WARRINGTONFIRE
AUSTRALIA
A Jensen Hughes Company

Master door hardware assessment

Report sponsor: E Plus Building Products Pty Ltd and Davcor Group Pty Ltd

Products: Davcor door hardware

Report number: FAS220275

Revision: DHAR1.3

Contents

1. Introduction

This report documents the findings of the assessment to determine the expected fire resistance level (FRL) of Davcor door hardware installed in E-core old and new generation doorset in accordance with AS 1530.4:2014[1] and AS 1905.1:2015[2].

Warringtonfire performed this assessment at the request of the report sponsors listed in Table 1.

Table 1 Report sponsor details

Report sponsor	Address
E Plus Building Products Pty Ltd	12-13 Dansu Court Hallam VIC 3803 Australia
Davcor Group Pty Ltd	14 John Hines Ave Minchinbury 2770 NSW Australia

2. Baseline test data for full scale doorset

E-core doorsets were previously tested and reported in test reports FSV 0608, FSV 0609, SI 2271. Based on the test data, the doorsets are expected to achieve performance as outlined in Table 2.

E-core doorsets were further tested in accordance with AS 1530.4:2014. Based on the test data, the expected performance of the E-core doorsets is assessed in assessment reports FAS200350, FCO 3501 and FCO 3430. The tested/assessed performance is summarised in Table 3.

Table 2 Old generation E-core doorset

Test reference	Doorset description	Test/assessment standard	Reference doorset	FRL
FSV 0608	Single leaf plywood faced E-core mini doorset, nominally 35 mm thick	AS 1530.4:1997[3]	A	-/120/30
FSV 0609, FCO 1794	Single leaf plywood faced E-core doorset, nominally 45 mm thick	AS 1530.4:2005	B	-/240/30
SI 2271, FCO 1794	Two leaf plywood faced E-core doorset, nominally 45 mm thick		C	-/240/30

Notes–

- It should be noted that the performance of the doorset varied based on their construction and test standards. The relevant doorsets were referenced in section 5 as defined in this table.
- Refer to E Plus Building Products Pty Ltd for the latest version of assessment reports FCO 1794.

[1] Standards Australia, 2014, Methods for fire tests on building materials, components and structures – Part 4: Fire-resistance tests for elements of construction, AS 1530.4:2014, Standards Australia, NSW.
[2] Standards Australia, 2015, Components for the protection of openings in fire-resistant walls Fire-resistant doorsets, AS 1905.1:2015, Standards Australia, NSW.
[3] Standards Australia, 1997, Methods for fire tests on building materials, components and structures – Part 4: Fire-resistance tests of elements of building construction, AS 1530.4:1997, Standards Australia, NSW.

Table 3 New generation E-core doorset

Assessment reference	Doorset description	Test standard	Reference doorset	FRL
FAS200350, FCO 3430	Single leaf E-core maxi doorset, nominally 45 mm thick	AS 1530.4:2014	D	Up to -/180/30
	Two leaf E-core maxi doorset, nominally 45 mm thick		E	Up to -/120/30
FAS200350, FCO 3501	Single leaf plywood faced E-core Mini doorset, nominally 35 mm thick		F	Up to -/60/30
• It should be noted that the performance of the doorset varied based on their construction and test standards. The relevant doorsets were referenced in section 5 as defined in this table. • Refer to E Plus Building Products Pty Ltd for the latest version of assessment reports, FAS200350, FCO 3430, FCO 1794 and FCO 3501.				

3. Hardware considered in this report

A range of door hardware was considered in this report. The considered hardware is listed in Table 4 to Table 10.

Table 4 List of proposed locksets

Item	Model	Description	Backset	Reference test / assessment
1.	DL2700 Trilogy	• Digital cylindrical leverset	70 mm	FSP 1520 COA 1634
2.	CDL71 /CDL7100 series	• Mechanical digital lockset	60 mm	FSP 1799 COA 2374
3.	CDL7100 & CDL7200	• Mechanical digital lockset	60 mm	FSP 1799 FAS210033 DHAR1.0
4.	CDL - SL8SS	• Electronic lockset (Tubular latch)	70 mm	EWFA 49234400
5.	CEL - 3IN1 - SL8SN	• Electronic lockset (Tubular latch)	70 mm	EWFA 49594800
6.	3000 series	• Cylindrical lock	70 mm	FSP 0676
7.	NK2000 series	• Digital lock	70 mm	FSP 1086
8.	P series Tiebolt	• Cylindrical lock	70 mm	FSP 1165
9.	PN6000 Entry leverset with a cylindrical lock	• Entry lever lock set	70 mm	FRT210042 DHAR1.0

Item	Model	Description	Backset	Reference test / assessment
10.	PN6000 Entry Leverset with cylindrical lock tested with: - PN6012 Classroom Lever Lockset, PN6062 Storeroom Lever Lockset, PN6082 Passage Lever Lockset, PN6011 Double Cylinder Lever Lockset, PN6095 Communication Passage Lever Lockset, PN6030 Privacy Lever Lockset, PN6075 Dummy Lever, PN6085 Half Cupboard Lever Lockset, PN3000 Entry Knob & Lever Lockset, PN3013 Classroom Knob & Lever Lockset, PN3062 Storeroom Knob & Lever Lockset	• Entry lever lock set	70 mm	FAS210049 DHAR1.0
11.	PD7000	• Cylindrical lock	70 mm	FSP 0523
12.	Davcor Carbine PN6000 Entrance leverset	• Leverset furniture	70 mm	FRT220106 R1.0
13.	Carbine Alpha Deadlatch with lever	• Lockset	60 mm	FRT230125 DHAR1.0
14.	Carbine Alpha Deadlatch with key lever	• Lockset	60 mm	FRT230125 DHAR1.0
15.	Carbine Alpha Deadlatch with knob	• Lockset	60 mm	FRT230125 DHAR1.0
16.	Carbine Alpha Deadlatch with key knob	• Lockset	60 mm	FRT230125 DHAR1.0
17.	Carbine PY6000 series of cylindrical leversets	• Entrance leverset	70 mm	FRT240046 DHAR1.0
18.	Carbine CEL2 BT electronic lockset	• Electronic lockset (Tubular latch)	70 mm	FRT240024 DHAR1.0

