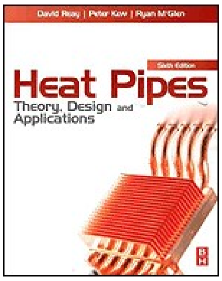

Heat Pipes: Theory, Design and Applications, Sixth Edition

by D.A. Reay, P.A. Kew and R.J. McGlen

Nomenclature

A_c
: circumferential flow area

A_w
: Wick cross-sectional area

C_p
: specific heat of vapour, constant pressure

C_v
: specific heat of vapour, constant volume

D
: sphere density in Blake–Kozeny equation

H
: constant in the Ramsey–Shields–Eotvös equation

J
: 4.18 J/g mechanical equivalent of heat

K
: Wick permeability

L
: enthalpy of vaporisation or latent heat of vaporisation

M
: molecular weight

M
: Mach number

M
: figure of merit

N
: number of grooves or channels

Nu
: Nusselt number

Pr
: Prandtl number

P
: pressure

ΔP
: pressure difference

$\Delta P_{c\,max}$
: maximum capillary head

ΔP_1
: pressure drop in the liquid

ΔP_v
: pressure drop in the vapour

ΔP_g
: pressure drop due to gravity

Q
: quantity of heat

R
: radius of curvature of liquid surface

R_o
: universal gas constant=8.3×10^3 J/K kg mol

Re
: Reynolds number

Re_r
: radial Reynolds number

Re_b
: a bubble Reynolds number

S
: volume flow per second

T
: absolute temperature

T_c
: critical temperature

T_v
: vapour temperature

ΔT_s
: superheat temperature

T_w
: heated surface temperature

V
: volume

V_c
: volume of condenser

V_R
: volume of gas reservoir

We
: Weber number

a
: groove width

a
: radius of tube

b
: constant in the Hagen–Poiseuille equation

c
: velocity of sound

d_a
: artery diameter

d_w
: wire diameter

f
: force

g
: acceleration due to gravity

g
: heat flux

g_c
: Rohsenhow correlation

h
: capillary height, artery height, coefficient of heat transfer

k
: Boltzmanns constant=1.38×10^{-23} J/K

k_w
: Wick thermal conductivity − k_s solid phase, k_l liquid phase

l
: length of heat pipe section defined by subscripts, Section 2.3.4

l_{eff}
: effective length of heat pipe

m
: mass

m
: mass of molecule

m
: mass flow

n
: number of molecules per unit volume

r
: radius

r
: radial co-ordinate

r_e
: radius in the evaporator section

r_c
: radius in the condensing section

r_H
: hydraulic radius

r_v
: radius of vapour space

r_w
: Wick radius

u
: radial velocity

υ
: axial velocity

y
: co-ordinate

z
: co-ordinate

α
: heat transfer coefficient

β
: defined as $(1+k_s/k_l)/(1-k_s/k_l)$

δ
: constant in Hsu formula – thermal layer thickness

ε
: fractional voidage

θ
: contact angle

φ
: inclination of heat pipe

φ_c
: function of channel aspect ratio

λ
: characteristic dimension of liquid–vapour interface

μ
: viscosity

μ_l
: dynamic viscosity of liquid

μ_v
: dynamic viscosity of vapour

γ
: ratio of specific heats

ρ
: density

ρ_l
: density of liquid

ρ_v
: density of vapour

σ
: σ_{LV} used for surface energy where there is no ambiguity

σ_{SL}
: surface energy between solid and liquid

σ_{LV}
: surface energy between liquid and vapour

σ_{SV}
: surface energy between solid and vapour

Other notations are as defined in the text.