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CSIRO

Our ref: FCO-2247

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

Dear Mr Fazzini,

VERMIDUCT PASSIVE FIRE PROTECTION SYSTEM
Assessment No. FCO-2247
Our telephone conversation of 28th February.

INTRODUCTION

We have re-examined the information referenced by you on the likely performance of your sprayed insulation system when applied to air handling ducting and subjected to AS 1530.4-1997. The information included

- Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-1990, Fire-resistance tests of elements of building construction;
- British Standard 476, Fire tests on building materials and structures, Part 20:1987, Method for the determination of the fire resistance of elements of construction (general principles):
- British Standard 476, Fire tests on building materials and structures, Part 24:1987, Method for the determination of the fire resistance of ventilation ducts;
- CSIRO Letters of Assessment numbered FCO-1468 and FCO-1096;
- CSIRO Sponsored Investigation test reports numbered FSH 0236, FSH 0230, FSH 0092, FSH 0540, FSH 0649, FSH 0972 and FSH 1042 on air-handling ducts tested to AS 1350.4; and
- CSIRO Sponsored Investigation test report numbered FSH 0970 on air-handling ducts tested to BS 476:24-1987.

We have retained this information.

You have requested an assessment as to the performance of your tested duct systems for application in accordance with AS 1530.4-1997 based on tests conducted in accordance with AS 1530.4 and those conducted in accordance with BS476, Part 24.

ANALYSIS

***CSIRO Sponsored Investigation report numbered FSH 0540***

On 28 January 1998 this Division conducted a full-scale fire-resistance test on duct systems in accordance with AS 1530.4-1997 The specimen comprised six ducts fabricated from galvanised sheet steel 0.8-mm thick and protected with Vermiduct sprayed insulation reinforced with square steel mesh and two steel ducts protected with Vermiduct sprayed insulation without the aid of mechanical reinforcement.

Duct V1 was 2300 mm long and was fixed vertically into a 1650 mm x 650 mm opening in the 200-mm thick Hebel slab. The duct projected 100-mm into the furnace chamber and 2000-mm above the Hebel panel. The duct was fixed to the slab with 8-mm masonry anchors through 1.6-mm thick steel angles which were in turn fixed to the ducts with self tapping screws at 300-mm centres as shown in drawings numbered 0197-003 and 0197-004. The duct incorporated slip on propriety flange (SPF) joints and specifically TDF joints, had 10-mm thick polystyrene sheeting adhered to its perimeter by means of self adhesive double-sided tape, as well as 25 mm x 25 mm x 1 mm square mesh wrapped to its perimeter.

The duct was protected on the outside with Vermiduct sprayed insulation and was exposed to the fire from the inside. The average sprayed thickness of Vermiduct on the duct (including polystyrene sheeting) ranged from 50 mm to 65 mm with an average of 58.6 mm.

Duct V2 was of similar construction to Duct V1 except for the following differences. Duct V2 incorporated Integrated Machine Rolled Flange (IMRF) joints and specifically 25-mm MEZ joints.

The duct was protected on the outside with Vermiduct sprayed insulation and was exposed to the fire from the inside. The average sprayed thickness of Vermiduct on 50 mm. The duct was clad with 0.55-mm thick galvanised steel sheeting, which was fixed to the duct with self tapping hex screws at 200-mm centres.

Duct H1 was 2350-mm long and was fixed horizontally into a 1650-mm wide x 650-mm high opening in a 230-mm thick brick wall with 100 mm of ductwork projecting into the furnace chamber and 2250 mm outside the furnace. The duct was fixed to the wall with 8-mm masonry anchors through 1.6-mm thick steel angles which were in turn fixed to the ducts with self tapping screws at 300-mm centres as shown in drawings numbered 0197-001, 0197-002 and 0197-003. The duct had appended, at the end of the horizontal run, a vertical riser duct, this portion of the duct was not sprayed as shown on drawing numbered 0197-003. The duct incorporated slip on propriety flange (SPF) joints and specifically 25-mm MEZ joints, had 25 mm x 25 mm x 1 mm square mesh wrapped to its perimeter tensioned by means of plastic inserts. The duct was supported by trapeze hangers with 8-mm diameter threaded rods and 40 mm x 40 mm x 5 mm steel angle, and incorporated one access panel measuring 600 mm x 600 mm.

The duct was protected on the outside with Vermiduct sprayed insulation and was exposed to the fire from the inside. The average sprayed thickness of Vermiduct on the duct ranged from 45 mm to 62 mm with an average of 53.9 mm.

