

Technical Catalogue 2017

Dear Sir/Madam,

Please accept our Technical Catalogue for fire ventilation systems, which contains detailed information on the use, design, versions, manufacture and equipment, methods of installation and technical parameters of our fire dampers and valves.

Every appliance dispatched from „MERCOR“ S.A. factories to a Customer is thoroughly verified in accordance with the highest quality management standards and subject to a range of approval tests. We are proud to provide safety through our operations.

We are looking forward to doing business with you.

The „MERCOR“ S.A. Team

The electronic version of our Technical Catalogue is available at www.mercor.com.pl

Fire ventilation systems

Technical Catalogue 2017

Edited by: „MERCOR” S.A.- Fire Ventilation Systems Department

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Desktop publishing: Bliskie strony

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FIRE VENTILATION SYSTEMS

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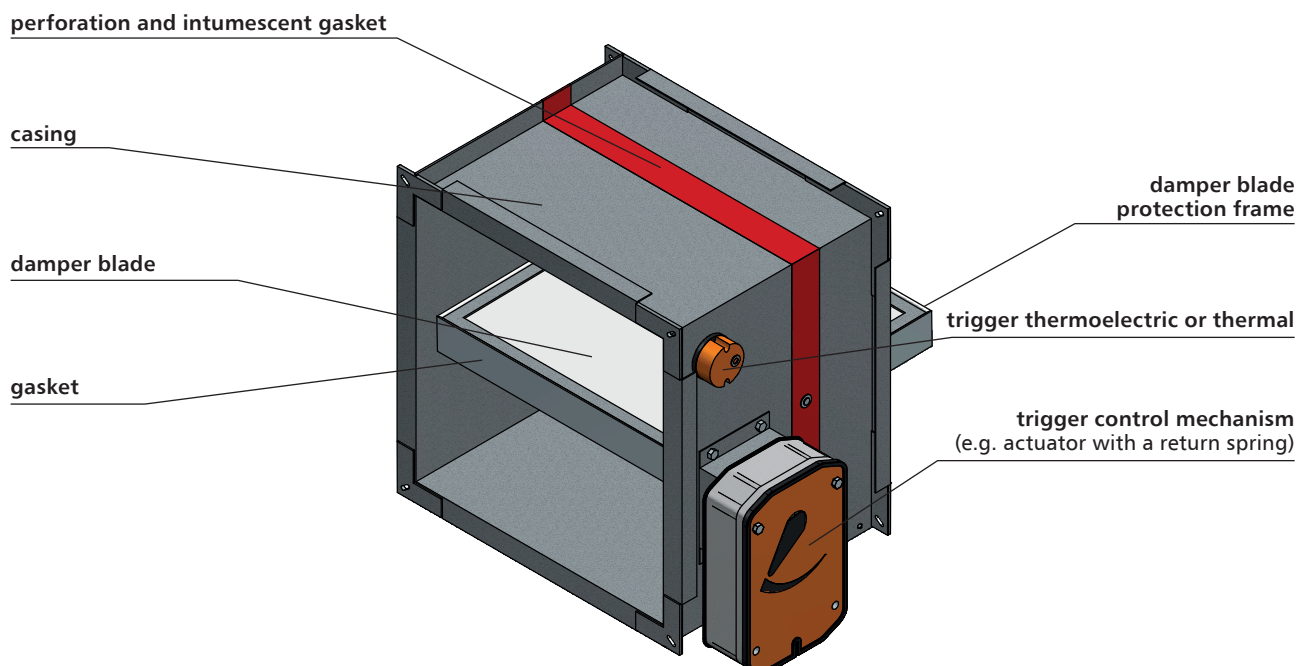
- ▶ **EIS120**
- ▶ Certificate of constancy of performance 1488-CPD-0203/W, 1396-CPR-0114.
- ▶ Dampers certified for compliance with EN 15650.
- ▶ Dampers qualified under EN 13501-3 and tested under EN 1366-2.
- ▶ Cut-off dampers with the fire resistance independent of airflow direction and installation side.
- ▶ Lower acoustic noise and hydraulic resistance in the system with reduced partition thickness.

1.1. application

The mcr FID S/S c/P low-resistance cut-off dampers are designed for use in general ventilation systems, where those systems pass through vertical and horizontal construction partitions. The dampers are intended, for example, for systems with increased acoustic requirements. During a fire, the dampers preserve the fire resistance of the construction partition where ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and burning fumes to the remaining part of the building which is not on fire. During normal system operation, the damper blade is open. In case of fire, the damper blade closes.

The dampers cannot be operated in systems exposed to dust, except for when they are included in a special, individually developed programme of service and technical inspections.

1.2. design



The mcr FID S/S/ c/P cut-off fire dampers consist of a casing with a rectangular cross section, a moving damper blade and a trigger control mechanism, which is activated remotely or automatically when the thermal or thermoelectric trigger is tripped. Standard damper casing is made of galvanised steel sheet. For chemically aggressive environments, special manufacture casing is used, in which steel elements are made of 1.4404 acid-proof steel sheet, while other elements are impregnated.

The casing total length is at least 296 mm. In the middle part, in which the damper blade is placed, the casing is perforated - perforation width is 30 mm. On the inner side of the casing, around the damper blade, there is an intumescent gasket. The damper blade is made of a fire-proof panel with the total thickness of 30 mm.

The damper blade is covered with steel reinforcement profile on blade perimeter. The inner surface is equipped with „P“-type ventilation gasket, which ensures the tightness of dampers at the ambient temperature. Both ends of the fire damper casing are finished with flange connections.

1.3. versions

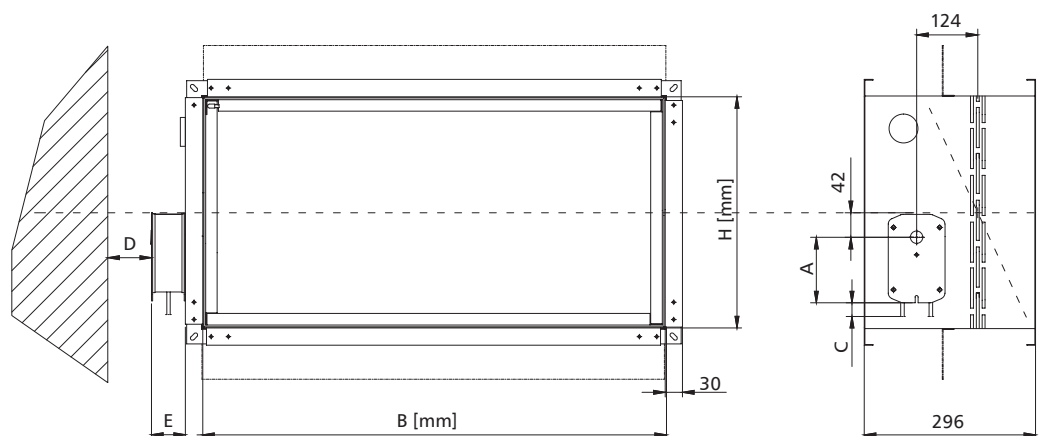
1.3.1. mcr FID S/S c/P – the cut-off fire damper for ventilation ducts with an actuator with a return spring – damper closing and opening with an actuator

During normal operation, the damper blade of the fire damper remains open. In case of fire, the blade closes automatically or remotely when the power supply is cut off.

The mcr FID S/S c/P dampers are equipped with a Belimo trigger control mechanisms **BFL**, **BFN**, **BF-TL** and **EXBF** axial actuator with a return spring, powered with 24 V AC/DC or 230 V AC, with thermoelectric trigger 72°C (optionally it is possible to use triggers with the nominal tripping temperature of 95°C). BFL, BFN, BF-TL and EXBF series actuators are equipped with limit switches used to monitor the blade position. Furthermore, the mechanical position indicator is placed on the actuator.

The thermoelectric trigger is equipped with a test switch and a power supply indicator (LED).

Dampers with Belimo actuators: analogue BFL, BFN, digital BF-TL, EXBF explosion proof actuators close thanks to thermoelectric trigger tripping or power supply cut-off as a result of the actuator return spring action. The dampers open when the power supply voltage is applied to the actuator terminals. Furthermore, dampers with those actuators may be opened manually using a key.

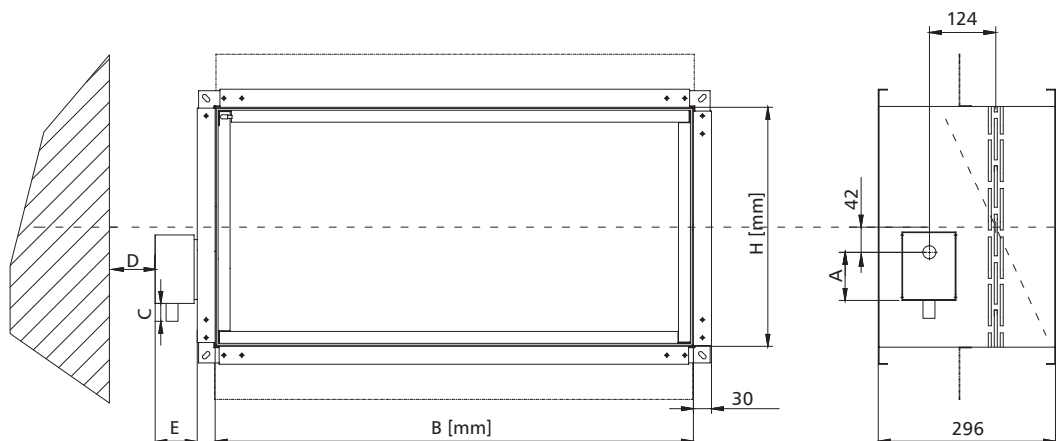


mechanism	A	C	D	E
BFN	157	30	75	57
BFL	138	30	75	53
BF24TL-ST	198	10	75	65
EXBF	225	55	75	175

1.3.2. mcr FID S/S c/P – the cut-off fire damper for ventilation ducts with a spring drive and thermal trigger

During normal operation, the damper blade of the fire damper remains open. In case of fire, the blade closes automatically.

The mcr FID S/S c/P dampers are equipped with a **RST** trigger control mechanism with a spring drive (without an integrated thermal trigger). In this case, a thermal trigger rated at 74°C (optionally 95°C) is installed outside the damper mechanism, on the damper blade itself. After the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. On the RST mechanism, there is a mechanical indicator of blade position. It is possible to equip the damper with WK1 or WK2 limit switches used to signal the blade position state.

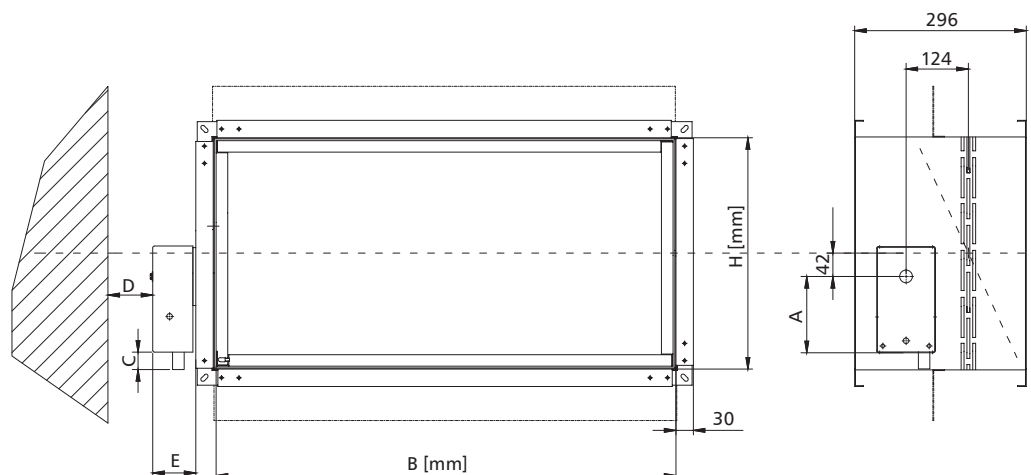


mechanism	A	C	D	E
RST	50	30	75	70

1.3.3. mcr FID S/S c/P – the cut-off fire damper for ventilation ducts with a spring drive and an integrated thermal trigger, optionally equipped with an electromagnetic trigger and limit switches

During normal operation, the damper blade of the fire damper remains open. In case of fire, the blade closes automatically or, in case of a damper with an electromagnetic trigger, additionally remotely by using the fire automation.

The mcr FID S/S c/P dampers are equipped with a **RST-KW1** trigger control mechanism with a spring drive and a cam lever system. A thermal trigger rated at 74°C (optionally at 95°C) is integrated with the damper mechanism. After the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. On the RST-KW1 mechanism, there is a mechanical blade position indicator. It is possible to equip a trigger control mechanism with an electromagnetic trigger, activated by the application („pulse”) or removal („break”) of the power supply voltage and with limit switches used to signal the damper blade position state. The mechanism has a function to test and blade button-release. Blade re-opening is activated manually.



mechanism	A	C	D	E
RST-KW1	130	30	75	80

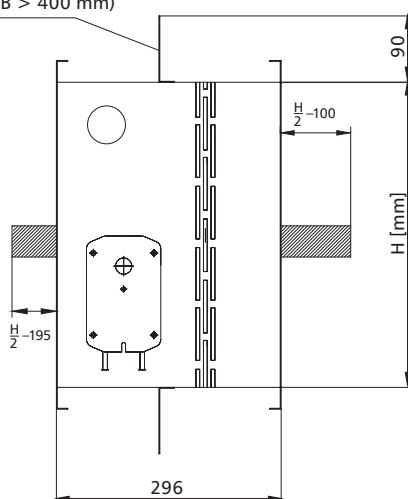
1.4. dimensions

Rectangular dampers:

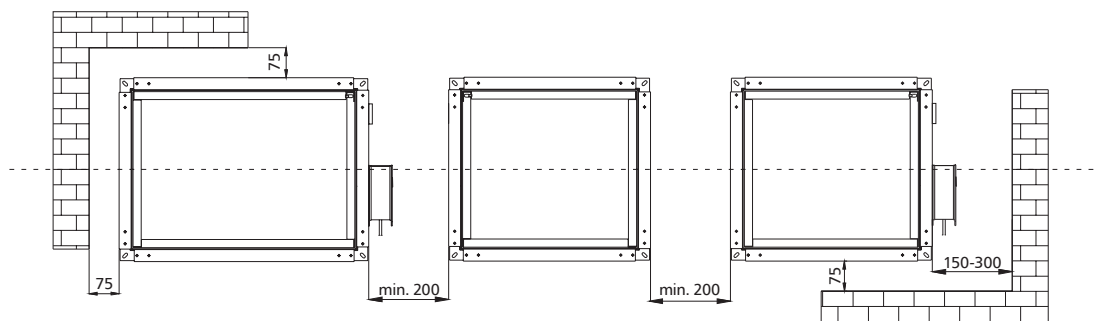
- nominal width B: from 200 mm to 800 mm
- nominal height H: from 200 mm to 400 mm
- the maximum cross-section surface of one damper up to 0.32 m²

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (in 1 mm increments, in the given range).

mounting flange
(for dampers with the dimension of B > 400 mm)



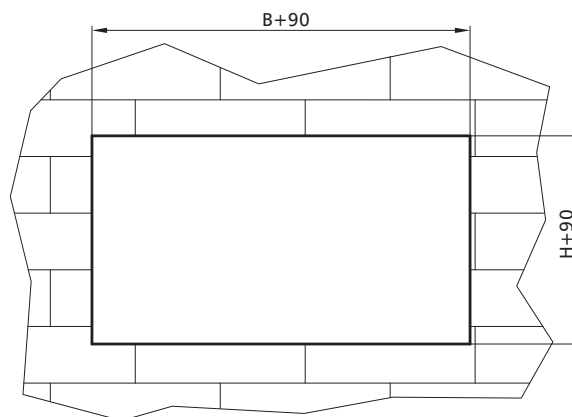
Distance between the installations and partitions



1.5. installation

The mcr FID S/S c/P rectangular dampers are EI120(ve ho i↔o)S-rated when installed in concrete partitions with the thickness of at least 110 mm, made of full bricks or cellular concrete blocks with the thickness of at least 115 mm, lightweight walls of cardboard-plaster panels on a steel framework with the thickness of at least 125 mm and the resistance class of not less than EI120 and concrete ceilings with the thickness of at least 150 mm.

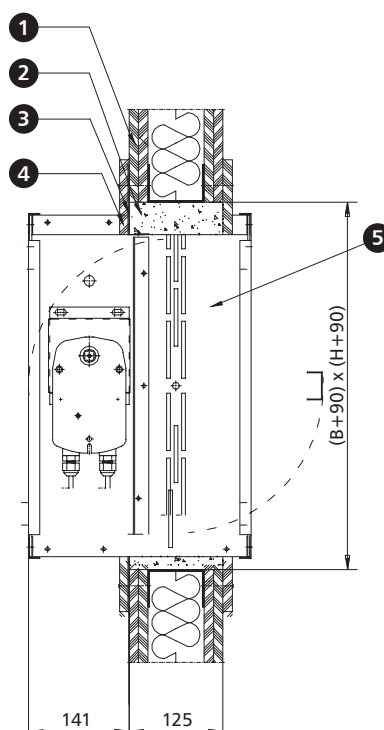
1.5.1. preparation of installation openings



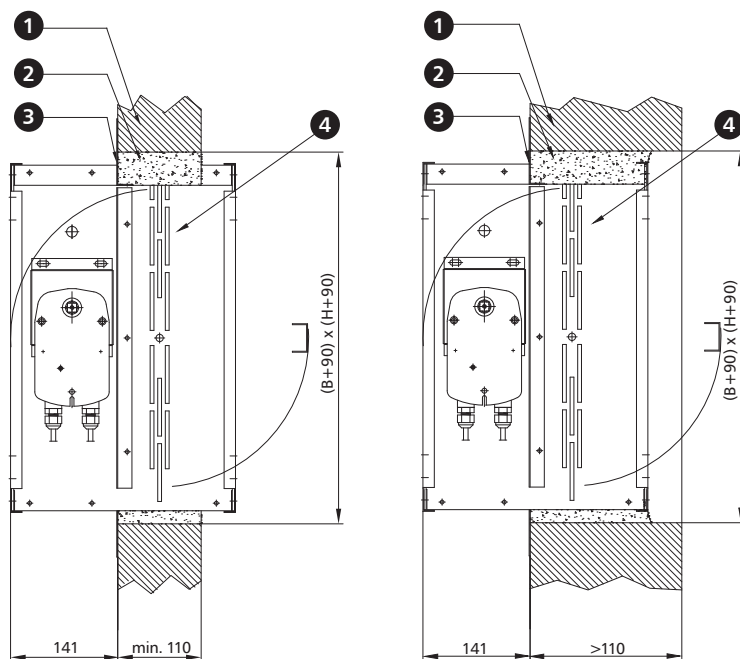
1.5.2. sample installation in lightweight walls of plaster-cardboard panels

1. lightweight wall
2. sealing - plaster mortar*
3. mounting flange - embedding border
4. circumferential belt of 100 x 12.5 plaster-cardboard panels
5. fire damper mcr FID S

*it is possible to use a different sealing which ensures the required fire resistance



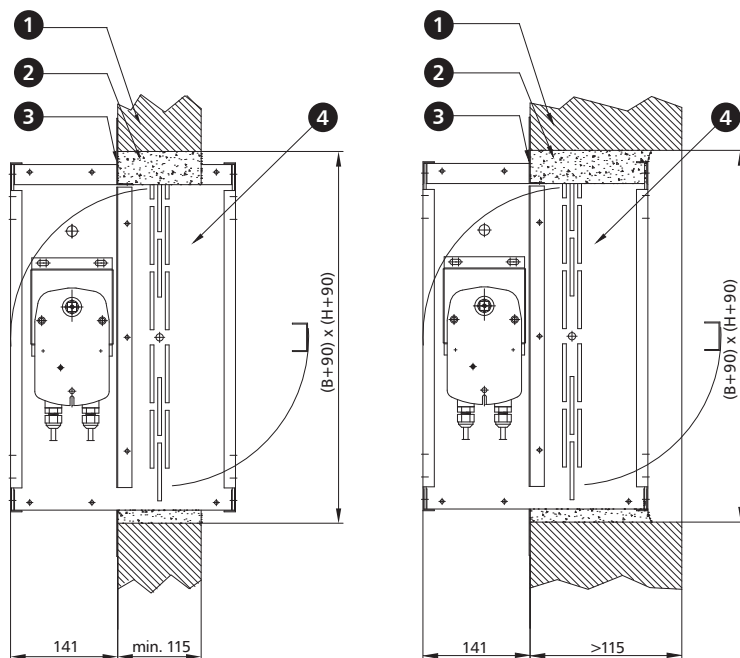
1.5.3. sample installation in concrete walls



1. rigid wall
2. sealing - cement or cement-lime masonry mortar*
3. mounting flange - embedding border
4. fire damper mcr FID S

*it is possible to use a different sealing which ensures the required fire resistance

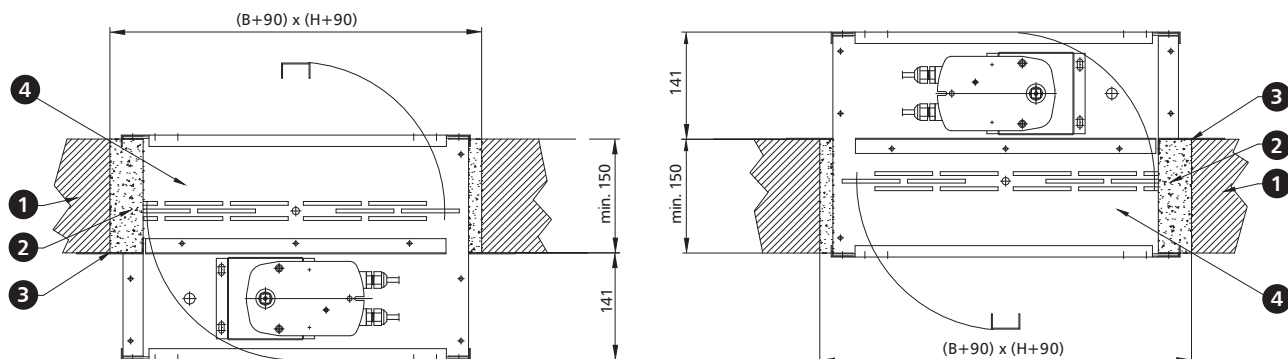
1.5.4. sample installation in masonry walls



1. rigid wall
2. sealing - cement or cement-lime masonry mortar*
3. mounting flange - embedding border
4. fire damper mcr FID S

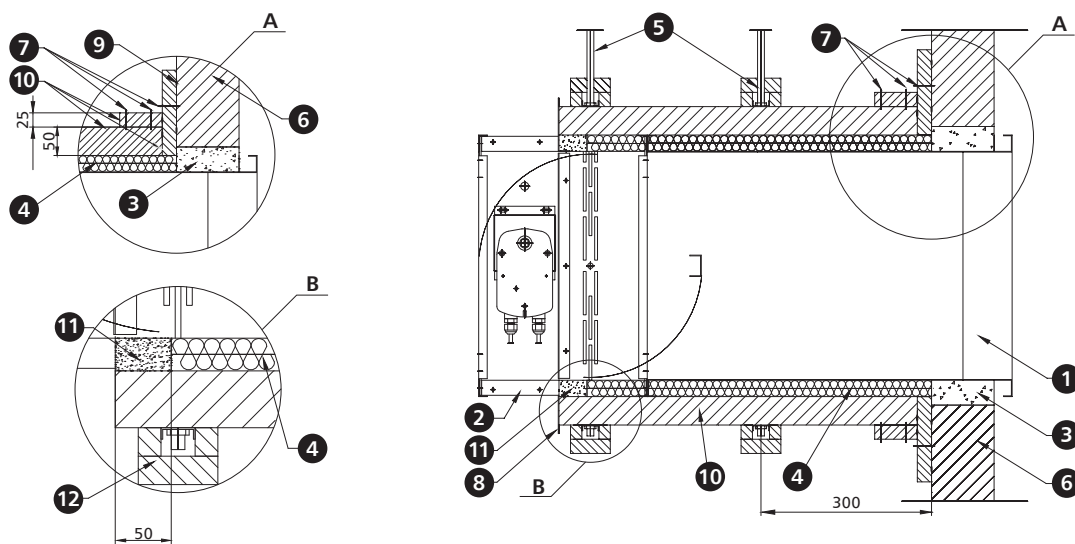
*it is possible to use a different sealing that ensures the required fire resistance

If the damper is installed in a wall with the thickness of less than 115 mm, the wall thickness should be increased along the damper circumference by installing a belt of panels or other construction elements to the required thickness.

1.5.5. sample installation in ceilings


1. ceiling
2. sealing - cement or cement-lime masonry mortar*
3. mounting flange - embedding border
4. fire damper mcr FID S

*it is possible to use a different sealing which ensures the required fire resistance

1.5.6. sample installation outside the fire partition


1. ventilation duct
2. fire damper mcr FID S
3. e.g. cement mortar*
4. mineral wool with the density of at least 80 kg/m³ and thickness 30 mm, A1 class
5. suspension rod M12
6. wall
7. ST3,5x50 screw

8. angle - casting limits
9. board joints sealed with a bonding agent, e.g. Promat H 84
10. non-combustible board with the thickness corresponding to the fire rating of the fire partition (e.g. Promat L500 for EI120 - thickness 50 mm)
11. e.g. gypsum mortar
12. suspension rod insulation

*it is possible to use a different sealing which ensures the required fire resistance

Fire damper installation with a vertical axis of rotation

Installation must be specified in the design plans and specifications and selected when ordering. Fire damper dimensions BxH are specified for the fire damper with a horizontal axis of rotation.

1.6. technical parameters of mcr FID S/S c/P rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

			height H [mm]														
			200					250					300				
			v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]
width B [mm]	200	4	0.04	0.033	468	7	27	0.05	0.043	612	6	26	0.06	0.053	756	6	28
		6			702	15	37			918	13	37			1 134	13	38
		8			936	26	45			1 224	24	45			1 512	22	44
		10			1 170	41	51			1 530	37	50			1 890	34	50
	250	4	0.05	0.041	585	6	27	0.0625	0.053	765	6	27	0.075	0.066	945	5	26
		6			878	14	37			1 148	13	38			1 418	11	37
		8			1 170	24	45			1 530	23	45			1 890	20	44
		10			1 463	38	50			1 913	36	51			2 363	31	50
	300	4	0.06	0.049	702	6	27	0.075	0.064	918	6	28	0.09	0.079	1 134	4	26
		6			1 053	13	38			1 377	13	38			1 701	10	36
		8			1 404	24	45			1 836	22	46			2 268	18	44
		10			1 755	37	51			2 295	35	51			2 835	28	49
	350	4	0.07	0.057	819	6	27	0.0875	0.074	1 071	5	27	0.105	0.092	1 323	4	25
		6			1 229	13	38			1 607	11	37			1 985	9	35
		8			1 638	22	45			2 142	20	45			2 646	16	43
		10			2 048	35	51			2 678	31	50			3 308	25	49
	400	4	0.08	0.065	936	5	27	0.1	0.085	1 224	4	25	0.12	0.105	1 512	4	24
		6			1 404	12	38			1 836	9	35			2 268	8	34
		8			1 872	22	45			2 448	17	43			3 024	14	42
		10			2 340	34	51			3 060	26	49			3 780	22	47
	450	4	0.09	0.073	1 053	5	27	0.1125	0.096	1 377	3	22	0.135	0.118	1 701	3	23
		6			1 580	11	37			2 066	7	33			2 552	7	33
		8			2 106	20	45			2 754	13	40			3 402	13	41
		10			2 633	31	50			3 443	20	46			4 253	20	47
	500	4	0.1	0.081	1 170	4	26	0.125	0.106	1 530	3	23	0.15	0.131	1 890	3	23
		6			1 755	10	36			2 295	8	34			2 835	7	34
		8			2 340	18	44			3 060	13	41			3 780	13	41
		10			2 925	28	50			3 825	21	47			4 725	20	47
550	4	0.11	0.089	1 287	4	25	0.1375	0.117	1 683	3	23	0.165	0.144	2 079	3	22	
	6			1 931	9	36			2 525	7	33			3 119	6	33	
	8			2 574	17	43			3 366	13	41			4 158	12	40	
	10			3 218	26	49			4 208	20	47			5 198	18	46	
600	4	0.12	0.098	1 404	3	21	0.15	0.128	1 836	3	20	0.18	0.158	2 268	2	20	
	6			2 106	7	32			2 754	6	31			3 402	5	31	
	8			2 808	12	39			3 672	10	38			4 536	10	38	
	10			3 510	19	45			4 590	16	44			5 670	15	44	
650	4	0.13	0.106	1 521	3	22	0.1625	0.138	1 989	3	21	0.195	0.171	2 457	2	20	
	6			2 282	7	32			2 984	6	31			3 686	5	30	
	8			3 042	12	40			3 978	10	39			4 914	9	38	
	10			3 803	19	46			4 973	16	45			6 143	14	44	
700	4	0.14	0.114	1 638	3	21	0.175	0.149	2 142	2	20	0.21	0.184	2 646	2	19	
	6			2 457	6	32			3 213	5	31			3 969	5	30	
	8			3 276	12	39			4 284	10	38			5 292	8	37	
	10			4 095	18	45			5 355	15	44			6 615	13	43	
750	4	0.15	0.122	1 755	3	21	0.1875	0.159	2 295	2	20	0.225	0.197	2 835	2	20	
	6			2 633	6	31			3 443	5	31			4 253	5	30	
	8			3 510	11	39			4 590	10	38			5 670	8	38	
	10			4 388	17	45			5 738	15	44			7 088	13	43	
800	4	0.16	0.130	1 872	2	20	0.2	0.170	2 448	2	20	0.24	0.210	3 024	2	19	
	6			2 808	5	30			3 672	5	30			4 536	4	29	
	8			3 744	10	38			4 896	9	38			6 048	8	37	
	10			4 680	15	43			6 120	14	44			7 560	12	43	

The mcr FID S fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

1.6. technical parameters of mcr FID S/S c/P rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]									
		350					400				
	v [m/s]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.07	0.063	900	5	0.08	0.073	1 044	5	26
		6			1 350	12			1 566	11	37
		8			1 800	21			2 088	19	44
		10			2 250	32			2 610	30	50
	250	4	0.0875	0.078	1 125	4	0.1	0.091	1 305	4	25
		6			1 688	10			1 958	9	35
		8			2 250	17			2 610	16	43
		10			2 813	27			3 263	25	49
	300	4	0.105	0.094	1 350	4	0.12	0.109	1 566	4	24
		6			2 025	10			2 349	8	35
		8			2 700	17			3 132	15	42
		10			3 375	27			3 915	23	48
	350	4	0.1225	0.109	1 575	4	0.14	0.127	1 827	4	25
		6			2 363	9			2 741	8	36
		8			3 150	15			3 654	15	43
		10			3 938	24			4 568	23	49
	400	4	0.14	0.125	1 800	3	0.16	0.145	2 088	3	23
		6			2 700	8			3 132	7	34
		8			3 600	13			4 176	12	41
		10			4 500	21			5 220	19	47
	450	4	0.1575	0.141	2 025	3	0.18	0.163	2 349	3	21
		6			3 038	7			3 524	6	32
		8			4 050	13			4 698	10	39
		10			5 063	20			5 873	16	45
	500	4	0.175	0.156	2 250	2	0.2	0.181	2 610	2	20
		6			3 375	5			3 915	5	31
		8			4 500	10			5 220	9	38
		10			5 625	15			6 525	14	44
	550	4	0.1925	0.172	2 475	2	0.22	0.199	2 871	2	20
		6			3 713	5			4 307	5	30
		8			4 950	8			5 742	8	38
		10			6 188	13			7 178	13	43
	600	4	0.21	0.188	2 700	2	0.24	0.218	3 132	2	19
		6			4 050	4			4 698	4	28
		8			5 400	8			6 264	7	36
		10			6 750	12			7 830	11	42
	650	4	0.2275	0.203	2 925	2	0.26	0.236	3 393	2	18
		6			4 388	4			5 090	4	29
		8			5 850	8			6 786	7	36
		10			7 313	12			8 483	11	42
	700	4	0.245	0.219	3 150	2	0.28	0.254	3 654	2	18
		6			4 725	4			5 481	4	29
		8			6 300	7			7 308	7	36
		10			7 875	11			9 135	11	42
	750	4	0.2625	0.234	3 375	2	0.3	0.272	3 915	2	17
		6			5 063	4			5 873	4	28
		8			6 750	7			7 830	6	35
		10			8 438	11			9 788	10	41
	800	4	0.28	0.250	3 600	2	0.32	0.290	4 176	2	18
		6			5 400	4			6 264	4	28
		8			7 200	7			8 352	6	36
		10			9 000	11			10 440	10	41

The mcr FID S fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

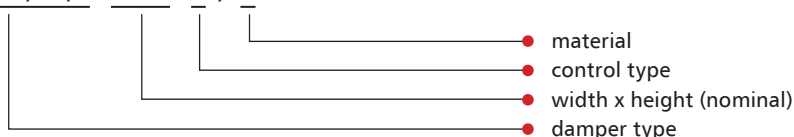
1.7. estimated weights of mcr FID S/S c/P dampers for rectangular ventilation ducts [kg]

		width B [mm]							
		200	250	300	400	500	600	700	800
height H [mm]	200	7,5	8	9	10	11	14	16	18
	250	8	9,5	10	11	14	15	17	19
	300	9	10,5	11	12	15	16	18	20
	350	10	11,5	12	13	16	17	19	21
	400	11	12,5	13,5	14	18	19	21	22

For dampers with no actuator, subtract ~1 kg.

1.8. marking

mcr FID S/S c/P B x H 1 / 2



1 – control:

- RST trigger control mechanism
 - RST** – thermal trigger
 - RST/WK1** – thermal trigger + limit switch (closed blade signal)
 - RST/WK2** – thermal trigger + limit switch (open/closed blade signal)
- RST-KW1 trigger control mechanism
 - RST-KW1/S** – thermal trigger
 - RST-KW1/S/WK2** – thermal trigger + limit switch (open/closed blade signal)
 - RST-KW1/24I** – thermal trigger + „pulse“ electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
 - RST-KW1/24P** – thermal trigger + „break“ electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
 - RST-KW1/230I** – thermal trigger + „pulse“ electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
 - RST-KW1/230P** – thermal trigger + „break“ electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
- Belimo trigger control mechanism
 - BF24TL-T-ST** (with the BKN230-24MP option) – actuator with a return spring, U = 24 V, MP Bus digital control
 - EXBF24-T** – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
 - EXBF230-T** – explosion proof actuator with a return spring in the Ex version, U = 230 V AC
 - BFL24-T** – actuator with a return spring, U = 24 V AC/DC
 - BFL230-T** – actuator with a return spring, U = 230 V AC
 - BFL24-T-ST** (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
 - BFN24-T** – actuator with a return spring, U = 24 V AC/DC
 - BFN230-T** – actuator with a return spring, U = 230 V AC
 - BFN24-T-ST** (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system

2 – material

- [no symbol]** – galvanised steel, Zn 275 g/m² coating
- KN** – 1.4404 acid-proof stainless steel

example marking:

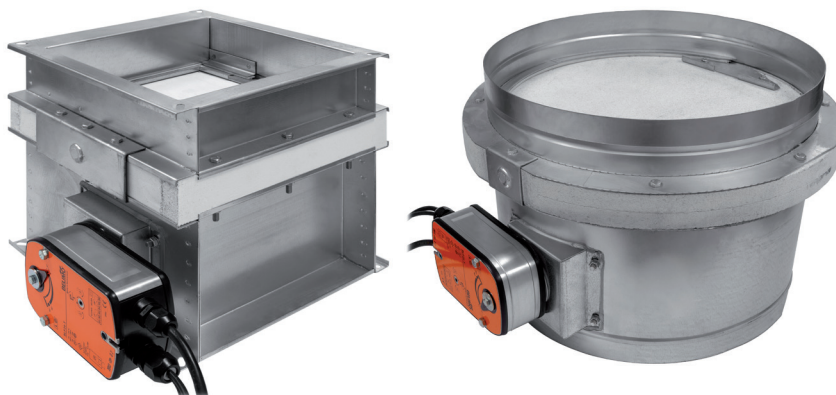
mcr FID S/S c/P 400 x 400 BFL24-T

EIS120 low-resistance cut-off damper with a 24 V compact Belimo actuator with limit switches.

Chapter 12 - power supply and control (p. 141) contains:

- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper,
- location of trigger control mechanisms in relation to the damper - production standards.

**PRODUCT CONFIGURATOR
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CERTYFIKACJA PRODUKTU



- ▶ **EIS120**
- ▶ Certificate of constancy of performance 1488-CPR-0422/W and 1396-CPR-0103.
- ▶ Dampers certified for compliance with EN 15650.
- ▶ Dampers qualified under EN 13501-3 and tested under EN 1366-2.
- ▶ Cut-off dampers with the fire resistance independent of airflow direction and installation side.
- ▶ Dampers for rectangular and circular ventilation ducts.

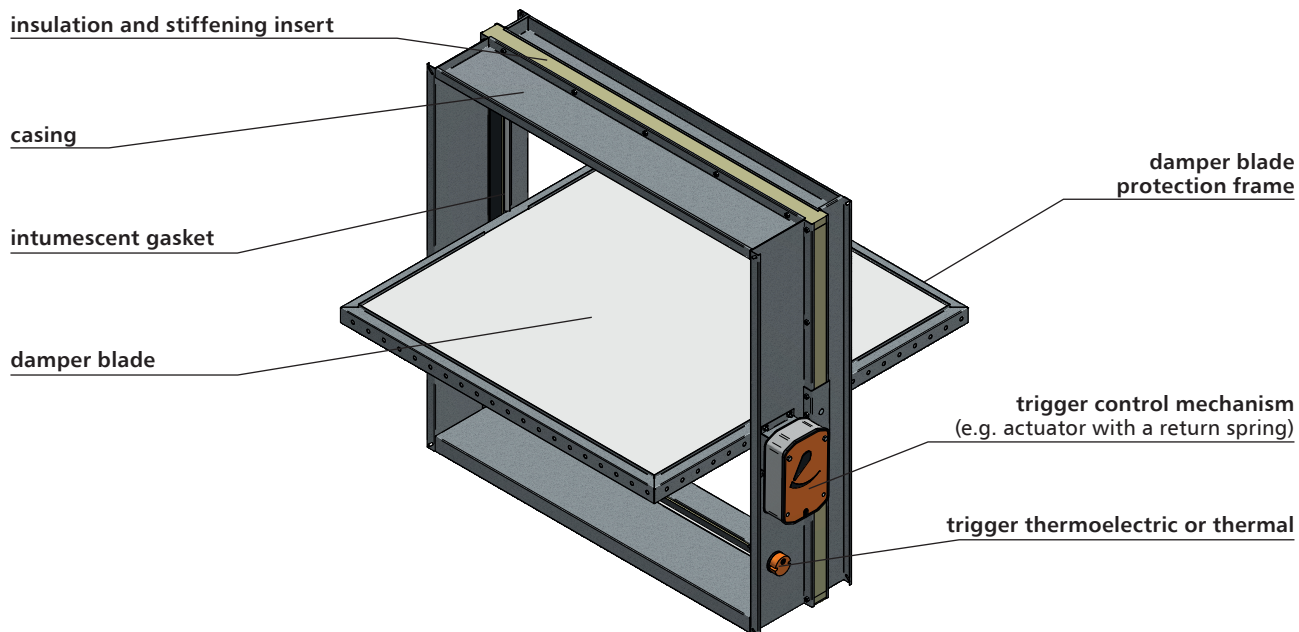
2.1. application

The mcr FID S/S p/P and mcr FID S/S p/O cut-off dampers are designed for use in general ventilation systems, where those systems pass through construction partitions.

During a fire, the dampers preserve the fire resistance of the construction partition where ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and burning fumes to the remaining part of the building which is not on fire. During normal system operation, the damper blade is open. In case of fire, the damper blade closes.

Additionally mcr FID S/S dampers may be used as relief dampers in gas extinguishing systems, in which case they are equipped with drives without thermoelectric or thermal triggers.

2.2. design



The mcr FID S/S cut-off dampers consist of a casing with a rectangular (mcr FID S/S p/P) or circular (mcr FID S/S p/O) cross-section, made of two segments separated with a fire-proof panel with the cross-section of 20 x 40 mm, a moving damper blade and a trigger control mechanism, which is activated remotely or automatically by tripping a thermal or thermoelectric trigger. Standard damper casing is made of galvanised steel sheet. For chemically aggressive environments, special manufacture casing is used, in which steel elements are made of 1.4404 acid-proof steel sheet, while other elements are impregnated. The casing total length is at least 296 mm. Dampers may be made with an extension element, in such case the casing length is 400 mm.

The damper blade is made of a fire-proof panel with the total thickness of 40 mm, edge is covered with a reinforcement metal profile. The inner side of the fire damper casing is equipped with an intumescent gasket. There are stop profiles fastened to the inner casing surface, which limit the rotating motion of the damper blade. The stop profiles are finished with a polyethylene ventilation-grade seal. In dampers with a rectangular cross-section, both ends are finished with flange connections, and in circular dampers, with nipple, muff or flange connections.

2.3. versions

2.3.1. mcr FID S/S – the cut-off fire damper for ventilation ducts with an actuator with a return spring – damper closing and opening with an actuator

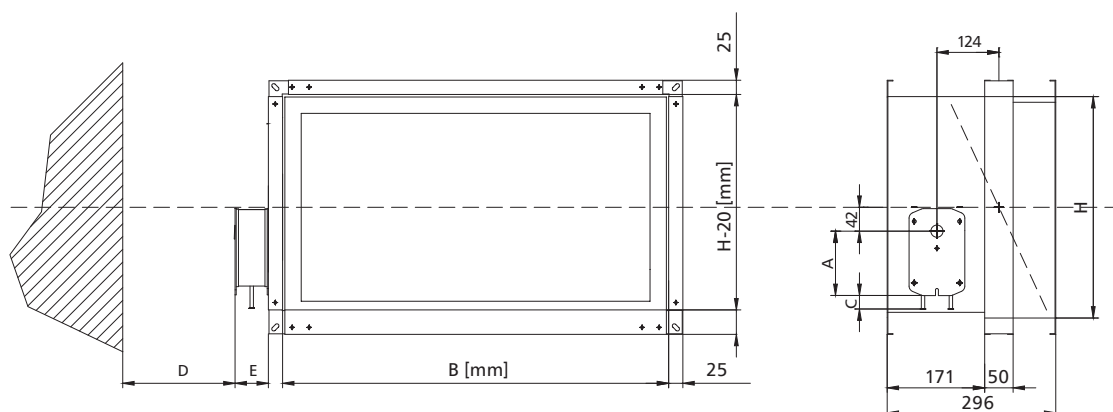
During normal operation, the damper blade of the fire damper remains open. In case of fire, the blade closes automatically or remotely when the power supply is cut off.

The mcr FID S/S c/P dampers are equipped with a trigger control Belimo mechanisms **BF, BFL, BFN, BF-TL, EXBF** - axial actuator with a return spring, powered with 24 V AC/DC or 230 V AC, with thermoelectric trigger 72°C (optionally it is possible to use triggers with the nominal tripping temperature of 95°C). BFL-series actuators are used in dampers with the height up to 600 mm and the diameter up to 550 mm. BFN-series actuators are used in dampers with the height up to 1000 mm and the diameter up to 630 mm.

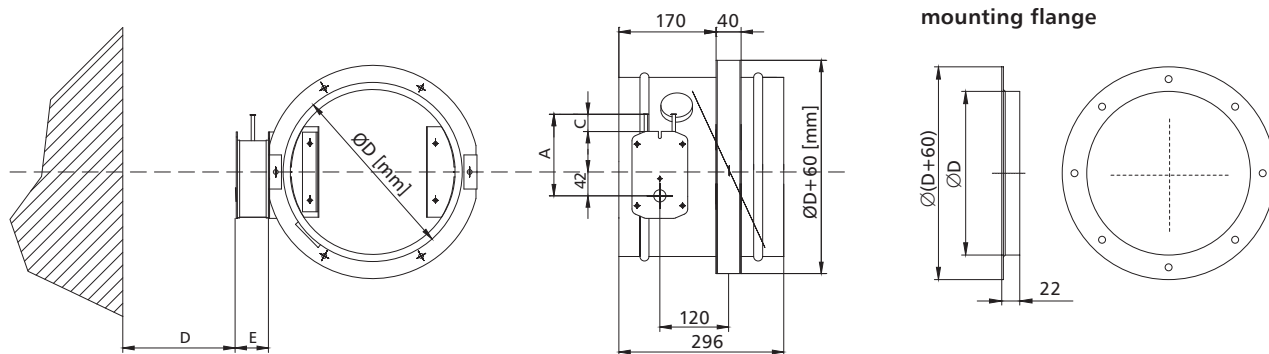
BF, BFL, BFN, BF-TL, EXBF series actuators are equipped with limit switches used to monitor the blade position. Furthermore, the mechanical position indicator is placed on the actuator.

The thermoelectric trigger is equipped with a test switch and a power supply indicator (LED).

Dampers with Belimo actuators: analogue BF, BFL, BFN, digital BF-TL, EXBF explosion proof actuators close thanks to thermoelectric trigger tripping or power supply cut-off as a result of the actuator return spring action. The dampers open when the power supply voltage is applied to the actuator terminals. Furthermore, dampers with those actuators may be opened manually using a key.



mechanism	A	C	D	E
BFN	157	30	75	62
BFL	138	30	75	58
BF24TL-ST	198	10	75	70
EXBF	225	55	75	175
BF	198	10	75	70

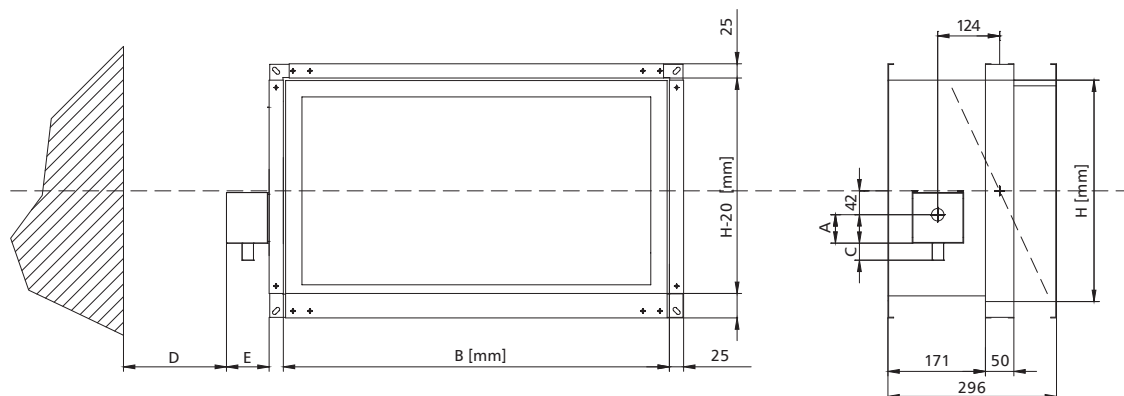


mechanism	A	C	D	E
BFN	157	30	75	42
BFL	138	30	75	38
BF24TL-ST	198	10	75	50
EXBF	225	55	75	160
BF	198	10	75	50

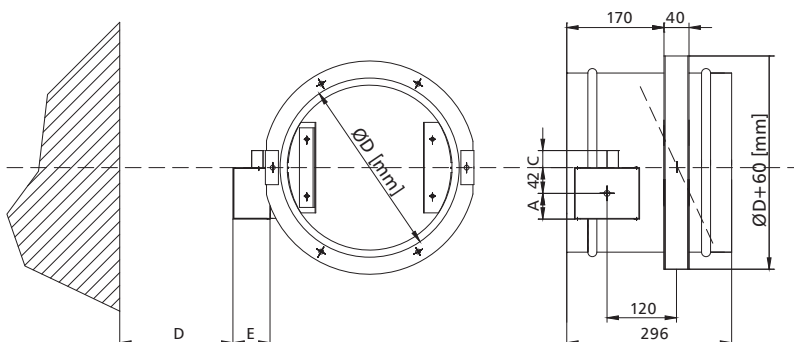
2.3.2. mcr FID S/S – the cut-off fire damper for ventilation ducts with a spring drive and thermal trigger

During normal operation, the damper blade of the fire damper remains open. In case of fire, the blade closes automatically.

The mcr FID S/S dampers are equipped with a **RST** trigger control mechanism with a drive spring (without an integrated thermal trigger). In this case, a thermal trigger 74°C (optionally 95°C) is installed outside the damper mechanism, on the damper blade itself. After the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. On the RST mechanism, there is a mechanical blade position indicator. It is possible to equip the damper with WK1 or WK2 limit switches used to signal the blade position state.



mechanism	A	C	D	E
RST	50	30	75	75

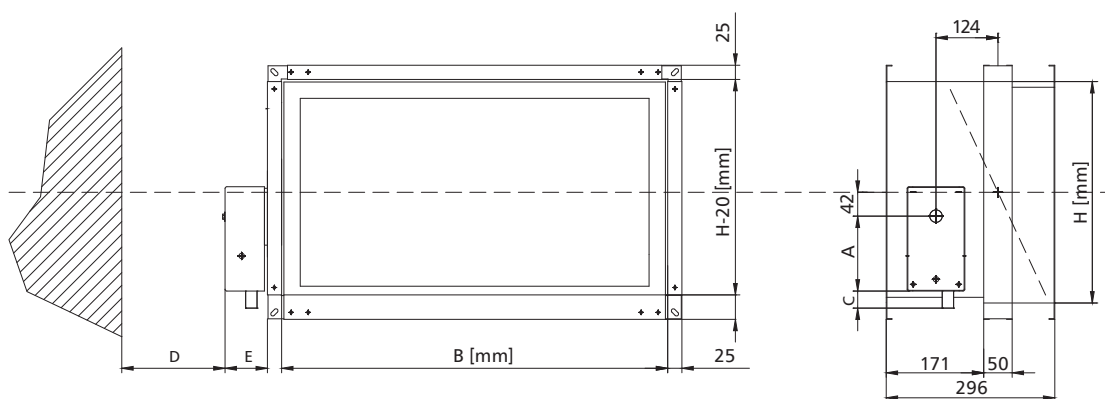


mechanism	A	C	D	E
RST	40	30	75	55

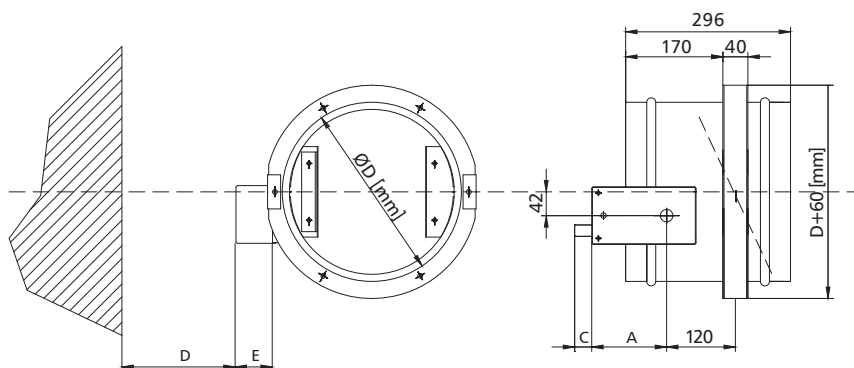
2.3.3. mcr FID S/S – the cut-off fire damper for ventilation ducts with a spring drive and an integrated thermal trigger, optionally equipped with an electromagnetic trigger and limit switches

During normal operation, the damper blade of the fire damper remains open. In case of fire, the blade closes automatically or, in case of a damper with an electromagnetic trigger, additionally remotely using the fire automation.

The mcr FID S/S dampers are equipped with a **RST-KW1** trigger control mechanism with a drive spring and a cam-lever system. A thermal trigger 74°C (optionally at 95°C) is integrated with the damper mechanism. After the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. On the RST-KW1 mechanism, there is a mechanical blade position indicator. It is possible to equip a trigger control mechanism with an electromagnetic trigger activated by the application („pulse”) or removal („break”) of the power supply voltage and with limit switches used to signal the blade position state. The mechanism has a function to test and blade button-release. Blade re-opening is activated manually. It is not required to dismantle the system to replace the thermal trigger. The RST-KW1 mechanism may be replaced with an electric actuator.



mechanism	A	C	D	E
RST-KW1	130	30	75	85



mechanism	A	C	D	E
RST-KW1	130	30	75	65

2.4. dimensions

Rectangular dampers:

- nominal width B: from 200 mm to 1500 mm
- nominal height H: from 200 mm to 1500 mm
- the maximum cross-section surface of one damper: up to 1.8 m²

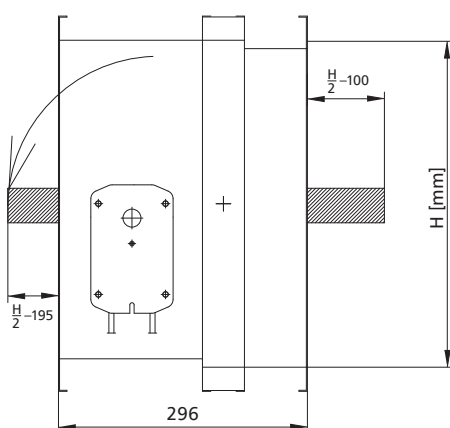
Apart from the standard dimensions, fire dampers can be manufactured with intermediate dimensions (in 1 mm increments, in the given range).

Circular dampers:

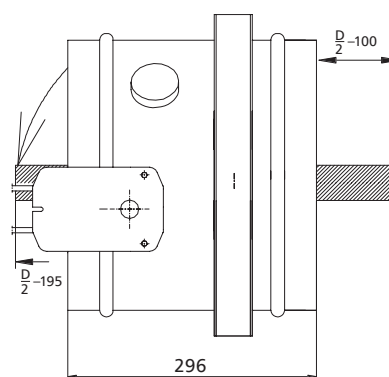
- nominal diameter D from 125 mm to 630 mm

Apart from the standard dimensions, fire dampers can be manufactured with intermediate dimensions (in 1 mm increments, in the given range).

mcr FID S/S p/P damper



mcr FID S/S p/O damper



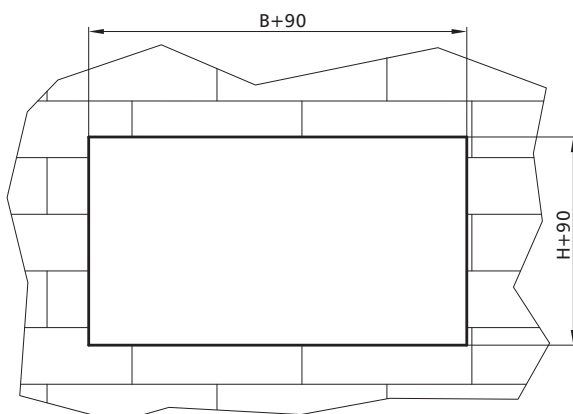
2.5. installation

The mcr FID S/S p/P rectangular dampers are EI120(ve ho i↔o)S-rated when installed in concrete partitions made of full bricks or cellular concrete blocks with the thickness of at least 110 mm, lightweight walls of cardboard-plaster panels on a steel framework with the thickness of at least 125 mm and the resistance class of not less than EI120 and concrete ceilings with the thickness of at least 150 mm.

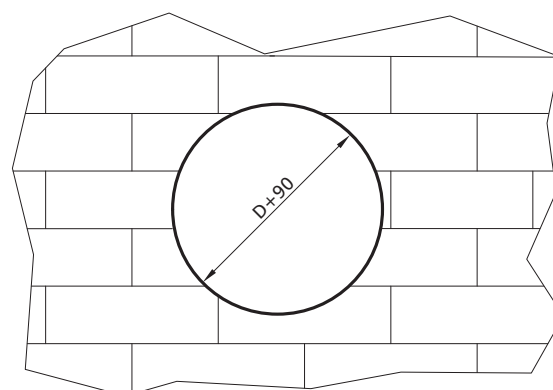
The mcr FID S/S p/O circular dampers are EI120(ve ho i↔o)-rated when installed in concrete partitions made of full bricks or cellular concrete blocks with the thickness of at least 110 mm, lightweight walls of cardboard-plaster panels on a steel framework with the thickness of at least 125 mm and the resistance class of not less than EI120 and concrete ceilings with the thickness of at least 150 mm.

2.5.1. preparation of installation openings

mcr FID S/S p/P damper

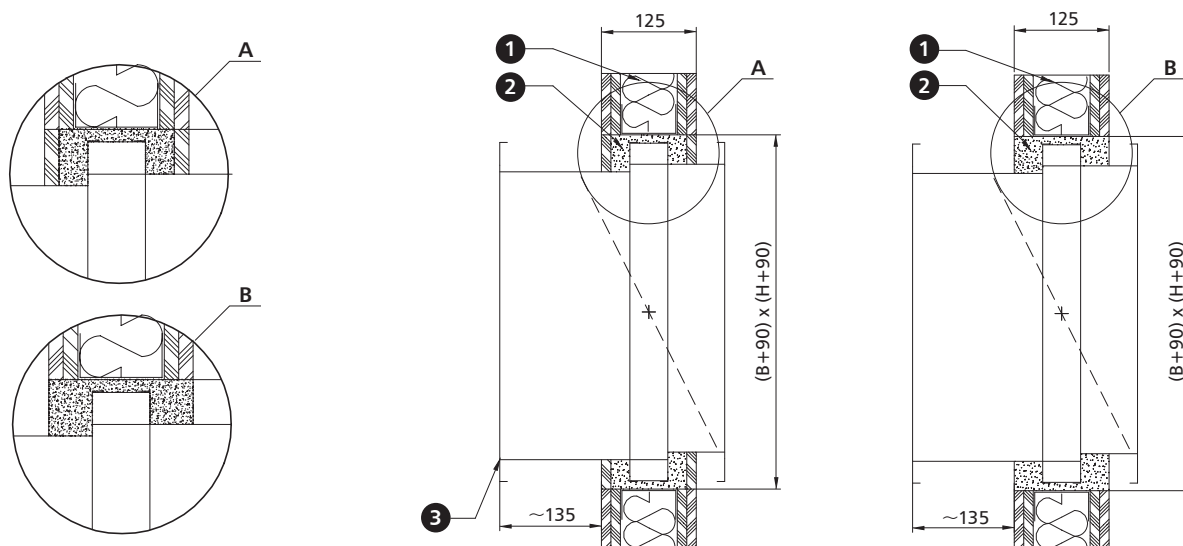


mcr FID S/S p/O damper



2.5.2. sample installation in lightweight walls of plaster-cardboard panels

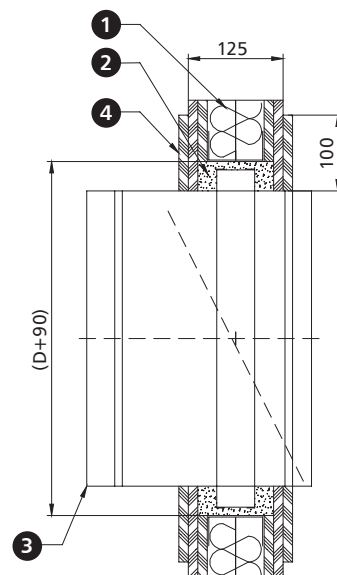
mcr FID S/S p/P damper



- 1. lightweight wall
- 2. sealing - plaster mortar*
- 3. fire damper mcr FID S

*it is possible to use a different sealing which ensures the required fire resistance

mcr FID S/S p/O damper

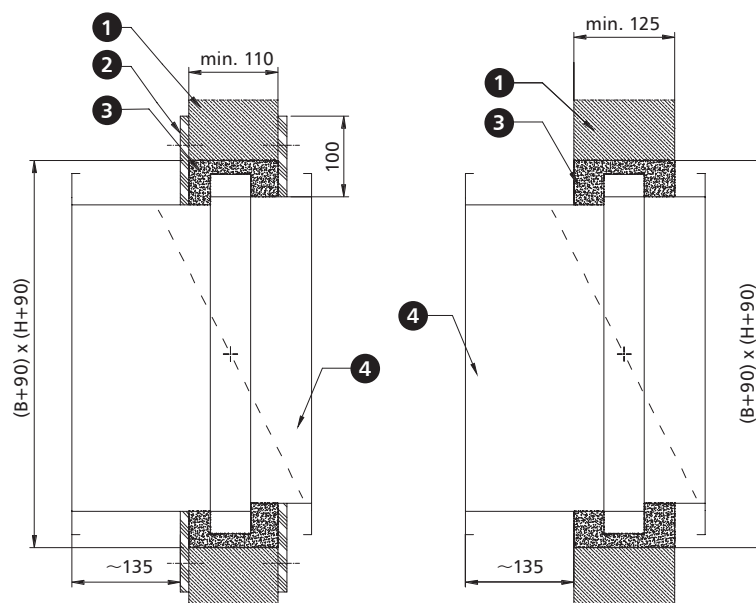


- 1. lightweight wall
- 2. sealing - plaster mortar*
- 3. fire damper mcr FID S
- 4. circumferential gypsum board trim

*it is possible to use a different sealing which ensures the required fire resistance

2.5.3. sample installation in concrete and masonry walls

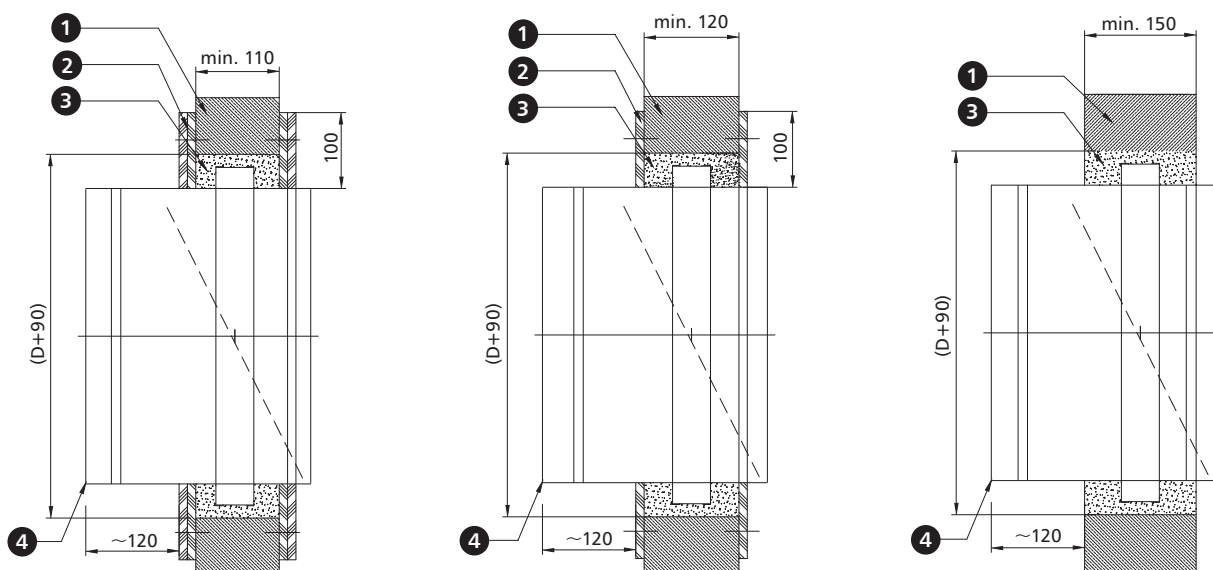
mcr FID S/S p/P damper



1. rigid wall - concrete, cellular concrete or bricks
2. circumferential band of plaster-cardboard panels
3. sealing - concrete, cement or cement-lime masonry mortar*
4. fire damper mcr FID S

*it is possible to use a different sealing which ensures the required fire resistance

mcr FID S/S p/O damper

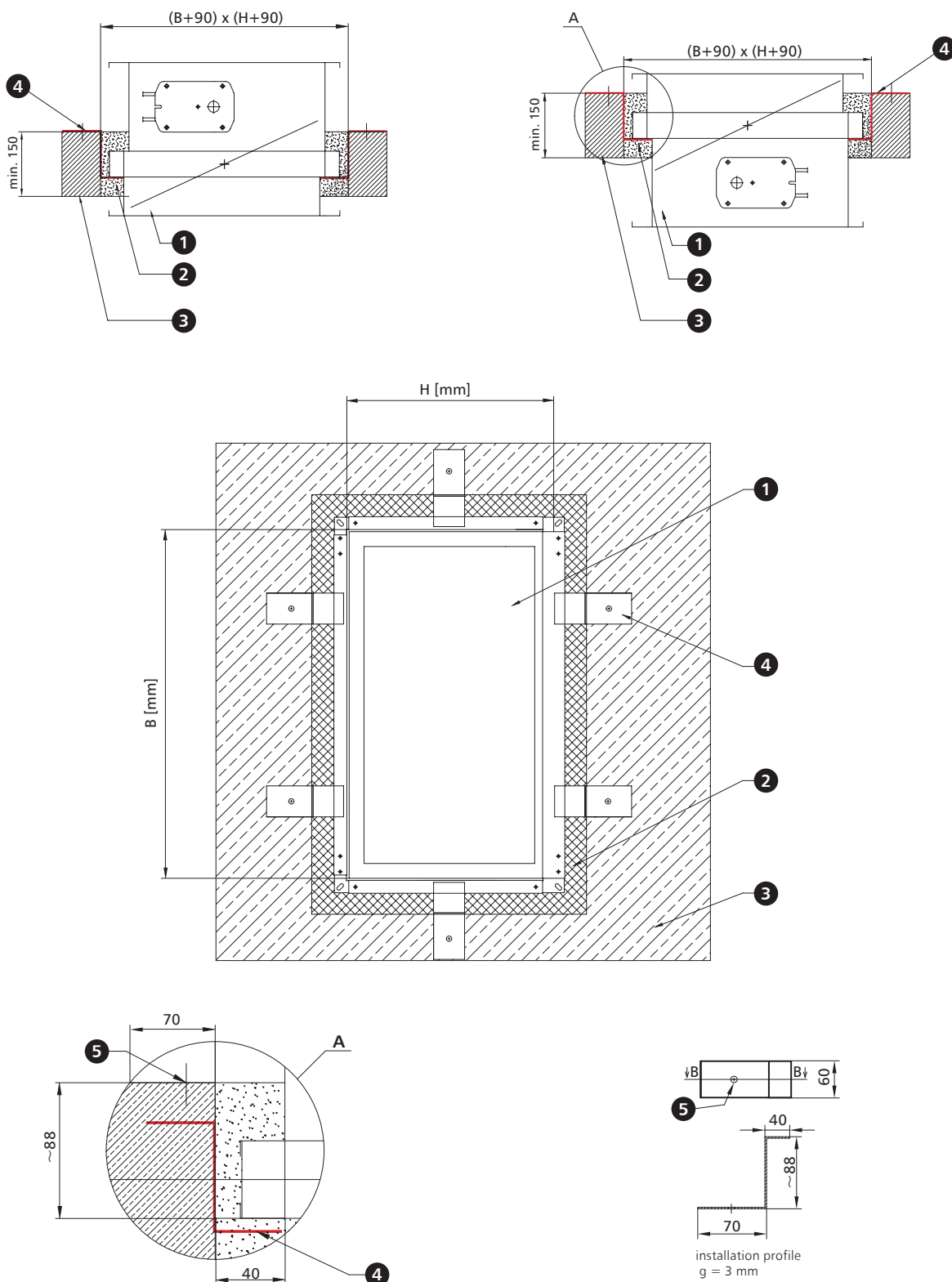


1. rigid wall - concrete, cellular concrete or bricks
2. circumferential gypsum board trim
3. sealing - concrete, cement or cement-lime masonry mortar*
4. fire damper mcr FID S

*it is possible to use a different sealing which ensures the required fire resistance

2.5.4. sample installation in ceilings

mcr FID S/S p/P damper

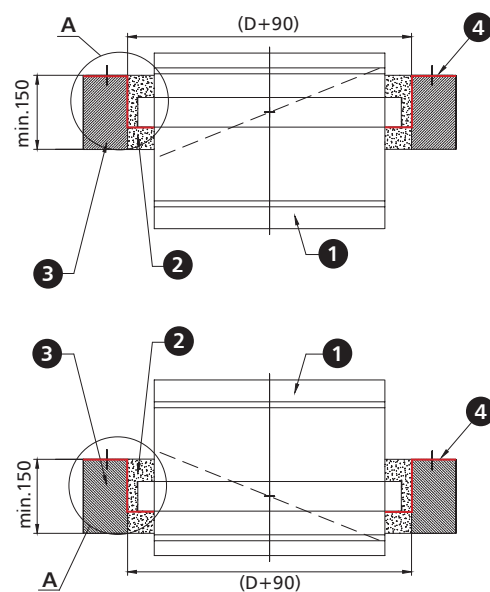
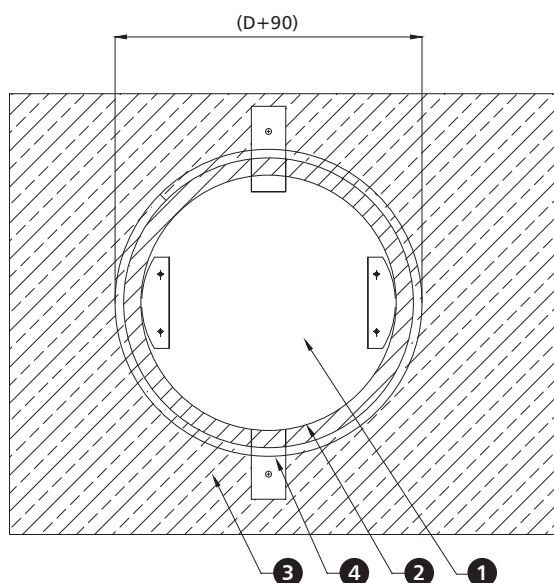


- 1. fire damper mcr FID S
- 2. sealing - concrete, cement or cement-lime masonry mortar*
- 3. ceiling

- 4. installation profile $g = 3 \text{ mm}$
- 5. steel expansion plug

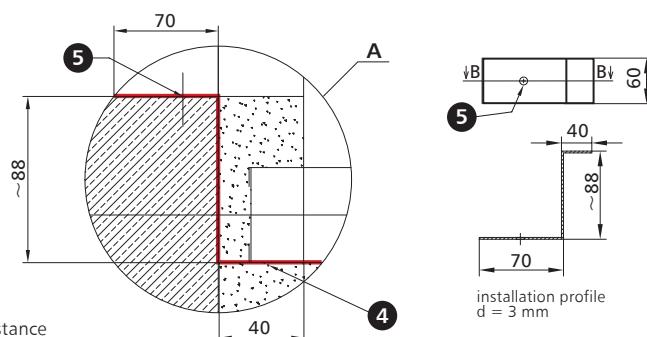
*it is possible to use a different sealing which ensures the required fire resistance

mcr FID S/S p/O damper



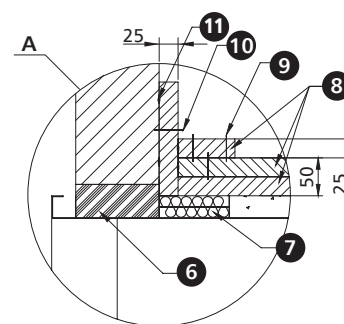
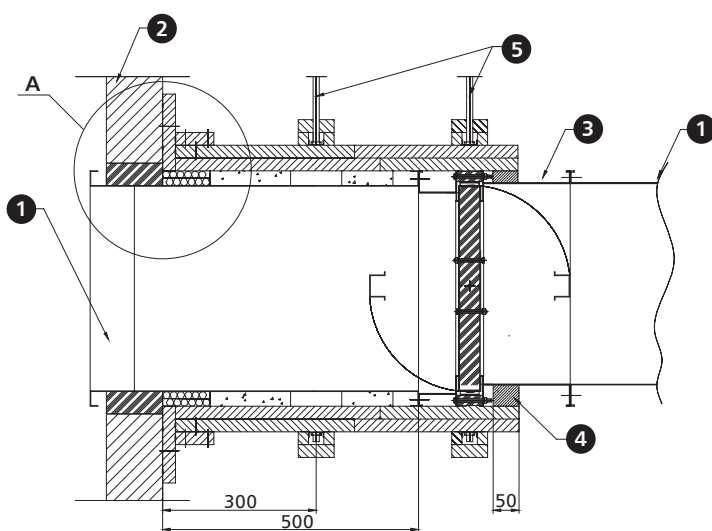
1. fire damper mcr FID S
2. sealing - concrete, cement or cement-lime masonry mortar*
3. ceiling
4. installation profile d = 3 mm
5. steel expansion plug

*it is possible to use a different sealing which ensures the required fire resistance



2.5.5. sample installation outside the fire partition

mcr FID S/S p/P damper

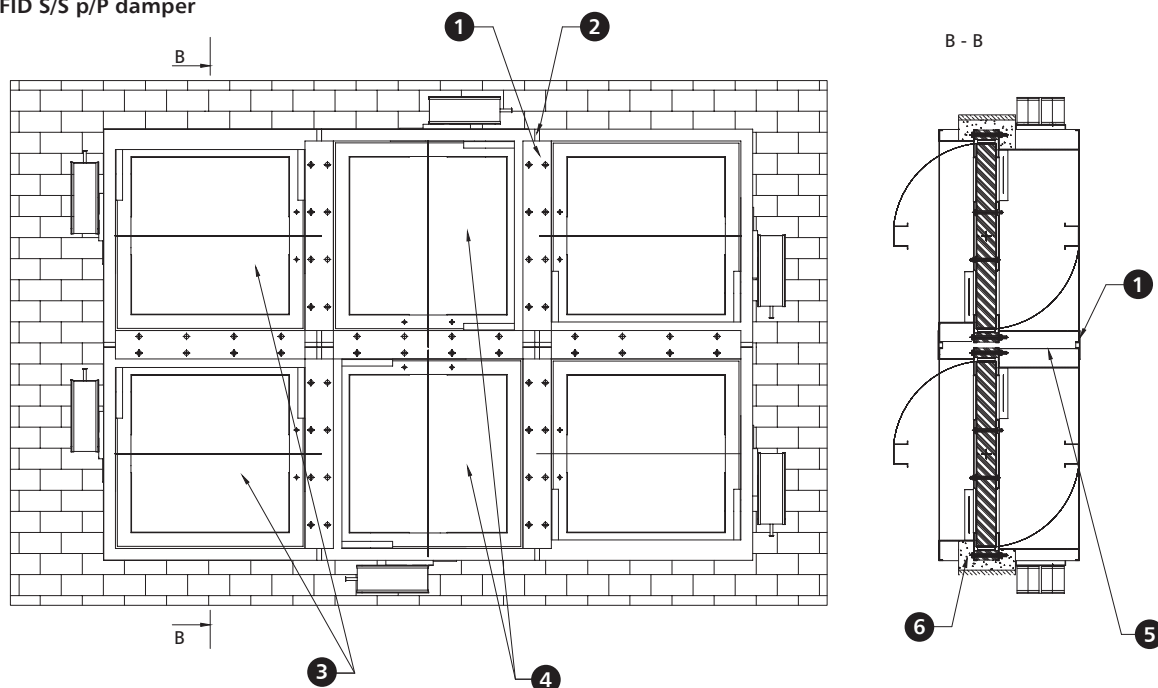


1. ventilation duct
2. rigid wall - concrete, cellular concrete or bricks
3. fire damper mcr FID S
4. gypsum filling
5. duct suspension
6. sealing (cement or cement-lime masonry mortar)*
7. mineral wool with the density of at least 80 kg/m³, A1 class
8. Ridurit fire retardant board
9. screws 3.5 x 50 at ~150 mm centres
10. steel expansion anchor Ø8 x 80 mm
11. board joints sealed with Conlit Glue

*it is possible to use a different sealing which ensures the required fire resistance

2.5.6. sample installation in sets

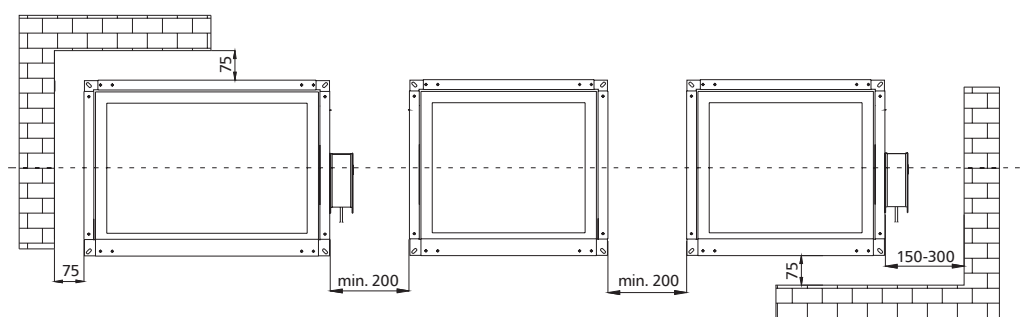
mcr FID S/S p/P damper



1. installation flat bar, width 60 mm
2. 10 mm gaps between damper flanges
3. dampers mcr FID S turned by 180°
4. dampers mcr FID S turned by 90° and 270°
5. fire resistant material, e.g. mineral wool with the density of at least 80 kg/m³, A1 class
6. sealing - concrete, cement or cement-lime masonry mortar*

*it is possible to use a different sealing which ensures the required fire resistance

Distance between systems and partitions



Installation of the damper with a vertical axis of rotation

Such installation must be clearly stated in the draft documentation and mentioned in the order. The dimensions of the damper BxH should be given as to the damper with a horizontal axis of rotation.

