

University of Idaho Department of Chemical Engineering  
 DOUBLE PIPE HEAT EXCHANGER Prediction Program Rel. 2/8/92  
 Ch. E. 434 Laboratory D. C. Drown

Date: Jan 29, 2009 Time: 22:50:26

Input File Name: G175.dat

Start Iteration Loop  
 Flow = 0.900 GPM  
 Inlet Temperature = 19.50 C

Steam Temperature = 110.16 T Wall Guess = 95.00  
 T Out Guess = 71.00

Steam Pressure = 6.20 PSIG + Temperature = 230.300 Deg F  
 H Vaporization = 958.56 BTU/LB Density= 0.051854 LB/FT3  
 Barometric Pressure = 14.6960 PSIA

Steam Pressure = 6.20 PSIG + Temperature = 110.164 Deg C  
 H Vaporization = 2229715. J/Kg Density = 0.8306 Kg/M3  
 Fouling - Inside = .0000000 Outside = .0000000  
 Temperature Convergence to 0.010 Degrees

N	T Wall C	T Out C	Re No.	H Inside Watts / Sq. Meter	H Outside BTU / Sq. Feet	U
	Units = F	F				
1	83.0 181.5	32.0 89.7	13164.	9220. 1624.	12608. 2220.	3969. 699.
	Dittus-Boelter T film Pr.33 = 1905. BTU/Ft2 F					
	Dittus-Boelter T bulk Pr.4 = 1624.					
	Nusselt Ent. = 2410.					
	Sieder-Tate = 1936.					
	Sleicher-Rouse = 1700.					
	Petukhov-Popov = 1755. T V					
	McAdams T bulk = 1596. 78.4 6.20					
	McAdams T film = 2082. 129.9					
2	85.8 186.5	43.7 110.7	16128.	10168. 1791.	12984. 2287.	4273. 753.
	Dittus-Boelter T film Pr.33 = 2039. BTU/Ft2 F					
	Dittus-Boelter T bulk Pr.4 = 1791.					
	Nusselt Ent. = 2579.					
	Sieder-Tate = 2121.					
	Sleicher-Rouse = 1914.					
	Petukhov-Popov = 1928. T V					
	McAdams T bulk = 1802. 100.2 6.21					
	McAdams T film = 2209. 143.3					
3	88.8 191.9	54.3 129.8	19623.	11136. 1961.	13442. 2367.	4583. 807.
	Dittus-Boelter T film Pr.33 = 2170. BTU/Ft2 F					
	Dittus-Boelter T bulk Pr.4 = 1961.					
	Nusselt Ent. = 2746.					
	Sieder-Tate = 2307.					

			Sleicher-Rouse =	2123.		
			Petukhov-Popov =	2096.	T	V
			McAdams T bulk =	1992.	120.2	6.21
			McAdams T film =	2330.	156.0	
4	91.8	63.9	23527.	12082.	13991.	4891.
	197.3	147.0		2128.	2464.	861.
			Dittus-Boelter T film Pr.33 =	2293.	BTU/Ft2	F
			Dittus-Boelter T bulk Pr.4 =	2128.		
			Nusselt Ent. =	2900.		
			Sieder-Tate =	2487.		
			Sleicher-Rouse =	2316.		
			Petukhov-Popov =	2250.	T	V
			McAdams T bulk =	2164.	138.4	6.21
			McAdams T film =	2442.	167.9	
5	94.8	72.2	27592.	12958.	14644.	5191.
	202.7	162.0		2282.	2579.	914.
			Dittus-Boelter T film Pr.33 =	2400.	BTU/Ft2	F
			Dittus-Boelter T bulk Pr.4 =	2282.		
			Nusselt Ent. =	3036.		
			Sieder-Tate =	2650.		
			Sleicher-Rouse =	2486.		
			Petukhov-Popov =	2384.	T	V
			McAdams T bulk =	2316.	154.5	6.21
			McAdams T film =	2544.	178.6	
6	97.6	79.4	31491.	13720.	15409.	5476.
	207.7	175.0		2416.	2714.	964.
			Dittus-Boelter T film Pr.33 =	2487.	BTU/Ft2	F
			Dittus-Boelter T bulk Pr.4 =	2416.		
			Nusselt Ent. =	3147.		
			Sieder-Tate =	2791.		
			Sleicher-Rouse =	2625.		
			Petukhov-Popov =	2494.	T	V
			McAdams T bulk =	2449.	168.5	6.21
			McAdams T film =	2634.	188.1	

Flow Rate = 0.900 GPM Steam Pressure = 6.20 PSIG

Temperature IN = 19.5 Degrees C 67.1 F  
 Temperature OUT = 79.4 Degrees C 175.0 F  
 Steam Temperature = 110.2 Degrees C 230.3 F

Length Inches	Wall Temp.		Temp. Water Out	
	C	F	C	F
11.667	83.0	181.5	32.0	89.7
23.333	85.8	186.5	43.7	110.7
35.000	88.8	191.9	54.3	129.8
46.667	91.8	197.3	63.9	147.0
58.333	94.8	202.7	72.2	162.0
70.000	97.6	207.7	79.4	175.0