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Title:

The Fire Resistance Performance Of Timber-Based Insulated Doorsets When Fitted With Various Hardware

Report No:

402262 Issue 6

Prepared for:

ZOO HARDWARE LTD

Unit B, Dukes Drive,
Kingmoor Park North,
Carlisle
CA6 4SH

Date:

19 July 2018

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Foreword

This assessment report has been commissioned by Zoo Hardware Ltd and relates to the fire resistance of door hardware.

The report is for National Application and has been written in accordance with the general principles outlined in BS EN 15725: 2010; *Extended application reports on the fire performance of construction products and building elements*.

This assessment uses established empirical methods of extrapolation and experience of fire testing similar products, in order to extend the scope of application by determining the limits for the design based on the tested constructions and performances obtained. The assessment is an evaluation of the potential fire resistance performance, if the elements were to be tested in accordance with EN 1634-1:2014+ A1:2018.

This scope document cannot be used as supporting documentation for either a CE marking application for doorsets, nor can the conclusion be used to establish a formal classification against EN13501-2.

The defined scope presented in this assessment report relates to the behaviour of the proposed door hardware under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the hardware in use.

This report has been prepared and checked by product assessors with the necessary competence, who subscribe to the principles outlined in the Passive Fire Protection Forum (PFPF) 'Guide to Undertaking Technical Assessments of the Fire Performance of Construction Products Based on Fire Test Evidence - 2021'. The aim of the PFPF guidelines is to give confidence to end-users that assessments that exist in the UK are of a satisfactory standard to be used for building control and other purposes.

Executive Summary

Objective

This report presents an appraisal of the fire resistance performance of single-acting timber-based doorsets when fitted with Zoo stainless steel flushbolts, if tested in accordance with BS EN 1634-1.

In addition this report presents an appraisal of the fire resistance performance of timber-based doorsets when fitted with Zoo ancillary hardware, if tested in accordance with BS EN 1634-1.

Report Sponsor

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Summary of Conclusions

Should the recommendations given in this report be followed, it can be concluded that the Zoo stainless steel flushbolts detailed within this report may be fitted to previously tested insulated single-action, double-leaf timber-based doorsets to provide 30 minutes or 60 minutes integrity and insulation performance, if tested in accordance with BS EN 1634-1.

Additionally, should the recommendations given in this report be followed, it can be concluded that the Zoo hardware ancillary items detailed within this report may be fitted to previously tested insulated timber-based doorsets to provide 30 minutes or 60 minutes integrity and insulation performance, if tested in accordance with BS EN 1634-1.

This assessment represents our opinion as to the performance likely to be demonstrated on a test in accordance with EN1634-1, on the basis of the evidence referred to evidence referred to herein. We express no opinion as to whether that evidence, and/or this assessment, would be regarded by any Building Control authority as sufficient for that or any other purpose. This assessment is provided to the client for its own purposes and we cannot opine on whether it will be accepted by Building Control authorities or any other third parties for any purpose.

Valid until

26th July 2028

Introduction

This report presents an appraisal of the fire resistance performance of single-acting insulated timber-based doorsets when fitted with a range of Zoo stainless steel flushbolts. The doorset, onto which the proposed hardware is to be fitted, shall be a single-action, double-leaf configuration.

Additionally, this report presents an appraisal of the fire resistance performance of insulated timber-based doorsets when fitted with a range of Zoo ancillary hardware (e.g. lever handles, pull handles, cylinders, door viewer, etc.). The doorset, onto which the proposed hardware is to be fitted, shall be a single-action, double-leaf configuration.

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

FTSG / PFPF

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. and the Passive Fire Protection Federation (PFPF) Guide to Undertaking Technical Assessments of Fire Performance of Construction Products Based on Fire Test Evidence - 2021.

Assumptions

Doorsets

It is assumed that the flushbolts will be fitted to an insulated timber-based doorset which has also been previously shown to be capable of providing the required fire resistance performance when tested in accordance with BS EN 1634-1 and fitted with similarly sized and positioned flush bolts in the proposed configuration i.e. single-action, double-leaf. The critical aspects of the door construction are detailed later in this report.

In addition, it is assumed that the door leaves will be in the closed position, with the primary leaf latched and the secondary leaves bolted top and bottom.

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.

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.

Installation

It is assumed that the doorsets will be installed in a similar manner to that of the previously tested assembly by competent installers.

Lever / knob furniture

The lever/knob furniture will always be used in combination with a lock/latch and it is therefore assumed that the tested doorset will have been tested or assessed when incorporating a latch/lock.

The spindle hole should be as small as possible, allowing for the operation of the handle, but shall be a maximum 15 mm in diameter.

Hardware Approval

All door hardware is subject to the acceptance by the chosen door assembly supplier's tested, assessed or certificated scope, which generally identifies the types of hardware approved, the required specification/design based on the key materials/ maximum size and the application of any additional intumescent protection.

On this basis approval should be sought from the specific door assembly supplier to ensure compliance based on this assessed/certificated scope.

EN1634-1

EN1634-1 was issued originally in 2000, with amended versions issued in 2008, 2014 and 2018. The differences between each version are mainly procedural and are not considered to have a practical impact on the performance of the samples under test. On this basis this evaluation is consider applicable to all versions of EN1634-1 issued prior to the issue of this assessment.

Hardware Variant Specifications

An appraisal of the hardware variants detailed in this report is based upon product information supplied by the hardware manufacturer, which is retained in the confidential file relating to this report. Warringtonfire have not inspected the devices being appraised and cannot be held responsible for the accuracy of the information provided.

Proposals

It is proposed that the Zoo stainless steel flushbolts, as referenced within this report, may be fitted into a previously tested (in accordance with BS EN 1634-1) insulated timber-based doorset which has been shown to be capable of providing 30 minutes or 60 minutes integrity and insulation in the same configuration as that proposed i.e. single-action, double-leaf.

It is further proposed that the ancillary hardware items as supplied by Zoo Hardware Ltd (e.g. lever handles, pull handles, cylinders, door viewers, etc.), as referenced within this report, may be fitted into a previously tested (in accordance with BS EN 1634-1) insulated timber-based doorset which has been shown to be capable of providing 30 minutes or 60 minutes integrity and insulation in the same configuration as that proposed e.g. single-action, double-action, single-leaf or double-leaf.

Basic Test Evidence

WF Test Report No. 388830

The fire resistance test referenced WF No. 388830 to determine the fire resistance performance of one typical 30 minute single-acting, single-leaf doorset (Doorset C), a narrow typical 30 minute single-acting, double-leaf doorset (Doorset B) and a narrow typical 60 minute single-acting, double-leaf doorset (Doorset A) incorporating various items of hardware in accordance with BS EN 1634-1: 2014.

Doorset B and C achieved 36 minutes and Doorset A 63 minutes.

WF Test Report No. 195150

The test referenced WF Test Report No. 195150 and briefly described in the supporting data section of this report, describes a test conducted in accordance with BS EN 1634-1: 2008 which included two single-acting, single-leaf timber based doorsets. The doorsets were referenced as Doorset A and Doorset B for the purpose of the test.

The test demonstrated the ability of the doorsets to provide 46 and 64 minutes integrity and insulation performances for doorsets A and B respectively.

WF Test Report No. 310030

The test referenced WF Test Report No. 310030 and briefly described in the supporting data section of this report, describes a test conducted in accordance with BS EN 1634-1: 2008 which included two single-acting, single-leaf timber based doorsets. The doorsets were referenced as Doorset A and Doorset B for the purpose of the test.

The test demonstrated the ability of the doorsets to provide 36 and 60 minutes integrity and insulation performances for doorsets A and B respectively.

WF Test Report No. 379261

The test referenced WF Test Report No. 310030 and briefly described in the supporting data section of this report, describes a test conducted in accordance with BS EN 1634-1: 2014 which included a single-acting, single-leaf timber based doorset.

The test demonstrated the ability of the doorsets to provide 37 minutes integrity and insulation performances.

