



PILKINGTON

NSG Group Flat Glass Business

Technical Information

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Handling, Inspecting and Fabricating Pilkington Activ™ Self-Cleaning Glass

Pilkington **Activ™** Self-Cleaning Glass has a thin, clear, permanent, pyrolytic Titanium Oxide coating on one of its surfaces. The coating has a hydrophilic property with makes raindrops spread out, or sheet, across the surface to wash away dirt particles. It also acts as a catalyst, when activated by the Ultra-Violet (UV) light in daylight, to break down organic dirt into water vapor and CO₂ gas.

Pilkington **Activ™** can be glazed monolithically, or incorporated into an insulating glass unit, with the self-cleaning coating on the #1 (exterior) surface. When laminated the coating must be on the outer (#1) surface and never against the pvb interlayer, as that would prevent the operation of the self-cleaning action. Similarly, the coating should not be on the room-side surface as there is insufficient UV light there the active it.

IDENTIFYING THE ACTIV COATED SURFACE

The coated glass surface should be identified by the location of a label on the non-coated glass side. A special hand-held detector is available from EDTM, Toledo, Ohio, tel. 419 861 1030, www.edtm.com to positively identify the coated surface.

The fine scale roughness of the coating can be detected by added friction when it is rubbed with finger tips or finger nails.

Note: the coating emittance is the same as non-coated glass and so standard low-e detectors cannot be used to identify the coated surface.

GLASS HANDLING

Take care to avoid excessive contact with the coated surface of Pilkington **Activ™**. As this product carries a “Self-Cleaning” label the end customer typically expects to receive a “clean” piece of glass and so even removable marks or dirt should be not be on the final installed glass. If handling requires contact with the coated surface, clean gloves must be used at each workstation. Care should be taken to avoid contaminating the coated surface with cutting oils or finger prints after it has been properly cleaned.

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Do not allow any Silicone materials (sealants or lubricants) to contact the coating. Silicone oils adhere tenaciously to glass and coatings and cannot be effectively removed. Even though thin enough to be not visible, a thin contamination of Silicone oil will effectively and permanently block the self-cleaning action of the Pilkington **Activ**TM coating.

Pilkington **Activ**TM should be cut, washed, heat treated, and generally processed with the self-cleaning coated surface facing upwards to avoid unnecessary contact with other materials.

INSPECTION

It is the responsibility of the fabricator to carefully inspect Pilkington **Activ**TM Self-Cleaning Glass, 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 **Activ**TM 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.

UNPACKING

Pilkington **Activ**TM is shipped in either standard cases or stoces. The glass surfaces are protected with an interleaving material that resists moisture staining and abrasions between the individual lights.

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

Pilkington **Activ**TM 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.

CUTTING

Stock Sheets

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

Standard procedures used in cutting ¼” (6 mm) 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.

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Pilkington **Activ**[™] 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 such as "Low Odor Base Solvent" No. 529-66 available from Ashland Chemical, Charlotte, NC, phone: 800 522 1409. Keep the quantity of cutting oil to an absolute minimum to reduce contamination of gloves and to allow easier washing of the coated surface.

INTERNAL TRANSPORT

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

WASHING

Pilkington **Activ**[™] Self-Cleaning Glass has a pyrolytic coating. As with any coated glass product, care should be taken while washing the glass to prevent damage to the coating.

Pilkington **Activ[™] Self-Cleaning Glass Mechanical Washing**

Pilkington **Activ**[™] should be washed, with the coating side up, in a rotating drum brush flat glass washing and drying machine. Pilkington recommends using a non-abrasive detergent solution of hot 50 to 60 °C (120-140°F) clean water and a commercial detergent designed for glass washing. The final rinsing should be with clean deionized water heated to at least 43 °C (110 °F). 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 delivered 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 **Activ**[™], the fabricator should consider that polypropylene brushes usually have a lower coefficient of friction, and are softer, and more flexible than nylon.

Do not allow the glass to remain stationary under the rotating brushes or to contact dry brushes. It is recommended that a test light be run through the washer before starting production. This glass should be inspected, in transmission and in reflection, and then with a bright spotlight close to the reflective surface. If glass particles are trapped in any washing section, abrasion damage can occur to the coating or glass.

Hand Washing

Pilkington **Activ**[™] can be cleaned and maintained by hand washing with non-abrasive cleaners. For hand washing Pilkington **Activ**[™], 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.

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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 **Activ**[™] coated surface. See ATS Bulletin #166 “Maintenance and Hand Cleaning” for details.

