

WK45

Technical Manual
Installation type with fire resistance class
English
FIRE DAMPER
RECTANGULAR SERIES WK45 - 500 Pa
Cert. N° 1812-CPR-1006



This is a 58 page manual.

1. Overview	p. 4
1.1. Description	p. 4
1.2. General characteristics	p. 4
1.3. European Standards applied	p. 4
1.4. Certifications and approvals	p. 4
1.5. Components	p. 4
1.6. Available dimensions	p. 5
1.7. Paired fire dampers wall opening	p. 6
1.8. Fire dampers pairing	p. 6
1.9. Performances	p. 8
1.10. Fire resistance classification according to EN 13501-3-2009	p. 9
1.11. Mechanism type	p. 12
2. Technical data	p. 14
2.1. Dimension	p. 14
2.2. Weights	p. 15
3. Installation	p. 16
3.1. Intended use	p. 16
3.2. Not allowed uses	p. 16
3.3. Blade rotation axis positioning	p. 16
3.4. Positioning brackets before fixing	p. 16
3.5. Installation of flexible connectors in order to balance out the ventilation ducts expansion	p. 16
3.6. Transfer Application (application not connected to air ducts on one or both sides)	p. 17
3.7. Minimum distances	p. 19
3.8. Construction supports characteristics	p. 20
3.9. Installations within vertical rigid wall	p. 23
3.10. Installations within vertical light wall (plasterboard)	p. 25
3.11. Installation within vertical light wall (gypsum blocks wall)	p. 28
3.12. Installations within floor	p. 29
3.13. Installations within vertical wall with Fire Batt (Weichschott) sealing	p. 30
3.14. Installation within floor with Fire Batt (Weichschott) sealing	p. 31
4. Electrical connections	p. 32
4.1. Electrical wiring	p. 32
4.2. Electrical specifications	p. 34
5. Maintenance and inspections	p. 35
5.1. Periodic inspection and cleaning	p. 35
5.2. Repair	p. 35
5.3. Disposal	p. 35
6. Selection	p. 36
6.1. Air flow rates in relation to the diameter	p. 36
6.2. Air flow rates as a function of the pressure drop	p. 39
6.3. Air flow rates as a function of generated sound levels	p. 42
6.4. Pressure drop and sound level graph for base 400 mm	p. 45
6.5. Correction for base different than 400 mm	p. 46
6.6. Sound spectrum table	p. 46
7. Accessories and spare parts	p. 47
8. How to order	p. 50
8.1. Motorized fire dampers	p. 50
8.2. Fire damper with manual control	p. 50
8.3. Electric motor driven actuators	p. 51
9. Specification Text	p. 53
9.1. Series WK45 rectangular fire damper	p. 53
10. Revision Index	p. 54

1. OVERVIEW

1.1. Description

Fire dampers WK45 are devices for use in heating, ventilation and air-conditioning (HVAC) systems at fire boundaries to maintain compartmentation and protect means of escape in case of fire. They satisfy integrity, insulation and smoke leakage criteria for the declared time of fire resistance.

Tested and classed in accordance with EN 1366-2 and EN 13501-3 regulations with 500 Pa depression (300 Pa for installations with Weichschott sealing).

Studied and optimized for medium and big size ducts focusing on aerualic and acoustical performance.

1.2. General characteristics

- Casing made from galvanized carbon steel.
- Intumescent sealing gasket.
- Opening/closing mechanism with IP42 protection box (IP54 for motorized version).
- 40 mm thick closing blade made with refractory material.
- Cold smoke air seal gasket
- Internal intumescent gasket for hot smoke seal.

1.3. European Standards applied

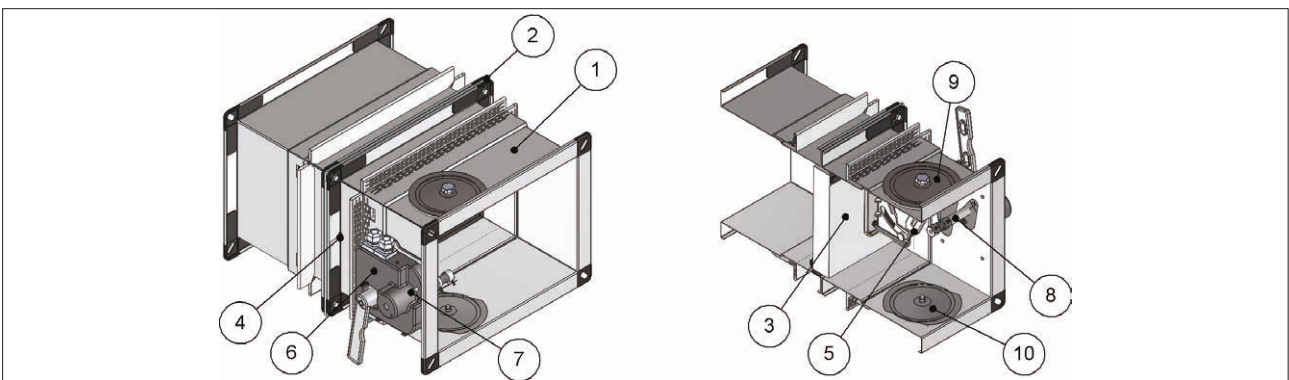
Test	EN 1366-2
Thermal fuse reliability	ISO 10294-4
Classification	EN 13501-3
Air Seal	EN 1751
Resistance to corrosive environments	EN 60068-2-52
CE certification	EN 15650

1.4. Certifications and approvals

CE Certificate of Constancy of Performance	n° 1812-CPR-1006	Efectis
NF certification *Refer to specification Notice Technique NF*	n° 28/01	AFNOR
VKF-AEAI Approval (Switzerland)	n° 23220	VKF-AEAI
RISE Approval (Sweden)	n° SC0185-16	RISE

1.5. Components

1. Casing made from 2 galvanized carbon steel ducts.
2. Mineral fiber gasket between the 2 fire damper casings.
3. Damper blade made from refractoring material
4. Blade rotation axis, pivots housing.
5. Blade drive with crank and slotted link mechanism
6. Protection box
7. Manual closing device (Test button)
8. Temperature controlled closing device (thermal fuse)
9. OPTIONAL Inspection opening side "A"
10. OPTIONAL Inspection opening side "C"



1.6. Available dimensions

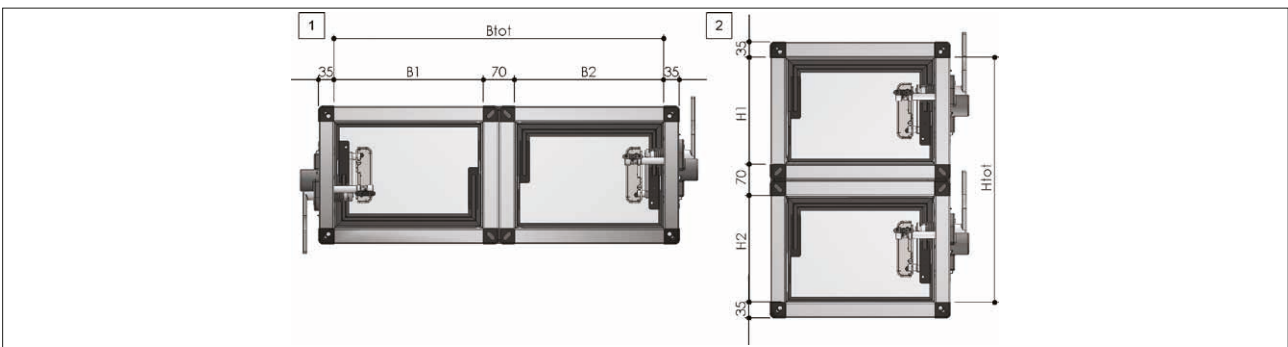
1.6.1. Single fire dampers

Fire dampers are available in all base-height combination indicated below, excluded sizes: 200x650, 200x700, 250x700, 200x750, 250x750, 300x750, 350x750, 200x800, 250x800, 300x800, 350x800.

Available height	mm	200	250	300	350	400	450	500	550	600	650	700	750	800	
Available base	mm	200	250	300	350	400	450	500	550	600	650	700	750	800	850
Available base	mm	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	

1.6.2. Fire dampers pairing for big ducts dimensions

1. Side by side paired fire dampers
2. Vertically paired fire dampers



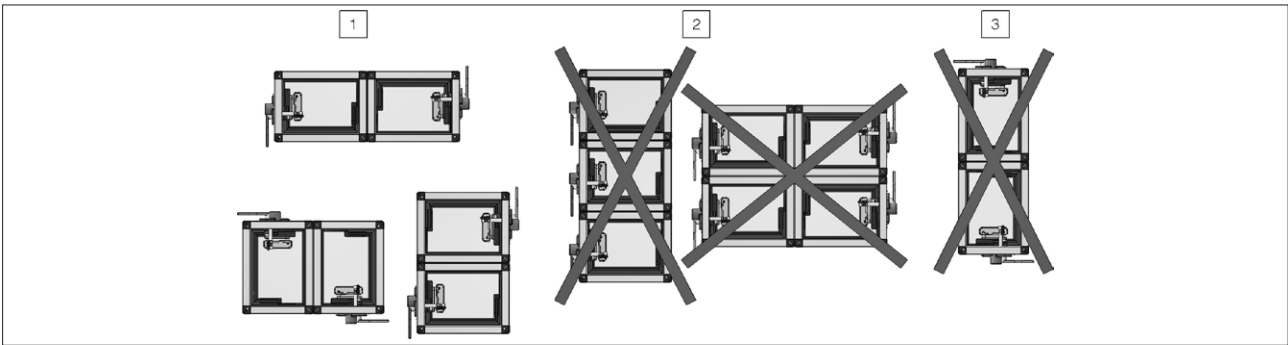
Side by side paired fire dampers																	
Required base	mm	1600	1600	1700	1700	1800	1800	1900	1900	2000	2000	2100	2100	2200	2200	2300	2300
B tot	mm	1570	1620	1670	1720	1770	1820	1870	1920	1970	2020	2070	2120	2170	2220	2270	2320
B1	mm	750	800	800	850	850	900	900	950	950	1000	1000	1050	1050	1100	1100	1150
B2	mm	750	750	800	800	850	850	900	900	950	950	1000	1000	1050	1050	1100	1100

Side by side paired fire dampers																	
Required base	mm	2400	2400	2500	2500	2600	2600	2700	2700	2800	2800	2900	2900	3000	3000	3100	3100
B tot	mm	2370	2420	2470	2520	2570	2620	2670	2720	2770	2820	2870	2920	2970	3020	3070	3070
B1	mm	1150	1200	1200	1250	1250	1300	1300	1350	1350	1400	1400	1450	1450	1500	1500	1500
B2	mm	1150	1150	1200	1250	1250	1250	1300	1300	1350	1350	1400	1400	1450	1450	1500	1500

Vertically paired fire dampers																		
Required height	mm	900	900	1000	1000	1100	1100	1200	1200	1300	1300	1400	1400	1500	1500	1600	1600	1650
H tot	mm	870	920	970	1020	1070	1120	1170	1220	1270	1320	1370	1420	1470	1520	1570	1620	1670
H1	mm	400	450	450	500	500	550	550	600	600	650	650	700	700	750	750	800	800
H2	mm	400	400	450	450	500	500	550	550	600	600	650	650	700	700	750	750	800

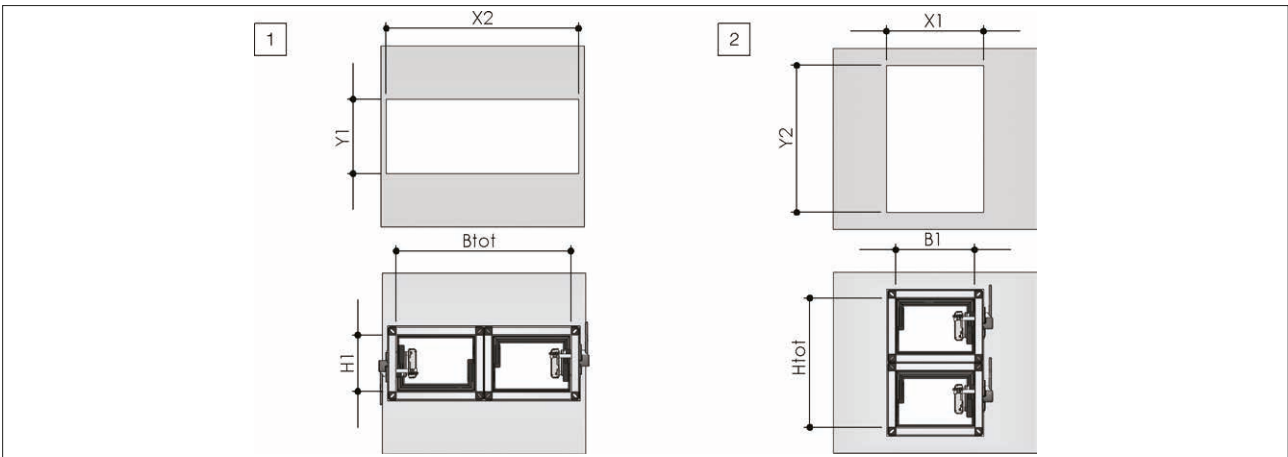
From the requested dimensions, it is possible to identify the closest effective achievable sizes.

1. It is allowed to pair two fire dampers. Maximum paired size: 1670x1500, 3070x800, 1500x1670.
2. It is forbidden to pair three or more fire dampers.
3. It is forbidden to vertically pair two fire dampers with vertical axis.



1.7. Paired fire dampers wall opening

1. Hole and installation for two fire dampers paired side by side with horizontal axis
2. Hole and installation for two fire dampers paired vertically with horizontal axis



	X1	X2	Y1	Y2
vertical rigid wall EI 120 S	B1 + 80 mm	Btot + 80 mm	H1 + 80 mm	Htot + 80 mm
light vertical plasterboard wall EI 120 S	B1 + 100 mm	Btot + 100 mm	H1 + 100 mm	Htot + 100 mm
light vertical plasterboard wall EI 90 S	B1 + 75 mm	Btot + 75 mm	H1 + 75 mm	Htot + 75 mm
light vertical gypsum blocks wall EI 120 S	B1 + 80 mm	Btot + 80 mm	H1 + 80 mm	Htot + 80 mm
light vertical gypsum blocks wall EI 90 S	B1 + 80 mm	Btot + 80 mm	H1 + 80 mm	Htot + 80 mm
horizontal floor EI 180 S	B1 + 130 mm	Btot + 130 mm	H1 + 130 mm	Htot + 130 mm
horizontal floor EI 120 S	B1 + 130 mm	Btot + 130 mm	H1 + 130 mm	Htot + 130 mm
horizontal floor EI 90 S	B1 + 130 mm	Btot + 130 mm	H1 + 130 mm	Htot + 130 mm

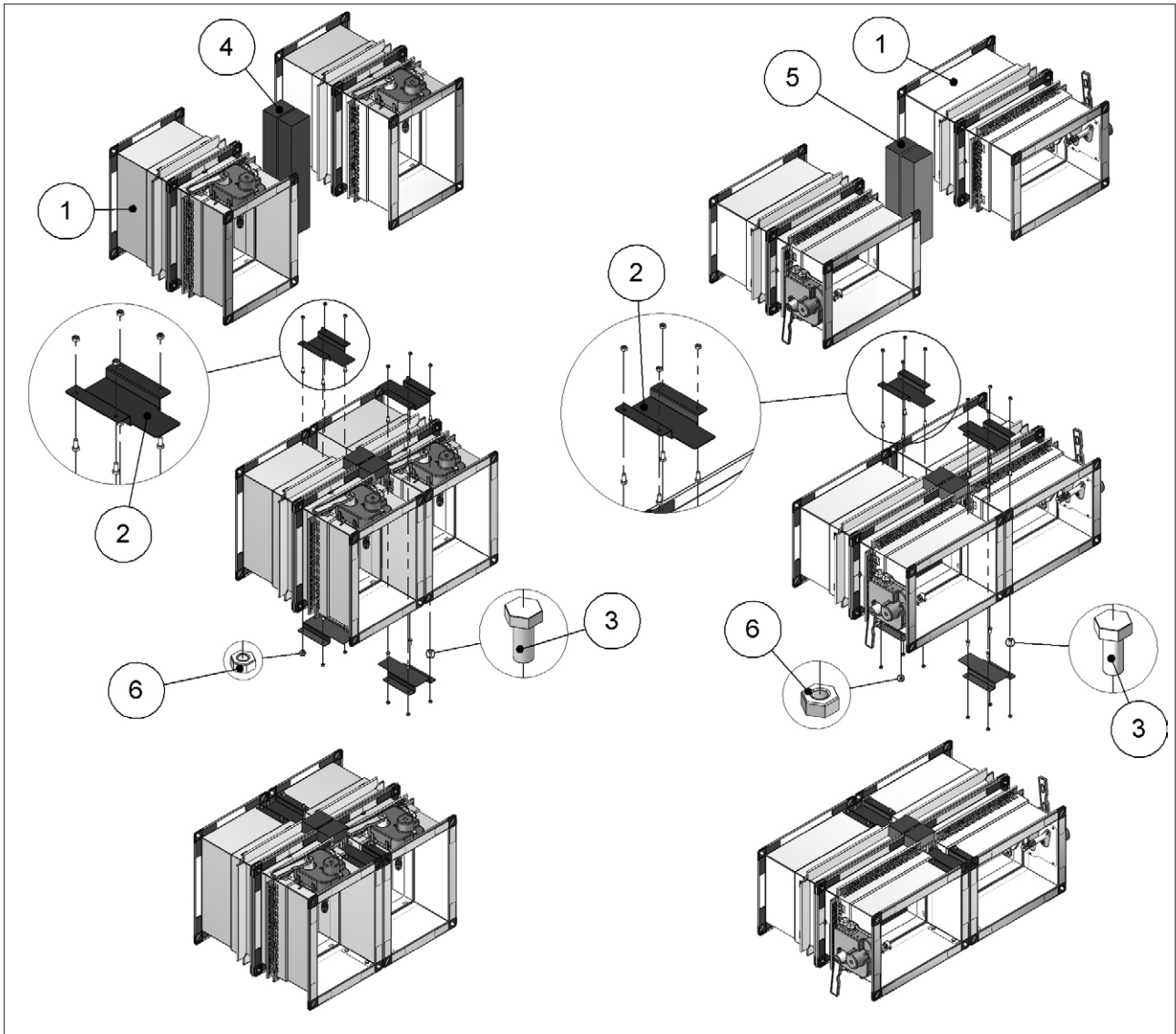
1.8. Fire dampers pairing

The WK45 patented rectangular fire dampers can be paired side-by-side or vertically (not more than two) using the custom connection kit (see section Accessories and spare parts p. 47). Two insulating layers must be inserted between the two fire dampers.

The pair of dampers, may be installed in vertical wall in the same way as a single damper.

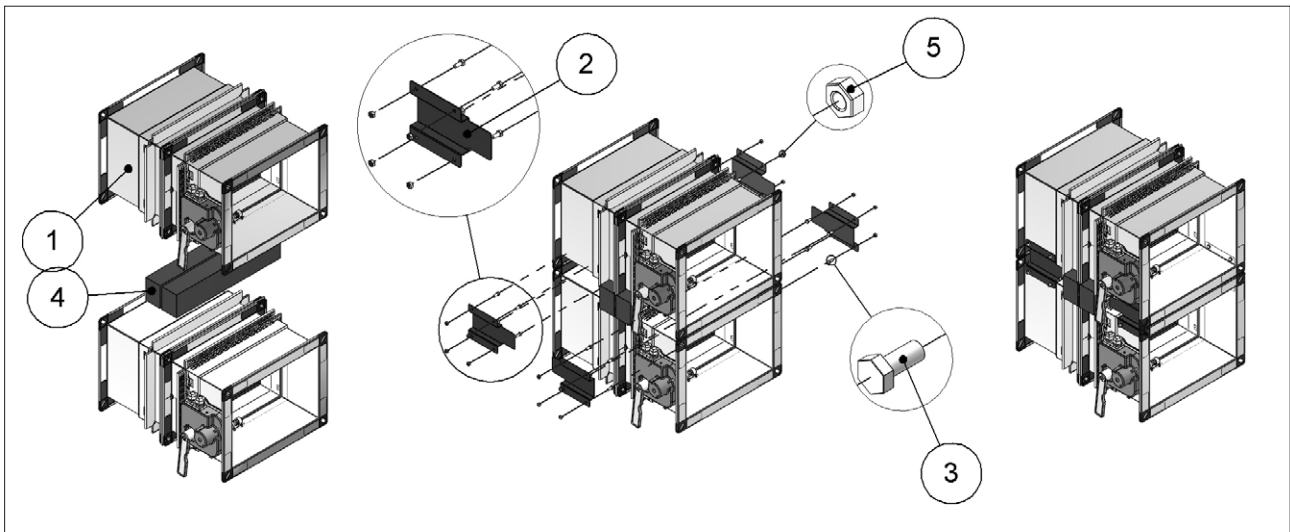
1. WK45 Fire damper
2. Steel plate
3. Fixing screws
4. Rock wool strip 100 kg/m³ 80 x 65 x nominal fire damper base + 70 mm (not included in the connection kit WKBA2)

5. Rock wool strip 100 kg/m³ 80 x 65 x nominal fire damper height + 70 mm (not included in the connection kit WKBA2)
6. Nut



- It is forbidden to pair three or more fire dampers.

1. WK45 Fire damper
2. Steel plate
3. Fixing screws
4. Rock wool strip 100 kg/m³ 80 x 65 x nominal fire damper base + 70 mm (not included in the connection kit WKBA2)
5. Nut



- It is forbidden to pair three or more fire dampers.
- It is forbidden to vertically pair two fire dampers with vertical axis.