Test report review

The original test reports used in support of this assessment have been reviewed and it has been concluded that the test data remains acceptable, and the final result would be unchanged on the following basis:

- A comparison of the test procedures and performance criteria with the current standard has identified that any variations would have no detrimental impact on the performance of the doorset and hardware under test.
- The client has confirmed that there has been no change to the design or material specification of the hardware tested originally.
- The reports are available in their entirety, the products are adequately referenced and linked to the products being considered for assessment, and the ownership of the test data has been confirmed as the assessment report holder.

Assessed Performance

Morticed Flushbolts – Edge-mounted and Face Mounted

It is proposed that the Zoo stainless steel flushbolts, as referenced within this report, may be fitted into the meeting edge or face of the door leaves within a previously tested (in accordance with BS EN 1634-1) insulated timber-based doorset which has been shown to be capable of providing 30 minutes or 60 minutes integrity and insulation in the same configuration as that proposed i.e. single-action, double-leaf.

The range consists of lever action flushbolts with the mechanism fully exposed behind the forend, with a maximum size of 904 mm long x 20 mm wide x 42 mm return (20 mm bolt throw), and a minimum size of 200 mm long x 20 mm wide x 42 mm return, with a 42 mm x 19 mm keep fitted in the head of the frame, manufactured entirely from stainless steel, as follows:

Product code	Product description
ZAS02	Lever Action Flush Bolt 20 x 150mm
ZAS02R	Lever Action Flush Bolt 20 x 150mm, Radius
ZAS03	Lever Action Flush Bolt 20 x 203mm
ZAS03R	Lever Action Flush Bolt 20 x 203mm, Radius
ZAS05	Lever Action Flush Bolt 20 x 305mm
ZAS05R	Lever Action Flush Bolt 20 x 305mm, Radius
ZAS09	Lever Action Flush Bolt 20 x 914mm
ZAS09R	Lever Action Flush Bolt 20 x 914mm, Radius
ZAS12	Lever Action Flush Bolt 20 x 457mm
ZAS12R	Lever Action Flush Bolt 20 x 457mm, Radius
ZAS13	Lever Action Flush Bolt 20 x 609mm
ZAS13R	Lever Action Flush Bolt 20 x 609mm, Radius

The performances of the flushbolts during the test referenced WF No. 388830 is cited to display the ability of the flushbolts to contribute towards the required fire resistance performances in both the edge mounted and face mounted applications.

On reviewing the observations taken from the test report, it's clear that there were no integrity failures associated with flushbolts fitted to Doorset B (E30), for a test duration of 36 minutes (at which point the door was blanked off to allow the testing of the Doorset A to continue), or Doorset A (E60) for a test duration of 63 minutes.

Alternative Flushbolts

One key aspect of the flushbolts use is it location within the doorset as the performance will be influenced by whether the they fitted in edge or face of doorsets, also the location in the height is significant as flushbolts in the top of the door are subject to increased positive pressure which may result in hot gases and flames being pushed around the bolts, and burn through of the leaf and at the leaf to frame gap at the bolt position.

The ZAS09 904 mm long flushbolts were fitted in the top and bottom edges, and the exposed face of both doorsets; in addition the ZAS13R 608 mm long flushbolts were fitted in to the unexposed face, and bottom of the exposed face of both doorsets. All flushbolts were engaged.

In terms of the flushbolt material, it is critical that materials which are combustible or have a lower melting point are not utilised since materials which melt or ignite may advance the burn through of the leaf and therefore lead to a premature integrity failure.

It is critical that the flushbolt dimensions are not increased since the increased mortice required for a larger body, forend or keep may lead to an earlier burn through of the leaf or increased strike/forend dimensions may lead to the penetration of flames/hot gases at the leaf edge due to further interruption of intumescent seals and an increase in conducted heat.

In terms of the intumescent protection, it is critical that this is not reduced from that tested, as the reaction of this material when subjected to the heating conditions of the test is essential in limiting the burn through of the leaf and at the leaf to frame gap at the bolt position.

Substitution of alternative flushbolts from the proposed range may therefore be considered in terms of the critical aspects discussed and where such flushbolts fall within the scope of the tested locksets, it is considered reasonable to assume that no reduction in the performance of the doorset would be expected as a consequence of their substitution.

All of the proposed flushbolts are of identical materials and will utilise the same level of intumescent protection and all are of the same or smaller dimensions and therefore they may be positively appraised.

The proposed flushbolts are of the same basic construction as those tested comprising steel bodies and operating mechanism, with steel bolts and keeps. All flushbolts have bolt projections at least equal to that of the tested models. The nominal dimensions of all the flushbolts considered by this report the same or less than the dimensions of the tested flushbolts and therefore the full range of sizes required are considered suitable for use in the leading edge and face of 30 minute and 60 minute timber-based doorsets.

All of the flushbolts have steel bodies, keeps and bolts, and the bolts have a 20 mm throw. The test evidence, although taken from a test in which the specimen bolts did not demonstrate an essential retention function on a full width door leaf, however, based on these design features the bolts would not be subject to any melting or substantial deformation and therefore it is reasonable to conclude that they would provide a retention function when fitted to timber-based doorset for up to 60 minute performance.

Radiused and square forends

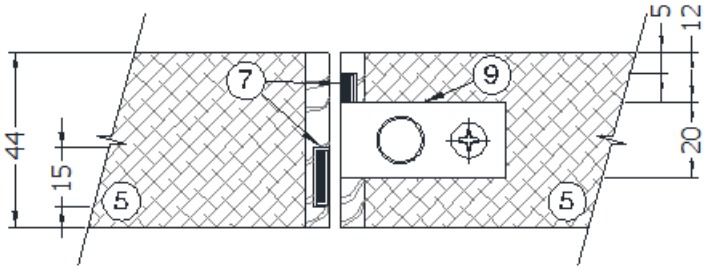
The tested forend and keep plates incorporated were square. It is proposed that radiused forends and keep plates also be permitted.

As the radiused forend and keep plates require the removal of less material to both the frame and leaf edge, when fitted to timber doorsets, their inclusion can only be considered to beneficial. Therefor the alternative forend and keep plate variants are approved subject to intumescent specification discussed earlier in this report.

30 minute Intumescent Protection

It is a requirement of this appraisal that the flushbolts must be installed within the doorsets such that the same level of intumescent protection is provided. This protection shall be such that the mortice in the door leaf is lined (bottom and sides) with a 2 mm thickness of graphite-based sheet material intumescent and that a 2 mm thickness of the same material is provided behind the return and keep plate.

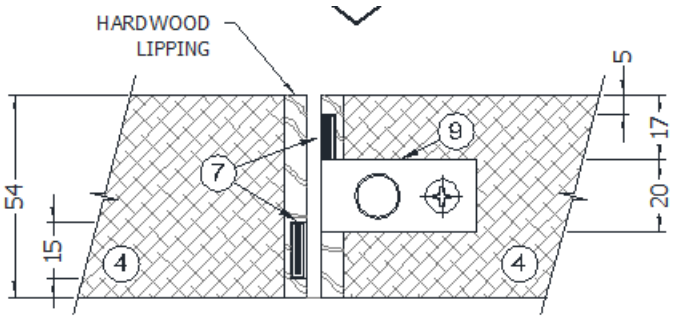
In addition, where the flushbolts are fitted in the meeting edge of the doors, the perimeter intumescent fire seals within the meeting edge of the doors (primary or secondary leaf) shall by-pass the flushbolts by a minimum of 7 mm wide on secondary leaf, with a full intumescent of minimum 15 mm width fitted in the primary leaf (as below).



60 minute Intumescent Protection

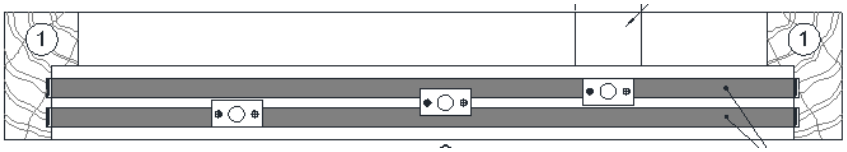
It is a requirement of this appraisal that the flushbolts must be installed within the doorsets such that the same level of intumescent protection is provided. This protection shall be such that the mortice in the door leaf is lined (bottom and sides) with a 2 mm thickness of graphite-based sheet material intumescent and that a 2 mm thickness of the same material is provided behind the return and keep plate.

