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ASSESSMENT REPORT

The fire resistance performance of Protecta FR Damper in accordance with AS 1530.4:2014

Client: Polyseam Ltd

Project reference number: FAS190052 Report no: FAS190052a Issuing consultant: Mahmoud Akl

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			Prepared by	Reviewed by	Approved by
	Expiry: 31/07/2024	Name	Mahmoud Akl	Omar Saad	Omar Saad
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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.

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 UK[1].

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.

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

Contents

1. Introduction

This report presents an assessment on the fire resistant properties of various sizes Protecta FR Damper if tested in accordance with section 11 of AS 1530.4:2014.

The Protecta FR Damper is defined as a non-mechanical fire barrier for ventilation ductwork to prevent the spread of fire and smoke from one fire compartment to another through the air ductwork system which may penetrate fire separating walls and floors.

The tested prototypes described in section 2 of this report, when subjected to the proposed variations described in section 3 and tested in accordance with the relevant standards described in section 4, are assessed to achieve performance as summarised in section 5.

The validity of this assessment is conditional on compliance with sections 6, 7, 8 and 9 of this report.

Summaries of the test data on which this assessment is based are provided in Appendix A. A summary of the critical issues leading to the assessment conclusions including the main points of argument is discussed in Appendix B.

2. Tested prototypes

This assessment is based on reference tests F15024, F15025 Rev B, F15026, F15027, being tests in accordance with BS EN 1366-12:2014 on various sizes of Protecta FR Dampers, mounted within a mortar seal in a rigid floor supporting construction. The tests were sponsored by Polyseam Ltd and were conducted by BM TRADA.

The assessment also references test reports F15052, F15053, F15094 Rev B, F15095 Rev B, being tests in accordance with BS EN 1366-12:2014 on various sizes of Protecta FR Dampers, mounted within a coated board seal in a flexible wall supporting construction. The tested were sponsored by Polyseam Ltd

Since the date of the test, the test sponsor manufacturing address has changed to St. Andrews Road, Huddersfield, West Yorks, HD1 6SB

Refer to Appendix A for a full summary of the test data.

3. Variation to tested prototypes

In floor systems, the proposed construction shall be as tested in the latest versions of test reports F15024, F15025 Rev B, F15026 & F15027 with consideration of following variations.

- Performance of Protecta FR Damper (ducted) if tested in accordance with AS 1530.4:2014
- Size of Protecta FR Damper to be varied provided that the maximum dimensions do not exceed those tested and that the components remain in the same orientation as those tested.
- Achieved FRL is applicable to concrete floors with minimum thickness of 150mm
- Protecta FR Dampers can be installed in concrete floors with minimum thickness of 100mm; however, FRL of the whole system will be governed by the fire resistance periods for insulation for slabs stated in AS 3600:2018[2]
- Gaps less than 10mm between damper and floor may be sealed with 15mmØ Protecta FR Putty cord to both faces. Gaps of 10-30mm between damper and floor may be sealed with 15mm deep Protecta FR Acrylic sealant to both faces, backed with 25mm stone wool (min 33 kg/m^3)

In wall systems, the proposed construction shall be as tested in the latest version of test reports F15052, F15053, F15094 Rev B & F15095 Rev B with consideration of the following variations:

- Flexible wall systems must have a minimum thickness of 100mm and consists of steel or timber studs lined on both faces with 2 layers of minimum 12.5mm thick fire rated plasterboard. Achieved FRL is applicable to walls with cavity insulation of at least 50mm thick 35 kg/m^3 and optional lining of the aperture.

[2] Concrete structures

- For timber framed walls, it is required that no part of the penetration seal is closer than 100mm to a stud, the cavity is closed between the penetration seal and the stud, and minimum 100mm of insulation is provided within the cavity between the penetration seal and the stud.
- The Protecta FR Dampers can be installed in an uninsulated wall; however, the integrity and insulation performance will be limited to 60 minutes only.
- Rigid walls must have a minimum thickness of 100mm or as otherwise specified and consist of concrete, aerated concrete or masonry with a minimum density of 650kg/m³
- Size of Protecta FR Damper to be varied provided that the maximum dimensions do not exceed those tested and that the components remain in the same orientation as those tested
- Gaps of less than10mm between damper and wall may be sealed with 15mmØ Protecta FR Putty cord to both faces.
- Gaps of 10mm-30mm between damper and wall may be sealed with 12.5mm deep Protecta FR Acrylic sealant to both faces, backed with 12.5mm stone wool (min 33kg/m³)

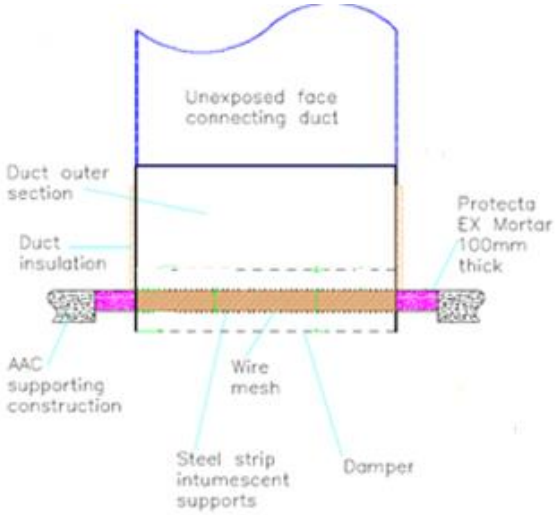

Figure 1 Typical installation of Protecta FR Damper in concrete floor

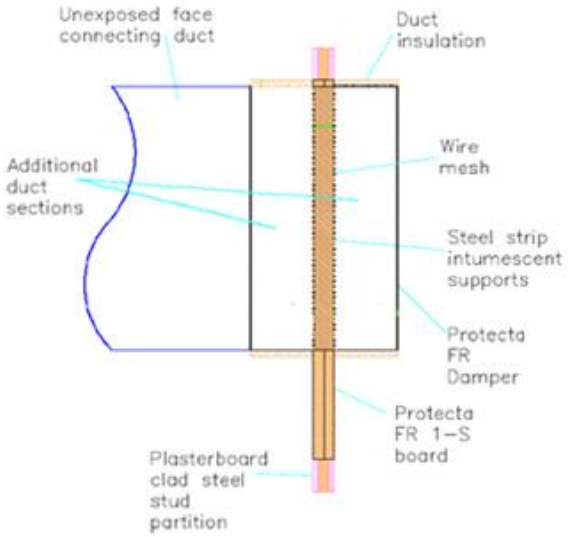

Figure 2 Typical installation of Protecta FR Damper in wall systems

4. Referenced test standard

This report is prepared with reference to the requirements of AS 1530.4:2014 section 11.

