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Title:

The Fire Resistance Performance Of Timber/Mineral-Based Doorsets and Steel-Based Doorsets When Fitted With ABLOY OY Electromechanical and Mechanical Locks

WF Assessment Report No:

383734 Issue 4

Prepared for:

Abloy Oy

Wahlforssinkatu 20,
FI-80100 Joensuu
Finland

Date:

14th September 2017

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Executive Summary

Objective

This report considers the fire resistance performance of single-acting, insulated timber or mineral-based doorsets, insulated and uninsulated steel-based doorsets, and fully-glazed, steel-framed doorsets when fitted with ABLOY OY electromechanical locks and mechanical locks.

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Summary of Conclusions

Should the recommendations given in this report be followed, it can be concluded that the ABLOY OY electromechanical and mechanical locks, as detailed within this report, may be fitted to previously tested or assessed (by Exova Warringtonfire, BM TRADA or Chiltern International Fire) single-acting, insulated timber or mineral-based doorsets to provide 60 minutes integrity and insulation performance, without detracting from the overall performance of the doorset with respect to EN 1634-1.

Should the recommendations given in this report be followed, it can be concluded that the ABLOY OY electromechanical and mechanical locks, as detailed within this report, may be fitted to previously tested or assessed (by Exova Warringtonfire, BM TRADA or Chiltern International Fire) single-acting, insulated and uninsulated steel-based doorsets to provide up to 120 minutes integrity performance, without detracting from the overall performance of the doorset with respect to EN 1634-1.

Should the recommendations given in this report be followed, it can be concluded that the ABLOY OY electromechanical and mechanical locks, as detailed within this report, may be fitted to previously tested or assessed (by Exova Warringtonfire, BM TRADA or Chiltern International Fire) single-acting, fully-glazed, steel-framed doorsets, to provide 60 minutes integrity and insulation performance without detracting from the overall performance of the doorset with respect to EN 1634-1.

Valid until

31st August 2022

Introduction

This report presents an appraisal of the fire resistance performance of single-acting, insulated timber/mineral-based doorsets, insulated and uninsulated steel-based doorsets, and fully-glazed steel-framed doorsets when fitted with ABLOY OY electromechanical and mechanical locks. The doorset, onto which the proposed hardware is to be fitted, may be of single-leaf or double-leaf configuration.

The proposed timber/mineral-based doorsets are required to provide a fire resistance performance of 60 minutes integrity and insulation, with respect to EN 1634-1.

The proposed insulated and uninsulated steel-based doorsets are required to provide a fire resistance performance of up to 120 minutes integrity with respect to EN 1634-1.

The proposed fully-glazed steel-framed doorsets are required to provide a fire resistance performance of 60 minutes integrity and insulation, with respect to EN 1634-1.

FTSG

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

Assumptions

Doorset Specification

It is assumed that the lockset will be fitted to a doorset which has also been previously shown to be capable of providing the required fire resistance performance when tested in accordance with EN 1634-1 in the proposed configuration i.e. single-leaf or double-leaf.

It is also assumed that the doorsets will fully comply with any certification scope or assessed modifications, apart from the modifications specified in this report.

Latching

Where a lock considered by this report does not incorporate a self-latching mechanism e.g. deadlocks, then either the lock shall be engaged or the doorsets shall have been proven for the required period without the restraint of a latch/lock.

It is assumed all motor locks have a latchbolt that is thrown automatically by the spring force, and the motor is only used to withdraw the bolts. Where this is not the case the locks shall only be incorporated on doorsets that have been proven for the required period without the restraint of a latch/lock.

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.

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, and latched where applicable.

Electrical safety

The effectiveness and electrical safety of this electrically operated lock is outside the scope of this appraisal.

Proposals

It is proposed that the ABLOY OY electromechanical and mechanical locks, as referenced within this report, may be fitted into a previously tested (in accordance with EN 1634-1) or assessed (by Exova Warringtonfire, BM TRADA or Chiltern International Fire) single-acting, insulated timber/mineral-based doorsets, insulated and uninsulated steel-based doorsets, and fully-glazed, steel-framed doorsets, in the same configuration as that proposed i.e. single-leaf or double-leaf.

The approval applies to the following products as identified in Annex A

It is proposed that the narrow profile locks are for use with 60 minute fully glazed, steel-framed doorsets only, whereas all other locks are for use with 60 minute timber/mineral-based doorsets, and insulated/uninsulated steel-based doorsets up to 120 minutes performance only.

The latch/deadbolt, case, forend and strikeplates are all of steel, with a minimum latchbolt projection of 10 mm. The maximum forend proposed is 24 mm wide.

Basic Test Evidence

WF Report No. 364240

A test to determine the fire resistance performance of two 60 minute timber-based, single-acting, single-leaf doorsets incorporating EL520 locks in accordance with BS EN 1634-1: 2014.

For the purposes of the test, the doorsets were referenced Doorset A (opening away from the furnace) and Doorset B (opening towards the furnace).

Both doorsets achieved 68 minutes integrity and insulation performance, at which point the test was discontinued without failure.

WF Report No. 364241

A test to determine the fire resistance performance of two 60 minute timber-based, single-acting, single-leaf doorsets incorporating MP520 locks in accordance with BS EN 1634-1: 2014.

For the purposes of the test, the doorsets were referenced Doorset A (opening away from the furnace) and Doorset B (opening towards the furnace).

Both doorsets achieved 68 minutes integrity and insulation performance, at which point the test was discontinued without failure.

WF Report No. 364242

A test to determine the fire resistance performance of two 60 fully-glazed, steel framed, single-acting, single-leaf doorsets incorporating EL420 locks in accordance with BS EN 1634-1: 2014.

For the purposes of the test, the doorsets were referenced Doorset A (opening away from the furnace) and Doorset B (opening towards the furnace).

Both doorsets achieved 68 minutes integrity and insulation performance, at which point the test was discontinued without failure.

WF Report No. 364243

A test to determine the fire resistance performance of two 60 fully-glazed, steel framed, single-acting, single-leaf doorsets incorporating MP420 locks in accordance with BS EN 1634-1: 2014.

