

Volume Annular side:  $V_2 = 3.121$   
 Volume bottom side:  $V_1 = 7.851$   
 Annular side:  $A_a = 47.3 \text{ cm}^2$   
 Bottom side:  $A_b = 78.5 \text{ cm}^2$   
 Requested time in = 6.77 s  
 Requested time out = 11.23 s  
 Size hydraulic cylinder: 100/63-1000

$Q = A_b \cdot v_1$   
 $Q_{in} = 78.5 \text{ cm}^2 \cdot 100 \text{ cm} / 11.23 \text{ s}$   
 $Q_{in} = 421 \text{ l/min}$

