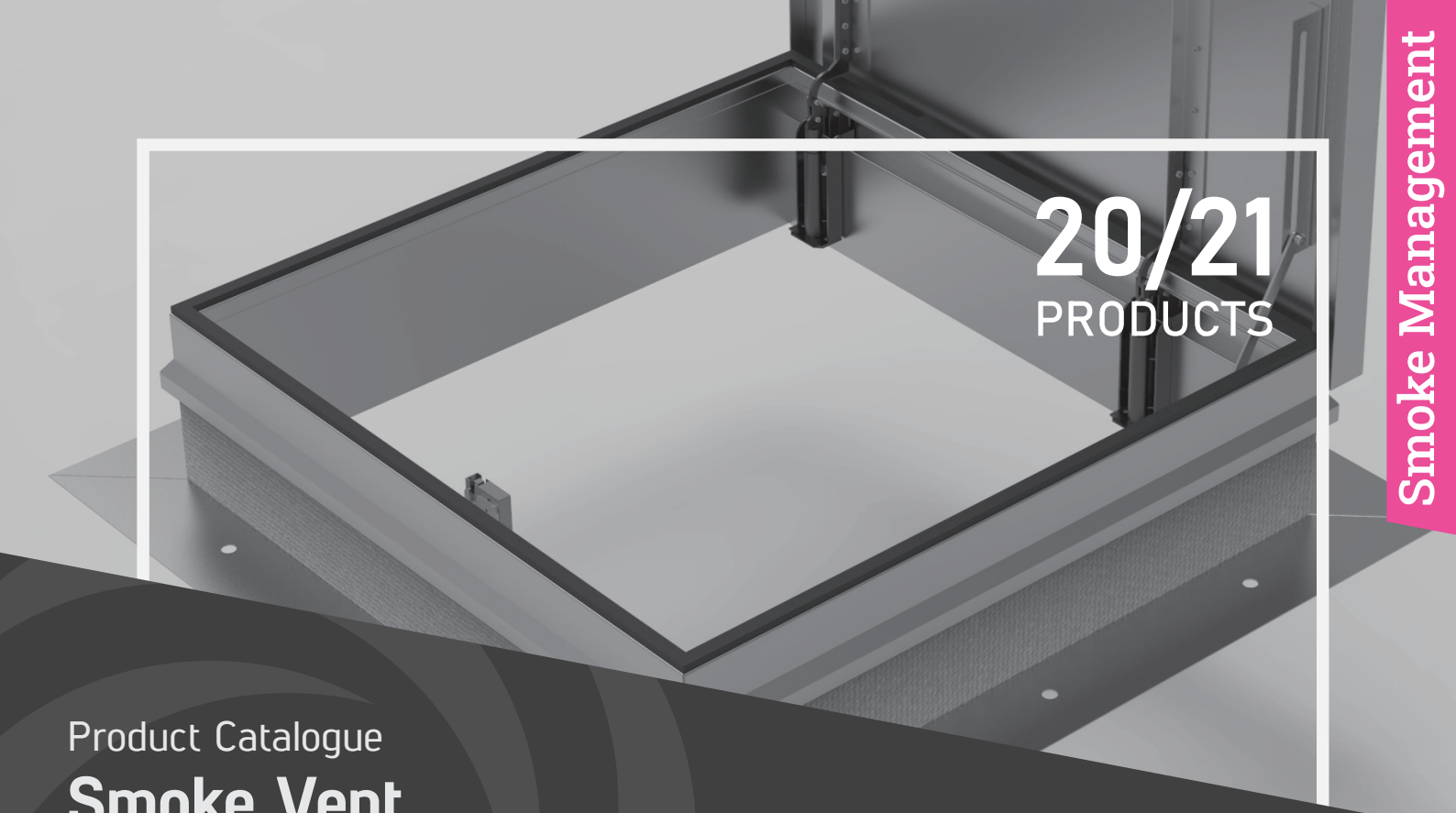


Smoke Management

20/21
PRODUCTS

Product Catalogue

Smoke Vent

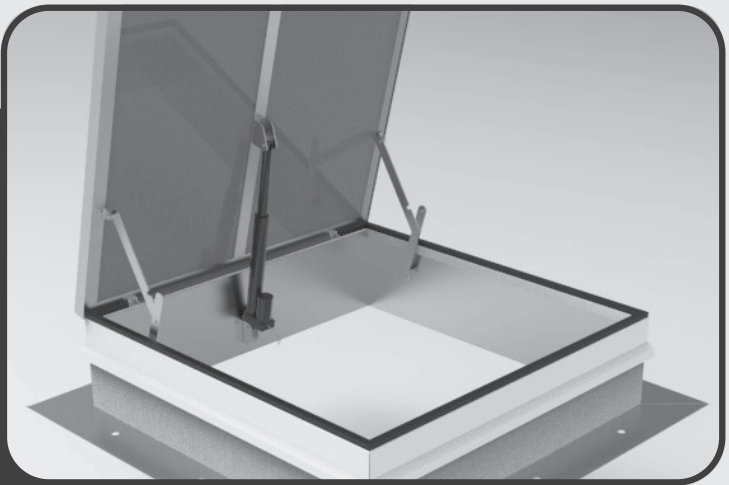
Type (SMV)

Khedr Trust
ALL AIR PRODUCTS