2.6.1. technical parameters of mcr FID S/S p/P rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]																	
		200						250						300					
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]		
width B [mm]	200	4	0.040	0.029	420	9	31	0.050	0.039	564	9	31	0.060	0.049	708	8	32		
		6			631	21	41			847	19	42			1 063	19	42		
		8			841	37	49			1 129	35	49			1 417	33	50		
		10			1 051	58	55			1 411	54	55			1 771	52	55		
	250	4	0.050	0.037	526	9	31	0.063	0.049	706	9	32	0.075	0.062	886	8	32		
		6			788	21	42			1 058	19	43			1 328	18	42		
		8			1 051	37	50			1 411	35	50			1 771	31	50		
		10			1 314	57	55			1 764	54	56			2 214	49	56		
	300	4	0.060	0.044	631	9	32	0.075	0.059	847	8	33	0.090	0.074	1 063	8	32		
		6			946	20	43			1 270	19	43			1 594	17	43		
		8			1 261	36	50			1 693	34	51			2 125	30	50		
		10			1 577	56	56			2 117	53	56			2 657	47	56		
	350	4	0.070	0.051	736	9	33	0.088	0.069	988	8	33	0.105	0.086	1 240	7	32		
		6			1 104	20	43			1 482	19	44			1 860	16	43		
		8			1 472	36	51			1 976	33	51			2 480	29	50		
		10			1 840	56	57			2 470	52	57			3 100	45	56		
	400	4	0.080	0.058	841	9	33	0.100	0.078	1 129	8	34	0.120	0.098	1 417	7	32		
		6			1 261	19	43			1 693	19	44			2 125	15	42		
		8			1 682	35	51			2 258	33	52			2 834	27	50		
		10			2 102	54	57			2 822	52	57			3 542	42	56		
	450	4	0.090	0.066	946	9	33	0.113	0.088	1 270	7	32	0.135	0.111	1 594	7	32		
		6			1 419	19	44			1 905	17	43			2 391	15	43		
		8			1 892	35	51			2 540	29	51			3 188	27	50		
		10			2 365	54	57			3 175	46	56			3 985	42	56		
	500	4	0.100	0.073	1 051	9	34	0.125	0.098	1 411	7	32	0.150	0.123	1 771	7	32		
		6			1 577	19	44			2 117	16	43			2 657	15	43		
		8			2 102	35	52			2 822	28	50			3 542	26	50		
		10			2 628	54	58			3 528	44	56			4 428	41	56		
	550	4	0.110	0.080	1 156	8	34	0.138	0.108	1 552	7	33	0.165	0.135	1 948	6	33		
		6			1 734	19	44			2 328	16	43			2 922	14	43		
		8			2 313	34	52			3 105	28	51			3 897	26	51		
		10			2 891	53	58			3 881	44	57			4 871	40	56		
	600	4	0.120	0.088	1 261	8	34	0.150	0.118	1 693	7	33	0.180	0.148	2 125	6	33		
		6			1 892	19	45			2 540	15	43			3 188	14	43		
		8			2 523	34	52			3 387	27	51			4 251	26	51		
		10			3 154	53	58			4 234	42	56			5 314	40	57		
	650	4	0.130	0.095	1 367	8	35	0.163	0.127	1 835	6	32	0.195	0.160	2 303	6	33		
		6			2 050	19	45			2 752	14	43			3 454	14	44		
		8			2 733	34	53			3 669	26	50			4 605	26	51		
		10			3 416	53	59			4 586	40	56			5 756	40	57		
	700	4	0.140	0.102	1 472	8	35	0.175	0.137	1 976	6	33	0.210	0.172	2 480	6	34		
		6			2 208	19	45			2 964	14	43			3 720	14	44		
		8			2 943	33	53			3 951	26	51			4 959	26	52		
		10			3 679	52	59			4 939	40	56			6 199	40	57		
	800	4	0.160	0.117	1 682	8	35	0.200	0.157	2 258	6	32	0.240	0.197	2 834	6	33		
		6			2 523	18	45			3 387	14	43			4 251	14	44		
		8			3 364	32	53			4 516	24	51			5 668	24	52		
		10			4 205	50	59			5 645	38	56			7 085	38	57		
	900	4	0.180	0.131	1 892	7	34	0.225	0.176	2 540	6	32	0.270	0.221	3 188	5	32		
		6			2 838	16	44			3 810	13	43			4 782	12	42		
		8			3 784	29	52			5 080	23	50			6 376	21	50		
		10			4 730	45	58			6 350	36	56			7 970	32	56		
	1000	4	0.200	0.146	2 102	7	34	0.250	0.196	2 822	6	32	0.300	0.246	3 542	5	32		
		6			3 154	16	45			4 234	13	43			5 314	12	43		
		8			4 205	29	52			5 645	22	50			7 085	21	50		
		10			5 256	45	58			7 056	35	56			8 856	32	56		
	1100	4	0.220	0.161	2 313	7	35	0.275	0.216	3 105	5	32	0.330	0.271	3 897	5	33		
6		3 469			16	45	4 657			12	43	5 845			12	43			
8		4 625			29	53	6 209			22	50	7 793			21	51			
10		5 782			45	59	7 762			34	56	9 742			32	56			
1200	4	0.240	0.175	2 523	8	37	0.300	0.235	3 387	5	33	0.360	0.295	4 251	9	40			
	6			3 784	18	47			5 080	12	43			6 376	20	51			
	8			5 046	29	53			6 774	22	51			8 502	36	58			
	10			6 307	45	59			8 467	34	57			10 627	42	60			
1300	4	0.260	0.190	2 733	8	37	0.325	0.255	3 669	5	33	0.390	0.320	4 605	5	33			
	6			4 100	18	47			5 504	12	43			6 908	12	44			
	8			5 466	29	54			7 338	21	51			9 210	21	51			
	10			6 833	45	59			9 173	33	57			11 513	32	57			
1400	4	0.280	0.204	2 943	7	36	0.350	0.274	3 951	5	33	0.420	0.344	4 959	5	34			
	6			4 415	16	46			5 927	12	44			7 439	12	44			
	8			5 887	29	54			7 903	21	51			9 919	21	52			
	10			7 358	45	60			9 878	32	57			12 398	32	58			
1500	4	0.300	0.219	3 154	7	35	0.375	0.294	4 234	5	33	0.450	0.369	5 314	5	34			
	6			4 730	15	46			6 350	12	44			7 970	12	45			
	8			6 307	27	53			8 467	21	51			10 627	21	52			
	10			7 884	42	59			10 584	32	57			13 284	32	58			

2.6.1. technical parameters of mcr FID S/S p/P rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		350						400					450				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.070	0.059	852	8	32	0.080	0.069	996	7	31	0.090	0.079	1 140	7	31
		6			1 279	18	42			1 495	17	42			1 711	15	41
		8			1 705	32	50			1 993	29	49			2 281	26	49
		10			2 131	50	56			2 491	46	55			2 851	41	54
	250	4	0.088	0.074	1 066	7	31	0.100	0.087	1 246	6	29	0.113	0.099	1 426	6	29
		6			1 598	16	42			1 868	13	40			2 138	13	40
		8			2 131	29	50			2 491	23	47			2 851	22	47
		10			2 664	45	55			3 114	36	53			3 564	35	53
	300	4	0.105	0.089	1 279	7	32	0.120	0.104	1 495	6	30	0.135	0.119	1 711	5	30
		6			1 918	16	43			2 242	13	41			2 566	12	40
		8			2 557	28	50			2 989	24	48			3 421	22	48
		10			3 197	44	56			3 737	37	54			4 277	34	54
	350	4	0.123	0.104	1 492	7	32	0.140	0.121	1 744	6	30	0.158	0.139	1 996	5	30
		6			2 238	15	42			2 616	13	41			2 994	12	41
		8			2 984	26	50			3 488	22	48			3 992	21	48
		10			3 730	41	56			4 360	35	54			4 990	33	54
	400	4	0.140	0.118	1 705	6	31	0.160	0.138	1 993	6	31	0.180	0.158	2 281	5	30
		6			2 557	13	41			2 989	13	41			3 421	12	41
		8			3 410	24	49			3 986	22	49			4 562	21	48
		10			4 262	37	55			4 982	35	55			5 702	32	54
	450	4	0.158	0.133	1 918	5	30	0.180	0.156	2 242	5	30	0.203	0.178	2 566	4	29
		6			2 877	12	41			3 363	12	41			3 849	10	40
		8			3 836	22	48			4 484	21	48			5 132	18	47
		10			4 795	34	54			5 605	32	54			6 415	28	53
	500	4	0.175	0.148	2 131	5	31	0.200	0.173	2 491	5	30	0.225	0.198	2 851	4	29
		6			3 197	12	41			3 737	11	40			4 277	9	39
		8			4 262	22	49			4 982	19	48			5 702	17	47
		10			5 328	34	55			6 228	30	54			7 128	26	52
	550	4	0.193	0.163	2 557	5	30	0.220	0.190	2 740	5	30	0.248	0.218	3 136	4	29
		6			3 836	12	41			4 110	11	41			4 704	9	40
		8			5 115	21	48			5 481	19	48			6 273	17	47
		10			6 394	32	54			6 851	30	54			7 841	26	53
	600	4	0.210	0.178	2 557	5	30	0.240	0.208	2 989	4	28	0.270	0.238	3 421	4	29
		6			3 836	10	40			4 484	8	37			5 132	9	40
		8			5 115	19	48			5 979	14	45			6 843	17	47
		10			6 394	29	53			7 474	27	53			8 554	26	53
	650	4	0.228	0.192	2 771	5	30	0.260	0.225	3 239	4	30	0.293	0.257	3 707	4	30
		6			4 156	10	40			4 858	10	40			5 560	9	40
		8			5 541	19	48			6 477	17	48			7 413	17	48
		10			6 926	29	54			8 096	27	53			9 266	26	54
	700	4	0.245	0.207	2 984	5	30	0.28	0.242	3 488	4	30	0.315	0.277	3 992	4	30
		6			4 476	10	41			5 232	10	40			5 988	9	40
		8			5 967	19	48			6 975	17	48			7 983	16	48
		10			7 459	29	54			8 719	27	54			9 979	25	53
	800	4	0.280	0.237	3 410	4	30	0.32	0.277	3 986	4	30	0.360	0.317	4 562	4	29
		6			5 115	10	41			5 979	9	41			6 843	9	40
		8			6 820	18	48			7 972	17	48			9 124	16	47
		10			8 525	28	54			9 965	26	54			11 405	25	53
900	4	0.315	0.266	3 836	4	31	0.360	0.311	4 484	6	35	0.405	0.356	5 132	4	29	
	6			5 754	10	41			6 726	12	44			7 698	9	40	
	8			7 672	18	49			8 968	26	54			10 264	16	47	
	10			9 590	28	55			11 210	33.4	58			12 830	25	53	
1000	4	0.350	0.296	4 262	4	30	0.400	0.346	4 982	4	31	0.450	0.396	5 702	4	29	
	6			6 394	9	41			7 474	9	42			8 554	9	40	
	8			8 525	17	48			9 965	17	49			11 405	16	47	
	10			10 656	26	54			12 456	26	55			14 256	25	53	
1100	4	0.385	0.326	4 689	4	32	0.440	0.381	5 481	4	31	0.495	0.436	6 273	4	29	
	6			7 033	10	42			8 221	9	42			9 409	9	39	
	8			9 377	18	50			10 961	17	49			12 545	15	47	
	10			11 722	28	56			13 702	26	55			15 682	24	53	
1200	4	0.420	0.355	5 115	4	31	0.480	0.415	5 979	4	31	0.540	0.475	6 843	4	29	
	6			7 672	9	41			8 968	9	42			10 264	9	39	
	8			10 230	16	49			11 958	16	49			13 686	15	47	
	10			12 787	25	54			14 947	25	55			17 107	24	53	
1300	4	0.455	0.385	5 541	4	32	0.520	0.450	6 477	4	32	0.585	0.515	7 413	4	28	
	6			8 312	10	43			9 716	9	42			11 120	8	39	
	8			11 082	17	50			12 954	16	50			14 826	15	46	
	10			13 853	27	56			16 193	25	55			18 533	23	52	
1400	4	0.490	0.414	5 967	4	32	0.560	0.484	6 975	4	32	0.630	0.554	7 983	4	28	
	6			8 951	10	43			10 463	9	43			11 975	8	39	
	8			11 935	17	50			13 951	16	50			15 967	15	46	
	10			14 918	27	56			17 438	25	56			19 958	23	52	
1500	4	0.525	0.444	6 394	4	32	0.600	0.519	7 474	4	32	0.675	0.594	8 554	4	28	
	6			9 590	9	43			11 210	9	43			12 830	8	38	
	8			12 787	17	50			14 947	16	50			17 107	14	46	
	10			15 984	26	56			18 684	25	56			21 384	22	51	

2.6.1. technical parameters of mcr FID S/S p/P rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		500					550					600					
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.100	0.089	1 284	6	29	0.110	0.099	1 428	5	29	0.120	0.109	1 572	5	29
		6			1 927	13	40			2 143	12	39			2 359	12	39
		8			2 569	22	47			2 857	21	47			3 145	21	47
		10			3 211	35	53			3 571	33	53			3 931	32	53
	250	4	0.125	0.112	1 606	6	30	0.138	0.124	1 786	5	30	0.150	0.137	1 966	5	30
		6			2 408	13	41			2 678	12	40			2 948	12	40
		8			3 211	22	48			3 571	21	48			3 931	21	48
		10			4 014	35	54			4 464	33	53			4 914	32	54
	300	4	0.150	0.134	1 927	5	30	0.165	0.149	2 143	5	30	0.180	0.164	2 359	5	30
		6			2 890	12	41			3 214	12	41			3 538	11	40
		8			3 853	21	48			4 285	21	48			4 717	19	48
		10			4 817	33	54			5 357	32	54			5 897	30	53
	350	4	0.175	0.156	2 248	5	30	0.193	0.174	2 500	5	31	0.210	0.191	2 752	5	30
		6			3 372	12	41			3 750	12	41			4 128	10	40
		8			4 496	21	48			5 000	21	49			5 504	19	48
		10			5 620	32	54			6 250	32	55			6 880	29	54
	400	4	0.200	0.178	2 569	5	30	0.220	0.198	2 857	5	30	0.240	0.218	3 145	4	30
		6			3 853	11	41			4 285	10	41			4 717	10	41
		8			5 138	19	48			5 714	19	48			6 290	18	48
		10			6 422	30	54			7 142	29	54			7 862	28	54
	450	4	0.225	0.201	2 890	4	29	0.248	0.223	3 214	4	29	0.270	0.246	3 538	4	30
		6			4 335	9	39			4 821	9	40			5 307	9	40
		8			5 780	17	47			6 428	17	47			7 076	17	48
		10			7 225	26	52			8 035	26	53			8 845	26	53
	500	4	0.250	0.223	3 211	4	27	0.275	0.248	3 571	4	29	0.300	0.273	3 931	4	29
		6			4 817	8	38			5 357	9	39			5 897	9	39
		8			6 422	14	45			7 142	15	47			7 862	15	47
		10			8 028	20	50			8 928	24	52			9 828	24	53
	550	4	0.275	0.245	3 853	3	27	0.303	0.273	4 285	4	28	0.330	0.300	4 717	4	28
		6			5 780	8	37			6 428	8	38			7 076	8	39
		8			7 707	13	45			8 571	14	46			9 435	14	46
		10			9 634	21	51			10 714	22	52			11 794	22	52
	600	4	0.300	0.268	3 853	3	27	0.330	0.298	4 285	3	28	0.360	0.328	4 717	3	28
		6			5 780	8	38			6 428	8	38			7 076	8	39
		8			7 707	13	45			8 571	13	46			9 435	13	46
		10			9 634	21	51			10 714	21	51			11 794	21	52
	650	4	0.325	0.290	4 175	4	31	0.358	0.322	4 643	3	28	0.390	0.355	5 111	3	28
		6			6 262	10	41			6 964	8	38			7 666	8	39
		8			8 349	17	49			9 285	13	46			10 221	13	46
		10			10 436	21	51			11 606	21	52			12 776	21	52
	700	4	0.350	0.312	4 496	3	28	0.385	0.347	5 000	3	28	0.420	0.382	5 504	3	29
		6			6 744	8	38			7 500	8	39			8 256	8	39
		8			8 991	13	46			9 999	13	46			11 007	13	47
		10			11 239	21	52			12 499	21	52			13 759	21	52
	800	4	0.400	0.357	5 138	3	28	0.440	0.397	5 714	3	29	0.480	0.437	6 290	3	29
		6			7 707	8	39			8 571	8	39			9 435	8	40
		8			10 276	13	46			11 428	13	47			12 580	13	47
		10			12 845	21	52			14 285	21	53			15 725	21	53
	900	4	0.450	0.401	5 780	3	28	0.495	0.446	6 428	3	29	0.540	0.491	7 076	3	30
		6			8 670	8	39			9 642	8	40			10 614	8	38
		8			11 560	13	46			12 856	13	47			14 152	13	45
		10			14 450	21	52			16 070	21	53			17 690	21	51
	1000	4	0.500	0.446	6 422	3	28	0.550	0.496	6 428	3	30	0.600	0.546	7 862	3	30
		6			9 634	8	39			9 642	8	40			11 794	8	41
		8			12 845	13	46			12 856	13	48			15 725	13	48
		10			16 056	21	52			16 070	21	54			19 656	21	54
	1100	4	0.550	0.491	7 065	4	29	0.605	0.546	7 857	4	31	0.660	0.601	8 649	3	31
		6			10 597	8	39			11 785	8	41			12 973	8	41
		8			14 129	14	47			15 713	14	49			17 297	13	49
		10			17 662	22	53			19 642	22	55			21 622	21	54
	1200	4	0.600	0.535	7 707	3	27	0.660	0.595	8 571	3	30	0.720	0.655	9 435	3	30
6		11 560			7	38	12 856			7	40	14 152			7	40	
8		15 414			13	45	17 142			13	48	18 870			12	48	
10		19 267			20	51	21 427			20	54	23 587			19	54	
1300	4	0.650	0.580	8 349	3	27	0.715	0.645	9 285	3	30	0.780	0.710	10 221	3	30	
	6			12 524	7	38			13 928	7	41			15 332	7	41	
	8			16 698	13	45			18 570	13	48			20 442	12	48	
	10			20 873	20	51			23 213	20	54			25 553	19	54	
1400	4	0.700	0.624	8 991	3	27	0.770	0.694	9 999	3	31	0.840	0.764	11 007	3	30	
	6			13 487	7	38			14 999	7	41			16 511	7	41	
	8			17 983	13	45			19 999	13	49			22 015	12	48	
	10			22 478	20	51			24 998	20	54			27 518	19	54	
1500	4	0.750	0.669	9 634	3	27	0.825	0.744	10 714	3	31	0.900	0.819	11 794	3	31	
	6			14 450	7	38			16 070	7	41			17 690	7	41	
	8			19 267	13	45			21 427	13	49			23 587	12	49	
	10			24 084	20	51			26 784	20	55			29 484	19	54	

2.6.1. technical parameters of mcr FID S/S p/P rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		650						700					750				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.130	0.119	1 716	5	29	0.140	0.129	1 860	5	29	0.150	0.139	2 004	5	29
		6			2 575	11	39			2 791	11	40			3 007	11	40
		8			3 433	20	47			3 721	20	47			4 009	20	47
		10			4 291	31	53			4 651	31	53			5 011	31	53
	250	4	0.163	0.149	2 146	5	30	0.175	0.162	2 326	5	30	0.188	0.174	2 506	5	30
		6			3 218	11	40			3 488	11	41			3 758	11	41
		8			4 291	20	48			4 651	20	48			5 011	20	48
		10			5 364	31	53			5 814	31	54			6 264	31	54
	300	4	0.195	0.179	2 575	5	30	0.210	0.194	2 791	4	29	0.225	0.209	3 007	4	30
		6			3 862	10	40			4 186	10	40			4 510	10	40
		8			5 149	19	48			5 581	18	47			6 013	18	48
		10			6 437	29	53			6 977	28	53			7 517	28	54
	350	4	0.228	0.209	3 004	4	30	0.245	0.226	3 256	4	30	0.263	0.244	3 508	4	30
		6			4 506	10	40			4 884	10	40			5 262	10	41
		8			6 008	18	48			6 512	17	48			7 016	17	48
		10			7 510	28	54			8 140	27	53			8 770	27	54
	400	4	0.260	0.238	3 433	4	30	0.280	0.258	3 721	4	30	0.300	0.278	4 009	4	31
		6			5 149	10	41			5 581	10	41			6 013	10	41
		8			6 866	18	48			7 442	17	48			8 018	17	49
		10			8 582	28	54			9 302	27	54			10 022	27	54
	450	4	0.293	0.268	3 862	4	30	0.315	0.291	4 186	4	29	0.338	0.313	4 510	4	30
		6			5 793	9	40			6 279	9	40			6 765	9	40
		8			7 724	17	48			8 372	15	47			9 020	15	48
		10			9 655	26	54			10 465	24	53			11 275	24	53
	500	4	0.325	0.298	4 291	4	29	0.350	0.323	4 651	4	29	0.375	0.348	5 011	4	29
		6			6 437	9	40			6 977	8	40			7 517	8	40
		8			8 582	15	47			9 302	15	47			10 022	15	47
		10			10 728	24	53			11 628	23	53			12 528	23	53
	550	4	0.358	0.328	5 149	4	29	0.385	0.355	5 116	4	29	0.413	0.383	5 512	4	29
		6			7 724	8	39			7 674	8	39			8 268	8	40
		8			10 299	14	47			10 233	14	47			11 025	14	47
		10			12 874	22	52			12 791	22	53			13 781	22	53
	600	4	0.390	0.358	5 149	3	28	0.420	0.388	5 581	3	29	0.450	0.418	6 013	3	29
		6			7 724	8	39			8 372	8	39			9 020	8	40
		8			10 299	13	46			11 163	13	47			12 027	13	47
		10			12 874	21	52			13 954	21	53			15 034	21	53
	650	4	0.423	0.387	5 579	3	28	0.455	0.420	6 047	3	28	0.488	0.452	6 515	3	28
		6			8 368	7	39			9 070	7	39			9 772	7	39
		8			11 157	13	46			12 093	13	46			13 029	12	46
		10			13 946	20	52			15 116	20	52			16 286	19	52
	700	4	0.455	0.417	6 008	3	28	0.490	0.452	6 512	3	29	0.525	0.487	7 016	3	28
		6			9 012	7	39			9 768	7	39			10 524	7	39
		8			12 015	13	46			13 023	13	47			14 031	12	46
		10			15 019	20	52			16 279	20	53			17 539	19	52
	800	4	0.520	0.477	6 866	3	27	0.560	0.517	7 442	4	29	0.600	0.557	8 018	3	28
		6			10 299	6	38			11 163	7	37			12 027	6	39
		8			13 732	12	45			14 884	11	43			16 036	12	46
		10			17 165	18	51			18 605	16	47			20 045	18	52
	900	4	0.585	0.536	7 724	3	26	0.630	0.581	8 372	3	27	0.675	0.626	9 020	3	27
		6			11 586	6	36			12 558	6	37			13 530	6	38
8		15 448			10	44	16 744			10	45	18 040			10	45	
10		19 310			16	50	20 930			16	51	22 550			16	51	
1000	4	0.650	0.596	8 582	3	26	0.700	0.646	9 302	3	27	0.750	0.696	10 022	3	28	
	6			12 874	6	36			13 954	6	38			15 034	6	38	
	8			17 165	10	44			18 605	10	45			20 045	10	46	
	10			21 456	16	50			23 256	16	51			25 056	16	52	
1100	4	0.715	0.656	9 441	3	29	0.770	0.711	10 233	3	31	0.825	0.766	11 025	3	28	
	6			14 161	8	40			15 349	8	42			16 537	8	39	
	8			18 881	13	47			20 465	13	49			22 049	10	46	
	10			23 602	21	53			25 582	21	55			27 562	16	52	
1200	4	0.780	0.715	10 299	3	28	0.840	0.775	11 163	3	30	0.900	0.835	12 027	2	28	
	6			15 448	7	39			16 744	7	41			18 040	5	38	
	8			20 598	12	46			22 326	12	48			24 054	10	46	
	10			25 747	19	52			27 907	19	54			30 067	15	52	
1300	4	0.845	0.775	11 157	3	28	0.910	0.840	12 093	3	31	0.975	0.905	13 029	2	28	
	6			16 736	7	39			18 140	7	41			19 544	5	39	
	8			22 314	12	46			24 186	12	49			26 058	10	46	
	10			27 893	19	52			30 233	19	55			32 573	15	52	
1400	4	0.910	0.834	12 015	3	28	0.980	0.904	13 023	3	31	1.050	0.974	14 031	2	28	
	6			18 023	7	39			19 535	7	42			21 047	5	39	
	8			24 031	12	46			26 047	12	49			28 063	10	46	
	10			30 038	19	52			32 558	19	55			35 078	15	52	
1500	4	0.975	0.894	12 874	3	28	1.050	0.969	13 954	3	31	1.125	1.044	15 034	3	30	
	6			19 310	7	39			20 930	7	42			22 550	6	41	
	8			25 747	12	46			27 907	12	49			30 067	11	48	
	10			32 184	19	52			34 884	19	55			37 584	17	54	

2.6.1. technical parameters of mcr FID S/S p/P rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		800					850					900					
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.160	0.149	2 148	5	29	0.170	0.159	2 292	5	29	0.180	0.169	2 436	5	30
		6			3 223	11	40			3 439	11	40			3 655	11	40
		8			4 297	19	47			4 585	19	48			4 873	19	48
		10			5 371	30	53			5 731	30	53			6 091	30	54
	250	4	0.200	0.187	2 686	5	30	0.213	0.199	2 866	5	30	0.225	0.212	3 046	5	31
		6			4 028	11	41			4 298	11	41			4 568	11	41
		8			5 371	19	48			5 731	19	49			6 091	19	49
		10			6 714	30	54			7 164	30	54			7 614	30	55
	300	4	0.240	0.224	3 223	4	30	0.255	0.239	3 439	4	30	0.270	0.254	3 655	4	30
		6			4 834	10	41			5 158	10	41			5 482	10	41
		8			6 445	18	48			6 877	18	48			7 309	17	48
		10			8 057	28	54			8 597	28	54			9 137	27	54
	350	4	0.280	0.261	3 760	4	30	0.298	0.279	4 012	4	31	0.315	0.296	4 264	4	30
		6			5 640	10	41			6 018	10	41			6 396	9	41
		8			7 520	17	48			8 024	17	49			8 528	17	48
		10			9 400	27	54			10 030	27	54			10 660	26	54
	400	4	0.320	0.298	4 297	4	31	0.340	0.318	4 585	4	31	0.360	0.338	4 873	4	30
		6			6 445	10	41			6 877	10	42			7 309	9	41
		8			8 594	17	49			9 170	17	49			9 746	16	48
		10			10 742	27	55			11 462	27	55			12 182	25	54
	450	4	0.360	0.336	4 834	4	29	0.383	0.358	5 158	4	29	0.405	0.381	5 482	3	29
		6			7 251	8	39			7 737	8	40			8 223	8	39
		8			9 668	14	47			10 316	14	47			10 964	13	47
		10			12 085	22	53			12 895	22	53			13 705	21	52
	500	4	0.400	0.373	5 371	4	29	0.425	0.398	5 731	4	29	0.450	0.423	6 091	3	29
		6			8 057	8	40			8 597	8	40			9 137	8	40
		8			10 742	14	47			11 462	14	47			12 182	13	47
		10			13 428	22	53			14 328	22	53			15 228	21	53
	550	4	0.440	0.410	5 908	3	29	0.468	0.438	6 304	3	29	0.495	0.465	6 700	3	29
		6			8 862	8	40			9 456	8	40			10 050	7	39
		8			11 817	13	47			12 609	13	47			13 401	13	47
		10			14 771	21	53			15 761	21	53			16 751	20	53
	600	4	0.480	0.448	6 445	3	29	0.510	0.478	6 877	3	29	0.540	0.508	7 309	3	29
		6			9 668	7	39			10 316	7	40			10 964	7	39
		8			12 891	13	47			13 755	13	47			14 619	12	47
		10			16 114	20	53			17 194	20	53			18 274	19	52
	650	4	0.520	0.485	6 983	3	28	0.553	0.517	7 451	3	29	0.585	0.550	7 919	3	29
		6			10 474	7	39			11 176	7	39			11 878	7	39
		8			13 965	12	46			14 901	12	47			15 837	12	47
		10			17 456	19	52			18 626	19	53			19 796	19	53
	700	4	0.560	0.522	7 520	3	28	0.595	0.557	8 024	3	28	0.630	0.592	8 528	3	27
		6			11 280	6	39			12 036	6	39			12 792	6	38
		8			15 039	12	46			16 047	12	46			17 055	10	45
		10			18 799	18	52			20 059	18	52			21 319	16	51
	800	4	0.640	0.597	8 594	3	27	0.680	0.637	9 170	3	27	0.720	0.677	9 746	3	28
		6			12 891	6	38			13 755	6	38			14 619	6	38
		8			17 188	10	45			18 340	10	45			19 492	10	46
		10			21 485	16	51			22 925	16	51			24 365	16	51
	900	4	0.720	0.671	9 668	3	28	0.765	0.716	10 316	3	28	0.810	0.761	10 964	3	28
		6			14 502	6	38			15 474	6	38			16 446	6	39
		8			19 336	10	46			20 632	10	46			21 928	10	46
		10			24 170	16	51			25 790	16	52			27 410	16	52
	1000	4	0.800	0.746	10 742	3	28	0.850	0.796	11 462	3	28	0.900	0.846	12 182	3	29
		6			16 114	6	39			17 194	6	39			18 274	6	39
		8			21 485	10	46			22 925	10	46			24 365	10	47
		10			26 856	16	52			28 656	16	52			30 456	16	52
	1100	4	0.880	0.821	11 817	3	28	0.935	0.876	12 609	3	29	0.990	0.931	13 401	3	29
		6			17 725	6	39			18 913	6	39			20 101	6	40
		8			23 633	10	46			25 217	10	47			26 801	10	47
		10			29 542	16	52			31 522	16	53			33 502	16	53
	1200	4	0.960	0.895	12 891	2	28	1.020	0.955	13 755	2	28	1.080	1.015	14 619	2	28
		6			19 336	5	39			20 632	5	39			21 928	5	38
8		25 782			10	46	27 510			10	46	29 238			9	46	
10		32 227			15	52	34 387			15	52	36 547			14	51	
1300	4	1.040	0.970	13 965	2	28	1.105	1.035	14 901	2	29	1.170	1.100	15 837	2	29	
	6			20 948	5	39			22 352	5	39			23 756	5	39	
	8			27 930	10	46			29 802	10	47			31 674	10	47	
	10			34 913	15	52			37 253	15	52			39 593	15	53	
1400	4	1.120	1.044	15 039	2	29	1.190	1.114	16 047	3	30	1.260	1.184	17 055	2	28	
	6			22 559	5	39			24 071	6	40			25 583	5	39	
	8			30 079	10	47			32 095	10	48			34 111	9	46	
	10			37 598	15	52			40 118	16	54			42 638	14	52	
1500	4	1.200	1.119	16 114	3	31	1.275	1.194	17 194	3	30	1.350	1.269	18 274	2	29	
	6			24 170	6	41			25 790	6	41			27 410	5	40	
	8			32 227	11	49			34 387	10	48			36 547	10	48	
	10			40 284	17	54			42 984	16	54			45 684	15	53	

2.6.1. technical parameters of mcr FID S/S p/P rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		1000						1100					1200				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.200	0.189	2 724	5	30	0.220	0.209	3 012	5	30	0.240	0.229	3 300	4	30
		6			4 087	10	40			4 519	10	41			4 951	10	41
		8			5 449	19	48			6 025	19	48			6 601	18	48
		10			6 811	29	54			7 531	29	54			8 251	28	54
	250	4	0.250	0.237	3 406	5	31	0.275	0.262	3 766	4	31	0.300	0.287	4 126	4	31
		6			5 108	10	41			5 648	10	41			6 188	10	41
		8			6 811	19	49			7 531	18	49			8 251	17	49
		10			8 514	29	55			9 414	28	55			10 314	27	55
	300	4	0.300	0.284	4 087	4	31	0.330	0.314	4 519	4	31	0.360	0.344	4 951	4	31
		6			6 130	10	41			6 778	10	42			7 426	9	42
		8			8 173	17	49			9 037	17	49			9 901	17	49
		10			10 217	27	54			11 297	27	55			12 377	26	55
	350	4	0.350	0.331	4 768	4	31	0.385	0.366	5 272	4	31	0.420	0.401	5 776	4	31
		6			7 152	9	41			7 908	9	42			8 664	9	41
		8			9 536	17	49			10 544	17	49			11 552	15	49
		10			11 920	26	55			13 180	26	55			14 440	24	54
	400	4	0.400	0.378	5 449	3	28	0.440	0.418	6 025	3	28	0.480	0.458	6 601	3	29
		6			8 173	7	39			9 037	7	39			9 901	7	39
		8			10 898	13	46			12 050	13	46			13 202	13	47
		10			13 622	20	52			15 062	20	52			16 502	20	53
	450	4	0.450	0.426	6 130	3	28	0.495	0.471	6 778	3	29	0.540	0.516	7 426	3	29
		6			9 195	7	39			10 167	7	39			11 139	7	40
		8			12 260	13	47			13 556	13	47			14 852	13	47
		10			15 325	20	52			16 945	20	53			18 565	20	53
	500	4	0.500	0.473	6 811	3	29	0.550	0.523	7 531	3	29	0.600	0.573	8 251	3	30
		6			10 217	7	39			11 297	7	40			12 377	7	40
		8			13 622	13	47			15 062	13	47			16 502	13	48
		10			17 028	20	53			18 828	20	53			20 628	20	54
	550	4	0.550	0.520	7 492	3	29	0.605	0.575	8 284	3	30	0.660	0.630	9 076	3	30
		6			11 238	7	40			12 426	7	40			13 614	7	41
		8			14 985	13	47			16 569	13	48			18 153	13	48
		10			18 731	20	53			20 711	20	54			22 691	20	54
	600	4	0.600	0.568	8 173	3	29	0.660	0.628	9 037	3	29	0.720	0.688	9 901	3	29
		6			12 260	7	40			13 556	6	39			14 852	6	40
		8			16 347	12	47			18 075	12	47			19 803	12	47
		10			20 434	19	53			22 594	18	53			24 754	18	53
	650	4	0.650	0.615	8 855	3	29	0.715	0.680	9 791	3	29	0.780	0.745	10 727	3	30
		6			13 282	7	40			14 686	6	40			16 090	6	40
		8			17 709	12	47			19 581	12	47			21 453	12	48
		10			22 136	19	53			24 476	18	53			26 816	18	53
	700	4	0.700	0.662	9 536	3	27	0.770	0.732	10 544	2	27	0.840	0.802	11 552	2	27
		6			14 304	6	38			15 816	5	38			17 328	5	38
		8			19 071	10	46			21 087	10	45			23 103	10	46
		10			23 839	16	51			26 359	15	51			28 879	15	51
	800	4	0.800	0.757	10 898	3	28	0.880	0.837	12 050	2	28	0.960	0.917	13 202	2	28
		6			16 347	6	39			18 075	5	38			19 803	5	39
		8			21 796	10	46			24 100	10	46			26 404	10	46
		10			27 245	16	52			30 125	15	52			33 005	15	52
	900	4	0.900	0.851	12 260	3	29	0.990	0.941	13 556	3	29	1.080	1.031	14 852	2	29
		6			18 390	6	39			20 334	6	40			22 278	5	39
		8			24 520	10	47			27 112	10	47			29 704	10	47
		10			30 650	16	52			33 890	16	53			37 130	15	52
	1000	4	1.000	0.946	13 622	3	29	1.100	1.046	15 062	2	29	1.200	1.146	16 502	2	28
		6			20 434	6	40			22 594	5	39			24 754	5	39
		8			27 245	10	47			30 125	10	47			33 005	9	46
		10			34 056	16	53			37 656	15	52			41 256	14	52
	1100	4	1.100	1.041	14 985	3	29	1.210	1.151	16 569	2	29	1.320	1.261	18 153	2	29
		6			22 477	6	40			24 853	5	40			27 229	5	39
		8			29 969	10	48			33 137	10	47			36 305	9	47
		10			37 462	16	53			41 422	15	53			45 382	14	52
	1200	4	1.200	1.135	16 347	2	28	1.320	1.255	18 075	10	47	1.440	1.375	19 803	2	28
		6			24 520	5	39			27 112	22	58			29 704	5	39
		8			32 694	9	46			36 150	38	66			39 606	8	46
10		40 867			14	52	45 187			14	52	49 507			13	52	
1300	4	1.300	1.230	17 709	2	28	1.430	1.360	19 581	2	28	1.560	1.490	21 453	2	28	
	6			26 564	5	39			29 372	5	38			32 180	5	39	
	8			35 418	9	46			39 162	8	46			42 906	8	46	
	10			44 273	14	52			48 953	13	52			53 633	13	52	
1400	4	1.400	1.324	19 071	2	29	1.540	1.464	21 087	2	28	1.680	1.604	23 103	2	28	
	6			28 607	5	39			31 631	5	39			34 655	4	38	
	8			38 143	9	47			42 175	8	46			46 207	8	46	
	10			47 678	14	53			52 718	13	52			57 758	12	51	
1500	4	1.500	1.419	20 434	2	28	1.650	1.569	22 594	2	29	1.800	1.719	24 754	2	28	
	6			30 650	5	39			33 890	5	39			37 130	4	38	
	8			40 867	8	46			45 187	8	47			49 507	8	46	
	10			51 084	13	52			56 484	13	52			61 884	12	52	

2.6.1. technical parameters of mcr FID S/S p/P rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		1300					1400					1500					
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.260	0.249	3 588	4	30	0.280	0.269	3 876	4	29	0.300	0.289	4 164	4	29
		6			5 383	9	40			5 815	9	40			6 247	9	40
		8			7 177	17	48			7 753	16	47			8 329	15	47
	250	4	0.325	0.312	4 486	4	31	0.350	0.337	4 846	4	30	0.375	0.362	4 164	4	30
		6			6 728	9	41			7 268	9	40			6 247	8	40
		8			8 971	17	49			9 691	15	48			8 329	15	48
	300	4	0.390	0.374	5 383	4	31	0.420	0.404	5 815	4	31	0.450	0.434	6 247	4	30
		6			8 074	9	41			8 722	9	41			9 370	8	40
		8			10 765	16	49			11 629	15	49			12 493	14	48
	350	4	0.455	0.436	6 280	4	30	0.490	0.471	6 784	3	30	0.525	0.506	7 288	3	30
		6			9 420	8	41			10 176	8	40			10 932	8	40
		8			12 560	15	48			13 568	13	48			14 576	13	48
	400	4	0.520	0.498	7 177	3	29	0.560	0.538	7 753	3	29	0.600	0.578	8 329	3	30
		6			10 765	7	40			11 629	7	40			12 493	7	40
		8			14 354	13	47			15 506	13	48			16 658	13	48
	450	4	0.585	0.561	8 074	3	29	0.630	0.606	8 722	3	29	0.675	0.651	9 370	3	30
		6			12 111	7	40			13 083	7	40			14 055	7	40
		8			16 148	12	47			17 444	12	47			18 740	12	48
	500	4	0.650	0.623	8 971	3	29	0.700	0.673	9 691	3	30	0.750	0.723	10 411	3	30
		6			13 457	7	40			14 537	7	40			15 617	7	41
		8			17 942	12	48			19 382	12	48			20 822	12	48
	550	4	0.715	0.685	9 868	3	30	0.770	0.740	10 660	3	30	0.825	0.795	11 452	3	31
		6			14 802	7	40			15 990	7	41			17 178	7	41
		8			19 737	12	48			21 321	12	48			22 905	12	49
	600	4	0.780	0.748	10 765	3	29	0.840	0.808	11 629	3	29	0.900	0.868	12 493	3	29
		6			16 148	6	39			17 444	6	40			18 740	6	40
		8			21 531	11	47			23 259	11	47			24 987	11	48
	650	4	0.845	0.810	11 663	3	29	0.910	0.875	12 599	3	29	0.975	0.940	13 535	3	30
6		17 494			6	40	18 898			6	40	20 302			6	40	
8		23 325			11	47	25 197			11	48	27 069			11	48	
700	4	0.910	0.872	12 560	2	28	0.980	0.942	13 568	2	28	1.050	1.012	14 576	2	28	
	6			18 840	5	38			20 352	5	39			21 864	5	39	
	8			25 119	10	46			27 135	10	46			29 151	10	47	
800	4	1.040	0.997	14 354	2	28	1.120	1.077	15 506	2	29	1.200	1.157	16 658	2	29	
	6			21 531	5	39			23 259	5	39			24 987	5	40	
	8			28 708	10	46			31 012	10	47			33 316	10	47	
900	4	1.170	1.121	16 148	2	29	1.260	1.211	17 444	2	29	1.350	1.301	18 740	2	30	
	6			24 222	5	39			26 166	5	40			28 110	5	40	
	8			32 296	10	47			34 888	10	47			37 480	10	48	
1000	4	1.300	1.246	17 942	2	28	1.400	1.346	19 382	2	28	1.500	1.446	20 822	2	28	
	6			26 914	5	39			29 074	5	38			31 234	5	39	
	8			35 885	9	47			38 765	8	46			41 645	8	46	
1100	4	1.430	1.371	19 737	2	29	1.540	1.481	21 321	2	27	1.650	1.591	22 905	2	26	
	6			29 605	5	39			31 981	4	38			34 357	4	37	
	8			39 473	9	47			42 641	8	45			45 809	7	44	
1200	4	1.560	1.495	21 531	2	28	1.680	1.615	23 259	2	28	1.800	1.735	24 987	2	26	
	6			32 296	5	39			34 888	4	38			37 480	4	36	
	8			43 062	8	46			46 518	8	46			49 974	6	44	
1300	4	1.690	1.620	23 325	2	28	1.820	1.750	25 197	2	27						
	6			34 988	4	38			37 796	4	37						
	8			46 650	8	46			50 394	7	45						
1400	4	1.820	1.744	25 119	2	28											
	6			37 679	4	39											
	8			50 239	8	46											

2.6.2. technical parameters of mcr FID S/S p/O circular dampers

D – nominal diameter [mm]

v – velocity [m/s]

Q – flow [m³/h]

Sk – duct cross-section [m²]

dp – pressure drop [Pa]

Se – damper active cross-section [m²]

L_{WA} – damper noise level [dB]

D [mm]	v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	D [mm]	v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
250	2	0.0491	0.0392	281	1	15	450	2	0.1590	0.1410	1 015	1	16
	4			560	4	24		4			2 030	4	25
	6			890	8	28		6			3 045	10	35
	8			1 130	11	33		8			4 060	18	41
315	2	0.0779	0.0653	478	1	18	500	2	0.1963	0.1763	1 269	1	18
	4			949	4	24		4			2 538	4	24
	6			1 400	8	30		6			3 807	8	33
	8			1 880	16	35		8			5 076	15	40
355	2	0.0989	0.0847	610	1	17	560	2	0.2462	0.2238	1 611	1	16
	4			1 220	5	24		4			3 222	3	24
	6			1 830	11	34		6			4 834	7	33
	8			2 440	20	40		8			6 445	13	39
400	2	0.1256	0.1096	789	1	17	630	2	0.3116	0.2864	2 062	1	20
	4			1 578	5	25		4			4 124	2	22
	6			2 367	11	34		6			6 186	5	33
	8			3 156	10	41		8			8 247	9	40

The mcr FID S fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

2.7.1. estimated weights of mcr FID S/S p/P dampers for rectangular ventilation ducts [kg]

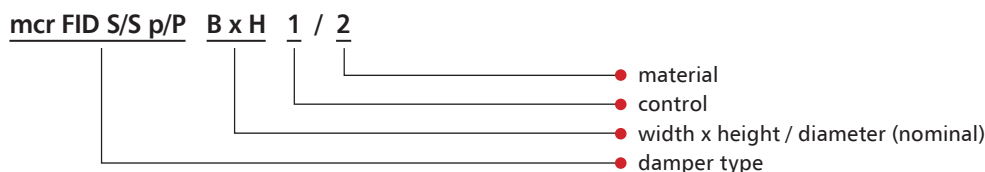
		width B [mm]														
		200	250	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
height H [mm]	200	9.5	9.7	10	10	15	17	17.5	19	22	25	28	30	33	39	45
	250	9.5	10	11	11	16	17.5	18	21	24	27	29	32	34	45	48
	300	10	11	11	12	17	20	21	23	26	28	31	34	38	50	51
	350	11	11	11	16	18	20.5	23	26	28	29	33	35	36	52	53
	400	10	11	12	18	19	21	25	29	30	33	35	36	39	54	55
	500	15	16	17	19	20	23	27	32	33	35	38	40	44	55	56
	600	17	17.5	20	21	30	26	30	35	37	39	43	48	52	56	58
	700	17.5	18	21	23	30	35	35	40	42	44	47	52	54	57	65
	800	20	21	22	24	29	35	37	41	43	49	52	57	60	62	78
	900	22	25	25	28	33	35	39	43	47	53	56	60	62	64	82
	1000	23	29	28	33	36	42	43	49	53	56	59	65	67	69	98
	1100	26	30	31	35	38	42	47	56	59	62	63	69	71	73	101
	1200	32	33	35	36	40	49	53	56	61	71	72	73	85	86	105
	1300	39	40	38	39	44	52	57	59	78	79	80	81	92		
	1400	–	–	48	39	48	56	63	65	80	82	85	87			
	1500	–	–	50	50	52	58	68	71	82	98	115	120			

For dampers with no actuator, subtract ~1 kg.

2.7.2. estimated weights of mcr FID S/S p/O dampers for circular ventilation ducts [kg]

diameter D [mm]	RST, RST-KW1	actuator
125	4	5
160	5	6
200	6	7
250	7	8
315	9	10
355	12	13
400	14	15
500	16	17
630	20	21

2.8. marking



1 – control:

- RST trigger control mechanism
 - RST** – thermal trigger
 - RST/WK1** – thermal trigger + limit switch (closed blade signal)
 - RST/WK2** – thermal trigger + limit switch (open/closed blade signal)
- RST-KW1 trigger control mechanism
 - RST-KW1/S** – thermal trigger
 - RST-KW1/S/WK2** – thermal trigger + limit switch (open/closed blade signal)
 - RST-KW1/24I** – thermal trigger + „pulse“ electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
 - RST-KW1/24P** – thermal trigger + „break“ electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
 - RST-KW1/230I** – thermal trigger + „pulse“ electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
 - RST-KW1/230P** – thermal trigger + „break“ electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
- Belimo trigger control mechanism
 - BF24-T** – actuator with a return spring, U = 24 V AC/DC
 - BF230-T** – actuator with a return spring, U = 230 V AC
 - BF24TL-T-ST** (with the BKN230-24MP option) – actuator with a return spring, U = 24 V, MP Bus digital control
 - EXBF24-T** – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
 - EXBF230-T** – explosion proof actuator with a return spring in the Ex version, U = 230 V AC
 - BF24-T-ST** (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
 - BFL24-T** – actuator with a return spring, U = 24 V AC/DC
 - BFL230-T** – actuator with a return spring, U = 230 V AC
 - BFL24-T-ST** (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
 - BFN24-T** – actuator with a return spring, U = 24 V AC/DC
 - BFN230-T** – actuator with a return spring, U = 230 V AC
 - BFN24-T-ST** (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system

2 – material

- [no symbol]** – galvanised steel, Zn 275 g/m² coating
- KN** – 1.4404 acid-proof stainless steel

example marking:

mcr FID S/S p/P 400 x 400 BFL24-T

EIS120 cut-off fire damper with a 24 V compact Belimo actuator with limit switches.

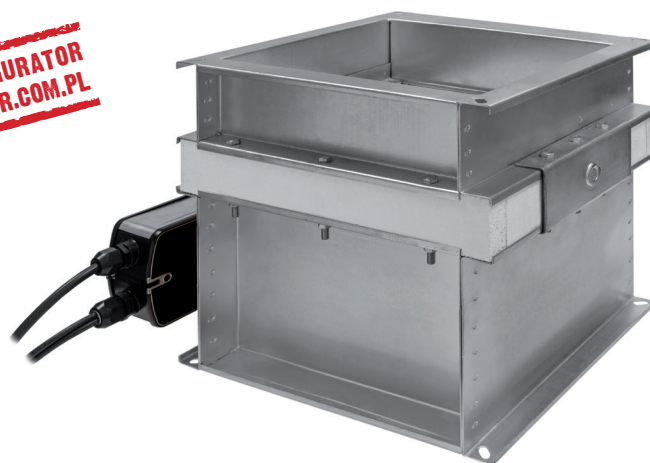
mcr FID S/S p/O Ø400 RST / WK2

EIS120 cut-off fire damper with a trigger rated at 72°C and a partition opening and closing limit switch.

Chapter 12 - power supply and control (p. 141) contains:

- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper,
- location of trigger control mechanisms in relation to the damper - manufacture standards.

**PRODUCT CONFIGURATOR
AT WWW.MERCOR.COM.PL**



ATEST HIGIENICZNY



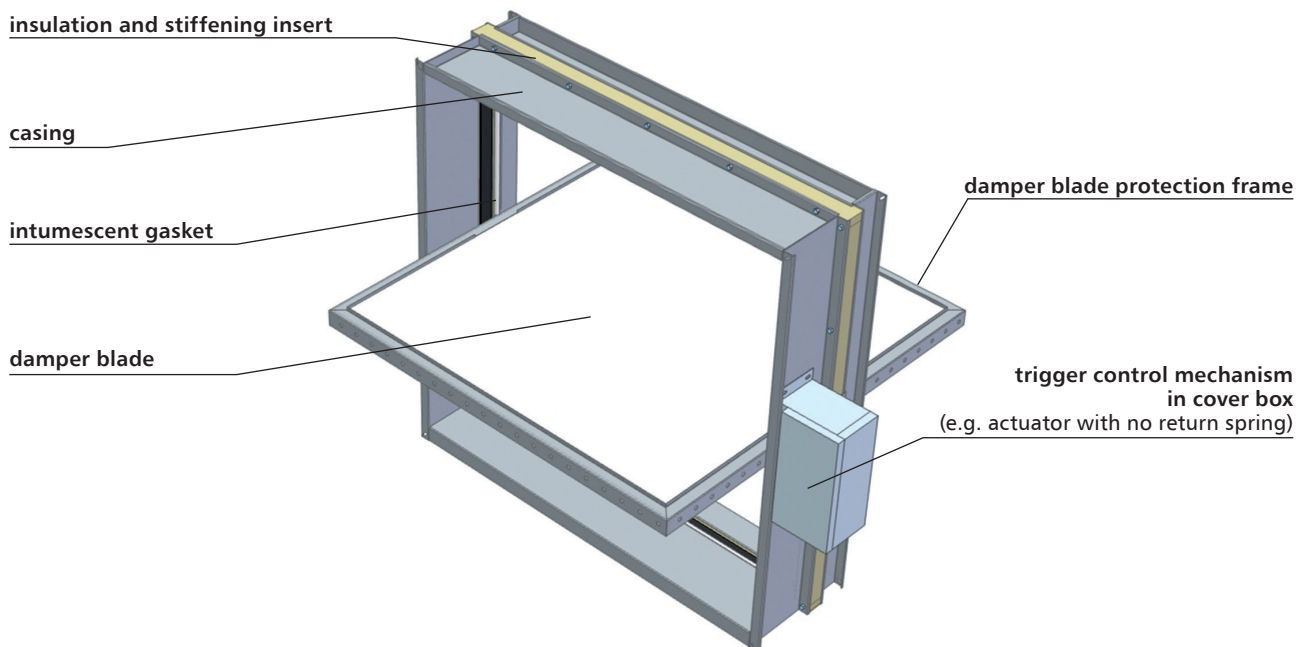
CERTYFIKACJA PRODUKTU

- ▶ **EIS120**
- ▶ Certificate of constancy of performance 1488-CPR-0448/W.
- ▶ Dampers certified for compliance with EN 12101-8.
- ▶ Dampers qualified under EN 13501-4 and tested under EN 1366-10.
- ▶ Smoke exhaust dampers with the fire resistance independent of airflow direction and installation side.

3.1. application

The mcr FID S/V p/P, mcr FID S/V-M p/P smoke exhaust dampers are intended for installation in automatically operated fire ventilation systems. Dampers mcr FID S/V p/P are used in fire ventilation systems, while dampers marked mcr FID S/V-M p/P are used in mixed systems - fire and comfort ventilation systems. They support both single and multiple fire zones in a building. They prevent the spreading of fire, smoke and burning fumes into the adjacent zones. During normal system operation, the blade of the damper is open or closed depending on damper function. The damper blade opens in the zone on fire and dampers close in other zones.

3.2. design



The mcr FID S/V p/P, mcr FID S/V-M p/P smoke exhaust dampers consist of a casing with a rectangular cross-section, made of two segments separated with a fire-proof panel with the cross-section of 20 x 40 mm, a moving damper blade and a remotely activated actuator. Standard damper casing is made of galvanised steel sheet. For chemically aggressive environments, special manufacture casing is used, in which steel elements are made of 1.4404 acid-proof steel sheet, while other elements are impregnated. The casing total length is at least 296 mm. Dampers may be made with an extension element, in which case the casing length is 400 mm.

The damper blade is made of a fire-proof panel with the total thickness of 40 mm, which is covered with a reinforcement steel profile. The inner side of the fire damper casing features an intumescent gasket. There are stop profiles fastened to the inner casing surface, which limit the rotating motion of the damper blade. The stop shaped are lined with a polyethylene ventilation-grade seal.

3.3. versions

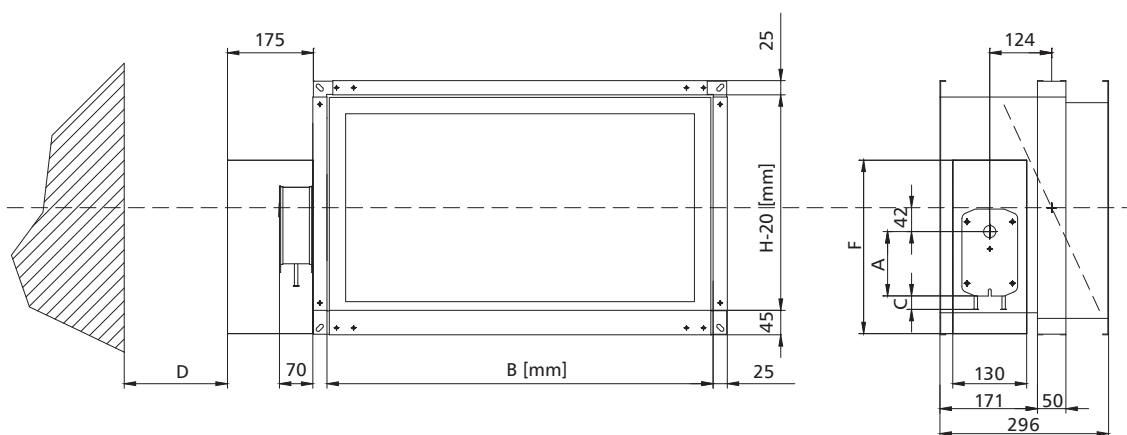
3.3.1. mcr FID S/V p/P, mcr FID S/V-M p/P – smoke exhaust fire damper for multi-zone fire ventilation systems with an actuator – damper closing and opening with an actuator

During normal operation, the damper blade of the fire damper remains open or closed. In case of fire, the blade of the damper in the zone on fire opens, while in other zones the damper blades are closed - the dampers are remotely activated by applying the power supply.

The mcr FID S/V p/P, mcr FID S/V-M p/P dampers are equipped with a Belimo trigger control mechanisms **BE** or **BLE** series axial actuator, powered with 24 V AC/DC or 230 V AC. BLE-series actuators are used in mcr FID S/V-M p/P dampers with the surface of not more than 0.75 m² and in mcr FID S/V-M p/P with the surface of not more than 1.25 m².

BE and BLE series actuators are equipped with limit switches used to monitor the blade position. Furthermore, the mechanical position indicator is placed on the actuator.

Dampers with Belimo BE or BLE series actuators close and open when the voltage is applied to the actuator terminals.



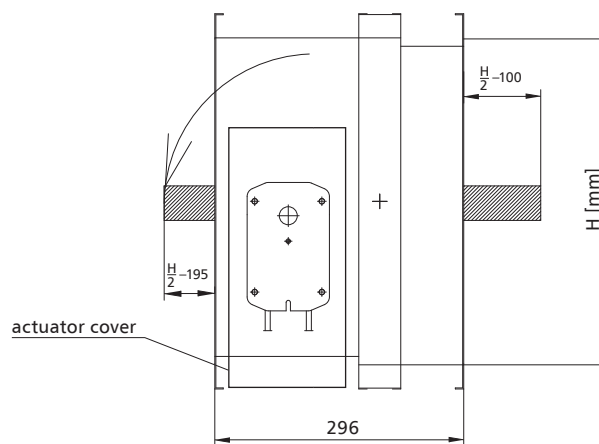
mechanism	A	C	D	E	F
BE	198	10	75	81	345
BLE	130	30	75	70	305

3.4. dimensions

Rectangular dampers:

- nominal width B: from 200 mm to 1500 mm
- nominal height H: from 200 mm to 1500 mm
- the maximum cross-section surface of one damper up to:
 - 1.5 m² for mcr FID S/V p/P dampers,
 - 1.25 m² for mcr FID S/V-M p/P dampers.

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (in 1 mm increments, in the given range).

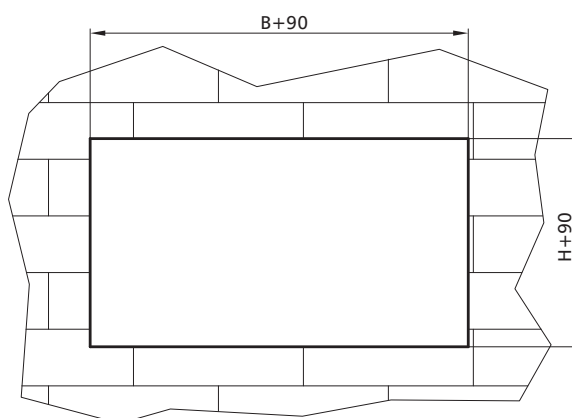


3.5. installation

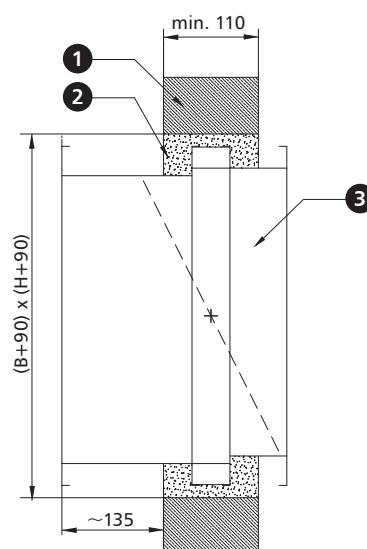
The mcr FID S/V p/P rectangular dampers are EI120($V_{ew} i \leftrightarrow o$)S1000C₃₀₀AA multi-rated if installed in concrete partitions made of full bricks or cellular blocks with the thickness of at least 110 mm.

The mcr FID S/V-M p/P rectangular dampers are EI120($V_{ew} i \leftrightarrow o$)S1500C₁₀₀₀₀AA multi-rated if installed in concrete partitions made of full bricks or cellular blocks with the thickness of at least 110 mm.

3.5.1. preparation of installation openings



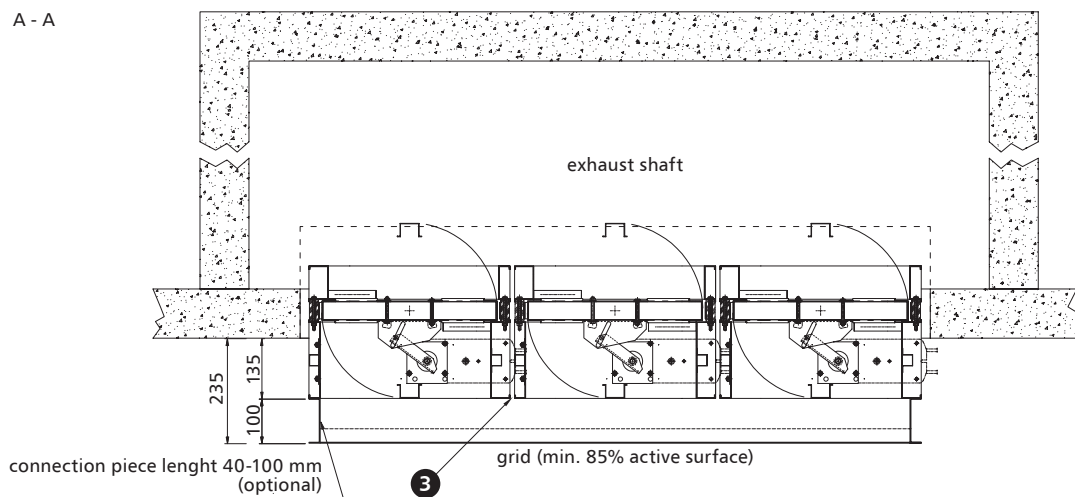
3.5.2. sample installation in concrete and masonry walls



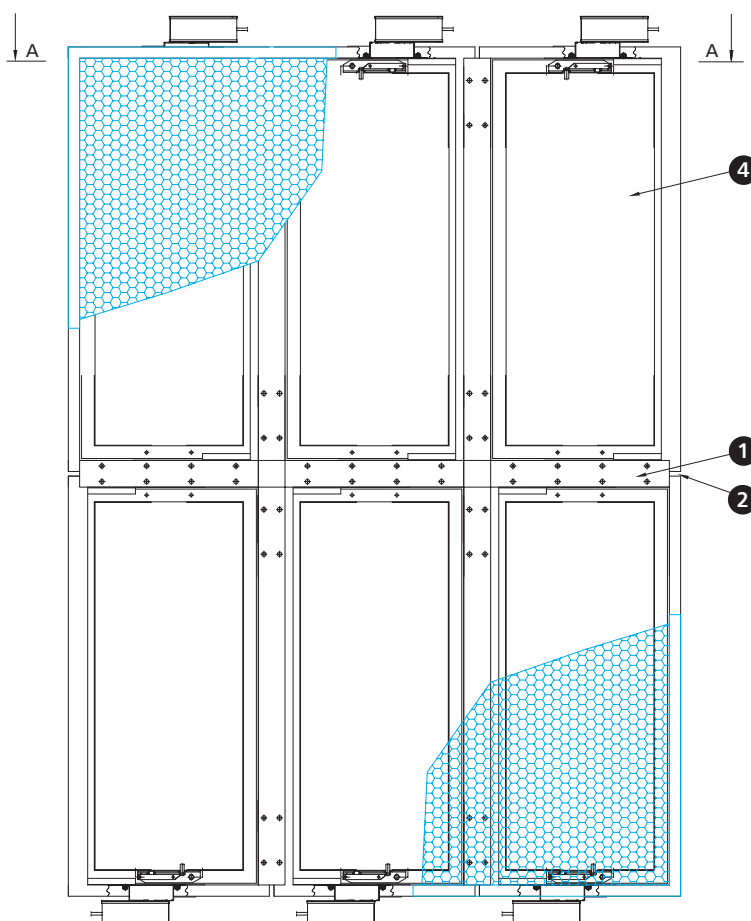
1. rigid wall - concrete, cellular concrete or bricks
2. sealing - concrete, cement or cement-lime masonry mortar*
3. fire damper mcr FID S

*it is possible to use a different sealing which ensures the required fire resistance

3.5.3. sample installation in sets



The height of $H=400$ mm ensures that the partition does not protrude outside the damper casing on the actuator side. To attach a guard grid (grill), a connection piece - length: 40-100 mm is required.



1. installation flat bar, width 60 mm
2. 10 mm gaps between damper flanges
3. fire resistant material, e.g. mineral wool with the density of at least 80 kg/m^3 , A1 class
4. fire damper mcr FID S

Installation of the damper with a vertical axis of rotation

Such installation must be clearly stated in the draft documentation and mentioned in the order. The dimensions of the damper $B \times H$ should be given as to the damper with a horizontal axis of rotation.