For the purposes of the test, the doorsets were referenced Doorset A (opening away from the furnace) and Doorset B (opening towards the furnace).

Both doorsets achieved 68 minutes integrity and insulation performance, at which point the test was discontinued without failure.

WF Report No. 364244

A test to determine the fire resistance performance of two uninsulated steel-based, single-acting, single-leaf doorsets incorporating MP520 locks in accordance with BS EN 1634-1: 2014.

For the purposes of the test, the doorsets were referenced Doorset A (opening away from the furnace) and Doorset B (opening towards the furnace).

Doorset A achieved 132 minutes integrity performance, and Doorset B achieved 25 minutes integrity at which point the test was discontinued without failure of Doorset A.

WF Report No. 364245

A test to determine the fire resistance performance of two uninsulated steel-based, single-acting, single-leaf doorsets incorporating EL520 locks in accordance with BS EN 1634-1: 2014.

For the purposes of the test, the doorsets were referenced Doorset A (opening away from the furnace) and Doorset B (opening towards the furnace).

Both doorsets achieved 132 minutes integrity performance, at which point the test was discontinued without failure.

Assessed Performance

Manufacturing location

The mortice locks were identified as being produced at manufacturing plant X/002. Full details are retained on file by EXOVA Warringtonfire.

60 minute Timber and Mineral-Based Doorsets

It is proposed that previously fire tested (or assessed by Exova Warringtonfire, BM TRADA or Chiltern International Fire) timber or mineral-based doorsets may be fitted with the following ABLOY Oy electromechanical and mechanical locks, without detracting from the performance of the doorset:

Motor Locks	
Single-point	*Multi-point*
EL520	MP520
EL532	MP532
EL522*	MP522*
EL524*	MP524*
EL534*	MP534*
EL535*	MP535*

Solenoid Locks	
Single-point	*Multi-point*
EL560	EL566
EL561	EL567
EL562*	EL568*
EL563*	EL569*
EL564*	MP564*
EL565*	MP565*

Mechanical Locks	
Single-point	*Multi-point*
EL160*	EL166*
EL162*	EL168*
EL163*	MP165*
EL165*	EL366*
EL360*	EL368*
EL362*	

**Added Issue 2*

Single-point Locks

The performances of the Doorsets A and B during the test referenced WF No. 364240 is cited to display the ability of the ABLOY OY EL520 Motorised single-point electromechanical locks to contribute towards the required fire resistance performance for 60 minute rated timber based doorsets.

Both Doorset A and Doorset B were single acting, single leaf doorsets with 54 mm thick graduated density chipboard leaf and 8 mm thick hardwood lippings. The leaf was hung within a hardwood frame. Doorset A opened towards the heating conditions, whilst Doorset B opened away from the heating conditions. Both doorsets were latched for the duration of the test.

Both doorsets incorporated the EL520/100 sashlock which included:

- 235 mm high x 24 mm wide steel forend (square corners)
- 168.5 mm high x 133 mm deep x 16.5 mm thick steel lockcase.
- EA329 232 mm high x 24 mm wide x 3 mm thick strikeplate, with a 38 x 176 mm latchbolt lip was fitted to the frame.
- Double Euro profile steel/chrome cylinder.

The lock case was wrapped with a 2 mm thickness of Mono Ammonium Phosphate intumescent to all faces and that a 2 mm thickness of the same material was provided behind the forend, and behind the strike plate. In addition the perimeter intumescent fire seals within the frame by-passed the strikpelate by 7.5 mm on each side (except for the latchbolt lip).

On reviewing the observations taken from the tests report, it's clear that there were no integrity failures associated with the electromechanical mortice locks fitted to either doorset for the test duration of 68 minutes.

Multi-point Locks

The performances of the Doorsets A and B during the test referenced WF No. 364241 is cited to display the ability of the ABLOY OY MP520 Motorised Multi-point electromechanical locks to contribute towards the required fire resistance performance for 60 minute rated timber based doorsets.

Both Doorset A and Doorset B were single acting, single leaf doorsets with 54 mm thick graduated density chipboard leaf and 8 mm thick hardwood lippings. The leaf was hung within a hardwood frame. Doorset A opened towards the heating conditions, whilst Doorset B opened away from the heating conditions. Both doorsets were latched for the duration of the test.

Both doorsets incorporated the MP520/100 lock which included:

- 2000 mm high x 24 mm wide steel forend (square corners)
- 168.5 mm high x 133 mm deep x 16.5 mm thick steel central lockcase
- lockcase.
- EA329 232 mm high x 24 mm wide x 3 mm thick central strikeplate, with a 38 x 176 mm latchbolt lip was fitted to the frame.
- Double Euro profile steel/chrome cylinder.
- 123 mm high x 37.5 mm deep x 16.5 mm thick steel ancillary lockcases top and bottom
- LP780 ancillary strikeplates - 150 mm high x 25 mm wide x 4 mm thick faceplate and 46 mm high x 27 mm deep x 20.5 mm steel backplate.

The lock case was wrapped with a 2 mm thickness of Mono Ammonium Phosphate intumescent to all faces and that a 2 mm thickness of the same material was provided behind the entire length of the forend, and behind the strike plate. In addition the perimeter intumescent fire seals within the frame by-passed the strikpelate by 7.5 mm on each side (except for the latchbolt lip).

On reviewing the observations taken from the tests report, it's clear that there were no integrity failures associated with the electromechanical mortice locks fitted to either doorset for the test duration of 68 minutes.

Alternative Locks

In terms of the lock material, it is critical that no additional flammable materials are incorporated, or materials of a lower melting point are 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 important that the lock dimensions are not increased since the increased mortice required for a large case 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 lock position.

Substitution of alternative locksets from the proposed range may therefore be considered in terms of the critical aspects discussed and where such locksets 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 locks required are of identical materials and will utilise the same level of intumescent protection and all are of the same or smaller dimensions (except for the products with the 'France dimensions introduced in issue 2 and discussed below) and therefore they may be positively appraised.

