

Efisiensi rangkaian flat plate Solar thermal collector

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Abstrak

[Efisiensi suatu sistem rangkaian flat plate solar thermal collector dapat dijadikan sebagai pertimbangan dalam optimasi sebuah sistem pemanas air tenaga surya yang sedang dirancang maupun yang sudah berjalan. Penulisan ilmiah ini mengangkat masalah mengenai nilai efisiensi suatu sistem rangkaian seri dan parallel flat plate solar thermal collector yang dihitung dengan dua metode yaitu metode pengujian pada peralatan uji dan metode simulasi komputer. Pengujian dilakukan dengan merangkai 8 panel flat plate solar thermal collector menjadi rangkaian seri dan parallel kemudian diukur temperatur keluaran, radiasi matahari, dan laju aliran massa air. Simulasi komputer menggunakan program komputer Visual Basic 6.0 untuk menghitung radiasi matahari, temperatur keluaran, energi berguna, dan efisiensi. Dari kedua metode tersebut didapatkan nilai efisiensi rangkaian flat plate solar thermal collector. Berdasarkan pengujian didapatkan grafik karakteristik efisiensi dari rangkaian parallel adalah $y = -1.0684x + 0.2884$ dan grafik karakteristik efisiensi dari rangkaian seri adalah $y = -1,2247 x + 0,428$. Sedangkan dari simulasi didapatkan grafik karakteristik efisiensi dari rangkaian parallel adalah $y = -8,1605 + 0,5654$ dan grafik karakteristik efisiensi dari rangkaian seri adalah $y = -8,6055x + 0,6472$. Dari kedua metode tersebut terlihat bahwa terdapat perbedaan nilai karakteristik efisiensi tetapi memiliki trend line yang sama antara keduanya. To optimized a designed flat plate solar water heating system, solar thermal collator's effeciency can be a point of review. This final projetc paper focused on a series and parallel of flat plate solar thermal collector combination based on two methods, experimental and computer's simulation. On experimental testing method, an eight flat plate solar thermal collector was combinated to a series and parallel and the output temperature, sun's radiation, and mass flow rate of the fluid were measured. Computer simulation method based on visual basic 6.0 programming to calculated sun's radiation, output temperature, usefull energy, and efficiency. The experimental result shown parallel efficiency's characteristic graphic, $y = -1,0684 x + 0,2884$, dan series effeciency's characteristics graphic, $y = -1,2247 x + 0, 428$. While the computer simulation result shows the parallel efficiency's characteristic $y = -8,1605 + 0,5654$ and the series efficiency's characteristic $y = - 8,6055 x + 0,6472$, although there was different efficiencies value between two methods, but it shown same trendline, To optimized a designed flat plate solar water heating system, solar thermal collator's effeciency can be a point of review. This final projetc paper focused on a series and parallel of flat plate solar thermal collector combination based on two methods, experimental and computer's simulation. On experimental testing method, an eight flat plate solar thermal collector was combinated to a series and parallel and the output temperature, sun's radiation, and mass flow rate of the fluid were measured. Computer simulation method based on visual basic 6.0 programming to calculated sun's radiation, output temperature, usefull energy, and efficiency. The experimental result shown parallel efficiency's characteristic graphic, $y = -1,0684 x + 0,2884$, dan series effeciency's characteristics graphic, $y = -1,2247 x + 0, 428$. While the computer simulation result shows the parallel efficiency's characteristic $y = -8,1605 + 0,5654$ and the series efficiency's characteristic $y = - 8,6055 x + 0,6472$, although there was different efficiencies value between two methods, but it shown same trendline]