5. Formal assessment summary

On the basis of the discussion presented in this report, it is the opinion of this testing authority that if the tested prototype described in section 2 had been varied as in section 3, it will achieve the fire resistance performance as stated below if tested in accordance with the test method referenced in section 4 when subject to the requirements of section 7.

Table 1 FRL of Protecta FR Damper (ducted) in floors

Damper Size (mm)	Seal around damper	Number of Intumescent Lined fins	Damper Length (mm)	Connecting duct minimum length (mm)*	Insulation	FRL
≤100Ø	100mm thick Protecta Ex Mortar	3	200	200	Min. 30mm thick stone wool wired mat with minimum density of 80 kg/m³ min.150mm long to top side	-/180/120
≤125Ø		3				
≤160Ø		5				
≤200Ø		7				
≤250Ø		7				
≤315Ø		9				
≤400Ø		13				
≤1000×600		19	200	500	Min. 30mm thick stone wool wired mat with minimum density of 80 kg/m³Min 500mm long to the top side	-/90/60
≤500Ø		15	300	500		-/90/90
≤630Ø		19				
≤800Ø		25				
≤1000Ø		32				
≤1000×1000						

*Connecting duct is required to hold the localised insulation as tested.

Table 2 FRL of Protecta FR Dampers (ducted) in walls

Damper Size (mm)	Seal around damper	Number of Intumescent Lined fins	Damper Length (mm)	Connecting duct minimum length (mm)*	Insulation	FRL
≤100Ø	2×50mm Protecta FR Board 1-S	3	200	200	Min. 30mm thick stone wool wired mat with minimum density of 80 kg/m³, min.200mm long to both sides	-/120/120
≤125Ø		3				
≤160Ø		5				
≤200Ø		7				
≤250Ø		7				
≤315Ø		9				
≤400Ø		13				
≤500Ø		15	300	500		-/90/60
≤630Ø		19				

Damper Size (mm)	Seal around damper	Number of Intumescent Lined fins	Damper Length (mm)	Connecting duct minimum length (mm)*	Insulation	FRL
≤800Ø		25			Min. 30mm thick stone wool wired mat with minimum density of 80 kg/m³, Min 500mm long to both sides	
≤1250Ø		40				
≤1000×600		19	200			-/120/120
≤1700×1200		39	300			-/90/90

*Connecting duct is required to hold the localised insulation as tested

6. Direct field of application

The results of the referenced assessment are applicable for fire exposure to walls and floors from both sides.

7. Requirements

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 1530.4:2014.

All services shall be supported in the manner in which they are assessed as described in section 3. 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.

Dampers shall be installed to ducts on each side of the wall and break away joints shall otherwise be designed and installed in accordance with and AS 1682.1:2015[3] and AS 1682.2:2015[4].

8. Validity

This assessment report does not provide an endorsement by Warringtonfire Aus Pty Ltd of the actual products supplied.

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.

Because of 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.

The assessment can therefore only relate only to the actual prototype test specimens, testing conditions, and methodology described in the supporting data, and does not imply any performance abilities of constructions of subsequent manufacture.

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 the subject of constant review and improvement and it is recommended that this report be reviewed on or, before, the stated expiry date.

[3] Fire, smoke and air dampers Specification

[4] Fire, smoke and air dampers Installation

The information contained in this report shall not be used for the assessment of variations other than those stated in the conclusions above. The assessment is valid provided no modifications are made to the systems detailed in this report. All details of construction should be consistent with the requirements stated in the relevant test reports and all referenced documents.

9. Authority

9.1 Applicant undertakings and conditions of use

By using this report as evidence of compliance or performance, the applicant(s) confirms 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, and
- They agree to withdraw this assessment from circulation should the component or element of structure be 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, and
- 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, agree to ask the assessing authority to withdraw the assessment.

9.2 General conditions of use

Appendix A Summary of supporting data

A.1 Test report – F15024

A.1.1 Report sponsor

Polyseam Ltd, Shaw Park, Silver Street, Huddersfield, West Yorks, HD5 AF, UK (Refer to section 2 for report sponsor address)

A.1.2 Test laboratory

BM TRADA, Chiltern House, Stocking Lane, Hughenden Valley High Wycombe, HP14 4ND United Kingdom.

A.1.3 Test date

The fire resistance test was conducted on 24/04/2015.

A.1.4 Test standards

The test was conducted in accordance with BSEN 1366-12:2014 and BSEN 1363-1:2012

A.1.5 Variations to test standards

None

A.1.6 General description of tested specimen

Table 3 Summary of tested specimen

Description of tested specimen	
Supporting Construction	150mm thick reinforced aerated autoclaved concrete, 1800mm wide × 1800mm high × 150mm thick
Aperture size	1100mm wide × 1100mm deep, Surface Area: 0.126m^2
Fire Seal	Protecta EX Mortar, 100mm thick Fitted flush with unexposed face of the supporting construction
Damper	Damper Ref: 400,398mm internal × 200mm long, Damper wall: 0.7mm thick galvanised steel Surface Area: 0.126m^2
Duct Section	200mm long, fitted over the 50mm of damper wall protruding from the fire seal. A steel connecting duct of 800mm long was fixed with self-tapping screws and sealed to the specimen using Protecta FR Acrylic sealant
Insulation	150mm long, 30mm thick foiled faced Rockwool Alu Brandmatte vent insulation fitted on the unexposed side

