

The manufacturing, processing and distributing of bus side-glass in the UK

The glass that is used as body side-glass in buses (**safety toughened glass**) is very strong, but when broken, breaks into small blunt cuboid fragments rather than irregular sharp shards of glass, thus making it the ideal safety glass for transport, it will carry a trade **kite-mark** stamp either BS: 857 or E43R.

Ingredients consisting of silica sand (73%), soda (13%) and lime are mixed together with re-cycled glass (**cullet**) and delivered into the feed hopper of a furnace that has been fired up to a high temperature of around 1500°C. The ingredients dissolve together and melt down into a pool of hot liquid called **molten glass**.

The molten glass which is now around 1000°C is poured into a huge bath through a delivery canal. The glass then flows out onto a molten tin surface – up to ¼ mile long – then spreads out to form a floating ribbon 3210mm wide with perfectly smooth glossy surfaces on both sides with a perfectly even thickness, which can be anything from 3mm to 25mm. The glass which is highly viscous and the tin which is very fluid do not mix so the contact surface between these two materials is perfectly flat. This is called the **float process**.

As the glass flows along the liquid tin, the temperature is gradually reduced down to around 600°C until it is hard enough for it to roll onto a conveyor. It then passes through a long kiln - called a *lehr* - where it is cooled slowly down so that it hardens without strain and does not crack from the change in temperature – the glass at this stage is called **annealed glass**.

The glass travels down the rollers in the *lehr* for about 100 metres and comes out at the "cold end" where it is cut by machines into jumbo sheets 6000mm x 3210mm. Jumbo sheets of annealed glass fit under the trailer of a special transporter for dispatch to a toughened glass processing facility.

A computerised machine will take all the information from a technical drawing to cut the glass to shape followed by any special edgework grinding and drilling holes. If the glass needs a black band (ceramic) around the edge, this is applied at this stage.

The glass is placed onto a roller table, taking it through a furnace that heats it to above its annealing point of about 600 °C. The glass is then rapidly cooled with forced draughts of air while the inner portion of the glass remains free to flow for a short time. This process is known as **tempering** and glass produced at this stage is called **tempered or toughened glass**.

A **specialist glass distributor**, like **PSV Glass**, will store toughened glass for body side-glass and laminated glass for windscreens in specially developed warehouses ready to deliver to bus garages on a '**next-day**' basis but will have '**imprest**' stock (stock owned by the distributor, but only charged when used) already in the bus garage stores for emergencies.

When a glass needs to be replaced it will either be fitted in the bus a thick rubber type gasket with a 'H' cross-section or will be **bonded** directly onto the body frame using special primers and adhesives that may need several hours to 'cure'.

To protect the glass from scratches, it can be coated with a very thin sheet of sacrificial polyester film.