

Regulatory Information Report

RPF23110

**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:	16/04/2024
Valid till:	09/08/2028
Test number:	PF23110

Table of Contents


1.1	Document revision schedule	3
1.2	Signatories	3
2.	Report Summary.....	4
3.	General Information	5
3.1	Testing Scope	5
3.2	Contact Details.....	5
3.3	Timeline	6
3.4	Use of the Report.....	6
4.	Specimen Description.....	7
4.1	Supporting Construction.....	7
4.2	Specimen 1 - Duct.....	7
5.	Additional temperature measurements	12
6.	Permissible variations to the tested specimen	13



1.1 Document revision schedule

Revision #	Date	Description
1	22/01/2024	Initial issue for Client review
2	25/01/2024	Issued
3	16/04/2024	Angles description amended

1.2 Signatories

Report	Name	Signature	Date
Prepared by:	Alex Kokorin		16/04/2024
Authorised by:	Andrew Bain (Authorized signatory)		16/04/2024



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

2. Report Summary

An 800mm diameter circular air duct was installed, penetrating through a 76mm steel stud wall with 1 x layer of FR plasterboard on each side. The supporting construction aperture was protected using a combination of steel collars, FR board and acrylic sealant. The duct was protected using 38mm thick FIRESTOP Duct Wrap-38, fixed using foil tape and steel pins.

Test results

Structural adequacy	No Failure at 125 minutes
Integrity	No Failure at 125 minutes
Insulation	31 minutes
Fire resistance level (FRL)	60/60/30*

*The test was discontinued at 125 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:

19/12/2023

Installation completion date:

18/12/2023

Termination of The Test:

The test was discontinued at 125 minutes.

3.4 Use of the Report

Regulatory information report was issued in addition to full test report PF23110. 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	76mm Steel Stud with one-layer of 13mm FR plasterboard each side	
	Aperture	Diameter: 820mm	
	Dimensions	Width / Height (W/H):	1200mm x 1200mm
		Wall Thickness (T):	102mm
Cavity:		76mm	

