

Berekening bol in water

$$V_i = \frac{4}{3}\pi r^3 = 0,01149404 \text{ m}^3$$

$$V_u = \frac{4}{3}\pi r^3 = 0,014137167 \text{ m}^3$$

$$V_{ijzer} = 0,002643127 \text{ m}^3$$

$$m_{bol} = V \cdot \rho = 0,002643127 \cdot 7860 = 20,775 \text{ kg}$$

$$\text{zwaartekracht } G_{bol} = 203,8 \text{ N}$$

$$\text{opwaartse kracht } OK = V_u \cdot g \cdot \rho_{water} = 138,686 \text{ N}$$

$$F_\mu = 6\pi\mu r_u v = 2,833v \quad (\mu = 1,002 \text{ mPa}\cdot\text{s})$$

$$F_D = \frac{1}{2}C_w\rho A_{doorsnede}v^2 = \frac{1}{2}0,47 \cdot 1000(\pi r_u^2)v^2 = 16,61v^2$$

Terminal velocity wordt bereikt als $F_{netto} = 0$

$$G - OK - F_\mu - F_D = 0$$

$$203,8 - 138,686 - 2,833v - 16,61v^2 = 0$$

$$16,61v^2 + 2,833v - 65,114 = 0$$

$$v = 1,896 \text{ m/s}$$

$$t = \frac{55}{1,896} = 29 \text{ sec}$$