2.37 CFC-114(R114)

All equations for CFC-114(R114) are based on the Table from Japanese Association of Refrigeration [1].

2.37.1 Temperature Scale

International practical temperature scale 1968 (IPTS-1968)

2.37.2 The Names of Substance, Library File and Single Shot Program

Name of Substance:	CFC-114, R114, Refrigerant 114, Freon 114, 1,2-Dichlorotetra-fluoroethane
Library File for UNIX:	libjr114.a
Library File for DOS,Windows95/NT:	JR114.LIB
Single Shot Program for UNIX:	r114-ss
Single Shot Program for DOS,Windows95/NT:	R114–SS.EXE

2.37.3 Important Constants and Others

Molecular Formula:	$CC\ell F_2CC\ell F_2$
Relative Molecular Mass:	170.922
Gas Constant:	48.6445 J/(kg·K)

Critical Constants:

Critical Pressure:	3.248×10^{6}Pa (32.48 bar)
Critical Temperature:	418.78 K (145.63 °C)
Critical Specific Volume:	$1.7361\times10^{-3}m^3/kg$

Reference State:

At 0°C, 1.0000 kJ/(kg·K) and 200.00 kJ/kg are assigned to the specific entropy and the specific enthalpy of saturated liquid, respectively.

2.37.4 Formula

Equation of State:

Equation (II·2·1) in a function from of $Z = Z(\rho, T)$ in reference [1]. Here Z=compressibility, ρ=density and T= temperature.

Vapor Pressure:

Equation (II·2·18) in reference [1].

Properties at Vapor-Liquid Equilibrium:

saturated liquid: Equations (II·2·3), (II·2·8), (II·2·15) and (II·2·19) for specific volume, specific enthalpy, specific entropy and isobaric specific heat, respectively.

saturated vapor: Equations (II·2·18) and (II·2·1) for specific volume (II·2·18) and (II·2·6) for specific enthalpy and (II·2·25) for isobaric specific heat. Equation (II·2·30) for isochoric specific heat.

All of these equations have been cited from reference [1].

Transport Properties:

Equations (II·3·6) and (II·3·1) in reference [1] for thermal conductivity and dynamic viscosity of saturated liquid, respectively. However the 1st term in the right hand side of (II·3·1) has been corrected as $635392/T^2$. Equations (II·3·8) and (II·3·3) in reference [1] for thermal conductivity of vapor and dynamic viscosity at the

atmospheric pressure, respectively. Equations (II·3·4) in reference [1] for dynamic viscosity of superheated vapor.

The Other Properties:
Equation (II·2·38) in reference [1] for surface tension.

References

[1] Japanese Association of Refrigeration, Thermophysical Properties of Refrigerants (R114, 1,2-Dichlorotetrafluoroethane), (1986).

Table II–2.37–1 CFC-114 (R114) Function

No.	Name of Function	Function and Argument(s)	Range of Argument(s)
1	AIPPT(P,T)		
94	AJTPT(P,T)		
8A	AKPD(P)		
8B	AKPDD(P)		
82	AKPT(P,T)	AKPT: Isentropic Exponent [–] P∗: Pressure [Pa], [bar] T∗: Temperature [K], [°C]	$1.369\times10^3 \le P \le PST(310K)$ [Pa] $TSP(P) \le T \le 510$ [K] $PST(310K) < P \le 11\times10^6$ [Pa] $TPV(P,0.7\times10^{-3}m^3/kg) \le T \le 510$ [K] $0.01369 \le P \le PST(36.85°C)$ [bar] $TSP(P) \le T \le 236.85$ [°C] $PST(36.85°C) < P \le 110$ [bar] $TPV(P,0.7\times10^{-3}m^3/kg) \le T \le 236.85$ [°C] see Fig.II-2.37-1
8C	AKTD(T)		
8D	AKTDD(T)		
2	ALAPP(P)	ALAPP: Laplace Coefficient [m] P∗: Pressure [Pa], [bar]	$1.369\times10^3 \le P < 3.248\times10^6$ [Pa] $0.01369 \le P < 32.48$ [bar]
3	ALAPT(T)	ALAPT: Laplace Coefficient [m] T∗: Temperature [K], [°C]	$200 \le T < 418.78$ [K] $-73.15 \le T < 145.63$ [°C]
4	ALHP(P)	ALHP: Latent Heat of Vaporization [J/kg] P∗: Pressure [Pa], [bar]	$1.369\times10^3 \le P \le 3.248\times10^6$ [Pa] $0.01369 \le P \le 32.48$ [bar]
5	ALHT(T)	ALHT: Latent Heat of Vaporization [J/kg] T∗: Temperature [K], [°C]	$200 \le T \le 418.78$ [K] $-73.15 \le T \le 145.63$ [°C]
6	ALMPD(P)	ALMPD: Thermal Conductivity of Saturated Liquid [W/(m·K)] P∗: Pressure [Pa], [bar]	$1.369\times10^3 \le P \le 1.889\times10^6$ [Pa] $0.01369 \le P \le 18.89$ [bar]
7	ALMPDD(P)	ALMPDD: Thermal Conductivity of Saturated Vapor [W/(m·K)] T∗: Temperature [K], [°C]	$1.637\times105 \le P \le 2.111\times10^6$ [Pa] $1.637 \le P \le 21.11$ [bar]
8	ALMPT(P,T)	ALMPT: Thermal Conductivity at Ordinary Pressure [W/(m·K)] P∗: Pressure [Pa], [bar] T∗: Temperature [K], [°C]	P=Dummy $290 \le T \le 394$ [K] $0.85 \le T \le 120.85$ [°C]
9	ALMTD(T)	ALMTD: Thermal Conductivity of Saturated Liquid [W/(m·K)] T∗: Temperature [K], [°C]	$180 \le T \le 388$ [K] $-53.15 \le T \le 114.85$ [°C]
10	ALMTDD(T)	ALMTDD: Thermal Conductivity of Saturated Vapor [W/(m·K)] T∗: Temperature [K], [°C]	$290 \le T \le 394$ [K] $16.85 \le T \le 120.85$ [°C]
11	AMUPD(P)	AMUPD: Coefficient of Viscosity of Saturated Liquid [Pa·s] P∗: Pressure [Pa], [bar]	$PST(210K) \le P \le PST(398K)$ [Pa] ($\sim2.96\times10^3$) ($\sim2.269\times10^6$) $PST(-63.15°C) \le P \le PST(124.85°C)$ (~0.0296) (~22.69) [bar]
12	AMUPDD(P)		
13	AMUPT(P,T)	AMUPT: Coefficient of Viscosity [Pa·s] P∗: Pressure [Pa], [bar] T∗: Temperature [K], [°C]	$0.1\times10^6 \le P \le 4.4\times10^6$ [Pa] $298.15 \le T \le 473.15$ [K] $3.3333\times10^{-3} < V(P,T)$ [m^3/kg] $1.0 \le P \le 44$ [bar] $25 \le T \le 200$ [°C]

