

冷凍空調裝修丙級技術士 技能檢定術科測試試題

壓力概述

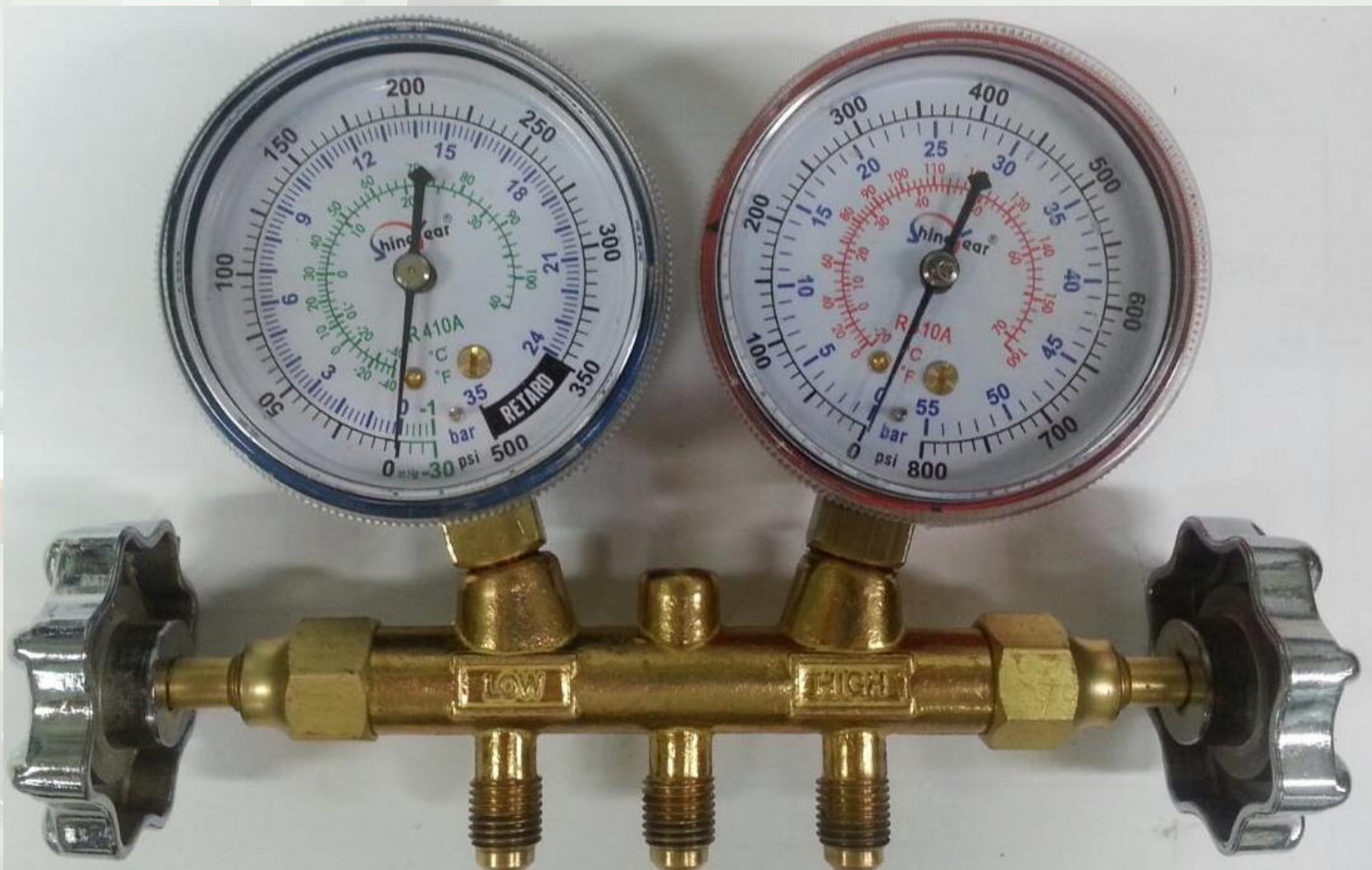
壓力 (pressure)



