

COCINA SOLAR PRIMROSE

TOMA DE DATOS

22/06/2009 Norma india con tapas								
Hora	Estado del cielo	Tamb (°C)	Tw (°C)	I global 0° (W/m2)	I transf. 40°	Vel.viento (m/s)	Humedad (%)	I directa 40°
12:30	Nubosos	26,69	35	920,772575	911,779264	1,591973	14,979933	674,8688
12:40	Casi despejado	26,56	44	943,906355	934,434783	1,18796	14,785953	691,637664
12:50	Nubes finas	27,16	51	846,538462	840,230769	1,020401	14,41806	621,910974
13:00	Nubes finas	27,88	55	936,046823	925,722408	0,975251	13,431438	683,79734
13:10	Nubes finas	28,97	61	950,685619	939,060201	0,82709	13,244147	693,64948
13:20	Nubes finas	29,07	63	786,598662	772,555184	0,968562	12,959866	568,814497
13:30	Nubes finas	29,16	63	741,093645	725,056856	0,796321	12,010033	532,747869
13:40	Nubes finas	29,11	67	680,749164	673,237458	0,788963	12,086957	494,45909
13:50	Nubes finas	29,73	68	1030,943144	1008,9398	1,624749	12,702341	738,278104
14:00	Nubes finas	30,29	71	721,849498	727,143813	0,774916	12,053512	530,971921
14:10	Nubes finas	30,27	70	800,374582	795,421405	1,002676	12,317726	580,571686
14:20	Nubes finas	30,40	73	970,538462	945,190635	1,724749	12	686,68669
14:30	Nubes finas	30,77	76	997,033445	969,354515	1,313043	12	701,784504
				Ta media (°C)	I media	I media	Ib media	
				28,93	871,3177258	859,086699	630,782971	
				I max	I max	I max		
				1030,943144	1008,9398	738,278104		
				958,90301	940,56689	688,326652		

Tiempo total	
02:00	horas
7200	segundos

F1=(Ts-Ta)/(C*Id s)	
Cálculo de F1: F1	
con C1	0,00951189
con C2	0,033518645

F2=[...]	
Cálculo de F2: F2	
#iNUM!	-0,14146741
	0,135957836
	0,72639904

Q=mcp(T2-T1)/(t2-t1)	
Cálculo de Q med	
Qcocina:[W]	35,75541667

Q=rend.óp*I*Ac	
Q max	
	244,3157813
	178,7747813

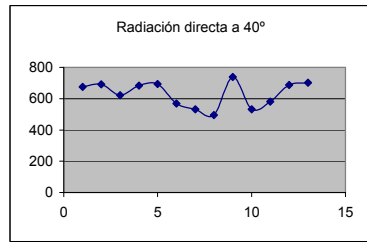
rend=Qmed/I*Ac	
	0,089376208
	0,121724769

rend=Qmax/I*Ac	
	0,200462695
	0,273954747

Inc.Tª (°C)	41
Qmedia normalizada(W)	39,67892735

Cálculo de Q max	
Qcocina:[W]	94,185

línea de tendencia - recta	
tstag (min)	= 119,7176471
Tstag (°C)	= 76



t (min)	t1	t2	t (sec)
0	30	90	0
10	30	90	600
20	30	90	1200
30	30	90	1800
40	30	90	2400
50	30	90	3000
60	30	90	3600
70	30	90	4200
80	30	90	4800
90	30	90	5400
100	30	90	6000
110	30	90	6600
120	30	90	7200

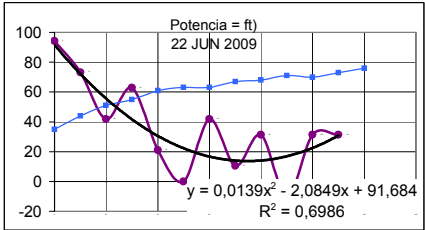
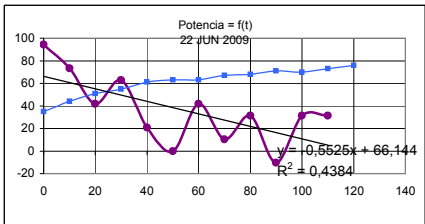
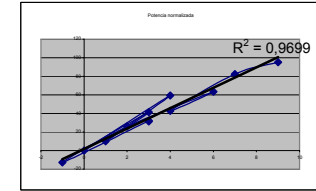
Q<<I*Ac*rd.o

x = t (Tiempo)	y1 = Potencia	y2 = Tª (temperatura)	Inc. Tª
163,42	0	94,185	35
167,48	10	73,255	44
150,60	20	41,86	51
165,58	30	62,79	55
167,97	40	20,93	61
137,74	50	0	63
129,01	60	41,86	63
119,73	70	10,465	67
178,77	80	31,395	68
128,58	90	-10,465	71
140,59	100	31,395	70
166,28	110	31,395	73
169,94	120	MEDIA	76
		35,75541667	

Q'norm	
95,3237561	
82,4531197	
42,8518777	
63,3648568	
25,7570791	
0	
59,2607166	
9,92241265	
41,3891943	
-12,6177356	
32,0036784	
31,3151685	
39,6789273	

tstag (min)	= 119,7176471	línea de	y=0
Tstag (°C)	= 76	tendencia -	x=0
Qmáxima	= 66,144	recta	y= 0-0,5525X+66,144

tstag (min)	= -	línea de	y=0
Tstag (°C)	= -	tendencia -	y=0
Qmáxima	= 91,684	parábola	x=0
			y= 0,0139x^2-2,0849x+91,684



23/06/2009 Norma india con tapas								
Hora	Estado del cielo	Tamb (°C)	Tw (°C)	I global 0° (W/m2)	I transf. 40°	Vel.viento (m/s)	Humedad (%)	I directa 40°
09:30	Despejado	24,453512	30	406,953177	351,431438	0,769565	30,113712	251,700895
09:40	Despejado	25,138796	37	430,939799	379,913043	0,549498	28,311037	273,481862
09:50	Despejado	25,198328	45	462,812709	417,133779	1,047492	28,287625	301,992736
10:00	Despejado	25,646823	52	505,501672	461,020067	0,709365	27,311037	334,933856
10:10	Despejado	25,933779	60	543,712375	502,391304	0,965886	26,117057	364,990309
10:20	Despejado/aire	25,952843	65	524,695652	490,488294	1,021739	26,040134	358,003461
10:30	Despejado	25,913043	68	606,702341	570,488294	0,907023	25,949833	416,763903
10:40	Despejado	26,443478	75	606,133779	574,294314	1,008361	25,909699	420,232127
10:50	Despejado	26,150836	76	662,829431	632,35786	1,226087	24,989967	464,435079
11:00	Despejado	27,09398	83	688,204013	656,371237	1,180936	22,87291	482,856831
11:10	Despejado/aire	27,370569	83	704,61204	677,608696	1,260201	23,010033	498,907596
11:20	Despejado	27,489632	84	722,923077	699,464883	1,264548	23,839465	516,669168
11:30	Despejado	27,272575	85	757,468227	732,581394	2,108027	26,090301	541,131528
11:40	Despejado	27,792977	86	781,421405	760,846154	1,293645	26,361204	563,153113
11:50	Despejado	28,216722	90	805,016722	786,254181	1,933445	26,32107	581,959292
12:00	Despejado	28,280936	91	825,023411	805,267559	2,118395	26,043478	596,992159
12:10	Despejado	28,732776	88	853,468227	831,284281	1,840803	25,795987	616,279884
12:20	Despejado	29,07893	90	870,548495	847,438127	2,26087	24,782609	628,255679
12:30	Despejado	29,191973	84	890,227425	866,602007	2,18796	24,682274	641,430091
12:40	Despejado	29,453846	84	909,605351	884,006689	2,309365	23,943144	654,31246
12:50	Despejado	30,016722	84	921,541806	896,086957	1,891639	22,431438	663,253874
13:00	Despejado	30,798997	85	938,488294	913,762542	1,90301	20,896321	674,963023
13:10	Despejado	30,703679	84	951,117057	924,979933	2,550502	20,652174	683,2489
13:20	Despejado	30,638796	83	930,488294	902,060201	3,11806	20,628763	664,166043
13:30	Despejado	30,820067	82	972,133779	938,187291	3,009365	20,153846	689,349085
13:40	Despejado	31,011706	81	977,311037	943,16388	2,941137	19,41806	692,706486

Ta media (°C)
26,28

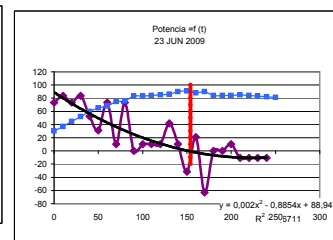
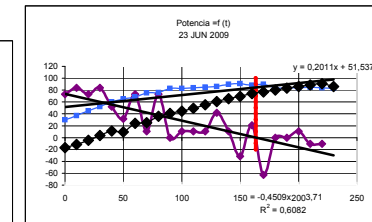
I media
720,8514491
I max
951,117057

I media
690,172241
I max
924,979933

argumento del ln
-0,55835359
-0,53969696

rend=Qmed/I*Ac
0,066424606
0,090229276

rend=Qmax/I*Ac
0,170067778
0,230237154



t (min)	t1	t2	t (sec)
0	30	90	0
10	30	90	600
20	30	90	1200
30	30	90	1800
40	30	90	2400
50	30	90	3000
60	30	90	3600
70	30	90	4200
80	30	90	4800
90	30	90	5400
100	30	90	6000
110	30	90	6600
120	30	90	7200
130	30	90	7800
140	30	90	8400
150	30	90	9000
160	30	90	9600
170	30	90	10200
180	30	90	10800
190	30	90	11400
200	30	90	12000
210	30	90	12600
220	30	90	13200
230	30	90	13800
240	30	90	14400
250	30	90	15000

tstag (min) = 163,4730539
Tstag (°C) = 91
Qmáxima = 73,71

tstag (min) = 154,1017844
Tstag (°C) = 89
Qmáxima = 88,947

línea de tendencia - recta

línea de tendencia - parábola

$$Q = mcp(T2 - T1)/(t2 - t1)$$

x = t (Tiempo)	y1 = Potencia	y2 = Tª (temperatura)	Inc. Tº
0	73,255	30	7
10	83,72	37	8
20	73,255	45	7
30	83,72	52	8
40	52,325	60	5
50	31,395	65	3
60	73,255	68	7
70	10,465	75	1
80	73,255	76	7
90	0	83	0
100	10,465	83	1
110	10,465	84	1
120	10,465	85	1
130	41,86	86	4
140	10,465	90	1
150	-31,395	91	-3
160	20,93	98	2
170	-62,79	90	-6
180	0	84	0
190	0	84	0
200	10,465	84	1
210	-10,465	85	-1
220	-10,465	84	-1
230	-10,465	83	-1
240	-10,465	82	-1
250	MEDIA 21,3486	81	

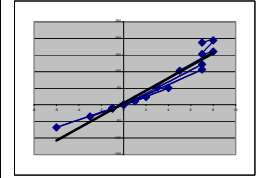
$$y = 0,04509x + 73,71$$

$$y = 0,002x^2 - 0,8854x + 89,947$$

línea de tendencia - recta

tstag (min) = 163,4730539
Tstag (°C) = 89

Q < I*Ac*rd.o
60,9496234
66,2239063
73,127843
81,1045681
88,3827683
86,690896
100,919796
101,75963
112,463419
116,924264
120,810973
125,111956
131,035541
136,368089
140,922025
144,562248
149,23279
152,132741
155,322938
158,442416
160,607589
163,442971
165,449404



Q'norm
187,5023802
194,0576479
153,1003782
160,5631673
102,3104635
52,73129419
122,024226
15,77292571
106,1981455
0
14,17831846
13,53737421
13,00800765
50,35060077
12,27068042
-35,659934
23,32012345
-68,5234457
0
0
10,85318713
-10,7215687
-11,0296214
-10,6266914
-10,5751861
29,41226266

ESTANCAMIENTO	
tiempo	temperatura
163,473054	100
163,473054	90
163,473054	80
163,473054	70
163,473054	60
163,473054	50
163,473054	40
163,473054	30
163,473054	20
163,473054	10
163,473054	0
163,473054	-10
163,473054	-20

ESTANCAMIENTO	
tiempo	temperatura
154,101784	100
154,101784	90
154,101784	80
154,101784	70
154,101784	60
154,101784	50
154,101784	40
154,101784	30
154,101784	20
154,101784	10
154,101784	0
154,101784	-10
154,101784	-20

Tiempo total
03:50 horas
15000 segundos

F1=(Ts-Ta)/(C*Id s)
Cálculo de F1: **F1**
0,015504964
0,055212549

F2=[...]
Cálculo de F2: **F2**
#INUM!
#INUM!