Duct H2 was of similar construction to Duct H1 except the following differences. The duct had 10-mm thick polystyrene sheeting adhered to its perimeter by means of self adhesive double-sided tape, as well as 25 mm x 25 mm x 1 mm square mesh wrapped to its perimeter and fixed with self tapping screws.

The duct was protected on the outside with Vermiduct sprayed insulation and was exposed to the fire from the inside. The average sprayed thickness of Vermiduct on the duct (including polystyrene sheeting) ranged from 52 mm to 67 mm with an average of 61.2 mm.

Duct H3 was 5220-mm long and was fixed horizontally at both ends into 1650-mm wide x 650-mm high openings in a 230-mm thick brick wall with 100 mm of ductwork projecting outside the furnace on each end.

The duct was fixed to the wall with 6 mm masonry anchors through 1.6-mm thick steel angles which were in turn fixed to the ducts with self tapping screws at 300-mm centres as shown in drawings numbered 0197-001and 0197-004. The duct incorporated Drive Slip (DS) joints, one access panel measuring 600 mm x 600 mm, and was supported by trapeze hangers with 10-mm diameter threaded rods and 40 mm x 40 mm x 5 mm steel angle.

The duct was protected on the outside with Vermiduct sprayed insulation sprayed directly to contour without any mechanical reinforcement and was exposed to the fire from the outside. The average sprayed thickness of Vermiduct on the duct ranged from 35 mm to 49 mm with an average of 42.5 mm.

Duct H4 was of similar construction to Duct H3 except the following differences. Duct H4 had 25 mm x 25 mm x 1 mm square mesh wrapped to its perimeter and tensioned by means of plastic inserts.

The duct was protected on the outside with Vermiduct sprayed insulation and was exposed to the fire from the outside. The average sprayed thickness of Vermiduct on the duct ranged from 35 mm to 59 mm with an average of 48.5 mm.

A full description of the test specimen and the test results are detailed in CSIRO Sponsored investigation report numbered **FSH 0540**.

***CSIRO Sponsored Investigation report numbered FSH 0649***

On 22 December 1998 a full-scale test was conducted on a duct that was compositely built using a 1000 mm high x 1000 mm wide x 2600 mm long x 0.8 mm thick sheet metal duct on the northern half. The southern half was Trimesh R100 panels which were 30 mm thick with no core with a layer of aluminium foil fixed to its inner surface with 5 mm aluminium speed clips at 300-400 mm centres. Internal clearance dimensions of the Trimesh duct were 1000 mm high x 1000 mm wide x 2600 mm long. The overall thickness of both sections was 40 mm when sprayed with Vermiduct. The duct was suspended from three sets of trapeze hangers at nominal 2000 mm centres. The trapeze rods were fire rated with Vermibloc covers.

The two duct sections were aligned together with four 200 mm long 75 mm x 75 mm x 1.2 mm thick L angles set into the corners of the sheet metal duct with 100 mm protruding into the Trimesh section. The Trimesh panels then located over 30 mm x 30 mm x 30 mm x 0.55 mm thick C section fixed to the flange of the steel duct and were fixed to the C channel with 12-14 x 75 mm long Tek screws. Steel plates 75 mm x 75 mm x 1.2 mm thick were used in conjunction with the screws as washers.

A nominally 600 mm x 600 mm access panel was let into the eastern face of the Trimesh duct. The panel was 55 mm thick.

The composite specimen maintained integrity for 205 minutes and insulation for 151 minutes.

A full description of the test specimen and the test results are detailed in CSIRO Sponsored investigation report numbered **FSH 0649**.

***CSIRO Sponsored Investigation report numbered FSH 0972***

Subsequent to these, on 10 May 2003 this Division conducted a full-scale fire-resistance test in accordance with BS 476 Part 24 on three duct systems. The ducts were also instrumented in accordance with AS 1530.4-1997.

The three ducts consisted of two horizontal ducts, Duct H1-B was subjected to internal fire exposure and H2-A and V1-C were subjected to external fire exposure.

The ducts were constructed from nominal 0.8-mm thick galvanized steel sheeting with all longitudinal seams of the Pittsburgh lock type. The transverse joint consisted of Integrated Machine Rolled Flange (IMRF), or 38-mm TDF. The IMRF joints were sealed with closed cell fire retarded foam tape. Each duct section was of variable length and nominally 1000-mm wide x 250-mm deep.

