(1) TO HEAT AIR ~~AIN~~ ONLY IN THE STERILIZER ROOM:

$$H_1 = M_{AIR} \times C_{P\text{-}AIR} \times \Delta T,$$

ρ_{AIR}

$$M = 245{,}640\ FT^3 \times \frac{0.075\ LB}{FT^3} = 18{,}423\ LB \text{ OF AIR}$$

$$C_p = \frac{0.24\ BTU}{LB\text{-}^\circ F}$$

$$\Delta T = 130 - 70 = 60^\circ F$$

$$H = (18{,}423\ LB) \times \left(\frac{0.24\ BTU}{LB\text{-}^\circ F}\right) \times 60^\circ F$$

$$H = 265{,}291\ BTU$$

$$TIME = 2\ HOURS = t$$

$$\dot{Q}_1 = \frac{H_1}{t} = \frac{265{,}291\ BTU}{2\ HR} = 132{,}646\ \frac{BTU}{HR}$$

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(2) NOW ADD ~~A~~ "ENVELOPE" HEAT LOSS: CEILING, WALLS, FLOOR, ETC. FROM THE STERILE ROOM. $\dot{Q}_2 = ?$

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(3) NOW ADD THE HEAT REQ'D TO BRING THE PRODUCT (TO BE STERILIZED) FROM 70°F up TO 130°F. YOU WILL NEED C_p OF PRODUCT, AND ρ OF PRODUCT.

$$H_3 = MASS_{PROD} \times C_{P\text{-}PRODUCT} \times \Delta T \quad \Delta T = 60^\circ F.$$

$$\dot{Q}_3 = H_3/t$$