4.2 Specimen 1 - Duct

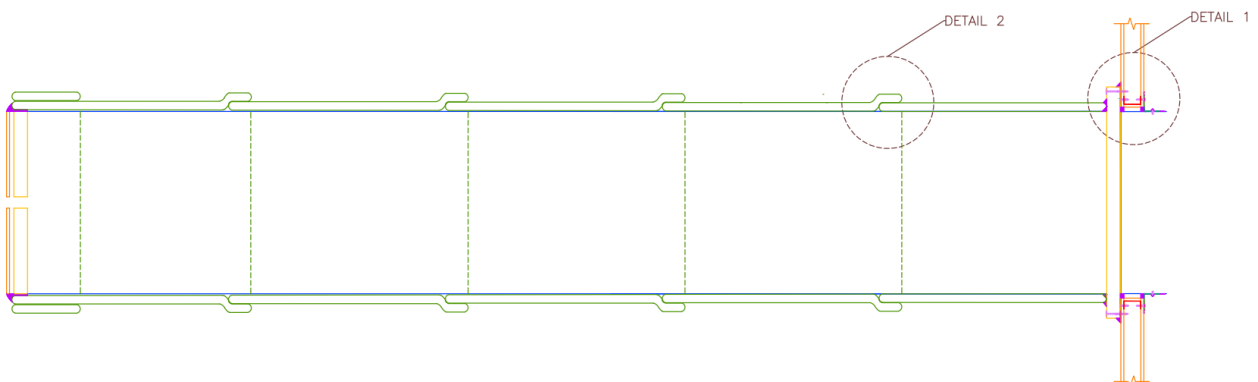


Figure 1a – Duct cross section

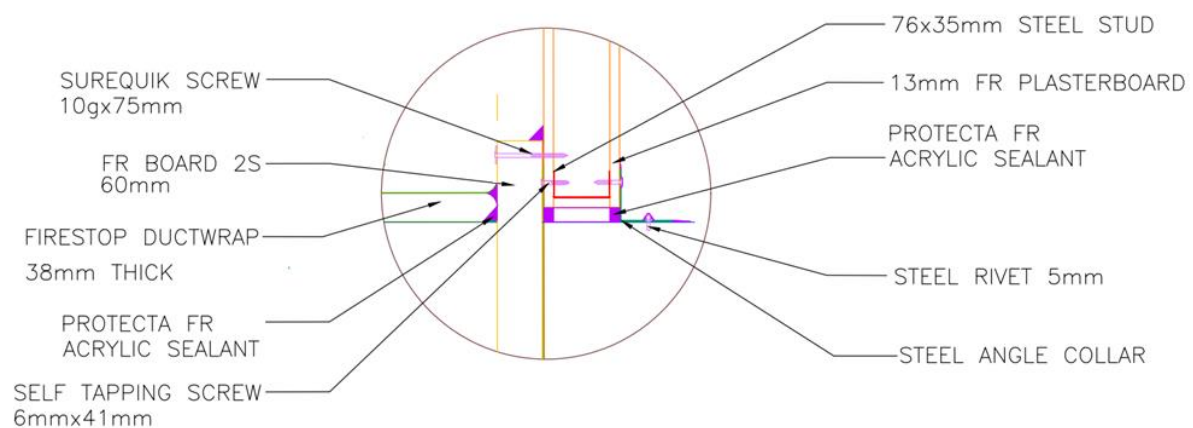


Figure 1b – Separating element detail view at 90 degrees

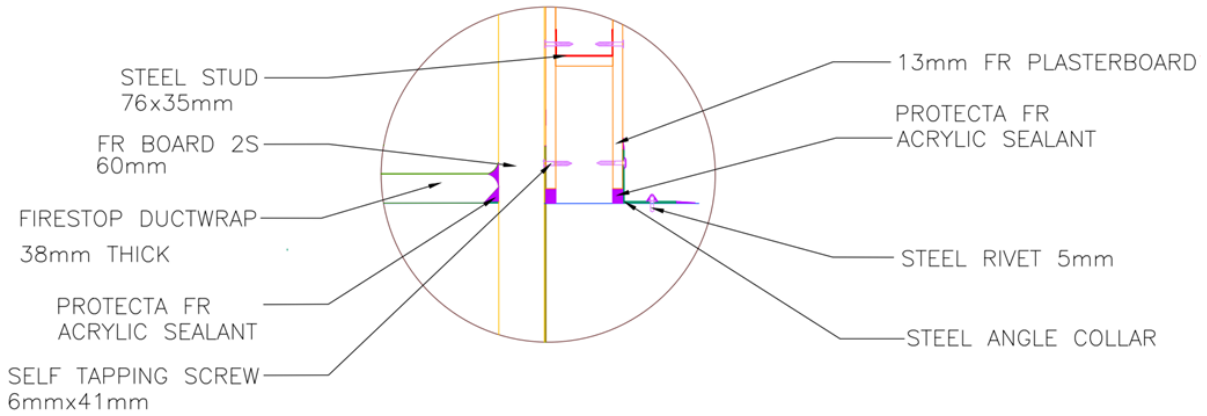


Figure 1c – Separating element detail view at 45 degrees

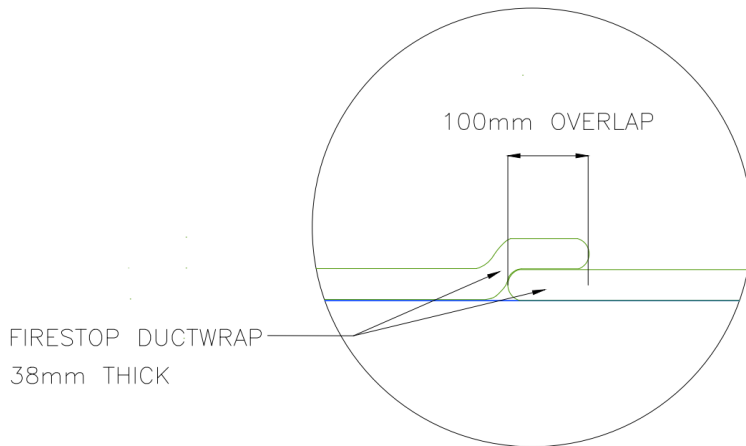


Figure 1d – Wrap overlap detail view

Specimen		
2.1	Item	Circular Air Duct (as per AS4254.2)
	Dimensions	Diameter / Thickness (D/T): 800mm x 0.76mm
	Specimen Support	Unistrut structure at 610mm, 1470mm and between 2940mm and 4930mm.
	Aperture Size	820mm
	Annular Spacing	10mm
	Installation	Asymmetrical – Protrudes 100mm from exposed face, 4798mm from unexposed face.

