


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	538.70		TEMPERATURE			°C	226.00	
ENTHALPY			kcal/kg	157.232		ENTHALPY			kcal/kg	62.820	
HEAT			kcal/hr	4,192,756		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	528.75		TEMPERATURE			°C	15.00	
ENTHALPY			kcal/kg	153.611		ENTHALPY			kcal/kg	3.5684	
HEAT			kcal/hr	4,195,052		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	347.70		TEMPERATURE			°C	15.00	
ENTHALPY			kcal/kg	98.971		ENTHALPY			kcal/kg	3.5684	
HEAT			kcal/hr	2,702,861		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	342.39		TEMPERATURE			°C		
ENTHALPY			kcal/kg	96.775		ENTHALPY			kcal/kg		
HEAT			kcal/hr	2,705,157		HEAT			kcal/hr		

	Cliente : RECHIM		PROG.	FE1013	
	Utente :		Doc. :	FE1013-CAL-001	
	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 : 4000 ORE					
FLUE GAS @ BOILER INLET					
WET DRY					
ANALYSIS % vol % weight % vol % weight					
CO2 5.1000 8.4576 6.9482 10.3215					
N2 61.3000 64.7134 83.5150 78.9745					
Ar 0.7000 1.0537 0.9537 1.2859					
H2O 26.6000 18.0579 0.0000 0.0000					
O2 6.2000 7.4760 8.4469 9.1235					
SO2 0.1000 0.2414 0.1362 0.2946					
FLOW Nm3/hr 22,522					
kg/hr 26,666					
SPECIFIC WEIGHT kg/Nm3 1.1840					
FALSE AIR @ SUPERHEATER INLET					
WET DRY					
ANALYSIS % vol % weight % vol % weight					
CO2 0.0000 0.0000 0.0000 0.0000					
N2 77.3139 75.0859 78.1650 75.6000					
Ar 1.0042 1.3905 1.0153 1.4000					
H2O 1.0890 0.6801 0.0000 0.0000					
O2 20.5930 22.8436 20.8197 23.0000					
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					
WET DRY					
ANALYSIS % vol % weight % vol % weight					
CO2 5.1000 8.4576 6.9482 10.3215					
N2 61.3000 64.7134 83.5150 78.9745					
Ar 0.7000 1.0537 0.9537 1.2859					
H2O 26.6000 18.0579 0.0000 0.0000					
O2 6.2000 7.4760 8.4469 9.1235					
SO2 0.1000 0.2414 0.1362 0.2946					
FLOW Nm3/hr 22,522					
kg/hr 26,666					
SPECIFIC WEIGHT kg/Nm3 1.2653					
FLUE GAS FLOW @ SUPERHEATER INLET BEFORE FALSE AIR					
FLOW kg/hr 26,666					
CO2 kg/hr 2,255					
N2 kg/hr 17,256					
Ar kg/hr 281					
H2O kg/hr 4,815					
O2 kg/hr 1,994					
SO2 kg/hr 64					
FLUE GAS @ SUPERHEATER INLET AFTER FALSE AIR					
WET DRY					
ANALYSIS % vol % weight % vol % weight					
CO2 4.9892 8.2583 6.7464 10.0282					
N2 61.6478 64.9578 83.3596 78.8786					
Ar 0.7066 1.0616 0.9555 1.2892					
H2O 26.0459 17.6484 0.0000 0.0000					
O2 6.5126 7.8381 8.8063 9.5179					
SO2 0.0978 0.2357 0.1323 0.2862					
FLOW Nm3/hr 23,022					
kg/hr 27,310					
SPECIFIC WEIGHT kg/Nm3 1.1862					
FALSE AIR @ EVA #4 INLET					
FLOW kg/hr 644					
CO2 kg/hr 0					
N2 kg/hr 483					
Ar kg/hr 9					
H2O kg/hr 4					
O2 kg/hr 147					
SO2 kg/hr 0					
FLUE GAS FLOW @ EVA #4 INLET AFTER FALSE AIR					
FLOW kg/hr 27,953					
CO2 kg/hr 2,255					
N2 kg/hr 18,223					
Ar kg/hr 299					
H2O kg/hr 4,824					
O2 kg/hr 2,288					
SO2 kg/hr 64					
REFERENCE AIR					
WET DRY					
ANALYSIS % vol % weight % vol % weight					
CO2 0.0000 0.0000 0.0000 0.0000					
N2 77.3139 75.0859 78.1650 75.6000					
Ar 1.0042 1.3905 1.0153 1.4000					
H2O 1.0890 0.6801 0.0000 0.0000					
O2 20.5930 22.8436 20.8197 23.0000					
SO2 0.0000 0.0000 0.0000 0.0000					
TEMPERATURE °C 15.00					
R.H. % 65.00					
SPECIFIC WEIGHT kg/Nm3 1.2870					
SITE ELEVATION m 0					
FLOW Nm3/hr 21,719					
kg/hr 27,953					



Cliente : RECHIM  
Utente :  
Progetto : CALDAIA DI RECUPERO  
Località :  
Unità :

PROG. FE1013  
Doc. : FE1013-CAL-001  
Data : 16-07-2023  
Rev. : B  
Pag. : 1 of 1

