Fraunhofer
IBP

Climate Simulator for Building Components or Units

- thermal insulation
- protection against cold
- moisture proofing
- weather proofing
- HVAC analyses

The climate simulator of IBP allows for performing general building physical as well as specific HVAC analyses of large-size or voluminous test specimens (up to 15,000 kg) or in test rooms (up to 60 m³). Investigations which were so far time-consuming and could only be conducted outdoors can now be performed under defined conditions in the test laboratory by means of the climate simulator:

- thermal cycling of the indoor environment
- simulation of the daily evolution of the thermal indoor climate under real-time or accelerated conditions
- rapid thermal cycling
- variable air flow
- simulated sprinkling and exposure to sunlight

Programmable HVAC control:
To investigate stationary and non-stationary heat and moisture transfer mechanisms, extensive temperature and moisture variations are available. The total measuring procedure can be controlled by means of a time programmer, and the measurement can be monitored by a central measurement value acquisition system.

Equipment for the temperature control of the test specimen:
A high-performance separate heater or chiller with integrated air circulation allows the generation of a defined indoor climate with temperatures between -15 °C and 55 °C in the standard room or other test rooms with a total surface of walls, floor and ceiling of approx. 100 m². A special lifting tool as well as mounting brackets on the ceiling complete the possible applications of the climate simulator.

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Technical Data

Climate simulator:

internal dimensions	length	6.98 m
	width	6.00 m
	heigth	5.80 m
door	width	2.00 m
	height	3.20 m
temperature range		-15 °C to 55 °C
temperature stability	temporal	±0.5 K
	spatial	±1.5 K
Thermal range:		
temperature		5 °C to 30 °C
dew-point temperature		2 °C to 27 °C
relative humidity		35 % to 85 %
stability		
- temperature	temporal	±0.5 K
	spatial	±0.5 K
- dew-point temperature		±0.5 K
- relative humidity		±3.0 %
thermal cycling	cooling rate	32 K/h
(without load)	heating rate	44 K/h
air circulation		7000 – 30000 m³/h
(laminar or turbulent)		
maximum thermal load		6 kW
maximum point load		20000 N
maximum total load		150000 N

Equipment for temperature control of test specimens:

dimensions	height	2190 mm
	width	600 mm
	depth	785 mm
temperature range		-15 °C to 55 °C
temperature stability	temporal	±0.5 K
	spatial	±1.5 K
air circulation		1000 – 6000 m³/h

Standard room:

Dimensions	height	max. 4.2 m
	lenght x width	4 m x 4 m

Examples of examinations:

Prefabricated building elements, examinations for the development of building materials, façade elements, walls, ceilings, roof constructions, flat roof systems, design of insulation materials, sandwich constructions, windows, doors, components with thermal bridges, shutter systems, skylights, components for the renovation of building elements, etc.