

## Self-cleaning glass

*This Technical Note is one of several on the use of glass and glazing in building envelopes. The series at the time of publication comprises:*

- TN 7 Threat resistant fenestration*
- TN 8 Selection of windows – a checklist for specifiers*
- TN 11 Glass types*
- TN 12 Specification of hermetically sealed glass units*
- TN 13 Glass breakage*
- TN 31 Pressure effects on insulated glazing units*
- TN 35 Assessing the appearance of glass*
- TN 38 Acoustic performance of windows*
- TN 42 Safety and fragility of glazed roofing*
- TN 43 Film backed glass*
- TN 51 Environmental control glasses (in preparation)*
- TN 54 Self-cleaning glass*

### Introduction

This Technical Note explains how self-cleaning glass works, gives guidance on the use of self-cleaning glass and highlights some of the factors that will need to be considered when specifying self-cleaning glass on commercial and high-rise residential buildings. References to relevant manufacturer's publications are also given at the end of the Technical Note.

Self-cleaning glass is a relatively recent development having been commercially available since 2001. The glass is designed to reduce the frequency of cleaning and improve the appearance of glazing. Currently its main use is in the domestic and domestic refurbishment markets.

In the future there is expected to be demand from clients and building developers to use the glass on commercial and high-rise residential buildings as they increasingly become aware of its potential benefits. Its use will also be driven by the need to improve health and safety by reducing the need for regular access for cleaning. This may however be offset by a general requirement for powder coatings to have a maximum three-monthly cleaning cycle.

### How self-cleaning glass works

Self-cleaning glass consists of float glass with a neutral, durable and hard polycrystalline coating of titania (TiO<sub>2</sub>). The coating is applied to the non-tin side of the float glass during glass manufacture and is designed to:

- Break down organic dirt that accumulates on the glass surface by photodegradation, and
- Reduce the build-up of dirt and dust particles on the glass surface due to its hydrophilic (water attracting) nature.

The coating's ability to photo-degrade organic material arises from the thin titania coating reacting with oxygen and water molecules in the atmosphere to produce free radicals after exposure to ultraviolet radiation. These free radicals break-up organic material adsorbed on the glass surface into volatile molecules. This helps to reduce the dirt's adhesion enabling surface water to more easily wash away organic dirt along with any inorganic dust that may be attached.

The coating's hydrophilic nature causes surface water to spread out over the glass surface to form a sheet of water. This sheet, when moving, washes away organic dirt along with any inorganic dust