壓力的種類

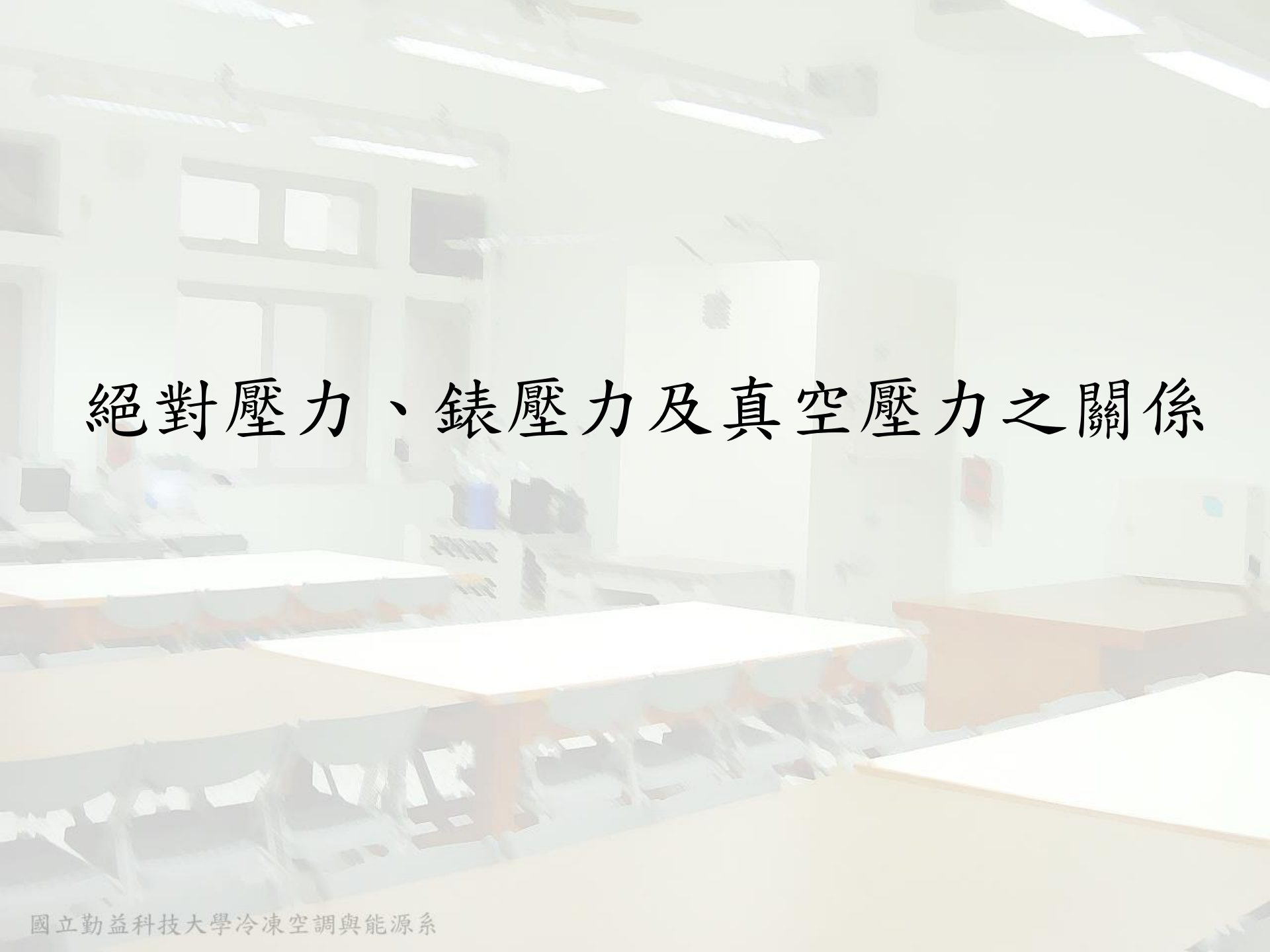
- 絕對壓力(absolute pressure)：
相對於完全真空時所量測所得之壓力。
- 錶壓力(gage pressure)：
絕對壓力與當地大氣壓力之差值。
- 真空壓力(vacuum pressure)：
絕對壓力低於當地之大氣壓力時。

