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Testing. Advising. Assuring.

Title:

The Fire Resistance
Performance
of 'Advantage', 'Advantage
Plus' and 'NOR400'
Letterboxes and 'DV' Door
Viewers within Timber Based
Doorsets

WF Assessment Report No:

136789 Issue 7

Prepared for:

Norseal Ltd

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Date:

19th January 2004

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Executive Summary

Objective This report presents an appraisal of the fire resistance performance of 'Advantage', 'Advantage Plus' and 'NOR400' letterboxes and 'DV' Door Viewers when installed within previously tested or assessed fire doors having a fire resistance period of 30 or 60 minutes.

Report Sponsor **Norseal Limited**

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Summary of Conclusions Should the recommendations given in this report be followed, it can be concluded that the proposed 'Advantage', 'Advantage Plus' and 'NOR400' letterboxes could be installed within previously tested doorsets (which have achieved 30 or 60 minutes integrity performance with respect to BS 476: Part 22: 1987), in accordance with the recommendations given in this report, without detracting from the overall performance of the doorsets.

Should the recommendations given in this report be followed, it can be concluded that the 'DV' door viewers may be fitted to previously tested or assessed (by Exova warringtonfire) fully insulated timber doorsets, to provide up to 60 minutes integrity performance if tested in accordance with BS 476: Part 22: 1987.

Valid until 1st March 2020

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Introduction

This report provides an appraisal of the performance of intumescent letter boxes and liners and 'DV' Door Viewers, similar to those reported under the reference Nos. 136452, 166079 and 165855 when incorporated within timber based doorset constructions, previously tested in accordance with BS 476: Part 22: 1987.

It is understood that the intumescent letter boxes are to be installed within timber based doorsets required to provide 30 or 60 minutes integrity performance.

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

General

Construction

It is assumed that the doorset construction into which the intumescent letter boxes and liners will be incorporated, will have been previously fire tested to BS 476: Part 22: 1987 at a UKAS accredited laboratory or assessed by Exova warringtonfire, and will have achieved a minimum integrity performance of 30 minutes or 60 minutes, dependant upon application.

Doorset

Construction

It is also assumed that the section of leaf into which the letter box and intumescent liner is fitted will be of a minimum nominal thickness of 44 mm.

Applicable

Doorsets

It is assumed that the proposed letter boxes and intumescent liners will be fitted to inorganic or timber based door leaves which have previously been shown to be capable of providing 30 minutes or 60 minutes in the same configuration as that proposed with regard to:

- single or double-leaf, and
- latched or unlatched, and
- single or double-acting

Supporting

Construction

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.

General

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 and/or latched position.

Proposals

Scope

It is proposed to provide letter boxes and intumescent liners (referenced 'Advantage', 'Advantage Plus' and 'NOR400') similar to or as tested under the reference No.'s 136452, 166079 and 165855 for installation into previously tested FD30 or FD60 timber based doorsets without having a detrimental effect on the integrity performance of the doorset.

'Advantage'

The 'Advantage' letter box and intumescent liners will be similar to that referenced 'Letter Box B' in the test referenced No. 136452 and will comprise steel letter plates, fitted to a plastic frame with an intumescent liner fitted around the outside perimeter of the plastic telescopic sleeves of the letter box. The flap pivots (i.e. the sprung connection between the plate and the frame) will be of plastic. Each half of the letterbox frames will be attached to the face of the door leaf by means of 2 steel screws to each vertical frame edge (i.e. a total of four screw fixings per letterbox half).

It is proposed that the 'Advantage' letter plates may be 10" (254 mm) as tested or 12" (304 mm) wide. It is also proposed that the surface mounted plastic frames may vary in profile.

The aperture within the door leaf will be a maximum of 242 mm wide for 10" boxes or 278 mm for 12" boxes by 60 mm high.

'Advantage Plus'

The 'Advantage Plus' letter box and intumescent liners will be similar to that referenced 'Letter Box A' in the test referenced No. 136452 and will comprise aluminium letter plates, fitted to an aluminium frame with an intumescent liner fitted around the outside perimeter of the plastic telescopic sleeves of the letter box. The flap pivots (i.e. the sprung connection between the plate and the frame) will be steel pins and springs. Each half of the letterbox frames will be attached together by means of a steel through bolt (M4) which engages into a brass boss.

It is proposed that the 'Advantage Plus' letter plates may be 12" (304 mm) as tested or 10" (254 mm) wide.