Table II–2.37–1 CFC-114 (R114) Function (cont'd)

No.	Name of Function	Function and Argument(s)	Range of Argument(s)
14	AMUTD(T)	AMUTD: Coefficient of Viscosity of Saturated Liquid [Pa·s] T∗: Temperature [K], [°C]	210≤T≤398 [K] −63.15≤T≤124.85 [°C]
15	AMUTDD(T)		
92	BPPT(P,T)		
90	BSPT(P,T)		
91	BTPT(P,T)		
93	BVPT(P,T)		
16	CPPD(P)	CPPD: Isobaric Specific Heat of Saturated Liquid [J/(kg·K)] P∗: Pressure [Pa], [bar]	1.369×10^3≤P≤0.2×10^6 [Pa] 0.01369≤P≤2 [bar]
17	CPPDD(P)	CPPDD: Isobaric Specific Heat of Saturated Vapor [J/(kg·K)] P∗: Pressure [Pa], [bar]	1.369×10^3≤P<3.248×10^6 [Pa] 0.01369≤P<32.48 [bar]
18	CPPT(P,T)	CPPT: Isobaric Specific Heat [J/(kg·K)] P∗: Pressure [Pa], [bar] T∗: Temperature [K], [°C]	1.369×10^3≤P≤PST(310K) [Pa] TSP(P)≤T≤510 [K] PST(310K)<P≤11×10^6 [Pa] TPV(P,0.7×10^{-3}m^3/kg) ≤T≤510 [K] 0.01369≤P≤PST(36.85°C) [bar] TSP(P)≤T≤236.85 [°C] PST(36.85°C)<P≤110 [bar] TPV(P,0.7×10^{-3}m^3/kg) ≤T≤236.85 [°C] see Fig.II-2.37-1
19	CPTD(T)	CPTD: Isobaric Specific Heat of Saturated Liquid [J/(kg·K)] T∗: Temperature [K], [°C]	182≤T≤296 [K] −91.15≤T≤22.85 [°C]
20	CPTDD(T)	CPTDD: Isobaric Specific Heat of Saturated Vapor [J/(kg·K)] T∗: Temperature [K], [°C]	200≤T≤418.78 [K] −73.15≤T≤145.63 [°C]
21	CRP('A')	CRP: Critical Constants H: 'A'='H': 0.3829×10^6 [J/kg] Specific Enthalpy P∗: 'A'='P': 3.248×10^6 [Pa], 32.48 [bar] Pressure S: 'A'='S': 1.512×10^3 [J/(kg·K)] Specific Entropy T∗: 'A'='T': 418.78[K], 145.63 [°C] Temperature V: 'A'='V': 1.7361×10^{-3} [m^3/kg] Specific Volume	one of 'H', 'P', 'S', 'T' and 'V'
7A	CVPD(P)		
76	CVPDD(P)	CVPDD: Isochoric Specific Heat of Saturated Vapor [J/(kg·K)] P∗: Pressure [Pa], [bar]	1.369×10^3≤P≤3.248×10^6 [Pa] 0.01369≤P≤32.48 [bar]
77	CVPT(P,T)	CVPT: Isochoric Specific Heat [J/(kg·K)] P∗: Pressure [Pa], [bar] T∗: Temperature [K], [°C]	1.369×10^3≤P≤PST(310K) [Pa] TSP(P)≤T≤510 [K] PST(310K)<P≤11×10^6 [Pa] TPV(P,0.7×10^{-3}m^3/kg) ≤T≤510 [K] 0.01369≤P≤PST(36.85°C) [bar] TSP(P)≤T≤236.85 [°C] PST(36.85°C)<P≤110 [bar] TPV(P,0.7×10^{-3}m^3/kg) ≤T≤236.85 [°C] see Fig.II-2.37-1
7B	CVTD(T)		
78	CVTDD(T)	CVTDD: Isochoric Specific Heat of Saturated Vapor [J/(kg·K)] T∗: Temperature [K], [°C]	200≤T≤418.78 [K] −73.15≤T≤145.63 [°C]

