Glass and Glazing Federation

Technical Standards
Reference Number 21.1
September 2014

Glass and Glazing Federation Standard for:

The Specification and Installation of Fire-Resistant Barriers containing Glass for Resistance against the passage of Fire and Products of Combustion

FOREWORD:

The Glass and Glazing Federation (GGF)

This industry standard has been produced by the Fire Resistant Glazing Group (FRGG) of the Glass and Glazing Federation (GGF), the responsible body for the UK's glass and glazing industry.

The FRGG is the specialist group within the GGF responsible for understanding the criteria that affect glass and glazing system behaviour in fire and for evaluating the conditions that affect the performance of such systems in practice. Members provide a cross section of this specialist technology sector, including manufacturers, test authorities, suppliers and installers not only of glass but also of glazing systems and glazing sealants.

The role of the FRGG is to determine and develop applicable best practice guidance and standards governing the use of glass where there is a risk of fire exposure, based on the accumulated know-how and experience of this specialist technology, including the latest technical understanding of glass and glazing behaviour in fire. Terms of reference are to evaluate the risks of exposing glass to fire in the current use of glass in buildings and to identify the core principles and guidance applying to the application and development of fire-resistant glazed systems.

Peer Review

This standard has been endorsed by the FRGG and adopted by the GGF on behalf of its Members under the formal processes of technical approval operated by the GGF. It has been independently and separately reviewed for technical correctness by Exova and Chiltern Fire as UKAS accredited test and certification bodies and members of the FRGG.

Endorsements

BMTRADA – Testing and Product Certification

Warrington Certification Limited – Testing and Product Certification

NOTE:

Care has been taken to ensure that the guidance and information in this document is accurate as it relates to matters of fact, accepted industry practice and know-how at the time of publication.

The document has been produced on the basis of considered technical good practice by members of the UK's glass and glazing industry – according to the best of available knowledge and technical understanding at the time of publication. But, neither the Glass and Glazing Federation (GGF) nor the co-publishers will be liable for any technical, editorial, typographical or other errors and omissions in the document, or for misinterpretations resulting from its use.

The document may be subject to material change as it is revised and updated in the light of new information, experiences and developments in understanding, as summarised above where relevant. The latest version of this publication is freely available by download from the GGF web site at www.ggf.org.uk. The GGF shall not be liable for products delivered to the market nor for the finished installation, which remain the responsibility of the specifier, supplier and installer, as applicable.

Compliance with this industry standard does not of itself confer immunity from legal obligation.

This publication does not purport to include the necessary provisions of a contract, and users are responsible for its correct interpretation and application.

Where regulations and regulatory guidance is referred to as applicable to England and Wales, e.g. Approved Document B, then the reference should be taken to mean "or equivalent as applicable in Scotland and N Ireland."

INTRODUCTION:

Use of this Standard

This standard provides guidance and recommendations on the key principles and criteria that apply to glazing used in barriers that are intended to provide resistance against fire and smoke, as part of a specified fire safety design.

It applies to applications subject to applicable regulations and legislation, also provisions that arise from other requirements such as expert judgments made under an engineered risk-based fire safety design approach or additional insurance requirements for the protection of property.

The guidance provided by the standard is primarily intended for the benefit of three main groups, as follows:

a) Those who are directly involved in the supply and installation chain for fire-resistant glazed systems.

   For example: designers of glazed elements and constructions, suppliers and installers of glass, glazing products and assemblies and elements containing fire-resistant glass (e.g. doors), as well as specifiers in that process who can be involved in the selection of products.

   It is also expected that main contractors and sub-contractors in the chain of responsibility will also find value in the document as a reference point for key criteria to evaluate the work of those engaged on their behalf in providing a fire-resistant glazed installation.

b) Those who are responsible for the fire safety measures in buildings for the protection of occupants, the building itself and its contents, including risk assessors and fire safety managers.

   For example: building owners, main contractors, specifiers and building operators as responsible persons under the Fire Safety Order 2005 (FSO), including competent persons under the FSO such as fire risk assessors, facilities managers and fire safety managers who may have responsibilities for fire risk assessments and consequent actions needed to reduce risks of fire exposure.

   The guidance provided in the standard may serve in that respect as a reference to judge the competency of individuals providing the fire-resistant installation and the suitability of that installation for its intended use. The standard may serve as a reference for fire safety risk assessments of glass and glazing assemblies.

c) Those who are responsible for enforcing and overseeing compliance with applicable regulations and legislation applying to the provision of fire safety measures in buildings.

