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The Doors of Perception is a well known piece by English writer Aldous Huxley detailing his experiences under the influence of drugs.

You will be pleased to know that the writer of this article is not under the influence of illicit substances save the strong black coffee consumed at breakfast this morning.

However, it is the perception of what is assumed to be a fire resisting door that this commentary is hoping to highlight. In particular, when to glaze and when not to glaze is a subject that needs particular investigation.

Clients, architects and contractors now have a wide choice of clear fire resisting glass products. The manufacturers of these materials all use different chemical or processing techniques to produce products offering high visual clarity.

It is no wonder then that in the modern built environment, these products are specified and used to make buildings feel less claustrophobic and provide natural light to building occupants.

A “timber” fire resisting door-set is a complex design which brings together a wide variety of components that all interact correctly in the event of a fire.

In the majority of cases, the construction of non metallic fire resisting doors in the UK will be based on either,

- Strips of timber glued together vertically to form the core,
- Chipboard or flax-board sheets cut into pieces and glued together,
- Wood particle cores
- Timber stiles and rails forming an opening, in the case of a fully glazed or 2XGG door

Each of the above offers both advantages and disadvantages when used to produce high quality products.

The “bolt on” items that are used in conjunction with the above are very critical in ensuring that in the event of a fire the door will perform its function to provide effective fire compartmentation for a pre-defined period. These items include, the facings, adhesives, the leaf framing, intumescent materials, ironmongery and glass to name just a few.

Intumescent materials use a variety of chemical formulations to trigger their response in the event of a fire. This is a complex subject in itself, so a door manufacturer will obviously consider this when selecting the material best suited to their core substrate. In some cases intumescent is not just used around the door edge to seal gaps, but maybe used between the core and the timber outer frame prior to it being bonded to the core. In addition many of the fire resistant glazing sealants used today are also intumescent based.

As most of the door types highlighted above are manufactured as solid blocks, then to put a glazed vision panel into them requires an aperture(s) to be cut into them. This process can weaken the core so it should not be undertaken without checking with the door manufacture or processor first.

It may be that the core has been successfully fire tested with a glass opening but the size and the position of the opening may well be critical. Some door types need minimum distances from the door edges to be maintained. Site working of this should be discouraged as the forming of an opening should only be undertaken by a specialist that understands these and other issues.

The glazing beads also play a pivotal role in the fire performance. Typically people tend to talk in terms of hardwood and softwood when discussing glazing beads and frames. This however is too simplistic. Issues such as density, moisture content, grain structure to name but three are all relevant here.

For example, some hardwoods have a propensity to distort very quickly when subjected to a fire. If this timber is used as a glazing bead then this distortion could cause certain glass types to shatter prematurely, or the glazing seal could fall away from the glazing pocket. Other hardwoods can char extremely quickly, thus the bead on the fire side may fall away into the fire. Again advice should be sought from the door producer or glazing system supplier.

As previously mentioned the glazing seal must be compatible with the glass product being used in conjunction with the beads. In addition, careful consideration must be given to the bead fixings. The fixing type, orientation, distance between each one, distance from the corner mitres and size are all critical. Get the detail wrong and malfunction can occur in the event of a fire.

The classic question my Technical Department get asked regularly is; How much glass can I have in a fire resisting door? The simple answer is as much as you want provided the door has proven by fire test it can accommodate the aperture size being requested.

Many of the door producers using chipboard, Flaxboard and wood particle door cores have tested with reasonable sized glass openings. However other points should be considered such as, safety in terms of impact resistance and in Table A4 of APD B Fire Safety (page 127) some limitations are placed on the amount of un-insulating glass that can be used in certain situations.

The term insulating and non-insulating has been discussed in many articles on the subject of fire resisting glass and glazing. To recap here, glass that provides integrity in terms of fire is the ability to withstand fire exposure on one side without transmission of fire as a result of the passage of flames or hot gasses.

Insulating glasses (in terms of fire performance) is the ability to do as integrity glasses in addition to withstanding fire exposure on one side without the transmission of fire to the unexposed side by limiting heat transfer due to conduction, convection and radiation.

Put simply. If the door together with an insulating glass is used, then there would be no restrictions of the amount of glass that is used, provided the complete door/door-set has been fire tested and achieved an appropriate level of fire performance.

With me so far? Then read on. Like studying French it gets more complicated as we get into the detail!!

The beauty of using timber in the construction of buildings is that depending upon which timber is used, a very traditional or indeed a modern “funky” (apologies to James Brown) feel can be achieved.

If the client wants a truly fully glazed door then a joinery or 2XGG type door is likely to be required. These types of door are often seen in hotels, restaurants, bars and modern health clubs the length and breadth of the land.

This hardworking scribe can often be found in these establishments both enjoying the hospitality and indeed looking closely at many of these doors that have been installed on the basis of them being fire doors. On close inspection it is obvious that the “fire door” has been cobbled together using some clear fire resisting glass, maybe some intumescent materials and fitted with a surface mounted door closer.

I would contest that many of these products would give only a very short period of fire resistance and will certainly not have undergone any fire testing. This is actually disappointing as a number of companies have carried out expensive research and development and now have products that have been fire tested for both integrity and integrity/insulation.

Products such as Firestile® have large areas of clear glass incorporated into them. In the design of this product, a great deal of thought went into the timber species, the actual construction, adhesives, glass type, intumescent types (4 different chemical combinations were used), the door closer and hinges to name but a few.

The hinges chosen were not simply selected for their fire resistance; consideration also had to be given to if these hinges could support the weight of the door both when they were fitted but also during the life cycle of the building. The same is also true of the closing device.

The aim of this diatribe was to try and bring just some of the issues relating to this complex subject to the forefront. Industry has recognised this and therefore a number of initiatives have been undertaken by various trade bodies.

The Fire Resisting Glazing Group of the Glass and Glazing Federation has published “A Guide to Best Practice in the Specification and Use of Fire-Resistant Glazed Systems”. This 80 page document gives very practical guidance with a series of Best Practice Rules. If the thought of reading an 80 page tome makes you reach for nearest pot of valium, then the GGF have condensed this into a 30 minute CPD approved seminar. The Association is currently engaged in writing a NVQ on this subject and it is hoped it will be available early next year.

Individual members of the Association like Mann McGowan also have CPD rated seminars which they are happy to present to interested parties. These seminars are generic and will provide valuable information in the specification and use of fire resisting glazing systems.

Further help is also at hand from both the British Woodwork Federation, who have introduced the Certifire 3rd party accreditation scheme for fire resisting doors, and the Architectural and Specialist Door Manufacturers Association have published a Best Practice Guide to Timber Fire Doors.

The Certifire Scheme is run on behalf of the BWF by Bodycoat Warrington. Products are not just simply tested against the standard fire test temperature curve. Factory control, compliance with ISO 9001: 2001 and yearly audits all play an important role in the ongoing approval of fire resisting products to ensure they are completely fit for purpose.

All these initiatives have been forged in the hope that when a fire resisting doors is specified, the client gets what they are paying for and not a hotch-potch of non compatible components.

End.

About the author

Kevin Hulin is Joint Managing Director of the Mann McGowan Group, who specialise in the manufacture and installation of Pyrovista® fire resisting glazed screens and Firestile® fire resisting glazed doors. He has worked in the field of passive fire protection since 1981 and witnessed over 100 fire tests in many parts of the world. He is Vice Chairman of the Fire Resisting Glass and Glazing Group of the GGF.

