5-5. Force $P \sim N(2.5, 0.3^2)$ kN is exerting on the piston of a cylinder as shown in the figure. The diameter of the piston is 80 mm, and the cylinder has a wall thickness of 2 mm. If the allowable Hoop stress for this cylinder is $p_a \sim N(16, 1^2)$ MPa, determine the probability of failure of the cylinder.   (**Ans.** $p_f = 4.8 \times 10^{-5}$)