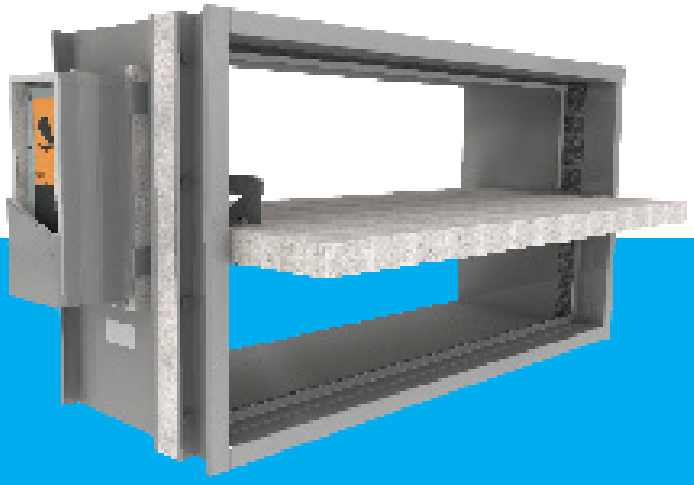
Frapol®

AIR HANDLING VENTILATION



SMOKE EXTRACTION AND FIRE SAFETY

Agenda

1. FIRE DAMPERS

APPLICATION

Cut-off fire dampers serve for securing the rooms against the spread of fire and smoke via ventilation ducts in the event of fire.Their master function is to ensure the declared fire resistance of the partition in the event of fire by automatic or remote closure of the opening made at the point of the installation's passing through a partition.These are normally open dampers.All cut-off dampers have fire resistance of two hours (EI 120 S).Installation details are provided in the Technical and Operational Documentation for damper type.

VERSIONS

Depending on the type of the applied element that keeps the damper's partition in the open position, method of damper opening and closing, as well as furnishing, there are the following versions of the dampers:

HO VERSION - basic variant of the damper with manually opened and automatically closed cut-off partition, and a mechanical thermal trigger based on a glass or soldered thermal element. Desoldering of the soldered element or breaking of a glass thermal element due to excess temperature causes the closure of the damper.

HE VERSION - basic version of the damper (HO) extended with a micro-switch installed on the damper, which allows for signalling the position of the cut-off partition or other use in the control systems (e.g. switching off the fan in the event of damper closure).

MR VERSION - damper version with manually opened and automatically closed cut-off partition, sustaining the cut-off partition in the open position by a solenoid powered via electric thermal trigger. The activation of the trigger under excess temperature causes disconnection of the solenoid's power, which results in damper closure. When connecting power for the solenoid via an additional switch, it is possible to close the damper by remote (e.g. for the purpose of operation test).

ER VERSION - version of the damper with opening and maintenance of the damper partition in the open position with an actuator with Belimo release spring (specially adjusted to support fire safety dampers). The

actuators can be powered with 24 V DC and AC voltage or with 230 V AC voltage. In the actuator powering system, there is electrical trigger, or the actuator furnished with a thermal trigger is applied. Actuator kept live all the time maintains the damper in the open position. Power shortage in the actuator caused by power loss or activation of the trigger due to excess temperature will cause the release spring on the engine axle, with the force of the accumulated mechanical energy, will close the partition via the drive system, and will keep the damper in the closed position. In the case of damper closure caused by power shortage, reconnection of power will cause damper opening.

DAMPERS IN THE ER VERSION ARE USUALLY FURNISHED WITH THE FOLLOWING SERVOS

- Belimo BF24-T, BF230-T or BLF24-T, BLF230-T – are equipped with thermoelectrical tripping device Belimo BAE72-S, which features two thermal fuses TF1 and TF2 (on the inside and outside of the damper casing). If the ambient temperature or the temperature inside the damper rises above 72°C, the thermal fuse activates, and the partition of the damper is closed. Activation of any fuse causes durable and irreversible cut-off of the power to the drive. This is a standard type of a servo applied in V370 dampers.
- Belimo BF24-T-ST, BF230-T-ST or BLF24-T-ST, BLF230-T-ST – servo analogical to the above, additionally furnished with a plug that allows for connecting it to a standard power&control module Belimo BKN.
- BELIMO BF24TL-T-ST – digital servo for dampers, adjusted for cooperation with MP-Bus.

Other types of actuators, e.g. allowing for communication using LonWorks bus, are available on individual request.

Details of electrical connections and the parameters of actuators applied are provided in the Technical and Operational Documentation for damper type.

All tripping devices can be activated at temperatures 72±5°C or 90±5°C. By standard, tripping devices activated at the temperature of 72±5°C are installed.

1.1 Rectangular dampers

Fire dampers of V370 type

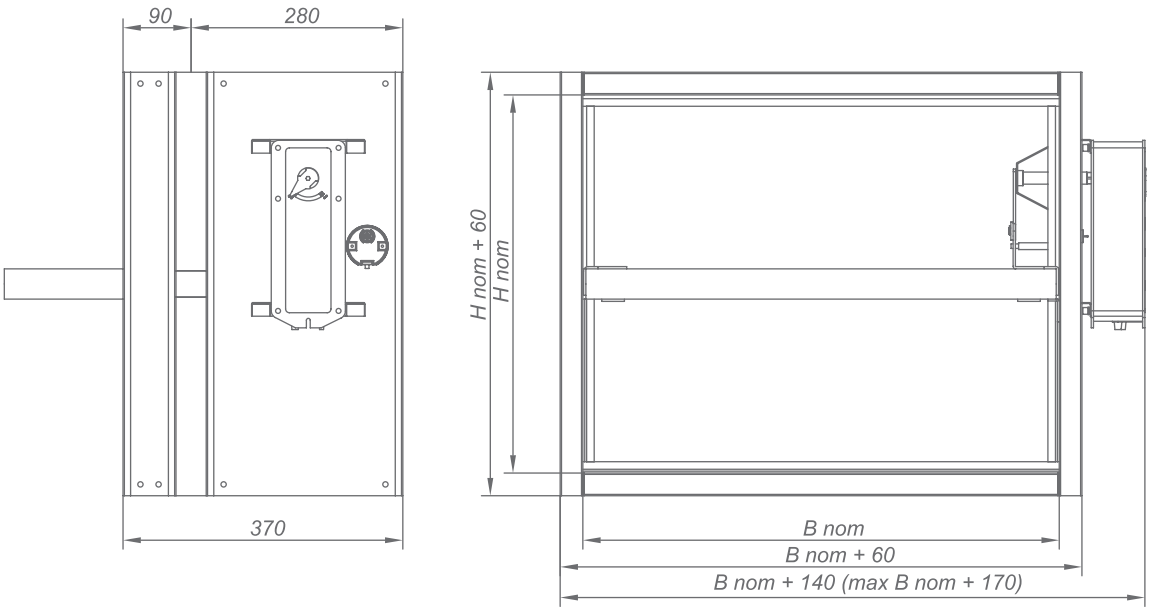
CONSTRUCTION

In the standard version, **V370** fire dampers comprise two-part steel bodies made of galvanised steel, separated with distance elements that isolating both parts, cut-off partition made of fire-resistant Promatect plate suspended on hinges and tendons in the part isolating the bodies, ventilation and expanding seals, axle and flexible connector, as well as additional elements that differ for particular versions, which secure and execute the fundamental task of opening and closing the cut-off partition, as well as maintaining it in the open or closed position.

STANDARD CROSS-SECTIONS OF V370 DAMPERS MANUFACTURED CAN BE ANY COMBINATION OF THE FOLLOWING B AND H DIMENSIONS ON CONDITION THAT THE NOMINAL AREA OF THE DAMPER CROSS-SECTION IS SMALLER OR EQUAL TO 1 M²:

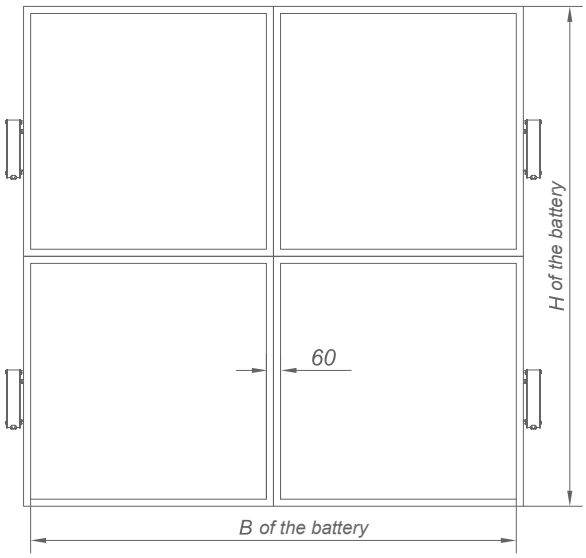
B (width) = 150, 200, 250, 300, 350, 400, 450, 500, 560, 630, 750, 800, 900, 1000, 1100, 1200, 1250, 1300, 1400, 1500 mm.
H (height) = 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000 mm

Dampers can also be made with intermediate **B** and **H** dimensions. Dampers with intermediate dimensions shall be treated as a special version.



The length of rectangular dampers amounts to 370 mm regardless of their size. In the event where the width of the damper (dimension B) or the height of the damper (dimension H) exceed permissible dimensions for a single damper, the damper with the required dimension is made as a battery of dampers, comprising standard dampers.

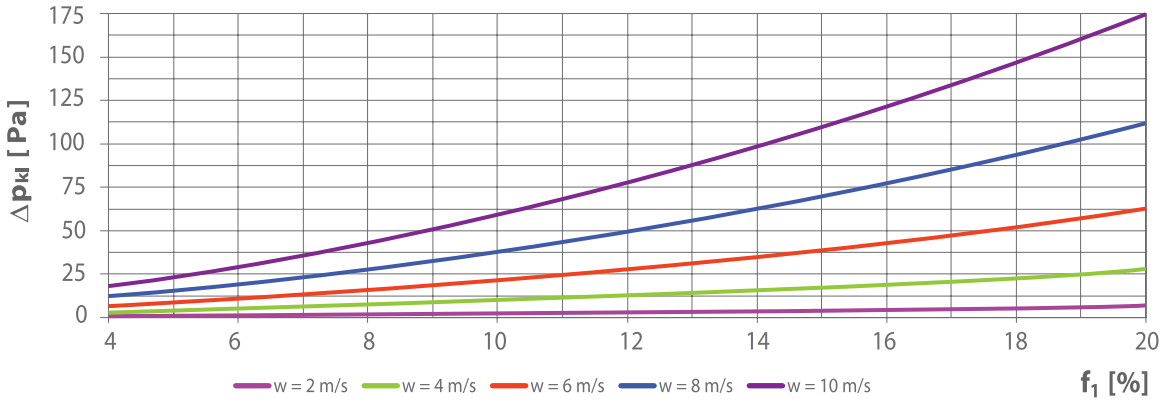
Damper battery can comprise two columns and "n" rows if the axes of the partition of component dampers are set horizontally, or two rows and "n" columns if the axes of the partitions of component dampers are in vertical position.