Table II–2.37–1 CFC-114 (R114) Function (cont'd)

No.	Name of Function	Function and Argument(s)	Range of Argument(s)
2A	EPSPD(P)		
2B	EPSPDD(P)		
22	EPSPT(P,T)		
2C	EPSTD(T)		
2D	EPSTDD(T)		
89	FC('A')	FC: Fundamental Constants M: 'A'='M': 170.922 Relative Molecular Mass R: 'A'='R': 48.6445 [J/(kg·K)] Gas Constant	one of 'M' and 'R'
9A	GAMPD(P)		
96	GAMPDD(P)		
95	GAMPT(P,T)		
9B	GAMTD(T)		
97	GAMTDD(T)		
23	HPD(P)	HPD: Specific Enthalpy of Saturated Liquid [J/kg] P∗: Pressure [Pa], [bar]	$1.369\times10^3\leq P\leq3.248\times10^6$ [Pa] $0.01369\leq P\leq32.48$ [bar]
24	HPDD(P)	HPDD: Specific Enthalpy of Saturated Vapor [J/kg] P∗: Pressure [Pa], [bar]	$1.369\times10^3\leq P\leq3.248\times10^6$ [Pa] $0.01369\leq P\leq32.48$ [bar]
71	HPS(P,S)	HPS: Specific Enthalpy [J/kg] P∗: Pressure [Pa], [bar] S: Specific Entropy [J/(kg·K)]	$1.369\times10^3\leq P\leq11\times10^6$ [Pa] $0.01369\leq P\leq110$ [bar] see Fig.II-2.37-4 for S
25	HPT(P,T)	HPT: Specific Enthalpy [J/kg] P∗: Pressure [Pa], [bar] T∗: Temperature [K], [°C]	$1.369\times10^3\leq P\leq11\times10^6$ [Pa] $200\leq T\leq510$ [K] $0.01369\leq P\leq110$ [bar] $-73.15\leq T\leq236.85$ [°C] see Fig.II-2.37-1
26	HPX(P,X)	HPX: Specific Enthalpy of Mixture [J/kg] P∗: Pressure [Pa], [bar] X: Dryness Fraction [–]	$1.369\times10^3\leq P\leq3.248\times10^6$ [Pa] $0.01369\leq P\leq32.48$ [bar] $0\leq X\leq1.0$ [–]
27	HTD(T)	HTD: Specific Enthalpy of Saturated Liquid [J/kg] T∗: Temperature [K], [°C]	$200\leq T\leq418.78$ [K] $-73.15\leq T\leq145.63$ [°C]
28	HTDD(T)	HTDD: Specific Enthalpy of Saturated Vapor [J/kg] T∗: Temperature [K], [°C]	$200\leq T\leq418.78$ [K] $-73.15\leq T\leq145.63$ [°C]
29	HTX(T,X)	HTX: Specific Enthalpy of Mixture [J/kg] T∗: Temperature [K], [°C] X: Dryness Fraction [–]	$200\leq T\leq418.78$ [K] $-73.15\leq T\leq145.63$ [°C] $0\leq X\leq1.0$ [–]
84	IDENTF('A')	IDENTF: CHARACTER TYPE FUNCTION for Package Identification (Length 20) C: 'A'='C': 'CCLF2CCLF2' Molecular Formula S: 'A'='S': 'CFC-114(R114)' Name of Substance V: 'A'='V': '10.1' Version Number	one of 'C', 'S' and 'V'
66	PLDT(T)		
68	PMLT(T)		
85	PRPD(P)	PRPD: Prandtl Number of Saturated Liquid [–] P∗: Pressure [Pa], [bar]	$2.96\times10^3\leq P\leq1.889\times10^6$ [Pa] $0.0296\leq P\leq18.89$ [bar]
86	PRPDD(P)		
81	PRPT(P,T)	PRPT: Prandtl Number at Ordinary Pressure [–] P∗: Pressure [Pa], [bar] T∗: Temperature [K], [°C]	P=Dummy $290\leq T\leq394$ [K] $0.85\leq T\leq120.85$ [°C]
87	PRTD(T)	PRTD: Prandtl Number of Saturated Liquid [–] T∗: Temperature [K], [°C]	$210\leq T\leq388$ [K] $-63.15\leq T\leq114.85$ [°C]
88	PRTDD(T)		
99	PSBT(T)		
30	PST(T)	PST∗: Saturation Pressure [Pa], [bar] T∗: Temperature [K], [°C]	$200\leq T\leq418.78$ [K] $-73.15\leq T\leq145.63$ [°C]

