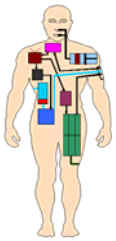
New thermal manikin body forms!

8 years later, "Bo" is still one-of-a-kind.

"Newton" goes to work for the EPA.



Our latest installations, and more.

Measurement Technology NeWs

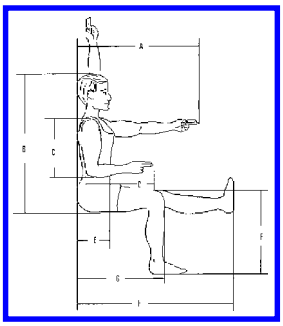
Newsletter published by Measurement Technology NW

Winter/Spring 2004

Measurement Technology NW (Seattle, Washington) announces another expansion to our "Newton" thermal manikin product line. Two all-new body forms are now available immediately - a 50th percentile Asian Male and a 50th percentile Western Female - making the "Newton" system perfect for an even wider variety of applications!

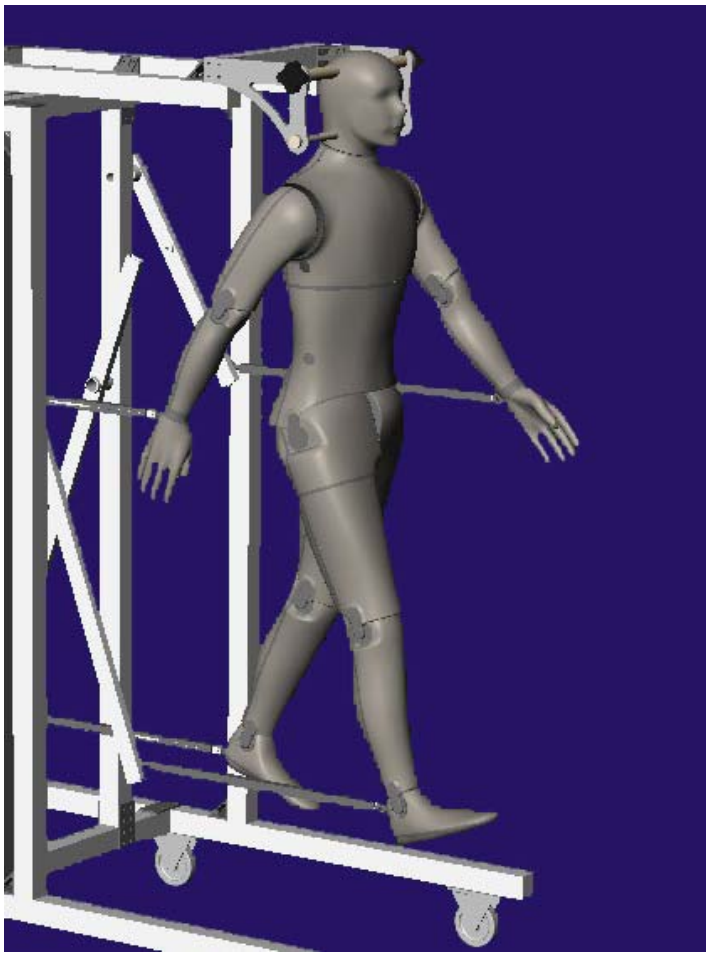
Rapid economic growth and expanding textile/clothing capabilities in Asia led MTNW to develop a 50th percentile Asian Male "Newton" manikin that is more representative of the average Asian consumer. This new Asian Male manikin form will benefit textile research and garment testing organizations throughout the region.

Client requests for a female "Newton" manikin have also increased substantially in recent years, particularly for tests involving the thermal characteristics of room or cabin environments - where using both male and female manikin forms improves the relevance of data generated. Our new 50th percentile Western Female "Newton" addresses this need.



As with MTNW's 50th percentile Western Male body form, these new manikins were designed as 3D computer models, based on a set of anthropometrics data from several sources. The new forms accurately depict average Asian Male or Western Female body dimensions, and assures thermal testing laboratories that clothing ensembles destined for these consumers will fit correctly and yield precise test results.

All three "Newton" manikin forms feature standard 20 and 34 zone configurations - but the versatile "Newton" design can be built to accommodate almost any zone quantity or geometry. Computer controlled sweating and walking systems are also available. Give us a call or send an e-mail to get further details or dimensional specifications and see how these new manikin shapes can help meet your needs.



Measurement Technology NW's new Asian Male and Western Female body forms make "Newton" the world's most comprehensive thermal manikin line.

MEASUREMENT Technology NORTHWEST

4211 - 24th Avenue West
Seattle, WA 98199 USA

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.

Still sweating after all these years.

