

**APROXIMACION AL ESTUDIO DEL RIESGO
DEL BLEVE Y SUS EFECTOS EN LOS
GENERADORES MARINOS DE VAPOR Y LOS
TANQUES DE CARGA DE LOS BUQUES LNG-
LPG. APLICACION COMPARATIVA DE LAS
NORMAS QUE LO REGULAN Y PREVIENEN.**

Autor: German de Melo Rodriguez
Director: Emilio Eguia López

Barcelona, mayo de 1994

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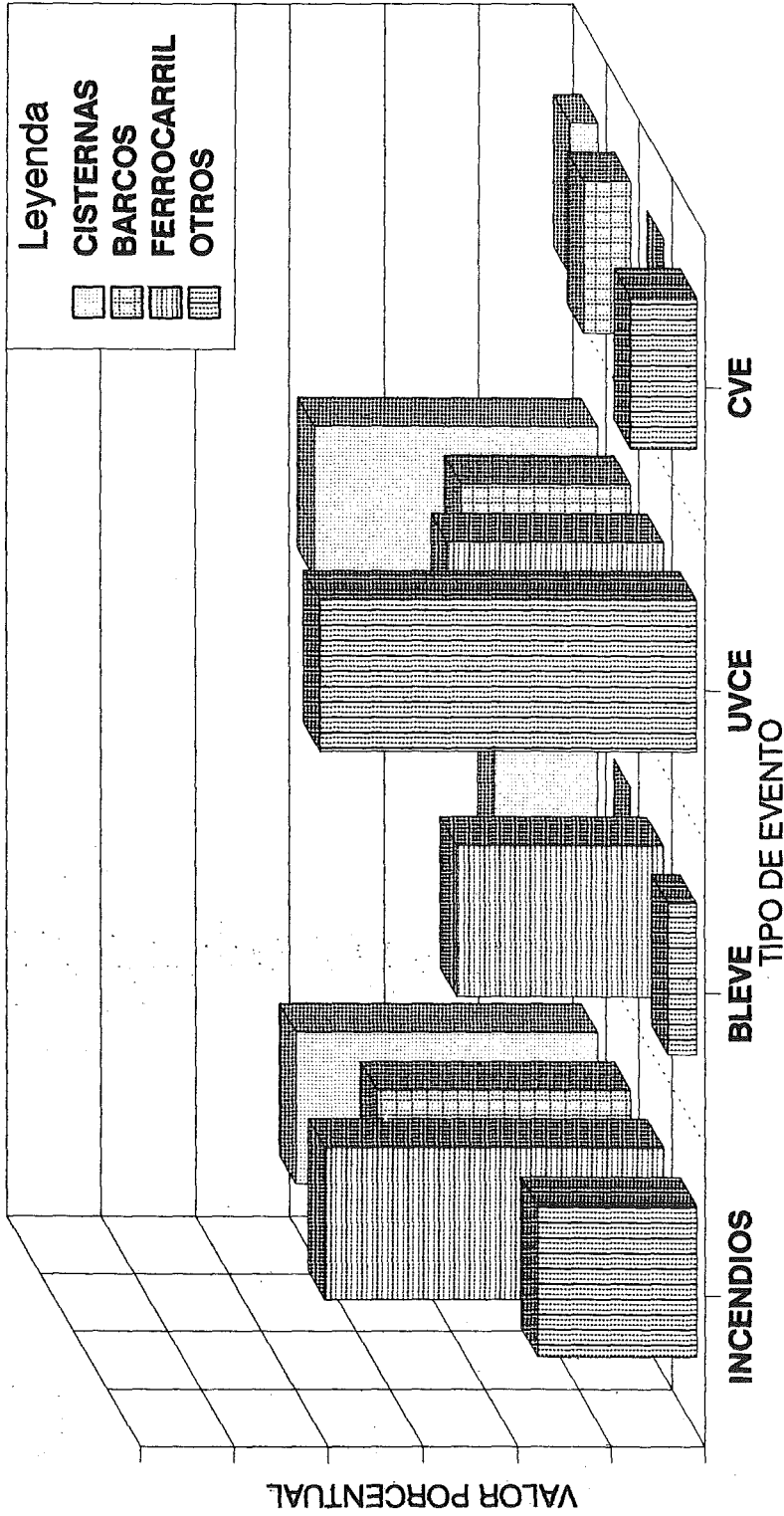
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ANEXO 4

ANEXO 4: BASE DE DATOS "SONATA"

INCIDENTE POR TIPOLOGÍA DEL EVENTO



	INCENDIOS	BLEVÉ	UVCE	CVE
CISTERNAS	32	11	30	3
BARCOS	27	0	18	5
FERROCARRIL	36	22	23	0
OTROS	17	3	40	7

RESULTADOS GLOBALES DEL ANÁLISIS HISTÓRICO DE ACCIDENTES EN INSTALACIONES DE CARGA/DESCARGA DE LPG.

ANEXO 5

A42: PR ^Q
B42: PR [A18] ^HOME^Q
C44: PR ^Q
D44: PR [A30] ^HOME^MENUBIFURCAR MENU 1}
C45: PR ^MENU 1
D45: PR [A30] ^ENTRADA A CALCULO DE FORMULAS
E45: PR [A30] ^COPIAS SEGURIDAD
F45: PR [A30] ^GRABAR LA HOJA COMO ESTA
G45: PR [A30] ^SALIDA
D46: PR [A30] ^Menú de ecuaciones
E46: PR [A30] ^Copias de los programas
F46: PR [A30] ^Graba la hoja con los valores actuales
G46: PR [A30] ^SALIDA DEL PROGRAMA
D47: PR [A30] ^MENUBIFURCAR MENU 1.1}
E47: PR [A30] ^FOJESC^ESC^B\MACROO.B.WQ1^RC/^FOJESC^ESC^B\MACROO.B.WQ1^RC^MENUBIFURCAR MENU 1}
F47: PR [A30] ^fgr/^fgs^MENUBIFURCAR MENU 1}
G47: PR [A30] ^/FSS
C49: PR ^MENU 1.1
D49: PR [A30] ^Ecuación I (Cálculo Temperatura casco exterior (Tfcel)
E49: PR [A30] ^Ecuación II (Cálculo Temperatura casco interior (Tfci)
F49: PR [A30] ^Ecuación III (Cálculo de q para cada R)
G49: PR [A30] ^Ecuación IV (Cálculo de q para líneas de conductancia K)
H49: PR [A30] ^Ecuación V (Cálculo del calor recibido por el gas (Qr)
I49: PR [A30] ^Ecuación VI (Cálculo de la masa de vapor en el tanque (mvl)
J49: PR [A30] ^Ecuación VII (Cálculo del calor para abrir válvulas [An])
K49: PR [A30] ^Ecuación VIII (Cálculo de Qextra)
L49: PR [A30] ^Ecuación IX (Tanques indep. Temp. casco exterior (Tfcel)
M49: PR [A23] ^Ecuación X (Cálculo Temperatura casco interior Tq/IND.(Tfci)
N49: PR [A15] ^Ecuación XI (Calor radiado casco int. a pared aislamiento (qr3)
O49: PR [A19] ^Ecuación XII (Calor transitorio casco int. a pared aislam. (qT)
P49: PR ^Grafica radiación temp. casco interior con aislamiento)

CALCULO TEMPERATURA CASCO EXTERIOR

Emisividad llamas (Σ)	0,9
Emisividad casco ext. (Σ1)	1
Temperatura llamas (T _L)	1473 °K
Temp. casco ext. (T _{ce})	293 °K
Sprf.casco ext.afec.(S _{ce1})	180 m ²
Cte. Stephan-R. (cte)	4,9E-08 Kcal/hm ² K4
Calor esp. Acero. (Cece)	0,114 Kcal/Kg°C
Vol. casco (Vce)	3,24 m ³
Densidad del acero (fce)	7850 Kg/m ³

Horas	Tice	Tfce	Cece
0	293	293	0,114
0,01667	800,9166	507,9166	0,114
0,04167	1473	1233,897	0,129
0,08333	1473	1473	0,243
0,125	1473	1473	0,302
0,16667	1473	1473	0,302
0,20833	1473	1473	0,302
0,25	1473	1473	0,302
0,29167	1473	1473	0,302
0,33333	1473	1473	0,302
0,375	1473	1473	0,302
0,41667	1473	1473	0,302
0,45833	1473	1473	0,302
0,5	1473	1473	0,302
0,54167	1473	1473	0,302
0,58333	1473	1473	0,302
0,625	1473	1473	0,302
0,66667	1473	1473	0,302
0,70833	1473	1473	0,302
0,75	1473	1473	0,302
0,79167	1473	1473	0,302
0,83333	1473	1473	0,302
0,875	1473	1473	0,302
0,91667	1473	1473	0,302
0,95833	1473	1473	0,302
1	1473	1473	0,302

$$\Sigma 1 \Sigma cte (T_{L4} - T_{ce4}) S_{ce} t$$

$$T_{fce} = \text{-----} + T_{ice}$$

$$\text{Cece fce Vce}$$

AP1: PR [A261] 'CALCULO TEMPERATURA CASCO EXTERIOR

AS1: PR [A81] 'Horas

AT1: PR [A9] ~Tice

AU1: PR [A9] ~Tfice

AW1: PR [A8] ~Cece

AS2: PR [A8] 0

AT2: PR [A9] +AV2

AU2: PR [A9] @SI(AV2>=\$AQ\$5,\$AQ\$5;AV2)

AV2: (F2) PR [A9] +AQ6

AW2: (F3) PR [A8] (0, 113+4, 8*(10⁻⁵)*(AU2-273)+9, 1*(10⁻⁸)*(AU2-273)²)

AP3: PR [A261] 'Emissividad llamas (Σ)

AQ3: D [A7] [F3] 0, 9

AR3: PR [A12] '

AS3: PR [A8] 1/60

AT3: PR [A9] @SI(+AT2+AV3>=\$AQ\$5,\$AQ\$5;AT2+AV3)

AU3: PR [A9] @SI(AV3>=\$AQ\$5,\$AQ\$5;AV3)

AV3: (.2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8)*(\$AQ\$5⁴)-(\$AT2⁴))*\$AQ\$7*AS3)/(\$AW3*\$AQ\$11*\$AQ\$10))+AT2

AW3: (F3) PR [A8] (0, 113+4, 8*(10⁻⁵)*(AU2-273)+9, 1*(10⁻⁸)*(AU2-273)²)

AP4: PR [A261] 'Emissividad casco ext. (Σ1)

AQ4: D [A7] [F3] 1

AR4: PR [A12] '

AS4: PR [A8] 2, 5/60

AT4: PR [A9] @SI(+AT3+AV4>=\$AQ\$5,\$AQ\$5;AT3+AV4)

AU4: PR [A9] @SI(AV4>=\$AQ\$5,\$AQ\$5;AV4)

AV4: (.2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8)*(\$AQ\$5⁴)-(\$AT3⁴))*\$AQ\$7*AS4)/(\$AW4*\$AQ\$11*\$AQ\$10))+AT3

AW4: (F3) PR [A8] (0, 113+4, 8*(10⁻⁵)*(AU3-273)+9, 1*(10⁻⁸)*(AU3-273)²)

AP5: PR [A261] 'Temperatura llamas (TLL)

AQ5: D [A7] [F3] 1473

AR5: PR [A12] '°K

AS5: PR [A8] +AS4+2, 5/60

AT5: PR [A9] @SI(+AT4+AV5>=\$AQ\$5,\$AQ\$5;AT4+AV5)

AP1: PR [A261] 'CALCULO TEMPERATURA CASCO EXTERIOR

AS1: FR [A81] 'Horas

AT1: PR [A91] ~Tice

AU1: PR [A91] ~Tfice

AW1: PR [A81] ~Cece

AS2: PR [A81] 0

AT2: PR [A91] +AV2

AU2: PR [A91] @SI(AV2>=\$AQ\$5,\$AQ\$5;AV2)

AV2: (F2) PR [A91] +AQ6

AW2: (F3) PR [A81] (0, 113+4, 8*(10^-5)*(AU2-273)+9, 1*(10^-8)*(AU2-273)^2)

AP3: PR [A261] 'Emisividad llamas (Σ)

AQ3: D [A71] F3] 0, 9

AR3: PR [A121]'

AS3: PR [A81] 1/60

AT3: PR [A91] @SI(+AT2+AV3>=\$AQ\$5,\$AQ\$5;AT2+AV3)

AU3: PR [A91] @SI(AV3>=\$AQ\$5,\$AQ\$5;AV3)

AV3: (.2) PR [A91] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(((\$AQ\$5^4)-(\$AT2^4))*\$AQ\$7*AS3)/(\$AW3*\$AQ\$11*\$AQ\$10)))+AT2

AW3: (F3) PR [A81] (0, 113+4, 8*(10^-5)*(AU2-273)+9, 1*(10^-8)*(AU2-273)^2)

AP4: PR [A261] 'Emisividad casco ext. (Σ1)

AQ4: D [A71] F3] 1

AR4: PR [A121]'

AS4: PR [A81] 2, 5/60

AT4: PR [A91] @SI(+AT3+AV4>=\$AQ\$5,\$AQ\$5;AT3+AV4)

AU4: PR [A91] @SI(AV4>=\$AQ\$5,\$AQ\$5;AV4)

AV4: (.2) PR [A91] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(((\$AQ\$5^4)-(\$AT3^4))*\$AQ\$7*AS4)/(\$AW4*\$AQ\$11*\$AQ\$10)))+AT3

AW4: (F3) PR [A81] (0, 113+4, 8*(10^-5)*(AU3-273)+9, 1*(10^-8)*(AU3-273)^2)

AP5: PR [A261] 'Temperatura llamas (TLL)

AQ5: D [A71] F3] 1473

AR5: PR [A121] 'OK

AS5: PR [A81] +AS4+2, 5/60

AT5: PR [A91] @SI(+AT4+AV5>=\$AQ\$5,\$AQ\$5;AT4+AV5)

AU5: PR [A9] @SI(AV5>=\$AQ\$5,\$AQ\$5;AV5)
 AV5: (.2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5~4)-(\$AT4~4))*\$AQ\$7*AS5)/(\$AW5*\$AQ\$11*\$AQ\$10))+AT4
 AW5: (F3) PR [A8] (0, 113+4, 8*(10~5))*(AU4-273)+9, 1*(10~8)*(AU4-273)^2)
 AP6: PR [A26] 'Temp. casco ext. (Tce)
 AQ6: D [A7] [F3] 293
 AR6: PR [A12] '°K
 AS6: PR [A8] +AS5+2, 5/60
 AT6: PR [A9] @SI(AT5+AV6>=\$AQ\$5,\$AQ\$5;AT5+AV6)
 AU6: PR [A9] @SI(AV6>=\$AQ\$5,\$AQ\$5;AV6)
 AV6: (.2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5~4)-(\$AT5~4))*\$AQ\$7*AS6)/(\$AW6*\$AQ\$11*\$AQ\$10))+AT5
 AW6: (F3) PR [A8] (0, 113+4, 8*(10~5))*(AU5-273)+9, 1*(10~8)*(AU5-273)^2)
 AP7: PR [A26] 'Sprf.casco ext.afec.(Scei)
 AQ7: D [A7] [F3] 180
 AR7: PR [A12] 'm²
 AS7: PR [A8] +AS6+2, 5/60
 AT7: PR [A9] @SI(AT6+AV7>=\$AQ\$5,\$AQ\$5;AT6+AV7)
 AU7: PR [A9] @SI(AV7>=\$AQ\$5,\$AQ\$5;AV7)
 AV7: (.2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5~4)-(\$AT6~4))*\$AQ\$7*AS7)/(\$AW7*\$AQ\$11*\$AQ\$10))+AT6
 AW7: (F3) PR [A8] (0, 113+4, 8*(10~5))*(AU6-273)+9, 1*(10~8)*(AU6-273)^2)
 AP8: PR [A26] 'Cte. Stephan-B. (cte)
 AQ8: D [A7] [F3] 4, 91*(10)^-8
 AR8: PR [A12] 'Kcal/hm²K4
 AS8: PR [A8] +AS7+2, 5/60
 AT8: PR [A9] @SI(AT7+AV8>=\$AQ\$5,\$AQ\$5;AT7+AV8)
 AU8: PR [A9] @SI(AV8>=\$AQ\$5,\$AQ\$5;AV8)
 AV8: (.2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5~4)-(\$AT7~4))*\$AQ\$7*AS8)/(\$AW8*\$AQ\$11*\$AQ\$10))+AT7
 AW8: (F3) PR [A8] (0, 113+4, 8*(10~5))*(AU7-273)+9, 1*(10~8)*(AU7-273)^2)
 AP9: PR [A26] 'Calor esp. Acero. (Cece)
 AQ9: D [A7] [F3] 0, 114
 AR9: PR [A12] 'Kcal/Kg°C
 AS9: PR [A8] +AS8+2, 5/60

ASI3: PR [A8] + ASI2+2, 5/60
 ATI3: PR [A9] @SI(+ATI2+AV13>=\$AQ\$5,\$AQ\$5;ATI2+AV13)
 AU13: PR [A9] @SI(AV13>=\$AQ\$5,\$AQ\$5;AV13)
 AV13: (2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5~4)-(\$ATI2~4))*\$AQ\$7*ASI3)/(\$AW13*\$AQ\$11*\$AQ\$10))+ATI2
 AW13: (F3) PR [A8] (0, 113+4, 8*(10~5)*(AU12-273)+9, 1*(10~8)*(AU12-273)^2)
 AP14: PR [A26]'
 AQ14: PR [A7]'
 AR14: PR [A12]'
 ASI4: PR [A8] + ASI3+2, 5/60
 ATI4: PR [A9] @SI(+ATI3+AV14>=\$AQ\$5,\$AQ\$5;ATI3+AV14)
 AU14: PR [A9] @SI(AV14>=\$AQ\$5,\$AQ\$5;AV14)
 AV14: (2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5~4)-(\$ATI3~4))*\$AQ\$7*ASI4)/(\$AW14*\$AQ\$11*\$AQ\$10))+ATI3
 AW14: (F3) PR [A8] (0, 113+4, 8*(10~5)*(AU13-273)+9, 1*(10~8)*(AU13-273)^2)
 ASI5: PR [A8] + ASI4+2, 5/60
 ATI5: PR [A9] @SI(+ATI4+AV15>=\$AQ\$5,\$AQ\$5;ATI4+AV15)
 AU15: PR [A9] @SI(AV15>=\$AQ\$5,\$AQ\$5;AV15)
 AV15: (2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5~4)-(\$ATI4~4))*\$AQ\$7*ASI5)/(\$AW15*\$AQ\$11*\$AQ\$10))+ATI4
 AW15: (F3) PR [A8] (0, 113+4, 8*(10~5)*(AU14-273)+9, 1*(10~8)*(AU14-273)^2)
 AP16: PR [A26]'
 AR16: PR [A12]'
 ASI6: PR [A8] + ASI5+2, 5/60
 ATI6: PR [A9] @SI(+ATI5+AV16>=\$AQ\$5,\$AQ\$5;ATI5+AV16)
 AU16: PR [A9] @SI(AV16>=\$AQ\$5,\$AQ\$5;AV16)
 AV16: (2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5~4)-(\$ATI5~4))*\$AQ\$7*ASI6)/(\$AW16*\$AQ\$11*\$AQ\$10))+ATI5
 AW16: (F3) PR [A8] (0, 113+4, 8*(10~5)*(AU15-273)+9, 1*(10~8)*(AU15-273)^2)
 AP17: PR [A26] ' Tice= ----- + Tice
 ASI7: PR [A8] + ASI6+2, 5/60
 ATI7: PR [A9] @SI(+ATI6+AV17>=\$AQ\$5,\$AQ\$5;ATI6+AV17)
 AU17: PR [A9] @SI(AV17>=\$AQ\$5,\$AQ\$5;AV17)
 AV17: (2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5~4)-(\$ATI6~4))*\$AQ\$7*ASI7)/(\$AW17*\$AQ\$11*\$AQ\$10))+ATI6
 AW17: (F3) PR [A8] (0, 113+4, 8*(10~5)*(AU16-273)+9, 1*(10~8)*(AU16-273)^2)

Σ I cte (TIL4-Tice4) See t

AT9: PR [A9] @SI(+ATB+AV9>=\$AQ\$5;\$AQ\$5;ATB+AV9)
 AU9: PR [A9] @SI(AV9>=\$AQ\$5;\$AQ\$5;AV9)
 AV9: (.2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5^4)-(\$ATB^4))*\$AL\$7*AS9)/(\$AW9*\$AQ\$11*\$AQ\$10))+ATB
 AW9: (F3) PR [A8] (0, 113+4, 8*(10^-5)*(AU8-273)+9, 1*(10^-8)*(AU8-273)^2)
 AP10: PR [A26] 'Vol casco
 (Vce)
 AQ10: D [A7] [F3] 3, 24
 AR10: PR [A12] 'm3
 ASI0: PR [A8] +AS9+2, 5/60
 ATI0: PR [A9] @SI(+AT9+AV10>=\$AQ\$5;\$AQ\$5;AT9+AV10)
 AU10: PR [A9] @SI(AV10>=\$AQ\$5;\$AQ\$5;AV10)
 AV10: (.2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5^4)-(\$AT9^4))*\$AQ\$7*ASI0)/(\$AW10*\$AQ\$11*\$AQ\$10))+AT9
 AW10: (F3) PR [A8] (0, 113+4, 8*(10^-5)*(AU9-273)+9, 1*(10^-8)*(AU9-273)^2)
 AP11: PR [A26] 'Densidad del acero (fce)
 AQ11: D [A7] [F3] 7850
 AR11: PR [A12] 'Kg/m3
 ASI1: PR [A8] +ASI0+2, 5/60
 ATI1: PR [A9] @SI(+ATI0+AV11>=\$AQ\$5;\$AQ\$5;ATI0+AV11)
 AU11: PR [A9] @SI(AV11>=\$AQ\$5;\$AQ\$5;AV11)
 AV11: (.2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5^4)-(\$ATI0^4))*\$AQ\$7*ASI1)/(\$AW11*\$AQ\$11*\$AQ\$10))+ATI0
 AW11: (F3) PR [A8] (0, 113+4, 8*(10^-5)*(AU10-273)+9, 1*(10^-8)*(AU10-273)^2)
 AP12: PR [A26] '
 AQ12: PR [A7] '
 AR12: PR [A12] '
 ASI2: PR [A8] +ASI1+2, 5/60
 ATI2: PR [A9] @SI(+ATI1+AV12>=\$AQ\$5;\$AQ\$5;ATI1+AV12)
 AU12: PR [A9] @SI(AV12>=\$AQ\$5;\$AQ\$5;AV12)
 AV12: (.2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5^4)-(\$ATI1^4))*\$AQ\$7*ASI2)/(\$AW12*\$AQ\$11*\$AQ\$10))+ATI1
 AW12: (F3) PR [A8] (0, 113+4, 8*(10^-5)*(AU11-273)+9, 1*(10^-8)*(AU11-273)^2)
 AP13: PR [A26] '
 AQ13: PR [A7] '
 AR13: PR [A12] '

AP18: PR [A261] Cece fce Vce
 ASI 8: PR [A81 +ASI 7+2, 5/60
 ATI 8: PR [A9] @SI(+ATI 7+AV18>=\$AQ\$5,\$AQ\$5;ATI 7+AV18)
 AU18: PR [A9] @SI(AV18>=\$AQ\$5,\$AQ\$5;AV18)
 AV18: (.2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5^4)-(\$ATI 7^4))*\$AQ\$7*ASI 8)/(\$AW18*\$AQ\$11*\$AQ\$10))+ATI 7
 AW18: (F3) PR [A8] (0, 113+4, 8*(10^-5)*(AU17-273)+9, 1*(10^-8)*(AU17-273)^2)
 ASI 3: PR [A8] +ASI 8+2, 5/60
 ATI 9: PR [A9] @SI(+ATI 8+AV19>=\$AQ\$5,\$AQ\$5;ATI 8+AV19)
 AU19: PR [A9] @SI(AV19>=\$AQ\$5,\$AQ\$5;AV19)
 AV19: (.2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5^4)-(\$ATI 8^4))*\$AQ\$7*ASI 9)/(\$AW19*\$AQ\$11*\$AQ\$10))+ATI 8
 AW19: (F3) PR [A8] (0, 113+4, 8*(10^-5)*(AU18-273)+9, 1*(10^-8)*(AU18-273)^2)
 AS20: PR [A8] +ASI 9+2, 5/60
 AT20: PR [A9] @SI(+ATI 9+AV20>=\$AQ\$5,\$AQ\$5;ATI 9+AV20)
 AU20: PR [A9] @SI(AV20>=\$AQ\$5,\$AQ\$5;AV20)
 AV20: (.2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5^4)-(\$ATI 9^4))*\$AQ\$7*AS20)/(\$AW20*\$AQ\$11*\$AQ\$10))+ATI 9
 AW20: (F3) PR [A8] (0, 113+4, 8*(10^-5)*(AU19-273)+9, 1*(10^-8)*(AU19-273)^2)
 AS21: PR [A8] +AS20+2, 5/60
 AT21: PR [A9] @SI(+AT20+AV21>=\$AQ\$5,\$AQ\$5;AT20+AV21)
 AU21: PR [A9] @SI(AV21>=\$AQ\$5,\$AQ\$5;AV21)
 AV21: (.2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5^4)-(\$AT20^4))*\$AQ\$7*AS21)/(\$AW21*\$AQ\$11*\$AQ\$10))+AT20
 AW21: (F3) PR [A8] (0, 113+4, 8*(10^-5)*(AU20-273)+9, 1*(10^-8)*(AU20-273)^2)
 AS22: PR [A8] +AS21+2, 5/60
 AT22: PR [A9] @SI(+AT21+AV22>=\$AQ\$5,\$AQ\$5;AT21+AV22)
 AU22: PR [A9] @SI(AV22>=\$AQ\$5,\$AQ\$5;AV22)
 AV22: (.2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5^4)-(\$AT21^4))*\$AQ\$7*AS22)/(\$AW22*\$AQ\$11*\$AQ\$10))+AT21
 AW22: (F3) PR [A8] (0, 113+4, 8*(10^-5)*(AU21-273)+9, 1*(10^-8)*(AU21-273)^2)
 AS23: PR [A8] +AS22+2, 5/60
 AT23: PR [A9] @SI(+AT22+AV23>=\$AQ\$5,\$AQ\$5;AT22+AV23)
 AU23: PR [A9] @SI(AV23>=\$AQ\$5,\$AQ\$5;AV23)
 AV23: (.2) PR [A9] ((\$AQ\$3*\$AQ\$4*\$AQ\$8*(\$AQ\$5^4)-(\$AT22^4))*\$AQ\$7*AS23)/(\$AW23*\$AQ\$11*\$AQ\$10))+AT22
 AW23: (F3) PR [A8] (0, 113+4, 8*(10^-5)*(AU22-273)+9, 1*(10^-8)*(AU22-273)^2)

