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## CERTIFICATE OF APPROVAL

### No. ME0143

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This is to certify that the referenced products of

## PROMAT MIDDLE EAST

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have been assessed against the requirements of the *warringtonfire – mideast certification scheme* and are approved for use within the scope of the test and/or assessment report(s) referenced.

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## Supalux Steel Ventilation

### Smoke Outlet and Kitchen Extract Ductwork Systems

Certificate Reference	Valid Until
CERTIFIRE Certificate CF546	22 <sup>nd</sup> April 2012

Horizontal ducts

#### **Steel duct assembly**

The Supalux steel duct system consists of a steel duct protected with minimum 9mm-thick Supalux board. The minimum construction requirements for the steel duct are as follows:

- Wall thickness - minimum 0.7mm-thick galvanised steel sheet (Table 1),
- Longitudinal seams - Pittsburgh Lock or Grooved Corner Seam,
- Cross joints - rolled steel angle flanged cross-joints or equivalent rollformed sheet steel profile cross-joints (Table 1),
- Maximum section length - 1220mm,
- Maximum size – 6000mm wide x 2500mm high (Table 1).

**Table 1 Minimum construction requirements for steel duct**

Maximum size of duct longer side - mm	Thickness of steel sheet - mm	Size of cross joint angle - mm x mm x mm	Stiffening collar required
Up to 800	0.7	25 x 25 x 3	No
Up to 1000	1.0	30 x 30 x 4	No
Up to 1500	1.0	30 x 30 x 4	Yes
Up to 2500	1.0	40 x 40 x 4	Yes
Up to 3000	1.2	50 x 50 x 5	Yes
Up to 6000	1.2	70 x 70 x 6	Yes

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The rolled steel angles of the cross joints are welded at the corners and fastened to the duct walls with minimum 5mm-diameter steel rivets (or equivalent) at maximum 150mm centres or spot-welded at 75mm nominal centres. The cross joints of adjacent sections are fastened with steel bolts at the corners and at 300mm maximum centres along each of the four sides.

The stiffening collars are required, as shown in the above table, for ducts with a section length greater than 625mm. Each collar is fitted at approximately mid-length of the duct section and is made of the same size of steel angle as used for the cross joints (or equivalent). The angles are welded or bolted together at the corners and fastened to the duct walls with minimum 5mm-diameter steel rivets (or equivalent) at maximum 300mm centres.

#### ***Hanger supports***

Steel hangers consisting of a pair of threaded drop rods and an angle or channel bearer under the steel duct. The maximum spacing of the hangers is 1220mm. The maximum tensile stress in the rods and the bending stress in the bearers must not exceed 10N/mm<sup>2</sup> for 120 minutes fire resistance and 6N/mm<sup>2</sup> for 240 minutes fire resistance.

For steel ducts wider than 3000mm, an additional drop rod is fitted at approximately mid-width of the duct at each hanger position. The rod passes through the top wall of the duct and supports the top of the duct with steel nuts and large steel washers fitted to the threaded rod. The drop rod also passes through the bottom wall of the duct and supports the bearer of the hanger.

The fixings used to fasten the threaded rod hangers to concrete soffits are all-steel expanding anchors (e.g. Hilti HKD anchors) with a penetration in the concrete of at least 50mm for 120 minutes fire resistance and 60mm for 240 minutes fire resistance. The anchors must match the size of the threaded rods, be of sufficient strength to support the weight of the duct and be fitted in accordance with the manufacturer's instructions. When the hanger rods are suspended from protected structural steel beams, they must be protected for at least 300 mm from the beams with the same level of protection as the structural beams.

For steel ducts wider than 3000mm, steel struts are included within the ducts at the positions of the cross-joints. The struts are positioned at 2000mm maximum centres across the width of the duct. The maximum stresses in the struts must not exceed 10N/mm<sup>2</sup> for 120 minutes fire resistance and 6N/mm<sup>2</sup> for 240 minutes fire resistance.

