



PILKINGTON

Technical Information

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2001, August 15

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 which makes raindrops spread out, or sheet, across the surface to wash away dirt particles. It also acts as a catalyst, when activated by sunlight, to break down organic dirt into water vapor and CO₂ gas.

Pilkington **Activ** Self-Cleaning Glass 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 should be on the outer (#1) surface and never against the pvb interlayer, as that would prevent the operation of the self cleaning action.

GLASS HANDLING

Care must be taken to avoid excessive contact with the coated surface of Pilkington **Activ** Self-Cleaning 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.

Pilkington **Activ** Self-Cleaning Glass should be cut, washed, heat treated, and generally processed with the self cleaning coated surface up to avoid unnecessary contact with other materials.

INSPECTION

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

UNPACKING

Pilkington Pilkington **Activ** Self-Cleaning Glass is shipped in either standard cases or stoces. Like other Pilkington glass products, the glass surfaces are protected with an interleaving material that resists moisture staining and abrasions between the individual lights.

Pilkington **Activ** Self-Cleaning Glass 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** Self-Cleaning Glass 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.

Pilkington **Activ** Self-Cleaning Glass 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 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 **Activ** coating.

WASHING

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

Pilkington Activ Self-Cleaning Glass Mechanical Washing

Pilkington **Activ** Self-Cleaning Glass 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. 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 **Activ** Self-Cleaning Glass, 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.

It is recommended that a test light be run through the washer before starting production. The glass should then be inspected, in transmission and in reflection, with a bright spotlight close to the reflective surface to determine if brush and/or air drying adjustments are needed. If abrasive materials are trapped in any washing implement, abrasion damage to the glass can occur.

Hand Washing

Pilkington **Activ** Self-Cleaning Glass can be cleaned and maintained by hand washing with non-abrasive cleaners. For hand washing Pilkington **Activ** Self-Cleaning Glass, 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 Activ coated surface.** See ATS Bulletin # 166 "Maintenance and Hand Cleaning" for details.

LAMINATING

Pilkington **Activ** Self-Cleaning Glass can be laminated, however it should not be laminated with the self cleaning coated surface towards the plastic 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 TREATMENT: Heat Strengthening, Tempering, Bending

Pilkington **Activ** Self-Cleaning Glass can be heat-strengthened, fully tempered or bent, after it is cut to size. Pilkington recommends that **Activ** Self-Cleaning Glass 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.

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

Overheating Pilkington **Activ** Self-Cleaning Glass 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 605°C (1121°F).

If the fabricator is experienced at heat-treating Pilkington ¼” Clear Float glass, those furnace and quench settings make an excellent starting point for the processing of **Activ** Self-Cleaning 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** Self-Cleaning Glass 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 **Activ** Self-Cleaning Glass coating.

Pilkington **Activ** Self-Cleaning Glass 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 1240°F (670°C) and a heating cycle time of 240 seconds as the starting point for ¼” thick **Activ** Self-Cleaning Glass test lights. Since each furnace is unique, furnace time and/or temperature adjustments will be required.

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** Self-Cleaning Glass 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 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. Although a complete listing of compatible sealant manufacturers is not available at this time, results indicate that the glass side of **Pilkington Activ Self-Cleaning Glass** is compatible with most major insulating glass sealants. The fabricator of **Pilkington Activ Self-Cleaning Glass** 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.

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.

PILKINGTON ACTIV SELF-CLEANING GLASS COATING QUALITY SPECIFICATIONS

Standards

Pilkington **Activ** Self-Cleaning Glass meets the quality requirements of ASTM C 1376 "Standard for Reflective Coated Glass".

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

Pinholes greater than 1/8" (3 mm) shall not be allowed. Clusters or close spacing of smaller pinholes visible from a distance of 6' (1.83m) shall only be allowed in an area of glass through which a person normally would not be looking.

Scratches

Viewed from a distance of 10' (3m), visible scratches longer than 3" (76 mm) 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 ASTM C 1036-91.

Optical Properties of Pilkington Activ Self-Cleaning Glass

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

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