

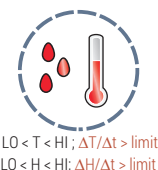
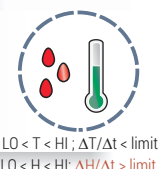
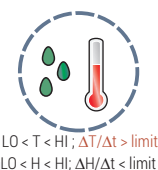
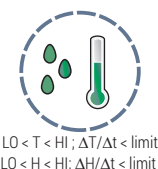
Microbalances and ultra-microbalances are precise weighing instruments requiring stable work environment.



Max 2 - 52 g,  
d = 0,1 µg - 1 µg  
Full Automatic Adjustment  
series (4Y, 4Y.F, 4Y.P)

#### Ambient conditions

IS T1: 24.26 °C  
IS T2: 24.26 °C  
IS H: 59%  
ISP: 994 hPa  
ρ: 1.161 kg/m<sup>3</sup>



This refers to such environmental conditions as temperature, humidity and ground vibrations. Assuming that ambient conditions are correct, the metrological tests can be carried out after acclimatization period. Place of balance installation is of great importance.

Thermal stability of microbalance can be assessed using ambient conditions module. Out-of-range values are signalled with red pictograms.

## AMBIENT CONDITIONS REQUIREMENTS



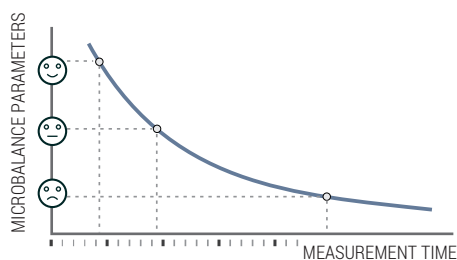
Temperature range: + 10°C - + 40°C  
Temperature change dynamics: ± 0,30C / 1 h  
Temperature change dynamics: ± 0,80C / 8 h



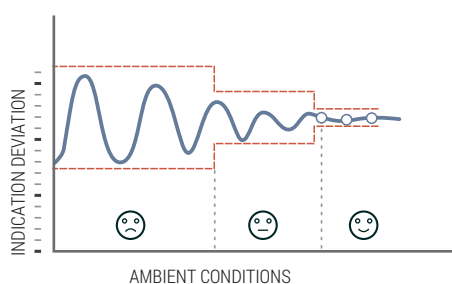
Humidity range: 40 % - 80 %  
Humidity change dynamics: ± 1 % / 1 h  
Humidity change dynamics: ± 4 % / 8 h

## ACCLIMATISATION TIME / SETTINGS / AMBIENT CONDITIONS INFLUENCE

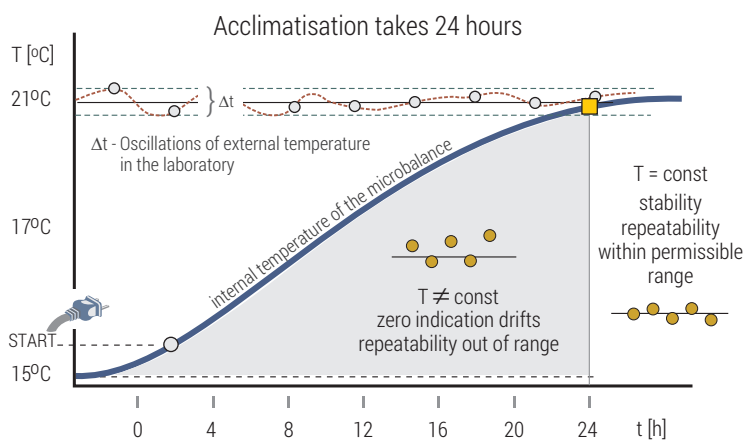
Acclimatisation time is a period of time within which the microbalance installed at its workplace reaches thermal stabilisation. Both parameters setup and ambient conditions determine how quickly and accurately the indications are displayed.



Correct settings = quick measurement.



Dynamics of ambient conditions change influences measurement accuracy.