The proposed locksets are of the same basic construction as those tested comprising steel cases with steel latch bolts and/or deadbolts. All locksets have latch and/or dead bolt projections at least equal to that of the tested model. The nominal dimensions of all the locks considered by this report are the same as those tested in terms of forend and case dimensions.

Issue 2 – Mechanical lock variants

The mechanical only lock variants identified above incorporate cases, forends, strikeplates and mechanical components that are identical to those included in the originally tested and assessed Solenoid and Motor locks.

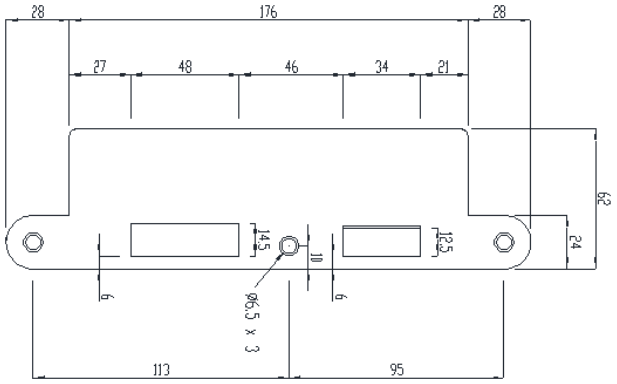
The motorised locks were considered to incorporate the most electronic components and other operating mechanism, therefore, the solenoid locks and mechanical locks, with a reduced amount of flammable elements, are considered less onerous than the locks tested, and therefore are positively appraised.

Issue 2 – 'France Dimensions' variant

The EL564, EL565, EL524 and EL535 are single-point locks which incorporate a 250 mm high x 25 mm wide forend, all other key dimensions remain as the originally tested lock.

The increased height of the forend is deemed acceptable on the basis of the multi-point locks which were tested with far taller forends. The 1 mm increase in width can be considered to be slightly more detrimental, requiring more timber material to be removed for the edge of the door. However, fire tests WF Report No. 364240 and 364241, incorporating the EI60 timber-based doorsets, both achieved 68 minutes without failure. This substantial overrun, in conjunction with the use of a 2 mm intumescent sheet material to both faces of the lock, is considered sufficient to compensate for the slight increased risk associated with this wider forend.

The tested strikeplates represents the tallest and widest strikeplate, which encompasses the largest apertures for bolts and the largest latchbolt lip



It therefore considered the most onerous strikeplate for the range and consequently the following alternative strikeplates are approved:

EA321	EA328
EA322	EA329
EA324	EA330
EA325	EA331
EA326	EA332
EA327	EA323*

**Added Issue 2*

The locks are not approved for use on doors with rebated meeting edge, and the use of strikes for rebated wooden doors are not permitted.

All lock installations included Euro profile double cylinders and so the performance of the locksets when fitted with double Euro cylinders, and equally Euro cylinders with thumb turn are considered acceptable to this appraisal. Single Euro cylinders provide less penetration through the face of the door leaf and so are positively appraised on the basis that they are a less onerous configuration for the lockset. All Euro cylinders shall be manufactured with materials of the same or greater melting point to the tested cylinders.

The range of mortice locks proposed is therefore deemed acceptable for use on 60 minute timber/mineral-based doorsets.

Intumescent Protection

It is a requirement of this appraisal that the electromechanical mortice locksets must be installed within the doorsets such that the same lever of intumescent protection is provided. This protection shall be as follows:

- The lock case shall be wrapped with a 2 mm thickness of Mono Ammonium Phosphate or 2 mm graphite intumescent sheet material to all faces and a 2 mm thickness of the same material shall be provided behind the entire length of the forend, and behind the strike plate(s).

- For all applications (all electromechanical mortice lock types), the perimeter intumescent fire seals within the frame/door edge shall by-pass the strike plate or forend by a minimum of 7.5 mm wide on each side (with the exception of the latchbolt lip where present).

Steel-Based Doorsets up to 120 minutes.

It is proposed that previously fire tested (or assessed by Exova Warringtonfire, BM TRADA or Chiltern International Fire) insulated and uninsulated steel-based doorsets may be fitted with the following ABLOY Oy electromechanical and mechanical locks, without detracting from the performance of the doorset:

Motor Locks	
Single-point	*Multi-point*
EL520	MP520
EL532	MP532
EL522*	MP522*
EL524*	MP524*
EL534*	MP534*
EL535*	MP535*

Solenoid Locks	
Single-point	*Multi-point*
EL560	EL566
EL561	EL567
EL562*	EL568*
EL563*	EL569*
EL564*	MP564*
EL565*	MP565*

Mechanical Locks	
Single-point	*Multi-point*
EL160*	EL166*
EL162*	EL168*
EL163*	MP165*
EL165*	EL366*
EL360*	EL368*
EL362*	

**Added Issue 2*

Single-point Locks

The performances of the Doorsets A and B during the test referenced WF No. 364245 is cited to display the ability of the ABLOY OY EL520 Motorised single-point electromechanical locks to contribute towards the required fire resistance performance for 120 minute rated uninsulated steel-based doorsets.

Both Doorset A and Doorset B were single acting, single leaf doorsets with 45 mm thick honeycomb core steel leaf. The leaf was hung within a hollow steel frame. Doorset A opened towards the heating conditions, whilst Doorset B opened away from the heating conditions. Both doorsets were latched for the duration of the test.

Both doorsets incorporated the EL520/100 sashlock which included:

- 235 mm high x 24 mm wide steel forend (square corners)
- 168.5 mm high x 133 mm deep x 16.5 mm thick steel lockcase.
- EA329 232 mm high x 24 mm wide x 3 mm thick strikeplate, with a 38 x 176 mm latchbolt lip was fitted to the frame.
- Double Euro profile steel/powder coated cylinder.

On reviewing the observations taken from the tests report, it's clear that there were no integrity failures (with the exception of a cotton pad failure which is not relevant to uninsulated steel doorsets) associated with the electromechanical mortice locks fitted to either doorset for the test duration of 132 minutes.

