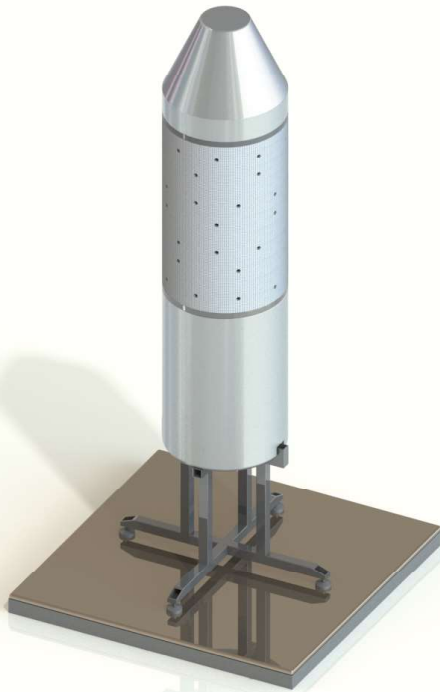


# Sweating Torso System



**The Sweating Torso is an upright standing cylindrical test apparatus, simulating the human trunk with thermal guards on the upper and lower ends. This versatile instrument has been developed and validated in collaboration with Empa, to correlate with the existing Empa TORSO system.**

The Sweating Torso has the ability to measure Thermal Insulation (thermal resistance), Cooling Properties (initial cooling, cooling delay, sustained cooling, and post cooling), Moisture Uptake, Evaporated Moisture, and Drying Rate.

Sweating Torso components include a temperature controlled measurement cylinder with upper and lower thermal guards, 54 sweat pores (with volumetric flowrate control) that are distributed over the measurement surface, two precision balances, a multi-fan array for wind speed control, and Thermetrics exclusive ThermDAC software.

The Sweating Torso device streamlines sample preparation because test specimens can be simple, easily made sewn tubes or unsewn fabric swatches that are wrapped around the test cylinder. Spacers can be added to simulate air gaps.

A complete system consists of the Sweating Torso, balances, multi-fan system for wind speed control, fluid reservoir, lower shroud, power supply, and laptop PC with ThermDAC

## ASSOCIATED TEST METHODS

- ISO 18640 Part 1

## FEATURES AT A GLANCE

- Multi-functional device performs tests that would traditionally require a sweating guarded hotplate **and** a thermal manikin.
- 54 sweat pores simulate perspiration rates from 0.0 l/h·m<sup>2</sup> to 1.5 l/h·m<sup>2</sup>
- Two precision balance scales are used to monitor the weight of the torso and the sweat reservoir during experiments, yielding valuable data on moisture uptake and evaporated moisture.
- Test specimens can be prepared as sewn tubes or as fabric swatches that are wrapped around the test cylinder.
- ThermDAC control software provides graphical test results in real time, and automatically logs test data.
- The Sweating TORSO system has been developed for scientific use by Empa, Swiss Federal Laboratories for Materials Science and Technology. The first scientific prototype was commissioned by Empa in 1995.



## Thermetrics

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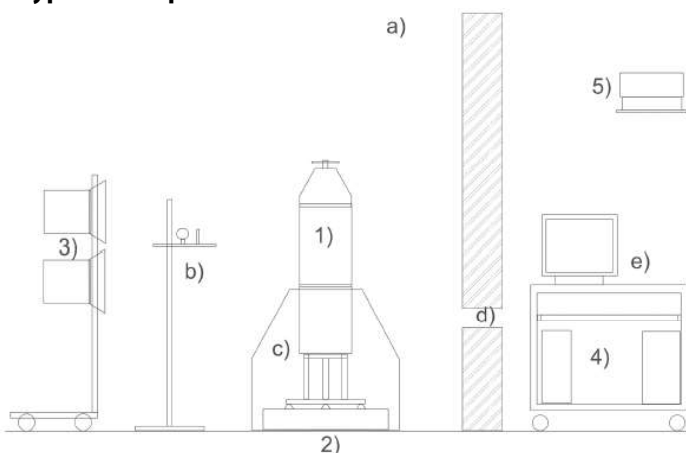
# Sweating Torso System

## Specifications and Performance Range

- Overall Diameter 11.8" (30cm), Length 46" (117cm)
- Upper Guard length: 10.5" (26.7cm)
- Measurement Cylinder length: 18.1" (46cm)
- Lower Guard length: 17.4" (44.3 cm)
- Base material: Aluminum
- 500 W power output, adjustable
- -20°C to +50°C operating range
- $\pm 0.1^\circ\text{C}$  temperature measurement and setpoint control, 0-100% R.H. including condensation
- $\pm 3\%$  relative humidity measurement
- Balance Scales: 1) Torso weight,  $\pm 1.0\text{g}$   
2) Reservoir weight,  $\pm 0.1\text{g}$
- Fan Array: designed to generate a wind speed of 1.0 m/s,  $\pm 0.1$  m/s, at the surface of the Torso
- Fluid Reservoir: 5 liter, distilled or DI water only

System requires 85-265 VAC, 50/60Hz, Single-phase.  
Maximum nominal current 10 Amps

## Typical set-up shown below



- |                        |                          |
|------------------------|--------------------------|
| a) Climate chamber     | 1) Torso                 |
| b) Ambient sensors     | 2) Torso balance/scale   |
| c) Air turbulence fins | 3) Fan system            |
| 4) Chamber wall        | 4) Operator station      |
| 5) Laptop computer     | 5) Sweat water reservoir |

## ThermDAC Control Software

ThermDAC is a Windows-based application providing full device control, fault detection, data logging and analysis capabilities. Automatic data collection, drying curve calculation, and water delivery totals are also contained within ThermDAC.

- Define non-standard test conditions and custom tolerance criteria
- View multiple device and ambient variables on a single graph screen
- Apply real-time statistical functions to test data over any user-selected time range

## Service

All systems come with a one year warranty.  
Please ask about these service options:

- Startup installation and training
- Extended warranty
- Annual Service Care Package—a periodic maintenance and service contract designed to keep your Thermetrics equipment calibrated and in top operating condition