

Regulatory Information Report

RPF24010-2

**Fire resistance test for an air duct passing
through a horizontal separating element –
External fire**

Issued to:	Firestop Centre Ltd
Test method:	AS1530.4-2014
Report Date:	16/04/2024
Valid till:	09/08/2028
Test number:	PF24010-2



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1.1 Document revision schedule

Revision #	Date	Description
1	21/02/2024	Initial issue for Client review
2	06/03/2024	Issued with Client comments
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

A circular 800mm air duct was installed having two 90 degrees bends, penetrating through a 150mm reinforced concrete slab. The penetration through the concrete slab was protected using a combination of the steel collar, FR board and acrylic sealant. The duct was protected using 38mm thick Firestop DuctWrap-38, fixed using steel pins.

Test results	
Structural adequacy	No Failure at 124 minutes
Integrity	No Failure at 124 minutes
Insulation	93 minutes
Fire resistance level (FRL)	120/120/90
Calculated difference in air temperature, temperature rise per meter	9.1 C°(K)/m

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 – External 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:

16/02/2024

Installation completion date:

15/02/2024

Termination of The Test:

The test was discontinued at 124 minutes.

3.4 Use of the Report

Regulatory information report was issued in addition to full test report PF24010-2. 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	Concrete slab
	Aperture	Two 860mm x 860mm
	Dimensions	Width / Height (W/H): 3590mm x 1805mm Thickness (T): 150mm