Table II–2.37–1 CFC-114 (R114) Function (cont'd)

No.	Name of Function	Function and Argument(s)	Range of Argument(s)
72	PSTD(T)		
73	PSTDD(T)		
31	SIGP(P)	SIGP: Surface Tension [N/m] P∗: Pressure [Pa], [bar]	PST(180K)≤P≤3.248×10^6 [Pa] ($\sim1.0\times10^3$) PST(−93.15 °C)≤P≤32.48 [bar] ($\sim$0.01)
32	SIGT(T)	SIGT: Surface Tension [N/m] T∗: Temperature [K], [°C]	180≤T≤418.78 [K] −93.15≤T≤145.63 [°C]
33	SPD(P)	SPD: Specific Entropy of Saturated Liquid [J/(kg·K)] P∗: Pressure [Pa], [bar]	1.369×10^3≤P≤3.248×10^6 [Pa] 0.01369≤P≤32.48 [bar]
34	SPDD(P)	SPDD: Specific Entropy of Saturated Vapor [J/(kg·K)] P∗: Pressure [Pa], [bar]	1.369×10^3≤P≤3.248×10^6 [Pa] 0.01369≤P≤32.48 [bar]
35	SPT(P,T)	SPT: Specific Entropy [J/(kg·K)] P∗: Pressure [Pa], [bar] T∗: Temperature [K], [°C]	1.369×10^3≤P≤11×10^6 [Pa] 200≤T≤510 [K] 0.01369≤P≤110 [bar] −73.15≤T≤236.85 [°C] see Fig.II-2.37-1
36	SPX(P,X)	SPX: Specific Entropy of Mixture [J/(kg·K)] P∗: Pressure [Pa], [bar] X: Dryness Fraction [–]	1.369×10^3≤P≤3.248×10^6 [Pa] 0.01369≤P≤32.48 [bar] 0≤X≤1.0 [–]
37	STD(T)	STD: Specific Entropy of Saturated Liquid [J/(kg·K)] T∗: Temperature [K], [°C]	200≤T≤418.78 [K] −73.15≤T≤145.63 [°C]
38	STDD(T)	STDD: Specific Entropy of Saturated Vapor [J/(kg·K)] T∗: Temperature [K], [°C]	200≤T≤418.78 [K] −73.15≤T≤145.63 [°C]
39	STX(T,X)	STX: Specific Entropy of Mixture [J/(kg·K)] T∗: Temperature [K], [°C] X: Dryness Fraction [–]	200≤T≤418.78 [K] −73.15≤T≤145.63 [°C] 0≤X≤1.0 [–]
67	TLDP(P)		
69	TMLP(P)		
64	TPH(P,H)	TPH∗: Temperature [K], [°C] P∗: Pressure [Pa], [bar] H: Specific Enthalpy [J/kg]	1.369×10^3≤P≤11×10^6 [Pa] 0.01369≤P≤110 [bar] see Fig.II-2.37-3 for H
6H	TPH2(P,H)		
65	TPS(P,S)	TPS∗: Temperature [K], [°C] P∗: Pressure [Pa], [bar] S: Specific Entropy [J/(kg·K)]	1.369×10^3≤P≤11×10^6 [Pa] 0.01369≤P≤110 [bar] see Fig.II-2.37-4 for S
6S	TPS2(P,S)		
98	TPSEUP(P)		
70	TPV(P,V)	TPV∗: Temperature [K], [°C] P∗: Pressure [Pa], [bar] V: Specific Volume [m^3/kg]	1.369×10^3≤P≤PST(310K) [Pa] VPD(P)≤V≤VPT(P,510 K) [m^3/kg] PST(310K)<P≤11×10^6 [Pa] 0.705×10^{-3}≤V≤VPT(P,510K) [m^3/kg] 11×10^6<P≤21×10^6 [Pa] 0.705×10^{-3}≤V≤VPT(P,430K) [m^3/kg] 0.01369≤P≤PST(36.85°C) [bar] VPD(P)≤V≤VPT(P,236.85°C) [m^3/kg] PST(36.85°C)<P≤110 [bar] 0.705×10^{-3}≤V≤ VPT(P,236.85°C) [m^3/kg] 110<P≤210 [bar] 0.705×10^{-3}≤V≤ VPT(P,156.85°C) [m^3/kg]
41	TRPL('A')		

Table II–2.37–1 CFC-114 (R114) Function (cont'd)

