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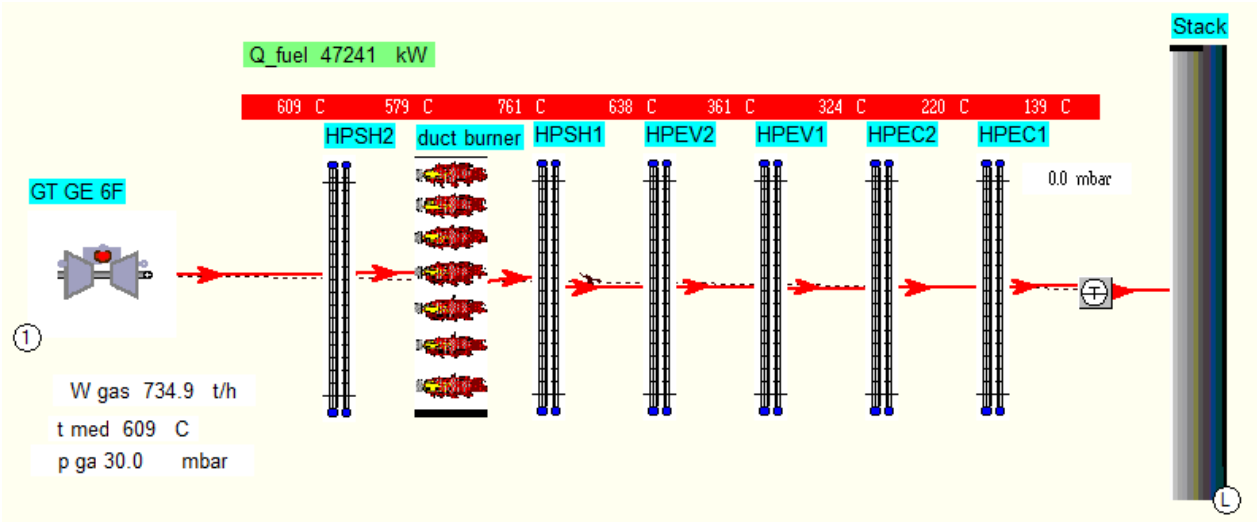
