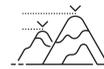


Large Cube

Breathability of technical fabrics

The test in a nutshell



High altitude



Group testing



Temperature ranging



Humidity

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

Today the breathability of a garment is one of the essential parameters for assessing the efficacy of technical materials. Several techniques are employed for this, such as quantifying the sweat loss of a subject during high-intensity exercise (whole body sweat loss (WBSL)). In addition to the assessment of the performance of a garment, the measurement of sweat loss is essential for studying heat and water balance within the body and for evaluating the general state of health and the metabolism of a subject. The standard method requires the precise measurement of subject's weight as well as clothing weight before and after exercise. terraXcube offers two precision scales to properly take these measurements: body-weight scale with a

5g resolution and a scale with 0.1g resolution to weigh clothing. During the test, participants of up to a maximum of 10 people, can simultaneously carry out different types of high-intensity exercises, from walking to running on a treadmill and riding on an exercise bike to skiing on a special simulator. Before and after the tests, the participants and their technical garments will be weighed to assess the intrinsic wicking properties of the garment. The tests can be carried out under different environmental conditions inside the chamber, such as elevated or decreased temperature, humidity, and simulated heights of up to 9000m.

During the tests, participants will be visually and physically monitored by means of the Equivital® system which constantly checks vital parameters.

Main focus

Evaluation of the breathability of technical garments after high-intensity exercise under different environmental conditions, such as varying temperature, humidity, and 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 m ² + 100 m ² 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
Light	Day/night simulation up to 1,000 lux
Capacity	Up to 12 participants and 3 investigators
Duration of the Study	Up to 45 days without interruption
Medical Monitoring System	Full medical monitoring system for both test subjects and investigators: <ul style="list-style-type: none">• Portable harness• Wireless data transmission within the chamber• Real time medical data acquisition<ul style="list-style-type: none">– ECG– SpO2– Blood pressure– Core temperature• Synchronised medical and environmental parameters• Threshold alarms
Available Equipment	Climbing wall Treadmills and cycle ergometers Audio & video projection system

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