

PROJEX GROUP PTY LTD

FIRE ASSESSMENT REPORT

Fire resistance performance of the Model "T" Link-Seal® modular seal system in accordance with AS 1530.4:2014



Report number: FAS200402

Revision: R1.0 Reference number: EWFA 28750-00

Issued date: 29 September 2026 Expiry date: 31 October 2031



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Quality management

Revision	Date	Revision Description		
R1.0	Issue: 29 Sep 2026	EWFA 28750-00 revalidated and issued under FAS200402 R1.0.		
	Expiry: 31 October 2031	Prepared	Reviewed	Authorised
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¹ Warringtonfire Australia Pty Ltd was acquired by Jensen Hughes in December 2023. Jensen Hughes Fire Testing Pty Ltd is not affiliated, associated, authorised, or endorsed by Warringtonfire Australia Pty Ltd, Warringtonfire Testing and Certification Limited or its "Warringtonfire" or "Certifire" brands.

Executive summary

This report documents the findings of the assessment undertaken to determine the fire resistance level (FRL) of a Ø275 mm steel pipe with a 10 mm wall thickness penetrating a 200 mm thick concrete wall through a nominal Ø335 mm aperture, protected with Model “T” Link-Seal® modular seal system accordance with AS 1530.4:2014 and assessed in accordance with AS 4072.1:2005 (R2016).

This assessment is based on fire resistance test report No. 719186476-MEC10-IHN, which documents testing sponsored by Pipeline Seal and Insulator, Inc. and conducted by TUV SUD PSB Pte Ltd.

The test specimen comprised a 200 mm thick precast cement block wall incorporating a 275 mm diameter steel pipe with a 10 mm wall thickness, protected by a Model “T” Link-Seal® modular seal system. Testing was conducted in accordance with BS 476.20-1987.

The analysis in section 5.0 of this report found that the proposed system, together with the described variation, will achieve an FRL of -/120/- as shown in Table 1 – in accordance with AS 1530.4:2014.

The variations and outcome of this assessment are subject to the limitations and requirements described in sections 2.0, 3.0 and 6.0 of this report. The results of this report are valid until 31 October 2031.

Table 1 Overview of variations and assessment outcome

Variation	Test standard	Reference test	Evidence of suitability	Governing requirements	FRL
Application of BS 476.20-1987 test data to assess the Model “T” Link-Seal® modular sealing system to AS 1530.4:2014 for 120 minutes of integrity performance.	AS 1530.4:2014	719186476-MEC10-IHN	A5G3(1)(d)	S1C2(b)	-/120/-

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1.0 Introduction

This report documents the findings of the assessment undertaken to determine the fire resistance level (FRL) of a Ø275 mm steel pipe penetrating a 200 mm thick concrete wall protected with Model “T” Link-Seal® modular seal system if tested in accordance with AS 1530.4:2014 and assessed in accordance with AS 4072.1:2005.

This report may be used as evidence of suitability in accordance with the requirements of the relevant National Construction Code (NCC) to support the use of the material, product, form of construction or design as given within the scope of this assessment report. It also references test evidence for meeting deemed-to-satisfy (DTS) provisions of the NCC that apply to the assessed systems.

This assessment was carried out at the request of PROJEX GROUP PTY LTD The sponsor details are included in Table 2.

Table 2 Sponsor details

Sponsor	Address
PROJEX GROUP PTY LTD	Forum 377 New South Head Road Double Bay 2028 Australia

2.0 Framework for the assessment

2.1 Assessment approach

An assessment is a professional opinion about the expected performance of a component or element of structure subjected to a fire test.

No specific framework, methodology, standard or guidance documents exists in Australia for undertaking these assessments. We have therefore followed the 'Guide to undertaking technical assessments of the fire performance of construction products based on fire test evidence' prepared by the Passive Fire Protection Forum (PFPF) in the UK in 2021².

This guide provides a framework for undertaking 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
- + The 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 can 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.

This assessment uses established empirical methods and our experience of fire testing similar products to extend the scope of application by determining the limits for the design and performance based on the tested constructions and performances obtained. The assessment is an evaluation of the potential fire resistance performance of the elements in accordance with AS 1530.4:2014.

