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**Content Based
Chemical Engineering**

TEMPERATURE RATE OF RISE @ PUMP SHUTOFF

PUMP: TEST

.....	SYSTEM	FLUID
flow =	1500	Q, gpm	FLUID =	WATER	
shut-off head =	150	H, feet	sp. gr. =	1.000	
driver =	1750	rpm	sp.ht. =	1.000	specific heat
driver =	75	bhp			

- determine, η ; pump efficiency

$$\eta := \frac{\gamma \cdot Q \cdot H}{3960 \cdot \text{bhp}} = 75.76\% \quad \text{pump efficiency}$$

- determine, ΔT ; temperature increase, degree F

$$\Delta T := \left(\frac{H}{778 \cdot \text{sp}_{\text{ht}}} \right) \cdot \left(\frac{1}{\eta} - 1 \right) = 0.0616967 \text{ } ^\circ\text{F per minute}$$

$$= 0.0010283 \text{ } ^\circ\text{F per second}$$

TEMPERATURE RATE OF RISE @ PUMP SHUTOFF

PUMP: TEST

.....	SYSTEM	FLUID
flow =	325	Q, m ³ /h	FLUID =	WATER	
shut-off head =	45.72	H, meter	sp. gr. =	1.000	
driver =	1750	rpm	sp.ht. =	1.000	specific heat
driver =	75	bhp			

- determine, η ; pump efficiency

$$\eta := \frac{\gamma \cdot Q \cdot H}{270 \cdot \text{bhp}} = 73.3778\% \text{ pump efficiency}$$

- determine, ΔT ; temperature increase, degree C

$$\begin{aligned} \Delta T &:= 2.34 \cdot 10^{-3} \cdot \left(\frac{H}{\text{sp.ht.}} \right) \cdot \left(\frac{1}{\eta} - 1 \right) = 0.0388152 \text{ }^\circ\text{C per minute} \\ &= 0.0006469 \text{ }^\circ\text{C per second} \end{aligned}$$