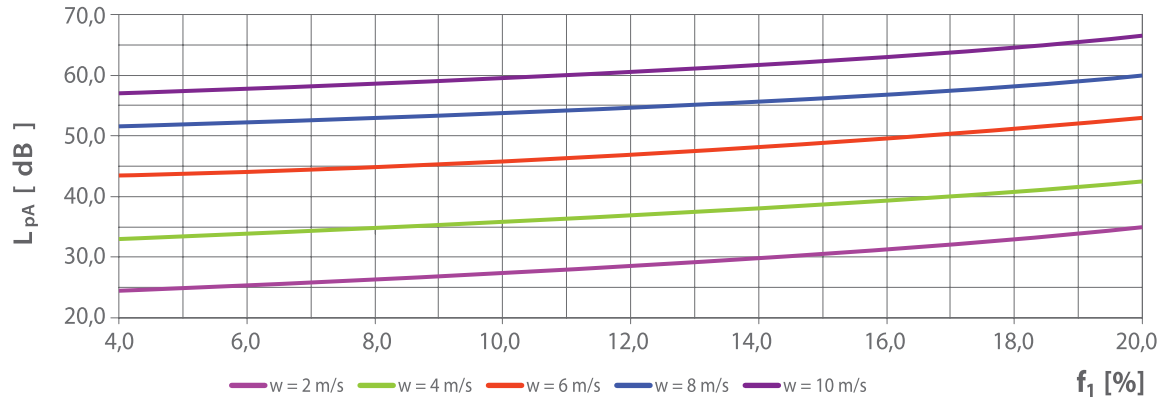
EFFECTIVE AREA AND f_1 COEFFICIENT VALUE

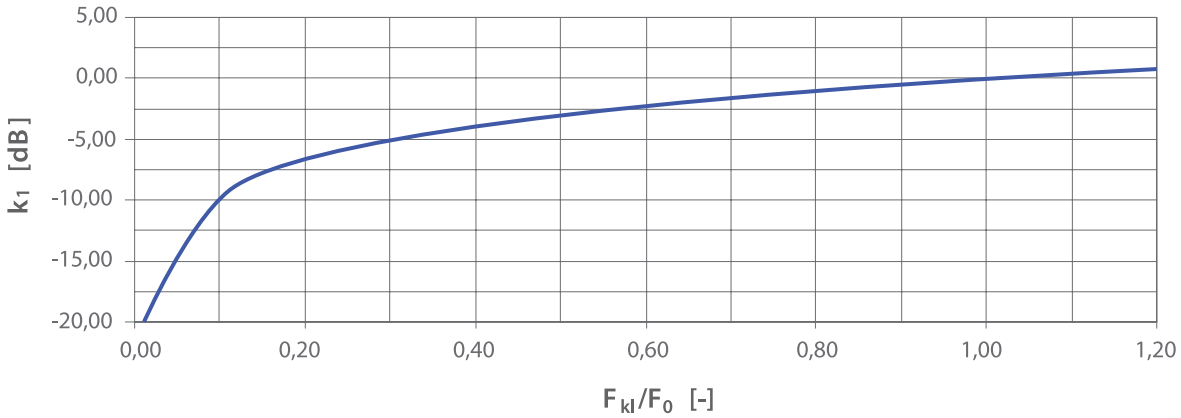
V370 FIRE SAFETY DAMPERS												
f_1	20,0	16,0	13,3	11,4	10,0	8,9	8,0	6,7	5,7	5,0	4,4	4,0
Dimensions	Height											
Width	200	250	300	350	400	450	500	600	700	800	900	1000
150	0,0156	0,0216	0,0276	0,0336	0,0396	0,0456	0,0516	0,0636	0,0756	0,0876	0,0996	0,1116
200	0,0221	0,0306	0,0391	0,0476	0,0561	0,0646	0,0731	0,0901	0,1071	0,1241	0,1411	0,1581
250	0,0286	0,0396	0,0506	0,0616	0,0726	0,0836	0,0946	0,1166	0,1386	0,16 06	0,1826	0,2046
300	0,0351	0,0486	0,0621	0,0756	0,0891	0,1026	0,1161	0,1431	0,1701	0,1971	0,2241	0,2511
350	0,0416	0,0576	0,0736	0,0896	0,1056	0,1216	0,1376	0,1696	0,2016	0,2336	0,2656	0,2976
400	0,0481	0,0666	0,0851	0,1036	0,1221	0,1406	0,1591	0,1961	0,2331	0,2701	0,3071	0,3441
450	0,0546	0,0756	0,0966	0,1176	0,1386	0,1596	0,1806	0,2226	0,2646	0,3066	0,3486	0,3906
500	0,0611	0,0846	0,1081	0,1316	0,1551	0,1786	0,2021	0,2491	0,2961	0,3431	0,3901	0,4371
560	0,0689	0,0954	0,1219	0,1484	0,1749	0,2014	0,2279	0,2809	0,3339	0,3869	0,4399	0,4929
630	0,0780	0,1080	0,1380	0,1680	0,1980	0,2280	0,2580	0,3180	0,3780	0,4380	0,4980	0,5580
750	0,0936	0,1296	0,1656	0,2016	0,2376	0,2736	0,3096	0,3816	0,4536	0,5256	0,5976	0,6696
800	0,1001	0,1386	0,1771	0,2156	0,2541	0,2926	0,3311	0,4081	0,4851	0,5621	0,6391	0,7161
900	0,1131	0,1566	0,2001	0,2436	0,2871	0,3306	0,3741	0,4611	0,5481	0,6351	0,7221	0,8091
1000	0,1261	0,1746	0,2231	0,2716	0,3201	0,3686	0,4171	0,5141	0,6111	0,7081	0,8051	0,9021
1100	0,1391	0,1926	0,2461	0,2996	0,3531	0,4066	0,4601	0,5671	0,6741	0,7811	0,8881	X
1200	0,1521	0,2106	0,2691	0,3276	0,3861	0,4446	0,5031	0,6201	0,7371	0,8541	X	X
1250	0,1586	0,2196	0,2806	0,3416	0,4026	0,4636	0,5246	0,6466	0,7686	0,8541	X	X
1300	0,1651	0,2286	0,2921	0,3556	0,4191	0,4826	0,5461	0,6731	0,8001	X	X	X
1400	0,1781	0,2466	0,3151	0,3836	0,4521	0,5206	0,5891	0,7261	0,8631	X	X	X
1500	0,1911	0,2646	0,3381	0,4116	0,4851	0,5586	0,6321	0,7791	X	X	X	X

FLOW RESISTANCE VALUES FOR V370 DAMPERS DEPENDING ON f_1 AND W



L_{PA} AND L_{WA} SURFACE ACOUSTIC PRESSURE DEPENDING ON f_1 AND W





$$L_{wA} = L_{pA} + k_1 \quad [dB(A)]$$

where:
k_1 - correction in dB determined from the diagram depending on the F_{kl}/F_0 ratio
F_{kl} - damper cross-section area, m^2
F_0 - reference area equal to 1 m^2

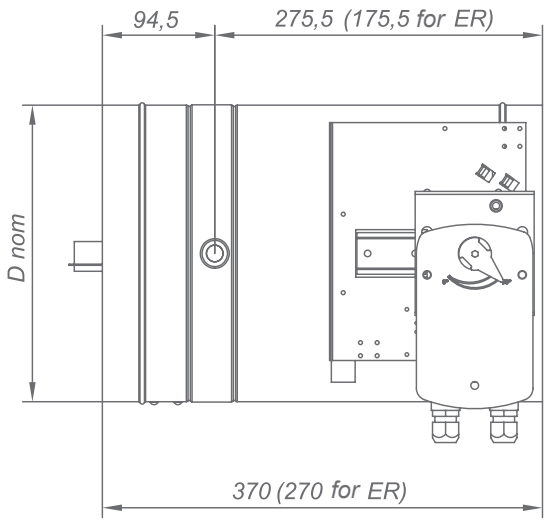
1.2 Round dampers

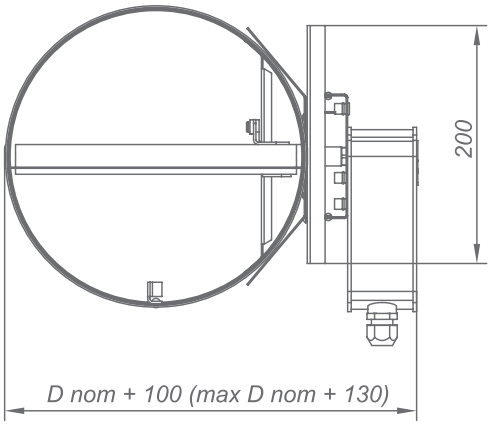
Fire dampers of RK370M type

CONSTRUCTION

In the standard version, **RK370M** round fire dampers comprise single-part perforated body made of galvanised steel, cut-off partition made of Promatect fire--resistant plate suspended on tendons, ventilation and expanding seals, flexible connector, tripping device (soldered or with a glass phial) and additional protective elements performing the fundamental task of cutting off air flow in the event of fire, namely: elements retaining and setting the mobile partition in the open or closed position (lever-spring mechanism or a BELIMO servo).

The series of manufactured dampers of this type conforms to diameters recommended by PN-EN 1506 and amounts to: D = 100, 125, 160, 200, 250 and 315 mm. dampers with ventilation ducts can be connected with nipples or muffs. Total length of the dampers amounts to 370 mm, and for the ER variant - 270

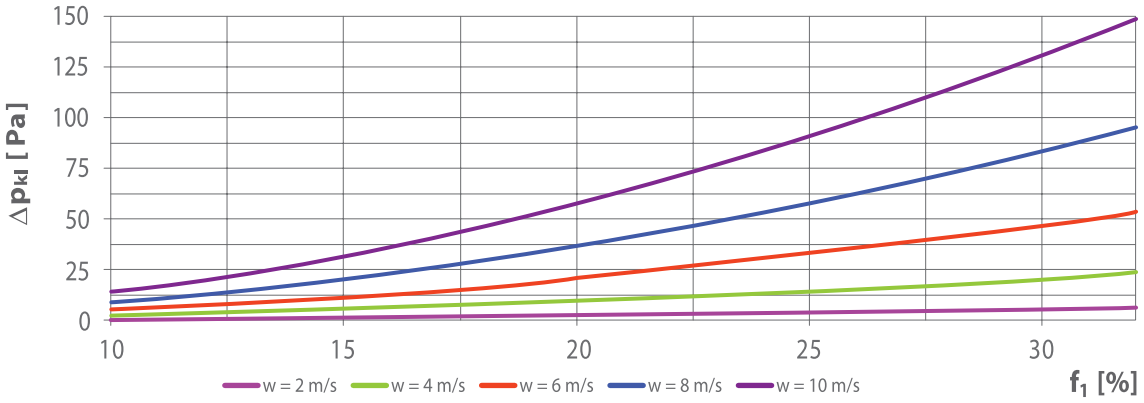




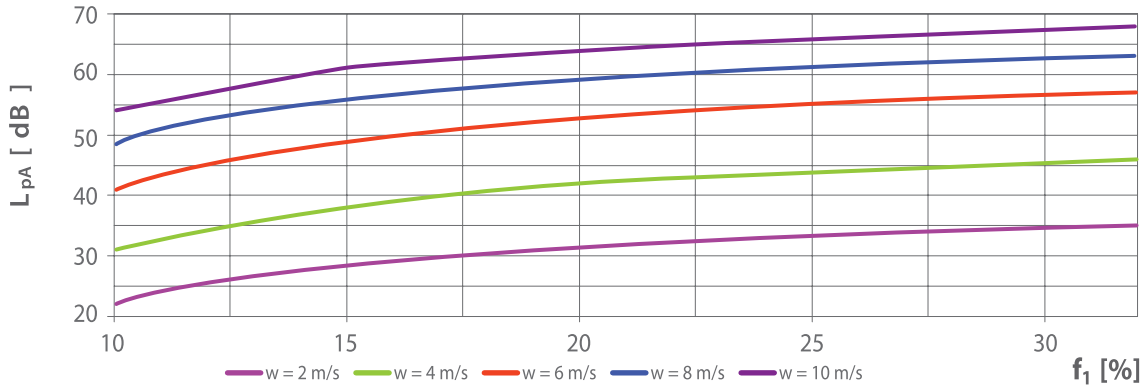
EFFECTIVE AREA AND f_1 COEFFICIENT VALUE

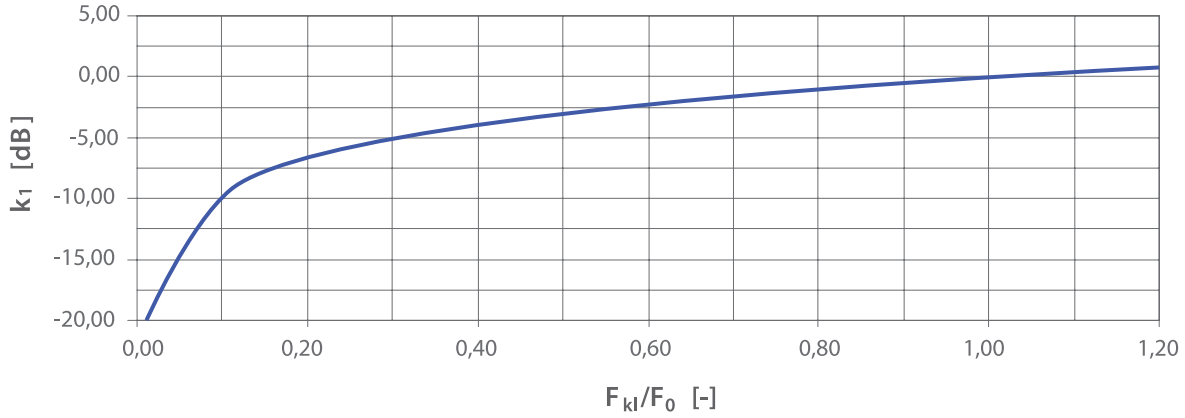
RK370M FIRE DAMPER						
D_n	100	125	160	200	250	315
A_{ef} [m²]	0,00453	0,00806	0,01466	0,02455	0,04046	0,067
f_1 [%]	31,8	25,5	19,9	15,9	12,7	8,1