Smoke Vent products are manufactured by

Khedr Trust
ALL AIR PRODUCTS

“Your comfort is our priority”



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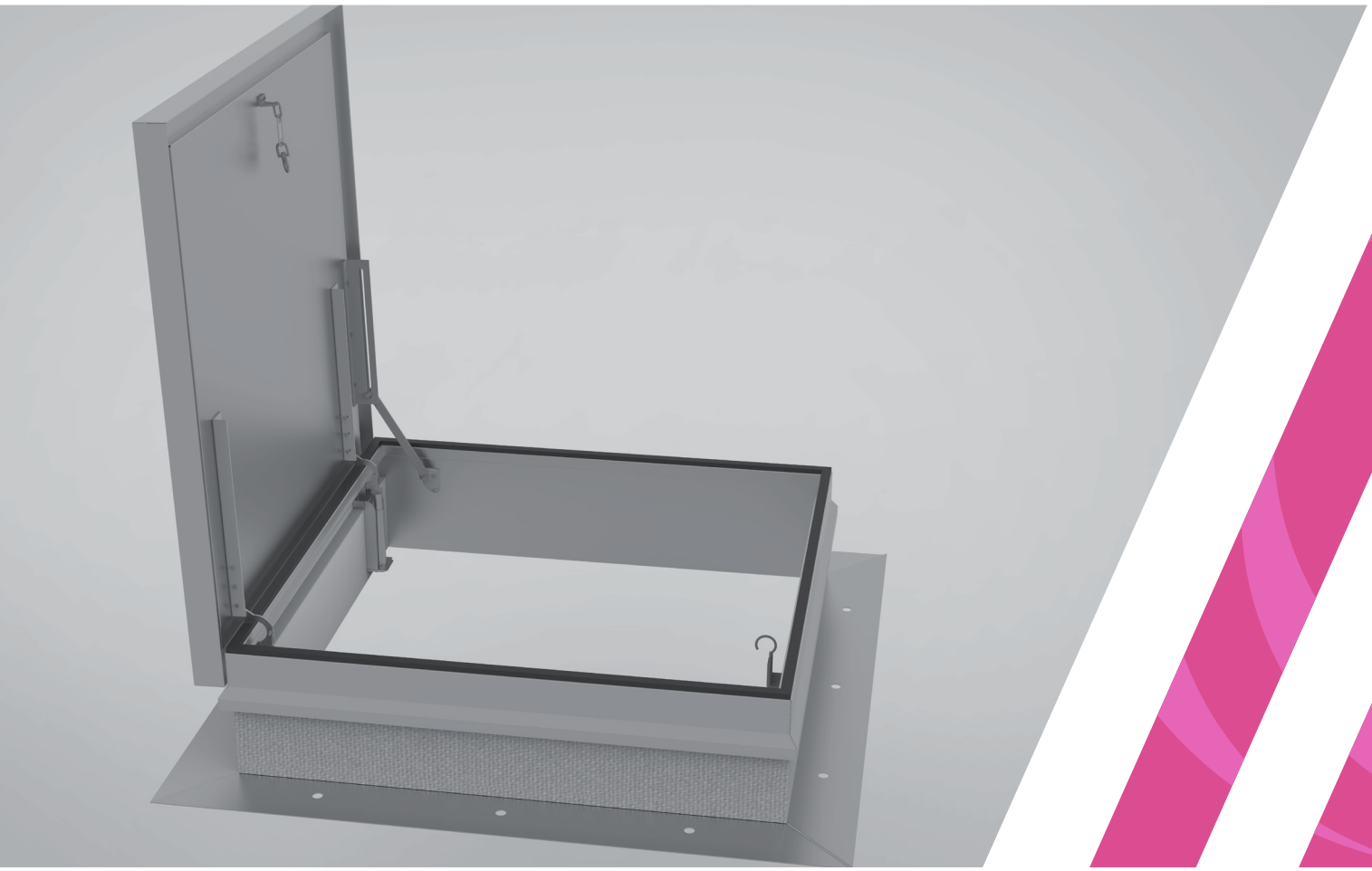