3.6. technical parameters of mcr FID S/V p/P, mcr FID S/V-M p/P rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		200						250					300				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.040	0.029	420	9	31	0.050	0.039	564	9	31	0.06	0.049	708	8	32
		6			631	21	41			847	19	42			1 063	19	42
		8			841	37	49			1 129	35	49			1 417	33	50
		10			1 051	58	55			1 411	54	55			1 771	52	55
	250	4	0.050	0.037	526	9	31	0.063	0.049	706	9	32	0.075	0.062	886	8	32
		6			788	21	42			1 058	19	43			1 328	18	42
		8			1 051	37	50			1 411	35	50			1 771	31	50
		10			1 314	57	55			1 764	54	56			2 214	49	56
	300	4	0.060	0.044	631	9	32	0.075	0.059	847	8	33	0.09	0.074	1 063	8	32
		6			946	20	43			1 270	19	43			1 594	17	43
		8			1 261	36	50			1 693	34	51			2 125	30	50
		10			1 577	56	56			2 117	53	56			2 657	47	56
	350	4	0.070	0.051	736	9	33	0.088	0.069	988	8	33	0.105	0.086	1 240	7	32
		6			1 104	20	43			1 482	19	44			1 860	16	43
		8			1 472	36	51			1 976	33	51			2 480	29	50
		10			1 840	56	57			2 470	52	57			3 100	45	56
	400	4	0.080	0.058	841	9	33	0.100	0.078	1 129	8	34	0.12	0.098	1 417	7	32
		6			1 261	19	43			1 693	19	44			2 125	15	42
		8			1 682	35	51			2 258	33	52			2 834	27	50
		10			2 102	54	57			2 822	52	57			3 542	42	56
	450	4	0.090	0.066	946	9	33	0.113	0.088	1 270	7	32	0.135	0.111	1 594	7	32
		6			1 419	19	44			1 905	17	43			2 391	15	43
		8			1 892	35	51			2 540	29	51			3 188	27	50
		10			2 365	54	57			3 175	46	56			3 985	42	56
	500	4	0.100	0.073	1 051	9	34	0.125	0.098	1 411	7	32	0.15	0.123	1 771	7	32
		6			1 577	19	44			2 117	16	43			2 657	15	43
		8			2 102	35	52			2 822	28	50			3 542	26	50
		10			2 628	54	58			3 528	44	56			4 428	41	56
	550	4	0.110	0.080	1 156	8	34	0.138	0.108	1 552	7	33	0.165	0.135	1 948	6	33
		6			1 734	19	44			2 328	16	43			2 922	14	43
		8			2 313	34	52			3 105	28	51			3 897	26	51
		10			2 891	53	58			3 881	44	57			4 871	40	56
	600	4	0.120	0.088	1 261	8	34	0.150	0.118	1 693	7	33	0.18	0.148	2 125	6	33
		6			1 892	19	45			2 540	15	43			3 188	14	43
		8			2 523	34	52			3 387	27	51			4 251	26	51
		10			3 154	53	58			4 234	42	56			5 314	40	57
	650	4	0.130	0.095	1 367	8	35	0.163	0.127	1 835	6	32	0.195	0.160	2 303	6	33
		6			2 050	19	45			2 752	14	43			3 454	14	44
		8			2 733	34	53			3 669	26	50			4 605	26	51
		10			3 416	53	59			4 586	40	56			5 756	40	57
	700	4	0.140	0.102	1 472	8	35	0.175	0.137	1 976	6	33	0.21	0.172	2 480	6	34
		6			2 208	19	45			2 964	14	43			3 720	14	44
		8			2 943	33	53			3 951	26	51			4 959	26	52
		10			3 679	52	59			4 939	40	56			6 199	40	57
	800	4	0.160	0.117	1 682	8	35	0.200	0.157	2 258	6	32	0.24	0.197	2 834	6	33
		6			2 523	18	45			3 387	14	43			4 251	14	44
		8			3 364	32	53			4 516	24	51			5 668	24	52
		10			4 205	50	59			5 645	38	56			7 085	38	57
	900	4	0.180	0.131	1 892	7	34	0.225	0.176	2 540	6	32	0.27	0.221	3 188	5	32
		6			2 838	16	44			3 810	13	43			4 782	12	42
		8			3 784	29	52			5 080	23	50			6 376	21	50
		10			4 730	45	58			6 350	36	56			7 970	32	56
	1000	4	0.200	0.146	2 102	7	34	0.250	0.196	2 822	6	32	0.3	0.246	3 542	5	32
		6			3 154	16	45			4 234	13	43			5 314	12	43
		8			4 205	29	52			5 645	22	50			7 085	21	50
		10			5 256	45	58			7 056	35	56			8 856	32	56
	1100	4	0.220	0.161	2 313	7	35	0.275	0.216	3 105	5	32	0.33	0.271	3 897	5	33
		6			3 469	16	45			4 657	12	43			5 845	12	43
		8			4 625	29	53			6 209	22	50			7 793	21	51
		10			5 782	45	59			7 762	34	56			9 742	32	56
1200	4	0.240	0.175	2 523	8	37	0.300	0.235	3 387	5	33	0.36	0.295	4 251	9	40	
	6			3 784	18	47			5 080	12	43			6 376	20	51	
	8			5 046	29	53			6 774	22	51			8 502	36	58	
	10			6 307	45	59			8 467	34	57			10 627	42	60	
1300	4	0.260	0.190	2 733	8	37	0.325	0.255	3 669	5	33	0.39	0.320	4 605	5	33	
	6			4 100	18	47			5 504	12	43			6 908	12	44	
	8			5 466	29	54			7 338	21	51			9 210	21	51	
	10			6 833	45	59			9 173	33	57			11 513	32	57	
1400	4	0.280	0.204	2 943	7	36	0.350	0.274	3 951	5	33	0.42	0.344	4 959	5	34	
	6			4 415	16	46			5 927	12	44			7 439	12	44	
	8			5 887	29	54			7 903	21	51			9 919	21	52	
	10			7 358	45	60			9 878	32	57			12 398	32	58	
1500	4	0.300	0.219	3 154	7	35	0.375	0.294	4 234	5	33	0.45	0.369	5 314	5	34	
	6			4 730	15	46			6 350	12	44			7 970	12	45	
	8			6 307	27	53			8 467	21	51			10 627	21	52	
	10			7 884	42	59			10 584	32	57			13 284	32	58	

3.6. technical parameters of mcr FID S/V p/P, mcr FID S/V-M p/P rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]																	
		350						400						450					
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]		
width B [mm]	200	4	0.070	0.059	852	8	32	0.080	0.069	996	7	31	0.090	0.079	1 140	7	31		
		6			1 279	18	42			1 495	17	42			1 711	15	41		
		8			1 705	32	50			1 993	29	49			2 281	26	49		
		10			2 131	50	56			2 491	46	55			2 851	41	54		
	250	4	0.088	0.074	1 066	7	31	0.100	0.087	1 246	6	29	0.113	0.099	1 426	6	29		
		6			1 598	16	42			1 868	13	40			2 138	13	40		
		8			2 131	29	50			2 491	23	47			2 851	22	47		
		10			2 664	45	55			3 114	36	53			3 564	35	53		
	300	4	0.105	0.089	1 279	7	32	0.120	0.104	1 495	6	30	0.135	0.119	1 711	5	30		
		6			1 918	16	43			2 242	13	41			2 566	12	40		
		8			2 557	28	50			2 989	24	48			3 421	22	48		
		10			3 197	44	56			3 737	37	54			4 277	34	54		
	350	4	0.123	0.104	1 492	7	32	0.140	0.121	1 744	6	30	0.158	0.139	1 996	5	30		
		6			2 238	15	42			2 616	13	41			2 994	12	41		
		8			2 984	26	50			3 488	22	48			3 992	21	48		
		10			3 730	41	56			4 360	35	54			4 990	33	54		
	400	4	0.140	0.118	1 705	6	31	0.160	0.138	1 993	6	31	0.180	0.158	2 281	5	30		
		6			2 557	13	41			2 989	13	41			3 421	12	41		
		8			3 410	24	49			3 986	22	49			4 562	21	48		
		10			4 262	37	55			4 982	35	55			5 702	32	54		
	450	4	0.158	0.133	1 918	5	30	0.180	0.156	2 242	5	30	0.203	0.178	2 566	4	29		
		6			2 877	12	41			3 363	12	41			3 849	10	40		
		8			3 836	22	48			4 484	21	48			5 132	18	47		
		10			4 795	34	54			5 605	32	54			6 415	28	53		
	500	4	0.175	0.148	2 131	5	31	0.200	0.173	2 491	5	30	0.225	0.198	2 851	4	29		
		6			3 197	12	41			3 737	11	40			4 277	9	39		
		8			4 262	22	49			4 982	19	48			5 702	17	47		
		10			5 328	34	55			6 228	30	54			7 128	26	52		
	550	4	0.193	0.163	2 557	5	30	0.220	0.190	2 740	5	30	0.248	0.218	3 136	4	29		
		6			3 836	12	41			4 110	11	41			4 704	9	40		
		8			5 115	21	48			5 481	19	48			6 273	17	47		
		10			6 394	32	54			6 851	30	54			7 841	26	53		
	600	4	0.210	0.178	2 557	5	30	0.240	0.208	2 989	4	28	0.270	0.238	3 421	4	29		
		6			3 836	10	40			4 484	8	37			5 132	9	40		
		8			5 115	19	48			5 979	14	45			6 843	17	47		
		10			6 394	29	53			7 474	27	53			8 554	26	53		
	650	4	0.228	0.192	2 771	5	30	0.260	0.225	3 239	4	30	0.293	0.257	3 707	4	30		
		6			4 156	10	40			4 858	10	40			5 560	9	40		
		8			5 541	19	48			6 477	17	48			7 413	17	48		
		10			6 926	29	54			8 096	27	53			9 266	26	54		
	700	4	0.245	0.207	2 984	5	30	0.28	0.242	3 488	4	30	0.315	0.277	3 992	4	30		
		6			4 476	10	41			5 232	10	40			5 988	9	40		
		8			5 967	19	48			6 975	17	48			7 983	16	48		
		10			7 459	29	54			8 719	27	54			9 979	25	53		
	800	4	0.280	0.237	3 410	4	30	0.32	0.277	3 986	4	30	0.360	0.317	4 562	4	29		
		6			5 115	10	41			5 979	9	41			6 843	9	40		
		8			6 820	18	48			7 972	17	48			9 124	16	47		
		10			8 525	28	54			9 965	26	54			11 405	25	53		
	900	4	0.315	0.266	3 836	4	31	0.360	0.311	4 484	6	35	0.405	0.356	5 132	4	29		
		6			5 754	10	41			6 726	12	44			7 698	9	40		
		8			7 672	18	49			8 968	26	54			10 264	16	47		
		10			9 590	28	55			11 210	33.4	58			12 830	25	53		
	1000	4	0.350	0.296	4 262	4	30	0.400	0.346	4 982	4	31	0.450	0.396	5 702	4	29		
		6			6 394	9	41			7 474	9	42			8 554	9	40		
		8			8 525	17	48			9 965	17	49			11 405	16	47		
		10			10 656	26	54			12 456	26	55			14 256	25	53		
1100	4	0.385	0.326	4 689	4	32	0.440	0.381	5 481	4	31	0.495	0.436	6 273	4	29			
	6			7 033	10	42			8 221	9	42			9 409	9	39			
	8			9 377	18	50			10 961	17	49			12 545	15	47			
	10			11 722	28	56			13 702	26	55			15 682	24	53			
1200	4	0.420	0.355	5 115	4	31	0.480	0.415	5 979	4	31	0.540	0.475	6 843	4	29			
	6			7 672	9	41			8 968	9	42			10 264	9	39			
	8			10 230	16	49			11 958	16	49			13 686	15	47			
	10			12 787	25	54			14 947	25	55			17 107	24	53			
1300	4	0.455	0.385	5 541	4	32	0.520	0.450	6 477	4	32	0.585	0.515	7 413	4	28			
	6			8 312	10	43			9 716	9	42			11 120	8	39			
	8			11 082	17	50			12 954	16	50			14 826	15	46			
	10			13 853	27	56			16 193	25	55			18 533	23	52			
1400	4	0.490	0.414	5 967	4	32	0.560	0.484	6 975	4	32	0.630	0.554	7 983	4	28			
	6			8 951	10	43			10 463	9	43			11 975	8	39			
	8			11 935	17	50			13 951	16	50			15 967	15	46			
	10			14 918	27	56			17 438	25	56			19 958	23	52			
1500	4	0.525	0.444	6 394	4	32	0.600	0.519	7 474	4	32	0.675	0.594	8 554	4	28			
	6			9 590	9	43			11 210	9	43			12 830	8	38			
	8			12 787	17	50			14 947	16	50			17 107	14	46			
	10			15 984	26	56			18 684	25	56			21 384	22	51			

3.6. technical parameters of mcr FID S/V p/P, mcr FID S/V-M p/P rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		500					550					600					
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.1	0.089	1 284	6	29	0.110	0.099	1 428	5	29	0.120	0.109	1 572	5	29
		6			1 927	13	40			2 143	12	39			2 359	12	39
		8			2 569	22	47			2 857	21	47			3 145	21	47
		10			3 211	35	53			3 571	33	53			3 931	32	53
	250	4	0.125	0.112	1 606	6	30	0.138	0.124	1 786	5	30	0.150	0.137	1 966	5	30
		6			2 408	13	41			2 678	12	40			2 948	12	40
		8			3 211	22	48			3 571	21	48			3 931	21	48
		10			4 014	35	54			4 464	33	53			4 914	32	54
	300	4	0.15	0.134	1 927	5	30	0.165	0.149	2 143	5	30	0.180	0.164	2 359	5	30
		6			2 890	12	41			3 214	12	41			3 538	11	40
		8			3 853	21	48			4 285	21	48			4 717	19	48
		10			4 817	33	54			5 357	32	54			5 897	30	53
	350	4	0.175	0.156	2 248	5	30	0.193	0.174	2 500	5	31	0.210	0.191	2 752	5	30
		6			3 372	12	41			3 750	12	41			4 128	10	40
		8			4 496	21	48			5 000	21	49			5 504	19	48
		10			5 620	32	54			6 250	32	55			6 880	29	54
	400	4	0.2	0.178	2 569	5	30	0.220	0.198	2 857	5	30	0.240	0.218	3 145	4	30
		6			3 853	11	41			4 285	10	41			4 717	10	41
		8			5 138	19	48			5 714	19	48			6 290	18	48
		10			6 422	30	54			7 142	29	54			7 862	28	54
	450	4	0.225	0.201	2 890	4	29	0.248	0.223	3 214	4	29	0.270	0.246	3 538	4	30
		6			4 335	9	39			4 821	9	40			5 307	9	40
		8			5 780	17	47			6 428	17	47			7 076	17	48
		10			7 225	26	52			8 035	26	53			8 845	26	53
	500	4	0.250	0.223	3 211	4	27	0.275	0.248	3 571	4	29	0.300	0.273	3 931	4	29
		6			4 817	8	38			5 357	9	39			5 897	9	39
		8			6 422	14	45			7 142	15	47			7 862	15	47
		10			8 028	20	50			8 928	24	52			9 828	24	53
	550	4	0.275	0.245	3 853	3	27	0.303	0.273	4 285	4	28	0.330	0.300	4 717	4	28
		6			5 780	8	37			6 428	8	38			7 076	8	39
		8			7 707	13	45			8 571	14	46			9 435	14	46
		10			9 634	21	51			10 714	22	52			11 794	22	52
	600	4	0.3	0.268	3 853	3	27	0.330	0.298	4 285	3	28	0.360	0.328	4 717	3	28
		6			5 780	8	38			6 428	8	38			7 076	8	39
		8			7 707	13	45			8 571	13	46			9 435	13	46
		10			9 634	21	51			10 714	21	51			11 794	21	52
	650	4	0.325	0.290	4 175	4	31	0.358	0.322	4 643	3	28	0.390	0.355	5 111	3	28
		6			6 262	10	41			6 964	8	38			7 666	8	39
		8			8 349	17	49			9 285	13	46			10 221	13	46
		10			10 436	21	51			11 606	21	52			12 776	21	52
	700	4	0.350	0.312	4 496	3	28	0.385	0.347	5 000	3	28	0.420	0.382	5 504	3	29
		6			6 744	8	38			7 500	8	39			8 256	8	39
		8			8 991	13	46			9 999	13	46			11 007	13	47
		10			11 239	21	52			12 499	21	52			13 759	21	52
	800	4	0.4	0.357	5 138	3	28	0.440	0.397	5 714	3	29	0.480	0.437	6 290	3	29
		6			7 707	8	39			8 571	8	39			9 435	8	40
		8			10 276	13	46			11 428	13	47			12 580	13	47
		10			12 845	21	52			14 285	21	53			15 725	21	53
	900	4	0.45	0.401	5 780	3	28	0.495	0.446	6 428	3	29	0.540	0.491	7 076	3	30
		6			8 670	8	39			9 642	8	40			10 614	8	38
		8			11 560	13	46			12 856	13	47			14 152	13	45
		10			14 450	21	52			16 070	21	53			17 690	21	51
	1000	4	0.5	0.446	6 422	3	28	0.550	0.496	6 428	3	30	0.600	0.546	7 862	3	30
		6			9 634	8	39			9 642	8	40			11 794	8	41
		8			12 845	13	46			12 856	13	48			15 725	13	48
		10			16 056	21	52			16 070	21	54			19 656	21	54
	1100	4	0.55	0.491	7 065	4	29	0.605	0.546	7 857	4	31	0.660	0.601	8 649	3	31
		6			10 597	8	39			11 785	8	41			12 973	8	41
		8			14 129	14	47			15 713	14	49			17 297	13	49
		10			17 662	22	53			19 642	22	55			21 622	21	54
	1200	4	0.6	0.535	7 707	3	27	0.660	0.595	8 571	3	30	0.720	0.655	9 435	3	30
		6			11 560	7	38			12 856	7	40			14 152	7	40
		8			15 414	13	45			17 142	13	48			18 870	12	48
		10			19 267	20	51			21 427	20	54			23 587	19	54
1300	4	0.65	0.580	8 349	3	27	0.715	0.645	9 285	3	30	0.780	0.710	10 221	3	30	
	6			12 524	7	38			13 928	7	41			15 332	7	41	
	8			16 698	13	45			18 570	13	48			20 442	12	48	
	10			20 873	20	51			23 213	20	54			25 553	19	54	
1400	4	0.7	0.624	8 991	3	27	0.770	0.694	9 999	3	31	0.840	0.764	11 007	3	30	
	6			13 487	7	38			14 999	7	41			16 511	7	41	
	8			17 983	13	45			19 999	13	49			22 015	12	48	
	10			22 478	20	51			24 998	20	54			27 518	19	54	
1500	4	0.75	0.669	9 634	3	27	0.825	0.744	10 714	3	31	0.900	0.819	11 794	3	31	
	6			14 450	7	38			16 070	7	41			17 690	7	41	
	8			19 267	13	45			21 427	13	49			23 587	12	49	
	10			24 084	20	51			26 784	20	55			29 484	19	54	

3.6. technical parameters of mcr FID S/V p/P, mcr FID S/V-M p/P rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		650					700					750					
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.130	0.119	1 716	5	29	0.140	0.129	1 860	5	29	0.150	0.139	2 004	5	29
		6			2 575	11	39			2 791	11	40			3 007	11	40
		8			3 433	20	47			3 721	20	47			4 009	20	47
		10			4 291	31	53			4 651	31	53			5 011	31	53
	250	4	0.163	0.149	2 146	5	30	0.175	0.162	2 326	5	30	0.188	0.174	2 506	5	30
		6			3 218	11	40			3 488	11	41			3 758	11	41
		8			4 291	20	48			4 651	20	48			5 011	20	48
		10			5 364	31	53			5 814	31	54			6 264	31	54
	300	4	0.195	0.179	2 575	5	30	0.210	0.194	2 791	4	29	0.225	0.209	3 007	4	30
		6			3 862	10	40			4 186	10	40			4 510	10	40
		8			5 149	19	48			5 581	18	47			6 013	18	48
		10			6 437	29	53			6 977	28	53			7 517	28	54
	350	4	0.228	0.209	3 004	4	30	0.245	0.226	3 256	4	30	0.263	0.244	3 508	4	30
		6			4 506	10	40			4 884	10	40			5 262	10	41
		8			6 008	18	48			6 512	17	48			7 016	17	48
		10			7 510	28	54			8 140	27	53			8 770	27	54
	400	4	0.260	0.238	3 433	4	30	0.280	0.258	3 721	4	30	0.300	0.278	4 009	4	31
		6			5 149	10	41			5 581	10	41			6 013	10	41
		8			6 866	18	48			7 442	17	48			8 018	17	49
		10			8 582	28	54			9 302	27	54			10 022	27	54
	450	4	0.293	0.268	3 862	4	30	0.315	0.291	4 186	4	29	0.338	0.313	4 510	4	30
		6			5 793	9	40			6 279	9	40			6 765	9	40
		8			7 724	17	48			8 372	15	47			9 020	15	48
		10			9 655	26	54			10 465	24	53			11 275	24	53
	500	4	0.325	0.298	4 291	4	29	0.350	0.323	4 651	4	29	0.375	0.348	5 011	4	29
		6			6 437	9	40			6 977	8	40			7 517	8	40
		8			8 582	15	47			9 302	15	47			10 022	15	47
		10			10 728	24	53			11 628	23	53			12 528	23	53
	550	4	0.358	0.328	5 149	4	29	0.385	0.355	5 116	4	29	0.413	0.383	5 512	4	29
		6			7 724	8	39			7 674	8	39			8 268	8	40
		8			10 299	14	47			10 233	14	47			11 025	14	47
		10			12 874	22	52			12 791	22	53			13 781	22	53
	600	4	0.390	0.358	5 149	3	28	0.420	0.388	5 581	3	29	0.450	0.418	6 013	3	29
		6			7 724	8	39			8 372	8	39			9 020	8	40
		8			10 299	13	46			11 163	13	47			12 027	13	47
		10			12 874	21	52			13 954	21	53			15 034	21	53
	650	4	0.423	0.387	5 579	3	28	0.455	0.420	6 047	3	28	0.488	0.452	6 515	3	28
		6			8 368	7	39			9 070	7	39			9 772	7	39
		8			11 157	13	46			12 093	13	46			13 029	12	46
		10			13 946	20	52			15 116	20	52			16 286	19	52
	700	4	0.455	0.417	6 008	3	28	0.490	0.452	6 512	3	29	0.525	0.487	7 016	3	28
		6			9 012	7	39			9 768	7	39			10 524	7	39
		8			12 015	13	46			13 023	13	47			14 031	12	46
		10			15 019	20	52			16 279	20	53			17 539	19	52
	800	4	0.520	0.477	6 866	3	27	0.560	0.517	7 442	4	29	0.600	0.557	8 018	3	28
		6			10 299	6	38			11 163	7	37			12 027	6	39
		8			13 732	12	45			14 884	11	43			16 036	12	46
		10			17 165	18	51			18 605	16	47			20 045	18	52
	900	4	0.585	0.536	7 724	3	26	0.630	0.581	8 372	3	27	0.675	0.626	9 020	3	27
		6			11 586	6	36			12 558	6	37			13 530	6	38
		8			15 448	10	44			16 744	10	45			18 040	10	45
		10			19 310	16	50			20 930	16	51			22 550	16	51
	1000	4	0.650	0.596	8 582	3	26	0.700	0.646	9 302	3	27	0.750	0.696	10 022	3	28
		6			12 874	6	36			13 954	6	38			15 034	6	38
		8			17 165	10	44			18 605	10	45			20 045	10	46
		10			21 456	16	50			23 256	16	51			25 056	16	52
	1100	4	0.715	0.656	9 441	3	29	0.770	0.711	10 233	3	31	0.825	0.766	11 025	3	28
		6			14 161	8	40			15 349	8	42			16 537	6	39
		8			18 881	13	47			20 465	13	49			22 049	10	46
		10			23 602	21	53			25 582	21	55			27 562	16	52
	1200	4	0.780	0.715	10 299	3	28	0.840	0.775	11 163	3	30	0.900	0.835	12 027	2	28
		6			15 448	7	39			16 744	7	41			18 040	5	38
		8			20 598	12	46			22 326	12	48			24 054	10	46
		10			25 747	19	52			27 907	19	54			30 067	15	52
	1300	4	0.845	0.775	11 157	3	28	0.910	0.840	12 093	3	31	0.975	0.905	13 029	2	28
		6			16 736	7	39			18 140	7	41			19 544	5	39
		8			22 314	12	46			24 186	12	49			26 058	10	46
		10			27 893	19	52			30 233	19	55			32 573	15	52
1400	4	0.910	0.834	12 015	3	28	0.980	0.904	13 023	3	31	1.050	0.974	14 031	2	28	
	6			18 023	7	39			19 535	7	42			21 047	5	39	
	8			24 031	12	46			26 047	12	49			28 063	10	46	
	10			30 038	19	52			32 558	19	55			35 078	15	52	
1500	4	0.975	0.894	12 874	3	28	1.050	0.969	13 954	3	31	1.125	1.044	15 034	3	30	
	6			19 310	7	39			20 930	7	42			22 550	6	41	
	8			25 747	12	46			27 907	12	49			30 067	11	48	
	10			32 184	19	52			34 884	19	55			37 584	17	54	

3.6. technical parameters of mcr FID S/V p/P, mcr FID S/V-M p/P rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		800						850					900				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.160	0.149	2 148	5	29	0.170	0.159	2 292	5	29	0.180	0.169	2 436	5	30
		6			3 223	11	40			3 439	11	40			3 655	11	40
		8			4 297	19	47			4 585	19	48			4 873	19	48
		10			5 371	30	53			5 731	30	53			6 091	30	54
	250	4	0.200	0.187	2 686	5	30	0.213	0.199	2 866	5	30	0.225	0.212	3 046	5	31
		6			4 028	11	41			4 298	11	41			4 568	11	41
		8			5 371	19	48			5 731	19	49			6 091	19	49
		10			6 714	30	54			7 164	30	54			7 614	30	55
	300	4	0.240	0.224	3 223	4	30	0.255	0.239	3 439	4	30	0.270	0.254	3 655	4	30
		6			4 834	10	41			5 158	10	41			5 482	10	41
		8			6 445	18	48			6 877	18	48			7 309	17	48
		10			8 057	28	54			8 597	28	54			9 137	27	54
	350	4	0.280	0.261	3 760	4	30	0.298	0.279	4 012	4	31	0.315	0.296	4 264	4	30
		6			5 640	10	41			6 018	10	41			6 396	9	41
		8			7 520	17	48			8 024	17	49			8 528	17	48
		10			9 400	27	54			10 030	27	54			10 660	26	54
	400	4	0.320	0.298	4 297	4	31	0.340	0.318	4 585	4	31	0.360	0.338	4 873	4	30
		6			6 445	10	41			6 877	10	42			7 309	9	41
		8			8 594	17	49			9 170	17	49			9 746	16	48
		10			10 742	27	55			11 462	27	55			12 182	25	54
	450	4	0.360	0.336	4 834	4	29	0.383	0.358	5 158	4	29	0.405	0.381	5 482	3	29
		6			7 251	8	39			7 737	8	40			8 223	8	39
		8			9 668	14	47			10 316	14	47			10 964	13	47
		10			12 085	22	53			12 895	22	53			13 705	21	52
	500	4	0.400	0.373	5 371	4	29	0.425	0.398	5 731	4	29	0.450	0.423	6 091	3	29
		6			8 057	8	40			8 597	8	40			9 137	8	40
		8			10 742	14	47			11 462	14	47			12 182	13	47
		10			13 428	22	53			14 328	22	53			15 228	21	53
	550	4	0.440	0.410	5 908	3	29	0.468	0.438	6 304	3	29	0.495	0.465	6 700	3	29
		6			8 862	8	40			9 456	8	40			10 050	7	39
		8			11 817	13	47			12 609	13	47			13 401	13	47
		10			14 771	21	53			15 761	21	53			16 751	20	53
	600	4	0.480	0.448	6 445	3	29	0.510	0.478	6 877	3	29	0.540	0.508	7 309	3	29
		6			9 668	7	39			10 316	7	40			10 964	7	39
		8			12 891	13	47			13 755	13	47			14 619	12	47
		10			16 114	20	53			17 194	20	53			18 274	19	52
	650	4	0.520	0.485	6 983	3	28	0.553	0.517	7 451	3	29	0.585	0.550	7 919	3	29
		6			10 474	7	39			11 176	7	39			11 878	7	39
		8			13 965	12	46			14 901	12	47			15 837	12	47
		10			17 456	19	52			18 626	19	53			19 796	19	53
	700	4	0.560	0.522	7 520	3	28	0.595	0.557	8 024	3	28	0.630	0.592	8 528	3	27
		6			11 280	6	39			12 036	6	39			12 792	6	38
		8			15 039	12	46			16 047	12	46			17 055	10	45
		10			18 799	18	52			20 059	18	52			21 319	16	51
	800	4	0.640	0.597	8 594	3	27	0.680	0.637	9 170	3	27	0.720	0.677	9 746	3	28
		6			12 891	6	38			13 755	6	38			14 619	6	38
		8			17 188	10	45			18 340	10	45			19 492	10	46
		10			21 485	16	51			22 925	16	51			24 365	16	51
	900	4	0.720	0.671	9 668	3	28	0.765	0.716	10 316	3	28	0.810	0.761	10 964	3	28
		6			14 502	6	38			15 474	6	38			16 446	6	39
		8			19 336	10	46			20 632	10	46			21 928	10	46
		10			24 170	16	51			25 790	16	52			27 410	16	52
	1000	4	0.800	0.746	10 742	3	28	0.850	0.796	11 462	3	28	0.900	0.846	12 182	3	29
		6			16 114	6	39			17 194	6	39			18 274	6	39
		8			21 485	10	46			22 925	10	46			24 365	10	47
		10			26 856	16	52			28 656	16	52			30 456	16	52
	1100	4	0.880	0.821	11 817	3	28	0.935	0.876	12 609	3	29	0.990	0.931	13 401	3	29
		6			17 725	6	39			18 913	6	39			20 101	6	40
		8			23 633	10	46			25 217	10	47			26 801	10	47
		10			29 542	16	52			31 522	16	53			33 502	16	53
	1200	4	0.960	0.895	12 891	2	28	1.020	0.955	13 755	2	28	1.080	1.015	14 619	2	28
		6			19 336	5	39			20 632	5	39			21 928	5	38
8		25 782			10	46	27 510			10	46	29 238			9	46	
10		32 227			15	52	34 387			15	52	36 547			14	51	
1300	4	1.040	0.970	13 965	2	28	1.105	1.035	14 901	2	29	1.170	1.100	15 837	2	29	
	6			20 948	5	39			22 352	5	39			23 756	5	39	
	8			27 930	10	46			29 802	10	47			31 674	10	47	
	10			34 913	15	52			37 253	15	52			39 593	15	53	
1400	4	1.120	1.044	15 039	2	29	1.190	1.114	16 047	3	30	1.260	1.184	17 055	2	28	
	6			22 559	5	39			24 071	6	40			25 583	5	39	
	8			30 079	10	47			32 095	10	48			34 111	9	46	
	10			37 598	15	52			40 118	16	54			42 638	14	52	
1500	4	1.200	1.119	16 114	3	31	1.275	1.194	17 194	3	30	1.350	1.269	18 274	2	29	
	6			24 170	6	41			25 790	6	41			27 410	5	40	
	8			32 227	11	49			34 387	10	48			36 547	10	48	
	10			40 284	17	54			42 984	16	54			45 684	15	53	

3.6. technical parameters of mcr FID S/V p/P, mcr FID S/V-M p/P rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
		1000					1100					1200																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
width B [mm]	200	4	0.200	0.189	2 724	5	0.220	0.209	3 012	5	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.240	0.229	3 300	4	0.2

3.6. technical parameters of mcr FID S/V p/P, mcr FID S/V-M p/P rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

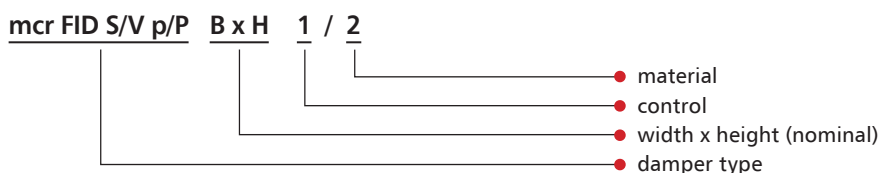
		height H [mm]																			
		1300					1400					1500									
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]				
width B [mm]	200	4	0.260	0.249	3 588	4	0.280	0.269	3 876	4	0.300	0.289	4 164	4	0.300	0.289	4 164	4	0.300	0.289	
		6			5 383	9			40	5 815			9	40			6 247	9			40
		8			7 177	17			48	7 753			16	47			8 329	15			47
		10			8 971	26			53	9 691			25	53			10 411	24			53
	250	4	0.325	0.312	4 486	4	0.350	0.337	4 846	4	0.375	0.362	4 164	4	0.375	0.362	4 164	4	0.375	0.362	
		6			6 728	9			41	7 268			9	40			6 247	8			40
		8			8 971	17			49	9 691			15	48			8 329	15			48
		10			11 214	26			54	12 114			24	54			10 411	23			53
	300	4	0.390	0.374	5 383	4	0.420	0.404	5 815	4	0.450	0.434	6 247	4	0.450	0.434	6 247	4	0.450	0.434	
		6			8 074	9			41	8 722			9	41			9 370	8			40
		8			10 765	16			49	11 629			15	49			12 493	14			48
		10			13 457	25			55	14 537			24	54			15 617	22			54
	350	4	0.455	0.436	6 280	4	0.490	0.471	6 784	3	0.525	0.506	7 288	3	0.525	0.506	7 288	3	0.525	0.506	
		6			9 420	8			41	10 176			8	40			10 932	8			40
		8			12 560	15			48	13 568			13	48			14 576	13			48
		10			15 700	23			54	16 960			21	53			18 220	21			54
	400	4	0.520	0.498	7 177	3	0.560	0.538	7 753	3	0.600	0.578	8 329	3	0.600	0.578	8 329	3	0.600	0.578	
		6			10 765	7			40	11 629			7	40			12 493	7			40
		8			14 354	13			47	15 506			13	48			16 658	13			48
		10			17 942	20			53	19 382			20	53			20 822	20			54
	450	4	0.585	0.561	8 074	3	0.630	0.606	8 722	3	0.675	0.651	9 370	3	0.675	0.651	9 370	3	0.675	0.651	
		6			12 111	7			40	13 083			7	40			14 055	7			40
		8			16 148	12			47	17 444			12	47			18 740	12			48
		10			20 185	19			53	21 805			19	53			23 425	19			53
	500	4	0.650	0.623	8 971	3	0.700	0.673	9 691	3	0.750	0.723	10 411	3	0.750	0.723	10 411	3	0.750	0.723	
		6			13 457	7			40	14 537			7	40			15 617	7			41
		8			17 942	12			48	19 382			12	48			20 822	12			48
		10			22 428	19			53	24 228			19	54			26 028	19			54
	550	4	0.715	0.685	9 868	3	0.770	0.740	10 660	3	0.825	0.795	11 452	3	0.825	0.795	11 452	3	0.825	0.795	
		6			14 802	7			40	15 990			7	41			17 178	7			41
		8			19 737	12			48	21 321			12	48			22 905	12			49
		10			24 671	19			54	26 651			19	54			28 631	19			54
	600	4	0.780	0.748	10 765	3	0.840	0.808	11 629	3	0.900	0.868	12 493	3	0.900	0.868	12 493	3	0.900	0.868	
		6			16 148	6			39	17 444			6	40			18 740	6			40
		8			21 531	11			47	23 259			11	47			24 987	11			48
		10			26 914	17			53	29 074			17	53			31 234	17			53
	650	4	0.845	0.810	11 663	3	0.910	0.875	12 599	3	0.975	0.940	13 535	3	0.975	0.940	13 535	3	0.975	0.940	
		6			17 494	6			40	18 898			6	40			20 302	6			40
		8			23 325	11			47	25 197			11	48			27 069	11			48
		10			29 156	17			53	31 496			17	53			33 836	17			54
	700	4	0.910	0.872	12 560	2	0.980	0.942	13 568	2	1.050	1.012	14 576	2	1.050	1.012	14 576	2	1.050	1.012	
		6			18 840	5			38	20 352			5	39			21 864	5			39
		8			25 119	10			46	27 135			10	46			29 151	10			47
		10			31 399	15			52	33 919			15	52			36 439	15			52
	800	4	1.040	0.997	14 354	2	1.120	1.077	15 506	2	1.200	1.157	16 658	2	1.200	1.157	16 658	2	1.200	1.157	
		6			21 531	5			39	23 259			5	39			24 987	5			40
		8			28 708	10			46	31 012			10	47			33 316	10			47
		10			35 885	15			52	38 765			15	53			41 645	15			53
900	4	1.170	1.121	16 148	2	1.260	1.211	17 444	2	1.350	1.301	18 740	2	1.350	1.301	18 740	2	1.350	1.301		
	6			24 222	5			39	26 166			5	40			28 110	5			40	
	8			32 296	10			47	34 888			10	47			37 480	10			48	
	10			40 370	15			53	43 610			15	53			46 850	15			53	
1000	4	1.300	1.246	17 942	2	1.400	1.346	19 382	2	1.500	1.446	20 822	2	1.500	1.446	20 822	2	1.500	1.446		
	6			26 914	5			39	29 074			5	38			31 234	5			39	
	8			35 885	9			47	38 765			8	46			41 645	8			46	
	10			44 856	14			52	48 456			13	52			52 056	13			52	
1100	4	1.430	1.371	19 737	2			21 321	2			22 905	2			22 905	2				
	6			29 605	5			39	31 605			5	40			33 605	5			40	
	8			39 473	9			47	48 456			9	47			52 056	9			47	
	10			49 342	14			53	58 456			13	53			62 056	13			53	

3.7. estimated weights of mcr FID S/V p/P, mcr FID S/V-M p/P rectangular dampers [kg]

		width B [mm]														
		200	250	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
height H [mm]	200	9.5	9.7	10	10	15	17	17.5	19	22	25	28	30	33	39	45
	250	9.5	10	11	11	16	17.5	18	21	24	27	29	32	34	45	48
	300	10	11	11	12	17	20	21	23	26	28	31	34	38	50	51
	350	11	11	11	16	18	20.5	23	26	28	29	33	35	36	52	53
	400	10	11	12	18	19	21	25	29	30	33	35	36	39	54	55
	500	15	16	17	19	20	23	27	32	33	35	38	40	44	55	56
	600	17	17.5	20	21	30	26	30	35	37	39	43	48	52	56	58
	700	17.5	18	21	23	30	35	35	40	42	44	47	52	54	57	65
	800	20	21	22	24	29	35	37	41	43	49	52	57	60	62	78
	900	22	25	25	28	33	35	39	43	47	53	56	60	62	64	82
	1000	23	29	28	33	36	42	43	49	53	56	59	65	67	69	98
	1100	26	30	31	35	38	42	47	56	59	62	63	69	71		
	1200	32	33	35	36	40	49	53	56	61	71	72	73			
	1300	39	40	38	39	44	52	57	59	78	79	80				
	1400	42	45	48	39	48	56	63	65	80	82					
	1500	45	48	50	50	52	58	68	71	82	98					

For dampers with no actuator, subtract ~1 kg.

3.8. marking



1 – control:

- Belimo trigger control mechanism
- BE24** – actuator with no return spring, U = 24 V AC/DC
- BLE24** – actuator with no return spring, U = 24 V AC/DC
- BE24-ST** (with the BKNE230-24 option) – actuator with no return spring, U = 24 V AC/DC, with a plug for the SBS Control system
- BLE24-ST** (with the BKNE230-24 option) – actuator with no return spring, U = 24 V AC/DC, with a plug for the SBS Control system
- BE230** – actuator with no return spring, U = 230 V AC
- BLE230** – actuator with no return spring, U = 230 V AC

2 – material

- [no symbol]** – galvanised steel, Zn 275 g/m² coating
- KN** – 1.4404 acid-proof stainless steel

example marking:

mcr FID S/V p/P 400 x 400 BLE24

Smoke exhaust damper for fire ventilation systems with a 24 V compact Belimo actuator with limit switches.

Chapter 12 - power supply and control (p. 141) contains:

- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper,
- location of trigger control mechanisms in relation to the damper - manufacture standards.

**PRODUCT CONFIGURATOR
AT WWW.MERCOR.COM.PL**



ATEST HIGIENICZNY
ITH
CERTYFIKACJA PRODUKTU



- ▶ **EIS120, E180S**
- ▶ Certificate of constancy of performance 1488-CPR-0467/W and 1396-CPR-0098.
- ▶ Dampers certified for compliance with EN 15650.
- ▶ Dampers qualified under EN 13501-3 and tested under EN 1366-2.
- ▶ Cut-off dampers with the fire resistance independent of airflow direction and installation side.
- ▶ Lower acoustic noise and hydraulic resistance in the system with reduced partition thickness.

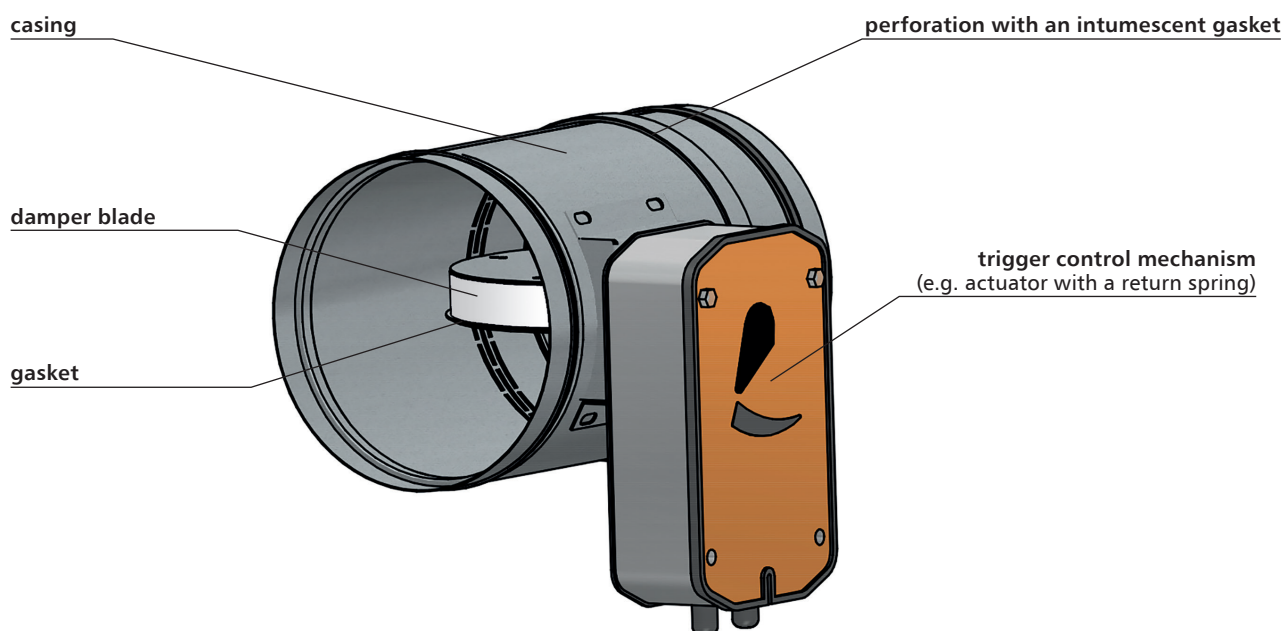
4.1. application

The mcr FID PRO low-resistance cut-off dampers are designed for use in residential ventilation systems, where those systems pass through vertical and horizontal construction partitions. They are installed e.g. in systems with increased acoustic requirements.

During a fire, the dampers preserve the fire resistance of the construction partition where ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and burning fumes to the remaining part of the building not on fire. During normal system operation, the damper blade is open. In case of fire, the damper blade closes.

The dampers cannot be operated in systems exposed to dust, except for when they are included in a special, individually developed programme of service and technical inspections.

4.2. design



The mcr FID PRO cut-off fire dampers consist of a casing with a circular cross section, a moving damper blade and a trigger control mechanism, which is activated remotely or automatically when the thermal or thermoelectric trigger is tripped. Standard damper casing is made of galvanised steel sheet. For chemically aggressive environments, special manufacture casing is used, in which steel elements are made of 1.4404 acid-proof steel sheet, while other elements are impregnated.

In the middle part, in which the damper blade is placed, the casing is perforated - perforation width is 20 mm. On the damper circumference, around the closed damper blade, there is an intumescent gasket. The damper blade is made of a fire-proof panel with the total thickness of 20 mm.

The damper blade is coated with steel sheet on both sides for mechanical reinforcement and reduced friction resistance. The damper circumference has a ventilation gasket installed, which ensures the tightness of dampers at the ambient temperature. Both ends of the casing are finished nipple (standard) or muff connection.

4.3. versions

4.3.1. mcr FID PRO – the cut-off fire damper for ventilation ducts with an actuator with a return spring – damper closing and opening with an actuator

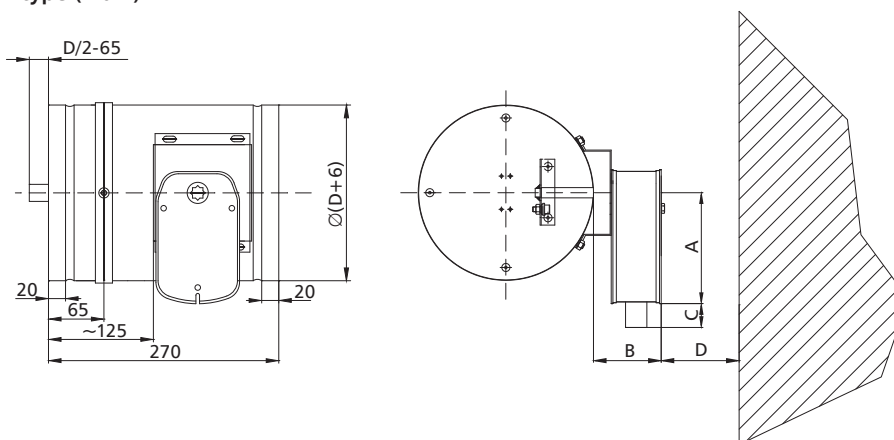
During normal operation, the damper blade of the fire damper remains open. In case of fire, the blade closes automatically or remotely when the power supply is cut off.

The mcr FID PRO dampers are equipped with a Belimo trigger control mechanisms **BFL**, **EXBF** or **BF-TL** axial actuator with a return valve, powered with 24 V AC/DC or 230 V AC, with thermoelectric trigger 72°C (optionally it is possible to use triggers with the nominal tripping temperature of 95°C). The actuators are equipped with limit switches used to monitor the blade position. Furthermore, the mechanical position indicator is placed on the actuator.

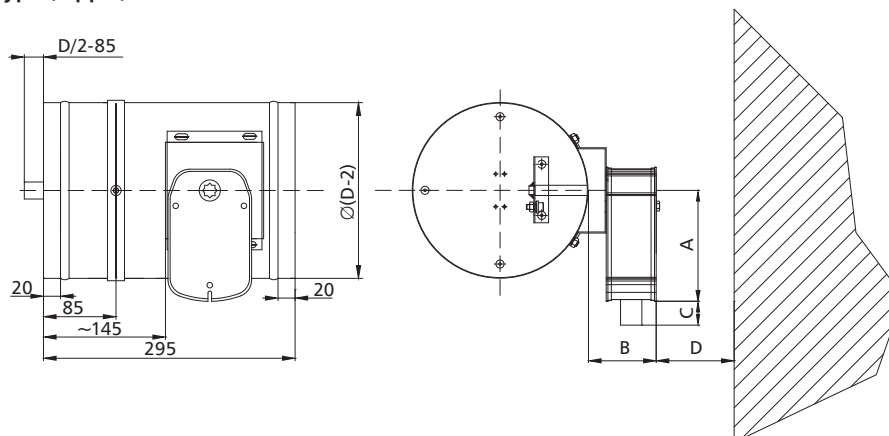
The thermoelectric trigger is equipped with a test switch and a power supply indicator (LED).

Dampers with Belimo actuators: analogue BFL, digital BF-TL, EXBF explosion proof actuators close as a result of thermoelectric trigger tripping or power supply cut-off as a result of the actuator return spring action. The dampers open when the power supply voltage is applied to the actuator terminals. Furthermore, dampers with those actuators may be opened manually using a key.

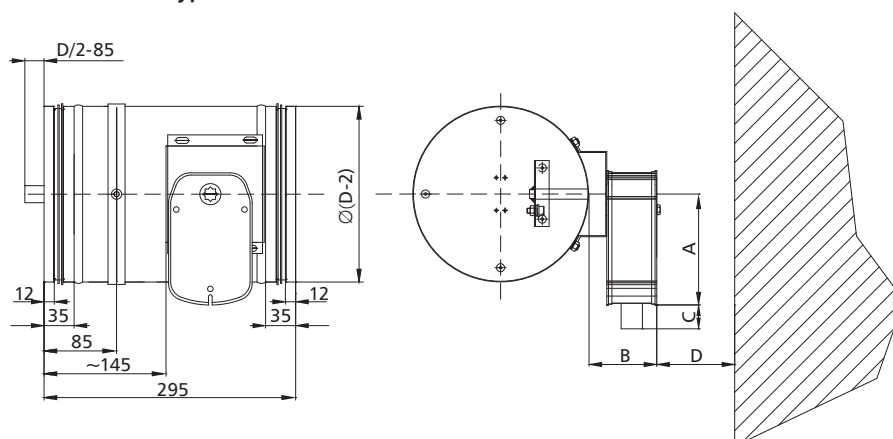
female connection type (muff)



male connection type (nipple)

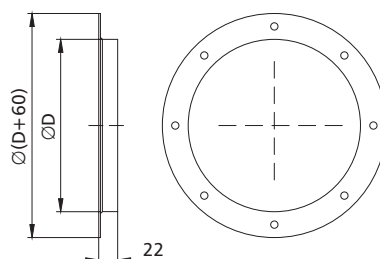


version with circumferential seal type F



mechanism	A	B	C	D
BFL	138	74	30	75
BF24TL-ST	198	85	10	75
EXBF	225	190	55	100

flange connection



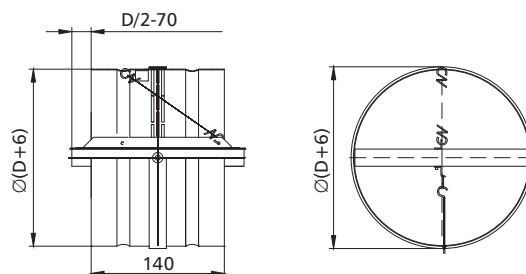
Spacing and quantities of openings according to EN 12220 (dimensions of flanges with circular intersection for comfort ventilation purposes).

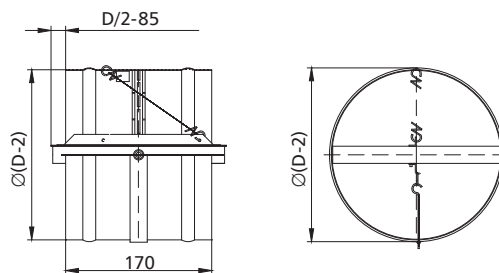
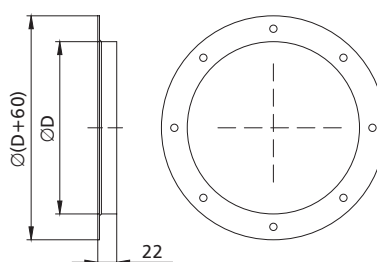
4.3.2. mcr FID PRO – the cut-off fire damper for ventilation ducts with a spring drive and thermal trigger

During normal operation, the damper blade of the fire damper remains open. In case of fire, the blade closes automatically.

The mcr FID PRO dampers are equipped with a **RST** trigger control mechanism with a drive spring (without an integrated thermal trigger). In this case, a thermal trigger 74°C (optionally 95°C) is installed outside the damper mechanism, on the damper blade itself. After the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. It is possible to equip the damper with a WK1 or WK2 limit switch used to signal the blade position state.

female connection type (muff)



male connection type (nipple)

flange connection


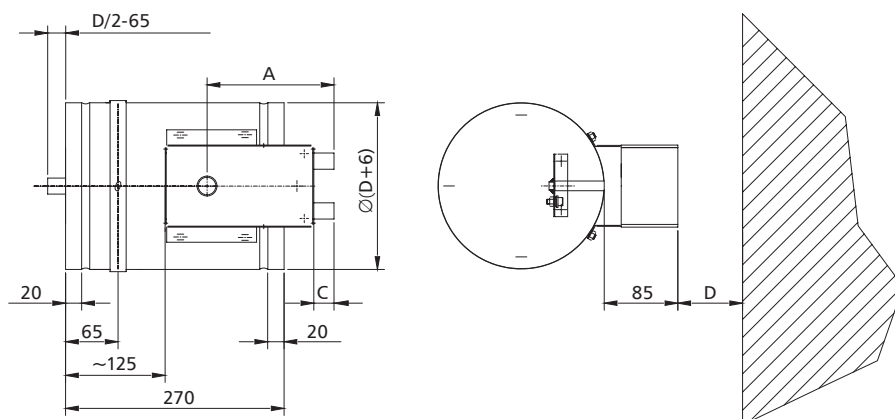
Spacing and quantities of openings according to EN 12220 (dimensions of flanges with circular intersection for comfort ventilation purposes).

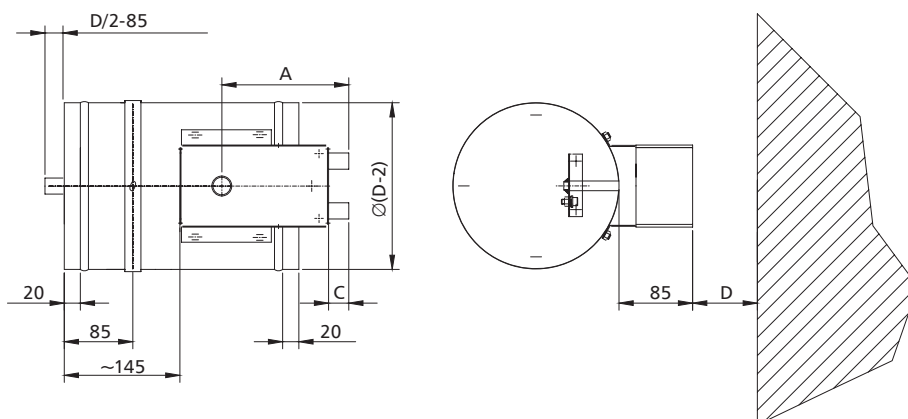
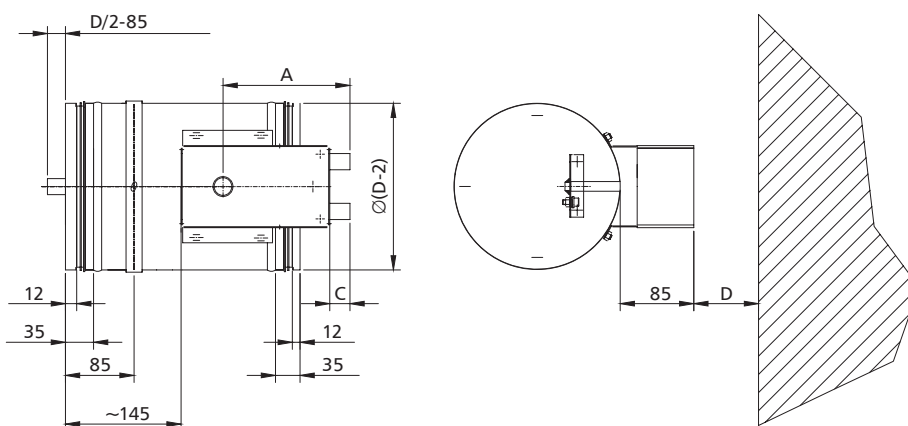
4.3.3.

mcr FID PRO – the cut-off fire damper for ventilation ducts with a spring drive and an integrated thermal trigger, optionally equipped with an electromagnetic trigger and limit switches

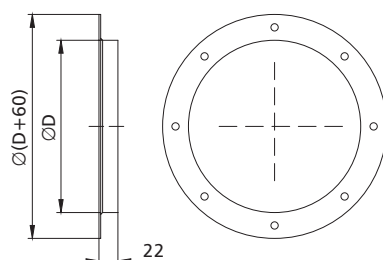
During normal operation, the damper blade of the fire damper remains open. In case of fire, the blade closes automatically or, in case of a damper with an electromagnetic trigger, additionally using the fire automation.

The mcr FID PRO dampers are equipped with a **RST-KW1** trigger control mechanism with a drive spring and a cam-lever system. A thermal trigger 74°C (optionally at 95°C) is integrated with the damper mechanism. After the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. On the RST-KW1 mechanism, there is a mechanical indicator of blade position. It is possible to equip a trigger control mechanism with an electromagnetic trigger activated by the application („pulse”) or removal („break”) of the power supply voltage and with limit switches used to signal the blade position state. The mechanism has function to test and blade button-release. Blade re-opening is activated manually using a key. It is not required to dismantle the system to replace the thermal trigger. The RST-KW1 mechanism may be replaced with an electric actuator.

female connection type (muff)


male connection type (nipple)

version with circumferential seal type F


mechanizm	A	C	D
RST-KW1	130	30	75

flange connection


Spacing and quantities of openings according to EN 12220 (dimensions of flanges with circular intersection for comfort ventilation purposes).

4.4. dimensions
Circular dampers:

- nominal diameter D from 100 mm to 315 mm

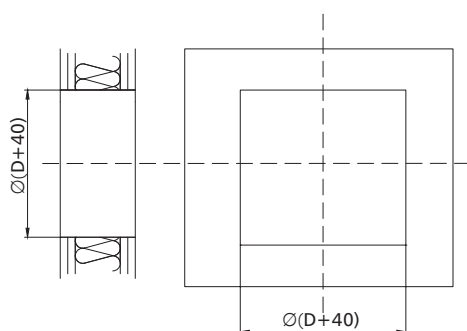
Apart from the standard dimensions there is a possibility to produce dampers with intermediate dimensions (in 1 mm increments, in the given range).

4.5. installation

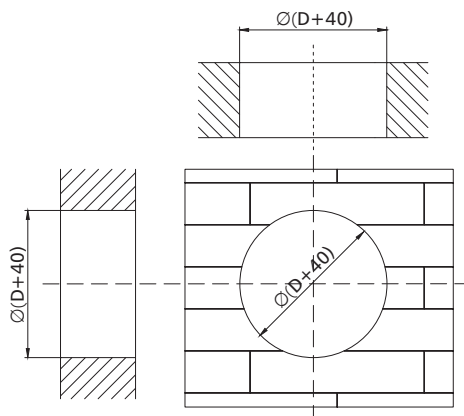
The mcr FID PRO circular dampers are EI120(ve ho i↔o)S-rated when installed in concrete partitions made of full bricks or cellular concrete blocks with the thickness of at least 125 mm, lightweight walls of cardboard-plaster panels on a steel framework with the thickness of at least 125 mm and the resistance class of not less than EI120 and concrete ceilings with the thickness of at least 150 mm. Additionally dampers mcr FID PRO with diameter 201-315 mm installed in concrete ceilings are E180(ho i↔o)S-rated.

4.5.1. preparation of installation openings

in light plaster-cardboard walls

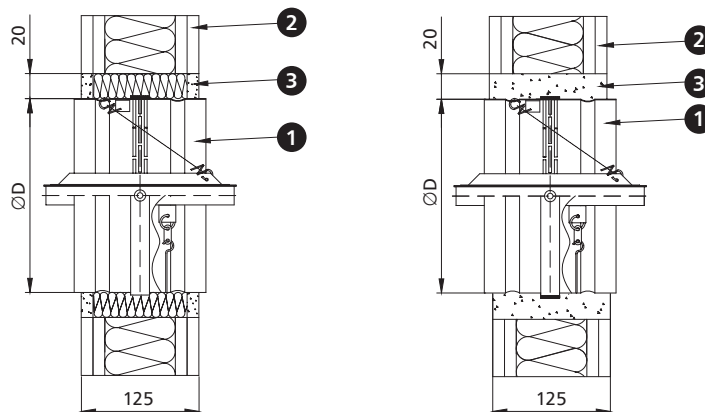


in rigid walls and ceilings

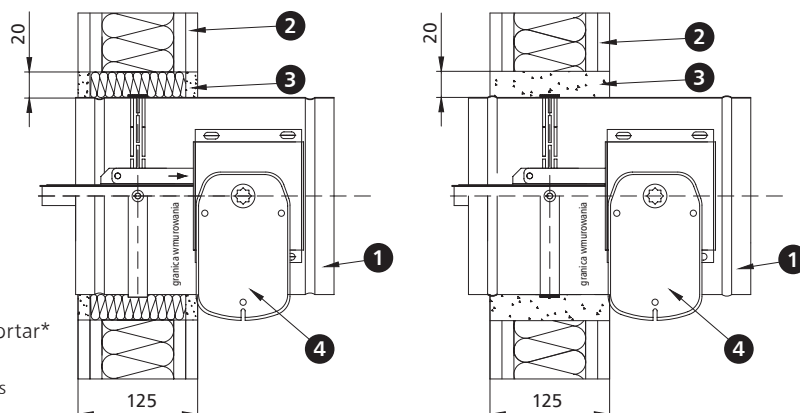


4.5.2. sample installation in lightweight walls of plaster-cardboard panels

mcr FID PRO damper with a RST mechanism



mcr FID PRO damper with a BFL or RST-KW1 mechanism

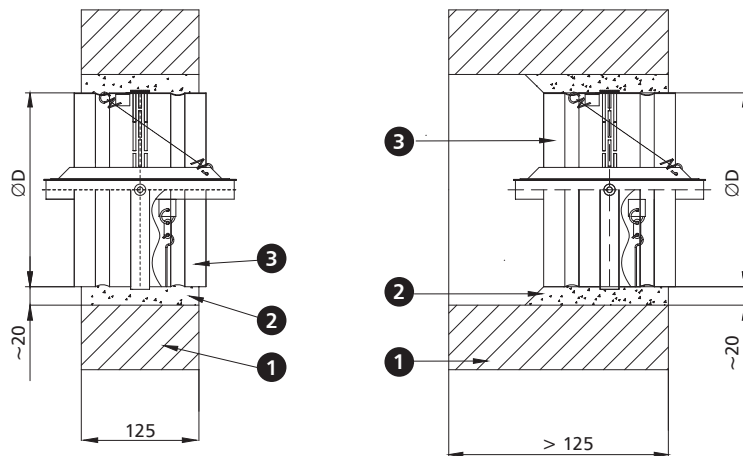


1. fire damper mcr FID PRO
2. lightweight wall
3. sealing - mineral wool with the density of at least 80 kg/m³, A1 class and/or plaster mortar*
4. trigger control mechanism

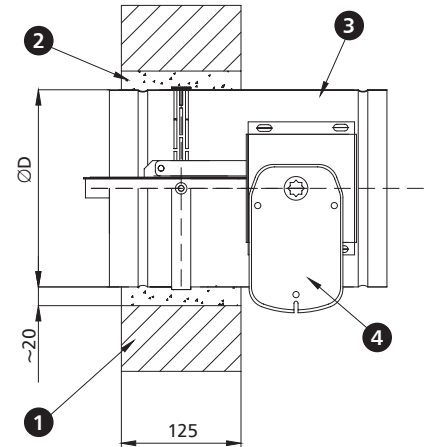
*it is possible to use a different sealing which ensures the required fire resistance

4.5.3. sample installation in concrete and masonry walls

mcr FID PRO damper with a RST mechanism



mcr FID PRO damper with a BFL or RST-KW1 mechanism

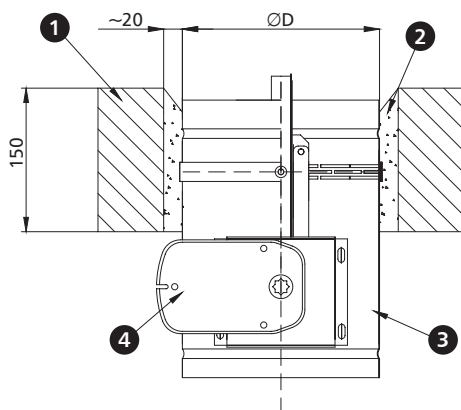


1. rigid wall - concrete, cellular concrete or bricks
2. sealing - concrete, cement or cement-lime masonry mortar*
3. fire damper mcr FID PRO
4. trigger control mechanism

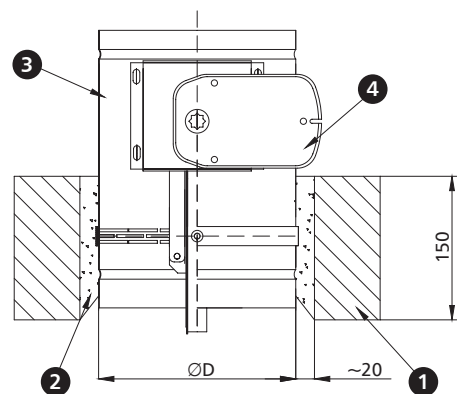
*it is possible to use a different sealing which ensures the required fire resistance

4.5.4. sample installation in ceilings

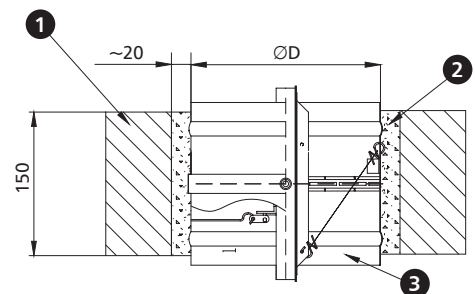
mcr FID PRO damper with a BFL or RST-KW1 mechanism



mcr FID PRO damper with a BFL or RST-KW1 mechanism

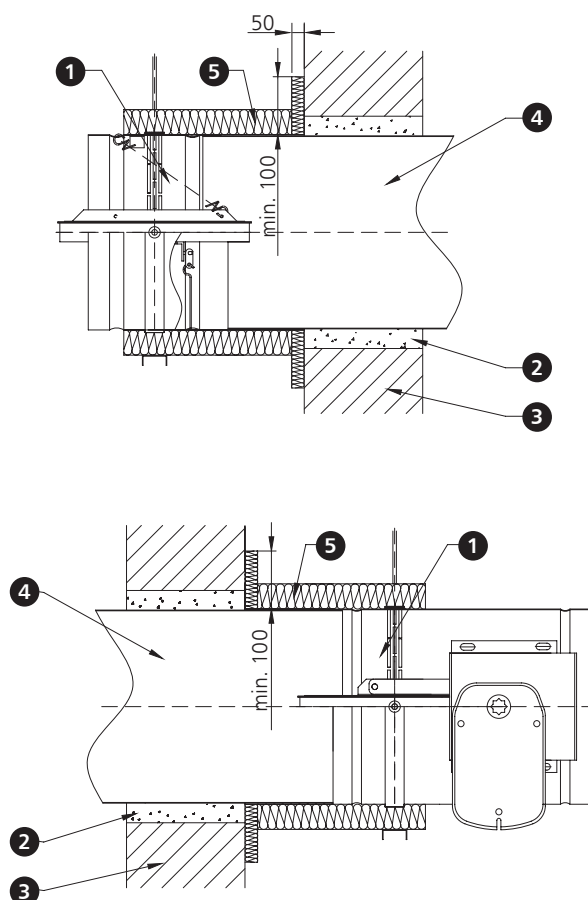


mcr FID PRO damper with a RST mechanism



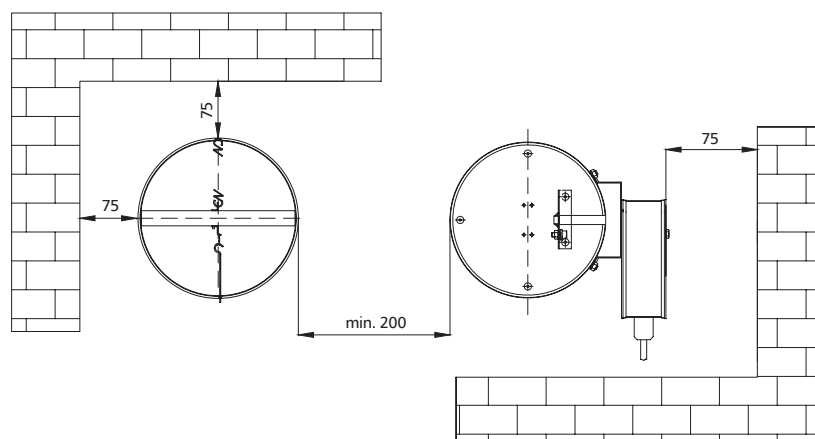
1. ceiling
2. sealing - concrete, cement or cement-lime masonry mortar*
3. fire damper mcr FID PRO
4. trigger control mechanism

*it is possible to use a different sealing which ensures the required fire resistance

4.5.5. sample installation outside the fire partition


- 1. fire damper mcr FID PRO
- 2. e.g. cement mortar*
- 3. wall
- 4. ventilation duct
- 5. mineral wool with the density of at least 80 kg/m^3 and thickness 30 mm, A1 class

*it is possible to use a different sealing which ensures the required fire resistance

Distance between systems and partitions


4.6. technical parameters of mcr FID PRO circular dampers

D – nominal diameter [mm]
v – velocity [m/s]

Sk – duct cross-section [m²]
Se – damper active cross-section [m²]
Q – flow [m³/h]

weff – velocity measured on the damper active surface [m/s]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

mcr FID PRO 100

d [mm]	Sk [m ²]	Se [m ²]	v [m/s]	Q [m ³ /h]	weff [m/s]	dp [Pa]	L _{WA} [dB]
100	0.0079	0.0057	2.0	41	2.8	4.5	21
			4.0	81	5.5	14	29
			6.0	122	8.3	26	37
			8.0	163	11.1	42	43

mcr FID PRO 125

d [mm]	Sk [m ²]	Se [m ²]	v [m/s]	Q [m ³ /h]	weff [m/s]	dp [Pa]	L _{WA} [dB]
125	0.0123	0.0095	2.0	69	2.6	3	19
			4.0	137	5.2	10	27
			6.0	206	7.8	20	36
			8.0	274	10.4	33	42

mcr FID PRO 160

d [mm]	Sk [m ²]	Se [m ²]	v [m/s]	Q [m ³ /h]	weff [m/s]	dp [Pa]	L _{WA} [dB]
160	0.0201	0.0166	2.0	119	2.4	2	17
			4.0	239	4.8	6	23
			6.0	358	7.3	15	34
			8.0	477	9.7	24	41

mcr FID PRO 200

d [mm]	Sk [m ²]	Se [m ²]	v [m/s]	Q [m ³ /h]	weff [m/s]	dp [Pa]	L _{WA} [dB]
200	0.0314	0.027	2.0	194	2.3	1	16
			4.0	389	4.7	5	21
			6.0	583	7.0	11	33
			8.0	778	9.3	20	40

mcr FID PRO 250

d [mm]	Sk [m ²]	Se [m ²]	v [m/s]	Q [m ³ /h]	weff [m/s]	dp [Pa]	L _{WA} [dB]
250	0.0491	0.0391	2.0	282	2.5	2	18
			4.0	564	5.0	4	21
			6.0	846	7.5	7	29
			8.0	1127	10.0	10	33

mcr FID PRO 315

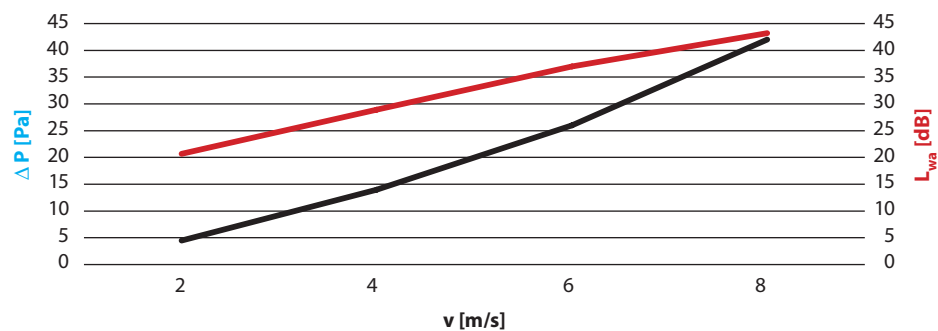
d [mm]	Sk [m ²]	Se [m ²]	v [m/s]	Q [m ³ /h]	weff [m/s]	dp [Pa]	L _{WA} [dB]
315	0.0779	0.0654	2.0	471	2.4	2	18
			4.0	942	4.8	4	23
			6.0	1413	7.1	7	31
			8.0	1884	9.5	13	39

The mcr FID PRO fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

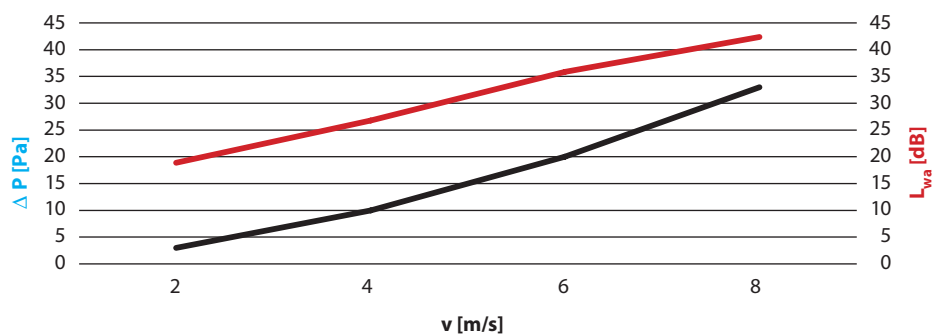
4.6.1 flow characteristics in circular mcr FID PRO dampers

— pressure drop on a damper
 — damper noise level

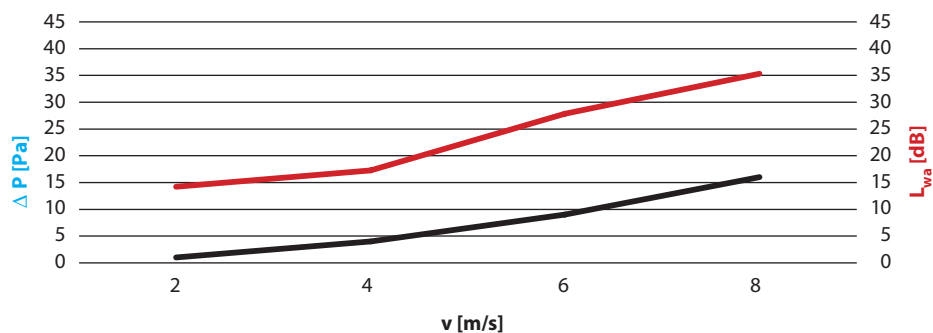
mcr FID PRO 100



mcr FID PRO 125



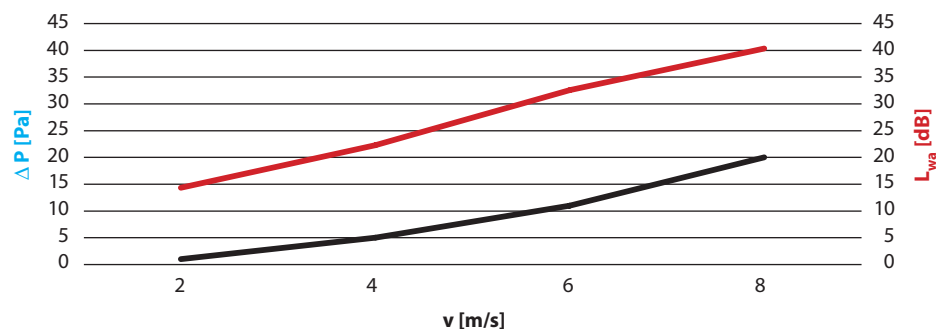
mcr FID PRO 160



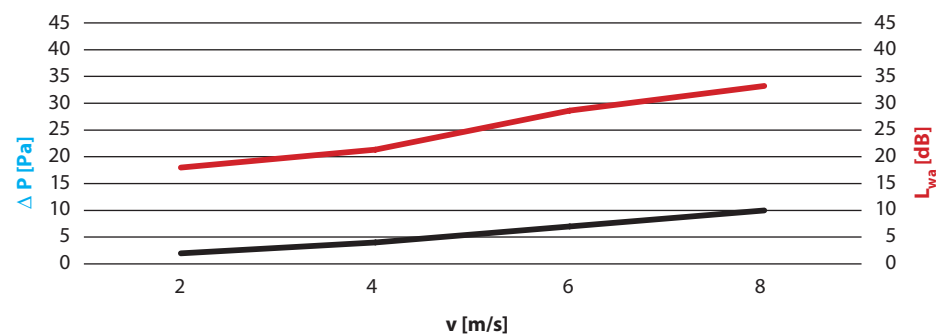
4.6.1 flow characteristics in circular mcr FID PRO dampers

— pressure drop on a damper
— damper noise level

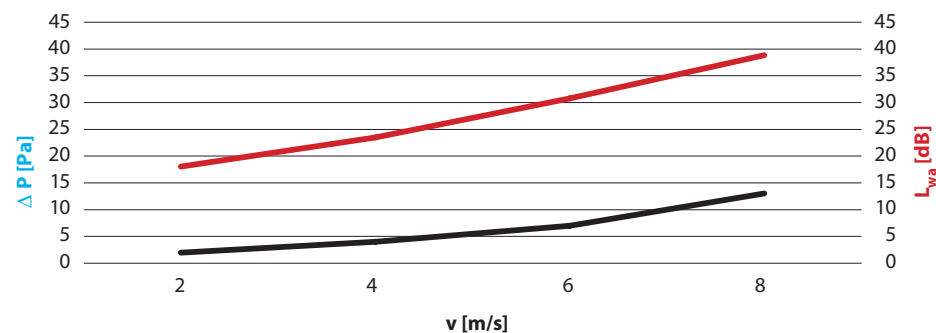
mcr FID PRO 200



mcr FID PRO 250



mcr FID PRO 315

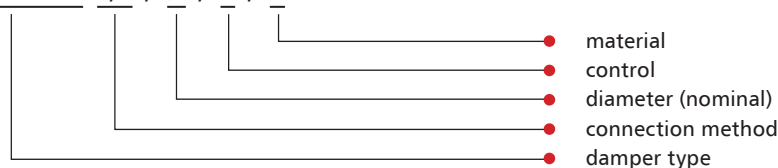


4.7. estimated weights of mcr FID PRO dampers for circular ventilation ducts [kg]

diameter D [mm]	RST	actuator/RST-KW1
100	0.7	3
125	0.9	3.2
160	1.2	3.6
200	1.7	4.2
250	2.1	4.6
315	2.6	5.1

4.8. marking

mcr FID PRO S/1 / Ø / 2 / 3



1 – connection method:

- N** or **[no symbol]** – male connection (nipple)
- M** – female connection (muff)
- K** – flange

2 – control:

- RST trigger control mechanism
 - RST** – thermal trigger
 - RST/WK1** – thermal trigger + limit switch (closed blade signal)
 - RST/WK2** – thermal trigger + limit switch (open/closed blade signal)
- RST-KW1 trigger control mechanism
 - RST-KW1/S** – thermal trigger
 - RST-KW1/S/WK2** – thermal trigger + limit switch (open/closed blade signal)
 - RST-KW1/24I** – thermal trigger + „pulse“ electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
 - RST-KW1/24P** – thermal trigger + „break“ electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
 - RST-KW1/230I** – thermal trigger + „pulse“ electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
 - RST-KW1/230P** – thermal trigger + „break“ electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
- Belimo trigger control mechanism
 - BF24TL-T-ST** (with the BKN230-24MP option) – actuator with a return spring, U = 24 V, MP Bus digital control
 - EXBF24-T** – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
 - EXBF230-T** – explosion proof actuator with a return spring in the Ex version, U = 230 V AC
 - BFL24-T** – actuator with a return spring, U = 24 V AC/DC
 - BFL230-T** – actuator with a return spring, U = 230 V AC
 - BFL24-T-ST** (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system

3 – material:

- [no symbol]** – galvanised steel, Zn 275 g/m² coating
- KN** – 1.4404 acid-proof stainless steel

example marking:

mcr FID PRO Ø125 BFL24-T

EIS120 low-resistance cut-off damper with a 24 V compact Belimo actuator with a thermoelectric trigger and limit switches.

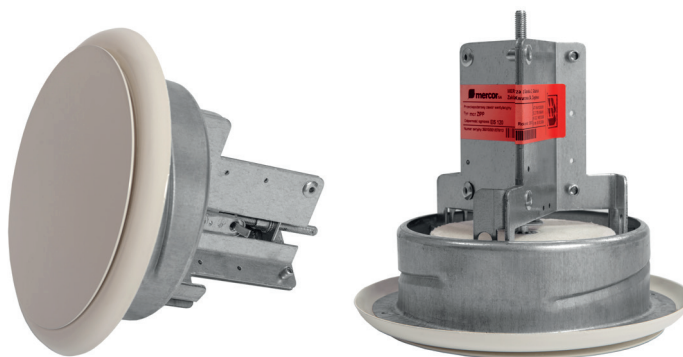
mcr FID PRO Ø125 RST/WK1

EIS120 low-resistance cut-off fire damper with a trigger rated at 74°C and a partition closing limit switch.

Chapter 12 - power supply and control (p. 141) contains:

- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper,
- location of trigger control mechanisms in relation to the damper - manufacture standards.

