

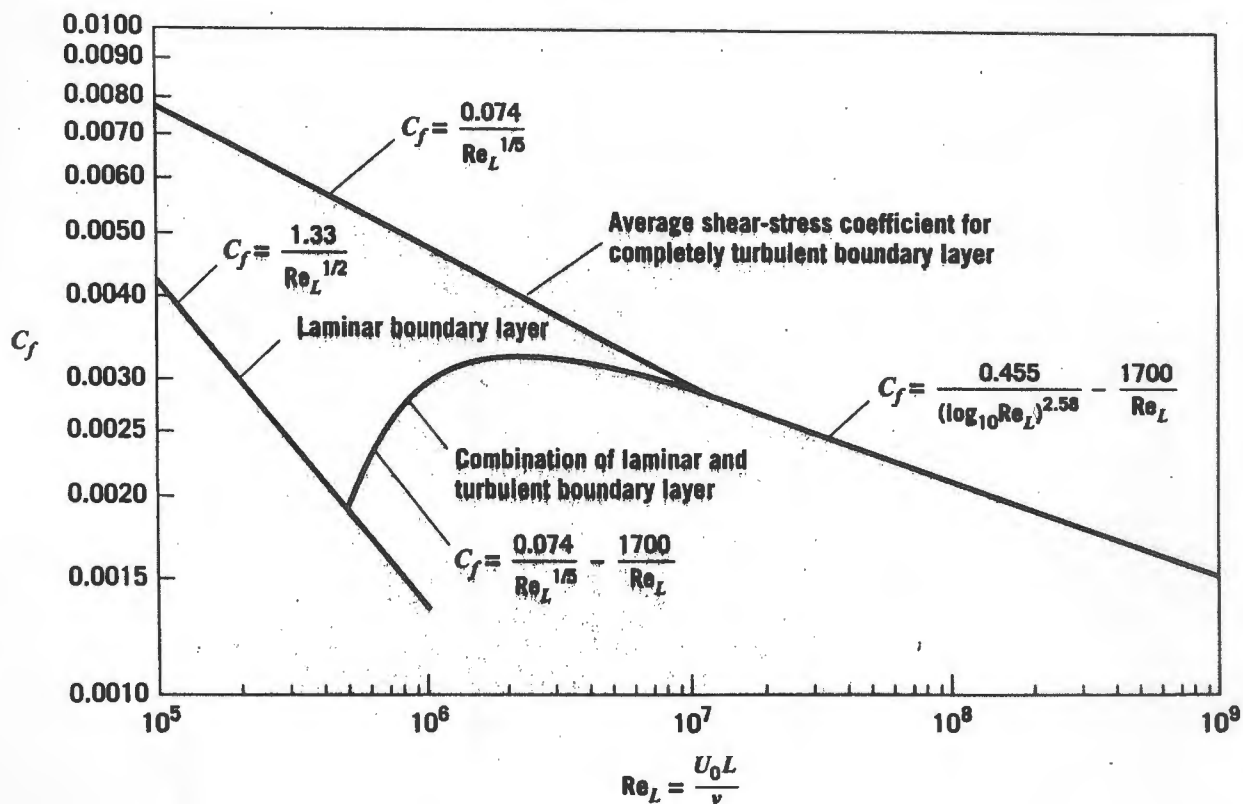
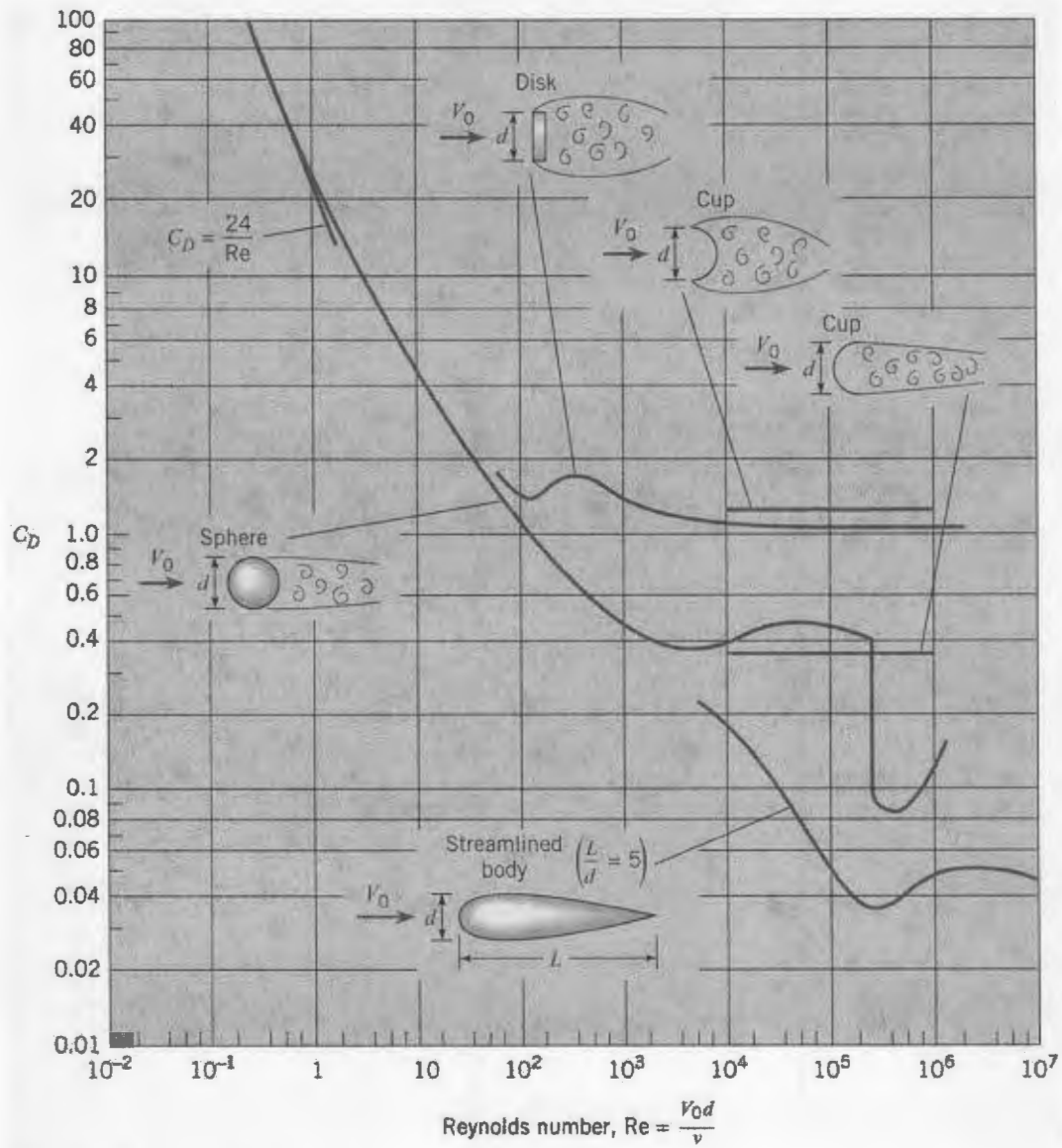
