

Exova Warringtonfire
Holmesfield Road
Warrington
WA1 2DS
United Kingdom

T : +44 (0) 1925 655 116
F : +44 (0) 1925 655 419
E : warrington@exova.com
W: www.exova.com



Testing. Advising. Assuring.

Title:

Fire Resistance Performance
of Bespoke Glazed Screens
for Installation at Queen Mary
Project

Report No:

363247

Prepared for:

Doorpac Limited
6 Ranskill Court
Sheffield
South Yorkshire
S9 5FZ

Date:

12th April 2016

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Executive Summary

Objective	This report provides a considered opinion regarding the expected fire resistance performance of bespoke glazed screens containing glazed panel(s) incorporating either Pyroguard EW30 uninsulating glass or Pyroguard EI30 INT insulating glass, which is required to provide an integrity (and insulation for the Pyroguard EI30 INT option) performance of 30 minutes if tested against BS 476: Part 22: 1987.
Report Sponsor	Doorpac Limited 6 Ranskill Court Sheffield South Yorkshire S9 5FZ
Summary of Conclusions	It can be concluded that the bespoke glazed screen assemblies as discussed in this assessment, incorporating Pyroguard EW30 uninsulating glass are expected to be capable of achieving an integrity and insulation performance of 30 minutes if tested in accordance with BS 476: Part 22: 1987. It can be also concluded that the bespoke glazed screen assemblies as discussed in this assessment, incorporating Pyroguard EI30 INT insulating glass are expected to be capable of achieving an integrity and insulation performance of 30 minutes if tested in accordance with BS 476: Part 22: 1987. This report only addresses the fire resistance performance of the glazed screen elements of the constructions. It does not consider the fire resistance of the other surrounding structures or any aspects of the fire resistant glass, such as impact performance.
Valid until	1 st May 2021

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Introduction

This report provides a considered opinion regarding the expected fire resistance performance of bespoke glazed screens containing glazed panel(s) incorporating either Pyroguard EW30 uninsulating glass or Pyroguard EI30 INT insulating glass, which is required to provide an integrity (and insulation for the Pyroguard EI30 INT option) performance of 30 minutes if tested against BS 476: Part 22: 1987.

The apertures within the glazed screens will be dual glazed using one of the fire glass types given above along with a secondary pane, independently glazed, comprised 6 mm toughened glass. The cavity between the two glasses will incorporate a blind unit operated via a mechanism positioned on the fire side of the screen.

The glazed units will form part of glazed screens into which are fitted fire rated doorsets. This report does not consider the performance of the doorsets which are assumed to be certificated under separate approval.

FTSG

The data referred to in the supporting data section has been considered for the purpose of this appraisal which has been prepared in accordance with the Fire Test Study Group Resolution No. 82: 2001.

Assumptions

Supporting Construction

It is assumed that the supporting constructions to which the proposed glazed screens will be fixed are capable of providing the necessary support and required level of fire performance for a period of 30 minutes.

Perimeter Seals

It is assumed that any seals, sealant or fire stopping products used between the screen and supporting constructions have been the subject of previous fire tests in a representative configuration and found to be capable of providing the required level of fire performance for 30 minutes

Direction of fire

It is assumed that the glazed screens will only ever be exposed to heating conditions (Fire Risk) from the side to which the toughened glass pane is fitted (i.e. the fire glass will be orientated to the unexposed face of the assemblies.

Installation

It is assumed that the proposed screens will be installed by competent installers.

