FHinfinity© CASE STUDY

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FHinfinity© CASE #RCS-7T

DEMO CASE #RCS-7T

HEATER GEOMETRY	*Radiant + Convection*
FIREBOX TYPE / NO. OF PATH	*Cubical / Thirty (30)*
FIREBOX TUBE LAYOUT	*Arbor Tube, Central*
CONV. LAYOUT / NO. OF T.B.	*Rectangular / Three (3)*
CONV. TUBE TYPE	*Bare - Fin1 - Fin 2*
BURNER LAYOUT	*Endwall-Fired*
STACK	*One (1)*
FAN / APH / TRANSFER LINE	*None*
FUEL	*Fuel Gas*
NO. OF PROCESS STREAM	*Three (3)*
PROCESS THERMO. STATE	*All Vap. / All Vap. / All Vap.*
THERMO ENGINE	*User Input Data / NaftPack*

Model Specification & Setting:

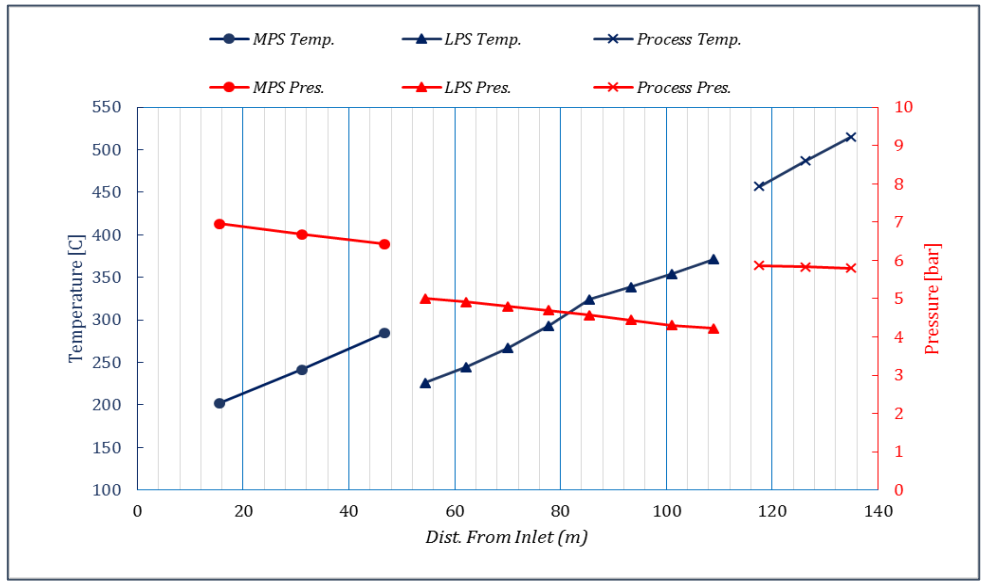
- ☑ *Fouling Factor*
- ☑ *Radiation to Tube Bank*

DEMO CASE #RCS-7T - OUTPUT

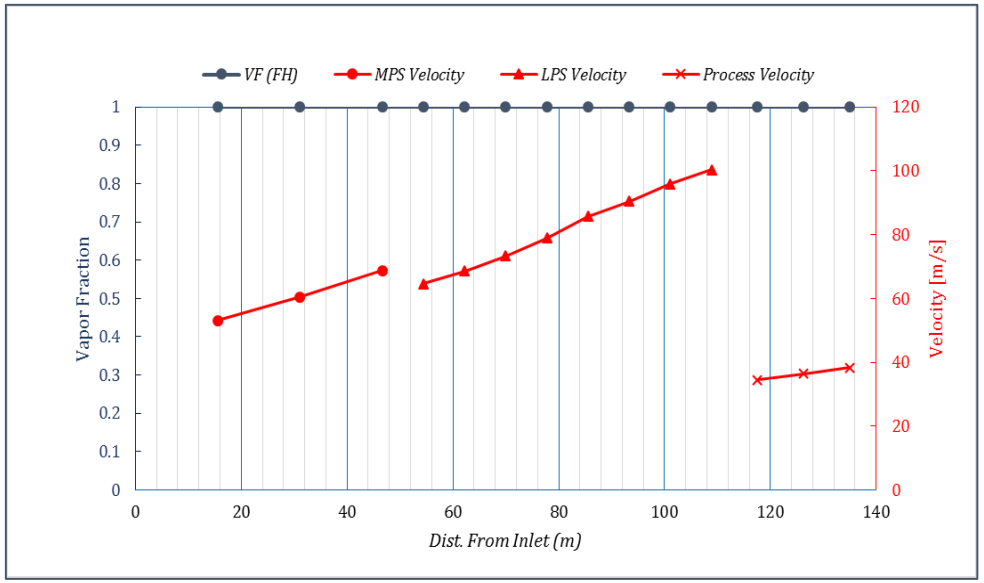
	FHinfinity
Total Heat Absorption [kW]	14446
Firebox Duty [kW]	9618
Avg. Rad. Sec. Heat Flux Density [W/m2]	38992
Process Outlet Temperature [C]	285/ 371/ 516
Process Side Pressure Drop [bar]	0.12 / 0.87 / 0.77
Heater Efficiency [%]	84.9
Flue Gas Temp. Leaving Heater [C]	309
Bridgewall Temperature [C]	868
Draft at Arch [in WC]	- 0.08
Max. Flue Gas Mass Velocity [kg/m2.s]	1.56
Ratio of Peak to Mean Heat Flux [-]	1.2
Adiabatic Flame Temperature [C]	1903

NOTES:

