

Desain dan studi eksperimental silica gel-water adsorption chiller = Design and experimental study of silica gel water adsorption chiller / Andi Taufan

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Abstrak

ABSTRAK

Pendingin adsorpsi merupakan salah satu solusi terkait permasalahan lingkungan oleh pendingin konvensional. Naskah ini mempresentasikan desain terbaru silica gel-water adsorption chiller yang dikembangkan di Departemen Teknik Mesin, Universitas Indonesia. Konfigurasi chiller terdiri atas dua ruang penyerapan dengan menggunakan fin tube heat exchangers sebagai adsorber, kondenser, and evaporator. Chiller diuji pada kondisi temperatur hot water inlet/cooling water inlet/chilled water outlet sebesar 64.4/31/8.9oC. Heat dan mass recovery diadopsi dalam eksperimen untuk meningkatkan kapasitas pendinginan. Waktu proses pendinginan divariasikan untuk memperoleh waktu optimal berkaitan dengan performa. Nilai COP dan kapasitas pendinginan diperoleh sebesar 0.77 dan 3.2 pada saat waktu adsorpsi/mass recovery/heat recovery sebesar 600/40/20 s.

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ABSTRACT

Adsorption chiller is one of the solution related to enviromental issues by conventional refrigeration. This paper presented a new design of silica gel water adsorption chiller that is developed in Mechanical Engineering, Universitas Indonesia. The chiller design configuration is composed of two sorption chambers with compact fin tube heat exchangers as adsorber, condenser, and evaporator. The chiller is tested under typical condition for hot water inlet cooling water inlet chilled water outlet temperatures are 64.4 31 8.9oC, respectively. Heat and mass recovery were adopted in experimen to increase the cooling capacity. The cooling time was variated to obtain the heat recovery optimum time related to the performance. Average value of COP and colling power were obtained 0.77 and 3.2 kW, respectively, at adsorption mass recovery heat recovery time 600 40 20.