

Introduction

Pyrolytic coated glass is float glass that has a metal oxide based coating applied and fused to the glass at extremely high temperatures during the manufacturing process. This process is technically termed Chemical Vapour Deposition (CVD). It is commonly used to apply Low E (Low Emissivity) coatings for thermal and solar control, as well as some self-cleaning, reflective and anti-reflective coatings.

Why are they made?

Standard float glass is a poor insulator. It provides protection from wind and rain but allows high levels of heat transfer and solar gain. Pyrolytic coated Low E glass addresses these problems by using metal oxide-based coatings that reduce the rate of heat transfer. Some variants also have reflective or solar-absorbing properties that provide greater control of solar heat gain.

Less common variants include:

- **Anti-reflective coatings** – reduce the natural reflectivity of glass, improving clarity for applications such as display glazing.
- **Self-cleaning coatings** – typically titanium dioxide, which breaks down organic dirt when exposed to UV light and encourages water to sheet across the surface (hydrophilic actions) to wash debris away.

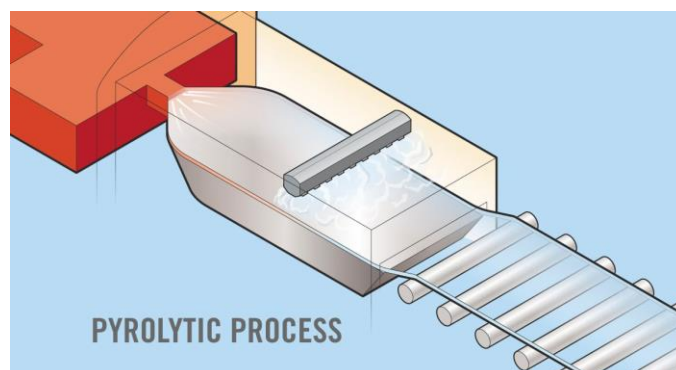
How are they made?

The coating is applied during the float glass manufacturing process while the glass ribbon is forming. As the glass exits the annealing lehr, a chemical vapour is sprayed onto the surface, bonding the coating into the glass and creating a durable finish.

Typical materials include:

- Tin oxide (SnO_2) – Base layer for conductivity and emissivity control.
- Doped tin oxide – Enhances infrared reflectivity.
- Titanium dioxide or silicon dioxide – Improves durability and surface quality.
- Silver-free composition – Pyrolytic coatings do not typically use silver, unlike soft coats.

Diagram 1. Pyrolytic process



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Benefits of Pyrolytic Coatings

- Coatings are bonded to the glass at ~650 °C, creating a hard, abrasion-resistant layer.
- Can be handled, transported, and stored like ordinary float glass with no need for edge-deletion or special protection during processing.
- Resist degradation from UV exposure and humidity.
- Suitable for single-glazed applications with an internally exposed coating.
- Can be cut, toughened, heat-strengthened, bent or curved, and laminated.
- Durable and more easily processed compared to soft coats.
- Enhanced surface temperature on the coated face can help minimise interior condensation.
- Can provide coloured or reflective aesthetics.

Compared with soft coatings (applied by magnetron sputtering under vacuum), pyrolytic coatings are thicker, tougher, and easier to process. Soft coats offer smoother surfaces with higher optical clarity but require full encapsulation within an IGU, are more delicate, and demand more careful handling.

Visual Expectations and Known Characteristics

Pyrolytic coatings can be thicker and microscopically rougher than standard float glass. Under strong or angled lighting, light scatter may create subtle visual effects that are expected characteristics of the product. These should be understood as inherent to pyrolytic coatings and not as manufacturing faults.

Known Optical Characteristic – Haze

After installation, some customers may observe a haze effect under certain lighting and viewing conditions.

This is a **known optical characteristic** of pyrolytic coatings, typically visible under:

- Oblique viewing angles
- Strong side-lighting conditions
- High coating thickness (enhanced solar control versions)

Cause:

- Microscopic irregularities in the coating scatter light.
- Shorter wavelengths (blue light) scatter more readily, sometimes producing a faint bluish halo.
- Higher-performance coatings with greater thickness can increase the effect.

This haze does **not** affect the structural integrity, durability, or thermal performance of the glass. It arises from the inherent coating structure, not from defects, contamination, or delamination.

Other Known Characteristics

In addition to haze, other visual effects may occur and should be expected:

- **Slight colour variation** between batches due to coating process tolerances.
- **Higher surface reflectivity** under certain angles compared to clear float glass.
- **Optical anisotropy** (rainbow effect) visible under polarised light sources.

These are not faults, but natural outcomes of the coating technology.

Diagnostic Assessment

To confirm the haze is inherent and not defect-related, a technical inspection should:

- **Verify installation cleanliness** – Check for residues, adhesive marks, or construction dust.
- **Assess coating location** – Confirm coating is on the intended surface and not exposed to external weathering where it's not specified.
- **Conduct comparative viewing** – Inspect sample panes under various lighting angles to determine consistency with expected pyrolytic optical characteristics.
- **Review batch records** – Ensure the supplied product matches the specified glass type and coating.

Recommended Resolution Pathway

Where haze or other optical effects are confirmed as inherent:

- **Customer Education** – Provide clear explanation, supported by comparative photos, that these are expected characteristics.
- **Design Guidance** – For projects with higher sensitivity to appearance:
 - Consider soft coat Low-E alternatives where optical clarity is prioritised.
 - Review glazing orientation and viewing angles during design to reduce perception of haze.
- **Performance Validation** – Reassure that thermal, structural, and durability performance remain unaffected.

If an inspection determines the issue is not characteristic (e.g. surface damage, contamination, or incorrectly manufactured coating location), Viridian will:

- Arrange replacement panes from the correct batch specification.
- Provide on-site technical support during inspection and installation.

Conclusion

Pyrolytic coated glass is a robust, versatile solution where durability, ease of processing, and performance are priorities. While some optical characteristics such as haze or colour variation are inherent to the coating technology, these should be understood as part of the product's nature, not as defects.

By setting clear expectations before supply, Viridian ensures that customers can select the right glass type for their project, balancing performance, durability, and aesthetics.

Disclaimer: Viridian Glass issues TechDirect™ documents to provide clarification on a range of topics and is offered as a general guide only. It is recommended the user should undertake careful evaluation and make suitable enquiries with a technical consultant.