVMS Climatic produce a range of test chambers for evaluating the properties of devices and equipment and their sealing methods, for resistance to the ingress of dust and water during storage, transport, and operating conditions. Typical test items include automotive parts, storage and transport containers, household appliances, electrical items, electrical cabinets, lighting systems, telecoms devices and equipment that might be installed in an outdoor environment.

The results of these tests along with subsequent investigations and further tests can help to improve product robustness, durability, reliability and on-going safety.

**Specifications**

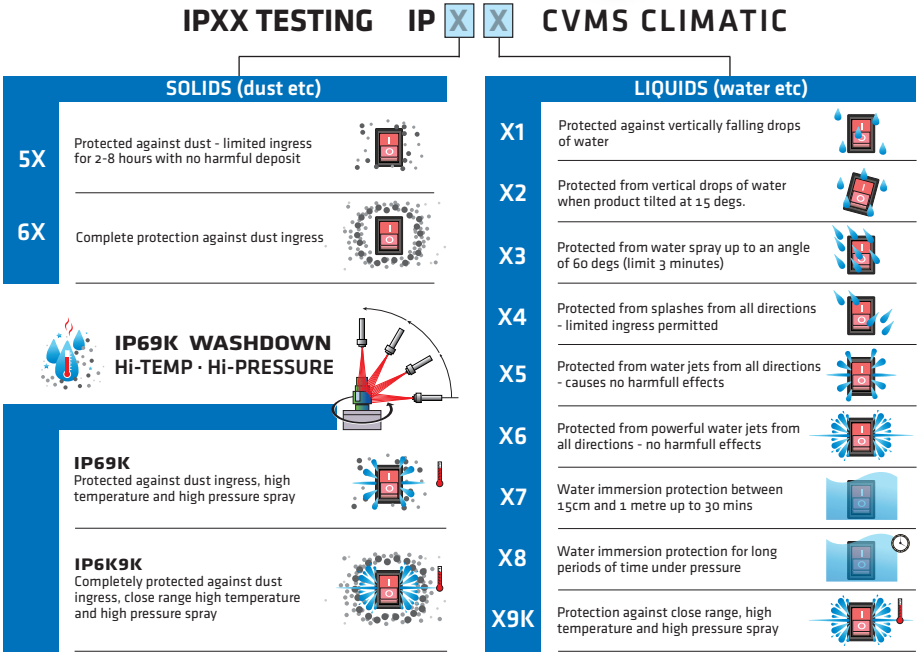
- Internal volume: four standard chamber sizes from 500 to 2600 litres
- Dust ingress standards: IP5X and IP6X
- Water ingress standards: IPX1 to IPX9K

**Options**

- Bespoke equipment for specific tests, including walk-in facilities
- Full immersion and low-depth simulation (water)
- Splash and immersion (ice water)

**Some related test standards**

- IEC60529, GB2423.38, GB4208.93, GB7000.1, GB2423.37-89, GJB150.12, GB10485, GJB150.1-86, IEC529, ISO20653:2013



Climatic and Environmental Test Chambers

# Battery Test Systems

Global demand drives new technologies and brings new challenges. One example is the electrification of the transport sector, and this has been deemed crucial if we are to meet current and future emissions targets. By 2040 more that 30% of public transport is expected to be electric and there could be as many as 300m EVs on our roads.

With demand on the increase, the test industry has had to keep pace and CVMS Climatic have developed a range of test chambers that will meet the demands of battery testing. EUCAR has produced a scale to define the level of danger and type of potential hazard associated with the failure of a lithium-ion battery. Our chambers are designed to not only provide the conditions for battery testing but detect and deal with any potential hazard caused by a battery failure. This ranges from the installation of a hydrogen detector, alarm and purge system that will deal with early signs of failure, up to a containment and extinguishing system in the event of a major malfunction including explosion.

**Specifications**

- Standard internal volumes up to 800 litres
- Temperature range -40˚C ... +150˚C
- Over-temperature protection
- Bespoke designs including walk-in and defined temperature ranges
- Separate Air Treatment Units and Test Enclosures
- Reinforced structures, explosion panel for controlled pressure release, chains to secure doors
- Gas detection: $H_2$, CO
- Fresh air inlet / exhaust
- $CO_2$ fire extinguishing

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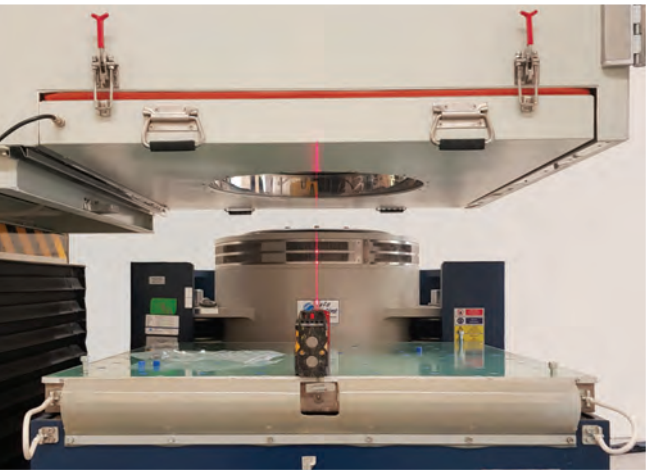

