



A flight deck view of the windscreens on the Anglo-French Concorde with the visor in the raised position.

Triplex in Concorde: The story behind the film.

The Anglo-French Concorde is the world's first supersonic transport aircraft. The first of a new generation of long distance, high speed civilian jets, and Concorde, like every new aircraft, has raised new problems for designers. In this case the problems are in the field of solar radiation and kinetic heating. And although the aircrew probably won't realise it, as much research has gone into the design of the flight deck windows as into any one of the complicated control systems. Sud-Aviation and BAC, realising the need for the most advanced windscreen and visor glass available, chose Triplex to provide it.

Triplex have a long tradition of service to the aircraft industry and have produced windscreens and windscreen heating systems for the De Havilland Comet, the TSR2, the Hawker Hunter, the Bristol 188 and the VC10. It was this invaluable experience and the vast research facilities available that made Triplex the logical choice to supply the glass for Concorde.

The Golden Windscreen Both the windscreen and the protective visor for high speed flight use the Triplex Gold Film System for de-icing and de-misting. The glass surface itself is used as a base for a conductive coating. A multilayer coating containing a thin film of gold less than two ten millionths of an inch thick, which is

deposited by a process of cathodic sputtering, is laid on the glass. Uniform heat distribution is ensured by careful grading of the coating over both curved and flat surfaces. Depending on the conditions under which the heated glass will operate, its position on the aircraft and the thermal effects to which it is exposed,



A view of the Concorde cockpit test rig which shows how the Triplex visor is withdrawn into the nose for low level flight.

up to 900 watts per square foot of surface (100 watts per square decimetre) may be needed to guarantee fully effective de-icing and de-misting. The Gold Film gives a distinctive golden tint to the windscreen. This tint in no way effects the pilot's vision, but it does prevent dazzle and acts as a shield to harmful ultra-violet and infra-red radiation.

The High Speed Shield At the very high operating speeds planned for Concorde skin temperatures will reach new levels, and this has posed several problems for Triplex designers. A visor has been designed which will shield the windscreen proper at supersonic cruise speeds. Specially chosen, chemically toughened glass, 2mm. thick to save weight is used in the visor. These panels are laminated with a silicone 'K' interlayer which will withstand cruise temperatures in excess of 100° C. The actual flight deck windscreen is made from three plies of $\frac{3}{8}$ inch thick toughened soda lime glass with polyvinyl butyral interlayers. This gives full pressure resistance with fail safe properties and is proof against strikes by birds weighing up to 4 lb, at over 500 m.p.h. All the visor panels, flight deck windscreens and side panels use Triplex Gold Film heating.

That in brief is the story behind the windscreens in Concorde, a good product developed after a long and exacting research programme. If you need any advice or help with aircraft windscreen problems contact: Aviation Sales Manager, Triplex Safety Glass Co., Ltd., (Aviation Division), King's Norton, Birmingham, 30, England.
Tel: 021-458 2031.

Triplex
GOLD FILM HEATING

