me263 – Fluids and Heat Transfer

Selecting a Heat Exchanger – A Tutorial Problem

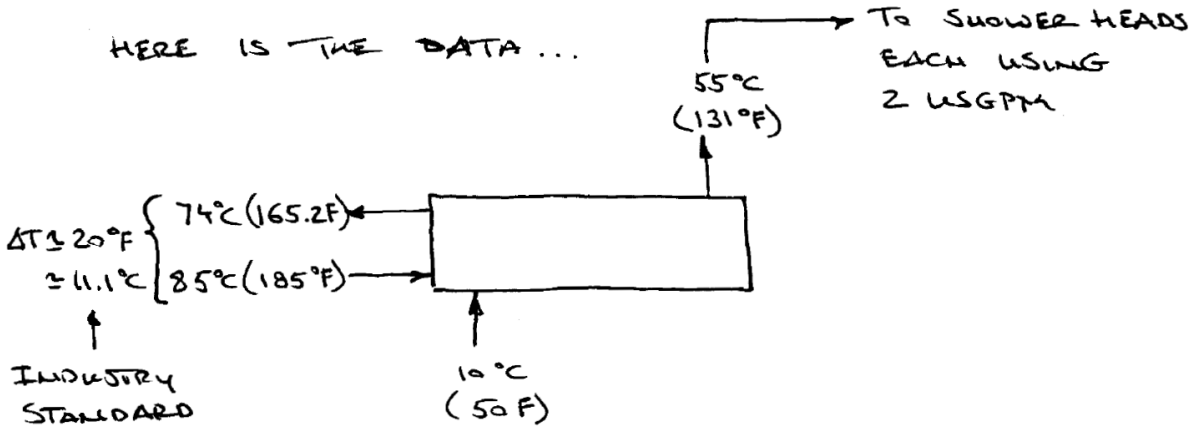
Do the following:

A. Review the BASCO Heat Exchanger Catalog (Complete – Online, Partial – Online and Handout).
B. Work through the example problem provided by BASCO, in their catalog. Make sure you track every number and understand its source.
C. Now its your turn.
    - Take a look at the problem below.
    - Using the BASCO Catalog method of analysis and their Heat Exchanger selection example, work on the Heat Exchanger problem below and select a BASCO Heat Exchanger that will work in this application.
    - Review the worked solution, on the next page and make sure you understand where every number came from.

THE HOT WATER HEATING SYSTEM FOR A BUILDING IS BEING USED TO HEAT WATER FOR 10 SHOWER HEADS IN A HIGH SCHOOL.

USING THE DATA BELOW SELECT A BASCO TYPE 500 'STANDARD STRAIGHT-TUBE' HEAT EXCHANGER TO DO THE JOB.

HERE IS THE DATA ...



TUTORIAL SOLUTION

(10 SHOWER HEAD PROBLEM).

BOTH SIDES H_2O

SHOWER SIDE...

$Q = \Delta T \times$ THERMAL DUTY VALUE $\times$ GPM

$= (131 - 50) \times 500 \times 20$

$= 810{,}000$ BTU/HR

BOILER SIDE...

(FLOW CONSTANT)

$Q = \Delta T \times$ THERMAL DUTY VALUE $\times$ GPM

$= (185 - 165.2) \times 500 \times GPM$

$\therefore GPM = \dfrac{810{,}000}{(20.2)(500)}$

$= 80.2$ US GPM

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

BOILER	185	165.2	FROM LMTD GRAPH
SHOWER	131	50	LMTD $\simeq 80°F$
	54	115.2	
	LTTD ↑	↑ LGTTD	

CORRECTIONS:

$R = \dfrac{185 - 165.2}{131 - 50} = 0.244$

$P = \dfrac{131 - 50}{185 - 50} = 0.6$

} CORRECTION $= 0.96$

FIND AREA

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

SELECT HX 6048 [45.6 FT^2, 115 USGPM W/2-PASS] *

OR 8036 [37.3 FT^2, 115 USGPM W/4-PASS]

* BETTER ONE AS CONNECTIONS ARE BETTER SIZE FOR FLOW.