



Foto: Eurac Research/Ivo Corrà

LABORATORY

Heat Pumps Lab

Laboratory for testing heat pump systems

Heat Pumps Lab

The Heat Pumps Lab is a research infrastructure available to industry, as well as researchers and developers. In the laboratory individual heat pumps and complete systems can be tested under stationary and dynamic conditions. To this end, the laboratory allows for the establishment of variable, real-like operating conditions in a climatic chamber and a double calorimeter.

The Climate Chamber for Testing Heat Pumps and Installations

The laboratory has a large climate chamber (10x6x6 m), in which heat pumps with a thermal capacity of up to 400kW can be tested. The chamber can simulate climate conditions with temperatures varying from -20°C to 50°C and relative humidity of 10 to 95%.

It is possible to test heat pumps both in accordance with relevant norms and under conditions agreed with the customer, allowing heat pumps control to be checked under specific operating conditions. Moreover, dynamic testing for a minimum of six consecutive days can be performed. Variable, real-like climate parameters and building thermal loads can be replicated.

In each test, the electricity consumption, evaporator and condenser thermal fluxes and sound emissions can be measured. This allows for the computation of COP and EER values under stationary conditions as well as its seasonal performance through dynamic testing.

Double Climate Chamber for Testing Outdoor Units

The calorimeter consists of two separate sections of 4.3x3.8x3.9 m each. This makes it possible to simulate indoor and outdoor temperatures and humidity conditions simultaneously. Air-to-air heat pumps can be installed and tested. In addition to this, the indoor space can accommodate heat pump systems consisting of pumps, valves, thermal storage tanks, pipes and control systems. The operation of an entire system can be tested under dynamic conditions, reproducing heating, cooling and domestic hot water loads.

Tests performed

- Stationary tests for heat pumps and chillers according to norms
Water/Water to 400 kW
Air/Water to 400 kW
Air/Air to 20kW
Water/Air to 20 kW
- Tests for hot water production heat pumps according to norms
- Dynamic tests for individual components (heat pumps, chillers)
- Dynamic tests for complete systems

Company Service Expertise

The Heat Pump Lab is available to manufacturers and experts for stationary and dynamic heat pump testing. The laboratory can be part of a collaboration between research and industry: dynamic testing, for example, is of great use during the developmental phase of a product as it may detect possible malfunctions or inefficiencies during part load operation, which otherwise might not be apparent until the product is in use. Furthermore, the tests make it possible to provide the end customer with reliable seasonal COP/EER values.

Using laboratories and extensive dynamic simulations, Eurac Research can assist in the development of individual components or entire heating and cooling systems, from designing the prototype, to evaluating a variety of product options, to creating a marketable product.

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