In addition, where the flushbolts are fitted in the meeting edge of the doors, the perimeter intumescent fire seals within the meeting edge of the doors (primary or secondary leaf) shall by-pass the flushbolts by a minimum of 12 mm wide on secondary leaf, with a full intumescent of minimum 15 mm width fitted in the primary leaf (as below).



In addition the keep plate in the frame head shall be by-passed by the perimeter intumescent fire seals as follows for 60 minute applications only:

- Meeting stile edge-mounted – 9 mm each side
- Face mounted – 15 mm to one side only



Lever handles

Fire doors often incorporate locking/latching devices either to retain the doorset in the closed position during a fire or simply for keeping the doorset closed/locked in normal use.

The introduction of a lock/latch case into a timber-based leaf can increase the risk of localised integrity failure, via either the mortise removing enough leaf material that premature burn through can occur, or by interruption of the intumescent seals around the leaf perimeter by the strike/forend plate.

This appraisal does not however consider the implications of installing a specific lock, within a specific timber-based fire door construction and only considers the influence of the lever/knob handle furniture, the suitability of the door leaf and latch/lock should be demonstrated by separate test/assessment evidence.

Included with the tested doorset assemblies were ‘ZCZ010CP’ zinc alloy lever handles on roses fitted to the mortice locksets and ‘ZB022’ brass lever handles on backplates fitted to the tubular mortice latches.

The handles tested were selected as being typical of their respective ranges and the most onerous of all handle sets to be considered by appraisal. Other designs and types considered by this appraisal are:

- stainless steel lever handles on roses,
- zinc alloy or brass lever handles on backplates,
- brass knobs on roses

As has been previously discussed, the tested doorsets achieved 46 and 64 minutes respectively. Failure of the 30 minute doorset occurred after 46 minutes and was not directly related to, or as a consequence of the installation of either latch/lockset or their accompanying handles. Failure of the 60 minute doorset after 64 minutes was again not as a result or consequence of the installation of the lock/latch or handles, nor was there any instance of failure relating to either handle set within the test duration of 68 minutes.

The performance of the tested handles provides a high degree of confidence in the abilities of the other designs within their respective ranges, and the other designs of handles proposed and detailed within Annex A to be fitted to timber based doorsets, in conjunction with a suitably proven lock or latch, without detriment to the performance of the doorset for fire resistance performances of 30 or 60 minutes, as dictated by the doorset design.

The spindle hole should be as small as possible, allowing for the operation of the handle, but shall be a maximum 15 mm in diameter.

Europrofile cylinders

The introduction of a lock/latch case into a timber-based leaf can increase the risk of localised integrity failure, via either the mortise removing enough leaf material that premature burn through can occur, or by interruption of the intumescent seals around the leaf perimeter by the strike/forend plate.

This appraisal does not however consider the implications of installing a specific lock, within a specific timber-based fire door construction and only considers the influence of the Europrofile cylinder; the suitability of the door leaf and cylinder lock should be demonstrated by separate test/assessment evidence.

The 'ZUKS76EPSS Euro profile sash lock 3" fitted to doorsets in test WF report No. 310030 incorporated Euro profile double cylinders. It is proposed that a alternative Euro profile cylinders from the ZEP, V6 and V10 range, as identified in Annex A, may be used in conjunction with the previously appraised lock cases within 30 minute and 60 minute timber based doorsets, without detriment to the performance of the lockset, or the doorset into which it is fitted.

The tested cylinders doorsets in test WF report No. 310030 were Euro profile double cylinder nominally 70 mm (30 minutes) and 80 mm (60 minutes) overall in length, referenced:

- ZEP70DNPE 70 mm
- ZEP80DNPE 80 mm

In addition the ZDL7260 Euro profile sash lock fitted to Doorset C in test WF report No. 388830, incorporated a Zoo V6EP100D 100 mm Euro profile double cylinder within a typical 44 mm thick E30 door leaf. This achieved 36 minutes without failure.

All the cylinders were manufactured primarily from brass and extended at least 13 mm beyond the face of each door. The range of alternative Euro profile lock cylinders proposed are all of the same basic construction and material differing only in overall length. As the reason for the different cylinder lengths is primarily to suit the thickness of the door into which the lockset is installed, it is reasonable to consider that the alternative cylinders will perform in an similar manner to the tested model.

The proposed range includes single cylinders, double cylinders and cylinder/thumbturn options. However, as the tested products were double cylinders, this configuration is consider to represent the most onerous application, requiring the body of the cylinder to pass completely through the entire door thickness and lock case, therefore this provides a high degree of confidence that the single cylinders, double cylinders and cylinder/thumbturns will perform for the required periods of fire resistance.

It is a requirement of this assessment that:

1. Recessing for locks shall result in a tight fit, allowing for any intumescent protection where required.

2. the hole in the door face shall follow the shape of the cylinders and be as tight as possible; furthermore the single cylinders door preparation will penetrate through only half the thickness of the door leaf)

The performance of the alternative V5, V6 and V10 Euro profile lock cylinders is therefore positively appraised for use with the relevant lock cases. The range of approved cylinders is detailed in Annex A – 'Approved Hardware' at the back of this report.

Escutcheons

Included within the Zoo Plus stainless steel range, the Zoo Plus Zinc range and the brass accessories range are escutcheons to suit euro or standard profile locks. The tested doorsets included mild steel escutcheons with a plastic under construction. The other designs considered here are either the same or are constructed solely of metal components.

All of these accessories are surface mounted and whilst the most onerous of them has been successfully tested on both 30 and 60 minute door constructions, are not considered to have any detrimental influence on the likely performance of the doorset or lock to which they are fitted. On this basis they are all positively appraised and detailed within Annex A.

It also proposed that the use of security escutcheon, reference ZAS008 be permitted.

The escutcheon is wholly surface mounted and consists entirely of steel components, consequently it can be assumed that there is no increased risk of flaming or additional erosion as a result of fitting this item, therefore the use of the ZAS008 security escutcheon is positively appraised.

Turn & release accessories

Turn and release accessories available with the above ranges comprise 50 mm roses with various designs of turn and outer 50 mm roses some with indicator and release or just release. These accessories fit to the door leaf in the same way as the lever handles and are actuated by either standard 8 mm spindles, as the lever handles, or smaller 5 mm spindles. Positive appraisal of these accessories is made on the basis that they are no more onerous that the previously appraised lever handles from the same ranges.

Miscellaneous accessories

Other door mounted accessories are included within the tables of approved hardware in Annex A on the basis that they are purely surface mounted and not considered influential on the performance of the doorset. These items range from surface fixed signs to door chains and door stops. The specific product references of the items approved are detailed within the tables.

Pull handles

The tested pull handles comprise a tubular stainless steel handle, with brass thread inserts and M8 bolts. The tested handles were nominally 320 mm high by 19 mm diameter and were through fixed to the exposed face of each door.

The fixing holes of each handle were provided with protection in the form of intumescent acrylic mastic applied into the holes prior to the insertion of the mounting bolts (to a minimum depth of 10 mm on both sides). In neither instance was the presence of the pull handle a cause of integrity failure.

The pull handles are formed from grade 304 stainless steel and fit to the door in the same manner with M8 fixing bolts. Handles come in a range of sizes from 150 mm up to 600 mm and 19, 21 or 30 mm diameters. The size of the handle does nothing more than change the proximity of the fixing holes to one another, which even when considering the smallest handle, are never closer than 150 mm centres.

It is further proposed that the following aluminium bolt-through or screw fixed backplate pull handles be considered (see Annex A for full list of approved handles):

- FB Series
- ZAA Series
- ZCA Series
- ZCS2g Series
- ZPSALP

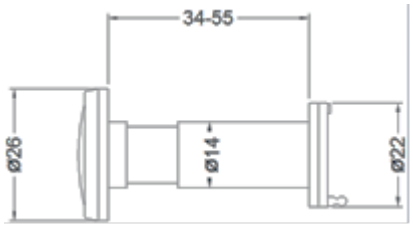
Although these handles have a lower meting point, the handles themselves do not penetrate the door – with only the steel M8 fixing bolts passing through the leaf, or screw fixing partially entering the door face. Consequently due to the insulting performance of timber doors the handles are not liable to melting or flaming.