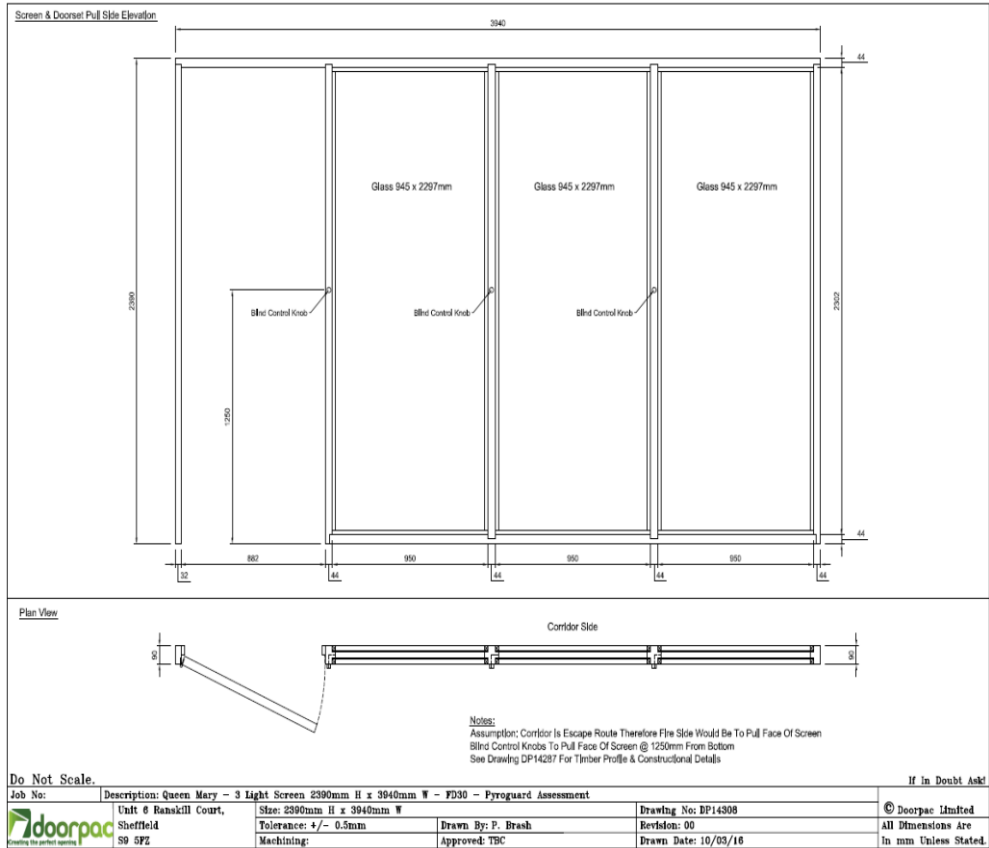
Doorsets

This report does not consider the performance of the doorsets which are assumed to be certificated under separate approval. It is assumed that the door opening will be fitted with a CERTIFIRE approved doorset of the appropriate specification.