1.9. Performances

Performance	Reference standard	Class
Thermal fuse testing	ISO 10294-4	Compliant
Open and Close cycle reliability	EN 15650	Compliant
Resistance to corrosion in humid and saline environments	EN 60068-2-52	Degree of severity 2
Casing tightness	EN 1751	Class C
Blade seal	EN 1751	Class 2 minimum

1.10. Fire resistance classification according to EN 13501-3-2009

		EI 180 S (500 Pa)	EI 120 S (500 Pa)	EI 90 S (500 Pa)	EI 60 S (500 Pa)	EI 30 S (500 Pa)
Rigid wall						
EI 120 S Installation within vertical rigid wall p. 23						
Wall minimum thickness 100 mm Wall minimum density 500 kg/m ³ Mortar or plaster putty sealing ve (i↔o)	W	-	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800
EI 120 S Installation within vertical rigid wall p. 23						
Wall minimum thickness 100 mm Wall minimum density 500 kg/m ³ Plasterboard and rock wool 100 kg/m ³ sealing ve (i↔o)	D	-	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800
EI 180 S Installation within vertical rigid wall p. 23						
Wall minimum thickness 140 mm Wall minimum density 500 kg/m ³ Mortar sealing ve (i↔o)	W	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800
Flexible wall						
EI 120 S Installation within vertical light wall (plasterboard) p. 25						
Wall minimum thickness 100 mm Wall rock wool density up to 100 kg/m ³ (optional) Mortar or plaster putty sealing ve (i↔o)	W	-	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800
EI 90 S Installation within vertical light wall (plasterboard) p. 25						
Wall minimum thickness 100 mm Wall rock wool density up to 100 kg/m ³ (optional) Plasterboard and rock wool 100 kg/m ³ sealing ve (i↔o)	D	-	-	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800
EI 120 S Installation within vertical light wall (gypsum blocks wall) p. 28						
Wall minimum thickness 100 mm Wall minimum density 995 kg/m ³ Plaster putty sealing ve (i↔o)	W	-	B X H min 200 X 200 max 1000 X 600	B X H min 200 X 200 max 1000 X 600	B X H min 200 X 200 max 1000 X 600	B X H min 200 X 200 max 1000 X 600
EI 90 S Installation within vertical light wall (gypsum blocks wall) p. 28						
Wall minimum thickness 70 mm Wall minimum density 995 kg/m ³ Plaster putty sealing ve (i↔o)	W	-	-	B X H min 200 X 200 max 1000 X 600	B X H min 200 X 200 max 1000 X 600	B X H min 200 X 200 max 1000 X 600

		El 180 S (500 Pa)	El 120 S (500 Pa)	El 90 S (500 Pa)	El 60 S (500 Pa)	El 30 S (500 Pa)
<u>El 180 S Installation within floor p. 29</u>						
Floor	Floor minimum thickness 140 mm	B X H min 200 X 200	B X H min 200 X 200	B X H min 200 X 200	B X H min 200 X 200	B X H min 200 X 200
	Floor minimum density 2200 kg/m ³	W				
	Mortar sealing ho (i↔o)	max 1500 X 800	max 1500 X 800	max 1500 X 800	max 1500 X 800	max 1500 X 800
<u>El 120 S Installation within floor p. 29</u>						
Floor	Floor minimum thickness 150 mm		B X H min 200 X 200	B X H min 200 X 200	B X H min 200 X 200	B X H min 200 X 200
	Floor minimum density 650 kg/m ³	W	-			
	Mortar sealing ho (i↔o)		max 1500 X 800	max 1500 X 800	max 1500 X 800	max 1500 X 800
<u>El 90 S Installation within floor p. 29</u>						
Floor	Floor minimum thickness 100 mm			B X H min 200 X 200	B X H min 200 X 200	B X H min 200 X 200
	Floor minimum density 650 kg/m ³	W	-			
	Mortar sealing ho (i↔o)			max 1500 X 800	max 1500 X 800	max 1500 X 800

B X H are fire damper minimum and maximum nominal dimensions (base x height) in mm

- ve Vertical installation
- ho Horizontal installation
- (i↔o) Origin of fire irrelevant
- Pa Pascal of depression
- E Integrity
- I Thermal insulation
- S Smoke seal
- W Wet method sealing
- D Dry method sealing
- Cert. N° 1812-CPR-1006

1.10.1. Fire Batt (Weichschott) sealings

		El 120 S (300 Pa)	El 90 S (300 Pa)	El 60 S (300 Pa)	El 30 S (300 Pa)
Rigid wall	El 90 S Installation within vertical rigid wall with Fire Batt (Weichschott) sealing <u>p. 30</u>				
	Wall minimum thickness 100 mm				
	Wall rock wool minimum density 500 kg/m ³ Rock wool 140 kg/m ³ and endothermic varnish sealing ve (i↔o)	W	-	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800
Flexible wall	El 90 S Installation within vertical light wall (plasterboard) with Fire Batt (Weichschott) sealing <u>p. 30</u>				
	Wall minimum thickness 100 mm				
	Wall rock wool density up to 100 kg/m ³ (optional) Rock wool density 140 kg/m ³ and endothermic varnish sealing ve (i↔o)	W	-	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800
Flexible wall	El 90 S Installation within vertical light wall (gypsum blocks wall) with Fire Batt (Weichschott) sealing <u>p. 30</u>				
	Wall minimum thickness 100 mm				
	Wall minimum density 995 kg/m ³ Rock wool 140 kg/m ³ and endothermic varnish sealing ve (i↔o)	W	-	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800
Floor	El 120 S Installation within floor with Fire Batt (Weichschott) sealing <u>p. 31</u>				
	Floor minimum thickness 150 mm				
	Floor minimum density 650 kg/m ³ Rock wool 140 kg/m ³ and endothermic varnish sealing ho (i↔o)	W	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800	B X H min 200 X 200 max 1500 X 800

B X H are fire damper minimum and maximum nominal dimensions (base x height) in mm

ve Vertical installation

ho Horizontal installation

(i↔o) Origin of fire irrelevant

Pa Pascal of depression

E Integrity

I Thermal insulation

S Smoke seal

W Wet method sealing

D Dry method sealing

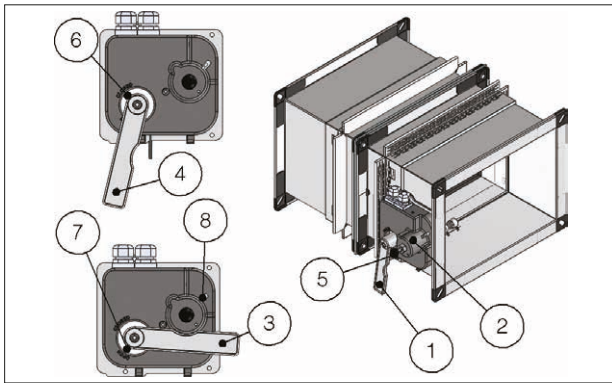
Cert. N° 1812-CPR-1006

1.11. Mechanism type

Mechanism type selection must be done according to national legislation and according to building type where fire damper will be installed. In particular it must be considered if fire alarm system or smoke detection system need specific control over the fire damper or if periodic controls (such as opening and closing) are required.

1.11.1. Manual / Manual with magnet

1. Manual opening lever
2. Protection box
3. Lever position when the blade is open
4. Lever position when the blade is closed
5. Magnet knob (for magnetic version)
6. Closed blade indicator
7. Open blade indicator
8. Manual closing button



Blade closing mode

Automatic closing with thermal fuse.

The control mechanism has a thermosensitive element that automatically closes the blade when the temperature in the duct exceeds 70°C (or 95°C for the fire damper with 95°C thermal fuse).

It is possible to close the damper by pressing the indicated button.

If the manual mechanism is equipped with electromagnet it is possible to remotely close the fire damper.

The manual command mechanism with magnet is equipped with an electromagnet which, in case power is interrupted (interruption magnet version) or when power is supplied (input magnet version), commands the closing of the damper.

Blade opening mode

Make sure that the damper is open before the ventilation system start-up, otherwise there is a risk of product malfunction.

In case of closed damper by pressing the closing button or remotely by electromagnet (magnetic version), it is possible to manually open the fire damper blade by rotating the lever anticlockwise.

For power supply interruption electromagnet, provide power supply and pull the magnet knob before opening the fire damper.

In case of closed damper as a result of the action of the thermosensitive element, it is possible to manually reopen the damper by rotating the lever counterclockwise once the element has been replaced.

Position indication microswitches

On request, the fire damper can be supplied with position microswitches (SA/SC/S2 optional) that signal the blade position (open or closed). Refer to Electrical connections p.32 paragraph for more details.

Closing by remote control

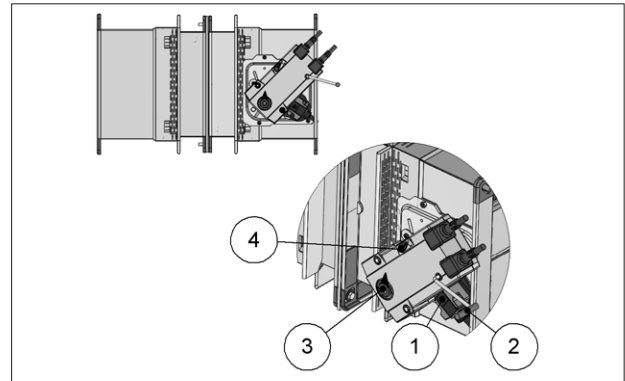
With power supply input or interruption magnet (WK45M version only).

Temperature calibration of thermosensitive element for automatic damper closing

- 70 °C±7 °C (Standard)
- 95 °C±9 °C (On request).

1.11.2. Belimo motorized version

1. Manual closing switch
2. Manual opening lever
3. Position indicator
4. Blade locking lever



Blade closing mode

Automatic closing with thermal fuse.

The control mechanism has a thermosensitive element that automatically closes the blade when the temperature in the duct or in the room exceeds 72°C (or 95°C for the 95°C version).

To close the damper when the motor is connected, press the switch on the temperature sensor or cut off the power supply.

Blade opening mode

Make sure that the damper is open before the ventilation system start-up, otherwise there is a risk of product malfunction.

To open the damper with the electric motor driven actuator, provide power supply to the motor. Refer to the section Electrical connections p.32 for further information.

To manually open the damper, use the handle supplied and carefully rotate clockwise to the 90° indicator. To hold the damper in open position operate on the lever indicated in figure.

For VGB/DGB versions to hold the damper in open position, carefully rotate the handle counterclockwise.

During the manual opening of the damper, power must not be supplied to the motor.

Position indication microswitches

The motorized versions are supplied with two microswitches to show the blade's position (open or closed). Refer

to the section Electrical connections [p. 32](#) for further information.

Closing by remote control

If power to the motor is cut off, the blade will close.

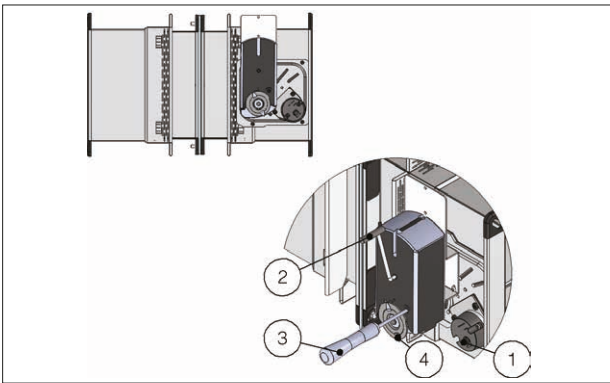
Temperature calibration of thermosensitive element for automatic damper closing

72 °C±7 °C (Standard)

95 °C±9 °C (On request).

1.11.3. Siemens motorized version

1. Manual closing switch
2. Manual opening lever
3. Screwdriver
4. Position indicator



Blade closing mode

Automatic closing with thermal fuse.

The control mechanism has a thermosensitive element that automatically closes the blade when the temperature in the duct or in the room exceeds 72°C (or 95°C for the 95°C version).

To close the damper when the motor is connected, press the switch on the temperature sensor or cut off the power supply.

Blade opening mode

Make sure that the damper is open before the ventilation system start-up, otherwise there is a risk of product malfunction.

To open the damper with the electric motor driven actuator, provide power supply to the motor. Refer to the section Electrical connections [p. 32](#) for further information.

To manually open the damper, use the handle supplied and carefully rotate counterclockwise to the 90 °C indicator. To hold the damper in open position, rotate the screw anticlockwise as shown in the picture.

During the manual opening of the damper, power must not be supplied to the motor.

Position indication microswitches

The motorized versions are supplied with two microswitches to show the blade's position (open or closed). Refer to the section Electrical connections [p. 32](#) for further information.

Closing by remote control

If power to the motor is cut off, the blade will close.

Temperature calibration of thermosensitive element for automatic damper closing

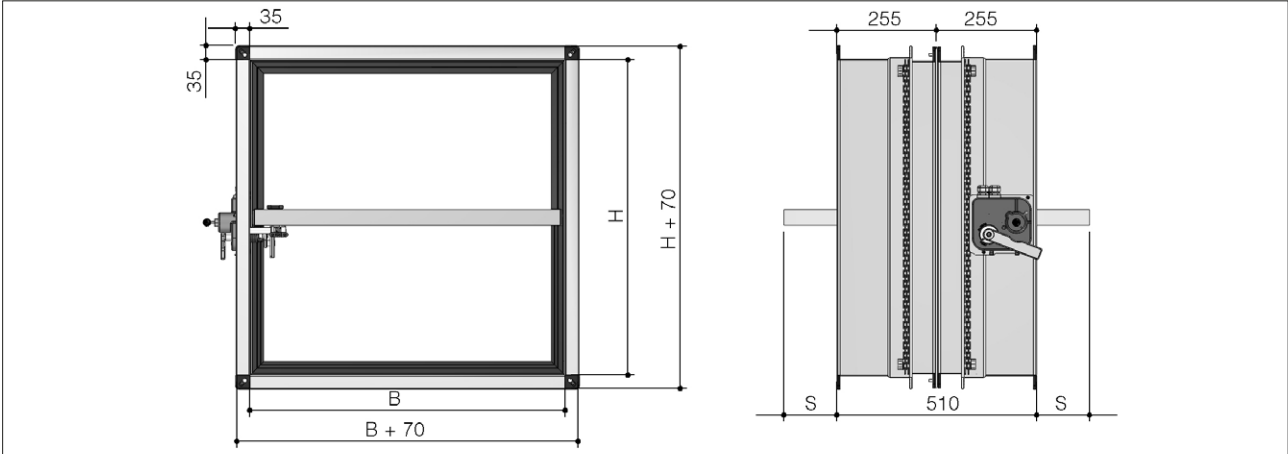
72 °C±7 °C (Standard)

95 °C±9 °C (On request).

2. TECHNICAL DATA

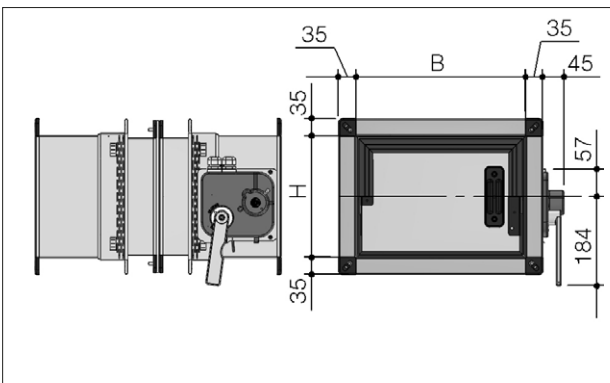
The sizes shown are in mm.

2.1. Dimension

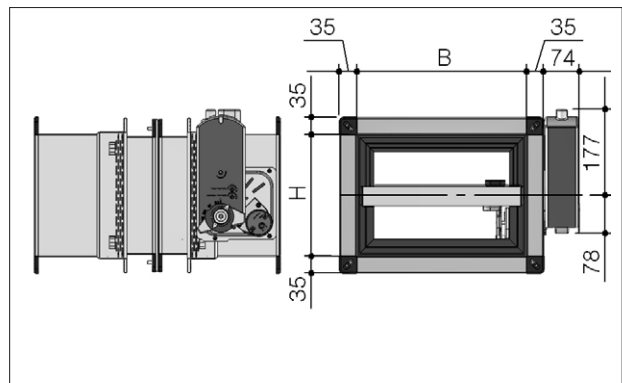


H	mm	200	250	300	350	400	450	500	550	600	650	700	750	800
S blade exposition	mm	0	0	0	0	0	0	0	9	34	59	84	109	134

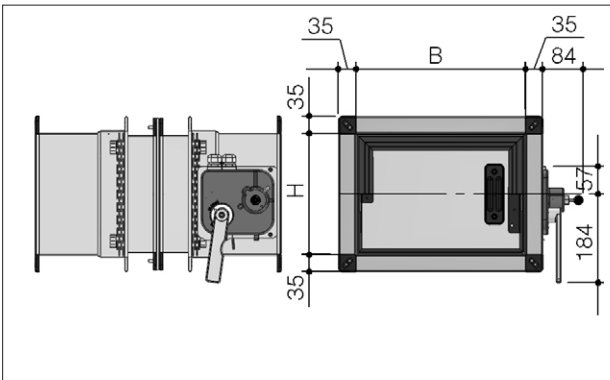
2.1.1. Manual



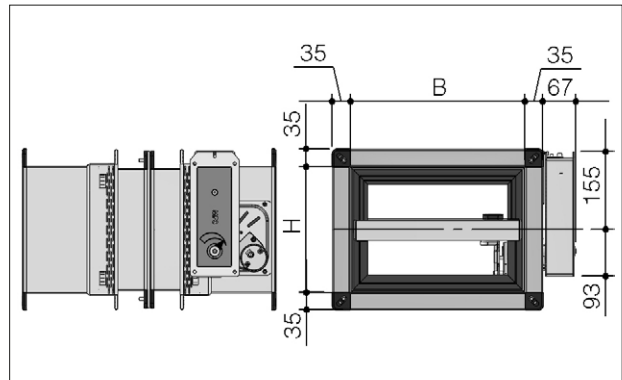
2.1.3. Siemens motorized version



2.1.2. Manual with magnet



2.1.4. Belimo motorized version



2.2. Weights

Height	Base								
	200	250	300	350	400	450	500	550	600
200	9,0	10,0	11,0	12,0	13,0	15,0	16,0	18,0	20,0
250	10,0	11,0	12,0	13,0	14,0	16,0	18,0	20,0	22,0
300	11,0	12,0	13,0	14,0	17,0	19,0	21,0	22,0	24,0
350	12,0	13,0	14,0	15,0	18,0	19,0	22,0	24,0	26,0
400	14,0	15,0	16,0	17,0	19,0	21,0	23,0	26,0	28,0
450	15,0	16,0	17,0	18,0	21,0	23,0	25,0	27,0	29,0
500	17,0	18,0	19,0	20,0	23,0	25,0	27,0	28,0	31,0
550	18,0	19,0	20,0	21,0	24,0	26,0	29,0	31,0	33,0
600	19,0	20,0	21,0	22,0	25,0	27,0	31,0	33,0	35,0
650	20,0	22,0	23,0	24,0	29,0	31,0	33,0	36,0	38,0
700			24,0	25,0	31,0	33,0	35,0	38,0	40,0
750					32,0	35,0	37,0	40,0	42,0
800					34,0	37,0	39,0	42,0	44,0

Height	Base								
	650	700	750	800	850	900	950	1000	1050
200	22,0	24,0	25,0	26,0	27,0	27,0	27,0	28,0	30,0
250	24,0	26,0	27,0	28,0	28,0	29,0	30,0	31,0	33,0
300	26,0	28,0	29,0	30,0	31,0	32,0	33,0	35,0	36,0
350	28,0	30,0	31,0	34,0	34,0	34,0	36,0	38,0	39,0
400	30,0	32,0	34,0	36,0	37,0	37,0	39,0	41,0	42,0
450	32,0	34,0	36,0	38,0	38,0	40,0	42,0	44,0	45,0
500	34,0	36,0	38,0	40,0	41,0	43,0	45,0	47,0	49,0
550	36,0	38,0	40,0	42,0	44,0	46,0	48,0	50,0	52,0
600	38,0	40,0	42,0	44,0	46,0	49,0	51,0	53,0	55,0
650	40,0	42,0	45,0	47,0	49,0	51,0	54,0	56,0	58,0
700	42,0	45,0	47,0	49,0	52,0	54,0	56,0	59,0	61,0
750	45,0	47,0	50,0	52,0	54,0	57,0	59,0	62,0	64,0
800	47,0	49,0	52,0	55,0	57,0	60,0	62,0	65,0	67,0

Height	Base								
	1100	1150	1200	1250	1300	1350	1400	1450	1500
200	31,0	32,0	33,0	34,0	36,0	37,0	38,0	39,0	40,0
250	34,0	35,0	37,0	38,0	39,0	41,0	42,0	43,0	45,0
300	37,0	39,0	40,0	42,0	43,0	45,0	46,0	47,0	49,0
350	41,0	42,0	44,0	45,0	47,0	48,0	50,0	51,0	53,0
400	44,0	46,0	47,0	49,0	51,0	52,0	54,0	56,0	57,0
450	47,0	49,0	51,0	53,0	54,0	56,0	58,0	60,0	61,0
500	50,0	52,0	54,0	56,0	58,0	60,0	62,0	64,0	66,0
550	54,0	56,0	58,0	60,0	62,0	64,0	66,0	68,0	70,0
600	57,0	59,0	61,0	63,0	65,0	68,0	70,0	72,0	74,0
650	60,0	62,0	65,0	67,0	69,0	71,0	74,0	76,0	78,0
700	64,0	66,0	68,0	71,0	73,0	75,0	78,0	80,0	82,0
750	67,0	69,0	72,0	74,0	77,0	79,0	82,0	83,0	85,0
800	70,0	73,0	75,0	78,0	80,0	83,0	86,0	86,0	88,0

Weights in kg
Manual version. Motorized version: +1 kg

3. INSTALLATION

The sizes shown are in mm.

It is recommended to perform a functional test before installation to exclude possible damage during transport and another test immediately after installation to exclude accidental damage to the product and interference with mounting components.

3.1. Intended use

The MP3 fire dampers are "Devices for use in heating, ventilation and air conditioning (HVAC) systems at fire boundaries to maintain compartmentation and protect means of escape in case of fire" according to the 3.1 paragraph of EN 15650:2010 standard.

It is compulsory to install the fire damper according to the instructions indicated in the technical data sheet and manual to maintain the declared performances and, in particular, the fire classes.

The double test (with the mechanism inside and outside the fire area) demonstrated that there is no preferred direction for the position of the damper, both in relation to air flow and the side with the higher probability of exposure to fire, as indicated in standard EN1366-2:2015 (paragraph 6.2).

Use permitted in any civil and industrial building.
Use permitted in saline atmosphere, for example:

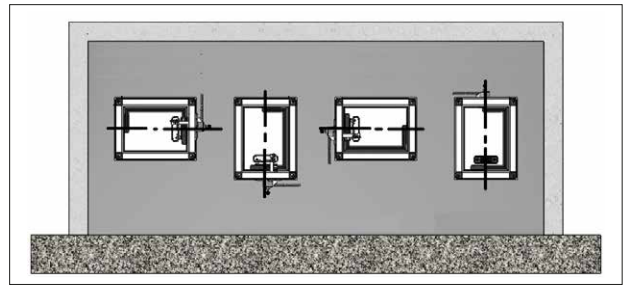
- maritime and port environments;
- fish markets;
- slaughterhouses;
- cheese makers.

3.2. Not allowed uses

- Use with installations different to those described in the technical data sheet and manual;
- use as smoke control damper;
- use as shut off damper;
- use in external environments without adequate protection from atmospheric conditions;
- use in explosive environments;
- use on board of ships;
- use in cooker extraction hoods;
- use in pneumatic conveying systems of dust or corn;
- use in ventilation systems within locations subject to chemical contamination;
- use in non inspectable environments;
- installation in fire resistant false ceilings crossings;
- use in ventilation ducts where condensation can occur.

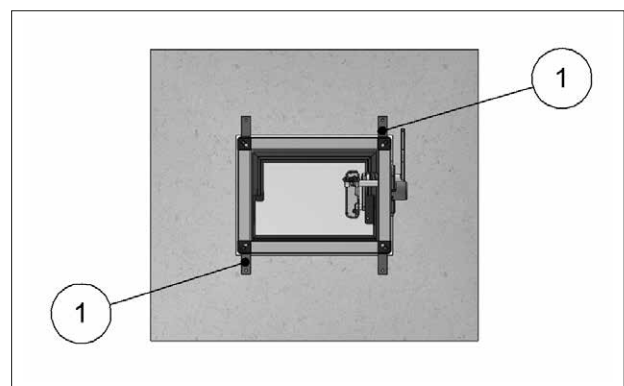
3.3. Blade rotation axis positioning

The fire damper can be installed both with the blade axis positioned vertically or horizontally.



3.4. Positioning brackets before fixing

1. WKGY100 fixing brackets (accessory to order separately, one size valid for all fire dampers kind)



WKGY100 fixing brackets are mandatory for vertical plaster-board wall installation with rock wool sealing. They are not usable for installations with Fire Batt (Weichschott) sealing.

3.5. Installation of flexible connectors in order to balance out the ventilation ducts expansion

ATTENTION: the following indications must be considered binding only if legislation or local regulation where the fire dampers are installed require the use of flexible connectors.

Flexible connectors compensate any duct thermal expansion and wall bending in case of fire.

Flexible connectors are used to limit fire damper stresses due to external forces in case of fire and to preserve fire resistance class.

In general it is always appropriate the use of flexible connectors for the followings installations:

- light walls;
- Plasterboard and rock wool or Fire Batt (Weichschott) sealing;
- Applique fixing system.

Flexible connector must be normal flammability and in case of fire the grounding bonding should disconnect to guarantee the complete separation between fire damper and connected air duct.

When flexible connectors made of conductive material (e.g. aluminum) are used, no additional grounding bonding is required.

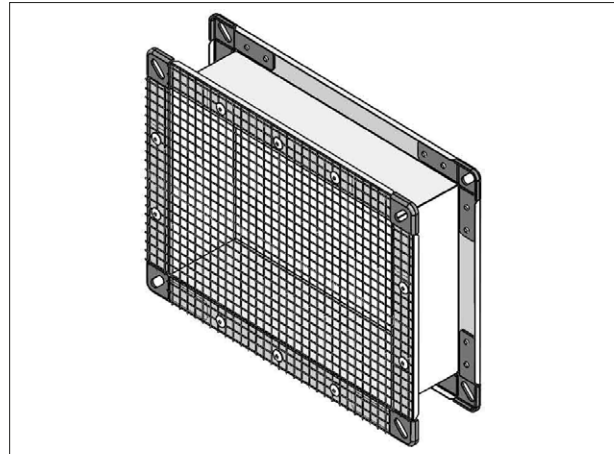
Despite flexible connector installation, the fire damper must be installed in the construction support so that its weight does not affect damper's installation position both during normal operation and in case of fire. It is recommended not to compress flexible connectors in the installation phase.

Flexible connector must be at least 100mm long and in order that possible duct thermal expansions are balanced. Take care that the flexible connector does not interfere with opening / closing movement of the blade. Refer to the section Technical data [p. 14](#) for blade exposition values.