Multi-point Locks

The performances of the Doorsets A and B during the test referenced WF No. 364244 is cited to display the ability of the ABLOY OY MP520 Motorised Multi-point electromechanical locks to contribute towards the required fire resistance performance for 120 minute rated uninsulated steel-based doorsets.

Both Doorset A and Doorset B were single acting, single leaf doorsets with 45 mm thick honeycomb core steel leaf. The leaf was hung within a hollow steel frame. Doorset A opened towards the heating conditions, whilst Doorset B opened away from the heating conditions. Both doorsets were latched for the duration of the test.

Both doorsets incorporated the MP520/100 lock which included:

- 2000 mm high x 24 mm wide steel forend (square corners)
- 168.5 mm high x 133 mm deep x 16.5 mm thick steel central lockcase
- lockcase.
- EA329 232 mm high x 24 mm wide x 3 mm thick central strikeplate, with a 38 x 176 mm latchbolt lip was fitted to the frame.
- Double Euro profile steel/chrome cylinder.
- 123 mm high x 37.5 mm deep x 16.5 mm thick steel ancillary lockcases top and bottom
- LP780 ancillary strikeplates - 150 mm high x 25 mm wide x 4 mm thick faceplate and 46 mm high x 27 mm deep x 20.5 mm steel backplate.

On reviewing the observations taken from the tests report, it can be seen that an integrity failure due to sustained flaming occurred at the top leading edge of doorset B at 25 minutes. This failure was not associated with or coincident to the lock or strikeplates and therefore is not considered irrelevant with regards this evaluation.

There was no integrity failure (with the exception of a cotton pad failure which is not relevant to uninsulated steel doorsets) associated with the electromechanical mortice locks fitted to either doorset for the test duration of 132 minutes.

Alternative Locks

The critical aspects of the locks in terms of their impact upon the performance of the doorset are considered to be the lock material and the case dimensions. The tested locks were chosen to be representative of the range of locks considered by this appraisal.

In terms of the lock 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 lead to a premature integrity failure.

Substitution of alternative locks may therefore be considered in terms of the critical aspects discussed and where such locks fall within the scope of the tested locks, 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 locks required are of identical materials and all are of the same or smaller dimensions and therefore they may be positively appraised.

The proposed locksets are of the same basic construction as those tested comprising steel cases with steel latch bolts and/or deadbolts. All locksets have latch and/or dead bolt projections at least equal to that of the tested model. The nominal dimensions of all the locks considered by this report are the same as those tested in terms of forend and case dimensions.

Issue 2 – Mechanical lock variants

The mechanical only lock variants identified above incorporate cases, forends, strikeplates and mechanical components that are identical to those included in the originally tested and assessed Solenoid and Motor locks.

The motorised locks were considered to incorporate the most electronic components and other operating mechanism, therefore, the solenoid locks and mechanical locks, with a reduced amount of flammable elements, are considered less onerous than the locks tested, and therefore are positively appraised.

As the electromechanical locks were incorporated on uninsulated doorset, the performance is considered equally applicable to insulated steel doorset, where the likelihood of failure due to heat transfer through the door leaf and frame is greatly reduced.

All lock installations included Euro profile double cylinders and so the performance of the locksets when fitted with double Euro cylinders, and equally Euro cylinders with thumb turn are considered acceptable to this appraisal. Single Euro cylinders provide less penetration through the face of the door leaf and so are positively appraised on the basis that they are a less onerous configuration for the lockset. All Euro cylinders shall be manufactured with materials of the same or greater melting point to the tested cylinders.

Issue 2 – 'France Dimensions' variant

The EL564, EL565, EL524 and EL535 are single-point locks which incorporate a 250 mm high x 25 mm wide forend, all other key dimensions remain as the originally tested lock.

The increased height of the forend is deemed acceptable on the basis of the multi-point locks which were tested with far taller forends. The 1 mm increase in width is not considered detrimental to the performance of steel-based doorsets.

The tested strikeplates represents the tallest and widest strikeplate, which encompasses the largest apertures for bolts and the largest latchbolt lip

It therefore considered the most onerous strikeplate for the range and consequently the following alternative strikeplates are approved:

EA321	EA328
EA322	EA329
EA324	EA330
EA325	EA331
EA326	EA332
EA327	EA323*

**Added Issue 2*

The locks are not approved for use on doors with rebated meeting edge.

The range of mortice locks proposed is therefore deemed acceptable for use on insulated and uninsulated steel-based doorsets with a fire resistance of up to 120 minutes.

60 minute Fully-Glazed, Steel-Framed Doorsets

It is proposed that previously fire tested (or assessed by Exova Warringtonfire, BM TRADA or Chiltern International Fire) insulated fully-glazed, steel-framed doorsets may be fitted with the following ABLOY Oy electromechanical and mechanical locks, without detracting from the performance of the doorset:

Motor Locks - Narrow Profile	
Single-point	*Multi-point*
EL420	MP420
EL432	MP432
EL422*	MP422*
EL434*	MP434*

Solenoid Locks – Narrow Profile	
Single-point	*Multi-point*
EL460	EL466
EL461	EL467
EL462*	EL468*
EL463*	EL469*

Mechanical Locks - Narrow Profile	
Single-point	*Multi-point*
EL060*	EL066*
EL062*	EL068*
EL063*	EL266*
EL260*	EL268*
EL262*	

**Added Issue 2*

Single-point Locks

The performances of the Doorsets A and B during the test referenced WF No. 364242 is cited to display the ability of the ABLOY OY EL420 Motorised single-point electromechanical narrow-profile locks to contribute towards the required fire resistance performance for fully-glazed, steel-framed doorsets.

Both Doorset A and Doorset B were single acting, single leaf doorsets with 65 mm thick steel frame leaf, with a non-combustible mineral board core. The leaf was hung within a 65 mm thick frame of a similar section and specification. Doorset A opened towards the heating conditions, whilst Doorset B opened away from the heating conditions. Both doorsets were latched for the duration of the test.

