
	Cliente :	RECHIM				PROG.	FE1013			
	Utente :					Doc. :	FE1013-CAL-002			
	Progetto :	CALDAIA DI RECUPERO				Data :	16-07-2023			
	Località :					Rev. :	B			
	Unità :					Pag. :	1 of 1			
AIR / GAS MIX AT BOILER INLET										
COMBUSTIBILE :		RIFIUTI								
CARICO CALDAIA :		CASE NOP x 3								
SPORCAMENTO :		1000 ORE								
FLUE GAS @ BOILER INLET [A]					PRIMARY & SECONDARY AIR [B]					
WET DRY					WET DRY					
ANALYSIS	% vol	% weight	% vol	% weight	ANALYSIS	% vol	% weight	% vol	% weight	
CO2	5.1000	8.4576	6.9482	10.3215	CO2	0.0000	0.0000	0.0000	0.0000	
N2	61.3000	64.7134	83.5150	78.9745	N2	77.3139	75.0859	78.1650	75.6000	
Ar	0.7000	1.0537	0.9537	1.2859	Ar	1.0042	1.3905	1.0153	1.4000	
H2O	26.6000	18.0579	0.0000	0.0000	H2O	1.0890	0.6801	0.0000	0.0000	
O2	6.2000	7.4760	8.4469	9.1235	O2	20.5930	22.8436	20.8197	23.0000	
SO2	0.1000	0.2414	0.1362	0.2946	SO2	0.0000	0.0000	0.0000	0.0000	
FLOW	Nm3/hr		22,522		FLOW	Nm3/hr		21,719		
	kg/hr		26,666			kg/hr		27,953		
SPECIFIC WEIGHT	kg/Nm3		1.1840		SPECIFIC WEIGHT	kg/Nm3		1.2870		
TEMPERATURE	°C		794.00		TEMPERATURE	°C		15.00		
ENTHALPY	kcal/kg		238.9774		ENTHALPY	kcal/kg		3.568		
HEAT	kcal/hr		6,372,571		HEAT	kcal/hr		99,747		
FLUE GAS @ SUPERHEATER INLET [C]					RECIRCULATION GAS [D]					
WET DRY					WET DRY					
ANALYSIS	% vol	% weight	% vol	% weight	ANALYSIS	% vol	% weight	% vol	% weight	
CO2	5.1000	8.4576	6.9482	10.3215	CO2	4.8832	8.0682	6.5560	9.7510	
N2	61.3000	64.7134	83.5150	78.9745	N2	61.9808	65.1909	83.2130	78.7880	
Ar	0.7000	1.0537	0.9537	1.2859	Ar	0.7129	1.0692	0.9571	1.2922	
H2O	26.6000	18.0579	0.0000	0.0000	H2O	25.5155	17.2578	0.0000	0.0000	
O2	6.2000	7.4760	8.4469	9.1235	O2	6.8119	8.1835	9.1454	9.8904	
SO2	0.1000	0.2414	0.1362	0.2946	SO2	0.0957	0.2303	0.1285	0.2783	
FLOW	Nm3/hr		22,522		FLOW	Nm3/hr		7,006		
	kg/hr		26,666			kg/hr		8,326		
SPECIFIC WEIGHT	kg/m3		1.1840		SPECIFIC WEIGHT	kg/Nm3		1.1884		
TEMPERATURE	°C		493.80		TEMPERATURE	°C		226.00		
ENTHALPY	kcal/kg		143.242		ENTHALPY	kcal/kg		62.820		
HEAT	kcal/hr		3,819,687		HEAT	kcal/hr		523,038		
FLUE GAS MIX @ SUPERHEATER INLET AFTER FALSE AIR [F]					FALSE AIR @ SUPERHEATER INLET [E]					
WET DRY					WET DRY					
ANALYSIS	% vol	% weight	% vol	% weight	ANALYSIS	% vol	% weight	% vol	% weight	
CO2	4.9892	8.2583	6.7464	10.0282	CO2	0.0000	0.0000	0.0000	0.0000	
N2	61.6478	64.9578	83.3596	78.8786	N2	77.3139	75.0859	78.1650	75.6000	
Ar	0.7066	1.0616	0.9555	1.2892	Ar	1.0042	1.3905	1.0153	1.4000	
H2O	26.0459	17.6484	0.0000	0.0000	H2O	1.0890	0.6801	0.0000	0.0000	
O2	6.5126	7.8381	8.8063	9.5179	O2	20.5930	22.8436	20.8197	23.0000	
SO2	0.0978	0.2357	0.1323	0.2862	SO2	0.0000	0.0000	0.0000	0.0000	
FLOW	Nm3/hr		23,022		FLOW	Nm3/hr		500		
	kg/hr		27,310			kg/hr		644		
SPECIFIC WEIGHT	kg/m3		1.1862		SPECIFIC WEIGHT	kg/Nm3		1.2870		
TEMPERATURE	°C		484.54		TEMPERATURE	°C		15.00		
ENTHALPY	kcal/kg		139.951		ENTHALPY	kcal/kg		3.5684		
HEAT	kcal/hr		3,821,983		HEAT	kcal/hr		2,296		
FLUE GAS MIX @ EVA #4 INLET [H]					FALSE AIR @ EVA #4 INLET [G]					
WET DRY					WET DRY					
ANALYSIS	% vol	% weight	% vol	% weight	ANALYSIS	% vol	% weight	% vol	% weight	
CO2	4.9892	8.2583	6.7464	10.0282	CO2	0.0000	0.0000	0.0000	0.0000	
N2	61.6478	64.9578	83.3596	78.8786	N2	77.3139	75.0859	78.1650	75.6000	
Ar	0.7066	1.0616	0.9555	1.2892	Ar	1.0042	1.3905	1.0153	1.4000	
H2O	26.0459	17.6484	0.0000	0.0000	H2O	1.0890	0.6801	0.0000	0.0000	
O2	6.5126	7.8381	8.8063	9.5179	O2	20.5930	22.8436	20.8197	23.0000	
SO2	0.0978	0.2357	0.1323	0.2862	SO2	0.0000	0.0000	0.0000	0.0000	
FLOW	Nm3/hr		23,022		FLOW	Nm3/hr		500		
	kg/hr		27,310			kg/hr		644		
SPECIFIC WEIGHT	kg/m3		1.1884		SPECIFIC WEIGHT	kg/Nm3		1.2870		
TEMPERATURE	°C		313.50		TEMPERATURE	°C		15.00		
ENTHALPY	kcal/kg		88.766		ENTHALPY	kcal/kg		3.5684		
HEAT	kcal/hr		2,424,163		HEAT	kcal/hr		2,296		
FLUE GAS MIX @ EVA #4 INLET AFTER FALSE AIR [L]					ECO INLET					
WET DRY					WET DRY					
ANALYSIS	% vol	% weight	% vol	% weight	ANALYSIS	% vol	% weight	% vol	% weight	
CO2	4.8832	8.0682	6.5560	9.7510	CO2	4.8832	8.0682	6.5560	9.7510	
N2	61.9808	65.1909	83.2130	78.7880	N2	61.9808	65.1909	83.2130	78.7880	
Ar	0.7129	1.0692	0.9571	1.2922	Ar	0.7129	1.0692	0.9571	1.2922	
H2O	25.5155	17.2578	0.0000	0.0000	H2O	25.5155	17.2578	0.0000	0.0000	
O2	6.8119	8.1835	9.1454	9.8904	O2	6.8119	8.1835	9.1454	9.8904	
SO2	0.0957	0.2303	0.1285	0.2783	SO2	0.0957	0.2303	0.1285	0.2783	
FLOW	Nm3/hr		23,522		FLOW	Nm3/hr		20,676		
	kg/hr		27,953			kg/hr		24,571		
SPECIFIC WEIGHT	kg/m3		1.1884		SPECIFIC WEIGHT	kg/Nm3		1.1884		
TEMPERATURE	°C		308.75		TEMPERATURE	°C				
ENTHALPY	kcal/kg		86.805		ENTHALPY	kcal/kg				
HEAT	kcal/hr		2,426,459		HEAT	kcal/hr				

	Cliente : RECHIM		PROG.	FE1013	
	Utente :		Doc. :	FE1013-CAL-002	
	Progetto : CALDAIA DI RECUPERO		Data :	16-07-2023	
	Località :		Rev. :	B	
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AIR / GAS MIX AT BOILER INLET					
COMBUSTIBILE : CARICO CALDAIA SPORCAMENTO :		RIFIUTI CASE NOP x 3 1000 ORE			
FLUE GAS @ BOILER INLET			FLUE GAS @ BOILER INLET		
WET			FLOW		
DRY			kg/hr		
26,666					
ANALYSIS			ANALYSIS		
% vol			% vol		
% weight			% weight		
CO2			CO2		
5.1000			6.9482		
8.4576			10.3215		
N2			N2		
61.3000			83.5150		
64.7134			78.9745		
Ar			Ar		
0.7000			0.9537		
1.0537			1.2859		
H2O			H2O		
26.6000			0.0000		
18.0579			0.0000		
O2			O2		
6.2000			8.4469		
7.4760			9.1235		
SO2			SO2		
0.1000			0.1362		
0.2946			0.2946		
FLOW			Nm3/hr		
			22,522		
kg/hr			26,666		
SPECIFIC WEIGHT			kg/Nm3		
			1.1840		
FALSE AIR @ SUPERHEATER INLET			FALSE AIR FLOW @ SUPERHEATER INLET		
WET			FLOW		
DRY			kg/hr		
644					
ANALYSIS			ANALYSIS		
% vol			% vol		
% weight			% weight		
CO2			CO2		
0.0000			0.0000		
0.0000			0.0000		
N2			N2		
77.3139			78.1650		
75.0859			75.6000		
Ar			Ar		
1.0042			1.0153		
1.4000			1.4000		
H2O			H2O		
1.0890			0.0000		
0.0000			0.0000		
O2			O2		
20.5930			20.8197		
22.8436			23.0000		
SO2			SO2		
0.0000			0.0000		
0.0000			0.0000		
FLOW			Nm3/hr		
			21,719		
kg/hr			27,953		
SPECIFIC WEIGHT			kg/Nm3		
			1.2870		
FLUE GAS @ SUPERHEATER INLET BEFORE FALSE AIR			FLUE GAS FLOW @ SUPERHEATER INLET BEFORE FALSE AIR		
WET			FLOW		
DRY			kg/hr		
26,666					
ANALYSIS			ANALYSIS		
% vol			% vol		
% weight			% weight		
CO2			CO2		
5.1000			6.9482		
8.4576			10.3215		
N2			N2		
61.3000			83.5150		
64.7134			78.9745		
Ar			Ar		
0.7000			0.9537		
1.0537			1.2859		
H2O			H2O		
26.6000			0.0000		
18.0579			0.0000		
O2			O2		
6.2000			8.4469		
7.4760			9.1235		
SO2			SO2		
0.1000			0.1362		
0.2946			0.2946		
FLOW			Nm3/hr		
			22,522		
kg/hr			26,666		
SPECIFIC WEIGHT			kg/Nm3		
			1.2653		
FLUE GAS @ SUPERHEATER INLET AFTER FALSE AIR			FLUE GAS FLOW @ SUPERHEATER INLET AFTER FALSE AIR		
WET			FLOW		
DRY			kg/hr		
27,310					
ANALYSIS			ANALYSIS		
% vol			% vol		
% weight			% weight		
CO2			CO2		
4.9892			6.7464		
8.2583			10.0282		
N2			N2		
61.6478			83.3596		
64.9578			78.8786		
Ar			Ar		
0.7066			0.9555		
1.2892			1.2892		
H2O			H2O		
26.0459			0.0000		
0.0000			0.0000		
O2			O2		
6.5126			8.8063		
7.8381			9.5179		
SO2			SO2		
0.0978			0.1323		
0.2862			0.2862		
FLOW			Nm3/hr		
			23,022		
kg/hr			27,310		
SPECIFIC WEIGHT			kg/Nm3		
			1.1862		
FLUE GAS @ EVA #4 INLET AFTER FALSE AIR			FALSE AIR @ EVA #4 INLET		
WET			FLOW		
DRY			kg/hr		
644					
ANALYSIS			ANALYSIS		
% vol			% vol		
% weight			% weight		
CO2			CO2		
4.8832			6.5560		
9.7510			9.7510		
N2			N2		
61.9808			83.2130		
78.7880			78.7880		
Ar			Ar		
0.7129			0.9571		
1.2922			1.2922		
H2O			H2O		
25.5155			0.0000		
0.0000			0.0000		
O2			O2		
6.8119			9.1454		
9.8904			9.8904		
SO2			SO2		
0.0957			0.1285		
0.2783			0.2783		
FLOW			Nm3/hr		
			23,522		
kg/hr			27,953		
SPECIFIC WEIGHT			kg/Nm3		
			1.1884		
REFERENCE AIR			FLUE GAS FLOW @ EVA #4 INLET AFTER FALSE AIR		
WET			FLOW		
DRY			kg/hr		
27,953					
ANALYSIS			ANALYSIS		
% vol			% vol		
% weight			% weight		
CO2			CO2		
0.0000			0.0000		
0.0000			0.0000		
N2			N2		
77.3139			78.1650		
75.0859			75.6000		
Ar			Ar		
1.0042			1.0153		
1.4000			1.4000		
H2O			H2O		
1.0890			0.0000		
0.0000			0.0000		
O2			O2		
20.5930			20.8197		
23.0000			23.0000		
SO2			SO2		
0.0000			0.0000		
0.0000			0.0000		
TEMPERATURE			°C		
R.H.			%		
SPECIFIC WEIGHT			kg/Nm3		
SITE ELEVATION			m		
FLOW			Nm3/hr		
			21,719		
kg/hr			27,953		



