1.) Type: VL-F

Single compartment rectangular smoke extraction ducts and fittings

2.) Manufacturer / Place of manufacture:

AEROPRODUKT Zrt., 6640 Csongrád, Szegedi út 1., HUNGARY

3.) Function:

The smoke extraction ducts are part of the smoke extraction and fire protect system .The function of the smoke extraction duct is to prevent the transmission of smoke and combustion products from the fire zone. AEROPRODUKT Zrt. produce only single compartment smoke extraction duct systems. The single compartment means that the smoke extraction ducts do not pass through into other fire compartments.

4.) Normative references:

The VL-F smoke extraction duct system for single compartment is CE marked and tested in two hours at a temperature of 600 ºC in horizontal and vertical position at different pressure according to the following standards:

4.1.) Tested: **EN 1366-9: 2008**

Fire resistance tests for service installations.
Part 9: Single compartment smoke extraction ducts

Integrity:

Smoke extraction duct is able to prevent the transmission of fire as a result of the passage of significant quantities of flames or hot gasses from the fire to the unexposed side.

Smoke leakage:

Criteria at ambient temperature:

The leakage do not exceed 10 m^3 /h per 1 m^2 of total internal surface area of the complete duct.

Criteria at fire temperature:

The leakage do not exceed 5 m^3 /h per 1 m^2 of internal surface area from the perforated plate to the end of the duct.

Mechanical stability:

The duct during fire (heat exposure up to 600 ºC) does not collapse so performance of the duct is maintained.

Maintainance of cross section:

The internal dimensions (width and height for rectangular ducts) of the smoke extracting ductwork shall not decrease by more than 10 % during the test inside and outside ofthe furnace

4.2.) Classified: **EN 13501-4: 2007+A1:2010**
Fire classification of construction products and building elements.
Classification using data from fire resistance tests on components of smoke control systems

Fire resistance class:
E_{600} (v_e, h_o i ↔ o) S1500 single

4.3.) Qualified: **EN 12101-7:2011**
Smoke and heat control systems.
Part 7: Smoke duct sections

Leakage is measured at both ambient temperature and exposure at 600 °C.
Tested both horizontally and vertically in the furnace to meet the standard.

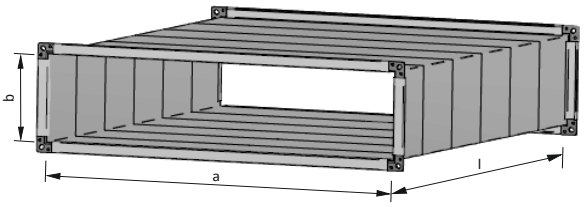
5.) Raw material:

Smoke ducts constructed from non-combustible materials (euro class A1 and A2-s1, d0).
Smoke extraction duct is made of 0,9 mm thick galvanized steel sheet.

6.) Dimension:

Minimum sizes from – width a [mm]: 160
Minimum sizes from – height b [mm]: 160
Minimum sizes from – lenght l [mm]: 100

Maximum sizes up to – width a [mm]: 1 250
Maximum sizes up to – height b [mm]: 1 000
Maximum sizes up to – lenght l [mm]: 1 500



Dimension according to R10 RENARD row									
160	200	250	315	400	500	630	800	1000	1250

Intermadiate sizes are possible between the miniumum and maximum sizes without restrictions. The reduction of rectangular duct cross-section is not limited.

Tolerance of sides:

Side lenght [mm]	160-500	501-1250
tolerance at sides [mm]	±2,5	±6
tolerance at lenght [mm]	±2,5	±6

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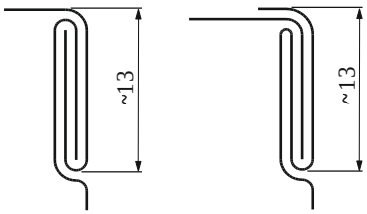
7.) Technical description of the duct

7.1.) Folds:

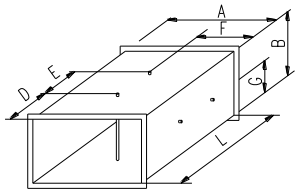
The parts of duct elements are assembled by using mechanical corner folds or Pittsburgh folds in case of bend elements. We use ribbing regardless of the size.



