…deling of biomass reactor

A Major Thesis Submitted in

Partial fulfilment of the requirements for the award of the degree of

Master of Engineering

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Thermal Engineering

By

N K Ram

ROLL NO.10233

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Under the Guidance of

Dr. S Maji		Dr. B.B.ARORA

Department of Mechanical Engineering

Delhi College of Engineering

University of Delhi

Session 2006-08

Candidate's Declaration

I hereby declare that the work which being present in the minor thesis entitled **"CFD Modeling of biomass reactor"** in the partial fulfilment for the award of degree of MASTER in ENGINEERING with specialization in ñTHERMAL ENGINEERINGò submitted to Delhi College of Engineering, University of Delhi, is an authentic record of my own work carried out under the supervisions of Dr. B.B.ARORA, and Dr. S Maji Department of Mechanical Engineering Delhi College of Engineering, University of Delhi. I have not submitted the matter in this dissertation for the award of any other Degree or Diploma or any other purpose what so ever.

N K Ram

College Roll No. 4-THR-2006

University Roll No: 10233

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Certificate

This is to certify that the above statement made by N K RAM is true to the best of my knowledge and belief.

Dr. B B ARORA

Assistant Professor

Department of Mechanical Engineering

Delhi College of Engineering

Dr. S Maji

HOD & Professor

Department of Mechanical Engineering

Delhi College of Engineering

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N K Ram

04-THR-06

University Roll No. 10233

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NOMENCLATURE

	d (m/s)
c	concentration (mass/volume, moles/volume)
c_p	heat capacity at constant pressure (J/kg-K)
c_v	heat capacity at constant volume (J/kg-K)
D	mass diffusion coefficient (m^2/s)
D_H	hydraulic diameter (m)
D_{ij}	mass diffusion coefficient (m^2/s)
D_t	turbulent diffusivity (m^2/s)
E	total energy (J)
g	gravitational acceleration (m/s^2)
G	incident radiation
Gr	Grashof number ($L^3.r^2.g.b.DT/m^2$)
H	total enthalpy (W/m^2-K)
h	species enthalpy (W/m^2-K)
J	mass flux; diffusion flux (kg/m^2-s)
k	turbulence kinetic energy (m^2/s^2)
k	thermal conductivity (W/m-K)
m	mass (kg)
M_W	molecular weight (kg/kgmol)
M	Mach number
p	pressure (atm)
Pr	Prandtl number (*n/a*)
q	heat flux
q_r	radiation heat flux
R	universal gas constant
S	source term
Sc	Schmidt number (*n/D*)
t	time (s)
T	temperature (K)
U	mean velocity (m/s)
X	mole fraction (dimensionless)
Y	mass fraction (dimensionless)

Greek letter

b	coefficient of thermal expansion (K^{-1})
e	turbulence dissipation (m^2/s^3)
e_w	wall emissivity
k	von Karman constant
m	dynamics viscosity (kg/m-s)
m_k	turbulent viscosity (kg/m-s)
v	kinematic viscosity (m^2/s)
v'	stoichiometric coefficient of reactant
v"	stoichiometric coefficient of product
r	density (kg/m^3)
r_w	wall reflectivity
s	Stefan-Boltzmann constant
s_s	scattering coefficient
t	stress tensor ($kg/m\text{-}s^2$)

Subscript

i	reactant i
j	product j
r	reaction r