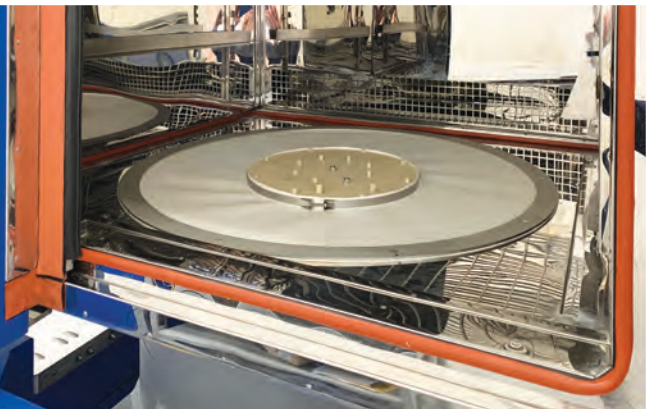

Climatic and Environmental Test Chambers

# Combined Climate – Vibration

CVMS Climatic design and build environmental test chambers to work with all manufacturers and models of electro-dynamic and mechanical vibration test systems, to provide combined climate and vibration test solutions.

The chambers are mounted on rails and can also be equipped with an elevator, which makes precise horizontal and vertical positioning over a shaker, head expander or slip table a simple operation. Bespoke gasket sets provide the seal between the shaker and the chamber environment, and thermal barriers can also be supplied to protect the vibration system from extreme temperatures.

We can match a chamber with the customer's existing shaker system, or provide a turnkey package of environmental chamber and vibration system to meet customers precise test requirements.

As these chambers are built to order, it is very easy to customise the temperature range, performance and humidity control as required. A full consultancy, supply and installation service is provided.

**Specifications**

- Test space: typically, 500 litres upwards
- Temperature range: -70˚C ... +180˚C (or customised to customer's specification)
- Temperature rate of change: 1, 3 or 5 $Kmin^{-1}$ (or customised to customer's specification)
- Humidity range: 10%RH ... 98%RH
- Horizontal and vertical motorised positioning

**Options**

- Customised floors to interface with armature, head expander or slip-table
- Access portholes, door notches for test cables etc.
- Thermal barriers and armature head expanders
- Custom-built test fixtures
- Ethernet communications

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# Bespoke Products

The size and shape of your test item and the complexity of your test is not a limiting factor with CVMS Climatic. We can build a test chamber or construct an environmental simulation or a process to your precise requirements.

**Bespoke test chambers**

- Volume typically from 1m³ to large-scale 'walk-in / drive-in' facilities
- Temperature ranges from -70°C ... +150°C or as required
- Humidity ranges from 10%RH to 98%RH
- Heating and cooling rates to suit applications
- Colour touch screen programmable controllers available with remote interface
- Combined environments; solar radiation; rainfall; low pressure; vibration
- Automotive airbag test /deployment systems
- Battery test systems with gas monitoring and fire protection
- Test chambers for PV panels
- Test chambers for fibre optics
- Long-term storage chambers with controlled temperature and humidity
- SAFE heating systems
- Complete environmental test systems that will provide environment such as vibration with temperature and humidity control
- Bespoke air treatment units to provide temperature control or cycling for test items in mechanical test rigs, tensile testers etc.
- Design and manufacture of bespoke insulated test enclosures
- ESS, HALT, HASS and HAST chambers

# Support Services

Support from CVMS Climatic can begin even before you have purchased your new test chamber. Our many years of experience as users, operators, manufacturers and suppliers of environmental equipment places us in a position to provide expert consultancy and technical support on all aspects of testing, calibration and maintenance. This can be particularly useful to a company or individual that is new to the genre.

We have chambers at our test lab that are available for demonstrations as well as short or long-term hire and we can often give a prospective purchaser the opportunity to 'try before you buy'.

It may also be important for you to know that there are no proprietary components, materials or software used in the construction of CVMS Climatic test chambers. All major components and devices are generally available worldwide through local supply chains. Therefore, if you prefer to use your own service technicians or service company there is nothing to stop you from doing so.

We provide services including preventative maintenance and calibration on all makes and models of environmental and vibration test equipment.

**Our services include:**

- Test chamber and ATU short or long-term rental
- Test laboratory services / demonstrations
- Test chamber commissioning / installation / relocation (all makes and models)
- Test equipment repair / refurbishment / upgrades / repurposing
- Preventative maintenance and emergency breakdown contracts
- On-site calibration services.
  Traceable to UKAS: temperature, humidity
- Spare parts and accessories
- Test chamber and vibration system decommissioning and recycling. Includes recovery and safe disposal of refrigerants (subject to f-gas regulations) oils, and other controlled fluids

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Specifications and parameters are correct at the time of publication. Our design, development and continuous improvement policies may result in component or specification changes, and we reserve the right to amend specifications or withdraw products or services without prior notice.

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