No.	Name of Function	Function and Argument(s)	Range of Argument(s)
100	TSBP(P)		
40	TSP(P)	TSP∗: Saturation Temperature [K], [°C] P∗: Pressure [Pa], [bar]	$1.369\times10^3 \le P \le 3.248\times10^6$ [Pa] $0.01369 \le P \le 32.48$ [bar]
74	TSPD(P)		
75	TSPDD(P)		
42	UPD(P)	UPD: Specific Internal Energy of Saturated Liquid [J/kg] P∗: Pressure [Pa], [bar]	$1.369\times10^3 \le P \le 3.248\times10^6$ [Pa] $0.01369 \le P \le 32.48$ [bar]
43	UPDD(P)	UPDD: Specific Internal Energy of Saturated Vapor [J/kg] P∗: Pressure [Pa], [bar]	$1.369\times10^3 \le P \le 3.248\times10^6$ [Pa] $0.01369 \le P \le 32.48$ [bar]
79	UPS(P,S)	UPS: Specific Internal Energy [J/kg] P∗: Pressure [Pa], [bar] S: Specific Entropy [J/(kg·K)]	$1.369\times10^3 \le P \le 11\times10^6$ [Pa] $0.01369 \le P \le 110$ [bar] see Fig.II-2.37-4 for S
44	UPT(P,T)	UPT: Specific Internal Energy [J/kg] P∗: Pressure [Pa], [bar] T∗: Temperature [K], [°C]	$1.369\times10^3 \le P \le 11\times10^6$ [Pa] $200 \le T \le 510$ [K] $0.01369 \le P \le 110$ [bar] $-73.15 \le T \le 236.85$ [°C] see Fig.II-2.37-1
45	UPX(P,X)	UPX: Specific Internal Energy of Mixture [J/kg] P∗: Pressure [Pa], [bar] X: Dryness Fraction [–]	$1.369\times10^3 \le P \le 3.248\times10^6$ [Pa] $0.01369 \le P \le 32.48$ [bar] $0 \le X \le 1.0$ [–]
46	UTD(T)	UTD: Specific Internal Energy of Saturated Liquid [J/kg] T∗: Temperature [K], [°C]	$200 \le T \le 418.78$ [K] $-73.15 \le T \le 145.63$ [°C]
47	UTDD(T)	UTDD: Specific Internal Energy of Saturated Vapor [J/kg] T∗: Temperature [K], [°C]	$200 \le T \le 418.78$ [K] $-73.15 \le T \le 145.63$ [°C]
48	UTX(T,X)	UTX: Specific Internal Energy of Mixture [J/kg] T∗: Temperature [K], [°C] X: Dryness Fraction [–]	$200 \le T \le 418.78$ [K] $-73.15 \le T \le 145.63$ [°C] $0 \le X \le 1.0$ [–]
49	VPD(P)	VPD: Specific Volume of Saturated Liquid [m^3/kg] P∗: Pressure [Pa], [bar]	$1.369\times10^3 \le P \le 3.248\times10^6$ [Pa] $0.01369 \le P \le 32.48$ [bar]
50	VPDD(P)	VPDD: Specific Volume of Saturated Vapor [m^3/kg] P∗: Pressure [Pa], [bar]	$1.369\times10^3 \le P \le 3.248\times10^6$ [Pa] $0.01369 \le P \le 32.48$ [bar]
80	VPS(P,S)	VPS: Specific Volume [m^3/kg] P∗: Pressure [Pa], [bar] S: Specific Entropy [J/(kg·K)]	$1.369\times10^3 \le P \le 11\times10^6$ [Pa] $0.01369 \le P \le 110$ [bar] see Fig.II-2.37-4 for S
51	VPT(P,T)	VPT: Specific Volume [m^3/kg] P∗: Pressure [Pa], [bar] T∗: Temperature [K], [°C]	$1.369\times10^3 \le P \le 21\times10^6$ [Pa] $200 \le T \le 510$ [K] $0.01369 \le P \le 210$ [bar] $-73.15 \le T \le 236.85$ [°C] see Fig.II-2.37-2
52	VPX(P,X)	VPX: Specific Volume of Mixture [m^3/kg] P∗: Pressure [Pa], [bar] X: Dryness Fraction [–]	$1.369\times10^3 \le P \le 3.248\times10^6$ [Pa] $0.01369 \le P \le 32.48$ [bar] $0 \le X \le 1.0$ [–]
53	VTD(T)	VTD: Specific Volume of Saturated Liquid [m^3/kg] T∗: Temperature [K], [°C]	$200 \le T \le 418.78$ [K] $-73.15 \le T \le 145.63$ [°C]
54	VTDD(T)	VTDD: Specific Volume of Saturated Vapor [m^3/kg] T∗: Temperature [K], [°C]	$200 \le T \le 418.78$ [K] $-73.15 \le T \le 145.63$ [°C]
55	VTX(T,X)	VTX: Specific Volume of Mixture [m^3/kg] T∗: Temperature [K], [°C] X: Dryness Fraction [–]	$200 \le T \le 418.78$ [K] $-73.15 \le T \le 145.63$ [°C] $0 \le X \le 1.0$ [–]

Table II–2.37–1 CFC-114 (R114) Function (cont'd)