Table 5 List of proposed door closers

Item	Model	Description	Reference test / assessment
1.	• Davcor Carbine CDC-3-S door closer	Surface mounted door closer	FRT210369 DHAR1.0 FAS210379-A
2.	• Davcor Carbine CDC-1-S door closer	Surface mounted door closer	FRT210369 DHAR1.0 FAS210379-A
3.	• Davcor Carbine CDC-5-S, EN2-6 door closer	Surface mounted door closer	FRT210369 DHAR1.0
4.	• Davcor Carbine CDC-5 closer slide track	Closer slide track	FRT210369 DHAR2.0
5.	• Davcor Carbine CDC-CA2 door closer	Door Closer	FRT210370 DHAR 1.0
6.	• Davcor Carbine CDC-CA1G, CA2G, CA1B & CA2B door closers	Door Closer	FAS210379-B DHAR1.1

Table 6 List of proposed electric strike

Item	Model	Description	Reference test / assessment
1.	Davcor Carbine CES720S Electric strike	Electric Strike	FRT220106 R1.0
2.	Davcor Carbine CES350-1224 Electric strike	Electric Strike	FRT220106 R1.0
3.	GEM GK-300 series	Electric Strike	FSV 0736

Table 7 List of proposed eye viewer

Item	Model	Description	Reference test / assessment
1.	Ritefit 34 series Door viewer	Eye viewer	FSP 1229

Table 8 List of proposed locks, latches or bolts

Item	Model	Description	Reference test / assessment
1.	Davcor Carbine Night Hawk Pro	Night latch	FRT210369 DHAR3.1
2.	Davcor Carbine Night Hawk Advance	Night latch	FRT210370 DHAR 2.0

Table 9 List of proposed additional furniture

Item	Model	Description	Reference test / assessment
1.	BP & DS series	Blocker plate and Door saver plate	FSP 1165
2.	Latch Guard Blocker Plate BP-LF1MS	Blocker Plate	EWFA 53298100c.1
3.	Latch Guard Blocker Plate BP-NF1MS or BP-MF1MS	Blocker plate	EWFA 53298100 FAS180419.1
4.	Edge Fixed Anti Thrust Plate	Thrust plate	FRT190405d.1
5.	Davcor Carbine Filler Plate CPHD-1SC	Filler Plate	EWFA 53298100b.1
6.	Davcor EVVA Airkey Oval Cylinder retest with a Lockwood 3572C Vestible M	Cylinder knob	FRT200436 DHAR1.0

Table 10 List of proposed hinges

Item	Model	Description	Reference test / assessment
1.	Carbine ball bearing SSS 100 × 100 hinge	Ball bearing hinge	FRT230125 DHAR2.0
2.	Carbine ball bearing SSS 100 × 75 hinge	Ball bearing hinge	FRT240024 DHAR2.0
3.	Carbine fixed pin SSS 100 × 100 hinge	Fixed pin hinge	FRT230143 DHAR2.0
4.	Carbine fixed pin SSS 100 × 75 × 2.5 hinge	Fixed pin hinge	FRT230202 DHAR2.0

4. Additional supporting test data considered in this report

The proposed hardware is assessed based on supporting test data listed in Table 11 in compliance with the stipulation of AS 1905.1:2015.

Table 11 Additional supporting test data

Test report	Test date	Test scale	Doorset description	Tested hardware	Test duration	Test standard
FSP 1520	20 December 2011	Pilot scale	Single leaf plywood faced E-core doorset nominally 35 mm thick	• TRILOGY DL2700 Series digital lockset • VEML-WPS Series electromagnetic lock • FSH2500 Series electromagnetic shear lock • GK 300 Series electric strike	121 minutes	AS 1530.4:2005
FSP 1799	10 January 2017	Pilot scale	Single leaf plywood E-core doorset nominally 35 mm thick	• Kone uniswing firesafe automated swing door operator, grade 5 – pushing (Type1) • Carbine CDL71 series mechanical digital lockset	121 minutes	AS 1530.4:2014
EWFA 49234400	14 August 2017	Pilot scale	Single leaf plywood faced E-core doorset nominally 35 mm thick	• Carbine CEL-3IN1-SL8SN Electronic lockset •	61 minutes	AS 1530.4:2014
EWFA 49594800	14 July 2017	Pilot scale	Single leaf plywood faced E-core doorset nominally 35 mm thick	• Carbine CEL-3IN1-SL8SN electronic lockset	121 minutes	AS 1530.4:2014
FSP 0676	22 June 1999	Pilot scale	Single leaf plywood E-core doorset nominally 35 mm thick	• Carbine 3000 series cylindrical lockset • DORMA TS 68 series surface mounted door closer	121 minutes	AS 1530.4:1997
FSP 1086	19 October 2004	Pilot scale	Single leaf plywood E-core doorset nominally 35 mm thick	• Carbine digital lockset – NK 2000 series • Strike protector plate – ES200/ES2000 series	121 minutes	BS 476: Part22 –1987
FSP 1165	20 March 2007	Pilot scale	Single leaf plywood E-core doorset nominally 35 mm thick	• Carbine P series tiebolt leverset • Carbine ‘BP’ series blocker plate and carbine ‘DS’ series door saver.	121 minutes	AS 1530.4:1997
FRT210042	4 March 2021	Pilot scale	Single leaf plywood E-core doorset nominally 38 mm thick	• Carbine PN6000 entry leverset • Lockwood stainless steel fixed pin hinges LW10075FPSSS	124 minutes	AS 1530.4:2014