Both doorsets incorporated the EL420/35 narrow profile sashlock which included:

- 300 mm high x 24 mm wide steel forend (square corners)
- 245 mm high x 50 mm deep x 20.5 mm thick steel lockcase.
- EA328 strikeplate - 232 mm high x 24 mm wide x 3 mm thick, with a 12 x 176 mm latchbolt lip was fitted to the frame.
- Double Euro profile steel cylinder.

No additional intumescent protection was incorporated around the locks case or behind the forend or strikeplate. The graphite-based perimeter intumescent fire seals within the frame by-passed the forend and strikeplate by 10 mm on each side (except for the latchbolt lip).

On reviewing the observations taken from the tests report, it's clear that there were no integrity failures associated with the electromechanical mortice locks fitted to either doorset for the test duration of 68 minutes.

Multi-point Locks

The performances of the Doorsets A and B during the test referenced WF No. 364243 is cited to display the ability of the ABLOY OY MP420 Motorised multi-point electromechanical narrow-profile locks to contribute towards the required fire resistance performance for fully-glazed, steel-framed doorsets.

Both Doorset A and Doorset B were single acting, single leaf doorsets with 65 mm thick steel frame leaf, with a non-combustible mineral board core. The leaf was hung within a 65 mm thick frame of a similar section and specification. Doorset A opened towards the heating conditions, whilst Doorset B opened away from the heating conditions. Both doorsets were latched for the duration of the test.

Both doorsets incorporated the MP420/35 lock which included:

- 2000 mm high x 24 mm wide steel forend (square corners)
- 245 mm high x 50 mm deep x 20.5 mm thick steel lockcase.
- EA328 strikeplate - 232 mm high x 24 mm wide x 3 mm thick, with a 12 x 176 mm latchbolt lip was fitted to the frame.
- Double Euro profile steel cylinder.
- 123 mm high x 37.5 mm deep x 16.5 mm thick steel ancillary lockcases top and bottom
- LP780 150 mm high x 25 mm wide x 4 mm thick faceplate and 46 mm high x 27 mm deep x 20.5 mm steel backplate.

No additional intumescent protection was incorporated around the locks case or behind the forend or strikeplate. The graphite-based perimeter intumescent fire seals within the frame by-passed the forend and strikeplate by 10 mm on each side (except for the latchbolt lip).

On reviewing the observations taken from the tests report, it's clear that there were no integrity failures associated with the electromechanical mortice locks fitted to either doorset for the test duration of 68 minutes.

Alternative Locks

The critical aspects of the locks in terms of their impact upon the performance of the doorset are considered to be the lock material and the case dimensions. The tested locks were chosen to be representative of the range of locks considered by this appraisal.

In terms of the lock 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 lead to a premature integrity failure.

Substitution of alternative locks may therefore be considered in terms of the critical aspects discussed and where such locks fall within the scope of the tested locks, 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 locks required are of identical materials and all are of the same or smaller dimensions and therefore they may be positively appraised.

The proposed locksets are of the same basic construction as those tested comprising steel cases with steel latch bolts and/or deadbolts. All locksets have latch and/or dead bolt projections at least equal to that of the tested model. The nominal dimensions of all the locks considered by this report are the same as those tested in terms of forend and case dimensions.

Issue 2 – Mechanical lock variants

The mechanical only lock variants identified above incorporate cases, forends, strikeplates and mechanical components that are identical to those included in the originally tested and assessed Solenoid and Motor locks.

The motorised locks were considered to incorporate the most electronic components and other operating mechanism, therefore, the solenoid locks and mechanical locks, with a reduced amount of flammable elements, are considered less onerous than the locks tested, and therefore are positively appraised.

All lock installations included Euro profile double cylinders and so the performance of the locksets when fitted with double Euro cylinders, and equally Euro cylinders with thumb turn are considered acceptable to this appraisal. Single Euro cylinders provide less penetration through the face of the door leaf and so are positively appraised on the basis that they are a less onerous configuration for the lockset. All Euro cylinders shall be manufactured with materials of the same or greater melting point to the tested cylinders.

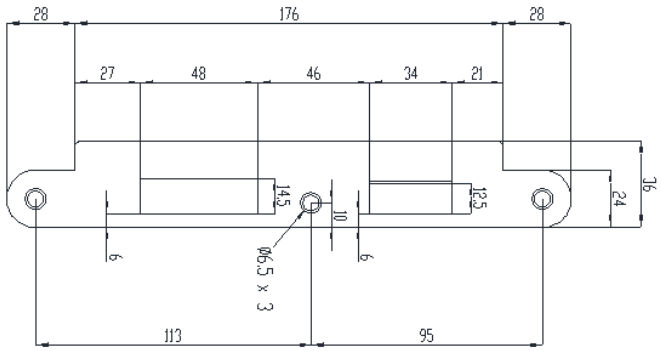
Issue 2 – 'France Dimensions' variant

The EL564, EL565, EL524 and EL535 are single-point locks which incorporate a 250 mm high x 25 mm wide forend, all other key dimensions remain as the originally tested lock.

The increased height of the forend is deemed acceptable on the basis of the multi-point locks which were tested with far taller forends. The 1 mm increase in width is not considered detrimental to the performance of steel-based doorsets.

The tested strikeplates represents the tallest and widest strikeplate, which encompasses the largest apertures for bolts and the largest latchbolt lip

It therefore considered the most onerous strikeplate for the range and consequently the following alternative strikeplates are approved:



EA321	EA328
EA322	EA329
EA324	EA330
EA325	EA331
EA326	EA332
EA327	EA323*

**Added Issue 2*

The locks are not approved for use on doors with rebated meeting edge.

The range of narrow profile mortice locks proposed is therefore deemed acceptable for use on fully-glazed, steel-framed doorsets with an integrity and insulation performance of up to 60 minutes (Insulation performance as determined against I_1 in accordance with EN1634-1).

