NOMENCLATURE

a – thermal diffusivity; absorptivity;

B – velocity-profile constant; particle relative concentration; dimensionless complex;

c – specific heat;

c_f – coefficient of aerodynamic drag of particles;

D – channel diameter; diffusion coefficient;

d – diameter;

E – electric-field strength; radiation density; energy spectrum of turbulence;

F – force; surface area;

f – shape factor; frequency; focal distance;

G – flowrate; radial temperature distribution;

g – acceleration of gravity;

H – height of reactor;

I – intensity of radiation; dimensionless particle mass flux;

j – particle mass flux density; emissivity;

K – transport coefficients; Gasterstädt coefficient; overall heat transfer coefficient; acceleration parameter;

K^* – flow-through number; thermal accommodation factor;

k – correction factors; adiabatic exponent; coefficient of particle interaction with radiation; turbulent kinetic energy;

L – reference dimension; length in direction of flow;

l – molecular mean free path; radiation wavelength; flow-cell size;

M – moment of force; Mach number;

m – mass; coefficient;

N – number of particles; number of transfer units; power;

n – rotational frequency; index of refraction; normal to a surface;

P – thermal resistance; volumetric radiation density;

p – pressure;

Q – heat flux;

q – heat flux density; charge of particle;

R – dimensionless radius; correlation coefficient;
r – radius;
S – shearing-rate tensor; distance between two points;
s – entropy;
T – temperature; time scale;
U – dimensionless velocity;
u – velocity;
V – volume, dimensionless transverse velocity;
v – transverse velocity;
v_{ff} – terminal setting velocity (free fall);
v^* – friction velocity;
W – flow heat capacity rate; dimensionless relative velocity;
w – relative velocity;
X – dimensionless coordinate;
x – coordinate;
Y – shift; dimensionless coordinate;
y – transverse coordinate;
Z – heat capacity rate ratio;
z – coordinate;
α – heat transfer coefficient; amplification factor;
α_β – coefficient of mass transfer in transport of particles;
β – particle concentration by volume;
Γ – strength of vortex;
γ – probability of capture of particles on the wall; scattering function;
Δ – relative thickness of boundary layer;
δ – thickness of boundary layer; scattering-function shape factor;
ε – porosity ($\varepsilon = 1 - \beta$); viscous dissipation of the energy of turbulence; emissivity factor; fouling factor; dimensionless eddy viscosity;
ζ – momentum loss factor;
η – dynamic viscosity; particle collection efficiency; thermodynamic efficiency;
θ – polar angle; relative temperature;
ϑ – excess temperature; dimensionless temperature;
æ – radiation absorption or attenuation factor; contribution of particle to eddy thermal conductivity;
Λ – macroscale of turbulence; dimensionless eddy thermal conductivity;
λ – thermal conductivity; microscale of turbulence; friction factor;
μ – solids loading ratio (solids mass flow rate ratio);
ν – kinematic viscosity;
ξ – flow resistance coefficient;
Π – group of geometric characteristics;
ρ – density; diffraction parameter; distance from point to coordinate origin;
σ – Boltzman constant; tensor of viscous stresses; thermal effectiveness;
τ – time; shear stresses; optical thickness;
τ_{rel} – relaxation time;

Φ – relative contribution of particles to momentum transfer; dimensionless force; light flux;
φ – slip coefficient;
ϕ – angular coordinate;
χ – velocity profile constant; absorption factor; configuration factor;
Ψ – stream function;
ψ – phase shift; nonuniformity coefficient; dimensionless relative velocity; configuration factor;
Ω – albedo; channel cross section;
ω – angular velocity; frequency of fluctuations, solid angle.

SUBSCRIPTS

0 – value in particle-less flow; non-disturbed value; value at start;
i – component corresponding to Cartesian coordinate;
max, min – maximal and minimal values;
a – value on flow axis; adhesion;
r – radial distribution;
R – quantity of radiative nature;
conv – quantity of convective nature;
ce – cell in suspension flow;
c – flow core; circulation;
t – tangential component; quantity of thermal nature;
w – value on the wall;
x – lengthwise local value;
fin – final value;
cr – critical value;
l – local value; layer of deposit;
in – initial value;
opt – optimal value;
f – suspension flow;
inc, *abs*, *res*, *em* – incident, absorbed, resultant and emitted radiant fluxes;
b – boundary layer;
s – solid particle;
imp – impact-related quantity;
sph – sphere;
e – effective or equivalent value; quantity of electrical nature;
* – quantity of turbulent nature; effective value;
' – fluctuating component; inlet value of quantity; ''– exit value of quantity;
$\langle\ \rangle$ – averaging;
$\bar{}$ – averaged by volume;
D – diffusion;
v – volume; velocity; vibration;
sl – slip flow regime;
d – drag force; diffraction;

int – internal;
ext – external;
mol – molecular;
inj – injection;
lim – limiting;
n – normal;
sed – sedimentation;
T – turbulent;
M – modified value;
act – actual;
g – gravity;
ac – acceleration;
st – stabilized; steady;
fr – friction; flow rate;
sh – shear;
j – jet;
un – unsteady;
rot – rotation;
Σ – resultant value;
id – ideal;
ap – aperture;
red – reduced;
m – melting;
rel – relaxation;
L – laminarization;
noz – nozzle;
sc – scattering;
itc – intercomponent;
d.p – dew point;
g – flue gas;
tu – tube;
sp – specific.