"Bo" is the name of an advanced 50th percentile sweating manikin that Measurement Technology NW designed, built, and delivered to the US Navy's Natick RD&E laboratories in mid-1996. "Bo" was, and in many ways still is, a thermal *tour de force*. This one-of-a-kind thermal manikin utilized sophisticated heat pipe technology to transfer heat to the skin surface, providing unparalleled surface temperature uniformity even under non-uniform heat fluxes. This heat pipe design automatically delivers more heat to the regions with higher heat loss, maintaining surface temperature uniformity to ±0.1 °C over the entire surface of the manikin.

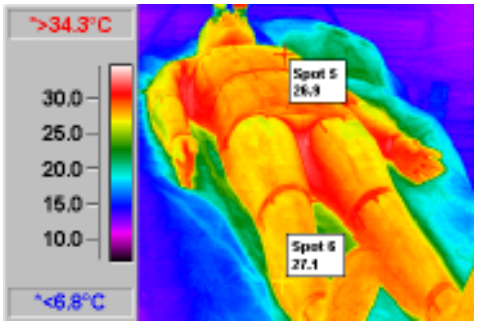
16 independent thermally controlled regions, combined with Measurement Technology NW's exclusive porous metal sweating skin gave "Bo" the ability to quantify the thermal and vapor properties of prototype clothing systems with outstanding repeatability and extreme accuracy - up to three times the accuracy of manikins available at that time.

All thermal and irrigation functions were controlled through a computer based graphical user interface that ultimately evolved into our present ThermDAC software program (see story on page 3).

The Navy Clothing and Textile Research Facility (NCTRF), located in Natick, MA, performs all aspects of research, development, testing, and evaluation of Navy uniforms and protective clothing. NCTRF's goal is to provide Navy sailors with uniforms and protective clothing, vests, and ensembles that are functional, affordable, and durable.

So how has "Bo" fared over the last 8 years? His primary mission with the military has been to evaluate both the thermal insulation and water vapor permeability of dress and protective clothing systems, and he's been a busy fellow.

To date "Bo" has tested Navy uniforms and a wide variety of cold weather clothing, evaluated a great many sleeping bags as part of the drive to develop a new modular sleeping bag system, tested a series of wearable micro-climate cooling and heating systems to generate base data and to improve on existing military designs, and he's even evaluated the thermal comfort characteristics of the bomb disposal suits currently used by the military.



In the months ahead, "Bo" will be a participant in the ASTM round-robin evaluations to develop both a new sweating thermal manikin test standard, and a new micro-climate cooling standard. These new testing standards will help define the heat exchange variables between the human body and the environment.

Heat transfer is both sensible (conduction, convection, and radiation) and latent (evaporation). Sweating manikins tests are key to evaluating the evaporative resistance of a clothing ensemble, and their use gives testing laboratories the ability to measure variations in thermal performance due to the garment's design and material selection, the amount of body surface area covered by the clothing, the distribution of clothing layers over the body, the looseness or tightness of fit, and the increased surface area for heat loss.

Evaporative resistance measurements made on fabrics alone do not take all these factors into account, and the new sweating manikin test standards being developed will ensure greater accuracy when predicting the thermal comfort or stress of people wearing a tested clothing ensemble.

Despite this busy schedule, "Bo" has also found time to grace the pages of National Geographic Magazine (January 2003) as part of a story on the latest advances in textile technology. His newfound star status hasn't changed him a bit though, as our "Bo" continues to be a well-mannered and reliable member of the NCTRF laboratories.

Recent thermal installations and other good news.

In addition to an 18-zone “Newton” thermal manikin we’ve built for the EPA (see page 4 story), there have been several other recent installations worthy of note, including a 43-zone “Newton” manikin for a major European manufacturer, the complete refurbishment of a 1984-era copper manikin for USARIEM’s Natick labs, and shipment of a 126-zone “ADAM” wireless sweating manikin to the Department of Energy’s National Renewable Energy Laboratory in Golden, Colorado. There, “ADAM” will be linked to sophisticated physiological response and psychological comfort computer models, which together will measure, simulate, and predict the comfort level of a car’s human occupants. NREL’s thermal research will help drive the development of more occupant focused and fuel-efficient automobile climate control systems.

ThermDAC Software
Measurement Technology NW’s ThermDAC software program continues to provide the sophistication and automation needed to address both current and proposed thermal testing standards. Recent ThermDAC updates feature new communication optimizations for manikins with higher zone counts, and enhanced operating features.

The latest version of ThermDAC features:

- Full support for sweating manikin testing, including real-time calculation of evaporative resistance (Ret) and permeability index (i_m).
- The evaluation of Personal Cooling Systems (PCS) is now possible through an operating mode called Heat Difference. This mode allows the manikin performance to be compared to a reference test - measuring the power difference between the tests determines the effective cooling capacity of the equipment under evaluation.
- By request, ThermDAC now includes the capability to read-back data files and use ThermDAC’s graphs and built-in statistical analysis tools to review prior tests.

