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Door hardware assessment

Test standard: Section 2 and appendix B11 of AS 1530.4:2014

Report sponsor: Southern Design Group Pty Ltd

Products: Door levers, escutcheon and pull handles

Report number: FAS180547

Revision: DHAR3.0

Contents

1. Introduction

This report documents the findings of the assessment to determine the likely fire resistance level (FRL) of a door levers and Escutcheon tested in accordance with section 2 and appendix B11 of AS 1530.4:2014.

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

Table 1 Test sponsor details

Test sponsor	Address
Firecore Pty Ltd	291 Warringah Road Beacon Hill NSW 2100 Australia
Southern Design Group Pty Ltd	4-16 Stepney Street Stepney SA 5069 Australia

2. Variations considered in this report

The variations considered in this report are:

Fitting various door levers, escutcheon plates and pull handles as listed in Table 6 to Table 8 instead of the door levers, escutcheon and pull handles tested in the referenced test reports listed in Table 2. Table 3 provides additional supporting information about the doorset.

Table 2 Referenced test reports

Test reference	Doorset description	Test standard
FSV 1382a	Single leaf TVC30 core Firecore doorset, nominally 38 mm thick.	AS 1530.4:2005
FSV 1418a	Single leaf TVC40 core Firecore doorset, nominally 48 mm thick.	AS 1530.4:2005
FSV 1391a	Double leaf TVC40 core Firecore doorset, nominally 48 mm thick.	AS 1530.4:2005

Table 3 Additional supporting information

Test report	Doorset description	Test duration	Test standard
FRT190028	Single Leaf TVC30 Core Firecore Doorset, nominally 38 mm thick.	121 minutes	AS 1530.4:2014
A fire resistance test in accordance with Appendix B11 of AS 1530.4:2014 was conducted on a pilot scale doorset on the 28 February 2019. It included a Tradco Berlin door lever and Tradco 6213 tube latch fitted onto the door leaf with Tradco Stepped backplates.			
FRT190029	Single Leaf TVC30 Core Firecore Doorset, nominally 38 mm thick.	121 minutes	AS 1530.4:2014
A fire resistance test in accordance with Appendix B11 of AS 1530.4:2014 was conducted on a pilot scale doorset on the 1 March 2019. It included Tradco Brunswick door levers and Tradco 6213 tube latch fitted onto the door leaf with Tradco Chamfered long backplates.			
FRT210033 R1.0	Single leaf TVC30 core Firecore doorset, nominally 38 mm thick.	121 minutes	AS 1530.4:2014
A pilot scale fire resistance test – in accordance with section 2 and appendix B11 of AS 1530.4:2014 – was done on a pilot scale doorset on 26 March 2021. It included a Futurismo - with round rose - leverset (20694) and Berlin Pull Handle (9449) with extra brass rods fitted onto the door leaf.			

3. Description of the tested door hardware

Table 4 describes the tested door hardware specimen. This information was provided by the test sponsor and surveyed by Warringtonfire.

Table 5 describes the pre-test functionality test done on the door system.

Photographs of the test specimen are included in Figure 1 to Figure 8

All measurements were done by Warringtonfire – unless indicated otherwise.

Table 4 Specimen description in FRT210033

Item	Description
Pull handle door hardware product name	Berlin Pull Handle (9449) with extra brass rods
Pull handle Door hardware mass	3.55 kg
Lever door hardware product name	Futurismo - with round rose - leverset (20694)
Door system properties	
Door leaf thickness	38 mm
Location of pull handle	The centre of the handle was located 700 mm from the hinge edge of the door leaf and 56 mm from the top of the door leaf.
Backset	70 mm
Lockset type	Cylindrical latchset
Location of lockset	The centre of spindle was located at 243 mm from the bottom of the door leaf.
Cut out size of lockset	To fit cylindrical latchset

Table 5 Specimen functionality test in FRT210033

Item	Description	
Opening and closing cycles	The doors were subjected to a series of 50 opening and closing cycles of at least 75° for side-hung doorsets and at least 300 mm for sliding doorsets and shutters – in accordance with clause 7.2.5 of AS 1530.4:2014.	
Opening force	2.0 N	
Closing force	1.0 N	
Latching force	20.1 N	
Average clearance measurement	Top edge	3.4 mm
	Latch edge	2.4 mm
	Hinge edge	2.5 mm

Figure 1 Latch edge view of the tested hardware

Figure 2 Tradco 6213 Tube Latch

Figure 3 Tradco Berlin lever & Tradco Stepped plate (unexposed side)

Figure 4 Tradco Berline lever & Tradco Stepped plate (exposed side)