A.1.7 Instrumentation

The test report states that the instrumentation was in accordance with BS EN 1363-1:2012 with additional special considerations given as per the requirements of BS EN 1366-12:2014

A.1.8 Test results

The test specimen achieved the following result:

Table 4 Results summary

Performance criteria	Fire Resistance performance
Specimen Closure requirement	No achieved within 2 minutes**

Performance criteria	Fire Resistance performance
50Pa pressure differential over 5 seconds, inside 2 minutes	
Integrity (E) From 5 minutes after the test start, the time at which leakage exceeded 360m³/(h m²) Cotton pad Continuous flaming Gap gauges	 183 (one hundred and eighty three) minutes* 183 (one hundred and eighty three) minutes* 183 (one hundred and eighty three) minutes* 183 (one hundred and eighty three) minutes*
Insulation (I) Average set Maximum set	 173 (one hundred and eighty three) minutes* 173 (one hundred and eighty three) minutes

Refer to section 2 for report sponsor address

A.2 Test report – F15025 Rev B

A.2.1 Report sponsor

Polyseam Ltd, Shaw Park, Silver Street, Huddersfield, West Yorks, HD5 9AF, UK (Refer to section 2 for report sponsor address)

A.2.2 Test laboratory

BM TRADA, Chiltern House, Stocking Lane, Hughenden Valley High Wycombe, HP14 4ND United Kingdom.

A.2.3 Test date

The fire resistance test was conducted on 30/04/2015.

A.2.4 Test standards

The test was conducted in accordance with BSEN 1366-12:2014 and BSEN 1363-1:2012

A.2.5 Variations to test standards

None

A.2.6 General description of tested specimen

Table 5 Summary of tested specimen

Description of tested specimen	
Supporting Construction	150mm thick reinforced aerated autoclaved concrete 1860mm wide × 1860mm high × 150mm thick
Aperture size	1100mm wide × 1100mm deep Surface Area: 0.595m²
Fire Seal	Protecta EX Mortar, 100mm thick Fitted flush with unexposed face of the supporting construction
Damper	Damper Ref: 1000/600, external 1005mm × 600mm long Internal, Damper wall: 0.7mm thick galvanised steel, Surface Area: 0.595m²
Duct Section	2000mm long,100mm O.D flexible duct section fixed with self tapping screws and sealed using Protecta FR Acrylic sealant to the damper on the unexposed face
Insulation	500mm long, 30mm thick foiled faced Rockwool Alu Brandmatte vent insulation fitted on the unexposed side

A.2.7 Instrumentation

The test report states that the instrumentation was in accordance with BS EN 1363-1:2012 with additional special considerations given as per the requirements of BS EN 1366-12:2014

A.2.8 Test results

The test specimen achieved the following result:

Table 6 Results summary

Performance criteria	Fire Resistance performance
Specimen Closure requirement 50Pa pressure differential over 5 seconds, inside 2 minutes	Yes- 1 minute 43 seconds**
Integrity (E) From 5 minutes after the test start, the time at which leakage exceeded 360m³/(h m²) Cotton pad Continuous flaming Gap gauges	 91 (ninety one) minutes* 91 (ninety one) minutes* 91 (ninety one) minutes* 91 (ninety one) minutes*
Insulation (I) Average set Maximum set	 76 (seventy six) minutes 77 (seventy seven) minutes

*No failure of the test criteria was recorded at termination of the test at 91 minutes

** Exert from EN 1366-12

A.3 Test report – F15026

A.3.1 Report sponsor

Polyseam Ltd, Shaw Park, Silver Street, Huddersfield, West Yorks, HD5 9AF, UK (Refer to section 2 for report sponsor address)

A.3.2 Test laboratory

BM TRADA, Chiltern House, Stocking Lane, Hughenden Valley High Wycombe, HP14 4ND United Kingdom

A.3.3 Test date

The fire resistance test was conducted on 21/07/2015.

A.3.4 Test standards

The test was conducted in accordance with BSEN 1366-12:2014 and BSEN 1363-1:2012

A.3.5 Variations to test standards

None

A.3.6 General description of tested specimen

Table 7 Summary of tested specimen

Description of tested specimen	
Supporting Construction	150mm thick reinforced aerated autoclaved concrete 1800mm wide × 1800mm high × 150mm thick
Aperture size	1100mm wide × 1100mm deep
Fire Seal	Protecta EX Mortar, 100mm thick Fitted flush with unexposed face of the supporting construction
Damper	Damper Ref: 1000/1000, internal 998mm × 998mm long Internal, Damper wall: 0.7mm thick galvanised steel, Surface Area: 0.996m²
Duct Section	two steel connecting ducts 750mm long and 1250 mm long fixed with self tapping screws and sealed to the specimen and each other using Protecta FR Acrylic Sealant
Insulation	500mm long, 30mm thick foiled faced Rockwool Alu Brandmatte vent insulation fitted on the unexposed side

A.3.7 Instrumentation

The test report states that the instrumentation was in accordance with BS EN 1363-1:2012 with additional special considerations given as per the requirements of BS EN 1366-12:2014

A.3.8 Test results

The test specimen achieved the following result:

Table 8 Results summary

Performance criteria	Fire Resistance performance
Specimen Closure requirement	
50Pa pressure differential over 5 seconds, inside 2 minutes	Not achieved within 2 minutes***
Integrity (E)	
From 5 minutes after the test start, the time at which leakage exceeded 360m³/ (h m²)	110 (one hundred and ten) minutes
Cotton pad	110 (one hundred and ten) minutes*
Continuous flaming	110 (one hundred and ten) minutes*
Gap gauges	110 (one hundred and ten) minutes*
Insulation (I)	
Average set	110 (one hundred and ten) minutes**
Maximum set	110 (one hundred and ten) minutes**

* No failure of the test criteria was recorded at termination of the test at 110 minutes

** Failure by virtue of integrity failure

***Exert from EN 1366-12

A.4 Test report – F15027

A.4.1 Report sponsor

Polyseam Ltd, Shaw Park, Silver Street, Huddersfield, West Yorks, HD5 9AF, UK (Refer to section 2 for report sponsor address)

A.4.2 Test laboratory

BM TRADA, Chiltern House, Stocking Lane, Hughenden Valley High Wycombe, HP14 4ND United Kingdom

A.4.3 Test date

The fire resistance test was conducted on 26/08/2015.