Duct V1 consisted of a nominal 4500-mm high duct with nominally 2000-mm above the furnace roof. The hole in the roof was nominally 1050-mm wide x 300-mm deep and did not have any packing except for the Vermiduct® spray.

The duct was secured to the furnace roof, above and below, with nominal angles 75 mm x 75 mm x 1.6-mm thick along all sides. The angle was secured to the roof with 12 masonry anchors and to the duct with self tapping screws.

Duct H1-B was nominally 6340-mm long and installed horizontally into a 1050-mm wide x 800-mm high opening in a brickwork wall. The length of duct inside the furnace was nominally 3610 mm and outside the furnace was nominally 2500 mm. The end of the duct was then connected into a transition piece which then fed into an exhaust fan. The flow rate through the duct was set to 3 m/s before the start of the test. Inside the furnace the duct had an opening in accordance with BS476:24 for internal exposure for type B ducts.

The duct was supported by trapeze hangers with 8-mm diameter threaded rods and 40 mm x 40 mm x 5 mm angles. The duct also had two access panels measuring nominally 198-mm x 332-mm, one inside the furnace the other outside the furnace

Duct H2-A was of similar construction to Duct H1-B except it had a T-Junction and a 90° bend as shown in drawing HA-1073-1 and was closed to the furnace. Before the start of the test the pressure was set inside the duct to minus 300 Pa below laboratory pressure.

The Vermiduct® Fire Spray material was then applied as per the manufactures instructions in layers up to 20-mm thick until the required thickness was achieved. The applied density of the Vermiduct® was nominally 293kg/$m^3$. The ducts were sprayed at the following thickness:

- Duct V1-C spayed to 30-mm thickness
- Duct H1-B sprayed to 50-mm thickness
- Duct H2-A sprayed to 60-mm thickness.

The spray was applied so that the joints were not visible i.e. the thickness over the joints was of reduced thickness.

A full description of the test specimen and the test results are detailed in CSIRO Sponsored investigation report numbered **FSH 0972**.

***CSIRO Sponsored Investigation report numbered FSH 1042***

Subsequent to this, on 28 March 2004 this Division conducted a full-scale fire-resistance test in accordance with AS 1530.4-1997.

Duct A subjected to external fire exposure and Duct B was subjected to internal fire exposure.

The ducts were constructed from nominal 0.8-mm thick galvanized steel sheeting with all longitudinal seams of the Pittsburgh lock type. The transverse joint consisted of Integrated Machine Rolled Flange (IMRF), or 38-mm TDF. The IMRF joints were sealed with closed cell fire retarded foam tape. Each duct section was of variable length and nominally 1000-mm wide x 250-mm deep.

Duct B was nominally 6340-mm long and installed horizontally into a 1050-mm wide x 300-mm high opening in a brickwork wall. The length of duct inside the furnace was nominally 3610 mm and outside the furnace was nominally 2500 mm. The end of the duct was then connected into a transition piece which then fed into an exhaust fan. The flow rate through the duct was set to 3 m/s before the start of the test. Inside the furnace the duct had an opening in accordance with BS476:24 for internal exposure for type B ducts.

The duct was supported by trapeze hangers with 12-mm diameter threaded rods and 40 mm x 40 mm x 5 mm angles. The duct also had two access panels measuring nominally 198-mm x 332-mm, one inside the furnace the other outside the furnace

Duct A was of similar construction to Duct B except it had a T-Junction and a 90° bend and was closed to the furnace. Before the start of the test the pressure was set inside the duct to minus 300 Pa below laboratory pressure.

The Vermiduct® Fire Spray material was then applied as per the manufactures instructions in a single layer at least 20-mm thick. The applied density of the Vermiduct® was nominally 293kg/m$^3$. Duct B failed insulation over one of the support hangers due to a reduced thickness in spray in this area. If the spray had the specified minimum 20 mm thickness over the support bracket then it is considered insulation failure would not have occurred until the next temperature recorded, in excess of the test failure criteria, at 115 minutes.

A full description of the test specimen and the test results are detailed in CSIRO Sponsored investigation report numbered **FSH 1042**.

Below is a summary of these tests in table form.