#### ***Steel collars to support boards***

Steel channel collars are folded around the duct at maximum 610mm centres. The collars are steel channels, minimum 50mm flanges x 50mm web x 0.6mm thick, which are fastened together at the corners with steel rivets or self-tapping screws. The channels are not directly fastened to the duct except for ducts with dimensions greater than 1500mm wide or 1500mm high where the channels under the soffit of the duct and the channels up the sides of the duct must be fastened to either the cross joint angles or the stiffening collar angles with either steel self-tapping screws or steel rivets at 300mm nominal centres. Where the depth of the flanged cross-joints or the hanger bearer is greater than 50mm, the depth of the channel collars must be increased to suit. Similarly, where 100mm thick rock wool insulation is fitted around the steel duct the minimum size of the channel collars is 100mm flanges x 70mm web x 0.8mm thick.

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#### **Rock wool insulation**

Where 120 or 240 minutes insulation performance is required, rock wool insulation of 100kg/m<sup>3</sup> density is fitted around the steel duct. The insulation is minimum 50mm thick for a 120-minute fire rating and minimum 100mm thick (fitted in at least two layers) for a 240-minute fire rating. The joints in the rock wool batts are tight butt joints and staggered between layers by at least 150mm. The steel channel collars are also filled with the rock wool.

#### **Supalux boards**

Supalux boards, 9, 12, 15, 20 or 25mm thick, are screwed to the channel collars with M4 steel self-tapping screws at 200mm nominal centres. Transverse board joints are coincident with the channels. The boards at the longitudinal corner joints are screwed to a galvanised steel angle, minimum 25mm x 25mm x 0.6mm thick, with M4 steel self tapping screws at 200mm nominal centres. Alternatively, for board thicknesses of 15mm and above, the boards at the longitudinal corner joints are directly fastened together with steel staples, minimum 50mm long x 10mm wide x 1.5mm thick, at 150mm maximum centres.

The maximum area of unsupported board is 1.5m<sup>2</sup>. In order to achieve this for larger duct sizes either the spacing of the channel collars is reduced or longitudinal channels (the same size as the collars) are fitted between the transverse collars. Any longitudinal board joint in the Supalux (other than a corner joint) must be backed by a steel channel (the same size as the collars). Where the hanger drop rods pass through the Supalux board the penetrations are sealed with Promaseal fire-rated silicone mastic or Promaseal intumescent mastic or equivalent.

The thicknesses of Supalux board and rock wool for the various fire resistance ratings are given in Table 2.

**Table 2 – Thickness of Supalux board and rock wool specification**

Fire resistance - minutes			Supalux mm	Rock wool mm x kg/m <sup>3</sup>
Stability	Integrity	Insulation		
120	120	-	9	-
120	120	30	20	-
120	120	60	12	50 x 60
120	120	120	15	50 x 100
240	240	-	12	-
240	240	30	20	-
240	240	240	25	100 x 100

#### **Penetration details**

At wall penetrations, L-shaped collars of Supalux, made of strips at least 150mm wide x the same thickness as the casing screwed together at 200mm nominal centres, are fitted around the duct on both sides of the wall. (For 9mm and 12mm thick Supalux the boards are fastened together with a steel angle minimum 25mm x 25mm x 0.6mm thick). They are fastened to the Supalux casing of the duct with steel screws at 200mm maximum centres. The space between the Supalux casing and the reveals of the opening is filled with rock wool of minimum density 100kg/m<sup>3</sup>. The collar is not fastened to the wall but is fitted against the wall with Promaseal fire rated acrylic / silicone sealant. A steel duct cross joint or stiffening collar is located at compartment wall penetrations.

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##### One, two and three sided ducts

One, two and three-sided Supalux steel ducts are constructed using the adjacent concrete/masonry walls and floor slab to support the assembly. The surrounding building elements must have a fire resistance equal to or higher than the fire resistance required for the duct. The 4-sided steel duct and hanger supports are as described above.