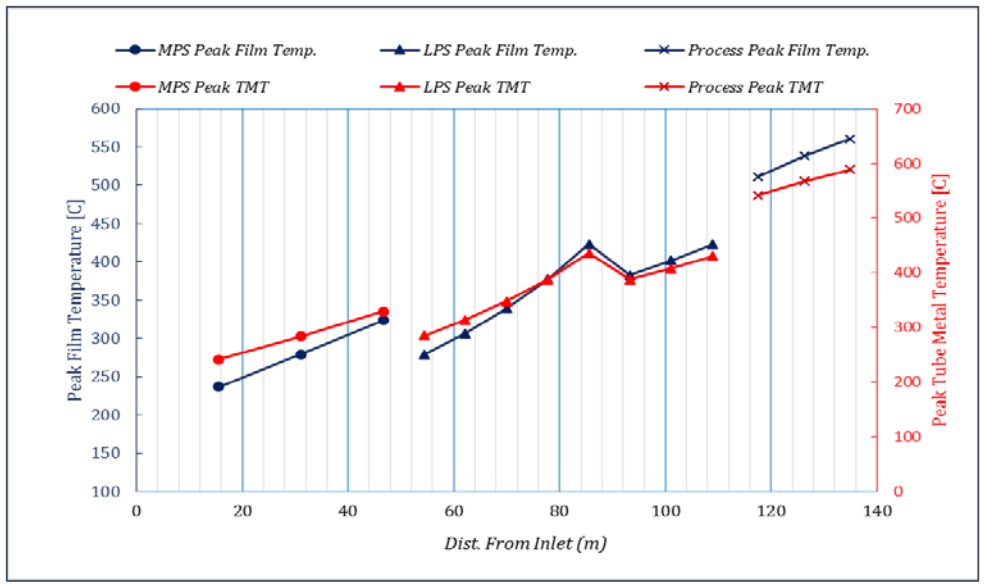
TEMPERATURE & PRESSURE



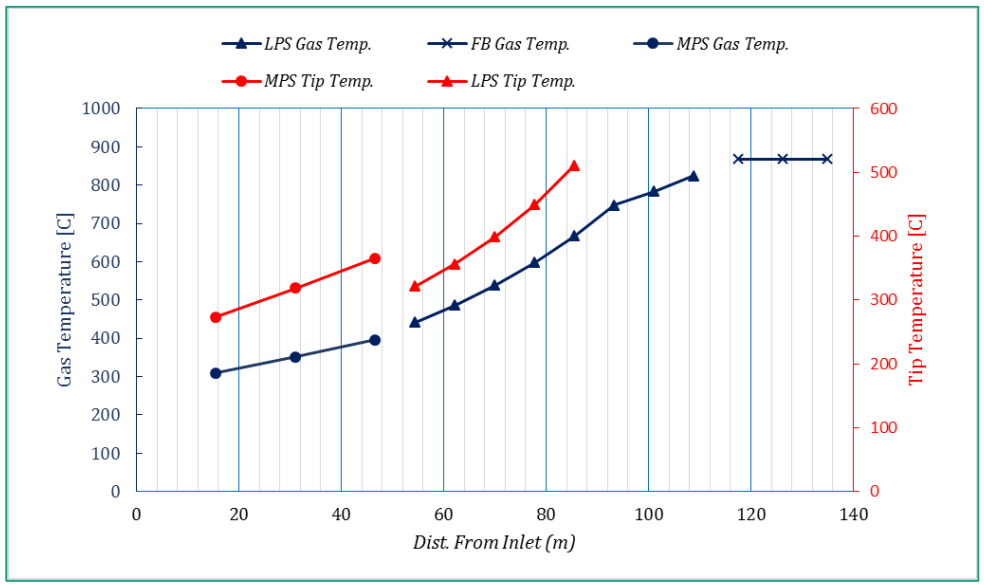
VELOCITY & VAPOR FRACTION



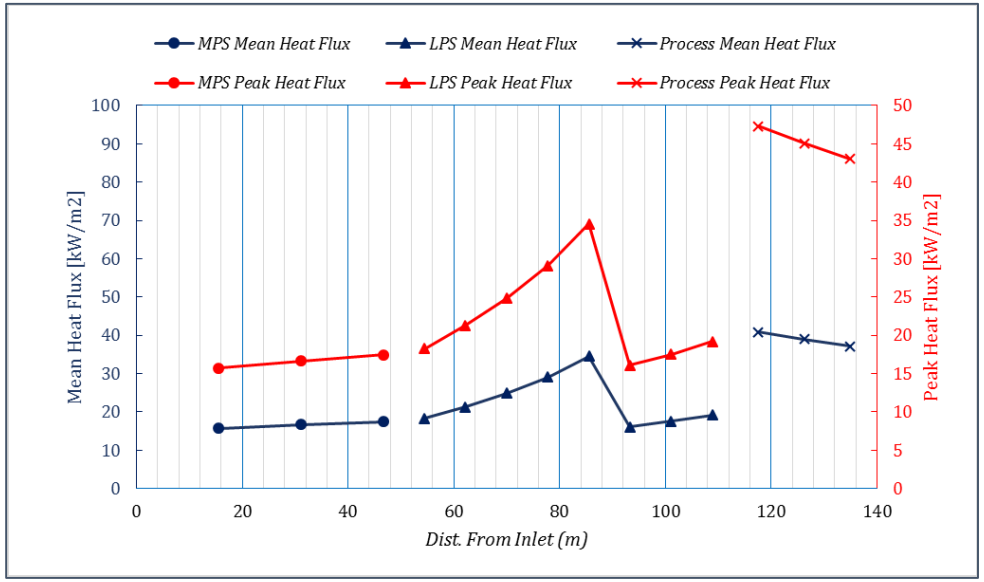
TUBE TEMPERATURES



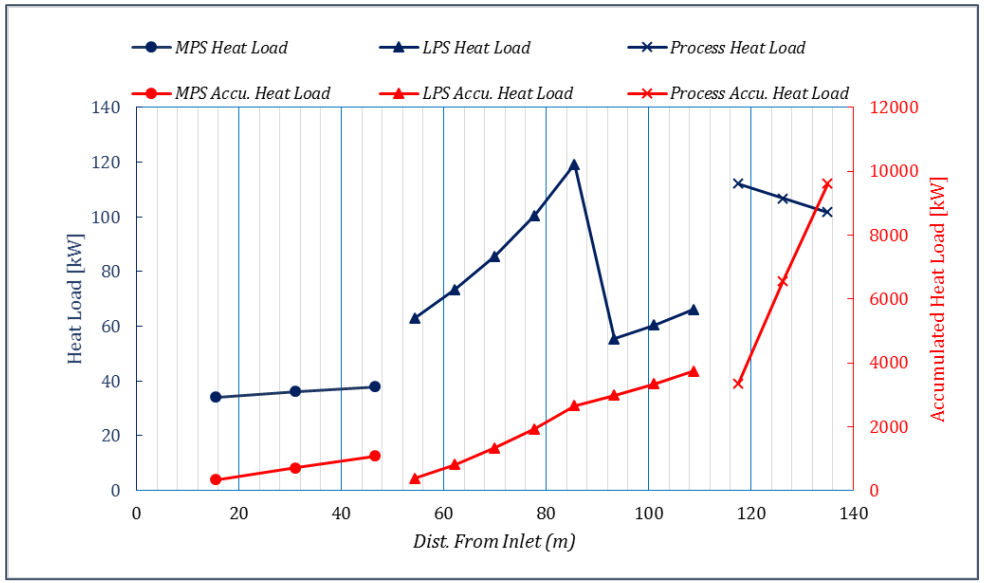
GAS TEMP. & TIP TEMP.



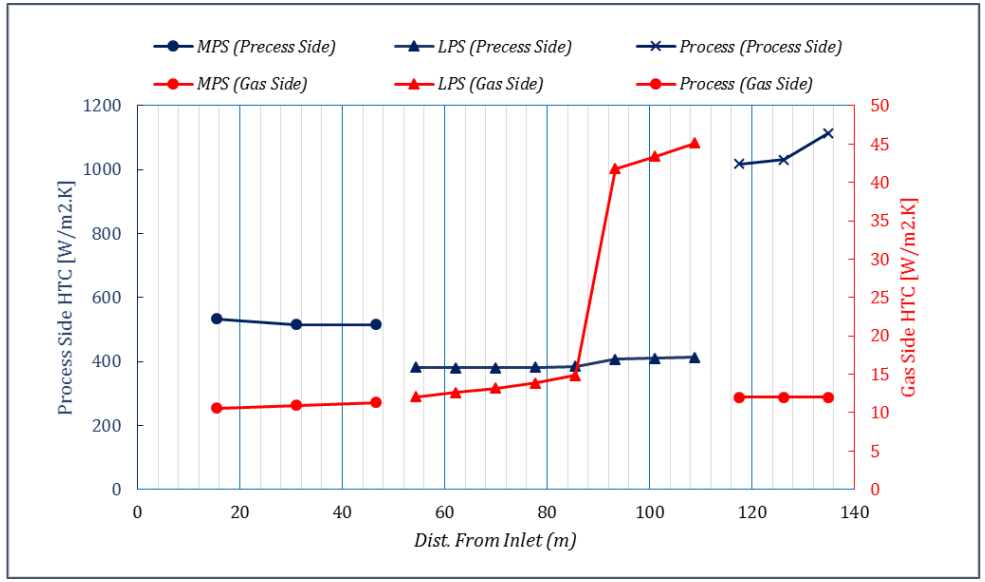
HEAT FLUXES



HEAT LOAD



HEAT TRANSFER COEF.