A.4.4 Test standards

The test was conducted in accordance with BSEN 1366-12:2014 and BSEN 1363-1:2012

A.4.5 Variations to test standards

None

A.4.6 General description of tested specimen

Table 9 Summary of tested specimen

Description of tested specimen	
Supporting Construction	150mm thick reinforced aerated autoclaved concrete 1800mm wide × 1800mm high × 150mm thick
Aperture size	1100mm wide × 1100mm deep
Fire Seal	Protecta EX Mortar, 100mm thick Fitted flush with unexposed face of the supporting construction
Damper	Damper Ref: 1000/1000, internal 998mm × 300mm long Internal, Damper wall: 0.7mm thick galvanised steel, Surface Area of damper aperture: 0.782m²
Duct Section	two steel connecting ducts 500mm long and 2000 mm long fixed with self tapping screws and sealed to the specimen and each other using Protecta FR Acrylic Sealant
Insulation	500mm long, 30mm thick foiled faced Rockwool Alu Brandmatte vent insulation fitted on the unexposed side

A.4.7 Instrumentation

The test report states that the instrumentation was in accordance with BS EN 1363-1:2012 with additional special considerations given as per the requirements of BS EN 1366-12:2014

A.4.8 Test results

The test specimen achieved the following result:

Table 10 Results summary

Performance criteria	Fire Resistance performance
Specimen Closure requirement 50Pa pressure differential over 5 seconds, inside 2 minutes	 Not achieved within 2 minutes**
Integrity (E) From 5 minutes after the test start, the time at which leakage exceeded 360m³/ (h m²) Cotton pad Continuous flaming Gap gauges	 111 (one hundred and eleven) minutes 113 (one hundred and thirteen) minutes* 113 (one hundred and thirteen) minutes* 113 (one hundred and thirteen) minutes*
Insulation (I) Average set Maximum set	 91 (ninety one) minutes 94 (ninety four) minutes

* No failure of the test criteria was recorded at termination of the test at 113 minutes

** Exert from EN1366-12

A.5 Test report – F15052

A.5.1 Report sponsor

Polyseam Ltd, Shaw Park, Silver Street, Huddersfield, West Yorks, HD5 9AF, UK (Refer to section 2 for report sponsor address)

A.5.2 Test laboratory

BM TRADA, Chiltern House, Stocking Lane, Hughenden Valley High Wycombe, HP14 4ND United Kingdom

A.5.3 Test date

The fire resistance test was conducted on 20/05/2015.

A.5.4 Test standards

The test was conducted in accordance with BSEN 1366-12:2014 and BSEN 1363-1:2012

A.5.5 Variations to test standards

None

A.5.6 General description of tested specimen

Table 11 Summary of tested specimen

Description of tested specimen	
Supporting Construction	50mm thick steel stud partition with 50mm thick 35kg/m^3 density insulation fitted in between the studs. The stud work was cladded on both faces with 2 layers of nominally 12.5mm thick Type F plasterboard using appropriate length dry wall screws to achieve a minimum of 10mm penetration into the framework the supporting construction was unrestrained at the vertical edge.
Aperture size	1500mm high × 1800mm wide Aperture was unlined and unframed but the insulation within the cavity was not cut back at all
Fire Seal	Fireseal within the aperture of the wall consisted of 2 No. layers of 50mm thick Protecta FR Board 50 1-S sealed at all edges with Protecta FR Coating and Protecta FR Acrylic Sealant. Board Joints were present in the fireseal. The exposed face joints were reversed to avoid butt joints where possible. The duct/damper was installed so to have a nominally 30mm between the top and left side of the aperture and the specimen
Damper	Damper Ref: 1250 External 1250mm × 300mm, Internal 1242mm × 300mm long Damper wall: 0.7mm thick galvanised steel, Surface Area: 1.212m^2
Duct Section	The Protecta FR Damper was 300mm long, with additional 500mm long duct sections, fixed with self tapping screws and sealed using Protecta FR Acrylic sealant to the Protecta FR Damper on each face. The additional duct was fitted on both faces, butted up to the fire seal. Therefore, 100mm of the additional duct protruded from the edge of the insulation on both faces
Insulation	500mm long, 30mm thick foiled faced Rockwool Alu Brandmatte vent insulation fitted on the unexposed side

A.5.7 Instrumentation

The test report states that the instrumentation was in accordance with BS EN 1363-1:2012 with additional special considerations given as per the requirements of BS EN 1366-12:2014

A.5.8 Test results

The test specimen achieved the following result:

Table 12 Results summary

Performance criteria	Fire Resistance performance
Specimen Closure requirement 50Pa pressure differential over 5 seconds, inside 2 minutes	 Not achieved within 2 minutes**
Integrity (E) From 5 minutes after the test start, the time at which leakage exceeded 360m³/ (h m²) Cotton pad Continuous flaming Gap gauges	 103 (one hundred and three) minutes 103 (one hundred and three) minutes* 103 (one hundred and three) minutes* 103 (one hundred and three) minutes*
Insulation (I) Average set Maximum set	 80 (eighty one) minutes 87 (eighty seven) minutes

* No failure of the test criteria was recorded at termination of the test at 103 minutes

** Exert from EN1366-12

A.6 Test report – F15053

A.6.1 Report sponsor

Polyseam Ltd, Shaw Park, Silver Street, Huddersfield, West Yorks, HD5 9AF, UK (Refer to section 2 for report sponsor address)

A.6.2 Test laboratory

BM TRADA, Chiltern House, Stocking Lane, Hughenden Valley High Wycombe, HP14 4ND United Kingdom

A.6.3 Test date

The fire resistance test was conducted on 11/06/2015.

