RiSe

Air on the Hot Air

# Hover-chute

Can you balance the forces to make the parachute hover?

In order to make the parachute hover the downward force of gravity ($F_G$) must equal the upward force of the drag ($F_D$) the parachute is causing.

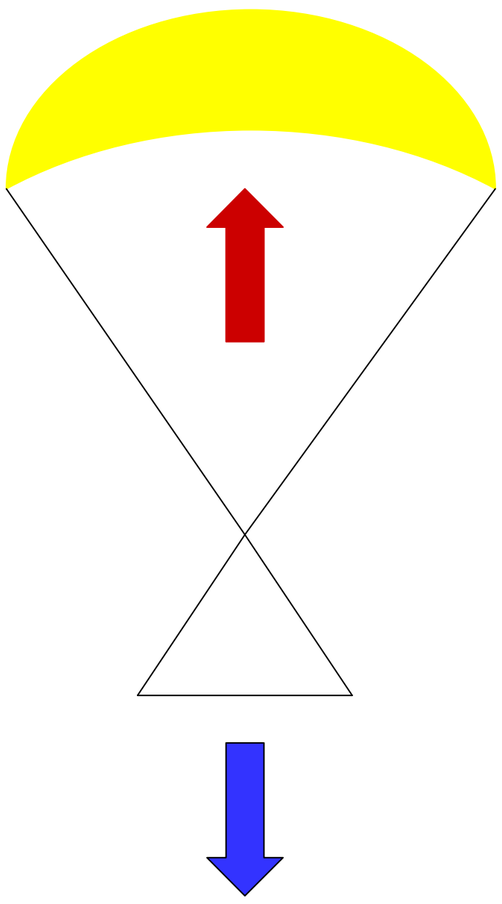
***Force of Gravity (downward force)***

$F_G = m*a$

$F_G$ = mass * acceleration

acceleration (a) = 32.2 ft/sec$^2$

How much does the parachute need to weigh in order for the force of gravity to equal the force of drag?



***Force of Drag (upward force)***

$F_D = C_D * 0.5 * p * V^2 * A$

$C_D$ = drag coefficient ~ 1.2 for a parachute

p = density of air = 13.36 $lb_m/ft^3$

V = velocity of air = 75 ft/min = 1.25 ft/sec

A = area of parachute = 8"x8" = 64 $in^2$ = 0.44 $ft^2$

$F_D = 1.2 * 0.5 * 13.36\ lb_m/ft^3 * (1.25\ ft/sec)^2 * 0.44\ ft^2$

$F_D = 5.5\ lb_m*ft/sec^2$

$F_G = F_D$

$m * a = 5.5\ lb_m*ft/sec^2$

$m = 5.5\ lb_m*ft/sec^2 / 32.2\ ft/sec^2$

$m = 0.17\ lb_m$ = 2.7 oz.