AS24: PR [A81 +AS23+2, 5/60
AT24: PR [A91 @SI(+AT23+AV24>=\$AQ\$5,\$AQ\$5;AT23+AV24)
AU24: PR [A91 @SI(AV24>=\$AQ\$5,\$AQ\$5;AV24)
AV24: (.2) PR [A91 ((\$AQ\$3*\$AQ\$4*\$AQ\$8*((\$AQ\$5^4)-(\$AT23^4)))*AQ\$7*AS24)/(\$AW24*\$AQ\$11*\$AQ\$10))+AT23
AW24: (F3) PR [A81 (0, 113+4, 8*(10^~5)*(AU23-273)+9, 1*(10^~8)*(AU23-273)^2)
AS25: PR [A81 +AS24+2, 5/60
AT25: PR [A91 @SI(+AT24+AV25>=\$AQ\$5,\$AQ\$5;AT24+AV25)
AU25: PR [A91 @SI(AV25>=\$AQ\$5,\$AQ\$5;AV25)
AV25: (.2) PR [A91 ((\$AQ\$3*\$AQ\$4*\$AQ\$8*((\$AQ\$5^4)-(\$AT24^4)))*AQ\$7*AS25)/(\$AW25*\$AQ\$11*\$AQ\$10))+AT24
AW25: (F3) PR [A81 (0, 113+4, 8*(10^~5)*(AU24-273)+9, 1*(10^~8)*(AU24-273)^2)
AS26: PR [A81 +AS25+2, 5/60
AT26: PR [A91 @SI(+AT25+AV26>=\$AQ\$5,\$AQ\$5;AT25+AV26)
AU26: PR [A91 @SI(AV26>=\$AQ\$5,\$AQ\$5;AV26)
AV26: (.2) PR [A91 ((\$AQ\$3*\$AQ\$4*\$AQ\$8*((\$AQ\$5^4)-(\$AT25^4)))*AQ\$7*AS26)/(\$AW26*\$AQ\$11*\$AQ\$10))+AT25
AW26: (F3) PR [A81 (0, 113+4, 8*(10^~5)*(AU25-273)+9, 1*(10^~8)*(AU25-273)^2)
AS27: PR [A81 +AS26+2, 5/60
AT27: PR [A91 @SI(+AT26+AV27>=\$AQ\$5,\$AQ\$5;AT26+AV27)
AU27: PR [A91 @SI(AV27>=\$AQ\$5,\$AQ\$5;AV27)
AV27: (.2) PR [A91 ((\$AQ\$3*\$AQ\$4*\$AQ\$8*((\$AQ\$5^4)-(\$AT26^4)))*AQ\$7*AS27)/(\$AW27*\$AQ\$11*\$AQ\$10))+AT26
AW27: (F3) PR [A81 (0, 113+4, 8*(10^~5)*(AU26-273)+9, 1*(10^~8)*(AU26-273)^2)
AP29: PR [A261 'Alt-q >>> VUELVE AL MENU

CALCULO TEMPERATURA CASCO INTERIOR

	Horas	Tci	Tci	Tci	numer	denom	Cece
Emisividad llamas (Σ)	0, 9	293	293, 00	293, 00	849520	2899, 38	0, 114
Emisividad casco ext. ($\Sigma 1$)	1	586, 5807	293, 5807	293, 58	851203	2899, 38	0, 114
Temperatura llamas (TLL)	1473	1228, 886	642, 3057	642, 31	1862782	2900, 15	0, 114
Temp. casco ext. (Tce)	293	1473	1326, 584	1.326, 58	4829519	3640, 57	0, 143
Sprf.casco ext.afec.(Sce)	180	0, 125	1473	1472, 499	1.472, 50	9909140	6729, 47
Cte. Stephan-B. (cte)	4, 9E-09	0, 16667	1473	1472, 414	1.472, 41	1, 1E+07	7668, 52
Calor esp. Acero. (Cece)	0, 114	0, 20833	1473	1472, 268	1.472, 27	1, 1E+07	7667, 94
Vol casco (Vce)	3, 24	0, 25	1473	1472, 121	1.472, 12	1, 1E+07	7666, 95
Densidad del acero (fce)	7850	0, 29167	1473	1471, 975	1.471, 97	1, 1E+07	7665, 96
Resist. Radiactiva (R)	5	0, 33333	1473	1471, 828	1.471, 83	1, 1E+07	7664, 97
Superf. aisl. (See=Sa)	180	0, 375	1473	1471, 681	1.471, 68	1, 1E+07	7663, 97
Temperatura liquido (TL)	112	0, 41667	1473	1471, 535	1.471, 53	1, 1E+07	7662, 98
Espesor aislam. (e)	0, 2	0, 45833	1473	1471, 388	1.471, 39	1, 1E+07	7661, 99
Coef. cond térmica (h)	0, 022	0, 5	1473	1471, 241	1.471, 24	1, 1E+07	7661
		0, 54167	1473	1471, 094	1.471, 09	1, 1E+07	7660
		0, 58333	1473	1470, 948	1.470, 95	1, 1E+07	7659, 01
		0, 625	1473	1470, 801	1.470, 80	1, 1E+07	7658, 02
		0, 66667	1473	1470, 654	1.470, 65	1, 1E+07	7657, 02
		0, 70833	1473	1470, 507	1.470, 51	1, 1E+07	7656, 03
		0, 75	1473	1470, 36	1.470, 36	1, 1E+07	7655, 03
		0, 79167	1473	1470, 213	1.470, 21	1, 1E+07	7654, 04
		0, 83333	1473	1470, 066	1.470, 07	1, 1E+07	7653, 04
		0, 875	1473	1469, 919	1.469, 92	1, 1E+07	7652, 05
		0, 91667	1473	1469, 771	1.469, 77	1, 1E+07	7651, 06
		0, 95833	1473	1469, 624	1.469, 62	1, 1E+07	7650, 06
		1	1473	1469, 477	1.469, 48	1, 1E+07	7649, 07

CALCULO TEMPERATURA CASCO INTERIOR

		Horas	Tci	Tci	numer	denom	Cece
Emisividad llamas (Σ)	0, 9	0	293	293, 00	293, 00	849520	0, 114
Emisividad casco ext. (Σ)	1	0, 01667	586, 5807	293, 5807	293, 58	851203	0, 114
Temperatura llamas (TIL)	1173	0, 04167	1228, 886	642, 3057	642, 31	1862782	0, 114
Temp. casco ext. (Tce)	293	0, 08333	1473	1326, 584	1.326, 58	4829519	0, 143
Sprf.casco ext.afec.(Sce)	180	0, 125	1473	1472, 499	1.472, 50	9909140	0, 265
Cte. Stephan-B. (cte)	1, 9E-08	0, 16667	1473	1472, 414	1.472, 41	1, 1E+07	0, 302
Calor esp. Acero. (Cece)	0, 114	0, 20833	1473	1472, 268	1.472, 27	1, 1E+07	0, 301
Vol. casco (Vce)	3, 21	0, 25	1473	1472, 121	1.472, 12	1, 1E+07	0, 301
Densidad del acero (fce)	7850	0, 29167	1473	1471, 975	1.471, 97	1, 1E+07	0, 301
Resist. Radioactiva (R)	5	0, 33333	1473	1471, 828	1.471, 83	1, 1E+07	0, 301
Superf. aisl. (Sce=Sa)	180	0, 375	1473	1471, 681	1.471, 68	1, 1E+07	0, 301
Temperatura liquido (TL)	112	0, 41667	1473	1471, 535	1.471, 53	1, 1E+07	0, 301
Espesor aislam. (e)	0, 2	0, 45833	1473	1471, 388	1.471, 39	1, 1E+07	0, 301
Coef. cond. térmica (h)	0, 022	0, 5	1473	1471, 241	1.471, 24	1, 1E+07	0, 301
		0, 54167	1473	1471, 094	1.471, 09	1, 1E+07	0, 301
		0, 58333	1473	1470, 948	1.470, 95	1, 1E+07	0, 301
		0, 625	1473	1470, 801	1.470, 80	1, 1E+07	0, 301
		0, 66667	1473	1470, 654	1.470, 65	1, 1E+07	0, 301
		0, 70833	1473	1470, 507	1.470, 51	1, 1E+07	0, 301
		0, 75	1473	1470, 36	1.470, 36	1, 1E+07	0, 301
		0, 79167	1473	1470, 213	1.470, 21	1, 1E+07	0, 301
		0, 83333	1473	1470, 066	1.470, 07	1, 1E+07	0, 301
		0, 875	1473	1469, 919	1.469, 92	1, 1E+07	0, 301
		0, 91667	1473	1469, 771	1.469, 77	1, 1E+07	0, 301
		0, 95833	1473	1469, 624	1.469, 62	1, 1E+07	0, 301
		1	1473	1469, 477	1.469, 48	1, 1E+07	0, 301

AF37: PR [A26] 'Sprf.casco ext.afec.(Scei)
AQ37: D [A7] [F3] 180
AE37: PR [A12] 'm²
AS37: PR [A8] +AS36+2, 5/60
AT37: PR [A9] @SI(+AT36+AV37>=\$AQ\$35,\$AQ\$35;AT36+AV37)
AU37: PR [A9] @SI(AV37>=\$AQ\$35,\$AQ\$35;AV37)
AF38: PR [A26] 'Cte. Stephan-B. (cte)
AQ38: D [A7] [F3] 4, 91*(10)~8
AR38: PR [A12] 'Kcal/hm²K4
AS38: PR [A8] +AS37+2, 5/60
AT38: PR [A9] @SI(+AT37+AV38>=\$AQ\$35,\$AQ\$35;AT37+AV38)
AU38: PR [A9] @SI(AV38>=\$AQ\$35,\$AQ\$35;AV38)
AF39: PR [A26] 'Calor esp. Acero. (Cece)
AQ39: D [A7] [F3] 0, 114
AR39: PR [A12] 'Kcal/Kg°C
AS39: PR [A8] +AS38+2, 5/60
AT39: PR [A9] @SI(+AT38+AV39>=\$AQ\$35,\$AQ\$35;AT38+AV39)
AU39: PR [A9] @SI(AV39>=\$AQ\$35,\$AQ\$35;AV39)
AP40: PR [A26] 'Vol. casco (Vce)
AQ40: D [A7] [F3] 3, 24
AR40: PR [A12] 'm3
AS40: PR [A8] +AS39+2, 5/60
AT40: PR [A9] @SI(+AT39+AV40>=\$AQ\$35,\$AQ\$35;AT39+AV40)
AU40: PR [A9] @SI(AV40>=\$AQ\$35,\$AQ\$35;AV40)
AP41: PR [A26] 'Densidad del acero (fce)
AQ41: D [A7] [F3] 7850
AR41: PR [A12] 'Kg/m3
AS41: PR [A8] +AS40+2, 5/60
AT41: PR [A9] @SI(+AT40+AV41>=\$AQ\$35,\$AQ\$35;AT40+AV41)
AU41: PR [A9] @SI(AV41>=\$AQ\$35,\$AQ\$35;AV41)
AP42: PR [A26] '

AF37: PR [A261] 'Sprf.casco ext.afec.(Scei)
AQ37: D [A71] [F3] 180
AE37: PR [A12] 'm²
AS37: PR [A8] +AS36+2, 5/60
AT37: PR [A9] @SI(+AT36+AV37>=\$AQ\$35,\$AQ\$35;AT36+AV37)
AU37: PR [A9] @SI(AV37>=\$AQ\$35,\$AQ\$35;AV37)
AF38: PR [A261] 'Cte. Stephan-R
AQ38: D [A71] [F3] 4, 91*(10)⁻⁸
AE38: PR [A12] 'Kcal/hm²K4
AS38: PR [A8] +AS37+2, 5/60
AT38: PR [A9] @SI(+AT37+AV38>=\$AQ\$35,\$AQ\$35;AT37+AV38)
AU38: PR [A9] @SI(AV38>=\$AQ\$35,\$AQ\$35;AV38)
AF39: PR [A261] 'Calor esp. Acero. (Cece)
AQ39: D [A71] [F3] 0, 114
AE39: PR [A12] 'Kcal/Kg°C
AS39: PR [A8] +AS38+2, 5/60
AT39: PR [A9] @SI(+AT38+AV39>=\$AQ\$35,\$AQ\$35;AT38+AV39)
AU39: PR [A9] @SI(AV39>=\$AQ\$35,\$AQ\$35;AV39)
AP40: PR [A261] 'Vol casco
AQ40: D [A71] [F3] 3, 24
AR40: PR [A12] 'm3
AS40: PR [A8] +AS39+2, 5/60
AT40: PR [A9] @SI(+AT39+AV40>=\$AQ\$35,\$AQ\$35;AT39+AV40)
AU40: PR [A9] @SI(AV40>=\$AQ\$35,\$AQ\$35;AV40)
AP41: PR [A261] 'Densidad del acero (fce)
AQ41: D [A71] [F3] 7850
AR41: PR [A12] 'Kg/m3
AS41: PR [A8] +AS40+2, 5/60
AT41: PR [A9] @SI(+AT40+AV41>=\$AQ\$35,\$AQ\$35;AT40+AV41)
AU41: PR [A9] @SI(AV41>=\$AQ\$35,\$AQ\$35;AV41)
AP42: PR [A261]'

AS47: PR [A8] +AS46+2, 5/60
AT47: PR [A9] @SI(AT46+AV47>=\$AQ\$35,\$AQ\$35;AT46+AV47)
AU47: PR [A9] @SI(AV47>=\$AQ\$35,\$AQ\$35;AV47)
AS48: PR [A8] +AS47+2, 5/60
AT48: PR [A9] @SI(AT47+AV48>=\$AQ\$35,\$AQ\$35;AT47+AV48)
AU48: PR [A9] @SI(AV48>=\$AQ\$35,\$AQ\$35;AV48)
AS49: PR [A8] +AS48+2, 5/60
AT49: PR [A9] @SI(AT48+AV49>=\$AQ\$35,\$AQ\$35;AT48+AV49)
AU49: PR [A9] @SI(AV49>=\$AQ\$35,\$AQ\$35;AV49)
AS50: PR [A8] +AS49+2, 5/60
AT50: PR [A9] @SI(AT49+AV50>=\$AQ\$35,\$AQ\$35;AT49+AV50)
AU50: PR [A9] @SI(AV50>=\$AQ\$35,\$AQ\$35;AV50)
AS51: PR [A8] +AS50+2, 5/60
AT51: PR [A9] @SI(AT50+AV51>=\$AQ\$35,\$AQ\$35;AT50+AV51)
AU51: PR [A9] @SI(AV51>=\$AQ\$35,\$AQ\$35;AV51)
AS52: PR [A8] +AS51+2, 5/60
AT52: PR [A9] @SI(AT51+AV52>=\$AQ\$35,\$AQ\$35;AT51+AV52)
AU52: PR [A9] @SI(AV52>=\$AQ\$35,\$AQ\$35;AV52)
AS53: PR [A8] +AS52+2, 5/60
AT53: PR [A9] @SI(AT52+AV53>=\$AQ\$35,\$AQ\$35;AT52+AV53)
AU53: PR [A9] @SI(AV53>=\$AQ\$35,\$AQ\$35;AV53)
AS54: PR [A8] +AS53+2, 5/60
AT54: PR [A9] @SI(AT53+AV54>=\$AQ\$35,\$AQ\$35;AT53+AV54)
AU54: PR [A9] @SI(AV54>=\$AQ\$35,\$AQ\$35;AV54)
AS55: PR [A8] +AS54+2, 5/60
AT55: PR [A9] @SI(AT54+AV55>=\$AQ\$35,\$AQ\$35;AT54+AV55)
AU55: PR [A9] @SI(AV55>=\$AQ\$35,\$AQ\$35;AV55)
AS56: PR [A8] +AS55+2, 5/60
AT56: PR [A9] @SI(AT55+AV56>=\$AQ\$35,\$AQ\$35;AT55+AV56)
AU56: PR [A9] @SI(AV56>=\$AQ\$35,\$AQ\$35;AV56)
AS57: PR [A8] +AS56+2, 5/60

AQ42: D (A7) F31 '
AR42: PR (A12) '
AS42: PR (A8) +AS41+2, 5/60
AT42: PR (A9) @SI(AT41 +AV42>=\$AQ\$35;\$AQ\$35;AT41 +AV42)
AU42: PR (A9) @SI(AV42>=\$AQ\$35;\$AQ\$35;AV42)
AP43: PR (A26) 'Resist. Radioactiva (R)
AQ43: D (A7) F31 5
AS43: PR (A8) +AS42+2, 5/60
AT43: PR (A9) @SI(AT42 +AV43>=\$AQ\$35;\$AQ\$35;AT42 +AV43)
AU43: PR (A9) @SI(AV43>=\$AQ\$35;\$AQ\$35;AV43)
AP44: PR (A26) 'Superf. aisl. (See=Sa)
AQ44: D (A7) F31 +AQ37
AR44: PR (A12) 'm²
AS44: PR (A8) +AS43+2, 5/60
AT44: PR (A9) @SI(AT43 +AV44>=\$AQ\$35;\$AQ\$35;AT43 +AV44)
AU44: PR (A9) @SI(AV44>=\$AQ\$35;\$AQ\$35;AV44)
AP45: PR (A26) 'Temperatura liquido (TL)
AQ45: D (A7) F31 112
AR45: PR (A12) 'oK
AS45: PR (A8) +AS44+2, 5/60
AT45: PR (A9) @SI(AT44 +AV45>=\$AQ\$35;\$AQ\$35;AT44 +AV45)
AU45: PR (A9) @SI(AV45>=\$AQ\$35;\$AQ\$35;AV45)
AP46: PR (A26) 'Espesor aislam. (e)
AQ46: D (A7) F31 0, 2
AR46: PR (A12) 'm
AS46: PR (A8) +AS45+2, 5/60
AT46: PR (A9) @SI(AT45 +AV46>=\$AQ\$35;\$AQ\$35;AT45 +AV46)
AU46: PR (A9) @SI(AV46>=\$AQ\$35;\$AQ\$35;AV46)
AP47: PR (A26) 'Coef. cond. térmica (h)
AQ47: D (A7) F31 0, 022
AR47: PR (A12) 'Kcal/hm²C

AT57: PR [A9] @SI(+AT56+AV57>=\$AQ\$35;\$AQ\$35:AT56+AV57)
AV57: PR [A9] @SI(AV57>=\$AQ\$35;\$AQ\$35:AV57)

CALCULO DE q PARA LOS DIFERENTES R

Tci	1,5	3	5
0	153785, 6485	76892, 8	46135, 69
100	153782, 3818	76891, 2	46134, 71
200	153733, 3818	76866, 7	46120, 01
300	153521, 0485	76760, 5	46056, 31
400	152949, 3818	76474, 7	45884, 81
500	151743, 9818	75872	45523, 19
600	149552, 0485	74776	44865, 61
700	145942, 3818	72971, 2	43782, 71
800	140405, 3818	70202, 7	42121, 61
900	132353, 0485	66176, 5	39705, 91
1000	121118, 9818	60559, 5	36335, 69
1100	105958, 3818	52979, 2	31787, 51
1200	86048, 04849	43024	25814, 41
1300	60486, 38183	30243, 2	18145, 91
1400	28293, 38183	14146, 7	8488, 015
1473	0	0	0

1,9E-03 Kcal/hm²K4

Cte. Stephan-B. (cte)

$$q = \frac{cte}{R} (1473^4 - T_{ci}^4)$$

AST0: PR LAB1 (\$AQ\$B1/\$AS\$B3)*(1473~4-\$AQ70~4)
AT70: PR LAB1 (\$AQ\$B1/\$AT\$B3)*(1473~4-\$AQ70~4)
AQ71: PR LAB1 +AQ70+100
AF71: PR LAB1 (\$AQ\$B1/\$AR\$B3)*(1473~4-\$AQ71~4)
AST1: PR LAB1 (\$AQ\$B1/\$AS\$B3)*(1473~4-\$AQ71~4)
AT71: PR LAB1 (\$AQ\$B1/\$AT\$B3)*(1473~4-\$AQ71~4)
AQ72: PR LAB1 +AQ71+100
AF72: PR LAB1 (\$AQ\$B1/\$AR\$B3)*(1473~4-\$AQ72~4)
AST2: PR LAB1 (\$AQ\$B1/\$AS\$B3)*(1473~4-\$AQ72~4)
AT72: PR LAB1 (\$AQ\$B1/\$AT\$B3)*(1473~4-\$AQ72~4)
AQ73: PR LAB1 +AQ72+100
AF73: PR LAB1 (\$AQ\$B1/\$AR\$B3)*(1473~4-\$AQ73~4)
AST3: PR LAB1 (\$AQ\$B1/\$AS\$B3)*(1473~4-\$AQ73~4)
AT73: PR LAB1 (\$AQ\$B1/\$AT\$B3)*(1473~4-\$AQ73~4)
AQ74: PR LAB1 +AQ73+100
AF74: PR LAB1 (\$AQ\$B1/\$AR\$B3)*(1473~4-\$AQ74~4)
AST4: PR LAB1 (\$AQ\$B1/\$AS\$B3)*(1473~4-\$AQ74~4)
AT74: PR LAB1 (\$AQ\$B1/\$AT\$B3)*(1473~4-\$AQ74~4)
AQ75: PR LAB1 +AQ74+100
AF75: PR LAB1 (\$AQ\$B1/\$AR\$B3)*(1473~4-\$AQ75~4)
AST5: PR LAB1 (\$AQ\$B1/\$AS\$B3)*(1473~4-\$AQ75~4)
AT75: PR LAB1 (\$AQ\$B1/\$AT\$B3)*(1473~4-\$AQ75~4)
AQ76: PR LAB1 +AQ75+100
AF76: PR LAB1 (\$AQ\$B1/\$AR\$B3)*(1473~4-\$AQ76~4)
AST6: PR LAB1 (\$AQ\$B1/\$AS\$B3)*(1473~4-\$AQ76~4)
AT76: PR LAB1 (\$AQ\$B1/\$AT\$B3)*(1473~4-\$AQ76~4)
AQ77: PR LAB1 +AQ76+100
AF77: PR LAB1 (\$AQ\$B1/\$AR\$B3)*(1473~4-\$AQ77~4)
AST7: PR LAB1 (\$AQ\$B1/\$AS\$B3)*(1473~4-\$AQ77~4)
AT77: PR LAB1 (\$AQ\$B1/\$AT\$B3)*(1473~4-\$AQ77~4)
AQ78: PR LAB1 +AQ77+100

AP61: PR IA261 CALCULO DE q PARA LOS DIFERENTES R

AQ63: PR IA71 ~Tci

AR63: D IA121 1, 5

AS63: D IA81 3

AT63: D IA91 5

AQ64: PR IA71 0

AR64: PR IA121 (\$AQ\$81/\$AR\$63)*(1473~4-\$AQ64~4)

AS64: PR IA81 (\$AQ\$81/\$AS\$63)*(1473~4-\$AQ64~4)

AT64: PR IA91 (\$AQ\$81/\$AT\$63)*(1473~4-\$AQ64~4)

AQ65: PR IA71 +AQ64+100

AR65: PR IA121 (\$AQ\$81/\$AR\$63)*(1473~4-\$AQ65~4)

AS65: PR IA81 (\$AQ\$81/\$AS\$63)*(1473~4-\$AQ65~4)

