Fire Rated Vertical Laminated Duct

Laminated duct systems are fire rated laminated plasterboard enclosures for building services. They are designed to provide fire and acoustic isolation for electrical, plumbing and air-handling services. The laminated duct systems are constructed from three layers of either 13mm or 16mm FireShield and metal angle framing.

Laminated duct systems are suitable for use with fire rated penetrations including access panels, cable trays and power points.

Laminated ducts can form one up to four sides of a fire rated enclosure. They can be easily joined to other plasterboard, masonry or concrete walls with an equivalent or higher fire rating.

Unless otherwise stated, laminated duct systems are non-load bearing and must not support roof, ceiling or floor loads.

For acoustic upgrades [Refer to Section 3.6.1].
**KLV1D1-KLV1D2**

**FRAME:** 50x50mm, x 0.7mm BMT steel angles

**DUCT LINING:** 3 layers of 13mm or 16mm FireShield laminated together

[13mm FireShield can be substituted with 13mm TruRock]

[16mm FireShield can be substituted with 16mm TruRock]

[Laminated Vertical Duct can be 1, 2, 3 or 4 sided]

[Refer to ‘Framing’ for Maximum Height and Maximum Width dimensions]

<table>
<thead>
<tr>
<th>FRL</th>
<th>System</th>
<th>Plasterboard Lining</th>
<th>Plasterboard Thickness (mm)</th>
<th>Sound Insulation Rw (Rw + Ctr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>– /90/90</td>
<td>KLVD1</td>
<td>3 layers of 13mm FireShield</td>
<td>39</td>
<td>37 [34]</td>
</tr>
<tr>
<td>rated from both sides Fire Report FAR 1660</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– /120/120</td>
<td>KLVD2</td>
<td>3 layers of 16mm FireShield</td>
<td>48</td>
<td>38 [35]</td>
</tr>
<tr>
<td>rated from both sides Fire Report FAR 1660</td>
<td></td>
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<td></td>
<td></td>
</tr>
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</table>
3.6.2 Fire Rated Vertical Laminated Duct

General Requirements

<table>
<thead>
<tr>
<th>Fire Rated</th>
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</thead>
<tbody>
<tr>
<td>✓</td>
</tr>
</tbody>
</table>

- Only joint the face layer. As a minimum to achieve the FRL, only use paper tape and:
  - Two coats of MastaBase/MastaLongset, or
  - Three coats of MastaLite.
- Use approved fire rated penetration details. Fire penetrations may require fire collars or other devices to maintain fire performance.
- Use fire sealant on all gaps and around perimeter, vermiculite plaster is not permitted.

For acceptable modifications or variations to fire rated systems. [Refer To Section 2.3 Fire Resistance]

Maximum Height and Width Dimensions

<table>
<thead>
<tr>
<th>Max Duct Width (m)</th>
<th>Max Duct Height (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unlimited</td>
<td>3.0</td>
</tr>
<tr>
<td>3.0</td>
<td>3.6</td>
</tr>
<tr>
<td>2.4</td>
<td>4.2</td>
</tr>
<tr>
<td>1.8</td>
<td>4.8</td>
</tr>
<tr>
<td>1.2</td>
<td>5.4</td>
</tr>
</tbody>
</table>

1 Dimensions apply to both KLVD1 and KLVD2 systems

Plasterboard Layout

<table>
<thead>
<tr>
<th>Fire Rated</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
</tr>
</tbody>
</table>

- Vertical Layout
  - Stagger butt joints by 600mm minimum on adjoining sheets and between layers.
  - First layer butt joints must be backed by a steel angle of minimum 50mm width.
  - Stagger recessed edges by 300mm minimum between layers.

Minimise butt joints by using long sheets.
Plasterboard Fixing

- Use the ‘Screw Only Method’. Stud adhesive is not permitted. ✓
- Drive screws to just below the sheet surface, taking care not to break the paper linerboard. ✓
- Laminating screws can be used to fix butt joints in the second and third layer. ✓

**SCREW TYPE AND MINIMUM SIZE FOR THE INSTALLATION OF PLASTERBOARD TO STEEL ANGLE**

<table>
<thead>
<tr>
<th>Plasterboard Thickness</th>
<th>1st Layer</th>
<th>2nd Layer</th>
<th>3rd Layer</th>
</tr>
</thead>
<tbody>
<tr>
<td>13mm</td>
<td>25mm screw</td>
<td>40mm screw*</td>
<td>60mm screw*</td>
</tr>
<tr>
<td>16mm</td>
<td>30mm screw</td>
<td>45mm screw*</td>
<td>65mm screw*</td>
</tr>
</tbody>
</table>

For steel ≤ 0.75mm BMT minimum 6g fine thread needle point screws.
For steel ≥ 0.75mm BMT minimum 6g fine thread drill point screws.
*38mm –10g Laminating screws may be used as detailed in installation diagrams.
**FIGURE 2** Steel Angle Frames and 1st Layer

- 1st layer: 50x50mm x 0.7mm BMT angle frame before 1st layer. Fix to floor and wall at 600mm max centres and 100mm max from ends.
- 2nd layer: Floating butt joints fixed to previous layer at 200mm max centres using laminating screws.

