

The Fire Resistance Performance of
FD60 Timber Doorsets Incorporating
Perko R1/R2 and Perkomatic R85
Door Closers

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The Professionals in Fire Safety

SECTION	TABLE OF CONTENTS	PAGE
1 INTRODUCTION		3
2 ASSUMPTIONS		3
3 PROPOSAL		3
4 BASIC TEST EVIDENCE		4
5 ASSESSED PERFORMANCE		4
6 CONCLUSION		5
7 VALIDITY		5
FIGURE 1		6
8 SUMMARY OF SUPPORTING DATA		7
9 DECLARATION BY SAMUEL HEATH & SONS PLC		7
10 SIGNATORIES		8

1 Introduction

This report presents an appraisal of the expected fire resistance performance of single-acting, single-leaf, FD60 timber based doorsets, similar to those previously successfully tested (or assessed by Warrington Fire Research Centre), but modified as detailed in Section 3 of this report by the incorporation of Perko R1/R2 or Perkomatic R85 door closers.

The doorsets are required to provide 60 minutes integrity and insulation (where applicable) performance should the doorsets be tested in accordance with Clause 6 of BS 476: Part 22: 1987, when fitted with either of the above referenced closers.

The data referred to in Section 8 has been considered for the purpose of this appraisal which has been prepared in accordance with the Fire Test Study Group Resolution No. 64A. 1993.

2 Assumptions

It is assumed that the doorsets into which the closers are to be fitted will have been successfully tested to BS 476: Part 22: 1987, assessed by Warrington Fire Research Centre or will be CERTIFIRE approved, for a period of at least 60 minutes. The doorsets will be of single-acting, single-leaf configuration only.

A doorset which is fitted with either closer must incorporate a (fully engaged) latch, and the closer must possess sufficient closing force to close the leaf and overcome the latch from angle of closing.

It is also assumed that the construction of the FD60 doorsets and the materials used in their construction (including door leaf to frame intumescent sealing systems) will, unless specifically detailed in this report, be identical to those of the tested, or assessed, assemblies.

In addition, it is assumed that the doorsets will be installed by competent installers in a similar manner to that used when installing the fire tested assembly. The closers will be fitted into the doorset assemblies using the fixing instructions provided with each closer by Samuel Heath & Sons PLC.

The closers will be protected using additional intumescent materials as detailed in Section 3 of this report.

Closers will be fitted into the leaf at a position no higher than 1100 mm from the leaf threshold position.

3 Proposal

It is proposed that FD60 timber based door leaves hung within timber door frames, either previously tested, assessed by Warrington Fire Research Centre or CERTIFIRE approved, may be modified by the inclusion of a 'Perko R1/R2' or a 'Perkomatic R85' door closer, with no resultant detrimental effect on the fire resistance performance of the doorset.

The proposal involves the fitting of either a Perko or a Perkomatic closer within the hinged edge of a single-acting, single-leaf, FD60 doorset, the leaves of which have a minimum nominal thickness of 54 mm.

The closers will be fitted according to the manufacturers instructions and will incorporate additional intumescent protection as detailed below and shown in Figures 1 and 2:

- a. the closer body, cylinder plate, anchor body and anchor plate will be fully bedded on acrylic based intumescent mastic, with a nominal thickness of 1-2 mm.
- b. a Palusol based intumescent strip seal, of dimensions 10 mm wide by 4 mm thick, will be fitted into the door frame adjacent to the anchor plate of the closer, at a position where the doorset's specified intumescent seal is interrupted by the inclusion of the anchor plate. The strip should extend past the ends of the anchor plate by at least 20 mm. Alternatively, where the doorset's specified intumescent strip is fitted into the door leaf, the above additional seal may be fitted into the door leaf edge adjacent to the cylinder plate.

The additional bypassing, 10 mm by 4 mm thick strip, should be fitted to the side of the anchor/cylinder plate furthest away from the door stop position.

4 Basic Test Evidence

The report referenced No. 109900 describes a fire resistance test performed on a small scale section of doorset overall leaf dimensions of 940 mm high by 915 mm wide by 54 mm thick, hung within a hardwood timber frame.