LAMINATING

Pilkington **Activ**[™] can be laminated; however, it must not be laminated with the self-cleaning coated surface against the interlayer material as this will prevent its operation. It is recommended that each laminator carry out the normal quality control procedures for their process.

HEAT TREATMENT: Heat Strengthening, Tempering, Bending

Pilkington **Activ**[™] can be heat-strengthened, fully tempered, or bent, after it is cut to size. Pilkington recommends that Pilkington **Activ**[™] 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 self-cleaning 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 and no slipping or sliding occurs, the glass can be processed with the coating down. This orientation will be necessary when ceramic frit is applied to the glass surface.

Overheating Pilkington **Activ**[™] can damage the coating and destroy its self-cleaning 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 640 °C (1185 °F).

If the fabricator is experienced at heat-treating Pilkington **Optifloat**[™] Clear 6 mm (¼”) glass, those furnace and quench settings make an excellent starting point for processing 6 mm (¼”) Pilkington **Activ**[™] 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 **Activ**[™] 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 **Activ**[™] coating. Pilkington **Activ**[™] has an emittance value the same as non-coated glass, and with a solar transmission only about 2% points less than clear glass of the same thickness, the furnace settings for heat treating or bending can initially be those for clear non-coated glass of the same thickness.

If the fabricator has no previous experience heat treating glasses, Pilkington recommends a furnace setting of approximately 670 °C (1240 °F) and a heating cycle time of 240 seconds as the starting point for 6 mm (¼”) thick Pilkington **Activ**[™] test lights. Since each furnace is unique, furnace time and/or temperature adjustments will be required.

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Sample lights of Pilkington **Activ**[™] Self-Cleaning Glass should be tested to ensure compliance to applicable safety standards and reinspected for distortion prior to starting production. Confirmation that Pilkington **Activ**[™] 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

When Pilkington **Activ**[™] Self-Cleaning Glass is used on the first surface of insulating glass units; no edge deletion of the reflective coating is required. Results to date indicate that the glass side of Pilkington **Activ**[™] is compatible with current insulating glass sealants. The fabricator of Pilkington **Activ**[™] 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.

PACKING FOR TRANSPORTATION

Pilkington **Activ**[™] Self-Cleaning Glass should be separated from contact with adjacent glass by using paper interleaving or small cork tabs around the glass perimeter. A pack of typical glazing size, sealed double glazing (both lights the same thickness and 13 mm (1/2") air space) insulating glass, with 4 mm (5/32") thick cork tabs on the surface, near the perimeter, will typically not require cork tabs for center of glass protection caused by sealed air space expansion provided: the glass is flat or slightly concave after fabrication and the sealed unit is not exposed to an excessive temperature rise (greater than 30 °C (55 °F), or rise more than about 600 m in altitude above the IG fabrication and sealing location, during transportation. A greater temperature rise or altitude gain would need wider sealed unit separation in a pack.

MOCK-UP CONSTRUCTION

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, including both vision and spandrel glass, 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 hand held samples under interior lighting conditions.

See Bulletin ATS-169 for detailed glazing instructions and compatible sealants.

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Pilkington **Activ[™] SELF-CLEANING GLASS COATING QUALITY SPECIFICATIONS**

Standards

Pilkington **Activ**[™] glass meets the quality requirements of the current ASTM C 1376 “Standard for Reflective Coated Glass”.

When viewed in reflection or transmission, as described above, from a distance of 3 m (10 feet), the coating will not have objectionable, bands, streaks or color differences as detailed in the current ASTM C 1376.

Uniformity

At a viewing distance of 10' (3m), it is acceptable for some mottling or streaking of the coating to appear. Slight differences in adjacent lights may be visible.

Pinholes

There shall be no single visible spots on the coating greater than 2.4 mm (3/32”) diameter in the outer area, or greater than 1.6 mm (1/16”) dia. in the central area. There shall be no more than 2 readily apparent blemishes in a 75 mm (3”) dia. circle, or no more than 5 in a 300 mm (12”) dia. circle.

Scratches

Viewed from a distance of 3 m (10'), visible scratches longer than 76 mm (3”) shall not be allowed in the normal viewing area.

Quality Standard of Base Glass

The base glass shall meet the requirements for “glazing select” quality in the current ASTM C 1036.

Optical Properties of Pilkington **Activ[™] Self-Cleaning Glass**

Optical properties may be found in the current edition of the Pilkington Product Brochure.

The information contained in this bulletin is offered for assistance in the application of Pilkington North America Inc. flat glass products, but **IT DOES NOT CONSTITUTE A WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.** Actual performance may vary in particular applications.

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