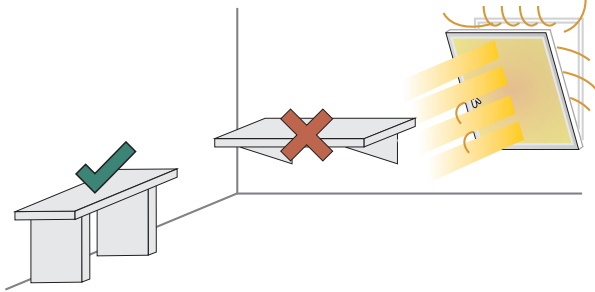


Temperature difference, ΔT, between the microbalance and the environment is of a great importance. Acclimatization time is not affected by microbalance transport method.



Microbalance workstation must comply with the following requirements:

- reduced or eliminated air flow,
- stable floor (reduced ground vibrations),
- weighing table of robust design (bending, deflecting, springing unacceptable),
- no sunlight exposure.

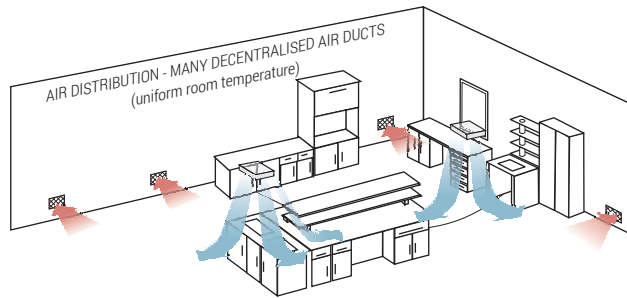
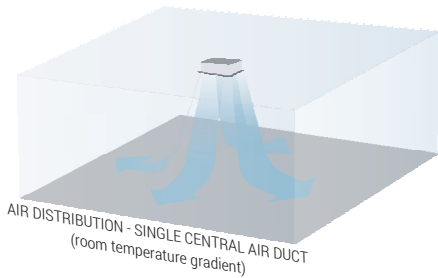


It is recommended to operate microbalances and ultra-microbalances when they are placed on anti-vibration tables equipped with granite top, which guarantees stability.



It is possible to seriously limit influence of the environment, especially air flows, using ergonomic glass anti-draft chambers. The anti-draft chamber is a standard ultra-microbalance ( $d=0.1 \mu\text{g}$ ) accessory and optional microbalance ( $d=1 \mu\text{g}$ ) accessory.

## ADJUSTING AMBIENT CONDITIONS IN A LABORATORY



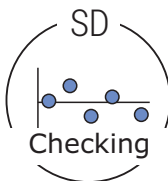
It is recommended to use systems offering laminar air flow. The best solution is system with a number of points of distribution. Dynamics of temperature changes must remain within permissible limits.

## AMBIENT TEMPERATURE REQUIREMENTS

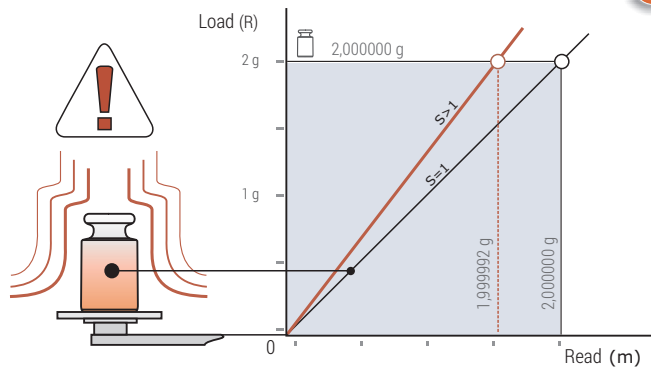
Unstable ambient temperature affects metrological parameters of the microbalance.



Acclimatisation is necessary in order to guarantee stabilisation of the microbalance at the place of installation.



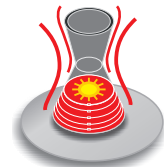
Greater dispersion of indication is a result of unstable thermal conditions.