Mechanical corner fold Pittsburgh fold

7.3.) Stiffeners:

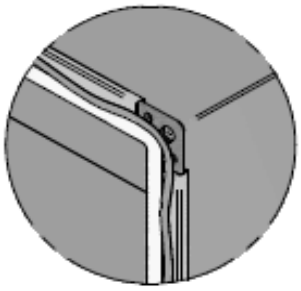
Attach steel stiffeners at 90° angles to any side of the duct section where the width or depth exceeds the 501 mm. Position these at the mid-width / depth and mid-length in each section. Fasten the stiffeners to the duct walls with a steel washer of the same size, on the outside of the duct wall and seal with firestop sealant (Type: HILTI CFS-S SIL firestop silicone sealant or equivalent) both sides.

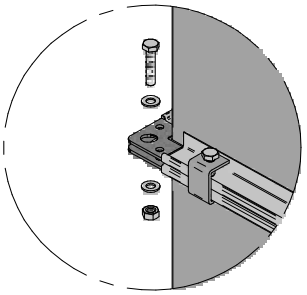


a	b	l	d	e	f	g
501 - 1 250	501 – 1 000	400 – 1 250	l/2	-	a/2	b/2
501 – 1 250	501 – 1 000	1 251 – 1 500	l/3	l/3	a/2	b/2

7.4.) Connection:

We use a ceramic tape gasket (3 mm thick) and firestop sealant (Type: HILTI CFS-S SIL firestop silicone sealant or equivalent) between the flanges to seal the joints and bolt them togehter with an M10 steel nut and bolt at each other.





Fasten the flanges together with 40 mm steel clamps according to the drawing.

8.) Accessories

8.1.) Compensator:

To compensate the elongation of the ducts and to avoid horizontal forces resulting from this, there must be installed compensators in smoke exhaust ducts.
The compensator has been tested at room temperature with 1500 Pa underpressure and at 600 °C with 500 Pa underpressure for a period of 120 min.

Type:	WSK-600 (or equivalent type)
Manufacturer:	Strulik Zrt., Hungary
Dimension:	~155 mm
Certified:	DIN 18232-6

Technical descrition:
Single-layer spun glass fabrics ca. 1 mm thick with a special elastomer coating and a supporting ring lying within. Stiffeners are arranged in the area of the fastening (two flanges per compensator). To balance out the duct elongations of the tested smoke extraction duct of sheet steel and to prevent horizontal forces resulting from this, for horizontal ducts having a length of ≥ 5 m compensators shall be arranged.

The distance between two compensators shall not exceed 10 m.

8.2.) Air grilles:

Type:	CSD-F-C
Manufacturer:	AEROPRODUKT Zrt.
Material:	galvanised steel natur or powder coated RAL colours
Fatening:	by srew or by or direct into the duct or hidden fastening with mounting frame or direct into the duct

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9.) Installation –

9.1) Horiozntal installation.

The duct is suspended to the supporting construction by means of suspension components in maximum distance of 1500 mm.

- The suspension shall be performed with L-profiles (35/35/4) or C-profiles (38/40).
- The threaded rods are the maximum allowable tensile load at:

EI 120 S - ≤ 6 N/mm^2

- The recommended tread size is minimum M8.

  Is is possible to splice two shorter threaded rods.
- The threaded rods must be fixed to slab with minimum M8 fire safety dowel.
- The load of the dowel will be up to 500 N (50 kg) per piece.
- The deep of the dowel is minimum 40 mm.
- The threaded rods shall have a maximum lateral distance of 50 mm to the smoke extraction duct of sheet steel.
- Nut with washer holds the C-profile at the end of threaded rod.
- Non-combustible sealings shall be used to interconnect the duct pieces.
- The breaking of the wall of smoke extraction duct does not allowe.