No.	Name of Function	Function and Argument(s)	Range of Argument(s)
8E	WPD(P)		
8F	WPDD(P)		
83	WPT(P,T)	WPT: Velocity of Sound [m/s] P∗: Pressure [Pa], [bar] T∗: Temperature [K], [°C]	$1.369\times10^3\leq P\leq PST(310K)$ [Pa] $TSP(P)\leq T\leq510$ [K] $PST(310K)<P\leq11\times10^6$ [Pa] $TPV(P,0.7\times10^{-3}m^3/kg)\leq T\leq510$ [K] $0.01369\leq P\leq PST(36.85°C)$ [bar] $TSP(P)\leq T\leq236.85$ [°C] $PST(36.85°C)<P\leq110$ [bar] $TPV(P,0.7\times10^{-3}m^3/kg)\leq T\leq236.85$ [°C] see Fig.II-2.37-1
8G	WTD(T)		
8H	WTDD(T)		
56	XPH(P,H)	XPH: Dryness Fraction [–] P∗: Pressure [Pa], [bar] H: Specific Enthalpy of Mixture [J/kg]	$1.369\times10^3\leq P<3.248\times10^6$ [Pa] $0.01369\leq P<32.48$ [bar] $HPD(P)\leq H\leq HPDD(P)$ [J/kg]
57	XPS(P,S)	XPS: Dryness Fraction [–] P∗: Pressure [Pa], [bar] S: Specific Entropy of Mixture [J/(kg·K)]	$1.369\times10^3\leq P<3.248\times10^6$ [Pa] $0.01369\leq P<32.48$ [bar] $SPD(P)\leq S\leq SPDD(P)$ [J/(kg·K)]
58	XPU(P,U)	XPU: Dryness Fraction [–] P∗: Pressure [Pa], [bar] U: Specific Internal Energy of Mixture [J/kg]	$1.369\times10^3\leq P<3.248\times10^6$ [Pa] $0.01369\leq P<32.48$ [bar] $UPD(P)\leq U\leq UPDD(P)$ [J/kg]
59	XPV(P,V)	XPV: Dryness Fraction [–] P∗: Pressure [Pa], [bar] V: Specific Volume of Mixture [m^3/kg]	$1.369\times10^3\leq P<3.248\times10^6$ [Pa] $0.01369\leq P<32.48$ [bar] $VPD(P)\leq V\leq VPDD(P)$ [m^3/kg]
60	XTH(T,H)	XTH: Dryness Fraction [–] T∗: Temperature [K], [°C] H: Specific Enthalpy of Mixture [J/kg]	$200\leq T<418.78$ [K] $-73.15\leq T<145.63$ [°C] $HTD(T)\leq H\leq HTDD(T)$ [J/kg]
61	XTS(T,S)	XTS: Dryness Fraction [–] T∗: Temperature [K], [°C] S: Specific Entropy of Mixture [J/(kg·K)]	$200\leq T<418.78$ [K] $-73.15\leq T<145.63$ [°C] $STD(T)\leq S\leq STDD(T)$ [J/(kg·K)]
62	XTU(T,U)	XTU: Dryness Fraction [–] T∗: Temperature [K], [°C] U: Specific Internal Energy of Mixture [J/kg]	$200\leq T<418.78$ [K] $-73.15\leq T<145.63$ [°C] $UTD(T)\leq U\leq UTDD(T)$ [J/kg]
63	XTV(T,V)	XTV: Dryness Fraction [–] T∗: Temperature [K], [°C] V: Specific Volume of Mixture [m^3/kg]	$200\leq T<418.78$ [K] $-73.15\leq T<145.63$ [°C] $VTD(T)\leq V\leq VTDD(T)$ [m^3/kg]