### 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  
Utente :  
Progetto : CALDAIA DI RECUPERO  
Località :  
Unità :

PROG. FE1013  
Doc. : FE1013-CAL-001  
Data : 16-07-2023  
Rev. : B  
Pag. : 1 of 1

### FOULING FACTORS

COMBUSTIBILE : RIFIUTI  
CARICO CALDAIA : CASE NOP x 3  
SPORCAMENTO : 4000 ORE

#### HIGH - HIGH SLAG

TEMPERATURA °C	FOULING m <sup>2</sup> C/w	FOULING m <sup>2</sup> h°C/kcal	COEFFICIENTE SPORCAMENTO	FOULING m <sup>2</sup> C/w	FOULING m <sup>2</sup> h°C/kcal
0	0.010836	0.012600	0.75	0.008127	0.009450
100	0.010836	0.012600	0.75	0.008127	0.009450
200	0.010836	0.012600	0.75	0.008127	0.009450
300	0.010836	0.012600	0.75	0.008127	0.009450
400	0.010836	0.012600	0.75	0.008127	0.009450
500	0.014620	0.017000	0.75	0.010965	0.012750
600	0.017630	0.020500	0.75	0.013223	0.015375
700	0.021242	0.024700	0.75	0.015932	0.018525
800	0.024596	0.028600	0.75	0.018447	0.021450
900	0.028036	0.032600	0.75	0.021027	0.024450
1,000	0.030960	0.036000	0.75	0.023220	0.027000
1,100	0.035088	0.040800	0.75	0.026316	0.030600
1,200	0.038958	0.045300	0.75	0.029219	0.033975
1,300	0.042914	0.049900	0.75	0.032186	0.037425
1,400	0.046870	0.054500	0.75	0.035153	0.040875
1,500	0.050826	0.059100	0.75	0.038120	0.044325
1,600	0.054782	0.063700	0.75	0.041087	0.047775
1,700	0.058738	0.068300	0.75	0.044054	0.051225
1,800	0.062694	0.072900	0.75	0.047021	0.054675
1,900	0.066650	0.077500	0.75	0.049988	0.058125
2,000	0.070606	0.082100	0.75	0.052955	0.061575
2,100	0.074562	0.086700	0.75	0.055922	0.065025
2,200	0.078518	0.091300	0.75	0.058889	0.068475

TEMPERATURA  
IN (°C)

342


OUT


280


AVERAGE (°C)  
311

FOULING  
m<sup>2</sup>C/w  
0.008127

FOULING  
m<sup>2</sup>h°C/kcal  
0.009450

	Cliente : RECHIM	PROG. FE1013
	Utente :	Doc. : FE1013-CAL-001
	Progetto : CALDAIA DI RECUPERO	Data : 16-07-2023
	Località :	Rev. : B
	Unità :	Pag. : 1 of 1
<b>HEAT BALANCE</b>		
COMBUSTIBILE : RIFIUTI CARICO CALDAIA CASE NOP x 3 SPORCAMENTO : 4000 ORE		
<b>BILANCIO TERMICO GLOBALE</b>		
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	1,432,509
CALORE SCAMBIATO RADIANTE 2	kcal/hr	657,552
CALORE SCAMBIATO RADIANTE 3	kcal/hr	106,168
CALORE SCAMBIATO RADIANTE 4	kcal/hr	
CALORE SCAMBIATO EVA 1	kcal/hr	315,164
CALORE SCAMBIATO SURRISCALDATORE	kcal/hr	296,629
CALORE SCAMBIATO EVA2 + EVA 3 + EVA 4	kcal/hr	1,424,664
CALORE SCAMBIATO ECONOMIZZATORE	kcal/hr	480,806
CALORE USCITA ECONOMIZZATORE	kcal/hr	
PERDITA PER IRRAGGIAMENTO ( 2% )	kcal/hr	94,270
CALORE TOTALE ASSORBITO	kcal/hr	4,619,222
CALORE AL VAPORE SURRISCALDATO	kcal/hr	4,619,222
TEMPERATURA VAPORE SURRISCALDATO	°C	259.4
TEMP. ACQUA ALIMENTO INGRESSO CALDAIA	°C	174.0
ENTALPIA VAPORE SURRISCALDATO	kcal/kg	698.800
ENTALPIA ACQUA ALIMENTO	kcal/kg	176.330
PRODUZIONE DI VAPORE	=	4,619,222 / ( 698.800 - 176.330 ) = 8,841 kg/hr
RENDIMENTO TERMICO LORDO	(	4,619,222 / 6,372,571 ) x 100 = 72.49 %

