

5. An airtight box has a removable lid of area  $1.3 \times 10^{-2} \text{ m}^2$  and negligible weight. The box is taken up a mountain where the air pressure outside the box is  $0.85 \times 10^5 \text{ Pa}$ . The inside of the box is completely evacuated. What is the magnitude of the force required to pull the lid off the box?

$$P = F/A$$

$$F = PA = (0.85 \times 10^5 \text{ Pa})(1.3 \times 10^{-2} \text{ m}^2) \times \left( \frac{\text{N/m}^2}{\text{Pa}} \right) = 1105 \text{ N}$$

$$\boxed{F = 1.1 \times 10^3 \text{ N}}$$

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