Drag Coefficient as a Function of Mach Number for Two-Dimensional Objects in Subsonic Flow

$$C_D = \frac{\mathcal{D}}{\frac{1}{2}\rho U^2 \, bD}$$

$U \rightarrow$ D

b = length

$4D$ D $U \rightarrow$

Ma
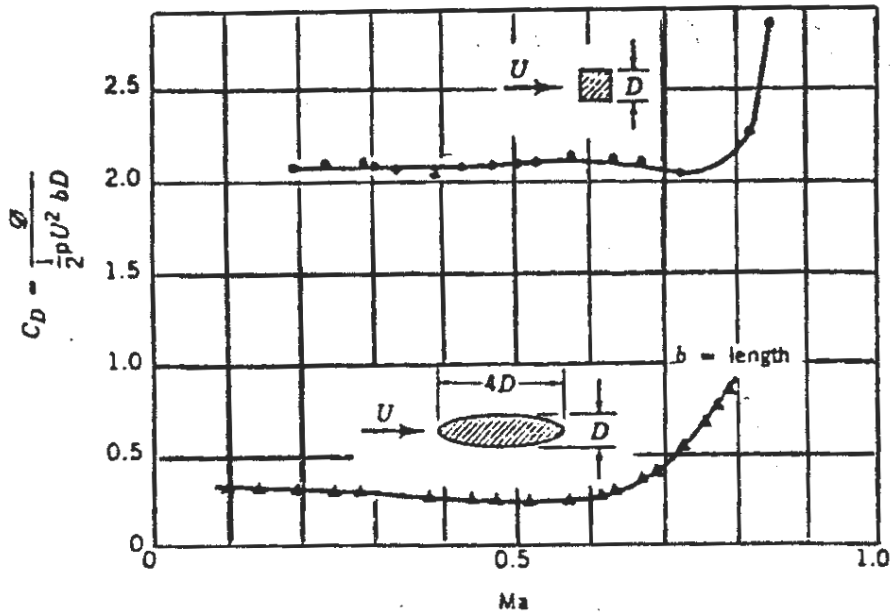
A Typical Variation of Drag Coefficient as a Function of Angle of Attack for an Airfoil

$$C_D = \frac{\mathcal{D}}{\frac{1}{2}\rho U^2 \, b\ell}$$

$U \rightarrow$ ℓ α

$$Re = \frac{U\ell}{\nu} = 7 \times 10^5$$

b = length

α, degrees
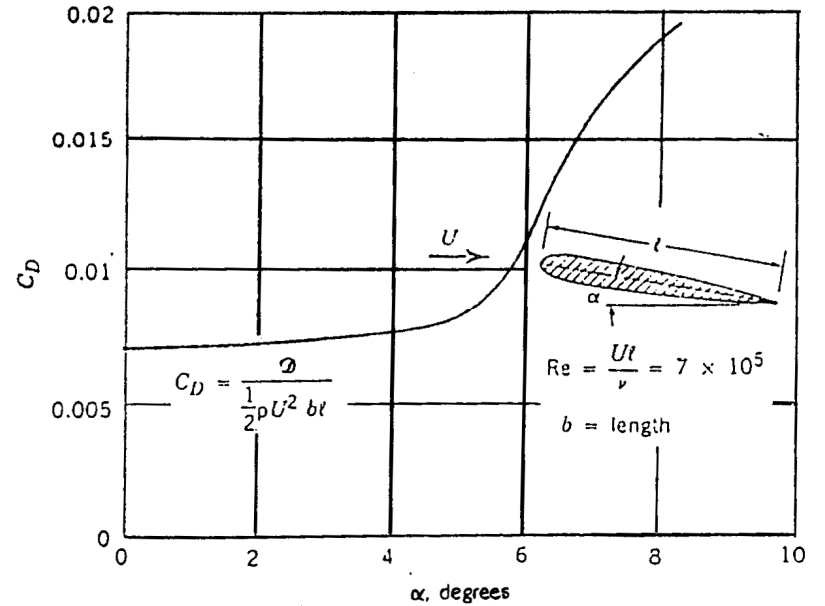
Drag Coefficient for an Ellipse with the Characteristic Area either the Frontal Area (A=bD) or the Planform Area (A=bl)

Flat plate normal to flow

$U \rightarrow$ D ℓ

$$Re = \frac{UD}{\nu} = 10^5$$

b = length

$$C_D = \frac{\mathcal{D}}{\frac{1}{2}\rho U'^2 \, bD}$$

$$C_D = \frac{\mathcal{D}}{\frac{1}{2}\rho U^2 \, b\ell}$$

Flat plate parallel to flow

C_D

$\dfrac{\ell}{D}$
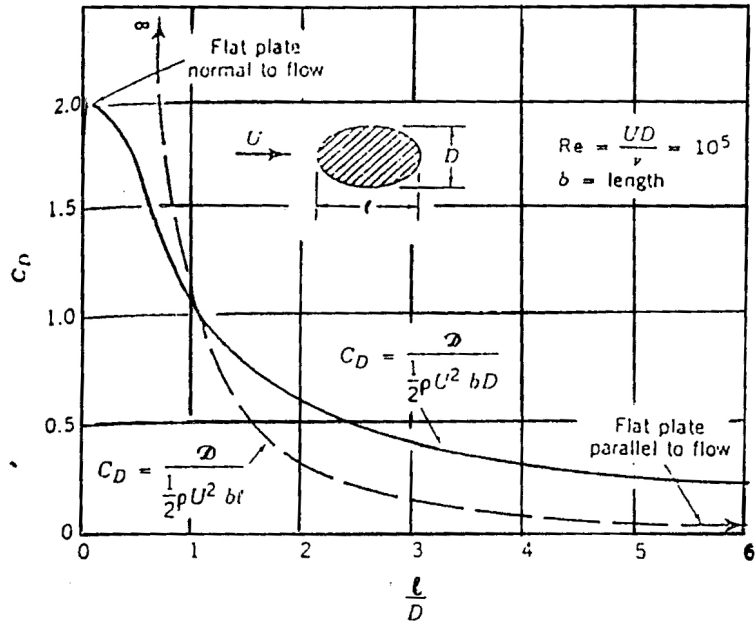
Drag Coefficient as a Function of Aspect Ratio for a Flat Plate Normal to the Up-Stream Flow and a Circular Cylinder

$$C_D = \frac{\mathcal{D}}{\frac{1}{2}\rho U^2 \, bD}$$

$U \rightarrow$ D b

$$Re = \frac{UD}{\nu} = 10^5$$

$b/D = \infty$ limit

Flat plate

$b/D = \infty$ limit

Circular cylinder

$U \rightarrow$ b

$$Re = \frac{UD}{\nu} = 8.8 \times 10^4$$

$\dfrac{b}{D}$