"DESIGN AND EXPERIMENTAL ANALYSIS OF THERMOELECTRIC REFRIGERATOR"

Submitted to Delhi Technological University in Partial Fulfilment of the Requirement for the Award of the Degree of

Master of Technology
In
Mechanical Engineering
With specialization in Renewable Energy Technology

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CERTIFICATE

This is to certify that the project entitled "Design and experimental analysis of thermoelectric refrigerator" being submitted by me, is a bonafide record of my own work carried by me under the guidance and supervision of Prof Dr.R.S Mishra and Dr. Raj Kumar Singh(Associate Professor) in partial fulfillment of requirements for the award of the Degree of Master of Technology in Renewable Energy Technology from Department of Mechanical Engineering, Delhi Technological University, Delhi.

The matter embodied in this project either full or in part have not been submitted to any other institution or University for the award of any other Diploma or Degree or any other purpose what so ever.

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SYMBOLS AND MEANING

Symbols	Meaning	Unit
[redacted]	Peltier heat	J
π_{AB}	Peltier coefficient	
I	Electric current	A
Z	Figure of merit	/K
α	Seebeck coefficient	V/K
ϱ	Electrical resistivity	Ωm
k	Thermal conductivity	W/mK
ΔT_{max}	Maximum temperature when there is no ripple	^oC
ΔT_{max}	Actual maximum temperature difference	^oC
N	Ripple amplitude around average current	m
T_h	Heat sink temperature	^oC
T_c	Cold side temperature of module	^oC
K_m	Module thermal conductance	W/K
R_m	Module resistance	Ω
x_1,x_2,x_3	Thicknesses of mild steel sheet, polyethane and aluminium respectively	m
Q_{co}	Heat transfer per unit area	W/m^2
h_o,h_i	Heat transfer coefficient of air outside and inside chamber respectively	W/m^2k
Q_{INF}	Heat due to infiltration	W
M_w	Mass of water	kg
Cp_w	Specific heat capacity of water	J/kgK
T_{w2},T_{w1}	Initial and final temperature of water	^oC
Q_p	Product load	kJ
Q_T	Total refrigeration load	W
Q_c	Cooling capacity per module	W
V_{IN}	Input voltage	V
P	Electrical power	W
Q_R	Heat rejected	W
C.O.P	Coefficient of performance	

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