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NOMENCLATURE

T	temperature, K
T_{sky}	effective sky temperature, K
I_c	solar radiation temperature, W/m^2
q_{rad}	radiation heat transfer between glass and environment, W/m^2
Q	air supply volume, m^3/h
h_1	convection heat transfer coefficient between glass and the environment, W/(m^2·K)
h_2	convection heat transfer coefficient between air flow and absorber plate, and between air flow and cover plate, W/(m^2·K)
h_3	radiation heat transfer coefficient between glass and absorber plate, W/(m^2·K)
h_{hole}	convection heat transfer coefficient when air flows through perforations, W/(m^2·K)
d	air layer thickness, m
e	height of baffle, m
v_f	cross-section air flow velocity in the duct, m/s
v_{app}	head-on air flow speed against the absorber plate, m/s
v_w	outdoor wind speed, m/s
p	aperture ratio
s	baffle interval, m
D D_k	equivalent diameters of the duct and perforations, respectively, m
B	center distance between adjacent pores, m
W	semi-width of air heater, m
H	baffle sections air heater length, m
Re, Nu, Pr	Reynolds number, Nusselt number, and Planck number
F_{gs} F_{gg}	the angular coefficient between glass and sky, and between glass and the ground
ΔP_f	air flow resistance in the air heater, Pa
f	air flow resistance coefficient
C_f	thermal-mechanical energy conversion factor, 0.02
W_p	drought fan power consumption, W
Q_u	effective energy of the air heater, W

Greek symbols

α_g	absorptivity of glass cover plate
α	absorptivity of absorber plate
τ	transmissivity of glass cover plate
λ	heat conduction coefficients, W/(m·K)
ε	emissivity on the surface, W/(m·K)
σ_b	Boltzmann constant
δ	thickness, m
θ	included angle between baffle and heater wall, °
η_{rh}	effective efficiency
η	thermal efficiency

Subscripts

a	ambient
b	absorber plate
g	glass cover plate
f	flow
k	baffle
gnd	ground
in	inlet
out	outlet
m	simulated
s	experimental
1, 2	region 1, region 2