AT65: PR IA91 (\$AQ\$81/\$AT\$63)*(1473~4-\$AQ65~4)

AQ66: PR IA71 +AQ65+100

AR66: PR IA121 (\$AQ\$81/\$AR\$63)*(1473~4-\$AQ66~4)

AS66: PR IA81 (\$AQ\$81/\$AS\$63)*(1473~4-\$AQ66~4)

AT66: PR IA91 (\$AQ\$81/\$AT\$63)*(1473~4-\$AQ66~4)

AQ67: PR IA71 +AQ66+100

AR67: PR IA121 (\$AQ\$81/\$AR\$63)*(1473~4-\$AQ67~4)

AS67: PR IA81 (\$AQ\$81/\$AS\$63)*(1473~4-\$AQ67~4)

AT67: PR IA91 (\$AQ\$81/\$AT\$63)*(1473~4-\$AQ67~4)

AQ68: PR IA71 +AQ67+100

AR68: PR IA121 (\$AQ\$81/\$AR\$63)*(1473~4-\$AQ68~4)

AS68: PR IA81 (\$AQ\$81/\$AS\$63)*(1473~4-\$AQ68~4)

AT68: PR IA91 (\$AQ\$81/\$AT\$63)*(1473~4-\$AQ68~4)

AQ69: PR IA71 +AQ68+100

AR69: PR IA121 (\$AQ\$81/\$AR\$63)*(1473~4-\$AQ69~4)

AS69: PR IA81 (\$AQ\$81/\$AS\$63)*(1473~4-\$AQ69~4)

AT69: PR IA91 (\$AQ\$81/\$AT\$63)*(1473~4-\$AQ69~4)

AQ70: PR IA71 +AQ69+100

AR70: PR IA121 (\$AQ\$81/\$AR\$63)*(1473~4-\$AQ70~4)

CALCULO DE q SEGUN DIFERENTES K

Tci	0,1		20	
	l0	l0	l0	l0
40	0	0	0	0
140	10	1000	2000	2000
240	20	2000	4000	4000
340	30	3000	6000	6000
440	40	4000	8000	8000
540	50	5000	10000	10000
640	60	6000	12000	12000
740	70	7000	14000	14000
840	80	8000	16000	16000
940	90	9000	18000	18000
1040	100	10000	20000	20000
1140	110	11000	22000	22000
1240	120	12000	24000	24000
1340	130	13000	26000	26000
1440	140	14000	28000	28000
1473	143,3	14330	28660	28660

10 °K

10 °K

$$q=K(T_{ci}-T_l)$$

10 °K

AR78: PR [A12] (\$AQ\$81 / \$AR\$63) * (1473~4 - \$AQ78~4)
AS78: PR [A81] (\$AQ\$81 / \$AS\$63) * (1473~4 - \$AQ78~4)
AT78: PR [A91] (\$AQ\$81 / \$AT\$63) * (1473~4 - \$AQ78~4)
AQ79: PR [A71] 1473
AR79: PR [A12] (\$AQ\$81 / \$AR\$63) * (1473~4 - \$AQ79~4)
AS79: PR [A81] (\$AQ\$81 / \$AS\$63) * (1473~4 - \$AQ79~4)
AT79: PR [A91] (\$AQ\$81 / \$AT\$63) * (1473~4 - \$AQ79~4)
AP81: PR [A26] 'Cte. Stephan-B. (cte)
AQ81: D [A71] [F3] 4, 9*10~8
AR81: PR [A12] 'Kcal/hm*K4
AP83: PR [A26] 'q=cte/R(1473~4 - Tci~4)

AQ96: D LA71 +AQ95+100
AR96: PR LA121 +\$AR\$89*(\$AQ96-\$AQ\$107)
AS96: PR LAB1 +\$AS\$89*(\$AQ96-\$AQ\$107)
AT96: PR LA91 +\$AT\$89*(\$AQ96-\$AQ\$107)
AQ97: D LA71 +AQ96+100
AR97: PR LA121 +\$AR\$89*(\$AQ97-\$AQ\$107)
AS97: PR LAB1 +\$AS\$89*(\$AQ97-\$AQ\$107)
AT97: PR LA91 +\$AT\$89*(\$AQ97-\$AQ\$107)
AQ98: D LA71 +AQ97+100
AR98: PR LA121 +\$AR\$89*(\$AQ98-\$AQ\$107)
AS98: PR LAB1 +\$AS\$89*(\$AQ98-\$AQ\$107)
AT98: PR LA91 +\$AT\$89*(\$AQ98-\$AQ\$107)
AQ99: D LA71 +AQ98+100
AR99: PR LA121 +\$AR\$89*(\$AQ99-\$AQ\$107)
AS99: PR LAB1 +\$AS\$89*(\$AQ99-\$AQ\$107)
AT99: PR LA91 +\$AT\$89*(\$AQ99-\$AQ\$107)
AQ100: D LA71 +AQ99+100
AR100: PR LA121 +\$AR\$89*(\$AQ100-\$AQ\$107)
AS100: PR LAB1 +\$AS\$89*(\$AQ100-\$AQ\$107)
AT100: PR LA91 +\$AT\$89*(\$AQ100-\$AQ\$107)
AQ101: D LA71 +AQ100+100
AR101: PR LA121 +\$AR\$89*(\$AQ101-\$AQ\$107)
AS101: PR LAB1 +\$AS\$89*(\$AQ101-\$AQ\$107)
AT101: PR LA91 +\$AT\$89*(\$AQ101-\$AQ\$107)
AQ102: D LA71 +AQ101+100
AR102: PR LA121 +\$AR\$89*(\$AQ102-\$AQ\$107)
AS102: PR LAB1 +\$AS\$89*(\$AQ102-\$AQ\$107)
AT102: PR LA91 +\$AT\$89*(\$AQ102-\$AQ\$107)
AQ103: D LA71 +AQ102+100
AR103: PR LA121 +\$AR\$89*(\$AQ103-\$AQ\$107)
AS103: PR LAB1 +\$AS\$89*(\$AQ103-\$AQ\$107)

CALCULO DE LA MASA DE VAPOR EN EL TANQUE

Vt	VL	Vv1	mt	mv1
1	1	1	1	1
1	1	2	1	1
3	1	3	1	0,5
12	23	4,5	7	8,054054
1	1	5	1	0,25
1	1	6	1	0,2
1	1	7	1	0,166667
3	1	8	1	0,285714
3	1	9	1	0,25
4	1	0	1	-3
3	1	3	1	1
3	1	4	1	0,666667
3	1	5	1	0,5
7	1	6	1	-0,8
7	1	6	1	1,2

Vol. total del tanque (Vt)

Vol. espe. del liq. (VL)

Vol. del Vapor (Vv1)

Masa total de liq/gas (mt)

Alt-q >>> VUELVE AL MENU

AT103: PR (A91 + \$AT\$89*(\$AQ103-\$AQ\$107))
AQ104: D (A71 + AQ103 + 100)
AR104: PR (A121 + \$AR\$89*(\$AQ104-\$AQ\$107))
AS104: PR (A81 + \$AS\$89*(\$AQ104-\$AQ\$107))
AT104: PR (A91 + \$AT\$89*(\$AQ104-\$AQ\$107))
AQ105: D (A71 1473)
AR105: PR (A121 + \$AR\$89*(\$AQ105-\$AQ\$107))
AS105: PR (A81 + \$AS\$89*(\$AQ105-\$AQ\$107))
AT105: PR (A91 + \$AT\$89*(\$AQ105-\$AQ\$107))
AP107: PR (A261 "TEMPERATURA DEL LIQUIDO
AQ107: D (A71 40)
AR107: PR (A121 'OK)
AP109: PR (A261 'q=K(Tci-TL))

ASI52: D [A8] 5
AT152: D [A9] 1
AU152: PR [A9] (AQ152-ARI52*AT152)/(ASI52-ARI52)
AQ153: D [A7] 2
AR153: D [A12] 1
ASI53: D [A8] 6
AT153: D [A9] 1
AU153: PR [A9] (AQ153-ARI53*AT153)/(ASI53-ARI53)
AQ154: D [A7] 2
AR154: D [A12] 1
ASI54: D [A8] 7
AT154: D [A9] 1
AU154: PR [A9] (AQ154-ARI54*AT154)/(ASI54-ARI54)
AQ155: D [A7] 3
AR155: D [A12] 1
ASI55: D [A8] 8
AT155: D [A9] 1
AU155: PR [A9] (AQ155-ARI55*AT155)/(ASI55-ARI55)
AQ156: D [A7] 3
AR156: D [A12] 1
ASI56: D [A8] 9
AT156: D [A9] 1
AU156: PR [A9] (AQ156-ARI56*AT156)/(ASI56-ARI56)
AQ157: D [A7] 4
AR157: D [A12] 1
ASI57: D [A8] 0
AT157: D [A9] 1
AU157: PR [A9] (AQ157-ARI57*AT157)/(ASI57-ARI57)
AQ158: D [A7] 3
AR158: D [A12] 1
ASI58: D [A8] 3

AP144: PR [A26] 'CALCULO DE LA MASA DE VAPOR EN EL TANQUE

AQ146: PR [A7] ~Vt

AR146: PR [A12] ~VL

AS146: PR [A8] ~Vv1

AT146: PR [A9] ~mt

AU146: PR [A9] ~mv1

AQ148: D [A7] 2

AR148: D [A12] 1

AS148: D [A8] 2

AT148: D [A9] 1

AU148: PR [A9] (AQ148-AR148*AT148)/(AS148-AR148)

AQ149: D [A7] 2

AR149: D [A12] 1

AS149: D [A8] 2

AT149: D [A9] 1

AU149: PR [A9] (AQ149-AR149*AT149)/(AS149-AR149)

AP150: PR [A26] ,

AQ150: D [A7] 2

AR150: D [A12] 1

AS150: D [A8] 3

AT150: D [A9] 1

AU150: PR [A9] (AQ150-AR150*AT150)/(AS150-AR150)

AP151: PR [A26] ,

AQ151: D [A7] 12

AR151: D [A12] 23

AS151: D [A8] 4, 5

AT151: D [A9] 7

AU151: PR [A9] (AQ151-AR151*AT151)/(AS151-AR151)

AP152: PR [A26] ,

AQ152: D [A7] 2

AR152: D [A12] 1

AT158: D [A9] 1
AU158: PR [A9] (AQ158-ARI58*AT158)/(ASI58-ARI58)
AQ159: D [A7] 3
ARI59: D [A12] 1
ASI59: D [A8] 4
AT159: D [A9] 1
AU159: PR [A9] (AQ159-ARI59*AT159)/(ASI59-ARI59)
AQ160: D [A7] 3
ARI60: D [A12] 1
ASI60: D [A8] 5
AT160: D [A9] 1
AU160: PR [A9] (AQ160-ARI60*AT160)/(ASI60-ARI60)
AQ161: D [A7] 7
ARI61: D [A12] 1
ASI61: D [A8] 6
AT161: D [A9] 11
AU161: PR [A9] (AQ161-ARI61*AT161)/(ASI61-ARI61)
AQ162: D [A7] 7
ARI62: D [A12] 1
ASI62: D [A8] 6
AT162: D [A9] 1
AU162: PR [A9] (AQ162-ARI62*AT162)/(ASI62-ARI62)
AP164: PR [A26] 'Vol total del tanque (Vt)
AP165: PR [A26] 'Vol espe. del liq (VL)
AP166: PR [A26] 'Vol del Vapor (Vv1)
AP167: PR [A26] 'Masa total de liq/gas (mt)
AP169: PR [A26] 'Alt-q >>> VUELVE AL MENU

API 71: PR [A26] 'CALCULO DEL CALOR PARA ABRIR VALVULAS DE SEGURIDAD
API 73: PR [A26] 'Entalpia liq.sat. (hli)

AQ1 73: D [A7] 1

ARI 73: D [A12] 1

ASI 73: D [A8] 1

ATI 73: D [A9] 1

AU1 73: D [A9] 1

API 74: PR [A26] 'Entalpia vap.sat. (hvi)

AQ1 74: D [A7] 1

ARI 74: D [A12] 1

ASI 74: D [A8] 1

ATI 74: D [A9] 1

AU1 74: D [A9] 1

API 75: PR [A26] 'Masa vap. tanq. (mvl)

AQ1 75: D [A7] 1

ARI 75: D [A12] 1

ASI 75: D [A8] 1

ATI 75: D [A9] 1

AU1 75: D [A9] 1

API 76: PR [A26] 'Masa total liq/gas (mt)

AQ1 76: D [A7] 2

ARI 76: D [A12] 2

ASI 76: D [A8] 2

ATI 76: D [A9] 2

AU1 76: D [A9] 2

API 77: PR [A26] 'Vol. esp. vap.sat. (Vvi)

AQ1 77: D [A7] 2

ARI 77: D [A12] 2

ASI 77: D [A8] 2

ATI 77: D [A9] 2

AU1 77: D [A9] 2

CALCULO DEL CALOR PARA ABRIR VALVULAS DE SEGURIDAD

Entalpia liq.sat (hl1)
 Entalpia vap.sat. (hv1)
 Masa vap. tanq (mv1)
 Masa total liq/gas (mt)
 Vol esp. vap.sat. (Vv1)
 Vol esp. liq.sat (Vll)
 Presión ini. trans. (p1)
 Volumen esp. inicial (v1)
 Entalpia vapor x1 (h1)

1,5	1,5	1,5	1,5	1,5	1,5
1	1	1	1	1	1

Entalpia liq.sat. (hl2)
 Entalpia vap.sat. (hv2)
 Masa vap. tanq (mv2)
 Vol esp. vapor (Vv2)
 Vol esp. liquido (Vl2)
 Presión tar. válv. (p2)
 Vol esp. vapor (v2)
 Entalpia vapor x2 (h2)

1	1	1	1	1	1
1	1	1	1	1	1

>>>>> An >>>>>>>>>>>>>>>>>>>>>>>>

23, 4 23, 4 23, 4 23, 4 23, 4

Alt-g >>> VUELVE AL MENU

AP178: PR [A26] Vol. esp. liq.sat. (v1)
 AQ178: D [A7] 1
 AR178: D [A12] 1
 AS178: D [A8] 1
 AT178: D [A9] 1
 AU178: D [A9] 1
 AP179: PR [A26] Presión ini. trans. (p1)
 AQ179: D [A7] 1
 AR179: D [A12] 1
 AS179: D [A8] 1
 AT179: D [A9] 1
 AU179: D [A9] 1
 AP180: PR [A26] Volumen esp. inicial (v1)
 AQ180: PR [A7] (AQ178+(AQ175/AQ176)*(AQ177-AQ178))
 AR180: PR [A12] (AR178+(AR175/AR176)*(AR177-AR178))
 AS180: PR [A8] (AS178+(AS175/AS176)*(AS177-AS178))
 AT180: PR [A9] (AT178+(AT175/AT176)*(AT177-AT178))
 AU180: PR [A9] (AU178+(AU175/AU176)*(AU177-AU178))
 AP181: PR [A26] Entalpia vapor x1 (h1)
 AQ181: PR [A7] (AQ173+(AQ175/AQ176)*(AQ174-AQ173))
 AR181: PR [A12] (AR173+(AR175/AR176)*(AR174-AR173))
 AS181: PR [A8] (AS173+(AS175/AS176)*(AS174-AS173))
 AT181: PR [A9] (AT173+(AT175/AT176)*(AT174-AT173))
 AU181: PR [A9] (AU173+(AU175/AU176)*(AU174-AU173))
 AP183: PR [A26] Entalpia liq.sat. (h12)
 AQ183: D [A7] 1
 AR183: D [A12] 1
 AS183: D [A8] 1
 AT183: D [A9] 1
 AU183: D [A9] 1
 AP184: PR [A26] Entalpia vap.sat. (hv2)

AQ184: D [A7] 1
AR184: D [A12] 1
AS184: D [A8] 1
AT184: D [A9] 1
AU184: D [A9] 1
AP185: PR [A26] 'Masa vap. tanq (mv2)
AQ185: D [A7] 1
AR185: D [A12] 1
AS185: D [A8] 1
AT185: D [A9] 1
AU185: D [A9] 1
AP186: PR [A26] 'Vol. esp. vapor (Vv2)
AQ186: D [A7] 1
AR186: D [A12] 1
AS186: D [A8] 1
AT186: D [A9] 1
AU186: D [A9] 1
AP187: PR [A26] 'Vol. esp. liquido (VL2)
AQ187: D [A7] 1
AR187: D [A12] 1
AS187: D [A8] 1
AT187: D [A9] 1
AU187: D [A9] 1
AP188: PR [A26] 'Presión tar. válv. (p2)
AQ188: D [A7] 1
AR188: D [A12] 1
AS188: D [A8] 1
AT188: D [A9] 1
AU188: D [A9] 1
AP189: PR [A26] 'Vol. esp. vapor (v2)
AQ189: PR [A7] (AQ186-AQ187)

CALCULO CALOR RADIADO DE CASCO INTERIOR A LA PARED DEL AISLAMIENTO

A B C D E

23				
5				
0.12				
1				
3				
2				

Superficie Aislamiento(Sa)
 Cte Stephan-Boltzman (cte)
 Tiempo considerado (t)
 Resistencia Radiactiva (R)
 Temp. casco interior (Tci)
 Temp. aislamiento (Ta)

Valor calor radiado (qr3) 897 0 0 0 0

F G H I J

Superficie Aislamiento(Sa)
 Cte Stephan-Boltzman (cte)
 Tiempo considerado (t)
 Resistencia Radiactiva (R)
 Temp. casco interior (Tci)
 Temp. aislamiento (Ta)

Valor calor radiado (qr3) 0 0 0 0 0

$$qr3 = \frac{cte * Sa * t}{R} (Tci^4 - Ta)$$

Alt-q >>> VUELVE AL MENU

AF290: PR IA261 'CALCULO CALOR RADIADO DE CASO INTERIOR A LA PARED DEL AISLAMIENTO

AQ292: PR IA71 ^A

AR292: PR IA121 ^B

AS292: PR IA81 ^C

AT292: PR IA91 ^D

AU292: PR IA91 ^E

AF293: PR IA261 'Superficie Aislamiento(Sa)

AQ293: D IA71 23

AF294: PR IA261 'Cte Stephan-Boltzman (cte)

AQ294: D IA71 5

AF295: PR IA261 'Tiempo considerado (t)

AQ295: D IA71 0, 12

AF296: PR IA261 'Resistencia Radiactiva (R)

AQ296: D IA71 1

AR296: D IA121 1

AS296: D IA81 1

AT296: D IA91 1

AU296: D IA91 1

AF297: PR IA261 'Temp. casco interior (Tci)

AQ297: D IA71 3

AF298: PR IA261 'Temp. aislamiento (Ta)

AQ298: D IA71 2

AF300: PR IA261 'Valor calor radiado (qr3)

AQ300: PR IA71 ((AQ294*AQ293*AQ295)/AQ296)*((AQ297^4)-(AQ298^4))

AR300: PR IA121 ((AR294*AR293*AR295)/AR296)*((AR297^4)-(AR298^4))

AS300: PR IA81 ((AS294*AS293*AS295)/AS296)*((AS297^4)-(AS298^4))

AT300: PR IA91 ((AT294*AT293*AT295)/AT296)*((AT297^4)-(AT298^4))

AU300: PR IA91 ((AU294*AU293*AU295)/AU296)*((AU297^4)-(AU298^4))

AQ302: PR IA71 ^F

AR302: PR IA121 ^G

AS302: PR IA81 ^H

AT302: PR [A9] ~I
 AU302: PR [A9] ~J
 AP303: PR [A26] 'Superficie Aislamiento(Sa)
 AP304: PR [A26] 'Cte Stephan-Boltzman (cte)
 AP305: PR [A26] 'Tiempo considerado (t)
 AP306: PR [A26] 'Resistencia Radiactiva (R)
 AQ306: D [A7] 1
 AR306: D [A12] 1
 AS306: D [A8] 1
 AT306: D [A9] 1
 AU306: D [A9] 1
 AP307: PR [A26] 'Temp. casco interior (Tci)
 AR307: D [A12] '
 AS307: D [A8] '
 AP308: PR [A26] 'Temp. aislamiento (Ta)
 AP310: PR [A26] 'Valor calor radiado (qr3)
 AQ310: PR [A7] ((AQ304*AQ303*AQ305)/AQ306)*((AQ307~4)-(AQ308~4))
 AR310: PR [A12] ((AR304*AR303*AR305)/AR306)*((AR307~4)-(AR308~4))
 AS310: PR [A8] ((AS304*AS303*AS305)/AS306)*((AS307~4)-(AS308~4))
 AT310: PR [A9] ((AT304*AT303*AT305)/AT306)*((AT307~4)-(AT308~4))
 AU310: PR [A9] ((AU304*AU303*AU305)/AU306)*((AU307~4)-(AU308~4))
 AP313: PR [A26] ' cte*Sa*t
 AP314: PR [A26] 'qr3 = ----- (Tci~4-Ta)
 AP315: PR [A26] ' R
 AP318: PR [A26] 'Alt-q >>> VUELVE AL MENU

CALCULO CALOR TRANSITORIO RADIADO CASO INTERIOR AL AISLAMIENTO

Superficie Aislamiento(Sa)	Temp. Aislamiento (Ta)	Temp. Líquido (TL)	$\Sigma(e/h)$	Horas	QT
10	1000	200	0,1	0	0
				0, 01667	333, 3333
				0, 04167	833, 3333
				0, 08333	1666, 667
				0, 125	2500
				0, 16667	3333, 333
				0, 20833	4166, 667
				0, 25	5000
				0, 29167	5833, 333
				0, 33333	6666, 667
				0, 375	7500
				0, 41667	8333, 333
				0, 45833	9166, 667
				0, 5	10000
				0, 54167	10833, 33
				0, 58333	11666, 67
				0, 625	12500
				0, 66667	13333, 33
				0, 70833	14166, 67
				0, 75	15000
				0, 79167	15833, 33
				0, 83333	16666, 67
				0, 875	17500
				0, 91667	18333, 33
				0, 95833	19166, 67
				1	20000

$$qT = Sa^* \frac{Ta - TL}{\Sigma(e/h)}$$

Alt-q >>> VUELVE AL MENU

AF320: PR IA261 'CALCULO CALOR TRANSITORIO RADIADO CASO INTERIOR AL AISLAMIENTO

AS321: PR IA81 'Horas

AT321: PR IA91 ^QT

AS322: PR IA81 0

AT322: PR IA91 + \$AQ\$323 * \$AS322 * ((\$AQ\$325 - \$AQ\$326) / \$AQ\$327)

AF323: PR IA261 'Superficie Aislamiento(Sa)

AQ323: D IA71 10

AS323: PR IA81 1 / 60

AT323: PR IA91 + \$AQ\$323 * \$AS323 * ((\$AQ\$325 - \$AQ\$326) / \$AQ\$327)

AF324: PR IA261 '

AS324: PR IA81 2, 5 / 60

AT324: PR IA91 + \$AQ\$323 * \$AS324 * ((\$AQ\$325 - \$AQ\$326) / \$AQ\$327)

AF325: PR IA261 'Temp. Aislamiento (Ta)

AQ325: D IA71 1000

AS325: PR IA81 + AS324 + 2, 5 / 60

AT325: PR IA91 + \$AQ\$323 * \$AS325 * ((\$AQ\$325 - \$AQ\$326) / \$AQ\$327)

AF326: PR IA261 'Temp. Líquido (TL)

AQ326: D IA71 200

AS326: PR IA81 + AS325 + 2, 5 / 60

AT326: PR IA91 + \$AQ\$323 * \$AS326 * ((\$AQ\$325 - \$AQ\$326) / \$AQ\$327)

AF327: PR IA261 '

AQ327: D IA71 0, 4

AS327: PR IA81 + AS326 + 2, 5 / 60

AT327: PR IA91 + \$AQ\$323 * \$AS327 * ((\$AQ\$325 - \$AQ\$326) / \$AQ\$327)

AS328: PR IA81 + AS327 + 2, 5 / 60

AT328: PR IA91 + \$AQ\$323 * \$AS328 * ((\$AQ\$325 - \$AQ\$326) / \$AQ\$327)

AF329: PR IA261 '

AQ329: PR IA71 '

AS329: PR IA81 + AS328 + 2, 5 / 60

AT329: PR IA91 + \$AQ\$323 * \$AS329 * ((\$AQ\$325 - \$AQ\$326) / \$AQ\$327)

AS330: PR IA81 + AS329 + 2, 5 / 60

Σ(e/h)