3.6. Transfer Application (application not connected to air ducts on one or both sides)

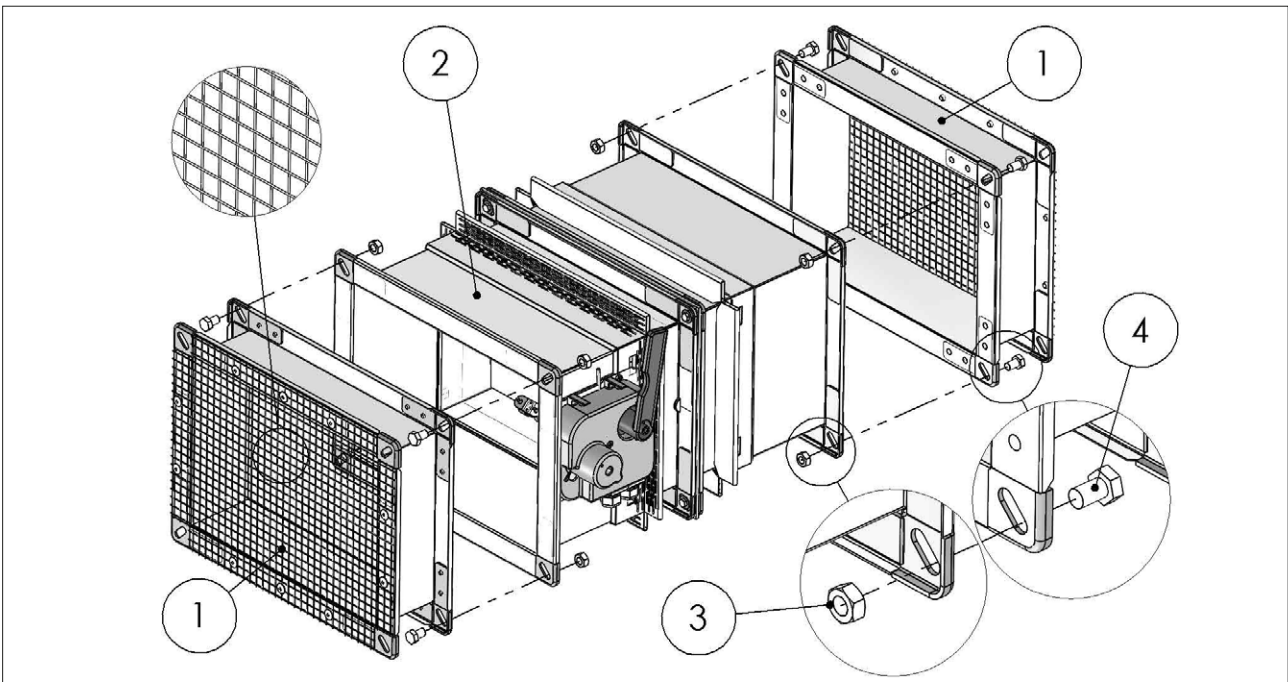
Note: For this application please refer to national legislation to verify if any specific obligation is required. Following tests performed as per EN 1366-2, section 6.3.6 Standard, it is possible to install the fire damper free from air duct from one or both sides.

- Attention: fire resistance classification for transfer application is conform to section Fire resistance classification according to EN 13501-3-2009 [p. 9](#) limited to EI 120S if the ducted classification is higher.
- End cap with mesh shall be mounted on the side not connected to air duct.
- End cap with mesh is made from galvanized steel sheet and includes nuts and screws for fixing on fire damper.
- End cap with mesh is supplied not installed on the fire damper.
- Refer to the section How to order (transfer Application) [p. 18](#) for codes to use.



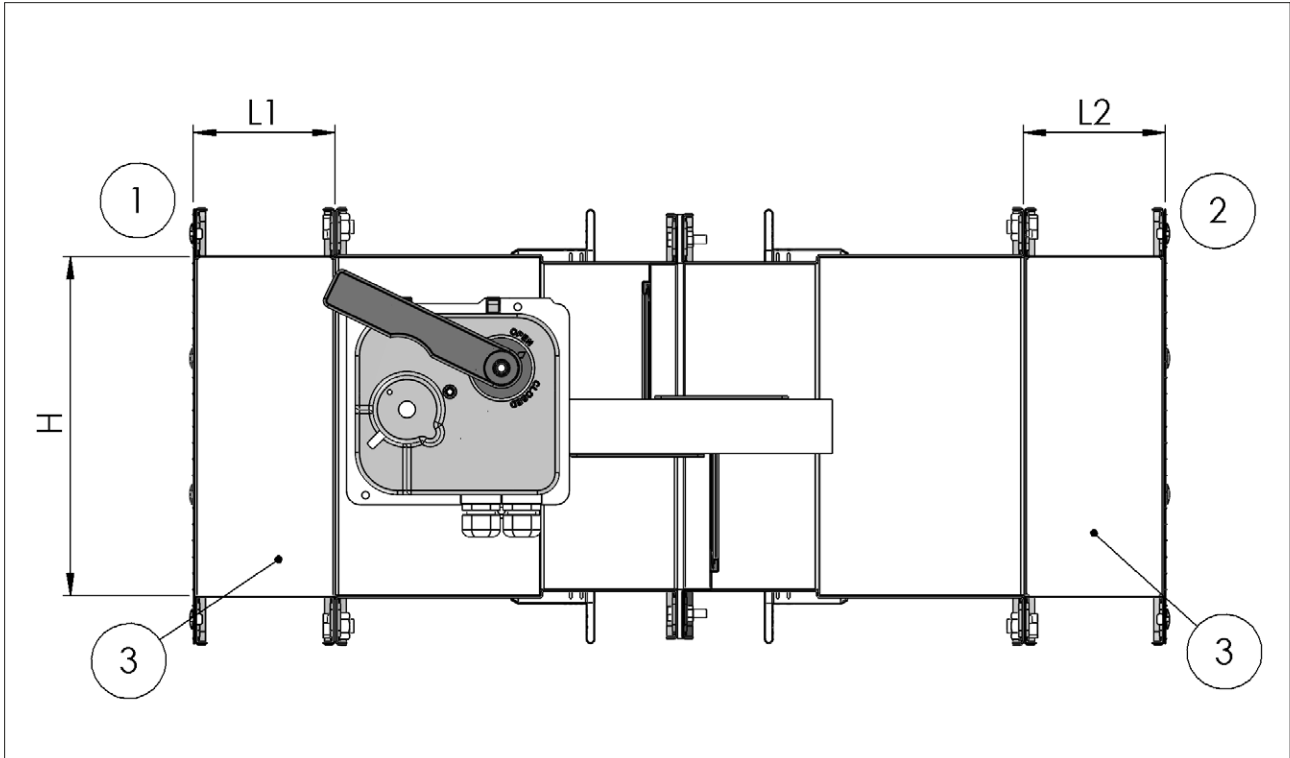
3.6.1. Components (Transfer Application)

- | | |
|----------------------|--------------|
| 1. End cap with mesh | 3. M10 nut |
| 2. Fire damper | 4. M10 screw |



3.6.2. Technical data (Transfer Application)

- | | | | |
|----|-------------------------|----|--|
| 1. | Mechanism side | L1 | End cap length mechanism side |
| 2. | Mechanism opposite side | L2 | End cap length mechanism opposite side |
| 3. | End cap with mesh | H | Nominal height of fire damper |



Length of end cap with mesh depending on fire damper height H.

H	L1	L2
200	50	50
250	50	50
300	50	50
350	50	50
400	50	50
450	50	50
500	50	50
550	50	50
600	50	50
650	100	100
700	100	100
750	150	150
800	150	150

- H Nominal height of fire damper
 L1 End cap length mechanism side
 L2 End cap length mechanism opposite side

3.6.3. How to order (transfer Application)

Type	FMWK005V	End cap with mesh with flange 35 mm
Base	XYZ	Nominal base dimension (mm)
Height	XYZ	Nominal height dimension (mm)
Length	XYZ	Length dimension (mm)

Examples	Code
End cap with mesh length 50 mm for fire damper 400x300 not connected to air ducts on 1 side	FMWK005V400-300-050
End cap with mesh length 50 mm for fire damper 800x600 not connected to air ducts on 1 side	FMWK005V800-600-050
End caps with mesh length 50 mm for fire damper 500x400 not connected to air ducts on both sides	FMWK005V500-400-050 (x2)

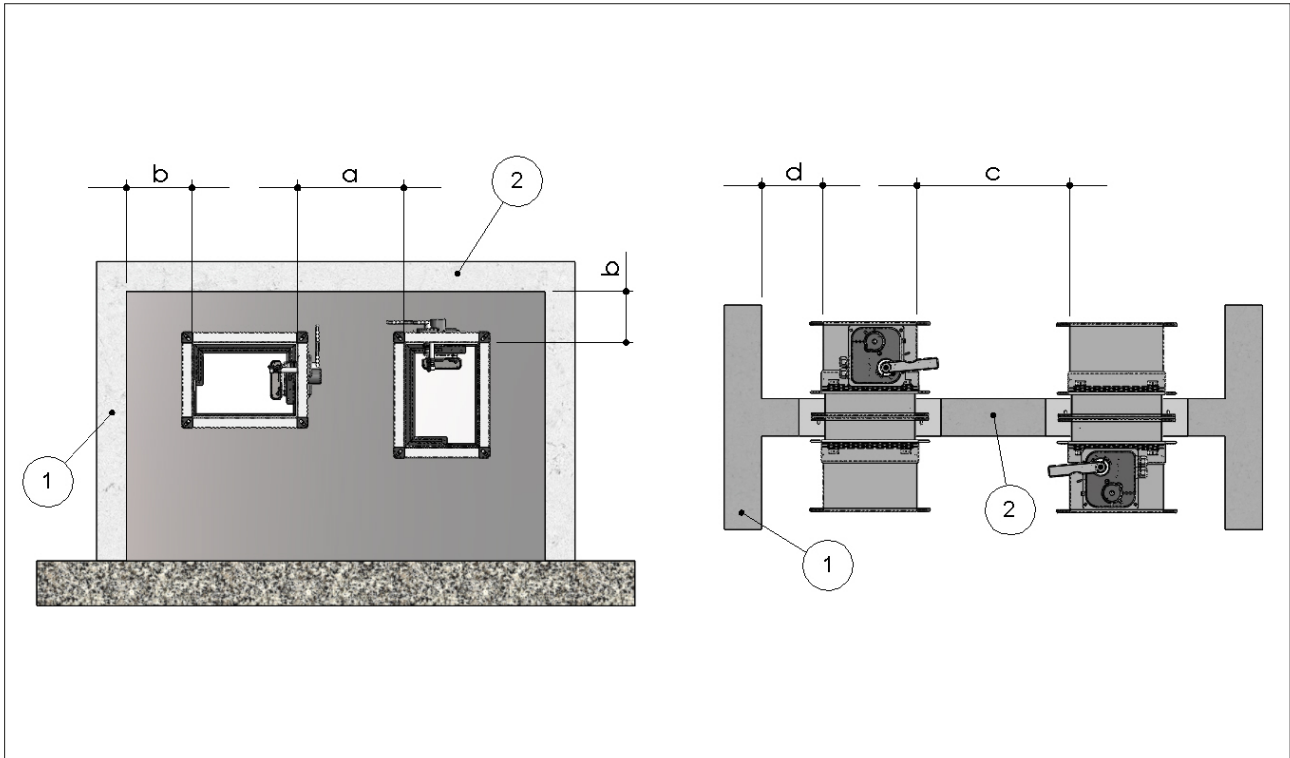
3.7. Minimum distances

It is recommended to keep enough space (about 200mm) for using or replacing the control mechanism or for maintenance. Also provide the necessary space to remove the ventilation duct from the damper whenever necessary.

In accordance with Articles 7 and 13 of EN 1366-2 respect the minimum distances indicated below.

Minimum distances

- | | | | |
|----|--|----|--|
| 1. | Side vertical wall | b. | Distance between fire damper and vertical lateral wall / floor |
| 2. | Floor | c. | Distance between fire dampers installed within floor |
| a. | Distance between fire dampers installed within vertical wall | d. | Distance between fire damper and vertical lateral wall |



Installation	Fire dampers installed within vertical wall		Fire dampers installed within floor		Paired installation	
	a [mm]	b [mm]	c [mm]	d [mm]		
Rigid wall EI 180 S Installation within vertical rigid wall p. 23 Mortar sealing	70	75	-	-	Yes. One air duct or separated air ducts	
	EI 120 S Installation within vertical rigid wall p. 23 Mortar or plaster putty sealing	70	75	-	-	Yes. One air duct or separated air ducts
	EI 120 S Installation within vertical rigid wall p. 23 Plasterboard and rock wool 100 kg/m ³ sealing	70	75	-	-	Yes. One air duct or separated air ducts
Flexible wall EI 120 S Installation within vertical light wall (plasterboard) p. 25 Mortar or plaster putty sealing	70	75	-	-	Yes. Separate air duct	
	EI 90 S Installation within vertical light wall (plasterboard) p. 25 Plasterboard and rock wool 100 kg/m ³ sealing	70	75	-	-	Yes. Separate air duct
	EI 120 S Installation within vertical light wall (gypsum blocks wall) p. 28 Plaster putty sealing	70	75	-	-	Yes. Separate air duct
	EI 90 S Installation within vertical light wall (gypsum blocks wall) p. 28 Plaster putty sealing	200	75	-	-	No

Installation	Fire dampers installed within vertical wall		Fire dampers installed within floor		Paired installation	
	a [mm]	b [mm]	c [mm]	d [mm]		
Floor	EI 180 S Installation within floor p. 29 Mortar sealing	-	-	70	75	Yes. Separate air duct
	EI 120 S Installation within floor p. 29 Mortar sealing	-	-	70	75	Yes. Separate air duct
	EI 90 S Installation within floor p. 29 Mortar sealing	-	-	70	75	Yes. Separate air duct

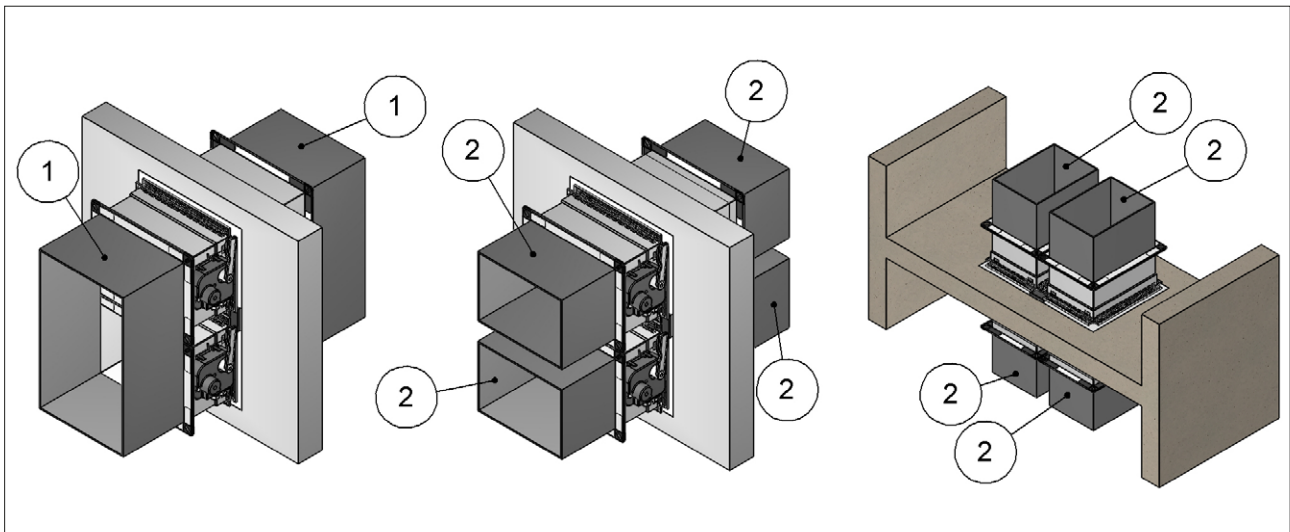
The minimum distance between two or more paired installations is 200 mm. It is forbidden to pair three or more fire dampers.

3.7.1. Fire Batt (Weichschott) sealings

Installation	Fire dampers installed within vertical wall		Fire dampers installed within floor		Paired installation	
	a [mm]	b [mm]	c [mm]	d [mm]		
Rigid wall	EI 90 S Installation within vertical rigid wall with Fire Batt (Weichschott) sealing p. 30 Rock wool 140 kg/m ³ and endothermic varnish sealing	70	50	-	-	Yes. One air duct
	EI 90 S Installation within vertical light wall (plasterboard) with Fire Batt (Weichschott) sealing p. 30 Rock wool 140 kg/m ³ and endothermic varnish sealing	70	50	-	-	Yes. One air duct
Flexible wall	EI 90 S Installation within vertical light wall (gypsum blocks wall) with Fire Batt (Weichschott) sealing p. 30 Rock wool 140 kg/m ³ and endothermic varnish sealing	70	50	-	-	Yes. One air duct
	EI 120 S Installation within floor with Fire Batt (Weichschott) sealing p. 31 Rock wool 140 kg/m ³ and endothermic varnish sealing	-	-	200	75	No

The minimum distance between two or more paired installations is 200 mm. It is forbidden to pair three or more fire dampers.

- 1. One air duct
- 2. Separate air ducts



3.8. Construction supports characteristics

The European standard for fire dampers foresees a precise correlation between the wall/floor characteristics and the fire resistance class obtained, as well as the correlation between wall/floor used for the test and wall/floor used for the actual installation.

The test results obtained on a type of wall/floor are valid also for walls/floor of the same type but with greater thickness and/or density than those used in the test.

For plasterboard walls, the test results are also valid for walls with a greater number of plasterboard layers on each side. As a result, the indicated thickness and density characteristics are to be considered as minimum values.

The wall/floor in which the fire dampers are installed must be fire class certified according to the standards foreseen for the structure.

3.8.1. Rigid walls

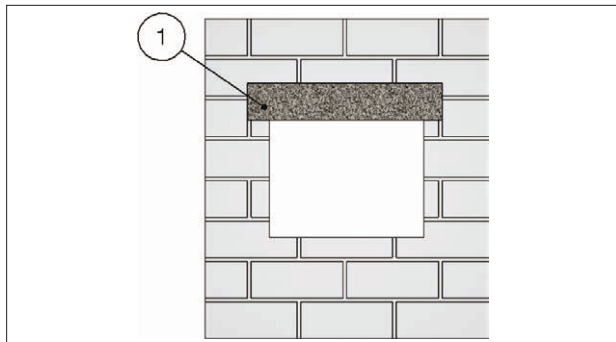
Can be made with aerated concrete blocks, poured concrete, concrete panels, perforated cell elements in concrete or brick in accordance with the following characteristics:

- minimum thickness 100 mm;
- minimum density 500 kg/m³.

The use of a reinforcing beam above the opening is recommended for walls made from concrete blocks, bricks or in concrete cell elements.

For walls built with perforated elements, it is also recommended that the area of the opening be made from full elements (for example aerated concrete blocks) to guarantee the correct adhesion of the mortar.

1. Reinforcing beam



3.8.2. Light plasterboard vertical walls

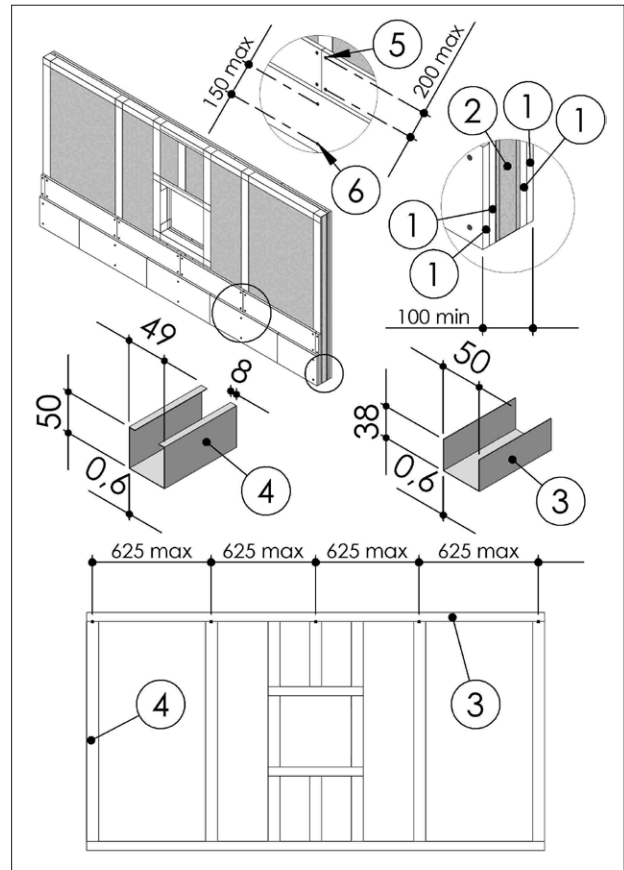
During testing, light plasterboard walls have been used with the following characteristics:

- U-shaped horizontal metal frame (50 mm) and C-shaped vertical frame (49 mm) made from 0,6 mm thick sheet metal;
- Vertical profiles placed with a maximum spacing of 625 mm between each other;
- Filling made of rock wool with density up to 100 kg/m³ (optional);
- Each side is made from two plasterboard layers 12,5 mm thick, unalinged to avoid alignment between the joints of the layer above and below.

The following indications are given for the installation walls:

- metal profiles minimum width: 49 mm;
- metal profiles minimum thickness: 0,6 mm;
- vertical profiles placed with a maximum spacing of 625 mm between each other;
- vertical profile fixing with selfthreading screws or by clinching to the bottom horizontal profile and insertion in the top horizontal profile;
- profiles fixed using self-threading screws or by clinching on every intersection.
- installation of a frame around the damper with base and height where shown in the installation instructions;
- Filling made of rock wool with density up to 100 kg/m³ (optional);
- each side is made from two plasterboard layers 12,5 mm minimum thick, unalinged to avoid alignment between the joints of the layer above and below.
- the front plasterboards layers are fixed using long enough screws to pass through the lower plasterboard and attach to the steel profile underneath.

1. Plasterboard thickness 12,5 mm
2. Rock wool density up to 80 kg/m³ (optional)
3. Horizontal U-shaped profile
4. Vertical C-shaped profile
5. Self-drilling screw Ø 3,5 X 25 mm
6. Self-drilling screw Ø 3,5 X 35 mm



3.8.3. Light plasterboard vertical walls with steel reinforcement

During testing, light plasterboard walls have been used with the following characteristics:

- U-shaped horizontal metal frame (50 mm) and C-shaped vertical frame (49 mm) made from 0,6 mm thick sheet metal;
- Vertical profiles placed with a maximum spacing of 312,5 mm between each other;
- reinforcement sheet;
- Filling made of rock wool with density up to 100 kg/m³ (optional);
- Each side is made from two plasterboard layers 12,5 mm thick, unalinged to avoid alignment between the joints of the layer above and below.

The following indications are given for the installation walls:

- metal profiles minimum width: 49 mm;
- metal profiles minimum thickness: 0,6 mm;
- vertical profiles placed with a maximum spacing of 312,5mm between each other;
- vertical profile fixing with selfthreading screws or by clinching to the bottom horizontal profile and insertion in the top horizontal profile;

3.9. Installations within vertical rigid wall

Refer to the section Construction supports characteristics [p. 20](#) for further information.

Comply with the minimum distances indicated on section Minimum distances [p. 19](#).

Before and after installation please perform a functional test. Refer to section Mechanism type for further information [p. 12](#).

3.9.1. Wall opening

A opening must be provided in the wall as indicated in the table and in the drawing

3.9.2. Damper positioning

Position the damper in the opening so that the side of the closing mechanism extends as indicated in the table and in the drawing.

Close the blade before installing the fire damper.

3.9.3. Filling

Fill the space between the wall and the damper as indicated in the table and in the drawing.

Sealing with concrete is not allowed.