   For example: building control and approval authorities responsible for monitoring compliance with regulatory guidance, and Fire and Rescue Authorities responsible for enforcement of the FSO.

It is also expected that the standard will be of use as a source of information and guidance for others who may have an interest in ensuring the suitable provision of fire safety measures in buildings.

For example, that would include insurance assessors and property surveyors, architects, quantity surveyors, test bodies, responsible third party certification operators and fire safety specialists in other product sectors.

NOTE: For general glazing contractors

The GGF would draw the attention to this standard of **all** involved in the provision of glass and glazing installations, and recommends that glazing installers and providers always take the precaution of satisfying themselves that the requirements of building regulations have been fully met with regard to fire safety (including members of the Fenestration Self Assessment Scheme, FENSA or similar, carrying out window replacements).

Further information and guidance is available from the GGF's associated publication "A guide to best practice in the specification and use of fire-resistant glazed systems", which should be read in conjunction with this standard (www.ggf.org.uk/publications).

TECHNICAL NOTE:

Behaviour of Glass in Fire/Proprietary Products/Product Awareness

Behaviour of Glass in fire

Soda lime silicate glass is a material that is well known for its sensitivity to quite mild thermal stress, causing multiple cracking. That sensitivity, together with the basic glass characteristics of substantial transparency to heat, relatively high thermal conductivity and expansion, mean that glass as a general material is not best suited to provide protection against fire and the effects of fire. That also applies to Insulating Glass Units IGU's) including those that contain low emissivity glass and various other functional coatings (such as solar control).

For these reasons the glass and glazing sector has devoted considerable effort to the development of suitable and applicable robust systems for resistance against fire, including innovative glass technologies and processes. That has entailed extensive technical research and product development in conjunction with validation of performance in fire through product testing over several decades, to provide reliable fit for purpose, fire-resistant glass and glazing technologies for resistance against fire.

Proprietary products

Such fire-resistant glass and glazing system developments are proprietary products with characteristic properties specifically developed and designed for resistance against fire.

Such products are identified specifically by individual product names which means that they can be directly related to individual product specifications, production control and quality processes. In each case, scopes of application are established by rigorous furnace testing. Key criteria for use to provide resistance against fire are the effectiveness of both the product and the technologies employed, not only for core functionality but importantly for consistency and reliability of performance.

Generic glass and glazing products manufactured routinely for standard glazing applications, not manufactured with the intended use to provide resistance against fire, are not subjected to the same manufacturing processes and level of control as applies to glass and glazing products intended for resistance against fire, and they should not be used for that purpose.

Product awareness
(reference importance for risk assessments)

Those involved in product specification, design, supply and installation of glass and glazing products should be aware of the risks involved in the exposure of standard glass and glazing products to fire.

That awareness should also include glass products classified only for impact safety and security uses, which may be referred to generically as "safety products". This includes commercially produced thermally toughened glass, manufactured to a generic industry specification (also referred to as tempered glass) and commodity laminated safety glass using a plastic interlayer (such as polyvinyl butyral, pvb). Paradoxically the enhanced strength of standard thermally toughened glass compared with float (annealed) glass makes the glass more susceptible to unexpected, sudden failure in fire due to thermal shock (unless specific precautions are taken in the glass and glazing technology employed).

NOTE: Special fire-resistant safety and/or security glass formulations are available from manufacturers, properly tested and approved for use in providing resistance against fire and smoke.

SECTION 1:

Scope

1.1 This industry standard applies to the specification, supply and installation of all barrier assemblies containing glass in applications that are required to provide resistance against fire and smoke.

1.2 The overall purpose of recommendations and guidance contained in this document is to provide a sufficient and suitable standard of workmanship and performance in the provision of such fire-resistant assemblies containing glass, used as part of a fire safety building design in accordance with established industry specialist best practice.

1.3 The basis for the standard is the accumulated knowledge, shared experience and expertise of the UK's specialist glass and glazing sector. The sector contains those who work on a day-to-day basis with glass and glazing systems including practical know-how on general glazing and fire-resistant glazing, who also have access to technical information on the behaviour of glass products in fire.

NOTE: (1) BS EN's are British standards.
(2) Additional guidance: Those who order, oversee, manage and control building and installation work should be aware of their primary duties in ensuring that the proposed installations are fit for the intended purpose (as outlined in Section 2). They should satisfy themselves that they have taken appropriate, reasonable and practical measures to confirm that the defined design, specification and material selection are suitable for the proposed application. And, if called upon, they should be able to and be prepared to demonstrate to the appropriate authorities, who may carry out or evaluate associated fire safety risk assessments, that suitable and sufficient care and attention has been taken in this respect. The duty should not be ff loaded onto others acting under instruction, who are not in a position to take the responsibility.