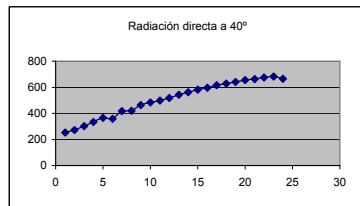
Q=mcp(T2-T1)/(t2-t1)
Cálculo de **Q med**
Qcocina:[W] 21,3486

Q=rend.óp*1*Ac
Q máx
223,9848158
165,4494045

Inc.Tª (°C) 51
Qmedia normalizada(W) 29,41226266

Cálculo de **Q máx**
Qcocina:[W] 73,255

línea de tendencia - parábola
tstag (min) = 154,1017844 288,5982156
Tstag (°C) = 91 -



13/07/2009		Norma india con tapas						
Hora	Estado del cielo	Tamb (°C)	Tw (°C)	I global 0° (W/m²)	I transf. 40°	Vel.viento (m/s)	Humedad (%)	I directa 40°
11:10	Despejado	27,96388	33	686,234114	669,304348	1,321405	24,859532	509,583992
11:20	Despejado	28,432107	38	708,645485	693,785953	1,262207	25,170569	529,986318
11:30	Despejado	29,211371	46	737,448161	725,886288	1,740134	26,190635	555,331848
11:40	Despejado	29,580936	54	763,585284	752,762542	2,132441	25,408027	576,093782
11:50	Despejado	29,673244	64	786,698997	778,394649	1,786622	24,779264	596,592724
12:00	Despejado	29,701338	69	807,180602	799,839465	2,211706	23,993311	613,028887
12:10	Despejado	30,129603	76	824,743682	817,707581	1,749097	23,064982	626,723724
12:20	Despejado	29,960156	79	848,789062	838,832031	3,144141	22,46875	642,914346
12:30	Despejado	29,937838	82	868,905405	856,445946	2,75777	22,314189	656,414353
12:40	Despejado	30,450836	85	885,431438	871,799331	2,849833	22,153846	668,1818
12:50	Despejado	30,558528	84	896,675585	883,147157	3,472575	22,638796	675,877926
13:00	Despejado	31,032107	84	906,240803	891,284281	2,999666	21,83612	680,85621
13:10	Despejado	31,534448	83	923,598662	907,595318	3,17592	19,859532	693,316287
13:20	Despejado	31,753846	84	925,816054	909,715719	2,883278	18,882943	692,624468
13:30	Despejado	31,643813	83	936,434783	917,254181	3,831438	18,852843	698,114957
13:40	Despejado	31,898328	82	943,046823	921,96999	3,522074	18,133779	700,655169
13:50	Despejado	32,125753	81	949,688963	924,882943	4,121405	17,488294	700,253448
14:00	Despejado	32,214047	81	951,635452	925,494983	3,576254	16,899666	698,087644
14:10	Despejado	32,548829	81	951,394649	922,408027	3,370903	15,909699	695,759198
14:20	Despejado	32,83612	82	954,953177	921,438127	3,813378	14,729097	692,13529
14:30	Despejado	33,065886	81	950,404682	912,899666	3,583946	14,672241	685,199404
14:40	Despejado	33,168896	81	951,571906	908,200669	3,677592	14,033445	679,841101
14:50	Despejado	33,532107	81	945,384615	896,949833	3,121405	14,866221	668,029922
15:00	Despejado	33,539465	84	937,591973	887,250836	3,510702	14,832776	659,750622
15:10	Despejado	33,474247	81	933,598662	878,214047	3,764214	15	651,213691
15:20	Despejado	33,575585	81	922,013378	863,234114	3,571572	15	636,711687
15:30	Despejado	33,792642	79	916,876254	850,428094	3,145819	14,812709	624,59671
15:40	Despejado	33,710368	77	904,301003	833,100334	3,825753	15,006689	608,375821
15:50	Despejado	33,644482	78	897,153846	818,682274	4,202007	14,979933	597,039024
16:00	Despejado	33,965217	81	880,785953	797,688963	3,371237	15	579,238826

Ta media (°C)
29,5041309

I media
883,2276484

I media
852,553253

Ib media
643,084306

I max
954,953177

I max
925,494983

I max
700,655169

783,5100335

733,496656

588,882896

647,034847

Tiempo total
04:50 horas
17400 segundos

$F1 = (Ts - Ta) / (C * Id \cdot s)$
Cálculo de F1:
F1
0,010324465
0,036382052

$F2 = [\dots]$
Cálculo de F2:
F2
#INUM!
0,06636789
0,090115657
0,72228763

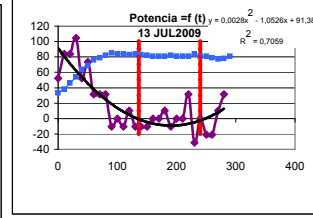
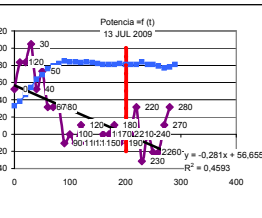
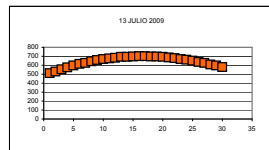
$Q = mcp(T2 - T1) / (t2 - t1)$
Cálculo de **Q med**
Qcocina: [W] 17,32137931

$Q = rend \cdot \dot{m} \cdot T \cdot \Delta C$
Q max
224,1095356
169,6643497

Inc. T* (°C) 48
Qmedia normalizada (W) 18,85439499

Cálculo de **Q max**
Qcocina: [W] 52,325

línea de tendencia - parábola
tstag (min) = 136,05226 239,8763115
Tstag (°C) = 83 81



tstag (min) = 201,6192171
Tstag (°C) = 81
Qmáxima = 56,655

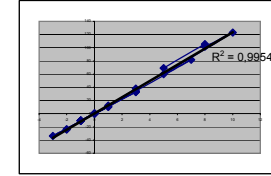
línea de tendencia - recta
 $y = 0 - 0,281x + 56,655$
y=0
x=0

tstag (min) = 136,05226
Tstag (°C) = 83
Qmáxima = 91,38

línea de tendencia - parábola
 $y = 0,0028x^2 - 1,0526x + 91,38$
y=0
x=0

$Q = mcp(T2 - T1) / (t2 - t1)$

x = t (Tiempo)	y1 = Potencia	y2 = Tª (temperatura)	Inc. T°
0	52,325	33	5
10	83,72	38	8
20	104,72	46	8
30	83,65	54	10
40	52,325	64	5
50	73,255	69	7
60	31,395	76	3
70	31,395	79	3
80	31,395	82	3
90	-10,465	85	-1
100	0	84	0
110	-10,465	84	-1
120	10,465	83	-1
130	-10,465	84	-1
140	-10,465	83	-1
150	-10,465	82	-1
160	0	81	0
170	0	81	0
180	10,465	81	1
190	-10,465	82	-1
200	0	81	0
210	0	81	0
220	31,395	81	3
230	-31,395	84	-3
240	0	81	0
250	-20,93	81	-2
260	-20,93	79	-2
270	10,465	77	1
280	31,395	78	3
290	17,32137931	81	



ESTANCAMIENTO	
tiempo	temperatura
201,619217	100
201,619217	90
201,619217	80
201,619217	70
201,619217	60
201,619217	50
201,619217	40
201,619217	30
201,619217	20
201,619217	10
201,619217	0
201,619217	-10
201,619217	-20

ESTANCAMIENTO		ESTANCAMIENTO	
tiempo	temperatura	tiempo	temperatura
136,05226	100	239,876312	100
136,05226	90	239,876312	90
136,05226	80	239,876312	80
136,05226	70	239,876312	70
136,05226	60	239,876312	60
136,05226	50	239,876312	50
136,05226	40	239,876312	40
136,05226	30	239,876312	30
136,05226	20	239,876312	20
136,05226	10	239,876312	10
136,05226	0	239,876312	0
136,05226	-10	239,876312	-10
136,05226	-20	239,876312	-20

Q'norm
69,11027462
105,529694
101,7264928
122,7889598
59,74840791
81,81994397
34,18262502
33,47961527
32,89000089
-10,8384957
0
-10,5658848
10,57643837
-10,4932575
-10,4552144
-10,4612123
0
0
10,58391344
-10,6910484
0
0
33,31031344
-37,9469871
0
-23,4567358
-24,0821537
12,26971723
37,94030895
18,8544

14/07/2009	Norma india con tapas							
Hora	Estado del cielo	Tamb (°C)	Tw (°C)	I global 0° (W/m²)	I transf. 40°	Vel.viento (m/s)	Humedad (%)	I directa 40°
10:10	Despejado	23,106689	30	535,244147	501,913043	2,786288	31,959866	377,010371
10:20	Despejado	22,926756	38	565,314381	534,19398	3,691304	32,501672	402,934888
10:30	Despejado	23,407358	46	595,284281	567,785953	3,050167	31,849498	429,57063
10:40	Despejado	23,032107	53	621,996656	595,053512	3,783278	32,511706	450,530823
10:50	Despejado	23,151505	60	649,638796	625,789298	3,720401	32,561873	475,571389
11:00	Despejado	23,080936	64	678,230769	653,959866	3,557191	32,51505	496,979739
11:10	Despejado	23,750502	69	703,832776	682,090301	2,397993	31,638796	519,318752
11:20	Despejado	23,595987	71	728,083612	710,234114	2,545151	31,879599	542,551145
11:30	Despejado	23,706355	74	753,183946	738,698997	2,532441	31,488294	565,134079
11:40	Despejado	23,959197	76	777,351171	764,668896	3,051505	31,043478	585,205788
11:50	Despejado	24,530769	80	799,966555	792,026756	2,91806	29,571906	607,040915
12:00	Despejado	23,958528	81	823,150502	815,471572	3,654849	30,591973	625,009958
12:10	Despejado	24,511371	83	843,87291	834,123746	2,130769	29,77592	639,305728
12:20	Despejado	24,838127	86	859,341137	849,334448	2,356856	28,361204	650,963817
12:30	Despejado	25,241137	86	880,468227	869,361204	2,545485	28,023411	666,313122
12:40	Despejado	25,9301	86	899,58194	887,698997	2,077592	25,819398	680,367939
12:50	Despejado	25,931773	88	914,759197	901,822742	2,656856	26,38796	690,170466
13:00	Despejado	25,945485	87	927,454849	913,976589	2,495987	25,765886	698,19097
13:10	Despejado	26,308696	86	938,936455	923,929766	2,627425	24,80602	705,794248
13:20	Despejado	26,324415	86	948,525084	933,003344	3,106355	23,973244	710,354819
13:30	Despejado	26,77291	85	952,327759	933,351171	2,50602	23,913043	710,36625
13:40	Despejado	27,131438	85	960,354515	940,722408	2,825753	22,314381	714,906221
13:50	Despejado	27,068562	84	967,668896	943,033445	3,672575	21,692308	713,995676
14:00	Despejado	27,09699	82	973,411371	944,899666	3,616722	20,361204	712,724319
14:10	Despejado	27,467893	82	975,304348	943,692308	3,430435	19,993311	711,813627
14:20	Despejado	27,66087	82	978,578595	940,217391	3,808696	19,434783	706,241274
14:30	Despejado	27,860535	81	976,816054	933,943144	3,791304	19,123746	700,994107
14:40	Despejado	28,063545	82	987,257525	937,026756	2,892642	17,963211	701,419106
14:50	Despejado	28,195987	83	1002,153846	948,949833	3,657525	14,578955	706,75846
15:00	Despejado	28,649833	84	1048,404682	979,083612	3,489967	15,494983	728,036532
15:10	Despejado	28,564214	82	1061,254181	979,755853	3,845151	15,073579	726,509018
15:20	Despejado	28,655518	80	874,494983	806,705686	3,473913	16,100334	595,01696
15:30	Despejado	28,519398	77	843,301003	785,314381	3,999331	17,424749	576,773959
15:40	Despejado	28,585953	74	699,093645	641,67893	3,314716	16,016722	468,589352

Tiempo total	25,80974821	Ib media	845,4305528	Ib media	816,279756	Ib media	617,425425
05:30 horas		I max	1061,254181	I max	979,755853	I max	728,036532
19:00 segundos			617,168896		571,795987		537,60067

$F1 = (Ts - Ta) / (C * Id \cdot s)$ $F2 = \dots$ $561,231695$

F1 Cálculo de F1: 0,012905754 0,045478174 Q = mcp(T2-T1)/(t2-t1)	F2 Cálculo de F2: #iNUM! 0,16081534 Q = rend.óp * I * Ac	argumento del ln -0,28391049 0,67382719 rend = Qmed / I * Ac 0,036707602 0,048530027
--	--	--

Q med Cálculo de Qcocina: [W] 13,95333333	Q max 237,2488596 176,2947743	rend = Qmax / I * Ac 0,183496772 0,246940955
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Inc.Tª (°C)	44
Qmedia normalizada (W)	15,81945437

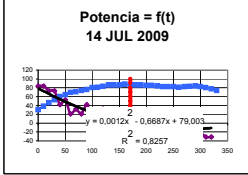
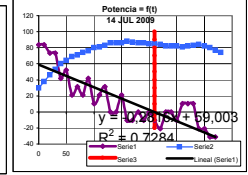
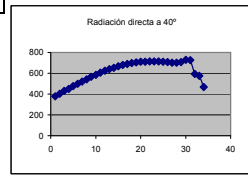
Cálculo de Q max Qcocina: [W]	83,72
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línea de tendencia - parábola		
tstag (min) =	170,0153444	387,2346556
Tstag (°C) =	87	-

t (min)	t1	t2	t (sec)
0	30	90	0
10	30	90	600
20	30	90	1200
30	30	90	1800
40	30	90	2400
50	30	90	3000
60	30	90	3600
70	30	90	4200
80	30	90	4800
90	30	90	5400
100	30	90	6000
110	30	90	6600
120	30	90	7200
130	30	90	7800
140	30	90	8400
150	30	90	9000
160	30	90	9600
170	30	90	10200
180	30	90	10800
190	30	90	11400
200	30	90	12000
210	30	90	12600
220	30	90	13200
230	30	90	13800
240	30	90	14400
250	30	90	15000
260	30	90	15600
270	30	90	16200
280	30	90	16800
290	30	90	17400
300	30	90	18000
310	30	90	18600
320	30	90	19200
330	30	90	19800

tstag (min) =	209,5276989	línea de
Tstag (°C) =	85	tendencia -
Qmáxima =	59,003	recta

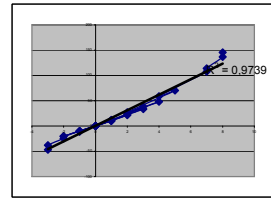
tstag (min) =	170,0153444	línea de
Tstag (°C) =	87	tendencia -
Qmáxima =	79,003	parábola