Test report	Test date	Test scale	Doorset description	Tested hardware	Test duration	Test standard
FSP 0523	November 1997	Pilot scale	Single leaf plywood E-core doorset nominally 38 mm thick	• PD7000 leverset • Carbine professional – cyclone series surface mounted door closer • Brodie switch plug	240 minutes	AS 1530.4:1990
FRT220106	14 July 2022	Pilot scale	Single leaf plywood E-core doorset nominally 35 mm thick	• Davcor carbine CES720S monitored electric strike • Davcor carbine CES350-1224 electric strike • Davcor carbine PN6000 entrance leverset • Stainless steel FP hinges	241 minutes	AS 1530.4:2014
FRT210369	15 November 2021	Pilot scale	Single leaf plywood E-core doorset nominally 35 mm thick	• Davcor carbine CDC-5-S EN2-6 door closer • Davcor carbine CDC-5-S slide track • Davcor carbine night hawk pro night latch • Trio R1-175F Butt hinges	121 minutes	AS 1530.4:2014
FRT210370	22 November 2021	Pilot scale	Single leaf plywood faced E-core doorset nominally 35 mm thick	• Davcor carbine CDC-CA2 door closer • Davcor carbine night hawk advance night latch • Davcor carbine PE3000 knobset • Trio R1-175F Butt hinges	121 minutes	AS 1530.4:2014

Test report	Test date	Test scale	Doorset description	Tested hardware	Test duration	Test standard
FSV 0736	1 February 2000	Full scale	Single leaf plywood E-core doorset nominally 45 mm thick	• Legge pacific 990MF mortice lock fitted to door A • Dalco 4200 series SSS door furniture fitted to door A • Sabre 836 PAS-PC surface mounted door closer fitted to the unexposed face of door A • GEM GK-300 electric strike fitted to the door frame of door A • Dorma BOH-AD 8400 series full vertical rod panic exit device fitted to the exposed face of door B • Dorma TS 83 EN 2-6 surface mounted door closer fitted to the unexposed face of door B	240 minutes	AS 1530.4:1997
FSP 1229	28 September 2006	Pilot scale	• Single leaf plywood E-core doorset nominally 38 mm thick	• Carbine CTL series tubular leverset • Ritefit 34 series door viewer •	121 minutes	AS 1530.4:1997
EWFA 53298100	1 June 2018	Pilot scale	Single leaf plywood faced E-core doorset nominally 35 mm thick	• Novas auto flushbolt US32D	121 minutes	AS 1530.4:2014

Test report	Test date	Test scale	Doorset description	Tested hardware	Test duration	Test standard
FRT190405	1 November 2019	Pilot scale	Single leaf plywood faced E-core doorset nominally 35 mm thick	• Davcore carbine CDC-5-S EN2-6	240 minutes	AS 1530.4:2014
FRT200436	7 January 2021	Pilot scale	Single leaf plywood E-core doorset nominally 38 mm thick	• Davcor EVVA airkey oval cylinder knob – E. A. PZ. AOV. 36	54 minutes and 30 seconds	AS 1530.4:2014
FRT230125	12 October 2023	Pilot scale	Single leaf plywood E-core doorset nominally 35 mm thick	• Carbine Alpha Deadlatch with lever – installed on unexposed side • Carbine Alpha Deadlatch with lever – installed on exposed side • Davcor ball bearing 100 × 100 × 2.5 mm SS hinges	120 minutes and 1 second	AS 1530.4:2014
FRT240046	29 May 2024	Pilot scale	Single leaf plywood E-core doorset nominally 35 mm thick	Davcor carbine PY6000-L1 cylindrical leverset (entrance)	120 minutes	AS 1530.4:2014
FRT240024	8 May 2024	Pilot scale	Single leaf plywood E-core doorset nominally 35 mm thick	• Davcor carbine CEL2 BT electronic lockset • Davcor Carbine CHBB100×75-SSS hinges	120 minutes	AS 1530.4:2014
FRT230143	13 October 2023	Pilot scale	Single leaf plywood E-core doorset nominally 35 mm thick	Davcor carbine fixed pin CDFP100×100-SSS hinges	120 minutes	AS 1530.4:2014
FRT230202	26 March 2024	Pilot scale	Single leaf plywood E-core doorset nominally 35 mm thick	Davcor carbine fixed pin CHFP100×75×2.5-SSS hinges	120 minutes	AS 1530.4:2014

5. Assessment

5.1 Door hardware assessment in accordance with AS 1905.1:2015

The E-core doorsets were tested in a range of fire resistance tests. The expected performance of the E-core doorset based on these tests and subsequent assessments – FCO 1794, FAS200350, FCO 3501 and FCO 3430 – is summarised in Table 2 and Table 3. It should be noted that FCO 1794, FCO 3501 and FCO 3430 were issued by Infrastructure Technologies (CSIRO). Warringtonfire has not verified the outcome of these assessment reports. However, for the purpose of this report, it is assumed that the outcomes are accurate.

