Regulatory Information Report

RPF24071

Fire resistance test for an air duct passing through a vertical separating element – Internal fire

Issued to:	Firestop Centre Ltd
Test method:	AS1530.4-2014
Report Date:	21/06/2024
Valid till:	09/08/2028
Test number:	PF24071

Passive Fire Inspection and Test Services Limited
1/113 Pavilion Drive, Mangere, Auckland 2022, New Zealand
www.firelab.co.nz
tests@firelab.co.nz

Table of Contents

1.1 Document revision schedule

Revision #	Date	Description
1	14/06/2024	Initial issue for Client review
2	21/06/2024	Issued

1.2 Signatories

Report	Name	Signature	Date
Prepared by:	Alex Kokorin		21/06/2024
Authorised by:	Andrew Bain (Authorized signatory)		21/06/2024

ACCREDITED
TESTING LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

2. Report Summary

An 300mm diameter circular air duct was installed, penetrating through a 64mm steel stud wall with 1 x layer of 13mm FR plasterboard on each side. The supporting construction aperture was protected using a combination of slotted steel equal angles, and FIRESTOP Ultra Acrylic Sealant. The duct was protected using 25mm thick FIRESTOP Duct Wrap-25, fixed using stainless steel cable ties and aluminium foil tape.

Test results - duct wrap protection	
Structural adequacy	**No Failure at 123 minutes**
Integrity	**No Failure at 123 minutes**
Insulation	**31 minutes**
Fire resistance level (FRL)	**120/120/30**

Test results - penetration	
Structural adequacy	**Not applicable**
Integrity	**No Failure at 123 minutes**
Insulation	**31 minutes**
Fire resistance level (FRL)	**-/60/30***

Test results – threaded rod penetration through the duct wrap	
Structural adequacy	**Not applicable**
Integrity	**No Failure at 123 minutes**
Insulation	**No Failure at 123 minutes**
Fire resistance level (FRL)	**-/120/120**

*The test was discontinued at 123 minutes, at which time the structural adequacy and integrity failure criteria had not been exceeded. AS1530.4 Clause 10.12 states that the supporting construction shall have an FRL equal to or greater than that of the proposed penetration and representative of that used in practice.

Therefore, the FRL of the tested system was reduced to match that of the supporting construction.

The conditions of the test complied with AS1530.4-2014 requirements.

There were no major observations related to the performance criteria during the test.

3. General Information

3.1 Testing Scope

Applicable Standards:

AS 1530.4-2014 Section 9 Air ducts – Internal fire

AS 1530.4-2014 Section 10 Service penetrations and control joints

Departures from Testing Method:

No departures from the testing method

Conditions of the test complied with AS1530.4-2014 requirements.

3.2 Contact Details

Accredited Testing Laboratory

Fire TS Lab - Passive Fire Inspection and Test Services Ltd

Accreditation Number - 1335

1/113 Pavilion Drive, Mangere, Auckland, 2022

New Zealand

Contact e-mail: tests@firelab.co.nz

Issued to:

Firestop Centre Ltd.

657 Great South Rd, Penrose, Auckland, 1061

New Zealand

Contact e-mail: info@firestopcentre.co.nz

3.3 Timeline

Testing date:

29/05/2024

Installation completion date:

27/05/2024

Termination of The Test:

The test was discontinued at 123 minutes.

3.4 Use of the Report

Regulatory information report was issued in addition to full test report PF24071. This provides the minimum information required for regulatory compliance.

The report is valid till 09/08/2028.

This report shall not be reproduced, except in full.

This report details the methods of construction, test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in AS 1530.4. Any significant variation with respect to size, constructional details, loads, stresses, edge or end conditions, other than that allowed under the field of direct application in the relevant test method, is not covered by this report.

Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.

The test results relate to the specimens of the product in the form in which they were tested. Differences in the composition or thickness of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product, which is supplied or used, is fully represented by the specimens, which were tested.

The specimens were supplied by the sponsor and the Laboratory was not involved in any of selection or sampling procedures.

The results of these fire tests may be used to directly assess fire hazard, but it should be recognized that a single test method will not provide a full assessment of fire hazard under all fire conditions.

