

TUTORIAL SOLUTION

(10 SHOWER HEAD PROBLEM).

BOTH SIDES H₂O

SHOWER SIDE ...

$$\begin{aligned} Q &= \Delta T \times \text{THERMAL DUTY VALUE} \times \text{GPM} \\ &= (131 - 50) \times 500 \times 20 \\ &= 810,000 \text{ BTU/HR} \end{aligned}$$

BOILER SIDE ...

$$\begin{aligned} Q &= \Delta T \times \text{THERMAL DUTY VALUE} \times \text{GPM} \\ &= (185 - 165.2) \times 500 \times \text{GPM} \end{aligned}$$

$$\begin{aligned} \therefore \text{GPM} &= \frac{810,000}{(20.2)(500)} \\ &= 80.2 \text{ US GPM} \end{aligned}$$

FIND LMTD (WITH MULTI-PASS CORRECTIONS) ...

BOILER	185	-	165.2	FROM LMTD GRAPH LMTD = 80°F
SHOWER	<u>131</u>	-	<u>50</u>	
	54		115.2	
	LTTD		LTDT	

$$\begin{aligned} \text{CORRECTIONS: } R &= \frac{185 - 165.2}{131 - 50} = 0.244 \\ P &= \frac{131 - 50}{185 - 50} = 0.6 \end{aligned} \quad \left. \vphantom{\begin{aligned} R \\ P \end{aligned}} \right\} \begin{array}{l} \text{CORRECTION} \\ = 0.96 \end{array}$$

FIND AREA

$$\text{AREA} = \frac{Q}{U \times \text{LMTD} \times \text{CORR.}} = \frac{810,000}{300 \times 80 \times 0.96} = 35.16 \text{ FT}^2$$

SELECT HX 6048 [45.6 FT², 115 USGPM W/2-PASS] *
OR 8036 [37.3 FT², 115 USGPM W/4-PASS]

* BETTER ONE AS CONNECTIONS ARE BETTER SIZE FOR FLOW.