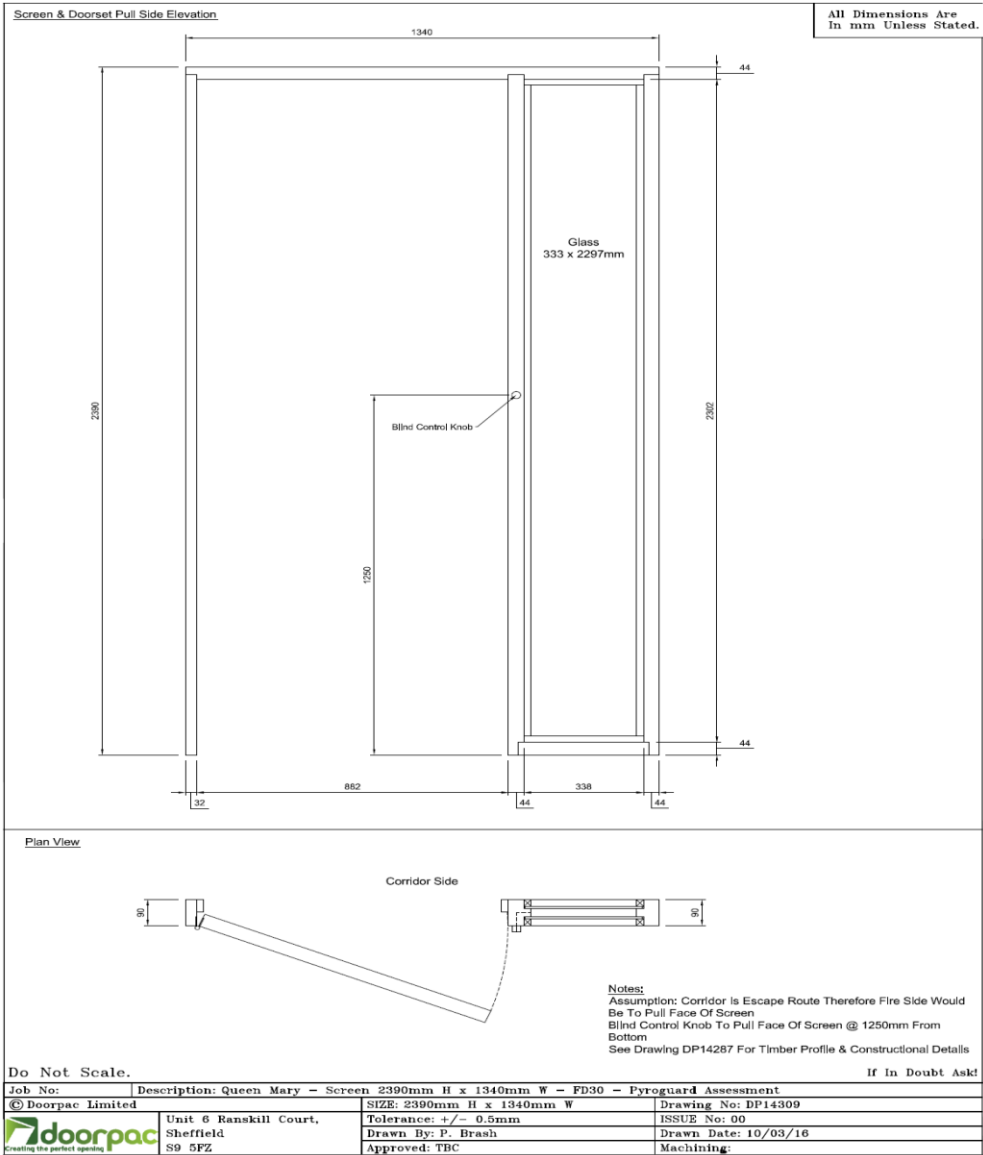
Proposals

There are two designs of glazed screens considered by this appraisal as detailed below and in the Annex to this report. Each screen may incorporate either Pyroguard EW30 or Pyroguard EI30 INT depending on the level of performance required (i.e. 30 minutes integrity only or 30 minutes integrity and insulation).