Cliente : RECHIM
Utente :
Progetto : CALDAIA DI RECUPERO
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AIR / GAS MIX AT BOILER INLET

CODE 1 FLUE GAS ENTHALPY @ BOILER INLET

Temp. °C	Enth. kcal/kg
0	0.0000
100	27.3590
200	55.6444
300	84.7379
400	114.5776
500	145.1365
600	176.3917
700	208.3282
800	240.9337
900	274.1928
1,000	308.0985
1,100	342.6378
1,200	377.8011
1,300	413.5801
1,400	449.9620
1,500	486.9420
1,600	524.5066
1,700	562.6512
1,800	601.3632
1,900	640.6325
2,000	680.4533
2,100	720.8160
2,200	761.7100

TEMP °C 702.9000
ENT 198.7865

CODE 2 AIR ENTHALPY

Temp. °C	Enth. kcal/kg
0	0.0000
100	23.7893
200	48.2530
300	73.2851
400	98.8310
500	124.8709
600	151.3862
700	178.3689
800	205.8137
900	233.7103
1,000	262.0568
1,100	290.8466
1,200	320.0762
1,300	349.7422
1,400	379.8381
1,500	410.3646
1,600	441.3138
1,700	472.6870
1,800	504.4779
1,900	536.6813
2,000	569.2970
2,100	602.3224
2,200	635.7512

TEMP °C 15.0000
ENT 3.5684

CODE 3 FLUE GAS RECIRCULATION

Temp. °C	Enth. kcal/kg
0	0.0000
100	27.1947
200	55.3041
300	84.2106
400	113.8526
500	144.2034
600	175.2404
700	206.9489
800	239.3168
900	272.3289
1,000	305.9786
1,100	340.2532
1,200	375.1433
1,300	410.6409
1,400	446.7334
1,500	483.4162
1,600	520.6763
1,700	558.5091
1,800	596.9024
1,900	635.8464
2,000	675.3355
2,100	715.3604
2,200	755.9106

TEMP °C 482.6000
ENT 132.4147

CODE 4 FLUE GAS MIX @ EVA #1 INLET

Temp. °C	Enth. kcal/kg
0	0.0000
100	27.2749
200	55.4703
300	84.4681
400	114.2065
500	144.6590
600	175.8025
700	207.6223
800	240.1062
900	273.2389
1,000	307.0136
1,100	341.4174
1,200	376.4409
1,300	412.0758
1,400	448.3097
1,500	485.1375
1,600	522.5463
1,700	560.5313
1,800	599.0802
1,900	638.1831
2,000	677.8341
2,100	718.0239
2,200	758.7420

TEMP °C 321.0000
ENT 85.9424

CODE 5 FLUE GAS MIX @ EVA #4 INLET

Temp. °C	Enth. kcal/kg
0	0.0000
100	27.1947
200	55.3041
300	84.2106
400	113.8526
500	144.2034
600	175.2404
700	206.9489
800	239.3168
900	272.3289
1,000	305.9786
1,100	340.2532
1,200	375.1433
1,300	410.6409
1,400	446.7334
1,500	483.4162
1,600	520.6763
1,700	558.5091
1,800	596.9024
1,900	635.8464
2,000	675.3355
2,100	715.3604
2,200	755.9106

TEMP °C 321.0000
ENT 85.9424

CODE 6 FLUE GAS MIX @ ECO OUTLET

Temp. °C	Enth. kcal/kg
0	0.0000
100	25.1940
200	51.2818
300	78.1551
400	105.7476
500	134.0230
600	162.9457
700	192.4890
800	222.6261
900	253.3286
1,000	284.5751
1,100	316.3390
1,200	348.5960
1,300	381.3242
1,400	414.4959
1,500	448.0924
1,600	482.0857
1,700	516.4567
1,800	551.1794
1,900	586.2279
2,000	621.5832
2,100	657.2212
2,200	693.1164

TEMP °C 321.0000
ENT 85.9424



Cliente : RECHIM
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FOULING FACTORS

COMBUSTIBILE : RIFIUTI
CARICO CALDAIA : CASE NOP x 3
SPORCAMENTO : 1000 ORE

HIGH - HIGH SLAG

TEMPERATURA °C	FOULING m ² C/w	FOULING m ² h°C/kcal	COEFFICIENTE SPORCAMENTO	FOULING m ² C/w	FOULING m ² h°C/kcal
0	0.010836	0.012600	0.28	0.003034	0.003528
100	0.010836	0.012600	0.28	0.003034	0.003528
200	0.010836	0.012600	0.28	0.003034	0.003528
300	0.010836	0.012600	0.28	0.003034	0.003528
400	0.010836	0.012600	0.28	0.003034	0.003528
500	0.014620	0.017000	0.28	0.004094	0.004760
600	0.017630	0.020500	0.28	0.004936	0.005740
700	0.021242	0.024700	0.28	0.005948	0.006916
800	0.024596	0.028600	0.28	0.006887	0.008008
900	0.028036	0.032600	0.28	0.007850	0.009128
1,000	0.030960	0.036000	0.28	0.008669	0.010080
1,100	0.035088	0.040800	0.28	0.009825	0.011424
1,200	0.038958	0.045300	0.28	0.010908	0.012684
1,300	0.042914	0.049900	0.28	0.012016	0.013972
1,400	0.046870	0.054500	0.28	0.013124	0.015260
1,500	0.050826	0.059100	0.28	0.014231	0.016548
1,600	0.054782	0.063700	0.28	0.015339	0.017836
1,700	0.058738	0.068300	0.28	0.016447	0.019124
1,800	0.062694	0.072900	0.28	0.017554	0.020412
1,900	0.066650	0.077500	0.28	0.018662	0.021700
2,000	0.070606	0.082100	0.28	0.019770	0.022988
2,100	0.074562	0.086700	0.28	0.020877	0.024276
2,200	0.078518	0.091300	0.28	0.021985	0.025564

TEMPERATURA
IN (°C)

308


OUT


250

AVERAGE (°C)
279

FOULING
m²C/w
0.003034

FOULING
m²h°C/kcal
0.003528


	Cliente : RECHIM	PROG. FE1013
	Utente :	Doc. : FE1013-CAL-002
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HEAT BALANCE		
COMBUSTIBILE : RIFIUTI CARICO CALDAIA CASE NOP x 3 SPORCAMENTO : 1000 ORE		
BILANCIO TERMICO GLOBALE		
PORTATA RIFIUTO	kg/hr	0
POTERE CALORIFICO	kcal/kg	0
CALORE TEORICO SULLA GRIGLIA	kcal/hr	0
PERDITA PER INCOMBUSTI (0%)	kcal/hr	0
CALORE NETTO SVILUPPATO SULLA GRIGLIA	kcal/hr	0
VAPORE SATURO ESTRATTO DAL CORPO	kg/hr	0
ENTALPIA VAPORE SATURO	kcal/kg	0.000
CALORE AL VAPORE SATURO	kcal/hr	0
CALORE INGRESSO FUMI	kcal/hr	6,372,571
CALORE SCAMBIATO RADIANTE 1	kcal/hr	1,804,828
CALORE SCAMBIATO RADIANTE 2	kcal/hr	666,822
CALORE SCAMBIATO RADIANTE 3	kcal/hr	96,202
CALORE SCAMBIATO RADIANTE 4	kcal/hr	
CALORE SCAMBIATO EVA 1	kcal/hr	326,539
CALORE SCAMBIATO SURRISCALDATORE	kcal/hr	253,763
CALORE SCAMBIATO EVA2 + EVA 3 + EVA 4	kcal/hr	1,246,451
CALORE SCAMBIATO ECONOMIZZATORE	kcal/hr	445,469
CALORE USCITA ECONOMIZZATORE	kcal/hr	
PERDITA PER IRRAGGIAMENTO (2%)	kcal/hr	96,801
CALORE TOTALE ASSORBITO	kcal/hr	4,743,273
CALORE AL VAPORE SURRISCALDATO	kcal/hr	4,743,273
TEMPERATURA VAPORE SURRISCALDATO	°C	250.9
TEMP. ACQUA ALIMENTO INGRESSO CALDAIA	°C	168.5
ENTALPIA VAPORE SURRISCALDATO	kcal/kg	693.450
ENTALPIA ACQUA ALIMENTO	kcal/kg	170.500
PRODUZIONE DI VAPORE	=	4,743,273 / (693.450 - 170.500) = 9,070 kg/hr
RENDIMENTO TERMICO LORDO	(4,743,273 / 6,372,571) x 100 = 74.43 %

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Calter 4.2									
CAVITY / RADIANT PASS									
PATH :		C:\Imp\FE\Calter_4.2\W7\General\Calter_42_General.xlsm						ENTH. (kcal/kg)	
FUEL :		LOAD :		CASE NOP x 3 [1000 ore]					
FLUE GAS ENTHALPY		EXCESS AIR		0.00 %		NOTES			
FLUE GAS ANALYSIS		% vol wet		% wt wet		% vol dry		% wt dry	
Carbon Dioxide - CO2		5.100000		8.484338		6.948229		10.361280	
Nitrogen - N2		62.000000		65.659000		84.468660		80.184330	
Argon - Ar		0.000000		0.000000		0.000000		0.000000	
Water Vapor - H2O		26.600000		18.114920		0.000000		0.000000	
Oxygen - O2		6.200000		7.499600		8.446866		9.158689	
Carbon Monoxide - CO		0.000000		0.000000		0.000000		0.000000	
Sulphur Dioxide/Tioxide - SO2/SO3		0.100000		0.242149		0.136240		0.295719	
Chlorine Acid - HCl		0.000000		0.000000		0.000000		0.000000	
Flue Gas Specific Weight (kg/Nm3)		1.180278		1.180278		1.316719		1.316719	


