Drag Force on Solid Particles in fluids

$$Re = \frac{\rho U_\infty D}{\mu}$$

laminar flow	$Re < 1$	$C_D = \frac{24}{Re}$
Transition flow	$1 < Re < 1000$	$C_D = 18\, Re^{-0.6}$
Turbulent flow	$Re > 1000$	$C_D = 0.44$

* experimental data for the drag on a smoth sphere can be correlated in terms of two dimentionless groups

$$C_D = \frac{F_D / A_p}{\frac{1}{2}\rho U_\infty^2}$$ drag Coefficient

$$Re = \frac{\rho U_\infty D}{\mu}$$

$$\boxed{F_D = 3\pi \mu U_\infty D}$$ only for laminar flow

* for a Constant sphere travelling at its terminal velocity

$$F_D = \frac{\pi}{6} D^3 (\rho_s - \rho_f) g$$

$$\text{OR } C_D = \frac{4}{3} \frac{gD}{U_t^2} * \frac{\rho_s - \rho_f}{\rho_f}$$

Basim A. Abussaud

Digitally signed by Basim A. Abussaud
DN: cn=Basim A. Abussaud, c=SA, o=KFUPM, email=basim@ktupm.edu.sa
Reason: I am the author of this document
Date: 2008.04.26 12:00:45 +03'00'