**TABLE 1** Test to AS 1530:4-1990

| REPORT | DATE | DUCT | SIZE | MODE | FIRE SIDE | THICKNESS (mm) | Fire Resistance | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | With Access Panel | Without Access Panel |
| FSH 0540 | 28/01/98 | H-1 | 1600 x 600 | HORIZ | INT | 54 | 120/120/90 | 120/120/90 |
| FSH 0540 | 28/01/98 | H-2 | 1600 x 600 | HORIZ | INT | 62* | 120/120/60 | 120/120/60 |
| FSH 0540 | 28/01/98 | H-3 | 1600 x 600 | HORIZ | EXT | 43 | 120/120/60 | 120/120/60 |
| FSH 0540 | 28/01/98 | H-4 | 1600 x 600 | HORIZ | EXT | 49 | 120/120/90 | 120/120/60 |
| FSH 0540 | 28/01/98 | V-1 | 1600 x 600 | VERTI | INT | 59 | 120/120/120 | 120/120/120 |
| FSH 0540 | 28/01/98 | V-2 | 1600 x 600 | VERTI | INT | 50 | 120/120/120 | 120/120/120 |
| FSH 0649 | 22/12/98 | H | 1000 x 1000 | HORIZ | EXT | 40 | 120/120/120 | 120/120/120 |

| REPORT | DATE | DUCT | SIZE | MODE | FIRE SIDE | THICKNESS (mm) | Fire Resistance | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | With Access Panel | Without Access Panel |
| FSH 0540 | 28/01/98 | H-1 | 1600 x 600 | HORIZ | INT | 54 | 120/120/90 | 120/120/90 |
| FSH 0972 | 10/05/03 | H1-B | 1000 x 250 | HORIZ | INT | 50 | 240/240/185 | N/A |
| FSH 0972 | 10/05/03 | H2-A | 1000 x 250 | HORIZ | EXT | 60 | 145/145/16 | N/A |
| FSH 0972 | 10/05/03 | V1-C | 1000 x 250 | VERTI | INT | 30 | 240/240/240 | N/A |
| FSH 1042 | 28/03/04 | A | 1000 x 250 | HORIZ | EXT | 20 | 200/51 | N/A |
| FSH 1042 | 28/03/04 | B | 1000 x 250 | HORIZ | INT | 20 | 240/27 | N/A |

Note (*) FSH 0540: Spray Thickness incorporated a 10 mm layer of sacrificial/ material/ designed to vaporize during fire conditions.

**Table 2** Test to BS 476:24-1987

| REPORT | DATE | DUCT | SIZE | MODE | FIRE SIDE | THICKNESS (mm) | Fire resistance | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | With Access Panel | Without Access Panel |
| FSH 0970 | 10/05/03 | H1-B | 1000 x 250 | HORIZ | INT | 50 | 240/185 | N/A |
| FSH 0970 | 10/05/03 | H2-A | 1000 x 250 | HORIZ | EXT | 60 | 229/229 | N/A |
| FSH 0970 | 10/05/03 | V1-C | 1000 x 250 | VERTI | INT | 30 | 240/240 | N/A |

As can be seen from the results the structural adequacy and integrity of the systems were of little concern in the test reported in FSH 0540 and observation documented that no failure under these criteria were imminent at the time the testing was terminated. For the test reported in FSH 0972 observation made during and after the completion of the test show that the failures occurred because

(a) Insulation failure for H1-B at 185 minute occurred at a thermocouple located over the joint. As the Vermiduct material had not been profiled over the joint the thickness of the Vermiduct at this point was approximately 12 mm (38_mm TDF joints).

(b) Subsequent insulation failure occurred at 227 minutes when a roving thermocouple was positioned at a point where the insulation had cracked due to the sagging of the duct at the mid-point between supports.

(c) Insulation failure of H2-A at 16 minutes accord due to leakage through the access pane that was installed without a seal. Subsequent insulation failures occurred between 60 minutes and 192 minutes depending on proximity to the access panel. At 229 minutes the portion of the duct A inside the furnace collapsed due failure of the 8-mm thick support rods. Increasing these rods to 10 mm would increase the loadbearing capacity by 56% as well as reducing the surface areas-to-mass ratio ( a measure of the heat intake of the rod) 20%

The critical performance requirements for your spray insulation and that of any protection method attached to ducting is the ability to restrict the temperature rise within the duct. This performance is a factor of the thermal conductivity of the protection material, the thickness of the protection material, the ability of the protection material to remain in place (called stickability) and the severity of the fire exposure.

