

```

to=5
tc=50
psat_e7171=pressure(R717; T=to; X=1)
volesp_7171=volume(R717; T=to+10; p=psat_e7171)
h2_7171=enthalpy(R717; T=to+10; p=psat_e7171)
s2_7171=entropy(R717; T=to+10; p=psat_e7171)
psat_c7171=pressure(R717; T=tc; X=1)
s3_7171=s2_7171
{R7171 compresor de pistones abiertos/modelo W6HA}

```

```

Q_e7171= l1 + l2*to + l3*tc + l4*to^2 + l5*to*tc + l6*tc^2 + l7*to^3 + l8*tc*to^2 + l9*to*tc^2 + l10*tc^3
W_c7171 = m1 + m2*to + m3*tc + m4*to^2 + m5*to*tc + m6*tc^2 + m7*to^3 + m8*tc*to^2 + m9*to*tc^2 + m10*tc^3
m_7171 = n1 + n2*to + n3*tc + n4*to^2 + n5*to*tc + n6*tc^2 + n7*to^3 + n8*tc*to^2 + n9*to*tc^2 + n10*tc^3

```

COP_7171=Q_e7171/W_c7171

eta_7171=vol_7171/110,5

vol_7171=volesp_7171*m_7171

etaisen_7171=(Wisen_7171*1000)/W_c7171

```

h3_7171=enthalpy(R717; p=psat_c7171; s=s3_7171)
Wisen_7171=m_7171*(1/3600)*(h3_7171-h2_7171)

```

{potencia frigorífica}

```

l1=126959,824305027
l2=5085,4134356046
l3=-563,258909332399
l4=66,0114281908945
l5=-17,0479327276699
l6=-8,89383115288087
l7=0,444102523211097
l8=-0,176789402173205
l9=0,0264086195976048
l10=0,0673533691302064

```

{potencia del compresor}

```

m1=7903,05694433638
m2=-734,832116844786
m3=209,042064101402
m4=-18,9338186435764
m5=29,334145347463
m6=3,98611038828902
m7=-0,0456857973982627
m8=0,232057149950496
m9=-0,146776477265078
m10=-0,0365795974959422

```

{caudal másico}

```

n1=355,084303964783
n2=13,944980441953
n3=-0,226274134951096
n4=0,173978846142275
n5=-0,00092785578088467
n6=-0,0295146405468251
n7=0,00130121910774389
n8=0,000161683960248001
n9=0,000222352355810537
n10=0,000173295545041248

```

```

psat_e7172=pressure(R717; T=to; X=1)
volesp_7172=volume(R717; T=to+10; p=psat_e7172)
h2_7172=enthalpy(R717; T=to+10; p=psat_e7172)
s2_7172=entropy(R717; T=to+10; p=psat_e7172)
psat_c7172=pressure(R717; T=tc; X=1)

```

s3_7172=s2_7172

{R717 compresor de tornillos abierto modelo OSKA5351-K}

$$\begin{aligned} Q_{e7172} &= d1 + d2*to + d3*tc + d4*to^2 + d5*to*tc + d6*tc^2 + d7*to^3 + d8*tc*to^2 + d9*to*tc^2 + d10*tc^3 \\ W_c7172 &= e1 + e2*to + e3*tc + e4*to^2 + e5*to*tc + e6*tc^2 + e7*to^3 + e8*tc*to^2 + e9*to*tc^2 + e10*tc^3 \\ m_7172 &= j1 + j2*to + j3*tc + j4*to^2 + j5*to*tc + j6*tc^2 + j7*to^3 + j8*tc*to^2 + j9*to*tc^2 + j10*tc^3 \end{aligned}$$

COP_7172=Q_e7172/W_c7172

eta_7172=vol_7172/100

vol_7172=volesp_7172*m_7172

etaisen_7172=(Wisen_7172*1000)/W_c7172

h3_7172=enthalpy(R717; p=psat_c7172; s=s3_7172)

Wisen_7172=m_7172*(1/3600)*(h3_7172-h2_7172)

{potencia frigorífica}

$$\begin{aligned} d1 &= 104776,246613189 \\ d2 &= 3878,23056532379 \\ d3 &= -76,1450394868364 \\ d4 &= 58,1061861511066 \\ d5 &= -3,7597050086029 \\ d6 &= -9,05572325929391 \\ d7 &= 0,337650970537942 \\ d8 &= -0,259745768693577 \\ d9 &= -0,181871063648128 \\ d10 &= 0,0242615507355514 \end{aligned}$$

