

# Mechanical strength

Partition walls and ceilings have to withstand normal constraints of utilisation in premises without deterioration to their tightness characteristics, their surface evenness and aesthetic appeal. In the event of extreme or exceptional stress, panels must retain their stability.

## Loads to be taken into account

### Partition walls

Loads to be taken into account are of different types :

- constraints inside a closed building caused by atmospheric variations and the effects of wind (measurement from 12 daN/m<sup>2</sup> to 22 daN/m<sup>2</sup> inclusive.)
- internal excess pressure and partial vacuums to meet clean zone classification criteria and due to the gradation of pressures from one room to another:  $\Delta P$  of roughly 2 daN/m<sup>2</sup>.

In the event of inadvertent excess pressure, the aeraulic overload can be allowed to reach 50daN/m<sup>2</sup>; it will then be necessary to fit pressure relief valves or other equivalent valve systems. The company that installs the air treatment system and possible refrigeration must have the competence and experience to be able to determine the number of such systems and their location.

- buckling constraints due to the downward pressure of ceilings and accessories or equipment on the partition walls
- exceptional shocks ( soft shock 250 J ).

### Ceilings or false ceilings

The same types of loads are encountered here, viz: constraints caused by wind (in accordance with NV65 calculation notes), excess pressure and partial vacuums due to the process, the possible weight of integrated accessories (filters, lighting units...) to which must be added the ceiling's own weight.

Ceilings can be accessed but cannot be used for foot traffic. Nonetheless, they allow occasional loads of 150 daN permissible at any point.

Special precautions must be taken for heavy foot traffic during erection work or operations.

## Resistance criteria

### Resistance to shock or scratching

Various tests have been developed to determine the resistance of panel faces:

- TABER chalk hardness test for resistance to abrasion or scratching.
- metal ball drop tests for resistance to shock.

Depending on applications, various levels of resistance could be required, since a shock on a panel face might prove to be a source of contamination, corrosion, etc.

### Resistance to deflection and rupture

- Deflection criteria: the deflection of panels (vertical or ceiling) is generally limited to 1/200th of the reach.
- Safety criteria: one should make sure that the load borne by panels is less than half the failure load.