thermal comfort

assessment

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

The comfort of clothing systems plays an important role in sports, work and daily routine. Optimal comfort enables the wearer to work or exercise more efficiently over longer periods of time and helps to protect the body from local cooling or from imminent overheating.

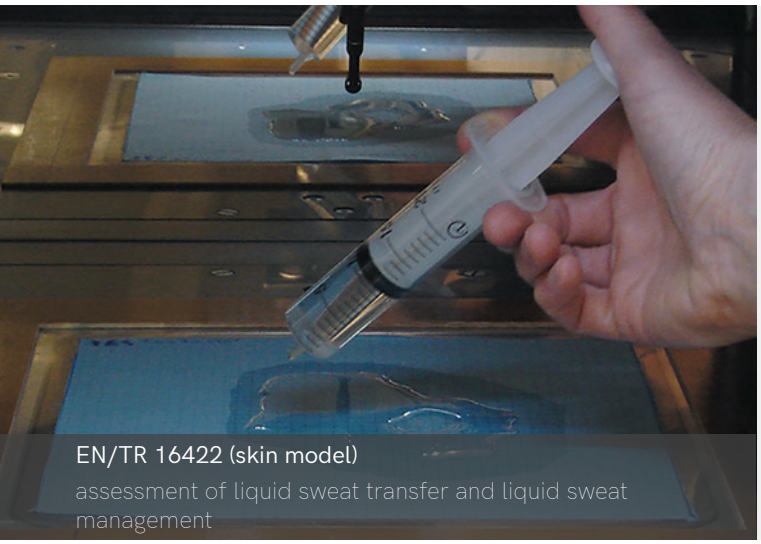
Because ensuring optimal thermo-physiological comfort is a complex issue in clothing design, Centexbel offers a whole series of tests to assess this important aspect in the development of workwear, sportswear, corporate wear, medical wear, protective and military clothing.

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 ISO 11092, 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/TR 16422 (skin model)
assessment of liquid sweat transfer and liquid sweat management

AATCC 195 - moisture management tester
liquid moisture management 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 (work, sports, walking...).

ISO 15831
thermal insulation by means of a thermal manikin

ISO 15831 - EN 342
thermal insulation of ensembles and garments for protection against cold

ISO 15831 - EN 14058
thermal insulation of garments for protection against cool environments

ASTM F2370
standard test method for measuring the evaporative resistance of clothing using a sweating manikin

ASTM F2371
standard test method to measure the heat removal rate of personal cooling systems using a sweating heated manikin