Q = mcp(T2-T1)/(t2-t1)

x = t (Tiempo)	y1 = Potencia	y2 = Tª (temperatura)
0	83,72	30
10	83,72	38
20	73,255	46
30	73,255	53
40	41,86	60
50	52,255	64
60	20,93	69
70	31,395	71
80	20,93	74
90	41,86	76
100	10,465	80
110	20,93	81
120	31,395	83
130	0	86
140	0	86
150	20,93	86
160	-10,465	88
170	-10,465	87
180	0	86
190	-10,465	86
200	0	85
210	-10,465	85
220	-20,93	84
230	0	82
240	0	82
250	-10,465	82
260	10,465	81
270	10,465	82
280	10,465	83
290	-20,93	84
300	-20,93	82
310	-31,395	80
320	-31,395	77
330	MEDIA	74

Q'norm
145,442854
136,424597
113,817962
107,825031
58,9601501
70,5299007
27,0039058
38,8872319
25,0366376
48,2702224
11,7206133
22,9170479
33,7599409
0
0
21,2280889
-10,4921151
-10,3790871
0
-10,3122861
-10,2598661
-20,5563352
0
0
-10,4501592
10,4438273
10,3649272
10,0619951
-20,1663016
-24,6228276
-38,1024484
-46,8992731
15,8194544



ESTANCAMIENTO	
tiempo	temperatura
209,527699	100
209,527699	90
209,527699	80
209,527699	70
209,527699	60
209,527699	50
209,527699	40
209,527699	30
209,527699	20
209,527699	10
209,527699	0
209,527699	-10
209,527699	-20

ESTANCAMIENTO		ESTANCAMIENTO	
tiempo	temperatura	tiempo	temperatura
170,015344	100	387,234656	100
170,015344	90	387,234656	90
170,015344	80	387,234656	80
170,015344	70	387,234656	70
170,015344	60	387,234656	60
170,015344	50	387,234656	50
170,015344	40	387,234656	40
170,015344	30	387,234656	30
170,015344	20	387,234656	20
170,015344	10	387,234656	10
170,015344	0	387,234656	0
170,015344	-10	387,234656	-10
170,015344	-20	387,234656	-20

20/07/2009		Norma india con tapas						
Hora	Estado del cielo	Tamb (°C)	Tw (°C)	I global 0° (W/m²)	I transf. 40°	Vel.viento (m/s)	Humedad (%)	I directa 40°
10:00	Despejado	24,356856	29	457,645485	439,839465	1,228094	35,729097	329,245459
10:10	Despejado	24,411037	36	490	477,448161	1,442809	35,501672	358,633653
10:20	Despejado	24,250502	43	519,648829	513,157191	1,93913	36,705686	387,067138
10:30	Despejado	24,577926	48	517,598662	514,946488	1,511371	35,61204	389,5938
10:40	Despejado	24,368562	53	573,083612	564,301003	2,37291	36,591973	427,247282
10:50	Despejado	24,892642	59	611,688963	602,949833	1,541137	35,240803	458,214435
11:00	Despejado	25,470903	63	640,277592	635,832776	2,237458	34,672241	483,203975
11:10	Despejado	25,265217	68	666,183946	663,090301	1,949164	35,381271	504,852843
11:20	Despejado	25,646154	71	685,732441	687,732441	1,821739	33,698997	525,362012
11:30	Despejado	25,961538	74	716,769231	720,568562	1,88194	33,19398	551,263576
11:40	Despejado	25,934228	77	732,033557	739,761745	2,075168	33,489933	566,144193
11:50	Despejado	25,893311	78	748,431438	758,906355	3,138462	32,732441	581,656118
12:00	Nubes finas	26,735254	80	743,881356	754,481356	1,731525	31,555932	578,264622
12:10	Nubes finas	27,584564	82	807,798658	825,271812	1,51745	29,231544	632,521253
12:20	Nubes finas	27,988629	82	796,762542	820,190635	1,186288	28,652174	628,626836
12:30	Nubes	28,160201	82	789,782609	818,140468	1,259866	28,384615	627,055506
12:40	Cubierto	29,197993	81	799,050167	828,685619	1,035117	25,876254	635,137731
12:50	Cubierto	29,473913	79	622,280936	628,632107	0,946488	24,428094	481,096
13:00	Cubierto	29,539799	76	519,304348	492,267559	0,798997	23,551839	376,045479

3:00	horas	26,30048574
10800	segundos	

Ib media	654,6291775	Ib media	657,168625	Ib media	501,117469
I max	807,798658	I max	828,685619	I max	635,137731
	488,4749165		466,053512		478,150482

$F1 = (Ts - Ta) / (C * Id \cdot s)$

$F2 = [\dots]$

356,487914

Cálculo de F1:

0,012696582
0,044741079

Cálculo de F2:

#iNUM!	-0,91245765
0,343931112	0,51877548

$Q = mcp(T2 - T1) / (t2 - t1)$

$Q = rend.op * I * Ac$

Cálculo de Qcocina: [W]

Q med	27,32527778
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Q máx

200,6670513
153,7992366

Inc. T° (°C)

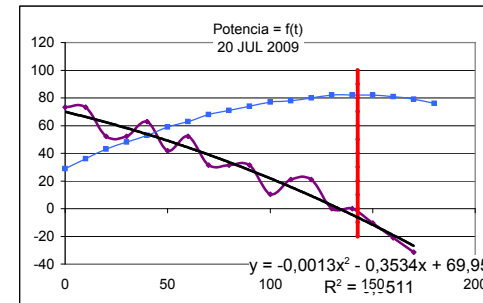
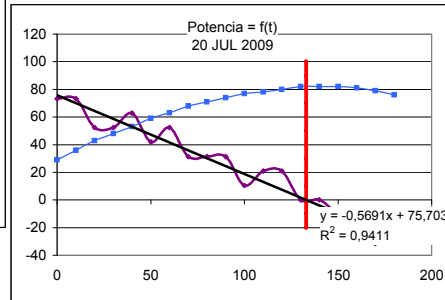
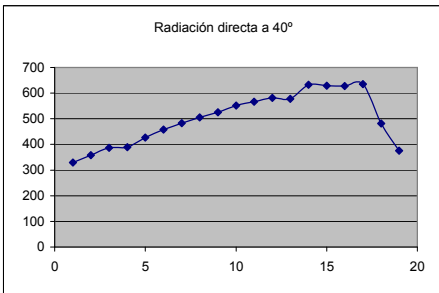
47	
Qmedia normalizada(W)	38,17008112

Cálculo de Qcocina: [W]

Q máx	73,255
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línea de tendencia - recta

tstag (min)	= 133,0223159
Tstag (°C)	= 82



tstag (min)	= 133,0223159
Tstag (°C)	= 82
Qmáxima	= 75,703

línea de tendencia - recta

$y = 0 - 0,5691x + 75,703$

tstag (min)	= 142,7656213
	= -414,6117752
Tstag (°C)	= 82
Qmáxima	= 76,95

línea de tendencia - parábola

$y = 0 - 0,0013x^2 - 0,3534x + 76,95$

línea de tendencia - parábola

tstag (min)	142,7656213	-414,6117752
Tstag (°C)	82	-

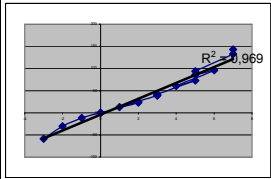
t (min)	t1	t2	t (sec)
0	30	90	0
10	30	90	600
20	30	90	1200
30	30	90	1800
40	30	90	2400
50	30	90	3000
60	30	90	3600
70	30	90	4200
80	30	90	4800
90	30	90	5400
100	30	90	6000
110	30	90	6600
120	30	90	7200
130	30	90	7800
140	30	90	8400
150	30	90	9000
160	30	90	9600
170	30	90	10200
180	30	90	10800

$Q = mcp(T2 - T1) / (t2 - t1)$

x = t (Tiempo)	y1 = Potencia	y2 = T° (temperatura)
0	73,255	29
10	73,255	36
20	52,325	43
30	52,325	48
40	62,79	53
50	41,86	59
60	52,325	63
70	31,395	68
80	31,395	71
90	31,395	74
100	10,465	77
110	20,93	78
120	20,93	80
130	0	82
140	0	82
150	-10,465	82
160	-20,93	81
170	-31,395	79
180	MEDIA	76

Q'norm

142,982956
132,479601
94,0145865
85,7290416
95,9223382
60,6410574
72,5508443
41,8311554
39,8656848
38,8178494
12,5942112
25,3361514
23,1628581
0
0
0
-11,5337188
-30,4533814
-58,4410695
38,1700811



ESTANCAMIENTO

tiempo	temperatura
133,022316	100
133,022316	90
133,022316	80
133,022316	70
133,022316	60
133,022316	50
133,022316	40
133,022316	30
133,022316	20
133,022316	10
133,022316	0
133,022316	-10
133,022316	-20

ESTANCAMIENTO

tiempo	temperatura
142,765621	100
142,765621	90
142,765621	80
142,765621	70
142,765621	60
142,765621	50
142,765621	40
142,765621	30
142,765621	20
142,765621	10
142,765621	0
142,765621	-10
142,765621	-20

20/07/2009		Norma europea sin tapas						
Hora	Estado del cielo	Tamb (°C)	Tw (°C)	I global 0° (W/m²)	I transf. 40°	Vel.viento (m/s)	Humedad (%)	I directa 40°
13:30	Muy nublado	30,124415	40	353,682274	318,086957	1,476923	22,752508	242,093486
13:40	Muy nublado	30,002341	41	315,391304	300,16388	1,82709	21,822742	228,110889
13:50	Muy nublado	29,924415	41	234,889632	214,381271	2,083278	21,454849	162,313756
14:00	Muy nublado	30,110135	40	165,837838	146,050676	1,163176	21,246622	110,163938
14:10	Muy nublado	29,830769	40	152,826087	138,953177	1,396656	20,989967	104,374233
14:20	Muy nublado	29,81443	39	183,503356	166,332215	1,749329	20,942953	124,509351
14:30	Muy nublado	29,968227	39	214,464883	193,531773	0,889632	20,886288	144,138513
Tiempo total		29,96781886		Ib media	Ib media			Ib media
01:00 horas				231,5136249	211,071421			159,38631
3600 segundos				I max	I max			I max
				353,682274	318,086957			242,093486
				284,0735785	255,809365			202,203621

$$F1 = (Ts - Ta) / (C * Id \cdot s)$$

Cálculo de F1:	
F1	
0,00924768	
0,032587605	

$$Q = mcp(T2 - T1) / (t2 - t1)$$

Cálculo de Q med
Qcocina: [W]
-1,744166667

Inc. T° (°C)	-1
Qmedia normalizada(W)	-7,660110018

Cálculo de Q max
Qcocina: [W]
10,465

línea de tendencia - recta	
tstag (min)	= 16,66650741
Tstag (°C)	= 41

$$F2 = [\dots]$$

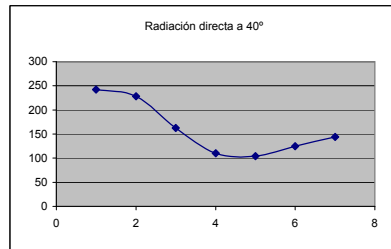
Cálculo de F2:	
F2	argumento del ln
-9,194681412	0,64025424
0,313940224	0,96728391
0,082528376	

$$Q = \text{rend.} \cdot \text{op} \cdot I \cdot A \cdot c$$

Cálculo de Q max
Q max
46,86391236
58,62317974

rend=Qmed/I*Ac
-0,017744985
-0,023499252

rend=Qmax/I*Ac
0,07064972
0,092826763



t (min)	t1	t2	t (sec)
0	30	90	0
10	30	90	600
20	30	90	1200
30	30	90	1800
40	30	90	2400
50	30	90	3000
60	30	90	3600

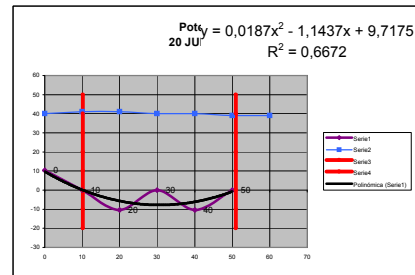
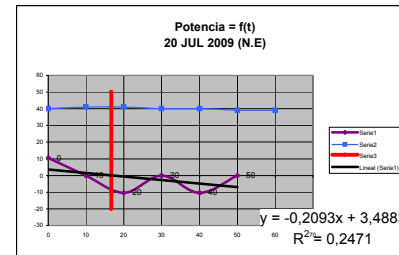
tstag (min)	= 16,66650741
Tstag (°C)	= 41
Qmáxima	= 3,4883

tstag (min)	= 10,19646852
	= 50,96395929
Tstag (°C)	= 40
	= 39
Qmáxima	= 9,7175

línea de tendencia - recta
 $y = 0,02093x + 3,4883$

línea de tendencia - parábola
 $y = 0,0187x^2 - 1,1437x + 9,7175$

línea de tendencia - parábola	
tstag (min)	10,19646852
Tstag (°C)	39
	40



$$Q = mcp(T2 - T1) / (t2 - t1)$$

x = t (Tiempo)	y1 = Potencia	y2 = Tª (temperatura)
0	10,465	40
10	0	41
20	-10,465	41
30	0	40
40	-10,465	40
50	0	39
60	MEDIA	39
		-1,744166667

Q'norm	
32,1137672	
0	
-66,4963517	
0	
-58,8349383	
0	
-7,66011002	

ESTANCAMIENTO	
tiempo	temperatura
16,6665074	50
16,6665074	40
16,6665074	30
16,6665074	20
16,6665074	10
16,6665074	0
16,6665074	-10
16,6665074	-20