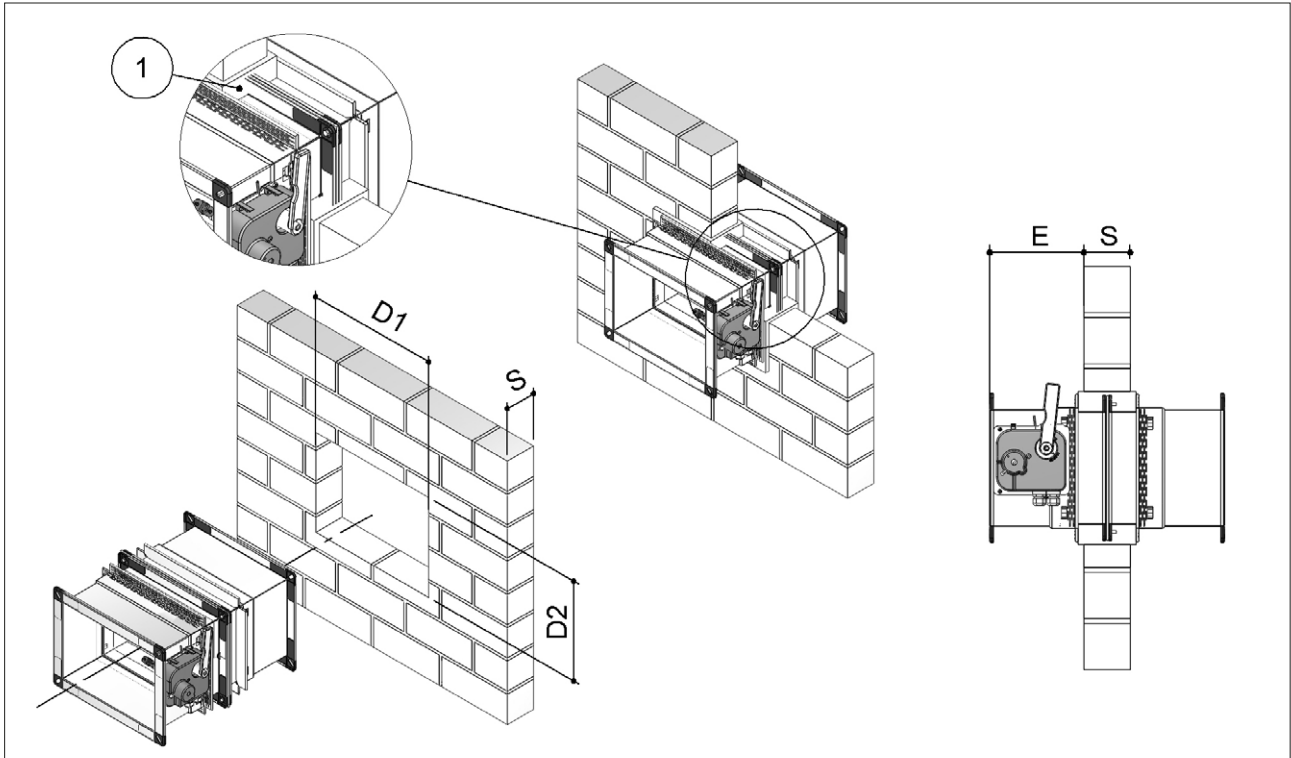
	Fire resistance classification	Hole size "D1 x D2" [mm]	Damper protrusion from the wall "E" [mm]	Wall minimum thickness "S" [mm]	Sealing
EI 120 S Installation within vertical rigid wall					
Wall minimum density 500 kg/m ³	EI 120 S (500 Pa)	From (B+80) x (H+80) to (B+580) x (H+580)	205	100	Mortar or plaster putty sealing
EI 120 S Installation within vertical rigid wall					
Wall minimum density 500 kg/m ³	EI 120 S (500 Pa)	From (B+80) x (H+80) to (B+110) x (H+110)	205	100	Rock wool 100 kg/m ³ with infill plasterboard (thickness 12.5 mm)
EI 180 S Installation within vertical rigid wall					
Wall minimum density 500 kg/m ³	EI 180 S (500 Pa)	From (B+80) x (H+80) to (B+110) x (H+110)	185	140	Mortar sealing

B Nominal base of the damper
H Nominal height of the damper

EI 120 S / EI 180 S Installations within vertical rigid wall

- 1. Sealing indicated in the table
- D1 Hole base: see table above
- D2 Hole height: see table above

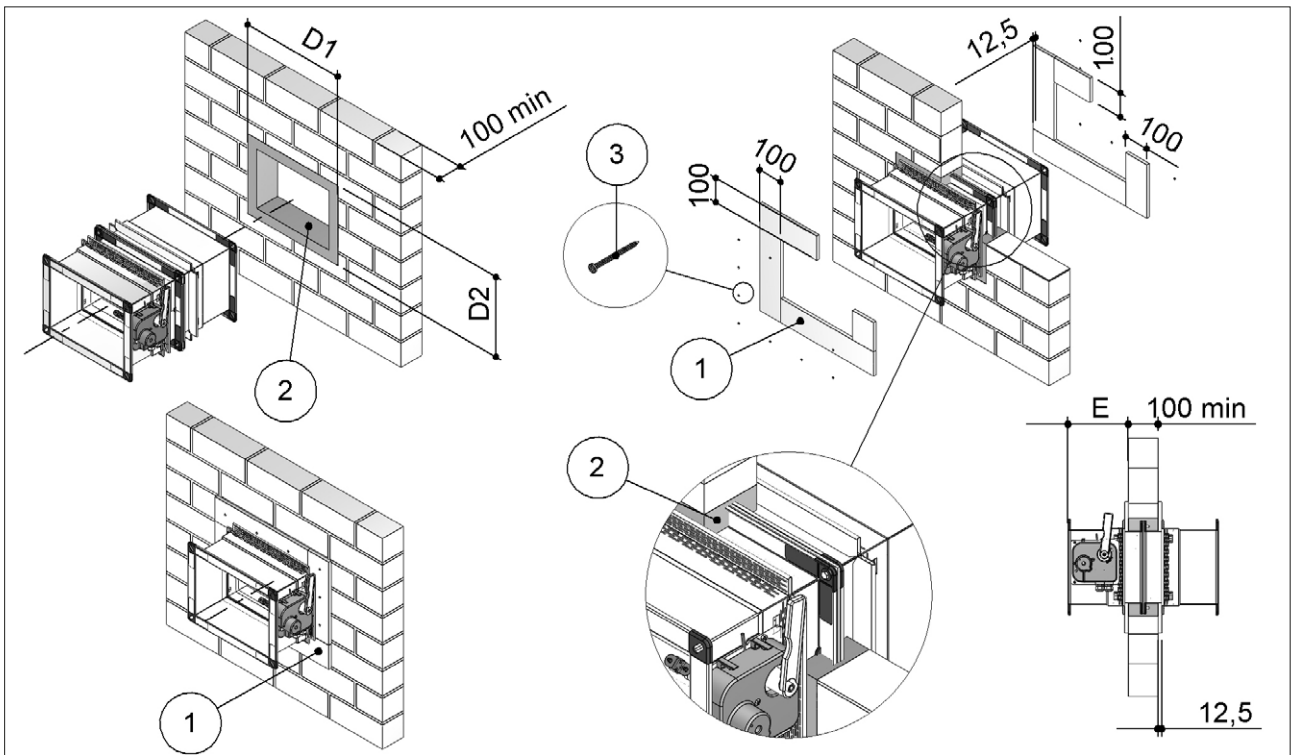
- E Damper protrusion from the wall: see table above
- S Wall minimum thickness: see table above



EI 120S Installation within vertical rigid wall

- 1. Plasterboard infill panel, thickness 12,5 mm, for rock wool sealing
- 2. Rock wool, 100 kg/m³
- 3. Self-drilling screw Ø 3,5 X 45 mm

- D1 Hole base: see table above
- D2 Hole height: see table above
- E Damper protrusion from the wall: see table above



3.10. Installations within vertical light wall (plasterboard)

Refer to the section Construction supports characteristics [p. 20](#) for further information.

Comply with the minimum distances indicated on section Minimum distances [p. 19](#).

Before and after installation please perform a functional test. Refer to section Mechanism type for further information [p. 12](#).

3.10.1. Wall opening

A opening must be provided in the wall as indicated in the table and in the drawing

3.10.2. Damper positioning

Fix the four flaps code WKG100 on the four corners of the fire damper (in correspondence to the longer screws) only for rock wool sealing. See section Accessories and spare parts [p. 47](#) for further details.

Position the damper in the opening so that the side of the closing mechanism extends as indicated in the table and in the drawing.

Close the blade before installing the fire damper.

3.10.3. Filling

Fill the space between the wall and the damper as indicated in the table and in the drawing.

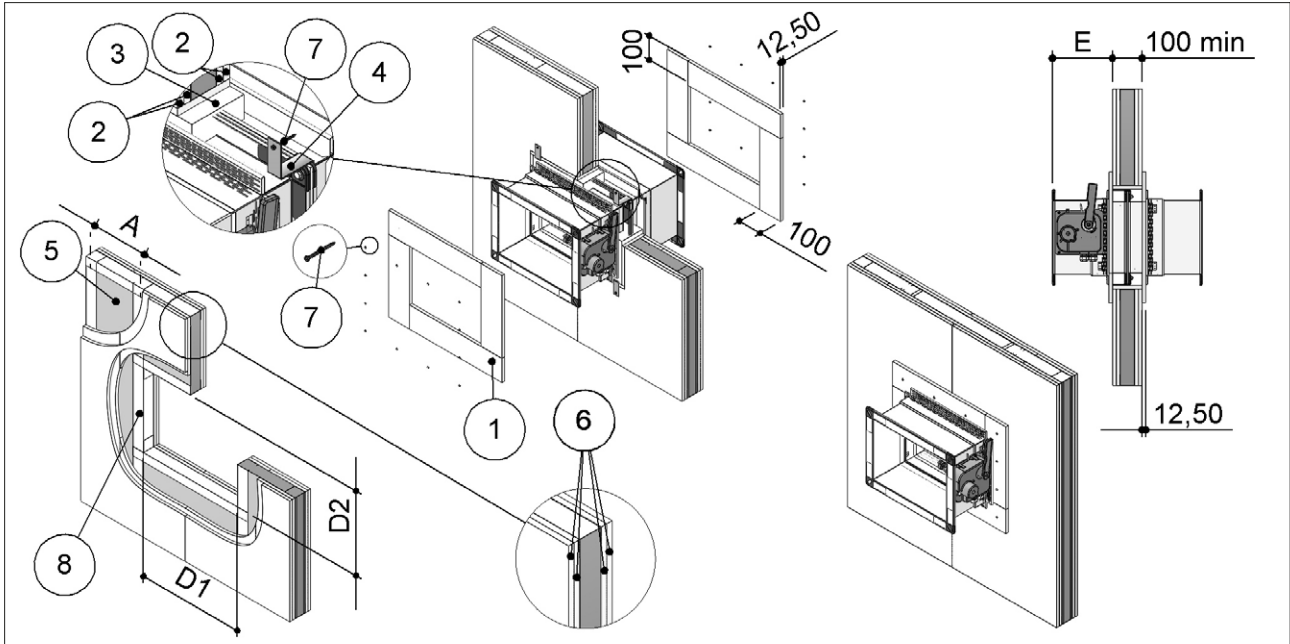
Sealing with concrete is not allowed.

	Fire resistance classification	Hole size "D1 x D2" [mm]	Damper protrusion from the wall "E" [mm]	Wall minimum thickness "S" [mm]	Sealing
EI 90 S Installation within vertical light wall (plasterboard)					
Wall rock wool density up to 100 kg/m ³ (optional)	EI 90 S (500 Pa)	Da (B+75) x (H+75) a (B+95) x (H+95)	205	100	Rock wool 100 kg/m ³ with infill plasterboard (thickness 12.5 mm)
EI 120 S Installation within vertical light wall (plasterboard)					
Wall rock wool density up to 100 kg/m ³ (optional)	EI 120 S (500 Pa)	Da (B+100) x (H+100) to (B+580) x (H+580)	205	100	Mortar or plaster putty

B Nominal base of the damper
H Nominal height of the damper

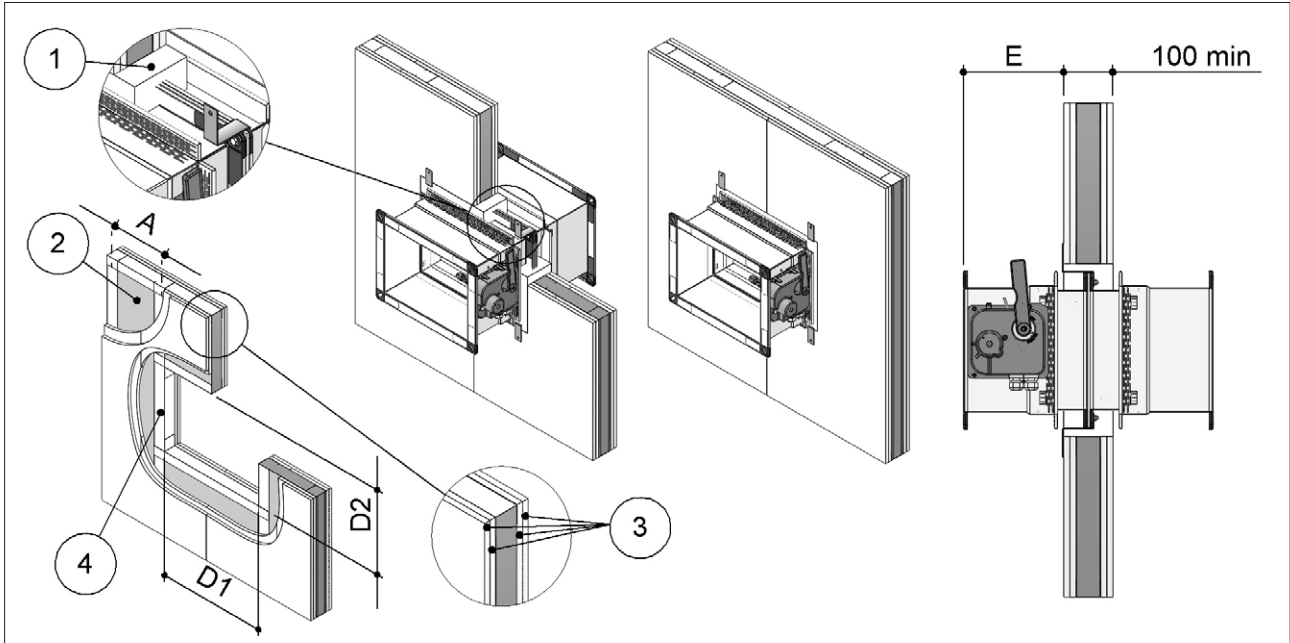
EI 90 S Installation within vertical light wall (plasterboard)

- | | | | |
|----|---|----|--|
| D1 | Hole base: see table above | 3. | Rock wool, 100 kg/m ³ |
| D2 | Hole height: see table above | 4. | WKGY100 fixing brackets (accessory to order separately, one size valid for all fire dampers kind and wall thickness) |
| E | Damper protrusion from the wall: see table above | 5. | Rock wool density up to 100 kg/m ³ (optional) |
| A | Distance between vertical profiles: 625 mm see section Light plasterboard vertical walls p. 21 or 312,5 mm see section Light plasterboard vertical walls with steel reinforcement p. 21 | 6. | Plasterboard thickness 12,5 mm |
| 1. | Plasterboard infill panel, thickness 12,5 mm | 7. | Self-drilling screw Ø 3,5 X 45 mm |
| 2. | Plasterboard infill panel, thickness 12,5 mm | 8. | Metal frame |



EI 120 S Installation within vertical light wall (plasterboard)

- | | | | |
|----|---|----|--|
| D1 | Hole base: see table above | 1. | Mortar M-10, EN998-2 or plaster |
| D2 | Hole height: see table above | 2. | Rock wool density up to 100 kg/m ³ (optional) |
| E | Damper protrusion from the wall: see table above | 3. | Plasterboard thickness 12,5 mm |
| A | Distance between vertical profiles: 625 mm see section Light plasterboard vertical walls p. 21 or 312,5 mm see section Light plasterboard vertical walls with steel reinforcement p. 21 | 4. | Metal frame |



3.11. Installation within vertical light wall (gypsum blocks wall)

Refer to the section [p. 20](#) for further information.
Comply with the minimum distances indicated on section Minimum distances [p. 19](#).
Before and after installation please perform a functional test. Refer to section Mechanism type for further information [p. 12](#).

3.11.1. Wall opening

A opening must be provided in the wall as indicated in the table and in the drawing

3.11.2. Damper positioning

Position the damper in the opening so that the side of the closing mechanism extends as indicated in the table and in the drawing.

Close the blade before installing the fire damper.

3.11.3. Filling

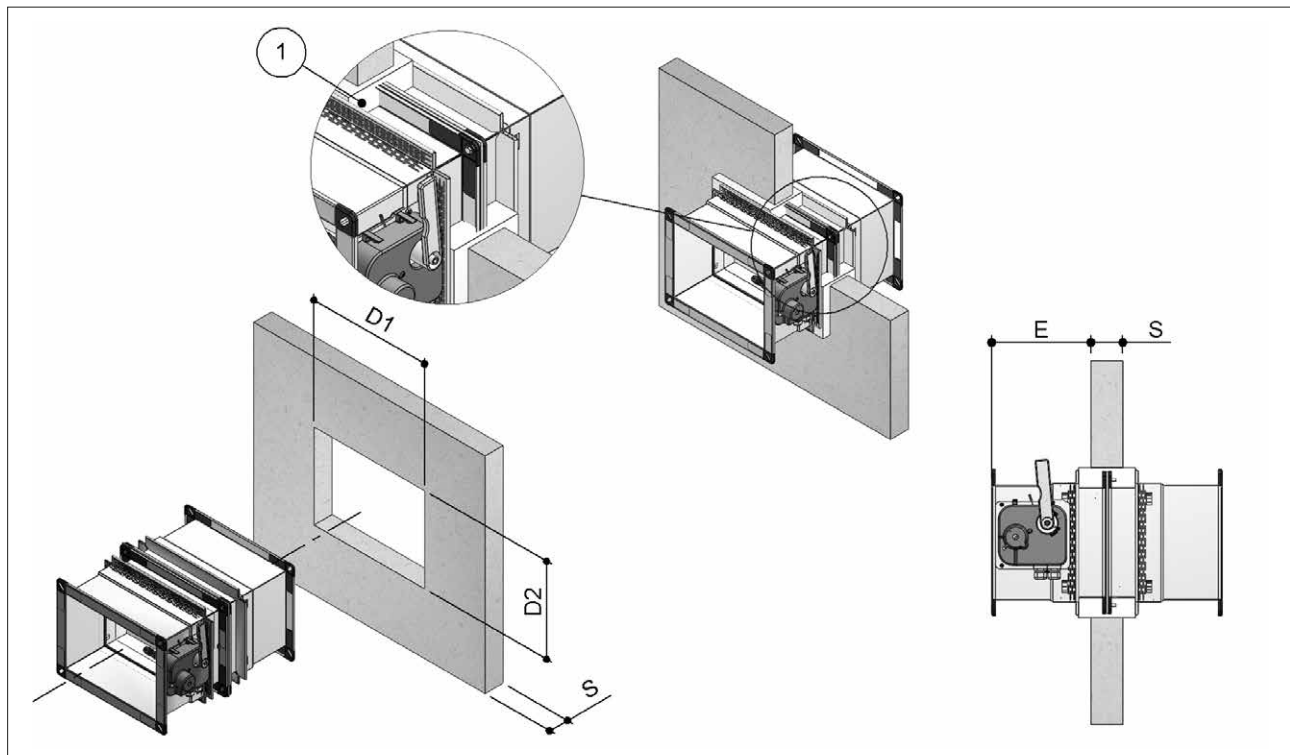
Fill the space between the wall and the damper as indicated in the table and in the drawing.
Sealing with concrete is not allowed.

	Fire resistance classification	Hole size "D1 x D2" [mm]	Damper protrusion from the wall "E" [mm]	Wall minimum thickness "S" [mm]	Sealing
EI 90 S Installation within vertical light wall (gypsum blocks wall) <small>(paired installation not available)</small>					
Wall minimum density 995 kg/m ³	EI 90 S (500 Pa)	From (B+80) x (H+80) to (B+110) x (H+110)	220	70	Plaster putty sealing
EI 120 S Installation within vertical light wall (gypsum blocks wall)					
Wall minimum density 995 kg/m ³	EI 120 S (500 Pa)	From (B+80) x (H+80) to (B+110) x (H+110)	205	100	Plaster putty sealing

B Nominal base of the damper
H Nominal height of the damper

- 1. Plaster putty
- D1 Hole base: see table above
- D2 Hole height: see table above

- E Damper protrusion from the wall: see table above
- S Wall minimum thickness: see table above



3.12. Installations within floor

Refer to the section Construction supports characteristics p. 20 for further information.

Comply with the minimum distances indicated on section Minimum distances p. 19.

Before and after installation please perform a functional test. Refer to section Mechanism type for further information p. 12.

3.12.1. Floor opening

A opening must be provided in the floor as indicated in the table and in the drawing

3.12.2. Damper positioning

Position the damper in the opening so that the side of the closing mechanism extends as indicated in the table and in the drawing.

Close the blade before installing the fire damper.

3.12.3. Filling

Fill the space between the floor and the damper as indicated in the table and in the drawing.

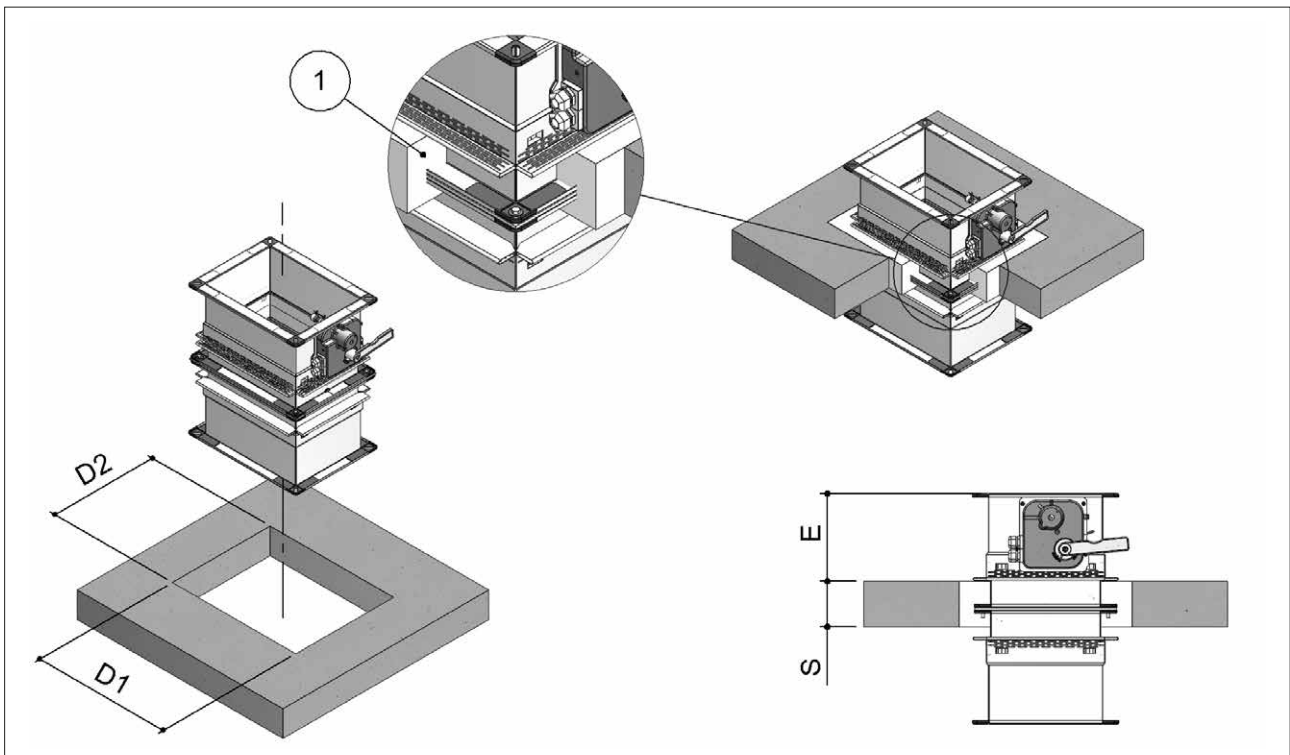
Sealing with concrete is not allowed.

	Fire resistance classification	Hole size "D1 x D2" [mm]	Damper protrusion from the wall "E" [mm]	Floor minimum thickness "S" [mm]	Sealing
EI 90 S Installation within floor					
Floor minimum density 650 kg/m ³	EI 90 S (500 Pa)	From (B+130) x (H+130) to (B+170) x (H+170)	193	100	Mortar sealing
EI 120 S Installation within floor					
Floor minimum density 650 kg/m ³	EI 120 S (500 Pa)	From (B+130) x (H+130) to (B+170) x (H+170)	193	150	Mortar sealing
EI 180 S Installation within floor					
Floor minimum density 2200 kg/m ³	EI 180 S (500 Pa)	From (B+130) x (H+130) to (B+170) x (H+170)	185	140	Mortar sealing

B Nominal base of the damper
H Nominal height of the damper

D1 Hole base: see table above
D2 Hole height: see table above
E Damper protrusion from the floor: see table above

S Floor minimum thickness: see table above
1. Mortar M-10, EN998-2



3.13. Installations within vertical wall with Fire Batt (Weichschott) sealing

Refer to the section Construction supports characteristics p.20 for further information.