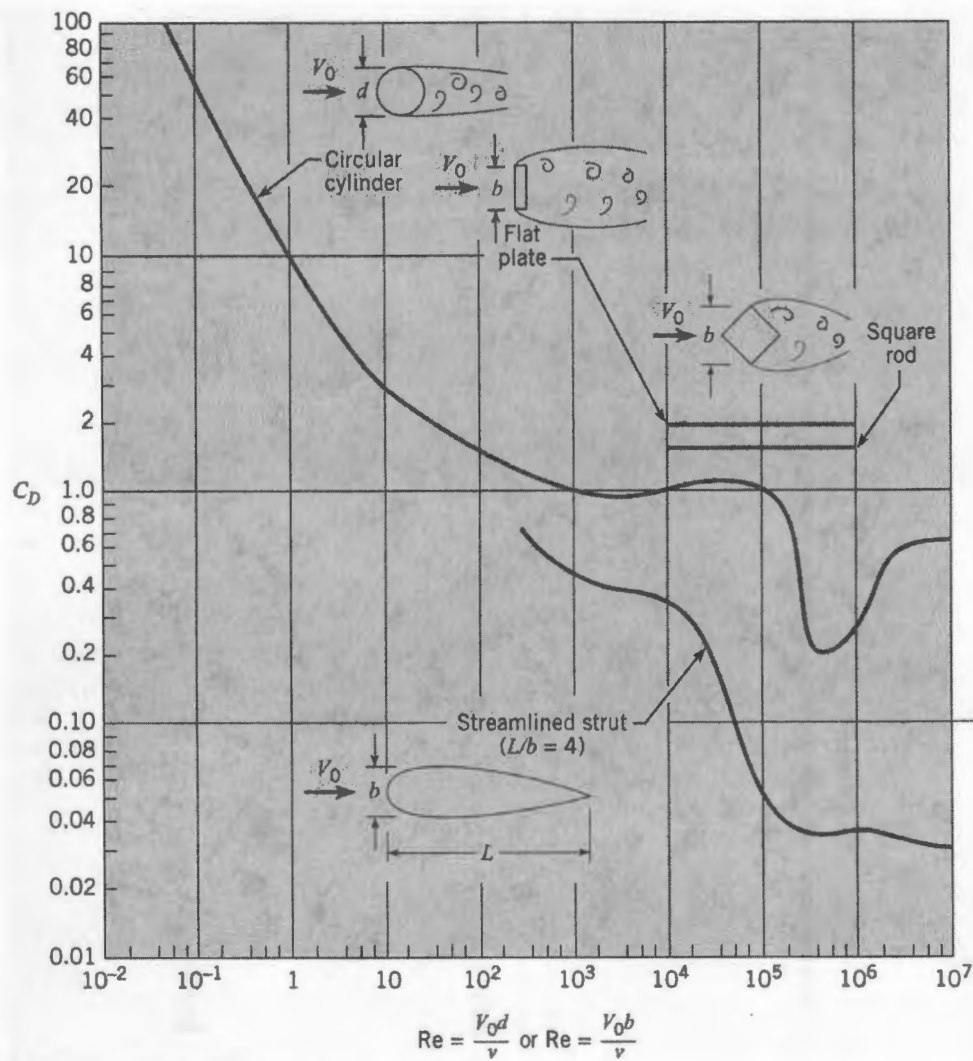