ESTANCAMIENTO	
tiempo	temperatura
50,9639593	50
50,9639593	40
50,9639593	30
50,9639593	20
50,9639593	10
50,9639593	0
50,9639593	-10
50,9639593	-20

ESTANCAMIENTO	
tiempo	temperatura
10,1964685	50
10,1964685	40
10,1964685	30
10,1964685	20
10,1964685	10
10,1964685	0
10,1964685	-10
10,1964685	-20

21/07/2009		Norma india con tapas						
Hora	Estado del cielo	Tamb (°C)	Tw (°C)	I global 0° (W/m²)	I transf. 40°	Vel.viento (m/s)	Humedad (%)	I directa 40°
10:00	Casi despejado	24,454515	28	445,434783	429,133779	1,905686	38,879599	321,231629
10:10	Casi despejado	24,989632	30	474,361204	465,307692	1,687625	36,397993	349,514379
10:20	Casi despejado	25,588629	32	502,578595	497,217391	1,456187	34,331104	375,043975
10:30	Casi despejado	25,880602	35	531,762542	526,628763	1,731438	33,040134	398,432276
10:40	Casi despejado	26,083612	37	561,67893	555,040134	1,523411	32,548495	420,235632
10:50	Casi despejado	26,550502	40	589,48495	586,672241	0,921739	32,070234	445,844206
11:00	Casi despejado	26,880936	43	614,662207	614,725753	1,528428	31,337793	467,163598
11:10	Casi despejado	26,917391	46	639,822742	642,749164	1,388963	31,521739	489,365841
11:20	Casi despejado	27,151839	49	666,729097	671,327458	1,795318	30,32107	512,761418
11:30	Casi despejado	27,886288	51	688,976589	697,324415	1,344482	29,147157	533,480888
11:40	Casi despejado	28,398997	54	708,254181	719,698997	1,048829	28,337793	550,790049
11:50	Casi despejado	28,459866	57	728,956522	745,050167	1,894983	28,214047	571,036182
12:00	Casi despejado	29,317391	60	749,595318	765,421405	1,223077	26,876254	586,649512
12:10	Casi despejado	30,234114	63	767,685619	783,675585	1,351839	25,41806	600,640244
12:20	Casi despejado	30,718729	65	786,909699	802,143813	1,748495	23,822742	614,795031
12:30	Casi despejado	31,014716	69	802,381271	817,816054	2,191304	23,70903	626,806862
12:40	Casi despejado	31,394649	71	820,314381	833,180602	1,950836	22,929766	638,582865
12:50	Casi despejado	31,525084	73	834,672241	844,016722	3,036789	22,29097	645,931165
13:00	Casi despejado	31,821739	75	849,060201	856,742475	3,213043	21,414716	654,469564

Tiempo total	28,17206479
03:00 horas	
10800 segundos	

Ib media	671,7537406	Ib media	676,514874	Ib media	515,935543
I max	849,060201	I max	856,742475	I max	654,469564
	647,247492		642,938127		487,850597

$$F1 = (Ts - Ta) / (C * Id \text{ s})$$

$$F2 = [\dots]$$

515,935543

Cálculo de F1:	F1
	0,009736784
	0,034311141

Cálculo de F2:	F2	argumento del ln
	#iNUM!	0,29973051
	0,120817421	0,65951778

$$Q = mcp(T2 - T1) / (t2 - t1)$$

$$Q = \text{rend.op} * I * Ac$$

$$\text{rend} = Q_{\text{med}} / I * Ac$$

Cálculo de Qcocina: [W]	Q med
	27,32527778

Q máx
207,4610471
158,4804593

$$\text{rend} = Q_{\text{max}} / I * Ac$$

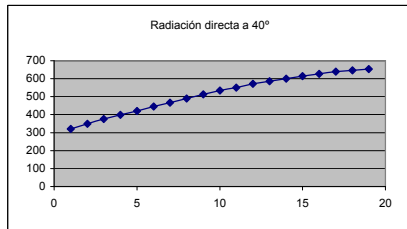
$$0,052460933$$

$$0,068674713$$

Inc. T° (°C)	47
Qmedia normalizada (W)	37,07380645

Cálculo de Qcocina: [W]	Q máx
	20,93

línea de tendencia - recta
tstag (min) = -
Tstag (°C) = -



t (min)	t1	t2	t (sec)
0	30	90	0
10	30	90	600
20	30	90	1200
30	30	90	1800
40	30	90	2400
50	30	90	3000
60	30	90	3600
70	30	90	4200
80	30	90	4800
90	30	90	5400
100	30	90	6000
110	30	90	6600
120	30	90	7200
130	30	90	7800
140	30	90	8400
150	30	90	9000
160	30	90	9600
170	30	90	10200
180	30	90	10800

Q = mcp(T2 - T1) / (t2 - t1)		
x = t (Tiempo)	y1 = Potencia	y2 = Tª (temperatura)
0	20,93	28
10	20,93	30
20	31,395	32
30	20,93	35
40	31,395	37
50	31,395	40
60	31,395	43
70	31,395	46
80	20,93	49
90	31,395	51
100	31,395	54
110	31,395	57
120	31,395	60
130	20,93	63
140	41,86	65
150	20,93	69
160	20,93	71
170	20,93	73
180	MEDIA	75
	27,32527778	

Q'norm
41,918161
39,0647523
55,1574291
34,8637738
49,291882
47,0424067
44,9081202
42,8591139
27,4630273
39,8999583
38,4853021
37,4610386
36,5884574
23,8307066
46,7480523
22,9429896
22,6819835
22,3860678
37,0738064

tstag (min) =	-
Tstag (°C) =	-
Qmáxima =	27,233

línea de tendencia - recta

$$y = 0,0011x + 27,233$$

y=0

x=0

tstag (min) =	-
Tstag (°C) =	-
Qmáxima =	21,205

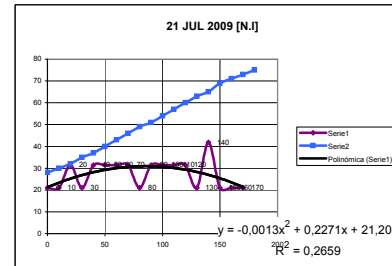
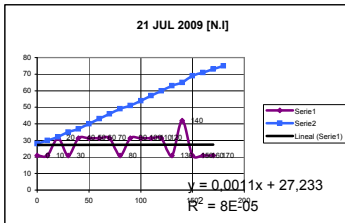
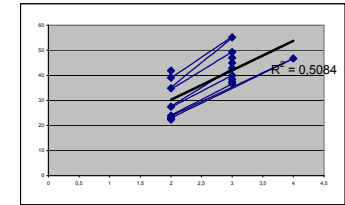
línea de tendencia - parábola

$$y = -0,0013x^2 + 0,2271x + 21,205$$

y=0

x=0

línea de tendencia - parábola	
tstag (min) =	-
Tstag (°C) =	-



21/07/2009		Norma europea con tapas						
Hora	Estado del cielo	Tamb (°C)	Tw (°C)	I global 0° (W/m²)	I transf. 40°	Vel.viento (m/s)	Humedad (%)	I directa 40°
13:20	Despejado	32,625084	40	863,51505	871,0301	2,452174	20,304348	663,170644
13:30	Despejado	32,983278	46	874,93311	880,384615	2,753846	19,408027	670,05382
13:40	Despejado	33,595652	49	880,645485	883,09699	2,429097	18,294314	671,113526
13:50	Despejado	34,128428	53	884,153846	885,618729	2,365552	17,973244	670,525469
14:00	Despejado	34,294649	57	883,317726	881,989967	2,344482	17,531773	665,272432
14:10	Despejado	34,202676	59	889,494983	883,9699	3,547157	17,61204	666,765867
14:20	Despejado	34,4301	61	890,214047	880,829431	3,391639	17,0301	661,632199
14:30	Despejado	34,432441	63	893,568562	878,137124	3,628094	16,799331	659,10752
14:40	Despejado	35,012709	65	889,377926	868,816054	2,72408	15,394649	650,359422
14:50	Despejado	35,147492	68	885,829431	860,602007	3,810368	15,093645	640,958803
15:00	Despejado	35,205017	70	879,759197	850,779264	3,014047	15,48495	632,630735
15:10	Despejado	35,773579	71	873,331104	841,769231	3,388294	14,799331	624,189114

Tiempo total	34,31925875
01:50 horas	
6600 segundos	

Ib media	882,3450389	Ib media	872,251951	Ib media	656,314963
I max	893,568562	I max	885,618729	I max	671,113526
	868,423077		856,399666		643,679879

$F1 = (Ts - Ta) / (C * Id \text{ s})$

$F2 = [\dots]$

656,314963

Cálculo de F1: **F1**

0,008328987
0,029350249

Cálculo de F2: **F2**

0	argumento del ln
0,322247658	0,06111802
0,104170852	0,77383575

$Q = mcp(T2 - T1) / ((t2 - t1))$

$Q = \text{rend.} \acute{o}p * I * Ac$

$\text{rend} = Q_{med} / I * Ac$

Cálculo de **Q med**

Qcocina: [W] 29,49227273

Q máx

203,8352611

162,5108114

$\text{rend} = Q_{max} / I * Ac$

0,160182295

0,200914633

Inc. T° (°C)	31
Qmedia normalizada (W)	31,45531046

Cálculo de **Q max**

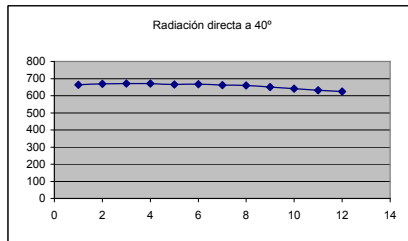
Qcocina: [W] 62,79

línea de

tstag (min)	=	-
Tstag (°C)	=	-

línea de tendencia - recta

tstag (min)	=	136,1080292
Tstag (°C)	=	-



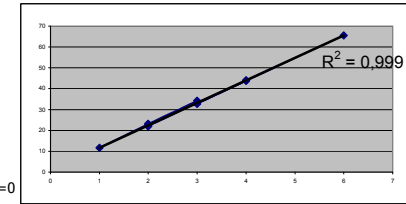
t (min)	t1	t2	t (sec)
0	30	90	0
10	30	90	600
20	30	90	1200
30	30	90	1800
40	30	90	2400
50	30	90	3000
60	30	90	3600
70	30	90	4200
80	30	90	4800
90	30	90	5400
100	30	90	6000
110	30	90	6600

$Q = mcp(T2 - T1) / (t2 - t1)$

x = t (Tiempo)	y1 = Potencia	y2 = T° (temperatura)
0	62,79	40
10	31,395	46
20	41,86	49
30	41,86	53
40	20,93	57
50	20,93	59
60	20,93	61
70	20,93	63
80	31,395	65
90	20,93	68
100	10,465	70
110	MEDIA	71
	29,49227273	

Q'norm

65,5962233
32,7463226
43,7000552
44,0451138
21,9732304
22,1437228
22,2285432
22,5275432
34,286915
23,1588495
11,7360265
31,4553105



tstag (min) = 136,1080292

Tstag (°C) =

Qmáxima = 46,617

línea de tendencia - recta

$y = 0,03425x + 46,617$

y=0

x=0

tstag (min) = -

Tstag (°C) = -

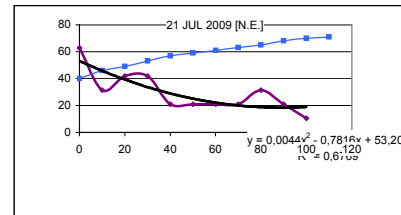
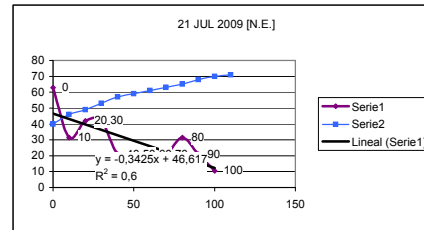
Qmáxima = 53,203

línea de tendencia - parábola

$y = 0,0044x^2 - 0,7816x + 53,203$

y=0

x=0



28/07/2009		Norma europea con tapas						
Hora	Estado del cielo	Tamb (°C)	Tw (°C)	I global 0° (W/m²)	I transf. 40°	Vel.viento (m/s)	Humedad (%)	I directa 40°
13:20	Despejado	30,016722	40	921,996656	945,32107	2,329097	24,347826	719,733087
13:30	Despejado	30,025084	47	927,351171	948,879599	2,198997	25,244147	722,184814
13:40	Despejado	30,100669	54	943,200669	959,882943	2,528094	23,391304	729,467356
13:50	Despejado	30,78796	59	944,351171	957,120401	2,184615	22,254181	724,661284
14:00	Despejado	31,215385	65	958,779264	970,100334	2,42709	20,22408	731,732823
14:10	Despejado	31,815719	69	959,294314	969	2,041806	19,334448	730,902857
14:20	Despejado	31,406689	73	967,782609	972,157191	2,590301	17,72575	730,232752
14:30	Despejado	32,077592	77	960,12709	960,404682	2,29398	17,745819	720,855468
14:40	Despejado	31,937124	78	960,742475	955,946488	2,623077	16,722408	715,581627
14:50	Despejado	32,706355	83	961,311037	950,93311	2,052174	14,879599	708,235565
15:00	Despejado	32,789298	85	952,976589	935,073579	2,681271	15,013378	695,311123
15:10	Despejado	32,913378	86	960,22408	936,190635	3,189967	12,929766	694,204518
15:20	Despejado	32,840134	88	956,217391	924,729097	2,516722	12,053512	682,069689
15:30	Despejado	32,340134	79	938,886288	900,879599	3,280936	12,916388	661,650806
Tiempo total		32,840134		Ib media	Ib media	2,516722		Ib media
02:10	horas	32,340134		950,945717	949,044195	3,280936		711,915984
7800	segundos	31,6408745		I max	I max			I max
				967,782609	972,157191			731,732823
				930,441472	923,100335			700,901388

$$F1 = (Ts - Ta) / (C * Id \cdot s)$$

Cálculo de F1:	F1
0,011082052	
0,039051689	

$$Q = mcp(T2 - T1) / (t2 - t1)$$

Cálculo de Qcocina: [W]	Q med
	31,395

Inc. T* (°C)	48
Qmedia normalizada (W)	30,86951341

Cálculo de Qcocina: [W]	Q max
	73,255

línea de tendencia - recta	
tstag (min) =	96,4
Tstag (°C) =	84

$$F2 = [\dots]$$

Cálculo de F2:	F2	argumento del ln
0,529510332	0,0433742	
0,158226297	0,76637306	

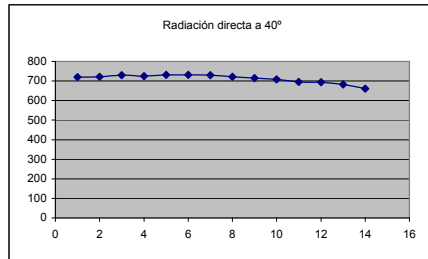
$$Q = \text{rend.} \cdot \text{op} \cdot I \cdot A_c$$