Models

- SMV-S "Mechanical Spring & Heavy Duty Electric Lock"
- SMV-P "Electric Piston"
- SMV-F "Mechanical Spring & Fusible Link"

Features

- Hinge: Heavy duty Hinge with 10mm pin.
- Opening: Gas spring operators allow cover to open and close with ease. Inside and out-side release allows for manual lid operation.
- Door Latch: Self latching Slam Latch With electrical opening signal in additional to manual opening They work together.

Smoke Vent

Model Design

Khedr Smoke Vents are specially designed for smoke management applications.

Air Flow

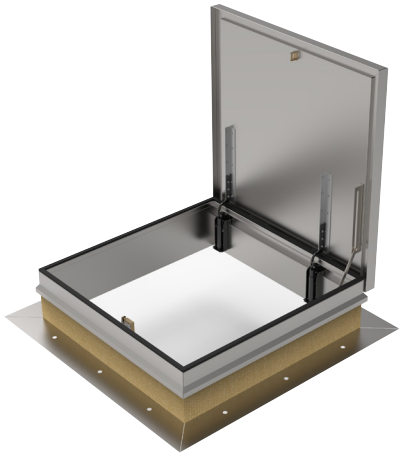
They are completed with automatic opening actuator / or Fusible Link.

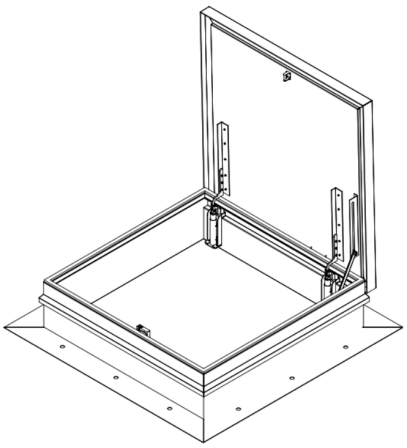
Covers

Available with either Polycarbonate or Steel covers.

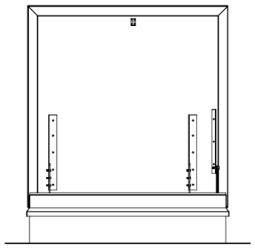
- Construction

SMV-S "Mechanical Spring & Heavy Duty Electric Lock "