Comply with the minimum distances indicated on section Minimum distances p.19.

Before and after installation please perform a functional test. Refer to section Mechanism type for further information p.12.

3.13.1. Wall opening

A opening must be provided in the wall as indicated in the table and in the drawing

3.13.2. Damper positioning

Position the damper in the opening so that the side of the closing mechanism extends as indicated in the table and in the drawing.

Close the blade before installing the fire damper.

3.13.3. Filling

Fill the space between the damper and the wall using Fire Batt (Weichschott) sealing made from two rock wool panels with minimum thickness of 50 mm and minimum density of 140 kg/m³.

The panels must be covered on both faces of the wall with endothermic varnish type PROMASTOP E PASTE or HILTI CFS-CT (minimum thickness of 1 mm) and with an internal perimeter sealant type PROMASTOP E PASTE or HILTI CFS-S ACR (minimum thickness of 1 mm).

	Fire resistance classification	Hole size "D1 x D2" [mm]	Damper protrusion from the wall "E" [mm]	Wall minimum thickness "S" [mm]	Sealing
Rigid wall	EI 90 S Installation within vertical rigid wall and Fire Batt (Weichschott) sealing				
Wall minimum density 500 kg/m ³	EI 90 S (300 Pa)	(B+800 max) x (H+800 max)	205	100	Rock wool 140 kg/m ³ and endothermic varnish sealing
Flexible wall	EI 90 S Installation within vertical light wall (plasterboard) with Fire Batt (Weichschott) sealing				
Wall rock wool density up to 100 kg/m ³ (optional)	EI 90 S (300 Pa)	(B+800 max) x (H+800 max)	205	100	Rock wool 140 kg/m ³ and endothermic varnish sealing
	EI 90 S Installation within vertical light wall (plasterboard) with Fire Batt (Weichschott) sealing				
Wall minimum density 995 kg/m ³	EI 90 S (300 Pa)	(B+800 max) x (H+800 max)	205	100	Rock wool 140 kg/m ³ and endothermic varnish sealing

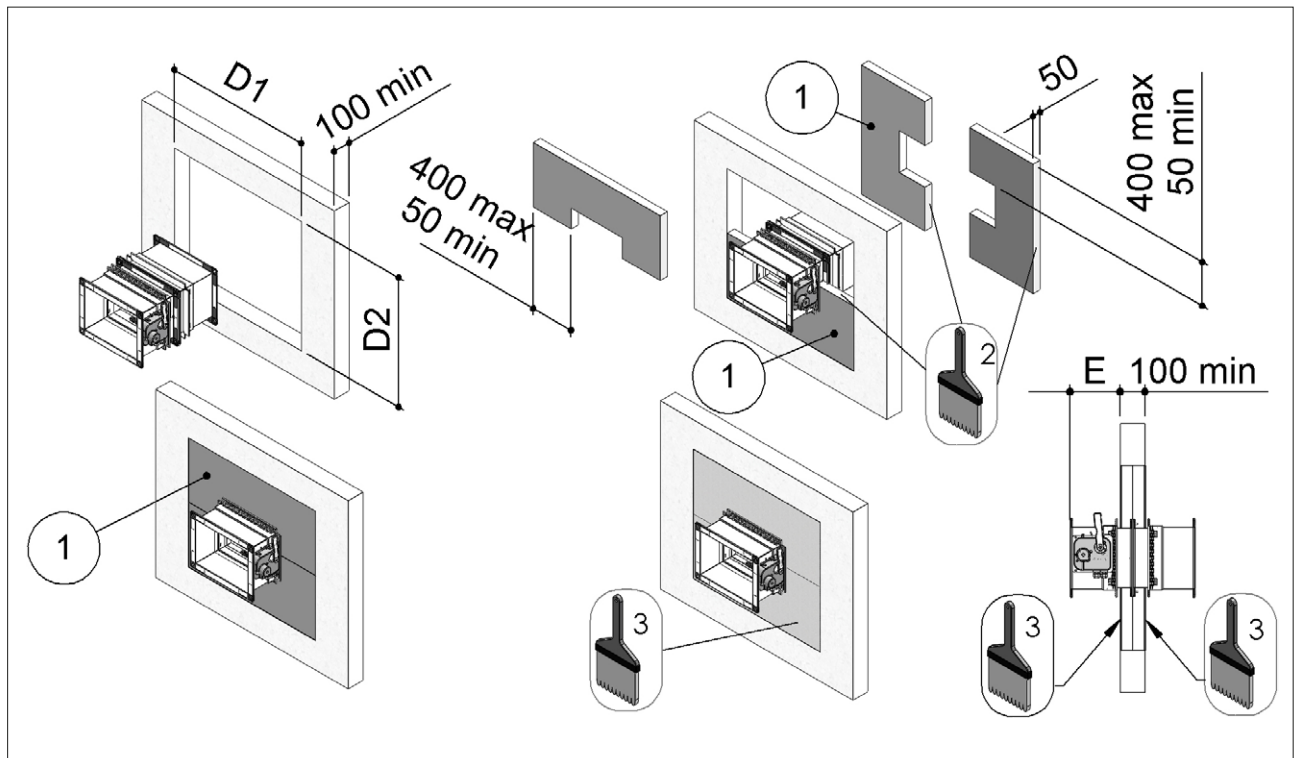
B Nominal base of the damper
H Nominal height of the damper

D1 Hole base indicated in the table

D2 Hole height indicated in the table

E Damper protrusion from the wall indicated in the table

1. Rock wool panel 50 mm thick with 140 kg/m³ density.
2. PROMASTOP E PASTE or HILTI CFS-S ACR type sealant
3. PROMASTOP E PASTE or HILTI CFS-CT endothermic varnish



3.14. Installation within floor with Fire Batt (Weichschott) sealing

Refer to the section [p. 20](#) for further information.
Comply with the minimum distances indicated on section Minimum distances [p. 19](#).
Before and after installation please perform a functional test. Refer to section Mechanism type for further information [p. 12](#).

3.14.1. Floor opening

A opening must be provided in the floor as indicated in the table and in the drawing

3.14.2. Damper positioning

Position the damper in the opening so that the side of the closing mechanism extends as indicated in the table and in the drawing.

Close the blade before installing the fire damper.

3.14.3. Filling

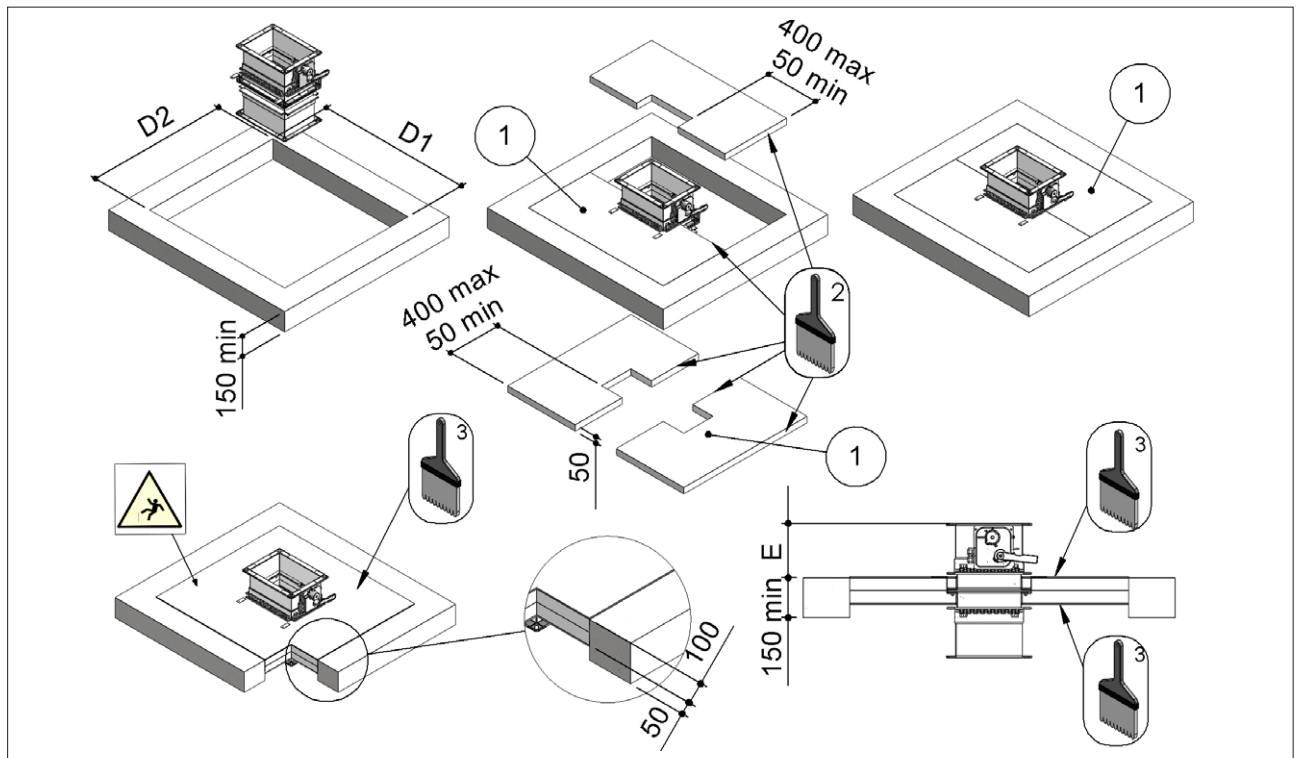
Fill the space between the damper and the floor using Fire Batt (Weichschott) sealing made from two rock wool panels with minimum thickness of 50 mm and minimum density of 140 kg/m³.

The panels must be covered on both faces of the wall with endothermic varnish type PROMASTOP E PASTE or HILTI CFS-CT (minimum thickness of 1 mm) and with an internal perimeter sealant type PROMASTOP E PASTE or HILTI CFS-S ACR (minimum thickness of 1 mm).

	Fire resistance classification	Hole size "D1 x D2" [mm]	Damper protrusion from the wall "E" [mm]	Floor minimum thickness "S" [mm]	Sealing
EI 120 S Installation within floor and Fire Batt (Weichschott) sealing					
Floor minimum density 650 kg/m ³	EI 120 S (300 Pa)	(B+800 max) x (H+800 max)	205	150	Rock wool 140 kg/m ³ and endothermic varnish sealing

B Nominal base of the damper
H Nominal height of the damper

- D1 Hole base: see table above
 - D2 Hole height: see table above
 - E Damper protrusion from the floor: see table above
1. Rock wool panel 50 mm thick with 140 kg/m³ density.
 2. PROMASTOP E PASTE or HILTI CFS-S ACR type sealant
 3. PROMASTOP E PASTE or HILTI CFS-CT endothermic varnish

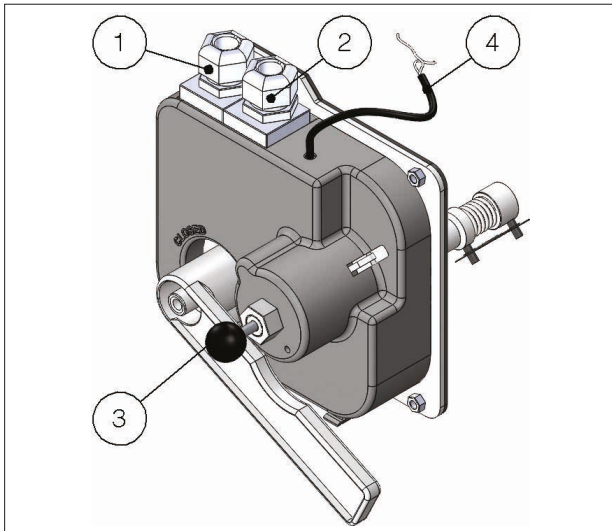


4. ELECTRICAL CONNECTIONS

4.1. Electrical wiring

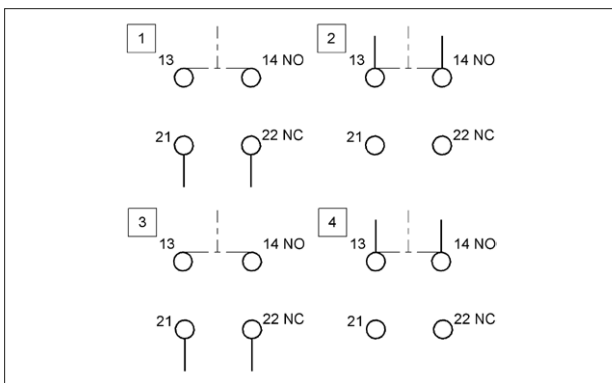
Electrical connections must be done by qualified and trained people.

Switch off the power supply before starting any work on the electric elements. Never switch on the power supply during electrical connections.



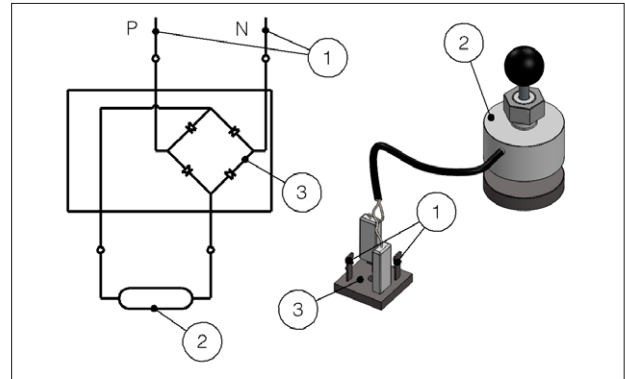
1. SC (closed damper) microswitch - on request
2. SA (open damper) microswitch - on request
3. Magnet - on request
4. Magnet cables for wiring

4.1.1. SC/SA microswitches position



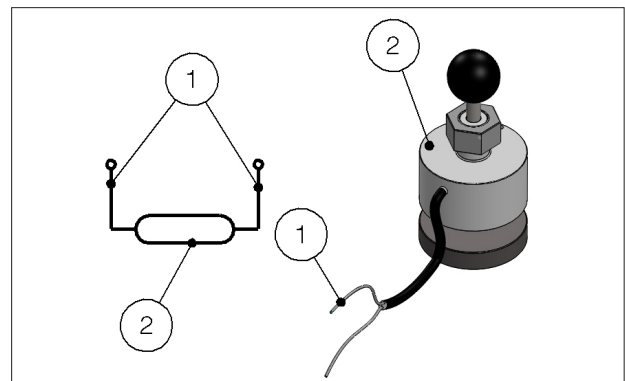
1. "NC" contact of SC microswitch. When the fire blade is closed the circuit is open.
2. "NO" contact of SC microswitch. When the fire blade is closed the circuit is closed.
3. "NC" contact of SA microswitch. When the fire blade is open the circuit is open.
4. "NO" contact of SA microswitch. When the fire blade is open the circuit is closed.

4.1.2. 230 V AC magnet wiring



1. 230 V AC power supply
2. Magnet
3. Rectifier

4.1.3. 24 V DC magnet wiring

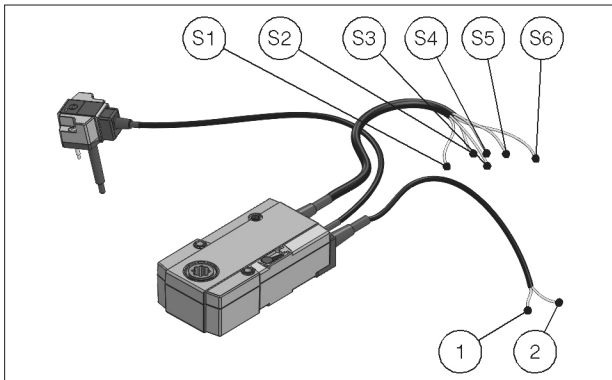


1. 24 V DC power supply
2. Magnet

4.1.4. WK45 - Motorized version

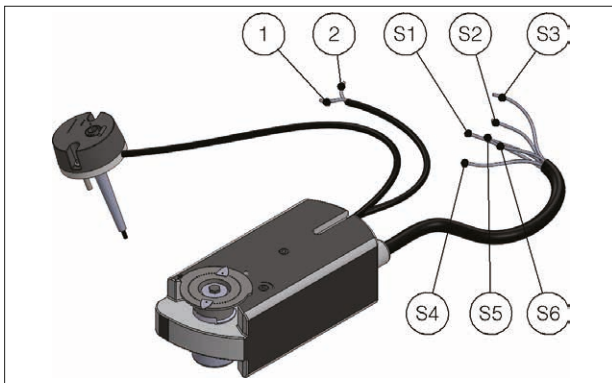
Belimo servomotor:

BFL24T, BFN24T, BF24T, BFL230T, BFN230T, BF230T.



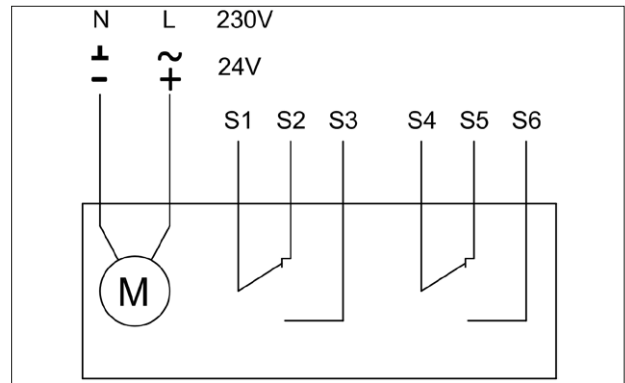
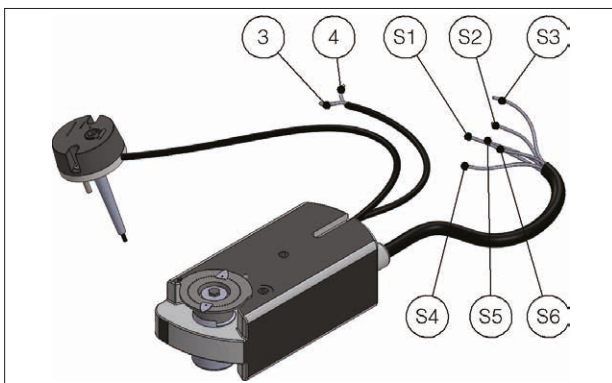
Siemens servomotor:

GRA126, GNA126, GGA126.



Siemens servomotor:

GRA326, GNA326, GGA326.



- 1 Negative (DC) or neutral (AC)
- 2 Positive (DC) or phase (AC)
- 3 Phase
- 4 Neutral
- S1 Common closed damper microswitch
- S2 Normally closed, closed damper microswitch
- S3 Normally opened, closed damper microswitch
- S4 Common open damper microswitch
- S5 Normally closed, open damper microswitch
- S6 Normally opened, open damper microswitch

Motorized fire dampers electrical wiring

To connect the dampers to the power supply, proceed as follows:

- Check that the voltage and electrical frequency are equivalent to those of the motor of the servomotor (check the motor's information label);
- Make the connections as shown in the below diagram.

4.2. Electrical specifications

Manual		Manual with magnet Belimo motorized version Siemens motorized version	
Voltage and power consumption	-	Power interruption magnet: P=4,5 W (24V DC or 230 V AC version)	Power input magnet: P=4,5 W (24V DC or 230 V AC version)
		Motor 24V AC/DC (WK45VMB): Belimo BFN24T Opening: 4 W In stand-by: 1,4 W	Motor 230V AC (WK45DMB): Belimo BFN230T Opening: 5 W In stand-by: 2,1 W
		Motor 24V AC/DC (WK45VGB): Belimo BF24T Opening: 7 W In stand-by: 2 W	Motor 230V AC (WK45DGB): Belimo BF230T Opening: 8 W In stand-by: 3 W
		Motor 24V AC/DC (WK45VPS) / (WK45VSS): Siemens GNA126 / GRA126 Opening: 3,5 W In stand-by: 2 W	Motor 230V AC (WK45DPS) / (WK45DSS): Siemens GNA326 / GRA326 Opening: 4,5 W In stand-by: 3,5 W
		Motor 24V AC/DC (WK45VGS): Siemens GGA126 Opening: 6 W In stand-by: 1.5 W	Motor 230V AC (WK45DGS): Siemens GGA326 Opening: 6 W In stand-by: 2,5 W
Microswitches position contacts	Manual control version: 15 - 400V 1,8 A	Motorized version: Siemens: AC 24V...230V / 6 (2) A Belimo: DC 5V...AC 250V / 1mA...3A (0,5A)	
Blade closing time	Spring: 1 s	motor: < 30 s	
Protection degree	IP42	IP42 MAGNETIC VERSION IP54 MOTORIZED VERSION	

5. MAINTENANCE AND INSPECTIONS

Fire dampers and control mechanisms do not require routine maintenance.

Extraordinary maintenance (repairs) and periodic inspection operations are the responsibility of the ventilation system operator.

It is recommended to keep enough space (about 200mm) for using or replacing the control mechanism or for maintenance. Also provide the necessary space to remove the ventilation duct from the damper whenever necessary.

It is recommended to provide inspection hatches on both sides of the ducts connected to the fire damper.

The implementation of a periodic inspection plan allows to guarantee the efficiency and functionality of the fire dampers for the fire safety of the building.

5.1. Periodic inspection and cleaning

Periodic inspection shall be performed in accordance with the requirements of the law or by the building regulations or other local regulations.

In the absence of specific regulations (or to their complement), in accordance with point 8.3 of the EN 1560 standard, it is recommended to carry out the following control activities at intervals of no more than 12 months:

- Check the servomotor electrical wiring for damage (where applicable);
- Check end-switch wiring for damage (where applicable);
- Check damper cleanliness and clean where necessary;
- Check the condition of blades and seals, rectify and report where necessary;
- Check the correct opening and closing of the fire damper by manual operation according to the instructions in the technical manual of the fire damper;
- Check the opening and closing operation of the damper controlled by the fire alarm system (if present);
- Check the operation of the end switches in open and closed state, adjust and report if necessary;
- Confirm that the damper fulfils its function as part of the control system (where necessary);
- Check that the damper is left in its normal operating position, which usually corresponds to the open position.

5.2. Repair

For safety reasons, repair activities involving fire-fighting components must be carried out only by qualified personnel.

Only original spare parts supplied by the fire damper manufacturer must be used.

A functional test must be performed after each repair.

At the end of the inspection, cleaning or repair operations, check that the fire damper is in the normal operating position.

Keep records of all inspections, repair activities, any problems encountered and their resolution.

This practice, even when not mandatory, is very useful in practice.

5.3. Disposal

Disposal in case of destruction must be carried out in accordance with national legislation. For electrical and electronic parts also refer to EU Directive 2011/65.

