

물-공기 히트펌프 시스템의 부분부하 난방운전 특성

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Performance Characteristics of Water-to-Air Heat Pump under Partial Load Heating Operation

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Performance of water-to-air heat pump using raw water has been analyzed under part load heating operation in March, 2010. The water source heat pump of 30 RT was installed for 24 hours cooling and heating ventilation, and the gravity inflow water from Daechung dam is used as the heat source. The daily averaged water and air temperatures are 5.7°C and 9.9°C respectively, and the heat pump is operated under part load condition for 7.5 hours in 24 hours. The daily averaged heat pump COP calculated with heat transferred from the brine water is 2.49 and the monthly averaged COP is 2.25 in March. Based on the database of the California Energy Commission, the monthly averaged COPs of air source heat pumps installed in U.S.A. are 1.97 in March and 2.03 in April. Therefore it is confirmed again that the performance of the heat pump using raw water is better than that of air source heat pumps.

Key words : Water Source Heat Pump(수열원 히트펌프), Water-to-Air(물대공기), Raw Water(원수), COP(성능계수), Partial Load Operation(부분부하운전)

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Evaluation of Water Temperature Difference Energy of the Raw Water from Paldang Water Intake Station

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The amount of the heating and cooling energy of water source heat pump using the raw water from the Paldang water intake station is investigated in the study. The Han river water is conveyed in the large-size shallowly buried pipe. Averaged water temperature at the position, 27 km from the Paldang water intake station, is increased by 1.11°C due to the geothermal energy transfer under the ground, therefore the raw water has more thermal energy than the river water. To estimate of the thermal energy for the raw water, it is assumed that the water source heat pump is used for the heating and cooling ventilation. When 5.0°C temperature difference energy of the raw water is used in the heat pump system all the year except for the January and February in which 3.0°C temperature difference energy is used. It is predicted that total 5,766.3 Tcal could be used in the metropolitan area a year, which is about 3.0% of the river water unutilized energy resources.

Key words : Water Temperature Difference Energy(수온차 에너지), Han River Basin(한강수계), Raw Water(원수), Water Intake Station(취수장), Water Source Heat Pump(수열원 히트펌프)

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