	Client : RECHIM	JOB	1013
	User :	Doc. :	1013-B001
	Project : CALDAIA DI RECUPERO	Date :	16-07-2023
	Location :	Rev. :	B
	Unit :	Page :	1 of 10
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   4000 ore			100 27.494
FLUE GAS ENTHALPY EXCESS AIR 0.00 %			200 56.003
FLUE GAS ANALYSIS % vol wet % wt wet % vol dry % wt dry			300 85.162
Carbon Dioxide - CO2 5.100000 8.484338 6.948229 10.361280			400 115.152
Nitrogen - N2 62.000000 65.659000 84.468660 80.184330			500 145.863
Argon - Ar 0.000000 0.000000 0.000000 0.000000			600 177.278
Water Vapor - H2O 26.600000 18.114920 0.000000 0.000000			700 209.367
Oxygen - O2 6.200000 7.499600 8.446866 9.158689			800 242.144
Carbon Monoxide - CO 0.000000 0.000000 0.000000 0.000000			900 275.560
Sulphur Dioxide/Tioxide - SO2/SO3 0.100000 0.242149 0.136240 0.295719			1000 309.640
Chlorine Acid - HCl 0.000000 0.000000 0.000000 0.000000			1100 344.348
Flue Gas Specific Weight ( kg/Nm3 ) 1.180278 1.180278 1.316719 1.316719			1200 379.686
CAV-1 C:\ProBasic\CAV\Cav_1\BASFILE			1300 415.643
FLUE GAS FLOW kg/hr 26.666			1400 452.201
FLUE GAS SPECIFIC WEIGHT kg/Nm3 1.1840			1500 489.372
FLUE GAS INLET TEMP. °C 794.00			1600 527.372
BOILER PRESSURE kg/cm2a 23.435			1700 565.457
BOILER PRESSURE kg/cm2a 22.000			1800 604.355
WALL #1 (SATURATION) - DATA			1900 643.824
- PROJECTED SURFACE m2 145.920			2000 683.842
- TUBES OUTSIDE DIAMETER mm 60.30			2100 724.408
- TUBES THICKNESS mm 5.00			2200 765.509
- 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 395.66			
- TUBES METAL TEMPERATURE °C 224.56			
- RADIATION FROM CO2 + SO2 kcal/m2hr 3.143			
- RADIATION FROM H2O kcal/m2hr 11.717			
- TOTAL RADIATION kcal/hr 1,658,809			
- CONVECT. HEAT TRANSFER COEFFICIENT kcal/m2hr 4.5181			
- HEAT FROM CONVECTION kcal/hr 329,739			
- OVERALL HEAT TRANSFER COEFFICIENT kcal/m2hr 17.7079			
- TOTAL HEAT TO WALL #1 kcal/hr 1,292,345			
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			
- 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			
- 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			
- 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			
- 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			
- 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			
- 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			
- 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			
- 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			
- 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			
- 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			
- 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			
- 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			
- 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			

	Client : RECHIM	JOB	1013
	User :	Doc. :	1013-B001
	Project : CALDAIA DI RECUPERO	Date :	16-07-2023
	Location :	Rev. :	B
	Unit :	Page :	2 of 10


  

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   4000 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		645.30		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		0.016500					
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		86.76		TUBES THERMAL CONDUCTIVITY		kcal/h.m°C	
TUBES SKIN TEMP.		°C		0.00		FINS THERMAL CONDUCTIVITY		kcal/h.m°C	
MAX. DEPOSIT TEMP.		°C		248.31		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		0.3209		FLUE GAS PRESSURE LOSS		mmH2O	
FLUE GAS SPEC. HEAT @ FILM TEMP.		kcal/kg°C		0.3061		INLET FLUE GAS HEAT		kcal/hr	
FLUE GAS AVERAGE CONDUCTIVITY		kcal/h.m°C		0.03611		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 )




	Client : RECHIM	JOB	1013
	User :	Doc. :	1013-B001
	Project : CALDAIA DI RECUPERO	Date :	16-07-2023
	Location :	Rev. :	B
	Unit :	Page :	3 of 10

Calter 4.2									
CAVITY / RADIANT PASS									
PATH : C:\Imp\FE\Calter_4.2\W7\General\Calter_42_General.xlsm								ENTH. (kcal/kg)	
FUEL : RIFIUTI		LOAD :		CASE NOP x 3   4000 ore					
FLUE GAS ENTHALPY EXCESS AIR 0.00 %		% vol wet		% wt dry		NOTES			
FLUE GAS ANALYSIS		% wt wet		% vol dry		RADIANTE 2			
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_2\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		628.90		- 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		110.650		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		0.00000	
- 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		314.44		FLUE GAS INLET HEAT		kcal/hr	
- TUBES METAL TEMPERATURE		°C		222.90		FLUE GAS OUTLET HEAT		kcal/hr	
- RADIATION FROM CO2 + SO2		kcal/m2hr		1.746		HEAT RELEASED IN CAVITY		kcal/hr	
- RADIATION FROM H2O		kcal/m2hr		6.120		HEAT ABSORBED IN CAVITY		kcal/hr	
- TOTAL RADIATION		kcal/hr		665.842		FLUE GAS INLET TEMPERATURE		°C	
- CONVECT. HEAT TRANSFER COEFFICIENT		kcal/m2hr		5.2674		FLUE GAS AVERAGE TEMPERATURE		°C	
- HEAT FROM CONVECTION		kcal/hr		216.074		FLUE GAS OUTLET TEMPERATURE		°C	
- OVERALL HEAT TRANSFER COEFFICIENT		kcal/m2hr		16.0295		MEAN GAS SPECIFIC HEAT		kcal/kg°C	
- TOTAL HEAT TO WALL #1		kcal/hr		657.552		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					




