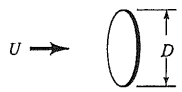
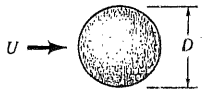
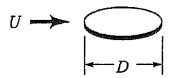
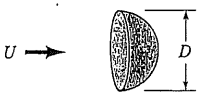
TABLE 9.4

Low Reynolds Number Drag Coefficients (Ref. 7) ($Re = \rho UD/\mu, A = \pi D^2/4$)

Object	$C_D = \mathcal{D}/(\rho U^2 A/2)$ (for $Re \lesssim 1$)	Object	C_D
a. Circular disk normal to flow 	20.4/Re	c. Sphere 	24.0/Re
b. Circular disk parallel to flow 	13.6/Re	d. Hemisphere 	22.2/Re

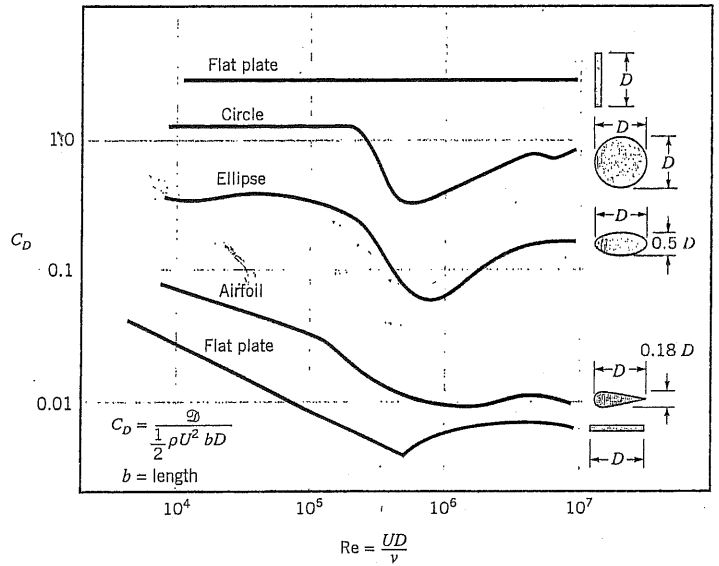


FIGURE 9.22 Character of the drag coefficient as a function of Reynolds number for objects with various degrees of streamlining, from a flat plate normal to the upstream flow to a flat plate parallel to the flow (two-dimensional flow) (Ref. 5).

Shape	Reference area A (b = length)	Drag coefficient $C_D = \frac{\mathcal{D}}{\frac{1}{2}\rho U^2 A}$	Reynolds number $Re = \rho UD/\mu$
Square rod with rounded corners	$A = bD$	R/D | C_D: 0 | 2.2; 0.02 | 2.0; 0.17 | 1.2; 0.33 | 1.0	$Re = 10^5$
Rounded equilateral triangle	$A = bD$	R/D | C_D →: 0 | 1.4; 0.02 | 1.2; 0.08 | 1.3; 0.25 | 1.1 | C_D ←: 2.1; 2.0; 1.9; 1.3	$Re = 10^5$
Semicircular shell	$A = bD$	→ 2.3, ← 1.1	$Re \doteq 2 \times 10^4$
Semicircular cylinder	$A = bD$	→ 2.15, ← 1.15	$Re > 10^4$
T-beam	$A = bD$	→ 1.80, ← 1.65	$Re > 10^4$
I-beam	$A = bD$	2.05	$Re > 10^4$
Angle	$A = bD$	→ 1.98, ← 1.82	$Re > 10^4$
Hexagon	$A = bD$	1.0	$Re > 10^4$
Rectangle	$A = bD$	ℓ/D | C_D: ≤0.1 | 1.9; 0.5 | 2.5; 0.65 | 2.9; 1.0 | 2.2; 2.0 | 1.6; 3.0 | 1.3	$Re = 10^5$

FIGURE 9.28 Typical drag coefficients for regular two-dimensional objects (Refs. 5, 6).

Source: Munson, Young + Okiishi
Fundamentals of Fluid Mechanics, 5th Ed.