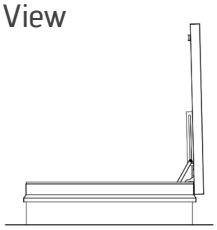




Isometric View

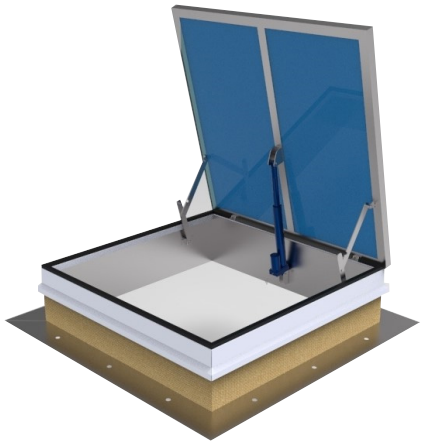


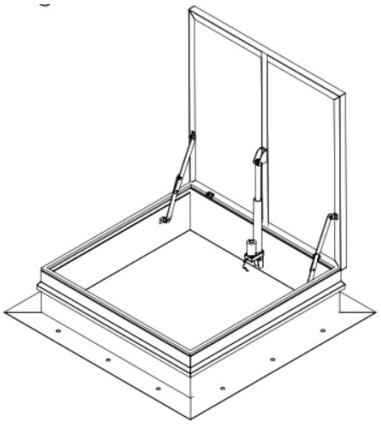
Front View



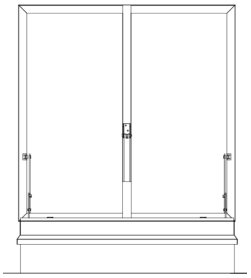
Side View

SMV-P "Electric Piston "

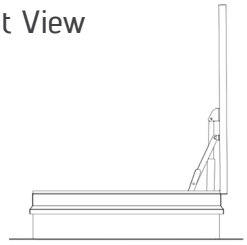




Isometric View

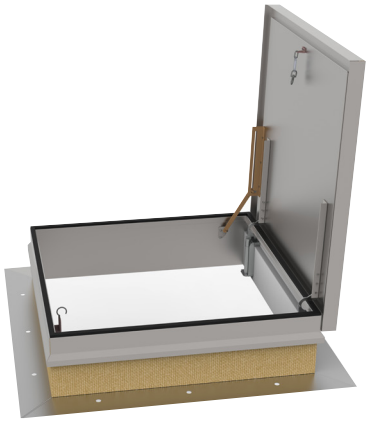


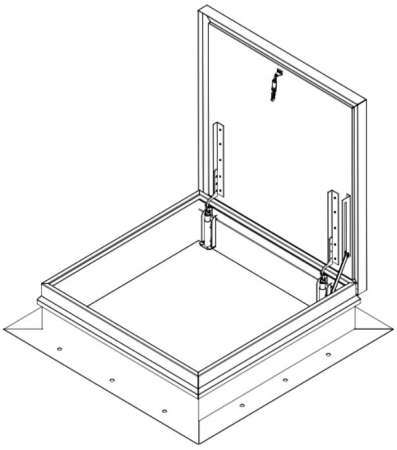
Front View



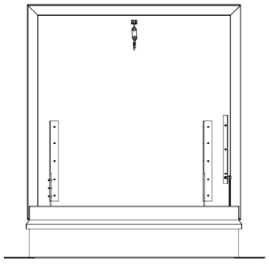
Side View

SMV-F "Mechanical Spring & Fusible Link"

