



4. STRUCTURAL GLAZING

4.1 General Information

Since its introduction in the early 1970's, structural sealant glazing has become an increasingly popular design choice among architects.

Structural Glazing is used in the following systems:

1. The "Panel system".
A conventional framing system with structurally bonded panels inserted into the grid. In this case the primary weather seal is usually silicone or EPDM gaskets.
2. The "Strip-window" system
Horizontal or vertical bands with two sides of the glass bonded to a supporting structure.
The other two sides are fixed by mechanical means.
3. The "Total-wall" system
Complete smooth glass wall in which the four sides are bonded to the metal supporting structure with a continuous silicone weather seal

This last system in particular has found increasing aesthetic appeal in recent years and is now frequently employed. The application of insulating glazing in a total wall system is the natural progression to this technique to ensure maximum thermal insulation to the building.

4.2 Technical Information

"Structural glazing" is a system of bonding glass to the building frame with adhesive sealant in order to transfer negative and positive wind-loads to structural framing members utilising recommended silicone sealant instead of the glass being captured by conventional glazing beads. This facade design concept, results in an all-glass facade allowing a completely flush appearance to the exterior of the building, with the glass supported off the internal aluminium framing structure by the silicone sealant.

The system utilises the unique properties of silicone sealant not only for sealing the building from the elements but also for transferring structural loads from the glass to the perimeter structural support. Structural glazing techniques also allow a completely flush appearance on the exterior of the building, with the glass supported from the interior of the structure by the silicone sealant.

The strength of the bond, adhesion to both glass and metal, weather resistance and ease of application are the advantages of silicone high modulus sealant.



The basic components of a structural glazing system are:

1. The structural aluminium or steel framing
2. The glass
3. The high modulus silicone sealant, spacers, setting blocks and gaskets

Each of these components must work in concert with the other whilst performing its primary function.

The structural framing members designed to strength requirements, similar to those found in curtain walls where deflection is a limiting factor, will normally be of extruded aluminium finished with an approved coating, applied under controlled factory conditions. This coating is a material that is compatible with silicone sealant and no other material should be used. The glass panels are designed to cope with all stress loading such as wind-loads, expansion and contraction and secured to the aluminium framing by means of the high modulus silicone sealant.

Properties

Several aluminium system providers have developed the structural glazing technique using the structural sealant to hold the glass in place, thereby completely eliminating the need for metal fasteners. As a result, the skin of the building is totally flush and presents a smooth exterior glass surface without visual interruption of conventional mullions and transoms.

The most obvious aesthetic advantage of mullion free facades can be further enhanced by the use of reflective solar control glasses on the second surface of the insulating units.

A further advantage of structural glazing units is that there will be less risk of thermal failure of the glass since the total surface is exposed and will heat up evenly. The system has advantages with regard to differential expansion of the various materials making up the building structure due to the flexibility of the silicone sealant,

The use of silicone sealant in lieu of conventional metal mullions helps eliminate problems that arise in conditions of heavy rain. A standard glazing system is susceptible to water cascading down and finding its way into metal pockets and eventually penetrating the metal grid system. By using the completely flush silicone sealant system, the water problem is minimised. In addition, the structure is rendered water and air-tight under conditions of positive and negative wind loads.

High wind and rain usually accompany low barometric pressures that increase the pressure differential on the side of the building being buffeted by heavy wind and rain - a condition that is sure to find the smallest leak point. The opposite side of the building and the sides across which the wind is blowing may have lower pressures than the interior of the building, this will exert outward pressure (suction) on windows and panels, thus a more likely ingress of water.



4.3 Installation Guidance

The following parties should collaborate from the outset in the development of a project in order to achieve a successful structural glazing installation.

1. Fabricator of the metal supporting structure
2. Insulating glass manufacturer
3. Silicone manufacturer
4. Installation Contractor.

To ensure a successful installation (assuming that the framing system meets the structural qualifications specified) the drawings and loading requirements should be submitted to the glass supplier and the sealant/adhesive manufacturer for approval in writing. Upon receipt of these approvals, samples of the actual metals to which the sealant/adhesive is going to be applied, samples of the glass, samples of the spacers, and samples of the setting blocks, should be sent to the sealant/adhesive manufacturer for testing and approval.

The sealant must adhere to the metal or painted surface. The sealant manufacturer will specify what type of treatment and/or primer is required to attain the satisfactory results. It is also recommended that samples of the materials that are shipped or are on the job site be submitted for test. Often the surface of the job site material is different from the samples previously submitted for test. For example, a small change in the aluminium anodising process will change the surface adhesion characteristics.

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