



16MEOE1-Solar Energy Utilisation – UNIT II NON CONCENTRATING COLLECTORS Topic - Types and classification of solar collectors

Hent transfer processes and afficiency of a Solar Collector :-

Process imolving:

Conduction convertion

Rodiation

Losses in the flat plato collutor

occurring are: Reflection losses Rephikon Convertion losses conduction losses Insulation Radiation losses wert din thom Diffine Irrochart Hent Radiahan "Conduction "Avoidable Heat Glass cover Absorber





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A fundamental Concept of thermal analys of any thermal system is the conservation of energy, which can be analysed through energy balance Calculation under stendy state Conditions. In standy state, the useful energy output of the collector is the difference between the absorbed solar radiation between the absorbed solar radiation the and the total termal losses from the collector Useful energy = Absorbed Solar energy-Collector Thermal lasses. obisonsly the highes the useful onergy ontput for a particulars design, the highers the expected efficiency. Thermal efficiency of the Collector is an impostant parameter to consider in this kind of analysis as it creates the basis fee compassion of different basis fee and modifications of collector system.

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Efficienty (i) Closed loop Set up for Testing liquid flat plate collectors $\eta_i = \frac{2u}{A_c J_T}$ $\gamma_i = mic_p \left(\frac{T_{Fo} - T_{Fi}}{A_i} \right)$ m - Flind flow rate fi - flind intet temp fo - Flind outlet temp fo - Solar radiation incident on IT - Colar radiation incident - 1-Ta - The ambient temperature Voo - wind speed (ii) Fractuated Tube Collectors $n_i = 0.527 - 1.736 \left(T_{f_i} - T_a \right) / T_{f_i}$ Liter mir the performance and h of Liter mir the performance and h of Specific cellentor depends on the disign Specific cellentor depends on the disign parameters and solar irradiation of the parameters and solar irradiation of the partsental longitude.