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Solar Domestic Hot Water Design and Optimisation in the United Kingdom

Hunt, E.

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The Plymouth Student Scientist University of Plymouth

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Nomenclature

Symbol	Meaning	Unit
Ac	Collector Area	m ²
α	Thermal Diffusivity	m²/s
β	Collector Incidence Angle	°C
β'	Volumetric Coefficient of	1/K
	Expansion	
Cp	Specific Heat Capacity	J/kgK
ΔΤ	Change in Temperature	K
di	Inside Pipe Diameter	m
do	Outside Pipe Diameter	m
δ	Plate Thickness	m
٤	Collector Effectiveness	-
ε _c	Glass Emittance	-
ε _p	Plate Emittance	-
F	Heat Distribution Factors	-
q	Gravitational Constant	N/ka
Gt	Incident Radiation	W
h _{c, p-c}	Convective Heat Transfer	W/m ² K
	Coefficient Plate to Cover	
h _i	Heat Transfer Coefficient Inside	W/m ² K
	Pipe Wall	
ho	Heat Transfer Coefficient Outside	W/m ² K
	Pipe Wall	
h _{r, c-a}	Radiation Heat Transfer Coefficient	W/m ² K
	Cover to Air	
h _{r, p-c}	Radiation Heat Transfer Coefficient	W/m ² K
	Plate to Cover	
hw	Convective Heat Transfer	W/m ² K
	Coefficient Cover to Air	
lt	Solar Irradiance	W/m ²
k	Thermal Conductivity	W/m²K
L	Distance for Plat to Lower Spacing	m
m i	Mass Flow Rate	Kg/s
NTU	Number of Transfer Units	-
Nu	Nusselt Number	-
Pr	Prantle Number	-
Q	Heat Energy Transferred	J
Ra	Rayleigh Number	-
Re	Reynolds Number	-
ρ	Density	kg/m²
S	Solar Energy at Plate	W/m ²
σ	Stefan-Boltzmann Constant	W/m ² K ⁴
Ta, Ts	Ambient Temperature	К
Tc	Cover Temperature	K
Tf	Fluid Temperature at Wall	К
Tp	Plate Temperature	К
μ	Dynamic Viscosity	Pa.s
Ub	Back Loss Coefficient	W/m ² K
Ue	Edge Loss Coefficient	W/m ² K
UL	Top Loss Coefficient	W/m ² K
Uτ	Top Loss Coefficient	W/m ² K
v	Kinematic Viscosity	m²/s