

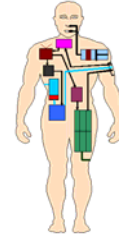
The world according to ThermDAC.



Off to Seoul National University.



Bringing old hotplates up to date.



Our latest installations, and more.

# Measurement Technology NeWs

Newsletter published by Measurement Technology NW

Summer/Fall 2004

**Measurement Technology NW** (Seattle, Washington) continues to expand the power and capabilities of our exclusive ThermDAC manikin and hotplate control software.

ThermDAC is a complete and intuitive 32-bit Windows based program that provides data logging and analysis, precise thermal control capabilities, and real-time displays of hotplate or manikin zone temperatures. Each thermal zone is individually controlled using either a temperature setpoint, heat flux setpoint, or comfort equation (Madsen) output. ThermDAC's automated data analysis functions include Dry Thermal Resistance (SI or Clo units), Evaporative Resistance, Vapor Pressure, Permeability Index, Cooling Rate, Area Weighted Averages, and Teq - Equivalent Temperature.

**Standard ThermDAC test menus:**

Count on ThermDAC to handle the complex data collection and analysis required by current ASTM and ISO standards.

**Dry Test** - The mode used for standard non-sweating tests that calculate Rct, or dry thermal resistance.

**Wet Test** - Used for standard sweating tests that calculate Ret, or wet evaporative resistance.

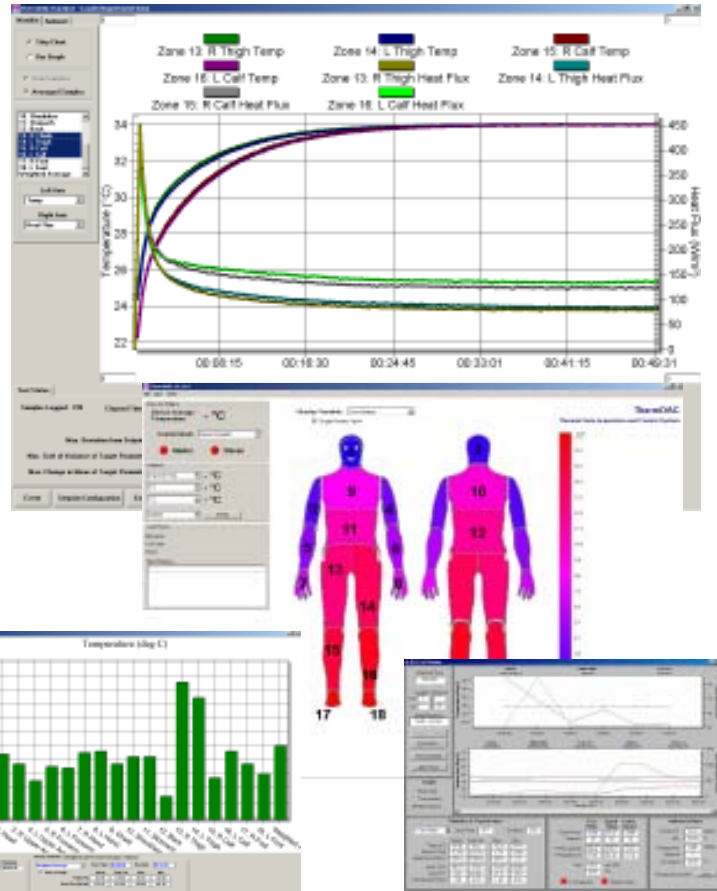
**Heat Differential Test** - Developed for evaluating Personal Cooling Systems (PCS), this mode will calculate/display the total Watts of heat removed.

**Work Cycle Simulation** - Allows operators to control an experiment with several user-defined temperature and/or heat flux setpoints.

Two independent methods of data logging can be used. Choose logging that provides a complete data set of the entire run, or log steady state average values to file once the system has stabilized.

Do both at the same time! Tests generate comma delimited (.csv) data files ready for importing into Excel or many other Windows compatible spreadsheet programs.

If it needs to be logged, graphed, calculated, averaged, timed, analyzed, diagnosed, adjusted, generated, or automated, ThermDAC is your ticket to precise thermal test results.



**Measurement Technology NW's exclusive ThermDAC software is a powerful, feature-packed tool for thermal comfort evaluation.**



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Measurement Technology NW manufactures a wide range of precision instruments for measuring and evaluating the thermal comfort of textiles, garments, and dynamic thermal environments such as aircraft, truck, and automobile interiors. Our complete line of thermal manikins and guarded hotplate systems are designed to support current industry test standards for thermal insulation and moisture permeability.