4. Specimen Description

4.1 Supporting Construction

Separating element		
1.1	Item	64mm Steel Stud with one-layer of 13mm FR plasterboard each side
	Aperture	Diameter: 330mm
	Dimensions	Width / Height (W/H): 1200mm × 1200mm
		Wall Thickness (T): 90mm
		Cavity: 64mm

4.2 Specimen 1 - Duct

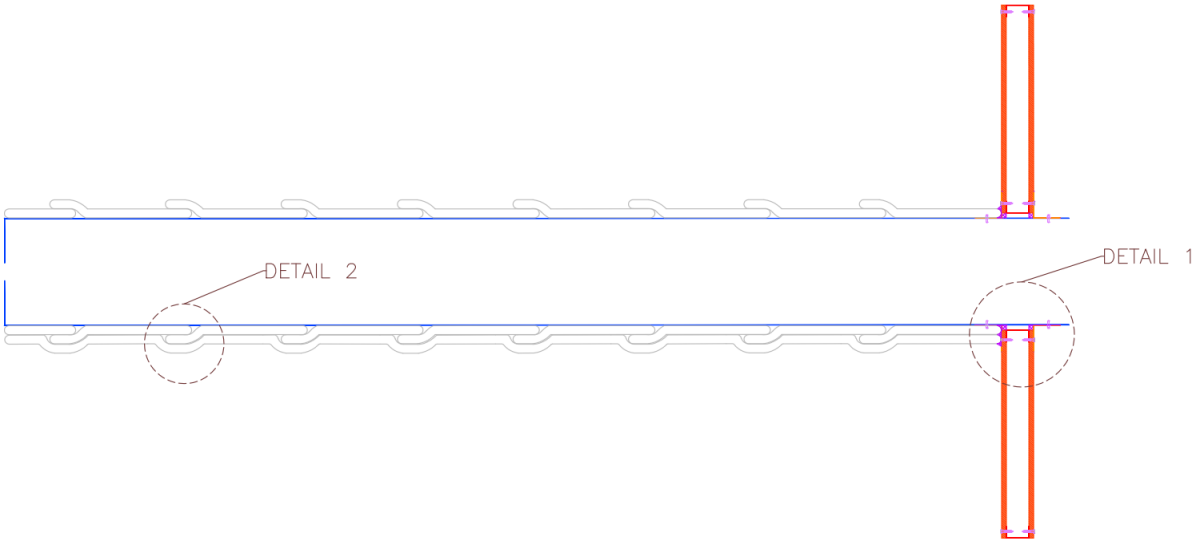

Figure 1a – Duct plain view

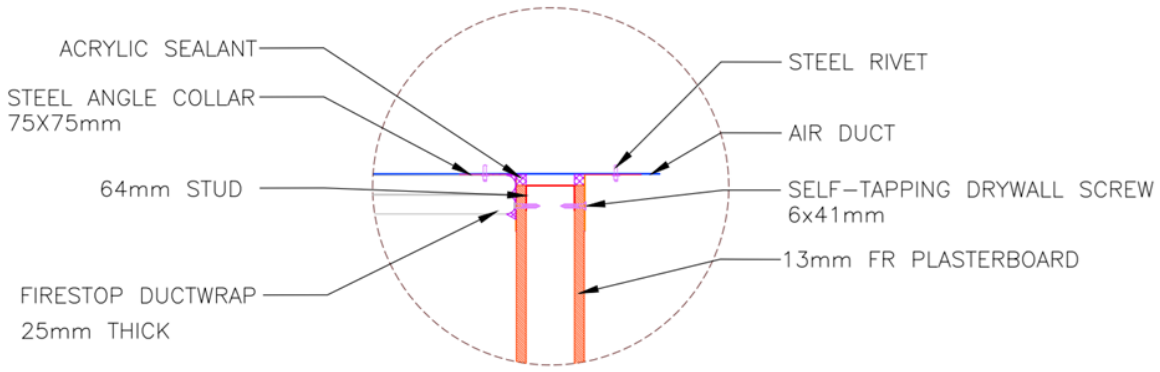

Figure 1b – Separating element detail view

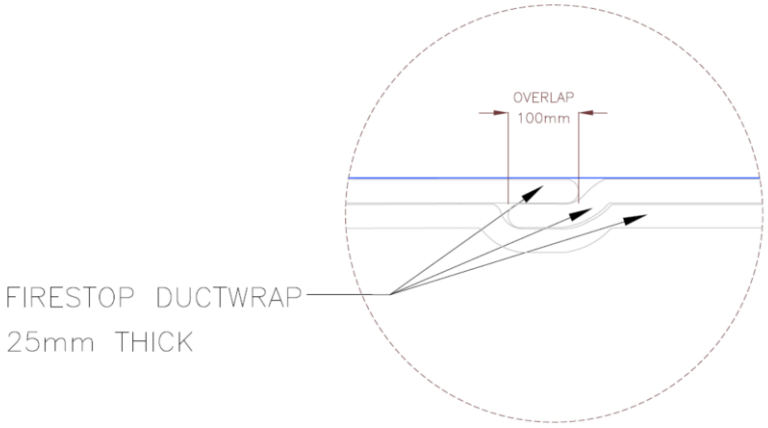

Figure 1c – Wrap overlap detail view

Specimen		
2.1	Item	Circular Air Duct
	Dimensions	Diameter (D): 300mm
	Specimen Support	Unistrut structure at 535mm and1865mm.
	Aperture Size	330mm
	Annular Spacing	10-20mm
	Installation	Asymmetrical – Protrudes 100mm from exposed face, 2810mm from unexposed face. One layer of the duct wrap was installed around the duct having nominal 100mm overlap for the longitudinal and transverse joints. At right hand side (unexposed face view) of the air duct, one 400mm wide second layer was installed on top of first layer.

		A 200mm x 200mm duct wrap patch was installed on top of the first layer at the location of the threaded rod holding the ring fixing. The end of the duct was covered using a steel cap, fixed with steel rivet. A 50mm hole is drilled at the centre of the cap. The duct wrap was fixed with stainless steel cable ties. The duct was tested open on the fire side.

Wrap		
3.1	Item	Firestop Duct Wrap – 25
	Dimensions	Width / Length (W/L): 400mm x 5000mm
	Thickness	25mm
	Density	96 kg/m^3
	Installation	Used to wrap the Air duct on unexposed face. The first wrap was butt-joined to the steel collar, then the following wraps overlapped each other by 100mm. The final wrap was trimmed flush with the end of the duct. On the right-hand side of the air duct, a full-width layer was installed on top of the first layer, extending from the SE to the end of the duct. A 200mm x 200mm duct wrap was then added on top of first layer of duct wrap, surrounding the threaded rod that secures the ring fixing.

Sealants / Coatings		
