


# Feedwater Heater Performance

Calculation of the expected results of the performance of a feedwater heater from the steam conditions, the flow rate and the feedwater temperature based on the surfaces of the equipment.

## PROGRAM WINDOWS

FWH Performance



### Feed Water Heater Performance (Ver.2)

Coefficients According to Nusselt and McAdams

**INPUTS**

Job Name:

Units Code (1 = S.I. 2 = USA)  Press Button

Steam Temperature At Inlet	<input type="text" value="750.36"/>	oF
Steam Enthalpy At Inlet	<input type="text" value="1380.84"/>	btu/lb
Steam Pressure At Inlet	<input type="text" value="594.6"/>	psia
Pressure Drop At Desuperheater	<input type="text" value="4.35"/>	psi
Flow At # 1 Drain Inlet	<input type="text" value="0"/>	lb/h
Enthalpy At # 1 Drain Inlet	<input type="text" value="0"/>	btu/lb
Flow At # 2 Drain Inlet	<input type="text" value="0"/>	lb/h
Enthalpy At # 2 Drain Inlet	<input type="text" value="0"/>	btu/lb
Feed Water Pump Pressure	<input type="text" value="1305.3"/>	psia
Feed Water Flow	<input type="text" value="2645502"/>	lb/h
Feed Water Inlet Temperature	<input type="text" value="440.33"/>	oF
Number Of Plugged Tubes	<input type="text" value="0"/>	
Drain Cooler Tube Outlet Velocity	<input type="text" value="3.28"/>	ft/s

Original Desuperheater Surface  ft2

Original Condensation Surface  ft2

Original Drain Cooling Surface  ft2

Tubes Outlet Diameter  in

Tube Thickness  in

Number Of Tubes

Tubes Material :

[ 1 ] .... Carbon Steel

[ 2 ] .... Cooper Nickel 90/10

[ 3 ] .... Austenitic S.S.

[ 4 ] .... Monel

[ 5 ] .... Cooper Nickel 70/30

[ 6 ] .... Ferritic S.S.

[ 7 ] .... Admiralty Brass 70/30

Enter Code Material

Heater Installation :