For the test reported in FSH 1042 observations made after the completion of the test showed that the thickness of the spray at the point of insulation failure of Duct B was due to a reduced thickness of spray over one of the support angles in the underside of the duct. If the spray had been the specified thickness then it is considered that the duct would have in fact failed insulation, at the next temperature recorded in excess of the test failure criteria which was, at 115 minutes. Based on previous test evidence if the thickness of the spray is increased to at least 30 mm where the duct exits both sides of the wall it is considered that the insulation failure would have occurred at the thermocouples positioned further away from the wall. The next insulation failures occurred at 151 minutes.

CONCLUSION/ASSESSMENT

Based on the test data and the factors related to the construction detailed above, it is the assessment of this Division that the Vermiduct systems as detailed in your specification listed above and to be reported in our report numbered FSH 0540, FSH 0972 and FSH 1042 would be capable of the following fire-resistance levels if tested in accordance with AS 1530.4-1997.

Table 3

| Maximum duct Dimension | ORIENTATION | FIRE SIDE | FRL Integrity / Thick | | FRL Integrity & Insulation / Thick | |
|---|---|---|---|---|---|---|
| (mm) | | | minutes | mm | minutes | mm |
| 1600 x 1600 | Horizontal / Vertical | Internal | 60/60/- | 5 | 60/60/60 | 12 |
| 1600 x 1600 | Horizontal / Vertical | Internal | 90/90/- | 8 | 90/90/90 | 16 |
| 1600 x 1600 | Horizontal / Vertical | Internal | 120/120/- | 10 | 120/120/120 | 20 |
| 1600 x 1600 | Horizontal / Vertical | Internal | 180/180/- | 15 | 180/180/180 | 45 |
| 1600 x 1600 | Horizontal / Vertical | Internal | 240/240/- | 25 | 240/240/240 | 55 |
| 1600 x 1600 | Horizontal / Vertical | Internal / External | 60/60/- | 5 | 60/60/60 | 25 |
| 1600 x 1600 | Horizontal / Vertical | Internal / External | 90/90/- | 8 | 90/90/90 | 30 |
| 1600 x 1600 | Horizontal / Vertical | Internal / External | 120/120/- | 10 | 120/120/120 | 33 |
| 1600 x 1600 | Horizontal / Vertical | Internal / External | 180/180/- | 15 | 180/180/180 | 55 |
| 1600 x 1600 | Horizontal / Vertical | Internal / External | 240/240/- | 25 | 240/240/240 | 75 |

i. Ducts not to exceed the dimensions of 1600 x 1600 mm;
ii. Ductwork to be manufactured in accordance with AS 4254 or BS EN 1505:1998 using minimum 0.8 mm galvanised sheet metal;
iii. Trapeze centres at maximum 1520 mm (Refer FCO 2542) comprising 50 x 50 x 6.5 mm angle & hanging rods ≥ 10 mm diameter;
iv. Conforming ductwork construction Joints: Drive Slip @ 2.4m max.; Mez, TDF or Angle Joints @ 1.52m max centres;
v. Manufacturer supplied Access Panel equal to IGNISEAL with rebated edges and non-combustible Fire seal;
vi. Mandatory tested reinforcement to be equal to manufacturer supplied QUIKMESH which shall be secured with LAF adhesive pins;
vii. In all cases, except where Insulation criteria is waived, the spray thickness for 150 mm distance each side of a penetration to be ≥ 30mm;
viii. Pins of appropriate length shall be positioned on flanges and support angles at the corners to ensure minimum thickness is maintained;

Table 4

| Maximum duct Dimension | ORIENTATION | FIRE SIDE | FRL Integrity / Thick | | FRL Integrity & Insulation / Thick | |
|---|---|---|---|---|---|---|
| (mm) | | | minutes | mm | minutes | mm |
| 2400 x 2400 | Horizontal / Vertical | Internal | 60/60/- | 8 | 60/60/60 | 16 |
| 2400 x 2400 | Horizontal / Vertical | Internal | 90/90/- | 10 | 90/90/90 | 20 |
| 2400 x 2400 | Horizontal / Vertical | Internal | 120/120/- | 13 | 120/120/120 | 25 |
| 2400 x 2400 | Horizontal / Vertical | Internal | 180/180/- | 20 | 180/180/180 | 50 |
| 2400 x 2400 | Horizontal / Vertical | Internal | 240/240/- | 30 | 240/240/240 | 55 |
| 2400 x 2400 | Horizontal / Vertical | Internal / External | 60/60/- | 8 | 60/60/60 | 30 |
| 2400 x 2400 | Horizontal / Vertical | Internal / External | 90/90/- | 10 | 90/90/90 | 35 |
| 2400 x 2400 | Horizontal / Vertical | Internal / External | 120/120/- | 13 | 120/120/120 | 38 |
| 2400 x 2400 | Horizontal / Vertical | Internal / External | 180/180/- | 20 | 180/180/180 | 60 |
| 2400 x 2400 | Horizontal / Vertical | Internal / External | 240/240/- | 30 | 240/240/240 | 75 |

