

Sistem Pengujian Unjuk Kerja Solar Termal Kolektor Dengan Standar ASHRAE = Solar Thermal Collector Performance Testing System With ASHRAE Standard

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Abstrak

Penelitian mengenai unjuk kerja solar termal kolektor terus mengalami kemajuan. Telah banyak inovasi dan temuan baru pada berbagai jenis kolektor non concentrating yang menyatakan peningkatan yang cukup signifikan dalam unjuk kerja solar termal kolektor. Oleh karena itu dibutuhkan suatu sistem sebagai fasilitas pengujian unjuk kerja, yang memiliki standar tertentu yang umum. Penelitian ini membahas sistem pengujian dengan standar ASHRAE-93, yaitu meliputi perancangan fasilitas pendukung seperti frame, perhitungan instrumen-instrumen utama, dan pemilihan alat ukur yang sesuai dengan standar. Selanjutnya juga diberikan pembahasan mengenai proses assembling dan validasi alat-alat ukur.

Dilakukan pengujian dengan menggunakan kolektor jenis Evacuated Tube Sollar Collector, yang dipasang di atas gedung MRC FTUI. Pengujian dimulai pukul 09.00 WIB hingga 15.00 WIB dibawah sinar matahari. Data yang diperoleh yaitu temperatur inlet kolektor, temperatur outlet, temperatur ambien dan radiasi matahari setiap sepuluh menit. Diperoleh bahwa efisiensi pada pengujian ini adalah sebesar 50,7 % dengan persamaan garis karakteristik efisiensi $y = -3.1836x + 0.057$.

.....Research on the solar thermal collector performance continues to progress. There have been many innovations and new findings on various types of non-concentrating collectors which state a significant increase in the performance of solar thermal collectors. Therefore, a system is needed as a performance testing facility, which has certain common standards. This study discusses the testing system with the ASHRAE-93 standard, which includes the design of supporting facilities such as frames, calculation of main instruments, and selection of measuring instruments according to standards. Furthermore, it is also given a discussion about the assembling process and validation of measuring instruments.

The test was carried out using the Evacuated Tube Sollar Collector, which is installed on the rooftop of the MRC FTUI building. The experiment was carried out at 09.00 WIB to 15.00 WIB under the sun. The data obtained are collector inlet temperature, collector outlet temperature, ambient temperature and solar radiation every ten minutes. It was found that the efficiency of Evacuated Tube Sollar Collector was 50.7% with the efficiency characteristic line equation $y = -3.1836x + 0.057$.