Table 11.2 COEFFICIENTS OF DRAG FOR CARS		
Make and Model	Profile	C_D
1932 Fiat Balillo		0.60
Volkswagen "Bug"		0.46
Plymouth Voyager		0.36
Toyota Paseo		0.31
Dodge Intrepid		0.31
Ford Taurus		0.30
Mercedes-Benz E320		0.29
Ford Probe V (concept car)		0.14
GM Sunrayeer (experimental solar vehicle)		0.12

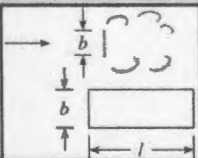
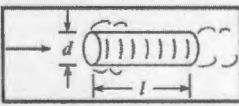


Drag Coeffs for 3-D objects



Drag Coeffs for 2-D shapes

Table 11.1 APPROXIMATE C_D VALUES FOR VARIOUS BODIES

Type of Body	Length Ratio	Re	C_D
	$l/b = 1$	$>10^4$	1.18
	$l/b = 5$	$>10^4$	1.20
	$l/b = 10$	$>10^4$	1.30
	$l/b = 20$	$>10^4$	1.50
	$l/b = \infty$	$>10^4$	1.98
	$l/d = 0$ (disk)	$>10^4$	1.17
	$l/d = 0.5$	$>10^4$	1.15
	$l/d = 1$	$>10^4$	0.90
	$l/d = 2$	$>10^4$	0.85
	$l/d = 4$	$>10^4$	0.87
	$l/d = 8$	$>10^4$	0.99
	∞	$>10^4$	2.00

