



# Technical Bulletin

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## Fabrication and Glazing Guidelines for Pilkington **SaniTise™**

### **Summary**

Pilkington **SaniTise™** has a thin, clear, permanent, pyrolytic titanium dioxide (TiO<sub>2</sub>) coating on one of its surfaces. The coating has antimicrobial photocatalytic properties when activated by UV exposure.

Pilkington **SaniTise™** can be glazed monolithically, or incorporated into an insulating glass unit, with the coating on the #4 (interior) surface. If laminated, the interlayer must allow for sufficient UV transmission to activate the Pilkington **SaniTise™** coating and ensure the intended virucidal and bactericidal properties.

### **Glass Handling**

Care should be taken to avoid contaminating the coated surface with cutting oils after it has been properly cleaned. Pilkington **SaniTise™** should be cut, washed, heat treated, and generally processed with the coated surface up to avoid unnecessary contact with other materials.

### **Unpacking**

Pilkington **SaniTise™** is shipped in either standard cases or stoces. Like other Pilkington glass products, the glass surfaces are protected with an interleaving material that inhibits moisture staining and abrasion between the individual lights.

Pilkington **SaniTise™** should never be removed from cases by "end opening" the case since sliding glass surfaces past each other may damage the coating or the glass surface.

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Pilkington **SaniTise™** can be handled with suction cups, though it is preferable to apply suction cups to the glass side where possible. The cups must be clean and dry to prevent damage to or marking of the coating. The cups should not be slid across the coated surface.

### ***Inspection***

The fabricator is responsible for carefully inspecting Pilkington **SaniTise™**, both before and after washing, as well as after any further fabrication. Glass not rejected by the fabricator during inspection prior to fabrication will be considered acceptable by Pilkington. Pilkington **SaniTise™** should be inspected in transmitted and reflected light, from the coated side of the lite.

When viewed in transmitted light, there should be a bright, uniform, diffused light (similar to an overcast sky) behind the glass. The objects which are seen in reflection (walls, ceilings, etc.) on the viewing side of the coated glass should be dark color or mat black and should have low level illumination on them to minimize masking reflections.

When viewed in reflection, the glass should be placed in front of a uniform, dark background to minimize transmitted images (black velvet cloth is particularly effective), and the reflected image of a uniform diffuse light source or brightly illuminated white wall or screen (similar to an overcast sky) should be visible in reflection to the inspector.

### ***Cutting Stock Sheets***

The fabricator is responsible for cutting stock sheets to eliminate imperfections from the finished cut piece.

Standard procedures used in cutting float glass should be practiced. All stock sheet edges must be trimmed a minimum of 1" (25 mm) to obtain a clean-cut edge. Special care should be exercised in cutting to avoid sliding tools over the coated surface.

Pilkington **SaniTise™** should be cut with the coated side up to eliminate coating damage that could result from glass particles on the cutting table, especially when using free-fall cutting techniques.

Cutting oils should be light, evaporating lubricants. Keep the quantity of cutting oil to an absolute minimum to reduce contamination of gloves and to allow easier washing the coated surface.

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## ***Internal Transport***

Mobile harp racks and other internal transport systems must have the surfaces cleaned regularly where contact will be made with the Pilkington **SaniTise™** coating.

## ***Packing***

When packing Pilkington **SaniTise™** coated glass for shipping with the coating exposed, it is preferable to use paper or hardwood flour as an interleaving medium. Over long distances, interleavants can be abraded and leave a deposit on the coating which is difficult to remove. Care should also be taken to minimize the contact of Styrofoam packing materials with the coated surface. Styrofoam packing materials can leave a rub mark on the coating that is difficult to remove.

## **Washing**

Pilkington **SaniTise™** has a pyrolytic coating. As with any coated glass product, care should be taken while washing the glass to prevent damage to the coating. The following recommendations are for washing coated glass:

### ***Mechanical Washing***

Pilkington **SaniTise™** should be washed, with the coating side up, in a rotating drum brush flat glass washing and drying machine. Pilkington recommends using a detergent solution of hot 120-140°F (50-60°C) clean water and a commercial detergent designed for glass washing. The final rinsing should be with clean deionized water heated to at least 110°F (43°C). As with all washing machines, either the water should be changed on a routine basis or a continuous overflow system should be used. Drying air should be filtered and operated in such a manner so as not to leave water droplets on the glass surfaces.

Polypropylene brush rolls are recommended for glass washing machines. If nylon brushes are used, care must be given to proper brush adjustment to avoid the possibility of surface damage. When selecting the proper brush for washing Pilkington **SaniTise™**, the fabricator should consider that polypropylene brushes usually have a lower coefficient of friction, and are softer, and more flexible than nylon. If abrasive materials are trapped in any washing implement, abrasion damage to the glass can occur.

Do not allow the glass to remain stationary under the rotating brushes.

It is recommended that a test lite be run through the washer before starting production. The glass should then be inspected, in transmission and in reflection, and then with a bright spotlight close to the reflective surface to determine if brush and/or air-drying adjustments are needed.

