

Application Note

What is a Transparent Window Heater?

Transparent Heater Windows are used for widely differing purposes from keeping food hot or cold to preventing aircraft windows from frosting over. In essence a Transparent Heater Window is a pane of glass with an application of transparent semiconductor coating that has electric current passed through the coating. The electrical resistance of the coating creates heat energy which heats the glass, which then radiates heat.

Transparent Heater Windows were originally developed during World War II for use on the wind-shields of aircraft. Certain aircraft were deployed to high altitude or cold weather environments and were susceptible to frost forming on the windshield which obscured the vision of the crew.

Several different types of Transparent Heater Windows exist. The most common form can be seen used in the rear window of an automobile as a de-fogger. The obvious flaw in using that particular iteration of the technology is the fact that it has visible lines which can obscure vision. For that reason Transparent Conductive Oxide coatings are used. TCO's come in several forms, but the three most common are Fluorine-doped Tin Oxide (SnO₂:F), Indium Tin Oxide (ITO), and thin stacks of oxides and metallic silver. ITO coatings are robust and suited for a variety of industrial uses.

Using a TCO in a transparent heater window also has another noteworthy property. The metal oxides used not only conduct electricity, but also reflect heat. Without a TCO the glass surface absorbs heat as a high-emissivity material. Adding the coating allows the glass to reflect heat as a low-emissivity material.

Transparent Heater Windows are used in a wide variety of applications today. They are used in supermarket freezers and cold item displays to reduce the amount of environmental heat that reaches the contents while allowing customers to view what is inside. These windows are also used in outdoor security camera housings to prevent frost from forming and obscuring the view of the camera. Please call us to discuss how this technology is, or could be, used in your application.

Application Note

What is a Transparent Window Heater?

Glass Fabrication



Coating Deposition



CNC Machining



Strengthening - Chemical & Heat



Screen Printing of Graphics



Abrisa Technologies, a member of HEF Photonics, is a globally recognized technology glass fabrication and optical thin film coating company with expertise in high volume manufacturing and engineering capabilities, delivering Total Solutions that provide excellent performance, fitness-for-use and economies of scale.

Our US based, state-of-the-art ISO 9001:2015 and ITAR registered facilities include Abrisa Industrial Glass in Santa Paula, CA and ZC&R Coatings for Optics in Torrance CA. These two divisions produce solutions from cut-to-order coated glass components to custom complex and ready-to-install fabricated, strengthened, optically coated, electronically enabled and branded sub-assemblies.

Our Total Solutions serve a variety of markets including Micro-Electronics, Defense and Avionics, Display, Industrial Automation, Optical Sensors, Imaging, Photonics, Medical & Dental, Life Science and more.



Abrisa Industrial Glass
200 South Hallock Drive
Santa Paula, CA 93060

ZC&R Coatings for Optics
1401 Abalone Avenue
Torrance, CA 90501

(877) 622-7472

www.abrisatechnologies.com
info@abrisatechnologies.com