# New life for old hotplates

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Shawn Deaton, Research Associate at North Carolina State University's Textile Protection and Comfort Center, faced a dilemma. "Our old Holometrics sweating guarded hotplate was linked to an equally old IBM (PS2) computer that monitored the plate and recorded ambient air temperatures, relative humidity, and plate surface temperatures. When that computer's hard drive died, right about the time we were due to begin work on a major Homeland Security Department project, we found there was no way to reinstall the old control system onto a different computer. Our choices were to purchase a new hotplate or try to upgrade the old Holometrics system, FAST."

Measurement Technology NW proposed upgrading the unit's PC interface, modifying its Eurotherm 2408 controller, replacing the ambient temperature and relative humidity sensor probes, and designing/manufacturing a new airflow

hood. All sensor inputs, plus test plate heater and power controls would be routed through a National Instruments PCI bus card, where a customized version of our ThermDAC software would read and analyze these inputs.

"I knew that MTNW could and would do custom work," said Shawn, "but they really pulled out all the stops to get this project done for us. We're still adjusting to the new system, but so far the improvements have been dramatic. With ThermDAC we can now start a test and leave it running unsupervised - a huge time saver. I've noticed that airflow control is much better, temperature control is extremely precise, and I like the real time displays and graphs, but I'd have to say the biggest plus is that we no longer have to manually enter test data into a secondary spreadsheet program in order to calculate evaporative and thermal resistance values. The new ThermDAC software does it all automatically."

The Textile Protection and Comfort Center (T-PACC) at NC State University provides an environment where diverse problems related to textile comfort and protection can be studied and solved.

Its major goal is to support basic and applied research programs which will develop fundamental knowledge and be the basis for improving the comfort and performance of clothing and protective clothing systems while strengthening our Nation's position in textile materials science, technology, and industrial development.

Thermal comfort is related to complex interactions between fabric, climate, physiological states and psychological variables, but the thermal insulative and moisture conductivity rate of the fabric is a key factor that contributes to perceived comfort. Using a sweating guarded hotplate while controlling ambient temperature, humidity, and wind speed creates a variety of climatic test conditions for fabric or

composite evaluation, and the resulting thermal comfort and heat stress indices are quite useful for comparing the thermal characteristics of different materials.

"Our upgraded sweating hotplate has been running almost constantly since it came back," added Shawn, "and MTNW helped us quickly come up to speed on the new system. Their engineers are extremely knowledgeable on the equipment and test standards used to evaluate textiles and garments, and every question we had was answered quickly and competently."

Measurement Technology NW offers all its customers the option of on-site system startup and training, but after the upgraded system arrived Shawn decided that wasn't going to be necessary. "ThermDAC was so easy to operate and understand that I didn't even have to look at the manual."



# Recent thermal installations and other good news.

MTNW has delivered a new 10" sweating guarded hotplate to **Southern Mills** as part of an upgrade to their textile testing capabilities, and has also built and shipped the first of two new 8" sweating guarded hotplates to Canada's **University of Alberta**.

The University's first hotplate was a standard SGHP-8.2, but the second is a highly advanced sweating guarded hotplate able to operate in temperatures as low as -20 °C, with test plate orientations up to 180 degrees from horizontal, and in atmospheric pressures from 50% to 150% of normal. This new cutting-edge device will allow the University of Alberta to explore textile performance under environmental extremes outside the reach of existing thermal test instruments.

**Customized hardware and software systems are an everyday occurrence at Measurement Technology NW. If you have a product or testing need which cannot be accurately addressed by one of our existing packages, please let us know. Custom engineered systems that make use of our core competencies and advance our in-house expertise are a simply irresistible challenge!**

The researchers at **USARIEM** recently sent us their original 1950's era copper thermal manikin "George", and asked MTNW to completely rebuild him to current technological standards. "George" now has a new sweating skin system, new computerized control systems, and a new level of accuracy and reliability not seen since he was a youngster. "George" surpasses the previously upgraded "Uncle Wiggly" as USARIEM's oldest/newest thermal manikin, yet promises to deliver outstanding performance for many years to come.

