

Altitude Temperature Chamber



Perform aviation testing (using UN testing criteria) of lithium ion batteries

Lithium ion batteries are defined as hazardous materials under the UN Restriction of Hazardous Substances*¹ and must comply with these restrictions for transportation. They must pass the UN Manual of Test and Criteria, which includes low-pressure (high-altitude), thermal cycle, vibration, and shock criteria.

This chamber can be used to perform low-pressure (high-altitude) testing in accordance with the UN Manual of Test and Criteria for air transport.

*1

UN standard (Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals Orange Book III) defines safety standards for international transportations of a wide variety of hazard objects and these objects are classified into 9 classes (Class 1 to Class 9). UN numbers relating to the lithium ion batteries are following;

- UN3480: Lithium ion batteries (including lithium polymer batteries)
- UN3481: Lithium ion batteries incorporated to the device (including lithium polymer batteries)

Lithium ion batteries are classified into a non hazardous objects transport with toxic substances (Class 9) or a hazardous objects transport depending on the amount of Wh. In both cases, the batteries have to be passed the test of UN (UN Manual of Test and Criteria , PartIII, Subsection 38.3).



- Single cell battery: Lower than 20Wh, Battery module: Lower than 100Wh
⇒ These batteries are considered non hazardous objects and can be transported as non hazardous objects.
- Single cell battery: More than 20Wh, Battery module: More than 100Wh
⇒ These batteries are classified as Class 9 and must be handled as hazardous objects.

Test contents

T1 : Low pressure	...	Test which is assumed a low pressure condition during air transport.
T2: Temperature	...	Test which is assumed drastic temperature ⇒ TSA series changes.
T3: Vibration	...	Test which is assumed vibrations during transport. ⇒ Combined Temperature & humidity chamber
T4: Impact	...	Test which is assumed a impact during transportation.
T5: External short circuit	...	Test which is assumed a external short circuit.
T6: Collision	...	Test which is assumed a colision by heavy objects.
T7: Overcharge	...	Evaluation of duration of an over charged battery. This test is for a battery pack.
T8: Forced discharge	...	Test which is assumed a reversal of an over discharged battery. This test is for a single cell battery.

[This is an article relating to Test Navi case study.](#) 

Operation is easy because of the same instrumentation as a Standard chamber.

Operability is consistent by adopting the operation panel which is based on the functions of the vacuum oven.

Constant operation... Number of settings 3 patterns

Functions: Start conditions setting, Temperature and pressure control switch off setting, Time signal, Max Min absolute limit alarm setting, Max min variation alarm setting, Name setting

Program operation... Number of settings 40 patterns (Max. 99 steps per 1pattern)

Functions: Start conditions setting, Temperature and pressure control switch off setting, Time signal, Max min absolute limit alarm setting, Max min variation alarm setting, Name setting, Pressure gradient setting, Gas replacement setting, Exposure time setting, Pause setting, Counter setting (A,B^{*2}), End conditions setting (Program chain is possible)

*2 2system counter is set. Many kinds of cycle tests can be done by combining the settings.

Features

- Testing that complies with JIS C8712 and UN Manual of Test and Criteria^{*3} (20°C±5°C, 11.6 kPa or less for at least 6 hours)
- Support for use in a clean room when installed in a clean room

- Magnetic coupling air circulator^{*4}
- Safety devices for protecting the specimen temperature and refrigeration circuit

*3 UN Manual of Test and Criteria, Part III, 38.3.4.1 Test T.1, JIS C8712 (Safety requirements for portable sealed secondary cells)

*4 Adjust to a move in route, an air bower can be removed from a chamber before transportation. After we check the move in route, we will make a suggestion. Please contact our local sales for more details.

Specifications

Model	VLC-201P	VLC-301P
Temperature range	-20°C to +80°C ^{*6}	
Temperature constancy	±0.5°C (atmospheric pressure)	
Temperature heat-up time ^{*5}	+20°C ⇒ +80°C Within 60 minutes	
Temperature pull-down time ^{*5}	+20°C ⇒ -20°C Within 90 minutes	
Temperature uniformity	±5°C (at +20°C, 11.6 kPa)	
Pressure control range	93.3kPa to 10.1kPa	
Achieved pressure	Less than 10 kPa	
Inside dimensions	W560 × H560 × D509 mm	W800 × H800 × D709 mm
Inside capacity	160L	453L
System	Mechanical type single-stage refrigeration system	

* The time required for the pressure to drop varies depending on the pump that is matched with the chamber. We will select the right pump for your test need. Please contact our local sales for more details.

*5 Without specimen or load and at atmospheric pressure.

*6 It is possible to customize the chamber to accommodate your test requirements, such as expansion of temperature range. Please contact our local sales for more details.

Option

- Internal voltage application terminal
- Cleanroom-Ready
- Machinery stand separate adjuster
- Frost free circuit
- Viewing window
- Heavy duty shelf and shelf brackets
- Internal ground terminal
- Dry pump (Vacuum pump)
- Low Out-Gassing Sealant (Silicone)

- Inert Gas Purge Function

Recommended products for customers viewing this product

Altitude Chamber



Air to Air Thermal Shock Chambers



Large Capacity Thermal Shock Chamber



Combined Temperature & Humidity Chamber