綜合壓力錶

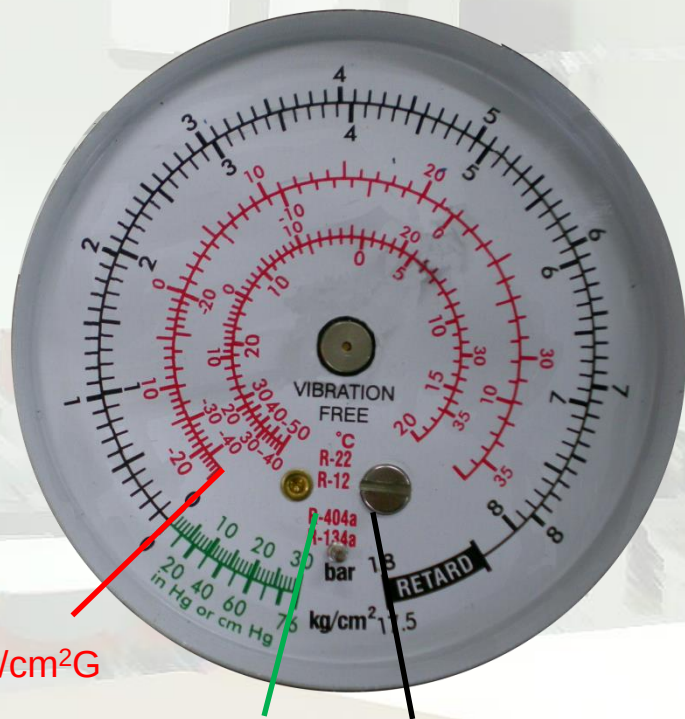


複合壓力錶





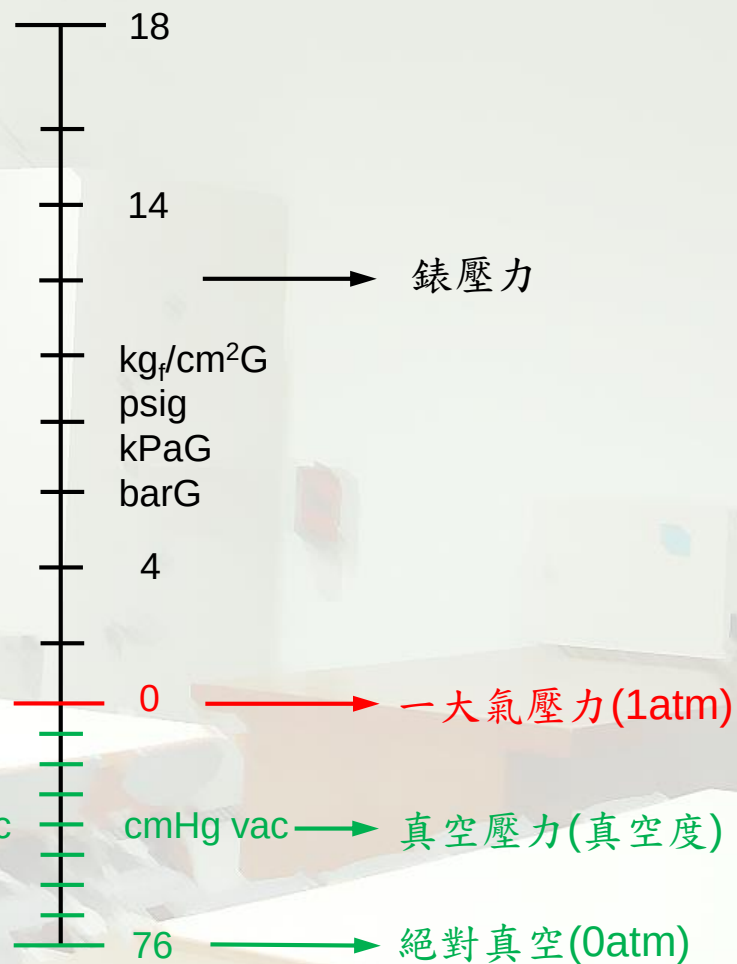
絕對壓力、錶壓力及真空壓力之關係

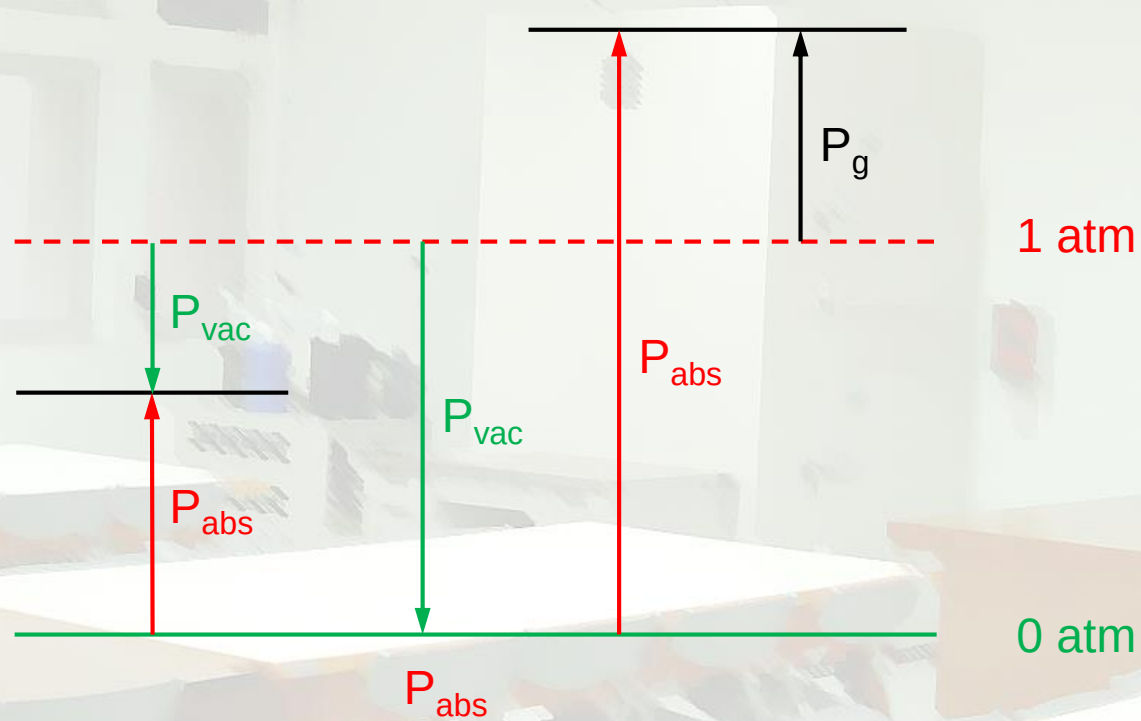