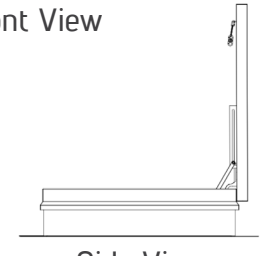




Isometric View

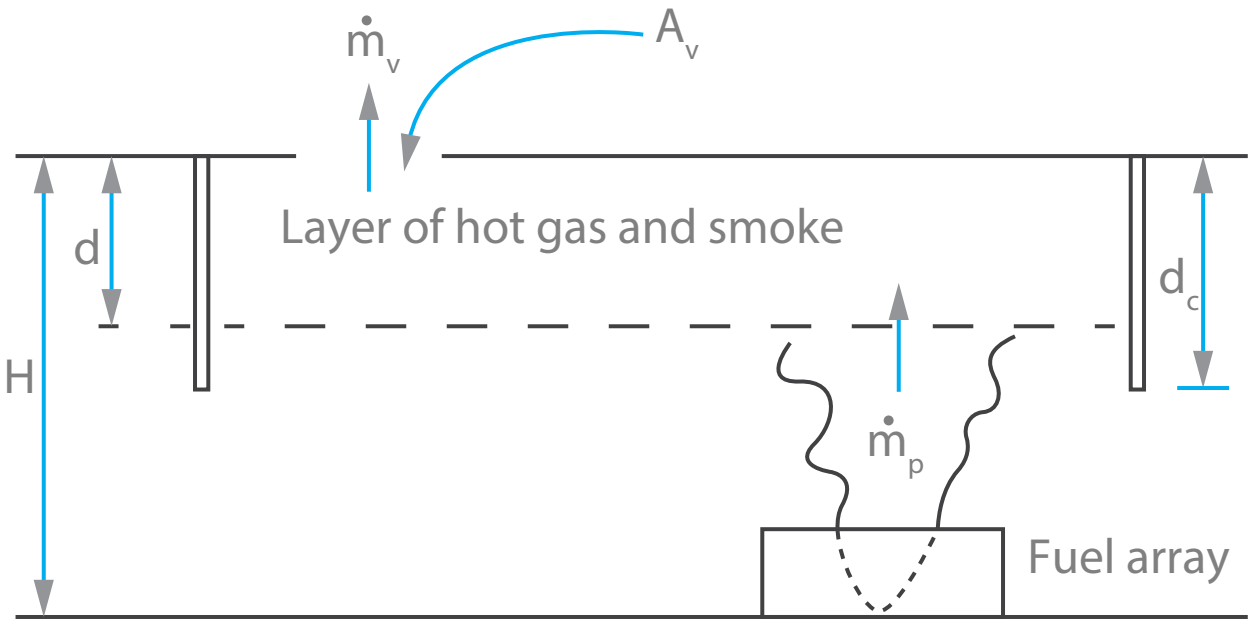


Front View



Side View

– Smoke Vent Sizing



The mass flow rate into the smoke layer shall be equal to the mass flow rate out of the vent or vents ($m_p = m_v$).

A. Mass Flow Rate in Plume.

1- Calculate the mean flame height above the base of the fire (m).

$$L = 1.02D + 0.235Q^{2/5}$$ **NFPA 204 [9.2.3.1]**

Where:
L = Mean flame height above the base of the fire (m)
D = Base diameter of fire (m)
Q = Total heat release rate (kW)

2- Calculate The virtual origin, Z_0 , is the effective point source of the fire plume.

$$z_o = 0.083Q^{2/5} - 1.02D$$ **NFPA 204 [9.2.3.2]**

Where:
z_o = Virtual fire origion
D = Base diameter of fire (m)
Q = Total heat release rate (kW)

(Total heat release rate ASHRAE Applications –2019 Ch. 54 FIRE AND SMOKE CONTROL)

Table 8 Steady Design Fire Sizes for Atriums

	kW
Minimum fire for fuel-restricted atrium	2100
Minimum fire for atrium with combusitbles	4600
Large fires	11000 to 26000

Note: These fire sizes apply to fire in the atrium space, but not to fires in communicating spaces in fully sprinklered buildings.

3- Determine the height of the smoke layer boundary above the base of the fire (z_s) as per site conditions

z_s = 1.8 (International Building Code) unless it attached to Atrium.

4- When the mean flame height, L, is below the smoke layer boundary ($L < z_s$), the mass flow rate in the fire plume shall be calculated in accordance with the following equation:

$$\dot{m}_p = \left[0.071 Q_c^{1/3} \left(z_s - z_o\right)^{5/3}\right]\left[1 = 0.027 Q_c^{2/3} \left(z_s - z_o\right)^{-5/3}\right]$$ **NFPA 204 [9.2.3.6]**

Where:
$\dot{m}_p$ = Mass flow rate in the plume (kg/s)
Q_c = Convective heat release reate = 0.7Q (kW)
z_s = Height of the smoke layer boundary above the base of the fire (m)
z_o = Height of virtual origion above the base of the fire fire
(If below the base of the fire, z_o is negative) (m)

