Mini-Research Project Heat-Box:
Fundamentals and Construction of a Measurement System for Building Physics Studies

TECHNISCHE UNIVERSITÄT DARMSTADT

ISM+D
Institute of Structural Mechanics and Design
Institut für Statik und Konstruktion

Mini-Research Project
from the field of Building Physics / Energy Technology **4 CP**

In this module, you have the opportunity to undertake a hands-on project to construct a Heat-Box. This controlled environment is used for investigating fundamental building physics values such as temperature evolution, thermal conductivity, and heat flux of tested materials or building components. You will be actively involved in the development and construction of the Heat-Box and will learn to implement and solder custom circuits for monitoring and managing conditions within the box. Through data collection and analysis, you will develop practical skills to apply theoretical knowledge to real-world scenarios. This will enhance your understanding of how building materials and construction techniques impact environmental sustainability and energy efficiency. Take this opportunity to deepen both your practical and analytical skills and gain direct insights into building physics.

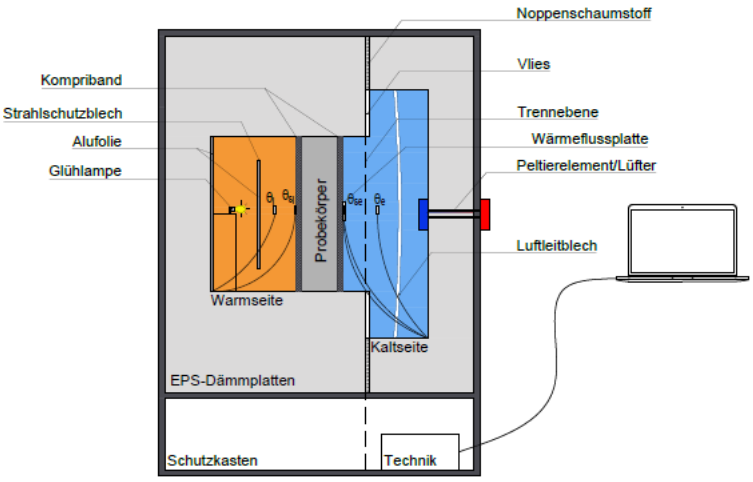

Abbildung 1 Aufbau einer Heat-Box

Learning Objectives

- Understanding of heat transfer processes, including conduction, convection, and radiation, within a constructed environment.
- Practical skills in designing and soldering circuits to measure and control environmental conditions within the Heat-Box.
- Practical skills in constructing and measuring conditions within the Heat-Box to isolate specific building physics phenomena.
- Interpretation of results in terms of thermal insulation and energy efficiency.
- Development of documentation and presentation skills through detailed reporting and explanation of project findings.

Prerequisites

- Experience in Python is advantageous, but not necessary.

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