



Fraunhofer IBP

FRAUNHOFER INSTITUTE FOR BUILDING PHYSICS IBP



Measurement device DRESSMAN (Dummy REpresenting Suit for Simulation of huMAN heatloss) worn by a manikin. Measured equivalent temperatures are correlated with human comfort sensation.

VEHICLE CLIMATE

Besides driving performance, in vehicle development emphasis is placed on thermal comfort of driver and passengers. A comfortable and performance enhancing indoor climate is reflected by satisfaction with the thermal environment. From the comfort-related requirements of buildings, the Fraunhofer IBP transferred and further increased its knowledge to vehicles (sectors automotive, aviation and rail). In vehicles, for example, inhomogeneous and unsteady conditions are considered during the driving phase as well as quick heating and cooling phases after a parking period.

Approach

In addition to measurements of physical parameters inside a vehicle like air temperature, velocity, air exchange and thermal radiation, the Fraunhofer IBP is specialized in subject surveys including questionnaires. Such thermal problems can be investigated inside climatic chambers, taking a vehicle

mock-up, in vehicles using special vehicle test facilities, or with humans exposed to real driving cycles. For the purpose of thermal comfort measurements in vehicles, trains and aircraft cabins, the Fraunhofer IBP developed the special measurement device DRESSMAN (Dummy REpresenting Suit for Simulation of huMAN heatloss), an overall equipped with climate sensors which can be worn by a manikin or by a human subject. With the knowledge from psychophysical measurements with subjects, the institute owns a comprehensive knowledge base on thermal comfort assessment.

The department of Indoor Climate utilizes state-of-the-art computational methods for simulating indoor climate and its environmental impact. For example, human thermoregulation models for prediction of blood circulation and metabolism are employed and further developed, as well as CFD (computational fluid dynamics) codes, computational thermal radiation models and thermal multi-zone models.

Customer Benefits

- Optimization of components and devices to improve indoor climate and its impact in terms of thermal comfort
- Development of technologies to improve the climate inside vehicles
- Access to the latest simulation technology
- Customized applications and their integration into existing information technology

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