SECTION 2:

Fitness for Purpose

2.1 All specifiers, suppliers and installers should note that glazed assemblies used to provide protection against fire and the effects of fire should be fit for the intended purpose.

2.2 In the UK that fitness for purpose is demonstrated by product classification on the basis of established and agreed applicable British or European test standards (e,g, BS 476 series or BS EN 1634 etc.).

2.3 Applicable building regulations and building standards that apply across the UK depend explicitly on the requirement for relevant building work to be carried out with proper materials and in workmanlike manner (for example, as detailed in Regulation 7) (England and Wales) or its equivalent elsewhere in the UK.

The GGF expects that all glass and glazing installations where the stated requirement and performance claim is for resistance against fire are fit for their intended purpose, also that the installation is completed by knowledgeable installers who are aware of the criteria laid down in this GGF trade standard. Fitness for purpose must include appropriate and applicable fire resistance test evidence of performance for the glazed system as installed.

2.4 In addition, the Construction (Design and Management) regulations 2007 (CDM) apply. Those who are, in effect, designers and who control or carry out construction work are required to both identify hazards associated with the proposed design and installation and plan to eliminate, mitigate or control the associated risks – including risks from fire.

SECTION 3:
Health & Safety

3.1 It is important at all times that those handling and manipulating glass panes do so with a dominant concern and awareness of the particular potential hazards that apply in working with glass. At all times, reference should be available to guidelines and conditions provided by the responsible company employing individuals at work on the site.

3.2 Operators should wear suitable protective work wear to guard against the risks of cutting and crushing injuries (e.g. appropriate gloves, protective safety footwear, eye protection and arm protectors) as well as the normal protective wear for working on building sites (e.g. protective helmet, high visibility jacket). Suitable lifting and positioning equipment should be provided, if necessary, to locate glass units without risks to operators and the glass elements being installed.

3.3 Specific handling, glazing and storage guidelines provided by suppliers should be read, understood and observed at all times.

3.4 Safety on site should include the safe storage of glass on suitable stillages designed for this purpose, so that passage ways are not blocked and that others working or moving through the area are not at risk of falling, stumbling injuries or inadvertent injury from exposed glass edges.

3.5 A workplace risk assessment shall be carried out for the work to be completed on site, and that the operators and their supervisors should be able to demonstrate that such an assessment has been completed.

3.6 This assessment should normally include reference to a method statement provided on acceptance of the order to supply and install.

REFERENCE:
GGF Code of Practice: Glass handling, storage and transport

SECTION 4:
Fire Safety Strategy

4.1 Fire-resistant barriers containing glass – for example in partitions, doors, facades, ceilings, roofs, floors and atria – are used as part of an overall fire safety strategy to protect occupants, firefighters, the building and contents from fire.

That strategy will normally include a mix of measures, including alarm, compartmentation, protected escape routes and fire suppression, working together within an overall fire safety plan.

4.2 The role of fire-resistant barriers containing glass is to provide built-in protection to contain fire to its place of origin limiting fire spread and mitigate its effects (primarily the risks of direct flame impingement, heat and smoke including the possibility of secondary fire propagation).

4.3 That strategy is commonly referred to as compartmentation – i.e. the building is constructed of a number of fire-tight compartments and the provision of protected escape or access routes using properly classified products and systems.

4.4 The strategy is to contain fire and its effects, limiting fire spread from its place of origin, protecting occupants and fire fighters who may otherwise be exposed to fire and to contribute to a less arduous fire fighting environment than would otherwise be the case.

4.5 Significant factors that are typically taken into account, when developing a strategy, include the following:

a) risk profile of the building, e.g. its height, type of use, complexity of layout and plan, age and state of repair and fire safety management;

b) risk profile of the people using the building, e.g. activity carried out, age range, ability to move without supervision or help, level of alertness (i.e. sleeping or awake), level of occupancy;

c) potential, anticipated fire intensity, based on likely fire load (i.e. amount and type of material and its combustibility), taking into account the standard of housekeeping and any changes from the original design condition;

d) ongoing building inspections, development of maintenance plans and procedures.

SECTION 5:

Fire Safety Risk Assessment

5.1 A fire safety risk assessment should have been carried out before the glazing work is undertaken, it should have been carried out by those responsible for the building or for the main construction project if the glazing work is part of a new build or major refurbishment and re-modelling project.

5.2 For new build and material alterations in refurbishment or re-build projects, the risk assessment should have been completed as part of the design process as an important element in deriving the overall fire safety strategy for the building.

