Solution to Problem 280A

If the man and the parachute are descending at a constant (terminal) velocity, U, the man's weight, W, must be equal to the drag on the parachute and since the drag, D, can be written as

$$D = \frac{1}{2} C_D \rho U^2 A$$

where ρ is the density of the air, A is the frontal projected area of the parachute and C_D is the drag coefficient, it follows that

$$W = \frac{1}{2} C_D \rho U^2 A$$

From the tables the drag coefficient can be estimated to be about 1.2 and it follows that the required frontal projected area of the parachute must be

$$A = \frac{2W}{C_D \rho U^2}$$

or

$$A = \frac{2 \times 70 \times 9.8}{1.2 \times 1 \times 3^2} = 127 \; m^2$$

for a diameter of about 12.7 m.

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