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List of Abbreviations

1. SWH – Solar Water Heater
2. FPC – Flat Plate Collector
3. ETC - Evacuated tube collectors
4. MNRE – Ministry of New and Renewable Energy
5. CPC = Compound Parabolic Collector
6. Q_{lost} = Heat lost by warm water per unit time (W)
7. Q_{gain} = Heat gain by cold water per unit time (W)
8. $\dot{m}$ = Mass flow rate of water (kg/s)
9. C_p = Specific heat of water (kJ/kg °C)
10. ΔT = Change in temperature (°C)
11. $\dot{m}_1$ = Mass flow rate of water flowing at the outlet of the primary storage tank (kg/s)
12. $\dot{m}_2$ = Mass flow rate of water flowing at the outlet of the secondary storage tank (kg/s)
13. $\dot{m}_{DEL}$ = Mass flow rate at the delivery outlet (kg/s)
14. T_p = Water temperature at the outlet of primary storage tank (°C)
15. T_s = Water temperature at the outlet of secondary storage tank (°C)
16. T_{DES} = Desired temperature at the delivery outlet (°C)
17. T_{tank} = Temperature of water inside the tank (°C)
18. T_t = Instantaneous tank water temperature (°C)
19. T_p = Water temperature at the outlet of primary storage tank (°C)
20. T_s = Water temperature at the outlet of secondary storage tank (°C)
21. T_{DEL} = Water temperature at the delivery outlet (°C)
22. Q_u = Useful energy gain per unit time (W)

23. Q_{ab} = Energy absorbed by solar Collector per unit time (W)

24. Q_{loss} = Energy lost per unit time (W)

25. A_c = Area of FPC (m^2)

26. τ_o= Transmittance of solar collector cover

27. α_o = Absorptance of solar collector

28. I_s = Solar insolation (W/m^2)

29. U_L = Collector overall heat loss coefficient (W/m^2)

30. T_a = Ambient temperature (°C)

31. N_u = Nusselt number

32. K = Thermal conductivity (W/m°C)

33. L = Spacing between plate and the cover (m)

34. R_a = Rayleigh number

35. g = Acceleration due to gravity (m/s)

36. β' = Expansion factor

37. T_{cp} =Mean absorber plate temperature (°C)

38. T_g = Mean glass cover temperature (°C)

39. θ = Collector angle of inclination w.r.t horizontal (°)

40. υ= Kinematic viscosity of air (m^2/s)

41. α =Thermal diffusivity (m^2/s)

42. T_f = Average film temperature (°C)

43. h_{1c} = Convective heat transfer coefficient between absorber plate and glass cover (W/m^2 °C)

44. h_{2c} = Convective heat coefficient from the top glazing to the ambient (W/m^2 °C)

45. v = Wind speed (m/s)

46. h_{1r}= Radiative heat transfer coefficient from plate to glass cover (W/m^2 °C)

47. h_{2r} = Radiative heat transfer coefficient from glass cover to ambient (W/m^2 °C)

48. σ = Stefan's constant =5.67 x 10-8 W/m^{2}K^4

49. ε_{eff}= Effective emissivity of plate- glazing system

50. ε_p = Absorber plate emittance

51. ε_g = Glass cover emittance

52. U_b = Bottom loss coefficient (W/m^2 °C)

53. K_{in} = Thermal conductivity of insulation (W/m °c)

54. L_{in} = Thickness of insulation (m)

55. η = Instantaneous efficiency of a solar flat-plate collector

56. Q_i = amount of solar radiated received by collector (W)

57. T_i = Collector water inlet temperature (°C)

58. T_o = Collector outlet temperature (°C)

59. ν = Kinematic Viscosity (m^2/s)

60. α = Thermal diffusivity (m^2/s)

61. T_{DES} (cal) = Calculated value of required temperature at the outlet of the delivery channel (°C)

62. $\dot{m}_2$(cal) = Calculated value of mass flow rate at the outlet of the delivery channel (kg/s)

63. V.P = Valve Position