Cálculo de Q max	Q max
218,1488958	
177,1898349	

rend=Qmed/I*Ac	

rend=Qmax/I*Ac	
0,174617432	
0,214981858	

línea de	
tstag (min) =	96,97039001
Tstag (°C) =	-66,5849733



t (min)	t1	t2	t (sec)
0	30	90	0
10	30	90	600
20	30	90	1200
30	30	90	1800
40	30	90	2400
50	30	90	3000
60	30	90	3600
70	30	90	4200
80	30	90	4800
90	30	90	5400
100	30	90	6000
110	30	90	6600
120	30	90	7200
130	30	90	7800

x = t (Tiempo)	y1 = Potencia	y2 = Tª (temperatura)
0	73,255	40
10	73,255	47
20	52,325	54
30	62,79	59
40	41,86	65
50	41,86	69
60	41,86	73
70	10,465	77
80	52,325	78
90	20,93	83
100	10,465	85
110	20,93	86
120	-94,185	88
130	MEDIA 31,395	79

tstag (min) =	96,4
Tstag (°C) =	84
Qmáxima =	83,145

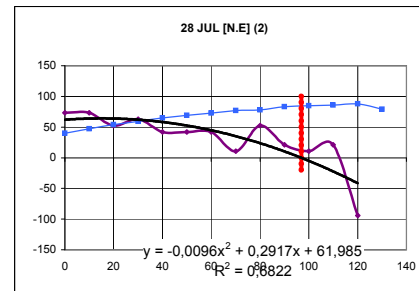
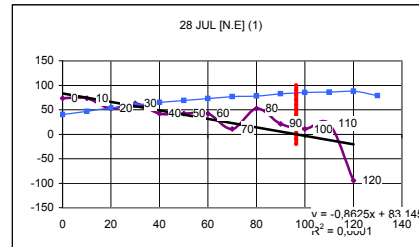
línea de tendencia - recta

$$y = 0,08625x + 83,145$$

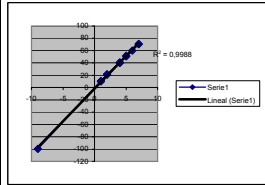
tstag (min) =	96,97039001
Tstag (°C) =	-66,58497334
Qmáxima =	61,985

línea de tendencia - parábola

$$y = -0,0096x^2 + 0,2917x + 61,985$$



Q'norm	71,0046777
	70,2958118
	50,5443037
	60,0670061
	40,0901429
	40,126932
	40,6489252
	10,237127
	51,71655
	21,0711429
	10,5523658
	21,4802098
	-99,6439503
	30,8695134



ESTANCAMIENTO	
tiempo	temperatura
96,4	100
96,4	90
96,4	80
96,4	70
96,4	60
96,4	50
96,4	40
96,4	30
96,4	20
96,4	10
96,4	0
96,4	-10
96,4	-20

ESTANCAMIENTO	
tiempo	temperatura
96,97039	100
96,97039	90
96,97039	80
96,97039	70
96,97039	60
96,97039	50
96,97039	40
96,97039	30
96,97039	20
96,97039	10
96,97039	0
96,97039	-10
96,97039	-20

21/09/2009		Norma europea con tapas / ACEITE						
Hora	Estado del cielo	Tamb (°C)	Tw (°C)	I global 0° (W/m2)	I transf. 40°	Vel.viento (m/s)	Humedad (%)	I directa 40°
13:20	Despejado/aire	19,828094	40	778,010033	1003,54515	2,872575	35,976589	746,766602
13:30	Despejado/aire	19,723411	72	803,505017	1024,28763	2,756187	36,19398	761,552138
13:40	Despejado/aire	20,243478	92	513,428094	649,153846	2,440803	35,521739	482,228571
13:50	Despejado/aire	20,797993	105	775,913043	971,70903	1,344147	34,839465	720,279318
14:00	Despejado/aire	20,826087	101	815,816054	1021,56522	3,117726	34,010033	756,240248
14:10	Despejado/aire	20,749498	109	817,086957	1023,35117	3,326421	33,826087	756,221672
14:20	Despejado/aire	21,105017	114	841,327759	1041,70903	2,682609	33,598662	767,01633
14:30	Despejado/aire	20,89699	117	548,939799	660,411371	2,693311	33,913043	485,995035

01:10	horas	20,521321
4200	segundos	

Ib media	736,7533445	Ib media	924,466555	Ib media	684,537489
I max	841,327759	I max	1041,70903	I max	767,01633
	663,474916		831,978261		616,380818

t (min)	t1	t2	t (sec)
0	30	90	0
10	30	90	600
20	30	90	1200
30	30	90	1800
40	30	90	2400
50	30	90	3000
60	30	90	3600
70	30	90	4200

x = t (Tiempo)	y1 = Potencia	y2 = Tª (temperatura)
0	123,28	40
10	77,05	72
20	50,0825	92
30	-15,41	105
40	30,82	101
50	19,2625	109
60	11,5575	114
70	MEDIA	117
	42,3775	

Q'norm	113,315945
	111,845302
	48,6724373
	-14,2639856
	28,5286719
	17,5794823
	16,646775
	43,334734

F1=(Ts-Ta)/(C*Id s)

F2=[...]

712,900697

Cálculo de F1:	F1
	0,017874236
	0,062986447

Cálculo de F2:	F2	argumento del ln
	#iNUM!	-0,09905028
	0,174010115	0,74400684

Q=mcp(T2-T1)/(t2-t1)

Q=rend.óp*I*Ac rend=Qmed/I*Ac

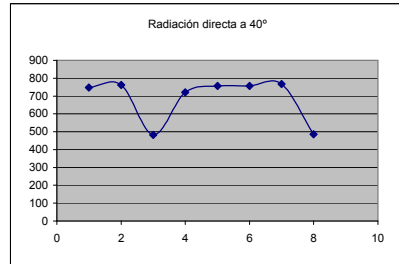
Cálculo de Qocina:[W]	Q med
	42,3775

Q max
159,9192739
185,7337714

Inc.Tª (°C)	77
Qmedia normalizada(W)	43,33473398

Cálculo de Qocina:[W]	Q max
	123,28

línea de tendencia - recta
tstag (min) = 55,24544263
Tstag (°C) = 112



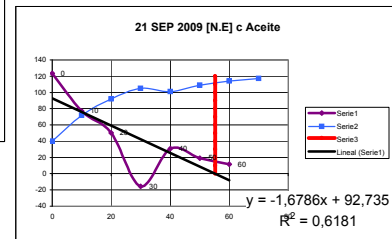
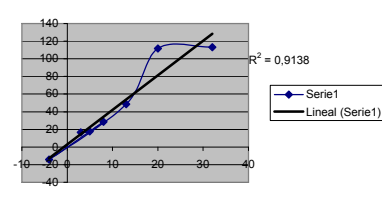
tstag (min)	= 55,24544263
Tstag (°C)	= 112
Qmáxima	= 92,735

línea de tendencia - recta y= 0-1,6786x+92,735

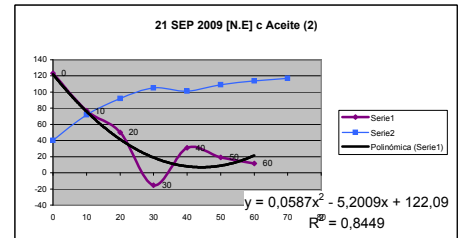
tstag (min)	=
Tstag (°C)	=
Qmáxima	= 122,09

línea de tendencia - parábola y= 0,0587x^2-5,2009x+122,09

ESTANCAMIENTO	
tiempo	temperatura
55,2454426	120
55,2454426	110
55,2454426	100
55,2454426	90
55,2454426	80
55,2454426	70
55,2454426	60
55,2454426	50
55,2454426	40
55,2454426	30
55,2454426	20
55,2454426	10
55,2454426	0



línea de		
tstag (min)	-	-
Tstag (°C)	-	-

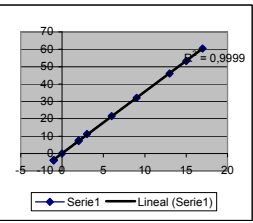


22/09/2009 Norma europea con tapas / ACEITE								
Hora	Estado del cielo	Tamb (°C)	Tw (°C)	I global 0° (W/m²)	I directa 40°	Vel.viento (m/s)	Humedad (%)	I directa 40°
13:20	Casi despejado	21,311371	43	755,023411	983,608696	1,847157	37,77592	751,38326
13:30	Casi despejado	21,701672	56	766,331104	994,033445	2,216722	36,568562	760,475076
13:40	Casi despejado	21,834114	71	767,230769	991,528428	2,688963	36,698997	758,822777
13:50	Casi despejado	21,567893	88	771,277592	991,137124	3,311371	37,274247	759,647047
14:00	Casi despejado	22,001003	97	774,892977	990,518395	1,748495	36,06689	759,172829
14:10	Casi despejado	22,673913	103	772,020067	983,591973	1,861204	33,842809	753,864143
14:20	Casi despejado	22,363545	105	769,294314	974,889632	2,513378	33,929766	747,194321
14:30	Casi despejado	22,702676	105	764,866221	962,953177	2,180602	32,936455	738,045746
14:40	Casi despejado	23,169565	108	757,551839	948,749164	2,167893	32,294314	727,159223
14:50	Casi despejado	23,130435	110	751,822742	937,227425	1,805017	31,521739	717,265886
15:00	Casi despejado	23,320067	109	742,809365	922,401338	1,942809	30,585284	704,626675
15:10	Casi despejado	23,655518	108	736,541806	909,61204	2,046823	30,297659	694,856871
15:20	Casi despejado	23,315719	107	728,441472	896,230769	2,227425	30,829431	682,357517

t (min)	t1	t2	t (sec)
0	30	90	0
10	30	90	600
20	30	90	1200
30	30	90	1800
40	30	90	2400
50	30	90	3000
60	30	90	3600
70	30	90	4200
80	30	90	4800
90	30	90	5400
100	30	90	6000
110	30	90	6600
120	30	90	7200

x = t (Tiempo)	y1 = Potencia (temperatura)	y2 = Tª (temperatura)
0	50,0825	43
10	57,7875	56
20	65,4925	71
30	34,6725	88
40	23,115	97
50	7,705	103
60	0	105
70	11,5575	105
80	7,705	108
90	-3,8525	110
100	-3,8525	109
110	-3,8525	108
120	MEDIA	107
	20,54666667	

Q'norm
46,0998014
53,3079017
60,3500667
31,9699903
21,4634164
7,21833645
0
11,12583001
7,51952672
-3,82720396
-3,88101509
-3,95210712
19,5685174



23	100	Ib media 758,3156676	Ib media 960,498585	Ib media 734,990105
22,51903777		I max 774,892977	I max 994,033445	I max 760,475076
		741,7324415	939,919733	734,324573

F1=(Ts-Ta)/(C*Id s)

Cálculo de F1:	F1
	0,017874228
	0,062986421
Q=mcp(T2-T1)/(t2-t1)	

Cálculo de Qcocina:[W]	Q med
	20,54666667

Inc.Tª (°C)	64
Qmedia normalizada(W)	19,5685174

Cálculo de Qcocina:[W]	Q máx
	50,0825

línea de tendencia - recta
tstag (min) = 87,45379877
Tstag (°C) = 110

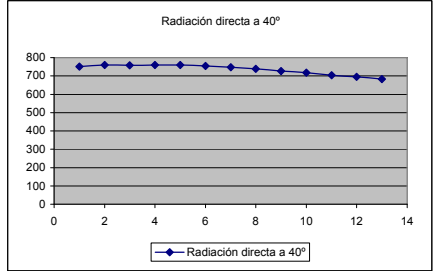
F2=[...]