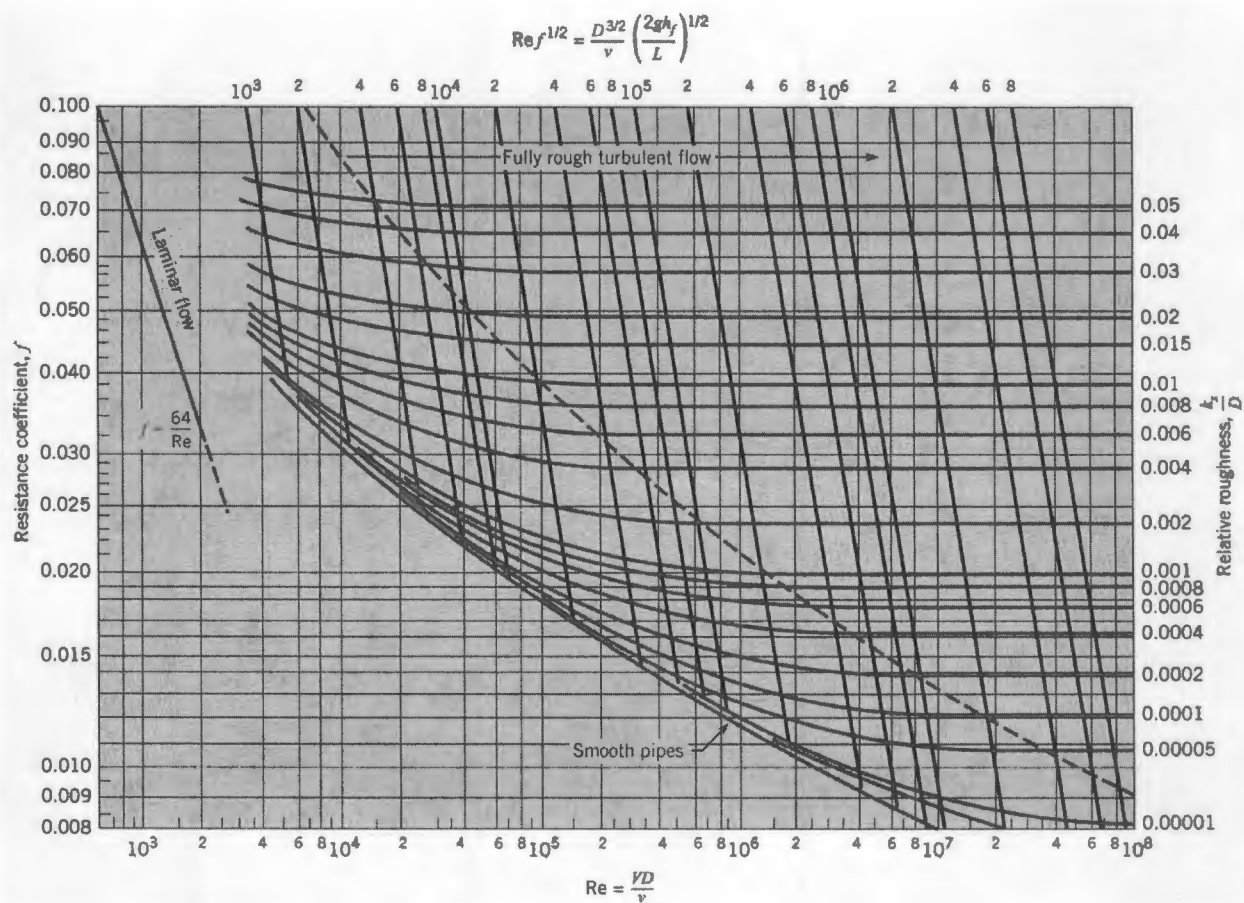


Table 10.4 EQUIVALENT SAND-GRAIN ROUGHNESS, (k_s), FOR VARIOUS PIPE MATERIALS

Boundary Material	k_s , Millimeters	k_s , Inches
Glass, plastic	Smooth	Smooth
Copper or brass tubing	0.0015	6×10^{-5}
Wrought iron, steel	0.046	0.002
Asphalted cast iron	0.12	0.005
Galvanized iron	0.15	0.006
Cast iron	0.26	0.010
Concrete	0.3 to 3.0	0.012–0.12
Riveted steel	0.9–9	0.035–0.35
Rubber pipe (straight)	0.025	0.001