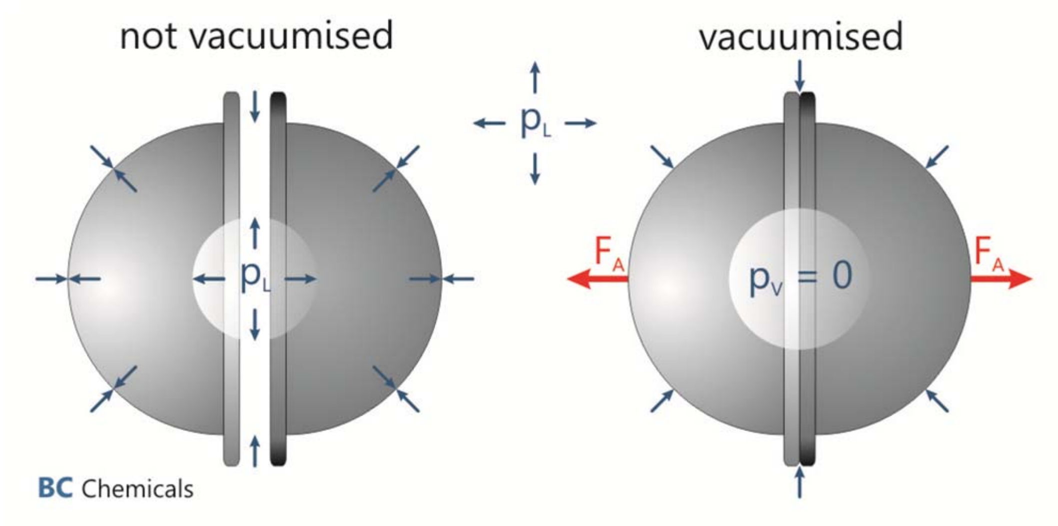


Hydrostatic air/atmospheric pressure normed at sea level

$p_L = p_v = p_h$ = 101,325 Pa= 1,013.25 hPa ≈ 1 bar = $1 \cdot 10^5$ N/m²

Pressure in perfect vacuum

$p_V = 0$

Force F exerted on a surface of A = 1 m²

$p = F/A$

$F = m \cdot g$ = 101,325 N

Mass m exerted on a surface of A = 1 m²

g = 9.81 m/s²

m = 10,329 kg

The air pressure is dependent on the height level or more precisely, on the air mass/column above. Moreover, air is a compressible fluid and therefore, no linear change develops in dependency on the height.

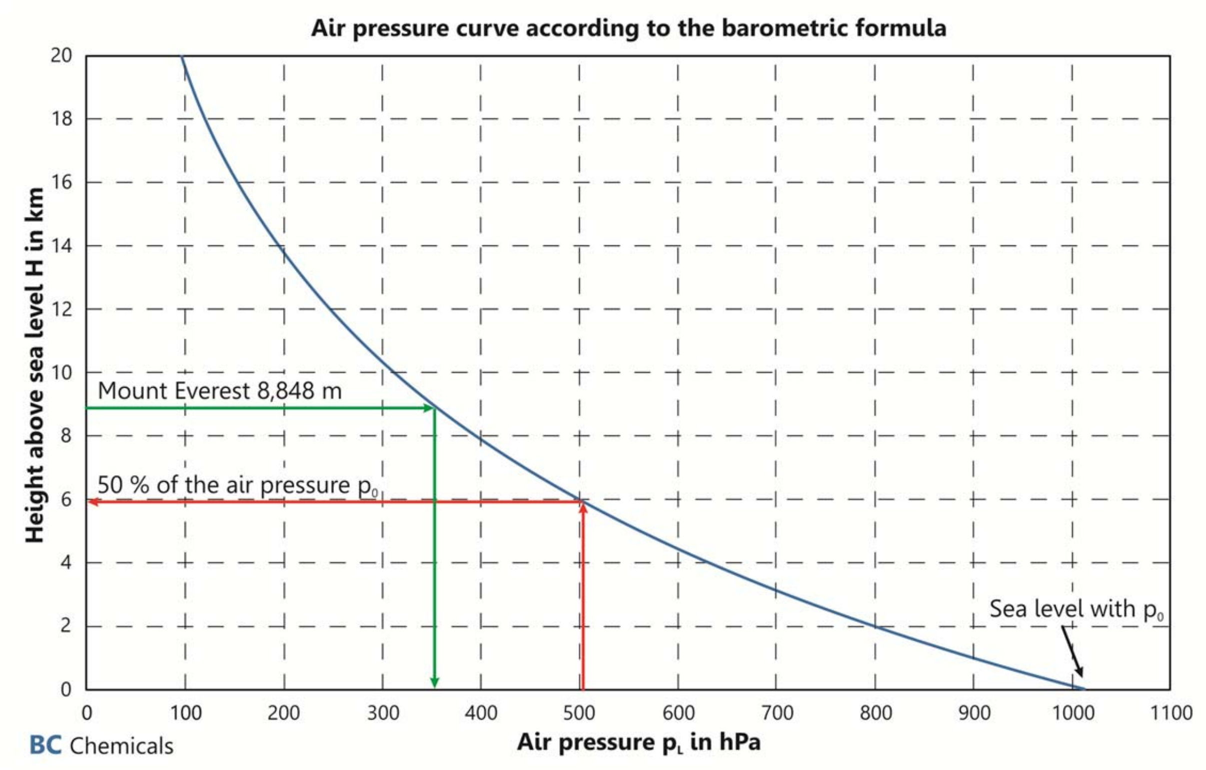
For an approximate calculation of the air pressure p(H) at a height H as well as a constant absolute temperature T (isothermal atmosphere), the trivialised barometric formula with sea level as reference system (C = 0.034, p_0 = 1,013.25 hPa)

$p(H) \approx p_0 \cdot \exp(-C \cdot H/T)$ [1]

can be used. The real air pressure can however significantly deviate due to various natural influences like temperature gradients and air flows.

In contrast to air, water is an incompressible fluid and therefore, the hydrostatic pressure p(H) exhibits a linear dependency on the height

$p = \rho \cdot g \cdot H$.



A	m²	surface
C	K/m	constant
F	N	force
F_A	N	detachment force
g	m/s²	gravity acceleration
H	m	height
m	kg	mass
p	N/m²	pressure
p_0	N/m²	normed air pressure at sea level
p_h	N/m²	horizontal pressure
p_L	N/m²	air/atmospheric pressure
p_v	N/m²	vertical pressure
p_V	N/m²	pressure in perfect vacuum
T	K	temperature
ρ	kg/m³	density

[1] H. Häckel, *Meteorologie*, Verlag Eugen Ulmer Stuttgart, 6., corrected edition, 2008