



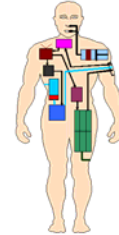
**Waterproof...
and sweating!
Meet NEMO**



**First review:
a breathing
"Newton".**



**MTNW sales
agents in the
Pacific Rim.**



**Our latest
installations,
and more.**

Measurement Technology NeWs

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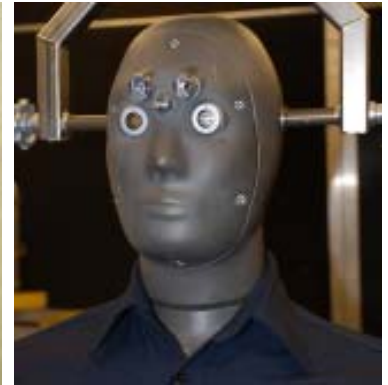
Measurement Technology NW (Seattle, Washington) has developed a new, *fully immersible* thermal manikin design! For protective clothing researchers who have been asking for a thermal manikin that can handle direct water contact, MTNW proudly introduces NEMO - a waterproof, true-weight, cast aluminum manikin. NEMO's sealed zones, joints, and cable connections allow it to operate even if fully submerged to depths of up to 10 feet (3 meters).

The new NEMO design follows our popular Newton body form dimensions, with some minor variations to accommodate the special waterproof joints. The development phase focused on three potential manufacturing paths - an all composite manikin, composite manikin with cast aluminum joints, and all-aluminum construction. Each path had its pros and cons.

Over a year of research and prototype development work resulted in an exciting all-aluminum design that delivered excellent sealing performance while meeting the true-weight goal. Rapid-prototyping technologies identified in the R&D process allowed our engineers to define the manikin surface and flange geometries in CAD, and a new resistance heater format was conceived to take advantage of the excellent thermal characteristics of NEMO's aluminum shell.

Our first NEMO manikin has been delivered to the Navy Clothing and Textile Research Facility (NCTRF) in Natick, MA, where he will replace an aging static manikin used to evaluate the thermal performance of marine survival gear. This NEMO will add significant versatility to the NCTRF labs because he has been built with full sweating capabilities, allowing researchers to also do clothing and garment tests.

MTNW is involved in advancing international research and standards for human comfort in clothing, textile assessment, and environmental ambiance. As a result, we bring the latest technology and methodology to your application. Feel free to call or e-mail to get further details and see how MTNW's line of thermal manikins can help meet your research needs.



- Sealed aluminum body form with waterproof joints at the shoulders, hips, knees, elbows, and ankles
- 21 independently controlled thermal zones
- Nominal maximum heat flux 1100 W/m²
- Distributed heating elements & high temperature point sensors for +/- 0.1 °C control and measurement of skin temperature
- Manikin powered at 60VDC, user-adjustable down to 5VDC for maintaining accuracy at very low heat flux
- Operation in environments -20 to 50 °C, 0 to 100% RH



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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 all current industry test standards for thermal insulation and moisture permeability.

It's like a breath of fresh air...

Measurement Technology NW had the honor of working with Dr. Jim Vincent of the University of Michigan on a research project to study aerosol/particulate transport in air moving at ultra-low windspeeds. A special wind tunnel had been built by the university to provide well-defined air movement at extremely low velocities (typical of most workplaces) while MTNW provided a new breathing manikin system based on our popular "Newton" design. The primary research goal was to study how and at what rate particles moving in this airflow might enter the human body by aspiration during breathing.

The project called for a life-sized thermal manikin (waist to head only), capable of regulated breathing through the mouth and/or nose. A custom airflow manifold with aerosol collection filter was designed and mounted inside the manikin head, and an external breathing machine was developed to generate the necessary respiration features.

Dr. Vincent was eager to improve upon a more basic system he had used for aerosol research in the late 1970's. "We needed the new device to generate breathing patterns that could be adjusted in terms of volumetric flowrate (volume per breath), breathing frequency, and breathing pattern. The inspired air had to pass through the aerosol collection apparatus installed in the manikin, but the exhaled air had to bypass the filter on the way out. But because exhaled air influences airflow around the subject, we could not simply route exhaled air out to a remote location. It was necessary to design a system where the air was inhaled through the filter path, and then exhaled immediately adjacent to where it was inhaled. In this way, the airflow scenario is almost the same as if inhalation and exhalation took place through the same orifice."

