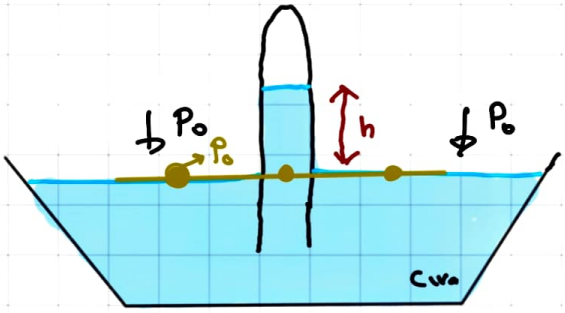
# Açık hava basıncı

- Açık hava basıncı **barometreyle** ölçülür.
- İlk kez **Toricelli** ölçmüştür.




$P_o$ (atmosfer basıncı)

$P_o = 1 atm = 76 cmHg$
$= 760 mmHg$

$d_{civa} = 13,6\ g/cm^3$
$d_{su} = 1\ g/cm^3$

$P_o = h_{sıvı} \cdot d_{sıvı} \cdot g \Rightarrow P_o = 76\ cmHg$

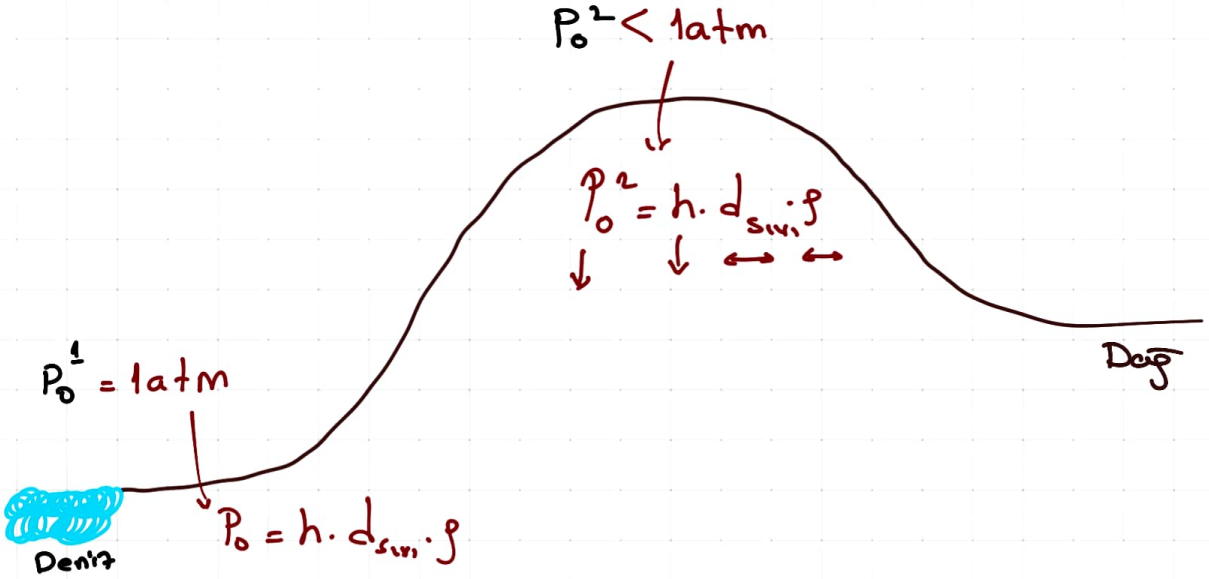
→ h yüksekliği,

- Ortama (açık hava basıncı),
- Sıvının cinsi,
- Sıcaklık

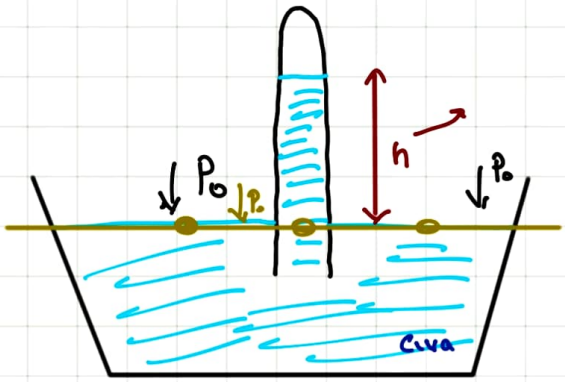
niceliklerine bağlıdır.