This assessment has been written in accordance with the general principles outlined in EN 15725:2023³ for extended application on the fire performance of construction products and building elements: Principle of EXAP standards and EXAP reports.

This assessment has been written using appropriate test evidence generated at accredited laboratories to the relevant test standard. The supporting test evidence has been deemed appropriate to support the manufacturer's stated design.

2.2 Compliance with the National Construction Code

This assessment report has been prepared to meet the evidence of suitability requirements of the NCC 2025⁴ under A5G3(1)(d). It references test evidence for meeting deemed-to-satisfy (DTS) provisions of the NCC under A5G5 for fire resistance level that apply to the assessed systems based on Specifications 1 and 2 for fire resistance for building elements.

² Passive Fire Protection Forum (PFPF), 2021, Guide to undertaking technical assessments of the fire performance of construction products based on fire test evidence, Passive Fire Protection Forum (PFPF), UK.

³ European Committee for Standardization, 2023, Extended application on the fire performance of construction products and building elements: Principle of EXAP standards and EXAP reports, EN 15725:2023, European Committee for Standardization, Brussels, Belgium.

⁴ National Construction Code Volumes One and Two - Building Code of Australia 2022, Australian Building Codes Board, Australia.

The proposed details and systems (building elements) in this report are confirmed to be assessed, without the aid of an active fire suppression system, based on prototype tests that are equivalent to or more severe than a standard fire test as specified in section 4.4, in accordance with NCC 2025 S1C2(b). It is also confirmed that the differences between the proposed systems and details compared to the tested prototypes are considered minor in accordance with NCC 2025 S1C2(c).

This assessment report may also be used to demonstrate compliance with the requirements for evidence of suitability under the relevant sections of previous versions of the NCC.

2.3 Declaration

The 'Guide to undertaking technical assessments of the fire performance of construction products based on fire test evidence' prepared by the PFPF in the UK requires a declaration from the client. By accepting our fee proposal on 7 September 2026, Projex Group Pty Ltd confirmed that:

- + To their knowledge, the variations to the component or element of structure, which is the subject of this assessment, have 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.

3.0 Requirements and limitations of this assessment

- + The scope of this report is limited to an assessment of the variations to the tested systems described in section 4.3.
- + This report details the methods of construction, test conditions and assessed results in accordance with AS 1530.4:2014.
- + This report relies on test evidence and applies only to the specific specimens tested. It does not verify ongoing compliance or the performance of future production batches.
- + This assessment report has been prepared based on the fire resistance performance and condition of the systems at the time they were tested. Any deterioration of fire resistance performance due to external factors including but not limited to passage of time and exposure to elements – is not considered in this report.
- + Jensen Hughes has provided this report on the fire performance of building elements in a controlled laboratory setting, strictly within the parameters allowed by the test standards and building regulations. The outcomes of this report are intended to assist in verifying the suitability of the product or system for practical use in specific applications.
- + This report is only valid for the assessed system and must not be used for any other purpose. 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 need to be done by an Accredited Testing Laboratory (ATL) that is accredited to the same nominated standards of this report.
- + This report has been prepared using information provided by others. Jensen Hughes has not verified the accuracy and/or completeness of that information and will not be responsible for any errors or omissions that may have been incorporated into this report as a result.
- + This report details the methods of construction, test conditions and assessed results that would have been expected had the specific elements of construction described herein been tested in accordance with AS 1530.4.
- + Any further variations with respect to size, constructional details, loads, stresses, edge or end conditions, other than those identified in this report, may invalidate the conclusions drawn in this report.

4.0 Description of the specimen and variations

4.1 Description of assessed system

The tested system comprised a Model “T” Link-Seal® modular seal incorporating grey silicone rubber modules, installed around a steel pipe penetration through a 200 mm thick cement block. The steel pipe measured 275 mm in diameter, with a 10 mm wall thickness and an overall length of 2000 mm. It passed through a nominal 335 mm diameter core hole, with the modular seal installed within the annular gap and positioned flush with the unexposed face of the block.