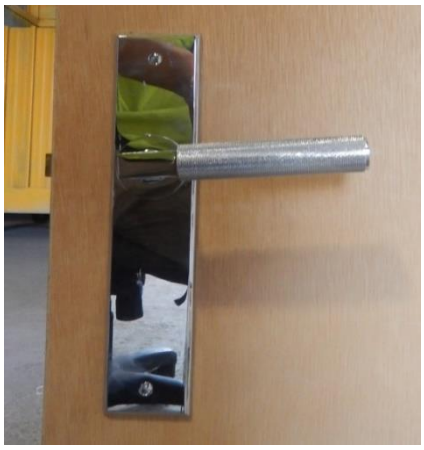

Figure 5 Tradco Brunswick lever & Tradco Chamfered long plate (unexposed side)

Figure 6 Tradco Brunswick lever & Tradco Chamfered long plate (exposed side)

Figure 7 Latch edge view of the tested pull handle hardware

Figure 8 Unexposed view of the tested Futurismo hardware

4. Discussion

It is expected that if the proposed Tradco Berlin, Tradco Brunswick, Futurismo lever ,Tradco Stepped escutcheon plate, Tradco Chamfered long escutcheon plates, and Tradco 6213 tube latch do not initiate failure of the pilot scale doorset before failure occurred on the referenced doorsets, then substituting them in the referenced test will not be detrimental to the performance of the referenced doorsets.

AS 1530.4:2014 states that sustained flaming on the surface of the unexposed face for 10 seconds or longer constitutes integrity failure. AS 1530.4:2014 also states that a latching mechanism ceasing to be engaged constitutes integrity failure. During the reference tests FRT190028, FRT190029, and FRT210033, the above levers, escutcheon plates, tube latch, and pull handles did not initiate failure of the doorset for the duration of the test.

Results from the tests FRT190028, FRT190029 and FRT210033 show that the proposed hardware are positively assessed for the test periods as indicated in the conclusion below.

The proposed lever modules summarised in Table 6 are generally similar to the tested leverset and have a similar method of construction. The main variations from the tested hardware are the shape of the levers, their masses and the moments they induce on the spindle. The proposed variations have near identical rose and escutcheons taking up the same or less area on the door leaf and operate the latchset via a similar mechanism.

AS 1530.4:2014, clause 7.9.7 (i) states 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 latchsets involving the operating mechanism. Although there are slight differences in the operating characteristics of the latchset, there is no modification to the door leaf or door frame required.

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 N.m.

(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%.'

The material used in all the various locksets mentioned in Table 6, Table 7 and Table 8 have an equal or higher melting point than the tested material. The proposed handles were surveyed, and a discussion based on their turning moments is presented next.

Proposed door Levers

The lever types tested in FRT190028, FRT190029 and FRT210033 were Berlin, Brunswick and Futurismo respectively. Berlin and Brunswick applied a turning moment to the lockset of 0.13 Nm for the duration of the test. A survey of the proposed handles and knobs was undertaken and the turning moments and weight for each lever is in Table 6.

Table 6 List of proposed levers and doorknobs

item	Door hardware	Mass (g)	Turning moment (Nm)
1.	Baltimore	269.0	0.09
2.	Siena	271.0	0.11
3.	Annecy	235.0	0.09
4.	Bronte	279.5	0.08
5.	Como	237.0	0.05
6.	Verona	234.0	0.10
7.	Berlin (tested)	310.0	0.13

item	Door hardware	Mass (g)	Turning moment (Nm)
8.	Brunswick (tested)	310.5	0.13
9.	Oxford	267.0	0.07
10.	Sarlat	230.5	0.09
11.	Tradco Return Lever	229.5	0.093
12.	Copenhagen Pair Rumbled Nickel	271.0	0.1233
13.	Stirling Pair Chrome Plated	261.5	0.0561
14.	Helsinki Pair Chrome	356.5	0.1212
15.	Baltimore Return Pair	346.0	0.1560
16.	Osaka Pair statin	281.0	0.0872
17.	Gepetto chrome	414.0	0.1086
18.	Futurismo (tested)	501.0	0.0814*
19.	Doorknob Cambridge Round Rose Concealed Fix	298.3	n/a
20.	Doorknob Paddington Round Rose Concealed Fix	301.5	n/a
21.	Doorknob Guildford Round Rose Concealed Fix	314.5	n/a
22.	Doorknob Zzzigurat D69 mm	362.0	n/a
Fitting the Futurismo lever into the measurement device was difficult due to its unique shape, and the measurement of the turning moment was deemed inaccurate.			

Based on the above discussion, it is considered that if the turning moment applied to the latch by the levers is less than or equal to the tested lever with the exception of Baltimore Return Pair which falls outside the permissible 10 % increase in turning moment based on the tested levers. However, due to the unique shape of the Futurismo lever, the measurement of the turning moment was deemed not accurate, and it is expected the actual turning moment for this lever to be significantly higher than the measured value and the tested Berlin and Brunswick levers. This is because the tested Berlin and Brunswick levers has a mass of 310.5 g while the tested Futurismo lever has a mass of 501 g, which is more than 60 % increase in mass. As a result, the actual tuning moment of the Futurismo lever is expected to be higher than the tested Berlin and Brunswick levers since turning moments have a proportional relation with mass.

