

ceramic or high melting-point metallic components. Both methods use rolled sheets of platinum alloy (for example, 10%Rh/Pt or 20%Rh/Pt, measured in wt.%), which are cut, formed and welded to the requisite shape. Extremely complex and sophisticated fabrications can be achieved using these processes.

However, with such a precious resource, optimisation of its use is essential and in order to minimise the amount of platinum the thicknesses of the platinum fabrications should be as small as possible. There is, however, a minimum thickness

below which the sheet is not sufficiently strong to support itself and contribute its protective and/or containment function.

## Platinum Coatings

An alternative technique, which utilises the beneficial properties of platinum in a far more efficient manner, is by thermal spraying a protective platinum layer directly onto the glass-contacting surfaces of the production equipment. This process, known as advanced coating technology, ACT™ (2), has the capability to render the

### ACT™ Platinum Coatings

ACT™ platinum coatings are applied by a thermal spray deposition process. Platinum in wire or powder form is fed into an oxygen-propylene or plasma flame. The residence time within the heat source is carefully controlled to ensure that the platinum is melted without vaporising it. A compressed gas stream fires the molten droplets onto the surface to be coated. The droplets 'splat' on impact and solidify almost instantly. The large differential in thermal mass between the molten particles and the substrate means that the component normally experiences only a slight increase in temperature during the deposition process. A continuous feed of wire or powder ensures a uniform, even stream of thousands of droplets per second. Successive 'splats' build up to form the coating.

The thermal spray gun is controlled by a sophisticated multi-axis robot. The precise control of speed and motion obtainable ensures that even, reproducible coatings can be achieved. Coatings are applied in a purpose built coating booth which collects any 'over-spray' platinum, thus minimising loss of metal.

Correct preparation of the substrate material is vital to the integrity of the bond between substrate and coating. Great care is taken to ensure that the ceramic surface is in optimum condition to allow maximum adhesion of the coating. The substrate preparation methods allow the ceramic surface to be imperfect: minor defects can be rectified, but the number should be kept to a minimum.

*The ACT™ platinum deposition process is being used here to apply a thin layer of platinum to a fusion-cast ceramic block which will cover glass delivery channels. Thermal spray techniques and sophisticated robotic systems ensure that the distribution of the platinum coating matches the carefully designated coating profile; for instance, two thicker (darker) bands of platinum can be seen on the upper surface*