Cálculo de F2:	F2	argumento del ln
	0,32731355	0,05286145
	0,097111596	0,78071837
Q=rend.op*I*Ac		rend=Qmed/I*Ac

Q máx
240,7061927
184,1498001

rend=Qmax/I*Ac

línea de tendencia - parábola	
tstag (min) = 85,63491798	153,303858
Tstag (°C) = 109	-

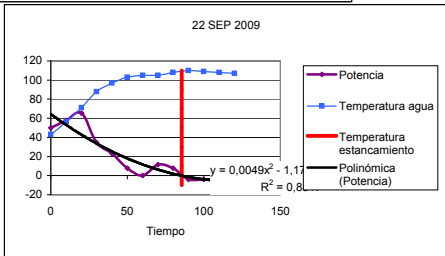
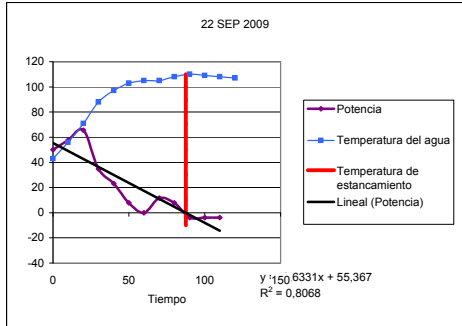


tstag (min) = 87,45379877
Tstag (°C) = 110
Qmáxima = 55,367

línea de tendencia - recta
y = 0-0,6331x+55,367

tstag (min) = 85,63491798
153,3038575
Tstag (°C) = 109
Qmáxima = 64,328

línea de tendencia - parábola
y = 0,0049x^2-1,1708x+64,328



ESTANCAMIENTO	
tiempo	temperatura
87,4537988	110
87,4537988	100
87,4537988	90
87,4537988	80
87,4537988	70
87,4537988	60
87,4537988	50
87,4537988	40
87,4537988	30
87,4537988	20
87,4537988	10
87,4537988	0
87,4537988	-10

ESTANCAMIENTO	
tiempo	temperatura
85,634918	110
85,634918	100
85,634918	90
85,634918	80
85,634918	70
85,634918	60
85,634918	50
85,634918	40
85,634918	30
85,634918	20
85,634918	10
85,634918	0
85,634918	-10

24/09/2009		Norma europea sin tapas / ACEITE						
Hora	Estado del cielo	Tamb (°C)	Tw (°C)	I global 0° (W/m²)	I transf. 40°	Vel.viento (m/s)	Humedad (%)	I directa 40°
13:20	Despejado	23,815719	43	720,662207	955,257525	1,282943	35,073579	710,834401
13:30	Despejado	24,225753	68	722,548495	951,036789	1,402341	34,026756	707,090549
13:40	Despejado	23,508027	85	728,421405	956,715719	1,025753	35,822742	710,703106
13:50	Despejado	24,496321	92	734,782609	958,230769	1,439465	33,381271	710,288558
14:00	Despejado	25,095652	98	741,153846	962,033445	0,695652	31,859532	712,170304
14:10	Despejado	24,135117	104	737,130435	955,571906	1,429097	33,187291	706,135103
14:20	Despejado	23,862542	102	736,993311	948,494983	2,372575	34,12709	698,382293
14:30	Despejado	24,114381	98	744,772575	951,187291	2,445485	33,421405	699,976289
14:40	Despejado	24,807023	97	745,752508	946,64214	1,808696	32,341137	695,018552
14:50	Despejado	25,151505	94	735,973244	931,9699	1,940803	31,157191	681,571696
15:00	Despejado	25,712375	92	711,725753	897,882943	1,243144	30,207358	657,420888
15:10	Despejado	25,082943	91	724,063545	909,64214	2,33913	31,033445	663,103616
15:20	Despejado	25,009365	88	713,297659	892,565217	1,637124	31,234114	648,694939

24,53974792

Tiempo total	
02:00	horas
7200	segundos

Ib media 730,5598148	Ib media 939,786982	Ib media 692,414638
I max 745,752508	I max 962,033445	I max 712,170304
716,979933	923,911371	708,484752

709,537003

$F1 = (Ts - Ta) / (C * Id \text{ s})$

$F2 = [\dots]$

Cálculo de F1:	
F1	
0,016691981	
0,058820339	

Cálculo de F2:	
F2	
argumento del ln	
0,94823422	0,00630079
0,172522504	0,7698047

$Q = mcp(T2 - T1) / (t2 - t1)$

$Q = \text{rend.} \dot{\phi} * I * Ac$

$\text{rend} = Q_{\text{med}} / I * Ac$

Cálculo de Qcocina: [W]	
Q med	
14,446875	

Q máx	
216,1355599	
172,4527514	

$\text{rend} = Q_{\text{max}} / I * Ac$

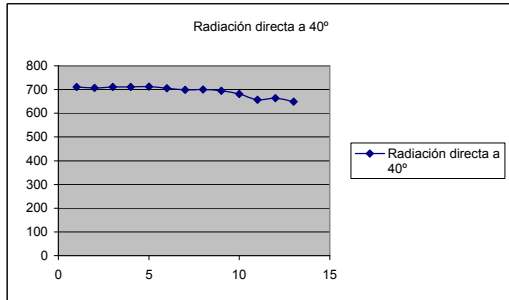
0,231718002

0,290412879

Inc. T* (°C)	45
Qmedia normalizada (W)	14,60513967

Cálculo de Qcocina: [W]	
Q máx	
96,3125	

línea de tendencia - parábola		
tstag (min) =	50,28460276	111,0975628
Tstag (°C) =	104	90



t (min)	t1	t2	t (sec)
0	30	90	0
10	30	90	600
20	30	90	1200
30	30	90	1800
40	30	90	2400
50	30	90	3000
60	30	90	3600
70	30	90	4200
80	30	90	4800
90	30	90	5400
100	30	90	6000
110	30	90	6600
120	30	90	7200

x = t (Tiempo)	y1 = Potencia	y2 = Tª (temperatura)
0	96,3125	43
10	65,4925	68
20	26,9675	85
30	23,115	92
40	23,115	98
50	-7,705	104
60	-15,41	102
70	-3,8525	98
80	-11,5575	97
90	-7,705	94
100	-3,8525	92
110	-11,5575	91
120	MEDIA	88
	14,446875	

línea de tendencia -

tstag (min) = 72,84214427

Tstag (°C) = 98

tstag (min) =	72,84214427
Tstag (°C) =	98
Qmáxima =	58,973

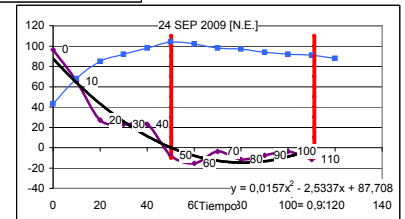
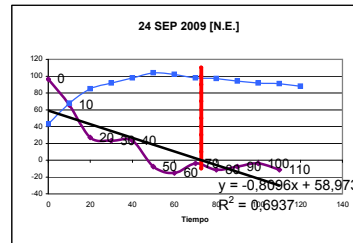
línea de tendencia - recta

$y = 0 - 0,8096x + 58,973$

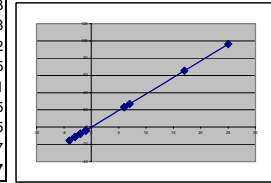
tstag (min) =	50,28460276
	111,0975628
Tstag (°C) =	104
	90
Qmáxima =	87,708

línea de tendencia - parábola

$y = 0,0157x^2 - 2,5337x + 87,708$



Q'norm	
95,3466993	
64,5061906	
26,5768747	
22,7199869	
22,9141703	
-7,72284758	
-15,410522	
-3,88011225	
-11,8699911	
-8,20402895	
-4,06686065	
-12,4715787	
14,6051397	



ESTANCAMIENTO	
tiempo	temperatura
72,8421443	110
72,8421443	100
72,8421443	90
72,8421443	80
72,8421443	70
72,8421443	60
72,8421443	50
72,8421443	40
72,8421443	30
72,8421443	20
72,8421443	10
72,8421443	0
72,8421443	-10

ESTANCAMIENTO		ESTANCAMIENTO	
tiempo	temperatura	tiempo	temperatura
111,097563	110	50,2846028	110
111,097563	100	50,2846028	100
111,097563	90	50,2846028	90
111,097563	80	50,2846028	80
111,097563	70	50,2846028	70
111,097563	60	50,2846028	60
111,097563	50	50,2846028	50
111,097563	40	50,2846028	40
111,097563	30	50,2846028	30
111,097563	20	50,2846028	20
111,097563	10	50,2846028	10
111,097563	0	50,2846028	0
111,097563	-10	50,2846028	-10

28/09/2009		Norma india con tapas						
Hora	Estado del cielo	Tamb (°C)	Tw (°C)	I global 0° (W/m ²)	I transf. 40°	Vel.viento (m/s)	Humedad (%)	I directa 40°
09:20	Despejado	15,89097	22	136,882943	242,782609	1,65786	66,826087	176,981715
09:30	Despejado	16,241137	25	164,979933	285,040134	2,589298	64,795987	207,951443
09:40	Despejado	16,540134	29	196,110368	329,063545	3,484615	63,093645	240,651977
09:50	Despejado	16,808361	32	229,832776	377,240803	3,891304	61,173913	276,967764
10:00	Despejado	16,811037	35	262,548495	422,558528	4,198997	60,966555	310,959737
10:10	Despejado	16,785284	38	298,204013	470,434783	4,843478	61,244147	346,383827
10:20	Despejado	17,050836	42	332,020067	513,879599	4,287625	61,063545	379,739527
10:30	Despejado	17,1699	45	363,531773	554,341137	4,285619	60,565217	410,365459
10:40	Despejado	17,511706	48	395,22408	595,183946	4,218729	59,003344	441,1801
10:50	Despejado	17,706689	51	426,230769	636,013378	4,854181	57,023411	472,467081
11:00	Despejado	17,830435	53	457,77592	678,100334	4,914716	56,043478	504,163817
11:10	Despejado	18,056187	56	484,909699	711,441472	4,774247	55,51505	529,403914
11:20	Despejado	18,267893	58	511,859532	745,906355	4,512709	54,622074	556,673955
11:30	Despejado	18,562207	61	531,749164	767,832776	4,339465	53,391304	573,037761
11:40	Despejado	18,73311	63	551,294314	788,19398	4,415385	53,77592	588,724742
11:50	Despejado	19,141472	65	578,173913	821	3,763545	52,565217	613,737745
12:00	Despejado	19,488294	67	604,976589	853,464883	3,492977	50,963211	638,006837
12:10	Despejado	19,77893	68	621,692308	871,80602	3,916388	47,919732	651,717736
12:20	Despejado	19,92107	70	633,842809	881,481605	3,679599	47,849498	658,95071
12:30	Despejado	19,997659	70	651,317726	899,013378	4,595652	47,32107	672,056569
12:40	Despejado	20,405686	71	663,424749	908,026756	3,467893	47,117057	678,794511
12:50	Despejado	20,553512	72	675,441472	920,100334	3,186288	46,555184	687,24939
13:00	Despejado	20,80301	74	692,615385	936,909699	2,70903	46,150502	699,804787

Tempo total	18,26328343
03:40 horas	
13200 segundos	

Ib media	454,9842955	Ib media	661,29635	Ib media	491,998744
I max	692,615385	I max	936,909699	I max	699,804787
	414,749164		589,846154		438,393251

$$F1 = (T_s - T_a) / (C * I_d_s)$$

$$F2 = [\dots]$$

$$491,998744$$

Cálculo de F1:	F1
	0,011218892
	0,039533896

Cálculo de F2:	F2	argumento del ln
	#iNUM!	-0,50483128
	0,128454851	0,62534763

$$Q = \text{rend} \cdot \dot{\phi} * I * A_c$$

$$\text{rend} = Q_{\text{med}} / I * A_c$$

$$\text{rend} = Q_{\text{max}} / I * A_c$$

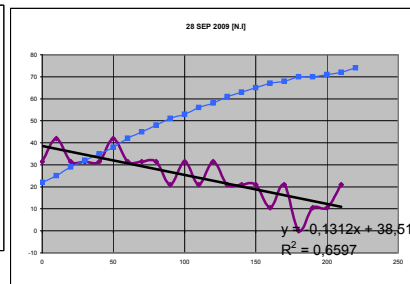
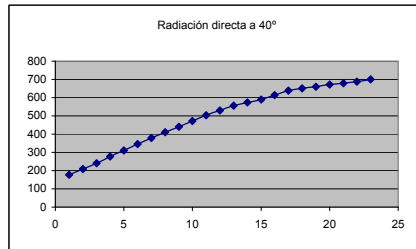
Cálculo de Qcocina: [W]	Q med
	24,73545455

Q máx
226,8736205
169,4584291

Inc.T° (°C)	52
Qmedia normalizada (W)	35,19280975

Cálculo de Qcocina: [W]	Q máx
	31,395

línea de tendencia - recta
tstag (min) = 293,5213415
Tstag (°C) = -



$$Q = mcp(T_2 - T_1) / (t_2 - t_1)$$

x = t (Tiempo)	y1 = Potencia	y2 = Tª (temperatura)
0	31,395	22
10	41,86	25
20	31,395	29
30	31,395	32
40	31,395	35
50	41,86	38
60	31,395	42
70	31,395	45
80	31,395	48
90	20,93	51
100	31,395	53
110	20,93	56
120	31,395	58
130	20,93	61
140	20,93	63
150	20,93	65
160	10,465	67
170	20,93	68
180	0	70
190	10,465	70
200	10,465	71
210	20,93	72
220	MEDIA	74

