Penerapan throtting process dalam pemanfaatan kembali energi panas = Applying throttling process in energy conservation

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Abstrak

Air akan berevaporasi dan berkondensasi pada tempratur dan tekanan tertentu. Tempratur dan tekanan merupakan parameter menunjukan keadaan suatu materi. Materi selalu dalam keadaan awalnya seimbang secara thermal maupun mekanik, memperbesar dan memperkecil parameter-parameter tersebut akan merubah wujud materi tersebut. Materi berwujud gas mempunyai energi jauh lebih besar dari kondisi berwujud cair atau padat. Penyerapan dan pelepasan energi peristiwa dalam proses evaporasi dan kondensasi. Jumlah energi yang diserap selama proses evaporasi equivalent dengan energi yang dilepas selama proses kondensasi. Besar energi tersebut besarnya bergantung pada pada tempratur atau tekanan pada perubahan fase yang terjadi. Pada study ini, disiapkan alat uji yang merupakan miniature dari penguapan dan pengkondensasian air, yang dinamakan alat proses throttling. Pada alat ini yang akan berperan menurunkan tekanan aliran fluida adalah katup expansi (throttling valve). Tekanan dan tempratur air yang masuk pada / lebih besar dari tekanan atmosfir di-throttled melalui katup ekspansi tersebut menjadi bertekanan lebih rendah / vakum sehingga menciptakan temprature jenuhnya juga lebih rendah membuat penguapan lebih banyak. Air yang diinjeksikan kedalam reactor vakum tersebut membentuk partikel cairan dan uap air. Uap yang terbentuk dikondensasikan dengan pendingin sehingga membentuk butiran air. Akumulasi partikel dan uap air yang terbentuk dengan tekanan dan tempratur rendah akan bermanfaat lebih banyak.

Dari simulasi, penggabungan alat throttling ini dengan sistem pembangkit PLTU, dengan pemanfaatan air kondensornya didapatkan peningkatan efisiensi pembangkit yang cukup signifikan. Disamping itu, keuntungan lain yang dihasilkan adalah dapat diproduksinya air sulingan sebesar 117 ton/jam melebihi kebutuhan siklus uap PLTU yang hanya 7 ton/jam.;Water boils and condenses at a specified pressure and temperature. A number of properties such as pressure and temperature are necessary to describe the state of a substance. At the dead state, a system is at the temprature and pressure of its environment in thermal and mechanical equilibrium, to increase and to decrease the properties change the phase of the substance. Molecules in the gas phase are at a cosiderably higher energy level than they are in the liquid or solid phases. Absorbing and releasing energy in event of evaporation and condensation process. More specifically, the amount of energy absorbed during melting is equivalent to the amount of energy released during freezing. Similarly, the amount of energy absorbed during evaporation is equivalent to the amount of energy released during condensation. The magnitudes of the latent heats depend on the temperature or pressure at which the phase change is occuring. On this study, to be prepared the device which is a miniature for evaporating and condensing water. At this device, throttling valve is a kind of flow-restricting device that cause a significant pressure drop in the fluid. The pressure and temperature of water fluid entering and exiting the expansion valve exist on the saturated states, it makes evaporation effectively occured. The fluid injected inside the vacuumed reactor through the expantion valve form liquid and gas particles. The water

gas particles are condensed by refrigerator so that forms a droplet water. Finally, accumulation of water liquid and condensation formed by low pressure and temprature effects beneficial.

In simulation, throttling devices and PLTU vapor power generation integrated which locates at the sea. Sea water used to cool in the condensor, thereafter, the sea water from the outlet of the condensor are throttled into the device. The result of the throttling device is cool water and destilation water. The cooled water is used to replace sea water for cooling the condensor increasing efficiency of the system. Besides, destilation produced is 117 ton/hour whereas it exceed necessary for the PLTU vapor cycle about 7 ton/hour.
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