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ACKNOWLEDGEMENTS

Foremost, I would like to express my sincere thanks and gratitude to my supervisor, philosopher, thinker **Dr. Amitesh Kumar** for his patience, motivation and encouragement in completing this Ph.D. research work. His guidance, valuable review, constructive criticism of the manuscript have improved the quality of the research work. I could not imagine a supervisor and mentor better than him for my Ph.D. research work. His positive approach and motivation constantly pushed me to work harder and extract best out of me.

My grateful appreciation also goes to my research progress evaluation committee members **Dr. Jahar Sarkar**, Department of mechanical engineering, IIT (BHU), Varanasi and **Dr. Pabitra Ranjan Maiti**, Department of civil engineering, IIT (BHU), Varanasi. I thank them all for their insightful comments and valuable suggestions during my research work. I also want to thank **Prof. Santosh Kumar**, Head, Department of mechanical engineering, IIT (BHU), Varanasi for providing me the necessary resources to enable me to complete this research work.

I want to thank some more people from IIT (BHU) Varanasi, who are directly or indirectly helped me to complete this work. Among them, I would like to sincerely acknowledge the assistance and motivation provided by Prof. P Shukla, Dr. Om Prakash Singh and Dr. S. S. Mondal. I want to thank my colleagues at IIT (BHU) Varanasi, especially to Prashant Srivastava, Ajeet Pratap Singh, Jitendra Kumar Goel, Akshayveer, Archana Kumari, Amit Kumar, Mayaram Sahu, Deepak Kumar Singh, Rishi Ram, Sri Prakash, Satish Upadhyaya and Jai Prakash for encouraging me to finish this work.

I would like to acknowledge my family members for their constant support during my Ph.D. duration and make me motivated towards my research work.

I would also like to thank the GOD, the almighty, for giving me strength and courage to complete this work.

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List of Symbols and Abbreviations

A	Cross-sectional area of square nozzle (mm^2)
B	Temperature decay rate along downstream locations (x/h)
C_{fw}	Skin friction coefficient
d_t	Diameter of the embedded straightener (mm)
F_θ	Flatness, $\langle \theta^4 \rangle / \langle \theta^2 \rangle^2$
G	Turbulent shear production
h	Nozzle height (mm)
k	Turbulent kinetic energy
l	Nozzle length (mm)
L	Non-dimensional nozzle length (l/h)
n	Velocity decay rate along downstream locations (x/h)
Q	Entrainment rate, $(= \Delta \rho \bar{u} dy dz)$
Ri	Richardson number
Re	Reynolds number $= \left(\frac{u_b h}{\nu} \right)$
S_θ	Skewness, $\langle \theta^3 \rangle / \langle \theta^2 \rangle^{3/2}$
t	Temperature inside the flow domain
t_{jet}	Jet exit temperature ($^{\circ}C$)
T	$\frac{t-t_o}{t_{jet}-t_o}$, Non-dimensional temperature
$\langle t' u'_i \rangle$	Turbulent heat flux
u_b	Bulk mean velocity (m/s)
u_{jet}	Jet exit velocity (m/s)
u_{max}	Local maximum mean velocity (m/s)
x, y, z	Cartesian coordinates
X, Y, Z	Non-dimensional Cartesian coordinates
$\bar{u}, \bar{v}, \bar{w}$	mean velocity components (m/s)
$\langle u'_i u'_j \rangle$	Reynolds shear stresses
y_{max}	Location of maximum velocity at jet centerline plane
$y_{1/2}/h$	Normal distance from the wall where $u(x, y, z) = u_{max}/2$
$y_{t1/2}/h$	Normal distance from the wall where $t(x, y, z) = t_{max}/2$
$z_{1/2}/h$	Lateral distance from the wall where $u(x, y, z) = u_{max}/2$
$z_{t1/2}/h$	Lateral distance from the wall where $t(x, y, z) = t_{max}/2$

Greek symbols

α, α_t	Laminar and turbulent thermal diffusivities, m^2/s
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$\alpha_{t,n}$	Non-dimensional thermal diffusivity
ε	Dissipation of turbulent kinetic energy, m^2/s^3
ν, ν_t	Laminar and turbulent kinematic viscosity respectively, m^2/s
$\sigma_k, \sigma_\varepsilon$	Turbulent model constant
τ_{wall}	Wall shear stress, $\mu \left(\frac{d\bar{u}}{dy} \right)_{y=0}$
μ	Dynamic viscosity
ρ	Density of the fluid (air), kg/m^3
θ'	$< (t - t_{mean})^2 >^{1/2}$
$\sigma_k, \sigma_\varepsilon, \sigma_{1\varepsilon}, \sigma_{2\varepsilon}$	Model constants

Subscript

max	maximum
min	minimum
n	non-dimensional parameters
o	ambient conditions

Acronym and other notations

2D	Two-dimensional
3D	Three-dimensional
BTW	Bottom wall
BW	Back wall
Gr	Grashof number
IR	Infrared
LDA	Laser Doppler Anemometer
LES	Large Eddy Simulation
LS	Launder and Sharma
PDF	Probability density function
PIV	Particle Image Velocimetry
PLIF	Planar laser induced fluorescence
RANS	Reynolds Averaged Navier Stokes
Re	Reynolds number
SW	Sidewall
SWE	Sidewall enclosure
YS	Yang and Shih