Both measured products temperature and ambient temperature must be similar. High dynamics of temperature change may cause sensitivity errors (indication deviations).



Low sample temperature



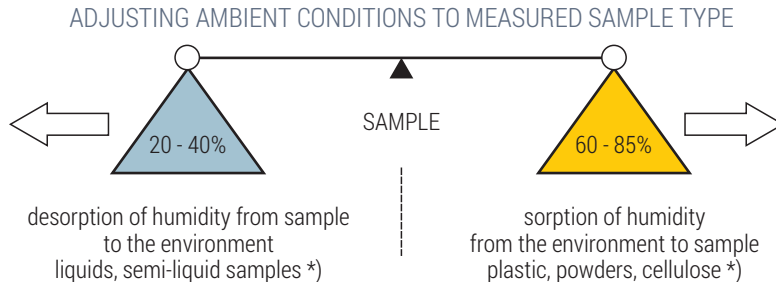
High sample temperature



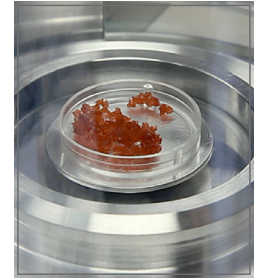
Humidity may affect both balance operation and measured sample mass. Relative humidity ranges between 40 % - 80 %. Correct microbalance operation is possible when the humidity range is wider, however in such case some unfavourable processes may occur, e.g. electrostatics.



use vessels with narrow neck



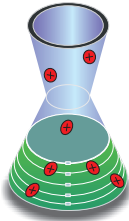
\*) possible indication variation, for high process dynamics



when weighing samples it is necessary to place them in closed containers

### Electrostatics in mass measurement.

Samples absorb electrostatic charges floating in the air (non-compensated charges). The charges can also be absorbed as a result of touch (contact of the sample with operator's hand).



Visible result of electrostatics phenomena is the drift of microbalance indication (indication decrease or increase).

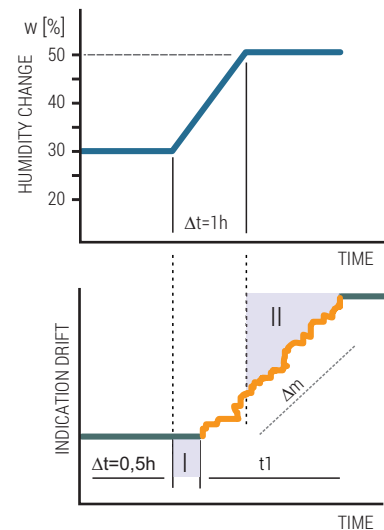
It is recommended to eliminate electrostatic charges by means of an anti-static ioniser (DJ-02 or DJ-03).



Anti-static ioniser DJ-02.

### Influence of unstable humidity on the indication

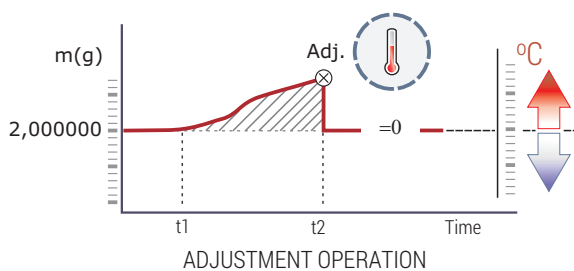
Dynamic change of humidity is a reason for variation of microbalance indication, repeatability parameter may be out of range.



Indication drift and humidity change do not occur simultaneously, the first comes humidity change.

## ADJUSTMENT - CORRECTION OF DEVIATIONS BEING A RESULT OF UNSTABLE AMBIENT CONDITIONS

Each microbalance, ultra-microbalance features function of automatic adjustment. This function records temperature changes which allows to eliminate indication deviations.



ADJUSTMENT OPERATION

Microbalance internal temperature is recorded on-line. When the changed temperature value is greater than the declared value then adjustment process runs automatically.



temperature adjustment (ambient temperature change)

time adjustment (time interval between adjustments)

manual adjustment (in accordance with microbalance operator decision)