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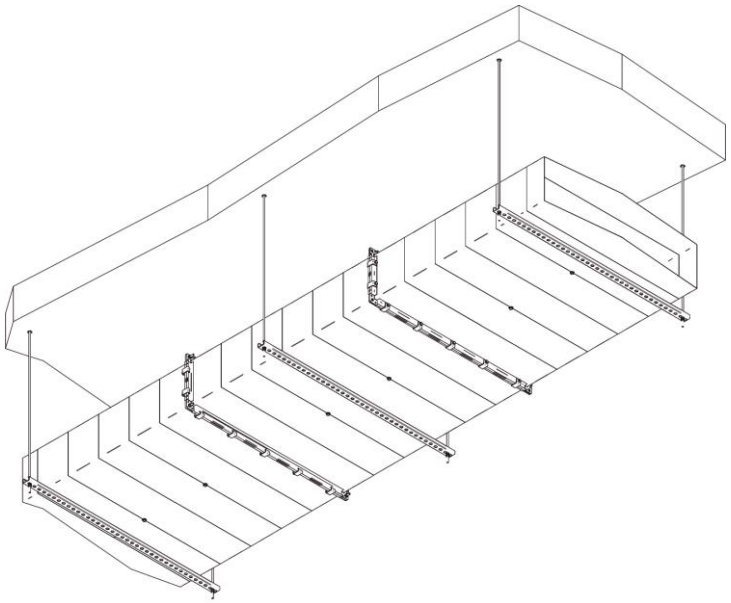
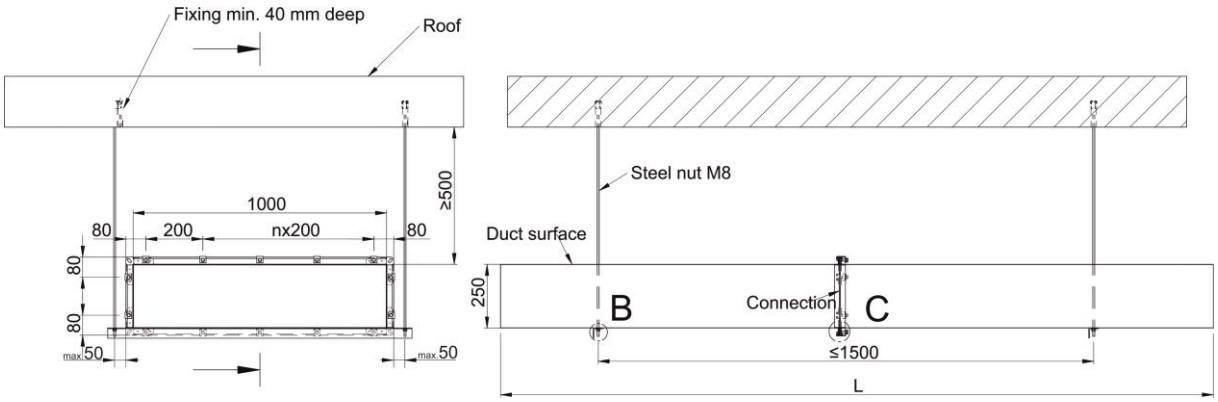
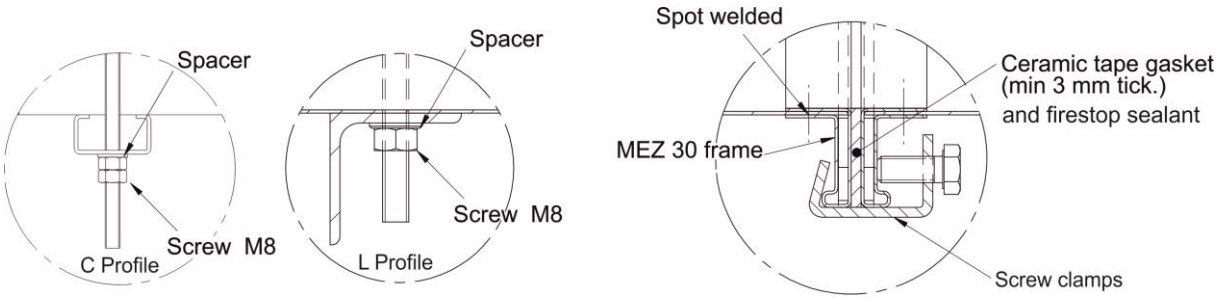
9.2) Installation instructions of horizontal installation







Detail B

Detail C

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9.4) Vertical installation

The duct is suspended to the supporting construction by means of suspension components in maximum distance of 1500 mm.