6. SELECTION

6.1. Air flow rates in relation to the diameter

Maximum frontal air speed = 10 m/s

Base (mm)	200			250			300			350		
	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow
Height (mm)	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h
200	0,040	0,018	1440	0,050	0,023	1800	0,060	0,029	2160	0,070	0,035	2520
250	0,050	0,025	1800	0,063	0,034	2250	0,075	0,042	2700	0,088	0,050	3150
300	0,060	0,033	2160	0,075	0,044	2700	0,090	0,055	3240	0,105	0,065	3780
350	0,070	0,041	2520	0,088	0,054	3150	0,105	0,067	3780	0,123	0,081	4410
400	0,080	0,049	2880	0,100	0,064	3600	0,120	0,080	4320	0,140	0,096	5040
450	0,090	0,056	3240	0,113	0,075	4050	0,135	0,093	4860	0,158	0,111	5670
500	0,100	0,064	3600	0,125	0,085	4500	0,150	0,106	5400	0,175	0,126	6300
550	0,110	0,072	3960	0,138	0,095	4950	0,165	0,118	5940	0,193	0,141	6930
600	0,120	0,080	4320	0,150	0,105	5400	0,180	0,131	6480	0,210	0,157	7560
650	0,130	0,087	4680	0,163	0,115	5850	0,195	0,144	7020	0,228	0,172	8190
700							0,210	0,156	7560	0,245	0,187	8820

Base (mm)	400			450			500			550		
	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow
Height (mm)	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h
200	0,080	0,041	2880	0,090	0,046	3240	0,100	0,052	3600	0,110	0,058	3960
250	0,100	0,058	3600	0,113	0,067	4050	0,125	0,075	4500	0,138	0,083	4950
300	0,120	0,076	4320	0,135	0,087	4860	0,150	0,098	5400	0,165	0,108	5940
350	0,140	0,094	5040	0,158	0,107	5670	0,175	0,120	6300	0,193	0,133	6930
400	0,160	0,112	5760	0,180	0,127	6480	0,200	0,143	7200	0,220	0,159	7920
450	0,180	0,129	6480	0,203	0,147	7290	0,225	0,166	8100	0,248	0,184	8910
500	0,200	0,147	7200	0,225	0,168	8100	0,250	0,188	9000	0,275	0,209	9900
550	0,220	0,165	7920	0,248	0,188	8910	0,275	0,211	9900	0,303	0,234	10890
600	0,240	0,182	8640	0,270	0,208	9720	0,300	0,234	10800	0,330	0,260	11880
650	0,260	0,200	9360	0,293	0,228	10530	0,325	0,257	11700	0,358	0,285	12870
700	0,280	0,218	10080	0,315	0,249	11340	0,350	0,279	12600	0,385	0,310	13860
750	0,300	0,236	10800	0,338	0,269	12150	0,375	0,302	13500	0,413	0,335	14850
800	0,320	0,253	11520	0,360	0,289	12960	0,400	0,325	14400	0,440	0,361	15840

Base (mm)	600			650			700			750		
	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow
Height (mm)	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h
200	0,120	0,064	4320	0,130	0,069	4680	0,140	0,075	5040	0,150	0,081	5400
250	0,150	0,091	5400	0,163	0,100	5850	0,175	0,108	6300	0,188	0,116	6750
300	0,180	0,119	6480	0,195	0,130	7020	0,210	0,140	7560	0,225	0,151	8100
350	0,210	0,147	7560	0,228	0,160	8190	0,245	0,173	8820	0,263	0,186	9450
400	0,240	0,174	8640	0,260	0,190	9360	0,280	0,206	10080	0,300	0,222	10800
450	0,270	0,202	9720	0,293	0,220	10530	0,315	0,239	11340	0,338	0,257	12150
500	0,300	0,230	10800	0,325	0,251	11700	0,350	0,271	12600	0,375	0,292	13500
550	0,330	0,258	11880	0,358	0,281	12870	0,385	0,304	13860	0,413	0,327	14850
600	0,360	0,285	12960	0,390	0,311	14040	0,420	0,337	15120	0,450	0,363	16200
650	0,390	0,313	14040	0,423	0,341	15210	0,455	0,370	16380	0,488	0,398	17550
700	0,420	0,341	15120	0,455	0,372	16380	0,490	0,402	17640	0,525	0,433	18900
750	0,450	0,369	16200	0,488	0,402	17550	0,525	0,435	18900	0,563	0,468	20250
800	0,480	0,396	17280	0,520	0,432	18720	0,560	0,468	20160	0,600	0,503	21600

Base (mm)	800			850			900			950		
	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow
Height (mm)	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h
200	0,160	0,086	5760	0,170	0,092	6120	0,180	0,098	6480	0,190	0,104	6840
250	0,200	0,124	7200	0,213	0,132	7650	0,225	0,141	8100	0,238	0,149	8550
300	0,240	0,162	8640	0,255	0,173	9180	0,270	0,183	9720	0,285	0,194	10260
350	0,280	0,200	10080	0,298	0,213	10710	0,315	0,226	11340	0,333	0,239	11970
400	0,320	0,237	11520	0,340	0,253	12240	0,360	0,269	12960	0,380	0,285	13680
450	0,360	0,275	12960	0,383	0,293	13770	0,405	0,312	14580	0,428	0,330	15390
500	0,400	0,313	14400	0,425	0,334	15300	0,450	0,354	16200	0,475	0,375	17100
550	0,440	0,351	15840	0,468	0,374	16830	0,495	0,397	17820	0,523	0,420	18810
600	0,480	0,388	17280	0,510	0,414	18360	0,540	0,440	19440	0,570	0,465	20520
650	0,520	0,426	18720	0,553	0,454	19890	0,585	0,482	21060	0,618	0,511	22230
700	0,560	0,464	20160	0,595	0,494	21420	0,630	0,525	22680	0,665	0,556	23940
750	0,600	0,501	21600	0,638	0,535	22950	0,675	0,568	24300	0,713	0,601	25650
800	0,640	0,539	23040	0,680	0,575	24480	0,720	0,611	25920	0,760	0,646	27360

Base (mm)	1000			1050			1100			1150		
	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow
Height (mm)	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h
200	0,200	0,109	7200	0,210	0,115	7560	0,220	0,121	7920	0,230	0,127	8280
250	0,250	0,157	9000	0,263	0,165	9450	0,275	0,174	9900	0,288	0,182	10350
300	0,300	0,205	10800	0,315	0,216	11340	0,330	0,226	11880	0,345	0,237	12420
350	0,350	0,253	12600	0,368	0,266	13230	0,385	0,279	13860	0,403	0,292	14490
400	0,400	0,300	14400	0,420	0,316	15120	0,440	0,332	15840	0,460	0,347	16560
450	0,450	0,348	16200	0,473	0,366	17010	0,495	0,384	17820	0,518	0,403	18630
500	0,500	0,396	18000	0,525	0,416	18900	0,550	0,437	19800	0,575	0,458	20700
550	0,550	0,443	19800	0,578	0,467	20790	0,605	0,490	21780	0,633	0,513	22770
600	0,600	0,491	21600	0,630	0,517	22680	0,660	0,543	23760	0,690	0,568	24840
650	0,650	0,539	23400	0,683	0,567	24570	0,715	0,595	25740	0,748	0,624	26910
700	0,700	0,587	25200	0,735	0,617	26460	0,770	0,648	27720	0,805	0,679	28980
750	0,750	0,634	27000	0,788	0,668	28350	0,825	0,701	29700	0,863	0,734	31050
800	0,800	0,682	28800	0,840	0,718	30240	0,880	0,754	31680	0,920	0,789	33120

Base (mm)	1200			1250			1300			1350		
	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow
Height (mm)	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h
200	0,240	0,132	8640	0,250	0,138	9000	0,260	0,144	9360	0,270	0,149	9720
250	0,300	0,190	10800	0,313	0,198	11250	0,325	0,206	11700	0,338	0,215	12150
300	0,360	0,248	12960	0,375	0,258	13500	0,390	0,269	14040	0,405	0,280	14580
350	0,420	0,305	15120	0,438	0,319	15750	0,455	0,332	16380	0,473	0,345	17010
400	0,480	0,363	17280	0,500	0,379	18000	0,520	0,395	18720	0,540	0,410	19440
450	0,540	0,421	19440	0,563	0,439	20250	0,585	0,457	21060	0,608	0,476	21870
500	0,600	0,479	21600	0,625	0,499	22500	0,650	0,520	23400	0,675	0,541	24300
550	0,660	0,536	23760	0,688	0,560	24750	0,715	0,583	25740	0,743	0,606	26730
600	0,720	0,594	25920	0,750	0,620	27000	0,780	0,646	28080	0,810	0,671	29160
650	0,780	0,652	28080	0,813	0,680	29250	0,845	0,708	30420	0,878	0,737	31590
700	0,840	0,710	30240	0,875	0,740	31500	0,910	0,771	32760	0,945	0,802	34020
750	0,900	0,767	32400	0,938	0,801	33750	0,975	0,834	35100	1,013	0,867	36450
800	0,960	0,825	34560	1,000	0,861	36000	1,040	0,896	37440	1,080	0,932	38880

Base (mm)	1400			1450			1500		
	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow	Front section	Net section	Maximum air flow
Height (mm)	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h	m ²	m ²	m ³ /h
200	0,280	0,155	10080	0,290	0,161	10440	0,300	0,167	10800
250	0,350	0,223	12600	0,363	0,231	13050	0,375	0,239	13500
300	0,420	0,291	15120	0,435	0,301	15660	0,450	0,312	16200
350	0,490	0,358	17640	0,508	0,372	18270	0,525	0,385	18900
400	0,560	0,426	20160	0,580	0,442	20880	0,600	0,458	21600
450	0,630	0,494	22680	0,653	0,512	23490	0,675	0,530	24300
500	0,700	0,562	25200	0,725	0,582	26100	0,750	0,603	27000
550	0,770	0,629	27720	0,798	0,653	28710	0,825	0,676	29700
600	0,840	0,697	30240	0,870	0,723	31320	0,900	0,748	32400
650	0,910	0,765	32760	0,943	0,793	33930	0,975	0,821	35100
700	0,980	0,832	35280	1,015	0,863	36540	1,050	0,894	37800
750	1,050	0,900	37800	1,088	0,933	39150	1,125	0,967	40500
800	1,120	0,968	40320	1,160	1,004	41760	1,200	1,039	43200

6.2. Air flow rates as a function of the pressure drop

$\Delta P = 20 \text{ Pa}$

Base (mm)	200		250		300		350		400		450		500		550		600	
	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw
Height (mm)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)
200	257	27,5	349	28,5	447	29,3	551	30,0	661	30,6	798	32,7	906	33,5	1016	34,3	1128	34,9
250	388	30,3	526	31,3	674	32,2	831	32,8	997	33,4	1204	35,6	1366	36,4	1532	37,1	1701	37,8
300	542	33,0	734	33,9	941	34,8	1161	35,5	1393	36,1	1682	38,2	1909	39,0	2141	39,7	2376	40,4
350	719	35,4	974	36,4	1248	37,2	1539	37,9	1846	38,5	2231	40,6	2531	41,4	2838	42,1	3151	42,8
400	917	37,5	1243	38,5	1593	39,3	1965	40,0	2356	40,6	2847	42,8	3230	43,6	3622	44,3	4021	45,0
450	1137	39,5	1540	40,5	1974	41,3	2435	42,0	2921	42,6	3529	44,8	4004	45,6	4490	46,3	4984	46,9
500	1377	41,3	1866	42,3	2392	43,2	2950	43,8	3538	44,4	4275	46,6	4851	47,4	5439	48,1	6038	48,8
550	1638	43,0	2220	44,0	2845	44,8	3509	45,5	4209	46,1	5085	48,3	5770	49,1	6469	49,8	7182	50,5
600	1919	44,6	2600	45,6	3332	46,4	4111	47,1	4930	47,7	5956	49,8	6759	50,6	7578	51,4	8413	52,0
650	2219	46,0	3007	47,0	3854	47,9	4754	48,6	5702	49,2	6889	51,3	7817	52,1	8765	52,8	9730	53,5
700					4409	49,2	5439	49,9	6523	50,5	7881	52,7	8943	53,5	10028	54,2	11132	54,8
750									7393	51,8	8932	53,9	10137	54,7	11365	55,5	12617	56,1
800									8312	53,0	10042	55,1	11396	56,0	12777	56,7	14184	57,3

Base (mm)	650		700		750		800		850		900		950		1000		1050	
	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw
Height (mm)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)
200	1241	35,5	1357	36,1	1474	36,6	1593	37,0	1713	37,5	1835	37,9	1958	38,3	2082	38,7	2208	39,0
250	1872	38,3	2047	38,9	2223	39,4	2402	39,9	2584	40,3	2767	40,7	2953	41,1	3140	41,5	3330	41,9
300	2616	41,0	2859	41,5	3106	42,0	3357	42,5	3610	43,0	3866	43,4	4126	43,8	4388	44,1	4652	44,5
350	3468	43,4	3791	43,9	4118	44,4	4450	44,9	4786	45,3	5126	45,8	5470	46,2	5817	46,5	6168	46,9
400	4426	45,5	4838	46,1	5256	46,6	5679	47,1	6108	47,5	6542	47,9	6980	48,3	7423	48,7	7871	49,1
450	5487	47,5	5997	48,1	6515	48,6	7040	49,1	7571	49,5	8109	49,9	8652	50,3	9202	50,7	9757	51,1
500	6647	49,4	7266	49,9	7893	50,4	8529	50,9	9173	51,3	9824	51,8	10483	52,2	11148	52,5	11821	52,9
550	7906	51,0	8642	51,6	9388	52,1	10144	52,6	10910	53,0	11684	53,4	12468	53,8	13260	54,2	14060	54,6
600	9261	52,6	10123	53,2	10997	53,7	11883	54,1	12780	54,6	13687	55,0	14605	55,4	15533	55,8	16470	56,1
650	10711	54,1	11708	54,6	12718	55,1	13743	55,6	14780	56,0	15830	56,5	16892	56,9	17964	57,2	19048	57,6
700	12254	55,4	13394	56,0	14551	56,5	15723	57,0	16910	57,4	18111	57,8	19325	58,2	20552	58,6	21792	59,0
750	13889	56,7	15181	57,3	16492	57,8	17821	58,2	19166	58,7	20527	59,1	21903	59,5	23294	59,9	24699	60,2
800	15615	57,9	17067	58,5	18541	59,0	20035	59,5	21547	59,9	23077	60,3	24625	60,7	26189	61,1	27768	61,5

Base (mm)	1100		1150		1200		1250		1300		1350		1400		1450		1500	
	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw
Height (mm)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)
200	2334	39,4	2462	39,7	2591	40,0	2721	40,3	2853	40,6	2985	40,9	3118	41,2	3230	41,2	3341	41,3
250	3521	42,2	3714	42,5	3908	42,9	4105	43,2	4303	43,5	4502	43,7	4703	44,0	4872	44,1	5040	44,2
300	4919	44,8	5189	45,2	5461	45,5	5735	45,8	6012	46,1	6290	46,4	6571	46,6	6807	46,7	7041	46,8
350	6522	47,2	6880	47,6	7240	47,9	7604	48,2	7970	48,5	8340	48,7	8712	49,0	9025	49,1	9336	49,2
400	8323	49,4	8779	49,7	9240	50,1	9704	50,4	10171	50,6	10643	50,9	11118	51,2	11517	51,3	11914	51,3
450	10317	51,4	10883	51,7	11453	52,0	12028	52,3	12608	52,6	13193	52,9	13781	53,2	14276	53,3	14768	53,3
500	12500	53,2	13185	53,6	13876	53,9	14573	54,2	15275	54,5	15983	54,7	16697	55,0	17296	55,1	17892	55,2
550	14867	54,9	15682	55,2	16504	55,6	17333	55,9	18168	56,1	19010	56,4	19859	56,7	20571	56,8	21280	56,8
600	17415	56,5	18370	56,8	19333	57,1	20304	57,4	21282	57,7	22269	58,0	23263	58,3	24097	58,3	24928	58,4
650	20142	57,9	21246	58,3	22359	58,6	23482	58,9	24614	59,2	25755	59,4	26904	59,7	27870	59,8	28831	59,9
700	23044	59,3	24307	59,6	25581	59,9	26865	60,2	28160	60,5	29466	60,8	30780	61,1	31885	61,2	32984	61,2
750	26118	60,6	27550	60,9	28994	61,2	30450	61,5	31918	61,8	33397	62,1	34887	62,4	36139	62,4	37385	62,5
800	29363	61,8	30972	62,1	32596	62,4	34233	62,7	35883	63,0	37546	63,3	39221	63,6	40628	63,7	42029	63,7

ΔP = 30 Pa

Base (mm)	200		250		300		350		400		450		500		550		600	
	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw
Height (mm)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)
200	315	32,7	427	33,7	547	34,5	675	35,2	809	35,8	978	38,0	1110	38,8	1244	39,5	1381	40,2
250	475	35,6	644	36,6	825	37,4	1018	38,1	1221	38,7	1475	40,8	1674	41,6	1876	42,3	2083	43,0
300	664	38,2	899	39,2	1153	40,0	1422	40,7	1706	41,3	2061	43,4	2338	44,2	2622	45,0	2910	45,6
350	880	40,6	1193	41,6	1529	42,4	1885	43,1	2261	43,7	2732	45,8	3100	46,6	3476	47,3	3859	48,0
400	1123	42,7	1522	43,8	1951	44,6	2406	45,3	2886	45,9	3486	48,0	3956	48,8	4436	49,5	4924	50,2
450	1392	44,7	1887	45,7	2418	46,6	2982	47,2	3577	47,9	4322	50,0	4904	50,8	5499	51,5	6104	52,2
500	1687	46,6	2286	47,6	2929	48,4	3613	49,1	4334	49,7	5236	51,8	5942	52,6	6662	53,3	7395	54,0
550	2006	48,2	2718	49,3	3484	50,1	4298	50,8	5154	51,4	6227	53,5	7067	54,3	7923	55,0	8796	55,7
600	2350	49,8	3184	50,8	4081	51,6	5034	52,3	6038	52,9	7295	55,1	8278	55,9	9282	56,6	10303	57,3
650	2718	51,3	3683	52,3	4720	53,1	5823	53,8	6983	54,4	8437	56,5	9574	57,3	10735	58,0	11917	58,7
700					5400	54,5	6661	55,2	7989	55,8	9652	57,9	10953	58,7	12281	59,4	13633	60,1
750									9055	57,0	10940	59,2	12415	60,0	13920	60,7	15452	61,4
800									10180	58,2	12299	60,4	13957	61,2	15649	61,9	>Qmax	--

Base (mm)	650		700		750		800		850		900		950		1000		1050	
	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw
Height (mm)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)
200	1520	40,7	1662	41,3	1805	41,8	1951	42,3	2098	42,7	2247	43,1	2398	43,5	2550	43,9	2704	44,3
250	2293	43,6	2506	44,1	2723	44,6	2942	45,1	3164	45,6	3389	46,0	3616	46,4	3846	46,7	4078	47,1
300	3204	46,2	3502	46,8	3804	47,3	4111	47,7	4421	48,2	4735	48,6	5053	49,0	5374	49,4	5698	49,7
350	4248	48,6	4643	49,1	5044	49,7	5450	50,1	5862	50,6	6278	51,0	6699	51,4	7124	51,8	7554	52,1
400	5421	50,8	5925	51,3	6437	51,8	6955	52,3	7480	52,7	8012	53,2	8549	53,6	9092	53,9	9640	54,3
450	6720	52,8	7345	53,3	7979	53,8	8622	54,3	9273	54,7	9931	55,2	10597	55,6	11270	55,9	11950	56,3
500	8141	54,6	8899	55,1	9667	55,6	10446	56,1	11234	56,6	12032	57,0	12839	57,4	13654	57,8	14478	58,1
550	9683	56,3	10584	56,8	11498	57,3	12424	57,8	13362	58,3	14310	58,7	15270	59,1	16240	59,4	17219	59,8
600	11343	57,8	12398	58,4	13468	58,9	14553	59,4	15652	59,8	16763	60,2	17888	60,6	19024	61,0	20171	61,4
650	13118	59,3	14339	59,8	15577	60,4	16832	60,8	18102	61,3	19388	61,7	20688	62,1	22002	62,5	23329	62,8
700	15008	60,7	16404	61,2	17821	61,7	19256	62,2	20710	62,6	22181	63,1	23668	63,5	25171	63,8	>Qmax	--
750	17011	62,0	18593	62,5	20199	63,0	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--
800	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--

Base (mm)	1100		1150		1200		1250		1300		1350		1400		1450		1500	
	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw
Height (mm)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)
200	2859	44,6	3016	44,9	3174	45,3	3333	45,5	3494	45,8	3656	46,1	3819	46,4	3956	46,5	4092	46,5
250	4312	47,4	4548	47,8	4787	48,1	5027	48,4	5270	48,7	5514	49,0	5760	49,2	5967	49,3	6172	49,4
300	6025	50,1	6355	50,4	6688	50,7	7024	51,0	7363	51,3	7704	51,6	8048	51,9	8336	51,9	8624	52,0
350	7988	52,5	8426	52,8	8867	53,1	9313	53,4	9762	53,7	10214	54,0	10670	54,2	11053	54,3	11434	54,4
400	10194	54,6	10753	55,0	11316	55,3	11885	55,6	12457	55,9	13035	56,2	13616	56,4	14105	56,5	14591	56,6
450	12636	56,6	13329	57,0	14027	57,3	14732	57,6	15442	57,9	16158	58,1	16879	58,4	17484	58,5	18087	58,6
500	15309	58,5	16148	58,8	16995	59,1	17848	59,4	18709	59,7	19576	60,0	20449	60,2	21183	60,3	21913	60,4
550	18208	60,1	19206	60,5	20213	60,8	21228	61,1	22251	61,4	23283	61,7	24322	61,9	25194	62,0	26063	62,1
600	21329	61,7	22498	62,0	23678	62,4	24867	62,7	26066	62,9	27274	63,2	28491	63,5	29513	63,6	30530	63,6
650	24669	63,2	26021	63,5	27385	63,8	28760	64,1	30146	64,4	31543	64,7	>Qmax	--	>Qmax	--	>Qmax	--
700	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--
750	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--
800	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--

$\Delta P = 40 \text{ Pa}$

Base (mm)	200		250		300		350		400		450		500		550		600	
	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw
Height (mm)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)
200	364	36,4	493	37,4	632	38,3	779	38,9	935	39,6	1129	41,7	1281	42,5	1437	43,2	1595	43,9
250	549	39,3	743	40,3	953	41,1	1175	41,8	1410	42,4	1703	44,5	1932	45,3	2167	46,0	2405	46,7
300	767	41,9	1039	42,9	1331	43,7	1642	44,4	1969	45,0	2379	47,1	2700	47,9	3027	48,7	3361	49,3
350	1016	44,3	1377	45,3	1765	46,1	2177	46,8	2611	47,4	3155	49,5	3580	50,3	4014	51,1	4456	51,7
400	1297	46,5	1757	47,5	2252	48,3	2778	49,0	3332	49,6	4026	51,7	4568	52,5	5122	53,2	5686	53,9
450	1608	48,5	2178	49,4	2792	50,3	3444	51,0	4130	51,6	4990	53,7	5663	54,5	6349	55,2	7048	55,9
500	1948	50,3	2639	51,3	3383	52,1	4172	52,8	5004	53,4	6046	55,5	6861	56,3	7692	57,0	8539	57,7
550	2317	52,0	3139	53,0	4023	53,8	4963	54,5	5952	55,1	7191	57,2	8160	58,0	9149	58,7	10156	59,4
600	2714	53,5	3677	54,5	4713	55,3	5813	56,0	6972	56,6	8423	58,8	9559	59,6	10717	60,3	11897	61,0
650	3139	55,0	4253	56,0	5451	56,8	6723	57,5	8063	58,1	9742	60,2	11055	61,0	12395	61,8	13760	62,4
700					6236	58,2	7692	58,9	9225	59,5	11145	61,6	>Qmax	--	>Qmax	--	>Qmax	--
750									10456	60,7	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--
800									>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--

Base (mm)	650		700		750		800		850		900		950		1000		1050	
	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw
Height (mm)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)
200	1756	44,5	1919	45,0	2085	45,5	2252	46,0	2423	46,4	2595	46,8	2769	47,2	2944	47,6	3122	48,0
250	2648	47,3	2894	47,8	3144	48,3	3397	48,8	3654	49,3	3913	49,7	4176	50,1	4441	50,5	4709	50,8
300	3700	49,9	4044	50,5	4393	51,0	4747	51,4	5105	51,9	5468	52,3	5834	52,7	6205	53,1	6579	53,4
350	4905	52,3	5361	52,9	5824	53,4	6293	53,8	6769	54,3	7249	54,7	7735	55,1	8227	55,5	8723	55,8
400	6260	54,5	6842	55,0	7433	55,5	8031	56,0	8638	56,5	9251	56,9	9871	57,3	10498	57,7	11132	58,0
450	7759	56,5	8481	57,0	9213	57,5	9955	58,0	10707	58,4	11467	58,9	12236	59,3	13013	59,6	13798	60,0
500	9401	58,3	10275	58,8	11162	59,4	12061	59,8	12972	60,3	13893	60,7	14825	61,1	15766	61,5	16717	61,8
550	11181	60,0	12221	60,5	13276	61,0	14346	61,5	15429	62,0	16524	62,4	17632	62,8	18752	63,2	19883	63,5
600	13097	61,6	14316	62,1	15552	62,6	16805	63,1	18073	63,5	19357	63,9	>Qmax	--	>Qmax	--	>Qmax	--
650	15148	63,0	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--
700	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--
750	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--
800	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--

Base (mm)	1100		1150		1200		1250		1300		1350		1400		1450		1500	
	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw	Q	Lw
Height (mm)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)	m ³ /h	dB(A)
200	3301	48,3	3482	48,6	3665	49,0	3849	49,3	4034	49,5	4221	49,8	4410	50,1	4598	50,2	4785	50,2
250	4979	51,2	5252	51,5	5527	51,8	5805	52,1	6085	52,4	6367	52,7	6651	52,9	6936	53,0	7223	53,1
300	6957	53,8	7338	54,1	7723	54,4	8111	54,7	8502	55,0	8896	55,3	9293	55,6	9692	55,6	9958	55,7
350	9224	56,2	9729	56,5	10239	56,8	10754	57,1	11272	57,4	11794	57,7	12321	58,0	12763	58,0	13203	58,1
400	11771	58,4	12416	58,7	13067	59,0	13723	59,3	14385	59,6	15051	59,9	15723	60,1	16287	60,2	16849	60,3
450	14591	60,3	15391	60,7	16197	61,0	17011	61,3	17831	61,6	18657	61,8	19490	62,1	20189	62,2	20885	62,3
500	17677	62,2	18646	62,5	19624	62,8	20609	63,1	21603	63,4	22604	63,7	23613	63,9	24460	64,0	25303	64,1
550	21025	63,9	22178	64,2	23340	64,5	24512	64,8	25694	65,1	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--
600	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--
650	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--
700	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--
750	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--
800	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--	>Qmax	--