FLOW RESISTANCE VALUES FOR RK370M DAMPERS DEPENDING ON f_1 AND W



L_{PA} AND L_{WA} SURFACE ACOUSTIC PRESSURE DEPENDING ON f_1 AND W





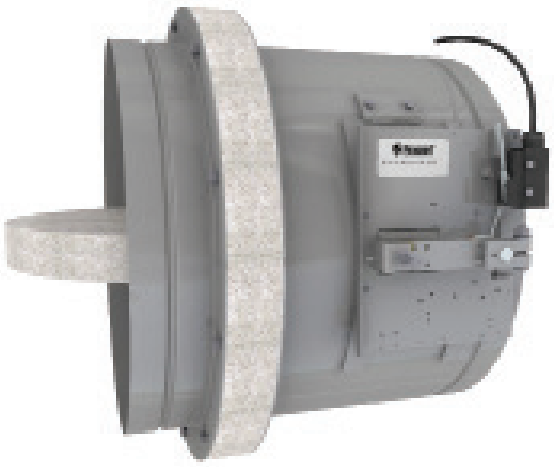
$$L_{wA} = L_{pA} + k_1 \quad [dB(A)]$$

where:
k_1 - correction in dB determined from the diagram depending on the F_{kl}/F_0 ratio
F_{kl} - damper cross-section area, m²
F_0 - reference area equal to 1 m²

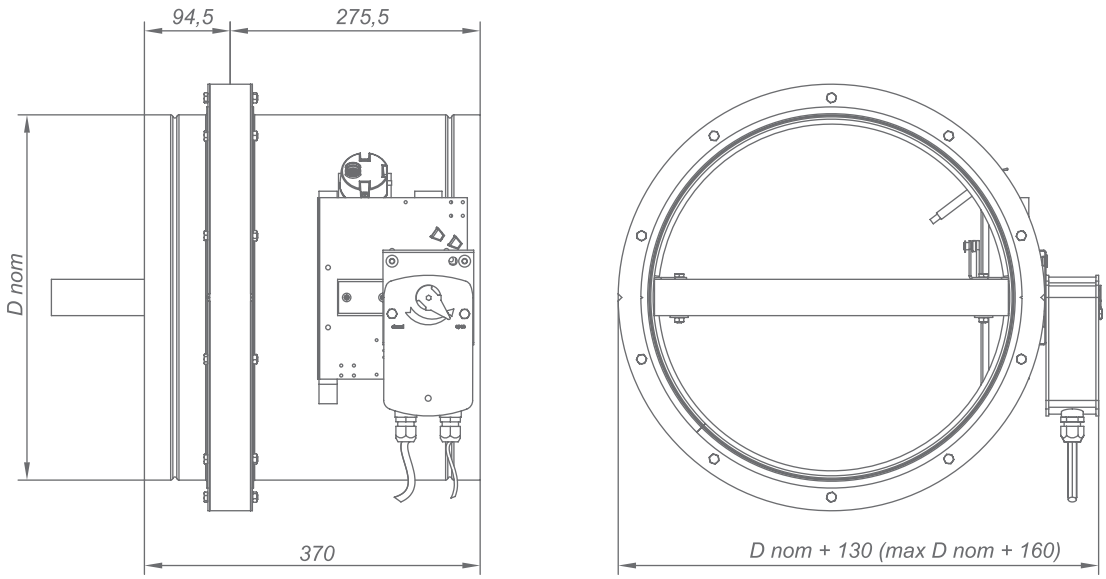
Fire dampers of RK370 type

CONSTRUCTION

In the standard version, **RK370** round fire dampers comprise two-part steel bodies made of galvanised steel, separated with distance elements that isolate both parts, cut-off partition made of fire-resistant Promatect plate suspended on hinges and tendons in the part isolating the bodies, ventilation and expanding seals, axle and flexible connector, as well as additional elements that differ for particular versions, which secure and execute the fundamental task of cutting off air flow in the event of fire, namely: elements retaining and setting the mobile partition in the open or closed position (lever-spring mechanism or a BELIMO servo).



The series of manufactured dampers of this type conforms to diameters recommended by PN-EN 1506 and amounts to: Dn = 400, 500, 560 and 630 mm. Dampers with ventilation ducts are connected with muffs. Total length of **RK370 dampers** amounts to 370 mm.

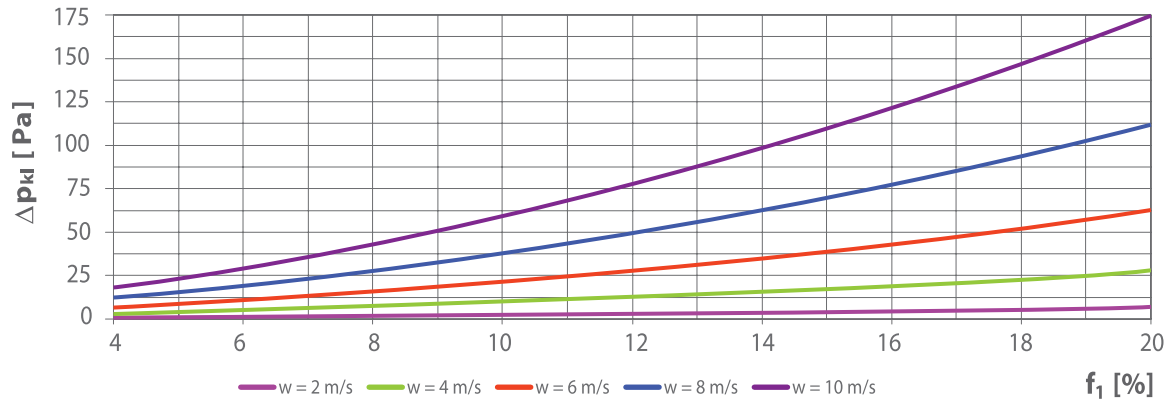


RK370 dampers are also made with diameters DN above 630 mm to 800 mm. For such sizes, they are made of rectangular (square) dampers of V370 type, with DxD dimensions with additional rectangular and round ducts connected with nipples or muffs. The length of square part of such a damper amounts to D+10 mm. On both sides, to the standard size of the damper (370 mm), straight ducts are assembled with relevant lengths, ensuring free opening of the damper. On both sides of such a kit (damper + ducts), there are transitions from square cross-section into round cross-section with the required diameter Dn. Total length of such a kit amounts to D+110 mm.

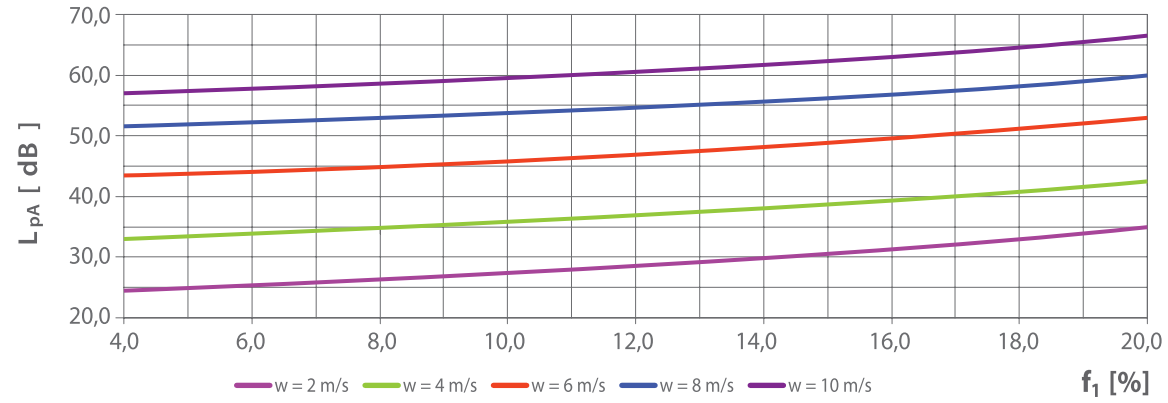
EFFECTIVE AREA AND F_1 COEFFICIENT VALUE

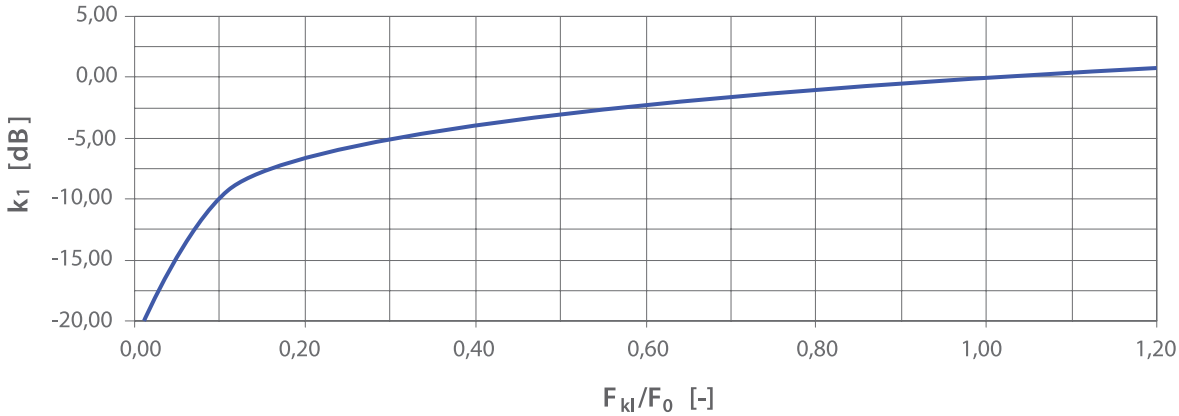
RK370 FIRE DAMPERS				
D_n	400	500	560	630
A_{ef} [m²]	0,099	0,163	0,209	0,270
f_1 [%]	12,7	10,6	9,1	8,1

FLOW RESISTANCE VALUES FOR RK370 DAMPERS DEPENDING ON f_1 AND W



L_{PA} AND L_{WA} SURFACE ACOUSTIC PRESSURE DEPENDING ON f_1 AND W





$$L_{wA} = L_{pA} + k_1 \quad [dB(A)]$$

where:

k_1 - correction in dB determined from the diagram depending on the F_{kl}/F_0 ratio

F_{kl} - damper cross-section area, m²

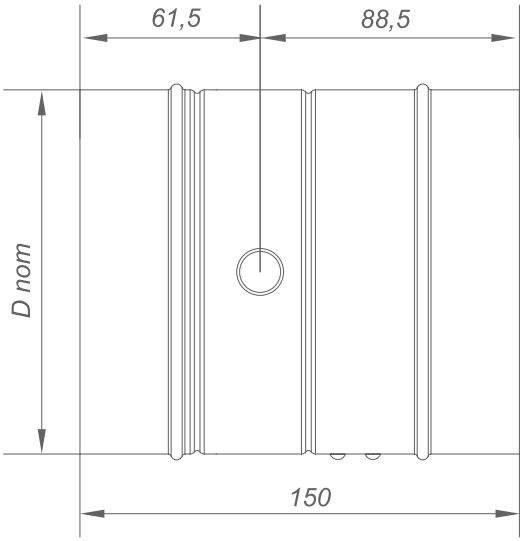
F_0 - reference area equal to 1 m²

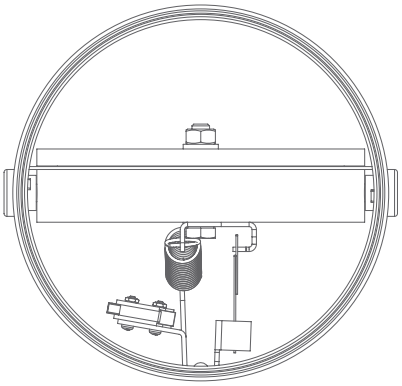
Fire dampers of RK150 type

CONSTRUCTION

RK150 fire dampers are made in four sizes (Dn=100; Dn=125; Dn=160 and Dn=200 mm). The length of the damper always amounts to 150 mm. Damper body is connected with ventilation installation with muffs or nipples. Damper partition drive is located inside the body. Dampers can be furnished with a thermal trigger adjusted to actuation at the temperatures of 72±5°C or 90±5°C.