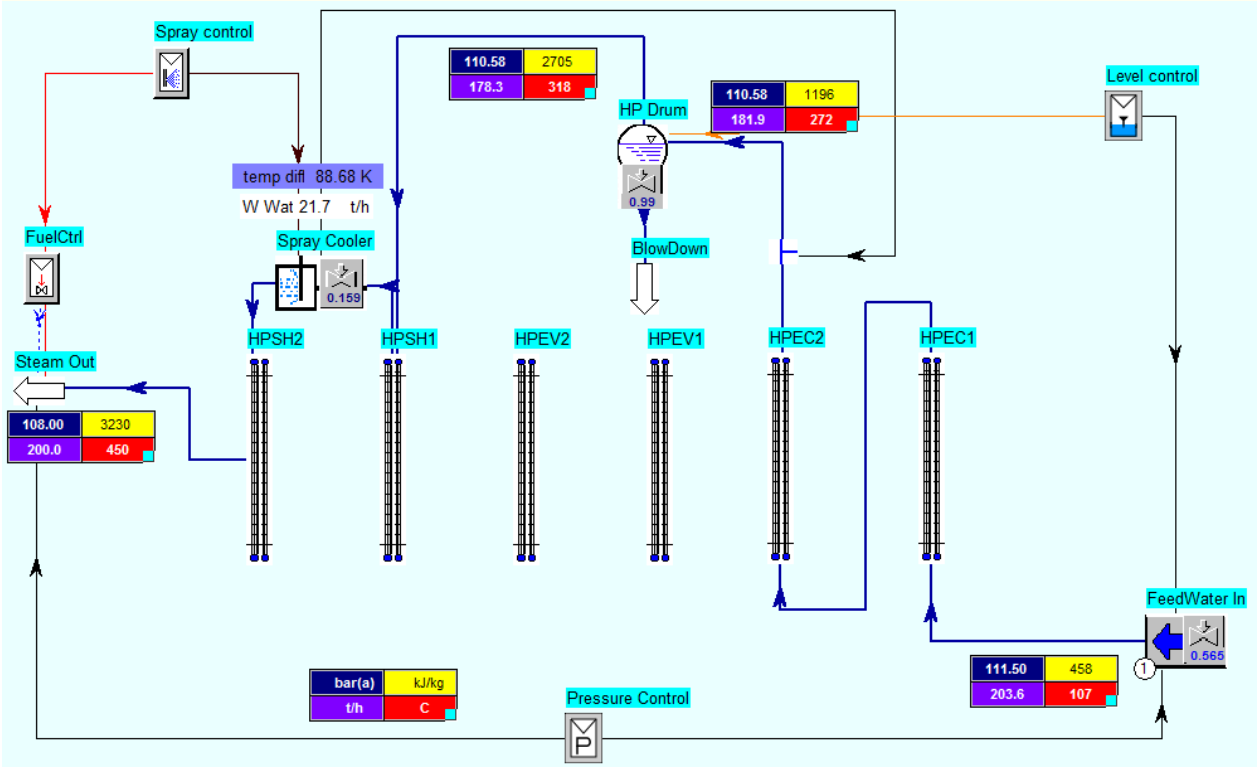
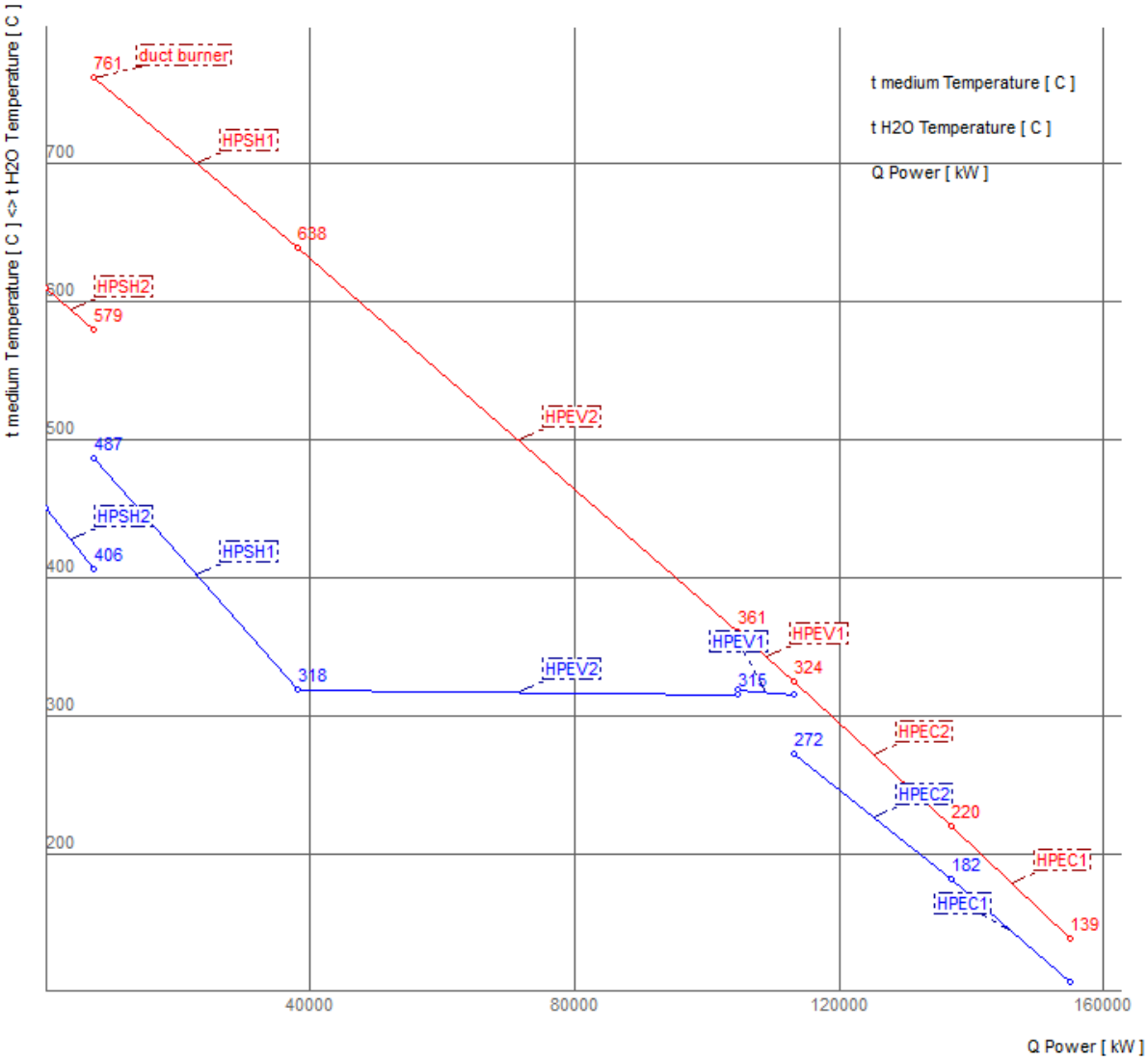
KED