A.6.4 Test standards

The test was conducted in accordance with BSEN 1366-12:2014 and BSEN 1363-1:2012

A.6.5 Variations to test standards

None

A.6.6 General description of tested specimen

Table 13 Summary of tested specimen

Description of tested specimen	
Supporting Construction	50mm thick steel stud partition with 50mm thick 35kg/m^3 density insulation fitted in between the studs. The stud work was cladded on both faces with 2 layers of nominally 12.5mm thick Type F plasterboard using appropriate length dry wall screws to achieve a minimum of 10mm penetration into the framework the supporting construction was unrestrained at the vertical edge.
Aperture size	1500mm high × 1800mm wide Aperture was unlined and unframed but the insulation within the cavity was not cut back at all
Fire Seal	Fireseal within the aperture of the wall consisted of 2 No. layers of 50mm thick Protecta FR Board 50 1-S sealed at all edges with Protecta FR Coating and Protecta FR Acrylic Sealant. Board Joints were present in the fireseal.The exposed face joints were reversed to avoid butt joints where possible. The duct/damper was installed so to have a nominally 30mm between the top and left side of the aperture and the specimen
Damper	Damper Ref: 1700/1500 External 1200mm × 1700mm × 300mm, Internal 1242mm × 300mm long Damper wall: 0.7mm thick galvanised steel, Surface Area: 2.036m²
Duct Section	The Protecta FR Damper was 300mm long, with additional 500mm long duct sections, fixed with self tapping screws and sealed using Protecta FR Acrylic sealant to the Protecta FR Damper on each face.
Insulation	500mm long, 30mm thick foiled faced Rockwool Alu Brandmatte vent insulation fitted on the unexposed side

A.6.7 Instrumentation

The test report states that the instrumentation was in accordance with BS EN 1363-1:2012 with additional special considerations given as per the requirements of BS EN 1366-12:2014

A.6.8 Test results

The test specimen achieved the following result:

Table 14 Results summary

Performance criteria	Fire Resistance performance
Specimen Closure requirement	
50Pa pressure differential over 5 seconds, inside 2 minutes	Not achieved within 2 minutes**
Integrity (E)	
From 5 minutes after the test start, the time at which leakage exceeded 360m³/ (h m²)	121 (one hundred twenty one) minutes*
Cotton pad	121 (one hundred twenty one) minutes*
Continuous flaming	96 (ninety six) minutes
Gap gauges	121 (one hundred twenty one) minutes*
Insulation (I)	
Average set	96 (ninety six) minutes**
Maximum set	95 (ninety five) minutes

* No failure of the test criteria was recorded at termination of the test at 121 minutes

** Failure by virtue of integrity failure

***Exert from EN1366-12

A.7 Test report – F15094 Rev B

A.7.1 Report sponsor

Polyseam Ltd, Shaw Park, Silver Street, Huddersfield, West Yorks, HD5 9AF, UK (Refer to section 2 for report sponsor address)

A.7.2 Test laboratory

BM TRADA, Chiltern House, Stocking Lane, Hughenden Valley High Wycombe, HP14 4ND United Kingdom

A.7.3 Test date

The fire resistance test was conducted on 11/06/2015.

A.7.4 Test standards

The test was conducted in accordance with BSEN 1366-12:2014 and BSEN 1363-1:2012

A.7.5 Variations to test standards

None

A.7.6 General description of tested specimen

Table 15 Summary of tested specimen

Description of tested specimen	
Supporting Construction	50mm thick steel stud partition with 50mm thick 35kg/m³ density insulation fitted in between the studs. The stud work was cladded on both faces with 2 layers of nominally 12.5mm thick Type F plasterboard using appropriate length dry wall screws to achieve a minimum of 10mm penetration into the framework the supporting construction was unrestrained at the vertical edge.
Aperture size	1500mm high × 1780mm wide Aperture was unlined and unframed but the insulation within the cavity was not cut back at all
Fire Seal	Fireseal within the aperture of the wall consisted of 2 No. layers of 50mm thick Protecta FR Board 50 1-S sealed at all edges with Protecta FR Coating and Protecta FR Acrylic Sealant. Board Joints were present in the fireseal. The exposed face joints were reversed to avoid butt joints where possible. The duct/damper was installed so to have a nominally 30mm between the top and left side of the aperture and the specimen
Damper	Damper Ref: 1000/600 External 610mm high × 1005mm wide × 300mm long, Internal 1242mm × 300mm long Damper wall: 0.7mm thick galvanised steel, Surface Area: 0.594m²
Duct Section	The Protecta FR Damper was 300mm long, with additional 500mm long duct sections, fixed with self tapping screws and sealed using Protecta FR Acrylic sealant to the Protecta FR Damper on each face.
Insulation	500mm long, 30mm thick foiled faced Rockwool Alu Brandmatte vent insulation fitted on the unexposed side

A.7.7 Instrumentation

The test report states that the instrumentation was in accordance with BS EN 1363-1:2012 with additional special considerations given as per the requirements of BS EN 1366-12:2014

A.7.8 Test results

The test specimen achieved the following result:

Table 16 Results summary

Performance criteria	Fire Resistance performance
Specimen Closure requirement 50Pa pressure differential over 5 seconds, inside 2 minutes	Not achieved within 2 minutes**
Integrity (E) From 5 minutes after the test start, the time at which leakage exceeded 360m³/ (h m²) Cotton pad Continuous flaming Gap gauges	132 (one hundred and thirty two) minutes* 132 (one hundred and thirty two) minutes* 132 (one hundred and thirty two) minutes 132 (one hundred and thirty two) minutes*
Insulation (I) Average set Maximum set	132 (one hundred and thirty two) minutes** 132 (one hundred and thirty two) minutes**

* No failure of the test criteria was recorded at termination of the test at 132 minutes

**Exert from EN1366-12

A.8 Test report – F15095 Rev B

A.8.1 Report sponsor

Polyseam Ltd, Shaw Park, Silver Street, Huddersfield, West Yorks, HD5 9AF, UK (Refer to section 2 for report sponsor address)

A.8.2 Test laboratory

BM TRADA, Chiltern House, Stocking Lane, Hughenden Valley High Wycombe, HP14 4ND United Kingdom

A.8.3 Test date

The fire resistance test was conducted on 10/09/2015.