With this specification in mind, MTNW designed a split mouth and split nose, with a special airflow manifold that connected to an external breathing system via four hoses - two for inhalation and two for exhalation. This manifold was designed to allow for breathing through the nose or mouth in any of the following combinations:

- Mouth inhalation/Mouth exhalation (top/bottom split)
- Nose inhalation/Nose exhalation (left/right split)
- Mouth inhalation/Nose exhalation
- Nose inhalation/Mouth exhalation

MTNW's external breathing system consists of pneumatic cylinders that are cycled in and out by a servo linear actuator to replicate the cycle, frequency, and volume of human breathing. Three user-adjustable variables allow control of tidal volume, breathing rate, and Inhale:Exhale (I:E) ratio.



The Department of Environmental Health Sciences at the University of Michigan School of Public Health provides scholarship across the spectrum of environmental health sciences through its academic programs and its research activities, with the aim of improving the quality of the environments in which we live and work.

MTNW's ThermDAC control system automatically monitors user-set inputs and adjusts the motion of the air cylinders accordingly. The tidal volume is controlled by the distance that the pistons are moved in the cylinder, and the breathing rate is determined by the speed that the piston moves. The piston speed can be different on the inhale and exhale cycles giving an I:E ratio matching the user input.

Dr. Vincent's research team has put Newton to work, and the system has exceeded his expectations. "Lovely piece of equipment. Sophisticated, easy to use, and built just the way we wanted it. Measurement Technology NW has made it possible for us to pursue an exciting new research area."

Recent thermal installations and other good news.

It's been a busy time here at Measurement Technology NW. In addition to the **NCTRF** waterproof NEMO manikin project (page 1), and the breathing "Newton" constructed for the **University of Michigan** (page 2), we have also delivered a 20-zone "Newton" manikin system with breathing manifold to **Syracuse University**, where the manikin is being used to test for aerosols and particulate contamination in a variety of nasty environmental conditions. Across the Pacific, **Seoul National University** added an MTNW 9-zone sweating foot system to their research lab, while in Canada the **Institute of Ocean Technology** accepted delivery of our second waterproof NEMO manikin - this one a dry 23-zone model.

A unique ½ manikin (upper body only) system was delivered to the **Naval Research Laboratory**. This novel "Newton" is a 12-zone design with sweating skin system, made for thermal comfort testing and uniform/ensemble evaluation.

Philadelphia University and **SGS Hong Kong** received sophisticated 34-zone "Newton" manikins with full sweating and walking capabilities. These manikins will add significant new capabilities to their research and testing programs.

Our friends at **3M-China** have added a 9-zone (dry) thermal foot manikin for testing the thermal comfort of footwear, while their co-workers at **3M-Germany** and **3M-Taiwan** added SGHP and GHP guarded hotplates to their facilities.

In Japan the automotive supply company **K. Brasch** selected a 6-zone (dry) STAN manikin for analyzing the insulative properties of car seats. Back here in the USA, **Kansas State University's** Institute for Environmental Research received a 20-zone sweating "Newton" designed to integrate with their pre-existing manikin walking system. This internationally known institute conducts studies on the relationship between people and their thermal environment. The facility houses eight climate-controlled chambers and an extraordinary collection of thermal measuring devices.

And last but by no means least, the **University of Zagreb**, **Yakupoglu**, **CTT Group**, **Med-Eng Systems**, **KTDI**, **Underwriters Laboratory**, **Stedfast**, and **CNR-ISMAL** among others have all received new sweating guarded hotplates, favoring Measurement Technology NW's SGHP design over other competitors based on its advanced system features, ease of operation, and accurate test results.

MTNW thanks all of our customers for their support. Our diverse line of thermal manikins and guarded hotplate systems would not be what it is today if it weren't for you.

RoHS Compliance

In January 2003, the European Parliament and The Council of the European Union created RoHS Directive 2002/95/EC to restrict the use of six hazardous substances in electrical and electronic equipment, in order to protect human health and the environment. This Directive, commonly known as RoHS, went into effect throughout the European Union on July 1, 2006.

Article 2 of the RoHS Directive specifies the categories of electronic devices it applies to. Based on the defined uses, Measurement Technology NW's thermal test instruments fall into Category 9: "Monitoring and Control Instruments" (Annex 1A of the 2002/96/EC Directive). According to Article 2 of the 2002/95/EC Directive, electronic devices in Category 9 are currently excluded from the RoHS requirements.