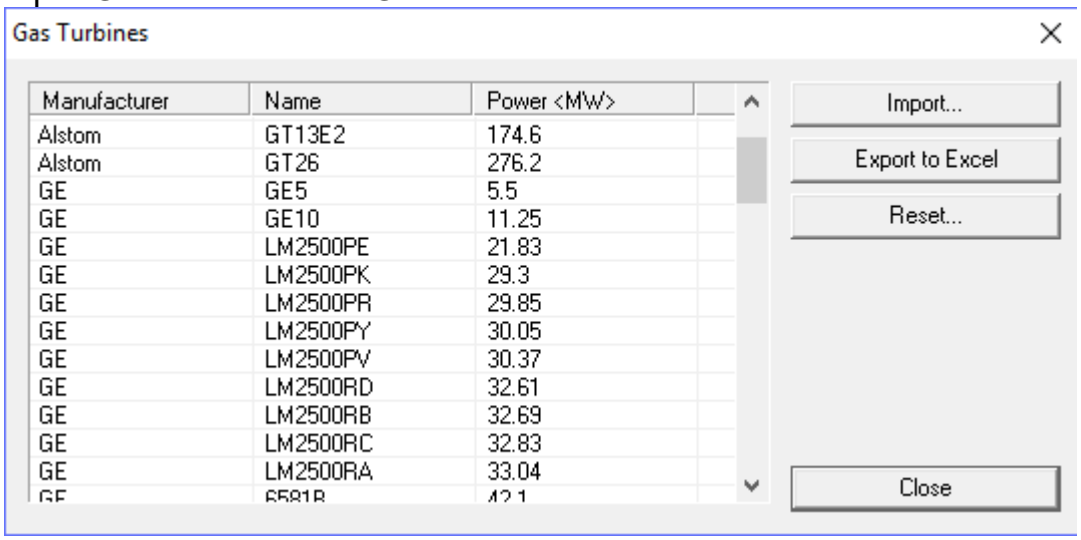
Power Plant Simulator & Designer
Input Output Simple HRSG







