



Fire assessment report

Fire resistance performance of TPS and CAT6 cables
penetrating through plasterboard walls


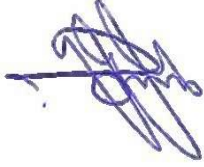




Client: Trafalgar Group

Product: TPS and CAT6 cables

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Amendment schedule

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			Prepared by	Reviewed by	Approved by
	Expiry: 31/01/2025	Name	Alim Rasel	Omar Saad	Omar Saad
		Signature			
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			Prepared by	Reviewed by	Approved by
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Exova Warringtonfire rebranded to Warringtonfire on 1 December 2018. Apart from the change to our brand name, no other changes have occurred. The introduction of our new brand name does not affect the validity of existing documents previously issued by us.

Executive summary

This report documents the findings of the assessment undertaken to determine the likely fire resistance level (FRL) of TPS and CAT6 cables if tested in accordance with AS 1530.4:2014.

The analysis conducted in section 5 of this report found that the proposed variations are likely to achieve FRL's as shown in Table 1, if tested in accordance with AS 1530.4:2014 and relevant requirements of AS 4072.1-2005.

Table 1 Variations and assessment outcome

Item	Configuration	Separating Element	FRL
TPS and 5mm CAT6 Cable	Any configuration (maximum five cables per penetration)	Two-layer 13mm or 16mm fire rated plasterboard wall system	-/120/120
		Concrete/Masonry	

The variations and outcome of this assessment are subject to the limitations and requirements described in section 2, 4 and 6 of this report. The results of this report are valid until 31 January 2025.

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1. Introduction

This report documents the findings of the assessment undertaken to determine the likely fire resistance level (FRL) of TPS and CAT6 cables if tested in accordance with AS 1530.4:2014 and as per the relevant requirements of AS 4072.1-2005. This assessment was carried out at the request of Trafalgar Group. The sponsor details are included in Table 2.

Table 2 Sponsor details

Client	Address
Trafalgar Group	26a Ferndell Street South Granville NSW, 2142 Australia

2. Framework for the assessment

An assessment is an opinion about the likely performance of a component or element of structure if it were subject to a standard fire test.

No specific framework, methodology, standard or guidance documents exists in Australia for doing these assessments. Therefore, we have followed the Guide to Undertaking Assessments In Lieu of Fire Tests prepared by the Passive Fire Protection Federation (PFPF) in the UK¹.

This guide provides a framework to undertake assessments in the absence of specific fire test results. 'Some areas where assessments may be offered are:

- *Where a modification is made to a construction which has already been tested*
- *Interpolation or extrapolation of results of a series of fire resistance tests, or utilisation of a series of fire test results to evaluate a range of variables in a construction design or a product*
- *Where, for various reasons – eg size or configuration – it is not possible to subject a construction or a product to a fire test.'*

Assessments will vary from relatively simple judgements on small changes to a product or construction through to detailed and often complex engineering assessments of large or sophisticated constructions.

2.1 Declaration

The guide to undertaking assessments in lieu of fire tests prepared by the PFPF in the UK requires a declaration from the client. By accepting our fee proposal dated 19 December 2019, Trafalgar Group confirmed that

- To their knowledge the component or element of structure, which is the subject of this assessment, has not been subjected to a fire test to the standard against which this assessment is being made.
- They agree to withdraw this assessment from circulation if the component or element of structure is the subject of a fire test by a test authority in accordance with the standard against which this assessment is being made and the results are not in agreement with this assessment.
- They are not aware of any information that could adversely affect the conclusions of this assessment and – if they subsequently become aware of any such information, they agree to ask the assessing authority to withdraw the assessment.

¹ Guide to Undertaking Assessments In Lieu of Fire Test - The Passive Fire Protection Federation (PFPF), June 2000, UK.

3. Description of the specimen and variations

3.1 System description

The fire resistance performance of three TPS and two 5mm OD CAT6 cables penetrating through a plasterboard wall system was tested in compliance with AS 1530.4:2014 and relevant requirement of AS 4072.1-2005. The plasterboard wall consists of one layer of 16mm Fireshield each side of 64mm wide metal stud. The penetrating service was sealed with Trafalgar Fyreflex sealant to full depth of plaster sheets and finished with a 30x30mm fillet.