0 $\text{kg}_f/\text{cm}^2\text{G}$

76 cmHg vac
29.92 inHg vac

18 bar G
17.5 $\text{kg}_f/\text{cm}^2\text{G}$





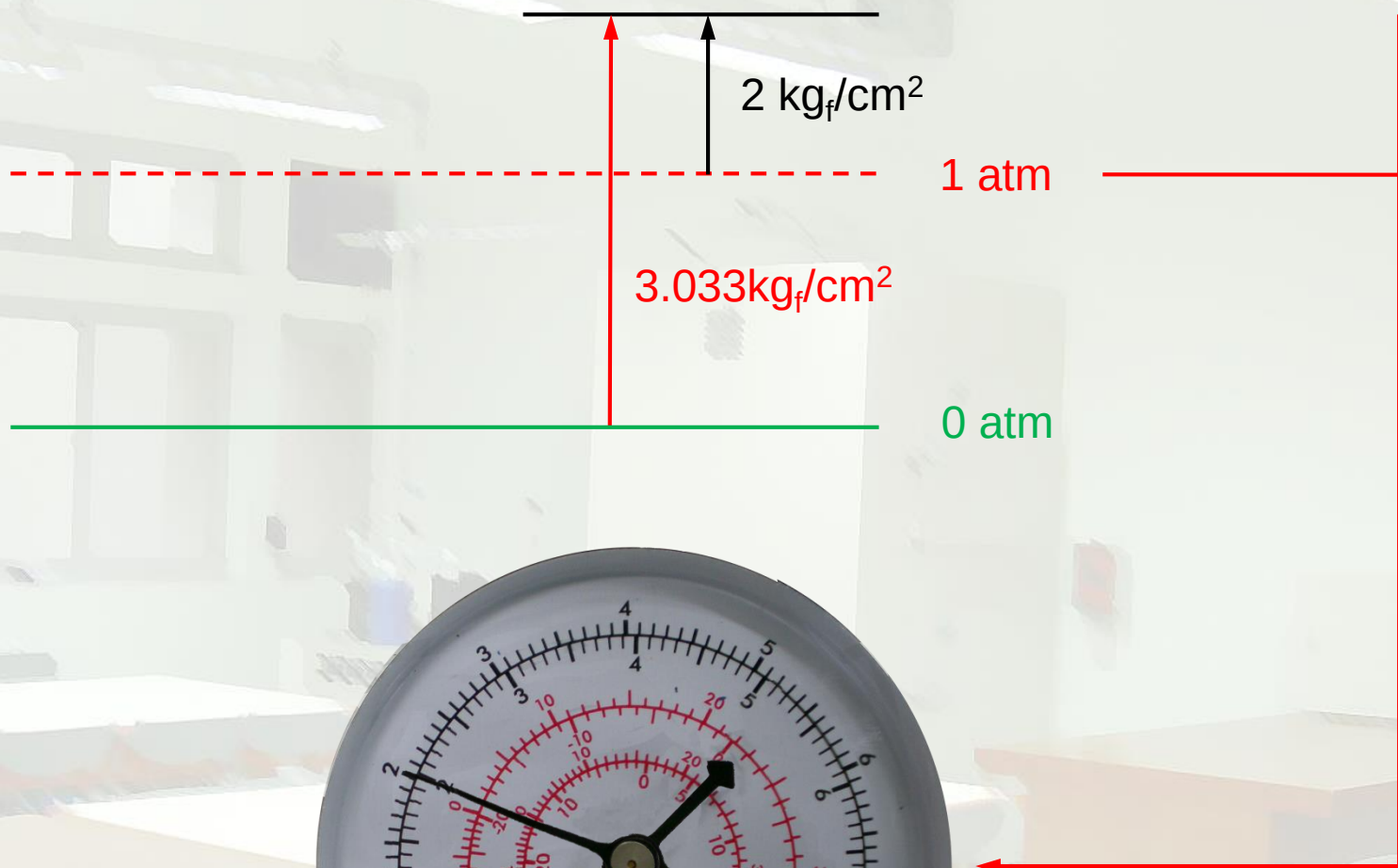