Subject to the pull handles being installed with the same provision for intumescent mastic to the fixing holes, all the handles detailed within Annex A are positively appraised.

Back-to-back pull handles are not permitted with any handle type.

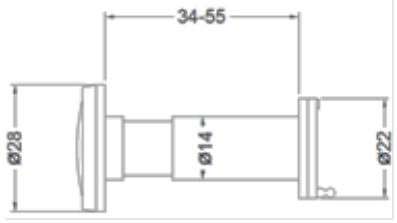
Door viewers

The detail and specification for the door viewers tested in WF report No. 379261 were as follows:



ZAB30

Casing – Brass
Lens - Glass



ZAS46

Casing – Stainless steel
Lens - Glass

The viewer requires a 15 mm (no intumescent protection) or 17 mm (intumescent protection) diameter hole to be drilled through the door leaf to accommodate it. The two parts are simply inserted from each face of the door leaf and screw together.

The doorset in WF report No. 379261 included 2No. ZAB30 and 2No. ZAS46 door viewers fitted at a height of 1350 mm (1 mm sheet graphite intumescent protection included) and 1650 mm (no intumescent protection fitted).

Review of the observations contained in the test report shows that no integrity failure of the doorset was recorded after 37 minutes, at which point the test was terminated at the request of the sponsor.

It is therefore reasonable to consider that, based on the performance of the both the ZAB30 and ZAS46 during the test, a high level of confidence can be taken in the proposal that the viewer may be fitted to other, previously proven, timber based insulated doorsets, without the use of additional intumescent protection, whilst continuing to positively contribute to the performance of the doorset for the required 30 minute performance.

The viewers shall be fitted in doors within previously proven 30 minute timber-based fire doors, with a minimum thickness of 44 mm, and positioned at a maximum height of 1650 mm from the finished floor level. The hole in the door shall be a maximum of 15 mm diameter.

It is additionally proposed that the door viewers be fitted in 60 minute timber-based doors, with a minimum thickness of 54 mm.

It has already been established that the viewers are cable of providing in excess of 37 minutes in a 44 mm thick 30 minute door without intumescent protection, furthermore the viewers are of brass or steel construction with a glass lens, therefore it is not expected that these units themselves are likely to flame at any point.

It is expected that the increased door thickness and the inclusion of the 1 mm sheet graphite material around the lens, will provide added protection/insulation around the viewer, sufficiently reducing any erosion or passage of hot gases through the hole in the door for the additional 23 minutes required to achieve 60 minutes integrity.

Therefore a high level of confidence can be taken in the proposal that the viewer may be fitted to other, previously proven, timber based insulated doorsets, with a 1 mm sheet graphite intumescent protection around the viewer, whilst continuing to positively contribute to the performance of the doorset for the required 60 minute performance.

The viewers shall be fitted in doors within previously proven 60 minute timber-based fire doors, with a minimum thickness of 54 mm, and positioned at a maximum height of 1650 mm from the finished floor level. The hole in the door shall be a maximum of 17 mm diameter.

Proposed Doorsets

As stated in this report, the doorset, in the required configuration, will be previously tested and its performance is therefore not in doubt.

To enable the use of the Zoo stainless steel flushbolts 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 locksets to be used safely:

a) The doorset shall carry valid certification or the doorset, including the door frame and associated ironmongery should have achieved 30 or 60 minutes integrity, as appropriate, when tested by a UKAS approved laboratory to BS EN 1634-1.

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

c) The leaves of the proposed doorset shall be of a minimum thickness of 44 mm for 30 minute doorsets and 54 mm for 60 minute doorsets.

d) The leaves should incorporate hardwood lippings of a minimum thickness of 6 mm and minimum density 640kg/m^3.

e) The door frame of 30 minute doorsets shall be of softwood or hardwood and have a minimum density of 450kg/m^3.

f) The door frame of 60 minute doorsets shall be of hardwood and have a minimum density of 640kg/m^3.

Conclusions

Should the recommendations given in this report be followed, it can be concluded that the Zoo stainless steel flushbolts detailed within this report may be fitted to previously tested insulated single-action, double-leaf timber-based doorsets to provide 30 minutes or 60 minutes integrity and insulation performance, if tested in accordance with BS EN 1634-1.

Additionally should the recommendations given in this report be followed, it can be concluded that the Zoo hardware ancillary items detailed within this report may be fitted to previously tested insulated timber-based doorsets to provide 30 minutes or 60 minutes integrity and insulation performance, if tested in accordance with BS EN 1634-1.

This report represents our opinion as to the performance likely to be demonstrated on a test in accordance with BS EN 1634-1:2014+A1:2018, on the basis of the test evidence referred to in this report. We express no opinion as to whether that evidence, and/or this report would be regarded by any Building Control authorities or any other third parties as sufficient for that or any other purpose.

Review

It has been confirmed by Zoo hardware Ltd that there have been no changes to the specification, materials or manufacturing location of the hardware considered in the original appraisal referenced WF Assessment Report No. 402262 issue 5.

The original assessment has been written using appropriate test evidence generated at accredited test laboratories. The supporting test evidence has been deemed appropriate to support the manufacturers stated design.

The defined scope presented in the original assessment report relates to the behaviour of the proposed design under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the hardware in use.

This revalidation has been prepared and checked by product assessors with the necessary competence, who subscribe to the principles outlined in the PFPF guidelines to undertaking assessments in lieu of fire tests. The aim of the PFPF guidelines is to give confidence to end-users that assessments that exist in the UK are of a satisfactory standard to be used in lieu of fire tests for building control and other purposes.

The PFPF guidelines are produced by the UK Fire Test Study Group (FTSG) an association of the major fire testing laboratories in the UK and are published by the PFPF, the representative body for the passive fire protection industry in the UK.

The data used for the original appraisal has been re-examined and found to be satisfactory. The procedures adopted for the original assessment have also been re-examined and are similar to those currently in use.

Therefore, with respect to the assessment of performance given in WF Assessment Report No. 402262 issue 6, the contents should remain valid for a further 5 years.

This review is based on information used to formulate the original assessment. No other information or data has been provided by Zoo hardware Ltd which could affect this review.

The original appraisal report was performed in accordance with the principles of the UK Fire Test Study Group Resolution 82: 2001. This review has therefore also been conducted using the principles of Resolution 82: 2001.

Validity

The assessment is initially valid for five years after which time it is recommended to be submitted to Warringtonfire for re-appraisal.

This assessment report is not valid unless it incorporates the declaration given below duly signed by the applicant.

Summary of Primary Supporting Data

WF Test Report No. 388830

To determine the fire resistance performance of one single-acting, single-leaf doorset and two narrow single-acting, double-leaf doorsets incorporating various items of hardware in accordance with BS EN 1634-1: 2014.

For the purpose of the test the Doorsets were referenced Doorset A, Doorset B and Doorset C.

Doorset A had overall nominal dimensions 2200 mm high by 629 mm wide incorporating two door leaves, each with overall dimensions 2132 mm high by 275 mm wide by 54 mm thick. The door leaves were of a solid graduated density chipboard construction, with 8 mm hardwood lippings to the vertical edges and were hung within a hardwood frame on three steel hinges. The Doorset was fitted with three engaged ZAS13R lever action flush bolts and three engaged ZAS09 lever action flush bolts.

Doorset B had overall nominal dimensions 2200 mm high by 620 mm wide incorporating two door leaves, each with overall dimensions 2132 mm high by 275 mm wide by 44 mm thick. The door leaves were of a solid graduated density chipboard construction, with 8 mm hardwood lippings to the vertical edges and were hung within a hardwood frame on three steel hinges. The Doorset was fitted with three engaged ZAS13R lever action flush bolts and three engaged ZAS09 lever action flush bolts.