This report must be read in conjunction with FCO 1794, FCO 3430, FCO 3501 and FAS200350. As such, the validity of this report is conditional upon the validity of FCO 1794, FCO 3430, FCO 3501 and FAS200350. Any changes or updates to FAS200350, FCO 1794, FCO 3501 and FCO 3430 may therefore impact the outcome of this report.

As per section 4 of AS 1905.1:2015, door hardware can be assessed based on additional pilot scale or full-scale tests if conducted in accordance with AS 1530.4. The proposed hardware listed in section 3 was tested either in full or pilot scale. The test outcomes are summarised in Table 11. Based on expected doorset performance listed in Table 2 and Table 3 and pilot/full scale test data summarised in Table 11, the proposed hardware is assessed in compliance with section 4 of AS 1905.1:2015.

This assessment is conditional upon the operational characteristics and materials of the doorset complying with section 2 of AS 1905.1:2015. The field of application of the hardware included in this report is defined by the field of application of the doorset that the door hardware is installed on.

5.2 Applicability of test data to AS 1530.4:2014

It is noted that some full scale or pilot scale tests were conducted in accordance with AS 1530.4:1990, AS 1530.4:1997 and AS 1530.4:2005. The stipulations provided in Appendix B11 of AS 1530.4:1990, AS 1530.4:1997, AS 1530.4:2005 and AS 1530.4:2014 are not appreciably different. Therefore, the results of pilot scale test can be used to assess the fire resistance performance of the hardware if tested in accordance with AS 1530.4:2014.

5.3 Locksets with or without additional furniture

5.3.1 Assessment based on pilot / full scale test

Section 4.5 of AS 1905.1:2015 permits the assessment of locksets based on a pilot scale or full-scale fire resistance test in accordance with AS 1530.4. As such, in addition to the full-scale tests listed in Table 2 and Table 3, the pilot scale or full-scale tests listed in Table 11 form the basis of this assessment.

It is noted that, some locksets included additional furniture. In such a case, the furniture was tested as part of the pilot scale or full-scale tests. Any variation in surface mounted furniture is discussed in section 5.3.2.

AS 1530.4:2014 states that either sustained flaming on the surface of the unexposed face for 10 seconds or longer, ignition of a cotton pad, gap gauge failure, or the latching mechanism being disengaged at the end of the test constitutes integrity failure. From the pilot scale or full-scale tests, the attained duration of integrity performance of each lockset based on the above criteria is noted.

As the proposed locksets with or without additional furniture (as applicable) did not cause failure up to the noted timeframes in the pilot scale tests or full-scale tests, substituting the locksets with or without additional furniture (as applicable) for the hardware tested in the referenced doorsets listed in Table 2 and Table 3is not expected to affect their performance. Based on the above, the proposed locksets listed in Table 3 are positively assessed. Variations from the tested locksets are discussed in sections 5.3.2, 5.3.3 and 5.3.4.

5.3.2 Variation in surface mounted furniture

The proposed locksets included variations for surface mounted furniture in the form of levers, knobs or escutcheon plates. AS 1530.4:2014, clause 7.9.7 (l) states: *'Where locksets or latchsets are operated by a steel shaft, their surface-mounted furniture may be varied provided—*

(i) the melting point of any part is not reduced.

(ii) any replacement handle or knob is not so massive or asymmetrical as to introduce a turning moment about the operating shaft which exceeds 0.07 Nm.

(iii) any replacement lever handle is not so massive or asymmetrical as to increase the turning moment about the operating shaft by more than 10%.

(iv) any replacement escutcheon plate adequately covers any hole in the door leaf formed to accommodate the lockset or latchset but does not increase the area of the face of the door leaf covered by the escutcheon by more than 20%.

The proposed locksets with surface mounted furniture that vary from the tested system all satisfied clauses 7.9.7 (I) (i), (ii), (iii) and (iv) of AS 1530.4:2014 as appropriate. Based on the above, the proposed variations in surface mounted furniture are positively assessed.

5.3.3 Variation in operating mechanism

The proposed locksets included variations in operating mechanisms from the tested specimen. AS 1530.4:2014, clause 7.9.7 states that:

(i) Changes may be made in the operating characteristics of latchset or lockset hardware, provided the changes do not require modification of the door leaf or door frame and changes to the functions of the latchsets involving the operating mechanism.

(j) Changes may be made to the materials of the essential latching components, provided the melting point of any part is the same or higher.

It has been confirmed through a survey conducted by Warringtonfire that the variations in the operating mechanism did not require modification of the door leaf and did not require changes to the function of the latchset. Additionally, the melting point of any part was not reduced. Based on the above, variation in the operating mechanisms of the locksets is positively assessed.

5.3.4 Variation in backset

It is proposed that the backset of locksets be varied. AS 1530.4:2014, clause 7.9.7 states that:

(g) The backset of the mortice lockset or latchset may be reduced.

(h) The backset of a cylindrical lockset or latchset may be varied, provided no additional encroachment is made on any structural framework of the door leaf and the fixing method remains identical.

Based on the above, the reduction in backset of mortice lock is positively assessed.

For cylindrical locksets, it was confirmed through survey that no additional encroachment was needed to be made on the leaf and the fixing method remained unchanged. Based on the above, variation in the backset of the cylindrical lock is also positively assessed.

5.3.5 Conclusion

Based on the discussion above, it is the opinion of this laboratory that the proposed lockset listed in Table 12 is capable of achieving the FRL listed in Table 12 – if fitted into the referenced E-core doorsets.

