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Nomenclature

C_p	Specific heat (kJ/kgK)
D	Pipe diameter (m)
$\dot{E}$	Energy loss rate (kW)
$\dot{E}x$	Exergy rate (kW)
ex	Specific exergy (kJ/kg)
EUF	Effective utilization factor
f	Friction factor
h	Specific enthalpy (kJ/kg)
h^0	Specific enthalpy at the reference state (kJ/kg)
$\dot{I}$	Irreversibility rate (kW)
LHV	Lower heating value (kJ/kg)
M	Molecular weight (kg/kmol)
$\dot{m}$	Mass flow rate (kg/s)
N	No of feed water heater, Nitrogen
n	Molar coefficients of products and reactants (kmol/100 kg of fuel)
p	Pressure (bar)
p_0	Reference pressure (bar)
$\dot{Q}$	Heat load rate (kW)
R	Universal gas constant (8.314 kJ/kmol.K)
Re	Reynolds number
s	Specific entropy (kJ/kgK)
s^0	Specific entropy at the reference state (kJ/kgK)
t	Temperature (°C)
T	Temperature (K)
T_0	Reference temperature (K)
W	Specific work (kJ/kg)
$\dot{W}$	Power (kW)
X	Concentration (kg LiBr/kg solution)
y	Mole fraction

Y	Mass fraction

Greek Letters

ε	Pipe roughness height (m)
ρ	Density (kg/m^3)
ν	Kinematic viscosity (m^2/s)
ω	Specific humidity (kg of water vapor/kg of dry air)
η_s	Isentropic efficiency (%)
η_I	Energy efficiency (%)
η_{II}	Exergy efficiency (%)
η_{SP}	Solution pump efficiency (%)

Subscripts

a	Air
A	Absorber
AC	Air conditioning
BFP	Boiler feed pump
C	VARS condenser
ch	Chemical
COP	Coefficient of performance
COMP	Compressor
CS	Combined system
CT	Cooling tower
CTP	Cooling tower pump
CWH	Closed water heater
db	Dry bulb
E	Evaporator
ExV	Expansion valve
f	Fuel or saturated liquid water
fg	Flue gas
G	Generator

HPG	High pressure generator
i	Inlet
LPG	Low pressure generator
MC	Mixing chamber
o	Outlet
OWH	Open water heater
PCC	Power cycle condenser
r	Refrigerant
RS	Refrigeration system
RSC	Refrigeration system condenser
s	Isentropic/steam
SHE	Solution heat exchanger
SP	Solution pump
ss	Strong solution
ST	Steam turbine
tm	Thermo-mechanical
w	Water, water vapor
ws	Weak solution

Abbreviations

AC	Air conditioning
AEHRS	Absorption–ejector hybrid refrigeration system
AFR	Air flow rate (kg/s)
AFC	Alkaline fuel cell
ANN	Artificial neural network
ARS	Absorption refrigeration system
BCHP	Building cooling, heating and power
BFP	Boiler feed pump
BP	Boiler pressure (bar)
CFC	Chlorofluorocarbon
CHP	Combined heat and power
CL	Cooling load
COP	Coefficient of performance
CPC	Combined power and cooling
CT	Cooling tower
CTP	Cooling tower pump
CS	Combined system
CWH	Closed water heater
DBT	Dry bulb temperature
DMFC	Direct methanol fuel cell
EAC	Equivalent annual cost
ERS	Ejector refrigeration system
ExV	Expansion valve
EUF	Energy utilization factor
FC	Fuel cell
FFR	Fuel flow rate (kg/s)
FWH	Feed water heater
GCRS	Gas cycle refrigeration system
GWP	Global warming potential
GT	Gas turbine
HAT	Humid air turbine

HC	Hydro carbon
HCFC	Hydro fluorocarbon
HP	High pressure
HPG	High pressure generator
HRSG	Heat recovery steam generator
ICE	Internal combustion engine
LP	Low pressure
LPG	Low pressure generator
MC	Mixing chamber
MCFC	Molten carbonate fuel cell
MGT	Micro gas turbine
ODP	Ozone depletion potential
ORC	Organic Rankine cycle
OWH	Open water heater
PC	Power cycle
PCC	Power cycle condenser
PCFC	Protonic ceramic fuel cell
PEMFC	Proton exchange membrane fuel cell
PER	Primary energy ratio
PMFC	Phosphoric acid fuel cell
PWV	Present worth value
RH	Relative humidity(%)
RRVPC	Reheat regenerative vapour power cycle
RS	Refrigeration system
RSC	Refrigeration system condenser
SAFC	Sulfuric acid fuel cell
SER	Steam extraction rate (kg/s)
SFEE	Steady flow energy equation
SGR	Steam generation rate (kg/s)
SHE	Solution heat exchanger
SOFC	Solid oxide fuel cell
SP	Solution pump

STIG	Steam injected gas turbine
STIT	Steam turbine inlet temperature (^oC)
ST	Steam turbine
TIT	Turbine inlet temperature (^oC)
TOR	Tones of refrigeration
TTD	Terminal temperature difference (^oC)
VARS	Vapour absorption refrigeration system
VCRS	Vapour compression refrigeration system
VMETS	Variable mass energy transformation and storage
VPC	Vapour power cycle