Therefore, the risk of the door unlatching during the test is not increased. In addition, the proposed doorknobs have a smaller mass compared to the tested Futurismo lever. Therefore, they will not introduce any detrimental effect on the doorset. In absence of any introduced integrity weakness, the proposed lever handles and doorknobs are positively assessed.

Proposed escutcheon plates

The escutcheon plates tested in FRT190028 and FRT190029 were Tradco Stepped and Tradco Chamfered long, respectively. The chosen escutcheon plates had the largest area and the largest weight when compared to the other proposed escutcheon plates. Therefore, they were considered to be the most onerous cases if tested. A survey of the proposed escutcheon plates was undertaken, the dimensions measured are shown in Table 7.

Table 7 List of proposed escutcheon plates

Item No.	Escutcheon Plate Type	Dimensions H × W (mm × mm)	Area (m^2)	Mass(g)
1.	Shouldered	250 × 48	0.120	245.0
2.	Rectangular	240 × 37	0.009	225.5
3.	Oval	230 × 40	0.009	218.5
4.	Stepped	237 × 50	0.012	315.5
5.	Chamfered Long	240 × 50	0.012	478.0

Item No.	Escutcheon Plate Type	Dimensions H × W (mm × mm)	Area (m^2)	Mass(g)
6.	Chamfered Square	60 × 60	0.004	93.0
7.	Round Rose	D52	0.002	99.0
8.	Square Rose	52 × 52	0.002	71.0

Based on the above, it is considered that installing the levers with any of the above escutcheon plates will not likely introduce any detrimental effect to the integrity performance of the specimen. Hence, they can be positively assessed.

Proposed door pull handles

The door pull handle type tested in FRT210033 R1.0 was Berlin Pull Handle (9449) with extra brass rods. Extra brass rods were installed on the Pull handle to increase the weight of the door pull handle to be at least 3.55 kg to match the heaviest Helsinki Chrome plated door handle which could not fit into the testing construction. The tested door handle has the largest weight when compared to the other proposed door handles. Therefore, it was assumed to be the most onerous case. The proposed door pull handles were surveyed and the weight of each hardware was recorded as shown in Table 8.

Table 8 Proposed door pull handles

Item No.	Escutcheon Plate Type	Mass(g)
1.	Sarlat Backplate Polished Brass	1150
2.	Sarlat Polished Nickel	1980
3.	Berlin Polished Brass (tested)	2010 (3550 with attached weights)
4.	Brunswick Knurled Antique Copper	2010
5.	Baltimore Polished Brass	2780
6.	Helsinki Chrome plated	3550

Based on the above, it is considered that installing the proposed door handles will not likely introduce any detrimental effect to the integrity performance of the specimen. Hence, they can be positively assessed.

5. Conclusions

It is the opinion of Warringtonfire's accredited fire testing laboratory in Australia that the doorsets listed in Table 9 will achieve the FRL shown in Table 9 if they are fitted with door levers, escutcheon and pull handles shown in Table 6 to Table 8 on the doorsets. This opinion is based on the pilot scale tests done.

This assessment report has been prepared in accordance with section 4.5 of AS 1905.1:2015 and is conditional on the operational characteristics and materials of the doorset complying with section 2 of AS 1905.1:2015. The field of application for the proposed levers and escutcheon is the same as the field of application for the doorset that the proposed levers and escutcheon is installed on.

Table 9 Conclusion

Test reference	Description	FRL
FSV 1382a	Single leaf TVC30 core Firecore doorset, nominally 38 mm thick.	**-/120/30**
FSV 1418a	Single leaf TVC40 core Firecore doorset, nominally 48 mm thick.	**-/120/30**
FSV 1391a	Double leaf TVC40 core Firecore doorset, nominally 48 mm thick.	**-/120/30**

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.
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Quality management

Revision	Date	Expiry date	Information about the report			
FAS180547-R1.0	23 April 2019	-	Description	Initial issue		
				Prepared by	**Reviewed by**	
			Name	Mahmoud Akl	Imran Ahamed	
FAS180547-R2.0	16 September 2019	-	Description	Update in door hardware list		
				Prepared by	**Reviewed by**	**Authorised by**
			Name	Mahmoud Akl	Imran Ahamed	
FAS180547 DHAR3.0	13 May 2021	31 May 2026	Description	Inclusion of new levers and pull handles		
				Prepared by	**Reviewed by**	**Authorised by**
			Name	Rami Al-Darwish	Yomal Dias	Omar Saad
			Signature			

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