Table 12 Fire resistance level of locksets installed in E-core old and new generation doorset

Item	Model	Description	Reference doorset as defined in Table 2 and Table 3	Backset	FRL
1.	DL2700 Trilogy	• Digital cylindrical leverset	A, B, C, D, E, F	70 mm	-/60/30
2.	CDL71 /CDL7100 series	• Mechanical digital lockset	A, B, C, D, E, F	60 mm	-/120/30
3.	CDL7100 & CDL7200	• Mechanical digital lockset	A, B, C, D, E, F	60 mm	-/120/30
4.	CDL - SL8SS	• Electronic lockset (Tubular latch)	A, B, C, D, E, F	70 mm	-/60/30
5.	CEL - 3IN1 - SL8SN	• Electronic lockset (Tubular latch)	A, B, C, D, E, F	70 mm	-/60/30

Item	Model	Description	Reference doorset as defined in Table 2 and Table 3	Backset	FRL
6.	3000 series	• Cylindrical lock	A, B, C, D, E, F	70 mm	-/120/30
7.	NK2000 series	• Digital lock	A, B, C, D, E, F	70 mm	-/120/30
8.	P series Tiebolt	• Cylindrical lock	A, B, C, D, E, F	70 mm	-/120/30
9.	PN6000 Entry leverset with a cylindrical lock	• Entry lever lock set	A, B, C, D, E, F	70 mm	-/120/30
10.	PN6000 Entry Leverset with cylindrical lock tested with: - PN6012 Classroom Lever Lockset, PN6062 Storeroom Lever Lockset, PN6082 Passage Lever Lockset, PN6011 Double Cylinder Lever Lockset, PN6095 Communication Passage Lever Lockset, PN6030 Privacy Lever Lockset, PN6075 Dummy Lever, PN6085 Half Cupboard Lever Lockset, PN3000 Entry Knob & Lever Lockset, PN3013 Classroom Knob & Lever Lockset, PN3062 Storeroom Knob & Lever Lockset	• Entry lever lock set	A, B, C, D, E, F	70 mm	-/120/30
11.	PD7000	• Cylindrical lock	B, C, D, E	70 mm	-/240/30
12.	Davcor Carbine PN6000 Entrance leverset	• Leverset furniture	A, B, C, D, E, F	70 mm	-/240/30
13.	Carbine Alpha Deadlatch with lever	• Lockset	A, B, C, D, E, F	60 mm	-/120/30
14.	Carbine Alpha Deadlatch with key lever	• Lockset	A, B, C, D, E, F	60 mm	-/120/30
15.	Carbine Alpha Deadlatch with knob	• Lockset	A, B, C, D, E, F	60 mm	-/120/30
16.	Carbine Alpha Deadlatch with key knob	• Lockset	A, B, C, D, E, F	60 mm	-/120/30
17.	Carbine PY6000 series of cylindrical leversets	• Entrance leverset	A, B, C, D, E, F	70 mm	-/120/30
18.	Carbine CEL2 BT electronic lockset	• Electronic lockset (Tubular latch)	A, B, C, D, E, F	70 mm	-/120/30*

Item	Model	Description	Reference doorset as defined in Table 2 and Table 3	Backset	FRL
Notes– *Direction of exposure is limited to the tested direction. The battery pack must be installed on the exposed side as tested. • The listed FRL is the maximum FRL assigned to the hardware. The system FRL needs to be determined in conjunction with the FRL of the referenced doorset. The lowest index between the FRL of the hardware and doorset will be the applicable FRL of any particular combination. Therefore, this report needs to be read in conjunction with the referenced reports listed in Table 2 and Table 3. • The FRLs provided in this table are contingent upon the validity of the assessment reports FAS200350, FCO 3430, FCO 1794 and FCO 3501.					

5.4 Door closers

5.4.1 Assessment based on pilot / full scale test

Section 4.5 of AS 1905.1:2015 permits the assessment of door closers based on a pilot scale or full-scale fire resistance test in accordance with AS 1530.4. As such, in addition to the full-scale tests listed in Table 2 and Table 3, the pilot scale or full-scale tests listed in Table 11 form the basis of this assessment.

AS 1530.4:2014 states that either sustained flaming on the surface of the unexposed face for 10 seconds or longer, ignition of a cotton pad, gap gauge failure, or the latching mechanism being disengaged at the end of the test constitutes integrity failure. From the pilot scale or full-scale tests, the attained duration of integrity performance of the closers based on the above criteria is noted.

As the proposed closers did not cause failure up to the noted timeframes in the pilot scale tests or full-scale tests, substituting the closers for the hardware tested in the referenced doorsets listed in Table 2 and Table 3 is not expected to affect their performance. Based on the above, the proposed closers listed in Table 5 are positively assessed.

It is noted that the name of some closers has changed for marketing purposes. In such instances, the manufacturer has confirmed that the closer construction remains identical to the tested closer. Any variations from the tested closer are discussed under sections 5.4.2 and 5.4.3.

5.4.2 Variation in closer dimensions

The proposal included closers that are smaller in dimension than the tested closers. AS 1530.4:2014 clause 7.9.7 states that:

(e) An alternative closer manufactured by the same manufacturer and of smaller size closer in the same series of the closer may be used, provided the closer–

(i) is manufactured from the same materials;

(ii) has the same operating mechanism design; and

(iii) uses the same hydraulic fluids.

