

THERMAL ANALYSIS OF COMPOUND PARABOLIC CONCENTRATOR

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ABSTRACT

A mathematical model is constructed by using the thermal properties and thermal mathematical equations. For a particular geometry of a compound parabolic concentrator such as acceptance angle 30° , concentration ratio 2, length 1.6 meter, the thermal efficiency and performance is calculated by using the mathematical model. The solar radiation fall on the compound parabolic concentrator is also calculated. The thermal performance, efficiency and solar radiation is calculated for Patan, Gujarat, India ($23.4^{\circ}N$, $72^{\circ}E$). The effects of air mass flow rate, Wind Velocity and solar radiation on the thermal performance of compound parabolic concentrator is calculated theoretically which is close agreement with experimental data that indicate thermal efficiency increase as mass flow rate increase and gain in temperature decreases. As wind velocity increases, the overall loss coefficient increases so that thermal efficiency decreases.

KEYWORDS: *Compound Parabolic Concentrator (CPC), Flat Receiver, Parabolic Reflector, Thermal Analysis, Efficiency*

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