5.3 For repair and modification work carried out on an existing building, a risk assessment, applying to the suitability and sufficiency of the measures and means of safe escape, should have been carried out according to the provisions of the Regulatory Reform (Fire Safety) Order 2005 in England and Wales, the Fire (Scotland) Act 2005 in Scotland and Part 3 of the Fire and Rescue Services (Northern Ireland) Order 2006 and the Fire Safety Regulations (Northern Ireland) 2010 in Northern Ireland.

5.4 Specifiers of glass for use in barriers where fire resistance is required by the overall building specification should ask for a copy of the risk assessment, so that they are aware of the role that the fire-resistant glazing is expected to carry out as part of the overall fire safety concept for the building.

SECTION 6:

Fire-Resistant Glazed Systems

6.1 Fire-resistant barriers containing glass are combined systems containing a number of components which are designed to work together as **a single entity** in resisting the penetration of fire and the effects of fire. Even the most effective fire-resistant glass cannot be expected to function in fire, if glazed in a standard fashion using standard glazing materials.

6.2 Specifiers, suppliers and installers of barriers containing glass to provide resistance against fire should be clearly aware that the assemblies must be an assembly of individually named and specified components, designed to work together.

6.3 The glass used in the specified fire-resistant glazed system must be individually named and manufactured according to a specific manufacturer's specification that has been properly validated by standard testing (or assessments based on applicable test evidence) to have the required fire resistant properties required for the application.

NOTE: It is important to be aware that general glass specifications used within the general glazing industry are not acceptable.

6.4 A fire-resistant glazed system is made up of the following core components

a) the glass, as a specifically named component

b) the glazing sealant, as a specifically named component

c) the frame, according to defined construction methods, including key dimensions such as thickness of components and other considerations

d) glazing beads, according to defined dimensions, material (e.g. type and density of timber), shape and profile

e) bead fixings (e.g. screws, nails for timber or clips for metal systems), specifically type, length, angle of insertion and fixing centres

f) glazing blocks (type, size and position) so that the glass is correctly located in the frame

g) fixings and sealing of the whole system into the surrounding building structure.

SECTION 6:

Fire-Resistant Glazed Systems

6.5 Details of the system may affect the performance of the assembled barrier in fire, to an extent, and in ways, that may not be easily anticipated. Those details in particular include the

a) glass and sealant combination

b) extent of bead edge cover over the glass (critical for some glass types) and the profile of the bead (i.e. sloped or rounded profile)

c) size of the glass panes and their aspect ratio

d) dimensions of the glazing frame mullions and transoms, and their arrangement

e) the type of fire door and the details of the glazing pocket, including special arrangements that may apply to the glazing system (especially for 60 minute classifications)

f) the configuration of the panes within the glazed barrier assembly and their orientation

6.6 Installers and those involved in the purchase of fire-resistant glazed systems should be aware of those considerations and be able to demonstrate their core competency in these respects.

6.7 The fire-resistant glazed system should be faithfully installed according to the detail of a specific approval from a UKAS or similar accredited test facility or certification body (i.e. a test report, third party certification or assessment), directly applicable to the designed use.

SECTION 7:

Understanding the Role of the Glazed Assembly

7.1 It is important for specifiers, suppliers and installers of the glazed assembly to satisfy themselves that they are sufficiently aware of:

a) the role and purpose of the glazed barrier;

b) how the barrier fits within the overall fire safety strategy and plan; and

c) how the barrier potentially interacts with other fire safety measures.

7.2 In preparing for the glazing installation work, and in carrying out that work, it is important to check that other fire safety measures are not compromised. Those carrying out the work should satisfy themselves that it does not affect other and associated fire safety measures that have been identified as part of the overall fire safety strategy, or identified in the fire risk assessment. In particular this applies to ensuring that there are no breaches of the compartmentation requirements.

7.3 Voids or penetrations through the structure as a result of the work should be properly sealed with appropriate fire stopping materials. If necessary, the glazing or installation contractor should check with the responsible managing contractor for instructions and obtain confirmation of the specification of the fire stopping material to be used.

SECTION 8

Validation of Performance

8.1 Performance in terms of fire resistance under the applicable UK Building Regulations/ Standards is to be determined for elements of structure, doors, and other forms of construction by reference to defined standard test procedures, either the BS 476 series or European (BS EN) test standards. Reference: Clause 12.3 of this standard.

8.2 The standard tests used to underpin the performance of the installed assembly must be representative of, and applicable to, the glazed system being used.

