

# Vacuum Applications and Measurements

## VACUUM HANDLING DEVELOPMENT

An industrial vacuum applied to suction cups is an efficient method for handling objects and materials.

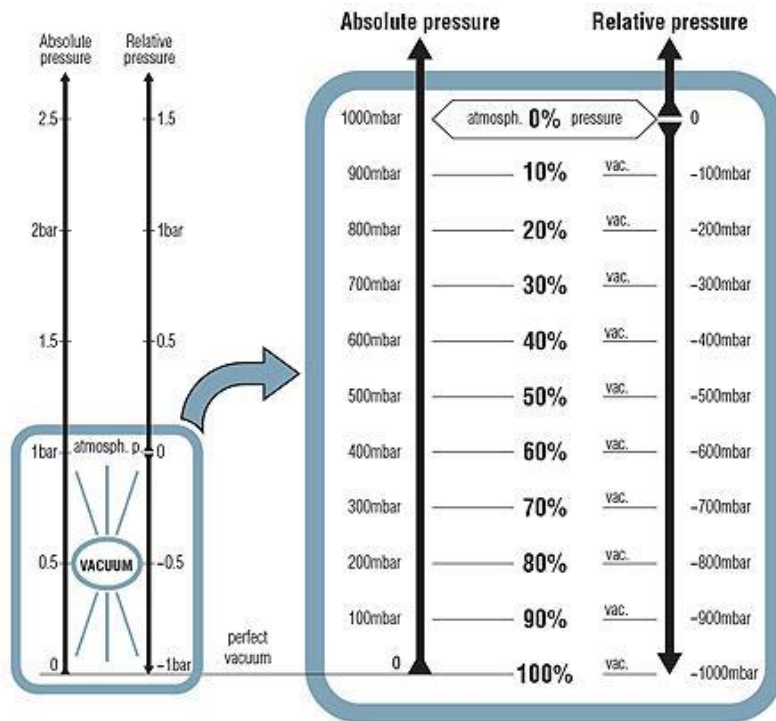


This technique was developed to meet industrial automation needs, with applications in parts assembly, finishing, testing, transfer, packaging, etc.

It is particularly designed for the automotive, wood and plastics industries, as well as all object transformation activities: food, electricals, furniture, etc.

Vacuum handling has become a key production technology, and this document will detail the rules, procedures and components involved.

## MEASURING THE VACUUM LEVEL



Scientists use absolute pressure, with a scale that starts at the perfect vacuum, with atmospheric pressure measuring roughly 1 bar.

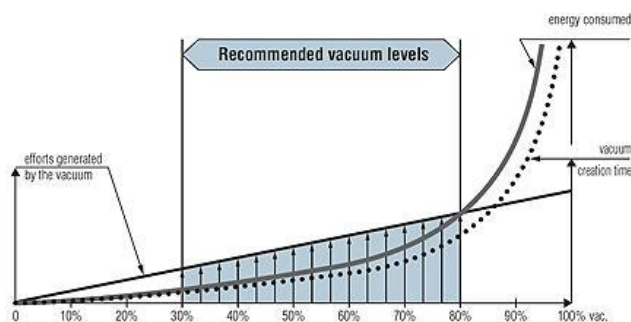
For industrial applications, relative pressure is preferred. This makes a clear distinction between vacuum (negative pressure) and positive pressures.

In handling applications, the vacuum is only effective through its difference compared with atmospheric pressure. However, atmospheric pressure varies slightly depending on the altitude of the application site.

This is why it is more practical to express the vacuum level as a percentage of the atmospheric pressure.

The scale shown on the left shows the relation between pressures expressed in bar and mbar and the vacuum level expressed as a percentage of the atmospheric pressure. This relation is accurate for use at an altitude of 100m. This is the measurement that we will use when discussing suction cups, since this is the most common altitude of industrial site.

## RECOMMENDED VACUUM LEVELS



The handling system provides a level of effort that is proportional to the level of the vacuum that generates it (see curves opposite). For the most efficient operation, a maximum vacuum level is recommended.

However, the curves also show that a high level of vacuum:

- has a high energy cost
- takes a long time to establish

This is why the vacuum levels used should be limited, from 30% when a high flow of vacuum needs to be maintained, to 80% in an airtight circuit (no flow required to maintain the vacuum).