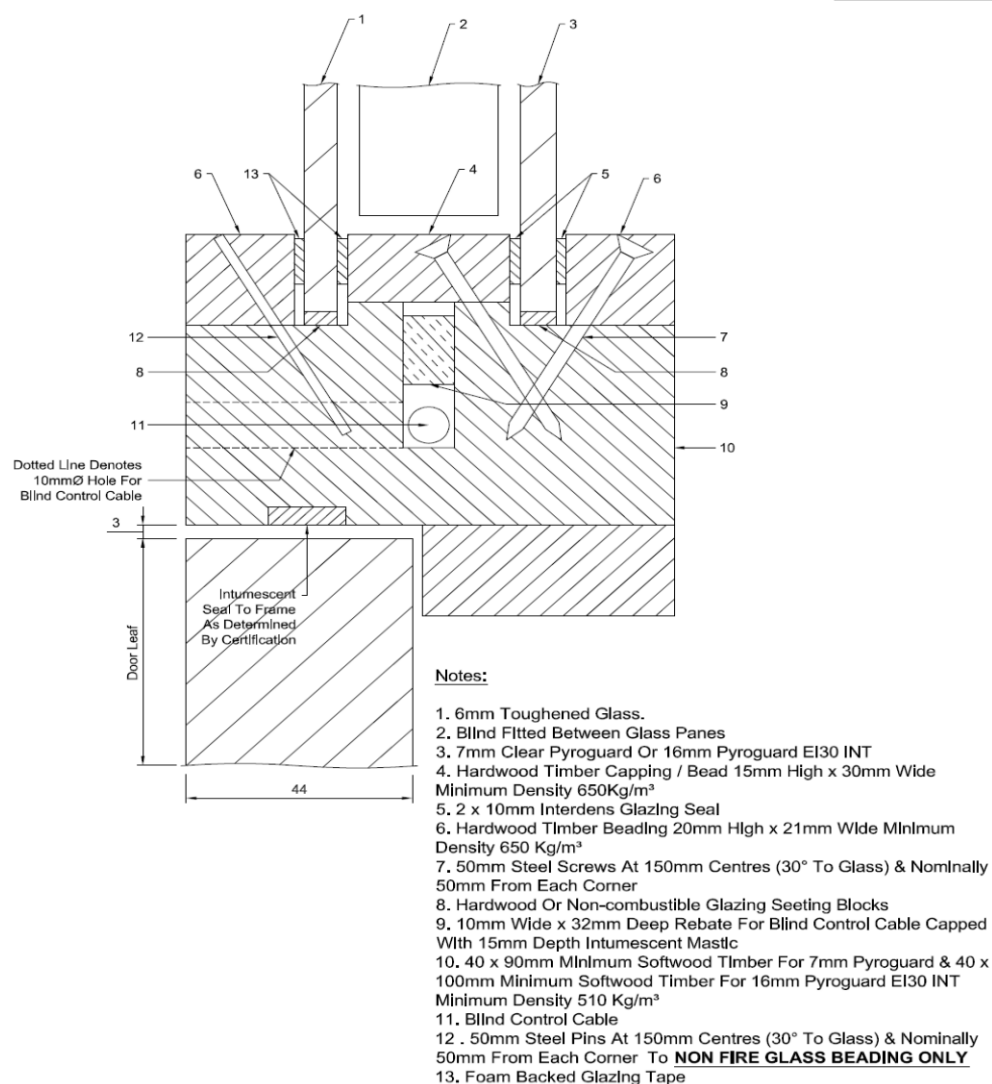
3 Light Screen



1 Light Screen



The proposed glazed screens comprise a softwood timber frame forming apertures glazed with single pane of Pyroguard EW30 or Pyroguard EI30 INT glass, with an additional pane of 6 mm toughened glass (orientated to the fire hazard side of the assembly). The details for both options are shown below:



The glass panes dimensions are as follows:

- 3 Light Screen option: 2297 mm high by 945 mm wide (2.17m²)
- 1 Light Screen option: 2297 mm high by 333 mm wide (0.76m²)

Basic Test Evidence

CERTIFIRE Certificate CF 257

This Certificate of approval contains information concerning the glazing and framing and acceptable sizes and areas of various thicknesses of Pyroguard Fire Resisting Glass that can be glazed into approved timber and steel doorsets and framing systems, to achieve a fire resistance performance of 30 and 60 minutes integrity only when tested to BS 476 Part 22: 1987.

CERTIFIRE Certificate CF 437

This Certificate of approval contains information concerning the glazing and framing and acceptable sizes and areas of various thicknesses of Pyroguard EI Fire Resisting Glass that can be glazed into approved timber and steel doorsets and framing systems, to achieve a fire resistance performance of 30 and 60 minutes integrity and insulation when tested to BS 476 Part 22: 1987.

CERTIFIRE certification is gained by a third party procedure and represents a higher level of attestation than simple 'type' testing, analysis of previously tested glazing constructions and approval against quality.

