Thermetrics
Advanced Thermal Measurement Technology

A subsidiary of Measurement Technology NW

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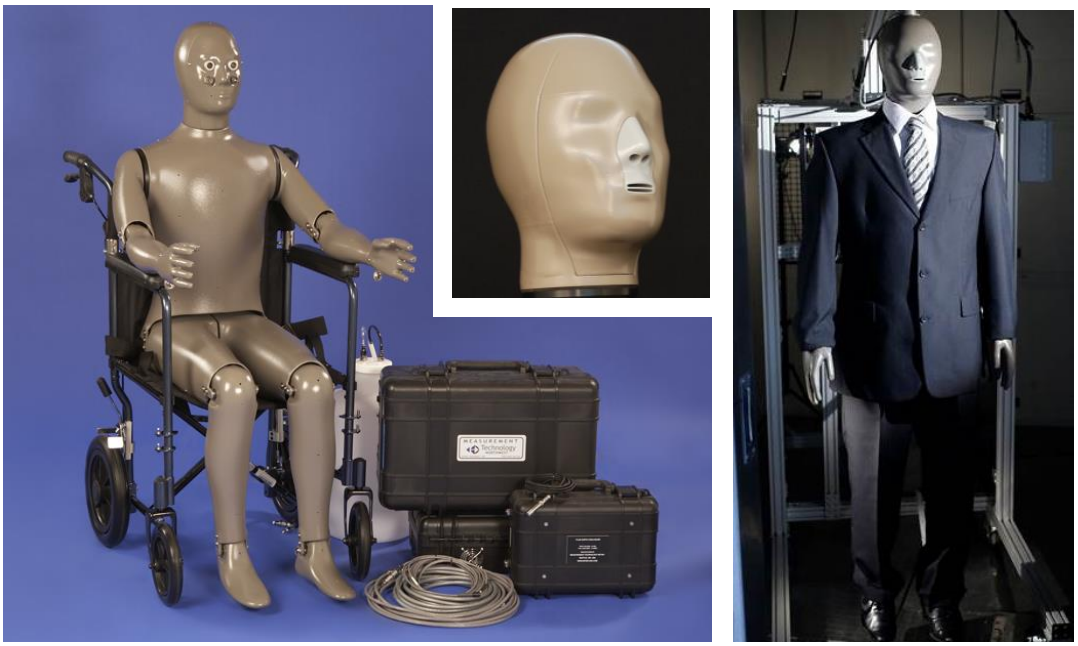
Custom 32-zone Newton thermal manikin to evaluate thermal comfort of climate control systems in buildings

The University Centre for Energy Efficient Buildings (UCEEB) is an independent institute of the Czech Technical University in Prague. UCEEB's goal is to research and design buildings which are green, smart, reasonably-priced, and with a healthy interior climate.

As stated by the institute's founder, Professor Zdeněk Bittnar, "Buildings represent an area with significant potential for energy savings and reduction of human impact on the environment, but it is also estimated that people spend up to 90% of their lives inside buildings - which means our health can be greatly influenced by the quality of the interior climate."

Thermetrics LLC (formerly Measurement Technology NW) won the UCEEB contract to build a custom 32-zone Newton thermal manikin with humidified external breathing capability, and UCEEB plans to use Newton as a human simulator for measuring and evaluating the performance of heating and air conditioning systems used in buildings.



The UCEEB 32-zone Newton includes a temperature controlled and humidified breathing system that consists of two pneumatic cylinders which are cycled in and out by a servo linear actuator to replicate the cycle, frequency, and volume of human breathing. The breathing system connects to the manikin with hoses for inhaling and exhaling. Inside the manikin a special manifold behind the face allows for breathing through the nose or mouth in any combination.

What makes a Newton thermal manikin ideal for environmental comfort research?

Most climate control systems try to meet the thermal comfort requirements of human occupants by conditioning large air volumes and bringing interior thermal masses to a desired temperature setpoint. This process is effective, but not efficient. *Localized* heating and cooling can be delivered to occupants at significantly lower energy cost. Toward this end Newton is expected to be a valuable tool that will quantify subtle changes in heat gain/loss conditions and predict which climate control variables maximize the thermal comfort and overall health of building occupants.

Evaluating human comfort is a complex endeavor. Variables include local air temperature distribution, surrounding surface temperatures and geometry, local air velocities, relative humidity, clothing layers and their insulation value, metabolic rate, perspiration rate, as well as solar intensity and its direction. All these factors contribute to our perception of thermal comfort, and at UCEEB their Newton thermal manikin is expected to provide the data necessary to drive future innovations leading to healthier, more comfortable, and more energy efficient buildings.

Thermetrics, LLC is a wholly owned subsidiary of Measurement Technology NW, dedicated to the design and manufacture of a wide range of precision instruments to measure and evaluate the thermal comfort of textiles, garments, and protective apparel. Our innovative Thermal and Automotive Manikins, Dry and Sweating Guarded Hotplates, and Radiant/Flame Test systems support all current industry test standards for thermal insulation, moisture permeability, and burn injury prediction. For more information please contact us or go to: www.thermetrics.com

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