	Client : RECHIM	JOB	1013
	User :	Doc. :	1013-B001
	Project : CALDAIA DI RECUPERO	Date :	16-07-2023
	Location :	Rev. :	B
	Unit :	Page :	4 of 10


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   4000 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		551.60		- 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		0.00000	
- 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		275.52		FLUE GAS INLET HEAT		kcal/hr	
- TUBES METAL TEMPERATURE		°C		221.68		FLUE GAS OUTLET HEAT		kcal/hr	
- RADIATION FROM CO2 + SO2		kcal/m2hr		1,219		HEAT RELEASED IN CAVITY		kcal/hr	
- RADIATION FROM H2O		kcal/m2hr		3,734		HEAT ABSORBED IN CAVITY		kcal/hr	
- TOTAL RADIATION		kcal/hr		105,566		FLUE GAS INLET TEMPERATURE		°C	
- CONVECT. HEAT TRANSFER COEFFICIENT		kcal/m2hr		2,4922		FLUE GAS AVERAGE TEMPERATURE		°C	
- HEAT FROM CONVECTION		kcal/hr		22,608		FLUE GAS OUTLET TEMPERATURE		°C	
- OVERALL HEAT TRANSFER COEFFICIENT		kcal/m2hr		11,7031		MEAN GAS SPECIFIC HEAT		kcal/kg°C	
- TOTAL HEAT TO WALL #1		kcal/hr		106,168		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					

	Client : RECHIM	JOB	1013
	User :	Doc. :	1013-B001
	Project : CALDAIA DI RECUPERO	Date :	16-07-2023
	Location :	Rev. :	B
	Unit :	Page :	6 of 10

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   4000 ore			
FLUE GAS ENTHALPY		EXCESS AIR		0.00 %				NOTES	
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		0.005200	
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		528.70	
TUBES OUTSIDE DIAMETER		mm		STEAM FLOW		kg/hr		8.500	
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		8,500		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		8,500		STEAM HEAT TRANSFER COEFF.		kcal/m2h°C	
INLET FLUE GAS TEMPERATURE		°C		528.70		OVERALL HEAT TRANSFER COEFF.		kcal/m2h°C	
AVERAGE FLUE GAS TEMPERATURE		°C		511.44		INLET GAS ENTHALPY		kcal/kg	
OUTLET FLUE GAS TEMPERATURE		°C		494.19		AVERAGE GAS ENTHALPY		kcal/kg	
INLET STEAM TEMPERATURE		°C		218.54		OUTLET GAS ENTHALPY		kcal/kg	
AVERAGE STEAM TEMPERATURE		°C		238.95		INLET STEAM ENTHALPY		kcal/kg	
OUTLET STEAM TEMPERATURE		°C		259.37		AVERAGE STEAM ENTHALPY		kcal/kg	
FILM TEMPERATURE		°C		387.87		OUTLET STEAM ENTHALPY		kcal/kg	
HOT GAS SIDE METAL TEMP.		°C		280.45		DESUPERH. WATER ENTHALPY		kcal/kg	
COLD GAS SIDE METAL TEMP.		°C		240.11		INLET STEAM SPECIFIC VOLUME		m3/kg	
AVERAGE METAL TEMP.		°C		260.28		AVERAGE STEAM SPECIFIC VOLUME		m3/kg	
HOT GAS SIDE DEPOSIT TEMP.		°C		284.62		OUTLET STEAM SPECIFIC VOLUME		m3/kg	
COLD GAS SIDE DEPOSIT TEMP.		°C		244.38		INLET STEAM SPECIFIC WEIGHT		kg/m3	
AVERAGE DEPOSIT TEMP.		°C		264.30		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		OUTLET 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		0.03817		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		0.3119		OUTLET STEAM VELOCITY		m/s	
FLUE GAS SPEC. HEAT @ FILM TEMP.		kcal/kg°C		0.3011		FLUE GAS PRESSURE LOSS		mmH2O	
TUBES THERMAL CONDUCTIVITY		kcal/h.m°C		29.960		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					


	Client : RECHIM	JOB	1013
	User :	Doc. :	1013-B001
	Project : CALDAIA DI RECUPERO	Date :	16-07-2023
	Location :	Rev. :	B
	Unit :	Page :	5 of 10