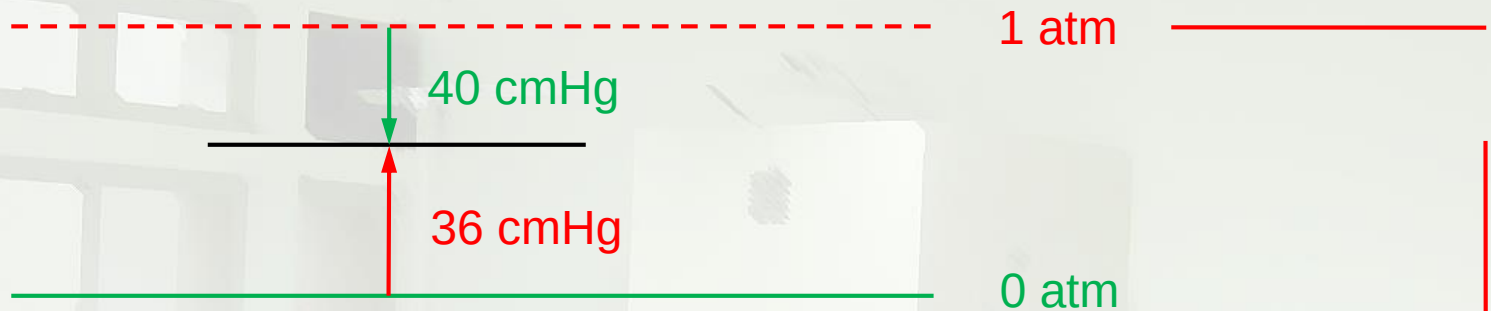
1 atm

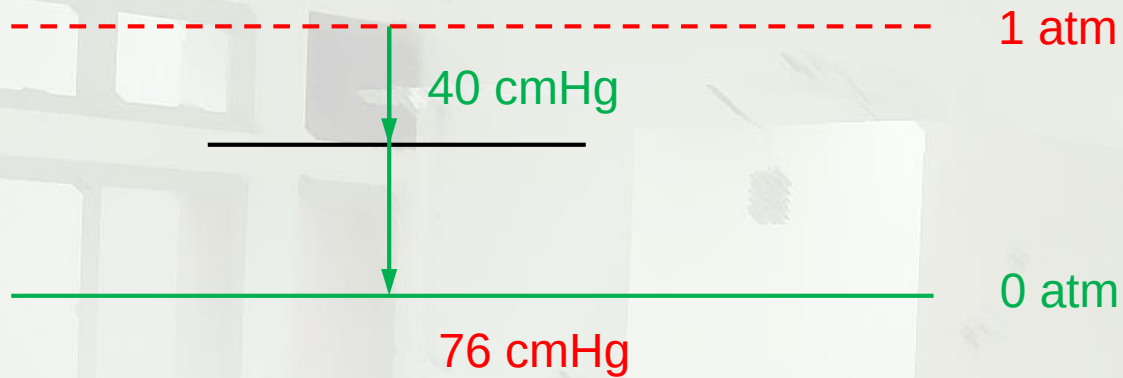


0 atm









$$1 \text{ atm} = 101325 \text{ Pa} = 101.325 \text{ kPa} = 1.01325 \text{ bar}$$

