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NOMENCLATURE

A_x	cross sectional area of test section [m ²]
C_p	specific heat at constant pressure [J/(kg°C)]
D	tube inside diameter [m]
d	Roughness diameter [m]
f	friction factor, dimensionless
h	Diameter ratio, dimensionless
h_c	convective heat transfer co-efficient [W/m ² °C]
h_x	local convective heat transfer co-efficient [W/m ² °C]
k	thermal conductivity [W/m °C]
L	tube length [m]
\dot{m}	mass flow rate [kg/s]
ΔP	pressure drop along axial length of tube [N/m ²]
P_i	inlet pressure [N/m ²]
P_m	blower power [W]
$P(x)$	pressure at any axial location, x [N/m ²]

Q	heat transfer rate [W]
T_i	inlet temperature [°C]
T_o	outlet temperature [°C]
V	mean velocity in the test section [m/s]
V_i	mean velocity at inlet section [m/s]
W	wetted perimeter [m]
y	Pitch ratio

Dimensionless numbers

Nu	Nu
Pr	Pr
Re	Re

Subscripts

b	bulk
i	inlet
o	outlet
p	tape inserts
s	smooth
x	Local

Greek Symbols

μ	fluid dynamic viscosity, kg/ms.
ρ	density of the fluid, kg/m ³
α	entrance angle of the tape
β_m	average synergy angle
	$= \cos^{-1} \left(\frac{\int \vec{u} \vec{v}_T \cos \beta \, dV}{\int \vec{u} \vec{v}_T \, dV} \right)$