Calter 4.2									
EVAPORATOR - CROSS FLOW									
PATH :		C:\Imp\FE\Calter_4.2\W7\General\Calter_42_General.xlsm						ENTH. (kcal/kg)	
FUEL :		LOAD :		CASE NOP x 3   4000 ore				0	0.000
FLUE GAS ENTHALPY   EXCESS AIR		0.00 %						100	27.411
FLUE GAS ANALYSIS		% vol wet	% wt wet	% vol dry	% wt dry			200	55.831
Carbon Dioxide - CO2		4.989200	8.284566	6.746347	10.066860	EVA 1		300	84.895
Nitrogen - N2		62.354400	65.911430	84.314990	80.091230			400	114.784
Argon - Ar		0.000000	0.000000	0.000000	0.000000			500	145.389
Water Vapor - H2O		26.045900	17.704570	0.000000	0.000000			600	176.694
Oxygen - O2		6.512600	7.863065	8.806272	9.554680			700	208.666
Carbon Monoxide - CO		0.000000	0.000000	0.000000	0.000000			800	241.323
Sulphur Dioxide/Tioxide - SO2/SO3		0.097800	0.236381	0.132244	0.287235			900	274.614
Chlorine Acid - HCl		0.000000	0.000000	0.000000	0.000000			1000	308.563
Flue Gas Specific Weight ( kg/Nm3 )		1.182478	1.182478	1.315851	1.315851			1100	343.136
EVA-2		[C:\ProBasic\EVA\Eva_2\BASFILE						1200	378.335
FLUE GAS FLOW		kg/hr	27,310	TUBES PER ROW				1300	414.150
FLUE GAS SPECIFIC WEIGHT		kg/Nm3	1.1862	ROWS DEEP				1400	450.560
FLUE GAS INLET TEMPERATURE		°C	494.20	EXCHANGE WIDTH	mm	2,560		1500	487.580
EXCESS AIR		%	0.00	EXCHANGE HEIGHT	mm	2,000		1600	525.438
CO2 + SO2 PARTIAL PRESSURE		atm	0.04900	TUBES FINNED LENGTH	mm	0		1700	563.352
H2O PARTIAL PRESSURE		atm	0.26000	DEPOSIT THICKNESS	mm	0.0000		1800	602.088
RADIATION LOSS		% HHV	2.0000	DEPOSIT CONDUCTIVITY	kcal/h.m°C	1.00000		1900	641.391
STEAM PRESSURE		kg/cm2a	23.000	EFFECTIVENESS		1.0000		2000	681.240
INLET WATER TEMP. [0=SATUR.]		°C	0.00	LATERAL WALLS SURFACE	m2	0.0		2100	721.634
FUEL CODE [0] [1] [2]			1					2200	762.561
GAS SIDE FOULING		m2.h°C/kcal	0.012000					CODES	
WATER/STEAM SIDE FOULING		m2.h°C/kcal	0.000200					MATERIAL	
[0] - BARE TUBES / [1] - FINNED TUBES			0					1 = C.S.	
[0] - IN LINE / [1] - STAGGERED			0					2 = A.S.	
FINS PER METER			0					3 = S.S.	
FINS HEIGHT		mm	0.00					FUEL	
FINS THICKNESS		mm	0.00					0 = GAS	
FINS MATERIAL : [1] [2] [3]			1					1 = OIL	
TUBES OUTSIDE DIAMETER		mm	38.10					2 = COAL	
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	154.99	TUBES THERMAL CONDUCTIVITY	kcal/h.m°C			41.058	
TUBES SKIN TEMP.		°C	0.00	FINS THERMAL CONDUCTIVITY	kcal/h.m°C			-1.000	
MAX. DEPOSIT TEMP.		°C	232.37	AVERAGE TUBES/FINS DIAMETER	mm			0.000	
MAX. FINS TEMPERATURE		°C	0.00	INTERTUBE RADIATION FROM CO2 + SO2	kcal/m2hr			604.1	
FLUE GAS NET FREE AREA		m2	3.9770	INTERTUBE RADIATION FROM H2O	kcal/m2hr			1,398.3	
SURFACE x METER - TUBES		m2/m	0.1197	TOTAL INTERTUBE RADIATION	kcal/m2hr			2,002.4	
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			256.33	
BARE TUBES SURFACE		m2	28.7	SATURATION TEMPERATURE	°C			218.54	
FINS SURFACE		m2	0.0	INLET FLUE GAS TEMPERATURE	°C			494.20	
TOTAL SURFACE		m2	48.2	AVERAGE FLUE GAS TEMPERATURE	°C			475.33	
FLUE GAS MASS VELOCITY		kg/m2hr	6,866.99	OUTLET FLUE GAS TEMPERATURE	°C			456.49	
FLUE GAS NORMAL VELOCITY (w0)		m/s	1.608	INLET FLUE GAS VELOCITY	m/s			4.519	
TEMPERATURE FACTOR			0.00000	AVERAGE FLUE GAS VELOCITY	m/s			4.408	
TUBES ARRANGEMENT FACTOR			0.99883	OUTLET FLUE GAS VELOCITY	m/s			4.297	
FLUE GAS SPEC. HEAT @ AVERAGE TEMP.		kcal/kg°C	0.3061	FLUE GAS PRESSURE LOSS	mmH2O			0.555	
FLUE GAS SPEC. HEAT @ FILM TEMP.		kcal/kg°C	0.2989	INLET FLUE GAS HEAT	kcal/hr			3,922,106	
FLUE GAS AVERAGE CONDUCTIVITY		kcal/h.m°C	0.03370	HEAT RELEASED BY GAS	kcal/hr			315,164	
FLUE GAS AVERAGE VISCOSITY		kg/mhr	0.00000	HEAT ABSORBED BY STEAM	kcal/hr			308,861	
REYNOLDS NUMBER			0.0	OUTLET FLUE GAS HEAT	kcal/hr			3,606,942	
PRANDTL NUMBER			0.00000	STEAM PRODUCED	kg/hr			694	
NUSSELT COEFFICIENT			0.000	INTERTUBE RADIATION HEAT TRANSF. COEFF.	kcal/m2hr°C			6.3039	
K1 COEFFICIENT			0.000	CONVECTION HEAT TRANSFER COEFF.	kcal/m2hr°C			31.0571	
X COEFFICIENT			0.00000	INTERNAL HEAT TRANSFER COEFF.	kcal/m2hr°C			4000.0000	
FINS EFFICIENCY			0.00000	OVERALL HEAT TRANSFER COEFF.	kcal/m2hr°C			25.4999	
				AVERAGE HEAT FLUX	kcal/m2hr			6,405.7	
				INLET SIDE HEAT FLUX	kcal/m2hr			6,888.7	
				OUTLET SIDE HEAT FLUX	kcal/m2hr			5,946.4	