- The suspension shall be performed with L-profiles (35/35/4) or C-profiles (38/40).
- The threaded rods are the maximum allowable tensile load at:

EI 120 S - ≤ 6 N/mm^2

- The recommended tread size is minimum M8.

Is is possible to splice two shorter threaded rods.

- The threaded rods must be fixed to slab with minimum M8 fire safety dowel.
- The load of the dowel will be up to 500 N (50 kg) per piece.
- The threaded rods shall have a maximum lateral distance of 50 mm to the smoke extraction duct of sheet steel.
- Nut with washer holds the C-profile at the end of threaded rod.
- Non-combustible sealings shall be used to interconnect the duct pieces.
- The breaking of the wall of smoke extraction duct does not allowe.

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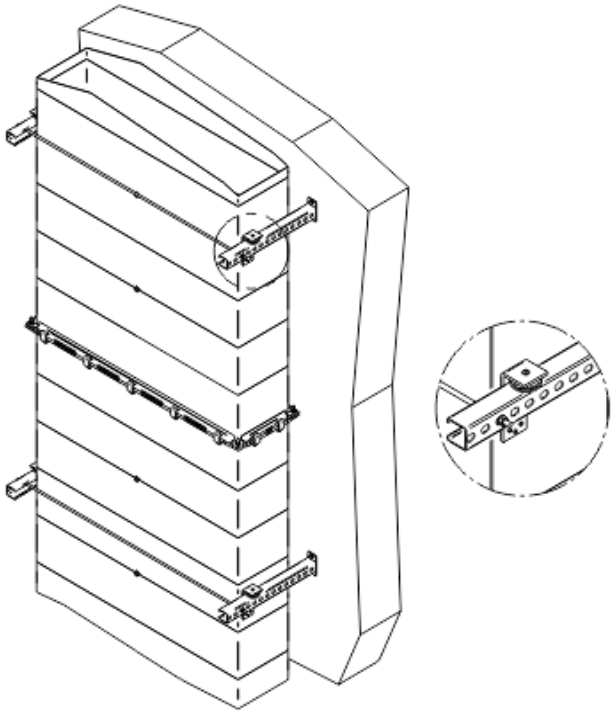
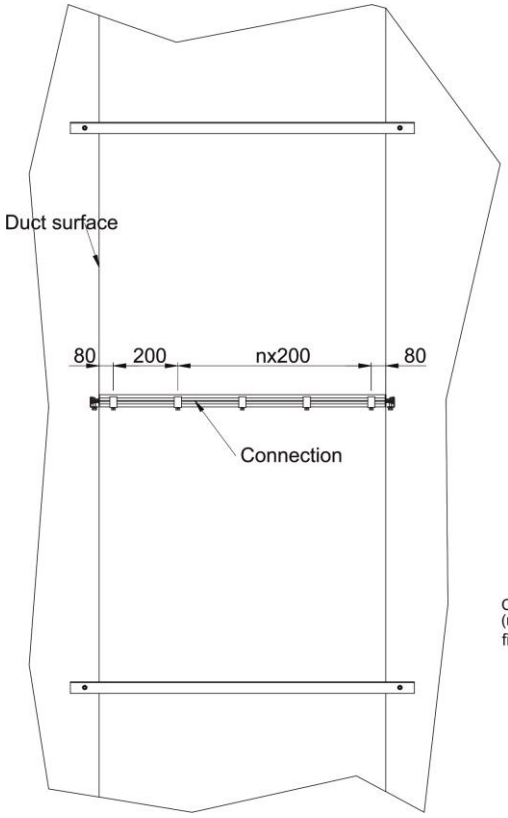
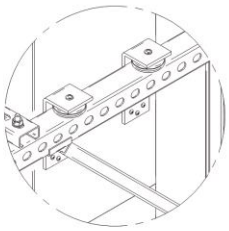
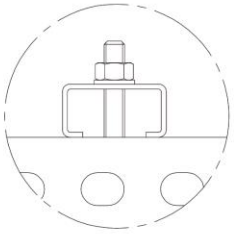
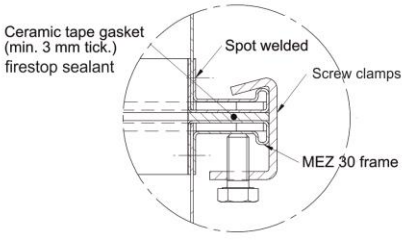
9.5) Installation instructions of vertical installation











