ANALYSIS AND TESTING

Analysis and testing is critical to all stages of the glass manufacturing process from the initial starting materials, through the melting and forming to the processes used for manufacturing the final product be it an automotive windscreen, solar control or fire-glazing product.

All samples analysed at the Pilkington European Technical Centre are computer tracked using a laboratory information management system (LIMS) and all testing is performed to the demanding QS 9000 standard with specialist techniques validated against

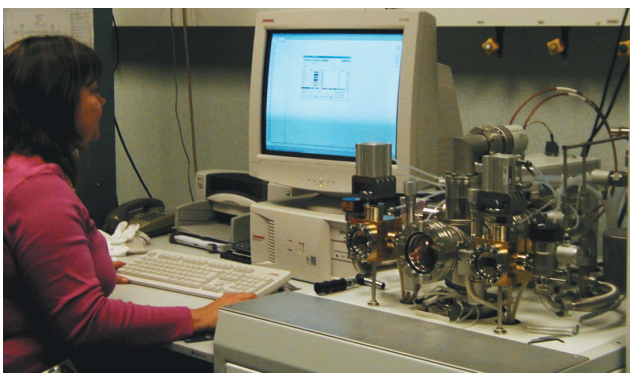
AA spectrometer for trace element analysis

international standards generated by the Technical Committees of the International Commission for Glass.

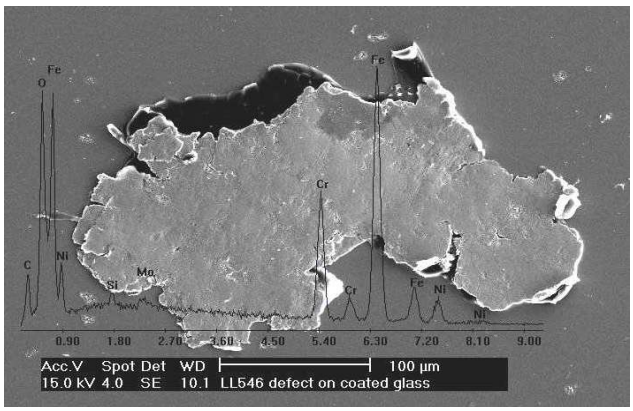
We perform regular bulk chemical analyses of glass and raw materials to maintain high quality in our basic glass product using automated X-ray fluorescence spectrometers. Sometimes this requires the separation and identification of millimetre sized contaminant particles in kilograms of batch material – a process at which we are particularly skilled. Important trace elements are routinely determined to levels of one part in a thousand million using an atomic absorption spectrometer. While using advanced instrumentation we have not forgotten the classical, wet chemical methods which we use for calibration. We have many hundreds of glasses and raw materials which we use as standards for this work.

Pilkington must ensure that microscopic bubbles which form in the melting process do not survive into the finished product, especially for critical automotive applications. A key to identifying the source of these bubbles is to analyse their gas content. We use a number of purpose designed mass spectrometer systems to analyse volumes of gas in these bubbles as small as 10 nanolitres – about one five hundredth of the volume of a pinhead!

The ability to break open a bubble in vacuum, extract, and then analyse the tiny amounts of gas they contain is a capability which



Mass spectrometer bubble analyser



Analysis of contaminant particle

is available at only a few specialist laboratories around the world – the European Technical Centre is one of them.

Producing the basic float glass is only part of our activity. Coated glasses are important products for Pilkington and a range of highly sophisticated instruments are used to chemically and physically analyse surfaces, thin films and coatings. Analytical Scanning Electron Microscopy is used to solve problems, e.g. relating to automotive inks, where a highly magnified image of a surface can be obtained at the same time as details of the chemical composition of the imaged areas. This highly magnified image shows a contaminating particle on a coated glass which can be identified as stainless steel from the superimposed element "fingerprint" trace.

Similar techniques can be used to analyse the composition through the thicknesss of multi-layer coatings with a resolution down to only a few tens of atoms. These capabilities are key to developing high performance coatings for automotive and building products.

Fire glazing test

Analysis and testing is not limited to the small scale. At times it is necessary to test full scale glazing products to the demanding requirements of building codes or automotive regulatory specifications.

We therefore maintain comprehensive large scale product testing facilities able to simulate a wide range of conditions. These range from electronic test facilities to qualify the performance of integrated aerials on car backlights through to environmental chambers simulating driving rain or fire on architectural glazing and ballistic ranges to reproduce bird strike effects on aircraft windscreens.

Shown on the left is a full scale fire glazing test where an instrumented glazing panel forms one face of a furnace and is exposed to high temperature combustion conditions. In this way the lifetime of the panel under these severe fire exposure conditions can be assured.

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