3.2 Referenced test data

The assessment of the variation to the tested system and the determination of the likely performance is based on the results of the fire tests documented in the reports summarised in Table 3. Further details of the tested system are described in Appendix A.

Table 3 Referenced test data

Report number	Test sponsor	Test date	Testing authority
FSP 1729A	Fire Containment Pty Ltd	25 November 2015	CSIRO
FRT 180392	Trafalgar Fire	27 November 2018	Warringtonfire Australia Ptd Ltd

3.3 Variations to tested systems

An identical system has not been subjected to a standard fire test. We have therefore assessed the product using baseline test information for similar components. The variations to the tested system together with the referenced baseline standard fire tests – are described in Table 4.

Table 4 Variation to tested systems

Item No	Item	Description	Referenced Test
1	Separating Element	The performance of TPS and CAT6 cables were previously tested in a one-layer 16mm fire rated plasterboard wall system. This report considers a two-layers 13mm or 16mm fire rated plasterboard wall system instead of tested setup in the reference test.	FRT 180392
		The performance of plasterboard wall is then extrapolated to concrete/masonry wall of greater or similar thickness as per the permissible variations in AS 1530.4:2014.	
2	Penetrating Cable bundle	Three TPS and two CAT6 cables penetration were tested in the reference test. This report considers a cable bundle size up to five at various configuration.	FSP 1729A

3.4 Purpose of the test

Sections 2 of AS 1530.4:2014 specify the general requirements for conducting fire resistance tests. Section 10 of AS 1530.4:2014 give guidelines for determining the fire resistance of elements of construction penetrated by services such as pipes and cables. AS 4072.1-2005 sets out the minimum requirements for the construction, installation and application of fire resistance tests to sealing systems. These include cables penetrating through building elements that are required to have a fire resistance level (FRL).

3.5 Schedule of components

Table 5 outlines the schedule of components for the assessed systems subject to a fire test, as referenced in Table 5.

Table 5 Schedule of components of assessed systems

Item	Description	
1	Separating Element	2x13mm or 16mm fire-rated Plasterboard wall system
	Specification	Two layers of 13mm or 16mm fire-rated plasterboard fixed onto both sides of the steel framing with an established FRL of - /120/120 or 120/120/120 (through test as per AS 1530.4:2014).
2	Steel Frame	64 mm steel frame
	Specification	64mm x 0.5 BMT steel stud, 64mm x 0.7 BMT nogging track, and 64mm x 50mm x 0.5BMT wall track.
3	Penetrating Service	TPS and CAT6 Cables
	Size	Standard TPS Cables and 5mm (Nominal) CAT6 Cables. The allowable core hole size is limited to 10% greater than the tested (30mm), and the sealant details are to be replicated.
4	Sealant	Trafalgar Fyreflex™ Sealant
	Description	Water and intumescent based acrylic sealant
	Density	1600 kg/m ³ (Nominal)
	Installation	The sealant is to be applied at the annular gaps between cables and separating element to a nominal 30mm fillet on both the exposed and unexposed side to the depth of the plasterboard.



4. Scope, objective and assumptions

4.1 Scope and objective

- The scope of this report is limited to an assessment of the variations to the tested systems described in section 3.3.
- This report details the methods of construction, test conditions and assessed results that would have been expected if the specific elements of construction described here had been tested in accordance with AS 1530.4:2014.
- The results of this assessment are applicable to electrical and communication cables penetrating through separating elements.
- This report is only valid for the assessed system/s. Any changes with respect to size, construction details, loads, stresses, edge or end conditions, other than those identified in this report, may invalidate the findings of this assessment. If there are changes to the system, a reassessment will be needed to verify consistency with the assessment in this report.
- The data, methodologies, calculations and conclusions documented in this report specifically relate to the assessed system/s and must not be used for any other purpose.
- This report has been prepared based on information provided by others. Warringtonfire has not verified the accuracy and/or completeness of that information and will not be responsible for any errors or omissions that may be incorporated into this report as a result.

