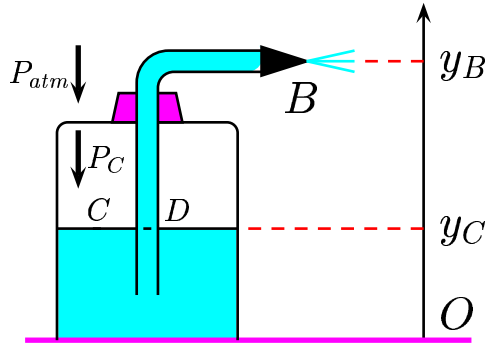


Consider the fire extinguisher where water is forced out of a pin-hole nozzle by air pressure, see the figure.

Denote:

1. The pressure of the air in the bottle by  $P_c$ ,
2. The water density,  $\rho$ ,
3. The height of the nozzle from the water surface by  $h$ ,
4.  $A_B$  the cross section of the pin-hole,  $A_D$  is the cross section of the tube; i.e.,  $A_D \gg A_B$ ,
5.  $v_D$  the speed within the tube at the water surface, and  $v_B$  the speed at the nozzle.



Find the relationship between  $v_D$  and  $v_B$ . Choose one

- A)  $v_D = v_B$ .
- B)  $v_D < v_B$ .
- C)  $v_D > v_B$ .

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Continuity implies that

$$A_B \ll A_D = \frac{v_B A_B}{v_D}.$$

This leads to  $v_D \ll v_B$ .

Answer **C**