{potencia del compresor}

$$\begin{aligned} e1 &= 7265,66699255437 \\ e2 &= 50,2923246510903 \\ e3 &= 429,216430729483 \\ e4 &= 3,29026610284303 \\ e5 &= 9,13142485579217 \\ e6 &= -1,9751624657475 \\ e7 &= 0,0181624096545564 \\ e8 &= -0,0410598367502572 \\ e9 &= -0,0603323883345802 \\ e10 &= 0,0279005566360072 \end{aligned}$$

{caudal másico}

$$\begin{aligned} j1 &= 291,969163416755 \\ j2 &= 10,4841606456178 \\ j3 &= 0,960313811272674 \\ j4 &= 0,156225913861466 \\ j5 &= 0,0345731381291939 \\ j6 &= -0,0252899712797674 \\ j7 &= 0,00100535326271931 \\ j8 &= -0,000238219141730752 \\ j9 &= -0,000564012428891657 \\ j10 &= 0,000019845453541426 \end{aligned}$$

psat_e1341=pressure(R134a; T=to; X=1)

volesp_1341=volume(R134a; T=to+10; p=psat_e1341)

h2_1341=enthalpy(R134a; T=to+10; p=psat_e1341)

s2_1341=entropy(R134a; T=to+10; p=psat_e1341)

psat_c1341=pressure(R134a; T=tc; X=1)

s3_1341=s2_1341

{R134a compresor de pistones semihermético modelo 8Ge-50Y-40P}

$$Q_{e1341} = a1 + a2*to + a3*tc + a4*to^2 + a5*to*tc + a6*tc^2 + a7*to^3 + a8*tc*to^2 + a9*to*tc^2 + a10*tc^3$$

$$W_c1341 = b1 + b2*to + b3*tc + b4*to^2 + b5*to*tc + b6*tc^2 + b7*to^3 + b8*tc*to^2 + b9*to*tc^2 + b10*tc^3$$

$$m_{1341} = c1 + c2*to + c3*tc + c4*to^2 + c5*to*tc + c6*tc^2 + c7*to^3 + c8*tc*to^2 + c9*to*tc^2 + c10*tc^3$$

COP_1341=Q_e1341/W_c1341

eta_1341=vol_1341/185

vol_1341=volesp_1341*m_1341

etaisen_1341=(Wisen_1341*1000)/W_c1341

h3_1341=enthalpy(R134a; p=psat_c1341; s=s3_1341)

Wisen_1341=m_1341*(1/3600)*(h3_1341-h2_1341)

{potencia frigorífica}

a1=135171,069776185
 a2=5366,71222332136
 a3=-1027,78172285452
 a4=80,9026607622835
 a5=-36,4971572603615
 a6=-5,17222604476511
 a7=0,455160651452518
 a8=-0,520612608762932
 a9=-0,0455378211832514
 a10=0,0350967922007044

{potencia del compresor}

b1=6379,87294730146
 b2=-398,392173786425
 b3=806,594948247053
 b4=-17,5283481020789
 b5=24,6576011195438
 b6=-9,24057910748324
 b7=-0,213626548440725
 b8=0,269917862774077
 b9=-0,0982204741753233
 b10=0,0429675021656542

{caudal másico}

c1=2339,58186825641
 c2=85,6830787769676
 c3=-2,05850745667121
 c4=1,17529064109416
 c5=-0,0674083242014702
 c6=-0,100531813811321
 c7=0,00727251162435066
 c8=-0,00195283118685133
 c9=-0,000136742030667512
 c10=0,000159771591185731

psat_e1342=pressure(R134a; T=to; X=1)

volesp_1342=volume(R134a; T=to+10; p=psat_e1341)

h2_1342=enthalpy(R134a; T=to+10; p=psat_e1341)

s2_1342=entropy(R134a; T=to+10; p=psat_e1341)

psat_c1342=pressure(R134a; T=tc; X=1)

s3_1342=s2_1342

{R134a compresor tornillo semihermético modelo HSK6461-40-40P}

Q_e1342=t1 + t2*to + t3*tc + t4*to^2 + t5*to*tc + t6*tc^2 + t7*to^3 + t8*tc*to^2 + t9*to*tc^2 + t10*tc^3

W_c1342 = u1 + u2*to + u3*tc + u4*to^2 + u5*to*tc + u6*tc^2 + u7*to^3 + u8*tc*to^2 + u9*to*tc^2 + u10*tc^3

m_1342 = v1 + v2*to + v3*tc + v4*to^2 + v5*to*tc + v6*tc^2 + v7*to^3 + v8*tc*to^2 + v9*to*tc^2 + v10*tc^3

