

• Cálculo da densidade

$$\bar{\rho} = \frac{4\bar{M}}{\pi \bar{D}^2 \bar{H}} = \frac{4 \cdot 11,85}{\pi \cdot 19,3^2 \cdot 15,1} = \frac{47,4}{17670,1939} = 2,682482539 \times 10^{-3} \text{ g/mm}^3$$

• Cálculo da incerteza da densidade

$$\sigma_{\rho} = \bar{\rho} \sqrt{\left(\frac{\sigma_M}{\bar{M}}\right)^2 + \left(\frac{\sigma_D}{\bar{D}}\right)^2 + \left(\frac{\sigma_H}{\bar{H}}\right)^2}$$

$$\sigma_{\rho} = 2,682482539 \cdot 10^{-3} \sqrt{\left(\frac{0,01}{11,85}\right)^2 + \left(\frac{0,570037712}{19,3}\right)^2 + \left(\frac{0,547722557}{15,1}\right)^2}$$

$$\sigma_{\rho} = 2,682482539 \cdot 10^{-3} \sqrt{7,121365378 \cdot 10^{-7} + 8,725066429 \cdot 10^{-4} + 1,315731764 \cdot 10^{-5}}$$

$$\sigma_{\rho} = 2,682482539 \cdot 10^{-3} \cdot 0,046786221$$

$$\sigma_{\rho} = 1,255032228 \cdot 10^{-4}$$

• Erro relativo

$$E\% = \frac{|\bar{x}_m - x_v| \cdot 100}{x_v} = \frac{|2,682482539 \cdot 10^{-3} - 2,7 \cdot 10^{-3}| \cdot 100}{2,7 \cdot 10^{-3}}$$

$$E\% = 0,648794351$$

• Incerteza experimental relativa

$$\sigma_{\rho} = \frac{\sigma_g}{\bar{g}} \cdot 100 = \frac{1,255032228 \cdot 10^{-4}}{2,7 \cdot 10^{-3}} \cdot 100$$

$$\sigma_{\rho} = 4,648267511$$

61,77%