SI

$$= 1.033 \frac{\text{kg}_f}{\text{cm}^2}$$

$$= 760 \text{ mmHg} = 760,000 \mu\text{mHg (micro)} = 760 \text{ torr}$$

公制

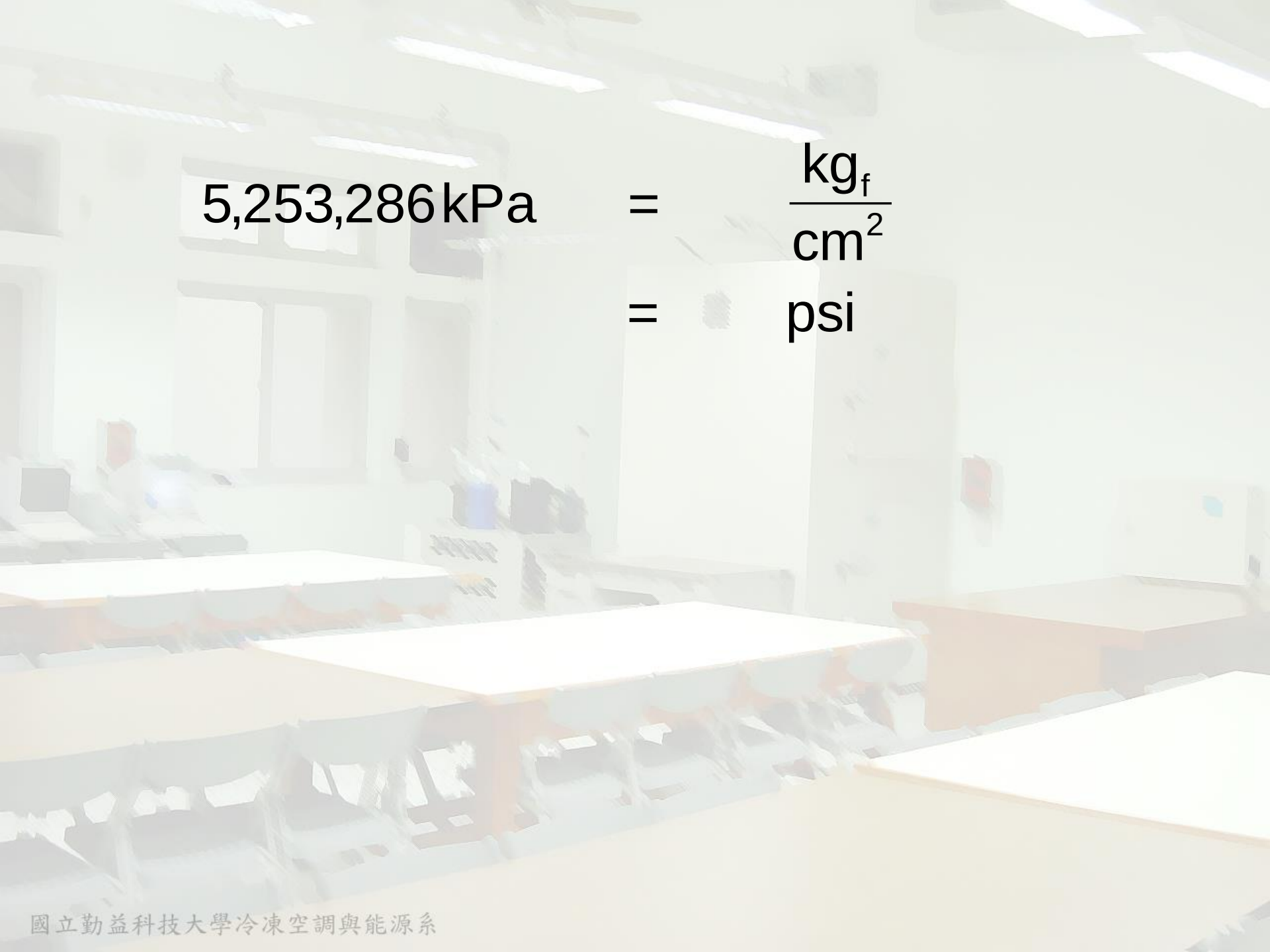
$$= 10.33 \text{ mH}_2\text{O}$$

$$= 14.696 \text{ psi} \left(\frac{\text{lb}_f}{\text{in}^2} \right) = 29.92 \text{ inHg} = 33.95 \text{ ft H}_2\text{O}$$