AT330: PR [A9] + \$AQ\$323*\$AS330*(((\$AQ\$325-\$AQ\$326)/\$AQ\$327)
 AS331: PR [A8] + AS330+2, 5/60
 AT331: PR [A9] + \$AQ\$323*\$AS331*(((\$AQ\$325-\$AQ\$326)/\$AQ\$327)
 AS332: PR [A8] + AS331+2, 5/60
 AT332: PR [A9] + \$AQ\$323*\$AS332*(((\$AQ\$325-\$AQ\$326)/\$AQ\$327)
 AS333: PR [A8] + AS332+2, 5/60
 AT333: PR [A9] + \$AQ\$323*\$AS333*(((\$AQ\$325-\$AQ\$326)/\$AQ\$327)
 AS334: PR [A8] + AS333+2, 5/60
 AT334: PR [A9] + \$AQ\$323*\$AS334*(((\$AQ\$325-\$AQ\$326)/\$AQ\$327)
 AS335: PR [A8] + AS334+2, 5/60
 AT335: PR [A9] + \$AQ\$323*\$AS335*(((\$AQ\$325-\$AQ\$326)/\$AQ\$327)
 AS336: PR [A8] + AS335+2, 5/60
 AT336: PR [A9] + \$AQ\$323*\$AS336*(((\$AQ\$325-\$AQ\$326)/\$AQ\$327)
 AS337: PR [A8] + AS336+2, 5/60
 AT337: PR [A9] + \$AQ\$323*\$AS337*(((\$AQ\$325-\$AQ\$326)/\$AQ\$327)
 AS338: PR [A8] + AS337+2, 5/60
 AT338: PR [A9] + \$AQ\$323*\$AS338*(((\$AQ\$325-\$AQ\$326)/\$AQ\$327)
 AS339: PR [A8] + AS338+2, 5/60
 AT339: PR [A9] + \$AQ\$323*\$AS339*(((\$AQ\$325-\$AQ\$326)/\$AQ\$327)
 AS340: PR [A8] + AS339+2, 5/60
 AT340: PR [A9] + \$AQ\$323*\$AS340*(((\$AQ\$325-\$AQ\$326)/\$AQ\$327)
 AS341: PR [A8] + AS340+2, 5/60
 AT341: PR [A9] + \$AQ\$323*\$AS341*(((\$AQ\$325-\$AQ\$326)/\$AQ\$327)
 AP342: PR [A26] , Ta - Tl
 AS342: PR [A8] + AS341+2, 5/60
 AT342: PR [A9] + \$AQ\$323*\$AS342*(((\$AQ\$325-\$AQ\$326)/\$AQ\$327)
 AP343: PR [A26] , qT = Sa^t -----
 AS343: PR [A8] + AS342+2, 5/60
 AT343: PR [A9] + \$AQ\$323*\$AS343*(((\$AQ\$325-\$AQ\$326)/\$AQ\$327)
 AP344: PR [A26] , Σ(e/h)
 AS344: PR [A8] + AS343+2, 5/60

AT344: PR [A9] + \$AQ\$323 * \$AS344 * ((\$AQ\$325 - \$AQ\$326) / \$AQ\$327)
AS345: PR [A8] + AS344 + 2, 5/60
AT345: PR [A9] + \$AQ\$323 * \$AS345 * ((\$AQ\$325 - \$AQ\$326) / \$AQ\$327)
AS346: PR [A8] + AS345 + 2, 5/60
AT346: PR [A9] + \$AQ\$323 * \$AS346 * ((\$AQ\$325 - \$AQ\$326) / \$AQ\$327)
AS347: PR [A8] + AS346 + 2, 5/60
AT347: PR [A9] + \$AQ\$323 * \$AS347 * ((\$AQ\$325 - \$AQ\$326) / \$AQ\$327)
AP348: PR [A26] 'Alt-q >>> VUELVE AL MENU

CALCULO TEMP. ACERO3 ZONA VAPOR

	Horas	TI	293	293	TF	α	Gr	Pr	Ceac
Valor de Qc (Qc)	0	293	293	293	293				
Superficie vapor tanque(S)	0, 01667	594, 7722	301, 7722	301, 7722	301, 7722	0, 2417	0, 00341	1	0, 114
Temp. acero zona vapor(Tp)	0, 04167	1198, 281	603, 5092	603, 5092	603, 5092	0, 20249	0, 00168	1	0, 114
Temp. del vapor (Tv)	0, 08333	1473	1205, 486	1205, 486	1205, 486	0, 16997	0, 00083	1	0, 139
Temp. inicial z vapor(TI)	0, 125	1473	1473	1477, 221	1477, 221	0, 16142	0, 00068	1	0, 237
Densidad del acero (fac)	0, 16667	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
Volumen del acero (Vac)	0, 20833	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
Calor esp. del acero(Ceac)	0, 25	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
	0, 29167	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
	0, 33333	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
	0, 375	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
	0, 41667	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
	0, 45833	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
Altura cámara de vapor (x)	0, 5	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
	0, 54167	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
Aceleración gravedad (g)	0, 58333	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
Viscosidad del vapor (μ)	0, 625	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
Calor esp. pres. cte. (Cp)	0, 66667	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
Coef. conduct. térmica (h)	0, 70833	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
	0, 75	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
	0, 79167	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
	0, 83333	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
	0, 875	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
	0, 91667	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
	0, 95833	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303
	1	1473	1473	1476, 306	1476, 306	0, 16142	0, 00068	1	0, 303

Alt-q >>> VUELVE AL MENU

AP435: PR (A261 'CALCULO TEMP. ACERO ZONA VAPOR
 AS436: PR (A1 'Horas
 AT436: PR (A9) ~T
 AV436: PR (A9) ~T
 AW436: PR (A1) ~x
 AX436: PR (A1) ~G
 AY436: PR ~P
 AZ436: PR ~Ceac
 AP437: PR (A261 'Valor de qc (qc)
 AQ437: D (A7) 1
 AS437: PR (A1) 0
 AT437: PR (A9) +AQ442
 AU437: PR (A9) +AT437
 AV437: PR (A9) +AT437
 AP438: PR (A261 'Superficie vapor tanque(S)
 AQ438: D (A7) 1
 AR438: PR (A12) m²
 AS438: PR (A1) 1/60
 AT438: PR (A9) @SI(AT437+AV438)>=1473.1473;AT437+AV438)
 AU438: PR (A9) @SI(AV438)>=1473.1473;AV438)
 AV438: PR (A9) ((((\$AQ\$437-\$AQ\$438*\$AS438*\$AW438*(\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ438)))+AT437
 AW438: PR (A1) (AQ447*(\$AX438*\$AY438)~0, 25)*(\$AQ\$455)/\$AQ\$450
 AX438: PR (A1) ((1/(\$AT437)*(\$AQ\$449~2)*(\$AQ\$450~3)*(\$AQ\$451*\$AQ\$452)/\$AQ\$453~2
 AY438: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
 AZ438: (F3) PR (0, 113+4, 8*(10~-5)*(\$AV437-273)+9, 1*(10~-8)*(\$AV437-273)~2)
 AP439: PR (A261 '
 AQ439: PR (A7) '
 AR439: PR (A12) '
 AS439: PR (A1) 2, 5/60
 AT439: PR (A9) @SI(AT438+AV439)>=1473.1473;AT438+AV439)
 AU439: PR (A9) @SI(AV439)>=1473.1473;AV439)

AV439: PR [A9] ((\$AQ\$437-\$AQ\$438-\$AS439*\$AW439*(\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ439)))+AT438
AW439: PR [A8] (AQ448*(\$AX439*\$AY439)^0, 25)*\$AQ\$455)/\$AQ\$450
AX439: PR [A8] ((1/\$AT438)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453^2
AY439: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
AZ439: (F3) PR (0, 113+4, 8*(10^-5)*(\$AV438-273)+9, 1*(10^-8)*(\$AV438-273)^2)
AP440: PR [A26] Temp. acero zona vapor(Tp)
AQ440: D [A7] 1
AR440: PR [A12] °K
AS440: PR [A8] +AS439+2, 5/60
AT440: PR [A9] @SI(AT439+AV440>=1473;1473;AT439+AV440)
AU440: PR [A9] @SI(AV440>=1473;1473;AV440)
AV440: PR [A9] ((\$AQ\$437-\$AQ\$438*\$AS440*\$AW440*(\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ440)))+AT439
AW440: PR [A8] (AQ449*(\$AX440*\$AY440)^0, 25)*\$AQ\$455)/\$AQ\$450
AX440: PR [A8] ((1/\$AT439)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453^2
AY440: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
AZ440: (F3) PR (0, 113+4, 8*(10^-5)*(\$AV439-273)+9, 1*(10^-8)*(\$AV439-273)^2)
AP441: PR [A26] Temp. del vapor (Tv)
AQ441: D [A7] 1
AR441: PR [A12] °K
AS441: PR [A8] +AS440+2, 5/60
AT441: PR [A9] @SI(AT440+AV441>=1473;1473;AT440+AV441)
AU441: PR [A9] @SI(AV441>=1473;1473;AV441)
AV441: PR [A9] ((\$AQ\$437-\$AQ\$438*\$AS441*\$AW441*(\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ441)))+AT440
AW441: PR [A8] (AQ450*(\$AX441*\$AY441)^0, 25)*\$AQ\$455)/\$AQ\$450
AX441: PR [A8] ((1/\$AT440)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453^2
AY441: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
AZ441: (F3) PR (0, 113+4, 8*(10^-5)*(\$AV440-273)+9, 1*(10^-8)*(\$AV440-273)^2)
AP442: PR [A26] Temp. inicial z. vapor(Ti)
AQ442: D [A7] 293
AR442: PR [A12] °K
AS442: PR [A8] +AS441+2, 5/60

AT442: PR [A9] @SI(AT441+AV442>=1473;1473;AT441+AV442)
 AU442: PR [A9] @S(AV442>=1473;1473;AV442)
 AV442: PR [A9] ((\$AQ\$437-\$AQ\$438*\$AS442*\$AW442*((\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ442))+AT441
 AW442: PR [A8] (AQ451*(\$AX442*\$AY442)^0, 25)*\$AQ\$455)/\$AQ\$450
 AX442: PR [A8] ((1/\$AT441)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453^2
 AY442: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
 AZ442: (F3) PR (0, 113+*, 8*(10^-5)*(\$AV441-273)+9, 1*(10^-8)*(\$AV441-273)^2)
 AP443: PR [A26] 'Densidad del acero (fac)
 AQ443: D [A7] 1
 AR443: PR [A12] 'Kg/m3
 AS443: PR [A8] +AS442+2, 5/60
 AT443: PR [A9] @SI(AT442+AV443>=1473;1473;AT442+AV443)
 AU443: PR [A9] @SI(AV443>=1473;1473;AV443)
 AV443: PR [A9] ((\$AQ\$437-\$AQ\$438*\$AS443*\$AW443*((\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ443))+AT442
 AW443: PR [A8] (AQ452*(\$AX443*\$AY443)^0, 25)*\$AQ\$455)/\$AQ\$450
 AX443: PR [A8] ((1/\$AT442)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453^2
 AY443: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
 AZ443: (F3) PR (0, 113+4, 8*(10^-5)*(\$AV442-273)+9, 1*(10^-8)*(\$AV442-273)^2)
 AP444: PR [A26] 'Volumen del acero (Vac)
 AQ444: D [A7] 1
 AR444: PR [A12] 'm3
 AS444: PR [A8] +AS443+2, 5/60
 AT444: PR [A9] @SI(AT443+AV444>=1473;1473;AT443+AV444)
 AU444: PR [A9] @SI(AV444>=1473;1473;AV444)
 AV444: PR [A9] ((\$AQ\$437-\$AQ\$438*\$AS444*\$AW444*((\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ444))+AT443
 AW444: PR [A8] (AQ453*(\$AX444*\$AY444)^0, 25)*\$AQ\$455)/\$AQ\$450
 AX444: PR [A8] ((1/\$AT443)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453^2
 AY444: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
 AZ444: (F3) PR (0, 113+4, 8*(10^-5)*(\$AV443-273)+9, 1*(10^-8)*(\$AV443-273)^2)
 AP445: PR [A26] 'Calor esp. del acero(Ceac)
 AQ445: D [A7] 1

AR445: PR [A12] Kcal/Kg°C
 AS445: PR [A8] +AS444+2, 5/60
 AT445: PR [A9] @SI(AT444+AV445>=1473;1473;AT444+AV445)
 AU445: PR [A9] @SI(AV445>=1473;1473;AV445)
 AV445: PR [A9] (((\$AQ\$437-\$AQ\$438*\$AS445*\$AW445*(\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ445))+AT444
 AW445: PR [A8] (AQ454*((\$AX445*\$AY445)^0, 25)*\$AQ\$455)/\$AQ\$450
 AX445: PR [A8] ((1/(\$AT444)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453~2
 AY445: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
 AZ445: (F3) PR (0, 113+4, 8*(10~5)*(\$AV444-273)+9, 1*(10~8)*(\$AV444-273)^2)
 AS446: PR [A8] +AS445+2, 5/60
 AT446: PR [A9] @SI(AT445+AV446>=1473;1473;AT445+AV446)
 AU446: PR [A9] @SI(AV446>=1473;1473;AV446)
 AV446: PR [A9] (((\$AQ\$437-\$AQ\$438*\$AS446*\$AW446*(\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ446))+AT445
 AW446: PR [A8] (AQ455*((\$AX446*\$AY446)^0, 25)*\$AQ\$455)/\$AQ\$450
 AX446: PR [A8] ((1/(\$AT445)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453~2
 AY446: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
 AZ446: (F3) PR (0, 113+4, 8*(10~5)*(\$AV445-273)+9, 1*(10~8)*(\$AV445-273)^2)
 AP447: PR [A26] ,
 AQ447: D [A7] 1
 AS447: PR [A8] +AS446+2, 5/60
 AT447: PR [A9] @SI(AT446+AV447>=1473;1473;AT446+AV447)
 AU447: PR [A9] @SI(AV447>=1473;1473;AV447)
 AV447: PR [A9] (((\$AQ\$437-\$AQ\$438*\$AS447*\$AW447*(\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ447))+AT446
 AW447: PR [A8] (AQ456*((\$AX447*\$AY447)^0, 25)*\$AQ\$455)/\$AQ\$450
 AX447: PR [A8] ((1/(\$AT446)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453~2
 AY447: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
 AZ447: (F3) PR (0, 113+4, 8*(10~5)*(\$AV446-273)+9, 1*(10~8)*(\$AV446-273)^2)
 AP448: PR [A26] ,
 AQ448: D [A7] 1
 AS448: PR [A8] +AS447+2, 5/60
 AT448: PR [A9] @SI(AT447+AV448>=1473;1473;AT447+AV448)

(C)

(B)

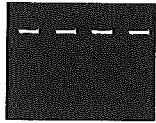
AS454: PR [A8] +AS453+2, 5/60
 AT454: PR [A9] @SI(AT453+AV454>=1473;1473;AT453+AV454)
 AU454: PR [A9] @SI(AV454>=1473;1473;AV454)
 AV454: PR [A9] (((\$AQ\$437-\$AQ\$438*\$AS454*\$AW454*\$AQ\$440-\$AQ\$441))/(\$AQ\$443*\$AQ\$444*\$AZ454))+AT453
 AW454: PR [A8] (AQ463*(\$AX454*\$AY454)^0, 25)*\$AQ\$455)/\$AQ\$450
 AX454: PR [A8] ((1/\$AT453)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453^2
 AY454: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
 AZ454: (F3) PR (0, 113+4, 8*(10^-5)*(\$AV453-273)+9, 1*(10^-8)*(\$AV453-273)^2)
 AP455: PR [A26] 'Coef. conduct. térmica (h)
 AQ455: D [A7] 1
 AR455: PR [A12] 'W/m^oC
 AS455: PR [A8] +AS454+2, 5/60
 AT455: PR [A9] @SI(AT454+AV455>=1473;1473;AT454+AV455)
 AU455: PR [A9] @SI(AV455>=1473;1473;AV455)
 AV455: PR [A9] (((\$AQ\$437-\$AQ\$438*\$AS455*\$AW455*\$AQ\$440-\$AQ\$441))/(\$AQ\$443*\$AQ\$444*\$AZ455))+AT454
 AW455: PR [A8] (AQ464*(\$AX455*\$AY455)^0, 25)*\$AQ\$455)/\$AQ\$450
 AX455: PR [A8] ((1/\$AT454)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453^2
 AY455: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
 AZ455: (F3) PR (0, 113+4, 8*(10^-5)*(\$AV454-273)+9, 1*(10^-8)*(\$AV454-273)^2)
 AS456: PR [A8] +AS455+2, 5/60
 AT456: PR [A9] @SI(AT455+AV456>=1473;1473;AT455+AV456)
 AU456: PR [A9] @SI(AV456>=1473;1473;AV456)
 AV456: PR [A9] (((\$AQ\$437-\$AQ\$438*\$AS456*\$AW456*\$AQ\$440-\$AQ\$441))/(\$AQ\$443*\$AQ\$444*\$AZ456))+AT455
 AW456: PR [A8] (AQ465*(\$AX456*\$AY456)^0, 25)*\$AQ\$455)/\$AQ\$450
 AX456: PR [A8] ((1/\$AT455)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453^2
 AY456: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
 AZ456: (F3) PR (0, 113+4, 8*(10^-5)*(\$AV455-273)+9, 1*(10^-8)*(\$AV455-273)^2)
 AP457: PR [A26] '
 AQ457: PR [A7] '
 AS457: PR [A8] +AS456+2, 5/60
 AT457: PR [A9] @SI(AT456+AV457>=1473;1473;AT456+AV457)

AU451: PR [A9] @SI(AV451>=1473;1473;AV451)
 AV451: PR [A9] ((\$AQ\$437-\$AQ\$438*\$AS451*\$AW451*(\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ451))+AT450
 AW451: PR [A8] (AQ460*(\$AX451*\$AY451)^0, 25)*\$AQ\$455)/\$AQ\$450
 AX451: PR [A8] ((1/\$AT450)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453^2
 AY451: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
 AZA51: (F3) PR (0, 113+4, 8*(10^-5)*(\$AV450-273)+9, 1*(10^-8)*(\$AV450-273)^2)
 AP452: PR [A26] 'Aceleración gravedad (g)
 AQ452: D [A7] 1
 AR452: PR [A12] 'm/sg'
 AS452: PR [A8] +AS451+2, 5/60
 AT452: PR [A9] @SI(AT451+AV452>=1473;1473;AT451+AV452)
 AU452: PR [A9] @SI(AV452>=1473;1473;AV452)
 AV452: PR [A9] ((\$AQ\$437-\$AQ\$438*\$AS452*\$AW452*(\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ452))+AT451
 AW452: PR [A8] (AQ461*(\$AX452*\$AY452)^0, 25)*\$AQ\$455)/\$AQ\$450
 AX452: PR [A8] ((1/\$AT451)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453^2
 AY452: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
 AZA52: (F3) PR (0, 113+4, 8*(10^-5)*(\$AV451-273)+9, 1*(10^-8)*(\$AV451-273)^2)
 AP453: PR [A26] 'Viscosidad del vapor (μ)
 AQ453: D [A7] 1
 AR453: PR [A12] 'Kg/sg m
 AS453: PR [A8] +AS452+2, 5/60
 AT453: PR [A9] @SI(AT452+AV453>=1473;1473;AT452+AV453)
 AU453: PR [A9] @SI(AV453>=1473;1473;AV453)
 AV453: PR [A9] ((\$AQ\$437-\$AQ\$438*\$AS453*\$AW453*(\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ453))+AT452
 AW453: PR [A8] (AQ462*(\$AX453*\$AY453)^0, 25)*\$AQ\$455)/\$AQ\$450
 AX453: PR [A8] ((1/\$AT452)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453^2
 AY453: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
 AZA53: (F3) PR (0, 113+4, 8*(10^-5)*(\$AV452-273)+9, 1*(10^-8)*(\$AV452-273)^2)
 AP454: PR [A26] 'Calor esp. pres. cte. (Cp)
 AQ454: D [A7] 1
 AR454: PR [A12] 'J/Kg°C

AX460: PR [A8] ((1/\$AT459)*(\$AQ\$449~2)*(\$AQ\$450~3)*(\$AQ\$451*\$AQ\$452)/\$AQ\$453~2
AY460: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
AZ460: (F3) PR (0, 113+4, 8*(10~5)*(\$AV459-273)+9, 1*(10~8)*(\$AV459-273)^2)
AS461: PR [A8] +AS460+2, 5/60
AT461: PR [A9] @SI(AT460+AV461)>=1473;1473;AT460+AV461)
AU461: PR [A9] @SI(AV461)>=1473;1473;AV461)
AV461: PR [A9] ((\$AQ\$437-\$AQ\$438*\$AS461*\$AW461*(\$AQ\$440-\$AQ\$441))/(\$AQ\$443*\$AQ\$444*\$AZ461))+AT460
AW461: PR [A8] (AQ470*(\$AX461*\$AY461)^0, 25)*(\$AQ\$455)/\$AQ\$450
AX461: PR [A8] ((1/\$AT460)*(\$AQ\$449~2)*(\$AQ\$450~3)*(\$AQ\$451*\$AQ\$452)/\$AQ\$453~2
AY461: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
AZ461: (F3) PR (0, 113+4, 8*(10~5)*(\$AV460-273)+9, 1*(10~8)*(\$AV460-273)^2)
AS462: PR [A8] +AS461+2, 5/60
AT462: PR [A9] @SI(AT461+AV462)>=1473;1473;AT461+AV462)
AU462: PR [A9] @SI(AV462)>=1473;1473;AV462)
AV462: PR [A9] ((\$AQ\$437-\$AQ\$438*\$AS462*\$AW462*(\$AQ\$440-\$AQ\$441))/(\$AQ\$443*\$AQ\$444*\$AZ462))+AT461
AW462: PR [A8] (AQ471*(\$AX462*\$AY462)^0, 25)*(\$AQ\$455)/\$AQ\$450
AX462: PR [A8] ((1/\$AT461)*(\$AQ\$449~2)*(\$AQ\$450~3)*(\$AQ\$451*\$AQ\$452)/\$AQ\$453~2
AY462: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
AZ462: (F3) PR (0, 113+4, 8*(10~5)*(\$AV461-273)+9, 1*(10~8)*(\$AV461-273)^2)
AP463: PR [A26] 'AU-q >>> VUELVE AL MENU

AU457: PR [A9] @SI(AV457>=1473;1473;AV457)
AV457: PR [A9] ((\$AQ\$437-\$AQ\$438*\$AS457*\$AW457*(\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ457))+AT456
AW457: PR [A9] (AQ466*(\$AX457*\$AY457)^0, 25)*\$AQ\$455)/\$AQ\$450
AX457: PR [A9] ((1/\$AT456)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453^2
AY457: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
AZ457: (F3) PR (0, 113+4, 8*(10^~5)*(\$AV456-273)+9, 1*(10^~8)*(\$AV456-273)^2)
AP458: PR [A26]'
AQ458: PR [A7]'
AS458: PR [A8] +AS457+2, 5/60
AT458: PR [A9] @SI(AT457+AV458>=1473;1473;AT457+AV458)
AU458: PR [A9] @SI(AV458>=1473;1473;AV458)
AV458: PR [A9] ((\$AQ\$437-\$AQ\$438*\$AS458*\$AW458*(\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ458))+AT457
AW458: PR [A9] (AQ467*(\$AX458*\$AY458)^0, 25)*\$AQ\$455)/\$AQ\$450
AX458: PR [A9] ((1/\$AT457)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453^2
AY458: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
AZ458: (F3) PR (0, 113+4, 8*(10^~5)*(\$AV457-273)+9, 1*(10^~8)*(\$AV457-273)^2)
AS459: PR [A8] +AS458+2, 5/60
AT459: PR [A9] @SI(AT458+AV459>=1473;1473;AT458+AV459)
AU459: PR [A9] @SI(AV459>=1473;1473;AV459)
AV459: PR [A9] ((\$AQ\$437-\$AQ\$438*\$AS459*\$AW459*(\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ459))+AT458
AW459: PR [A9] (AQ468*(\$AX459*\$AY459)^0, 25)*\$AQ\$455)/\$AQ\$450
AX459: PR [A9] ((1/\$AT458)*(\$AQ\$449^2)*(\$AQ\$450^3)*\$AQ\$451*\$AQ\$452)/\$AQ\$453^2
AY459: PR (\$AQ\$453*\$AQ\$454)/\$AQ\$455
AZ459: (F3) PR (0, 113+4, 8*(10^~5)*(\$AV458-273)+9, 1*(10^~8)*(\$AV458-273)^2)
AP460: PR [A26]'
AQ460: PR [A7]'
AS460: PR [A8] +AS459+2, 5/60
AT460: PR [A9] @SI(AT459+AV460>=1473;1473;AT459+AV460)
AU460: PR [A9] @SI(AV460>=1473;1473;AV460)
AV460: PR [A9] ((\$AQ\$437-\$AQ\$438*\$AS460*\$AW460*(\$AQ\$440-\$AQ\$441)))/(\$AQ\$443*\$AQ\$444*\$AZ460))+AT459
AW460: PR [A9] (AQ469*(\$AX460*\$AY460)^0, 25)*\$AQ\$455)/\$AQ\$450

CALOR TRANSM AGUA CALDERA FOR CONDUCCION



(SF)
 Temperatura de tubos (Ta)
 (eF)
 Espesor del forro
 (hF)
 Coef. conduc. forro