**3M** now has three new GHP-10.5 dry guarded hotplates, which they will be using to measure the dry insulative values of a wide variety of textiles and other materials. Installation was smooth and trouble-free, with several of the training session participants commenting on how easy the GHP-10.5 system is to operate. A fourth GHP-10.5 hotplate is being delivered to 3M's China Innovation Center, located in Shanghai, People's Republic of China.

## New Zone Controller Design

As MTNW manikins become more and more advanced, so do our thermal zone controller capabilities. These exclusive microprocessor-based zone controller boards were originally developed to support the thermal manikin functions of heating, fluid flow, and accurate temperature measurement. Mounted inside the manikin, our zone controllers provide increased measurement accuracy by eliminating voltage drop and electrical noise pickup on signal cables. All zone measurements are digitized within inches of their source.

Their modular design allows for easy maintenance and flexibility in zone segmentation (one controller per zone, a maximum of 126 zones possible), and because real-time thermal control is handled by a dedicated microprocessor, the central PC computer is relieved of time-critical tasks and can be used for more data compilation and analysis.



A new, more compact design was introduced in Spring, 2004 that solves a hot-swapping problem experienced with the older controller model, while also improving calibration and diagnostic functions. Service is easier than ever thanks to separate dry and wet components - replaceable separately (and quickly) should anything ever go wrong.

[www.mtnw-usa.com](http://www.mtnw-usa.com)

Measurement Technology NW has established relationships with top thermal instrumentation companies around the world. These representatives help us provide ongoing consultation, project coordination, installation assistance and service support.

In South Korea: Technox, Inc., (Mr. Her, Young-Chul), E-mail: tni@technox.co.kr  
In Taiwan: Tien Shiang Scientific Instruments Company LTD, (Mr. C. S. Yao), E-mail: tinshing@ms16.hinet.net  
In Turkey: Kontrol LTD, (Mr. Serhan Tozar), E-mail: kontroltest@ttnet.net.tr

## Seoul National University's new 20-zone "Newton" thermal manikin scores at the top of his class.

At Seoul National University, students attending classes at the College of Human Ecology's Department of Clothing and Textiles focus on all aspects of clothing - from fibers, yarns, and fabrics to apparel design and construction. Clothing physiology, including the biological functions of clothing (thermal comfort, motion adaptability, protection from the environment, and optimum work efficiency) plays a critical role in the development of functional clothing.

In June of 2004, Measurement Technology NW installed a 20-zone "Newton" sweating/walking thermal manikin at the Department of Clothing and Textiles testing lab, and the new manikin was put right to work measuring the thermal insulation and evaporative resistance of clothing systems and hazardous apparel such as firefighter gear and chemical protective suits. With the completion of an environmental chamber at the end of the year, the laboratory will contain an advanced suite of thermal testing tools available to both students and researchers.

MTNW's "Newton" manikin is constructed of thermally conductive aluminum filled carbon-epoxy with embedded heating and sensor wire elements in 20 microprocessor controlled and monitored heating zones. Seoul National University selected a 50th percentile Asian Male form built in accordance with ASTM and ISO standards (ENV342, ISO/DIS 15831, prEN13537, ASTM F1291, and ASTM 1720). SNU's "Newton" was also outfitted with an advanced walking stand and a computer controlled sweating skin system.

MTNW's sweating skin system is based on a matrix of pores over the active surface of the manikin, with a removable wicking fabric outer shell to distribute water over the manikin surface. Each zone controller within the manikin modulates and distributes the fluid volume passing through its on-board flow control valve. This metered volume is then divided up between the pores on the surface of manikin.



Newton's fabric skin layer consists of a tightly fitting elastic suit, including hands, feet, and hood. Zipper-closures allow the suit to be removed for replacement or cleaning, or to perform dry-only testing on the manikin.

Using the ThermDAC software interface, each manikin zone can be controlled to a specific flowrate setpoint. These flowrates can be adjusted at any time during the course of the test to optimize the wettedness of the fabric skin.

Standard "Newton" models are available in 20, 26, and 34 zone configurations, but this versatile manikin design can be built to accommodate almost any zone quantity or geometry. Call us for more details!

Seoul National University's comprehensive academic program is designed to provide students with an understanding of humankind and the world, to educate them with a broad perspective of both natural and social phenomena, and to foster a creative and intellectual mind through a systematic approach to learning. The University's goal is to prepare individuals for continuous professional and personal growth, and to enable them to contribute significantly to their society in this rapidly changing world.

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