Doorset C had overall nominal dimensions 2085 mm high by 990 mm wide incorporating a door leaf with overall dimensions 2029 mm high by 919 mm wide by 44 mm thick. The door leaf was of a solid graduated density chipboard construction, with 8 mm hardwood lippings to the vertical edges and was hung within a softwood frame on three steel hinges. The Doorset was installed with a disengaged ZDL7260 Euro sashlock connected to a stainless steel handle and a VDC002.5 surface mounted closer in parallel arm configuration on the exposed face.

For the purpose of the Doorsets A and B were installed so that they opened towards the heating conditions and Doorset C was installed so that it opened away the heating conditions the test.

	Doorset A	**Doorset B**	**Doorset C**
Sustained flaming	63 minutes	36 minutes#	36 minutes#
Gap gauge	64 minutes*	36 minutes#	36 minutes#
Cotton Pad	63 minutes	36 minutes#	36 minutes#

* The test duration.
# Specimen blanked off
The test was discontinued after a period of 64 minutes.

Test date : 25th September 2017

Test sponsor : Zoo Hardware Ltd

WF Test Report No. 195150

The test referenced WF Test Report No. 195150 and briefly described in the supporting data section of this report, describes a test conducted in accordance with BS EN 1634-1: 2008 which included two single-acting, single-leaf timber based doorsets.

The doorsets were referenced as Doorset A and Doorset B for the purpose of the test. Both doorsets had nominal overall dimensions of 1010 mm wide by 2080 mm high and included a door leaf nominally 925 mm wide by 2010 high.

Doorset A comprised a chipboard based door leaf nominally 44 mm thick hung within a softwood door frame. Doorset B comprised a chipboard based door leaf nominally 54 mm thick hung within a hardwood doorframe.

Both doorsets were provided with the same hardware items which included Zoo stainless steel butt hinges referenced 'ZHSS43S', (three on each leaf) a mortice cased sashlock referenced 'ZLDC7255SS' complete with 'ZCZ010CP' lever handles and euro profile cylinder with thumb turn. In addition to these items a Zoo Hardware heavy duty latch fitted in conjunction with a Zoo Hush latch strike plate and brass lever handles on backplates referenced 'ZB022'. Each door leaf was also fitted with a bolt through stainless steel pull handle referenced 'ZCS420SS' mounted on the exposed face of the door leaf.

Both doorsets were oriented such that their door leaves opened towards the heating conditions of the test and were latched, but not locked, via the fitted sashlocks.

The specimens satisfied the test requirements for the following periods:

		Doorset A	Doorset B
Integrity	Sustained Flames	46 minutes	64 minutes
	Gap Gauge	46 minutes	64 minutes
	Cotton Pad	46 minutes	64 minutes
Insulation		46 minutes	64 minutes

The test was discontinued after a period of 67 minutes.

Test date : 22nd August 2010

Test sponsor : Zoo Hardware Ltd

WF Test Report No. 310039

For the purposes of the test the doorsets were referenced Doorset A and Doorset B.

Doorset A had overall dimensions of 2085 mm high by 1002 mm wide and incorporated a door leaf of overall dimensions 2040 mm high by 932 mm wide by 44 mm thick. The door leaf was hung within a softwood door frame on three Zoo Architectural Hardware stainless steel hinges, referenced 'ZHSS243S'. The door leaf was formed from graduated density chipboard core with hardwood lippings to the vertical edges. The doorset was fitted with a Zoo Architectural Hardware Euro profile sash lock complete with lever handles and ZEP70DNPE 70 mm euro profile cylinder. The doorset was orientated such that it opened towards the heating conditions of the test and was latched for the duration of the test.

Doorset B had overall dimensions of 2085 mm high by 1012 mm wide and incorporated a door leaf of overall dimensions 2040 mm high by 932 mm wide by 54 mm thick. The door leaf was hung within a hardwood door frame on three Zoo Architectural Hardware stainless steel hinges, referenced 'ZHSS244S' The door leaf was formed from graduated density chipboard core with hardwood lippings to the vertical edges. The doorset was fitted with a Zoo Architectural Hardware Euro profile sash lock complete with lever handles and ZEP80DNPE 80 mm euro profile cylinder. The doorset was orientated such that it opened towards the heating conditions of the test and was unlatched for the duration of the test.

The specimens satisfied the test requirements for the following periods:

		Doorset A	Doorset B
Integrity	Sustained Flames	36 minutes	60 minutes
	Gap Gauge	36 minutes	62* minutes
	Cotton Pad	36 minutes	60 minutes
Insulation		36 minutes	6 minutes

*The test was discontinued after a period of 62 minutes.

Test date : 5th August 2011

Test sponsor : Zoo Hardware Ltd

WF Test Report No. 379261

The test referenced WF Test Report No. 379261 and briefly described in the supporting data section of this report, describes a test conducted in accordance with BS EN 1634-1: 2014 which included a single-acting, single-leaf timber based doorset.

The doorset had overall dimensions of 2073 mm high by 1003 mm wide incorporating a door leaf with overall dimensions 2030 mm high by 932 mm wide by 44 mm thick. The door leaf was of a solid graduated density chipboard construction, with 8 mm hardwood lippings to the vertical edges and was hung within a softwood frame on three steel hinges.

Two models of Zoo Hardware door viewers, referenced ZAB30 and ZAS46 were fitter to the leaf, both with and without intumescent protection.

The door was installed so that it opened away from the heating conditions of the test and a surface mounted overhead closer, referenced 'Zoo Hardware 5023AWE' was fitted to the exposed face of the doorset in parallel arm configuration.

The doorset was not fitted with a latch and as such was unlatched for the duration of the test.

The specimens satisfied the test requirements for the following periods:

Integrity	Sustained Flames	37 minutes
	Gap Gauge	37 minutes
	Cotton Pad	37 minutes
Insulation		37 minutes

The test was discontinued after a period of 37 minutes.

Test date : 9th February 2017

Test sponsor : Zoo Hardware Ltd

Declaration by Zoo Hardware Ltd

We the undersigned confirm that we have read and comply with obligations placed on us by the Passive Fire Protection Forum (PFPF) Guide to undertaking technical assessments and engineering evaluations based on fire test evidence 2021 Industry Standard Procedure

We confirm that any changes to a component or element of structure, which are the subject of this assessment, have not to our knowledge been tested to the standard against which this assessment has been made.

We agree to withdraw this assessment from circulation should the component or element of structure, or any of its component parts be the subject of a failed fire resistance test to the standard against which this assessment is being made.

We understand that this assessment is based on test evidence and will be withdrawn should evidence become available that causes the conclusion to be questioned. In that case, we accept that new test evidence may be required.

We are not aware of any information that could affect the conclusions of this assessment. If we subsequently become aware of any such information, we agree to ask the assessing authority to withdraw the assessment.

(In accordance with the principles of FTSG Resolution 82:2001)

Signature: 

Name:
Jason Tonks

Position:
Technical Product Manager

Date:
26/7/2023

For and on behalf of:
Zoo Hardware

Limitations

The following limitations apply to this assessment:

We confirm that any changes to a component or element of structure which are the subject of this assessment have not to our knowledge been tested to the standard against which this assessment has been made.

We agree to withdraw this assessment from circulation should the component or element of structure, or any of its component parts be the subject of a failed fire resistance test to the standard against which this assessment is being made.

1. This report addresses itself solely to the elements and subjects discussed and do not cover any other criteria or modifications. All other details not specifically referred to should remain as tested or assessed.

2. This report is issued on the basis of test data and information to hand at the time of issue. If contradictory evidence becomes available to Warringtonfire, the assessment will be unconditionally withdrawn, and the applicant will be notified in writing. Similarly, the assessment evaluation is invalidated if the assessed construction is subsequently tested since actual test data is deemed to take precedence.

3. This field of application has been carried out in accordance with Fire Test Study Group Resolution No. 82: 2001.

4. Opinions and interpretation expressed herein are outside the scope of UKAS accreditation.

5. This field of application relates only to those aspects of design, materials and construction that influence the performance of the element(s) under fire resistance test conditions against the ISO 834 time/temperature curve that is stipulated in the standard this assessment concludes to. It does not purport to be a complete specification ensuring fitness for purpose and long-term serviceability. It is the responsibility of the client to ensure that the element conforms to recognised good practice in all other respects and that, with the incorporation of the guidance given in this field of application, the element is suitable for its intended purpose.