8.3 It is therefore important that the validating standard test covers within its scope the proposed application with regard to key aspects of the application and the glazed assembly, e.g. the specific application (such as doors, partitions, vertical or horizontal use) and key parameters and elements of the assembly (such as size of the assembly, the glazing arrangement, the size and orientation of the glass panes, the glazing transoms and mullions, and components).

8.4 If those conditions are not satisfied, and evidence of performance not available, then the attention of the supplier should be brought to the deficiency (normally the installer company and glass supplier). It is the responsibility of the main supplier to provide standard test evidence, and in turn they would normally be expected to seek the guidance of a UKAS or similar accredited test facility or certification body.

8.5 Non-standard tests which only indicate a principle of notional fire resistance performance are not in isolation sufficient for validating fire resistance performance of installed systems.

Validation tests must be representative of the assembly that is to be installed, including scale, glazing arrangements, materials, glass specification, transom/mullion arrangements and functionality. Such tests, and associated assertions or unsubstantiated opinions, should not be accepted as sufficient validation for the performance of an installed system for resistance against fire.

8.6 Using individually named components in the installed glazed assembly allows the components to be tracked to a specific manufacturer, and for the component accordingly to be linked to a precise manufacturer's product specification and quality control system.

8.7 Making un-validated claims for fire resistant performance without reference to standard tests is not acceptable, and the appropriate evidence must be able to be produced if requested.

SECTION 9:

Product Classification

9.1 All products tested for fire resistance using BS EN standards are to be classified in accordance with BS EN 13501-2:2007 +A1:2009, Fire classification of construction products and building elements – Classification using data from fire resistance tests, as defined in the applicable regulations for the UK.

9.2 UK Building Regulations or Building Standards require products that are classified in terms of two fire-resistant performance categories: either integrity or insulation (which includes integrity), together with an endurance time as achieved in a standard test (i.e. 30, 60, 90, 120 and 180 minutes).

a) Integrity refers to the property of the glazed systems to act as a physical barrier against fire and flames from exposure on one side, without the passage of flames or hot gases.

b) Radiation is the ability to reduce the amount of radiated heat passing through the glass. It should be noted that this classification is not referenced in the UK. Glass that is classed as EW when used in the UK is considered as integrity glass (E).

c) Insulation is the ability of a glazed system to withstand fire exposure from one side without the transmission of fire, by limiting heat transfer due to conduction, convection and radiant heat.

SECTION 10:

Evidence of Test Performance

10.1 All assemblies using glass intended and designed to produce defined levels of fire resistance must have relevant, suitable and applicable test evidence to validate and demonstrate performance, which is current and valid for the glazed assembly to be used.

10.2 Approval and validation of system performance in fire should be provided independently by a UKAS or similar accredited body. The test evidence is normally provided by four main sources:

a) an original test report, giving in detail a description of what happened in a given test to a defined fire-resistant glazed system, according to standard procedures;

b) an assessment report (1), according to BS 476 test evidence and defined procedures;

c) an extended applications report carried out according to specific rules defined in applicable EN standards;

d) a recognised third party scheme certificate, completed according to UKAS or similar-accredited scheme, procedures and schedules, and based on applicable and approved submitted test evidence.

10.3 The proposed application must fit within the scope of application defined by the approvals evidence. If not then the question should be referred back to the main supplier of the test evidence for clarification and confirmation of applicability of the provided system.

10.4 Some fire-resistant glazed systems may be asymmetric from one side to the other in the cross section of the system. The test report should note that asymmetry where relevant and identify the correct orientation towards the direction of maximum fire risk. The system must be installed according to that stipulation.

10.5 If relevant and applicable test evidence is not immediately available, or accessible, then questions should be asked of the main supplier.

(1) Note: An assessment is an opinion of likely performance provided by a UKAS or similar accredited test facility or certification body, with reference to available test evidence. If subsequent test evidence shows that the opinion needs to be modified then the original assessment should be withdrawn and replaced. Dates of assessments should be carefully noted to check that they are still relevant and applicable.

SECTION 11:

Installation

Glazed systems

11.1 The whole system should be assembled and installed according to the system specification (including material listings, associated product definitions, and drawings) as provided by the owner of the system test evidence (usually a main product supplier, e.g. glass, sealant, door or framing system).

11.2 Specific conditions defined by the owner of the test evidence and the glass manufacturer, if they are not the owner, must be observed. For example, that may typically include requirements concerning the extent of edge cover on the glass.

11.3 It is not acceptable for the installer to make unwarranted changes or substitutions of one material for another. Any changes to the installed system must be evaluated and endorsed by the owner of the test evidence and confirmed by the glass manufacturer.

