

## **Baseline Study for Performance Evaluation of New Generation Solar Insulation Films for Windows: A Test Bed in Singapore**

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**Abstract :** Due to the solar geometry of Singapore, which lay within the geographical classification of equatorial tropics, there is a great deal of thermal energy transfer to the inside of the buildings. With changing face of economic development of cities like Singapore, more and more buildings are designed to be lightweight using transparent construction materials such as glass. Increased demand for energy efficiency and reduced cooling load demands make it important for building designer and operators to adopt new and non-invasive technologies to achieve building energy efficiency targets. A real time performance evaluation study was undertaken at School of Art Design and Media (SADM), Singapore, to determine the efficiency potential of a new generation solar insulation film. The building has a window to wall ratio (WWR) of 100% and is fitted with high performance (low emissivity) double glazed units. The empirical data collected was then used to calibrate a computerized simulation model to understand the annual energy consumption based on existing conditions (baseline performance). It was found that the correlations of various parameters such as solar irradiance, solar heat flux, and outdoor air-temperatures quantification are significantly important to determine the cooling load during a particular period of testing.

**Keywords :** solar insulation film, building energy efficiency, tropics, cooling load

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