



Serpentine Gallery Pavilion 2009



Since its inception back in 2000, the Serpentine Gallery Pavilion has become one of the most anticipated events in the global design calendar. The Pavilion presents the work of a leading international architect who, at the time of the Serpentine Gallery's invitation, had not previously completed a building in England. Beginning with Zaha Hadid in 2000, through to Frank Gehry in 2008, the list of previous designers reads like a 'Who's Who' of cutting edge contemporary architects. The immediacy of the process – a maximum of six months from invitation to completion – provides a peerless model for commissioning architecture.



The 2009 pavilion was designed by Kazuyo Sejima and Ryue Nishizawa of the Japanese architectural practice SANAA.

A reflective cloud-like structure, it was a form that required an innovative approach to engineering and an in-depth understanding and capability of working with different materials. Our experience in developing and manufacturing composite sandwich panels enabled us to work closely with engineering advisors Arup to accomplish a number of design solutions in order to produce the complex geometry and demanding finish that was specified.





SPECIALIST MANUFACTURING

The roof structure used a sandwich panel technique comprising an 18mm plywood core with 3mm aluminium skins, mirror polished to achieve the architects' design intent. In order to accurately achieve the fluid shape, the 172 individual panels were CNC cut, with the structural continuity of the overall 565sqm design being achieved by developing and manufacturing an ingenious interlocking 'teeth' system. The curvature of the undulating design was controlled by a combination of the 118 columns with unique lengths, specially designed connections and pre-curved panels.

The 118 columns and column heads were manufactured from superduplex steel, a high strength stainless steel alloy. The columns were either 40mm or 60mm in diameter and ranged in length from 1.1m to 3.9m. Importantly, the column heads were adjustable, compensating for the difference in angle between the vertical columns and the undulating roof, allowing for both the geometry and overall aesthetic of the design to be achieved. Invisible fixings were also used and embedded within the sandwich, minimizing impairment of the mirror-polished roof.

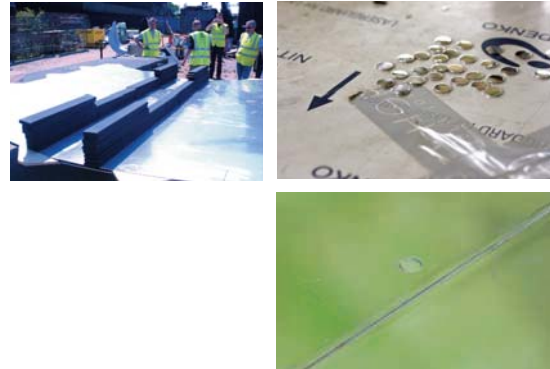


TESTING AND DEVELOPMENT

With such innovative projects, research and development becomes an inherent part of the manufacturing process and this project saw us working with Arup and the design team in validating certain aspects of the designs through testing. The correct adhesives for the innovative new ply and aluminium sandwich panel design were duly tested and selected, along with one of a higher strength for the column heads.

We also helped develop a pattern of fixings that met both the structural and aesthetic requirements, using tools more commonly associated with aerospace manufacturing in order to produce a flush, invisible fixing detail that met the architects' requirement. Such collaborative involvement in the design and manufacturing process helped maintain design integrity and maximized the client's creative freedom.

We also produced two curved acrylic walls, 25mm thick and comprising of 37 panels approximately 2m by 2.5m. These were of varying height, meandering within the building itself. The complex installation process took 6 weeks, with a team of up to 12 crew working on site at the Serpentine Gallery in central London where the pavilion was located on the Gallery's lawn for its three-month tenure.



MANUFACTURE: STATISTICS

- Roof: 565 square metres
- 172 unique panels
- 118 stainless steel posts
- 6,000 screw caps
- Finish: polished aluminium
- Time Frame: 3 months