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


	Client : RECHIM	JOB	1013
	User :	Doc. :	1013-B001
	Project : CALDAIA DI RECUPERO	Date :	16-07-2023
	Location :	Rev. :	B
	Unit :	Page :	7 of 10


  

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   4000 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 456.50								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 0.010400								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 167.28								TUBES THERMAL CONDUCTIVITY kcal/h.m°C 41.148	
TUBES SKIN TEMP. °C 0.00								FINS THERMAL CONDUCTIVITY kcal/h.m°C -1.000	
MAX. DEPOSIT TEMP. °C 228.94								AVERAGE TUBES/FINS DIAMETER mm 0.000	
MAX. FINS TEMPERATURE °C 0.00								INTERTUBE RADIATION FROM CO2 + SO2 kcal/m2hr 438.3	
FLUE GAS NET FREE AREA m2 3.9770								INTERTUBE RADIATION FROM H2O kcal/m2hr 1,000.5	
SURFACE x METER - TUBES m2/m 0.1197								TOTAL INTERTUBE RADIATION kcal/m2hr 1,438.8	
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 210.07	
BARE TUBES SURFACE m2 43.1								SATURATION TEMPERATURE °C 218.54	
FINS SURFACE m2 0.0								INLET FLUE GAS TEMPERATURE °C 456.50	
TOTAL SURFACE m2 74.4								AVERAGE FLUE GAS TEMPERATURE °C 429.74	
FLUE GAS MASS VELOCITY kg/m2hr 6,866.99								OUTLET FLUE GAS TEMPERATURE °C 403.02	
FLUE GAS NORMAL VELOCITY (w0) m/s 1.608								INLET FLUE GAS VELOCITY m/s 4.297	
TEMPERATURE FACTOR 0.00000								AVERAGE FLUE GAS VELOCITY m/s 4.140	
TUBES ARRANGEMENT FACTOR 1.16752								OUTLET FLUE GAS VELOCITY m/s 3.982	
FLUE GAS SPEC. HEAT @ AVERAGE TEMP. kcal/kg°C 0.3061								FLUE GAS PRESSURE LOSS mmH2O 1.534	
FLUE GAS SPEC. HEAT @ FILM TEMP. kcal/kg°C 0.2971								INLET FLUE GAS HEAT kcal/hr 3,606,995	
FLUE GAS AVERAGE CONDUCTIVITY kcal/h.m°C 0.03311								HEAT RELEASED BY GAS kcal/hr 446,922	
FLUE GAS AVERAGE VISCOSITY kg/mhr 0.00000								HEAT ABSORBED BY STEAM kcal/hr 437,984	
REYNOLDS NUMBER 0.0								OUTLET FLUE GAS HEAT kcal/hr 3,160,072	
PRANDTL NUMBER 0.00000								STEAM PRODUCED kg/hr 985	
NUSSELT COEFFICIENT 0.000								INTERTUBE RADIATION HEAT TRANSF. COEFF. kcal/m2hr°C 5.5272	
K1 COEFFICIENT 0.000								CONVECTION HEAT TRANSFER COEFF. kcal/m2hr°C 35.9233	
X COEFFICIENT 0.00000								INTERNAL HEAT TRANSFER COEFF. kcal/m2hr°C 4000.0000	
FINS EFFICIENCY 0.00000								OVERALL HEAT TRANSFER COEFF. kcal/m2hr°C 28.5917	
								AVERAGE HEAT FLUX kcal/m2hr 5,886.1	
								INLET SIDE HEAT FLUX kcal/m2hr 6,667.6	
								OUTLET SIDE HEAT FLUX kcal/m2hr 5,169.2	