Horas	0	qCF
	0, 01667	5, 199981
	0, 04167	26, 04157
	0, 08333	104, 2496
	0, 125	183, 9999
	0, 16667	245, 3333
	0, 20833	306, 6666
	0, 25	367, 9999
	0, 29167	429, 3332
	0, 33333	490, 6665
	0, 375	551, 9998
	0, 41667	613, 3332
	0, 45833	674, 6665
	0, 5	735, 9998
	0, 54167	797, 3331
	0, 58333	858, 6664
	0, 625	919, 9997
	0, 66667	981, 3331
	0, 70833	1042, 666
	0, 75	1104
	0, 79167	1165, 333
	0, 83333	1226, 666
	0, 875	1288
	0, 91667	1349, 333
	0, 95833	1410, 666
	1	1472

Alt-q >>> VUELVE AL MENU

AP495: PR [A261] 'CALOR TRANSM. AGUA CALDERA POR CONDUCCION
 AS496: PR [A81] 'Horas
 AT496: PR [A91] '~qCF
 AP497: PR [A261] '
 AQ497: D [A71] 1
 AS497: PR [A81] 0
 AP498: PR [A261] 'Temperatura de tubos (Ta)
 AQ498: D [A71] 1
 AS498: PR [A81] 1/60
 AT498: PR [A91] (((\$AQ\$497*\$AS498)*(\$AU468-\$AQ\$498))/(\$AQ\$499/\$AQ\$500)))
 AP499: PR [A261] 'Espesor del forro (eF)
 AQ499: D [A71] 1
 AS499: PR [A81] 2, 5/60
 AT499: PR [A91] (((\$AQ\$497*\$AS499)*(\$AU469-\$AQ\$498))/(\$AQ\$499/\$AQ\$500)))
 AP500: PR [A261] 'Coef. conduc. forro (hF)
 AQ500: D [A71] 1
 AS500: PR [A81] +AS499+2, 5/60
 AT500: PR [A91] (((\$AQ\$497*\$AS500)*(\$AU470-\$AQ\$498))/(\$AQ\$499/\$AQ\$500)))
 AS501: PR [A81] +AS500+2, 5/60
 AT501: PR [A91] (((\$AQ\$497*\$AS501)*(\$AU471-\$AQ\$498))/(\$AQ\$499/\$AQ\$500)))
 AS502: PR [A81] +AS501+2, 5/60
 AT502: PR [A91] (((\$AQ\$497*\$AS502)*(\$AU472-\$AQ\$498))/(\$AQ\$499/\$AQ\$500)))
 AS503: PR [A81] +AS502+2, 5/60
 AT503: PR [A91] (((\$AQ\$497*\$AS503)*(\$AU473-\$AQ\$498))/(\$AQ\$499/\$AQ\$500)))
 AS504: PR [A81] +AS503+2, 5/60
 AT504: PR [A91] (((\$AQ\$497*\$AS504)*(\$AU474-\$AQ\$498))/(\$AQ\$499/\$AQ\$500)))
 AS505: PR [A81] +AS504+2, 5/60
 AT505: PR [A91] (((\$AQ\$497*\$AS505)*(\$AU475-\$AQ\$498))/(\$AQ\$499/\$AQ\$500)))
 AS506: PR [A81] +AS505+2, 5/60
 AT506: PR [A91] (((\$AQ\$497*\$AS506)*(\$AU476-\$AQ\$498))/(\$AQ\$499/\$AQ\$500)))
 AS507: PR [A81] +AS506+2, 5/60

(SF)

CALDERAS : TEMP. FORRO DE LA CHAPA

Cte. Stephan-B	(cte)	1.9E 08	Kcal/hm ² K ⁴	Horas	Tch	Tch	Cech	
Emissividad del acero (S)	(S)	1		0	313		0, 114	
Em.chapa acero p.alum.(Z1)	(Z1)	0, 9		0, 01667	625, 9989	312, 9989	0, 115066	312, 999
Em.chapa acero p.alum.(Z2)	(Z2)	0, 2		0, 04167	1251, 997	625, 9978	0, 141283	625, 998
Temperatura llama (TLL)	(TLL)	200	OK	0, 08333	1473	1251, 996	0, 247209	1252
Temp.chapa ace. forro(Tch)	(Tch)	313	OK	0, 125	1473	1472, 999	0, 30164	1473
Temp. inicial chapa (Tich)	(Tich)	313	OK	0, 16667	1473	1473	0, 30164	1473
Cal esp.chapa forro(Cech)	(Cech)	0, 114	Kcal/Kg°C	0, 20833	1473	1473	0, 30164	1473
Densidad acero chapa (fch)	(fch)	50	Kg/m ³	0, 25	1473	1473	0, 30164	1473
Volumen chapa acero (Vch)	(Vch)	200	m ³	0, 29167	1473	1473	0, 30164	1473
				0, 33333	1473	1473	0, 30164	1473
				0, 375	1473	1473	0, 30164	1473
				0, 41667	1473	1473	0, 30164	1473
				0, 45833	1473	1473	0, 30164	1473
				0, 5	1473	1473	0, 30164	1473
				0, 54167	1473	1473	0, 30164	1473
				0, 58333	1473	1473	0, 30164	1473
				0, 625	1473	1473	0, 30164	1473
				0, 66667	1473	1473	0, 30164	1473
				0, 70833	1473	1473	0, 30164	1473
				0, 75	1473	1473	0, 30164	1473
				0, 79167	1473	1473	0, 30164	1473
				0, 83333	1473	1473	0, 30164	1473
				0, 875	1473	1473	0, 30164	1473
				0, 91667	1473	1473	0, 30164	1473
				0, 95833	1473	1473	0, 30164	1473
				1	1473	1473	0, 30164	1473

Alt-g >>> VUELVE AL MENU

AT507: PR [A9] ((\$AQ\$497*\$AS507)*(\$AU477-\$AQ\$498)/(\$AQ\$499/\$AQ\$500)))
AS508: PR [A8] +AS507+2, 5/60
AT508: PR [A9] ((\$AQ\$497*\$AS508)*(\$AU478-\$AQ\$498)/(\$AQ\$499/\$AQ\$500)))
AS509: PR [A8] +AS508+2, 5/60
AT509: PR [A9] ((\$AQ\$497*\$AS509)*(\$AU479-\$AQ\$498)/(\$AQ\$499/\$AQ\$500)))
AS510: PR [A8] +AS509+2, 5/60
AT510: PR [A9] ((\$AQ\$497*\$AS510)*(\$AU480-\$AQ\$498)/(\$AQ\$499/\$AQ\$500)))
AS511: PR [A8] +AS510+2, 5/60
AT511: PR [A9] ((\$AQ\$497*\$AS511)*(\$AU481-\$AQ\$498)/(\$AQ\$499/\$AQ\$500)))
AS512: PR [A8] +AS511+2, 5/60
AT512: PR [A9] ((\$AQ\$497*\$AS512)*(\$AU482-\$AQ\$498)/(\$AQ\$499/\$AQ\$500)))
AS513: PR [A8] +AS512+2, 5/60
AT513: PR [A9] ((\$AQ\$497*\$AS513)*(\$AU483-\$AQ\$498)/(\$AQ\$499/\$AQ\$500)))
AS514: PR [A8] +AS513+2, 5/60
AT514: PR [A9] ((\$AQ\$497*\$AS514)*(\$AU484-\$AQ\$498)/(\$AQ\$499/\$AQ\$500)))
AS515: PR [A8] +AS514+2, 5/60
AT515: PR [A9] ((\$AQ\$497*\$AS515)*(\$AU485-\$AQ\$498)/(\$AQ\$499/\$AQ\$500)))
AS516: PR [A8] +AS515+2, 5/60
AT516: PR [A9] ((\$AQ\$497*\$AS516)*(\$AU486-\$AQ\$498)/(\$AQ\$499/\$AQ\$500)))
AS517: PR [A8] +AS516+2, 5/60
AT517: PR [A9] ((\$AQ\$497*\$AS517)*(\$AU487-\$AQ\$498)/(\$AQ\$499/\$AQ\$500)))
AS518: PR [A8] +AS517+2, 5/60
AT518: PR [A9] ((\$AQ\$497*\$AS518)*(\$AU488-\$AQ\$498)/(\$AQ\$499/\$AQ\$500)))
AS519: PR [A8] +AS518+2, 5/60
AT519: PR [A9] ((\$AQ\$497*\$AS519)*(\$AU489-\$AQ\$498)/(\$AQ\$499/\$AQ\$500)))
AS520: PR [A8] +AS519+2, 5/60
AT520: PR [A9] ((\$AQ\$497*\$AS520)*(\$AU490-\$AQ\$498)/(\$AQ\$499/\$AQ\$500)))
AS521: PR [A8] +AS520+2, 5/60
AT521: PR [A9] ((\$AQ\$497*\$AS521)*(\$AU491-\$AQ\$498)/(\$AQ\$499/\$AQ\$500)))
AS522: PR [A8] +AS521+2, 5/60
AT522: PR [A9] ((\$AQ\$497*\$AS522)*(\$AU492-\$AQ\$498)/(\$AQ\$499/\$AQ\$500)))

AP465: PR I261 'CALDERAS : TEMP. FORRO DE LA CHAPA
 AS466: PR IAB1 'Horas
 AT466: PR IAG1 ~Tch
 AU466: PR IAG1 ~Tch
 AV466: PR IAG1 ~Cech
 AP467: PR I261 'Cte. Stephan-B. (cte)
 AQ467: D I271 E31 4. 91*(10)~-8
 AR467: PR I2121 'Kcal/hm²K4
 AS467: PR IAB1 0
 AT467: PR IAG1 +AQ473
 AU467: PR IAG1 '
 AV467: PR IAG1 +\$AQ\$474
 AP468: PR I261 '
 AQ468: D I271 E31 1 (S)
 AS468: PR IAB1 1/60
 AT468: PR IAG1 @SI(AT467+AW468)=1473.1473;AT467+AW468
 AU468: PR IAG1 @SI(AW468)=1473.1473;AW468
 AV468: PR IAG1 0, 113+4, 8*10~-5)*(AW468-273)+9, 1*10~-8)*(AW468-273)~2
 AW468: PR IAB1 ((((\$AQ\$467*\$AQ\$468*\$AS\$468)))/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV467*\$AQ\$475*\$AQ\$476))+S4T467
 AP469: PR I261 'Emissividad del acero (Z1)
 AQ469: D I271 E31 0, 9
 AS469: PR IAB1 2, 5/60
 AT469: PR IAG1 @SI(AT468+AW469)=1473.1473;AT468+AW469
 AU469: PR IAG1 @SI(AW469)=1473.1473;AW469
 AV469: PR IAG1 0, 113+4, 8*10~-5)*(AW469-273)+9, 1*10~-8)*(AW469-273)~2
 AW469: PR IAB1 ((((\$AQ\$467*\$AQ\$468*\$AS\$468)))/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV468*\$AQ\$475*\$AQ\$476))+S4T468
 AP470: PR I261 'Em.chapa acero palum(Z2)
 AQ470: D I271 E31 0, 2
 AS470: PR IAB1 +AS469+2, 5/60
 AT470: PR IAG1 @SI(AT469+AW470)=1473.1473;AT469+AW470
 AU470: PR IAG1 @SI(AW470)=1473.1473;AW470

AP465: PR [A261] CALDERAS : TEMP. FORRO DE LA CHAPA
 AS466: PR [A81] Horas
 AT466: PR [A91] ~Tch
 AU466: PR [A91] ~TFch
 AV466: PR [A91] ~Cech
 AP467: PR [A261] Cte. Stephan-B. (cte)
 AQ467: D [A71] [F3] 4, 91*(10)~-8
 AP467: PR [A121] Kcal/hm²K4
 AS467: PR [A81] 0
 AT467: PR [A91] +AQ473
 AU467: PR [A91] '
 AV467: PR [A91] +\$AQ\$474
 AP468: PR [A261] '
 AQ468: D [A71] [F3] 1
 AS468: PR [A81] 1/60
 AT468: PR [A91] @SI(AT467+AW468)>=1473;1473;AT467+AW468)
 AU468: PR [A91] @SI(AW468)>=1473;1473;AW468)
 AV468: PR [A91] 0, 113+(4, 8*10^-5)*(AW468-273)+(9, 1*10^-8)*(AW468-273)~2
 AW468: PR [A81] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(\$AQ\$471^4)-(\$AQ\$472^4))/(\$AV467*\$AQ\$475*\$AQ\$476))- \$AT467
 AP469: PR [A261] Emissividad del acero (Σ1)
 AQ469: D [A71] [F3] 0, 9
 AS469: PR [A81] 2, 5/60
 AT469: PR [A91] @SI(AT468+AW469)>=1473;1473;AT468+AW469)
 AU469: PR [A91] @SI(AW469)>=1473;1473;AW469)
 AV469: PR [A91] 0, 113+(4, 8*10^-5)*(AW469-273)+(9, 1*10^-8)*(AW469-273)~2
 AW469: PR [A81] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(\$AQ\$471^4)-(\$AQ\$472^4))/(\$AV468*\$AQ\$475*\$AQ\$476))- \$AT468
 AP470: PR [A261] Em.chapa acero p.alum.(Σ2)
 AQ470: D [A71] [F3] 0, 2
 AS470: PR [A81] +AS469+2, 5/60
 AT470: PR [A91] @SI(AT469+AW470)>=1473;1473;AT469+AW470)
 AU470: PR [A91] @SI(AW470)>=1473;1473;AW470)

AT507: PR IAB1 ((\$AQ\$497*\$AS507)*(\$AU477-\$AQ\$498)/(\$AQ\$499/\$AQ\$500))
AS508: PR IAB1 +AS507+2, 5/60
AT508: PR IAB1 ((\$AQ\$497*\$AS508)*(\$AU478-\$AQ\$498)/(\$AQ\$499/\$AQ\$500))
AS509: PR IAB1 +AS508+2, 5/60
AT509: PR IAB1 ((\$AQ\$497*\$AS509)*(\$AU479-\$AQ\$498)/(\$AQ\$499/\$AQ\$500))
AS510: PR IAB1 +AS509+2, 5/60
AT510: PR IAB1 ((\$AQ\$497*\$AS510)*(\$AU480-\$AQ\$498)/(\$AQ\$499/\$AQ\$500))
AS511: PR IAB1 +AS510+2, 5/60
AT511: PR IAB1 ((\$AQ\$497*\$AS511)*(\$AU481-\$AQ\$498)/(\$AQ\$499/\$AQ\$500))
AS512: PR IAB1 +AS511+2, 5/60
AT512: PR IAB1 ((\$AQ\$497*\$AS512)*(\$AU482-\$AQ\$498)/(\$AQ\$499/\$AQ\$500))
AS513: PR IAB1 +AS512+2, 5/60
AT513: PR IAB1 ((\$AQ\$497*\$AS513)*(\$AU483-\$AQ\$498)/(\$AQ\$499/\$AQ\$500))
AS514: PR IAB1 +AS513+2, 5/60
AT514: PR IAB1 ((\$AQ\$497*\$AS514)*(\$AU484-\$AQ\$498)/(\$AQ\$499/\$AQ\$500))
AS515: PR IAB1 +AS514+2, 5/60
AT515: PR IAB1 ((\$AQ\$497*\$AS515)*(\$AU485-\$AQ\$498)/(\$AQ\$499/\$AQ\$500))
AS516: PR IAB1 +AS515+2, 5/60
AT516: PR IAB1 ((\$AQ\$497*\$AS516)*(\$AU486-\$AQ\$498)/(\$AQ\$499/\$AQ\$500))
AS517: PR IAB1 +AS516+2, 5/60
AT517: PR IAB1 ((\$AQ\$497*\$AS517)*(\$AU487-\$AQ\$498)/(\$AQ\$499/\$AQ\$500))
AS518: PR IAB1 +AS517+2, 5/60
AT518: PR IAB1 ((\$AQ\$497*\$AS518)*(\$AU488-\$AQ\$498)/(\$AQ\$499/\$AQ\$500))
AS519: PR IAB1 +AS518+2, 5/60
AT519: PR IAB1 ((\$AQ\$497*\$AS519)*(\$AU489-\$AQ\$498)/(\$AQ\$499/\$AQ\$500))
AS520: PR IAB1 +AS519+2, 5/60
AT520: PR IAB1 ((\$AQ\$497*\$AS520)*(\$AU490-\$AQ\$498)/(\$AQ\$499/\$AQ\$500))
AS521: PR IAB1 +AS520+2, 5/60
AT521: PR IAB1 ((\$AQ\$497*\$AS521)*(\$AU491-\$AQ\$498)/(\$AQ\$499/\$AQ\$500))
AS522: PR IAB1 +AS521+2, 5/60
AT522: PR IAB1 ((\$AQ\$497*\$AS522)*(\$AU492-\$AQ\$498)/(\$AQ\$499/\$AQ\$500))

CALDERAS : TEMP. FORRO DE LA CHAPA

Cte. Stephan-B	(cte)	Horas	Tch	TFch	Cech
Emissividad del acero (Σ1)	(S)	0, 01667	313	312, 9989	0, 114
Em.chapa acero p.alum.(Σ2)		0, 04167	625, 9989	625, 9978	0, 115066
Temperatura llama (TLL)	°K	0, 08333	1473	1251, 996	0, 247209
Temp.chapa ace. forro(Tch)	°K	0, 125	1473	1472, 999	0, 30164
Temp. inicial chapa (Tfch)	°K	0, 16667	1473	1473	0, 30164
Cal esp.chapa forro(Cech)	Kcal/Kg°C	0, 20833	1473	1473	0, 30164
Densidad acero chapa (fch)	Kg/m3	0, 25	1473	1473	0, 30164
Volumen chapa acero (Vch)	m3	0, 29167	1473	1473	0, 30164
		0, 33333	1473	1473	0, 30164
		0, 375	1473	1473	0, 30164
		0, 41667	1473	1473	0, 30164
		0, 45833	1473	1473	0, 30164
		0, 5	1473	1473	0, 30164
		0, 54167	1473	1473	0, 30164
		0, 58333	1473	1473	0, 30164
		0, 625	1473	1473	0, 30164
		0, 66667	1473	1473	0, 30164
		0, 70833	1473	1473	0, 30164
		0, 75	1473	1473	0, 30164
		0, 79167	1473	1473	0, 30164
		0, 83333	1473	1473	0, 30164
		0, 875	1473	1473	0, 30164
		0, 91667	1473	1473	0, 30164
		0, 95833	1473	1473	0, 30164
		1	1473	1473	0, 30164

Alt-q >>> VUELVE AL MENU

AV470: PR [A9] 0, 113+(4, 8*10⁻⁵)*(AW470-273)+(9, 1*10⁻⁸)*(AW470-273)²
 AW470: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV469*\$AQ\$475*\$AQ\$476))+(\$AT469
 AP471: PR [A26] Temperatura llama (TLL)
 AQ471: D [A7] [F3] 200
 AR471: PR [A12] °K
 AS471: PR [A8] +AS470+2, 5/60
 AT471: PR [A9] @SI(AT470+AW471)>=1473;1473;AT470+AW471)
 AU471: PR [A9] @SI(AW471)>=1473;1473;AW471)
 AV471: PR [A9] 0, 113+(4, 8*10⁻⁵)*(AW471-273)+(9, 1*10⁻⁸)*(AW471-273)²
 AW471: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV470*\$AQ\$475*\$AQ\$476))+(\$AT470
 AP472: PR [A26] Temp.chapa ace. forro(Tch)
 AQ472: D [A7] [F3] 313
 AR472: PR [A12] °K
 AS472: PR [A8] +AS471+2, 5/60
 AT472: PR [A9] @SI(AT471+AW472)>=1473;1473;AT471+AW472)
 AU472: PR [A9] @SI(AW472)>=1473;1473;AW472)
 AV472: PR [A9] 0, 113+(4, 8*10⁻⁵)*(AW472-273)+(9, 1*10⁻⁸)*(AW472-273)²
 AW472: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV471*\$AQ\$475*\$AQ\$476))+(\$AT471
 AP473: PR [A26] Temp. inicial chapa (Tich)
 AQ473: D [A7] [F3] 313
 AR473: PR [A12] °K
 AS473: PR [A8] +AS472+2, 5/60
 AT473: PR [A9] @SI(AT472+AW473)>=1473;1473;AT472+AW473)
 AU473: PR [A9] @SI(AW473)>=1473;1473;AW473)
 AV473: PR [A9] 0, 113+(4, 8*10⁻⁵)*(AW473-273)+(9, 1*10⁻⁸)*(AW473-273)²
 AW473: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV472*\$AQ\$475*\$AQ\$476))+(\$AT472
 AP474: PR [A26] Cal esp.chapa forro(Cech)
 AQ474: D [A7] [F3] 0, 114
 AR474: PR [A12] Kcal/Kg°C
 AS474: PR [A8] +AS473+2, 5/60
 AT474: PR [A9] @SI(AT473+AW474)>=1473;1473;AT473+AW474)

AU474: PR [A9] @SI(AW474>=1473;1473;AW474)
AV474: PR [A9] 0, 113+(4, 8*10^-5)*(AW474-273)+(9, 1*10^-8)*(AW474-273)^2
AW474: PR [A6] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV473*\$AQ\$475*\$AQ\$476))+ \$AT473
AP475: PR [A26] 'Densidad acero chapa (fch)
AQ475: D [A7] [F3] 50
AR475: PR [A12] 'Kg/m3
AS475: PR [A6] +AS474+2, 5/60
AT475: PR [A9] @SI(AT474+AW475>=1473;1473;AT474+AW475)
AU475: PR [A9] @SI(AW475>=1473;1473;AW475)
AV475: PR [A9] 0, 113+(4, 8*10^-5)*(AW475-273)+(9, 1*10^-8)*(AW475-273)^2
AW475: PR [A6] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV474*\$AQ\$475*\$AQ\$476))+ \$AT474
AP476: PR [A26] 'Volumen chapa acero (Vch)
AQ476: D [A7] [F3] 200
AR476: PR [A12] 'm3
AS476: PR [A6] +AS475+2, 5/60
AT476: PR [A9] @SI(AT475+AW476>=1473;1473;AT475+AW476)
AU476: PR [A9] @SI(AW476>=1473;1473;AW476)
AV476: PR [A9] 0, 113+(4, 8*10^-5)*(AW476-273)+(9, 1*10^-8)*(AW476-273)^2
AW476: PR [A6] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV475*\$AQ\$475*\$AQ\$476))+ \$AT475
AS477: PR [A6] +AS476+2, 5/60
AT477: PR [A9] @SI(AT476+AW477>=1473;1473;AT476+AW477)
AU477: PR [A9] @SI(AW477>=1473;1473;AW477)
AV477: PR [A9] 0, 113+(4, 8*10^-5)*(AW477-273)+(9, 1*10^-8)*(AW477-273)^2
AW477: PR [A6] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV476*\$AQ\$475*\$AQ\$476))+ \$AT476
AS478: PR [A6] +AS477+2, 5/60
AT478: PR [A9] @SI(AT477+AW478>=1473;1473;AT477+AW478)
AU478: PR [A9] @SI(AW478>=1473;1473;AW478)
AV478: PR [A9] 0, 113+(4, 8*10^-5)*(AW478-273)+(9, 1*10^-8)*(AW478-273)^2
AW478: PR [A6] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV477*\$AQ\$475*\$AQ\$476))+ \$AT477
AS479: PR [A6] +AS478+2, 5/60
AT479: PR [A9] @SI(AT478+AW479>=1473;1473;AT478+AW479)

AS485: PR [A8] +AS484+2, 5/60
AT485: PR [A9] @SI(AT484+AW485>=1473;1473;AT484+AW485)
AU485: PR [A9] @SI(AW485>=1473;1473;AW485)
AV485: PR [A9] 0, 113+(4, 8*10^-5)*(AW485-273)+(9, 1*10^-8)*(AW485-273)^2
AW485: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV484*\$AQ\$475*\$AQ\$476))-(\$AT484
AP486: PR [A26] ,
AS486: PR [A8] +AS485+2, 5/60
AT486: PR [A9] @SI(AT485+AW486>=1473;1473;AT485+AW486)
AU486: PR [A9] @SI(AW486>=1473;1473;AW486)
AV486: PR [A9] 0, 113+(4, 8*10^-5)*(AW486-273)+(9, 1*10^-8)*(AW486-273)^2
AW486: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV485*\$AQ\$475*\$AQ\$476))-(\$AT485
AP487: PR [A26] ,
AS487: PR [A8] +AS486+2, 5/60
AT487: PR [A9] @SI(AT486+AW487>=1473;1473;AT486+AW487)
AU487: PR [A9] @SI(AW487>=1473;1473;AW487)
AV487: PR [A9] 0, 113+(4, 8*10^-5)*(AW487-273)+(9, 1*10^-8)*(AW487-273)^2
AW487: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV486*\$AQ\$475*\$AQ\$476))-(\$AT486
AP488: PR [A26] ,
AS488: PR [A8] +AS487+2, 5/60
AT488: PR [A9] @SI(AT487+AW488>=1473;1473;AT487+AW488)
AU488: PR [A9] @SI(AW488>=1473;1473;AW488)
AV488: PR [A9] 0, 113+(4, 8*10^-5)*(AW488-273)+(9, 1*10^-8)*(AW488-273)^2
AW488: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV487*\$AQ\$475*\$AQ\$476))-(\$AT487
AP489: PR [A26] ,
AS489: PR [A8] +AS488+2, 5/60
AT489: PR [A9] @SI(AT488+AW489>=1473;1473;AT488+AW489)
AU489: PR [A9] @SI(AW489>=1473;1473;AW489)
AV489: PR [A9] 0, 113+(4, 8*10^-5)*(AW489-273)+(9, 1*10^-8)*(AW489-273)^2
AW489: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV488*\$AQ\$475*\$AQ\$476))-(\$AT488
AP490: PR [A26] ,
AS490: PR [A8] +AS489+2, 5/60