COP_1342=Q_e1342/W_c1342

eta_1342=vol_1342/165

vol_1342=volesp_1342*m_1342

etaisen_1342=(Wisen_1342*1000)/W_c1342

h3_1342=enthalpy(R134a; p=psat_c1342; s=s3_1342)
Wisen_1342=m_1342*(1/3600)*(h3_1342-h2_1342)

{potencia frigorífica}

t1=129521,273695714
t2=4989,26760612574
t3=-776,46159813861
t4=76,5931076539188
t5=-29,1244947507916
t6=-5,94739452272556
t7=0,436030915455575
t8=-0,466768164290594
t9=-0,0905645440978759
t10=0,0243316843275274

{potencia del compresor}

u1=11555,3388663881
u2=111,890313040705
u3=291,62367035875
u4=-0,200850663774885
u5=2,38844657955202
u6=-0,921522532688875
u7=-0,0136434219830224
u8=0,0534166557764211
u9=-0,0379417323140027
u10=0,0527718531438581

{caudal másico}

v1=2233,48107415127
v2=78,3210263443687
v3=2,01475876357672
v4=1,09654669039859
v5=0,0662691936967631
v6=-0,0915329819408927
v7=0,00701127200949158
v8=-0,000780951324242471
v9=-0,0013448265338803
v10=-0,0000286942902864362

psat_e410=pressure(R410A; T=to; X=1)
volesp_410=volume(R410A; T=to+10; p=psat_e410)
h2_410=enthalpy(R410A; T=to+10; p=psat_e410)
s2_410=entropy(R410A; T=to+10; p=psat_e410)
psat_c410=pressure(R410A; T=tc; X=1)
s3_410=s2_410

{R410a compresor Scroll modelo GSD80485VA 4}

Q_e410 = f1 + f2*to + f3*tc + f4*to^2 + f5*to*tc + f6*tc^2 + f7*to^3 + f8*tc*to^2 + f9*to*tc^2 + f10*tc^3

W_c410 = g1 + g2*to + g3*tc + g4*to^2 + g5*to*tc + g6*tc^2 + g7*to^3 + g8*tc*to^2 + g9*to*tc^2 + g10*tc^3

m_410 = h1 + h2*to + h3*tc + h4*to^2 + h5*to*tc + h6*tc^2 + h7*to^3 + h8*tc*to^2 + h9*to*tc^2 + h10*tc^3

COP_410=Q_e410/W_c410

eta_410=vol_410/77,2

vol_410=volesp_410*m_410

etaisen_410=(Wisen_410*1000)/W_c410

h3_410=enthalpy(R410a; p=psat_c410; s=s3_410)
 Wisen_410=m_410*(1/3600)*(h3_410-h2_410)

{potencia frigorífica}

f1=141687,874934095
 f2=4691,0308028141
 f3=-779,993114329406
 f4=68,3266927308387
 f5=-14,5648462477527
 f6=-4,35621485025484
 f7=0,334332104620338
 f8=-0,497556815163527
 f9=-0,338770546584211
 f10=-0,0457456332710608

{potencia del compresor}

g1=8875,79477053814
 g2=-85,2866499861496
 g3=428,699066979965
 g4=-2,90023037996284
 g5=5,52950943541136
 g6=-3,67758906952655
 g7=-0,0266570707166015
 g8=0,0730330458895148
 g9=-0,0705463335733529
 g10=0,0919147481107476

{caudal másico}

h1=2162,09536195402
 h2=69,0828816528643
 h3=6,10335396153722
 h4=0,963611826626977
 h5=0,230029208932478
 h6=-0,138354179369668
 h7=0,0064629031073779
 h8=-0,000747854381005923
 h9=-0,0036369739115343
 h10=-0,0000634334903526115

{R744 compresor de pistones semiherméticos/modelo 4FTC-30K-40P}

psat_e744=pressure(R744; T=to; X=1)
 volesp_744=volume(R744; T=to+10; p=psat_e744)
 h2_744=enthalpy(R744; T=to+10; p=psat_e744)
 s2_744=entropy(R744; T=to+10; p=psat_e744)
 p_HP744=98,7
 s3_744=s2_744