Input Gas Turbine from Gas Turbine Data Base



Type of gas turbine	GE 6111FA 78.29<MW>	-	Type of gas turbine
Ambient temp	20	C	Ambient temperature
Ngt_rel	100.00	%	relative Power of Gasturbine
el_eff	99.00	%	el. efficiency
dP_inGT	2.0	mbar	Pressure drop intake gas turbine
dPout	1.0	mbar	Pressure drop outside gas turbine
p_gas	0.0	mbar	Set point of gas pressure
SetLoadFunctionOfTime	100.00	%	Set Load as a Function Of Time (x=sec, y =rel load)

Heating Surfaces in Excel

Model		HPSH2	HPSH1	HPEV2	HPEV1	HPEC2	HPEC1	
swTubeArr	-	staggere	staggere	staggere	staggere	staggere	staggere	0 - bank of in-line tubes , 1 - bank of staggered tubes
swFlowType	-	cross cou	cross cou	cross cou	cross cou	cross cou	cross cou	0-cross parallel flow;1-cross counter flow;2-cross-flow;
ODtube	mm	50.8	50.8	50.8	50.8	50.8	50.8	Tube ouside diameter
thkTube	mm	3.2	3.2	3.2	3.2	3.2	3.2	Tube wall thickness
pitchTrans	mm	100	100	100	100	100	100	Transverse tube pitch
pitchLong	mm	102	102	102	102	102	102	Longintudinal tube pitch
widthDuct	mm	3660	3660	3660	3660	3660	3660	Width fluegas duct
heightDuct	mm	19200	19200	19200	19200	19200	19200	Height fluegas duct
NumTubesPerRow	-	36	36	36	36	36	36	Number of tubes per row width (transversal)
NumRows	-	1	2	8	8	10	10	Number of tubes in gas flow direction
NumRowsPar	-	1	1	8	8	1	1	Number of rows carrying flows on steam/water side
usage factor	-	1	1	0.95	0.95	1	1	Usage factor (surface area factor)
fouling outside	m² K/W	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	Thermal resistance of fouling outside tubes
fouling inside	m² K/W	0.00035	0.00035	0.00035	0.00035	0.00035	0.00035	Thermal resistance of fouling inside tubes
TypFin	-	Serrated	Serrated	Serrated	Serrated	Serrated	Serrated	fin type:0-spiral solid,1-circle solid,2-square,5-Serrated
MatFin	-	T409	CS	CS	CS	CS	CS	Fin material
Fins per length	1/m	200	236	236	236	236	236	Fins per length
heightFin	mm	19.05	19.05	19.05	19.05	19.05	19.05	Fin height
thkFin	mm	1.5	1.5	1.5	1.5	1.5	1.5	Fin thickness
w_s	mm	4	4	4	4	4	4	fin segment width
distSegmTube	mm	5.08	5.08	5.08	5.08	5.08	5.08	Distance fin segment from tube (5.08mm=HF;0mm=SF)

In US units:

Model		HPSH2	HPSH1	HPEV2	HPEV1	HPEC2	HPEC1	
swTubeArr	-	staggerec	staggerec	staggerec	staggerec	staggerec	staggerec	0 - bank of in-line tubes , 1 - bank of staggered tubes
swFlowType	-	cross cou	cross cou	cross cou	cross cou	cross cou	cross cou	0-cross parallel flow;1-cross counter flow;2-cross-flow
ODtube	in	2.0	2.0	2.0	2.0	2.0	2.0	Tube ouside diameter
thkTube	in	0.12598	0.12598	0.12598	0.12598	0.12598	0.12598	Tube wall thickness
pitchTrans	in	3.937	3.937	3.937	3.937	3.937	3.937	Transverse tube pitch
pitchLong	in	4.01574	4.01574	4.01574	4.01574	4.01574	4.01574	Longintudinal tube pitch
widthDuct	in	144.094	144.094	144.094	144.094	144.094	144.094	Width fluegas duct
heightDuct	in	755.904	755.904	755.904	755.904	755.904	755.904	Height fluegas duct
NumTubesPerRow	-	36	36	36	36	36	36	Number of tubes per row width (transversal)
NumRows	-	1	2	8	8	10	10	Number of tubes in gas flow direction
NumRowsPar	-	1	1	8	8	1	1	Number of rows carrying flows on steam/water side
usage factor	-	1	1	0.95	0.95	1	1	Usage factor (surface area factor)
fouling outside	hr·ft² F/Btu	0.01022	0.01022	0.01022	0.01022	0.01022	0.01022	Thermal resistance of fouling outside tubes
fouling inside	hr·ft² F/Btu	0.002	0.002	0.002	0.002	0.002	0.002	Thermal resistance of fouling inside tubes
MatTube	-	T22	T11	CS	CS	CS	CS	Tube wall material
TypFin	-	Serrated	Serrated	Serrated	Serrated	Serrated	Serrated	fin type:0-spiral solid,1-circle solid,2-square,5-Serrated
MatFin	-	T409	CS	CS	CS	CS	CS	Fin material
Fins per length	in	5.08	6.00001	6.00001	6.00001	6.00001	6.00001	Fins per length
heightFin	in	0.75	0.75	0.75	0.75	0.75	0.75	Fin height
thkFin	in	0.05906	0.05906	0.05906	0.05906	0.05906	0.05906	Fin thickness
w_s	in	0.15748	0.15748	0.15748	0.15748	0.15748	0.15748	fin segment width
distSegmTube	in	0.2	0.2	0.2	0.2	0.2	0.2	Distance fin segment from tube (5.08mm=HF;0mm=SF)