AU479: PR [A9] @SI(AW479)>=1473;1473;AW479)
 AV479: PR [A9] 0, 113+(4, 8*10^-5)*(AW479-273)+(9, 1*10^-8)*(AW479-273)^2
 AW479: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(\$AQ\$471^4)-(\$AQ\$472^4)))/(\$AV478*\$AQ\$475*\$AQ\$476))+(\$AT478
 AS480: PR [A8] +AS479+2, 5/60
 AT480: PR [A9] @SI(AT479+AW480)>=1473;1473;AT479+AW480)
 AU480: PR [A9] @SI(AW480)>=1473;1473;AW480)
 AV480: PR [A9] 0, 113+(4, 8*10^-5)*(AW480-273)+(9, 1*10^-8)*(AW480-273)^2
 AW480: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(\$AQ\$471^4)-(\$AQ\$472^4)))/(\$AV479*\$AQ\$475*\$AQ\$476))+(\$AT479
 AP481: PR [A26] ,
 AQ481: PR [A7] ,
 AS481: PR [A8] +AS480+2, 5/60
 AT481: PR [A9] @SI(AT480+AW481)>=1473;1473;AT480+AW481)
 AU481: PR [A9] @SI(AW481)>=1473;1473;AW481)
 AV481: PR [A9] 0, 113+(4, 8*10^-5)*(AW481-273)+(9, 1*10^-8)*(AW481-273)^2
 AW481: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(\$AQ\$471^4)-(\$AQ\$472^4)))/(\$AV480*\$AQ\$475*\$AQ\$476))+(\$AT480
 AS482: PR [A8] +AS481+2, 5/60
 AT482: PR [A9] @SI(AT481+AW482)>=1473;1473;AT481+AW482)
 AU482: PR [A9] @SI(AW482)>=1473;1473;AW482)
 AV482: PR [A9] 0, 113+(4, 8*10^-5)*(AW482-273)+(9, 1*10^-8)*(AW482-273)^2
 AW482: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(\$AQ\$471^4)-(\$AQ\$472^4)))/(\$AV481*\$AQ\$475*\$AQ\$476))+(\$AT481
 AS483: PR [A8] +AS482+2, 5/60
 AT483: PR [A9] @SI(AT482+AW483)>=1473;1473;AT482+AW483)
 AU483: PR [A9] @SI(AW483)>=1473;1473;AW483)
 AV483: PR [A9] 0, 113+(4, 8*10^-5)*(AW483-273)+(9, 1*10^-8)*(AW483-273)^2
 AW483: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(\$AQ\$471^4)-(\$AQ\$472^4)))/(\$AV482*\$AQ\$475*\$AQ\$476))+(\$AT482
 AS484: PR [A8] +AS483+2, 5/60
 AT484: PR [A9] @SI(AT483+AW484)>=1473;1473;AT483+AW484)
 AU484: PR [A9] @SI(AW484)>=1473;1473;AW484)
 AV484: PR [A9] 0, 113+(4, 8*10^-5)*(AW484-273)+(9, 1*10^-8)*(AW484-273)^2
 AW484: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(\$AQ\$471^4)-(\$AQ\$472^4)))/(\$AV483*\$AQ\$475*\$AQ\$476))+(\$AT483
 AP485: PR [A26] ,

AT490: PR [A9] @SI(AT489+AW490>=1473;1473;AT489+AW490)
AU490: PR [A9] @SI(AW490>=1473;1473;AW490)
AV490: PR [A9] 0, 113+(4, 8*10^-5)*(AW490-273)+(9, 1*10^-8)*(AW490-273)^2
AW490: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV489*\$AQ\$475*\$AQ\$476))+ \$AT489
AP491: PR [A26] ,
AS491: PR [A8] +AS490+2, 5/60
AT491: PR [A9] @SI(AT490+AW491>=1473;1473;AT490+AW491)
AU491: PR [A9] @SI(AW491>=1473;1473;AW491)
AV491: PR [A9] 0, 113+(4, 8*10^-5)*(AW491-273)+(9, 1*10^-8)*(AW491-273)^2
AW491: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV490*\$AQ\$475*\$AQ\$476))+ \$AT490
AS492: PR [A8] +AS491+2, 5/60
AT492: PR [A9] @SI(AT491+AW492>=1473;1473;AT491+AW492)
AU492: PR [A9] @SI(AW492>=1473;1473;AW492)
AV492: PR [A9] 0, 113+(4, 8*10^-5)*(AW492-273)+(9, 1*10^-8)*(AW492-273)^2
AW492: PR [A8] ((((\$AQ\$467*\$AQ\$468*\$AS\$468)/((1/\$AQ\$469)+(1/\$AQ\$470)-1)))*(((\$AQ\$471~4)-(\$AQ\$472~4)))/(\$AV491*\$AQ\$475*\$AQ\$476))+ \$AT491
AP493: PR [A26] 'AU-q >>> VUELVE AL MENU

CALCULO TEMPERATURA CHAPA COLECTOR 1

	Horas	Tc1	Tf1	α1	Cec
Superf. forro colect.(Sfc)	0	293	293		
Temperatura llama (TLL)	0, 0166666667	585, 994	292, 9937	0, 648559	0, 114
Temper. chapa colect.(Tch)	0, 0416666667	1171, 97	585, 978	0, 648562	0, 114
Espesor forro colect.(eFC)	0, 0833333333	1473	1171, 946	0, 545376	0, 13694
Cf.cd.térm.forro col.(hFC)	0, 125	1473	1472, 967	0, 458606	0, 22969
Densidad colect. acero(fc)	0, 1666666667	1473	1472, 959	0, 43313	0, 30163
Vol.chapa colect.acero(Vc)	0, 2083333333	1473	1472, 949	0, 43313	0, 30163
Calor esp. chapa col.(Cec)	0, 25	1473	1472, 939	0, 433131	0, 30163
Var.T.Vapor-chapa col.(ΔT)	0, 2916666667	1473	1472, 928	0, 433132	0, 30162
Superficie colector (Sc)	0, 3333333333	1473	1472, 918	0, 433133	0, 30162
(C)	0, 375	1473	1472, 908	0, 433133	0, 30162
Coef.cond.térm.vapor (h)	0, 4166666667	1473	1472, 898	0, 433134	0, 30162
Altura cámara vapor (x)	0, 4583333333	1473	1472, 887	0, 433135	0, 30161
Aceleración gravedad (g)	0, 5	1473	1472, 877	0, 433136	0, 30161
Viscosidad vapor (μ)	0, 5416666667	1473	1472, 867	0, 433136	0, 30161
Cal.Esp. pres.cte.vap.(Cp)	0, 5833333333	1473	1472, 857	0, 433137	0, 3016
(f)	0, 625	1473	1472, 846	0, 433138	0, 3016
	0, 6666666667	1473	1472, 836	0, 433139	0, 3016
	0, 7083333333	1473	1472, 826	0, 433139	0, 3016
	0, 75	1473	1472, 816	0, 43314	0, 30159
	0, 7916666667	1473	1472, 806	0, 433141	0, 30159
	0, 8333333333	1473	1472, 795	0, 433142	0, 30159
	0, 875	1473	1472, 785	0, 433142	0, 30159
	0, 9166666667	1473	1472, 775	0, 433143	0, 30158
	0, 9583333333	1473	1472, 765	0, 433144	0, 30158
	1	1473	1472, 754	0, 433145	0, 30158

Alt-q >>> VUELVE AL MENU

AP525: PR IA261 'CALCULO TEMPERATURA CHAPA COLECTOR 1

AR526: PR IA121 'Horas

AS526: PR IA81 ~Tic1

AT526: PR IA91 ~Tic1

AU526: PR IA91 '

AV526: PR IA91 ~cx1

AW526: PR IA81 ~Cec

AP527: PR IA261 'Superf. forro colect.(SfC)

AQ527: D IA71 IF31 1

AR527: PR IA121 0

AS527: PR IA81 +AQ529

AU527: PR IA91 +AS527

AP528: PR IA261 'Temperatura llama (TLL)

AQ528: D IA71 IF31 1473

AR528: PR IA121 1/60

AS528: PR IA81 @SI(\$AS527+\$AU528>=\$AQ528;\$AQ528;\$AS527+\$AU528)

AT528: PR IA91 @SI(\$AU528>=\$AQ528;\$AQ528;\$AU528)

AU528: PR IA91 ((((\$AQ527*\$AR528)*(\$AQ528-\$AQ529)/(\$AQ530/\$AQ531))-(\$AV528*\$AQ536*\$AR528*\$AQ535))/(\$AQ532*\$AQ533*\$AQ534)+\$AS527

AV528: PR IA91 ((((\$AQ537*((1/\$AU527)*(\$AQ543^2)*(\$AQ539^3)*\$AQ535*\$AQ540)/(\$AQ541^2))*(\$AQ541*\$AQ542)/\$AQ538))^0,25)*\$AQ538)/\$AQ539

AW528: PR IA81 0,113+(4,8*10^-5)*(\$AU527-273)+(9,1*10^-8)*(\$AU527-273)^2

AP529: PR IA261 'Temper. chapa colect.(Tch)

AQ529: D IA71 IF31 293

AR529: PR IA121 2,5/60

AS529: PR IA81 @SI(\$AS528+\$AU529>=\$AQ528;\$AQ528;\$AS528+\$AU529)

AT529: PR IA91 @SI(\$AU529>=\$AQ528;\$AQ528;\$AU529)

AU529: PR IA91 ((((\$AQ527*\$AR529)*(\$AQ528-\$AQ529)/(\$AQ530/\$AQ531))-(\$AV529*\$AQ536*\$AR529*\$AQ535))/(\$AQ532*\$AQ533*\$AQ534)+\$AS528

AV529: PR IA91 ((((\$AQ537*((1/\$AU528)*(\$AQ543^2)*(\$AQ539^3)*\$AQ535*\$AQ540)/(\$AQ541^2))*(\$AQ541*\$AQ542)/\$AQ538))^0,25)*\$AQ538)/\$AQ539

AW529: PR IA81 0,113+(4,8*10^-5)*(\$AU528-273)+(9,1*10^-8)*(\$AU528-273)^2

AP530: PR IA261 'Espesor forro colect.(eFC)

AQ530: D IA71 IF31 1,3

AR530: PR IA121 +AR529+2,5/60

AF534: PR [A121 +AR533+2, 5/60
 AS534: PR [A81 @SI(\$AS533+\$AU534>=\$AQ\$528,\$AQ\$528,\$AS533+\$AU534)
 AT534: PR [A9] @SI(\$AU534>=\$AQ\$528,\$AQ\$528,\$AU534)
 AU534: PR [A9] ((((\$AQ\$527*AR534)/(\$AQ\$528-\$AQ\$529)/(\$AQ\$530/\$AQ\$531))-(\$AV534*\$AQ\$536*AR534*\$AQ\$535))/(\$AQ\$532*\$AQ\$533*\$AQ\$534))+\$AS533
 AV534: PR [A9] ((((\$AQ\$537*((1/\$AU533)*(\$AQ\$543~2)*(\$AQ\$539~3)*\$AQ\$535*\$AQ\$540)/(\$AQ\$541~2))*(\$AQ\$541*\$AQ\$542)/\$AQ\$538))^(0, 25)*\$AQ\$538)/\$AQ\$539
 AW534: PR [A8] 0, 113+(4, 8*10~5)*(\$AU533-273)+(9, 1*10~8)*(\$AU533-273)^2
 AF535: PR [A26] 'Var.T.Vapor-chapa col.(dT)
 AQ535: D [A7] [F3] 100
 AR535: PR [A121 +AR534+2, 5/60
 AS535: PR [A8] @SI(\$AS34+\$AU535>=\$AQ\$528,\$AQ\$528,\$AS534+\$AU535)
 AT535: PR [A9] @SI(\$AU535>=\$AQ\$528,\$AQ\$528,\$AU535)
 AU535: PR [A9] ((((\$AQ\$527*AR535)/(\$AQ\$528-\$AQ\$529)/(\$AQ\$530/\$AQ\$531))-(\$AV535*\$AQ\$536*AR535*\$AQ\$535))/(\$AQ\$532*\$AQ\$533*\$AQ\$534))+\$AS534
 AV535: PR [A9] ((((\$AQ\$537*((1/\$AU534)*(\$AQ\$543~2)*(\$AQ\$539~3)*\$AQ\$535*\$AQ\$540)/(\$AQ\$541~2))*(\$AQ\$541*\$AQ\$542)/\$AQ\$538))^(0, 25)*\$AQ\$538)/\$AQ\$539
 AW535: PR [A8] 0, 113+(4, 8*10~5)*(\$AU534-273)+(9, 1*10~8)*(\$AU534-273)^2
 AF536: PR [A26] 'Superficie collector (Sc)
 AQ536: D [A7] [F3] 30
 AR536: PR [A121 +AR535+2, 5/60
 AS536: PR [A8] @SI(\$AS35+\$AU536>=\$AQ\$528,\$AQ\$528,\$AS535+\$AU536)
 AT536: PR [A9] @SI(\$AU536>=\$AQ\$528,\$AQ\$528,\$AU536)
 AU536: PR [A9] ((((\$AQ\$527*AR536)/(\$AQ\$528-\$AQ\$529)/(\$AQ\$530/\$AQ\$531))-(\$AV536*\$AQ\$536*AR536*\$AQ\$535))/(\$AQ\$532*\$AQ\$533*\$AQ\$534))+\$AS535
 AV536: PR [A9] ((((\$AQ\$537*((1/\$AU535)*(\$AQ\$543~2)*(\$AQ\$539~3)*\$AQ\$535*\$AQ\$540)/(\$AQ\$541~2))*(\$AQ\$541*\$AQ\$542)/\$AQ\$538))^(0, 25)*\$AQ\$538)/\$AQ\$539
 AW536: PR [A8] 0, 113+(4, 8*10~5)*(\$AU535-273)+(9, 1*10~8)*(\$AU535-273)^2
 AF537: PR [A26] '
 AQ537: D [A7] [F3] 0, 27
 AR537: PR [A121 +AR536+2, 5/60
 AS537: PR [A8] @SI(\$AS36+\$AU537>=\$AQ\$528,\$AQ\$528,\$AS536+\$AU537)
 AT537: PR [A9] @SI(\$AU537>=\$AQ\$528,\$AQ\$528,\$AU537)
 AU537: PR [A9] ((((\$AQ\$527*AR537)/(\$AQ\$528-\$AQ\$529)/(\$AQ\$530/\$AQ\$531))-(\$AV537*\$AQ\$536*AR537*\$AQ\$535))/(\$AQ\$532*\$AQ\$533*\$AQ\$534))+\$AS536
 AV537: PR [A9] ((((\$AQ\$537*((1/\$AU536)*(\$AQ\$543~2)*(\$AQ\$539~3)*\$AQ\$535*\$AQ\$540)/(\$AQ\$541~2))*(\$AQ\$541*\$AQ\$542)/\$AQ\$538))^(0, 25)*\$AQ\$538)/\$AQ\$539
 AW537: PR [A8] 0, 113+(4, 8*10~5)*(\$AU536-273)+(9, 1*10~8)*(\$AU536-273)^2
 AF538: PR [A26] 'Coef.cond.term.vapor (h)

AS530: PR IAB1 @SI(\$AS529+\$AU530>=\$AQ\$528,\$AQ\$528,\$AS529+\$AU530)
 AT530: PR IAB1 @SI(\$AU530>=\$AQ\$528,\$AQ\$528,\$AU530)
 AU530: PR IAB1 ((((\$AQ\$527*\$AF530)/(\$AQ\$528-\$AQ\$529)/(\$AQ\$530/\$AQ\$531))-(\$AV530*\$AQ\$536*\$AF530*\$AQ\$535))/(\$AQ\$532*\$AQ\$533*\$AQ\$534))-(\$AS529
 AV530: PR IAB1 ((((\$AQ\$537*((1/\$AU529)/(\$AQ\$543~2)*\$AQ\$539~3)*\$AQ\$535*\$AQ\$540)/(\$AQ\$541~2))*(((\$AQ\$541~2)/(\$AQ\$542)/\$AQ\$538))~0, 25)*\$AQ\$538)/\$AQ\$539
 AW530: PR IAB1 0, 113+(4, 8*10~5)*(\$AU529-273)+(9, 1*10~8)*(\$AU529-273)~2
 AP531: PR IAB1 'Cf.cd térm. forro col(hfC)
 AQ531: D IAB1 I F31 0, 1
 AR531: PR IAB1 I +AR530+2, 5/60
 AS531: PR IAB1 @SI(\$AS530+\$AU531>=\$AQ\$528,\$AQ\$528,\$AS530+\$AU531)
 AT531: PR IAB1 @SI(\$AU531>=\$AQ\$528,\$AQ\$528,\$AU531)
 AU531: PR IAB1 ((((\$AQ\$527*\$AF531)/(\$AQ\$528-\$AQ\$529)/(\$AQ\$530/\$AQ\$531))-(\$AV531*\$AQ\$536*\$AF531*\$AQ\$535))/(\$AQ\$532*\$AQ\$533*\$AQ\$534))-(\$AS530
 AV531: PR IAB1 ((((\$AQ\$537*((1/\$AU530)/(\$AQ\$543~2)*\$AQ\$539~3)*\$AQ\$535*\$AQ\$540)/(\$AQ\$541~2))*(((\$AQ\$541~2)/(\$AQ\$542)/\$AQ\$538))~0, 25)*\$AQ\$538)/\$AQ\$539
 AW531: PR IAB1 0, 113+(4, 8*10~5)*(\$AU530-273)+(9, 1*10~8)*(\$AU530-273)~2
 AP532: PR IAB1 'Densidad colect. acerq(fC)
 AQ532: D IAB1 I F31 0, 123
 AR532: PR IAB1 I +AR531+2, 5/60
 AS532: PR IAB1 @SI(\$AS531+\$AU532>=\$AQ\$528,\$AQ\$528,\$AS531+\$AU532)
 AT532: PR IAB1 @SI(\$AU532>=\$AQ\$528,\$AQ\$528,\$AU532)
 AU532: PR IAB1 ((((\$AQ\$527*\$AF532)/(\$AQ\$528-\$AQ\$529)/(\$AQ\$530/\$AQ\$531))-(\$AV532*\$AQ\$536*\$AF532*\$AQ\$535))/(\$AQ\$532*\$AQ\$533*\$AQ\$534))-(\$AS531
 AV532: PR IAB1 ((((\$AQ\$537*((1/\$AU531)/(\$AQ\$543~2)*\$AQ\$539~3)*\$AQ\$535*\$AQ\$540)/(\$AQ\$541~2))*(((\$AQ\$541~2)/(\$AQ\$542)/\$AQ\$538))~0, 25)*\$AQ\$538)/\$AQ\$539
 AW532: PR IAB1 0, 113+(4, 8*10~5)*(\$AU531-273)+(9, 1*10~8)*(\$AU531-273)~2
 AP533: PR IAB1 'Vol.chapa colect.acerq(Vc)
 AQ533: D IAB1 I F31 200
 AR533: PR IAB1 I +AR532+2, 5/60
 AS533: PR IAB1 @SI(\$AS532+\$AU533>=\$AQ\$528,\$AQ\$528,\$AS532+\$AU533)
 AT533: PR IAB1 @SI(\$AU533>=\$AQ\$528,\$AQ\$528,\$AU533)
 AU533: PR IAB1 ((((\$AQ\$527*\$AF533)/(\$AQ\$528-\$AQ\$529)/(\$AQ\$530/\$AQ\$531))-(\$AV533*\$AQ\$536*\$AF533*\$AQ\$535))/(\$AQ\$532*\$AQ\$533*\$AQ\$534))-(\$AS532
 AV533: PR IAB1 ((((\$AQ\$537*((1/\$AU532)/(\$AQ\$543~2)*\$AQ\$539~3)*\$AQ\$535*\$AQ\$540)/(\$AQ\$541~2))*(((\$AQ\$541~2)/(\$AQ\$542)/\$AQ\$538))~0, 25)*\$AQ\$538)/\$AQ\$539
 AW533: PR IAB1 0, 113+(4, 8*10~5)*(\$AU532-273)+(9, 1*10~8)*(\$AU532-273)~2
 AP534: PR IAB1 'Calor esp. chapa col.(Cec)
 AQ534: D IAB1 I F31 200

AF542: PR IA261 CalEsp. pres.cte.vap.(Cp)
 AQ542: D IA71 IF31 2
 AR542: PR IA121 +AR541+2, 5/60
 AS542: PR IA81 @SI(\$AS541+\$AU542>=\$AQ528,\$AQ528,\$AS541+\$AU542)
 AT542: PR IA91 @SI(\$AU542>=\$AQ528,\$AQ528,\$AU542)
 AU542: PR IA91 ((((\$AQ527*AR542)/(\$AQ528-\$AQ529)/(\$AQ530/\$AQ531))-(\$AV542*\$AQ536*AR542*\$AQ535))/(\$AQ532*\$AQ533*\$AQ534)+\$AS541
 AV542: PR IA91 ((((\$AQ537*((1/\$AU541)/(\$AQ543^2)*(\$AQ539^3)*\$AQ535*\$AQ540)/(\$AQ541^2))*(\$AQ541*\$AQ542)/\$AQ538)/\$AQ539
 AW542: PR IA81 0, 113+(4, 8*10^-5)*(\$AU541-273)+(9, 1*10^-8)*(\$AU541-273)^2
 AF543: PR IA261',
 AQ543: D IA71 IF31 2
 AR543: PR IA121 +AR542+2, 5/60
 AS543: PR IA81 @SI(\$AS542+\$AU543>=\$AQ528,\$AQ528,\$AS542+\$AU543)
 AT543: PR IA91 @SI(\$AU543>=\$AQ528,\$AQ528,\$AU543)
 AU543: PR IA91 ((((\$AQ527*AR543)/(\$AQ528-\$AQ529)/(\$AQ530/\$AQ531))-(\$AV543*\$AQ536*AR543*\$AQ535))/(\$AQ532*\$AQ533*\$AQ534)+\$AS542
 AV543: PR IA91 ((((\$AQ537*((1/\$AU542)/(\$AQ543^2)*(\$AQ539^3)*\$AQ535*\$AQ540)/(\$AQ541^2))*(\$AQ541*\$AQ542)/\$AQ538)/\$AQ539
 AW543: PR IA81 0, 113+(4, 8*10^-5)*(\$AU542-273)+(9, 1*10^-8)*(\$AU542-273)^2
 AF544: PR IA71',
 AR544: PR IA121 +AR543+2, 5/60
 AS544: PR IA81 @SI(\$AS543+\$AU544>=\$AQ528,\$AQ528,\$AS543+\$AU544)
 AT544: PR IA91 @SI(\$AU544>=\$AQ528,\$AQ528,\$AU544)
 AU544: PR IA91 ((((\$AQ527*AR544)/(\$AQ528-\$AQ529)/(\$AQ530/\$AQ531))-(\$AV544*\$AQ536*AR544*\$AQ535))/(\$AQ532*\$AQ533*\$AQ534)+\$AS543
 AV544: PR IA91 ((((\$AQ537*((1/\$AU543)/(\$AQ543^2)*(\$AQ539^3)*\$AQ535*\$AQ540)/(\$AQ541^2))*(\$AQ541*\$AQ542)/\$AQ538)/\$AQ539
 AW544: PR IA81 0, 113+(4, 8*10^-5)*(\$AU543-273)+(9, 1*10^-8)*(\$AU543-273)^2
 AF545: PR IA71',
 AR545: PR IA121 +AR544+2, 5/60
 AS545: PR IA81 @SI(\$AS544+\$AU545>=\$AQ528,\$AQ528,\$AS544+\$AU545)
 AT545: PR IA91 @SI(\$AU545>=\$AQ528,\$AQ528,\$AU545)
 AU545: PR IA91 ((((\$AQ527*AR545)/(\$AQ528-\$AQ529)/(\$AQ530/\$AQ531))-(\$AV545*\$AQ536*AR545*\$AQ535))/(\$AQ532*\$AQ533*\$AQ534)+\$AS544
 AV545: PR IA91 ((((\$AQ537*((1/\$AU544)/(\$AQ543^2)*(\$AQ539^3)*\$AQ535*\$AQ540)/(\$AQ541^2))*(\$AQ541*\$AQ542)/\$AQ538)/\$AQ539
 AW545: PR IA81 0, 113+(4, 8*10^-5)*(\$AU544-273)+(9, 1*10^-8)*(\$AU544-273)^2
 AF546: PR IA71',

