

# Thermal shock of solar glass

What is a thermal shock in a building fire?

Keywords: Thermal shock; Thermal stress; Glass; Crack; Finite element method 1. Introduction In a building fire, the glass is heated gradually in the early stage of fire; however, if flashover occurs in a compartment, the glass is heated rapidly, which could result in a thermal shock.

Can solar-induced thermal stress breakage occur in spandrel glass?

These gradients create a large thermal stress which, under certain circumstances, may lead to breakage. Recently, attention has been drawn to several incidents in which spandrel glass has experienced solar-induced thermal stress breakage.

How does thermal shock occur?

Thermal shock occurs when a thermal gradient causes different parts of an object to expand by different amounts. This differential expansion can be understood equally in terms of stress or strain. At some point in time, this stress can exceed the strength of the material, causing a crack to form.

What causes thermal stress on glass?

Thermal stress is caused by temperature difference upon the glass, if the temperature rise  $T(x,y,z)$  with respect to the original state is known, then the associated deformation can be considered easily. For glass, the temperature rise  $T$  results in a uniform strain, which depends on the coefficient of linear expansion of the material.

Do thermal shocks affect foamed glass?

Foamed glass is mostly used for thermal insulation in industrial applications such as chemical reactors, containers often exposed to rapid temperature changes. It is becoming more and more popular. Therefore, the subject of the analysis is the impact of thermal shocks on foamed glass strength and the effect of the gas enclosed inside the structure.

Does thermal shock affect structural integrity of foamed glass insulation?

This paper deals with heat transfer inside cellular solids (foamed glass insulation) under thermal shock and the impact of transient temperature fields on the local integrity (strength) of the structure. The Finite Element model of a three-dimensional regular, periodic structure of the foamed glass for thermal and structural analyses was built.

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