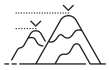
terraXcube
eurac research

Large Cube

Operation of a medical device (MD) at very high altitude

The test in a nutshell



High altitude

Group testing

Flights and climbs

terraXcube

terraXcube is Eurac Research's extreme climate simulation centre at the NOI Techpark in Bolzano, South Tyrol, Italy. Within its chambers, even the most extreme of all our Planet's environmental conditions can be created. By combining hypobaric and altitude technology with state-of-the-art environmental simulation, we aim to investigate the effects of extreme climate conditions on humans, ecological processes and industrial products.
The climate chambers differ in size and equipment and can accommodate people, plants and other living organisms for up to extended periods and have the space to accommodate large machines and products.
Each day our team breaks new ground with scientists and industry partners and prepares the path to gain discoveries.

Test description

The objective of the test is to check the operation of medical devices (MD) at very high altitude. The device can be of both small and large dimensions and, depending on its size, can be placed in either the ambulatory or the test room.
The test will be carried out on both people (acting as operators of the medical devices and study participants, supplemental oxygen may be provided) and on the objects themselves. In the latter case, the devices will be externally connected via their communication ports in order to monitor their functionality.

- When unaccompanied objects are inside the test chamber and the ambulatory room fresh air circulation can be switched off
- When people are inside the test chamber or the ambulatory room, fresh air circulation must be kept on

Once the object has been placed inside the test chamber or the ambulatory room through the large access door or the airlock, all the relevant doors can be closed.
In the case of a small device in the ambulatory room, once the communication between the control room and the device has been checked and verified, the pressure in the ambulatory room and in the airlock can be lowered to the desired value and the desired speed (max 6m/s). At the set pressure point, the test can begin in compliance with previously upon agreed test protocol. At the end of the test, the pressure can be increased back to the equilibrium value so that the door connecting the ambulatory room with the airlock and the door connecting the airlock with the external part of the chamber can be re-opened.

Main focus

The objective of the test is to check the operation of a medical device (MD) at very high altitude.

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Large Cube
Operation of a medical device (MD) at very high altitude

Large Cube - General Characteristics and Environment Control

Internal dimensions	12 m x 6 m x 5 m (L x W x H)
Useful Square Footage	137 m² + 100 m² for test setup
Access to the chamber	Large sliding door: 3.6 m x 4 m (W x H)
Maximum simulated altitude	9,000 m ±10 m (~ 30,000 ft)
Maximum Rate of Climb (ROC)	6 m/s (~ 1,180 ft/min); 14 m/s (~ 2,756 ft/min) in the airlock
Minimum Rate of Climb (ROC)	0.1 m/s (~ 20 ft/min)
Temperature Range According to IEC 60068-3-5	-40...+60°C (± 1°C in time ± 2°C in space)
Temperature Rate of Change According to IEC 60068-3-5	± 0.5°C/min (cooling & heating)
Relative Humidity T > 4°C and according to IEC 60068-3-6	10...95% ± 3%
Humidity Rate of Change T > 4°C and according to IEC 60068-3-6	0.4%/ min cooling; 0.5%/ min heating
Wind	Up to 30 m/s
Precipitations	Rain: 0...60 ±1 mm/h Snow: up to 50 mm/h

Ambulatory Room

General Characteristics	The ambulatory room allows participants to be medically examined during tests. It can also be used to evaluate small or medium-sized objects at high altitudes and non- extreme temperatures. The room has a line of sight between the control room on one side and the test chamber on the other via pressure-tight windows.
Internal dimensions	4.5 m x 2.8 (L x W)
Maximum simulated altitude	9,000 m ±10 m (~ 30,000 ft)
Maximum Rate of Climb (ROC)	6 m/s (~ 1,180 ft/min)
Minimum Rate of Climb (ROC)	0.1 m/s (~ 20 ft/min)
Temperature Range	20...30°C ± 1°C

Other Features

Power Supply	230Vac 1~ 50Hz, 400Vac 3~ 50Hz, 63A
Data-acquisition equipment Smoke/Fire detection system + Fire suppression system CC cameras	
Network connection	Gigabit-Ethernet (1000BaseT) PoE, Wi-Fi