Intumescent Protection

It is a requirement of this appraisal that the electromechanical mortice locksets must be installed within the fully-glazed, steel-based doorsets such that the same lever of intumescent protection is provided. This protection shall be as follows:

- For all applications (all electromechanical mortice lock types), the perimeter intumescent fire seals within the frame/door edge shall by-pass the strike plate and forend by a minimum of 10 mm wide on each side (with the exception of the latchbolt lip where present).

General Requirements

Radiused Corners

It is proposed that the lock forends and strikeplates incorporate either square or radiused corners. All the locks tested incorporated square corners.

Radiused corners require less timber material to be removed from the door and frame and represent a slight reduction in metal within timber doorsets, this reduces the potential for transferring heat into the door and frame and consequently the risk of flaming and erosion is also slightly reduced.

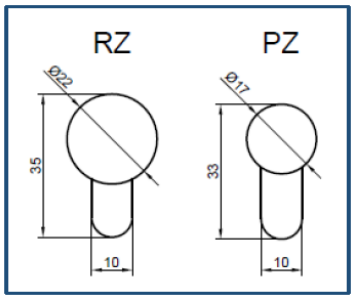
With regards steel doorsets, as the door, frame and lock components are all of steel the use of either square or radiused corners is unlikely to change the performance of the locks under test.

The use of the lock forends and strikeplates with either square or radiused corners is therefore approved.

'RZ' cylinders – Issue 2

All lock installations included 'PZ' Euro profile double cylinders and so the performance of the locksets when fitted with double Euro cylinders, and equally Euro cylinders with thumb turn are considered acceptable to this appraisal. Single Euro cylinders provide less penetration through the face of the door leaf and so are positively appraised on the basis that they are a less onerous configuration for the lockset. All Euro cylinders shall be manufactured with materials of the same or greater melting point to the tested cylinders.

Several locks introduced in issue 2 incorporated the 'RZ' variant as shown below:



DIN cylinders

The 'RZ' cylinder incorporates a 22 mm diameter barrel, instead of the 17 mm barrel tested, this does represent a slight increase in risk of additional erosion and potential flaming of timber-based doorsets due to the increased heat sink associated with the larger cylinder. However, fire tests WF Report No. 364240 and 364241, incorporating the EI60 timber-based doorsets, both achieved 68 minutes without failure. This substantial overrun, in conjunction with the use of a 2 mm intumescent sheet material to both faces of the lock, is considered sufficient to compensate for the slight increased risk associated with the 'RZ' cylinder in this application.

The alternative cylinder is not considered detrimental when used in conjunction with steel-based doorsets, therefore the use of the 'RZ' cylinder variant is approved for all applications

Lead Covers

It is further proposed that the EA280 and EA281 concealed lead covers may be fitted into a previously tested (in accordance with EN 1634-1) or assessed (by Exova Warringtonfire, BM TRADA or Chiltern International Fire) single-acting, insulated timber/mineral-based doorsets, insulated and uninsulated steel-based doorsets, and fully-glazed steel-framed doorsets.

The EA281, the largest of the two lead covers with a 543 mm high x 34 mm wide forend and a 478 mm high x 24 mm back box, was include in all the tested doorsets. No failure was recorded in association with any of the lead covers for the duration of each test.

The lead cover to the 60 minute timber doorsets was bedded on 2 mm mono ammonium phosphate intumescent sheet material and in addition the perimeter intumescent fire seals within the frame by-passed by 7.5 mm on each side.

The lead cover to the 60 minute fully-glazed, steel-framed doorsets was by-passed by graphite-based perimeter intumescent fire seals by 10 mm on each side.

The EA280 is significantly smaller, having only a 323 mm high forend and 258 mm high back box. As a consequence for timber-based doorsets, this require less timber to be removed from the door and frame and represent a slight reduction in metal within timber doorsets, this reduces the potential for transferring heat into the door and frame and consequently the risk of flaming and erosion is also slightly reduced.

With regards steel-based doorsets and fully-glazed, steel-framed doorsets, as the door, frame and lead cover components are predominantly of steel, and any potentially flammable elements are reduced from that tested, the risk of flaming is also slightly reduced.

The use of the EA280 and EA281 concealed lead covers are approved for the following doorset types and performance:

- Timber/mineral-based doorsets – 60 minutes integrity and insulation
- Steel-based insulated and uninsulated doorsets – up to 120 minutes integrity
- Timber/mineral-based doorsets – 60 minutes integrity and insulation

It is a requirement of this appraisal that the lead covers must be installed within the doorsets such that the same lever of intumescent protection is provided. This protection shall be as follows:

- 60 minute timber/mineral-based doorsets:
    - The base and forend of the lead cover shall be bedded on 2 mm thickness of Mono Ammonium Phosphate or 2 mm graphite intumescent sheet material
    - the perimeter intumescent fire seals within the frame/door edge shall by-pass the strike plate or forend by a minimum of 7.5 mm wide on each side

- 60 minute fully-glazed, steel-framed doorsets:
    - the perimeter intumescent fire seals within the frame/door edge shall by-pass the lead cover by a minimum of 10 mm wide on each side

Required Doorset Specifications

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

To enable the use of the ABLOY OY electromechanical and mechanical locks discussed on a range of doorsets, it is necessary to address the available information on the proposed doorset. This appraisal is intended to be used on a general basis and not restricted to any particular manufacturer of fire resisting doorsets, however, the following minimum specification shall be followed:

60 Minute Timber/Mineral-Based Doorsets

a) The doorset shall carry valid certification or the doorset, including the door frame and associated ironmongery should have achieved 60 minutes integrity and where applicable insulation, when tested by a UKAS approved laboratory (or assessed by Exova Warringtonfire, BM TRADA or Chiltern International Fire) to EN 1634-1 or BS 476: Part 22: 1987.

b) If 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 54 mm for 60 minute doorsets.

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

e) Door frame density - 640 kg/m^3 for 60 minute doorsets.

f) The amount of interruption to the intumescent seal specification at the door leaf to frame perimeter clearance gaps should be replicated, or greater than that that originally specified for the tested doorset.