{p_HP744=1+2,44*tc}

Q_e744 = w1 + w2*to + w3*p_HP744 + w4*to^2 + w5*to*p_HP744 + w6*p_HP744^2 + w7*to^3 + w8*p_HP744*to^2 + w9*p_HP744^2 + w10*p_HP744^3
 W_c744 = k1 + k2*to + k3*p_HP744 + k4*to^2 + k5*to*p_HP744 + k6*p_HP744^2 + k7*to^3 + k8*p_HP744*to^2 + k9*to*p_HP744^2 + k10*p_HP744^3
 m_744 = z1 + z2*to + z3*p_HP744 + z4*to^2 + z5*to*p_HP744 + z6*p_HP744^2 + z7*to^3 + z8*p_HP744*to^2 + z9*to*p_HP744^2 + z10*p_HP744^3

COP_744=Q_e744/W_c744

eta_744=vol_744/17,8

vol_744=volesp_744*m_744

etaisen_744=(Wisen_744*1000)/W_c744

h3_744=enthalpy(R744;p=p_HP744 ; s=s3_744)
 Wisen_744=m_744*(1/3600)*(h3_744-h2_744)
 efin_744=Q_e744/(1000*4,3)

{Potencia frigorífica}

w1=-612355,592666879
 w2=-11158,2106466126
 w3=16018,0659438277
 w4=-72,7037510597427
 w5=225,666529348905
 w6=-128,973325534918
 w7=-0,181400302789252
 w8=0,90703029295759
 w9=-0,978823261316559
 w10=0,345356361045351

{Potencia de compresión}

k1=-13643,2838676621
 k2=-666,71084263225
 k3=614,326171269391
 k4=-8,53075194384591
 k5=8,94204364536802
 k6=-3,13325231781031
 k7=-0,0329049656198738
 k8=0,020711235875344
 k9=-0,0140322039396475
 k10=0,0072009200972959

{caudal másico}

z1=1713,48733596902
 z2=54,0808960372607
 z3=-5,29454016123849
 z4=0,840835839018917
 z5=-0,0807109925317144
 z6=0,00500979706160117
 z7=0,0105143499388965
 z8=-0,000564872336943745
 z9=-0,0000151735186032934
 z10=0,0000115106650003764

Parametric Table: COP tevap variable

	to	COP ₇₁₇₁	COP ₇₁₇₂	COP ₁₃₄₁	COP ₁₃₄₂	COP ₄₁₀	COP ₇₄₄
Run 1	-20	1,319	1,56	1,445	1,061	1,172	1,071
Run 2	-16,67	1,714	1,778	1,641	1,264	1,366	1,149
Run 3	-13,33	2,079	2,001	1,827	1,486	1,578	1,253
Run 4	-10	2,435	2,232	2,008	1,729	1,81	1,38
Run 5	-6,667	2,796	2,473	2,193	1,993	2,063	1,529
Run 6	-3,333	3,174	2,723	2,387	2,281	2,339	1,7
Run 7	-4,337E-19	3,578	2,983	2,596	2,592	2,64	1,893
Run 8	3,333	4,018	3,254	2,826	2,928	2,969	2,108
Run 9	6,667	4,501	3,535	3,082	3,289	3,327	2,349
Run 10	10	5,039	3,827	3,371	3,675	3,717	2,62

Parametric Table: eta vol tevap variable

	to	η_{7171}	η_{7172}	η_{1341}	η_{1342}	η_{410}	η_{744}
Run 1	-20	0,3839	0,7369	0,6164	0,845	0,8928	0,6593
Run 2	-16,67	0,491	0,7665	0,6602	0,8661	0,9085	0,6923

Parametric Table: eta vol tevap variable

	to	η_{7171}	η_{7172}	η_{1341}	η_{1342}	η_{410}	η_{744}
Run 3	-13,33	0,5783	0,7899	0,6961	0,8831	0,9214	0,719
Run 4	-10	0,65	0,8086	0,7258	0,8971	0,9323	0,742
Run 5	-6,667	0,7093	0,8238	0,7505	0,9088	0,9417	0,7631
Run 6	-3,333	0,7587	0,8362	0,7713	0,9187	0,95	0,7833
Run 7	-4,337E-19	0,8	0,8464	0,7889	0,9271	0,9572	0,8033
Run 8	3,333	0,8348	0,855	0,8038	0,9342	0,9636	0,8235
Run 9	6,667	0,8641	0,8621	0,8164	0,9403	0,9691	0,8439
Run 10	10	0,8889	0,868	0,8272	0,9455	0,9739	0,8642

