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Title:

The Fire Resistance Performance Of Timber Or Mineral Composite Based Insulated Doorsets When Fitted With 'Powermatic Free Swing R106 FS' Jamb Mounted Concealed Door Closers

Report No:

WF 325231

Prepared for:

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Date:

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Executive Summary

Objective	This report presents an appraisal of the fire resistance performance of single-acting timber or mineral composite doorsets when fitted with a 'Powermatic Free Swing R106 FS' jamb mounted concealed door closer, if tested in accordance with BS EN 1634-1.
Report Sponsor	**Samuel Heath And Sons Plc**
Address	Leopard Street Birmingham B12 0UJ
Summary of Conclusions	Should the recommendations given in this report be followed, it can be concluded that the 'Powermatic Free Swing R106 FS' jamb mounted concealed door closers may be fitted to previously tested (or assessed by Exova Warringtonfire) insulated doorsets, to provide 30 or 60 minutes integrity and insulation performance, if tested in accordance with BS EN 1634-1.
Valid until	1st February 2018

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Introduction

This report presents an appraisal of the fire resistance performance of single-acting insulated (timber or mineral composite) doorsets when fitted with a 'Powermatic Free Swing R106 FS' jamb mounted concealed door closer. The doorset, onto which the closer is to be fitted, may be of single-leaf or double-leaf configuration.

The proposed closer is based on the previously tested 'Perko Powermatic R100' closer, but modified to include an electronic free swing function.

The proposed doorsets are required to provide a fire resistance performance of 30 or 60 minutes integrity and insulation with respect to BS EN 1634-1.

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

It is assumed that the 'Powermatic Free Swing R106 FS' jamb mounted concealed door closers will be fitted to an insulated doorset (timber or mineral composite) which has been previously shown to be capable of providing the required fire resistance performance when tested in accordance with BS EN 1634-1 in the proposed configuration i.e. single-leaf or double-leaf.

The door leaf of 60 minute doorsets shall be a minimum of 53 mm thick and include sub-facings comprising a minimum of 3 mm thick non-combustible board.

It is assumed that the doorset will be in the fully closed position. It is also assumed that the door closer will return the doorset to the fully closed position, overcoming the latch mechanism (if fitted) from any angle.

Supporting wall

It is also assumed that the construction of the wall, which supports the proposed doorsets, will have been the subject of a separate test and the performance of the wall is such that it will not influence the performance of the doorset for the required period.

Clearance gaps

Door leaf to frame clearance gaps can have a significant effect on the overall fire performance of a doorset. It is therefore assumed that the leaf to leaf and leaf to frame clearance gaps will not exceed those measured for the relevant fire tested doorset. In addition, it is assumed that the door leaves will be in the closed position.

Proposals

It is proposed that 'Powermatic Free Swing R106 FS' jamb mounted concealed door closers may be fitted onto a previously tested (in accordance with BS EN 1634-1) insulated (timber or mineral composite) doorset which has been shown to be capable of providing 30 or 60 minutes integrity and insulation in the same configuration as that proposed i.e. single-leaf or double-leaf.

The proposed unit is similar to the previously proven 'Perko Powermatic R100', being the same basic unit as the 'R100', with the same power size 3, but includes additional components and a wired connection to allow its powered free swing function.

Basic Test Evidence

WARRES No. 149150/A

The test report referenced WARRES No. 149150/A describes a test which was conducted in accordance with EN 1634-1: 2000 and included a fully insulated, single-acting, single-leaf, timber doorset which was fitted with a 'Perko Powermatic R100' jamb mounted concealed door closer.

The doorset was orientated such that the door leaf opened towards the heating conditions of the test and was rendered unlatched for the duration of the test.

Whilst integrity failure of the doorset occurred after a period of 52 minutes, there were no modes of integrity failure either co-incident with, or attributable to the 'Perko Powermatic R100' jamb mounted concealed door closer position for the 62 minute test duration.

WARRES No. 114743

The test report referenced WARRES No. 114743 describes a test which was conducted in accordance with EN 1634-1: 2000 and included two specimens of fully insulated single-acting, single-leaf, timber doorsets.

For the purpose of the test the specimens were referenced 'Doorset A' and 'Doorset B'. Doorset B was positioned such that it opened towards the heating conditions of the test and Doorset A was positioned such that it opened away from the heating conditions. Both doorsets were unlatched for the duration of the test.

Doorset B suffered an integrity failure by application of the cotton pad after 23 minutes. This was in the region of the threshold near to the leading edge. Similarly Doorset A failed integrity after 25 minutes, again by application of the cotton pad at the threshold. In both instances the failures were not associated with the door closers and the integrity of each doorset in the closer area was maintained for the full 33 minute duration of the test.