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- ▶ **EIS120**
- ▶ **Certificate of constancy of performance 1396-CPR-0092.**
- ▶ **Valves certified for compliance with EN 15650.**
- ▶ **Valves qualified under EN 13501-3 and tested under EN 1366-2.**

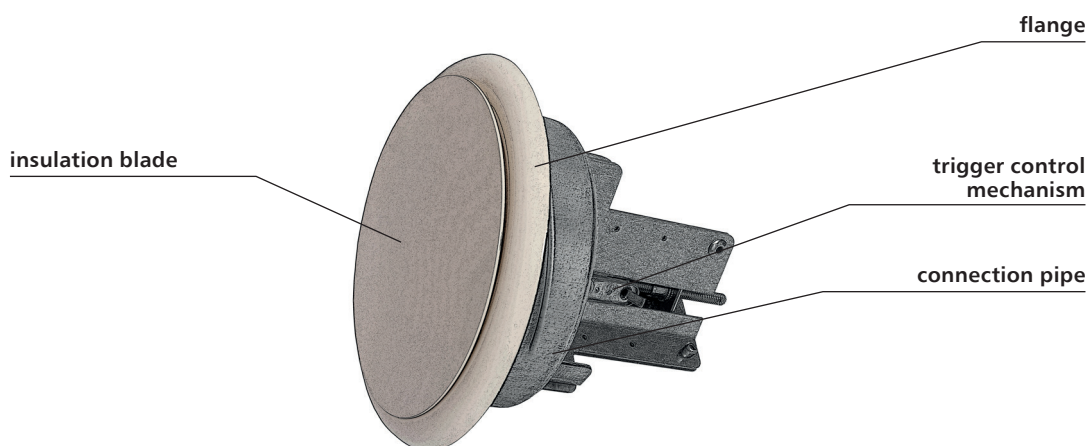
5.1. application

The mcr ZIPP cut-off fire valves are designed for installation at the ends of the general ventilation system, where those systems pass through construction partitions. They are used to separate the fire hazard zone from other parts of the building and to transfer air through construction partitions. During normal system operation, the valves are open. In case of fire, the valves close.

Furthermore, the mcr ZIPP cut-off fire valves may be used to close transfer openings, in which case they are installed without connection ducts.

Valves may also be used in the systems which are protecting escape routes from smoke, in which case they remain open during the fire and ensure the supply of fresh air to escape routes. As the fire develops further, the valves are automatically closed as a result of thermal trigger tripping, which prevents the spreading of fire and smoke to other rooms.

5.2. design



The mcr ZIPP cut-off valves consist of a casing with a circular cross-section, a moving cut-off partition (cover), a connection stub pipe and a trigger control mechanism activated when the thermal or electromagnetic trigger trips, with the automatic trip of the thermal trigger overrides the remote power supply application or disconnection.

The connection stub pipe is made of galvanised steel sheet. The valve flange is made of powder-painted steel sheet. The insulation blade of the valve is made of fire protection material, coated on the outside with powder-painted steel sheet. The blade is placed on a treaded, moving guiding pin, which enables the adjustment of performance (active surface) of the valve by tightening the cover.

During normal operation, cut-off valves remain open. The valve switches to safe mode (closes):

- automatically, by the thermal trigger tripping (RST trigger control mechanism),
- remotely, by the electromagnetic and thermal trigger tripping (RST+EK trigger control mechanism).

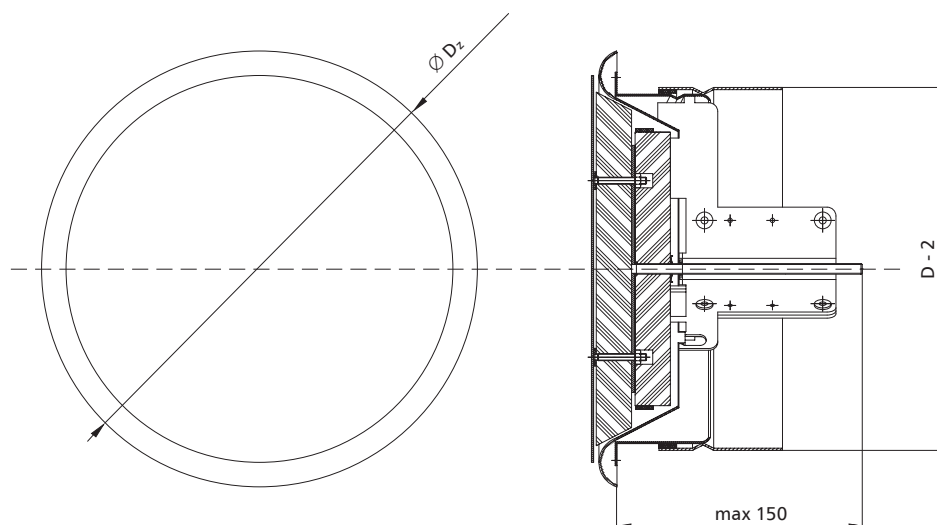
As a standard the valves are painted in RAL 9010.

5.3. versions

5.3.1. mcr ZIPP RST – the cut-off fire valve for ventilation ducts with a thermal trigger

During normal operation, the insulation blade of the fire valve remains open. In case of fire, the blade closes automatically.

The mcr ZIPP RST valves are equipped with a RST trigger control mechanism with a thermal trigger 74°C (optionally, it is possible to use triggers with the nominal tripping temperature of 95°C) and a drive spring. After the nominal temperature is exceeded, the thermal trigger is tripped and the blade closes. It is possible to equip the valves with a WK1 limit switch used to signal the blade position state.

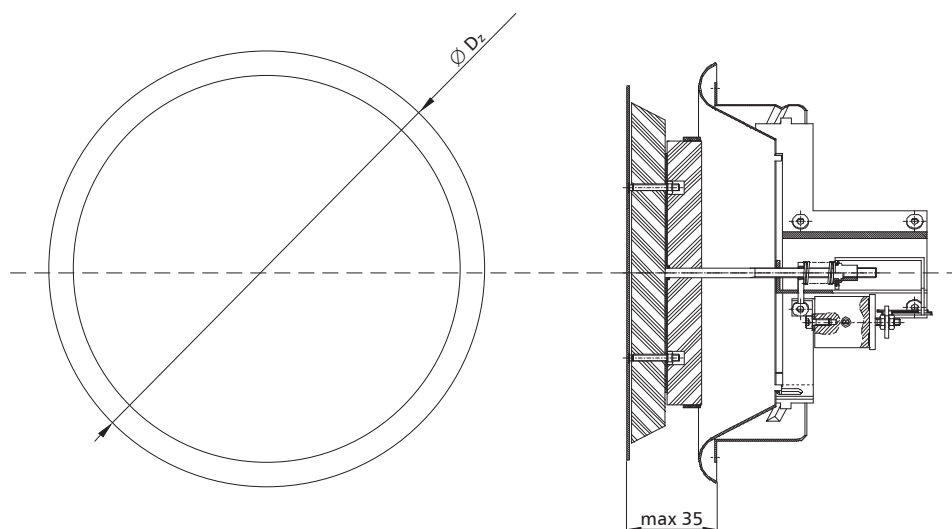


closed valve blade

5.3.2. mcr ZIPP RST+EK – the cut-off fire valve for ventilation ducts with an electromagnetic and thermal trigger

During normal operation, the insulation blade of the fire valve remains open. In case of fire, the blade closes automatically or remotely by applying or cutting off the power supply.

The mcr ZIPP RST+EK valves are equipped with a trigger control mechanism with a thermal trigger 74°C (optionally 95°C), a drive spring and an electromagnetic trigger tripped by the power supply application („pulse”) or removal („break”). The use of a MP230/24 conversion element enables tripping the blade with 230 V AC voltage. The valve is equipped with a WK1 limit switch used to signal the blade position state.



open valve blade

5.4. dimensions

Circular valves:

- nominal diameters D: 100 mm, 125 mm, 160 mm, 200 mm.

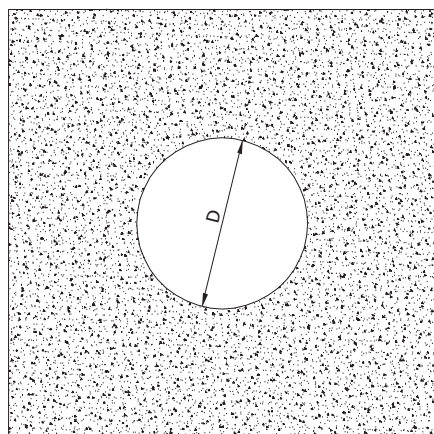
5.5. installation

The mcr ZIPP valves are EI120 (ve ho o↔i)S-rated when installed in concrete partitions made of full bricks or cellular concrete blocks with the thickness of at least 110 mm, light walls of cardboard-plaster panels on a steel framework with the thickness of at least 125 mm and the resistance class of not less than EI120 and concrete ceilings with the thickness of at least 150 mm.

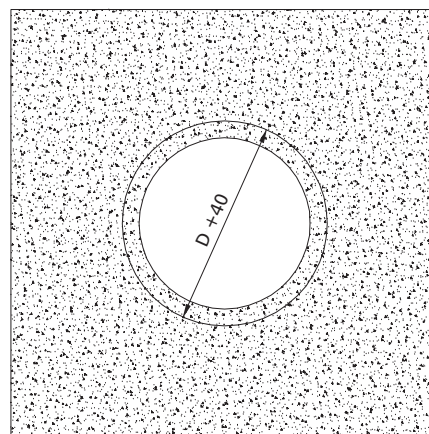
In the case of ductless installation, the valves have the resistance of EI120 (ho i↔o).

5.5.1. preparation of installation openings

in lightweight plaster-cardboard walls

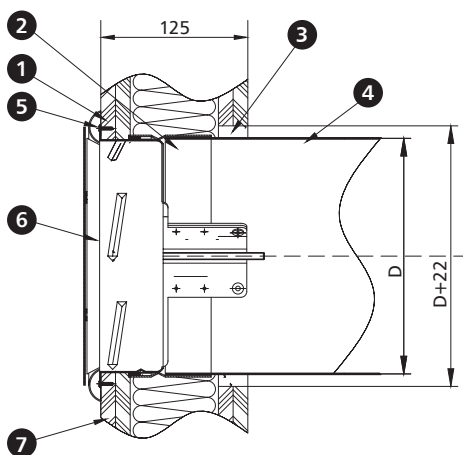


in rigid walls and ceilings



5.5.2. sample installation in lightweight walls of plaster-cardboard panels on a steel framework

duct installation



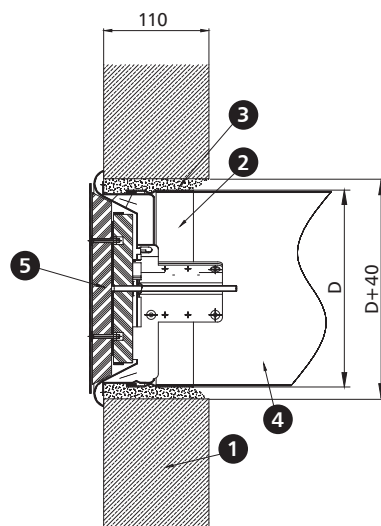
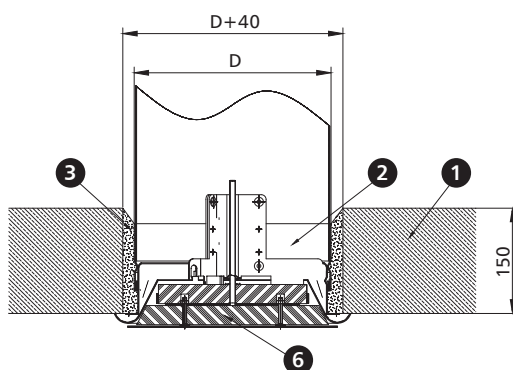
1. plaster-cardboard panel
2. extension connecting pipe
3. sealing - plaster mortar*
4. ventilation duct
5. screw for plaster-cardboard
6. mcr ZIPP valve
7. lightweight plaster-cardboard wall

*it is possible to use a different sealing which ensures the required fire resistance

5.5.3. sample installation in rigid walls
duct installation

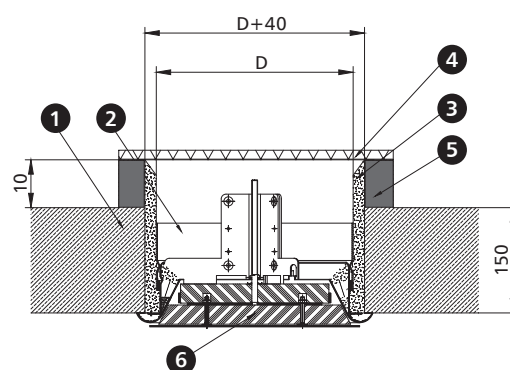
1. rigid concrete or masonry wall
2. extension connection pipe
3. sealing - plaster or cement mortar*
4. duct
5. mcr ZIPP valve

*it is possible to use a different sealing which ensures the required fire resistance


5.5.4. sample installation in ceilings
duct installation


1. ceiling
2. extension connecting pipe
3. sealing - plaster or cement mortar*
4. guard grid (not included)
5. circumferential trim or duct cover with suitable height
6. mcr ZIPP valve

*it is possible to use a different sealing which ensures the required fire resistance

ductless installation

5.6. technical parameters of mcr ZIPP valves

Se – damper active cross-section [m²]

Sk – duct cross-section [m²]

D – nominal diameter [mm]

diameter D [mm]	100	125	160	200
Se	0.0027	0.0055	0.0111	0.0191
Sk	0.0079	0.0123	0.0201	0.0314

Flow characteristics

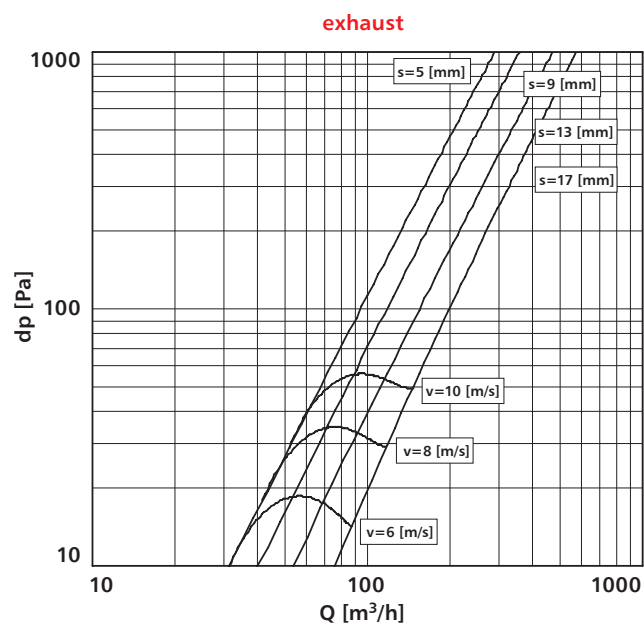
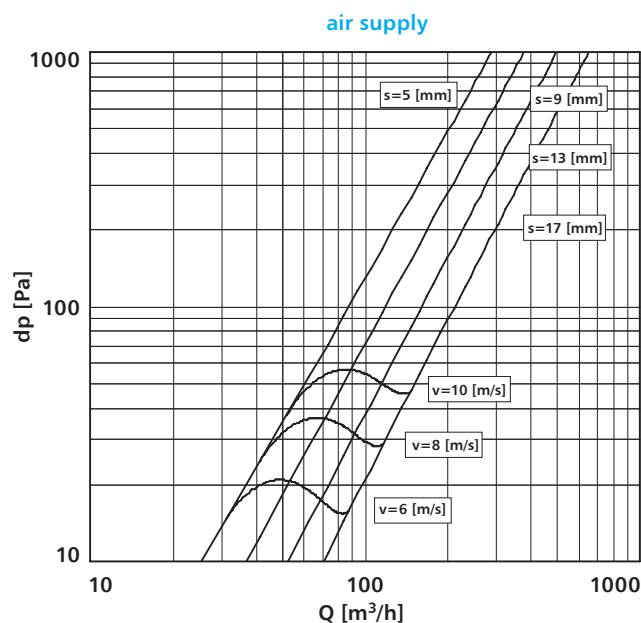
dp – pressure drop [Pa]

s – valve opening [mm]

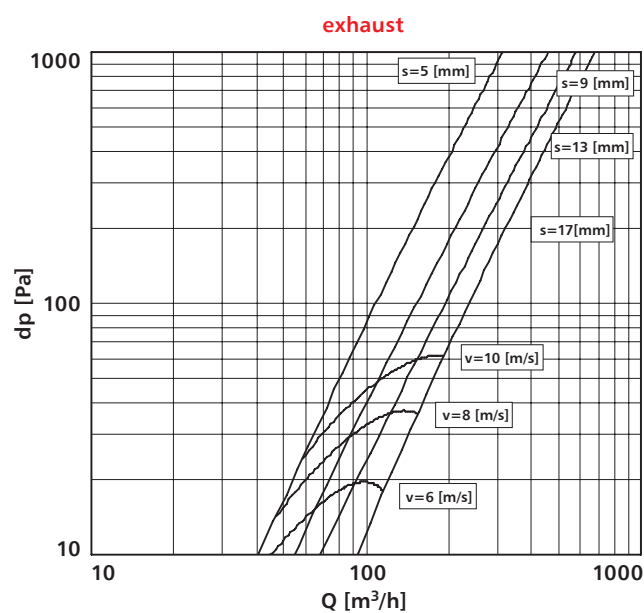
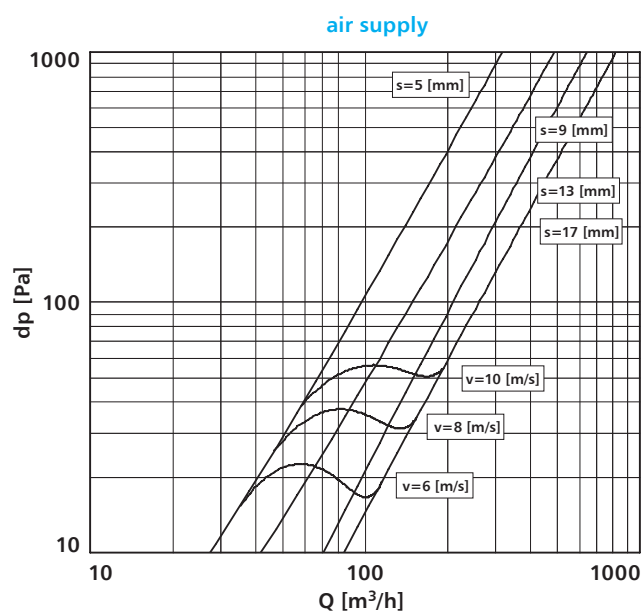
v – velocity [m/s]

Q – flow [m³/h]

mcr ZIPP 100 flow characteristics



mcr ZIPP 125 flow characteristics



Flow characteristics

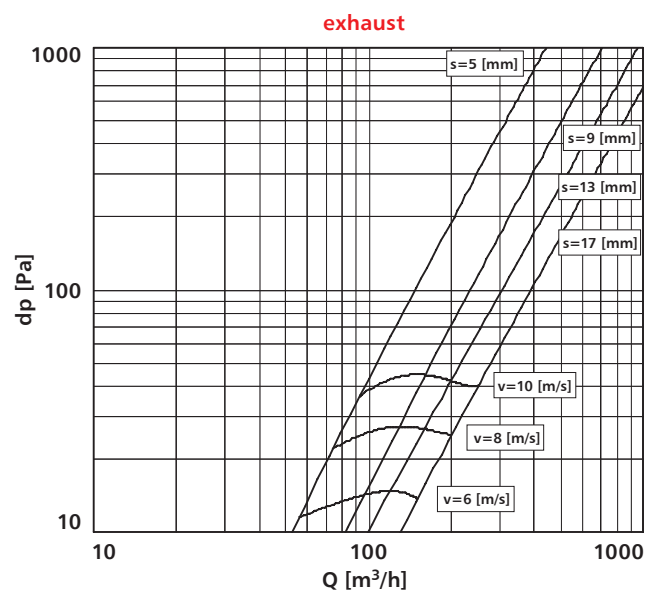
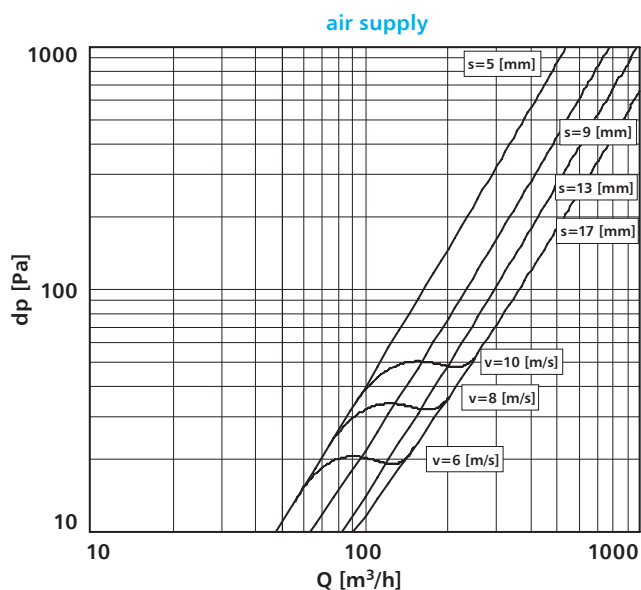
 Δp – pressure drop [Pa]

 s – valve opening [mm]

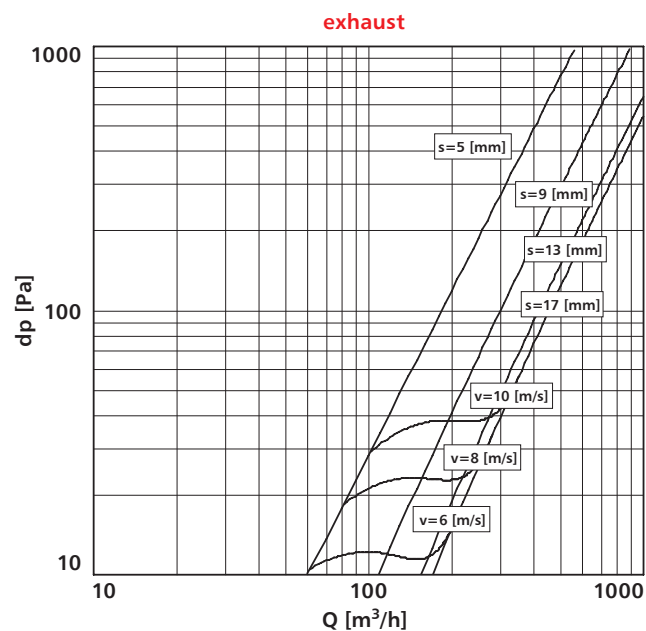
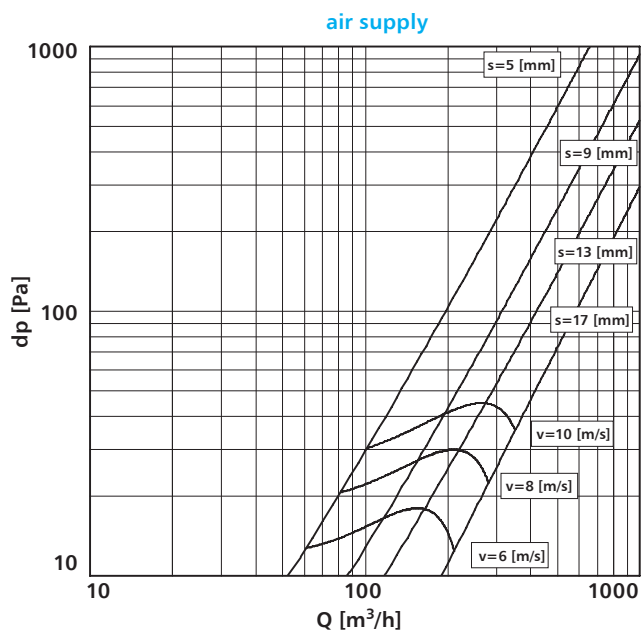
 v – velocity [m/s]

 Q – flow [m³/h]

mcr ZIPP 160 flow characteristics



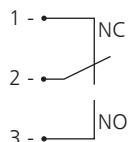
mcr ZIPP 200 flow characteristics



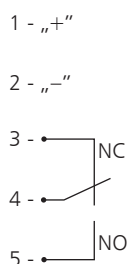
5.7. trigger control mechanisms – specifications and connection diagram

manufacture type	RST	RST+WK1	RST+EKI	RST+EKP	MP230/24
thermal trigger	+	+	+	+	-
limit switch	-	250 V AC / 5A	250V AC / 5A	250 V AC / 5A	-
rated voltage	-	-	24 V DC	24 V DC	230 V AC / output 24 V DC
power consumption	-	-	3.5 W	1.8 W	2 W

electric connection diagram for the mcr ZIPP RST+WK1 valve

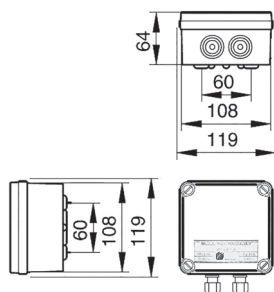


electric connection diagram for the mcr ZIPP RST+EKI valve or RST + EKP



note: the position of limit switch in standby (open valve)

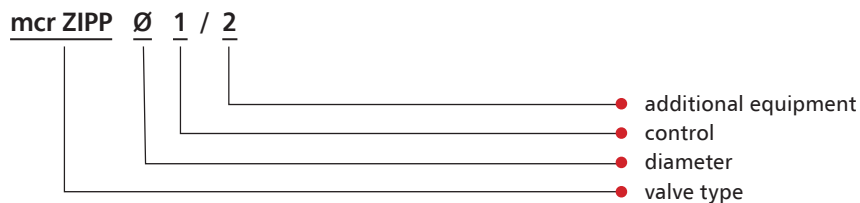
diagram and dimensions of the MP230/24 conversion unit



5.8. weights of the mcr ZIPP valves [kg]

D [mm]	RST	RST+EK
100	0.9	1
125	1.5	1.6
160	1.7	1.8
200	2.7	2.8

5.9. marking

**1 – control:**

- RST trigger control mechanism
RST – thermal trigger
- RST+EK trigger control mechanism
RST+EKI24 – thermal trigger + „pulse” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
RST+EKP24 – thermal trigger + „break” electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)

2 – additional equipment:

- WK1** – limit switch (closed blade signal)
- MP230/24** – conversion unit – possible to power with the voltage of 230 V AC
- RMK** – extension connecting pipe

example marking:**mcr ZIPP Ø125 RST**

EIS120 cut-off fire valve with a thermal trigger rated at 74°C.

mcr ZIPP Ø125 RST + WK1

EIS120 cut-off fire valve with a thermal trigger rated at 74°C and a limit switch.

mcr ZIPP Ø125 RST + EKP24

EIS120 cut-off fire valve with a thermal trigger rated at 74°C and a „break” electromagnetic trigger, U = 24 V DC and a limit switch.

mcr ZIPP Ø125 RST+EKI24+MP230/24

EIS120 cut-off fire valve with a thermal trigger rated at 74°C and a „pulse” electromagnetic trigger, U = 24 V DC, a limit switch and a 230 V AC to 24 V DC voltage conversion unit.

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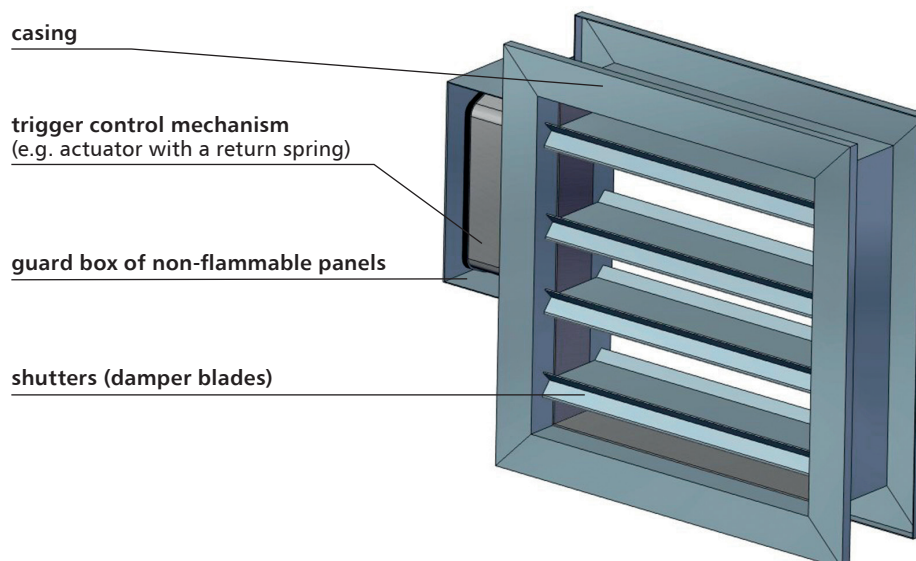
- ▶ **EIS60, ES120**
- ▶ **Certificate of constancy of performance 1396-CPR-P0097.**
- ▶ **Dampers certified for compliance with EN 15650.**
- ▶ **Dampers qualified under EN 13501-3 and tested under EN 1366-2.**
- ▶ **Narrow shutter cut-off dampers.**

6.1. application

The mcr WIP/S multi-blade cut-off dampers are designed for use in general ventilation systems, where those systems pass through construction partitions. The mcr WIP dampers are particularly useful for systems with a silencer elbow or supply and extract grill.

During a fire, the dampers preserve the fire resistance of the construction partition where ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and burning fumes to the remaining part of the building which is not on fire. During normal system operation, the shutters are open. In case of fire, the shutters close.

6.2. design



The mcr WIP/S cut-off dampers consist of a casing with a rectangular cross section, a moving multiple damper blades - shutters rotating on their axes and a trigger control mechanism which is tripped remotely or automatically by tripping a thermoelectric trigger. Damper casing is made of a galvanised or stainless steel sheet. Its integral part is a flange of silicate-cement panels. The inner side of the fire damper casing is equipped with an intumescent gasket. The casing total length is 140 mm.

The shutter surface is covered with galvanised or stainless steel sheet. Each blade with the thickness of 15 mm is filled with a plaster panel. The damper blades rotate on their axes, which consist of two steel pins.

Square and rectangular dampers are made with 50 mm flanges that enable the correct installation of dampers in ventilation ducts. In a circular duct, the damper is made as square with a circular connection.

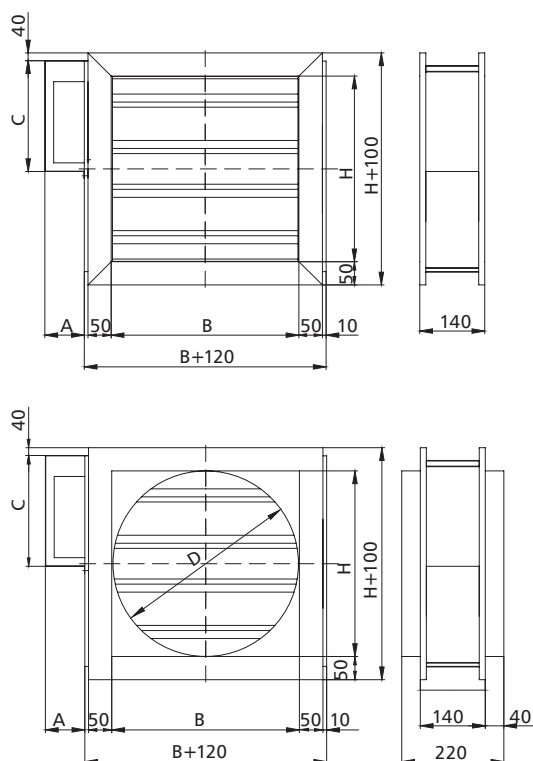
6.3. versions

6.3.1. mcr WIP/S – the cut-off fire damper for ventilation ducts with an actuator with a return spring – damper closing and opening with an actuator

During normal operation, the damper blades of the fire damper remain open. In case of fire, the shutters close automatically or remotely by cutting off the power supply.

The mcr WIP/S dampers are equipped with a Belimo trigger control mechanisms **BFL, BFN, BF, BF-TL, EXBF** axial actuator with a return spring, powered with 24 V AC/DC or 230 V AC, with thermoelectric trigger 72°C (optionally it is possible to use triggers with the nominal tripping temperature of 95°C). BFL, BFN, BF series actuators are equipped with limit switches used to monitor the blade position. Furthermore, the mechanical position indicator is placed on the actuator.

Dampers with Belimo actuators: analogue BFL, BFN, BF, digital BF-TL, EXBF explosion proof actuators close thanks to thermoelectric trigger tripping or power supply cut off as a result of the actuator return spring action. The dampers open when the power supply voltage is applied to the actuator terminals. Furthermore, dampers with those actuators may be opened manually using a key.

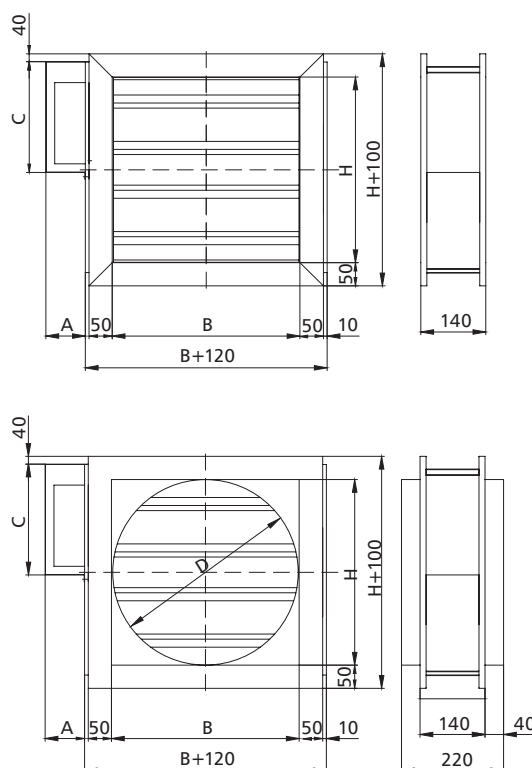


mechanism	A	C
BFN	125	325
BFL	125	275
BF	125	325
BF24TL-ST	125	325
EXBF	175	400

6.3.2. mcr WIP/S – the cut-off fire damper for ventilation ducts with a spring drive and an integrated thermal trigger, optionally equipped with an electromagnetic trigger and limit switches

During normal operation, the cut-off shutters of the fire damper remain open. In case of fire, the shutters close automatically or, in case of a damper with an electromagnetic trigger, additionally using the fire automation.

The mcr WIP/S dampers are equipped with a **RST-KW1** trigger control mechanism with a drive spring and a cam-lever system. A thermal trigger 74°C (optionally at 95°C) is integrated into the damper mechanism. After the nominal temperature is exceeded, the thermal trigger is tripped and the shutters close. On the RST-KW1 mechanism, there is a mechanical blades position indicator. It is possible to equip a trigger control mechanism with an electromagnetic trigger activated by the application („pulse”) or removal („break”) of the power supply voltage and with limit switches used to signal the blades position state. The mechanism is equipped with test and blades button-release functions. Blades re-opening is activated manually using a key.



mechanism	A	C
RST-KW1	165	275

6.4. dimensions

Rectangular dampers:

- nominal width B: from 120 mm to 1000 mm
- nominal height H: from 160 mm to 1000 mm
- the maximum cross-section surface of one damper up to 1 m²

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (in 1 mm increments, in the given range).

Square fire dampers may also be fitted with round connectors for the spigot connection to the round ducts.

6.5. installation

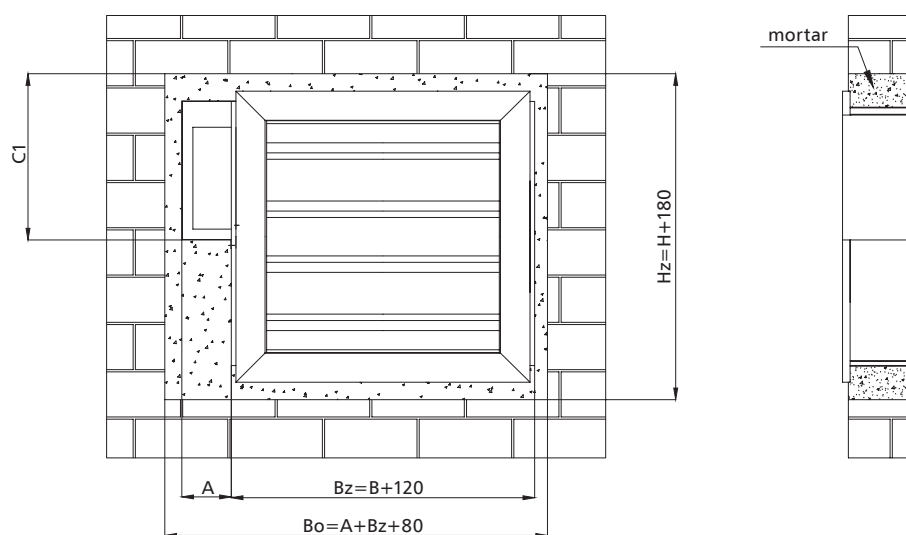
The mcr WIP/S rectangular dampers are EI60(ve i↔o)S-rated and E120(ve i↔o)S-rated when installed in concrete partitions with the thickness of at least 110 mm, made of full bricks or cellular concrete blocks with the thickness of at least 115 mm, lightweight walls with the resistance rating of not less than EI60.

6.5.1. preparation of installation openings

The minimum dimensions of the installation opening that permits correct installation of the mcr WIP/S damper is:

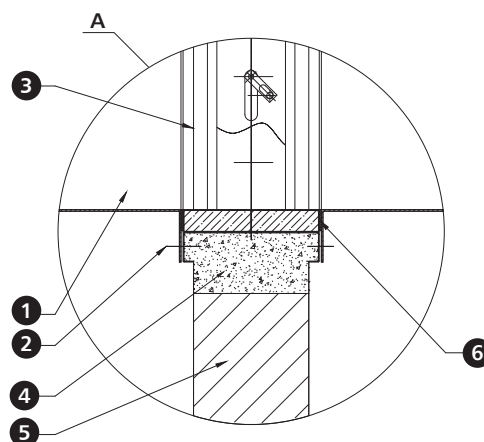
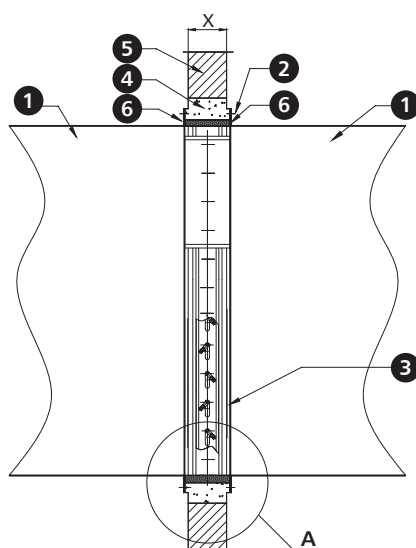
$$Bo = (A+Bz+80) \text{ mm}$$

$$Ho = (H+180) \text{ mm}$$



	BF	BFL	BFN	RST-KW1	EXBF
C1 [mm]	385	335	385	335	460
A [mm]	125	125	125	165	175

6.5.2. sample installation in concrete or masonry walls



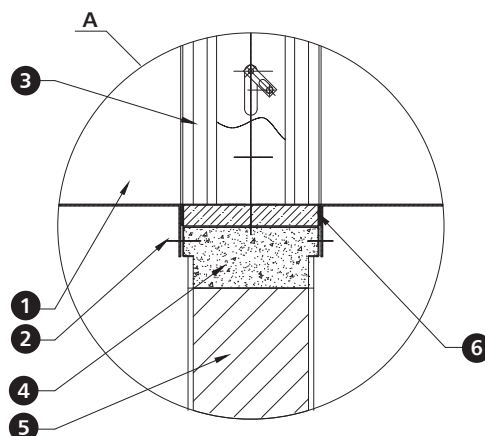
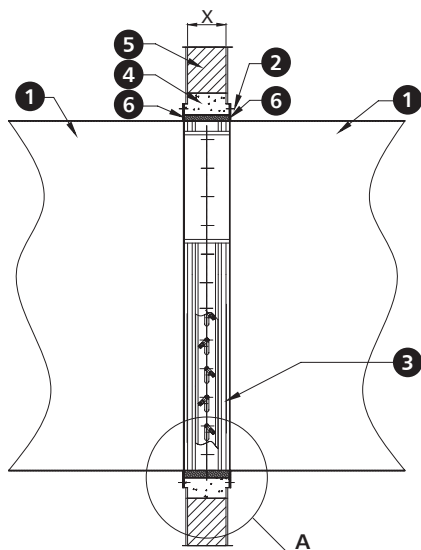
1. ventilation duct
2. screw ST4.2x16

3. fire damper mcr WIP
4. sealing - e.g. cement masonry mortar*

5. masonry wall
X. wall thickness

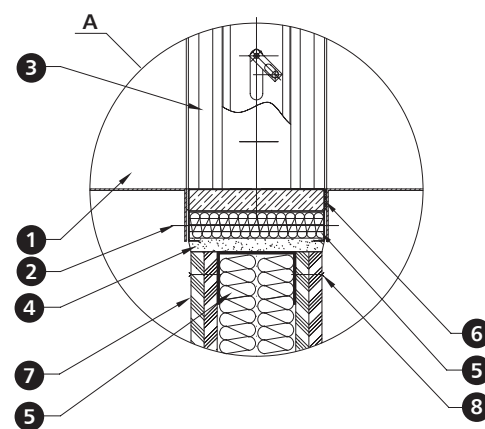
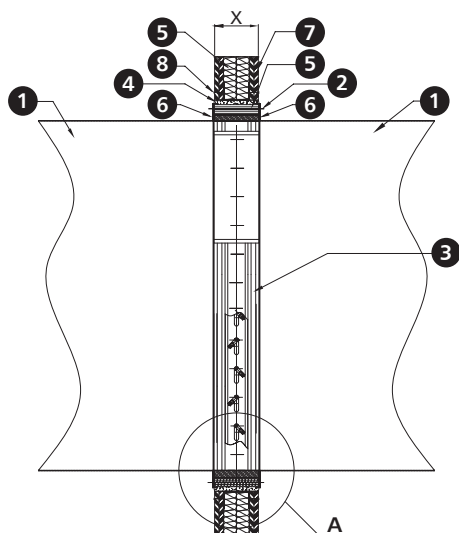
6. heat resistant gasket

*it is possible to use a different sealing which ensures the required fire resistance

6.5.3. sample installation in concrete block or full brick walls


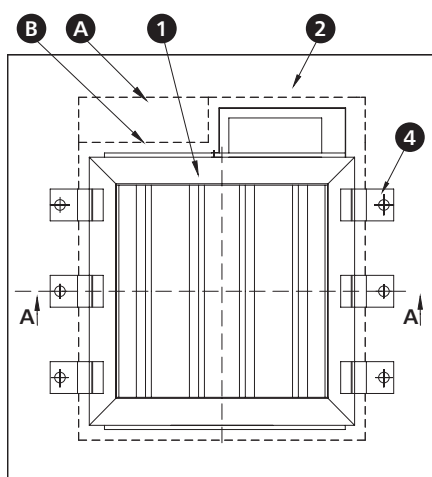
- 1. ventilation duct
- 2. screw ST4.2x16
- 3. fire damper mcr WIP
- 4. sealing - e.g. cement masonry mortar*
- 5. wall of concrete blocks or full bricks
- 6. heat resistant gasket
- X. wall thickness

*it is possible to use a different sealing which ensures the required fire resistance

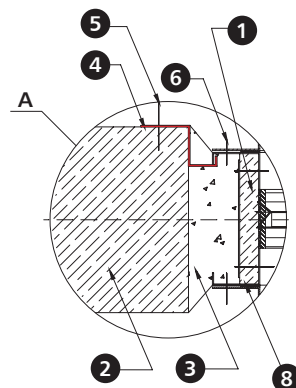
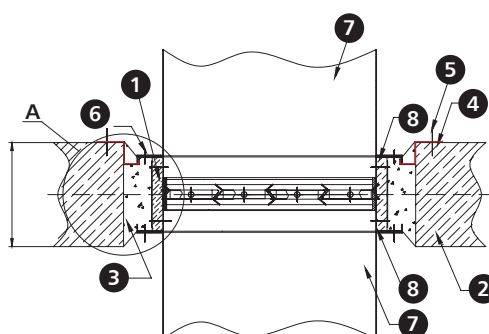
6.5.4. sample installation in lightweight walls


- 1. ventilation duct
- 2. screw ST4.2x16
- 3. fire damper mcr WIP
- 4. sealing - e.g. cement masonry mortar*
- 5. mineral wool with the density of at least 80 kg/m³, A1 class
- 6. heat resistant gasket
- 7. lightweight wall
- 8. screw ST5.5x38
- X. wall thickness

*it is possible to use a different sealing which ensures the required fire resistance

6.5.5. sample installation in ceiling


A - A

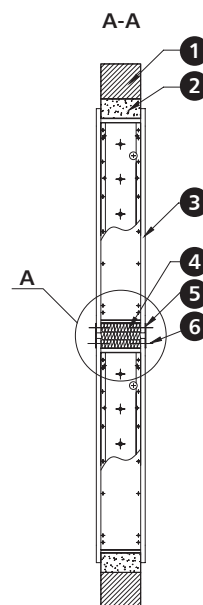
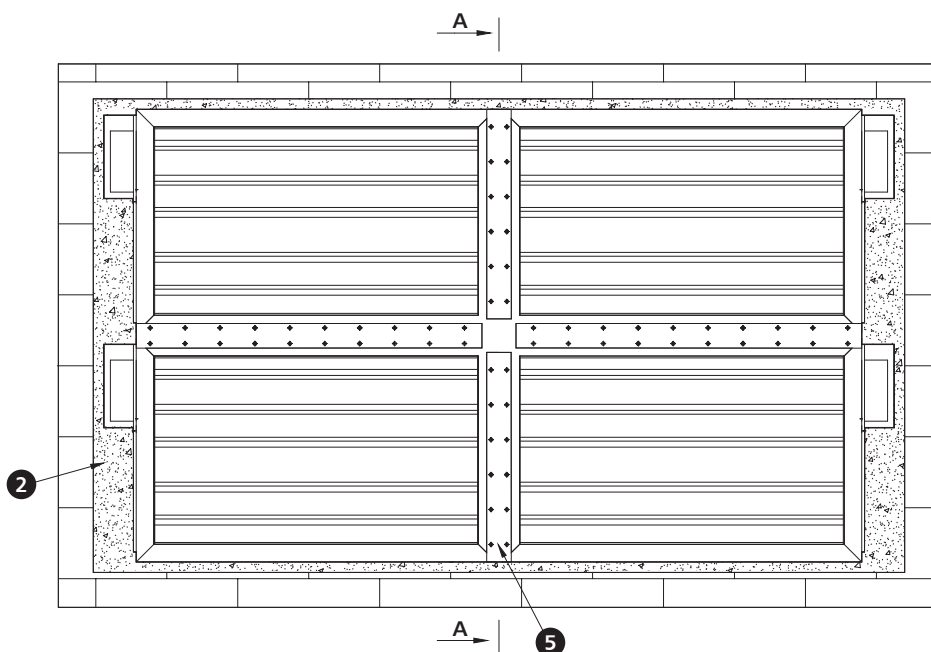


- 1. fire damper mcr WIP
- 2. ceiling
- 3. e.g. cement mortar*

- 4. mounting bracket
- 5. steel expansion anchor with M6 metal screw
- 6. ST4.2x16 screw

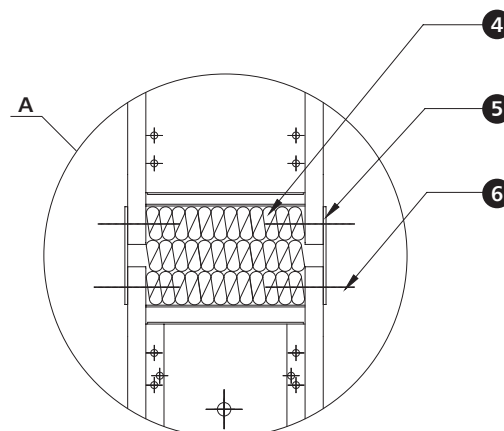
- 7. ventilation duct
- 8. heat resistant gasket
- A./B. construction opening

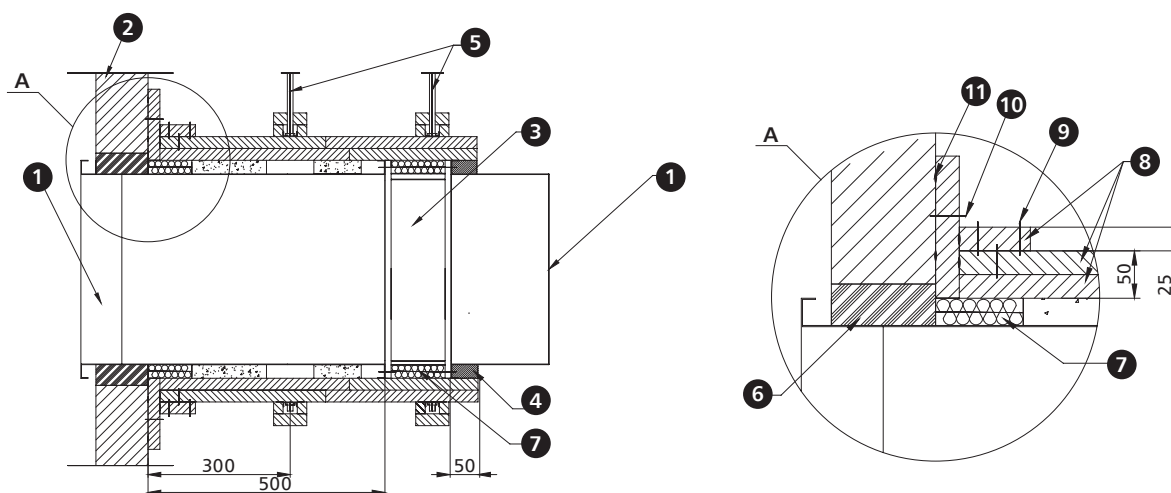
*it is possible to use a different sealing which ensures the required fire resistance

6.5.6 sample installation in a multiple set (a battery of four dampers)


- 1. e.g. masonry wall
- 2. e.g. cement mortar*
- 3. fire damper mcr WIP
- 4. mineral wool with the density of at least 80 kg/m³, A1 class
- 5. installation flat bar with the width of 70 mm
- 6. screw ST8x16

*it is possible to use a different sealing which ensures the required fire resistance



6.5.7. sample installation outside the fire partition


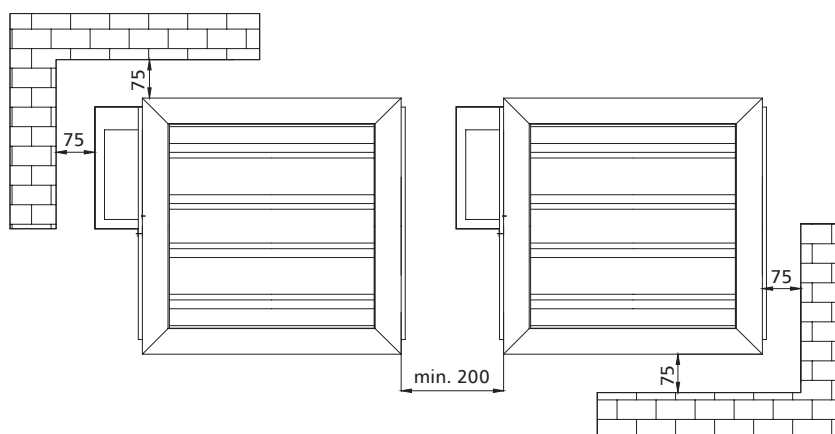
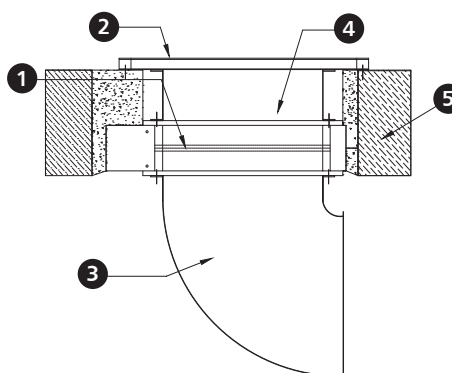
- | | |
|------------------------|--|
| 1. ventilation duct | 5. duct suspension |
| 2. fire partition | 6. sealing (cement or cement-lime masonry mortar)* |
| 3. fire damper mcr WIP | 7. mineral wool with the density of at least 80 kg/m ³ , A1 class |
| 4. gypsum filling | |

- | |
|--|
| 8. Ridurit fire retardant board |
| 9. screws 3.5 x 50 – spacing: ~150 mm |
| 10. steel expansion anchor Ø8 x 80 mm |
| 11. board joints sealed with Conlit Glue |

*it is possible to use a different sealing which ensures the required fire resistance

Fire damper installation with vertical rotation axis of the louvers

The fire damper can operate with vertical axis of louver rotation with the top or bottom-mounted mechanism.

Distance between systems and partitions

Example applications - installation with masking cover


- | |
|--|
| 1. fire damper mcr WIP |
| 2. masking cover |
| 3. ventilation duct |
| 4. duct - ventilation straight connection pipe |
| 5. wall, ceiling |

For mcr WIP/S fire damper with louvers (no single-blade), available free space in front or behind of the fire damper can be used for the installation of its system components including the masking cover, silencer or leading the duct along the wall, using bends or reducer couplings.

6.6. technical parameters of mcr WIP/S rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		wysokość H [mm]															
		200						250					300				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.040	0.034	490	6	26	0.050	0.043	612	6	26	0.06	0.051	734	6	27
		6			734	13	36			918	13	37			1 102	13	37
		8			979	24	44			1 224	23	44			1 469	22	45
		10			1 224	37	49			1 530	36	50			1 836	35	50
	250	4	0.050	0.043	612	6	26	0.063	0.053	765	6	27	0.075	0.064	918	6	28
		6			918	13	37			1 148	13	38			1 377	13	38
		8			1 224	23	44			1 530	23	45			1 836	22	46
		10			1 530	36	50			1 913	36	51			2 295	35	51
	300	4	0.060	0.051	734	6	27	0.075	0.064	918	6	28	0.09	0.077	1 102	6	28
		6			1 102	13	37			1 377	13	38			1 652	13	39
		8			1 469	23	45			1 836	23	46			2 203	22	46
		10			1 836	36	51			2 295	36	52			2 754	35	52
	350	4	0.070	0.060	857	6	27	0.088	0.074	1 071	6	28	0.105	0.089	1 285	5	29
		6			1 285	13	38			1 607	13	39			1 928	12	39
		8			1 714	22	45			2 142	22	46			2 570	22	47
		10			2 142	35	51			2 678	35	52			3 213	34	52
	400	4	0.080	0.068	979	6	28	0.100	0.085	1 224	6	29	0.12	0.102	1 469	5	29
		6			1 469	13	38			1 836	13	39			2 203	12	40
		8			1 958	22	46			2 448	22	47			2 938	22	47
		10			2 448	35	52			3 060	35	53			3 672	34	53
	450	4	0.090	0.077	1 102	6	28	0.113	0.096	1 377	6	29	0.135	0.115	1 652	5	30
		6			1 652	13	39			2 066	13	40			2 479	12	40
		8			2 203	22	46			2 754	22	47			3 305	22	48
		10			2 754	35	52			3 443	35	53			4 131	34	54
	500	4	0.100	0.085	1 224	5	28	0.125	0.106	1 530	5	29	0.15	0.128	1 836	5	30
		6			1 836	12	39			2 295	12	40			2 754	12	40
		8			2 448	22	46			3 060	22	47			3 672	21	48
		10			3 060	34	52			3 825	34	53			4 590	33	54
550	4	0.110	0.094	1 346	5	29	0.138	0.117	1 683	5	30	0.165	0.140	2 020	5	31	
	6			2 020	12	39			2 525	12	40			3 029	12	41	
	8			2 693	22	47			3 366	22	48			4 039	22	49	
	10			3 366	34	53			4 208	34	54			5 049	34	54	
600	4	0.120	0.102	1 469	5	29	0.150	0.128	1 836	5	30	0.18	0.153	2 203	5	31	
	6			2 203	12	40			2 754	12	41			3 305	12	41	
	8			2 938	22	47			3 672	22	48			4 406	21	49	
	10			3 672	34	53			4 590	34	54			5 508	33	54	
650	4	0.130	0.111	1 591	5	30	0.163	0.138	1 989	5	30	0.195	0.166	2 387	5	31	
	6			2 387	12	40			2 984	12	41			3 580	12	41	
	8			3 182	22	48			3 978	22	49			4 774	21	49	
	10			3 978	34	53			4 973	34	54			5 967	33	55	
700	4	0.140	0.119	1 714	5	30	0.175	0.149	2 142	5	31	0.21	0.179	2 570	5	31	
	6			2 570	12	40			3 213	12	41			3 856	12	42	
	8			3 427	22	48			4 284	22	49			5 141	21	49	
	10			4 284	34	54			5 355	34	55			6 426	33	55	
750	4	0.150	0.128	1 836	5	30	0.188	0.159	2 295	5	31	0.225	0.191	2 754	5	31	
	6			2 754	12	40			3 443	12	41			4 131	12	42	
	8			3 672	21	48			4 590	21	49			5 508	21	49	
	10			4 590	33	54			5 738	33	55			6 885	32	55	
800	4	0.160	0.136	1 958	5	30	0.200	0.170	2 448	5	31	0.24	0.204	2 938	5	31	
	6			2 938	12	41			3 672	12	42			4 406	12	42	
	8			3 917	21	48			4 896	21	49			5 875	21	49	
	10			4 896	33	54			6 120	33	55			7 344	32	55	
850	4	0.170	0.145	2 081	5	30	0.213	0.181	2 601	5	31	0.255	0.217	3 121	5	31	
	6			3 121	12	40			3 902	12	41			4 682	11	42	
	8			4 162	21	48			5 202	21	49			6 242	20	49	
	10			5 202	32	54			6 503	32	55			7 803	31	55	
900	4	0.180	0.153	2 203	5	30	0.225	0.191	2 754	5	31	0.27	0.230	3 305	5	31	
	6			3 305	12	41			4 131	12	42			4 957	11	42	
	8			4 406	21	48			5 508	21	49			6 610	20	50	
	10			5 508	32	54			6 885	32	55			8 262	31	55	
1000	4	0.200	0.170	2 448	5	31	0.250	0.213	3 060	5	32	0.3	0.255	3 672	5	32	
	6			3 672	12	41			4 590	12	42			5 508	11	43	
	8			4 896	21	49			6 120	21	50			7 344	20	50	
	10			6 120	32	54			7 650	32	55			9 180	31	56	

The mcr WIP fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

6.6. technical parameters of mcr WIP/S rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		350						400					450				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.070	0.060	857	6	27	0.080	0.068	979	5	27	0.090	0.077	1 102	5	28
		6			1 285	13	38			1 469	12	38			1 652	12	38
		8			1 714	22	45			1 958	22	45			2 203	22	46
		10			2 142	35	51			2 448	34	51			2 754	34	52
	250	4	0.088	0.074	1 071	6	28	0.100	0.085	1 224	5	28	0.113	0.096	1 377	5	29
		6			1 607	13	39			1 836	12	39			2 066	12	39
		8			2 142	22	46			2 448	22	46			2 754	22	47
		10			2 678	35	52			3 060	34	52			3 443	34	53
	300	4	0.105	0.089	1 285	6	29	0.120	0.102	1 469	5	29	0.135	0.115	1 652	5	30
		6			1 928	13	40			2 203	12	40			2 479	12	40
		8			2 570	22	47			2 938	22	47			3 305	22	48
		10			3 213	35	53			3 672	34	53			4 131	34	54
	350	4	0.123	0.104	1 499	5	29	0.140	0.119	1 714	5	29	0.158	0.134	1 928	5	30
		6			2 249	12	40			2 570	12	40			2 892	12	41
		8			2 999	22	47			3 427	21	48			3 856	21	48
		10			3 749	34	53			4 284	33	53			4 820	33	54
	400	4	0.140	0.119	1 714	5	30	0.160	0.136	1 958	5	30	0.180	0.153	2 203	5	31
		6			2 570	12	40			2 938	12	41			3 305	12	41
		8			3 427	22	48			3 917	21	48			4 406	21	49
		10			4 284	34	54			4 896	33	54			5 508	33	54
450	4	0.158	0.134	1 928	5	30	0.180	0.153	2 203	5	31	0.203	0.172	2 479	5	31	
	6			2 892	12	41			3 305	12	41			3 718	12	42	
	8			3 856	22	48			4 406	21	49			4 957	21	49	
	10			4 820	34	54			5 508	33	54			6 197	33	55	
500	4	0.175	0.149	2 142	5	30	0.200	0.170	2 448	5	31	0.225	0.191	2 754	5	32	
	6			3 213	12	41			3 672	12	42			4 131	12	42	
	8			4 284	21	48			4 896	21	49			5 508	21	50	
	10			5 355	33	54			6 120	33	55			6 885	33	55	
550	4	0.193	0.164	2 570	5	31	0.220	0.187	2 693	5	31	0.248	0.210	3 029	5	32	
	6			3 856	12	42			4 039	12	42			4 544	12	43	
	8			5 141	22	49			5 386	21	49			6 059	21	50	
	10			6 426	34	55			6 732	33	55			7 574	33	56	
600	4	0.210	0.179	2 570	5	31	0.240	0.204	2 938	4	28	0.270	0.230	3 305	5	32	
	6			3 856	12	42			4 406	8	37			4 957	12	42	
	8			5 141	21	49			5 875	14	44			6 610	21	50	
	10			6 426	33	55			7 344	32	55			8 262	32	56	
650	4	0.228	0.193	2 785	5	32	0.260	0.221	3 182	5	32	0.293	0.249	3 580	5	32	
	6			4 177	12	42			4 774	12	42			5 370	12	43	
	8			5 569	21	50			6 365	21	50			7 160	21	50	
	10			6 962	33	55			7 956	32	56			8 951	32	56	
700	4	0.245	0.208	2 999	5	32	0.28	0.238	3 427	5	32	0.315	0.268	3 856	5	33	
	6			4 498	12	42			5 141	12	43			5 783	12	43	
	8			5 998	21	50			6 854	21	50			7 711	21	51	
	10			7 497	33	56			8 568	32	56			9 639	32	56	
750	4	0.263	0.223	3 213	5	32	0.3	0.255	3 672	5	32	0.338	0.287	4 131	5	33	
	6			4 820	12	42			5 508	12	43			6 197	12	43	
	8			6 426	21	50			7 344	21	50			8 262	21	51	
	10			8 033	32	56			9 180	32	56			10 328	32	57	
800	4	0.280	0.238	3 427	5	32	0.32	0.272	3 917	5	33	0.360	0.306	4 406	5	32	
	6			5 141	12	43			5 875	11	43			6 610	11	42	
	8			6 854	21	50			7 834	20	50			8 813	20	50	
	10			8 568	32	56			9 792	31	56			11 016	31	56	
850	4	0.298	0.253	3 641	5	32	0.34	0.289	4 162	5	32	0.383	0.325	4 682	5	31	
	6			5 462	11	42			6 242	11	43			7 023	11	42	
	8			7 283	20	50			8 323	19	50			9 364	19	49	
	10			9 104	31	56			10 404	30	56			11 705	30	55	
900	4	0.315	0.268	3 856	5	32	0.360	0.306	4 406	6	35	0.405	0.344	4 957	5	31	
	6			5 783	11	43			6 610	12	44			7 436	11	42	
	8			7 711	20	50			8 813	26	54			9 914	19	49	
	10			9 639	31	56			11 016	30	56			12 393	30	55	
1000	4	0.350	0.298	4 284	5	33	0.400	0.340	4 896	5	33	0.450	0.383	5 508	5	31	
	6			6 426	11	43			7 344	11	43			8 262	11	42	
	8			8 568	20	51			9 792	19	51			11 016	19	49	
	10			10 710	31	56			12 240	30	57			13 770	30	55	

The mcr WIP fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

6.6. technical parameters of mcr WIP/S rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		500						550					600				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.100	0.085	1 224	5	28	0.110	0.094	1 346	5	28	0.120	0.102	1 469	5	28
		6			1 836	12	39			2 020	12	39			2 203	12	39
		8			2 448	21	46			2 693	21	46			2 938	21	46
		10			3 060	33	52			3 366	33	52			3 672	32	52
	250	4	0.125	0.106	1 530	5	29	0.138	0.117	1 683	5	29	0.150	0.128	1 836	5	29
		6			2 295	12	40			2 525	12	40			2 754	12	40
		8			3 060	21	47			3 366	21	47			3 672	21	47
		10			3 825	33	53			4 208	33	53			4 590	32	53
	300	4	0.150	0.128	1 836	5	30	0.165	0.140	2 020	5	30	0.180	0.153	2 203	5	30
		6			2 754	12	40			3 029	12	41			3 305	12	41
		8			3 672	21	48			4 039	21	48			4 406	21	48
		10			4 590	33	54			5 049	33	54			5 508	32	54
	350	4	0.175	0.149	2 142	5	30	0.193	0.164	2 356	5	30	0.210	0.179	2 570	5	30
		6			3 213	12	41			3 534	12	41			3 856	11	41
		8			4 284	21	48			4 712	21	49			5 141	20	48
		10			5 355	32	54			5 891	32	54			6 426	31	54
	400	4	0.200	0.170	2 448	5	31	0.220	0.187	2 693	5	31	0.240	0.204	2 938	5	31
		6			3 672	12	41			4 039	12	42			4 406	11	42
		8			4 896	21	49			5 386	21	49			5 875	20	49
		10			6 120	32	54			6 732	32	55			7 344	31	55
450	4	0.225	0.191	2 754	5	31	0.248	0.210	3 029	5	32	0.270	0.230	3 305	5	31	
	6			4 131	12	42			4 544	12	42			4 957	11	42	
	8			5 508	21	49			6 059	21	50			6 610	20	50	
	10			6 885	32	55			7 574	32	55			8 262	31	55	
500	4	0.250	0.213	3 060	5	31	0.275	0.234	3 366	5	32	0.300	0.255	3 672	5	32	
	6			4 590	11	42			5 049	12	43			5 508	11	43	
	8			6 120	22	51			6 732	21	50			7 344	20	50	
	10			7 650	32	55			8 415	32	56			9 180	31	56	
550	4	0.275	0.234	3 672	5	32	0.303	0.257	4 039	5	32	0.330	0.281	4 406	5	32	
	6			5 508	12	43			6 059	12	43			6 610	11	43	
	8			7 344	21	50			8 078	21	50			8 813	20	50	
	10			9 180	32	56			10 098	32	56			11 016	31	56	
600	4	0.300	0.255	3 672	5	32	0.330	0.281	4 039	5	32	0.360	0.306	4 406	5	32	
	6			5 508	11	43			6 059	11	43			6 610	11	43	
	8			7 344	20	50			8 078	20	50			8 813	19	50	
	10			9 180	31	56			10 098	31	56			11 016	30	56	
650	4	0.325	0.276	3 978	5	33	0.358	0.304	4 376	5	33	0.390	0.332	4 774	5	33	
	6			5 967	12	43			6 564	11	43			7 160	11	43	
	8			7 956	21	51			8 752	20	51			9 547	19	51	
	10			9 945	31	56			10 940	31	57			11 934	30	57	
700	4	0.350	0.298	4 284	5	33	0.385	0.327	4 712	5	33	0.420	0.357	5 141	5	33	
	6			6 426	11	43			7 069	11	44			7 711	11	44	
	8			8 568	20	51			9 425	20	51			10 282	19	51	
	10			10 710	31	56			11 781	31	57			12 852	30	57	
750	4	0.375	0.319	4 590	5	33	0.413	0.351	5 049	5	33	0.450	0.383	5 508	5	33	
	6			6 885	11	43			7 574	11	44			8 262	11	44	
	8			9 180	20	51			10 098	20	51			11 016	19	51	
	10			11 475	31	57			12 623	31	57			13 770	30	57	
800	4	0.400	0.340	4 896	5	32	0.440	0.374	5 386	5	33	0.480	0.408	5 875	5	33	
	6			7 344	11	43			8 078	11	44			8 813	10	44	
	8			9 792	19	51			10 771	19	51			11 750	19	51	
	10			12 240	30	56			13 464	30	57			14 688	29	57	
850	4	0.425	0.361	5 202	5	32	0.468	0.397	5 722	5	33	0.510	0.434	6 242	4	33	
	6			7 803	10	43			8 583	10	44			9 364	10	43	
	8			10 404	19	50			11 444	19	51			12 485	18	51	
	10			13 005	29	56			14 306	29	57			15 606	28	57	
900	4	0.450	0.383	5 508	5	32	0.495	0.421	6 059	5	33	0.540	0.459	6 610	4	33	
	6			8 262	10	43			9 088	10	44			9 914	10	41	
	8			11 016	19	50			12 118	19	51			13 219	18	49	
	10			13 770	29	56			15 147	29	57			16 524	28	54	
1000	4	0.500	0.425	6 120	5	32	0.550	0.468	6 059	5	34	0.600	0.510	7 344	4	34	
	6			9 180	10	43			9 088	10	44			11 016	10	44	
	8			12 240	19	50			12 118	19	52			14 688	18	52	
	10			15 300	29	56			15 147	29	58			18 360	28	57	

The mcr WIP fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

6.6. technical parameters of mcr WIP/S rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		650					700					750				
width B [mm]	v [m/s]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]
200	4	0.130	0.111	1 591	5	29	0.140	0.119	1 714	5	29	0.150	0.128	1 836	5	29
	6			2 387	12	39			2 570	11	39			2 754	11	40
	8			3 182	21	47			3 427	20	47			3 672	20	47
	10			3 978	32	53			4 284	31	52			4 590	31	53
250	4	0.163	0.138	1 989	5	30	0.175	0.149	2 142	5	30	0.188	0.159	2 295	5	30
	6			2 984	12	40			3 213	11	40			3 443	11	40
	8			3 978	21	48			4 284	20	48			4 590	20	48
	10			4 973	32	54			5 355	31	53			5 738	31	54
300	4	0.195	0.166	2 387	5	30	0.210	0.179	2 570	5	30	0.225	0.191	2 754	5	31
	6			3 580	12	41			3 856	11	41			4 131	11	41
	8			4 774	21	49			5 141	20	48			5 508	20	49
	10			5 967	32	54			6 426	31	54			6 885	31	55
350	4	0.228	0.193	2 785	5	31	0.245	0.208	2 999	5	31	0.263	0.223	3 213	5	31
	6			4 177	11	41			4 498	11	41			4 820	11	42
	8			5 569	20	49			5 998	19	49			6 426	19	49
	10			6 962	31	55			7 497	30	54			8 033	30	55
400	4	0.260	0.221	3 182	5	31	0.280	0.238	3 427	5	31	0.300	0.255	3 672	5	32
	6			4 774	11	42			5 141	11	42			5 508	11	42
	8			6 365	20	49			6 854	19	49			7 344	19	50
	10			7 956	31	55			8 568	30	55			9 180	30	55
450	4	0.293	0.249	3 580	5	32	0.315	0.268	3 856	5	32	0.338	0.287	4 131	5	32
	6			5 370	11	42			5 783	11	42			6 197	11	43
	8			7 160	20	50			7 711	19	50			8 262	19	50
	10			8 951	31	56			9 639	30	56			10 328	30	56
500	4	0.325	0.276	3 978	5	32	0.350	0.298	4 284	5	32	0.375	0.319	4 590	5	32
	6			5 967	11	43			6 426	11	43			6 885	11	43
	8			7 956	20	50			8 568	19	50			9 180	19	51
	10			9 945	31	56			10 710	30	56			11 475	30	56
550	4	0.358	0.304	4 774	5	33	0.385	0.327	4 712	5	33	0.413	0.351	5 049	5	33
	6			7 160	11	43			7 069	11	43			7 574	11	43
	8			9 547	20	51			9 425	19	51			10 098	19	51
	10			11 934	31	57			11 781	30	56			12 623	30	57
600	4	0.390	0.332	4 774	5	33	0.420	0.357	5 141	5	33	0.450	0.383	5 508	5	33
	6			7 160	11	44			7 711	11	44			8 262	11	44
	8			9 547	20	51			10 282	19	51			11 016	19	51
	10			11 934	31	57			12 852	30	57			13 770	30	57
650	4	0.423	0.359	5 171	5	33	0.455	0.387	5 569	5	33	0.488	0.414	5 967	5	33
	6			7 757	11	44			8 354	10	43			8 951	10	44
	8			10 343	19	51			11 138	19	51			11 934	19	51
	10			12 929	30	57			13 923	29	57			14 918	29	57
700	4	0.455	0.387	5 569	5	33	0.490	0.417	5 998	5	33	0.525	0.446	6 426	5	34
	6			8 354	11	44			8 996	10	44			9 639	10	44
	8			11 138	19	51			11 995	19	51			12 852	19	52
	10			13 923	30	57			14 994	29	57			16 065	29	57
750	4	0.488	0.414	5 967	5	34	0.525	0.446	6 426	5	34	0.563	0.478	6 885	5	34
	6			8 951	11	44			9 639	10	44			10 328	10	44
	8			11 934	19	52			12 852	19	52			13 770	19	52
	10			14 918	30	57			16 065	29	57			17 213	29	58
800	4	0.520	0.442	6 365	5	33	0.560	0.476	6 854	4	29	0.600	0.510	7 344	4	34
	6			9 547	10	44			10 282	7	37			11 016	10	44
	8			12 730	19	51			13 709	11	43			14 688	18	52
	10			15 912	29	57			17 136	28	54			18 360	28	57
850	4	0.553	0.470	6 763	4	33	0.595	0.506	7 283	4	34	0.638	0.542	7 803	4	34
	6			10 144	10	43			10 924	10	44			11 705	10	44
	8			13 525	18	51			14 566	18	52			15 606	18	52
	10			16 907	28	57			18 207	28	57			19 508	28	58
900	4	0.585	0.497	7 160	4	33	0.630	0.536	7 711	4	33	0.675	0.574	8 262	4	34
	6			10 741	10	43			11 567	10	44			12 393	10	44
	8			14 321	18	51			15 422	17	51			16 524	17	52
	10			17 901	28	57			19 278	27	57			20 655	27	58
1000	4	0.650	0.553	7 956	4	33	0.700	0.595	8 568	4	34	0.750	0.638	9 180	4	34
	6			11 934	10	43			12 852	10	44			13 770	10	45
	8			15 912	18	51			17 136	17	52			18 360	17	52
	10			19 890	28	57			21 420	27	58			22 950	27	58

The mcr WIP fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

6.6. technical parameters of mcr WIP/S rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]																				
		800						850				900				1000						
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.160	0.136	1 958	5	29	0.170	0.145	2 081	5	29	0.180	0.153	2 203	5	29	0.200	0.170	2 448	5	29
		6			2 938	11	39			3 121	11	40			3 305	10	39			3 672	10	40
		8			3 917	19	47			4 162	19	47			4 406	19	47			4 896	19	47
		10			4 896	30	53			5 202	30	53			5 508	29	53			6 120	29	53
	250	4	0.200	0.170	2 448	5	30	0.213	0.181	2 601	5	30	0.225	0.191	2 754	5	30	0.250	0.213	3 060	5	30
		6			3 672	11	40			3 902	11	41			4 131	10	40			4 590	10	41
		8			4 896	19	48			5 202	19	48			5 508	19	48			6 120	19	48
		10			6 120	30	54			6 503	30	54			6 885	29	54			7 650	29	54
	300	4	0.240	0.204	2 938	5	31	0.255	0.217	3 121	5	31	0.270	0.230	3 305	5	31	0.300	0.255	3 672	5	31
		6			4 406	11	41			4 682	11	41			4 957	10	41			5 508	10	42
		8			5 875	19	49			6 242	19	49			6 610	19	49			7 344	19	49
		10			7 344	30	54			7 803	30	55			8 262	29	54			9 180	29	55
350	4	0.280	0.238	3 427	5	31	0.298	0.253	3 641	5	31	0.315	0.268	3 856	4	31	0.350	0.298	4 284	4	31	
	6			5 141	10	41			5 462	10	42			5 783	10	41			6 426	10	42	
	8			6 854	19	49			7 283	19	49			7 711	18	49			8 568	18	49	
	10			8 568	29	55			9 104	29	55			9 639	28	55			10 710	28	55	
400	4	0.320	0.272	3 917	5	31	0.340	0.289	4 162	5	32	0.360	0.306	4 406	4	31	0.400	0.340	4 896	4	32	
	6			5 875	10	42			6 242	10	42			6 610	10	42			7 344	10	42	
	8			7 834	19	49			8 323	19	50			8 813	18	49			9 792	18	50	
	10			9 792	29	55			10 404	29	55			11 016	28	55			12 240	28	56	
450	4	0.360	0.306	4 406	5	32	0.383	0.325	4 682	4	32	0.405	0.344	4 957	4	31	0.450	0.383	5 508	4	32	
	6			6 610	10	42			7 023	10	42			7 436	10	42			8 262	10	42	
	8			8 813	19	50			9 364	18	50			9 914	17	50			11 016	17	50	
	10			11 016	29	56			11 705	28	56			12 393	27	55			13 770	27	56	
500	4	0.400	0.340	4 896	5	32	0.425	0.361	5 202	4	32	0.450	0.383	5 508	4	32	0.500	0.425	6 120	4	32	
	6			7 344	10	43			7 803	10	43			8 262	10	42			9 180	10	43	
	8			9 792	19	50			10 404	18	50			11 016	17	50			12 240	17	50	
	10			12 240	29	56			13 005	28	56			13 770	27	56			15 300	27	56	
550	4	0.440	0.374	5 386	5	33	0.468	0.397	5 722	4	33	0.495	0.421	6 059	4	32	0.550	0.468	6 732	4	33	
	6			8 078	10	43			8 583	10	43			9 088	10	43			10 098	10	43	
	8			10 771	19	51			11 444	18	51			12 118	17	50			13 464	17	51	
	10			13 464	29	57			14 306	28	56			15 147	27	56			16 830	27	57	
600	4	0.480	0.408	5 875	5	33	0.510	0.434	6 242	4	33	0.540	0.459	6 610	4	33	0.600	0.510	7 344	4	33	
	6			8 813	10	44			9 364	10	43			9 914	10	43			11 016	10	44	
	8			11 750	19	51			12 485	18	51			13 219	17	51			14 688	17	51	
	10			14 688	29	57			15 606	28	57			16 524	27	57			18 360	27	57	
650	4	0.520	0.442	6 365	5	33	0.553	0.470	6 763	4	33	0.585	0.497	7 160	4	33	0.650	0.553	7 956	4	34	
	6			9 547	10	44			10 144	10	44			10 741	10	44			11 934	10	44	
	8			12 730	19	52			13 525	18	51			14 321	17	51			15 912	17	52	
	10			15 912	29	57			16 907	28	57			17 901	27	57			19 890	27	57	
700	4	0.560	0.476	6 854	4	33	0.595	0.506	7 283	4	33	0.630	0.536	7 711	4	33	0.700	0.595	8 568	4	33	
	6			10 282	10	44			10 924	10	44			11 567	9	43			12 852	9	44	
	8			13 709	18	51			14 566	17	51			15 422	17	51			17 136	17	51	
	10			17 136	28	57			18 207	27	57			19 278	26	57			21 420	26	57	
750	4	0.600	0.510	7 344	4	34	0.638	0.542	7 803	4	33	0.675	0.574	8 262	4	33	0.750	0.638	9 180	4	34	
	6			11 016	10	44			11 705	10	44			12 393	9	44			13 770	9	44	
	8			14 688	18	52			15 606	17	51			16 524	17	51			18 360	17	52	
	10			18 360	28	57			19 508	27	57			20 655	26	57			22 950	26	57	
800	4	0.640	0.544	7 834	4	34	0.680	0.578	8 323	4	34	0.720	0.612	8 813	4	33	0.800	0.680	9 792	4	34	
	6			11 750	10	44			12 485	10	44			13 219	9	44			14 688	9	44	
	8			15 667	18	52			16 646	17	52			17 626	17	52			19 584	17	52	
	10			19 584	28	58			20 808	27	58			22 032	26	57			24 480	26	58	
850	4	0.680	0.578	8 323	4	34	0.723	0.614	8 843	4	33	0.765	0.650	9 364	4	34	0.850	0.723	10 404	4	34	
	6			12 485	10	44			13 265	9	44			14 045	9	44			15 606	9	45	
	8			16 646	17	52			17 687	17	52			18 727	17	52			20 808	17	52	
	10			20 808	27	58			22 109	26	57			23 409	26	58			26 010	26	58	
900	4	0.720	0.612	8 813	4	34	0.765	0.650	9 364	4	34	0.810	0.689	9 914	4	34	0.900	0.765	11 016	4	34	
	6			13 219	10	45			14 045	9	44			14 872	9	45			16 524	9	44	
	8			17 626	17	52			18 727	17	52			19 829	17	52			22 032	16	52	
	10			22 032	27	58			23 409	26	58			24 786	26	58			27 540	25	58	
1000	4	0.800	0.680	9 792	4	34	0.850	0.723	10 404	4	34	0.900	0.765	11 016	4	33	1.000	0.850	12 240	4	34	
	6			14 688	9	44			15 606	9	44			16 524	9	44			18 360	9	44	
	8			19 584	17	52			20 808	16	52			22 032	15	51			24 480	15	52	
	10			24 480	26	58			26 010	25	58			27 540	24	57			30 600	24	58	

The mcr WIP fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

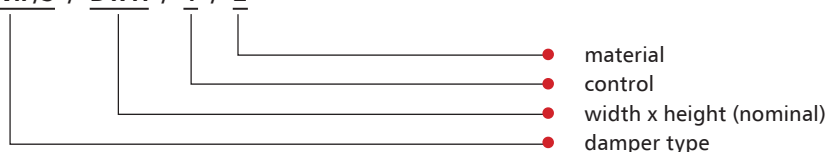
6.7. estimated weights of mcr WIP/S dampers for rectangular ducts [kg]

		width B [mm]									
		200	250	300	400	500	600	700	800	900	1000
height H [mm]	200	10	10	10	10	15	17	18	19	22	25
	250	10	10	11	11	16	18	18	21	24	27
	300	10	11	11	12	17	20	21	23	26	28
	350	11	11	11	16	18	21	23	26	28	30
	400	12	12	14	18	19	21	25	29	30	33
	500	15	16	17	19	20	23	27	32	33	35
	600	17	18	20	21	23	26	30	35	37	39
	700	18	18	21	23	25	28	32	35	38	40
	800	20	21	22	24	29	35	37	41	43	49
	900	22	25	25	28	33	35	39	43	49	52
	1000	23	29	32	33	36	42	43	47	53	60

The table shows the weights of dampers with RST-KW1 trigger control mechanisms or actuators.

