

### • Cálculo da Incerteza da Densidade (g/mm<sup>3</sup>):

$$\rightarrow \sigma_p = \bar{\rho} \cdot \sqrt{\left(\frac{\sigma_m}{\bar{M}}\right)^2 + \left(\frac{2 \cdot \sigma_D}{\bar{D}}\right)^2 + \left(\frac{\sigma_H}{\bar{H}}\right)^2}$$

$$\rightarrow \sigma_p = 0,004458328178 \cdot \sqrt{\left(\frac{0,01}{16,1}\right)^2 + \left(\frac{0,05}{16,35}\right)^2 + \left(\frac{0,05}{17,2}\right)^2}$$

$$\rightarrow \sigma_p = 0,004458328178 \cdot 0,004264774473$$

$$\rightarrow \sigma_p = 0,0000190137642 \text{ g/mm}^3$$

$$3,03 \times 10^{-5}$$

### • Notação Final Densidade (g/mm<sup>3</sup>):

$$\rightarrow \rho = \bar{\rho} \pm \sigma_p$$

$$\rightarrow \rho = 0,004458328178 \pm 0,0000190137642$$

$$\rightarrow \rho = 0,004477341942 \text{ g/mm}^3$$

$$(4,46 \pm 0,03) \cdot 10^{-3}$$

### • Erro Relativo:

$$\rightarrow E\% = \frac{|X_m - X_v|}{X_v} \times 100\%$$

$$\rightarrow E\% = \frac{|0,004458328178 - 0,0045|}{0,0045} \times 100\%$$

$$\rightarrow E\% = 0,009260404889 \times 100\%$$

$$\rightarrow E\% = 0,926040488\%$$

$$5,09\%$$

### • Incerteza Experimental Relativa:

$$\rightarrow \delta\% = \frac{\sigma_p}{\bar{\rho}} \times 100$$

$$\rightarrow \delta\% = \frac{0,0000190137642}{0,004458328178} \times 100$$

$$\rightarrow \delta\% = 0,004264774472 \times 100$$

$$\rightarrow \delta\% = 0,426477447\%$$

$$0,60\%$$