[ 0 ] .... Horizontal Full Flow [ 1 ] .... Vertical Channel Down

[ 2 ] .... Horizontal Split Flow [ 3 ] .... Vertical Channel Up

Enter Installation Code

Number Of Tubes In D. C. If Code = 2 Or 3

~ Ext.Surf. Of D. C. Casing If Code 3  ft2

Desuperheating Correction Coefficient

Condensation Correction Coefficient

Drain Cooler Correction Coefficient

**End Of Calculation. Press Results**

Instructions

Run File

Results

Print Results

Drawing

Print Drawing

Save File

Load File

Exit

## DATA ENTRY WINDOW



## F W H Performance - Data Results

Job Name : Test 3 zones

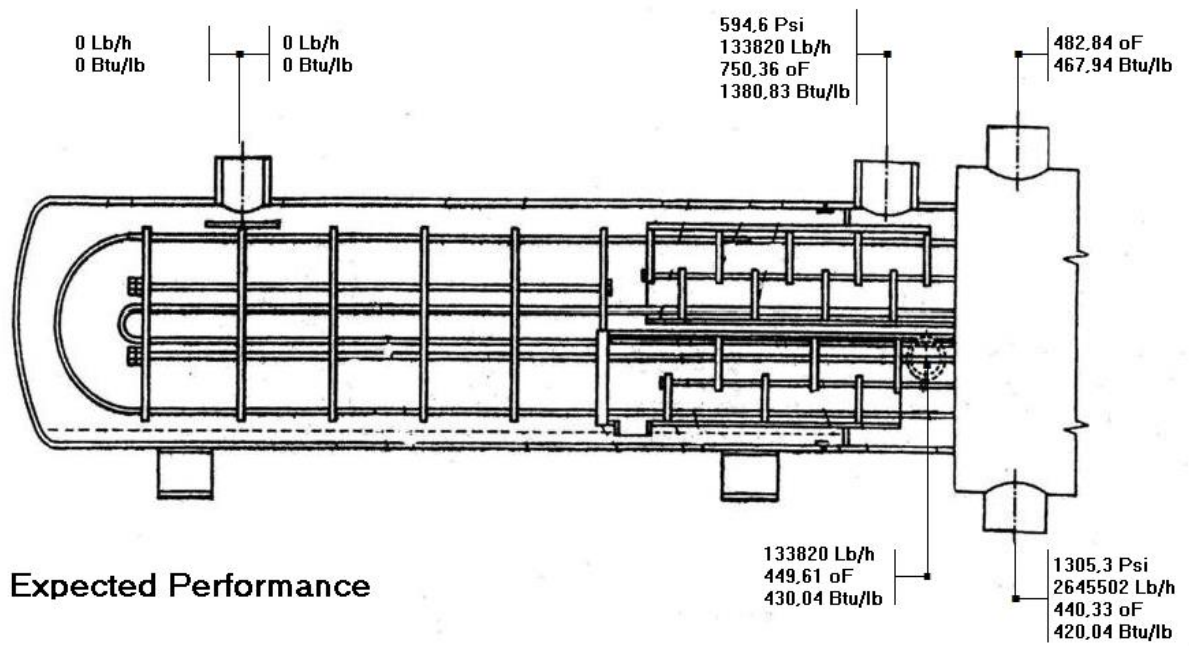
### ■ Data

Steam Pressure At Inlet	594,6	Psia
Steam Saturation Temp.At Inlet Pressure	485,22	oF
Steam Temperature At Inlet	750,36	oF
Steam Enthalpy At Inlet	1380,83	Btu/lb
Temperature At Condensation Zone	484,44	oF
Enthalpy At Condensation Zone	469,64	Btu/lb
Flow At # 1 Drain Inlet	0	Lb/h
Enthalpy At # 1 Drain Inlet	0	Btu/lb
Flow At # 2 Drain Inlet	0	Lb/h
Enthalpy At # 2 Drain Inlet	0	Btu/lb
Feed Water Pump Pressure	1305,3	Psia
Feed Water Flow	2645502	Lb/h
Feed Water Inlet Temperature	440,33	oF
Feed Water Inlet Enthalpy	420,04	Btu/lb
Number Of Non Plugged Tubes	1125	
Tubes Outlet Diameter	0,748	In
Tubes Thickness	0,059	In
Tubes Material	Carbon Steel	
Active Desuperheating Surface	947,22	Sqft
Active Condensing Surface	7244	Sqft
Active Drain Cooler Surface	419,8	Sqft
Heater Installation	Horizontal Full Flow	
Desuperheating Correction Coefficient	1	
Condensation Correction Coefficient	1	
Drain Cooler Correction Coefficient	1	

### ■ Results

Steam Flow (Including 0.3 % Lost)	133820	Lb/h
Desuperheating Duty	16672,1	Kbtu/h
Condensation Duty	104763,1	Kbtu/h
Drain Cooler Duty	5283,1	Kbtu/h
Desuperheating L.M.T.D.	147,34	oF
Condensation L.M.T.D.	19,65	oF
Drain Cooler L.M.T.D.	21,81	oF
Desup.Heat Transfer Coefficient	116,7	Btu/hoFsqft
Conden.Heat Transfer Coefficient	733,2	Btu/hoFsqft
D.C. Heat Transfer Coefficient	569,9	Btu/hoFsqft
F W Heater Shell Outlet Temperature	449,61	oF
Feed Water Outlet Temperature	482,84	oF
Feed Water Temp.At In Conden.Zone	441,96	oF
Feed Water Temp.At Out Conden.Zone	477,42	oF
F W Heater Shell Outlet Enthalpy	430,04	Btu/lb
Feed Water Outlet Enthalpy	467,94	Btu/lb
Feed Water Enthal.At In Conden.Zone	422,04	Btu/lb
Feed Water Enthal.At Out Conden.Zone	461,64	Btu/lb
Steam Temp.At Desuperheater End	547,43	oF
Steam Enthal.At Desuperheater End	1254,83	Btu/lb
Terminal Temperature Difference	2,35	oF
Drain Cooler Approach	9,27	oF
Tube Number In Drain Cooler	1125	
Number Of Plugged Tubes	0	
Dew Point Verification	521,47	oF
(It Must Be Less Than Temperature At Desuperheater Outlet)		

## RESULTS SHEET



## DATA FLUID DRAWING