Q'norm
105,680921
121,760895
79,3467792
70,6731366
63,4455141
77,1634184
53,5534839
49,8129902
46,5143518
29,059999
41,5117823
26,3188171
38,3508758
24,8859933
23,8717597
22,9637038
11,2402956
22,233833
0
10,7919258
10,6591582
20,9358385
35,1928098

tstag (min) = 293,5213415
Tstag (°C) =
Qmáxima = 38,51

línea de tendencia - recta

$$y = 0,01312x + 38,51$$

y=0
x=0

tstag (min) = 271,422666
Tstag (°C) = -678,922666
Qmáxima = 36,855

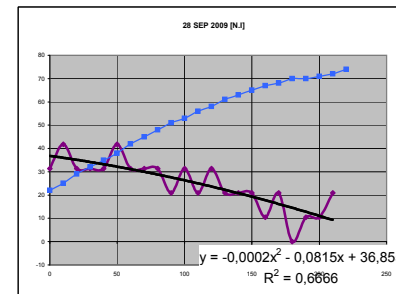
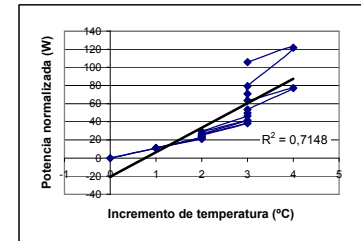
línea de tendencia - parábola

$$y = 0,0002x^2 - 0,0815x + 36,855$$

y=0
x=0

línea de tendencia - parábola

tstag (min) 271,422666	-678,922666
Tstag (°C) -	-



28/09/2009		Norma europea con tapas / Agua fría						
Hora	Estado del cielo	Tamb (°C)	Tw (°C)	I global 0° (W/m2)	I transf. 40°	Vel.viento (m/s)	Humedad (%)	I directa 40°
13:20	Despejado	21,280268	20	739,929766	976,906355	3,994649	45,086957	726,943913
13:30	Despejado	21,379933	32	725,143813	960,371237	4,240803	44,080268	714,030659
13:40	Despejado	21,408361	40	670,658863	891,886288	4,134448	42,528428	662,5441
13:50	Despejado	21,78796	44	750,909699	992,103679	3,738796	40,67893	735,396852
14:00	Despejado	21,744147	50	705,605351	925,655518	4,305686	38,70903	685,240597
14:10	Despejado	22,085619	53	743,595318	974,448161	4,302341	34,906355	720,084013
14:20	Despejado	22,354181	57	740,779264	969,197324	4,161204	31,722408	713,625546
14:30	Despejado	22,205017	61	728,939799	948,695652	4,841806	33,451505	698,142698
14:40	Despejado	22,412375	63	726,555184	935,454849	4,160201	35,297659	686,804915
14:50	Despejado	22,470234	65	730,277592	937,655518	3,5	33,411371	685,729724
15:00	Despejado	22,848829	67	719,083612	914,856187	3,532776	33,010033	669,848527
15:10	Despejado	23,130769	69	707,568562	898,943144	3,375585	33,270903	655,304348
15:20	Despejado	22,555518	71	505,113712	639,625418	4,037793	33,494983	464,864375

Tiempo total	22,12793931	Ib media	Ib media	Ib media
02:00 horas		707,2431181	920,446102	678,35079
7200 segundos		I max	I max	I max
		750,909699	992,103679	735,396852
		622,521739	808,265887	595,904144

$F1 = (Ts - Ta) / (C * Id \cdot s)$ $F2 = [\dots]$ 678,35079

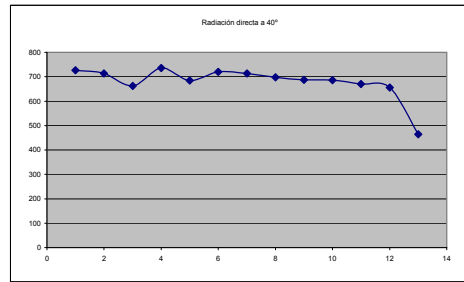
Cálculo de F1:	F1	Cálculo de F2:	F2
0,015380055		#iNUM!	#iNUM!
0,054197283		0,440628478	3,23503492
		0,440628478	3,23503492

$Q = mcp(T2 - T1) / (t2 - t1)$ $Q = \text{rend.} \cdot \dot{m} \cdot I \cdot Ac$ $\text{rend} = Q_{med} / I \cdot Ac$

Cálculo de Qcocina: [W]	Q med	Q máx
44,47625	45,89568623	154,8859346
		178,0770831

Cálculo de Q_{cocina} : [W] $\text{rend} = Q_{max} / I \cdot Ac$

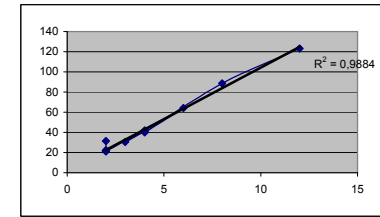
línea de tendencia - recta
tstag (min) = 115,4697485
Tstag (°C) = 71



t (min)	t1	t2	t (sec)
0	30	90	0
10	30	90	600
20	30	90	1200
30	30	90	1800
40	30	90	2400
50	30	90	3000
60	30	90	3600
70	30	90	4200
80	30	90	4800
90	30	90	5400
100	30	90	6000
110	30	90	6600
120	30	90	7200

$Q = mcp(T2 - T1) / (t2 - t1)$		
x = t (Tiempo)	y1 = Potencia	y2 = Tª (temperatura)
0	125,58	20
10	83,72	32
20	41,86	40
30	62,79	44
40	31,395	50
50	41,86	53
60	41,86	57
70	20,93	61
80	20,93	63
90	20,93	65
100	20,93	67
110	20,93	69
120	MEDIA	71
	44,47625	

Q'norm
123,112361
88,45298
39,8451529
64,1424344
30,5193555
41,0607498
41,9713622
21,3321129
21,3655607
21,872109
22,3575504
31,5167193
45,8956862

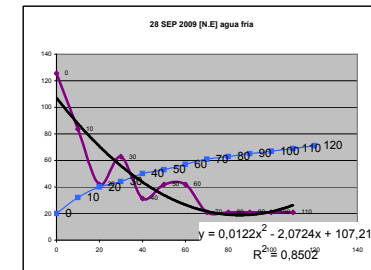
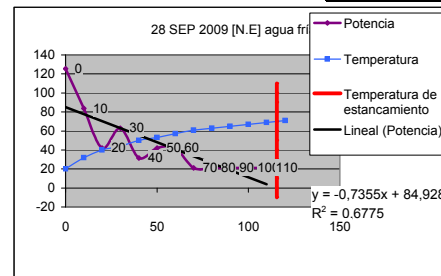


tstag (min) = 115,4697485	línea de tendencia - recta	y = 0 - 0,7355x + 84,928	y=0
Tstag (°C) = 71			x=0
Qmáxima = 84,928			

tstag (min) = -	línea de tendencia - parábola	y = 0,0122x² - 2,0724x + 107,21	y=0
Tstag (°C) = -			y=0
Qmáxima = 107,21			x=0

línea de tendencia - parábola	
tstag (min)	-
Tstag (°C)	-

ESTANCAMIENTO	
tiempo	temperatura
115,469748	110
115,469748	100
115,469748	90
115,469748	80
115,469748	70
115,469748	60
115,469748	50
115,469748	40
115,469748	30
115,469748	20
115,469748	10
115,469748	0
115,469748	-10



				Constantes	Sistema Internacional	
Aolla	0,04184601	A1	0,068726266	masa agua	1,5 litros	1,5 kg
A tapa-olla	0,02688025			Cp agua	4,186	4186 J/kgK
Atotal_olla	0,06872627	A2	0,242182292	Ac	88,7*52,5 cm^2	0,465675 m^2
A recinto (tapa)	0,24218229			At1	Sólo olla	0,068726266 m^2
				rend. óptico	0,52	0,52 []
				Cp aceite	1,675	1675 J/kgK
				masa aceite	1,5 litros	1,38 kg
				At2	olla + tapa	0,242182292 m^2
				Ap	olla + tapa	0,298 m^2
						C1=Ac/At1 = 6,775793669
						C2=Ac/At2 = 1,922828446

$$\dot{Q}_{neta} = \dot{Q}_S - \dot{Q}_P = m \cdot C_p \cdot \frac{T_2 - T_1}{t_2 - t_1}$$

$$\eta_{max\ COCINA} = \frac{\dot{Q}_{max}}{I_{b_max} \cdot A_c}$$

$$F_1 = \frac{\eta_o}{U_{LS}} = \frac{T_s - T_a}{I_s \cdot C}$$

$$F_2 = F_1 = \frac{-F_1 \cdot (m \cdot C_p)_w}{A_t \cdot (t_2 - t_1)} \cdot \ln \left[\frac{1 - \left(\frac{T_{w2} - T_a}{F_1 \cdot C \cdot I_b} \right)}{1 - \left(\frac{T_{w1} - T_a}{F_1 \cdot C \cdot I_b} \right)} \right]$$

$$F' \cdot U_L = \frac{(m \cdot C_p)_w}{A_t \cdot t_0}$$

$$\eta_0 = \frac{m \cdot C_p}{A_c \cdot I_b \cdot t_0} \cdot \left\{ \frac{(T_{w2} - T_a) - (T_{w1} - T_a) \cdot \exp\left(-\frac{t_2 - t_1}{t_0}\right)}{1 - \exp\left(-\frac{t_2 - t_1}{t_0}\right)} \right\}$$

$$U_{LS} \cdot A_t = \frac{\eta_o \cdot I_b \cdot A_c}{T_s - T_a}$$

$$t_{eb} = -t_0 \cdot \ln \left[1 - \frac{F' \cdot U_L}{C \cdot \eta_0 \cdot I_b} \cdot (97 - T_a) \right]$$

Aolla	0,029059732	A1	0,055939984
A tapa-olla	0,026880252		
Atotal_olla	0,055939984		
A recinto (tapa)	0,242182292	A2	0,298122276
A recinto (mesa)	0,2318		
A recinto (lado2)	0,04655	A3	0,741972276
A recinto (lado1)	0,04655		
A recinto (atrás)	0,11895		

mw (kg): Masa de agua
 CpW (J/kg·K): Calor específico del agua
 T1w (°C): Temperatura inicial del agua
 T1amb. (°C): Temperatura inicial del ambiente
 T2w (°C): Temperatura final del agua (cuando se estabiliza)
 T2amb. (°C): Temperatura del aire en el momento de estabilizarse la del agua
 t1(s): Instante en el que se empieza a medir
 t2 (s): Instante en el que la temperatura se estabiliza
 U (W/m²·K): Factor de pérdidas

I 0° (W/m²): Radiación
 Tps (°C): Temperatura estabilizada del agua
 Tamb. (°C): Temperatura del ambiente en el momento en el cual la del agua se estabiliza
 F1: 1ª Figura de mérito
 η0: Rendimiento

mw (kg): Masa de agua
 CpW (J/kg·K): Calor específico del agua
 T1w (°C): Temperatura inicial del agua
 T1amb. (°C): Temperatura inicial del ambiente
 T2w (°C): Temperatura final del agua (cuando se estabiliza)
 T2amb. (°C): Temperatura del aire en el momento de estabilizarse la del agua
 t1(s): Instante en el que se empieza a medir
 t2 (s): Instante en el que la temperatura se estabiliza
 U (W/m²·K): Factor de pérdidas

Hora: Hora local en el momento de la toma de cada medida.
 Estado del cielo (despejado, nublado, etc.)
 Tamb (°C): Temperatura instantánea del ambiente.
 Tw (°C): Temperatura instantánea del agua.
 I global 0° (W/m²): Radiación global instantánea sobre el plano horizontal.
 I dif.est.0° (W/m²): Radiación difusa estimada sobre el plano horizontal.
 Isueloest.0° (W/m²): Radiación del suelo estimada sobre el plano horizontal.
 I directa 0° (W/m²): Radiación directa calculada sobre el plano horizontal
 I transr. x° (W/m²): Radiación transformada al plano "x" (para parabólica y Primrose).
 Velocidad del viento (m/s)
 Humedad del ambiente(%)

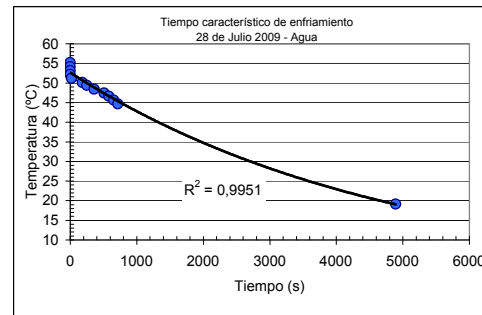
CÁLCULO DEL TIEMPO CARACTERÍSTICO

Método gráfico

Método numérico

AGUA	28/07/2009	ENFRIAMIENTO		T _w -T _a	TIEMPO
		88	0:00:00	55,160	0
		87	0:00:32	54,160	0,32
		86	00:00:56	53,160	0,56
		85	00:01:26	52,160	1,26
		84	00:20:09	51,160	20,09
		83	03:01:00	50,160	181
		82	04:09:00	49,410	249
		81	05:59:00	48,410	359
		80	08:31:00	47,410	511
		79	09:44:00	46,660	584
		78	10:53:00	45,660	653
	77	11:59:00	44,660	719	
	52,6323147		19,144	4895,275364	

y=53,022e-0,0002x

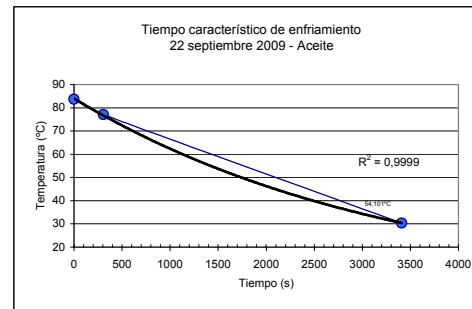


to	
	3404,994857
	35,14207142
	25,87655018
	74,07326114
	1954,910439
	16383,68138
	6787,685007
	10760,07681
	14564,46707
	6848,775595
	6335,498885
	5928,041078
to_m =	6336,202559 [s]

to - agua
4895,275364
6336,202559

ACEITE	22/09/2009	ENFRIAMIENTO		T _w -T _a	TIEMPO (s)
		107	0:00:00	83,684281	0
		100	00:04:37	77	307
				30,37569253	3409,84
		54,1014455			

