

Air drag

Air drag or air resistance, unlike ordinary friction, depends on the velocity of the moving object. Air drag also depends on the frontal area and shape of the moving object.

The force of air drag is given by the formula

$$F_{drag} = \frac{1}{2} C_d \rho A v^2$$

C_d : The drag coefficient or the shape coefficient.

$C_d = 1$ for a flat frontal surface.

$C_d < 1$ for a rounded frontal surface (like the shape of a car).

$C_d > 1$ for an inverted frontal surface (like the shape of a parachute).

ρ : The density of air, 1.22 kg/m^3 .

A: Frontal surface area.

Finding the air drag on a car at various speeds

a) Estimating the frontal surface area of a car: _____ m \times _____ m = _____ m^2

b) C_d for the car. (Refer to online source.) $C_d =$ _____

1. Find the air drag for the car at a speed of 25 mph. (First convert to m/s.)

2. Find the air drag for the car at a speed of 50 mph. (First convert to m/s.)

3. Find the air drag for the car at a speed of 75 mph. (First convert to m/s.)

