QUALITEST™

LARGE ALTITUDE TEST CHAMBER - QUALILATC™

STANDARDS

ASTM D4169
IEC 60068
IEC 61215
MIL-STD-810
NASA-STD-5001
NF C20-713

APPLICATIONS

Large Altitude Test Chamber - QualiLATC™

Large Altitude Test Chambers are specialized systems designed to replicate high-altitude environments. They create controlled conditions of low pressure, low temperature, and reduced humidity to evaluate how products or materials perform and remain reliable at high altitudes. These chambers are widely used in aerospace, electronics, materials science, and other industries where components must withstand extreme environmental conditions.

Large Altitude Test Chamber

Application Fields of Altitude Test Chamber

Our Altitude Test Chambers serve a wide range of industries, providing reliable testing under extreme environmental conditions, including:

- Aerospace: Evaluates the performance of instruments, control systems, and other components under extreme temperature and pressure conditions.
- Electronics: Tests the reliability of parts for mobile phones, laptops, chipsets, and other devices in low-pressure and extreme temperature environments.
- Automotive: Assesses the function, durability, and reliability of engines, brakes, tires, and more by simulating high-altitude and temperature extremes.
- Food: Examines shelf life and storage requirements under varying temperature and pressure conditions.
- Materials: Studies the physical and chemical behavior of materials when exposed to different environmental conditions.
- Coatings: Evaluates coating performance, durability, and reliability under changing temperature and pressure levels.

Large Altitude Test Chamber

The Test Contents of Altitude test Chamber

The Large Altitude Test Chamber is a specialized system designed to replicate high-altitude conditions. It can simulate varying pressure and temperature levels, from sea level to tens of thousands of meters above sea level, allowing accurate evaluation of sample performance in low-pressure environments.

Common Testing Standards for Low-Pressure Chambers:

- NF C20-713-2021: Environmental Testing Part 2-13, Method M – Low Air Pressure.
- MIL-STD-810: U.S. military standards covering reliability testing of materials and equipment under low-pressure conditions, with multiple methods and scenarios.
- ASTM D4169: Standards from the American Society for Testing and Materials addressing low-pressure testing in packaging and transportation.

- IEC 60068: International Electrotechnical Commission standards for a wide range of environmental tests, including low-pressure and extreme temperature testing.
- IEC 61215: Standards for photovoltaic modules that include evaluation under low-pressure conditions.
- NASA-STD-5001: Requirements for testing spacecraft and components in various environmental conditions.

Large High-Altitude Test Chambers are advanced tools that provide essential data for research and product development in extreme environments.

Large Altitude Test Chamber

Control System of the Test Chambers

The control system of the test chamber integrates advanced software and hardware to ensure reliable operation under preset conditions. It provides accurate experimental data while allowing precise control and monitoring of various test parameters.

- Controller: Equipped with a high-performance controller and an in-house developed control platform, with the option to integrate a Siemens system. Communication interfaces include RS232, RS485, and Ethernet ports.
- Programmable control: Supports the creation of test programs, including heating, cooling, and constant temperature cycles. Multiple programs can be executed, with the added option for scheduled startup.
- Language options: Available in English and others.
- Remote monitoring: Remote access technology enables monitoring and control from both PC and mobile devices, allowing real-time data tracking and enhanced testing convenience.

Control system specifications may vary by model. Please refer to the Environmental Test Chamber Manual for detailed instructions and follow all safety procedures before operation.

Large Altitude Test Chamber

Refrigeration System of the Test Chamber

The refrigeration system of the test chamber is a critical component, as its stability directly affects the accuracy and reliability of test results.

- Hot gas defrosting technology: Frost on the evaporator is efficiently removed by injecting high-temperature, high-pressure refrigerant vapor into the heat exchanger. This prevents frosting, reduces downtime, and significantly lowers energy consumption.
- High-quality components: Built with internationally recognized brands. Energy-efficient EPV and XUP series quick-opening solenoid valves were developed, offering service lives of more than 15 years. A next-generation Danfoss AKV electronic expansion valve system is also in development, designed for greater efficiency, reduced noise, and lower energy use.
- Optimized design: Incorporates VRF (Variable Refrigerant Flow) technology, based on PID cold-end output control, to deliver low-temperature energy-saving operation. This approach can reduce energy consumption by up to 30% under low-temperature conditions.
- Modular construction: Features a modular layout with fewer welding points, lower failure rates, high refrigeration efficiency, dependable performance, easy maintenance, and reduced service costs.

FEATURES

Advantages Large Altitude Test Chamber - QualiLATC™

Large High-Altitude Test Chambers are advanced systems that provide critical data for research in extreme environments. They support both enterprises and research institutions in optimizing product design, enhancing safety, and ensuring long-term reliability.

- Large capacity design: Offers significantly more internal space than standard test chambers, accommodating larger equipment and samples.
- High-altitude simulation: Replicates conditions such as 5,000 meters or 8,000 meters with low pressure and low temperature to test product performance in extreme environments.
- Stable performance: Delivers excellent temperature stability and uniformity, with precise low-pressure control.
- Customizable: Chamber volume, temperature range, and appearance can be tailored to specific requirements.
- On-site support: Local teams are available for installation and system setup.
- Programmable controls: Allows fixed settings or programmed sequences, including variable temperature and humidity curves with defined test durations.

TECHNICAL SPECIFICATIONS

Large Altitude Test Chamber - QualiLATC™ Technical Specifications

Model	Large Altitude Test Chamber QualiLATC™
Temperature	
Temperature control range	-70℃～ +180℃ （ A: 0℃～ +180℃; B: -20℃～ +180℃； C: -40℃～ +180℃; D: -70℃～ +180℃)
Temperature fluctuation	±0.5℃
Cooling rate	+180.0 ℃~-70.0 ℃ for about 120 minutes, 1.0~2.0 ℃/min
Heating rate	-70.0℃~+180.0℃ for about 100 minutes, 2.0~3.0℃/min

Model	Large Altitude Test Chamber QualiLATC™
Temperature unifomity	±1.5℃ (-40.0℃～ +100.0℃) ±2.0℃ (+100.1℃～ +180.0℃ or -40.0℃～ -70.0℃)
Humidity	
Humidity control range	20.0% RH ～ 98.0% RH (work under atmospheric humidity)
Humidity fluctuation	±2.0%RH
Humidity uniformity	±5.0%RH
Pressure	
Pressure control range	Normal pressure~0.5kpa(500pa)
Pressure control error	±2kpa(>40kpa),±5%(2kpa~40kpa),±0.1kpa(<2kpa)
Depressurization time	Normal pressure~1kpa,about 30 mins
Pressure recovery time	<10kpa/min

QUALITEST™

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