The door leaf construction comprised a flaxboard core, softwood timber stiles and rails, plywood facings and hardwood timber lippings.

A Perko R1/R2 closer and a Perkomatic R85 closer was fitted into the hinged edge of the doorset section. Additional intumescent protection, as given in Section 3, and detailed in Figures 1 and 2, was incorporated around each closer.

The doorset, representing only small sample section, was tested utilising the general heating conditions and test procedure given in BS 476: Part 20: 1987, and as such no specific test results could be stated. However, observations within the test report state that no modes of potential integrity failure, attributable to the closers, occurred for a period of 72 minutes after which time the test was discontinued due to the failure of the door leaf core (which was remote from the closer positions). There were no signs of potential failure of the doorset around the position of the magnetic catch throughout the test duration of 72 minutes.

5 Assessed Performance

It is considered that the inclusion of the Perko and Perkomatic assemblies into a timber leaf/timber frame doorset may have two potential detrimental effects upon the fire performance of the doorset.

The first problem concerns the inclusion of a mass of steel within the timber components of the door leaf and frame, which could effect the integrity of the doorset due to the high thermal conductivity of these steel components.

The second cause of concern relates to the interruption of the intumescent seals fitted to the doorset at the position of the door closers.

The indicative test evidence provided by the report referenced No. 109900 showed that the inclusion of the Perko and Perkomatic door closers, along with the associated intumescent protection, shown in Figures 1 and 2, had no detrimental effect upon the door leaf. No signs of failure, associated with either burn through or excessive temperature rise of the leaf due to the presence of a steel mass, or the interruption of the intumescent door seals, occurred throughout the test duration of 72 minutes.

It is considered that the substantial use of intumescent mastic protection used in the installation of the closers within the leaf and frame, and also the use of 10 mm wide Palusol intumescent seals by-passing the anchor plate positions, was sufficient to counteract the potential detrimental effects of the inclusion of the catch.

The proposal involves the inclusion of either type of closer into any type of previously tested, assessed or CERTIFIRE approved FD60 doorset. The doorset section that was included in the test referenced No. 109900, comprised a flaxboard core and softwood stiles. The closer cylinders extended through the softwood stiles and into the flaxboard core material.

It is generally considered that flaxboard is the most onerous material with respect to burn through resistance and dimensional stability under fire conditions. It is therefore considered acceptable to positively appraise the use of the closers into doorsets with alternative construction, i.e. chipboard cored doors, solid timber lamel cored door etc.

Since the inclusion of the closers is unlikely to effect the dimensional stability of the door leaf or frame, their installation into full size doorsets is not expected to prove detrimental to the fire resistance performance of the doorset.

The furnace pressure during the indicative test was controlled at a level such that the closers were subjected to a similar pressure as would be experienced if the closers were fitted at a distance of approximately 1100 mm from the threshold of a full scale doorset. It is a condition of this appraisal, therefore, that the closers must be fitted no higher than 1100 mm from the threshold of a doorset.

Based upon the above discussion, the use of the Perko and Perkomatic door closers within previously tested, assessed or CERTIFIRE approved, single-acting, single-leaf, latched doorsets, following the recommendations given above, are positively appraised.