Facility Investments
Measurement Technology NW recently purchased a climate controlled environmental room for manikin testing and new prototype development. When installation is completed, the temperature and humidity controlled room will measure 9’ x 11’ (2.7 x 3.4 meters) and will improve our ability to conduct pre-shipment QC and test the performance of new manikin designs, materials, and construction methods. We are also excited about the opportunities to participate more actively in research programs and round-robin studies.

NEW! ST-1 Seat Comfort Test System
People spend countless hours in automobile seats, but no universal standard exists for evaluating their thermal comfort. Therefore, MTNW has developed the innovative, single zone ST-1 Seat Comfort Test System to support in-house development of testing procedures and to help evaluate and define more advanced seat test procedures and instruments. The ST-1 can be used on seat backs or cushions to quickly evaluate the thermal properties and moisture management of automobile seating. The ST-1 can be quickly and easily positioned on different seat regions to evaluate the regional effects from different coverings or internal seat construction. Ruggedly made, it can also support the weights needed to simulate seat compression.

By using a single heating/sweating zone, the complexity of the test and subsequent data analysis is greatly reduced, along with the device cost. This lightweight, portable, carbon-epoxy unit contains one thermally controlled porous metal sweating insert, temperature sensors, and a computer-controlled fluid supply system that simulates metabolic heat and perspiration levels. Tests are underway at MTNW's Seattle facility to evaluate procedures for passive seat testing, and develop performance metrics for heated, cooled, and ventilated seats.

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

The Environmental Protection Agency picks “Newton” for particulate exposure research.

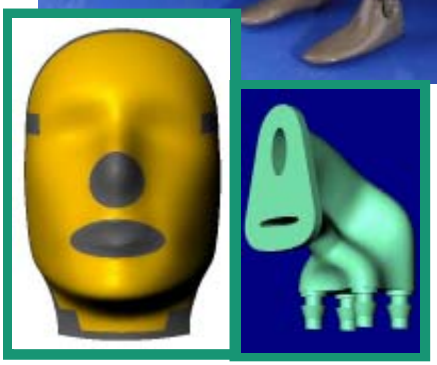
Measurement Technology NW is supplying the Environmental Protection Agency with a specialized "Newton" thermal manikin for use in the Aerosol Wind Tunnel System (AWTS) project. This project will help determine the exposure, effects, and risks of aerosols in the ambient air on people and the environment. In these studies "Newton" will be used to simulate human exposure so that air flow and particle movement around a heated, clothed human form can be analyzed, understood, and modeled.

The manikin is comprised of 18 thermally separate regions, each with high accuracy sensors for temperature control and a fine grid electric element for heating. As with all "Newton" manikins, the EPA's model can be easily posed using joints that incorporate an adjustable friction mechanism. Joints can be locked in place to support the weight of the limbs when posed, while also resisting movement in wind tunnel speeds exceeding 3 meters/second.

An external breathing device will replicate human respiration rates, frequencies, and volumes, so the manikin head was designed for breathing simulation. Working closely with the end user, MTNW engineers developed a CAD model of a respiratory tract for “Newton” that mimics human physiology. Mouth and sinus cavities were produced by stereolithography (STL), and provide the capability for mouth only, nose only, or mouth+nose breath routing on both inhale and exhale cycles.

A portable, lightweight storage/transport stand was built to support the manikin from either the front or back without interfering with airflow during tests. Ranges of motion have been optimized to allow manikin testing in seated or crawling positions, and “Newton's” ball-bearing joints can quickly be converted to work with a motorized walking mechanism.

This project is great example of how our “Newton” thermal manikin line can be customized for specific user needs.



“NEWTON”- EPA Breathing System

This design uses an exterior breath generator, feeding tubes routed through the manikin, that terminate in a custom breathing manifold.

Sadly, this latest “Newton” is destined to spend the rest of his life breathing contaminated air (so the rest of us don't have to), but his creation proves once again that Measurement Technology NW is able to take on just about any challenge.

Give us a call, and let us make a "Newton" that’s right for you.

The Environmental Protection Agency was established in 1970 in response to the growing public demand for cleaner water, air, and land. Its mission is to protect human health and to safeguard the natural environment - air, water, and land - upon which life depends.

At laboratories located throughout the nation, the EPA works to assess environmental conditions and to identify, understand, and solve current and future environmental problems; integrate the work of scientific partners; provide leadership in addressing emerging environmental issues; and advance the science and technology of risk assessment and risk management.

The EPA’s National Center for Environmental Assessment (NCEA) serves as the national resource center for the overall process of human health and ecological risk assessment.

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