6.3. Air flow rates as a function of generated sound levels

Lw = 30 dB(A)

Base (mm)	200		250		300		350		400		450		500		550		600	
	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP
Height (mm)	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa
200	284	24,4	370	22,5	459	21,1	551	20,0	646	19,1	718	16,2	790	15,2	861	14,4	932	13,7
250	383	19,5	499	18,0	620	16,9	744	16,0	872	15,3	970	13,0	1067	12,2	1163	11,5	1259	11,0
300	483	15,9	630	14,7	782	13,8	939	13,1	1101	12,5	1225	10,6	1347	10,0	1468	9,4	1588	8,9
350	584	13,2	761	12,2	945	11,5	1135	10,9	1330	10,4	1480	8,8	1628	8,3	1774	7,8	1919	7,4
400	685	11,2	893	10,3	1109	9,7	1331	9,2	1560	8,8	1736	7,4	1909	7,0	2081	6,6	2251	6,3
450	786	9,6	1025	8,9	1272	8,3	1528	7,9	1791	7,5	1992	6,4	2191	6,0	2388	5,7	2584	5,4
500	887	8,3	1157	7,7	1436	7,2	1725	6,8	2021	6,5	2248	5,5	2473	5,2	2696	4,9	2916	4,7
550	989	7,3	1289	6,7	1600	6,3	1922	6,0	2252	5,7	2505	4,9	2755	4,6	3003	4,3	3249	4,1
600	1090	6,5	1421	6,0	1764	5,6	2118	5,3	2482	5,1	2761	4,3	3038	4,0	3311	3,8	3582	3,6
650	1191	5,8	1553	5,3	1928	5,0	2315	4,7	2713	4,5	3018	3,8	3320	3,6	3619	3,4	3915	3,2
700					2092	4,5	2512	4,3	2944	4,1	3275	3,5	3602	3,2	3927	3,1	4248	2,9
750									3175	3,7	3532	3,1	3885	2,9	4234	2,8	4581	2,6
800									3406	3,4	3788	2,8	4167	2,7	4542	2,5	4914	2,4

Base (mm)	650		700		750		800		850		900		950		1000		1050	
	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP
Height (mm)	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa
200	1003	13,1	1073	12,5	1143	12,0	1212	11,6	1282	11,2	1350	10,8	1419	10,5	1487	10,2	1555	9,9
250	1354	10,5	1449	10,0	1544	9,6	1638	9,3	1731	9,0	1824	8,7	1917	8,4	2009	8,2	2101	8,0
300	1709	8,5	1829	8,2	1948	7,9	2067	7,6	2185	7,3	2302	7,1	2419	6,9	2535	6,7	2651	6,5
350	2065	7,1	2210	6,8	2354	6,5	2498	6,3	2640	6,1	2782	5,9	2923	5,7	3064	5,5	3204	5,4
400	2422	6,0	2593	5,7	2762	5,5	2930	5,3	3097	5,1	3263	5,0	3429	4,8	3593	4,7	3758	4,6
450	2780	5,1	2975	4,9	3169	4,7	3362	4,6	3554	4,4	3745	4,3	3935	4,1	4124	4,0	4312	3,9
500	3138	4,5	3358	4,3	3577	4,1	3795	4,0	4011	3,8	4227	3,7	4441	3,6	4655	3,5	4867	3,4
550	3496	3,9	3741	3,7	3985	3,6	4228	3,5	4469	3,4	4709	3,2	4948	3,1	5186	3,1	5423	3,0
600	3854	3,5	4125	3,3	4394	3,2	4661	3,1	4927	3,0	5192	2,9	5455	2,8	5717	2,7	5979	2,6
650	4213	3,1	4508	3,0	4802	2,9	5094	2,7	5385	2,7	5674	2,6	5962	2,5	6249	2,4	6534	2,4
700	4571	2,8	4892	2,7	5211	2,6	5528	2,5	5843	2,4	6157	2,3	6470	2,2	6781	2,2	7090	2,1
750	4929	2,5	5275	2,4	5619	2,3	5961	2,2	6301	2,2	6640	2,1	6977	2,0	7312	2,0	7646	1,9
800	5288	2,3	5659	2,2	6028	2,1	6395	2,0	6760	2,0	7123	1,9	7484	1,8	7844	1,8	8202	1,7

Base (mm)	1100		1150		1200		1250		1300		1350		1400		1450		1500	
	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP
Height (mm)	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa
200	1623	9,7	1690	9,4	1757	9,2	1824	9,0	1891	8,8	1957	8,6	2024	8,4	2090	8,4	2155	8,3
250	2192	7,8	2283	7,6	2374	7,4	2464	7,2	2554	7,0	2644	6,9	2734	6,8	2823	6,7	2912	6,7
300	2766	6,3	2881	6,2	2996	6,0	3110	5,9	3224	5,8	3337	5,6	3450	5,5	3562	5,5	3675	5,4
350	3343	5,3	3482	5,1	3620	5,0	3758	4,9	3895	4,8	4032	4,7	4169	4,6	4305	4,6	4441	4,5
400	3921	4,4	4084	4,3	4246	4,2	4408	4,1	4569	4,0	4730	4,0	4890	3,9	5049	3,8	5208	3,8
450	4500	3,8	4687	3,7	4873	3,6	5059	3,5	5243	3,5	5428	3,4	5611	3,3	5795	3,3	5977	3,3
500	5079	3,3	5290	3,2	5500	3,1	5710	3,1	5918	3,0	6126	2,9	6334	2,9	6541	2,9	6747	2,8
550	5659	2,9	5894	2,8	6128	2,8	6361	2,7	6594	2,6	6826	2,6	7057	2,5	7287	2,5	7517	2,5
600	6239	2,6	6498	2,5	6756	2,4	7013	2,4	7270	2,3	7525	2,3	7780	2,2	8034	2,2	8287	2,2
650	6819	2,3	7102	2,2	7384	2,2	7665	2,1	7945	2,1	8225	2,0	8503	2,0	8781	2,0	9057	2,0
700	7399	2,1	7706	2,0	8012	2,0	8317	1,9	8621	1,9	8924	1,8	9226	1,8	9528	1,8	9828	1,8
750	7979	1,9	8310	1,8	8640	1,8	8969	1,7	9297	1,7	9624	1,7	9950	1,6	10275	1,6	10598	1,6
800	8559	1,7	8914	1,7	9269	1,6	9621	1,6	9973	1,5	10324	1,5	10673	1,5	11022	1,5	11369	1,5

Lw = 40 dB(A)

Base (mm)	200		250		300		350		400		450		500		550		600	
	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP
Height (mm)	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa
200	418	52,8	545	48,9	676	45,8	812	43,4	951	41,4	1058	35,1	1164	33,0	1269	31,2	1373	29,7
250	564	42,3	736	39,2	913	36,7	1097	34,9	1285	33,2	1430	28,2	1573	26,5	1714	25,0	1855	23,8
300	712	34,5	928	31,9	1153	30,0	1384	28,4	1622	27,1	1804	23,0	1985	21,6	2163	20,4	2341	19,4
350	861	28,7	1122	26,6	1393	24,9	1673	23,6	1960	22,5	2180	19,1	2398	17,9	2614	17,0	2828	16,1
400	1010	24,3	1316	22,4	1634	21,1	1962	19,9	2299	19,0	2557	16,1	2813	15,2	3066	14,3	3317	13,6
450	1159	20,8	1510	19,2	1875	18,0	2252	17,1	2638	16,3	2935	13,8	3228	13,0	3519	12,3	3807	11,7
500	1308	18,0	1704	16,7	2116	15,7	2541	14,8	2978	14,2	3313	12,0	3644	11,3	3972	10,7	4297	10,1
550	1457	15,8	1899	14,6	2358	13,7	2831	13,0	3318	12,4	3691	10,5	4060	9,9	4425	9,4	4788	8,9
600	1606	14,0	2093	13,0	2599	12,2	3122	11,5	3658	11,0	4069	9,3	4476	8,8	4879	8,3	5278	7,9
650	1756	12,5	2288	11,6	2841	10,9	3412	10,3	3998	9,8	4447	8,3	4892	7,8	5332	7,4	5769	7,0
700					3083	9,8	3702	9,3	4338	8,8	4826	7,5	5308	7,0	5786	6,7	6260	6,3
750									4678	8,0	5204	6,8	5724	6,4	6240	6,0	6751	5,7
800									5018	7,3	5582	6,2	6141	5,8	6693	5,5	7241	5,2

Base (mm)	650		700		750		800		850		900		950		1000		1050	
	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP
Height (mm)	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa
200	1477	28,3	1581	27,2	1684	26,1	1786	25,1	1888	24,3	1990	23,5	2091	22,8	2191	22,1	2291	21,5
250	1996	22,7	2136	21,8	2275	20,9	2414	20,2	2551	19,5	2688	18,9	2825	18,3	2961	17,8	3096	17,3
300	2519	18,5	2695	17,8	2871	17,1	3046	16,5	3220	15,9	3392	15,4	3565	14,9	3736	14,5	3907	14,1
350	3043	15,4	3257	14,8	3469	14,2	3681	13,7	3891	13,2	4100	12,8	4308	12,4	4515	12,0	4721	11,7
400	3570	13,0	3820	12,5	4069	12,0	4317	11,6	4563	11,2	4808	10,8	5052	10,5	5295	10,2	5537	9,9
450	4097	11,2	4384	10,7	4670	10,3	4954	9,9	5237	9,6	5518	9,3	5798	9,0	6077	8,7	6354	8,5
500	4624	9,7	4949	9,3	5271	8,9	5592	8,6	5911	8,3	6229	8,0	6545	7,8	6859	7,6	7172	7,4
550	5152	8,5	5513	8,1	5873	7,8	6230	7,5	6586	7,3	6939	7,1	7291	6,8	7642	6,6	7991	6,5
600	5680	7,5	6078	7,2	6474	6,9	6868	6,7	7260	6,5	7650	6,2	8039	6,1	8425	5,9	8810	5,7
650	6208	6,7	6643	6,4	7076	6,2	7507	6,0	7935	5,8	8362	5,6	8786	5,4	9208	5,3	9629	5,1
700	6736	6,0	7208	5,8	7678	5,6	8146	5,4	8610	5,2	9073	5,0	9533	4,9	9992	4,7	10448	4,6
750	7264	5,5	7774	5,2	8280	5,0	8784	4,9	9285	4,7	9784	4,5	10281	4,4	10775	4,3	11267	4,2
800	7792	5,0	8339	4,8	8882	4,6	9423	4,4	9961	4,3	10496	4,1	11028	4,0	11558	3,9	12086	3,8

Base (mm)	1100		1150		1200		1250		1300		1350		1400		1450		1500	
	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP
Height (mm)	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa
200	2391	21,0	2490	20,5	2589	20,0	2688	19,5	2786	19,1	2884	18,7	2982	18,3	3079	18,2	3176	18,1
250	3230	16,8	3365	16,4	3498	16,0	3631	15,6	3764	15,3	3896	15,0	4028	14,7	4160	14,6	4291	14,5
300	4077	13,7	4246	13,4	4414	13,1	4583	12,8	4750	12,5	4917	12,2	5083	12,0	5249	11,9	5415	11,8
350	4926	11,4	5131	11,1	5335	10,9	5538	10,6	5740	10,4	5942	10,2	6143	9,9	6344	9,9	6544	9,8
400	5778	9,6	6018	9,4	6257	9,2	6495	9,0	6733	8,8	6969	8,6	7205	8,4	7440	8,3	7675	8,3
450	6631	8,3	6906	8,1	7181	7,9	7454	7,7	7726	7,5	7998	7,4	8269	7,2	8539	7,2	8808	7,1
500	7484	7,2	7795	7,0	8105	6,8	8414	6,7	8721	6,5	9028	6,4	9333	6,2	9638	6,2	9942	6,2
550	8339	6,3	8685	6,1	9030	6,0	9374	5,8	9716	5,7	10058	5,6	10398	5,5	10738	5,4	11076	5,4
600	9193	5,6	9575	5,4	9955	5,3	10334	5,2	10712	5,1	11089	5,0	11464	4,9	11838	4,8	12211	4,8
650	10048	5,0	10465	4,9	10881	4,7	11295	4,6	11708	4,5	12119	4,4	12530	4,3	12939	4,3	13346	4,3
700	10902	4,5	11355	4,4	11806	4,3	12256	4,2	12704	4,1	13150	4,0	13595	3,9	14039	3,9	14482	3,9
750	11757	4,1	12245	4,0	12732	3,9	13217	3,8	13700	3,7	14181	3,6	14661	3,5	15140	3,5	15617	3,5
800	12612	3,7	13136	3,6	13658	3,5	14178	3,4	14696	3,4	15212	3,3	15727	3,2	16241	3,2	16753	3,2

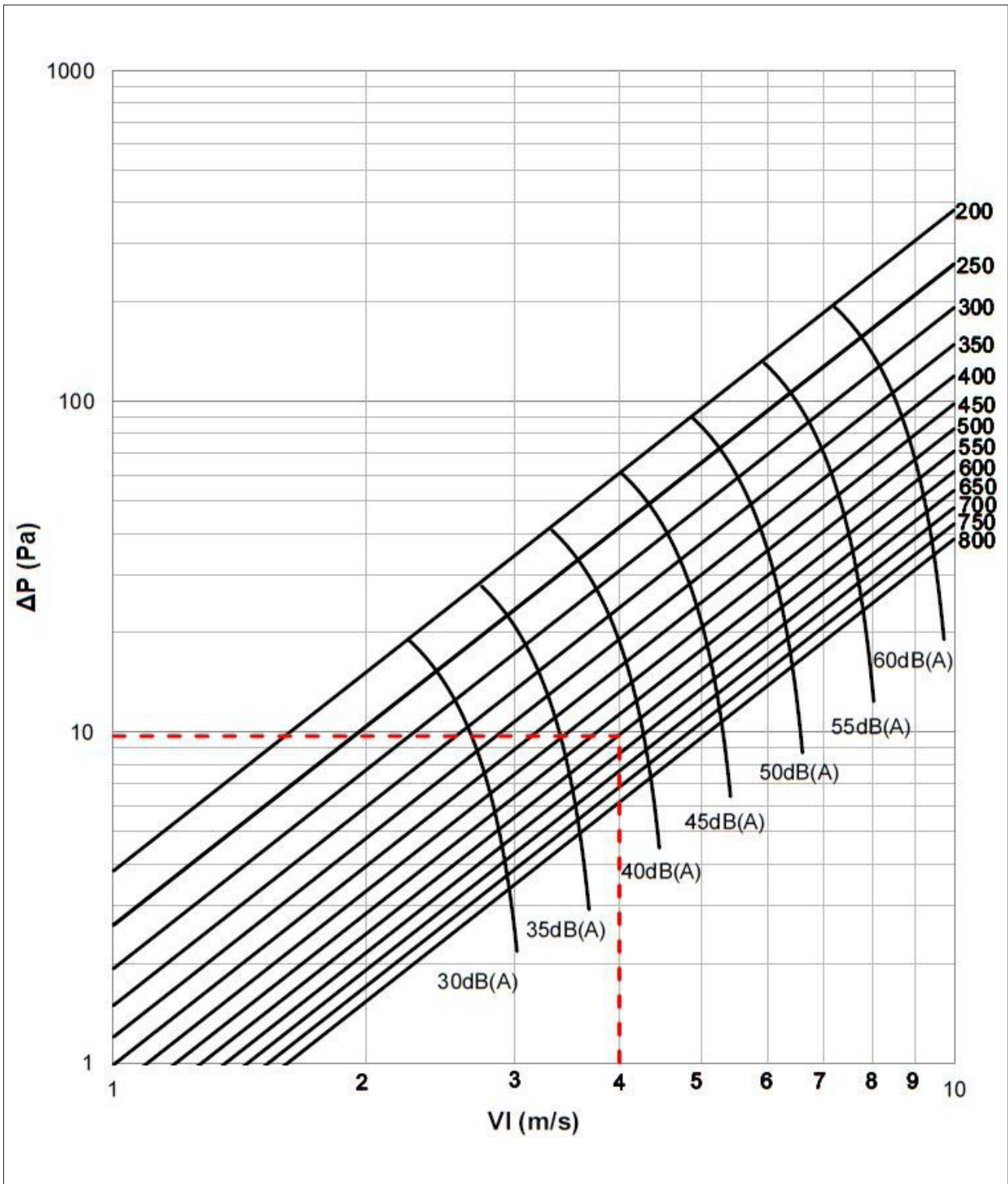
Lw = 45 dB(A)

Base (mm)	200		250		300		350		400		450		500		550		600	
	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP
Height (mm)	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa
200	507	77,7	661	71,9	821	67,6	986	64,1	1155	61,1	1285	51,8	1413	48,6	1540	46,0	1667	43,7
250	685	62,4	893	57,7	1109	54,2	1332	51,4	1560	49,0	1736	41,6	1909	39,0	2081	36,9	2251	35,0
300	865	50,9	1127	47,1	1399	44,2	1680	41,9	1969	40,0	2190	33,9	2409	31,8	2626	30,1	2841	28,6
350	1045	42,3	1362	39,1	1691	36,7	2031	34,8	2379	33,2	2647	28,2	2911	26,4	3174	25,0	3433	23,7
400	1225	35,7	1597	33,0	1983	31,0	2382	29,4	2791	28,1	3105	23,8	3415	22,4	3722	21,1	4027	20,1
450	1406	30,6	1833	28,3	2276	26,6	2733	25,2	3203	24,1	3563	20,4	3919	19,2	4272	18,1	4621	17,2
500	1587	26,6	2069	24,6	2569	23,1	3085	21,9	3615	20,9	4021	17,7	4423	16,6	4822	15,7	5216	14,9
550	1769	23,3	2305	21,6	2862	20,2	3437	19,2	4028	18,3	4480	15,5	4928	14,6	5372	13,8	5812	13,1
600	1950	20,7	2541	19,1	3156	17,9	3789	17,0	4440	16,2	4939	13,8	5433	12,9	5922	12,2	6407	11,6
650	2131	18,4	2778	17,1	3449	16,0	4142	15,2	4853	14,5	5399	12,3	5938	11,5	6473	10,9	7003	10,4
700					3742	14,4	4494	13,7	5266	13,0	5858	11,1	6444	10,4	7024	9,8	7599	9,3
750									5679	11,8	6317	10,0	6949	9,4	7574	8,9	8194	8,4
800									6092	10,7	6777	9,1	7454	8,6	8125	8,1	8790	7,7

Base (mm)	650		700		750		800		850		900		950		1000		1050	
	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP
Height (mm)	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa
200	1793	41,7	1919	40,0	2044	38,5	2169	37,1	2292	35,8	2415	34,7	2538	33,6	2660	32,6	2782	31,8
250	2423	33,5	2593	32,1	2762	30,9	2930	29,8	3097	28,7	3263	27,8	3429	27,0	3594	26,2	3758	25,5
300	3057	27,3	3272	26,2	3485	25,2	3697	24,3	3908	23,4	4118	22,7	4327	22,0	4535	21,4	4742	20,8
350	3694	22,7	3954	21,8	4211	20,9	4468	20,2	4723	19,5	4976	18,8	5229	18,3	5480	17,7	5731	17,3
400	4333	19,2	4637	18,4	4940	17,7	5240	17,0	5539	16,4	5837	15,9	6133	15,4	6428	15,0	6721	14,6
450	4973	16,4	5322	15,8	5669	15,1	6014	14,6	6357	14,1	6698	13,6	7038	13,2	7377	12,9	7714	12,5
500	5613	14,3	6007	13,7	6399	13,1	6788	12,7	7175	12,2	7561	11,8	7944	11,5	8326	11,2	8707	10,9
550	6254	12,5	6693	12,0	7129	11,5	7563	11,1	7994	10,7	8424	10,4	8851	10,1	9277	9,8	9700	9,5
600	6894	11,1	7378	10,6	7859	10,2	8338	9,8	8813	9,5	9287	9,2	9758	8,9	10227	8,7	10694	8,4
650	7535	9,9	8064	9,5	8590	9,1	9113	8,8	9633	8,5	10150	8,2	10665	8,0	11178	7,7	11688	7,5
700	8176	8,9	8750	8,5	9321	8,2	9888	7,9	10452	7,6	11014	7,4	11572	7,2	12129	7,0	12683	6,8
750	8817	8,1	9436	7,7	10051	7,4	10663	7,2	11272	6,9	11877	6,7	12480	6,5	13080	6,3	13677	6,1
800	9458	7,3	10122	7,0	10782	6,8	11438	6,5	12091	6,3	12741	6,1	13387	5,9	14031	5,7	14671	5,6

Base (mm)	1100		1150		1200		1250		1300		1350		1400		1450		1500	
	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP	Q	ΔP
Height (mm)	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa	m ³ /h	Pa
200	2903	30,9	3023	30,1	3143	29,4	3263	28,8	3382	28,1	3501	27,5	3620	27,0	3738	26,8	3856	26,6
250	3921	24,8	4084	24,2	4246	23,6	4408	23,1	4569	22,6	4730	22,1	4890	21,6	5050	21,5	5209	21,4
300	4948	20,2	5154	19,7	5359	19,3	5563	18,8	5766	18,4	5969	18,0	6171	17,6	6372	17,5	6573	17,4
350	5980	16,8	6228	16,4	6476	16,0	6722	15,6	6968	15,3	7213	15,0	7457	14,7	7700	14,6	7943	14,5
400	7014	14,2	7305	13,8	7595	13,5	7884	13,2	8173	12,9	8460	12,6	8746	12,4	9032	12,3	9316	12,2
450	8049	12,2	8383	11,9	8716	11,6	9048	11,3	9379	11,1	9709	10,8	10037	10,6	10365	10,5	10692	10,5
500	9085	10,6	9463	10,3	9839	10,1	10213	9,8	10587	9,6	10959	9,4	11330	9,2	11699	9,2	12068	9,1
550	10122	9,3	10543	9,0	10961	8,8	11379	8,6	11795	8,4	12209	8,2	12623	8,1	13035	8,0	13445	8,0
600	11159	8,2	11623	8,0	12085	7,8	12545	7,6	13003	7,5	13460	7,3	13916	7,2	14370	7,1	14823	7,1
650	12197	7,3	12703	7,1	13208	7,0	13711	6,8	14212	6,7	14712	6,5	15210	6,4	15706	6,4	16201	6,3
700	13234	6,6	13784	6,4	14332	6,3	14877	6,1	15421	6,0	15963	5,9	16503	5,7	17042	5,7	17579	5,7
750	14272	6,0	14865	5,8	15455	5,7	16044	5,6	16630	5,4	17215	5,3	17797	5,2	18378	5,2	18958	5,1
800	15310	5,4	15946	5,3	16579	5,2	17210	5,1	17839	4,9	18466	4,8	19091	4,7	19715	4,7	20336	4,7

6.4. Pressure drop and sound level graph for base 400 mm



Example

B = Base [mm]	B = 500
H = Height [mm]	H = 600
Q = Air flow [m ³ /h]	Q = 4320 m ³ /h
V1 = Frontal air speed [m/s]	V1 = 4 m/s
ΔP = Pressure drop [Pa]	$\Delta P = 0,83 \times 9,7 = 8$ Pa
Lw = Sound level [dB(A)]	$L_w = 38 + 0,55 = 38,5$ dB(A)

6.5. Correction for base different than 400 mm

Correction for base different than 400 mm														
B in mm	200	250	300	350	400	450	500	550	600	650	700	750	800	850
$\Delta P \times \zeta \times \dots$	1,65	1,40	1,23	1,10	1,00	0,87	0,83	0,80	0,77	0,75	0,73	0,71	0,69	0,67
Lw + ...	3,35	2,27	1,39	0,65	0,00	0,29	0,55	0,79	1,00	1,17	1,34	1,49	1,63	1,76

Correction for base different than 400 mm														
B in mm	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	
$\Delta P \times \zeta \times \dots$	0,66	0,64	0,63	0,62	0,61	0,60	0,59	0,58	0,57	0,56	0,55	0,55	0,55	
Lw + ...	1,89	2,00	2,11	2,22	2,32	2,42	2,51	2,60	2,69	2,77	2,85	2,93	3,00	