5. Assessment of TPS and CAT6 cable performance

5.1 Description of variation

The fire resistance performance of three TPS and two 5mm OD CAT6 cables penetrating through a one-layer 16mm plasterboard wall system was tested in compliance with AS 1530.4:2014 and relevant requirement of AS 4072.1-2005. The penetrating service was sealed with Trafalgar Fyreflex sealant to full depth of plaster sheets and finished with a 30×30mm fillet.

This report presents a considered opinion of the fire resistance performance of TPS and CAT6 cable penetrating through the following separating elements instead of the tested setup.

- Two-layer 13mm or 16mm fire-rated plasterboard wall system.
- Concrete/masonry walls of equal/greater thickness.

Further, the cable various configuration of TPS and CAT6 is also considered.

5.2 Methodology

The approach and method of assessment used for this assessment is summarised in Table 6.

Table 6 Method of assessment

Assessment method	
Level of complexity	Simple assessment
Type of assessment	Quantitative –Comparative

5.3 Assessment

5.3.1 Cable performance in 2 × 13mm (also 2×16mm) fire-rated plasterboard wall system

In test FSP 1729A, the fire resistance performance of three TPS and two 5mm OD CAT6 cables penetrating through a single layer plasterboard wall system was tested and an FRL of -/60/60 was achieved. The separating element known as Knauf plasterboard wall system (KSW315), consists of one-layer 16mm fireshield each side of 64mm wide metal stud with an established FRL of -/60/60. The penetration service was sealed with Trafalgar Fyreflex sealant with 5mm annular gap around the cable to a minimum depth of the plasterboard and finished with a 30mm × 30mm fillet on both side of the wall.

During test FSP 1729A, failure under the criterion of insulation was observed on the separating element as maximum temperature rise of 180°C was recorded on the unexposed face of the wall, 25mm above the sealant. Further analysis of the recorded temperature profile shows, no insulation failure occurred on the cables and the sealant for the tested period of 120 minutes. The temperature for both cable and sealant at 120 minutes were recorded below 200 °C (initial ambient temperature during test was recorded as 28 °C).

Therefore, it can be concluded that, the insulation levels achieved for the tested system will solely depend on the performance of the separating element as the sealing system had proven its ability to maintaining integrity and insulation for extended duration of the test.

The fire resistance performance of two-layer 13mm fire-rated plasterboard wall system with ten horizontal penetration was tested in test FRT180392. No integrity or insulation failure was observed for the separating element for duration of the test period (120 minutes).

Based on the above discussion it can be concluded that, the two-layer 13mm plasterboard system as tested in FRT180392 if penetrated by the TPS and CAT6 cables tested in FSP 1729A, would likely achieve an FRL of -/120/120 provided same penetration sealing system was used.

5.3.2 Cable performance in concrete/masonry walls

As per AS 1530.4:2014 clause 10.12.2 (c):

Results obtained from framed wall systems may be applied to the performance of a system in concrete, masonry or solid gypsum blocks of greater or equal thickness to that of the tested prototype.

Therefore, it can be reasonably concluded that, the TPS and CAT6 cables performance in a two-layer 13mm or 16mm plasterboard system can be replicated in masonry or concrete separating element of greater or equal thickness (116mm).

5.3.3 Cable performance bundle size and configuration

This report considers the bundle size of cable penetration along with cable configuration. AS 1530.4:2014 clause 10.4.6.2 stipulates the largest bundle size must be tested for fire stopping system. As 5 cable services were tested in FSP 1729A, a maximum of 5 cables penetration through the separating element is recommended at a time.

The TPS and CAT6 cables are of similar sizes and have similar conductors (Copper) and insulations (PVC). Therefore, it is our opinion that, change in cable configuration (number of TPS and CAT6 cable penetration; max 5) will not likely affect the fire resistance performance of the system, provided the maximum core hole size is no greater than 5% of the tested (30mm) and the sealant details are replicated.

5.4 Conclusion

Based on the above discuss, it can be concluded that, the TPS and 5mm OD CAT6 cables (in any configuration; max 5) penetrating through a two-layer 13mm or 16mm plasterboard wall system as tested in FRT180392 or concrete/masonry wall of greater or equal thickness will achieve the following FRL's if tested in accordance with AS 1530.4:2014 and relevant requirements of AS 4072.1-2005.