Parametric Table: eta isen tevap variable

	to	etaisen ₇₁₇₁	etaisen ₇₁₇₂	etaisen ₁₃₄₁	etaisen ₁₃₄₂	etaisen ₄₁₀	etaisen ₇₄₄
Run 1	-20	0,5049	0,5938	0,5996	0,4404	0,5281	0,6352
Run 2	-16,67	0,6034	0,6251	0,626	0,4822	0,5679	0,6522
Run 3	-13,33	0,6746	0,6496	0,6402	0,521	0,6046	0,664
Run 4	-10	0,728	0,6678	0,646	0,5561	0,638	0,6728
Run 5	-6,667	0,7688	0,6801	0,6459	0,5871	0,6677	0,6801
Run 6	-3,333	0,8003	0,6865	0,642	0,6132	0,6932	0,6866
Run 7	-4,337E-19	0,8244	0,6872	0,6352	0,6341	0,7141	0,6926
Run 8	3,333	0,8424	0,6822	0,6265	0,6491	0,7297	0,6979
Run 9	6,667	0,8548	0,6713	0,6163	0,6576	0,7396	0,702
Run 10	10	0,8619	0,6545	0,6046	0,6592	0,7431	0,7042

Parametric Table: COP tcond variable

	tc	COP ₇₁₇₁	COP ₇₁₇₂	COP ₁₃₄₁	COP ₁₃₄₂	COP ₄₁₀	COP ₇₄₄
Run 1	35	6,557	4,91	4,363	4,939	5,434	1,796
Run 2	37,22	6,109	4,648	4,102	4,63	5,042	2,061
Run 3	39,44	5,707	4,401	3,864	4,334	4,669	2,204
Run 4	41,67	5,343	4,167	3,644	4,052	4,316	2,257
Run 5	43,89	5,014	3,946	3,441	3,782	3,98	2,248
Run 6	46,11	4,714	3,736	3,253	3,525	3,662	2,196
Run 7	48,33	4,442	3,537	3,076	3,281	3,36	2,118
Run 8	50,56	4,193	3,347	2,91	3,048	3,074	2,027
Run 9	52,78	3,965	3,165	2,753	2,827	2,803	1,935
Run 10	55	3,757	2,991	2,604	2,617	2,547	1,851

Parametric Table: eta vol tcond variable

	tc	η_{7171}	η_{7172}	η_{1341}	η_{1342}	η_{410}	η_{744}
Run 1	35	0,9086	0,9028	0,861	0,9719	1,004	0,8644
Run 2	37,22	0,9004	0,8981	0,8543	0,9679	1	0,8507
Run 3	39,44	0,892	0,8928	0,8473	0,9635	0,9957	0,8372
Run 4	41,67	0,8834	0,8868	0,84	0,9587	0,9907	0,824
Run 5	43,89	0,8747	0,8802	0,8325	0,9535	0,9851	0,8111
Run 6	46,11	0,8658	0,8729	0,8247	0,948	0,9789	0,7985
Run 7	48,33	0,8568	0,865	0,8166	0,9421	0,972	0,7862
Run 8	50,56	0,8478	0,8565	0,8083	0,9358	0,9645	0,7741
Run 9	52,78	0,8387	0,8473	0,7997	0,9292	0,9564	0,7624
Run 10	55	0,8296	0,8375	0,7909	0,9221	0,9476	0,7509

Parametric Table: eta isen tcond variable

	tc	etaisen₇₁₇₁	etaisen₇₁₇₂	etaisen₁₃₄₁	etaisen₁₃₄₂	etaisen₄₁₀	etaisen₇₄₄
Run 1	35	0,8205	0,6145	0,5517	0,6245	0,7357	0,7017
Run 2	37,22	0,8284	0,6302	0,5648	0,6375	0,7459	0,702
Run 3	39,44	0,8346	0,6436	0,5769	0,6471	0,7522	0,7007
Run 4	41,67	0,8394	0,6546	0,588	0,6537	0,7547	0,6982
Run 5	43,89	0,8431	0,6635	0,5981	0,6573	0,7537	0,6949
Run 6	46,11	0,8459	0,6703	0,6074	0,6583	0,7495	0,6909
Run 7	48,33	0,8481	0,6751	0,6158	0,6568	0,7425	0,6864
Run 8	50,56	0,8497	0,678	0,6234	0,653	0,7328	0,6813
Run 9	52,78	0,8509	0,6791	0,6302	0,6472	0,7208	0,6757
Run 10	55	0,8519	0,6784	0,6362	0,6394	0,7066	0,6697