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

	Client : RECHIM	JOB	1013
	User :	Doc. :	1013-B001
	Project : CALDAIA DI RECUPERO	Date :	16-07-2023
	Location :	Rev. :	B
	Unit :	Page :	8 of 10
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   4000 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	403.00	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	0.009400	
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	187.11	
TUBES SKIN TEMP.	°C	0.00	
MAX. DEPOSIT TEMP.	°C	224.04	
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	0.2993	
FLUE GAS SPEC. HEAT @ FILM TEMP.	kcal/kg°C	0.2949	
FLUE GAS AVERAGE CONDUCTIVITY	kcal/h.m°C	0.03227	
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	41.275	
FINS THERMAL CONDUCTIVITY	kcal/h.m°C	-1.000	
AVERAGE TUBES/FINS DIAMETER	mm	0.000	
INTERTUBE RADIATION FROM CO2 + SO2	kcal/m2hr	232.6	
INTERTUBE RADIATION FROM H2O	kcal/m2hr	448.1	
TOTAL INTERTUBE RADIATION	kcal/m2hr	680.7	
MEAN BEAM LENGTH	mm	269.45	
LOGARITMIC MEAN TEMP. DIFFERENCE	°C	155.18	
SATURATION TEMPERATURE	°C	218.54	
INLET FLUE GAS TEMPERATURE	°C	403.00	
AVERAGE FLUE GAS TEMPERATURE	°C	375.35	
OUTLET FLUE GAS TEMPERATURE	°C	347.73	
INLET FLUE GAS VELOCITY	m/s	4.740	
AVERAGE FLUE GAS VELOCITY	m/s	4.546	
OUTLET FLUE GAS VELOCITY	m/s	4.352	
FLUE GAS PRESSURE LOSS	mmH2O	1.674	
INLET FLUE GAS HEAT	kcal/hr	3,159,821	
HEAT RELEASED BY GAS	kcal/hr	451,663	
HEAT ABSORBED BY STEAM	kcal/hr	442,629	
OUTLET FLUE GAS HEAT	kcal/hr	2,708,158	
STEAM PRODUCED	kg/hr	995	
INTERTUBE RADIATION HEAT TRANSF. COEFF.	kcal/m2hr°C	3.5401	
CONVECTION HEAT TRANSFER COEFF.	kcal/m2hr°C	31.3244	
INTERNAL HEAT TRANSFER COEFF.	kcal/m2hr°C	4000.0000	
OVERALL HEAT TRANSFER COEFF.	kcal/m2hr°C	25.9522	
AVERAGE HEAT FLUX	kcal/m2hr	3,946.6	
INLET SIDE HEAT FLUX	kcal/m2hr	4,691.4	
OUTLET SIDE HEAT FLUX	kcal/m2hr	3,285.8	
* ( 18 x 63.5 ) + ( 2 x 76.1 )			

	Client : RECHIM	JOB	1013
	User :	Doc. :	1013-B001
	Project : CALDAIA DI RECUPERO	Date :	16-07-2023
	Location :	Rev. :	B
	Unit :	Page :	9 of 10


  

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   4000 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		342.40		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		0.009400					
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		204.03		TUBES THERMAL CONDUCTIVITY		kcal/h.m°C	
TUBES SKIN TEMP.		°C		0.00		FINS THERMAL CONDUCTIVITY		kcal/h.m°C	
MAX. DEPOSIT TEMP.		°C		220.93		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		0.2952		FLUE GAS PRESSURE LOSS		mmH2O	
FLUE GAS SPEC. HEAT @ FILM TEMP.		kcal/kg°C		0.2907		INLET FLUE GAS HEAT		kcal/hr	
FLUE GAS AVERAGE CONDUCTIVITY		kcal/h.m°C		0.03131		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	

