태양열 집열기 효율식의 불확도

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Uncertainty of Efficiency Equation of Solar Thermal Collectors

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Thermal performance tests of solar thermal collectors include determination of coefficient parameters in an efficiency equation. The parameters can be estimated using regression method to minimize an objective function as sum of differences between measured efficiency data and regressed efficiency equation. However, this conventional approach doesn't consider measurement uncertainties. In this presentation, a method to determine regression parameters in the efficiency equation and uncertainties of the parameters is described with mainly mathematical expressions based on literature reviews. In the method, parameters in the equation for collector efficiency can be determined using regression analysis with a weighting factor in the objective function. The weighting factor can be uncertainties of the differences between measured and fitted efficiencies. To evaluate the approach, performance estimation of a solar collector using the efficiency equation with uncertainties is compared to the result using the conventional efficiency equation by a simulated way for a case in one of previous studies.

Key words : Solar thermal collector(태양열 집열기), Efficiency equation(효율식), Parameters(파라메터), Uncertainty (불확도)

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다기능 솔라윈도우의 열성능 연구

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The Study of Thermal Performance on Solar Window

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The aim of this study was to analysis the Heating/cooling performance of Solar Window built in apartments. The solar window is the idea to integrate daylight as a third form of solar energy into a PV/Solar Collector system and allows more control due to the possibility to close the reflectors. However, there can be a conflict between the desire for on one hand daylight and view and on the other hand optimal energy conversion for the PV/Solar Collector system.

The process of this study is as follows: 1) The Solar Window system is designed through the investigation of previous paper and work. 2)The simulation program(ESP-r, Therm5.0, Window6.0) was used in Heating/cooling performance analysis. The reference model of simulation was made up to analysis Heating/cooling performance on Solar Window. 3)Selected reference model(Floors:15, Area of Unit:148.5㎡) for heating energy analysis, Energy performance simulation with various variants, such as U-value of Solar Window system according to its position and angle.

Consequently, When Solar Window system is equipped with balcony window of Apartment, Annual heating and cooling energy of reference model was cut down about 5%~11%.

Key words : Multi-Purpose Solar Window(다기능 솔라윈도우), Movable Insulation System(가동단열), Heating & Cooling Energy(냉난방에너지), Renewable Energy(신재생에너지), Energy conservation(에너지절약)

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