CAV-1		[C:\ProBasic\CAV\Cav_1\BASFILE							
FLUE GAS FLOW		kg/hr		26.666		WALL #4 - DATA			
FLUE GAS SPECIFIC WEIGHT		kg/Nm3		1.1840		- FLUID TEMPERATURE		°C	
FLUE GAS INLET TEMP.		°C		794.00		- PROJECTED SURFACE		m2	
BOILER PRESSURE		kg/cm2a		23.435		- TUBES OUTSIDE DIAMETER		mm	
BOILER PRESSURE		kg/cm2a		22.000		- TUBES THICKNESS		mm	
WALL #1 (SATURATION) - DATA						- TUBES MATERIAL : [0] [1] [2]			
- PROJECTED SURFACE		m2		145.920		CAVITY WIDTH		mm	
- TUBES OUTSIDE DIAMETER		mm		60.30		CAVITY DEPTH		mm	
- TUBES THICKNESS		mm		5.00		CAVITY HEIGHT (GAS DIRECTION)		mm	
- TUBES PITCH		mm		80.00		MEAN BEAM LENGTH		mm	
- TUBES MATERIAL : [0] [1] [2]				0		FUEL : [0] [1] [2]			
WALL #2 - DATA						CO2 + SO2 PARTIAL PRESSURE		atm	
- FLUID TEMPERATURE		°C		0.00		H2O PARTIAL PRESSURE		atm	
- PROJECTED SURFACE		m2		0.000		RADIATION LOSS		% HHV	
- TUBES OUTSIDE DIAMETER		mm		0.00		DEPOSIT THICKNESS		mm	
- TUBES THICKNESS		mm		0.00		DEPOSIT CONDUCTIVITY		kcal/h.m°C	
- TUBES MATERIAL : [0] [1] [2]				1		GAS SIDE FOULING		m2.h°C/kcal	
WALL #3 - DATA						WATER/STEAM SIDE FOULING		m2.h°C/kcal	
- FLUID TEMPERATURE		°C		0.00		INLET WATER TEMPERATURE		°C	
- PROJECTED SURFACE		m2		0.000		EFFECTIVENESS			
- TUBES OUTSIDE DIAMETER		mm		0.00					
- TUBES THICKNESS		mm		0.00					
- TUBES MATERIAL : [0] [1] [2]				1					


WALL #1 (SATURATION) - DATA									
- TUBES SKIN TEMPERATURE		°C		305.82		FLUE GAS INLET HEAT		kcal/hr	
- TUBES METAL TEMPERATURE		°C		225.93		FLUE GAS OUTLET HEAT		kcal/hr	
- RADIATION FROM CO2 + SO2		kcal/m2hr		3,215		HEAT RELEASED IN CAVITY		kcal/hr	
- RADIATION FROM H2O		kcal/m2hr		11,852		HEAT ABSORBED IN CAVITY		kcal/hr	
- TOTAL RADIATION		kcal/hr		1,681,937		FLUE GAS INLET TEMPERATURE		°C	
- CONVECT. HEAT TRANSFER COEFFICIENT		kcal/m2hr		4.4858		FLUE GAS AVERAGE TEMPERATURE		°C	
- HEAT FROM CONVECTION		kcal/hr		314,097		FLUE GAS OUTLET TEMPERATURE		°C	
- OVERALL HEAT TRANSFER COEFFICIENT		kcal/m2hr		23.4460		MEAN GAS SPECIFIC HEAT		kcal/kg°C	
- TOTAL HEAT TO WALL #1		kcal/hr		1,641,705		AVERAGE GAS VELOCITY IN CAVITY		m/s	
WALL #2 - DATA						RESIDENCE TIME		sec	
- TUBES SKIN TEMPERATURE		°C		0.00		STEAM PRODUCED		kg/hr	
- TUBES METAL TEMPERATURE		°C		0.00					
- RADIATION FROM CO2 + SO2		kcal/m2hr		0					
- RADIATION FROM H2O		kcal/m2hr		0					
- TOTAL RADIATION		kcal/hr		0					
- CONVECT. HEAT TRANSFER COEFFICIENT		kcal/m2h°C		0.0000					
- HEAT FROM CONVECTION		kcal/hr		0					
- OVERALL HEAT TRANSFER COEFFICIENT		kcal/m2hr		0.0000					
- TOTAL HEAT TO WALL #2		kcal/hr		0					
WALL #3 - DATA									
- TUBES SKIN TEMPERATURE		°C		0.00					
- TUBES METAL TEMPERATURE		°C		0.00					
- RADIATION FROM CO2 + SO2		kcal/m2hr		0					
- RADIATION FROM H2O		kcal/m2hr		0					
- TOTAL RADIATION		kcal/hr		0					
- CONVECT. HEAT TRANSFER COEFFICIENT		kcal/m2hr		0.0000					
- HEAT FROM CONVECTION		kcal/hr		0					
- OVERALL HEAT TRANSFER COEFFICIENT		kcal/m2hr		0.0000					
- TOTAL HEAT TO WALL #3		kcal/hr		0					
WALL #4 - DATA									
- TUBES SKIN TEMPERATURE		°C		0.00					
- TUBES METAL TEMPERATURE		°C		0.00					
- RADIATION FROM CO2 + SO2		kcal/m2hr		0					
- RADIATION FROM H2O		kcal/m2hr		0					
- TOTAL RADIATION		kcal/hr		0					
- CONVECT. HEAT TRANSFER COEFFICIENT		kcal/m2hr		0.0000					
- HEAT FROM CONVECTION		kcal/hr		0					
- OVERALL HEAT TRANSFER COEFFICIENT		kcal/m2hr		0.0000					
- TOTAL HEAT TO WALL #4		kcal/hr		0					

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Calter 4.2									
EVAPORATOR - CROSS FLOW									
PATH :		C:\Imp\FE\Calter_4.2\W7\General\Calter_42_General.xlsm						ENTH. (kcal/kg)	
FUEL :		RIFIUTI		LOAD :		CASE NOP x 3 1000 ore			
FLUE GAS ENTHALPY		EXCESS AIR		0.00 %					
FLUE GAS ANALYSIS		% vol wet		% wt wet		% vol dry		% wt dry	
Carbon Dioxide - CO2		5.100000		8.484338		6.948229		10.361280	
Nitrogen - N2		62.000000		65.659000		84.468660		80.184330	
Argon - Ar		0.000000		0.000000		0.000000		0.000000	
Water Vapor - H2O		26.600000		18.114920		0.000000		0.000000	
Oxygen - O2		6.200000		7.499600		8.446866		9.158689	
Carbon Monoxide - CO		0.000000		0.000000		0.000000		0.000000	
Sulphur Dioxide/Tioxide - SO2/SO3		0.100000		0.242149		0.136240		0.295719	
Chlorine Acid - HCl		0.000000		0.000000		0.000000		0.000000	
Flue Gas Specific Weight (kg/Nm3)		1.180278		1.180278		1.316719		1.316719	
EVA-1		C:\ProBasic\EVA\Eva_1\BASFILE							
FLUE GAS FLOW		kg/hr		26,666		TUBES PER ROW		10.00	
FLUE GAS SPECIFIC WEIGHT		kg/Nm3		1.1840		ROWS DEEP		3.00	
FLUE GAS INLET TEMPERATURE		°C		604.70		EXCHANGE WIDTH		mm	
EXCESS AIR		%		0.00		EXCHANGE HEIGHT		mm	
CO2 + SO2 PARTIAL PRESSURE		atm		0.05100		TUBES FINNED LENGTH		mm	
H2O PARTIAL PRESSURE		atm		0.26600		DEPOSIT THICKNESS		mm	
RADIATION LOSS		% HHV		2.0000		DEPOSIT CONDUCTIVITY		kcal/h.m°C	
STEAM PRESSURE		kg/cm2a		23.400		EFFECTIVENESS		1.0000	
INLET WATER TEMP. [0=SATUR.]		°C		0.00		LATERAL WALLS SURFACE		m2	
FUEL CODE [0] [1] [2]				1					
GAS SIDE FOULING		m2.h°C/kcal		0.005700					
WATER/STEAM SIDE FOULING		m2.h°C/kcal		0.000200					
[0] - BARE TUBES / [1] - FINNED TUBES				0					
[0] - IN LINE / [1] - STAGGERED				0					
FINS PER METER				0					
FINS HEIGHT		mm		0.00					
FINS THICKNESS		mm		0.00					
FINS MATERIAL : [1] [2] [3]				1					
TUBES OUTSIDE DIAMETER		mm		60.30					
TUBES THICKNESS		mm		5.00					
TUBES MATERIAL : [1] [2] [3]				1					
TRANSVERSE PITCH		mm		240.0					
LONGITUDINAL PITCH		mm		200.0					
TUBES AVERAGE METAL TEMP.		°C		164.16		TUBES THERMAL CONDUCTIVITY		kcal/h.m°C	
TUBES SKIN TEMP.		°C		0.00		FINS THERMAL CONDUCTIVITY		kcal/h.m°C	
MAX. DEPOSIT TEMP.		°C		228.83		AVERAGE TUBES/FINS DIAMETER		mm	
MAX. FINS TEMPERATURE		°C		0.00		INTERTUBE RADIATION FROM CO2 + SO2		kcal/m2hr	
FLUE GAS NET FREE AREA		m2		4.8925		INTERTUBE RADIATION FROM H2O		kcal/m2hr	
SURFACE x METER - TUBES		m2/m		0.1894		TOTAL INTERTUBE RADIATION		kcal/m2hr	
SURFACE x METER - FINS		m2/m		0.0000		MEAN BEAM LENGTH		mm	
SURFACE x METER - TOTAL		m2/m		0.1894		LOGARITMIC MEAN TEMP. DIFFERENCE		°C	
BARE TUBES SURFACE		m2		14.2		SATURATION TEMPERATURE		°C	
FINS SURFACE		m2		0.0		INLET FLUE GAS TEMPERATURE		°C	
TOTAL SURFACE		m2		14.2		AVERAGE FLUE GAS TEMPERATURE		°C	
FLUE GAS MASS VELOCITY		kg/m2hr		5,450.38		OUTLET FLUE GAS TEMPERATURE		°C	
FLUE GAS NORMAL VELOCITY (w0)		m/s		1.279		INLET FLUE GAS VELOCITY		m/s	
TEMPERATURE FACTOR				0.00000		AVERAGE FLUE GAS VELOCITY		m/s	
TUBES ARRANGEMENT FACTOR				1.04209		OUTLET FLUE GAS VELOCITY		m/s	
FLUE GAS SPEC. HEAT @ AVERAGE TEMP.		kcal/kg°C		0.3158		FLUE GAS PRESSURE LOSS		mmH2O	
FLUE GAS SPEC. HEAT @ FILM TEMP.		kcal/kg°C		0.3044		INLET FLUE GAS HEAT		kcal/hr	
FLUE GAS AVERAGE CONDUCTIVITY		kcal/h.m°C		0.03547		HEAT RELEASED BY GAS		kcal/hr	
FLUE GAS AVERAGE VISCOSITY		kg/mhr		0.00000		HEAT ABSORBED BY STEAM		kcal/hr	
REYNOLDS NUMBER				0.0		OUTLET FLUE GAS HEAT		kcal/hr	
PRANDTL NUMBER				0.00000		STEAM PRODUCED		kg/hr	
NUSELT COEFFICIENT				0.000		INTERTUBE RADIATION HEAT TRANSF. COEFF.		kcal/m2hr°C	
K1 COEFFICIENT				0.000		CONVECTION HEAT TRANSFER COEFF.		kcal/m2hr°C	
X COEFFICIENT				0.00000		INTERNAL HEAT TRANSFER COEFF.		kcal/m2hr°C	
FINS EFFICIENCY				0.00000		OVERALL HEAT TRANSFER COEFF.		kcal/m2hr°C	
						AVERAGE HEAT FLUX		kcal/m2hr	
						INLET SIDE HEAT FLUX		kcal/m2hr	
						OUTLET SIDE HEAT FLUX		kcal/m2hr	