Pyroguard EW30 and Pyroguard EI30 INT fire resistant glass products included within the Certificates referenced above are approved on the basis of:

- a) Initial type testing
- b) A design appraisal against a Technical Schedule (TS25)
- c) Product surveillance under ISO 9001:2000

It is therefore deemed acceptable to use this approval as a basis for technical justification of the glazing assemblies considered in this appraisal.

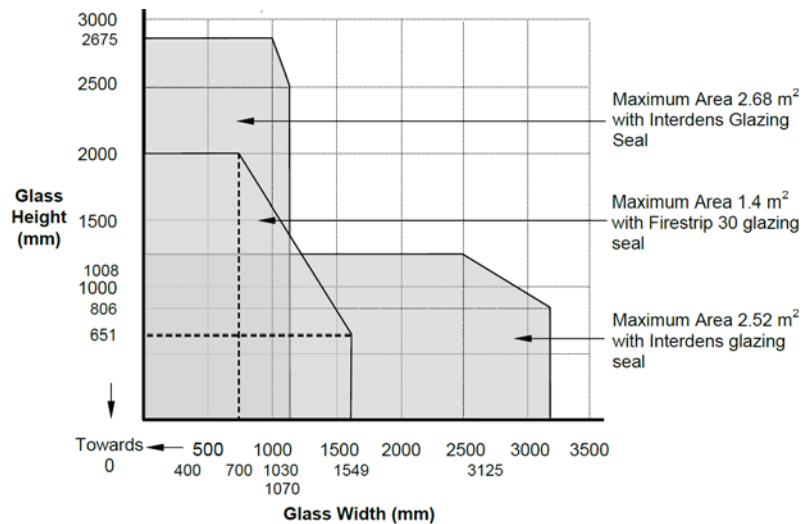
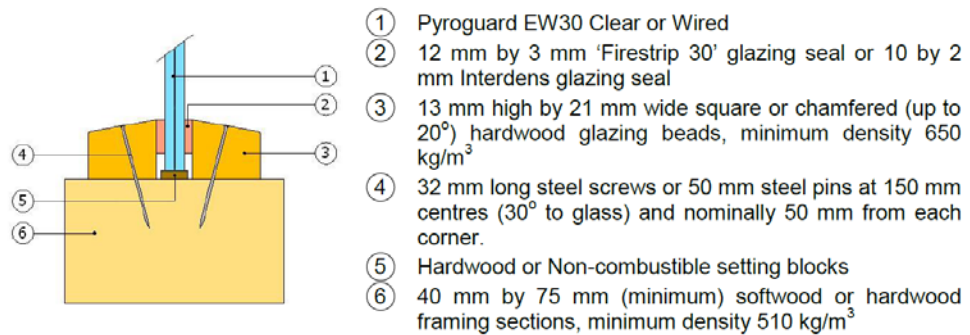
Assessed Performance

Bespoke glazed screen for 30 minutes integrity

The proposed integrity only screens consist of a single pane of Pyroguard EW30 (7 mm thick) with a secondary single pane of 6 mm thick toughened glass pane in a softwood timber frame (90 mm by 40 mm, 510kg/m³ density). The Pyroguard glass will be retained in place with screw fixed hardwood beads, 650kg/m³ density, 20 mm high by 21 mm wide on the unexposed face and 15 mm high by 30 mm wide on the cavity side (this latter bead being sat on a 5 mm step thus creating an effective bead height of 20 mm). Interdens (10 mm by 2 mm) glazing gaskets are utilised between the Pyroguard EW30 and the hardwood beads.

The toughened glass is retained with a pin fixed bead to the fire side in conjunction with the screw fixed spacer bead as described above.

Pyroguard EW30 is approved in CERTIFIRE certificate CF257, in softwood timber framed screens when utilising Interdens glazing gaskets at maximum heights of up to 2675 mm and widths of up to 1070 mm, subject to a maximum area of 2.68 m². A summary of the CERTIFIRE approved scope for Pyroguard in this application is shown below:



It is evident that the proposed pane dimensions and area are well within those currently approved. This gives confidence in the performance of the glass at the proposed dimensions.