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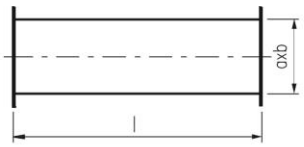
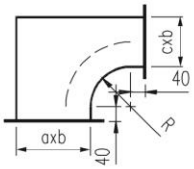
10.) Some rectangular duct fittings

VL-F-01



VL-F-02

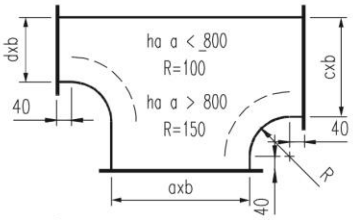


a ≥ c

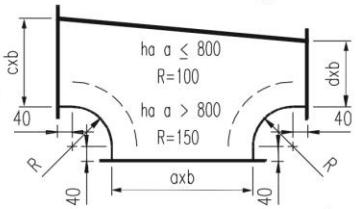
ha a ≤ 800 R=100

ha a > 800 R=150

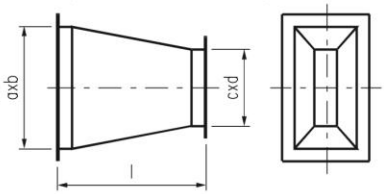
VL-F-03



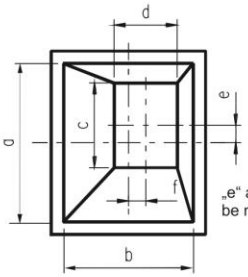
VL-F-04



VL-F-05



VL-F-06

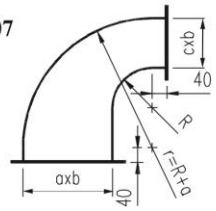


a ≥ b

length: l

„e" and „f" size would be negative sign:

VL-F-07

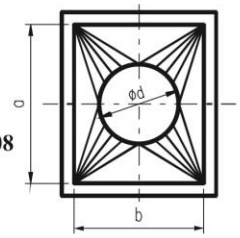


a ≥ c

ha a < 800 R=100

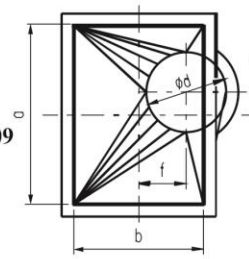
ha a > 800 R=150

VL-F-08



length: l

VL-F-09

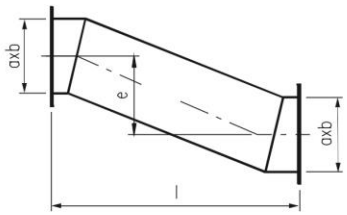


a ≥ b

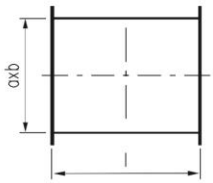
length: l

„e" and „f" size would be negative sign:

VL-F-10

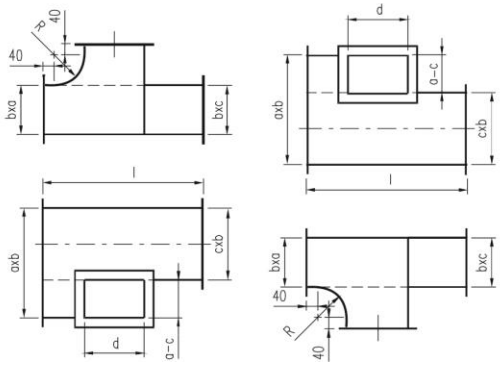


VL-F-11

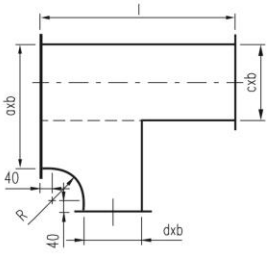


- l=400-900 or
- lateral connection socket or
- access door
- socket for installation grilles

VL-F-12



VL-F-13



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