5- When the mean flame height (L) is equal to or above the smoke layer boundary ($L < z_s$), the mass flow rate shall be calculated in accordance with the following equation:

$$\dot{m}_p = \left(0.0056 Q_c\right)\frac{z_s}{L}$$ **NFPA 204 [9.2.3.7]**

Where:
$\dot{m}_p$ = Mass flow rate in the plume (kg/s)
Q_c = Convective heat release reate = 0.7Q (kW)
z_s = Height above the base of the fire (m)
L = Mean flame height (m)

B. Mass Flow Rate Through Vents

$$\dot{m}_v \frac{C_{d,v}A_v}{\sqrt{1+\frac{C_{d,v}^2A_v^2}{C_{d,i}^2A_i^2}\left(\frac{T_o}{T}\right)}}\sqrt{\left(2p_o^2gd\right)}\sqrt{\frac{T_o\left(T-T_o\right)}{T^2}}$$ **NFPA 204 [9.2.4.1]**

Where:
$\dot{m}_v$ = Mass flow through vent (kg/s)
$C_{d,v}$ = Vent discharge coefficient
A_v = Vent area (m^2)
p_o = Ambient density (kg/m^3)
g = Acceleration due to gravity ($9.81 m/s^2$)
d = Smoke layer depth (m)
T_o = Ambient temperature (k)
T = Smoke layer temperature (k)
$C_{d,i}$ = Inlet discharge coefficient
A_i = Inlet area (m^2)

* The smoke layer temperature, T, used in 9.2.4.1 shall be determined from the following equation.

$$T = T_o + \frac{KQ_c}{c_p\dot{m}_p}$$ **NFPA 204 [9.2.4.3]**

Where:
= Smoke layer temperature (K)
= Ambient temperature (K)
T = Fraction of convected energy contained in the smoke layer gases (see 9.2.4.4)
T_o = Convective heat release rate (kW)
K = Specific heat of the smoke layer gases (kJ/kg–K)
Q_c = Plume mass flow rate (kg/s) (see 9.2.3)
c_p
$\dot{m}_p$

**Fraction of convected energy contained in the smoke layer gases.

[9.2.4.3] The value of K used in equation **[9.2.4.3]** shall be 0.5, unless an anlysis acceptable to the AHJ is provided by the designer to validate the use of an alternative value.

(Default Discharge Coefficients for Vents and Inlets.)

Table 9.2.4.2 Default Discharge Coefficients for Vents and Inlets

Vent or Inlet Type	Discharge Coefficients [(d.v and (d.i)]
Louvered with blades at 90 degrees to airflow Flap type or door open at least 55 degrees Drop-out vent leaving clear opening	0.55
Flap type or door open at least 30 degrees	0.35
Fixed weather louver with blades at 45 degrees	0.25

**** Smoke layer depth (m) (NFPA 92)

[4.5.1.3] Minimm Design Smoke Layer Depth. The minimium design design depth of the smoke management system shall be either of the following:

(1) Twenty percent of the floor-to-ceiling height
(2) Based on an engineering analysis

– How to order

Type	SMV-S	SMV-S "Mechanical Spring & Heavy Duty Electric Lock" SMV-P "Electric Piston" SMV-F "Mechanical Spring & Fusible Link"
Size	1 x 1	Size "m"
Cover	0	P Polycarbonate S Steel

Smoke Vent products are manufactured by Khedr Trust Co.

Other Products are provided by Khedr Trust Co.

Diffusers & Grills

- Slot Linear Diffuser
- Eye Ball Diffuser
- Circular Ceiling Diffuser
- Swirl Diffuser
- Perforated Ceiling Diffuser
- Jet Diffuser
- Square Ceiling Diffuser
- Disc Valve Diffuser
- Linear Bar Grill
- Supply / Return Grill
- Door Grill

Louvers

- Aluminum Louver
- Sand Trap Louver

Dampers

- Volume Damper
- Fire Damper
- Smoke Motorized Damper
- Shutter Damper
- Pressure Relief Damper

Special Parts

- Sound Attenuator
- Plenum Box

Duct Works

- Galvanized Steel Duct
- Black Steel Duct
- Stainless Steel Duct
- Spiral Duct
- Flexible Duct
- Canvas
- Flanges
- Flexible Duct Connector

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ISO 9001:2015 | ISO 14001:2015 | OHSAS 18001:2007

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