In the standard version, **RK150** round fire dampers comprise single-part perforated body made of galvanised steel, cut-off partition made of Promatect fire-resistant plate suspended on tendons, ventilation and expanding seals, tripping device, closing spring and additional elements, such as holders and limiter of the cut-off partition for closed position.

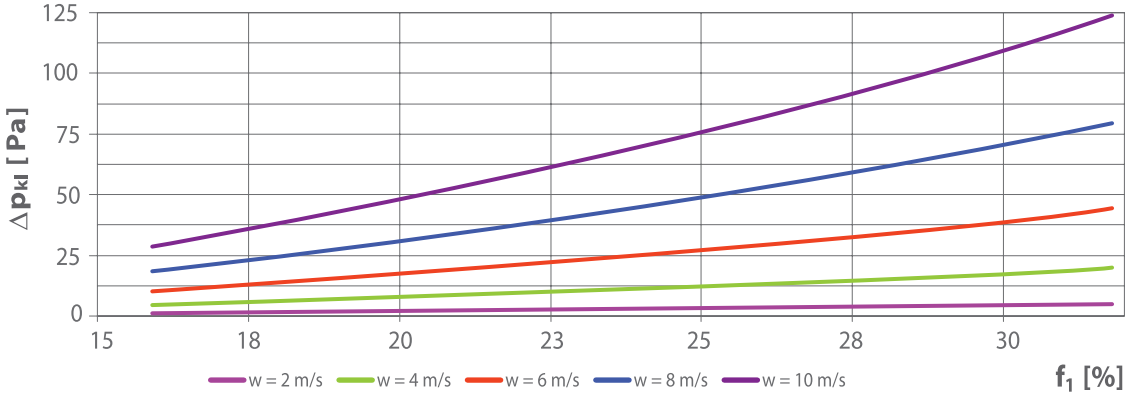




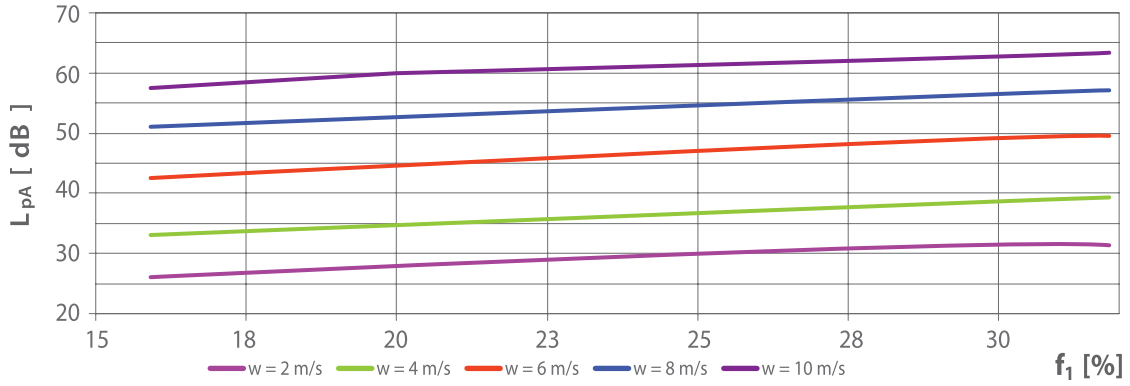
EFFECTIVE AREA AND F_1 COEFFICIENT VALUE

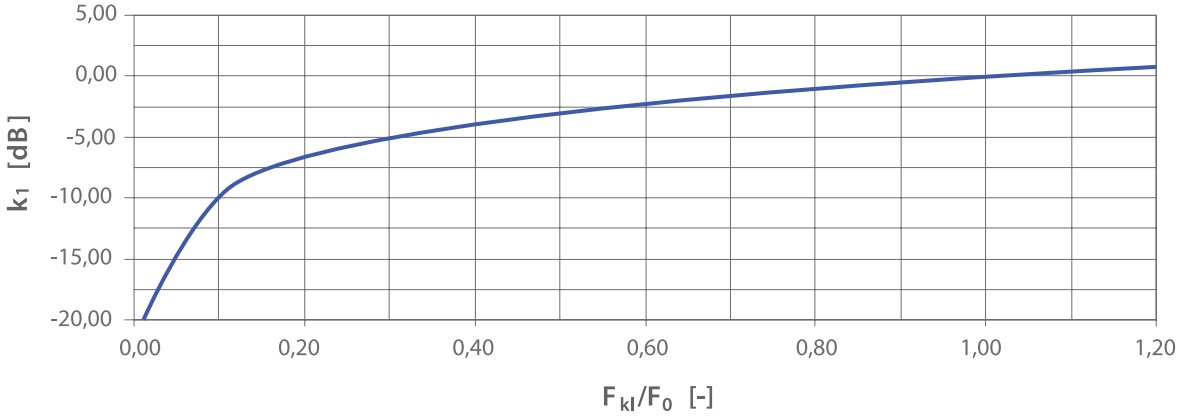
RK150 FIRE SAFETY DAMPERS				
D_n	100	125	160	200
A_{ef} [m2]	0,00457	0,00813	0,01475	0,02457
f_1 [%]	31,8	25,5	19,9	15,9

FLOW RESISTANCE VALUES FOR RK150 DAMPERS DEPENDING ON f_1 AND W



L_{PA} AND L_{WA} SURFACE ACOUSTIC PRESSURE DEPENDING ON f_1 AND W





$$L_{wA} = L_{pA} + k_1 \quad [dB(A)]$$

where:

k_1 - correction in dB determined from the diagram depending on the F_{kl}/F_0 ratio

F_{kl} - damper cross-section area, m^2

F_0 - reference area equal to 1 m^2

APPROVALS

FIRE DAMPERS OF V370 TYPE

- European Harmonised Standard PN-EN 15650:2010
- Certificate of Conformity No. 1488-CPD-0352/W
- Hygienic Attestation HK/B/1639/01/2012
- Declaration of Conformity

FIRE DAMPERS OF RK370 TYPE

- European Harmonised Standard PN-EN 15650:2010
- Certificate of Conformity No. 1488-CPD-0353/W
- Hygienic Attestation HK/B/1539/01/2012
- Declaration of Conformity

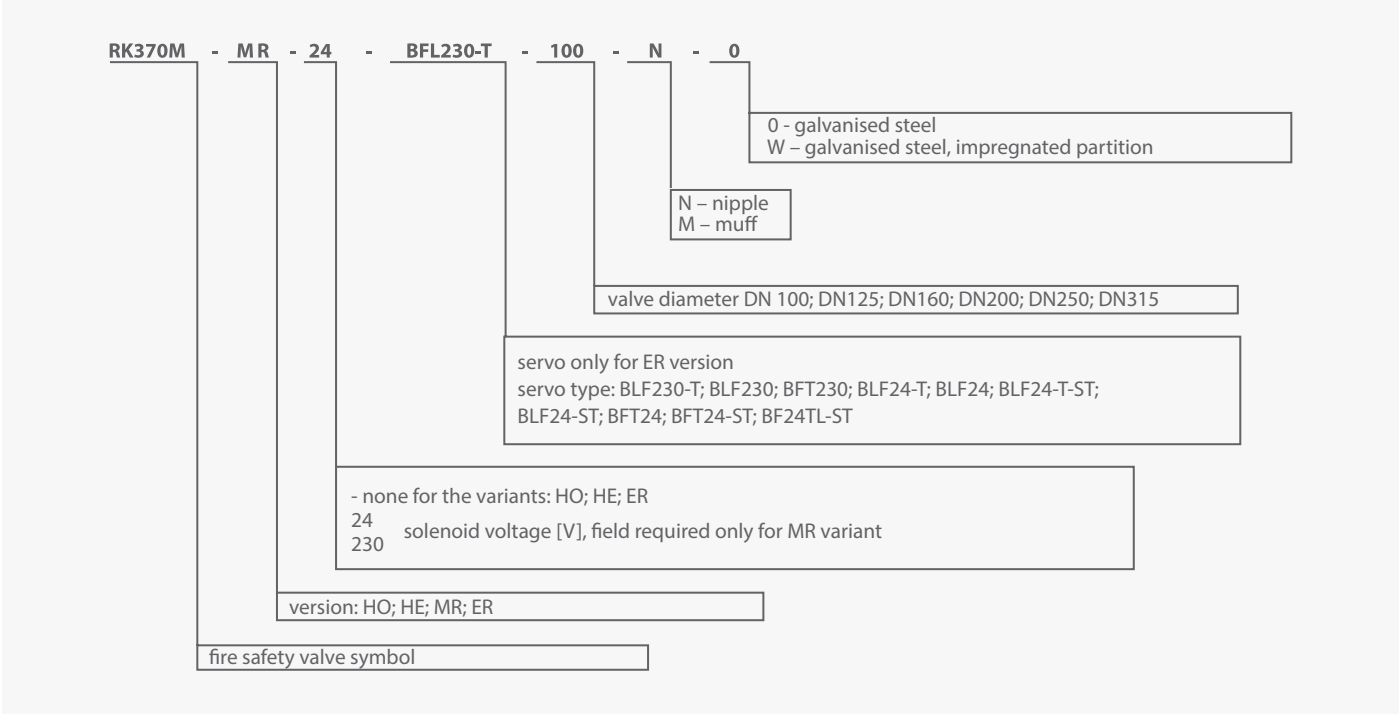
FIRE DAMPERS OF RK370M TYPE

- European Harmonised Standard PN-EN 15650:2010
- Certificate of Conformity No. 1488-CPD-0351/W
- Hygienic Attestation HK/B/1539/01/2012
- Declaration of Conformity

FIRE DAMPERS OF RK150 TYPE

- European Harmonised Standard PN-EN 15650:2010
- Certificate of Conformity No. 1488-CPD-0354/W
- Hygienic Attestation HK/B/1539/01/2012
- Declaration of Conformity

EXEMPLARY ORDER



2. SMOKE CONTROL DAMPERS

Smoke control damper VD37

APPLICATION

VD370 dampers are dampers intended for use in duct smoke extraction installations.They allow for following the fire scenario and correct operation of the smoke extraction installation.These are normally closed dampers.They can also act as cut-off dampers for household ventilation and operate as normally open dampers.**VD370** dampers feature fire resistance of two hours and remote control function after fire has been detected by the fire signalling system (EI 120 S AA).Installation details are provided in the Technical and Operational Documentation of the damper.

CONSTRUCTION

VD370 smoke control dampers are built of two-part rectangular steel body, one-surface cut-off partition and a drive system. The damper body is made of galvanised steel plate.

On the internal surface of the insulation insert, around the closed cut-off partition, there are expanding seal bars. Bearing profiles made of galvanised steel plate are fixed to the inner surface of the casing, limiting the movement of the rotating cut-off partition. The profiles are provided with silicate tape to ensure damper tightness in the ambient conditions.

The drive system comprises BLE or BE type actuator by BELIMO. The actuator is placed in an insulated casing with screwed-on cover to allow for maintenance access. Between the actuator casing and the damper body, there is a calcium-silicate board which facilitates insulation after the damper is connected to the installation. The drive from the actuator to the damper is transferred via live axle and flexible connector.

