

# Tampere University of Technology

## Fibre Materials Science

### SmartWearLab

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## SmartWearLab (SWL), main activities

### Smart textiles and clothing Function vs. comfort

-thermal, tactile, etc.

### Applications

- Protection
- Health care
- Sport and leisure
- Military



# Sweating thermal manikin and cylinder

## Unique resources for thermal comfort measurements in climatic chamber

- materials
- garments
- clothing ensembles

## Thermal insulation

## Water vapour permeability

## Dynamic measurements, e.g. on smart materials

## New generation equipment under construction



# CLAN (CLothing Area Network)

## Smart clothing for firefighters

### Integrated sensors:

- temperature
- heart rate
- compressed air

Data to CLAN-box and wireless transmission to team leader's laptop.

Realtime information on connected staff.

Prototype developed and tested in fire simulations. No further funding.



	Palomies, Pasi	Brandman, Bjorn
Outside Temperature	162,0 C°	72,2 C°
In suit temp 1 (shoulder)	73,5 C°	46,1 C°
In suit temp 2	62,0 C°	26,4 C°
Unused	NaN	NaN
Glove Temperature	72,2 C°	26,4 C°
Boot temperature	46,1 C°	21,5 C°
Unused	NaN	NaN
Pulse from Polar belt	162	72
Bottle pressure	NaN	NaN

# TSR-PCM (Possibilities of inorganic phase change materials ...)

**Application example: cold food handling**

**Phase change materials in clothing:**

- water
- organic paraffin waxes
- hydrated inorganic salts

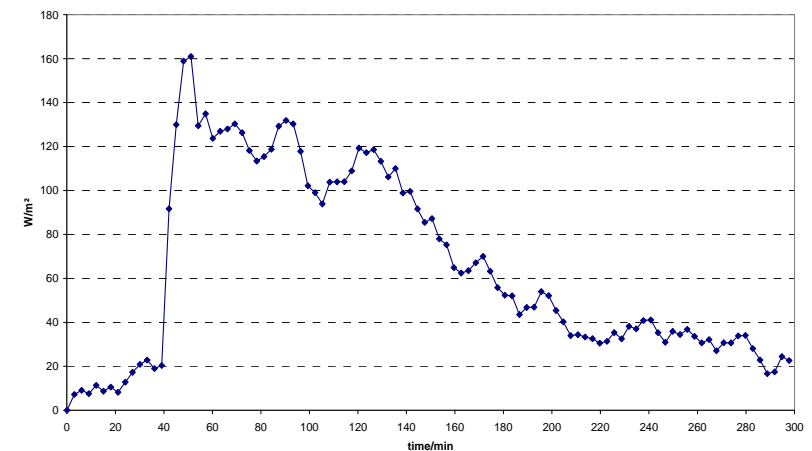
**Plastic bags filled with glauber salt  
(44 % NaSO<sub>4</sub> and 56 % H<sub>2</sub>O)**

**Tests with sweating cylinder:**

- temperature (°C)
- heat loss (W/m<sup>2</sup>)



Cooling effect W/m<sup>2</sup>



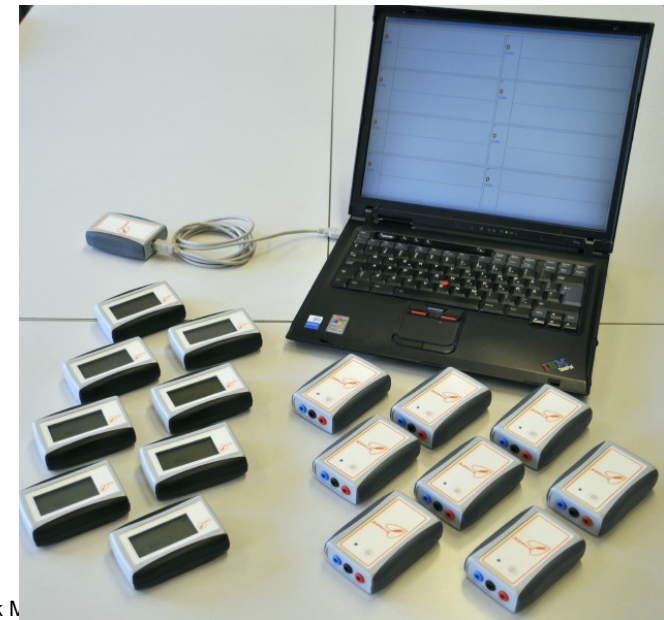
# CorusFit

## Medical Cardiac Fitness Concept (physical training for CAD risk groups)

### CorusFit Concept:

- Mandatory check-up before entering program
- Supervised training at individual intensities
- Exercise sessions 2x weekly for 6 months
- Each session 60 min
- Real-time monitoring

Good experience in use by CorusFit  
(physiotherapy).



# NEST II (Networking Nordic Intelligent Textile Know How)

**Network project, funded by Nordic InnovationCentre (NICE)**



**”The overall objective of the project was to create a platform for continuous collaboration and transfer of knowledge between users, research institutes and industrial companies”.**

**Partners from 7 research organisations, 5 countries**

**Main activities:**

- network group seminars
- initiating new R&D projects



## New smart textile projects

**NoTeReFiGa (Novel Temperature Regulating Fibres and Garments)  
EU FP7 funding, 2009-2012**

**Safe@Sea (Protective clothing for improved safety and performance  
in the fisheries), EU FP7 funding, 2009-2012**

**Safeprotex (High-protective clothing for complex emergency operations)  
EU FP7 funding, 2009-2012**

**Smartwell (Smart Solutions for Future Health Care, Well-Being and  
Home Security), Baltic Sea Region Programme proposal,  
2009-2012**



**Thank you!**  
**Questions?**

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