A.8.4 Test standards

The test was conducted in accordance with BSEN 1366-12:2014 and BSEN 1363-1:2012

A.8.5 Variations to test standards

None

A.8.6 General description of tested specimen

Table 17 Summary of tested specimen

Description of tested specimen	
Supporting Construction	50mm thick steel stud partition with 50mm thick 30kg/m³ density insulation fitted in between the studs. The stud work was cladded on both faces with 2 layers of nominally 12.5mm thick Type F plasterboard using appropriate length dry wall screws to achieve a minimum of 10mm penetration into the framework the supporting construction was unrestrained at the vertical edge. The wall was nominally 100mm thick

Description of tested specimen	
Aperture size	1500mm high × 1780mm wide Aperture was unlined and unframed but the insulation within the cavity was not cut back at all
Fire Seal	Fireseal within the aperture of the wall consisted of 2 No. layers of 50mm thick Protecta FR Board 50 1-S, sealed at all edges with Protecta FR Acrylic sealant and Protecta FR Coating. Board Joints were present in the fireseal. The exposed face joints were reversed to avoid butt joints where possible. The duct/damper was installed so to have a nominally 30mm between the top and left side of the aperture and the specimen
Damper	Damper Ref: Ø400 × 500mm long, inner diameter measured Ø397mm long Damper wall: 0.7mm thick galvanised steel, Surface Area of the damper aperture: 0.123m²
Duct Section	The Protecta FR Damper was 100mm long, with additional 200mm long duct sections, fixed with self tapping screws and sealed using Protecta FR Acrylic sealant to the Protecta FR Damper on the unexposed face.
Insulation	200mm long, 30mm thick foiled faced Rockwool Alu Brandmatte vent insulation fitted on both faces, butted up to the fire seal.

A.8.7 Instrumentation

The test report states that the instrumentation was in accordance with BS EN 1363-1:2012 with additional special considerations given as per the requirements of BS EN 1366-12:2014

A.8.8 Test results

The test specimen achieved the following result:

Table 18 Results summary

Performance criteria	Fire Resistance performance
Specimen Closure requirement 50Pa pressure differential over 5 seconds, inside 2 minutes	 Not achieved within 2 minutes**
Integrity (E) From 5 minutes after the test start, the time at which leakage exceeded 360m³/ (h m²) Cotton pad Continuous flaming Gap gauges	 126 (one hundred and twenty six) minutes* 125 (one hundred and twenty five) minutes* 126 (one hundred and twenty six) minutes 126 (one hundred and twenty six) minutes*
Insulation (I) Average set Maximum set	 123 (one hundred and twenty three) minutes** 125 (one hundred and twenty five) minutes**

* No failure of the test criteria was recorded at termination of the test at 126 minutes

**Failure by virtue of integrity failure

**Exert from EN1366-12

Appendix B Assessment of specific variations

B.1 Applicability of test results to AS 1530.4:2014

B.1.1 Proposed constructions

1. It is proposed to assess the likely performance of various sizes of Protecta FR Damper (ducted) if tested in accordance with section 11 of AS 1530.4:2014
2. Reference is made to fire resistance tests F15024, F15025 Rev B, F15026 & F15027, F15052, F15053, F15094 Rev B & F15095 Rev B which were conducted in accordance with EN 1363-1:2012 and EN 1366-12:2014. These standards differ from AS 1530.4:2014
3. The effect of these differences has on the fire resistance performance of tested specimens is discussed below.

B.1.2 Discussion

Performance of Protecta FR Damper (ducted) in floors if tested in accordance with AS 1530.4:2014

Furnace Temperature Measurement

1. The 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 1.0mm and an overall diameter of 3mm. The measuring junction protrudes at least 25mm from the supporting heat resistant tube.
2. The furnace thermocouple specified in EN1363-1:2012 is made from folded steel plate that faces the furnace chamber. A thermocouple is fixed to the side of the plate facing the specimen with the thermocouple hot junction protected by a pad of insulating material.
3. The plate part is to be constructed from 150±1mm long by 100±1mm wide by 0.7±0.1mm thick nickel alloy sheet strips
4. The measuring junction is to consist of nickel chromium/nickel aluminium (Type K) wire as defined in IEC 60584-1, contained within the mineral insulation in a heat-resisting steel alloy sheath of nominal diameter 1mm, the hot junctions being electrically insulated from the sheath.
5. The thermocouple hot junction is to be fixed to the geometric centre of the plate, by a small steel strip made from the same material as the plate. The steel strip can be welded to the plate or may be screwed to it to facilitate replacement of the thermocouple. The strip should be approximately 18mm by 6mm if it is spot-welded to the plate, and nominally 25mm by 6mm if it is to be screwed to the plate. The screw is to be 2mm in diameter.
6. The assembly of plate and thermocouple should be fitted with a pad of inorganic insulation material 97±1mm by 97±1mm by 10±1mm thick with a density of 280±30kg/m^3
7. The relative location of the furnace thermocouples for the exposed face of the specimen for AS 1530.4:2014 and EN 1363.1:2012 is 100mm+10mm and 100mm +50mm respectively.
8. The furnace control thermocouples required by EN1363-1:2012 are less responsive than those specified by AS 1530.4:2014. This variation in sensitivity can produce a potentially more onerous heating condition for specimens tested to EN1363-1:2012, particularly when the furnace temperature is changing quickly in the early stages of the test.

Furnace Pressure Regime

9. It is a requirement of AS 1530.4:2014 and EN1363-1:2012 that for horizontal elements, a furnace gauge pressure of 20Pa is established at a height 100mm below the floor soffit level.