6.8. marking

mcr WIP/S / B x H / 1 / 2



1 – control:

- RST-KW1 trigger control mechanism
 - RST-KW1/S** – thermal trigger
 - RST-KW1/S/WK2** – thermal trigger + limit switch (open/closed blade signal)
 - RST-KW1/24I** – thermal trigger + „pulse“ electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
 - RST-KW1/24P** – thermal trigger + „break“ electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)
 - RST-KW1/230I** – thermal trigger + „pulse“ electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
 - RST-KW1/230P** – thermal trigger + „break“ electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)
- Belimo trigger control mechanism
 - BF24-T** – actuator with a return spring, U = 24 V AC/DC
 - BF230-T** – actuator with a return spring, U = 230 V AC
 - BF24TL-T-ST** (with the BKN230-24MP option) – actuator with a return spring, U = 24 V, MP Bus digital control
 - EXBF24-T** – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
 - EXBF230-T** – explosion proof actuator with a return spring in the Ex version, U = 230 V AC
 - BF24-T-ST** (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
 - BFL24-T** – actuator with a return spring, U = 24 V AC/DC
 - BFL230-T** – actuator with a return spring, U = 230 V AC
 - BFL24-T-ST** (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
 - BFN24-T** – actuator with a return spring, U = 24 V AC/DC
 - BFN230-T** – actuator with a return spring, U = 230 V AC
 - BFN24-T-ST** (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system

2 – material:

- [no symbol]** – galvanised steel, Zn 275 g/m² coating
- KN** – 1.4404 acid-proof stainless steel

example marking:

mcr WIP/S 400 x 400 BFL24-T

EIS60 multi-blade cut-off damper with a 24 V compact Belimo actuator with limit switches.

Chapter 12 - power supply and control (p. 141) contains:

- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper,
- location of trigger control mechanisms in relation to the damper - manufacture standards.

**PRODUCT CONFIGURATOR
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- ▶ EI₁60, EI₂120, EI120, E120
- ▶ Technical Approval AT-15-9582/2015, Certificate of Conformity CZ-ITB-2415/W.
- ▶ Certificate of constancy of performance 1396-CPR-0097.
- ▶ Dampers qualified under EN 13501-2, EN 13501-3 and tested under EN 1366-2.
- ▶ Transfer shutter dampers.

7.1. application

The mcr WIP/T transfer dampers are intended for installation in automatically operated fire ventilation systems. They are installed in fire walls without connecting ventilation ducts and retain their fire resistance during the fire. During normal operation, damper blades are open, what enables the supply of fresh air to escape routes, protecting them from smoke, or to the space, in which air exchange or supply through vertical construction partitions is required.

It is possible to use a closed transfer damper, in which the shutters open to transfer compensation air upon the receipt of an alarm signal from the fire signalling centre.

The mcr WIP/T-G dampers are used as relief dampers, e.g. in gas extinguishing systems. In that case, they are equipped with drives without thermoelectric triggers. Shutter closing and opening is achieved through dedicated control units.

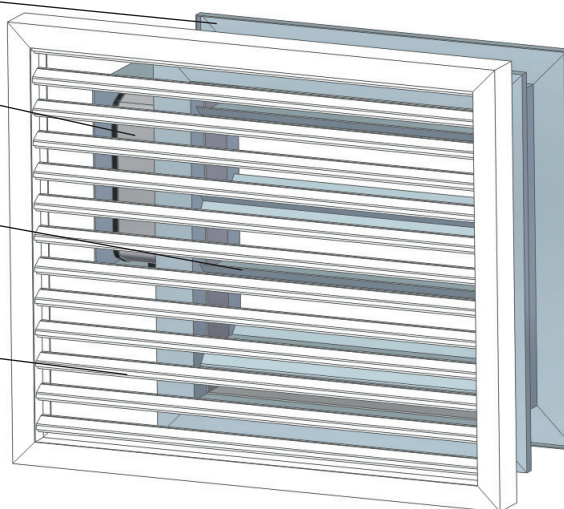
7.2. design

casing

trigger control mechanism
(e.g. actuator with a return spring)

shutters (damper blades)

duct cover



The mcr WIP/T transfer and relief dampers mcr WIP/T-G consist of a casing with a rectangular cross section, a moving multiple damper blades - shutters rotating on their axes and a trigger control mechanism which is tripped remotely or automatically by tripping a thermal trigger (only mcr WIP/T). Damper casings are made of a galvanised or stainless steel sheet. Its integral part is a flange of silicate-cement panels. The inner side of the fire damper casing is equipped with an intumescent gasket. The casing total length is 140 mm.

The shutter surface is covered with galvanised or stainless steel sheet. Each blade has the thickness of 15 mm and is filled with a plaster panel. The damper blades rotate on their axes, which consist of two steel pins. Transfer dampers must be protected with duct covers.

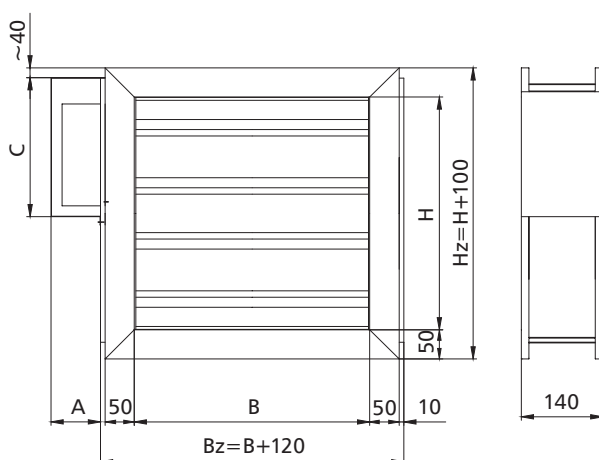
7.3. versions

7.3.1. mcr WIP/T – the transfer fire damper with an axial actuator with a return spring – damper closing and opening with an actuator

During normal operation, the shutters of the fire damper remain open or closed. In case of fire, the shutters shift or remain in standby.

The mcr WIP/T dampers are equipped with a Belimo trigger control mechanisms **BFL, BFN, BF, BF-TL** and **EXBF** axial actuator with a return valve, powered with 24 V AC/DC or 230 V AC, with thermoelectric trigger 72°C (optionally it is possible to use triggers with the nominal tripping temperature of 95°C). BFL, BFN, BF series actuators are equipped with limit switches used to monitor the blades position. Furthermore, the mechanical position indicator is placed on the actuator.

Dampers with Belimo actuators: analogue BFL, BFN, BF, digital BF-TL, EXBF explosion proof actuators close as a result of thermoelectric trigger tripping or power supply cut-off as a result of the actuator return spring action. The dampers open when the power supply voltage is applied to the actuator terminals. Furthermore, dampers with those actuators may be opened manually using a key.



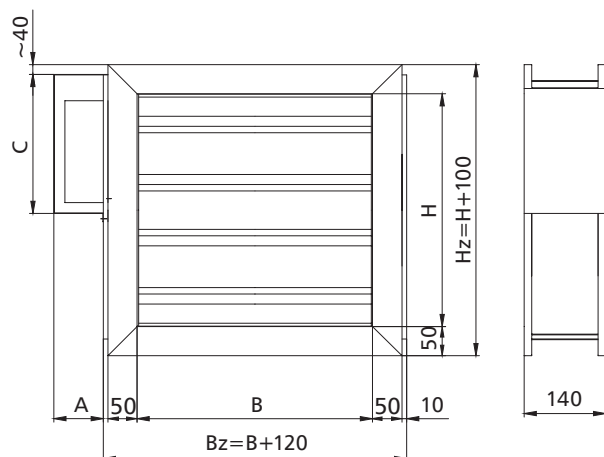
mechanism	A	C
BFN	125	325
BFL	125	275
BF	125	325
BF24TL-ST	125	325
EXBF	175	400
BLE	125	275
BE	125	325

7.3.2. WIP/T-G – the relief fire damper with an actuator with a return spring – damper closing and opening with an actuator

During normal operation, the shutters of the relief damper remain open or closed. In case of fire, the shutters are shifted remotely by dedicated control units.

The mcr WIP/T-G dampers are equipped with a Belimo trigger control mechanisms **BFL, BFN, BF** series axial actuator with a return spring, powered with 24 V AC/DC or 230 V AC without a thermoelectric trigger. BFL, BFN, BF series actuators are equipped with limit switches used to monitor the blades position. Furthermore, the blades mechanical position indicator is placed on the actuator.

The mcr WIP/T-G relief dampers are designed e.g. to release the extinguishing medium from the space, in which the gas extinguishing system was used. Dampers have no thermal triggers installed. Damper closing and opening is triggered by a suitable control device, according to the fire protection design prepared for the specific building.



mechanism	A	C
BFN	125	325
BFL	125	275
BF	125	325

7.4. dimensions

Rectangular dampers:

- nominal width B: from 120 mm to 1000 mm
- nominal height H: from 160 mm to 1000 mm
- the maximum cross-section surface of one damper up to 1 m²

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (in 1 mm increments, in the given range).

7.5. installation

The mcr WIP/T, mcr WIP/T-G rectangular dampers are EI₁60-rated and EI₂120-rated according to the Technical Approval in the case of installation in concrete or reinforced concrete partitions with the thickness of at least 110 mm, made of full bricks or concrete blocks with the thickness of at least 110 mm, made of hollow bricks or cellular concrete blocks with the thickness of at least 110 mm.

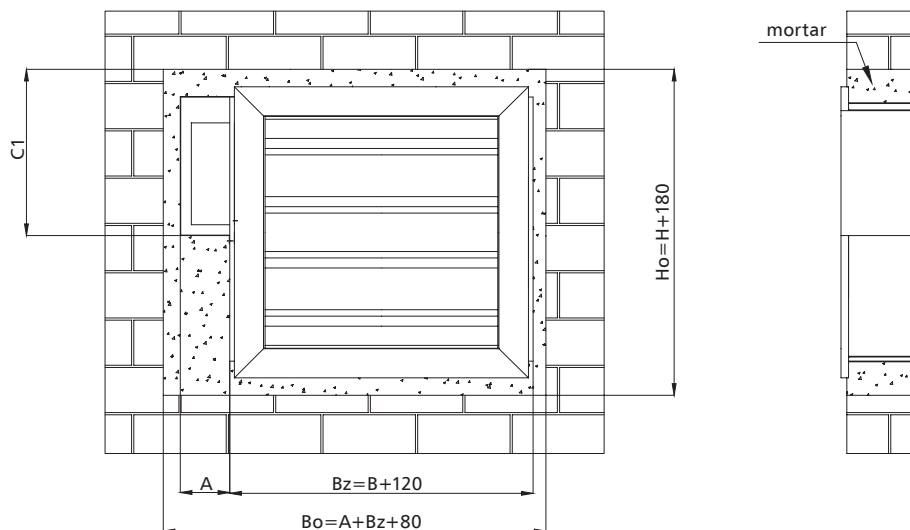
mcr WIP/T rectangular dampers are EI120(ve i↔o) / E120(ve i↔o)-rated in case of installation in concrete or reinforced concrete partitions with the thickness of at least 110 mm, made of full bricks or concrete blocks with the thickness of at least 110 mm, made of hollow bricks or cellular concrete blocks with the thickness of at least 110 mm.

7.5.1. preparation of installation openings

The minimum dimensions of the installation opening that allows correct installation of the mcr WIP/T or mcr WIP/T-G damper is:

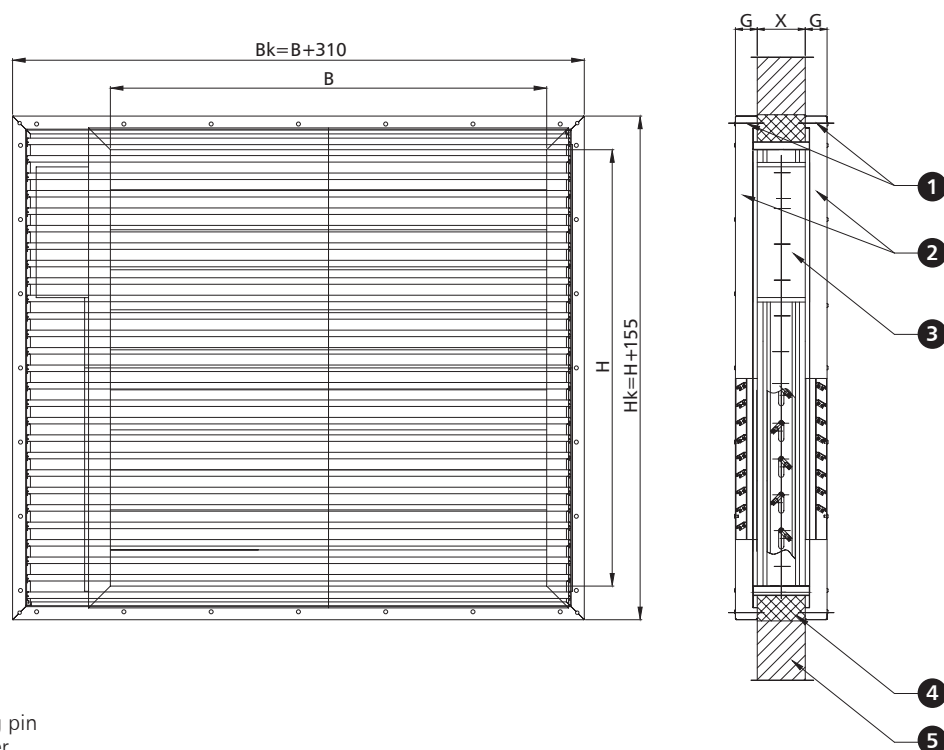
$$B_o = (A + B_z + 80) \text{ mm}$$

$$H_o = (H + 180) \text{ mm}$$



	BF	BFL	BFN	EXBF	BE	BLE
C ₁ [mm]	385	335	385	460	385	335
A [mm]	125	125	125	175	125	125

7.5.2. sample installation in concrete block or full brick walls

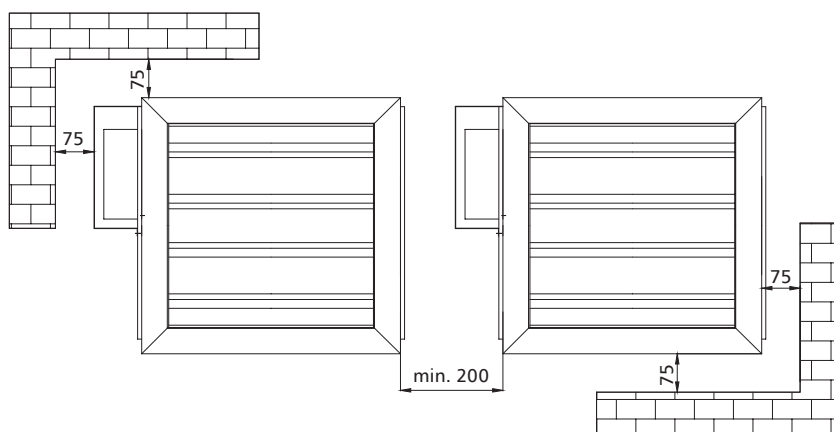


1. mounting pin
2. duct cover
3. fire damper mcr WIP
4. e.g. cement mortar*
5. e.g. masonry wall

*it is possible to use a different sealing which ensures the required fire resistance

The thickness of the duct cover "G" is 50 mm for wall thickness up to 110 mm. For walls thicker than 110 mm manufacturer allows thickness of cover below 50 mm. For walls wider than dampers thickness, 30 mm duct covers can be used. The duct cover can be made of galvanized steel or stainless steel and painted any RAL color (standard RAL 9010).

Distance between systems and partitions



7.6. technical parameters of mcr WIP/T rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		200					250					300					
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.040	0.034	490	6	26	0.050	0.043	612	6	26	0.06	0.051	734	6	27
		6			734	13	36			918	13	37			1 102	13	37
		8			979	24	44			1 224	23	44			1 469	22	45
		10			1 224	37	49			1 530	36	50			1 836	35	50
	250	4	0.050	0.043	612	6	26	0.063	0.053	765	6	27	0.075	0.064	918	6	28
		6			918	13	37			1 148	13	38			1 377	13	38
		8			1 224	23	44			1 530	23	45			1 836	22	46
		10			1 530	36	50			1 913	36	51			2 295	35	51
	300	4	0.060	0.051	734	6	27	0.075	0.064	918	6	28	0.09	0.077	1 102	6	28
		6			1 102	13	37			1 377	13	38			1 652	13	39
		8			1 469	23	45			1 836	23	46			2 203	22	46
		10			1 836	36	51			2 295	36	52			2 754	35	52
	350	4	0.070	0.060	857	6	27	0.088	0.074	1 071	6	32	0.105	0.089	1 285	5	29
		6			1 285	13	38			1 607	13	39			1 928	12	39
		8			1 714	22	45			2 142	22	46			2 570	22	47
		10			2 142	35	51			2 678	35	52			3 213	34	52
	400	4	0.080	0.068	979	6	28	0.100	0.085	1 224	6	29	0.12	0.102	1 469	5	29
		6			1 469	13	38			1 836	13	39			2 203	12	40
		8			1 958	22	46			2 448	22	47			2 938	22	47
		10			2 448	35	52			3 060	35	53			3 672	34	53
	450	4	0.090	0.077	1 102	6	28	0.113	0.096	1 377	6	29	0.135	0.115	1 652	5	30
		6			1 652	13	39			2 066	13	40			2 479	12	40
		8			2 203	22	46			2 754	22	47			3 305	22	48
		10			2 754	35	52			3 443	35	53			4 131	34	54
	500	4	0.100	0.085	1 224	5	28	0.125	0.106	1 530	5	29	0.15	0.128	1 836	5	30
		6			1 836	12	39			2 295	12	40			2 754	12	40
		8			2 448	22	46			3 060	22	47			3 672	21	48
		10			3 060	34	52			3 825	34	53			4 590	33	54
	550	4	0.110	0.094	1 346	5	29	0.138	0.117	1 683	5	30	0.165	0.140	2 020	5	31
		6			2 020	12	39			2 525	12	40			3 029	12	41
		8			2 693	22	47			3 366	22	48			4 039	22	49
		10			3 366	34	53			4 208	34	54			5 049	34	54
	600	4	0.120	0.102	1 469	5	29	0.150	0.128	1 836	5	30	0.18	0.153	2 203	5	31
		6			2 203	12	40			2 754	12	41			3 305	12	41
		8			2 938	22	47			3 672	22	48			4 406	21	49
		10			3 672	34	53			4 590	34	54			5 508	33	54
	650	4	0.130	0.111	1 591	5	30	0.163	0.138	1 989	5	30	0.195	0.166	2 387	5	31
		6			2 387	12	40			2 984	12	41			3 580	12	41
		8			3 182	22	48			3 978	22	49			4 774	21	49
		10			3 978	34	53			4 973	34	54			5 967	33	55
	700	4	0.140	0.119	1 714	5	30	0.175	0.149	2 142	5	31	0.21	0.179	2 570	5	31
		6			2 570	12	40			3 213	12	41			3 856	12	42
		8			3 427	22	48			4 284	22	49			5 141	21	49
		10			4 284	34	54			5 355	34	55			6 426	33	55
	750	4	0.150	0.128	1 836	5	30	0.188	0.159	2 295	5	31	0.225	0.191	2 754	5	31
		6			2 754	12	40			3 443	12	41			4 131	12	42
		8			3 672	21	48			4 590	21	49			5 508	21	49
		10			4 590	33	54			5 738	33	55			6 885	32	55
800	4	0.160	0.136	1 958	5	30	0.200	0.170	2 448	5	31	0.24	0.204	2 938	5	31	
	6			2 938	12	41			3 672	12	42			4 406	12	42	
	8			3 917	21	48			4 896	21	49			5 875	21	49	
	10			4 896	33	54			6 120	33	55			7 344	32	55	
850	4	0.170	0.145	2 081	5	30	0.213	0.181	2 601	5	31	0.255	0.217	3 121	5	31	
	6			3 121	12	40			3 902	12	41			4 682	11	42	
	8			4 162	21	48			5 202	21	49			6 242	20	49	
	10			5 202	32	54			6 503	32	55			7 803	31	55	
900	4	0.180	0.153	2 203	5	30	0.225	0.191	2 754	5	31	0.27	0.230	3 305	5	31	
	6			3 305	12	41			4 131	12	42			4 957	11	42	
	8			4 406	21	48			5 508	21	49			6 610	20	50	
	10			5 508	32	54			6 885	32	55			8 262	31	55	
1000	4	0.200	0.170	2 448	5	31	0.250	0.213	3 060	5	32	0.3	0.255	3 672	5	32	
	6			3 672	12	41			4 590	12	42			5 508	11	43	
	8			4 896	21	49			6 120	21	50			7 344	20	50	
	10			6 120	32	54			7 650	32	55			9 180	31	56	

The mcr WIP fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

7.6. technical parameters of mcr WIP/T rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		350					400					450				
	v [m/s]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.070	0.060	857	6	0.080	0.068	979	5	0.090	0.077	1 102	5	28	
		6			1 285	13			1 469	12						
		8			1 714	22			1 958	22						
		10			2 142	35			2 448	34						
	250	4	0.088	0.074	1 071	6	0.100	0.085	1 224	5	0.113	0.096	1 377	5	29	
		6			1 607	13			1 836	12						
		8			2 142	22			2 448	22						
		10			2 678	35			3 060	34						
	300	4	0.105	0.089	1 285	6	0.120	0.102	1 469	5	0.135	0.115	1 652	5	30	
		6			1 928	13			2 203	12						
		8			2 570	22			2 938	22						
		10			3 213	35			3 672	34						
	350	4	0.123	0.104	1 499	5	0.140	0.119	1 714	5	0.158	0.134	1 928	5	30	
		6			2 249	12			2 570	12						
		8			2 999	22			3 427	21						
		10			3 749	34			4 284	33						
	400	4	0.140	0.119	1 714	5	0.160	0.136	1 958	5	0.180	0.153	2 203	5	31	
		6			2 570	12			2 938	12						
		8			3 427	22			3 917	21						
		10			4 284	34			4 896	33						
	450	4	0.158	0.134	1 928	5	0.180	0.153	2 203	5	0.203	0.172	2 479	5	31	
		6			2 892	12			3 305	12						
		8			3 856	22			4 406	21						
		10			4 820	34			5 508	33						
	500	4	0.175	0.149	2 142	5	0.200	0.170	2 448	5	0.225	0.191	2 754	5	32	
		6			3 213	12			3 672	12						
		8			4 284	21			4 896	21						
		10			5 355	33			6 120	33						
	550	4	0.193	0.164	2 570	5	0.220	0.187	2 693	5	0.248	0.210	3 029	5	32	
		6			3 856	12			4 039	12						
		8			5 141	22			5 386	21						
		10			6 426	34			6 732	33						
	600	4	0.210	0.179	2 570	5	0.240	0.204	2 938	4	0.270	0.230	3 305	5	32	
		6			3 856	12			4 406	8						
		8			5 141	21			5 875	14						
		10			6 426	33			7 344	32						
	650	4	0.228	0.193	2 785	5	0.260	0.221	3 182	5	0.293	0.249	3 580	5	32	
		6			4 177	12			4 774	12						
		8			5 569	21			6 365	21						
		10			6 962	33			7 956	32						
	700	4	0.245	0.208	2 999	5	0.28	0.238	3 427	5	0.315	0.268	3 856	5	33	
		6			4 498	12			5 141	12						
		8			5 998	21			6 854	21						
		10			7 497	33			8 568	32						
	750	4	0.263	0.223	3 213	5	0.3	0.255	3 672	5	0.338	0.287	4 131	5	33	
		6			4 820	12			5 508	12						
		8			6 426	21			7 344	21						
		10			8 033	32			9 180	32						
	800	4	0.280	0.238	3 427	5	0.32	0.272	3 917	5	0.360	0.306	4 406	5	32	
		6			5 141	12			5 875	11						
		8			6 854	21			7 834	20						
		10			8 568	32			9 792	31						
	850	4	0.298	0.253	3 641	5	0.34	0.289	4 162	5	0.383	0.325	4 682	5	31	
		6			5 462	11			6 242	11						
		8			7 283	20			8 323	19						
		10			9 104	31			10 404	30						
	900	4	0.315	0.268	3 856	5	0.360	0.306	4 406	6	0.405	0.344	4 957	5	31	
		6			5 783	11			6 610	12						
		8			7 711	20			8 813	26						
		10			9 639	31			11 016	30						
	1000	4	0.350	0.298	4 284	5	0.400	0.340	4 896	5	0.450	0.383	5 508	5	31	
		6			6 426	11			7 344	11						
		8			8 568	20			9 792	19						
		10			10 710	31			12 240	30						

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7.6. technical parameters of mcr WIP/T rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		500						550					600				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.100	0.085	1 224	5	28	0.110	0.094	1 346	5	28	0.120	0.102	1 469	5	28
		6			1 836	12	39			2 020	12	39			2 203	12	39
		8			2 448	21	46			2 693	21	46			2 938	21	46
		10			3 060	33	52			3 366	33	52			3 672	32	52
	250	4	0.125	0.106	1 530	5	29	0.138	0.117	1 683	5	29	0.150	0.128	1 836	5	29
		6			2 295	12	40			2 525	12	40			2 754	12	40
		8			3 060	21	47			3 366	21	47			3 672	21	47
		10			3 825	33	53			4 208	33	53			4 590	32	53
	300	4	0.150	0.128	1 836	5	30	0.165	0.140	2 020	5	30	0.180	0.153	2 203	5	30
		6			2 754	12	40			3 029	12	41			3 305	12	41
		8			3 672	21	48			4 039	21	48			4 406	21	48
		10			4 590	33	54			5 049	33	54			5 508	32	54
	350	4	0.175	0.149	2 142	5	30	0.193	0.164	2 356	5	30	0.210	0.179	2 570	5	30
		6			3 213	12	41			3 534	12	41			3 856	11	41
		8			4 284	21	48			4 712	21	49			5 141	20	48
		10			5 355	32	54			5 891	32	54			6 426	31	54
	400	4	0.200	0.170	2 448	5	31	0.220	0.187	2 693	5	31	0.240	0.204	2 938	5	31
		6			3 672	12	41			4 039	12	42			4 406	11	42
		8			4 896	21	49			5 386	21	49			5 875	20	49
		10			6 120	32	54			6 732	32	55			7 344	31	55
	450	4	0.225	0.191	2 754	5	31	0.248	0.210	3 029	5	32	0.270	0.230	3 305	5	31
		6			4 131	12	42			4 544	12	42			4 957	11	42
		8			5 508	21	49			6 059	21	50			6 610	20	50
		10			6 885	32	55			7 574	32	55			8 262	31	55
	500	4	0.250	0.213	3 060	5	31	0.275	0.234	3 366	5	32	0.300	0.255	3 672	5	32
		6			4 590	11	42			5 049	12	43			5 508	11	43
		8			6 120	22	51			6 732	21	50			7 344	20	50
		10			7 650	32	55			8 415	32	56			9 180	31	56
550	4	0.275	0.234	3 672	5	32	0.303	0.257	4 039	5	32	0.330	0.281	4 406	5	32	
	6			5 508	12	43			6 059	12	43			6 610	11	43	
	8			7 344	21	50			8 078	21	50			8 813	20	50	
	10			9 180	32	56			10 098	32	56			11 016	31	56	
600	4	0.300	0.255	3 672	5	32	0.330	0.281	4 039	5	32	0.360	0.306	4 406	5	32	
	6			5 508	11	43			6 059	11	43			6 610	11	43	
	8			7 344	20	50			8 078	20	50			8 813	19	50	
	10			9 180	31	56			10 098	31	56			11 016	30	56	
650	4	0.325	0.276	3 978	5	33	0.358	0.304	4 376	5	33	0.390	0.332	4 774	5	33	
	6			5 967	12	43			6 564	11	43			7 160	11	43	
	8			7 956	21	51			8 752	20	51			9 547	19	51	
	10			9 945	31	56			10 940	31	57			11 934	30	57	
700	4	0.350	0.298	4 284	5	33	0.385	0.327	4 712	5	33	0.420	0.357	5 141	5	33	
	6			6 426	11	43			7 069	11	44			7 711	11	44	
	8			8 568	20	51			9 425	20	51			10 282	19	51	
	10			10 710	31	56			11 781	31	57			12 852	30	57	
750	4	0.375	0.319	4 590	5	33	0.413	0.351	5 049	5	33	0.450	0.383	5 508	5	33	
	6			6 885	11	43			7 574	11	44			8 262	11	44	
	8			9 180	20	51			10 098	20	51			11 016	19	51	
	10			11 475	31	57			12 623	31	57			13 770	30	57	
800	4	0.400	0.340	4 896	5	32	0.440	0.374	5 386	5	33	0.480	0.408	5 875	5	33	
	6			7 344	11	43			8 078	11	44			8 813	10	44	
	8			9 792	19	51			10 771	19	51			11 750	19	51	
	10			12 240	30	56			13 464	30	57			14 688	29	57	
850	4	0.425	0.361	5 202	5	32	0.468	0.397	5 722	5	33	0.510	0.434	6 242	4	33	
	6			7 803	10	43			8 583	10	44			9 364	10	43	
	8			10 404	19	50			11 444	19	51			12 485	18	51	
	10			13 005	29	56			14 306	29	57			15 606	28	57	
900	4	0.450	0.383	5 508	5	32	0.495	0.421	6 059	5	33	0.540	0.459	6 610	4	33	
	6			8 262	10	43			9 088	10	44			9 914	10	41	
	8			11 016	19	50			12 118	19	51			13 219	18	49	
	10			13 770	29	56			15 147	29	57			16 524	28	54	
1000	4	0.500	0.425	6 120	5	32	0.550	0.468	6 732	5	34	0.600	0.510	7 344	4	34	
	6			9 180	10	43			9 988	10	44			11 016	10	44	
	8			12 240	19	50			12 118	19	52			14 688	18	52	
	10			15 300	29	56			15 147	29	58			18 360	28	57	

The mcr WIP fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

7.6. technical parameters of mcr WIP/T rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		650					700					750					
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.130	0.111	1 591	5	29	0.140	0.119	1 714	5	29	0.150	0.128	1 836	5	29
		6			2 387	12	39			2 570	11	39			2 754	11	40
		8			3 182	21	47			3 427	20	47			3 672	20	47
		10			3 978	32	53			4 284	31	52			4 590	31	53
	250	4	0.163	0.138	1 989	5	30	0.175	0.149	2 142	5	30	0.188	0.159	2 295	5	30
		6			2 984	12	40			3 213	11	40			3 443	11	40
		8			3 978	21	48			4 284	20	48			4 590	20	48
		10			4 973	32	54			5 355	31	53			5 738	31	54
	300	4	0.195	0.166	2 387	5	30	0.210	0.179	2 570	5	30	0.225	0.191	2 754	5	31
		6			3 580	12	41			3 856	11	41			4 131	11	41
		8			4 774	21	49			5 141	20	48			5 508	20	49
		10			5 967	32	54			6 426	31	54			6 885	31	55
	350	4	0.228	0.193	2 785	5	31	0.245	0.208	2 999	5	31	0.263	0.223	3 213	5	31
		6			4 177	11	41			4 498	11	41			4 820	11	42
		8			5 569	20	49			5 998	19	49			6 426	19	49
		10			6 962	31	55			7 497	30	54			8 033	30	55
	400	4	0.260	0.221	3 182	5	31	0.280	0.238	3 427	5	31	0.300	0.255	3 672	5	32
		6			4 774	11	42			5 141	11	42			5 508	11	42
		8			6 365	20	49			6 854	19	49			7 344	19	50
		10			7 956	31	55			8 568	30	55			9 180	30	55
	450	4	0.293	0.249	3 580	5	32	0.315	0.268	3 856	5	32	0.338	0.287	4 131	5	32
		6			5 370	11	42			5 783	11	42			6 197	11	43
		8			7 160	20	50			7 711	19	50			8 262	19	50
		10			8 951	31	56			9 639	30	56			10 328	30	56
	500	4	0.325	0.276	3 978	5	32	0.350	0.298	4 284	5	32	0.375	0.319	4 590	5	32
		6			5 967	11	43			6 426	11	43			6 885	11	43
		8			7 956	20	50			8 568	19	50			9 180	19	51
		10			9 945	31	56			10 710	30	56			11 475	30	56
	550	4	0.358	0.304	4 774	5	33	0.385	0.327	4 712	5	33	0.413	0.351	5 049	5	33
		6			7 160	11	43			7 069	11	43			7 574	11	43
		8			9 547	20	51			9 425	19	51			10 098	19	51
		10			11 934	31	57			11 781	30	56			12 623	30	57
	600	4	0.390	0.332	4 774	5	33	0.420	0.357	5 141	5	33	0.450	0.383	5 508	5	33
		6			7 160	11	44			7 711	11	44			8 262	11	44
		8			9 547	20	51			10 282	19	51			11 016	19	51
		10			11 934	31	57			12 852	30	57			13 770	30	57
	650	4	0.423	0.359	5 171	5	33	0.455	0.387	5 569	5	33	0.488	0.414	5 967	5	33
		6			7 757	11	44			8 354	10	43			8 951	10	44
		8			10 343	19	51			11 138	19	51			11 934	19	51
		10			12 929	30	57			13 923	29	57			14 918	29	57
	700	4	0.455	0.387	5 569	5	33	0.490	0.417	5 998	5	33	0.525	0.446	6 426	5	34
		6			8 354	11	44			8 996	10	44			9 639	10	44
		8			11 138	19	51			11 995	19	51			12 852	19	52
		10			13 923	30	57			14 994	29	57			16 065	29	57
	750	4	0.488	0.414	5 967	5	34	0.525	0.446	6 426	5	34	0.563	0.478	6 885	5	34
		6			8 951	11	44			9 639	10	44			10 328	10	44
		8			11 934	19	52			12 852	19	52			13 770	19	52
		10			14 918	30	57			16 065	29	57			17 213	29	58
	800	4	0.520	0.442	6 365	5	33	0.560	0.476	6 854	4	29	0.600	0.510	7 344	4	34
		6			9 547	10	44			10 282	7	37			11 016	10	44
		8			12 730	19	51			13 709	11	43			14 688	18	52
		10			15 912	29	57			17 136	28	54			18 360	28	57
	850	4	0.553	0.470	6 763	4	33	0.595	0.506	7 283	4	34	0.638	0.542	7 803	4	34
		6			10 144	10	43			10 924	10	44			11 705	10	44
		8			13 525	18	51			14 566	18	52			15 606	18	52
		10			16 907	28	57			18 207	28	57			19 508	28	58
	900	4	0.585	0.497	7 160	4	33	0.630	0.536	7 711	4	33	0.675	0.574	8 262	4	34
		6			10 741	10	43			11 567	10	44			12 393	10	44
		8			14 321	18	51			15 422	17	51			16 524	17	52
		10			17 901	28	57			19 278	27	57			20 655	27	58
	1000	4	0.650	0.553	7 956	4	33	0.700	0.595	8 568	4	34	0.750	0.638	9 180	4	34
		6			11 934	10	43			12 852	10	44			13 770	10	45
		8			15 912	18	51			17 136	17	52			18 360	17	52
		10			19 890	28	57			21 420	27	58			22 950	27	58

The mcr WIP fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

7.6. technical parameters of mcr WIP/T rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

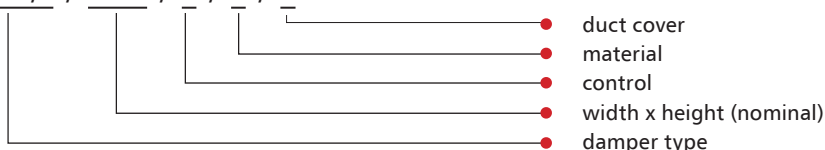
		height H [mm]																				
		800						850				900				1000						
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.160	0.136	1 958	5	29	0.170	0.145	2 081	5	29	0.180	0.153	2 203	5	29	0.200	0.170	2 448	5	29
	6	2 938			11	39	3 121			11	40	3 305			10	39	3 672			10	40	
	8	3 917			19	47	4 162			19	47	4 406			19	47	4 896			19	47	
	10	4 896			30	53	5 202			30	53	5 508			29	53	6 120			29	53	
	250	4	0.200	0.170	2 448	5	30	0.213	0.181	2 601	5	30	0.225	0.191	2 754	5	30	0.250	0.213	3 060	5	30
	6	3 672			11	40	3 902			11	41	4 131			10	40	4 590			10	41	
	8	4 896			19	48	5 202			19	48	5 508			19	48	6 120			19	48	
	10	6 120			30	54	6 503			30	54	6 885			29	54	7 650			29	54	
	300	4	0.240	0.204	2 938	5	31	0.255	0.217	3 121	5	31	0.270	0.230	3 305	5	31	0.300	0.255	3 672	5	31
	6	4 406			11	41	4 682			11	41	4 957			10	41	5 508			10	42	
	8	5 875			19	49	6 242			19	49	6 610			19	49	7 344			19	49	
	10	7 344			30	54	7 803			30	55	8 262			29	54	9 180			29	55	
	350	4	0.280	0.238	3 427	5	31	0.298	0.253	3 641	5	31	0.315	0.268	3 856	4	31	0.350	0.298	4 284	4	31
	6	5 141			10	41	5 462			10	42	5 783			10	41	6 426			10	42	
	8	6 854			19	49	7 283			19	49	7 711			18	49	8 568			18	49	
	10	8 568			29	55	9 104			29	55	9 639			28	55	10 710			28	55	
	400	4	0.320	0.272	3 917	5	31	0.340	0.289	4 162	5	32	0.360	0.306	4 406	4	31	0.400	0.340	4 896	4	32
	6	5 875			10	42	6 242			10	42	6 610			10	42	7 344			10	42	
	8	7 834			19	49	8 323			19	50	8 813			18	49	9 792			18	50	
	10	9 792			29	55	10 404			29	55	11 016			28	55	12 240			28	56	
450	4	0.360	0.306	4 406	5	32	0.383	0.325	4 682	4	32	0.405	0.344	4 957	4	31	0.450	0.383	5 508	4	32	
6	6 610			10	42	7 023			10	42	7 436			10	42	8 262			10	42		
8	8 813			19	50	9 364			18	50	9 914			17	50	11 016			17	50		
10	11 016			29	56	11 705			28	56	12 393			27	55	13 770			27	56		
500	4	0.400	0.340	4 896	5	32	0.425	0.361	5 202	4	32	0.450	0.383	5 508	4	32	0.500	0.425	6 120	4	32	
6	7 344			10	43	7 803			10	43	8 262			10	42	9 180			10	43		
8	9 792			19	50	10 404			18	50	11 016			17	50	12 240			17	50		
10	12 240			29	56	13 005			28	56	13 770			27	56	15 300			27	56		
550	4	0.440	0.374	5 386	5	33	0.468	0.397	5 722	4	33	0.495	0.421	6 059	4	32	0.550	0.468	6 732	4	33	
6	8 078			10	43	8 583			10	43	9 088			10	43	10 098			10	43		
8	10 771			19	51	11 444			18	51	12 118			17	50	13 464			17	51		
10	13 464			29	57	14 306			28	56	15 147			27	56	16 830			27	57		
600	4	0.480	0.408	5 875	5	33	0.510	0.434	6 242	4	33	0.540	0.459	6 610	4	33	0.600	0.510	7 344	4	33	
6	8 813			10	44	9 364			10	43	9 914			10	43	11 016			10	44		
8	11 750			19	51	12 485			18	51	13 219			17	51	14 688			17	51		
10	14 688			29	57	15 606			28	57	16 524			27	57	18 360			27	57		
650	4	0.520	0.442	6 365	5	33	0.553	0.470	6 763	4	33	0.585	0.497	7 160	4	33	0.650	0.553	7 956	4	34	
6	9 547			10	44	10 144			10	44	10 741			10	44	11 934			10	44		
8	12 730			19	52	13 525			18	51	14 321			17	51	15 912			17	52		
10	15 912			29	57	16 907			28	57	17 901			27	57	19 890			27	57		
700	4	0.560	0.476	6 854	4	33	0.595	0.506	7 283	4	33	0.630	0.536	7 711	4	33	0.700	0.595	8 568	4	33	
6	10 282			10	44	10 924			10	44	11 567			9	43	12 852			9	44		
8	13 709			18	51	14 566			17	51	15 422			17	51	17 136			17	51		
10	17 136			28	57	18 207			27	57	19 278			26	57	21 420			26	57		
750	4	0.600	0.510	7 344	4	34	0.638	0.542	7 803	4	33	0.675	0.574	8 262	4	33	0.750	0.638	9 180	4	34	
6	11 016			10	44	11 705			10	44	12 393			9	44	13 770			9	44		
8	14 688			18	52	15 606			17	51	16 524			17	51	18 360			17	52		
10	18 360			28	57	19 508			27	57	20 655			26	57	22 950			26	57		
800	4	0.640	0.544	7 834	4	34	0.680	0.578	8 323	4	34	0.720	0.612	8 813	4	33	0.800	0.680	9 792	4	34	
6	11 750			10	44	12 485			10	44	13 219			9	44	14 688			9	44		
8	15 667			18	52	16 646			17	52	17 626			17	52	19 584			17	52		
10	19 584			28	58	20 808			27	58	22 032			26	57	24 480			26	58		
850	4	0.680	0.578	8 323	4	34	0.723	0.614	8 843	4	33	0.765	0.650	9 364	4	34	0.850	0.723	10 404	4	34	
6	12 485			10	44	13 265			9	44	14 045			9	44	15 606			9	45		
8	16 646			17	52	17 687			17	52	18 727			17	52	20 808			17	52		
10	20 808			27	58	22 109			26	57	23 409			26	58	26 010			26	58		
900	4	0.720	0.612	8 813	4	34	0.765	0.650	9 364	4	34	0.810	0.689	9 914	4	34	0.900	0.765	11 016	4	34	
6	13 219			10	45	14 045			9	44	14 872			9	45	16 524			9	44		
8	17 626			17	52	18 727			17	52	19 829			17	52	22 032			16	52		
10	22 032			27	58	23 409			26	58	24 786			26	58	27 540			25	58		
1000	4	0.800	0.680	9 792	4	34	0.850	0.723	10 404	4	34	0.900	0.765	11 016	4	33	1.000	0.850	12 240	4	34	
6	14 688			9	44	15 606			9	44	16 524			9	44	18 360			9	44		
8	19 584			17	52	20 808			16	52	22 032			15	51	24 480			15	52		
10	24 480			26	58	26 010			25	58	27 540			24	57	30 600			24	58		

7.7. estimated weights of mcr WIP/T, mcr WIP/T-G dampers [kg]

		width B [mm]									
		200	250	300	400	500	600	700	800	900	1000
height H [mm]	200	10	10	10	10	15	17	18	19	22	25
	250	10	10	11	11	16	18	18	21	24	27
	300	10	11	11	12	17	20	21	23	26	28
	350	11	11	11	16	18	21	23	26	28	30
	400	12	12	14	18	19	21	25	29	30	33
	500	15	16	17	19	20	23	27	32	33	35
	600	17	18	20	21	23	26	30	35	37	39
	700	18	18	21	23	25	28	32	35	38	40
	800	20	21	22	24	29	35	37	41	43	49
	900	22	25	25	28	33	35	39	43	49	52
	1000	23	29	32	33	36	42	43	47	53	60

7.8. marking

mcr WIP/T / B x H / 1 / 2 / 3



1 – control:

- Belimo trigger control mechanism
- BF24-T** – actuator with a return spring, U = 24 V AC/DC
- BF230-T** – actuator with a return spring, U = 230 V AC
- BF24TL-T-ST** (with the BKN230-24MP option) – actuator with a return spring, U = 24 V, MP Bus digital control
- EXBF24-T** – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC
- EXBF230-T** – explosion proof actuator with a return spring in the Ex version, U = 230 V AC
- BF24-T-ST** (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
- BFL24-T** – actuator with a return spring, U = 24 V AC/DC
- BFL230-T** – actuator with a return spring, U = 230 V AC
- BFL24-T-ST** (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
- BFN24-T** – actuator with a return spring, U = 24 V AC/DC
- BFN230-T** – actuator with a return spring, U = 230 V AC
- BFN24-T-ST** (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system
- BE24** – actuator with no return spring, U = 24 V AC/DC
- BLE24** – actuator with no return spring, U = 24 V AC/DC
- BE230** – actuator with no return spring, U = 230 V AC/DC
- BLE230** – actuator with no return spring, U = 230 V AC/DC

2 – material:

- [no symbol]** – galvanised steel, Zn 275 g/m² coating
- KN** – 1.4404 acid-proof stainless steel

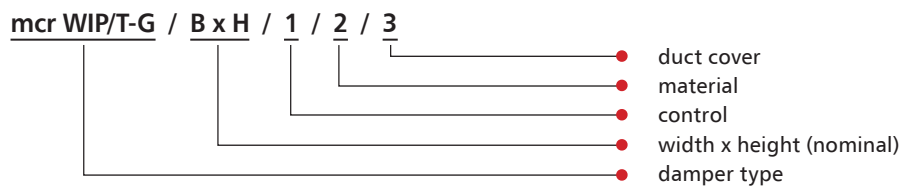
3 – duct cover:

- MSTx1** – single duct cover
- MSTx2** – double duct cover

example marking:

mcr WIP/T 400 x 400 BFL24-T

EI120 multi-blade transfer damper with a 24 V compact Belimo actuator with limit switches.



1 – control:

- Belimo trigger control mechanism
- BF24** – actuator with a return spring, U = 24 V AC/DC
- BF230** – actuator with a return spring, U = 230 V AC
- BFL24** – actuator with a return spring, U = 24 V AC/DC
- BFL230** – actuator with a return spring, U = 230 V AC
- BFN24** – actuator with a return spring, U = 24 V AC/DC
- BFN230** – actuator with a return spring, U = 230 V AC

2 – material:

- [no symbol]** – galvanised steel, Zn 275 g/m² coating
- KN** – 1.4404 acid-proof stainless steel

3 – duct cover:

- MSTx1** – single duct cover
- MSTx2** – double duct cover

example marking:

mcr WIP/T-G 400 x 400 BFL24

EI120 multi-blade relief damper with a 24 V compact Belimo actuator with limit switches.

Chapter 12 - power supply and control (p. 141) contains:

- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper,
- location of trigger control mechanisms in relation to the damper - manufacture standards.

**PRODUCT CONFIGURATOR
AT WWW.MERCOR.COM.PL**

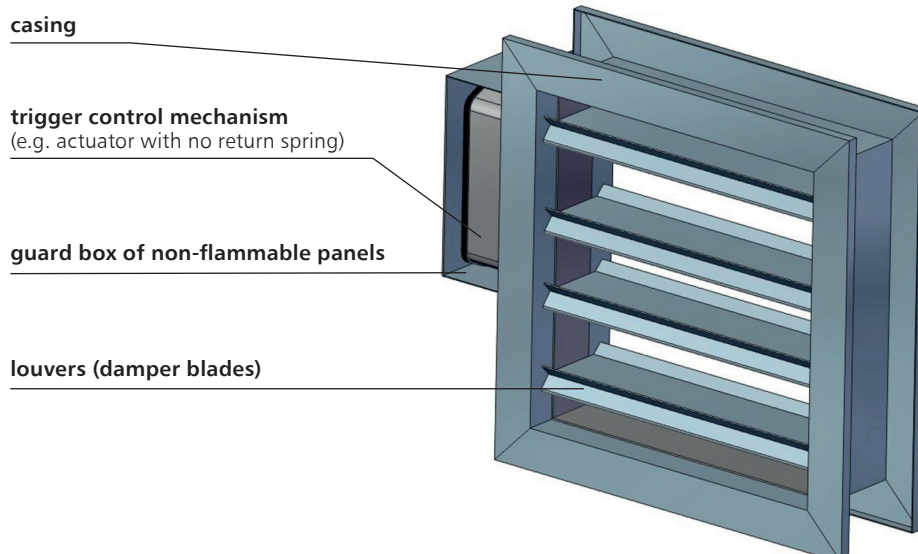


- ▶ **EI120**
- ▶ **Certificate of constancy of performance 1396-CPR-0117.**
- ▶ **Dampers certified for compliance with EN 12101-8.**
- ▶ **Dampers qualified under EN 13501-4 and tested under EN 1366-10.**
- ▶ **Narrow louvered fire dampers for fire ventilation systems.**

8.1. application

Multi-blade mcr WIP/V, mcr WIP/V-M fire dampers are designed for use in automatic fire ventilation systems. mcr WIP/V fire dampers are used in fire ventilation systems, mcr WIP/V-M fire dampers are used in mixed systems, combining both fire and comfort ventilation systems. The devices prevent fire, smoke and fire gases propagation to the adjacent areas. During normal operation, the fire damper is in open or closed position depending on its function. In the fire-covered area, the fire damper is open, whereas it remains closed in the other areas. mcr WIP/V, mcr WIP/V-M fire dampers due to their design are intended for use in systems, where the components such as a silencer, bend or supply/return grille are installed downstream of the fire damper.

8.2. design



mcr WIP/V, mcr WIP/V-M fire dampers consist of a rectangular casing, movable multiple blades rotating around their axis and a remote trigger control mechanism. Damper casing is made of galvanised or stainless steel sheet. Its integral part is a flange of silicate-cement panels. An intumescent seal and the ventilation seals are installed on the inside to ensure air tightness. The damper casing total length is 140 mm.

The louver surface (blades) is covered with galvanised or stainless steel sheet. Each louver with the thickness of 15 mm is filled with a plaster panel. The damper blades revolve on their axes, which consist of two steel pins.

Square and rectangular dampers are made with 50 mm flanges that enable the correct installation of dampers in ventilation ducts. In a circular duct, the damper is made as square with a circular connection.

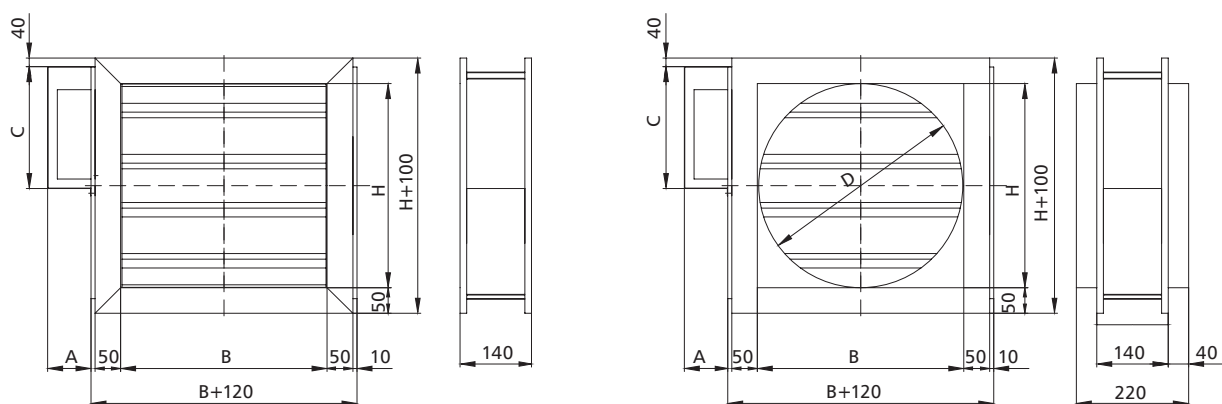
8.3. versions

8.3.1. mcr WIP/V, mcr WIP/V-M – smoke exhaust fire damper for multi-zone fire ventilation systems with an actuator – damper closing and opening with an actuator

During normal operation, the fire dampers are opened or closed. In case of fire, the fire damper louvers are opened in the fire-covered area and closed in the other areas - the fire damper is released remotely by feeding the supply voltage to the trigger control mechanism.

mcr WIP/V, mcr WIP/V-M fire dampers are equipped with a Belimo trigger control mechanisms **BLE**, **BE** axial actuator without the return spring (24 V AC/DC or 230 V AC). BLE, BE series actuators are equipped with limit switches used to monitor the damper blade position. Furthermore, the mechanical position indicator is placed on the actuator.

Fire dampers with Belimo BLE, BE actuators can be opened/closed by supplying voltage to the actuator terminals. Furthermore, dampers with those actuators may be opened/closed manually using a key.



mechanism	A	C
BLE	125	275
BE	125	325

8.4. dimensions

Rectangular dampers:

- nominal width B: from 120 mm to 1000 mm
- nominal height H: from 160 mm to 1000 mm
- the maximum cross-section surface of one damper up to 1 m²

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (in 1 mm increments, in the given range).

Square fire dampers may also be fitted with round connectors for the spigot connection to the round ducts.

8.5. installation

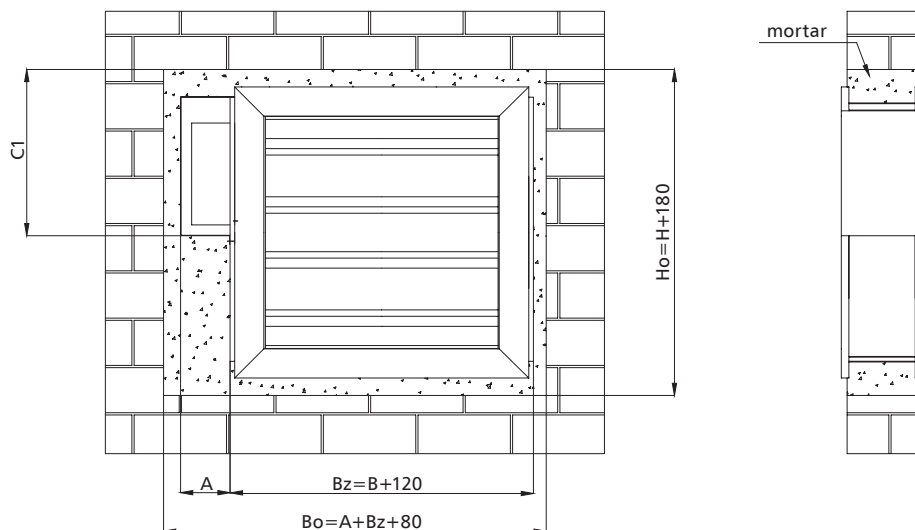
Rectangular mcr WIP/V, mcr WIP/V-M fire dampers are class EI120($V_{ed} i \leftrightarrow o$)1000C₁₀₀₀AA multi devices, if installed in a concrete partition, min. 110 mm thick made of full bricks or cellular concrete blocks, min. thickness 115 mm.

8.5.1. preparation of installation openings

The minimum dimensions of the installation opening that permits correct installation of the mcr WIP/V, mcr WIP/V-M damper are:

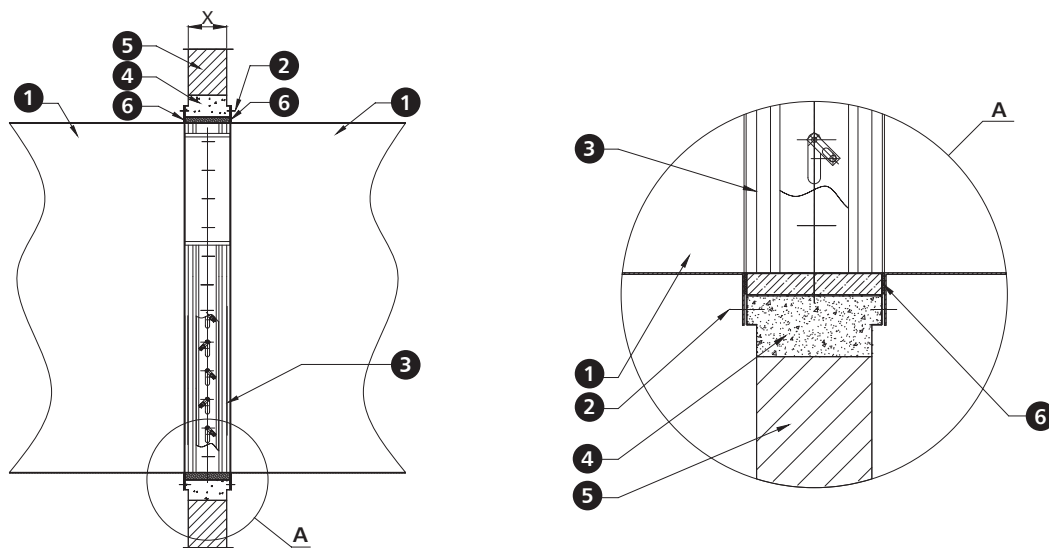
$$B_o = (A + B_z + 80) \text{ mm}$$

$$H_o = (H + 180) \text{ mm}$$



	BE	BLE
C1 [mm]	385	335
A [mm]	125	125

8.5.2. sample installation in concrete or masonry walls

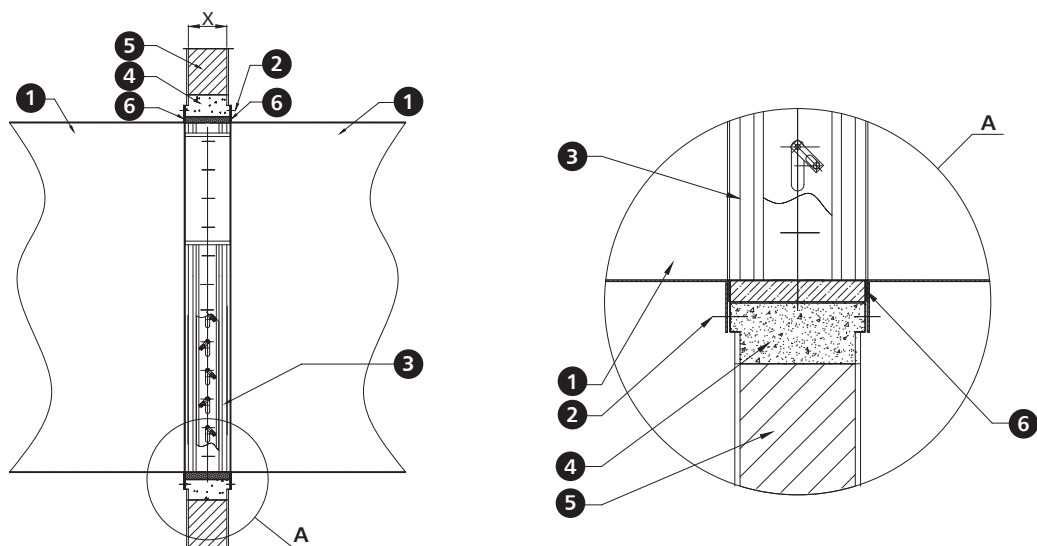


- 1. smoke ventilation duct
- 2. ST4.2x16 screw
- 3. fire damper mcr WIP
- 4. sealing - e.g. masonry cement mortar*
- 5. masonry wall
- 6. heat resistant gasket

X. wall thickness

*it is possible to use a different sealing which ensures the required fire resistance

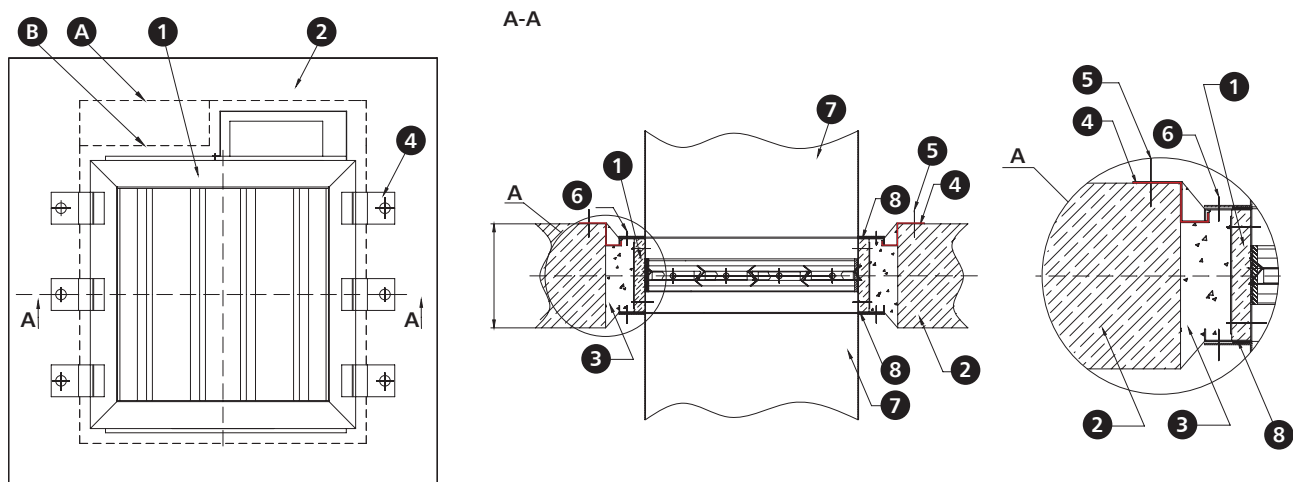
8.5.3. sample installation in concrete block or full brick walls



1. smoke ventilation duct
2. ST4.2x16 screw
3. fire damper mcr WIP
4. sealing - cement masonry mortar*
5. wall of concrete blocks or full bricks
6. heat resistant gasket
- X. wall thickness

*it is possible to use a different sealing which ensures the required fire resistance

8.5.4. sample installation in ceiling

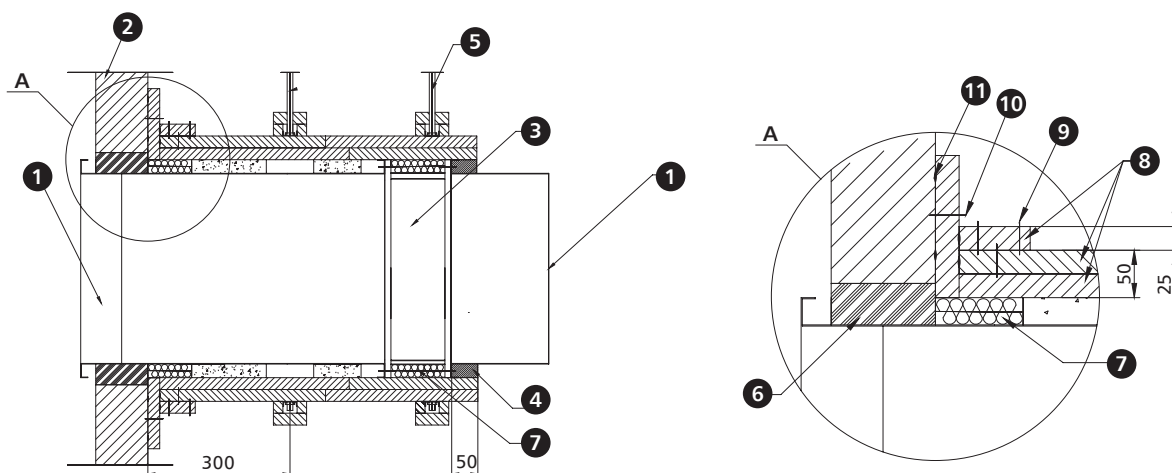


1. fire damper mcr WIP
2. ceiling
3. e.g. cement mortar*
4. mounting bracket
5. steel expansion anchor with M6 metal screw
6. ST4.2x16 screw

*it is possible to use a different sealing which ensures the required fire resistance

7. ventilation duct
8. heat resistant gasket
- A./B. construction opening

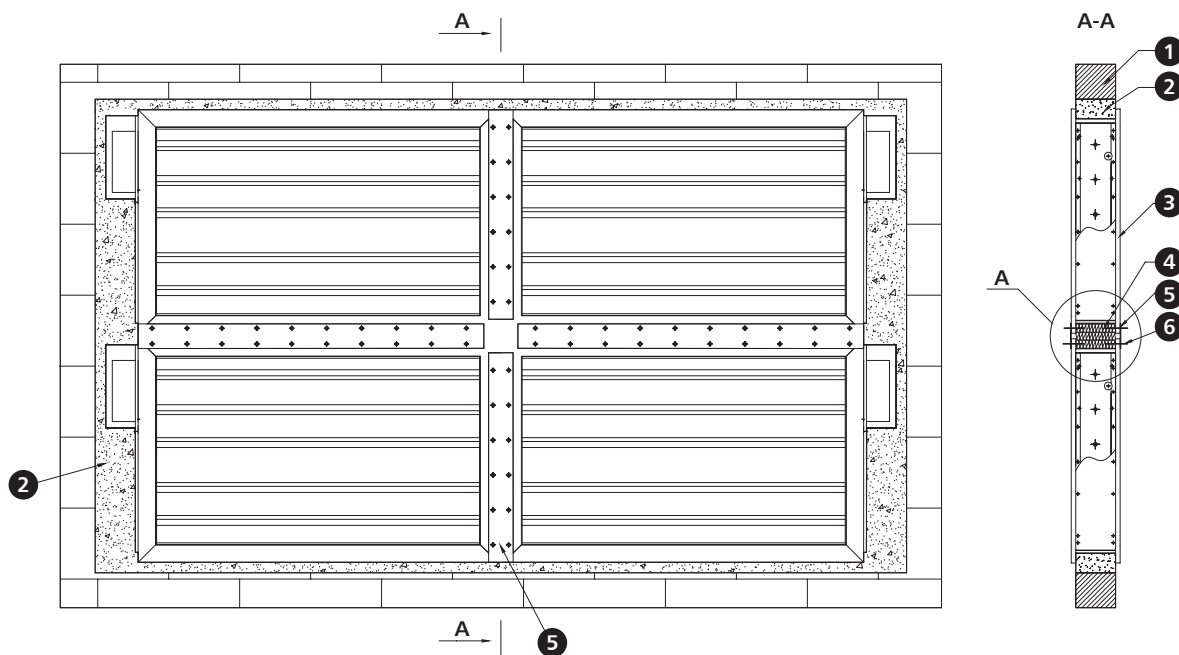
8.5.5. sample installation outside the fire partition



- | | | |
|------------------------|--|--|
| 1. ventilation duct | 5. duct suspension | 9. screws 3.5 x 50 spacing: ~150 mm |
| 2. partition | 6. sealing (cement or cement-lime masonry mortar)* | 10. steel expansion anchor Ø8 x 80 mm |
| 3. fire damper mcr WIP | 7. mineral wool with the density of at least 80 kg/m ³ , A1 class | 11. board joints sealed with Conlit Glue |
| 4. gypsum filling | 8. Ridurit fire retardant board | |

*it is possible to use a different sealing which ensures the required fire resistance

8.5.6. sample installation in a multiple set (a battery of four dampers)



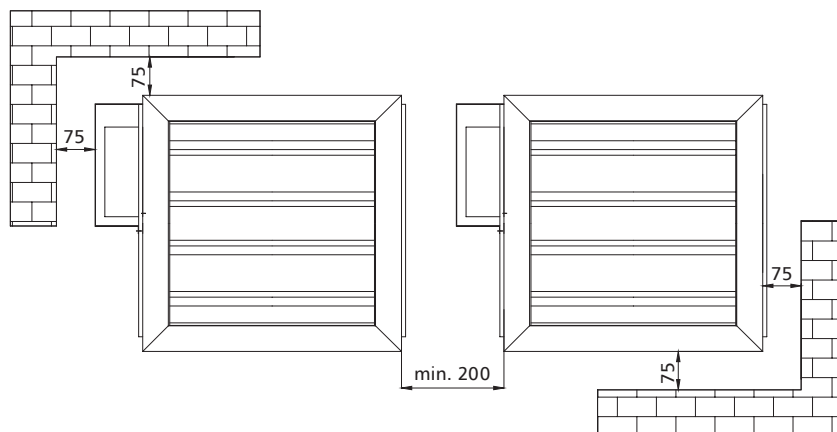
- | |
|--|
| 1. e.g. masonry wall |
| 2. e.g. cement mortar* |
| 3. fire damper mcr WIP |
| 4. mineral wool with the density of at least 80 kg/m ³ , A1 class |
| 5. installation flat bar with the width of 70 mm |
| 6. ST8x16 screw |

*it is possible to use a different sealing which ensures the required fire resistance

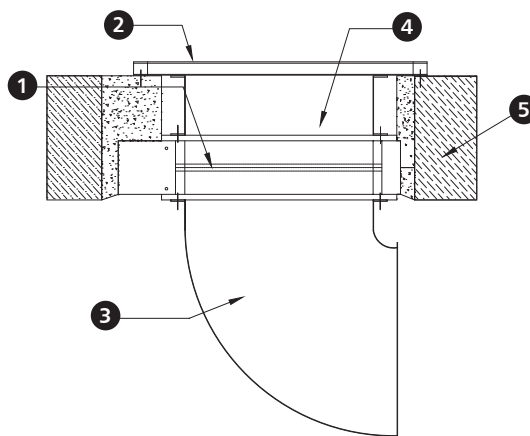
Fire damper installation with vertical rotation axis of the louvers

The fire damper can operate with a vertical axis of louver rotation with the top or bottom-mounted mechanism.

