PEPA
Polymeric Exterior Products Association

THE EFFECT OF CONCENTRATED SUNLIGHT ON POLYMERIC SIDING

Exterior building materials, by nature, have always been subject to potential damage from abnormal weather phenomena. The issue of unusually intense reflected sunlight and its potential consequences have been heightened due to the growing popularity of highly reflective windows.

While ongoing research is still being conducted about the combination of building and environmental conditions that must occur before polymeric siding (vinyl, insulated vinyl, backed vinyl and polypropylene) is affected by abnormally concentrated sunlight reflected by windows, the Polymeric Exterior Products Association (PEPA) has outlined the currently available information related to this phenomenon and its effect on polymeric siding in particular.

- Abnormally concentrated sunlight reflected onto polymeric siding or other cladding by windows can result in surface temperatures far exceeding those caused by direct exposure to the sun. Temperatures necessary to cause significant distortion of siding are not routinely achieved, even when siding is exposed to both direct sunlight and the reflection from normal, flat window glass. In cases where distortion has occurred, abnormal mechanisms that tend to increase the intensity of the reflected sunlight above natural levels are usually found.

- There is a correlation between the increased use of energy-efficient windows made with low emissivity (Low-E) glass and the incidence of exterior building material damage, according to field observations. Low-E glass reflects a greater percentage of incident sunlight than normal glass, especially in the infrared (heat) part of the spectrum. Combined with other factors, the higher reflectance of such glass can cause a temperature rise on the siding surface that well exceeds normal conditions.

- There is strong evidence that most cases of distortion are the result of the partial collapse of double-pane insulating glass elements. When the pressure between the panes of glass is different from that of the outdoor environment, the glass

may bend slightly inward. This creates a concave reflective surface that concentrates the reflected beam of sunlight. Siding or any other surface that is struck by this narrowed beam of sunlight will be at greater risk of being raised to its distortion temperature, even without exposure directly from the sun. These conditions far exceed the normal, natural conditions for which siding and other building materials are designed.

- Because a beam of sunlight reflected from the glass can be so intense, both light and dark colors can be affected. The relative darkness of the siding appears to be, at most, a secondary factor.

- The issue is not limited to polymeric siding. Numerous news outlets have reported that outdoor items such as solar collectors, painted surfaces, and automobile parts have been damaged by sunlight abnormally reflected by windows. Cases also have been reported in buildings under construction where the weather resistant barrier has been damaged by window reflection before the cladding was applied. It can be expected that the lifetime of other building materials, including paints and other finishes, will be adversely affected by long term exposure to high-intensity reflected sunlight.

- Certain steps can be taken to reduce the potential effects of concentrated sunlight. Anything that blocks the path of sunlight, either to the window or between the window and the siding, will eliminate or reduce the problem. This includes the strategic placement of trees, bushes or other landscaping elements and the use of sunshades above windows. Screening applied to windows may reduce the total amount of reflected energy sufficiently to avoid the problem. Homeowners can contact the manufacturers of the windows and the siding for additional techniques to address their specific situation.