The aperture within the door leaf will be a maximum of 242 mm wide for 10" boxes or 278 mm for 12" boxes by 60 mm high.

'NOR400' Letterplate

The 'NOR400' letter box and intumescent liners will be identical to those tested under the reference WF Test Report No. 165855 (and referenced FFLP1240) and will comprise steel letter plates, fitted to an steel frame with an intumescent liner fitted around the outside perimeter of the plastic telescopic sleeves of the letter box. The flap pivots (i.e. the sprung connection between the plate and the frame) will be steel pins and springs. Each half of the letterbox frames will be attached together by means of a steel through bolt (M4) which engages into a steel boss.

The 'NOR400' letter plates are of overall dimensions 310 mm wide by 76 mm high.

The aperture within the door leaf will be nominally 257 mm wide by 38 mm high.

Intumescent Details

The intumescent material to all letterboxes will be identical, in terms of performance and expansion ratios, to that included in the test and will be referenced 'Norseal Liner'. The intumescent wrap will comprised two layers of 2 mm thick graphite intumescent (nominally 4 mm total thickness), and nominally 38 mm wide. Any voids within the aperture to the doorset provided for the inclusion of the letterboxes will be fully filled with an acrylic intumescent mastic. The back face of the mounting plates will also be bedded on similar mastic.

Positional Requirements

The proposed letterboxes will be installed within the doorsets no higher than 1100 mm from the threshold.

Brush Seals

It is proposed that the 'Advantage' and 'Advantage Plus' may be supplied with or without brush seals.

Door Viewers

It is proposed that previously fire tested (or assessed by Exova warringtonfire) insulated timber doorsets may incorporate the following types of door viewer without detracting from the previously achieved or appraised integrity performance (maximum 60 minutes):

DV 120 B – brass effect

DV 120 C – chrome effect



DV 160 B – brass effect

DV 160 C – chrome effect



Intumescent wrap



Basic Test Evidence

The tested assembly referred to in the indicative test referenced No. 136452 comprised a sample section of door leaf of overall nominal dimensions 990 mm high by 990 mm wide by 44 mm thick fitted with two letter box and intumescent liner assemblies. A description of the test specimens is given in the test report.

Letterbox A comprised a 12" 'Advantage Plus' letterbox and Letterbox B comprised a 10" 'Advantage' letterbox.

The specimens tested were each subjected to the general test conditions as specified in BS 476: Part 20: 1987.

The specimen referenced 'A' remained intact with respect to the performance requirements for integrity detailed within BS 476: Part 20: 1987 for a period of 81 minutes after which time the test was discontinued.

The specimen referenced 'B' remained intact with respect to the performance requirements for integrity detailed within BS 476: Part 20: 1987 for a period of 74 minutes after which time sustained flaming occurred on the surface of the specimen.

During the test the letter box assemblies were subjected to neutral furnace pressure, subject to the specified tolerances given in BS 476: Part 20: 1987.

The tested assembly referred to in the indicative test referenced No. 165855 comprised a sample section of door leaf of overall nominal dimensions 990 mm high by 990 mm wide by 54 mm thick fitted with two letter box and intumescent liner assemblies. For the purpose of the test, the specimens were referenced Letter Plate A and Letter Plate B of identical designs to the letter plates referenced 'NOR400' discussed in this report.

Letter Plate A, was chrome in colour and of overall dimensions 310 mm wide by 68 mm high. The letter plate was mounted 200 mm from the head of the door leaf over an aperture of nominal dimensions 257 mm long by 38 mm high.

Letter Plate B, was gold in colour and of overall dimensions 310 mm wide by 76 mm high. The letter plate was mounted 200 mm from the base of the door leaf over an aperture of nominal dimensions 257 mm long by 38 mm high.

The assembly formed the front vertical face of a one metre cubed gas fired furnace chamber, the temperature rise of which was controlled to conform with the relationship given in BS 476: Pt 20: 1987. The pressure within the furnace chamber coincident with the upper letter plate was controlled to be +8.5 (± 2) Pa.

The specimen letter plates remained intact for the 66 minute test duration with no visible flaming, ignition of a cotton pad or any through gaps observed during the test.

The report referenced WF Test Report No. 166079 to an indicative test on a specimen comprising a sample section of door leaf fitted with two letter box and intumescent liner assemblies.

