지열히트펌프 시스템의 건물통합설계 및 커미셔닝에 관한 연구

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A Study on Building Integrated Design and Commissioning of GHP System

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Geothermal heat pump(GHP)system has been extensively disseminated due to the recent increasing demand over new and renewable energy. However, the economics and system reliability has been key issues and barriers to insure a better system performance as designed originally. The building integrated designs of geothermal heat pump system are test and optimize GHP system by evaluating its performance in virtual reality. System design is an iterative process that will help optimize the cost efficiency of the system. One of the primary goals is to minimize the energy imbalance between the amount of energy extracted from the ground and the energy reject to it. This will reduce the land area required to install the GHX, reduce the cost of installing it and ensure the long-term efficiency of the system. Commissioning is the process of ensuring that are designed, installed, functionally tested, and capable of being operated and maintained to performance in conformity with design intent. In this paper, Study on introduction of Initial commissioning method of Geothermal Heat Pump(GHP) system using ISO performance data has been introduced. Also KIER GHP Simulator is used to simulate actual heat pimp operating condition and test commissioning method. Result should that the experiment data base could verify the applicability of the commissioning method, and also were able to suggest a better ways to GHP commissioning

Key words : Building Integrated design(건물통합설계), Geothermal heat pump(지열히트펌프), Initial Commissioning (초기 커미셔닝)

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물-물 수온차 히트펌프 시스템의 원수온도에 따른 성능 특성 분석

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Analysis on Cooling and Heating Performance of Water-to-Water Heat Pump System for Water Source Temperature

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The research assesses the performance of the water-to-water heat pump system installed in Cheongju water treatment plant for cooling and heating ventilation. In summer season monthly averaged COP is ranged from 3.85 to 4.56 according to the water source temperature, and the performance is increased as the raw water temperature is dropped. While, heating performance is increased for the high temperature water source, and the monthly averaged COP is changed from 2.92 to 3.82. The correlation of the water source temperature and the heat pump performance shows a linear tendency by the simple regression of average data. In heating, the COP of heat pump system linearly rises according to the water source temperature. In comparison, the COP in cooling linearly reduces as the raw water temperature is raised. The goodness of fit at the simple regression shows the coefficient of determination 82% in cooling, 46% in heating. The electric cost of water-to-water heat pump is reduced by 40% compared to that of air source heat pump.

Key words : Water Source Heat Pump(수열원 히트펌프), Water-to-Water(물대물), Raw Water(원수), COP(성능계수), Cooling and Heating System(냉난방시스템)

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