6. This report represents our opinion as to the performance likely to be demonstrated on a test in accordance with EN1634-1, on the basis of the test evidence referred to in this report. We express no opinion as to whether that evidence, and/or this report would be regarded by any Building Control authorities or any other third parties as sufficient for that or any other purpose.

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8. The version/revision stated on the front of this report supersedes all previous versions/revisions and must be used to manufacture the assessed systems from the stated validity date on this front cover. Previous revisions of the report cannot be used once an updated report has been issued under a new revision.

Signatories

Responsible Officer (Issue 6) A.Green-Morris* - Product Assessor

Approved (Issue 6) R.Anning* - Principal Product Assessor

* For and on behalf of Warringtonfire.

Report Issued: 26th July 2023

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

Revision History

Issue No: 1	Issue Date: 18th July 2018
Revised By: R. Anning	Approved By: A. Kearns

Issue No: 2	Re-issue Date: (13th December 2019)
Revised By: R. Anning	Approved By: A. Kearns
Reason for Revision: Format and contents updated to current standard prior to reported being issued.	

Issue No: 3	Re-issue Date: (18th January 2021)
Revised By: R. Anning	Approved By: M. Tolan
Reason for Revision: Ancillary hardware added & format and contents updated.	

Issue No: 4	Re-issue Date: 19th March 2021
Revised By: R. Anning	Approved By: M. Tolan
Reason for Revision: Ancillary hardware added.	

Issue No: 5	Re-issue Date: 29th October 2021
Revised By: R. Anning	Approved By: M. Tolan
Reason for Revision: Size of flushbolts ZAS03 & ZAS03R.	

Issue No: 6	Re-issue Date: 26th July 2023
Revised By: A. Green-Morris	Approved By: R. Anning
Reason for Revision: Revalidation.	

Annex A

Steel Flushbolts	
Product code	**Product description**
ZAS02	Lever Action Flush Bolt 20 x 150mm
ZAS02R	Lever Action Flush Bolt 20 x 150mm, Radius
ZAS03	Lever Action Flush Bolt 20 x 203mm
ZAS03R	Lever Action Flush Bolt 20 x 203mm, Radius
ZAS05	Lever Action Flush Bolt 20 x 305mm
ZAS05R	Lever Action Flush Bolt 20 x 305mm, Radius
ZAS09	Lever Action Flush Bolt 20 x 914mm
ZAS09R	Lever Action Flush Bolt 20 x 914mm, Radius
ZAS12	Lever Action Flush Bolt 20 x 457mm
ZAS12R	Lever Action Flush Bolt 20 x 457mm, Radius
ZAS13	Lever Action Flush Bolt 20 x 609mm
ZAS13R	Lever Action Flush Bolt 20 x 609mm, Radius

Annex A – (continued)

ZAA Group – solid aluminium levers on rose	
Code	**Description**
ZAA Levers on Rose	• Aluminium screw on rose cover
	• Solid die cast zinc inner rose
	• Sprung rose assembly (steel cam, steel spring, steel cir clip)
	• 100mm HESO spindle and HESO grub screw
	• M4 male to female fixing bolts.
	• BS EN 1906 grade 3 tested
	• Also available on pressed steel back-plates

ZAA Group – solid aluminium levers on backplate	
Code	**Description**
ZAA Levers on Backplate	• Aluminium screw on cover
	• Solid die cast zinc inner rose
	• Sprung rose assembly (steel cam, steel spring, steel cir clip)
	• 100mm HESO spindle and HESO grub screw
	• M4 male to female fixing bolts.
	• BS EN 1906 grade 3 tested
	• Also available on pressed steel back-plates

ZAA Group – solid aluminium ‘D’ pull handles	
ZAAD150BSA	19x150mm Architectural "D" Pull Handle- Bolt Through
ZAAD225BSA	19x225mm Architectural "D" Pull Handle- Bolt Through
ZAAD300BSA	19x300mm Architectural "D" Pull Handle- Bolt Through
ZAAD425BSA	19x425mm Architectural "D" Pull Handle- Bolt Through
ZAAD600BSA	19x600mm Architectural "D" Pull Handle- Bolt Through
ZAAD300CSA	22x300mm Architectural "D" Pull Handle- Bolt Through
ZAAD425CSA	22x425mm Architectural "D" Pull Handle- Bolt Through

Aluminium Accessories	
Code	**Description**
ZAA60	Door Stop- Floor Mounted Oval
ZAA61	Door Stop- 75mm

Annex A – (continued)

SS201, SS304, SS316 Stainless Steel Accessories	
Code	**Description**
ZAS16SS	Cylinder Latch Pull- Euro Profile
ZAS17SS	Cylinder Latch Pull- Oval Profile
ZAS18SS	Cylinder Latch Pull- Round Profile
ZAS19SS	Cylinder Latch Pull- Blank Profile
ZAS15SS	Architectural Door Bolt- "ZOO BOLT"
ZAS06SS	Door Stop- Floor Mounted Oval
ZAS07SS	Door Stop- Cylinder c/w Rose- 64mm
ZAS08SS	Cylinder Door Stop without rose- 64mm
ZAS12SQP	Square Door Stop
ZAS12SQS	Square Door Stop
ZAS32RASS	Finger Plate - Blank (Radius)- 300x75mm
ZAS32RBSS	Finger Plate - Blank (Radius)- 350x75mm
ZAS32RCSS	Finger Plate - Blank (Radius)- 475x75mm
ZAS32RDSS	Finger Plate - Blank (Radius)- 650x75mm
ZAS33SS	Rectangular Push Sign
ZAS34SS	Rectangular Pull Sign
ZAS008	Security escutcheon
ZSS01SS	Sex Symbol - Male
ZSS02SS	Sex Symbol - Female
ZSS03SS	Sex Symbol - Unisex
ZSS04SS	Sex Symbol - Shower
ZSS05SS	Sex Symbol - Push
ZSS06SS	Sex Symbol - Pull
ZSS07SS	Sex Symbol - Disabled
ZSS08SS	Sex Symbol - Baby Change
ZSS09SS	Sex Symbol - Fire Door Keep Shut
ZSS10SS	Sex Symbol - Fire Door Keep Locked
ZSS11SS	Sex Symbol - Fire Escape Keep Clear
ZAS50S	Adaptor Sleeve for Thumb turns - increase 5mm to 8mm

Annex A – (continued)

ZAB Group - Brass Accessories	
Code	**Description**
ZAB06	Door Stop- Floor Mounted- Oval
ZAB06CP	Door Stop- Floor Mounted- Oval
ZAB06SC	Door Stop- Floor Mounted- Oval
ZAB07	Door Stop- Cylinder c/w Rose
ZAB07CP	Door Stop- Cylinder c/w Rose
ZAB07SC	Door Stop- Cylinder c/w Rose
ZAB08	Door Stop- Cylinder Without Rose
ZAB08CP	Door Stop- Cylinder Without Rose
ZAB08SC	Door Stop- Cylinder Without Rose
ZAB09	Door Stop- Cylinder c/w Rose
ZAB09CP	Door Stop- Cylinder c/w Rose
ZAB09SC	Door Stop- Cylinder c/w Rose
ZAB10	Std. Key Profile Victorian Escutcheon
ZAB10CP	Std. Key Profile Victorian Escutcheon
ZAB10SC	Std. Key Profile Victorian Escutcheon
ZAB11	Std. Key Profile Victorian Covered Escutcheon
ZAB11CP	Std. Key Profile Victorian Covered Escutcheon
ZAB11SC	Std. Key Profile Victorian Covered Escutcheon
ZAB12	Door Stop- Cylinder Without Rose
ZAB12CP	Door Stop- Cylinder Without Rose
ZAB12SC	Door Stop- Cylinder Without Rose
ZAB15	Heavy Door Chain
ZAB15CP	Heavy Door Chain
ZAB15SC	Heavy Door Chain
ZAB40	Oval Thumb Turn- Rack Bolt
ZAB40CP	Oval Thumb Turn- Rack Bolt
ZAB40SC	Oval Thumb Turn- Rack Bolt