Performance data

Model		HPSH2	HPSH1	HPEV2	HPEV1	HPEC2	HPEC1	
usage factor	-	1	1	0.95	0.95	1	1	Usage factor (surface area factor)
fouling outside	m² K/W	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	Thermal resistance of fouling outside tubes
fouling inside	m² K/W	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	Thermal resistance of fouling inside tubes
h outside conv	W/m² K	49.6	57.4	62.3	56.9	56.1	53.8	outside covection heat transfer coefficient
h inside	W/m² K	2832.0	3515.7	45714.6	9535.4	7458.7	6344.3	Heat transfer coefficient (inside tubes)
lambdaMet	W/m K	42.5	41.6	47.5	48.9	52.4	55.4	Thermal conducitivity of metall
h GasRad	W/m² K	0	0	0	0	0	0	Gas side radiation heat transfer coefficient
TmetRn	C	509.4	592.6	408.1	331.0	288.9	193.8	Temperature metall at the root of fin (i.e. tube outside temp)
Tmet fin tip	C	537.5	647.8	478.9	339.2	298.0	199.9	Temperature metall fin tip
Q	kW	7371.0	30851.2	66493.9	8517.0	23735.7	17984.3	Heat power
Q_RH_fromHS	kW	0	0	0	0	0	0	Radiation heat from heating surfaces
Q_RH_toHS	kW	0	0	0	0	0	0	Radiation heat to heating surfaces
DQ_LS	kW	19.0	79.4	171.2	21.9	61.1	46.3	Heat loss to ambient
W gas	t/h	734.9	738.5	738.5	738.5	738.5	738.5	Medium mass flow (flue gas)
t gas inlet	C	609.4	761.4	638.3	360.9	324.1	219.5	Fuel/fluegas temperature inlet
h gas inlet	kJ/kg	678.1	869.4	718.6	393.6	352.0	236.0	Fuel/fluegas enthalpy inlet (without dust)
velocity inlet outside	m/s	20.8	24.5	21.7	15.2	14.4	12.0	velocity at the inlet outside pipes
p gas inlet	mbar	30.0	28.7	26.0	18.2	12.0	5.4	Fuel/fluegas pressure inlet
t gas outlet	C	578.8	638.3	360.9	324.1	219.5	138.6	Fuel/fluegas temperature outlet
h gas outlet	kJ/kg	641.9	718.6	393.6	352.0	236.0	148.1	Fuel/fluegas enthalpy outlet (without dust)
velosity outlet outside	m/s	20.1	21.7	15.2	14.4	12.0	10.0	velosity at the outlet outside pipes
p gas outlet	mbar	28.7	26.0	18.2	12.0	5.4	0.0	Fuel/fluegas pressure outlet
W H2O	t/h	200.0	178.3	1206.0	1206.0	203.6	203.6	Water/steam flow
t inlet H2O	C	406.1	318.5	315.4	315.4	181.7	107.2	Water/Steam temperature inlet
h inlet H2O	kJ/kg	3096.8	2705.2	1433.3	1433.3	775.8	457.8	Water/Steam enthalpy inlet
velocity in	m/s	23.7	13.9	1.1	1.1	1.1	1.0	Inlet velocity H2O
p H2O inlet	bar(a)	109.1	110.6	110.5	110.5	111.1	111.5	Water/Steam pressure inlet
t outlet H2O	C	450.0	486.6	318.3	318.4	272.4	181.7	Water/Steam temperature outlet
h outlet H2O set	kJ/kg	3229.5	3328.1	1631.8	1458.7	1195.6	775.8	Water/Steam enthalpy outlet set value
velocity out	m/s	26.7	25.4	2.6	1.2	1.3	1.1	outlet velocity H2O
p H2O outlet	bar(a)	108.0	109.1	110.4	110.4	110.6	111.1	Water/Steam pressure outlet