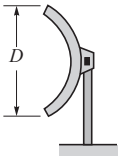
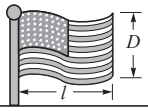
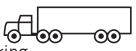
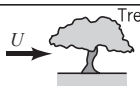
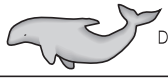
Shape	Reference area	Drag coefficient C_D
 Parachute	Frontal area $A = \frac{\pi}{4}D^2$	1.4
 Porous parabolic dish	Frontal area $A = \frac{\pi}{4}D^2$	Porosity: 0 / 0.2 / 0.5 → 1.42 / 1.20 / 0.82 ← 0.95 / 0.90 / 0.80 Porosity = open area/total area
 Average person	Standing Sitting Crouching	$C_DA = 9$ ft^2 $C_DA = 6$ ft^2 $C_DA = 2.5$ ft^2
 Fluttering flag	$A = \ell D$	ℓ/D / C_D 1 / 0.07 2 / 0.12 3 / 0.15
 Empire State Building	Frontal area	1.4
 Six-car passenger train	Frontal area	1.8
Bikes		
 Upright commuter	$A = 5.5$ ft^2	1.1
 Racing	$A = 3.9$ ft^2	0.88
 Drafting	$A = 3.9$ ft^2	0.50
 Streamlined	$A = 5.0$ ft^2	0.12
Tractor-trailer trucks		
 Standard	Frontal area	0.96
Fairing  With fairing	Frontal area	0.76
Gap seal  With fairing and gap seal	Frontal area	0.70
 Tree, U = 10 m/s, U = 20 m/s, U = 30 m/s	Frontal area	0.43 0.26 0.20
 Dolphin	Wetted area	0.0036 at Re = 6×10^6 (flat plate has $C_{Df} = 0.0031$)
 Large birds	Frontal area	0.40

FIGURE 9.30 **Typical drag coefficients for objects of interest (Refs. 5, 6, 15, 20).**