* (18 x 63.5) + (2 x 76.1)


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Calter 4.2			
CAVITY / RADIANT PASS			
PATH : C:\Imp\FE\Calter_4.2\W7\General\Calter_42_General.xlsm			ENTH. (kcal/kg)
FUEL : RIFIUTI			0 0.000
LOAD : CASE NOP x 3 1000 ore			100 27.494
FLUE GAS ENTHALPY EXCESS AIR 0.00 %			200 56.003
FLUE GAS ANALYSIS			300 85.162
Carbon Dioxide - CO2			400 115.152
Nitrogen - N2			500 145.863
Argon - Ar			600 177.278
Water Vapor - H2O			700 209.367
Oxygen - O2			800 242.144
Carbon Monoxide - CO			900 275.560
Sulphur Dioxide/Tioxide - SO2/SO3			1000 309.640
Chlorine Acid - HCl			1100 344.348
Flue Gas Specific Weight (kg/Nm3)			1200 379.686
1.180278 1.180278 1.316719 1.316719			1300 415.643
CAV-1 C:\ProBasic\CAV\Cav_2\BASFILE			1400 452.201
FLUE GAS FLOW kg/hr 26.666			1500 489.372
FLUE GAS SPECIFIC WEIGHT kg/Nm3 1.1840			1600 527.372
FLUE GAS INLET TEMP. °C 585.30			1700 565.457
BOILER PRESSURE kg/cm2a 23.435			1800 604.355
BOILER PRESSURE kg/cm2a 22.000			1900 643.824
WALL #1 (SATURATION) - DATA			2000 683.842
- PROJECTED SURFACE m2 110.650			2100 724.408
- TUBES OUTSIDE DIAMETER mm 60.30			2200 765.509
- TUBES THICKNESS mm 5.00			
- TUBES PITCH mm 80.00			
- TUBES MATERIAL : [0] [1] [2] 0			
WALL #2 - DATA			
- FLUID TEMPERATURE °C 0.00			
- PROJECTED SURFACE m2 0.000			
- TUBES OUTSIDE DIAMETER mm 0.00			
- TUBES THICKNESS mm 0.00			
- TUBES MATERIAL : [0] [1] [2] 1			
WALL #3 - DATA			
- FLUID TEMPERATURE °C 0.00			
- PROJECTED SURFACE m2 0.000			
- TUBES OUTSIDE DIAMETER mm 0.00			
- TUBES THICKNESS mm 0.00			
- TUBES MATERIAL : [0] [1] [2] 1			
WALL #1 (SATURATION) - DATA			
- TUBES SKIN TEMPERATURE °C 256.17			
- TUBES METAL TEMPERATURE °C 222.95			
- RADIATION FROM CO2 + SO2 kcal/m2hr 1.496			
- RADIATION FROM H2O kcal/m2hr 5.151			
- TOTAL RADIATION kcal/hr 562.607			
- CONVECT. HEAT TRANSFER COEFFICIENT kcal/m2hr 5.1804			
- HEAT FROM CONVECTION kcal/hr 186.923			
- OVERALL HEAT TRANSFER COEFFICIENT kcal/m2hr 18.4803			
- TOTAL HEAT TO WALL #1 kcal/hr 666.822			
WALL #2 - DATA			
- TUBES SKIN TEMPERATURE °C 0.00			
- TUBES METAL TEMPERATURE °C 0.00			
- RADIATION FROM CO2 + SO2 kcal/m2hr 0			
- RADIATION FROM H2O kcal/m2hr 0			
- TOTAL RADIATION kcal/hr 0			
- CONVECT. HEAT TRANSFER COEFFICIENT kcal/m2h°C 0.0000			
- HEAT FROM CONVECTION kcal/hr 0			
- OVERALL HEAT TRANSFER COEFFICIENT kcal/m2hr 0.0000			
- TOTAL HEAT TO WALL #2 kcal/hr 0			
WALL #3 - DATA			
- TUBES SKIN TEMPERATURE °C 0.00			
- TUBES METAL TEMPERATURE °C 0.00			
- RADIATION FROM CO2 + SO2 kcal/m2hr 0			
- RADIATION FROM H2O kcal/m2hr 0			
- TOTAL RADIATION kcal/hr 0			
- CONVECT. HEAT TRANSFER COEFFICIENT kcal/m2hr 0.0000			
- HEAT FROM CONVECTION kcal/hr 0			
- OVERALL HEAT TRANSFER COEFFICIENT kcal/m2hr 0.0000			
- TOTAL HEAT TO WALL #3 kcal/hr 0			
WALL #4 - DATA			
- TUBES SKIN TEMPERATURE °C 0.00			
- TUBES METAL TEMPERATURE °C 0.00			
- RADIATION FROM CO2 + SO2 kcal/m2hr 0			
- RADIATION FROM H2O kcal/m2hr 0			
- TOTAL RADIATION kcal/hr 0			
- CONVECT. HEAT TRANSFER COEFFICIENT kcal/m2hr 0.0000			
- HEAT FROM CONVECTION kcal/hr 0			
- OVERALL HEAT TRANSFER COEFFICIENT kcal/m2hr 0.0000			
- TOTAL HEAT TO WALL #4 kcal/hr 0			
WALL #4 - DATA			
- FLUID TEMPERATURE °C 0.00			
- PROJECTED SURFACE m2 0.000			
- TUBES OUTSIDE DIAMETER mm 0.00			
- TUBES THICKNESS mm 0.00			
- TUBES MATERIAL : [0] [1] [2] 0			
CO2 + SO2 PARTIAL PRESSURE atm 0.05100			
H2O PARTIAL PRESSURE atm 0.26600			
RADIATION LOSS % HHV 2.0000			
DEPOSIT THICKNESS mm 0.00000			
DEPOSIT CONDUCTIVITY kcal/h.m°C 0.00000			
GAS SIDE FOULING m2.h°C/kcal 0.005200			
WATER/STEAM SIDE FOULING m2.h°C/kcal 0.000200			
INLET WATER TEMPERATURE °C 0.00			
EFFECTIVENESS 0.00000			
FLUE GAS INLET HEAT kcal/hr 4,604,151			
FLUE GAS OUTLET HEAT kcal/hr 3,937,329			
HEAT RELEASED IN CAVITY kcal/hr 666,822			
HEAT ABSORBED IN CAVITY kcal/hr 653,485			
FLUE GAS INLET TEMPERATURE °C 585.30			
FLUE GAS AVERAGE TEMPERATURE °C 545.61			
FLUE GAS OUTLET TEMPERATURE °C 505.91			
MEAN GAS SPECIFIC HEAT kcal/kg°C 0.3142			
AVERAGE GAS VELOCITY IN CAVITY m/s 4.58			
RESIDENCE TIME sec 2.9040			
STEAM PRODUCED kg/hr 1,472			

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Calter 4.2									
CAVITY / RADIANT PASS									
PATH :		C:\Imp\FE\Calter_4.2\W7\General\Calter_42_General.xlsm						ENTH. (kcal/kg)	
FUEL :		LOAD :		CASE NOP x 3 [1000 ore]					
FLUE GAS ENTHALPY		EXCESS AIR		0.00 %		NOTES			
FLUE GAS ANALYSIS		% vol wet		% wt wet		% vol dry		% wt dry	
Carbon Dioxide - CO2		5.100000		8.484338		6.948229		10.361280	
Nitrogen - N2		62.000000		65.659000		84.468660		80.184330	
Argon - Ar		0.000000		0.000000		0.000000		0.000000	
Water Vapor - H2O		26.600000		18.114920		0.000000		0.000000	
Oxygen - O2		6.200000		7.499600		8.446866		9.158689	
Carbon Monoxide - CO		0.000000		0.000000		0.000000		0.000000	
Sulphur Dioxide/Tioxide - SO2/SO3		0.100000		0.242149		0.136240		0.295719	
Chlorine Acid - HCl		0.000000		0.000000		0.000000		0.000000	
Flue Gas Specific Weight (kg/Nm3)		1.180278		1.180278		1.316719		1.316719	


CAV-1		[C:\ProBasic\CAV\Cav_3\BASFILE							
FLUE GAS FLOW		kg/hr		26.666		WALL #4 - DATA			
FLUE GAS SPECIFIC WEIGHT		kg/Nm3		1.1840		- FLUID TEMPERATURE		°C	
FLUE GAS INLET TEMP.		°C		505.90		- PROJECTED SURFACE		m2	
BOILER PRESSURE		kg/cm2a		23.435		- TUBES OUTSIDE DIAMETER		mm	
BOILER PRESSURE		kg/cm2a		22.000		- TUBES THICKNESS		mm	
WALL #1 (SATURATION) - DATA						- TUBES MATERIAL : [0] [1] [2]			
- PROJECTED SURFACE		m2		27.860		CAVITY WIDTH		mm	
- TUBES OUTSIDE DIAMETER		mm		60.30		CAVITY DEPTH		mm	
- TUBES THICKNESS		mm		5.00		CAVITY HEIGHT (GAS DIRECTION)		mm	
- TUBES PITCH		mm		80.00		MEAN BEAM LENGTH		mm	
- TUBES MATERIAL : [0] [1] [2]				0		FUEL : [0] [1] [2]			
WALL #2 - DATA						CO2 + SO2 PARTIAL PRESSURE		atm	
- FLUID TEMPERATURE		°C		0.00		H2O PARTIAL PRESSURE		atm	
- PROJECTED SURFACE		m2		0.000		RADIATION LOSS		% HHV	
- TUBES OUTSIDE DIAMETER		mm		0.00		DEPOSIT THICKNESS		mm	
- TUBES THICKNESS		mm		0.00		DEPOSIT CONDUCTIVITY		kcal/h.m°C	
- TUBES MATERIAL : [0] [1] [2]				1		GAS SIDE FOULING		m2.h°C/kcal	
WALL #3 - DATA						WATER/STEAM SIDE FOULING		m2.h°C/kcal	
- FLUID TEMPERATURE		°C		0.00		INLET WATER TEMPERATURE		°C	
- PROJECTED SURFACE		m2		0.000		EFFECTIVENESS			
- TUBES OUTSIDE DIAMETER		mm		0.00					
- TUBES THICKNESS		mm		0.00					
- TUBES MATERIAL : [0] [1] [2]				1					

