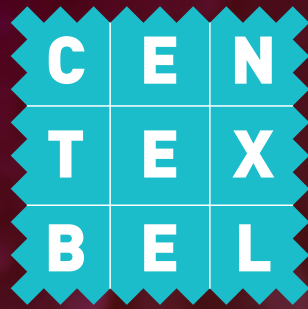




Thermophysiological Comfort

Thermal comfort occurs when there is a thermal equilibrium between the human body and the environment.

The comfort of clothing systems is crucial in sports, work, and everyday life. When garments provide optimal comfort, wearers can perform tasks or exercise more efficiently for extended periods, while staying protected against local cooling or the risk of overheating.

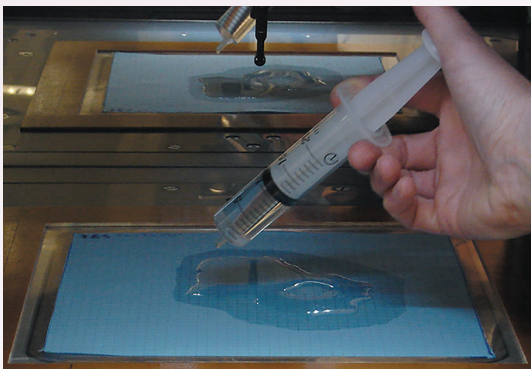
Because achieving ideal thermophysiological comfort is a complex challenge in clothing design, Centexbel offers a comprehensive range of tests to evaluate this key factor in the development of workwear, sportswear, corporate apparel, medical garments, protective gear, and military clothing.

1. Skin Model Test

Water vapour resistance and thermal resistance are essential elements to assess comfort. The skin model or sweating guarded-hotplate test simulates the heat and moisture transfer of the human skin and is used to produce accurate, repeatable measurements of thermal resistance (R_{ct}) and vapor permeability (R_{et}) for textiles as per EN ISO 11092 and ASTM F1868.

2. Wicking Assessment

Wicking refers to the ability of a fabric to move moisture (sweat) away from the skin to the outer layer of a fabric where it can evaporate more easily, thus helping to keep the skin dry.



EN ISO 11092:2014: Measurement of thermal and water vapour resistance under steady-state conditions



AATCC TM195: Liquid Moisture Management Properties of Textile Fabrics

3. Thermal & Sweating Manikin

The thermal and sweating manikin called “Newton” is an advanced, fully articulated thermal manikin system built in accordance with ASTM and ISO standards.

It measures the thermal and vapour resistance of the entire garment while simulating the body heat and transpiration of a person in action (working, exercising, walking).

ISO 15831:2004: Clothing - Physiological effects - Measurement of thermal insulation by means of a thermal manikin

EN 342:2017: Protective clothing - Ensembles and garments for protection against cold

EN 14058:2017: Protective clothing - Garments for protection against cool environments

ASTM F2370-22: Standard Test Method for Measuring the Evaporative Resistance of Clothing Using a Sweating Manikin

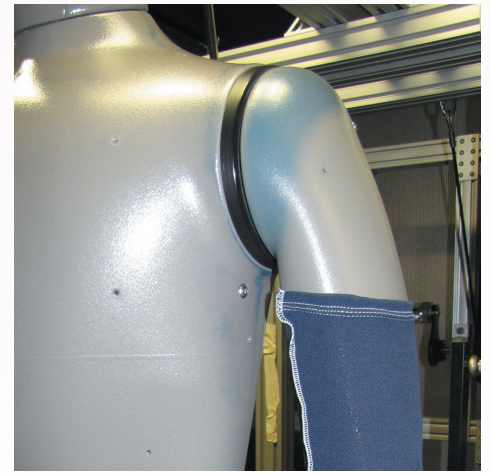
ASTM F2371-16: Standard Test Method for Measuring the Heat Removal Rate of Personal Cooling Systems Using a Sweating Heated Manikin