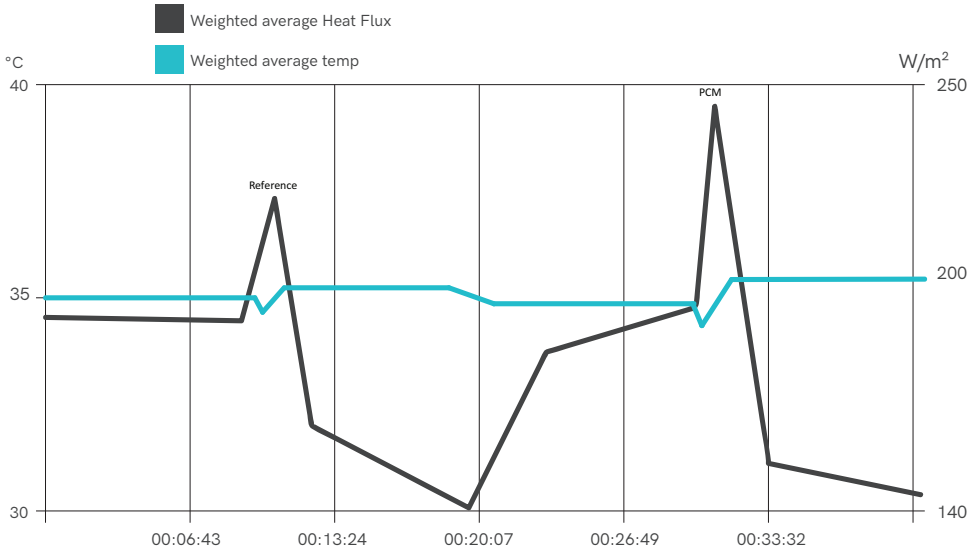
4. sweating arms of the thermal manikin

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

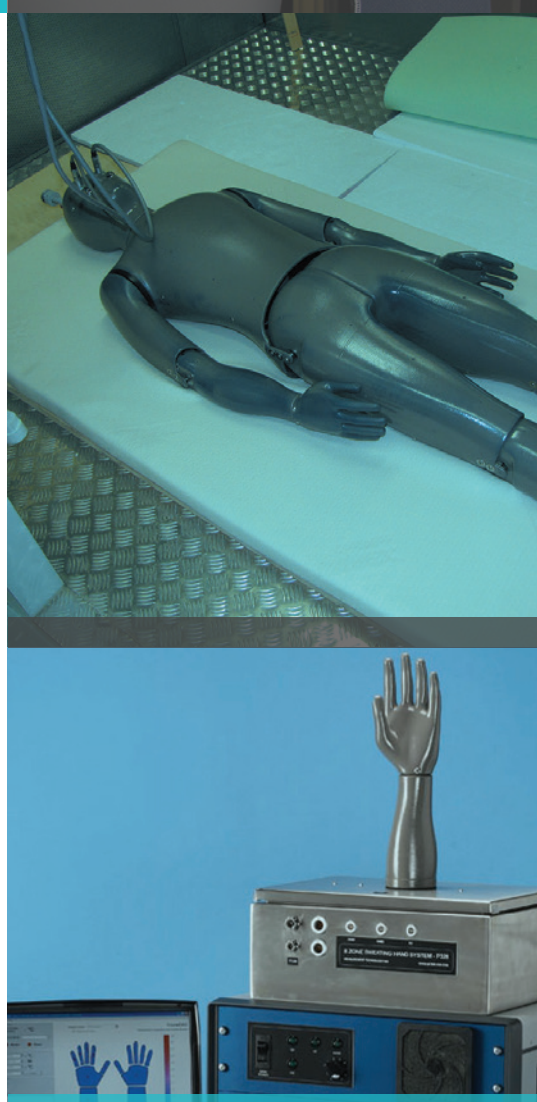
5. thermal contact test

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).



