

The Effect of Glass Thickness on Stress in Vacuum Glazing

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Abstract : Heat transfer through multiple pane windows can be reduced by creating a vacuum pressure less than 0.1 Pa between the glass panes, with low emittance coatings on one or more of the internal surfaces. Fabrication of vacuum glazing (VG) requires the formation of a hermetic seal around the periphery of the glass panes together with an array of support pillars between the panes to prevent them from touching under atmospheric pressure. Atmospheric pressure and temperature differentials induce stress which can affect the integrity of the glazing. Several parameters define the stresses in VG including the glass thickness, pillar specifications, glazing dimensions and edge seal configuration. Inherent stresses in VG can result in fractures in the glass panes and failure of the edge seal. In this study, stress in VG with different glass thicknesses is theoretically studied using Finite Element Modelling (FEM). Based on the finding in this study, suggestions are made to address problems resulting from the use of thinner glass panes in the fabrication of VG. This can lead to the development of high performance, light and thin VG.

Keywords : vacuum glazing, stress, vacuum insulation, support pillars

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