i. Ducts not to exceed the dimensions of 2400 x 2400 mm;
ii. Ductwork to be manufactured in accordance with AS 4254 or BS EN 1505:1998 using minimum 1.0 mm galvanised sheet metal;
iii. Trapeze centres at maximum 1520 mm (Refer FCO 2542) comprising 50 x 50 x 6.5 mm angle & hanging rods ≥ 10 mm diameter;
Note: Notwithstanding assessment FCO 2542, both AS 4254 and SMACNA standards override the above ductwork construction detail;
iv. Conforming ductwork construction Joints: Mez Joint, TDF and Angle Flanges @ 1.52m centres max;
v. Manufacturer supplied Access Panel equal to IGNISEAL with rebated edges and non-combustible Fire seal;
vi. As per AS 4254 and SMACNA rules central hanging rod to be used at duct every joint;
vii. Mandatory tested reinforcement to be equal to manufacturer supplied QUIKMESH which shall be secured with CD welded pins @1,6m centres and LAF adhesive pins thereafter;
viii. In all cases, except where Insulation criteria is waived, the spray thickness for 150 mm distance each side of a penetration to be ≥ 30mm;
ix. Pins of appropriate length shall be positioned on flanges and support angles at the corners to ensure minimum thickness is maintained;

Table 5

| Maximum duct Dimension | ORIENTATION | FIRE SIDE | FRL Integrity / Thick | | FRL Integrity & Insulation / Thick | |
|---|---|---|---|---|---|---|
| (mm) | | | minutes | mm | minutes | mm |
| 4800 x 3600 | Horizontal / Vertical | Internal | 60/60/- | 10 | 60/60/60 | 16 |
| 4800 x 3600 | Horizontal / Vertical | Internal | 90/90/- | 13 | 90/90/90 | 20 |
| 4800 x 3600 | Horizontal / Vertical | Internal | 120/120/- | 15 | 120/120/120 | 25 |
| 4800 x 3600 | Horizontal / Vertical | Internal | 180/180/- | 25 | 180/180/180 | 50 |
| 4800 x 3600 | Horizontal / Vertical | Internal | 240/240/- | 35 | 240/240/240 | 65 |
| 4800 x 3600 | Horizontal / Vertical | Internal / External | 60/60/- | 10 | 60/60/60 | 30 |
| 4800 x 3600 | Horizontal / Vertical | Internal / External | 90/90/- | 13 | 90/90/90 | 35 |
| 4800 x 3600 | Horizontal / Vertical | Internal / External | 120/120/- | 15 | 120/120/120 | 38 |
| 4800 x 3600 | Horizontal / Vertical | Internal / External | 180/180/- | 25 | 180/180/180 | 60 |
| 4800 x 3600 | Horizontal / Vertical | Internal / External | 240/240/- | 35 | 240/240/240 | 75 |

i. Ducts not to exceed the dimensions of 4800 x 3600 mm;
ii. Ductwork to be manufactured in accordance with AS 4254 or BS EN 1505:1998 using minimum 1.0 mm galvanised sheet metal;
iii. Trapeze centres at maximum 1200 mm comprising 60 x 60 x 5 mm angle & hanging rods ≥ 12 mm diameter with stress levels not to exceed that of the tested prototype;
iv. Conforming ductwork construction Joints: TDF @ 1,52m centres max.; Angle Flanges @ 1,2m centres max;
v. Manufacturer supplied Access Panel equal to IGNISEAL with rebated edges and non-combustible Fire seal;
vi. As per AS 4254 and SMACNA rules central hanging rod to be used at duct every joint and spaced @ 1,2m across the duct width;
vii. Mandatory tested reinforcement to be equal to manufacturer supplied QUIKMESH which shall be secured with CD welded pins @1,6m centres and LAF adhesive pins thereafter;
viii. In all cases, except where Insulation criteria is waived, the spray thickness for 150 mm distance each side of a penetration to be ≥ 30mm;
ix. Pins of appropriate length shall be positioned on flanges and support angles at the corners to ensure minimum thickness is maintained;

TERM OF VALIDITY

This assessment report will lapse on 31 March 2016. 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

28 February 2014