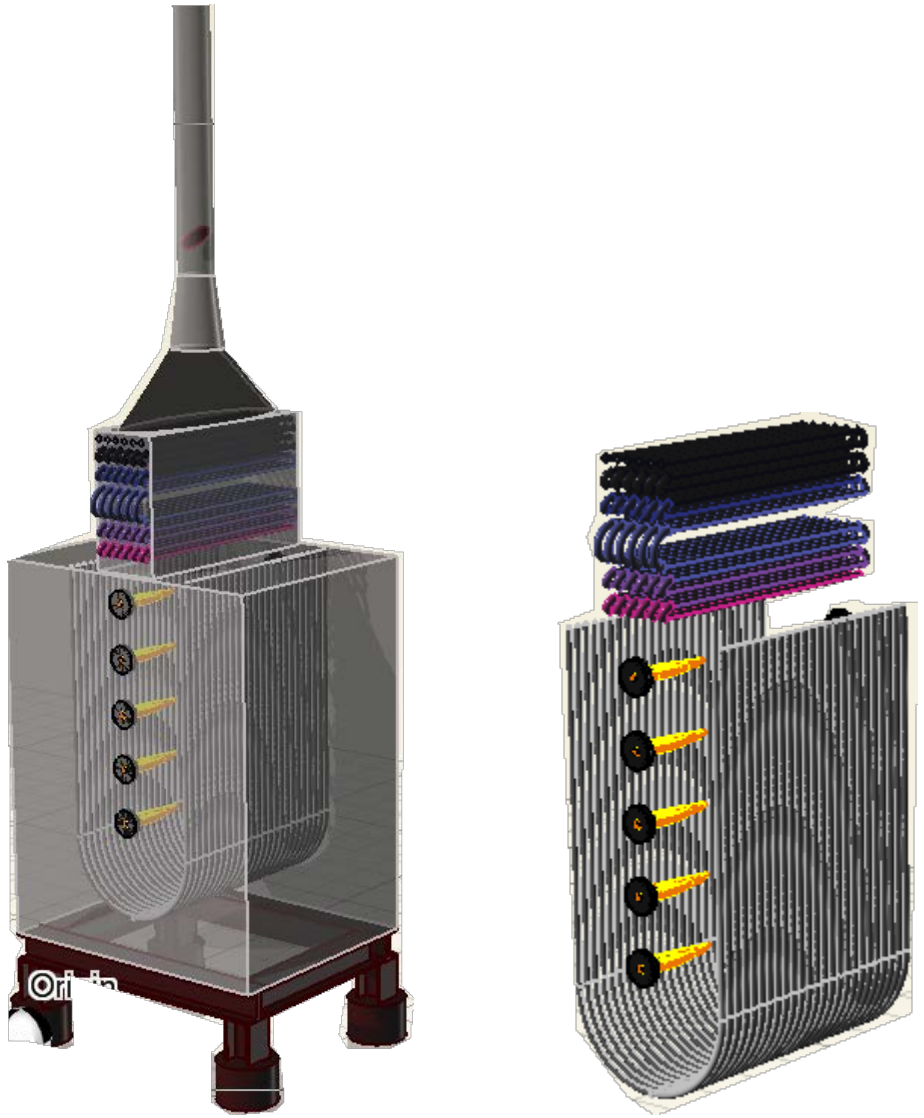
FHinfinity© CASE #RCS-8T

DEMO CASE #RCS-8T

HEATER GEOMETRY	*Radiant + Convection*
FIREBOX TYPE / NO. OF PATH	*Cubical / Twenty Five (25)*
FIREBOX TUBE LAYOUT	*U-Tube, Central*
CONV. LAYOUT / NO. OF T.B.	*Triangular / One (1)*
CONV. TUBE TYPE	*Bare*
BURNER LAYOUT	*Endwall-Fired*
STACK	*One (1)*
FAN / APH / TRANSFER LINE	*None*
FUEL	*Fuel Gas*
NO. OF PROCESS STREAM	*Two (2)*
PROCESS THERMO. STATE	*All Vap. / All Vap.*
THERMO ENGINE	*User Input Data / NaftPack*

Model Specification & Setting:

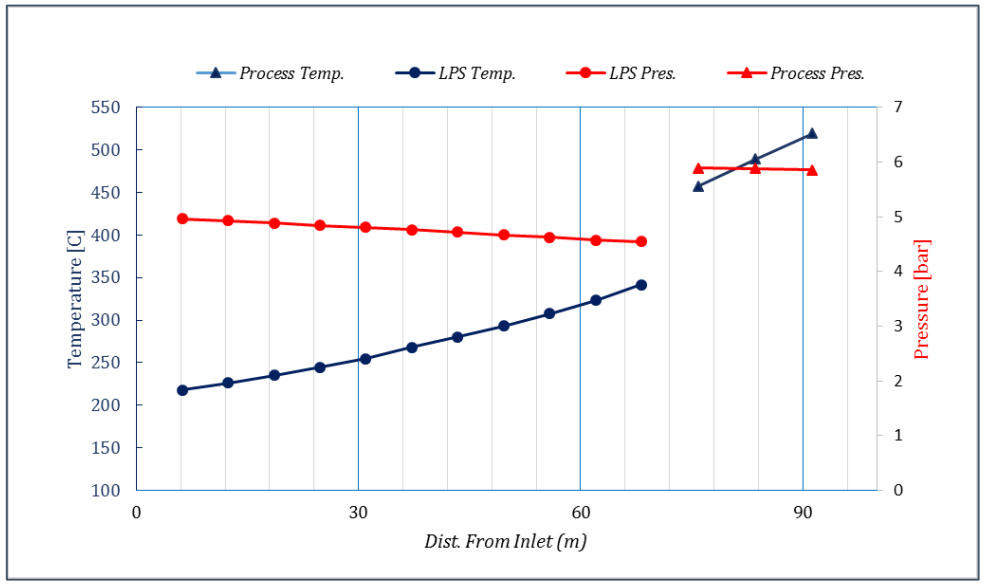
- ☑ *Hottel Parameter*
- ☑ *Fouling Factor*
- ☑ *Radiation to Tube Bank*



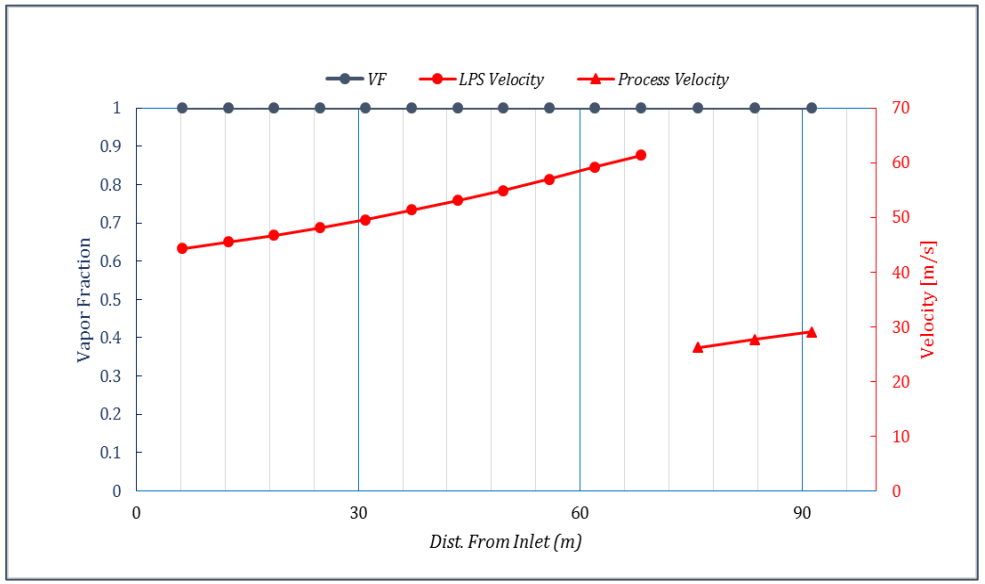
	FHinfinity
Total Heat Absorption [kW]	12723
Firebox Duty [kW]	9680
Avg. Rad. Sec. Heat Flux Density [W/m2]	41739
Process Outlet Temperature [C]	519
Process Side Pressure Drop [bar]	0.05 / 0.45
Heater Efficiency [%]	74.8
Flue Gas Temp. Leaving Heater [C]	516
Bridgewall Temperature [C]	860
Draft at Arch [in WC]	0.03
Max. Flue Gas Mass Velocity [kg/m2.s]	1.15
Ratio of Peak to Mean Heat Flux [-]	1.22
Adiabatic Flame Temperature [C]	1903

NOTES:

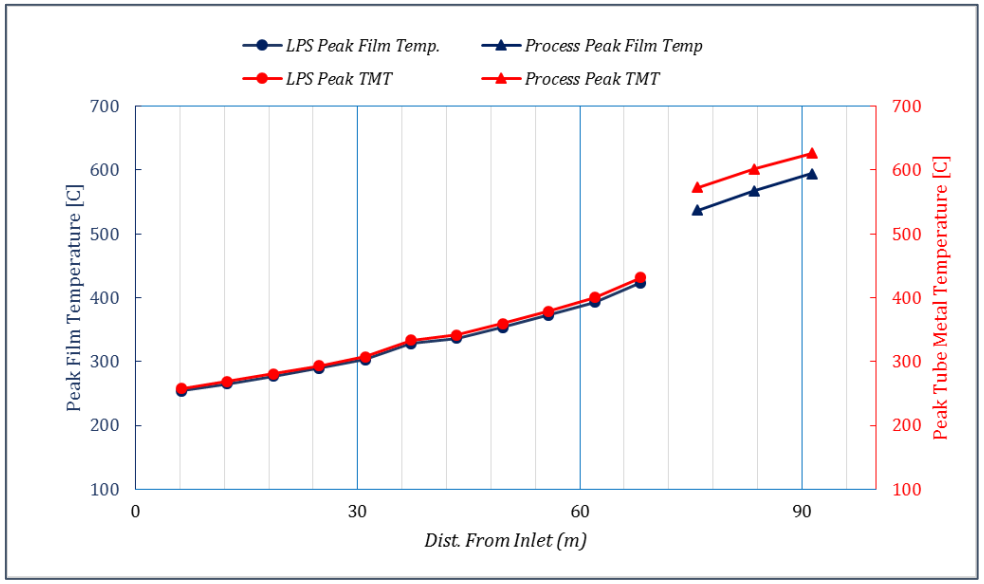
TEMPERATURE & PRESSURE



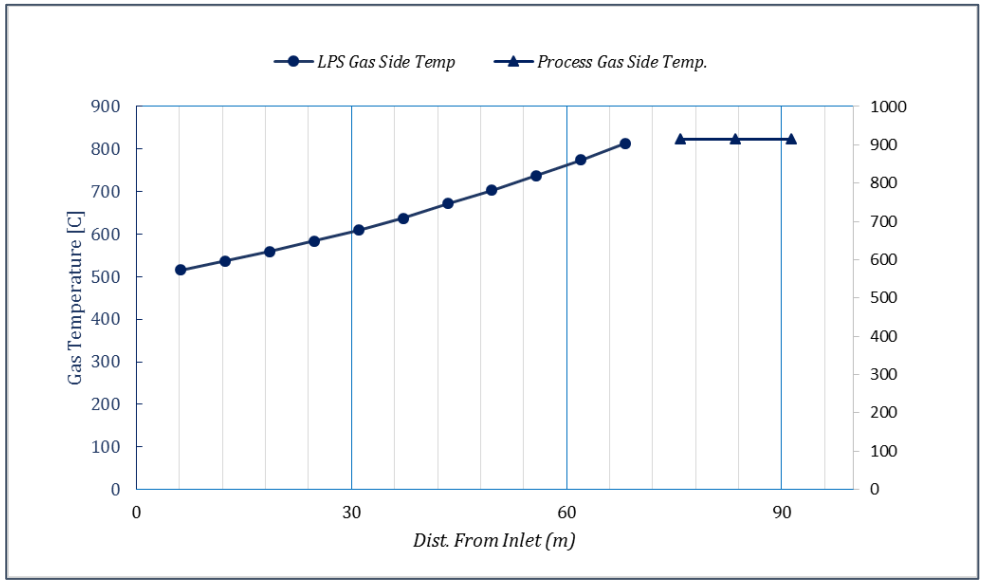
VELOCITY & VAPOR FRACTION



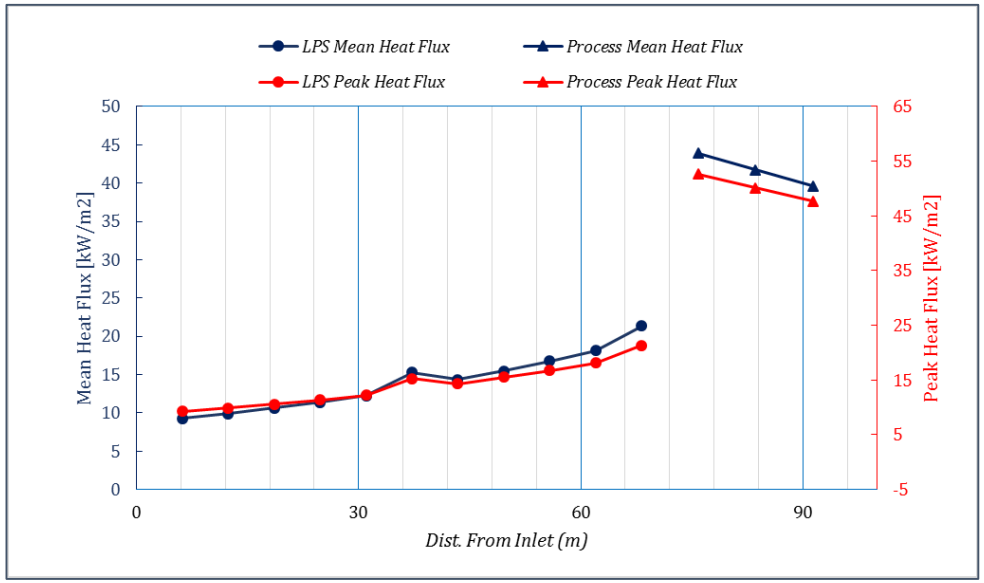
TUBE TEMPERATURES



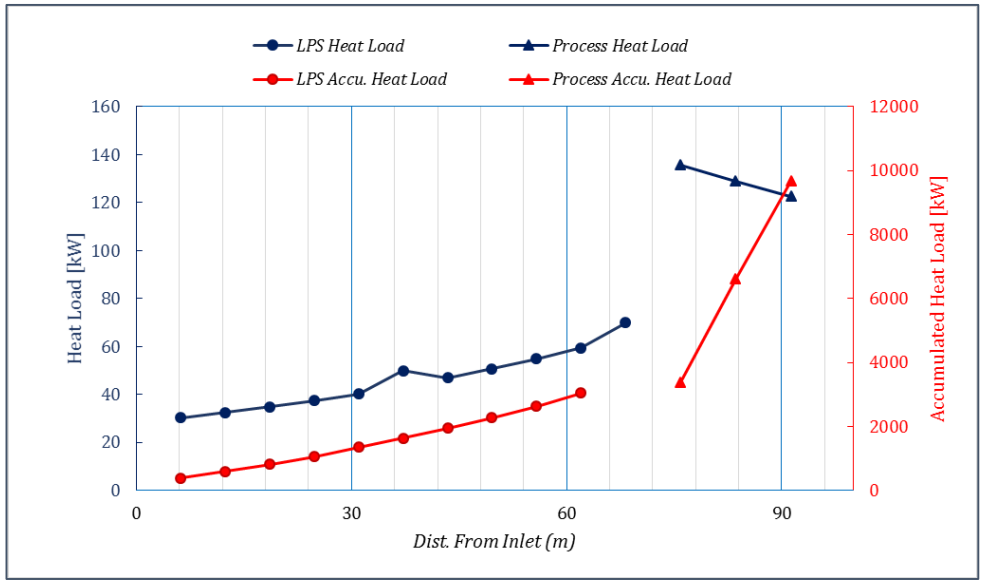
GAS TEMP.



