

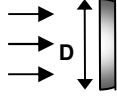
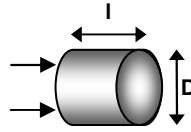
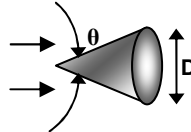
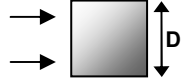
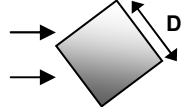
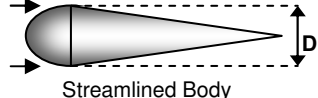









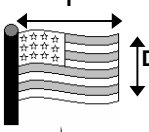






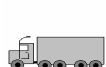
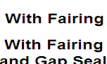
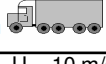
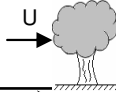




Typical Drag Coefficients for Objects of Interest

Shape	Reference Area A	Drag Coefficient C _D	Reynolds Number										
 Solid Hemisphere	$A = \frac{\pi}{4} D^2$	\rightarrow 1.17 \leftarrow 0.42	Re > 10 ⁴										
 Hollow Hemisphere	$A = \frac{\pi}{4} D^2$	\rightarrow 1.42 \leftarrow 0.38	Re > 10 ⁴										
 Thin Disk	$A = \frac{\pi}{4} D^2$	1.1	Re > 10 ³										
 Circular Rod Parallel to Flow	$A = \frac{\pi}{4} D^2$	<table border="1"><thead><tr><th>l/D</th><th>C_D</th></tr></thead><tbody><tr><td>0.5</td><td>1.10</td></tr><tr><td>1.0</td><td>0.93</td></tr><tr><td>2.0</td><td>0.83</td></tr><tr><td>4.0</td><td>0.85</td></tr></tbody></table>	l/D	C _D	0.5	1.10	1.0	0.93	2.0	0.83	4.0	0.85	Re > 10 ⁵
l/D	C _D												
0.5	1.10												
1.0	0.93												
2.0	0.83												
4.0	0.85												
 Cone	$A = \frac{\pi}{4} D^2$	<table border="1"><thead><tr><th>θ</th><th>C_D</th></tr></thead><tbody><tr><td>10°</td><td>0.30</td></tr><tr><td>30°</td><td>0.55</td></tr><tr><td>60°</td><td>0.80</td></tr><tr><td>90°</td><td>1.15</td></tr></tbody></table>	θ	C _D	10°	0.30	30°	0.55	60°	0.80	90°	1.15	Re > 10 ⁴
θ	C _D												
10°	0.30												
30°	0.55												
60°	0.80												
90°	1.15												
 Cube	$A = D^2$	1.05	Re > 10 ⁴										
 Cube	$A = D^2$	0.80	Re > 10 ⁴										
 Streamlined Body	$A = \frac{\pi}{4} D^2$	0.04	Re > 10 ⁵										

Shape	Reference Area A	Drag Coefficient C _D												
 Parachute	Frontal Area $A = \frac{\pi}{4} D^2$	1.4												
 Porous Parabolic Dish	Frontal Area $A = \frac{\pi}{4} D^2$	<table><tr><th>Porosity</th><th>0</th><th>0.2</th><th>0.5</th></tr><tr><td></td><td>1.42</td><td>1.20</td><td>0.82</td></tr><tr><td></td><td>0.95</td><td>0.90</td><td>0.80</td></tr></table>	Porosity	0	0.2	0.5		1.42	1.20	0.82		0.95	0.90	0.80
Porosity	0	0.2	0.5											
	1.42	1.20	0.82											
	0.95	0.90	0.80											
 Average Person	Standing Sitting Crouching	C _D A = 9 ft ² C _D A = 6 ft ² C _D A = 2.5 ft ²												
 Fluttering Flag	$A = l \cdot D$	<table><tr><th>I/D</th><th>C_D</th></tr><tr><td>1</td><td>0.07</td></tr><tr><td>2</td><td>0.12</td></tr><tr><td>3</td><td>0.15</td></tr></table>	I/D	C _D	1	0.07	2	0.12	3	0.15				
I/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  Racing  Drafting  Streamlined	A = 5.5 ft ² A = 3.9 ft ² A = 3.9 ft ² A = 5.0 ft ²	1.10 0.88 0.50 0.12												
TRACTOR - TRAILER TRUCKS  Standard  With Fairing  With Fairing and Gap Seal	Frontal Area Frontal Area Frontal Area	0.96 0.76 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												