The pipe extended 500 mm beyond the exposed face of the block into the furnace. Its exposed end was closed with a welded steel plate measuring 300 mm × 300 mm × 6 mm thick. The pipe projecting from the unexposed face was supported on vertical steel stands.

Figure 1 View of Model “T” modular seal with compressed pressure plates



4.2 Referenced test data

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

Table 3 Referenced test data

Report number	Test sponsor	Test date	Testing authority
719186476-MEC10-IHN	Pipeline Seal and Insulator, Inc.	5 October 2010	TUV SUD PSB Pte Ltd

4.3 Variations to the tested system

The tested system and variations to the tested system – together with the referenced standard fire tests – are described in Table 4.

Table 4 Variation to tested system

Item	Reference test	Description	Variations
Model "T" Link-Seal® modular sealing system	719186476-MEC10-IHN	The test specimen reported in test report 719186476-MEC10-IHN comprised a 200 mm thick precast cement block wall incorporating a Ø275 mm × 10 mm thick steel pipe protected with Model "T" Link-Seal® modular seal system.	Application of BS 476.20-1987 test data to assess the Model "T" Link-Seal® modular sealing system to AS 1530.4:2014 for 120 minutes of integrity performance.

4.4 Test standard

AS 1530.4:2014 sets out procedures and methods for fire tests on building materials, components, structures, and fire-resistance tests for elements of construction. Section 10 discusses the procedures and methods for service penetrations and control joints.

4.5 Reference standard

AS 4072.1:2005 sets out the minimum requirements for the construction, installation and application of fire resistance tests to sealing systems around penetrations through separating building elements that are required to have an FRL.

5.0 Assessment

5.1 Description of variation / background

Fire resistance test 719186476-MEC10-IHN was conducted in accordance with BS 476: Part 20:1987, which differs from AS 1530.4:2014. The relevance of the test evidence to the proposed 120 minute integrity performance of the Model “T” Link-Seal® modular sealing system is discussed below.

The assessment relates to the system installed around the steel pipe in the configuration described in section 4.1. No insulation rating is sought.

5.2 Methodology

The method of assessment used is summarised in Table 5.

Table 5 Method of assessment

Assessment method	
Level of complexity	Intermediate assessment
NCC procedure for determining fire performance	Differs in only a minor degree from a tested prototype S1C2(b) and S1C2(c)
Type of assessment	Qualitative and comparative

5.3 Assessment

5.3.1 Relevance of BS 476: Part 20:1987 test data to AS 1530.4:2014

Fire resistance test 719186476-MEC10-IHN was conducted in accordance with BS 476: Part 20:1987, which differs from AS 1530.4:2014. The relevance of the test evidence to the proposed 120 minute integrity performance of the Model “T” Link-Seal® modular sealing system is discussed below.

5.3.2 Discussion

5.3.2.1 Furnace regime

The furnace temperature regime for fire resistance tests conducted in accordance with AS 1530.4:2014 follows a similar trend to BS 476.20:1987.

The parameters outlining the accuracy of control of the furnace temperature in AS 1530.4:2014 and BS 476.20:1987 are not appreciably different.

5.3.2.2 Furnace thermocouples

For furnace thermocouples specified in AS 1530.4:2014 are Type K, mineral insulated metal sheathed (MIMS), with a stainless-steel sheath having a wire of diameter of less than 1.0 mm and an overall diameter of 3 mm. The measuring junction protrudes at least 25 mm from the supporting heat resistant tube.

The furnace thermocouple types in BS 476.20:1987 shall be one of the following two types:

- + Bare nickel chromium/nickel aluminium wires – 0.75 mm to 1.5 mm in diameter – welded or crimped together at their ends and supported and insulated from each other in a twin bore porcelain insulator. However, for 25 mm approximately from the weld/crimp, the wires shall be exposed and separated from each other by at least 5 mm (to be replaced or recalibrated after six hours of usage).

- + Nickel chromium/nickel aluminium wire contained within mineral insulation in a heat resisting steel sheath of diameter 1.5 mm; the hot junctions being electrically insulated from the sheath. The thermocouple hot junction shall project 25 mm from a porcelain insulator. The assembly shall have a response time on cooling in air, not greater than 30 seconds.