WALL #1 (SATURATION) - DATA									
- TUBES SKIN TEMPERATURE		°C		239.57		FLUE GAS INLET HEAT		kcal/hr	
- TUBES METAL TEMPERATURE		°C		221.48		FLUE GAS OUTLET HEAT		kcal/hr	
- RADIATION FROM CO2 + SO2		kcal/m2hr		987		HEAT RELEASED IN CAVITY		kcal/hr	
- RADIATION FROM H2O		kcal/m2hr		2,974		HEAT ABSORBED IN CAVITY		kcal/hr	
- TOTAL RADIATION		kcal/hr		84,429		FLUE GAS INLET TEMPERATURE		°C	
- CONVECT. HEAT TRANSFER COEFFICIENT		kcal/m2hr		2.4497		FLUE GAS AVERAGE TEMPERATURE		°C	
- HEAT FROM CONVECTION		kcal/hr		19,134		FLUE GAS OUTLET TEMPERATURE		°C	
- OVERALL HEAT TRANSFER COEFFICIENT		kcal/m2hr		12.3166		MEAN GAS SPECIFIC HEAT		kcal/kg°C	
- TOTAL HEAT TO WALL #1		kcal/hr		96,202		AVERAGE GAS VELOCITY IN CAVITY		m/s	
WALL #2 - DATA						RESIDENCE TIME		sec	
- TUBES SKIN TEMPERATURE		°C		0.00		STEAM PRODUCED		kg/hr	
- TUBES METAL TEMPERATURE		°C		0.00					
- RADIATION FROM CO2 + SO2		kcal/m2hr		0					
- RADIATION FROM H2O		kcal/m2hr		0					
- TOTAL RADIATION		kcal/hr		0					
- CONVECT. HEAT TRANSFER COEFFICIENT		kcal/m2h°C		0.0000					
- HEAT FROM CONVECTION		kcal/hr		0					
- OVERALL HEAT TRANSFER COEFFICIENT		kcal/m2hr		0.0000					
- TOTAL HEAT TO WALL #2		kcal/hr		0					
WALL #3 - DATA									
- TUBES SKIN TEMPERATURE		°C		0.00					
- TUBES METAL TEMPERATURE		°C		0.00					
- RADIATION FROM CO2 + SO2		kcal/m2hr		0					
- RADIATION FROM H2O		kcal/m2hr		0					
- TOTAL RADIATION		kcal/hr		0					
- CONVECT. HEAT TRANSFER COEFFICIENT		kcal/m2hr		0.0000					
- HEAT FROM CONVECTION		kcal/hr		0					
- OVERALL HEAT TRANSFER COEFFICIENT		kcal/m2hr		0.0000					
- TOTAL HEAT TO WALL #3		kcal/hr		0					
WALL #4 - DATA									
- TUBES SKIN TEMPERATURE		°C		0.00					
- TUBES METAL TEMPERATURE		°C		0.00					
- RADIATION FROM CO2 + SO2		kcal/m2hr		0					
- RADIATION FROM H2O		kcal/m2hr		0					
- TOTAL RADIATION		kcal/hr		0					
- CONVECT. HEAT TRANSFER COEFFICIENT		kcal/m2hr		0.0000					
- HEAT FROM CONVECTION		kcal/hr		0					
- OVERALL HEAT TRANSFER COEFFICIENT		kcal/m2hr		0.0000					
- TOTAL HEAT TO WALL #4		kcal/hr		0					

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Calter 4.2									
SUPERHEATER - CROSS FLOW									
PATH :		C:\Imp\FE\Calter_4.2\W\General\Calter_42_General.xlsm						ENTH. (kcal/kg)	
FUEL :		RIFIUTI		LOAD :		CASE NOP x 3 1000 ore			
FLUE GAS ENTHALPY		EXCESS AIR		0.00 %					
FLUE GAS ANALYSIS		% vol wet		% wt wet		% vol dry		% wt dry	
Carbon Dioxide - CO2		4.989200		8.284566		6.746347		10.066860	
Nitrogen - N2		62.354400		65.911430		84.314990		80.091230	
Argon - Ar		0.000000		0.000000		0.000000		0.000000	
Water Vapor - H2O		26.045900		17.704570		0.000000		0.000000	
Oxygen - O2		6.512600		7.863065		8.806272		9.554680	
Carbon Monoxide - CO		0.000000		0.000000		0.000000		0.000000	
Sulphur Dioxide/Tioxide - SO2/SO3		0.097800		0.236381		0.132244		0.287235	
Chlorine Acid - HCl		0.000000		0.000000		0.000000		0.000000	
Flue Gas Specific Weight (kg/Nm3)		1.182478		1.182478		1.315851		1.315851	
SH-1		C:\ProBasic\SH\Sh_1\BASFILE							
[0] - SURF. DSH / [1] - SPRAY DSH		0		FUEL : [0] [1] [2]		2		1600	
TUBES PER ROW		15.00		GAS SIDE FOULING		m2h°C/kcal		0.004400	
ROWS IN PARALLEL STEAM SIDE		1.0000		WATER/STEAM SIDE FOULING		m2h°C/kcal		0.000200	
ROWS DEEP		8.00		FLUE GAS FLOW		kg/hr		27,310	
EXCHANGE WIDTH		mm		FLUE GAS SPECIFIC WEIGHT		kg/Nm3		1.1862	
EXCHANGE HEIGHT		mm		FLUE GAS INLET TEMPERATURE		°C		484.50	
TUBES OUTSIDE DIAMETER		mm		STEAM FLOW		kg/hr		8,800	
TUBES THICKNESS		mm		ADDITIONAL STEAM FLOW		kg/hr		0	
TUBES MATERIAL : [1] [2] [3]		2		CONTROLL. STEAM TEMP. [0]=UNCONTR.		°C		0.00	
[0] - BARE TUBES / [1] - FINNED TUBES		0		INLET STEAM TEMP. [0]=SATURATED		°C		0.00	
FINS PER METER		0		DESUPERH. WATER TEMP.		°C		120.00	
FINS HEIGHT		mm		INLET STEAM PRESSURE		kg/cm2(a)		23.000	
FINS THICKNESS		mm		OUTLET STEAM PRESSURE		kg/cm2(a)		21.000	
TUBES FINNED LENGTH		mm		CO2 + SO2 PARTIAL PRESSURE		atm		0.04900	
FINS MATERIAL : [1] [2] [3]		2		H2O PARTIAL PRESSURE		atm		0.26000	
LATERAL WALLS SURFACE		m2		RADIATION LOSS		% HHV		2.0000	
[0] - IN LINE / [1] - STAGGERED		0		EXCESS AIR		%		0.00	
TRANSVERSE PITCH		mm		TOTAL RADIATION TO SUPERHEATER		kcal/hr		0	
LONGITUDINAL PITCH		mm							
EXCHANGE [0] [1] [2]		1							
EFFECTIVENESS		1.0000							
DEPOSIT THICKNESS		mm		0.0000					
DEPOSIT CONDUCTIVITY		kcal/h.m°C		1.00000					
SURFACE x METER - TUBES		m2/m		0.1596		INTERTUBE RADIATION FROM CO2 + SO2		kcal/m2hr	
SURFACE x METER - FINS		m2/m		0.0000		INTERTUBE RADIATION FROM H2O		kcal/m2hr	
SURFACE x METER - TOTAL		m2/m		0.1596		AVERAGE TUBES/FINS TEMPERATURE		°C	
BARE TUBES SURFACE		m2		0.0		NORMAL STEAM VELOCITY (w0)		m/s	
FINS SURFACE		m2		38.3		LOGARITMIC MEAN TEMP. DIFFERENCE		°C	
TOTAL SURFACE		m2		38.3		CONVECTION HEAT TRANSFER COEFF.		kcal/m2h°C	
STEAM FLOW IN TUBES		kg/hr		8,800		RADIATION HEAT TRANSFER COEFF.		kcal/m2h°C	
SPRAY WATER FLOW		kg/hr		0		GAS TOTAL HEAT TRANSFER COEFF.		kcal/m2h°C	
OUTLET STEAM FLOW		kg/hr		8,800		STEAM HEAT TRANSFER COEFF.		kcal/m2h°C	
INLET FLUE GAS TEMPERATURE		°C		484.50		OVERALL HEAT TRANSFER COEFF.		kcal/m2h°C	
AVERAGE FLUE GAS TEMPERATURE		°C		469.48		INLET GAS ENTHALPY		kcal/kg	
OUTLET FLUE GAS TEMPERATURE		°C		454.46		AVERAGE GAS ENTHALPY		kcal/kg	
INLET STEAM TEMPERATURE		°C		218.54		OUTLET GAS ENTHALPY		kcal/kg	
AVERAGE STEAM TEMPERATURE		°C		234.75		INLET STEAM ENTHALPY		kcal/kg	
OUTLET STEAM TEMPERATURE		°C		250.95		AVERAGE STEAM ENTHALPY		kcal/kg	
FILM TEMPERATURE		°C		362.17		OUTLET STEAM ENTHALPY		kcal/kg	
HOT GAS SIDE METAL TEMP.		°C		268.31		DESUPERH. WATER ENTHALPY		kcal/kg	
COLD GAS SIDE METAL TEMP.		°C		236.07		INLET STEAM SPECIFIC VOLUME		m3/kg	
AVERAGE METAL TEMP.		°C		252.19		AVERAGE STEAM SPECIFIC VOLUME		m3/kg	
HOT GAS SIDE DEPOSIT TEMP.		°C		271.16		OUTLET STEAM SPECIFIC VOLUME		m3/kg	
COLD GAS SIDE DEPOSIT TEMP.		°C		238.95		INLET STEAM SPECIFIC WEIGHT		kg/m3	
AVERAGE DEPOSIT TEMP.		°C		254.87		AVERAGE STEAM SPECIFIC WEIGHT		kg/m3	
HOT GAS SIDE FINS TEMP.		°C		0.00		OUTLET STEAM SPECIFIC WEIGHT		kg/m3	
COLD GAS SIDE FINS TEMP.		°C		0.00		INLET FLUE GAS HEAT		kcal/hr	
AVERAGE FINS TEMP.		°C		0.00		HEAT RELEASED BY GAS		kcal/hr	
FLUE GAS NET FREE AREA		m2		3.7240		HEAT ABSORBED BY STEAM		kcal/hr	
STEAM NET FREE AREA		m2		0.021581		OUTLET FLUE GAS HEAT		kcal/hr	
FLUE GAS MASS VELOCITY		kg/m2hr		7,333.51		INLET FLUE GAS VELOCITY		m/s	
FLUE GAS NORMAL VELOCITY (w0)		m/s		1.717		AVERAGE FLUE GAS VELOCITY		m/s	
BARE TUBES ARRANGEMENT FACTOR				0.84507		OUTLET FLUE GAS VELOCITY		m/s	
FLUE GAS AVERAGE CONDUCTIVITY		kcal/h.m°C		0.03683		INLET STEAM VELOCITY		m/s	
FLUE GAS AVERAGE VISCOSITY		kg/mhr		0.00000		AVERAGE STEAM VELOCITY		m/s	
FLUE GAS SPEC. HEAT @ AVERAGE TEMP.		kcal/kg°C		0.3061		OUTLET STEAM VELOCITY		m/s	
FLUE GAS SPEC. HEAT @ FILM TEMP.		kcal/kg°C		0.2994		FLUE GAS PRESSURE LOSS		mmH2O	
TUBES THERMAL CONDUCTIVITY		kcal/h.m°C		29.992		STRAIGHT TUBES LENGTH		m	
FINS THERMAL CONDUCTIVITY		kcal/h.m°C		0.000		EQUIVALENT TUBES LENGTH		m	
REYNOLDS NUMBER				0.0		STEAM PRESSURE LOSS		kg/cm2	
PRANDTL NUMBER				0.00000		AVERAGE HEAT FLUX		kcal/m2hr	
NUSSELT COEFFICIENT				0.000		INLET SIDE HEAT FLUX		kcal/m2hr	
K1 COEFFICIENT				0.000		OUTLET SIDE HEAT FLUX		kcal/m2hr	
X COEFFICIENT				0.00000					
FINS EFFICIENCY				0.00000					
TUBES INSIDE DIAMETER		mm		42.80					
AVERAGE TUBES/FINS DIAMETER		mm		0.000					
MEAN BEAM LENGTH		mm		297.69					


