$$d << H_c$$

exponential goes rapidly to 0 so

$$C_{top} = \frac{F_{x,in} / A_{in}}{v_{in} + \frac{e^{-\left(H_c/d\right)^2}}{erf\left(H_c/d\right)}\sqrt{\frac{2D_{ab}v_{in}}{\pi H_c}}}$$

$$C_{top} = \frac{F_{x,in}}{A_{in}v_{in}} \equiv C_{in}$$ input concentration if diffusion doesn't occur

after some algebra…

$$J_{dep} = D_{ab}\left.\frac{dC}{dz}\right|_{bottom} = D_{ab}\frac{C_{in}}{\underbrace{erf\left(H_c/d\right)}_{\approx 1}}\frac{2}{d\sqrt{\pi}}$$

$$J_{dep} = F_{x,in}\sqrt{\frac{2D_{ab}}{\pi v_{in}H_c}}$$

$$\eta = \sqrt{\frac{2D_{ab}}{\pi v_{in}H_c}}$$

As we go faster there's less time for species to diffuse to the wafer; efficiency falls as the square root of the input velocity, even though deposition rate is increased vs. the pure-diffusion case.