

# **TECHNICAL BRIEFING: THE QUANTIFICATION AND EVALUATION OF THE BENEFITS OF SELF-CLEANING GLASS.**

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## **Extract from the Executive Summary of the BRE Report, August 2006:**

Viridian **Renew**<sup>™</sup> is a dual action self-cleaning glass which comprises a pyrolitically applied coating on the external surface of float glass. Assuming that Viridian **Renew**<sup>™</sup> is used in a climate where prolonged dry periods do not occur and that the glass is not protected from rain by significant overhangs, recesses or adjacent structures, it should not need cleaning. This gives rise to a number of potential benefits.

Pilkington commissioned the Building Research Establishment (BRE) in the UK to quantify the benefits of using self cleaning glass and to express in objective terms the non-quantifiable benefits.

## **Summary of the outputs of the report as concluded by Pilkington (UK) Ltd.\* Marketed as Viridian Renew<sup>™</sup> in Australia**

### **1. Positive user and specifier feedback**

Interviews were conducted with 17 occupants, clients, specifiers and installers, covering 12 separate projects. Most comments were very positive; architects said it gave them design flexibility (they didn't have to take window cleaning practicalities into account in their designs), occupants enjoyed the permanently clean windows, building owners valued the cost savings and lack of disruption caused by window cleaning. Everybody welcomed the fact that there would be less need for cleaners to work in dangerous, and potentially fatal, conditions. The vast majority would use the product again, would recommend it to others and believed one day it would "become the norm." Project specifiers said they would use it in their own homes.

### **2. Identification of window-cleaning cost savings from real life examples**

The interviews also provided feedback on savings on window cleaning costs in practice. Most respondents had stopped using window cleaners completely, and had never had to clean their glass even once in 2 – 3 years' experience. One school now only cleaned once a year, and a zoo had changed from daily to monthly cleaning.

### **3. Whole life costings**

Whole life cost analyses were done for a three-storey school, a six-storey apartment block and a twelve-storey office building. They compared the whole life costs for these buildings with and without self cleaning glass. This included the capital costs and the maintenance and running costs (including window cleaning of course) over the lifetime of the buildings. In every case, the lowest whole life costs occurred when self cleaning glass was used.

### **4. Payback periods**

The cost analysis also calculated the payback period after which the investment in self cleaning glass paid for itself. Three different "test discount rates" were used, to reflect the cost of borrowing money to pay for the initial investment. For the school building the payback period was 5 – 6 years (depending on the test discount rate). For the apartment building the payback period was 9 – 11 years. For the office building the payback period was 3 – 4 years.

### **5. Capital costs compared to reversible windows**

Frequently, in housing and apartment blocks higher than three storeys, reversible windows are installed, for the purposes of being able to clean the windows from inside. However, these windows are considerably more expensive than conventional windows. The report showed that in such buildings, the use of self cleaning glass in conventional windows results in a lower capital cost building than one with reversible windows containing non self-cleaning glass.

## **6. Water Savings**

The report quantifies the annual and lifetime savings in water for the three buildings studied above, and for a range of individual dwellings. For the office building, almost 100,000 litres of water is saved over its lifetime. \*Please contact Viridian to receive a copy of the full BRE report.

## **7. Individual environmental impacts**

The report quantifies the impacts of the use of energy and other resources for window cleaning of a typical semi-detached house on 13 separate environmental aspects. These range from the effect on climate change, through human toxicity to water, to waste disposal. In all respects, self cleaning glass has a reduced negative impact compared to conventional glass.

## **8. Ecopoints**

BRE has developed the "Ecopoints" system, which weights each individual environmental impact, and enables them to be added up to produce an overall assessment of environmental impact, known as Ecopoints. The lower the score, the less the negative impact. The report contains the result of this analysis, and shows that the Ecopoints for self cleaning glass are less than one-tenth of those for ordinary glass.

## **9. Avoidable deaths and injuries from window cleaning**

BRE were able to research the national data and statistics on deaths and injuries resulting from window cleaning. Falls from ladders when cleaning windows were found to result in 20 deaths and 1,500 major injuries a year, the majority in the domestic/DIY situation in the UK. The numbers are increasing. Obviously BRE were not in a position to project the number of deaths and injuries that would be avoided if self-cleaning glass were used, but it is reasonable to assume that they would decline pro-rata to the reduced frequency of window cleaning.

## **10. External condensation**

Prior to the project, it had already been observed that external condensation in conditions of low temperature and high relative humidity is reduced with self cleaning glass. BRE did not conduct any tests on this, but did describe the phenomenon and reported on the work of Institut fur Fenstertechnik (IFT), and reproduced some of the photographs from their report of April 2006. These show a dramatic increase in clarity of view through self cleaning glass in conditions where external condensation occurs on ordinary glass.

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### **Further information**

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