Door Viewers	
Code	**Description**
ZAB30	Brass door viewer with glass lens
ZAS46	Stainless steel door viewer with glass lens

Annex A – (continued)

ZCA Group – solid aluminium levers on rose	
Code	**Description**
ZCA Levers	• Aluminium press on rose cover
	• Nylon molded inner rose
	• Sprung rose assembly (steel cam, steel spring, steel cir clip)
	• 100mm spindle and M6 grub screws
	• M4 male to female fixing bolts
	• Also available on aluminium cast back-plates

ZCA Group – solid aluminium ‘D’ pull handles	
Code	**Description**
ZCAD225BSA	19x225mm Architectural "D" Pull Handle- Bolt Through
ZCAD300BSA	19x300mm Architectural "D" Pull Handle- Bolt Through

Annex A – (continued)

ZCS Group– hollow SS201, SS304, SS316 stainless steel levers on rose	
ZCS Levers	• Stainless steel press on rose cover • Pressed stainless steel inner rose • Sprung rose assembly (steel cam, steel spring, steel cir clip) • 100mm HESO spindle and HESO grub screw • M4 male to female fixing bolts. • BS EN 1906 grade 3 tested • Also available on pressed stainless steel back-plates

ZCS001SS	ZCS Euro Profile Escutcheon
ZCS002SS	ZCS Std. Key Profile Escutcheon
ZCS004SS	ZCS 5mm Turn & Release Set
ZCS005SS	ZCS 8mm Turn & Release Set

ZCSPD150BS	ZCS 19x150mm "D" Pull Handle- Bolt Through
ZCSPD225BS	ZCS 19x225mm "D" Pull Handle- Bolt Through
ZCSPD300BS	ZCS 19x300mm "D" Pull Handle- Bolt Through
ZCSPD425BS	ZCS 19x425mm "D" Pull Handle- Bolt Through
ZCSPD600BS	ZCS 19x600mm "D" Pull Handle- Bolt Through

ZCS2 Group– hollow SS201, SS304, SS316 stainless steel levers on rose	
Code	**Description**
ZCS2 Levers	• Stainless steel press on rose cover • Pressed stainless steel inner rose • Sprung rose assembly (steel cam, steel spring, steel cir clip) • 100mm HESO spindle and HESO grub screw • M4 male to female fixing bolts.

ZCS2G Group – solid SS201, SS304, SS316 stainless guardsman pull handles	
Code	**Description**
ZCS2G300BS	19x300mm Guardsman Pull Handle- Bolt Through
ZCS2G425BS	19x425mm Guardsman Pull Handle- Bolt Through
ZCS2G600BS	19x600mm Guardsman Pull Handle- Bolt Through
ZCS2G300CS	22x300mm Guardsman Pull Handle- Bolt Through
ZCS2G425CS	22x425mm Guardsman Pull Handle- Bolt Through
ZCS2G600CS	22x600mm Guardsman Pull Handle- Bolt Through
ZCS2G600ES	30x600mm Guardsman Pull Handle- Bolt Through

Annex A – (continued)

ZCS2M Group – solid SS201, SS304, SS316 stainless mitred pull handles	
Code	**Description**
ZCS2M150BS	19x150mm Mitred Pull Handle- Bolt Through
ZCS2M225BS	19x225mm Mitred Pull Handle- Bolt Through
ZCS2M300BS	19x300mm Mitred Pull Handle- Bolt Through
ZCS2M425BS	19x425mm Mitred Pull Handle- Bolt Through
ZCS2M600BS	19x600mm Mitred Pull Handle- Bolt Through

ZCS2000SS	ZCS2 Blank Escutcheon
ZCS2001SS	ZCS2 Euro Profile Escutcheon
ZCS2002SS	ZCS2 Standard Profile Escutcheon
ZCS2003SS	ZCS2 Oval Escutcheon
ZCS2004SS	ZCS2 5mm Turn & Release Set
ZCS2006ISS	ZCS2 5mm Disabled Turn & Release Set c/w Indicator

ZCS2PD150BS	ZCS2 19x150mm "D" Pull Handle- Bolt Through
ZCS2PD225BS	ZCS2 19x225mm "D" Pull Handle- Bolt Through
ZCS2PD300BS	ZCS2 19x300mm "D" Pull Handle- Bolt Through
ZCS2PD425BS	ZCS2 19x425mm "D" Pull Handle- Bolt Through
ZCS2PD600BS	ZCS2 19x600mm "D" Pull Handle- Bolt Through

Annex A – (continued)

ZCZ Group – solid zinc levers on rose	
Code	**Description**
ZCZ Levers	• Steel press on rose cover
	• Injection molded inner rose
	• Sprung rose assembly (steel cam, steel spring, steel cir clip)
	• 100mm solid spindle and M6 grub screws
	• M4 male to female fixing bolts.
	• Also available on zinc cast back-plates

ZCZ001CP	ZCZ Euro Profile Escutcheon
ZCZ001SC	ZCZ Euro Profile Escutcheon
ZCZ002CP	ZCZ Std. Key Profile Escutcheon
ZCZ002SC	ZCZ Std. Key Profile Escutcheon
ZCZ004CP	ZCZ Turn & Release
ZCZ004SC	ZCZ Turn & Release

ZPZ Group – solid zinc levers on rose	
Code	**Description**
ZPZ Levers	• Zinc screw on rose cover
	• Solid die cast zinc inner rose
	• Sprung rose assembly (steel cam, steel spring, steel circlip)
	• 100mm HESO spindle and HESO grub screw
	• M4 male to female fixing bolts.
	• BS EN 1906 grade 3 tested
	• Also available on Casted Zinc back-plates
	• Zinc Lever

ZPZ001	Euro profile Escutcheon
ZPZ002	Std. key Profile Escutcheon
ZPZ004	Turn & Release

Annex A – (continued)

ZG4 Group – SS201, SS304, SS316 stainless steel levers on rose	
Code	**Description**
ZG4 Levers	• Stainless steel press on rose cover
	• cast stainless steel inner rose
	• Sprung rose assembly (steel cam, steel spring, steel cir clip)
	• 100mm solid spindle and M6 grub screws
	• M4 male fixing bolts.
	• BS EN 1906 grade 4 tested

ZPA Group – solid aluminium levers on rose	
Code	**Description**
ZPA Levers on Rose	• Zinc screw on rose cover
	• Solid die cast zinc inner rose
	• Sprung rose assembly (steel cam, steel spring, steel cir clip)
	• 100mm HESO spindle and HESO grub screw
	• M4 male to female fixing bolts.
	• BS EN 1906 grade 3 tested
	• Also available on Casted Zinc back-plates (As per ZPZ) • Aluminium Lever

Annex A – (continued)

ZPS Group – SS201, SS304, SS316 designer stainless steel levers on rose	
Code	**Description**
ZPS Levers	• Stainless steel screw on rose cover • cast stainless steel inner rose • Sprung rose assembly (steel cam, steel spring, steel cir clip) • 100mm heso spindle and HESO grub screw • M4 male to female fixing bolts. • BS EN 1906 grade 3 tested

ZPSAL – Anti-ligature pull handle	
Code	**Description**
ZPSALP	75x300mm Anti-ligature style pull handle on backplate

ZPS000SS	ZPS Escutcheons Blank Profile
ZPS001SS	ZPS Escutcheons Euro-profile
ZPS002SS	ZPS Escutcheons Standard lock
ZPS003SS	ZPS Escutcheons Oval Profile
ZPS004SS	ZPS Turn & Release- 5mm
ZPS005SS	ZPS Turn & Release- 8mm
ZPS006ISS	ZPS Disabled Turn & Release c/w Indicator- 5mm

ZPSPD150BS	ZPS 19x150mm Architectural "D" Pull Handle- Bolt Through
ZPSPD225BS	ZPS 19x225mm Architectural "D" Pull Handle- Bolt Through
ZPSPD300BS	ZPS 19x300mm Architectural "D" Pull Handle- Bolt Through
ZPSPD425BS	ZPS 19x425mm Architectural "D" Pull Handle- Bolt Through
ZPSPD600BS	ZPS 19x600mm Architectural "D" Pull Handle- Bolt Through
ZPSPD600ES	ZPS 30x600mm Architectural "D" Pull Handle- Bolt Through
ZPSPD1200ES	ZPS 30x1200mm Architectural "D" Pull Handle- Bolt Through
ZPSPD1800ES	ZPS 30x1800mm Architectural "D" Pull Handle- Bolt Through

