

No 5

Komposisi gas cerobong

CO_2	= 10,5 %
CO	= 1,1 %
O_2	= 7,7 %
N_2	= 80,7 %

Basis 1 unit volume

a. Komposisi berat

$$\begin{aligned}\text{CO}_2 &= \text{BM CO}_2 \times 10,5 \\ &= 44 \times 10,5 \\ &= 462\end{aligned}$$

$$\begin{aligned}\text{CO} &= \text{BM CO} \times 1,1 \\ &= 28 \times 1,1 \\ &= 30,8\end{aligned}$$

$$\begin{aligned}\text{O}_2 &= \text{BM O}_2 \times 7,7 \\ &= 32 \times 7,7 \\ &= 246,4\end{aligned}$$

$$\begin{aligned}\text{N}_2 &= \text{BM N}_2 \times 80,7 \\ &= 28 \times 80,7 \\ &= 2259,6\end{aligned}$$

b. Volume yg ditempati 1 lb gas pada ^{tekanan} 29.1 in Hg suhu 67°F

$$1 \text{ lb gas} = 0,45 \text{ kg} = \frac{0,45}{29,904} = 0,015 \text{ kmole}$$

$$\begin{aligned}\text{Suhu dalam kelvin} &= (67 - 32) \times \frac{5}{9} + 273 \\ &= 292 \text{ K}\end{aligned}$$

$$29,1 \text{ inHg} \times \frac{1 \text{ atm}}{29,921 \text{ inHg}} = 0,972 \text{ atm}$$

$$PV = nRT$$

$$V = \frac{nRT}{P}$$

$$= \frac{15 \text{ mol} \times 0,082 \text{ Liter atm/mol.K} \cdot 292 \text{ K}}{0,972 \text{ atm}}$$

$$= 369,5 \text{ Liter}$$

$$= 0,3695 \text{ m}^3$$

c. Densitas

$$\rho = \frac{m}{V} = \frac{0,45 \text{ kg}}{0,3695 \text{ m}^3} = 1,218 \text{ kg/m}^3$$

$$1,218 \text{ kg/m}^3 \times \frac{1 \text{ lb/ft}^3}{13,61 \text{ kg/m}^3} = 0,076 \text{ lb/ft}^3$$

d. Specific gravity

$$\frac{\text{densitas gas}}{\text{densitas air}} = \frac{1,218 \text{ kg/m}^3}{1,225 \text{ kg/m}^3} = 0,994$$