IP

Note :

$$1 \text{ torr} = 1 \text{ mmHg} = 1,000 \mu\text{mHg (micro)}$$


$$5,253,286 \text{ kPa} = \frac{\text{kg}_f}{\text{cm}^2}$$
$$= \text{psi}$$

$$5,253,286 \text{ kPa} = \frac{\text{kg}_f}{\text{cm}^2}$$

$$5,253,286 \cancel{\text{kPa}} \times \left(\frac{\cancel{\text{kPa}}}{\cancel{\text{kPa}}} \right) = \frac{\text{kg}_f}{\text{cm}^2}$$

$$5,253,286 \cancel{\text{kPa}} \times \left(\frac{\cancel{\text{cm}^2}}{\cancel{\text{kPa}}} \right) = \frac{\text{kg}_f}{\text{cm}^2}$$

$$5,253,286 \text{ kPa} \times 1 = \frac{\text{kg}_f}{\text{cm}^2}$$

$$5,253,286 \text{ kPa} \times \left(\frac{1.033 \frac{\text{kg}_f}{\text{cm}^2}}{101.325 \text{ kPa}} \right) = 53,556.8 \frac{\text{kg}_f}{\text{cm}^2}$$

$$5,253,286 \text{ kPa} \times \left(\frac{14.696 \text{ psi}}{101.325 \text{ kPa}} \right) = 761,927.4 \text{ psi}$$

$$5,253,286 \text{ kPa} \times \left(\frac{760 \text{ mmHg}}{101.325 \text{ kPa}} \right) = 3.94 \times 10^7 \text{ mmHg}$$

例：下列壓力何者最大?(1) 1 bar(2) 5 psi (3) 10mmHg(4) 100 Pa。

$$1\text{ bar} \times \left(\frac{101325\text{ Pa}}{1.01325\text{ bar}} \right) = 100,000\text{ Pa}$$

$$5\text{ psi} \times \left(\frac{101325\text{ Pa}}{14.696\text{ psi}} \right) = 34,474\text{ Pa}$$

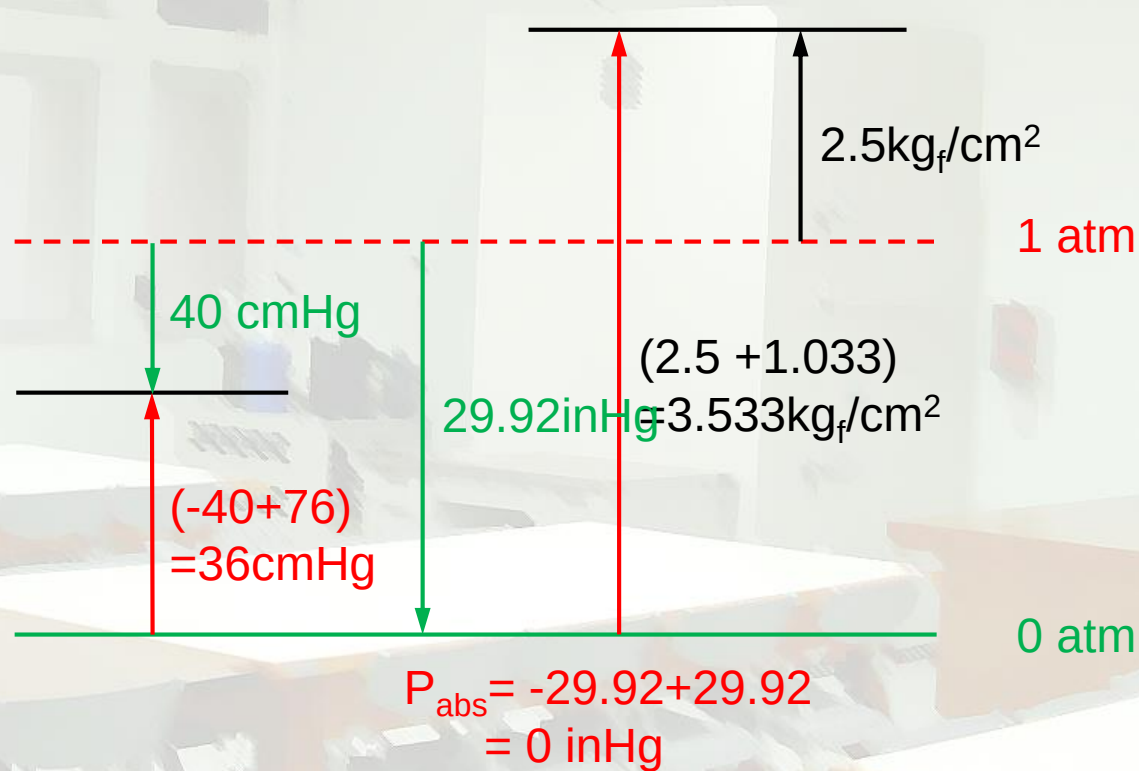
$$10\text{ mmHg} \times \left(\frac{101325\text{ Pa}}{760\text{ mmHg}} \right) = 1,333\text{ Pa}$$