Distance between systems and partitions



Example applications - installation with masking cover



1. fire damper mcr WIP
2. masking cover
3. ventilation duct
4. duct - ventilation straight connection pipe
5. wall, ceiling

If a mcr WIP/V, mcr WIP/V-M damper is used, thanks to the louvers (no single-plane partition) it is possible to use the space in front of and behind the damper for such system elements as a duct cover or a rectangular silencer or to route a duct along the wall using a duct bend or reduction.

8.6. technical parameters of mcr WIP/V, mcr WIP/V-M rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		200						250					300				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.040	0.034	490	6	26	0.050	0.043	612	6	26	0.06	0.051	734	6	27
		6			734	13	36			918	13	37			1 102	13	37
		8			979	24	44			1 224	23	44			1 469	22	45
		10			1 224	37	49			1 530	36	50			1 836	35	50
	250	4	0.050	0.043	612	6	26	0.063	0.053	765	6	27	0.075	0.064	918	6	28
		6			918	13	37			1 148	13	38			1 377	13	38
		8			1 224	23	44			1 530	23	45			1 836	22	46
		10			1 530	36	50			1 913	36	51			2 295	35	51
	300	4	0.060	0.051	734	6	27	0.075	0.064	918	6	28	0.09	0.077	1 102	6	28
		6			1 102	13	37			1 377	13	38			1 652	13	39
		8			1 469	23	45			1 836	23	46			2 203	22	46
		10			1 836	36	51			2 295	36	52			2 754	35	52
	350	4	0.070	0.060	857	6	27	0.088	0.074	1 071	6	28	0.105	0.089	1 285	5	29
		6			1 285	13	38			1 607	13	39			1 928	12	39
		8			1 714	22	45			2 142	22	46			2 570	22	47
		10			2 142	35	51			2 678	35	52			3 213	34	52
	400	4	0.080	0.068	979	6	28	0.100	0.085	1 224	6	29	0.12	0.102	1 469	5	29
		6			1 469	13	38			1 836	13	39			2 203	12	40
		8			1 958	22	46			2 448	22	47			2 938	22	47
		10			2 448	35	52			3 060	35	53			3 672	34	53
	450	4	0.090	0.077	1 102	6	28	0.113	0.096	1 377	6	29	0.135	0.115	1 652	5	30
		6			1 652	13	39			2 066	13	40			2 479	12	40
		8			2 203	22	46			2 754	22	47			3 305	22	48
		10			2 754	35	52			3 443	35	53			4 131	34	54
	500	4	0.100	0.085	1 224	5	28	0.125	0.106	1 530	5	29	0.15	0.128	1 836	5	30
		6			1 836	12	39			2 295	12	40			2 754	12	40
		8			2 448	22	46			3 060	22	47			3 672	21	48
		10			3 060	34	52			3 825	34	53			4 590	33	54
	550	4	0.110	0.094	1 346	5	29	0.138	0.117	1 683	5	30	0.165	0.140	2 020	5	31
		6			2 020	12	39			2 525	12	40			3 029	12	41
		8			2 693	22	47			3 366	22	48			4 039	22	49
		10			3 366	34	53			4 208	34	54			5 049	34	54
	600	4	0.120	0.102	1 469	5	29	0.150	0.128	1 836	5	30	0.18	0.153	2 203	5	31
		6			2 203	12	40			2 754	12	41			3 305	12	41
		8			2 938	22	47			3 672	22	48			4 406	21	49
		10			3 672	34	53			4 590	34	54			5 508	33	54
	650	4	0.130	0.111	1 591	5	30	0.163	0.138	1 989	5	30	0.195	0.166	2 387	5	31
		6			2 387	12	40			2 984	12	41			3 580	12	41
		8			3 182	22	48			3 978	22	49			4 774	21	49
		10			3 978	34	53			4 973	34	54			5 967	33	55
	700	4	0.140	0.119	1 714	5	30	0.175	0.149	2 142	5	31	0.21	0.179	2 570	5	31
		6			2 570	12	40			3 213	12	41			3 856	12	42
		8			3 427	22	48			4 284	22	49			5 141	21	49
		10			4 284	34	54			5 355	34	55			6 426	33	55
	750	4	0.150	0.128	1 836	5	30	0.188	0.159	2 295	5	31	0.225	0.191	2 754	5	31
		6			2 754	12	40			3 443	12	41			4 131	12	42
		8			3 672	21	48			4 590	21	49			5 508	21	49
		10			4 590	33	54			5 738	33	55			6 885	32	55
800	4	0.160	0.136	1 958	5	30	0.200	0.170	2 448	5	31	0.24	0.204	2 938	5	31	
	6			2 938	12	41			3 672	12	42			4 406	12	42	
	8			3 917	21	48			4 896	21	49			5 875	21	49	
	10			4 896	33	54			6 120	33	55			7 344	32	55	
850	4	0.170	0.145	2 081	5	30	0.213	0.181	2 601	5	31	0.255	0.217	3 121	5	31	
	6			3 121	12	40			3 902	12	41			4 682	11	42	
	8			4 162	21	48			5 202	21	49			6 242	20	49	
	10			5 202	32	54			6 503	32	55			7 803	31	55	
900	4	0.180	0.153	2 203	5	30	0.225	0.191	2 754	5	31	0.27	0.230	3 305	5	31	
	6			3 305	12	41			4 131	12	42			4 957	11	42	
	8			4 406	21	48			5 508	21	49			6 610	20	50	
	10			5 508	32	54			6 885	32	55			8 262	31	55	
1000	4	0.200	0.170	2 448	5	31	0.250	0.213	3 060	5	32	0.3	0.255	3 672	5	32	
	6			3 672	12	41			4 590	12	42			5 508	11	43	
	8			4 896	21	49			6 120	21	50			7 344	20	50	
	10			6 120	32	54			7 650	32	55			9 180	31	56	

The mcr WIP fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

8.6. technical parameters of mcr WIP/V, mcr WIP/V-M rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		350					400					450					
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.070	0.060	857	6	27	0.080	0.068	979	5	27	0.090	0.077	1 102	5	28
		6			1 285	13	38			1 469	12	38			1 652	12	38
		8			1 714	22	45			1 958	22	45			2 203	22	46
		10			2 142	35	51			2 448	34	51			2 754	34	52
	250	4	0.088	0.074	1 071	6	28	0.100	0.085	1 224	5	28	0.113	0.096	1 377	5	29
		6			1 607	13	39			1 836	12	39			2 066	12	39
		8			2 142	22	46			2 448	22	46			2 754	22	47
		10			2 678	35	52			3 060	34	52			3 443	34	53
	300	4	0.105	0.089	1 285	6	29	0.120	0.102	1 469	5	29	0.135	0.115	1 652	5	30
		6			1 928	13	40			2 203	12	40			2 479	12	40
		8			2 570	22	47			2 938	22	47			3 305	22	48
		10			3 213	35	53			3 672	34	53			4 131	34	54
	350	4	0.123	0.104	1 499	5	29	0.140	0.119	1 714	5	29	0.158	0.134	1 928	5	30
		6			2 249	12	40			2 570	12	40			2 892	12	41
		8			2 999	22	47			3 427	21	48			3 856	21	48
		10			3 749	34	53			4 284	33	53			4 820	33	54
	400	4	0.140	0.119	1 714	5	30	0.160	0.136	1 958	5	30	0.180	0.153	2 203	5	31
		6			2 570	12	40			2 938	12	41			3 305	12	41
		8			3 427	22	48			3 917	21	48			4 406	21	49
		10			4 284	34	54			4 896	33	54			5 508	33	54
	450	4	0.158	0.134	1 928	5	30	0.180	0.153	2 203	5	31	0.203	0.172	2 479	5	31
		6			2 892	12	41			3 305	12	41			3 718	12	42
		8			3 856	22	48			4 406	21	49			4 957	21	49
		10			4 820	34	54			5 508	33	54			6 197	33	55
	500	4	0.175	0.149	2 142	5	30	0.200	0.170	2 448	5	31	0.225	0.191	2 754	5	32
		6			3 213	12	41			3 672	12	42			4 131	12	42
		8			4 284	21	48			4 896	21	49			5 508	21	50
		10			5 355	33	54			6 120	33	55			6 885	33	55
	550	4	0.193	0.164	2 570	5	31	0.220	0.187	2 693	5	31	0.248	0.210	3 029	5	32
		6			3 856	12	42			4 039	12	42			4 544	12	43
		8			5 141	22	49			5 386	21	49			6 059	21	50
		10			6 426	34	55			6 732	33	55			7 574	33	56
	600	4	0.210	0.179	2 570	5	31	0.240	0.204	2 938	4	28	0.270	0.230	3 305	5	32
		6			3 856	12	42			4 406	8	37			4 957	12	42
		8			5 141	21	49			5 875	14	44			6 610	21	50
		10			6 426	33	55			7 344	32	55			8 262	32	56
	650	4	0.228	0.193	2 785	5	32	0.260	0.221	3 182	5	32	0.293	0.249	3 580	5	32
		6			4 177	12	42			4 774	12	42			5 370	12	43
		8			5 569	21	50			6 365	21	50			7 160	21	50
		10			6 962	33	55			7 956	32	56			8 951	32	56
	700	4	0.245	0.208	2 999	5	32	0.28	0.238	3 427	5	32	0.315	0.268	3 856	5	33
		6			4 498	12	42			5 141	12	43			5 783	12	43
		8			5 998	21	50			6 854	21	50			7 711	21	51
		10			7 497	33	56			8 568	32	56			9 639	32	56
	750	4	0.263	0.223	3 213	5	32	0.3	0.255	3 672	5	32	0.338	0.287	4 131	5	33
		6			4 820	12	42			5 508	12	43			6 197	12	43
		8			6 426	21	50			7 344	21	50			8 262	21	51
		10			8 033	32	56			9 180	32	56			10 328	32	57
	800	4	0.280	0.238	3 427	5	32	0.32	0.272	3 917	5	33	0.360	0.306	4 406	5	32
		6			5 141	12	43			5 875	11	43			6 610	11	42
		8			6 854	21	50			7 834	20	50			8 813	20	50
		10			8 568	32	56			9 792	31	56			11 016	31	56
	850	4	0.298	0.253	3 641	5	32	0.34	0.289	4 162	5	32	0.383	0.325	4 682	5	31
		6			5 462	11	42			6 242	11	43			7 023	11	42
		8			7 283	20	50			8 323	19	50			9 364	19	49
		10			9 104	31	56			10 404	30	56			11 705	30	55
	900	4	0.315	0.268	3 856	5	32	0.360	0.306	4 406	6	35	0.405	0.344	4 957	5	31
		6			5 783	11	43			6 610	12	44			7 436	11	42
		8			7 711	20	50			8 813	26	54			9 914	19	49
		10			9 639	31	56			11 016	30	56			12 393	30	55
	1000	4	0.350	0.298	4 284	5	33	0.400	0.340	4 896	5	33	0.450	0.383	5 508	5	31
		6			6 426	11	43			7 344	11	43			8 262	11	42
		8			8 568	20	51			9 792	19	51			11 016	19	49
		10			10 710	31	56			12 240	30	57			13 770	30	55

The mcr WIP fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

8.6. technical parameters of mcr WIP/V, mcr WIP/V-M rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		500					550					600					
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.100	0.085	1 224	5	28	0.110	0.094	1 346	5	28	0.120	0.102	1 469	5	28
		6			1 836	12	39			2 020	12	39			2 203	12	39
		8			2 448	21	46			2 693	21	46			2 938	21	46
		10			3 060	33	52			3 366	33	52			3 672	32	52
	250	4	0.125	0.106	1 530	5	29	0.138	0.117	1 683	5	29	0.150	0.128	1 836	5	29
		6			2 295	12	40			2 525	12	40			2 754	12	40
		8			3 060	21	47			3 366	21	47			3 672	21	47
		10			3 825	33	53			4 208	33	53			4 590	32	53
	300	4	0.150	0.128	1 836	5	30	0.165	0.140	2 020	5	30	0.180	0.153	2 203	5	30
		6			2 754	12	40			3 029	12	41			3 305	12	41
		8			3 672	21	48			4 039	21	48			4 406	21	48
		10			4 590	33	54			5 049	33	54			5 508	32	54
	350	4	0.175	0.149	2 142	5	30	0.193	0.164	2 356	5	30	0.210	0.179	2 570	5	30
		6			3 213	12	41			3 534	12	41			3 856	11	41
		8			4 284	21	48			4 712	21	49			5 141	20	48
		10			5 355	32	54			5 891	32	54			6 426	31	54
	400	4	0.200	0.170	2 448	5	31	0.220	0.187	2 693	5	31	0.240	0.204	2 938	5	31
		6			3 672	12	41			4 039	12	42			4 406	11	42
		8			4 896	21	49			5 386	21	49			5 875	20	49
		10			6 120	32	54			6 732	32	55			7 344	31	55
	450	4	0.225	0.191	2 754	5	31	0.248	0.210	3 029	5	32	0.270	0.230	3 305	5	31
		6			4 131	12	42			4 544	12	42			4 957	11	42
		8			5 508	21	49			6 059	21	50			6 610	20	50
		10			6 885	32	55			7 574	32	55			8 262	31	55
500	4	0.250	0.213	3 060	5	31	0.275	0.234	3 366	5	32	0.300	0.255	3 672	5	32	
	6			4 590	11	42			5 049	12	43			5 508	11	43	
	8			6 120	22	51			6 732	21	50			7 344	20	50	
	10			7 650	32	55			8 415	32	56			9 180	31	56	
550	4	0.275	0.234	3 672	5	32	0.303	0.257	4 039	5	32	0.330	0.281	4 406	5	32	
	6			5 508	12	43			6 059	12	43			6 610	11	43	
	8			7 344	21	50			8 078	21	50			8 813	20	50	
	10			9 180	32	56			10 098	32	56			11 016	31	56	
600	4	0.300	0.255	3 672	5	32	0.330	0.281	4 039	5	32	0.360	0.306	4 406	5	32	
	6			5 508	11	43			6 059	11	43			6 610	11	43	
	8			7 344	20	50			8 078	20	50			8 813	19	50	
	10			9 180	31	56			10 098	31	56			11 016	30	56	
650	4	0.325	0.276	3 978	5	33	0.358	0.304	4 376	5	33	0.390	0.332	4 774	5	33	
	6			5 967	12	43			6 564	11	43			7 160	11	43	
	8			7 956	21	51			8 752	20	51			9 547	19	51	
	10			9 945	31	56			10 940	31	57			11 934	30	57	
700	4	0.350	0.298	4 284	5	33	0.385	0.327	4 712	5	33	0.420	0.357	5 141	5	33	
	6			6 426	11	43			7 069	11	44			7 711	11	44	
	8			8 568	20	51			9 425	20	51			10 282	19	51	
	10			10 710	31	56			11 781	31	57			12 852	30	57	
750	4	0.375	0.319	4 590	5	33	0.413	0.351	5 049	5	33	0.450	0.383	5 508	5	33	
	6			6 885	11	43			7 574	11	44			8 262	11	44	
	8			9 180	20	51			10 098	20	51			11 016	19	51	
	10			11 475	31	57			12 623	31	57			13 770	30	57	
800	4	0.400	0.340	4 896	5	32	0.440	0.374	5 386	5	33	0.480	0.408	5 875	5	33	
	6			7 344	11	43			8 078	11	44			8 813	10	44	
	8			9 792	19	51			10 771	19	51			11 750	19	51	
	10			12 240	30	56			13 464	30	57			14 688	29	57	
850	4	0.425	0.361	5 202	5	32	0.468	0.397	5 722	5	33	0.510	0.434	6 242	4	33	
	6			7 803	10	43			8 583	10	44			9 364	10	43	
	8			10 404	19	50			11 444	19	51			12 485	18	51	
	10			13 005	29	56			14 306	29	57			15 606	28	57	
900	4	0.450	0.383	5 508	5	32	0.495	0.421	6 059	5	33	0.540	0.459	6 610	4	33	
	6			8 262	10	43			9 088	10	44			9 914	10	41	
	8			11 016	19	50			12 118	19	51			13 219	18	49	
	10			13 770	29	56			15 147	29	57			16 524	28	54	
1000	4	0.500	0.425	6 120	5	32	0.550	0.468	6 659	5	34	0.600	0.510	7 344	4	34	
	6			9 180	10	43			9 988	10	44			11 016	10	44	
	8			12 240	19	50			12 118	19	52			14 688	18	52	
	10			15 300	29	56			15 147	29	58			18 360	28	57	

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8.6. technical parameters of mcr WIP/V, mcr WIP/V-M rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		650					700					750					
		v [m/s]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.130	0.111	1 591	5	29	0.140	0.119	1 714	5	29	0.150	0.128	1 836	5	29
		6			2 387	12	39			2 570	11	39			2 754	11	40
		8			3 182	21	47			3 427	20	47			3 672	20	47
		10			3 978	32	53			4 284	31	52			4 590	31	53
	250	4	0.163	0.138	1 989	5	30	0.175	0.149	2 142	5	30	0.188	0.159	2 295	5	30
		6			2 984	12	40			3 213	11	40			3 443	11	40
		8			3 978	21	48			4 284	20	48			4 590	20	48
		10			4 973	32	54			5 355	31	53			5 738	31	54
	300	4	0.195	0.166	2 387	5	30	0.210	0.179	2 570	5	30	0.225	0.191	2 754	5	31
		6			3 580	12	41			3 856	11	41			4 131	11	41
		8			4 774	21	49			5 141	20	48			5 508	20	49
		10			5 967	32	54			6 426	31	54			6 885	31	55
	350	4	0.228	0.193	2 785	5	31	0.245	0.208	2 999	5	31	0.263	0.223	3 213	5	31
		6			4 177	11	41			4 498	11	41			4 820	11	42
		8			5 569	20	49			5 998	19	49			6 426	19	49
		10			6 962	31	55			7 497	30	54			8 033	30	55
	400	4	0.260	0.221	3 182	5	31	0.280	0.238	3 427	5	31	0.300	0.255	3 672	5	32
		6			4 774	11	42			5 141	11	42			5 508	11	42
		8			6 365	20	49			6 854	19	49			7 344	19	50
		10			7 956	31	55			8 568	30	55			9 180	30	55
	450	4	0.293	0.249	3 580	5	32	0.315	0.268	3 856	5	32	0.338	0.287	4 131	5	32
		6			5 370	11	42			5 783	11	42			6 197	11	43
		8			7 160	20	50			7 711	19	50			8 262	19	50
		10			8 951	31	56			9 639	30	56			10 328	30	56
	500	4	0.325	0.276	3 978	5	32	0.350	0.298	4 284	5	32	0.375	0.319	4 590	5	32
		6			5 967	11	43			6 426	11	43			6 885	11	43
		8			7 956	20	50			8 568	19	50			9 180	19	51
		10			9 945	31	56			10 710	30	56			11 475	30	56
	550	4	0.358	0.304	4 774	5	33	0.385	0.327	4 712	5	33	0.413	0.351	5 049	5	33
		6			7 160	11	43			7 069	11	43			7 574	11	43
		8			9 547	20	51			9 425	19	51			10 098	19	51
		10			11 934	31	57			11 781	30	56			12 623	30	57
	600	4	0.390	0.332	4 774	5	33	0.420	0.357	5 141	5	33	0.450	0.383	5 508	5	33
		6			7 160	11	44			7 711	11	44			8 262	11	44
		8			9 547	20	51			10 282	19	51			11 016	19	51
		10			11 934	31	57			12 852	30	57			13 770	30	57
	650	4	0.423	0.359	5 171	5	33	0.455	0.387	5 569	5	33	0.488	0.414	5 967	5	33
		6			7 757	11	44			8 354	10	43			8 951	10	44
		8			10 343	19	51			11 138	19	51			11 934	19	51
		10			12 929	30	57			13 923	29	57			14 918	29	57
	700	4	0.455	0.387	5 569	5	33	0.490	0.417	5 998	5	33	0.525	0.446	6 426	5	34
		6			8 354	11	44			8 996	10	44			9 639	10	44
		8			11 138	19	51			11 995	19	51			12 852	19	52
		10			13 923	30	57			14 994	29	57			16 065	29	57
	750	4	0.488	0.414	5 967	5	34	0.525	0.446	6 426	5	34	0.563	0.478	6 885	5	34
		6			8 951	11	44			9 639	10	44			10 328	10	44
		8			11 934	19	52			12 852	19	52			13 770	19	52
		10			14 918	30	57			16 065	29	57			17 213	29	58
	800	4	0.520	0.442	6 365	5	33	0.560	0.476	6 854	4	29	0.600	0.510	7 344	4	34
		6			9 547	10	44			10 282	7	37			11 016	10	44
		8			12 730	19	51			13 709	11	43			14 688	18	52
		10			15 912	29	57			17 136	28	54			18 360	28	57
	850	4	0.553	0.470	6 763	4	33	0.595	0.506	7 283	4	34	0.638	0.542	7 803	4	34
		6			10 144	10	43			10 924	10	44			11 705	10	44
		8			13 525	18	51			14 566	18	52			15 606	18	52
		10			16 907	28	57			18 207	28	57			19 508	28	58
	900	4	0.585	0.497	7 160	4	33	0.630	0.536	7 711	4	33	0.675	0.574	8 262	4	34
		6			10 741	10	43			11 567	10	44			12 393	10	44
		8			14 321	18	51			15 422	17	51			16 524	17	52
		10			17 901	28	57			19 278	27	57			20 655	27	58
	1000	4	0.650	0.553	7 956	4	33	0.700	0.595	8 568	4	34	0.750	0.638	9 180	4	34
		6			11 934	10	43			12 852	10	44			13 770	10	45
		8			15 912	18	51			17 136	17	52			18 360	17	52
		10			19 890	28	57			21 420	27	58			22 950	27	58

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8.6. technical parameters of mcr WIP/V, mcr WIP/V-M rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]																					
		800						850				900						1000					
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	
width B [mm]	200	4	0.160	0.136	1 958	5	29	0.170	0.145	2 081	5	29	0.180	0.153	2 203	5	29	0.200	0.170	2 448	5	29	
		6			2 938	11	39			3 121	11	40			3 305	10	39			3 672	10	40	
		8			3 917	19	47			4 162	19	47			4 406	19	47			4 896	19	47	
		10			4 896	30	53			5 202	30	53			5 508	29	53			6 120	29	53	
	250	4	0.200	0.170	2 448	5	30	0.213	0.181	2 601	5	30	0.225	0.191	2 754	5	30	0.250	0.213	3 060	5	30	
		6			3 672	11	40			3 902	11	41			4 131	10	40			4 590	10	41	
		8			4 896	19	48			5 202	19	48			5 508	19	48			6 120	19	48	
		10			6 120	30	54			6 503	30	54			6 885	29	54			7 650	29	54	
	300	4	0.240	0.204	2 938	5	31	0.255	0.217	3 121	5	31	0.270	0.230	3 305	5	31	0.300	0.255	3 672	5	31	
		6			4 406	11	41			4 682	11	41			4 957	10	41			5 508	10	42	
		8			5 875	19	49			6 242	19	49			6 610	19	49			7 344	19	49	
		10			7 344	30	54			7 803	30	55			8 262	29	54			9 180	29	55	
	350	4	0.280	0.238	3 427	5	31	0.298	0.253	3 641	5	31	0.315	0.268	3 856	4	31	0.350	0.298	4 284	4	31	
		6			5 141	10	41			5 462	10	42			5 783	10	41			6 426	10	42	
		8			6 854	19	49			7 283	19	49			7 711	18	49			8 568	18	49	
		10			8 568	29	55			9 104	29	55			9 639	28	55			10 710	28	55	
	400	4	0.320	0.272	3 917	5	31	0.340	0.289	4 162	5	32	0.360	0.306	4 406	4	31	0.400	0.340	4 896	4	32	
		6			5 875	10	42			6 242	10	42			6 610	10	42			7 344	10	42	
		8			7 834	19	49			8 323	19	50			8 813	18	49			9 792	18	50	
		10			9 792	29	55			10 404	29	55			11 016	28	55			12 240	28	56	
450	4	0.360	0.306	4 406	5	32	0.383	0.325	4 682	4	32	0.405	0.344	4 957	4	31	0.450	0.383	5 508	4	32		
	6			6 610	10	42			7 023	10	42			7 436	10	42			8 262	10	42		
	8			8 813	19	50			9 364	18	50			9 914	17	50			11 016	17	50		
	10			11 016	29	56			11 705	28	56			12 393	27	55			13 770	27	56		
500	4	0.400	0.340	4 896	5	32	0.425	0.361	5 202	4	32	0.450	0.383	5 508	4	32	0.500	0.425	6 120	4	32		
	6			7 344	10	43			7 803	10	43			8 262	10	42			9 180	10	43		
	8			9 792	19	50			10 404	18	50			11 016	17	50			12 240	17	50		
	10			12 240	29	56			13 005	28	56			13 770	27	56			15 300	27	56		
550	4	0.440	0.374	5 386	5	33	0.468	0.397	5 722	4	33	0.495	0.421	6 059	4	32	0.550	0.468	6 732	4	33		
	6			8 078	10	43			8 583	10	43			9 088	10	43			10 098	10	43		
	8			10 771	19	51			11 444	18	51			12 118	17	50			13 464	17	51		
	10			13 464	29	57			14 306	28	56			15 147	27	56			16 830	27	57		
600	4	0.480	0.408	5 875	5	33	0.510	0.434	6 242	4	33	0.540	0.459	6 610	4	33	0.600	0.510	7 344	4	33		
	6			8 813	10	44			9 364	10	43			9 914	10	43			11 016	10	44		
	8			11 750	19	51			12 485	18	51			13 219	17	51			14 688	17	51		
	10			14 688	29	57			15 606	28	57			16 524	27	57			18 360	27	57		
650	4	0.520	0.442	6 365	5	33	0.553	0.470	6 763	4	33	0.585	0.497	7 160	4	33	0.650	0.553	7 956	4	34		
	6			9 547	10	44			10 144	10	44			10 741	10	44			11 934	10	44		
	8			12 730	19	52			13 525	18	51			14 321	17	51			15 912	17	52		
	10			15 912	29	57			16 907	28	57			17 901	27	57			19 890	27	57		
700	4	0.560	0.476	6 854	4	33	0.595	0.506	7 283	4	33	0.630	0.536	7 711	4	33	0.700	0.595	8 568	4	33		
	6			10 282	10	44			10 924	10	44			11 567	9	43			12 852	9	44		
	8			13 709	18	51			14 566	17	51			15 422	17	51			17 136	17	51		
	10			17 136	28	57			18 207	27	57			19 278	26	57			21 420	26	57		
750	4	0.600	0.510	7 344	4	34	0.638	0.542	7 803	4	33	0.675	0.574	8 262	4	33	0.750	0.638	9 180	4	34		
	6			11 016	10	44			11 705	10	44			12 393	9	44			13 770	9	44		
	8			14 688	18	52			15 606	17	51			16 524	17	51			18 360	17	52		
	10			18 360	28	57			19 508	27	57			20 655	26	57			22 950	26	57		
800	4	0.640	0.544	7 834	4	34	0.680	0.578	8 323	4	34	0.720	0.612	8 813	4	33	0.800	0.680	9 792	4	34		
	6			11 750	10	44			12 485	10	44			13 219	9	44			14 688	9	44		
	8			15 667	18	52			16 646	17	52			17 626	17	52			19 584	17	52		
	10			19 584	28	58			20 808	27	58			22 032	26	57			24 480	26	58		
850	4	0.680	0.578	8 323	4	34	0.723	0.614	8 843	4	33	0.765	0.650	9 364	4	34	0.850	0.723	10 404	4	34		
	6			12 485	10	44			13 265	9	44			14 045	9	44			15 606	9	45		
	8			16 646	17	52			17 687	17	52			18 727	17	52			20 808	17	52		
	10			20 808	27	58			22 109	26	57			23 409	26	58			26 010	26	58		
900	4	0.720	0.612	8 813	4	34	0.765	0.650	9 364	4	34	0.810	0.689	9 914	4	34	0.900	0.765	11 016	4	34		
	6			13 219	10	45			14 045	9	44			14 872	9	45			16 524	9	44		
	8			17 626	17	52			18 727	17	52			19 829	17	52			22 032	16	52		
	10			22 032	27	58			23 409	26	58			24 786	26	58			27 540	25	58		
1000	4	0.800	0.680	9 792	4	34	0.850	0.723	10 404	4	34	0.900	0.765	11 016	4	33	1.000	0.850	12 240	4	34		
	6			14 688	9	44			15 606	9	44			16 524	9	44			18 360	9	44		
	8			19 584	17	52			20 808	16	52			22 032	15	51			24 480	15	52		
	10			24 480	26	58			26 010	25	58			27 540	24	57			30 600	24	58		

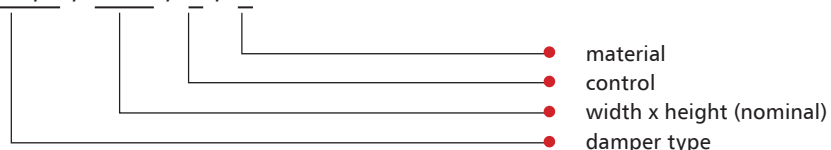
8.7. estimated weights of mcr WIP/V, mcr WIP/V-M dampers [kg]

		width B [mm]									
		200	250	300	400	500	600	700	800	900	1000
height H [mm]	200	10	10	10	10	15	17	18	19	22	25
	250	10	10	11	11	16	18	18	21	24	27
	300	10	11	11	12	17	20	21	23	26	28
	350	11	11	11	16	18	21	23	26	28	30
	400	12	12	14	18	19	21	25	29	30	33
	500	15	16	17	19	20	23	27	32	33	35
	600	17	18	20	21	23	26	30	35	37	39
	700	18	18	21	23	25	28	32	35	38	40
	800	20	21	22	24	29	35	37	41	43	49
	900	22	25	25	28	33	35	39	43	49	52
	1000	23	29	32	33	36	42	43	47	53	60

The table shows the weights of dampers with trigger control mechanisms or actuators.

8.8. marking

mcr WIP/V / B x H / 1 / 2



1 – control:

- Belimo trigger control mechanism
- BE24** – actuator with no return spring, U = 24 V AC/DC
- BE24-ST** (with the BKNE230-24 option) – actuator with no return spring, U = 24 V AC/DC, with a SBS Control system
- BE230** – actuator with no return spring, U = 230 V AC/DC
- BLE24** – actuator with no return spring, U = 24 V AC/DC
- BLE24-ST** (with the BKNE230-24 option) – actuator with no return spring, U = 24 V AC/DC, with a SBS Control system
- BLE230** – actuator with no return spring, U = 230 V AC/DC

2 – material:

- [no symbol]** – galvanised steel, Zn 275 g/m² coating
- KN** – 1.4404 acid-proof stainless steel

example marking:

mcr WIP/V 400 x 400 BLE24

Louvered fire damper with a compact 24 V Belimo actuator with limit switches.

Chapter 12 - power supply and control (p. 141) contains:

- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper,
- location of trigger control mechanisms in relation to the damper - manufacture standards.

**PRODUCT CONFIGURATOR
AT WWW.MERCOR.COM.PL**



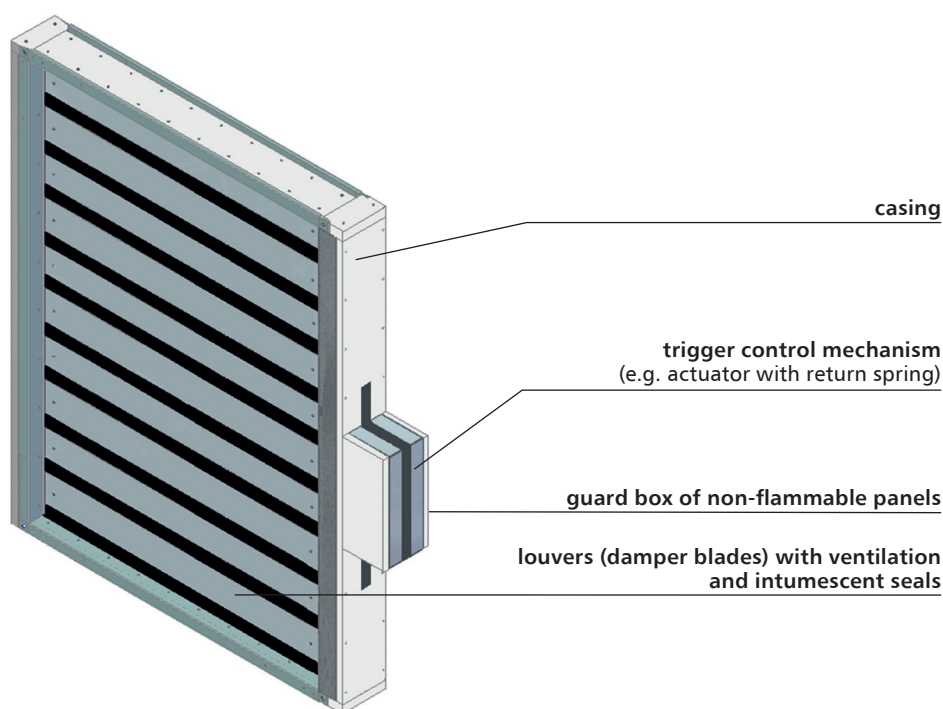
- ▶ **EI120S, EI90S, ES120**
- ▶ **Certificate of constancy of performance 2434-CPR-0003.**
- ▶ **Dampers certified for compliance with EN 15650.**
- ▶ **Dampers qualified under EN 13501-3 and tested under EN 1366-2.**
- ▶ **Narrow louvered fire dampers.**

9.1. application

The mcr WIP PRO/S multi-blade cut-off dampers are designed for use in general ventilation systems, where those systems pass through construction partitions. mcr WIP PRO/S dampers are particularly useful for systems with a silencer, elbow or supply and extract grill.

During a fire, they preserve the fire resistance of the construction partition where ventilation and air conditioning ducts are routed through. Furthermore, they prevent the spreading of fire, smoke and burning fumes to the remaining part of the building which is not on fire. During normal operation, the fire damper louvers are open. In case of fire, the fire damper louvers are closed.

9.2. design



Multi-blade mcr WIP PRO/S damper consists of a rectangular casing made of two steel sections joined with a non-combustible plate using rivets and galvanized steel fasteners, a set of movable blades rotating around their axis and a trigger control mechanism. The fire damper casing is made of fire resistant panels and galvanized steel „C“ shape profiles. The device is reinforced on both sides with steel corners. Intumescent and ventilation seals are installed on the inside. Each fire damper blade is made of two 20 mm thick fire resistant plates. Intumescent seal and ventilation seals fixed with staples are installed at the entire blade length. The blades rotate around the axis made by two steel pins. Each pin is mounted in a brass sleeve mounted on a vertical side H of the fire damper casing.

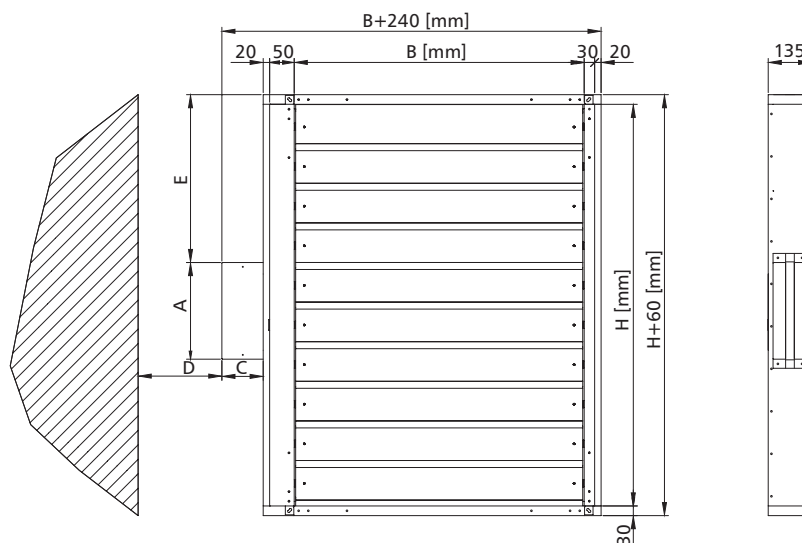
9.3. versions

9.3.1. mcr WIP PRO/S S – the cut-off fire damper for ventilation ducts with an actuator with a return spring – damper closing and opening with an actuator

During normal operation, the cut-off shutters of the fire damper remain open. In case of fire, the louvers close automatically or remotely by cutting off the power supply.

The mcr WIP PRO/S dampers feature a Belimo trigger control mechanisms **BFL, BFN, BF, BF-TL** axial actuator with a return spring, powered with 24 V AC/DC or 230 V AC, with thermoelectric trigger 72°C (optionally it is possible to use triggers with the nominal tripping temperature of 95°C). BFL, BFN, BF series actuators are equipped with limit switches used to monitor the blades position. Furthermore, the mechanical position indicator is placed on the actuator.

Fire dampers with analogue BFL, BFN, BF or digital BF-TL Belimo actuators are closed by the thermoelectric trigger or power cut-off as a result of the actuator return spring action. The dampers open when the power supply voltage is applied to the actuator terminals. Furthermore, dampers with those actuators may be opened manually using a key.



mechanism	A	C	D	E
BF, BFL, BFN	298	120	75	formula*

* shown in below table

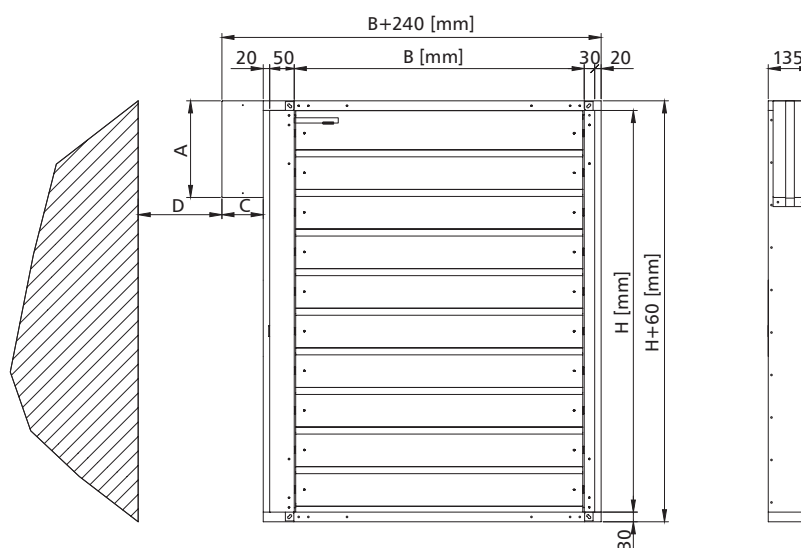
for the even number of blades	for the odd number of blades
$E \text{ [mm]} = (H/2 - 123) + 30$	$E \text{ [mm]} = (H/2 - 61.5) + 30$

Number of blades = $H/123$.

9.3.2. mcr WIP PRO/S – the cut-off fire damper for ventilation ducts with a spring drive and an integrated thermal trigger, optionally equipped with an electromagnetic trigger and limit switches

During normal operation, the cut-off shutters of the fire damper remain open. In case of fire, the shutters close automatically or, in case of a damper with an electromagnetic trigger, additionally using the fire automation.

The mcr WIP PRO/S dampers are equipped with a **RST-KW1** trigger control mechanism with a drive spring and a cam-lever system. A thermal trigger 74°C (optionally at 95°C or 120°C) is integrated into the damper mechanism. After the nominal temperature is exceeded, the thermal trigger is tripped and the louvers close. On the RST-KW1 mechanism, there is a mechanical indicator of blades position. It is possible to equip a trigger control mechanism with an electromagnetic trigger activated by the application („pulse”) or removal („break”) of the power supply voltage and with limit switches used to signal the blades position state. The mechanism features test and blades button-release functions. Blades re-opening is activated manually.



mechanism	A	C	D
RST-KW1	298	120	75

9.4. dimensions - rectangular dampers

Installation in walls:

- nominal width B: from 110 mm to 900 mm
- nominal height H: from 263 mm to 1250 mm
- the maximum cross-section surface of one damper up to 1.125 m²

Installation in ceilings:

- nominal width B: from 110 mm to 1000 mm
- nominal height H: from 263 mm to 1000 mm
- the maximum cross-section surface of one damper up to 1 m²

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (in 1 mm increments, in the given range).

Square fire dampers may also be fitted with round connectors for the spigot connection to the round ducts.

9.5. installation

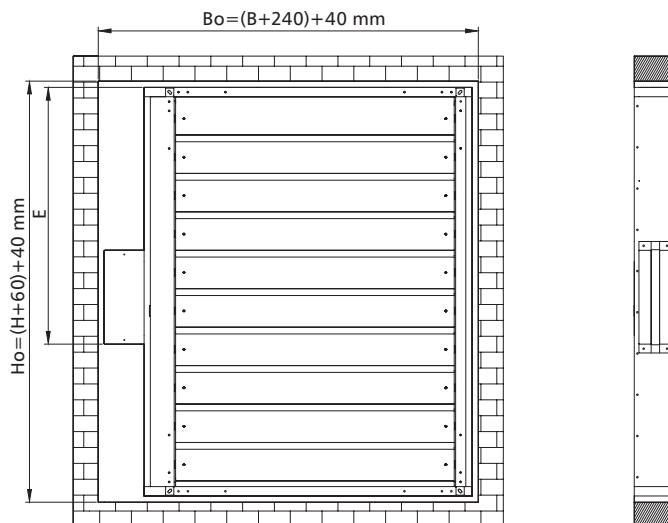
Rectangular mcr WIP PRO/S fire dampers are class EI120(v_e i↔o)S-rated devices, when installed in a concrete partition, min. 110 mm thick, made of common bricks or aerated concrete blocks, min. thickness 115 mm or stud partitions with min. EI120 fire rating and class EI90(h_o i↔o)S / EI20(h_o i↔o)S-rated devices, when installed in floor slabs, min. 150 mm thick.

9.5.1. preparation of installation openings

The minimum dimensions of the installation opening that permits correct installation of the mcr WIP PRO/S damper is:

$$B_o = (B + 240) + 40 \text{ mm}$$

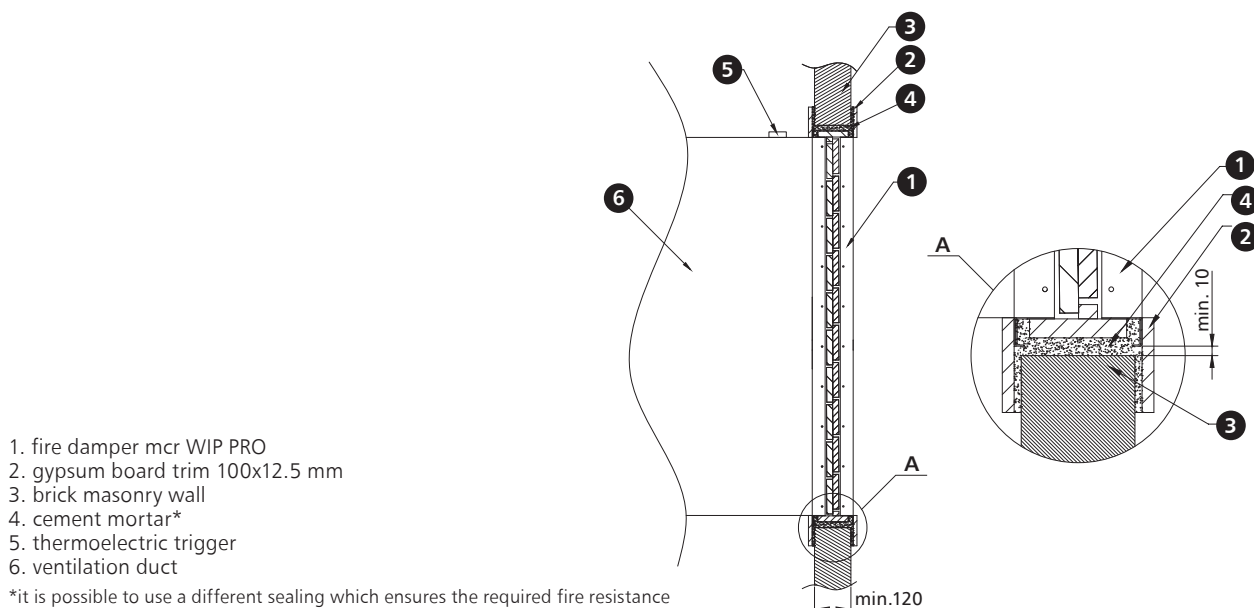
$$H_o = (H + 60) + 40 \text{ mm}$$



Dimension E (distance from the top fire damper edge to the edge of the trigger control mechanism box) - depending on the dimension H and the trigger control mechanism used:

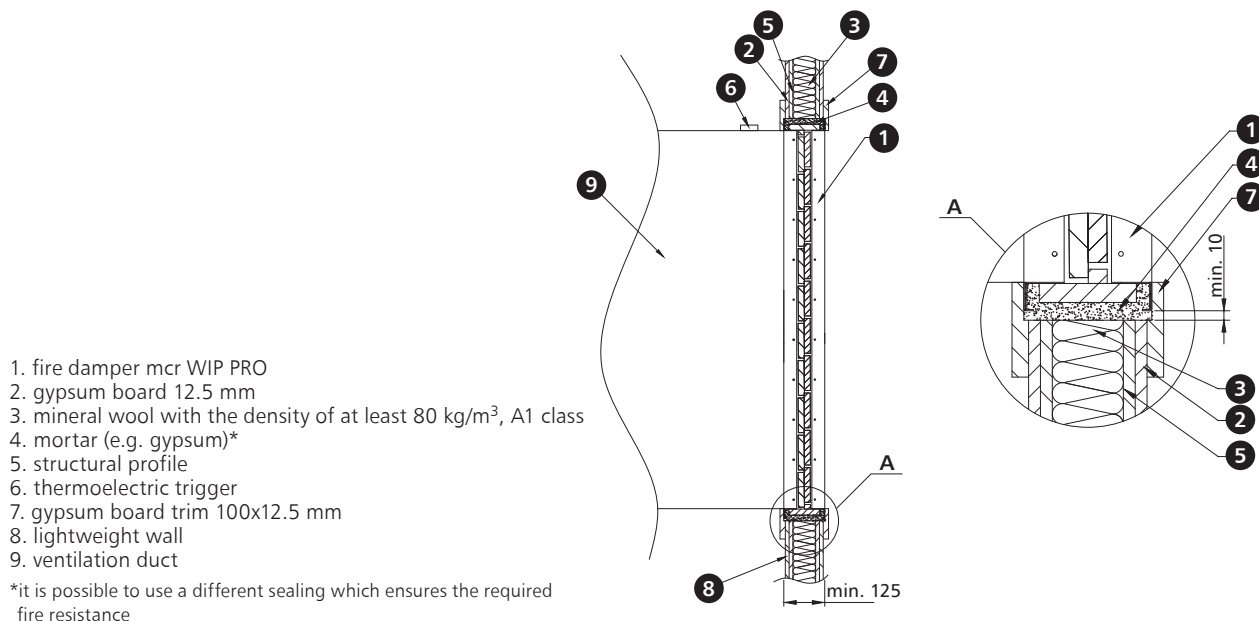
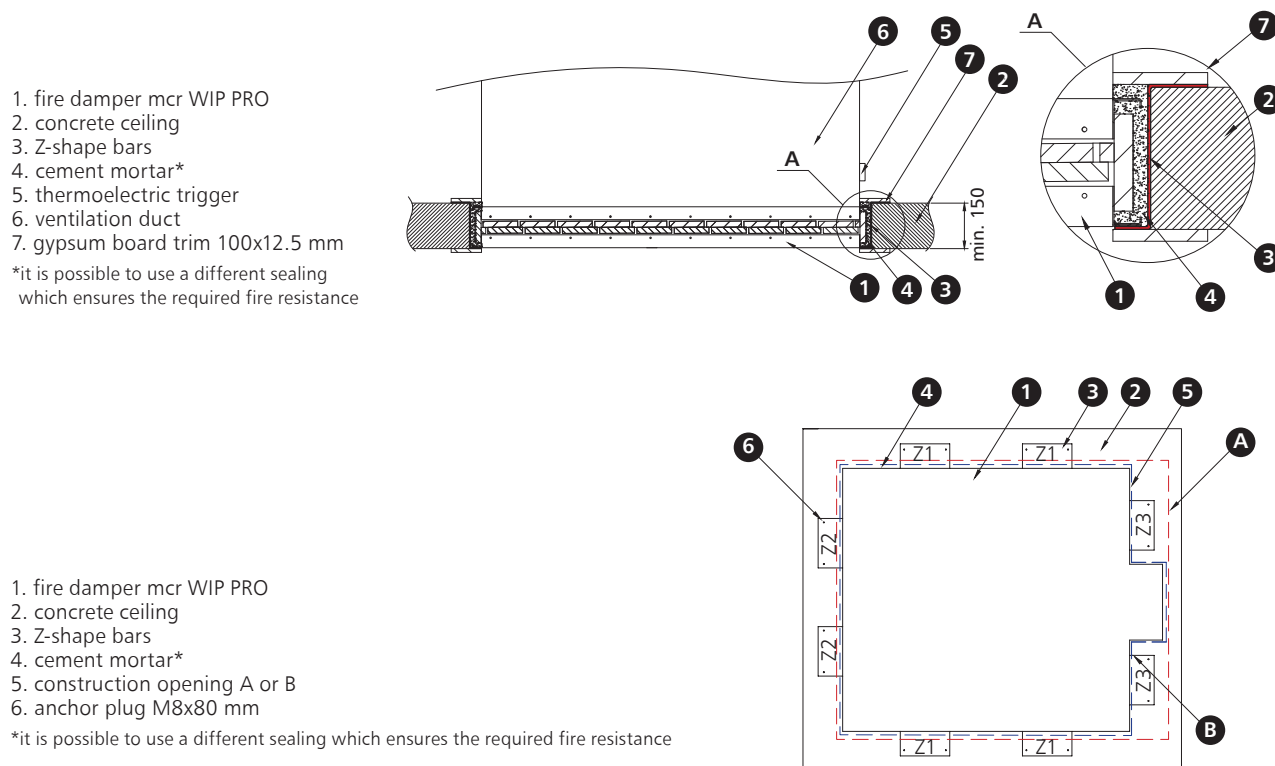
mechanism	for the even number of blades	for the odd number of blades
BF, BFL, BFN	$E \text{ [mm]} = (H/2 - 123) + 30$	$E \text{ [mm]} = (H/2 - 61.5) + 30$
RST-KW1	$E \text{ [mm]} = 0$	$E \text{ [mm]} = 0$

9.5.2. sample installation in concrete block or full brick walls

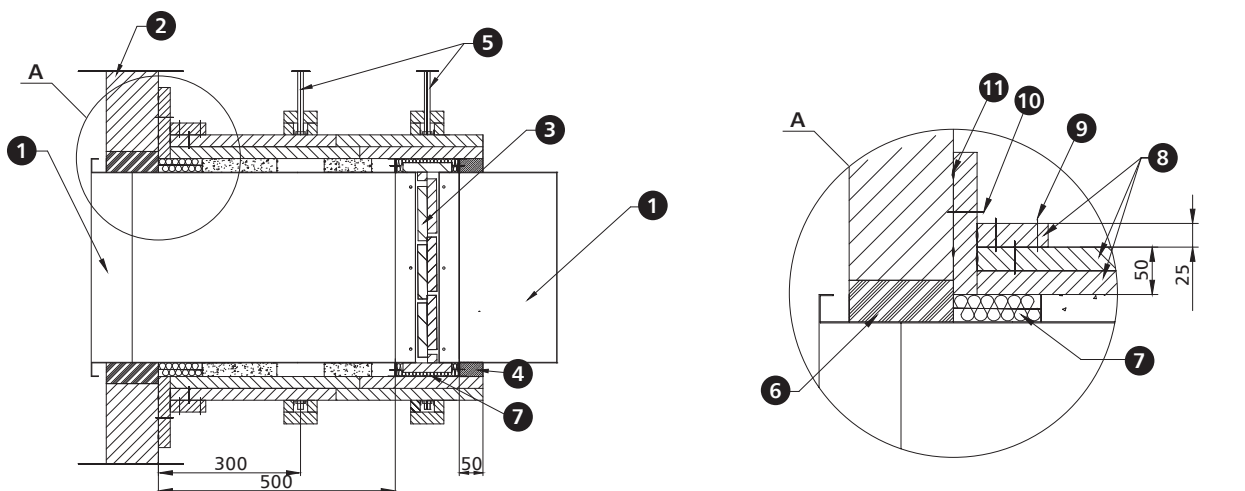


1. fire damper mcr WIP PRO
2. gypsum board trim 100x12.5 mm
3. brick masonry wall
4. cement mortar*
5. thermoelectric trigger
6. ventilation duct

*it is possible to use a different sealing which ensures the required fire resistance

9.5.3. sample installation in lightweight walls

9.5.4. sample installation in ceilings


For mcr WIP PRO/S damper installation in the floor slab, use Z1/Z2/Z3 fasteners compatible with the fire damper and construction opening „5” width as per the guidelines in the operation and maintenance manual. Z1, Z2, Z3 fasteners are not included with the fire damper.
 For construction openings with a cut-out for the trigger control mechanism box **B**, use standard Z3 fasteners.
 For construction openings in form of a regular rectangular **A**, extend the Z3 fasteners by 120 mm.

9.5.5. sample installation outside the fire partition


1. ventilation duct

2. partition

3. fire damper mcr WIP PRO

4. gypsum filling

5. duct suspension

6. sealing (cement or cement-lime masonry mortar)*

 7. mineral wool with the density of at least 80 kg/m³, A1 class

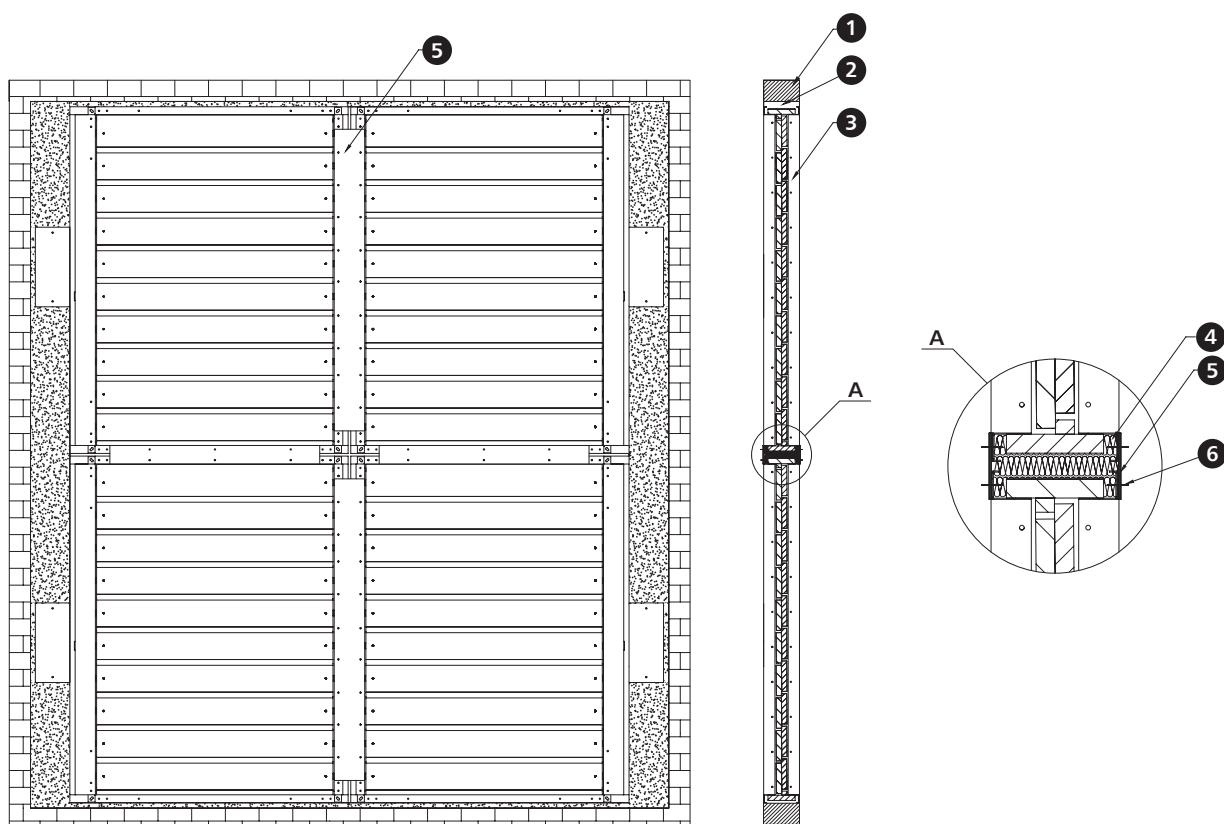
8. Ridurit fire retardant board

9. screws 3.5 x 50 spacing: ~150 mm

10. steel expansion anchor Ø8 x 80 mm

11. board joints sealed with Conlit Glue

*it is possible to use a different sealing which ensures the required fire resistance

9.5.6. sample installation in a multiple set (a battery of four dampers)


1. e.g. masonry wall

2. e.g. cement mortar*

3. fire damper mcr WIP PRO

 4. mineral wool with the density of at least 80 kg/m³, A1 class

5. steel flat bar, dimensions:

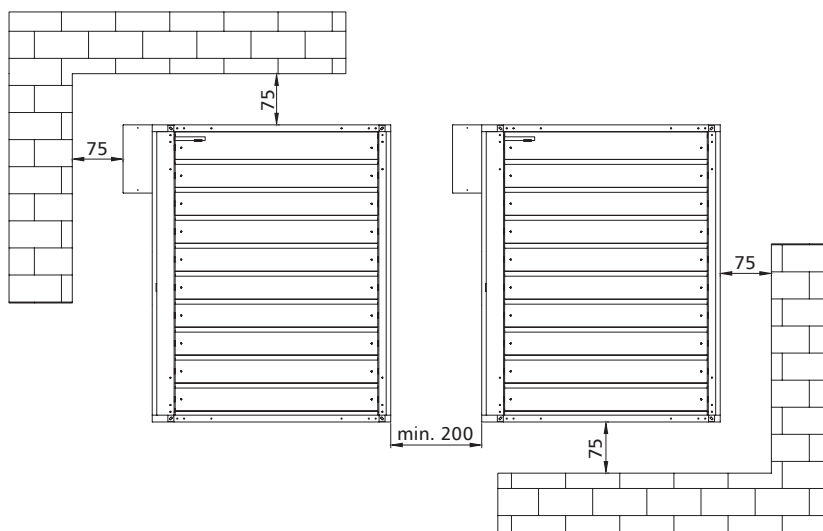
- vertical H: width 110 mm, thickness 2 mm

- horizontal B: width 70 mm, thickness 2 mm

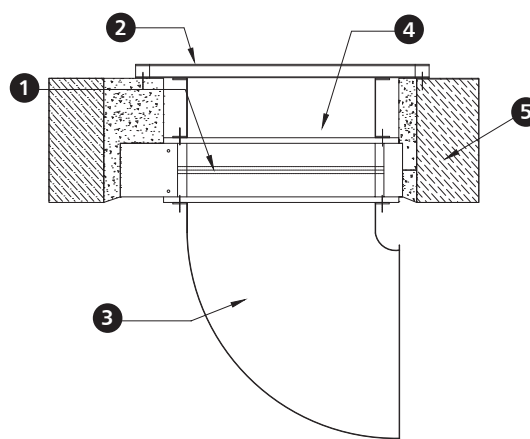
6. ST8x16 screw

*it is possible to use a different sealing which ensures the required fire resistance

Distance between systems and partitions



Example applications - installation with masking cover



1. fire damper mcr WIP
2. masking cover
3. ventilation duct
4. duct - ventilation straight connection pipe
5. wall, ceiling

If a mcr WIP/V, mcr WIP/V-M damper is used, with the louvers (no single-plane partition) it is possible to use the space in front of and behind the damper for such system elements as a masking cover or a rectangular silencer or to route a duct along the wall using a duct bend or reduction.

9.6. technical parameters of mcr WIP PRO/S rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		263						300					350				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
110	4	0.029	0.019	269	13	6	0.033	0.019	269	14	10	0.039	0.019	269	16	15	
	6			404	28	16			404	30	21			404	36	25	
	8			539	50	24			539	54	28			539	63	33	
	10			673	78	29			673	85	34			673	99	39	
150	4	0.040	0.026	367	13	7	0.045	0.026	367	14	12	0.053	0.026	367	16	16	
	6			551	28	17			551	30	22			551	36	27	
	8			734	50	25			734	54	30			734	63	34	
	10			918	78	31			918	85	36			918	99	40	
200	4	0.053	0.034	490	13	8	0.060	0.034	490	14	13	0.070	0.034	490	16	17	
	6			734	28	19			734	30	23			734	36	28	
	8			979	50	26			979	54	31			979	63	35	
	10			1 224	78	32			1 224	84	37			1 224	99	41	
250	4	0.067	0.043	612	13	9	0.075	0.043	612	14	14	0.088	0.043	612	16	18	
	6			918	28	20			918	30	24			918	36	29	
	8			1 224	50	27			1 224	54	32			1 224	63	36	
	10			1 530	78	33			1 530	85	38			1 530	99	42	
300	4	0.080	0.051	734	13	10	0.090	0.051	734	14	15	0.105	0.051	734	16	19	
	6			1 102	28	20			1 102	30	25			1 102	36	30	
	8			1 469	50	28			1 469	54	33			1 469	63	37	
	10			1 836	78	34			1 836	85	39			1 836	99	43	
350	4	0.093	0.060	857	13	11	0.105	0.060	857	14	15	0.123	0.060	857	16	20	
	6			1 285	28	21			1 285	30	26			1 285	36	30	
	8			1 714	50	29			1 714	54	33			1 714	63	38	
	10			2 142	78	34			2 142	85	39			2 142	99	44	
400	4	0.106	0.068	979	13	11	0.120	0.068	979	14	16	0.140	0.068	979	16	20	
	6			1 469	28	22			1 469	30	26			1 469	36	31	
	8			1 958	50	29			1 958	54	34			1 958	63	38	
	10			2 448	78	35			2 448	84	40			2 448	99	44	
450	4	0.120	0.077	1 102	13	12	0.135	0.077	1 102	14	16	0.158	0.077	1 102	16	21	
	6			1 652	28	22			1 652	30	27			1 652	36	31	
	8			2 203	50	30			2 203	54	34			2 203	63	39	
	10			2 754	78	36			2 754	84	40			2 754	99	45	
500	4	0.133	0.085	1 224	13	12	0.150	0.085	1 224	14	17	0.175	0.085	1 224	16	21	
	6			1 836	28	23			1 836	30	27			1 836	36	32	
	8			2 448	50	30			2 448	54	35			2 448	63	39	
	10			3 060	78	36			3 060	85	41			3 060	99	45	
550	4	0.146	0.094	1 346	2	12	0.165	0.094	1 346	14	17	0.193	0.094	1 346	16	22	
	6			2 020	4	23			2 020	30	28			2 020	36	32	
	8			2 693	6	31			2 693	54	35			2 693	63	40	
	10			3 366	10	36			3 366	84	41			3 366	99	46	
600	4	0.160	0.102	1 469	13	13	0.180	0.102	1 469	14	18	0.210	0.102	1 469	16	22	
	6			2 203	28	23			2 203	30	28			2 203	36	33	
	8			2 938	50	31			2 938	54	36			2 938	63	40	
	10			3 672	78	37			3 672	85	42			3 672	99	46	
650	4	0.173	0.111	1 591	13	13	0.195	0.111	1 591	14	18	0.228	0.111	1 591	16	22	
	6			2 387	28	24			2 387	30	29			2 387	36	33	
	8			3 182	50	31			3 182	54	36			3 182	63	41	
	10			3 978	78	37			3 978	85	42			3 978	99	46	
700	4	0.186	0.119	1 714	13	14	0.210	0.119	1 714	14	18	0.245	0.119	1 714	16	23	
	6			2 570	28	24			2 570	30	29			2 570	36	33	
	8			3 427	50	32			3 427	54	36			3 427	63	41	
	10			4 284	78	37			4 284	85	42			4 284	99	47	
750	4	0.200	0.128	1 836	13	14	0.225	0.128	1 836	14	19	0.263	0.128	1 836	16	23	
	6			2 754	28	24			2 754	30	29			2 754	36	34	
	8			3 672	50	32			3 672	54	37			3 672	63	41	
	10			4 590	78	38			4 590	85	43			4 590	99	47	
800	4	0.213	0.136	1 958	13	14	0.240	0.136	1 958	14	19	0.280	0.136	1 958	16	23	
	6			2 938	28	25			2 938	30	29			2 938	36	34	
	8			3 917	50	32			3 917	54	37			3 917	63	41	
	10			4 896	78	38			4 896	84	43			4 896	99	47	
850	4	0.226	0.145	2 081	13	14	0.255	0.145	2 081	14	19	0.298	0.145	2 081	16	24	
	6			3 121	28	25			3 121	30	30			3 121	36	34	
	8			4 162	50	32			4 162	54	37			4 162	63	42	
	10			5 202	78	38			5 202	84	43			5 202	99	48	
900	4	0.239	0.153	2 203	13	15	0.270	0.153	2 203	14	19	0.315	0.153	2 203	16	24	
	6			3 305	28	25			3 305	30	30			3 305	36	34	
	8			4 406	50	33			4 406	54	37			4 406	63	42	
	10			5 508	78	39			5 508	84	43			5 508	99	48	

The mcr WIP PRO fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

9.6. technical parameters of mcr WIP PRO/S rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		400						450					500				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.044	0.028	401	13	8	0.050	0.028	401	14	12	0.056	0.037	532	11	15
		6			601	29	18			601	31	23			798	26	26
		8			802	52	26			802	55	30			1 064	45	34
		10			1 002	81	32			1 002	86	36			1 331	71	39
	150	4	0.060	0.038	546	13	9	0.068	0.038	546	14	14	0.077	0.050	726	11	17
		6			820	29	20			820	31	24			1 089	26	27
		8			1 093	52	27			1 093	55	32			1 452	45	35
		10			1 366	81	33			1 366	86	38			1 814	71	41
	200	4	0.080	0.051	729	13	10	0.090	0.051	729	14	15	0.102	0.067	968	11	18
		6			1 093	29	21			1 093	31	25			1 452	26	29
		8			1 457	52	28			1 457	55	33			1 935	45	36
		10			1 822	81	34			1 822	86	39			2 419	71	42
	250	4	0.100	0.063	911	13	11	0.113	0.063	911	14	16	0.128	0.084	1 210	11	19
		6			1 366	29	22			1 366	31	26			1 814	26	30
		8			1 822	52	29			1 822	55	34			2 419	45	37
		10			2 277	81	35			2 277	86	40			3 024	71	43
	300	4	0.120	0.076	1 093	13	12	0.135	0.076	1 093	14	17	0.154	0.101	1 452	11	20
		6			1 639	29	23			1 639	31	27			2 177	26	30
		8			2 186	52	30			2 186	55	35			2 903	45	38
		10			2 732	81	36			2 732	86	41			3 629	71	44
	350	4	0.140	0.089	1 275	13	13	0.158	0.089	1 275	14	17	0.179	0.118	1 693	11	20
		6			1 913	29	23			1 913	31	28			2 540	26	31
		8			2 550	52	31			2 550	55	35			3 387	45	39
		10			3 188	81	37			3 188	86	41			4 234	71	44
	400	4	0.160	0.101	1 457	13	13	0.180	0.101	1 457	14	18	0.205	0.134	1 935	11	21
		6			2 186	29	24			2 186	31	28			2 903	26	32
		8			2 915	52	31			2 915	55	36			3 871	45	39
		10			3 643	81	37			3 643	86	42			4 838	71	45
	450	4	0.180	0.114	1 639	13	14	0.203	0.114	1 639	14	18	0.230	0.151	2 177	11	22
		6			2 459	29	24			2 459	31	29			3 266	26	32
		8			3 279	52	32			3 279	55	36			4 355	45	40
		10			4 099	81	38			4 099	86	42			5 443	71	45
	500	4	0.200	0.127	1 822	13	14	0.225	0.127	1 822	14	19	0.256	0.168	2 419	11	22
		6			2 732	29	25			2 732	31	29			3 629	26	33
		8			3 643	52	32			3 643	55	37			4 838	45	40
		10			4 554	81	38			4 554	86	43			6 048	71	46
	550	4	0.220	0.139	2 004	13	15	0.248	0.139	2 004	14	19	0.282	0.185	2 661	11	22
		6			3 006	29	25			3 006	31	30			3 992	26	33
		8			4 008	52	33			4 008	55	37			5 322	45	40
		10			5 009	81	39			5 009	86	43			6 653	71	46
	600	4	0.240	0.152	2 186	13	15	0.270	0.152	2 186	14	20	0.307	0.202	2 903	11	23
		6			3 279	29	26			3 279	31	30			4 355	26	33
		8			4 372	52	33			4 372	55	38			5 806	45	41
		10			5 465	81	39			5 465	86	44			7 258	71	47
	650	4	0.260	0.164	2 368	13	15	0.293	0.164	2 368	14	20	0.333	0.218	3 145	11	23
		6			3 552	29	26			3 552	31	31			4 717	26	34
		8			4 736	52	34			4 736	55	38			6 290	45	41
		10			5 920	81	39			5 920	86	44			7 862	71	47
	700	4	0.280	0.177	2 550	13	16	0.315	0.177	2 550	14	20	0.358	0.235	3 387	11	23
		6			3 825	29	26			3 825	31	31			5 080	26	34
		8			5 100	52	34			5 100	55	38			6 774	45	42
		10			6 376	81	40			6 376	86	44			8 467	71	47
	750	4	0.300	0.190	2 732	13	16	0.338	0.190	2 732	14	21	0.384	0.252	3 629	11	24
		6			4 099	29	27			4 099	31	31			5 443	26	34
		8			5 465	52	34			5 465	55	39			7 258	45	42
		10			6 831	81	40			6 831	86	45			9 072	71	48
	800	4	0.320	0.202	2 915	13	16	0.360	0.202	2 915	14	20	0.410	0.269	3 871	11	24
		6			4 372	29	27			4 372	31	31			5 806	26	34
		8			5 829	52	34			5 829	55	38			7 741	45	42
		10			7 286	81	40			7 286	86	44			9 677	71	48
850	4	0.340	0.215	3 097	13	17	0.383	0.215	3 097	14	20	0.435	0.286	4 113	11	24	
	6			4 645	29	27			4 645	31	31			6 169	26	34	
	8			6 193	52	35			6 193	55	38			8 225	45	42	
	10			7 742	81	40			7 742	86	44			10 282	71	48	
900	4	0.360	0.228	3 279	13	17	0.405	0.228	3 279	14	20	0.461	0.302	4 355	11	24	
	6			4 918	29	27			4 918	31	31			6 532	26	34	
	8			6 558	52	35			6 558	55	38			8 709	45	42	
	10			8 197	81	41			8 197	86	44			10 886	71	48	