10. With respect to vertical elements, AS 1530.4:2014 states that a furnace gauge pressure of 15+3Pa is established at the centre of lowest penetration. Whereas, in EN 1363-1:2012 it is specified that the furnace shall be operated so that the neutral pressure plane (a pressure of zero) is established 500mm above notional floor level. Where a pressure greater than 20Pa is expected at the top of the vertical test specimen, the nominal pressure of the furnace shall not exceed 20Pa.

11. The pressure recorded in the referenced test reports was found to be within the tolerance of the pressure stated by AS 1530.4:2014.

Integrity performance criteria

12. In AS 1530.4:2014, the damper assembly shall be deemed to have failed the integrity

criterion of Clauses 2.13.2 when:

(a) Flaming, cotton pad and gap gauge are applied to the outside of the duct and supporting construction; or

(b) Leakage rate exceeds 360m³/(h/m²) corrected to a standard temperature and pressure (STP) being 20˚C (293K) and 101 325 Pa, at any time after the first 5 min of the test

Whereas, the integrity failure in EN 1366-12:2014, in addition to the above failing criteria in AS 1530.4:2014 states that during the first 2 min of the test closure of the non-mechanical fire barrier shall be assumed when the under pressure inside the connecting duct increases at least 50Pa over a 5 second time period. When this occurs the pressure difference across the non-mechanical fire barrier shall be adjusted to 300 Pa ±15Pa. if an abrupt pressure increase inside the connecting duct does not happen within the first 2 min of the test, the non-mechanical fire barrier shall be deemed to have not closed and the test failed.

Specimen Temperature Measurement

13. The specimen thermocouple specified in section 11 of AS 1530.4:2014 and EN 1366-12:2014 are not appreciably different.

Insulation performance

14. The general insulation criteria of AS 1530.4:2014 and EN1363.1:2012 are not appreciably different. In addition, AS 1530.4:2014 and EN 1366-12:2014 requires that the maximum temperature and average temperature are taken from the same specified thermocouples.

Combined fire and leakage test procedure

15. The test procedure in AS 1530.4:2014 and EN 1366-12:2014 for setting up a damper with a connecting duct, test conditions during the test and criteria of failure are not appreciably different

Application of test data to AS 1530.4:2014

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

17. While EN 1366-12:2014 states that if an abrupt pressure increase inside the connecting duct does not happen within the first 2 min of the test, the non-mechanical fire barrier shall be deemed to have not closed and the test failed, AS 1530.4:2014 does not include the speed of closure or abrupt pressure increase as an integrity failure, therefore, the integrity performance of the dampers with ducts will be limited to the leakage rate exceeding 360m³/(h/m²).

B.2 Performance of Protecta FR Damper (ducted) installed in floor systems in accordance with AS 1530.4:2014

B.2.1 Proposed constructions

1. The proposed construction shall be as tested in F15024, F15025 Rev B, F15026 & F15027 with consideration of following variations:

    - Size of Protecta FR Damper to be varied provided that the maximum dimensions do not exceed those tested and that the components remain in the same orientation as those tested.
    - Achieved FRL is applicable to concrete floors with minimum thickness of 150mm
    - Protecta FR Dampers can be installed in concrete floor with minimum thickness of 100mm; however, FRL of the whole system will be governed by the fire resistance periods for insulation for slabs stated in AS 3600:2018
    - Gaps less than 10mm between damper and floor may be sealed with 15mmØ Protecta FR Putty cord to both faces. Gaps of 10-30mm between damper and floor may be sealed with 15mm deep Protecta FR Acrylic sealant to both faces, backed with 25mm stone wool (min 33 kg/m^3)

B.2.2 Discussion

Size of fire damper

2. Section 11.9 in AS 1530.4:2014 states that a test result obtained for the largest fire damper in the range may be applied to all dampers of the same type (including any aspect ratio) provided the maximum dimensions do not exceed those tested and the components remain in the same orientation as that tested.

3. Reference to test report F15024, a Ø400 intumescent damper measuring Ø398mm (internal)×200mm long was fitted through 100mm Protecta Ex Mortar fire seal. In addition, the damper was fitted with 200mm long duct section and 150mm, 30mm thick foiled faced rockwool Alu Brandmatte vent insulation.

4. When tested, the specimen continued to maintain integrity performance for 183 minutes until a flow rate of 56.8m^3/hr was observed which constitutes integrity failure. With respect to the insulation performance, the specimen maintained insulation performance for 173 minutes.

5. It is proposed that the test results achieved in test report F15024 are extended to cover fire intumescent dampers of sizes 100Ø,125Ø,160Ø, 200Ø,315Ø. It is understood that the number of intumescent lined fins will be reduced proportionally to the size of the intumescent damper. It is also considered that the provided number of the intumescent lined fins is sufficient and will likely expand when exposed to fire to provide the required closure of the damper.

6. Based on the above discussion, it is reasonable to consider that intumescent dampers of sizes from 100Ø-400Ø will likely maintain an integrity performance for 180 minutes and insulation performance of 120 minutes if tested in accordance with AS 1530.4:2014.

7. It is also proposed that the test results achieved in test report F15026 are extended to cover fire intumescent dampers of sizes 500Ø, 630Ø, 800Ø. It is understood that the number of intumescent lined fins will be governed proportionally by the size of the intumescent damper and the provided number of the intumescent lined fins is sufficient and will likely expand when exposed to fire to provide the required closer.

8. Reference to test report F15027, a Ø1000 intumescent damper measuring Ø998mm(internal)×300mm long was fitted through 100mm Protecta Ex Mortar fire seal. In addition, the damper was fitted with 500mm long localised interrupted, 30mm thick foiled faced Rockwool Alu Brandmatte vent insulation fitted on the unexposed face over the additional duct, butted up to the fire seal.

9. When tested, the specimen continued to maintain integrity performance for 111 minutes where the system leakage was found to increase beyond the failure threshold.