It has been confirmed by the manufacturer that the proposed closers are manufactured from the same materials, have the same operating mechanism design, and do not vary in hydraulic fluid. The only variation in the closer series is that of a reduction in size. Based on the above, the reduction in closer size is positively assessed.

5.4.3 Sliding channel

The proposed closers included a parallel arm and slide track. The hardware was tested with both, parallel arm, and slide track. Neither the parallel arm nor slide track hardware negatively impacted the performance of the doorset. As such, the surface mounted door closers may be optionally installed with either a parallel arm or slide track configuration.

5.4.4 Conclusion

Based on the discussion above, it is the opinion of this laboratory that the proposed closers listed in Table 13 are capable of achieving the FRLs listed in Table 13 – if they are fitted in the referenced E-core doorsets.

Table 13 Fire resistance level of closers installed in E-core old and new generation doorset

Item	Model	Description	Reference doorset as defined in Table 2 and Table 3	FRL
1.	• Davcor Carbine CDC-3-S door closer	Surface mounted door closer	A, B, C, D, E, F	-/120/30
2.	• Davcor Carbine CDC-1-S door closer	Surface mounted door closer	A, B, C, D, E, F	-/120/30
3.	• Davcor Carbine CDC-5-S, EN2-6 door closer	Surface mounted door closer	A, B, C, D, E, F	-/120/30
4.	• Davcor Carbine CDC-5 closer slide track	Closer slide track	A, B, C, D, E, F	-/120/30
5.	• Davcor Carbine CDC-CA2 door closer	Door Closer	A, B, C, D, E, F	-/120/30
6.	• Davcor Carbine CDC-CA1G, CA2G, CA1B & CA2B door closers	Door Closer	A, B, C, D, E, F	-/120/30

Notes–

- The listed FRL is the maximum FRL assigned to the hardware. The system FRL needs to be determined in conjunction with the FRL of the referenced doorset. The lowest index between the FRL of the hardware and doorset will be the applicable FRL of any particular combination. Therefore, this report needs to be read in conjunction with the referenced reports listed in Table 2 and Table 3.
- The FRLs provided in this table are contingent upon the validity of the assessment reports FAS200350, FCO 3430, FCO 1794 and FCO 3501.

5.5 Electric strikes

5.5.1 Assessment based on pilot scale test

Section 4.5 of AS 1905.1:2015 permits the assessment of electric strikes based on a pilot scale or full-scale fire resistance test in accordance with AS 1530.4. As such, in addition to the full-scale tests listed in Table 2 and Table 3, the pilot scale or full-scale tests listed in Table 11 form the basis of this assessment.

AS 1530.4:2014 states that either sustained flaming on the surface of the unexposed face for 10 seconds or longer, ignition of a cotton pad, gap gauge failure, or the latching mechanism being disengaged at the end of the test constitute integrity failure. From the pilot scale or full-scale tests, the attained duration of integrity performance of the electric strike based on the above criteria is noted.

As the proposed door electric strike did not cause failure up to the noted timeframes in the pilot scale tests or full-scale tests, substituting the electric strike for the items tested in the referenced doorsets listed in Table 2 and Table 3 is not expected to affect their performance. Based on the above, the proposed electric strike listed in Table 6 is positively assessed.

5.5.2 Conclusion

Based on the discussion above, it is the opinion of this laboratory that the proposed electric strikes listed in Table 14 are capable of achieving the FRLs listed in Table 14 – if fitted in the referenced E-core doorsets.

Table 14 Fire resistance level of electric strikes installed in E-core old and new generation doorset

Item	Model	Description	Reference doorset as defined in Table 2 and Table 3	FRL
1.	Davcor Carbine CES720S Electric strike	Electric Strike	A, B, C, D, E, F	-/240/30
2.	Davcor Carbine CES350-1224 Electric strike	Electric Strike	A, B, C, D, E, F	-/240/30
3.	GEM GK-300 series	Electric Strike	B, C, D, E	-/240/30

Notes–

- The listed FRL is the maximum FRL assigned to the hardware. The system FRL needs to be determined in conjunction with the FRL of the referenced doorset. The lowest index between the FRL of the hardware and doorset will be the applicable FRL of any particular combination. Therefore, this report needs to be read in conjunction with the referenced reports listed in Table 2 and Table 3.
- The FRLs provided in this table are contingent upon the validity of the assessment reports FAS200350, FCO 3430, FCO 1794 and FCO 3501.

5.6 Other locks, latches or bolts

5.6.1 Assessment based on pilot/full scale test

Section 4.5 of AS 1905.1:2015 permits the assessment of locks, latches and bolts based on a pilot scale or full-scale fire resistance test in accordance with AS 1530.4. As such, in addition to the full-scale tests listed in Table 2 and Table 3, the pilot scale or full-scale tests listed in Table 11 form the basis of this assessment.

AS 1530.4:2014 states that either sustained flaming on the surface of the unexposed face for 10 seconds or longer, ignition of a cotton pad, gap gauge failure, or the latching mechanism being disengaged at the end of the test constitute integrity failure. From the pilot scale or full-scale tests, the attained duration of integrity performance of the proposed locks, latches and bolts based on the above criteria is noted.

As the proposed locks, latches and bolts did not cause failure up to the noted timeframes in the pilot scale tests or full-scale tests, adding the proposed locks, latches and bolts as an additional item of hardware in the referenced doorsets listed in Table 2 and Table 3 is not expected to affect their performance. Based on the above, the proposed locks, latches and bolts listed in Table 7 are positively assessed.

5.6.2 Conclusion

Based on the discussion above, it is the opinion of this laboratory that the proposed locks, latches and bolts listed in Table 15 are capable of achieving the FRLs listed in Table 15 – if fitted in the referenced E-core doorsets.