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Calter 4.2			
EVAPORATOR - CROSS FLOW			
PATH : C:\Imp\FE\Calter_4.2\W7\General\Calter_42_General.xlsm			ENTH. (kcal/kg)
FUEL : RIFIUTI	LOAD :	CASE NOP x 3 [1000 ore]	0 0.000
FLUE GAS ENTHALPY EXCESS AIR	0.00 %		100 27.411
FLUE GAS ANALYSIS	% vol wet	% wt wet	200 55.831
Carbon Dioxide - CO2	4.989200	8.284566	300 84.895
Nitrogen - N2	62.354400	65.911430	400 114.784
Argon - Ar	0.000000	0.000000	500 145.389
Water Vapor - H2O	26.045900	17.704570	600 176.694
Oxygen - O2	6.512600	7.863065	700 208.666
Carbon Monoxide - CO	0.000000	0.000000	800 241.323
Sulphur Dioxide/Tioxide - SO2/SO3	0.097800	0.236381	900 274.614
Chlorine Acid - HCl	0.000000	0.000000	1000 308.563
Flue Gas Specific Weight (kg/Nm3)	1.182478	1.182478	1100 343.136
		1.315851	1200 378.335
			1300 414.150
			1400 450.560
			1500 487.580
EVA-2 [C:\ProBasic\EVA\Eva_2\BASFILE			1600 525.438
FLUE GAS FLOW	kg/hr	27,310	1700 563.352
FLUE GAS SPECIFIC WEIGHT	kg/Nm3	1.1862	1800 602.088
FLUE GAS INLET TEMPERATURE	°C	454.50	1900 641.391
EXCESS AIR	%	0.00	2000 681.240
CO2 + SO2 PARTIAL PRESSURE	atm	0.04900	2100 721.634
H2O PARTIAL PRESSURE	atm	0.26000	2200 762.561
RADIATION LOSS	% HHV	2.0000	
STEAM PRESSURE	kg/cm2a	23.000	
INLET WATER TEMP. [0-SATUR.]	°C	0.00	
FUEL CODE [0] [1] [2]		1	
GAS SIDE FOULING	m2.h°C/kcal	0.003900	
WATER/STEAM SIDE FOULING	m2.h°C/kcal	0.000200	
[0] - BARE TUBES / [1] - FINNED TUBES		0	
[0] - IN LINE / [1] - STAGGERED		0	
FINS PER METER		0	
FINS HEIGHT	mm	0.00	
FINS THICKNESS	mm	0.00	
FINS MATERIAL : [1] [2] [3]		1	
TUBES OUTSIDE DIAMETER	mm	38.10	
TUBES THICKNESS	mm	4.00	
TUBES MATERIAL : [1] [2] [3]		1	
TRANSVERSE PITCH	mm	160.0	
LONGITUDINAL PITCH	mm	100.0	
TUBES AVERAGE METAL TEMP.	°C	196.85	
TUBES SKIN TEMP.	°C	0.00	
MAX. DEPOSIT TEMP.	°C	222.68	
MAX. FINS TEMPERATURE	°C	0.00	
FLUE GAS NET FREE AREA	m2	3.9770	
SURFACE x METER - TUBES	m2/m	0.1197	
SURFACE x METER - FINS	m2/m	0.0000	
SURFACE x METER - TOTAL	m2/m	0.1197	
BARE TUBES SURFACE	m2	28.7	
FINS SURFACE	m2	0.0	
TOTAL SURFACE	m2	48.2	
FLUE GAS MASS VELOCITY	kg/m2hr	6,866.99	
FLUE GAS NORMAL VELOCITY (w0)	m/s	1.608	
TEMPERATURE FACTOR		0.00000	
TUBES ARRANGEMENT FACTOR		0.99883	
FLUE GAS SPEC. HEAT @ AVERAGE TEMP.	kcal/kg°C	0.3061	
FLUE GAS SPEC. HEAT @ FILM TEMP.	kcal/kg°C	0.2973	
FLUE GAS AVERAGE CONDUCTIVITY	kcal/h.m°C	0.03308	
FLUE GAS AVERAGE VISCOSITY	kg/mhr	0.00000	
REYNOLDS NUMBER		0.0	
PRANDTL NUMBER		0.00000	
NUSSELT COEFFICIENT		0.000	
K1 COEFFICIENT		0.000	
X COEFFICIENT		0.00000	
FINS EFFICIENCY		0.00000	
TUBES THERMAL CONDUCTIVITY	kcal/h.m°C	41.310	
FINS THERMAL CONDUCTIVITY	kcal/h.m°C	-1.000	
AVERAGE TUBES/FINS DIAMETER	mm	0.000	
INTERTUBE RADIATION FROM CO2 + SO2	kcal/m2hr	456.1	
INTERTUBE RADIATION FROM H2O	kcal/m2hr	1,042.9	
TOTAL INTERTUBE RADIATION	kcal/m2hr	1,499.0	
MEAN BEAM LENGTH	mm	422.11	
LOGARITMIC MEAN TEMP. DIFFERENCE	°C	215.81	
SATURATION TEMPERATURE	°C	218.54	
INLET FLUE GAS TEMPERATURE	°C	454.50	
AVERAGE FLUE GAS TEMPERATURE	°C	434.94	
OUTLET FLUE GAS TEMPERATURE	°C	415.43	
INLET FLUE GAS VELOCITY	m/s	4.285	
AVERAGE FLUE GAS VELOCITY	m/s	4.170	
OUTLET FLUE GAS VELOCITY	m/s	4.055	
FLUE GAS PRESSURE LOSS	mmH2O	0.525	
INLET FLUE GAS HEAT	kcal/hr	3,590,278	
HEAT RELEASED BY GAS	kcal/hr	326,539	
HEAT ABSORBED BY STEAM	kcal/hr	320,008	
OUTLET FLUE GAS HEAT	kcal/hr	3,263,739	
STEAM PRODUCED	kg/hr	720	
INTERTUBE RADIATION HEAT TRANSF. COEFF.	kcal/m2hr°C	5.6052	
CONVECTION HEAT TRANSFER COEFF.	kcal/m2hr°C	30.7358	
INTERNAL HEAT TRANSFER COEFF.	kcal/m2hr°C	4000.0000	
OVERALL HEAT TRANSFER COEFF.	kcal/m2hr°C	31.3803	
AVERAGE HEAT FLUX	kcal/m2hr	6,636.9	
INLET SIDE HEAT FLUX	kcal/m2hr	7,256.4	
OUTLET SIDE HEAT FLUX	kcal/m2hr	6,054.9	
* (18 x 63.5) + (2 x 76.1)			

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Calter 4.2									
EVAPORATOR - CROSS FLOW									
PATH : C:\Imp\FE\Calter_4.2\W7\General\Calter_42_General.xlsm								ENTH. (kcal/kg)	
FUEL : RIFIUTI								0 0.000	
LOAD : CASE NOP x 3 [1000 ore]								100 27.411	
FLUE GAS ENTHALPY EXCESS AIR 0.00 %								200 55.831	
FLUE GAS ANALYSIS								300 84.895	
Carbon Dioxide - CO2 4.989200 8.284566 6.746347 10.066860 EVA 2								400 114.784	
Nitrogen - N2 62.354400 65.911430 84.314990 80.091230								500 145.389	
Argon - Ar 0.000000 0.000000 0.000000 0.000000								600 176.694	
Water Vapor - H2O 26.045900 17.704570 0.000000 0.000000								700 208.666	
Oxygen - O2 6.512600 7.863065 8.806272 9.554680								800 241.323	
Carbon Monoxide - CO 0.000000 0.000000 0.000000 0.000000								900 274.614	
Sulphur Dioxide/Tioxide - SO2/SO3 0.097800 0.236381 0.132244 0.287235								1000 308.563	
Chlorine Acid - HCl 0.000000 0.000000 0.000000 0.000000								1100 343.136	
Flue Gas Specific Weight (kg/Nm3) 1.182478 1.182478 1.315851 1.315851								1200 378.335	
EVA-3 [C:\ProBasic\EVA\Eva_3\BASFILE								1300 414.150	
FLUE GAS FLOW kg/hr 27,310								1400 450.560	
FLUE GAS SPECIFIC WEIGHT kg/Nm3 1.1862								1500 487.580	
FLUE GAS INLET TEMPERATURE °C 415.40								1600 525.438	
EXCESS AIR % 0.00								1700 563.352	
CO2 + SO2 PARTIAL PRESSURE atm 0.04900								1800 602.088	
H2O PARTIAL PRESSURE atm 0.26000								1900 641.391	
RADIATION LOSS % HHV 2.0000								2000 681.240	
STEAM PRESSURE kg/cm2a 23.000								2100 721.634	
INLET WATER TEMP. [0-SATUR.] °C 0.00								2200 762.561	
FUEL CODE [0] [1] [2] 1								CODES	
GAS SIDE FOULING m2.h°C/kcal 0.003500								MATERIAL	
WATER/STEAM SIDE FOULING m2.h°C/kcal 0.000200								1 = C.S.	
[0] - BARE TUBES / [1] - FINNED TUBES 0								2 = A.S.	
[0] - IN LINE / [1] - STAGGERED 1								3 = S.S.	
FINS PER METER 0								FUEL	
FINS HEIGHT mm 0.00								0 = GAS	
FINS THICKNESS mm 0.00								1 = OIL	
FINS MATERIAL : [1] [2] [3] 1								2 = COAL	
TUBES OUTSIDE DIAMETER mm 38.10									
TUBES THICKNESS mm 4.00									
TUBES MATERIAL : [1] [2] [3] 1									
TRANSVERSE PITCH mm 160.0									
LONGITUDINAL PITCH mm 100.0									
TUBES AVERAGE METAL TEMP. °C 201.79								TUBES THERMAL CONDUCTIVITY kcal/h.m°C 41.337	
TUBES SKIN TEMP. °C 0.00								FINS THERMAL CONDUCTIVITY kcal/h.m°C -1.000	
MAX. DEPOSIT TEMP. °C 221.67								AVERAGE TUBES/FINS DIAMETER mm 0.000	
MAX. FINS TEMPERATURE °C 0.00								INTERTUBE RADIATION FROM CO2 + SO2 kcal/m2hr 314.3	
FLUE GAS NET FREE AREA m2 3.9770								INTERTUBE RADIATION FROM H2O kcal/m2hr 708.1	
SURFACE x METER - TUBES m2/m 0.1197								TOTAL INTERTUBE RADIATION kcal/m2hr 1,022.4	
SURFACE x METER - FINS m2/m 0.0000								MEAN BEAM LENGTH mm 422.11	
SURFACE x METER - TOTAL m2/m 0.1197								LOGARITMIC MEAN TEMP. DIFFERENCE °C 168.82	
BARE TUBES SURFACE m2 43.1								SATURATION TEMPERATURE °C 218.54	
FINS SURFACE m2 0.0								INLET FLUE GAS TEMPERATURE °C 415.40	
TOTAL SURFACE m2 74.4								AVERAGE FLUE GAS TEMPERATURE °C 388.76	
FLUE GAS MASS VELOCITY kg/m2hr 6,866.99								OUTLET FLUE GAS TEMPERATURE °C 362.15	
FLUE GAS NORMAL VELOCITY (w0) m/s 1.608								INLET FLUE GAS VELOCITY m/s 4.055	
TEMPERATURE FACTOR 0.00000								AVERAGE FLUE GAS VELOCITY m/s 3.898	
TUBES ARRANGEMENT FACTOR 1.16752								OUTLET FLUE GAS VELOCITY m/s 3.741	
FLUE GAS SPEC. HEAT @ AVERAGE TEMP. kcal/kg°C 0.3010								FLUE GAS PRESSURE LOSS mmH2O 1.445	
FLUE GAS SPEC. HEAT @ FILM TEMP. kcal/kg°C 0.2952								INLET FLUE GAS HEAT kcal/hr 3,263,465	
FLUE GAS AVERAGE CONDUCTIVITY kcal/h.m°C 0.03246								HEAT RELEASED BY GAS kcal/hr 437,637	
FLUE GAS AVERAGE VISCOSITY kg/mhr 0.00000								HEAT ABSORBED BY STEAM kcal/hr 428,884	
REYNOLDS NUMBER 0.0								OUTLET FLUE GAS HEAT kcal/hr 2,825,828	
PRANDTL NUMBER 0.00000								STEAM PRODUCED kg/hr 964	
NUSSELT COEFFICIENT 0.000								INTERTUBE RADIATION HEAT TRANSF. COEFF. kcal/m2hr°C 4.8875	
K1 COEFFICIENT 0.000								CONVECTION HEAT TRANSFER COEFF. kcal/m2hr°C 35.5100	
X COEFFICIENT 0.00000								INTERNAL HEAT TRANSFER COEFF. kcal/m2hr°C 4000.0000	
FINS EFFICIENCY 0.00000								OVERALL HEAT TRANSFER COEFF. kcal/m2hr°C 34.8383	
								AVERAGE HEAT FLUX kcal/m2hr 5,763.8	
								INLET SIDE HEAT FLUX kcal/m2hr 6,721.1	
								OUTLET SIDE HEAT FLUX kcal/m2hr 4,903.0	


