LIST OF ABBREVIATIONS

\( g \): Acceleration due to gravity, \( \text{m/s}^2 \)

\( T_a \): Ambient air temperature, \( ^\circ \text{C} \)

\( A_c \): Collector area, \( \text{m}^2 \)

\( h_w \): Convective heat transfer coefficient from the basin liner to water or vice versa, \( \text{W/m}^2{}^\circ \text{C} \)

\( h_{th} \): Convective heat transfer coefficient from the bottom of insulation to ambient, \( \text{W/m}^2{}^\circ \text{C} \)

\( h \): Convective heat transfer coefficient, \( \text{W/m}^2{}^\circ \text{C} \)

\( F_R \): Collector overall heat removal efficiency factor (dimensionless)

\( I_c \): Critical radiation level (MJ/m\(^2\))

\( H_d \): Daily diffuse radiation on a horizontal surface (MJ/m\(^2\))

\( m_w \): Distillate output, Kg/m\(^2\)/s

\( n \): Day of the year

\( T_g \): Glass cover temperature, \( ^\circ \text{C} \)

\( I \): Hourly global solar radiation incident on a horizontal surface (MJ/m\(^2\))

\( I_d \): Hourly diffuse radiation incident on a horizontal surface (MJ/m\(^2\))

\( I_T \): Hourly total solar radiation incident on a tilted surface (MJ/m\(^2\))

\( \phi \): Latitude of the location

\( m \): Mass flow rate of water, Kg/s

\( M_a \): Mass of the air molecules, Kg/m\(^2\)

\( M_w \): Mass of the vapor (water) molecules, Kg

\( S_g \): Monthly average daily hours of bright sunshine hours (h)

\( S_o \): Monthly average day length (h)
\( T_{\text{max}} \): Maximum Ambient air temperature

\( T_{\text{min}} \): Minimum Ambient air temperature

\( X_c \): Monthly average critical radiation ratio given by

Equation (6.3) (dimensionless)

\( \overline{H_d} \): Monthly average daily diffuse radiation on a horizontal surface (MJ/m\(^2\))

\( \overline{HT} \): Monthly average daily global radiation on a tilted surface (MJ/m\(^2\))

\( H_g \): Monthly average daily global radiation (MJ m\(^2\)d\(^{-1}\))

\( H_o \): Monthly average daily extraterrestrial radiation (MJ m\(^2\)d\(^{-1}\))

\( Nu \): Nusselt Number

\( n \): Number of hours

\( N \): Number of days

\( n_o \): Number of data

\( U_k \): Overall heat transfer of a still, W/m\(^2\)\(\degree\)C

\( h_{rb} \): Radiative heat transfer coefficient from the bottom of insulation to ambient, W/m\(^2\)\(\degree\)C

\( q \): Rate of heat transferred, W/m\(^2\)

\( \overline{R} \): Ratio of monthly average daily global radiation on a tilted surface to that on a horizontal surface (dimensionless)

\( \overline{R_b} \): Ratio of monthly average daily beam radiation on a tilted surface to that on a horizontal surface (dimensionless)

\( \overline{k} \): Ratio of the monthly average daily global radiation on a horizontal surface to the monthly average daily extraterrestrial radiation on horizontal surface (dimensionless)
a, b and c : Regression coefficients
\( R_b \) : Ratio of daily beam radiation on a tilted surface to that on a horizontal surface (dimensionless)
\( R_{b,n} \) : Ratio of beam radiation on a tilted surface to that on a horizontal surface at noon (dimensionless)
\( r_{d,n} \) : Ratio of diffuse radiation at noon to the daily diffuse radiation (dimensionless)
\( R_n \) : Ratio of radiation on a tilted surface to that on a horizontal surface at noon (dimensionless)
\( r_{t,n} \) : Ratio of radiation at noon to the daily total radiation (dimensionless)
\( I_{sc} \) : Solar constant
\( \delta \) : Solar declination
\( \omega_s \) : Sunshine Hour angle
\( P_g \) : Saturated partial vapor pressure at glass surface, N/m\(^2\)
\( P_w \) : Saturated partial vapor pressure at water surface, N/m\(^2\)
\( A_{ss} \) : Sides area of solar still, m\(^2\)
\( T_{sky} \) : Sky temperature, °C
\( I(t) \) : Solar intensity, W/m\(^2\)
\( A_s \) : Solar still basin area, m\(^2\)
\( d_f \) : Spacing between water and glass cover, m
\( C_{pa} \) : Specific heat of air at constant pressure, J/Kg°C
\( C_w \) : Specific heat of water, J/Kg°C
\( T \) : Temperature, °C
\( k_i \) : Thermal conductivity of insulation, W/m°C
\( L_i \) : Thickness of insulation
\( T_w \) : Water temperature, °C
\( V \) : Wind velocity, m/s
Greek

$\beta^1$ : Coefficient of volumetric thermal expansion, $^\circ$C$^{-1}$

$\rho_f$ : Density of vapor, Kg/m$^2$

e$_g$ : Emmisivity of glass cover

e$_w$ : Emmisivity of water surface

$\rho$ : Ground reflectance assumed to be 0.2

$\tau\alpha$ : Monthly average transmittance-absorptance product (dimensionless)

$\omega_s$ : Sunset hour angle on a horizontal surface (degrees)

$\omega_s'$ : Sunset hour angle on a tilted surface (degrees)

$\bar{\phi}$ : Monthly average daily utilizability (dimensionless)

$\bar{\phi}d$ : Monthly average daily utilizability using data expression (6.2) (dimensionless)

$\bar{\phi}k$ : Monthly average daily utilizability using Klein’s expression (6.1) (dimensionless)

$\beta$ : Slope of the collector plane with respect to the horizontal (degrees)

$\sigma$ : Stefan –Boltzman constant ($5.66 \times 10^{-8}$ W/m$^2$K$^4$)

$\eta$ : Thermal efficiency of the system (percentage)

$\mu_f$ : Viscosity of vapor, N.S/m$^2$