

격판분리 축열조의 히트펌프 성능개선 효과

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Effect of heat pump performance improvement by use of thermal tank with temperature seperation plate

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This study was carried out in order to estimate the effect of heat pump performance by use of thermal tank with 3 separation plates which were able to divide thermal tank into 3 chambers that have different temperatures levels. For testing the effect of developed thermal tank which was installed for supplying the heat to the paprika greenhouse in Jinju city. The volume of thermal storage tank was designed for 110 m³ which was able to cover 30% of heating capacity. The temperature difference was 3 degree Celcius between high temperature and low temperature when only heating circulation was made from heat pump to thermal tank, but 5.5 degree Celcius difference was made when heating circulation of heat pump to thermal tank and hot water supplying circulation of thermal tank to greenhouse was done simultaneously. As a result of this study showed that COP of heat pump was increased by 15% or more than that of using normal thermal tank because heat pump was able to take 3 ~ 5 degree Celcius lower thermal tank water constantly.

Key words : heat pump(히트펌프), performance improvement(성능개선), thermal tank(축열조), temperature seperation plate(온도분리격판)

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히트펌프에 연계된 공기-물 직접접촉식 열교환기의 성능

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Performance of Air-Water Direct Contact Heat Exchanger Linked to Heat Pump

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Fossil fuel was a major energy resource but the consumption of fossil fuel will decrease gradually because of limited deposits and non-environmental features. In contrast, because the renewable energy resources are infinite and sustainable, their consumption has increased annually. To promote the supply of these infinite natural energy we have to develop more efficient and inexpensive heat recovery system. In this study a simple device was designed as a heat exchanger, that is a direct contact heat exchanger. This heat exchanger was manufactured in cylindrical shape with height of 1,500 mm and diameter of 1,000 mm. To test the efficiency of this heat exchanger, it was connected to the evaporator of heat pump system. During the experimental tests, the humid air of 10~30°C was supplied to this air-to-water heat exchanger and then the water flow rate was set to 2500~3500 L/h. Heat recovery rate of this heat exchanger increased in proportion to entering air temperature and water flow rate.

Key words : direct contact(직접 접촉), heat exchanger(열교환기), heat pump(열펌프), waste heat(폐열)

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