Assessed Performance

General

It is proposed that previously fire tested (or assessed by Exova Warringtonfire) timber or mineral composite based insulated doorsets may be fitted with a 'Powermatic Free Swing R106 FS' jamb mounted concealed door closer in order to provide 30 or 60 minutes integrity, without detracting from the performance of the doorset.

The previously tested 'R100' model has been proven when mounted in both 30 and 60 minute timber based doorsets and is Certifire approved for the same scope of use. The supporting test evidence for that model is cited in support of the proposed 'R106' as a basis for its appraisal with further discussion of the differences between the two units and requirements specific to the installation of the 'R106' detailed later.

Intumescent bedding

The 'R100' unit in each tested doorset construction was provided with a bedding of intumescent mastic provided in the mortises formed in the door leaf and frame to accommodate the unit. It is therefore a requirement of this appraisal that the same intumescent mastic bedding be provided to the proposed model. Intumescent protection in addition to this is required for the proposed model and is detailed later in this report.

Comparison of models

To enable to the appraisal of the proposed 'Powermatic Free Swing R106 FS' it is necessary to consider the differences between it and the previously tested 'R100'.

The body of the proposed unit is of the same basic design and shape as the tested 'R100', albeit slightly larger to accommodate the additional components necessary for the free swing function. The table below shows the dimensions of both units.

R100	R106 FS
Body: 178mm long by 98mm high by 25mm wide	Body: 226mm long by 101mm high by 25mm wide
Frame fixing plate: 140mm high by 28mm wide by 5mm thick flange. Requires 30mm deep mortise in door frame	Frame fixing plate: 140mm high by 28mm wide by 5mm thick flange. Requires 30mm deep mortise in door frame
Door fixing plate: 140mm high by 28mm wide by 5mm flange	Door fixing plate: 148mm high by 28mm wide by 7mm flange

The body of the proposed unit is therefore longer and slightly taller but has the same thickness as the tested unit. Both units have frame fixing plates of the same dimensions and the proposed unit has a slightly thicker door fixing plate at 7 mm.

The most significant increase is that of the body length, which at 226 mm, is 48 mm longer than the tested model. Whilst the increased length will require a longer mortise to be cut into the width of the door leaf, the width of the body remains the same at 25 mm meaning that the removal of door material from the leaf's thickness remains the same. This is considered to be of more importance as the resistance to burn through of the door leaf remains comparable to that of the tested assemblies. The nominal height increase of 3 mm is considered minor and unlikely to influence the unit's performance.

The door fixing plate is 8 mm taller and 2 mm thicker than that of the tested unit. To counteract any possible detraction from the performance of the proposed unit, it shall be a requirement of this appraisal that the flanges of the plate are bedded on to a 2 mm thickness of Interdens intumescent sheet. The inclusion of this additional intumescent protection behind the fixing plate flanges is considered sufficient to eliminate any potential reduction in performance due to the increased dimensions of the door fixing plate.

On the basis of the above, it can be concluded that, subject to the inclusion of the additional bedding of Interdens intumescent sheet behind the door fixing plate, the comparison of the proposed 'R106' body with that of the previously tested 'R100' is acceptable.

Free swing connection

The free swing function of the unit requires it to be connected to a power supply. The unit will be connected via a wired connection from the closer body to a suitable conductor hinge.

The design of the unit is such that small wires pass from it via the door fixing plate and are laid within a small groove (nominally 3 mm by 3 mm) provided in the door leaf edge and ending with a terminal block which will also be concealed within a mortise cut into the door leaf edge.

The mortise will be nominally 16 mm wide by 26 mm high by 17 mm deep. Where the wires from the conductor hinge will also connect. A 30 mm by 30 mm by 2 mm thick Brass cover plate will be fitted over the terminal block and this shall be recessed flush with the surface of the door leaf edge. The back face of the cover plate shall be lined with a 2 mm thickness of Interdens intumescent sheet material to ensure that the removal of door material for the mortise does not create a localised weakness.

The routing of the wires and the placement of the terminal connection block within the door leaf edge is designed such that the wires and block are mounted behind the door leaf standard intumescent seal. For 30 minute doorsets the seal must be a minimum of 15 mm wide by 4 mm thick and be mounted within the door leaf edge. For 60 minute applications the standard door seal must be a single, centrally positioned seal such that it covers the wires and groove. In situations where the standard door intumescent seals are frame mounted (both 30 and 60 minute applications), the intumescent seal fitted over the wires shall be additional to the doorset's standard seals and shall extend from the edge of the door fixing plate to the mortise for the terminal block and from the terminal block mortise to abut against the conductor hinge.

In situations where 60 minute doorsets include two separate seals mounted about the centreline of the door leaf, it is acceptable to plant the length of additional intumescent seal between the two standard seals. The width of the additional seal shall be determined by the gap between the standard seals and its thickness shall remain as 4 mm. The table below summarises the seal requirements.

