

**Analysis & Redesigning of Watermills for
Sustainable Development of Rural Areas of Uttarakhand**

LIST OF SYMBOLS

T	Torque
N	Speed
P _o	Power output
P _t	Power input
η	Efficiency
ρ	Density
g	Acceleration due to gravity
H	Head available
Q	Discharge
γ	Specific weight
h _f	Head loss due to friction
L	Total length of the pipe
n	Manning constant
D	Diameter of penstock
C ₀	spouting velocity (ideal velocity)
C	Velocity at nozzle outlet
E	Wall thickness of penstock
P ₁	Hydrostatic pressure
σ_f	Allowable tensile strength
d	Outlet nozzle diameter
ϕ	Coefficient of velocity for the nozzle
U	Tangential Speed of Blade
A	Radial width of runner
D _r	Diameter of blade
Z	Number of blade
d _t	Diameter of shaft
t	Yield stress
m	Jet ratio

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N_s Specific speed

Q_u Unit discharge

N_u Unit speed

L_w Length of weir notch