The test assembly had overall nominal dimensions of 990 mm high x 940 mm wide by 54 mm thick and comprised a section of graduated density chipboard core door leaf with 6 mm thick hardwood facings. The section of door leaf was fitted with a single letter plate identical to that referenced 'NOR400' was gold in colour and of overall dimensions 310 mm wide by 76 mm high. The letter plate was mounted at the approximate centre of the door leaf over an aperture of nominal dimensions 257 mm long by 38 mm high.

The assembly formed the front vertical face of a one metre cubed gas fired furnace chamber, the temperature rise of which was controlled to conform with the relationship given in BS 476: Pt 20: 1987. The pressure within the furnace chamber coincident with the letter plate was controlled to be -5 (± 2) Pa.

The specimen letter plate remained intact for the 66 minute test duration with no visible flaming, ignition of a cotton pad or any through gaps observed during the test.

Assessed Performance

Letterbox Design The 'Advantage', 'Advantage Plus' and 'NOR400' letterboxes have each been successfully tested within a small section of door leaf and have achieved a fire resistance performance significantly in excess of the maximum 60 minutes required. The performance of the tested letterboxes is therefore not in doubt.

Dimensions The proposal involves the provision of both designs of letterbox in 10" and 12" versions. During the test referenced No. 136452, both sizes of letterbox were tested. Since each design utilises a similar intumescent protection (i.e. 2 layers of 2 mm by 38 mm Norseal Liner and acrylic intumescent bedding), and also a similar internal telescopic sleeve arrangement, confidence exists in the ability of this intumescent to protect and fill apertures provided within the door leaf, when provided at dimensions suitable for both 10" and 12" letterboxes.

It is therefore considered acceptable to positively appraise both letterbox designs for use in 10" and 12" versions.

Variations to 'Advantage' letterboxes The proposal includes the option for the plastic frame to the 'Advantage' letterboxes to be modified in design such that variations in its cross sectional profile may be altered. In addition it is proposed that various finishes (i.e. chromed) may be applied to the plastic frame.

The critical design features relating to the performance of the letterboxes is the flap material, its pivot detail, frame fixing details, the telescopic sleeve design and most importantly the intumescent protection specification.

Variations in the profile shape (or finish) of the plastic frame do not affect any of the critical items given above and would not be expected to detrimentally affect the fire resistance performance of the assembly.

Variations to 'NOR400' letterboxes The proposal includes the use of the 'Norseal Liner' on the 'XXX' letterplate in lieu of the liner utilised in the tests referenced WF Test Report No.'s 166079 and 165855. On the basis that similar letterplates (with very similar telescopic sleeve designs) have been successfully tested, the use of the liner with the 'NOR400' letterplates is positively assessed.

Positional Requirements – 'Advantage' and 'Advantage plus' In the test referenced No.136452, the furnace pressure was controlled such that the letterboxes were subjected to neutral pressure, subject to the specified tolerances given in BS 476: Part 20: 1987.

The pressure to which a letter plate and intumescent liner is subjected to can have a significant effect on its fire resistance performance. In a positive pressure zone hot furnace gases are forced through the letter plate assembly which can lead to erosion, loss of material and subsequently degradation of the letter plate and intumescent which could lead to loss of impermeability or sustained flaming on the unexposed surface of the letter plate/doorset.

When positioned in a negative pressure zone, the air flow induced through the letter plate is from the unexposed surface into the furnace, i.e. cold air will be drawn through the letter plate. This can have the effect of limiting the thermal reaction of the intumescent which could lead to the intumescent liner not reacting fully or closing the letter plate's aperture fully. This again may lead to loss of integrity of the doorset at this position.

Considering the performance of the specimens, and the fact that they satisfied the requirement for integrity for periods well in excess of those required, it is considered acceptable for the letter plates to be positioned at any height below 1100 mm (i.e. this maximum height corresponds to a furnace pressure of less than 1 Pa and is deemed acceptable based on the tested specimen being subjected the previously stated pressure conditions.

Positional Requirements – 'NOR400'

The 'NOR400' letterplate design has been tested in both positive and negative pressure zones and so the letter plate may be fitted at any height within a door leaf between 200 mm and 2000 mm from the threshold.

Alternative Doorsets

The proposals require the letterboxes to be used on alternative timber doorsets.