**Önemli**

- Borunun kesit alanına ve şekline bağlı değildir.




→ Deney ortamı daha yüksek bir yerde yapılsaydı; $(P_2^o < P_1^o)$

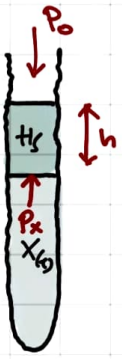



1atm = 76cmHg $\quad P_0 = h \cdot d_{ciwa} \cdot g \quad (d_{ciwa} > d_{su})$

$\leftrightarrow P_0 = h \cdot d_{su} \cdot g$

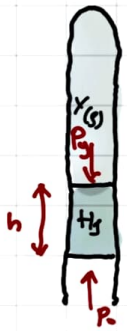
$P_0 = h \cdot d_{sữa} \cdot g$

# Tüplerde gaz basıncı



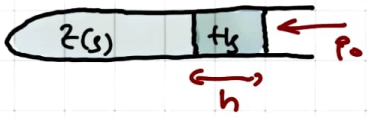

$P_{x(g)} = h + P_o$

$P_x > P_o$



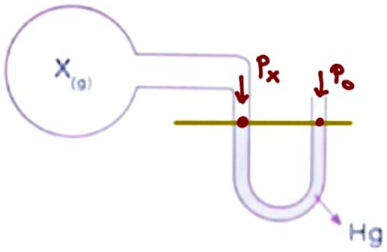

$P_o = h + P_{y(g)}$

$P_o > P_y$

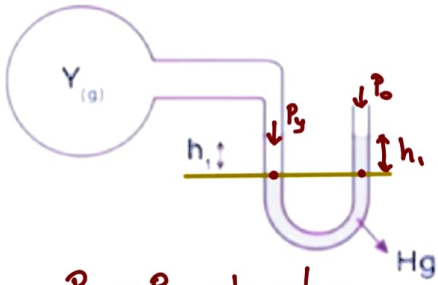



$P_o = P_{z(g)}$

## Manometrede gaz basıncı

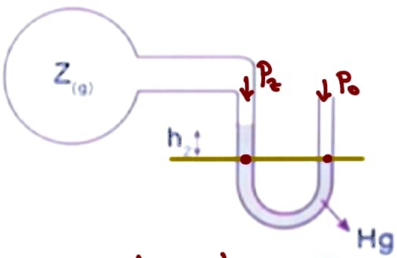



$P_x = P_o$

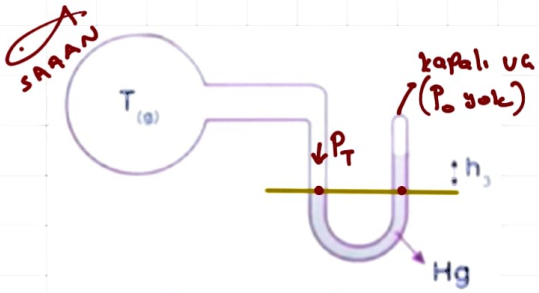



$P_y = P_o + h_1 \cdot d \cdot g$

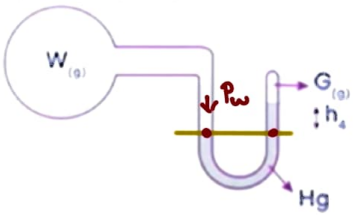
$P_y > P_o$




$P_z + h_2 \cdot d \cdot g = P_o$

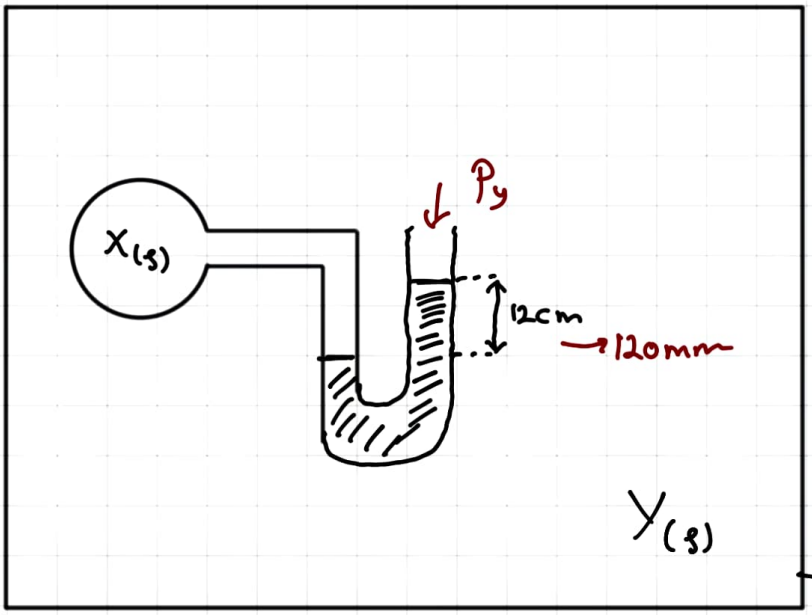



$P_T = h_3 \cdot d \cdot g$




$P_w = P_G + h_4 \cdot d \cdot g$

? Soru




$P_{y_{(g)}} = 154$ cmHg $= 1540$ mmHg

$P_x > P_y$

Buna göre $P_{x\,(g)}$ kaç ~~torr~~ mmHg ?

$$P_x = P_y + \underbrace{12\text{ cm}}_{\downarrow}$$

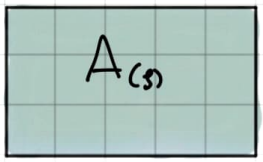
$$P_x = 1540 + 120$$

$$P_x = 1660 \text{ mmHg}$$

1660 torr