* (18 x 63.5) + (2 x 76.1)

	Client : RECHIM	JOB	1013
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Calter 4.2			
EVAPORATOR - CROSS FLOW			
PATH : C:\Imp\FE\Calter_4.2\W7\General\Calter_42_General.xlsm			ENTH. (kcal/kg)
FUEL : RIFIUTI			0 0.000
LOAD : CASE NOP x 3 [1000 ore]			100 27.411
FLUE GAS ENTHALPY	EXCESS AIR	0.00 %	200 55.831
FLUE GAS ANALYSIS	% vol wet	% wt wet	300 84.895
Carbon Dioxide - CO2	4.989200	8.284566	400 114.784
Nitrogen - N2	62.354400	65.911430	500 145.389
Argon - Ar	0.000000	0.000000	600 176.694
Water Vapor - H2O	26.045900	17.704570	700 208.666
Oxygen - O2	6.512600	7.863065	800 241.323
Carbon Monoxide - CO	0.000000	0.000000	900 274.614
Sulphur Dioxide/Tioxide - SO2/SO3	0.097800	0.236381	1000 308.563
Chlorine Acid - HCl	0.000000	0.000000	1100 343.136
Flue Gas Specific Weight (kg/Nm3)	1.182478	1.182478	1200 378.335
		1.315851	1300 414.150
			1400 450.560
			1500 487.580
EVA-4	C:\ProBasic\EVA\Eva_4\BASFILE		1600 525.438
FLUE GAS FLOW	kg/hr	27.310	1700 563.352
FLUE GAS SPECIFIC WEIGHT	kg/Nm3	1.1884	1800 602.088
FLUE GAS INLET TEMPERATURE	°C	362.10	1900 641.391
EXCESS AIR	%	0.00	2000 681.240
CO2 + SO2 PARTIAL PRESSURE	atm	0.04900	2100 721.634
H2O PARTIAL PRESSURE	atm	0.26000	2200 762.561
RADIATION LOSS	% HHV	2.0000	
STEAM PRESSURE	kg/cm2a	23.000	
INLET WATER TEMP. [0-SATUR.]	°C	0.00	
FUEL CODE [0] [1] [2]		1	
GAS SIDE FOULING	m2.h°C/kcal	0.003500	
WATER/STEAM SIDE FOULING	m2.h°C/kcal	0.000200	
[0] - BARE TUBES / [1] - FINNED TUBES		0	
[0] - IN LINE / [1] - STAGGERED		0	
FINS PER METER		0	
FINS HEIGHT	mm	0.00	
FINS THICKNESS	mm	0.00	
FINS MATERIAL : [1] [2] [3]		1	
TUBES OUTSIDE DIAMETER	mm	42.50	
TUBES THICKNESS	mm	4.00	
TUBES MATERIAL : [1] [2] [3]		1	
TRANSVERSE PITCH	mm	120.0	
LONGITUDINAL PITCH	mm	100.0	
TUBES AVERAGE METAL TEMP.	°C	208.44	
TUBES SKIN TEMP.	°C	0.00	
MAX. DEPOSIT TEMP.	°C	220.64	
MAX. FINS TEMPERATURE	°C	0.00	
FLUE GAS NET FREE AREA	m2	3.3350	
SURFACE x METER - TUBES	m2/m	0.1335	
SURFACE x METER - FINS	m2/m	0.0000	
SURFACE x METER - TOTAL	m2/m	0.1335	
BARE TUBES SURFACE	m2	112.2	
FINS SURFACE	m2	0.0	
TOTAL SURFACE	m2	112.2	
FLUE GAS MASS VELOCITY	kg/m2hr	8,188.91	
FLUE GAS NORMAL VELOCITY (w0)	m/s	1.914	
TEMPERATURE FACTOR		0.00000	
TUBES ARRANGEMENT FACTOR		0.96939	
FLUE GAS SPEC. HEAT @ AVERAGE TEMP.	kcal/kg°C	0.2989	
FLUE GAS SPEC. HEAT @ FILM TEMP.	kcal/kg°C	0.2934	
FLUE GAS AVERAGE CONDUCTIVITY	kcal/h.m°C	0.03162	
FLUE GAS AVERAGE VISCOSITY	kg/mhr	0.00000	
REYNOLDS NUMBER		0.0	
PRANDTL NUMBER		0.00000	
NUSSELT COEFFICIENT		0.000	
K1 COEFFICIENT		0.000	
X COEFFICIENT		0.00000	
FINS EFFICIENCY		0.00000	
TUBES THERMAL CONDUCTIVITY	kcal/h.m°C	41.363	
FINS THERMAL CONDUCTIVITY	kcal/h.m°C	-1.000	
AVERAGE TUBES/FINS DIAMETER	mm	0.000	
INTERTUBE RADIATION FROM CO2 + SO2	kcal/m2hr	158.2	
INTERTUBE RADIATION FROM H2O	kcal/m2hr	300.7	
TOTAL INTERTUBE RADIATION	kcal/m2hr	458.9	
MEAN BEAM LENGTH	mm	269.45	
LOGARITMIC MEAN TEMP. DIFFERENCE	°C	117.58	
SATURATION TEMPERATURE	°C	218.54	
INLET FLUE GAS TEMPERATURE	°C	362.10	
AVERAGE FLUE GAS TEMPERATURE	°C	337.79	
OUTLET FLUE GAS TEMPERATURE	°C	313.50	
INLET FLUE GAS VELOCITY	m/s	4.453	
AVERAGE FLUE GAS VELOCITY	m/s	4.282	
OUTLET FLUE GAS VELOCITY	m/s	4.112	
FLUE GAS PRESSURE LOSS	mmH2O	1.577	
INLET FLUE GAS HEAT	kcal/hr	2,825,382	
HEAT RELEASED BY GAS	kcal/hr	396,672	
HEAT ABSORBED BY STEAM	kcal/hr	388,739	
OUTLET FLUE GAS HEAT	kcal/hr	2,428,709	
STEAM PRODUCED	kg/hr	874	
INTERTUBE RADIATION HEAT TRANSF. COEFF.	kcal/m2hr°C	3.1495	
CONVECTION HEAT TRANSFER COEFF.	kcal/m2hr°C	30.9868	
INTERNAL HEAT TRANSFER COEFF.	kcal/m2hr°C	4000.0000	
OVERALL HEAT TRANSFER COEFF.	kcal/m2hr°C	30.0804	
AVERAGE HEAT FLUX	kcal/m2hr	3,466.1	
INLET SIDE HEAT FLUX	kcal/m2hr	4,232.0	
OUTLET SIDE HEAT FLUX	kcal/m2hr	2,799.3	
* (18 x 63.5) + (2 x 76.1)			

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Calter 4.2									
EVAPORATOR - CROSS FLOW									
PATH :		C:\Imp\FE\Calter_4.2\W7\General\Calter_42_General.xlsm						ENTH. (kcal/kg)	
FUEL :		RIFIUTI		LOAD :		CASE NOP x 3 [1000 ore]		0 0.000	
FLUE GAS ENTHALPY EXCESS AIR		0.00 %						100 27.332	
FLUE GAS ANALYSIS		% vol wet		% wt wet		% vol dry		200 55.666	
Carbon Dioxide - CO2		4.883200		8.094113		6.555996		300 84.640	
Nitrogen - N2		62.693700		66.152070		84.170120		400 114.433	
Argon - Ar		0.000000		0.000000		0.000000		500 144.938	
Water Vapor - H2O		25.515500		17.313140		0.000000		600 176.136	
Oxygen - O2		6.811900		8.209782		9.145393		700 207.999	
Carbon Monoxide - CO		0.000000		0.000000		0.000000		800 240.540	
Sulphur Dioxide/Tioxide - SO2/SO3		0.095700		0.230894		0.128483		900 273.711	
Chlorine Acid - HCl		0.000000		0.000000		0.000000		1000 307.536	
Flue Gas Specific Weight (kg/Nm3)		1.184588		1.184588		1.315037		1100 341.981	
								1200 377.047	
								1300 412.725	
								1400 448.995	
								1500 485.871	
								1600 523.593	
								1700 561.343	
								1800 599.925	
								1900 639.071	
								2000 678.758	
								2100 718.988	
								2200 759.748	
EVA-5 [C:\ProBasic\EVA\Eva_5\BASFILE								CODES	
FLUE GAS FLOW		kg/hr		27,953		TUBES PER ROW		21.00	
FLUE GAS SPECIFIC WEIGHT		kg/Nm3		1.1884		ROWS DEEP		32.00	
FLUE GAS INLET TEMPERATURE		°C		308.70		EXCHANGE WIDTH		2,560	
EXCESS AIR		%		0.00		EXCHANGE HEIGHT		3,150	
CO2 + SO2 PARTIAL PRESSURE		atm		0.04800		TUBES FINNED LENGTH		mm	
H2O PARTIAL PRESSURE		atm		0.25500		DEPOSIT THICKNESS		mm	
RADIATION LOSS		% HHV		2.0000		DEPOSIT CONDUCTIVITY		kcal/h.m°C	
STEAM PRESSURE		kg/cm2a		23.000		EFFECTIVENESS		1.0000	
INLET WATER TEMP. [0-SATUR.]		°C		0.00		LATERAL WALLS SURFACE		m2	
FUEL CODE [0] [1] [2]				0				0.0	
GAS SIDE FOULING		m2.h°C/kcal		0.003500					
WATER/STEAM SIDE FOULING		m2.h°C/kcal		0.000200					
[0] - BARE TUBES / [1] - FINNED TUBES				0					
[0] - IN LINE / [1] - STAGGERED				0					
FINS PER METER				0					
FINS HEIGHT		mm		0.00					
FINS THICKNESS		mm		0.00					
FINS MATERIAL : [1] [2] [3]				1					
TUBES OUTSIDE DIAMETER		mm		42.50					
TUBES THICKNESS		mm		4.00					
TUBES MATERIAL : [1] [2] [3]				1					
TRANSVERSE PITCH		mm		120.0					
LONGITUDINAL PITCH		mm		100.0					
TUBES AVERAGE METAL TEMP.		°C		214.39		TUBES THERMAL CONDUCTIVITY		kcal/h.m°C	
TUBES SKIN TEMP.		°C		0.00		FINS THERMAL CONDUCTIVITY		kcal/h.m°C	
MAX. DEPOSIT TEMP.		°C		220.26		AVERAGE TUBES/FINS DIAMETER		mm	
MAX. FINS TEMPERATURE		°C		0.00		INTERTUBE RADIATION FROM CO2 + SO2		kcal/m2hr	
FLUE GAS NET FREE AREA		m2		5.2526		INTERTUBE RADIATION FROM H2O		kcal/m2hr	
SURFACE x METER - TUBES		m2/m		0.1335		TOTAL INTERTUBE RADIATION		kcal/m2hr	
SURFACE x METER - FINS		m2/m		0.0000		MEAN BEAM LENGTH		mm	
SURFACE x METER - TOTAL		m2/m		0.1335		LOGARITMIC MEAN TEMP. DIFFERENCE		°C	
BARE TUBES SURFACE		m2		282.6		SATURATION TEMPERATURE		°C	
FINS SURFACE		m2		0.0		INLET FLUE GAS TEMPERATURE		°C	
TOTAL SURFACE		m2		282.6		AVERAGE FLUE GAS TEMPERATURE		°C	
FLUE GAS MASS VELOCITY		kg/m2hr		5,321.72		OUTLET FLUE GAS TEMPERATURE		°C	
FLUE GAS NORMAL VELOCITY (w0)		m/s		1.244		INLET FLUE GAS VELOCITY		m/s	
TEMPERATURE FACTOR				0.00000		AVERAGE FLUE GAS VELOCITY		m/s	
TUBES ARRANGEMENT FACTOR				0.96939		OUTLET FLUE GAS VELOCITY		m/s	
FLUE GAS SPEC. HEAT @ AVERAGE TEMP.		kcal/kg°C		0.2911		FLUE GAS PRESSURE LOSS		mmH2O	
FLUE GAS SPEC. HEAT @ FILM TEMP.		kcal/kg°C		0.2897		INLET FLUE GAS HEAT		kcal/hr	
FLUE GAS AVERAGE CONDUCTIVITY		kcal/h.m°C		0.03078		HEAT RELEASED BY GAS		kcal/hr	
FLUE GAS AVERAGE VISCOSITY		kg/mhr		0.00000		HEAT ABSORBED BY STEAM		kcal/hr	
REYNOLDS NUMBER				0.0		OUTLET FLUE GAS HEAT		kcal/hr	
PRANDTL NUMBER				0.00000		STEAM PRODUCED		kg/hr	
NUSSELT COEFFICIENT				0.000		INTERTUBE RADIATION HEAT TRANSF. COEFF.		kcal/m2hr°C	
K1 COEFFICIENT				0.000		CONVECTION HEAT TRANSFER COEFF.		kcal/m2hr°C	
X COEFFICIENT				0.00000		INTERNAL HEAT TRANSFER COEFF.		kcal/m2hr°C	
FINS EFFICIENCY				0.00000		OVERALL HEAT TRANSFER COEFF.		kcal/m2hr°C	
						AVERAGE HEAT FLUX		kcal/m2hr	
						INLET SIDE HEAT FLUX		kcal/m2hr	
						OUTLET SIDE HEAT FLUX		kcal/m2hr	
								919.9	