Up To 120 Minute Steel-Based Doorsets

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

b) The leaves of the proposed doorset shall be of a minimum thickness of 45 mm.

c) No additional intumescent protection is required.

60 Minute Fully-Glazed, Steel-Framed Doorsets

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

b) The leaves of the proposed doorset shall be of a minimum thickness 65 mm thick and 50 mm wide (excluding beads).

c) The leaves shall be manufactured of steel with a non-combustible mineral core, and provide an integrity and insulation of 60 minutes (Insulation performance as determined against I_1 in accordance with EN1634-1).

Conclusions

Should the recommendations given in this report be followed, it can be concluded that the ABLOY OY electromechanical and mechanical locks, as detailed within this report, may be fitted to previously tested or assessed (by Exova Warringtonfire, BM TRADA or Chiltern International Fire) single-acting, insulated timber or mineral-based doorsets to provide 60 minutes integrity and insulation performance, without detracting from the overall performance of the doorset with respect to EN 1634-1.

Should the recommendations given in this report be followed, it can be concluded that the ABLOY OY electromechanical and mechanical locks, as detailed within this report, may be fitted to previously tested or assessed (by Exova Warringtonfire, BM TRADA or Chiltern International Fire) single-acting, insulated and uninsulated steel-based doorsets to provide up to 120 minutes integrity performance, without detracting from the overall performance of the doorset with respect to EN 1634-1.

Should the recommendations given in this report be followed, it can be concluded that the ABLOY OY electromechanical and mechanical locks, as detailed within this report, may be fitted to previously tested or assessed (by Exova Warringtonfire, BM TRADA or Chiltern International Fire) single-acting, fully-glazed, steel-framed doorsets, to provide 60 minutes integrity and insulation performance without detracting from the overall performance of the doorset with respect to EN 1634-1.

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 ABLOY OY 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 31st August 2022, 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

WF Report No. 364240

An investigation of two single-acting, single-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 and Doorset B.

Briefly both doorsets had overall nominal dimensions 2084 mm high by 1000 mm wide incorporating a door leaf with overall dimensions 2040 mm high by 931 mm wide by 54 mm thick. The door leaves was of a solid graduated density chipboard construction, with 8 mm hardwood lippings to the vertical edges, each leaf was hung within a hardwood frame on three steel hinges.

Both doorsets were installed with a engaged Abloy OY single point lockset referenced EL 520/100 which was connected to a Abloy OY door loop referenced EA281 and an Abloy OY handle set referenced Inoxi long plate 3-19/012/120 SS PZPZ.

Doorset A was orientated so that it opened towards and Doorset B so that they opened away from the heating conditions of the test.

Test Results:		**Doorset A**	**Doorset B**
Integrity performance	**Sustained flaming**	68 Minutes*	68 Minutes*
	Gap gauge	68 Minutes*	68 Minutes*
	Cotton Pad	68 Minutes*	68 Minutes*
Insulation performance		68 Minutes*	68 Minutes*

* The test duration.

A representative of Warrington Certification Limited sample selected the locksets and handles for both Doorsets on the 26th April 2016.

The test was undertaken on the 11th May 2016 and was sponsored by ABLOY Oy.

Full details of the manufacturing plant for the locks and latches are retained on file by EXOVA Warringtonfire.

WF Report No. 364241

An investigation of two single-acting, single-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 and Doorset B.

Briefly both doorsets had overall nominal dimensions 2084 mm high by 1000 mm wide incorporating a door leaf with overall dimensions 2040 mm high by 931 mm wide by 54 mm thick. The door leaves was of a solid graduated density chipboard construction, with 8 mm hardwood lippings to the vertical edges, each leaf was hung within a hardwood frame on three steel hinges.

Both doorsets were installed with an engaged Abloy OY multipoint lockset referenced MP 520/100 which was connected to a Abloy OY door loop referenced EA281 and an Abloy OY handle set referenced Inoxi long plate 3-19/012/120 SS PZPZ.

Doorset A was orientated so that it opened towards and Doorset B so that they opened away the heating conditions of the test.

Test Results:		**Doorset A**	**Doorset B**
Integrity performance	**Sustained flaming**	68 Minutes*	68 Minutes*
	Gap gauge	68 Minutes*	68 Minutes*
	Cotton Pad	68 Minutes*	68 Minutes*
Insulation performance		68 Minutes*	68 Minutes*

* The test duration.

A representative of Warrington Certification Limited sample selected the locksets and handles for both Doorsets on the 26th April 2016.

The test was undertaken on the 11th May 2016 and was sponsored by ABLOY Oy.

Full details of the manufacturing plant for the locks and latches are retained on file by EXOVA Warringtonfire.

WF Report No. 364242

An investigation of two single-acting, single-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 and Doorset B.

Briefly both doorsets had overall nominal dimensions 2090 mm high by 890 mm wide incorporating a door leaf with overall dimensions 2000 mm high by 770 mm wide by 65 mm thick. The door leaves was formed from 1.5 mm thick steel with a Promatec H core and hung on four Abloy OY steel hinges within a 1.5 mm thick steel door frame.

Both Doorsets incorporated a 1884 mm high by 654 mm wide Pyrostop 60-101 vision panel and were installed with an engaged Abloy OY single-point lockset referenced EL 420/35 which was connected to a Abloy OY door loop referenced EA281 and an Abloy OY handle set referenced Inoxi long plate 3-19/012/120 SS PZPZ.

Doorset A was orientated so that it opened towards and Doorset B so that they opened away from the heating conditions of the test.

Test Results:		**Doorset A**	**Doorset B**
Integrity performance	**Sustained flaming**	68 Minutes*	68 Minutes*
	Gap gauge	68 Minutes*	68 Minutes*
	Cotton Pad	68 Minutes*	68 Minutes*
Insulation performance	**Door leaf (I2)**	43 Minutes	42 Minutes
	Glazing (I1)	68 Minutes*	68 Minutes*

* The test duration.

A representative of Warrington Certification Limited sample selected the locksets and handles for both Doorsets on the 26th April 2016.

The test was undertaken on the 12th May 2016 and was sponsored by ABLOY Oy.