AF542: PR IA261 'CalEsp. pres.cte.vap.(Cp)
 AQ542: D IA71 IF31 2
 AR542: PR IA121 +AR541+2, 5/60
 AS542: PR IA81 @SI(\$AS541+\$AU542>=\$AQ528,\$AQ528,\$AS541+\$AU542)
 AT542: PR IA91 @SI(\$AU542>=\$AQ528,\$AQ528,\$AU542)
 AU542: PR IA91 ((((\$AQ527*\$AR542)/(\$AQ528-\$AQ529)/(\$AQ530/\$AQ531))-(\$AV542*\$AQ532*\$AR542*\$AQ533*\$AQ534))-(\$AS541
 AV542: PR IA91 ((((\$AQ537*((1/\$AU541)*(\$AQ543^2)*(\$AQ539^3)*\$AQ535*\$AQ540)/(\$AQ541^2))*(((\$AQ541*\$AQ542)/(\$AQ538))^0, 25)*\$AQ538)/\$AQ539
 AW542: PR IA81 0, 113+(4, 8*10^-5)*(\$AU541-273)+(9, 1*10^-8)*(\$AU541-273)^2
 AP543: PR IA261',
 AQ543: D IA71 IF31 2
 AR543: PR IA121 +AR542+2, 5/60
 AS543: PR IA81 @SI(\$AS542+\$AU543>=\$AQ528,\$AQ528,\$AS542+\$AU543)
 AT543: PR IA91 @SI(\$AU543>=\$AQ528,\$AQ528,\$AU543)
 AU543: PR IA91 ((((\$AQ527*\$AR543)/(\$AQ528-\$AQ529)/(\$AQ530/\$AQ531))-(\$AV543*\$AQ532*\$AR543*\$AQ533*\$AQ534))-(\$AS542
 AV543: PR IA91 ((((\$AQ537*((1/\$AU542)*(\$AQ543^2)*(\$AQ539^3)*\$AQ535*\$AQ540)/(\$AQ541^2))*(((\$AQ541*\$AQ542)/(\$AQ538))^0, 25)*\$AQ538)/\$AQ539
 AW543: PR IA81 0, 113+(4, 8*10^-5)*(\$AU542-273)+(9, 1*10^-8)*(\$AU542-273)^2
 AP544: PR IA71',
 AR544: PR IA121 +AR543+2, 5/60
 AS544: PR IA81 @SI(\$AS543+\$AU544>=\$AQ528,\$AQ528,\$AS543+\$AU544)
 AT544: PR IA91 @SI(\$AU544>=\$AQ528,\$AQ528,\$AU544)
 AU544: PR IA91 ((((\$AQ527*\$AR544)/(\$AQ528-\$AQ529)/(\$AQ530/\$AQ531))-(\$AV544*\$AQ532*\$AR544*\$AQ533*\$AQ534))-(\$AS543
 AV544: PR IA91 ((((\$AQ537*((1/\$AU543)*(\$AQ543^2)*(\$AQ539^3)*\$AQ535*\$AQ540)/(\$AQ541^2))*(((\$AQ541*\$AQ542)/(\$AQ538))^0, 25)*\$AQ538)/\$AQ539
 AW544: PR IA81 0, 113+(4, 8*10^-5)*(\$AU543-273)+(9, 1*10^-8)*(\$AU543-273)^2
 AP545: PR IA71',
 AR545: PR IA121 +AR544+2, 5/60
 AS545: PR IA81 @SI(\$AS544+\$AU545>=\$AQ528,\$AQ528,\$AS544+\$AU545)
 AT545: PR IA91 @SI(\$AU545>=\$AQ528,\$AQ528,\$AU545)
 AU545: PR IA91 ((((\$AQ527*\$AR545)/(\$AQ528-\$AQ529)/(\$AQ530/\$AQ531))-(\$AV545*\$AQ532*\$AR545*\$AQ533*\$AQ534))-(\$AS544
 AV545: PR IA91 ((((\$AQ537*((1/\$AU544)*(\$AQ543^2)*(\$AQ539^3)*\$AQ535*\$AQ540)/(\$AQ541^2))*(((\$AQ541*\$AQ542)/(\$AQ538))^0, 25)*\$AQ538)/\$AQ539
 AW545: PR IA81 0, 113+(4, 8*10^-5)*(\$AU544-273)+(9, 1*10^-8)*(\$AU544-273)^2
 AP546: PR IA71',

AQ538: D [A71 IF31 1
 AR538: PR [A121 +AR537+2, 5/60
 AS538: PR [A81 @SI(\$AS537+\$AU538>=\$AQ528,\$AQ528,\$AS537+\$AU538)
 AT538: PR [A91 @SI(\$AU538>=\$AQ528,\$AQ528,\$AU538)
 AU538: PR [A91 ((((\$AQ527*AR538)/(\$AQ528-\$AQ529)/(\$AQ530/\$AQ531)))-(\$AV538*\$AQ536*AR538*\$AQ535)/(\$AQ532*\$AQ533*\$AQ534))+\$AS537
 AV538: PR [A91 ((((\$AQ537*((1/\$AU537)*(\$AQ543~2)*(\$AQ539~3)*\$AQ535*\$AQ540)/(\$AQ541~2))*(((\$AQ541~2)/(\$AQ542)/\$AQ538))~0, 25)*\$AQ538)/\$AQ539
 AW538: PR [A81 0, 113+(4, 8*10~5)*(\$AU537-273)+(9, 1*10~8)*(\$AU537-273)^2
 AP539: PR [A261 'Altura cámara vapor (x)
 AQ539: D [A71 IF31 20
 AR539: PR [A121 +AR538+2, 5/60
 AS539: PR [A81 @SI(\$AS538+\$AU539>=\$AQ528,\$AQ528,\$AS538+\$AU539)
 AT539: PR [A91 @SI(\$AU539>=\$AQ528,\$AQ528,\$AU539)
 AU539: PR [A91 ((((\$AQ527*AR539)/(\$AQ528-\$AQ529)/(\$AQ530/\$AQ531)))-(\$AV539*\$AQ536*AR539*\$AQ535)/(\$AQ532*\$AQ533*\$AQ534))+\$AS538
 AV539: PR [A91 ((((\$AQ537*((1/\$AU538)*(\$AQ543~2)*(\$AQ539~3)*\$AQ535*\$AQ540)/(\$AQ541~2))*(((\$AQ541~2)/(\$AQ542)/\$AQ538))~0, 25)*\$AQ538)/\$AQ539
 AW539: PR [A81 0, 113+(4, 8*10~5)*(\$AU538-273)+(9, 1*10~8)*(\$AU538-273)^2
 AP540: PR [A261 'Aceleración gravedad (g)
 AQ540: D [A71 IF31 9, 6
 AR540: PR [A121 +AR539+2, 5/60
 AS540: PR [A81 @SI(\$AS539+\$AU540>=\$AQ528,\$AQ528,\$AS539+\$AU540)
 AT540: PR [A91 @SI(\$AU540>=\$AQ528,\$AQ528,\$AU540)
 AU540: PR [A91 ((((\$AQ527*AR540)/(\$AQ528-\$AQ529)/(\$AQ530/\$AQ531)))-(\$AV540*\$AQ536*AR540*\$AQ535)/(\$AQ532*\$AQ533*\$AQ534))+\$AS539
 AV540: PR [A91 ((((\$AQ537*((1/\$AU539)*(\$AQ543~2)*(\$AQ539~3)*\$AQ535*\$AQ540)/(\$AQ541~2))*(((\$AQ541~2)/(\$AQ542)/\$AQ538))~0, 25)*\$AQ538)/\$AQ539
 AW540: PR [A81 0, 113+(4, 8*10~5)*(\$AU539-273)+(9, 1*10~8)*(\$AU539-273)^2
 AP541: PR [A261 'Viscosidad vapor (μ)
 AQ541: D [A71 IF31 2
 AR541: PR [A121 +AR540+2, 5/60
 AS541: PR [A81 @SI(\$AS540+\$AU541>=\$AQ528,\$AQ528,\$AS540+\$AU541)
 AT541: PR [A91 @SI(\$AU541>=\$AQ528,\$AQ528,\$AU541)
 AU541: PR [A91 ((((\$AQ527*AR541)/(\$AQ528-\$AQ529)/(\$AQ530/\$AQ531)))-(\$AV541*\$AQ536*AR541*\$AQ535)/(\$AQ532*\$AQ533*\$AQ534))+\$AS540
 AV541: PR [A91 ((((\$AQ537*((1/\$AU540)*(\$AQ543~2)*(\$AQ539~3)*\$AQ535*\$AQ540)/(\$AQ541~2))*(((\$AQ541~2)/(\$AQ542)/\$AQ538))~0, 25)*\$AQ538)/\$AQ539
 AW541: PR [A81 0, 113+(4, 8*10~5)*(\$AU540-273)+(9, 1*10~8)*(\$AU540-273)^2

ATB70: PR [A9] (\$AQ\$647*\$ASS70)/(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
ASS71: PR [A8] + ASS70+2, 5/60
ATB71: PR [A9] (\$AQ\$647*\$ASS71)/(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
ASS72: PR [A8] + ASS71+2, 5/60
ATB72: PR [A9] (\$AQ\$647*\$ASS72)/(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AB673: PR [A26] 'Alt-q >>> VUELVE AL MENU

CALOR RECIBIDO POR LA INERCIA TERMICA

Spf.hogar exp. radia. (SE)	1	
Cte. Stephan-B. (cte)	1.9E-08	Kcal/hm²K4
Temperatura radiación (TR)	1	
Temperatura pared (TP)	1	
Factor de visión (Fr2)	3	
Emis. superf. expuesta(Σ1)	3	
Emis. superf. radiante(Σ2)	1	
Superficie Radiante (SR)	1	

Cal. rec. inerc. térm.(Qi) 7, 5E-06

$$Q_i = \frac{SE \text{ cte } (TR^4 - TP^4)}{1/Fr2 + (1/\Sigma1 - 1) + SE/SR (1/\Sigma2 - 1)}$$

Alt-q >>> VUELVE AL MENU

AS551: PR [A8] @SI(\$AS550+\$AU551>=\$AQ\$528,\$AQ\$528,\$AS550+\$AU551)
 AT551: PR [A9] @SI(\$AU551>=\$AQ\$528,\$AQ\$528,\$AU551)
 AU551: PR [A9] ((((\$AQ\$527*\$AR551)*(((\$AQ\$528-\$AQ\$529)/(\$AQ\$530/\$AQ\$531))-(\$AV551*\$AQ\$536*\$AR551*\$AQ\$535)))/(\$AQ\$532*\$AQ\$533*\$AQ\$534))+\$AS550
 AV551: PR [A9] ((((\$AQ\$537*((1/\$AU550)*(\$AQ\$543~2)*(\$AQ\$539~3)*\$AQ\$535*\$AQ\$540)/(\$AQ\$541*\$AQ\$538)))/(\$AQ\$542)/\$AQ\$538))~0,25)*\$AQ\$538)/\$AQ\$539
 AW551: PR [A8] 0,113+(4,8*10~5)*(\$AU550-273)+(9,1*10~8)*(\$AU550-273)^2
 AR552: PR [A12] +AR551+2,5/60
 AS552: PR [A8] @SI(\$AS551+\$AU552>=\$AQ\$528,\$AQ\$528,\$AS551+\$AU552)
 AT552: PR [A9] @SI(\$AU552>=\$AQ\$528,\$AQ\$528,\$AU552)
 AU552: PR [A9] ((((\$AQ\$527*\$AR552)*(((\$AQ\$528-\$AQ\$529)/(\$AQ\$530/\$AQ\$531))-(\$AV552*\$AQ\$536*\$AR552*\$AQ\$535)))/(\$AQ\$532*\$AQ\$533*\$AQ\$534))+\$AS551
 AV552: PR [A9] ((((\$AQ\$537*((1/\$AU551)*(\$AQ\$543~2)*(\$AQ\$539~3)*\$AQ\$535*\$AQ\$540)/(\$AQ\$541*\$AQ\$538)))/(\$AQ\$542)/\$AQ\$538))~0,25)*\$AQ\$538)/\$AQ\$539
 AW552: PR [A8] 0,113+(4,8*10~5)*(\$AU551-273)+(9,1*10~8)*(\$AU551-273)^2
 AF553: PR [A26] 'AU-q >>> VUELVE AL MENU

AR546: PR IA121 +AR545+2, 5/60
AS546: PR IA81 @SI(\$AS545+\$AU546>=\$AQ\$528;\$AQ\$528;\$AS545+\$AU546)
AT546: PR IA91 @SI(\$AU546>=\$AQ\$528;\$AQ\$528;\$AU546)
AU546: PR IA91 ((((\$AQ\$527*AR546)*(\$AQ\$528-\$AQ\$529)/(\$AQ\$530/\$AQ\$531))-(\$AV546*\$AQ\$536*AR546*\$AQ\$535))/(\$AQ\$532*\$AQ\$533*\$AQ\$534))+\$AS545
AV546: PR IA91 ((((\$AQ\$537*((1/\$AU545)*(\$AQ\$543~2)*(\$AQ\$539~3)*\$AQ\$535*\$AQ\$540)/(\$AQ\$541*\$AQ\$542)/\$AQ\$538))^0, 25)*\$AQ\$538)/\$AQ\$539
AW546: PR IA81 0, 113+(4, 8*10^-5)*(\$AU545-273)+(9, 1*10^-8)*(\$AU545-273)^2
AR547: PR IA121 +AR546+2, 5/60
AS547: PR IA81 @SI(\$AS546+\$AU547>=\$AQ\$528;\$AQ\$528;\$AS546+\$AU547)
AT547: PR IA91 @SI(\$AU547>=\$AQ\$528;\$AQ\$528;\$AU547)
AU547: PR IA91 ((((\$AQ\$527*AR547)*(\$AQ\$528-\$AQ\$529)/(\$AQ\$530/\$AQ\$531))-(\$AV547*\$AQ\$536*AR547*\$AQ\$535))/(\$AQ\$532*\$AQ\$533*\$AQ\$534))+\$AS546
AV547: PR IA91 ((((\$AQ\$537*((1/\$AU546)*(\$AQ\$543~2)*(\$AQ\$539~3)*\$AQ\$535*\$AQ\$540)/(\$AQ\$541*\$AQ\$542)/\$AQ\$538))^0, 25)*\$AQ\$538)/\$AQ\$539
AW547: PR IA81 0, 113+(4, 8*10^-5)*(\$AU546-273)+(9, 1*10^-8)*(\$AU546-273)^2
AR548: PR IA121 +AR547+2, 5/60
AS548: PR IA81 @SI(\$AS547+\$AU548>=\$AQ\$528;\$AQ\$528;\$AS547+\$AU548)
AT548: PR IA91 @SI(\$AU548>=\$AQ\$528;\$AQ\$528;\$AU548)
AU548: PR IA91 ((((\$AQ\$527*AR548)*(\$AQ\$528-\$AQ\$529)/(\$AQ\$530/\$AQ\$531))-(\$AV548*\$AQ\$536*AR548*\$AQ\$535))/(\$AQ\$532*\$AQ\$533*\$AQ\$534))+\$AS547
AV548: PR IA91 ((((\$AQ\$537*((1/\$AU547)*(\$AQ\$543~2)*(\$AQ\$539~3)*\$AQ\$535*\$AQ\$540)/(\$AQ\$541*\$AQ\$542)/\$AQ\$538))^0, 25)*\$AQ\$538)/\$AQ\$539
AW548: PR IA81 0, 113+(4, 8*10^-5)*(\$AU547-273)+(9, 1*10^-8)*(\$AU547-273)^2
AR549: PR IA121 +AR548+2, 5/60
AS549: PR IA81 @SI(\$AS548+\$AU549>=\$AQ\$528;\$AQ\$528;\$AS548+\$AU549)
AT549: PR IA91 @SI(\$AU549>=\$AQ\$528;\$AQ\$528;\$AU549)
AU549: PR IA91 ((((\$AQ\$527*AR549)*(\$AQ\$528-\$AQ\$529)/(\$AQ\$530/\$AQ\$531))-(\$AV549*\$AQ\$536*AR549*\$AQ\$535))/(\$AQ\$532*\$AQ\$533*\$AQ\$534))+\$AS548
AV549: PR IA91 ((((\$AQ\$537*((1/\$AU548)*(\$AQ\$543~2)*(\$AQ\$539~3)*\$AQ\$535*\$AQ\$540)/(\$AQ\$541*\$AQ\$542)/\$AQ\$538))^0, 25)*\$AQ\$538)/\$AQ\$539
AW549: PR IA81 0, 113+(4, 8*10^-5)*(\$AU548-273)+(9, 1*10^-8)*(\$AU548-273)^2
AR550: PR IA121 +AR549+2, 5/60
AS550: PR IA81 @SI(\$AS549+\$AU550>=\$AQ\$528;\$AQ\$528;\$AS549+\$AU550)
AT550: PR IA91 @SI(\$AU550>=\$AQ\$528;\$AQ\$528;\$AU550)
AU550: PR IA91 ((((\$AQ\$527*AR550)*(\$AQ\$528-\$AQ\$529)/(\$AQ\$530/\$AQ\$531))-(\$AV550*\$AQ\$536*AR550*\$AQ\$535))/(\$AQ\$532*\$AQ\$533*\$AQ\$534))+\$AS549
AV550: PR IA91 ((((\$AQ\$537*((1/\$AU549)*(\$AQ\$543~2)*(\$AQ\$539~3)*\$AQ\$535*\$AQ\$540)/(\$AQ\$541*\$AQ\$542)/\$AQ\$538))^0, 25)*\$AQ\$538)/\$AQ\$539
AW550: PR IA81 0, 113+(4, 8*10^-5)*(\$AU549-273)+(9, 1*10^-8)*(\$AU549-273)^2
AR551: PR IA121 +AR550+2, 5/60

AP645: PR [A26] 'CALCULO CALOR RECIBIDO CALDERAS CILINDRICAS

AS646: PR [A1] 'Horas

AT646: PR [A9] '~QR

AP647: PR [A26] ' (S)

AQ647: D [A7] 1

AS647: PR [A1] 0

AP648: PR [A26] ' (TLL)

AQ648: D [A7] 2

AS648: PR [A1] 1/60

AT648: PR [A9] (\$AQ\$647*\$AS648-\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)

AP649: PR [A26] 'Temperatura del tubo (TT)

AQ649: D [A7] 1

AS649: PR [A1] 2, 5/60

AT649: PR [A9] (\$AQ\$647*\$AS649)/(\$AQ\$649)/(\$AQ\$650/\$AQ\$651)

AP650: PR [A26] 'Espesor del forro (eF)

AQ650: D [A7] 13

AS650: PR [A1] +AS649+2, 5/60

AT650: PR [A9] (\$AQ\$647*\$AS650)/(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)

AP651: PR [A26] 'Conductividad forro (hF)

AQ651: D [A7] 12

AS651: PR [A1] +AS650+2, 5/60

AT651: PR [A9] (\$AQ\$647*\$AS651)/(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)

AS652: PR [A1] +AS651+2, 5/60

AT652: PR [A9] (\$AQ\$647*\$AS652)/(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)

AS653: PR [A1] +AS652+2, 5/60

AT653: PR [A9] (\$AQ\$647*\$AS653)/(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)

AS654: PR [A1] +AS653+2, 5/60

AT654: PR [A9] (\$AQ\$647*\$AS654)/(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)

AS655: PR [A1] +AS654+2, 5/60

AT655: PR [A9] (\$AQ\$647*\$AS655)/(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)

AS656: PR [A1] +AS655+2, 5/60

AT656: PR [A9] (\$AQ\$647*\$AS656)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AS657: PR [A8] +AS656+2, 5/60
AT657: PR [A9] (\$AQ\$647*\$AS657)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AS658: PR [A8] +AS657+2, 5/60
AT658: PR [A9] (\$AQ\$647*\$AS658)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AS659: PR [A8] +AS658+2, 5/60
AT659: PR [A9] (\$AQ\$647*\$AS659)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AS660: PR [A8] +AS659+2, 5/60
AT660: PR [A9] (\$AQ\$647*\$AS660)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AP661: PR [A26] TIL - TT
AS661: PR [A8] +AS660+2, 5/60
AT661: PR [A9] (\$AQ\$647*\$AS661)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AP662: PR [A26] QR = S t -----
AS662: PR [A8] +AS661+2, 5/60
AT662: PR [A9] (\$AQ\$647*\$AS662)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AP663: PR [A26] ef / hf
AS663: PR [A8] +AS662+2, 5/60
AT663: PR [A9] (\$AQ\$647*\$AS663)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AS664: PR [A8] +AS663+2, 5/60
AT664: PR [A9] (\$AQ\$647*\$AS664)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AS665: PR [A8] +AS664+2, 5/60
AT665: PR [A9] (\$AQ\$647*\$AS665)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AS666: PR [A8] +AS665+2, 5/60
AT666: PR [A9] (\$AQ\$647*\$AS666)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AS667: PR [A8] +AS666+2, 5/60
AT667: PR [A9] (\$AQ\$647*\$AS667)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AS668: PR [A8] +AS667+2, 5/60
AT668: PR [A9] (\$AQ\$647*\$AS668)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AS669: PR [A8] +AS668+2, 5/60
AT669: PR [A9] (\$AQ\$647*\$AS669)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AS670: PR [A8] +AS669+2, 5/60

AT670: PR [A9] (\$AQ\$647*\$AS670)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AS671: PR [A8] +AS670+2, 5/60
AT671: PR [A9] (\$AQ\$647*\$AS671)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AS672: PR [A8] +AS671+2, 5/60
AT672: PR [A9] (\$AQ\$647*\$AS672)*(\$AQ\$648-\$AQ\$649)/(\$AQ\$650/\$AQ\$651)
AP673: PR [A26] 'AUC-q >>> VUELVE AL MENU

CALOR RECIBIDO POR LA INERCIA TERMICA

Spf.hogar exp. radia. (SE) |
 Cte. Stephan-B (cte) |
 Temperatura radiación (TR) |
 Temperatura pared (TP) |
 Factor de visión (Fr2) |
 Emis. superf. expuesta(Σ1) |
 Emis. superf. radiante(Σ2) |
 Superficie Radiante (SR) |



Cal. rec. inerc. térm.(Qi) 7, 5E-06

$$Q_i = \frac{SE \cdot cte \cdot (TR^4 - TP^4)}{1/Fr2 + (1/\Sigma1 - 1) + SE/SR \cdot (1/\Sigma2 - 1)}$$

Alt-q >>> VUELVE AL MENU

CALCULO CALOR RECIBIDO CALDERAS CILINDRICAS

(S)

(TLL)

Temperatura del tubo (TT)

Espesor del forro (eF)

Conductividad forro (hF)

1
2
1
13
12

Horas QR

0

0, 01667 0, 015385
 0, 04167 0, 038462
 0, 08333 0, 076923
 0, 125 0, 115385
 0, 16667 0, 153846
 0, 20833 0, 192308
 0, 25 0, 230769
 0, 29167 0, 269231
 0, 33333 0, 307692
 0, 375 0, 346154
 0, 41667 0, 384615
 0, 45833 0, 423077
 0, 5 0, 461538
 0, 54167 0, 5
 0, 58333 0, 538462
 0, 625 0, 576923
 0, 66667 0, 615385
 0, 70833 0, 653846
 0, 75 0, 692308
 0, 79167 0, 730769
 0, 83333 0, 769231
 0, 875 0, 807692
 0, 91667 0, 846154
 0, 95833 0, 884615
 1 0, 923077

TLL - TT

QR = S t -----

eF / hF

Alt-q >>> VUELVE AL MENU

AP615: PR [A26] 'CALOR RECIBIDO POR LA INERCIA TERMICA

AP617: PR [A26] 'Spf.hogar exp. radia. (SE)

AQ617: D [A7] [F3] 1

AP618: PR [A26] 'Cte. Stephan-B. (cte)

AQ618: D [A7] [F3] 4, 91*(10)^-8

AP618: PR [A12] 'Kcal/hm^2K4

AP619: PR [A26] 'Temperatura radiación (TR)

AQ619: D [A7] [F3] 4

AP620: PR [A26] 'Temperatura pared (TP)

AQ620: D [A7] [F3] 1

AP621: PR [A26] 'Factor de visión (Fr2)

AQ621: D [A7] [F3] 3

AP622: PR [A26] 'Emis. superf. expuesta(Σ1)

AQ622: D [A7] [F3] 3

AP623: PR [A26] 'Emis. superf. radiante(Σ2)

AQ623: D [A7] [F3] 1

AP624: PR [A26] 'Superficie Radiante (SR)

AQ624: D [A7] [F3] 1

AP627: PR [A26] 'Cal. rec. inerc. térm.(qi)

AQ627: PR [A7] (\$AQ617*\$AQ618*((\$AQ619^4)-(\$AQ620^4)))/((1/\$AQ621)+((1/\$AQ622)+1)+(\$AQ617/\$AQ624)*((1/\$AQ623)-1))

AQ628: PR [A7] \-

AP633: PR [A26] ' SE cte (TR^4 - TP^4)

AP634: PR [A26] 'qi = -----

AP635: PR [A26] ' 1/Fr2 + (1/Σ1 - 1) + SE/SR (1/Σ2 - 1)