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## ***Hand Washing***

Pilkington **SaniTise™** can be cleaned and maintained by hand washing with non-abrasive cleaners. For hand washing Pilkington **SaniTise™**, a mild detergent and water solution is recommended. Uniformly apply the solution to the glass and wash with a clean, soft cloth, sponge, or pad. Rinse thoroughly with clean water and wipe or squeegee dry immediately. Make sure no metal parts of the cleaning equipment touch the reflective glass surface, and that no abrasive particles are trapped between the glass and the cleaning materials. Do not use harsh chemical cleaners, abrasives, steel wool, or razor blades on the Pilkington **SaniTise™** coated surface.

Recommended routine cleaning products are:

- Sparkle Glass Cleaner (purple colored transparent liquid available from grocery stores), produced by A.J. Funk & Co.
- Windex® Glass & Surface (clear liquid available from grocery stores), produced by SC Johnson & Son, Inc.

In addition to the above products, commercially available vinegar-based glass cleaners have generally demonstrated an ability to provide a clean, streak free glass surface.

## ***Spot Cleaning***

Occasionally spot cleaning may be required to remove stubborn dirt, metal rub marks or foreign materials that can adhere to the coated glass surface. Spot cleaning products can be used to remove marks or residue from grease, oil, tape adhesive, and crayons or other waxy materials as well as paint and rub marks from plastics.

Recommended spot cleaning products are:

- Acetone
- MEK (Methyl Ethyl Ketone)
- 1,1,1 Trichloroethane
- Mineral Spirits
- Acid Magic™ Muriatic Acid Replacement (available in hardware stores), produced by Universal Chemicals & Supplies Inc.

For spot cleaning stubborn material, DO NOT:

- Contact the coated surface with razor blades, steel wool or other metallic objects as they can permanently damage the coating
- Use abrasive cleaners such as "Bon Ami" powder, Cerium Oxide, or the white opaque liquids: "Sparkle" by C.R. Lawrence and "Soft Scrub" by The Clorox Company
- Use any solutions containing Hydrofluoric acid or Fluorine compounds on the coating or allow harsh alkali solutions to come in contact with the coating.

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## **Fabricating**

### ***Laminating***

Standard interlayers in laminated glass may absorb up to 99% of the UV radiation. Pilkington **SaniTise™** is not recommended for use in laminated applications unless the coated surface is directed towards the UV source or is fabricated with interlayers that allow for adequate UV transmission for coating activation. Interlayers shown to allow for sufficient UV transmission in laminated configurations are:

- Trosifol® Natural UV, produced by Kuraray
- SnetryGlas® Natural UV, produced by Kuraray

In these cases, Pilkington **SaniTise™** can be laminated; however, it must not be laminated with the coated surface towards the interlayer as this will prevent its operation. It is recommended that each laminator conduct in-house adhesion tests, prior to actual production, to determine if an adequate bond has been obtained.

### ***Heat Treating & Bending***

Pilkington **SaniTise™** can be heat-strengthened, fully tempered or bent, after it is cut to size. Pilkington recommends that Pilkington **SaniTise™** be properly cleaned and dried prior to heat-treating. Clean cotton or cloth gloves should be used at this stage to prevent hand or fingerprints, which could be burnt into the surface during heat-treating. The coated surface must be visibly clean before entering the heat treatment furnace. The coating should be facing up when heat-treating in a horizontal furnace to minimize the chance of coating damage.

If the furnace rollers are clean, the glass can be processed with the coating down. This orientation will be necessary if frit is applied to the glass surface.

Overheating Pilkington **SaniTise™** can damage the coating and destroy its photocatalytic action. If excessive distortion or coating damage is experienced, a cooler glass temperature during the heat-treating process will be required. Note that at no time should the glass temperature exceed 1121°F (605°C).

If the fabricator is experienced at heat-treating Pilkington ¼" (6 mm) Clear Float glass, those furnace and quench settings make an excellent starting point for the processing of Pilkington **SaniTise™** glass test lights. The effective radiant temperature of the furnace will determine the actual heat transfer to the glass. Individual furnaces will have different heating characteristics. The first piece of tempered Pilkington **SaniTise™** processed should be examined for break pattern and distortion immediately after it has cooled down. Remember that the rate of feeding cold glass (singly or in continuous batches) into a hot furnace will have more effect on the glass temperature reached in the heating cycle than the presence or absence of the Pilkington **SaniTise™** coating. Pilkington **SaniTise™** has an emittance value the same as non-coated glass, and with a solar transmission generally 2% points less than uncoated glass of the same tint and thickness, the furnace settings for heat treating or bending can initially be those for non-coated glass of the same tint and thickness.

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If the fabricator has no previous experience heat treating glasses, Pilkington recommends a furnace setting of approximately 1240°F (670°C) and a heating cycle time of 240 seconds as the starting point for ¼" thick Pilkington **SaniTise™** test lights. Since each furnace is unique, furnace time and/or temperature adjustments will be required.