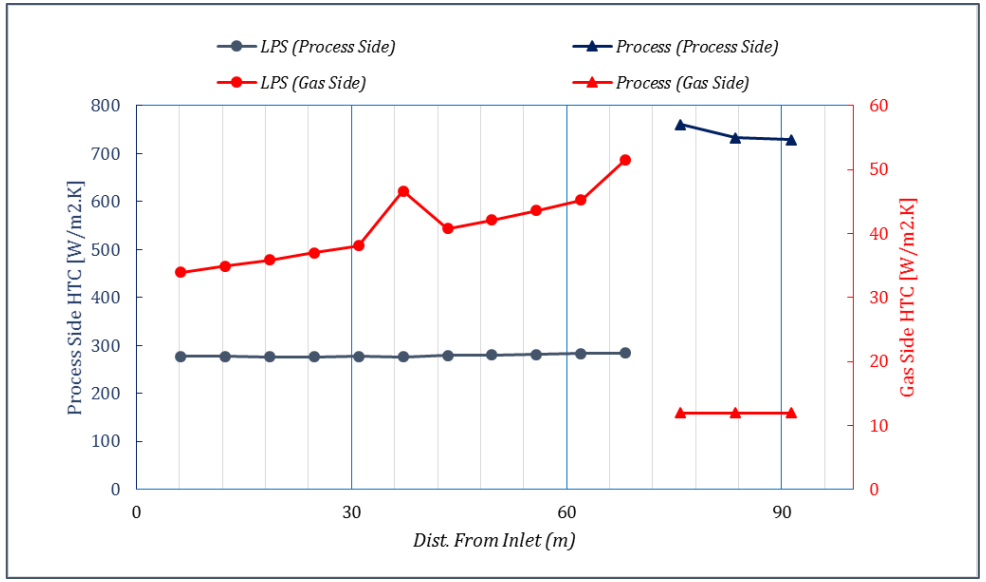
HEAT FLUXES



HEAT LOAD



HEAT TRANSFER COEF.



FHinfinity© CASE #RCS-9T

DEMO CASE #RCS-9T

HEATER GEOMETRY	*Radiant + Convection*
FIREBOX TYPE / NO. OF PATH	*Box / Six (6)*
FIREBOX TUBE LAYOUT	*Vertical, Ref. Backed & Central*
CONV. LAYOUT / NO. OF T.B.	*Triangular / Two (2)*
CONV. TUBE TYPE	*Bare - Fin*
BURNER LAYOUT	*Up-Fired*
STACK	*One (1)*
FAN / APH / TRANSFER LINE	*None*
FUEL	*Fuel Oil (+ Atm. Steam)*
NO. OF PROCESS STREAM	*Two (2)*
PROCESS THERMO. STATE	*All Vap. & Vaporizing (Liq/2ph.)*
THERMO ENGINE	*Aspen Hysys / Aspen Hysys*

Model Specification & Setting:

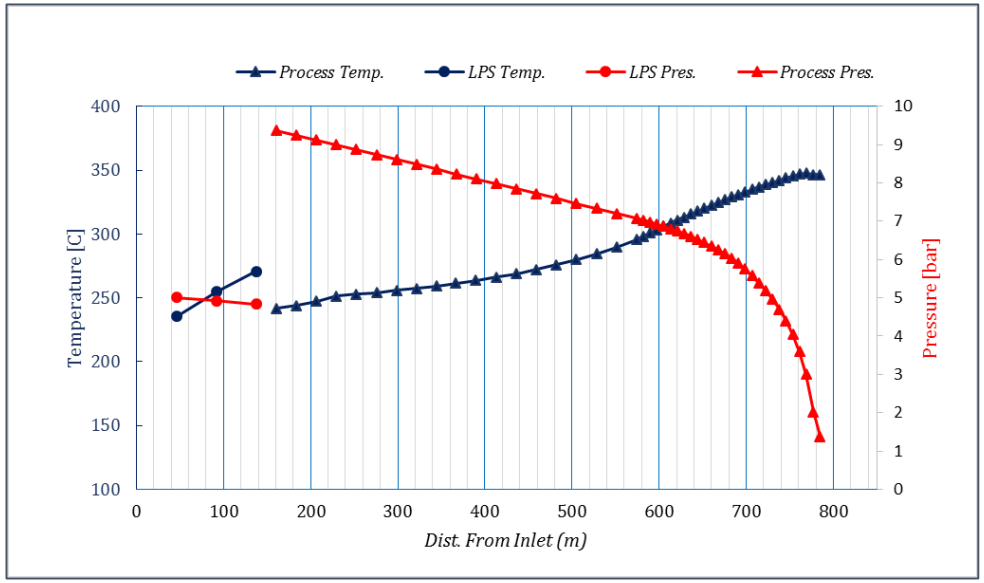
- ☑ *Hottel Parameter*
- ☑ *Fouling Factor*
- ☑ *Radiation to Tube Bank*

DEMO CASE #RCS-9T - OUTPUT

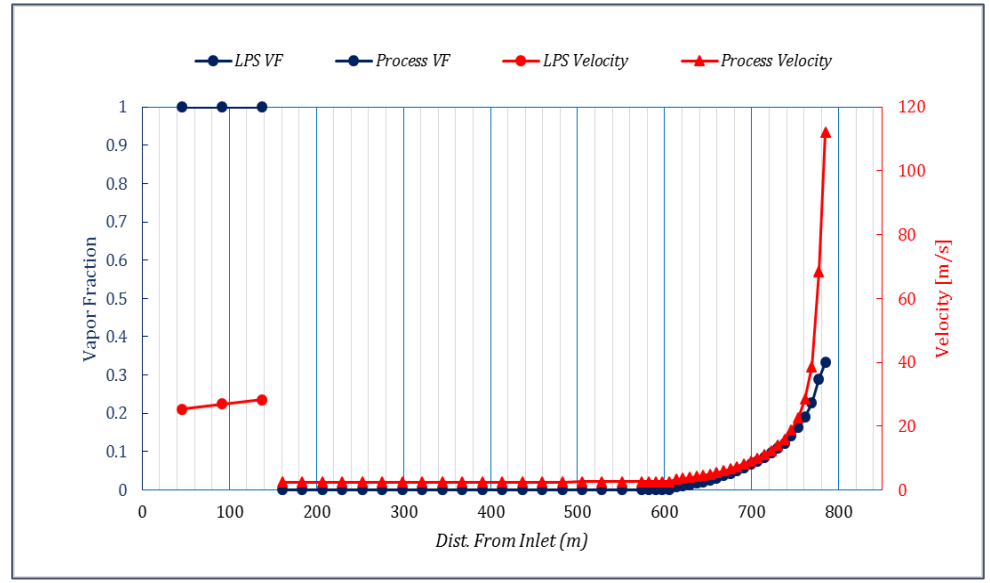
	FHinfinity
Total Heat Absorption [kW]	31617
Firebox Duty [kW]	18239
Avg. Rad. Sec. Heat Flux Density [W/m2]	38683
Process Outlet Temperature [C]	347 / 271
Process Side Pressure Drop [bar]	0.27 / 8.1
Heater Efficiency [%]	85.5
Flue Gas Temp. Leaving Heater [C]	294
Bridgewall Temperature [C]	950
Draft at Arch [mbar]	-2.24
Max. Flue Gas Mass Velocity [kg/m2.s]	1.57
Ratio of Peak to Mean Heat Flux [-]	1.76
Adiabatic Flame Temperature [C]	1797

NOTES:

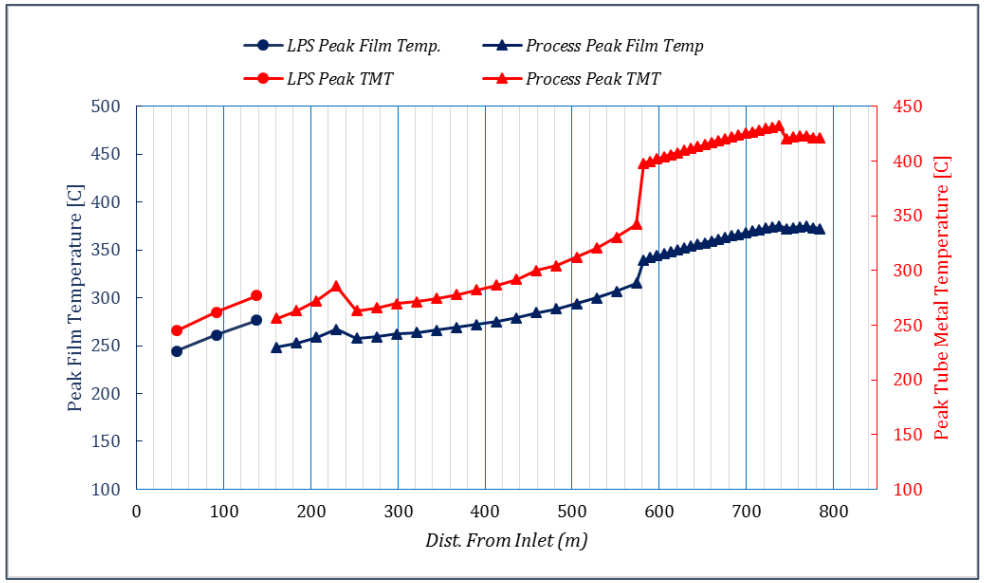
TEMPERATURE & PRESSURE



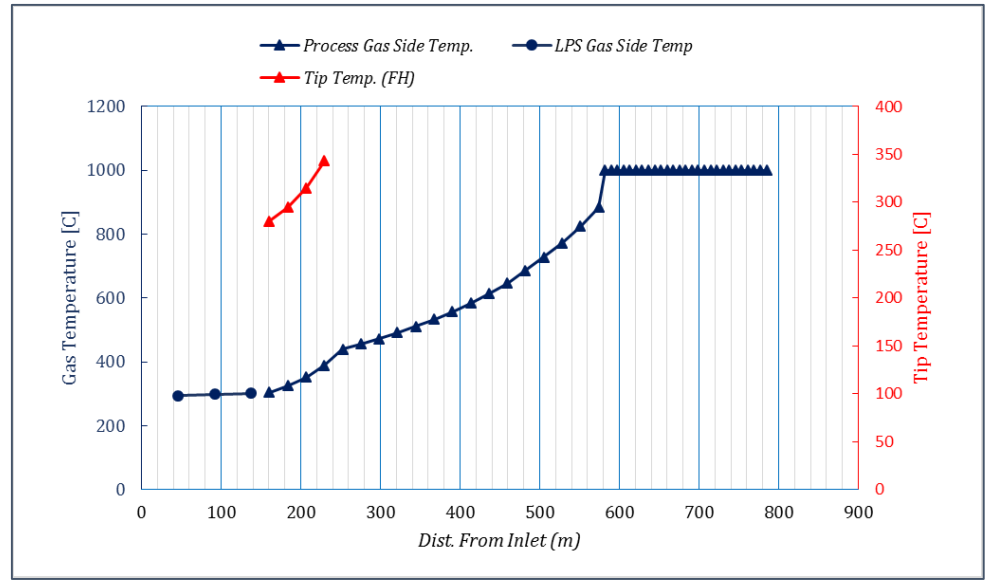
VELOCITY & VAPOR FRACTION



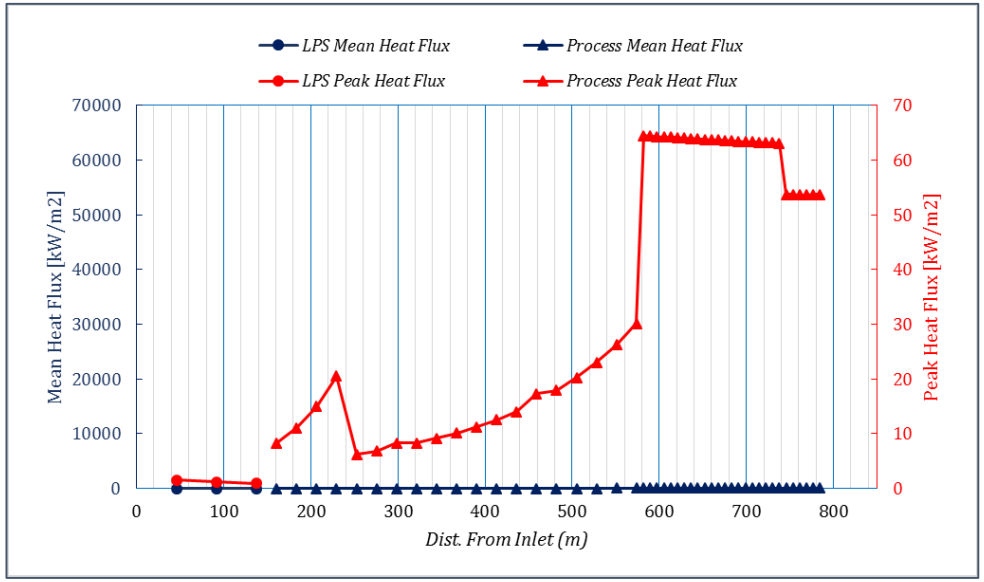
TUBE TEMPERATURES



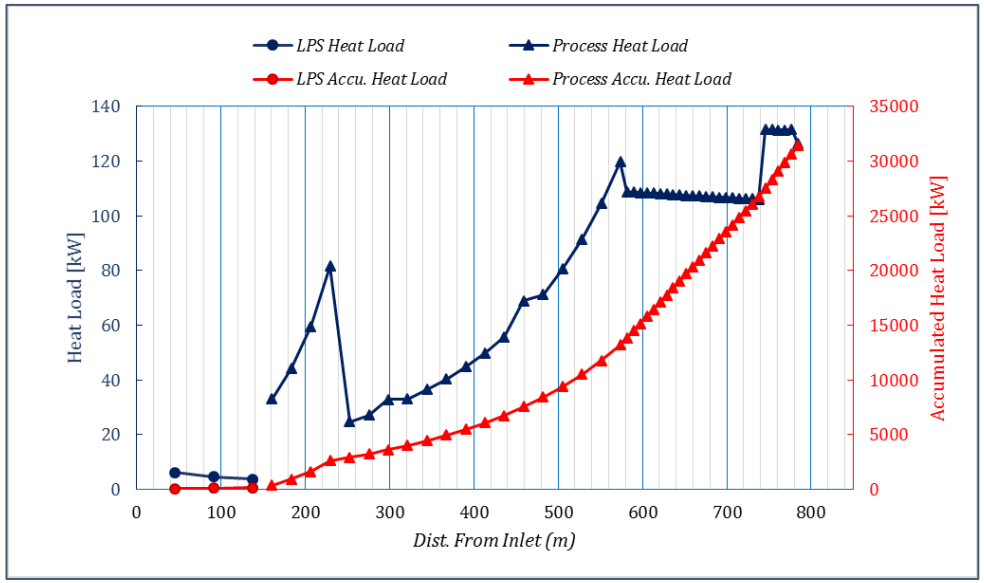
GAS TEMP. & TIP TEMP.



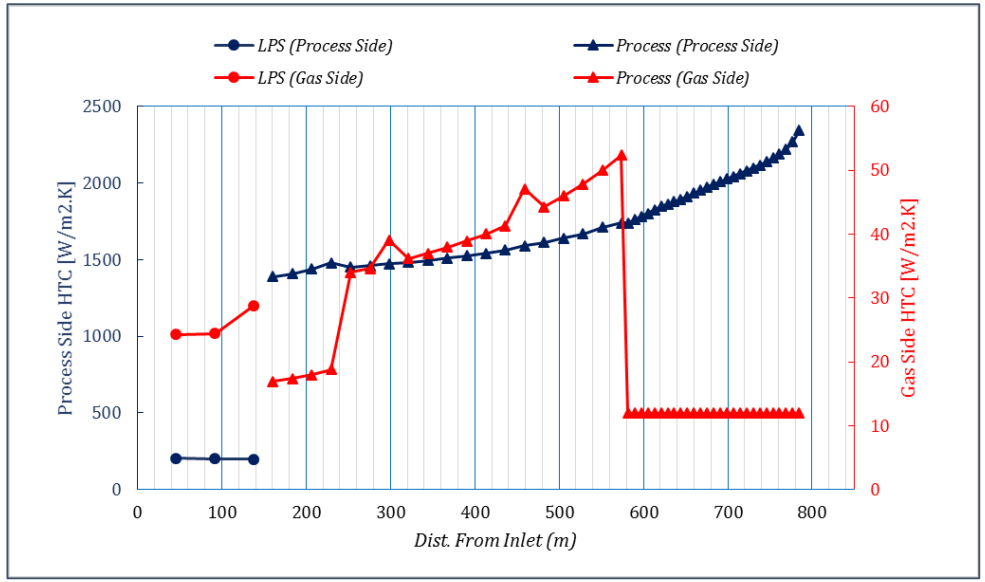
HEAT FLUXES



HEAT LOAD



HEAT TRANSFER COEF.