STANDARD CROSS-SECTIONS OF VD370 DAMPERS MANUFACTURED CAN BE ANY COMBINATION OF THE FOLLOWING B AND H DIMENSIONS ON CONDITION THAT THE NOMINAL AREA OF THE DAMPER CROSS-SECTION IS SMALLER OR EQUAL TO 1 M²:
B (width) = 150, 200, 250, 300, 350, 400, 450, 500, 560, 630, 750, 800, 900, 1000, 1100, 1200, 1250, 1300, 1400, 1500 mm.
H (height) = 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000 mm

It is possible to manufacture untypical dampers with intermediate sizes of dimensions **B** or **H**. Dampers with intermediate dimensions are subject to an extra charge.

The length **VD370** dampers amounts to 370 mm regardless of their size.In the event where the width of the damper (dimension B) or the height of the damper (dimension H) exceed permissible dimensions for a single damper, the damper with the required dimension is made as a battery of dampers analogical to **V370** dampers.

BE and BLE Belimo actuators feature installed micro-switches that signal drive shaft rotation by 5°and 85° (position signalling), hence it is not required to install additional micro-switches informing about position of the partition.

VD370 dampers can be furnished with the following actuators:BLE24; BLE24-ST; BLE230; BE24-12; BE24-12-ST and BE230-12.
BLE Belimo actuators with all variations are applied in dampers with cross-sections < 0.2 m, while BE actuators with all variations are applied in dampers with the cross-section of 0.2 m.
BLE24-ST and BE24-ST actuators are adjusted for connection via BKNE230-24 control and power module.

The damper normally remains closed. Moving the damper from closed to open position, and the other way round, from open to closed position, occurs after connecting relevant drive to actuator. VD370 dampers do not feature tripping devices, and actuators applied in them do not have a return spring (power shortage does not cause movement of the damper's cut-off partition).

The actuators applied are secured against overload, and thus power is supplied to them also during downtime at limit positions.All actuator types are furnished with a crank that allows for manual tuning of damper partition's position to check its operation.
All actuators feature in-built limit switches that signal the position of damper's partition.
Position of the partition can also be read from the mechanical position indicator placed on the actuator.

ELECTRICAL CONNECTION OF ACTUATORS

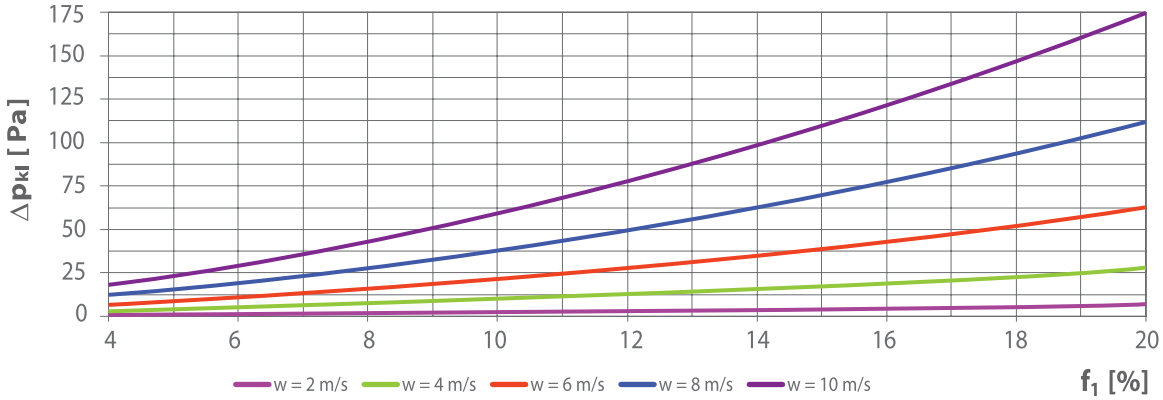
Power and control cables, led out from actuator casing, must be connected according to the relevant diagram and secured so that they ensure power supply to the actuator for the time not shorter than 2 minutes from receiving the signal from the fire sensor via fire-resistant conductors.
Before executing the connection, check for conformity of voltage supplied with the requirements of the actuator installed at the damper.Power supply must be connected via the automatic control sensors and via maintenance switches.
BE24-ST and BLE24-ST actuators are opened and closed via BKNE230-24 power and communication unit.The actuators are furnished with pin plugs on the power and control cable, which facilitate their connection with BKNE230-24 unit (three-pin plug for power and six-pin plug for control).

Details of electrical connections and the parameters of actuators applied are provided in the Technical and Operational Documentation for VD370 damper.

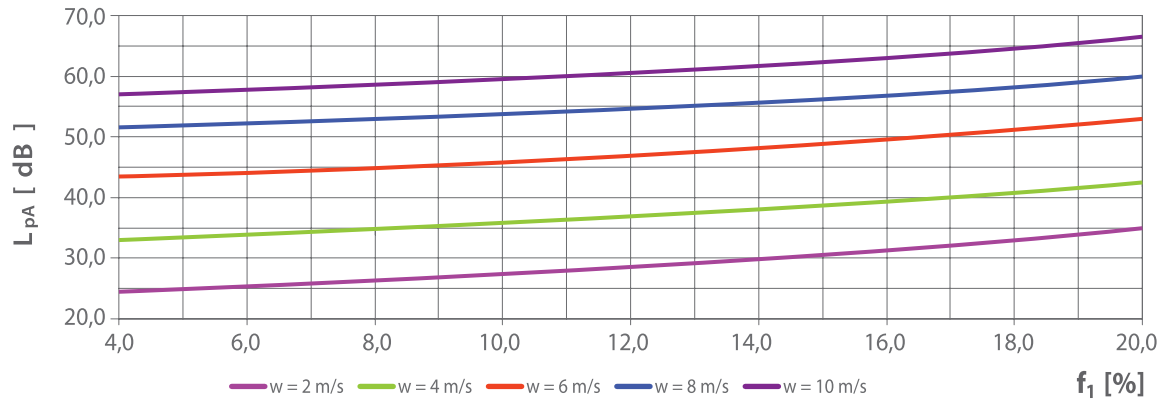
EFFECTIVE AREA AND f_1 COEFFICIENT VALUE

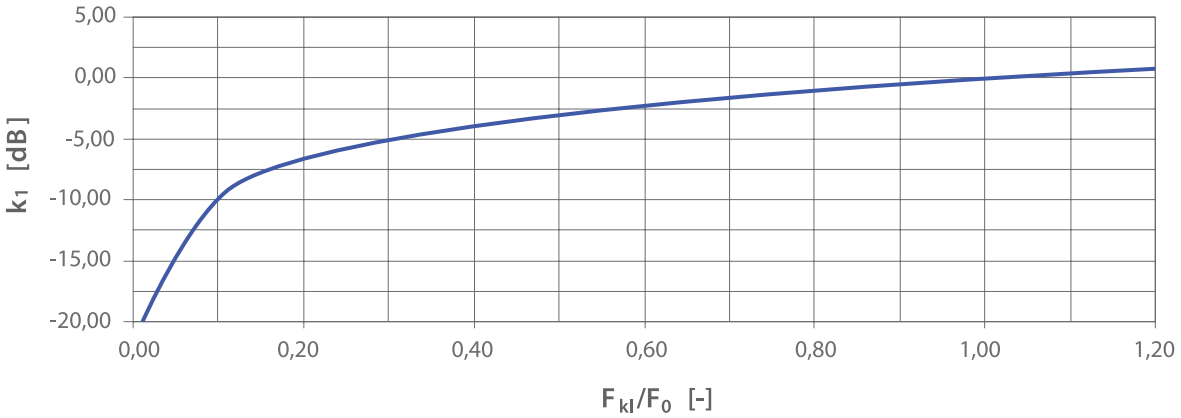
VD370 TYPE FIRE DAMPERS												
f_1	20,0	16,0	13,3	11,4	10,0	8,9	8,0	6,7	5,7	5,0	4,4	4,0
Dimensions	Height											
Width	200	250	300	350	400	450	500	600	700	800	900	1000
150	0,0156	0,0216	0,0276	0,0336	0,0396	0,0456	0,0516	0,0636	0,0756	0,0876	0,0996	0,1116
200	0,0221	0,0306	0,0391	0,0476	0,0561	0,0646	0,0731	0,0901	0,1071	0,1241	0,1411	0,1581
250	0,0286	0,0396	0,0506	0,0616	0,0726	0,0836	0,0946	0,1166	0,1386	0,16 06	0,1826	0,2046
300	0,0351	0,0486	0,0621	0,0756	0,0891	0,1026	0,1161	0,1431	0,1701	0,1971	0,2241	0,2511
350	0,0416	0,0576	0,0736	0,0896	0,1056	0,1216	0,1376	0,1696	0,2016	0,2336	0,2656	0,2976
400	0,0481	0,0666	0,0851	0,1036	0,1221	0,1406	0,1591	0,1961	0,2331	0,2701	0,3071	0,3441
450	0,0546	0,0756	0,0966	0,1176	0,1386	0,1596	0,1806	0,2226	0,2646	0,3066	0,3486	0,3906
500	0,0611	0,0846	0,1081	0,1316	0,1551	0,1786	0,2021	0,2491	0,2961	0,3431	0,3901	0,4371
560	0,0689	0,0954	0,1219	0,1484	0,1749	0,2014	0,2279	0,2809	0,3339	0,3869	0,4399	0,4929
630	0,0780	0,1080	0,1380	0,1680	0,1980	0,2280	0,2580	0,3180	0,3780	0,4380	0,4980	0,5580
750	0,0936	0,1296	0,1656	0,2016	0,2376	0,2736	0,3096	0,3816	0,4536	0,5256	0,5976	0,6696
800	0,1001	0,1386	0,1771	0,2156	0,2541	0,2926	0,3311	0,4081	0,4851	0,5621	0,6391	0,7161
900	0,1131	0,1566	0,2001	0,2436	0,2871	0,3306	0,3741	0,4611	0,5481	0,6351	0,7221	0,8091
1000	0,1261	0,1746	0,2231	0,2716	0,3201	0,3686	0,4171	0,5141	0,6111	0,7081	0,8051	0,9021
1100	0,1391	0,1926	0,2461	0,2996	0,3531	0,4066	0,4601	0,5671	0,6741	0,7811	0,8881	X
1200	0,1521	0,2106	0,2691	0,3276	0,3861	0,4446	0,5031	0,6201	0,7371	0,8541	X	X
1250	0,1586	0,2196	0,2806	0,3416	0,4026	0,4636	0,5246	0,6466	0,7686	0,8541	X	X
1300	0,1651	0,2286	0,2921	0,3556	0,4191	0,4826	0,5461	0,6731	0,8001	X	X	X
1400	0,1781	0,2466	0,3151	0,3836	0,4521	0,5206	0,5891	0,7261	0,8631	X	X	X
1500	0,1911	0,2646	0,3381	0,4116	0,4851	0,5586	0,6321	0,7791	X	X	X	X

FLOW RESISTANCE VALUES DEPENDING ON f_1 AND W



L_{PA} SURFACE ACOUSTIC PRESSURE DEPENDING ON f_1 AND W





$$L_{wA} = L_{pA} + k_1 \quad [dB(A)]$$

where:

k_1 - correction in dB determined from the diagram depending on the F_{kl}/F_0 ratio

F_{kl} - damper cross-section area, m^2

F_0 - reference area equal to 1 m^2

APPROVALS

SMOKE CONTROL DAMPER VD370

- Technical Approval AT-15-8023/2009
- Certificate of Conformance No. ITB-1809/W
- Hygienic Attestation HK/B/0232/02/2009
- Declaration of Conformity

EXEMPLARY ORDER

VD370 - BE24-12 - B - H - 0

- 0 – galvanised steel
  W – galvanised steel, impregnated partition
- valve height, size H [mm]
- valve width, size B [mm]
- servo type: BE24-12; BE24-12-ST; BLE24; BLE24-ST; BLE230; BE230-12
- fire safety valve symbol

3. FIRE VALVES

Fire valves ZPp60 and ZPp120 type

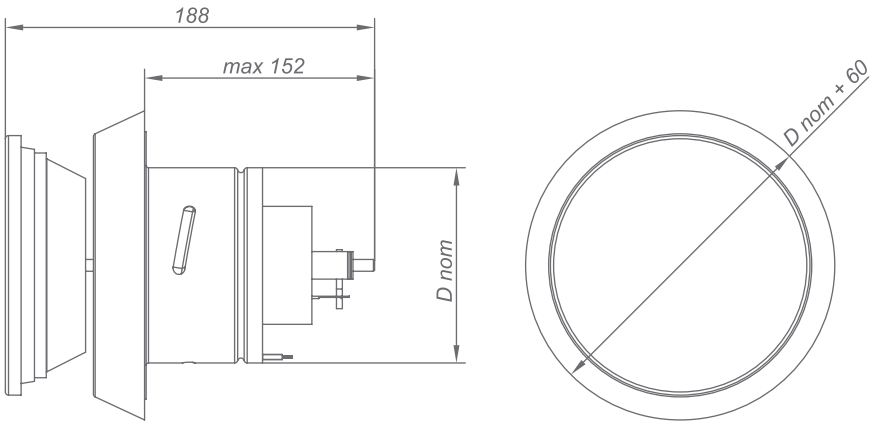
APPLICATION

Fire valves sserve for securing the rooms against the spread of fire and smoke via ventilation ducts in the event of fire. Their master function is to ensure the declared fire resistance of the partition in the event of fire by automatic closure of the opening made at the point of the installation's passing through a partition. Apart from the fire safety function, they also have the function of air supply to the room. Fire valves type **ZPp60** have the declared fire resistance EIS 60. Fire valve type **ZPp120**, installed in the appropriately prepared opening, have the declared fire resistance EIS 120. Installation details are provided in the Technical and Operational Documentation for valve type.