* (18 x 63.5) + (2 x 76.1)

	Client : RECHIM	JOB	1013
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Calter 4.2									
ECONOMIZER									
PATH :		C:\Imp\FE\Calter_4.2\W7\General\Calter_42_General.xlsm						ENTH. (kcal/kg)	
FUEL :		LOAD :		CASE NOP x 3 [1000 ore]				0 0.000	
FLUE GAS ENTHALPY		EXCESS AIR		0.00 %				100 27.332	
FLUE GAS ANALYSIS		% vol wet		% wt wet		% vol dry		200 55.666	
Carbon Dioxide - CO2		4.883200		8.094113		6.555996		300 84.640	
Nitrogen - N2		62.693700		66.152070		84.170120		400 114.433	
Argon - Ar		0.000000		0.000000		0.000000		500 144.938	
Water Vapor - H2O		25.515500		17.313140		0.000000		600 176.136	
Oxygen - O2		6.811900		8.209782		9.145393		700 207.999	
Carbon Monoxide - CO		0.000000		0.000000		0.000000		800 240.540	
Sulphur Dioxide/Tioxide - SO2/SO3		0.095700		0.230894		0.128483		900 273.711	
Chlorine Acid - HCl		0.000000		0.000000		0.000000		1000 307.536	
Flue Gas Specific Weight (kg/Nm3)		1.184588		1.184588		1.315037		1100 341.981	
								1200 377.047	
								1300 412.725	
								1400 448.995	
								1500 485.871	
ECO-1		C:\ProBasic\ECO\Eco_1\BASFILE						1600 523.593	
FLUE GAS FLOW		kg/hr		24,571		TUBES PER ROW		22.00	
FLUE GAS SPECIFIC WEIGHT		kg/Nm3		1.1884		ROWS IN PARALLEL		1.00	
FLUE GAS INLET TEMPERATURE		°C		208.00		ROWS DEEP		64.00	
WATER FLOW		kg/hr		8,800		[0] - IN LINE / [1] - STAGGERED		0	
ADDITIONAL WATER FLOW		kg/hr		0		TRANSVERSE PITCH		90.0	
INLET WATER TEMP.		°C		120.00		LONGITUDINAL PITCH		102.0	
[1] COLD BANK (AS DEFAULT)				1		EXCHANGE WIDTH		1,970	
WATER PRESSURE		kg/cm2a		35.000		EXCHANGE LENGTH		3,500	
CO2 + SO2 PARTIAL PRESSURE		atm		0.04800		TUBES FINNED LENGTH		0	
H2O PARTIAL PRESSURE		atm		0.25500		[0] INTER.BENDS [1] EXT.BENDS		1	
RADIATION LOSS		% HHV		2.0000		NR. OF INTERMEDIATE SUPPORTS		0	
EXCESS AIR		%		0.00		INTERM. SUPPORTS THICKNESS		0.00	
GAS SIDE FOULING		m2.h°C/kcal		0.003500		TUBES OUTSIDE DIAMETER		38.10	
WATER/STEAM SIDE FOULING		m2.h°C/kcal		0.000200		TUBES THICKNESS		4.00	
DEPOSIT THICKNESS		mm		0.0000		FINS PER METER		0	
DEPOSIT CONDUCTIVITY		kcal/h.m°C		1.00000		FINS HEIGHT (SIDE FOR SQUARE)		0.00	
FUEL CODE [0] [1] [2]				2		FINS THICKNESS		0.00	
TUBES TYPE [0] [1] [2]				0		EFFECTIVENESS		1.0000	
FINS TYPE [0] [1] [2]				1		[0] CROSS [1] COUNTER [2] PARALL		1	
TUBES MATERIAL : [1] [2] [3]				1		LATERAL WALLS SURFACE		m2	
FINS MATERIAL : [1] [2] [3]				1		SLEEVE OUTS DIAM. [0-BARE/SPIRAL]		mm	
								0.00	
								1 = SPIRAL	
								2 = ROUND	
								3 = SQUARE	
WATER FLOW IN ECONOMIZER		kg/hr		8,800		MEAN BEAM LENGTH		mm	
INLET FLUE GAS TEMPERATURE		°C		208.00		TUBES/FINS AVERAGE DIAMETER		mm	
AVERAGE FLUE GAS TEMPERATURE		°C		176.15		INTERTUBE RADIATION FROM CO2 + SO2		kcal/m2hr	
OUTLET FLUE GAS TEMPERATURE		°C		144.31		INTERTUBE RADIATION FROM H2O		kcal/m2hr	
INLET WATER TEMPERATURE		°C		120.00		WATER SIDE FREE AREA		m2	
AVERAGE WATER TEMPERATURE		°C		144.24		INLET WATER ENTHALPY		kcal/kg	
OUTLET WATER TEMPERATURE		°C		168.47		AVERAGE WATER ENTHALPY		kcal/kg	
FILM TEMPERATURE		°C		160.04		OUTLET WATER ENTHALPY		kcal/kg	
LOGARITMIC MEAN TEMP. DIFFERENCE		°C		31.34		INLET WATER SPECIFIC VOLUME		m3/kg	
AVERAGE FINS TEMPERATURE		°C		139.28		AVERAGE WATER SPECIFIC VOLUME		m3/kg	
DEPOSIT AVERAGE TEMPERATURE		°C		139.28		OUTLET WATER SPECIFIC VOLUME		m3/kg	
TUBES AVERAGE TEMPERATURE		°C		143.71		INLET WATER SPECIFIC WEIGHT		kg/m3	
FLUE GAS NET FREE AREA		m2		3.9613		AVERAGE WATER SPECIFIC WEIGHT		kg/m3	
SURFACE x METER - TUBES		m2/m		0.1197		OUTLET WATER SPECIFIC WEIGHT		kg/m3	
SURFACE x METER - FINS		m2/m		0.0000		INLET WATER VELOCITY		m/s	
SURFACE x METER - TOTAL		m2/m		0.1197		AVERAGE WATER VELOCITY		m/s	
BARE TUBES SURFACE		m2		0.0		OUTLET WATER VELOCITY		m/s	
FINS SURFACE		m2		589.9		INLET GAS VELOCITY		m/s	
TOTAL SURFACE		m2		589.9		AVERAGE GAS VELOCITY		m/s	
INLET FLUE GAS HEAT		kcal/hr		1,424,729		OUTLET GAS VELOCITY		m/s	
HEAT RELEASED BY GAS		kcal/hr		445,469		BARE TUBES LOSS FACTOR			
HEAT ABSORBED BY WATER		kcal/hr		436,560		COEFFICIENT C1		0.00000	
OUTLET FLUE GAS HEAT		kcal/hr		979,260		COEFFICIENT C2		0.00000	
FLUE GAS SPEC. HEAT @ AVERAGE TEMP.		kcal/kg°C		0.2841		COEFFICIENT C3		0.00000	
FLUE GAS SPEC. HEAT @ FILM TEMP.		kcal/kg°C		0.2833		COEFFICIENT "f" - CAST IRON SLEEVES		0.00000	
FLUE GAS AVERAGE CONDUCTIVITY		kcal/h.m°C		0.02632		COEFFICIENT "fg" - CAST IRON SLEEVES		0.00000	
TUBES THERMAL CONDUCTIVITY		kcal/h.m°C		43.451		FLUE GAS PRESSURE LOSS		mmH2O	
FINS THERMAL CONDUCTIVITY		kcal/h.m°C		0.0000		TOTAL TUBES LENGTH		m	
FLUE GAS AVERAGE DYNAMIC VISCOSITY		kg/mhr		0.00000		EQUIVALENT LENGTH		m	
BARE TUBES ARRANGEMENT FACTOR				1.02406		COEFFICIENT "F"		0.18357	
FLUE GAS MASS VELOCITY		kg/m2hr		6,203		WATER SIDE PRESSURE LOSS		kg/cm2	
FLUE GAS NORMAL VELOCITY (w0)		m/s		1.450		AVERAGE HEAT FLUX		kcal/m2hr	
TUBES/FINS EQUIVALENT DIAMETER		mm		0.000		INLET SIDE HEAT FLUX		kcal/m2hr	
REYNOLDS NUMBER				0.0		OUTLET SIDE HEAT FLUX		kcal/m2hr	
PRANDTL NUMBER				0.00000					
NUSSELT COEFFICIENT				0.000					
K1 COEFFICIENT				0.000					
X COEFFICIENT				0.00000					
FINS EFFICIENCY		%		0.00000					
CONVECT. HEAT TRANSFER COEFF.		kcal/m2hr°C		26.323		WATER AIR HEATER			
INTERTUBE RADIATION HEAT TRANSF. COEFF.		kcal/m2hr°C		0.501		AIR FLOW		kg/hr	
GAS SIDE HEAT TRANSF. COEFF.		kcal/m2hr°C		26.824		AIR INLET TEMPERATURE		°C	
WATER SIDE HEAT TRANSF. COEFF.		kcal/m2hr°C		1,932		WATER INLET TEMPERATURE		°C	
OVERALL HEAT TRANSF. COEFF.		kcal/m2hr°C		24.097		WATER OUTLET TEMPERATURE		°C	
						WATER SPECIFIC HEAT		kcal/kg°C	
						AIR SPECIFIC HEAT		kcal/kg°C	
						HEAT EXCHANGED		kcal/hr	
						AIR OUTLET TEMPERATURE		°C	