To enable the use of these items on other 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 doors, the following points are given to enable the letter plate liners to be used safely:

- i) The doorset, including door frame and associated ironmongery should have achieved 30 minutes or 60 minutes integrity when tested by a NAMAS approved laboratory or assessed (by Exova warringtonfire) to BS 476: Part 22: 1987 for the relevant period.
- ii) If the proposed doorset is to be used in double-leaf configuration the test or assessment evidence should be applicable to double-leaf configurations.
- iii) Likewise, if the proposed doorset is to be used in the unlatched configuration the available evidence should be applicable to unlatched doorsets.

Successful test evidence is available on the proposed letterboxes when installed within chipboard cored doorsets. In each case there were no modes of failure associated with either burn through of the letter plates or problems associated at the letter plate/door aperture junction for in excess of the maximum required period of fire resistance of 60 minutes. The installation of the letter plate and liner component into previously tested chipboard cored doorsets is therefore not in question.

Where the letter box liners are to be incorporated in a door of a core type other than chipboard, the core is to be of solid timber, laminated timber, solid flaxboard or similar construction.

Tubeboard or partially hollow cores are considered suitable assuming a hardwood liner, minimum 10 mm thick with a minimum density of 650kg/m³, is utilised within the perimeter of the aperture.

The letter plates may be installed at any height below 1100 mm from the threshold of a previously tested doorset. However, installation of the plates must not remove any internal framing components (either stiles, rails or mid-rails) of the doorset which may affect the stability of the door leaf.

Brush Seals

It is proposed that the 'Advantage', 'Advantage Plus' or 'XXX' plates may be supplied with or without brush seals.

The letter plates tested were fitted with brush seals. It is not expected that any detrimental effects to the fire resistance performance of the letter plates would occur should they be supplied without the brush seals fitted, for the following reasons:

- the absence of plastic brush seals will essentially remove a potentially flammable material from the letter plate which can only be considered beneficial.
- movement of hot gases through the letter plates would continue to be restricted by the metallic plates themselves, rather than the brush seals. Reaction of the intumescent would not be expected to be affected as heat exposure and air movement through the plate is not expected to be detrimentally affected.

It is therefore concluded that the letter plates may be supplied with or without brush seals fitted and still retain the required fire resistance period.

Option to Remove Foil Coating from Intumescent Liners

The tested specimens incorporated 2 layers of 2 mm by 38 mm Norseal Liners within the apertures. These liners comprised an active intumescent covered in a plastics based foil coating.

It is proposed that, as an optional alternative, the foil coating may be removed.

The removal of the foil coating to the strips of the Norseal liners does not reduce the cross section or volume of the critical component – namely the intumescent compound. In fact, the removal of the foil coating may have beneficial effects in that the active compound will be fully exposed in the event of fire exposure and should, in theory, react marginally quicker. In addition, the removal of the foil coating essentially also removes a potentially flammable component, i.e. the plastic coating.

There are no obvious foreseeable risks associated with the removal of the foil coating to the intumescent liners and on this basis this optional design modification is positively assessed.

DV 120 and DV160 Door Viewers – 30 minute Timber door Applications

It is proposed that this door viewer may be fitted within 30 or 60 minute timber doors. The door viewer comprises a steel casing (chrome plated for the DV 160 and brass or chrome plated for the DV 120) with optical glass viewers on each face. No combustible components shall be incorporated.

The viewers comprise two threaded body sections screwed together through the thickness of the door leaf and clamped to each door leaf face via the outer steel flanges. The body of the viewer/intumescent glass should be an interference fit within the leaf.

In order to appraise the performance of the door viewers in 30 and 60 minute timber door options, it is required to provide some additional protection, in the form of a layer of 0.5 mm intumescent wrap (as supplied) around the body of the viewer across the full thickness of the leaf into which it is fitted. This intumescent protection would be considered to offset the exposure and levels of timber leaf degradation that would be expected to occur on a door requiring up to 60 minutes performance.

Scope of Appraisal – 30 or 60 minute Timber Doors

It is not intended that the scope of this appraisal shall be restricted to any one particular size, type or configuration of doorset. The following guidelines are, however, provided as a basis for the selection of an appropriate doorset:

- The doorset shall carry valid certification or the doorset, including the door frame and associated ironmongery should have achieved at least 30 or 60 minutes integrity and insulation, when tested by a NAMAS/UKAS approved laboratory (or assessed by Exova warringtonfire) to BS 476: Part 22; 1987.
- The door should be or a solid core construction (tubeboard cored doors are not included within the scope of this approval)

Conclusions

Previously fire tested, by a UKAS approved laboratory, (or assessed by Exova warringtonfire) doorsets which have achieved 30 or 60 minutes integrity as discussed in this report may be fitted with 'Advantage', 'Advantage Plus' or 'NOR400' letterboxes, as described within this report and in accordance with the recommendations given in this report without detracting from the overall performance of the door for up to 30 or 60 minutes integrity (dependant on doorset specification).