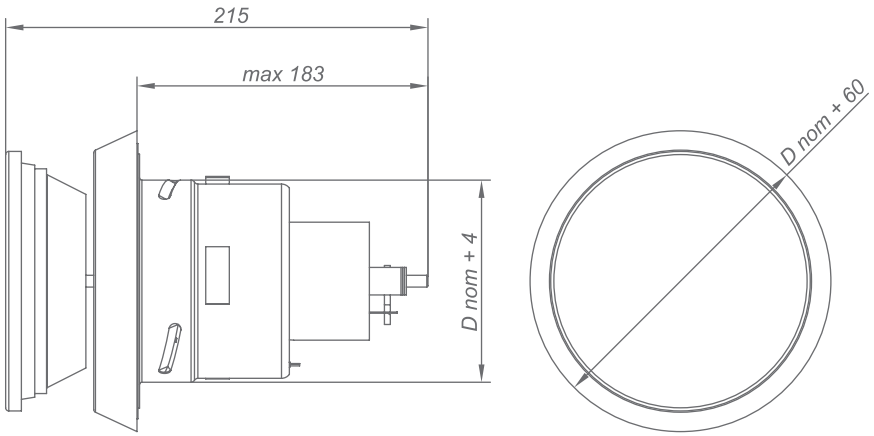
CONSTRUCTION

The valve comprises the body assembly, cut-off head assembly, regulation & closure mechanism with power spring, heat responsive element, and connection stub. The body assembly features a seal ensuring tight connection between the body and the stub. Expansion seal additionally tightens this connection. In the body assembly, claws and embossments made on the anchor allow for fixing the valve in the connection stub. The head assembly features a seal that ensures tightness of the valve when closed. Head location in the closed position is blocked by the spring. The regulation & closure mechanism features a screw for blocking the set location of the head.

Valves for special orders can be furnished with limit switches that serve for transmitting the signal about closure of the valve head. The limit switch is an additional fitting of the valve.



Structure and sizes of ZPp60 fire valve



Structure and sizes of ZPp120 fire valve

VALVE OPERATING METHOD:

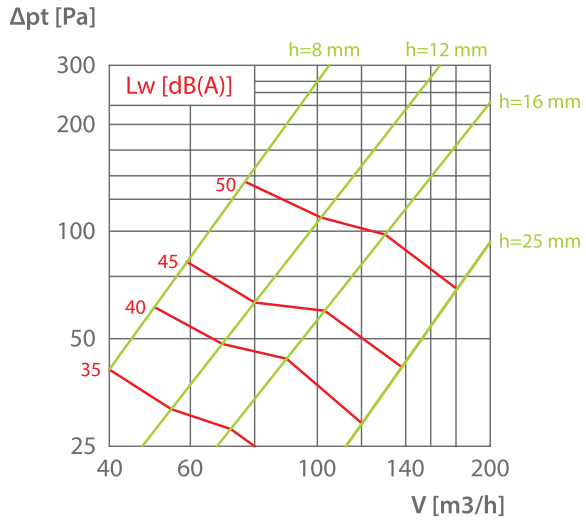
Cut-off-fire valves are supplied in the closed position. To open the valve, squeeze the winglets of the blocking spring and at the same time stretch the closing spring until the appropriate length is achieved to allow for placement of the soldered release device. Regulation of valve efficiency occurs by change of the distance between the valve head and the body. Temperature of release device operation by standard amounts to 72°C, and optionally to 90°C. During normal operation, cut-off valve is in the open position. In the event of fire, after the temperature limit is breached, the catch is unsoldered, which causes valve head closure.

TYPE / SIZE	RESISTANCE CLASS	TOTAL LENGTH [MM]	DEPTH OF INSTALLATION [MM]	VALVE WEIGHT [KG]
ZPp60 - 100	EI 60 S	187	152	1,1
ZPp60 - 125				1,4
ZPp60 - 160				1,8
ZPp60 - 200				2,33

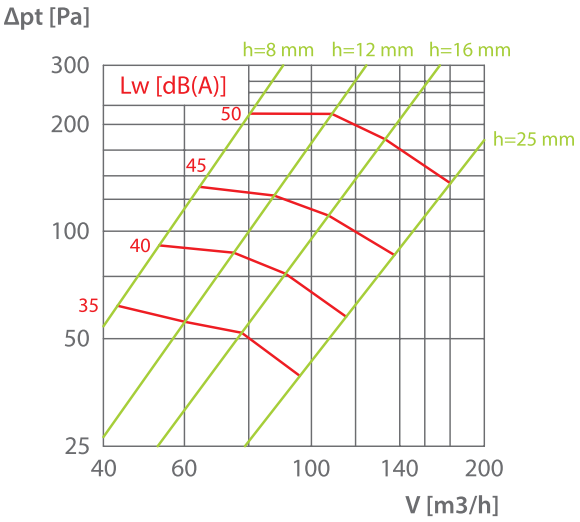
TYPE / SIZE	RESISTANCE CLASS	TOTAL LENGTH [MM]	DEPTH OF INSTALLATION [MM]	VALVE WEIGHT [KG]
ZPp120 - 100	EI 120 S	215	183	1,22
ZPp120 - 125				1,49
ZPp120 - 160				1,83
ZPp120 - 200				2,39

FLOW RESISTANCE VALUES FOR ZPP60 AND ZPP120 TYPE VALVES DEPENDING ON AIR FLOW RATE "V" AND SLOT SIZE "H"