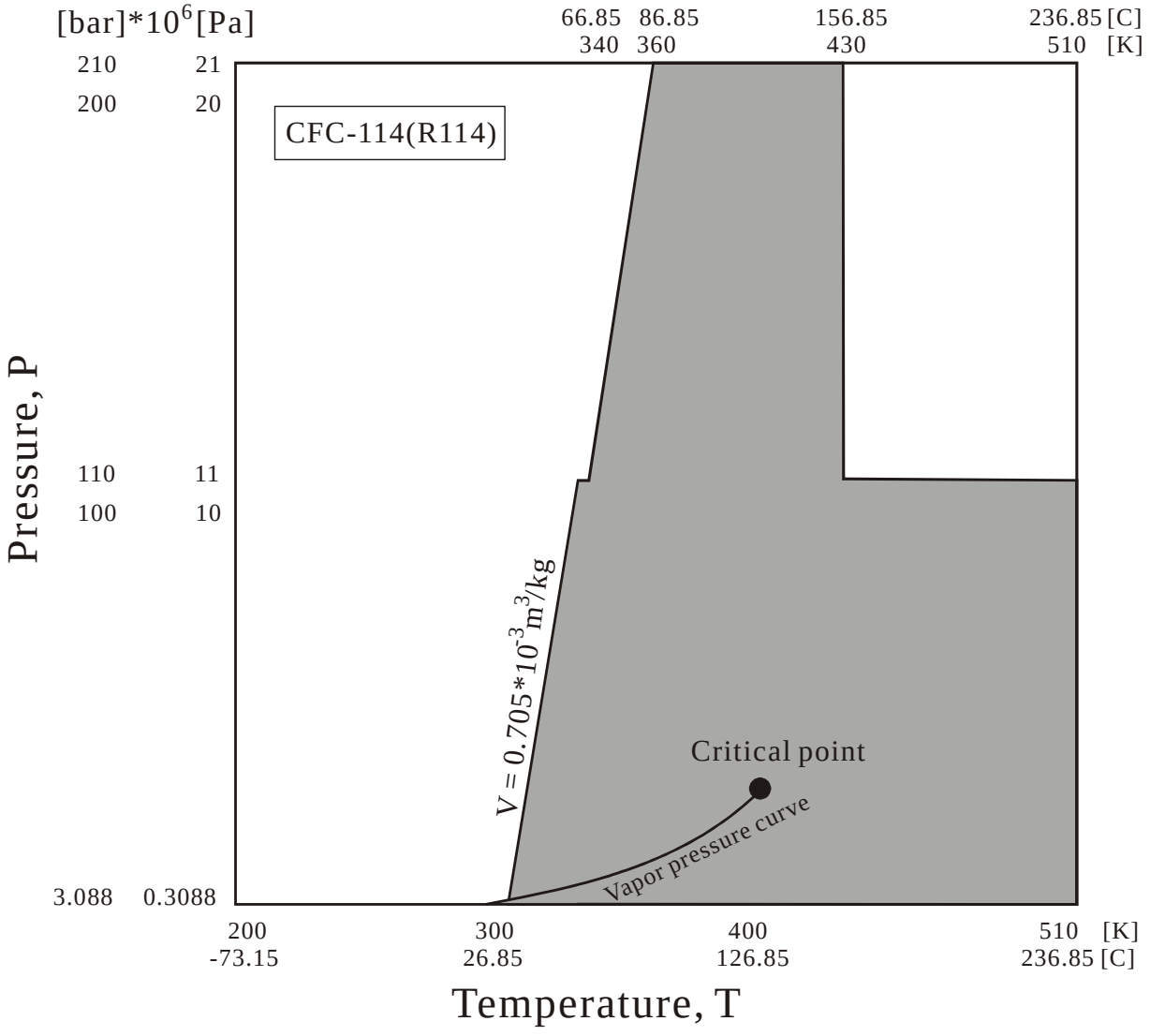

Fig.II–2.37–2 Range of Arguments(P,T) for VPT(P,T).

