

Fire Resisting Glass

Introduction

When ordinary annealed glass is subject to a rapid build-up of heat from one side or unevenly across its surface, it will crack and generally it will quickly fall away from its frame.

Partitions, doors and windows containing traditional annealed wired glazing based on soda lime silica, can be used to give periods of fire resistance of up to 90 minutes according to the requirements of the appropriate part of BS 476, in terms of stability and integrity.

Recommended Glazings

Wired Glass panes 6 mm thick and not exceeding 1.2 m² in area.

Copper Light Glazing unwired glass 6 mm thick with the individual panes exceeding 0.015 m² in area.

Panels of copper lights should not exceed 0.4 m² in area, but composite panels may be assembled by the use of metal dividing bars.

Unwired Fire Resisting Glass

Borosilicate Glass (eg Pyran)

6.7 mm thick with minimum area of 300 mm x 200 mm and a maximum area of 2000 mm x 1200 mm.

Laminated Float Glass (eg Pyrostop and Pyrobel)

Varying thickness 11 mm to 19 mm with a minimum and maximum area (see description later).

Glass in Wood Frames

The sections of the frame, dividing bars, beads and rebates should be such as to ensure that, at the end of the required test period, there is sufficient uncharred wood to retain the glass. Another limiting factor is the heat transferred by radiation, conduction and convection from

the glass to the beading and the wood surround on the side away from the fire. Because of this wood beading is likely to need protection.

Thirty Minute Fire Resistance

Wood frame members of dividing bars for wired glass and copper light glazing should be not less than 56 mm deep and 44 mm wide with the rebate worked from the solid material and of minimum depth 13 mm. Wood beading which should not be less than 13 mm wide and 5 mm deep can be protected with intumescent paint, but a more durable method using metal capping is preferred.

Alternatively, non combustible beads may be used. these should neither melt nor disintegrate at temperatures up to 900°C.

Glazing in Metal Frames

Thirty Minute Fire Resistance

All frame members, including dividing bars, should have a melting point of not less than 900°C.

Glazing in Reinforced Concrete Frames

Subject to suitable non combustible beads being used, or to the glass being glazed into channel, sixty minutes fire resistance can be achieved with concrete frames reinforced in the ordinary way with steel.

Glazing in Plastic Frames

Plastics will normally soften or char under fire conditions and frames without rigid reinforcement will therefore not be suitable for a fire resisting glazing system. For fire resisting purposes an appropriately designed steel reinforced plastic window should be able to give a fire rating of up to sixty minutes, but test data will be needed.

Unwired Fire Resisting Glass

Unwired glass products able to satisfy the requirements for stability and integrity are available and some products also provide insulation for at least 30 minutes.

Borosilicate Glass

Borosilicate glass (one example has the trade name Pyran) has an optical quality nearly like that of normal glass. Panes of the glass undergo thermal treatment and subsequent cutting, drilling and machining are impossible.

Unwired Float Glass (Laminated)

Unwired float glass (examples have trade names Pyrostop and Pyrobel) consist of several float-glass sheets with fire protection layers between them and in the event of fire the intumesence absorbs the heat. Up until that moment the glass remains transparent. Such glass sheets are delivered but to size and cannot afterwards be cut. The glass of one

manufacturer is 15 mm thick with a minimum area of 100 mm x 100 mm and a maximum area of 1100 mm x 2000 mm.

Such glass may, when treated to BS 476: Part 22: 1987, obtain satisfactory fire rating certification for stability, integrity and insulation.

Glazing in Internal Walls

Fire resisting glass that meets the requirements of BS 476 in terms of stability and integrity, nevertheless permit local high heat transmission and radiation through the glazing and so are unable to satisfy the requirements for insulation for more than a few minutes. Such heat transmission and radiation can constitute a hazard to people escaping nearby and could ignite adjacent combustible materials.

Where an escape route is bordered by a glazed screen, a person using the route in the event of fire must not be exposed unbearably by radiation. This is achieved by a limitation being placed on the maximum overall size of the glazed area or by keeping glazing 1.1 m above floor level.