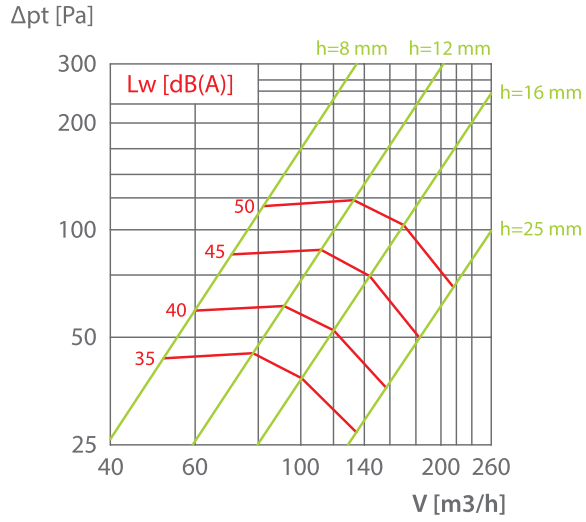
DN 100 EXHAUST



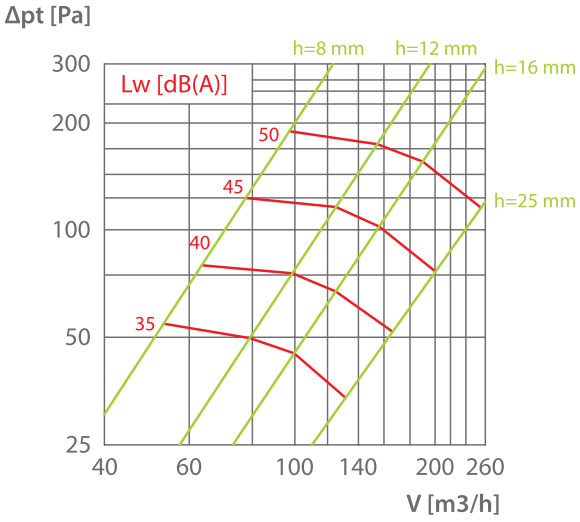
DN 100 AIR SUPPLY



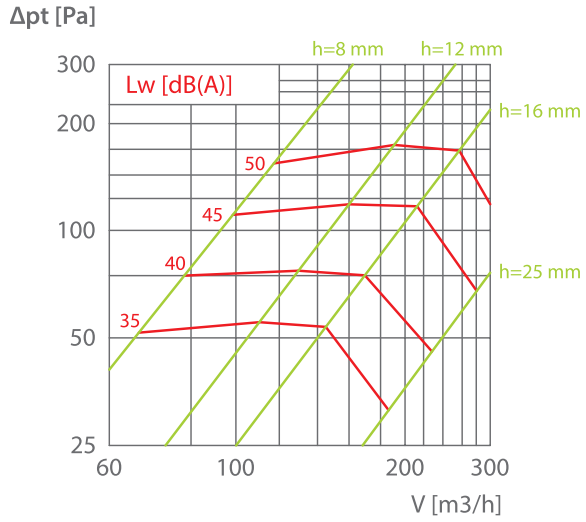
DN 125 EXHAUST



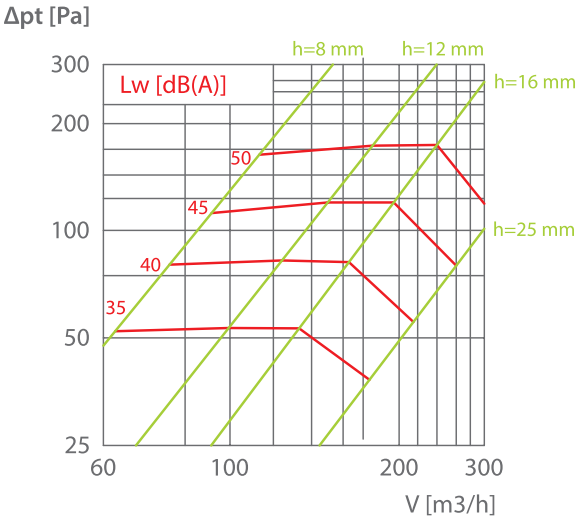
DN 125 AIR SUPPLY



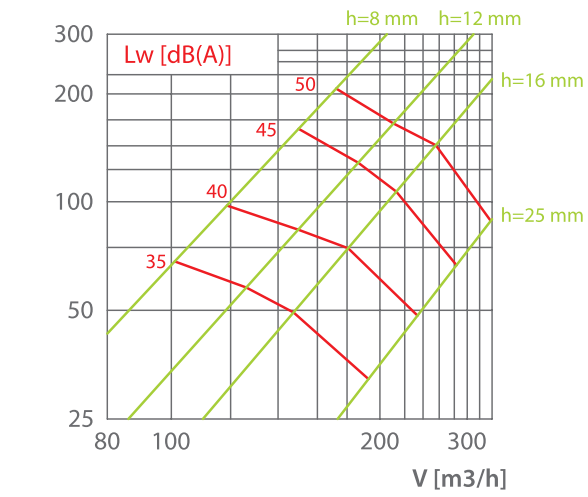
DN 160 EXHAUST



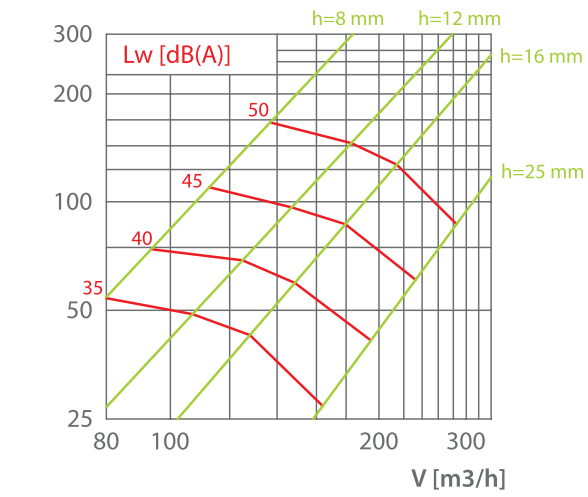
DN 160 AIR SUPPLY



DN 200 EXHAUST

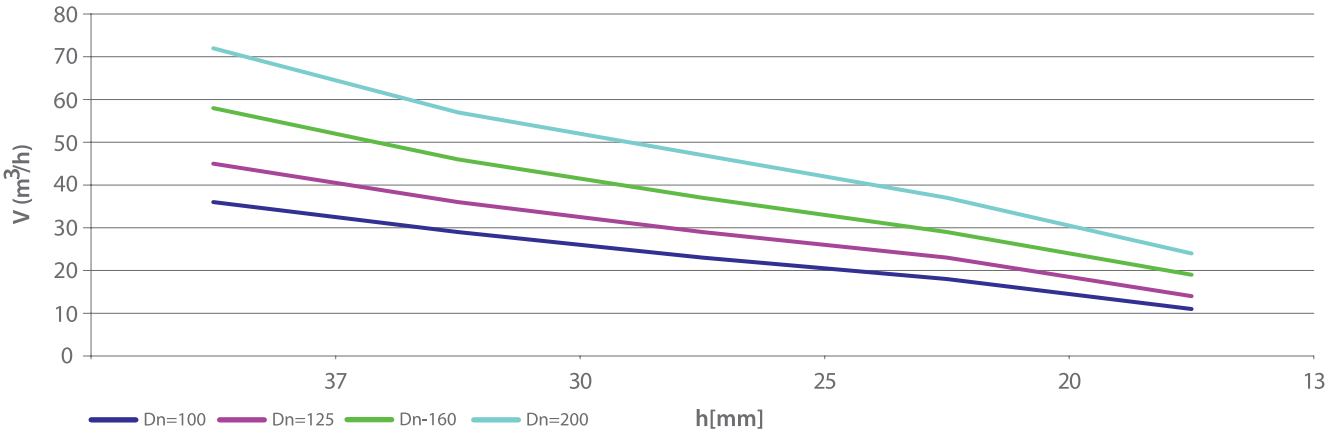


DN 200 AIR SUPPLY

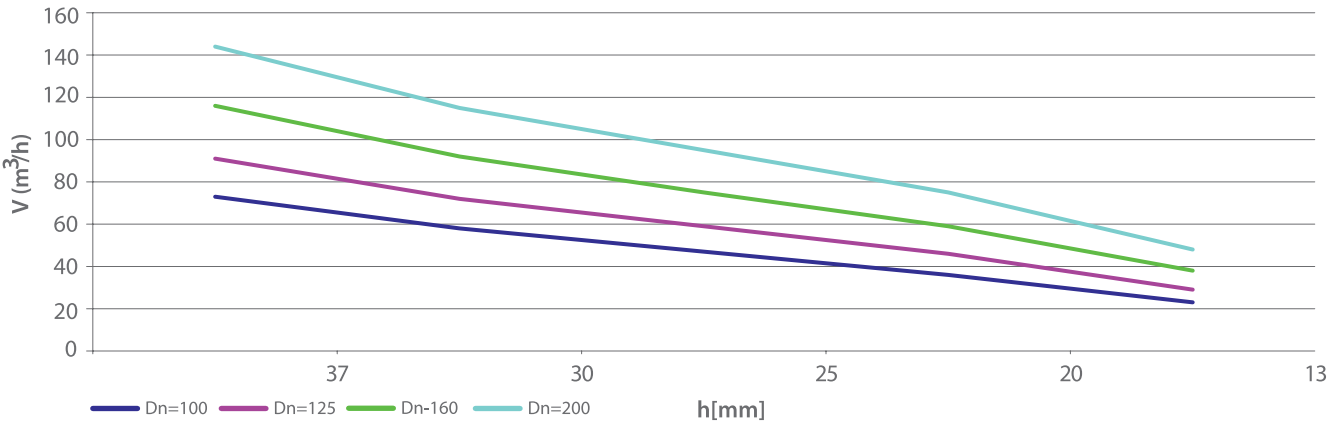


CORRELATION DIAGRAM OF AIR FLOW RATE "V" AND SLOT SIZE "H"

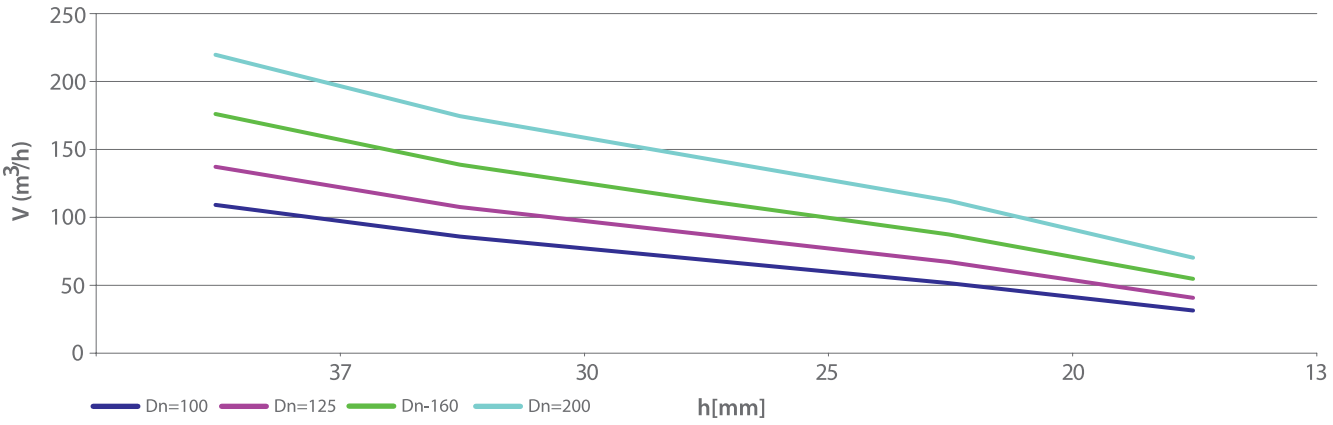
AIR FLOW RATES V FOR W = 2 [M/S] AND SLOT H



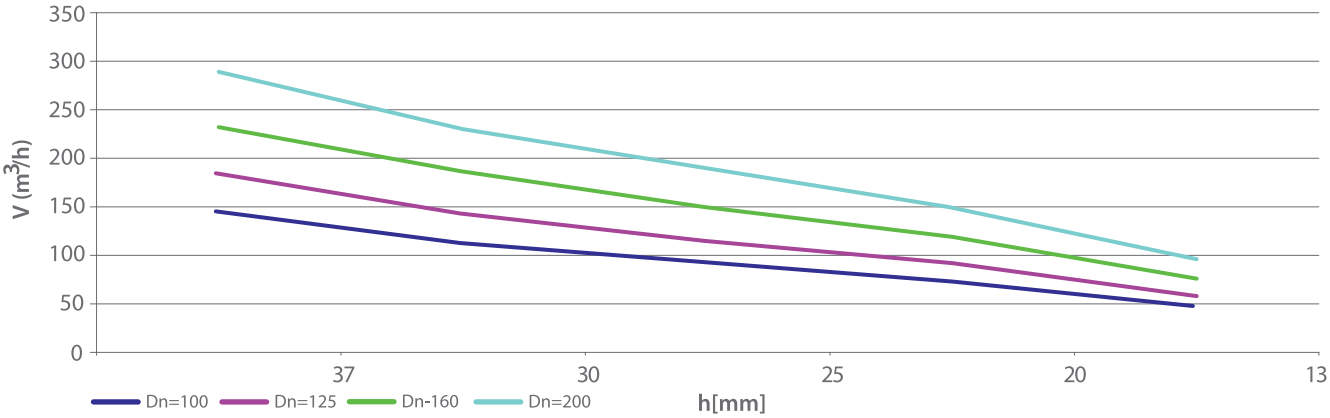
AIR FLOW RATES V FOR W = 4 [M/S] AND SLOT H



AIR FLOW RATES V FOR W = 6 [M/S] AND SLOT H



AIR FLOW RATES V FOR W = 8 [M/S] AND SLOT H



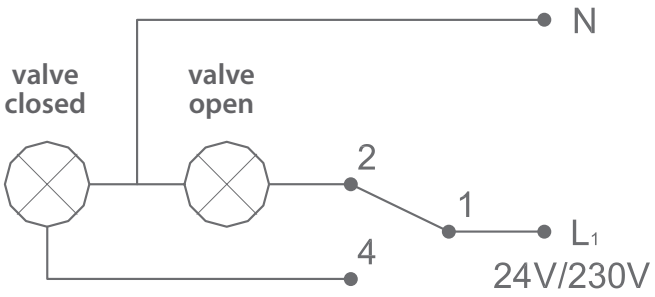
VALVE REGULATION

Cut-off fire valve is regulated to set the volume of air flow (exhaust or supply).For regulation, the valve is turned off the connection.Valve regulation is performed in the open position, previously releasing the blocking screw, and then, by turning the valve head against the body, the size of the slot “h” is set. After regulation, immobilise the valve head with the screw, and place it back in the connection.Informative data on interdependence between air flow rate "V" and the distance "h" at various air outflow velocities have been provided in the diagrams attached.

CAUTION!Changing the position of the immobilised valve head (when the screw is tightened) can damage the valve.

OPTIONAL EQUIPMENT

Cut-off fire valves on special orders can be furnished with limit switch, used for transmitting the signal about closure of valve head. Conceptual diagram showing connection of the limit switch has been presented in the diagram.



APPROVALS

FIRE VALVES ZPp60 AND ZPp120 TYPE

- Technical Approval ITB AT-15-6956/2009
- Certificate of Conformity No. ITB-1498/W
- Hygienic Attestation HK/B/0232/01/2009 - for ZPp60
- Hygienic Attestation HK/B/0842/01/2006 - for ZPp120

EXEMPLARY ORDER

ZPp60 - HE - 100 - K - T

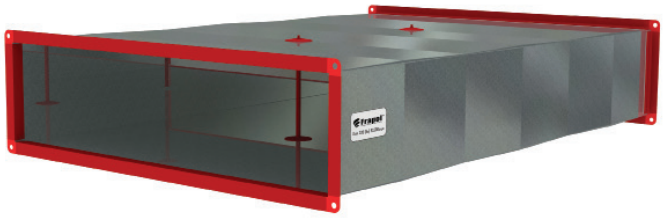
- **ZPp60** – fire valve symbol
- **HE** – HO - basic variant; HE - variant with a micro-switch
- **100** – diameter DN 100; DN125; DN160; DN200
- **K** – - no standard version; K - with auxiliary flange
- **T** – R - powder-painted acc. to RAL palette, RAL 9010-standard; E - powder-painted with epoxy paint acc. to RAL palette; T - powder-painted with temperature paint

4. PDSMOKEEXTRACTIONDUCTS

PD single-compartment smoke extraction ducts

APPLICATION

They can serve for construction of smoke extraction installation or for mixed ventilation installation which at the same time has the function of general and smoke removing ventilation, with the assumption that they support exclusively the zone where they are located. The installations, referred to as single compartment installation, can be individual or can be connected with collective, multi-compartment installation. One must remember that crossing a fire partition is treated as an element of multi-compartment installation. PD ducts can only be installed in horizontal installations.**PD ducts** can only be installed in horizontal installations.



In single compartment installation, there is no need for applying solutions guaranteeing thermal insulation (fire-protective plates, mineral wool).