AP643: PR [A26] 'Alt-q >>> VUELVE AL MENU

AP585: PR [A26] 'CALCULO CALOR RECIBIDO A TRAVES DEL FORRO

AS586: PR [A8] 'Horas

AT586: PR [A9] ~QF

AP587: PR [A26] ' (S)

AQ587: D [A7] 1

AS587: PR [A8] 0

AP588: PR [A26] ' (TLL)

AQ588: D [A7] 3

AS588: PR [A8] 1/60

AT588: PR [A9] ($\$AQ\$587 * \$AS588 - \$AQ\$588 - \$AQ\$589$) / ($\$AQ\$590 / \$AQ\591)

AP589: PR [A26] 'Temperatura del tubo (TT)

AQ589: D [A7] 2

AS589: PR [A8] 2, 5/60

AT589: PR [A9] ($\$AQ\$587 * \$AS589 - \$AQ\$588 - \$AQ\$589$) / ($\$AQ\$590 / \$AQ\591)

AP590: PR [A26] 'Espesor del forro (eF)

AQ590: D [A7] 13

AS590: PR [A8] +AS589+2, 5/60

AT590: PR [A9] ($\$AQ\$587 * \$AS590 - \$AQ\$588 - \$AQ\$589$) / ($\$AQ\$590 / \$AQ\591)

AP591: PR [A26] 'Conductividad forro (hF)

AQ591: D [A7] 12

AS591: PR [A8] +AS590+2, 5/60

AT591: PR [A9] ($\$AQ\$587 * \$AS591 - \$AQ\$588 - \$AQ\$589$) / ($\$AQ\$590 / \$AQ\591)

AS592: PR [A8] +AS591+2, 5/60

AT592: PR [A9] ($\$AQ\$587 * \$AS592 - \$AQ\$588 - \$AQ\$589$) / ($\$AQ\$590 / \$AQ\591)

AS593: PR [A8] +AS592+2, 5/60

AT593: PR [A9] ($\$AQ\$587 * \$AS593 - \$AQ\$588 - \$AQ\$589$) / ($\$AQ\$590 / \$AQ\591)

AS594: PR [A8] +AS593+2, 5/60

AT594: PR [A9] ($\$AQ\$587 * \$AS594 - \$AQ\$588 - \$AQ\$589$) / ($\$AQ\$590 / \$AQ\591)

AS595: PR [A8] +AS594+2, 5/60

AT595: PR [A9] ($\$AQ\$587 * \$AS595 - \$AQ\$588 - \$AQ\$589$) / ($\$AQ\$590 / \$AQ\591)

AS596: PR [A8] +AS595+2, 5/60

CALCULO CALOR RECEIDO A TRAVES DEL FORRO

1
3
2
13
12

(S)
(TIL)
Temperatura del tubo (TT)
Esesor del forro (eF)
Conductividad forro (hF)

Horas	QF
0	
0, 01667	0, 015385
0, 04167	0, 038462
0, 08333	0, 076923
0, 125	0, 115385
0, 16667	0, 153846
0, 20833	0, 192308
0, 25	0, 230769
0, 29167	0, 269231
0, 33333	0, 307692
0, 375	0, 346154
0, 41667	0, 384615
0, 45833	0, 423077
0, 5	0, 461538
0, 54167	0, 5
0, 58333	0, 538462
0, 625	0, 576923
0, 66667	0, 615385
0, 70833	0, 653846
0, 75	0, 692308
0, 79167	0, 730769
0, 83333	0, 769231
0, 875	0, 807692
0, 91667	0, 846154
0, 95833	0, 884615
1	0, 923077

$$QF = S t \frac{TIL - TT}{eF / hF}$$

Alt-q >>> VUELVE AL MENU

AT610: PR [A9] (\$AQ\$087*\$AS610)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AS611: PR [A8] +AS610+2, 5/60
AT611: PR [A9] (\$AQ\$587*\$AS611)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AS612: PR [A8] +AS611+2, 5/60
AT612: PR [A9] (\$AQ\$587*\$AS612)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AP613: PR [A26] 'Alt-q >>> VUELVE AL MENU

AT596: PR LA91 (\$AQ\$587*AS596)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AS597: PR LAB1 +AS596+2, 5/60
AT597: PR LA91 (\$AQ\$587*AS597)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AS598: PR LAB1 +AS597+2, 5/60
AT598: PR LA91 (\$AQ\$587*AS598)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AS599: PR LAB1 +AS598+2, 5/60
AT599: PR LA91 (\$AQ\$587*AS599)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AS600: PR LAB1 +AS599+2, 5/60
AT600: PR LA91 (\$AQ\$587*AS600)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AP601: PR LA261' TIL - TT
AS601: PR LAB1 +AS600+2, 5/60
AT601: PR LA91 (\$AQ\$587*AS601)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AP602: PR LA261' QF = S t -----
AS602: PR LAB1 +AS601+2, 5/60
AT602: PR LA91 (\$AQ\$587*AS602)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AP603: PR LA261' eF / hF
AS603: PR LAB1 +AS602+2, 5/60
AT603: PR LA91 (\$AQ\$587*AS603)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AS604: PR LAB1 +AS603+2, 5/60
AT604: PR LA91 (\$AQ\$587*AS604)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AS605: PR LAB1 +AS604+2, 5/60
AT605: PR LA91 (\$AQ\$587*AS605)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AS606: PR LAB1 +AS605+2, 5/60
AT606: PR LA91 (\$AQ\$587*AS606)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AS607: PR LAB1 +AS606+2, 5/60
AT607: PR LA91 (\$AQ\$587*AS607)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AS608: PR LAB1 +AS607+2, 5/60
AT608: PR LA91 (\$AQ\$587*AS608)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AS609: PR LAB1 +AS608+2, 5/60
AT609: PR LA91 (\$AQ\$587*AS609)*(\$AQ\$588-\$AQ\$589)/(\$AQ\$590/\$AQ\$591)
AS610: PR LAB1 +AS609+2, 5/60

CALCULO LIMITE ELASTICO A LA TEMPERATURA DE LA CHAPA

Lim. elast. cond. nor.(Te)
Temperatura chapa (°C) (θ)

1000
222

Lim. elast. a temp. θ

918,18	0	0	0	0
--------	---	---	---	---

Lim. elast. cond. nor.(Te)
Temperatura chapa (θ)

--	--	--	--	--

Lim. elast. a temp. θ

0	0	0	0	0
---	---	---	---	---

$$Te(\theta) = 0 + 3 \cdot 10^{-4} \cdot \theta - 3 \cdot 5 \cdot 10^{-6} \cdot \theta^2 + 2 \cdot 2 \cdot 10^{-9} \cdot \theta^3 + Te$$

Alt-q >>> VUELVE AL MENU

AP735: PR [A26] 'CALCULO LIMITE ELASTICO A LA TEMPERATURA DE LA CHAPA

AP737: PR [A26] 'Lim. elást. cond. nor.(Te)

AQ737: D [A7] 1000

AP738: PR [A26] 'Temperatura chapa (°C) (θ)

AQ738: D [A7] 222

AP741: PR [A26] 'Lim. elást. a temp. θ

AQ741: PR [A7] (1+(3*10⁻⁴)*AQ738-(3, 5*10⁻⁶)*AQ738²+2, 2*10⁻⁹)*AQ738³)*AQ737

AR741: PR [A12] (1+(3*10⁻⁴)*AR738-(3, 5*10⁻⁶)*AR738²+2, 2*10⁻⁹)*AR738³)*AR737

AS741: PR [A8] (1+(3*10⁻⁴)*AS738-(3, 5*10⁻⁶)*AS738²+2, 2*10⁻⁹)*AS738³)*AS737

AT741: PR [A9] (1+(3*10⁻⁴)*AT738-(3, 5*10⁻⁶)*AT738²+2, 2*10⁻⁹)*AT738³)*AT737

AU741: PR [A9] (1+(3*10⁻⁴)*AU738-(3, 5*10⁻⁶)*AU738²+2, 2*10⁻⁹)*AU738³)*AU737

AP745: PR [A26] 'Lim. elást. cond. nor.(Te)

AP746: PR [A26] 'Temperatura chapa (θ)

AP749: PR [A26] 'Lim. elást. a temp. θ

AQ749: PR [A7] (1+(3*10⁻⁴)*AQ746-(3, 5*10⁻⁶)*AQ746²+2, 2*10⁻⁹)*AQ746³)*AQ745

AR749: PR [A12] (1+(3*10⁻⁴)*AR746-(3, 5*10⁻⁶)*AR746²+2, 2*10⁻⁹)*AR746³)*AR745

AS749: PR [A8] (1+(3*10⁻⁴)*AS746-(3, 5*10⁻⁶)*AS746²+2, 2*10⁻⁹)*AS746³)*AS745

AT749: PR [A9] (1+(3*10⁻⁴)*AT746-(3, 5*10⁻⁶)*AT746²+2, 2*10⁻⁹)*AT746³)*AT745

AU749: PR [A9] (1+(3*10⁻⁴)*AU746-(3, 5*10⁻⁶)*AU746²+2, 2*10⁻⁹)*AU746³)*AU745

AP754: PR [A26] 'Te(θ) = 1 + 3*(10⁻⁴) * θ - 3, 5*(10⁻⁶) * θ² + 2, 2*(10⁻⁹) * θ³ + Te

AP763: PR [A26] 'AU-q >>> VUELVE AL MENU

AP825: PR [A26] 'CALCULO ECUACION CLASSIUS-CLAPEYRON A

AQ826: D [A7] ^METANO

AR826: D [A12] ^CLORO

AS826: D [A8] ^AGUA

AT826: D [A9] ^LIBRE

AU826: D [A9] ^LIBRE

AP827: PR [A26] 'Temp. critica fluido (Ts1)

AQ827: D [A7] 190, 55

AR827: D [A12] 1

AS827: D [A8] 1

AT827: D [A9] 1

AU827: D [A9] 1

AP828: PR [A26] 'Temp. cualquiera fl. (Ts2)

AQ828: D [A7] 100

AR828: D [A12] 1

AS828: D [A8] 1

AT828: D [A9] 1

AU828: D [A9] 1

AP829: PR [A26] 'Pres. critica fluido (Ps1)

AQ829: D [A7] 45, 99

AR829: D [A12] 1

AS829: D [A8] 1

AT829: D [A9] 1

AU829: D [A9] 1

AP830: PR [A26] 'Pres. cualquiera fl. (Ps2)

AQ830: D [A7] 0, 3451

AR830: D [A12] 1

AS830: D [A8] 1

AT830: D [A9] 1

AU830: D [A9] 1

AP833: PR [A26] 'Valor constante. A

CALCULO ECUACION CLASSIUS-CLAPEYRON A

	METANO	CLORO	AGUA	LIBRE	LIBRE
Temp. crítica fluido (Ts1)	190.55				
Temp. cualquiera fl. (Ts2)	100				
Pres. crítica fluido (Ps1)	45.99				
Pres. cualquiera fl. (Ps2)	0.3451				

Valor constante. A -1 -1 -1 -1 -1

	LIBRE	LIBRE	LIBRE	LIBRE	LIBRE
Temp. crítica fluido (Ts1)					
Temp. cualquiera fl. (Ts2)					
Pres. crítica fluido (Ps1)					
Pres. cualquiera fl. (Ps2)					

Valor constante. A -1 -1 -1 -1 -1

$$A = \frac{Ts1 * Ts2 * \ln(Ps1 / Ps2)}{Ts1 - Ts2}$$

Alt-q >>> VUELVE AL MENU

AQ833: PR [A7] (AQ827*AQ828*LN(AQ829/AQ830))/AQ827-AQ828
AR833: PR [A12] (AR827*AR828*LN(AR829/AR830))/AR827-AR828
AS833: PR [A8] (AS827*AS828*LN(AS829/AS830))/AS827-AS828
AT833: PR [A9] (AT827*AT828*LN(AT829/AT830))/AT827-AT828
AU833: PR [A9] (AU827*AU828*LN(AU829/AU830))/AU827-AU828
AQ835: D [A7] ^LIBRE
AR835: D [A12] ^LIBRE
AS835: D [A8] ^LIBRE
AT835: D [A9] ^LIBRE
AU835: D [A9] ^LIBRE
AP836: PR [A26] 'Temp. crítica fluido (Ts1)
AQ836: D [A7] 1
AR836: D [A12] 1
AS836: D [A8] 1
AT836: D [A9] 1
AU836: D [A9] 1
AP837: PR [A26] 'Temp. cualquiera fl (Ts2)
AQ837: D [A7] 1
AR837: D [A12] 1
AS837: D [A8] 1
AT837: D [A9] 1
AU837: D [A9] 1
AP838: PR [A26] 'Pres. crítica fluido (Ps1)
AQ838: D [A7] 1
AR838: D [A12] 1
AS838: D [A8] 1
AT838: D [A9] 1
AU838: D [A9] 1
AP839: PR [A26] 'Pres. cualquiera fl (Ps2)
AQ839: D [A7] 1
AR839: D [A12] 1

AS839: D [A6] 1
AT839: D [A9] 1
AU839: D [A9] 1
AP842: PR [A26] 'Valor constante. A
AQ842: PR [A7] (AQ836*AQ837*LN(AQ838/AQ839))/AQ836-AQ837
AR842: PR [A12] (AR836*AR837*LN(AR838/AR839))/AR836-AR837
AS842: PR [A6] (AS836*AS837*LN(AS838/AS839))/AS836-AS837
AT842: PR [A9] (AT836*AT837*LN(AT838/AT839))/AT836-AT837
AU842: PR [A9] (AU836*AU837*LN(AU838/AU839))/AU836-AU837
AP847: PR [A26] ' Ts1*Ts2 * ln(Ps1/Ps2)
AP848: PR [A26] 'A = -----
AP849: PR [A26] ' Ts1 - Ts2
AP853: PR [A26] 'Alt-q >>> VUELVE AL MENU

AP855: PR [A26] 'CALCULO ECUACION CLASSIUS-CLAPEYRON B

AQ856: D [A7] ^LIBRE

AR856: D [A12] ^LIBRE

AS856: D [A8] ^LIBRE

AT856: D [A9] ^LIBRE

AU856: D [A9] ^LIBRE

AP857: PR [A26] 'Temp. critica fluido (Ts1)

AQ857: D [A7] 190, 55

AR857: D [A12] 1

AS857: D [A8] 1

AT857: D [A9] 1

AU857: D [A9] 1

AP858: PR [A26] 'Pres. critica fluido (Ps1)

AQ858: D [A7] 45, 99

AR858: D [A12] 1

AS858: D [A8] 1

AT858: D [A9] 1

AU858: D [A9] 1

AP859: PR [A26] 'Valor constante. A

AQ859: PR [A7] +AQ833

AR859: PR [A12] +AR833

AS859: PR [A8] +AS833

AT859: PR [A9] +AT833

AU859: PR [A9] +AU833

AP862: PR [A26] 'Valor constante. B

AQ862: PR [A7] @LN(AQ858)+AQ859/AQ857

AR862: PR [A12] @LN(AR858)+AR859/AR857

AS862: PR [A8] @LN(AS858)+AS859/AS857

AT862: PR [A9] @LN(AT858)+AT859/AT857

AU862: PR [A9] @LN(AU858)+AU859/AU857

AQ863: PR [A7]'

CALCULO ECUACION CLASSIUS-CLAPEYRON B

	LIBRE	LIBRE	LIBRE	LIBRE	LIBRE
Temp. crítica fluido (Ts1)	190,55	1	1	1	1
Pres. crítica fluido (Ps1)	45,99	1	1	1	1
Valor constante. A	389,23	-1	-1	-1	-1

Valor constante. B	5,8711	-1	-1	-1	-1
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	LIBRE	LIBRE	LIBRE	LIBRE	LIBRE
Temp. crítica fluido (Ts1)	1	1	1	1	1
Pres. crítica fluido (Ps1)	1	1	1	1	1
Valor constante. A	-1	-1	-1	-1	-1

Valor constante. B	-1	-1	-1	-1	-1
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$$B = \ln Ps1 + (A / Ts1)$$

Alt-q >>> VUELVE AL MENU

AT871: PR [A9] @LN(AT867)+AT868/AT866
AU871: PR [A9] @LN(AU867)+AU868/AU866
AQ872: PR [A7] '
AR872: PR [A12] '
AS872: PR [A8] '
AT872: PR [A9] '
AU872: PR [A9] '
AP877: PR [A26] '
AP878: PR [A26] 'B = ln Psi + (A / Ts1)
AP879: PR [A26] '
AP883: PR [A26] 'Alt-q >>> VUELVE AL MENU

AR863: PR [A12] '
AS863: PR [A8] '
AT863: PR [A9] '
AU863: PR [A9] '
AQ865: D [A7] ~LIBRE
AR865: D [A12] ~LIBRE
AS865: D [A8] ~LIBRE
AT865: D [A9] ~LIBRE
AU865: D [A9] ~LIBRE
AP866: PR [A26] 'Temp. critica fluido (Ts1)
AQ866: D [A7] 1
AR866: D [A12] 1
AS866: D [A8] 1
AT866: D [A9] 1
AU866: D [A9] 1
AP867: PR [A26] 'Pres. critica fluido (Ps1)
AQ867: D [A7] 1
AR867: D [A12] 1
AS867: D [A8] 1
AT867: D [A9] 1
AU867: D [A9] 1
AP868: PR [A26] 'Valor constante. A
AQ868: PR [A7] +AQ842
AR868: PR [A12] +AR842
AS868: PR [A8] +AS842
AT868: PR [A9] +AT842
AU868: PR [A9] +AUB42
AP871: PR [A26] 'Valor constante. B
AQ871: PR [A7] @LN(AQ867)+AQ868/AQ866
AR871: PR [A12] @LN(AR867)+AR868/AR866
AS871: PR [A8] @LN(AS867)+AS868/AS866

CALCULO ECUACION CLASSIUS-CLAPEYRON T

Temp. critica fluido (Tsl) LIBRE LIBRE LIBRE LIBRE LIBRE LIBRE
 Valor constante: A 190,55 1 -1 -1 -1 -1 -1

Valor constante: T 97,266 2 2 2 2 2 2

Temp. critica fluido (Tsl) LIBRE LIBRE LIBRE LIBRE LIBRE LIBRE
 Valor constante: A 1 1 -1 -1 -1 -1

Valor constante: T 2 2 2 2 2 2

Tc = Tsl

$$T = (Tc * (A - Tc)) / A$$

Alt-q >>> VUELVE AL MENU

AP885: PR [A26] 'CALCULO ECUACION CLASSIUS-CLAPEYRON T

AQ886: D [A7] ~LIBRE

AR886: D [A12] ~LIBRE

AS886: D [A8] ~LIBRE

AT886: D [A9] ~LIBRE

AU886: D [A9] ~LIBRE

AP887: PR [A26] 'Temp. critica fluido (Tsl)

AQ887: D [A7] 190, 55

AR887: D [A12] 1

AS887: D [A8] 1

AT887: D [A9] 1

AU887: D [A9] 1

AP888: PR [A26] 'Valor constante. A

AQ888: PR [A7] +AQ833

AR888: PR [A12] +AR833

AS888: PR [A8] +AS833

AT888: PR [A9] +AT833

AU888: PR [A9] +AU833

AP892: PR [A26] 'Valor constante. T

AQ892: PR [A7] (AQ887*(AQ888-AQ887))/AQ888

AR892: PR [A12] (AR887*(AR888-AR887))/AR888

AS892: PR [A8] (AS887*(AS888-AS887))/AS888

AT892: PR [A9] (AT887*(AT888-AT887))/AT888

AU892: PR [A9] (AU887*(AU888-AU887))/AU888

AQ893: PR [A7] '

AR893: PR [A12] '

AS893: PR [A8] '

AT893: PR [A9] '

AU893: PR [A9] '

AQ895: D [A7] ~LIBRE

AR895: D [A12] ~LIBRE

ASB95: D IAB1 ~LIBRE
 ATB95: D IAB1 ~LIBRE
 AUB95: D IAB1 ~LIBRE
 APB96: PR IAB261 "Temp. critica fluido (Ts1)
 AQB96: D IAB71 I
 ARB96: D IAB121 I
 ASS96: D IAB1 I
 ATB96: D IAB1 I
 AUB96: D IAB1 I
 APB97: PR IAB261 "Valor constante. A
 AQB97: PR IAB71 +AQB42
 ARB97: PR IAB121 +ARB42
 ASS97: PR IAB1 +ASB42
 ATB97: PR IAB1 +ATB42
 AUB97: PR IAB1 +AUB42
 AP901: PR IAB261 "Valor constante. T
 AQB901: PR IAB71 (AQB96*(AQB97-AQB96))/AQB97
 ARB901: PR IAB121 (ARB96*(ARB97-ARB96))/ARB97
 ASB901: PR IAB1 (ASB96*(ASB97-ASB96))/ASB97
 ATB901: PR IAB1 (ATB96*(ATB97-ATB96))/ATB97
 AUB901: PR IAB1 (AUB96*(AUB97-AUB96))/AUB97
 AQB02: PR IAB71 '
 ARB02: PR IAB121 '
 ASB02: PR IAB1 '
 ATB02: PR IAB1 '
 AUB02: PR IAB1 '
 AP905: PR IAB261 "Tc = Ts1
 AQB07: PR IAB261 '
 ARB08: PR IAB261 "T = (Tc * (A - Tc)) / A
 ASB09: PR IAB261 '
 ATB13: PR IAB261 "Alt-q >>> VUELVE AL MENU

CALCULO ECUACION CLASSIUS-CLAPEYRON P

	LIBRE	LIBRE	LIBRE	LIBRE	LIBRE
Valor de la Temperatura T	190,55	1	1	1	1
Valor constante. A	389,23	-1	-1	-1	-1
Valor constante. B	5,8711	-1	-1	-1	-1
Valor de la presión P	45,99	1	1	1	1

	LIBRE	LIBRE	LIBRE	LIBRE	LIBRE
Valor de la Temperatura T	1	1	1	1	1
Valor constante. A	-1	-1	-1	-1	-1
Valor constante. B	-1	-1	-1	-1	-1
Valor de la presión P	1	1	1	1	1

$$P = e^{- (A / T) + B}$$

Alt-q >>> VUELVE AL MENU

AP945: PR IA261 'CALCULO ECUACION CLASSIUS-CLAPYRON P
 AQ946: D IA71 ~LIBRE
 AR946: D IA121 ~LIBRE
 AS946: D IA81 ~LIBRE
 AT946: D IA91 ~LIBRE
 AU946: D IA91 ~LIBRE
 AP947: PR IA261 'Valor de la Temperatura T
 AQ947: D IA71 190, 55
 AR947: D IA121 1
 AS947: D IA81 1
 AT947: D IA91 1
 AU947: D IA91 1
 AP948: PR IA261 'Valor constante. A
 AQ948: PR IA71 +AQ833
 AR948: PR IA121 +AR833
 AS948: PR IA81 +AS833
 AT948: PR IA91 +AT833
 AU948: PR IA91 +AU833
 AP949: PR IA261 'Valor constante. B
 AQ949: PR IA71 +AQ862
 AR949: PR IA121 +AR862
 AS949: PR IA81 +AS862
 AT949: PR IA91 +AT862
 AU949: PR IA91 +AU862
 AP952: PR IA261 'Valor de la presión P
 AQ952: PR IA71 2, 7182818~(-(AQ948/AQ947)+AQ949)
 AR952: PR IA121 2, 7182818~(-(AR948/AR947)+AR949)
 AS952: PR IA81 2, 7182818~(-(AS948/AS947)+AS949)
 AT952: PR IA91 2, 7182818~(-(AT948/AT947)+AT949)
 AU952: PR IA91 2, 7182818~(-(AU948/AU947)+AU949)
 AQ953: PR IA71 '

AR953: PR [A12] '
AS953: PR [A8] '
AT953: PR [A9] '
AU953: PR [A9] '
AQ955: D [A7] ^LIBRE
AR955: D [A12] ^LIBRE
AS955: D [A8] ^LIBRE
AT955: D [A9] ^LIBRE
AU955: D [A9] ^LIBRE
AP956: PR [A26] 'Valor de la Temperatura T
AQ956: D [A7] I
AR956: D [A12] I
AS956: D [A8] I
AT956: D [A9] I
AU956: D [A9] I
AP957: PR [A26] 'Valor constante. A
AQ957: PR [A7] +AQ842
AR957: PR [A12] +AR842
AS957: PR [A8] +AS842
AT957: PR [A9] +AT842
AU957: PR [A9] +AU842
AP958: PR [A26] 'Valor constante. B
AQ958: PR [A7] +AQ871
AR958: PR [A12] +AR871
AS958: PR [A8] +AS871
AT958: PR [A9] +AT871
AU958: PR [A9] +AU871
AP961: PR [A26] 'Valor de la presión P
AQ961: PR [A7] 2, 7182818 ^(-(AQ957/AQ956)+AQ958)
AR961: PR [A12] 2, 7182818 ^(-(AR957/AR956)+AR958)
AS961: PR [A8] 2, 7182818 ^(-(AS957/AS956)+AS958)