In addition, the CERTIFIRE approved specification (regards bead size, frame size, fixings, gasket etc.) defined within CF257 is essentially complied with for the proposed screen design.

The pertinent difference between the CERTIFIRE approved scope and the proposed screen design is the use of the secondary glazing (6 mm toughened glass) and the fitment of an integral blind unit with associated operating mechanism.

Based on the intended exposure direction (i.e. the screen will be orientated such that the toughened glass faces the fire hazard direction), the specific design of the screen is such that the toughened glass element can be considered sacrificial. Under fire exposure the toughened glass is likely to shatter within the first 10 minutes of exposure and will fall away. The integral blind will then become fully exposed to the fire and will degrade and be consumed within the fire compartment. At this point the Pyroguard EW30 glass will become fully exposed, and as the pertinent features of the CERTIFIRE approved glazing system has been replicated, would be expected to perform as if it was a single glazed system. Therefore, the secondary toughened glass pane and the integral blind is unlikely to have any detrimental affect on the performance of the system as a whole, and may in fact provide some benefit as they will provide some initial protection to the Pyroguard EW30 glass element.

As the operating mechanism is also on the fire exposed face, with any voids being protected with a 15 mm deep application of intumescent mastic and with no penetration through the depth of the frame, it is considered unlikely that loss of impermeability will occur at this area.

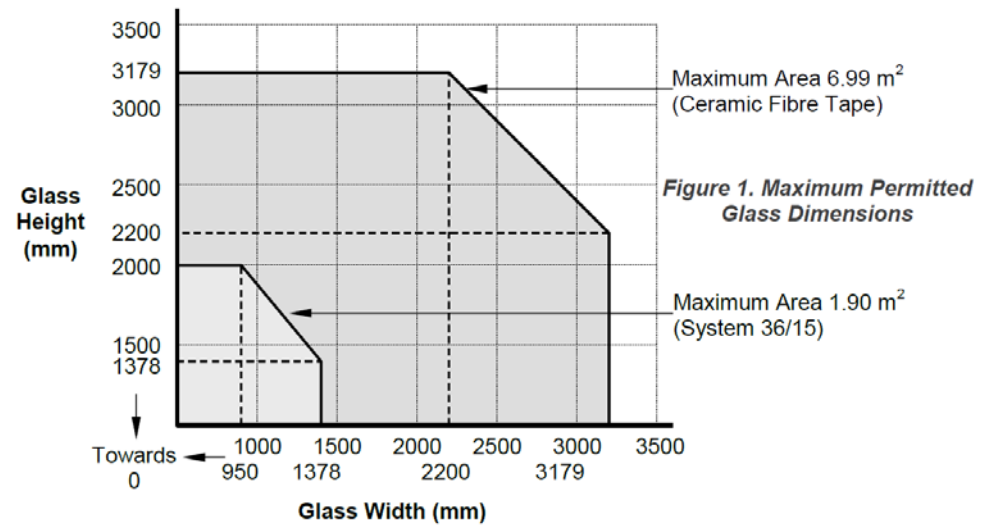
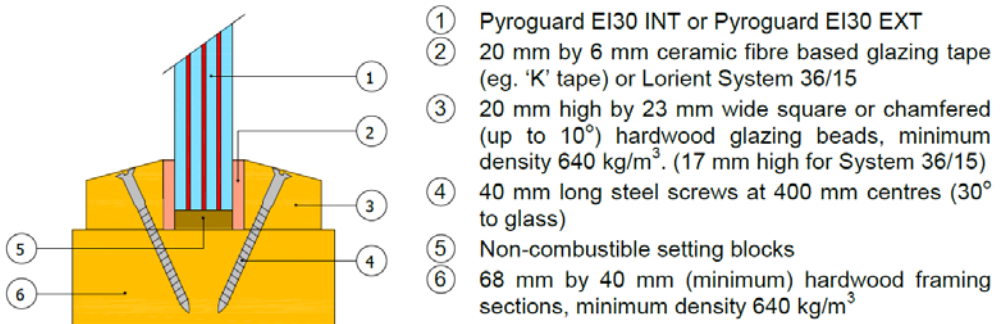
Based on the above, it is expected that the proposed glazed screen would provide the required 30 minutes integrity performance should they be subjected to a test in accordance with BS 476: Part 22: 1987.