**Önemli**

- Cisimler cam / çelik kaba veya pistonlu kaba konulabilir



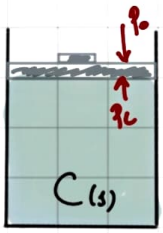

V sabit

$P.V = n.R.T$

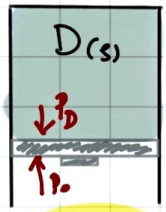



P sabit

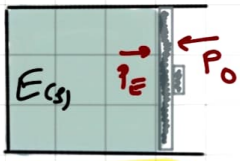
$P.V = n.R.T$



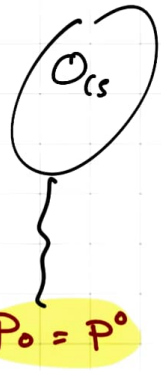

$P_C = P^o$




$P_D = P^o$




$P_E = P^o$




$P_O = P^o$

**Soru** ($N_A = 6{,}02 \times 10^{23}$ tane atom / molekül / iyon)

**Aşağıdaki ifadelerin istenilen karşılıklarını bulunuz.**

- 19 cm Hg = 0,25 atm
- 0,3 L = 300 ml
- 273 °C = 546 k
- 380 mm Hg = 0,5 atm
- 3 mol $C_2H_6$ = $3N_A$ tane molekül
- 693 k = 420 °C
- 0,4 mol $O_2$ = 19,2 gr. (O:16)

1 mol $O_2$ — 4 gr

0,4 — x

x = 19,2 gr

$k = C + 273$

$273 + 273 = 546\,k$

1 mol $C_2H_6$ — $1N_A$

3 mol $C_2H_6$ — x

x = $3N_A$

$693 = C + 273$

$C = 420$

# Gaz yasaları

→ ideal gaz denklemi:

$$P \cdot V = n \cdot R \cdot T$$

P: Basınç (atm) — V: Hacim (L) — n: mol sayısı — R: sabit — T: sıcaklık (K)

$\left(R = \frac{22,4}{273} \simeq 0,082\right)$

**Önemli**
formüllerdeki birimlerle işlem yapılmalıdır.
(ml → L, °C → K, cmHg → atm)

→ 4 tane gaz yasası vardır.
- Boyle ✓
- Charles ✓
- Gay-Lussac ✓
- Avogadro ✓

## 1) Boyle yasası

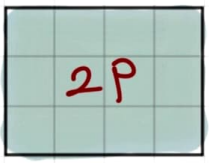
- P ile V ilişkisidir. (basınç - hacim)
- n ve T sabittir.