11.4 Changes to the originally specified fire-resistant system, if necessary as the result of circumstances, should be fully documented with the appropriate authorisation and source of endorsement properly and clearly noted.

Glazed doorsets

11.5 Fire-resistant glass should only be installed in approved fire-resistant door sets that are approved for glazing. In particular, openings for glazing should not be cut into doors that are not designed to have glazing fitted. In all cases, such glazing should only be carried out by following the door manufacturer's guidance and recommended procedures, especially concerning the glazing opening size limitations, its position, the glazing pocket design and the glazing system including bead size and section.

SECTION 12:
Product Identification

12.1 Glass used in applications where resistance against fire is required should be permanently marked to enable its unambiguous identification during the working life of the building.

12.2 The information included in the mark should be at least the manufacturer's name, product name and the products classification. The date of manufacture and a code for the suppliers factory may also be included as additional information.

12.3 Under UK Building Regulations, glass used in applications where there is a risk of impact should comply with the relevant country's regulatory guidance provided in:

12.3.1 England – Approved Document K 2013– England, Protection from falling, collision and impact.

12.3.2 Wales – Approved document N 2010 – England and Wales but now only applicable in Wales until the Welsh Assembly issues its own version for Wales only

12.3.3 Scotland – Domestic and Non-domestic handbooks 2013, section 4

12.3.4 Northern Ireland – Technical Booklet V

In installations where safety glazing in relation to human impact is required, building control inspectors will require evidence to show the glazing is suitable for use in that location. It is therefore usually a requirement in all countries to permanently mark glass in such situations in accordance with BS 6262-4:2005.

This standard requires the manufactures name, trade name of trademark, the standard to which the glass has been manufactured and the classification of the glass in accordance with BS EN 12600 or in older installations, in accordance with BS 6206 (See section 14).

12.4 The identifying mark is normally applied by the glass manufacturer or supplier, either etched or sandblasted onto the surface of the glass. The mark must be legible and permanent. Stuck on temporary labels are not acceptable.

12.5 It is important to make sure that the mark is visible after glazing – not hidden by the frame, beads or any glazing gaskets; nor applied back to front or positioned in an inaccessible corner of the glazing. Normal practice is to position the mark in one of the bottom corners of the glass pane, positioned at a defined distance from the edges.

12.6 The specifier for the glazed system installation should ensure that the requirement for product marking and the location of the identifying mark are carefully defined in advance of product ordering and delivery to site.

SECTION 13:
Changes to Specification

13.1 Unauthorised changes to the specification for the glazed system and its components are not to be made. Those who are responsible for purchasing, ordering and the installation in particular, should take note.

13.2 Any problems arising (such as the sourcing of materials, the installation of the fire-resistant glazed system, and the suitability of the glazed system for the application) should be taken up with the main supplier of the system or its component suppliers.

13.3 Any necessary replacements must be authorised and approved for use by the owner of the system test evidence.

SECTION 14:

Additional Performance Criteria

14.1 Specifiers and installers should ensure that other requirements of the application and the overall performance specification are followed.

14.2 In particular, attention should be given to applications where other regulatory guidance applies concerning aspects of safety for the application:

a) locations for impact safety – as detailed in clause 12.3

b) protection against falling from one level to another

b.1 England – Approved Document K 2013 – England only, Protection from falling, collision and impact.

b.2 Wales – Approved document K 2010 – England and Wales but now only applicable in Wales

b.3 Scotland – Domestic and Non-Domestic handbooks 2013, section 4

b.4 Northern Ireland – Technical Booklet H 2006

c) protection against inadvertently running or walking into large glazed areas

c.1 England – Approved Document K 2013 – England only, Protection from falling, collision and impact.

c.2 Wales – Approved document N 1998 edition including 2010 amendments – England and Wales but now only applicable in Wales

c.3 Scotland – Domestic and Non-Domestic handbooks 2013, section 4

c.4 Northern Ireland – Technical Booklet V 2012

d) access

d.1 England and Wales – Approved Document M 2010

d.2 Scotland – Domestic and Non-Domestic handbooks 2013, section 4

d.3 Northern Ireland – Technical Booklet R 2006

e) noise

e.1 England and Wales – Approved Document E 2010

e.2 Scotland – Domestic and Non-Domestic handbooks 2013, section 5

e.3 Northern Ireland – Technical Booklet G 2012

SECTION 15:

Documentation

15.1 It is important to note that the approvals documentation should be available and accessible to those who have, or will undertake, fire safety responsibility for the building. That should include reference to the applicable test evidence which shows that the scope of the test evidence fits the application as installed so that the relevant test reports can be accessed if necessary.