The relative distance of the furnace thermocouples from the exposed face of the specimen – for both AS 1530.4:2014 and BS 476.20:1987 – is 100 mm + 10 mm.

5.3.2.3 Furnace pressure

It is a requirement of AS 1530.4:2014 that for vertical elements a furnace gauge pressure of zero (0) Pa is established at a height of 500 mm above the notional floor level. For horizontal elements a furnace pressure of 20 Pa is established at 100 mm below the underside of the concrete slab.

For BS 476.20:1987 – for vertical elements – the neutral axis is maintained at a height of 1000 mm. For horizontal elements the pressure is 20 Pa at a point 100 mm below the soffit of the floor assembly.

Therefore, based on an average pressure gradient of 8.5 Pa/m, at a particular height above the notional floor level, AS 1530.4:2014 requires the pressure to be approximately 4 Pa higher than BS 476.20:1987 for vertical elements.

5.3.2.4 Performance criteria

AS 1530.4:2014 specifies the following performance criteria for building materials and structures:

- + structural adequacy (not relevant to the referenced test).
- + integrity.
- + insulation.

5.3.2.5 Integrity

The integrity criteria differ slightly between AS 1530.4:2014 and BS 476.20:1987.

For uninsulated specimens – or for specimens that have exceeded their insulation criteria performance – the specimen shall be deemed to have failed the integrity criterion in accordance with AS 1530.4:2014 if it sustains flaming for 10 seconds, if a gap forms that allows the penetration of a 25 mm diameter gap gauge anywhere on the specimen, or if a gap forms that allows a 6 mm × 150 mm gap gauge to penetrate the specimen anywhere on the specimen.

The integrity criteria for BS 476.20:1987 are similar, except that the 150 mm by 6 mm gap criterion is not applied at the threshold of doorsets.

5.3.2.6 Insulation

The thermocouple locations for measuring insulation in AS 1530.4:2014 and BS 476.20:1987 are different. AS 1530.4:2014 specifically nominates positions for maximum temperature rise of the thermocouple, though this allows the application of a roving thermocouple anywhere on the specimen. In BS 476.20:1987, there is a requirement to measure temperatures at specified minimum number of locations, with additional thermocouples fitted at the discretion of the laboratory. Similarly, a roving thermocouple can be applied at any location.

The failure criteria for insulation in AS 1530.4:2014 and BS 476.20:1987 are not appreciably different except for the positioning of thermocouples as noted above.

5.3.3 Application of referenced test data to AS 1530.4:2014

The variations in furnace heating regimes, furnace thermocouples, and the responses of the different thermocouple types to the furnace conditions are not expected to have an overall significant effect on the outcome of the referenced fire resistance test.

Based on the above and in the absence of any foreseeable detrimental effects it is considered that the results of the referenced test can otherwise be used to assess the integrity and insulation performance in accordance with AS 1530.4:2014.

The specimen maintained integrity until the test was discontinued at 132 minutes, representing a 12-minute overrun, or 10%, beyond the proposed 120-minute integrity rating. No gaps, fissures or other openings reported during this period. This demonstrates continued integrity beyond the proposed rating period and provides an observed margin in duration under the tested conditions. When considered together with the recorded integrity observations and the comparison of furnace-pressure conditions between the two standards, this additional exposure provides further support for assessing the Model “T” Link-Seal® modular sealing system for 120 minutes of integrity performance in accordance with AS 1530.4:2014.

5.4 Assessment outcome

This assessment determines that the Model “T” Link-Seal® modular sealing system, installed in the configuration described in the referenced test report in Table 3, is capable of achieving an FRL of –/120/– in accordance with AS 1530.4:2014.

6.0 Validity

Jensen Hughes does not endorse the tested or assessed products and systems in any way. The conclusions of this assessment may be used to directly assess fire resistance, but it should be recognised that a single test method will not provide a full assessment of fire resistance 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 test data, information and experience available at the time of preparation. If contradictory evidence becomes available to the assessing authority, the assessment will be unconditionally withdrawn and the report sponsor will be notified in writing. Similarly, the assessment should be re-evaluated, if the assessed construction is subsequently tested since actual test data is deemed to take precedence.