① $P_1 \cdot V_1 = n_1 \cdot R \cdot T_1$

② $P_2 \cdot V_2 = n_2 \cdot R \cdot T_2$

$\Rightarrow P_1 \cdot V_1 = P_2 \cdot V_2$ (↑↓ =)

→ P ile V ters orantılıdır.




n mol $CH_4$
T kelvin
V

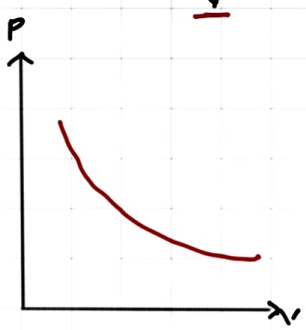


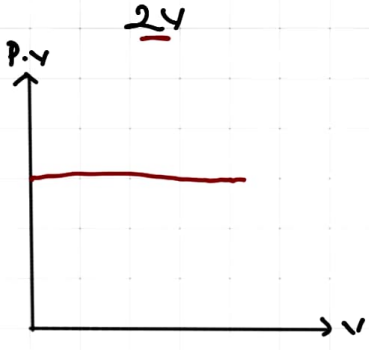

n mol $CH_4$
T kelvin
2V

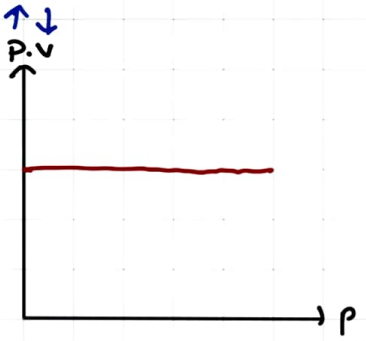
$P_{ilk} \cdot V_{ilk} = P_{son} \cdot V_{son}$

$P_1 \cdot V = P_2 \cdot 2V$

$P_1 = 2P_2$ ($P_1$: 2P, $P_2$: P)




(↑↓ =)

## Soru

Madde miktarı ve sıcaklığın 0°C olduğu sabit bir kapta bulunan $SO_2$ gazının 500ml 'deki basıncı 1,2 atm 'dir.

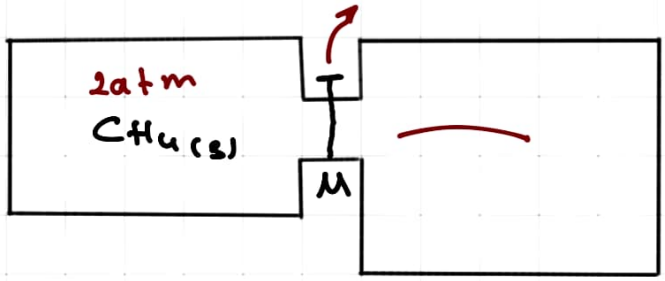
**Kabın hacmi 1500ml 'ye çıkarıldığına göre, son durumda $SO_2$ gazının basıncı kaç atm 'dir?**

$P_1 \cdot V_1 = P_2 \cdot V_2$

$1,2 \cdot 0,5 = P_2 \cdot 1,5$

$P_2 = 0,4$ atm

## Soru




Yandaki sistemde 1. kapta 1520 mmHg basınç yapan $CH_{4(g)}$ bulunmaktadır.

**Aradaki M musluğu açılarak sistem dengeye geldiğinde $CH_{4(g)}$ son basıncı kaç cmHg olur?**

(n ve T sabit)

$P_1 \cdot V_1 = P_2 \cdot V_2$

$2 \cdot V = P_2 \cdot (V + 3V)$

$2V = P_2 \cdot 4V$

$P_2 = 0,5$ atm

$0,5 \cdot 76$ cmHg = 38 cmHg