Table 15 Fire resistance level of additional locks, latches and bolts installed in E-core old and new generation doorset

Item	Model	Description	Reference doorset as defined in Table 2 and Table 3	FRL
1.	Davcor Carbine Night Hawk Pro	Night latch	A, B, C, D, E, F	-/120/30
2.	Davcor Carbine Night Hawk Advance	Night latch	A, B, C, D, E, F	-/120/30

Notes–

- The listed FRL is the maximum FRL assigned to the hardware. The system FRL needs to be determined in conjunction with the FRL of the referenced doorset. The lowest index between the FRL of the hardware and doorset will be the applicable FRL of any particular combination. Therefore, this report needs to be read in conjunction with the referenced reports listed in Table 2 and Table 3.

- The FRLs provided in this table are contingent upon the validity of the assessment reports FAS200350, FCO 3430, FCO 1794 and FCO 3501.

5.7 Eye viewers

5.7.1 Assessment based on pilot/full scale test

Section 4.5 of AS 1905.1:2015 permits the assessment of eye viewer based on a pilot scale or full-scale fire resistance test in accordance with AS 1530.4. As such, in addition to the full-scale tests listed in Table 2 and Table 3, the pilot scale or full-scale tests listed in Table 11form the basis of this assessment.

AS 1530.4:2014 states that either sustained flaming on the surface of the unexposed face for 10 seconds or longer, ignition of a cotton pad, gap gauge failure, or the latching mechanism being disengaged at the end of the test constitute integrity failure. From the pilot scale or full-scale tests, the attained duration of integrity performance of the eye viewer based on the above criteria is noted.

As the proposed eye viewer did not cause failure up to the noted timeframes in the pilot scale tests or full-scale tests, adding the eye viewer as an additional item of hardware in the referenced doorsets listed in Table 2 and Table 3is not expected to affect their performance. Based on the above, the proposed eye viewer listed in Table 8 is positively assessed.

5.7.2 Conclusion

Based on the discussion above, it is the opinion of this laboratory that the proposed eye viewer listed in Table 16 – if fitted in the referenced E-core doorsets.

Table 16 Fire resistance level of eye viewers installed in E-core old and new generation doorset

Item	Model	Description as defined in Table 2 and Table 3	Reference doorset	FRL
1.	Ritefit 34 series Door viewer	Eye viewer	A, B, C, D, E, F	-/120/30

Notes–

- The listed FRL is the maximum FRL assigned to the hardware. The system FRL needs to be determined in conjunction with the FRL of the referenced doorset. The lowest index between the FRL of the hardware and doorset will be the applicable FRL of any particular combination. Therefore, this report needs to be read in conjunction with the referenced reports listed in Table 2 and Table 3.
- The FRLs provided in this table are contingent upon the validity of the assessment reports FAS200350, FCO 3430, FCO 1794 and FCO 3501.

5.8 Additional furniture

5.8.1 Assessment based on pilot/full scale test

Section 4.5 of AS 1905.1:2015 permits the assessment of surface mounted furniture based on a pilot scale or full-scale fire resistance test in accordance with AS 1530.4. As such, in addition to the full-scale tests listed in Table 2 and Table 3, the pilot scale or full-scale tests listed in Table 11 form the basis of this assessment.

AS 1530.4:2014 states that either sustained flaming on the surface of the unexposed face for 10 seconds or longer, ignition of a cotton pad, gap gauge failure, or the latching mechanism being disengaged at the end of the test constitute integrity failure. From the pilot scale or full-scale tests, the attained duration of integrity performance of the furniture based on the above criteria is noted.

As the proposed furniture did not cause failure up to the noted timeframes in the pilot scale tests or full-scale tests, substituting the proposed furniture for the tested hardware in the referenced doorsets listed in Table 2 and Table 3 is not expected to affect their performance. Based on the above, the proposed furniture listed in Table 9 is positively assessed.

5.8.2 Conclusion

Based on the discussion above, it is the opinion of this laboratory that the proposed furniture listed in Table 17 are capable of achieving the FRLs listed in Table 17 – if fitted in the referenced E-core doorsets.

Table 17 Fire resistance level of additional Furniture installed in E-core old and new generation doorset

Item	Model	Description	Reference doorset as defined in Table 2 and Table 3	FRL
1.	BP & DS series	Blocker plate and Door saver plate	A, B, C, D, E, F	-/120/30
2.	Latch Guard Blocker Plate BP-LF1MS	Blocker Plate	A, B, C, D, E, F	-/120/30
3.	Latch Guard Blocker Plate BP-NF1MS or BP-MF1MS	Blocker plate	A, B, C, D, E, F	-/120/30
4.	Edge Fixed Anti Thrust Plate	Thrust plate	A, B, C, D, E, F	-/240/30
5.	Davcor Carbine Filler Plate CPHD-1SC	Filler Plate	A, B, C, D, E, F	-/120/30
6.	Davcor EVVA Airkey Oval Cylinder retest with a Lockwood 3572C Vestible M	Cylinder knob	A, B, C, D, E, F	-/45/30

Notes–

- The listed FRL is the maximum FRL assigned to the hardware. The system FRL needs to be determined in conjunction with the FRL of the referenced doorset. The lowest index between the FRL of the hardware and doorset will be the applicable FRL of any particular combination. Therefore, this report needs to be read in conjunction with the referenced reports listed in Table 2 and Table 3.
- The FRLs provided in this table are contingent upon the validity of the assessment reports FAS200350, FCO 3430, FCO 1794 and FCO 3501.