		<p>The annular gap between the vertical separating element and the duct was filled with Protecta Acrylic sealant to the depth of plasterboard. Slotted steel angles were installed around the duct flush with the wall and fixed to the duct and the wall. FR Board collar was installed on the top of the steel angles and fixed to the wall. All joints were sealed with bead of Acrylic sealant.</p> <p>One layer of the duct wrap was installed around the duct having nominal 100mm overlap for the longitudinal and transverse joints. Longitudinal joints were staggered by at least 200mm.</p> <p>The duct wrap was fixed with pins (refer to item 6.6 and 6.7)</p> <p>The duct was tested open on the fire side.</p>
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Wrap		
3.1	Item	FIRESTOP Duct Wrap-38 – foil faced ceramic fibre blanket
	Dimensions	Width / Length (W/L): 1000mm x 5000mm
	Thickness	38mm
	Density	96 kg/m ³
	Installation	Used to wrap the Air duct on unexposed face. The wrap was installed around the duct. The first wrap was butt-joined to the FR Board, then the following wraps overlapped each other by 100mm. The final wrap was trimmed flush with the end of the duct.
3.2	Item	FIRESTOP Duct Wrap-38 – foil faced ceramic fibre blanket
	Dimensions	Width / Length (W/L): 600mm x 5000mm
	Thickness	38mm
	Density	96 kg/m ³
	Installation	An additional length of 600mm width wrap was installed along the left side of the duct. The wrap was butt-joined to the FR Board and was installed in one length to the end of the duct with no joints.

Board		
4.1	Item	Protecta FR Board 2S
	Dimensions	Width/Height (W/H): 1020mm x 510mm
	Thickness	Thickness (T): 60mm
	Installation	Two boards were trimmed to 1020mm x 510mm, then an 800mm diameter hole was cut from the two boards. The boards were installed around the duct, fixed to the FR plasterboard using screws. The board overlapped the FR plasterboard by a minimum of 100mm.

Sealants / Coatings		
5.1	Item	Protecta FR Acrylic Sealant
	Dimensions	310mL tube
	Installation	Installed to FR Board joints. Installed between separating element and FR Boards. Installed in the annular gap between duct and plasterboard. Installed at FR Board/duct joint and FR Board/wrap joint.

Fixings		
6.1	Item	Screw 10g x 75mm
	Dimensions	75mm
	Installation	Used to fix the FR Board to Plasterboard around duct at approximately 250mm centres
6.2	Item	Stainless steel Washer
	Dimensions	OD: 32mm, ID: 6mm, Thickness 1.5mm
	Installation	Used to fix the FR Board to Plasterboard around duct at approximately 250mm centres
6.3	Item	Steel Angle Collar
	Dimensions	W/H/T: 72mm x 72mm x 0.8mm Internal Diameter: 800mm
	Installation	Used to fix duct to wall. Two half circle collars were installed on each face of the separating element. The collars were fixed to the wall at 100mm centres using

		6mm x 41mm screws. The collars were fixed to the duct at 100mm centres using steel rivets.
6.4	Item	Screws 6mm x 41mm
	Dimensions	41mm
	Installation	Used to fix steel collar to plasterboard at 100mm centres
6.5	Item	Stainless Steel Blind Rivets
	Dimensions	10 x 5mm
	Installation	Used to fix the steel collar to duct at 100mm centres
6.6	Item	1 ½ in Duct Pin
	Dimensions	Length: 38mm
	Installation	Used to fix single layers of duct wrap to the duct. Pins were attached to the duct using Capacitive Discharge Welder. Pins were located 50mm from the ends of each wrap, and 200mm centres around both the width and the length of the duct.
6.7	Item	2 ½ in Duct Pin
	Dimensions	Length: 63mm
	Installation	Used to fix double layers of duct wrap to the duct. Pins were attached to the duct using Capacitive Discharge Welder. Pins were located 50mm from the ends of each wrap, and 200mm centres around both the width and the length of the duct.
6.8	Item	Plain Aluminium Foil Tape
	Dimensions	Width: 75mm
		Thickness: 50 microns
	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	176	364	331	373
	400	176	300	304	313
	850	110	214	233	254
	1100	131	228	244	253
	1750	112	186	203	215
	1900	87	174	208	226
	2500	90	163	194	209
	3400	142	176	189	201
	4300	81	147	169	184
	4550	30	104	133	145
2	50	41	109	121*	132*
	400	37	78	108*	110*
	800	18	94	105*	115*
	1700	28	125	166	167
	3150	11	71	108	118
	4200	7	46	82	93
	4550	4	26	57	71

* - Roving thermocouple at 90 seconds of measurement

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.