4.2 Specimen 1 - Duct

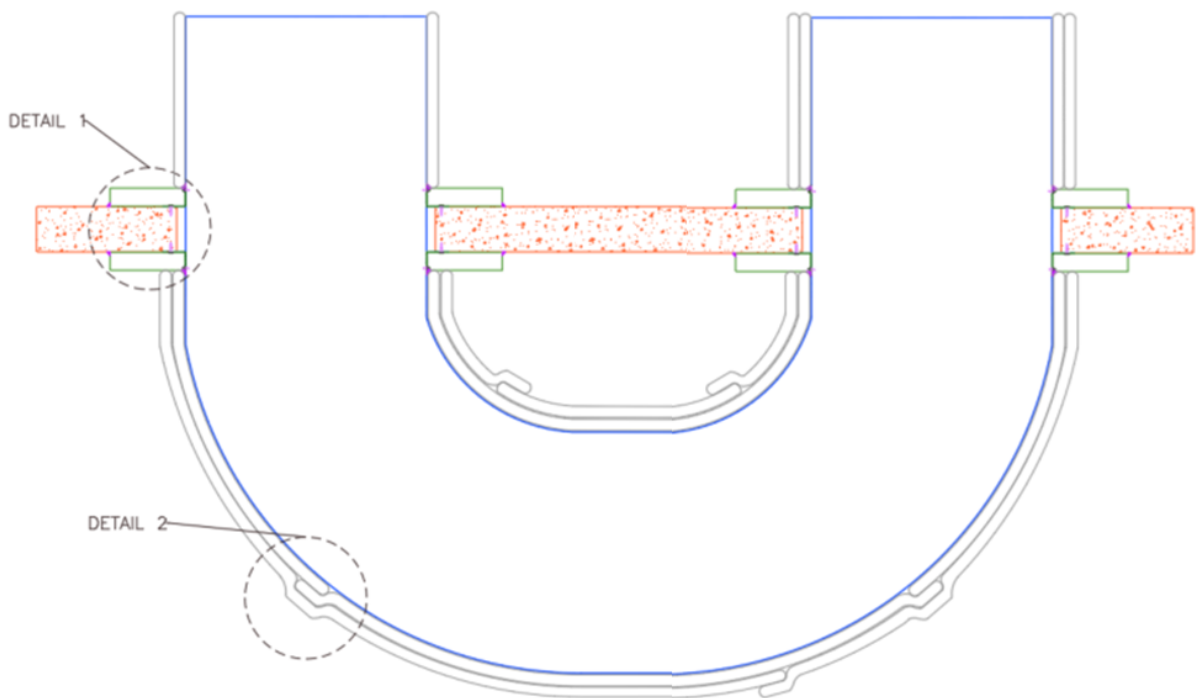


Figure 1a – Duct cross section

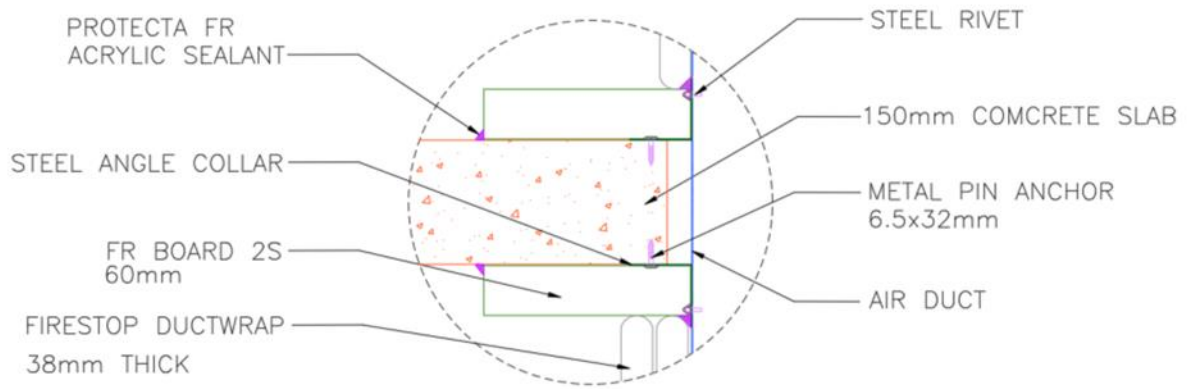


Figure 1b – Separating element detail

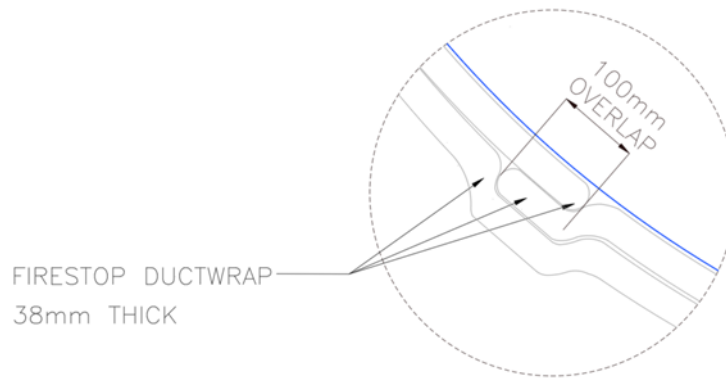


Figure 1c – Wrap overlap detail view

Specimen		
2.1	Item	Circular Air Duct (as per AS4254.2)
	Dimensions	Diameter (D/T): 800mm x 0.76mm; Central Line Length (L): 4800mm (4000mm exposed to fire)
	Specimen Support	Diameter (D/T): 800mm x 0.76mm; Central Line Length (L): 4700mm
	Aperture Size	860mm x 860mm
	Annular Spacing	Various 30-200mm
	Installation	Asymmetrical – air duct was with two 90 degrees bends. 4000mm exposed to the fire two opened ends with 500mm on the unexposed face. The annular gap between the horizontal separating element and the duct was protected with FR Board

		<p>pattresses on both faces. Steel slotted angles were installed around the duct flush with the separating element and fixed to the duct and the separating element at 100mm centres. The angle was fixed with three screws per side. FR Board collar was installed on both sides of the separating element. All joints were sealed with bead of Acrylic sealant. Unpainted edges of the FR Board were coated with Acrylic sealant.</p> <p>Two layer of duct wrap was installed around the duct (except for the air inlet side, where 1 layer was installed) 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 both sides, having 1+/- 0.1m/s air flow.</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. The wrap was installed around the duct. The wrap was butt-joined to the FR Board, then the following wraps overlapped each other by 100mm.
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	Used to wrap the Air duct. The wrap was installed around the duct. The wrap was butt-joined to the FR Board, then the following wraps overlapped each other by 100mm.

Board		
4.1	Item	Protecta FR Board 2S
	Dimensions	Width/Height (W/H): 1060mm x 530mm
	Thickness	Thickness (T): 60mm
	Installation	The boards were installed around the duct, fixed to concrete using screws with washers at 200mm centres. The board overlapped the concrete by a minimum of 100mm.

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

Fixings		
6.1	Item	Masonry Screw
	Dimensions	75mm
	Installation	Used to fix the FR Board to Plasterboard around duct at approximately 200mm centres
6.2	Item	Stainless steel Washer
	Dimensions	OD: 32mm, ID: 6mm, Thickness 1.5mm
	Installation	Used to fix the FR Board to concrete around duct at approximately 200mm centres
6.3	Item	Slotted Steel Angle Collar
	Dimensions	W/H/T: 75mm x 75mm x 0.8mm
	Installation	Used to fix duct to concrete. The collars were fixed to the concrete at 100mm centres. The collars were fixed to the duct at 100mm centres using steel rivets.
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

Thermocouples were installed to the internal face of the duct to assess the performance of the duct wrap protection.

Location	Maximum temperature rise, deg C			
	30 min	60 min	90 min	120 min
Thermocouple inside the duct, attached to the surface, duct in the furnace	37	140	174	298
External thermocouples at seal and wrap (non-fire side)	1	12	31	41

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, provided the maximum dimensions do not exceed those tested and that the components remain in the same orientation as that tested.