Mr Lorenzo Fazzini  
L & A Fazzini Manufacturing Pty Ltd  
23-25 Wentworth Street  
GREENACRE NSW 2190

Dear Mr Fazzini,

WALL & SLAB, FIRE STOPPING OF OPENINGS PENETRATED BY FIRE RATED DUCTS AND/OR FIRE DAMPERS - FIRE DAMPER PERFORMANCE WHEN SUPPORTED BY TRIMESH OR YOUR PROPRIETARY TESTED TRAPEZE SYSTEM AND SPRAYED WITH VERMITEX DX OR VERMIDUCT  
Assessment Number FCO–2539

INTRODUCTION

We have examined the information referenced by you on the likely performance of your sprayed Duct and Trimesh wall systems incorporating fire dampers when tested to AS 1530.4 and BS 476 Part 20 to 24. The information included:

- data from our test report numbered FSH 0649 comprising a steel frame 5200-mm long x 2400-mm wide x 3600-mm high supporting your Trimesh system with various Hydraulic & Electrical services penetrations, a 2400-mm wide x 1200-mm high fire damper, doorset, sheet metal duct and a proprietary Trimesh duct all appropriately sprayed with Vermiduct and Alltex;
- data from our test report numbered FSH 0973 (AS) & FSH 0974 (BS) comprising a Vermiduct proprietary lintel system as well as a Vermiduct fire stopping system installed to the perimeter of a duct penetrating through a masonry wall;
- data from our test report numbered FSP 1108 comprising a Trimesh fire stopping system sprayed with Vermitex DX mortar system supporting multiple horizontally fixed fire damper assemblies in a slab opening with perimeter gap clearances that differ from those in AS 1682 Appendix F.; and
- data from our test report numbered FSH 1036 comprising a vertically fixed fire damper fixed into an oversized masonry opening and with the surrounding perimeter gap sprayed with Vermitex DX mortar.

We also referenced previous Assessments requested by you in conjunction with fire protection application to Mechanical HVAC systems. These included:

- FCO 0522 – Vermitex System for Horizontal Bulkheads and Enclosures for Air ducts;
- Letter 25th July 2003 – Installation of fire stopping around penetrations; and
- FCO 1737 – Fire Performance of Trimesh System.

THIS ASSESSMENT SUPERSEDES FCO-2539 ISSUED ON 17th APRIL 2017.
We have retained this information.

You have requested that we analyse the test data from your full-scale tests in order to determine the likely performance of your Trimesh Fire stopping system as well as Trimesh and trapeze support system when incorporating a damper assembly both in the horizontal as well as vertical plane.

ANALYSIS

CSIRO report numbered FSH 0649

On 22 December 1998 this Division conducted a full-scale fire test on a structure comprising vertical and horizontal panels of your Trimesh wall systems. The panels comprised various thicknesses of your Vermiduct and Alltex spray material. One panel (Panel 3) comprising 35 mm of Alltex spray and approximately 25 mm of polyurethane incorporated 2400-mm wide x 900-mm high fire damper. The damper was installed using M10 threaded rods from the top of the wall and horizontal steel channels top and bottom of the actual damper body (refer to Dwg LAF-1298-11 dated 23/12/98). At 42 minutes expansion of the damper, which was forced downward by the stiffness of the support rods, caused cracks in the portion of the wall below the damper. Throughout the test period this expansion resulted in significant distortion of the wall around the lower portion of the damper. Insulation failure was recorded at 94 minutes on a thermocouple on the wall in the region of the cracking caused by the expansion of the damper. In the region above the damper, which was not directly affected by the damper, the insulation failure was recorded at 138 minutes.

CSIRO report numbered FSP 1108

On 28 January 2005 this Division conducted a full-scale fire test on a concrete slab comprising an opening where a pair of fire dampers were horizontally installed and supported on two sides with a Trimesh infill system whilst on the other side the dampers were positioned so the gap between the slab and damper exceeded the clearance requirements of Australian Standards 1682 Parts 1 & 2. The damper was supported by 50 mm x 50 mm perimeter angles which engaged no more than 15 mm onto the slab edge. Dampers were Bullocks models 5650 S and 5650 F. The system failed insulation on the damper blade at 3 minutes but did not fail integrity for the full 241 minutes duration of the test.

CSIRO report numbered FSH 0973

On 10 May 2003 this Division conducted a full-scale fire test on a masonry wall comprising an opening where a fire damper was installed in a vertical position. A 330-mm gap was left between the fire damper and the concrete slab above the damper.

This gap was filled with a Vermiduct lintel system constructed from 0.8 mm galvanised sheetmetal and this was sprayed with Vermiduct to a thickness of 50 mm.

The lintel was installed using M10 masonry anchors (two on each side) into angle cleats protruding from the lintel body. Integrity failure was recorded at 172 minutes and Insulation failure was recorded at 234 minutes on a thermocouple on the lintel.