Because MTNW thermal testing products are considered a (Category 9) "Monitoring and Control Instrument", they are currently excluded from the regulations. However, MTNW recognizes the environmental value of the RoHS directive and is working with component suppliers to reduce the use of hazardous substances targeted by the RoHS directive. The complete RoHS exemption document can be viewed at www.mtnw-usa.com.

ICEE 2007

Measurement Technology NW will be co-presenting a paper at the 2007 International Conference on Environmental Ergonomics in Piran, Slovenia, August 19-24. The research paper is titled "**Evaluating Vapor Resistance Using a Manikin with a Removable Fabric Skin**" and the study was done in partnership with the National Institute of Occupational Safety and Health in Kawasaki, Japan.

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

In Japan: IDS-ENV, (Mr. M. Kawazoe), E-mail: kawazoe@ids-env.co.jp

In China: Test International, (Mr. David Pan), Email: davidpan@test-tech.com.cn

The major textile research areas of east Asia are well served by these respected MTNW agents:



Technox Inc. (South Korea) was founded in 1996 to advance the field of thermal measurement technology for human comfort and environmental monitoring, including the fields of textile/garment testing, and construction and office environments. Technox Inc. supplies the testing equipment and measuring instruments required for the research and development of advanced textiles, garment ensembles, and personal environmental systems that improve human comfort in a variety of conditions. Key thermal testing products include thermal manikins, sweating or dry guarded hotplates, as well as compact temperature and humidity data loggers.

Led by Mr. Her, Young-Chul, Managing Director of Technox Inc, the company is focused on innovation, productivity, and efficiency in the development of new thermal measurement technology. In partnership with the industry and the Korean government, Technox Inc. brings an achievement-oriented, creative, and empowered business culture to the business of thermal measurement technology. Continuous training and professional manpower ensure that Technox provides high, value-added services equal to our reputation as a leading global firm. For more information go to: www.technox.co.kr (Translations available).



Intelligence & Design Systems Co., Ltd. (Japan) was founded in 2003 by Mr. Masahiro Kajioaka, President of IDS. The IDS mission is to supply highly reliable and stable measuring instruments and competent technologies to a wide range of growing markets from indoor and outdoor human comfort to occupational health and safety.

IDS's customer base has grown rapidly to include major Japanese industries, government agencies, academia, and the service laboratory sector. The decision to introduce MTNW's thermal testing products, in partnership with a marketing advisor in Japan, has also been successful, with the IDS team establishing strong trust from governmental agencies, textile companies and leading car manufacturers. IDS maintains sales offices in Osaka and Tokyo.



Tien Shiang Trade & Engineering Co., Ltd. (Taiwan) was established in 1971 to provide machines for textile dyeing and mechanical inspection, and in 1982 expanded into the field of physical textile testing instruments. Strong demand for laboratory equipment, an increasing focus on textile production quality control, and the new trend towards human and environmental comfort evaluation convinced General Manager C.S. Yao to introduce a range of advanced thermal comfort testing equipment suitable for government research institutes, universities, and industrial factories.

In 1993 Tien Shiang Trade & Engineering began representing Measurement Technology NW's guarded hotplates, thermal manikins, and environmental chambers. In 1996, Tien Shiang imported the region's first sweating thermal manikin system ("HUEY") for the Taiwan Textile Research Institute.

Tien Shiang continues to help the Taiwan textile industry remain a major force in the global textile market by supplying high-quality testing instruments, value-added technology, and excellent service to the region's research and commercial markets. Tien Shiang develops long-term relationships with its customers, and continues to strengthen its capabilities as it grows into a leading company known world-wide.



Shanghai TEST Trade Company, Ltd (China) is part of TEST INTERNATIONAL GROUP LIMITED, and is a provider of instruments, laboratory equipment, and innovative solutions to the textile and environmental testing industries. Shanghai TEST is the general agent in the Chinese Mainland for several world-famous manufacturers of specialized instruments and measurement equipment.

The professional background of TEST's General Manager, David Pan, has helped lead to good relations with Chinese government officials in the army, aircraft, and aerospace industries. A principal goal is to absorb advanced technology from abroad and introduce it to Chinese industry in order to improve the traditional methods of product development. Shanghai TEST has developed trusted and cooperative relationships with internal authority inspection organizations, famous universities, and progressive corporations, and as a result has gained influence within several key industries.

Measurement Technology NW

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