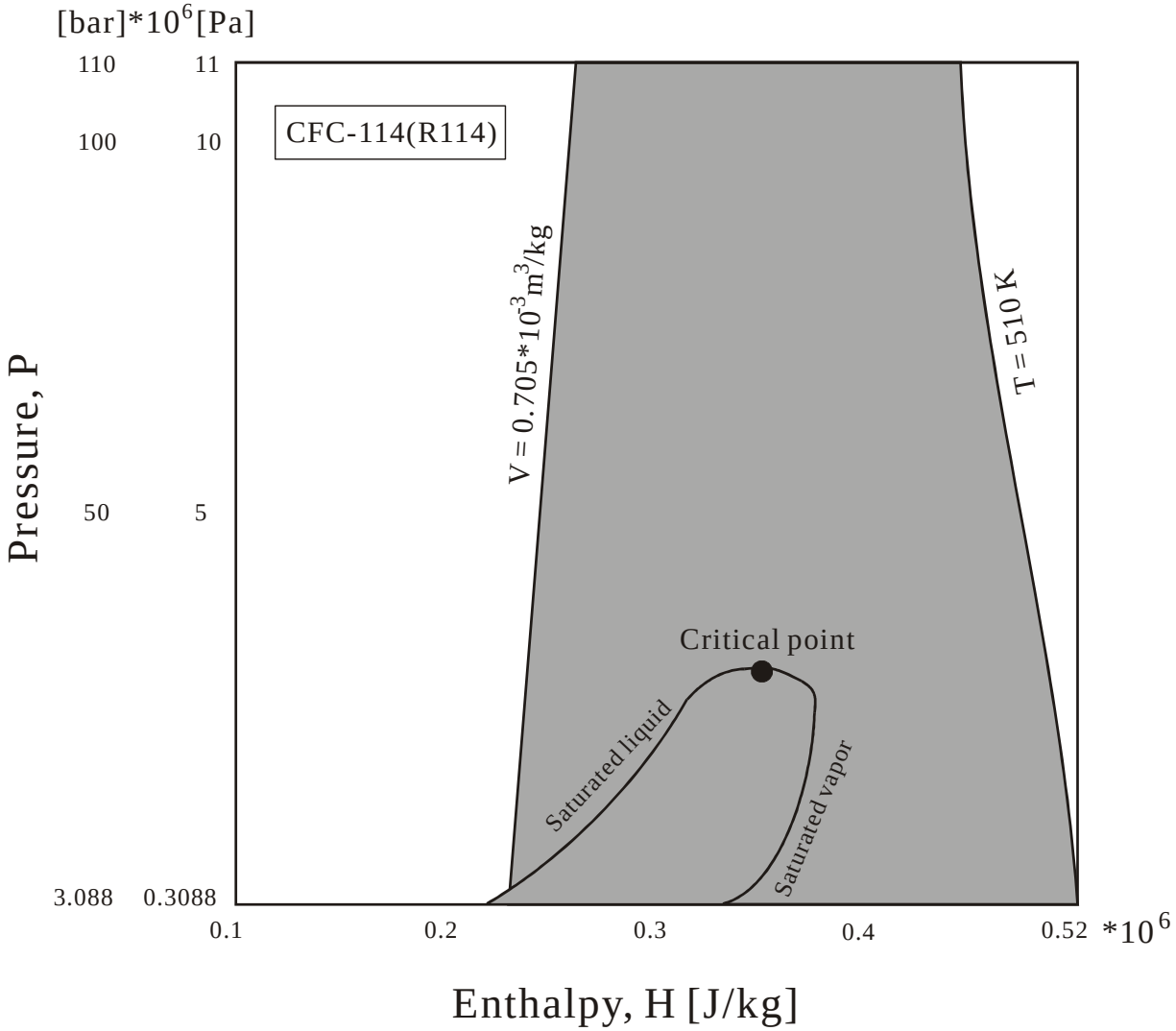

Fig.II–2.37–3 Range of Arguments(P,H) for TPH(P,H).

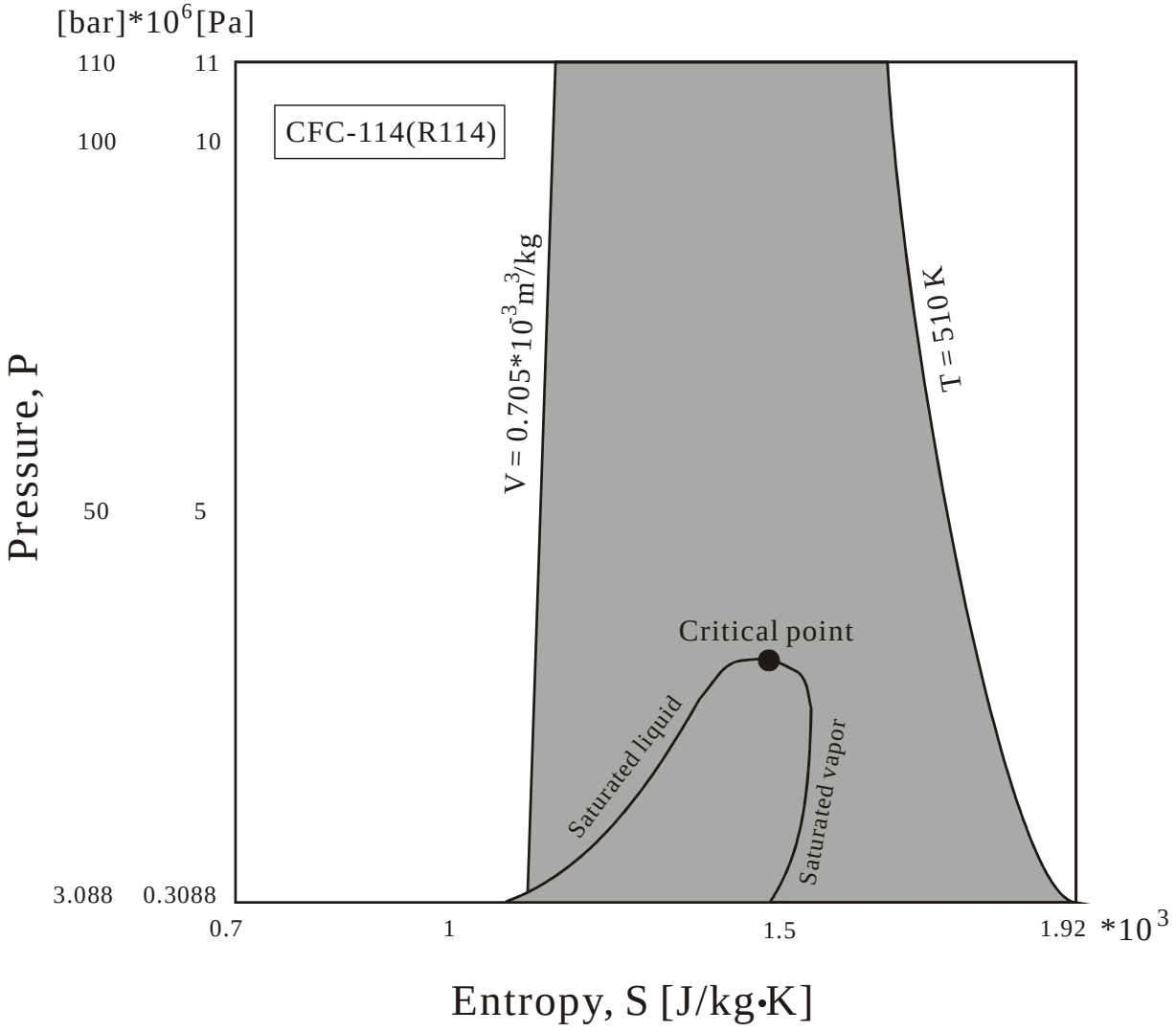

Fig.II–2.37–4 Range of Arguments(P,S) for HPS(P,S),TPS(P,S),UPS(P,S) and VPS(P,S).