**FIGURE 3** 2nd and 3rd Layers

- 2nd layer: Laminate to 1st layer at 400mm max centres vertically and horizontally.
- 3rd layer: Laminate to 2nd layer at 400mm max centres.

**Fixing**
- Screw Only Method

**Frame 1**
- Steel Angle 50x50mm x 0.7mm BMT.
- Installed before 1st layer.

**Frame 2**
- Steel Angle 50x50mm x 0.7mm BMT.
- Installed between 1st and 2nd layers.

**Sheet Layout**
- 1st, 2nd and 3rd layers: All Vertical

**Fasteners**
- Perimeter screws 10-15mm from sheet edges.

**Sheet Perimeter**
- Screw fix to steel angle at 400mm max centres vertically and 600mm max horizontally.

**Field**
- 2nd layer: Laminate to 1st layer at 400mm max centres vertically and horizontally.
- 3rd layer: Laminate to 2nd layer at 400mm max centres vertically and horizontally.

**Recessed Edges**
- 1st layer: Once 2nd layer is installed, support the recessed edge in the 1st layer with an additional double line of laminating screws through 2nd layer at 400mm max centres. Stagger recessed edges by 300mm min between layers.
- 2nd layer: Laminate to 1st layer at 400mm max centres.
- 3rd layer: Laminate to 2nd layer at 400mm max centres.

**Butt Joints**
- 1st layer: Fix at 200mm max centres to additional horizontal steel angle. Stagger butt joints by 600mm min on adjoining sheets and between layers.
- 2nd layer: Laminate to 1st layer at 200mm max centres.
- 3rd layer: Laminate to 2nd layer at 200mm max centres.

**Internal and External corners**
- All layers: Fix to angle at 400mm max centres vertically.

**Fire Sealant**
- Use fire sealant on all gaps and around perimeter to maintain fire and acoustic integrity. [Refer to Construction Details]

**Jointing Face Layer**
- As a minimum, only use paper tape with either two coats of MastaBase / MastaLongset or three coats of MastaLite. [Refer to Section 4]
3.6.2 FIRE RATED VERTICAL LAMINATED DUCT

Construction Details

FIGURE 4 Laminated Duct Head to Slab
Elevation

Suitable masonry fasteners at 400mm max centres and 100mm max from ends

10mm clearance to plasterboard

Fill gap with mineral fibre insulation minimum 60 kg/m³, with minimum 15% compression and melting temperature 1000°C

Small bead of fire sealant under angle filling any gaps

Laminating screws

Suitable masonry fasteners at 400mm max centres and 100mm max from ends

FIGURE 5 Laminated Duct Deflection Head to Slab
Elevation

Suitable masonry fasteners at 400mm max centres and 100mm max from ends

1.5mm clearance to plasterboard

Fire sealant required to maintain fire and acoustic integrity

FIGURE 6 Laminated Duct Base to Slab
Elevation

Suitable masonry fasteners at 400mm max centres and 100mm max from ends

5-10mm clearance to plasterboard

Knauf fire rated plasterboard

FIGURE 7 Laminated Duct to Masonry Wall
Plan view

Suitable masonry fasteners at 400mm max centres and 100mm max from ends

50x50x0.7mm BMT steel angle before 1st layer

50x50x0.7mm BMT steel angle between 1st and 2nd layers

Overlap sheet edges at corners

Screws fixed through angle

Small bead of fire sealant under angle filling any gaps

FIGURE 8 Laminated Duct Internal Corner
Plan view

FIGURE 9 Laminated Duct External Corner
Plan view

Laminating screws

Overlap sheet edges at corners

Screws fixed through angle

Small bead of fire sealant under angle filling any gaps

Suitable masonry fasteners at 400mm max centres and 100mm max from ends

50x50x0.7mm BMT steel angle before 1st layer and between 1st and 2nd layers

Screws fixed through angle

Suitable masonry fasteners at 400mm max centres and 100mm max from ends

15mm clearance to plasterboard

Fire sealant required to maintain fire and acoustic integrity

50mm from sheet top.
Do not fix through angle
## FIRE RATED VERTICAL LAMINATED DUCT

### Construction Details

Laminate recessed edges in 1st layer through 2nd layer at 400mm max centres.

**FIGURE 10** Laminated Duct Recessed Edge in 1st Layer

Stagger butt joints by 600mm min on adjacent sheets and between layers.

**FIGURE 11** Laminated Duct Recessed Edge in 2nd and 3rd Layer

Laminate butt joints in 2nd and 3rd layer at 200mm max centres.

**FIGURE 12** Laminated Duct Butt Joint in 2nd and 3rd Layer

Stagger butt joints by 600mm min on adjacent sheets and between layers.

**FIGURE 13** Laminated Duct Butt Joint in 1st Layer

Additional 50x50x0.7mm BMT steel angle to support butt joint in 1st layer.

**FIGURE 14** Typical Cable Tray Penetration

Up to 2 hours FRL

Example Only

**FIGURE 15** Typical Metal Pipe Penetration

Up to 2 hours FRL

Example Only

**FIGURE 16** Typical Fire Collar Penetration

Up to 2 Hours FRL

Example Only