**Bespoke glazed
screen for 30
minutes integrity
and insulation**

The proposed integrity only screens consist of a single pane of Pyroguard EI30 INT (16 mm thick) with a secondary single pane of 6 mm thick toughened glass pane in a softwood timber frame (100 mm by 40 mm, 510kg/m³ density). The Pyroguard EI30 INT glass will be retained in place with screw fixed hardwood beads, 650kg/m³ density, 20 mm high by 21 mm wide on the unexposed face and 15 mm high by 30 mm wide on the cavity side (this latter bead being sat on a 5 mm step thus creating an effective bead height of 20 mm). Interdens (10 mm by 2 mm) glazing gaskets are utilised between the Pyroguard EI30 INT and the hardwood beads.

The toughened glass is retained with a pin fixed bead to the fire side in conjunction with the screw fixed spacer bead as described above.

Pyroguard EI30 INT is approved in CERTIFIRE certificate CF437, in hardwood timber framed screens when utilising ceramic fibre based glazing gaskets at maximum heights of up to 3179 mm and widths of up to 3179 mm, subject to a maximum area of 6.99 m². A summary of the CERTIFIRE approved scope for Pyroguard EI30 INT in this application is shown below:



It is evident that the proposed pane dimensions and area are well within those currently approved. This gives confidence in the performance of the glass at the proposed dimensions.

In addition, the CERTIFIRE approved specification (regards bead size, frame size, fixings, gasket etc.) defined within CF437 is essentially complied with for the proposed screen design.

The pertinent difference between the CERTIFIRE approved scope and the proposed screen design is the use of the secondary glazing (6 mm toughened glass) and the fitment of an integral blind unit with associated operating mechanism.

Additionally, the CERTIFIRE approved scope for the Pyroguard EI30 INT and the design of screens considered in this assessment differs as follows:

- CF437 specifies a hardwood frame whereas the proposal involves utilisation of a softwood frame
- CF437 specifies bead dimensions of 20 mm high by 23 mm wide whereas the proposed bead on the unexposed face are 20 mm high by 21 mm wide
- CF437 specifies ceramic fibre gaskets whereas the proposed screen utilises Interdens glazing gaskets

Regarding the use of the secondary glazing and integral blind unit, based on the intended exposure direction (i.e. the screen will be orientated such that the toughened glass faces the fire hazard direction), the specific design of the screen is such that the toughened glass element can be considered sacrificial. Under fire exposure the toughened glass is likely to shatter within the first 10 minutes of exposure and will fall away. The integral blind will then become fully exposed to the fire and will degrade and be consumed within the fire compartment. At this point the Pyroguard EW30 glass will become fully exposed, and as the pertinent features of the CERTIFIRE approved glazing system has been replicated, would be expected to perform as if it was a single glazed system. Therefore, the secondary toughened glass pane and the integral blind is unlikely to have any detrimental affect on the performance of the system as a whole, and may in fact provide some benefit as they will provide some initial protection to the Pyroguard EW30 glass element.

As the operating mechanism is also on the fire exposed face, with any voids being protected with a 15 mm deep application of intumescent mastic and with no penetration through the depth of the frame, it is considered unlikely that loss of impermeability will occur at this area.

Regarding the proposed use of the softwood frame (at 510kg/m³ density) compared to the CERTIFIRE approved hardwood frame (at 640kg/m³ density), the proposed change from hardwood to softwood is deemed acceptable due to the fact that the proposed frame is significantly larger than the CERTIFIRE approved frame which will be expected to offset the affects of potential increased charring rates.