FHinfinity© CASE #RCS-12T

DEMO CASE #RCS-12T

HEATER GEOMETRY	*Radiant + Convection*
FIREBOX TYPE / NO. OF PATH	*Cylindrical / Two (2)*
FIREBOX TUBE LAYOUT	*Vertical, Ref. Backed, 2Row*
CONV. LAYOUT / NO. OF T.B.	*Triangular / Two (2)*
CONV. TUBE TYPE	*Bare - Stud*
BURNER LAYOUT	*Up-Fired*
STACK	*None*
FAN / APH / TRANSFER LINE	*None*
FUEL	*Fuel Oil*
NO. OF PROCESS STREAM	*One (1)*
PROCESS THERMO. STATE	*All Liquid*
THERMO ENGINE	*Aspen Hysys*

Model Specification & Setting:

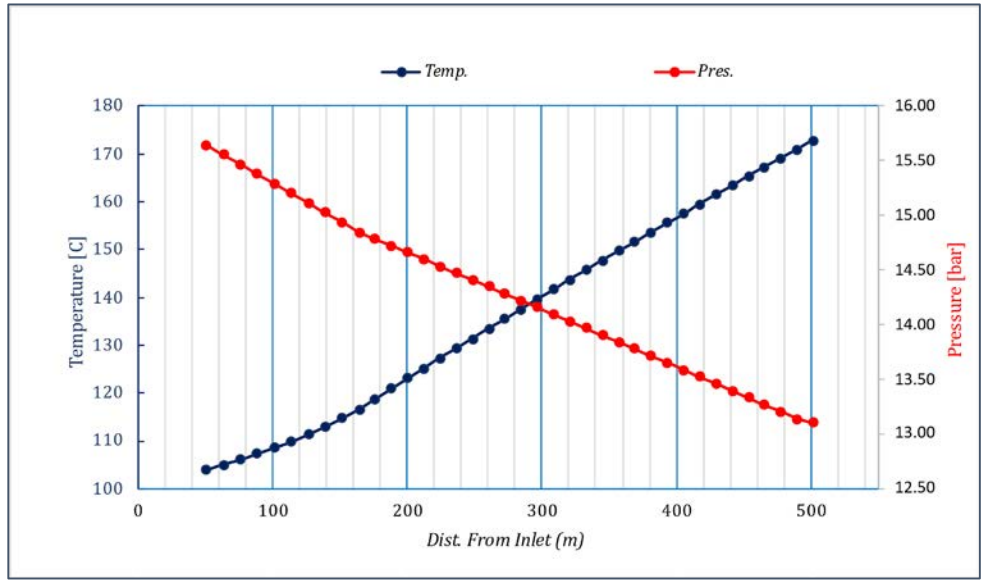
- ☑ *Hottel Parameter*
- ☑ *Fouling Factor*
- ☑ *Radiation to Tube Bank*

Case is not supported by 3D Schematic

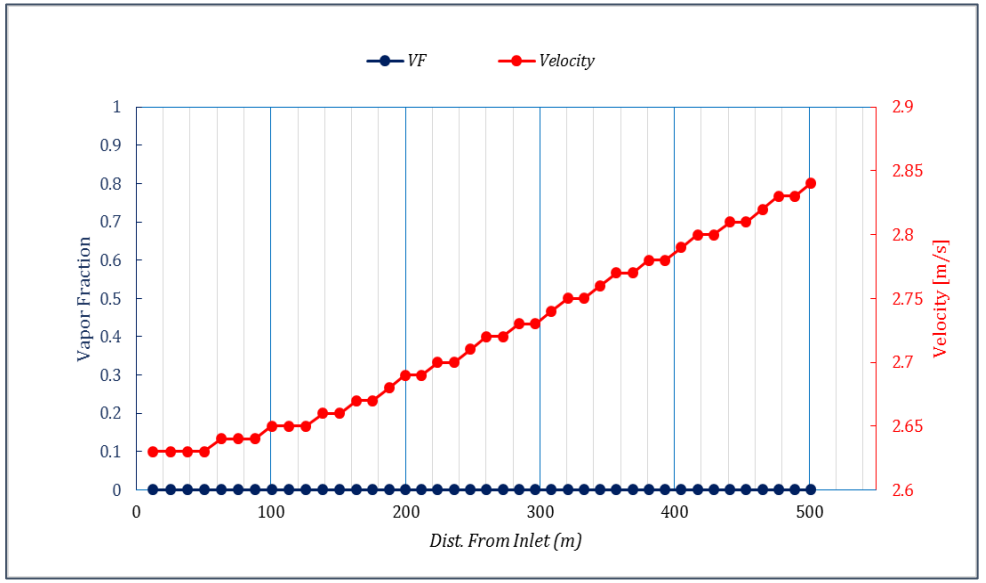
	FHinfinity
Total Heat Absorption [kW]	12293
Firebox Duty [kW]	9626
Avg. Rad. Sec. Heat Flux Density [W/m2]	26997
Process Outlet Temperature [C]	172.8
Process Side Pressure Drop [bar]	2.9
Heater Efficiency [%]	82.1
Flue Gas Temp. Leaving Heater [C]	377
Bridgewall Temperature [C]	737
Draft at Arch [in WC]	N/A
Max. Flue Gas Mass Velocity [kg/m2.s]	1.97
Ratio of Peak to Mean Heat Flux [-]	3.5
Adiabatic Flame Temperature [C]	1966

NOTES:

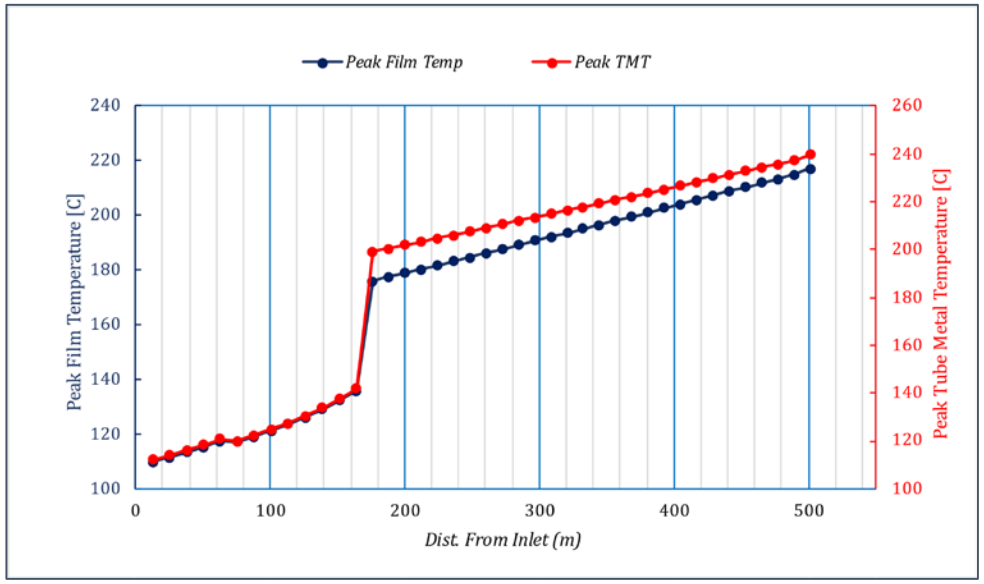
TEMPERATURE & PRESSURE



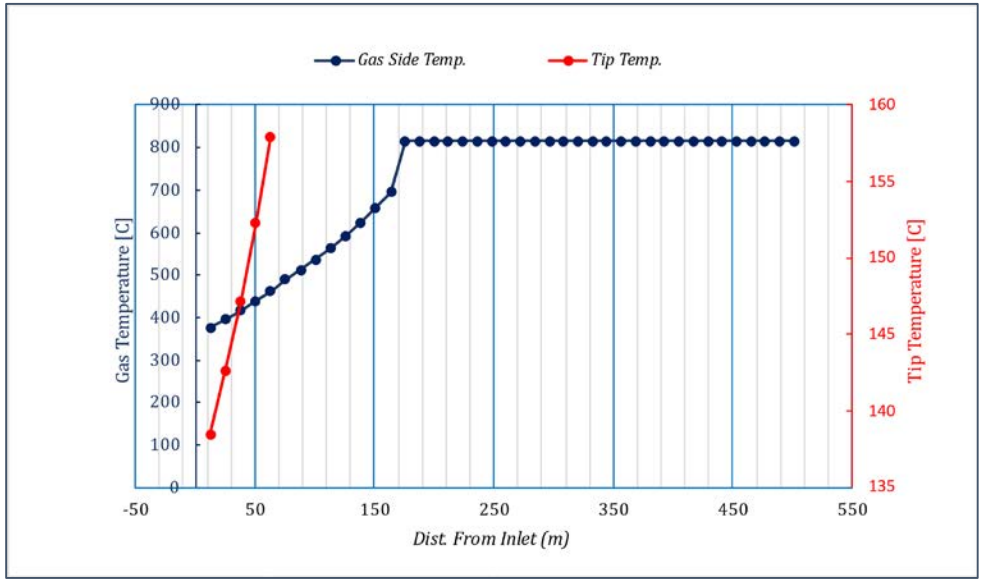
VELOCITY & VAPOR FRACTION



TUBE TEMPERATURES

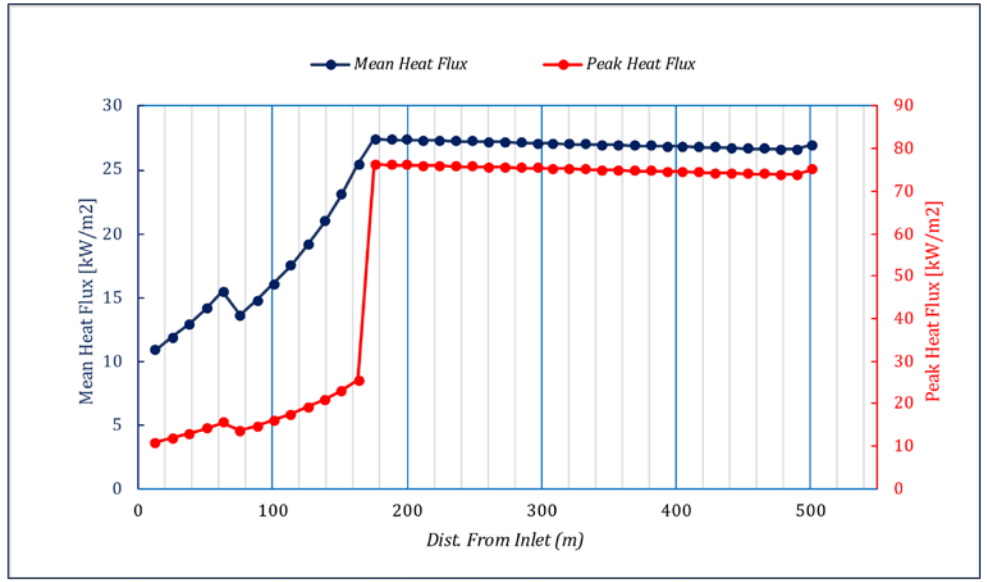


GAS TEMP. & TIP TEMP.

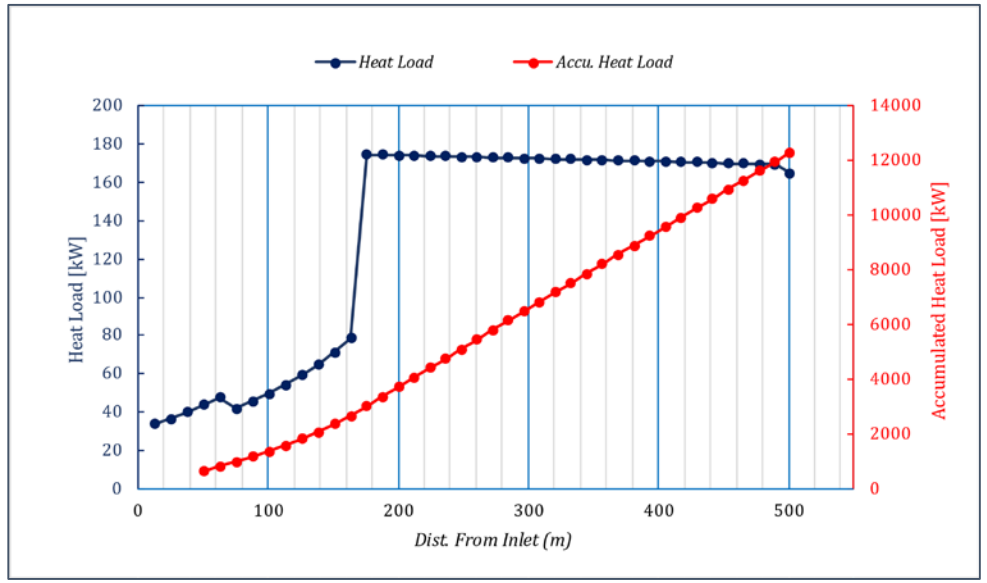


DEMO CASE #RCS-12T - DIAGRAMS

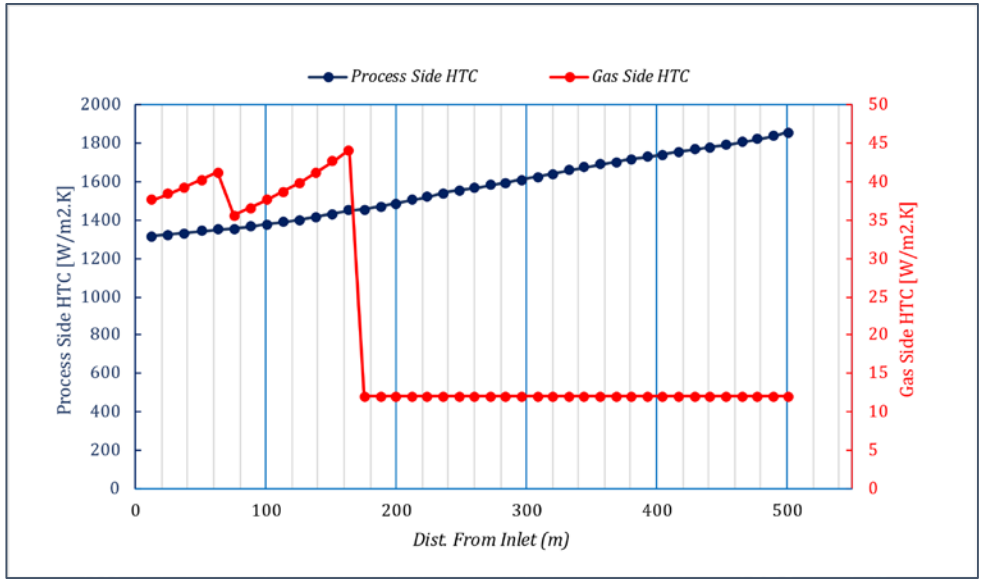
HEAT FLUXES



HEAT LOAD



HEAT TRANSFER COEF.



The End

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