

Energy Consumption Reduction in Building in the Light of Thermal Performance Improvement in Airflow Windows

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Abstract

The efforts to reduce energy consumption, and improve energy performance in buildings, have received much attention in the field of construction, coinciding with the energy crisis in the world. Proper design and construction of building elements and components can reduce energy consumption, reduce negative impacts on the environment and save money throughout the life cycle of the building. The window is usually the façade element with the lowest thermal resistance and the thinnest component with the highest thermal conductivity in the building. Under standard conditions, windows and ventilation are two separate systems, that the lack of proper management system can increase energy consumption in the building. In this study, the use of airflow window was introduced as a suitable solution and a passive method to reduce the energy consumption of the building, and the effect of combined factors such as low emission coating layers and phase change materials was investigated in improving the thermal performance of this type of windows and reducing cooling and heating load of the building. The research method was descriptive-analytical with a qualitative study. The data collection tool was a review of written sources, documents, and previous studies, and the method of data analysis was content analysis. The results of the study indicated that using the airflow windows in combination with phase change materials and absorbent or reflective internal curtains with the ability to change the position in the cold and hot seasons of the year, can create a dynamic performance in different seasons, and have a significant effect on reduction of heating and cooling loads and energy consumption in the buildings.

Keywords: Airflow Window, Energy, Thermal Performance, Phase Change Materials, Protective Cover.

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