6 Conclusion

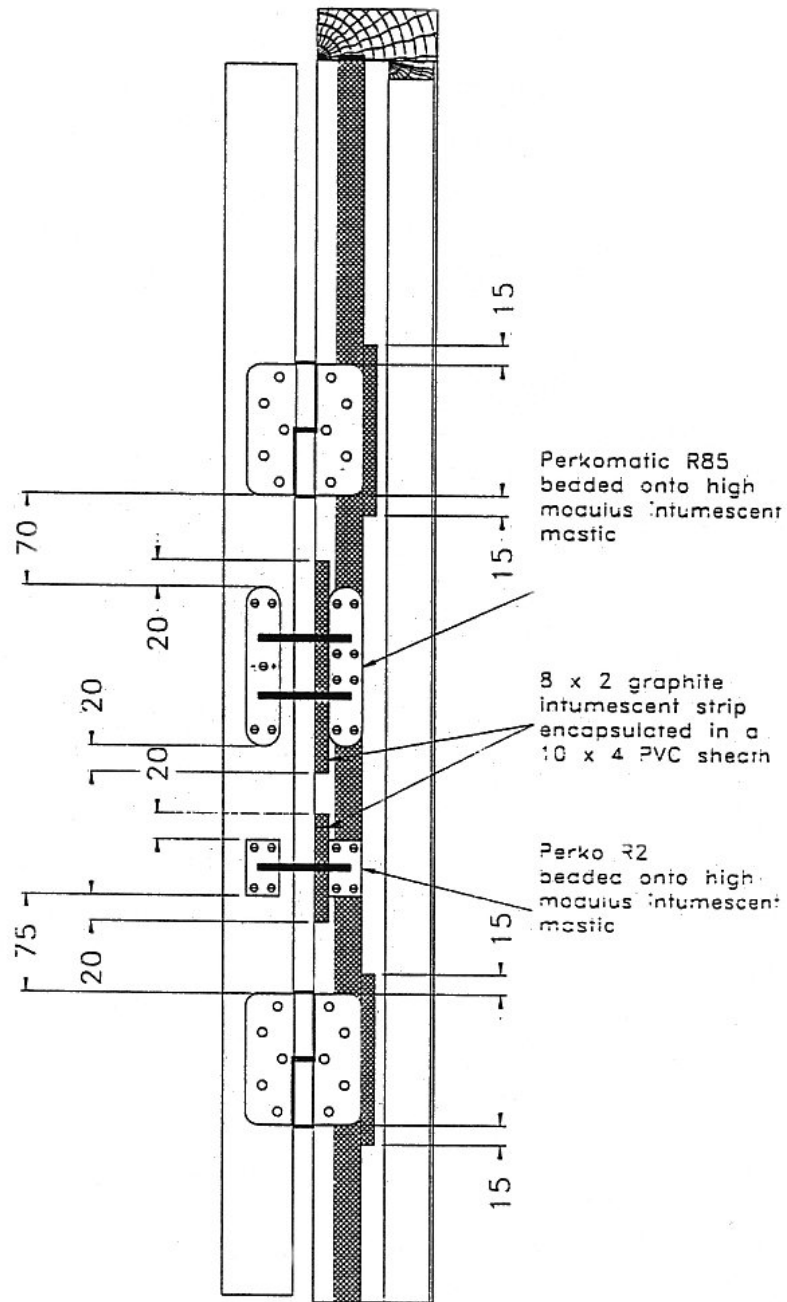
Previously tested, assessed by Warrington Fire Research Centre or CERTIFIRE approved, timber based door leaves, when hung in a single-acting, single-leaf, latched configuration in a timber frame, and fitted with either a Perko R1/R2 or a Perkomatic R85 closer, as discussed in this report, would be expected to be capable of satisfying the integrity and insulation (where applicable) criteria for a period of 60 minutes, if subjected to a test in accordance with BS 476: Part 22: 1987.

7 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 Warrington Fire Research Centre the assessment will be unconditionally withdrawn and Samuel Heath & Sons PLC 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 two years i.e. until 1st November 2001, at 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.

Figure 1



VERTICAL SECTION
THROUGH HINGED JAMB

8 Summary of Supporting Data

Test Report Referenced No. 109900

A report on an indicative fire resistance test utilising the general principles and test criteria given in BS 476: Part 20: 1987, on a small section of timber based door leaf hung within a timber frame. The door leaf incorporated a Perko R1/R2 and a Perkomatic R85 door closer.

The test was discontinued after a period of 72 minutes.

Date of test : 15th September 1999
Test Sponsor : Samuel Heath & Sons PLC

9 Declaration by Samuel Heath & 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. 64A: 1993.

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 Warrington Fire Research Centre to withdraw the assessment.

Signed:

For and on behalf of: *Samuel Heath & Sons PLC.*

10 Signatories

Prepared by:  * A. Kearns

Reviewed by:  * S. Hankey

* For and on behalf of Warrington Fire Research Centre.

The assessment report is not valid unless it incorporates the declaration duly signed by the applicant. This is included in Section 9 to this report.

Report Issued: 7th October 1999

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