Additional intumescent requirements

30 minute doorset - door mounted seal	30 or 60 minute doorset - frame mounted seals	60 minute doorset – door mounted twin seals
Minimum seal size 15 mm x 4 mm no additional seal required.	Additional seal minimum 15 mm by 4 mm fitted to the leaf edge between the closer and terminal block mortise and between the terminal block mortise and the conductor hinge.	Additional seal minimum 4 mm thick fitted between the standard seals.

Subject to the above requirements being complied with, it is considered that the proposed closer unit may be fitted to previously proven 30 and 60 minute timber or mineral composite based doorsets without detracting from the proven performance of the doorset.

As stated previously, the proposed 'R106' remains the same basic unit as the proven 'R100' and so its ability to maintain the door leaf in the closed position is not in doubt.

Proposed Doorsets

As stated in this report, the doorset, in the required configuration, will be previously tested (or assessed by Exova Warringtonfire) and its performance is therefore not in doubt.

To enable the use of the door closers on a range of doorsets, it is necessary to address the available information on the proposed doorset. As this appraisal is intended to be used on a general basis and not restricted to any particular manufacturer of fire resisting doorsets, the following points are given to enable the closers to be used safely:

a) The doorset shall carry valid certification or the doorset, including the door frame and associated ironmongery should have achieved up to 60 minutes integrity, when tested by a UKAS approved laboratory (or assessed by Exova Warringtonfire) to BS EN 1634-1.

b) If the proposed doorset is to be used in double-leaf configuration the test or assessment evidence should be applicable to double-leaf configurations.

c) The critical aspects of the doorset construction are given earlier in this report and shall be replicated on the proposed doorset, in particular the necessity for the door leaf to include non-combustible sub-facings.

Conclusions

Timber or mineral composite based doorsets that have previously been successfully fire tested by a UKAS accredited laboratory (or assessed by Exova Warringtonfire) which have achieved 30 or 60 minutes integrity and insulation as discussed in this report, may be fitted with 'Powermatic Free Swing R106 FS' jamb mounted concealed door closers, without detracting from the overall performance of the doorset.

The fitting of the proposed door closer into previously proven doorsets, on the basis of compliance with the conditions given above, is therefore considered to be acceptable.

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 warringtonfire the assessment will be unconditionally withdrawn and Samuel Heath And Sons Plc as 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 2018, 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

WARRES No. 149150/A

Test report relating to the performance of a fully insulated, single-acting, single-leaf, timber doorset incorporating a jamb mounted concealed door closer referenced 'Perko Powermatic R100', when subjected to a test in accordance with BS EN 1634-1: 2000 to determine its fire resistance performance.

The doorsets had overall dimensions of 2090 mm high by 1015 mm wide and incorporated door leaves of overall dimensions 2040 mm high by 926 mm and by 53 mm thick.

The doorset was retained via a 'Perko Powermatic R100' jamb mounted concealed door closer.

The doorset was orientated such that the doorset opened towards the heating conditions of the test and was rendered unlatched for the duration of the test.

The specimen satisfied the test requirements for the following periods:

		Doorset B
Integrity	Sustained Flames	52 minutes
	Gap Gauge	62 minutes*
	Cotton Pad	52 minutes
Insulation		52 minutes

* The test duration.

Test date : 30th September 2005

Permission has been provided for this test report to be utilised for the purposes of this appraisal

WARRES No. 114743

For the purpose of the test the specimens were referenced 'Doorset A' and 'Doorset B'. Doorset B was positioned such that it opened towards the heating conditions of the test and Doorset A was positioned such that it opened away from the heating conditions. Both doorsets were unlatched for the duration of the test.

Each doorset had overall dimensions of 2015 mm high x 822 mm wide and incorporated a flaxboard cored door leaf of overall dimensions of 1981 mm high x 761 mm wide x 43 mm thick. Both doorsets also incorporated a door closer referenced 'R100', such that the body was inserted into the door leaf, with the centre of the closer body positioned at 700 mm above the doorset threshold. The closers were bedded on intumescent mastic.

The specimens satisfied the test requirements for the following periods:

Test Results:		**Doorset A**	**Doorset B**
Integrity performance	Sustained flaming	33 minutes*	29 minutes
	Gap gauge	-	-
	Cotton Pad	25 minutes	23 minutes
Insulation performance		25 minutes	23 minutes

*The test duration. The test was discontinued after a period of 33 minutes

Date of Test 21st July 2000

Test Sponsor Samuel Heath & Sons Plc

Declaration by Samuel Heath And Sons Plc

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

D Forshaw* - Principal Certification Engineer

Approved

D Hankinson* - Principal Certification Engineer

* For and on behalf of Exova Warringtonfire.

Report Issued: 16th April 2013

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

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