15.2 For new buildings or major material alterations, the approval reference should be included in the fire safety information handed over on completion, in compliance with Regulation 38 in England (In England see Appendix G of Approved Document B, concerning fire safety information).

15.3 In England and Wales Regulation 38 requires that fire safety information relating to building works under applicable regulations and building standards shall be provided to the person responsible for the building either on completion or when the building (or extension) is first occupied. Similar requirements apply to other nations in the UK.

15.4 'Fire safety information' for example, for fire-resistant glass and glazing systems should be taken to be as a minimum, documentation detailing the specification of the glazed system as installed and information that provides, or leads to, the source fire test evidence for the fire-resistant glazed system as installed.

The recommended practice under this GGF standard is that such documentation and information be supplied on completion of all glazing work involving glazed systems where a fire resistance function is asked for and claimed, irrespective of whether or not the building work falls under applicable building regulations or standards.

SECTION 16:

Personal Responsibility

16.1 The Regulatory Reform (Fire Safety) Order 2005 (FSO) legislation in England and Wales and its equivalents in Scotland and Northern Ireland, introduced key provisions for personal responsibility, individual competency, and risk assessment in providing suitable and sufficient measures for escape from fire. The provisions of the FSO include those responsible for installation and alterations work in the building.

16.2 All those involved in the specification and provision of fire-resistant glazed systems in buildings should be aware of the principles of the FSO and its equivalent in Scotland and Northern Ireland, in addition to observing normal expected duties of care that apply to the provision of a safety system for the protection of lives and property, involving certain critical claims of performance in fire.

Terms and Definitions

Barrier

When referred to in this guidance document, a barrier is designed to limit the passage of fire, either as integrity only or integrity with insulation for a specified time. The barrier will also limit the movement of dangerous combustion gases from the fire to non-fire side of the barrier.

Compartmentation

The practice of designing and constructing buildings in separate fire-resistant boxes, using tested and approved fire-resistant barriers, to contain fire to its place of origin so that other measures (such as suppression and emergency response) can function as effectively as possible, to allow escape to a place of safety, separated from the effects of fire, minimise the risks of fire spread and protect firefighters in carrying out their job of rescue and fire control.

Doorset

Pedestrian doorset, industrial, commercial and/or garage doorset, including any frame or guide door leaf or leaves, etc, which is provided to give a fire resisting and/or smoke control capability when used for the closing of permanent openings in fire resisting separating elements, including any side panel(s) vision panel(s), flush over panel(s), transom panel(s) and/or glazing together with the essential building hardware and any seals (whether provided for the purpose of fire resistance or smoke control) which form the assembly.

Fire resistance

The ability of a component in a building or a construction to satisfy the appropriate performance criteria, for a period of time, as specified in the relevant British or European test standards (either the BS 476 series or the European BS EN test methods) as required by applicable regulatory guidance.

Integrity

The ability of a barrier to physically hold back the fire by resisting the penetration and passage of flames, smoke and fumes, as evaluated against the criteria defined in relevant test standards and recorded in an official test report from a UKAS or other European-accredited test organisation.

Insulation

The ability of a barrier to protect against the heat of a fire by all transfer mechanisms whilst also acting as an integrity barrier, as evaluated against the criteria defined in relevant test standards and recorded in an official test report from a UKAS or other European-accredited test organisation.

Fire-resistant glazed system

A complete assembly containing glass intended and specified to provide resistance against fire, including all constituent elements and components (e.g. glass and glazing arrangement, frames, sealants, glazing beads and fixings, other non-glazed panels, door set elements, and fixings to the surrounding structure).

UKAS or similar accredited test facility or certification body

An organisation which carries out testing to an appropriate standard (BS or BS EN) or carries out assessments of test data and whose testing or assessment methods have been assessed and are regularly audited by UKAS in the UK or by a similar recognised national organisation in other European countries.

Test report

A formal report from a UKAS or similar accredited body to carry out and record the results of a specific test carried out according to a defined standard method on a specified and complete assembly submitted for evaluation of fire resistance performance under standard test conditions. The full validity of the report can only be claimed on presentation of the complete report.

Assessment

An opinion expressed and written down in a formal report by a UKAS or similar accredited body of the expected performance of a particular modified fire-resistant glazed system if it were to be tested according to a recognised standard. The assessment must be based on applicable and available test evidence and should be revised, or withdrawn, if subsequent test evidence shows the opinion to be mistaken and not in accordance with test evidence.