4. Sweating Arms

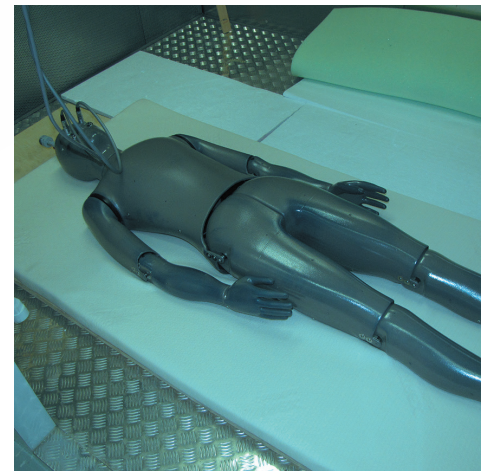
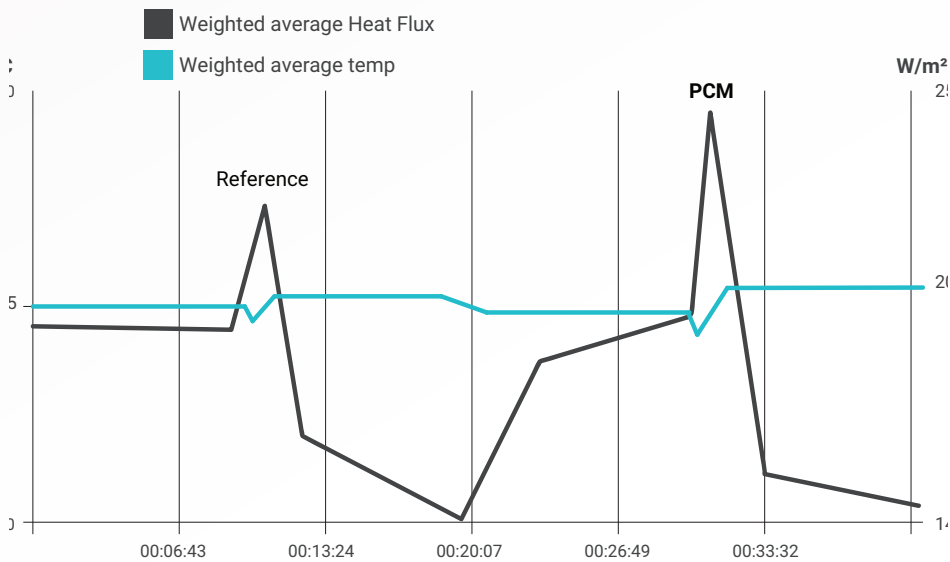
The sweating arms of the thermal manikin are used to :

- simultaneously compare the breathability of different materials under identical conditions
- measure the surface temperature of a thermal sweating arm during simulated exercise and rest phases
- evaluate moisture management properties



5. Thermal Contact Test

Measurement of the heat removal from the skin that comes into contact with a fabric. The thermal contact test is particularly interesting to characterise heat-regulating textiles containing e.g. phase change materials (PCM).



6. Thermal Hand

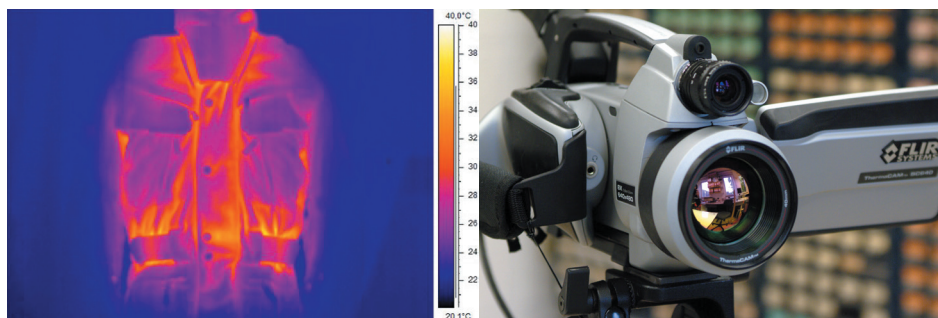
EN 511:2006: Protective gloves against cold

This European Standard specifies the requirements and test methods for gloves which protect against convective and conductive cold down to -50 $^{\circ}C$.

The thermo-physiological comfort of gloves and mittens is assessed by measuring the thermal insulation and water vapour resistance.



7. Thermal Infrared Camera



Scan QR for more details





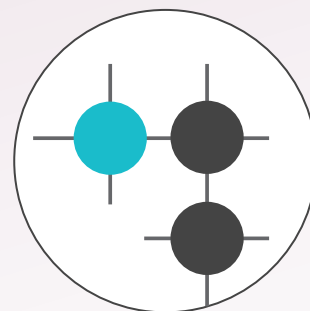
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Centexbel

GENT | Technologiepark 70 | BE-9052 Gent | +32 9 220 41 51 | gent@centexbel.be
KORTRIJK | E. Sabbelaan 49 | BE-8500 Kortrijk | +32 56 29 27 00 | kortrijk@centexbel.be
GRÂCE-HOLLOGNE | Rue du Travail 5 | BE-4460 Grâce-Hollogne | +32 4 296 82 00 | g-h@centexbel.be

www.centexbel.be