The steel channels are fitted around one, two or three sides of the steel duct, in a similar way to the 4-sided system, except that the ends of the channels are fixed to minimum 40mm x 40mm x 1.5mm angles anchored to the wall or floor elements with minimum M8 all-steel expanding anchor bolts at 400mm maximum centres. A bead of Promaseal fire rated acrylic / silicone sealant is fitted between the angles and the wall or floor. The channels are fastened to the angles with minimum two M4 steel self-tapping screws or M4 steel rivets at each junction. The size and spacing of the screws and anchors must be adjusted depending on the weight of the duct assembly. The maximum bearing, tensile and shear stresses for the steel angles, screws and anchors is 10N/mm<sup>2</sup> for a fire exposure of 120 minutes and 6N/mm<sup>2</sup> for a fire exposure of 240 minutes.

For steel ducts over 1220mm wide the channels under the soffit of the duct are fastened to either the cross joint angles or the stiffening collar angles as for the 4-sided duct. The maximum size of steel duct is 6000mm wide x 2500mm high.

The Supalux boards are fastened to the channels and angles in the same way as for the 4-sided duct system. The penetration seal system is the same as for the 4-sided duct system.

##### Vertical ducts

The construction of vertical ducts is the same as for the horizontal ducts. In order to support the duct system in the vertical orientation, steel sections are fastened to the steel duct, either along the two longer or shorter sides or on all four sides. The weight must be taken by the steel duct and not by the Supalux board. The steel sections either span across the opening in the concrete floor or form part of a cantilever bracket that is fastened to the building structure. If the distance between the floors is greater than 5m then intermediate supports must be fitted, e.g. cantilever bracket from adjacent fire rated wall. Also, to prevent buckling of the duct, the distance between supports must not exceed 8 times the smallest lateral dimension across the outside face of the steel duct. The weight of the duct system is taken by the building structure at each floor level. The stress limit within the steel supports is 10N/mm<sup>2</sup> for fire exposures of up to 120 minutes and 6N/mm<sup>2</sup> for fire resistance periods up to 240 minutes.

The design of the penetration seal for vertical ducts through concrete floors is the same as for horizontal ducts through masonry/concrete walls.

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#### Smoke outlet ducts

The ducts may be used as smoke outlet ducts.

#### Kitchen extract ducts

Where the duct system is to be used as a kitchen extract duct the internal duct surface of duct type A should not exceed 140°C mean or 180°C maximum. The steel of the duct is deemed to be non-combustible. The thicknesses of Supalux board and rock wool for the various fire resistance ratings are given in Table 3.

**Table 3 – Thickness of Supalux board and rock wool specification for kitchen extract ducts**

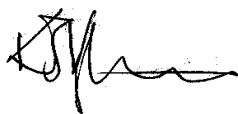
Fire resistance - minutes			Supalux mm	Rock wool mm x kg/m <sup>3</sup>
Stability	Integrity	Insulation		
120	120	30	15	50 x 100
120	120	60	15	100 x 100
120	120	120	15	90 x 165

**Table 4 Maximum loads for drop rods**

Nominal rod diameter mm	Tensile stress area mm <sup>2</sup> (BS 4190)	Load			
		kN – 2hr (10N/mm <sup>2</sup> )	kg – 2hr	kN – 4hr (6N/mm <sup>2</sup> )	kg – 4hr
6	20.1	0.20	20.49	0.12	12.29
8	36.6	0.37	37.31	0.22	22.39
10	58.0	0.58	59.12	0.35	35.47
12	84.3	0.84	85.93	0.51	51.56
16	157.0	1.57	160.04	0.94	96.02
20	245.0	2.45	249.75	1.47	149.85

Certification is awarded on the basis of initial type testing to BS 476: Part 22: 1987, initial inspection and ongoing surveillance of factory production control, and ongoing compliance with the scheme requirements including the use of labels supplied by warringtonfire. The currency of the certification may be verified at [www.warringtonfire.net/mideast](http://www.warringtonfire.net/mideast).

#### Signed for and on behalf of Warrington Certification



Sir Ken Knight  
Chairman - Management Council

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