Table 7 The expected FRL's of TPS and 5mm CAT6 cables

Item	Configuration	Separating Element	FRL
TPS and 5mm CAT6 Cable	Any configuration (max 5)	two-layer 13mm or 16mm plasterboard wall system	-/120/120
		Concrete/Masonry	

6. Validity

Warringtonfire Australia does not endorse the tested or assessed product in any way. The conclusions of this assessment may be used to directly assess fire hazard, but it should be recognised that a single test method will not provide a full assessment of fire hazard under all conditions.

Due to the nature of fire testing and the consequent difficulty in quantifying the uncertainty of measurement, it is not possible to provide a stated degree of accuracy. The inherent variability in test procedures, materials and methods of construction, and installation may lead to variations in performance between elements of similar construction.

This assessment is based on information and experience available at the time of preparation. The published procedures for the conduct of tests and the assessment of test results are subject to constant review and improvement. It is therefore recommended that this report be reviewed on or before, the stated expiry date.

This assessment represents our opinion about the performance likely to be demonstrated on a test in accordance with AS 1530.4:2014, based on the evidence referred to in this report.

This assessment is provided to the Trafalgar Group for its own purposes and we cannot express an opinion on whether it will be accepted by building certifiers or any other third parties for any purpose.

Appendix A Summary of supporting test data

A.1 Test report – FSP 1729A

Table 8 Information about test report

Item	Information about test report
Report sponsor	Fire Containment Pty Ltd
Test laboratory	CSIRO NATA Registered Laboratory 14 Julius Avenue North Ryde, NSW 2113
Test date	The fire resistance test was completed on 25 November 2015.
Test standards	The test was done in accordance with AS 1530.4:2014
Variation to test standards	None
General description of tested specimen	The fire resistance performance of three TPS and two 5 mm OD CAT6 cables (Specimen 2) penetrating through single layer 16mm plasterboard wall system was tested in compliance with AS 1530.4:2014 and relevant requirements of AS 4072.1-2005. The penetration was protected by Trafalgar Fyreflex™ Sealant which was applied at the annular gaps between the services and the separating element to a nominal 30mm×30mm fillet on both the exposed and unexposed side to the depth of the plasterboard.
Instrumentation	The test report states that the instrumentation was in accordance with AS 1530.4:2014.

The test specimen achieved the following result:

Table 9 Results summary for this test report

Item	Structural Adequacy	Integrity	Insulation
Specimen 2	N/A	60	60

A.2 Test report – FRT 180392

Table 10 Information about test report

Item	Information about test report
Report sponsor	Trafalgar Fire
Test laboratory	Warringtonfire Australia, Unit 2, 409-411 Hammond Road, Dandenong, Victoria 3175, Australia.
Test date	The fire resistance test was completed on 27 November 2018.
Test standards	The test was done in accordance with AS 1530.4:2014
Variation to test standards	The percentage deviation in the area of the curve of the average temperature recorded by the specified furnace thermocouples versus time from the standard time-temperature curve was up to 8% below the limits prescribed in the standard from the 5 th to the 33 rd minute period. The test period was extended for a further 10 minutes, during which no penetration system failures occurred.

Item	Information about test report
	<p>The pressure was up to 12 Pa above the limits prescribed in the standard during the 5-15, and 114-120 minute periods. The pressure was also up to 4 Pa below the limits prescribed in the standard during the 15-20, and 120-125 minute periods.</p> <p>The pressure and temperature were within the limits for the rest of the test duration. The overpressure resulted in a more onerous test conditions, and due to the nature of the specimen and the fact that no significant events occurred during these time periods, these deviations are unlikely to have invalidated the test results.</p>
General description of tested specimen	<p>The fire resistance performance of two layers of 13mm thick CSR Fyrchek fire-rated plasterboard fixed onto both sides of a 64mm 0.50BMT steel stud to construct a wall at 116mm total thickness with studs located at nominal 600mm centres with a vertical joint between the plasterboard sheets was tested. Ten varying service penetrations protected by Trafalgar Fyreflex™ Sealant, Trafalgar TWrap, Trafalgar Fyresafe FR Batts, and Trafalgar Fyrebox™ Mini penetrated the wall system.</p>
Instrumentation	<p>The test report states that the instrumentation was in accordance with AS 1530.4:2014.</p>