UKAS

(United Kingdom Accreditation Service) The UK national body recognised by UK Government to carry out accreditation of organisations that provide certification, testing, inspection and calibration services to British or international agreed standards, in terms of competency, impartiality and capability, within a defined and declared scope for the organisation.

Relevant Reference Documents

The Building Act 1984 (as amended)

The Building Regulations 2000 (as amended),

Approved Documents:

B : Fire Safety, Volume 1 – Dwelling houses,
Volume 2 – Buildings other than dwellinghouses

E : Resistance to passage of sound

K : Protection from falling, collision and impact

M : Access to and use of buildings

N : Glazing – safety in relation to impact, opening and cleaning
(now incorporated in AD K, edition 2013 for England but still applicable in Wales)

The Regulatory Reform (Fire Safety) Order, 2005.

Fire test and classification standards for building materials and structures:

BS 476-22:1987	Fire tests on building materials and structures. Method for determination of the fire resistance on non-loadbearing elements of construction.
BS EN 1364-1:1999	Fire resistance tests for non-loadbearing elements. Walls.
BS EN 1365-1:2012	Fire resistance tests for non-loadbearing elements. Walls.
BS EN 1634-1:2014	Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. Fire resistance test for door and shutter assemblies and openable windows.
BS EN 1634-3:2004	Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. Smoke control test for door and shutter assemblies.
BS EN 13501-2:2007 +A1:2009	Fire classification of construction products and building elements. Classification using data from fire resistance tests, excluding ventilation.
BS EN 1365-5:2004	Fire resistance tests for loadbearing elements. Balconies and walkways.
BS EN 15254-4:2008 +1:2011	Extended application of results for fire resistance tests. Non-loadbearing walls. Glazed constructions.

Other European standards

BS EN 12600:2002	Glass in building. Pendulum test. Impact test method and classification for flat glass.

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- A Guide to Best Practice in the Specification and Use of Fire-Resistant Glazed Systems
- Code of Practice for Glass handling, storage and transport
- Information leaflet “The Right Glazing in the Right Place”

Additional design guides

Guidance for Approved Document B incorporating insurer’s requirements for property protection RISC Authority.

BS EN 1995-1-2:2004	Eurocode 5. Design of timber structures. General. Structural fire design.
BS EN 357:2004	Glass in building. Fire resistant glazed elements with transparent or translucent glass products. Classification of fire resistance.

Appendix

Construction Products Regulation The CE Mark

Glass products placed on the market in the UK intended for resistance against fire must comply with the European Community Construction Products Regulation (CPR) which has superseded the Construction Products Directive (CPD)).
The evaluation of conformity standards for glass includes, within Annex ZA, a list of Essential Characteristics. The performance of an Essential Characteristic must be declared if the manufacturer is claiming a performance for that characteristic.
In relation to fire-resistant glasses, a group of Essential Characteristics is included under the section 'Safety in case of fire'.

The CPR requires compliance with the applicable harmonised European Standard and, following the production of a Declaration of Performance (DoP), a CE Label may be produced and affixed to the product, its packaging or supplied with delivery documentation. Guidance can be found on the GGF website, www.ggf.org.uk/ce-marking
Under the CPR specific procedures have to be followed to assess and verify constancy of performance of the product. When making a declaration for Fire resistance, the applicable mandate from the European Commission defines the level of ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE (AVCP) as System 1.

Under AVCP System 1, the following actions will be undertaken by:

- The manufacturer shall carry out:
  - Factory production control
  - Further testing of samples taken at the factory by the manufacturer in accordance with the prescribed test plan
- The notified product certification body shall issue the certificate of constancy of performance of the product on the basis of:
  - Determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product
  - Initial inspection of the manufacturing plant and of factory production control
  - Continuous surveillance, assessment and evaluation of factory production control

Following the issue of the certificate of constancy of performance of the product, by the notified product certification body, the manufacturer may:

- Draw up a Declaration of Performance (DoP) for the product, detailing the performance of those essential characteristics being declared based, on the results of type testing
  - The DoP must be made available either in electronic format or if requested, a printed version must be provided if requested
- Create a CE Label, in accordance with the product standard and either affix it to the product, to its packaging or supplied with the delivery documentation

CE marking under the CPR is a legal requirement in the UK and the implementation of it is the responsibility of the Department of Communities and Local Government (DCLG) and Trading Standards have been given the responsibility for the policing and enforcement of this legislation. The Declaration of Performance is a legal document based on the requirements detailed above in AVoC System 1. Therefore if any of these requirements are not fulfilled, the manufacturer may be liable to prosecution.

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