Full details of the manufacturing plant for the locks and latches are retained on file by EXOVA Warringtonfire.

WF Report No. 364243

An investigation of two single-acting, single-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 and Doorset B.

Briefly both doorsets had overall nominal dimensions 2190 mm high by 890 mm wide incorporating a door leaf with overall dimensions 2100 mm high by 770 mm wide by 65 mm thick. The door leaves was formed from 1.5 mm thick steel with a Promatect core and hung on four Abloy OY steel hinges within a 1.5 mm thick steel door frame.

Both Doorsets incorporated a 1884 mm high by 654 mm wide Pyrostop 60-101 vision panel and were installed with a engaged Abloy OY multipoint lockset referenced MP 420/35 which was connected to a Abloy OY door loop referenced EA281 and an Abloy OY handle set referenced Inoxi long plate 3-19/012/120 SS PZPZ.

Doorset A was orientated so that it opened towards and Doorset B so that they opened away from the heating conditions of the test.

Test Results:		**Doorset A**	**Doorset B**
Integrity performance	**Sustained flaming**	68 Minutes*	68 Minutes*
	Gap gauge	68 Minutes*	68 Minutes*
	Cotton Pad	68 Minutes*	68 Minutes*
Insulation performance	**Door leaf (I2)**	36 Minutes	41 Minutes
	Glazing (I1)	68 Minutes*	68 Minutes*

* The test duration.

A representative of Warrington Certification Limited sample selected the locksets and handles for both Doorsets on the 26th April 2016.

The test was undertaken on the 13th May 2016 and was sponsored by ABLOY Oy.

Full details of the manufacturing plant for the locks and latches are retained on file by EXOVA Warringtonfire.

WF Report No. 364244

An investigation of two single-acting, single-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 and Doorset B.

Briefly both doorsets had overall nominal dimensions 2050 mm high by 1065 mm wide incorporating a door leaf with overall dimensions 2000 mm high by 980 mm wide by 45 mm thick. The door leaves were formed from 1.0 mm thick steel with a paper honeycomb core and hung on three certified stainless steel hinges within a 1.5 mm thick l steel door frame.

Both doorsets were installed with a engaged Abloy OY multipoint lockset referenced MP 520/100 which was connected to a Abloy OY door loop referenced EA281 and an Abloy OY handle set referenced Inoxi x/012/120 PZPZ PZ272.

Doorset A was orientated so that it opened towards and Doorset B so that they opened away the heating conditions of the test.

Test Results:		**Doorset A**	**Doorset B**
Integrity performance	**Sustained flaming**	132 Minutes*	25 Minutes
	Gap gauge	132 Minutes*	132 Minutes*
	Cotton Pad	45 Minutes	25 Minutes
Insulation performance		7 Minutes	8 Minutes

* The test duration.

A representative of Warrington Certification Limited sample selected the locksets and handles for both Doorsets on the 26th April 2016.

The test was undertaken on the 26th July 2016 and was sponsored by ABLOY Oy.

Full details of the manufacturing plant for the locks and latches are retained on file by EXOVA Warringtonfire.

WF Report No. 364245

An investigation of two single-acting, single-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 and Doorset B.

Briefly both doorsets had overall nominal dimensions 2050 mm high by 1065 mm wide incorporating a door leaf with overall dimensions 2000 mm high by 980 mm wide by 45 mm thick. The door leaves were formed from 1.0 mm thick steel with a paper honeycomb core and hung on three certified stainless steel hinges within a 1.5 mm thick l steel door frame.

Both doorsets were installed with a engaged Abloy OY single point lockset referenced EL 520/100 which was connected to a Abloy OY door loop referenced EA281 and an Abloy OY handle set referenced Inoxi x/012/120 PZPZ PZ272.

Doorset A was orientated so that it opened towards and Doorset B so that it opened away the heating conditions of the test.

Test Results:		**Doorset A**	**Doorset B**
Integrity performance	**Sustained flaming**	132 Minutes*	132 Minutes*
	Gap gauge	132 Minutes*	132 Minutes*
	Cotton Pad	61 Minutes	62 Minutes
Insulation performance		7 Minutes	8 Minutes

* The test duration.

A representative of Warrington Certification Limited sample selected the locksets and handles for both Doorsets on the 26th April 2016.

The test was undertaken on the 24th August 2016 and was sponsored by ABLOY Oy.

Full details of the manufacturing plant for the locks and latches are retained on file by EXOVA Warringtonfire.

Declaration by ABLOY OY

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

R. Anning* - Senior Certification Engineer

Approved

A. Kearns* - Technical Manager

* For and on behalf of Exova Warringtonfire.

Report Issued: 14th September 2017

Issue 2: Approved list of products updated (21st February 2018)

Issue 3: Reference correction (23rd February 2018)

Issue 4: Reference correction (26th February 2018)

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

Annex A

The approval applies to the following products:

Motor Locks		**Motor Locks - Narrow Profile**	
Single-point	*Multi-point*	*Single-point*	*Multi-point*
EL520	MP520	EL420	MP420
EL532	MP532	EL432	MP432
EL522*	MP522*	EL422*	MP422*
EL524*	MP524*	EL434*	MP434*
EL534*	MP534*		
EL535*	MP535*		

Solenoid Locks		**Solenoid Locks – Narrow Profile**	
Single-point	*Multi-point*	*Single-point*	*Multi-point*
EL560	EL566	EL460	EL466
EL561	EL567	EL461	EL467
EL562*	EL568*	EL462*	EL468*
EL563*	EL569*	EL463*	EL469*
EL564*	MP564*		
EL565*	MP565*		

Mechanical Locks		**Mechanical Locks - Narrow Profile**	
Single-point	*Multi-point*	*Single-point*	*Multi-point*
EL160*	EL166*	EL060*	EL066*
EL162*	EL168*	EL062*	EL068*
EL163*	MP165*	EL063*	EL266*
EL165*	EL366*	EL260*	EL268*
EL360*	EL368*	EL262*	
EL362*			

*Added Issue 2