

Indoor Air Test Center (IATC)

Vehicle and filter test facility

Fraunhofer IBP has a unique test center for testing the air quality and the indoor climate at its branch in Holzkirchen. In a room 127 m³ in size (5 × 8.2 × 3.1 m³), a variety of studies can be conducted on air quality, airflow & temperature characteristics, as well as on the efficacy of active and passive air purification systems.


Via a range of precise dosage systems, the air can be dosed with chemical and microbiological substances as well as particles in order to test the efficacy of air purification systems.

Air samples trapped on special solid-phase adsorbers and filters designed to retain airborne germs are analyzed offline in the laboratory in order to measure the levels of volatile organic compounds (VOCs), microbial airborne pathogens, etc., up to and including

odorous substances. The individual substances are identified and their concentration in the air determined.

The IATC is variable and can be used to perform thermal and emission tests on road vehicles with simulated solar radiation.

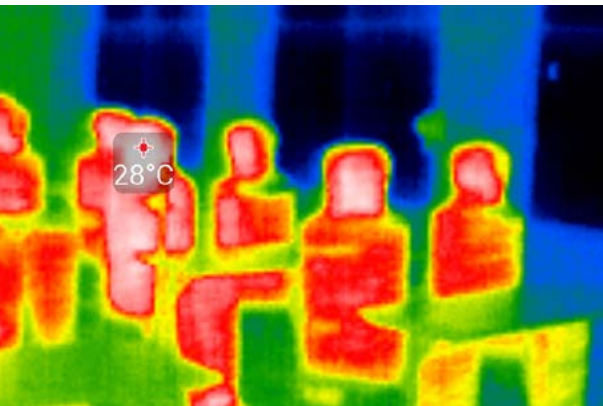
The IATC is also suitable for conducting comfort studies in buildings. Activated surfaces can be used to simulate cold windows or radiant heating, for example, enabling their effect on comfort in the room to be assessed.



Heat input due to solar radiation is simulated above the vehicle with IR heaters and solar lamps on the windshield. © Fraunhofer IBP

The composition of the air can be analyzed online for the following parameters, e.g.:

- TVOC and odors (0.1 – 1000 ppm)
- CO₂ (30 – 5000 ppm)
- CO (0.04 – 1 ppm)
- NO_x (1 – 1000 ppb)
- O₃ (1 – 1000 ppb)
- Particles (0.02 – 10 μm), including viruses, bacteria, spores and pollen



Exterior view of test room with modular heating/cooling panels. © Fraunhofer IBP

Special features of the test facility

- **Controlled pollution of the air** with microbiological and chemical substances as well as particles, including pollen, spores, bacteria, viruses (bacteriophages as surrogates for human pathogenic viruses such as SARS-CoV-2) and aerosols.
- **Volume flow rate settings** up to 1800 m³/h
- **Air conditioning settings** up to 40 °C and 55 % relative humidity
- **Temperature controlled walls, floor and ceiling elements**
- **Inert interior surfaces** to minimize the impact on emission measurements
- **Access for vehicles** up to 3.5 t in weight and 2.5 m in height
- **Determination of VOC levels** in vehicle interiors with and without activated ventilation systems (ISO 12219-1)
- **VOC tests on material combinations** on a real scale
- **Verification of the efficacy of air filtration devices** with regard to particles (including viruses, bacteria, spores, pollen)
- **Measurement of different air outlets** to assess their local effect
- **High-tech airflow measurement technology** such as anemometers, ultrasonic measuring devices, tracer gas and visual display of three-dimensional airflow images

Key uses of the multifunctional air test facility

- Development and evaluation of air purification systems or materials with active purification properties
- VOC measurements in vehicle interiors and room constructions
- Comfort-optimized ventilation concepts
- Thermal tests in vehicles
- Subject studies to assess odors using a sensory trained panel

Contact

Energy Efficiency and
Indoor Climate
Dr. Victor Norrefeldt
Tel. +49 8024 643-273
victor.norrefeldt@
ibp.fraunhofer.de

Environment, Hygiene and
Sensor Technology
Dr. Andrea Burdack-Freitag
Telefon+49 8024 643-295
andrea.burdack-freitag@
ibp.fraunhofer.de

Fraunhofer Institute for Building Physics IBP
Fraunhoferstrasse 10
83626 Valley | Germany
www.ibp.fraunhofer.de



[www.ibp.fraunhofer.de/
indoor-air-test-center](http://www.ibp.fraunhofer.de/indoor-air-test-center)

