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Saint Kitts and Nevis solar Curtain Wall Design

Overview

Do VPV curtain walls save energy?

According to the literature review, VPV curtain walls exhibit significant potential for energy savings owing to their excellent thermal insulation performance . Furthermore, the shading effect of PV cells can alleviate discomfort glare and enhance occupants’ visual comfort .

Are vacuum integrated photovoltaic curtain walls performance-driven?

The vacuum integrated photovoltaic (VPV) curtain wall has garnered widespread attention from scholars owing to its remarkable thermal insulation performance and power generation ability. However, there is a lack of in-depth, performance-driven optimal design that considers the mutually constraining functions of the VPV curtain wall.

What is a VPV curtain wall?

The VPV curtain wall consists of a piece of CdTe-based PV laminate glass, an air cavity, and a sheet of vacuum glazing. The solar cells are etched into strips by lasers, and the transmittance of the VPV sample can be adjusted by changing the arrangement density of the strip solar cells.

Which VPV curtain wall has the highest rneh?

When aiming at the highest RNEH (ω 1 = ω 2 = ω 3 = 0.01, ω 4 = 0.97), the partitioned VPV curtain wall with 20%, 40%, and 90% PV coverages of the daylight, view, and spandrel sections achieved the highest RNEH of 64.7%. However, the corresponding glare index is as high as 29.4%.

Does a curtain wall provide enough daylight?

The sufficient daylight provided by the external curtain wall has been shown to enhance the physiological and psychological well-being of occupants [2, 3], and increase their satisfaction and productivity [4, 5].

Which VPV curtain wall has the highest DGP?

It is observed that the VPV curtain wall with 10%, 0%, and 50% PV coverages of daylight, view, and spandrel sections has the highest average DGPs of 40.1%. By increasing the daylight section's PV coverage to 50%, the average DGPs decrease by 11.5%, while increasing the spandrel section's PV coverage to 90%, the DGPs only reduces by 2.5%.

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