9.6. technical parameters of mcr WIP PRO/S rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		550						630					650				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.061	0.037	532	13	10	0.070	0.046	664	11	14	0.072	0.046	664	12	9
		6			798	29	21			996	25	24			996	27	20
		8			1 064	51	29			1 327	44	32			1 327	48	27
		10			1 331	79	34			1 659	69	38			1 659	76	33
	150	4	0.083	0.050	726	13	12	0.095	0.063	905	11	15	0.098	0.063	905	12	10
		6			1 089	29	22			1 358	25	26			1 358	27	21
		8			1 452	51	30			1 810	44	33			1 810	48	28
		10			1 814	79	36			2 263	69	39			2 263	76	34
	200	4	0.110	0.067	968	13	13	0.127	0.084	1 207	11	16	0.130	0.084	1 207	12	12
		6			1 452	29	24			1 810	25	27			1 810	27	22
		8			1 935	51	31			2 413	44	34			2 413	48	30
		10			2 419	79	37			3 017	69	40			3 017	76	36
	250	4	0.138	0.084	1 210	13	14	0.159	0.105	1 508	11	17	0.163	0.105	1 508	12	13
		6			1 814	29	25			2 263	25	28			2 263	27	23
		8			2 419	51	32			3 017	44	35			3 017	48	31
		10			3 024	79	38			3 771	69	41			3 771	76	36
	300	4	0.165	0.101	1 452	13	15	0.191	0.126	1 810	11	18	0.195	0.126	1 810	12	13
		6			2 177	29	25			2 715	25	29			2 715	27	24
		8			2 903	51	33			3 620	44	36			3 620	48	31
		10			3 629	79	39			4 525	69	42			4 525	76	37
	350	4	0.193	0.118	1 693	13	15	0.222	0.147	2 112	11	19	0.228	0.147	2 112	12	14
		6			2 540	29	26			3 168	25	29			3 168	27	25
		8			3 387	51	34			4 224	44	37			4 224	48	32
		10			4 234	79	39			5 279	69	43			5 279	76	38
	400	4	0.220	0.134	1 935	13	16	0.254	0.168	2 413	11	19	0.260	0.168	2 413	12	15
		6			2 903	29	27			3 620	25	30			3 620	27	25
		8			3 871	51	34			4 827	44	37			4 827	48	33
		10			4 838	79	40			6 034	69	43			6 034	76	39
	450	4	0.248	0.151	2 177	13	17	0.286	0.189	2 715	11	20	0.293	0.189	2 715	12	15
		6			3 266	29	27			4 073	25	30			4 073	27	26
		8			4 355	51	35			5 430	44	38			5 430	48	33
		10			5 443	79	40			6 788	69	44			6 788	76	39
	500	4	0.275	0.168	2 419	13	17	0.318	0.210	3 017	11	20	0.325	0.210	3 017	12	16
		6			3 629	29	28			4 525	25	31			4 525	27	26
		8			4 838	51	35			6 034	44	38			6 034	48	34
		10			6 048	79	41			7 542	69	44			7 542	76	40
	550	4	0.303	0.185	2 661	13	17	0.349	0.230	3 318	11	21	0.358	0.230	3 318	12	16
		6			3 992	29	28			4 978	25	31			4 978	27	27
		8			5 322	51	36			6 637	44	39			6 637	48	34
		10			6 653	79	41			8 296	69	45			8 296	76	40
	600	4	0.330	0.202	2 903	13	18	0.381	0.251	3 620	11	21	0.390	0.251	3 620	12	16
		6			4 355	29	28			5 430	25	32			5 430	27	27
		8			5 806	51	36			7 240	44	39			7 240	48	34
		10			7 258	79	42			9 050	69	45			9 050	76	40
	650	4	0.358	0.218	3 145	13	18	0.413	0.272	3 922	11	21	0.423	0.272	3 922	12	17
		6			4 717	29	29			5 883	25	32			5 883	27	27
		8			6 290	51	36			7 844	44	39			7 844	48	35
		10			7 862	79	42			9 805	69	45			9 805	76	41
700	4	0.385	0.235	3 387	13	18	0.445	0.293	4 224	11	22	0.455	0.293	4 224	12	17	
	6			5 080	29	29			6 335	25	32			6 335	27	28	
	8			6 774	51	37			8 447	44	40			8 447	48	35	
	10			8 467	79	42			10 559	69	46			10 559	76	41	
750	4	0.413	0.252	3 629	13	19	0.476	0.314	4 525	11	22	0.488	0.314	4 525	12	17	
	6			5 443	29	29			6 788	25	33			6 788	27	28	
	8			7 258	51	37			9 050	44	40			9 050	48	35	
	10			9 072	79	43			11 313	69	46			11 313	76	41	
800	4	0.440	0.269	3 871	13	19	0.508	0.335	4 827	11	22	0.520	0.335	4 827	12	17	
	6			5 806	29	30			7 240	25	33			7 240	27	28	
	8			7 741	51	37			9 654	44	40			9 654	48	35	
	10			9 677	79	43			12 067	69	46			12 067	76	41	
850	4	0.468	0.286	4 113	13	19	0.540	0.356	5 129	11	23	0.553	0.356	5 129	12	17	
	6			6 169	29	30			7 693	25	33			7 693	27	28	
	8			8 225	51	37			10 257	44	41			10 257	48	35	
	10			10 282	79	43			12 821	69	46			12 821	76	41	
900	4	0.495	0.302	4 355	13	20	0.572	0.377	5 430	11	23	0.585	0.377	5 430	12	17	
	6			6 532	29	30			8 145	25	32			8 145	27	28	
	8			8 709	51	38			10 860	44	39			10 860	48	35	
	10			10 886	79	43			13 576	69	44			13 576	76	41	

The mcr WIP PRO fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

9.6. technical parameters of mcr WIP PRO/S rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		700						750					800				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA}
width B [mm]	110	4	0.077	0.046	664	14	12	0.083	0.060	859	9	15	0.088	0.055	795	10	[dB]
		6			996	30	23			1 288	20	25			1 193	22	22
		8			1 327	54	30			1 717	35	33			1 590	40	29
		10			1 659	85	36			2 146	55	39			1 988	62	35
	150	4	0.105	0.063	905	14	14	0.114	0.081	1 171	9	16	0.120	0.075	1 084	10	12
		6			1 358	30	24			1 756	20	27			1 626	22	23
		8			1 810	54	32			2 341	35	34			2 169	40	30
		10			2 263	85	37			2 927	55	40			2 711	62	36
	200	4	0.140	0.084	1 207	14	15	0.152	0.108	1 561	9	17	0.160	0.100	1 446	10	14
		6			1 810	30	25			2 341	20	28			2 169	22	24
		8			2 413	54	33			3 122	35	35			2 892	40	32
		10			3 017	85	39			3 902	55	41			3 614	62	38
	250	4	0.175	0.105	1 508	14	16	0.190	0.136	1 951	9	18	0.200	0.126	1 807	10	15
		6			2 263	30	26			2 927	20	29			2 711	22	25
		8			3 017	54	34			3 902	35	36			3 614	40	33
		10			3 771	85	40			4 878	55	42			4 518	62	39
	300	4	0.210	0.126	1 810	14	17	0.227	0.163	2 341	9	19	0.240	0.151	2 169	10	15
		6			2 715	30	27			3 512	20	30			3 253	22	26
		8			3 620	54	35			4 683	35	37			4 337	40	33
		10			4 525	85	40			5 854	55	43			5 422	62	39
	350	4	0.245	0.147	2 112	14	17	0.265	0.190	2 732	9	20	0.280	0.176	2 530	10	16
		6			3 168	30	28			4 098	20	30			3 795	22	27
		8			4 224	54	35			5 463	35	38			5 060	40	34
		10			5 279	85	41			6 829	55	44			6 325	62	40
	400	4	0.280	0.168	2 413	14	18	0.303	0.217	3 122	9	20	0.320	0.201	2 892	10	17
		6			3 620	30	28			4 683	20	31			4 337	22	27
		8			4 827	54	36			6 244	35	38			5 783	40	35
		10			6 034	85	42			7 805	55	44			7 229	62	41
	450	4	0.315	0.189	2 715	14	18	0.341	0.244	3 512	9	21	0.360	0.226	3 253	10	17
		6			4 073	30	29			5 268	20	31			4 879	22	28
		8			5 430	54	36			7 024	35	39			6 506	40	35
		10			6 788	85	42			8 780	55	45			8 132	62	41
	500	4	0.350	0.210	3 017	14	19	0.379	0.271	3 902	9	21	0.400	0.251	3 614	10	18
		6			4 525	30	29			5 854	20	32			5 422	22	28
		8			6 034	54	37			7 805	35	39			7 229	40	36
		10			7 542	85	43			9 756	55	45			9 036	62	42
	550	4	0.385	0.230	3 318	14	19	0.417	0.298	4 293	9	22	0.440	0.276	3 976	10	18
		6			4 978	30	30			6 439	20	32			5 964	22	29
		8			6 637	54	37			8 585	35	40			7 952	40	36
		10			8 296	85	43			10 732	55	46			9 940	62	42
	600	4	0.420	0.251	3 620	14	20	0.455	0.325	4 683	9	22	0.480	0.301	4 337	10	18
		6			5 430	30	30			7 024	20	33			6 506	22	29
		8			7 240	54	38			9 366	35	40			8 675	40	36
		10			9 050	85	43			11 707	55	46			10 843	62	42
	650	4	0.455	0.272	3 922	14	20	0.493	0.352	5 073	9	22	0.520	0.326	4 699	10	19
		6			5 883	30	31			7 610	20	33			7 048	22	29
		8			7 844	54	38			10 146	35	40			9 397	40	37
		10			9 805	85	44			12 683	55	46			11 747	62	43
	700	4	0.490	0.293	4 224	14	20	0.531	0.379	5 463	9	23	0.560	0.351	5 060	10	19
		6			6 335	30	31			8 195	20	33			7 590	22	30
		8			8 447	54	38			10 927	35	41			10 120	40	37
		10			10 559	85	44			13 658	55	47			12 650	62	43
	750	4	0.525	0.314	4 525	14	21	0.569	0.407	5 854	9	23	0.600	0.377	5 422	10	19
		6			6 788	30	31			8 780	20	34			8 132	22	30
		8			9 050	54	39			11 707	35	41			10 843	40	37
		10			11 313	85	44			14 634	55	47			13 554	62	43
	800	4	0.560	0.335	4 827	14	19	0.606	0.434	6 244	9	23	0.640	0.402	5 783	10	20
		6			7 240	30	29			9 366	20	34			8 675	22	30
		8			9 654	54	37			12 488	35	41			11 566	40	38
		10			12 067	85	42			15 610	55	47			14 458	62	44
850	4	0.595	0.356	5 129	14	21	0.644	0.461	6 634	9	24	0.680	0.427	6 144	10	20	
	6			7 693	30	32			9 951	20	34			9 217	22	31	
	8			10 257	54	39			13 268	35	42			12 289	40	38	
	10			12 821	85	45			16 585	55	47			15 361	62	44	
900	4	0.630	0.377	5 430	14	21	0.682	0.488	7 024	9	24	0.720	0.452	6 506	10	20	
	6			8 145	30	32			10 536	20	34			9 759	22	31	
	8			10 860	54	39			14 049	35	42			13 012	40	38	
	10			13 576	85	45			17 561	55	48			16 265	62	44	

9.6. technical parameters of mcr WIP PRO/S rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		850					900					950				
	v [m/s]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]
width B [mm]	4	0.097	0.064	927	12	14	0.099	0.064	927	13	10	0.105	0.064	927	14	13
	6			1 390	27	24			1 390	30	21			1 390	32	23
	8			1 853	49	32			1 853	53	28			1 853	57	31
	10			2 317	76	37			2 317	83	34			2 317	89	36
	4	0.132	0.088	1 264	12	15	0.135	0.088	1 264	13	11	0.143	0.088	1 264	14	14
	6			1 895	27	25			1 895	30	22			1 895	32	24
	8			2 527	49	33			2 527	53	30			2 527	57	32
	10			3 159	76	39			3 159	83	35			3 159	89	38
	4	0.176	0.117	1 685	12	16	0.180	0.117	1 685	13	13	0.190	0.117	1 685	14	15
	6			2 527	27	27			2 527	30	23			2 527	32	26
	8			3 370	49	34			3 370	53	31			3 370	57	33
	10			4 212	76	40			4 212	83	37			4 212	89	39
	4	0.220	0.146	2 106	12	17	0.225	0.146	2 106	13	14	0.238	0.146	2 106	14	16
	6			3 159	27	28			3 159	30	24			3 159	32	27
	8			4 212	49	35			4 212	53	32			4 212	57	34
	10			5 265	76	41			5 265	83	38			5 265	89	40
	4	0.264	0.176	2 527	12	18	0.270	0.176	2 527	13	14	0.285	0.176	2 527	14	17
	6			3 791	27	28			3 791	30	25			3 791	32	27
	8			5 054	49	36			5 054	53	33			5 054	57	35
	10			6 318	76	42			6 318	83	38			6 318	89	41
	4	0.308	0.205	2 948	12	19	0.315	0.205	2 948	13	15	0.333	0.205	2 948	14	18
	6			4 423	27	29			4 423	30	26			4 423	32	28
	8			5 897	49	37			5 897	53	33			5 897	57	36
	10			7 371	76	42			7 371	83	39			7 371	89	41
	4	0.352	0.234	3 370	12	19	0.360	0.234	3 370	13	16	0.380	0.234	3 370	14	18
	6			5 054	27	30			5 054	30	26			5 054	32	29
	8			6 739	49	37			6 739	53	34			6 739	57	36
	10			8 424	76	43			8 424	83	40			8 424	89	42
	4	0.396	0.263	3 791	12	20	0.405	0.263	3 791	13	16	0.428	0.263	3 791	14	19
	6			5 686	27	30			5 686	30	27			5 686	32	29
	8			7 582	49	38			7 582	53	34			7 582	57	37
	10			9 477	76	44			9 477	83	40			9 477	89	43
	4	0.441	0.293	4 212	12	20	0.450	0.293	4 212	13	17	0.475	0.293	4 212	14	19
	6			6 318	27	31			6 318	30	27			6 318	32	30
	8			8 424	49	38			8 424	53	35			8 424	57	37
	10			10 530	76	44			10 530	83	41			10 530	89	43
	4	0.485	0.322	4 633	12	21	0.495	0.322	4 633	13	17	0.523	0.322	4 633	14	20
	6			6 950	27	31			6 950	30	28			6 950	32	30
	8			9 266	49	39			9 266	53	35			9 266	57	38
	10			11 583	76	44			11 583	83	41			11 583	89	43
	4	0.529	0.351	5 054	12	21	0.540	0.351	5 054	13	17	0.570	0.351	5 054	14	20
	6			7 582	27	31			7 582	30	28			7 582	32	30
	8			10 109	49	39			10 109	53	36			10 109	57	38
	10			12 636	76	45			12 636	83	41			12 636	89	44
	4	0.573	0.380	5 476	12	21	0.585	0.380	5 476	13	18	0.618	0.380	5 476	14	20
	6			8 213	27	32			8 213	30	28			8 213	32	31
	8			10 951	49	39			10 951	53	36			10 951	57	38
	10			13 689	76	45			13 689	83	42			13 689	89	44
	4	0.617	0.410	5 897	12	22	0.630	0.410	5 897	13	18	0.665	0.410	5 897	14	21
	6			8 845	27	32			8 845	30	29			8 845	32	31
	8			11 794	49	40			11 794	53	36			11 794	57	39
	10			14 742	76	45			14 742	83	42			14 742	89	44
	4	0.661	0.439	6 318	12	22	0.675	0.439	6 318	13	18	0.713	0.439	6 318	14	21
	6			9 477	27	32			9 477	30	29			9 477	32	31
	8			12 636	49	40			12 636	53	37			12 636	57	39
	10			15 795	76	46			15 795	83	42			15 795	89	45
	4	0.705	0.468	6 739	12	22	0.720	0.468	6 739	13	19	0.760	0.468	6 739	14	21
	6			10 109	27	33			10 109	30	29			10 109	32	32
	8			13 478	49	40			13 478	53	37			13 478	57	39
	10			16 848	76	46			16 848	83	43			16 848	89	45
	4	0.749	0.497	7 160	12	22	0.765	0.497	7 160	13	19	0.808	0.497	7 160	14	21
	6			10 741	27	33			10 741	30	30			10 741	32	32
	8			14 321	49	40			14 321	53	37			14 321	57	39
	10			17 901	76	46			17 901	83	43			17 901	89	45
	4	0.793	0.527	7 582	12	23	0.810	0.527	7 582	13	19	0.855	0.527	7 582	14	22
	6			11 372	27	33			11 372	30	30			11 372	32	32
	8			15 163	49	41			15 163	53	37			15 163	57	40
	10			18 954	76	47			18 954	83	43			18 954	89	46

The mcr WIP PRO fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

9.6. technical parameters of mcr WIP PRO/S rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		1000					1050					1100				
	v [m/s]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]
width B [mm]	4	0.110	0.073	1 058	12	15	0.116	0.073	1 058	13	12	0.124	0.083	1 190	11	14
	6			1 587	27	25			1 587	29	22			1 784	24	24
	8			2 116	48	33			2 116	51	30			2 379	43	32
	10			2 645	76	38			2 645	79	36			2 974	67	38
	4	0.151	0.100	1 443	12	16	0.158	0.100	1 443	13	13	0.169	0.113	1 622	11	15
	6			2 164	27	26			2 164	29	24			2 433	24	26
	8			2 886	48	34			2 886	51	31			3 244	43	33
	10			3 607	76	40			3 607	79	37			4 055	67	39
	4	0.201	0.134	1 924	12	17	0.210	0.134	1 924	13	14	0.225	0.150	2 163	11	16
	6			2 886	27	28			2 886	29	24			3 244	24	26
	8			3 848	48	35			3 848	51	32			4 326	43	34
	10			4 810	76	41			4 810	79	38			5 407	67	40
	4	0.251	0.167	2 405	12	18	0.263	0.167	2 405	13	15	0.282	0.188	2 704	11	17
	6			3 607	27	29			3 607	29	25			4 055	24	27
	8			4 810	48	36			4 810	51	33			5 407	43	35
	10			6 012	76	42			6 012	79	39			6 759	67	41
	4	0.301	0.200	2 886	12	19	0.315	0.200	2 886	13	15	0.338	0.225	3 244	11	17
	6			4 329	27	29			4 329	29	26			4 866	24	28
	8			5 772	48	37			5 772	51	34			6 489	43	36
	10			7 214	76	43			7 214	79	39			8 111	67	41
	4	0.351	0.234	3 367	12	20	0.368	0.234	3 367	13	16	0.394	0.263	3 785	11	18
	6			5 050	27	30			5 050	29	27			5 678	24	29
	8			6 733	48	38			6 733	51	34			7 570	43	36
	10			8 417	76	43			8 417	79	40			9 463	67	42
	4	0.402	0.267	3 848	12	20	0.420	0.267	3 848	13	17	0.451	0.300	4 326	11	19
	6			5 772	27	31			5 772	29	27			6 489	24	29
	8			7 695	48	38			7 695	51	35			8 652	43	37
	10			9 619	76	44			9 619	79	41			10 814	67	43
	4	0.452	0.301	4 329	12	21	0.473	0.301	4 329	13	17	0.507	0.338	4 866	11	19
	6			6 493	27	31			6 493	29	28			7 300	24	30
	8			8 657	48	39			8 657	51	35			9 733	43	37
	10			10 822	76	45			10 822	79	41			12 166	67	43
	4	0.502	0.334	4 810	12	21	0.525	0.334	4 810	13	18	0.564	0.376	5 407	11	20
	6			7 214	27	32			7 214	29	28			8 111	24	30
	8			9 619	48	39			9 619	51	36			10 814	43	38
	10			12 024	76	45			12 024	79	42			13 518	67	44
	4	0.552	0.367	5 291	12	22	0.578	0.367	5 291	13	18	0.620	0.413	5 948	11	20
	6			7 936	27	32			7 936	29	29			8 922	24	31
	8			10 581	48	40			10 581	51	36			11 896	43	38
	10			13 226	76	45			13 226	79	42			14 870	67	44
	4	0.602	0.401	5 772	12	22	0.630	0.401	5 772	13	18	0.676	0.451	6 489	11	20
	6			8 657	27	32			8 657	29	29			9 733	24	31
	8			11 543	48	40			11 543	51	37			12 977	43	39
	10			14 429	76	46			14 429	79	42			16 222	67	44
	4	0.653	0.434	6 252	12	22	0.683	0.434	6 252	13	19	0.733	0.488	7 029	11	21
	6			9 379	27	33			9 379	29	29			10 544	24	31
	8			12 505	48	40			12 505	51	37			14 059	43	39
	10			15 631	76	46			15 631	79	43			17 573	67	45
	4	0.703	0.468	6 733	12	23	0.735	0.468	6 733	13	19	0.789	0.526	7 570	11	21
	6			10 100	27	33			10 100	29	30			11 355	24	32
	8			13 467	48	41			13 467	51	37			15 140	43	39
	10			16 834	76	46			16 834	79	43			18 925	67	45
	4	0.753	0.501	7 214	12	23	0.788	0.501	7 214	13	19	0.845	0.563	8 111	11	21
	6			10 822	27	33			10 822	29	30			12 166	24	32
	8			14 429	48	41			14 429	51	38			16 222	43	40
	10			18 036	76	47			18 036	79	43			20 277	67	45
	4	0.803	0.534	7 695	12	23	0.840	0.534	7 695	13	20	0.902	0.601	8 652	11	22
	6			11 543	27	34			11 543	29	30			12 977	24	32
	8			15 391	48	41			15 391	51	38			17 303	43	40
	10			19 238	76	47			19 238	79	44			21 629	67	46
	4	0.853	0.568	8 176	12	23	0.893	0.568	8 176	13	20	0.958	0.638	9 192	11	22
	6			12 264	27	34			12 264	29	31			13 788	24	33
	8			16 353	48	41			16 353	51	38			18 384	43	40
	10			20 441	76	47			20 441	79	44			22 981	67	46
	4	0.904	0.601	8 657	12	24	0.945	0.601	8 657	13	20	1.014	0.676	9 733	11	22
	6			12 986	27	34			12 986	29	31			14 599	24	33
	8			17 315	48	42			17 315	51	38			19 466	43	40
	10			21 643	76	48			21 643	79	44			24 332	67	46

The mcr WIP PRO fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

9.6. technical parameters of mcr WIP PRO/S rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		1150					1200					1250				
	v [m/s]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]
width B [mm]	4	0.127	0.083	1 190	13	11	0.132	0.083	1 190	2	13	0.138	0.092	1 321	11	10
	6			1 784	29	22			1 784	4	23			1 982	24	21
	8			2 379	52	29			2 379	7	31			2 642	43	28
	10			2 974	81	35			2 974	11	37			3 303	66	34
	4	0.173	0.113	1 622	13	12	0.180	0.113	1 622	2	14	0.188	0.125	1 801	11	12
	6			2 433	29	23			2 433	4	25			2 702	24	22
	8			3 244	52	30			3 244	7	32			3 603	43	30
	10			4 055	81	36			4 055	11	38			4 504	66	36
	4	0.230	0.150	2 163	13	12	0.240	0.150	2 163	2	14	0.250	0.167	2 402	11	11
	6			3 244	29	23			3 244	4	25			3 603	24	22
	8			4 326	52	31			4 326	7	33			4 804	43	29
	10			5 407	81	36			5 407	11	38			6 005	66	35
	4	0.288	0.188	2 704	13	13	0.300	0.188	2 704	2	15	0.313	0.209	3 002	11	12
	6			4 055	29	24			4 055	4	26			4 504	24	23
	8			5 407	52	32			5 407	7	33			6 005	43	30
	10			6 759	81	37			6 759	11	39			7 506	66	36
	4	0.345	0.225	3 244	13	14	0.360	0.225	3 244	2	16	0.375	0.250	3 603	11	13
	6			4 866	29	25			4 866	4	27			5 404	24	24
	8			6 489	52	32			6 489	7	34			7 206	43	31
	10			8 111	81	38			8 111	11	40			9 007	66	37
	4	0.403	0.263	3 785	13	15	0.420	0.263	3 785	2	17	0.438	0.292	4 203	11	14
	6			5 678	29	25			5 678	4	27			6 305	24	24
	8			7 570	52	33			7 570	7	35			8 407	43	32
	10			9 463	81	39			9 463	11	41			10 508	66	38
	4	0.460	0.300	4 326	13	15	0.480	0.300	4 326	2	17	0.500	0.334	4 804	11	14
	6			6 489	29	26			6 489	4	28			7 206	24	25
	8			8 652	52	34			8 652	7	36			9 608	43	32
	10			10 814	81	39			10 814	11	41			12 010	66	38
	4	0.518	0.338	4 866	13	16	0.540	0.338	4 866	2	18	0.563	0.375	5 404	11	15
	6			7 300	29	27			7 300	4	29			8 106	24	25
	8			9 733	52	34			9 733	7	36			10 809	43	33
	10			12 166	81	40			12 166	11	42			13 511	66	39
	4	0.575	0.376	5 407	13	16	0.600	0.376	5 407	2	18	0.625	0.417	6 005	11	15
	6			8 111	29	27			8 111	4	29			9 007	24	26
	8			10 814	52	35			10 814	7	36			12 010	43	33
	10			13 518	81	40			13 518	11	42			15 012	66	39
	4	0.633	0.413	5 948	13	17	0.660	0.413	5 948	2	19	0.688	0.459	6 605	11	16
	6			8 922	29	27			8 922	4	29			9 908	24	26
	8			11 896	52	35			11 896	7	37			13 211	43	34
	10			14 870	81	41			14 870	11	43			16 513	66	40
	4	0.690	0.451	6 489	13	17	0.720	0.451	6 489	2	19	0.750	0.500	7 206	11	16
	6			9 733	29	28			9 733	4	30			10 809	24	27
	8			12 977	52	35			12 977	7	37			14 412	43	34
	10			16 222	81	41			16 222	11	43			18 014	66	40
	4	0.748	0.488	7 029	13	18	0.780	0.488	7 029	2	20	0.813	0.542	7 806	11	17
	6			10 544	29	28			10 544	4	30			11 709	24	27
	8			14 059	52	36			14 059	7	38			15 612	43	35
	10			17 573	81	41			17 573	11	43			19 516	66	40
	4	0.805	0.526	7 570	13	18	0.840	0.526	7 570	2	20	0.875	0.584	8 407	11	17
	6			11 355	29	28			11 355	4	30			12 610	24	27
	8			15 140	52	36			15 140	7	38			16 813	43	35
	10			18 925	81	42			18 925	11	44			21 017	66	41
	4	0.863	0.563	8 111	13	18	0.900	0.563	8 111	2	20	0.938	0.626	9 007	11	17
	6			12 166	29	29			12 166	4	31			13 511	24	28
	8			16 222	52	36			16 222	7	38			18 014	43	35
	10			20 277	81	42			20 277	11	44			22 518	66	41
	4	0.920	0.601	8 652	13	18	0.960	0.601	8 652	2	20	1.000	0.667	9 608	11	17
	6			12 977	29	29			12 977	4	31			14 412	24	28
	8			17 303	52	37			17 303	7	39			19 215	43	35
	10			21 629	81	42			21 629	11	44			24 019	66	41
	4	0.978	0.638	9 192	13	19	1.020	0.638	9 192	2	21	1.063	0.709	10 208	11	18
	6			13 788	29	29			13 788	4	31			15 312	24	28
	8			18 384	52	37			18 384	7	39			20 416	43	36
	10			22 981	81	43			22 981	11	45			25 520	66	42
	4	1.035	0.676	9 733	13	19	1.080	0.676	9 733	2	21	1.125	0.751	10 809	11	18
	6			14 599	29	30			14 599	4	32			16 213	24	28
	8			19 466	52	37			19 466	7	39			21 617	43	36
	10			24 332	81	43			24 332	11	45			27 022	66	42

The mcr WIP PRO fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

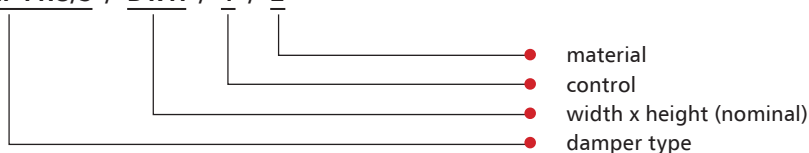
9.7. estimated weights of mcr WIP PRO/S dampers for rectangular ventilation ducts [kg]

		height H [mm]										
		263	300	400	500	600	700	800	900	1000	1100	1250
width B [mm]	110	3	3	4	5	7	8	9	10	11	13	14
	150	4	4	6	8	9	11	12	14	16	17	20
	200	5	6	8	10	12	15	17	19	21	23	27
	250	7	8	12	13	16	18	21	24	27	29	33
	300	8	9	12	16	19	22	25	29	32	35	40
	350	9	11	15	18	22	26	30	34	37	41	47
	400	11	12	17	21	25	30	34	38	43	47	54
	500	14	16	21	27	32	37	43	48	54	59	67
	600	16	19	25	32	38	45	51	58	64	71	81
	700	19	22	30	37	45	52	60	68	75	83	94
	800	22	25	34	43	51	60	69	77	86	95	108
	900	25	29	38	48	58	68	77	87	97	106	128

The table shows the weights of dampers with RST-KW1 type trigger control mechanisms or actuators.

9.8. marking

mcr WIP PRO/S / B x H / 1 / 2



1 – control:

– RST-KW1 trigger control mechanism

RST-KW1/S – thermal trigger

RST-KW1/S/WK2 – thermal trigger + limit switch (open/closed blade signal)

RST-KW1/24I – thermal trigger + „pulse“ electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)

RST-KW1/24P – thermal trigger + „break“ electromagnetic trigger, U = 24 V DC + limit switch (open/closed blade signal)

RST-KW1/230I – thermal trigger + „pulse“ electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)

RST-KW1/230P – thermal trigger + „break“ electromagnetic trigger, U = 230 V AC + limit switch (open/closed blade signal)

– Belimo trigger control mechanism

BF24TL-T-ST (with the BKN230-24MP option) – actuator with a return spring, U = 24 V, MP Bus digital control

EXBF24-T – explosion proof actuator with a return spring in the Ex version, U = 24 V AC/DC

EXBF230-T – explosion proof actuator with a return spring in the Ex version, U = 230 V AC

BFL24-T – actuator with a return spring, U = 24 V AC/DC

BFL230-T – actuator with a return spring, U = 230 V AC

BFL24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system

BFN24-T – actuator with a return spring, U = 24 V AC/DC

BFN230-T – actuator with a return spring, U = 230 V AC

BFN24-T-ST (with the BKN230-24 option) – actuator with a return spring, for the SBS Control system

2 – material:

[no symbol] – galvanised steel, Zn 275 g/m² coating

KN – 1.4404 acid-proof stainless steel

example marking:

mcr WIP PRO/S 400 x 400 BFL24-T

Louvered fire damper EIS120 with a compact 24 V Belimo actuator with limit switches.

Chapter 12 - power supply and control (p. 141) contains:

- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper,
- location of trigger control mechanisms in relation to the damper - manufacture standards.

**PRODUCT CONFIGURATOR
AT WWW.MERCOR.COM.PL**

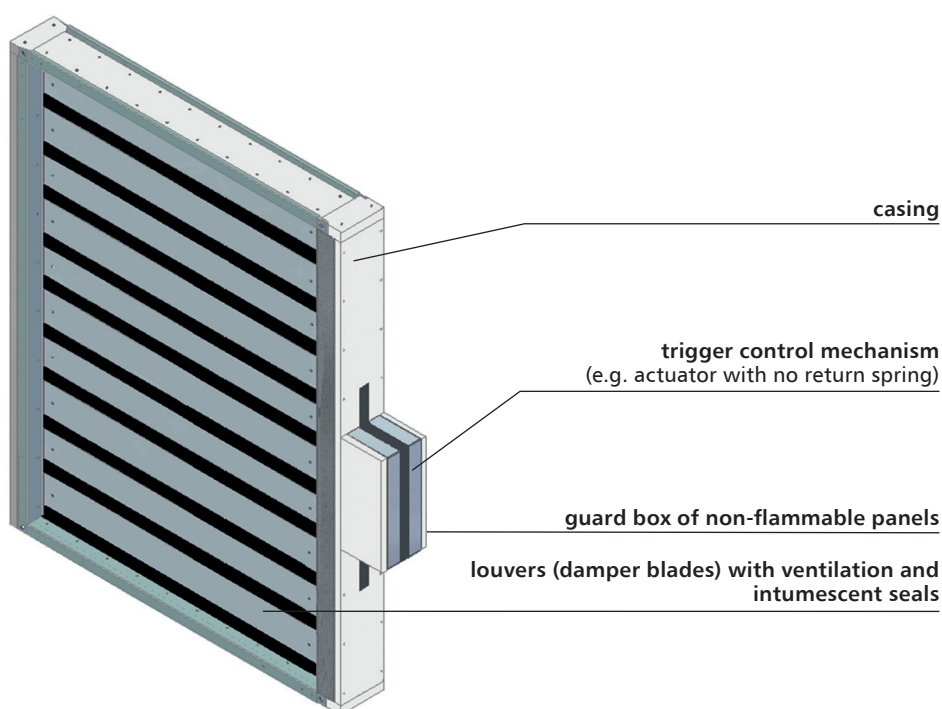


- ▶ **EIS120, EIS90, ES120**
- ▶ **Certificate of constancy of performance 1396-CPR-0115.**
- ▶ **Dampers certified for compliance with EN 12101-8.**
- ▶ **Dampers qualified under EN 13501-4 and tested under EN 1366-10.**
- ▶ **Narrow louvered fire dampers for fire ventilation systems.**

10.1. application

Multi-blade mcr WIP PRO/V, mcr WIP PRO/V-M fire dampers for use in automatic fire ventilation systems. mcr WIP PRO/V fire dampers are used in fire ventilation systems, mcr WIP PRO/V-M fire dampers are used in mixed systems, combining both fire and comfort ventilation systems. The devices prevent fire, smoke and fire gases propagation to the adjacent areas. During normal operation, the fire damper is in open or closed position depending on its function. In the fire-covered area, the fire damper is open, whereas it remains closed in the other areas. mcr WIP PRO/V, mcr WIP PRO/V-M fire dampers due to their design are intended for use in systems, where the components such as a silencer, bend or supply/return grille are installed downstream of the fire damper.

10.2. design



Multi-blade mcr WIP PRO/V, mcr WIP PRO/V-M dampers consist of a rectangular casing made of two steel sections joined with a non-combustible plate using rivets and galvanized steel fasteners, a set of movable blades rotating around their axis and a trigger control mechanism. The fire damper casing is made of fire resistant panels and galvanized steel „C“ shape profiles. The device is reinforced on both sides with steel corners. Intumescent and ventilation seals are installed on the inside. Each fire damper blade is made of two 20 mm thick fire resistant plates. Intumescent seal and ventilation seals fixed with staples are installed at the entire blade length. The blades rotate around the axis made by two steel pins. Each pin is mounted in a brass sleeve mounted on a vertical side H of the fire damper casing.

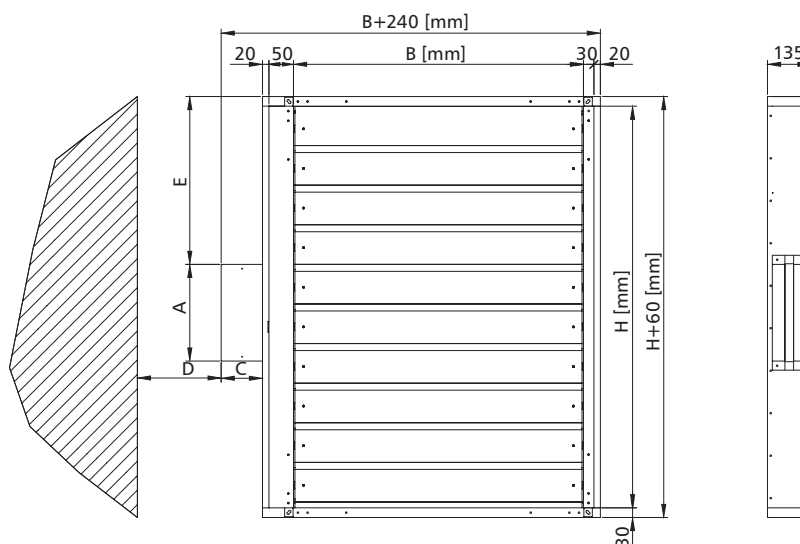
10.3. versions

10.3.1. mcr WIP PRO/V, mcr WIP PRO/V-M fire damper for multi-zone fire ventilation systems with actuator - damper opened/closed with an actuator.

During normal operation, the louvers are open or closed. In case of fire, the fire damper louvers are opened in the fire-covered area and closed in the other areas - the fire damper is released remotely by feeding the supply voltage to the trigger control mechanism.

mcr WIP PRO/V, mcr WIP PRO/V-M fire dampers feature a Belimo trigger control mechanisms **BLE, BE** axial actuator without the return spring (24 V AC/DC or 230 V AC). BLE, BE series actuators are equipped with limit switches used to monitor the blade position. Furthermore, the mechanical blade position indicator is placed on the actuator.

mcr WIP PRO/V, mcr WIP PRO/V-M fire dampers with Belimo BLE, BE actuators are opened or closed by supplying voltage to the actuator terminals. Furthermore, dampers with those actuators may be opened/closed manually using a key.



mechanism	A	C	D	E
BF, BFL, BFN	298	120	75	formula*

* shown in below table

for the even number of blades	for the odd number of blades
$E [mm] = (H/2 - 123) + 30$	$E [mm] = (H/2 - 61.5) + 30$

Number of blades = $H/123$.

10.4. dimensions

Rectangular dampers:

- nominal width B: from 110 mm to 900 mm
- nominal height H: from 263 mm to 1250 mm
- the maximum cross-section surface of one damper up to 1.125 m²

Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (in 1 mm increments, in the given range).

Square fire dampers may also be fitted with round connectors for the spigot connection to the round ducts.

10.5. installation

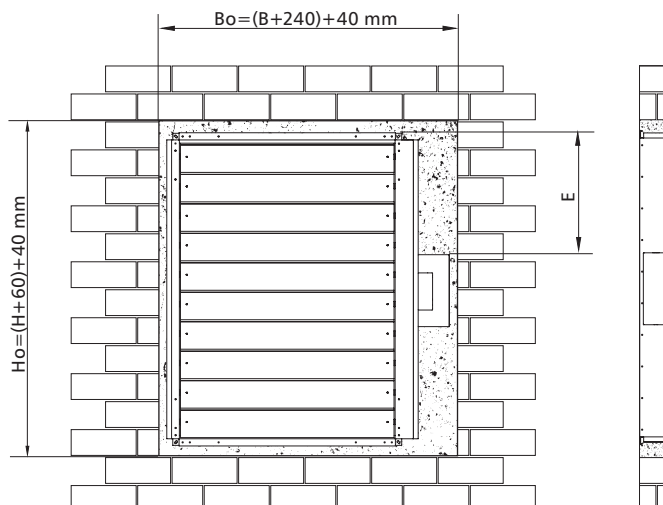
Rectangular mcr WIP PRO/V, mcr WIP PRO/V-M fire dampers are class EI120($v_{e,i} \leftrightarrow o$)S-rated devices, if installed in concrete partitions, min. 110 mm thick, made of common bricks or aerated concrete blocks, min. thickness 115 mm or stud partitions with min. EI120 fire rating.

10.5.1. preparation of installation openings

The minimum dimensions of the installation opening that permits correct installation of the mcr WIP PRO/V, mcr WIP PRO/V-M damper is:

$$B_o = (B + 240) + 40 \text{ mm}$$

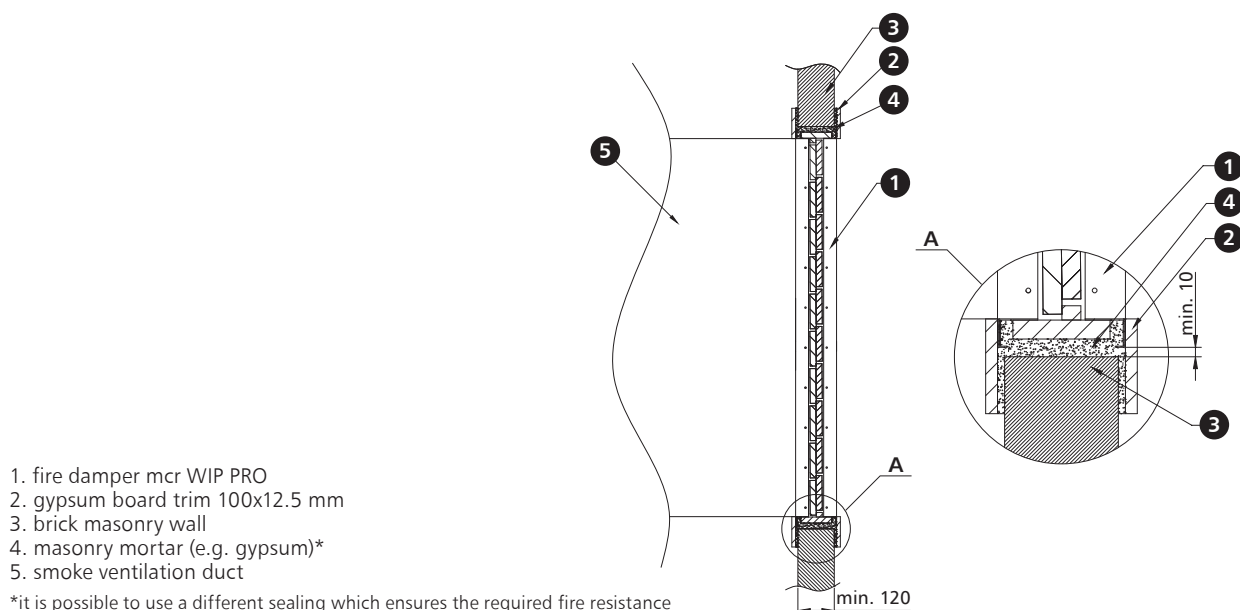
$$H_o = (H + 60) + 40 \text{ mm}$$



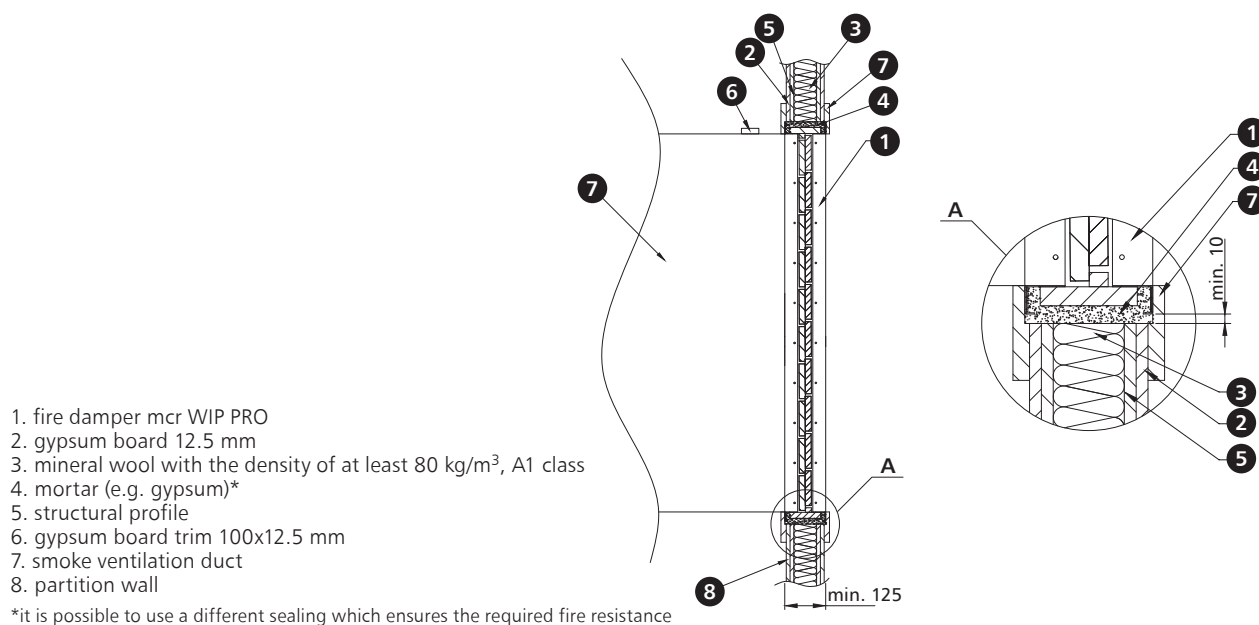
Dimension E (distance from the top fire damper edge to the edge of the trigger control mechanism box) - depending on the dimension H and the trigger control mechanism used:

mechanism	for the even number of blades	for the odd number of blades
BE, BLE	$E [\text{mm}] = (H/2 - 123) + 30$	$E [\text{mm}] = (H/2 - 61.5) + 30$

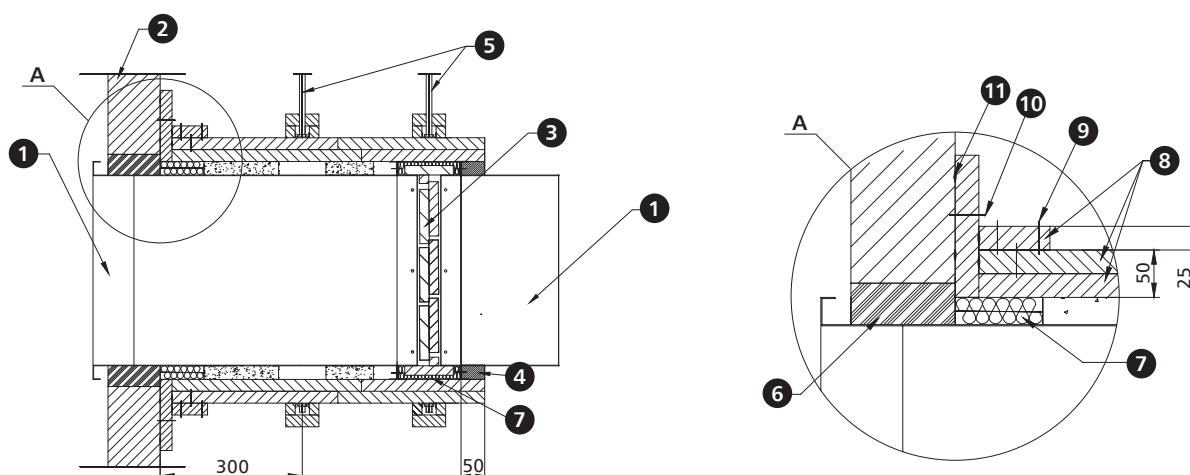
10.5.2. sample installation in concrete block or full brick walls



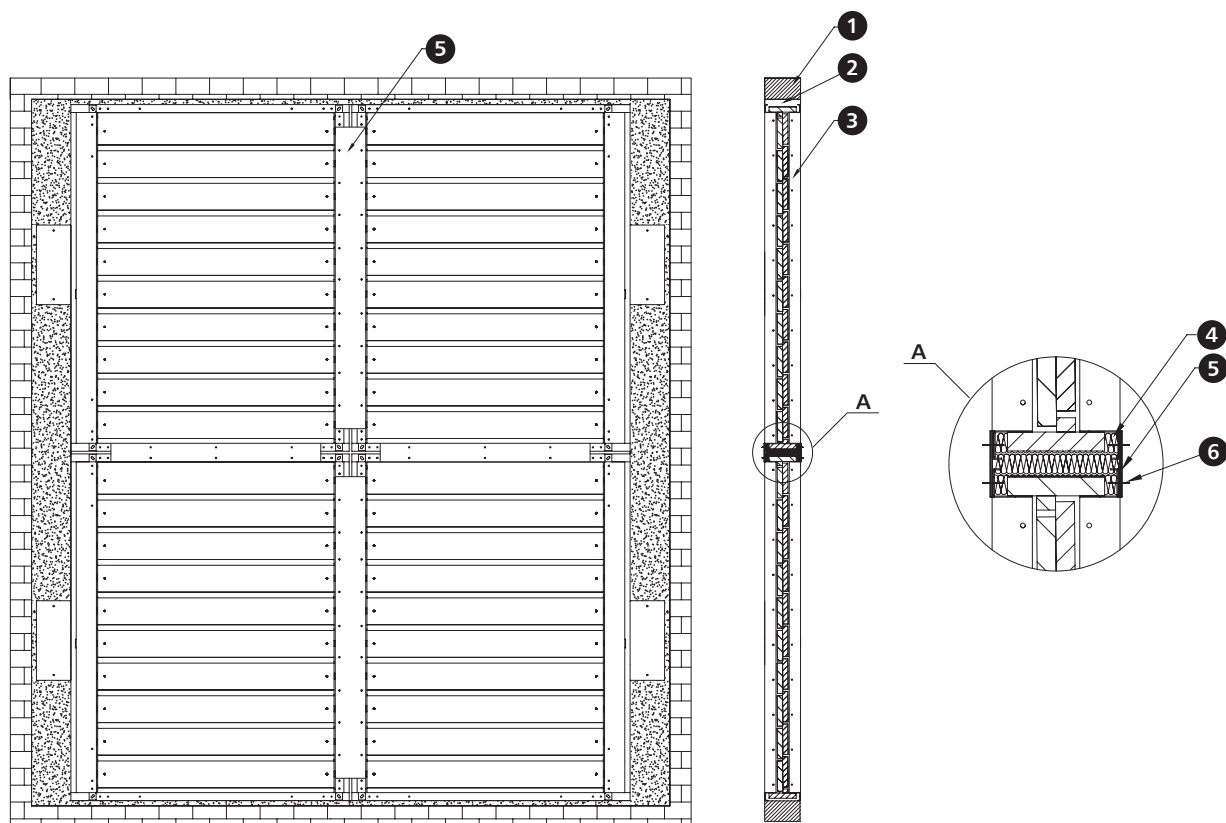
10.5.3. sample installation in lightweight walls



10.5.4. sample installation outside the fire partition



10.5.5. sample installation in a multiple set (a battery of four dampers)

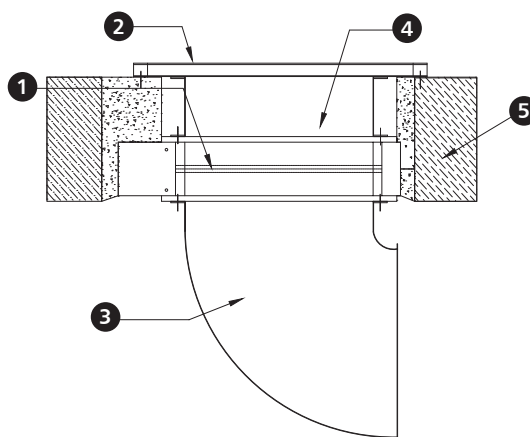


- 1. e.g. masonry wall
- 2. e.g. cement mortar*
- 3. fire damper mcr WIP PRO
- 4. mineral wool with the density of at least 80 kg/m³, A1 class

- 5. steel flat bar, dimensions:
 - vertical H: width 110 mm, thickness 2 mm
 - horizontal B: width 70 mm, thickness 2 mm
- 6. ST8x16 screw

*it is possible to use a different sealing which ensures the required fire resistance

Example applications - installation with end cap



- 1. fire damper mcr WIP
- 2. duct cover
- 3. ventilation duct
- 4. duct - ventilation straight connection pipe
- 5. wall, ceiling

If a mcr WIP/V, mcr WIP/V-M damper is used, thanks to the shutters (no single-plane partition) it is possible to use the space in front of and behind the damper for such system elements as a duct cover or a rectangular silencer or to route a duct along the wall using a duct bend or reduction.

10.6. technical parameters of mcr WIP PRO/V, mcr WIP PRO/V-M rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		263						300					350				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.029	0.019	269	13	6	0.033	0.019	269	14	10	0.039	0.019	269	16	15
		6			404	28	16			404	30	21			404	36	25
		8			539	50	24			539	54	28			539	63	33
		10			673	78	29			673	85	34			673	99	39
	150	4	0.040	0.026	367	13	7	0.045	0.026	367	14	12	0.053	0.026	367	16	16
		6			551	28	17			551	30	22			551	36	27
		8			734	50	25			734	54	30			734	63	34
		10			918	78	31			918	85	36			918	99	40
	200	4	0.053	0.034	490	13	8	0.060	0.034	490	14	13	0.070	0.034	490	16	17
		6			734	28	19			734	30	23			734	36	28
		8			979	50	26			979	54	31			979	63	35
		10			1 224	78	32			1 224	84	37			1 224	99	41
	250	4	0.067	0.043	612	13	9	0.075	0.043	612	14	14	0.088	0.043	612	16	18
		6			918	28	20			918	30	24			918	36	29
		8			1 224	50	27			1 224	54	32			1 224	63	36
		10			1 530	78	33			1 530	85	38			1 530	99	42
	300	4	0.080	0.051	734	13	10	0.090	0.051	734	14	15	0.105	0.051	734	16	19
		6			1 102	28	20			1 102	30	25			1 102	36	30
		8			1 469	50	28			1 469	54	33			1 469	63	37
		10			1 836	78	34			1 836	85	39			1 836	99	43
	350	4	0.093	0.060	857	13	11	0.105	0.060	857	14	15	0.123	0.060	857	16	20
		6			1 285	28	21			1 285	30	26			1 285	36	30
		8			1 714	50	29			1 714	54	33			1 714	63	38
		10			2 142	78	34			2 142	85	39			2 142	99	44
	400	4	0.106	0.068	979	13	11	0.120	0.068	979	14	16	0.140	0.068	979	16	20
		6			1 469	28	22			1 469	30	26			1 469	36	31
		8			1 958	50	29			1 958	54	34			1 958	63	38
		10			2 448	78	35			2 448	84	40			2 448	99	44
	450	4	0.120	0.077	1 102	13	12	0.135	0.077	1 102	14	16	0.158	0.077	1 102	16	21
		6			1 652	28	22			1 652	30	27			1 652	36	31
		8			2 203	50	30			2 203	54	34			2 203	63	39
		10			2 754	78	36			2 754	84	40			2 754	99	45
	500	4	0.133	0.085	1 224	13	12	0.150	0.085	1 224	14	17	0.175	0.085	1 224	16	21
		6			1 836	28	23			1 836	30	27			1 836	36	32
		8			2 448	50	30			2 448	54	35			2 448	63	39
		10			3 060	78	36			3 060	85	41			3 060	99	45
	550	4	0.146	0.094	1 346	2	12	0.165	0.094	1 346	14	17	0.193	0.094	1 346	16	22
		6			2 020	4	23			2 020	30	28			2 020	36	32
		8			2 693	6	31			2 693	54	35			2 693	63	40
		10			3 366	10	36			3 366	84	41			3 366	99	46
	600	4	0.160	0.102	1 469	13	13	0.180	0.102	1 469	14	18	0.210	0.102	1 469	16	22
		6			2 203	28	23			2 203	30	28			2 203	36	33
		8			2 938	50	31			2 938	54	36			2 938	63	40
		10			3 672	78	37			3 672	85	42			3 672	99	46
	650	4	0.173	0.111	1 591	13	13	0.195	0.111	1 591	14	18	0.228	0.111	1 591	16	22
		6			2 387	28	24			2 387	30	29			2 387	36	33
		8			3 182	50	31			3 182	54	36			3 182	63	41
		10			3 978	78	37			3 978	85	42			3 978	99	46
	700	4	0.186	0.119	1 714	13	14	0.210	0.119	1 714	14	18	0.245	0.119	1 714	16	23
		6			2 570	28	24			2 570	30	29			2 570	36	33
		8			3 427	50	32			3 427	54	36			3 427	63	41
		10			4 284	78	37			4 284	85	42			4 284	99	47
	750	4	0.200	0.128	1 836	13	14	0.225	0.128	1 836	14	19	0.263	0.128	1 836	16	23
		6			2 754	28	24			2 754	30	29			2 754	36	34
		8			3 672	50	32			3 672	54	37			3 672	63	41
		10			4 590	78	38			4 590	85	43			4 590	99	47
	800	4	0.213	0.136	1 958	13	14	0.240	0.136	1 958	14	19	0.280	0.136	1 958	16	23
		6			2 938	28	25			2 938	30	29			2 938	36	34
		8			3 917	50	32			3 917	54	37			3 917	63	41
		10			4 896	78	38			4 896	84	43			4 896	99	47
	850	4	0.226	0.145	2 081	13	14	0.255	0.145	2 081	14	19	0.298	0.145	2 081	16	24
		6			3 121	28	25			3 121	30	30			3 121	36	34
		8			4 162	50	32			4 162	54	37			4 162	63	42
		10			5 202	78	38			5 202	84	43			5 202	99	48
900	4	0.239	0.153	2 203	13	15	0.270	0.153	2 203	14	19	0.315	0.153	2 203	16	24	
	6			3 305	28	25			3 305	30	30			3 305	36	34	
	8			4 406	50	33			4 406	54	37			4 406	63	42	
	10			5 508	78	39			5 508	84	43			5 508	99	48	

10.6. technical parameters of mcr WIP PRO/V, mcr WIP PRO/V-M rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		400						450					500				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.044	0.028	401	13	8	0.050	0.028	401	14	12	0.056	0.037	532	11	15
		6			601	29	18			601	31	23			798	26	26
		8			802	52	26			802	55	30			1 064	45	34
		10			1 002	81	32			1 002	86	36			1 331	71	39
	150	4	0.060	0.038	546	13	9	0.068	0.038	546	14	14	0.077	0.050	726	11	17
		6			820	29	20			820	31	24			1 089	26	27
		8			1 093	52	27			1 093	55	32			1 452	45	35
		10			1 366	81	33			1 366	86	38			1 814	71	41
	200	4	0.080	0.051	729	13	10	0.090	0.051	729	14	15	0.102	0.067	968	11	18
		6			1 093	29	21			1 093	31	25			1 452	26	29
		8			1 457	52	28			1 457	55	33			1 935	45	36
		10			1 822	81	34			1 822	86	39			2 419	71	42
	250	4	0.100	0.063	911	13	11	0.113	0.063	911	14	16	0.128	0.084	1 210	11	19
		6			1 366	29	22			1 366	31	26			1 814	26	30
		8			1 822	52	29			1 822	55	34			2 419	45	37
		10			2 277	81	35			2 277	86	40			3 024	71	43
	300	4	0.120	0.076	1 093	13	12	0.135	0.076	1 093	14	17	0.154	0.101	1 452	11	20
		6			1 639	29	23			1 639	31	27			2 177	26	30
		8			2 186	52	30			2 186	55	35			2 903	45	38
		10			2 732	81	36			2 732	86	41			3 629	71	44
	350	4	0.140	0.089	1 275	13	13	0.158	0.089	1 275	14	17	0.179	0.118	1 693	11	20
		6			1 913	29	23			1 913	31	28			2 540	26	31
		8			2 550	52	31			2 550	55	35			3 387	45	39
		10			3 188	81	37			3 188	86	41			4 234	71	44
	400	4	0.160	0.101	1 457	13	13	0.180	0.101	1 457	14	18	0.205	0.134	1 935	11	21
		6			2 186	29	24			2 186	31	28			2 903	26	32
		8			2 915	52	31			2 915	55	36			3 871	45	39
		10			3 643	81	37			3 643	86	42			4 838	71	45
	450	4	0.180	0.114	1 639	13	14	0.203	0.114	1 639	14	18	0.230	0.151	2 177	11	22
		6			2 459	29	24			2 459	31	29			3 266	26	32
		8			3 279	52	32			3 279	55	36			4 355	45	40
		10			4 099	81	38			4 099	86	42			5 443	71	45
	500	4	0.200	0.127	1 822	13	14	0.225	0.127	1 822	14	19	0.256	0.168	2 419	11	22
		6			2 732	29	25			2 732	31	29			3 629	26	33
		8			3 643	52	32			3 643	55	37			4 838	45	40
		10			4 554	81	38			4 554	86	43			6 048	71	46
	550	4	0.220	0.139	2 004	13	15	0.248	0.139	2 004	14	19	0.282	0.185	2 661	11	22
		6			3 006	29	25			3 006	31	30			3 992	26	33
		8			4 008	52	33			4 008	55	37			5 322	45	40
		10			5 009	81	39			5 009	86	43			6 653	71	46
	600	4	0.240	0.152	2 186	13	15	0.270	0.152	2 186	14	20	0.307	0.202	2 903	11	23
		6			3 279	29	26			3 279	31	30			4 355	26	33
		8			4 372	52	33			4 372	55	38			5 806	45	41
		10			5 465	81	39			5 465	86	44			7 258	71	47
	650	4	0.260	0.164	2 368	13	15	0.293	0.164	2 368	14	20	0.333	0.218	3 145	11	23
		6			3 552	29	26			3 552	31	31			4 717	26	34
		8			4 736	52	34			4 736	55	38			6 290	45	41
		10			5 920	81	39			5 920	86	44			7 862	71	47
700	4	0.280	0.177	2 550	13	16	0.315	0.177	2 550	14	20	0.358	0.235	3 387	11	23	
	6			3 825	29	26			3 825	31	31			5 080	26	34	
	8			5 100	52	34			5 100	55	38			6 774	45	42	
	10			6 376	81	40			6 376	86	44			8 467	71	47	
750	4	0.300	0.190	2 732	13	16	0.338	0.190	2 732	14	21	0.384	0.252	3 629	11	24	
	6			4 099	29	27			4 099	31	31			5 443	26	34	
	8			5 465	52	34			5 465	55	39			7 258	45	42	
	10			6 831	81	40			6 831	86	45			9 072	71	48	
800	4	0.320	0.202	2 915	13	16	0.360	0.202	2 915	14	20	0.410	0.269	3 871	11	24	
	6			4 372	29	27			4 372	31	31			5 806	26	34	
	8			5 829	52	34			5 829	55	38			7 741	45	42	
	10			7 286	81	40			7 286	86	44			9 677	71	48	
850	4	0.340	0.215	3 097	13	17	0.383	0.215	3 097	14	20	0.435	0.286	4 113	11	24	
	6			4 645	29	27			4 645	31	31			6 169	26	34	
	8			6 193	52	35			6 193	55	38			8 225	45	42	
	10			7 742	81	40			7 742	86	44			10 282	71	48	
900	4	0.360	0.228	3 279	13	17	0.405	0.228	3 279	14	20	0.461	0.302	4 355	11	24	
	6			4 918	29	27			4 918	31	31			6 532	26	34	
	8			6 558	52	35			6 558	55	38			8 709	45	42	
	10			8 197	81	41			8 197	86	44			10 886	71	48	

10.6. technical parameters of mcr WIP PRO/V, mcr WIP PRO/V-M rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		550						630					650				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.061	0.037	532	13	10	0.070	0.046	664	11	14	0.072	0.046	664	12	9
		6			798	29	21			996	25	24			996	27	20
		8			1 064	51	29			1 327	44	32			1 327	48	27
		10			1 331	79	34			1 659	69	38			1 659	76	33
	150	4	0.083	0.050	726	13	12	0.095	0.063	905	11	15	0.098	0.063	905	12	10
		6			1 089	29	22			1 358	25	26			1 358	27	21
		8			1 452	51	30			1 810	44	33			1 810	48	28
		10			1 814	79	36			2 263	69	39			2 263	76	34
	200	4	0.110	0.067	968	13	13	0.127	0.084	1 207	11	16	0.130	0.084	1 207	12	12
		6			1 452	29	24			1 810	25	27			1 810	27	22
		8			1 935	51	31			2 413	44	34			2 413	48	30
		10			2 419	79	37			3 017	69	40			3 017	76	36
	250	4	0.138	0.084	1 210	13	14	0.159	0.105	1 508	11	17	0.163	0.105	1 508	12	13
		6			1 814	29	25			2 263	25	28			2 263	27	23
		8			2 419	51	32			3 017	44	35			3 017	48	31
		10			3 024	79	38			3 771	69	41			3 771	76	36
	300	4	0.165	0.101	1 452	13	15	0.191	0.126	1 810	11	18	0.195	0.126	1 810	12	13
		6			2 177	29	25			2 715	25	29			2 715	27	24
		8			2 903	51	33			3 620	44	36			3 620	48	31
		10			3 629	79	39			4 525	69	42			4 525	76	37
	350	4	0.193	0.118	1 693	13	15	0.222	0.147	2 112	11	19	0.228	0.147	2 112	12	14
		6			2 540	29	26			3 168	25	29			3 168	27	25
		8			3 387	51	34			4 224	44	37			4 224	48	32
		10			4 234	79	39			5 279	69	43			5 279	76	38
	400	4	0.220	0.134	1 935	13	16	0.254	0.168	2 413	11	19	0.260	0.168	2 413	12	15
		6			2 903	29	27			3 620	25	30			3 620	27	25
		8			3 871	51	34			4 827	44	37			4 827	48	33
		10			4 838	79	40			6 034	69	43			6 034	76	39
	450	4	0.248	0.151	2 177	13	17	0.286	0.189	2 715	11	20	0.293	0.189	2 715	12	15
		6			3 266	29	27			4 073	25	30			4 073	27	26
		8			4 355	51	35			5 430	44	38			5 430	48	33
		10			5 443	79	40			6 788	69	44			6 788	76	39
	500	4	0.275	0.168	2 419	13	17	0.318	0.210	3 017	11	20	0.325	0.210	3 017	12	16
		6			3 629	29	28			4 525	25	31			4 525	27	26
		8			4 838	51	35			6 034	44	38			6 034	48	34
		10			6 048	79	41			7 542	69	44			7 542	76	40
	550	4	0.303	0.185	2 661	13	17	0.349	0.230	3 318	11	21	0.358	0.230	3 318	12	16
		6			3 992	29	28			4 978	25	31			4 978	27	27
		8			5 322	51	36			6 637	44	39			6 637	48	34
		10			6 653	79	41			8 296	69	45			8 296	76	40
	600	4	0.330	0.202	2 903	13	18	0.381	0.251	3 620	11	21	0.390	0.251	3 620	12	16
		6			4 355	29	28			5 430	25	32			5 430	27	27
		8			5 806	51	36			7 240	44	39			7 240	48	34
		10			7 258	79	42			9 050	69	45			9 050	76	40
	650	4	0.358	0.218	3 145	13	18	0.413	0.272	3 922	11	21	0.423	0.272	3 922	12	17
		6			4 717	29	29			5 883	25	32			5 883	27	27
		8			6 290	51	36			7 844	44	39			7 844	48	35
		10			7 862	79	42			9 805	69	45			9 805	76	41
700	4	0.385	0.235	3 387	13	18	0.445	0.293	4 224	11	22	0.455	0.293	4 224	12	17	
	6			5 080	29	29			6 335	25	32			6 335	27	28	
	8			6 774	51	37			8 447	44	40			8 447	48	35	
	10			8 467	79	42			10 559	69	46			10 559	76	41	
750	4	0.413	0.252	3 629	13	19	0.476	0.314	4 525	11	22	0.488	0.314	4 525	12	17	
	6			5 443	29	29			6 788	25	33			6 788	27	28	
	8			7 258	51	37			9 050	44	40			9 050	48	35	
	10			9 072	79	43			11 313	69	46			11 313	76	41	
800	4	0.440	0.269	3 871	13	19	0.508	0.335	4 827	11	22	0.520	0.335	4 827	12	17	
	6			5 806	29	30			7 240	25	33			7 240	27	28	
	8			7 741	51	37			9 654	44	40			9 654	48	35	
	10			9 677	79	43			12 067	69	46			12 067	76	41	
850	4	0.468	0.286	4 113	13	19	0.540	0.356	5 129	11	23	0.553	0.356	5 129	12	17	
	6			6 169	29	30			7 693	25	33			7 693	27	28	
	8			8 225	51	37			10 257	44	41			10 257	48	35	
	10			10 282	79	43			12 821	69	46			12 821	76	41	
900	4	0.495	0.302	4 355	13	20	0.572	0.377	5 430	11	23	0.585	0.377	5 430	12	17	
	6			6 532	29	30			8 145	25	32			8 145	27	28	
	8			8 709	51	38			10 860	44	39			10 860	48	35	
	10			10 886	79	43			13 576	69	44			13 576	76	41	

10.6. technical parameters of mcr WIP PRO/V, mcr WIP PRO/V-M rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		700						750					800				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.077	0.046	664	14	12	0.083	0.060	859	9	15	0.088	0.055	795	10	11
		6			996	30	23			1 288	20	25			1 193	22	22
		8			1 327	54	30			1 717	35	33			1 590	40	29
		10			1 659	85	36			2 146	55	39			1 988	62	35
	150	4	0.105	0.063	905	14	14	0.114	0.081	1 171	9	16	0.120	0.075	1 084	10	12
		6			1 358	30	24			1 756	20	27			1 626	22	23
		8			1 810	54	32			2 341	35	34			2 169	40	30
		10			2 263	85	37			2 927	55	40			2 711	62	36
	200	4	0.140	0.084	1 207	14	15	0.152	0.108	1 561	9	17	0.160	0.100	1 446	10	14
		6			1 810	30	25			2 341	20	28			2 169	22	24
		8			2 413	54	33			3 122	35	35			2 892	40	32
		10			3 017	85	39			3 902	55	41			3 614	62	38
	250	4	0.175	0.105	1 508	14	16	0.190	0.136	1 951	9	18	0.200	0.126	1 807	10	15
		6			2 263	30	26			2 927	20	29			2 711	22	25
		8			3 017	54	34			3 902	35	36			3 614	40	33
		10			3 771	85	40			4 878	55	42			4 518	62	39
	300	4	0.210	0.126	1 810	14	17	0.227	0.163	2 341	9	19	0.240	0.151	2 169	10	15
		6			2 715	30	27			3 512	20	30			3 253	22	26
		8			3 620	54	35			4 683	35	37			4 337	40	33
		10			4 525	85	40			5 854	55	43			5 422	62	39
	350	4	0.245	0.147	2 112	14	17	0.265	0.190	2 732	9	20	0.280	0.176	2 530	10	16
		6			3 168	30	28			4 098	20	30			3 795	22	27
		8			4 224	54	35			5 463	35	38			5 060	40	34
		10			5 279	85	41			6 829	55	44			6 325	62	40
	400	4	0.280	0.168	2 413	14	18	0.303	0.217	3 122	9	20	0.320	0.201	2 892	10	17
		6			3 620	30	28			4 683	20	31			4 337	22	27
		8			4 827	54	36			6 244	35	38			5 783	40	35
		10			6 034	85	42			7 805	55	44			7 229	62	41
	450	4	0.315	0.189	2 715	14	18	0.341	0.244	3 512	9	21	0.360	0.226	3 253	10	17
		6			4 073	30	29			5 268	20	31			4 879	22	28
		8			5 430	54	36			7 024	35	39			6 506	40	35
		10			6 788	85	42			8 780	55	45			8 132	62	41
	500	4	0.350	0.210	3 017	14	19	0.379	0.271	3 902	9	21	0.400	0.251	3 614	10	18
		6			4 525	30	29			5 854	20	32			5 422	22	28
		8			6 034	54	37			7 805	35	39			7 229	40	36
		10			7 542	85	43			9 756	55	45			9 036	62	42
	550	4	0.385	0.230	3 318	14	19	0.417	0.298	4 293	9	22	0.440	0.276	3 976	10	18
		6			4 978	30	30			6 439	20	32			5 964	22	29
		8			6 637	54	37			8 585	35	40			7 952	40	36
		10			8 296	85	43			10 732	55	46			9 940	62	42
	600	4	0.420	0.251	3 620	14	20	0.455	0.325	4 683	9	22	0.480	0.301	4 337	10	18
		6			5 430	30	30			7 024	20	33			6 506	22	29
		8			7 240	54	38			9 366	35	40			8 675	40	36
		10			9 050	85	43			11 707	55	46			10 843	62	42
	650	4	0.455	0.272	3 922	14	20	0.493	0.352	5 073	9	22	0.520	0.326	4 699	10	19
		6			5 883	30	31			7 610	20	33			7 048	22	29
		8			7 844	54	38			10 146	35	40			9 397	40	37
		10			9 805	85	44			12 683	55	46			11 747	62	43
700	4	0.490	0.293	4 224	14	20	0.531	0.379	5 463	9	23	0.560	0.351	5 060	10	19	
	6			6 335	30	31			8 195	20	33			7 590	22	30	
	8			8 447	54	38			10 927	35	41			10 120	40	37	
	10			10 559	85	44			13 658	55	47			12 650	62	43	
750	4	0.525	0.314	4 525	14	21	0.569	0.407	5 854	9	23	0.600	0.377	5 422	10	19	
	6			6 788	30	31			8 780	20	34			8 132	22	30	
	8			9 050	54	39			11 707	35	41			10 843	40	37	
	10			11 313	85	44			14 634	55	47			13 554	62	43	
800	4	0.560	0.335	4 827	14	19	0.606	0.434	6 244	9	23	0.640	0.402	5 783	10	20	
	6			7 240	30	29			9 366	20	34			8 675	22	30	
	8			9 654	54	37			12 488	35	41			11 566	40	38	
	10			12 067	85	42			15 610	55	47			14 458	62	44	
850	4	0.595	0.356	5 129	14	21	0.644	0.461	6 634	9	24	0.680	0.427	6 144	10	20	
	6			7 693	30	32			9 951	20	34			9 217	22	31	
	8			10 257	54	39			13 268	35	42			12 289	40	38	
	10			12 821	85	45			16 585	55	47			15 361	62	44	
900	4	0.630	0.377	5 430	14	21	0.682	0.488	7 024	9	24	0.720	0.452	6 506	10	20	
	6			8 145	30	32			10 536	20	34			9 759	22	31	
	8			10 860	54	39			14 049	35	42			13 012	40	38	
	10			13 576	85	45			17 561	55	48			16 265	62	44	

10.6. technical parameters of mcr WIP PRO/V, mcr WIP PRO/V-M rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]															
		850					900					950					
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.097	0.064	927	12	14	0.099	0.064	927	13	10	0.105	0.064	927	14	13
		6			1 390	27	24			1 390	30	21			1 390	32	23
		8			1 853	49	32			1 853	53	28			1 853	57	31
		10			2 317	76	37			2 317	83	34			2 317	89	36
	150	4	0.132	0.088	1 264	12	15	0.135	0.088	1 264	13	11	0.143	0.088	1 264	14	14
		6			1 895	27	25			1 895	30	22			1 895	32	24
		8			2 527	49	33			2 527	53	30			2 527	57	32
		10			3 159	76	39			3 159	83	35			3 159	89	38
	200	4	0.176	0.117	1 685	12	16	0.180	0.117	1 685	13	13	0.190	0.117	1 685	14	15
		6			2 527	27	27			2 527	30	23			2 527	32	26
		8			3 370	49	34			3 370	53	31			3 370	57	33
		10			4 212	76	40			4 212	83	37			4 212	89	39
	250	4	0.220	0.146	2 106	12	17	0.225	0.146	2 106	13	14	0.238	0.146	2 106	14	16
		6			3 159	27	28			3 159	30	24			3 159	32	27
		8			4 212	49	35			4 212	53	32			4 212	57	34
		10			5 265	76	41			5 265	83	38			5 265	89	40
	300	4	0.264	0.176	2 527	12	18	0.270	0.176	2 527	13	14	0.285	0.176	2 527	14	17
		6			3 791	27	28			3 791	30	25			3 791	32	27
		8			5 054	49	36			5 054	53	33			5 054	57	35
		10			6 318	76	42			6 318	83	38			6 318	89	41
	350	4	0.308	0.205	2 948	12	19	0.315	0.205	2 948	13	15	0.333	0.205	2 948	14	18
		6			4 423	27	29			4 423	30	26			4 423	32	28
		8			5 897	49	37			5 897	53	33			5 897	57	36
		10			7 371	76	42			7 371	83	39			7 371	89	41
	400	4	0.352	0.234	3 370	12	19	0.360	0.234	3 370	13	16	0.380	0.234	3 370	14	18
		6			5 054	27	30			5 054	30	26			5 054	32	29
		8			6 739	49	37			6 739	53	34			6 739	57	36
		10			8 424	76	43			8 424	83	40			8 424	89	42
	450	4	0.396	0.263	3 791	12	20	0.405	0.263	3 791	13	16	0.428	0.263	3 791	14	19
		6			5 686	27	30			5 686	30	27			5 686	32	29
		8			7 582	49	38			7 582	53	34			7 582	57	37
		10			9 477	76	44			9 477	83	40			9 477	89	43
	500	4	0.441	0.293	4 212	12	20	0.450	0.293	4 212	13	17	0.475	0.293	4 212	14	19
		6			6 318	27	31			6 318	30	27			6 318	32	30
		8			8 424	49	38			8 424	53	35			8 424	57	37
		10			10 530	76	44			10 530	83	41			10 530	89	43
	550	4	0.485	0.322	4 633	12	21	0.495	0.322	4 633	13	17	0.523	0.322	4 633	14	20
		6			6 950	27	31			6 950	30	28			6 950	32	30
		8			9 266	49	39			9 266	53	35			9 266	57	38
		10			11 583	76	44			11 583	83	41			11 583	89	43
	600	4	0.529	0.351	5 054	12	21	0.540	0.351	5 054	13	17	0.570	0.351	5 054	14	20
		6			7 582	27	31			7 582	30	28			7 582	32	30
		8			10 109	49	39			10 109	53	36			10 109	57	38
		10			12 636	76	45			12 636	83	41			12 636	89	44
	650	4	0.573	0.380	5 476	12	21	0.585	0.380	5 476	13	18	0.618	0.380	5 476	14	20
		6			8 213	27	32			8 213	30	28			8 213	32	31
		8			10 951	49	39			10 951	53	36			10 951	57	38
		10			13 689	76	45			13 689	83	42			13 689	89	44
700	4	0.617	0.410	5 897	12	22	0.630	0.410	5 897	13	18	0.665	0.410	5 897	14	21	
	6			8 845	27	32			8 845	30	29			8 845	32	31	
	8			11 794	49	40			11 794	53	36			11 794	57	39	
	10			14 742	76	45			14 742	83	42			14 742	89	44	
750	4	0.661	0.439	6 318	12	22	0.675	0.439	6 318	13	18	0.713	0.439	6 318	14	21	
	6			9 477	27	32			9 477	30	29			9 477	32	31	
	8			12 636	49	40			12 636	53	37			12 636	57	39	
	10			15 795	76	46			15 795	83	42			15 795	89	45	
800	4	0.705	0.468	6 739	12	22	0.720	0.468	6 739	13	19	0.760	0.468	6 739	14	21	
	6			10 109	27	33			10 109	30	29			10 109	32	32	
	8			13 478	49	40			13 478	53	37			13 478	57	39	
	10			16 848	76	46			16 848	83	43			16 848	89	45	
850	4	0.749	0.497	7 160	12	22	0.765	0.497	7 160	13	19	0.808	0.497	7 160	14	21	
	6			10 741	27	33			10 741	30	30			10 741	32	32	
	8			14 321	49	40			14 321	53	37			14 321	57	39	
	10			17 901	76	46			17 901	83	43			17 901	89	45	
900	4	0.793	0.527	7 582	12	23	0.810	0.527	7 582	13	19	0.855	0.527	7 582	14	22	
	6			11 372	27	33			11 372	30	30			11 372	32	32	
	8			15 163	49	41			15 163	53	37			15 163	57	40	
	10			18 954	76	47			18 954	83	43			18 954	89	46	

