

## Thermal manikin calibration

Calibration of the manikin is essential for the value of measuring results. The manikin has no precision from beginning, but has to “learn” which temperatures the incoming digital values are related to.

### The manikin is not more precise than the calibration.

The principle in calibration is to bring the manikin body to two well known temperatures with a minimum difference of 10 dgr. and insert these known temperatures in the manikin software. Since we want to know the temperature of the body, **we must bring the body to be equal to the ambient temperature**, to use the measured air temperature as known body temperature.



In order to obtain  $T_{amb} = T_{body}$ , **it is important to minimize the thermal resistance from air to body.**

To obtain that, **the body must be nude and placed in an open chair, that does not insulate or stop air movement. Air velocity must be high by using fans. Feet should not rest on the floor, but placed on eg.a box.**

Place a good quality **mercury thermometer near the manikin for double checking** chamber temperature.

Set the manikin in **no heat mode.**

### **The Chamber must be able to provide a stable temperature**

Set Climate chamber to temp.  $A = 20$  to  $25$  dgr.C.

When steady state is almost obtained, **set graph scale to 1 dgr. C.** eg.  $23$  and  $24$  dgr.

Wait till the temperature in **all body sections is stable.**

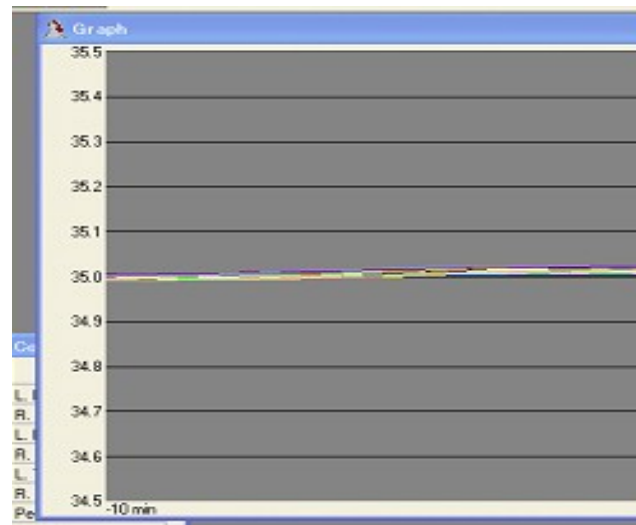
Stable means **no change in one direction**, but maybe following small changes in climate chamber up and down.

This process can take 3 to 6 hours.

It is usually necessary to perform calibration over two days.

It is possible to make the low calibration one day and the high an other day, and it is possible to calibrate one of the temperatures alone. Then it will be used with the old value of the other temperature.

### Set graph scale to 1 dgr. C.



Press body section – calibrate – A and type chamber temperature (can be done more than once)  
Set chamber temperature B to 30 to 37 Dgr. C. ( B – A must be more than 10 dgr. C.)  
Wait for steady state using graf range one dgr (eg.33 and 34 dgr.)  
Press body section – calibrate – B and type air temperature.

The digital number for each body section for the two measured temperatures has now been stored in memory in the controllers inside the body.

In the controllers the two known measure points will shape an equation, which is the temperature calibration.

It is possible to save a calibration by using the firmware.exe.  
Load firmware.exe – scan – file – export – specify name and location.

Now all data from the manikin are stored in a file.

This is useful in case the calibration is accidentally damaged by user, or if a user wants to send the copy of manikin memory to PT-Teknik for analyzing.

A stored calibration can be uploaded to the manikin by firmware.exe by using import – browse – controller – transfer to all controllers.

It is advised to repeat calibration once a Year or before an important series of measurements.  
It is important to double check, that calibration is succeeded by placing the manikin in a known uniform ambient temperature.  
Experience has shown, that the calibration does not change in one year.