10. With respect to the insulation performance, insulation failure was recorded at 91 minutes where the average set temperatures were found to exceed the failure criteria determined in EN 1363-1:2012 and AS 1530.4:2014

11. Based on the above discussion, it is reasonable to consider that intumescent dampers of sizes 500Ø-800Ø will likely maintain an integrity and insulation performance for 90 minutes if tested in accordance with section 11 of AS 1530.4:2014.

Performance in thinner concrete slabs

12. It is proposed that various Protecta FR Dampers are installed in a thinner concrete slab of minimum thickness of 100mm.

13. It is considered that this variation will likely introduce detrimental effect to the overall fire resistance performance of the tested system. A conservative approach has been adopted, in which the overall fire resistance performance of the system will be governed by the insulation for slab stated in AS 3600:2018.

14. The concrete structure code AS 3600:2018 states in clause 5.5.1 minimum slab thicknesses for prescribed insulation for fire resistance levels

Table 19 Maximum Fire Resistance for Given Slab Thickness

Fire Resistance periods for insulation for slabs	
Effective Slab Thickness	**Maximum Fire Resistance**
100mm	90 minutes
120mm	120 minutes
150mm	180 minutes
175mm	240 minutes

B.3 Performance of Protecta FR Damper (ducted) installed in wall systems in accordance with AS 1530.4:2014

B.3.1 Proposed constructions

1. The proposed construction shall be as tested in test reports F15052, F15053, F15094 Rev B & F15095 Rev B with consideration of the following variations:

- Flexible wall systems must have a minimum thickness of 100mm and consists of steel or timber studs lined on both faces with 2 layers of minimum12.5mm thick fire rated plasterboard. The achieved FRLs are applicable to a wall with cavity insulation of at least 50mm thick and density of 35 kg/m³. Apertures are not required to be lined.
- The Protecta FR Dampers can be installed in an uninsulated wall; however, the integrity and insulation performance will be limited to 60 minutes only.
- Rigid walls must have a minimum thickness of 100mm or as otherwise specified and consist of concrete, aerated concrete or masonry with a minimum density of 650kg/m³
- Size of Protecta FR Damper to be varied provided that the maximum dimensions do not exceed those tested and that the components remain in the same orientation as those tested.
- Gaps less than 10 between damper and wall may be sealed with 15mmØ Protecta FR Putty cord to both faces.

- Gaps of 10-30mm between damper and wall may be sealed with 12.5mm deep Protecta FR Acrylic sealant to both faces, backed with 12.5mm stone wool (min 33kg/m³)

B.3.2 Discussion

Size of fire damper

1. Section 11.9 in AS 1530.4:2014 states that a test result obtained for the largest fire damper in the range may be applied to all dampers of the same type (including any aspect ratio) provided the maximum dimensions do not exceed those tested and the components remain in the same orientation as that tested.
2. Reference to test report F15095 Rev B , a Ø400 intumescent damper measuring Ø397mm (internal)×200mm long was installed through a fire seal fitted within the aperture of a wall comprised 2 No. layers of 50mm thick Protecta FR Board 50 1-S, sealed at all edges with Protecta FR Acrylic sealant/ Protecta FR coating. In addition, the damper was connected with 800mm long connecting duct section fitted with 200mm long localised interrupted, 30mm thick Rockwool Alu Brandmatte vent insulation fitted on both faces, butted up to the fire seal.
3. When tested, the specimen continued to maintain integrity for 125 minutes where integrity failure was recorded due to ignition of a cotton pad applied at the left edge glow between the FR board and plasterboard aperture 100mm below the damper. With respect to the insulation performance, the specimen maintained insulation performance for 123 minutes.
4. It is proposed that the test results achieved in test report F15095 Rev B are extended to cover fire intumescent dampers of sizes 100Ø,125Ø,160Ø, 200Ø,315Ø. It is understood that the number of intumescent lined fins will be reduced proportionally to the size of the intumescent damper; however, it is assumed that the provided number of the intumescent lined fins is sufficient and will likely expand when exposed to fire to provide the required closure of the damper.
5. Based on the above discussion, it is reasonable to consider that intumescent dampers of sizes from 100Ø-400Ø will likely maintain an integrity performance for 120 minutes and insulation performance of 120 minutes if tested in accordance with AS 1530.4:2014.
6. It is also proposed that the test results achieved in test report F15052 are extended to cover fire intumescent dampers of sizes 500Ø, 630Ø, 800Ø. It is understood that the number of intumescent lined fins will be governed proportionally by the size of the intumescent damper and the provided number of the intumescent lined fins is sufficient and will likely expand when exposed to fire to provide the required closer.
7. Reference to test report F15052, a Ø1200 intumescent damper measuring Ø1242mm(internal)×300mm long was installed within the aperture of the wall comprised 2 No. layers of 50mm thick Protecta FR Board 50 1-S, sealed at all edges with Protecta FR Acrylic sealant and/or Protecta FR Coating. In addition, the damper was fitted with 500mm long duct sections fitted with 500mm long localised interrupted, 30mm thick foiled faced Rockwool Alu Brandmatte vent insulation fitted on the unexposed face over the additional duct, butted up to the fire seal.
8. When tested, the specimen continued to maintain integrity performance for 103 minutes where an integrity failure was deemed to occur, and the test was terminated accordingly.
9. With respect to the insulation performance, insulation failure was recorded at 80 minutes where the average set temperatures were found to exceed the failure criteria determined in EN 1363-1:2012 and AS 1530.4:2014
10. As the main variation in the proposed construction is the size of the damper, subject to the activation of the provided lined fins, it is reasonable to consider that intumescent dampers of sizes 500Ø-800Ø will likely maintain an integrity performance of 90 minutes and insulation performance for 60 minutes if tested in accordance with section 11 of AS 1530.4:2014

Applicability to Masonry or Concrete Walls

11. The scope of AS 1530.4:2014 allows the application of test results obtained in plasterboard lined partitions to be applied to solid or hollow masonry or normal weight concrete walls of the same or greater thickness