Should the recommendations given in this report be followed, it can be concluded that the 'DV' door viewers may be fitted to previously tested or assessed (by Exova warringtonfire) fully insulated timber doorsets, to provide up to 60 minutes integrity performance 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 Norseal 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 March 2020, 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

Test No. 136452 A report relating to an indicative test on a specimen comprising a sample section of door leaf of overall nominal dimensions 990 mm high by 990 mm wide by 44 mm thick fitted with two letter box and intumescent liner assemblies referenced Letterbox A (Advantage Plus) and Letterbox B (Advantage).

The specimens tested were each subjected to the general test conditions as specified in BS 476: Part 20: 1987.

The specimen referenced 'Letterbox A' (Advantage Plus) remained intact with respect to the performance requirements for integrity detailed within BS 476: Part 20: 1987 for a period of 81 minutes.

The specimen referenced 'Letterbox B' (Advantage) remained intact with respect to the performance requirements for integrity detailed within BS 476: Part 20: 1987 for a period of 74 minutes.

Test Date : 16th December 2003

Test Sponsor : Norseal Limited

WF Test Report No. 165855 A report relating to an indicative test on a specimen comprising a sample section of door leaf fitted with two letter box and intumescent liner assemblies.

For the purpose of the test, the specimens were referenced Letter Plate A and Letter Plate B of identical designs to the letter plates referenced 'NOR400' discussed in this report.

The test assembly had overall nominal dimensions of 990 mm high by 940 mm wide by 54 mm thick and comprised a section of graduated density chipboard core door leaf with 6 mm thick hardwood facings. The section of door blank was fitted with two letter plates.

Letter Plate A, was chrome in colour and of overall dimensions 310 mm wide by 68 mm high. The letter plate was mounted 200 mm from the head of the door leaf over an aperture of nominal dimensions 257 mm long by 38 mm high.

Letter Plate B, was gold in colour and of overall dimensions 310 mm wide by 76 mm high. The letter plate was mounted 200 mm from the base of the door leaf over an aperture of nominal dimensions 257 mm long by 38 mm high.

The assembly formed the front vertical face of a one metre cubed gas fired furnace chamber, the temperature rise of which was controlled to conform with the relationship given in BS 476: Pt 20: 1987. The pressure within the furnace chamber coincident with the upper letter plate was controlled to be +8.5 (± 2) Pa.

The specimen letter plates remained intact for the 66 minute test duration with no visible flaming, ignition of a cotton pad or any through gaps observed during the test.

Test Date : 20th July 2007

Test Sponsor : The sponsor of this test has provided written permission to allow the use of this data in the formulation of this appraisal

**WF Test Report
No. 166079**

A report relating to an indicative test on a specimen comprising a sample section of door leaf fitted with two letter box and intumescent liner assemblies.

The test assembly had overall nominal dimensions of 990 mm high x 940 mm wide by 54 mm thick and comprised a section of graduated density chipboard core door leaf with 6 mm thick hardwood facings. The section of door leaf was fitted with a single letter plate identical to that referenced 'NOR400' was gold in colour and of overall dimensions 310 mm wide by 76 mm high. The letter plate was mounted at the approximate centre of the door leaf over an aperture of nominal dimensions 257 mm long by 38 mm high.

The assembly formed the front vertical face of a one metre cubed gas fired furnace chamber, the temperature rise of which was controlled to conform with the relationship given in BS 476: Pt 20: 1987. The pressure within the furnace chamber coincident with the letter plate was controlled to be -5 (± 2) Pa.

The specimen letter plate remained intact for the 66 minute test duration with no visible flaming, ignition of a cotton pad or any through gaps observed during the test.

Test Date : 24th July 2007

Test Sponsor : The sponsor of this test has provided written permission to allow the use of this data in the formulation of this appraisal

Declaration by Norseal 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* - Principal Certification Engineer

* For and on behalf of Exova warringtonfiire.

Report Issued: 19th January 2004

Issue 7: Review and revalidation of report – 27th February 2015

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