CSIRO report numbered FSP 1036

On 28 February 2004 this Division conducted a full-scale fire test on a masonry wall comprising an opening where a fire damper was installed in a vertical position. The damper was bearing on two small masonry blocks with a 220-mm gap left on its perimeter. Twisted sections of Galvanised mesh were used to fill the gap and subsequently Vermiduct was spray applied into the void. The system failed insulation on the damper blade at 4 minutes but no integrity failure was recorded for the full 240-minute duration of the test.
CONCLUSION/OPINION

Based on the experimental data and specimen performances that model the installation methods of the various systems under consideration it is the opinion of this Division that the installation of fire rated ducts as well as approved fire dampers, including packing material, into oversized openings in masonry walls, lightweight masonry wall or plasterboard lined framed walls may be subsequently smoke sealed and/or fire stopped by the installation of:

a) your Vermiduct Lintel system shown in Annexure A, Figure 9 with fixing details and opening modified as shown in Annexure A, Figures 7 and 8; or

b) your Trimesh fire stopping system constructed as a stand-alone wall/floor fire stopping system as detailed in Certificates of Test numbered 1532, 1841, 1842 and 1843;

would be capable of achieving fire-resistance levels (FRL) of up to -/240/240 when sprayed to the require thickness as referred to in FCO-2247 for the purpose of meeting the requirements of AS1668.1-2015 Section 3 and in particular Clause 3.4.

In addition the above construction would be capable of achieving an integrity and insulation of 240 minutes in accordance with BS476 Part 24 when sprayed to the required thickness as referred to in FCO-2233 for the purpose of meeting the requirements of BS 5588 Part 9 in particular for applications described in BS 5588 Part 9, Figures 1 and 2.

Furthermore and based on the information detailed above it is the opinion of this Division that the installation of approved fire dampers with perimeter packing material when supported by your trapeze hanger system (Annexure A, Figure 10 drawing numbered LAF-1298-11) in combination with:

a) your Trimesh enclosure system constructed as a stand-alone wall/floor fire stopping, fan enclosure, bulkhead or plenum system;

b) your fire rated Vermiduct sprayed over ducts up to 4800-mm x 3600-mm which have multiple fire dampers installed (e.g. Smoke Extraction system) along the duct or where a single fire damper is used to terminate the duct;

c) with hanging rod supports left uncoated and exposed to fire;

would be capable of achieving fire-resistance levels up to 240/240/- when sprayed to the require thickness as referred to in FCO-2247 for the purpose of meeting the requirements of AS1668.1-2015 Section 3 and in particular Clause 3.4.

In addition the above construction would be capable of achieving an integrity and insulation of 240 minutes in accordance with BS476 Part 24 when sprayed to the required thickness as referred to in FCO-2233 for the purpose of meeting the requirements of BS 5588 Part 9 in particular for applications described in BS 5588 Part 9, Figures 3 and 4.

provided that:

i. in case of 2 hour Fire Resistance Levels, the hanging rods anchor penetrating into concrete soffit minimum 40 mm with tensile stress not exceeding 10 N/mm² on the hanging rod;

ii. in case of 4 hour Fire Resistance Levels, the hanging rods anchor penetrating into concrete soffit minimum 60 mm with tensile stress not exceeding 6 N/mm² on the hanging rod;

iii. the top locating channel shall always be constructed using 2-mm thick sheet metal and folded to the appropriate dimensions to engage into the fire damper retaining angles;

iv. the bottom trapeze section shall be equal or greater than PFC 100 for dampers up to 2400-mm wide as tested and for larger fire dampers the channel’s stress limit set not to exceed 20 N/mm²; and

v. installation being in accordance with your tested prototype as detailed in Annexure A, Figure 10 drawing numbered LAF-1298-11.
TERM OF VALIDITY

This assessment report will lapse on 31 May 2023. Should you wish us to re-examine this assessment with a view to the possible extension of its term of validity, would you please apply to us three to four months before the date of expiry. This Division reserves the right at any time to amend or withdraw this report in the light of new knowledge.

Yours faithfully

Brett Roddy
Team Leader, Fire Testing and Assessment
ANNEXURE A - Installation Photos and Details

1 Horizontal Fire Damper assembly before filling

2 Fire Damper & Vermitex DX during Fire Test
3 Fire Damper in Wall Assembly before spraying

4 Fire Damper during Wall Fire Test
5 Fire Damper Trapeze using double hanger

6 Fire Damper top and bottom Angle supports
7 Fire Damper and Vermiduct Lintel component

8 Fire Damper & Lintel ready for fixing into slab (shown upside down)
10 Damper Support and Fixing Specification (LAF-1298-11)
11 Damper Support and Fixing Specification (FDR-001 rev 1)