10.6. technical parameters of mcr WIP PRO/V, mcr WIP PRO/V-M rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		1000					1050					1100				
	v [m/s]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]
width B [mm]	4	0.110	0.073	1 058	12	15	0.116	0.073	1 058	13	12	0.124	0.083	1 190	11	14
	6			1 587	27	25			1 587	29	22			1 784	24	24
	8			2 116	48	33			2 116	51	30			2 379	43	32
	10			2 645	76	38			2 645	79	36			2 974	67	38
	4	0.151	0.100	1 443	12	16	0.158	0.100	1 443	13	13	0.169	0.113	1 622	11	15
	6			2 164	27	26			2 164	29	24			2 433	24	26
	8			2 886	48	34			2 886	51	31			3 244	43	33
	10			3 607	76	40			3 607	79	37			4 055	67	39
	4	0.201	0.134	1 924	12	17	0.210	0.134	1 924	13	14	0.225	0.150	2 163	11	16
	6			2 886	27	28			2 886	29	24			3 244	24	26
	8			3 848	48	35			3 848	51	32			4 326	43	34
	10			4 810	76	41			4 810	79	38			5 407	67	40
	4	0.251	0.167	2 405	12	18	0.263	0.167	2 405	13	15	0.282	0.188	2 704	11	17
	6			3 607	27	29			3 607	29	25			4 055	24	27
	8			4 810	48	36			4 810	51	33			5 407	43	35
	10			6 012	76	42			6 012	79	39			6 759	67	41
	4	0.301	0.200	2 886	12	19	0.315	0.200	2 886	13	15	0.338	0.225	3 244	11	17
	6			4 329	27	29			4 329	29	26			4 866	24	28
	8			5 772	48	37			5 772	51	34			6 489	43	36
	10			7 214	76	43			7 214	79	39			8 111	67	41
	4	0.351	0.234	3 367	12	20	0.368	0.234	3 367	13	16	0.394	0.263	3 785	11	18
	6			5 050	27	30			5 050	29	27			5 678	24	29
	8			6 733	48	38			6 733	51	34			7 570	43	36
	10			8 417	76	43			8 417	79	40			9 463	67	42
	4	0.402	0.267	3 848	12	20	0.420	0.267	3 848	13	17	0.451	0.300	4 326	11	19
	6			5 772	27	31			5 772	29	27			6 489	24	29
	8			7 695	48	38			7 695	51	35			8 652	43	37
	10			9 619	76	44			9 619	79	41			10 814	67	43
	4	0.452	0.301	4 329	12	21	0.473	0.301	4 329	13	17	0.507	0.338	4 866	11	19
	6			6 493	27	31			6 493	29	28			7 300	24	30
	8			8 657	48	39			8 657	51	35			9 733	43	37
	10			10 822	76	45			10 822	79	41			12 166	67	43
	4	0.502	0.334	4 810	12	21	0.525	0.334	4 810	13	18	0.564	0.376	5 407	11	20
	6			7 214	27	32			7 214	29	28			8 111	24	30
	8			9 619	48	39			9 619	51	36			10 814	43	38
	10			12 024	76	45			12 024	79	42			13 518	67	44
	4	0.552	0.367	5 291	12	22	0.578	0.367	5 291	13	18	0.620	0.413	5 948	11	20
	6			7 936	27	32			7 936	29	29			8 922	24	31
	8			10 581	48	40			10 581	51	36			11 896	43	38
	10			13 226	76	45			13 226	79	42			14 870	67	44
	4	0.602	0.401	5 772	12	22	0.630	0.401	5 772	13	18	0.676	0.451	6 489	11	20
	6			8 657	27	32			8 657	29	29			9 733	24	31
	8			11 543	48	40			11 543	51	37			12 977	43	39
	10			14 429	76	46			14 429	79	42			16 222	67	44
	4	0.653	0.434	6 252	12	22	0.683	0.434	6 252	13	19	0.733	0.488	7 029	11	21
	6			9 379	27	33			9 379	29	29			10 544	24	31
	8			12 505	48	40			12 505	51	37			14 059	43	39
	10			15 631	76	46			15 631	79	43			17 573	67	45
	4	0.703	0.468	6 733	12	23	0.735	0.468	6 733	13	19	0.789	0.526	7 570	11	21
	6			10 100	27	33			10 100	29	30			11 355	24	32
	8			13 467	48	41			13 467	51	37			15 140	43	39
	10			16 834	76	46			16 834	79	43			18 925	67	45
	4	0.753	0.501	7 214	12	23	0.788	0.501	7 214	13	19	0.845	0.563	8 111	11	21
	6			10 822	27	33			10 822	29	30			12 166	24	32
	8			14 429	48	41			14 429	51	38			16 222	43	40
	10			18 036	76	47			18 036	79	43			20 277	67	45
	4	0.803	0.534	7 695	12	23	0.840	0.534	7 695	13	20	0.902	0.601	8 652	11	22
	6			11 543	27	34			11 543	29	30			12 977	24	32
	8			15 391	48	41			15 391	51	38			17 303	43	40
	10			19 238	76	47			19 238	79	44			21 629	67	46
	4	0.853	0.568	8 176	12	23	0.893	0.568	8 176	13	20	0.958	0.638	9 192	11	22
	6			12 264	27	34			12 264	29	31			13 788	24	33
	8			16 353	48	41			16 353	51	38			18 384	43	40
	10			20 441	76	47			20 441	79	44			22 981	67	46
	4	0.904	0.601	8 657	12	24	0.945	0.601	8 657	13	20	1.014	0.676	9 733	11	22
	6			12 986	27	34			12 986	29	31			14 599	24	33
	8			17 315	48	42			17 315	51	38			19 466	43	40
	10			21 643	76	48			21 643	79	44			24 332	67	46

The mcr WIP PRO fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

10.6. technical parameters of mcr WIP PRO/V, mcr WIP PRO/V-M rectangular dampers

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross-section [m²]
Se – damper active cross-section [m²]

Q – flow [m³/h]
dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

		height H [mm]														
		1150					1200					1250				
	v [m/s]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]
width B [mm]	110	4	0.127	1 190	13	11	0.132	0.083	1 190	2	13	0.138	0.092	1 321	11	10
		6		1 784	29	22			1 784	4	23			1 982	24	21
		8		2 379	52	29			2 379	7	31			2 642	43	28
		10		2 974	81	35			2 974	11	37			3 303	66	34
	150	4	0.173	1 622	13	12	0.180	0.113	1 622	2	14	0.188	0.125	1 801	11	12
		6		2 433	29	23			2 433	4	25			2 702	24	22
		8		3 244	52	30			3 244	7	32			3 603	43	30
		10		4 055	81	36			4 055	11	38			4 504	66	36
	200	4	0.230	2 163	13	12	0.240	0.150	2 163	2	14	0.250	0.167	2 402	11	11
		6		3 244	29	23			3 244	4	25			3 603	24	22
		8		4 326	52	31			4 326	7	33			4 804	43	29
		10		5 407	81	36			5 407	11	38			6 005	66	35
	250	4	0.288	2 704	13	13	0.300	0.188	2 704	2	15	0.313	0.209	3 002	11	12
		6		4 055	29	24			4 055	4	26			4 504	24	23
		8		5 407	52	32			5 407	7	33			6 005	43	30
		10		6 759	81	37			6 759	11	39			7 506	66	36
	300	4	0.345	3 244	13	14	0.360	0.225	3 244	2	16	0.375	0.250	3 603	11	13
		6		4 866	29	25			4 866	4	27			5 404	24	24
		8		6 489	52	32			6 489	7	34			7 206	43	31
		10		8 111	81	38			8 111	11	40			9 007	66	37
	350	4	0.403	3 785	13	15	0.420	0.263	3 785	2	17	0.438	0.292	4 203	11	14
		6		5 678	29	25			5 678	4	27			6 305	24	24
		8		7 570	52	33			7 570	7	35			8 407	43	32
		10		9 463	81	39			9 463	11	41			10 508	66	38
	400	4	0.460	4 326	13	15	0.480	0.300	4 326	2	17	0.500	0.334	4 804	11	14
		6		6 489	29	26			6 489	4	28			7 206	24	25
		8		8 652	52	34			8 652	7	36			9 608	43	32
		10		10 814	81	39			10 814	11	41			12 010	66	38
	450	4	0.518	4 866	13	16	0.540	0.338	4 866	2	18	0.563	0.375	5 404	11	15
		6		7 300	29	27			7 300	4	29			8 106	24	25
		8		9 733	52	34			9 733	7	36			10 809	43	33
		10		12 166	81	40			12 166	11	42			13 511	66	39
	500	4	0.575	5 407	13	16	0.600	0.376	5 407	2	18	0.625	0.417	6 005	11	15
		6		8 111	29	27			8 111	4	29			9 007	24	26
		8		10 814	52	35			10 814	7	36			12 010	43	33
		10		13 518	81	40			13 518	11	42			15 012	66	39
	550	4	0.633	5 948	13	17	0.660	0.413	5 948	2	19	0.688	0.459	6 605	11	16
		6		8 922	29	27			8 922	4	29			9 908	24	26
		8		11 896	52	35			11 896	7	37			13 211	43	34
		10		14 870	81	41			14 870	11	43			16 513	66	40
	600	4	0.690	6 489	13	17	0.720	0.451	6 489	2	19	0.750	0.500	7 206	11	16
		6		9 733	29	28			9 733	4	30			10 809	24	27
		8		12 977	52	35			12 977	7	37			14 412	43	34
		10		16 222	81	41			16 222	11	43			18 014	66	40
	650	4	0.748	7 029	13	18	0.780	0.488	7 029	2	20	0.813	0.542	7 806	11	17
		6		10 544	29	28			10 544	4	30			11 709	24	27
		8		14 059	52	36			14 059	7	38			15 612	43	35
		10		17 573	81	41			17 573	11	43			19 516	66	40
	700	4	0.805	7 570	13	18	0.840	0.526	7 570	2	20	0.875	0.584	8 407	11	17
		6		11 355	29	28			11 355	4	30			12 610	24	27
		8		15 140	52	36			15 140	7	38			16 813	43	35
		10		18 925	81	42			18 925	11	44			21 017	66	41
	750	4	0.863	8 111	13	18	0.900	0.563	8 111	2	20	0.938	0.626	9 007	11	17
		6		12 166	29	29			12 166	4	31			13 511	24	28
		8		16 222	52	36			16 222	7	38			18 014	43	35
		10		20 277	81	42			20 277	11	44			22 518	66	41
	800	4	0.920	8 652	13	18	0.960	0.601	8 652	2	20	1.000	0.667	9 608	11	17
		6		12 977	29	29			12 977	4	31			14 412	24	28
		8		17 303	52	37			17 303	7	39			19 215	43	35
		10		21 629	81	42			21 629	11	44			24 019	66	41
	850	4	0.978	9 192	13	19	1.020	0.638	9 192	2	21	1.063	0.709	10 208	11	18
		6		13 788	29	29			13 788	4	31			15 312	24	28
		8		18 384	52	37			18 384	7	39			20 416	43	36
		10		22 981	81	43			22 981	11	45			25 520	66	42
	900	4	1.035	9 733	13	19	1.080	0.676	9 733	2	21	1.125	0.751	10 809	11	18
		6		14 599	29	30			14 599	4	32			16 213	24	28
		8		19 466	52	37			19 466	7	39			21 617	43	36
		10		24 332	81	43			24 332	11	45			27 022	66	42

The mcr WIP PRO fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

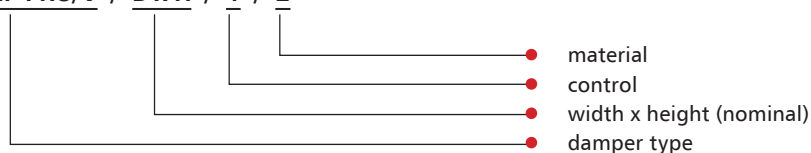
10.7. estimated weights of mcr WIP PRO/V, mcr WIP PRO/V-M dampers [kg]

		height H [mm]										
		263	300	400	500	600	700	800	900	1000	1100	1250
width B [mm]	110	3	3	4	5	7	8	9	10	11	13	14
	150	4	4	6	8	9	11	12	14	16	17	20
	200	5	6	8	10	12	15	17	19	21	23	27
	250	7	8	12	13	16	18	21	24	27	29	33
	300	8	9	12	16	19	22	25	29	32	35	40
	350	9	11	15	18	22	26	30	34	37	41	47
	400	11	12	17	21	25	30	34	38	43	47	54
	500	14	16	21	27	32	37	43	48	54	59	67
	600	16	19	25	32	38	45	51	58	64	71	81
	700	19	22	30	37	45	52	60	68	75	83	94
	800	22	25	34	43	51	60	69	77	86	95	108
	900	25	29	38	48	58	68	77	87	97	106	128

The table shows the weights of dampers with RST-KW1 type trigger control mechanisms or actuators.

10.8. marking

mcr WIP PRO/V / B x H / 1 / 2



1 – control:

- Belimo trigger control mechanism
- BE24** – actuator with no return spring, U = 24 V AC/DC
- BE24-ST** (with the BKNE230-24 option) – actuator with no return spring, U = 24 V AC/DC, with a SBS Control system
- BE230** – actuator with no return spring, U = 230 V AC/DC
- BLE24** – actuator with no return spring, U = 24 V AC/DC
- BLE24-ST** (with the BKNE230-24 option) – actuator with no return spring, U = 24 V AC/DC, with a SBS Control system
- BLE230** – actuator with no return spring, U = 230 V AC/DC

2 – material:

- [no symbol]** – galvanised steel, Zn 275 g/m² coating
- KN** – 1.4404 acid-proof stainless steel

example marking:

mcr WIP PRO/V 400 x 400 BLE24

Louvered fire damper EIS120 with a compact 24 V Belimo actuator with limit switches.

Chapter 12 - power supply and control (p. 141) contains:

- technical specifications and connection diagrams for the trigger control mechanisms supporting the damper,
- location of trigger control mechanisms in relation to the damper - manufacture standards.

**PRODUCT CONFIGURATOR
AT WWW.MERCOR.COM.PL**



- ▶ **E120**
- ▶ **Certificate of constancy of performance 0832-CPR-P0001.**
- ▶ **Dampers certified for compliance with EN 15650.**
- ▶ **Dampers qualified under EN 13501-3 and tested under EN 1366-2.**
- ▶ **Narrow cut-off dampers with a stainless steel curtain with a large active surface.**

11.1. application

The mcr FS fire dampers with a thermal trigger are used in vertical construction partitions to allow the air to flow through. The purpose of the dampers is to maintain the fire resistance of the partition, in which they are installed.

During normal operation, the dampers remain open. The dampers switch to safe mode (close):

- automatically, by the thermal trigger tripping at 72°C,
- manually (in test mode), by pressing the manual release button (trigger control mechanism),
- remotely, by the EM electromagnetic trigger tripping (optional).

Dampers with EM electromagnetic triggers (optional) close as a result of power supply cut-off due to the action of return springs in the damper. The dampers open upon the application of the power supply to trigger terminals and upon manual lifting of the steel curtain.

Dampers with a thermal trigger control mechanism close as a result of the action of the drive spring in the damper, activated by the triggering of the thermal trigger or manually, by pressing the dedicated button on the panel. The dampers are opened manually, by lifting the steel curtain and locking it in the trigger control mechanism clamps.

The mcr FS curtain dampers used in the systems protecting escape routes from smoke remain open during the fire, which ensure the supply of fresh air to escape routes. If the fire develops further, the dampers are automatically closed as a result of thermal trigger tripping to prevent the spreading of fire.

11.2. design

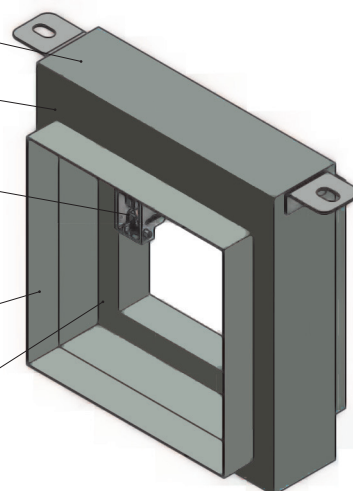
steel cut-off curtain under casing

casing

trigger control mechanism
(thermal trigger - panel at 72°C)

connection pipe

ribbon springs



The mcr FS dampers consist of a double casing with a rectangular cross section, a moving blade in the form of a falling foldable curtain and a trigger control mechanism (panel), which is activated remotely or automatically when the thermal trigger is tripped. The damper casing is made of galvanised steel sheet. The casing total length is 90 mm for rectangular dampers and 92 mm for circular dampers. On two sides, each damper is equipped with a connection piece with the length of 38 mm for rectangular dampers and 60 mm for circular dampers. The damper curtain is made of stainless steel sheet. The steel flat bar on casing exterior is installed to tighten the device after its activation.

The mechanism of curtain the mcr FS dampers, which moves the curtain, consists of two ribbon springs, placed inside of the damper sides, along its height. If the allowed temperature is exceeded in the casing, the trigger control mechanism is triggered and the spring-powered curtain is lowered. It is possible to equip the damper with an EM mechanism for remote control.

11.3. versions

11.3.1. mcr FS I/F – cut-off fire damper for E120(ve ho i↔o) rigid walls and ceilings



The mcr FS I/F damper is suitable for installation in rigid walls.

The cut-off curtain of stainless steel falls when the temperature of 72°C is exceeded or if the voltage is removed from the EM trigger control mechanism (optional).

The damper may be equipped with a MSSP curtain closing limit switch or a MSDP curtain closing and opening limit switch.

11.3.2. mcr FS DWFX-C – cut-off damper for E120(ve i↔o) lightweight walls



The mcr FS DWFX-C damper is suitable for installation in newly constructed lightweight walls.

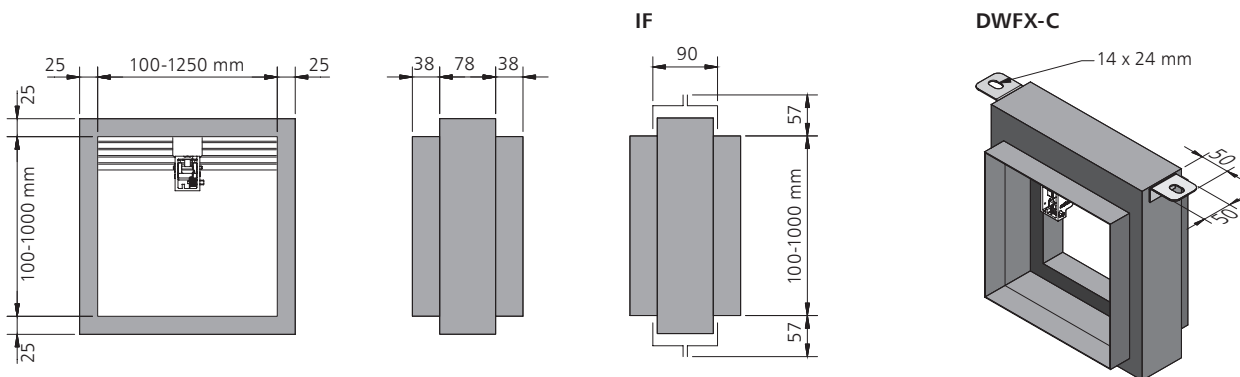
The cut-off curtain of stainless steel falls when the temperature of 72°C is exceeded or if the voltage is removed from the EM trigger control mechanism (optional).

The damper may be equipped with a MSSP curtain closing limit switch or a MSDP curtain closing and opening limit switch.

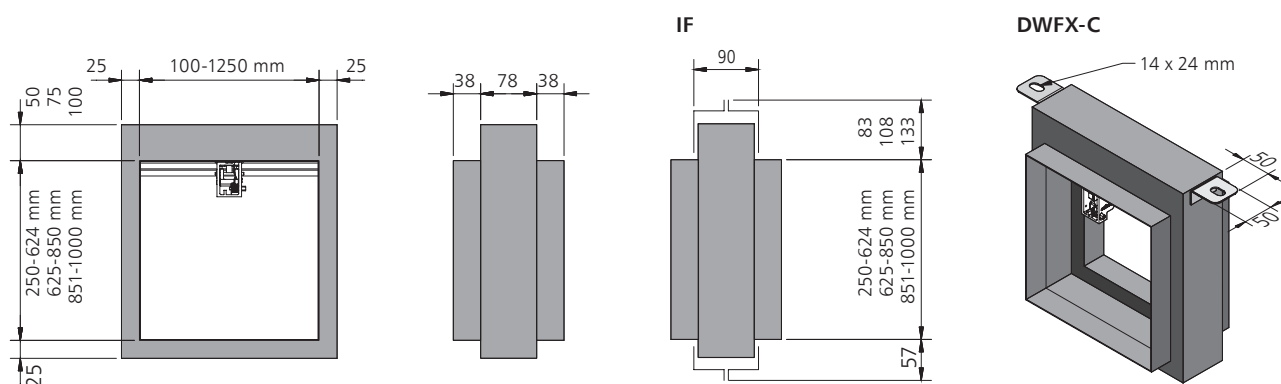
11.4. dimensions

The mcr FS transfer dampers are manufactured in three series:

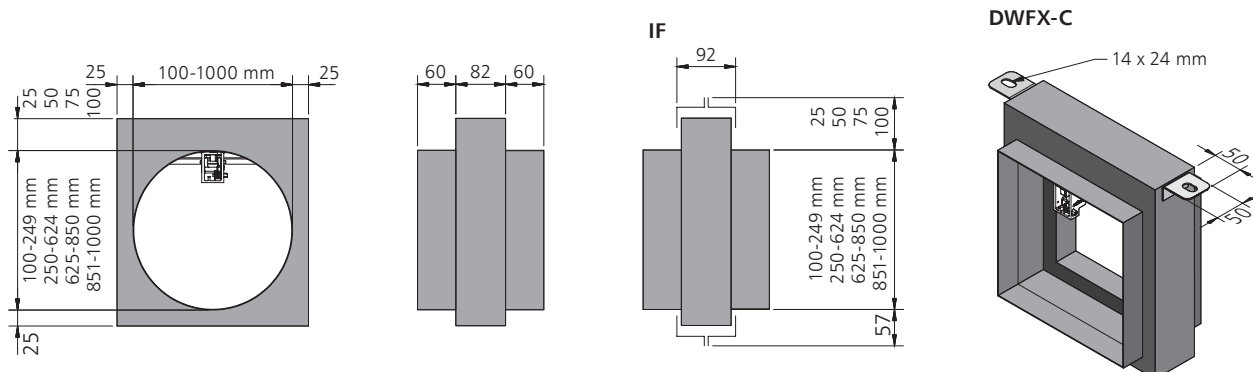
101 series (rectangular dampers) with a curtain partly in the air stream – from 100x100 mm to 1250x1000 mm.



201 series (rectangular dampers) with a curtain outside the air stream – from 100x250 mm to 1250x1000 mm.



301 series (circular dampers) with a curtain outside the air flow – from D100 to D1000 mm.



Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (in 1 mm increments in the given range).

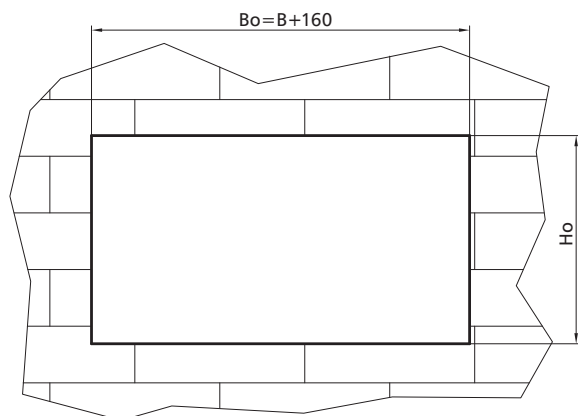
11.5. installation

The mcr FS I/F dampers are E120(ve i↔o)-rated if installed in concrete partitions, made of full bricks or cellular concrete blocks with the thickness of at least 110 mm and concrete ceilings with the thickness of at least 150 mm.

The mcr FS DWFX-C dampers are E120(ve i↔o)-rated if installed in lightweight walls of cardboard-plaster panels, on a steel framework with the thickness of at least 125 mm.

11.5.1. preparation of installation openings

version mcr FS I/F

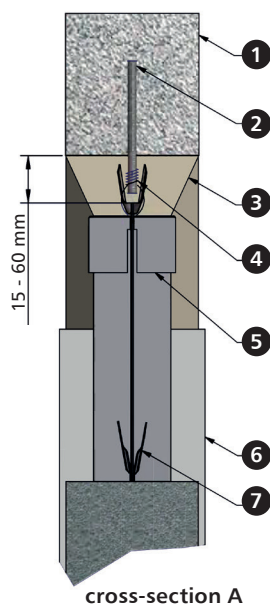


$H_o = H + 160^*$ for mcr FS 101 I/F
 $H_o = H + 180^*$ for mcr FS 201 I/F 250-624 mm
 $H_o = H + 205^*$ for mcr FS 201 I/F 625-850 mm
 $H_o = H + 230^*$ for mcr FS 201 I/F 851-1000 mm
 * applies also to mcr FS 301 I/F

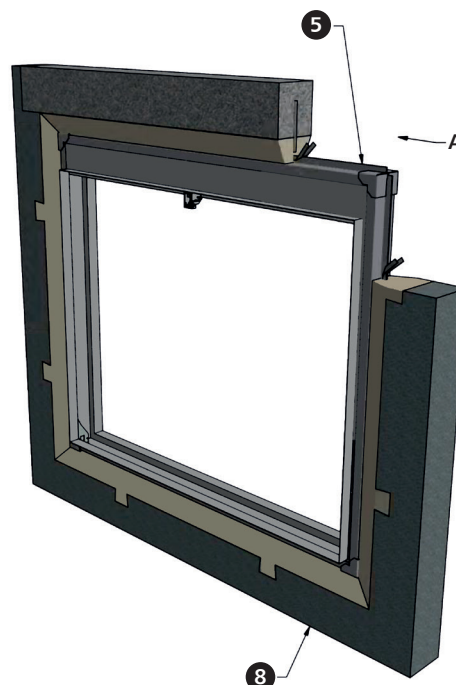
version mcr FS DWFX-C

The dampers are installed during the construction of the plaster-cardboard panel wall (the damper is embedded in the wall of panels).

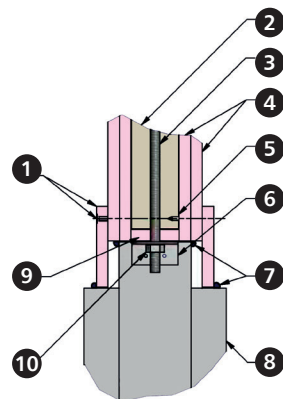
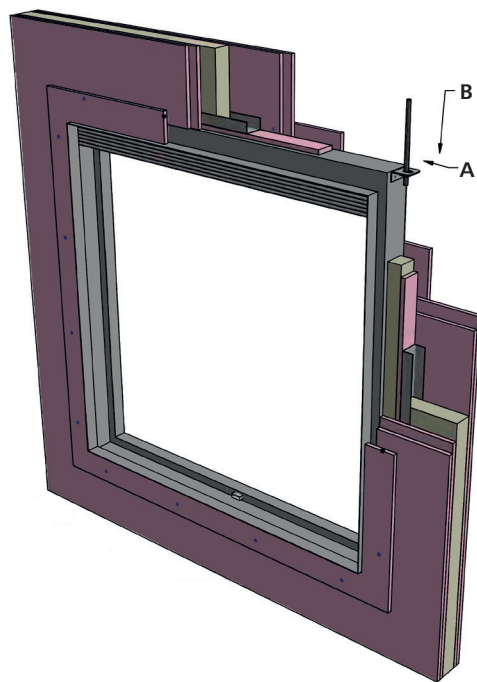
11.5.2. sample installation of mcr FS I/F dampers



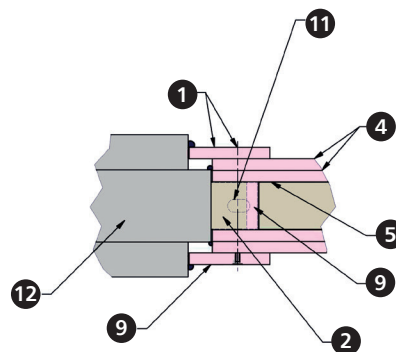
cross-section A



1. lintel
2. steel anchors $\varnothing$ min. 6.5 mm
3. 4:1 sand-cement mortar
4. steel wire $\varnothing$ 1.5 mm binding the anchors with frame runners
5. installation frame
6. fire damper mcr FS
7. frame runners - for bending sideways and downwards
8. rigid partition

11.5.3. sample installation of mcr FS DWFX-C dampers


cross-section A



cross-section B

1. circumferential band of 12.5 x 100 mm plaster-cardboard panels around the damper bolted to the plaster-cardboard wall (300 mm), to the UD50 profile
2. mineral wool 33 kg/m³
3. rod M10 (pin)
4. 2 x 12.5 mm two-sided plaster-cardboard panels
5. UD50 profile
6. angle bar welded to both ends of the casing
7. low-expansion intumescent compound around the damper, on both sides
8. damper casing
9. 12.5 mm trim
10. nut M10
11. angle bar with an opening
12. fire damper mcr FS

11.5.4. sample installation of mcr FS dampers with duct covers

NOTE: **Minimum wall thickness: 155 mm.**

B x H damper dimensions

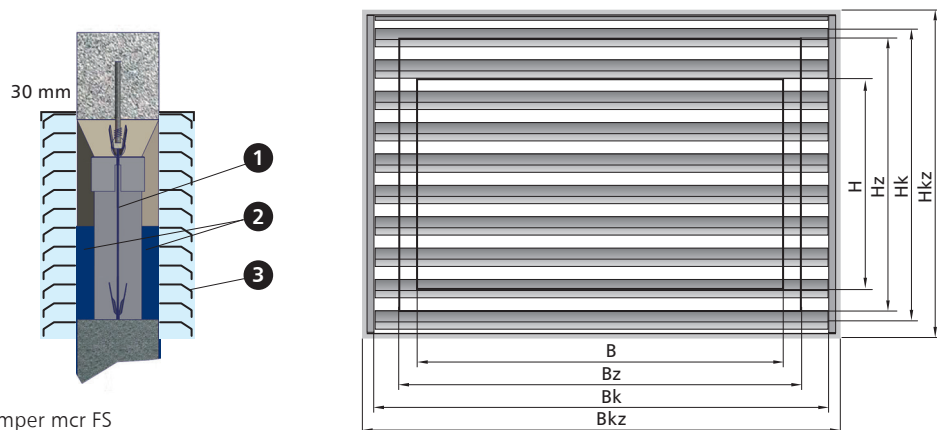
Bz x Hz damper external dimensions

Bk x Hk duct cover dimensions

Bkz x Hkz duct cover external dimensions

type\size	H	Hz	Hk	Hkz
mcr FS 101 I/F	100-1000	H+114	H+160	H+210
mcr FS 201 I/F	250-624	H+140	H+180	H+230
mcr FS 201 I/F	625-850	H+165	H+205	H+255
mcr FS 201 I/F	851-1000	H+190	H+230	H+280

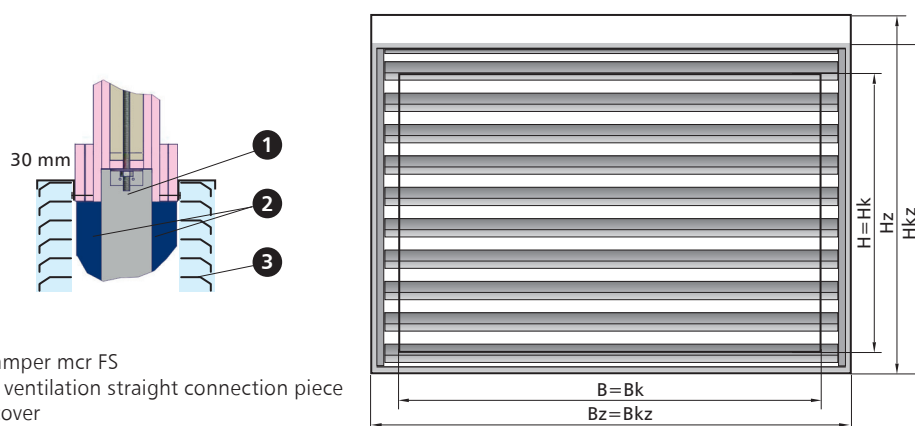
type\size	B	Bz	Bk	Bkz
mcr FS 101 I/F	100-1000	B+114	B+160	B+210
mcr FS 201 I/F	100-1000	B+114	B+160	B+210



1. fire damper mcr FS
2. duct - ventilation straight connection piece
3. duct cover

type\size	H	Hz	Hk	Hkz
mcr FS 101 / DWFX-C	100-1000	H+50	H	H+50
mcr FS 201 / DWFX-C	250-624	H+75	H	H+50
mcr FS 201 / DWFX-C	625-850	H+100	H	H+50
mcr FS 201 / DWFX-C	851-1000	H+125	H	H+50

type\size	B	Bz	Bk	Bkz
mcr FS 101 / DWFX-C	100-1000	B+50	B	B+50
mcr FS 201 / DWFX-C	100-1000	B+50	B	B+50



1. fire damper mcr FS
2. duct - ventilation straight connection piece
3. duct cover

11.6. technical parameters

damper active surface in relation to the B and H nominal and Bz and Hz total dimensions

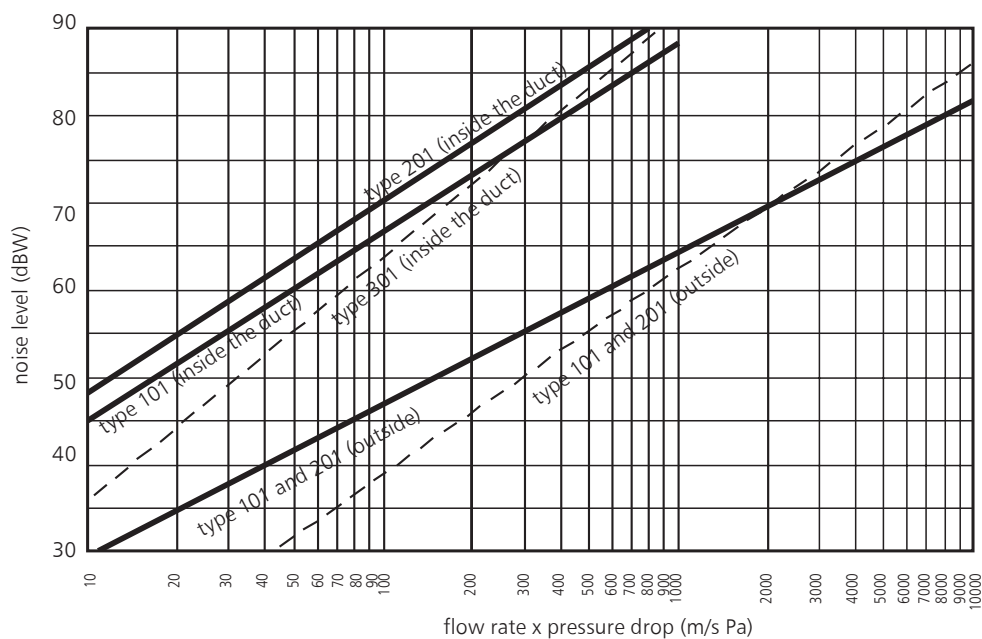
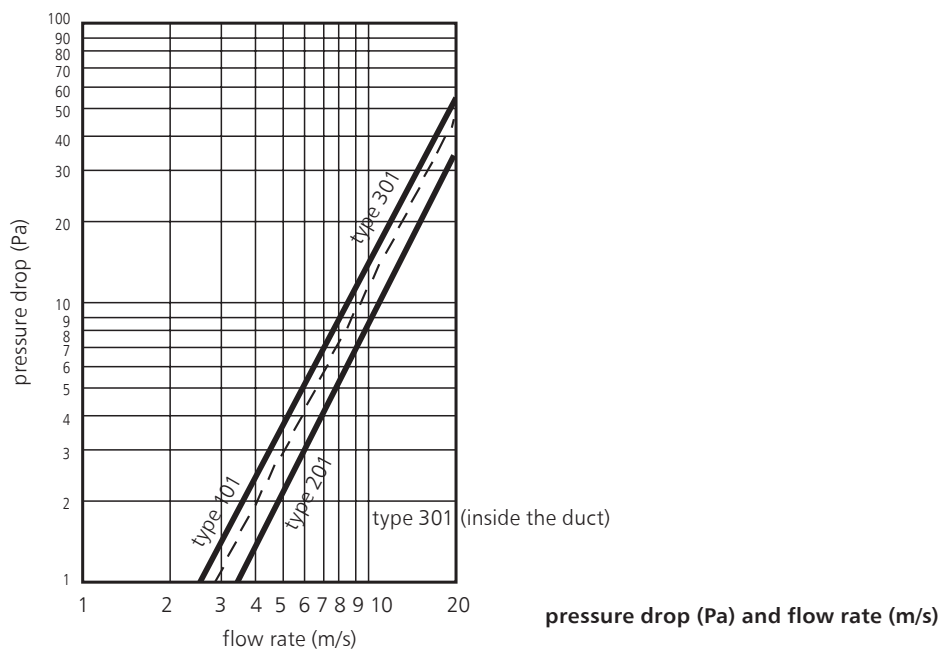
101 series														
H \ B	100	200	300	400	500	600	700	800	900	1000	1100	1200	1250	
100	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	150
200	0.02	0.04	0.06	0.08	0.10	0.12	0.14	0.16	0.18	0.20	0.22	0.24	0.25	250
300	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	0.30	0.33	0.36	0.37	350
400	0.03	0.07	0.11	0.15	0.19	0.23	0.27	0.31	0.35	0.39	0.43	0.47	0.49	450
500	0.04	0.09	0.14	0.19	0.24	0.29	0.34	0.39	0.44	0.49	0.54	0.59	0.62	550
600	0.05	0.11	0.17	0.23	0.29	0.35	0.41	0.47	0.53	0.59	0.65	0.71	0.74	650
700	0.05	0.12	0.19	0.26	0.33	0.40	0.47	0.54	0.61	0.68	0.75	0.82	0.85	750
800	0.04	0.12	0.20	0.28	0.36	0.44	0.52	0.60	0.68	0.76	0.84	0.92	0.96	850
900	0.04	0.13	0.22	0.31	0.40	0.49	0.58	0.67	0.76	0.85	0.94	1.03	1.07	950
1000	0.03	0.13	0.23	0.33	0.43	0.53	0.63	0.73	0.83	0.93	1.03	1.13	1.18	1050
	150	250	350	450	550	650	750	850	950	1050	1150	1250	1300	Bz \ Hz

201 series														
H \ B	100	200	300	400	500	600	700	800	900	1000	1100	1200	1250	
250	0.03	0.05	0.08	0.10	0.13	0.15	0.18	0.20	0.23	0.25	0.28	0.30	0.31	325
300	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	0.30	0.33	0.36	0.38	375
400	0.04	0.08	0.12	0.16	0.20	0.24	0.28	0.32	0.36	0.40	0.44	0.48	0.50	475
500	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.63	575
600	0.06	0.12	0.18	0.24	0.30	0.36	0.42	0.48	0.54	0.60	0.66	0.72	0.75	675
700	0.07	0.14	0.21	0.28	0.35	0.42	0.49	0.56	0.63	0.70	0.77	0.84	0.88	800
800	0.08	0.16	0.24	0.32	0.40	0.48	0.56	0.64	0.72	0.80	0.88	0.96	1.00	900
900	0.09	0.18	0.27	0.36	0.45	0.54	0.63	0.72	0.81	0.90	0.99	1.08	1.13	1025
1000	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.25	1125
	150	250	350	450	550	650	750	850	950	1050	1150	1250	1300	Bz \ Hz

301 series										
D	100	200	300	400	500	600	700	800	900	1000
active surface	0.01	0.03	0.07	0.13	0.20	0.28	0.38	0.50	0.64	0.79
Hz	150	250	375	475	575	675	800	900	1025	1125
Bz	150	250	350	450	550	650	750	850	950	1050

The mcr FS fire damper selection program is available at www.mercor.com.pl, in the Architect and Designer Zone.

11.6.1. flow characteristics



flow rate (m/s) x pressure drop (Pa) and noise level (dBW)

acoustic power spectrum
for mcr FS dampers (outside)

frequency	Hz	63	125	250	500	1k	2k	3k	4k
typ 101	dB	10	7	3	9	13	20	30	33
typ 201	dB	10	7	3	9	13	20	30	33
typ 301	dB	13	10	3	7	11	12	26	42

acoustic power spectrum
for mcr FS dampers (inside the duct)

frequency	Hz	63	125	250	500	1k	2k	3k	4k
typ 101	dB	4	12	16	18	22	20	32	38
typ 201	dB	4	11	17	19	22	30	33	40
typ 301	dB	4	10	16	18	21	24	30	38

11.7. weights of mcr FS curtain dampers

approximate weights of dampers [kg]																			
active opening dimensions □ Ø(mm)	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
101 series/DWFX-C	1.6	2.1	2.8	3.5	4.2	5.0	5.7	6.9	7.5	8.6	9.5	10.9	12.0	13.1	13.8	15.2	16.7	18.1	19.0
101 series/ I/F	3.8	4.6	5.7	6.8	8.0	9.2	10.7	11.8	12.9	14.1	15.8	17.9	19.1	20.2	21.4	23.3	25.2	27.4	29.2
201 series/DWFX-C	-	-	-	4.1	4.6	5.4	6.0	7.1	8.0	9.3	10.5	12.1	12.7	14.4	16.0	17.5	19.0	20.5	22.0
201 series/ I/F	-	-	-	7.4	8.5	9.6	10.4	12.6	13.8	15.3	16.8	18.0	20.3	21.7	23.6	25.5	27.6	29.8	31.0
301 series/DWFX-C	2.3	3.0	4.0	5.4	6.5	7.6	8.8	10.2	11.7	13.2	14.9	16.9	18.7	20.5	22.4	24.5	26.7	28.8	31.0
301 series/ I/F	4.4	5.5	6.9	9.0	10.4	11.7	13.6	15.5	16.5	18.5	20.3	22.2	24.5	27.8	30.4	32.8	35.2	38.9	42.0

11.8. options

11.8.1. EM trigger control mechanism

mechanism operation description:

The EM mechanism is designed to operate mcr FS transfer dampers. After the removal of the power supply voltage the mechanism lock is released, which causes in the steel cord movement and damper operation. The mechanism is not equipped with a drive (return) spring. That spring is installed directly on the damper.

versions:

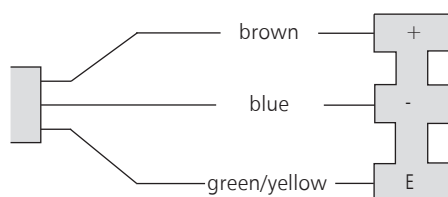
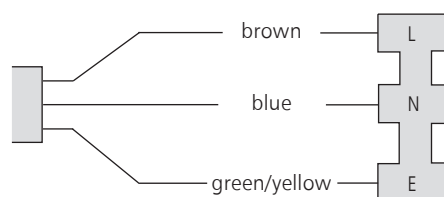
- EM24 – mechanism supplied with the voltage of 24 V AC/DC – released by the removal of the power supply voltage
- EM240 – mechanism supplied with the voltage of 230 V AC – released by the removal of the power supply voltage

**specifications**

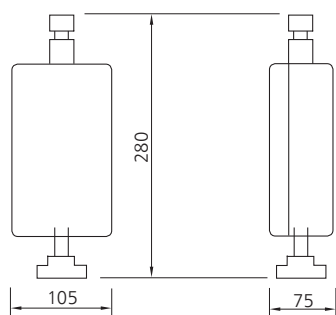
	EM24	EM240
power supply voltage	24 V AC / DC	230 V AC 50 Hz
rated current	120 m A	10 m A
electrical connection	wire 3 x 0.75 mm ²	
weight	1.6 kg	1.6 kg

electrical diagram of the mechanism**mechanism power supply**

brown lead – „+“ supply or „L“
blue lead – mass „-“ or „N“
green-yellow lead - ground „E“

24 V AC/DC**230 V AC**

mechanism dimensions



11.8.2. MSSP and MSDP independent limit switches

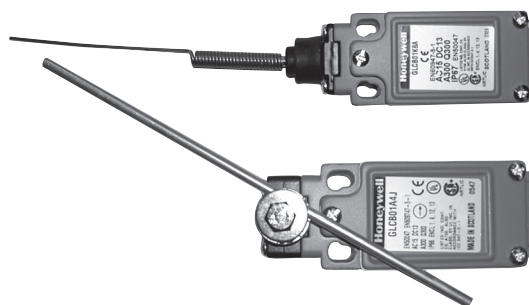
operation description:

The limit switch is used to signal the position of the fire damper partition.

versions:

MSSP – single switch – closed partition damper signaling.

MSDP – assembly of two switches – closed and open partition damper signaling.



specifications

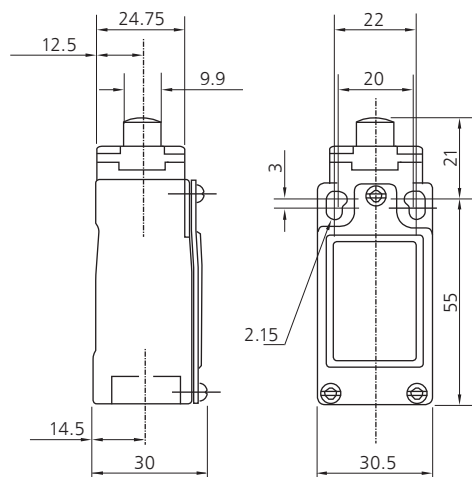
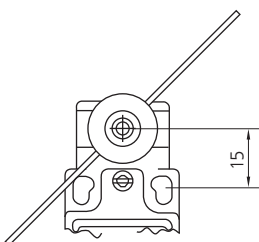
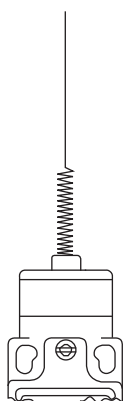
MSSP and MSDP limit switch	1NO/1NC SPDT (switching contact)
limit switch operating temperature	-25°C do +85°C
service durability	5 000 000 cycles
voltage	300 V AC i 250 V DC
current	10 A
head version	„cat whiskers” or „steel rod”
ingress protection rating	IP 66

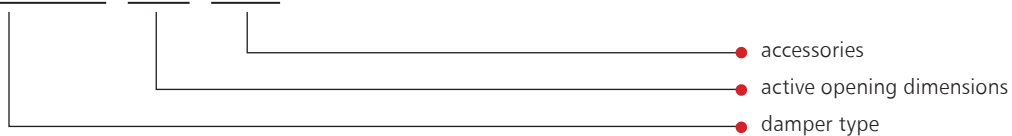
electrical diagram of the mechanism

MSSP – single limit switch. closed damper signaling:

MSDP – two limit switches:

- contacts 13 and 14 NO (normally open)
- contacts 21 and 22 NC (normally closed)



mcr FS 201 / IF / B x H / MSSP**type:**

mcr FS 101 - square or rectangular damper with a curtain partly in the air stream

mcr FS 201 - square or rectangular damper with a curtain outside the air stream

mcr FS 301 - circular damper with a curtain outside the air stream

+ IF - installation frame for rigid partitions

+ DWFX-C - frame for installation before the assembly of dry partition walls

accessories:

MSSP - single limit switch (closed damper signaling)

MSDP - two single limit switches (closed and open damper signalling)

EM24 - electromagnetic trigger (power supply voltage of 24 V AC/DC)

EM240 - electromagnetic trigger (power supply voltage of 230 V AC)

MKPZ - masking cover x 1 front, x 2 front and rear

12.1. cooperation with smoke exhaust/cut-off dampers - drive quick selection table

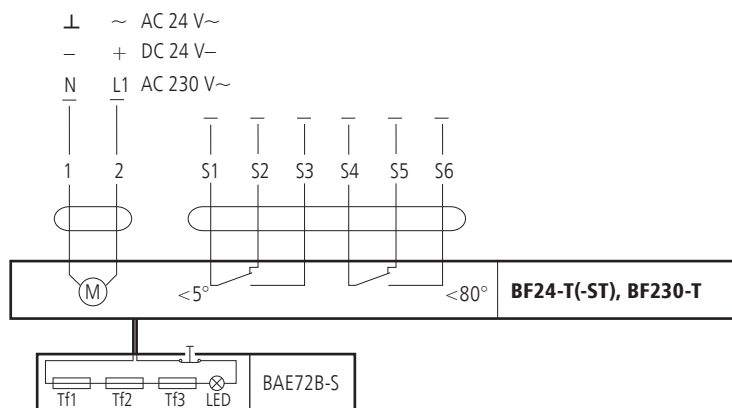
	mcr FID S/S c/P	mcr FID S/S p/P mcr FID S/S p/O	mcr FID S/V p/P mcr FID S/V-M p/P	mcr FID PRO	mcr WIP/S	mcr WIP/T	mcr WIP/T-G	mcr WIP/V mcr WIP/V-M	mcr WIP PRO/S	mcr WIP PRO/V mcr WIP PRO/V-M
BF24-T (-ST)		X			X	X			X	
BF230-T		X			X	X			X	
BFL24-T (-ST)	X	X		X	X	X			X	
BFL230-T	X	X		X	X	X			X	
BFN24-T (-ST)	X	X			X	X			X	
BFN230-T	X	X			X	X			X	
BE24			X			X		X		X
BE230			X			X		X		X
BLE24			X			X		X		X
BLE230			X			X		X		X
EXBF24-T	X	X		X	X	X			X	
EXBF230-T	X	X		X	X	X			X	
BF24TL-T (-ST)	X	X		X	X	X			X	
RST	X	X		X						
RST/WK1	X	X		X						
RST/WK2	X	X		X						
RST-KW1/S	X	X		X						
RST-KW1/S/WK2	X	X		X	X	X	X		X	
RST-KW1/24I	X	X		X						
RST-KW1/24P	X	X		X					X	
RST-KW1/230I	X	X		X						
RST-KW1/230P	X	X		X					X	
BF24 (-ST)							X			
BF230							X			
BFL24 (-ST)							X			
BFL230							X			
BFN24 (-ST)							X			
BFN230							X			

12.2. actuators

12.2.1. BF electric actuators

Specifications	BF24 (BF24-T)	BF230 (BF230-T)
power supply	AC 24 V 50/60 Hz DC 24 V	AC 220-240 V 50/60 Hz
power demand: - for spring tensioning - for holding	7 W 2 W	8 W 3 W
sizing (apparent power)	10 VA	11 VA
protection class	III	II
ingress protection rating	IP 54	IP 54
auxiliary circuit breaker:	2 x EPU 3 (0.5) A 250 V	2 x EPU 3 (0.5) A 250 V~
- activation position	5°, 80°	5°, 80°
torque: - motor - return spring	18 Nm 12 Nm	18 Nm 12 Nm
cable connection: - motor (length: 0.9 m) - auxiliary circuit breaker	2 x 0.75 mm ² 6 x 0.75 mm ²	2 x 0.75 mm ² 6 x 0.75 mm ²
movement time (0-90°): - motor - return spring	120 s ~16 s	120 s ~16 s
operating temperature range	-30 ... +50°C	-30 ... +50°C
sound intensity level: - motor - return spring	max 45 dB (A) ~63 dB (A)	max 45 dB (A) ~63 dB (A)

electrical diagram of the BF...-T series actuator:



note: 24 V connection through a safety transformer.

To disconnect the 230 V actuator from the mains, the gap of at least 3 mm between the contacts (when off) is required in the switch.

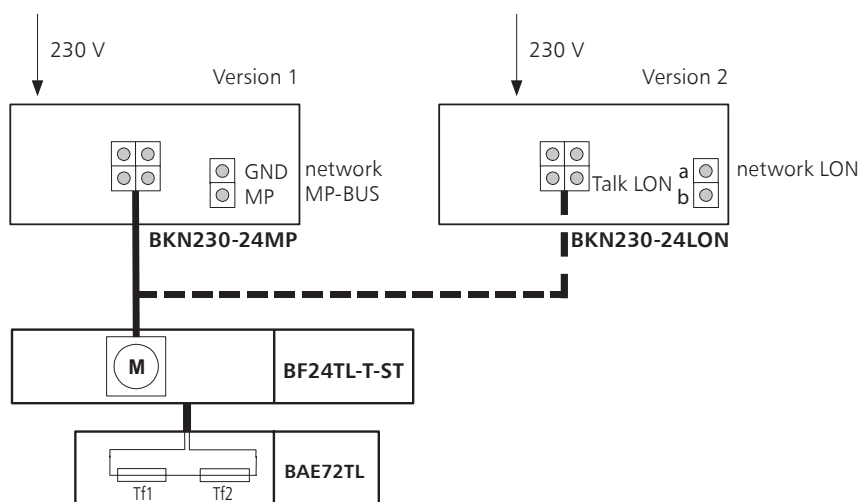
It is possible to connect further actuators in parallel.

Check the power consumption.

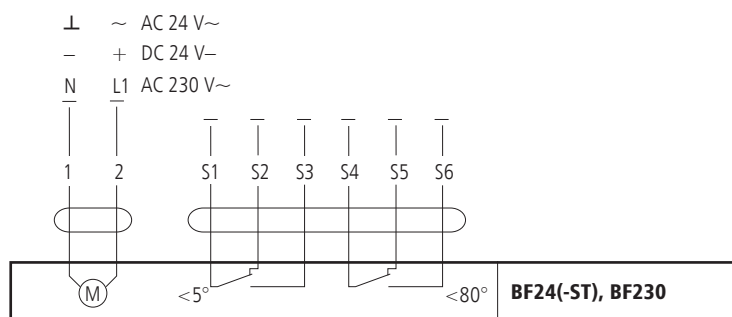
note:

The location of the actuator limit switches is shown for the no voltage position.

electrical diagram of the BF24TL-T(-ST) and BF24TL(-ST) actuator:



electrical diagram of the BF series actuator:



note: 24 V connection through a safety transformer.

To disconnect the 230 V actuator from the mains, the gap of at least 3 mm between the contacts (when off) is required in the switch.

It is possible to connect further actuators in parallel.

Check the power consumption.

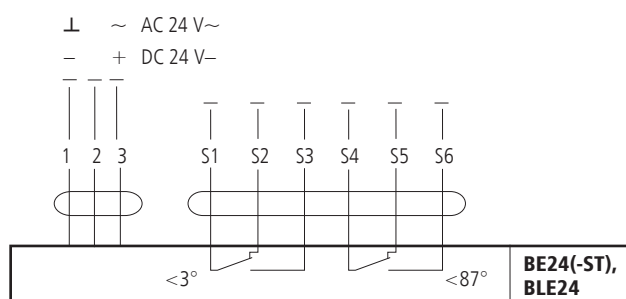
note:

The location of the actuator limit switches is shown for the no voltage position.

12.2.2. BE, BLE electric actuators

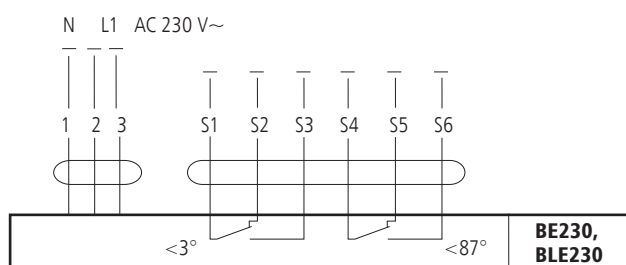
Specifications	BE24. BE24-ST	BE230	BLE24	BLE230
power supply	AC 24 V 50/60 Hz DC 24 V	AC 230 V 50/60 Hz	AC 24 V 50/60 Hz DC 24 V	AC 230 V 50/60 Hz
power demand: - in movement - for holding	12 W 0.5 W	8 W 0.5 W	7.5 W 0.5 W	5 W 0.5 W
sizing (apparent power)	18 VA	15 VA	9 VA	12 VA
protection class	III	II	III	II
ingress protection rating	IP 54	IP 54	IP 54	IP 54
auxiliary circuit breaker:	2 x SPDT 6 (1.5) A AC 250 V	2 x SPDT 6 (1.5) A AC 250 V	2 x EPU 3 (0.5) A 250 V	2 x EPU 3 (0.5) A 250 V~
- activation position	5°, 80°	5°, 80°	5°, 80°	5°, 80°
torque - motor	40 Nm	40 Nm	15 Nm	15 Nm
movement time (0-90°) - motor	< 60 s for 90°	< 60 s for 90°	< 30 s for 90°	< 30 s for 90°
operating temperature range	-30 ... +50°C	-30 ... +50°C	-30 ... +50°C	-30 ... +50°C
sound intensity level	~62 dB (A)	~62 dB (A)	~62 dB (A)	~62 dB (A)

electrical diagram of the BE, BLE series actuator:



note:

The actuator operation control requires routing three wire system to it. The actuator rotation sense is changed by the application of the power supply voltage to the terminal 2 or 3, depending on the desired direction.



note: 24 V connection through a safety transformer.

To disconnect the 230 V actuator from the mains, the gap of at least 3 mm between the contacts (when off) is required in the switch.

It is possible to connect further drives in parallel. Check the power consumption.

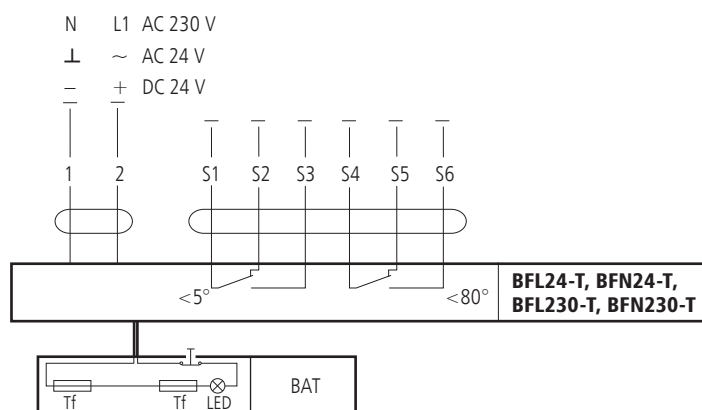
note:

The location of the actuator limit switches is shown for the no voltage position.

12.2.3. BFL, BFN electric actuators

Specifications	BFL24 (BFL24-T)	BFL230 (BFL230-T)	BFN24 (BFN24-T)	BFN230 (BFN230-T)
power supply	AC 24 V 50/60 Hz DC 24 V	AC 220-240 V 50/60 Hz	AC 24 V 50/60 Hz DC 24 V	AC 220-240 V 50/60 Hz
power demand: - for spring tensioning - for holding	2.5 W 0.7 W	3.5 W 1.1 W	4 W 1.4 W	5 W 2.1 W
sizing (apparent power)	4 VA	6.5 VA	6 VA	10 VA
protection class	III	II	III	II
ingress protection rating	IP 54	IP 54	IP 54	IP 54
auxiliary circuit breaker:	2 x SPDT 3 (0.5) A AC 250 V	2 x SPDT 3 (0.5) A AC 250 V	2 x EPU 3 (0.5) A 250 V	2 x EPU 3 (0.5) A 250 V
- activation position	5°, 80°	5°, 80°	5°, 80°	5°, 80°
torque: - motor - return spring	4 Nm 3 Nm	4 Nm 3 Nm	9 Nm 7 Nm	9 Nm 7 Nm
cable connection: - motor (length: 0.9 m) - auxiliary circuit breaker	2 x 0.75 mm ² 6 x 0.75 mm ²	2 x 0.75 mm ² 6 x 0.75 mm ²	2 x 0.75 mm ² 6 x 0.75 mm ²	2 x 0.75 mm ² 6 x 0.75 mm ²
movement time (0-90°): - motor - return spring	< 60 s ~20 s	< 60 s ~20 s	< 60 s ~20 s	< 60 s ~20 s
operating temperature range	-30 ... +55°C	-30 ... +55°C	-30 ... +55°C	-30 ... +55°C
sound intensity level: - motor - return spring	max 43 dB (A) ~62 dB (A)	max 43 dB (A) ~62 dB (A)	max 55 dB (A) ~67 dB (A)	max 55 dB (A) ~67 dB (A)

electrical diagram of the BFL...-T, BFN...-T series actuator:



note: 24 V connection through a safety transformer.

To disconnect the 230 V actuator from the mains, the gap of at least 3 mm between the contacts (when off) is required in the switch.

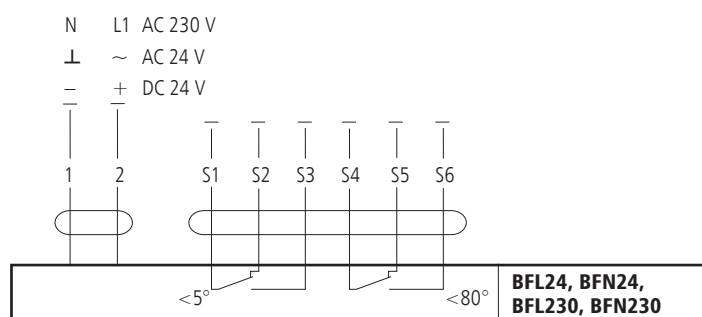
It is possible to connect further actuators in parallel.

Check the power consumption.

note:

The location of the actuator limit switches is shown for the no voltage position.

electrical diagram of the BFL, BFN series actuator:



note: 24 V connection through a safety transformer.

To disconnect the 230 V actuator from the mains, the gap of at least 3 mm between the contacts (when off) is required in the switch.

It is possible to connect further actuators in parallel.

Check the power consumption.

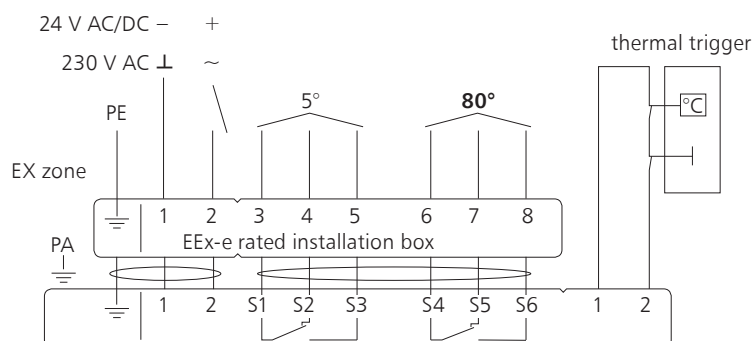
note:

The location of the actuator limit switches is shown for the no voltage position.

12.2.4. EXBF actuators

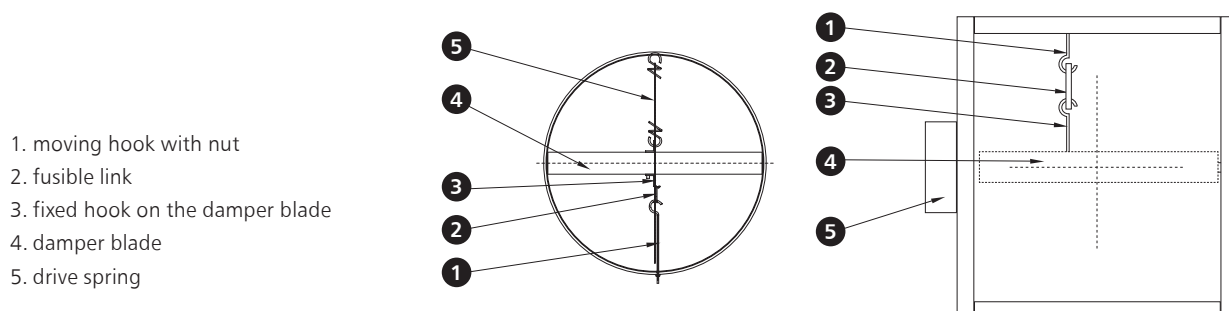
Specifications	EXBF B 001 2 ...0 N 000	EXBF A 001 2 ...0 N 000
zone	1, 2, 21, 22	
ATEX-rating	II 2 GD EEx d IIC T6	
power supply	24 V AC $\pm 20\%$ 50/60 Hz / 24 V DC -10/+20%	230 V AC $\pm 14\%$ 50/60 Hz
power demand: - for spring tensioning - for holding	7 W 2 W	8 W 3 W
sizing (apparent power)	10 VA	11 VA
ingress protection rating	IP 66	IP 66
auxiliary circuit breaker: - activation position	2 x SPDT 6 A (3) max 250 V AC 5°, 80°	2 x SPDT 6 A (3) max 250 V AC 5°, 80°
torque: - motor - return spring	18 Nm 12 Nm	18 Nm 12 Nm
movement time (90°C): - motor - return spring	150 s ~20 s	150 s ~20 s
ambient temperature	-30 ... +50°C	-30 ... +50°C

connection diagram for EXBF and EXBF...-T actuators:



12.3. RST trigger control mechanisms

In the RST version the WK1 limit switches are independent units installed inside the fire damper casing. The thermal trigger is on the damper blade. The driving spring is installed on the damper blade or in a guard box on its casing.



Independent limit switches – RST version

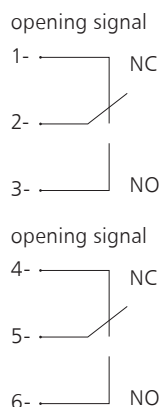
WK1 – limit switch (closed damper blade signal)

WK2 – limit switch (closed/open damper blade signal)

Switch specifications

WK1 and WK2 limit switch	1xNO/1xNC SPDT 5 A, 230 V AC
limit switch operating temperature	-25 ... +85°C
casing	plastic

electric connection diagram of WK1 and WK2 limit switches



note:

When the damper blade closes, the closed indication limit switch is switched over (contacts 2-3 are closed).

12.4. RST-KW1 mechanisms

	RST-KW1/S	RST-KW1/S/WK2	RST-KW1/24I	RST-KW1/24P	RST-KW1/230I	RST-KW1/230P
rated voltage	–	–	24 V - 48 V DC	24 V - 48 V DC	230 AC	230 AC
power consumption	–	–	3.5 W	1.6 W	2 W	2 W
thermal trigger	74°C (optionally 95°C)					
connections - trigger	–	–	wire 0.6 m, 2 x 0.5 mm ²			
connections - limit switches	–	wire 0.6 m, 6 x 0.5 mm ²				
limit switch	–	2 x NO/NC 5A. 230 V AC				
movement time	max. 2 s					
mechanism operation control (closing)	–	–	voltage application „pulse“	voltage removal „break“	voltage application „pulse“	voltage removal „break“
mechanism operation control (opening)	manual	manual	manual	manual	manual	manual
pulse width	max. 1 s					

description of electrical connections:

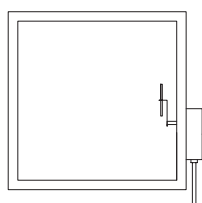
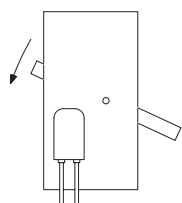
RST-KW1 mechanism power supply	closing limit switch	opening limit switch
wire number: 1-2	wire number: 3-4 – NO (normally open)	wire number: 6-7 – NO (normally open)
	wire number: 4-5 – NC (normally closed)	wire number: 7-8 – NC (normally closed)

12.5. manufacture standards

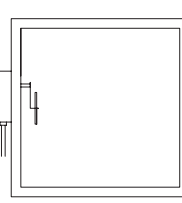
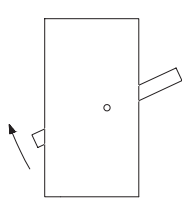
damper type	description	standard	option
mcr FID S/S c/P	right damper	X	
	inverse damper		X
	left damper		X
	actuator normal to the axis flow	X	
	actuator along the axis flow		
mcr FID S/S p/P mcr FID S/V p/P	right damper	X	
	inverse damper		X
	left damper		X
	actuator normal to the axis flow	X	
	actuator along the axis flow		X
mcr FID S/S p/O	right damper	X	
	inverse damper		
	left damper		
	actuator normal to the axis flow	X	
	BF actuator along the v (exception)	X	
	actuator along the axis flow		X
mcr FID PRO	right damper	X	
	inverse damper		
	left damper		
	actuator normal to the axis flow	X	
	actuator along the axis flow		X
mcr WIP	right damper		
	inverse damper		X
	left damper	X	
	actuator normal to the axis flow	X	
	actuator along the axis flow		
mcr WIP PRO	right damper		X
	inverse damper		X
	left damper	X	
	actuator normal to the axis flow	X	
	actuator along the axis flow		

mcr FID S/S c/P damper

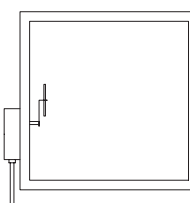
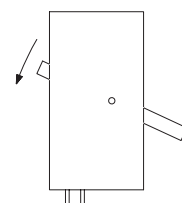
right damper standard



inverse damper
(wires downward)

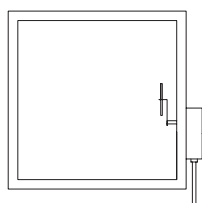
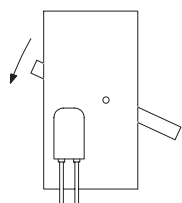


left damper

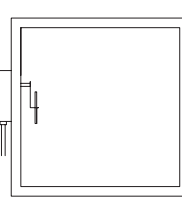
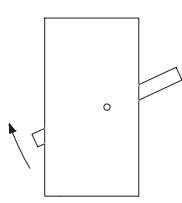


mcr FID S/S p/P, mcr FID S/S p/O, mcr FID S/V p/P damper

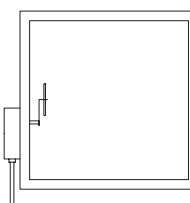
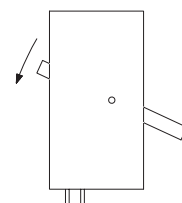
right damper standard



inverse damper
(wires downward)

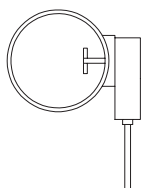
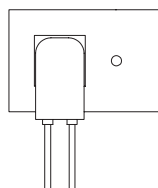


left damper

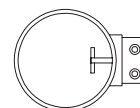
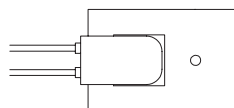


mcr FID PRO/S damper

right damper
standard

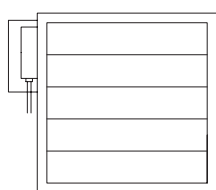


actuator along the axis flow

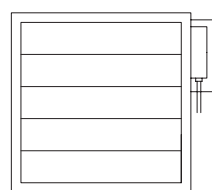
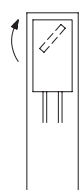


mcr WIP/S, mcr WIP/V, mcr WIP/V-M, mcr WIP/T, mcr WIP/T-G damper

left damper
standard

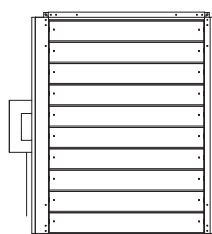
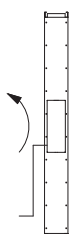


inverse damper
(wires downward)

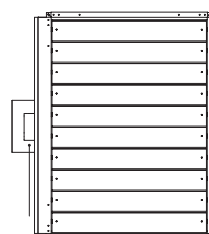
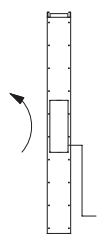


mcr WIP PRO/S, mcr WIP PRO/V, mcr WIP PRO/V-M damper with an actuator

left damper
standard



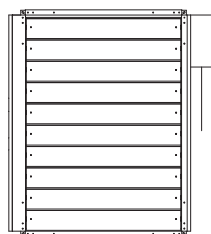
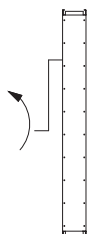
inverse damper
reversed cable outlet



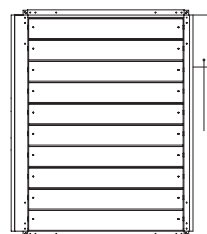
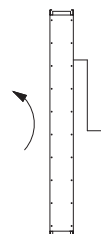
installation in reversed horizontal and vertical position available

mcr WIP PRO/S, mcr WIP PRO/V, mcr VIP PRO/V-M damper with RST-KW1 mechanism

left damper
standard



inverse damper
reversed cable outlet



installation in reversed horizontal and vertical position available