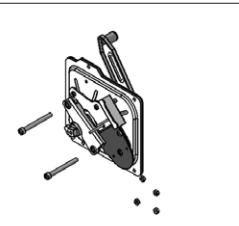
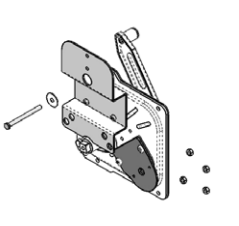
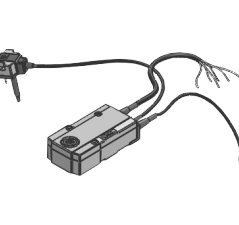
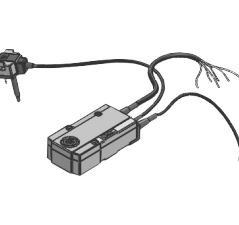
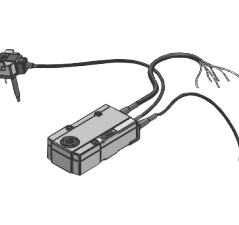
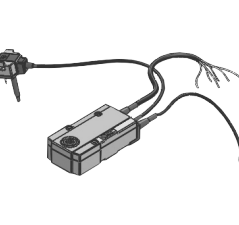
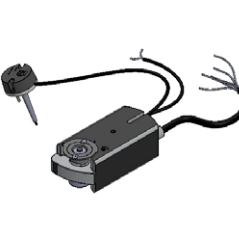
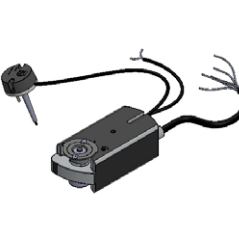






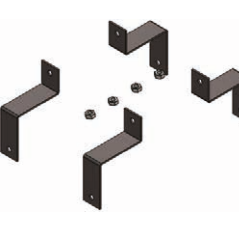
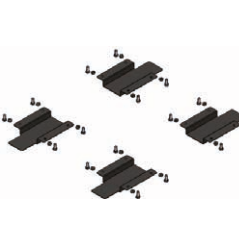
6.6. Sound spectrum table

Correction used to estimate the octave band spectrum (Values to be added to the noise levels in dB(A))

V1 (m/s)	F (Hz)							
	63	125	250	500	1000	2000	4000	8000
2	25	9	2	-4	-9	-17	-32	-19
3	20	8	1	-4	-8	-14	-27	-22
4	15	6	1	-4	-7	-11	-22	-24
5	11	5	0	-4	-6	-8	-18	-26
6	9	4	-1	-4	-5	-7	-15	-25
7	8	4	-2	-5	-5	-7	-14	-22
8	7	4	-3	-5	-5	-6	-13	-21
9	7	4	-3	-6	-5	-6	-12	-20
10	7	3	-3	-6	-5	-6	-12	-19

7. ACCESSORIES AND SPARE PARTS

	<p>Open blade microswitch Closed blade microswitch (necessary according to UNI 10365, art. 4.9)</p>	<p>WHKICKIT WHKFCKIT</p>
	<p>Remote control magnet, optional for manual command fire dampers. Power supply input version: the fire WHKMA024KIT damper blade closes when power is supplied. Power supply 24 V DC - 4,5 W Remote control magnet, optional for manual command fire dampers. Power supply input version: the fire WHKMA230KIT damper blade closes when power is supplied. Power supply 230 V DC - 4,5 W - rectifier included</p>	
	<p>Remote control magnet, optional for manual command fire dampers. Power supply interruption version: WHKMG024KIT the fire damper blade closes when power is not supplied. Power supply 24 V DC - 4,5 W Remote control magnet, optional for manual command fire dampers. Power supply interruption version: WHKMG230KIT the fire damper blade closes when power is not supplied. Power supply 230 V DC - 4,5 W - rectifier included</p>	
	<p>WK45 manual mechanism with fuseholder group, cam, lever, protection box and 4 fixing nuts for B X H ≤ 600 X 300 WK45 manual mechanism with fuseholder group, cam, lever, protection box and 4 fixing nuts for B X H > 600 X 300</p>	<p>WK45MAN3 WK45MAN4</p>
	<p>WK45 manual mechanism with fuseholder group, cam, lever, protection box 4 fixing nuts and 1 microswitch closed damper for B X H ≤ 600 X 300 WK45 manual mechanism with fuseholder group, cam, lever, protection box 4 fixing nuts and 1 microswitch closed damper for B X H > 600 X 300</p>	<p>WK45MAN3CM WK45MAN4CM</p>
	<p>Red reset lever for WH/WK45 (spare part for manual mechanism) Blue reset lever for WH/WK45 (spare part for manual mechanism)</p>	<p>WHK45PLSLEVA WHK45PLSLEVAB</p>
	<p>Motorized plate WK45/43 for Siemens GGA + fixing screws (motor not included) Motorized plate WK45/43 for Belimo BF + fixing screws (motor not included)</p>	<p>WK45MTSG WK45MTB</p>

	<p>Motorized plate WK45/43 for Belimo BFN + fixing screws (motor not included)</p>	<p>WK45SMB</p>
	<p>Motorized plate WK45/43 for Siemens GNA / GRA + fixing screws (motor not included)</p>	<p>WK45MTSP</p>
	<p>Belimo motor for dampers predisposed for use with BFN24T / BF24T, 24 V AC/DC power supply, thermofuse 72 °C</p>	<p>BFN24T/BF24T</p>
	<p>Belimo motor for dampers predisposed for use with BFN24T-ST / BF24T-ST, 24 V AC/DC power supply, thermofuse 72 °C with connection plugs for control and monitoring systems</p>	<p>BFN24T-ST / BF24T-ST</p>
	<p>Belimo motor Top Line series for dampers predisposed for use with BF24TLT-ST, 24 V AC/DC power supply, BF24TLT-ST thermofuse 72 °C with connection plugs for control and monitoring systems</p>	
	<p>Belimo motor for dampers predisposed for use with BFN230T / BF230T, 230 V AC power supply, thermofuse 72 °C</p>	<p>BFN230T / BF230T</p>
	<p>Siemens motor for dampers predisposed for use with GGA126 / GNA126 / GRA126, 24 V AC/DC power supply, thermofuse 72 °C</p>	<p>GGA126 / GNA126 / GRA126</p>
	<p>Siemens motor for dampers predisposed for use with GGA326 / GNA326 / GRA326, 230 V AC power supply, thermofuse 72 °C</p>	<p>GGA326 / GNA326 / GRA326</p>
	<p>Copper mechanical thermofuse 70 °C for manual mechanism</p>	<p>WK70</p>
	<p>Copper mechanical thermofuse 95 °C for manual mechanism</p>	<p>WK95</p>
	<p>Thermofuse 72 °C for Belimo motor BFL, BFN and BF (spare part)</p>	<p>WWEZBAT72</p>
	<p>Thermofuse 95 °C for Belimo motor BFL, BFN and BF (accessory)</p>	<p>WWEZBAT95</p>
	<p>Thermofuse 72 °C for Siemens motors GRA, GNA and GGA (spare part)</p>	<p>MT-FUSASK79.4</p>
	<p>Thermofuse 95 °C for Siemens motors GRA, GNA and GGA (accessory)</p>	<p>MT-FUSASK79.5</p>
	<p>Set of 4 brackets for plasterboard wall mounting + nuts</p>	<p>WKG100</p>
	<p>Set of 4 plates for paired installation + screws + nuts</p>	<p>WKBA2</p>

	<p>Inspection opening side A Inspection opening side C Inspection opening side A+C (Available only during fire damper order)</p> <p>(Inspection opening not available for INOX steel casing) (Refer to the section Components p. 4 for further information about inspection openings)</p>	<p>WKSPA WKSPC WKSPAC</p>
	<p>Matt black epoxy powder painting for WK45 fire damper casing</p> <ul style="list-style-type: none"> • Corrosion resistance: Excellent • Heat resistance: Very good • Resistance direct impact: ≥2Kg 5cm ISO 6272 • Resistance reverse impact: ≥2Kg 5cm ISO 6272 • Resistance umidity chamber: after 500 hrs noy blistering ISO 6270 • Resistance salt spray test: after 500 hrs creeping at cross-cut <1mm ISO 9227 	<p>WK45PAINT[B][H]</p>
	<p>Communication and control unit BKS24-1B to control and monitor 1 fire damper with Belimo motor</p>	<p>WKBKS241B</p>
	<p>Communication and control unit BKS24-9A to control and monitor up to 9 fire dampers with Belimo motor</p>	<p>WKBKS249A</p>
	<p>Communication and power supply unit: BKN230-24 for Belimo motors BFL24T-ST, BFN24T-ST e BF24T-ST LON Communication and power supply unit: BKN230-24LON for Belimo motors BF24TL-T-ST Modbus Communication and power supply unit: BKN230-24MOD for Belimo motors BFL24T-ST, BFN24T-ST and BF24T-ST</p> <p>Communication and power supply unit MPBUS for BKS24-9A or gateways Belimo UK24MOD and UK24BAC: BKN230-24-C-MP for Belimo motors BFL24T-ST, BFN24T-ST and BF24T-ST</p> <p>Modbus Communication and power supply unit: BKN230MOD for Belimo motors BFL230T, BFN230T and BF230T</p>	<p>WKBKN23024 WHKBKN230-24LON WHKBKN230-24MOD WHKBKN230-24-C-MP WHKBKN230MOD</p>
	<p>Gateway UK24BAC Belimo for BACnet communication</p>	<p>WHKUK24BAC</p>

8. HOW TO ORDER

8.1. Motorized fire dampers

Code		
Type	WK	Rectangular fire damper
Series	45	Blade thickness 40 mm - 500 Pa air sealing
Motor type	VSS	Siemens motor GRA126 (24V)
	DSS	Siemens motor GRA326 (230V)
	VPS	Siemens motor GNA126 (24V)
	DPS	Siemens motor GNA326 (230V)
	VGS	Siemens motor GGA126 (24V)
	DGS	Siemens motor GGA326 (230V)
	VMB	Belimo motor BFN24T (24V)
	DMB	Belimo motor BFN230T (230V)
	TMB	Belimo motor BFN24T-ST (24V) with connection plugs for integration in control and monitoring systems
	VGB	Belimo motor BF24T (24V)
	DGB	Belimo motor BF230T (230V)
	TGB	Belimo motor BF24T-ST (24V) with connection plugs for integration in control and monitoring systems
Base	XYZ	Nominal base dimension (mm)
Height	XYZ	Nominal height dimension (mm)

8.2. Fire damper with manual control

Code		
Type	WK	Rectangular fire damper
Series	45	Blade thickness 40 mm - 500 Pa air sealing
Command type	B	Manual command
	M	Manual command with magnet
Position indication microswitches	S0	Without position microswitches (not recommended)
	SA	With open blade microswitch
	SC	With closed blade microswitch
	S2	With two microswitches
Magnet	M0	Without magnet (only for command type "B")
	MR	With power supply interruption magnet, 24 V DC
	MI	With power supply input magnet, 24 V DC
	MY	With power supply interruption magnet, 230 V AC
	MZ	With power supply input magnet, 230 V AC
Base	XYZ	Nominal base dimension (mm)
Height	XYZ	Nominal height dimension (mm)

Examples	Code
WK45 fire damper with manual control, without microswitch, without magnet, 400x450	WK45B-S0-M0-0400450
WK45 fire damper with manual control, with open blade microswitch, with 24 V DC power interruption magnet, 1500x800	WK45M-SA-MR-1500800
WK45 Siemens motorized 230V fire damper, 400x450	WK45DPS-0400450

8.3. Electric motor driven actuators

8.3.1. Siemens servomotors

		Base													
		200	250	300	350	400	450	500	550	600	650	700	750	800	850
Height	800					P	P	P	P	P	P	P	P	P	P
	750					P	P	P	P	P	P	P	P	P	P
	700			P	P	P	P	P	P	P	P	P	P	P	P
	650	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	600	S	S	S	S	S	S	S	S	S	S	S	S	S	P
	550	S	S	S	S	S	S	S	S	S	S	S	S	S	P
	500	S	S	S	S	S	S	S	S	S	S	S	S	S	P
	450	S	S	S	S	S	S	S	S	S	S	S	S	S	P
	400	S	S	S	S	S	S	S	S	S	S	S	S	S	P
	350	S	S	S	S	S	S	S	S	S	S	S	S	S	P
	300	S	S	S	S	S	S	S	S	S	S	S	S	S	P
	250	S	S	S	S	S	S	S	S	S	S	S	S	S	P
	200	S	S	S	S	S	S	S	S	S	S	S	S	S	P
	Height		900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500
800		P	P	G	G	G	G	G	G	G	G	G	G	G	
750		P	P	P	G	G	G	G	G	G	G	G	G	G	
700		P	P	P	P	G	G	G	G	G	G	G	G	G	
650		P	P	P	P	P	P	G	G	G	G	G	G	G	
600		P	P	P	P	P	P	P	P	G	G	G	G	G	
550		P	P	P	P	P	P	P	P	P	P	P	G	G	
500		P	P	P	P	P	P	P	P	P	P	P	P	P	
450		P	P	P	P	P	P	P	P	P	P	P	P	P	
400		P	P	P	P	P	P	P	P	P	P	P	P	P	
350		P	P	P	P	P	P	P	P	P	P	P	P	P	
300		P	P	P	P	P	P	P	P	P	P	P	P	P	
250		P	P	P	P	P	P	P	P	P	P	P	P	P	
200		P	P	P	P	P	P	P	P	P	P	P	P	P	

		Siemens	
		24 V	230V
S		GRA126	GRA326
P		GNA126	GNA326
G		GGA126	GGA326

8.3.2. Belimo servomotors

		Base													
		200	250	300	350	400	450	500	550	600	650	700	750	800	850
Height	800					M	M	M	M	M	M	M	M	M	M
	750					M	M	M	M	M	M	M	M	M	M
	700			M	M	M	M	M	M	M	M	M	M	M	M
	650	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	600	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	550	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	500	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	450	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	400	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	350	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	300	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	250	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	200	M	M	M	M	M	M	M	M	M	M	M	M	M	M
		900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	
Height	800	M	M	G	G	G	G	G	G	G	G	G	G	G	
	750	M	M	M	M	G	G	G	G	G	G	G	G	G	
	700	M	M	M	M	M	G	G	G	G	G	G	G	G	
	650	M	M	M	M	M	M	M	G	G	G	G	G	G	
	600	M	M	M	M	M	M	M	M	M	G	G	G	G	
	550	M	M	M	M	M	M	M	M	M	M	M	M	G	
	500	M	M	M	M	M	M	M	M	M	M	M	M	M	
	450	M	M	M	M	M	M	M	M	M	M	M	M	M	
	400	M	M	M	M	M	M	M	M	M	M	M	M	M	
	350	M	M	M	M	M	M	M	M	M	M	M	M	M	
	300	M	M	M	M	M	M	M	M	M	M	M	M	M	
	250	M	M	M	M	M	M	M	M	M	M	M	M	M	
	200	M	M	M	M	M	M	M	M	M	M	M	M	M	

		Belimo	
		24 V	230V
M		BFN24T	BFN230T
G		BF24T	BF230T

9. SPECIFICATION TEXT

9.1. Series WK45 rectangular fire damper

Description

WK45 rectangular symmetric fire damper tested for fire resistance and smoke seal with 500 Pa depression (300 Pa for Weichschott sealing installations) as per EN 1366-2, classified according to EN 13501-3 and CE marked according to European Regulation UE 305/2011 and EN 15650 standard. Allows maximum safety for fire protection inside buildings providing perfect heat insulation and cold and hot smokes tightness. Can be connected to fire protection alarm system or smokes detection to anticipate blade closure before fire, prevents indirect damages caused by smokes generated by combustion.

Technical characteristics

- Available sizes from 200x200 mm to 1500x800 mm
- Bigger sizes achievable by pairing two fire dampers, only on vertical rigid wall as per EN 1366-2
- Case made from galvanized sheet steel, with a total length of 510 mm. Comes with flanges for duct connection 35 mm width with reinforced angle connections
- Closing mechanism built according to UNI 10365, with thermal fuse certified to ISO 10294-4, a test button to check the correct working of the damper, a release system to block the damper in closed position and a visual signal "open/closed". The closing mechanism can be easily interchanged and substituted:
 - with mechanical release and manual rearming
 - with mechanical release and manual rearming, can be released remotely via a magnet and electric and signal
 - with electric release and rearming, via and integrated Siemens or Belimo system tested according to EN 15650, composed by an electric thermal fuse and remote controlled servomotor via an electrical signal
- Blade made from calcium silicate insulating material
- Blade axis made of steel, patented fixing on casing, with low friction bearings for high reliability in case of fire.
- Silicon lip gasket to cold smoke sealing according to EN 1366-2
- Thermal, expanding graphite gasket
- Thermal fuse with melting point certified ISO 10294-4 at 70 °C or 95 °C (version with mechanical release) or at 72 °C (version with servo motor)
- Absence of thermal bridge between the wall of installation and the ducts before and after
- Resistance to salt spray, tested with severity 2, according to EN 60068-2-52
- Casing leakage Class C according to EN 1751

Installation

- Installation within vertical rigid walls made from aerated concrete blocks, standard concrete or masonry with a minimum thickness of 140 mm and minimum density of 500 kg/m³ (EI 180 S) or minimum thickness of 100 mm and minimum density of 500 kg/m³ (EI 120 S)
 - Mortar sealing (EI 180 S)
 - Mortar or plaster putty sealing (EI 120 S)
 - Plasterboard and rock wool 100 kg/m³ sealing (EI 120 S)
- Installation within light plasterboard walls with minimum thickness of 100 mm and simplified sealing with rock wool (EI 90 S) or with standard sealing with rock wool or simplified sealing with mortar or plaster putty (EI 120 S)
- Installation within light walls made with gypsum blocks 100 mm thick and minimum density 995 kg/m³ (EI 120 S) or minimum thickness of 70 mm and minimum density 995 kg/m³ (EI 90 S)
- Installation within concrete floors with a minimum thickness of 140 mm and minimum density of 2200 kg/m³ (EI 180 S) or aerated concrete with minimum thickness 150 mm and minimum density 650 kg/m³ (EI 120 S) or aerated concrete with minimum thickness 100 mm and minimum density 650 kg/m³ (EI 90 S)
- Installation with Fire Batt (Weichschott) sealing within vertical rigid walls made from aerated concrete blocks, standard concrete or masonry with minimum thickness 100 mm and minimum density 500 kg/m³, within light plasterboard walls with minimum thickness of 100 mm, within gypsum blocks light walls with with minimum thickness 100 mm and minimum density 995 kg/m³ (EI 90 S)
- Installation with Fire Batt (Weichschott) sealing within concrete floors or aerated concrete with minimum thickness 150 mm and minimum density 650 kg/m³ (EI 120 S)
- Fire resistance characteristics independent from direction of the source of the fire according to EN 1366-2 article 6.2
- Installation possible with damper blade placed horizontally or vertically, with the mechanism placed in left/right or above/below

Accessories

- Motorised version with 24 V or 230 V servomotor installed on the damper
- Set of microswitches with four NO/NC position detecting connectors for open and closed damper, as per standard UNI 10365
- Immission and interruption magnet 24 V DC or 230 V AC with rectifier
- Power supply and communication unit LonWorks, MP-Bus, Modbus, Bacnet
- Inspection doors diameter 140 mm with air sealing gasket, no tools required for opening
- Junction for circular ducts connection
- WKGY100 installation kit for plasterboard walls, comes with 4 shaped plates
- Fire damper pairing kit WKBA, comes with 4 shaped plates

10. REVISION INDEX

Revision n°	Date of issue	Description
14/00	2014/11	<p>First issue</p> <p>Added section:</p> <ul style="list-style-type: none"> • El 90 S Installation within vertical rigid wall with Fire Batt (Weichschott) sealing p. 30 • El 90 S Installation within vertical light wall (plasterboard) with Fire Batt (Weichschott) sealing p. 30 <p>El 90 S Installation within vertical light wall (gypsum blocks wall) with Fire Batt (Weichschott) sealing p. 30</p> <ul style="list-style-type: none"> • Blade rotation axis positioning p. 16 <p>Added table:</p> <ul style="list-style-type: none"> • Revision Index p. 54
15/07	2015/07	<p>Updated drawing:</p> <ul style="list-style-type: none"> • El 90 S Installation within vertical light wall (plasterboard) p. 25 • Fire dampers pairing for big ducts dimensions p. 5 <p>Updated section:</p> <ul style="list-style-type: none"> • El 90 S Installation within vertical light wall (plasterboard) Installations within vertical light wall (plasterboard) p. 25 • Belimo motorized version p. 12 • Fire dampers pairing for big ducts dimensions p. 5 • Specification Text p. 53 <p>Updated table:</p> <ul style="list-style-type: none"> • Performances p. 8 <p>General improvements</p>
16/04	2016/04	<p>Added section:</p> <ul style="list-style-type: none"> • El 120S Installation within vertical rigid wall p. 23 • El 120 S Installation within floor with Fire Batt (Weichschott) sealing p. 31 <p>Updated section:</p> <ul style="list-style-type: none"> • Fire resistance classification according to EN 13501-3-2009 p. 9 • Mechanism type p. 12 • Minimum distances p. 19 • El 120 S Installation within vertical rigid wall p. 23 • Electrical connections p. 32 • How to order p. 50 • Specification Text p. 53 <p>Updated table:</p> <ul style="list-style-type: none"> • Accessories and spare parts p. 47 <p>General improvements</p>
16/10	2016/10	<p>Added section:</p> <ul style="list-style-type: none"> • Indications for the correct duct suspension and for damper connection • Positioning brackets before fixing p. 16 <p>Updated section:</p> <ul style="list-style-type: none"> • Mechanism type p. 12 • Fire dampers pairing p. 6 • Minimum distances p. 19 <p>Updated table:</p> <ul style="list-style-type: none"> • Accessories and spare parts p. 47 <p>General improvements</p>
17/04	2017/04	<p>Updated section:</p> <ul style="list-style-type: none"> • Installations within vertical light wall (plasterboard) p. 25 • Installations within vertical wall with Fire Batt (Weichschott) sealing p. 30 • Installation within floor with Fire Batt (Weichschott) sealing p. 31 • Maintenance and inspections p. 35 <p>Updated table:</p> <ul style="list-style-type: none"> • Electrical specifications p. 34 • Motorized fire dampers p. 50 • Electric motor driven actuators p. 51 • Accessories and spare parts p. 47 <p>General improvements</p>

19/05	2019/05	<p>Added section:</p> <ul style="list-style-type: none"> • Installation of flexible connectors in order to balance out the ventilation ducts expansion p. 16 • Transfer Application (application not connected to air ducts on one or both sides) p. 17 <p>Updated section:</p> <ul style="list-style-type: none"> • Available dimensions p. 5 • Installation p. 16 • Not allowed uses p. 16 • Minimum distances p. 19 • Light plasterboard vertical walls p. 21 • Maintenance and inspections p. 35 • Accessories and spare parts p. 47 <p>Updated table:</p> <ul style="list-style-type: none"> • Installations within vertical rigid wall p. 23 • Installations within vertical light wall (plasterboard) p. 25 <p>General improvements</p>
20/10	2020/10	<p>Updated section:</p> <p>Installation of flexible connectors in order to balance out the ventilation ducts expansion p. 16</p> <p>Not allowed uses p. 16</p> <p>Transfer Application (application not connected to air ducts on one or both sides) p. 17</p> <p>Mechanism type p. 12</p> <p>Installation p. 16</p> <p>Minimum distances p. 19</p> <p>Periodic inspection and cleaning p. 35</p> <p>Certifications and approvals p. 4</p> <p>Positioning brackets before fixing p. 16</p> <p>General improvements</p>

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As the manufacturer is constantly improving its products, the aesthetic or dimensional features, the technical data, the equipment and accessories indicated could be subject to variations.



Good Thinking

At Lindab, good thinking is a philosophy that guides us in everything we do. We have made it our mission to create a healthy indoor climate – and to simplify the construction of sustainable buildings. We do that by designing innovative products and solutions that are easy to use, as well as offering efficient availability and logistics. We are also working on ways to reduce our impact on our environment and climate. We do that by developing methods to produce our solutions using a minimum of energy and natural resources, and by reducing negative effects on the environment. We use steel in our products. It's one of few materials that can be recycled an infinite number of times without losing any of its properties. That means less carbon emissions in nature and less energy wasted.

We simplify construction



1MTLWK45EN-LIND rev 20-10