

Case Study: Panel Walk-In Chamber Central Michigan University



The Thermotron Walk-In Chamber in the Apparel Merchandising and Design Body Scanning Lab at Central Michigan University in Mt. Pleasant, Michigan.

Central Michigan University's Apparel Merchandising and Design Body Scanning Lab goes to great lengths to help bring one-of-a-kind technologies together to design consumer products. This is accomplished, in part, through the utilization of a Thermotron Panel Walk-In environmental test chamber. "The Thermotron chamber is the most heavily used piece of equipment in our lab," said Tanya Domina, M.S., MBA, professor in the university's Human Environmental Studies department. "It is used almost every day."



A lab faculty member opens the chamber door to setup a test.

The chamber has an interior volume of 563 cubic feet, big enough to accommodate a hospital bed or a treadmill and is used to simulate temperature (-20°F to 180°F) and humidity (10% to 95% RH) tests. CMU's Lab tests a variety of products including, but not limited to: athletic wear, cold weather gear, military apparel, mattresses, and blankets to see how effective they are in different environments. For example, the chamber is used to simulate what Miami, Florida feels like in July at 7 in the morning. The faculty research team uses these simulated environments to test what happens when a body perspires on a new fabric.

"CMU is the top school in the Midwest for performing this kind of testing," said Tanya. "We could not publish research without the chamber." CMU was able to purchase the chamber

with grant money after a Thermotron sales representative provided a detailed cost and return on investment analysis for the Lab. "It was also important to us to buy a locally made chamber so if we ever needed assistance or service it would not be far away," said Tanya.

Testing Technologies

Thermal Manikin

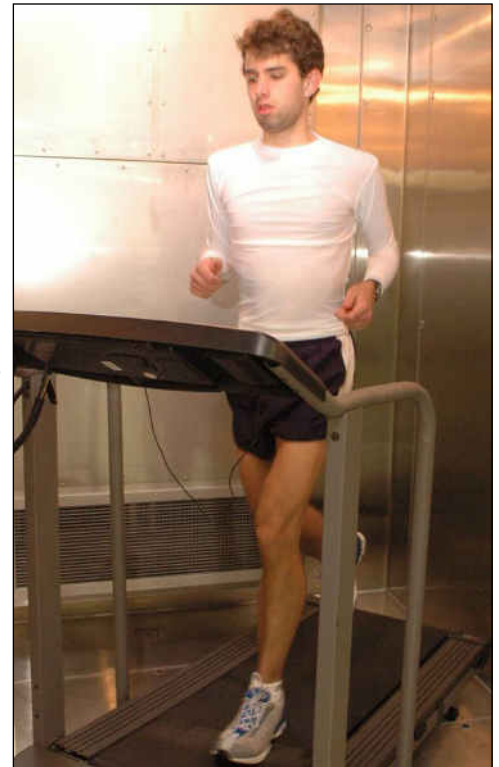
The Thermal Manikin is a life-sized model that replicates human heat and sweat patterns. The Lab has the only one in the world with 46 different zones to understand how products handle heat and moisture transfer on different parts of the body. The manikin is integral to the testing process because test results are repeatable, something a human subject cannot provide.

Wireless Physiological Monitoring and Biofeedback System

The Wireless Physiological Monitoring and Biofeedback System provides the ability to measure human subjects' EMG, EEG, EOG, and ECG as well as skin temperature, respiration, heart rate, and skin conductance. The Biofeedback System is utilized inside the chamber as the chamber provides a controlled environment and eliminates outside distractions. The system is used to determine if there are unconscious physiological fluctuations based on changes in sensory inputs. The system has been used to study subjects' reactions to different microencapsulated scents on fabrics, to test various 3D knit-in structures, and to determine the visual appeal of garments.

Guarded Sweating Hotplate

The guarded sweating hotplate is used to measure how much heat and moisture pass through fabric swatches. This tool provides repeatable test results, improving test accuracy.



A human subject tests athletic apparel while running on a treadmill inside the Walk-In Chamber.



Two faculty members prepare a Thermal Manikin for a temperature and humidity environmental test in the Thermotron Walk-In Chamber.

With all of these innovative testing technologies and a renowned reputation, multi-national companies commission the Lab to perform temperature and humidity tests on their products with the Thermotron chamber. The Lab has worked with companies such as Adidas and Reebok to improve the quality and reliability of their products, as well as to provide an environment to design newer products. When performing tests for companies, the faculty research team meets with company representatives to determine testing objectives and procedures. Following the tests and the analyzed results, companies can decide whether product improvements are necessary, or if their product is ready to go to market.

Not only has the chamber brought in outside revenue from multi-national companies, it has been a valuable tool in providing real-world testing experiences for faculty and student research. "We found the chamber's control system (8800 Controller) easy to use," said Tanya. "Since so many

people use the chamber it's convenient not to spend a lot of time training each user."

Central Michigan University is located in Mount Pleasant, Michigan. With the continued support of Thermotron, CMU's Apparel Merchandising and Design Body Scanning Lab remains a strong force for innovation and education in the Midwest.

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