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



	Client : RECHIM	JOB	1013
	User :	Doc. :	1013-B001
	Project : CALDAIA DI RECUPERO	Date :	16-07-2023
	Location :	Rev. :	B
	Unit :	Page :	10 of 10
Calter 4.2			
ECONOMIZER			
PATH : C:\Imp\FE\Calter_4.2\W7\General\Calter_42_General.xlsm			ENTH. (kcal/kg)
FUEL : RIFIUTI	LOAD : CASE NOP x 3 [ 4000 ore ]		0 0.000
FLUE GAS ENTHALPY	EXCESS AIR	0.00 %	100 27.332
FLUE GAS ANALYSIS	% vol wet	% wt wet	200 55.666
Carbon Dioxide - CO2	4.883200	8.094113	300 84.640
Nitrogen - N2	62.693700	66.152070	400 114.433
Argon - Ar	0.000000	0.000000	500 144.938
Water Vapor - H2O	25.515500	17.313140	600 176.136
Oxygen - O2	6.811900	8.209782	700 207.999
Carbon Monoxide - CO	0.000000	0.000000	800 240.540
Sulphur Dioxide/Tioxide - SO2/SO3	0.095700	0.230894	900 273.711
Chlorine Acid - HCl	0.000000	0.000000	1000 307.536
Flue Gas Specific Weight ( kg/Nm3 )	1.184588	1.184588	1100 341.981
		1.315037	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	1700 561.343
FLUE GAS SPECIFIC WEIGHT	kg/Nm3	1.1884	1800 599.925
FLUE GAS INLET TEMPERATURE	°C	219.00	1900 639.071
WATER FLOW	kg/hr	8,500	2000 678.758
ADDITIONAL WATER FLOW	kg/hr	0	2100 718.988
INLET WATER TEMP.	°C	120.00	2200 759.748
[1] COLD BANK (AS DEFAULT)		1	
WATER PRESSURE	kg/cm2a	35.000	CODES
CO2 + SO2 PARTIAL PRESSURE	atm	0.04800	MATERIAL
H2O PARTIAL PRESSURE	atm	0.25500	1 = C.S.
RADIATION LOSS	% HHV	2.0000	2 = A.S.
EXCESS AIR	%	0.00	3 = S.S.
GAS SIDE FOULING	m2.h°C/kcal	0.008100	FUEL
WATER/STEAM SIDE FOULING	m2.h°C/kcal	0.000200	0 = GAS
DEPOSIT THICKNESS	mm	0.0000	1 = OIL
DEPOSIT CONDUCTIVITY	kcal/h.m°C	1.00000	2 = COAL
FUEL CODE [0] [1] [2]		2	TUBES TYPE
TUBES TYPE [0] [1] [2]		0	0 = BARE
FINS TYPE [0] [1] [2]		1	1 = FINNED
TUBES MATERIAL : [1] [2] [3]		1	2 = GILLED
FINS MATERIAL : [1] [2] [3]		1	FINS TYPE
			1 = SPIRAL
			2 = ROUND
			3 = SQUARE
WATER FLOW IN ECONOMIZER	kg/hr	8,500	mm 228.38
INLET FLUE GAS TEMPERATURE	°C	219.00	mm 0.00
AVERAGE FLUE GAS TEMPERATURE	°C	184.79	kcal/m2hr 7.8
OUTLET FLUE GAS TEMPERATURE	°C	150.57	kcal/m2hr 17.3
INLET WATER TEMPERATURE	°C	120.00	m2 0.015655
AVERAGE WATER TEMPERATURE	°C	147.02	kcal/kg 120.90
OUTLET WATER TEMPERATURE	°C	174.03	kcal/kg 148.62
FILM TEMPERATURE	°C	165.77	kcal/kg 176.33
LOGARITMIC MEAN TEMP. DIFFERENCE	°C	37.38	m3/kg 0.001059
AVERAGE FINS TEMPERATURE	°C	142.38	m3/kg 0.001088
DEPOSIT AVERAGE TEMPERATURE	°C	142.38	m3/kg 0.001118
TUBES AVERAGE TEMPERATURE	°C	146.45	kg/m3 944.465
FLUE GAS NET FREE AREA	m2	3.9613	kg/m3 918.956
SURFACE x METER - TUBES	m2/m	0.1197	kg/m3 894.788
SURFACE x METER - FINS	m2/m	0.0000	m/s 0.159
SURFACE x METER - TOTAL	m2/m	0.1197	m/s 0.164
BARE TUBES SURFACE	m2	0.0	m/s 0.168
FINS SURFACE	m2	589.9	m/s 2.613
TOTAL SURFACE	m2	589.9	m/s 2.431
INLET FLUE GAS HEAT	kcal/hr	1,503,039	m/s 2.249
HEAT RELEASED BY GAS	kcal/hr	480,806	BARE TUBES LOSS FACTOR
HEAT ABSORBED BY WATER	kcal/hr	471,190	COEFFICIENT C1
OUTLET FLUE GAS HEAT	kcal/hr	1,022,233	COEFFICIENT C2
FLUE GAS SPEC. HEAT @ AVERAGE TEMP.	kcal/kg°C	0.2851	COEFFICIENT C3
FLUE GAS SPEC. HEAT @ FILM TEMP.	kcal/kg°C	0.2833	COEFFICIENT "f" - CAST IRON SLEEVES
FLUE GAS AVERAGE CONDUCTIVITY	kcal/h.m°C	0.02662	COEFFICIENT "fg" - CAST IRON SLEEVES
TUBES THERMAL CONDUCTIVITY	kcal/h.m°C	43.385	FLUE GAS PRESSURE LOSS
FINS THERMAL CONDUCTIVITY	kcal/h.m°C	0.0000	TOTAL TUBES LENGTH
FLUE GAS AVERAGE DYNAMIC VISCOSITY	kg/mhr	0.00000	EQUIVALENT LENGTH
BARE TUBES ARRANGEMENT FACTOR		1.02406	COEFFICIENT "F"
FLUE GAS MASS VELOCITY	kg/m2hr	6,203	WATER SIDE PRESSURE LOSS
FLUE GAS NORMAL VELOCITY (w0)	m/s	1.450	AVERAGE HEAT FLUX
TUBES/FINS EQUIVALENT DIAMETER	mm	0.000	INLET SIDE HEAT FLUX
REYNOLDS NUMBER		0.0	OUTLET SIDE HEAT FLUX
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	26.493	WATER AIR HEATER
INTERTUBE RADIATION HEAT TRANSF. COEFF.	kcal/m2hr°C	0.513	AIR FLOW
GAS SIDE HEAT TRANSF. COEFF.	kcal/m2hr°C	27.006	AIR INLET TEMPERATURE
WATER SIDE HEAT TRANSF. COEFF.	kcal/m2hr°C	1,904	WATER INLET TEMPERATURE
OVERALL HEAT TRANSF. COEFF.	kcal/m2hr°C	21.808	WATER OUTLET TEMPERATURE
			WATER SPECIFIC HEAT
			AIR SPECIFIC HEAT
			HEAT EXCHANGED
			AIR OUTLET TEMPERATURE