

## Case Study Bibliothèque Nationale de France, Paris



### The Project

With its four corner towers comprising of more than 60000m<sup>2</sup> of structurally glazed monolithic glass panels, the Bibliothèque Nationale de France is one of the most imposing features along the banks of the River Seine. Designed to resemble four open books, each facing one another, architects of the new national library have created an environment which meets the convivial demands of academia, whilst allowing an inquisitive public to appreciate the cultural aspects of the library. Vast expanses of glass facade generate working areas bathed in natural light and open up a magical view of the city of Paris.

The primary function of the design is the preservation of millions of rare books, which, together, constitute the unique collection of the old national library. Working closely with Dow Corning, architects designed the towers and base building with structurally glazed facades comprising of two main skins. The thermal performance of the building, essential to book preservation, is maintained by an airflow system whereby pulsed air is continuously circulated between the two glass facades. Inside, the towers are interconnected by a network of circulation services which allow books to remain in optimum conditions whilst studied by readers or researchers.

The use of glass panels, each 1.8 x 3.6 metres, had the potential to cause serious aesthetical problems for the designers. Standard architectural design would have demanded a very thick structural joint, which would have impaired the transparency of the structure, thus minimising the impact of the structural glazing. The problem was solved by designing structural silicone joints, without the use of supporting setting blocks, to allow a perfectly isotropic and uniform dilatation of the glass and aluminium, decreasing the shear movement on the silicone joint by a factor of two. In this case, however, the silicone joint not only had to withstand the dynamic effect generated by wind pressure, but also support the weight of the glass.

### The Product

Dow Corning® 993 Structural Silicone Glazing Sealant, a two component neutral curing silicone sealant, was specified for this project. The sealant was successfully tested and qualified at the Centre Scientifique et Technique du Bâtiment (CSTB) to resist a constant stress level corresponding to 15000 Pa. This stress is representative of the tension and shear load generated by the effect of the wind, thermal dilatation and the constant weight of the glass unit.

Dow Corning 993 has been specifically developed to meet the stringent requirements of the proposed European standard for structural glazing. It offers superb structural capability, together with enhanced adhesion to substrates, including coated, enamelled and reflective glasses, anodised and polyester coated aluminium and stainless steel.

The Dow Corning structural silicone sealant specified in this project underwent rigorous testing to ensure it met the high performance requirements set by the architect. Project drawings were reviewed for joint dimensions, whilst adhesion testing was conducted on each daily production run of aluminium used in the project. All Dow Corning testing procedures are mandatory during the design and initial construction phase of a structurally glazed facade.

Through the use of Dow Corning 993, architects were able to design and construct a new national library which embodies the spirit of a nation's culture. The blend of function with aesthetic splendour has created one of the new breed of magnificent structures which guard the banks of the River Seine.

<b>Building:</b>	<b>Bibliothèque Nationale de France</b>
<b>City:</b>	<b>Paris</b>
<b>Country:</b>	<b>France</b>
<b>Product:</b>	<b>Dow Corning® 993</b>
<b>Architect:</b>	<b>Dominique Perrault</b>
<b>Curtainwall:</b>	<b>Rinaldi Structural / Harmon CFEM</b>

### The project:

- **The Bibliothèque Nationale de France (the new national library) was designed to resemble four open books, each facing one another. It is one of the most imposing features along the banks of the River Seine. The four corner towers comprise of more than 60,000m<sup>2</sup> of structurally glazed monolithic glass panels.**
- **The thermal performance of the building was essential for book preservation. The architects worked closely with Dow Corning to design the towers and base building with structurally glazed facades. The glazed facades comprise of two main skins which air is continuously circulated between for the airflow system.**
- **On the glass panels (1.8 x 3.6 metres) structural silicone joints were designed without the use of supporting setting blocks, allowing a perfectly isotropic and uniform dilatation of the glass and aluminium and decreasing the shear movement on the silicone joint by a factor of two.**

Business & Technology Centre

Dow Corning  
Parc Industriel - zone C  
B-7180 Senefte

Tel. +32 64 888 000 Fax. +32 64 888 401

European Press Office, GCI Group

30-34 New Bridge Street

London EC4V 6BJ

Tel. +44(0) 207 072 4000 Fax. + 44(0) 207 072 4010