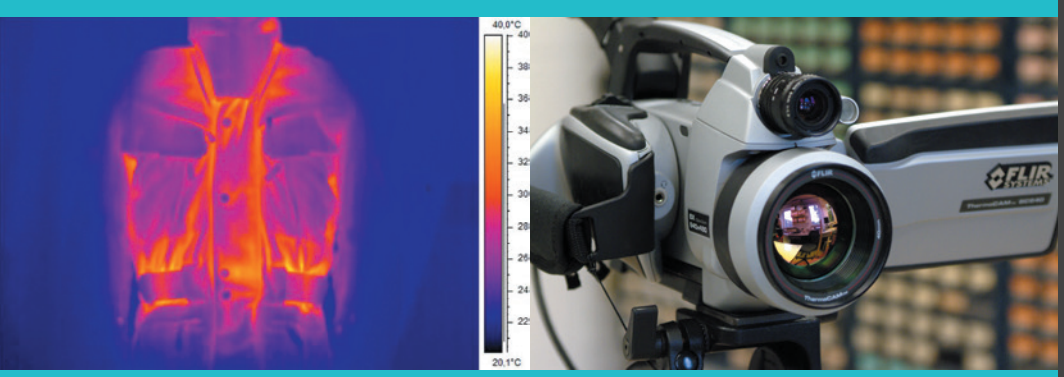
6. thermal hand

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



EN 511
protective gloves against cold

7. thermal infrared camera



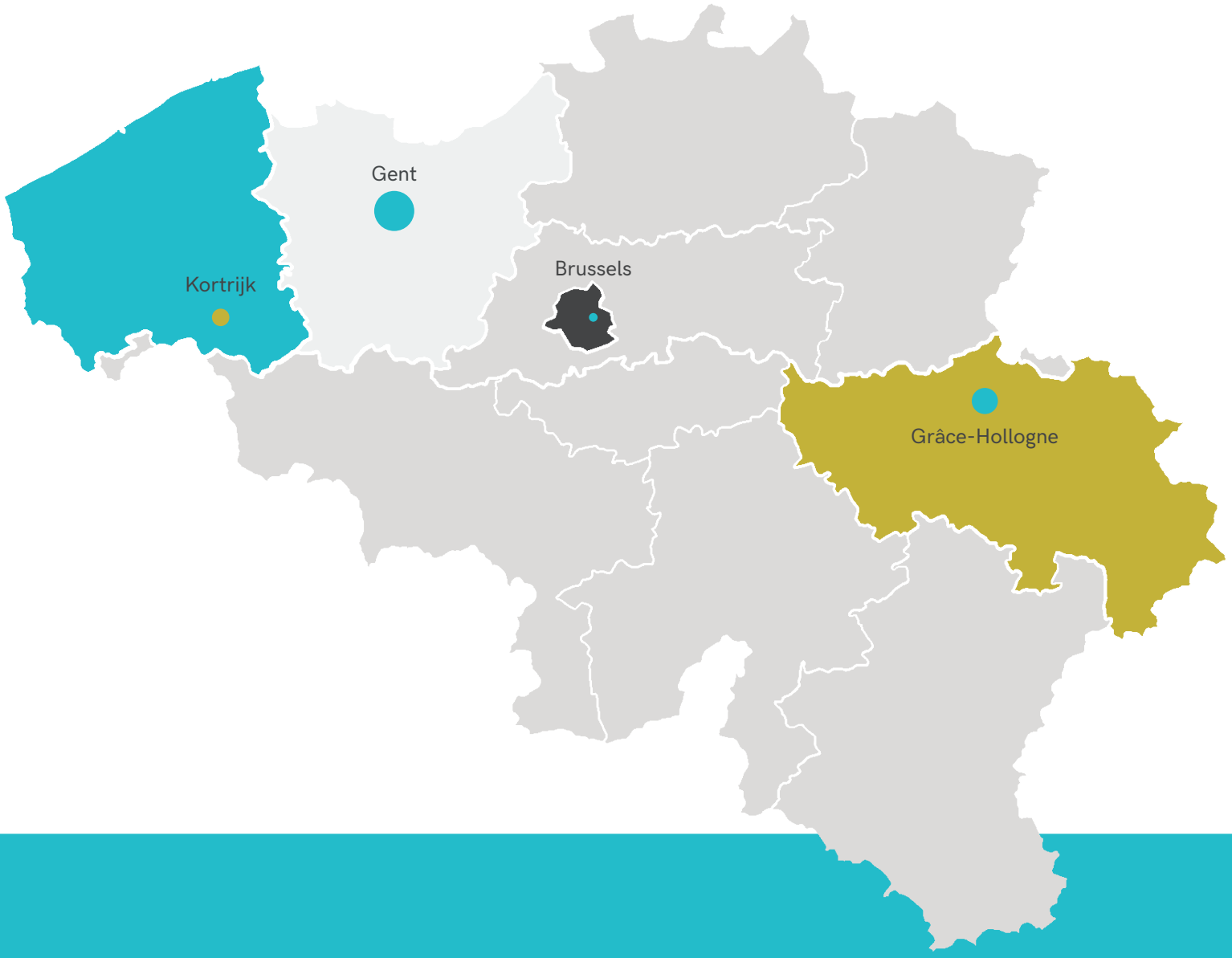
VISUALISATION OF HEAT LOSSES AND OTHER THERMAL FEATURES OF FABRICS AND CLOTHING.

CREATE

CONNECT

INSPIRE

SOLVE



Centexbel-VKC

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