Annex A – (continued)

ZS Group – Zoo Solutions – SS201, SS304, SS316 Stainless Steel Lever on Rose	
Code	**Description**
ZS – **Zoo Solutions** Levers on Rose	• Stainless steel press on rose cover
	• Pressed stainless steel inner rose
	• Sprung rose assembly (steel cam, steel spring, steel cir clip)
	• 100mm HESO spindle and HESO grub screw
	• M4 male to female fixing bolts.
	• Complete with Anti bacterial Coating
	• Also available on pressed steel back-plates

ZSG4 Group – Zoo Solutions – Grade 4 - SS201, SS304, SS316 Stainless Steel Lever on Rose	
Code	**Description**
ZSG4 – Zoo Solutions Levers on Rose Grade 4	• Stainless Steel press on rose Cover
	• Cast Stainless Steel inner Rose
	• Sprung rose assembly (steel cam, steel spring, steel cir clip)
	• 100mm solid spindle and M6 Grub Screws
	• M4 male fixing bolts.
	• BS EN 1906 grade 4 tested
	• Complete with Anti bacterial Coating

Annex A – (continued)

PRO Group – solid zinc or Aluminium levers on zinc backplate	
Code	**Description**
PRO Levers	• Sprung assembly (steel cam, steel spring, steel cir clip)
	• 100mm solid spindle
	• Wood screw / M4 bolt fixed.

Rosso Group (RM) – solid zinc levers on rose	
Code	**Description**
RM Levers	• Zinc screw on rose cover
	• Zinc die cast inner rose
	• Sprung rose assembly (steel cam, steel spring, steel cir clip)
	• 100mm solid spindle and M6 grub screws
	• M4 male to female fixing bolts.
	• Also available on zinc cast back-plates

RT Group – Rosso Tecnica - SS201, SS304, SS316 Stainless Steel levers on rose	
Code	**Description**
RT Levers on Rose	• SS304 screw on rose cover
	• Solid die cast 304 inner rose
	• Sprung rose assembly (steel cam, steel spring, steel cir clip)
	• 100mm HESO spindle and HESO grub screw
	• M4 male to female fixing bolts.
	• BS EN 1906 grade 3 tested
DAT Group – brass levers on rose	
Code	**Description**
DAT Levers	• Brass screw on rose cover
	• Forged brass inner rose
	• Sprung rose assembly (steel cam, steel spring, steel cir clip)
	• 100mm solid spindle and M6 grub screws
	• M4 male to female fixing bolts

Annex A – (continued)

Fulton & Bray Group (FB) – brass levers on rose	
Code	**Description**
FB Levers	• Brass screw on rose cover
	• Forged brass inner rose
	• Sprung rose assembly (steel cam, steel spring, steel cir clip)
	• 100mm solid spindle and M6 grub screws
	• M4 male to female fixing bolts.
	• Also available on forged brass back-plates

FBP Group – solid brass 'D' pull handles	
Code	**Description**
FBD225B	19x226mm "D" Pull Handle- Bolt Through
FBD225B	19x300mm "D" Pull Handle- Bolt Through
FBD225B	19x425mm "D" Pull Handle- Bolt Through

FB113 Group – solid brass pull handles on square rose	
Code	**Description**
FB113	250mm pull handle – screw fixed
FB113CP	250mm pull handle – screw fixed

FB Group – solid brass pull handles on backplate	
Code	**Description**
FB106	65x382mm backplate – screw fixed
FB106CP	65x382mm backplate – screw fixed
FB112A	60x300mm backplate – screw fixed
FB112ACP	60x300mm backplate – screw fixed
FB112B	60x425mm backplate – screw fixed
FB112BCP	60x425mm backplate – screw fixed
FB114L	42x377mm backplate – screw fixed
FB114LCP	42x377mm backplate – screw fixed
FB114R	42x377mm backplate – screw fixed
FB114RCP	42x377mm backplate – screw fixed
FB118L	76x457mm backplate – screw fixed
FB118LCP	76x457mm backplate – screw fixed
FB118R	76x457mm backplate – screw fixed
FB118RCP	76x457mm backplate – screw fixed

Annex A – (continued)

Fulton & Bray Group (FB) – Brass Knob Furniture	
Code	**Description**
FB200	Oval Mortice Knob Furniture
FB200CP	Oval Mortice Knob Furniture
FB200SC	Oval Mortice Knob Furniture
FB200R	Oval Mortice Rim Knob Furniture
FB200RCP	Oval Mortice Rim Knob Furniture
FB200RSC	Oval Mortice Rim Knob Furniture
FB201	Mushroom Mortice Knob Furniture
FB201CP	Mushroom Mortice Knob Furniture
FB201SC	Mushroom Mortice Knob Furniture
FB201R	Mushroom Mortice Rim Knob Furniture
FB201RCP	Mushroom Mortice Rim Knob Furniture
FB201RSC	Mushroom Mortice Rim Knob Furniture
FB202	Ball Mortice Knob Furniture
FB202CP	Ball Mortice Knob Furniture
FB202SC	Ball Mortice Knob Furniture
FB202R	Ball Mortice Rim Knob Furniture
FB202RCP	Ball Mortice Rim Knob Furniture
FB202RSC	Ball Mortice Rim Knob Furniture

Brass Accessories	
Code	**Description**
FB001	Euro Profile Escutcheon
FB001CP	Euro Profile Escutcheon
FB001SC	Euro Profile Escutcheon
FB002	Standard Key Profile
FB002CP	Standard Key Profile
FB002SC	Standard Key Profile
FB004	5mm Turn & Release
FB004CP	5mm Turn & Release
FB004SC	5mm Turn & Release
FB005	8mm Turn & Release
FB005CP	8mm Turn & Release
FB005SC	8mm Turn & Release

Annex A – (continued)

Vier (VS) Group – hollow SS201, SS304, SS316 Stainless Steel levers on rose	
Code	**Description**
Vier (VS) Levers	• Stainless steel press on rose cover
	• Stamped stainless steel inner rose
	• Un-Sprung rose assembly
	• 100mm heso spindle and HESO grub screw
	• M4 male to female fixing bolts.
	• BS EN 1906 grade 3 tested

VS000	Blank Profile Escutcheon
VS001	Euro Profile Escutcheon
VS002	Standard Profile Escutcheon
VS003	Oval Profile Escutcheon
VS004I	Turn and Release c/w 3 roses and can be fitted with or without Indicator
VS005I	Mitred Turn and Release c/w 3 roses and can be fitted with or without Indicator - 5mm Spindle

VSD425B	19mm D Pull Handle - 425mm
VSD425C	21mm D Pull Handle - 425mm
VSM425B	19mm Mitred Pull Handle - 425mm
VSM425C	21mm Mitred Pull Handle - 425mm

Annex A – (continued)

V5 range of Cylinders	
Code	**Description**
V5	• Double, Cylinder & Turn or Single version
	• All Finishes
	• 40mm long single cylinder to 130mm Long Double cylinder
	• Cylinder & turn
	• Inline or offset versions
	• key to differ, keyed alike, Masterkey, Classroom Function and construction key facility

V6 range of Cylinders	
Code	**Description**
V6	• Double , Cylinder & Turn or Single version
	• All Finishes
	• 40mm long single cylinder to 130mm Long Double cylinder
	• Cylinder & turn
	• Inline or offset versions
	• key to differ, keyed alike, Masterkey, Classroom Function and construction key facility

V10 range of Cylinders	
Code	**Description**
V10	• Double , Cylinder & Turn or Single version
	• All Finishes
	• 40mm long single cylinder to 130mm Long Double cylinder
	• Cylinder & turn
	• Inline or offset versions
	• key to differ, keyed alike, Masterkey, Classroom Function and construction key facility