In addition, the fire glass is offset to the unexposed face of the frame section resulting in a larger width of timber to the fire exposed face which will ensure charred timber will not reach the fire glass/fixing line. Furthermore, the screens incorporate no loadbearing cross transoms which may exhibit increased charring to an extent where glass support is compromised.

The nominal reduction in bead dimensions of the proposed beads compared to the CERTIFIRE approved scope is considered negligible, especially considering the fully insulating nature of the glass being utilised.

The proposed use of the reactive intumescent Interdens glazing gaskets is considered to be a design enhancement compared to the non-reactive ceramic fibre based seals as CERTIFIRE approved (due to the fact that the Interdens will offer additional local protection as it intumesces under fire exposure) and this difference is therefore positively appraised.

Based on the above, it is expected that the proposed glazed screen would provide the required 30 minutes integrity performance should they be subjected to a test in accordance with BS 476: Part 22: 1987.

Conclusions

It can be concluded that the bespoke glazed screen assemblies as discussed in this assessment, incorporating Pyroguard EW30 uninsulating glass are expected to be capable of achieving an integrity and insulation performance of 30 minutes if tested in accordance with BS 476: Part 22: 1987.

It can be also concluded that the bespoke glazed screen assemblies as discussed in this assessment, incorporating Pyroguard EI30 INT insulating glass are expected to be capable of achieving an integrity and insulation performance of 30 minutes if tested in accordance with BS 476: Part 22: 1987.

Validity

This assessment is issued on the basis of test data and information available at the time of issue. If contradictory evidence becomes available to Exova Warringtonfire the assessment will be unconditionally withdrawn and **Doorpac Limited** will be notified in writing. Similarly the assessment is invalidated if the assessed construction is subsequently tested because actual test data is deemed to take precedence over an expressed opinion. The assessment is valid initially for a period of five years i.e. until 1st May 2021 after which time it is recommended that it be returned for re-appraisal.

The appraisal is only valid provided that no other modifications are made to the tested construction other than those described in this report.

Summary of Primary Supporting Data

CERTIFIRE
Certificate CF 257

This Certificate of approval contains information concerning the glazing and framing and acceptable sizes and areas of various thicknesses of Pyroguard Fire Resisting Glass that can be glazed into approved timber and steel doorsets and framing systems, to achieve a fire resistance performance of 30 and 60 minutes integrity only when tested to BS 476 Part 22: 1987.

CERTIFIRE
Certificate CF 437

This Certificate of approval contains information concerning the glazing and framing and acceptable sizes and areas of various thicknesses of Pyroguard EI Fire Resisting Glass that can be glazed into approved timber and steel doorsets and framing systems, to achieve a fire resistance performance of 30 and 60 minutes integrity and insulation when tested to BS 476 Part 22: 1987.

Declaration by Doorpac Limited

We the undersigned confirm that we have read and complied with the obligations placed on us by the UK Fire Test Study Group Resolution No. 82: 2001.

We confirm that the component or element of structure, which is the subject of this assessment, has not to our knowledge been subjected to a fire test to the Standard against which the assessment is being made.

We agree to withdraw this assessment from circulation should the component or element of structure be the subject of a fire test to the Standard against which this assessment is being made.

We are not aware of any information that could adversely affect the conclusions of this assessment.

If we subsequently become aware of any such information we agree to cease using the assessment and ask **Exova Warringtonfire** to withdraw the assessment.

Signed:

For and on behalf of:

Signatories



Responsible Officer

A. Kearns* - Technical Manager



Approved

D. Hankinson* - Certification Engineer

* For and on behalf of **Exova Warringtonfire**.

Report Issued:

12th April 2016

The assessment report is not valid unless it incorporates the declaration duly signed by the applicant.

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Drawings

