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LIST OF ABBREVIATIONS AND SYMBOLS

List of abbreviations

Abbreviations	Descriptions
BIS	Bureau of Indian Standards
MBFS	Multifunctional Biomass Fuelled Stove
PAH	Parallel Flow Air Preheater
PHE	Parallel Flow Flue Gas Heat Extractor
RAH	Radial Flow Air Preheater
SHE	Spiral Flow Flue Gas Heat Extractor
SHTM	Steady State Heat Transfer Model
WBT	Water Boiling Test

List of symbols

Symbols	Descriptions
A	Area
a	Carbon in fuel, Air
B	Breadth, Length of PHE or PAH
b	Hydrogen in fuel
c	Nitrogen in fuel
C	Carbon
c_p	Specific heat
$C_{s,f}$	Constant depending on combination of pot material and fluid
D	Diameter
d	Oxygen in fuel
D_h	Hydraulic diameter
exp	Exponential
F	View factor, Carbon dioxide in flue gas
f	Friction factor
g	Acceleration due to gravity
h	Convective heat transfer coefficient
h_{fg}	Heat of vaporization
H	Hydrogen, Height
I	Nitrogen in flue gas
K_R	Radiation coefficient
k	Thermal conductivity
L	Length, Flow path length, Fin height, Lost
M	Mass flow rate
m	Mass
$\dot{m}$	Burn rate
n	Number of moles, Coefficients depending on combination of water and pot material, Number
N	Nitrogen, Fins, Data values

Symbols	Descriptions
Nu	Nusselt number
NCV	Net calorific value
O	Oxygen
o	Opacity coefficient
P	Perimeter
p	Pitch
Pr	Prandtl number
Q	Heat
Q''	Energy per unit volume
$Q_B^{"}$	Heat flux
q_{ig}	Heat flux at ignition front
r	Radius
Re	Reynold's number
Re_c	Critical Reynolds number
R_t	Resistance
S	Standard deviation
T	Temperature
t	Thickness
T_e	Excess temperature
U	Overall heat transfer coefficient
V	Velocity
W	Width
w_{ig}	Ignition front velocity
x	Thickness, Excess air percentage, Data
y_m	Moisture content

Greek Symbols

Symbols	Descriptions
ψ	Excess air

Symbols	Descriptions
ε	Bed void, Emissivity
ρ	Density
∞	Ambient, Initial
σ	Stefan Boltzmann constant, Standard error
μ	Dynamic viscosity
λ	Latent heat of vaporization
β	Aspect ratio
η	Efficiency
θ	Log mean temperature difference
Δ	Difference

Superscripts

Symbols	Descriptions
k	Flame opacity coefficient
n	Constant depending on combination of pot material and fluid
o	Flame opacity coefficient
x	Flame thickness

Subscripts

Symbols	Descriptions
a	Air, Component
an	Annular space
b	Breadthwise, Bulk, Base, Boiling, component
bcc	Fuel bed to combustion chamber
bp	Fuel bed to pot bottom
bx	Bed to excess air
c	Cross-sectional
cc	Combustion chamber
co	Connector channel

Symbols	Descriptions
com	Combustion
cond	Conduction
conv	Convection
evap	Evaporated
f	Flame, Fuel, Fin, Fluid
fb	Fuel bed
fc	Fixed carbon
fg	Flue gas
fp	Flow path
fr	Flame on annular ring
ft	Flame top
fuel	Fuel
g	Air flux, gap
HE	Heat extractors
i	Initial, Gas component, Internal, Inlet
ig	Ignition
l	Liquid, Lengthwise
lb	Lower bed
max	Maximum
mc	Moisture content
min	Minimum
n	Number of components
o	Outer, Overall, Outlet
oc	Outer cover
p	Pot, Particles, Plate
pa_fb	Primary air through fuel bed
pb	Pot bottom
r	Annular ring
rad	Radiation
RAH	Radial flow air pre-heater

Symbols	Descriptions
RD	Rectangular duct
s	Supplied, Surface, Spacing
sat	Saturated
SHE	Spiral Heat Extractor
t	Turns, Total, Array area
tb	Top bed
th	Theoretical
total	Total
U	Utilized
UC	Upper chamber
v	Vapor
vol	Volatiles
w	Water, Wall
x	Excess air
1 to 31	Position, Components