y=83,684e-0,0003x



to_m (s)	3687,876563
----------	-------------

$$F \cdot U_L = \frac{(m \cdot C_p)_w}{A_t \cdot t_0}$$

AGUA	4,304246081	Con el método gráfico
	3,325409755	Con el cálculo numérico
ACEITE	2,274802164	Con el método gráfico
	2,103300172	Con el cálculo numérico

$$\eta_0 = \frac{m \cdot C_p}{A_c \cdot I_b \cdot t_0} \cdot \left\{ \frac{(T_{w2} - T_a) - (T_{w1} - T_a) \cdot \exp\left(-\frac{t_2 - t_1}{t_0}\right)}{1 - \exp\left(-\frac{t_2 - t_1}{t_0}\right)} \right\}$$

$$t_{eb} = -t_0 \cdot \ln \left[1 - \frac{F' \cdot U_L}{C \cdot \eta_0 \cdot I_b} \cdot (97 - T_a) \right]$$

$$U_{Ls} \cdot A_t = \frac{\eta_0 \cdot I_b \cdot A_c}{T_s - T_a}$$

22-jun	0,18668721 0,13934251	t eb = -4895,275364 LN 0,86816764 0,001936661 68,07 -6336,202559 -0,141370448 0,89814787 0,001496241 68,07 -0,107420553 t eb = 692,0472694 680,6383831	Uls Ap 3,757156422 Uls 12,60790746
23-jun	0,42254227 0,32265036	t eb = -4895,275364 LN 0,82995377 0,002404333 70,72 -6336,202559 -0,186385282 0,86890705 0,001857559 70,57 -0,140519125 t eb = 912,4072772 1180,974896	Uls At = 2,280908835 Uls 7,654056493
13-jul	0,20203333 0,15471646	t eb = -4895,275364 LN 0,87178381 0,001899615 67,4958691 -6336,202559 -0,137213807 0,90094169 0,00146762 67,4958691 -0,104314745 t eb = 671,6993703 660,959355	Uls Ap 3,291701444 Uls 11,045978
14-jul	0,29483443 0,22497021	t eb = -4895,275364 LN 0,85914587 0,001978559 71,19025179 -6336,202559 -0,151816562 0,89117776 0,001528612 71,19025179 -0,115211368 t eb = 743,1838741 730,0025625	Uls Ap 2,769125945 Uls 9,292368942
20-jul	0,41129242 0,31339878	t eb = -4895,275364 LN 0,82765033 0,002437777 70,69951426 -6336,202559 -0,189164524 0,86684468 0,001883398 70,69951426 -0,14289547 t eb = 926,012435 905,4146426	Uls Ap 2,814746424 Uls 9,445457797
20-jul	-0,3197378 -0,36625164	t eb = -4895,275364 LN 0,48623335 0,007664478 67,03218114 -6336,202559 -0,721066633 0,60306994 0,005921485 67,03218114 -0,505722097 t eb = 3529,819723 3204,357642	Uls Ap 3,548746031 Uls 11,90854373
21-jul	0,22817325 0,17484281	t eb = -4895,275364 LN 0,8370318 0,002367762 68,82793521 -6336,202559 -0,177893217 0,87409269 0,001829305 68,82793521 -0,134568856 t eb = 870,836283 852,655529	Uls Ap 3,670376149 Uls 12,31669849
21-jul	0,13698061 0,10117853	t eb = -4895,275364 LN 0,88333102 0,001861321 62,68074125 -6336,202559 -0,124055266 0,90986292 0,001438035 62,68074125 -0,094461324 t eb = 607,2846856 598,5260855	Uls Ap 4,29075716 Uls 14,39851396
28-jul	0,14356905 0,10823428	t eb = -4895,275364 LN 0,85654546 0,002054171 69,83574647 -6336,202559 -0,154847882 0,88916872 0,001587028 69,83574647 -0,117468278 t eb = 758,0230202 744,3028047	Uls Ap 5,342325294 Uls 17,92726609
28-jul	0,18365955 0,13546087	t eb = -4895,275364 LN 0,88784696 0,001715951 65,3591255 -6336,202559 -0,118955898 0,91335188 0,001325723 65,3591255 -0,090634061 t eb = 582,3218753 574,275768	Uls Ap 3,224823212 Uls 10,8215544

AGUA

$$\eta_0 = \frac{m \cdot C_p}{A_c \cdot I_b \cdot t_0} \cdot \left\{ \frac{(T_{w2} - T_a) - (T_{w1} - T_a) \cdot \exp\left(-\frac{t_2 - t_1}{t_0}\right)}{1 - \exp\left(-\frac{t_2 - t_1}{t_0}\right)} \right\}$$

$$t_{eb} = -t_0 \cdot \ln \left[1 - \frac{F \cdot U_L}{C \cdot \eta_0 \cdot I_b} \cdot (97 - T_a) \right]$$

$$U_{Ls} \cdot A_t = \frac{\eta_0 \cdot I_b \cdot A_c}{T_s - T_a}$$

28-sep	0,29534633 0,22633374	t eb =	-4895,275364	LN	0,80449995	0,002482959	78,73671657	Uls Ap Uls	3,185489049 10,68956057
			-6336,202559		-0,21753438	0,84895896	0,001918305		
		t eb =	1064,890692						
			1037,517868						
28-sep	0,19825779 0,1538724	t eb =	-4895,275364	LN	0,86516612	0,001800857	74,87206069	Uls Ap Uls	2,323636637 7,797438379
			-6336,202559		-0,144833743	0,89582894	0,001391321		
		t eb =	709,0010525						
			697,0190584						

AGUA

$$\eta_0 = \frac{m \cdot C_p}{A_c \cdot I_b \cdot t_0} \cdot \left\{ \frac{(T_{w2} - T_a) - (T_{w1} - T_a) \cdot \exp\left(-\frac{t_2 - t_1}{t_0}\right)}{1 - \exp\left(-\frac{t_2 - t_1}{t_0}\right)} \right\} \quad U_{Ls} \cdot A_t = \frac{\eta_0 \cdot I_b \cdot A_c}{T_s - T_a}$$

21-sep	0,1677104 0,15236508	Uls Ap	=	1,999395074	ACEITE
		Uls		6,709379443	
22-sep	0,15830923 0,14471003	Uls Ap	=	1,999395895	ACEITE
		Uls		6,709382199	
24-sep	0,13594846 0,12252041	Uls At	=	2,435958325	ACEITE
		Uls		8,174356794	

RESULTADOS

TOTAL	t estancamie	Tª estanca	Qmáx cocina (aprox. Grado 1)	t estancamiento (aprox. Grado2)	Tª estancamiento (aprox. Grado2)	Qmáx cocina (aprox. Grado 2)	t estancamiento (aprox. Grado2)	Tª estancamie
	119,717647	76	66,144	154,1017844	89	91,684	288,5982156	39
	171,780689	89	70,808	136,05226	87	88,947	239,8763115	90
	201,619217	81	56,655	170,0153444	82	91,38	387,2346556	
	209,527699	85	59,003	142,7656213	40	79,003	-414,6117752	
	133,022316	82	75,703	10,19646852	60	76,95	50,96395929	
	16,6665074	41	3,4883	130,3439904	85	9,7175	254,8324802	
	136,108029	60	46,617	96,97039001	109	53,203	-66,58497334	
	125,109958	84	50,632	85,5559787	104	56,467	153,564322	
	96,4	112	83,145	50,23925205		61,985	111,3217808	
	55,2458441	110	251,91	271,422666		331,64	-678,922666	
	87,4520293	98	150,4			174,74		
	72,8479833		160,2			238,25		
	293,521341		38,51			36,855		
			84,928			107,2		
	132,232251	83,4545	85,58166429	124,7663756	82	107,0015357	32,62723105	64,5

INDIA	t estancamie	Tª estanca	Qmáx cocina (aprox. Grado 1)	t estancamiento (aprox. Grado2)	Tª estancamiento (aprox. Grado2)	Qmáx cocina (aprox. Grado 2)	t estancamiento (aprox. Grado2)	Tª estancamie
	119,717647	76	66,144	154,1017844	89	91,684	288,5982156	
	171,780689	89	70,808	136,05226	87	88,947	239,8763115	-
	201,619217	81	56,655	170,0153444	82	91,38	387,2346556	-
	209,527699	85	59,003	142,7656213	60	79,003	-414,6117752	-
	133,022316	82	75,703	130,3439904		76,95	254,8324802	-
	125,109958	60	50,632	271,422666		56,467	-678,922666	-
	293,521341		38,51			36,855		-
	179,185552	78,8333	59,63642857	167,4502778	79,5	74,46942857	12,83453695	-
	199,233319	82,75	58,224	182,8980137	88	77,5738	59,19662918	-

EUROPEA	t estancamie	Tª estanca	Qmáx cocina (aprox. Grado 1)	t estancamiento (aprox. Grado2)	Tª estancamiento (aprox. Grado2)	Qmáx cocina (aprox. Grado 2)	t estancamiento (aprox. Grado2)	Tª estancamie
	16,6665074	41	3,4883	10,19646852	40	9,7175	50,96395929	39
	136,108029	84	46,617	96,97039001	85	53,203	-66,58497334	90
	96,4	112	83,145	85,5559787	109	61,985	153,564322	
	55,2458441	110	251,91	50,23925205	104	331,64	111,3217808	
	87,4520293	98	150,4			174,74		
	72,8479833		160,2			238,25		
			84,928			107,2		
	77,4533989	89	111,5269	60,74052232	84,5	139,5336429	62,31627219	64,5
	68,34163	83,25	99,308325	60,74052232	84,5	121,173125	81,14287005	64,5
	81,8949098	83,25	88,77006	60,74052232	84,5	107,5791	62,31627219	64,5

NO ACEITE	t estancamie	Tª estanca	Qmáx cocina (aprox. Grado 1)	t estancamiento (aprox. Grado2)	Tª estancamiento (aprox. Grado2)	Qmáx cocina (aprox. Grado 2)	t estancamiento (aprox. Grado2)	Tª estancamie
	16,6665074	41	3,4883	10,19646852	40	9,7175	50,96395929	39
	136,108029	84	46,617	96,97039001	85	53,203	-66,58497334	90
	96,4	110	83,145	85,5559787	109	61,985	153,564322	
	87,4520293	98	150,4	50,23925205	104	174,74	111,3217808	
	72,8479833		160,2			238,25		
			84,928			107,2		

t estancamie	Tª estanca	Qmáx cocina (aprox. Grado 1)	t estancamiento (aprox. Grado2)	Tª estancamiento (aprox. Grado2)	Qmáx cocina (aprox. Grado 2)	t estancamiento (aprox. Grado2)	Tª estancamie
16,6665074	41	3,4883	10,19646852	40	9,7175	50,96395929	39
136,108029	84	46,617	96,97039001	85	53,203	-66,58497334	90
96,4	110	83,145	85,5559787	109	61,985	153,564322	
87,4520293	98	150,4	50,23925205	104	174,74	111,3217808	
72,8479833		160,2			238,25		

132,232251	83,4545	85,58166429	124,7663756	82	107,0015357	32,62723105	64,5
179,185552	78,8333	59,63642857	167,4502778	79,5	74,46942857	12,83453695	64,5
199,233319	82,75	58,224	182,8980137	88	77,5738	59,19662918	64,5
77,4533989	89	111,5269	60,74052232	84,5	139,5336429	62,31627219	64,5
68,34163	83,25	99,308325	60,74052232	84,5	121,173125	81,14287005	
81,8949098	83,25	88,77006	60,74052232	84,5	107,5791	62,31627219	

VALORES DE RADICIÓN GLOBAL Y DIFUSA RECOGIDOS DE PVGIS

JUNIO		
09:22	814	231
09:37	821	230
09:52	826	228
10:00	830	227
10:07	830	227
10:22	833	225
10:30	835	225
10:37	835	224
10:52	836	222
11:00	836	221
11:07	838	221
11:22	838	219
11:30	838	219
11:37	839	218
11:52	839	218
12:00	839	217
12:07	839	217
12:22	839	217
12:30	839	218
12:37	839	218
12:52	839	218
13:00	838	219
13:07	838	219
13:22	838	221
13:30	837	222
13:37	836	222
13:52	835	224
14:00	834	225
14:07	833	225
14:22	830	227
14:37	826	228

JULIO		
10:00	867	218
10:07	872	217
10:22	875	215
10:30	875	213
10:37	877	213
10:52	879	211
11:00	879	211
11:07	880	210
11:22	881	208
11:30	881	207
11:37	882	207
11:52	882	206
12:00	882	206
12:07	882	206
12:22	882	206
12:30	882	206
12:37	882	206
12:52	882	207
13:00	881	208
13:07	881	208
13:22	880	210
13:30	879	210
13:37	879	211
13:52	877	213
14:00	875	215
14:07	875	215
14:22	872	217
14:30	870	217
14:37	867	218
14:52	862	220
15:00	858	220
15:07	855	221
15:22	846	222
15:30	836	222
15:40	823	222
15:50	820	222
16:00	807	221

SEPTIEMBRE		
09:22	749	203
09:30	758	205
09:37	763	205
09:52	775	206
10:00	780	206
10:07	785	207
10:22	793	207
10:30	797	207
10:37	800	207
10:52	805	207
11:00	807	207
11:07	809	207
11:22	812	206
11:30	812	206
11:37	814	206
11:52	816	206
12:00	816	206
12:07	816	206
12:22	816	206
12:30	816	206
12:37	816	206
12:52	814	206
13:00	814	206
13:07	812	206
13:22	809	207
13:30	807	207
13:37	805	207
13:52	800	207
14:00	797	207
14:07	793	207
14:22	785	207
14:30	780	206
14:37	775	206
14:52	763	205
15:00	758	203
15:07	749	203
15:22	732	200
15:30	712	196