Sample lights of Pilkington **SaniTise™** should be tested to ensure compliance to applicable safety standards and reinspected for distortion prior to starting production. Confirmation that Pilkington **SaniTise™** will meet or exceed all applicable safety glazing standards is the responsibility of the fabricator. Note that heat-treated (tempered or heat strengthened) glass can usually show a soft dappled shadow pattern from the furnace quench air, especially when viewed in polarized light (see ATS #157 for details).

### ***Insulating Glass Unit Assembly***

When Pilkington **SaniTise™** is used in insulating glass units, no edge deletion of the coating is required. Results to date indicate that the glass side of Pilkington **SaniTise™** is compatible with major insulating glass sealants.

Silicone sealants can exude silicone oil or plasticizers while they cure and long afterwards and impact the coated surface of the glass. This very thin layer of silicone oil is very difficult to remove from coatings. It is too thin to be visible when dry but is usually visible when the glass is wet. If using a silicone-based sealant, it is crucial to minimize incidental contamination on the coated surface. The oil will effectively prevent the sanitizing action in this region.

The fabricator of Pilkington **SaniTise™** has the ultimate responsibility of testing to ensure that the proper sealant is used for each application. Specific questions concerning compatibility should be directed to, and confirmed with, the individual sealant manufacturers. Once the insulating glass unit is made, care should be taken to ensure the coated surface is protected from sealant contamination or scratching.

## **Construction**

### ***Mock-up***

The construction of a full-scale mock-up is recommended, where the glass can be examined, from both sides, in transmission and reflection. A full-size mock-up, should be constructed and viewed on site, representing the proposed building location and viewing geometry. It should be approved prior to final glass production. This will show the final installed appearance of the glass far better than viewing small handheld samples under interior lighting conditions.

### ***Glazing Guidelines***

Pilkington **SaniTise™** should be located where it will receive daylight because the coating utilizes the sun's ultraviolet light, either direct or diffuse indirect, to activate its antimicrobial properties.

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Wet glazing tapes, such as “preshim” with a neoprene rod core enclosed in a high viscosity butyl, are designed to remain pliable and flexible over their design lifetime. These tapes may contain a significant percentage of oil that can migrate onto the glass surface. This oil can sometimes be seen on the coated surface and can be difficult to remove without damaging the coating.

Neoprene glazing gaskets are often coated with extrusion oil or a lubrication liquid to assist installation. These lubricants will usually be removed during the first glass cleaning.

Care must be taken to ensure sealants and lubricating liquids do not contain silicone as they can exude silicone oil that prevents sanitizing action in the affected regions.

### ***Removal of Silicone Contamination***

In the case of silicone contamination on the Pilkington **SaniTise™** surface, attempts to remove any silicone must be regarded as remedial action and no guarantees over the effectiveness of silicone removal can be provided, as this is dependent upon a wide number of factors including amount, time on surface and the nature of the silicone contamination.

In this instance the use of a silicone remover may be able to improve the appearance and performance. However, this is remedial action and no guarantees over the effectiveness of the treatment can be provided.

Care should be taken to ensure that all recommended safety procedures associated with the products are utilized throughout the procedure.

The use of strong alkali / acid or abrasive cleaners are not recommended as damage to the coated surface can occur.

It is essential that prior to commencing the following procedure that the lubricated gasket is removed and replaced with a compatible gasket.

It is recommended that the product is applied to the area using a soft sponge and should only be conducted on a dry day. Try to avoid direct sunlight and application on hot days. Water exposure during the procedure is not recommended as this will adversely affect the cleaning process. The material should be applied to the affected area using a dabbing action. Ensure the area is completely covered with a liberal coating of the silicone eater.

Care should be taken to ensure that the material does not run off onto surrounding areas or framing materials as this may result in damage to these areas. If this should occur, excess silicone eater should be wiped off the unintended area immediately and cleaned with water and a soft cloth. No water should come into contact with the contaminated glass surface being cleaned.

The silicone eater should then be left on the surface for approximately 30 minutes. During this period regular agitation of the material should be conducted with a sponge and fresh material.

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**The material should not be allowed to fully dry on the surface.** After this period the material should be removed from the surface using a soft cloth wetted with methylated spirits. Care should be taken to ensure a fresh area of the cloth wetted with the methylated spirits is used regularly to avoid spreading the material across the surface. Under no circumstances should a hard rubbing action be used as part of this procedure.

The surface should then be rinsed with water ensuring run off does not contaminate surrounding areas. If contamination is still evident the procedure may be repeated taking the same precautions. Complete removal of the silicone may require 4 or 5 reapplications. This is due to the nature of the cleaners. These are designed to remove a layer at a time and as such multiple applications may be required to remove heavy contamination.

Once a satisfactory cleanliness has been achieved the coated area should be thoroughly rinsed with water and, if necessary, cleaned with a hot soapy water solution followed by a water rinse and allowed to dry. If necessary, a good quality liquid window cleaner such as Nationwide could be utilized.

## Quality Specifications

### *Standards*

The base glass shall meet the requirements for “glazing select” quality in the latest version of ASTM C 1036 “Standard Specification for Flat Glass”.

Pilkington **SaniTise™** meets the quality requirements in the latest version of ASTM C 1376 “Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass”.

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