PD ducts can form part of the installation with operating pressure within the range of -1500 [Pa] to +500 [Pa].
They can be applied both in air supply and exhaust installations.
Types of elements, dimensions, and assembly method are similar to standard ventilation installation. FRAPOL offers full PD type smoke extraction system. It contains elements of smoke removing installation with connecting and assembly elements and with assembly compliant with updated fire safety requirements. The system does not include regulating and terminating elements or smoke control damper.
The supreme task of smoke removing installation is elimination of hot gases and smoke from the area covered with fire in order to facilitate evacuation of people and allow for extinguishing measures.
Steel smoke extraction ducts of PD type supporting one fire zone, with fire resistance E_{600} 120 (ho) S1500 single.
Installation details are provided in the Technical and Operational Documentation for **PD ducts.**

CONSTRUCTION

PD type ducts are straight sections and profiles with versions, main dimensions and tolerances compliant with standard PN-EN 1505:2001: "Sheet metal air ducts and fittings with rectangular cross sections". Maximum cross--sections of the ducts amounts to 1250 x 1000 [mm], and the maximum length of the straight duct or profile - 1500 [mm].

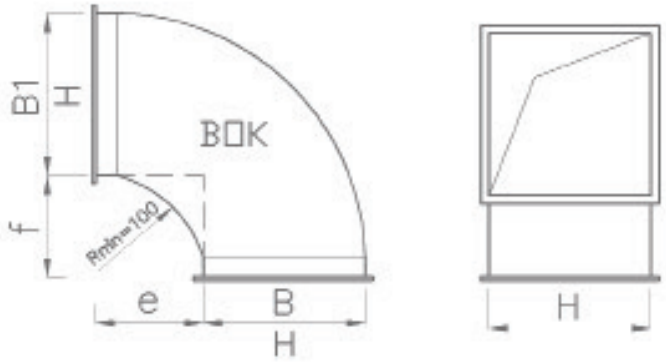
The structure of **PD steel smoke extraction ducts** guarantees fire resistance and smoke-tightness of 120 minutes. They have been admitted to application in fire zones with the ceiling featuring fire resistance of up to REI120 inclusive. They serve for construction of horizontal installations of one-zone smoke extraction ventilation in any buildings (underground garages, shopping centres, residential and office buildings). In such installations, there is no need for applying any additional fire-resistant plates or mineral wool. This allows for significant cost reduction of such an installation with simultaneous meeting fire safety requirements.

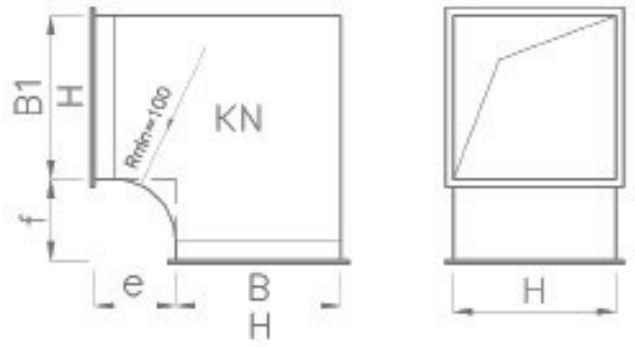
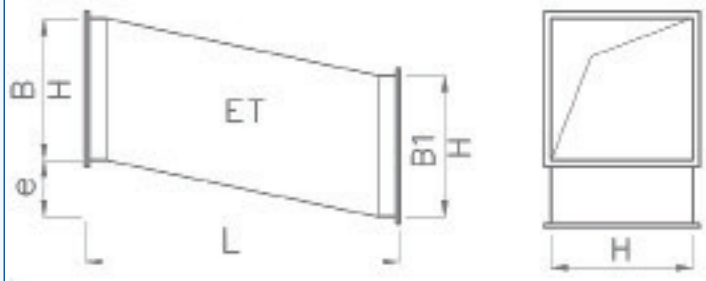
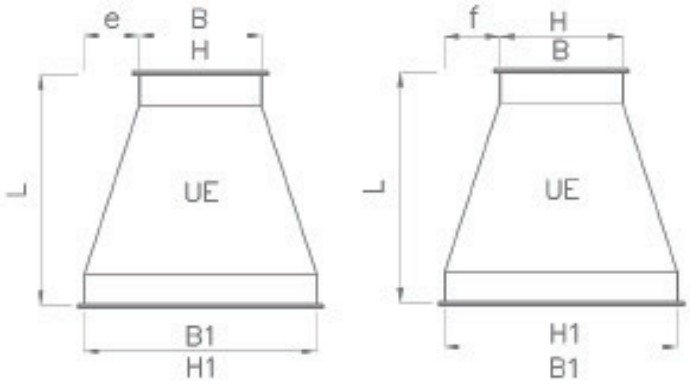
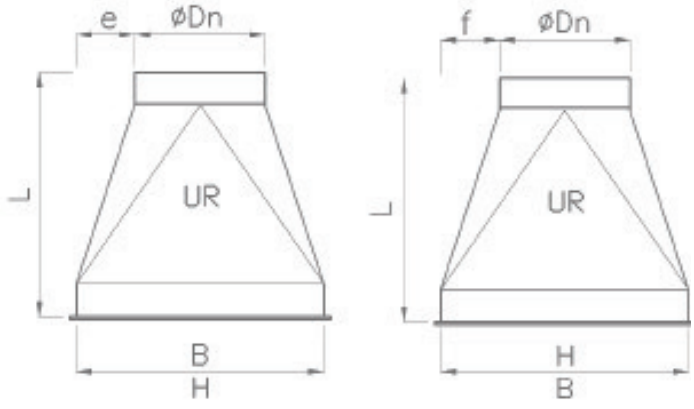
INSTALLATION OF PD DUCTS

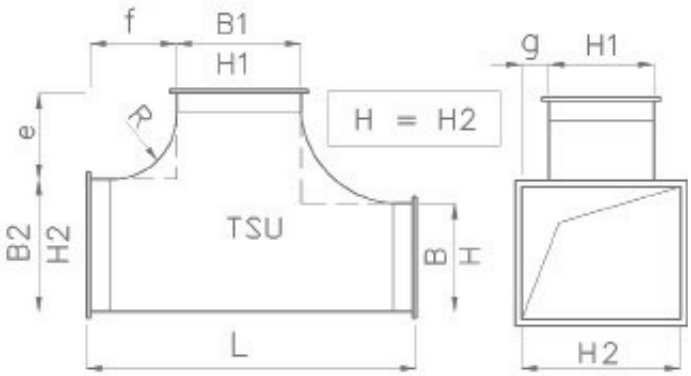
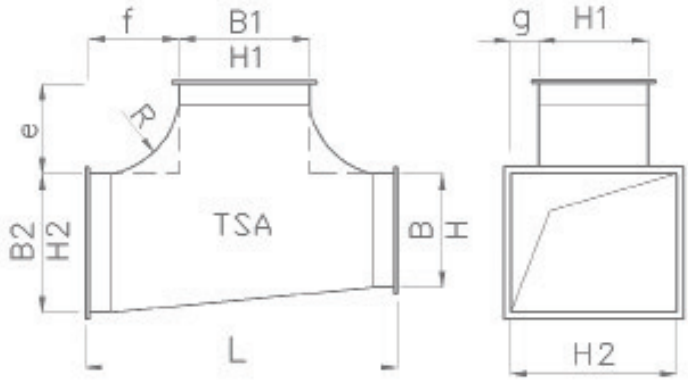
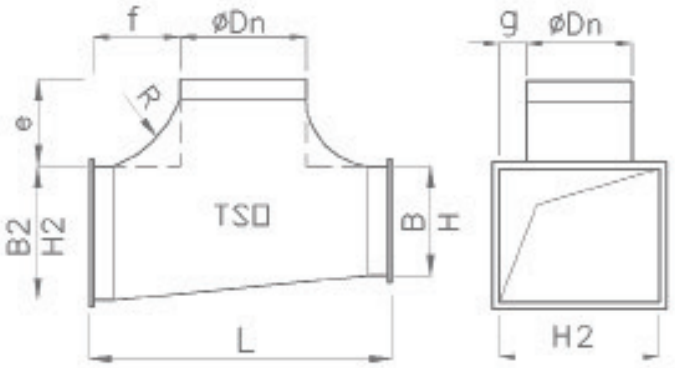
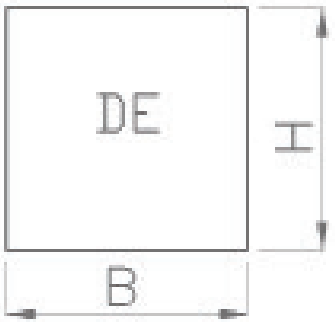
Due to the important role of the smoke extraction ventilation installation in anti-fire protection of buildings and individual nature of each project, installation of **PD ducts** can only be performed by **FRAPOL** or a company having a relevant licence issued by **FRAPOL**. The licence is granted on the basis of training.

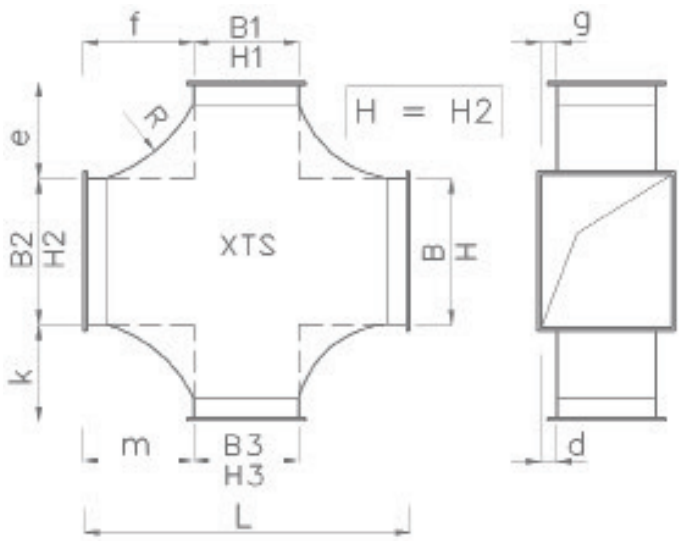
STANDARD SERIES OF CROSS-SECTION SIZES OF PD DUCTS WITH NOMINAL CROSS-SECTION DIMENSIONS IN [M²]:

Side length H [mm] / B [mm]	100	150	200	250	300	400	500	600	800	1000
200	0,020	0,030	0,040	0,050	0,060	0,080	0,100	0,120	0,160	0,200
250	0,025	0,038	0,050	0,063	0,075	0,100	0,125	0,150	0,200	0,250
300	0,030	0,045	0,060	0,075	0,090	0,120	0,150	0,180	0,240	0,300
400	0,040	0,060	0,080	0,100	0,120	0,160	0,200	0,240	0,320	0,400
500	0,050	0,075	0,100	0,125	0,150	0,200	0,250	0,300	0,400	0,500
600	0,060	0,090	0,120	0,150	0,180	0,240	0,300	0,360	0,480	0,600
800	0,080	0,120	0,160	0,200	0,240	0,320	0,400	0,480	0,640	0,800
1000	0,100	0,150	0,200	0,250	0,300	0,400	0,500	0,600	0,800	1,000
1250	0,125	0,188	0,250	0,313	0,375	0,500	0,625	0,750	1,000	1,250

SYMBOL	NAME	DRAWING
KGE	DUCT	
BOK	ARCH	

SYMBOL	NAME	DRAWING
KN	ELBOW	
ET	FAULT	
UE	DIFFUSER	
UR	DIFFUSER	

SYMBOL	NAME	DRAWING
TSU	T-PIPE	
TSA	ASYMMETRICAL T-PIPE	
TSO	T-PIPE WITH ROUND CONNECTOR	
DE	BLIND	

SYMBOL	NAME	DRAWING
XTS	CROSS-PIPE	

Profiles with a different shape than presented above are manufactured on special request according to the client's drawings.

Sizes of the elements according to Din 18379.

APPROVALS

PD SMOKE EXTRACTION DUCTS

- **Technical Approval ITB AT-15-8601/2011**
- **Certificate of Conformance No. ITB-2039/W**
- **Hygienic Attestation HK/B/0315/01/2011**

FRAPOL Ltd
PL 30-832 Kraków, ul. Mierzeja Wiślana 8
phone [+48] 12 653 27 66, [+48] 12 659 05 77
fax [+48] 12 653 27 89
biuro@frapol.com.pl

WWW.FRAPOL.COM.PL