5.9 Hinges

5.9.1 Assessment based on pilot/full scale test

Section 4.5 of AS 1905.1:2015 permits the assessment of hinges based on a pilot scale or full-scale fire resistance test in accordance with AS 1530.4:2014. As such, in addition to the full-scale tests listed in Table 2 and Table 3, pilot scale or full-scale tests listed in Table 11 for the basis of this assessment.

AS 1530.4:2014 states that either sustained flaming on the surface of the unexposed face for 10 seconds or longer, ignition of a cotton pad, gap gauge failure, or the latching mechanism being disengaged at the end of the test constitutes integrity failure. From the pilot scale tests, the attained duration of integrity performance of the hinges based on the above criteria is noted.

As the proposed hinges did not cause failure up to the noted timeframes in the pilot scale or full scale tests, adding the hinges as an additional item of hardware in the referenced doorsets listed in Table 2 and Table 3 is not expected to affect their performance. Based on the above, the proposed hinges listed in Table 10 are positively assessed.

5.9.2 Conclusion

Based on the discussion above, it is the opinion of this laboratory that the proposed hinges listed in Table 18 are capable of achieving the FRLs listed in Table 18 – if fitted in the referenced E-core doorsets.

Table 18 Fire resistance level of hinges installed in old and new generation E-core doorsets

Item	Model	Description	Reference doorset as defined in Table 2 and Table 3	FRL
1.	Carbine ball bearing SSS 100 × 100 hinge	Ball bearing hinge	A, B, C, D, E, F	-/120/30
2.	Carbine ball bearing SSS 100 × 75 hinge	Ball bearing hinge	A, B, C, D, E, F	-/120/30
3.	Carbine fixed pin SSS 100 × 100 hinge	Fixed pin hinge	A, B, C, D, E, F	-/120/30
4.	Carbine fixed pin SSS 100 × 75 × 2.5 hinge	Fixed pin hinge	A, B, C, D, E, F	-/120/30

Notes–

- The listed FRL is the maximum FRL assigned to the hardware. The system FRL needs to be determined in conjunction with the FRL of the referenced doorset. The lowest index between the FRL of the hardware and doorset will be the applicable FRL of any particular combination. Therefore, this report needs to be read in conjunction with the referenced reports listed in Table 2 and Table 3.
- The FRLs provided in this table are contingent upon the validity of the assessment reports FAS200350, FCO 3430, FCO 1794 and FCO 3501.

6. Summary of assessments

The door hardware assessed in this report and their reference outcome tables are summarised in Table 19.

Table 19 Summary of assessment

Hardware	Reference table
Locksets	Table 12
Door closers	Table 13
Electric strikes	Table 14
Other locks, latches or bolts	Table 15
Eye viewer	Table 16
Additional furniture	Table 17
Hinges	Table 18

7. Conditions and validity

- The conclusions of this assessment may be used to directly assess the fire hazard, but it should be recognised that a single test method will not provide a full assessment of fire hazard under all conditions.
- Because of the nature of fire resistance testing, and the consequent difficulty in quantifying the uncertainty of measurement, it is not possible to provide a stated degree of accuracy of the result. The inherent variability in test procedures, materials and methods of construction, and installation may lead to variations in performance between elements of similar construction.
- The assessment can therefore only relate to the actual prototype test specimens, testing conditions and methodology described in the supporting data, and does not imply any performance abilities of constructions of subsequent manufacture.
- This assessment is based on information and experience available at the time of preparing this report. The published procedures for the conduct of tests and the assessment of the test results are the subject of constant review and improvement and it is recommended that this report be reviewed by Warringtonfire before the end of the validity date.
- The information in this report must not be used for the assessment of variations other than those stated in the conclusions above. The assessment is valid provided no modifications are made to the systems detailed in this report. All details of construction should be consistent with the requirements stated in the relevant test reports and all referenced documents.
- The data, methodologies, calculations and results documented in this report specifically relate to the tested specimen/s and must not be used for any other purpose. This report may only be reproduced in full. Extracts or abridgements must not be published without permission from Warringtonfire.
-

Quality management

Revision	Issue date	Expiry date	Information about the report			
DHAR1.0	25 Nov 2022	30 Nov 2027	Description	Initial issue		
				Prepared by	**Reviewed by**	**Authorised by**
			Name	Mohammed Mutafi	Omar Saad	Mahmoud Akl
DHAR1.1	02 Dec 2022	30 Nov 2027	Description	Updated version with correcting a typographical error		
				Prepared by	**Reviewed by**	**Authorised by**
			Name	Mohammed Mutafi	Omar Saad	Omar Saad

Revision	Issue date	Expiry date	Information about the report			
DHAR1.2	29 Jan 2024	30 Nov 2027	Description	Updated version with the addition of Carbine Alpha Deadlatch hardware.		
				Prepared by	**Reviewed by**	**Authorised by**
			Name	Renz Rabusa	Alim Rasel	Alim Rasel
DHAR1.3	06 Aug 2024	30 Nov 2027	Description	Report updated to include Mini HD doors and Davcor locksets and hinges		
				Prepared by	**Reviewed by**	**Authorised by**
			Name	Zakaria Awad	Alim Rasel	Alim Rasel
			Signature			

Note-

The stated expiry date is dependent on the continued validity of report FCO 3430, FCO3501, FCO 1794 and FAS200350 throughout the duration of this report's validity period. Therefore, it is essential to read this report in conjunction with FCO 3430, FCO 3501, FCO 1794 and FAS200350.