例：請問 $2.5\text{kg}_f/\text{cm}^2\text{G}$ 等於?(1)kPa (2)5 psi (3)10mmHg。

$$\left(2.5 \frac{\text{kg}_f}{\text{cm}^2} + 1.033 \frac{\text{kg}_f}{\text{cm}^2}\right) \times \left(\frac{101.325\text{kPa}}{1.033 \frac{\text{kg}_f}{\text{cm}^2}}\right) = 346.5 \text{ kPa}$$

$$\left(2.5 \frac{\text{kg}_f}{\text{cm}^2} + 1.033 \frac{\text{kg}_f}{\text{cm}^2}\right) \times \left(\frac{14.696\text{psi}}{1.033 \frac{\text{kg}_f}{\text{cm}^2}}\right) = 50.3\text{psi}$$

$$\left(2.5 \frac{\text{kg}_f}{\text{cm}^2} + 1.033 \frac{\text{kg}_f}{\text{cm}^2}\right) \times \left(\frac{760\text{mmHg}}{1.033 \frac{\text{kg}_f}{\text{cm}^2}}\right) = 2,599\text{mmHg}$$



1kg 質量物質的重量為 9.807N

$$W = mg$$

$$= (1\text{kg})(9.807 \frac{\text{m}}{\text{s}^2})$$

$$= 9.807\text{N}$$

$$1 \text{ RT} = 3.516 \text{ kW}$$

SI

$$= 3,024 \text{ kcal/hr}$$

公制

$$= 12,000 \text{ Btu/hr}$$

IP


$$5,253 \text{ kcal/hr} = \text{ kW}$$
$$= \text{ Btu/hr}$$

$$5,253 \text{ kcal/hr} = \text{ kW}$$

$$5,253 \cancel{\text{kcal/hr}} \times \left(\frac{\cancel{\text{kcal/hr}}}{\cancel{\text{kcal/hr}}} \right) = \text{ kW}$$

$$5,253 \cancel{\text{kcal/hr}} \times \left(\frac{\text{ kW}}{\cancel{\text{kcal/hr}}} \right) = \text{ kW}$$

$$5,253 \text{ kcal/hr} \times 1 = \text{ kW}$$

$$5,253 \text{ kcal/hr} \times \left(\frac{3.516 \text{ kW}}{3,024 \text{ kcal/hr}} \right) = 6.1 \text{ kW}$$

$$5,253 \text{ kcal/hr} \times \left(\frac{12,000 \text{ Btu/hr}}{3,024 \text{ kcal/hr}} \right) = 20,845 \text{ Btu/hr}$$

$$5,253 \text{ kcal/hr} = \text{ kW}$$

$$5,253 \text{ kcal/hr} \times 1 = \text{ kW}$$

$$5,253 \text{ kcal/hr} \times \left(\frac{3.516 \text{ kW}}{3024 \text{ kcal/hr}} \right) = 6.1 \text{ kW}$$

$$5,253 \text{ kcal/hr} \times \left(\frac{12,000 \text{ Btu/hr}}{3,024 \text{ kcal/hr}} \right) = 20,845 \text{ Btu/hr}$$