The sponsor is responsible for formally notifying Jensen Hughes of any additional testing performed on their product/system. This obligation applies regardless of where the test was conducted, the results of the test, or whether it was initially considered part of Jensen Hughes' ongoing assessment. The primary goal of this notification is to allow Jensen Hughes to review the changes and determine whether they require re-evaluation or re-testing to determine whether the changes have affected the product's performance. It is important that the client promptly notify Jensen Hughes if any such changes are implemented.

The procedures for the conduct of tests and the assessment of test results are subject to constant review and improvement. The sponsor is therefore recommended that this report be reviewed on, or before, the stated expiry date.

This assessment represents our opinion about the performance of the proposed system that is expected to be demonstrated when subjected to test conditions in accordance with AS 1530.4:2014, based on the evidence referred to in this report.

This assessment is provided to Projex Group Pty Ltd for their own specific purposes. This report may be used as evidence of suitability in accordance with the requirements of the relevant National Construction Code. Building certifiers and other third parties must determine the suitability of the systems described in this report for a specific installation.

Appendix A Summary of supporting test data

A.1 Test report – 719186476-MEC10-IHN

Table 6 Information about test report

Item	Information about test report
Report sponsor	Pipeline Seal and Insulator, Inc., 6525 Goforth Street, Houston, TX 77021, U.S.A.
Test laboratory	TÜV SÜD PSB Pte. Ltd., No. 1 Science Park Drive, Singapore 118221. Fire test conducted at TÜV SÜD PSB fire test laboratory, No. 10 Tuas Ave 10, Singapore 639134.
Test date	The fire resistance test was done on 05 October 2010.
Test standards	The test was done in accordance with BS 476: Part 20: 1987.
Variation to test standards	None
General description of tested specimen	Steel pipe penetration assembly comprising a 275 mm diameter × 10 mm thick × 2000 mm long steel pipe penetrating a 200 mm thick precast cement block through a nominal 335 mm diameter core hole. The penetration was sealed using a Model "T" Link-Seal® modular seal system consisting of grey silicone rubber seal elements, zinc dichromate steel pressure plates, and carbon steel zinc dichromate bolts. One end of the pipe on the fire side was closed with a 300 mm × 300 mm × 6 mm welded steel end plate.
Instrumentation	Furnace temperatures measured using thermocouples arranged in accordance with BS 476: Part 20: 1987. Surface thermocouples were installed on the unexposed face of the specimen, with additional roving thermocouples available for hot spot measurements. Integrity assessment used cotton pad and gap gauge testing in accordance with BS 476: Part 20: 1987.

The test specimen achieved the following results – see Table 7.

Table 7 Results summary for this test report

Performance criteria	Integrity	Time to failure	Position of failure
Integrity	No visible integrity failures observed on the steel pipe penetration.	132 min	No integrity failure observed. Test terminated after 132 min with integrity maintained.
Insulation	At 25 minutes, the maximum temperature on the unexposed face was 187.4 °C.	24 min	Steel pipe penetration. Insulation criterion exceeded at 25 min when temperature rise reached 187.4°C

A.2 Assessment report – EWFA 28750-00

Table 8 Information about assessment report

Item	Information about test report
Report sponsor	Projex Group Pty Ltd, 2/1 Military Road, Matraville NSW 2036, Australia.
Issuing authority	Jensen Hughes, 409-411 Hammond Road, Dandenong, Victoria 3175, Australia.
Issued date	The report was issued on 3 September 2013.
Expiry date	The report expires on 30 September 2018.
Test standards	Assessment prepared with reference to AS 1530.4:2005 and AS 4072.1:2005. Supporting test data derived from testing to BS 476: Part 20:1987.

Item	Information about test report
General description of assessment	Assessment of the fire resistance performance of a Ø275 mm steel pipe penetrating a 200 mm thick concrete wall protected with a Model "T" Link-Seal® modular seal system, when evaluated in accordance with AS 1530.4:2005 and AS 4072.1:2005. The assessment is based on supporting fire test report 719186476-MEC10-IHN and concludes that the system would achieve an FRL of -/120/- for steel pipes in walls exposed from either side.

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