Klea® 134a Data Sheet – British Units

Klea® 134a Is 1,1,1,2-Tetrafluoroethane CF_3CH_2F

Klea® 134a has been thoroughly tested in a wide range of toxicological studies. The results have shown that Klea® 134a possesses extremely low toxicity and that it will be at least as safe in use as the materials that it replaces. Mexichem recommends an occupational exposure limit of 1000 ppm as an 8 hour time-weighted average. For information on the properties and safe handling of Klea® 134a, please refer to the Material Safety Data Sheet supplied with the product or available upon request. Further details of toxicity tests and their results will also be given, if required.

Physical Property Data for Klea® 134a

Property		Units	Value
Molecular Weight			102.03
Density (LIQ)	(70°F)	lb/cu ft	76.255
Boiling Point (14.7psia)		°F	-15.196
Pour Point		°F	
Viscosity (LIQ)	(70°F)	lb/ft.h	0.531
Surface Tension	(68°F)	lbf/in	4.91E-05
Vapor Pressure	(70°F)	psia	85.43
Refractive Index (LIQ)			
Specific Heat - Liquid	(70°F)	Btu/lb.R	0.336
Specific Heat - ideal gas	(70°F)	Btu/lb.R	0.197
Critical Temperature		°F	213.8
Critical Pressure	(70°F)	psia	588.1
Latent Heat Vaporization	(70°F)	Btu/lb	77.735
Thermal Conductivity (LIQ 70°F)		Btu/ft.h.R	0.05507
Trouton's Constant		Btu/lb.R	0.20978
Acentric Factor			0.3256
Coeff. Vol. Therm. Exp. (LIQ, 40-80°F)		$°F^{-1}$	0.001605
Purity	%wt		99.98
Solubility in Water (68°F, 14.7psia)	%wt		0.0773
Melting Point		°F	-149.8
Viscosity (vapor)	(70°F)	lb/ft.h	0.0335
Thermal Cond (sat vapor)	(70°F)	Btu/ft.h.R	7.74E-03
Critical Density		lb/cu ft	31.785

Standard States
Enthalpy (-40°F, liquid = 0 Btu/lb.)
Entropy (-40°F, liquid = 0 Btu/lb.R)

Equation of State (Martin-Hou)

$$Pr = \frac{RT}{V-B} + \sum_{i=1,4} \frac{(Ai + BiTr + Ci \exp(-KT))}{(V-B)^{(i+1)}}$$

Tr = T/Tc, P = P/Pc, V = V/Vc
R = 3.82821
B = 0.2124913803
K = 7.250023581
Tc, Pc, Vc = 673.47 (R), 588.137 (psia), 0.031461 (cu ft/lb)

A1, B1, C1 =-10.729649406, 5.0713498381,-467.15522467
A2, B2, C2= 14.034313767,-8.6811368103,-679.27189635
A3, B3, C3 = -11.321632367, 8.0404407351, 1661.953119
A4, B4, C4 = 3.201606791, -2.3711553933, -620.50640774
Applicable Range: 0-400 psia, 0-180 R superheat

Extended Antoine Equation

$$Ln(P) = A + \frac{B}{C + T} + DT + ELn(T)$$

P = Vapor pressure psia
T = Temperature R

A = 137.70925
B = -10374.28
C = 0
D = 0.0169203
E = -19.55224

Latent Heat Vaporization

$DH_{vap} = A + Bx + Cx^2 + Dx^3 + Ex^4$
Where $x = (1-(T/Tc))^{(1/3)}$

A = 0
B = 96.73608
C = 83.646037
D = -61.47253
E = 24.738317

T = Temperature R
T_c = Crit. Temperature R

DH_{vap}=Btu/lb

Ideal Gas Heat Capacity

$Cp(ideal) = A + B*T + C*T^2 + D*T^3 + E/T^2$

A = 0.034369
B = 3.98764E-4
C = -2.11294E-7
D =7.29480E-11
E = 0

T = Temperature R
d_{vap} = lb/cu ft

Cp(ideal)Btu/lb.R

Saturated Liquid Enthalpy

$h_{liq} = A + Bx + Cx^2 + Dx^3 + Ex^4$
where $x = (1-(T/Tc))^{(1/3)}$

A = 103.96852
B = -51.99068
C = 25.005281
D = -262.6082
E = 71.650154

T = Temperature R
T_c = Critical Temperature R
H_{liq} = Btu/lb

Liquid Density

$D_{liq} = A + Bx + Cx^2 + Dx^3 + Ex^4$
Where $x = (1 - (T/Tc))^{(1/3)}$

A = 31785.106
B = 56334.986
C = 39772.604
D = -31482.95
E = 25955.364

T = Temperature R
T_c = Critical Temperature R
d_{liq} = lb/cu ft

Liquid Viscosity

$Ln\ (\mu)_{liquid} = A + B/T + CT^2 + D/T^3$

A = -5.90347
B = 4193.58
C = -954391
D = 1.12281E+8

T = Temperature R
μ_{liquid} = lb/ft.h

Liquid Thermal Conductivity

$K_{(liquid)} = A + Bx + Cx^2 + DX^3$

A = 2.65879E-2
B = 3.08511E-2
C = -6.96048E-2
D = 1.400742E-1

T = Temperature R
Tc = Critical Temperature R
K_{liq} = Btu/ft.h.R

Saturated Vapor Density

$D_{vapor} = A + Bx + Cx^2 + Dx^3 + Ex^4$
Where $x = (1-(T/Tc))^{(1/3)}$

-60 TO +120°F
A = -25.16056
B = 312.32035
C = -934.7086
D = 1070.705
E = -426.477

T = Temperature R
Tc = Critical Temperature R
d_{vap} = lb/cu ft

+ 120 TO 214°F
A = 28.433009
B = -30.82937
C = -108.6244
D =184.61046
E = -69.19287

Vapor Viscosity (Sat Vapor)

$\mu_{vapor} = A + BT + CT^2 + DT^3$

A = -0.120667
B = 8.38591E-4
C =-1.653842E-6
D =1.170777E-9

T = Temperature R
μ_{vap} = lb/ft.h

Vapor Thermal Conductivity (Sat Vapor)

$K_{(gas)} = A + BT + CT^2 + DT^3$

A = -7.28289E-3
B = 3.507797E-5
C = -2861984E-8
D =3.007995E-11

T = Temperature R
K_{gas} = Btu/ft.h.r

The data presented here represents a combination of measurements and estimation. Mexichem does not guarantee its accuracy and reserves the right to update the information in the future, in light of the best available knowledge at the time.

The contents of this note are given in good faith but without any liability attaching to Mexichem and it is the user's responsibility to satisfy himself that the product is entirely suitable for his purpose. Freedom from rights must not be assumed.

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Refrigerants

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