4.1	Item	FIRESTOP Ultra Acrylic Sealant
	Dimensions	310mL tube
	Installation	Installed between separating element and steel angle collar. Installed in annular gap between duct and plasterboard. Installed at wrap to collar/wall junction. Installed around the threaded rod, filling the gap between threaded rod and duct wrap.

Fixings		
5.1	Item	Slotted Steel Angle Collar
	Dimensions	W/H/T: 75mm x 75mm x 0.8mm

		Internal Diameter: 300mm
	Installation	Used to fix duct to wall. 2 x half collars were installed on each face of the separating element. The collars were fixed to the wall using GIB Grabber screws at 100mm centres. The collars were fixed to the duct using steel rivets at 100mm centres.
5.2	Item	GIB Grabber Self Tapping Screws 6 x 41mm
	Dimensions	41mm
	Installation	Used to fix steel collar to plasterboard at 100mm centres.
5.3	Item	Stainless Steel Blind Rivets
	Dimensions	10 x 5mm
	Installation	Used to fix the steel collar to duct at 100mm centres.
5.4	Item	Stainless Steel Cable Ties
	Dimensions	12mm x 3000mm (0.3mm thick)
	Installation	Used to fix the duct wrap around the air duct.
5.5	Item	Plain Aluminium Foil Tape
	Dimensions	Width: 100mm
	Installation	Used to seal all cut ends of wrap. Applied to each overlap between wrap layers.

5. Additional temperature measurements

Additional thermocouples were installed to assess the performance of the duct wrap protection at different distances from the wall.

Layers of wrap	From the board, mm	Maximum temperature rise, deg C			
		30 min	60 min	90 min	120 min
1	25	179	362	414	415
	400	134	240	261	270
	900	115	198	225	239
	1300	72	152	182	199
	1700	54	115	144	159
	2100	64	109	135	144
2	25	47	137	208	230
	400	37	143	184	194
	900	31	126	169	178
	1300	22	87	127	147
	1700	15	65	98	107
	2100	11	50	78	90

6. Permissible variations to the tested specimen

A test result obtained for the largest air duct in the range may be applied to all air ducts of the same type (including any aspect ratio), provided the maximum dimensions do not exceed those tested and that the components remain in the same orientation as that tested.